Appendix A

Air Quality and Greenhouse Gas Modeling

Crawford Canyon Air Quality Emissions Summary

Regional	ROG	NOX	CO	SO2	PM10 Total	PM2.5 Total
Crawford Canyon Park						
Clearing and Grubbing	2.89	27.41	19.02	0.05	3.92	2.53
Grading	3.82	40.54	25.93	0.07	4.50	2.92
Paving and Construction	4.71	46.35	32.87	0.08	2.37	1.96
Landscaping	0.25	2.73	4.49	0.01	0.45	0.20
Sidewalk Extension						
Site Preparation	0.71	8.22	6.10	0.01	0.71	0.37
Demolition	1.24	10.94	15.42	0.03	0.82	0.60
Utility Relocation	1.07	8.09	7.10	0.03	0.43	0.31
Storm Drain Construction	1.10	8.14	10.95	0.02	0.69	0.42
Sidewalk Construction (Newport)	0.53	4.54	5.48	0.01	0.45	0.26
Sidewalk Construction (Crawford)	0.57	4.79	5.69	0.01	0.46	0.27
Traffic Signal Modification	1.13	10.90	8.82	0.03	0.73	0.47
Paving	0.78	7.64	10.30	0.02	0.57	0.41
Overlapping Phases						
Park Landscaping + Sidewalk Site Prep + Sidewalk Demo	2.20	21.90	26.02	0.05	1.98	1.17
Sidewalk Utility Relocation + Storm Drain Construction	2.17	16.23	18.05	0.05	1.12	0.73
Sidewalk Utility Relocation + Storm Drain Construction + Sidewalk Construction (Newport)	2.70	20.77	23.54	0.06	1.57	0.98
Sidewalk Construction (Newport) + Storm Drain Construction + Traffic Signal Mod	2.76	23.58	25.26	0.06	1.87	1.14
Sidewalk Construction (Newport) + Traffic Signal Mod	1.66	15.44	14.31	0.04	1.18	0.72
Daily Maximum Emissions	**4.71**	**46.35**	**32.87**	**0.08**	**4.50**	**2.92**
SCAQMD Regional Threshold	75	100	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Crawford Canyon Air Quality Emissions Summary

Localized	NOX	CO	PM10	PM2.5
Crawford Canyon Park				
Clearing and Grubbing	27.37	18.45	3.71	2.47
Grading	36.41	23.47	3.96	2.76
Paving and Construction	46.19	31.86	2.03	1.86
Landscaping	2.60	3.63	0.12	0.11
Sidewalk Extension				
Site Preparation	8.19	5.64	0.53	0.32
Demolition	10.32	14.52	0.54	0.52
Utility Relocation	8.07	6.75	0.29	0.27
Storm Drain Construction	7.12	9.52	0.33	0.32
Sidewalk Construction (Newport)	3.54	4.28	0.18	0.18
Sidewalk Construction (Crawford)	3.79	4.49	0.19	0.19
Traffic Signal Modification	9.89	7.51	0.41	0.38
Paving	7.61	9.84	0.39	0.36
Overlapping Phases				
Park Landscaping + Sidewalk Site Prep + Sidewalk Demo	21.11	23.78	1.20	0.96
Sidewalk Utility Relocation + Storm Drain Construction	15.19	16.27	0.63	0.59
Sidewalk Utility Relocation + Storm Drain Construction + Sidewalk Construction (Newport)	18.73	20.55	0.81	0.77
Sidewalk Construction (Newport) + Storm Drain Construction + Traffic Signal Mod	20.55	21.31	0.92	0.88
Sidewalk Construction (Newport) + Traffic Signal Mod	13.43	11.79	0.59	0.56
Daily Maximum Emissions	**46.19**	**31.86**	**3.96**	**2.76**
SCAQMD Localized Threshold	131	993	6	4
Exceeds Threshold?	No	No	No	No

Crawford Canyon GHG Emissions Summary

Construction

Crawford Canyon Park

		Onsite (MTCO2e)	Mobile (MTCO2e)	Total (MTCO2e)
Clearing and grubbing	2021	40.18	1.60	42
Grading	2021	153.60	44.33	198
Paving and Construction	2021	180.38	11.71	192
Paving and Construction	2022	97.17	11.71	109
landscaping	2022	20.64	11.96	33

Sidewalk Extension

		Onsite (MTCO2e)	Mobile (MTCO2e)	Total (MTCO2e)
Site Preparation	2022	3.21	0.41	4
Demolition	2022	15.14	2.92	18
Utility Relocation	2022	12.93	0.57	13
Storm Drain Construction	2022	19.87	9.15	29
Sidewalk Construction (Newport)	2022	5.04	3.89	9
Sidewalk Construction (Crawford)	2022	5.29	3.89	9
Traffic Signal Modification	2022	10.79	2.86	14
Paving	2022	10.65	0.07	11

Total Construction Emissions (MTCO2e)	**680**
Amortized Emissions (30 years) (MTCO2e)	**23**

Park

ESA

Emissions Summary

ESA

Air Quality Construction Analysis

Unmitigated Construction Scenario

Regional	lbs/day					
	ROG	NOX	CO	SO2	PM10 Total	Total PM2.5
Clearing and Grubbing	2.9	27.4	19.0	0.0	3.9	2.5
Grading	3.8	40.5	25.9	0.1	4.5	2.9
Paving and Construction	4.7	46.3	32.9	0.1	2.4	2.0
Landscaping	0.3	2.7	4.5	0.0	0.4	0.2
Daily Maximum Emissions	**4.7**	**46.3**	**32.9**	**0.1**	**4.5**	**2.9**
SCAQMD Regional Threshold	75	100	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Air Quality Construction Analysis

Unmitigated Construction Scenario				
Localized Emissions Summary	**NOX**	**CO**	**PM10 Total**	**Total PM2.5**
	lb/hr			
Clearing and Grubbing	27.4	18.4	3.7	2.5
Grading	36.4	23.5	4.0	2.8
Paving and Construction	46.2	31.9	2.0	1.9
Landscaping	2.6	3.6	0.1	0.1
Daily Maximum Emissions	**46.2**	**31.9**	**4.0**	**2.8**
SCAQMDLocalized Threshold	131	993	6	4
Exceeds Threshold?	No	No	No	No

Attachment E

Air Quality Construction Analysis

summer	Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017)										Offsite Construction Emissions - Running (EMFAC2017)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
	lb/day										lb/day									
Clearing and Grubbing	2.88	27.37	18.45	0.05	2.44	1.27	3.71	1.30	1.17	2.47	0.01	0.04	0.57	0.00	0.20	0.00	0.20	0.05	0.00	0.05
Grading	3.65	36.41	23.47	0.06	2.37	1.59	3.96	1.29	1.46	2.76	0.17	4.13	2.46	0.01	0.52	0.02	0.54	0.14	0.02	0.16
Paving and Construction	4.69	46.19	31.86	0.08	0.00	2.03	2.03	0.00	1.86	1.86	0.02	0.15	1.01	0.00	0.34	0.00	0.34	0.09	0.00	0.09
Landscaping	0.23	2.60	3.63	0.01	0.00	0.12	0.12	0.00	0.11	0.11	0.02	0.13	0.87	0.00	0.32	0.00	0.32	0.08	0.00	0.09

Regional Emissions - ALL	Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
Clearing and Grubbing	2.89	27.41	19.02	0.05	2.64	1.27	3.92	1.35	1.17	2.53
Grading	3.82	40.54	25.93	0.07	2.89	1.61	4.50	1.43	1.49	2.92
Paving and Construction	4.71	46.35	32.87	0.08	0.34	2.03	2.37	0.09	1.87	1.96
Landscaping	0.25	2.73	4.49	0.01	0.32	0.13	0.45	0.08	0.12	0.20
Maximum Daily Emissions	**4.71**	**46.35**	**32.87**	**0.08**	**2.89**	**2.03**	**4.50**	**1.43**	**1.87**	**2.92**

Air Quality Construction Analysis

Winter	Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017)										Offsite Construction Emissions - Running (EMFAC2017)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
	lb/day										lb/day									
Clearing and Grubbing	2.88	27.37	18.45	0.05	2.44	1.27	3.71	1.30	1.17	2.47	0.01	0.04	0.57	0.00	0.20	0.00	0.20	0.05	0.00	0.05
Grading	3.65	36.41	23.47	0.06	2.37	1.59	3.96	1.29	1.46	2.76	0.17	4.13	2.46	0.01	0.52	0.02	0.54	0.14	0.02	0.16
Paving and Construction	4.69	46.19	31.86	0.08	0.00	2.03	2.03	0.00	1.86	1.86	0.02	0.15	1.01	0.00	0.34	0.00	0.34	0.09	0.00	0.09
Landscaping	0.23	2.60	3.63	0.01	0.00	0.12	0.12	0.00	0.11	0.11	0.02	0.13	0.87	0.00	0.32	0.00	0.32	0.08	0.00	0.09

Regional Emissions - ALL	Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
Clearing and Grubbing	2.89	27.41	19.02	0.05	2.64	1.27	3.92	1.35	1.17	2.53
Grading	3.82	40.54	25.93	0.07	2.89	1.61	4.50	1.43	1.49	2.92
Paving and Construction	4.71	46.35	32.87	0.08	0.34	2.03	2.37	0.09	1.87	1.96
Landscaping	0.25	2.73	4.49	0.01	0.32	0.13	0.45	0.08	0.12	0.20
Maximum Daily Emissions	**4.71**	**46.35**	**32.87**	**0.08**	**2.89**	**2.03**	**4.50**	**1.43**	**1.87**	**2.92**

GHG Emissions Summary

Construction Summary		Onsite	Mobile	Total
Clearing and grubbing	2021	40	2	42
Grading	2021	154	44	198
Paving and Construction	2021	180	12	192
Paving and Construction	2022	97	12	109
landscaping	2022	21	12	33
			Total	573
			Amortized	19.11

Greenhouse Gas Emissions Inventory

Area		0.00007
Electricity		12
Natural Gas		0
Mobile		82
Waste		<1
Water		11
Construction		19
	Total	**124**

Onroad Emissions

ESA

Total On-Road Emissions **Total On-Road Emissions**

260 Max construction days per year

	Construction Phase	Daily One-Way Trips	Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (pounds/day) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
	Clearing and Grubbing	2021															
	Total Haul Trips	0															
Clearing and	Hauling	0	20	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021Vendor	Vendor	0	20	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021Worke	Worker	18	20	8	14.7	0	0.01	0.04	0.57	0.00	0.20	0.00	0.20	0.05	0.00	0.05	1.60
	Onroad Emissions - Clearing and Grubbing						**0.01**	**0.04**	**0.57**	**0.00**	**0.20**	**0.00**	**0.20**	**0.05**	**0.00**	**0.05**	**1.60**
	Grading	2021															
	Total Haul Trips	989															
2021Hauling	Hauling	17	60	8	20	15	0.16	4.08	1.82	0.01	0.30	0.02	0.32	0.08	0.02	0.10	39.00
2021Vendor	Vendor	0	60	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021Worke	Worker	20	60	8	14.7	0	0.01	0.05	0.64	0.00	0.22	0.00	0.22	0.06	0.00	0.06	5.34
	Onroad Emissions - Grading						**0.17**	**4.13**	**2.46**	**0.01**	**0.52**	**0.02**	**0.54**	**0.14**	**0.02**	**0.16**	**44.33**
	Paving and Construction	2021															
	Total Haul Trips	0															
2021Hauling	Hauling	0	80	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021Vendor	Vendor	1	80	8	6.9	15	0.00	0.08	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	1.04
2021Worke	Worker	30	80	8	14.7	0	0.02	0.07	0.96	0.00	0.34	0.00	0.34	0.09	0.00	0.09	10.67
	Onroad Emissions - Paving and Construction						**0.02**	**0.15**	**1.01**	**0.00**	**0.34**	**0.00**	**0.34**	**0.09**	**0.00**	**0.09**	**11.71**
	Landscaping	2022															
	Total Haul Trips	0															
2022Hauling	Hauling	0	90	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	1	90	8	6.9	15	0.00	0.07	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	1.12
2022Worke	Worker	28	90	8	14.7	0	0.02	0.06	0.81	0.00	0.31	0.00	0.31	0.08	0.00	0.08	10.84
	Onroad Emissions - Landscaping						**0.02**	**0.13**	**0.87**	**0.00**	**0.32**	**0.00**	**0.32**	**0.08**	**0.00**	**0.09**	**11.96**

Total On-Road Emissions **Total On-Road Emissions**

260 Max construction days per year

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (Tons/year) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
Clearing and Grubbing	2021															
Total Haul Trips	0															
Hauling	0	20	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	20	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	18	20	8	14.7	0	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60
						0.00	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.60**
Grading	2021															
Total Haul Trips	989															
Hauling	17	60	8	20	15	0.00	0.12	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	39.00
Vendor	0	60	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	60	8	14.7	0	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	5.34
						0.01	**0.12**	**0.07**	**0.00**	**0.02**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**44.33**
Paving and Construction	2021															
Total Haul Trips	0															
Hauling	0	80	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	80	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04
Worker	30	80	8	14.7	0	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	10.67
						0.00	**0.01**	**0.04**	**0.00**	**0.01**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**11.71**
Landscaping	2022															
Total Haul Trips	0															
Hauling	0	90	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	90	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
Worker	28	90	8	14.7	0	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	10.84
						0.00	**0.01**	**0.04**	**0.00**	**0.01**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**11.96**

Running Emissions

		Running Emissions Factor (grams/mile)						Running Emissions Factor (grams/mile)		
		ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2020Hauling	Hauling	0.12467436	4.127586075	0.70244559	0.01389473	0.04956172	0.04741766	1520.07529	0.08121693	0.2410944
2020Vendor	Vendor	0.12175156	3.217634225	0.70325362	0.01222293	0.05527116	0.05287672	1311.85371	0.04440854	0.18764154
2020Worker	Worker	0.02296702	0.083024116	1.08430473	0.00306823	0.00220351	0.002029	310.119284	0.00538825	0.00712331
2021Hauling	Hauling	0.08103572	3.571515626	0.57499969	0.01347655	0.0279869	0.02677616	1477.43548	0.08019506	0.23446951
2021Vendor	Vendor	0.0717977	2.602453214	0.52331731	0.01185125	0.02991351	0.02861613	1273.54109	0.04239589	0.18204996
2021Worker	Worker	0.01983596	0.07223241	0.98341812	0.00297251	0.00205695	0.00189393	300.448479	0.00471177	0.00646256
2022Hauling	Hauling	0.02463044	2.696920068	0.45130496	0.01267644	0.01843607	0.0176385	1394.21089	0.07850131	0.22145577
2022Vendor	Vendor	0.01991806	1.889760516	0.36497107	0.01125961	0.01227567	0.01174136	1211.83967	0.04029686	0.17274956
2022Worker	Worker	0.01716262	0.063167612	0.89784164	0.00287684	0.00193578	0.00178222	290.781675	0.00413135	0.00590029
2023Hauling	Hauling	0.02438513	2.70726027	0.46544535	0.01247986	0.01859168	0.01778737	1374.48104	0.07922973	0.21840565
2023Vendor	Vendor	0.01904515	1.897817151	0.35240371	0.01108069	0.01237071	0.01183229	1193.62946	0.0405116	0.17033183
2023Worker	Worker	0.01513169	0.055897597	0.83140276	0.00279565	0.00185735	0.00170978	282.578076	0.00368669	0.00544537
GWP		N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/day)						Regional Emissions (MT/year)			
					ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Clearing and Grubbing	2021													
Total Haul Trips	0													
Hauling	0	20	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	20	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	18	20	8	14.7	0.01	0.04	0.57	0.00	0.00	0.00	1.59	0.00	0.01	1.60
					0.01	**0.04**	**0.57**	**0.00**	**0.00**	**0.00**	**1.59**	**0.00**	**0.01**	**1.60**
Grading	2021													
Total Haul Trips	989													
Hauling	17	60	8	20	0.06	2.68	0.43	0.01	0.02	0.02	30.14	0.04	1.39	31.57
Vendor	0	60	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	60	8	14.7	0.01	0.05	0.64	0.00	0.00	0.00	5.30	0.00	0.03	5.34
					0.07	**2.72**	**1.07**	**0.01**	**0.02**	**0.02**	**35.44**	**0.04**	**1.42**	**36.90**
Paving and Construction	2021													
Total Haul Trips	0													
Hauling	0	80	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	80	8	6.9	0.00	0.04	0.01	0.00	0.00	0.00	0.70	0.00	0.03	0.73
Worker	30	80	8	14.7	0.02	0.07	0.96	0.00	0.00	0.00	10.60	0.00	0.07	10.67
					0.02	**0.11**	**0.96**	**0.00**	**0.00**	**0.00**	**11.30**	**0.00**	**0.10**	**11.40**
Landscaping	2022													
Total Haul Trips	0													
Hauling	0	90	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	90	8	6.9	0.00	0.03	0.01	0.00	0.00	0.00	0.75	0.00	0.03	0.78
Worker	28	90	8	14.7	0.02	0.06	0.81	0.00	0.00	0.00	10.77	0.00	0.06	10.84
					0.02	**0.09**	**0.82**	**0.00**	**0.00**	**0.00**	**11.52**	**0.00**	**0.09**	**11.62**

Idling Emissions

		Idling Emissions Factor (grams/minute)						Idling Emissions Factor (grams/minute)		
		ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2020	Hauling	0.18203757	2.514257339	2.34424676	0.00425698	0.00364827	0.00349045	457.401286	0.01060122	0.07221486
2020	Vendor	0.09655158	1.389498887	1.26412887	0.00228127	0.00225118	0.00215379	244.777779	0.00633167	0.03834928
2020	Worker	0	0	0	0	0	0	0	0	0
2021	Hauling	0.17992826	2.494221613	2.47137063	0.00431707	0.00153707	0.00147058	463.979458	0.01057258	0.07325903
2021	Vendor	0.09512038	1.358206146	1.32735389	0.00230801	0.00101987	0.00097575	247.718477	0.00631023	0.03882087
2021	Worker	0	0	0	0	0	0	0	0	0
2022	Hauling	0.1794334	2.268893827	2.65540888	0.00413434	0.00124387	0.00119006	444.864297	0.01062746	0.07026495
2022	Vendor	0.09453686	1.21688302	1.42143188	0.00221115	0.00069792	0.00066773	237.578447	0.00634204	0.03723243
2022	Worker	0	0	0	0	0	0	0	0	0
2023	Hauling	0.17974307	2.262044342	2.6647617	0.00409118	0.00119718	0.00114539	440.393976	0.01068902	0.06956683
2023	Vendor	0.09456838	1.210583463	1.42500372	0.00218695	0.00066414	0.00063541	235.070306	0.00635061	0.03685329
2023	Worker	0	0	0	0	0	0	0	0	0
GWP		N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	Idling minutes per Day (miles)	Regional Emissions (pounds/day)						Regional Emissions (MT/year)			
					ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Clearing and Grubbing	2021													
Total Haul Trips	0													
Hauling	0	20	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	20	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	18	20	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Grading	2021													
Total Haul Trips	989													
Hauling	17	60	8	15	0.10	1.40	1.39	0.00	0.00	0.00	7.10	0.00	0.33	7.43
Vendor	0	60	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	60	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.10	**1.40**	**1.39**	**0.00**	**0.00**	**0.00**	**7.10**	**0.00**	**0.33**	**7.43**
Paving and Construction	2021													
Total Haul Trips	0													
Hauling	0	80	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	80	8	15	0.00	0.04	0.04	0.00	0.00	0.00	0.30	0.00	0.01	0.31
Worker	30	80	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.00	**0.04**	**0.04**	**0.00**	**0.00**	**0.00**	**0.30**	**0.00**	**0.01**	**0.31**
Landscaping	2022													
Total Haul Trips	0													
Hauling	0	90	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	90	8	15	0.00	0.04	0.05	0.00	0.00	0.00	0.32	0.00	0.01	0.34
Worker	28	90	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.00	**0.04**	**0.05**	**0.00**	**0.00**	**0.00**	**0.32**	**0.00**	**0.01**	**0.34**

Road Dust, Break Wear, and Tire wear Emissions

	Emission Factors (grams/mile)					
		PM10			PM2.5	
	RD	BW	TW	RD	BW	TW
2020Hauling Hauling	3.00E-01	0.061048007	0.03558331	7.36E-02	0.02616343	0.00889583
2020Vendor Vendor	3.00E-01	0.095694022	0.02379166	7.36E-02	0.04101172	0.00594791
2020Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2021Hauling Hauling	3.00E-01	0.061055751	0.0355879	7.36E-02	0.02616675	0.00889698
2021Vendor Vendor	3.00E-01	0.095697894	0.02379395	7.36E-02	0.04101338	0.00594849
2021Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2022Hauling Hauling	3.00E-01	0.061063462	0.03559233	7.36E-02	0.02617005	0.00889808
2022Vendor Vendor	3.00E-01	0.095701749	0.02379617	7.36E-02	0.04101504	0.00594904
2022Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2023Hauling Hauling	3.00E-01	0.06107028	0.03559616	7.36E-02	0.02617298	0.00889904
2023Vendor Vendor	3.00E-01	0.095705158	0.02379808	7.36E-02	0.0410165	0.00594952
2023Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/day)					
						PM10			PM2.5	
					RD	BW	TW	RD	BW	TW
Clearing and Grubbing	2021									
Total Haul Trips	0									
Hauling	0	20	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	20	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	18	20	8	14.7	0.17	0.02	0.00	0.04	0.01	0.00
Grading	2021									
Total Haul Trips	989									
Hauling	17	60	8	20	0.22	0.05	0.03	0.06	0.02	0.01
Vendor	0	60	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	60	8	14.7	0.19	0.02	0.01	0.05	0.01	0.00
Paving and Construction	2021									
Total Haul Trips	0									
Hauling	0	80	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	80	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	30	80	8	14.7	0.29	0.04	0.01	0.07	0.02	0.00
Landscaping	2022									
Total Haul Trips	0									
Hauling	0	90	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	1	90	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	28	90	8	14.7	0.27	0.03	0.01	0.07	0.01	0.00

CalEEMod Output

ESA

Crawford Park - South Coast Air Basin, Annual

Crawford Park

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	2.50	Acre	2.50	108,900.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Import 10,000 CY soil, vendor trips for construction and landscaping

Grading - Import 10,000 CY

Vehicle Trips - Trip Generation Source: Translutions, 2020

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use - Lighting from CalEEMod user guide for open parking lot lighting

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	80.00
tblConstructionPhase	NumDays	220.00	90.00
tblConstructionPhase	NumDays	6.00	60.00
tblConstructionPhase	NumDays	3.00	20.00
tblEnergyUse	LightingElect	0.00	0.35
tblFleetMix	HHD	0.03	0.02
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.19
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8470e-003	6.0390e-003
tblFleetMix	MCY	4.8220e-003	4.4870e-003
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	8.6900e-004	9.1200e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	2.1100e-003	1.4160e-003
tblFleetMix	SBUS	7.1000e-004	6.2300e-004
tblFleetMix	UBUS	1.7690e-003	1.6780e-003
tblGrading	AcresOfGrading	60.00	3.00
tblGrading	AcresOfGrading	0.00	4.50

tblGrading	MaterialImported	0.00	10,000.00
tblLandUse	RecSwimmingAreaAllowEdit	0.00	108,900.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	VendorTripNumber	18.00	10.00
tblVehicleEF	HHD	0.52	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.07	1.0000e-006
tblVehicleEF	HHD	1.59	6.32
tblVehicleEF	HHD	0.96	0.58
tblVehicleEF	HHD	3.04	9.3040e-003
tblVehicleEF	HHD	4,355.32	1,186.71
tblVehicleEF	HHD	1,551.76	1,477.44
tblVehicleEF	HHD	9.81	0.09
tblVehicleEF	HHD	13.94	6.38
tblVehicleEF	HHD	1.91	3.57
tblVehicleEF	HHD	19.62	2.07

tblVehicleEF	HHD	9.5610e-003	3.9310e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	6.0750e-003	0.03
tblVehicleEF	HHD	8.4000e-005	2.0000e-006
tblVehicleEF	HHD	9.1470e-003	3.7610e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8000e-003	8.8970e-003
tblVehicleEF	HHD	5.8120e-003	0.03
tblVehicleEF	HHD	7.7000e-005	1.0000e-006
tblVehicleEF	HHD	9.9000e-005	7.0000e-006
tblVehicleEF	HHD	4.1500e-003	2.6800e-004
tblVehicleEF	HHD	0.40	0.46
tblVehicleEF	HHD	7.3000e-005	5.0000e-006
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	3.3800e-004	1.4610e-003
tblVehicleEF	HHD	0.07	3.0000e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.4800e-004	1.0000e-006
tblVehicleEF	HHD	9.9000e-005	7.0000e-006
tblVehicleEF	HHD	4.1500e-003	2.6800e-004
tblVehicleEF	HHD	0.48	0.53
tblVehicleEF	HHD	7.3000e-005	5.0000e-006
tblVehicleEF	HHD	0.19	0.17
tblVehicleEF	HHD	3.3800e-004	1.4610e-003
tblVehicleEF	HHD	0.08	3.0000e-006
tblVehicleEF	HHD	0.49	0.00
tblVehicleEF	HHD	0.09	4.84

tblVehicleEF	HHD	0.07	2.7300e-004
tblVehicleEF	HHD	1.16	4.3510e-003
tblVehicleEF	HHD	0.97	11,782.57
tblVehicleEF	HHD	2.89	0.09
tblVehicleEF	HHD	4,614.07	2.0000e-006
tblVehicleEF	HHD	1,551.76	1.85
tblVehicleEF	HHD	9.81	0.08
tblVehicleEF	HHD	14.39	0.00
tblVehicleEF	HHD	1.80	0.24
tblVehicleEF	HHD	19.61	0.24
tblVehicleEF	HHD	8.0610e-003	7.0000e-006
tblVehicleEF	HHD	0.06	5.53
tblVehicleEF	HHD	0.04	0.17
tblVehicleEF	HHD	6.0750e-003	6.3500e-004
tblVehicleEF	HHD	8.4000e-005	2.1900e-004
tblVehicleEF	HHD	7.7120e-003	1.4000e-005
tblVehicleEF	HHD	0.03	9.6000e-005
tblVehicleEF	HHD	8.8000e-003	6.6000e-005
tblVehicleEF	HHD	5.8120e-003	1.0000e-006
tblVehicleEF	HHD	7.7000e-005	1.4410e-003
tblVehicleEF	HHD	1.5500e-004	9.1000e-004
tblVehicleEF	HHD	4.3060e-003	0.03
tblVehicleEF	HHD	0.38	6.19
tblVehicleEF	HHD	1.1000e-004	0.00
tblVehicleEF	HHD	0.08	3.38
tblVehicleEF	HHD	3.3000e-004	0.03
tblVehicleEF	HHD	0.07	2.07
tblVehicleEF	HHD	0.04	6.18
tblVehicleEF	HHD	0.01	0.58

tblVehicleEF	HHD	1.4500e-004	8.8350e-003
tblVehicleEF	HHD	1.5500e-004	156.80
tblVehicleEF	HHD	4.3060e-003	2.0000e-006
tblVehicleEF	HHD	0.45	2.8010e-003
tblVehicleEF	HHD	1.1000e-004	6.2480e-003
tblVehicleEF	HHD	0.19	0.03
tblVehicleEF	HHD	3.3000e-004	0.04
tblVehicleEF	HHD	0.07	0.03
tblVehicleEF	HHD	0.56	0.00
tblVehicleEF	HHD	0.09	4.33
tblVehicleEF	HHD	0.07	3.0500e-004
tblVehicleEF	HHD	2.20	4.3950e-003
tblVehicleEF	HHD	0.96	11,875.11
tblVehicleEF	HHD	3.06	0.09
tblVehicleEF	HHD	3,998.00	2.0000e-006
tblVehicleEF	HHD	1,551.76	1.87
tblVehicleEF	HHD	9.81	0.08
tblVehicleEF	HHD	13.32	0.00
tblVehicleEF	HHD	1.87	0.22
tblVehicleEF	HHD	19.62	0.24
tblVehicleEF	HHD	0.01	5.0000e-006
tblVehicleEF	HHD	0.06	4.95
tblVehicleEF	HHD	0.04	0.17
tblVehicleEF	HHD	6.0750e-003	6.8400e-004
tblVehicleEF	HHD	8.4000e-005	1.4600e-004
tblVehicleEF	HHD	0.01	1.5000e-005
tblVehicleEF	HHD	0.03	6.4000e-005
tblVehicleEF	HHD	8.8000e-003	4.3000e-005
tblVehicleEF	HHD	5.8120e-003	1.0000e-006

tblVehicleEF	HHD	7.7000e-005	1.5510e-003
tblVehicleEF	HHD	9.6000e-005	9.1000e-004
tblVehicleEF	HHD	4.4260e-003	0.03
tblVehicleEF	HHD	0.43	6.64
tblVehicleEF	HHD	7.1000e-005	0.00
tblVehicleEF	HHD	0.08	3.51
tblVehicleEF	HHD	3.6700e-004	0.04
tblVehicleEF	HHD	0.07	2.07
tblVehicleEF	HHD	0.04	6.51
tblVehicleEF	HHD	0.01	0.57
tblVehicleEF	HHD	1.4800e-004	9.3940e-003
tblVehicleEF	HHD	9.6000e-005	156.80
tblVehicleEF	HHD	4.4260e-003	2.0000e-006
tblVehicleEF	HHD	0.51	2.8010e-003
tblVehicleEF	HHD	7.1000e-005	6.2480e-003
tblVehicleEF	HHD	0.19	0.03
tblVehicleEF	HHD	3.6700e-004	0.04
tblVehicleEF	HHD	0.08	0.04
tblVehicleEF	LDA	4.2840e-003	3.0340e-003
tblVehicleEF	LDA	4.4900e-003	0.05
tblVehicleEF	LDA	0.57	0.72
tblVehicleEF	LDA	1.00	2.11
tblVehicleEF	LDA	253.57	270.89
tblVehicleEF	LDA	54.70	53.31
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	0.06	0.18
tblVehicleEF	LDA	1.9580e-003	1.7990e-003
tblVehicleEF	LDA	2.2420e-003	1.8430e-003
tblVehicleEF	LDA	1.8050e-003	1.6570e-003

tblVehicleEF	LDA	2.0610e-003	1.6940e-003
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.09	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.06	0.22
tblVehicleEF	LDA	2.5390e-003	2.6800e-003
tblVehicleEF	LDA	5.6400e-004	5.2800e-004
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.09	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.25
tblVehicleEF	LDA	0.00	0.04
tblVehicleEF	LDA	4.5820e-003	0.00
tblVehicleEF	LDA	3.9780e-003	0.10
tblVehicleEF	LDA	0.00	11.18
tblVehicleEF	LDA	0.64	0.00
tblVehicleEF	LDA	0.86	3.2530e-003
tblVehicleEF	LDA	0.00	5.0530e-003
tblVehicleEF	LDA	266.77	0.00
tblVehicleEF	LDA	54.70	0.01
tblVehicleEF	LDA	0.00	9.4890e-003
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	0.05	4.4120e-003
tblVehicleEF	LDA	0.00	0.07
tblVehicleEF	LDA	0.04	0.00

tblVehicleEF	LDA	8.0000e-003	0.02
tblVehicleEF	LDA	1.9580e-003	0.20
tblVehicleEF	LDA	2.2420e-003	0.39
tblVehicleEF	LDA	0.00	0.02
tblVehicleEF	LDA	0.02	0.39
tblVehicleEF	LDA	2.0000e-003	0.33
tblVehicleEF	LDA	1.8050e-003	0.22
tblVehicleEF	LDA	2.0610e-003	0.20
tblVehicleEF	LDA	0.06	0.00
tblVehicleEF	LDA	0.10	1.4850e-003
tblVehicleEF	LDA	0.05	1.7000e-005
tblVehicleEF	LDA	0.01	0.04
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	2.6720e-003	0.79
tblVehicleEF	LDA	5.6100e-004	1.79
tblVehicleEF	LDA	0.06	60.05
tblVehicleEF	LDA	0.10	1.8400e-003
tblVehicleEF	LDA	0.00	3.8000e-004
tblVehicleEF	LDA	0.05	7.7830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.03	8.0020e-003
tblVehicleEF	LDA	0.06	0.00
tblVehicleEF	LDA	0.00	0.05
tblVehicleEF	LDA	4.1990e-003	0.00
tblVehicleEF	LDA	4.5800e-003	0.11
tblVehicleEF	LDA	0.00	11.32
tblVehicleEF	LDA	0.55	0.00
tblVehicleEF	LDA	1.03	2.9740e-003
tblVehicleEF	LDA	0.00	5.3880e-003

tblVehicleEF	LDA	249.51	0.00
tblVehicleEF	LDA	54.70	0.01
tblVehicleEF	LDA	0.00	0.01
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	0.06	4.7000e-003
tblVehicleEF	LDA	0.00	0.05
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	8.0000e-003	0.02
tblVehicleEF	LDA	1.9580e-003	0.24
tblVehicleEF	LDA	2.2420e-003	0.24
tblVehicleEF	LDA	0.00	0.02
tblVehicleEF	LDA	0.02	0.24
tblVehicleEF	LDA	2.0000e-003	0.22
tblVehicleEF	LDA	1.8050e-003	0.25
tblVehicleEF	LDA	2.0610e-003	0.24
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	0.10	1.4850e-003
tblVehicleEF	LDA	0.03	1.7000e-005
tblVehicleEF	LDA	0.01	0.04
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	2.4980e-003	0.69
tblVehicleEF	LDA	5.6400e-004	2.17
tblVehicleEF	LDA	0.03	56.49
tblVehicleEF	LDA	0.10	1.8400e-003
tblVehicleEF	LDA	0.00	3.8000e-004
tblVehicleEF	LDA	0.03	7.7830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	8.0020e-003
tblVehicleEF	LDA	0.07	0.00

tblVehicleEF	LDT1	0.01	7.7890e-003
tblVehicleEF	LDT1	0.01	0.07
tblVehicleEF	LDT1	1.36	1.46
tblVehicleEF	LDT1	2.49	2.28
tblVehicleEF	LDT1	319.38	318.65
tblVehicleEF	LDT1	67.76	63.32
tblVehicleEF	LDT1	0.13	0.12
tblVehicleEF	LDT1	0.15	0.26
tblVehicleEF	LDT1	2.9980e-003	2.7210e-003
tblVehicleEF	LDT1	3.2550e-003	2.6380e-003
tblVehicleEF	LDT1	2.7600e-003	2.5050e-003
tblVehicleEF	LDT1	2.9930e-003	2.4250e-003
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.25	0.20
tblVehicleEF	LDT1	0.10	0.11
tblVehicleEF	LDT1	0.03	0.03
tblVehicleEF	LDT1	0.16	0.70
tblVehicleEF	LDT1	0.17	0.36
tblVehicleEF	LDT1	3.2100e-003	3.1530e-003
tblVehicleEF	LDT1	7.2100e-004	6.2700e-004
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.25	0.20
tblVehicleEF	LDT1	0.10	0.11
tblVehicleEF	LDT1	0.04	0.05
tblVehicleEF	LDT1	0.16	0.70
tblVehicleEF	LDT1	0.19	0.39
tblVehicleEF	LDT1	0.00	0.07
tblVehicleEF	LDT1	0.01	0.00
tblVehicleEF	LDT1	0.01	0.21

tblVehicleEF	LDT1	0.00	13.55
tblVehicleEF	LDT1	1.49	0.00
tblVehicleEF	LDT1	2.12	8.2760e-003
tblVehicleEF	LDT1	0.00	5.8840e-003
tblVehicleEF	LDT1	334.82	0.00
tblVehicleEF	LDT1	67.76	0.04
tblVehicleEF	LDT1	0.00	0.01
tblVehicleEF	LDT1	0.11	0.00
tblVehicleEF	LDT1	0.13	8.0850e-003
tblVehicleEF	LDT1	0.00	0.15
tblVehicleEF	LDT1	0.04	0.00
tblVehicleEF	LDT1	8.0000e-003	0.05
tblVehicleEF	LDT1	2.9980e-003	0.65
tblVehicleEF	LDT1	3.2550e-003	0.93
tblVehicleEF	LDT1	0.00	0.05
tblVehicleEF	LDT1	0.02	0.93
tblVehicleEF	LDT1	2.0000e-003	0.71
tblVehicleEF	LDT1	2.7600e-003	0.35
tblVehicleEF	LDT1	2.9930e-003	0.65
tblVehicleEF	LDT1	0.20	0.00
tblVehicleEF	LDT1	0.27	2.3930e-003
tblVehicleEF	LDT1	0.15	3.5000e-005
tblVehicleEF	LDT1	0.03	0.11
tblVehicleEF	LDT1	0.15	0.00
tblVehicleEF	LDT1	3.3670e-003	1.59
tblVehicleEF	LDT1	7.1400e-004	1.93
tblVehicleEF	LDT1	0.20	71.69
tblVehicleEF	LDT1	0.27	2.6340e-003
tblVehicleEF	LDT1	0.00	5.9400e-004

tblVehicleEF	LDT1	0.15	7.9510e-003
tblVehicleEF	LDT1	0.05	0.02
tblVehicleEF	LDT1	0.15	8.0020e-003
tblVehicleEF	LDT1	0.16	0.00
tblVehicleEF	LDT1	0.00	0.08
tblVehicleEF	LDT1	0.01	0.00
tblVehicleEF	LDT1	0.01	0.23
tblVehicleEF	LDT1	0.00	13.73
tblVehicleEF	LDT1	1.32	0.00
tblVehicleEF	LDT1	2.56	7.6540e-003
tblVehicleEF	LDT1	0.00	6.2690e-003
tblVehicleEF	LDT1	314.49	0.00
tblVehicleEF	LDT1	67.76	0.03
tblVehicleEF	LDT1	0.00	0.02
tblVehicleEF	LDT1	0.12	0.00
tblVehicleEF	LDT1	0.15	8.6860e-003
tblVehicleEF	LDT1	0.00	0.10
tblVehicleEF	LDT1	0.04	0.00
tblVehicleEF	LDT1	8.0000e-003	0.05
tblVehicleEF	LDT1	2.9980e-003	0.83
tblVehicleEF	LDT1	3.2550e-003	0.60
tblVehicleEF	LDT1	0.00	0.05
tblVehicleEF	LDT1	0.02	0.59
tblVehicleEF	LDT1	2.0000e-003	0.48
tblVehicleEF	LDT1	2.7600e-003	0.40
tblVehicleEF	LDT1	2.9930e-003	0.83
tblVehicleEF	LDT1	0.12	0.00
tblVehicleEF	LDT1	0.28	2.3930e-003
tblVehicleEF	LDT1	0.10	3.5000e-005

tblVehicleEF	LDT1	0.03	0.12
tblVehicleEF	LDT1	0.19	0.00
tblVehicleEF	LDT1	3.1610e-003	1.41
tblVehicleEF	LDT1	7.2200e-004	2.35
tblVehicleEF	LDT1	0.12	68.01
tblVehicleEF	LDT1	0.28	2.6340e-003
tblVehicleEF	LDT1	0.00	5.9400e-004
tblVehicleEF	LDT1	0.10	7.9510e-003
tblVehicleEF	LDT1	0.04	0.02
tblVehicleEF	LDT1	0.19	8.0020e-003
tblVehicleEF	LDT1	0.19	0.00
tblVehicleEF	LDT2	5.9720e-003	4.9910e-003
tblVehicleEF	LDT2	5.6870e-003	0.07
tblVehicleEF	LDT2	0.75	1.03
tblVehicleEF	LDT2	1.24	2.65
tblVehicleEF	LDT2	356.41	341.38
tblVehicleEF	LDT2	75.77	68.34
tblVehicleEF	LDT2	0.07	0.09
tblVehicleEF	LDT2	0.09	0.28
tblVehicleEF	LDT2	1.9990e-003	1.9090e-003
tblVehicleEF	LDT2	2.3560e-003	1.8910e-003
tblVehicleEF	LDT2	1.8380e-003	1.7570e-003
tblVehicleEF	LDT2	2.1660e-003	1.7390e-003
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.06	0.41
tblVehicleEF	LDT2	0.08	0.31

tblVehicleEF	LDT2	3.5700e-003	3.3770e-003
tblVehicleEF	LDT2	7.7800e-004	6.7600e-004
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.06	0.41
tblVehicleEF	LDT2	0.08	0.34
tblVehicleEF	LDT2	0.00	0.06
tblVehicleEF	LDT2	6.3770e-003	0.00
tblVehicleEF	LDT2	5.0410e-003	0.13
tblVehicleEF	LDT2	0.00	14.40
tblVehicleEF	LDT2	0.83	0.00
tblVehicleEF	LDT2	1.06	5.3180e-003
tblVehicleEF	LDT2	0.00	6.4670e-003
tblVehicleEF	LDT2	374.21	0.00
tblVehicleEF	LDT2	75.77	0.02
tblVehicleEF	LDT2	0.00	0.01
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.09	6.6250e-003
tblVehicleEF	LDT2	0.00	0.10
tblVehicleEF	LDT2	0.04	0.00
tblVehicleEF	LDT2	8.0000e-003	0.03
tblVehicleEF	LDT2	1.9990e-003	0.38
tblVehicleEF	LDT2	2.3560e-003	0.54
tblVehicleEF	LDT2	0.00	0.03
tblVehicleEF	LDT2	0.02	0.54
tblVehicleEF	LDT2	2.0000e-003	0.49
tblVehicleEF	LDT2	1.8380e-003	0.31

tblVehicleEF	LDT2	2.1660e-003	0.38
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.10	1.6180e-003
tblVehicleEF	LDT2	0.06	1.7000e-005
tblVehicleEF	LDT2	0.02	0.08
tblVehicleEF	LDT2	0.05	0.00
tblVehicleEF	LDT2	3.7490e-003	1.12
tblVehicleEF	LDT2	7.7500e-004	2.26
tblVehicleEF	LDT2	0.07	75.14
tblVehicleEF	LDT2	0.10	1.8890e-003
tblVehicleEF	LDT2	0.00	4.0400e-004
tblVehicleEF	LDT2	0.06	7.8210e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.05	8.0020e-003
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.00	0.07
tblVehicleEF	LDT2	5.8560e-003	0.00
tblVehicleEF	LDT2	5.8000e-003	0.13
tblVehicleEF	LDT2	0.00	14.59
tblVehicleEF	LDT2	0.72	0.00
tblVehicleEF	LDT2	1.27	4.8870e-003
tblVehicleEF	LDT2	0.00	6.8940e-003
tblVehicleEF	LDT2	350.82	0.00
tblVehicleEF	LDT2	75.77	0.02
tblVehicleEF	LDT2	0.00	0.01
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.09	7.0820e-003
tblVehicleEF	LDT2	0.00	0.07
tblVehicleEF	LDT2	0.04	0.00

tblVehicleEF	LDT2	8.0000e-003	0.03
tblVehicleEF	LDT2	1.9990e-003	0.48
tblVehicleEF	LDT2	2.3560e-003	0.33
tblVehicleEF	LDT2	0.00	0.03
tblVehicleEF	LDT2	0.02	0.33
tblVehicleEF	LDT2	2.0000e-003	0.33
tblVehicleEF	LDT2	1.8380e-003	0.35
tblVehicleEF	LDT2	2.1660e-003	0.48
tblVehicleEF	LDT2	0.04	0.00
tblVehicleEF	LDT2	0.10	1.6180e-003
tblVehicleEF	LDT2	0.04	1.7000e-005
tblVehicleEF	LDT2	0.01	0.08
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	3.5130e-003	0.99
tblVehicleEF	LDT2	7.7900e-004	2.74
tblVehicleEF	LDT2	0.04	71.61
tblVehicleEF	LDT2	0.10	1.8890e-003
tblVehicleEF	LDT2	0.00	4.0400e-004
tblVehicleEF	LDT2	0.04	7.8210e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	8.0020e-003
tblVehicleEF	LDT2	0.09	0.00
tblVehicleEF	LHD1	5.2120e-003	5.5830e-003
tblVehicleEF	LHD1	9.8600e-003	5.7240e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.74	0.65
tblVehicleEF	LHD1	2.42	1.14
tblVehicleEF	LHD1	9.02	8.89

tblVehicleEF	LHD1	594.63	666.21
tblVehicleEF	LHD1	31.53	12.43
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	1.08	0.65
tblVehicleEF	LHD1	0.94	0.33
tblVehicleEF	LHD1	8.6300e-004	7.5700e-004
tblVehicleEF	LHD1	0.01	9.6790e-003
tblVehicleEF	LHD1	9.7700e-003	6.4420e-003
tblVehicleEF	LHD1	8.9700e-004	2.8500e-004
tblVehicleEF	LHD1	8.2600e-004	7.2400e-004
tblVehicleEF	LHD1	2.5390e-003	2.4200e-003
tblVehicleEF	LHD1	9.3240e-003	6.1330e-003
tblVehicleEF	LHD1	8.2500e-004	2.6200e-004
tblVehicleEF	LHD1	2.9620e-003	2.5670e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.7810e-003	1.5640e-003
tblVehicleEF	LHD1	0.06	0.05
tblVehicleEF	LHD1	0.30	0.56
tblVehicleEF	LHD1	0.24	0.08
tblVehicleEF	LHD1	9.0000e-005	8.6000e-005
tblVehicleEF	LHD1	5.8320e-003	6.5060e-003
tblVehicleEF	LHD1	3.6100e-004	1.2300e-004
tblVehicleEF	LHD1	2.9620e-003	2.5670e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.7810e-003	1.5640e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.30	0.56

tblVehicleEF	LHD1	0.26	0.09
tblVehicleEF	LHD1	5.2120e-003	5.1340e-003
tblVehicleEF	LHD1	0.01	0.30
tblVehicleEF	LHD1	0.02	0.08
tblVehicleEF	LHD1	0.15	0.83
tblVehicleEF	LHD1	0.75	124.98
tblVehicleEF	LHD1	2.31	6.2080e-003
tblVehicleEF	LHD1	9.02	1.7780e-003
tblVehicleEF	LHD1	594.63	0.01
tblVehicleEF	LHD1	31.53	0.05
tblVehicleEF	LHD1	0.07	1.0420e-003
tblVehicleEF	LHD1	1.01	0.07
tblVehicleEF	LHD1	0.91	0.03
tblVehicleEF	LHD1	8.6300e-004	2.2100e-003
tblVehicleEF	LHD1	0.08	0.42
tblVehicleEF	LHD1	0.01	0.06
tblVehicleEF	LHD1	9.7700e-003	0.48
tblVehicleEF	LHD1	8.9700e-004	0.06
tblVehicleEF	LHD1	8.2600e-004	5.6060e-003
tblVehicleEF	LHD1	0.03	0.05
tblVehicleEF	LHD1	2.5390e-003	0.03
tblVehicleEF	LHD1	9.3240e-003	0.07
tblVehicleEF	LHD1	8.2500e-004	0.54
tblVehicleEF	LHD1	4.5380e-003	1.7000e-004
tblVehicleEF	LHD1	0.10	5.2380e-003
tblVehicleEF	LHD1	0.02	0.05
tblVehicleEF	LHD1	2.6400e-003	1.8000e-005
tblVehicleEF	LHD1	0.06	0.61
tblVehicleEF	LHD1	0.29	9.1050e-003

tblVehicleEF	LHD1	0.23	0.32
tblVehicleEF	LHD1	9.0000e-005	0.19
tblVehicleEF	LHD1	5.8320e-003	0.67
tblVehicleEF	LHD1	3.5900e-004	1.09
tblVehicleEF	LHD1	4.5380e-003	48.48
tblVehicleEF	LHD1	0.10	2.8500e-004
tblVehicleEF	LHD1	0.02	4.2700e-004
tblVehicleEF	LHD1	2.6400e-003	5.4550e-003
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.29	9.3700e-003
tblVehicleEF	LHD1	0.25	9.5160e-003
tblVehicleEF	LHD1	5.2120e-003	5.3710e-003
tblVehicleEF	LHD1	9.8170e-003	0.30
tblVehicleEF	LHD1	0.02	0.09
tblVehicleEF	LHD1	0.15	0.84
tblVehicleEF	LHD1	0.73	124.98
tblVehicleEF	LHD1	2.43	6.0400e-003
tblVehicleEF	LHD1	9.02	1.8370e-003
tblVehicleEF	LHD1	594.63	0.01
tblVehicleEF	LHD1	31.53	0.05
tblVehicleEF	LHD1	0.07	1.0870e-003
tblVehicleEF	LHD1	1.06	0.07
tblVehicleEF	LHD1	0.95	0.03
tblVehicleEF	LHD1	8.6300e-004	1.5420e-003
tblVehicleEF	LHD1	0.08	0.42
tblVehicleEF	LHD1	0.01	0.06
tblVehicleEF	LHD1	9.7700e-003	0.53
tblVehicleEF	LHD1	8.9700e-004	0.04
tblVehicleEF	LHD1	8.2600e-004	6.2420e-003

tblVehicleEF	LHD1	0.03	0.04
tblVehicleEF	LHD1	2.5390e-003	0.02
tblVehicleEF	LHD1	9.3240e-003	0.08
tblVehicleEF	LHD1	8.2500e-004	0.60
tblVehicleEF	LHD1	3.0750e-003	1.7000e-004
tblVehicleEF	LHD1	0.11	5.2380e-003
tblVehicleEF	LHD1	0.02	0.05
tblVehicleEF	LHD1	1.7770e-003	1.8000e-005
tblVehicleEF	LHD1	0.06	0.64
tblVehicleEF	LHD1	0.32	9.1050e-003
tblVehicleEF	LHD1	0.24	0.34
tblVehicleEF	LHD1	9.0000e-005	0.19
tblVehicleEF	LHD1	5.8320e-003	0.65
tblVehicleEF	LHD1	3.6100e-004	1.14
tblVehicleEF	LHD1	3.0750e-003	48.48
tblVehicleEF	LHD1	0.11	2.8500e-004
tblVehicleEF	LHD1	0.02	4.2700e-004
tblVehicleEF	LHD1	1.7770e-003	5.4550e-003
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.32	9.3700e-003
tblVehicleEF	LHD1	0.26	9.5160e-003
tblVehicleEF	LHD2	3.6840e-003	3.9120e-003
tblVehicleEF	LHD2	3.6840e-003	3.9650e-003
tblVehicleEF	LHD2	7.3420e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.32	0.44
tblVehicleEF	LHD2	1.21	0.76
tblVehicleEF	LHD2	13.71	13.45
tblVehicleEF	LHD2	608.08	667.35

tblVehicleEF	LHD2	26.39	9.56
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.67	0.84
tblVehicleEF	LHD2	0.50	0.23
tblVehicleEF	LHD2	1.1670e-003	1.2520e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	8.9870e-003	0.01
tblVehicleEF	LHD2	4.2200e-004	1.6200e-004
tblVehicleEF	LHD2	1.1160e-003	1.1980e-003
tblVehicleEF	LHD2	2.6680e-003	2.6330e-003
tblVehicleEF	LHD2	8.5850e-003	9.5770e-003
tblVehicleEF	LHD2	3.8800e-004	1.4900e-004
tblVehicleEF	LHD2	1.0410e-003	1.5680e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	6.8300e-004	9.7100e-004
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.07	0.35
tblVehicleEF	LHD2	0.10	0.05
tblVehicleEF	LHD2	1.3400e-004	1.2900e-004
tblVehicleEF	LHD2	5.9210e-003	6.4600e-003
tblVehicleEF	LHD2	2.8600e-004	9.5000e-005
tblVehicleEF	LHD2	1.0410e-003	1.5680e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	6.8300e-004	9.7100e-004
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.07	0.35
tblVehicleEF	LHD2	0.11	0.06

tblVehicleEF	LHD2	3.6840e-003	3.5540e-003
tblVehicleEF	LHD2	3.7270e-003	0.23
tblVehicleEF	LHD2	7.0950e-003	0.06
tblVehicleEF	LHD2	0.13	0.64
tblVehicleEF	LHD2	0.32	184.31
tblVehicleEF	LHD2	1.16	4.2190e-003
tblVehicleEF	LHD2	13.71	1.2050e-003
tblVehicleEF	LHD2	608.08	0.02
tblVehicleEF	LHD2	26.39	0.05
tblVehicleEF	LHD2	0.09	7.2200e-004
tblVehicleEF	LHD2	0.64	0.05
tblVehicleEF	LHD2	0.48	0.05
tblVehicleEF	LHD2	1.1670e-003	1.3640e-003
tblVehicleEF	LHD2	0.09	0.31
tblVehicleEF	LHD2	0.01	0.06
tblVehicleEF	LHD2	8.9870e-003	0.28
tblVehicleEF	LHD2	4.2200e-004	0.03
tblVehicleEF	LHD2	1.1160e-003	3.7590e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.6680e-003	0.02
tblVehicleEF	LHD2	8.5850e-003	0.05
tblVehicleEF	LHD2	3.8800e-004	0.34
tblVehicleEF	LHD2	1.5870e-003	1.9200e-004
tblVehicleEF	LHD2	0.04	8.5420e-003
tblVehicleEF	LHD2	0.01	0.09
tblVehicleEF	LHD2	9.9900e-004	1.0000e-005
tblVehicleEF	LHD2	0.04	0.79
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.10	0.22

tblVehicleEF	LHD2	1.3400e-004	0.15
tblVehicleEF	LHD2	5.9210e-003	0.44
tblVehicleEF	LHD2	2.8500e-004	0.73
tblVehicleEF	LHD2	1.5870e-003	50.51
tblVehicleEF	LHD2	0.04	1.6200e-004
tblVehicleEF	LHD2	0.02	7.0500e-004
tblVehicleEF	LHD2	9.9900e-004	6.5990e-003
tblVehicleEF	LHD2	0.05	0.04
tblVehicleEF	LHD2	0.07	0.01
tblVehicleEF	LHD2	0.10	0.02
tblVehicleEF	LHD2	3.6840e-003	3.7180e-003
tblVehicleEF	LHD2	3.6740e-003	0.23
tblVehicleEF	LHD2	7.3760e-003	0.06
tblVehicleEF	LHD2	0.13	0.64
tblVehicleEF	LHD2	0.32	184.31
tblVehicleEF	LHD2	1.22	4.1490e-003
tblVehicleEF	LHD2	13.71	1.2430e-003
tblVehicleEF	LHD2	608.08	0.02
tblVehicleEF	LHD2	26.39	0.05
tblVehicleEF	LHD2	0.09	7.5300e-004
tblVehicleEF	LHD2	0.66	0.05
tblVehicleEF	LHD2	0.50	0.05
tblVehicleEF	LHD2	1.1670e-003	9.4300e-004
tblVehicleEF	LHD2	0.09	0.31
tblVehicleEF	LHD2	0.01	0.06
tblVehicleEF	LHD2	8.9870e-003	0.32
tblVehicleEF	LHD2	4.2200e-004	0.02
tblVehicleEF	LHD2	1.1160e-003	4.0970e-003
tblVehicleEF	LHD2	0.04	0.02

tblVehicleEF	LHD2	2.6680e-003	0.01
tblVehicleEF	LHD2	8.5850e-003	0.05
tblVehicleEF	LHD2	3.8800e-004	0.38
tblVehicleEF	LHD2	1.0460e-003	1.9200e-004
tblVehicleEF	LHD2	0.04	8.5420e-003
tblVehicleEF	LHD2	0.01	0.09
tblVehicleEF	LHD2	6.7100e-004	1.0000e-005
tblVehicleEF	LHD2	0.04	0.82
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.10	0.23
tblVehicleEF	LHD2	1.3400e-004	0.15
tblVehicleEF	LHD2	5.9210e-003	0.44
tblVehicleEF	LHD2	2.8600e-004	0.77
tblVehicleEF	LHD2	1.0460e-003	50.50
tblVehicleEF	LHD2	0.04	1.6200e-004
tblVehicleEF	LHD2	0.02	7.0500e-004
tblVehicleEF	LHD2	6.7100e-004	6.5990e-003
tblVehicleEF	LHD2	0.05	0.04
tblVehicleEF	LHD2	0.08	0.01
tblVehicleEF	LHD2	0.11	0.02
tblVehicleEF	MCY	0.51	0.38
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	18.57	19.19
tblVehicleEF	MCY	9.67	8.53
tblVehicleEF	MCY	183.90	223.45
tblVehicleEF	MCY	44.44	59.65
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	2.3320e-003	2.4320e-003

tblVehicleEF	MCY	3.6000e-003	3.2970e-003
tblVehicleEF	MCY	2.1780e-003	2.2730e-003
tblVehicleEF	MCY	3.3840e-003	3.1040e-003
tblVehicleEF	MCY	1.14	1.09
tblVehicleEF	MCY	0.66	0.66
tblVehicleEF	MCY	0.67	0.67
tblVehicleEF	MCY	2.47	2.61
tblVehicleEF	MCY	0.60	1.99
tblVehicleEF	MCY	2.04	1.82
tblVehicleEF	MCY	2.2170e-003	2.2110e-003
tblVehicleEF	MCY	6.6200e-004	5.9000e-004
tblVehicleEF	MCY	1.14	1.09
tblVehicleEF	MCY	0.66	0.66
tblVehicleEF	MCY	0.67	0.67
tblVehicleEF	MCY	3.08	3.24
tblVehicleEF	MCY	0.60	1.99
tblVehicleEF	MCY	2.22	1.98
tblVehicleEF	MCY	0.00	0.81
tblVehicleEF	MCY	0.50	0.00
tblVehicleEF	MCY	0.13	0.73
tblVehicleEF	MCY	0.00	28.87
tblVehicleEF	MCY	18.00	0.00
tblVehicleEF	MCY	8.85	0.37
tblVehicleEF	MCY	0.00	7.4230e-003
tblVehicleEF	MCY	183.90	0.00
tblVehicleEF	MCY	44.44	2.55
tblVehicleEF	MCY	0.00	0.10
tblVehicleEF	MCY	0.98	0.00
tblVehicleEF	MCY	0.29	0.06

tblVehicleEF	MCY	0.00	1.10
tblVehicleEF	MCY	0.01	0.00
tblVehicleEF	MCY	4.0000e-003	3.17
tblVehicleEF	MCY	2.3320e-003	1.87
tblVehicleEF	MCY	3.6000e-003	3.53
tblVehicleEF	MCY	0.00	0.37
tblVehicleEF	MCY	5.0400e-003	3.53
tblVehicleEF	MCY	1.0000e-003	2.20
tblVehicleEF	MCY	2.1780e-003	1.75
tblVehicleEF	MCY	3.3840e-003	1.87
tblVehicleEF	MCY	1.88	5.0000e-004
tblVehicleEF	MCY	0.75	2.2730e-003
tblVehicleEF	MCY	1.17	1.5520e-003
tblVehicleEF	MCY	2.42	0.99
tblVehicleEF	MCY	0.57	0.00
tblVehicleEF	MCY	1.82	0.25
tblVehicleEF	MCY	2.2060e-003	18.47
tblVehicleEF	MCY	6.4200e-004	7.76
tblVehicleEF	MCY	1.88	111.05
tblVehicleEF	MCY	0.75	3.2970e-003
tblVehicleEF	MCY	0.00	1.2160e-003
tblVehicleEF	MCY	1.17	5.8800e-003
tblVehicleEF	MCY	3.01	5.0400e-003
tblVehicleEF	MCY	0.57	4.0000e-003
tblVehicleEF	MCY	1.98	0.00
tblVehicleEF	MCY	0.00	0.93
tblVehicleEF	MCY	0.52	0.00
tblVehicleEF	MCY	0.15	0.85
tblVehicleEF	MCY	0.00	30.00

tblVehicleEF	MCY	18.58	0.00
tblVehicleEF	MCY	9.75	0.38
tblVehicleEF	MCY	0.00	7.6700e-003
tblVehicleEF	MCY	183.90	0.00
tblVehicleEF	MCY	44.44	2.62
tblVehicleEF	MCY	0.00	0.12
tblVehicleEF	MCY	1.10	0.00
tblVehicleEF	MCY	0.31	0.06
tblVehicleEF	MCY	0.00	0.64
tblVehicleEF	MCY	0.01	0.00
tblVehicleEF	MCY	4.0000e-003	3.26
tblVehicleEF	MCY	2.3320e-003	2.29
tblVehicleEF	MCY	3.6000e-003	2.37
tblVehicleEF	MCY	0.00	0.43
tblVehicleEF	MCY	5.0400e-003	2.37
tblVehicleEF	MCY	1.0000e-003	1.27
tblVehicleEF	MCY	2.1780e-003	2.02
tblVehicleEF	MCY	3.3840e-003	2.29
tblVehicleEF	MCY	1.25	5.0000e-004
tblVehicleEF	MCY	0.85	2.2730e-003
tblVehicleEF	MCY	0.66	1.5520e-003
tblVehicleEF	MCY	2.48	1.11
tblVehicleEF	MCY	0.69	0.00
tblVehicleEF	MCY	2.07	0.27
tblVehicleEF	MCY	2.2180e-003	19.29
tblVehicleEF	MCY	6.6500e-004	8.66
tblVehicleEF	MCY	1.25	111.83
tblVehicleEF	MCY	0.85	3.2970e-003
tblVehicleEF	MCY	0.00	1.2160e-003

tblVehicleEF	MCY	0.66	5.8800e-003
tblVehicleEF	MCY	3.09	5.0400e-003
tblVehicleEF	MCY	0.69	4.0000e-003
tblVehicleEF	MCY	2.25	0.00
tblVehicleEF	MDV	0.01	6.5750e-003
tblVehicleEF	MDV	0.01	0.08
tblVehicleEF	MDV	1.17	1.22
tblVehicleEF	MDV	2.29	3.11
tblVehicleEF	MDV	483.40	419.24
tblVehicleEF	MDV	101.24	83.18
tblVehicleEF	MDV	0.13	0.11
tblVehicleEF	MDV	0.20	0.35
tblVehicleEF	MDV	2.1080e-003	2.0860e-003
tblVehicleEF	MDV	2.4110e-003	2.0610e-003
tblVehicleEF	MDV	1.9430e-003	1.9230e-003
tblVehicleEF	MDV	2.2170e-003	1.8960e-003
tblVehicleEF	MDV	0.07	0.08
tblVehicleEF	MDV	0.15	0.14
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.17	0.40
tblVehicleEF	MDV	4.8410e-003	4.1450e-003
tblVehicleEF	MDV	1.0520e-003	8.2300e-004
tblVehicleEF	MDV	0.07	0.08
tblVehicleEF	MDV	0.15	0.14
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	0.09	0.43

tblVehicleEF	MDV	0.19	0.44
tblVehicleEF	MDV	0.00	0.08
tblVehicleEF	MDV	0.01	0.00
tblVehicleEF	MDV	0.01	0.15
tblVehicleEF	MDV	0.00	17.75
tblVehicleEF	MDV	1.29	0.00
tblVehicleEF	MDV	1.96	7.0040e-003
tblVehicleEF	MDV	0.00	7.1080e-003
tblVehicleEF	MDV	507.25	0.00
tblVehicleEF	MDV	101.24	0.03
tblVehicleEF	MDV	0.00	0.02
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	0.19	9.1800e-003
tblVehicleEF	MDV	0.00	0.13
tblVehicleEF	MDV	0.04	0.00
tblVehicleEF	MDV	8.0000e-003	0.04
tblVehicleEF	MDV	2.1080e-003	0.40
tblVehicleEF	MDV	2.4110e-003	0.62
tblVehicleEF	MDV	0.00	0.03
tblVehicleEF	MDV	0.02	0.61
tblVehicleEF	MDV	2.0000e-003	0.58
tblVehicleEF	MDV	1.9430e-003	0.39
tblVehicleEF	MDV	2.2170e-003	0.40
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	0.16	1.7780e-003
tblVehicleEF	MDV	0.10	2.1000e-005
tblVehicleEF	MDV	0.03	0.10
tblVehicleEF	MDV	0.09	0.00
tblVehicleEF	MDV	5.0810e-003	1.33

tblVehicleEF	MDV	1.0460e-003	2.64
tblVehicleEF	MDV	0.11	93.07
tblVehicleEF	MDV	0.16	2.0580e-003
tblVehicleEF	MDV	0.00	4.4600e-004
tblVehicleEF	MDV	0.10	7.9160e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	0.09	8.0020e-003
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.00	0.09
tblVehicleEF	MDV	0.01	0.00
tblVehicleEF	MDV	0.01	0.15
tblVehicleEF	MDV	0.00	17.99
tblVehicleEF	MDV	1.13	0.00
tblVehicleEF	MDV	2.35	6.4530e-003
tblVehicleEF	MDV	0.00	7.5770e-003
tblVehicleEF	MDV	476.03	0.00
tblVehicleEF	MDV	101.24	0.03
tblVehicleEF	MDV	0.00	0.02
tblVehicleEF	MDV	0.12	0.00
tblVehicleEF	MDV	0.21	9.7530e-003
tblVehicleEF	MDV	0.00	0.09
tblVehicleEF	MDV	0.04	0.00
tblVehicleEF	MDV	8.0000e-003	0.04
tblVehicleEF	MDV	2.1080e-003	0.50
tblVehicleEF	MDV	2.4110e-003	0.37
tblVehicleEF	MDV	0.00	0.03
tblVehicleEF	MDV	0.02	0.37
tblVehicleEF	MDV	2.0000e-003	0.40
tblVehicleEF	MDV	1.9430e-003	0.45

tblVehicleEF	MDV	2.2170e-003	0.50
tblVehicleEF	MDV	0.07	0.00
tblVehicleEF	MDV	0.17	1.7780e-003
tblVehicleEF	MDV	0.07	2.1000e-005
tblVehicleEF	MDV	0.03	0.11
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	4.7660e-003	1.18
tblVehicleEF	MDV	1.0530e-003	3.21
tblVehicleEF	MDV	0.07	89.28
tblVehicleEF	MDV	0.17	2.0580e-003
tblVehicleEF	MDV	0.00	4.4600e-004
tblVehicleEF	MDV	0.07	7.9160e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	0.11	8.0020e-003
tblVehicleEF	MDV	0.19	0.00
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.75	1.21
tblVehicleEF	MH	5.15	2.15
tblVehicleEF	MH	1,102.46	1,501.21
tblVehicleEF	MH	58.88	19.42
tblVehicleEF	MH	1.12	1.11
tblVehicleEF	MH	0.75	0.25
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.0110e-003	2.8400e-004
tblVehicleEF	MH	3.2180e-003	3.2450e-003
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	9.3000e-004	2.6100e-004

tblVehicleEF	MH	0.93	0.84
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	0.38	0.35
tblVehicleEF	MH	0.07	0.06
tblVehicleEF	MH	0.02	1.46
tblVehicleEF	MH	0.30	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.7800e-004	1.9200e-004
tblVehicleEF	MH	0.93	0.84
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	0.38	0.35
tblVehicleEF	MH	0.10	0.08
tblVehicleEF	MH	0.02	1.46
tblVehicleEF	MH	0.33	0.11
tblVehicleEF	MH	0.00	0.92
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.02	0.06
tblVehicleEF	MH	0.00	192.01
tblVehicleEF	MH	1.80	0.00
tblVehicleEF	MH	4.84	0.01
tblVehicleEF	MH	0.00	0.27
tblVehicleEF	MH	1,102.46	0.00
tblVehicleEF	MH	58.88	0.06
tblVehicleEF	MH	0.00	0.22
tblVehicleEF	MH	1.04	0.00
tblVehicleEF	MH	0.72	0.05
tblVehicleEF	MH	0.00	0.50
tblVehicleEF	MH	0.13	0.00
tblVehicleEF	MH	0.01	0.08

tblVehicleEF	MH	0.02	1.42
tblVehicleEF	MH	1.0110e-003	0.12
tblVehicleEF	MH	0.00	0.60
tblVehicleEF	MH	0.06	0.12
tblVehicleEF	MH	3.2180e-003	0.05
tblVehicleEF	MH	0.02	0.10
tblVehicleEF	MH	9.3000e-004	1.43
tblVehicleEF	MH	1.40	0.03
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	0.58	2.6060e-003
tblVehicleEF	MH	0.07	1.03
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.28	0.24
tblVehicleEF	MH	0.01	1.24
tblVehicleEF	MH	6.7300e-004	2.03
tblVehicleEF	MH	1.40	15,054.74
tblVehicleEF	MH	0.06	2.8400e-004
tblVehicleEF	MH	0.00	0.19
tblVehicleEF	MH	0.58	1.30
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.31	0.00
tblVehicleEF	MH	0.00	0.97
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.02	0.07
tblVehicleEF	MH	0.00	194.46
tblVehicleEF	MH	1.74	0.00
tblVehicleEF	MH	5.19	0.01
tblVehicleEF	MH	0.00	0.28

tblVehicleEF	MH	1,102.46	0.00
tblVehicleEF	MH	58.88	0.06
tblVehicleEF	MH	0.00	0.24
tblVehicleEF	MH	1.10	0.00
tblVehicleEF	MH	0.75	0.05
tblVehicleEF	MH	0.00	0.36
tblVehicleEF	MH	0.13	0.00
tblVehicleEF	MH	0.01	0.08
tblVehicleEF	MH	0.02	1.53
tblVehicleEF	MH	1.0110e-003	0.09
tblVehicleEF	MH	0.00	0.71
tblVehicleEF	MH	0.06	0.09
tblVehicleEF	MH	3.2180e-003	0.04
tblVehicleEF	MH	0.02	0.11
tblVehicleEF	MH	9.3000e-004	1.54
tblVehicleEF	MH	1.03	0.03
tblVehicleEF	MH	0.08	0.02
tblVehicleEF	MH	0.40	2.6060e-003
tblVehicleEF	MH	0.07	1.09
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.30	0.25
tblVehicleEF	MH	0.01	1.20
tblVehicleEF	MH	6.7900e-004	2.18
tblVehicleEF	MH	1.03	15,054.02
tblVehicleEF	MH	0.08	2.8400e-004
tblVehicleEF	MH	0.00	0.19
tblVehicleEF	MH	0.40	1.30
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	0.01

tblVehicleEF	MH	0.33	0.00
tblVehicleEF	MHD	0.02	4.3860e-003
tblVehicleEF	MHD	3.3120e-003	4.5970e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.34	0.39
tblVehicleEF	MHD	0.28	0.47
tblVehicleEF	MHD	5.26	1.42
tblVehicleEF	MHD	138.52	67.37
tblVehicleEF	MHD	1,128.29	1,069.65
tblVehicleEF	MHD	59.14	12.05
tblVehicleEF	MHD	0.37	0.48
tblVehicleEF	MHD	0.70	1.63
tblVehicleEF	MHD	10.62	1.29
tblVehicleEF	MHD	1.0200e-004	1.0770e-003
tblVehicleEF	MHD	2.8190e-003	0.03
tblVehicleEF	MHD	7.6400e-004	1.3700e-004
tblVehicleEF	MHD	9.8000e-005	1.0300e-003
tblVehicleEF	MHD	2.6930e-003	0.03
tblVehicleEF	MHD	7.0300e-004	1.2600e-004
tblVehicleEF	MHD	1.0280e-003	6.6200e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	6.7100e-004	4.2600e-004
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.32	0.07
tblVehicleEF	MHD	1.3330e-003	6.4000e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	6.8400e-004	1.1900e-004

tblVehicleEF	MHD	1.0280e-003	6.6200e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	6.7100e-004	4.2600e-004
tblVehicleEF	MHD	0.04	0.07
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.35	0.07
tblVehicleEF	MHD	0.01	3.1600e-003
tblVehicleEF	MHD	3.3570e-003	0.23
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.25	0.60
tblVehicleEF	MHD	0.28	801.62
tblVehicleEF	MHD	5.00	6.3020e-003
tblVehicleEF	MHD	146.72	4.4400e-004
tblVehicleEF	MHD	1,128.29	0.11
tblVehicleEF	MHD	59.14	0.06
tblVehicleEF	MHD	0.38	5.9500e-004
tblVehicleEF	MHD	0.66	0.04
tblVehicleEF	MHD	10.59	0.11
tblVehicleEF	MHD	8.6000e-005	6.0400e-004
tblVehicleEF	MHD	0.13	0.31
tblVehicleEF	MHD	0.01	0.07
tblVehicleEF	MHD	2.8190e-003	0.07
tblVehicleEF	MHD	7.6400e-004	0.02
tblVehicleEF	MHD	8.3000e-005	1.3950e-003
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	3.0000e-003	6.2570e-003
tblVehicleEF	MHD	2.6930e-003	0.04
tblVehicleEF	MHD	7.0300e-004	0.14

tblVehicleEF	MHD	1.5610e-003	2.5700e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.02	0.48
tblVehicleEF	MHD	9.8200e-004	6.0000e-006
tblVehicleEF	MHD	0.03	1.54
tblVehicleEF	MHD	0.02	8.5670e-003
tblVehicleEF	MHD	0.31	1.29
tblVehicleEF	MHD	1.4110e-003	0.32
tblVehicleEF	MHD	0.01	0.48
tblVehicleEF	MHD	6.7900e-004	1.35
tblVehicleEF	MHD	1.5610e-003	92.89
tblVehicleEF	MHD	0.04	1.3700e-004
tblVehicleEF	MHD	0.03	2.6640e-003
tblVehicleEF	MHD	9.8200e-004	0.01
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.34	8.9540e-003
tblVehicleEF	MHD	0.02	3.3190e-003
tblVehicleEF	MHD	3.3000e-003	0.25
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.47	0.60
tblVehicleEF	MHD	0.28	779.65
tblVehicleEF	MHD	5.30	6.1700e-003
tblVehicleEF	MHD	127.19	4.5700e-004
tblVehicleEF	MHD	1,128.29	0.11
tblVehicleEF	MHD	59.14	0.06
tblVehicleEF	MHD	0.35	6.2100e-004
tblVehicleEF	MHD	0.69	0.05
tblVehicleEF	MHD	10.63	0.11

tblVehicleEF	MHD	1.2500e-004	4.1600e-004
tblVehicleEF	MHD	0.13	0.34
tblVehicleEF	MHD	0.01	0.07
tblVehicleEF	MHD	2.8190e-003	0.08
tblVehicleEF	MHD	7.6400e-004	0.01
tblVehicleEF	MHD	1.1900e-004	1.4610e-003
tblVehicleEF	MHD	0.06	7.1060e-003
tblVehicleEF	MHD	3.0000e-003	4.3140e-003
tblVehicleEF	MHD	2.6930e-003	0.04
tblVehicleEF	MHD	7.0300e-004	0.16
tblVehicleEF	MHD	1.0490e-003	2.5700e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.03	0.48
tblVehicleEF	MHD	6.6300e-004	6.0000e-006
tblVehicleEF	MHD	0.03	1.60
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.33	1.29
tblVehicleEF	MHD	1.2270e-003	0.49
tblVehicleEF	MHD	0.01	0.47
tblVehicleEF	MHD	6.8400e-004	1.44
tblVehicleEF	MHD	1.0490e-003	92.89
tblVehicleEF	MHD	0.04	1.3700e-004
tblVehicleEF	MHD	0.04	2.6640e-003
tblVehicleEF	MHD	6.6300e-004	0.01
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.36	0.01
tblVehicleEF	OBUS	0.01	8.4810e-003
tblVehicleEF	OBUS	6.0680e-003	7.0170e-003

tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.25	0.60
tblVehicleEF	OBUS	0.45	0.79
tblVehicleEF	OBUS	5.23	2.39
tblVehicleEF	OBUS	92.13	94.60
tblVehicleEF	OBUS	1,229.05	1,392.48
tblVehicleEF	OBUS	68.41	19.23
tblVehicleEF	OBUS	0.19	0.46
tblVehicleEF	OBUS	0.64	1.57
tblVehicleEF	OBUS	2.34	0.76
tblVehicleEF	OBUS	1.8000e-005	7.9300e-004
tblVehicleEF	OBUS	2.5270e-003	0.02
tblVehicleEF	OBUS	8.5100e-004	1.9700e-004
tblVehicleEF	OBUS	1.7000e-005	7.5900e-004
tblVehicleEF	OBUS	2.4010e-003	0.02
tblVehicleEF	OBUS	7.8200e-004	1.8100e-004
tblVehicleEF	OBUS	1.4810e-003	1.8440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	7.8200e-004	9.4300e-004
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.33	0.11
tblVehicleEF	OBUS	8.9100e-004	9.0000e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.7600e-004	1.9000e-004
tblVehicleEF	OBUS	1.4810e-003	1.8440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.07

tblVehicleEF	OBUS	7.8200e-004	9.4300e-004
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.36	0.13
tblVehicleEF	OBUS	0.01	5.5090e-003
tblVehicleEF	OBUS	6.1800e-003	0.93
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.24	0.95
tblVehicleEF	OBUS	0.45	1,847.71
tblVehicleEF	OBUS	4.94	0.01
tblVehicleEF	OBUS	96.60	8.9700e-004
tblVehicleEF	OBUS	1,229.05	0.27
tblVehicleEF	OBUS	68.41	0.06
tblVehicleEF	OBUS	0.20	1.0490e-003
tblVehicleEF	OBUS	0.60	0.11
tblVehicleEF	OBUS	2.30	0.07
tblVehicleEF	OBUS	1.5000e-005	1.3250e-003
tblVehicleEF	OBUS	0.13	1.16
tblVehicleEF	OBUS	0.01	0.08
tblVehicleEF	OBUS	2.5270e-003	0.15
tblVehicleEF	OBUS	8.5100e-004	0.05
tblVehicleEF	OBUS	1.4000e-005	1.1330e-003
tblVehicleEF	OBUS	0.06	0.03
tblVehicleEF	OBUS	3.0000e-003	0.02
tblVehicleEF	OBUS	2.4010e-003	0.07
tblVehicleEF	OBUS	7.8200e-004	0.26
tblVehicleEF	OBUS	2.2200e-003	1.9300e-004
tblVehicleEF	OBUS	0.02	8.2800e-003
tblVehicleEF	OBUS	0.03	0.45

tblVehicleEF	OBUS	1.1540e-003	9.0000e-006
tblVehicleEF	OBUS	0.04	1.47
tblVehicleEF	OBUS	0.04	6.3020e-003
tblVehicleEF	OBUS	0.31	0.75
tblVehicleEF	OBUS	9.3400e-004	0.58
tblVehicleEF	OBUS	0.01	0.80
tblVehicleEF	OBUS	7.7100e-004	2.26
tblVehicleEF	OBUS	2.2200e-003	94.66
tblVehicleEF	OBUS	0.02	1.9700e-004
tblVehicleEF	OBUS	0.05	8.5200e-004
tblVehicleEF	OBUS	1.1540e-003	8.3860e-003
tblVehicleEF	OBUS	0.05	0.06
tblVehicleEF	OBUS	0.04	0.01
tblVehicleEF	OBUS	0.34	6.5870e-003
tblVehicleEF	OBUS	0.01	5.7950e-003
tblVehicleEF	OBUS	6.0410e-003	0.89
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.25	0.96
tblVehicleEF	OBUS	0.45	1,854.49
tblVehicleEF	OBUS	5.28	0.01
tblVehicleEF	OBUS	85.94	9.2400e-004
tblVehicleEF	OBUS	1,229.05	0.27
tblVehicleEF	OBUS	68.41	0.06
tblVehicleEF	OBUS	0.18	1.1010e-003
tblVehicleEF	OBUS	0.63	0.11
tblVehicleEF	OBUS	2.34	0.07
tblVehicleEF	OBUS	2.1000e-005	9.2500e-004
tblVehicleEF	OBUS	0.13	1.11
tblVehicleEF	OBUS	0.01	0.08

tblVehicleEF	OBUS	2.5270e-003	0.16
tblVehicleEF	OBUS	8.5100e-004	0.04
tblVehicleEF	OBUS	2.0000e-005	1.1750e-003
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	3.0000e-003	0.01
tblVehicleEF	OBUS	2.4010e-003	0.07
tblVehicleEF	OBUS	7.8200e-004	0.28
tblVehicleEF	OBUS	1.5070e-003	1.9300e-004
tblVehicleEF	OBUS	0.02	8.2800e-003
tblVehicleEF	OBUS	0.03	0.47
tblVehicleEF	OBUS	7.7100e-004	9.0000e-006
tblVehicleEF	OBUS	0.04	1.54
tblVehicleEF	OBUS	0.04	8.9540e-003
tblVehicleEF	OBUS	0.33	0.76
tblVehicleEF	OBUS	8.3200e-004	0.62
tblVehicleEF	OBUS	0.01	0.79
tblVehicleEF	OBUS	7.7700e-004	2.42
tblVehicleEF	OBUS	1.5070e-003	94.65
tblVehicleEF	OBUS	0.02	1.9700e-004
tblVehicleEF	OBUS	0.05	8.5200e-004
tblVehicleEF	OBUS	7.7100e-004	8.3860e-003
tblVehicleEF	OBUS	0.05	0.06
tblVehicleEF	OBUS	0.04	0.01
tblVehicleEF	OBUS	0.36	9.3590e-003
tblVehicleEF	SBUS	0.83	0.07
tblVehicleEF	SBUS	0.01	7.0580e-003
tblVehicleEF	SBUS	0.06	6.2120e-003
tblVehicleEF	SBUS	8.05	2.77
tblVehicleEF	SBUS	0.70	0.59

tblVehicleEF	SBUS	7.21	0.85
tblVehicleEF	SBUS	1,117.62	351.72
tblVehicleEF	SBUS	1,084.59	1,109.67
tblVehicleEF	SBUS	55.10	5.24
tblVehicleEF	SBUS	8.67	3.22
tblVehicleEF	SBUS	3.92	4.87
tblVehicleEF	SBUS	12.12	0.88
tblVehicleEF	SBUS	8.2760e-003	4.1230e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	7.8500e-004	5.1000e-005
tblVehicleEF	SBUS	7.9180e-003	3.9440e-003
tblVehicleEF	SBUS	2.6790e-003	2.6820e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	7.2200e-004	4.7000e-005
tblVehicleEF	SBUS	3.5810e-003	9.0700e-004
tblVehicleEF	SBUS	0.03	7.8550e-003
tblVehicleEF	SBUS	0.96	0.32
tblVehicleEF	SBUS	1.9090e-003	4.8200e-004
tblVehicleEF	SBUS	0.10	0.10
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.38	0.04
tblVehicleEF	SBUS	0.01	3.3550e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.7600e-004	5.2000e-005
tblVehicleEF	SBUS	3.5810e-003	9.0700e-004
tblVehicleEF	SBUS	0.03	7.8550e-003
tblVehicleEF	SBUS	1.38	0.46
tblVehicleEF	SBUS	1.9090e-003	4.8200e-004

tblVehicleEF	SBUS	0.12	0.11
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.42	0.04
tblVehicleEF	SBUS	0.83	7.9680e-003
tblVehicleEF	SBUS	0.01	3.57
tblVehicleEF	SBUS	0.06	7.9970e-003
tblVehicleEF	SBUS	7.94	1.24
tblVehicleEF	SBUS	0.71	3,371.97
tblVehicleEF	SBUS	5.75	5.9880e-003
tblVehicleEF	SBUS	1,167.88	1.4740e-003
tblVehicleEF	SBUS	1,084.59	0.43
tblVehicleEF	SBUS	55.10	0.11
tblVehicleEF	SBUS	8.95	1.3830e-003
tblVehicleEF	SBUS	3.70	0.78
tblVehicleEF	SBUS	12.09	0.17
tblVehicleEF	SBUS	6.9770e-003	6.7400e-004
tblVehicleEF	SBUS	0.74	5.14
tblVehicleEF	SBUS	0.01	0.11
tblVehicleEF	SBUS	0.02	0.13
tblVehicleEF	SBUS	7.8500e-004	5.2810e-003
tblVehicleEF	SBUS	6.6750e-003	1.9990e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.6790e-003	7.7120e-003
tblVehicleEF	SBUS	0.02	0.10
tblVehicleEF	SBUS	7.2200e-004	0.05
tblVehicleEF	SBUS	5.4810e-003	2.8700e-004
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	0.95	3.29
tblVehicleEF	SBUS	2.8990e-003	1.2000e-005

tblVehicleEF	SBUS	0.10	4.59
tblVehicleEF	SBUS	0.01	0.04
tblVehicleEF	SBUS	0.34	0.87
tblVehicleEF	SBUS	0.01	2.74
tblVehicleEF	SBUS	0.01	0.60
tblVehicleEF	SBUS	6.5100e-004	0.69
tblVehicleEF	SBUS	5.4810e-003	118.27
tblVehicleEF	SBUS	0.03	5.1000e-005
tblVehicleEF	SBUS	1.38	3.2450e-003
tblVehicleEF	SBUS	2.8990e-003	0.08
tblVehicleEF	SBUS	0.12	0.32
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.37	0.04
tblVehicleEF	SBUS	0.83	9.1700e-003
tblVehicleEF	SBUS	0.01	3.57
tblVehicleEF	SBUS	0.06	8.2560e-003
tblVehicleEF	SBUS	8.20	1.32
tblVehicleEF	SBUS	0.70	3,202.19
tblVehicleEF	SBUS	7.43	5.9530e-003
tblVehicleEF	SBUS	1,048.22	1.5370e-003
tblVehicleEF	SBUS	1,084.59	0.40
tblVehicleEF	SBUS	55.10	0.11
tblVehicleEF	SBUS	8.29	1.5910e-003
tblVehicleEF	SBUS	3.86	0.77
tblVehicleEF	SBUS	12.12	0.17
tblVehicleEF	SBUS	0.01	4.6300e-004
tblVehicleEF	SBUS	0.74	5.15
tblVehicleEF	SBUS	0.01	0.11
tblVehicleEF	SBUS	0.02	0.18

tblVehicleEF	SBUS	7.8500e-004	3.6810e-003
tblVehicleEF	SBUS	9.6340e-003	2.0640e-003
tblVehicleEF	SBUS	0.32	0.01
tblVehicleEF	SBUS	2.6790e-003	5.2960e-003
tblVehicleEF	SBUS	0.02	0.11
tblVehicleEF	SBUS	7.2200e-004	0.06
tblVehicleEF	SBUS	3.5300e-003	2.8700e-004
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	0.96	3.13
tblVehicleEF	SBUS	1.8720e-003	1.2000e-005
tblVehicleEF	SBUS	0.10	4.79
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.39	0.88
tblVehicleEF	SBUS	0.01	2.83
tblVehicleEF	SBUS	0.01	0.58
tblVehicleEF	SBUS	6.7900e-004	0.88
tblVehicleEF	SBUS	3.5300e-003	118.27
tblVehicleEF	SBUS	0.03	5.1000e-005
tblVehicleEF	SBUS	1.39	3.2450e-003
tblVehicleEF	SBUS	1.8720e-003	0.08
tblVehicleEF	SBUS	0.12	0.32
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.43	0.06
tblVehicleEF	UBUS	2.23	5.80
tblVehicleEF	UBUS	0.06	0.01
tblVehicleEF	UBUS	10.02	45.07
tblVehicleEF	UBUS	10.14	0.71
tblVehicleEF	UBUS	1,910.27	1,988.80
tblVehicleEF	UBUS	112.81	8.53

tblVehicleEF	UBUS	7.96	0.48
tblVehicleEF	UBUS	14.44	0.08
tblVehicleEF	UBUS	0.58	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.10	3.2120e-003
tblVehicleEF	UBUS	1.2160e-003	4.6000e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.9830e-003
tblVehicleEF	UBUS	0.10	3.0700e-003
tblVehicleEF	UBUS	1.1180e-003	4.2000e-005
tblVehicleEF	UBUS	4.9050e-003	6.1100e-004
tblVehicleEF	UBUS	0.08	8.4590e-003
tblVehicleEF	UBUS	2.8380e-003	4.9000e-004
tblVehicleEF	UBUS	0.70	0.08
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	0.79	0.05
tblVehicleEF	UBUS	9.5820e-003	1.5580e-003
tblVehicleEF	UBUS	1.3110e-003	8.4000e-005
tblVehicleEF	UBUS	4.9050e-003	6.1100e-004
tblVehicleEF	UBUS	0.08	8.4590e-003
tblVehicleEF	UBUS	2.8380e-003	4.9000e-004
tblVehicleEF	UBUS	3.01	5.92
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	0.86	0.05
tblVehicleEF	UBUS	0.00	0.01
tblVehicleEF	UBUS	2.23	0.00
tblVehicleEF	UBUS	0.05	8.7350e-003
tblVehicleEF	UBUS	0.00	2.10
tblVehicleEF	UBUS	10.08	0.00

tblVehicleEF	UBUS	8.80	0.67
tblVehicleEF	UBUS	0.00	1.7650e-003
tblVehicleEF	UBUS	1,910.27	0.00
tblVehicleEF	UBUS	112.81	2.0170e-003
tblVehicleEF	UBUS	0.00	2.5820e-003
tblVehicleEF	UBUS	7.50	0.00
tblVehicleEF	UBUS	14.38	4.3400e-003
tblVehicleEF	UBUS	0.00	6.8000e-004
tblVehicleEF	UBUS	0.58	0.00
tblVehicleEF	UBUS	0.01	5.92
tblVehicleEF	UBUS	0.10	0.03
tblVehicleEF	UBUS	1.2160e-003	3.5700e-003
tblVehicleEF	UBUS	0.00	2.1840e-003
tblVehicleEF	UBUS	0.25	2.5140e-003
tblVehicleEF	UBUS	3.0000e-003	1.9150e-003
tblVehicleEF	UBUS	0.10	0.03
tblVehicleEF	UBUS	1.1180e-003	0.05
tblVehicleEF	UBUS	7.1810e-003	9.1000e-005
tblVehicleEF	UBUS	0.08	1.5700e-004
tblVehicleEF	UBUS	4.1630e-003	1.0000e-005
tblVehicleEF	UBUS	0.71	0.48
tblVehicleEF	UBUS	0.02	0.00
tblVehicleEF	UBUS	0.72	0.08
tblVehicleEF	UBUS	9.5830e-003	45.07
tblVehicleEF	UBUS	1.2880e-003	0.62
tblVehicleEF	UBUS	7.1810e-003	53.30
tblVehicleEF	UBUS	0.08	4.6000e-005
tblVehicleEF	UBUS	0.00	4.2000e-005
tblVehicleEF	UBUS	4.1630e-003	3.2690e-003

tblVehicleEF	UBUS	3.02	0.03
tblVehicleEF	UBUS	0.02	1.4510e-003
tblVehicleEF	UBUS	0.79	0.00
tblVehicleEF	UBUS	0.00	0.01
tblVehicleEF	UBUS	2.23	0.00
tblVehicleEF	UBUS	0.06	9.0200e-003
tblVehicleEF	UBUS	0.00	2.14
tblVehicleEF	UBUS	10.01	0.00
tblVehicleEF	UBUS	10.32	0.67
tblVehicleEF	UBUS	0.00	1.8120e-003
tblVehicleEF	UBUS	1,910.27	0.00
tblVehicleEF	UBUS	112.81	1.9670e-003
tblVehicleEF	UBUS	0.00	2.8220e-003
tblVehicleEF	UBUS	7.81	0.00
tblVehicleEF	UBUS	14.45	4.5080e-003
tblVehicleEF	UBUS	0.00	4.6500e-004
tblVehicleEF	UBUS	0.58	0.00
tblVehicleEF	UBUS	0.01	5.92
tblVehicleEF	UBUS	0.10	0.05
tblVehicleEF	UBUS	1.2160e-003	2.3810e-003
tblVehicleEF	UBUS	0.00	2.2550e-003
tblVehicleEF	UBUS	0.25	1.6770e-003
tblVehicleEF	UBUS	3.0000e-003	1.3100e-003
tblVehicleEF	UBUS	0.10	0.04
tblVehicleEF	UBUS	1.1180e-003	0.07
tblVehicleEF	UBUS	5.4680e-003	9.1000e-005
tblVehicleEF	UBUS	0.09	1.5700e-004
tblVehicleEF	UBUS	2.9720e-003	1.0000e-005
tblVehicleEF	UBUS	0.70	0.48

tblVehicleEF	UBUS	0.03	0.00
tblVehicleEF	UBUS	0.80	0.08
tblVehicleEF	UBUS	9.5820e-003	45.07
tblVehicleEF	UBUS	1.3140e-003	0.72
tblVehicleEF	UBUS	5.4680e-003	53.30
tblVehicleEF	UBUS	0.09	4.6000e-005
tblVehicleEF	UBUS	0.00	4.2000e-005
tblVehicleEF	UBUS	2.9720e-003	3.2690e-003
tblVehicleEF	UBUS	3.01	0.03
tblVehicleEF	UBUS	0.03	1.4510e-003
tblVehicleEF	UBUS	0.88	0.00
tblVehicleTrips	SU_TR	16.74	19.50
tblVehicleTrips	WD_TR	1.89	34.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2726	2.7504	1.8205	4.9100e-003	0.2760	0.1138	0.3898	0.1413	0.1047	0.2460	0.0000	436.8267	436.8267	0.1239	0.0000	439.9246
2022	0.0792	0.7101	0.6862	1.7800e-003	0.0342	0.0285	0.0627	9.1800e-003	0.0262	0.0354	0.0000	158.8016	158.8016	0.0395	0.0000	159.7889
Maximum	**0.2726**	**2.7504**	**1.8205**	**4.9100e-003**	**0.2760**	**0.1138**	**0.3898**	**0.1413**	**0.1047**	**0.2460**	**0.0000**	**436.8267**	**436.8267**	**0.1239**	**0.0000**	**439.9246**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2726	2.7504	1.8205	4.9100e-003	0.1267	0.1138	0.2404	0.0602	0.1047	0.1649	0.0000	436.8263	436.8263	0.1239	0.0000	439.9242
2022	0.0792	0.7101	0.6862	1.7800e-003	0.0342	0.0285	0.0627	9.1800e-003	0.0262	0.0354	0.0000	158.8015	158.8015	0.0395	0.0000	159.7888
Maximum	**0.2726**	**2.7504**	**1.8205**	**4.9100e-003**	**0.1267**	**0.1138**	**0.2404**	**0.0602**	**0.1047**	**0.1649**	**0.0000**	**436.8263**	**436.8263**	**0.1239**	**0.0000**	**439.9242**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**48.15**	**0.00**	**33.01**	**53.87**	**0.00**	**28.80**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-1-2021	9-30-2021	1.3220	1.3220
2	10-1-2021	12-31-2021	1.6817	1.6817
3	1-1-2022	3-31-2022	0.6903	0.6903
4	4-1-2022	6-30-2022	0.1104	0.1104
		Highest	1.6817	1.6817

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0300e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	7.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	12.1443	12.1443	5.0000e-004	1.0000e-004	12.1877

Mobile	0.0332	0.0646	0.3215	8.8000e-004	0.0825	8.5000e-004	0.0834	0.0221	8.0000e-004	0.0229	0.0000	82.2062	82.2062	5.3900e-003	0.0000	82.3411
Waste						0.0000	0.0000		0.0000	0.0000	0.0426	0.0000	0.0426	2.5200e-003	0.0000	0.1056
Water						0.0000	0.0000		0.0000	0.0000	0.0000	10.5443	10.5443	4.4000e-004	9.0000e-005	10.5820
Total	**0.0343**	**0.0646**	**0.3215**	**8.8000e-004**	**0.0825**	**8.5000e-004**	**0.0834**	**0.0221**	**8.0000e-004**	**0.0229**	**0.0426**	**104.8948**	**104.9374**	**8.8500e-003**	**1.9000e-004**	**105.2164**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0300e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	7.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	12.1443	12.1443	5.0000e-004	1.0000e-004	12.1877
Mobile	0.0332	0.0646	0.3215	8.8000e-004	0.0825	8.5000e-004	0.0834	0.0221	8.0000e-004	0.0229	0.0000	82.2062	82.2062	5.3900e-003	0.0000	82.3411
Waste						0.0000	0.0000		0.0000	0.0000	0.0426	0.0000	0.0426	2.5200e-003	0.0000	0.1056
Water						0.0000	0.0000		0.0000	0.0000	0.0000	10.5443	10.5443	4.4000e-004	9.0000e-005	10.5820
Total	**0.0343**	**0.0646**	**0.3215**	**8.8000e-004**	**0.0825**	**8.5000e-004**	**0.0834**	**0.0221**	**8.0000e-004**	**0.0229**	**0.0426**	**104.8948**	**104.9374**	**8.8500e-003**	**1.9000e-004**	**105.2164**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing and Grubbing	Site Preparation	7/1/2021	7/28/2021	5	20	
2	Grading	Grading	7/29/2021	10/20/2021	5	60	
3	Paving and Construction	Building Construction	10/21/2021	2/9/2022	5	80	
4	Landscaping	Building Construction	2/10/2022	6/15/2022	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clearing and Grubbing	Excavators	1	8.00	158	0.38
Clearing and Grubbing	Graders	0	8.00	187	0.41
Clearing and Grubbing	Off-Highway Trucks	2	8.00	402	0.38
Clearing and Grubbing	Rubber Tired Dozers	1	8.00	247	0.40
Clearing and Grubbing	Scrapers	0	8.00	367	0.48
Clearing and Grubbing	Sweepers/Scrubbers	1	8.00	64	0.46
Clearing and Grubbing	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	2	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	1	8.00	367	0.48
Grading	Sweepers/Scrubbers	1	8.00	64	0.46
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Paving and Construction	Cranes	0	8.00	231	0.29
Paving and Construction	Excavators	1	8.00	158	0.38

Paving and Construction	Forklifts	0	7.00	89	0.20
Paving and Construction	Generator Sets	0	8.00	84	0.74
Paving and Construction	Off-Highway Trucks	3	8.00	402	0.38
Paving and Construction	Pavers	1	8.00	130	0.42
Paving and Construction	Rollers	1	8.00	80	0.38
Paving and Construction	Rubber Tired Dozers	1	8.00	247	0.40
Paving and Construction	Scrapers	1	8.00	367	0.48
Paving and Construction	Sweepers/Scrubbers	1	8.00	64	0.46
Paving and Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Paving and Construction	Welders	0	8.00	46	0.45
Landscaping	Air Compressors	0	6.00	78	0.48
Landscaping	Cranes	0	8.00	231	0.29
Landscaping	Forklifts	0	7.00	89	0.20
Landscaping	Generator Sets	0	8.00	84	0.74
Landscaping	Skid Steer Loaders	1	8.00	65	0.37
Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Landscaping	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clearing and Grubbing	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	989.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving and Construction	9	46.00	18.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Landscaping	2	46.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Clearing and Grubbing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0626	0.0000	0.0626	0.0334	0.0000	0.0334	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0288	0.2737	0.1845	4.5000e-004		0.0127	0.0127		0.0117	0.0117	0.0000	39.8622	39.8622	0.0129	0.0000	40.1845
Total	**0.0288**	**0.2737**	**0.1845**	**4.5000e-004**	**0.0626**	**0.0127**	**0.0753**	**0.0334**	**0.0117**	**0.0451**	**0.0000**	**39.8622**	**39.8622**	**0.0129**	**0.0000**	**40.1845**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.2000e-004	4.6000e-004	5.2300e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4350	1.4350	4.0000e-005	0.0000	1.4359
Total	**6.2000e-004**	**4.6000e-004**	**5.2300e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4350**	**1.4350**	**4.0000e-005**	**0.0000**	**1.4359**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0244	0.0000	0.0244	0.0130	0.0000	0.0130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0288	0.2737	0.1845	4.5000e-004		0.0127	0.0127		0.0117	0.0117	0.0000	39.8621	39.8621	0.0129	0.0000	40.1845
Total	**0.0288**	**0.2737**	**0.1845**	**4.5000e-004**	**0.0244**	**0.0127**	**0.0371**	**0.0130**	**0.0117**	**0.0247**	**0.0000**	**39.8621**	**39.8621**	**0.0129**	**0.0000**	**40.1845**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.2000e-004	4.6000e-004	5.2300e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4350	1.4350	4.0000e-005	0.0000	1.4359
Total	**6.2000e-004**	**4.6000e-004**	**5.2300e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4350**	**1.4350**	**4.0000e-005**	**0.0000**	**1.4359**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1823	0.0000	0.1823	0.0995	0.0000	0.0995	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.1094	1.0923	0.7042	1.7300e-003		0.0477	0.0477		0.0439	0.0439	0.0000	152.3711	152.3711	0.0493	0.0000	153.6031
Total	**0.1094**	**1.0923**	**0.7042**	**1.7300e-003**	**0.1823**	**0.0477**	**0.2300**	**0.0995**	**0.0439**	**0.1434**	**0.0000**	**152.3711**	**152.3711**	**0.0493**	**0.0000**	**153.6031**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8000e-003	0.1323	0.0291	3.8000e-004	8.5000e-003	4.0000e-004	8.9000e-003	2.3300e-003	3.8000e-004	2.7200e-003	0.0000	37.1109	37.1109	2.6800e-003	0.0000	37.1778
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8700e-003	1.3900e-003	0.0157	5.0000e-005	4.9400e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3500e-003	0.0000	4.3049	4.3049	1.2000e-004	0.0000	4.3078
Total	**5.6700e-003**	**0.1337**	**0.0448**	**4.3000e-004**	**0.0134**	**4.4000e-004**	**0.0139**	**3.6400e-003**	**4.1000e-004**	**4.0700e-003**	**0.0000**	**41.4158**	**41.4158**	**2.8000e-003**	**0.0000**	**41.4856**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0711	0.0000	0.0711	0.0388	0.0000	0.0388	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1094	1.0923	0.7042	1.7300e-003		0.0477	0.0477		0.0439	0.0439	0.0000	152.3709	152.3709	0.0493	0.0000	153.6029
Total	**0.1094**	**1.0923**	**0.7042**	**1.7300e-003**	**0.0711**	**0.0477**	**0.1188**	**0.0388**	**0.0439**	**0.0827**	**0.0000**	**152.3709**	**152.3709**	**0.0493**	**0.0000**	**153.6029**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8000e-003	0.1323	0.0291	3.8000e-004	8.5000e-003	4.0000e-004	8.9000e-003	2.3300e-003	3.8000e-004	2.7200e-003	0.0000	37.1109	37.1109	2.6800e-003	0.0000	37.1778
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8700e-003	1.3900e-003	0.0157	5.0000e-005	4.9400e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3500e-003	0.0000	4.3049	4.3049	1.2000e-004	0.0000	4.3078
Total	**5.6700e-003**	**0.1337**	**0.0448**	**4.3000e-004**	**0.0134**	**4.4000e-004**	**0.0139**	**3.6400e-003**	**4.1000e-004**	**4.0700e-003**	**0.0000**	**41.4158**	**41.4158**	**2.8000e-003**	**0.0000**	**41.4856**

3.4 Paving and Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1219	1.2010	0.8285	2.0400e-003		0.0527	0.0527		0.0485	0.0485	0.0000	178.9378	178.9378	0.0579	0.0000	180.3846
Total	**0.1219**	**1.2010**	**0.8285**	**2.0400e-003**		**0.0527**	**0.0527**		**0.0485**	**0.0485**	**0.0000**	**178.9378**	**178.9378**	**0.0579**	**0.0000**	**180.3846**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3500e-003	0.0455	0.0115	1.2000e-004	2.9500e-003	9.0000e-005	3.0400e-003	8.5000e-004	9.0000e-005	9.4000e-004	0.0000	11.3634	11.3634	7.3000e-004	0.0000	11.3817
Worker	4.9700e-003	3.6900e-003	0.0417	1.3000e-004	0.0131	1.0000e-004	0.0132	3.4800e-003	9.0000e-005	3.5800e-003	0.0000	11.4416	11.4416	3.1000e-004	0.0000	11.4493
Total	**6.3200e-003**	**0.0492**	**0.0533**	**2.5000e-004**	**0.0161**	**1.9000e-004**	**0.0163**	**4.3300e-003**	**1.8000e-004**	**4.5200e-003**	**0.0000**	**22.8049**	**22.8049**	**1.0400e-003**	**0.0000**	**22.8309**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1219	1.2010	0.8285	2.0400e-003		0.0527	0.0527		0.0485	0.0485	0.0000	178.9376	178.9376	0.0579	0.0000	180.3844
Total	**0.1219**	**1.2010**	**0.8285**	**2.0400e-003**		**0.0527**	**0.0527**		**0.0485**	**0.0485**	**0.0000**	**178.9376**	**178.9376**	**0.0579**	**0.0000**	**180.3844**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	1.3500e-003	0.0455	0.0115	1.2000e-004	2.9500e-003	9.0000e-005	3.0400e-003	8.5000e-004	9.0000e-005	9.4000e-004	0.0000	11.3634	11.3634	7.3000e-004	0.0000	11.3817
Worker	4.9700e-003	3.6900e-003	0.0417	1.3000e-004	0.0131	1.0000e-004	0.0132	3.4800e-003	9.0000e-005	3.5800e-003	0.0000	11.4416	11.4416	3.1000e-004	0.0000	11.4493
Total	**6.3200e-003**	**0.0492**	**0.0533**	**2.5000e-004**	**0.0161**	**1.9000e-004**	**0.0163**	**4.3300e-003**	**1.8000e-004**	**4.5200e-003**	**0.0000**	**22.8049**	**22.8049**	**1.0400e-003**	**0.0000**	**22.8309**

3.4 Paving and Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0562	0.5206	0.4193	1.1000e-003		0.0225	0.0225		0.0207	0.0207	0.0000	96.3954	96.3954	0.0312	0.0000	97.1748
Total	**0.0562**	**0.5206**	**0.4193**	**1.1000e-003**		**0.0225**	**0.0225**		**0.0207**	**0.0207**	**0.0000**	**96.3954**	**96.3954**	**0.0312**	**0.0000**	**97.1748**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.8000e-004	0.0233	5.8700e-003	6.0000e-005	1.5900e-003	4.0000e-005	1.6300e-003	4.6000e-004	4.0000e-005	5.0000e-004	0.0000	6.0647	6.0647	3.8000e-004	0.0000	6.0742
Worker	2.5100e-003	1.7900e-003	0.0208	7.0000e-005	7.0700e-003	5.0000e-005	7.1200e-003	1.8800e-003	5.0000e-005	1.9200e-003	0.0000	5.9402	5.9402	1.5000e-004	0.0000	5.9439
Total	**3.1900e-003**	**0.0251**	**0.0266**	**1.3000e-004**	**8.6600e-003**	**9.0000e-005**	**8.7500e-003**	**2.3400e-003**	**9.0000e-005**	**2.4200e-003**	**0.0000**	**12.0048**	**12.0048**	**5.3000e-004**	**0.0000**	**12.0181**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0562	0.5206	0.4193	1.1000e-003		0.0225	0.0225		0.0207	0.0207	0.0000	96.3953	96.3953	0.0312	0.0000	97.1747
Total	**0.0562**	**0.5206**	**0.4193**	**1.1000e-003**		**0.0225**	**0.0225**		**0.0207**	**0.0207**	**0.0000**	**96.3953**	**96.3953**	**0.0312**	**0.0000**	**97.1747**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.8000e-004	0.0233	5.8700e-003	6.0000e-005	1.5900e-003	4.0000e-005	1.6300e-003	4.6000e-004	4.0000e-005	5.0000e-004	0.0000	6.0647	6.0647	3.8000e-004	0.0000	6.0742
Worker	2.5100e-003	1.7900e-003	0.0208	7.0000e-005	7.0700e-003	5.0000e-005	7.1200e-003	1.8800e-003	5.0000e-005	1.9200e-003	0.0000	5.9402	5.9402	1.5000e-004	0.0000	5.9439
Total	**3.1900e-003**	**0.0251**	**0.0266**	**1.3000e-004**	**8.6600e-003**	**9.0000e-005**	**8.7500e-003**	**2.3400e-003**	**9.0000e-005**	**2.4200e-003**	**0.0000**	**12.0048**	**12.0048**	**5.3000e-004**	**0.0000**	**12.0181**

3.5 Landscaping - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0105	0.1172	0.1631	2.3000e-004		5.6100e-003	5.6100e-003		5.1600e-003	5.1600e-003	0.0000	20.4782	20.4782	6.6200e-003	0.0000	20.6438
Total	**0.0105**	**0.1172**	**0.1631**	**2.3000e-004**		**5.6100e-003**	**5.6100e-003**		**5.1600e-003**	**5.1600e-003**	**0.0000**	**20.4782**	**20.4782**	**6.6200e-003**	**0.0000**	**20.6438**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2100e-003	0.0415	0.0105	1.1000e-004	2.8400e-003	8.0000e-005	2.9100e-003	8.2000e-004	7.0000e-005	8.9000e-004	0.0000	10.8298	10.8298	6.8000e-004	0.0000	10.8468
Worker	8.0800e-003	5.7700e-003	0.0667	2.1000e-004	0.0227	1.7000e-004	0.0229	6.0300e-003	1.5000e-004	6.1800e-003	0.0000	19.0934	19.0934	4.8000e-004	0.0000	19.1054
Total	**9.2900e-003**	**0.0473**	**0.0772**	**3.2000e-004**	**0.0256**	**2.5000e-004**	**0.0258**	**6.8500e-003**	**2.2000e-004**	**7.0700e-003**	**0.0000**	**29.9232**	**29.9232**	**1.1600e-003**	**0.0000**	**29.9522**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0105	0.1172	0.1631	2.3000e-004		5.6100e-003	5.6100e-003		5.1600e-003	5.1600e-003	0.0000	20.4782	20.4782	6.6200e-003	0.0000	20.6438

Total	**0.0105**	**0.1172**	**0.1631**	**2.3000e-004**		**5.6100e-003**	**5.6100e-003**		**5.1600e-003**	**5.1600e-003**	**0.0000**	**20.4782**	**20.4782**	**6.6200e-003**	**0.0000**	**20.6438**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2100e-003	0.0415	0.0105	1.1000e-004	2.8400e-003	8.0000e-005	2.9100e-003	8.2000e-004	7.0000e-005	8.9000e-004	0.0000	10.8298	10.8298	6.8000e-004	0.0000	10.8468
Worker	8.0800e-003	5.7700e-003	0.0667	2.1000e-004	0.0227	1.7000e-004	0.0229	6.0300e-003	1.5000e-004	6.1800e-003	0.0000	19.0934	19.0934	4.8000e-004	0.0000	19.1054
Total	**9.2900e-003**	**0.0473**	**0.0772**	**3.2000e-004**	**0.0256**	**2.5000e-004**	**0.0258**	**6.8500e-003**	**2.2000e-004**	**7.0700e-003**	**0.0000**	**29.9232**	**29.9232**	**1.1600e-003**	**0.0000**	**29.9522**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0332	0.0646	0.3215	8.8000e-004	0.0825	8.5000e-004	0.0834	0.0221	8.0000e-004	0.0229	0.0000	82.2062	82.2062	5.3900e-003	0.0000	82.3411

Unmitigated	0.0332	0.0646	0.3215	8.8000e-004	0.0825	8.5000e-004	0.0834	0.0221	8.0000e-004	0.0229	0.0000	82.2062	82.2062	5.3900e-003	0.0000	82.3411

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	85.00	56.88	48.75	218,128	218,128
Total	85.00	56.88	48.75	218,128	218,128

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.552603	0.061033	0.186728	0.118579	0.023437	0.006039	0.017620	0.024846	0.001416	0.001678	0.004487	0.000623	0.000912

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	12.1443	12.1443	5.0000e-004	1.0000e-004	12.1877
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	12.1443	12.1443	5.0000e-004	1.0000e-004	12.1877
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	38115	12.1443	5.0000e-004	1.0000e-004	12.1877
Total		**12.1443**	**5.0000e-004**	**1.0000e-004**	**12.1877**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	38115	12.1443	5.0000e-004	1.0000e-004	12.1877
Total		**12.1443**	**5.0000e-004**	**1.0000e-004**	**12.1877**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0300e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	7.0000e-005
Unmitigated	1.0300e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	7.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	7.0000e-005
Total	**1.0200e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**7.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	7.0000e-005
Total	**1.0200e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**7.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	10.5443	4.4000e-004	9.0000e-005	10.5820
Unmitigated	10.5443	4.4000e-004	9.0000e-005	10.5820

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
City Park	0 / 2.9787	10.5443	4.4000e-004	9.0000e-005	10.5820
Total		**10.5443**	**4.4000e-004**	**9.0000e-005**	**10.5820**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 2.9787	10.5443	4.4000e-004	9.0000e-005	10.5820
Total		**10.5443**	**4.4000e-004**	**9.0000e-005**	**10.5820**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			

Mitigated	0.0426	2.5200e-003	0.0000	0.1056
Unmitigated	0.0426	2.5200e-003	0.0000	0.1056

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.21	0.0426	2.5200e-003	0.0000	0.1056
Total		**0.0426**	**2.5200e-003**	**0.0000**	**0.1056**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.21	0.0426	2.5200e-003	0.0000	0.1056
Total		**0.0426**	**2.5200e-003**	**0.0000**	**0.1056**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Crawford Park - South Coast Air Basin, Summer

Crawford Park

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	2.50	Acre	2.50	108,900.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Import 10,000 CY soil, vendor trips for construction and landscaping

Grading - Import 10,000 CY

Vehicle Trips - Trip Generation Source: Translutions, 2020

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use - Lighting from CalEEMod user guide for open parking lot lighting

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	80.00
tblConstructionPhase	NumDays	220.00	90.00
tblConstructionPhase	NumDays	6.00	60.00
tblConstructionPhase	NumDays	3.00	20.00
tblEnergyUse	LightingElect	0.00	0.35
tblFleetMix	HHD	0.03	0.02
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.19
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8470e-003	6.0390e-003
tblFleetMix	MCY	4.8220e-003	4.4870e-003
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	8.6900e-004	9.1200e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	2.1100e-003	1.4160e-003
tblFleetMix	SBUS	7.1000e-004	6.2300e-004
tblFleetMix	UBUS	1.7690e-003	1.6780e-003
tblGrading	AcresOfGrading	60.00	3.00
tblGrading	AcresOfGrading	0.00	4.50

tblGrading	MaterialImported	0.00	10,000.00
tblLandUse	RecSwimmingAreaAllowEdit	0.00	108,900.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	VendorTripNumber	18.00	10.00
tblVehicleEF	HHD	0.52	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.07	1.0000e-006
tblVehicleEF	HHD	1.59	6.32
tblVehicleEF	HHD	0.96	0.58
tblVehicleEF	HHD	3.04	9.3040e-003
tblVehicleEF	HHD	4,355.32	1,186.71
tblVehicleEF	HHD	1,551.76	1,477.44
tblVehicleEF	HHD	9.81	0.09
tblVehicleEF	HHD	13.94	6.38
tblVehicleEF	HHD	1.91	3.57
tblVehicleEF	HHD	19.62	2.07

tblVehicleEF	HHD	9.5610e-003	3.9310e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	6.0750e-003	0.03
tblVehicleEF	HHD	8.4000e-005	2.0000e-006
tblVehicleEF	HHD	9.1470e-003	3.7610e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8000e-003	8.8970e-003
tblVehicleEF	HHD	5.8120e-003	0.03
tblVehicleEF	HHD	7.7000e-005	1.0000e-006
tblVehicleEF	HHD	9.9000e-005	7.0000e-006
tblVehicleEF	HHD	4.1500e-003	2.6800e-004
tblVehicleEF	HHD	0.40	0.46
tblVehicleEF	HHD	7.3000e-005	5.0000e-006
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	3.3800e-004	1.4610e-003
tblVehicleEF	HHD	0.07	3.0000e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.4800e-004	1.0000e-006
tblVehicleEF	HHD	9.9000e-005	7.0000e-006
tblVehicleEF	HHD	4.1500e-003	2.6800e-004
tblVehicleEF	HHD	0.48	0.53
tblVehicleEF	HHD	7.3000e-005	5.0000e-006
tblVehicleEF	HHD	0.19	0.17
tblVehicleEF	HHD	3.3800e-004	1.4610e-003
tblVehicleEF	HHD	0.08	3.0000e-006
tblVehicleEF	HHD	0.49	0.00
tblVehicleEF	HHD	0.09	4.84

tblVehicleEF	HHD	0.07	2.7300e-004
tblVehicleEF	HHD	1.16	4.3510e-003
tblVehicleEF	HHD	0.97	11,782.57
tblVehicleEF	HHD	2.89	0.09
tblVehicleEF	HHD	4,614.07	2.0000e-006
tblVehicleEF	HHD	1,551.76	1.85
tblVehicleEF	HHD	9.81	0.08
tblVehicleEF	HHD	14.39	0.00
tblVehicleEF	HHD	1.80	0.24
tblVehicleEF	HHD	19.61	0.24
tblVehicleEF	HHD	8.0610e-003	7.0000e-006
tblVehicleEF	HHD	0.06	5.53
tblVehicleEF	HHD	0.04	0.17
tblVehicleEF	HHD	6.0750e-003	6.3500e-004
tblVehicleEF	HHD	8.4000e-005	2.1900e-004
tblVehicleEF	HHD	7.7120e-003	1.4000e-005
tblVehicleEF	HHD	0.03	9.6000e-005
tblVehicleEF	HHD	8.8000e-003	6.6000e-005
tblVehicleEF	HHD	5.8120e-003	1.0000e-006
tblVehicleEF	HHD	7.7000e-005	1.4410e-003
tblVehicleEF	HHD	1.5500e-004	9.1000e-004
tblVehicleEF	HHD	4.3060e-003	0.03
tblVehicleEF	HHD	0.38	6.19
tblVehicleEF	HHD	1.1000e-004	0.00
tblVehicleEF	HHD	0.08	3.38
tblVehicleEF	HHD	3.3000e-004	0.03
tblVehicleEF	HHD	0.07	2.07
tblVehicleEF	HHD	0.04	6.18
tblVehicleEF	HHD	0.01	0.58

tblVehicleEF	HHD	1.4500e-004	8.8350e-003
tblVehicleEF	HHD	1.5500e-004	156.80
tblVehicleEF	HHD	4.3060e-003	2.0000e-006
tblVehicleEF	HHD	0.45	2.8010e-003
tblVehicleEF	HHD	1.1000e-004	6.2480e-003
tblVehicleEF	HHD	0.19	0.03
tblVehicleEF	HHD	3.3000e-004	0.04
tblVehicleEF	HHD	0.07	0.03
tblVehicleEF	HHD	0.56	0.00
tblVehicleEF	HHD	0.09	4.33
tblVehicleEF	HHD	0.07	3.0500e-004
tblVehicleEF	HHD	2.20	4.3950e-003
tblVehicleEF	HHD	0.96	11,875.11
tblVehicleEF	HHD	3.06	0.09
tblVehicleEF	HHD	3,998.00	2.0000e-006
tblVehicleEF	HHD	1,551.76	1.87
tblVehicleEF	HHD	9.81	0.08
tblVehicleEF	HHD	13.32	0.00
tblVehicleEF	HHD	1.87	0.22
tblVehicleEF	HHD	19.62	0.24
tblVehicleEF	HHD	0.01	5.0000e-006
tblVehicleEF	HHD	0.06	4.95
tblVehicleEF	HHD	0.04	0.17
tblVehicleEF	HHD	6.0750e-003	6.8400e-004
tblVehicleEF	HHD	8.4000e-005	1.4600e-004
tblVehicleEF	HHD	0.01	1.5000e-005
tblVehicleEF	HHD	0.03	6.4000e-005
tblVehicleEF	HHD	8.8000e-003	4.3000e-005
tblVehicleEF	HHD	5.8120e-003	1.0000e-006

tblVehicleEF	HHD	7.7000e-005	1.5510e-003
tblVehicleEF	HHD	9.6000e-005	9.1000e-004
tblVehicleEF	HHD	4.4260e-003	0.03
tblVehicleEF	HHD	0.43	6.64
tblVehicleEF	HHD	7.1000e-005	0.00
tblVehicleEF	HHD	0.08	3.51
tblVehicleEF	HHD	3.6700e-004	0.04
tblVehicleEF	HHD	0.07	2.07
tblVehicleEF	HHD	0.04	6.51
tblVehicleEF	HHD	0.01	0.57
tblVehicleEF	HHD	1.4800e-004	9.3940e-003
tblVehicleEF	HHD	9.6000e-005	156.80
tblVehicleEF	HHD	4.4260e-003	2.0000e-006
tblVehicleEF	HHD	0.51	2.8010e-003
tblVehicleEF	HHD	7.1000e-005	6.2480e-003
tblVehicleEF	HHD	0.19	0.03
tblVehicleEF	HHD	3.6700e-004	0.04
tblVehicleEF	HHD	0.08	0.04
tblVehicleEF	LDA	4.2840e-003	3.0340e-003
tblVehicleEF	LDA	4.4900e-003	0.05
tblVehicleEF	LDA	0.57	0.72
tblVehicleEF	LDA	1.00	2.11
tblVehicleEF	LDA	253.57	270.89
tblVehicleEF	LDA	54.70	53.31
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	0.06	0.18
tblVehicleEF	LDA	1.9580e-003	1.7990e-003
tblVehicleEF	LDA	2.2420e-003	1.8430e-003
tblVehicleEF	LDA	1.8050e-003	1.6570e-003

tblVehicleEF	LDA	2.0610e-003	1.6940e-003
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.09	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.06	0.22
tblVehicleEF	LDA	2.5390e-003	2.6800e-003
tblVehicleEF	LDA	5.6400e-004	5.2800e-004
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.09	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.25
tblVehicleEF	LDA	0.00	0.04
tblVehicleEF	LDA	4.5820e-003	0.00
tblVehicleEF	LDA	3.9780e-003	0.10
tblVehicleEF	LDA	0.00	11.18
tblVehicleEF	LDA	0.64	0.00
tblVehicleEF	LDA	0.86	3.2530e-003
tblVehicleEF	LDA	0.00	5.0530e-003
tblVehicleEF	LDA	266.77	0.00
tblVehicleEF	LDA	54.70	0.01
tblVehicleEF	LDA	0.00	9.4890e-003
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	0.05	4.4120e-003
tblVehicleEF	LDA	0.00	0.07
tblVehicleEF	LDA	0.04	0.00

tblVehicleEF	LDA	8.0000e-003	0.02
tblVehicleEF	LDA	1.9580e-003	0.20
tblVehicleEF	LDA	2.2420e-003	0.39
tblVehicleEF	LDA	0.00	0.02
tblVehicleEF	LDA	0.02	0.39
tblVehicleEF	LDA	2.0000e-003	0.33
tblVehicleEF	LDA	1.8050e-003	0.22
tblVehicleEF	LDA	2.0610e-003	0.20
tblVehicleEF	LDA	0.06	0.00
tblVehicleEF	LDA	0.10	1.4850e-003
tblVehicleEF	LDA	0.05	1.7000e-005
tblVehicleEF	LDA	0.01	0.04
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	2.6720e-003	0.79
tblVehicleEF	LDA	5.6100e-004	1.79
tblVehicleEF	LDA	0.06	60.05
tblVehicleEF	LDA	0.10	1.8400e-003
tblVehicleEF	LDA	0.00	3.8000e-004
tblVehicleEF	LDA	0.05	7.7830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.03	8.0020e-003
tblVehicleEF	LDA	0.06	0.00
tblVehicleEF	LDA	0.00	0.05
tblVehicleEF	LDA	4.1990e-003	0.00
tblVehicleEF	LDA	4.5800e-003	0.11
tblVehicleEF	LDA	0.00	11.32
tblVehicleEF	LDA	0.55	0.00
tblVehicleEF	LDA	1.03	2.9740e-003
tblVehicleEF	LDA	0.00	5.3880e-003

tblVehicleEF	LDA	249.51	0.00
tblVehicleEF	LDA	54.70	0.01
tblVehicleEF	LDA	0.00	0.01
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	0.06	4.7000e-003
tblVehicleEF	LDA	0.00	0.05
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	8.0000e-003	0.02
tblVehicleEF	LDA	1.9580e-003	0.24
tblVehicleEF	LDA	2.2420e-003	0.24
tblVehicleEF	LDA	0.00	0.02
tblVehicleEF	LDA	0.02	0.24
tblVehicleEF	LDA	2.0000e-003	0.22
tblVehicleEF	LDA	1.8050e-003	0.25
tblVehicleEF	LDA	2.0610e-003	0.24
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	0.10	1.4850e-003
tblVehicleEF	LDA	0.03	1.7000e-005
tblVehicleEF	LDA	0.01	0.04
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	2.4980e-003	0.69
tblVehicleEF	LDA	5.6400e-004	2.17
tblVehicleEF	LDA	0.03	56.49
tblVehicleEF	LDA	0.10	1.8400e-003
tblVehicleEF	LDA	0.00	3.8000e-004
tblVehicleEF	LDA	0.03	7.7830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	8.0020e-003
tblVehicleEF	LDA	0.07	0.00

tblVehicleEF	LDT1	0.01	7.7890e-003
tblVehicleEF	LDT1	0.01	0.07
tblVehicleEF	LDT1	1.36	1.46
tblVehicleEF	LDT1	2.49	2.28
tblVehicleEF	LDT1	319.38	318.65
tblVehicleEF	LDT1	67.76	63.32
tblVehicleEF	LDT1	0.13	0.12
tblVehicleEF	LDT1	0.15	0.26
tblVehicleEF	LDT1	2.9980e-003	2.7210e-003
tblVehicleEF	LDT1	3.2550e-003	2.6380e-003
tblVehicleEF	LDT1	2.7600e-003	2.5050e-003
tblVehicleEF	LDT1	2.9930e-003	2.4250e-003
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.25	0.20
tblVehicleEF	LDT1	0.10	0.11
tblVehicleEF	LDT1	0.03	0.03
tblVehicleEF	LDT1	0.16	0.70
tblVehicleEF	LDT1	0.17	0.36
tblVehicleEF	LDT1	3.2100e-003	3.1530e-003
tblVehicleEF	LDT1	7.2100e-004	6.2700e-004
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.25	0.20
tblVehicleEF	LDT1	0.10	0.11
tblVehicleEF	LDT1	0.04	0.05
tblVehicleEF	LDT1	0.16	0.70
tblVehicleEF	LDT1	0.19	0.39
tblVehicleEF	LDT1	0.00	0.07
tblVehicleEF	LDT1	0.01	0.00
tblVehicleEF	LDT1	0.01	0.21

tblVehicleEF	LDT1	0.00	13.55
tblVehicleEF	LDT1	1.49	0.00
tblVehicleEF	LDT1	2.12	8.2760e-003
tblVehicleEF	LDT1	0.00	5.8840e-003
tblVehicleEF	LDT1	334.82	0.00
tblVehicleEF	LDT1	67.76	0.04
tblVehicleEF	LDT1	0.00	0.01
tblVehicleEF	LDT1	0.11	0.00
tblVehicleEF	LDT1	0.13	8.0850e-003
tblVehicleEF	LDT1	0.00	0.15
tblVehicleEF	LDT1	0.04	0.00
tblVehicleEF	LDT1	8.0000e-003	0.05
tblVehicleEF	LDT1	2.9980e-003	0.65
tblVehicleEF	LDT1	3.2550e-003	0.93
tblVehicleEF	LDT1	0.00	0.05
tblVehicleEF	LDT1	0.02	0.93
tblVehicleEF	LDT1	2.0000e-003	0.71
tblVehicleEF	LDT1	2.7600e-003	0.35
tblVehicleEF	LDT1	2.9930e-003	0.65
tblVehicleEF	LDT1	0.20	0.00
tblVehicleEF	LDT1	0.27	2.3930e-003
tblVehicleEF	LDT1	0.15	3.5000e-005
tblVehicleEF	LDT1	0.03	0.11
tblVehicleEF	LDT1	0.15	0.00
tblVehicleEF	LDT1	3.3670e-003	1.59
tblVehicleEF	LDT1	7.1400e-004	1.93
tblVehicleEF	LDT1	0.20	71.69
tblVehicleEF	LDT1	0.27	2.6340e-003
tblVehicleEF	LDT1	0.00	5.9400e-004

tblVehicleEF	LDT1	0.15	7.9510e-003
tblVehicleEF	LDT1	0.05	0.02
tblVehicleEF	LDT1	0.15	8.0020e-003
tblVehicleEF	LDT1	0.16	0.00
tblVehicleEF	LDT1	0.00	0.08
tblVehicleEF	LDT1	0.01	0.00
tblVehicleEF	LDT1	0.01	0.23
tblVehicleEF	LDT1	0.00	13.73
tblVehicleEF	LDT1	1.32	0.00
tblVehicleEF	LDT1	2.56	7.6540e-003
tblVehicleEF	LDT1	0.00	6.2690e-003
tblVehicleEF	LDT1	314.49	0.00
tblVehicleEF	LDT1	67.76	0.03
tblVehicleEF	LDT1	0.00	0.02
tblVehicleEF	LDT1	0.12	0.00
tblVehicleEF	LDT1	0.15	8.6860e-003
tblVehicleEF	LDT1	0.00	0.10
tblVehicleEF	LDT1	0.04	0.00
tblVehicleEF	LDT1	8.0000e-003	0.05
tblVehicleEF	LDT1	2.9980e-003	0.83
tblVehicleEF	LDT1	3.2550e-003	0.60
tblVehicleEF	LDT1	0.00	0.05
tblVehicleEF	LDT1	0.02	0.59
tblVehicleEF	LDT1	2.0000e-003	0.48
tblVehicleEF	LDT1	2.7600e-003	0.40
tblVehicleEF	LDT1	2.9930e-003	0.83
tblVehicleEF	LDT1	0.12	0.00
tblVehicleEF	LDT1	0.28	2.3930e-003
tblVehicleEF	LDT1	0.10	3.5000e-005

tblVehicleEF	LDT1	0.03	0.12
tblVehicleEF	LDT1	0.19	0.00
tblVehicleEF	LDT1	3.1610e-003	1.41
tblVehicleEF	LDT1	7.2200e-004	2.35
tblVehicleEF	LDT1	0.12	68.01
tblVehicleEF	LDT1	0.28	2.6340e-003
tblVehicleEF	LDT1	0.00	5.9400e-004
tblVehicleEF	LDT1	0.10	7.9510e-003
tblVehicleEF	LDT1	0.04	0.02
tblVehicleEF	LDT1	0.19	8.0020e-003
tblVehicleEF	LDT1	0.19	0.00
tblVehicleEF	LDT2	5.9720e-003	4.9910e-003
tblVehicleEF	LDT2	5.6870e-003	0.07
tblVehicleEF	LDT2	0.75	1.03
tblVehicleEF	LDT2	1.24	2.65
tblVehicleEF	LDT2	356.41	341.38
tblVehicleEF	LDT2	75.77	68.34
tblVehicleEF	LDT2	0.07	0.09
tblVehicleEF	LDT2	0.09	0.28
tblVehicleEF	LDT2	1.9990e-003	1.9090e-003
tblVehicleEF	LDT2	2.3560e-003	1.8910e-003
tblVehicleEF	LDT2	1.8380e-003	1.7570e-003
tblVehicleEF	LDT2	2.1660e-003	1.7390e-003
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.06	0.41
tblVehicleEF	LDT2	0.08	0.31

tblVehicleEF	LDT2	3.5700e-003	3.3770e-003
tblVehicleEF	LDT2	7.7800e-004	6.7600e-004
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.06	0.41
tblVehicleEF	LDT2	0.08	0.34
tblVehicleEF	LDT2	0.00	0.06
tblVehicleEF	LDT2	6.3770e-003	0.00
tblVehicleEF	LDT2	5.0410e-003	0.13
tblVehicleEF	LDT2	0.00	14.40
tblVehicleEF	LDT2	0.83	0.00
tblVehicleEF	LDT2	1.06	5.3180e-003
tblVehicleEF	LDT2	0.00	6.4670e-003
tblVehicleEF	LDT2	374.21	0.00
tblVehicleEF	LDT2	75.77	0.02
tblVehicleEF	LDT2	0.00	0.01
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.09	6.6250e-003
tblVehicleEF	LDT2	0.00	0.10
tblVehicleEF	LDT2	0.04	0.00
tblVehicleEF	LDT2	8.0000e-003	0.03
tblVehicleEF	LDT2	1.9990e-003	0.38
tblVehicleEF	LDT2	2.3560e-003	0.54
tblVehicleEF	LDT2	0.00	0.03
tblVehicleEF	LDT2	0.02	0.54
tblVehicleEF	LDT2	2.0000e-003	0.49
tblVehicleEF	LDT2	1.8380e-003	0.31

tblVehicleEF	LDT2	2.1660e-003	0.38
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.10	1.6180e-003
tblVehicleEF	LDT2	0.06	1.7000e-005
tblVehicleEF	LDT2	0.02	0.08
tblVehicleEF	LDT2	0.05	0.00
tblVehicleEF	LDT2	3.7490e-003	1.12
tblVehicleEF	LDT2	7.7500e-004	2.26
tblVehicleEF	LDT2	0.07	75.14
tblVehicleEF	LDT2	0.10	1.8890e-003
tblVehicleEF	LDT2	0.00	4.0400e-004
tblVehicleEF	LDT2	0.06	7.8210e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.05	8.0020e-003
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.00	0.07
tblVehicleEF	LDT2	5.8560e-003	0.00
tblVehicleEF	LDT2	5.8000e-003	0.13
tblVehicleEF	LDT2	0.00	14.59
tblVehicleEF	LDT2	0.72	0.00
tblVehicleEF	LDT2	1.27	4.8870e-003
tblVehicleEF	LDT2	0.00	6.8940e-003
tblVehicleEF	LDT2	350.82	0.00
tblVehicleEF	LDT2	75.77	0.02
tblVehicleEF	LDT2	0.00	0.01
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.09	7.0820e-003
tblVehicleEF	LDT2	0.00	0.07
tblVehicleEF	LDT2	0.04	0.00

tblVehicleEF	LDT2	8.0000e-003	0.03
tblVehicleEF	LDT2	1.9990e-003	0.48
tblVehicleEF	LDT2	2.3560e-003	0.33
tblVehicleEF	LDT2	0.00	0.03
tblVehicleEF	LDT2	0.02	0.33
tblVehicleEF	LDT2	2.0000e-003	0.33
tblVehicleEF	LDT2	1.8380e-003	0.35
tblVehicleEF	LDT2	2.1660e-003	0.48
tblVehicleEF	LDT2	0.04	0.00
tblVehicleEF	LDT2	0.10	1.6180e-003
tblVehicleEF	LDT2	0.04	1.7000e-005
tblVehicleEF	LDT2	0.01	0.08
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	3.5130e-003	0.99
tblVehicleEF	LDT2	7.7900e-004	2.74
tblVehicleEF	LDT2	0.04	71.61
tblVehicleEF	LDT2	0.10	1.8890e-003
tblVehicleEF	LDT2	0.00	4.0400e-004
tblVehicleEF	LDT2	0.04	7.8210e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	8.0020e-003
tblVehicleEF	LDT2	0.09	0.00
tblVehicleEF	LHD1	5.2120e-003	5.5830e-003
tblVehicleEF	LHD1	9.8600e-003	5.7240e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.74	0.65
tblVehicleEF	LHD1	2.42	1.14
tblVehicleEF	LHD1	9.02	8.89

tblVehicleEF	LHD1	594.63	666.21
tblVehicleEF	LHD1	31.53	12.43
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	1.08	0.65
tblVehicleEF	LHD1	0.94	0.33
tblVehicleEF	LHD1	8.6300e-004	7.5700e-004
tblVehicleEF	LHD1	0.01	9.6790e-003
tblVehicleEF	LHD1	9.7700e-003	6.4420e-003
tblVehicleEF	LHD1	8.9700e-004	2.8500e-004
tblVehicleEF	LHD1	8.2600e-004	7.2400e-004
tblVehicleEF	LHD1	2.5390e-003	2.4200e-003
tblVehicleEF	LHD1	9.3240e-003	6.1330e-003
tblVehicleEF	LHD1	8.2500e-004	2.6200e-004
tblVehicleEF	LHD1	2.9620e-003	2.5670e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.7810e-003	1.5640e-003
tblVehicleEF	LHD1	0.06	0.05
tblVehicleEF	LHD1	0.30	0.56
tblVehicleEF	LHD1	0.24	0.08
tblVehicleEF	LHD1	9.0000e-005	8.6000e-005
tblVehicleEF	LHD1	5.8320e-003	6.5060e-003
tblVehicleEF	LHD1	3.6100e-004	1.2300e-004
tblVehicleEF	LHD1	2.9620e-003	2.5670e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.7810e-003	1.5640e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.30	0.56

tblVehicleEF	LHD1	0.26	0.09
tblVehicleEF	LHD1	5.2120e-003	5.1340e-003
tblVehicleEF	LHD1	0.01	0.30
tblVehicleEF	LHD1	0.02	0.08
tblVehicleEF	LHD1	0.15	0.83
tblVehicleEF	LHD1	0.75	124.98
tblVehicleEF	LHD1	2.31	6.2080e-003
tblVehicleEF	LHD1	9.02	1.7780e-003
tblVehicleEF	LHD1	594.63	0.01
tblVehicleEF	LHD1	31.53	0.05
tblVehicleEF	LHD1	0.07	1.0420e-003
tblVehicleEF	LHD1	1.01	0.07
tblVehicleEF	LHD1	0.91	0.03
tblVehicleEF	LHD1	8.6300e-004	2.2100e-003
tblVehicleEF	LHD1	0.08	0.42
tblVehicleEF	LHD1	0.01	0.06
tblVehicleEF	LHD1	9.7700e-003	0.48
tblVehicleEF	LHD1	8.9700e-004	0.06
tblVehicleEF	LHD1	8.2600e-004	5.6060e-003
tblVehicleEF	LHD1	0.03	0.05
tblVehicleEF	LHD1	2.5390e-003	0.03
tblVehicleEF	LHD1	9.3240e-003	0.07
tblVehicleEF	LHD1	8.2500e-004	0.54
tblVehicleEF	LHD1	4.5380e-003	1.7000e-004
tblVehicleEF	LHD1	0.10	5.2380e-003
tblVehicleEF	LHD1	0.02	0.05
tblVehicleEF	LHD1	2.6400e-003	1.8000e-005
tblVehicleEF	LHD1	0.06	0.61
tblVehicleEF	LHD1	0.29	9.1050e-003

tblVehicleEF	LHD1	0.23	0.32
tblVehicleEF	LHD1	9.0000e-005	0.19
tblVehicleEF	LHD1	5.8320e-003	0.67
tblVehicleEF	LHD1	3.5900e-004	1.09
tblVehicleEF	LHD1	4.5380e-003	48.48
tblVehicleEF	LHD1	0.10	2.8500e-004
tblVehicleEF	LHD1	0.02	4.2700e-004
tblVehicleEF	LHD1	2.6400e-003	5.4550e-003
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.29	9.3700e-003
tblVehicleEF	LHD1	0.25	9.5160e-003
tblVehicleEF	LHD1	5.2120e-003	5.3710e-003
tblVehicleEF	LHD1	9.8170e-003	0.30
tblVehicleEF	LHD1	0.02	0.09
tblVehicleEF	LHD1	0.15	0.84
tblVehicleEF	LHD1	0.73	124.98
tblVehicleEF	LHD1	2.43	6.0400e-003
tblVehicleEF	LHD1	9.02	1.8370e-003
tblVehicleEF	LHD1	594.63	0.01
tblVehicleEF	LHD1	31.53	0.05
tblVehicleEF	LHD1	0.07	1.0870e-003
tblVehicleEF	LHD1	1.06	0.07
tblVehicleEF	LHD1	0.95	0.03
tblVehicleEF	LHD1	8.6300e-004	1.5420e-003
tblVehicleEF	LHD1	0.08	0.42
tblVehicleEF	LHD1	0.01	0.06
tblVehicleEF	LHD1	9.7700e-003	0.53
tblVehicleEF	LHD1	8.9700e-004	0.04
tblVehicleEF	LHD1	8.2600e-004	6.2420e-003

tblVehicleEF	LHD1	0.03	0.04
tblVehicleEF	LHD1	2.5390e-003	0.02
tblVehicleEF	LHD1	9.3240e-003	0.08
tblVehicleEF	LHD1	8.2500e-004	0.60
tblVehicleEF	LHD1	3.0750e-003	1.7000e-004
tblVehicleEF	LHD1	0.11	5.2380e-003
tblVehicleEF	LHD1	0.02	0.05
tblVehicleEF	LHD1	1.7770e-003	1.8000e-005
tblVehicleEF	LHD1	0.06	0.64
tblVehicleEF	LHD1	0.32	9.1050e-003
tblVehicleEF	LHD1	0.24	0.34
tblVehicleEF	LHD1	9.0000e-005	0.19
tblVehicleEF	LHD1	5.8320e-003	0.65
tblVehicleEF	LHD1	3.6100e-004	1.14
tblVehicleEF	LHD1	3.0750e-003	48.48
tblVehicleEF	LHD1	0.11	2.8500e-004
tblVehicleEF	LHD1	0.02	4.2700e-004
tblVehicleEF	LHD1	1.7770e-003	5.4550e-003
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.32	9.3700e-003
tblVehicleEF	LHD1	0.26	9.5160e-003
tblVehicleEF	LHD2	3.6840e-003	3.9120e-003
tblVehicleEF	LHD2	3.6840e-003	3.9650e-003
tblVehicleEF	LHD2	7.3420e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.32	0.44
tblVehicleEF	LHD2	1.21	0.76
tblVehicleEF	LHD2	13.71	13.45
tblVehicleEF	LHD2	608.08	667.35

tblVehicleEF	LHD2	26.39	9.56
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.67	0.84
tblVehicleEF	LHD2	0.50	0.23
tblVehicleEF	LHD2	1.1670e-003	1.2520e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	8.9870e-003	0.01
tblVehicleEF	LHD2	4.2200e-004	1.6200e-004
tblVehicleEF	LHD2	1.1160e-003	1.1980e-003
tblVehicleEF	LHD2	2.6680e-003	2.6330e-003
tblVehicleEF	LHD2	8.5850e-003	9.5770e-003
tblVehicleEF	LHD2	3.8800e-004	1.4900e-004
tblVehicleEF	LHD2	1.0410e-003	1.5680e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	6.8300e-004	9.7100e-004
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.07	0.35
tblVehicleEF	LHD2	0.10	0.05
tblVehicleEF	LHD2	1.3400e-004	1.2900e-004
tblVehicleEF	LHD2	5.9210e-003	6.4600e-003
tblVehicleEF	LHD2	2.8600e-004	9.5000e-005
tblVehicleEF	LHD2	1.0410e-003	1.5680e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	6.8300e-004	9.7100e-004
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.07	0.35
tblVehicleEF	LHD2	0.11	0.06

tblVehicleEF	LHD2	3.6840e-003	3.5540e-003
tblVehicleEF	LHD2	3.7270e-003	0.23
tblVehicleEF	LHD2	7.0950e-003	0.06
tblVehicleEF	LHD2	0.13	0.64
tblVehicleEF	LHD2	0.32	184.31
tblVehicleEF	LHD2	1.16	4.2190e-003
tblVehicleEF	LHD2	13.71	1.2050e-003
tblVehicleEF	LHD2	608.08	0.02
tblVehicleEF	LHD2	26.39	0.05
tblVehicleEF	LHD2	0.09	7.2200e-004
tblVehicleEF	LHD2	0.64	0.05
tblVehicleEF	LHD2	0.48	0.05
tblVehicleEF	LHD2	1.1670e-003	1.3640e-003
tblVehicleEF	LHD2	0.09	0.31
tblVehicleEF	LHD2	0.01	0.06
tblVehicleEF	LHD2	8.9870e-003	0.28
tblVehicleEF	LHD2	4.2200e-004	0.03
tblVehicleEF	LHD2	1.1160e-003	3.7590e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.6680e-003	0.02
tblVehicleEF	LHD2	8.5850e-003	0.05
tblVehicleEF	LHD2	3.8800e-004	0.34
tblVehicleEF	LHD2	1.5870e-003	1.9200e-004
tblVehicleEF	LHD2	0.04	8.5420e-003
tblVehicleEF	LHD2	0.01	0.09
tblVehicleEF	LHD2	9.9900e-004	1.0000e-005
tblVehicleEF	LHD2	0.04	0.79
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.10	0.22

tblVehicleEF	LHD2	1.3400e-004	0.15
tblVehicleEF	LHD2	5.9210e-003	0.44
tblVehicleEF	LHD2	2.8500e-004	0.73
tblVehicleEF	LHD2	1.5870e-003	50.51
tblVehicleEF	LHD2	0.04	1.6200e-004
tblVehicleEF	LHD2	0.02	7.0500e-004
tblVehicleEF	LHD2	9.9900e-004	6.5990e-003
tblVehicleEF	LHD2	0.05	0.04
tblVehicleEF	LHD2	0.07	0.01
tblVehicleEF	LHD2	0.10	0.02
tblVehicleEF	LHD2	3.6840e-003	3.7180e-003
tblVehicleEF	LHD2	3.6740e-003	0.23
tblVehicleEF	LHD2	7.3760e-003	0.06
tblVehicleEF	LHD2	0.13	0.64
tblVehicleEF	LHD2	0.32	184.31
tblVehicleEF	LHD2	1.22	4.1490e-003
tblVehicleEF	LHD2	13.71	1.2430e-003
tblVehicleEF	LHD2	608.08	0.02
tblVehicleEF	LHD2	26.39	0.05
tblVehicleEF	LHD2	0.09	7.5300e-004
tblVehicleEF	LHD2	0.66	0.05
tblVehicleEF	LHD2	0.50	0.05
tblVehicleEF	LHD2	1.1670e-003	9.4300e-004
tblVehicleEF	LHD2	0.09	0.31
tblVehicleEF	LHD2	0.01	0.06
tblVehicleEF	LHD2	8.9870e-003	0.32
tblVehicleEF	LHD2	4.2200e-004	0.02
tblVehicleEF	LHD2	1.1160e-003	4.0970e-003
tblVehicleEF	LHD2	0.04	0.02

tblVehicleEF	LHD2	2.6680e-003	0.01
tblVehicleEF	LHD2	8.5850e-003	0.05
tblVehicleEF	LHD2	3.8800e-004	0.38
tblVehicleEF	LHD2	1.0460e-003	1.9200e-004
tblVehicleEF	LHD2	0.04	8.5420e-003
tblVehicleEF	LHD2	0.01	0.09
tblVehicleEF	LHD2	6.7100e-004	1.0000e-005
tblVehicleEF	LHD2	0.04	0.82
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.10	0.23
tblVehicleEF	LHD2	1.3400e-004	0.15
tblVehicleEF	LHD2	5.9210e-003	0.44
tblVehicleEF	LHD2	2.8600e-004	0.77
tblVehicleEF	LHD2	1.0460e-003	50.50
tblVehicleEF	LHD2	0.04	1.6200e-004
tblVehicleEF	LHD2	0.02	7.0500e-004
tblVehicleEF	LHD2	6.7100e-004	6.5990e-003
tblVehicleEF	LHD2	0.05	0.04
tblVehicleEF	LHD2	0.08	0.01
tblVehicleEF	LHD2	0.11	0.02
tblVehicleEF	MCY	0.51	0.38
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	18.57	19.19
tblVehicleEF	MCY	9.67	8.53
tblVehicleEF	MCY	183.90	223.45
tblVehicleEF	MCY	44.44	59.65
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	2.3320e-003	2.4320e-003

tblVehicleEF	MCY	3.6000e-003	3.2970e-003
tblVehicleEF	MCY	2.1780e-003	2.2730e-003
tblVehicleEF	MCY	3.3840e-003	3.1040e-003
tblVehicleEF	MCY	1.14	1.09
tblVehicleEF	MCY	0.66	0.66
tblVehicleEF	MCY	0.67	0.67
tblVehicleEF	MCY	2.47	2.61
tblVehicleEF	MCY	0.60	1.99
tblVehicleEF	MCY	2.04	1.82
tblVehicleEF	MCY	2.2170e-003	2.2110e-003
tblVehicleEF	MCY	6.6200e-004	5.9000e-004
tblVehicleEF	MCY	1.14	1.09
tblVehicleEF	MCY	0.66	0.66
tblVehicleEF	MCY	0.67	0.67
tblVehicleEF	MCY	3.08	3.24
tblVehicleEF	MCY	0.60	1.99
tblVehicleEF	MCY	2.22	1.98
tblVehicleEF	MCY	0.00	0.81
tblVehicleEF	MCY	0.50	0.00
tblVehicleEF	MCY	0.13	0.73
tblVehicleEF	MCY	0.00	28.87
tblVehicleEF	MCY	18.00	0.00
tblVehicleEF	MCY	8.85	0.37
tblVehicleEF	MCY	0.00	7.4230e-003
tblVehicleEF	MCY	183.90	0.00
tblVehicleEF	MCY	44.44	2.55
tblVehicleEF	MCY	0.00	0.10
tblVehicleEF	MCY	0.98	0.00
tblVehicleEF	MCY	0.29	0.06

tblVehicleEF	MCY	0.00	1.10
tblVehicleEF	MCY	0.01	0.00
tblVehicleEF	MCY	4.0000e-003	3.17
tblVehicleEF	MCY	2.3320e-003	1.87
tblVehicleEF	MCY	3.6000e-003	3.53
tblVehicleEF	MCY	0.00	0.37
tblVehicleEF	MCY	5.0400e-003	3.53
tblVehicleEF	MCY	1.0000e-003	2.20
tblVehicleEF	MCY	2.1780e-003	1.75
tblVehicleEF	MCY	3.3840e-003	1.87
tblVehicleEF	MCY	1.88	5.0000e-004
tblVehicleEF	MCY	0.75	2.2730e-003
tblVehicleEF	MCY	1.17	1.5520e-003
tblVehicleEF	MCY	2.42	0.99
tblVehicleEF	MCY	0.57	0.00
tblVehicleEF	MCY	1.82	0.25
tblVehicleEF	MCY	2.2060e-003	18.47
tblVehicleEF	MCY	6.4200e-004	7.76
tblVehicleEF	MCY	1.88	111.05
tblVehicleEF	MCY	0.75	3.2970e-003
tblVehicleEF	MCY	0.00	1.2160e-003
tblVehicleEF	MCY	1.17	5.8800e-003
tblVehicleEF	MCY	3.01	5.0400e-003
tblVehicleEF	MCY	0.57	4.0000e-003
tblVehicleEF	MCY	1.98	0.00
tblVehicleEF	MCY	0.00	0.93
tblVehicleEF	MCY	0.52	0.00
tblVehicleEF	MCY	0.15	0.85
tblVehicleEF	MCY	0.00	30.00

tblVehicleEF	MCY	18.58	0.00
tblVehicleEF	MCY	9.75	0.38
tblVehicleEF	MCY	0.00	7.6700e-003
tblVehicleEF	MCY	183.90	0.00
tblVehicleEF	MCY	44.44	2.62
tblVehicleEF	MCY	0.00	0.12
tblVehicleEF	MCY	1.10	0.00
tblVehicleEF	MCY	0.31	0.06
tblVehicleEF	MCY	0.00	0.64
tblVehicleEF	MCY	0.01	0.00
tblVehicleEF	MCY	4.0000e-003	3.26
tblVehicleEF	MCY	2.3320e-003	2.29
tblVehicleEF	MCY	3.6000e-003	2.37
tblVehicleEF	MCY	0.00	0.43
tblVehicleEF	MCY	5.0400e-003	2.37
tblVehicleEF	MCY	1.0000e-003	1.27
tblVehicleEF	MCY	2.1780e-003	2.02
tblVehicleEF	MCY	3.3840e-003	2.29
tblVehicleEF	MCY	1.25	5.0000e-004
tblVehicleEF	MCY	0.85	2.2730e-003
tblVehicleEF	MCY	0.66	1.5520e-003
tblVehicleEF	MCY	2.48	1.11
tblVehicleEF	MCY	0.69	0.00
tblVehicleEF	MCY	2.07	0.27
tblVehicleEF	MCY	2.2180e-003	19.29
tblVehicleEF	MCY	6.6500e-004	8.66
tblVehicleEF	MCY	1.25	111.83
tblVehicleEF	MCY	0.85	3.2970e-003
tblVehicleEF	MCY	0.00	1.2160e-003

tblVehicleEF	MCY	0.66	5.8800e-003
tblVehicleEF	MCY	3.09	5.0400e-003
tblVehicleEF	MCY	0.69	4.0000e-003
tblVehicleEF	MCY	2.25	0.00
tblVehicleEF	MDV	0.01	6.5750e-003
tblVehicleEF	MDV	0.01	0.08
tblVehicleEF	MDV	1.17	1.22
tblVehicleEF	MDV	2.29	3.11
tblVehicleEF	MDV	483.40	419.24
tblVehicleEF	MDV	101.24	83.18
tblVehicleEF	MDV	0.13	0.11
tblVehicleEF	MDV	0.20	0.35
tblVehicleEF	MDV	2.1080e-003	2.0860e-003
tblVehicleEF	MDV	2.4110e-003	2.0610e-003
tblVehicleEF	MDV	1.9430e-003	1.9230e-003
tblVehicleEF	MDV	2.2170e-003	1.8960e-003
tblVehicleEF	MDV	0.07	0.08
tblVehicleEF	MDV	0.15	0.14
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.17	0.40
tblVehicleEF	MDV	4.8410e-003	4.1450e-003
tblVehicleEF	MDV	1.0520e-003	8.2300e-004
tblVehicleEF	MDV	0.07	0.08
tblVehicleEF	MDV	0.15	0.14
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	0.09	0.43

tblVehicleEF	MDV	0.19	0.44
tblVehicleEF	MDV	0.00	0.08
tblVehicleEF	MDV	0.01	0.00
tblVehicleEF	MDV	0.01	0.15
tblVehicleEF	MDV	0.00	17.75
tblVehicleEF	MDV	1.29	0.00
tblVehicleEF	MDV	1.96	7.0040e-003
tblVehicleEF	MDV	0.00	7.1080e-003
tblVehicleEF	MDV	507.25	0.00
tblVehicleEF	MDV	101.24	0.03
tblVehicleEF	MDV	0.00	0.02
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	0.19	9.1800e-003
tblVehicleEF	MDV	0.00	0.13
tblVehicleEF	MDV	0.04	0.00
tblVehicleEF	MDV	8.0000e-003	0.04
tblVehicleEF	MDV	2.1080e-003	0.40
tblVehicleEF	MDV	2.4110e-003	0.62
tblVehicleEF	MDV	0.00	0.03
tblVehicleEF	MDV	0.02	0.61
tblVehicleEF	MDV	2.0000e-003	0.58
tblVehicleEF	MDV	1.9430e-003	0.39
tblVehicleEF	MDV	2.2170e-003	0.40
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	0.16	1.7780e-003
tblVehicleEF	MDV	0.10	2.1000e-005
tblVehicleEF	MDV	0.03	0.10
tblVehicleEF	MDV	0.09	0.00
tblVehicleEF	MDV	5.0810e-003	1.33

tblVehicleEF	MDV	1.0460e-003	2.64
tblVehicleEF	MDV	0.11	93.07
tblVehicleEF	MDV	0.16	2.0580e-003
tblVehicleEF	MDV	0.00	4.4600e-004
tblVehicleEF	MDV	0.10	7.9160e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	0.09	8.0020e-003
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.00	0.09
tblVehicleEF	MDV	0.01	0.00
tblVehicleEF	MDV	0.01	0.15
tblVehicleEF	MDV	0.00	17.99
tblVehicleEF	MDV	1.13	0.00
tblVehicleEF	MDV	2.35	6.4530e-003
tblVehicleEF	MDV	0.00	7.5770e-003
tblVehicleEF	MDV	476.03	0.00
tblVehicleEF	MDV	101.24	0.03
tblVehicleEF	MDV	0.00	0.02
tblVehicleEF	MDV	0.12	0.00
tblVehicleEF	MDV	0.21	9.7530e-003
tblVehicleEF	MDV	0.00	0.09
tblVehicleEF	MDV	0.04	0.00
tblVehicleEF	MDV	8.0000e-003	0.04
tblVehicleEF	MDV	2.1080e-003	0.50
tblVehicleEF	MDV	2.4110e-003	0.37
tblVehicleEF	MDV	0.00	0.03
tblVehicleEF	MDV	0.02	0.37
tblVehicleEF	MDV	2.0000e-003	0.40
tblVehicleEF	MDV	1.9430e-003	0.45

tblVehicleEF	MDV	2.2170e-003	0.50
tblVehicleEF	MDV	0.07	0.00
tblVehicleEF	MDV	0.17	1.7780e-003
tblVehicleEF	MDV	0.07	2.1000e-005
tblVehicleEF	MDV	0.03	0.11
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	4.7660e-003	1.18
tblVehicleEF	MDV	1.0530e-003	3.21
tblVehicleEF	MDV	0.07	89.28
tblVehicleEF	MDV	0.17	2.0580e-003
tblVehicleEF	MDV	0.00	4.4600e-004
tblVehicleEF	MDV	0.07	7.9160e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	0.11	8.0020e-003
tblVehicleEF	MDV	0.19	0.00
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.75	1.21
tblVehicleEF	MH	5.15	2.15
tblVehicleEF	MH	1,102.46	1,501.21
tblVehicleEF	MH	58.88	19.42
tblVehicleEF	MH	1.12	1.11
tblVehicleEF	MH	0.75	0.25
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.0110e-003	2.8400e-004
tblVehicleEF	MH	3.2180e-003	3.2450e-003
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	9.3000e-004	2.6100e-004

tblVehicleEF	MH	0.93	0.84
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	0.38	0.35
tblVehicleEF	MH	0.07	0.06
tblVehicleEF	MH	0.02	1.46
tblVehicleEF	MH	0.30	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.7800e-004	1.9200e-004
tblVehicleEF	MH	0.93	0.84
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	0.38	0.35
tblVehicleEF	MH	0.10	0.08
tblVehicleEF	MH	0.02	1.46
tblVehicleEF	MH	0.33	0.11
tblVehicleEF	MH	0.00	0.92
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.02	0.06
tblVehicleEF	MH	0.00	192.01
tblVehicleEF	MH	1.80	0.00
tblVehicleEF	MH	4.84	0.01
tblVehicleEF	MH	0.00	0.27
tblVehicleEF	MH	1,102.46	0.00
tblVehicleEF	MH	58.88	0.06
tblVehicleEF	MH	0.00	0.22
tblVehicleEF	MH	1.04	0.00
tblVehicleEF	MH	0.72	0.05
tblVehicleEF	MH	0.00	0.50
tblVehicleEF	MH	0.13	0.00
tblVehicleEF	MH	0.01	0.08

tblVehicleEF	MH	0.02	1.42
tblVehicleEF	MH	1.0110e-003	0.12
tblVehicleEF	MH	0.00	0.60
tblVehicleEF	MH	0.06	0.12
tblVehicleEF	MH	3.2180e-003	0.05
tblVehicleEF	MH	0.02	0.10
tblVehicleEF	MH	9.3000e-004	1.43
tblVehicleEF	MH	1.40	0.03
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	0.58	2.6060e-003
tblVehicleEF	MH	0.07	1.03
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.28	0.24
tblVehicleEF	MH	0.01	1.24
tblVehicleEF	MH	6.7300e-004	2.03
tblVehicleEF	MH	1.40	15,054.74
tblVehicleEF	MH	0.06	2.8400e-004
tblVehicleEF	MH	0.00	0.19
tblVehicleEF	MH	0.58	1.30
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.31	0.00
tblVehicleEF	MH	0.00	0.97
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.02	0.07
tblVehicleEF	MH	0.00	194.46
tblVehicleEF	MH	1.74	0.00
tblVehicleEF	MH	5.19	0.01
tblVehicleEF	MH	0.00	0.28

tblVehicleEF	MH	1,102.46	0.00
tblVehicleEF	MH	58.88	0.06
tblVehicleEF	MH	0.00	0.24
tblVehicleEF	MH	1.10	0.00
tblVehicleEF	MH	0.75	0.05
tblVehicleEF	MH	0.00	0.36
tblVehicleEF	MH	0.13	0.00
tblVehicleEF	MH	0.01	0.08
tblVehicleEF	MH	0.02	1.53
tblVehicleEF	MH	1.0110e-003	0.09
tblVehicleEF	MH	0.00	0.71
tblVehicleEF	MH	0.06	0.09
tblVehicleEF	MH	3.2180e-003	0.04
tblVehicleEF	MH	0.02	0.11
tblVehicleEF	MH	9.3000e-004	1.54
tblVehicleEF	MH	1.03	0.03
tblVehicleEF	MH	0.08	0.02
tblVehicleEF	MH	0.40	2.6060e-003
tblVehicleEF	MH	0.07	1.09
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.30	0.25
tblVehicleEF	MH	0.01	1.20
tblVehicleEF	MH	6.7900e-004	2.18
tblVehicleEF	MH	1.03	15,054.02
tblVehicleEF	MH	0.08	2.8400e-004
tblVehicleEF	MH	0.00	0.19
tblVehicleEF	MH	0.40	1.30
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	0.01

tblVehicleEF	MH	0.33	0.00
tblVehicleEF	MHD	0.02	4.3860e-003
tblVehicleEF	MHD	3.3120e-003	4.5970e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.34	0.39
tblVehicleEF	MHD	0.28	0.47
tblVehicleEF	MHD	5.26	1.42
tblVehicleEF	MHD	138.52	67.37
tblVehicleEF	MHD	1,128.29	1,069.65
tblVehicleEF	MHD	59.14	12.05
tblVehicleEF	MHD	0.37	0.48
tblVehicleEF	MHD	0.70	1.63
tblVehicleEF	MHD	10.62	1.29
tblVehicleEF	MHD	1.0200e-004	1.0770e-003
tblVehicleEF	MHD	2.8190e-003	0.03
tblVehicleEF	MHD	7.6400e-004	1.3700e-004
tblVehicleEF	MHD	9.8000e-005	1.0300e-003
tblVehicleEF	MHD	2.6930e-003	0.03
tblVehicleEF	MHD	7.0300e-004	1.2600e-004
tblVehicleEF	MHD	1.0280e-003	6.6200e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	6.7100e-004	4.2600e-004
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.32	0.07
tblVehicleEF	MHD	1.3330e-003	6.4000e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	6.8400e-004	1.1900e-004

tblVehicleEF	MHD	1.0280e-003	6.6200e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	6.7100e-004	4.2600e-004
tblVehicleEF	MHD	0.04	0.07
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.35	0.07
tblVehicleEF	MHD	0.01	3.1600e-003
tblVehicleEF	MHD	3.3570e-003	0.23
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.25	0.60
tblVehicleEF	MHD	0.28	801.62
tblVehicleEF	MHD	5.00	6.3020e-003
tblVehicleEF	MHD	146.72	4.4400e-004
tblVehicleEF	MHD	1,128.29	0.11
tblVehicleEF	MHD	59.14	0.06
tblVehicleEF	MHD	0.38	5.9500e-004
tblVehicleEF	MHD	0.66	0.04
tblVehicleEF	MHD	10.59	0.11
tblVehicleEF	MHD	8.6000e-005	6.0400e-004
tblVehicleEF	MHD	0.13	0.31
tblVehicleEF	MHD	0.01	0.07
tblVehicleEF	MHD	2.8190e-003	0.07
tblVehicleEF	MHD	7.6400e-004	0.02
tblVehicleEF	MHD	8.3000e-005	1.3950e-003
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	3.0000e-003	6.2570e-003
tblVehicleEF	MHD	2.6930e-003	0.04
tblVehicleEF	MHD	7.0300e-004	0.14

tblVehicleEF	MHD	1.5610e-003	2.5700e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.02	0.48
tblVehicleEF	MHD	9.8200e-004	6.0000e-006
tblVehicleEF	MHD	0.03	1.54
tblVehicleEF	MHD	0.02	8.5670e-003
tblVehicleEF	MHD	0.31	1.29
tblVehicleEF	MHD	1.4110e-003	0.32
tblVehicleEF	MHD	0.01	0.48
tblVehicleEF	MHD	6.7900e-004	1.35
tblVehicleEF	MHD	1.5610e-003	92.89
tblVehicleEF	MHD	0.04	1.3700e-004
tblVehicleEF	MHD	0.03	2.6640e-003
tblVehicleEF	MHD	9.8200e-004	0.01
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.34	8.9540e-003
tblVehicleEF	MHD	0.02	3.3190e-003
tblVehicleEF	MHD	3.3000e-003	0.25
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.47	0.60
tblVehicleEF	MHD	0.28	779.65
tblVehicleEF	MHD	5.30	6.1700e-003
tblVehicleEF	MHD	127.19	4.5700e-004
tblVehicleEF	MHD	1,128.29	0.11
tblVehicleEF	MHD	59.14	0.06
tblVehicleEF	MHD	0.35	6.2100e-004
tblVehicleEF	MHD	0.69	0.05
tblVehicleEF	MHD	10.63	0.11

tblVehicleEF	MHD	1.2500e-004	4.1600e-004
tblVehicleEF	MHD	0.13	0.34
tblVehicleEF	MHD	0.01	0.07
tblVehicleEF	MHD	2.8190e-003	0.08
tblVehicleEF	MHD	7.6400e-004	0.01
tblVehicleEF	MHD	1.1900e-004	1.4610e-003
tblVehicleEF	MHD	0.06	7.1060e-003
tblVehicleEF	MHD	3.0000e-003	4.3140e-003
tblVehicleEF	MHD	2.6930e-003	0.04
tblVehicleEF	MHD	7.0300e-004	0.16
tblVehicleEF	MHD	1.0490e-003	2.5700e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.03	0.48
tblVehicleEF	MHD	6.6300e-004	6.0000e-006
tblVehicleEF	MHD	0.03	1.60
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.33	1.29
tblVehicleEF	MHD	1.2270e-003	0.49
tblVehicleEF	MHD	0.01	0.47
tblVehicleEF	MHD	6.8400e-004	1.44
tblVehicleEF	MHD	1.0490e-003	92.89
tblVehicleEF	MHD	0.04	1.3700e-004
tblVehicleEF	MHD	0.04	2.6640e-003
tblVehicleEF	MHD	6.6300e-004	0.01
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.36	0.01
tblVehicleEF	OBUS	0.01	8.4810e-003
tblVehicleEF	OBUS	6.0680e-003	7.0170e-003

tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.25	0.60
tblVehicleEF	OBUS	0.45	0.79
tblVehicleEF	OBUS	5.23	2.39
tblVehicleEF	OBUS	92.13	94.60
tblVehicleEF	OBUS	1,229.05	1,392.48
tblVehicleEF	OBUS	68.41	19.23
tblVehicleEF	OBUS	0.19	0.46
tblVehicleEF	OBUS	0.64	1.57
tblVehicleEF	OBUS	2.34	0.76
tblVehicleEF	OBUS	1.8000e-005	7.9300e-004
tblVehicleEF	OBUS	2.5270e-003	0.02
tblVehicleEF	OBUS	8.5100e-004	1.9700e-004
tblVehicleEF	OBUS	1.7000e-005	7.5900e-004
tblVehicleEF	OBUS	2.4010e-003	0.02
tblVehicleEF	OBUS	7.8200e-004	1.8100e-004
tblVehicleEF	OBUS	1.4810e-003	1.8440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	7.8200e-004	9.4300e-004
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.33	0.11
tblVehicleEF	OBUS	8.9100e-004	9.0000e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.7600e-004	1.9000e-004
tblVehicleEF	OBUS	1.4810e-003	1.8440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.07

tblVehicleEF	OBUS	7.8200e-004	9.4300e-004
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.36	0.13
tblVehicleEF	OBUS	0.01	5.5090e-003
tblVehicleEF	OBUS	6.1800e-003	0.93
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.24	0.95
tblVehicleEF	OBUS	0.45	1,847.71
tblVehicleEF	OBUS	4.94	0.01
tblVehicleEF	OBUS	96.60	8.9700e-004
tblVehicleEF	OBUS	1,229.05	0.27
tblVehicleEF	OBUS	68.41	0.06
tblVehicleEF	OBUS	0.20	1.0490e-003
tblVehicleEF	OBUS	0.60	0.11
tblVehicleEF	OBUS	2.30	0.07
tblVehicleEF	OBUS	1.5000e-005	1.3250e-003
tblVehicleEF	OBUS	0.13	1.16
tblVehicleEF	OBUS	0.01	0.08
tblVehicleEF	OBUS	2.5270e-003	0.15
tblVehicleEF	OBUS	8.5100e-004	0.05
tblVehicleEF	OBUS	1.4000e-005	1.1330e-003
tblVehicleEF	OBUS	0.06	0.03
tblVehicleEF	OBUS	3.0000e-003	0.02
tblVehicleEF	OBUS	2.4010e-003	0.07
tblVehicleEF	OBUS	7.8200e-004	0.26
tblVehicleEF	OBUS	2.2200e-003	1.9300e-004
tblVehicleEF	OBUS	0.02	8.2800e-003
tblVehicleEF	OBUS	0.03	0.45

tblVehicleEF	OBUS	1.1540e-003	9.0000e-006
tblVehicleEF	OBUS	0.04	1.47
tblVehicleEF	OBUS	0.04	6.3020e-003
tblVehicleEF	OBUS	0.31	0.75
tblVehicleEF	OBUS	9.3400e-004	0.58
tblVehicleEF	OBUS	0.01	0.80
tblVehicleEF	OBUS	7.7100e-004	2.26
tblVehicleEF	OBUS	2.2200e-003	94.66
tblVehicleEF	OBUS	0.02	1.9700e-004
tblVehicleEF	OBUS	0.05	8.5200e-004
tblVehicleEF	OBUS	1.1540e-003	8.3860e-003
tblVehicleEF	OBUS	0.05	0.06
tblVehicleEF	OBUS	0.04	0.01
tblVehicleEF	OBUS	0.34	6.5870e-003
tblVehicleEF	OBUS	0.01	5.7950e-003
tblVehicleEF	OBUS	6.0410e-003	0.89
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.25	0.96
tblVehicleEF	OBUS	0.45	1,854.49
tblVehicleEF	OBUS	5.28	0.01
tblVehicleEF	OBUS	85.94	9.2400e-004
tblVehicleEF	OBUS	1,229.05	0.27
tblVehicleEF	OBUS	68.41	0.06
tblVehicleEF	OBUS	0.18	1.1010e-003
tblVehicleEF	OBUS	0.63	0.11
tblVehicleEF	OBUS	2.34	0.07
tblVehicleEF	OBUS	2.1000e-005	9.2500e-004
tblVehicleEF	OBUS	0.13	1.11
tblVehicleEF	OBUS	0.01	0.08

tblVehicleEF	OBUS	2.5270e-003	0.16
tblVehicleEF	OBUS	8.5100e-004	0.04
tblVehicleEF	OBUS	2.0000e-005	1.1750e-003
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	3.0000e-003	0.01
tblVehicleEF	OBUS	2.4010e-003	0.07
tblVehicleEF	OBUS	7.8200e-004	0.28
tblVehicleEF	OBUS	1.5070e-003	1.9300e-004
tblVehicleEF	OBUS	0.02	8.2800e-003
tblVehicleEF	OBUS	0.03	0.47
tblVehicleEF	OBUS	7.7100e-004	9.0000e-006
tblVehicleEF	OBUS	0.04	1.54
tblVehicleEF	OBUS	0.04	8.9540e-003
tblVehicleEF	OBUS	0.33	0.76
tblVehicleEF	OBUS	8.3200e-004	0.62
tblVehicleEF	OBUS	0.01	0.79
tblVehicleEF	OBUS	7.7700e-004	2.42
tblVehicleEF	OBUS	1.5070e-003	94.65
tblVehicleEF	OBUS	0.02	1.9700e-004
tblVehicleEF	OBUS	0.05	8.5200e-004
tblVehicleEF	OBUS	7.7100e-004	8.3860e-003
tblVehicleEF	OBUS	0.05	0.06
tblVehicleEF	OBUS	0.04	0.01
tblVehicleEF	OBUS	0.36	9.3590e-003
tblVehicleEF	SBUS	0.83	0.07
tblVehicleEF	SBUS	0.01	7.0580e-003
tblVehicleEF	SBUS	0.06	6.2120e-003
tblVehicleEF	SBUS	8.05	2.77
tblVehicleEF	SBUS	0.70	0.59

tblVehicleEF	SBUS	7.21	0.85
tblVehicleEF	SBUS	1,117.62	351.72
tblVehicleEF	SBUS	1,084.59	1,109.67
tblVehicleEF	SBUS	55.10	5.24
tblVehicleEF	SBUS	8.67	3.22
tblVehicleEF	SBUS	3.92	4.87
tblVehicleEF	SBUS	12.12	0.88
tblVehicleEF	SBUS	8.2760e-003	4.1230e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	7.8500e-004	5.1000e-005
tblVehicleEF	SBUS	7.9180e-003	3.9440e-003
tblVehicleEF	SBUS	2.6790e-003	2.6820e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	7.2200e-004	4.7000e-005
tblVehicleEF	SBUS	3.5810e-003	9.0700e-004
tblVehicleEF	SBUS	0.03	7.8550e-003
tblVehicleEF	SBUS	0.96	0.32
tblVehicleEF	SBUS	1.9090e-003	4.8200e-004
tblVehicleEF	SBUS	0.10	0.10
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.38	0.04
tblVehicleEF	SBUS	0.01	3.3550e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.7600e-004	5.2000e-005
tblVehicleEF	SBUS	3.5810e-003	9.0700e-004
tblVehicleEF	SBUS	0.03	7.8550e-003
tblVehicleEF	SBUS	1.38	0.46
tblVehicleEF	SBUS	1.9090e-003	4.8200e-004

tblVehicleEF	SBUS	0.12	0.11
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.42	0.04
tblVehicleEF	SBUS	0.83	7.9680e-003
tblVehicleEF	SBUS	0.01	3.57
tblVehicleEF	SBUS	0.06	7.9970e-003
tblVehicleEF	SBUS	7.94	1.24
tblVehicleEF	SBUS	0.71	3,371.97
tblVehicleEF	SBUS	5.75	5.9880e-003
tblVehicleEF	SBUS	1,167.88	1.4740e-003
tblVehicleEF	SBUS	1,084.59	0.43
tblVehicleEF	SBUS	55.10	0.11
tblVehicleEF	SBUS	8.95	1.3830e-003
tblVehicleEF	SBUS	3.70	0.78
tblVehicleEF	SBUS	12.09	0.17
tblVehicleEF	SBUS	6.9770e-003	6.7400e-004
tblVehicleEF	SBUS	0.74	5.14
tblVehicleEF	SBUS	0.01	0.11
tblVehicleEF	SBUS	0.02	0.13
tblVehicleEF	SBUS	7.8500e-004	5.2810e-003
tblVehicleEF	SBUS	6.6750e-003	1.9990e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.6790e-003	7.7120e-003
tblVehicleEF	SBUS	0.02	0.10
tblVehicleEF	SBUS	7.2200e-004	0.05
tblVehicleEF	SBUS	5.4810e-003	2.8700e-004
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	0.95	3.29
tblVehicleEF	SBUS	2.8990e-003	1.2000e-005

tblVehicleEF	SBUS	0.10	4.59
tblVehicleEF	SBUS	0.01	0.04
tblVehicleEF	SBUS	0.34	0.87
tblVehicleEF	SBUS	0.01	2.74
tblVehicleEF	SBUS	0.01	0.60
tblVehicleEF	SBUS	6.5100e-004	0.69
tblVehicleEF	SBUS	5.4810e-003	118.27
tblVehicleEF	SBUS	0.03	5.1000e-005
tblVehicleEF	SBUS	1.38	3.2450e-003
tblVehicleEF	SBUS	2.8990e-003	0.08
tblVehicleEF	SBUS	0.12	0.32
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.37	0.04
tblVehicleEF	SBUS	0.83	9.1700e-003
tblVehicleEF	SBUS	0.01	3.57
tblVehicleEF	SBUS	0.06	8.2560e-003
tblVehicleEF	SBUS	8.20	1.32
tblVehicleEF	SBUS	0.70	3,202.19
tblVehicleEF	SBUS	7.43	5.9530e-003
tblVehicleEF	SBUS	1,048.22	1.5370e-003
tblVehicleEF	SBUS	1,084.59	0.40
tblVehicleEF	SBUS	55.10	0.11
tblVehicleEF	SBUS	8.29	1.5910e-003
tblVehicleEF	SBUS	3.86	0.77
tblVehicleEF	SBUS	12.12	0.17
tblVehicleEF	SBUS	0.01	4.6300e-004
tblVehicleEF	SBUS	0.74	5.15
tblVehicleEF	SBUS	0.01	0.11
tblVehicleEF	SBUS	0.02	0.18

tblVehicleEF	SBUS	7.8500e-004	3.6810e-003
tblVehicleEF	SBUS	9.6340e-003	2.0640e-003
tblVehicleEF	SBUS	0.32	0.01
tblVehicleEF	SBUS	2.6790e-003	5.2960e-003
tblVehicleEF	SBUS	0.02	0.11
tblVehicleEF	SBUS	7.2200e-004	0.06
tblVehicleEF	SBUS	3.5300e-003	2.8700e-004
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	0.96	3.13
tblVehicleEF	SBUS	1.8720e-003	1.2000e-005
tblVehicleEF	SBUS	0.10	4.79
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.39	0.88
tblVehicleEF	SBUS	0.01	2.83
tblVehicleEF	SBUS	0.01	0.58
tblVehicleEF	SBUS	6.7900e-004	0.88
tblVehicleEF	SBUS	3.5300e-003	118.27
tblVehicleEF	SBUS	0.03	5.1000e-005
tblVehicleEF	SBUS	1.39	3.2450e-003
tblVehicleEF	SBUS	1.8720e-003	0.08
tblVehicleEF	SBUS	0.12	0.32
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.43	0.06
tblVehicleEF	UBUS	2.23	5.80
tblVehicleEF	UBUS	0.06	0.01
tblVehicleEF	UBUS	10.02	45.07
tblVehicleEF	UBUS	10.14	0.71
tblVehicleEF	UBUS	1,910.27	1,988.80
tblVehicleEF	UBUS	112.81	8.53

tblVehicleEF	UBUS	7.96	0.48
tblVehicleEF	UBUS	14.44	0.08
tblVehicleEF	UBUS	0.58	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.10	3.2120e-003
tblVehicleEF	UBUS	1.2160e-003	4.6000e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.9830e-003
tblVehicleEF	UBUS	0.10	3.0700e-003
tblVehicleEF	UBUS	1.1180e-003	4.2000e-005
tblVehicleEF	UBUS	4.9050e-003	6.1100e-004
tblVehicleEF	UBUS	0.08	8.4590e-003
tblVehicleEF	UBUS	2.8380e-003	4.9000e-004
tblVehicleEF	UBUS	0.70	0.08
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	0.79	0.05
tblVehicleEF	UBUS	9.5820e-003	1.5580e-003
tblVehicleEF	UBUS	1.3110e-003	8.4000e-005
tblVehicleEF	UBUS	4.9050e-003	6.1100e-004
tblVehicleEF	UBUS	0.08	8.4590e-003
tblVehicleEF	UBUS	2.8380e-003	4.9000e-004
tblVehicleEF	UBUS	3.01	5.92
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	0.86	0.05
tblVehicleEF	UBUS	0.00	0.01
tblVehicleEF	UBUS	2.23	0.00
tblVehicleEF	UBUS	0.05	8.7350e-003
tblVehicleEF	UBUS	0.00	2.10
tblVehicleEF	UBUS	10.08	0.00

tblVehicleEF	UBUS	8.80	0.67
tblVehicleEF	UBUS	0.00	1.7650e-003
tblVehicleEF	UBUS	1,910.27	0.00
tblVehicleEF	UBUS	112.81	2.0170e-003
tblVehicleEF	UBUS	0.00	2.5820e-003
tblVehicleEF	UBUS	7.50	0.00
tblVehicleEF	UBUS	14.38	4.3400e-003
tblVehicleEF	UBUS	0.00	6.8000e-004
tblVehicleEF	UBUS	0.58	0.00
tblVehicleEF	UBUS	0.01	5.92
tblVehicleEF	UBUS	0.10	0.03
tblVehicleEF	UBUS	1.2160e-003	3.5700e-003
tblVehicleEF	UBUS	0.00	2.1840e-003
tblVehicleEF	UBUS	0.25	2.5140e-003
tblVehicleEF	UBUS	3.0000e-003	1.9150e-003
tblVehicleEF	UBUS	0.10	0.03
tblVehicleEF	UBUS	1.1180e-003	0.05
tblVehicleEF	UBUS	7.1810e-003	9.1000e-005
tblVehicleEF	UBUS	0.08	1.5700e-004
tblVehicleEF	UBUS	4.1630e-003	1.0000e-005
tblVehicleEF	UBUS	0.71	0.48
tblVehicleEF	UBUS	0.02	0.00
tblVehicleEF	UBUS	0.72	0.08
tblVehicleEF	UBUS	9.5830e-003	45.07
tblVehicleEF	UBUS	1.2880e-003	0.62
tblVehicleEF	UBUS	7.1810e-003	53.30
tblVehicleEF	UBUS	0.08	4.6000e-005
tblVehicleEF	UBUS	0.00	4.2000e-005
tblVehicleEF	UBUS	4.1630e-003	3.2690e-003

tblVehicleEF	UBUS	3.02	0.03
tblVehicleEF	UBUS	0.02	1.4510e-003
tblVehicleEF	UBUS	0.79	0.00
tblVehicleEF	UBUS	0.00	0.01
tblVehicleEF	UBUS	2.23	0.00
tblVehicleEF	UBUS	0.06	9.0200e-003
tblVehicleEF	UBUS	0.00	2.14
tblVehicleEF	UBUS	10.01	0.00
tblVehicleEF	UBUS	10.32	0.67
tblVehicleEF	UBUS	0.00	1.8120e-003
tblVehicleEF	UBUS	1,910.27	0.00
tblVehicleEF	UBUS	112.81	1.9670e-003
tblVehicleEF	UBUS	0.00	2.8220e-003
tblVehicleEF	UBUS	7.81	0.00
tblVehicleEF	UBUS	14.45	4.5080e-003
tblVehicleEF	UBUS	0.00	4.6500e-004
tblVehicleEF	UBUS	0.58	0.00
tblVehicleEF	UBUS	0.01	5.92
tblVehicleEF	UBUS	0.10	0.05
tblVehicleEF	UBUS	1.2160e-003	2.3810e-003
tblVehicleEF	UBUS	0.00	2.2550e-003
tblVehicleEF	UBUS	0.25	1.6770e-003
tblVehicleEF	UBUS	3.0000e-003	1.3100e-003
tblVehicleEF	UBUS	0.10	0.04
tblVehicleEF	UBUS	1.1180e-003	0.07
tblVehicleEF	UBUS	5.4680e-003	9.1000e-005
tblVehicleEF	UBUS	0.09	1.5700e-004
tblVehicleEF	UBUS	2.9720e-003	1.0000e-005
tblVehicleEF	UBUS	0.70	0.48

tblVehicleEF	UBUS	0.03	0.00
tblVehicleEF	UBUS	0.80	0.08
tblVehicleEF	UBUS	9.5820e-003	45.07
tblVehicleEF	UBUS	1.3140e-003	0.72
tblVehicleEF	UBUS	5.4680e-003	53.30
tblVehicleEF	UBUS	0.09	4.6000e-005
tblVehicleEF	UBUS	0.00	4.2000e-005
tblVehicleEF	UBUS	2.9720e-003	3.2690e-003
tblVehicleEF	UBUS	3.01	0.03
tblVehicleEF	UBUS	0.03	1.4510e-003
tblVehicleEF	UBUS	0.88	0.00
tblVehicleTrips	SU_TR	16.74	19.50
tblVehicleTrips	WD_TR	1.89	34.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.9302	48.0434	34.0093	0.0880	6.5307	2.0341	8.1359	3.4393	1.8715	4.9166	0.0000	8,582.8628	8,582.8628	2.4974	0.0000	8,645.2987
2022	4.2387	38.9337	31.9439	0.0878	0.6294	1.6167	2.2461	0.1695	1.4875	1.6570	0.0000	8,563.8460	8,563.8460	2.4962	0.0000	8,626.2514
Maximum	**4.9302**	**48.0434**	**34.0093**	**0.0880**	**6.5307**	**2.0341**	**8.1359**	**3.4393**	**1.8715**	**4.9166**	**0.0000**	**8,582.8628**	**8,582.8628**	**2.4974**	**0.0000**	**8,645.2987**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.9302	48.0434	34.0093	0.0880	2.8249	2.0341	4.4301	1.4166	1.8715	2.8939	0.0000	8,582.8628	8,582.8628	2.4974	0.0000	8,645.2987
2022	4.2387	38.9337	31.9439	0.0878	0.6294	1.6167	2.2461	0.1695	1.4875	1.6570	0.0000	8,563.8460	8,563.8460	2.4962	0.0000	8,626.2514
Maximum	**4.9302**	**48.0434**	**34.0093**	**0.0880**	**2.8249**	**2.0341**	**4.4301**	**1.4166**	**1.8715**	**2.8939**	**0.0000**	**8,582.8628**	**8,582.8628**	**2.4974**	**0.0000**	**8,645.2987**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.76**	**0.00**	**35.69**	**56.05**	**0.00**	**30.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.3477	0.0189	469.8572	2.0320	0.7642	0.5372	1.3014	1.3797	0.4410	1.8207		0.0800	0.0800	0.2340		5.9288
Total	**0.3533**	**0.0189**	**469.8574**	**2.0320**	**0.7642**	**0.5372**	**1.3014**	**1.3797**	**0.4410**	**1.8207**		**0.0805**	**0.0805**	**0.2340**	**0.0000**	**5.9293**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.3477	0.0189	469.8572	2.0320	0.7642	0.5372	1.3014	1.3797	0.4410	1.8207		0.0800	0.0800	0.2340		5.9288
Total	**0.3533**	**0.0189**	**469.8574**	**2.0320**	**0.7642**	**0.5372**	**1.3014**	**1.3797**	**0.4410**	**1.8207**		**0.0805**	**0.0805**	**0.2340**	**0.0000**	**5.9293**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing and Grubbing	Site Preparation	7/1/2021	7/28/2021	5	20	
2	Grading	Grading	7/29/2021	10/20/2021	5	60	
3	Paving and Construction	Building Construction	10/21/2021	2/9/2022	5	80	
4	Landscaping	Building Construction	2/10/2022	6/15/2022	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clearing and Grubbing	Excavators	1	8.00	158	0.38
Clearing and Grubbing	Graders	0	8.00	187	0.41
Clearing and Grubbing	Off-Highway Trucks	2	8.00	402	0.38
Clearing and Grubbing	Rubber Tired Dozers	1	8.00	247	0.40
Clearing and Grubbing	Scrapers	0	8.00	367	0.48
Clearing and Grubbing	Sweepers/Scrubbers	1	8.00	64	0.46
Clearing and Grubbing	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	2	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	1	8.00	367	0.48
Grading	Sweepers/Scrubbers	1	8.00	64	0.46
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Paving and Construction	Cranes	0	8.00	231	0.29
Paving and Construction	Excavators	1	8.00	158	0.38
Paving and Construction	Forklifts	0	7.00	89	0.20
Paving and Construction	Generator Sets	0	8.00	84	0.74
Paving and Construction	Off-Highway Trucks	3	8.00	402	0.38
Paving and Construction	Pavers	1	8.00	130	0.42
Paving and Construction	Rollers	1	8.00	80	0.38
Paving and Construction	Rubber Tired Dozers	1	8.00	247	0.40
Paving and Construction	Scrapers	1	8.00	367	0.48
Paving and Construction	Sweepers/Scrubbers	1	8.00	64	0.46
Paving and Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Paving and Construction	Welders	0	8.00	46	0.45
Landscaping	Air Compressors	0	6.00	78	0.48

Landscaping	Cranes	0	8.00	231	0.29
Landscaping	Forklifts	0	7.00	89	0.20
Landscaping	Generator Sets	0	8.00	84	0.74
Landscaping	Skid Steer Loaders	1	8.00	65	0.37
Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Landscaping	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clearing and Grubbing	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	989.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving and Construction	9	46.00	18.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Landscaping	2	46.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Clearing and Grubbing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2607	0.0000	6.2607	3.3360	0.0000	3.3360			0.0000			0.0000
Off-Road	2.8798	27.3674	18.4470	0.0454		1.2721	1.2721		1.1704	1.1704		4,394.0541	4,394.0541	1.4211		4,429.5823
Total	**2.8798**	**27.3674**	**18.4470**	**0.0454**	**6.2607**	**1.2721**	**7.5328**	**3.3360**	**1.1704**	**4.5063**		**4,394.0541**	**4,394.0541**	**1.4211**		**4,429.5823**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.0628**	**0.0410**	**0.5632**	**1.6700e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.0347**	**166.0347**	**4.4800e-003**		**166.1466**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4417	0.0000	2.4417	1.3010	0.0000	1.3010			0.0000			0.0000
Off-Road	2.8798	27.3674	18.4470	0.0454		1.2721	1.2721		1.1704	1.1704	0.0000	4,394.0541	4,394.0541	1.4211		4,429.5823
Total	**2.8798**	**27.3674**	**18.4470**	**0.0454**	**2.4417**	**1.2721**	**3.7138**	**1.3010**	**1.1704**	**2.4714**	**0.0000**	**4,394.0541**	**4,394.0541**	**1.4211**		**4,429.5823**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.0628**	**0.0410**	**0.5632**	**1.6700e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.0347**	**166.0347**	**4.4800e-003**		**166.1466**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0751	0.0000	6.0751	3.3160	0.0000	3.3160			0.0000			0.0000
Off-Road	3.6454	36.4114	23.4740	0.0578		1.5907	1.5907		1.4634	1.4634		5,598.6781	5,598.6781	1.8107		5,643.9462
Total	**3.6454**	**36.4114**	**23.4740**	**0.0578**	**6.0751**	**1.5907**	**7.6658**	**3.3160**	**1.4634**	**4.7794**		**5,598.6781**	**5,598.6781**	**1.8107**		**5,643.9462**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1253	4.2738	0.9441	0.0126	0.2879	0.0133	0.3012	0.0789	0.0128	0.0916		1,373.4961	1,373.4961	0.0968		1,375.9161

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.1881**	**4.3148**	**1.5073**	**0.0143**	**0.4556**	**0.0146**	**0.4701**	**0.1234**	**0.0139**	**0.1372**		**1,539.5308**	**1,539.5308**	**0.1013**		**1,542.0627**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3693	0.0000	2.3693	1.2932	0.0000	1.2932			0.0000			0.0000
Off-Road	3.6454	36.4114	23.4740	0.0578		1.5907	1.5907		1.4634	1.4634	0.0000	5,598.6781	5,598.6781	1.8107		5,643.9462
Total	**3.6454**	**36.4114**	**23.4740**	**0.0578**	**2.3693**	**1.5907**	**3.9600**	**1.2932**	**1.4634**	**2.7567**	**0.0000**	**5,598.6781**	**5,598.6781**	**1.8107**		**5,643.9462**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1253	4.2738	0.9441	0.0126	0.2879	0.0133	0.3012	0.0789	0.0128	0.0916		1,373.4961	1,373.4961	0.0968		1,375.9161
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.1881**	**4.3148**	**1.5073**	**0.0143**	**0.4556**	**0.0146**	**0.4701**	**0.1234**	**0.0139**	**0.1372**		**1,539.5308**	**1,539.5308**	**0.1013**		**1,542.0627**

3.4 Paving and Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.6870	46.1940	31.8636	0.0783		2.0268	2.0268		1.8647	1.8647		7,586.3508	7,586.3508	2.4536		7,647.6903
Total	**4.6870**	**46.1940**	**31.8636**	**0.0783**		**2.0268**	**2.0268**		**1.8647**	**1.8647**		**7,586.3508**	**7,586.3508**	**2.4536**		**7,647.6903**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0506	1.7238	0.4186	4.5500e-003	0.1152	3.5200e-003	0.1187	0.0332	3.3700e-003	0.0365		487.3387	487.3387	0.0301		488.0921
Worker	0.1925	0.1256	1.7272	5.1100e-003	0.5142	3.8100e-003	0.5180	0.1364	3.5000e-003	0.1399		509.1732	509.1732	0.0137		509.5163
Total	**0.2432**	**1.8494**	**2.1457**	**9.6600e-003**	**0.6294**	**7.3300e-003**	**0.6367**	**0.1695**	**6.8700e-003**	**0.1764**		**996.5120**	**996.5120**	**0.0439**		**997.6084**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.6870	46.1940	31.8636	0.0783		2.0268	2.0268		1.8647	1.8647	0.0000	7,586.3508	7,586.3508	2.4536		7,647.6903
Total	**4.6870**	**46.1940**	**31.8636**	**0.0783**		**2.0268**	**2.0268**		**1.8647**	**1.8647**	**0.0000**	**7,586.3508**	**7,586.3508**	**2.4536**		**7,647.6903**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0506	1.7238	0.4186	4.5500e-003	0.1152	3.5200e-003	0.1187	0.0332	3.3700e-003	0.0365		487.3387	487.3387	0.0301		488.0921
Worker	0.1925	0.1256	1.7272	5.1100e-003	0.5142	3.8100e-003	0.5180	0.1364	3.5000e-003	0.1399		509.1732	509.1732	0.0137		509.5163
Total	**0.2432**	**1.8494**	**2.1457**	**9.6600e-003**	**0.6294**	**7.3300e-003**	**0.6367**	**0.1695**	**6.8700e-003**	**0.1764**		**996.5120**	**996.5120**	**0.0439**		**997.6084**

3.4 Paving and Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0106	37.1829	29.9504	0.0784		1.6100	1.6100		1.4812	1.4812		7,589.8386	7,589.8386	2.4547		7,651.2063

Total	**4.0106**	**37.1829**	**29.9504**	**0.0784**		**1.6100**	**1.6100**		**1.4812**	**1.4812**		**7,589.8386**	**7,589.8386**	**2.4547**		**7,651.2063**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0475	1.6373	0.3963	4.5100e-003	0.1152	3.0600e-003	0.1182	0.0332	2.9300e-003	0.0361		483.0664	483.0664	0.0291		483.7939
Worker	0.1806	0.1134	1.5972	4.9300e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		490.9411	490.9411	0.0124		491.2512
Total	**0.2281**	**1.7508**	**1.9935**	**9.4400e-003**	**0.6294**	**6.7600e-003**	**0.6361**	**0.1695**	**6.3300e-003**	**0.1759**		**974.0075**	**974.0075**	**0.0415**		**975.0451**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0106	37.1829	29.9504	0.0784		1.6100	1.6100		1.4812	1.4812	0.0000	7,589.8386	7,589.8386	2.4547		7,651.2063
Total	**4.0106**	**37.1829**	**29.9504**	**0.0784**		**1.6100**	**1.6100**		**1.4812**	**1.4812**	**0.0000**	**7,589.8386**	**7,589.8386**	**2.4547**		**7,651.2063**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0475	1.6373	0.3963	4.5100e-003	0.1152	3.0600e-003	0.1182	0.0332	2.9300e-003	0.0361		483.0664	483.0664	0.0291		483.7939
Worker	0.1806	0.1134	1.5972	4.9300e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		490.9411	490.9411	0.0124		491.2512
Total	**0.2281**	**1.7508**	**1.9935**	**9.4400e-003**	**0.6294**	**6.7600e-003**	**0.6361**	**0.1695**	**6.3300e-003**	**0.1759**		**974.0075**	**974.0075**	**0.0415**		**975.0451**

3.5 Landscaping - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2343	2.6042	3.6251	5.1800e-003		0.1246	0.1246		0.1147	0.1147		501.6302	501.6302	0.1622		505.6861
Total	**0.2343**	**2.6042**	**3.6251**	**5.1800e-003**		**0.1246**	**0.1246**		**0.1147**	**0.1147**		**501.6302**	**501.6302**	**0.1622**		**505.6861**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0264	0.9096	0.2202	2.5100e-003	0.0640	1.7000e-003	0.0657	0.0184	1.6300e-003	0.0201		268.3702	268.3702	0.0162		268.7744
Worker	0.1806	0.1134	1.5972	4.9300e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		490.9411	490.9411	0.0124		491.2512
Total	**0.2070**	**1.0231**	**1.8174**	**7.4400e-003**	**0.5782**	**5.4000e-003**	**0.5836**	**0.1548**	**5.0300e-003**	**0.1598**		**759.3113**	**759.3113**	**0.0286**		**760.0256**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2343	2.6042	3.6251	5.1800e-003		0.1246	0.1246		0.1147	0.1147	0.0000	501.6302	501.6302	0.1622		505.6861
Total	**0.2343**	**2.6042**	**3.6251**	**5.1800e-003**		**0.1246**	**0.1246**		**0.1147**	**0.1147**	**0.0000**	**501.6302**	**501.6302**	**0.1622**		**505.6861**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0264	0.9096	0.2202	2.5100e-003	0.0640	1.7000e-003	0.0657	0.0184	1.6300e-003	0.0201		268.3702	268.3702	0.0162		268.7744
Worker	0.1806	0.1134	1.5972	4.9300e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		490.9411	490.9411	0.0124		491.2512
Total	**0.2070**	**1.0231**	**1.8174**	**7.4400e-003**	**0.5782**	**5.4000e-003**	**0.5836**	**0.1548**	**5.0300e-003**	**0.1598**		**759.3113**	**759.3113**	**0.0286**		**760.0256**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3477	0.0189	469.8572	2.0320	0.7642	0.5372	1.3014	1.3797	0.4410	1.8207		0.0800	0.0800	0.2340		5.9288
Unmitigated	0.3477	0.0189	469.8572	2.0320	0.7642	0.5372	1.3014	1.3797	0.4410	1.8207		0.0800	0.0800	0.2340		5.9288

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	85.00	56.88	48.75	218,128	218,128
Total	85.00	56.88	48.75	218,128	218,128

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.552603	0.061033	0.186728	0.118579	0.023437	0.006039	0.017620	0.024846	0.001416	0.001678	0.004487	0.000623	0.000912

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					

City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004

Unmitigated	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Total	**5.6300e-003**	**0.0000**	**2.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**5.5000e-004**	**5.5000e-004**	**0.0000**		**5.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Total	**5.6300e-003**	**0.0000**	**2.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**5.5000e-004**	**5.5000e-004**	**0.0000**		**5.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Crawford Park - South Coast Air Basin, Winter

Crawford Park

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	2.50	Acre	2.50	108,900.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Import 10,000 CY soil, vendor trips for construction and landscaping

Grading - Import 10,000 CY

Vehicle Trips - Trip Generation Source: Translutions, 2020

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use - Lighting from CalEEMod user guide for open parking lot lighting

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	80.00
tblConstructionPhase	NumDays	220.00	90.00
tblConstructionPhase	NumDays	6.00	60.00
tblConstructionPhase	NumDays	3.00	20.00
tblEnergyUse	LightingElect	0.00	0.35
tblFleetMix	HHD	0.03	0.02
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.19
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8470e-003	6.0390e-003
tblFleetMix	MCY	4.8220e-003	4.4870e-003
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	8.6900e-004	9.1200e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	2.1100e-003	1.4160e-003
tblFleetMix	SBUS	7.1000e-004	6.2300e-004
tblFleetMix	UBUS	1.7690e-003	1.6780e-003
tblGrading	AcresOfGrading	60.00	3.00
tblGrading	AcresOfGrading	0.00	4.50

tblGrading	MaterialImported	0.00	10,000.00
tblLandUse	RecSwimmingAreaAllowEdit	0.00	108,900.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	VendorTripNumber	18.00	10.00
tblVehicleEF	HHD	0.52	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.07	1.0000e-006
tblVehicleEF	HHD	1.59	6.32
tblVehicleEF	HHD	0.96	0.58
tblVehicleEF	HHD	3.04	9.3040e-003
tblVehicleEF	HHD	4,355.32	1,186.71
tblVehicleEF	HHD	1,551.76	1,477.44
tblVehicleEF	HHD	9.81	0.09
tblVehicleEF	HHD	13.94	6.38
tblVehicleEF	HHD	1.91	3.57
tblVehicleEF	HHD	19.62	2.07

tblVehicleEF	HHD	9.5610e-003	3.9310e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	6.0750e-003	0.03
tblVehicleEF	HHD	8.4000e-005	2.0000e-006
tblVehicleEF	HHD	9.1470e-003	3.7610e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8000e-003	8.8970e-003
tblVehicleEF	HHD	5.8120e-003	0.03
tblVehicleEF	HHD	7.7000e-005	1.0000e-006
tblVehicleEF	HHD	9.9000e-005	7.0000e-006
tblVehicleEF	HHD	4.1500e-003	2.6800e-004
tblVehicleEF	HHD	0.40	0.46
tblVehicleEF	HHD	7.3000e-005	5.0000e-006
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	3.3800e-004	1.4610e-003
tblVehicleEF	HHD	0.07	3.0000e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.4800e-004	1.0000e-006
tblVehicleEF	HHD	9.9000e-005	7.0000e-006
tblVehicleEF	HHD	4.1500e-003	2.6800e-004
tblVehicleEF	HHD	0.48	0.53
tblVehicleEF	HHD	7.3000e-005	5.0000e-006
tblVehicleEF	HHD	0.19	0.17
tblVehicleEF	HHD	3.3800e-004	1.4610e-003
tblVehicleEF	HHD	0.08	3.0000e-006
tblVehicleEF	HHD	0.49	0.00
tblVehicleEF	HHD	0.09	4.84

tblVehicleEF	HHD	0.07	2.7300e-004
tblVehicleEF	HHD	1.16	4.3510e-003
tblVehicleEF	HHD	0.97	11,782.57
tblVehicleEF	HHD	2.89	0.09
tblVehicleEF	HHD	4,614.07	2.0000e-006
tblVehicleEF	HHD	1,551.76	1.85
tblVehicleEF	HHD	9.81	0.08
tblVehicleEF	HHD	14.39	0.00
tblVehicleEF	HHD	1.80	0.24
tblVehicleEF	HHD	19.61	0.24
tblVehicleEF	HHD	8.0610e-003	7.0000e-006
tblVehicleEF	HHD	0.06	5.53
tblVehicleEF	HHD	0.04	0.17
tblVehicleEF	HHD	6.0750e-003	6.3500e-004
tblVehicleEF	HHD	8.4000e-005	2.1900e-004
tblVehicleEF	HHD	7.7120e-003	1.4000e-005
tblVehicleEF	HHD	0.03	9.6000e-005
tblVehicleEF	HHD	8.8000e-003	6.6000e-005
tblVehicleEF	HHD	5.8120e-003	1.0000e-006
tblVehicleEF	HHD	7.7000e-005	1.4410e-003
tblVehicleEF	HHD	1.5500e-004	9.1000e-004
tblVehicleEF	HHD	4.3060e-003	0.03
tblVehicleEF	HHD	0.38	6.19
tblVehicleEF	HHD	1.1000e-004	0.00
tblVehicleEF	HHD	0.08	3.38
tblVehicleEF	HHD	3.3000e-004	0.03
tblVehicleEF	HHD	0.07	2.07
tblVehicleEF	HHD	0.04	6.18
tblVehicleEF	HHD	0.01	0.58

tblVehicleEF	HHD	1.4500e-004	8.8350e-003
tblVehicleEF	HHD	1.5500e-004	156.80
tblVehicleEF	HHD	4.3060e-003	2.0000e-006
tblVehicleEF	HHD	0.45	2.8010e-003
tblVehicleEF	HHD	1.1000e-004	6.2480e-003
tblVehicleEF	HHD	0.19	0.03
tblVehicleEF	HHD	3.3000e-004	0.04
tblVehicleEF	HHD	0.07	0.03
tblVehicleEF	HHD	0.56	0.00
tblVehicleEF	HHD	0.09	4.33
tblVehicleEF	HHD	0.07	3.0500e-004
tblVehicleEF	HHD	2.20	4.3950e-003
tblVehicleEF	HHD	0.96	11,875.11
tblVehicleEF	HHD	3.06	0.09
tblVehicleEF	HHD	3,998.00	2.0000e-006
tblVehicleEF	HHD	1,551.76	1.87
tblVehicleEF	HHD	9.81	0.08
tblVehicleEF	HHD	13.32	0.00
tblVehicleEF	HHD	1.87	0.22
tblVehicleEF	HHD	19.62	0.24
tblVehicleEF	HHD	0.01	5.0000e-006
tblVehicleEF	HHD	0.06	4.95
tblVehicleEF	HHD	0.04	0.17
tblVehicleEF	HHD	6.0750e-003	6.8400e-004
tblVehicleEF	HHD	8.4000e-005	1.4600e-004
tblVehicleEF	HHD	0.01	1.5000e-005
tblVehicleEF	HHD	0.03	6.4000e-005
tblVehicleEF	HHD	8.8000e-003	4.3000e-005
tblVehicleEF	HHD	5.8120e-003	1.0000e-006

tblVehicleEF	HHD	7.7000e-005	1.5510e-003
tblVehicleEF	HHD	9.6000e-005	9.1000e-004
tblVehicleEF	HHD	4.4260e-003	0.03
tblVehicleEF	HHD	0.43	6.64
tblVehicleEF	HHD	7.1000e-005	0.00
tblVehicleEF	HHD	0.08	3.51
tblVehicleEF	HHD	3.6700e-004	0.04
tblVehicleEF	HHD	0.07	2.07
tblVehicleEF	HHD	0.04	6.51
tblVehicleEF	HHD	0.01	0.57
tblVehicleEF	HHD	1.4800e-004	9.3940e-003
tblVehicleEF	HHD	9.6000e-005	156.80
tblVehicleEF	HHD	4.4260e-003	2.0000e-006
tblVehicleEF	HHD	0.51	2.8010e-003
tblVehicleEF	HHD	7.1000e-005	6.2480e-003
tblVehicleEF	HHD	0.19	0.03
tblVehicleEF	HHD	3.6700e-004	0.04
tblVehicleEF	HHD	0.08	0.04
tblVehicleEF	LDA	4.2840e-003	3.0340e-003
tblVehicleEF	LDA	4.4900e-003	0.05
tblVehicleEF	LDA	0.57	0.72
tblVehicleEF	LDA	1.00	2.11
tblVehicleEF	LDA	253.57	270.89
tblVehicleEF	LDA	54.70	53.31
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	0.06	0.18
tblVehicleEF	LDA	1.9580e-003	1.7990e-003
tblVehicleEF	LDA	2.2420e-003	1.8430e-003
tblVehicleEF	LDA	1.8050e-003	1.6570e-003

tblVehicleEF	LDA	2.0610e-003	1.6940e-003
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.09	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.06	0.22
tblVehicleEF	LDA	2.5390e-003	2.6800e-003
tblVehicleEF	LDA	5.6400e-004	5.2800e-004
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.09	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.25
tblVehicleEF	LDA	0.00	0.04
tblVehicleEF	LDA	4.5820e-003	0.00
tblVehicleEF	LDA	3.9780e-003	0.10
tblVehicleEF	LDA	0.00	11.18
tblVehicleEF	LDA	0.64	0.00
tblVehicleEF	LDA	0.86	3.2530e-003
tblVehicleEF	LDA	0.00	5.0530e-003
tblVehicleEF	LDA	266.77	0.00
tblVehicleEF	LDA	54.70	0.01
tblVehicleEF	LDA	0.00	9.4890e-003
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	0.05	4.4120e-003
tblVehicleEF	LDA	0.00	0.07
tblVehicleEF	LDA	0.04	0.00

tblVehicleEF	LDA	8.0000e-003	0.02
tblVehicleEF	LDA	1.9580e-003	0.20
tblVehicleEF	LDA	2.2420e-003	0.39
tblVehicleEF	LDA	0.00	0.02
tblVehicleEF	LDA	0.02	0.39
tblVehicleEF	LDA	2.0000e-003	0.33
tblVehicleEF	LDA	1.8050e-003	0.22
tblVehicleEF	LDA	2.0610e-003	0.20
tblVehicleEF	LDA	0.06	0.00
tblVehicleEF	LDA	0.10	1.4850e-003
tblVehicleEF	LDA	0.05	1.7000e-005
tblVehicleEF	LDA	0.01	0.04
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	2.6720e-003	0.79
tblVehicleEF	LDA	5.6100e-004	1.79
tblVehicleEF	LDA	0.06	60.05
tblVehicleEF	LDA	0.10	1.8400e-003
tblVehicleEF	LDA	0.00	3.8000e-004
tblVehicleEF	LDA	0.05	7.7830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.03	8.0020e-003
tblVehicleEF	LDA	0.06	0.00
tblVehicleEF	LDA	0.00	0.05
tblVehicleEF	LDA	4.1990e-003	0.00
tblVehicleEF	LDA	4.5800e-003	0.11
tblVehicleEF	LDA	0.00	11.32
tblVehicleEF	LDA	0.55	0.00
tblVehicleEF	LDA	1.03	2.9740e-003
tblVehicleEF	LDA	0.00	5.3880e-003

tblVehicleEF	LDA	249.51	0.00
tblVehicleEF	LDA	54.70	0.01
tblVehicleEF	LDA	0.00	0.01
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	0.06	4.7000e-003
tblVehicleEF	LDA	0.00	0.05
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	8.0000e-003	0.02
tblVehicleEF	LDA	1.9580e-003	0.24
tblVehicleEF	LDA	2.2420e-003	0.24
tblVehicleEF	LDA	0.00	0.02
tblVehicleEF	LDA	0.02	0.24
tblVehicleEF	LDA	2.0000e-003	0.22
tblVehicleEF	LDA	1.8050e-003	0.25
tblVehicleEF	LDA	2.0610e-003	0.24
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	0.10	1.4850e-003
tblVehicleEF	LDA	0.03	1.7000e-005
tblVehicleEF	LDA	0.01	0.04
tblVehicleEF	LDA	0.04	0.00
tblVehicleEF	LDA	2.4980e-003	0.69
tblVehicleEF	LDA	5.6400e-004	2.17
tblVehicleEF	LDA	0.03	56.49
tblVehicleEF	LDA	0.10	1.8400e-003
tblVehicleEF	LDA	0.00	3.8000e-004
tblVehicleEF	LDA	0.03	7.7830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	8.0020e-003
tblVehicleEF	LDA	0.07	0.00

tblVehicleEF	LDT1	0.01	7.7890e-003
tblVehicleEF	LDT1	0.01	0.07
tblVehicleEF	LDT1	1.36	1.46
tblVehicleEF	LDT1	2.49	2.28
tblVehicleEF	LDT1	319.38	318.65
tblVehicleEF	LDT1	67.76	63.32
tblVehicleEF	LDT1	0.13	0.12
tblVehicleEF	LDT1	0.15	0.26
tblVehicleEF	LDT1	2.9980e-003	2.7210e-003
tblVehicleEF	LDT1	3.2550e-003	2.6380e-003
tblVehicleEF	LDT1	2.7600e-003	2.5050e-003
tblVehicleEF	LDT1	2.9930e-003	2.4250e-003
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.25	0.20
tblVehicleEF	LDT1	0.10	0.11
tblVehicleEF	LDT1	0.03	0.03
tblVehicleEF	LDT1	0.16	0.70
tblVehicleEF	LDT1	0.17	0.36
tblVehicleEF	LDT1	3.2100e-003	3.1530e-003
tblVehicleEF	LDT1	7.2100e-004	6.2700e-004
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.25	0.20
tblVehicleEF	LDT1	0.10	0.11
tblVehicleEF	LDT1	0.04	0.05
tblVehicleEF	LDT1	0.16	0.70
tblVehicleEF	LDT1	0.19	0.39
tblVehicleEF	LDT1	0.00	0.07
tblVehicleEF	LDT1	0.01	0.00
tblVehicleEF	LDT1	0.01	0.21

tblVehicleEF	LDT1	0.00	13.55
tblVehicleEF	LDT1	1.49	0.00
tblVehicleEF	LDT1	2.12	8.2760e-003
tblVehicleEF	LDT1	0.00	5.8840e-003
tblVehicleEF	LDT1	334.82	0.00
tblVehicleEF	LDT1	67.76	0.04
tblVehicleEF	LDT1	0.00	0.01
tblVehicleEF	LDT1	0.11	0.00
tblVehicleEF	LDT1	0.13	8.0850e-003
tblVehicleEF	LDT1	0.00	0.15
tblVehicleEF	LDT1	0.04	0.00
tblVehicleEF	LDT1	8.0000e-003	0.05
tblVehicleEF	LDT1	2.9980e-003	0.65
tblVehicleEF	LDT1	3.2550e-003	0.93
tblVehicleEF	LDT1	0.00	0.05
tblVehicleEF	LDT1	0.02	0.93
tblVehicleEF	LDT1	2.0000e-003	0.71
tblVehicleEF	LDT1	2.7600e-003	0.35
tblVehicleEF	LDT1	2.9930e-003	0.65
tblVehicleEF	LDT1	0.20	0.00
tblVehicleEF	LDT1	0.27	2.3930e-003
tblVehicleEF	LDT1	0.15	3.5000e-005
tblVehicleEF	LDT1	0.03	0.11
tblVehicleEF	LDT1	0.15	0.00
tblVehicleEF	LDT1	3.3670e-003	1.59
tblVehicleEF	LDT1	7.1400e-004	1.93
tblVehicleEF	LDT1	0.20	71.69
tblVehicleEF	LDT1	0.27	2.6340e-003
tblVehicleEF	LDT1	0.00	5.9400e-004

tblVehicleEF	LDT1	0.15	7.9510e-003
tblVehicleEF	LDT1	0.05	0.02
tblVehicleEF	LDT1	0.15	8.0020e-003
tblVehicleEF	LDT1	0.16	0.00
tblVehicleEF	LDT1	0.00	0.08
tblVehicleEF	LDT1	0.01	0.00
tblVehicleEF	LDT1	0.01	0.23
tblVehicleEF	LDT1	0.00	13.73
tblVehicleEF	LDT1	1.32	0.00
tblVehicleEF	LDT1	2.56	7.6540e-003
tblVehicleEF	LDT1	0.00	6.2690e-003
tblVehicleEF	LDT1	314.49	0.00
tblVehicleEF	LDT1	67.76	0.03
tblVehicleEF	LDT1	0.00	0.02
tblVehicleEF	LDT1	0.12	0.00
tblVehicleEF	LDT1	0.15	8.6860e-003
tblVehicleEF	LDT1	0.00	0.10
tblVehicleEF	LDT1	0.04	0.00
tblVehicleEF	LDT1	8.0000e-003	0.05
tblVehicleEF	LDT1	2.9980e-003	0.83
tblVehicleEF	LDT1	3.2550e-003	0.60
tblVehicleEF	LDT1	0.00	0.05
tblVehicleEF	LDT1	0.02	0.59
tblVehicleEF	LDT1	2.0000e-003	0.48
tblVehicleEF	LDT1	2.7600e-003	0.40
tblVehicleEF	LDT1	2.9930e-003	0.83
tblVehicleEF	LDT1	0.12	0.00
tblVehicleEF	LDT1	0.28	2.3930e-003
tblVehicleEF	LDT1	0.10	3.5000e-005

tblVehicleEF	LDT1	0.03	0.12
tblVehicleEF	LDT1	0.19	0.00
tblVehicleEF	LDT1	3.1610e-003	1.41
tblVehicleEF	LDT1	7.2200e-004	2.35
tblVehicleEF	LDT1	0.12	68.01
tblVehicleEF	LDT1	0.28	2.6340e-003
tblVehicleEF	LDT1	0.00	5.9400e-004
tblVehicleEF	LDT1	0.10	7.9510e-003
tblVehicleEF	LDT1	0.04	0.02
tblVehicleEF	LDT1	0.19	8.0020e-003
tblVehicleEF	LDT1	0.19	0.00
tblVehicleEF	LDT2	5.9720e-003	4.9910e-003
tblVehicleEF	LDT2	5.6870e-003	0.07
tblVehicleEF	LDT2	0.75	1.03
tblVehicleEF	LDT2	1.24	2.65
tblVehicleEF	LDT2	356.41	341.38
tblVehicleEF	LDT2	75.77	68.34
tblVehicleEF	LDT2	0.07	0.09
tblVehicleEF	LDT2	0.09	0.28
tblVehicleEF	LDT2	1.9990e-003	1.9090e-003
tblVehicleEF	LDT2	2.3560e-003	1.8910e-003
tblVehicleEF	LDT2	1.8380e-003	1.7570e-003
tblVehicleEF	LDT2	2.1660e-003	1.7390e-003
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.06	0.41
tblVehicleEF	LDT2	0.08	0.31

tblVehicleEF	LDT2	3.5700e-003	3.3770e-003
tblVehicleEF	LDT2	7.7800e-004	6.7600e-004
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.04	0.07
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.06	0.41
tblVehicleEF	LDT2	0.08	0.34
tblVehicleEF	LDT2	0.00	0.06
tblVehicleEF	LDT2	6.3770e-003	0.00
tblVehicleEF	LDT2	5.0410e-003	0.13
tblVehicleEF	LDT2	0.00	14.40
tblVehicleEF	LDT2	0.83	0.00
tblVehicleEF	LDT2	1.06	5.3180e-003
tblVehicleEF	LDT2	0.00	6.4670e-003
tblVehicleEF	LDT2	374.21	0.00
tblVehicleEF	LDT2	75.77	0.02
tblVehicleEF	LDT2	0.00	0.01
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.09	6.6250e-003
tblVehicleEF	LDT2	0.00	0.10
tblVehicleEF	LDT2	0.04	0.00
tblVehicleEF	LDT2	8.0000e-003	0.03
tblVehicleEF	LDT2	1.9990e-003	0.38
tblVehicleEF	LDT2	2.3560e-003	0.54
tblVehicleEF	LDT2	0.00	0.03
tblVehicleEF	LDT2	0.02	0.54
tblVehicleEF	LDT2	2.0000e-003	0.49
tblVehicleEF	LDT2	1.8380e-003	0.31

tblVehicleEF	LDT2	2.1660e-003	0.38
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.10	1.6180e-003
tblVehicleEF	LDT2	0.06	1.7000e-005
tblVehicleEF	LDT2	0.02	0.08
tblVehicleEF	LDT2	0.05	0.00
tblVehicleEF	LDT2	3.7490e-003	1.12
tblVehicleEF	LDT2	7.7500e-004	2.26
tblVehicleEF	LDT2	0.07	75.14
tblVehicleEF	LDT2	0.10	1.8890e-003
tblVehicleEF	LDT2	0.00	4.0400e-004
tblVehicleEF	LDT2	0.06	7.8210e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.05	8.0020e-003
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.00	0.07
tblVehicleEF	LDT2	5.8560e-003	0.00
tblVehicleEF	LDT2	5.8000e-003	0.13
tblVehicleEF	LDT2	0.00	14.59
tblVehicleEF	LDT2	0.72	0.00
tblVehicleEF	LDT2	1.27	4.8870e-003
tblVehicleEF	LDT2	0.00	6.8940e-003
tblVehicleEF	LDT2	350.82	0.00
tblVehicleEF	LDT2	75.77	0.02
tblVehicleEF	LDT2	0.00	0.01
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	0.09	7.0820e-003
tblVehicleEF	LDT2	0.00	0.07
tblVehicleEF	LDT2	0.04	0.00

tblVehicleEF	LDT2	8.0000e-003	0.03
tblVehicleEF	LDT2	1.9990e-003	0.48
tblVehicleEF	LDT2	2.3560e-003	0.33
tblVehicleEF	LDT2	0.00	0.03
tblVehicleEF	LDT2	0.02	0.33
tblVehicleEF	LDT2	2.0000e-003	0.33
tblVehicleEF	LDT2	1.8380e-003	0.35
tblVehicleEF	LDT2	2.1660e-003	0.48
tblVehicleEF	LDT2	0.04	0.00
tblVehicleEF	LDT2	0.10	1.6180e-003
tblVehicleEF	LDT2	0.04	1.7000e-005
tblVehicleEF	LDT2	0.01	0.08
tblVehicleEF	LDT2	0.07	0.00
tblVehicleEF	LDT2	3.5130e-003	0.99
tblVehicleEF	LDT2	7.7900e-004	2.74
tblVehicleEF	LDT2	0.04	71.61
tblVehicleEF	LDT2	0.10	1.8890e-003
tblVehicleEF	LDT2	0.00	4.0400e-004
tblVehicleEF	LDT2	0.04	7.8210e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	8.0020e-003
tblVehicleEF	LDT2	0.09	0.00
tblVehicleEF	LHD1	5.2120e-003	5.5830e-003
tblVehicleEF	LHD1	9.8600e-003	5.7240e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.74	0.65
tblVehicleEF	LHD1	2.42	1.14
tblVehicleEF	LHD1	9.02	8.89

tblVehicleEF	LHD1	594.63	666.21
tblVehicleEF	LHD1	31.53	12.43
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	1.08	0.65
tblVehicleEF	LHD1	0.94	0.33
tblVehicleEF	LHD1	8.6300e-004	7.5700e-004
tblVehicleEF	LHD1	0.01	9.6790e-003
tblVehicleEF	LHD1	9.7700e-003	6.4420e-003
tblVehicleEF	LHD1	8.9700e-004	2.8500e-004
tblVehicleEF	LHD1	8.2600e-004	7.2400e-004
tblVehicleEF	LHD1	2.5390e-003	2.4200e-003
tblVehicleEF	LHD1	9.3240e-003	6.1330e-003
tblVehicleEF	LHD1	8.2500e-004	2.6200e-004
tblVehicleEF	LHD1	2.9620e-003	2.5670e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.7810e-003	1.5640e-003
tblVehicleEF	LHD1	0.06	0.05
tblVehicleEF	LHD1	0.30	0.56
tblVehicleEF	LHD1	0.24	0.08
tblVehicleEF	LHD1	9.0000e-005	8.6000e-005
tblVehicleEF	LHD1	5.8320e-003	6.5060e-003
tblVehicleEF	LHD1	3.6100e-004	1.2300e-004
tblVehicleEF	LHD1	2.9620e-003	2.5670e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.7810e-003	1.5640e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.30	0.56

tblVehicleEF	LHD1	0.26	0.09
tblVehicleEF	LHD1	5.2120e-003	5.1340e-003
tblVehicleEF	LHD1	0.01	0.30
tblVehicleEF	LHD1	0.02	0.08
tblVehicleEF	LHD1	0.15	0.83
tblVehicleEF	LHD1	0.75	124.98
tblVehicleEF	LHD1	2.31	6.2080e-003
tblVehicleEF	LHD1	9.02	1.7780e-003
tblVehicleEF	LHD1	594.63	0.01
tblVehicleEF	LHD1	31.53	0.05
tblVehicleEF	LHD1	0.07	1.0420e-003
tblVehicleEF	LHD1	1.01	0.07
tblVehicleEF	LHD1	0.91	0.03
tblVehicleEF	LHD1	8.6300e-004	2.2100e-003
tblVehicleEF	LHD1	0.08	0.42
tblVehicleEF	LHD1	0.01	0.06
tblVehicleEF	LHD1	9.7700e-003	0.48
tblVehicleEF	LHD1	8.9700e-004	0.06
tblVehicleEF	LHD1	8.2600e-004	5.6060e-003
tblVehicleEF	LHD1	0.03	0.05
tblVehicleEF	LHD1	2.5390e-003	0.03
tblVehicleEF	LHD1	9.3240e-003	0.07
tblVehicleEF	LHD1	8.2500e-004	0.54
tblVehicleEF	LHD1	4.5380e-003	1.7000e-004
tblVehicleEF	LHD1	0.10	5.2380e-003
tblVehicleEF	LHD1	0.02	0.05
tblVehicleEF	LHD1	2.6400e-003	1.8000e-005
tblVehicleEF	LHD1	0.06	0.61
tblVehicleEF	LHD1	0.29	9.1050e-003

tblVehicleEF	LHD1	0.23	0.32
tblVehicleEF	LHD1	9.0000e-005	0.19
tblVehicleEF	LHD1	5.8320e-003	0.67
tblVehicleEF	LHD1	3.5900e-004	1.09
tblVehicleEF	LHD1	4.5380e-003	48.48
tblVehicleEF	LHD1	0.10	2.8500e-004
tblVehicleEF	LHD1	0.02	4.2700e-004
tblVehicleEF	LHD1	2.6400e-003	5.4550e-003
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.29	9.3700e-003
tblVehicleEF	LHD1	0.25	9.5160e-003
tblVehicleEF	LHD1	5.2120e-003	5.3710e-003
tblVehicleEF	LHD1	9.8170e-003	0.30
tblVehicleEF	LHD1	0.02	0.09
tblVehicleEF	LHD1	0.15	0.84
tblVehicleEF	LHD1	0.73	124.98
tblVehicleEF	LHD1	2.43	6.0400e-003
tblVehicleEF	LHD1	9.02	1.8370e-003
tblVehicleEF	LHD1	594.63	0.01
tblVehicleEF	LHD1	31.53	0.05
tblVehicleEF	LHD1	0.07	1.0870e-003
tblVehicleEF	LHD1	1.06	0.07
tblVehicleEF	LHD1	0.95	0.03
tblVehicleEF	LHD1	8.6300e-004	1.5420e-003
tblVehicleEF	LHD1	0.08	0.42
tblVehicleEF	LHD1	0.01	0.06
tblVehicleEF	LHD1	9.7700e-003	0.53
tblVehicleEF	LHD1	8.9700e-004	0.04
tblVehicleEF	LHD1	8.2600e-004	6.2420e-003

tblVehicleEF	LHD1	0.03	0.04
tblVehicleEF	LHD1	2.5390e-003	0.02
tblVehicleEF	LHD1	9.3240e-003	0.08
tblVehicleEF	LHD1	8.2500e-004	0.60
tblVehicleEF	LHD1	3.0750e-003	1.7000e-004
tblVehicleEF	LHD1	0.11	5.2380e-003
tblVehicleEF	LHD1	0.02	0.05
tblVehicleEF	LHD1	1.7770e-003	1.8000e-005
tblVehicleEF	LHD1	0.06	0.64
tblVehicleEF	LHD1	0.32	9.1050e-003
tblVehicleEF	LHD1	0.24	0.34
tblVehicleEF	LHD1	9.0000e-005	0.19
tblVehicleEF	LHD1	5.8320e-003	0.65
tblVehicleEF	LHD1	3.6100e-004	1.14
tblVehicleEF	LHD1	3.0750e-003	48.48
tblVehicleEF	LHD1	0.11	2.8500e-004
tblVehicleEF	LHD1	0.02	4.2700e-004
tblVehicleEF	LHD1	1.7770e-003	5.4550e-003
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.32	9.3700e-003
tblVehicleEF	LHD1	0.26	9.5160e-003
tblVehicleEF	LHD2	3.6840e-003	3.9120e-003
tblVehicleEF	LHD2	3.6840e-003	3.9650e-003
tblVehicleEF	LHD2	7.3420e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.32	0.44
tblVehicleEF	LHD2	1.21	0.76
tblVehicleEF	LHD2	13.71	13.45
tblVehicleEF	LHD2	608.08	667.35

tblVehicleEF	LHD2	26.39	9.56
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.67	0.84
tblVehicleEF	LHD2	0.50	0.23
tblVehicleEF	LHD2	1.1670e-003	1.2520e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	8.9870e-003	0.01
tblVehicleEF	LHD2	4.2200e-004	1.6200e-004
tblVehicleEF	LHD2	1.1160e-003	1.1980e-003
tblVehicleEF	LHD2	2.6680e-003	2.6330e-003
tblVehicleEF	LHD2	8.5850e-003	9.5770e-003
tblVehicleEF	LHD2	3.8800e-004	1.4900e-004
tblVehicleEF	LHD2	1.0410e-003	1.5680e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	6.8300e-004	9.7100e-004
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.07	0.35
tblVehicleEF	LHD2	0.10	0.05
tblVehicleEF	LHD2	1.3400e-004	1.2900e-004
tblVehicleEF	LHD2	5.9210e-003	6.4600e-003
tblVehicleEF	LHD2	2.8600e-004	9.5000e-005
tblVehicleEF	LHD2	1.0410e-003	1.5680e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	6.8300e-004	9.7100e-004
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.07	0.35
tblVehicleEF	LHD2	0.11	0.06

tblVehicleEF	LHD2	3.6840e-003	3.5540e-003
tblVehicleEF	LHD2	3.7270e-003	0.23
tblVehicleEF	LHD2	7.0950e-003	0.06
tblVehicleEF	LHD2	0.13	0.64
tblVehicleEF	LHD2	0.32	184.31
tblVehicleEF	LHD2	1.16	4.2190e-003
tblVehicleEF	LHD2	13.71	1.2050e-003
tblVehicleEF	LHD2	608.08	0.02
tblVehicleEF	LHD2	26.39	0.05
tblVehicleEF	LHD2	0.09	7.2200e-004
tblVehicleEF	LHD2	0.64	0.05
tblVehicleEF	LHD2	0.48	0.05
tblVehicleEF	LHD2	1.1670e-003	1.3640e-003
tblVehicleEF	LHD2	0.09	0.31
tblVehicleEF	LHD2	0.01	0.06
tblVehicleEF	LHD2	8.9870e-003	0.28
tblVehicleEF	LHD2	4.2200e-004	0.03
tblVehicleEF	LHD2	1.1160e-003	3.7590e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.6680e-003	0.02
tblVehicleEF	LHD2	8.5850e-003	0.05
tblVehicleEF	LHD2	3.8800e-004	0.34
tblVehicleEF	LHD2	1.5870e-003	1.9200e-004
tblVehicleEF	LHD2	0.04	8.5420e-003
tblVehicleEF	LHD2	0.01	0.09
tblVehicleEF	LHD2	9.9900e-004	1.0000e-005
tblVehicleEF	LHD2	0.04	0.79
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.10	0.22

tblVehicleEF	LHD2	1.3400e-004	0.15
tblVehicleEF	LHD2	5.9210e-003	0.44
tblVehicleEF	LHD2	2.8500e-004	0.73
tblVehicleEF	LHD2	1.5870e-003	50.51
tblVehicleEF	LHD2	0.04	1.6200e-004
tblVehicleEF	LHD2	0.02	7.0500e-004
tblVehicleEF	LHD2	9.9900e-004	6.5990e-003
tblVehicleEF	LHD2	0.05	0.04
tblVehicleEF	LHD2	0.07	0.01
tblVehicleEF	LHD2	0.10	0.02
tblVehicleEF	LHD2	3.6840e-003	3.7180e-003
tblVehicleEF	LHD2	3.6740e-003	0.23
tblVehicleEF	LHD2	7.3760e-003	0.06
tblVehicleEF	LHD2	0.13	0.64
tblVehicleEF	LHD2	0.32	184.31
tblVehicleEF	LHD2	1.22	4.1490e-003
tblVehicleEF	LHD2	13.71	1.2430e-003
tblVehicleEF	LHD2	608.08	0.02
tblVehicleEF	LHD2	26.39	0.05
tblVehicleEF	LHD2	0.09	7.5300e-004
tblVehicleEF	LHD2	0.66	0.05
tblVehicleEF	LHD2	0.50	0.05
tblVehicleEF	LHD2	1.1670e-003	9.4300e-004
tblVehicleEF	LHD2	0.09	0.31
tblVehicleEF	LHD2	0.01	0.06
tblVehicleEF	LHD2	8.9870e-003	0.32
tblVehicleEF	LHD2	4.2200e-004	0.02
tblVehicleEF	LHD2	1.1160e-003	4.0970e-003
tblVehicleEF	LHD2	0.04	0.02

tblVehicleEF	LHD2	2.6680e-003	0.01
tblVehicleEF	LHD2	8.5850e-003	0.05
tblVehicleEF	LHD2	3.8800e-004	0.38
tblVehicleEF	LHD2	1.0460e-003	1.9200e-004
tblVehicleEF	LHD2	0.04	8.5420e-003
tblVehicleEF	LHD2	0.01	0.09
tblVehicleEF	LHD2	6.7100e-004	1.0000e-005
tblVehicleEF	LHD2	0.04	0.82
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.10	0.23
tblVehicleEF	LHD2	1.3400e-004	0.15
tblVehicleEF	LHD2	5.9210e-003	0.44
tblVehicleEF	LHD2	2.8600e-004	0.77
tblVehicleEF	LHD2	1.0460e-003	50.50
tblVehicleEF	LHD2	0.04	1.6200e-004
tblVehicleEF	LHD2	0.02	7.0500e-004
tblVehicleEF	LHD2	6.7100e-004	6.5990e-003
tblVehicleEF	LHD2	0.05	0.04
tblVehicleEF	LHD2	0.08	0.01
tblVehicleEF	LHD2	0.11	0.02
tblVehicleEF	MCY	0.51	0.38
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	18.57	19.19
tblVehicleEF	MCY	9.67	8.53
tblVehicleEF	MCY	183.90	223.45
tblVehicleEF	MCY	44.44	59.65
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	2.3320e-003	2.4320e-003

tblVehicleEF	MCY	3.6000e-003	3.2970e-003
tblVehicleEF	MCY	2.1780e-003	2.2730e-003
tblVehicleEF	MCY	3.3840e-003	3.1040e-003
tblVehicleEF	MCY	1.14	1.09
tblVehicleEF	MCY	0.66	0.66
tblVehicleEF	MCY	0.67	0.67
tblVehicleEF	MCY	2.47	2.61
tblVehicleEF	MCY	0.60	1.99
tblVehicleEF	MCY	2.04	1.82
tblVehicleEF	MCY	2.2170e-003	2.2110e-003
tblVehicleEF	MCY	6.6200e-004	5.9000e-004
tblVehicleEF	MCY	1.14	1.09
tblVehicleEF	MCY	0.66	0.66
tblVehicleEF	MCY	0.67	0.67
tblVehicleEF	MCY	3.08	3.24
tblVehicleEF	MCY	0.60	1.99
tblVehicleEF	MCY	2.22	1.98
tblVehicleEF	MCY	0.00	0.81
tblVehicleEF	MCY	0.50	0.00
tblVehicleEF	MCY	0.13	0.73
tblVehicleEF	MCY	0.00	28.87
tblVehicleEF	MCY	18.00	0.00
tblVehicleEF	MCY	8.85	0.37
tblVehicleEF	MCY	0.00	7.4230e-003
tblVehicleEF	MCY	183.90	0.00
tblVehicleEF	MCY	44.44	2.55
tblVehicleEF	MCY	0.00	0.10
tblVehicleEF	MCY	0.98	0.00
tblVehicleEF	MCY	0.29	0.06

tblVehicleEF	MCY	0.00	1.10
tblVehicleEF	MCY	0.01	0.00
tblVehicleEF	MCY	4.0000e-003	3.17
tblVehicleEF	MCY	2.3320e-003	1.87
tblVehicleEF	MCY	3.6000e-003	3.53
tblVehicleEF	MCY	0.00	0.37
tblVehicleEF	MCY	5.0400e-003	3.53
tblVehicleEF	MCY	1.0000e-003	2.20
tblVehicleEF	MCY	2.1780e-003	1.75
tblVehicleEF	MCY	3.3840e-003	1.87
tblVehicleEF	MCY	1.88	5.0000e-004
tblVehicleEF	MCY	0.75	2.2730e-003
tblVehicleEF	MCY	1.17	1.5520e-003
tblVehicleEF	MCY	2.42	0.99
tblVehicleEF	MCY	0.57	0.00
tblVehicleEF	MCY	1.82	0.25
tblVehicleEF	MCY	2.2060e-003	18.47
tblVehicleEF	MCY	6.4200e-004	7.76
tblVehicleEF	MCY	1.88	111.05
tblVehicleEF	MCY	0.75	3.2970e-003
tblVehicleEF	MCY	0.00	1.2160e-003
tblVehicleEF	MCY	1.17	5.8800e-003
tblVehicleEF	MCY	3.01	5.0400e-003
tblVehicleEF	MCY	0.57	4.0000e-003
tblVehicleEF	MCY	1.98	0.00
tblVehicleEF	MCY	0.00	0.93
tblVehicleEF	MCY	0.52	0.00
tblVehicleEF	MCY	0.15	0.85
tblVehicleEF	MCY	0.00	30.00

tblVehicleEF	MCY	18.58	0.00
tblVehicleEF	MCY	9.75	0.38
tblVehicleEF	MCY	0.00	7.6700e-003
tblVehicleEF	MCY	183.90	0.00
tblVehicleEF	MCY	44.44	2.62
tblVehicleEF	MCY	0.00	0.12
tblVehicleEF	MCY	1.10	0.00
tblVehicleEF	MCY	0.31	0.06
tblVehicleEF	MCY	0.00	0.64
tblVehicleEF	MCY	0.01	0.00
tblVehicleEF	MCY	4.0000e-003	3.26
tblVehicleEF	MCY	2.3320e-003	2.29
tblVehicleEF	MCY	3.6000e-003	2.37
tblVehicleEF	MCY	0.00	0.43
tblVehicleEF	MCY	5.0400e-003	2.37
tblVehicleEF	MCY	1.0000e-003	1.27
tblVehicleEF	MCY	2.1780e-003	2.02
tblVehicleEF	MCY	3.3840e-003	2.29
tblVehicleEF	MCY	1.25	5.0000e-004
tblVehicleEF	MCY	0.85	2.2730e-003
tblVehicleEF	MCY	0.66	1.5520e-003
tblVehicleEF	MCY	2.48	1.11
tblVehicleEF	MCY	0.69	0.00
tblVehicleEF	MCY	2.07	0.27
tblVehicleEF	MCY	2.2180e-003	19.29
tblVehicleEF	MCY	6.6500e-004	8.66
tblVehicleEF	MCY	1.25	111.83
tblVehicleEF	MCY	0.85	3.2970e-003
tblVehicleEF	MCY	0.00	1.2160e-003

tblVehicleEF	MCY	0.66	5.8800e-003
tblVehicleEF	MCY	3.09	5.0400e-003
tblVehicleEF	MCY	0.69	4.0000e-003
tblVehicleEF	MCY	2.25	0.00
tblVehicleEF	MDV	0.01	6.5750e-003
tblVehicleEF	MDV	0.01	0.08
tblVehicleEF	MDV	1.17	1.22
tblVehicleEF	MDV	2.29	3.11
tblVehicleEF	MDV	483.40	419.24
tblVehicleEF	MDV	101.24	83.18
tblVehicleEF	MDV	0.13	0.11
tblVehicleEF	MDV	0.20	0.35
tblVehicleEF	MDV	2.1080e-003	2.0860e-003
tblVehicleEF	MDV	2.4110e-003	2.0610e-003
tblVehicleEF	MDV	1.9430e-003	1.9230e-003
tblVehicleEF	MDV	2.2170e-003	1.8960e-003
tblVehicleEF	MDV	0.07	0.08
tblVehicleEF	MDV	0.15	0.14
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.17	0.40
tblVehicleEF	MDV	4.8410e-003	4.1450e-003
tblVehicleEF	MDV	1.0520e-003	8.2300e-004
tblVehicleEF	MDV	0.07	0.08
tblVehicleEF	MDV	0.15	0.14
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	0.09	0.43

tblVehicleEF	MDV	0.19	0.44
tblVehicleEF	MDV	0.00	0.08
tblVehicleEF	MDV	0.01	0.00
tblVehicleEF	MDV	0.01	0.15
tblVehicleEF	MDV	0.00	17.75
tblVehicleEF	MDV	1.29	0.00
tblVehicleEF	MDV	1.96	7.0040e-003
tblVehicleEF	MDV	0.00	7.1080e-003
tblVehicleEF	MDV	507.25	0.00
tblVehicleEF	MDV	101.24	0.03
tblVehicleEF	MDV	0.00	0.02
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	0.19	9.1800e-003
tblVehicleEF	MDV	0.00	0.13
tblVehicleEF	MDV	0.04	0.00
tblVehicleEF	MDV	8.0000e-003	0.04
tblVehicleEF	MDV	2.1080e-003	0.40
tblVehicleEF	MDV	2.4110e-003	0.62
tblVehicleEF	MDV	0.00	0.03
tblVehicleEF	MDV	0.02	0.61
tblVehicleEF	MDV	2.0000e-003	0.58
tblVehicleEF	MDV	1.9430e-003	0.39
tblVehicleEF	MDV	2.2170e-003	0.40
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	0.16	1.7780e-003
tblVehicleEF	MDV	0.10	2.1000e-005
tblVehicleEF	MDV	0.03	0.10
tblVehicleEF	MDV	0.09	0.00
tblVehicleEF	MDV	5.0810e-003	1.33

tblVehicleEF	MDV	1.0460e-003	2.64
tblVehicleEF	MDV	0.11	93.07
tblVehicleEF	MDV	0.16	2.0580e-003
tblVehicleEF	MDV	0.00	4.4600e-004
tblVehicleEF	MDV	0.10	7.9160e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	0.09	8.0020e-003
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.00	0.09
tblVehicleEF	MDV	0.01	0.00
tblVehicleEF	MDV	0.01	0.15
tblVehicleEF	MDV	0.00	17.99
tblVehicleEF	MDV	1.13	0.00
tblVehicleEF	MDV	2.35	6.4530e-003
tblVehicleEF	MDV	0.00	7.5770e-003
tblVehicleEF	MDV	476.03	0.00
tblVehicleEF	MDV	101.24	0.03
tblVehicleEF	MDV	0.00	0.02
tblVehicleEF	MDV	0.12	0.00
tblVehicleEF	MDV	0.21	9.7530e-003
tblVehicleEF	MDV	0.00	0.09
tblVehicleEF	MDV	0.04	0.00
tblVehicleEF	MDV	8.0000e-003	0.04
tblVehicleEF	MDV	2.1080e-003	0.50
tblVehicleEF	MDV	2.4110e-003	0.37
tblVehicleEF	MDV	0.00	0.03
tblVehicleEF	MDV	0.02	0.37
tblVehicleEF	MDV	2.0000e-003	0.40
tblVehicleEF	MDV	1.9430e-003	0.45

tblVehicleEF	MDV	2.2170e-003	0.50
tblVehicleEF	MDV	0.07	0.00
tblVehicleEF	MDV	0.17	1.7780e-003
tblVehicleEF	MDV	0.07	2.1000e-005
tblVehicleEF	MDV	0.03	0.11
tblVehicleEF	MDV	0.11	0.00
tblVehicleEF	MDV	4.7660e-003	1.18
tblVehicleEF	MDV	1.0530e-003	3.21
tblVehicleEF	MDV	0.07	89.28
tblVehicleEF	MDV	0.17	2.0580e-003
tblVehicleEF	MDV	0.00	4.4600e-004
tblVehicleEF	MDV	0.07	7.9160e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	0.11	8.0020e-003
tblVehicleEF	MDV	0.19	0.00
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.75	1.21
tblVehicleEF	MH	5.15	2.15
tblVehicleEF	MH	1,102.46	1,501.21
tblVehicleEF	MH	58.88	19.42
tblVehicleEF	MH	1.12	1.11
tblVehicleEF	MH	0.75	0.25
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.0110e-003	2.8400e-004
tblVehicleEF	MH	3.2180e-003	3.2450e-003
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	9.3000e-004	2.6100e-004

tblVehicleEF	MH	0.93	0.84
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	0.38	0.35
tblVehicleEF	MH	0.07	0.06
tblVehicleEF	MH	0.02	1.46
tblVehicleEF	MH	0.30	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.7800e-004	1.9200e-004
tblVehicleEF	MH	0.93	0.84
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	0.38	0.35
tblVehicleEF	MH	0.10	0.08
tblVehicleEF	MH	0.02	1.46
tblVehicleEF	MH	0.33	0.11
tblVehicleEF	MH	0.00	0.92
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.02	0.06
tblVehicleEF	MH	0.00	192.01
tblVehicleEF	MH	1.80	0.00
tblVehicleEF	MH	4.84	0.01
tblVehicleEF	MH	0.00	0.27
tblVehicleEF	MH	1,102.46	0.00
tblVehicleEF	MH	58.88	0.06
tblVehicleEF	MH	0.00	0.22
tblVehicleEF	MH	1.04	0.00
tblVehicleEF	MH	0.72	0.05
tblVehicleEF	MH	0.00	0.50
tblVehicleEF	MH	0.13	0.00
tblVehicleEF	MH	0.01	0.08

tblVehicleEF	MH	0.02	1.42
tblVehicleEF	MH	1.0110e-003	0.12
tblVehicleEF	MH	0.00	0.60
tblVehicleEF	MH	0.06	0.12
tblVehicleEF	MH	3.2180e-003	0.05
tblVehicleEF	MH	0.02	0.10
tblVehicleEF	MH	9.3000e-004	1.43
tblVehicleEF	MH	1.40	0.03
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	0.58	2.6060e-003
tblVehicleEF	MH	0.07	1.03
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.28	0.24
tblVehicleEF	MH	0.01	1.24
tblVehicleEF	MH	6.7300e-004	2.03
tblVehicleEF	MH	1.40	15,054.74
tblVehicleEF	MH	0.06	2.8400e-004
tblVehicleEF	MH	0.00	0.19
tblVehicleEF	MH	0.58	1.30
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.31	0.00
tblVehicleEF	MH	0.00	0.97
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.02	0.07
tblVehicleEF	MH	0.00	194.46
tblVehicleEF	MH	1.74	0.00
tblVehicleEF	MH	5.19	0.01
tblVehicleEF	MH	0.00	0.28

tblVehicleEF	MH	1,102.46	0.00
tblVehicleEF	MH	58.88	0.06
tblVehicleEF	MH	0.00	0.24
tblVehicleEF	MH	1.10	0.00
tblVehicleEF	MH	0.75	0.05
tblVehicleEF	MH	0.00	0.36
tblVehicleEF	MH	0.13	0.00
tblVehicleEF	MH	0.01	0.08
tblVehicleEF	MH	0.02	1.53
tblVehicleEF	MH	1.0110e-003	0.09
tblVehicleEF	MH	0.00	0.71
tblVehicleEF	MH	0.06	0.09
tblVehicleEF	MH	3.2180e-003	0.04
tblVehicleEF	MH	0.02	0.11
tblVehicleEF	MH	9.3000e-004	1.54
tblVehicleEF	MH	1.03	0.03
tblVehicleEF	MH	0.08	0.02
tblVehicleEF	MH	0.40	2.6060e-003
tblVehicleEF	MH	0.07	1.09
tblVehicleEF	MH	0.02	0.00
tblVehicleEF	MH	0.30	0.25
tblVehicleEF	MH	0.01	1.20
tblVehicleEF	MH	6.7900e-004	2.18
tblVehicleEF	MH	1.03	15,054.02
tblVehicleEF	MH	0.08	2.8400e-004
tblVehicleEF	MH	0.00	0.19
tblVehicleEF	MH	0.40	1.30
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	0.01

tblVehicleEF	MH	0.33	0.00
tblVehicleEF	MHD	0.02	4.3860e-003
tblVehicleEF	MHD	3.3120e-003	4.5970e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.34	0.39
tblVehicleEF	MHD	0.28	0.47
tblVehicleEF	MHD	5.26	1.42
tblVehicleEF	MHD	138.52	67.37
tblVehicleEF	MHD	1,128.29	1,069.65
tblVehicleEF	MHD	59.14	12.05
tblVehicleEF	MHD	0.37	0.48
tblVehicleEF	MHD	0.70	1.63
tblVehicleEF	MHD	10.62	1.29
tblVehicleEF	MHD	1.0200e-004	1.0770e-003
tblVehicleEF	MHD	2.8190e-003	0.03
tblVehicleEF	MHD	7.6400e-004	1.3700e-004
tblVehicleEF	MHD	9.8000e-005	1.0300e-003
tblVehicleEF	MHD	2.6930e-003	0.03
tblVehicleEF	MHD	7.0300e-004	1.2600e-004
tblVehicleEF	MHD	1.0280e-003	6.6200e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	6.7100e-004	4.2600e-004
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.32	0.07
tblVehicleEF	MHD	1.3330e-003	6.4000e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	6.8400e-004	1.1900e-004

tblVehicleEF	MHD	1.0280e-003	6.6200e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	6.7100e-004	4.2600e-004
tblVehicleEF	MHD	0.04	0.07
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.35	0.07
tblVehicleEF	MHD	0.01	3.1600e-003
tblVehicleEF	MHD	3.3570e-003	0.23
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.25	0.60
tblVehicleEF	MHD	0.28	801.62
tblVehicleEF	MHD	5.00	6.3020e-003
tblVehicleEF	MHD	146.72	4.4400e-004
tblVehicleEF	MHD	1,128.29	0.11
tblVehicleEF	MHD	59.14	0.06
tblVehicleEF	MHD	0.38	5.9500e-004
tblVehicleEF	MHD	0.66	0.04
tblVehicleEF	MHD	10.59	0.11
tblVehicleEF	MHD	8.6000e-005	6.0400e-004
tblVehicleEF	MHD	0.13	0.31
tblVehicleEF	MHD	0.01	0.07
tblVehicleEF	MHD	2.8190e-003	0.07
tblVehicleEF	MHD	7.6400e-004	0.02
tblVehicleEF	MHD	8.3000e-005	1.3950e-003
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	3.0000e-003	6.2570e-003
tblVehicleEF	MHD	2.6930e-003	0.04
tblVehicleEF	MHD	7.0300e-004	0.14

tblVehicleEF	MHD	1.5610e-003	2.5700e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.02	0.48
tblVehicleEF	MHD	9.8200e-004	6.0000e-006
tblVehicleEF	MHD	0.03	1.54
tblVehicleEF	MHD	0.02	8.5670e-003
tblVehicleEF	MHD	0.31	1.29
tblVehicleEF	MHD	1.4110e-003	0.32
tblVehicleEF	MHD	0.01	0.48
tblVehicleEF	MHD	6.7900e-004	1.35
tblVehicleEF	MHD	1.5610e-003	92.89
tblVehicleEF	MHD	0.04	1.3700e-004
tblVehicleEF	MHD	0.03	2.6640e-003
tblVehicleEF	MHD	9.8200e-004	0.01
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.34	8.9540e-003
tblVehicleEF	MHD	0.02	3.3190e-003
tblVehicleEF	MHD	3.3000e-003	0.25
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.47	0.60
tblVehicleEF	MHD	0.28	779.65
tblVehicleEF	MHD	5.30	6.1700e-003
tblVehicleEF	MHD	127.19	4.5700e-004
tblVehicleEF	MHD	1,128.29	0.11
tblVehicleEF	MHD	59.14	0.06
tblVehicleEF	MHD	0.35	6.2100e-004
tblVehicleEF	MHD	0.69	0.05
tblVehicleEF	MHD	10.63	0.11

tblVehicleEF	MHD	1.2500e-004	4.1600e-004
tblVehicleEF	MHD	0.13	0.34
tblVehicleEF	MHD	0.01	0.07
tblVehicleEF	MHD	2.8190e-003	0.08
tblVehicleEF	MHD	7.6400e-004	0.01
tblVehicleEF	MHD	1.1900e-004	1.4610e-003
tblVehicleEF	MHD	0.06	7.1060e-003
tblVehicleEF	MHD	3.0000e-003	4.3140e-003
tblVehicleEF	MHD	2.6930e-003	0.04
tblVehicleEF	MHD	7.0300e-004	0.16
tblVehicleEF	MHD	1.0490e-003	2.5700e-004
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	0.03	0.48
tblVehicleEF	MHD	6.6300e-004	6.0000e-006
tblVehicleEF	MHD	0.03	1.60
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.33	1.29
tblVehicleEF	MHD	1.2270e-003	0.49
tblVehicleEF	MHD	0.01	0.47
tblVehicleEF	MHD	6.8400e-004	1.44
tblVehicleEF	MHD	1.0490e-003	92.89
tblVehicleEF	MHD	0.04	1.3700e-004
tblVehicleEF	MHD	0.04	2.6640e-003
tblVehicleEF	MHD	6.6300e-004	0.01
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.36	0.01
tblVehicleEF	OBUS	0.01	8.4810e-003
tblVehicleEF	OBUS	6.0680e-003	7.0170e-003

tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.25	0.60
tblVehicleEF	OBUS	0.45	0.79
tblVehicleEF	OBUS	5.23	2.39
tblVehicleEF	OBUS	92.13	94.60
tblVehicleEF	OBUS	1,229.05	1,392.48
tblVehicleEF	OBUS	68.41	19.23
tblVehicleEF	OBUS	0.19	0.46
tblVehicleEF	OBUS	0.64	1.57
tblVehicleEF	OBUS	2.34	0.76
tblVehicleEF	OBUS	1.8000e-005	7.9300e-004
tblVehicleEF	OBUS	2.5270e-003	0.02
tblVehicleEF	OBUS	8.5100e-004	1.9700e-004
tblVehicleEF	OBUS	1.7000e-005	7.5900e-004
tblVehicleEF	OBUS	2.4010e-003	0.02
tblVehicleEF	OBUS	7.8200e-004	1.8100e-004
tblVehicleEF	OBUS	1.4810e-003	1.8440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	7.8200e-004	9.4300e-004
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.33	0.11
tblVehicleEF	OBUS	8.9100e-004	9.0000e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.7600e-004	1.9000e-004
tblVehicleEF	OBUS	1.4810e-003	1.8440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.07

tblVehicleEF	OBUS	7.8200e-004	9.4300e-004
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.36	0.13
tblVehicleEF	OBUS	0.01	5.5090e-003
tblVehicleEF	OBUS	6.1800e-003	0.93
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.24	0.95
tblVehicleEF	OBUS	0.45	1,847.71
tblVehicleEF	OBUS	4.94	0.01
tblVehicleEF	OBUS	96.60	8.9700e-004
tblVehicleEF	OBUS	1,229.05	0.27
tblVehicleEF	OBUS	68.41	0.06
tblVehicleEF	OBUS	0.20	1.0490e-003
tblVehicleEF	OBUS	0.60	0.11
tblVehicleEF	OBUS	2.30	0.07
tblVehicleEF	OBUS	1.5000e-005	1.3250e-003
tblVehicleEF	OBUS	0.13	1.16
tblVehicleEF	OBUS	0.01	0.08
tblVehicleEF	OBUS	2.5270e-003	0.15
tblVehicleEF	OBUS	8.5100e-004	0.05
tblVehicleEF	OBUS	1.4000e-005	1.1330e-003
tblVehicleEF	OBUS	0.06	0.03
tblVehicleEF	OBUS	3.0000e-003	0.02
tblVehicleEF	OBUS	2.4010e-003	0.07
tblVehicleEF	OBUS	7.8200e-004	0.26
tblVehicleEF	OBUS	2.2200e-003	1.9300e-004
tblVehicleEF	OBUS	0.02	8.2800e-003
tblVehicleEF	OBUS	0.03	0.45

tblVehicleEF	OBUS	1.1540e-003	9.0000e-006
tblVehicleEF	OBUS	0.04	1.47
tblVehicleEF	OBUS	0.04	6.3020e-003
tblVehicleEF	OBUS	0.31	0.75
tblVehicleEF	OBUS	9.3400e-004	0.58
tblVehicleEF	OBUS	0.01	0.80
tblVehicleEF	OBUS	7.7100e-004	2.26
tblVehicleEF	OBUS	2.2200e-003	94.66
tblVehicleEF	OBUS	0.02	1.9700e-004
tblVehicleEF	OBUS	0.05	8.5200e-004
tblVehicleEF	OBUS	1.1540e-003	8.3860e-003
tblVehicleEF	OBUS	0.05	0.06
tblVehicleEF	OBUS	0.04	0.01
tblVehicleEF	OBUS	0.34	6.5870e-003
tblVehicleEF	OBUS	0.01	5.7950e-003
tblVehicleEF	OBUS	6.0410e-003	0.89
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.25	0.96
tblVehicleEF	OBUS	0.45	1,854.49
tblVehicleEF	OBUS	5.28	0.01
tblVehicleEF	OBUS	85.94	9.2400e-004
tblVehicleEF	OBUS	1,229.05	0.27
tblVehicleEF	OBUS	68.41	0.06
tblVehicleEF	OBUS	0.18	1.1010e-003
tblVehicleEF	OBUS	0.63	0.11
tblVehicleEF	OBUS	2.34	0.07
tblVehicleEF	OBUS	2.1000e-005	9.2500e-004
tblVehicleEF	OBUS	0.13	1.11
tblVehicleEF	OBUS	0.01	0.08

tblVehicleEF	OBUS	2.5270e-003	0.16
tblVehicleEF	OBUS	8.5100e-004	0.04
tblVehicleEF	OBUS	2.0000e-005	1.1750e-003
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	3.0000e-003	0.01
tblVehicleEF	OBUS	2.4010e-003	0.07
tblVehicleEF	OBUS	7.8200e-004	0.28
tblVehicleEF	OBUS	1.5070e-003	1.9300e-004
tblVehicleEF	OBUS	0.02	8.2800e-003
tblVehicleEF	OBUS	0.03	0.47
tblVehicleEF	OBUS	7.7100e-004	9.0000e-006
tblVehicleEF	OBUS	0.04	1.54
tblVehicleEF	OBUS	0.04	8.9540e-003
tblVehicleEF	OBUS	0.33	0.76
tblVehicleEF	OBUS	8.3200e-004	0.62
tblVehicleEF	OBUS	0.01	0.79
tblVehicleEF	OBUS	7.7700e-004	2.42
tblVehicleEF	OBUS	1.5070e-003	94.65
tblVehicleEF	OBUS	0.02	1.9700e-004
tblVehicleEF	OBUS	0.05	8.5200e-004
tblVehicleEF	OBUS	7.7100e-004	8.3860e-003
tblVehicleEF	OBUS	0.05	0.06
tblVehicleEF	OBUS	0.04	0.01
tblVehicleEF	OBUS	0.36	9.3590e-003
tblVehicleEF	SBUS	0.83	0.07
tblVehicleEF	SBUS	0.01	7.0580e-003
tblVehicleEF	SBUS	0.06	6.2120e-003
tblVehicleEF	SBUS	8.05	2.77
tblVehicleEF	SBUS	0.70	0.59

tblVehicleEF	SBUS	7.21	0.85
tblVehicleEF	SBUS	1,117.62	351.72
tblVehicleEF	SBUS	1,084.59	1,109.67
tblVehicleEF	SBUS	55.10	5.24
tblVehicleEF	SBUS	8.67	3.22
tblVehicleEF	SBUS	3.92	4.87
tblVehicleEF	SBUS	12.12	0.88
tblVehicleEF	SBUS	8.2760e-003	4.1230e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	7.8500e-004	5.1000e-005
tblVehicleEF	SBUS	7.9180e-003	3.9440e-003
tblVehicleEF	SBUS	2.6790e-003	2.6820e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	7.2200e-004	4.7000e-005
tblVehicleEF	SBUS	3.5810e-003	9.0700e-004
tblVehicleEF	SBUS	0.03	7.8550e-003
tblVehicleEF	SBUS	0.96	0.32
tblVehicleEF	SBUS	1.9090e-003	4.8200e-004
tblVehicleEF	SBUS	0.10	0.10
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.38	0.04
tblVehicleEF	SBUS	0.01	3.3550e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.7600e-004	5.2000e-005
tblVehicleEF	SBUS	3.5810e-003	9.0700e-004
tblVehicleEF	SBUS	0.03	7.8550e-003
tblVehicleEF	SBUS	1.38	0.46
tblVehicleEF	SBUS	1.9090e-003	4.8200e-004

tblVehicleEF	SBUS	0.12	0.11
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.42	0.04
tblVehicleEF	SBUS	0.83	7.9680e-003
tblVehicleEF	SBUS	0.01	3.57
tblVehicleEF	SBUS	0.06	7.9970e-003
tblVehicleEF	SBUS	7.94	1.24
tblVehicleEF	SBUS	0.71	3,371.97
tblVehicleEF	SBUS	5.75	5.9880e-003
tblVehicleEF	SBUS	1,167.88	1.4740e-003
tblVehicleEF	SBUS	1,084.59	0.43
tblVehicleEF	SBUS	55.10	0.11
tblVehicleEF	SBUS	8.95	1.3830e-003
tblVehicleEF	SBUS	3.70	0.78
tblVehicleEF	SBUS	12.09	0.17
tblVehicleEF	SBUS	6.9770e-003	6.7400e-004
tblVehicleEF	SBUS	0.74	5.14
tblVehicleEF	SBUS	0.01	0.11
tblVehicleEF	SBUS	0.02	0.13
tblVehicleEF	SBUS	7.8500e-004	5.2810e-003
tblVehicleEF	SBUS	6.6750e-003	1.9990e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.6790e-003	7.7120e-003
tblVehicleEF	SBUS	0.02	0.10
tblVehicleEF	SBUS	7.2200e-004	0.05
tblVehicleEF	SBUS	5.4810e-003	2.8700e-004
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	0.95	3.29
tblVehicleEF	SBUS	2.8990e-003	1.2000e-005

tblVehicleEF	SBUS	0.10	4.59
tblVehicleEF	SBUS	0.01	0.04
tblVehicleEF	SBUS	0.34	0.87
tblVehicleEF	SBUS	0.01	2.74
tblVehicleEF	SBUS	0.01	0.60
tblVehicleEF	SBUS	6.5100e-004	0.69
tblVehicleEF	SBUS	5.4810e-003	118.27
tblVehicleEF	SBUS	0.03	5.1000e-005
tblVehicleEF	SBUS	1.38	3.2450e-003
tblVehicleEF	SBUS	2.8990e-003	0.08
tblVehicleEF	SBUS	0.12	0.32
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.37	0.04
tblVehicleEF	SBUS	0.83	9.1700e-003
tblVehicleEF	SBUS	0.01	3.57
tblVehicleEF	SBUS	0.06	8.2560e-003
tblVehicleEF	SBUS	8.20	1.32
tblVehicleEF	SBUS	0.70	3,202.19
tblVehicleEF	SBUS	7.43	5.9530e-003
tblVehicleEF	SBUS	1,048.22	1.5370e-003
tblVehicleEF	SBUS	1,084.59	0.40
tblVehicleEF	SBUS	55.10	0.11
tblVehicleEF	SBUS	8.29	1.5910e-003
tblVehicleEF	SBUS	3.86	0.77
tblVehicleEF	SBUS	12.12	0.17
tblVehicleEF	SBUS	0.01	4.6300e-004
tblVehicleEF	SBUS	0.74	5.15
tblVehicleEF	SBUS	0.01	0.11
tblVehicleEF	SBUS	0.02	0.18

tblVehicleEF	SBUS	7.8500e-004	3.6810e-003
tblVehicleEF	SBUS	9.6340e-003	2.0640e-003
tblVehicleEF	SBUS	0.32	0.01
tblVehicleEF	SBUS	2.6790e-003	5.2960e-003
tblVehicleEF	SBUS	0.02	0.11
tblVehicleEF	SBUS	7.2200e-004	0.06
tblVehicleEF	SBUS	3.5300e-003	2.8700e-004
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	0.96	3.13
tblVehicleEF	SBUS	1.8720e-003	1.2000e-005
tblVehicleEF	SBUS	0.10	4.79
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.39	0.88
tblVehicleEF	SBUS	0.01	2.83
tblVehicleEF	SBUS	0.01	0.58
tblVehicleEF	SBUS	6.7900e-004	0.88
tblVehicleEF	SBUS	3.5300e-003	118.27
tblVehicleEF	SBUS	0.03	5.1000e-005
tblVehicleEF	SBUS	1.39	3.2450e-003
tblVehicleEF	SBUS	1.8720e-003	0.08
tblVehicleEF	SBUS	0.12	0.32
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.43	0.06
tblVehicleEF	UBUS	2.23	5.80
tblVehicleEF	UBUS	0.06	0.01
tblVehicleEF	UBUS	10.02	45.07
tblVehicleEF	UBUS	10.14	0.71
tblVehicleEF	UBUS	1,910.27	1,988.80
tblVehicleEF	UBUS	112.81	8.53

tblVehicleEF	UBUS	7.96	0.48
tblVehicleEF	UBUS	14.44	0.08
tblVehicleEF	UBUS	0.58	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.10	3.2120e-003
tblVehicleEF	UBUS	1.2160e-003	4.6000e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.9830e-003
tblVehicleEF	UBUS	0.10	3.0700e-003
tblVehicleEF	UBUS	1.1180e-003	4.2000e-005
tblVehicleEF	UBUS	4.9050e-003	6.1100e-004
tblVehicleEF	UBUS	0.08	8.4590e-003
tblVehicleEF	UBUS	2.8380e-003	4.9000e-004
tblVehicleEF	UBUS	0.70	0.08
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	0.79	0.05
tblVehicleEF	UBUS	9.5820e-003	1.5580e-003
tblVehicleEF	UBUS	1.3110e-003	8.4000e-005
tblVehicleEF	UBUS	4.9050e-003	6.1100e-004
tblVehicleEF	UBUS	0.08	8.4590e-003
tblVehicleEF	UBUS	2.8380e-003	4.9000e-004
tblVehicleEF	UBUS	3.01	5.92
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	0.86	0.05
tblVehicleEF	UBUS	0.00	0.01
tblVehicleEF	UBUS	2.23	0.00
tblVehicleEF	UBUS	0.05	8.7350e-003
tblVehicleEF	UBUS	0.00	2.10
tblVehicleEF	UBUS	10.08	0.00

tblVehicleEF	UBUS	8.80	0.67
tblVehicleEF	UBUS	0.00	1.7650e-003
tblVehicleEF	UBUS	1,910.27	0.00
tblVehicleEF	UBUS	112.81	2.0170e-003
tblVehicleEF	UBUS	0.00	2.5820e-003
tblVehicleEF	UBUS	7.50	0.00
tblVehicleEF	UBUS	14.38	4.3400e-003
tblVehicleEF	UBUS	0.00	6.8000e-004
tblVehicleEF	UBUS	0.58	0.00
tblVehicleEF	UBUS	0.01	5.92
tblVehicleEF	UBUS	0.10	0.03
tblVehicleEF	UBUS	1.2160e-003	3.5700e-003
tblVehicleEF	UBUS	0.00	2.1840e-003
tblVehicleEF	UBUS	0.25	2.5140e-003
tblVehicleEF	UBUS	3.0000e-003	1.9150e-003
tblVehicleEF	UBUS	0.10	0.03
tblVehicleEF	UBUS	1.1180e-003	0.05
tblVehicleEF	UBUS	7.1810e-003	9.1000e-005
tblVehicleEF	UBUS	0.08	1.5700e-004
tblVehicleEF	UBUS	4.1630e-003	1.0000e-005
tblVehicleEF	UBUS	0.71	0.48
tblVehicleEF	UBUS	0.02	0.00
tblVehicleEF	UBUS	0.72	0.08
tblVehicleEF	UBUS	9.5830e-003	45.07
tblVehicleEF	UBUS	1.2880e-003	0.62
tblVehicleEF	UBUS	7.1810e-003	53.30
tblVehicleEF	UBUS	0.08	4.6000e-005
tblVehicleEF	UBUS	0.00	4.2000e-005
tblVehicleEF	UBUS	4.1630e-003	3.2690e-003

tblVehicleEF	UBUS	3.02	0.03
tblVehicleEF	UBUS	0.02	1.4510e-003
tblVehicleEF	UBUS	0.79	0.00
tblVehicleEF	UBUS	0.00	0.01
tblVehicleEF	UBUS	2.23	0.00
tblVehicleEF	UBUS	0.06	9.0200e-003
tblVehicleEF	UBUS	0.00	2.14
tblVehicleEF	UBUS	10.01	0.00
tblVehicleEF	UBUS	10.32	0.67
tblVehicleEF	UBUS	0.00	1.8120e-003
tblVehicleEF	UBUS	1,910.27	0.00
tblVehicleEF	UBUS	112.81	1.9670e-003
tblVehicleEF	UBUS	0.00	2.8220e-003
tblVehicleEF	UBUS	7.81	0.00
tblVehicleEF	UBUS	14.45	4.5080e-003
tblVehicleEF	UBUS	0.00	4.6500e-004
tblVehicleEF	UBUS	0.58	0.00
tblVehicleEF	UBUS	0.01	5.92
tblVehicleEF	UBUS	0.10	0.05
tblVehicleEF	UBUS	1.2160e-003	2.3810e-003
tblVehicleEF	UBUS	0.00	2.2550e-003
tblVehicleEF	UBUS	0.25	1.6770e-003
tblVehicleEF	UBUS	3.0000e-003	1.3100e-003
tblVehicleEF	UBUS	0.10	0.04
tblVehicleEF	UBUS	1.1180e-003	0.07
tblVehicleEF	UBUS	5.4680e-003	9.1000e-005
tblVehicleEF	UBUS	0.09	1.5700e-004
tblVehicleEF	UBUS	2.9720e-003	1.0000e-005
tblVehicleEF	UBUS	0.70	0.48

tblVehicleEF	UBUS	0.03	0.00
tblVehicleEF	UBUS	0.80	0.08
tblVehicleEF	UBUS	9.5820e-003	45.07
tblVehicleEF	UBUS	1.3140e-003	0.72
tblVehicleEF	UBUS	5.4680e-003	53.30
tblVehicleEF	UBUS	0.09	4.6000e-005
tblVehicleEF	UBUS	0.00	4.2000e-005
tblVehicleEF	UBUS	2.9720e-003	3.2690e-003
tblVehicleEF	UBUS	3.01	0.03
tblVehicleEF	UBUS	0.03	1.4510e-003
tblVehicleEF	UBUS	0.88	0.00
tblVehicleTrips	SU_TR	16.74	19.50
tblVehicleTrips	WD_TR	1.89	34.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.9524	48.0517	33.8922	0.0876	6.5307	2.0342	8.1361	3.4393	1.8716	4.9168	0.0000	8,537.9731	8,537.9731	2.4986	0.0000	8,600.4389
2022	4.2600	38.9398	31.8342	0.0874	0.6294	1.6168	2.2462	0.1695	1.4876	1.6571	0.0000	8,520.1286	8,520.1286	2.4974	0.0000	8,582.5633
Maximum	**4.9524**	**48.0517**	**33.8922**	**0.0876**	**6.5307**	**2.0342**	**8.1361**	**3.4393**	**1.8716**	**4.9168**	**0.0000**	**8,537.9731**	**8,537.9731**	**2.4986**	**0.0000**	**8,600.4389**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.9524	48.0517	33.8922	0.0876	2.8249	2.0342	4.4303	1.4166	1.8716	2.8941	0.0000	8,537.9731	8,537.9731	2.4986	0.0000	8,600.4389
2022	4.2600	38.9398	31.8342	0.0874	0.6294	1.6168	2.2462	0.1695	1.4876	1.6571	0.0000	8,520.1286	8,520.1286	2.4974	0.0000	8,582.5632
Maximum	**4.9524**	**48.0517**	**33.8922**	**0.0876**	**2.8249**	**2.0342**	**4.4303**	**1.4166**	**1.8716**	**2.8941**	**0.0000**	**8,537.9731**	**8,537.9731**	**2.4986**	**0.0000**	**8,600.4389**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.76**	**0.00**	**35.69**	**56.05**	**0.00**	**30.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.3691	0.0185	472.5784	1.9533	0.7413	0.5997	1.3410	0.9324	0.5107	1.4431		0.0803	0.0803	0.2182		5.5360
Total	**0.3747**	**0.0185**	**472.5786**	**1.9533**	**0.7413**	**0.5997**	**1.3410**	**0.9324**	**0.5107**	**1.4431**		**0.0809**	**0.0809**	**0.2182**	**0.0000**	**5.5366**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.3691	0.0185	472.5784	1.9533	0.7413	0.5997	1.3410	0.9324	0.5107	1.4431		0.0803	0.0803	0.2182		5.5360
Total	**0.3747**	**0.0185**	**472.5786**	**1.9533**	**0.7413**	**0.5997**	**1.3410**	**0.9324**	**0.5107**	**1.4431**		**0.0809**	**0.0809**	**0.2182**	**0.0000**	**5.5366**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing and Grubbing	Site Preparation	7/1/2021	7/28/2021	5	20	
2	Grading	Grading	7/29/2021	10/20/2021	5	60	
3	Paving and Construction	Building Construction	10/21/2021	2/9/2022	5	80	
4	Landscaping	Building Construction	2/10/2022	6/15/2022	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clearing and Grubbing	Excavators	1	8.00	158	0.38
Clearing and Grubbing	Graders	0	8.00	187	0.41
Clearing and Grubbing	Off-Highway Trucks	2	8.00	402	0.38
Clearing and Grubbing	Rubber Tired Dozers	1	8.00	247	0.40
Clearing and Grubbing	Scrapers	0	8.00	367	0.48
Clearing and Grubbing	Sweepers/Scrubbers	1	8.00	64	0.46
Clearing and Grubbing	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	2	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	1	8.00	367	0.48
Grading	Sweepers/Scrubbers	1	8.00	64	0.46
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Paving and Construction	Cranes	0	8.00	231	0.29
Paving and Construction	Excavators	1	8.00	158	0.38
Paving and Construction	Forklifts	0	7.00	89	0.20
Paving and Construction	Generator Sets	0	8.00	84	0.74
Paving and Construction	Off-Highway Trucks	3	8.00	402	0.38
Paving and Construction	Pavers	1	8.00	130	0.42
Paving and Construction	Rollers	1	8.00	80	0.38
Paving and Construction	Rubber Tired Dozers	1	8.00	247	0.40
Paving and Construction	Scrapers	1	8.00	367	0.48
Paving and Construction	Sweepers/Scrubbers	1	8.00	64	0.46
Paving and Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Paving and Construction	Welders	0	8.00	46	0.45
Landscaping	Air Compressors	0	6.00	78	0.48

Landscaping	Cranes	0	8.00	231	0.29
Landscaping	Forklifts	0	7.00	89	0.20
Landscaping	Generator Sets	0	8.00	84	0.74
Landscaping	Skid Steer Loaders	1	8.00	65	0.37
Landscaping	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Landscaping	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clearing and Grubbing	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	989.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving and Construction	9	46.00	18.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Landscaping	2	46.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Clearing and Grubbing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2607	0.0000	6.2607	3.3360	0.0000	3.3360			0.0000			0.0000
Off-Road	2.8798	27.3674	18.4470	0.0454		1.2721	1.2721		1.1704	1.1704		4,394.0541	4,394.0541	1.4211		4,429.5823
Total	**2.8798**	**27.3674**	**18.4470**	**0.0454**	**6.2607**	**1.2721**	**7.5328**	**3.3360**	**1.1704**	**4.5063**		**4,394.0541**	**4,394.0541**	**1.4211**		**4,429.5823**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.0692**	**0.0450**	**0.5098**	**1.5600e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.7227**	**155.7227**	**4.1900e-003**		**155.8274**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4417	0.0000	2.4417	1.3010	0.0000	1.3010			0.0000			0.0000
Off-Road	2.8798	27.3674	18.4470	0.0454		1.2721	1.2721		1.1704	1.1704	0.0000	4,394.0541	4,394.0541	1.4211		4,429.5823
Total	**2.8798**	**27.3674**	**18.4470**	**0.0454**	**2.4417**	**1.2721**	**3.7138**	**1.3010**	**1.1704**	**2.4714**	**0.0000**	**4,394.0541**	**4,394.0541**	**1.4211**		**4,429.5823**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.0692**	**0.0450**	**0.5098**	**1.5600e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.7227**	**155.7227**	**4.1900e-003**		**155.8274**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0751	0.0000	6.0751	3.3160	0.0000	3.3160			0.0000			0.0000
Off-Road	3.6454	36.4114	23.4740	0.0578		1.5907	1.5907		1.4634	1.4634		5,598.6781	5,598.6781	1.8107		5,643.9462
Total	**3.6454**	**36.4114**	**23.4740**	**0.0578**	**6.0751**	**1.5907**	**7.6658**	**3.3160**	**1.4634**	**4.7794**		**5,598.6781**	**5,598.6781**	**1.8107**		**5,643.9462**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1285	4.3265	1.0058	0.0124	0.2879	0.0135	0.3014	0.0789	0.0129	0.0918		1,349.9133	1,349.9133	0.1004		1,352.4238

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.1977**	**4.3715**	**1.5156**	**0.0140**	**0.4556**	**0.0148**	**0.4703**	**0.1234**	**0.0141**	**0.1374**		**1,505.6360**	**1,505.6360**	**0.1046**		**1,508.2512**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3693	0.0000	2.3693	1.2932	0.0000	1.2932			0.0000			0.0000
Off-Road	3.6454	36.4114	23.4740	0.0578		1.5907	1.5907		1.4634	1.4634	0.0000	5,598.6781	5,598.6781	1.8107		5,643.9462
Total	**3.6454**	**36.4114**	**23.4740**	**0.0578**	**2.3693**	**1.5907**	**3.9600**	**1.2932**	**1.4634**	**2.7567**	**0.0000**	**5,598.6781**	**5,598.6781**	**1.8107**		**5,643.9462**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1285	4.3265	1.0058	0.0124	0.2879	0.0135	0.3014	0.0789	0.0129	0.0918		1,349.9133	1,349.9133	0.1004		1,352.4238
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.1977**	**4.3715**	**1.5156**	**0.0140**	**0.4556**	**0.0148**	**0.4703**	**0.1234**	**0.0141**	**0.1374**		**1,505.6360**	**1,505.6360**	**0.1046**		**1,508.2512**

3.4 Paving and Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.6870	46.1940	31.8636	0.0783		2.0268	2.0268		1.8647	1.8647		7,586.3508	7,586.3508	2.4536		7,647.6903
Total	**4.6870**	**46.1940**	**31.8636**	**0.0783**		**2.0268**	**2.0268**		**1.8647**	**1.8647**		**7,586.3508**	**7,586.3508**	**2.4536**		**7,647.6903**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0532	1.7198	0.4653	4.4300e-003	0.1152	3.6300e-003	0.1188	0.0332	3.4700e-003	0.0366		474.0728	474.0728	0.0322		474.8780
Worker	0.2121	0.1379	1.5634	4.7900e-003	0.5142	3.8100e-003	0.5180	0.1364	3.5000e-003	0.1399		477.5495	477.5495	0.0128		477.8706
Total	**0.2653**	**1.8577**	**2.0287**	**9.2200e-003**	**0.6294**	**7.4400e-003**	**0.6368**	**0.1695**	**6.9700e-003**	**0.1765**		**951.6223**	**951.6223**	**0.0451**		**952.7486**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.6870	46.1940	31.8636	0.0783		2.0268	2.0268		1.8647	1.8647	0.0000	7,586.3508	7,586.3508	2.4536		7,647.6903
Total	**4.6870**	**46.1940**	**31.8636**	**0.0783**		**2.0268**	**2.0268**		**1.8647**	**1.8647**	**0.0000**	**7,586.3508**	**7,586.3508**	**2.4536**		**7,647.6903**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0532	1.7198	0.4653	4.4300e-003	0.1152	3.6300e-003	0.1188	0.0332	3.4700e-003	0.0366		474.0728	474.0728	0.0322		474.8780
Worker	0.2121	0.1379	1.5634	4.7900e-003	0.5142	3.8100e-003	0.5180	0.1364	3.5000e-003	0.1399		477.5495	477.5495	0.0128		477.8706
Total	**0.2653**	**1.8577**	**2.0287**	**9.2200e-003**	**0.6294**	**7.4400e-003**	**0.6368**	**0.1695**	**6.9700e-003**	**0.1765**		**951.6223**	**951.6223**	**0.0451**		**952.7486**

3.4 Paving and Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0106	37.1829	29.9504	0.0784		1.6100	1.6100		1.4812	1.4812		7,589.8386	7,589.8386	2.4547		7,651.2063

Total	**4.0106**	**37.1829**	**29.9504**	**0.0784**		**1.6100**	**1.6100**		**1.4812**	**1.4812**		**7,589.8386**	**7,589.8386**	**2.4547**		**7,651.2063**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0499	1.6323	0.4407	4.3900e-003	0.1152	3.1600e-003	0.1183	0.0332	3.0200e-003	0.0362		469.8398	469.8398	0.0311		470.6167
Worker	0.1995	0.1246	1.4432	4.6200e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		460.4503	460.4503	0.0116		460.7403
Total	**0.2495**	**1.7569**	**1.8839**	**9.0100e-003**	**0.6294**	**6.8600e-003**	**0.6362**	**0.1695**	**6.4200e-003**	**0.1759**		**930.2901**	**930.2901**	**0.0427**		**931.3570**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0106	37.1829	29.9504	0.0784		1.6100	1.6100		1.4812	1.4812	0.0000	7,589.8386	7,589.8386	2.4547		7,651.2063
Total	**4.0106**	**37.1829**	**29.9504**	**0.0784**		**1.6100**	**1.6100**		**1.4812**	**1.4812**	**0.0000**	**7,589.8386**	**7,589.8386**	**2.4547**		**7,651.2063**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0499	1.6323	0.4407	4.3900e-003	0.1152	3.1600e-003	0.1183	0.0332	3.0200e-003	0.0362		469.8398	469.8398	0.0311		470.6167
Worker	0.1995	0.1246	1.4432	4.6200e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		460.4503	460.4503	0.0116		460.7403
Total	**0.2495**	**1.7569**	**1.8839**	**9.0100e-003**	**0.6294**	**6.8600e-003**	**0.6362**	**0.1695**	**6.4200e-003**	**0.1759**		**930.2901**	**930.2901**	**0.0427**		**931.3570**

3.5 Landscaping - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2343	2.6042	3.6251	5.1800e-003		0.1246	0.1246		0.1147	0.1147		501.6302	501.6302	0.1622		505.6861
Total	**0.2343**	**2.6042**	**3.6251**	**5.1800e-003**		**0.1246**	**0.1246**		**0.1147**	**0.1147**		**501.6302**	**501.6302**	**0.1622**		**505.6861**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.9068	0.2448	2.4400e-003	0.0640	1.7600e-003	0.0657	0.0184	1.6800e-003	0.0201		261.0221	261.0221	0.0173		261.4537
Worker	0.1995	0.1246	1.4432	4.6200e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		460.4503	460.4503	0.0116		460.7403
Total	**0.2273**	**1.0314**	**1.6880**	**7.0600e-003**	**0.5782**	**5.4600e-003**	**0.5836**	**0.1548**	**5.0800e-003**	**0.1599**		**721.4724**	**721.4724**	**0.0289**		**722.1940**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2343	2.6042	3.6251	5.1800e-003		0.1246	0.1246		0.1147	0.1147	0.0000	501.6302	501.6302	0.1622		505.6861
Total	**0.2343**	**2.6042**	**3.6251**	**5.1800e-003**		**0.1246**	**0.1246**		**0.1147**	**0.1147**	**0.0000**	**501.6302**	**501.6302**	**0.1622**		**505.6861**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0278	0.9068	0.2448	2.4400e-003	0.0640	1.7600e-003	0.0657	0.0184	1.6800e-003	0.0201		261.0221	261.0221	0.0173		261.4537
Worker	0.1995	0.1246	1.4432	4.6200e-003	0.5142	3.7000e-003	0.5179	0.1364	3.4000e-003	0.1398		460.4503	460.4503	0.0116		460.7403
Total	**0.2273**	**1.0314**	**1.6880**	**7.0600e-003**	**0.5782**	**5.4600e-003**	**0.5836**	**0.1548**	**5.0800e-003**	**0.1599**		**721.4724**	**721.4724**	**0.0289**		**722.1940**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3691	0.0185	472.5784	1.9533	0.7413	0.5997	1.3410	0.9324	0.5107	1.4431		0.0803	0.0803	0.2182		5.5360
Unmitigated	0.3691	0.0185	472.5784	1.9533	0.7413	0.5997	1.3410	0.9324	0.5107	1.4431		0.0803	0.0803	0.2182		5.5360

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	85.00	56.88	48.75	218,128	218,128
Total	85.00	56.88	48.75	218,128	218,128

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.552603	0.061033	0.186728	0.118579	0.023437	0.006039	0.017620	0.024846	0.001416	0.001678	0.004487	0.000623	0.000912

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					

City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004

Unmitigated	5.6300e-003	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Total	**5.6300e-003**	**0.0000**	**2.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**5.5000e-004**	**5.5000e-004**	**0.0000**		**5.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		5.5000e-004	5.5000e-004	0.0000		5.8000e-004
Total	**5.6300e-003**	**0.0000**	**2.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**5.5000e-004**	**5.5000e-004**	**0.0000**		**5.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Sidewalk Extension

ESA

Emissions Summary

ESA

Attachment E

Air Quality Construction Analysis

Unmitigated Construction Scenario

Regional	lbs/day					
	ROG	NOX	CO	SO2	PM10 Total	Total PM2.5
Site Preparation	0.7	8.2	6.1	0.0	0.7	0.4
Demolition	1.2	10.9	15.4	0.0	0.8	0.6
Utility Relocation	1.1	8.1	7.1	0.0	0.4	0.3
Storm Drain Construction	1.1	8.1	11.0	0.0	0.7	0.4
Sidewalk Construction (Newport)	0.5	4.5	5.5	0.0	0.5	0.3
Sidewalk Construction (Crawford)	0.6	4.8	5.7	0.0	0.5	0.3
Traffic Signal Modification	1.1	10.9	8.8	0.0	0.7	0.5
Paving	0.8	7.6	10.3	0.0	0.6	0.4
Daily Maximum Emissions	**1.2**	**10.9**	**15.4**	**0.0**	**0.8**	**0.6**
SCAQMD Regional Threshold	75	100	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Attachment E

Air Quality Construction Analysis

Unmitigated Construction Scenario				
Localized Emissions Summary	**NOX**	**CO**	**PM10 Total**	**Total PM2.5**
0	**lb/hr**			
Site Preparation	8.2	5.6	0.5	0.3
Demolition	10.3	14.5	0.5	0.5
Utility Relocation	8.1	6.8	0.3	0.3
Storm Drain Construction	7.1	9.5	0.3	0.3
Sidewalk Construction (Newport)	3.5	4.3	0.2	0.2
Sidewalk Construction (Crawford)	3.8	4.5	0.2	0.2
Traffic Signal Modification	9.9	7.5	0.4	0.4
Paving	7.6	9.8	0.4	0.4
Daily Maximum Emissions	**10.3**	**14.5**	**0.5**	**0.5**
SCAQMDLocalized Threshold	131	993	6	4
Exceeds Threshold?	No	No	No	No

Attachment E

Air Quality Construction Analysis

summer	Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017)										Offsite Construction Emissions - Running (EMFAC2017)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
	lb/day										lb/day									
Site Preparation	0.70	8.19	5.64	0.01	0.21	0.32	0.53	0.02	0.30	0.32	0.01	0.03	0.47	0.00	0.18	0.00	0.18	0.05	0.00	0.05
Demolition	1.21	10.32	14.52	0.02	0.00	0.54	0.54	0.00	0.52	0.52	0.03	0.62	0.91	0.00	0.28	0.00	0.28	0.07	0.00	0.08
Utility Relocation	1.06	8.07	6.75	0.03	0.00	0.29	0.29	0.00	0.27	0.27	0.01	0.02	0.35	0.00	0.13	0.00	0.13	0.04	0.00	0.04
Storm Drain Construction	1.04	7.12	9.52	0.01	0.00	0.33	0.33	0.00	0.32	0.32	0.06	1.01	1.43	0.01	0.36	0.00	0.36	0.10	0.00	0.10
Sidewalk Construction (Newport)	0.48	3.54	4.28	0.01	0.00	0.18	0.18	0.00	0.18	0.18	0.06	1.00	1.20	0.00	0.27	0.00	0.27	0.07	0.00	0.08
Sidewalk Construction (Crawford)	0.52	3.79	4.49	0.01	0.00	0.19	0.19	0.00	0.19	0.19	0.06	1.00	1.20	0.00	0.27	0.00	0.27	0.07	0.00	0.08
Traffic Signal Modification	1.07	9.89	7.51	0.02	0.00	0.41	0.41	0.00	0.38	0.38	0.06	1.01	1.32	0.01	0.31	0.00	0.32	0.08	0.00	0.09
Paving	0.77	7.61	9.84	0.02	0.00	0.39	0.39	0.00	0.36	0.36	0.01	0.03	0.47	0.00	0.18	0.00	0.18	0.05	0.00	0.05

Regional Emissions - ALL	Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
Site Preparation	0.71	8.22	6.10	0.01	0.39	0.33	0.71	0.07	0.30	0.37
Demolition	1.24	10.94	15.42	0.03	0.28	0.55	0.82	0.07	0.53	0.60
Utility Relocation	1.07	8.09	7.10	0.03	0.13	0.29	0.43	0.04	0.27	0.31
Storm Drain Construction	1.10	8.14	10.95	0.02	0.36	0.34	0.69	0.10	0.32	0.42
Sidewalk Construction (Newport)	0.53	4.54	5.48	0.01	0.27	0.18	0.45	0.07	0.18	0.26
Sidewalk Construction (Crawford)	0.57	4.79	5.69	0.01	0.27	0.19	0.46	0.07	0.19	0.27
Traffic Signal Modification	1.13	10.90	8.82	0.03	0.31	0.41	0.73	0.08	0.38	0.47
Paving	0.78	7.64	10.30	0.02	0.18	0.39	0.57	0.05	0.36	0.41
Maximum Daily Emissions	**1.24**	**10.94**	**15.42**	**0.03**	**0.39**	**0.55**	**0.82**	**0.10**	**0.53**	**0.60**

Air Quality Construction Analysis

Winter	Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017)										Offsite Construction Emissions - Running (EMFAC2017)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
	lb/day										lb/day									
Site Preparation	0.70	8.19	5.64	0.01	0.21	0.32	0.53	0.02	0.30	0.32	0.01	0.03	0.47	0.00	0.18	0.00	0.18	0.05	0.00	0.05
Demolition	1.21	10.32	14.52	0.02	0.00	0.54	0.54	0.00	0.52	0.52	0.03	0.62	0.91	0.00	0.28	0.00	0.28	0.07	0.00	0.08
Utility Relocation	1.06	8.07	6.75	0.03	0.00	0.29	0.29	0.00	0.27	0.27	0.01	0.02	0.35	0.00	0.13	0.00	0.13	0.04	0.00	0.04
Storm Drain Construction	1.04	7.12	9.52	0.01	0.00	0.33	0.33	0.00	0.32	0.32	0.06	1.01	1.43	0.01	0.36	0.00	0.36	0.10	0.00	0.10
Sidewalk Construction (Newport)	0.48	3.54	4.28	0.01	0.00	0.18	0.18	0.00	0.18	0.18	0.06	1.00	1.20	0.00	0.27	0.00	0.27	0.07	0.00	0.08
Sidewalk Construction (Crawford)	0.52	3.79	4.49	0.01	0.00	0.19	0.19	0.00	0.19	0.19	0.06	1.00	1.20	0.00	0.27	0.00	0.27	0.07	0.00	0.08
Traffic Signal Modification	1.07	9.89	7.51	0.02	0.00	0.41	0.41	0.00	0.38	0.38	0.06	1.01	1.32	0.01	0.31	0.00	0.32	0.08	0.00	0.09
Paving	0.77	7.61	9.84	0.02	0.00	0.39	0.39	0.00	0.36	0.36	0.01	0.03	0.47	0.00	0.18	0.00	0.18	0.05	0.00	0.05

Regional Emissions - ALL	Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul)									
	ROG	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	Total PM2.5
Site Preparation	0.71	8.22	6.10	0.01	0.39	0.33	0.71	0.07	0.30	0.37
Demolition	1.24	10.94	15.42	0.03	0.28	0.55	0.82	0.07	0.53	0.60
Utility Relocation	1.07	8.09	7.10	0.03	0.13	0.29	0.43	0.04	0.27	0.31
Storm Drain Construction	1.10	8.14	10.95	0.02	0.36	0.34	0.69	0.10	0.32	0.42
Sidewalk Construction (Newport)	0.53	4.54	5.48	0.01	0.27	0.18	0.45	0.07	0.18	0.26
Sidewalk Construction (Crawford)	0.57	4.79	5.69	0.01	0.27	0.19	0.46	0.07	0.19	0.27
Traffic Signal Modification	1.13	10.90	8.82	0.03	0.31	0.41	0.73	0.08	0.38	0.47
Paving	0.78	7.64	10.30	0.02	0.18	0.39	0.57	0.05	0.36	0.41
Maximum Daily Emissions	**1.24**	**10.94**	**15.42**	**0.03**	**0.39**	**0.55**	**0.82**	**0.10**	**0.53**	**0.60**

Greenhouse Gas Emissions

Construction Summary		Onsite	Mobile	Total
Site Preparation	2022	3.21	0.41	4
Demolition	2022	15.14	2.92	18
Utility Relocation	2022	12.93	0.57	13
Storm Drain Construction	2022	19.87	9.15	29
Sidewalk Construction (Newport)	2022	5.04	3.89	9
Sidewalk Construction (Crawford)	2022	5.29	3.89	9
Traffic Signal Modification	2022	10.79	2.86	14
Paving	2022	10.65	0.07	11
			Total	107
			Amortized	3.56

Onroad Emissions



Total On-Road Emissions **Total On-Road Emissions**

260 Max construction days per year

	Construction Phase	Daily One-Way Trips	Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (pounds/day) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
	Site Preparation	2022															
	Total Haul Trips	0															
Site Prepara	Hauling	0	6	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	0	6	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Worker	Worker	16	6	8	14.7	0	0.01	0.03	0.47	0.00	0.18	0.00	0.18	0.05	0.00	0.05	0.41
					Onroad Emissions - Site Preparation		**0.01**	**0.03**	**0.47**	**0.00**	**0.18**	**0.00**	**0.18**	**0.05**	**0.00**	**0.05**	**0.41**
	Demolition	2022															
	Total Haul Trips	32															
2022Haulin	Hauling	3	15	8	20	15	0.02	0.58	0.32	0.00	0.05	0.00	0.06	0.01	0.00	0.02	1.63
2022Vendor	Vendor	0	15	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Worke	Worker	20	15	8	14.7	0	0.01	0.04	0.58	0.00	0.22	0.00	0.22	0.06	0.00	0.06	1.29
					Onroad Emissions - Demolition		**0.03**	**0.62**	**0.91**	**0.00**	**0.28**	**0.00**	**0.28**	**0.07**	**0.00**	**0.08**	**2.92**
	Utility Relocation	2022															
	Total Haul Trips	0															
2022Haulin	Hauling	0	11	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	0	11	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Worke	Worker	12	11	8	14.7	0	0.01	0.02	0.35	0.00	0.13	0.00	0.13	0.04	0.00	0.04	0.57
					Onroad Emissions - Utility Relocation		**0.01**	**0.02**	**0.35**	**0.00**	**0.13**	**0.00**	**0.13**	**0.04**	**0.00**	**0.04**	**0.57**
	Storm Drain Construction	2022															
	Total Haul Trips	0															
2022Haulin	Hauling	0	33	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	14	33	8	6.9	15	0.05	0.97	0.74	0.00	0.09	0.00	0.09	0.03	0.00	0.03	5.75
2022Worke	Worker	24	33	8	14.7	0	0.01	0.05	0.70	0.00	0.27	0.00	0.27	0.07	0.00	0.07	3.41
					Onroad Emissions - Storm Drain Construction		**0.06**	**1.01**	**1.43**	**0.01**	**0.36**	**0.00**	**0.36**	**0.10**	**0.00**	**0.10**	**9.15**
	Sidewalk Contruction (Newport)	2022															13.05
	Total Haul Trips	0															
2022Haulin	Hauling	0	16	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	14	16	8	6.9	15	0.05	0.97	0.74	0.00	0.09	0.00	0.09	0.03	0.00	0.03	2.79
2022Worke	Worker	16	16	8	14.7	0	0.01	0.03	0.47	0.00	0.18	0.00	0.18	0.05	0.00	0.05	1.10
					Onroad Emissions - Sidewalk Contruction (Newport)		**0.06**	**1.00**	**1.20**	**0.00**	**0.27**	**0.00**	**0.27**	**0.07**	**0.00**	**0.08**	**3.89**
	Sidewalk Construction (Crawford)	2022															
	Total Haul Trips	0															
2022Haulin	Hauling	0	16	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	14	16	8	6.9	15	0.05	0.97	0.74	0.00	0.00	0.00	2.67	0.00	0.11	2.79	0.00
2022Worke	Worker	16	16	8	14.7	0	0.01	0.03	0.47	0.00	0.00	0.00	1.09	0.00	0.01	1.10	0.00
					Onroad Emissions - Sidewalk Construction (Crawford)		**0.06**	**1.00**	**1.20**	**0.00**	**0.00**	**0.00**	**3.77**	**0.00**	**0.12**	**3.89**	**0.00**
	Traffic Signal Modification	2022															
	Total Haul Trips	0															
2022Haulin	Hauling	0	11	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022Vendor	Vendor	14	11	8	6.9	15	0.05	0.97	0.74	0.00	0.09	0.00	0.09	0.03	0.00	0.03	1.92
2022Worke	Worker	20	11	8	14.7	0	0.01	0.04	0.58	0.00	0.22	0.00	0.22	0.06	0.00	0.06	0.95
					Onroad Emissions - Traffic Signal Modification		**0.06**	**1.01**	**1.32**	**0.01**	**0.31**	**0.00**	**0.32**	**0.08**	**0.00**	**0.09**	**2.86**
	Paving	2022															
	Total Haul Trips	0															
	Hauling	0	1	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0	1	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	16	1	8	14.7	0	0.01	0.03	0.47	0.00	0.00	0.00	0.07	0.00	0.00	0.07	0.00
					Onroad Emissions - Paving		**0.01**	**0.03**	**0.47**	**0.00**	**0.00**	**0.00**	**0.07**	**0.00**	**0.00**	**0.07**	**0.00**

Total On-Road Emissions **Total On-Road Emissions**

260 Max construction days per year

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (Tons/year) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
Site Preparation	2022															
Total Haul Trips	0															
Hauling	0	6	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	6	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	6	8	14.7	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
						0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.41**
Demolition	2022															
Total Haul Trips	32															
Hauling	3	15	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63
Vendor	0	15	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	15	8	14.7	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29
						0.00	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.92**
Utility Relocation	2022															
Total Haul Trips	0															
Hauling	0	11	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	11	8	6.9	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	12	11	8	14.7	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57
						0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.57**
Storm Drain Construction	2022															
Total Haul Trips	0															
Hauling	0	33	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	33	8	6.9	15	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.75
Worker	24	33	8	14.7	0	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41
						0.00	**0.02**	**0.02**	**0.00**	**0.01**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**9.15**
Sidewalk Contruction (Newport)	2022															
Total Haul Trips	0															
Hauling	0	16	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	6.9	15	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79
Worker	16	16	8	14.7	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.10
						0.00	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.89**
Sidewalk Construction (Crawford	2022															
Total Haul Trips	0															
Hauling	0	16	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	6.9	15	0.00	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.00
Worker	16	16	8	14.7	0	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
						0.00	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.03**	**0.00**
Traffic Signal Modification	2022															
Total Haul Trips	0															
Hauling	0	11	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	11	8	6.9	15	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.92
Worker	20	11	8	14.7	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95
						0.00	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.86**
Paving	2022															
Total Haul Trips	0															
Hauling	0	1	8	20	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	1	8	7	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	1	8	15	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Running Emissions

		Running Emissions Factor (grams/mile)						Running Emissions Factor (grams/mile)		
		ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2020	Hauling	0.12467436	4.127586075	0.70244559	0.01389473	0.04956172	0.04741766	1520.07529	0.08121693	0.2410944
2020	Vendor	0.12175156	3.217634225	0.70325362	0.01222293	0.05527116	0.05287672	1311.85371	0.04440854	0.18764154
2020	Worker	0.02296702	0.083024116	1.08430473	0.00306823	0.00220351	0.002029	310.119284	0.00538825	0.00712331
2021	Hauling	0.08103572	3.571515626	0.57499969	0.01347655	0.0279869	0.02677616	1477.43548	0.08019506	0.23446951
2021	Vendor	0.0717977	2.602453214	0.52331731	0.01185125	0.02991351	0.02861613	1273.54109	0.04239589	0.18204996
2021	Worker	0.01983596	0.07223241	0.98341812	0.00297251	0.00205695	0.00189393	300.448479	0.00471177	0.00646256
2022	Hauling	0.02463044	2.696920068	0.45130496	0.01267644	0.01843607	0.0176385	1394.21089	0.07850131	0.22145577
2022	Vendor	0.01991806	1.889760516	0.36497107	0.01125961	0.01227567	0.01174136	1211.83967	0.04029686	0.17274956
2022	Worker	0.01716262	0.063167612	0.89784164	0.00287684	0.00193578	0.00178222	290.781675	0.00413135	0.00590029
2023	Hauling	0.02438513	2.70726027	0.46544535	0.01247986	0.01859168	0.01778737	1374.48104	0.07922973	0.21840565
2023	Vendor	0.01904515	1.897817151	0.35240371	0.01108069	0.01237071	0.01183229	1193.62946	0.0405116	0.17033183
2023	Worker	0.01513169	0.055897597	0.83140276	0.00279565	0.00185735	0.00170978	282.578076	0.00368669	0.00544537
GWP		N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/day)						Regional Emissions (MT/year)			
					ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Site Preparation	2022													
Total Haul Trips	0													
Hauling	0	6	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	6	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	6	8	14.7	0.01	0.03	0.47	0.00	0.00	0.00	0.41	0.00	0.00	0.41
					0.01	**0.03**	**0.47**	**0.00**	**0.00**	**0.00**	**0.41**	**0.00**	**0.00**	**0.41**
Demolition	2022													
Total Haul Trips	32													
Hauling	3	15	8	20	0.00	0.36	0.06	0.00	0.00	0.00	1.25	0.00	0.06	1.31
Vendor	0	15	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	15	8	14.7	0.01	0.04	0.58	0.00	0.00	0.00	1.28	0.00	0.01	1.29
					0.01	**0.40**	**0.64**	**0.00**	**0.00**	**0.00**	**2.54**	**0.00**	**0.07**	**2.60**
Utility Relocation	2022													
Total Haul Trips	0													
Hauling	0	11	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	11	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	12	11	8	14.7	0.01	0.02	0.35	0.00	0.00	0.00	0.56	0.00	0.00	0.57
					0.01	**0.02**	**0.35**	**0.00**	**0.00**	**0.00**	**0.56**	**0.00**	**0.00**	**0.57**
Storm Drain Construction	2022													
Total Haul Trips	0													
Hauling	0	33	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	33	8	6.9	0.00	0.40	0.08	0.00	0.00	0.00	3.86	0.00	0.16	4.03
Worker	24	33	8	14.7	0.01	0.05	0.70	0.00	0.00	0.00	3.39	0.00	0.02	3.41
					0.02	**0.45**	**0.78**	**0.00**	**0.00**	**0.00**	**7.25**	**0.00**	**0.18**	**7.43**
Sidewalk Contruction (Nev	2022													
Total Haul Trips	0													
Hauling	0	16	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	6.9	0.00	0.40	0.08	0.00	0.00	0.00	1.87	0.00	0.08	1.95
Worker	16	16	8	14.7	0.01	0.03	0.47	0.00	0.00	0.00	1.09	0.00	0.01	1.10
					0.01	**0.44**	**0.54**	**0.00**	**0.00**	**0.00**	**2.97**	**0.00**	**0.08**	**3.05**
Sidewalk Construction (Cra	2022													
Total Haul Trips	0													
Hauling	0	16	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	6.9	0.00	0.40	0.08	0.00	0.00	0.00	1.87	0.00	0.08	1.95
Worker	16	16	8	14.7	0.01	0.03	0.47	0.00	0.00	0.00	1.09	0.00	0.01	1.10
					0.01	**0.44**	**0.54**	**0.00**	**0.00**	**0.00**	**2.97**	**0.00**	**0.08**	**3.05**
Traffic Signal Modification	2022													
Total Haul Trips	0													
Hauling	0	11	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	11	8	6.9	0.00	0.40	0.08	0.00	0.00	0.00	1.29	0.00	0.05	1.34
Worker	20	11	8	14.7	0.01	0.04	0.58	0.00	0.00	0.00	0.94	0.00	0.01	0.95
					0.02	**0.44**	**0.66**	**0.00**	**0.00**	**0.00**	**2.23**	**0.00**	**0.06**	**2.29**
Paving	2022													
Total Haul Trips	0													
Hauling	0	1	8	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	1	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	1	8	14.7	0.01	0.03	0.47	0.00	0.00	0.00	0.07	0.00	0.00	0.07
					0.01	**0.03**	**0.47**	**0.00**	**0.00**	**0.00**	**0.07**	**0.00**	**0.00**	**0.07**

Idling Emissions

	Idling Emissions Factor (grams/minute)						Idling Emissions Factor (grams/minute)		
	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2020Hauling Hauling	0.182037569	2.514257339	2.344246757	0.00425698	0.003648271	0.003490448	457.4012863	0.010601217	0.072214857
2020Vendor Vendor	0.096551578	1.389498887	1.264128866	0.002281269	0.002251179	0.002153794	244.7777788	0.006331669	0.038349282
2020Worker Worker	0	0	0	0	0	0	0	0	0
2021Hauling Hauling	0.179928256	2.494221613	2.47137063	0.004317067	0.001537071	0.001470578	463.9794578	0.010572582	0.073259029
2021Vendor Vendor	0.095120382	1.358206146	1.327353892	0.002308011	0.001019868	0.000975749	247.7184766	0.006310233	0.03882087
2021Worker Worker	0	0	0	0	0	0	0	0	0
2022Hauling Hauling	0.179433405	2.268893827	2.655408876	0.00413434	0.001243874	0.001190065	444.8642971	0.010627465	0.070264947
2022Vendor Vendor	0.094536862	1.21688302	1.421431884	0.002211148	0.000697923	0.000667731	237.5784467	0.00634204	0.037232428
2022Worker Worker	0	0	0	0	0	0	0	0	0
2023Hauling Hauling	0.179743074	2.262044342	2.6647617	0.004091185	0.001197181	0.001145392	440.3939763	0.01068902	0.069566829
2023Vendor Vendor	0.094568385	1.210583463	1.425003725	0.002186954	0.000664142	0.000635412	235.0703056	0.006350607	0.036853294
2023Worker Worker	0	0	0	0	0	0	0	0	0
GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	Idling minutes per Day (miles)	Regional Emissions (pounds/day)						Regional Emissions (MT/year)			
					ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Site Preparation	2022													
Total Haul Trips	0													
Hauling	0	6	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	6	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	6	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Demolition	2022													
Total Haul Trips	32													
Hauling	3	15	8	15	0.02	0.23	0.26	0.00	0.00	0.00	0.30	0.00	0.01	0.31
Vendor	0	15	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	15	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.02	**0.23**	**0.26**	**0.00**	**0.00**	**0.00**	**0.30**	**0.00**	**0.01**	**0.31**
Utility Relocation	2022													
Total Haul Trips	0													
Hauling	0	11	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	11	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	12	11	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Storm Drain Construction	2022													
Total Haul Trips	0													
Hauling	0	33	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	33	8	15	0.04	0.56	0.66	0.00	0.00	0.00	1.65	0.00	0.07	1.72
Worker	24	33	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.04	**0.56**	**0.66**	**0.00**	**0.00**	**0.00**	**1.65**	**0.00**	**0.07**	**1.72**
Sidewalk Contruction (New	2022													
Total Haul Trips	0													
Hauling	0	16	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	15	0.04	0.56	0.66	0.00	0.00	0.00	0.80	0.00	0.04	0.84
Worker	16	16	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.04	**0.56**	**0.66**	**0.00**	**0.00**	**0.00**	**0.80**	**0.00**	**0.04**	**0.84**
Sidewalk Construction (Cras	2022													
Total Haul Trips	0													
Hauling	0	16	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	15	0.04	0.56	0.66	0.00	0.00	0.00	0.80	0.00	0.04	0.84
Worker	16	16	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.04	**0.56**	**0.66**	**0.00**	**0.00**	**0.00**	**0.80**	**0.00**	**0.04**	**0.84**
Traffic Signal Modification	2022													
Total Haul Trips	0													
Hauling	0	11	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	11	8	15	0.04	0.56	0.66	0.00	0.00	0.00	0.55	0.00	0.02	0.57
Worker	20	11	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.04	**0.56**	**0.66**	**0.00**	**0.00**	**0.00**	**0.55**	**0.00**	**0.02**	**0.57**
Paving	2022													
Total Haul Trips	0													
Hauling	0	1	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	1	8	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	1	8	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Road Dust, Break Wear, and Tire wear Emissions

	Emission Factors (grams/mile)					
	PM10			PM2.5		
	RD	BW	TW	RD	BW	TW
2020Hauling Hauling	3.00E-01	0.061048007	0.03558331	7.36E-02	0.02616343	0.00889583
2020Vendor Vendor	3.00E-01	0.095694022	0.02379166	7.36E-02	0.04101172	0.00594791
2020Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2021Hauling Hauling	3.00E-01	0.061055751	0.0355879	7.36E-02	0.02616675	0.00889698
2021Vendor Vendor	3.00E-01	0.095697894	0.02379395	7.36E-02	0.04101338	0.00594849
2021Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2022Hauling Hauling	3.00E-01	0.061063462	0.03559233	7.36E-02	0.02617005	0.00889808
2022Vendor Vendor	3.00E-01	0.095701749	0.02379617	7.36E-02	0.04101504	0.00594904
2022Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2023Hauling Hauling	3.00E-01	0.06107028	0.03559616	7.36E-02	0.02617298	0.00889904
2023Vendor Vendor	3.00E-01	0.095705158	0.02379808	7.36E-02	0.0410165	0.00594952
2023Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/day)					
					PM10			PM2.5		
					RD	BW	TW	RD	BW	TW
Site Preparation	2022									
Total Haul Trips	0									
Hauling	0	6	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	6	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	6	8	14.7	0.16	0.02	0.00	0.04	0.01	0.00
Demolition	2022									
Total Haul Trips	32									
Hauling	3	15	8	20	0.04	0.01	0.00	0.01	0.00	0.00
Vendor	0	15	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	20	15	8	14.7	0.19	0.02	0.01	0.05	0.01	0.00
Utility Relocation	2022									
Total Haul Trips	0									
Hauling	0	11	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	11	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	12	11	8	14.7	0.12	0.01	0.00	0.03	0.01	0.00
Storm Drain Construction	2022									
Total Haul Trips	0									
Hauling	0	33	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	33	8	6.9	0.06	0.02	0.01	0.02	0.01	0.00
Worker	24	33	8	14.7	0.23	0.03	0.01	0.06	0.01	0.00
Sidewalk Contruction (New	2022									
Total Haul Trips	0									
Hauling	0	16	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	6.9	0.06	0.02	0.01	0.02	0.01	0.00
Worker	16	16	8	14.7	0.16	0.02	0.00	0.04	0.01	0.00
Sidewalk Construction (Cra	2022									
Total Haul Trips	0									
Hauling	0	16	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	16	8	6.9	0.06	0.02	0.01	0.02	0.01	0.00
Worker	16	16	8	14.7	0.16	0.02	0.00	0.04	0.01	0.00
Traffic Signal Modification	2022									
Total Haul Trips	0									
Hauling	0	11	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	14	11	8	6.9	0.06	0.02	0.01	0.02	0.01	0.00
Worker	20	11	8	14.7	0.19	0.02	0.01	0.05	0.01	0.00
Paving	2022									
Total Haul Trips	0									
Hauling	0	1	8	20	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0	1	8	6.9	0.00	0.00	0.00	0.00	0.00	0.00
Worker	16	1	8	14.7	0.16	0.02	0.00	0.04	0.01	0.00

CalEEMod Output



Crawford Canyon Sidewalk Extension - South Coast Air Basin, Annual

Crawford Canyon Sidewalk Extension

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Project Data

Grading -

Vehicle Trips -

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	33.00
tblConstructionPhase	NumDays	20.00	15.00
tblConstructionPhase	NumDays	2.00	6.00
tblConstructionPhase	NumDays	200.00	16.00
tblConstructionPhase	NumDays	200.00	16.00
tblConstructionPhase	NumDays	200.00	11.00
tblConstructionPhase	NumDays	10.00	16.00
tblConstructionPhase	PhaseEndDate	4/14/2022	7/14/2022
tblConstructionPhase	PhaseEndDate	1/19/2023	8/15/2022
tblConstructionPhase	PhaseEndDate	7/8/2021	6/29/2022
tblConstructionPhase	PhaseEndDate	7/2/2021	6/8/2022
tblConstructionPhase	PhaseStartDate	7/9/2021	6/30/2022
tblConstructionPhase	PhaseStartDate	4/15/2022	6/30/2022
tblConstructionPhase	PhaseStartDate	7/3/2021	6/9/2022

tblConstructionPhase	PhaseStartDate	7/1/2021	6/1/2022
tblOffRoadEquipment	HorsePower	8.00	81.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.73
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	16.00	32.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	37.00	12.00
tblTripsAndVMT	WorkerTripNumber	37.00	8.00
tblTripsAndVMT	WorkerTripNumber	37.00	8.00
tblTripsAndVMT	WorkerTripNumber	37.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0580	0.4924	0.5420	1.1700e-003	0.0116	0.0206	0.0322	2.9000e-003	0.0196	0.0225	0.0000	101.7318	101.7318	0.0211	0.0000	102.2603
Maximum	**0.0580**	**0.4924**	**0.5420**	**1.1700e-003**	**0.0116**	**0.0206**	**0.0322**	**2.9000e-003**	**0.0196**	**0.0225**	**0.0000**	**101.7318**	**101.7318**	**0.0211**	**0.0000**	**102.2603**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0580	0.4924	0.5420	1.1700e-003	0.0106	0.0206	0.0312	2.7900e-003	0.0196	0.0224	0.0000	101.7317	101.7317	0.0211	0.0000	102.2602
Maximum	**0.0580**	**0.4924**	**0.5420**	**1.1700e-003**	**0.0106**	**0.0206**	**0.0312**	**2.7900e-003**	**0.0196**	**0.0224**	**0.0000**	**101.7317**	**101.7317**	**0.0211**	**0.0000**	**102.2602**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**8.40**	**0.00**	**3.02**	**3.79**	**0.00**	**0.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
4	**4-1-2022**	**6-30-2022**	0.1251	0.1251
5	**7-1-2022**	**9-30-2022**	0.4199	0.4199
		Highest	0.4199	0.4199

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.8500e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	5.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.8500e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**5.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.8500e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	5.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**6.8500e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**5.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2022	6/8/2022	5	6	
2	Demolition	Demolition	6/9/2022	6/29/2022	5	15	
3	Utility Relocation	Trenching	6/30/2022	7/14/2022	5	11	
4	Storm Drain Construction	Building Construction	6/30/2022	8/15/2022	5	33	
5	Sidewalk Construction (Newport)	Building Construction	6/30/2022	7/21/2022	5	16	
6	Sidewalk Construction (Crawford)	Building Construction	8/15/2022	9/5/2022	5	16	
7	Traffic Signal Modification	Building Construction	7/21/2022	8/4/2022	5	11	
8	Paving	Paving	9/6/2022	9/27/2022	5	16	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 0

Acres of Paving: 2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Site Preparation	Graders	1	8.00	187	0.41
Demolition	Concrete/Industrial Saws	2	8.00	81	0.73

Sidewalk Construction (Newport)	Cranes	0	8.00	231	0.29
Site Preparation	Scrapers	0	8.00	367	0.48
Sidewalk Construction (Crawford)	Cranes	0	8.00	231	0.29
Site Preparation	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Traffic Signal Modification	Cranes	1	8.00	231	0.29
Demolition	Graders	0	8.00	187	0.41
Sidewalk Construction (Newport)	Forklifts	0	7.00	89	0.20
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Sidewalk Construction (Crawford)	Forklifts	0	7.00	89	0.20
Traffic Signal Modification	Forklifts	0	7.00	89	0.20
Demolition	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Utility Relocation	Cranes	0	8.00	231	0.29
Sidewalk Construction (Newport)	Generator Sets	0	8.00	84	0.74
Utility Relocation	Forklifts	0	7.00	89	0.20
Utility Relocation	Generator Sets	0	8.00	84	0.74
Sidewalk Construction (Crawford)	Generator Sets	0	8.00	84	0.74
Traffic Signal Modification	Generator Sets	0	8.00	84	0.74
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Sidewalk Construction (Newport)	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Utility Relocation	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Utility Relocation	Welders	0	8.00	46	0.45
Sidewalk Construction (Crawford)	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Storm Drain Construction	Cranes	0	8.00	231	0.29
Storm Drain Construction	Forklifts	0	7.00	89	0.20
Storm Drain Construction	Generator Sets	0	8.00	84	0.74
Traffic Signal Modification	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Storm Drain Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Storm Drain Construction	Welders	2	8.00	46	0.45
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sidewalk Construction (Newport)	Welders	0	8.00	46	0.45
Sidewalk Construction (Crawford)	Welders	0	8.00	46	0.45
Traffic Signal Modification	Welders	0	8.00	46	0.45
Demolition	Excavators	1	8.00	158	0.38
Utility Relocation	Off-Highway Trucks	2	8.00	402	0.38
Storm Drain Construction	Excavators	1	8.00	158	0.38
Storm Drain Construction	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Newport)	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Newport)	Plate Compactors	1	8.00	81	0.73
Sidewalk Construction (Newport)	Concrete/Industrial Saws	1	8.00	81	0.73
Sidewalk Construction (Crawford)	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Crawford)	Plate Compactors	1	8.00	8	0.43
Sidewalk Construction (Crawford)	Concrete/Industrial Saws	1	8.00	81	0.73
Traffic Signal Modification	Off-Highway Trucks	1	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	5	10.00	0.00	32.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Relocation	2	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Storm Drain Construction	6	12.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Sidewalk Construction (Newport)	4	8.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Sidewalk Construction (Crawford)	4	8.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Traffic Signal Modification	3	10.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1100e-003	0.0246	0.0169	4.0000e-005		9.7000e-004	9.7000e-004		9.0000e-004	9.0000e-004	0.0000	3.1800	3.1800	1.0300e-003	0.0000	3.2057
Total	**2.1100e-003**	**0.0246**	**0.0169**	**4.0000e-005**	**1.5900e-003**	**9.7000e-004**	**2.5600e-003**	**1.7000e-004**	**9.0000e-004**	**1.0700e-003**	**0.0000**	**3.1800**	**3.1800**	**1.0300e-003**	**0.0000**	**3.2057**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	7.0000e-005	7.7000e-004	0.0000	2.6000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2214	0.2214	1.0000e-005	0.0000	0.2215
Total	**9.0000e-005**	**7.0000e-005**	**7.7000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**2.7000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2214**	**0.2214**	**1.0000e-005**	**0.0000**	**0.2215**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.2000e-004	0.0000	6.2000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1100e-003	0.0246	0.0169	4.0000e-005		9.7000e-004	9.7000e-004		9.0000e-004	9.0000e-004	0.0000	3.1800	3.1800	1.0300e-003	0.0000	3.2057
Total	**2.1100e-003**	**0.0246**	**0.0169**	**4.0000e-005**	**6.2000e-004**	**9.7000e-004**	**1.5900e-003**	**7.0000e-005**	**9.0000e-004**	**9.7000e-004**	**0.0000**	**3.1800**	**3.1800**	**1.0300e-003**	**0.0000**	**3.2057**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	7.0000e-005	7.7000e-004	0.0000	2.6000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2214	0.2214	1.0000e-005	0.0000	0.2215
Total	**9.0000e-005**	**7.0000e-005**	**7.7000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**2.7000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2214**	**0.2214**	**1.0000e-005**	**0.0000**	**0.2215**

3.3 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	9.0500e-003	0.0774	0.1089	1.7000e-004		4.0800e-003	4.0800e-003		3.9400e-003	3.9400e-003	0.0000	15.0707	15.0707	2.7100e-003	0.0000	15.1383
Total	**9.0500e-003**	**0.0774**	**0.1089**	**1.7000e-004**		**4.0800e-003**	**4.0800e-003**		**3.9400e-003**	**3.9400e-003**	**0.0000**	**15.0707**	**15.0707**	**2.7100e-003**	**0.0000**	**15.1383**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	3.9600e-003	9.3000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.9000e-004	8.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.1864	1.1864	9.0000e-005	0.0000	1.1885
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.1000e-004	2.4200e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.3000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.6918	0.6918	2.0000e-005	0.0000	0.6922
Total	**4.1000e-004**	**4.1700e-003**	**3.3500e-003**	**2.0000e-005**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**3.0000e-004**	**2.0000e-005**	**3.1000e-004**	**0.0000**	**1.8782**	**1.8782**	**1.1000e-004**	**0.0000**	**1.8807**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.0500e-003	0.0774	0.1089	1.7000e-004		4.0800e-003	4.0800e-003		3.9400e-003	3.9400e-003	0.0000	15.0707	15.0707	2.7100e-003	0.0000	15.1383
Total	**9.0500e-003**	**0.0774**	**0.1089**	**1.7000e-004**		**4.0800e-003**	**4.0800e-003**		**3.9400e-003**	**3.9400e-003**	**0.0000**	**15.0707**	**15.0707**	**2.7100e-003**	**0.0000**	**15.1383**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	3.9600e-003	9.3000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.9000e-004	8.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.1864	1.1864	9.0000e-005	0.0000	1.1885
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.1000e-004	2.4200e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.3000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.6918	0.6918	2.0000e-005	0.0000	0.6922
Total	**4.1000e-004**	**4.1700e-003**	**3.3500e-003**	**2.0000e-005**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**3.0000e-004**	**2.0000e-005**	**3.1000e-004**	**0.0000**	**1.8782**	**1.8782**	**1.1000e-004**	**0.0000**	**1.8807**

3.4 Utility Relocation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.8400e-003	0.0444	0.0371	1.5000e-004		1.6100e-003	1.6100e-003		1.4800e-003	1.4800e-003	0.0000	12.8269	12.8269	4.1500e-003	0.0000	12.9306
Total	**5.8400e-003**	**0.0444**	**0.0371**	**1.5000e-004**		**1.6100e-003**	**1.6100e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**12.8269**	**12.8269**	**4.1500e-003**	**0.0000**	**12.9306**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	1.0600e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3044	0.3044	1.0000e-005	0.0000	0.3046
Total	**1.3000e-004**	**9.0000e-005**	**1.0600e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3044**	**0.3044**	**1.0000e-005**	**0.0000**	**0.3046**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.8400e-003	0.0444	0.0371	1.5000e-004		1.6100e-003	1.6100e-003		1.4800e-003	1.4800e-003	0.0000	12.8268	12.8268	4.1500e-003	0.0000	12.9306
Total	**5.8400e-003**	**0.0444**	**0.0371**	**1.5000e-004**		**1.6100e-003**	**1.6100e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**12.8268**	**12.8268**	**4.1500e-003**	**0.0000**	**12.9306**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	1.0600e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3044	0.3044	1.0000e-005	0.0000	0.3046
Total	**1.3000e-004**	**9.0000e-005**	**1.0600e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3044**	**0.3044**	**1.0000e-005**	**0.0000**	**0.3046**

3.5 Storm Drain Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0172	0.1175	0.1571	2.4000e-004		5.4900e-003	5.4900e-003		5.2600e-003	5.2600e-003	0.0000	19.7546	19.7546	4.7900e-003	0.0000	19.8744
Total	**0.0172**	**0.1175**	**0.1571**	**2.4000e-004**		**5.4900e-003**	**5.4900e-003**		**5.2600e-003**	**5.2600e-003**	**0.0000**	**19.7546**	**19.7546**	**4.7900e-003**	**0.0000**	**19.8744**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0213	5.3800e-003	6.0000e-005	1.4600e-003	4.0000e-005	1.5000e-003	4.2000e-004	4.0000e-005	4.6000e-004	0.0000	5.5593	5.5593	3.5000e-004	0.0000	5.5680

Worker	7.7000e-004	5.5000e-004	6.3800e-003	2.0000e-005	2.1700e-003	2.0000e-005	2.1900e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.8263	1.8263	5.0000e-005	0.0000	1.8275
Total	**1.3900e-003**	**0.0219**	**0.0118**	**8.0000e-005**	**3.6300e-003**	**6.0000e-005**	**3.6900e-003**	**1.0000e-003**	**5.0000e-005**	**1.0500e-003**	**0.0000**	**7.3856**	**7.3856**	**4.0000e-004**	**0.0000**	**7.3955**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0172	0.1175	0.1571	2.4000e-004		5.4900e-003	5.4900e-003		5.2600e-003	5.2600e-003	0.0000	19.7546	19.7546	4.7900e-003	0.0000	19.8744
Total	**0.0172**	**0.1175**	**0.1571**	**2.4000e-004**		**5.4900e-003**	**5.4900e-003**		**5.2600e-003**	**5.2600e-003**	**0.0000**	**19.7546**	**19.7546**	**4.7900e-003**	**0.0000**	**19.8744**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0213	5.3800e-003	6.0000e-005	1.4600e-003	4.0000e-005	1.5000e-003	4.2000e-004	4.0000e-005	4.6000e-004	0.0000	5.5593	5.5593	3.5000e-004	0.0000	5.5680
Worker	7.7000e-004	5.5000e-004	6.3800e-003	2.0000e-005	2.1700e-003	2.0000e-005	2.1900e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.8263	1.8263	5.0000e-005	0.0000	1.8275
Total	**1.3900e-003**	**0.0219**	**0.0118**	**8.0000e-005**	**3.6300e-003**	**6.0000e-005**	**3.6900e-003**	**1.0000e-003**	**5.0000e-005**	**1.0500e-003**	**0.0000**	**7.3856**	**7.3856**	**4.0000e-004**	**0.0000**	**7.3955**

3.6 Sidewalk Construction (Newport) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8000e-003	0.0283	0.0343	6.0000e-005		1.4300e-003	1.4300e-003		1.4300e-003	1.4300e-003	0.0000	5.0345	5.0345	3.1000e-004	0.0000	5.0423
Total	**3.8000e-003**	**0.0283**	**0.0343**	**6.0000e-005**		**1.4300e-003**	**1.4300e-003**		**1.4300e-003**	**1.4300e-003**	**0.0000**	**5.0345**	**5.0345**	**3.1000e-004**	**0.0000**	**5.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-004	0.0103	2.6100e-003	3.0000e-005	7.1000e-004	2.0000e-005	7.3000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6954	2.6954	1.7000e-004	0.0000	2.6996
Worker	2.5000e-004	1.8000e-004	2.0600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5903	0.5903	1.0000e-005	0.0000	0.5907
Total	**5.5000e-004**	**0.0105**	**4.6700e-003**	**4.0000e-005**	**1.4100e-003**	**3.0000e-005**	**1.4400e-003**	**3.9000e-004**	**2.0000e-005**	**4.1000e-004**	**0.0000**	**3.2857**	**3.2857**	**1.8000e-004**	**0.0000**	**3.2903**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	3.8000e-003	0.0283	0.0343	6.0000e-005		1.4300e-003	1.4300e-003		1.4300e-003	1.4300e-003	0.0000	5.0345	5.0345	3.1000e-004	0.0000	5.0423
Total	**3.8000e-003**	**0.0283**	**0.0343**	**6.0000e-005**		**1.4300e-003**	**1.4300e-003**		**1.4300e-003**	**1.4300e-003**	**0.0000**	**5.0345**	**5.0345**	**3.1000e-004**	**0.0000**	**5.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-004	0.0103	2.6100e-003	3.0000e-005	7.1000e-004	2.0000e-005	7.3000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6954	2.6954	1.7000e-004	0.0000	2.6996
Worker	2.5000e-004	1.8000e-004	2.0600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5903	0.5903	1.0000e-005	0.0000	0.5907
Total	**5.5000e-004**	**0.0105**	**4.6700e-003**	**4.0000e-005**	**1.4100e-003**	**3.0000e-005**	**1.4400e-003**	**3.9000e-004**	**2.0000e-005**	**4.1000e-004**	**0.0000**	**3.2857**	**3.2857**	**1.8000e-004**	**0.0000**	**3.2903**

3.7 Sidewalk Construction (Crawford) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.1200e-003	0.0303	0.0359	7.0000e-005		1.5100e-003	1.5100e-003		1.5100e-003	1.5100e-003	0.0000	5.2847	5.2847	3.4000e-004	0.0000	5.2931
Total	**4.1200e-003**	**0.0303**	**0.0359**	**7.0000e-005**		**1.5100e-003**	**1.5100e-003**		**1.5100e-003**	**1.5100e-003**	**0.0000**	**5.2847**	**5.2847**	**3.4000e-004**	**0.0000**	**5.2931**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-004	0.0103	2.6100e-003	3.0000e-005	7.1000e-004	2.0000e-005	7.3000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6954	2.6954	1.7000e-004	0.0000	2.6996
Worker	2.5000e-004	1.8000e-004	2.0600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5903	0.5903	1.0000e-005	0.0000	0.5907
Total	**5.5000e-004**	**0.0105**	**4.6700e-003**	**4.0000e-005**	**1.4100e-003**	**3.0000e-005**	**1.4400e-003**	**3.9000e-004**	**2.0000e-005**	**4.1000e-004**	**0.0000**	**3.2857**	**3.2857**	**1.8000e-004**	**0.0000**	**3.2903**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.1200e-003	0.0303	0.0359	7.0000e-005		1.5100e-003	1.5100e-003		1.5100e-003	1.5100e-003	0.0000	5.2847	5.2847	3.4000e-004	0.0000	5.2931
Total	**4.1200e-003**	**0.0303**	**0.0359**	**7.0000e-005**		**1.5100e-003**	**1.5100e-003**		**1.5100e-003**	**1.5100e-003**	**0.0000**	**5.2847**	**5.2847**	**3.4000e-004**	**0.0000**	**5.2931**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-004	0.0103	2.6100e-003	3.0000e-005	7.1000e-004	2.0000e-005	7.3000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6954	2.6954	1.7000e-004	0.0000	2.6996
Worker	2.5000e-004	1.8000e-004	2.0600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5903	0.5903	1.0000e-005	0.0000	0.5907
Total	**5.5000e-004**	**0.0105**	**4.6700e-003**	**4.0000e-005**	**1.4100e-003**	**3.0000e-005**	**1.4400e-003**	**3.9000e-004**	**2.0000e-005**	**4.1000e-004**	**0.0000**	**3.2857**	**3.2857**	**1.8000e-004**	**0.0000**	**3.2903**

3.8 Traffic Signal Modification - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.8800e-003	0.0544	0.0413	1.2000e-004		2.2600e-003	2.2600e-003		2.0800e-003	2.0800e-003	0.0000	10.7048	10.7048	3.4600e-003	0.0000	10.7913
Total	**5.8800e-003**	**0.0544**	**0.0413**	**1.2000e-004**		**2.2600e-003**	**2.2600e-003**		**2.0800e-003**	**2.0800e-003**	**0.0000**	**10.7048**	**10.7048**	**3.4600e-003**	**0.0000**	**10.7913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.1000e-004	7.1100e-003	1.7900e-003	2.0000e-005	4.9000e-004	1.0000e-005	5.0000e-004	1.4000e-004	1.0000e-005	1.5000e-004	0.0000	1.8531	1.8531	1.2000e-004	0.0000	1.8560
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5073	0.5073	1.0000e-005	0.0000	0.5076
Total	**4.2000e-004**	**7.2600e-003**	**3.5600e-003**	**3.0000e-005**	**1.0900e-003**	**1.0000e-005**	**1.1100e-003**	**3.0000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**2.3604**	**2.3604**	**1.3000e-004**	**0.0000**	**2.3636**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.8800e-003	0.0544	0.0413	1.2000e-004		2.2600e-003	2.2600e-003		2.0800e-003	2.0800e-003	0.0000	10.7047	10.7047	3.4600e-003	0.0000	10.7913
Total	**5.8800e-003**	**0.0544**	**0.0413**	**1.2000e-004**		**2.2600e-003**	**2.2600e-003**		**2.0800e-003**	**2.0800e-003**	**0.0000**	**10.7047**	**10.7047**	**3.4600e-003**	**0.0000**	**10.7913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.1000e-004	7.1100e-003	1.7900e-003	2.0000e-005	4.9000e-004	1.0000e-005	5.0000e-004	1.4000e-004	1.0000e-005	1.5000e-004	0.0000	1.8531	1.8531	1.2000e-004	0.0000	1.8560

Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5073	0.5073	1.0000e-005	0.0000	0.5076
Total	**4.2000e-004**	**7.2600e-003**	**3.5600e-003**	**3.0000e-005**	**1.0900e-003**	**1.0000e-005**	**1.1100e-003**	**3.0000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**2.3604**	**2.3604**	**1.3000e-004**	**0.0000**	**2.3636**

3.9 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2000e-003	0.0609	0.0787	1.2000e-004		3.1100e-003	3.1100e-003		2.8700e-003	2.8700e-003	0.0000	10.5639	10.5639	3.3400e-003	0.0000	10.6473
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2000e-003**	**0.0609**	**0.0787**	**1.2000e-004**		**3.1100e-003**	**3.1100e-003**		**2.8700e-003**	**2.8700e-003**	**0.0000**	**10.5639**	**10.5639**	**3.3400e-003**	**0.0000**	**10.6473**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.8000e-004	2.0600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5903	0.5903	1.0000e-005	0.0000	0.5907
Total	**2.5000e-004**	**1.8000e-004**	**2.0600e-003**	**1.0000e-005**	**7.0000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5903**	**0.5903**	**1.0000e-005**	**0.0000**	**0.5907**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2000e-003	0.0609	0.0787	1.2000e-004		3.1100e-003	3.1100e-003		2.8700e-003	2.8700e-003	0.0000	10.5639	10.5639	3.3400e-003	0.0000	10.6473
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2000e-003**	**0.0609**	**0.0787**	**1.2000e-004**		**3.1100e-003**	**3.1100e-003**		**2.8700e-003**	**2.8700e-003**	**0.0000**	**10.5639**	**10.5639**	**3.3400e-003**	**0.0000**	**10.6473**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.8000e-004	2.0600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5903	0.5903	1.0000e-005	0.0000	0.5907
Total	**2.5000e-004**	**1.8000e-004**	**2.0600e-003**	**1.0000e-005**	**7.0000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5903**	**0.5903**	**1.0000e-005**	**0.0000**	**0.5907**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.552712	0.042774	0.202769	0.116939	0.015078	0.005847	0.021692	0.031910	0.002110	0.001769	0.004822	0.000710	0.000869

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.8500e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	5.0000e-005
Unmitigated	6.8500e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	5.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.2100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Consumer Products	5.6300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	5.0000e-005
Total	**6.8400e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**5.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.2100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	5.0000e-005
Total	**6.8400e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**5.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000

Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Crawford Canyon Sidewalk Extension - South Coast Air Basin, Summer

Crawford Canyon Sidewalk Extension

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Project Data

Grading -

Vehicle Trips -

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	33.00
tblConstructionPhase	NumDays	20.00	15.00
tblConstructionPhase	NumDays	2.00	6.00
tblConstructionPhase	NumDays	200.00	16.00
tblConstructionPhase	NumDays	200.00	16.00
tblConstructionPhase	NumDays	200.00	11.00
tblConstructionPhase	NumDays	10.00	16.00
tblConstructionPhase	PhaseEndDate	4/14/2022	7/14/2022
tblConstructionPhase	PhaseEndDate	1/19/2023	8/15/2022
tblConstructionPhase	PhaseEndDate	7/8/2021	6/29/2022
tblConstructionPhase	PhaseEndDate	7/2/2021	6/8/2022
tblConstructionPhase	PhaseStartDate	7/9/2021	6/30/2022
tblConstructionPhase	PhaseStartDate	4/15/2022	6/30/2022
tblConstructionPhase	PhaseStartDate	7/3/2021	6/9/2022

tblConstructionPhase	PhaseStartDate	7/1/2021	6/1/2022
tblOffRoadEquipment	HorsePower	8.00	81.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.73
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	16.00	32.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	37.00	12.00
tblTripsAndVMT	WorkerTripNumber	37.00	8.00
tblTripsAndVMT	WorkerTripNumber	37.00	8.00
tblTripsAndVMT	WorkerTripNumber	37.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	2.8118	24.4493	23.2716	0.0589	0.6197	0.9318	1.5358	0.1663	0.8843	1.0506	0.0000	5,613.1252	5,613.1252	1.2466	0.0000	5,644.2908
Maximum	**2.8118**	**24.4493**	**23.2716**	**0.0589**	**0.6197**	**0.9318**	**1.5358**	**0.1663**	**0.8843**	**1.0506**	**0.0000**	**5,613.1252**	**5,613.1252**	**1.2466**	**0.0000**	**5,644.2908**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	2.8118	24.4493	23.2716	0.0589	0.6041	0.9318	1.5358	0.1663	0.8843	1.0506	0.0000	5,613.1252	5,613.1252	1.2466	0.0000	5,644.2908
Maximum	**2.8118**	**24.4493**	**23.2716**	**0.0589**	**0.6041**	**0.9318**	**1.5358**	**0.1663**	**0.8843**	**1.0506**	**0.0000**	**5,613.1252**	**5,613.1252**	**1.2466**	**0.0000**	**5,644.2908**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**2.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.7000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.7000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2022	6/8/2022	5	6	
2	Demolition	Demolition	6/9/2022	6/29/2022	5	15	
3	Utility Relocation	Trenching	6/30/2022	7/14/2022	5	11	
4	Storm Drain Construction	Building Construction	6/30/2022	8/15/2022	5	33	
5	Sidewalk Construction (Newport)	Building Construction	6/30/2022	7/21/2022	5	16	
6	Sidewalk Construction (Crawford)	Building Construction	8/15/2022	9/5/2022	5	16	
7	Traffic Signal Modification	Building Construction	7/21/2022	8/4/2022	5	11	
8	Paving	Paving	9/6/2022	9/27/2022	5	16	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 0

Acres of Paving: 2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Site Preparation	Graders	1	8.00	187	0.41
Demolition	Concrete/Industrial Saws	2	8.00	81	0.73
Sidewalk Construction (Newport)	Cranes	0	8.00	231	0.29
Site Preparation	Scrapers	0	8.00	367	0.48
Sidewalk Construction (Crawford)	Cranes	0	8.00	231	0.29
Site Preparation	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Traffic Signal Modification	Cranes	1	8.00	231	0.29
Demolition	Graders	0	8.00	187	0.41
Sidewalk Construction (Newport)	Forklifts	0	7.00	89	0.20
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Sidewalk Construction (Crawford)	Forklifts	0	7.00	89	0.20

Traffic Signal Modification	Forklifts	0	7.00	89	0.20
Demolition	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Utility Relocation	Cranes	0	8.00	231	0.29
Sidewalk Construction (Newport)	Generator Sets	0	8.00	84	0.74
Utility Relocation	Forklifts	0	7.00	89	0.20
Utility Relocation	Generator Sets	0	8.00	84	0.74
Sidewalk Construction (Crawford)	Generator Sets	0	8.00	84	0.74
Traffic Signal Modification	Generator Sets	0	8.00	84	0.74
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Sidewalk Construction (Newport)	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Utility Relocation	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Utility Relocation	Welders	0	8.00	46	0.45
Sidewalk Construction (Crawford)	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Storm Drain Construction	Cranes	0	8.00	231	0.29
Storm Drain Construction	Forklifts	0	7.00	89	0.20
Storm Drain Construction	Generator Sets	0	8.00	84	0.74
Traffic Signal Modification	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Storm Drain Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Storm Drain Construction	Welders	2	8.00	46	0.45
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sidewalk Construction (Newport)	Welders	0	8.00	46	0.45
Sidewalk Construction (Crawford)	Welders	0	8.00	46	0.45
Traffic Signal Modification	Welders	0	8.00	46	0.45
Demolition	Excavators	1	8.00	158	0.38
Utility Relocation	Off-Highway Trucks	2	8.00	402	0.38
Storm Drain Construction	Excavators	1	8.00	158	0.38
Storm Drain Construction	Cement and Mortar Mixers	2	8.00	9	0.56

Sidewalk Construction (Newport)	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Newport)	Plate Compactors	1	8.00	81	0.73
Sidewalk Construction (Newport)	Concrete/Industrial Saws	1	8.00	81	0.73
Sidewalk Construction (Crawford)	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Crawford)	Plate Compactors	1	8.00	8	0.43
Sidewalk Construction (Crawford)	Concrete/Industrial Saws	1	8.00	81	0.73
Traffic Signal Modification	Off-Highway Trucks	1	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	5	10.00	0.00	32.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Relocation	2	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Storm Drain Construction	6	12.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Sidewalk Construction (Newport)	4	8.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Sidewalk Construction (Crawford)	4	8.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Traffic Signal Modification	3	10.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.7032	8.1900	5.6382	0.0121		0.3249	0.3249		0.2989	0.2989		1,168.4471	1,168.4471	0.3779		1,177.8946
Total	**0.7032**	**8.1900**	**5.6382**	**0.0121**	**0.5303**	**0.3249**	**0.8552**	**0.0573**	**0.2989**	**0.3562**		**1,168.4471**	**1,168.4471**	**0.3779**		**1,177.8946**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0314**	**0.0197**	**0.2778**	**8.6000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**85.3811**	**85.3811**	**2.1600e-003**		**85.4350**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	0.7032	8.1900	5.6382	0.0121		0.3249	0.3249		0.2989	0.2989	0.0000	1,168.4471	1,168.4471	0.3779		1,177.8946

Total	**0.7032**	**8.1900**	**5.6382**	**0.0121**	**0.2068**	**0.3249**	**0.5317**	**0.0223**	**0.2989**	**0.3213**	**0.0000**	**1,168.4471**	**1,168.4471**	**0.3779**		**1,177.8946**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0314**	**0.0197**	**0.2778**	**8.6000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**85.3811**	**85.3811**	**2.1600e-003**		**85.4350**

3.3 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2071	10.3206	14.5171	0.0232		0.5444	0.5444		0.5249	0.5249		2,215.0128	2,215.0128	0.3977		2,224.9548
Total	**1.2071**	**10.3206**	**14.5171**	**0.0232**		**0.5444**	**0.5444**		**0.5249**	**0.5249**		**2,215.0128**	**2,215.0128**	**0.3977**		**2,224.9548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0154	0.5120	0.1209	1.6100e-003	0.0373	1.4900e-003	0.0388	0.0102	1.4300e-003	0.0116		175.6449	175.6449	0.0123		175.9531
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0393	0.0247	0.3472	1.0700e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		106.7263	106.7263	2.7000e-003		106.7937
Total	**0.0547**	**0.5367**	**0.4681**	**2.6800e-003**	**0.1490**	**2.2900e-003**	**0.1513**	**0.0399**	**2.1700e-003**	**0.0420**		**282.3713**	**282.3713**	**0.0150**		**282.7469**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2071	10.3206	14.5171	0.0232		0.5444	0.5444		0.5249	0.5249	0.0000	2,215.0128	2,215.0128	0.3977		2,224.9548
Total	**1.2071**	**10.3206**	**14.5171**	**0.0232**		**0.5444**	**0.5444**		**0.5249**	**0.5249**	**0.0000**	**2,215.0128**	**2,215.0128**	**0.3977**		**2,224.9548**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0154	0.5120	0.1209	1.6100e-003	0.0373	1.4900e-003	0.0388	0.0102	1.4300e-003	0.0116		175.6449	175.6449	0.0123		175.9531
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0393	0.0247	0.3472	1.0700e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		106.7263	106.7263	2.7000e-003		106.7937
Total	**0.0547**	**0.5367**	**0.4681**	**2.6800e-003**	**0.1490**	**2.2900e-003**	**0.1513**	**0.0399**	**2.1700e-003**	**0.0420**		**282.3713**	**282.3713**	**0.0150**		**282.7469**

3.4 Utility Relocation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0621	8.0676	6.7510	0.0266		0.2934	0.2934		0.2699	0.2699		2,570.7604	2,570.7604	0.8314		2,591.5463
Total	**1.0621**	**8.0676**	**6.7510**	**0.0266**		**0.2934**	**0.2934**		**0.2699**	**0.2699**		**2,570.7604**	**2,570.7604**	**0.8314**		**2,591.5463**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0236	0.0148	0.2083	6.4000e-004	0.0671	4.8000e-004	0.0676	0.0178	4.4000e-004	0.0182		64.0358	64.0358	1.6200e-003		64.0762
Total	**0.0236**	**0.0148**	**0.2083**	**6.4000e-004**	**0.0671**	**4.8000e-004**	**0.0676**	**0.0178**	**4.4000e-004**	**0.0182**		**64.0358**	**64.0358**	**1.6200e-003**		**64.0762**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0621	8.0676	6.7510	0.0266		0.2934	0.2934		0.2699	0.2699	0.0000	2,570.7604	2,570.7604	0.8314		2,591.5463
Total	**1.0621**	**8.0676**	**6.7510**	**0.0266**		**0.2934**	**0.2934**		**0.2699**	**0.2699**	**0.0000**	**2,570.7604**	**2,570.7604**	**0.8314**		**2,591.5463**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0236	0.0148	0.2083	6.4000e-004	0.0671	4.8000e-004	0.0676	0.0178	4.4000e-004	0.0182		64.0358	64.0358	1.6200e-003		64.0762
Total	**0.0236**	**0.0148**	**0.2083**	**6.4000e-004**	**0.0671**	**4.8000e-004**	**0.0676**	**0.0178**	**4.4000e-004**	**0.0182**		**64.0358**	**64.0358**	**1.6200e-003**		**64.0762**

3.5 Storm Drain Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0391	7.1237	9.5179	0.0148		0.3329	0.3329		0.3188	0.3188		1,319.7424	1,319.7424	0.3201		1,327.7447
Total	**1.0391**	**7.1237**	**9.5179**	**0.0148**		**0.3329**	**0.3329**		**0.3188**	**0.3188**		**1,319.7424**	**1,319.7424**	**0.3201**		**1,327.7447**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0471	0.0296	0.4167	1.2900e-003	0.1341	9.6000e-004	0.1351	0.0356	8.9000e-004	0.0365		128.0716	128.0716	3.2400e-003		128.1525
Total	**0.0841**	**1.3031**	**0.7249**	**4.8000e-003**	**0.2237**	**3.3400e-003**	**0.2271**	**0.0614**	**3.1700e-003**	**0.0645**		**503.7899**	**503.7899**	**0.0259**		**504.4367**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	1.0391	7.1237	9.5179	0.0148		0.3329	0.3329		0.3188	0.3188	0.0000	1,319.7424	1,319.7424	0.3201		1,327.7447
Total	**1.0391**	**7.1237**	**9.5179**	**0.0148**		**0.3329**	**0.3329**		**0.3188**	**0.3188**	**0.0000**	**1,319.7424**	**1,319.7424**	**0.3201**		**1,327.7447**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0471	0.0296	0.4167	1.2900e-003	0.1341	9.6000e-004	0.1351	0.0356	8.9000e-004	0.0365		128.0716	128.0716	3.2400e-003		128.1525
Total	**0.0841**	**1.3031**	**0.7249**	**4.8000e-003**	**0.2237**	**3.3400e-003**	**0.2271**	**0.0614**	**3.1700e-003**	**0.0645**		**503.7899**	**503.7899**	**0.0259**		**504.4367**

3.6 Sidewalk Construction (Newport) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	3.5375	4.2816	7.6800e-003		0.1788	0.1788		0.1788	0.1788		693.6973	693.6973	0.0428		694.7677
Total	**0.4752**	**3.5375**	**4.2816**	**7.6800e-003**		**0.1788**	**0.1788**		**0.1788**	**0.1788**		**693.6973**	**693.6973**	**0.0428**		**694.7677**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0684**	**1.2932**	**0.5860**	**4.3700e-003**	**0.1790**	**3.0200e-003**	**0.1820**	**0.0495**	**2.8700e-003**	**0.0524**		**461.0994**	**461.0994**	**0.0248**		**461.7192**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	3.5375	4.2816	7.6800e-003		0.1788	0.1788		0.1788	0.1788	0.0000	693.6973	693.6973	0.0428		694.7677
Total	**0.4752**	**3.5375**	**4.2816**	**7.6800e-003**		**0.1788**	**0.1788**		**0.1788**	**0.1788**	**0.0000**	**693.6973**	**693.6973**	**0.0428**		**694.7677**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0684**	**1.2932**	**0.5860**	**4.3700e-003**	**0.1790**	**3.0200e-003**	**0.1820**	**0.0495**	**2.8700e-003**	**0.0524**		**461.0994**	**461.0994**	**0.0248**		**461.7192**

3.7 Sidewalk Construction (Crawford) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5153	3.7888	4.4920	8.1600e-003		0.1886	0.1886		0.1886	0.1886		728.1767	728.1767	0.0464		729.3366
Total	**0.5153**	**3.7888**	**4.4920**	**8.1600e-003**		**0.1886**	**0.1886**		**0.1886**	**0.1886**		**728.1767**	**728.1767**	**0.0464**		**729.3366**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0684**	**1.2932**	**0.5860**	**4.3700e-003**	**0.1790**	**3.0200e-003**	**0.1820**	**0.0495**	**2.8700e-003**	**0.0524**		**461.0994**	**461.0994**	**0.0248**		**461.7192**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5153	3.7888	4.4920	8.1600e-003		0.1886	0.1886		0.1886	0.1886	0.0000	728.1767	728.1767	0.0464		729.3366
Total	**0.5153**	**3.7888**	**4.4920**	**8.1600e-003**		**0.1886**	**0.1886**		**0.1886**	**0.1886**	**0.0000**	**728.1767**	**728.1767**	**0.0464**		**729.3366**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842

Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0684**	**1.2932**	**0.5860**	**4.3700e-003**	**0.1790**	**3.0200e-003**	**0.1820**	**0.0495**	**2.8700e-003**	**0.0524**		**461.0994**	**461.0994**	**0.0248**		**461.7192**

3.8 Traffic Signal Modification - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0688	9.8937	7.5058	0.0222		0.4105	0.4105		0.3777	0.3777		2,145.4495	2,145.4495	0.6939		2,162.7966
Total	**1.0688**	**9.8937**	**7.5058**	**0.0222**		**0.4105**	**0.4105**		**0.3777**	**0.3777**		**2,145.4495**	**2,145.4495**	**0.6939**		**2,162.7966**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0393	0.0247	0.3472	1.0700e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		106.7263	106.7263	2.7000e-003		106.7937
Total	**0.0762**	**1.2982**	**0.6555**	**4.5800e-003**	**0.2014**	**3.1800e-003**	**0.2045**	**0.0554**	**3.0200e-003**	**0.0585**		**482.4446**	**482.4446**	**0.0253**		**483.0779**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0688	9.8937	7.5058	0.0222		0.4105	0.4105		0.3777	0.3777	0.0000	2,145.4495	2,145.4495	0.6939		2,162.7966
Total	**1.0688**	**9.8937**	**7.5058**	**0.0222**		**0.4105**	**0.4105**		**0.3777**	**0.3777**	**0.0000**	**2,145.4495**	**2,145.4495**	**0.6939**		**2,162.7966**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0370	1.2735	0.3082	3.5100e-003	0.0896	2.3800e-003	0.0920	0.0258	2.2800e-003	0.0281		375.7183	375.7183	0.0226		376.2842
Worker	0.0393	0.0247	0.3472	1.0700e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		106.7263	106.7263	2.7000e-003		106.7937
Total	**0.0762**	**1.2982**	**0.6555**	**4.5800e-003**	**0.2014**	**3.1800e-003**	**0.2045**	**0.0554**	**3.0200e-003**	**0.0585**		**482.4446**	**482.4446**	**0.0253**		**483.0779**

3.9 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	0.7749	7.6063	9.8366	0.0152		0.3884	0.3884		0.3585	0.3585		1,455.5854	1,455.5854	0.4597		1,467.0772
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7749**	**7.6063**	**9.8366**	**0.0152**		**0.3884**	**0.3884**		**0.3585**	**0.3585**		**1,455.5854**	**1,455.5854**	**0.4597**		**1,467.0772**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0314**	**0.0197**	**0.2778**	**8.6000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**85.3811**	**85.3811**	**2.1600e-003**		**85.4350**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7749	7.6063	9.8366	0.0152		0.3884	0.3884		0.3585	0.3585	0.0000	1,455.5854	1,455.5854	0.4597		1,467.0772
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Total	**0.7749**	**7.6063**	**9.8366**	**0.0152**		**0.3884**	**0.3884**		**0.3585**	**0.3585**	**0.0000**	**1,455.5854**	**1,455.5854**	**0.4597**		**1,467.0772**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0197	0.2778	8.6000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		85.3811	85.3811	2.1600e-003		85.4350
Total	**0.0314**	**0.0197**	**0.2778**	**8.6000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**85.3811**	**85.3811**	**2.1600e-003**		**85.4350**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.552712	0.042774	0.202769	0.116939	0.015078	0.005847	0.021692	0.031910	0.002110	0.001769	0.004822	0.000710	0.000869

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Unmitigated	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.6400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.7000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.6400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.7000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Crawford Canyon Sidewalk Extension - South Coast Air Basin, Winter

Crawford Canyon Sidewalk Extension

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Project Data

Grading -

Vehicle Trips -

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	33.00
tblConstructionPhase	NumDays	20.00	15.00
tblConstructionPhase	NumDays	2.00	6.00
tblConstructionPhase	NumDays	200.00	16.00
tblConstructionPhase	NumDays	200.00	16.00
tblConstructionPhase	NumDays	200.00	11.00
tblConstructionPhase	NumDays	10.00	16.00
tblConstructionPhase	PhaseEndDate	4/14/2022	7/14/2022
tblConstructionPhase	PhaseEndDate	1/19/2023	8/15/2022
tblConstructionPhase	PhaseEndDate	7/8/2021	6/29/2022
tblConstructionPhase	PhaseEndDate	7/2/2021	6/8/2022
tblConstructionPhase	PhaseStartDate	7/9/2021	6/30/2022
tblConstructionPhase	PhaseStartDate	4/15/2022	6/30/2022
tblConstructionPhase	PhaseStartDate	7/3/2021	6/9/2022

tblConstructionPhase	PhaseStartDate	7/1/2021	6/1/2022
tblOffRoadEquipment	HorsePower	8.00	81.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.73
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	16.00	32.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	37.00	12.00
tblTripsAndVMT	WorkerTripNumber	37.00	8.00
tblTripsAndVMT	WorkerTripNumber	37.00	8.00
tblTripsAndVMT	WorkerTripNumber	37.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	2.8297	24.4449	23.2747	0.0585	0.6197	0.9320	1.5361	0.1663	0.8845	1.0508	0.0000	5,575.3165	5,575.3165	1.2493	0.0000	5,606.5476
Maximum	**2.8297**	**24.4449**	**23.2747**	**0.0585**	**0.6197**	**0.9320**	**1.5361**	**0.1663**	**0.8845**	**1.0508**	**0.0000**	**5,575.3165**	**5,575.3165**	**1.2493**	**0.0000**	**5,606.5476**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	2.8297	24.4449	23.2747	0.0585	0.6041	0.9320	1.5361	0.1663	0.8845	1.0508	0.0000	5,575.3165	5,575.3165	1.2493	0.0000	5,606.5476
Maximum	**2.8297**	**24.4449**	**23.2747**	**0.0585**	**0.6041**	**0.9320**	**1.5361**	**0.1663**	**0.8845**	**1.0508**	**0.0000**	**5,575.3165**	**5,575.3165**	**1.2493**	**0.0000**	**5,606.5476**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**2.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.7000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.7000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2022	6/8/2022	5	6	
2	Demolition	Demolition	6/9/2022	6/29/2022	5	15	
3	Utility Relocation	Trenching	6/30/2022	7/14/2022	5	11	
4	Storm Drain Construction	Building Construction	6/30/2022	8/15/2022	5	33	
5	Sidewalk Construction (Newport)	Building Construction	6/30/2022	7/21/2022	5	16	
6	Sidewalk Construction (Crawford)	Building Construction	8/15/2022	9/5/2022	5	16	
7	Traffic Signal Modification	Building Construction	7/21/2022	8/4/2022	5	11	
8	Paving	Paving	9/6/2022	9/27/2022	5	16	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 0

Acres of Paving: 2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Site Preparation	Graders	1	8.00	187	0.41
Demolition	Concrete/Industrial Saws	2	8.00	81	0.73
Sidewalk Construction (Newport)	Cranes	0	8.00	231	0.29
Site Preparation	Scrapers	0	8.00	367	0.48
Sidewalk Construction (Crawford)	Cranes	0	8.00	231	0.29
Site Preparation	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Traffic Signal Modification	Cranes	1	8.00	231	0.29
Demolition	Graders	0	8.00	187	0.41
Sidewalk Construction (Newport)	Forklifts	0	7.00	89	0.20
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Sidewalk Construction (Crawford)	Forklifts	0	7.00	89	0.20

Traffic Signal Modification	Forklifts	0	7.00	89	0.20
Demolition	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Utility Relocation	Cranes	0	8.00	231	0.29
Sidewalk Construction (Newport)	Generator Sets	0	8.00	84	0.74
Utility Relocation	Forklifts	0	7.00	89	0.20
Utility Relocation	Generator Sets	0	8.00	84	0.74
Sidewalk Construction (Crawford)	Generator Sets	0	8.00	84	0.74
Traffic Signal Modification	Generator Sets	0	8.00	84	0.74
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Sidewalk Construction (Newport)	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Utility Relocation	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Utility Relocation	Welders	0	8.00	46	0.45
Sidewalk Construction (Crawford)	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Storm Drain Construction	Cranes	0	8.00	231	0.29
Storm Drain Construction	Forklifts	0	7.00	89	0.20
Storm Drain Construction	Generator Sets	0	8.00	84	0.74
Traffic Signal Modification	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Storm Drain Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Storm Drain Construction	Welders	2	8.00	46	0.45
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sidewalk Construction (Newport)	Welders	0	8.00	46	0.45
Sidewalk Construction (Crawford)	Welders	0	8.00	46	0.45
Traffic Signal Modification	Welders	0	8.00	46	0.45
Demolition	Excavators	1	8.00	158	0.38
Utility Relocation	Off-Highway Trucks	2	8.00	402	0.38
Storm Drain Construction	Excavators	1	8.00	158	0.38
Storm Drain Construction	Cement and Mortar Mixers	2	8.00	9	0.56

Sidewalk Construction (Newport)	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Newport)	Plate Compactors	1	8.00	81	0.73
Sidewalk Construction (Newport)	Concrete/Industrial Saws	1	8.00	81	0.73
Sidewalk Construction (Crawford)	Cement and Mortar Mixers	2	8.00	9	0.56
Sidewalk Construction (Crawford)	Plate Compactors	1	8.00	8	0.43
Sidewalk Construction (Crawford)	Concrete/Industrial Saws	1	8.00	81	0.73
Traffic Signal Modification	Off-Highway Trucks	1	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	5	10.00	0.00	32.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Utility Relocation	2	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Storm Drain Construction	6	12.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Sidewalk Construction (Newport)	4	8.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Sidewalk Construction (Crawford)	4	8.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Traffic Signal Modification	3	10.00	14.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.7032	8.1900	5.6382	0.0121		0.3249	0.3249		0.2989	0.2989		1,168.4471	1,168.4471	0.3779		1,177.8946
Total	**0.7032**	**8.1900**	**5.6382**	**0.0121**	**0.5303**	**0.3249**	**0.8552**	**0.0573**	**0.2989**	**0.3562**		**1,168.4471**	**1,168.4471**	**0.3779**		**1,177.8946**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0347**	**0.0217**	**0.2510**	**8.0000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**80.0783**	**80.0783**	**2.0200e-003**		**80.1288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	0.7032	8.1900	5.6382	0.0121		0.3249	0.3249		0.2989	0.2989	0.0000	1,168.4471	1,168.4471	0.3779		1,177.8946

Total	**0.7032**	**8.1900**	**5.6382**	**0.0121**	**0.2068**	**0.3249**	**0.5317**	**0.0223**	**0.2989**	**0.3213**	**0.0000**	**1,168.4471**	**1,168.4471**	**0.3779**		**1,177.8946**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0347**	**0.0217**	**0.2510**	**8.0000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**80.0783**	**80.0783**	**2.0200e-003**		**80.1288**

3.3 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2071	10.3206	14.5171	0.0232		0.5444	0.5444		0.5249	0.5249		2,215.0128	2,215.0128	0.3977		2,224.9548
Total	**1.2071**	**10.3206**	**14.5171**	**0.0232**		**0.5444**	**0.5444**		**0.5249**	**0.5249**		**2,215.0128**	**2,215.0128**	**0.3977**		**2,224.9548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0158	0.5178	0.1285	1.5900e-003	0.0373	1.5100e-003	0.0388	0.0102	1.4500e-003	0.0117		172.6033	172.6033	0.0128		172.9227
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0434	0.0271	0.3137	1.0000e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		100.0979	100.0979	2.5200e-003		100.1609
Total	**0.0592**	**0.5449**	**0.4423**	**2.5900e-003**	**0.1490**	**2.3100e-003**	**0.1514**	**0.0399**	**2.1900e-003**	**0.0420**		**272.7012**	**272.7012**	**0.0153**		**273.0836**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2071	10.3206	14.5171	0.0232		0.5444	0.5444		0.5249	0.5249	0.0000	2,215.0128	2,215.0128	0.3977		2,224.9548
Total	**1.2071**	**10.3206**	**14.5171**	**0.0232**		**0.5444**	**0.5444**		**0.5249**	**0.5249**	**0.0000**	**2,215.0128**	**2,215.0128**	**0.3977**		**2,224.9548**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0158	0.5178	0.1285	1.5900e-003	0.0373	1.5100e-003	0.0388	0.0102	1.4500e-003	0.0117		172.6033	172.6033	0.0128		172.9227
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0434	0.0271	0.3137	1.0000e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		100.0979	100.0979	2.5200e-003		100.1609
Total	**0.0592**	**0.5449**	**0.4423**	**2.5900e-003**	**0.1490**	**2.3100e-003**	**0.1514**	**0.0399**	**2.1900e-003**	**0.0420**		**272.7012**	**272.7012**	**0.0153**		**273.0836**

3.4 Utility Relocation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0621	8.0676	6.7510	0.0266		0.2934	0.2934		0.2699	0.2699		2,570.7604	2,570.7604	0.8314		2,591.5463
Total	**1.0621**	**8.0676**	**6.7510**	**0.0266**		**0.2934**	**0.2934**		**0.2699**	**0.2699**		**2,570.7604**	**2,570.7604**	**0.8314**		**2,591.5463**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0260	0.0163	0.1882	6.0000e-004	0.0671	4.8000e-004	0.0676	0.0178	4.4000e-004	0.0182		60.0587	60.0587	1.5100e-003		60.0966
Total	**0.0260**	**0.0163**	**0.1882**	**6.0000e-004**	**0.0671**	**4.8000e-004**	**0.0676**	**0.0178**	**4.4000e-004**	**0.0182**		**60.0587**	**60.0587**	**1.5100e-003**		**60.0966**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0621	8.0676	6.7510	0.0266		0.2934	0.2934		0.2699	0.2699	0.0000	2,570.7604	2,570.7604	0.8314		2,591.5463
Total	**1.0621**	**8.0676**	**6.7510**	**0.0266**		**0.2934**	**0.2934**		**0.2699**	**0.2699**	**0.0000**	**2,570.7604**	**2,570.7604**	**0.8314**		**2,591.5463**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0260	0.0163	0.1882	6.0000e-004	0.0671	4.8000e-004	0.0676	0.0178	4.4000e-004	0.0182		60.0587	60.0587	1.5100e-003		60.0966
Total	**0.0260**	**0.0163**	**0.1882**	**6.0000e-004**	**0.0671**	**4.8000e-004**	**0.0676**	**0.0178**	**4.4000e-004**	**0.0182**		**60.0587**	**60.0587**	**1.5100e-003**		**60.0966**

3.5 Storm Drain Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0391	7.1237	9.5179	0.0148		0.3329	0.3329		0.3188	0.3188		1,319.7424	1,319.7424	0.3201		1,327.7447
Total	**1.0391**	**7.1237**	**9.5179**	**0.0148**		**0.3329**	**0.3329**		**0.3188**	**0.3188**		**1,319.7424**	**1,319.7424**	**0.3201**		**1,327.7447**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0521	0.0325	0.3765	1.2100e-003	0.1341	9.6000e-004	0.1351	0.0356	8.9000e-004	0.0365		120.1175	120.1175	3.0300e-003		120.1931
Total	**0.0909**	**1.3021**	**0.7192**	**4.6200e-003**	**0.2237**	**3.4200e-003**	**0.2271**	**0.0614**	**3.2400e-003**	**0.0646**		**485.5484**	**485.5484**	**0.0272**		**486.2283**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	1.0391	7.1237	9.5179	0.0148		0.3329	0.3329		0.3188	0.3188	0.0000	1,319.7424	1,319.7424	0.3201		1,327.7447
Total	**1.0391**	**7.1237**	**9.5179**	**0.0148**		**0.3329**	**0.3329**		**0.3188**	**0.3188**	**0.0000**	**1,319.7424**	**1,319.7424**	**0.3201**		**1,327.7447**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0521	0.0325	0.3765	1.2100e-003	0.1341	9.6000e-004	0.1351	0.0356	8.9000e-004	0.0365		120.1175	120.1175	3.0300e-003		120.1931
Total	**0.0909**	**1.3021**	**0.7192**	**4.6200e-003**	**0.2237**	**3.4200e-003**	**0.2271**	**0.0614**	**3.2400e-003**	**0.0646**		**485.5484**	**485.5484**	**0.0272**		**486.2283**

3.6 Sidewalk Construction (Newport) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	3.5375	4.2816	7.6800e-003		0.1788	0.1788		0.1788	0.1788		693.6973	693.6973	0.0428		694.7677
Total	**0.4752**	**3.5375**	**4.2816**	**7.6800e-003**		**0.1788**	**0.1788**		**0.1788**	**0.1788**		**693.6973**	**693.6973**	**0.0428**		**694.7677**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0735**	**1.2912**	**0.5937**	**4.2100e-003**	**0.1790**	**3.1000e-003**	**0.1821**	**0.0495**	**2.9400e-003**	**0.0525**		**445.5093**	**445.5093**	**0.0262**		**446.1640**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	3.5375	4.2816	7.6800e-003		0.1788	0.1788		0.1788	0.1788	0.0000	693.6973	693.6973	0.0428		694.7677
Total	**0.4752**	**3.5375**	**4.2816**	**7.6800e-003**		**0.1788**	**0.1788**		**0.1788**	**0.1788**	**0.0000**	**693.6973**	**693.6973**	**0.0428**		**694.7677**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0735**	**1.2912**	**0.5937**	**4.2100e-003**	**0.1790**	**3.1000e-003**	**0.1821**	**0.0495**	**2.9400e-003**	**0.0525**		**445.5093**	**445.5093**	**0.0262**		**446.1640**

3.7 Sidewalk Construction (Crawford) - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5153	3.7888	4.4920	8.1600e-003		0.1886	0.1886		0.1886	0.1886		728.1767	728.1767	0.0464		729.3366
Total	**0.5153**	**3.7888**	**4.4920**	**8.1600e-003**		**0.1886**	**0.1886**		**0.1886**	**0.1886**		**728.1767**	**728.1767**	**0.0464**		**729.3366**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0735**	**1.2912**	**0.5937**	**4.2100e-003**	**0.1790**	**3.1000e-003**	**0.1821**	**0.0495**	**2.9400e-003**	**0.0525**		**445.5093**	**445.5093**	**0.0262**		**446.1640**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5153	3.7888	4.4920	8.1600e-003		0.1886	0.1886		0.1886	0.1886	0.0000	728.1767	728.1767	0.0464		729.3366
Total	**0.5153**	**3.7888**	**4.4920**	**8.1600e-003**		**0.1886**	**0.1886**		**0.1886**	**0.1886**	**0.0000**	**728.1767**	**728.1767**	**0.0464**		**729.3366**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352

Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0735**	**1.2912**	**0.5937**	**4.2100e-003**	**0.1790**	**3.1000e-003**	**0.1821**	**0.0495**	**2.9400e-003**	**0.0525**		**445.5093**	**445.5093**	**0.0262**		**446.1640**

3.8 Traffic Signal Modification - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0688	9.8937	7.5058	0.0222		0.4105	0.4105		0.3777	0.3777		2,145.4495	2,145.4495	0.6939		2,162.7966
Total	**1.0688**	**9.8937**	**7.5058**	**0.0222**		**0.4105**	**0.4105**		**0.3777**	**0.3777**		**2,145.4495**	**2,145.4495**	**0.6939**		**2,162.7966**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0434	0.0271	0.3137	1.0000e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		100.0979	100.0979	2.5200e-003		100.1609
Total	**0.0822**	**1.2967**	**0.6565**	**4.4100e-003**	**0.2014**	**3.2600e-003**	**0.2046**	**0.0554**	**3.0900e-003**	**0.0585**		**465.5288**	**465.5288**	**0.0267**		**466.1961**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0688	9.8937	7.5058	0.0222		0.4105	0.4105		0.3777	0.3777	0.0000	2,145.4495	2,145.4495	0.6939		2,162.7966
Total	**1.0688**	**9.8937**	**7.5058**	**0.0222**		**0.4105**	**0.4105**		**0.3777**	**0.3777**	**0.0000**	**2,145.4495**	**2,145.4495**	**0.6939**		**2,162.7966**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0388	1.2696	0.3428	3.4100e-003	0.0896	2.4600e-003	0.0920	0.0258	2.3500e-003	0.0281		365.4310	365.4310	0.0242		366.0352
Worker	0.0434	0.0271	0.3137	1.0000e-003	0.1118	8.0000e-004	0.1126	0.0296	7.4000e-004	0.0304		100.0979	100.0979	2.5200e-003		100.1609
Total	**0.0822**	**1.2967**	**0.6565**	**4.4100e-003**	**0.2014**	**3.2600e-003**	**0.2046**	**0.0554**	**3.0900e-003**	**0.0585**		**465.5288**	**465.5288**	**0.0267**		**466.1961**

3.9 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	0.7749	7.6063	9.8366	0.0152		0.3884	0.3884		0.3585	0.3585		1,455.5854	1,455.5854	0.4597		1,467.0772
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7749**	**7.6063**	**9.8366**	**0.0152**		**0.3884**	**0.3884**		**0.3585**	**0.3585**		**1,455.5854**	**1,455.5854**	**0.4597**		**1,467.0772**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0347**	**0.0217**	**0.2510**	**8.0000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**80.0783**	**80.0783**	**2.0200e-003**		**80.1288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7749	7.6063	9.8366	0.0152		0.3884	0.3884		0.3585	0.3585	0.0000	1,455.5854	1,455.5854	0.4597		1,467.0772
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Total	**0.7749**	**7.6063**	**9.8366**	**0.0152**		**0.3884**	**0.3884**		**0.3585**	**0.3585**	**0.0000**	**1,455.5854**	**1,455.5854**	**0.4597**		**1,467.0772**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0347	0.0217	0.2510	8.0000e-004	0.0894	6.4000e-004	0.0901	0.0237	5.9000e-004	0.0243		80.0783	80.0783	2.0200e-003		80.1288
Total	**0.0347**	**0.0217**	**0.2510**	**8.0000e-004**	**0.0894**	**6.4000e-004**	**0.0901**	**0.0237**	**5.9000e-004**	**0.0243**		**80.0783**	**80.0783**	**2.0200e-003**		**80.1288**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.552712	0.042774	0.202769	0.116939	0.015078	0.005847	0.021692	0.031910	0.002110	0.001769	0.004822	0.000710	0.000869

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Unmitigated	0.0375	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.6400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.7000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.6400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.7000e-004
Total	**0.0375**	**0.0000**	**2.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.7000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B
Biological Constraints Survey Memorandum

2121 Alton Parkway
Suite 100
Irvine, CA 92606
949.753.7001 phone
949.753.7002 fax

esassoc.com

memorandum

date	March 26, 2021
to	Natalia Gaerlan, PLA, LEED AP, Senior Project Manager, OC Parks - Planning & Design
cc	Scott Thomas, Manager, OC Parks – Planning & Design
from	Karla Flores, Senior Biologist
subject	Biological Constraints Survey Memorandum for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

This memorandum presents the findings of a biological constraints survey, conducted by Environmental Science Associates (ESA), for the Crawford Canyon Park (Park) and Crawford Canyon Road Sidewalk Extension (Sidewalk Extension) project (Project). The survey included a preliminary database review for the project location, followed by two site visits to document existing conditions and to identify potential biological constraints. The assessment to identify potential biological constraints included two separate surveys, one for the Park site and one for the Sidewalk Extension site. Each site was evaluated for the potential to support special-status plant and wildlife species, sensitive habitats, wildlife movement corridors, and waters regulated by the United Stated Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB) and California Department of Fish and Wildlife (CDFW).

Database Review

Prior to the onsite assessments, ESA conducted a query of the California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) Online Rare Plant inventory for the Orange, California U.S. Geological Service 7.5-minute topographic quadrangle and the surrounding eight topographic quadrangles. The surrounding topographic quadrangles included in the query were: La Habra, Yorba Linda, Prado Dam, Anaheim, Black Star Canyon, Newport Beach, Tustin, and Lake Forest. The query was conducted to determine the potential for special-status plant and wildlife species to occur within the Park and the Sidewalk Extension sites, if suitable habitat for these species is present. Additionally, a brief review of the National Wetlands Inventory (NWI) and WebSoil Survey was conducted to determine the potential for hydric soils and wetland jurisdictional features to be present onsite. The CNDDB, CNPS, NWI and WebSoil query results are included as an attachment to this memo.

Site Assessment

ESA biologist Karla Flores conducted two site visits to evaluate the Crawford Canyon Park site on April 15, 2020 and the Crawford Canyon Sidewalk Extension site on November 12, 2020 the potential of the sites to support

special-status species, sensitive habitats, wildlife movement corridors, and waters regulated by the USACE, RWQCB and the CDFW. Weather conditions for each site visit are summarized in **Table 1**, **Weather Details for Crawford Canyon Park and Sidewalk Extension Site Assessment**. Each site was surveyed on foot by walking the perimeter of the footprint, and examining areas with dense vegetation. Binoculars were used to aid in the identification of bird and other wildlife species detected.

TABLE 1
WEATHER DETAILS FOR CRAWFORD CANYON PARK AND SIDEWALK EXTENSION SITE ASSESSMENT

Survey Location	Date	Temperature (ºF)		Wind (mph)		Clouds (%)	
		Start	End	Start	End	Start	End
Park site	4/15/2020	80º	83º	2.4	3.8	0	0
Sidewalk Extension site	11/12/2020	66º	74º	3.5	2	20	40

Vegetation and Wildlife

Crawford Canyon Park

Crawford Canyon Park is located at the northwest corner of Newport Avenue and South Crawford Canyon Road in North Tustin, Orange County, California. The Park site is surrounded by residential development on all sides and consists primarily of a disturbed dirt/gravel lot with scattered patches of native and non-native vegetation. Because the Park site is situated along a slope, there are signs of erosion (e.g. surface channels) caused by downhill water flow. In addition to shallow surface channels, there are also more prominent drainage features onsite, including an ephemeral swale that originates in the northeast corner of the site, and drains toward Newport Avenue, then drains into a shallow basin located on an adjacent property at the west end of the project site. The ephemeral swale is confined by artificial mounds created by the deposition of fill material. In addition, two shallow depressions with saturated soil were observed along the northern portion of the site.

Native plants observed onsite included: lemonade berry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), California buckwheat (*Eriogonum fasciculatum*), chilicothe (*Marah macrocarpa*), and California brittlebush (*Encelia californica*). In addition, scattered mulefat (*Baccharis salicifolia*) plants occur along the ephemeral swale, as well as isolated along the southern portion of the site, all in non-riparian areas. Non-native plants observed onsite included Mexican fan palm (*Washingtonia robusta*), Canary Island date palm (*Phoenix canariensis*), Peruvian pepper tree (*Schinus molle*), Brazilian pepper tree (*Schinus terebinthifolius*), tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), Russian thistle (*Salsola tragus*), white horehound (*Marrubium vulgare*), common beggartick (*Bidens pilosa*), short-podded mustard (*Hirschfeldia incana*), marsh parsley (*Cyclospermum leptophyllum*), cheeseweed (*Malva parviflora*), common sow thistle (*Sonchus oleraceus*), London rocket (*Sisymbrium irio*), common groundsel (*Senecio vulgaris*), and red-stemmed filaree (*Erodium cicutarium*).

Avian species observed during the survey include house finch (*Haemorhous mexicanus*), Anna's hummingbird (*Calypte anna*), lesser goldfinch (*Spinus psaltria*), black phoebe (*Sayornis nigricans*) and American crow (*Corvus brachyrhynchos*). Other wildlife observed during the survey included California ground squirrel (*Otospermophilus beecheyi*) and side-blotched lizard (*Uta stansburiana*).

Sidewalk Extension Site

The Sidewalk Extension site extends from the intersection of South Crawford Canyon Road and Newport Avenue north toward the intersection of Crawford Canyon Road and Country Haven Lane (north side), and west from the South Crawford Canyon Road and Newport Avenue intersection to the Newport Avenue and Hyde Park Drive intersection (west side). The west side of the Sidewalk Extension site consists primarily of a paved sidewalk with ornamental/non-native trees and shrubs, and a concrete lined v-ditch that drains into a box culvert. Plant species on the west side of the Sidewalk Extension site include eucalyptus (*Eucalyptus* sp.), Peruvian pepper tree, castor bean, tree tobacco, carrotwood (*Cupaniopsis anacardioides*), Chinese elm (*Ulmus parvifolia* 'Drake'), variegated Pittosporum (*Pittosporum tobira* 'Variegata'), and weeping fig (*Ficus benjamina*). The north side of the Sidewalk Extension site consists of an uncurbed street (e.g. no sidewalk) with a concrete v-ditch that becomes a dirt erosion channel. The north side of the Sidewalk Extension site is dominated by non-native trees such as salt cedar (*Tamarix ramosissima*) and Mexican fan palm (*Washingtonia robusta*).

Avian species observed during the survey included house finch, lesser goldfinch, ruby-crowned kinglet (*Regulus calendula*), bushtit (*Psaltriparus minimus*), mourning dove (*Zenaida macroura*), American crow, California towhee (*Melozone crissalis)*, yellow rumped warbler (*Setophaga coronata*) and Anna's hummingbird.

Potential Constraints

Crawford Canyon Park

No special-status plants, wildlife species, or sensitive natural communities were observed during the site assessment at the Crawford Canyon Park site. However, the scattered patches of vegetation within the Park provide suitable habitat for nesting birds. In addition, the presence of Mexican fan palms may also provide suitable habitat for roosting bats. The surface channels and ephemeral swale traversing the site do not conform to the stream definition under the California Fish and Game Code, and are unlikely to be subject to CDFW jurisdiction. These areas are also unlikely to be subject to USACE or RWQCB jurisdiction.

Sidewalk Extension Site

No special-status plants, wildlife, or sensitive natural communities were observed at the Sidewalk Extension site during the site visit. Although the Sidewalk Extension site is primarily vegetated with ornamental and non-native tree and shrub species, native birds are known to nest in these trees. Bushtits and house finches (both observed during the site visit), are known to nest in Peruvian pepper trees. The ornamental trees present may provide similarly suitable nesting habitat. The concrete v-ditches that run along South Crawford Canyon Road and along Newport Avenue are not jurisdictional features and would not be subject to USACE and RWQCB regulation.

Recommendations and Conclusions

Crawford Canyon Park Site and Crawford Canyon Sidewalk Extension Site

Although the majority of the project site is disturbed, and was previously used by Orange County Public Works (OCPW) as a staging yard for vehicles and sediment deposition, there are areas of suitable habitat for birds and wildlife. The results of the biological constraints survey indicated that there are three biological constraints for this project: (1) presence of suitable nesting bird habitat, (2) presence of suitable roosting habitat for special-status bats, and (3) potential jurisdictional feature along the north and west portions of Sidewalk Extension site.

Birds

ESA recommends that project activities occur outside of the nesting bird season (February 1-September 1 for songbirds and January 1-September 1 for raptors). If work during the nesting bird season cannot be avoided, ESA recommends that a qualified biologist conduct a nesting bird survey prior to initiating construction activities. If active bird nests are present, a qualified biologist should be present onsite to monitor construction activities and to establish and maintain appropriate buffers around nests to minimize impacts to nesting birds until the biologist determines that the nest is no longer active. Smaller buffer areas around an active nest than may apply to native habitat areas may be recommended by the qualified monitoring biologist based on tolerance behavior of the nesting bird.

Bats

ESA also recommends that a qualified biologist should conduct a focused bat survey no less than 3 days, and no more than 7 days, prior to the initiation of construction activities. The survey would take place at an appropriate time of day to maximize detectability, usually just prior to sunset. Survey methods may include one, or a combination of, the following methods: visual surveys, inspection of suitable habitat for bat sign (e.g. guano, urine stains), or usage of ultrasonic acoustical bat detectors. If bats are detected onsite, the number and species of bats present should be determined. Project activities should avoid sensitive roosting periods and habitats for bats, including winter hibernation roosts, day roosts, and maternity colonies with nursing young. If bat roosts must be removed, bats should be passively excluded from the roost site prior to removal. A mitigation program addressing compensation and detailing exclusion methods and roost removal may need to be prepared and approved by CDFW prior to implementation.

Please feel free to contact me directly at (949) 753-1531, if I can be of any further assistance.



Karla L. Flores
Senior Biologist



Daryl Koutnik
Principal

Attachment 1: California Natural Diversity Database 9-Quadrangle Query
Attachment 2: California Native Plant Society Rare Plant Inventory 9-Quadrangle Query
Attachment 3: National Wetland Inventory
Attachment 4: WebSoil Survey Report
Attachment 5: Representative Photographs

References

California Department of Fish and Wildlife. California Natural Diversity Database Rarefind. Accessed April 17, 2020.

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 17 April 2020]

U.S. Fish and Wildlife Service National Wetlands Inventory. Accessed April 17, 2020.

United States Department of Agriculture, National Resources Conservation Service. Custom Soil Resource Report for Orange County and Part of Riverside County. California. Accessed April 17, 2020

Attachment 1

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Orange (3311777) OR Black Star Canyon (3311776) OR El Toro (3311766) OR Tustin (3311767) OR Newport Beach (3311768) OR Anaheim (3311778) OR La Habra (3311788) OR Yorba Linda (3311787) OR Prado Dam (3311786))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Allen's pentachaeta *Pentachaeta aurea ssp. allenii*	PDAST6X021	None	None	G4T1	S1	1B.1
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
American peregrine falcon *Falco peregrinus anatum*	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
aphanisma *Aphanisma blitoides*	PDCHE02010	None	None	G3G4	S2	1B.2
arroyo toad *Anaxyrus californicus*	AAABB01230	Endangered	None	G2G3	S2S3	SSC
bald eagle *Haliaeetus leucocephalus*	ABNKC10010	Delisted	Endangered	G5	S3	FP
bank swallow *Riparia riparia*	ABPAU08010	None	Threatened	G5	S2	
Belding's savannah sparrow *Passerculus sandwichensis beldingi*	ABPBX99015	None	Endangered	G5T3	S3	
big free-tailed bat *Nyctinomops macrotis*	AMACD04020	None	None	G5	S3	SSC
Braunton's milk-vetch *Astragalus brauntonii*	PDFAB0F1G0	Endangered	None	G2	S2	1B.1
burrowing owl *Athene cunicularia*	ABNSB10010	None	None	G4	S3	SSC
California beardtongue *Penstemon californicus*	PDSCR1L110	None	None	G3	S2	1B.2
California black rail *Laterallus jamaicensis coturniculus*	ABNME03041	None	Threatened	G3G4T1	S1	FP
California glossy snake *Arizona elegans occidentalis*	ARADB01017	None	None	G5T2	S2	SSC
California horned lark *Eremophila alpestris actia*	ABPAT02011	None	None	G5T4Q	S4	WL
California least tern *Sternula antillarum browni*	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
California Orcutt grass *Orcuttia californica*	PMPOA4G010	Endangered	Endangered	G1	S1	1B.1
California Walnut Woodland *California Walnut Woodland*	CTT71210CA	None	None	G2	S2.1	
chaparral nolina *Nolina cismontana*	PMAGA080E0	None	None	G3	S3	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
chaparral ragwort *Senecio aphanactis*	PDAST8H060	None	None	G3	S2	2B.2
chaparral sand-verbena *Abronia villosa var. aurita*	PDNYC010P1	None	None	G5T2?	S2	1B.1
coast horned lizard *Phrynosoma blainvillii*	ARACF12100	None	None	G3G4	S3S4	SSC
coast patch-nosed snake *Salvadora hexalepis virgultea*	ARADB30033	None	None	G5T4	S2S3	SSC
Coast Range newt *Taricha torosa*	AAAAF02032	None	None	G4	S4	SSC
coast woolly-heads *Nemacaulis denudata var. denudata*	PDPGN0G011	None	None	G3G4T2	S2	1B.2
coastal cactus wren *Campylorhynchus brunneicapillus sandiegensis*	ABPBG02095	None	None	G5T3Q	S3	SSC
coastal California gnatcatcher *Polioptila californica californica*	ABPBJ08081	Threatened	None	G4G5T2Q	S2	SSC
coastal whiptail *Aspidoscelis tigris stejnegeri*	ARACJ02143	None	None	G5T5	S3	SSC
Cooper's hawk *Accipiter cooperii*	ABNKC12040	None	None	G5	S4	WL
Coulter's goldfields *Lasthenia glabrata ssp. coulteri*	PDAST5L0A1	None	None	G4T2	S2	1B.1
Coulter's saltbush *Atriplex coulteri*	PDCHE040E0	None	None	G3	S1S2	1B.2
Crotch bumble bee *Bombus crotchii*	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
Davidson's saltscale *Atriplex serenana var. davidsonii*	PDCHE041T1	None	None	G5T1	S1	1B.2
decumbent goldenbush *Isocoma menziesii var. decumbens*	PDAST57091	None	None	G3G5T2T3	S2	1B.2
estuary seablite *Suaeda esteroa*	PDCHE0P0D0	None	None	G3	S2	1B.2
ferruginous hawk *Buteo regalis*	ABNKC19120	None	None	G4	S3S4	WL
Gambel's water cress *Nasturtium gambelii*	PDBRA270V0	Endangered	Threatened	G1	S1	1B.1
globose dune beetle *Coelus globosus*	IICOL4A010	None	None	G1G2	S1S2	
golden eagle *Aquila chrysaetos*	ABNKC22010	None	None	G5	S3	FP
grasshopper sparrow *Ammodramus savannarum*	ABPBXA0020	None	None	G5	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
great blue heron *Ardea herodias*	ABNGA04010	None	None	G5	S4	
heart-leaved pitcher sage *Lepechinia cardiophylla*	PDLAM0V020	None	None	G3	S2S3	1B.2
hoary bat *Lasiurus cinereus*	AMACC05030	None	None	G5	S4	
Horn's milk-vetch *Astragalus hornii var. hornii*	PDFAB0F421	None	None	GUT1	S1	1B.1
intermediate mariposa-lily *Calochortus weedii var. intermedius*	PMLIL0D1J1	None	None	G3G4T2	S2	1B.2
intermediate monardella *Monardella hypoleuca ssp. intermedia*	PDLAM180A4	None	None	G4T2?	S2?	1B.3
Jokerst's monardella *Monardella australis ssp. jokerstii*	PDLAM18112	None	None	G4T1?	S1?	1B.1
least Bell's vireo *Vireo bellii pusillus*	ABPBW01114	Endangered	Endangered	G5T2	S2	
light-footed Ridgway's rail *Rallus obsoletus levipes*	ABNME05014	Endangered	Endangered	G5T1T2	S1	FP
long-eared owl *Asio otus*	ABNSB13010	None	None	G5	S3?	SSC
long-spined spineflower *Chorizanthe polygonoides var. longispina*	PDPGN040K1	None	None	G5T3	S3	1B.2
Los Angeles sunflower *Helianthus nuttallii ssp. parishii*	PDAST4N102	None	None	G5TH	SH	1A
lucky morning-glory *Calystegia felix*	PDCON040P0	None	None	G1Q	S1	1B.1
Malibu baccharis *Baccharis malibuensis*	PDAST0W0W0	None	None	G1	S1	1B.1
many-stemmed dudleya *Dudleya multicaulis*	PDCRA040H0	None	None	G2	S2	1B.2
mesa horkelia *Horkelia cuneata var. puberula*	PDROS0W045	None	None	G4T1	S1	1B.1
Mexican long-tongued bat *Choeronycteris mexicana*	AMACB02010	None	None	G4	S1	SSC
mimic tryonia (=California brackishwater snail) *Tryonia imitator*	IMGASJ7040	None	None	G2	S2	
monarch - California overwintering population *Danaus plexippus pop. 1*	IILEPP2012	None	None	G4T2T3	S2S3	
mud nama *Nama stenocarpa*	PDHYD0A0H0	None	None	G4G5	S1S2	2B.2
northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	AMAFD05031	None	None	G5T3T4	S3S4	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
orange-throated whiptail *Aspidoscelis hyperythra*	ARACJ02060	None	None	G5	S2S3	WL
osprey *Pandion haliaetus*	ABNKC01010	None	None	G5	S4	WL
Pacific pocket mouse *Perognathus longimembris pacificus*	AMAFD01042	Endangered	None	G5T1	S1	SSC
pallid bat *Antrozous pallidus*	AMACC10010	None	None	G5	S3	SSC
Parish's brittlescale *Atriplex parishii*	PDCHE041D0	None	None	G1G2	S1	1B.1
Plummer's mariposa-lily *Calochortus plummerae*	PMLIL0D150	None	None	G4	S4	4.2
pocketed free-tailed bat *Nyctinomops femorosaccus*	AMACD04010	None	None	G4	S3	SSC
prostrate vernal pool navarretia *Navarretia prostrata*	PDPLM0C0Q0	None	None	G2	S2	1B.2
quino checkerspot butterfly *Euphydryas editha quino*	IILEPK405L	Endangered	None	G5T1T2	S1S2	
red-diamond rattlesnake *Crotalus ruber*	ARADE02090	None	None	G4	S3	SSC
Riverside fairy shrimp *Streptocephalus woottoni*	ICBRA07010	Endangered	None	G1G2	S1S2	
Riversidian Alluvial Fan Sage Scrub *Riversidian Alluvial Fan Sage Scrub*	CTT32720CA	None	None	G1	S1.1	
Robinson's pepper-grass *Lepidium virginicum var. robinsonii*	PDBRA1M114	None	None	G5T3	S3	4.3
salt marsh bird's-beak *Chloropyron maritimum ssp. maritimum*	PDSCR0J0C2	Endangered	Endangered	G4?T1	S1	1B.2
salt spring checkerbloom *Sidalcea neomexicana*	PDMAL110J0	None	None	G4	S2	2B.2
San Bernardino aster *Symphyotrichum defoliatum*	PDASTE80C0	None	None	G2	S2	1B.2
San Diego button-celery *Eryngium aristulatum var. parishii*	PDAPI0Z042	Endangered	Endangered	G5T1	S1	1B.1
San Diego desert woodrat *Neotoma lepida intermedia*	AMAFF08041	None	None	G5T3T4	S3S4	SSC
San Diego fairy shrimp *Branchinecta sandiegonensis*	ICBRA03060	Endangered	None	G2	S2	
San Fernando Valley spineflower *Chorizanthe parryi var. fernandina*	PDPGN040J1	Proposed Threatened	Endangered	G2T1	S1	1B.1
sandy beach tiger beetle *Cicindela hirticollis gravida*	IICOL02101	None	None	G5T2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Santa Ana River woollystar *Eriastrum densifolium ssp. sanctorum*	PDPLM03035	Endangered	Endangered	G4T1	S1	1B.1
Santa Ana speckled dace *Rhinichthys osculus ssp. 3*	AFCJB3705K	None	None	G5T1	S1	SSC
Santa Ana sucker *Catostomus santaanae*	AFCJC02190	Threatened	None	G1	S1	
smooth tarplant *Centromadia pungens ssp. laevis*	PDAST4R0R4	None	None	G3G4T2	S2	1B.1
south coast saltscale *Atriplex pacifica*	PDCHE041C0	None	None	G4	S2	1B.2
Southern California Arroyo Chub/Santa Ana Sucker Stream *Southern California Arroyo Chub/Santa Ana Sucker Stream*	CARE2330CA	None	None	GNR	SNR	
southern California legless lizard *Anniella stebbinsi*	ARACC01060	None	None	G3	S3	SSC
southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	ABPBX91091	None	None	G5T3	S3	WL
southern California saltmarsh shrew *Sorex ornatus salicornicus*	AMABA01104	None	None	G5T1?	S1	SSC
Southern Coast Live Oak Riparian Forest *Southern Coast Live Oak Riparian Forest*	CTT61310CA	None	None	G4	S4	
Southern Coastal Salt Marsh *Southern Coastal Salt Marsh*	CTT52120CA	None	None	G2	S2.1	
Southern Cottonwood Willow Riparian Forest *Southern Cottonwood Willow Riparian Forest*	CTT61330CA	None	None	G3	S3.2	
Southern Dune Scrub *Southern Dune Scrub*	CTT21330CA	None	None	G1	S1.1	
Southern Foredunes *Southern Foredunes*	CTT21230CA	None	None	G2	S2.1	
southern grasshopper mouse *Onychomys torridus ramona*	AMAFF06022	None	None	G5T3	S3	SSC
Southern Interior Cypress Forest *Southern Interior Cypress Forest*	CTT83230CA	None	None	G2	S2.1	
Southern Riparian Scrub *Southern Riparian Scrub*	CTT63300CA	None	None	G3	S3.2	
Southern Sycamore Alder Riparian Woodland *Southern Sycamore Alder Riparian Woodland*	CTT62400CA	None	None	G4	S4	
southern tarplant *Centromadia parryi ssp. australis*	PDAST4R0P4	None	None	G3T2	S2	1B.1
Southern Willow Scrub *Southern Willow Scrub*	CTT63320CA	None	None	G3	S2.1	
southwestern willow flycatcher *Empidonax traillii extimus*	ABPAE33043	Endangered	Endangered	G5T2	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
steelhead - southern California DPS *Oncorhynchus mykiss irideus pop. 10*	AFCHA0209J	Endangered	None	G5T1Q	S1	
Swainson's hawk *Buteo swainsoni*	ABNKC19070	None	Threatened	G5	S3	
Tecate cypress *Hesperocyparis forbesii*	PGCUP040C0	None	None	G2	S2	1B.1
thread-leaved brodiaea *Brodiaea filifolia*	PMLIL0C050	Threatened	Endangered	G2	S2	1B.1
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
two-striped gartersnake *Thamnophis hammondii*	ARADB36160	None	None	G4	S3S4	SSC
wandering (=saltmarsh) skipper *Panoquina errans*	IILEP84030	None	None	G4G5	S2	
western beach tiger beetle *Cicindela latesignata latesignata*	IICOL02113	None	None	G2G4T1T2	S1	
western mastiff bat *Eumops perotis californicus*	AMACD02011	None	None	G5T4	S3S4	SSC
western pond turtle *Emys marmorata*	ARAAD02030	None	None	G3G4	S3	SSC
western snowy plover *Charadrius alexandrinus nivosus*	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G3	S3	SSC
western tidal-flat tiger beetle *Cicindela gabbii*	IICOL02080	None	None	G2G4	S1	
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
white rabbit-tobacco *Pseudognaphalium leucocephalum*	PDAST440C0	None	None	G4	S2	2B.2
white-tailed kite *Elanus leucurus*	ABNKC06010	None	None	G5	S3S4	FP
yellow rail *Coturnicops noveboracensis*	ABNME01010	None	None	G4	S1S2	SSC
yellow warbler *Setophaga petechia*	ABPBX03010	None	None	G5	S3S4	SSC
yellow-breasted chat *Icteria virens*	ABPBX24010	None	None	G5	S3	SSC
Yuma myotis *Myotis yumanensis*	AMACC01020	None	None	G5	S4	

Record Count: 123

Attachment 2

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

Attachment E

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

61 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3311788, 3311787, 3311786, 3311778, 3311777, 3311776, 3311768 3311767 and 3311766;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Abronia maritima	red sand-verbena	Nyctaginaceae	perennial herb	Feb-Nov	4.2	S3?	G4
Abronia villosa var. aurita	chaparral sand-verbena	Nyctaginaceae	annual herb	(Jan)Mar-Sep	1B.1	S2	G5T2?
Aphanisma blitoides	aphanisma	Chenopodiaceae	annual herb	Feb-Jun	1B.2	S2	G3G4
Astragalus brauntonii	Braunton's milk-vetch	Fabaceae	perennial herb	Jan-Aug	1B.1	S2	G2
Atriplex coulteri	Coulter's saltbush	Chenopodiaceae	perennial herb	Mar-Oct	1B.2	S1S2	G3
Atriplex pacifica	South Coast saltscale	Chenopodiaceae	annual herb	Mar-Oct	1B.2	S2	G4
Atriplex parishii	Parish's brittlescale	Chenopodiaceae	annual herb	Jun-Oct	1B.1	S1	G1G2
Atriplex serenana var. davidsonii	Davidson's saltscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S1	G5T1
Baccharis malibuensis	Malibu baccharis	Asteraceae	perennial deciduous shrub	Aug	1B.1	S1	G1
Brodiaea filifolia	thread-leaved brodiaea	Themidaceae	perennial bulbiferous herb	Mar-Jun	1B.1	S2	G2
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4
Calochortus catalinae	Catalina mariposa lily	Liliaceae	perennial bulbiferous herb	(Feb)Mar-Jun	4.2	S3S4	G3G4
Calochortus plummerae	Plummer's mariposa lily	Liliaceae	perennial bulbiferous herb	May-Jul	4.2	S4	G4
Calochortus weedii var. intermedius	intermediate mariposa lily	Liliaceae	perennial bulbiferous herb	May-Jul	1B.2	S2	G3G4T2
Calystegia felix	lucky morning-glory	Convolvulaceae	annual rhizomatous herb	Mar-Sep	1B.1	S1	G1Q

Attachment E

Camissoniopsis lewisii	Lewis' evening-primrose	Onagraceae	annual herb	Mar-May(Jun)	3	S4	G4
Centromadia parryi ssp. australis	southern tarplant	Asteraceae	annual herb	May-Nov	1B.1	S2	G3T2
Centromadia pungens ssp. laevis	smooth tarplant	Asteraceae	annual herb	Apr-Sep	1B.1	S2	G3G4T2
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct(Nov)	1B.2	S1	G4?T1
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	Polygonaceae	annual herb	Apr-Jul	1B.1	S1	G2T1
Chorizanthe polygonoides var. longispina	long-spined spineflower	Polygonaceae	annual herb	Apr-Jul	1B.2	S3	G5T3
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	4.2	S4	G4
Deinandra paniculata	paniculate tarplant	Asteraceae	annual herb	(Mar)Apr-Nov(Dec)	4.2	S4	G4
Dodecahema leptoceras	slender-horned spineflower	Polygonaceae	annual herb	Apr-Jun	1B.1	S1	G1
Dudleya multicaulis	many-stemmed dudleya	Crassulaceae	perennial herb	Apr-Jul	1B.2	S2	G2
Dudleya stolonifera	Laguna Beach dudleya	Crassulaceae	perennial stoloniferous herb	May-Jul	1B.1	S1	G1
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Polemoniaceae	perennial herb	Apr-Sep	1B.1	S1	G4T1
Eryngium aristulatum var. parishii	San Diego button-celery	Apiaceae	annual / perennial herb	Apr-Jun	1B.1	S1	G5T1
Harpagonella palmeri	Palmer's grapplinghook	Boraginaceae	annual herb	Mar-May	4.2	S3	G4
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	Asteraceae	perennial rhizomatous herb	Aug-Oct	1A	SH	G5TH
Hesperocyparis forbesii	Tecate cypress	Cupressaceae	perennial evergreen tree		1B.1	S2	G2
Hordeum intercedens	vernal barley	Poaceae	annual herb	Mar-Jun	3.2	S3S4	G3G4
Horkelia cuneata var. puberula	mesa horkelia	Rosaceae	perennial herb	Feb-Jul(Sep)	1B.1	S1	G4T1
Juglans californica	Southern California black walnut	Juglandaceae	perennial deciduous tree	Mar-Aug	4.2	S4	G4
Juncus acutus ssp. leopoldii	southwestern spiny rush	Juncaceae	perennial rhizomatous herb	(Mar)May-Jun	4.2	S4	G5T5
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	Feb-Jun	1B.1	S2	G4T2
Lepechinia cardiophylla	heart-leaved pitcher sage	Lamiaceae	perennial shrub	Apr-Jul	1B.2	S2S3	G3
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Brassicaceae	annual herb	Jan-Jul	4.3	S3	G5T3
Lilium humboldtii ssp. ocellatum	ocellated Humboldt lily	Liliaceae	perennial bulbiferous herb	Mar-Jul(Aug)	4.2	S4?	G4T4?

Attachment E

Monardella australis ssp. jokerstii	Jokerst's monardella	Lamiaceae	perennial rhizomatous herb	Jul-Sep	1B.1	S1	G4T1
Monardella hypoleuca ssp. intermedia	intermediate monardella	Lamiaceae	perennial rhizomatous herb	Apr-Sep	1B.3	S2?	G4T2?
Nama stenocarpa	mud nama	Namaceae	annual / perennial herb	Jan-Jul	2B.2	S1S2	G4G5
Nasturtium gambelii	Gambel's water cress	Brassicaceae	perennial rhizomatous herb	Apr-Oct	1B.1	S1	G1
Navarretia prostrata	prostrate vernal pool navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G2
Nemacaulis denudata var. denudata	coast woolly-heads	Polygonaceae	annual herb	Apr-Sep	1B.2	S2	G3G4T2
Nolina cismontana	chaparral nolina	Ruscaceae	perennial evergreen shrub	(Mar)May-Jul	1B.2	S3	G3
Orcuttia californica	California Orcutt grass	Poaceae	annual herb	Apr-Aug	1B.1	S1	G1
Penstemon californicus	California beardtongue	Plantaginaceae	perennial herb	May-Jun(Aug)	1B.2	S2	G3
Pentachaeta aurea ssp. allenii	Allen's pentachaeta	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G4T1
Phacelia hubbyi	Hubby's phacelia	Hydrophyllaceae	annual herb	Apr-Jul	4.2	S4	G4
Phacelia ramosissima var. austrolitoralis	south coast branching phacelia	Hydrophyllaceae	perennial herb	Mar-Aug	3.2	S3	G5?T3Q
Pickeringia montana var. tomentosa	woolly chaparral-pea	Fabaceae	evergreen shrub	May-Aug	4.3	S3S4	G5T3T4
Polygala cornuta var. fishiae	Fish's milkwort	Polygalaceae	perennial deciduous shrub	May-Aug	4.3	S4	G5T4
Pseudognaphalium leucocephalum	white rabbit-tobacco	Asteraceae	perennial herb	(Jul)Aug-Nov(Dec)	2B.2	S2	G4
Quercus engelmannii	Engelmann oak	Fagaceae	perennial deciduous tree	Mar-Jun	4.2	S3	G3
Romneya coulteri	Coulter's matilija poppy	Papaveraceae	perennial rhizomatous herb	Mar-Jul(Aug)	4.2	S4	G4
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	1B.2	S3	G3
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
Sidalcea neomexicana	salt spring checkerbloom	Malvaceae	perennial herb	Mar-Jun	2B.2	S2	G4
Suaeda esteroa	estuary seablite	Chenopodiaceae	perennial herb	(May)Jul-Oct(Jan)	1B.2	S2	G3
Symphyotrichum defoliatum	San Bernardino aster	Asteraceae	perennial rhizomatous herb	Jul-Nov(Dec)	1B.2	S2	G2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 17 April 2020].

Attachment E

Search the Inventory
Simple Search
Advanced Search
Glossary

Information
About the Inventory
About the Rare Plant Program
CNPS Home Page
About CNPS
Join CNPS

Contributors
The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

© Copyright 2010-2018 California Native Plant Society. All rights reserved.

Questions and Comments
rareplants@cnps.org

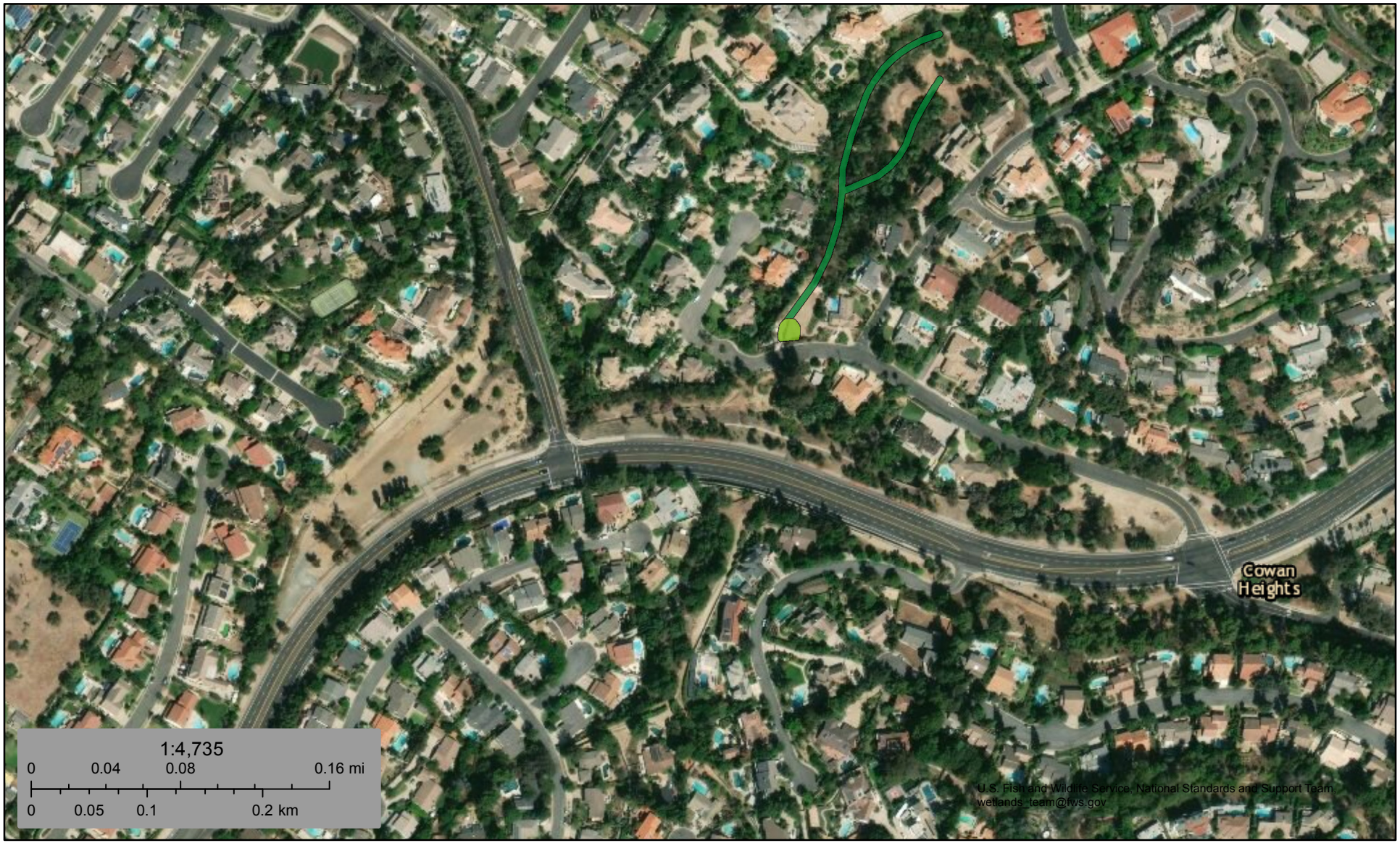
Attachment 3

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

U.S. Fish and Wildlife Service
National Wetlands Inventory

Crawford Canyon

Attachment E



April 17, 2020

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Attachment 4

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

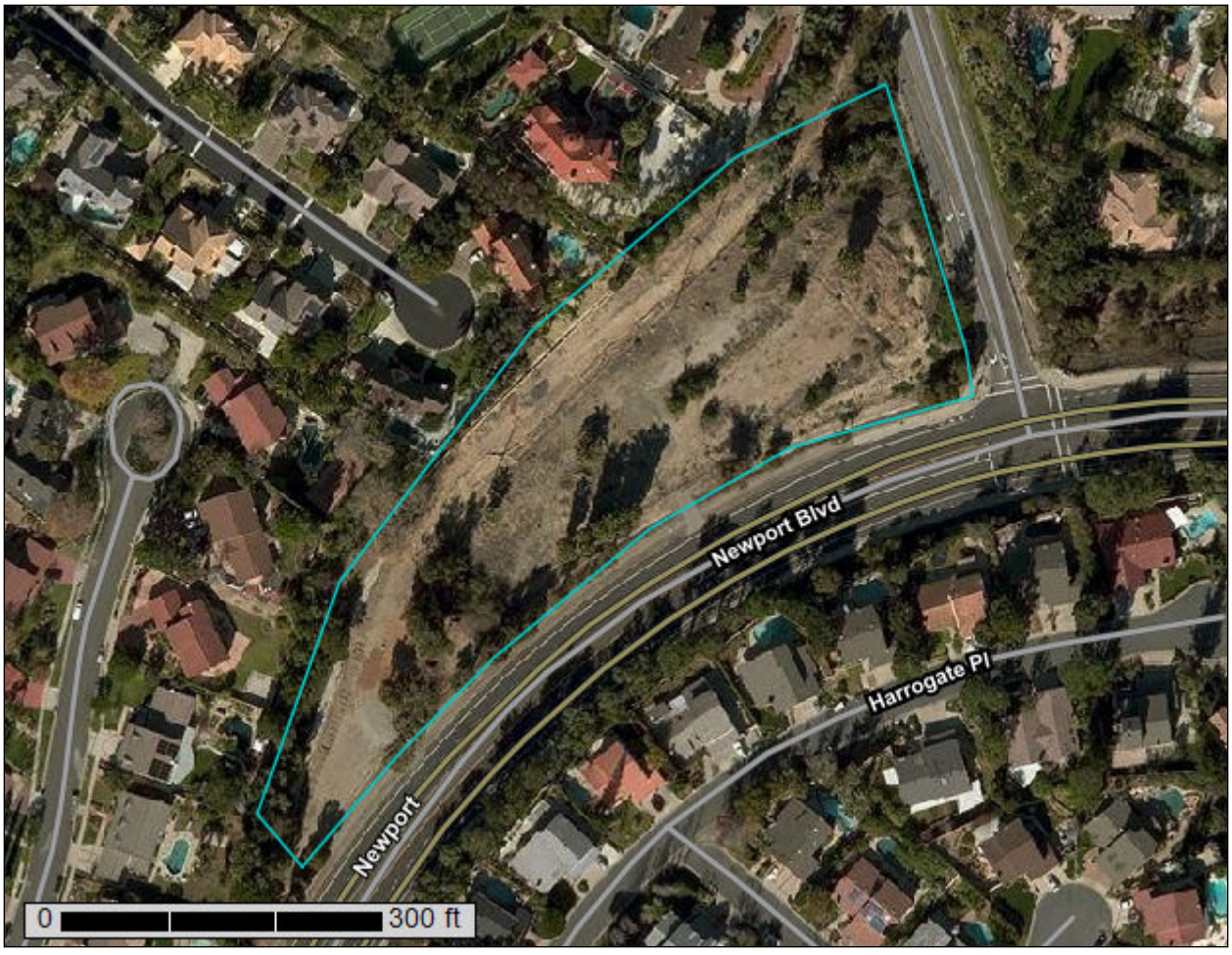
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Orange County and Part of Riverside County, California



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Orange County and Part of Riverside County, California.....14
149—Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19.....14
167—Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19.....15
References.....18

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

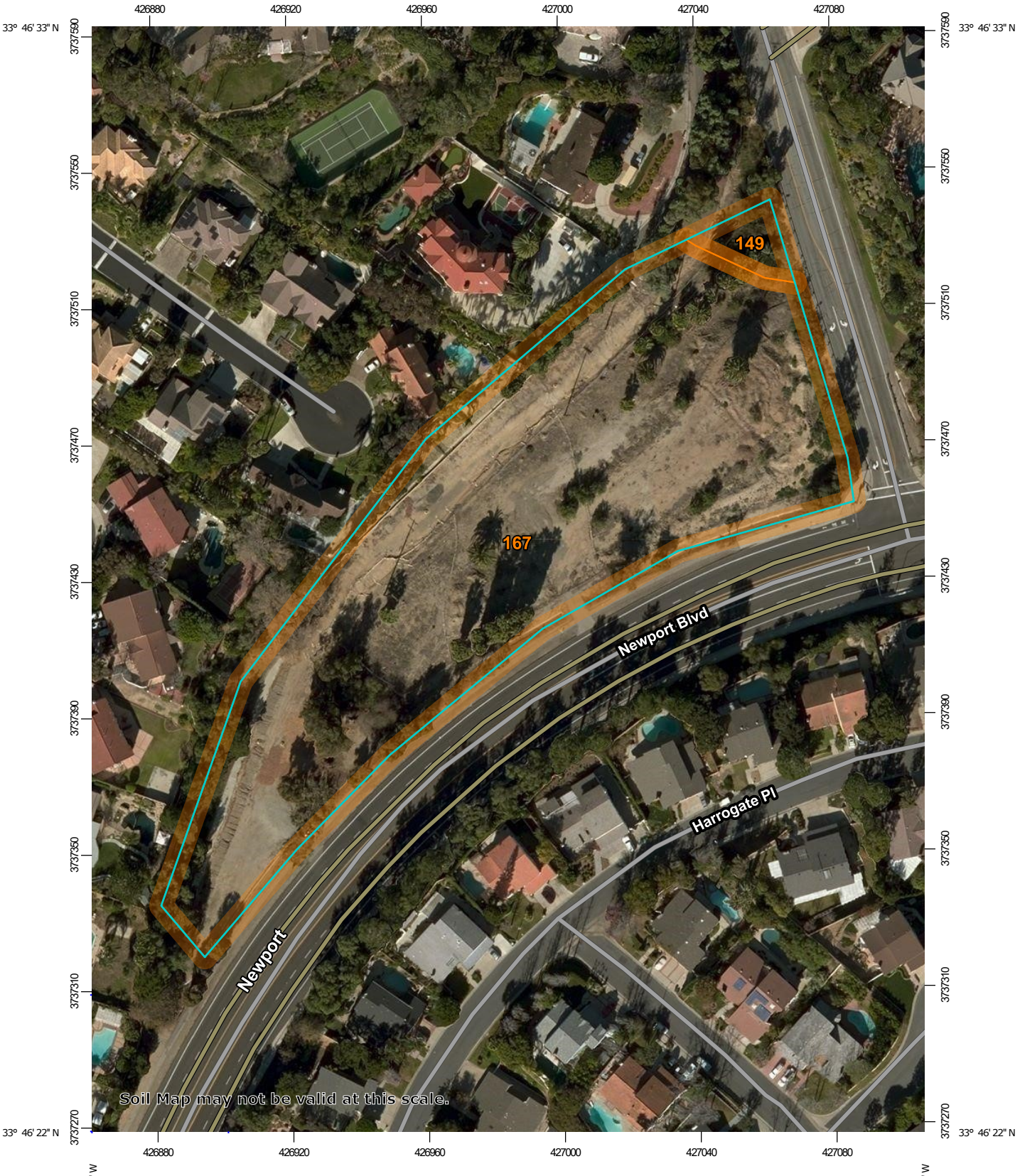
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 13, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 3, 2015—Jan 17, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
149	Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19	0.1	2.5%
167	Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	3.7	97.5%
Totals for Area of Interest		**3.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Orange County and Part of Riverside County, California

149—Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19

Map Unit Setting

National map unit symbol: 2tb9k
Elevation: 20 to 3,360 feet
Mean annual precipitation: 15 to 27 inches
Mean annual air temperature: 60 to 65 degrees F
Frost-free period: 270 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cropley and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cropley

Setting

Landform: Alluvial fans, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from calcareous shale

Typical profile

Ap - 0 to 3 inches: clay
A - 3 to 15 inches: clay
Bss1 - 15 to 29 inches: clay
Bss2 - 29 to 38 inches: clay
BCk1 - 38 to 49 inches: clay
BCk2 - 49 to 79 inches: clay

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Coastal Terrace 14-16" p.z. (R020XD047CA), CLAYEY (1975) (R019XD001CA)
Hydric soil rating: No

Minor Components

Salinas

Percent of map unit: 4 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rincon

Percent of map unit: 4 percent
Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Botella

Percent of map unit: 2 percent
Landform: Low hills
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

167—Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19

Map Unit Setting

National map unit symbol: 2tyz1
Elevation: 10 to 2,240 feet
Mean annual precipitation: 14 to 21 inches
Mean annual air temperature: 61 to 65 degrees F
Frost-free period: 200 to 350 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Mocho and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mocho

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 16 inches: loam
H2 - 16 to 60 inches: loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Sorrento

Percent of map unit: 4 percent
Hydric soil rating: No

Anacapa

Percent of map unit: 3 percent
Hydric soil rating: No

Pico

Percent of map unit: 3 percent
Hydric soil rating: No

Garretson

Percent of map unit: 2 percent
Hydric soil rating: No

Botella, loam

Percent of map unit: 1 percent
Hydric soil rating: No

Mocho, sandy loam

Percent of map unit: 1 percent
Hydric soil rating: No

Mocho, 0 to 2 percent slopes

Percent of map unit: 1 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Attachment 5

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension



Photo 1: Overview of Crawford Canyon Park facing southwest.



Photo 2: Overview of Crawford Canyon Park facing northeast.



Photo 3: Mexican fan palm clusters that may provide roosting habitat for bats.



Photo 4: Surface channel caused by erosion during downhill water flow.



Photo 5: Mexican fan palms and surface depression where water can pool after rain events.



Photo 6: Concrete lined v-ditch along Newport Avenue.



Photo 7: Concrete lined v-ditch drains into box culvert along Newport Avenue.



Photo 8: Concrete lined v-ditch north of Crawford Canyon Park.



Photo 9: Basin at the southwest corner of Crawford Canyon Park.



Photo 10: Salt cedar cluster along south Crawford Canyon Road.



Photo 11: Concrete lined-v-ditch drains into box culvert along south Crawford Canyon Road.





Photo 12 a-b. Concrete lined v-ditch ends and becomes a surface channel near Pine Canyon road and south Crawford Canyon Road.



Photo 13: Eroded surface channel disappears near south Crawford Canyon Road and Country Haven Lane.

Appendix C
Cultural Resources Assessment Report

Confidential Not For Public Distribution

Appendix D
Energy Modeling



Energy Summary

Construction Fuel Consumption Summary

	gallons		
Phase	**Diesel**	**Gas**	**# Years**
Total Project	***60,538***	***5,832***	1.17
Annual Average	51,890	4,999	
Total Project	60,538	5,832	
Annual Average	51,890	4,999	
County Usage[1]	1,402,000,000	55,000,000	
Project % County	0.0037%	0.0091%	

Construction	Total Gallons	
Total		
Onsite Equipment	56,309	diesel
Water Truck	0	gasoline
Haul Trucks	3,229	diesel
Vendor Trucks	1,000	diesel
Worker Trips	5,832	gasoline

Annual OperationalConsumption

	gallons		MMBTU/yr	GWh/yr		
	Diesel	**Gas**	**Natural Gas**	**Electric**		
2022						
Unmitigated	1,358.00	7,603.00	0.00	0.04	38	38,115.00
% of County	*0.0001%*	*0.01382%*	0.00000%	0.0002%		
%SCE/SoCal (2018)			0.00000%	0.000%		
%SCE/SoCal (2025)			0.00000%	0.000%		

	kBTU	MMBTU	kWh	GWh	MWh
Total Project[2]	0.00	0.00	12	0.00	
Project			54,645	0.05	
				0.00	
Orange (2019)[3,4]		62		19,460	
SCE (2019)[5]				87,143	87,143,000
SCE (2023)[5,6]				118,294	118,294,000
SoCalGas (2018)[7]		515,607,000			
SoCalGas (2023)[6,7]		514,101,159			

Note: Total Project includes energy from increase in existing booster station.

Operational Vehicle Fuel Consumption

source: EMFAC2017: Goetz

		Project	
		Unmitigated	**Mitigated**	
	Gasoline	245		gallons
	Diesel	91		gallons
	Natural Gas	0		MMBTU

Assumptions/Constants

8.78	Kg of CO_2 per gallon of Gasoline		
10.21	Kg of CO_2 per gallon of Diesel		
1040	MMBtu/MMCF	1040	MMBtu
1	MWh=	0.001	GWh
100,000	BTU/therm		
53.12	kg CO2/ thousand cubic feet[8]		
1036	btu/cubic foot		
623.1464	Orange (2019) Therms[3]		
5156070000	SoCalGas (2018) Therms[7]		
1.21192053	hundred cubic feet of natural gas per gallon		

Construction	diesel	Used for trucks (haul and vendor) and off-road equipment
	gasoline	worker vehicles
Operation	diesel	Majority of trucks and buses
	gasoline	remaining vehicle mix

LCFS & Pavley assumed for on-road vehicles after year 2011

Sources:

1 California Energy Commission, 2018. California Retail Fuel Outlet Annual Reporting (CEC-A15) Results. http://listserver.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html Accessed, October 2019.

2 ESA, 2020; CalEEMod output

3 http://www.ecdms.energy.ca.gov/gasbycounty.aspx

4 http://www.ecdms.energy.ca.gov/elecbycounty.aspx

5 Edison International and Southern California Edison, 2018. 2018 Annual Report. Available: https://www.edison.com/content/dam/eix/documents/investors/corporate-governance/eix-sce-2018-annual-report.pdf. Accessed October, 2019.

6 California Energy Commission, 2018.SCE TAC Peak and Energy Forecast: CED 2017, Mid Baseline- Mid AAEE/AAPV. Available: https://ww2.energy.ca.gov/2017_energypolicy/documents/ , Accessed 10/2019.

7 http://www.ecdms.energy.ca.gov/gasbyutil.aspx

2018	2017	2016	2025	
5156.07	5141.84	5124.14	5141.011589	MMTherms (from source 6)
7750	7750	7600	7700	Mmtherms (from source 7)
0.665299355	0.663463226	0.674228947		% difference
		0.667663843		average % difference

8 https://www.eia.gov/environment/emissions/co2_vol_mass.php

Unmitigated Fuel Conversion - Construction

	Total CO_2 MT/yr	Fuel Type	Factor $KGCO_2$/gal	Gallons
	source:	CalEEMod: Files: Goetz Tank Site; Goetz - Pipeline Construction		
Total Project				
Clearing and Grubbing	40.18	diesel	10.21	3,936
Grading	153.60	diesel	10.21	15,044
Paving and Construction	277.56	diesel	10.21	27,185
Landscaping	20.64	diesel	10.21	2,022
Site Preparation	3.21	diesel	10.21	314
Demolition	15.14	diesel	10.21	1,483
Utility Relocation	12.93	diesel	10.21	1,266
Storm Drain Construction	19.87	diesel	10.21	1,947
Sidewalk Construction (Newport)	5.04	diesel	10.21	494
Sidewalk Construction (Crawford)	5.29	diesel	10.21	518
Traffic Signal Modification	10.79	diesel	10.21	1,057
Paving	10.65	diesel	10.21	1,043
				56,309

Onroad	*source:*	EMFAC2017		
	Hauling	**Vendor**	**Worker**	
Total Project				
Clearing and Grubbing	0	0	160	
Grading	3100	0	481	
Paving and Construction	-	68	1967	
Landscaping	0	73	2150	
Site Preparation	0.00	0.00	50.00	
Demolition	129.00	0.00	156.00	4,229
Utility Relocation	0.00	0.00	69.00	56,309
Storm Drain Construction	0.00	373.00	411.00	60,538
Sidewalk Construction (Newport)	0.00	181.00	133.00	
Sidewalk Construction (Crawford)	0.00	181.00	133.00	
Traffic Signal Modification	0.00	124.00	114.00	
Paving	0.00	0.00	8.00	

Total On-Road Fuel Consumption

		gal/mile	gal/min
2020Hauling	Hauling	0.15613658	1.50968E-05
2020Vendor	Vendor	0.12720883	9.12128E-06
2020Worker	Worker	0.03742093	2.06198E-06
2021Hauling	Hauling	0.15194685	1.49226E-05
2021Vendor	Vendor	0.12346263	8.98135E-06
2021Worker	Worker	0.03636982	2.00421E-06
2022Hauling	Hauling	0.14312318	1.42709E-05
2022Vendor	Vendor	0.11698571	8.58941E-06
2022Worker	Worker	0.03532451	1.94677E-06
2023Hauling	Hauling	0.14107785	1.41309E-05
2023Vendor	Vendor	0.11532828	8.40578E-06
2023Worker	Worker	0.03445725	1.96264E-06

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/day	Total Gallons/yr
Clearing and Grubbing	2021								
Total Haul Trips	0								
Hauling	0	20	8	20	15	0.15	1.49E-05	0	0
Vendor	0	20	8	6.9	15	0.12	8.98E-06	0	0
Worker	18	20	8	14.7	0	0.04	2.00E-06	10	192
Grading	2021								
Total Haul Trips	989								
Hauling	17	60	8	20	15	0.15	1.49E-05	52	3,100
Vendor	0	60	8	6.9	15	0.12	8.98E-06	0	0
Worker	20	60	8	14.7	0	0.04	2.00E-06	11	642
Paving and Construction	2021								
Total Haul Trips	0								
Hauling	0	80	8	20	15	0.15	1.49E-05	0	0
Vendor	1	80	8	6.9	15	0.12	8.98E-06	1	68
Worker	30	80	8	14.7	0	0.04	2.00E-06	16	1,283
Landscaping	2022								
Total Haul Trips	0								
Hauling	0	90	8	20	15	0.14	1.43E-05	0	0
Vendor	1	90	8	6.9	15	0.12	8.59E-06	1	73
Worker	28	90	8	14.7	0	0.04	1.95E-06	15	1,309

Total On-Road Fuel Consumption

		gal/mile	gal/min
2020Hauling	Hauling	0.15613658	1.50968E-05
2020Vendor	Vendor	0.12720883	9.12128E-06
2020Worker	Worker	0.03742093	2.06198E-06
2021Hauling	Hauling	0.15194685	1.49226E-05
2021Vendor	Vendor	0.12346263	8.98135E-06
2021Worker	Worker	0.03636982	2.00421E-06
2022Hauling	Hauling	0.14312318	1.42709E-05
2022Vendor	Vendor	0.11698571	8.58941E-06
2022Worker	Worker	0.03532451	1.94677E-06
2023Hauling	Hauling	0.14107785	1.41309E-05
2023Vendor	Vendor	0.11532828	8.40578E-06
2023Worker	Worker	0.03445725	1.96264E-06

Total On-Road Fuel Consumption

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/day	Total Gallons/yr
Site Preparation	2022								
Total Haul Trips	0								
Hauling	0	6	8	20	15	0.14	1.43E-05	0	0
Vendor	0	6	8	6.9	15	0.12	8.59E-06	0	0
Worker	16	6	8	14.7	0	0.04	1.95E-06	8	50
Demolition	2022								
Total Haul Trips	32								
Hauling	3	15	8	20	15	0.14	1.43E-05	9	129
Vendor	0	15	8	6.9	15	0.12	8.59E-06	0	0
Worker	20	15	8	14.7	0	0.04	1.95E-06	10	156
Utility Relocation	2022								
Total Haul Trips	0								
Hauling	0	11	8	20	15	0.14	1.43E-05	0	0
Vendor	0	11	8	6.9	15	0.12	8.59E-06	0	0
Worker	12	11	8	14.7	0	0.04	1.95E-06	6	69
Storm Drain Construction	2022								
Total Haul Trips	0								
Hauling	0	33	8	20	15	0.14	1.43E-05	0	0
Vendor	14	33	8	6.9	15	0.12	8.59E-06	11	373
Worker	24	33	8	14.7	0	0.04	1.95E-06	12	411
Sidewalk Contruction (Newport)	2022								
Total Haul Trips	0								
Hauling	0	16	8	20	15	0.14	1.43E-05	0	0
Vendor	14	16	8	6.9	15	0.12	8.59E-06	11	181
Worker	16	16	8	14.7	0	0.04	1.95E-06	8	133
Sidewalk Construction (Crawford	2022								
Total Haul Trips	0								
Hauling	0	16	8	20	15	0.14	1.43E-05	0	0
Vendor	14	16	8	6.9	15	0.12	8.59E-06	11	181
Worker	16	16	8	14.7	0	0.04	1.95E-06	8	133
Traffic Signal Modification	2022								
Total Haul Trips	0								
Hauling	0	11	8	20	15	0.14	1.43E-05	0	0
Vendor	14	11	8	6.9	15	0.12	8.59E-06	11	124
Worker	20	11	8	14.7	0	0.04	1.95E-06	10	114
Paving	2022								
Total Haul Trips	0								
Hauling	0	1	8	20	15	0.14	1.43E-05	0	0
Vendor	0	1	8	6.9	15	0.12	8.59E-06	0	0
Worker	16	1	8	14.7	0	0.04	1.95E-06	8	8

Appendix E
Geotechnical Investigation Report

Geotechnical Investigation Report, Crawford Canyon Park, Northwest Corner of Newport Avenue And Crawford Canyon Road, Orange, California

Prepared For
HUNSAKER & ASSOCIATES IRVINE, INC.

November 6, 2020

GMU Project No. 20-188-00

23241 Arroyo Vista
Rancho Santa Margarita | CA 92688
949.888.6513 | FX: 949.888.1380 | www.gmugeo.com

HUNSAKER & ASSOCIATES IRVINE, INC.
3 Hughes
Irvine, CA 92618

PROJECT: 20-188-00

ATTENTION: Mr. Vojta Safranek

SUBJECT: Geotechnical Investigation Report, Crawford Canyon Park
Northwest Corner of Newport Avenue and Crawford Canyon Road
City of Orange, California

Dear Mr. Safranek:

GMU is pleased to present this geotechnical report for the subject project, which summarizes our data, conclusions, and recommendations.

Please note that this report has not been prepared for the use by other parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

We appreciate the opportunity to work on this project. Please do not hesitate to contact the undersigned if you have any questions regarding any aspect of this report.

Respectfully submitted,

Nadim Sunna, MS, QSP, PE 84197
Senior Engineer

DISTRIBUTION:

Addressee: Electronic copy

TABLE OF CONTENTS

Description Page
INTRODUCTION 1
PURPOSE 1
SCOPE 1
LOCATION 2
PROPOSED IMPROVEMENTS 2
SUBSURFACE EXPLORATION 2
LABORATORY TESTING 2
GEOLOGIC FINDINGS 3
REGIONAL GEOLOGIC SETTING 3
SUBSURFACE MATERIALS 3
Artificial Fill (Qaf) 3
Alluvium (Qal) 3
GROUNDWATER 3
GEOLOGIC HAZARDS 4
FAULTING AND SEISMICITY 4
LANDSLIDES 4
TSUNAMI, SEICHE, AND FLOODING 4
GEOTECHNICAL ENGINEERING FINDINGS 5
SOIL EXPANSION 5
SOIL CORROSION 5
PRELIMINARY INFILTRATION TESTING 5
EXCAVATION CHARACTERISTICS 6
Rippability 6
CONCLUSIONS 7
RECOMMENDATIONS 7
GENERAL SITE PREPARATION AND GRADING 7
General 7
Clearing and Grubbing 8
Corrective Grading 8
Processing and Fill Placement 9
Temporary Excavations 9
STRUCTURE SEISMIC DESIGN 10
BRIDGE FOUNDATION DESIGN AND CONSTRUCTION 12
General 12
General Foundation Design Parameters 12
POLE FOUNDATIONS 14
STRUCTURAL CONCRETE 14
FERROUS METAL CORROSION PROTECTION 15

SURFACE DRAINAGE 15
UTILITY TRENCH BACKFILL CONSIDERATIONS 16
General 16
Pipe Bedding....16
Trench Backfill 16
ASPHALT CONCRETE PAVEMENT THICKNESS RECOMMENDATIONS 17
Asphalt Pavement Design....17
CONCRETE FLATWORK DESIGN CONSIDERATIONS....18
PLANTERS AND TREES 19
PLAN REVIEW / GEOTECHNICAL TESTING DURING GRADING / FUTURE REPORT 19
Plan Review....19
Geotechnical Testing....19
Future Report....19
CLOSURE....21
REFERENCES 22

PLATES

Plate 1 -- Location Map
Plate 2 -- Geotechnical Map
Plate 3 -- Geotechnical Sections
Plate 4 -- Retaining Wall Construction Detail
Plate 5 -- Typical Benching and Keway Detail

APPENDICES

APPENDIX A: Geotechnical Exploration Procedures and Drill Hole Logs by GMU
APPENDIX B: Geotechnical Laboratory Procedures and Test Results by GMU
APPENDIX C: Infiltration Test Result

INTRODUCTION

PURPOSE

This report presents the results of our geotechnical investigation for the proposed development of the Crawford Canyon Park located on the northwest corner of Newport Avenue and Crawford Canyon Road, in the City of Orange, California.

SCOPE

The scope of our geotechnical investigation consist of the following:

1. Staked nine (9) hollow stem auger drill holes, coordinated with Hunsaker, and contacted Utility Underground Service Alert (USA/Dig Alert) in order to provide advance notification of the 9 subsurface drill holes planned within the park area.

2. Performed a field subsurface exploration program consisting of advancing: two (2) hollow-stem-auger borings to a depth of 21.5 feet below the existing grade, one (1) drill hole to a depth of 26.5 feet below the existing grade, four (4) drill holes a to a depth of 11.5 feet below the existing grade and two (2) drill holes to a depth of 3 and 5 feet below the existing grade for the purpose of performing infiltration testing. Logged the drill holes and obtained bulk and drive soil samples for geotechnical laboratory testing.

3. Performed laboratory testing on soil samples obtained from the drill holes. Testing included moisture and density, particle size, Atterberg Limits, expansion, chemical, compaction, direct shear strength, and R-value tests.

4. Interpreted and evaluated the acquired field and laboratory data to perform geotechnical engineering design which included settlement analysis, bearing capacity and associated settlement, pavement design, and seismic parameters in accordance with the 2019 California Building Code (CBC).

5. Prepared and distributed this formal geotechnical foundation report containing our final geotechnical conclusions and recommendations to support the main project submittal and permitting process.

LOCATION

The site is located on the northwest corner of Newport Avenue and Crawford Canyon Road in the City of Orange, California. The site is bound by Newport Avenue on the south, existing single family residences on the north and west, and Crawford Canyon Road on the east. The general location of the project site is shown on Plate 1.

PROPOSED IMPROVEMENTS

Based on our review of the provided conceptual design plans, we understand that the proposed site improvements will consist of the following:

- New asphalt-concrete parking lot
- New storm water basin
- 8-foot wide walkways
- 5-foot wide trails
- Picnic tables and benches
- Exercise station
- Pedestrian bridges
- Various play areas
- Retaining wall in order to create a level area for the new parking lot

As part of the grading for the proposed improvements, cuts and fills on the order of 8 feet will be performed and 2H:1V slopes of up to about 8 feet in maximum height are planned to be constructed at various locations throughout the park area.

SUBSURFACE EXPLORATION

GMU conducted a subsurface exploration program to evaluate the soil conditions below the proposed park features, parking areas, retaining wall and infiltration locations. A total of nine (9) hollow-stem-auger, truck-mounted drill holes were excavated to a maximum depth of 26.5 feet below the existing grade. The drill hole locations are shown on Plate 2 – Geotechnical Map. Drill hole logs are contained in Appendix A. The drill holes were logged by our Staff Engineer, and samples were collected in each of the drill holes for laboratory testing.

LABORATORY TESTING

Laboratory testing for the subject investigation was performed to characterize moisture and density, particle size distribution, Atterberg Limits, expansion index, maximum density, corrosion,

direct shear, and R-value. The results of our laboratory testing are summarized on Table B-1 and included within Appendix B – Laboratory Testing.

GEOLOGIC FINDINGS

REGIONAL GEOLOGIC SETTING

Based on our site investigation and according to the Dibble Geologic Map, the project site is underlain by alluvium deposits (Qal) that are typically comprised of sands and clays.

SUBSURFACE MATERIALS

Artificial Fill (Qaf)

Artificial fill soils were encountered in majority of the excavations at the site. The fills were encountered to a maximum depth of 5 feet below the existing grade and generally consists of yellow and dark brown, damp to moist, firm to stiff, sandy clays.

Alluvium (Qal)

Alluvium underlay the artificial fill to the maximum depth of the exploratory drill holes. The alluvium consists of brown to dark gray brown to yellow brown, damp to moist, medium dense to very dense, sands and firm to stiff clays.

GROUNDWATER

Groundwater was not observed during our exploration to a maximum depth of 26.5 feet below the existing grade. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations, or activities by humans at this site and nearby sites. However, based on the above findings, groundwater is unlikely to impact the proposed development.

GEOLOGIC HAZARDS

FAULTING AND SEISMICITY

The site is not located within an Alquist-Priolo Earthquake Fault Zone, and no known active faults are shown on the reviewed geologic maps crossing the site, however, the site is located in the seismically active region of Southern California. The nearest known active faults are the San Joaquin Hills and Elsinore fault systems, which are located approximately 6.3 and 7.9 miles from the site, respectively, and capable of generating a maximum earthquake magnitude (Mw) of 7.1 and 7.9, respectively.

Given the proximity of the site to these and numerous other active and potentially active faults, the site will likely be subject to earthquake ground motions in the future. A site PGA_M of 0.64g was calculated for the site in conformance with the 2019 CBC. This PGA_M is primarily dominated by earthquakes with a mean magnitude of 6.6 at a mean distance of 10 miles from the site using the USGS 2014 Interactive Deaggregation website.

LANDSLIDES

Based on our review of available geologic maps, literature, topographic maps, aerial photographs, and our subsurface evaluation, no landslides or related features underlie or are adjacent to the subject site.

TSUNAMI, SEICHE, AND FLOODING

The site is not located on any State of California Tsunami Inundation Map for Emergency Planning. The potential for the site to be adversely impacted by earthquake-induced tsunamis is considered to be negligible because the site is located several miles inland from the Pacific Ocean coast at an elevation exceeding the maximum height of potential tsunami inundation.

The potential for the site to be adversely impacted by earthquake-induced seiches is considered to be negligible due to the lack of any significant enclosed bodies of water located in the vicinity of the site.

According to the County of Orange FEMA Flood Insurance Rate Map, majority of the site is located with an Area of Minimal Flood Hazard (Zone X), however, the southwester side of the site is located within “Zone”, an area of 0.2% annual chance flood, 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and protected by levees from 1% annual chance flood. The potential for the site to be adversely impacted by significant flooding is considered low.

GEOTECHNICAL ENGINEERING FINDINGS

SOIL EXPANSION

Based on our evaluation, experience with similar material types, the soils encountered near the ground surface at the site exhibit a low to medium expansion potential. The recommendations provided in this report are based on a ***medium expansion potential.***

SOIL CORROSION

Based on laboratory test results for pH, soluble chlorides, sulfate, and minimum resistivity of the site soils obtained during our subsurface investigation, the on-site soils should be considered to have the following:

- A negligible sulfate exposure to concrete per ACI 318-14, Table 19.3.1.1
- A low minimum resistivity indicating conditions that are severely corrosive to ferrous metals.
- Elevated chlorides levels (severely corrosive to ferrous metals).

The laboratory testing program performed for this project does not address the potential for corrosion to copper piping. In this regard, a corrosion engineer should be consulted to perform more detailed testing and develop appropriate mitigation measures (if necessary). The above discussion is provided for general guidance in regards to the corrosiveness of the on-site soils to typical metal structures used for construction. Detailed corrosion testing and recommendations for protecting buried ferrous metal and/or copper elements are beyond our purview. If detailed recommendations are required, a corrosion engineer should be consulted to develop appropriate mitigation measures.

SETTLEMENT

Based on the remedial and design at the site, long-term settlements are expected to be less than an inch, with a long-term differential settlement of approximately ½ of an inch over a span of 40 feet.

PRELIMINARY INFILTRATION TESTING

Two (2) preliminary infiltration tests were performed in general conformance with the County of Orange Technical Guidance Document (TGD). The infiltrations drill holes were excavated to depths ranging from 3 and 5 feet below the existing grade using a hollow-stem-auger, truck-mounted drill rig. At the completion of the testing, we have determined the unfactored observed

infiltration rates as shown on Table 1 below. In addition, we have determined the geotechnical factor of safety in accordance with Section A of SOCTGD Worksheet 3 as shown on Table 2 below.

Table 1: Calculated Infiltration Rates*

Drill Hole	Depth Below Finish Grade (feet)	Infiltration Rate* (inch/hour)
DH-5	5.0	1.35
DH-6	5.0	0.67

**Rates do not incorporate a factor of safety.*

Table 2: Worksheet 3 Geotechnical Factor of Safety

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) P = w x v
A	Suitability Assessment	Soil assessment methods	0.25	2	0.50
		Predominant soil texture	0.25	2	0.50
		Site soil variability	0.25	2	0.50
		Depth to groundwater / impervious layer	0.25	1	0.25
		Actual Suitability Assessment Safety Factor, S_A			1.75
		Minimum Suitability Assessment Safety Factor, S_A			2

Final determination of infiltration feasibility should be determined by the project civil engineer after applying all the necessary factor of safety in accordance with Worksheet 3.

We note that infiltration is deemed feasible when the design infiltration rates meet and exceeds the minimum infiltration rate of 0.3 inches per hour in accordance with the SOC TGD Manual.

The preliminary infiltration test hole locations are shown on Plate 2 - Geotechnical Map. The results of the infiltration testing are contained in Appendix C of this report.

EXCAVATION CHARACTERISTICS

Rippability

Based on our site exploration, it is expected that the soil materials underlying the site can be excavated with scrapers and other conventional grading equipment.

CONCLUSIONS

Based on our geotechnical findings, the following is a summary of our conclusions:

1. The project area is not underlain by any known active faults.

2. Groundwater is not expected to be encountered and is not anticipated to have a significant impact on the proposed development.

3. Based on the planned slopes configuration (i.e., 2H:1V) and the corrective grading provided in this report, we expect the slopes to be surficially and grossly stable.

4. Different settlement at the site is expected to approximately ½-inch over a horizontal distance of 40 feet.

5. The proposed miscellaneous structures, lightly loaded bridges, and retaining walls may be supported on a shallow foundation system underlain by engineered fill.

6. Site soils within the at-grade foundation influence zone are anticipated to have a low to medium expansion potential based on our recent laboratory test results and local experience. Recommendations for the proposed developments are based on a "medium" expansive condition.

7. Corrosion testing indicates that the on-site soils have a negligible sulfate exposure and are severely corrosive to buried ferrous metals and reinforcing steel. Consequently, any metal exposed to the soil shall be protected.

RECOMMENDATIONS

GENERAL SITE PREPARATION AND GRADING

General

The following recommendations pertain to any required grading associated with the proposed improvements and corrective grading needed to support the proposed improvements. All site preparation and grading should be performed in accordance with the County of Orange grading code requirements and the recommendations presented in this report.

Clearing and Grubbing

All significant organic material such as weeds, brush, tree branches, or roots, or construction debris such as old irrigation lines, asphalt concrete, and other decomposable material should be removed from the area to be graded. No rock or broken concrete greater than 6 inches in diameter should be utilized in the fills.

Corrective Grading

Corrective grading is needed at the site to create a firm and workable platform for construction of the proposed developments such as new bridge foundations, retaining wall foundations, parking lot pavement, site hardscape and miscellaneous lightly loaded structures.

It should be noted that the recommendations provided herein are based on our subsurface exploration and knowledge of the geologic conditions at the site. Actual removals may vary in configuration and volume based on observations of geologic materials and conditions encountered during grading. The bottom of all remedial grading removals should be observed by a GMU representative to verify the suitability of in-place soil prior to performing processing and fill placement. Corrective grading recommendations are outlined below:

General:

- The upper 2 feet of soil materials at the site, in areas supporting foundations should be removed to expose dense of firm, native alluvial soils. In areas supporting pavement and hardscape improvements removals may be reduced to 1 foot.
- If loose soil materials are found at depths greater than the proposed remedial grading, then additional removals/ over-excavation may be needed, as determined by a representative of GMU.

Bridge Foundations: Grading recommendations for support of the new bridge foundations should consist of the following:

- Bridge foundations are to be supported by at least 2 feet of engineered fill.
- If the general site removals of 2 feet does not provide for a minimum of 2 feet of engineered fill below the foundation, over-excavation to a depth of at least 2 feet below the bottom of the footing is required.
- The materials exposed at the bottom of all removals and over-excavation should be approved by a representative of GMU.

Retaining Walls and Miscellaneous Structures: Grading recommendations for support of the new retaining walls/site walls and miscellaneous structure foundations should consist of the following:

- The retaining, site wall and miscellaneous footings should be supported by at least 2 feet of engineered fill except for pole foundations, which may be founded on competent alluvial soils.
- If the general site removals of 2 feet does not provide for a minimum of 2 feet of engineered fill below the foundation, over-excavation to a depth of at least 2 feet below the bottom of the footing is required.

- The materials exposed at the bottom of all removals and over-excavation should be approved by a representative of GMU.

Flatwork and Pavement Areas: Grading recommendations for the support of the asphalt and concrete pavement and flatwork improvements should consist of the following:

- The areas below the proposed improvements should be removed to a depth of at least 12 inches below existing grade or subgrade, whichever is deeper, to provide for at least 12 inches of engineered fill under the flatwork and pavement improvements.
- The removal or over-excavation bottom should be approved by a representative of GMU.

Processing and Fill Placement

- The bottom of the excavation should then be scarified to a depth of at least 6 inches, moisture conditioned to 3% above optimum moisture content, and compacted to at least 90% relative compaction.
- Onsite soil materials may be used to backfill the corrective grading excavations and achieve the planned grade elevation.
- All fill material should be placed in 6- to- 8-inch-thick lifts, moisture conditioned to at least 3% above optimum moisture content, blended to achieve uniform moisture content and compacted to achieve 90% relative compaction.
- No rock or broken concrete greater than 6 inches in diameter should be utilized in the fills.
- Where existing ground surfaces are at 5:1 or steeper benching in accordance with Plate 5 should be performed

Temporary Excavations

Temporary excavations for demolitions, earthwork, footings, and utility trenches are expected. We anticipate that unsurcharged excavations with vertical side slopes less than 4 feet high will generally be stable. Our recommendations for temporary excavations are as follows:

- Temporary, unsurcharged excavation sides over 4 feet in height should be sloped no steeper than an inclination provided by OSHA for a Type B soil.

- Where sloped excavations are created, the tops of the slopes should be barricaded so that vehicles and storage loads do no encroach within 10 feet of the tops of the excavated slopes. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes. GMU should be advised of such heavy vehicle loadings so that specific setback requirements can be established.
- If the temporary construction slopes are to be maintained during the rainy season, berms are recommended to be graded along the tops of the slopes in order to prevent runoff water from entering the excavation and eroding the slope faces.

Our temporary excavation recommendations are provided only as **minimum** guidelines. All work associated with temporary excavations should meet the minimal requirements as set forth by CAL-OSHA. Temporary slope construction, maintenance, and safety are the responsibility of the contractor.

STRUCTURE SEISMIC DESIGN

No active or potentially active faults are known to cross the site, therefore, the potential for primary ground rupture due to faulting on-site is very low. However, the site will likely be subject to seismic shaking at some time in the future.

Based on our field exploration and the site soil profile, the site should be designated as Site Class D based on the measured Standard Penetration Resistance within drill holes. The seismic design coefficients based on ASCE 7-16 and 2019 CBC are listed in Table 3 below.

Table 3: 2019 CBC and ASCE 7-16 Seismic Design Parameters
(To be utilized as per the requirements of Section 11.4.8 of ASCE 7-16)

Seismic Item		Design Value	2016 ASCE 7-16 or 2019 CBC Reference
Site Class based on soil profile (ASCE 7-16 Table 20.3-1)		D[a]	ASCE 7-16 Table 20.3-1
Short Period Spectral Acceleration S_s		1.371[a]	CBC Figures 1613.2.1 (1-8)
1-sec. Period Spectral Acceleration S_1		0.488[a]	CBC Figures 1613.2.1 (1-8)
Site Coefficient F_a (2019 CBC Table 1613.2.3(1))		1.200[a]	CBC Table 1613.2.3 (1)
Site Coefficient F_v (2019 CBC Table 1613.2.3(2))		1.812[b]	CBC Table 1613.2.3 (2)
Short Period MCE* Spectral Acceleration S_{MS}	$S_{MS} = F_a S_s$	1.645[a]	CBC Equation 16-36
1-sec. Period MCE Spectral Acceleration S_{M1}	$S_{M1} = F_v S_1$	0.884[b]	CBC Equation 16-37
Short Period Design Spectral Acceleration S_{DS}	$S_{DS} = 2/3S_{Ms}$	1.097 [a]	CBC Equation 16-38
1-sec. Period Design Spectral Acceleration S_{D1}	$S_{D1} = 2/3S_{M1}$	0.590[b]	CBC Equation 16-39
Short Period Transition Period T_S (sec)	$T_S = S_{D1}/S_{DS}$	0.538[b]	ASCE 7-16 Section 11.4.6
Long Period Transition Period Tl (sec)		8[b]	ASCE 7-16 Figures 22-14 to 22-17
MCE[c] Peak Ground Acceleration (PGA)		0.531[a]	ASCE 7-16 Figures 22-9 to 22-13
Site Coefficient F_{PGA} (ASCE 7-16 Table 11.8-1)		1.200[a]	ASCE 7-16 Table 11.8-1
Modified MCE[c] Peak Ground Acceleration (PGA_M)		0.637[a]	ASCE 7-16 Equation 11.8-1

[a] Design Values Obtained from USGS Earthquake Hazards Program website that are based on the ASCE-7-16 and 2019 CBC and site coordinates of N33.7747000º and W117.788512º.
[b] Design Values Determined per ASCE Table 11.4-2 and CBC Equations 16-36 through 16-39.
[c] MCE: Maximum Considered Earthquake.

Since the Site Class is designated as D and the S_1 value is greater than or equal to 0.2, the 2019 CBC requires either a site-specific seismic hazard analysis per Section 21.2 of ASCE 7-16 or the application of Exception 2 of Section 11.4.8 of ASCE 7-16. The project structural engineer should apply all requirements of Section 11.4.8 of ASCE 7-16 to determine if increases to the seismic response coefficient (i.e. increases to the loading of the structure) are required.

Per the 2019 CBC and ASCE 7-16, the Design Earthquake peak ground acceleration (PGA_D) may be assumed to be equivalent to $S_{DS}/2.5$; therefore, for the subject site, a PGA_D value of 0.35g (0.866g/2.5) should be used.

It should be recognized that much of southern California is subject to some level of damaging ground shaking as a result of movement along the major active (and potentially active) fault zones that characterize this region. Design utilizing the 2019 CBC is not meant to completely protect against damage or loss of function. Therefore, the preceding parameters should be considered as minimum design criteria.

BRIDGE FOUNDATION DESIGN AND CONSTRUCTION

General

The criteria contained in the following section may be used for the design and construction of the proposed bridge foundations. Foundation design parameters are presented below.

General Foundation Design Parameters

- Bearing Material: Minimum 2 feet of Engineered Fill
- Minimum Footing Size:
  - Width: 24 inches
  - Depth: 24 inches embedment below lowest adjacent soil grade (depth)
- Allowable Bearing Capacity: 2,000 psf for the minimum footing size given above.
  - May be increased by 100 psf for every footing width and 400 psf for every footing depth to a maximum allowable bearing pressure of 2,500 psf.
  - Above value may be increased by 1/3 for temporary loads such as wind or seismic
- Lateral Foundation Resistance:
  - Allowable passive resistance: 250 psf/ft (disregard upper 6 inches, max 2,500 psf)
  - Allowable friction coefficient: 0.35
  - Above values may be combined without reduction and may be increased by 1/3 for temporary loads such as wind or seismic

RETAINING AND SITE WALL DESIGN AND CONSTRUCTION CRITERIA

The following criterion is considered applicable to the design and construction of retaining and site walls at the subject site. The design assumes a maximum 6-foot-high retaining wall (i.e., from top of footing to top of retaining portion of wall) with level backfill conditions. In addition, the design assumes the use of on-site select backfill in accordance with Plate 3 – Retaining Wall Construction Detail.

Foundation Design Parameters:

Minimum Foundation Width:	24 inches (retaining) 12 inches (free standing)
Minimum Foundation Depth:	Depth below lowest adjacent grade to bottom of footing: o 24 inches

Bearing Materials:	Minimum 2 feet of Engineered fill
Allowable Bearing Capacity:	2,000 psf for footing on level ground o 1/3 increase for wind or seismic conditions
Allowable Coefficient of Friction:	0.35
Unit Weight of Backfill:	125 pcf
Allowable Passive Earth Pressure:	250 psf/ft of depth (static) o Disregard upper 6 inches o Reduce passive by one-third when combined with friction in sliding resistance o 1/3 increase for seismic conditions

Wall Design Parameters:

Active Earth Pressure:	45 pcf – level backfill (Assumes the use of select soils in backfill zone)
Weight of Backfill:	125 pcf
Control/Construction Joints:	As a minimum, maximum spacing of 15 feet and at angle points
Waterproofing:	The back side of all retaining walls should be waterproofed down to the top of the foundation prior to placing subdrains or backfill. The design and selection of the waterproofing system is outside the scope of our report and is outside our purview.
Concrete:	See "Structural Concrete" section of this report.
Wall Backfill and Drainage:	See Retaining Wall Construction Detail Diagram and Notes (shown on Plate 3) for backfill and drainage requirements.

The unrestrained (active) values are applicable when the walls are designed and constructed as cantilevered walls allowing sufficient wall movement to mobilize active pressure conditions. This wall movement should not be less than 0.01 H (H = height of wall) for the unrestrained values to be applicable.

Provided that the retaining walls have a maximum height of less than 6 feet, the current 2016 CBC indicates that the incorporation of seismic earth pressures is not required.

POLE FOUNDATIONS

It is expected that the shade structures and light poles will be supported on pole foundations. As a minimum, the pole foundations should be at least 18 inches in diameter and at least 4 feet deep; however, the actual dimensions should be determined by the project structural engineer based on the following design parameters.

Bearing Materials. The pole foundations may bear into engineered fill soils or competent native soils approved by a representative from GMU.

Bearing Values. End-bearing capacity and skin friction may be combined to determine the allowable bearing capacities of the pole foundations. An allowable bearing pressure of 3,000 pounds per square foot (psf) may be used for pole foundations at least 18 inches in diameter and embedded a minimum of 4 feet below the lowest adjacent grade. A value of 200 pounds per square foot may be used to determine the skin friction between the concrete and surrounding soil.

Lateral Load Design. Lateral loads may be resisted by passive resistance within the adjacent earth materials. For passive resistance, an allowable passive earth pressure of 250 pounds per foot of pile diameter per foot of depth into competent bearing material may be used; however, passive resistance should be disregarded within the upper foot due to possible disturbance during drilling. The passive resistance value may be applied over an area equivalent to two pile diameters.

STRUCTURAL CONCRETE

Laboratory tests indicate that the onsite soils are classified as having a “negligible” sulfate exposure and “S0” sulfate exposure category per ACI 318-14, Table 19.3.1.1. However, due to the low to moderate soil resistivity and elevated chloride levels obtained from our test result, the on-site soil is severely corrosive to ferrous metals such as reinforcing steel. On this basis, we recommend that a Type II/V cement with a maximum water to cement ratio of 0.50 be used for structural elements (i.e., foundations, walls, etc.). Utilization of CBC moderate sulfate level requirements will also serve to reduce the permeability of the concrete and help minimize the potential of water and/or vapor transmission through the concrete. Wet curing of the concrete per ACI Publication 308 is also recommended.

Wet curing of the concrete per ACI Publication 308 is also recommended.

The aforementioned recommendations in regards to concrete are made from a soils perspective only. Final concrete mix design is beyond our purview. All applicable codes, ordinances,

regulations, and guidelines should be followed in regard to the designing a durable concrete with respect to the potential for sulfate exposure from the on-site soils and/or changes in the environment.

FERROUS METAL CORROSION PROTECTION

The results of the laboratory chemical tests performed on a sample of soil collected within the site indicate that the on-site soils are severely corrosive to ferrous metals. Consequently, metal structures which will be in direct contact with the soil (i.e., underground metal conduits, pipelines, metal sign posts, etc.) and/or in close proximity to the soil (wrought iron fencing, etc.) may be subject to corrosion. The use of special coatings or cathodic protection around buried metal structures has been shown to be beneficial in reducing corrosion potential. Additional provisions will be required to address high chloride contents of the soil per the 2019 CBC to protect the concrete reinforcement. The laboratory testing program performed for this project does not address the potential for corrosion to copper piping. In this regard, a corrosion engineer should be consulted to perform more detailed testing and develop appropriate mitigation measures (if necessary).

The above discussion is provided for general guidance in regards to the corrosiveness of the on-site soils to typical metal structures used for construction. Detailed corrosion testing and recommendations for protecting buried ferrous metal and/or copper elements are beyond our purview. If detailed testing is required, a corrosion engineer should be consulted to perform the testing and develop appropriate mitigation measures.

SURFACE DRAINAGE

Surface drainage should be carefully controlled during and after grading to prevent ponding and uncontrolled runoff adjacent to the structures. Particular care will be required during grading to maintain slopes, swales, and other erosion control measures needed to direct runoff toward permanent surface drainage facilities. Positive drainage of at least 2% away from the perimeters of the structures and site pavements should be incorporated into the design. In addition, it is recommended that nuisance water be directed away from the perimeter of the structures by the use of area drains in adjacent landscape and flatwork areas and roof drains tied into the site storm drain system.

UTILITY TRENCH BACKFILL CONSIDERATIONS

General

New utility line pipelines should be backfilled with both select bedding materials beneath and around the pipes and compacted soil above the pipe bedding. Recommendations for the types of the materials to be used and the proper placement of these materials are provided in the following sections.

Pipe Bedding

The pipe bedding materials should extend from at least 6 inches below the pipes to at least 12 inches above the crown of the pipes. Pipe bedding should consist of either clean sand with a sand equivalent (SE) of at least 30 or crushed rock. If crushed rock is used, it should consist of ¾-inch crushed rock that conforms to Table 200-1.2 of the 2018 "Greenbook." Pipe bedding should also meet the minimum requirements of the County of Orange. If the requirements of the County are more stringent, they should take precedence over the geotechnical recommendations. Sufficient laboratory testing should be performed to verify the bedding meets the minimum requirements of the Greenbook.

Based on our subsurface exploration and knowledge of the onsite materials, the soils that will be excavated from the pipeline trenches will not meet the recommendations for pipe bedding materials; therefore, imported materials will be required for pipe bedding.

Granular pipe bedding material having a sand equivalent of 30 or greater should be properly placed in thicknesses not exceeding 3 feet, and then sufficiently jetted in place. With proper techniques, jetting is not expected to have an adverse impact on existing site soils.

Crushed rock, if used, should be capped with filter fabric (Mirafi 140N, or equivalent) to prevent the migration of fines into the rock.

Trench Backfill

All existing soil material within the limits of the pipeline alignment are considered suitable for use as trench backfill above the pipe bedding zone if care is taken to remove all significant organic and other decomposable debris, moisture condition the soil materials as necessary, and separate and selectively place and/or stockpile any inert materials larger than 6 inches in maximum diameter.

Imported soils are not anticipated for backfill since the on-site soils are suitable. However, if imported soils are used, the soils should consist of clean, granular materials with physical and chemical characteristics similar to those described herein for on-site soils. Any imported soils to be used as backfill should be evaluated and approved by GMU prior to placement.

Soils to be used as trench backfill should be moistened, dried, or blended as necessary to achieve a minimum of 3% over optimum moisture content for compaction, placed in loose lifts no greater than 8 inches thick, and mechanically compacted/densified to at least 90% relative compaction as determined by ASTM Test Method D 1557.

No rock or broken concrete greater than 6 inches in maximum diameter should be utilized in the trench backfills.

ASPHALT CONCRETE PAVEMENT THICKNESS RECOMMENDATIONS

Asphalt Pavement Design

Based on the R-value test results, as well as testing completed in the vicinity, an R-value of 26 was used for the design. Table 4 below provides recommended minimum thicknesses for asphalt concrete (AC) and aggregate base sections for two traffic indices.

Table 4: Recommended Minimum AC and Base Section Thicknesses

Location	R-Value	Traffic Index	Asphalt Concrete (in.)	Aggregate Base* (in.)
Driveways	26	5.5	4.0	5.5
Parking Stalls	26	4.0	4.0	4.0

* assumed R-Value = 78

Asphalt concrete pavement construction should be in accordance with the following recommendations:

- The planned pavement structural sections should consist of aggregate base materials (AB) and asphalt concrete materials (AC) of a type meeting the minimum Caltrans and City of Carlsbad requirements.
- The subgrade soils should be prepared in accordance with the ***Corrective Grading*** section of this report.
- The subgrade soils should unyielding and be check by a representative of GMU prior to placing the required AB section.
- The AB and AC should be compacted to at least 95% relative compaction.

CONCRETE FLATWORK DESIGN CONSIDERATIONS

We recommend that the subgrade for the subject concrete flatwork be moisture conditioned to 3% over optimum to a depth of 18 inches below finish grade and compacted to 90% relative compaction. The concrete for flatwork is considered non-structural and may be designed with concrete strengths that are determined by the engineer or designer responsible for these improvements. The concrete design should account for the elevated levels of chlorides within the onsite soils. Minimum recommendations are provided below:

- Cement Type: II/V
- Maximum Water Cement Ratio/ Concrete Strength:
    - No special requirements. W/C ratio and concrete strength should be selected by the engineer or designer balancing the chloride exposure (i.e., for flatwork only), durability, and project settlement as well as temperature and shrinkage stresses

- See Table 5 below for summary of flatwork recommendations:

Table 5: Concrete Flatwork Recommendations

Description	Subgrade Preparation (1)	Minimum Concrete Thickness	Reinforcement(3)	Joint Spacing (Max.)	Concrete Cement(4)
Concrete Paving (Patio, flatwork, sidewalk) (< 5 feet in width)	3% over optimum to 18 inches at 90% relative compaction	4 inches	1) No. 3 bars at 18" o.c. extend into thickened edge, 2) Thickened Edge: two horizontal No. 3 bar placed at the top and bottom 3) dowel into building and curb using 9-inch Speed Dowels @ 18"o.c	5 feet	Type II/V
Concrete Paving (Patio, flatwork, sidewalk) (> 5 feet in width)	3% over optimum to 18 inches at 90% relative compaction	4 inches	1) No. 3 bars at 18" o.c. extend into thickened edge, 2) Thickened Edge: two horizontal No. 3 bar placed at the top and bottom 3) dowel into building and curb using 9-inch Speed Dowels @ 18"o.c	8 feet	Type II/V

(1) The moisture content and compaction of the subgrade must be verified by the geotechnical consultant prior to placement of concrete/reinforcement.
(2) For pedestrian usages only, S.E. 30 sand may be used instead of Aggregate Base.
(3) Reinforcement to be placed in the middle of the recommended concrete section.
(4) Final concrete mix design to be supplied by others.

PLANTERS AND TREES

Where new trees or large shrubs are to be located in close proximity of new concrete flatwork, rigid moisture/root barriers should be placed around the perimeter of the flatwork to at least 2 feet in depth in order to offer protection to the adjacent flatwork against potential root and moisture damage. Existing mature trees near flatwork areas should also incorporate a rigid moisture/root barrier placed at least 2 feet in depth below the top of the flatwork.

PLAN REVIEW / GEOTECHNICAL TESTING DURING GRADING / FUTURE REPORT

Plan Review

GMU should review the final construction plans (grading and foundation plans) to confirm that they are consistent with our recommendations provided in this report.

Geotechnical Testing

Geotechnical observation and testing should be performed by the geotechnical engineer of record during the following stages of precise grading and construction:

- During site clearing and grubbing.
- During removal of any buried irrigation lines or other subsurface structures.
- During all phases of grading including over-excavation, temporary excavations, removals, scarification, ground preparation, moisture conditioning, proof-rolling, and placement and compaction of all fill materials.
- During grading for new foundations.
- During pavement and flatwork section placement and compaction.
- When any unusual conditions are encountered.

Future Report

If required, a report summarizing our construction observation/testing services will be prepared at project completion.

LIMITATIONS

All parties reviewing or utilizing this report should recognize that the findings, conclusions, and recommendations presented represent the results of our professional geological and geotechnical

engineering efforts and judgments. Due to the inexact nature of the state of the art of these professions and the possible occurrence of undetected variables in subsurface conditions, we cannot guarantee that the conditions actually encountered during grading and site construction will be identical to those observed, sampled, and interpreted during our study, or that there are no unknown subsurface conditions which could have an adverse effect on the use of the property. We have exercised a degree of care comparable to the standard of practice presently maintained by other professionals in the fields of geotechnical engineering and engineering geology, and believe that our findings present a reasonably representative description of geotechnical conditions and their probable influence on the grading and use of the property.

Our conclusions and recommendations are based on the assumption that our firm will act as the geotechnical engineer of record during construction and grading of the project to observe the actual conditions exposed, to verify our design concepts and the grading contractor's general compliance with the project geotechnical specifications, and to provide our revised conclusions and recommendations should subsurface conditions differ significantly from those used as the basis for our conclusions and recommendations presented in this report. Since our conclusions and recommendations are based on a limited amount of current and previous geotechnical exploration and analysis, all parties should recognize the need for possible revisions to our conclusions and recommendations during grading of the project.

It should be further noted that the recommendations presented herein are intended solely to minimize the effects of post-construction soil movements. Consequently, minor cracking and/or distortion of all on-site improvements should be anticipated.

This report has not been prepared for the use by other parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

CLOSURE

If you have any questions concerning our findings or recommendations, please do not hesitate to contact us and we will be happy to discuss them with you. The Plates and Appendices that complete this report are listed in the Table of Contents.



Respectfully submitted,

GMU GEOTECHNICAL, INC.

Nadim Sunna, M.Sc., P.E. 84197
Senior Engineer



Alan B. Mutchnick, PG, CEG 1789
Associate Engineering Geologist

Ns/20-188-00 (11-6-2020)

REFERENCES

SITE-SPECIFIC REFERENCES

(1) Site Plan, OC Parks – Crawford Park, prepared by Hunsaker and Associates Irvine, Inc., dated October 16, 2020.

TECHNICAL REFERENCES

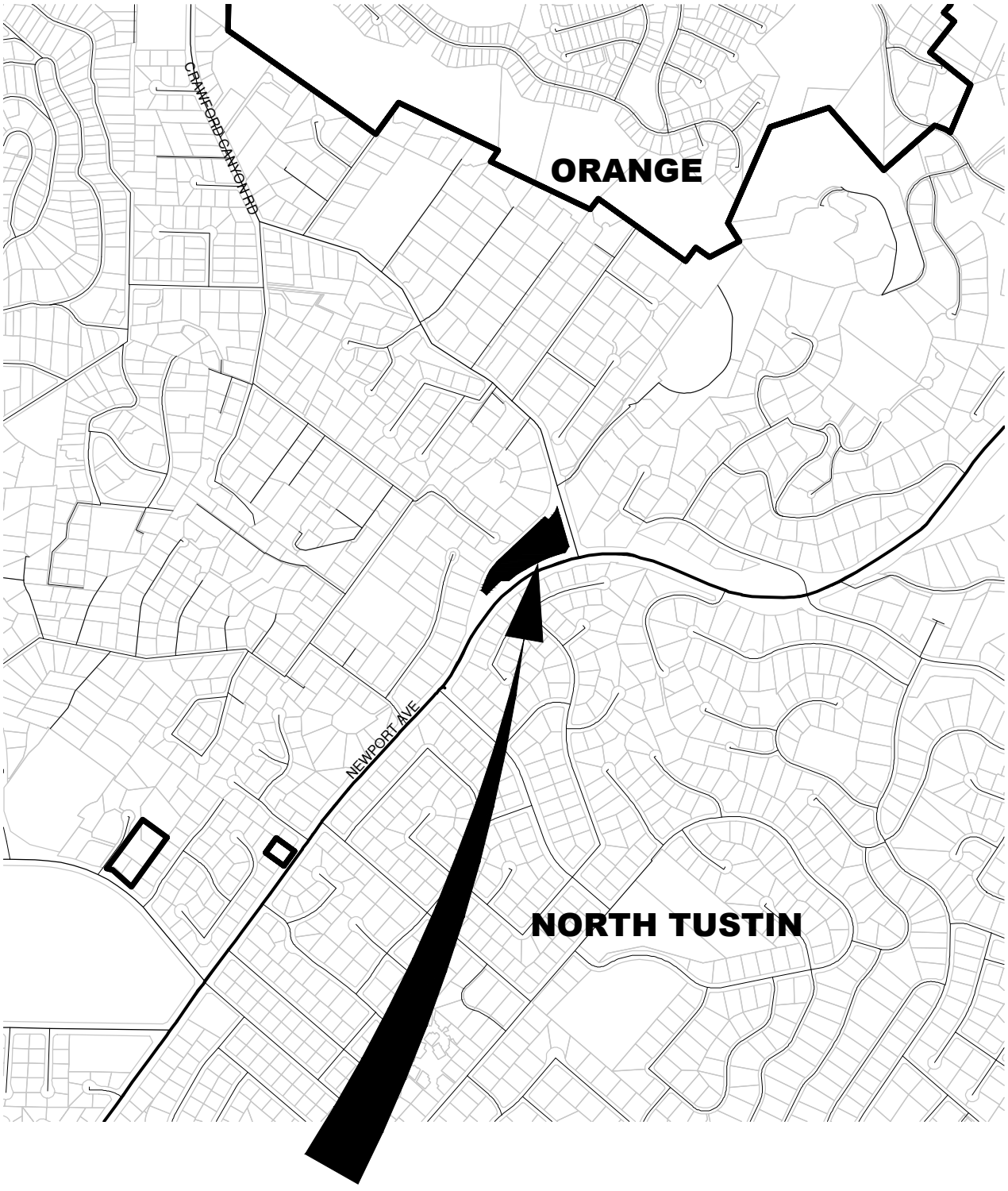
California Building Standards Commission and International Conference of Building Officials, 2019, *2019 California Building Code*.

Morton, D.M., and Miller, F.K., 2006, *"Geologic Map of the San Bernardino and Santa Ana 30'x6-'Quadrangles, California"* U.S. Geological Survey, Open-File Report OF-2006-1217, Scale 1:100,00.

Standard Specifications for Public Works Construction, by Public Works Standards, Inc., 2018, *The Greenbook 2018 Edition.*

U.S. Geological Survey, 2013a, 2014 Interactive De-aggregations Program; web site address: http://geohazards.usgs.gov/deaggint/2008/.

U.S. Geological Survey, 2013b, U.S. Seismic Design Maps, web site address: http://earthquake.usgs.gov/hazards/designmaps/usdesign.php.



CRAWFORD PARK
NEWPORT AVE & CRAWFORD CANYON RD
NORTH TUSTIN, CA

0 1000'

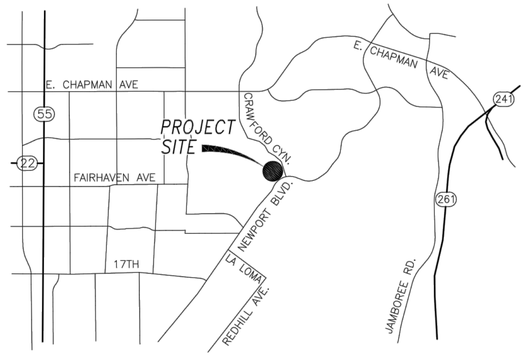
Location Map

GMU

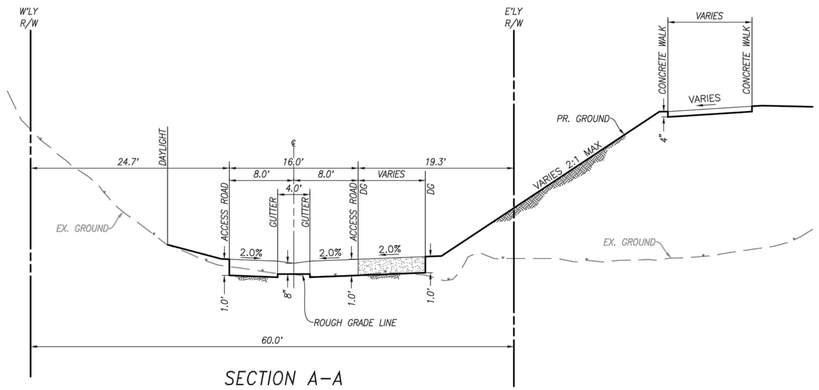
Date:	November 6, 2020
Project No.:	20-188-00

Plate 1

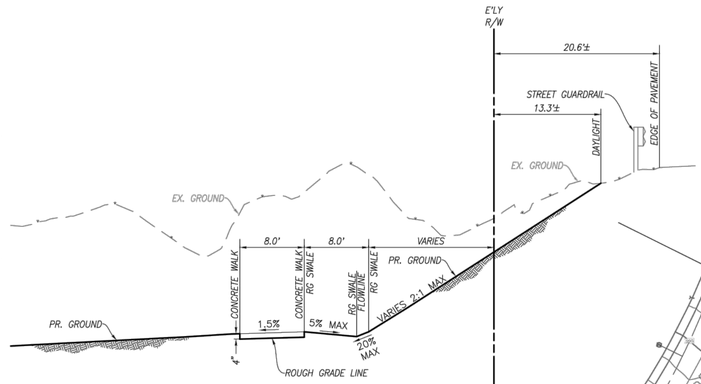
DRAWING: q:\2020\20-188-00\dwg\2018800_plate 1_location map.dwg PLOTTED: 11/4/2020 2:18 PM BY: Jmeza



LOCATION MAP



SECTION A–A
(NTS)



SECTION B–B
(NTS)

LEGEND

DH-9
Depth - 10 ft

APPROX. DRILL HOLE LOCATION

0 20 40 80
SCALE: 1" = 40'

PREPARED FOR:

OCparks

PREPARED BY:

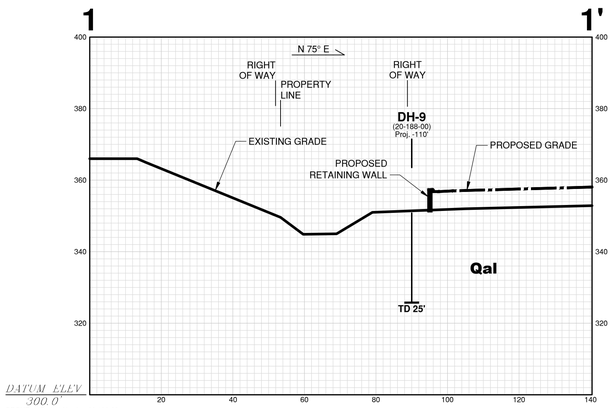
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

GEOTECHNICAL MAP		
GMU	Date: November 6, 2020	Plate 2
	Project No.: 20-188-00	

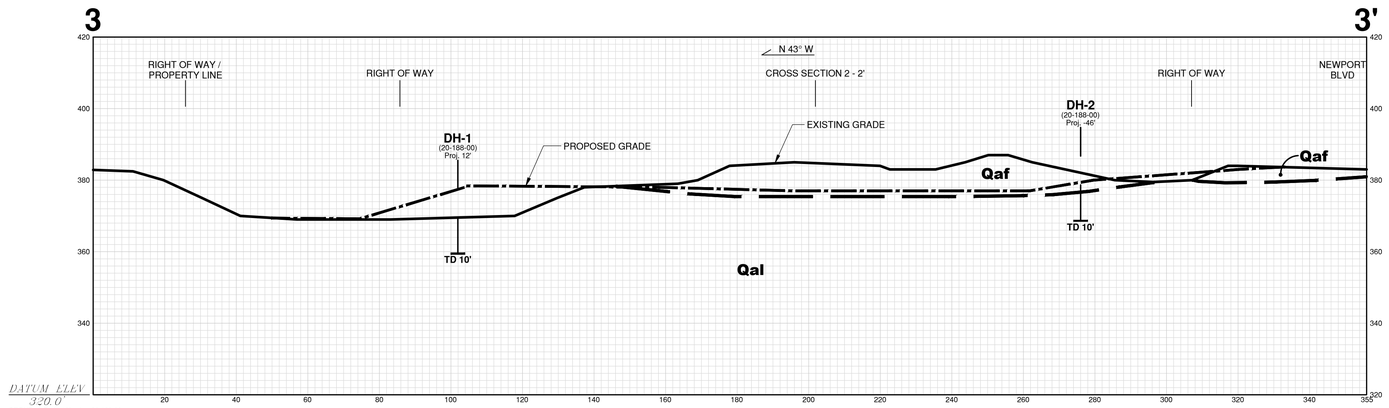
OC PARKS
CRAWFORD PARK
SITE PLAN

October 16, 2020

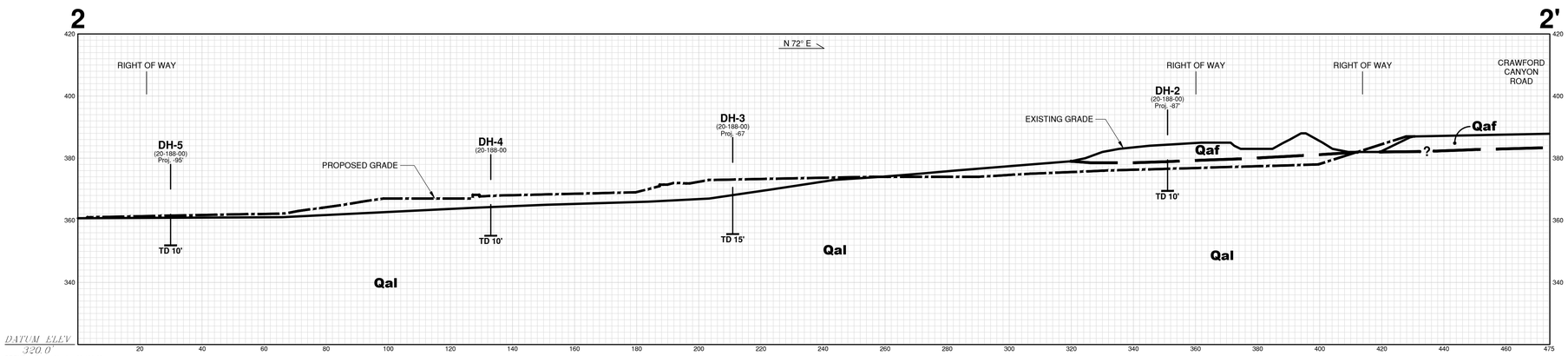
DRAWING: q:\2020\20-188-00\dwg\20188800_plate 2_geotechnical map.dwg PLOTTED: 11/4/2020 2:33 PM BY: Jmeza



GROUP Project Number 20-188-00
SECTION 1 - 1'
SCALE: 1" = 20'



GROUP Project Number 20-188-00
SECTION 3 - 3'
SCALE: 1" = 20'



GROUP Project Number 20-188-00
SECTION 2 - 2'
SCALE: 1" = 20'

0 20' 40'

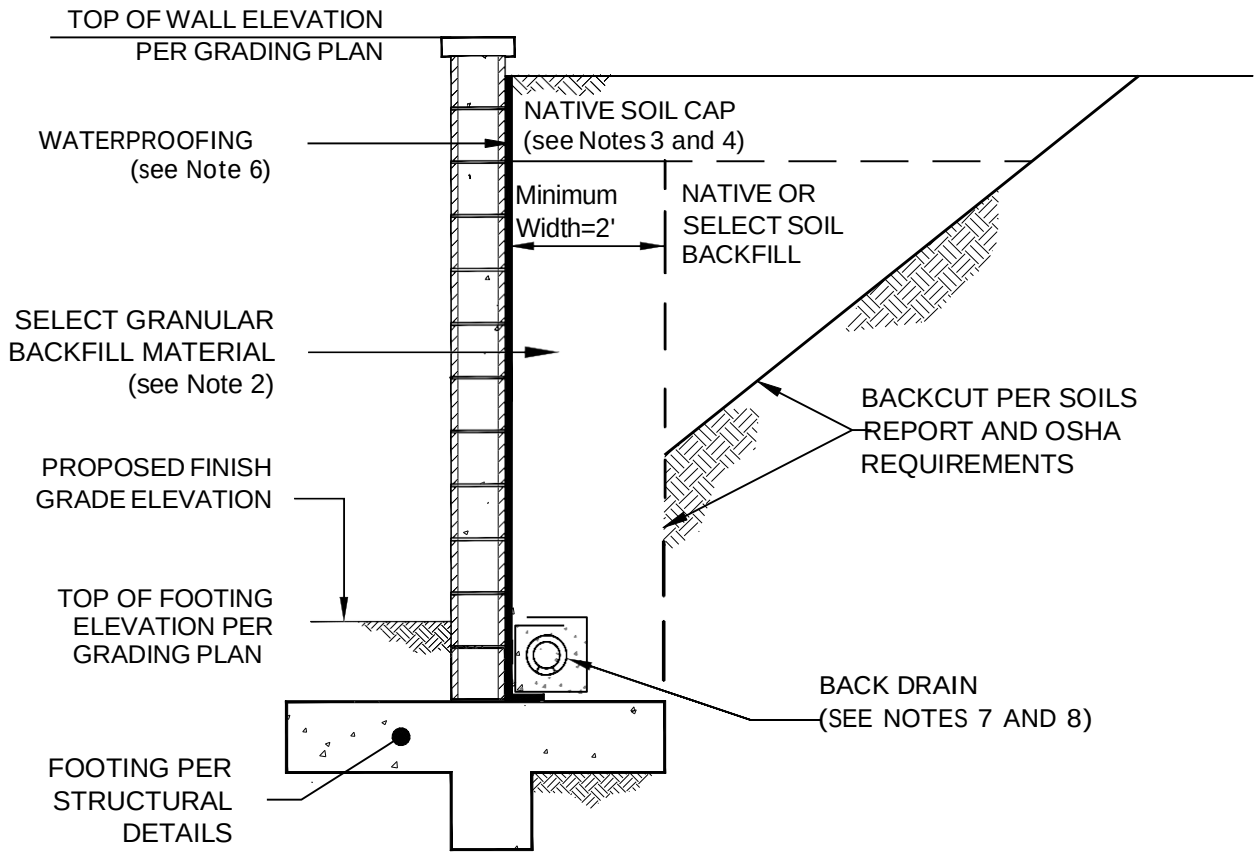
Geotechnical Sections

GMU

Date:	November 6, 2020
Project No.:	20-188-00

Plate 3

DRAWING: q:\2020\20-188-00\dwg\201888O_plate 3_geo sections.dwg PLOTTED: 11/4/2020 2:31 PM BY: jmeza

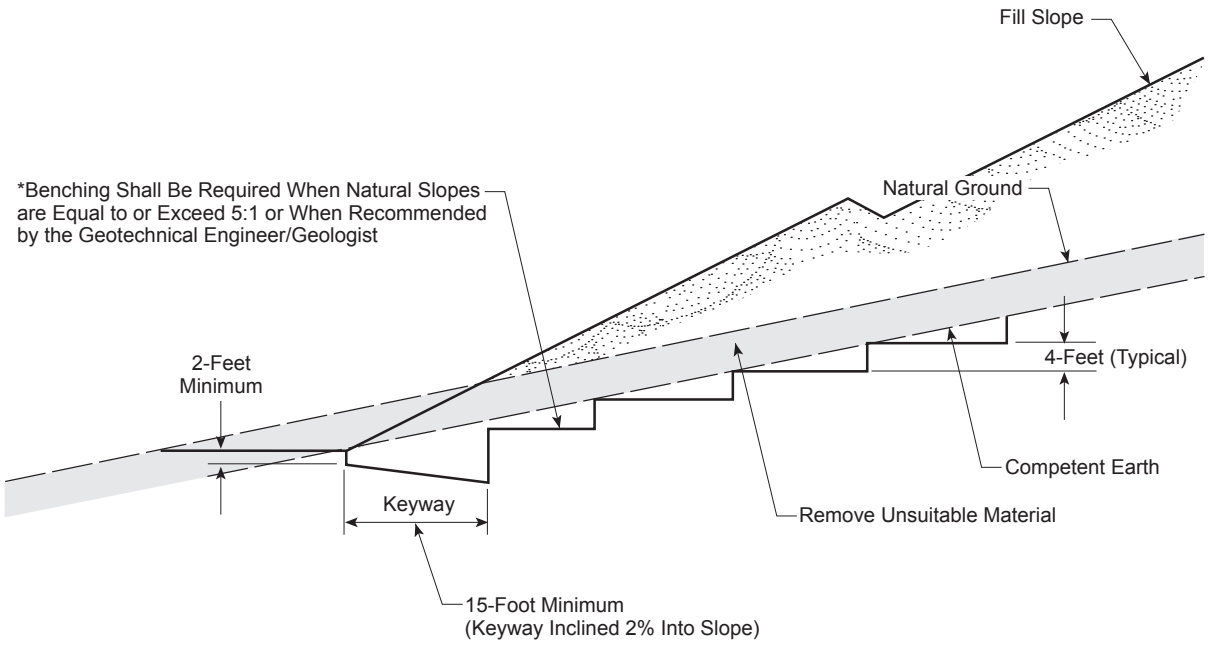


RETAINING WALL DETAIL

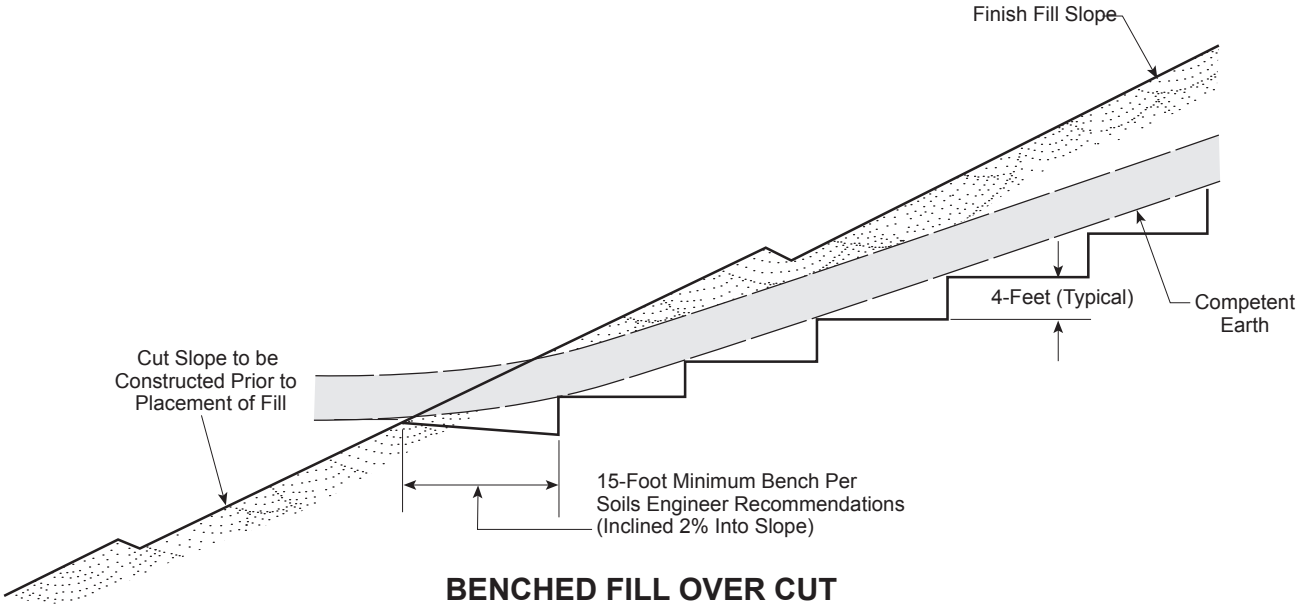
NOT TO SCALE

1. FINAL DETERMINATION OF THE MATERIAL TO BE USED FOR BACKFILL SHALL BE MADE BY GMU.
2. ALL SELECT BACKFILL TO WITHIN 1 TO 2 FEET OF FINAL GRADE SHOULD CONSIST OF FREE-DRAINING GRANULAR MATERIAL (I.E. SE 30 SAND, PEA GRAVEL, OR CRUSHED ROCK). CRUSHED ROCK, IF USED, SHOULD BE WRAPPED IN FILTER FABRIC (MIRAFI 140N OR EQUIVALENT) TO MINIMIZE THE POTENTIAL FOR MIGRATION OF FINES INTO THE ROCK. THE SELECT BACKFILL SHOULD BE MOISTURE CONDITIONED TO ACHIEVE OVER OPTIMUM MOISTURE CONTENT PER THE SOILS REPORT AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION AS DETERMINED BY ASTM TEST METHOD D 1557.
3. FINE-GRAINED NATIVE SOILS SHOULD BE USED TO CAP THE SELECT BACKFILL ZONE.
4. ALL NATIVE OR SELECT SOIL WALL BACKFILL SHOULD BE MOISTURE CONDITIONED AS NECESSARY TO OVER OPTIMUM MOISTURE CONTENT PER THE SOILS REPORT AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION AS DETERMINED BY ASTM TEST METHOD D 1557.
5. THE BACKSIDE OF THE WALLS SHOULD BE WATERPROOFED DOWN TO AND ACROSS THE TOP OF THE FOOTING. THE DESIGN AND SELECTION OF THE WATERPROOFING SYSTEM IS OUTSIDE OF THE PURVIEW OF GMU.
6. THE WATERPROOFING SYSTEM AND ANY DRAIN BOARDS SHOULD BE PROTECTED FROM DAMAGE BY CONSTRUCTION ACTIVITIES. THE TOP EDGE OF THE WATERPROOFING AND ANY DRAIN BOARDS SHOULD BE PROPERLY ADHERED TO THE WALL AND SEALED TO PREVENT THE POSSIBLE ACCUMULATION OF DEBRIS BETWEEN THE DRAINAGE/WATERPROOFING SYSTEM AND THE WALL.
7. THE BACKDRAIN SYSTEM SHOULD CONSIST OF 4" PERFORATED PIPE SURROUNDED BY AT LEAST ONE CUBIC FOOT OF 3/4"-1.5" OPEN GRADED GRAVEL WRAPPED IN MIRAFI 140N FILTER FABRIC (OR EQUIVALENT). THE PERFORATED PIPE SHOULD CONSIST OF SDR-35 OR SCHEDULE 40 PVC PIPE (OR APPROVED EQUIVALENT) LAID ON AT LEAST 2" OF CRUSHED ROCK WITH THE PERFORATIONS LAID DOWN. THE BACKDRAIN GRADIENT SHOULD NOT BE LESS THAN 1% WHEN POSSIBLE. THE PERFORATED PIPE SHOULD OUTLET INTO AREA DRAINS OR OTHER SUITABLE OUTLET POINTS AT RUNS OF 200 FEET OR LESS, IF PRACTICAL. IF THE BACKDRAINS CANNOT BE OUTLETED BY GRAVITY FLOW, A SUMP PUMP SYSTEM WILL NEED TO BE DESIGNED AND CONSTRUCTED. REDUNDANT BACK-UP PUMPS OR COMPONENTS ARE RECOMMENDED. DESIGN OF THIS SYSTEM IS OUTSIDE OF THE PURVIEW OF GMU.
8. THE TIE-IN LOCATIONS FOR BACKDRAIN OUTLETS SHOULD BE SHOWN ON THE PRECISE GRADING, SITE WALL, AND/OR LANDSCAPE PLANS.

GMU	**RETAINING WALL CONSTRUCTION DETAIL**	PLATE **4**



BENCHED FILL OVER NATURAL



BENCHED FILL OVER CUT

GMU

TYPICAL BENCHING AND KEYWAY

Plate **5**

APPENDIX A

Geotechnical Exploration Procedures and Logs

APPENDIX A

GMU GEOTECHNICAL EXPLORATION PROCEDURES AND LOGS

Our exploration at the subject site consisted of nine (9) drill holes. The estimated locations of the explorations are shown on Plate 2 – Geotechnical Map. Our drill holes were logged by a Staff Engineer, and drive, bulk, and SPT samples of the excavated soils were collected. "Undisturbed" samples were taken using a 3.0-inch thin walled, outside-diameter drive sampler which contains a 2.416-inch-diameter brass sample sleeve 6 inches in length. Standard penetration testing (SPT) with a 2.0-inch outside diameter split spoon sampler without liners was performed in the borings during advancement. Blow counts recorded during sampling from the drive and SPT sampler are shown on the drill hole logs. The logs of each drill hole are contained in this Appendix A, and the Legend to Logs is presented as Plate A-1 and A-2.

The geologic and engineering field descriptions and classifications that appear on these logs are prepared according to Corps of Engineers and Bureau of Reclamation standards. Major soil classifications are prepared according to the Unified Soil Classification System as modified by ASTM Standard No. 2487. Since the descriptions and classifications that appear on the Log of Drill hole are intended to be that which most accurately describe a given interval of a drill hole (frequently an interval of several feet), discrepancies do occur in the Unified Soil Classification System nomenclature between that interval and a particular sample in that interval. For example, an 8-foot-thick interval in a log may be identified as silty sand (SM) while one sample taken within the interval may have individually been identified as sandy silt (ML). This discrepancy is frequently allowed to remain to emphasize the occurrence of local textural variations in the interval.

MAJOR DIVISIONS			Group Letter	Symbol	TYPICAL NAMES
COARSE-GRAINED SOILS More Than 50% Retained On No.200 Sieve Based on The Material Passing The 3-Inch (75mm) Sieve. Reference: ASTM Standard D2487	GRAVELS 50% or More of Coarse Fraction Retained on No.4 Sieve	Clean Gravels	GW		Well Graded Gravels and Gravel-Sand Mixtures, Little or No Fines.
			GP		Poorly Graded Gravels and Gravel-Sand Mixtures Little or No Fines.
		Gravels With Fines	GM		Silty Gravels, Gravel-Sand-Silt Mixtures.
			GC		Clayey Gravels, Gravel-Sand-Clay Mixtures.
	SANDS More Than 50% of Coarse Fraction Passes No.4 Sieve	Clean Sands	SW		Well Graded Sands and Gravelly Sands, Little or No Fines.
			SP		Poorly Graded Sands and Gravelly Sands, Little or No Fines.
		Sands With Fines	SM		Silty Sands, Sand-Silt Mixtures.
			SC		Clayey Sands, Sand-Clay Mixtures.
FINE-GRAINED SOILS 50% or More Passe The No.200 Sieve Based on The Material Passing The 3-Inch (75mm) Sieve. Reference: ASTM Standard D2487	SILTS AND CLAYS Liquid Limit Less Than 50%		ML		Inorganic Silts, Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts With Slight Plasticity.
			CL		Inorganic Clays of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays.
			OL		Organic Silts and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit 50% or Greater		MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts.
			CH		Inorganic Clays of High Plasticity, Fat Clays.
			OH		Organic Clays of Medium To High Plasticity, Organic Silts.
HIGHLY ORGANIC SOILS			PT		Peat and Other Highly Organic Soils.

The descriptive terminology of the logs is modified from current ASTM Standards to suit the purposes of this study

ADDITIONAL TESTS

DS = Direct Shear
HY = Hydrometer Test
TC = Triaxial Compression Test
UC = Unconfined Compression
CN = Consolidation Test
(T) = Time Rate
EX = Expansion Test
CP = Compaction Test
PS = Particle Size Distribution
EI = Expansion Index
SE = Sand Equivalent Test
AL = Atterberg Limits
FC = Chemical Tests
RV = Resistance Value
SG = Specific Gravity
SU = Sulfates
CH = Chlorides
MR = Minimum Resistivity
pH
(N) = Natural Undisturbed Sample
(R) = Remolded Sample
CS = Collapse Test/Swell-Settlement

GEOLOGIC NOMENCLATURE

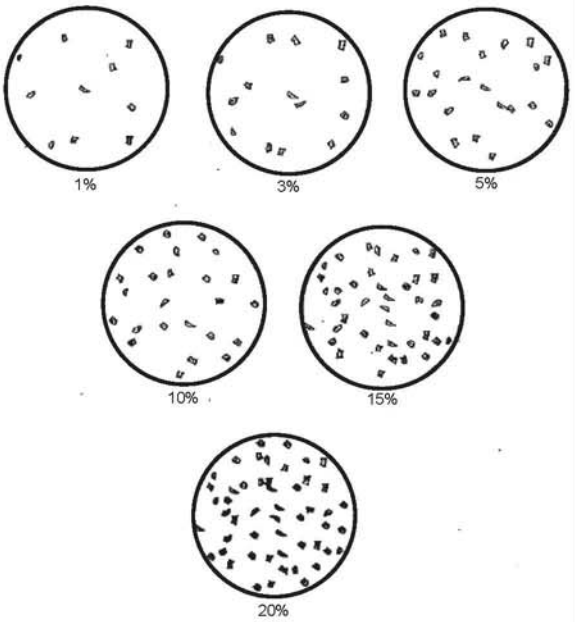
B = Bedding C = Contact J = Joint
F = Fracture Flt = Fault S = Shear
RS = Rupture Surface = Seepage
= Groundwater

SAMPLE SYMBOLS

Undisturbed Sample (California Sample)
Undisturbed Sample (Shelby Tube)
Bulk Sample
Unsuccessful Sampling Attempt
SPT Sample

5
10 Blows per 6-Inches Penetration
15

10: 10 Blows for 12-Inches Penetration
6/4": 6 Blows for 4-Inches Penetration
P: Push
(13): Uncorrected Blow Counts ("N" Values) for 12-Inches Penetration- Standard Penetration Test (SPT)



GMU

LEGEND TO LOGS

ASTM Designation: D 2487
(Based on Unified Soil Classification System)

Plate
A-1

P8-11/16/2012

SOIL DENSITY/CONSISTENCY

FINE GRAINED

Consistency	Field Test	SPT (#blows/foot)	Mod (#blows/foot)
Very Soft	Easily penetrated by thumb, exudes between fingers	<2	<3
Soft	Easily penetrated one inch by thumb, molded by fingers	2-4	3-6
Firm	Penetrated over 1/2 inch by thumb with moderate effort	4-8	6-12
Stiff	Penetrated about 1/2 inch by thumb with great effort	8-15	12-25
Very Stiff	Readily indented by thumbnail	15-30	25-50
Hard	Indented with difficulty by thumbnail	>30	>50

COARSE GRAINED

Density	Field Test	SPT (#blows/foot)	Mod (#blows/foot)
Very Loose	Easily penetrated with 0.5" rod pushed by hand	<4	<5
Loose	Easily penetrated with 0.5" rod pushed by hand	4-10	5-12
Medium Dense	Easily penetrated 1' with 0.5" rod driven by 5lb hammer	10-30	12-35
Dense	Dificult to penetrat 1' with 0.5" rod driven by 5lb hammer	31-50	35-60
Very Dense	Penetrated few inches with 0.5" rod driven by 5lb hammer	>50	>60

BEDROCK HARDNESS

Density	Field Test	SPT (#blows/foot)
Soft	Can be crushed by hand, soil like and structureless	1-30
Moderately Hard	Can be grooved with fingernails, crumbles with hammer	30-50
Hard	Can't break by hand, can be grooved with knife	50-100
Very Hard	Scratches with knife, chips with hammer blows	>100

MODIFIERS

Trace	1%
Few	1-5%
Some	5-12%
Numerous	12-20%
Abundant	>20%

GRAIN SIZE

Description		Sieve Size	Grain Size	Approximate Size
Boulders		>12"	>12"	Larger than a basketball
Cobbles		3-12"	3-12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4-3"	3/4-3"	Thumb-sized to fist-sized
	Fine	#4-3/4"	0.19-0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10-#4	0.079-0.19"	Rock-salt-sized to pea-sized
	Medium	#40-#10	0.017-0.079"	Sugar-sized to rock salt-sized
	Fine	#200-#40	0.0029-0.017"	Flour-sized to sugar-sized
Fines		passing #200	<0.0029"	Flour-sized and smaller

MOISTURE CONTENT

Dry- Very little or no moisture
Damp- Some moisture but less than optimum
Moist- Near optimum
Very Moist- Above optimum
Wet/Saturated- Contains free moisture

GMU

LEGEND TO LOGS

ASTM Designation: D 2487
(Based on Unified Soil Classification System)

Plate
A-2

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-1

Sheet 1 of 1

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**11.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**363.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
360	0		**ALLUVIUM (Qal)**		CLAYEY SAND (SC); yellowish brown and dark grayish brown, moist soft, fine grained sand				13		PS, HY, AL
	5				SILTY SAND (SM); brown, damp, loose, fine grained sand		3 6 6		26	96	
355					SANDY CLAY (CL); dark grayish brown, firm, damp to moist, fine grained sand						
	10				POORLY GRADED SAND (SP); grayish brown, damp, very loose, fine to medium grained sand		3 2 3				
					Total Depth = 11.5 ft No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-1

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-2

Sheet 1 of 2

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**21.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**374.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ARTIFICIAL FILL (Qaf)		SANDY CLAY (CL); yellowish and dark brown, damp, medium dense, fine grained sand				15		CP
370											
	5		**ALLUVIUM (Qal)**		CLAYEY SAND (SC); yellowish and dark brown, damp, medium dense, fine grained sand		9 9 9		23	101	
365											
	10						7 8 7				
360											
	15				Becomes very dense		13 29 44		12	121	
355											

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-2

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-2

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA			TEST DATA		
						SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			ALLUVIUM (Qal)		SILTY SAND (SM); brown, dry to damp, medium dense, fine grained sand		5 9 9				
					Total Depth = 21.5 ft Nogroundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-2

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-3

Sheet 1 of 2

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**21.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**366.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
365			**ALLUVIUM (Qal)**		SANDY CLAY (CL); brown, damp, dense, fine grained sand				14		EI
	5				CLAYEY SAND (SC); brown, damp, dense, fine grained sand, white veins		16 16 22		10	118	DS
360											
	10				Becomes moist		6 7 10				
355											
	15						4 5 8		15	109	
350											

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-3

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-3

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
345			**ALLUVIUM (Qal)**		CLAYEY SAND (SC); brown, damp, medium dense, fine to medium grained sand		10 13 16				
					Total Depth = 21.5 ft Nogroundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-4

Sheet 1 of 1

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**11.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**360.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ALLUVIUM (Qal)		CLAYEYSAND (SC); brown, dry to damp, medium dense, numerous gravel				4		CP
355	5				Becomes reddish and grayish brown, moist, medium dense, fine grained sand		5 6 13		13	117	
					SILTY CLAY (CL); dark grayish brown, loose, fine grained sand						
350	10				CLAYEY SAND (SC); dark grayish brown, dense, fine grained sand		4 6 8				
					Total depth = 11.5 No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-4

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-5

Sheet 1 of 1

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**11.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**357.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ALLUVIUM (Qal)		CLAYEY SAND (SC); dark brown, damp to moist, dense, fine grained sand, some gravel up to 1"				13		PS, HY, AL, FC
355											
	5						7		22	97	
					CLAYEY SILT (ML); grayish brown, moist, stiff, trace finr grained sand, olive and orange pockets		8 13				
350											
	10				CLAYEY SAND (SC); dark brown, moist, dense, fine grained sand		7 7 11				
					Total Depth = 11.5 ft No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-5

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-6

Sheet 1 of 1

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**3.0 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**352.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
350			**ALLUVIUM (Qal)**		CLAYEY SAND (SC); dark brown, damp, soft, fine grained sand	X			12		
					Total Depth = 3 ft No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-7

Sheet 1 of 1

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**5.0 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**352.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
350	0		**ALLUVIUM (Qal)**		CLAYEY SAND (SC); dark brown, damp, soft, fine grained	X			13		PS, HY
	5				Total Depth = 5 ft No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-7

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-8

Sheet 1 of 1

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**11.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**350.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ALLUVIUM (Qal)		CLAYEY SAND (SC); brown, soft, moist, fine grained sand				16		EI
345	5						5 6 7		13	102	
340	10						3 3 3				
					Total depth = 11.5 ft No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-8

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-9

Sheet 1 of 2

Date(s) Drilled	**4/28/2020**	Logged By	**RVC**	Checked By	**NS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling**	Total Depth of Drill Hole	**26.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches		Approx. Surface Elevation, ft MSL	**346.0**
Groundwater Depth [Elevation], feet	**N/A []**	Sampling Method(s)	**California Modified Sampler with 6-in sleeve/SPT**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb hammer, 30" drop**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ALLUVIUM (Qal)		CLAYEY SAND (SM); brown, dry, dense, fine grained sand				10		RV, FC
345											
					Becomes damp, loose						
	5								11	98	DS
340											
	10										
335											
	15								11	109	
330											

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-9

Project: OC Parks Crawford Park
Project Location: North Tustin
Project Number: 20-188-00

Log of Drill Hole DH-9

Sheet 2 of 2

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
325			**ALLUVIUM (Qal)**		CLAYEY SAND (SC); brown, damp, loose to medium dense, fine grained sand						
	25				SILTY SAND (SM); brown, damp, dense, fine grained sand				6	115	
320					Total depth = 26.5 ft No groundwater						

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

Drill Hole DH-9

APPENDIX B

Geotechnical Laboratory Procedures and Test Results

Mr. Vojta Safranek, **HUNSAKER & ASSOCIATES IRVINE, INC.**
Geotechnical Investigation Report — Crawford Canyon Park, Northwest Corner of Newport Avenue and Crawford Canyon Road, City of Orange, California

APPENDIX B

GMU GEOTECHNICAL LABORATORY PROCEDURES AND TEST RESULTS

MOISTURE AND DENSITY

Field moisture content and in-place density were determined for each 6-inch sample sleeve of undisturbed soil material obtained from the drill holes. The field moisture content was determined in general accordance with ASTM Test Method D 2216 by obtaining one-half the moisture sample from each end of the 6-inch sleeve. The in-place dry density of the sample was determined by using the wet weight of the entire sample.

At the same time the field moisture content and in-place density were determined, the soil material at each end of the sleeve was classified according to the Unified Soil Classification System. The results of the field moisture content and in-place density determinations are presented on the right-hand column of the Log of Drill Hole and are summarized on Table B-1. The results of the visual classifications were used for general reference.

PARTICLE SIZE DISTRIBUTION

As part of the engineering classification of the materials underlying the site, samples were tested to determine the distribution of particle sizes. The distribution was determined in general accordance with ASTM Test Method D 422 using U.S. Standard Sieve Openings 3", 1.5", 3/4, 3/8, and U.S. Standard Sieve Nos. 4, 10, 20, 40, 60, 100, and 200. In addition, on some samples a standard hydrometer test was performed to determine the distribution of particle sizes passing the No. 200 sieve (i.e., silt and clay-size particles). The results of the tests are contained in Appendix B. Key distribution categories (% gravel; % sand, etc.) are contained on Table B-1.

ATTERBERG LIMITS

As part of the engineering classification of the soil material, samples of the on-site soil material were tested to determine relative plasticity. This relative plasticity is based on the Atterberg limits determined in general accordance with ASTM Test Method D 4318. The results of these tests are contained in this Appendix B and also Table B-1.

EXPANSION TESTS

To provide a standard definition of one-dimensional expansion, a test was performed on typical on-site materials in general accordance with ASTM Test Method D 4829. The result from this test procedure is reported as an "expansion index". The results of this test are contained in Appendix B and also Table B-1.

CHEMICAL TESTS

The corrosion potential of typical on-site materials under long-term contact with both metal and concrete was determined by chemical and electrical resistance tests. The soluble sulfate test for potential concrete corrosion was performed in general accordance with California Test Method 417, the minimum resistivity test for potential metal corrosion was performed in general accordance with California Test Method 643, and the concentration of soluble chlorides was determined in general accordance with California Test Method 422. The results of these tests are contained in Appendix B and also Table B-1.

COMPACTION TESTS

Bulk sample representatives of the on-site materials were tested to determine the maximum dry density and optimum moisture content of the soil. These compactive characteristics were determined in general accordance with ASTM Test Method D 1557. The results of this test are contained in Appendix B and also Table B-1.

DIRECT SHEAR STRENGTH TESTS

Direct shear tests were performed on typical on-site materials. The general philosophy and procedure of the tests were in accord with ASTM Test Method D 3080 - "Direct Shear Tests for Soils Under Consolidated Drained Conditions".

The tests are single shear tests and are performed using a sample diameter of 2.416 inches and a height of 1.00 inch. The normal load is applied by a vertical dead load system. A constant rate of strain is applied to the upper one-half of the sample until failure occurs. Shear stress is monitored by a strain gauge-type precision load cell and deflection is measured with a digital dial indicator. This data is transferred electronically to data acquisition software which plots shear strength vs. deflection. The shear strength plots are then interpreted to determine either peak or ultimate shear strengths. Residual strengths were obtained through multiple shear box reversals. A strain rate compatible with the grain size distribution of the soils was utilized. The interpreted results of these tests are shown in Appendix B.

Mr. Vojta Safranek, **HUNSAKER & ASSOCIATES IRVINE, INC.**
Geotechnical Investigation Report — Crawford Canyon Park, Northwest Corner of Newport Avenue and Crawford Canyon Road, City of Orange, California

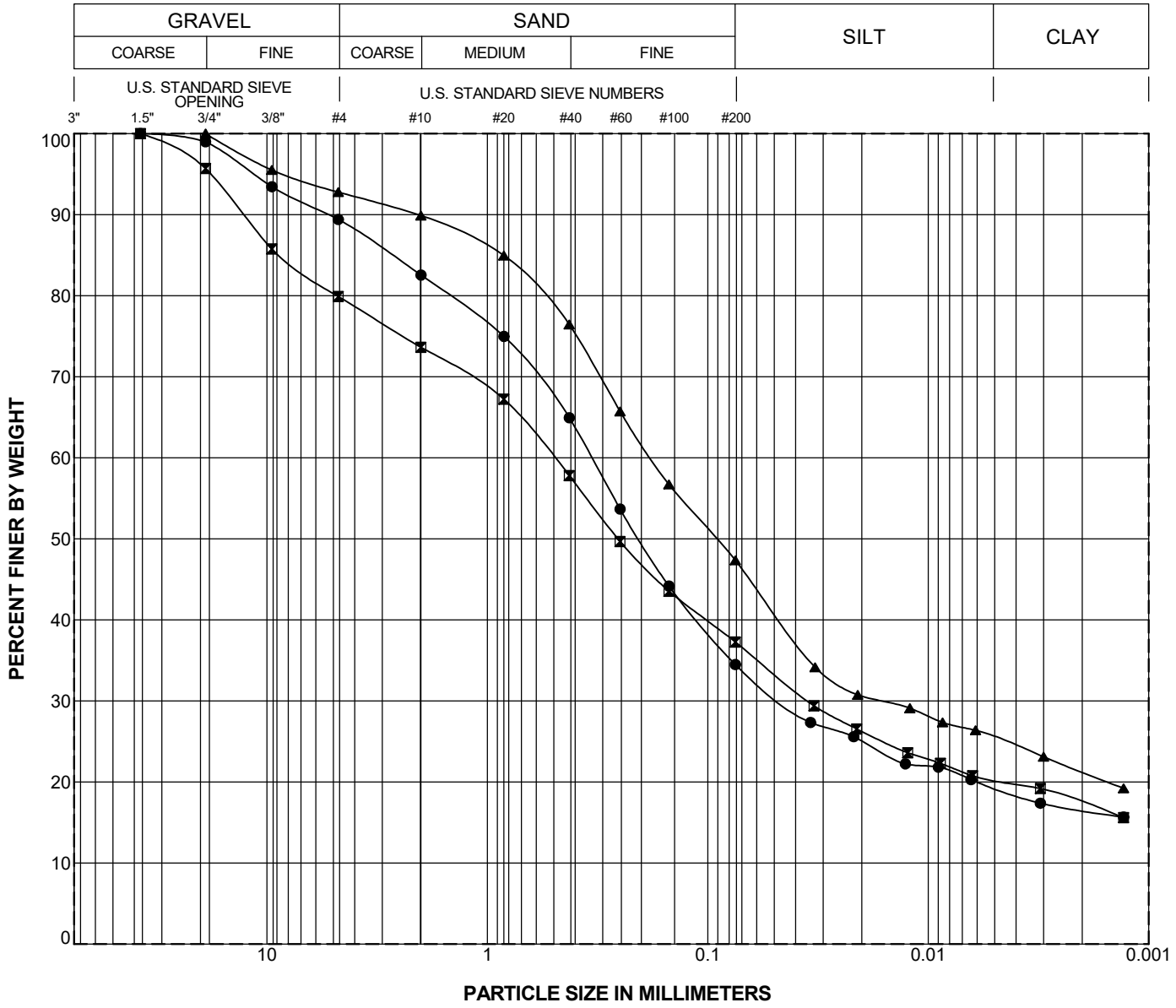
R-VALUE TESTS

Bulk samples representative of the underlying on-site materials were tested to measure the response of a compacted sample to a vertically applied pressure under specific conditions. The R-value of a material is determined when the material is in a state of saturation such that water will be exuded from the compacted test specimen when a 16.8 kN load (2.07 MPa) is applied. The results from these test procedures are reported in this Appendix B-1.

TABLE B-1
SUMMARY OF SOIL LABORATORY DATA

Sample Information			Geologic Unit	USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	In Situ Satur-ation, %	Sieve/Hydrometer				Atterberg Limits			Compaction		Expansion Index	R-Value	Chemical Test Results			
Boring Number	Depth, feet	Elevation, feet						Gravel, %	Sand, %	<#200, %	<2µ, %	LL	PL	PI	Maximum Dry Unit Weight, pcf	Optimum Water Content, %			pH	Sulfate (ppm)	Chloride (ppm)	Min. Resistivity (ohm/cm)
DH-1	0	363.0	Qal	SC	13.1			11	55	34	17	31	14	17								
DH-1	5	358.0	Qal	CL	26.1	96	96															
DH-2	0	374.0	Qaf	CL	15.4										122.0	11.5						
DH-2	5	369.0	Qal	CL/SC	22.9	101	96															
DH-2	15	359.0	Qal	SC	11.7	121	84															
DH-3	0	366.0	Qal	CL	13.5												65					
DH-3	5	361.0	Qal	CL-SC	9.7	118	64															
DH-3	15	351.0	Qal	SC	15.3	109	79															
DH-4	0	360.0	Qal	SC	4.3										135.5	7.0						
DH-4	5	355.0	Qal	SC	13.3	117	85															
DH-5	0	357.0	Qal	SC	13.1			20	43	37	17	36	14	22					8.3	537	1128	990
DH-5	5	352.0	Qal	ML	22.4	97	84															
DH-6	0	352.0	Qal	SC	12.2																	
DH-7	0	352.0	Qal	SC	13.1			7	45	47	21											
DH-8	0	350.0	Qal	CL-SC	16.1												46					
DH-8	5	345.0	Qal	SC	13.0	102	56															
DH-9	0	346.0	Qal	SC	9.7													26	8.3	10	264	1576
DH-9	5	341.0	Qal	CL-SC	11.4	98	43															
DH-9	15	331.0	Qal	SC	11.5	109	59															
DH-9	25	321.0	Qal	SM	6.1	115	37															

GMU_TABLE_SOIL_LAB_DATA 20-188-00.GPJ FNC AB GWGN01.GDT 6/23/20



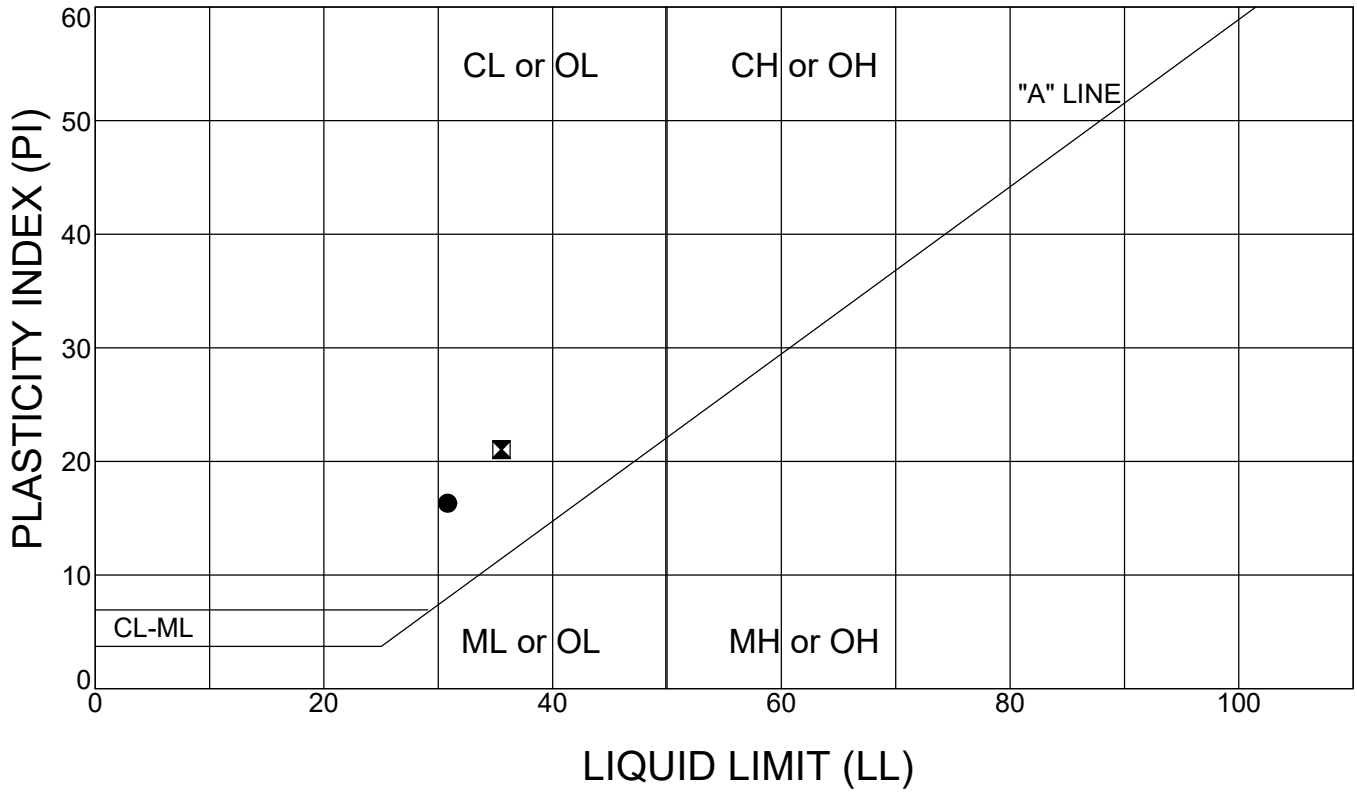
Boring Number	Depth (feet)	Geologic Unit	Symbol	LL	PI	Classification
DH-1	0.0	Qal	●	31	17	CLAYEY SAND (SC)
DH-5	0.0	Qal	⊠	36	22	CLAYEY SAND with GRAVEL (SC)
DH-7	0.0	Qal	▲			CLAYEY SAND (SC)

GMU_GRAIN_SIZE 20-188-00.GPJ 6/3/20

PARTICLE SIZE DISTRIBUTION

Project: OC Parks Crawford Park

Project No. 20-188-00

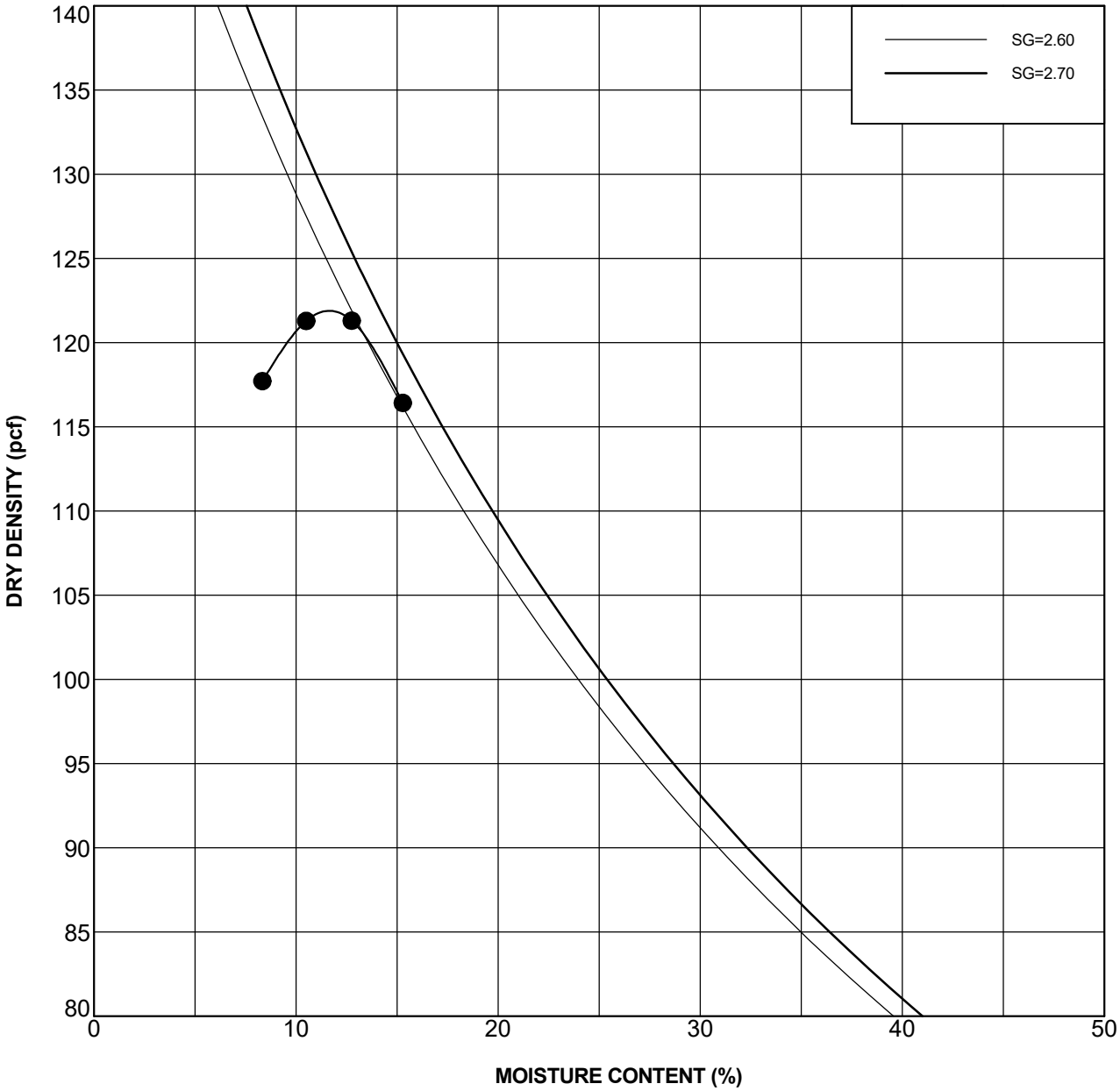


Boring Number	Depth (feet)	Geologic Unit	Test Symbol	Insitu Water Content (%)	LL	PL	PI	Classification
DH-1	0.0	Qal	●	13	31	14	17	CLAYEY SAND (SC)
DH-5	0.0	Qal	⊠	13	36	14	22	CLAYEY SAND with GRAVEL (SC)

LIMITS 20-188-00.GPJ 6/23/20

ATTERBERG LIMITS

Project: OC Parks Crawford Park
Project No. 20-188-00



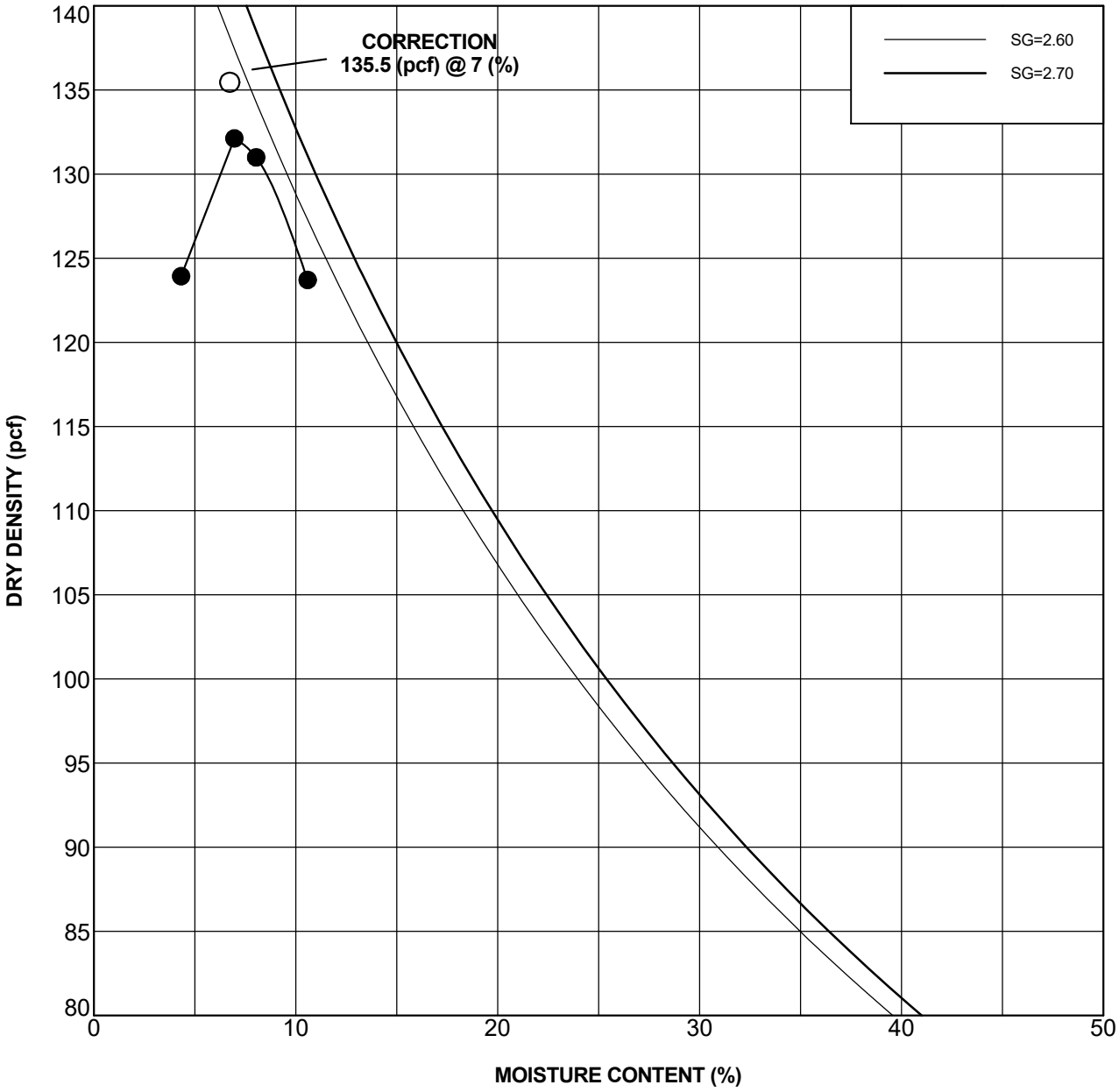
Boring Number	Depth (feet)	Geologic Unit	Symbol	Maximum Dry Density, pcf	Optimum Moisture Content, %	Classification
DH-2	0.0	Qal	●	122	11.5	SANDY CLAY (CL)

DVTCOMP 20-188-00.GPJ 6/3/20

COMPACTION TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00



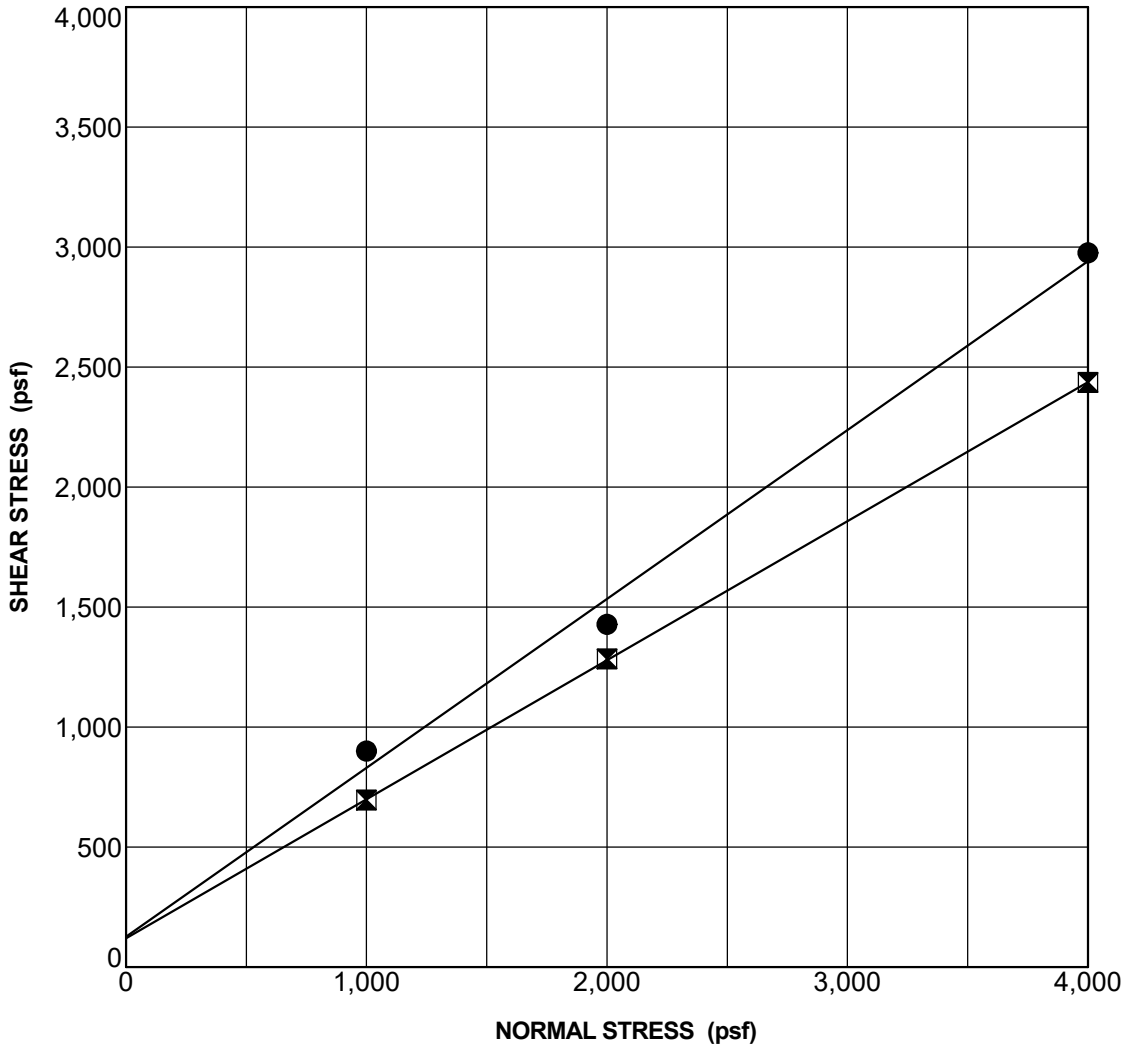
Boring Number	Depth (feet)	Geologic Unit	Symbol	Maximum Dry Density, pcf	Optimum Moisture Content, %	Classification
DH-4	0.0	Qal	●	135.5	7	CLAYEY SAND with GRAVEL (SC)

DVTCOMP 20-188-00.GPJ 6/3/20

COMPACTION TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00



SAMPLE AND TEST DESCRIPTION
Sample Location: DH-3 @ 5.0 ft **Geologic Unit:** Qal **Classification:** SANDY CLAY (CL-SC)
Strain Rate (in/min): 0.005 **Sample Preparation:** Undisturbed
Notes: Sample saturated prior and during shearing

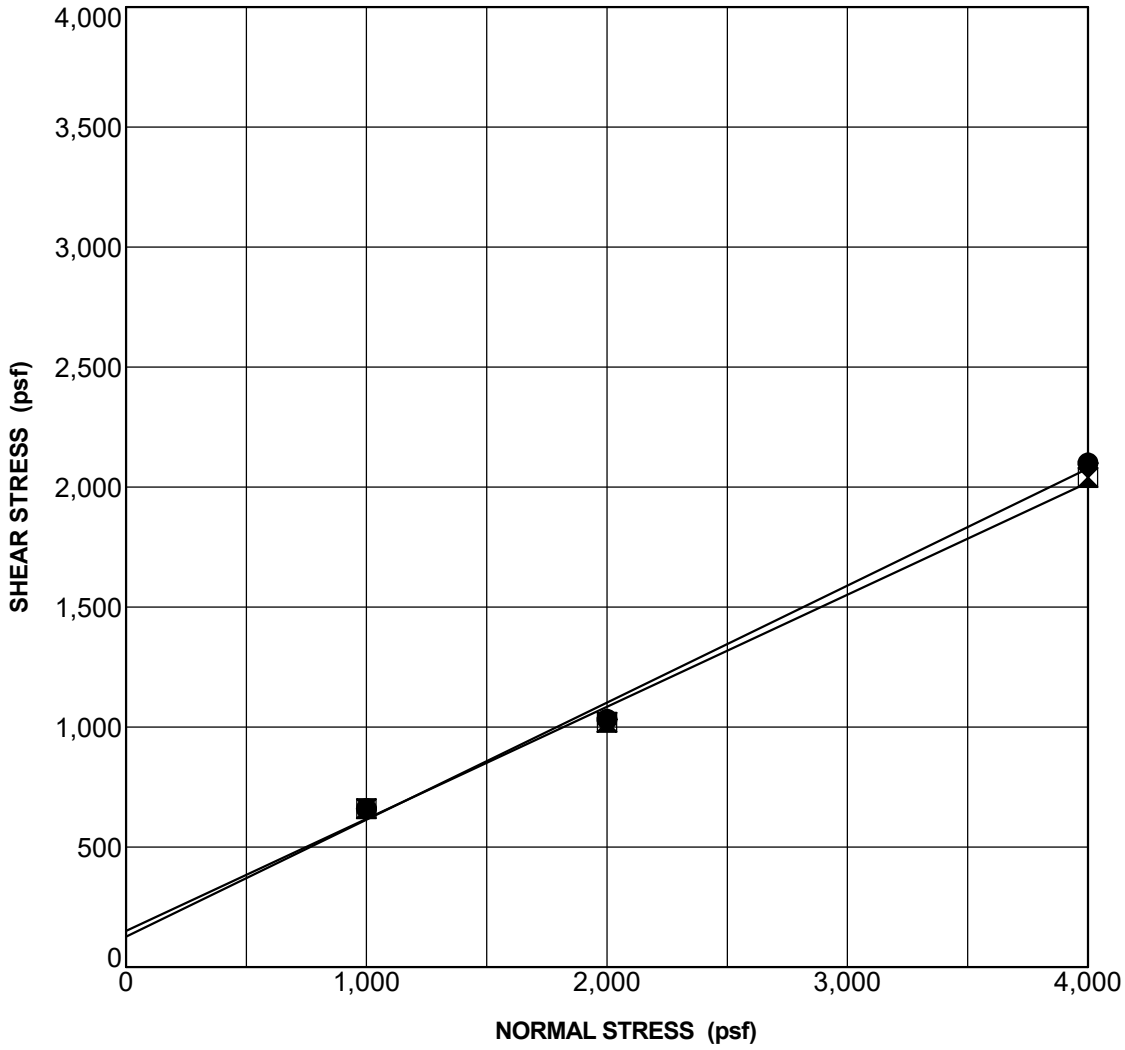
STRENGTH PARAMETERS		
STRENGTH TYPE	**COHESION (psf)**	**FRICTION ANGLE (degrees)**
● Peak Strength	126	35.1
⊠ Ultimate Strength	120	30.1

SHEAR TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00

GMU_DIRECT_SHEAR 20-188-00.GPJ GM&U.GDT 6/3/20



SAMPLE AND TEST DESCRIPTION
Sample Location: DH-9 @ 5.0 ft **Geologic Unit:** Qal **Classification:** SANDY CLAY (CL-SC) **Strain Rate (in/min):** 0.005 **Sample Preparation:** Undisturbed **Notes:** Sample saturated prior and during shearing

STRENGTH PARAMETERS		
STRENGTH TYPE	**COHESION (psf)**	**FRICTION ANGLE (degrees)**
● Peak Strength	126	26.0
⊠ Ultimate Strength	150	25.0

SHEAR TEST DATA

Project: OC Parks Crawford Park
Project No. 20-188-00

GMU_DIRECT_SHEAR 20-188-00.GPJ GM&U.GDT 6/3/20

APPENDIX C

Infiltration Test Results

Encased Falling Head Infiltration Test

Project Name:	OC Parks Crawford Park			**Date:**	4/29/2020
Project Number:	20-188-00			**Tested By:**	RC
Test Hole Number:	DH-5			**USCS Soil Classification:**	SC
Total Depth :	5.00	feet		**Water Temperature:**	70 °F
Test Hole Diameter:	6.00 inches	radius=	3 inches		

	Test No.	Start Time	End Time	ΔT (min)	Total Time (min)	Initial Depth of Water (ft)	Final Depth of Water (ft)	H_0 (in)	H_f (in)	ΔH (in)	Unfactored Infiltration Rate (in/hour)
Trial 1	1	8:18	8:38	20.0	60.0	4.00	4.06	12.00	11.25	0.75	2.25
	2	8:38	8:58	20.0	80.0	4.06	4.09	11.25	10.88	0.38	1.13
	3	8:58	9:18	20.0	100.0	4.09	4.13	10.88	10.50	0.38	1.13
	4	9:18	9:38	20.0	120.0	4.13	4.16	10.50	10.13	0.38	1.13
	5	9:38	9:58	20.0	140.0	4.16	4.18	10.13	9.88	0.25	0.75
	6	9:58	10:18	20.0	160.0	4.18	4.21	9.88	9.50	0.38	1.13
Trial 2	1	10:18	10:38	20.0	180.0	4.00	4.04	12.00	11.50	0.50	1.50
	2	10:38	10:58	20.0	200.0	4.04	4.06	11.50	11.25	0.25	0.75
	3	10:58	11:18	20.0	220.0	4.06	4.10	11.25	10.75	0.50	1.50
	4	11:18	11:38	20.0	240.0	4.10	4.13	10.75	10.50	0.25	0.75
	5	11:38	11:58	20.0	260.0	4.13	4.15	10.50	10.25	0.25	0.75
	6	11:58	12:18	20.0	280.0	4.15	4.17	10.25	10.00	0.25	0.75
Trial 3	1	12:15	12:35	20.0	300.0	4.00	4.02	12.00	11.75	0.25	0.75
	2	12:35	12:55	20.0	320.0	4.02	4.05	11.75	11.38	0.38	1.13
	3	12:55	13:15	20.0	340.0	4.05	4.06	11.38	11.25	0.13	0.37
	4	13:15	13:35	20.0	360.0	4.06	4.09	11.25	10.88	0.38	1.13
	5	13:35	13:55	20.0	380.0	4.09	4.13	10.88	10.50	0.38	1.13
	6	13:55	14:15	20.0	400.0	4.13	4.17	10.50	10.00	0.50	1.50

WATER TEMPERATURE CORRECTION FACTOR:	0.90
SAFETY FACTOR*:	2
UNFACTORED INFILTRATION RATE (IN/HR):	1.35
FACTORED INFILTRATION RATE (IN/HR):	0.67

Factor Category	Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) = w x v
Suitability Assessment	Soil assessment methods	0.25	2	0.5
	Predominant soil texture	0.25	2	0.5
	Site soil variablity	0.25	2	0.5
	Depth to groundwater	0.25	1	0.25
			Geotechnical Factor of Safety (SA):	1.75

Concern Level	Factor Value (v)
Low	1
Medium	2
High	3

Factor Description	High Concern	Medium Concern	Low Concern
Soil assessment methods	Use of borhole methods to estimate vertical infiltration rate (not recommended, but may be necessary at a planning level). Less than 2 tests per BMP	At least 2 tests per BMP. Use of borehole tests for dry wells or infiltration trenches. Use of infiltrometer or small scale PIT methods for vertical infiltration BMPs.	Extensive infiltration testing such as: PIT testing or infiltrometer testing at 3+ locations per BMP, and/or commitment to construction phase testing and design adaption if necessary.
Predominant soil texture	Silty and clayey soils with significant fines	Finer sandy soils with some loam content	Clean, granular soils (sands)
Site soil variablity	Highly variable soils indicated from site assessment or limited soil borings collected during site assessment.	Soil borings/test pits indicate moderately homogeneous soils.	Multiple soil borings/test pits indicate relatively homogeneous soils.
Depth to groundwater	Groundwater conditions or movement not well understood.	Seasonal high GW at least 10 ft below facility bottom.	Seasonal high GW at least 15 ft below facility bottom.

***Factor of safety should not be less than 2. Additional factor of safety in accordance with Table D-7 of the South Orange County Technical Guidance Document should be applied by the project civil engineer.**

Encased Falling Head Infiltration Test

Project Name:	OC Parks Crawford Park			**Date:**	4/29/2020
Project Number:	20-188-00			**Tested By:**	RC
Test Hole Number:	DH-6			**USCS Soil Classification:**	SC
Total Depth :	3.00	feet		**Water Temperature:**	70 °F
Test Hole Diameter:	6.00 inches	radius=	3 inches		

	Test No.	Start Time	End Time	ΔT (min)	Total Time (min)	Initial Depth of Water (ft)	Final Depth of Water (ft)	H_0 (in)	H_f (in)	ΔH (in)	Unfactored Infiltration Rate (in/hour)
Trial 1	1	8:15	8:35	20.0	60.0	2.00	2.10	12.00	10.75	1.25	3.75
	2	8:35	8:55	20.0	80.0	2.10	2.13	10.75	10.50	0.25	0.75
	3	8:55	9:15	20.0	100.0	2.13	2.15	10.50	10.25	0.25	0.75
	4	9:15	9:35	20.0	120.0	2.15	2.18	10.25	9.88	0.38	1.13
	5	9:35	9:55	20.0	140.0	2.18	2.20	9.88	9.63	0.25	0.75
	6	9:55	10:15	20.0	160.0	2.20	2.21	9.63	9.50	0.13	0.38
Trial 2	1	10:15	10:35	20.0	180.0	2.00	2.03	12.00	11.63	0.38	1.13
	2	10:35	10:55	20.0	200.0	2.03	2.05	11.63	11.38	0.25	0.75
	3	10:55	11:15	20.0	220.0	2.05	2.07	11.38	11.13	0.25	0.75
	4	11:15	11:35	20.0	240.0	2.07	2.08	11.13	11.00	0.13	0.38
	5	11:35	11:55	20.0	260.0	2.08	2.09	11.00	10.88	0.13	0.38
	6	11:55	12:15	20.0	280.0	2.09	2.13	10.88	10.50	0.38	1.13
Trial 3	1	12:15	12:35	20.0	300.0	1.95	1.97	12.63	12.38	0.25	0.75
	2	12:35	12:55	20.0	320.0	1.97	1.99	12.38	12.13	0.25	0.75
	3	12:55	13:15	20.0	340.0	1.99	2.00	12.13	12.00	0.13	0.37
	4	13:15	13:35	20.0	360.0	2.00	2.02	12.00	11.75	0.25	0.75
	5	13:35	13:55	20.0	380.0	2.02	2.03	11.75	11.63	0.13	0.38
	6	13:55	14:15	20.0	400.0	2.03	2.05	11.63	11.38	0.25	0.75

WATER TEMPERATURE CORRECTION FACTOR:	0.90
SAFETY FACTOR*:	2
UNFACTORED INFILTRATION RATE (IN/HR):	0.67
FACTORED INFILTRATION RATE (IN/HR):	0.34

Factor Category	Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) = w x v
Suitability Assessment	Soil assessment methods	0.25	2	0.5
	Predominant soil texture	0.25	2	0.5
	Site soil variablity	0.25	2	0.5
	Depth to groundwater	0.25	1	0.25
			Geotechnical Factor of Safety (SA):	1.75

Concern Level	Factor Value (v)
Low	1
Medium	2
High	3

Factor Description	High Concern	Medium Concern	Low Concern
Soil assessment methods	Use of borhole methods to estimate vertical infiltration rate (not recommended, but may be necessary at a planning level). Less than 2 tests per BMP	At least 2 tests per BMP. Use of borehole tests for dry wells or infiltration trenches. Use of infiltrometer or small scale PIT methods for vertical infiltration BMPs.	Extensive infiltration testing such as: PIT testing or infiltrometer testing at 3+ locations per BMP, and/or commitment to construction phase testing and design adaption if necessary.
Predominant soil texture	Silty and clayey soils with significant fines	Finer sandy soils with some loam content	Clean, granular soils (sands)
Site soil variablity	Highly variable soils indicated from site assessment or limited soil borings collected during site assessment.	Soil borings/test pits indicate moderately homogeneous soils.	Multiple soil borings/test pits indicate relatively homogeneous soils.
Depth to groundwater	Groundwater conditions or movement not well understood.	Seasonal high GW at least 10 ft below facility bottom.	Seasonal high GW at least 15 ft below facility bottom.

***Factor of safety should not be less than 2. Additional factor of safety in accordance with Table D-7 of the South Orange County Technical Guidance Document should be applied by the project civil engineer.**

Appendix F
Hazardous Materials Assessment

Attachment E

ORANGE COUNTY
OC PublicWorks
Our Community. Our Commitment.

Jess A. Carbajal, Director
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188

Memorandum

DATE: October 24, 2011

TO: John D. Pavlik, Manager, Right of Way Engineering

FROM: Manager, Environmental Resources

SUBJECT: Hazardous Materials Assessment for the North Tustin Park Parcel, Northwest Corner of Newport Avenue and Crawford Canyon Road, Unincorporated Orange County; ROWE I.D. No. 2011-41

Please find attached the Hazardous Materials Assessment (HMA) report prepared by Environmental Resources (ER) for the subject property. This HMA was prepared by ER in response to the request dated September 20, 2011 from Right of Way Engineering (ROWE).

The scope of work completed for this HMA involved: 1) a review of historical documents; 2) a regulatory agency database search; 3) interviews; 4) a property inspection; and 5) a reconnaissance of the adjoining sites and areas surrounding the property. The following presents the findings of the HMA:

- The property consists of a triangular unimproved parcel on the northwest corner of Crawford Canyon Road and Newport Avenue.
- The review of historical documents, which included historical topographic maps, aerial photographs, city directories, and Sanborn fire insurance maps did not identify RECs associated with the subject property or adjoining sites.
- The regulatory database search identified one mapped listing around the subject property. Nine orphan sites were also listed in the database search. However, further investigation determined that these target and orphan listings have a low potential for impacting the property.
- The property inspection and area reconnaissance did not identify RECs associated with the property or its adjoining sites. The site does contain some maintenance issues that would be considered *de minimis* conditions including: storm drain outfall maintenance, removing the accumulated soil piles to improve site drainage and sediment/erosion control on the property, and accumulated trash and debris piles on the property.
- Interview activities, including a review of the TDS provided by the property owner, did not identify RECs for the property.

Based on ER's document review, database research, and field reconnaissance, no evidence of environmental degradation to the property from hazardous materials contamination has been identified. Therefore, ER recommends that the property acquisition proceed. Although not necessarily HMA concerns, the following issues should be evaluated as part of the acquisition:

- Maintenance of the storm drain on the northeast corner of the property to facilitate site drainage;
- Re-grading of the property to remove the accumulated soil piles and to improve sediment/erosion control on the property; and
- Disposal of accumulated trash and debris from the site.

This HMA Update will be valid for a period of 18 months, through ~~October~~ April 3 2012.

Any questions concerning the HMA should be directed to James Fortuna at (714) 955-0677.

Chris Crompton

KB: HMA: TG 800, F6; EC41453

Attachment: Hazardous Materials Assessment

Appendix G
Hydrology Analysis

HYDROLOGY ANALYSIS

FOR

CRAWFORD CANYON PARK

S. CRAWFORD CANYON ROAD & NEWPORT BLVD

City of Tustin

County of Orange, California

November 16, 2020

Prepared for:
OC PARKS
OC Public Works
300 N. Flower Street
Santa Ana, CA 92703-5000

Prepared by:
Hunsaker & Associate Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949)583-1010

HYDROLOGY ANALYSIS

FOR

CRAWFORD CANYON PARK

S. CRAWFORD CANYON ROAD & NEWPORT BLVD

City of Tustin

County of Orange

November 16, 2020



PREPARED UNDER THE SUPERVISION OF:

11/16/2020

Jianhua "Gary" Guan, R.C.E. 64519, Exp. 06/30/21 Date:

TABLE OF CONTENTS

SECTION TITLE

1 INTRODUCTION

- **A. PROJECT LOCATION**
- **B. STUDY PURPOSE**
- **C. DISCUSSION**
- **D. HYDROLOGY METHODOLOGY**
- **E. HYDROLOGY STUDY RESULTS**
- **F. CONCLUSIONS**
- **G. WATER QUALITY MANAGEMENT PLAN REPORT**

2 EXISTING CONDITION HYDROLOGY CALCULATIONS & MAP

- **A. 2-YEAR STORM**
- **B. 25-YEAR STORM**
- **C. 100-YEAR STORM**

3 PROPOSED CONDITION HYDROLOGY CALCULATIONS & MAP

- **A. 2-YEAR STORM**
- **B. 25-YEAR STORM**
- **C. 100-YEAR STORM**

4 REFERENCES

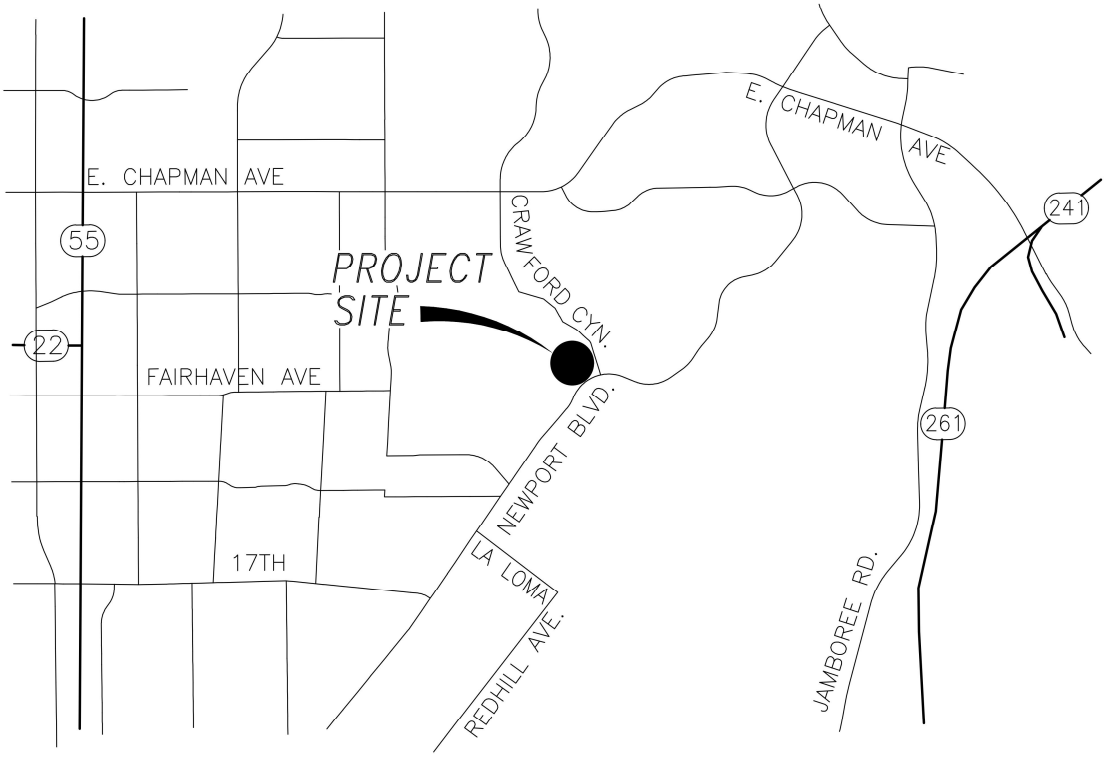
- **A. HYDROLOGIC SOILS GROUP MAP – PLATE B**
- **B. CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION PHASE 1**

SECTION I

INTRODUCTION

A. PROJECT LOCATION

The project site is located on the northwest corner of Newport Avenue and Crawford Canyon Road in the City of Tustin. The site is bound by Newport Avenue on the south, existing single family residences on the north and west, and Crawford Canyon Road on the east. The general location of the project site can be found blow.



LOCATION MAP

B. STUDY PURPOSE

The purpose of this preliminary hydrology study is to determine the flow rates produced by the site in its existing and proposed conditions for comparisons. It will also serve as the basis for analyzing and designing the proposed development's required storm drain system. This report has been extended to perform the off-site hydrology analysis for the existing storm drain systems within the project site.

As part of the report, the 2-year, 25- and 100-year storm events for both existing and proposed conditions were analyzed. In addition, water quality BMPs are provided to ensure all flows will be treated prior to release into the existing storm drain systems downstream.

C. DISCUSSION

Existing Condition:

The project site in the size of approximate 3.9 acre is located on the northwest corner of Newport Avenue and Crawford Canyon Road in the City of Tustin. Currently, the project site is a public park with paved areas, concrete channels, scattered trees and vegetation.

There are existing storm drain systems within the project site. The existing storm drain systems convey the offsite runoffs from the north and east existing single family residential developments.

There is an existing 30" storm drain and 36" storm drain at the northeast corner of the project for the off-site flows. There is an existing 48" pipe after the confluence of the existing 30" and 36" pipes. The 48" storm drains discharge into an existing energy dissipater and ultimately into the existing trapezoidal earthen/concrete channel. The existing trapezoidal channel joins an existing 42" RCP at the southwest corner of the project and ultimately discharges into an existing 60-inch RCP along Newport Boulevard.

Majority of runoffs within the project site, including west half of Crawford Canyon Road sheet flows from east to west into a depressed area downstream where flows are collected and conveyed into the on-site trapezoidal channel.

Existing concrete v-ditches are located along the southern boundary along Newport Blvd to collect and convey the flows within the project site and are discharged into the existing trapezoidal channel downstream via a concrete down drain.

Refer to Exhibit 1 for off-site hydrology map and Exhibit 2 for on-site hydrology map for detailed drainage facilities

Proposed Condition:

The park improvements will consist of the following:

- New asphalt-concrete parking lot
- New storm water basin
- 8-foot wide walkways
- 5-foot wide trails
- Picnic tables and benches
- Exercise station
- Pedestrian bridges
- Various play areas
- Retaining wall in order to create a level area for the new parking lot

The proposed project drainage pattern remains the same as the existing condition. The off-site hydrology studies remain the same without any changes.

An inlet is proposed for the concrete down drain at the northeastern corner of the project and will be proposed to join the existing 30-inch RCP underneath. A 16-Ft wide turf block access road will be proposed for the existing 48" pipe.

The majority of the on-site runoffs will be collected and conveyed by a meandering natural creek swale, which traverses the park site from east to west. A Bioretention basin is proposed at the end of the swale for water quality treatments. The storm runoffs from the Bioretention basin discharge to the existing trapezoidal channel.

An inlet and Filterra unit are proposed at the entrance to the parking lot. The storm drain system is proposed to join the existing trapezoidal channel which discharges into by an existing 42-inch RCP and ultimately into an existing 60-inch RCP along Newport Boulevard

Refer to Exhibit 3 for on-site hydrology map and the proposed drainage systems.

D. HYDROLOGY METHODOLOGY

The rational method was used to calculate the design discharge for the local drainage areas since the watershed area to the proposed storm drain systems is less than one square mile.

Hydrologic calculations to determine the 2-, 25- and 100-year discharges at critical locations throughout the project site were performed using the Orange County Rational Method. A technical description of the rational method is provided in the Orange County Hydrology Manual dated October, 1986. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for small watersheds for storms of a specified recurrence interval. The rational method equation is based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity and a loss coefficient which describes the effects of land use and soil type. The design discharges were computed by generating a hydrologic "link-node" model which divides the area into subareas, each tributary to a concentration point or hydrologic "node" point determined by the proposed terrain or street layout.

The following assumptions/guidelines were applied for use of the Rational Method.

- The rational Method Hydrology includes the effects of infiltration caused by soil surface characteristics. The soil map from Orange County Hydrology Manual indicates that the study area consists of soil types B, C & D. Refer to soils Map in Section 4. Hydrologic soils ratings are based on a scale of A through D, where A is the most pervious, providing the least runoff.

- The infiltration rate is also affected by the type of vegetation or ground cover and percentage of impervious surface. The runoff coefficients used for this study were based on the proposed land uses.
- Standard intensity-duration curve data was taken from the Orange County Hydrology Manual, dated October, 1986.

The hydrologic calculations were prepared using the Advanced Engineering Software (A.E.S.) Rational Method computer program. The results of the hydrologic calculations were used to design the required storm drain facilities.

E. HYDROLOGY STUDY RESULTS

There is only one drainage area within the studied reach for both the existing condition and proposed condition.

There are no available hydrology studies for the existing 30" and 36" pipe at the northeastern corner of the project site. This hydrology study was extended to include the off-site drainage areas. The 2-ft contour interval orthotopo mapping and aerial image was used to determine the drainage boundaries and land uses in the hydrology studies. The off-site hydrology studies (Exhibit 1) remain the same for the existing and proposed conditions.

The existing condition hydrology map and calculations can be found in Section 2 and the proposed condition hydrology analysis can be found in Section 3. Table 1 summarizes the hydrology analysis results for the overall hydrology study.

TABLE 1. CRAWFORD CANYON PARK OVERALL HYDROLOGY SUMMARY

Drainage Area	Existing Condition				Proposed Condition				Delta (Proposed-Existing)			
	Area	2-year	25-year	100-year	Area	2-year	25-year	100-year	Area (Ac)	2-year	25-year	100-year
	(acre)	(cfs)	(cfs)	(cfs)	(acre)	(cfs)	(cfs)	(cfs)	(acre)	(cfs)	(cfs)	(cfs)
Overall	37.1	35.8	86.4	113.2	37.1	35.7	86.0	112.9	0.0	-0.1	-0.4	-0.3

As indicated in the table 1, the overall peak runoffs are similar to the existing condition after the park improvements. The overall tributary areas remain the same and the proposed condition flow rate are all less than the existing levels.

F. CONCLUSION

Overall, it is concluded that there will have no adverse impacts to the existing drainage systems due to the project developments.

H. WATER QUALITY MANGEMENT PLAN REPORT

The water quality BMPs are provided for the project to meet the WQMP and LID requirements and is provided per separate report.

SECTION II
EXISTING CONDITION HYDROLOGY CALCULATIONS &MAP

A. 2-YEAR STORM

```
 ************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
                Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Existing Condition                                                    *
* 2-year Storm                                                          *
 ************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:25 11/13/2020
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    4.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
 FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.09
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
 STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
 FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.90
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.28
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.48
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.78
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.42
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.42
 RAINFALL INTENSITY(INCH/HR) =   1.57
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.62
 EFFECTIVE STREAM AREA(ACRES) =       2.12
 TOTAL STREAM AREA(ACRES) =       2.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
     2        2.78    9.42    1.573  0.25( 0.15) 0.62       2.1      20.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       23.14    9.42    1.573  0.21( 0.15) 0.72      17.9      20.00
     2       25.35   13.49    1.281  0.21( 0.15) 0.72      24.6      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      25.35    Tc(MIN.) =    13.49
 EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
 TOTAL AREA(ACRES) =       24.6
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.77
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.35
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.62
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
 EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      28.26

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.82
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      28.26
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.16
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.245
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    36
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    50
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =    4.60
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.13      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.13
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =      32.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.10      0.20     0.100    57    5.00
  PUBLIC PARK               C        0.30      0.25     0.850    50    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        1.33      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =    7.53
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    1.84
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        1.27      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =    8.98
 SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    1.56
 EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
 AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
 TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       3.71

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.07
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.71
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.11
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.11
 RAINFALL INTENSITY(INCH/HR) =   1.60
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.82
 EFFECTIVE STREAM AREA(ACRES) =       3.00
 TOTAL STREAM AREA(ACRES) =       3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.71

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       31.66   10.25    1.500  0.22( 0.15) 0.68      26.0      20.00
     1       32.15   14.30    1.238  0.22( 0.15) 0.69      32.8      10.00
     2        3.71    9.11    1.604  0.29( 0.24) 0.82       3.0      30.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.05    9.11    1.604  0.23( 0.16) 0.70      26.1      30.00
     2       35.09   10.25    1.500  0.23( 0.16) 0.70      29.0      20.00
     3       34.87   14.30    1.238  0.23( 0.16) 0.70      35.8      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      35.09    Tc(MIN.) =    10.25
 EFFECTIVE AREA(ACRES) =      28.98   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
 TOTAL AREA(ACRES) =       35.8
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.452
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        0.58      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.73
 AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
 Tc(MIN.) =   10.84
 SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.62
 EFFECTIVE AREA(ACRES) =     29.56     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
 TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      35.09
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.77
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.84
  RAINFALL INTENSITY(INCH/HR) =   1.45
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =      29.56
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.09

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.968
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               B        0.20      0.30     0.850    36    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.96
  Tc(MIN.) =    8.33
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.42
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   10.38
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       0.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.354
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.33
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =   12.24
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       0.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.77
  FLOW VELOCITY(FEET/SEC.) =   2.98   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =   12.46
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.46
  RAINFALL INTENSITY(INCH/HR) =   1.34
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.05    9.71    1.547  0.23( 0.16) 0.70      26.7      30.00
      1       35.09   10.84    1.452  0.23( 0.16) 0.70      29.6      20.00
      1       34.87   14.90    1.210  0.23( 0.16) 0.71      36.4      10.00
      2        0.77   12.46    1.340  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.83    Tc(MIN.) =    10.84
  EFFECTIVE AREA(ACRES) =      30.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.84
  EFFECTIVE AREA(ACRES) =     30.24  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.703
  PEAK FLOW RATE(CFS)   =      35.83

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B. 25-YEAR STORM

```
______________________________________________________________________________
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
                Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Existing Condition                                                    *
* 25-year Storm                                                         *
 ************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:26 11/13/2020
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.842
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    77    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      3.85

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.85
  FLOW VELOCITY(FEET/SEC) =   6.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    77
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       7.06

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    9.98
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.263
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    9.81
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      16.14

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.66
 FLOW VELOCITY(FEET/SEC.) =  7.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.63
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.36
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.64
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.91
 STREET FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   12.34
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   14.42
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      28.61

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
 FLOW VELOCITY(FEET/SEC.) =  7.96   DEPTH*VELOCITY(FT*FT/SEC.) =   3.20
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.79
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      28.61
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.41
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.41
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   26.89
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.20
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.42
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   12.57
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.57
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    69    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      4.00
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      4.00

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =    8.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.507
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    69
  COMMERCIAL                 C        0.30      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    2.89
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.72
  FLOW VELOCITY(FEET/SEC.) =  6.17   DEPTH*VELOCITY(FT*FT/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.02
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.40
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.09
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.09
 RAINFALL INTENSITY(INCH/HR) =   3.44
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.62
 EFFECTIVE STREAM AREA(ACRES) =       2.12
 TOTAL STREAM AREA(ACRES) =       2.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.40

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       55.42   12.57    2.862  0.21( 0.15) 0.73      22.5      10.00
     2        6.40    9.09    3.439  0.25( 0.15) 0.62       2.1      20.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       54.99    9.09    3.439  0.21( 0.15) 0.72      18.4      20.00
     2       60.69   12.57    2.862  0.21( 0.15) 0.72      24.6      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      60.69    Tc(MIN.) =    12.57
 EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
 TOTAL AREA(ACRES) =       24.6
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.24
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      60.69
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.68
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.68
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    8.08
 EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      67.93

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.60
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      67.93
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.11
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.11
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.795
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    69
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   11.10
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =      77.68

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.13      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      77.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.15
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   13.21
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =      77.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =  11.13
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.21
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      77.68

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.10      0.20     0.100    75    5.00
  PUBLIC PARK                C        0.30      0.25     0.850    69    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.025
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.33      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.96
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.89
  Tc(MIN.) =    6.89
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       5.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   3.33
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.702
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        1.27      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.87
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
 AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   1.10
 Tc(MIN.) =    7.98
 SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    3.94
 EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
 AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
 TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       9.34

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   4.21
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.35
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.34
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.08
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.08
 RAINFALL INTENSITY(INCH/HR) =   3.68
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.82
 EFFECTIVE STREAM AREA(ACRES) =       3.00
 TOTAL STREAM AREA(ACRES) =       3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.34

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       75.47    9.74    3.307  0.22( 0.15) 0.68      26.5      20.00
     1       77.68   13.21    2.783  0.22( 0.15) 0.69      32.8      10.00
     2        9.34    8.08    3.676  0.29( 0.24) 0.82       3.0      30.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       79.26    8.08    3.676  0.23( 0.16) 0.70      25.0      30.00
     2       83.80    9.74    3.307  0.23( 0.16) 0.70      29.5      20.00
     3       84.59   13.21    2.783  0.23( 0.16) 0.70      35.8      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      84.59    Tc(MIN.) =    13.21
 EFFECTIVE AREA(ACRES) =      35.77   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
 TOTAL AREA(ACRES) =       35.8
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        0.58      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      85.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.57
 AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.43
 Tc(MIN.) =   13.65
 SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    1.29
 EFFECTIVE AREA(ACRES) =     36.35     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.71
 TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      84.59
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =  10.52
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.65
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.71
  EFFECTIVE STREAM AREA(ACRES) =      36.35
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.59

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.203
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.20      0.30     0.850    56    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.71

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.742
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.99
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.45
  Tc(MIN.) =    7.83
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.72
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.05
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.50
  Tc(MIN.) =    9.33
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   3.14
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.135
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.16
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   1.37
  Tc(MIN.) =   10.70
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.31
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   3.16
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.02
  FLOW VELOCITY(FEET/SEC.) =   4.67   FLOW DEPTH(FEET) =   0.04
  TRAVEL TIME(MIN.) =   0.14   Tc(MIN.) =   10.85
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.85
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.26    8.52    3.566  0.23( 0.16) 0.70      25.6      30.00
      1       83.80   10.18    3.226  0.23( 0.16) 0.70      30.1      20.00
      1       84.59   13.65    2.732  0.23( 0.16) 0.71      36.4      10.00
      2        2.02   10.85    3.112  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       81.10    8.52    3.566  0.24( 0.17) 0.71      26.2      30.00
      2       85.78   10.18    3.226  0.23( 0.16) 0.70      30.8      20.00
      3       85.98   10.85    3.112  0.23( 0.16) 0.70      32.1      40.00
      4       86.35   13.65    2.732  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      86.35    Tc(MIN.) =    13.65
  EFFECTIVE AREA(ACRES) =      37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.65
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.709
  PEAK FLOW RATE(CFS)   =      86.35

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       81.10    8.52    3.566  0.24( 0.17) 0.71      26.2      30.00
      2       85.78   10.18    3.226  0.23( 0.16) 0.70      30.8      20.00
      3       85.98   10.85    3.112  0.23( 0.16) 0.70      32.1      40.00
      4       86.35   13.65    2.732  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

C. 100-YEAR STORM

```
______________________________________________________________________________
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                        Analysis prepared by:

                        HUNSAKER & ASSOCIATES
                              Irvine,Inc
                    Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Existing Condition                                                    *
* 100-year Storm                                                        *
 ************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:27 11/13/2020
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.914
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    92    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.00
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      5.00

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.00
  FLOW VELOCITY(FEET/SEC) =   6.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.81   Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    8.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.632
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    92
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       9.20

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =    9.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.198
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =   12.75
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      21.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
 FLOW VELOCITY(FEET/SEC.) =  8.38   DEPTH*VELOCITY(FT*FT/SEC.) =   2.99
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
   HALFSTREET FLOOD WIDTH(FEET) =   13.71
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.13
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.31
 STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   12.06
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.735
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   18.83
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      37.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
 FLOW VELOCITY(FEET/SEC.) =  8.54   DEPTH*VELOCITY(FT*FT/SEC.) =   3.67
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.66
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      37.44
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.12
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.12
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.725
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   35.13
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.47
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   12.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.28
  RAINFALL INTENSITY(INCH/HR) =   3.70
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.087
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    86    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      5.17
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    86
  COMMERCIAL                 C        0.30      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    3.75
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  6.55   DEPTH*VELOCITY(FT*FT/SEC.) =   2.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.92
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.32
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    8.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.96
 RAINFALL INTENSITY(INCH/HR) =   4.43
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.62
 EFFECTIVE STREAM AREA(ACRES) =       2.12
 TOTAL STREAM AREA(ACRES) =       2.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.32

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       72.47   12.28    3.698  0.21( 0.15) 0.73      22.5      10.00
     2        8.32    8.96    4.428  0.25( 0.15) 0.62       2.1      20.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       72.12    8.96    4.428  0.21( 0.15) 0.72      18.6      20.00
     2       79.36   12.28    3.698  0.21( 0.15) 0.72      24.6      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      79.36    Tc(MIN.) =    12.28
 EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
 TOTAL AREA(ACRES) =       24.6
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.42
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      79.36
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.38
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.38
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.681
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    76
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =   10.57
 EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      88.88

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.87
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      88.88
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.78
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.78
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.614
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    76
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    86
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   14.53
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =     101.73

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.599
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.13      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.23
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   12.87
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =     101.73
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =  12.31
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   3.60
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =     32.77
  TOTAL STREAM AREA(ACRES) =     32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     101.73

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.10      0.20     0.100    91    5.00
  PUBLIC PARK                C        0.30      0.25     0.850    86    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      2.17
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      2.17

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.212
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.33      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.75
  Tc(MIN.) =    6.75
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    5.93
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       7.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   3.62
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.810
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        1.27      0.30     0.850    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.36
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.32
 AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   1.01
 Tc(MIN.) =    7.76
 SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    5.21
 EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
 AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
 TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =      12.33

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   4.52
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.35
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.33
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.85
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.85
 RAINFALL INTENSITY(INCH/HR) =   4.78
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.82
 EFFECTIVE STREAM AREA(ACRES) =       3.00
 TOTAL STREAM AREA(ACRES) =       3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       98.93    9.57    4.265  0.22( 0.15) 0.68      26.7      20.00
     1      101.73   12.87    3.599  0.22( 0.15) 0.69      32.8      10.00
     2       12.33    7.85    4.777  0.29( 0.24) 0.82       3.0      30.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      103.61    7.85    4.777  0.23( 0.16) 0.70      24.9      30.00
     2      109.87    9.57    4.265  0.23( 0.16) 0.70      29.7      20.00
     3      110.85   12.87    3.599  0.23( 0.16) 0.70      35.8      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     110.85    Tc(MIN.) =    12.87
 EFFECTIVE AREA(ACRES) =      35.77   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
 TOTAL AREA(ACRES) =       35.8
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.537
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        0.58      0.30     0.850    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     111.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.59
 AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   0.40
 Tc(MIN.) =   13.27
 SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    1.71
 EFFECTIVE AREA(ACRES) =     36.35     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.71
 TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =     110.85
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =  11.60
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.27
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.71
  EFFECTIVE STREAM AREA(ACRES) =      36.35
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     110.85

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               B        0.20      0.30     0.850    76    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.832
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.23      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.32
  Tc(MIN.) =    7.70
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.95
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   3.51
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.396
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.23      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.32
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.38
  Tc(MIN.) =    9.08
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   3.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.085
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.12      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.50
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =   10.32
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOW VELOCITY(FEET/SEC.) =   3.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.69
  FLOW VELOCITY(FEET/SEC.) =   5.27   FLOW DEPTH(FEET) =   0.05
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      103.61    8.26    4.642  0.23( 0.16) 0.70      25.5      30.00
      1      109.87    9.97    4.167  0.23( 0.16) 0.70      30.3      20.00
      1      110.85   13.27    3.537  0.23( 0.16) 0.71      36.4      10.00
      2        2.69   10.44    4.057  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      106.06    8.26    4.642  0.24( 0.17) 0.71      26.1      30.00
      2      112.51    9.97    4.167  0.23( 0.16) 0.70      31.0      20.00
      3      112.70   10.44    4.057  0.23( 0.16) 0.70      31.9      40.00
      4      113.17   13.27    3.537  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     113.17    Tc(MIN.) =    13.27
  EFFECTIVE AREA(ACRES) =      37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.27
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.709
  PEAK FLOW RATE(CFS)   =     113.17

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      106.06    8.26    4.642  0.24( 0.17) 0.71      26.1      30.00
      2      112.51    9.97    4.167  0.23( 0.16) 0.70      31.0      20.00
      3      112.70   10.44    4.057  0.23( 0.16) 0.70      31.9      40.00
      4      113.17   13.27    3.537  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

DANIGER RD

S CRAWFORD CYN RD

PINE CYN RD

OVERBROOK DR

VILLA DEL CERRO

STRAND TERRACE

915.0 EL.

10

11

12

13

14

15

L=380'

L=325'

L=730'

L=1,085'

A1 1.19

A2 1.14

A3 2.49

A4 5.82

A5 10.85

Q_2 =23.1cfs
Q_{25} =55.4cfs
Q_{100}=72.5cfs
t=13.3
Total Area=22.5ac

Q_2 =11.3cfs
Q_{25} =26.9cfs
Q_{100}=35.1cfs

Q_2 = 1.7cfs
Q_{25} = 3.9cfs
Q_{100}= 5.0cfs
t=7.5
750.0 EL.

Q_2 = 3.0cfs
Q_{25} = 7.1cfs
Q_{100}= 9.2cfs
t=8.5
600.0 EL.

Q_2 =11.9cfs
Q_{25} =28.6cfs
Q_{100}=37.4cfs
t=13.2
395.0 EL.

Q_2 = 6.9cfs
Q_{25} =16.1cfs
Q_{100}=21.0cfs
t=10.4
503.0 EL.

EX. 30" PIPE

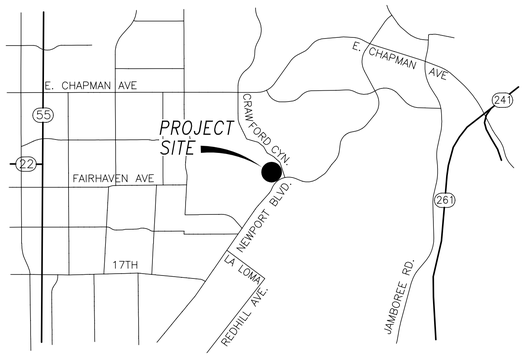
EX. 36" PIPE

EX. 48" PIPE

CRAWFORD PARK
SEE EXHIBIT 2 FOR EX. CONDITION
SEE EXHIBIT 3 FOR PROPOSED CONDITION

S CRAWFORD CYN RD

PROJECT BOUNDARY



LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SCALE: 1" =80'

80 40 0 80 160 240
GRAPHIC SCALE 1"= 80'

LEGEND

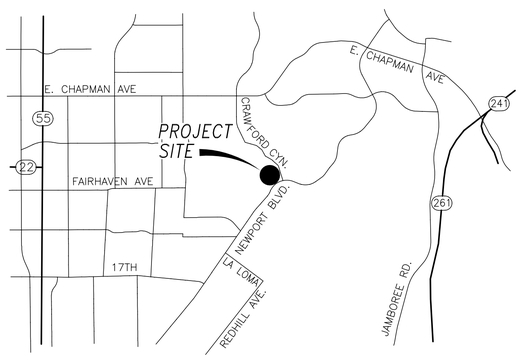
- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

EXHIBIT 1
OFF-SITE HYDROLOGY MAP
CRAWFORD PARK
S. CRAWFORD CANYON RD. & NEWPORT BLVD.
TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

PLOTTED BY: Gary Guan DATE: Nov. 13, 2020 08:16:49 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Offsite.dwg





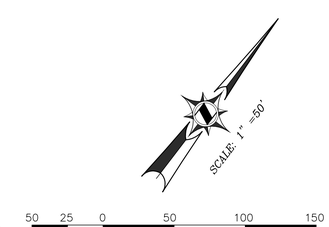
LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759



LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

EXHIBIT 2
EXISTING CONDITION HYDROLOGY MAP (ONSITE)
CRAWFORD PARK
S. CRAWFORD CANYON RD. & NEWPORT BLVD.
TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK - ON-SITE

PLOTTED BY: Gary Guan DATE: Nov. 15, 2020 07:28:11 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology_Onsite.dwg

SECTION III
PROPOSED CONDITION HYDROLOGY CALCULATIONS &MAP

A. 2-YEAR STORM

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                        Analysis prepared by:

                        HUNSAKER & ASSOCIATES
                              Irvine,Inc
                    Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Proposed Condition                                                    *
* 2-year Storm                                                          *
 ************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:44 11/14/2020
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    4.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
 FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.09
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
 STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
 FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.90
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.28
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.581
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               C        0.14      0.25     0.850    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.90

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.90
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
      2        2.90    9.41    1.575  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.24    9.41    1.575  0.21( 0.15) 0.72      18.0      20.00
      2       25.44   13.49    1.281  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.44    Tc(MIN.) =    13.49
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      28.39

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.39
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.00      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        C        0.50      0.25     0.600    50
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        2.16      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     4.66      SUBAREA RUNOFF(CFS) =     4.60
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.16
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.11
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      32.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.12      0.20     0.100    57    5.38
  PUBLIC PARK                 D        0.14      0.20     0.850    57    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.985
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.67
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.91
  Tc(MIN.) =    6.29
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.947
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    36
  PUBLIC PARK                B        0.84      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.05
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.21
  Tc(MIN.) =    6.50
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.46
  Tc(MIN.) =    6.96
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       2.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =    8.06
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       3.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   3.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.03
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.689
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        1.10      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    1.42
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       4.38

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   1.68
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.83   10.23    1.501  0.22( 0.15) 0.68      26.1      20.00
      1       32.28   14.30    1.238  0.22( 0.15) 0.69      32.9      10.00
      2        4.38    8.39    1.682  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.39    1.682  0.23( 0.16) 0.70      24.7      30.00
      2       35.66   10.23    1.501  0.23( 0.16) 0.69      29.4      20.00
      3       35.32   14.30    1.238  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.66    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      29.43   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.41      0.30     0.850    36
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   10.82
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =     29.84     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.75
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.82
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    36
  PUBLIC PARK                B        0.26      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =     30.32   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.82
  EFFECTIVE AREA(ACRES) =     30.32  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.693
  PEAK FLOW RATE(CFS)   =      35.66

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.99    1.617  0.24( 0.16) 0.70      25.6      30.00
      2       35.66   10.82    1.453  0.23( 0.16) 0.69      30.3      20.00
      3       35.32   14.89    1.210  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B. 25-YEAR STORM

```
______________________________________________________________________________
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
                Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Proposed Condition                                                    *
* 25-year Storm                                                         *
 ************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:45 11/14/2020
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.842
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    77    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      3.85

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.85
  FLOW VELOCITY(FEET/SEC) =   6.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    77
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       7.06

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    9.98
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.263
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    9.81
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      16.14

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.66
 FLOW VELOCITY(FEET/SEC.) =  7.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.63
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.36
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.64
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.91
 STREET FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   12.34
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   14.42
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      28.61

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
 FLOW VELOCITY(FEET/SEC.) =  7.96   DEPTH*VELOCITY(FT*FT/SEC.) =   3.20
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.79
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      28.61
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.41
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.41
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   26.89
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.20
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.42
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   12.57
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.57
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    69    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      4.00
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      4.00

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =    8.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.507
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    69
  COMMERCIAL                 C        0.30      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    2.89
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.72
  FLOW VELOCITY(FEET/SEC.) =  6.17   DEPTH*VELOCITY(FT*FT/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.40
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.03
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.452
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               C        0.14      0.25     0.850    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       6.70

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.70
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.42   12.57    2.862  0.21( 0.15) 0.73      22.5      10.00
      2        6.70    9.08    3.441  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.27    9.08    3.441  0.21( 0.15) 0.72      18.5      20.00
      2       60.94   12.57    2.862  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.94    Tc(MIN.) =    12.57
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.25
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.94
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.68
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    8.08
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      68.26

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.61
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.26
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.795
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.00      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        C        0.50      0.25     0.600    69
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        2.16      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     4.66      SUBAREA RUNOFF(CFS) =   11.10
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =      78.01

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.12      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      78.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.20
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   13.21
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      78.01
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =  11.18
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.21
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      78.01

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.629
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.12      0.20     0.100    75    5.38
  PUBLIC PARK                 D        0.14      0.20     0.850    75    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.06

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.294
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.37
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    6.14
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   4.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.226
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.84      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.12
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   0.18
  Tc(MIN.) =    6.32
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       4.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   6.77
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.094
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.12
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    6.68
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       5.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   4.18
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.30
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   0.89
  Tc(MIN.) =    7.57
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    2.08
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       7.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   4.38
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.25
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    7.79
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        1.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =      10.59

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.59
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.84
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.84
  RAINFALL INTENSITY(INCH/HR) =   3.74
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.59

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       75.86    9.73    3.309  0.22( 0.15) 0.68      26.6      20.00
      1       78.01   13.21    2.783  0.22( 0.15) 0.69      32.9      10.00
      2       10.59    7.84    3.740  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       80.02    7.84    3.740  0.23( 0.16) 0.70      24.8      30.00
      2       85.14    9.73    3.309  0.23( 0.16) 0.69      30.0      20.00
      3       85.71   13.21    2.783  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      85.71    Tc(MIN.) =    13.21
  EFFECTIVE AREA(ACRES) =      36.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.41      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      86.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.59
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.43
  Tc(MIN.) =   13.65
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =     36.65     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =      85.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =  10.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    56
  PUBLIC PARK                B        0.26      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      85.97
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.65
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.700
  PEAK FLOW RATE(CFS)   =      85.97

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       80.03    8.28    3.626  0.24( 0.16) 0.70      25.7      30.00
      2       85.21   10.16    3.228  0.23( 0.16) 0.69      30.9      20.00
      3       85.97   13.65    2.733  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

C. 100-YEAR STORM

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                        Analysis prepared by:

                        HUNSAKER & ASSOCIATES
                              Irvine,Inc
                    Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Proposed Condition                                                    *
* 100-year Storm                                                        *
 ************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:45 11/14/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.914
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    92    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.00
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.00
  FLOW VELOCITY(FEET/SEC) =   6.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.81   Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.632
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    92
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       9.20

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =    9.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.198
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =   12.75
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      21.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
 FLOW VELOCITY(FEET/SEC.) =  8.38   DEPTH*VELOCITY(FT*FT/SEC.) =   2.99
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
   HALFSTREET FLOOD WIDTH(FEET) =   13.71
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.13
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.31
 STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   12.06
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.735
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   18.83
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      37.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
 FLOW VELOCITY(FEET/SEC.) =  8.54   DEPTH*VELOCITY(FT*FT/SEC.) =   3.67
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.66
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      37.44
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.12
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.12
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.725
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   35.13
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.47
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   12.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.28
  RAINFALL INTENSITY(INCH/HR) =   3.70
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.087
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    86    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      5.17
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    86
  COMMERCIAL                 C        0.30      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    3.75
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  6.55   DEPTH*VELOCITY(FT*FT/SEC.) =   2.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.83
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.444
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               C        0.14      0.25     0.850    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.53
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       8.72

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.95
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.95
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.47   12.28    3.698  0.21( 0.15) 0.73      22.5      10.00
      2        8.72    8.95    4.431  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.50    8.95    4.431  0.21( 0.15) 0.72      18.7      20.00
      2       79.69   12.28    3.698  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.69    Tc(MIN.) =    12.28
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.43
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.69
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.38
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.33      0.30     0.600    76
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      C        3.00      0.25     0.600    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =   10.57
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      89.32

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.88
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      89.32
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.78
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.614
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.00      0.30     0.600    76
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        C        0.50      0.25     0.600    86
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        2.16      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   14.53
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =     102.16

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.599
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.12      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     102.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.28
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   12.87
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.36
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =     102.16
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.73   FLOW VELOCITY(FEET/SEC.) =  12.26
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   3.60
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     102.16

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.934
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.12      0.20     0.100    91    5.38
  PUBLIC PARK                 D        0.14      0.20     0.850    91    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.36

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.525
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.67
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   0.71
  Tc(MIN.) =    6.09
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.35
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   4.70
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.442
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    76
  PUBLIC PARK                B        0.84      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.59
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.16
  Tc(MIN.) =    6.26
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    4.41
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       6.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   7.24
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.278
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.38
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    6.60
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       7.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   4.48
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.930
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.59
  AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   0.84
  Tc(MIN.) =    7.43
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    2.73
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       9.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   4.69
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.49
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.64
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        1.10      0.30      0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    4.55
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =      13.90

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.90
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.84
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       99.44    9.56    4.268  0.22( 0.15) 0.68      26.8      20.00
      1      102.16   12.87    3.599  0.22( 0.15) 0.69      32.9      10.00
      2       13.90    7.68    4.838  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      104.86    7.68    4.838  0.23( 0.16) 0.70      24.9      30.00
      2      111.62    9.56    4.268  0.23( 0.16) 0.70      30.1      20.00
      3      112.31   12.87    3.599  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     112.31    Tc(MIN.) =    12.87
  EFFECTIVE AREA(ACRES) =      36.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.537
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.41      0.30      0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     112.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.60
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =   13.27
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =     36.65     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =     112.31
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =  11.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.537
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    76
  PUBLIC PARK                B        0.26      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.46
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =     112.85
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.27
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.700
  PEAK FLOW RATE(CFS)   =     112.85

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      105.13    8.09    4.698  0.24( 0.16) 0.70      25.8      30.00
      2      111.95    9.95    4.170  0.23( 0.16) 0.69      31.0      20.00
      3      112.85   13.27    3.537  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

DANIGER RD

S CRAWFORD CYN RD

PINE CYN RD

OVERBROOK DR

VILLA DEL CERRO

STRAND TERRACE

EX. 30" PIPE

EX. 36" PIPE

EX. 48" PIPE

CRAWFORD PARK
SEE EXHIBIT 2 FOR EX. CONDITION
SEE EXHIBIT 3 FOR PROPOSED CONDITION

PROJECT BOUNDARY

A5 10.85

A4 5.82

A3 7.49

A2 1.14

A1 1.19

L=1,085'

L=730'

L=325'

L=280'

10

11

12

13

14

15

915.0 EL.

Q_2 = 1.7cfs
Q_{25} = 3.9cfs
Q_{100} = 5.0cfs
t=7.5
750.0 EL.

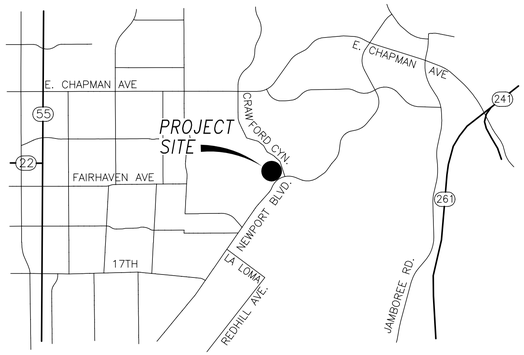
Q_2 = 3.0cfs
Q_{25} = 7.1cfs
Q_{100} = 9.2cfs
t=8.5
600.0 EL.

Q_2 = 6.9cfs
Q_{25} =16.1cfs
Q_{100}=21.0cfs
t=10.4
503.0 EL.

Q_2 =11.3cfs
Q_{25} =26.9cfs
Q_{100}=35.1cfs

ΣQ_2 =23.1cfs
ΣQ_{25} =55.4cfs
ΣQ_{100}=72.5cfs
t=13.3
Total Area=22.5ac

Q_2 =11.9cfs
Q_{25} =28.6cfs
Q_{100}=37.4cfs
t=13.2
395.0 EL.



LOCATION MAP

PREPARED FOR:
OCparks

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SCALE: 1" =80'

80 40 0 80 160 240
GRAPHIC SCALE 1"= 80'

LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ_{100}=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

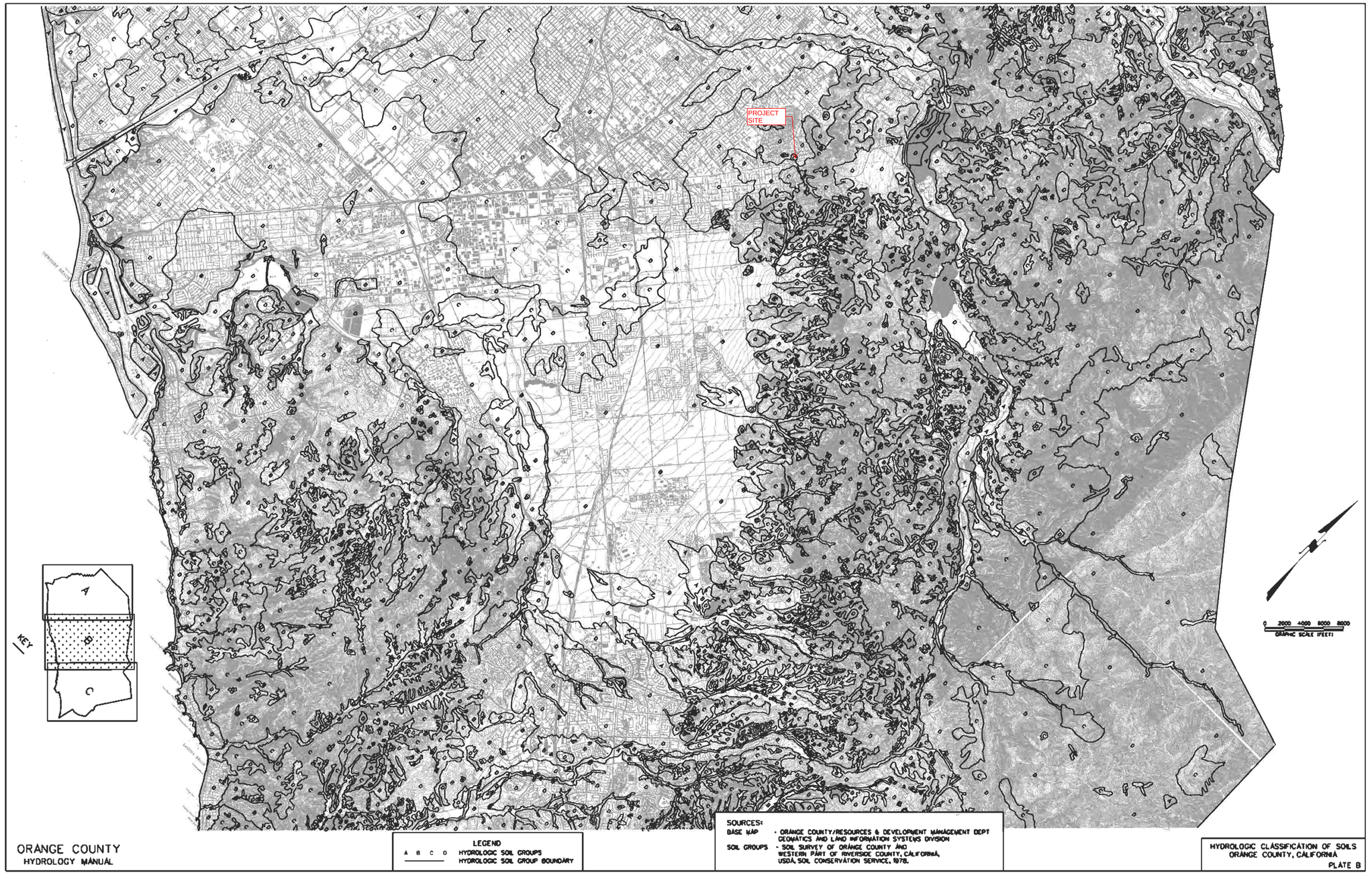
EXHIBIT 1
OFF-SITE HYDROLOGY MAP
CRAWFORD PARK
S. CRAWFORD CANYON RD. & NEWPORT BLVD.
TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

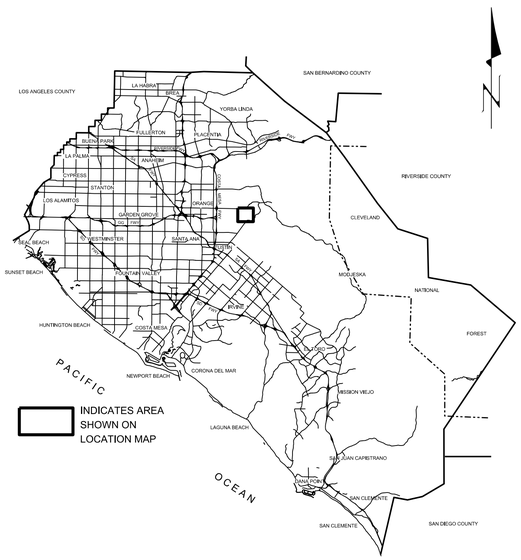
PLOTTED BY: Gary Guan DATE: Nov. 13, 2020 08:16:49 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Offsite.dwg

SECTION IV
REFERENCES

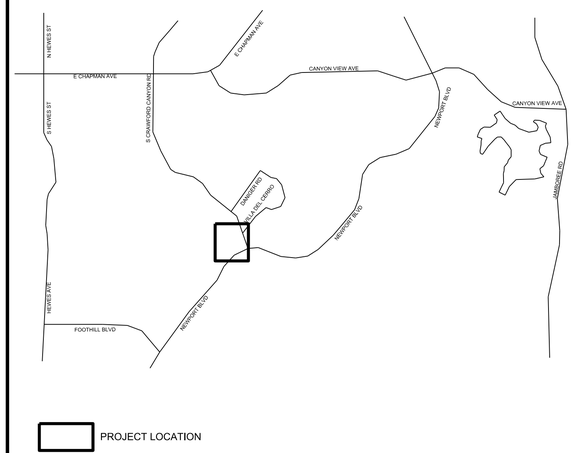
A. HYDROLOGIC SOIL GROUP MAP


PROJECT SITE
KEY
A
B
C
0 2000 4000 8000 8000
GRAPHIC SCALE (FEET)
LEGEND
A B C D HYDROLOGIC SOIL GROUPS
HYDROLOGIC SOIL GROUP BOUNDARY
SOURCES:
BASE MAP - ORANGE COUNTY/RESOURCES & DEVELOPMENT MANAGEMENT DEPT GEOMATICS AND LAND INFORMATION SYSTEMS DIVISION
SOIL GROUPS - SOIL SURVEY OF ORANGE COUNTY AND WESTERN PART OF RIVERSIDE COUNTY, CALIFORNIA, USDA, SOIL CONSERVATION SERVICE, 1978.
ORANGE COUNTY
HYDROLOGY MANUAL
HYDROLOGIC CLASSIFICATION OF SOILS
ORANGE COUNTY, CALIFORNIA
PLATE B

B. CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION PHASE 1



VICINITY MAP
(NO SCALE)



LOCATION MAP
(NO SCALE)

OC PUBLIC WORKS

SANTA ANA, CALIFORNIA
SHANE L. SILSBY, DIRECTOR

PLANS FOR CONSTRUCTION OF

CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1

NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

DECEMBER 2016

FUNDED BY: COUNTY OF ORANGE ROAD FUNDS

POST-PROJECT OWNERSHIP AND MAINTENANCE RESPONSIBILITY: COUNTY OF ORANGE

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	TYPICAL SECTIONS & ABBREVIATIONS
3	PIPE DETAILS
4	INLET STRUCTURE DETAILS
5	MISCELLANEOUS DETAILS
6	PLAN AND PROFILE LINE A STA 10+12.24 TO STA 13+50.00
7	PLAN AND PROFILE LINE A STA 13+50.00 TO STA 16+65.56
8	PLAN AND PROFILE LINE B STA 10+00.00 TO STA 12+72.00

UTILITY OWNER	PHONE NO.	CONTACT
SO. CALIF. GAS	RICHARD CLENDINENG	(714) 634-3262
EAST ORANGE COUNTY WATER DIST.	JERRY MENDZER	(714) 501-5596
ORANGE COUNTY SANITATION	RUDY DAVILA	(714) 593-7348
SO. CALIF. EDISON	JILL MONACO	(714) 973-5453
AT&T	RENEE BURGERON	(714) 237-6277
COX COMMUNICATIONS	JIM MCBRYDE	(626) 241-0948
CHARTER	DAVID CISNEROS	(714) 591-4888
CITY OF ORANGE WATER DEPARTMENT	JANETTE PICHAY & ROBERT BAEHNER	(714) 288-2475

BENCH MARK:

O.C.S. BM
3A-110-79 ELEV. = 403.068'
3A-89-71 ELEV. = 372.768'

LEVEL YEAR 1979

NGVD 29 1976 ADJ.

BASIS OF BEARINGS:

THE BASIS OF BEARING SHOWN HEREON IS BASED ON THE GRID BEARING BETWEEN O.C.S. HORIZONTAL CONTROL STATIONS G.P.S NO. 3172 BEING N88°48'15"W

OC PUBLIC WORKS

SUBMITTED: _____ DATE
REGINA HU, PE
SENIOR CIVIL ENGINEER
OC PUBLIC WORKS

RECOMMENDED: _____ DATE
NARDY KHAN, PE
DEPUTY DIRECTOR
OC PUBLIC WORKS

APPROVED: _____ DATE
KHALID M. BAZMI, PE
COUNTY ENGINEER / ASSISTANT DIRECTOR
OC PUBLIC WORKS

NO.	DESCRIPTION	SHT.	APPROVED	DATE

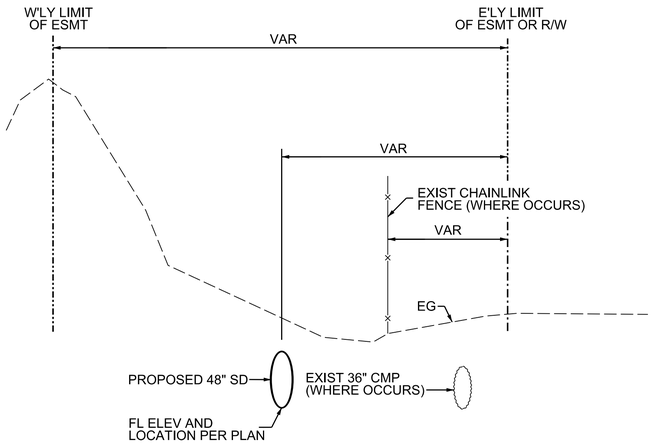
REVISIONS

W. O. NO. ER16006
DWG. NO. _____

SHEET 1 OF 8

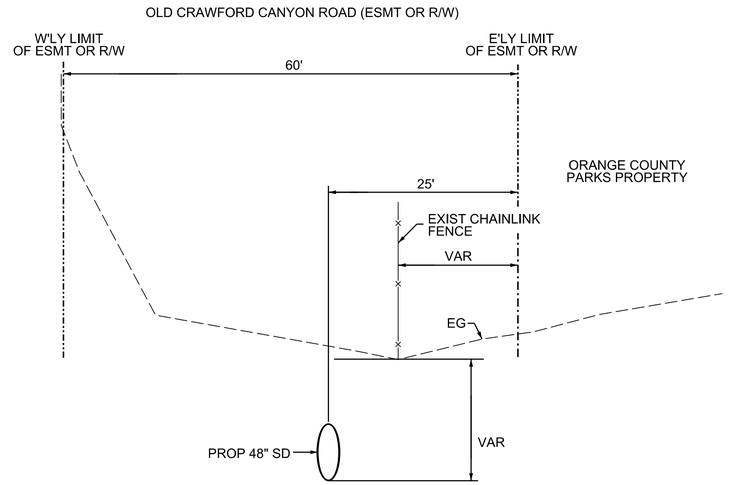
FILE NAME:$FILE$

DATE PLOTTED : $DATE$



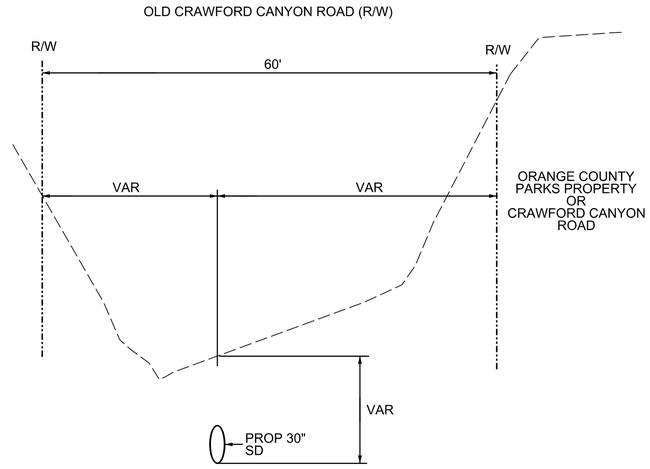
"LINE A" - STA 10+12 TO STA 11+44

TYPICAL SECTION
SCALE: NOT TO SCALE



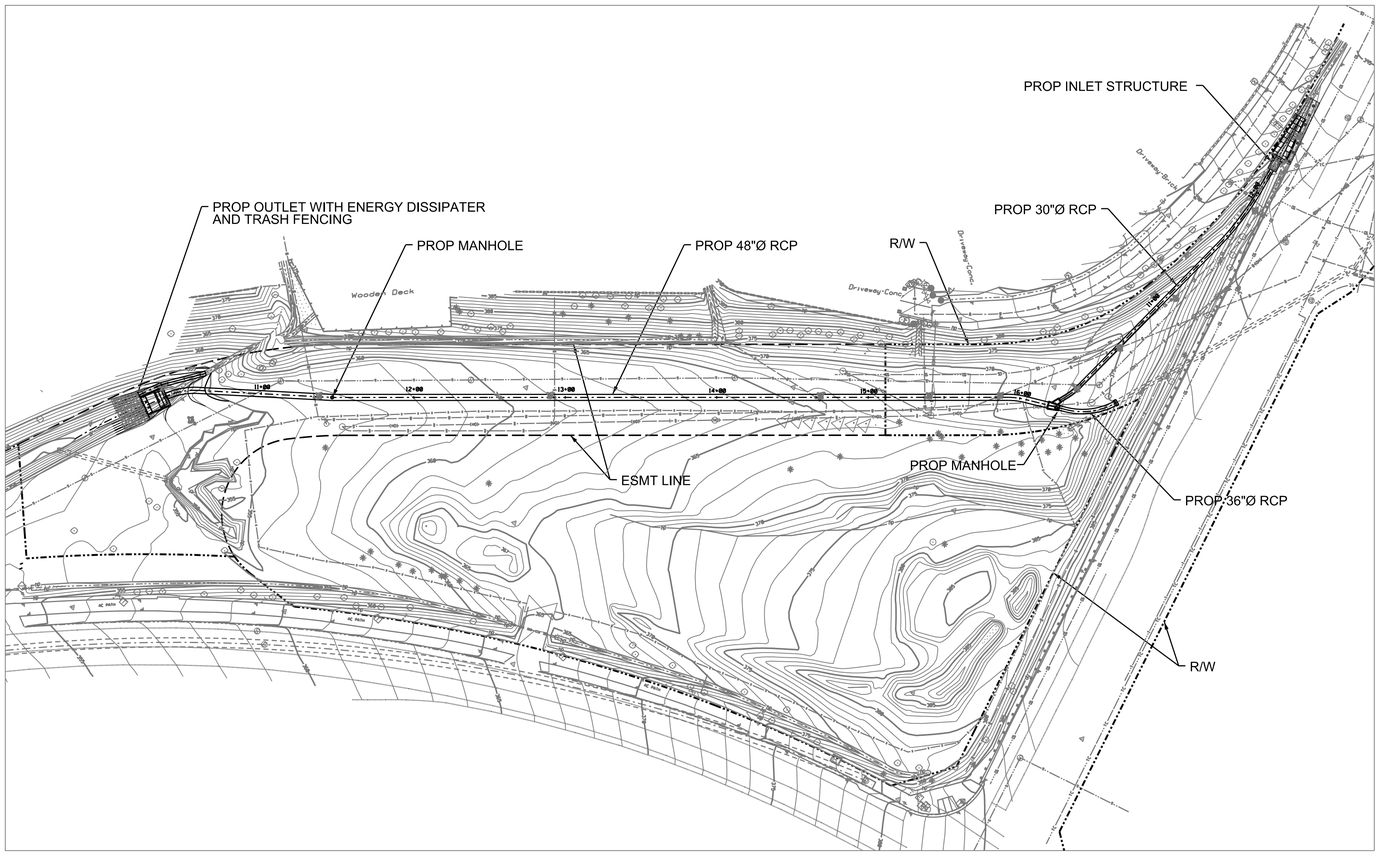
"LINE A" - STA 11+48 TO STA 15+50

TYPICAL SECTION
SCALE: NOT TO SCALE



"LINE B" - STA 10+00 TO STA 12+18

TYPICAL SECTION
SCALE: NOT TO SCALE



OVERALL SITE PLAN

SCALE: 1" = 50'-0"

LIST OF ABBREVIATIONS

" OR IN	INCH
' OR FT	FOOT
/	OF
ABAN, ABND OR ABAND	ABANDONED UTILITY
AC / ASPH	ASPHALT CONCRETE
AV OR AVE	AVENUE
BC	BEGINNING OF CURVE
BEG	BEGIN
BOTT	BOTTOM
BP	BEGIN PIPE
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CIP	CAST IRON PIPE
CISP	CAST IRON SOIL PIPE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CJ	CONSTRUCTION JOINT
CL	CENTERLINE
CML	CEMENT MORTAR LINED
CMU	COLUMN
CML&C	CONCRETE MASONRY UNIT
CMP	CEMENT MORTAR LINED & COATED
COL	CORRUGATED METAL PIPE
CONC	CONCRETE
CONT	CONTINUOUS
CP	CATHODIC PROTECTION
CT	CALTRANS
D	DEGREES
DI	DRAIN INLET
DIA	DIAMETER
DG	DECOMPOSED GRANITE
DWG	DRAWING
E	EAST
EC	END OF CURVE
EF	EACH FACE
EG	EXISTING GRADE
EJ	EXPANSION JOINT
EL/ELEV	ELEVATION
ELEC	ELECTRICAL
EP	END PIPE
EQ	EQUAL
ES	EACH SIDE
ESMT	EASEMENT
EVC	END OF VERTICAL CURVE
EW	EACH WAY
EXIST	EXISTING
E'LY	EASTERNLY
FF	FINISHED FLOOR
FL	FLOW LINE
FO	FIBER OPTIC (LINE)
FS	FINISHED SURFACE
FT	FEET
G	GAS (LINE)
GA	GAUGE
GALV	GALVANIZED
GPM	GALLON PER MINUTE
HC	HIGH CONFIDENCE
INV	INVERT
L	LENGTH
LF	LINEAR FEET
LT	LEFT
MAT'L	MATERIAL
MAX	MAXIMUM
MBGR	METAL BEAM GUARD RAIL
MH	MANHOLE
MIN	MINIMUM
NO	NUMBER
NTS	NOT TO SCALE
OCPW	ORANGE COUNTY PUBLIC WORKS
PIP	PROTECT IN PLACE
PL	PLATE
R	RADIUS LENGTH
RCP	REINFORCED CONCRETE PIPE
ROW OR R/W	RIGHT OF WAY
RT	RIGHT
SS	SANITARY SEWER
SCE	SOUTHERN CALIFORNIA EDISON
SCH	SCHEDULE
SD	STORM DRAIN (LINE)
SPECS	SPECIFICATIONS
STA	STATION STANDARD
STD	STANDARD
STL	STEEL
SWR	SEWER
T/	TOP OF
T OR TELE	TELEPHONE
TRANS	TRANSITION
TYP	TYPICAL
VAR	VARIES
W	WEST OR WIDTH
W/	WITH
W/O	WITHOUT
WTR	WATER(LINE)
W'LY	WESTERNLY

X / X — DETAIL NUMBER / SHEET NUMBER

CONC

NATIVE SOIL

WOOD

100% SUBMITTAL

COUNTY OF ORANGE
CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER
JOSEPH F. LONG
C 54329
Exp. 12-31-16
CIVIL
STATE OF CALIFORNIA

DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD
DRAINAGE IMPROVEMENTS
AND CONSTRUCTION, PHASE 1
NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

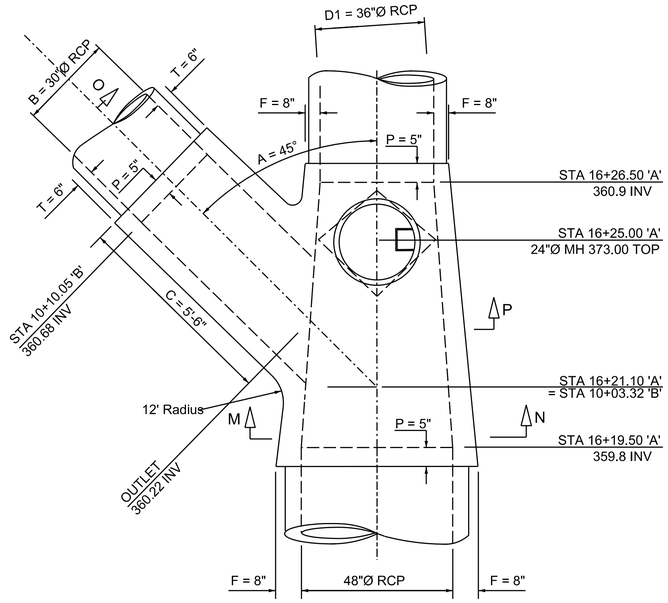
TYPICAL SECTIONS
& ABBREVIATIONS

Sheet
Reference
Number

2

Sheet 2 of 8

FILE NAME:$FILE$



SPPWC 322-2 DIMENSIONS	
DIMENSION	VALUE
∠A	45°
B	30"
C	5'-6"
D1	36"
D2	48"
F	8"
P	5"

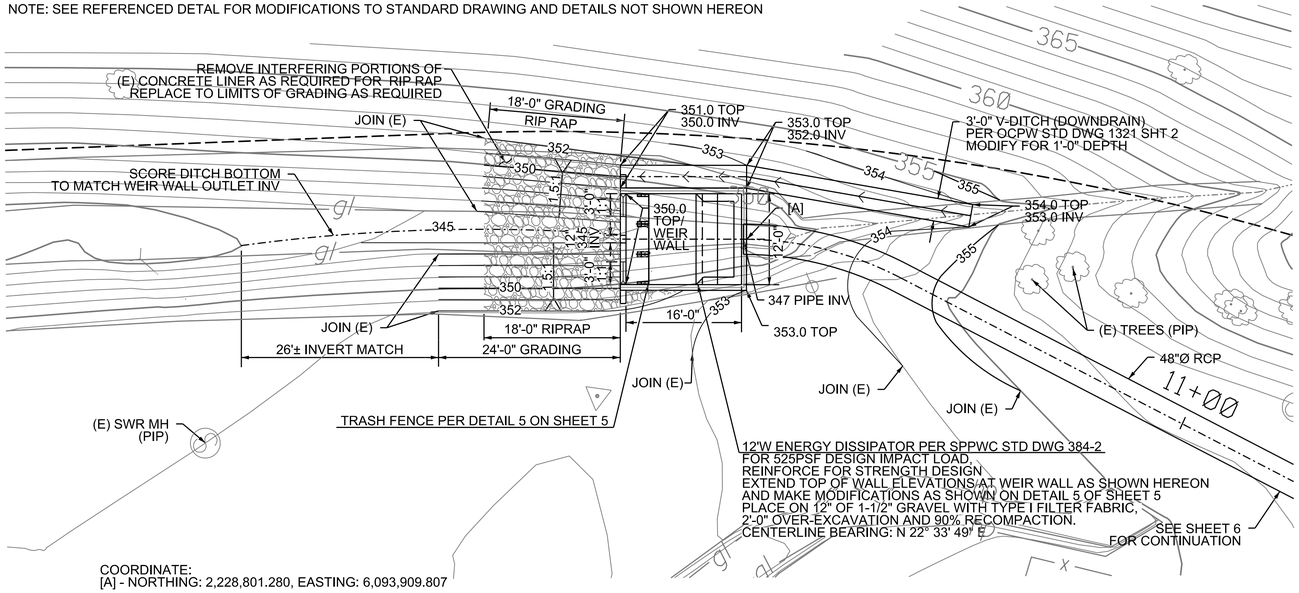
NOTE: FOR INFORMATION NOT SHOWN HEREON, SEE REFERENCE DETAIL SPPWC 322-2 & 322-2 OC

1/7 MANHOLE PIPE-TO-PIPE (LARGE SIDE INLET)

SCALE: 1" = 1'-0"

SPPWC STD DWG 384-2 DIMENSIONS (525 PSF DESIGN LOAD)														
WIDTH (W)	H	L	a	b	c	d	e	f	g	T1	T2	T3	T4	T5	T6
12'-0"	9'-0"	16'-0"	6'-0"	4'-6"	6'-0"	2'-0"	1'-0"	2'-6"	5'-0"	9"	8"	10"	8.5"	9"	9"

NOTE: SEE REFERENCED DETAL FOR MODIFICATIONS TO STANDARD DRAWING AND DETAILS NOT SHOWN HEREON

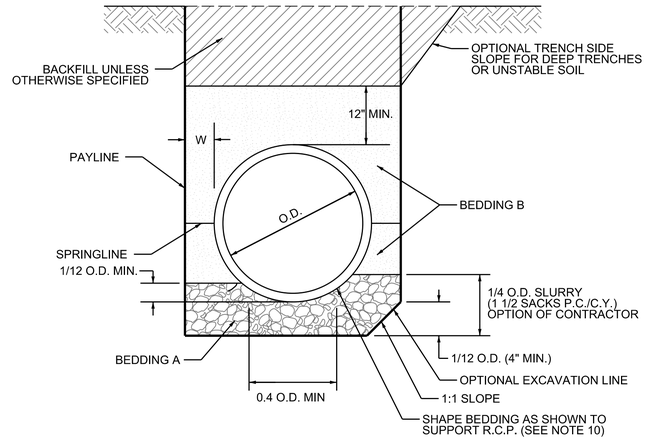


COORDINATE:
[A] - NORTHING: 2,228,801.280, EASTING: 6,093,909.807

NOTES:
RIPRAP SHALL BE CALTRANS 1/4 TON, 3'-0" DEEP MIN, METHOD OF PLACEMENT TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
RIPRAP SHALL BE PLACED ON TYPE I FILTER FABRIC PER SPECIFICATIONS.

2/6 OUTLET ENERGY DISSIPATOR & GRADING PLAN

SCALE: 1" = 5'-0"

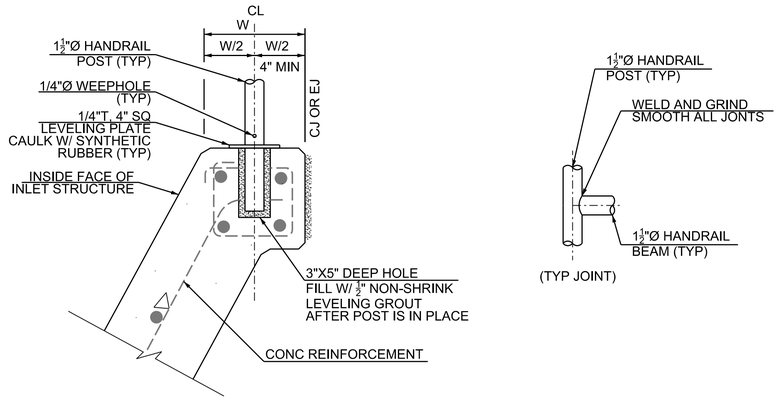


NOTES :

1. BEDDING A SHALL BE COMPOSED OF SAND, NO.3 OR NO.4 CRUSHED ROCK OR GRAVEL PER STD. SPECIFICATIONS OR OTHER GRANULAR MATERIAL AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER.
2. BEDDING B SHALL BE COMPOSED OF SAND OR OTHER GRANULAR MATERIAL AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER AND SHALL CONFORM TO SECTION 306-1.2.1 OF THE STD. SPECIFICATIONS.
3. BEDDING B SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90 PERCENT UNLESS OTHERWISE SPECIFIED.
4. BEDDING B SHALL BE PLACED IN TWO OR MORE LIFTS FOR O.D. GREATER THAN 60 INCHES.
5. BACKFILL SHALL BE PER SECTION 306-1.3 OF THE STD. SPECIFICATIONS.
6. WHERE THE COVER IS 8 FEET OR LESS, "W" MUST BE GREATER THAN OR EQUAL TO 6 INCHES. WHERE THE COVER IS GREATER THAN 8 FEET, "W" MUST BE BETWEEN 6 AND 10 INCHES INCLUSIVE FOR PIPES UP TO AN INCLUDING 96 INCHES IN DIAMETER. FOR PIPES OVER 96 INCHES IN DIAMETER, "W" MUST BE BETWEEN 6 AND 12 INCHES INCLUSIVE.
7. "W" SHALL INCLUDE THE THICKNESS OF ANY SHORING.
8. SHORING SHALL BE A MINIMUM OF 6 INCHES FROM THE PIPE AT SPRINGLINE.
9. AN IMPROVED BEDDING METHOD SHALL BE SUBMITTED TO THE ENGINEER FOR ANY "W" OTHER THAN THAT PERMITTED IN NOTE 6.
10. THE TRENCH BOTTOM SHALL BE SHAPED AS SHOWN, OR THE CONTRACTOR, AT HIS OPTION MAY CHOOSE NOTE TO SCREED BEDDING "A" IN WHICH CASE, THE PIPE SHALL BE BACKFILLED TO A DEPTH OF 1/4 O.D. WITH TRENCH BACKFILL SLURRY AT HIS EXPENSE.
11. THIS BEDDING DETAIL SHALL ONLY BE USED FOR R.C.P. OR AS APPROVED BY ENGINEER.
12. PLASTIC PIPE BEDDING SHALL BE DETAILED ON PLANS.

3/6 TYPICAL PIPE TRENCH & BEDDING DETAIL - OCPW STD 1319

SCALE: NOT TO SCALE



NOTE: ALL HANDRAIL METAL IS ALUMINUM

4/4 HANDRAIL DETAILS

NOT TO SCALE

THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL

100%SUBMITTAL

COUNTY OF ORANGE
CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER
JOSEPH F. LONG
C 54329
Exp. 12-31-16
CIVIL
STATE OF CALIFORNIA

DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD
DRAINAGE IMPROVEMENTS
AND CONSTRUCTION, PHASE 1
NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

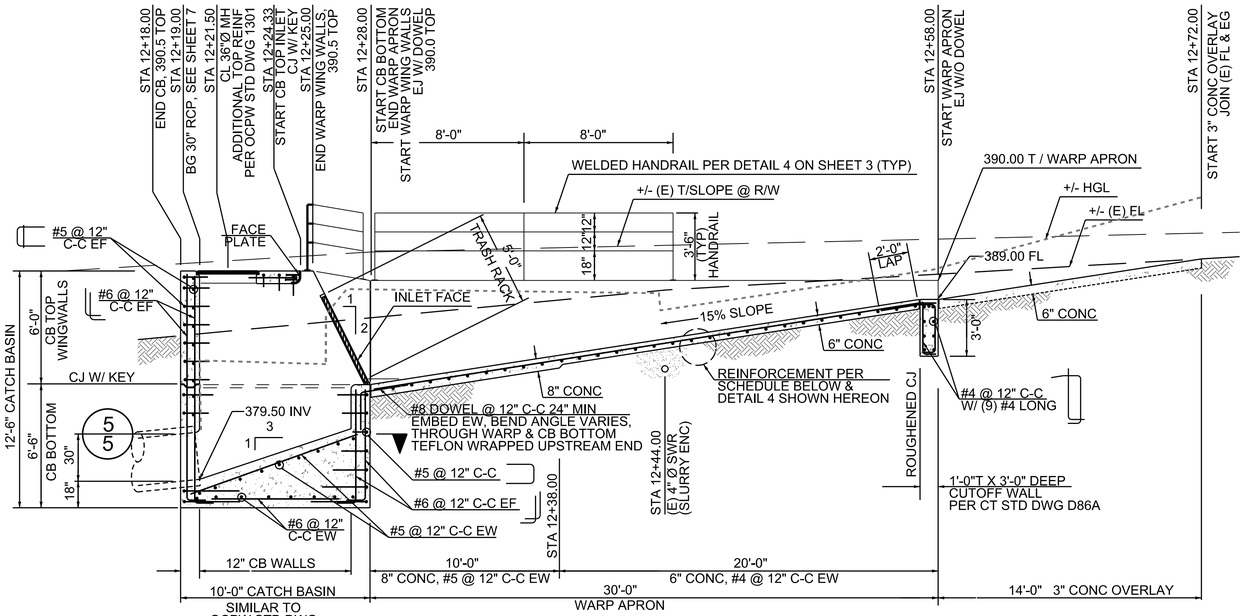
PIPE DETAILS

Sheet Reference Number

3

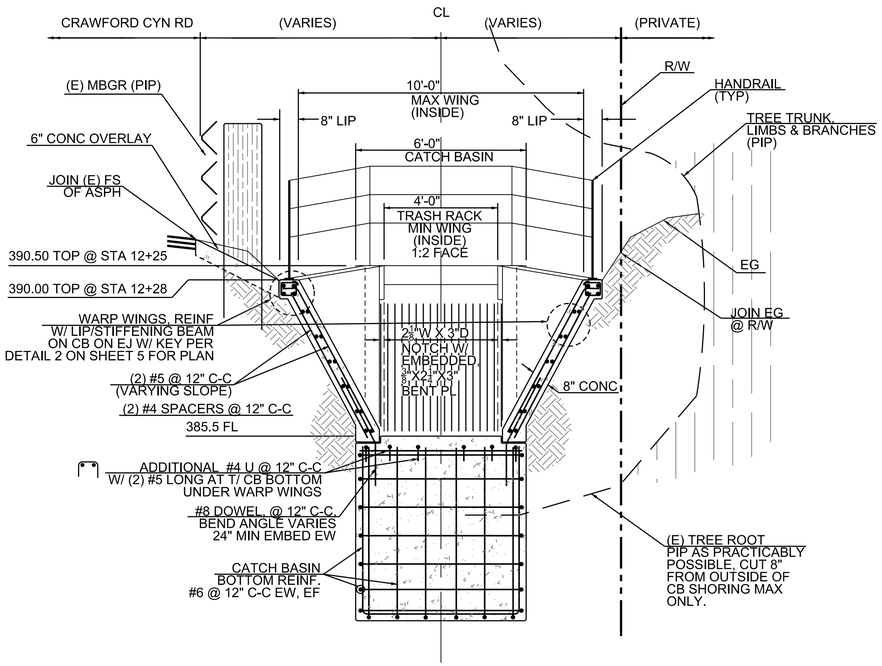
Sheet 3 of 8

FILE NAME:$FILE$

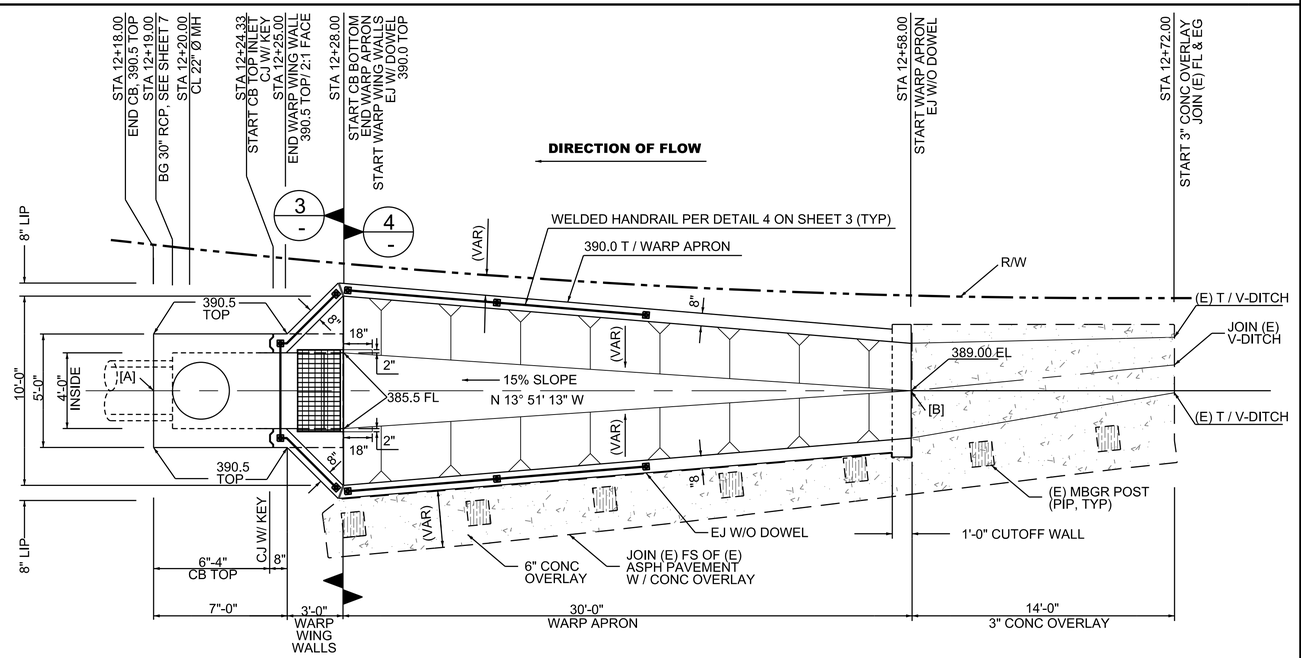


NOTES (TYP THIS SHEET):
- SEE FULL REFERENCED STANDARD DRAWINGS FOR DETAILS NOT SHOWN HEREON.
- ALL CONSTRUCTION JOINTS SHALL BE PER OCPW STD DWG 1318, AND WATERPROOFED WITH WALLS-COAT CURING COMPOUND.
- PROVIDE STEEL TROWEL FINISH ON ALL WATER BEARING SURFACES.
- TRASH RACK (GRATE) SHALL BE PER OCPW STD DWG 1307, PAGE 3, MADE OF 304 SS. EMBED FRAME IN WARP WING WALLS.
- PROVIDE STEPS (NOT SHOWN) IN CATCH BASIN UNDER MANHOLE PER OCPW STD DWG 1307.

1/7 INLET PROFILE THROUGH CENTERLINE
SCALE: 1/4" = 1'-0"

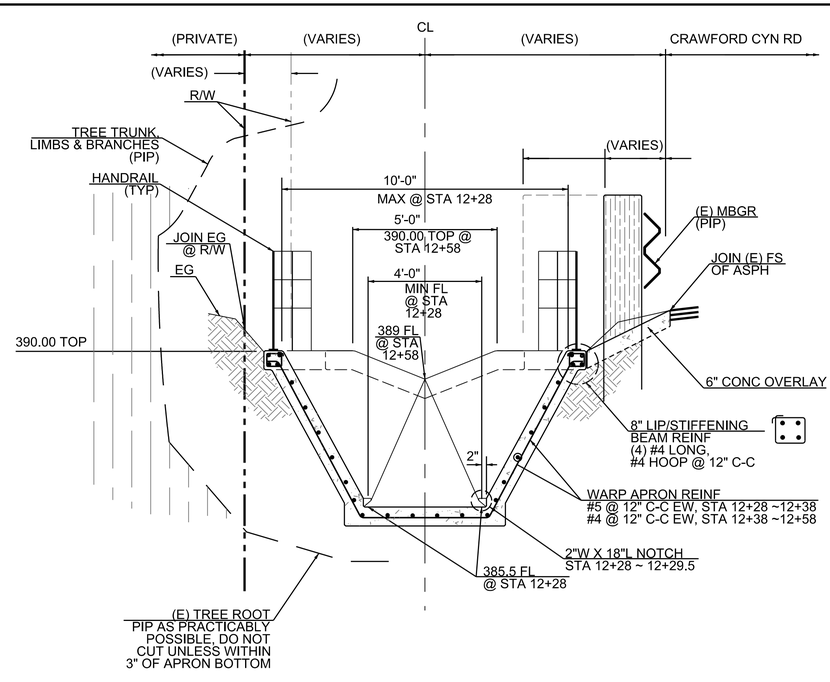


3/- INLET PROFILE (DOWNSTREAM)
SCALE: 3/8" = 1'-0"



COORDINATES:
[A] - NORTHING: 2,229,409.02, EASTING: 6,094,340.60
[B] - NOTRHING: 2,229,447.85, EASTING; 6,094,331.01

2/7 INLET PLAN
SCALE: 1/4" = 1'-0"



4/- WARP APRON PROFILE (UPSTREAM)
SCALE: 3/8" = 1'-0"

100% SUBMITTAL

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
DATE
REGISTERED PROFESSIONAL ENGINEER JOSEPH F. LONG C 54329 Exp. 12-31-16 CIVIL STATE OF CALIFORNIA

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

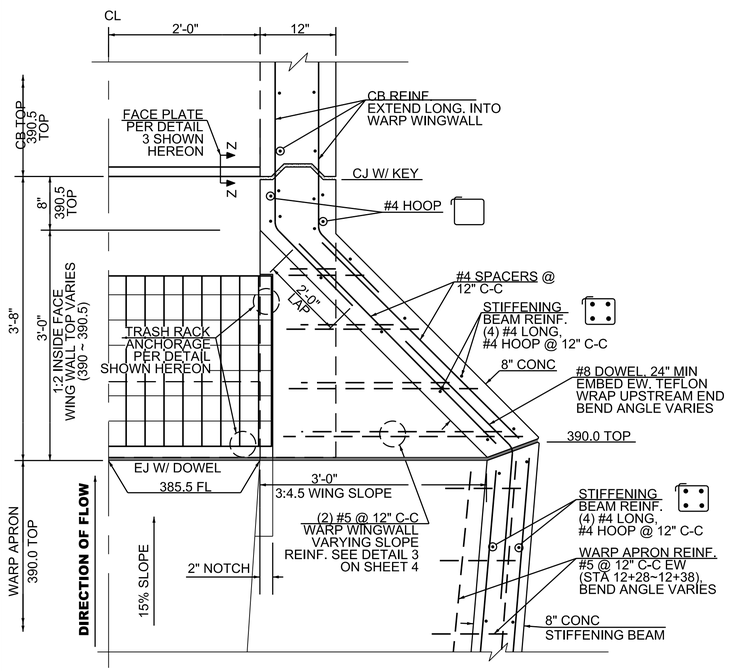
URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1 NEAR THE INTERSECTION OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD

INLET STRUCTURE DETAILS

Sheet Reference Number
4
Sheet 4 of 8

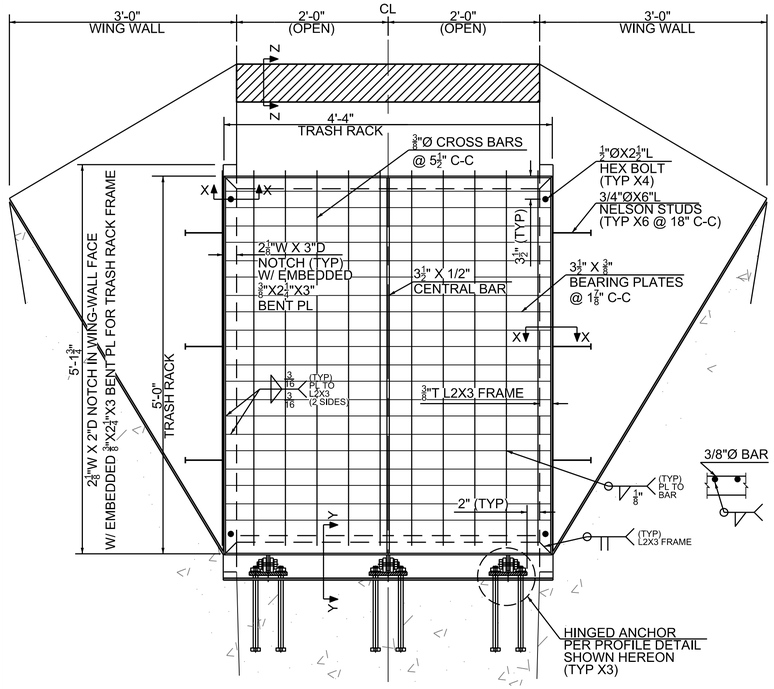
FILE NAME:$FILE$



NOTE: THIS DETAIL IS SYMMETRIC ABOUT CENTERLINE, HANDRAIL NOT SHOWN FOR CLARITY

1/3 WARP WINGWALL REINF PLAN

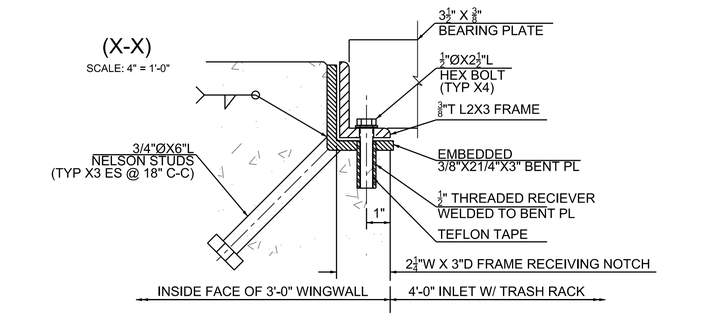
SCALE: 1" = 1'-0"

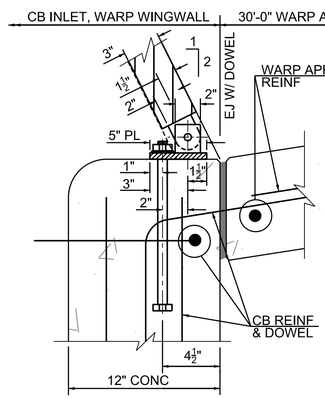


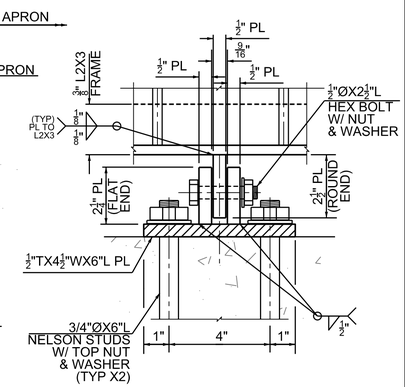
NOTE: TRASH RACK IS SHOWN AT, AND HAS FACE SLOPE OF 1:2

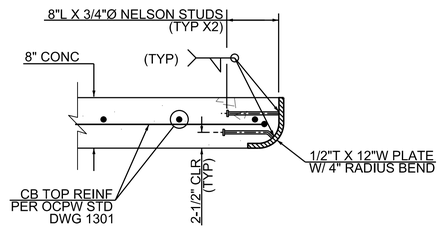
2/- TRASH RACK DETAILS

SCALE: 1" = 1'-0"



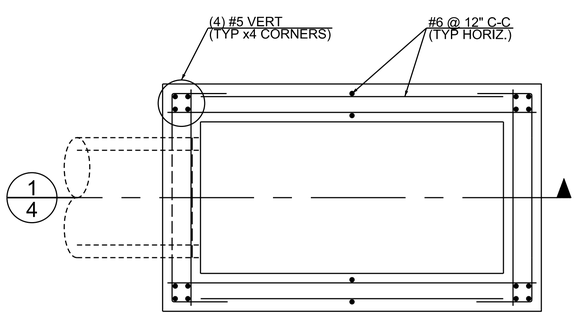






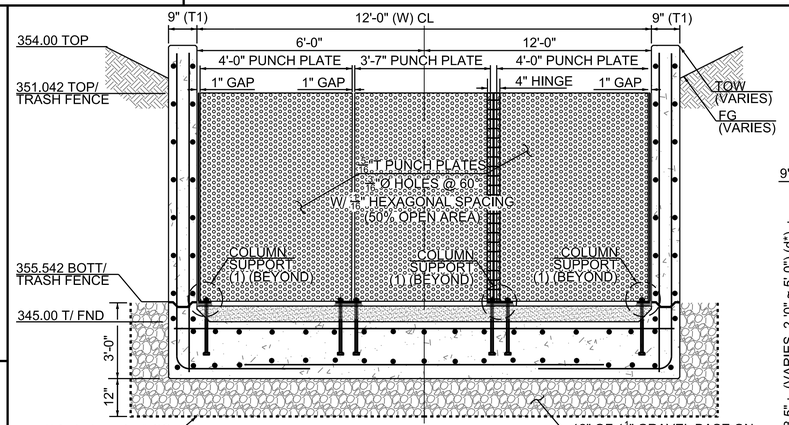
3/4 FACEPLATE DETAIL Z-Z

SCALE: 1" = 1'-0"



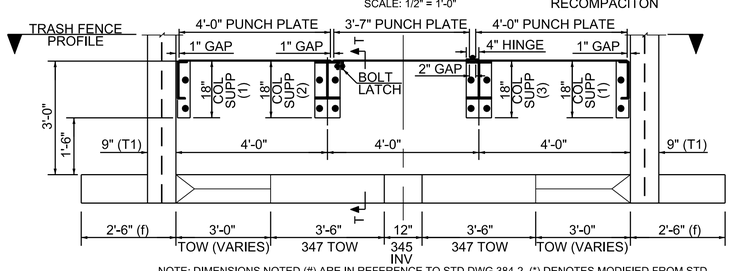
1/4 CATCH BASIN BOTTOM REINF PLAN

SCALE: 1/2" = 1'-0"



(TRASH FENCE PROFILE)

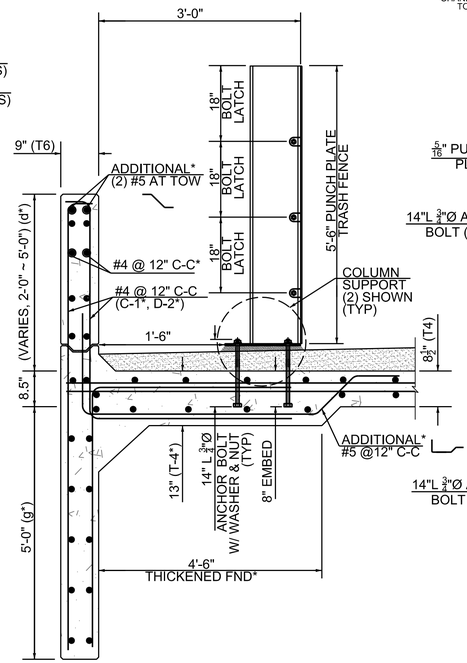
SCALE: 1/2" = 1'-0"



NOTE: DIMENSIONS NOTED (#) ARE IN REFERENCE TO STD DWG 384-2, (*) DENOTES MODIFIED FROM STD
ALL STEEL SHALL BE GALVANIZED. RE-GALVANIZE PAINT ALL MARRED SURFACES AND WELDS AFTER CONSTRUCTION

5/3 TRASH FENCE PLAN

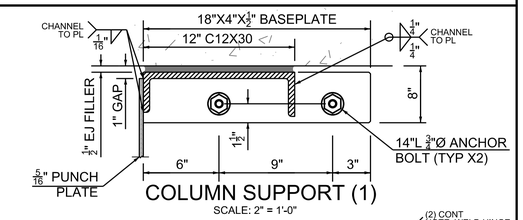
SCALE: 1/2" = 1'-0"

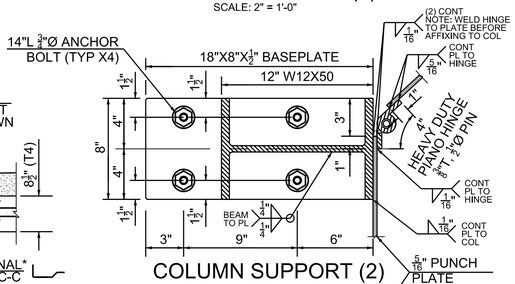


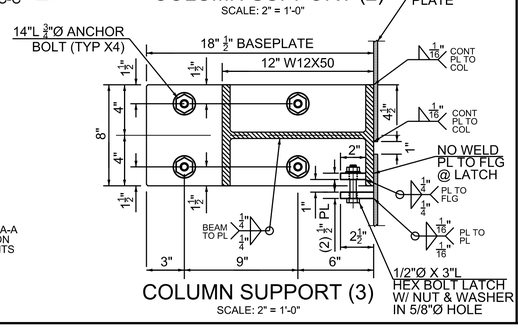
NOTE: SECTION IS MODIFICATION FOR STD DWG 384-2 SECTION A-A
SEE STD DWG FOR REINFORCEMENT NOT CALLED OUT HEREON
SEE PROFILE SHOWN HEREON FOR FOUNDATION REQUIREMENTS

TRASH FENCE SECTION (T-T)

SCALE: 3/8" = 1'-0"







COUNTY OF ORANGE
CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER
JOSEPH F. LONG
C 54329
Exp. 12-31-16
CIVIL
STATE OF CALIFORNIA

DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD
DRAINAGE IMPROVEMENTS
AND CONSTRUCTION, PHASE 1
NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

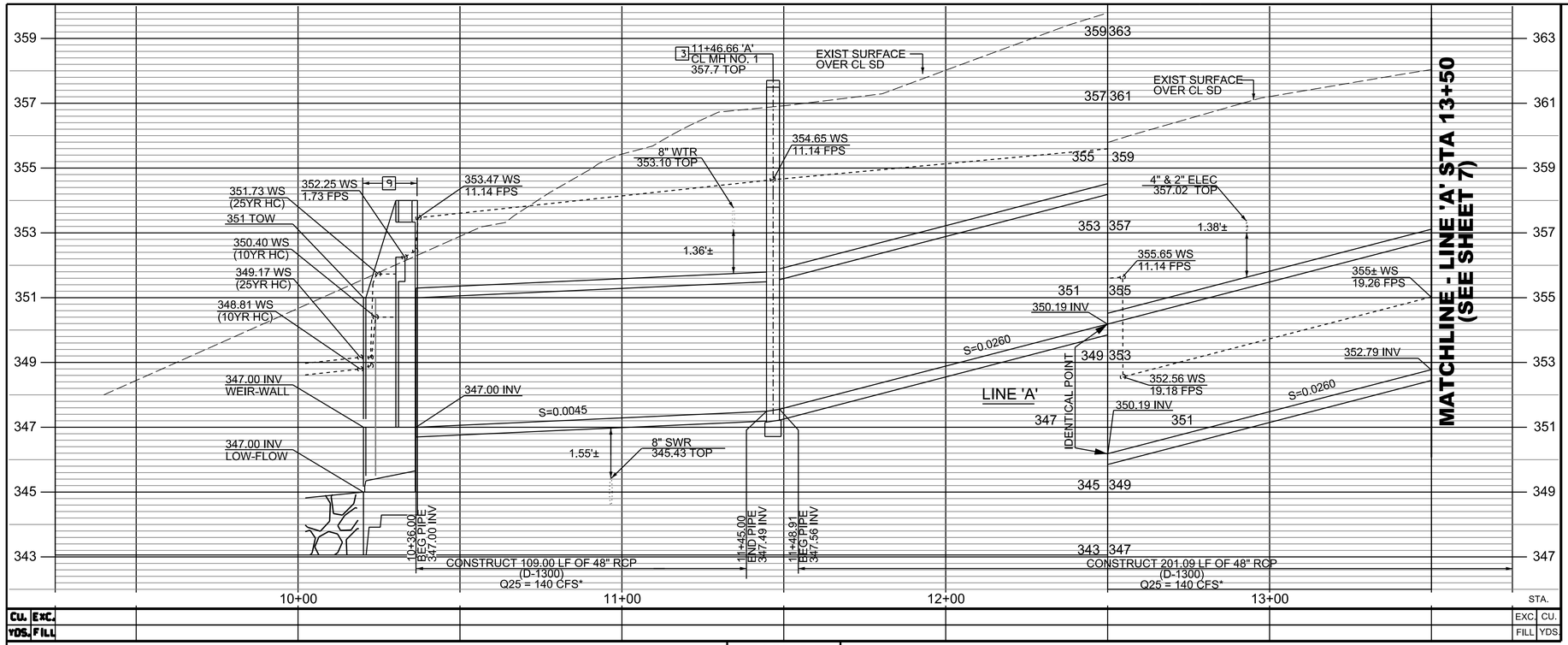
STANDARD DETAILS

Sheet Reference Number

5

Sheet 5 of 8

FILE NAME:$FILEL$



CONSTRUCTION NOTES

1. CONSTRUCT 48" R.C.P. PER OCPW STD PLAN 1319 (D-LOAD PER PROFILE), SEE DETAIL 3 ON SHEET 3
2. CONSTRUCT 3'-0" WIDE DOWNDRAIN PER OCPW STD 1321 (1'-0 DEPTH)
3. INSTALL MANHOLE PER OCPW STD. NO. 320-2.
9. CONSTRUCT ENERGY DISSIPATOR PER DETAIL 2 ON SHEET 3

DISPOSITION

(1) PROTECT IN PLACE
(2) REMOVE INTERFERING PORTION

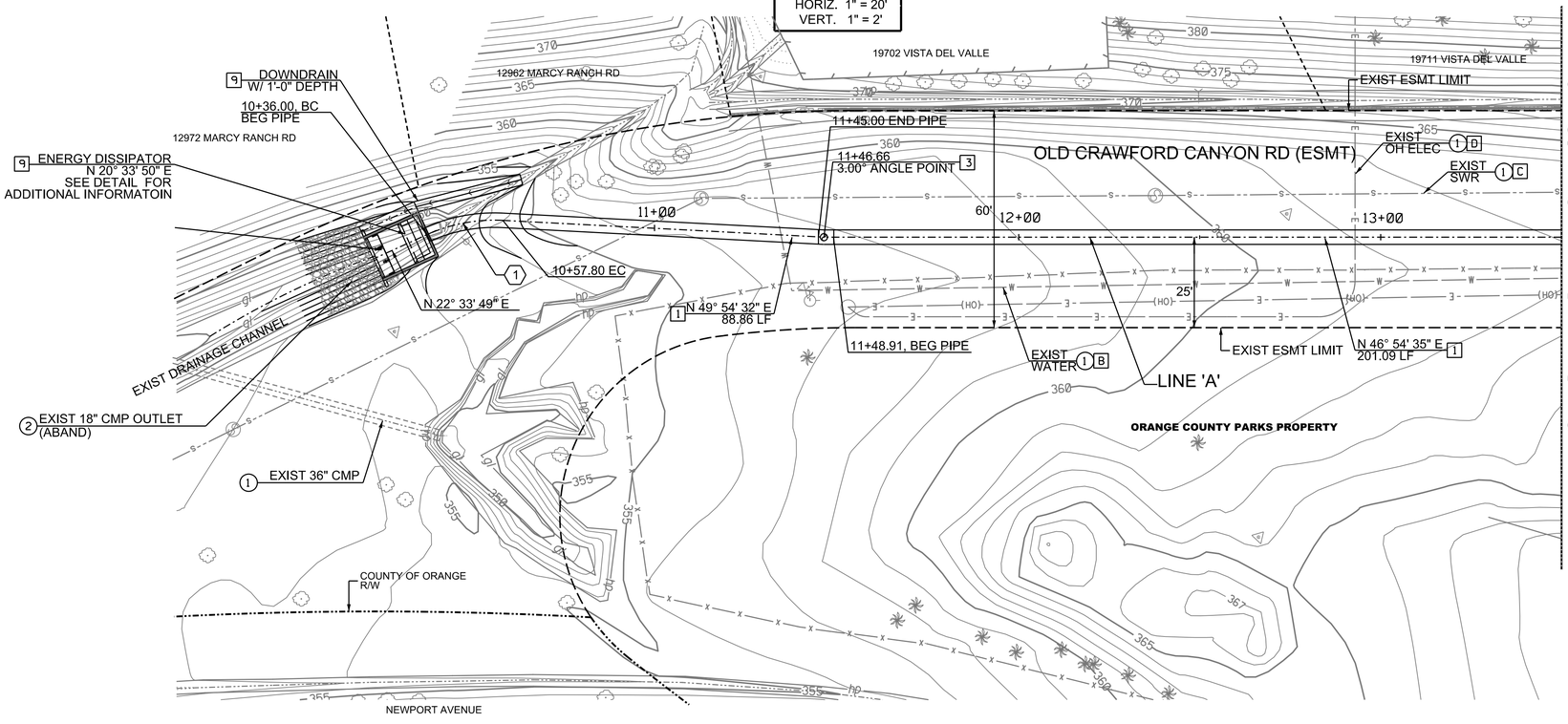
UTILITY		OWNER
A	GAS LINE	SO. CAL. GAS
B	WATER	EAST ORANGE COUNTY WATER DIST. CITY OF ORANGE WATER DEPARTMENT
C	SEWER LINE	ORANGE COUNTY SANITATION DISTRICT
D	ELECTRIC LINE	SO. CALIF. EDISON
E	TELECOMM LINE	AT&T, COX COMMUNICATIONS, CHARTER

NOTES

* VALUES ARE FOR 25HC YR STORM EVENT OBTAINED FROM OCPW HYDROLOGY REPORT NO. F13-3 SIGNED BY EDITHA LLANES (AUGUST 2015)

PROFILE

HORIZ. 1" = 20'
VERT. 1" = 2'



PLAN

1"=20'

HYDRAULIC DATA						
STA TO STA	Q25 (CFS)	SECTION	S (FT/FT)	'n'	Dn (FT)	Vn (F/S)
(OUTLET)	140	TRAP. 1.5:1	0.01	0.078	4.17	3.27
(DISSIPATER)	140	RECT. b = 12'	0.02	0.013	0.87	13.44
10+36 - 11+48	140	48"Ø RCP	0.0045	0.013	1.90	23.73
11+48 - 13+50	140	48"Ø RCP	0.026	0.013	2.24	19.30

CURVE DATA						
(#)	DELTA	RADIUS	LENGTH	TANGENT	BC	EC
(1)	27°20'42"	45'	21.80	11.23	10+36.00	10+69.29

THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL

100%SUBMITTAL

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF: JOSEPH F. LONG, REGISTERED PROFESSIONAL ENGINEER, C 54329, Exp. 12-31-16, CIVIL, STATE OF CALIFORNIA — DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

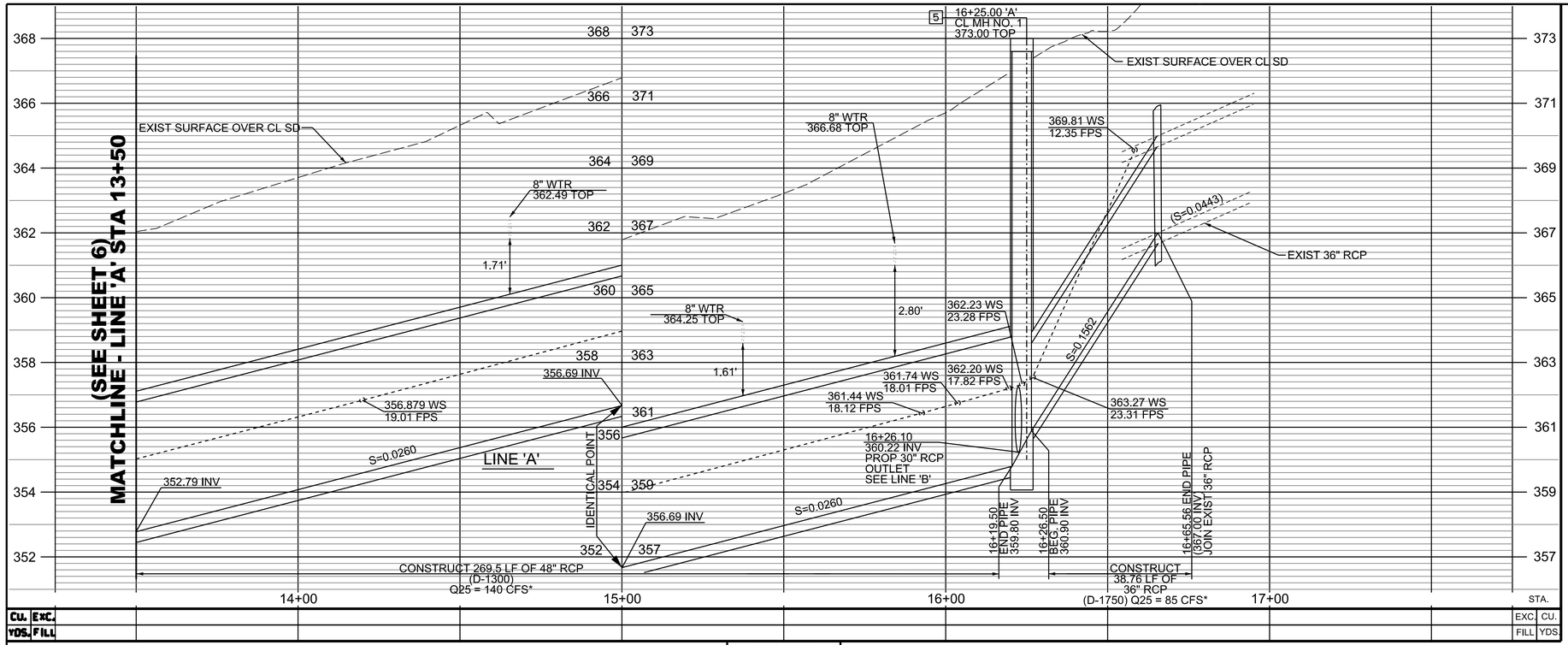
URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1 NEAR THE INTERSECTION OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD

PLAN AND PROFILE

Sheet Reference Number
6
Sheet 6 of 8

FILE NAME:$FILE$



CONSTRUCTION NOTES

1. CONSTRUCT 48" R.C.P. PER OCPW STD. PLAN 1319 (D-LOAD PER PROFILE), SEE DETAIL 3 ON SHEET 3
4. CONSTRUCT CONCRETE COLLAR PER OCPW STD. NO. 380-4
5. INSTALL 7' PIPE - TO - PIPE MANHOLE (LARGE SIDE INLET) PER OCPW STD. 322-2 WHERE ∠A = 45°, SEE DETAIL 1 ON SHEET 3
6. CONSTRUCT 36" R.C.P. PER OCPW STD. PLAN 1319 (D-LOAD PER PROFILE), SEE DETAIL 3 ON SHEET 3

DISPOSITION

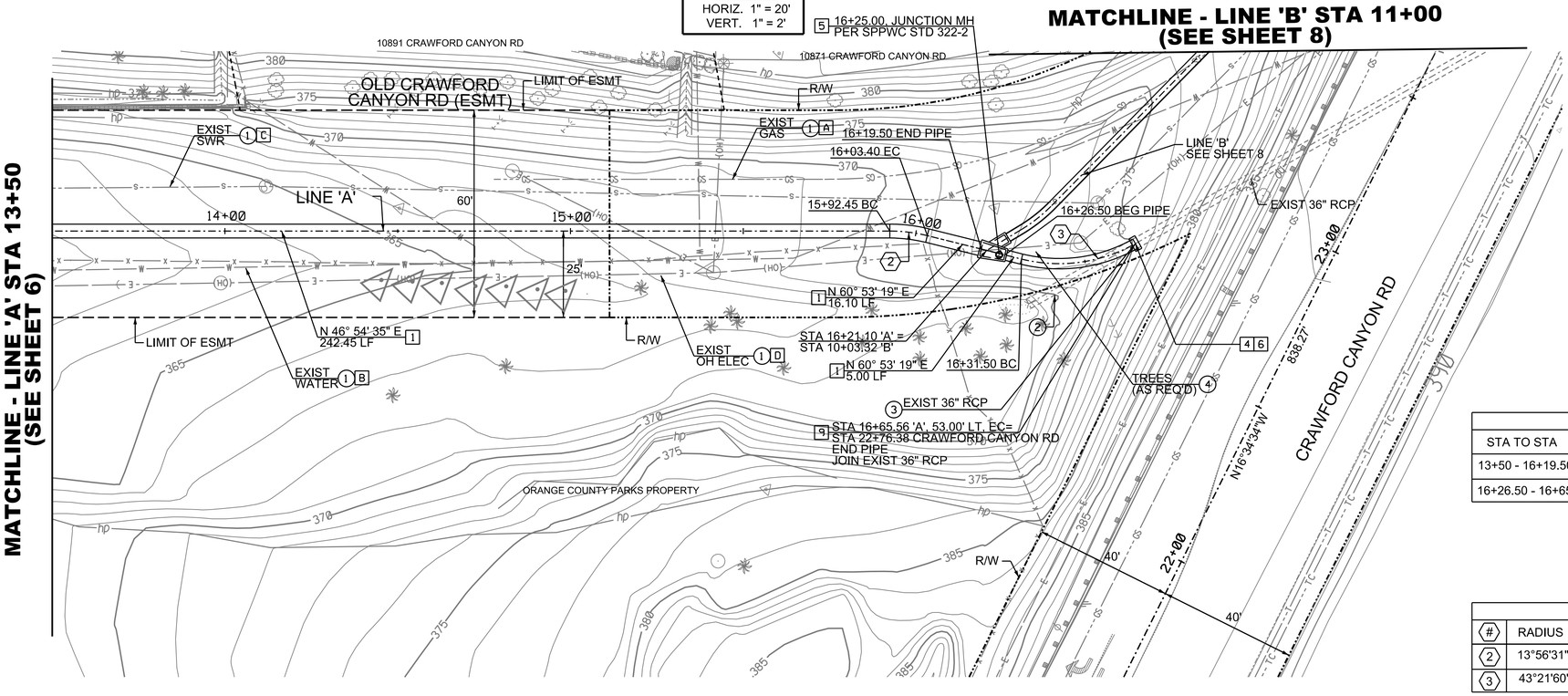
1. PROTECT IN PLACE
2. REMOVE INTERFERING PORTION
3. ABANDON PORTION
4. REMOVE

UTILITY	OWNER
A GAS LINE	SO. CAL. GAS
B WATER	EAST ORANGE COUNTY WATER DIST. CITY OF ORANGE WATER DEPARTMENT
C SEWER LINE	ORANGE COUNTY SANITATION DISTRICT
D ELECTRIC LINE	SO. CALIF. EDISON
E TELECOMM LINE	AT&T, COX COMMUNICATIONS, CHARTER

NOTES

* VALUES ARE FOR 25HC YR STORM EVENT OBTAINED FROM OCPW HYDROLOGY REPORT NO. F13-3 SIGNED BY EDITHA LLANES (AUGUST 2015)

PROFILE
HORIZ. 1" = 20'
VERT. 1" = 2'



PLAN
1"=20'

HYDRAULIC DATA						
STA TO STA	Q25 (CFS)	SECTION	S (FT/FT)	'n'	Dn (FT)	Vn (F/S)
13+50 - 16+19.50	140	48"Ø RCP	0.026	0.013	2.24	19.30
16+26.50 - 16+65	85	36"Ø RCP	0.1562	0.013	1.17	33.24

CURVE DATA						
#	RADIUS	DELTA	LENGTH	TANGENT	BC	EC
2	13°56'31"	45'	10.95'	5.53'	15+92.45	16+03.40
3	43°21'60"	45'	34.06'	17.96'	16+31.50	16+65.56

THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

JOSEPH F. LONG — REGISTERED PROFESSIONAL ENGINEER — C 54329 — Exp. 12-31-16 — CIVIL — STATE OF CALIFORNIA

DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

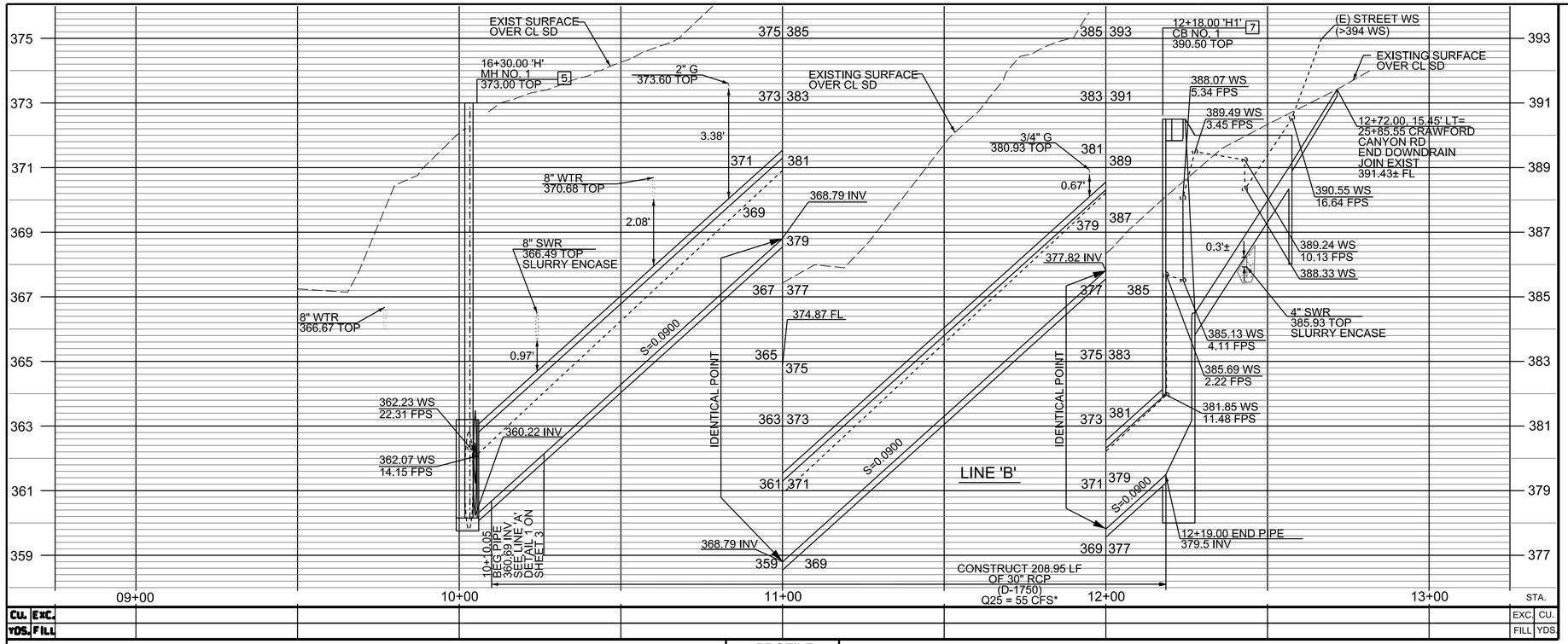
CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1 NEAR THE INTERSECTION OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD

PLAN AND PROFILE

Sheet Reference Number
7

Sheet 7 of 8

FILE NAME:$FILE$



CONSTRUCTION NOTES

5 INSTALL 7' PIPE - TO - PIPE MANHOLE (LARGE SIDE INLET) PER OCPW STD. 322-2 WHERE ∠A = 45°, SEE DETAIL 1 ON SHEET 3

7 CONSTRUCT 30" R.C.P. PER OCPW STD. PLAN 1319 (D-LOAD PER PROFILE), SEE DETAIL 3 ON SHEET 3

8 CONSTRUCT INLET STRUCTURE WITH CATCH BASIN, WARPED WING WALLS, WARPED APRON, AND CONCRETE OVERLAY PER DETAIL 1 ON SHEET 4

DISPOSITION

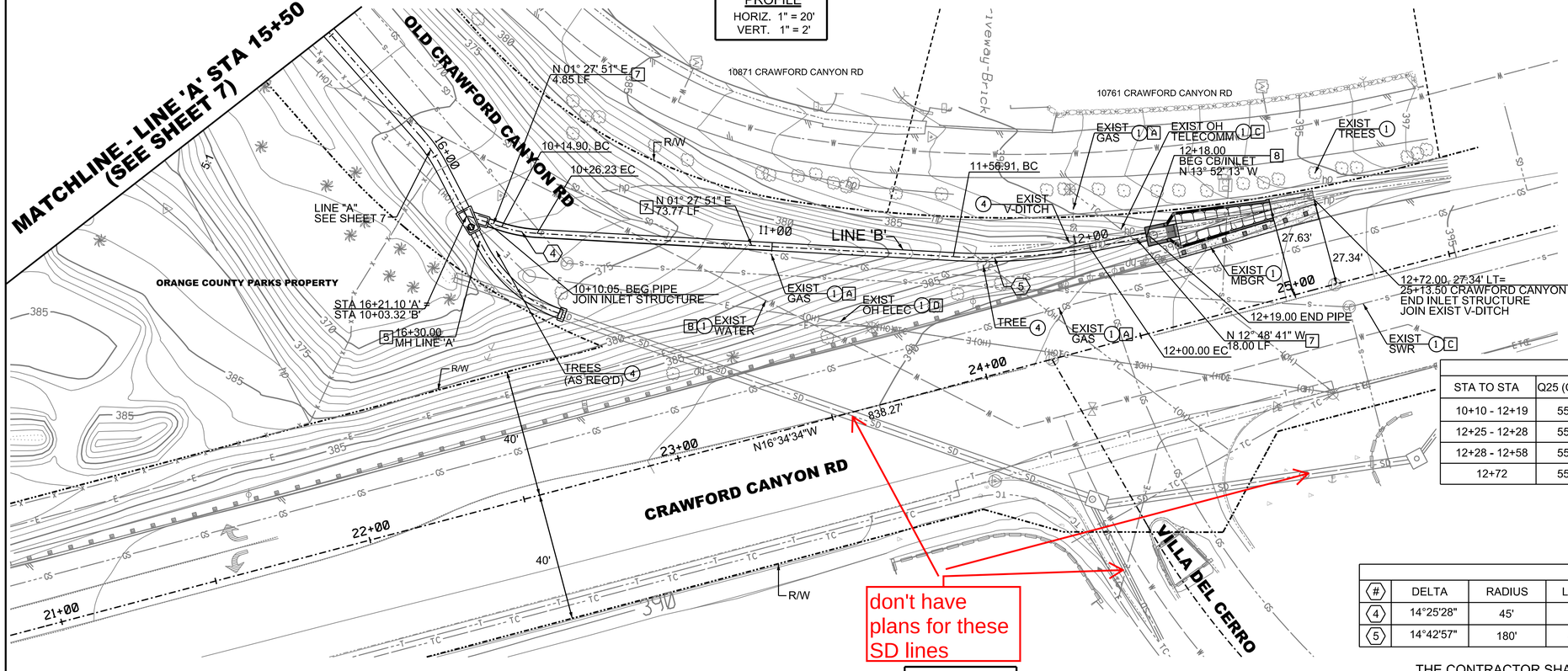
(1) PROTECT IN PLACE
(4) REMOVE

UTILITY	OWNER
A GAS LINE	SO. CAL. GAS
B WATER	EAST ORANGE COUNTY WATER DIST. CITY OF ORANGE WATER DEPARTMENT
C SEWER LINE	ORANGE COUNTY SANITATION DISTRICT
D ELECTRIC LINE	SO. CALIF. EDISON
E TELECOMM LINE	AT&T, COX COMMUNICATIONS, CHARTER

NOTES

* VALUES ARE FOR 25HC YR STORM EVENT OBTAINED FROM OCPW HYDROLOGY REPORT NO. F13-3 SIGNED BY EDITHA LLANES (AUGUST 2015)

PROFILE
HORIZ. 1" = 20'
VERT. 1" = 2'



PLAN
1"=20'

HYDRAULIC DATA						
STA TO STA	Q25 (CFS)	SECTION	S (FT/FT)	'n'	Dn (FT)	Vn (F/S)
10+10 - 12+19	55	30"Ø RCP	0.09	0.013	1.17	24.36
12+25 - 12+28	55	TRASH RACK	0.001	0.013	3.29	4.18
12+28 - 12+58	55	TRAP APRON	0.15	0.013	0.49	23.98
12+72	55	(E) V-DITCH	0.05±	0.015	1.90	15.21

CURVE DATA						
(#)	DELTA	RADIUS	LENGTH	TANGENT	BC	EC
(4)	14°25'28"	45'	11.33'	5.95'	10+14.90	10+26.23
(5)	14°42'57"	180'	43.09'	22.62'	11+56.91	12+00.00

THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL

100% SUBMITTAL

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
JOSEPH F. LONG
REGISTERED PROFESSIONAL ENGINEER
C 54329
Exp. 12-31-16
CIVIL
STATE OF CALIFORNIA
DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1 NEAR THE INTERSECTION OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD

PLAN AND PROFILE

Sheet Reference Number
8
Sheet 8 of 8

FILE NAME:$FILE$

Appendix H
Water Quality Management Plan



WATER QUALITY MANAGEMENT PLAN

"CRAWFORD CANYON PARK"

Project Address:
Northwest of Crawford Canyon Road and Newport Boulevard
County of Orange, California

Prepared For:

13042 Old Myford Road
Irvine, CA 92602
(714) 973-6855

Prepared By:

Hunsaker & Associates Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949) 583-1010

WQMP Preparation/Revision Date:
November 17, 2020

WATER QUALITY MANAGEMENT PLAN

"CRAWFORD CANYON PARK"

Northwest of Crawford Canyon Road and Newport Boulevard

County of Orange, California

COUNTY OF ORANGE/SANTA ANA REGION PRIORITY PROJECT WATER QUALITY MANAGEMENT PLAN (WQMP)

Project Name:

"CRAWFORD CANYON PARK"

GRADING PERMIT NO. TBD

Northwest of Crawford Canyon Road and Newport Boulevard
County of Orange, California

Prepared for:

OCparks
13042 Old Myford Rd
Irvine, CA 92602
(714) 973-6855

Prepared by:

Hunsaker and Associates Irvine, Inc.
Three Hughes
Irvine, CA 92618
(949) 583-1010
Contact: Vojta Safranek

Prepared: November 17, 2020

Project Owner's Certification			
Permit/Planning Application No.	N/A	Grading Permit No.	TBD
Tract/Parcel Map and Lot(s) No.	N/A	Building Permit No.	N/A
Address of Project Site and APN (If no address, specify Tract/Parcel Map and Lot Numbers)			West of Crawford Canyon Road and Newport Avenue APN 503-382-04

This Water Quality Management Plan (WQMP) has been prepared for OC Parks by Hunsaker and Associates Irvine, Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: OC Parks			
Name/Title			
Company	OC Parks		
Address	13042 Old Myford Road Irvine, CA 92602		
Email			
Telephone #	(714) 973-6855		
I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein.			
Signature		Date	

Preparer (Engineer): Vojta Safranek			
Title	Project Manager	PE Registration #	
Company	Hunsaker & Associates Irvine, Inc.		
Address	3 Hughes Irvine, CA 92618		
Email	vsafranek@hunsaker.com		
Telephone #	(949) 583-1010		
I hereby certify that this Water Quality Management Plan is in compliance with, and meets the requirements set forth in, Order No. R8-2009-0030/NPDES No. CAS618030, of the Santa Ana Regional Water Quality Control Board.			
Preparer Signature		Date	
Place Stamp Here			

Contents

Section I Discretionary Permit(s) and Water Quality Conditions 1
Section II Project Description 3
II.1 PROJECT DESCRIPTION 3
II.2 POTENTIAL STORMWATER POLLUTANTS 5
II.3 HYDROLOGIC CONDITIONS OF CONCERN 6
II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS 6
II.5 PROPERTY OWNERSHIP/MANAGEMENT 7
Section III Site Description 8
III.1 PHYSICAL SETTING 8
III.2 SITE CHARACTERISTICS 8
III.3 WATERSHED DESCRIPTION 10
Section IV Best Management Practices (BMPs) 11
IV. 1 PROJECT PERFORMANCE CRITERIA 11
IV.2 SITE DESIGN AND DRAINAGE PLAN 12
IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS 13
IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE) 21
Section V Inspection/Maintenance Responsibility for BMPs 23
Section VI Site Plan and Drainage Plan 27
Section VII Educational Materials Included 28

Attachments
Attachment A .....Educational Materials
Attachment B .....BMP Worksheets/Calculations & BMP Details
Attachment C .....Hydromodification Analysis (incorporated by reference)
Attachment D ..... Supporting Project Information
Attachment E ..... BMP Maintenance Agreement
Attachment F .....WQMP Notice of Transfer of Responsibility
Attachment G ..... BMP Operation and Maintenance Plan

SECTION I PERMIT(S) AND WATER QUALITY CONDITIONS OF APPROVAL OR ISSUANCE

The project's discretionary permit and water quality information are provided in the following:

PROJECT INFOMATION			
Permit/Application No. (If applicable)	N/A	Grading or Building Permit No. (If applicable)	TBD
Address of Project Site (or Tract Map and Lot Number if no address) and APN	West of Crawford Canyon Road and Newport Avenue APN 503-382-04		
WATER QUALITY CONDITIONS OF APPROVAL OR ISSUANCE			
Water Quality Conditions of Approval or Issuance applied to this project. (Please list verbatim.)	This Water Quality Management Plan has been developed in accordance with Section 7.II-1.5 of the Model Water Quality Management Plan and provides the basic framework to address the water quality component for Crawford Canyon Park Project. The project is considered a priority project under the County of Orange Local Implementation Plan and the WQMP Technical Guidance Document (TGD) for North Orange County. Therefore, the project is subject to the requirements of a Water Quality Management Plan (WQMP) to minimize the adverse effects of urbanization on site hydrology, runoff flow rates and pollutant loads. There is currently no applicable s project-specific water quality conditions of approval for this project.		
CONCEPTUAL WQMP			
Was a Conceptual Water Quality Management Plan previously approved for this project?	No.		
WATERSHED-BASED PLAN CONDITIONS			
Provide applicable conditions from watershed-based plans including WIHMPs and TMDLs	The project is located within the San Diego Creek Watershed. Established TMDLs for the project's receiving waters are as follows: Peters Canyon Channel – No TMDL's established; San Diego Creek Reach 1 – Nutrients, Pesticides, Sedimentation/Siltation, Metals; Upper Newport Bay – Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Metals; and		

	Lower Newport Bay – Indicator Bacteria, Nutrients, Pesticides, Metals, Siltation. Per the WIHMP for San Diego Creek, the project is subject to hydromodification impacts as it is tributary to natural reaches of downstream San Diego Creek.

SECTION II PROJECT DESCRIPTION

II.1 PROJECT DESCRIPTION

DESCRIPTION OF PROPOSED PROJECT				
Development Category (From Model WQMP, Table 7.11-2; or -3):	This project is considered a priority project under the following categories: *Priority Project, Category 1 – New development projects that create 10,000 square feet or more of impervious surface. This category includes commercial, industrial, residential housing subdivisions, mixed-use, and public projects on private or public property that falls under the planning and building authority or the Permittees.*			
Project Area (ft2): 168,695 ft2 (3.87 AC)[1]	Number of Dwelling Units: None proposed		SIC Code: N/A. Project is for a public Park	
Project Area	Pervious Surface		Impervious Surface	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	3.5 AC	90	0.37 AC	10
Post-Project Conditions	3.0 AC	78	0.87 AC	22
Drainage Patterns/Connections	In the pre-project condition, onsite project runoff from the western, northern, central and also run-on from the western portion of Crawford Canyon Road sheet flow from east to west to a depressed area downstream (at the southern-central portion of the site), where flows are collected and conveyed to an existing trapezoidal channel located just west of the project site via an existing 36" corrugated metal pipe (CMP). Existing concrete v-ditches located along the southern project boundary adjacent to Newport Blvd also collect and convey flows within the eastern portions of the project site, southerly prior to discharging to the existing trapezoidal channel via a concrete down drain. Runoff is then conveyed downstream in the existing County Facility (F13) prior to discharging southerly to Peters Canyon Channel (OCFCD Facility No. and then southwesterly to San Diego Creek (Reach 1), Newport Bay (Upper and Lower) and the Pacific Ocean.			
Narrative Project Description: (Use as much space as necessary)	The proposed project, "Crawford Canyon Park" (The Project), consists of an approximately 3.87-acre irregularly shaped parcel located just northwest of the intersection of Crawford Canyon Road and Newport Avenue. Specifically, the site is bound to the north by existing residential homes; to the east by Crawford Canyon Road and existing residential homes beyond; to the south by Newport Boulevard; and to the west by an			

[1] Project gross area based on property/tract limits. Net improvement areas, hydrological boundaries and BMP Drainage Management Areas will differ based on project grading, proposed improvements areas, developed drainage areas and BMP management areas.

DESCRIPTION OF PROPOSED PROJECT	
	existing trapezoidal drainage channel and residential homes beyond. The project proposes a park facility consisting of 8-foot wide walks, 5-foot wide trails, picnic tables and benches, exercise stations, pedestrian bridges, various play areas, retaining walls, a new asphalt parking area, a maintenance access road, landscaping areas, a meandering dry creek and supporting infrastructure improvements. Project landscaping areas include open space and slope landscaping located throughout the project site, consisting of shrub and groundcover. Total landscaping is anticipated to consist of approximately 78% of the project site, or 3.0 acres. Paved project areas include project walkways, decorative pavement, hardscape areas, drainage structures and the project's entrance and parking lot. Total impervious area is anticipated to consist of approximately 22% of the project site, or 0.87 acres. No other improvements, such as food service facilities, delivery areas, loading docks, outdoor material storage areas or trash enclosure areas, are proposed for the project. Anticipated use onsite will consist primarily of active and passive recreational activities, such as playing, exercising, walking running, sports, lounging, reading and eating. Wastes typical of parks and recreational areas are anticipated to be generated daily from the project site. These include food wastes, paper products, plastics, green wastes and recyclable materials. Designated receptacles will be provided within the park for visitor use. The receptacles shall be covered at all times, with collected materials removed on a weekly basis (at minimum), or as needed, by the contracted park maintenance staff for disposal. All proposed improvements are shown in the WQMP Site Plan in Section VI of this WQMP.

II.2 POTENTIAL STORMWATER POLLUTANTS

Table 2.1, Anticipated and Potential Pollutants Generated by Land Use Type, from the Technical Guidance Document (December 2013) lists the following Pollutants of Concern (POC's) associated with the proposed development:

POLLUTANTS OF CONCERN			
Pollutant	Check One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended Solid/Sediment	E ☒	N ☐	Pollutant is a Primary POC. Potential sources of sediment include disturbed or unstabilized landscaping areas and disturbed earth surfaces.
Nutrients	E ☒	N ☐	Pollutant is Primary POC as downstream water is impaired for Nutrients. Potential sources of nutrients include fertilizers, sediment and trash/debris.
Heavy Metals	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include automobiles from the project's parking lot area.
Pathogens (Bacteria/Virus)	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include food wastes, pet wastes, sediment and landscaping areas.
Pesticides	E ☒	N ☐	Pollutant is a Primary POC. Potential sources of pesticides include landscaping and open space areas.
Oil and Grease	E ☒	N ☐	Potential sources for the project include automobiles from the project's parking lot area.
Toxic Organic Compounds	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include automobiles from the project's parking lot area.
Trash and Debris	E ☒	N ☐	Potential sources of trash and debris include landscaping activities, food wrappers and food wastes.

II.3 HYDROLOGIC CONDITIONS OF CONCERN

The purpose of this section is to identify any hydrologic conditions of concern (HCOC) with respect to downstream flooding, erosion potential of natural channels downstream, impacts of increased flows on natural habitat, etc. that may occur as the result of project implementation. As specified in Section 2.3.3 of the Model WQMP, projects must identify and mitigate any HCOCs. An HCOC is a combination of upland hydrologic conditions and stream biological and physical conditions that present a condition of concern for physical and/or biological degradation of streams.

The project resides within the jurisdiction of the Santa Ana RWQCB and is subject to the requirements of the North Orange County WQMP TGD, in which HCOCs are considered to exist if the volume for the 2-year runoff event for post-development condition exceeds pre-development condition by more than 5% or the time of concentration is less than the pre-development condition by greater than 5%.

Is the proposed project potentially susceptible to hydromodification impacts?

☐ No – Show map

☒ Yes – Describe applicable hydrologic conditions of concern below.

The proposed project will increase the amount of impervious area located within the project site by a very small amount, thereby potentially increasing the developed condition runoff volume and rate. Therefore, the project is subject to the hydromodification requirements prescribed in the TGD for North Orange County.

A summary of the analysis is provided in the following table:

HCOC Analysis Summary (2-year event)									
Total Drainage Area [1]	Existing Condition			Proposed Condition			Δ Acres	Δ Q_2 (cfs)	Δ Tc (min)
	Acres	Q_2 (cfs)	Tc (min)	Acres[3]	Q_2 (cfs)	Tc (min)			
Overall (onsite plus offsite)	37.1	35.8	12.46	37.1	35.7	10.82	0.0	-0.1	-1.64

(1) Consists of onsite runoff and any offsite run-on areas to selected point of compliance (See Node 45 in project hydrology study).

Based on the project's hydrology analysis for the 2-year storm, the Tc to reach peak runoff for the developed condition is reduced by greater than 5%. Therefore, the project must implement hydromodification control BMPs to address HCOC impacts.

II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

The project's post-development drainage characteristics are described as follows:

In the developed condition, the project consists of 4 drainage areas.

Runoff from the eastern and central project areas (as well as the western portion of Crawford Canyon Road) is conveyed as sheet flow to a swale (dry creek) and conveyed southwesterly to a basin (bioretention basin) prior to discharging westerly to the existing open channel.

Runoff from the proposed parking lot is conveyed southwesterly as sheet flow and gutter to a catch basin prior to discharging southwesterly to the existing open channel.

Runoff from the sidewalk and landscaping area located at the southernmost portion of the project site is conveyed as sheet flow southwesterly to the existing open channel.

Low Impact Development

To satisfy the project's requirements for Low Impact Development (LID) requirements and water quality treatment, water qualify runoff from each of the project's Drainage Management Areas (DMAs) are addressed as follows.

DMA 1 (2.24 acres) – Consists of the eastern and central portions of the project site and western portion of Crawford Road. Runoff is conveyed southwesterly to a bioretention basin for infiltration of runoff.

DMA 2 (0.48 acres) – Consists of the proposed parking lot. Runoff is conveyed southwesterly to a proprietary biotreatment BMP (Filterra Biofiltration Unit or County approved equivalent) for treatment prior to discharge. Due to proximity of this DMA to a downstream retaining wall, infiltration BMPs are not proposed.

DMA 3 (0.07 acres) – Consists of landscaping and approximately 0.02 acres (840 ft^2) of sidewalk improvements located in the southernmost portion of the site. Runoff from the sidewalk will be conveyed northwesterly as sheet flow across the landscaping area, utilizing Hydrologic Source Control (HSC) BMP (HSC-2 Impervious Area Dispersion) prior to discharging offsite.

DMA 4 (0.17 acres) – Consists of entirely of landscaping improvements located on the southern perimeter of the site, adjacent to Newport Avenue. Site will be vegetated with native/drought tolerant plant species. Site's intended use is not anticipated to generate pollutants of concern as it consists only of vegetated slopes. HSC BMPs will be employed to address runoff.

DMA 5 (0.84 acres) – Consists of the northwestern and western perimeter of the project site and includes slope areas, open landscaping and decomposed granite areas, a maintenance access road comprised of Grasscrete and a ribbon gutter for runoff conveyance. HSC BMPs will be employed to address runoff.

DMA 6 (0.07 acres) – Consists of southern-western perimeter of the project site, which includes primarily slope areas that sheet flow to the existing channel. Site will be vegetated with native/drought tolerant plant species. Site's intended use is not anticipated to generate pollutants of concern as it consists only of vegetated slopes. HSC BMPs will be employed to address runoff.

The locations and sizes of the proposed BMPs are provided in the WQMP Site Plan (Section 6).

II.5 PROPERTY OWNERSHIP/MANAGEMENT

The project proponent, OC Parks, shall assume all onsite BMP maintenance, inspection and funding responsibilities. Inspection and maintenance activities are in Section V of this WQMP.

SECTION III SITE DESCRIPTION

III.1 PHYSICAL SETTING

General descriptions of the project area are provided below:

PHYSICAL SETTING	
Name of Planned Community/Planning Area (if applicable)	Planning Area – Currently not located within Planning Area. Project Name – "Crawford Canyon Park"
Location/Address	No current address. Project is located northwest of the intersection of Crawford Canyon Road and Newport Avenue, County of Orange, California.
General Plan Land Use Designation	Existing: 1B Suburban Residential Proposed: Open Space/Park
Zoning	Existing: AR (Agriculture Residential) Proposed: Open Space/Park
Acreage of Project Site	3.87 acres
Predominant Soil Type	Hydrologic Soil Type B

III.2 SITE CHARACTERISTICS

The following table summarizes general characteristics of the project site:

SITE CHARACTERISTICS	
Precipitation Zone	0.80 in.
Topography	The pre-project site is vacant and heavily disturbed, consisting of dirt areas and scattered trees throughout the project site. Generally, the site slopes from the northeast at approximately 392 feet above mean sea level (MSL) to the southwest, at approximately 348 feet above MSL.
Drainage Patterns/Connections	In the pre-project condition, onsite project runoff from the western, northern, central and also run-on from the western portion of Crawford Canyon Road sheet flow from east to west to a depressed area downstream (at the southern-central portion of the site), where flows are collected and conveyed to an existing trapezoidal channel located just west of the project site via an existing 36" corrugated metal pipe (CMP). Existing concrete v-ditches located along the southern project boundary adjacent to Newport Blvd also collect and convey flows within the eastern portions of the project site, southerly prior to discharging to the existing trapezoidal channel via a concrete down drain.

SITE CHARACTERISTICS	
	Runoff is then conveyed downstream in the existing County Facility (F13) prior to discharging southerly to Peters Canyon Channel (OCFCD Facility No. and then southwesterly to San Diego Creek (Reach 1), Newport Bay (Upper and Lower) and the Pacific Ocean.
Soil Type, Geology, and Infiltration Properties	Based on the County of Orange Technical Guidance Document (TGD) for Preparation of WQMPs and the geotechnical investigation, onsite soils consist primarily of Hydrologic Group B, characterized as having good infiltration rates when thoroughly wet. These soils are favorable for infiltration. Infiltration testing conducted onsite as part of the project's geotechnical investigation (GMU Geotechnical, November 6. 2020) yielded rates ranging from 0.67 inches per hour to 1.35 inches per hour (without safety factor).
Hydrogeologic (Groundwater) Conditions	Project site is not located within a shallow groundwater zone, as defined by the TGD. Per the project's geotechnical report, groundwater was not encountered at a maximum exploration depth of 26' below existing grade.
Geotechnical Conditions (relevant to infiltration)	Based on the TGD, majority of underlying soils consist primarily of Group "B" soils, which are favorable for infiltration. However, per the geotechnical investigation, artificial fill soils were encountered in majority of the excavations at the site. The fills were encountered to a maximum depth of 5 feet below the existing grade and generally consists of yellow and dark brown, damp to moist, firm to stiff, sandy clays. Alluvium underlay the artificial fill to the maximum depth of the exploratory drill holes. The alluvium consists of brown to dark gray brown to yellow brown, damp to moist, medium dense to very dense, sands and firm to stiff clays.
Off-Site Drainage	The project site receives run-on from the western portion of Crawford Canyon Road to the east. In the developed condition, storm water run-on from this area will be conveyed through the project site via onsite storm drain improvements prior to discharging to the existing channel to the southwest.
Utility and Infrastructure Information	The project site contains existing storm drain facilities, sewer, electric and water utilities. These facilities will be retained as in pre-project conditions. There are no facilities onsite that would obstruct interfere with the project's LID BMPs.

III.3 WATERSHED DESCRIPTION

The following table provides descriptions of the project's receiving waters.

WATERSHED DESCRIPTION	
Receiving Waters	Peters Canyon Channel, San Diego Creek (Reach 1), Upper and Lower Newport Bay.
303(d) Listed Impairments	Peters Canyon Channel – Pesticides, Pathogens, pH San Diego Creek (Reach 1) – Fecal Coliform, Selenium, Toxaphene, Nutrients, Pesticides, Sedimentation/Siltation, Benthic Community Effects, DDT, Malathion, Toxicity Newport Bay (Upper) – Chlordane, Copper, DDT, Indicator Bacteria, Metals, Nutrients, PCBs, Pesticides, Sediment Toxicity, Sedimentation Siltation, Malathion Newport Bay (Lower) – Chlordane, Copper, DDT, Indicator Bacteria, Nutrients, PCBs, Pesticides, Sediment Toxicity
Applicable TMDLs	Peters Canyon Channel – None San Diego Creek (Reach 1) – Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Metals Newport Bay (Upper) – Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Metals, Siltation Newport Bay (Lower) – Indicator Bacteria, Nutrients, Pesticides, Metals, Siltation
Pollutants of Concern for the Project	Pollutants of Concern for the project include: Suspended Solids/Sediment, Nutrients, Metals, Pathogens, Pesticides, Oil & Grease, Toxic Organic Compounds and Trash & Debris. Primary Pollutants of Concern for the project include: Suspended Solids/Sediment, Nutrients, Metals, Pathogens, Pesticides and Toxic Organic Compounds.
Environmentally Sensitive and Special Biological Significant Areas	The project site is not located within 200 feet of any Areas of Special Biological Significance (ASBS) or designated Environmentally Sensitive Areas (ESAs).

SECTION IV BEST MANAGEMENT PRACTICES (BMPS)

IV. 1 PROJECT PERFORMANCE CRITERIA

The project's performance criteria for HCOCs and LID BMPs are provided in the following table:

PROJECT PERFORMANCE CRITERIA		
Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implanting LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	There is currently no approved WIHMP for San Diego Creek.	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	Post-project runoff discharge volume for the 2-year frequency storm does not exceed that of the predevelopment condition by more than 5% and time of concentration of post-development runoff for the 2-year storm event is not less than that for the predevelopment condition by more than 5%.	
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	• LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency. • LID BMPs must be designed to: - Retain, onsite, (infiltrate, harvest and use, or evapotranspire) stormwater runoff as feasible up to the Design Capture Volume, and - Recover (i.e., draw down) the storage volume as soon as possible after a storm event, and if necessary - Biotreat, on-site, additional runoff, as feasible, up to 80 percent average annual capture efficiency (cumulative, retention plus biotreatment), and, if necessary - Retain or biotreat, in a regional facility, the remaining runoff up to 80 percent annual capture efficiency (cumulative, retention plus biotreatment, onsite plus offsite), and, if necessary - Fulfill alternative compliance obligations for runoff volume not retained or biotreated up to 80 percent average annual capture efficiency using treatment controls or other alternative approaches as described in Section 7.II-3.	

PROJECT PERFORMANCE CRITERIA	
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	Not applicable. Project proposes the use of LID BMPs to address the project's design capture volume.
Calculate LID design storm capture volume for Project.	DCV = C x D x A x 43560 sf/ac x 1ft/12in Where: DCV = design storm capture volume, cu-ft C = runoff coefficient = (0.75 x imp + 0.15) Imp = impervious fraction of drainage area (ranges from 0 to 1) D = storm depth (inches) A = tributary area (acres) *Imp = 0.70* *D = 0.80 inches (See Attachment D)* *A = 3.87 acres* *DCV[1] = [(0.22*0.75)+0.15](0.80)(3.87)(43560)(1/12)* *=3,540 cu-ft*

[1]DCV shown based on project limits. For actual DCV based on DMA limits, see Section IV.2.2.

IV.2 Site Design and Drainage Plan

The primary goal of site design principles and techniques is to reduce land development impacts on water quality and downstream hydrologic conditions. Benefits of site design include reductions in the size of downstream BMPs, conveyance systems, pollutant loading and hydromodification impacts.

IV.2.1 Site Design BMPs

The following section describes the site design BMPs that have been incorporated into this project.

Minimize Impervious Area

Landscaping and trees will be provided throughout the park to reduce the project's impervious footprint, thereby reducing runoff generated during rain events.

Maximize Natural Infiltration Capacity

Project will take advantage of onsite soils to infiltrate runoff wherever feasible. These measures include the use of pervious drainage swales, Grasscrete maintenance access road, decomposed granite and bioretention basin.

Preserve Existing Drainage Patterns and Time of Concentration

In the developed condition, runoff from project areas is consistent with pre-project conditions. Changes in the time of concentration and peak flows from pre-project conditions will be controlled via the project's hydromodification controls/detention facilities.

Disconnect Impervious Areas

Landscaping will be provided onsite to break up the project's impervious areas.

Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas

The pre-project site consists of heavily disturbed vegetation. All areas within project limits will be removed and revegetated with native and/or drought tolerant plantings.

Revegetate Disturbed Areas and Xeriscape Landscaping

Native and/or tolerant landscaping will be incorporated into site design, consistent with County guidelines, in proposed landscaping areas.

IV.2.2 Drainage Management Areas (DMAs)

Per the TGD, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas tributary to the project's BMPs. DMA limits have been delineated based on the tributary drainage area for each BMP.

The design capture volume (DCV) utilizing the "Simple Method" described in TGD Section III.1.1 is provided below. Locations of DMAs and associated LID BMPs are provided on the exhibits in Section VI. Calculations and TGD Worksheets are provided in Appendix B of this WQMP.

DMA	Area (Ac.)	Imp.	C-value	Design Storm Depth (in.)	DCV_{SIMPLE} (cu-ft)
1	2.24	0.247	0.335	0.8	2180.8
2	0.48	0.494	0.521	0.8	725.5
3	0.07	0.286	0.365	0.8	74.1
4	0.17	0	0.150	0.8	74.1
5	0.84	0.064	0.198	0.8	488.7
6	0.07	0	0.150	0.8	30.5
Total	3.87	--	--	--	3573.7

IV.3 LID BMP Selection and Project Conformance Analysis

Per the TGD, Low Impact Development (LID) BMPs must be incorporated into design features and source controls to reduce project related storm water pollutants. The incorporation of LID BMPs into project design requires evaluation of LID measures in the following treatment hierarchy: infiltration, evapotranspiration, harvest/reuse and biotreatment.

IV.3.1 Hydrologic Source Controls (HSC)

Hydrologic source controls (HSCs) can be considered to be an integration of site design practices and LID BMPs. The goal of HSCs is to reduce runoff volume for a given drainage area without reducing the site's true impervious area.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☒
Street trees (canopy interception)	☐

Name	Included?
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☒

HSC-2 Impervious Area Dispersion

Where feasible, runoff from the project's impervious areas and walkways will be directed to adjacent landscaping areas for filtration, evapotranspiration and incidental infiltration of runoff and volume reduction, prior to discharging to the storm drain system. Although HSC principles will be implemented throughout the project area, it will be solely employed in DMAs 3, 4, 5 and 6 to retain the DCV.

Summary of the project's HSC BMP credits are as follows:

HSC BMP SUMMARY TABLE								
DMA	BMP System	DCV (ft^3)	HSC System	Ratio [1]	D_{HSC}	D_{REM}	DCV_{HSC} [2] (ft^3)	Latitude/ Longitude
3	HSC-2 Impervious Area Dispersion	74.1	0.05 acres landscaping to 0.02 acres of walkway	>2:1	1.0"	0.0"	0.0	33.773436°, -117.789594°
4		74.1	0.17 acres landscaping to 0 acres of impervious	>2:1	1.0"	0.0"	0.0	33.774438°, -117.788238°
6		30.5	0.07 acres of landscaping to 0 acres of impervious	>2:1	1.0"	0.0"	0.0	33.774008°, -117.789376°
5	INF-6[3] (Grasscrete)	488.7	0.79 acres to 0.05 acres of gutter	>2:1	1.0"	0.0"	0.0	33.774448°, -117.789009°

[1] Landscaping area meets or exceeds 2:1 requirement for HSC-2. Full capture of runoff achieved. See Attachment B, Worksheets A and B.
[2] Remaining DCV with HSC credit applied.
[3] Areas upstream of Grasscrete roadway consists entirely of pervious areas.

IV.3.2 Infiltration BMPs

Infiltration BMPs are LID BMPs that capture, store and infiltrate storm water runoff. These BMPs are engineered to store a specified volume of water and have no design surface discharge (underdrain or outlet structure) until this volume is exceeded. Examples of infiltration BMPs include infiltration trenches, bioretention without underdrains, drywells, permeable pavement, and underground infiltration galleries.

Based to the project's predominant soil type (Type "B"), the project proposes the use of infiltration BMPs to address pollutants from project-related runoff. Supporting calculations are provided in Attachment B of this WQMP.

Name	Included?
Bioretention without underdrains	☒
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐

BMP Sizing

The proposed BMPs will be sized accordingly its tributary drainage area, as provided in the following table:

INFILTRATION DESIGN SUMMARY						
DMA	DCV_{SIMPLE} (cu-ft)	BMP	Maximum Ponding Depth (ft)	Minimum Footprint (ft^2)	Footprint Provided (ft^2)	Latitude/ Longitude
1	2180.8	INF-3 Bioretention	1.1[(1)]	1,983	2,001	33.774192°, -117.789027°

(1) Based on K_{DES} of 0.275 in/hr (K_{OBS} = 0.6 in/hr, FS = 2.18).

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Name	Included?
EVAPOTRANSPIRATION	
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐

Name	Included?
HARVEST & REUSE/ RAINWATER HARVESTING	
Above-ground cisterns and basins	☐
Underground detention	☐

Evapotranspiration

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, through some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site. Since ET is not the sole process in these BMPs, specific design and sizing criteria have not been developed for ET-based BMPs.

Harvest and Reuse

Harvest and Reuse (aka. Rainwater Harvesting) BMPs are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

The project does not propose the use of harvesting BMPs, as the project will employ the use of infiltration BMPs to satisfy LID requirements.

IV.3.4 Biotreatment BMPs

Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristic of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume.

BIOTREATMENT	
Name	Included?
Bioretention with underdrains (Biofiltration)	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☒
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐

The project proposes the use of a proprietary biotreatment BMP (Filterra Biofiltration or approved equivalent) to address runoff from the proposed parking lot area.

BIOTREATMENT BMP DESIGN SUMMARY				
DMA	BMP	Q_{BMP} (cfs)	BMP Unit/Model and capacity	BMP Location (Lat/Long)
2	BIO-7 Proprietary Biotreatment	0.065	Filterra 4x8 (0.074 cfs)	33.773779°, -117.789302°

IV.3.5 Hydromodification Control BMPs

The project is subject to hydromodification. The following BMPs will be employed to address project impacts.

HYDROMODIFICATION CONTROL BMPS	
BMP Name	BMP Description
Bioretention Basin and/or Upsized Storm Drain System (DMA 1)	The project's main storm drain line will be upsized and/or detention within the bioretention basin will be utilized to detain the difference in runoff for the 2-year storm event (volume and Tc) to mitigate HCOC.
Upsized Storm Drain System (DMA 2)	The project's main storm drain line in the parking lot area will be upsized to detain the difference in runoff for the 2-year storm event (volume and Tc) to mitigate HCOC

IV.3.6 Regional/Sub-Regional LID BMPs

Not applicable to project. Project is not part of any regional or sub-regional BMP programs. Project will employ use of onsite LID BMPs to address project runoff.

IV.3.7 Treatment Control BMPs

Not applicable to project. Project will employ use of onsite LID BMPs to address project runoff.

Source Control BMPs

In accordance with the County DAMP and County of Orange Local Implementation Plan (LIP), both structural and non-structural source control BMPs are required for all priority projects unless deemed not applicable based on project characteristics. The following tables summarize the source control BMPs (Non-Structural and Structural) specified in the County DAMP.

The following tables show source control BMPs (routine non-structural and routine structural) included in this project and those that were not included.

IV.3.8 Non-Structural Source Control BMPs

The table below indicates all Non-Structural Source Control BMPs to be utilized in the project. Additional discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☐	☒	Not applicable for public park.
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	Proposed facility will not generate waste subject to Title 22 CCR compliance.
N6	Local Industrial Permit Compliance	☐	☒	Project is not subject to industrial permit.
N7	Spill Contingency Plan	☐	☒	Proposed facility will not generate waste or store materials subject to the requirements of Chapter 6.95 of the CA Health and Safety Code.
N8	Underground Storage Tank Compliance	☐	☒	No underground storage tanks proposed for the project.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N9	Hazardous Materials Disclosure Compliance	☐	☒	Proposed facility will not store or generate hazardous materials subject to agency requirements.
N10	Uniform Fire Code Implementation	☐	☒	Proposed facility does not propose to store toxic or highly toxic compressed gases.
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☐	☒	None proposed.
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Public Streets and Parking Lots	☐	☒	
N16	Retail Gasoline Outlets	☐	☒	Not in project scope.

N2 – Activity Restrictions

Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the County for facility users and maintenance staff. Restrictions include prohibited activities within park property that have the potential to impact water quality, such as illegal dumping of wastes, proper clean up and disposal of pet wastes, proper disposal of litter and trash, and prohibiting wash down of the park's paved areas.

N3 – Common Area Landscape Management

Maintenance activities for landscape areas shall be consistent with County and manufacturer guidelines for fertilizer and pesticide use (OC DAMP Section 5.5). Maintenance includes trimming, weeding and debris removal and vegetation planting and replacement and shall be consistent with the County's Landscape Ordinance. Stockpiled materials during maintenance activities shall be placed away from drain inlets and runoff conveyance devices. Wastes shall be properly disposed of or recycled.

N4 – BMP Maintenance

Responsibility for implementation, inspection and maintenance of all BMPs (structural and non-structural) shall be consistent with the BMP Inspection and Maintenance Responsibilities Matrix provided in Section V of this WQMP, with documented records of inspections and maintenance activities completed.

N11 – Common Area Litter Control

The County shall implement a trash management and litter control procedures to minimize the potential for runoff pollution. These include the use of regular site patrols, ensuring all litter and trash are properly disposed, adequate capacity in waste receptacles and reporting any violations from facility users to management staff.

N12 – Employee Training

All employees, contractors and subcontractors involved for site maintenance shall be trained on the proper use and staging of landscaping and other materials with the potential to impact runoff and proper clean-up of spills and materials.

N14 – Common Area Catch Basin Inspection

As required by the TGD, at least 80% of all drainage facilities shall be inspected each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year; with 100% of all drainage facilities inspected, cleaned and maintained within a two year period. Drainage facilities include catch basins and inlets, detention vaults and the project's LID BMPs.

N15 – Street Sweeping Public Streets and Parking Lots

Project parking lot will be vacuum swept on twice per month, consistent with County's sweeping schedule.

Refer to Section V for implementation frequency and maintenance responsibilities.

IV.3.9 Structural Source Control BMPs

The source control BMPs have been selected in the following table to address the anticipated pollutants generated by the proposed project. These BMPs are designed to work in conjunction with the project's LID BMPs to minimize potential impacts to the site's receiving waters.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No outdoor storage areas proposed for park.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☐	☒	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☒	☐	
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	Not applicable to SARWQCB.
S6	Dock areas	☐	☒	None proposed.
S7	Maintenance bays	☐	☒	No maintenance bays proposed for project.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S8	Vehicle wash areas	☐	☒	No vehicle washing allowed onsite.
S9	Outdoor processing areas	☐	☒	No outdoor processing of goods required for project.
S10	Equipment wash areas	☐	☒	No wash areas onsite.
S11	Fueling areas	☐	☒	No fueling areas in project scope.
S12	Hillside landscaping	☒	☐	Project is not hillside development with large slopes.
S13	Wash water control for food preparation areas	☐	☒	Not in project scope.
S14	Community car wash racks	☐	☒	Not in project scope.

S1 – Provide Storm Drain System Stenciling and Signage (CASQA SD-13)

Storm drain stenciling with a brief message or graphical icons with symbols, prohibiting the dumping of improper materials into the storm drain system shall be placed in highly visible areas adjacent to all storm drain inlets. The BMP is designed to alert and educate facility users of the destination of pollutants discharged into storm drain systems. Legibility of stencils and signs shall be maintained.

S4 – Efficient Irrigation System & Landscape Design (CASQA SD-10 & SD-12)

In conjunction with routine landscaping maintenance activities, inspect irrigation for signs of leaks, overspray and repair or adjust accordingly. Adjust system cycle to accommodate seasonal fluctuations in water demand and temperatures. Ensure use of native or drought tolerant/non-invasive plant species to minimize water consumption.

S5 – Protect Slopes and Channels and Provide Energy Dissipation

The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed.

S12 – Site Design & Landscape Planning (Hillside Landscaping)

Hillside areas that are disturbed by the project shall be re-vegetated with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County requirements.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

The project is able to fully address the design capture volume via onsite LID BMPs. Therefore, an alternative compliance plan is not applicable to this project.

IV.4.1 Water Quality Credits

Not applicable to project. Project will utilize LID BMPs onsite to address storm water.

DESCRIPTION OF PROPOSED PROJECT				
Project Types that Qualify for Water Quality Credits (Select all that apply):				
☐Redevelopment projects that reduce the overall impervious footprint of the project site.	☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.		☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).	
☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).		☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned		☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).
☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	☐ Developments in a city center area.	☐ Developments in historic districts or historic preservation areas.	☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.	☐ In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.
Calculation of Water Quality Credits (if applicable)	N/A			

IV.4.2 Alternative Compliance Plan Information

Not applicable to project. Project will utilize LID BMPs onsite to address storm water pollutants.

SECTION V INSPECTION/MAINTENANCE RESPONSIBILITY FOR BMPS

It has been determined that the Owner, OC Parks, shall assume all BMP funding, inspection and maintenance responsibilities for Crawford Canyon Park project.

Contact/Title _____

Company OC Parks

Address 13042 Old Myford Road
Irvine, CA 92602

Email _____

Telephone # (714) 973-6855

The Owner shall verify BMP implementation and ongoing maintenance through inspection, self-certification or other equally effective measure. The certification shall verify that the inspection and maintenance of all BMPs are performed in accordance to the requirements of this WQMP.

The BMP Inspection and Maintenance Responsibility Matrix is provided in the following table. An Operations and Maintenance (O&M) Plan is also included as an attachment to this WQMP.

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
HYDROLOGIC SOURCE CONTROL BMPs			
HSC-2 Impervious Area Dispersion	OC Parks	Inspect for standing water and that water infiltrates into underlying soil completely. Remove accumulated sediment or repair eroded areas as needed.	After qualifying storm events of 0.5" or greater and monthly with landscaping maintenance
INF-5 Permeable Pavement (Grasscrete)	OC Parks	Inspect for oil spills, dead vegetation, soil level within modules and stability. Remove/repairs as needed based on inspections. Trim vegetation as needed to maintain desired height.	Monthly with landscaping maintenance
INFILTRATION BMPs			
INF-3 Bioretention with no Underdrains	OC Parks	Conduct general inspection and maintenance per routine landscaping maintenance activities. Inspect surface area for debris, trash and vegetation accumulation. Inspect for general plant health. Inspect for sediment, build up on planting surface and in area drain inlet. Inspect for sediment or debris clogging inlet. Inspect for standing water after rain event of 0.5 inches or greater, based (48-hour draw down). Clean/repair items as necessary.	Monthly

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
		Remove vegetation, permeable soil and drain rock. Replace in kind. Repair if necessary.	Every 5 to 7 years, or as needed
BIOTREATMENT BMPs			
BIO-7 Proprietary Biotreatment (Filterra Biofiltration)	OC Parks	Inspect unit for accumulated debris and sediment and plant health; remove trash; trim vegetation. Remove sediment, replace mulch (if included), replace media as needed.	2-4 weeks during rainy season or after significant events. Frequency to be customized after 1-2 years observation.
NON-STRUCTURAL SOURCE CONTROL BMPs			
N2 Activity Restrictions	OC Parks	Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the County for facility users and maintenance staff. Restrictions include prohibited activities within park property that have the potential to impact water quality, such as illegal dumping of wastes, proper clean up and disposal of pet wastes, proper disposal of litter and trash, and prohibiting wash down of the park's paved areas.	Ongoing
N3 Common Area Landscape Management	OC Parks	Maintenance shall be consistent with County requirements; any fertilizer and/or pesticide usages shall be consistent with County and manufacturer guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Monthly and as needed

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
N4 BMP Maintenance	OC Parks	Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the County and documented with the WQMP.	Ongoing
N11 Common Area Litter control	OC Parks	Litter patrol, violations investigation, reporting and other litter control activities shall be performed by the County staff as needed and in conjunction with maintenance activities for common areas.	Ongoing patrols. Weekly (minimum) pick up and removal. Monthly inspections with landscaping maintenance.
N12 Employee Training	OC Parks	All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc.	Upon hire and annually thereafter
N14 Common Area Catch Basin Inspection	OC Parks	Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of facilities inspected and maintained within a 2-year period.	Annually
N15 Street Sweeping	OC Parks	Project streets and parking areas shall be vacuum swept at a minimum, weekly basis, consistent with City schedules.	Twice per month

BMP INSPECTION/MAINTENANCE			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
STRUCTURAL SOURCE CONTROL BMPs			
S1 Provide storm drain system stencilling and signage	OC Parks	As a part of the civil engineering drawings, it will be required by the Developer to stencil on all of the project's catch basins, where applicable in paved areas, the words, "No Dumping - Drains to Ocean." Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible.	Annually
S4 Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	OC Parks	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Monthly
S5 Protect Slopes and Channels	OC Parks	The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed.	Monthly
S12 Site Design and Landscape Planning (Hillside Landscaping)	OC Parks	Hillside areas that are disturbed by the project shall be re-vegetated with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County requirements.	Monthly

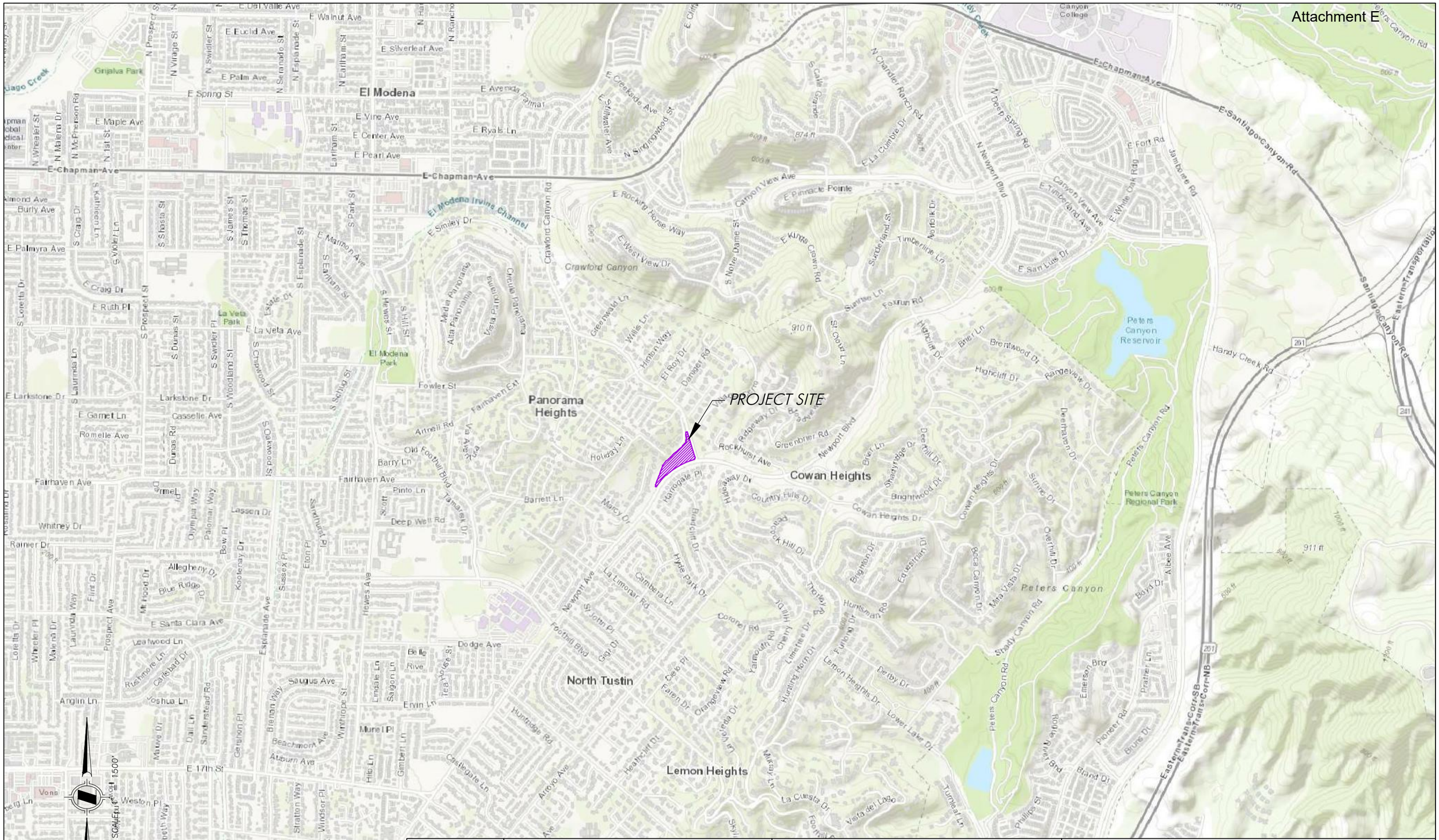
SECTION VI SITE PLAN AND DRAINAGE PLAN

The exhibits provided in this section are to illustrate the post construction BMPs prescribed within this WQMP. Drainage flow information of the proposed project, such as general surface flow lines, concrete or other surface drainage conveyances, and storm drain facilities are also depicted. All structural source control and LID BMPs are shown as well.

Exhibits

- Vicinity Map
- WQMP Site Plan Exhibit

Attachment E

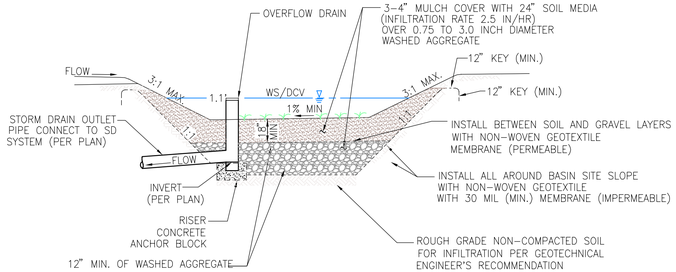


DRAWN BY: TIH	PREPARED BY: HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING ■ ENGINEERING ■ SURVEYING Three Hughes, Irvine, CA 92618 ■ PH: (949) 583-1010 ■ FX: (949) 583-0759	PREPARED FOR: OCparks 13042 OLD MYFORD ROAD IRVINE, CA 92602 (714) 973-6385	"CRAWFORD CANYON PARK" NORTHWEST OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD COUNTY OF ORANGE, CALIFORNIA	WQMP VICINITY MAP
DATE: 11/13/2020				
W.O.: 3644-10				

DATE: Nov. 16, 2020 05:14:08 PM FILE: F:\1140\Engineering\SY_WQ\WQMP\Exhibits\WQMP_VIC Crawford.dwg

LEGEND

- PROJECT LIMITS
- NAP — NOT A PART
- DRAINAGE MANAGEMENT AREA (DMA) LIMITS
- DMA / ACRE — DMA DESIGNATION AND AREA
- SURFACE FLOW (ONSITE)
- SURFACE FLOW (OFFSITE)
- CONCENTRATED FLOW (ONSITE)
- CONCENTRATED FLOW (OFFSITE)
- EXISTING STORM DRAIN SYSTEM
- PROJECT STORM DRAIN SYSTEM
- PROJECT INLET/CATCH BASIN
  S1 STORM DRAIN STENCILING AND SIGNAGE
- PROJECT LANDSCAPE AREAS
  S4 EFFICIENT IRRIGATION SYSTEMS & LANDSCAPE DESIGN
  S12 SITE DESIGN & LANDSCAPE PLANNING (HILLSIDE LANDSCAPING)
  FF-5 LANDSCAPE MAINTENANCE
- PROJECT SWALE/DRY CREEK
- BMP INF-6 PERMEABLE PAVEMENT
  GRASSCRETE MAINTENANCE ACCESS ROAD
- PROJECT WALKWAYS
- PROJECT PARKING LOT
  N15 SWEEPING PARKING LOT
  FF-9 PARKING LOT MAINTENANCE
- DECOMPOSED GRANITE
- BMP BIO-1 FLOW THROUGH BIORETENTION
- BMP BIO-7 PROPRIETARY BIOTREATMENT
  FILTERRA BIOFILTRATION BMP
- BMP HSC-2 IMPERVIOUS AREA DISPERSION
  S4 EFFICIENT IRRIGATION SYSTEMS & LANDSCAPE DESIGN
  S12 SITE DESIGN & LANDSCAPE PLANNING (HILLSIDE LANDSCAPING)
  FF-5 LANDSCAPE MAINTENANCE
- PROJECT DISCHARGE POINT



BIO-1 BIORETENTION WITH UNDERDRAIN
TYPICAL SECTION DETAIL
N.T.S.

WATER QUALITY MANAGEMENT PLAN - SITE PLAN

APPLICANT:
OCparks
13042 OLD MYFORD ROAD
IRVINE, CA 92602
(714) 973-6855

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

"CRAWFORD CANYON PARK"
NORTHWEST OF CRAWFORD CANYON ROAD
AND NEWPORT BOULEVARD
COUNTY OF ORANGE, CALIFORNIA

DRAFTED BY:	DATE:	W.O. NO:	SHEET NO:
TIH	11/15/2020	3644-10	1 OF 1

SECTION VII EDUCATIONAL MATERIALS INCLUDED

The following table contains a list of applicable educational materials to be included in the project's Final WQMP.

EDUCATION MATERIALS			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☐	Proper Maintenance Practices for Your Business	☐
Household Tips	☐	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☐		
Recycle at Your Local Used Oil Collection Center (North County)	☐		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☒		☐
Sewer Spill	☐		☐
Tips for the Home Improvement Projects	☐		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☐		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☐		☐
Tips for Projects Using Paint	☐		☐

Attachment A

Educational Materials

Attachment B

BMP Worksheets/Calculations

BMP Details

Table 2.7: Infiltration BMP Feasibility Worksheet			
	Infeasibility Criteria	*Yes*	*No*
1	Would Infiltration BMPs pose significant risk for groundwater related concerns? Refer to Appendix VII (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria.		X
Provide basis: **Based on TGD data, there are no restrictions for groundwater infiltration or known plumes within project area.**			
2	Would Infiltration BMPs pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level? (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert):		X
Provide basis: **Per geotechnical professional, no restrictions on infiltration.**			
3	Would infiltration of the DCV from drainage area violate downstream water rights?		X
Provide basis: **Per County TGD Maps, no restrictions on infiltration due to water rights.**			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)			
	Partial Infeasibility Criteria	*Yes*	*No*
4	Is proposed infiltration facility located on HSG D soils or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils?		X
Provide basis: Based on TGD maps, majority of site contains HSG B soils.			
5	Is measured infiltration rate below proposed facility less than 0.3 inches per hour? This calculation shall be based on the methods described in Appendix VII.		X
Provide basis: Onsite testing yielded 0.67 in/hr and 1.35 in/hr, which equates to 0.34 in/hr and 0.67 in/hr when FS2 is applied.			
6	Would reduction of over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Project discharges to storm channel that is not ephemeral.			
7	Would an increase in infiltration over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Based on TGD and County GIS records, no restrictions on infiltration due to ephemeral washes or groundwater concerns.			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)		
Infiltration Screening Results (check box corresponding to result):		
8	Is there substantial evidence that infiltration from the project would result in a significant increase in I&I to the sanitary sewer that cannot be sufficiently mitigated? (See Appendix XVII)? Provide narrative discussion and supporting evidence: **Per TGD and County of Orange GIS data, project is not located in an area where increase in I&I to the sanitary sewer is of concern.**	
9	If any answer from row 1-3 is yes: infiltration of any volume is not feasible within the DMA or equivalent. Provide basis: **Items 1-3 are no.**	
10	If any answer from row 4-7 is yes, infiltration is permissible but is not presumed to be feasible for the entire DCV. Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply. Provide basis: **Items 4-7 are no.**	
11	If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable. Provide basis: **Project will infiltrate.**	

Worksheet A: Hydrologic Source Control Calculation Form

		Drainage area ID: DMA 3		
		Total drainage area: 0.07 acres		
		Total drainage area Impervious Area (IA_{total}): 0.020 acres		
HSC ID	HSC Type/ Description/ Reference BMP Fact Sheet	Effect of individual HSC_i per criteria in BMP Fact Sheets (XIV.1) (d_{HSCi})[1]	Impervious Area Tributary to HSC_i (IA_i)	$d_i \times IA_i$
Landscape	HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.05 acres to 0.02 acres	Perv/Imp > 2:1 d_{hsc} = 1.0	0.020	0.020
		Box 1:	$\sum d_i \times IA_i =$	0.020
		Box 2:	$IA_{total} =$	0.020
		[Box 1]/[Box 2]:	$d_{HSC\ total} =$	1.0"
			Percent Capture Provided by HSCs (Table III.1)	80%
		Drainage area ID: DMA 4		
		Total drainage area: 0.17 acres		
		Total drainage area Impervious Area (IA_{total}): 0.0 acres		
HSC ID	HSC Type/ Description/ Reference BMP Fact Sheet	Effect of individual HSC_i per criteria in BMP Fact Sheets (XIV.1) (d_{HSCi})[1]	Impervious Area Tributary to HSC_i (IA_i)	$d_i \times IA_i$
Landscape	HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.17 acres to 0.0 acres	Perv/Imp > 2:1 d_{hsc} = 1.0	0.0	0.0
		Box 1:	$\sum d_i \times IA_i =$	0.0
		Box 2:	$IA_{total} =$	0.0
		[Box 1]/[Box 2]:	$d_{HSC\ total} =$	1.0"
			Percent Capture Provided by HSCs (Table III.1)	80%

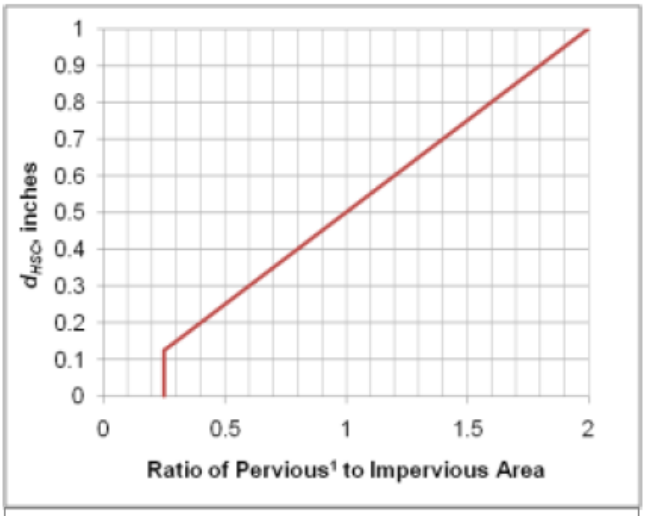
Worksheet A: Hydrologic Source Control Calculation Form

Drainage area ID	DMA 5
Total drainage area	0.07 acres
Total drainage area Impervious Area (IA_{total})	0.0 acres

HSC ID	HSC Type/ Description/ Reference BMP Fact Sheet	Effect of individual HSC_i per criteria in BMP Fact Sheets (XIV.1) (d_{HSCi})[1]	Impervious Area Tributary to HSC_i (IA_i)	$d_i \times IA_i$
Landscape	HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.07 acres to 0.0 acres	Perv/Imp > 2:1 d_{hsc} = 1.0	0.0	0.0
		Box 1: $\sum d_i \times IA_i =$		0.0
		Box 2: $IA_{total} =$		0.0
		[Box 1]/[Box 2]: $d_{HSC\ total} =$		1.0"
		Percent Capture Provided by HSCs (Table III.1)		80%

Drainage area ID	DMA 6
Total drainage area	0.84 acres
Total drainage area Impervious Area (IA_{total})	0.05 acres

HSC ID	HSC Type/ Description/ Reference BMP Fact Sheet	Effect of individual HSC_i per criteria in BMP Fact Sheets (XIV.1) (d_{HSCi})[1]	Impervious Area Tributary to HSC_i (IA_i)	$d_i \times IA_i$
Landscape	HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.79 acres to 0.05 acres	Perv/Imp > 2:1 d_{hsc} = 1.0	0.05	0.05
		Box 1: $\sum d_i \times IA_i =$		0.05
		Box 2: $IA_{total} =$		0.05
		[Box 1]/[Box 2]: $d_{HSC\ total} =$		1.0"
		Percent Capture Provided by HSCs (Table III.1)		80%



[1] Pervious area used in calculation should only include the pervious area receiving flow, not pervious area receiving only direct rainfall or upslope pervious drainage.

Table III.1: Fraction of Average Long Term Runoff Reduced (Capture Efficiency) by HSCs

Cumulative HSC Adjustment to Design Capture Storm Depth (d_{hsc})	Capture Efficiency Achieved Lowland Regions (<1,000 ft)	Capture Efficiency Achieved Mountainous Regions (>1,000 ft)
<0.05	0	0%
0.05"	8%	7%
0.1"	20%	16%
0.2"	37%	31%
0.3"	48%	42%
0.4"	57%	50%
0.5"	64%	57%
0.6"	70%	63%
0.7"	75%	68%
0.8"	80%	72%
0.9"	80%	76%
1.0"	80%	80%

Worksheet B: Simple Design Capture Volume Sizing Method – DMAs 1-6				
Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.80	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.95	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	See table below	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=		
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=		
4	Calculate runoff volume, $V_{design} = (C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=		cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate (DMA 1 only)				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII)	$K_{measured}$=	0.6	In/hr
2	Enter combined safety factor from Worksheet H, $S_{Preliminary}$ (unitless)	$S_{Preliminary}$=	2.18	
3	Calculate design infiltration rate, $K_{design} = K_{measured} / S_{Preliminary}$	K_{design}=	0.275	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	48	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	1.1 (13.2 in)	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	2181/1.1 = 1983 Proposed = 2001	sq-ft

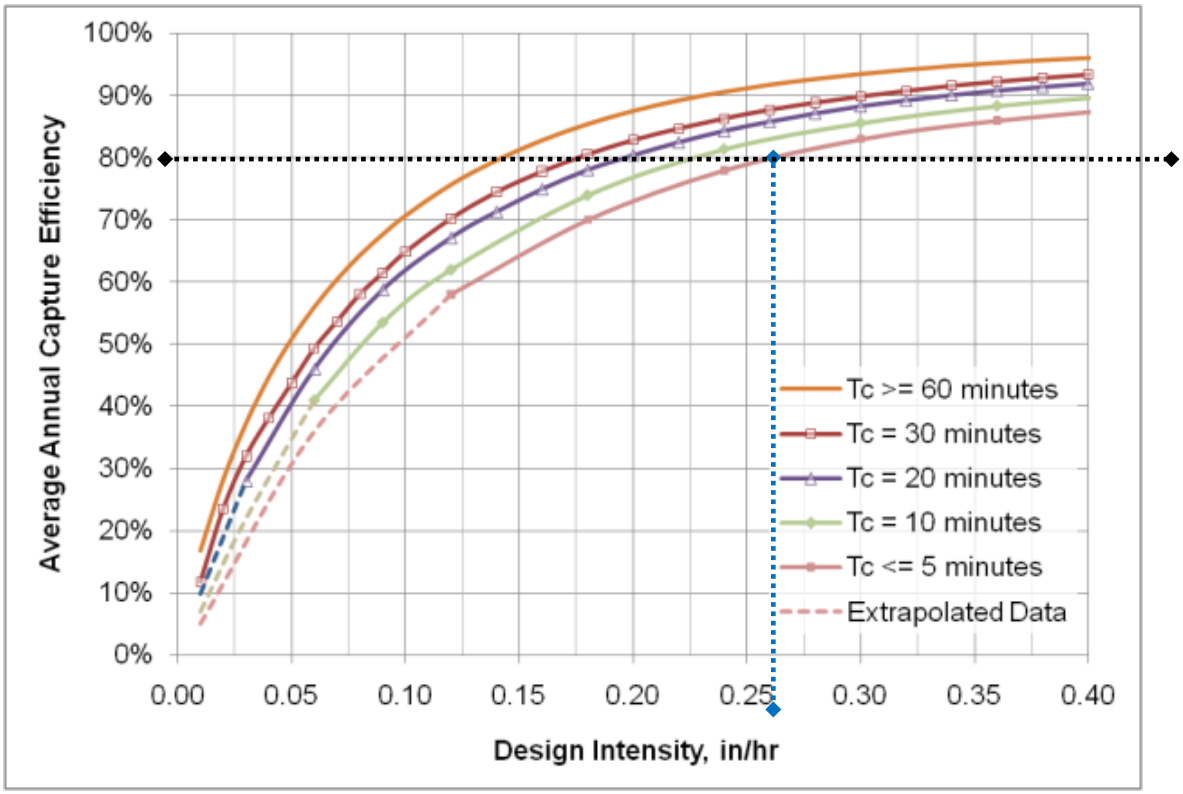
Calculations

DMA	Area (Ac.)	Imp.	C-value	Design Storm Depth (in.)	DCV_{SIMPLE} (cu-ft)
1	2.24	0.247	0.335	0.8	2180.8
2	0.48	0.494	0.521	0.8	725.5
3	0.07	0.286	0.365	0.8	74.1
4	0.17	0	0.150	0.8	74.1
5	0.84	0.064	0.198	0.8	488.7
6	0.07	0	0.150	0.8	30.5

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 2				
Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See Appendix IV.2)	T_c=	5	
2	Using Figure III.4, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.26	in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (Worksheet A)	Y_2=	0	%
5	Using Figure III.4, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0.26	
6	Determine the design intensity that must be provided by BMP $I_{design} = I_1 - I_2$	I_{design}=	0.26	
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	0.48	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.494	
3	Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$	C=	0.521	
4	Calculate design flow rate, $Q_{design} = (C \times i_{design} \times A)$	Q_{design}=	0.065	cfs
Supporting Calculations				
Describe system: Runoff from the parking lot will be conveyed as gutter flow to a Filterra Biofiltration BMP (or County approved equivalent) prior to discharging offsite. Filterra sizing required is 8'x4' unit with capacity of 0.074 cfs.				
Provide time of concentration assumptions: T_c based on minimum value of 5 minutes.				

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 2

Graphical Operations



Worksheet H: Factor of Safety and Design Infiltration Rate Worksheet					
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	2	0.25
		Predominant soil texture	0.25	2	0.25
		Site soil variability	0.25	2	0.50
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
B	Design	Tributary area size	0.25	1	0.25
		Level of pretreatment/ expected sediment loads	0.25	1	0.25
		Redundancy	0.25	2	0.75
		Compaction during construction	0.25	1	0.25
		Design Safety Factor, $S_B = \Sigma p$			1.25
Combined Safety Factor, $S_{TOT} = S_A \times S_B$				2.18	
Measured Infiltration Rate, inch/hr, K_M (corrected for test-specific bias)				(0.6 in/hr) / FS 2 = 0.3 in/hr	
Design Infiltration Rate, in/hr, $K_{DESIGN} = K_{OBS} / S_{TOT}$				(0.6 in/hr) / FS 2.18 = 0.275 in/hr	
Supporting Data					
Infiltration test conducted at BMP location. Observed rate (K_{OBS}) without factors of safety is 0.6 in/hr.					

Worksheet I: Summary of Groundwater-related Feasibility Criteria				
1	Is project large or small? (as defined by Table VIII.2) circle one	Large		Small
2	What is the tributary area to the BMP?	A	2.24	acres
3	What type of BMP is proposed?	Bioretention with no undedrains		
4	What is the infiltrating surface area of the proposed BMP?	A_{BMP}	2001	sq-ft
5	What land use activities are present in the tributary area (list all) - Walkways/Hardscape - Landscaping areas			
6	What land use-based risk category is applicable?	L	M	H
7	If M or H, what pretreatment and source isolation BMPs have been considered and are proposed (describe all): Bioretention media			
8	What minimum separation to mounded seasonally high groundwater applies to the proposed BMP? See Section VIII.2 (circle one)	5 ft		10 ft
9	Provide rationale for selection of applicable minimum separation to seasonally high mounded groundwater: Based geotechnical investigation onsite, groundwater is greater than 26' deep.			
10	What is separation from the infiltrating surface to seasonally high groundwater?	SHGWT	greater than 20	ft
11	What is separation from the infiltrating surface to mounded seasonally high groundwater?	Mounded SHGWT	greater than 20	ft
12	Describe assumptions and methods used for mounding analysis: Based geotechnical investigation the project, groundwater is greater than 26' deep.			
13	Is the site within a plume protection boundary (See Figure VIII.2)?	Y	N	N/A
14	Is the site within a selenium source area or other natural plume area (See Figure VIII.2)?	Y	N	N/A
15	Is the site within 250 feet of a contaminated site?	Y	N	N/A
16	If site-specific study has been prepared, provide citation and briefly summarize relevant findings: Determination based off County data provided in TGD and geotechnical study. No issues with infiltration BMPs identified.			
17	Is the site within 100 feet of a water supply well, spring, septic system?	Y	N	N/A
18	Is infiltration feasible on the site relative to groundwater-related criteria?	Y	N	

Worksheet I: Summary of Groundwater-related Feasibility Criteria
Provide rationale for feasibility determination: Based on soil report and testing conducted onsite, infiltration of runoff is feasible for the project.

INF-3: Bioretention with no Underdrain

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, planting soils, and plants. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, and biodegraded by the soil and plants. For areas with low permeability native soils or steep slopes, bioretention areas can be designed with an underdrain system that routes the treated runoff to the storm drain system rather than depending entirely on infiltration.

Also known as:

- *Rain gardens*
- *Infiltration planter*



Bioretention
Source: Geosyntec Consultants

Feasibility Screening Considerations

- Bioretention with no underdrains shall pass infiltration infeasibility screening criteria to be considered for use.

Opportunity Criteria

- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Bioretention may also be applied in parking lot islands, cul-de-sacs, traffic circles, road shoulders, and road medians.
- Drainage area is ≤ 5 acres, preferrably ≤ 1 acre.
- Area available for infiltration.
- Soils are adequate for infiltration or can be amended to improve infiltration capacity. Site slope is less than 15 percent.

OC-Specific Design Criteria and Considerations

- ☐ Placement of BMPs should observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations, utilities, roadways, etc.)
- ☐ Depth to mounded seasonally high groundwater shall not be less than 5 feet.
- ☐ If sheet flow is conveyed to the treatment area over stabilized grassed areas, the site must be graded in such a way that minimizes erosive conditions; sheet flow velocities should not exceed 1 foot per second.
- ☐ Ponding depth should not exceed 18 inches; fencing may be required if ponding depth exceeds 6 inches to mitigate the risk of drowning.
- ☐ Planting/storage media shall be based on the recommendations contained in MISC-1: Planting/Storage Media
- ☐ The minimum amended soil depth is 1.5 feet (3 feet is preferred).
- ☐ The maximum drawdown time of the planting soil is 48 hours.

- ☐ Infiltration pathways may need to be restricted due to the close proximity of roads, foundations, or other infrastructure. A geomembrane liner, or other equivalent water proofing, may be placed along the vertical walls to reduce lateral flows. This liner should have a minimum thickness of 30 mils.
- ☐ Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours; native plant species and/or hardy cultivars that are not invasive and do not require chemical fertilizers or pesticides should be used to the maximum extent feasible.
- ☐ The bioretention area should be covered with 2-4 inches (average 3 inches) of mulch at startup and an additional placement of 1-2 inches of mulch should be added annually.
- ☐ An optional gravel drainage layer may be installed below planting media to augment storage volume.
- ☐ An overflow device is required at the top of the ponding depth.
- ☐ Dispersed flow or energy dissipation (i.e. splash rocks) for piped inlets should be provided at basin inlet to prevent erosion.

Simple Sizing Method for Bioretention with no Underdrain

If the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** is used to size a bioretention area with underdrains, the user calculates the DCV and designs the system with geometry required to draw down the DCV in 48 hours. The sizing steps are as follows:

Step 1: Determine the Bioretention Design Capture Volume

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

Step 2: Determine the 48-hour Ponding Depth

The depth of effective storage depth that can be drawn down in 48 hours can be calculated using the following equation:

$$d_{48} = K_{DESIGN} \times 4$$

Where:

d_{48} = bioretention 48-hour effective depth, ft

K_{DESIGN} = bioretention design infiltration rate, in/hr (See **Appendix VII**)

This is the maximum effective depth of the basin below the overflow device to achieve drawdown in 48 hours. Effective depth includes ponding water and media/aggregate pore space.

Step 3: Design System Geometry to Provide d_{48}

Design system geometry such that

$$d_{48} \geq d_{EFFECTIVE} = (d_P + n_M d_M + n_G d_G)$$

Where:

d_{48} = depth of water that can drain in 48 hours

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft

d_P = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

n_M = bioretention media porosity

d_M = bioretention media depth, ft

n_G = bioretention gravel layer porosity; 0.35 may be assumed where other information is not available

d_G = bioretention gravel layer depth, ft

Step 4: Calculate the Required Infiltrating Area

The required infiltrating area (i.e. measured at the media surface) can be calculated using the following equation:

$A = DCV / d_{EFFECTIVE}$

Where:

A = required infiltrating area, sq-ft (measured as the media surface area)

DCV = design capture volume, cu-ft (see Step 1)

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft (from Step 3)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint.

Capture Efficiency Method for Bioretention with no Underdrain

If BMP geometry has already been defined and deviates from the 48 hour drawdown time, the designer can use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

Step 1: Determine the drawdown time associated with the selected basin geometry

$DD = (d_{EFFECTIVE} / K_{DESIGN}) \times 12$ in/ft

Where:

DD = time to completely drain infiltration basin ponding depth, hours

$d_{EFFECTIVE} \leq (d_P + n_M d_M + n_G d_G)$

d_P = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

n_M = bioretention media porosity

d_M = bioretention media depth, ft

n_G = bioretention gravel layer porosity; 0.35 may be assumed where other information is not available

d_G = bioretention gravel layer depth, ft

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

Step 2: Determine the Required Adjusted DCV for this Drawdown Time

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to calculate the fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the basin drawdown time calculated above.

Step 4: Check that the Bioretention Effective Depth Drains in no Greater than 96 Hours

$DD = (d_{EFFECTIVE} / K_{DESIGN}) \times 12$

Where:

DD = time to completely drain bioretention facility, hours

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft (from Step 3)

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

If DD_{ALL} is greater than 96 hours, adjust bioretention media depth and/or gravel layer depth until DD is less than 96 hours. This duration is based on preventing extended periods of saturation from causing plant mortality.

Step 5: Determine the Basin Infiltrating Area Needed

The required infiltrating area (i.e. the surface area of the top of the media layer) can be calculated using the following equation:

$A = DCV / d_{EFFECTIVE}$

Where:

A = required infiltrating area, sq-ft (measured at the media surface)

DCV = design capture volume, adjusted for drawdown time, cu-ft (see Step 1)

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft (from Step 3)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint. If the area required is greater than the selected basin area, adjust surface area or adjust ponding depth and recalculate required area until the required area is achieved.

Configuration for Use in a Treatment Train

- Bioretention areas may be preceeded in a treatment train by HSCs in the drainage area, which would reduce the required volume of the bioretention cell.
- Bioretention areas can be incorporated in a treatment train to provide enhanced water quality treatment and reductions in runoff volume and rate. For example, runoff can be collected from a roadway in a vegetated swale that then flows to a bioretention area. Similarly, bioretention could be used to manage overflow from a cistern.

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment:
  http://www.cabmphandbooks.com/Documents/Development/TC-32.pdf
- SMC LID Manual (pp 68):
  http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 5:
  http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf
- San Diego County LID Handbook Appendix 4 (Factsheet 7):
  http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf
- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4.
  http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850

  County of Los Angeles Low Impact Development Standards Manual, Chapter 5:
  http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf

HSC-2: Impervious Area Dispersion

Also known as:

- *Downspout disconnection*
- *Impervious area disconnection*
- *Sheet flow dispersion*

Impervious area dispersion refers to the practice of routing runoff from impervious areas, such as rooftops, walkways, and patios onto the surface of adjacent pervious areas. Runoff is dispersed uniformly via splash block or dispersion trench and soaks into the ground as it move slowly across the surface of pervious areas. Minor ponding may occur, but it is not the intent of this practice to actively promote localized on-lot storage (See HSC-1: Localized On-Lot Infiltration).



Simple Downspout Dispersion
Source:
toronto.ca/environment/water.htm

Feasibility Screening Considerations

- Impervious area dispersion can be used where infiltration would otherwise be infeasible, however dispersion depth over landscaped areas should be limited by site-specific conditions to prevent standing water or geotechnical issues.

Opportunity Criteria

- Rooftops and other low traffic impervious surface present in drainage area.
- Soils are adequate for infiltration. If not, soils can be amended to improve capacity to absorb dispersed water (see MISC-2: Amended Soils).
- Significant pervious area present in drainage area with shallow slope
- Overflow from pervious area can be safely managed.

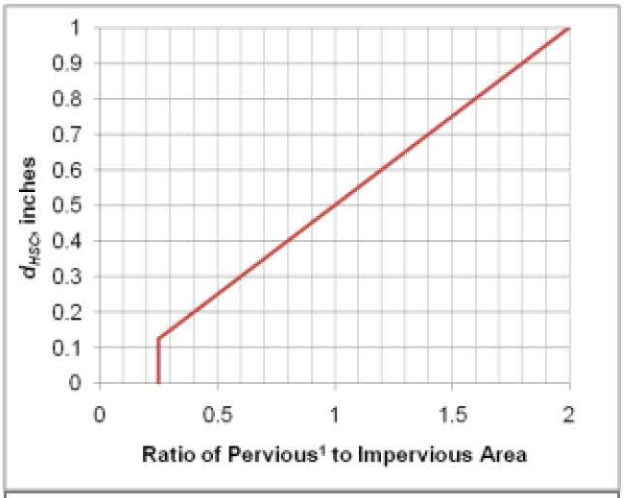
OC-Specific Design Criteria and Considerations

- ☐ Soils should be preserved from their natural condition or restored via soil amendments to meet minimum criteria described in Section .
- ☐ A minimum of 1 part pervious area capable of receiving flow should be provided for every 2 parts of impervious area disconnected.
- ☐ The pervious area receiving flow should have a slope ≤ 2 percent and path lengths of ≥ 20 feet per 1000 sf of impervious area.
- ☐ Dispersion areas should be maintained to remove trash and debris, loose vegetation, and protect any areas of bare soil from erosion.
- ☐ Velocity of dispersed flow should not be greater than 0.5 ft per second to avoid scour.

Calculating HSC Retention Volume

- The retention volume provided by downspout dispersion is a function of the ratio of impervious to pervious area and the condition of soils in the pervious area.
- Determine flow patterns in pervious area and estimate footprint of pervious area receiving dispersed flow. Calculate the ratio of pervious to impervious area.
- Check soil conditions using the soil condition design criteria below; amend if necessary.
- Look up the storm retention depth, d_{HSC} from the chart below.

- The max d_{HSC} is equal to the design storm depth for the project site.



[1] Pervious area used in calculation should only include the pervious area receiving flow, not pervious area receiving only direct rainfall or upslope pervious drainage.

Soil Condition Design Criteria

- ☐ Maximum slope of 2 percent
- ☐ Well-established lawn or landscaping
- ☐ Minimum soil amendments per criteria in MISC-2: Amended Soils.

Configuration for Use in a Treatment Train

- Impervious area disconnection is an HSC that may be used as the first element in any treatment train
- The use of impervious area disconnection reduces the sizing requirement for downstream LID and/or treatment control BMPs

Additional References for Design Guidance

- SMC LID Manual (pp 131) http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- City of Portland Bureau of Environmental Services. 2010. How to manage stormwater – Disconnect Downspouts. http://www.portlandonline.com/bes/index.cfm?c=43081&a=177702
- Seattle Public Utility: http://www.cityofseattle.org/util/stellent/groups/public/@spu/@usm/documents/webcontent/spu01_006395.pdf
- Thurston County, Washington State (pp 10): http://www.co.thurston.wa.us/stormwater/manual/docs-faqs/DG-5-Roof-Runoff-Control_Rev11Jan24.pdf

BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

Also known as:

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*



Proprietary biotreatment
Source:
http://www.americastusa.com
/index.php/filterra/

Feasibility Screening Considerations

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

Opportunity Criteria

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

OC-Specific Design Criteria and Considerations

☐ Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.

☐ Consult proprietors for specific criteria concerning the design and performance.

☐ Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.

☐ Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☐ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

Computing Sizing Criteria for Proprietary Biotreatment Device

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3)**.

Additional References for Design Guidance

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

CONTECH®
ENGINEERED SOLUTIONS

Filterra®
High Performance Bioretention



The experts you need to solve your stormwater challenges



Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team



STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.



STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.



REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.



SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.



Low Impact Development in a Small Footprint – Filterra®

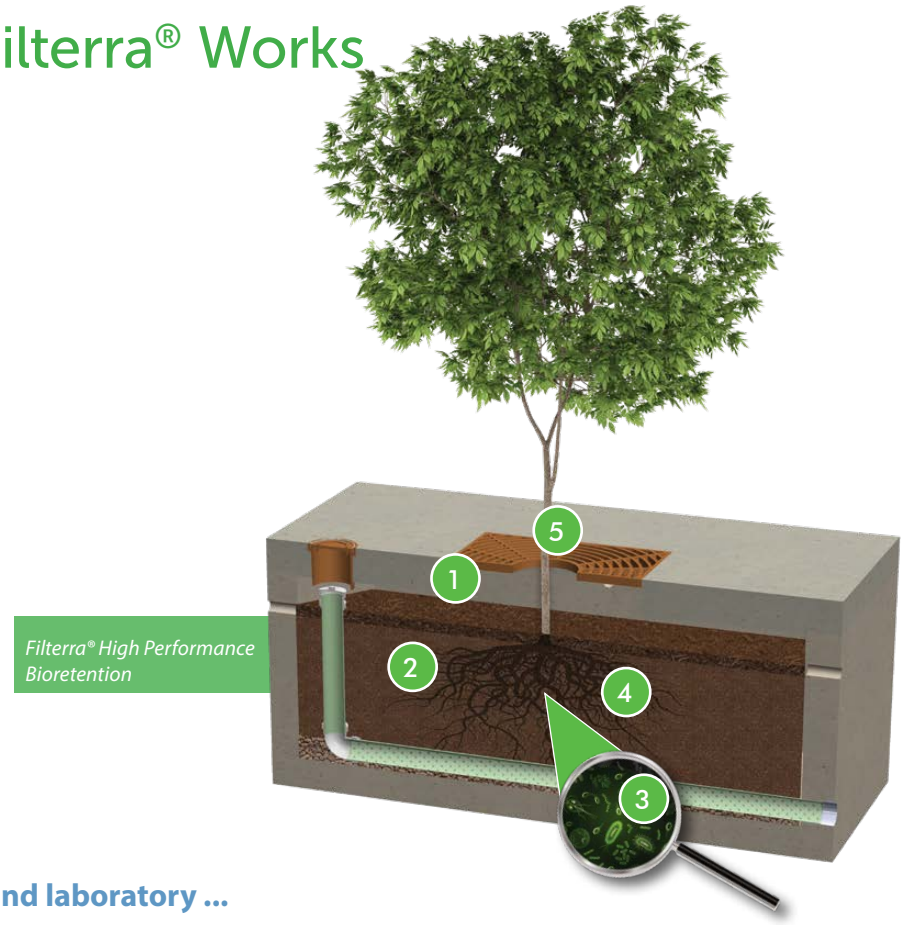
Filterra is an engineered high-performance bioretention system. While it operates similar to traditional bioretention, its high flow media allows for a reduction in footprint of up to 95% versus traditional bioretention practices. Filterra provides a Low Impact Development (LID) solution for tight, highly developed sites such as urban development projects, commercial parking lots, residential streets, and streetscapes. Its small footprint also reduces installation and life cycle costs versus traditional bioretention. Filterra can be configured in many different ways to enhance site aesthetics, integrate with other LID practices, or increase runoff reduction through infiltration below or downstream of the system.

At the Manchester Stormwater Park seen above, the Filterra systems surrounding the central courtyard allowed for the creation of a community space with parking, sidewalks, and benches in a quaint downtown area. A traditional bioretention system treating the same drainage area would have occupied the entire park area leaving no room for these amenities.

filterra® Bioretention Systems

filterra® Bioscape®

How the Filterra® Works



Tested in the field and laboratory ...

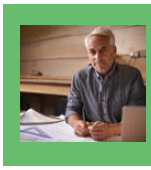
1. Stormwater enters the Filterra through a pipe, curb inlet, or sheet flow and ponds over the pretreatment mulch layer, capturing heavy sediment and debris. Organics and microorganisms within the mulch trap and degrade metals and hydrocarbons. The mulch also provides water retention for the system's vegetation.

2. Stormwater flows through engineered Filterra media which filters fine pollutants and nutrients. Organic material in the media removes dissolved metals and acts as a food source for root-zone microorganisms. Treated water exits through an underdrain pipe or infiltrates (if designed accordingly).

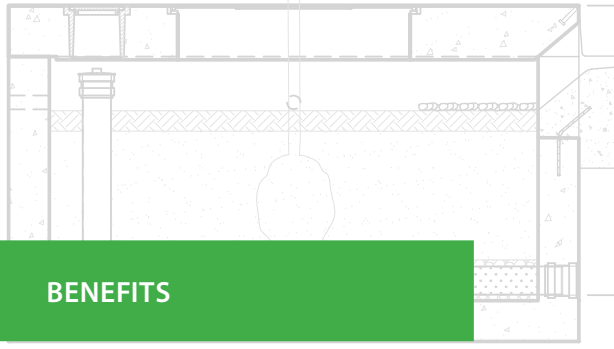
3. Rootzone microorganisms digest and transform pollutants into forms easily absorbed by plants.

4. Plant roots absorb stormwater and pollutants that were transformed by microorganisms, regenerating the media's pollutant removal capacity. The roots grow, provide a hospitable environment for the rootzone microorganisms and penetrate the media, maintaining hydraulic conductivity.

5. The plant trunk and foliage utilize nutrients such as Nitrogen and Phosphorus for plant health, sequester heavy metals into the biomass, and provide evapotranspiration of residual water within the system.

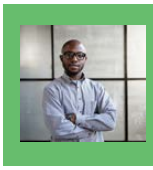


Plants and organic material are vital to the long term performance of bioretention systems



Filterra® Features and Benefits

FEATURE	BENEFITS
High biofiltration media flow rate (up to 175"/hr+)	Greatly reduced footprint versus traditional bioretention and LID solutions
Filterra system is packaged, including all components necessary for system performance	Quality control for easy, fast and successful installation
Quick and easy maintenance	Low lifecycle costs
Variety of configurations and aesthetic options	Integrates easily into any site or landscape plan
Natural stormwater management processes featuring organics and vegetation	Meets Low Impact Development requirements and ensures long-term performance



The Filterra system can be configured with many different aesthetic options

Select Filterra® Approvals

Filterra is approved through numerous local, state and federal verification programs, including:

- New Jersey Department of Environmental Protection (NJ DEP)
- Washington Department of Ecology (GULD) – Basic, Enhanced, Phosphorus, and Oil
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Texas Commission on Environmental Quality (TCEQ)
- Virginia Department of Environmental Quality (VA DEQ)
- Maine Department of Environmental Protection (ME DEP)
- Atlanta, GA Regional Commission
- Los Angeles County, CA - Alternate to Attachment H
- City of Portland, Oregon Bureau of Environmental Services
- North Carolina Department of Environmental Quality (NC DEQ)

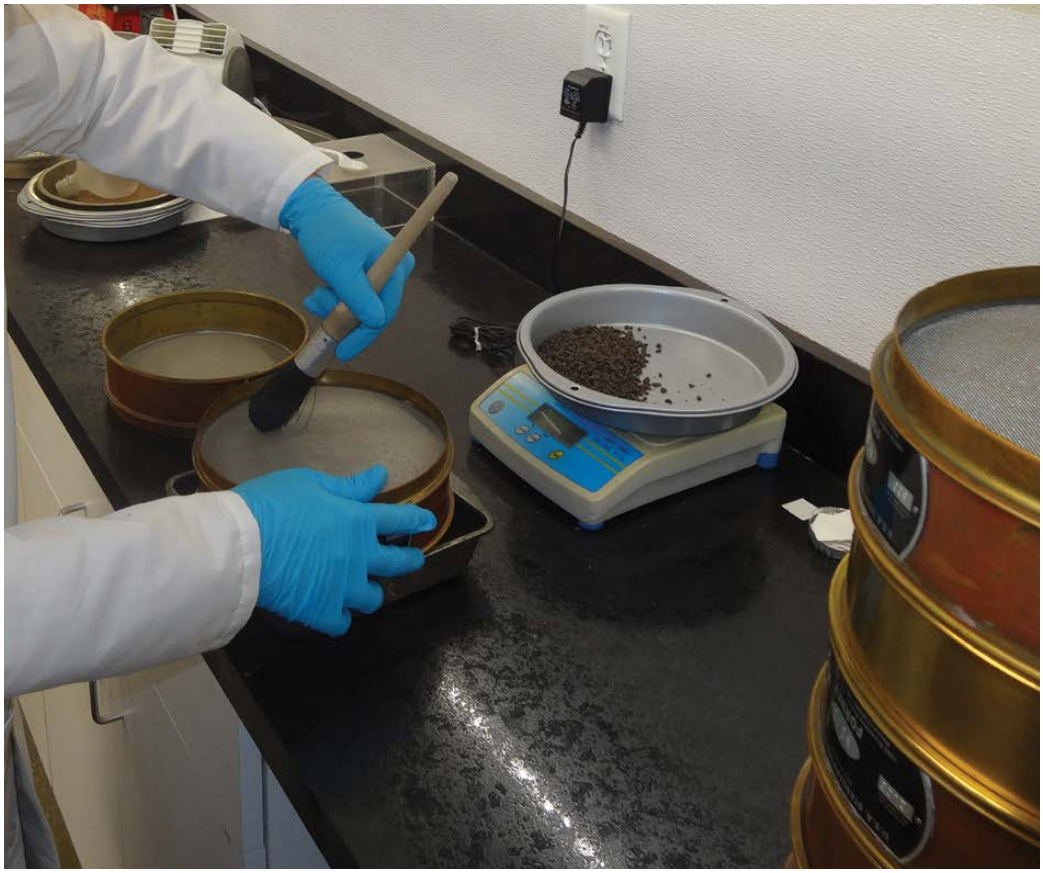


Filterra® Performance Testing Results



APPLICATION TIPS

- The Filterra system has been tested under industry standard protocols and has proven its pollutant removal performance and system longevity.
- Contech invests significant resources in media blending calibration and product testing to ensure our media meets our strict performance specifications every time.
- Keep regulators and owners happy by selecting a product with predictable and proven maintenance longevity.



POLLUTANT OF CONCERN	MEDIAN REMOVAL EFFICIENCY	MEDIAN EFFLUENT CONCENTRATION (MG/L)
Total Suspended Solids (TSS)	86%	3.3
Total Phosphorus - TAPE (TP)	70%	0.05
Total Nitrogen (TN)	34%	0.54
Total Copper (TCu)	55%	0.004
Total Dissolved Copper	43%	0.003
Total Zinc (TZn)	56%	0.04
Total Dissolved Zinc	54%	0.1
Total Zinc (TZn)	56%	0.04
Total Petroleum Hydrocarbons	87%	0.71

Each batch of Filterra® media has been extensively tested to ensure consistent performance every time.

Sources:
UVA (TARP) Field Study - 2006
Herrera (TAPE) Study - 2009
Herrera (TAPE) Study - 2014
NC State Study - 2015

Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.

Filterra® Maintenance

Activation and first year of maintenance is included with every system.*

With proper routine maintenance, the engineered media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation.* This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation.

Maintenance is low-cost, low-tech and simple:

- Remove trash, sediment, and mulch
- Replace with a fresh 3" layer of mulch
- No confined space entry or special tools
- Easily performed by landscape contractor or facilities maintenance provider

** Some exclusions may apply.*



Filterra offers high performance bioretention for advanced pollutant removal with easy maintenance.



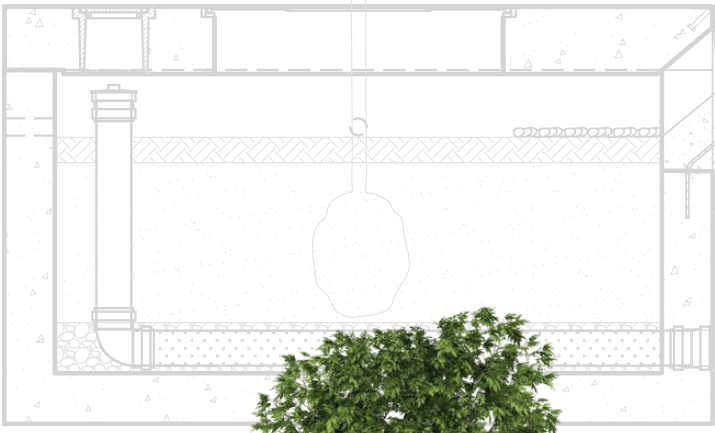
Plant health evaluation and pruning is important to encourage growth.

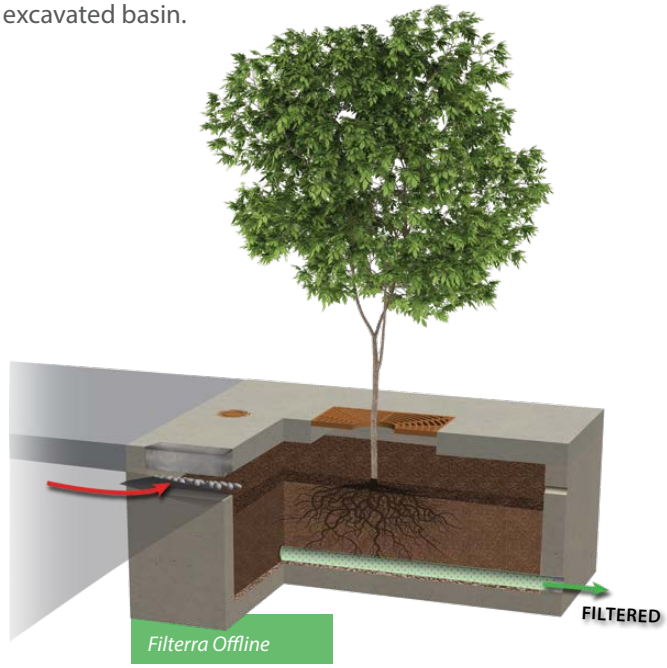
All stormwater treatment systems require maintenance for effective operation.

Filterra® Configurations

Multiple system configurations integrate with site hydraulic design and layout ...

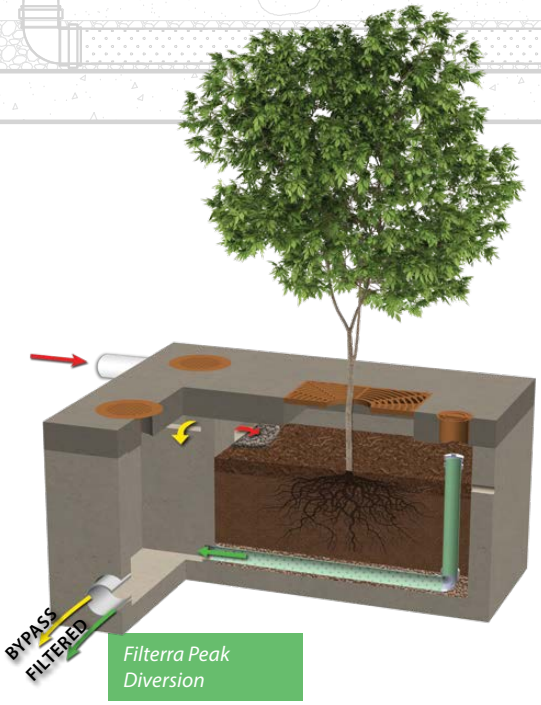
The Filterra is available in a variety of precast configurations as well as Filterra Bioscape, which can be installed directly into an excavated basin.



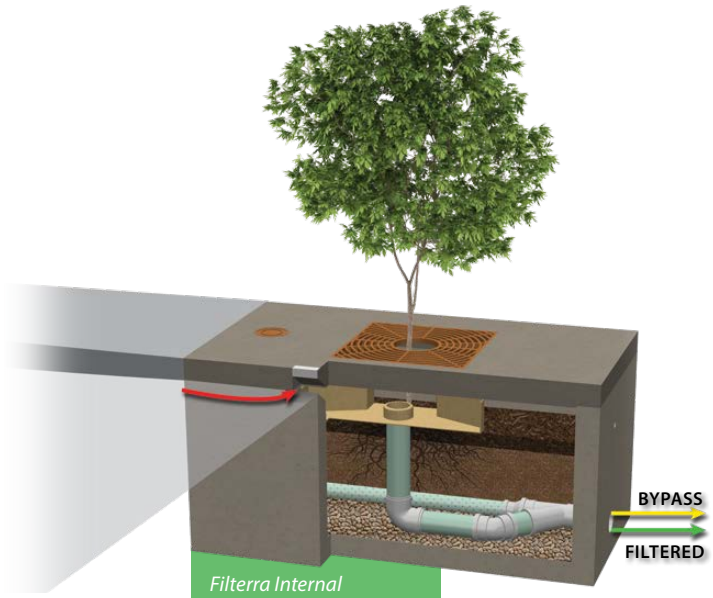


Filterra Offline

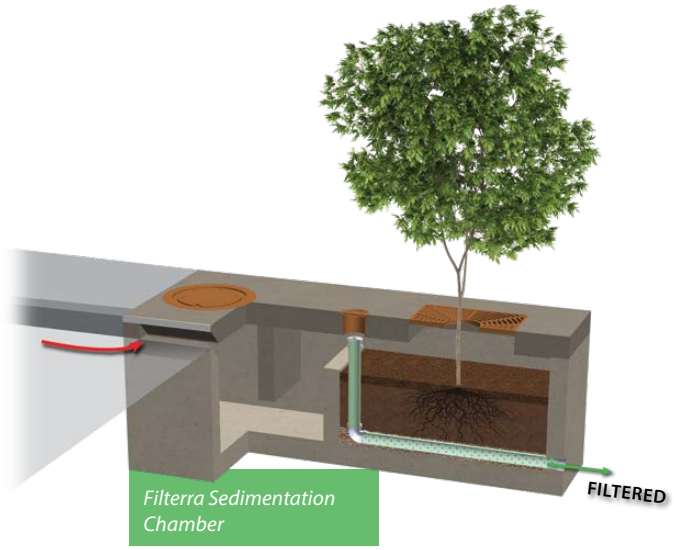
Bypass via downstream catch basin.



Filterra Peak Diversion



Filterra Internal Bypass Curb



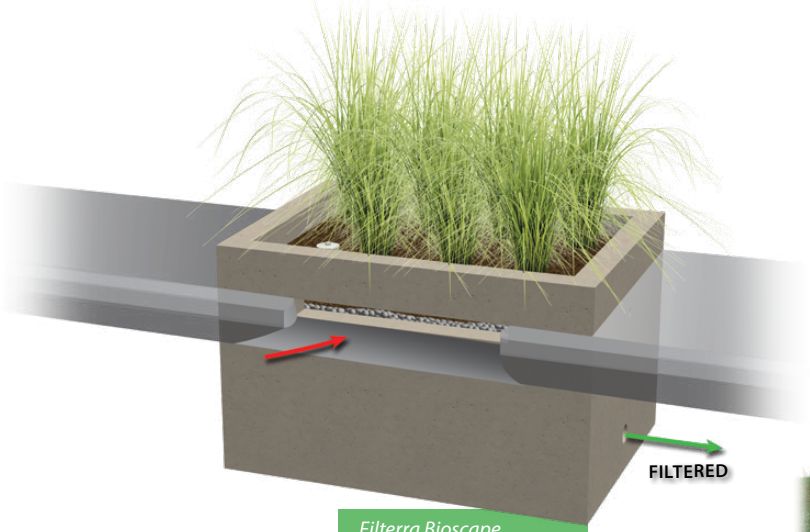
Filterra Sedimentation Chamber

Bypass via downstream catch basin.

**Additional configurations available, including offline - pipe, peak diversion - grate, and internal bypass curb-chamber.*

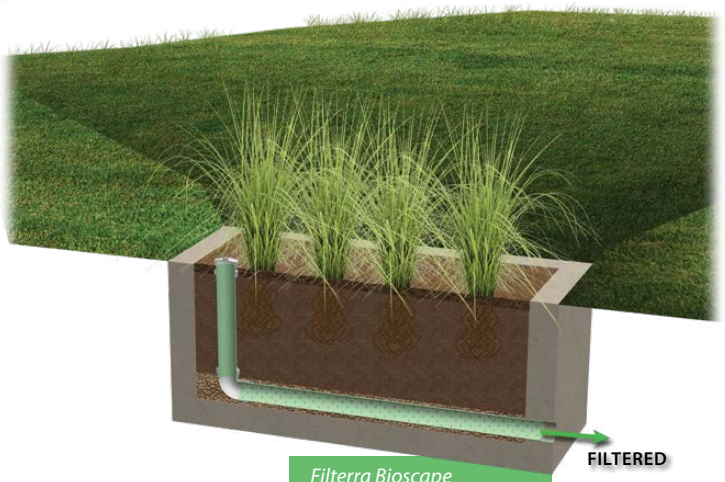
Multiple configurations allow for easy site integration

Filterra® Bioscape® Configurations



Filterra Bioscape Vault Offline

Bypass via downstream catch basin.



Filterra Bioscape Vault Basin

Bypass via upstream structure. Multiple inlet options.



Filterra Bioscape

Bypass via upstream structure. Multiple inlet options.

**Additional configurations available, including bioscape vault offline pipe.*

CONTECH® ENGINEERED SOLUTIONS

Filterra® Aesthetic Options

Multiple aesthetic options to enhance the appearance and integrate with landscaping ...



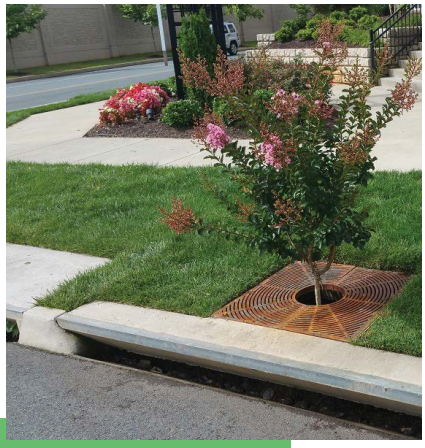
Standard Tree Grate



Custom/Decorative Tree Grate



Full Grate with Grasses



Recessed Top Slab



Open Top Planter - Filterra Bioscape



Street Tree

Filterra® Bioscape®







Large-scale Filterra that can be customized to your site ...

- Ideal for Filterra systems greater than 300 square feet
- Design with or without containment structure
- Incorporate infiltration directly below the system, where required
- Combine with upstream storage or downstream infiltration
- Use as an alternative to larger regional traditional bioretention systems
- Easily add pretreatment Hydrodynamic Separator for large-scale or heavy pollutant loading applications



A partner you can rely on



STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

CONTECH® ENGINEERED SOLUTIONS

Get social with us:

800-338-1122 | www.ContechES.com

© 2020 Contech Engineered Solutions LLC, a QUIKRETE Company

All Rights Reserved. Printed in the USA.

Attachment C

Hydromodification Analysis

(Excerpts provided. See project Hydrology Report)

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                         Analysis prepared by:

                         HUNSAKER & ASSOCIATES
                               Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Existing Condition                                                    *
* 2-year Storm                                                          *
 ************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:25 11/13/2020
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    4.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
 FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.09
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
 STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
 FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.90
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.28
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.48
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.78
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.42
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.42
 RAINFALL INTENSITY(INCH/HR) =   1.57
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.62
 EFFECTIVE STREAM AREA(ACRES) =       2.12
 TOTAL STREAM AREA(ACRES) =       2.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
     2        2.78    9.42    1.573  0.25( 0.15) 0.62       2.1      20.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       23.14    9.42    1.573  0.21( 0.15) 0.72      17.9      20.00
     2       25.35   13.49    1.281  0.21( 0.15) 0.72      24.6      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      25.35    Tc(MIN.) =    13.49
 EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
 TOTAL AREA(ACRES) =       24.6
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.77
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.35
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.62
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
 EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      28.26

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.82
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      28.26
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.16
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.245
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    36
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    50
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =    4.60
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.13      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.13
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =      32.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.10      0.20     0.100    57    5.00
  PUBLIC PARK               C        0.30      0.25     0.850    50    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        1.33      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =    7.53
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    1.84
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        1.27      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =    8.98
 SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    1.56
 EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
 AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
 TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       3.71

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.07
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.71
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.11
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.11
 RAINFALL INTENSITY(INCH/HR) =   1.60
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.82
 EFFECTIVE STREAM AREA(ACRES) =       3.00
 TOTAL STREAM AREA(ACRES) =       3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.71

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       31.66   10.25    1.500  0.22( 0.15) 0.68      26.0      20.00
     1       32.15   14.30    1.238  0.22( 0.15) 0.69      32.8      10.00
     2        3.71    9.11    1.604  0.29( 0.24) 0.82       3.0      30.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.05    9.11    1.604  0.23( 0.16) 0.70      26.1      30.00
     2       35.09   10.25    1.500  0.23( 0.16) 0.70      29.0      20.00
     3       34.87   14.30    1.238  0.23( 0.16) 0.70      35.8      10.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      35.09    Tc(MIN.) =    10.25
 EFFECTIVE AREA(ACRES) =      28.98   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
 TOTAL AREA(ACRES) =       35.8
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.452
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               B        0.58      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.73
 AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
 Tc(MIN.) =   10.84
 SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.62
 EFFECTIVE AREA(ACRES) =     29.56     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
 TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      35.09
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.77
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.84
  RAINFALL INTENSITY(INCH/HR) =   1.45
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =      29.56
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.09

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.968
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               B        0.20      0.30     0.850    36    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.96
  Tc(MIN.) =    8.33
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.42
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   10.38
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       0.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.354
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.33
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =   12.24
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       0.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.77
  FLOW VELOCITY(FEET/SEC.) =   2.98   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =   12.46
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.46
  RAINFALL INTENSITY(INCH/HR) =   1.34
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.05    9.71    1.547  0.23( 0.16) 0.70      26.7      30.00
      1       35.09   10.84    1.452  0.23( 0.16) 0.70      29.6      20.00
      1       34.87   14.90    1.210  0.23( 0.16) 0.71      36.4      10.00
      2        0.77   12.46    1.340  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.83    Tc(MIN.) =    10.84
  EFFECTIVE AREA(ACRES) =      30.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.84
  EFFECTIVE AREA(ACRES) =     30.24  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.703
  PEAK FLOW RATE(CFS)   =      35.83

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
                Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                     *
* Proposed Condition                                                    *
* 2-year Storm                                                          *
 ************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:44 11/14/2020
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

******************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    4.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
 EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
 FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
 STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.09
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
 STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
 EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
 FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.90
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.28
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
 SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
 EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.581
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               C        0.14      0.25     0.850    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.90

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.90
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
      2        2.90    9.41    1.575  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.24    9.41    1.575  0.21( 0.15) 0.72      18.0      20.00
      2       25.44   13.49    1.281  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.44    Tc(MIN.) =    13.49
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      28.39

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.39
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.00      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        C        0.50      0.25     0.600    50
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        2.16      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     4.66      SUBAREA RUNOFF(CFS) =     4.60
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.16
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.11
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      32.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.12      0.20     0.100    57    5.38
  PUBLIC PARK                 D        0.14      0.20     0.850    57    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.985
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.67
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.91
  Tc(MIN.) =    6.29
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.947
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    36
  PUBLIC PARK                B        0.84      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.05
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.21
  Tc(MIN.) =    6.50
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.46
  Tc(MIN.) =    6.96
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       2.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =    8.06
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       3.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   3.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.03
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.689
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        1.10      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    1.42
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       4.38

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   1.68
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.83   10.23    1.501  0.22( 0.15) 0.68      26.1      20.00
      1       32.28   14.30    1.238  0.22( 0.15) 0.69      32.9      10.00
      2        4.38    8.39    1.682  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.39    1.682  0.23( 0.16) 0.70      24.7      30.00
      2       35.66   10.23    1.501  0.23( 0.16) 0.69      29.4      20.00
      3       35.32   14.30    1.238  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.66    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      29.43   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.41      0.30     0.850    36
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   10.82
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =     29.84     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.75
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.82
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    36
  PUBLIC PARK                B        0.26      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =     30.32   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.82
  EFFECTIVE AREA(ACRES) =     30.32  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.693
  PEAK FLOW RATE(CFS)   =      35.66

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.99    1.617  0.24( 0.16) 0.70      25.6      30.00
      2       35.66   10.82    1.453  0.23( 0.16) 0.69      30.3      20.00
      3       35.32   14.89    1.210  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

DANIGER RD

S CRAWFORD CYN RD

PINE CYN RD

OVERBROOK DR

VILLA DEL CERRO

STRAND TERRACE

EX. 30" PIPE

EX. 36" PIPE

EX. 48" PIPE

CRAWFORD PARK
SEE EXHIBIT 2 FOR EX. CONDITION
SEE EXHIBIT 3 FOR PROPOSED CONDITION

PROJECT BOUNDARY

A1 1.19
A2 1.14
A3 2.49
A4 5.82
A5 10.85

L=380'
L=325'
L=730'
L=1,085'

10
11
12
13
14
15

915.0 EL.

Q_2 = 1.7cfs
Q_{25} = 3.9cfs
Q_{100} = 5.0cfs
t=7.5
750.0 EL.

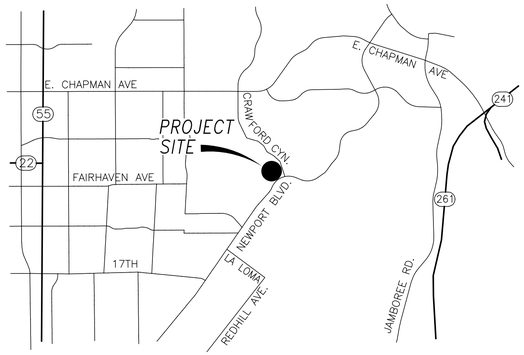
Q_2 = 3.0cfs
Q_{25} = 7.1cfs
Q_{100} = 9.2cfs
t=8.5
600.0 EL.

Q_2 = 6.9cfs
Q_{25} =16.1cfs
Q_{100}=21.0cfs
t=10.4
503.0 EL.

Q_2 =11.3cfs
Q_{25} =26.9cfs
Q_{100}=35.1cfs

ΣQ_2 =23.1cfs
ΣQ_{25} =55.4cfs
ΣQ_{100}=72.5cfs
t=13.3
Total Area=22.5ac

Q_2 =11.9cfs
Q_{25} =28.6cfs
Q_{100}=37.4cfs
t=13.2
395.0 EL.



LOCATION MAP

PREPARED FOR:
OCparks

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SCALE: 1" =80'

80 40 0 80 160 240
GRAPHIC SCALE 1"= 80'

LEGEND

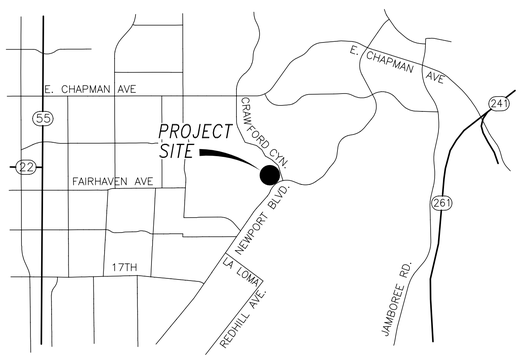
- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

EXHIBIT 1
OFF-SITE HYDROLOGY MAP
CRAWFORD PARK
S. CRAWFORD CANYON RD. & NEWPORT BLVD.
TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

PLOTTED BY: Gary Guan DATE: Nov. 13, 2020 08:16:49 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Offsite.dwg





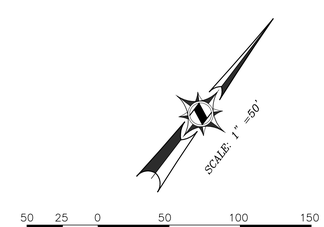
LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759



LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

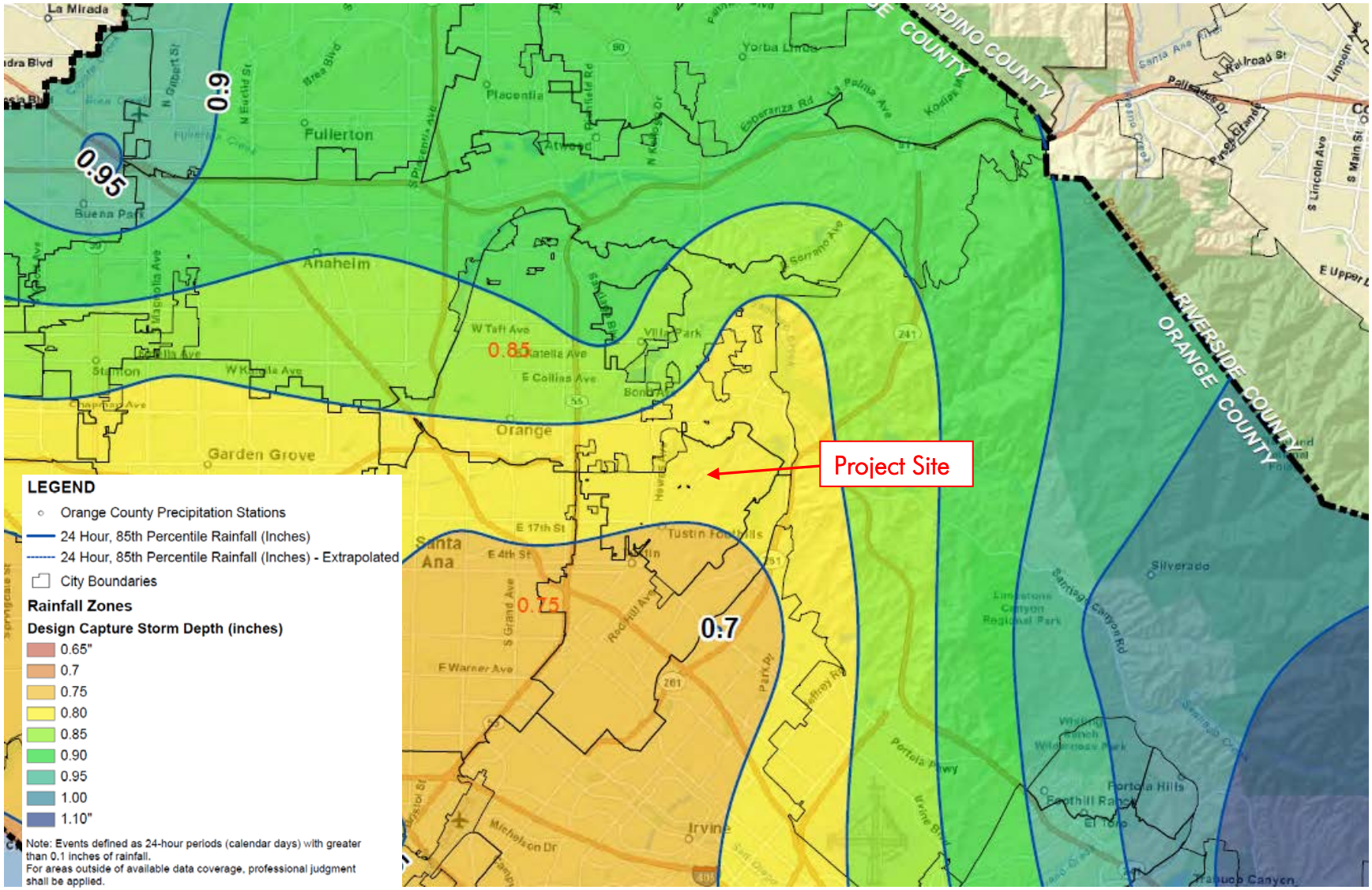
EXHIBIT 2
EXISTING CONDITION HYDROLOGY MAP (ONSITE)
CRAWFORD PARK
S. CRAWFORD CANYON RD. & NEWPORT BLVD.
TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK - ON-SITE

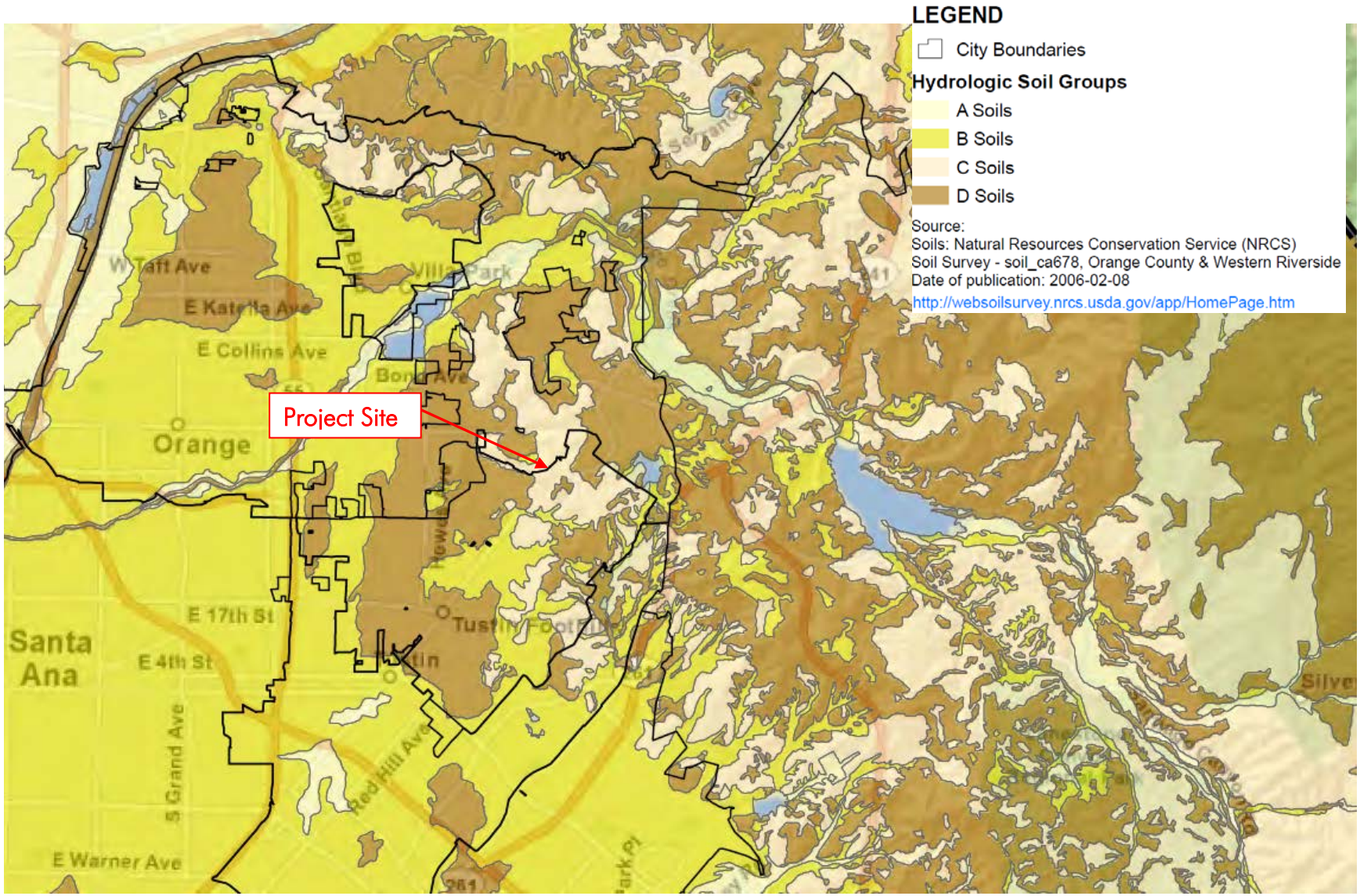
PLOTTED BY: Gary Guan DATE: Nov. 15, 2020 07:28:11 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology_Onsite.dwg

Attachment D

Supporting Project Information



Source: County of Orange TGD – Figure XVI-1 Rainfall Zones



Source: County of Orange TGD – Figure XVI-2a NRCS Hydrologic Soils Group Map

Attachment E

Operation and Maintenance Plan

OPERATIONS AND MAINTENANCE (O&M) PLAN
WATER QUALITY MANAGEMENT PLAN
FOR
CRAWFORD CANYON PARK
COUNTY OF ORANGE, CALIFORNIA

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Non-Structural Source Control BMPs			
No	**N1. Education for Property Owners, Tenants and Occupants** Not applicable to public park project.		
Yes	**N2. Activity Restrictions** Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the County for facility users and maintenance staff. Restrictions include prohibited activities within park property that have the potential to impact water quality, such as illegal dumping of wastes, proper clean up and disposal of pet wastes, proper disposal of litter and trash, and prohibiting wash down of the park's paved areas.	Ongoing	OC Parks
Yes	**N3. Common Area Landscape Management** Maintenance shall be consistent with County requirements; any fertilizer and/or pesticide usages shall be consistent with County and manufacturer guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Monthly and as needed	OC Parks

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N4. BMP Maintenance** Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the responsible party and documented with the WQMP, and shall be available for review upon request.	Ongoing, as prescribed per WQMP.	OC Parks
No	**N5. Title 22 CCR Compliance** Not applicable to residential projects.		
No	**N6. Local Water Quality Permit Compliance** Not applicable. No local water quality permits are required for the operation of the project.		
No	**N7. Spill Contingency Plan** Not applicable to residential projects.		
No	**N8. Underground Storage Tank Compliance** Not applicable. None onsite.		
No	**N9. Hazardous Materials Disclosure Compliance** Not applicable to residential projects.		
No	**N10. Uniform Fire Code Implementation** Not applicable to residential projects.		
Yes	**N11. Common Area Litter Control** Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with landscape maintenance activities.	Ongoing patrols. Weekly (minimum) pick up and removal. Monthly inspections with landscaping maintenance.	OC Parks

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N12. Employee Training** All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc.	Upon hire and annually thereafter	OC Parks
No	**N13. Housekeeping of Loading Docks** Not in project scope.		
Yes	**N14. Common Area Catch Basin Inspection** Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of facilities inspected and maintained within a 2-year period.	Annually	OC Parks
Yes	**N15. Street Sweeping Private Streets and Parking Lots** Project streets and parking areas shall be vacuum swept at a minimum, twice per month basis, consistent with County schedules.	Twice per month	OC Parks
Structural Source Control BMPs			
Yes	**S1. Provide Storm Drain System Stenciling and Signage** Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible.	Annually	OC Parks

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	**S2. Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction** Not applicable. No outdoor storage of hazardous materials onsite.		
No	**S3. Design Trash Enclosures to Reduce Pollutant Introduction** Not applicable. None proposed.		
Yes	**S4. Use Efficient Irrigation Systems and Landscape Design** In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Monthly	OC Parks
Yes	**S5. Protect Slopes and Channels** The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed.	Monthly	OC Parks
No	**S6. Loading Dock Areas** None proposed		
No	**S7. Maintenance Bays and Docks** Not applicable. None proposed.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	**S8. Vehicle Wash Areas** Not applicable. None proposed.		
No	**S9. Outdoor Processing Areas** Not applicable. No outdoor processing onsite.		
No	**S10. Equipment Wash Areas** Not applicable. No wash areas onsite.		
No	**S11. Fueling Areas** Not applicable. No fueling areas onsite.		
Yes	**S12. Site Design and Landscape Planning (Hillside Landscaping)** Hillside areas that are disturbed by the project shall be re-vegetated with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County requirements.	Monthly	OC Parks
No	**S13. Wash Water Controls for Food Preparation Areas** Not applicable. No food service facility proposed.		
No	**S14. Community Car Wash Racks** Not applicable. No community car wash areas onsite.		
Hydrologic Source Controls			
HSC BMP #1 **HSC-2 Impervious Area Dispersion** Inspect for standing water and that water infiltrates into underlying soil completely. Remove accumulated sediment or repair eroded areas as needed.		After qualifying storm events of 0.5" or greater and monthly with landscaping maintenance	OC Parks

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
	HSC BMP #2 **INF-6 Permeable Pavement (Grasscrete)** Inspect for oil spills, dead vegetation, soil level within modules and stability. Remove/repairs as needed based on inspections. Trim vegetation as needed to maintain desired height.	Monthly with landscaping maintenance	OC Parks
	Low Impact Development BMPs		
	Infiltration BMP #1 INF-3 Bioretention with no underdrains Conduct general inspection and maintenance per routine landscaping maintenance activities. Inspect surface area for debris, trash and vegetation accumulation. Inspect for general plant health. Inspect for sediment, build up on planting surface and in area drain inlet. Inspect for sediment or debris clogging inlet. Clean/repair items as necessary. Inspect for standing water after rain event of 0.5 inches or greater, based on 48-hr draw down time. Remove vegetation, permeable soil and drain rock. Replace in kind. Check sub-drain pipe and inlet. Repair if necessary.	Monthly Every 5 to 7 years, or as needed	OC Parks
	Biotreatment BMP #2 **BIO-7 Proprietary Biotreatment -** Inspect unit for accumulated debris and sediment and plant health; remove trash; trim vegetation. Remove sediment, replace mulch (if included), replace media as needed.	2-4 weeks during rainy season or after significant events. Frequency to be customized after 1-2 years observation.	OC Parks

Required Permits

No additional permits are necessary for the operation and maintenane of the proposed BMPs.

Forms to Record BMP Implementation, Maintenance, and Inspection

The form that will be used to record implementation, maintenance, and inspection of BMPs is attached.

Recordkeeping

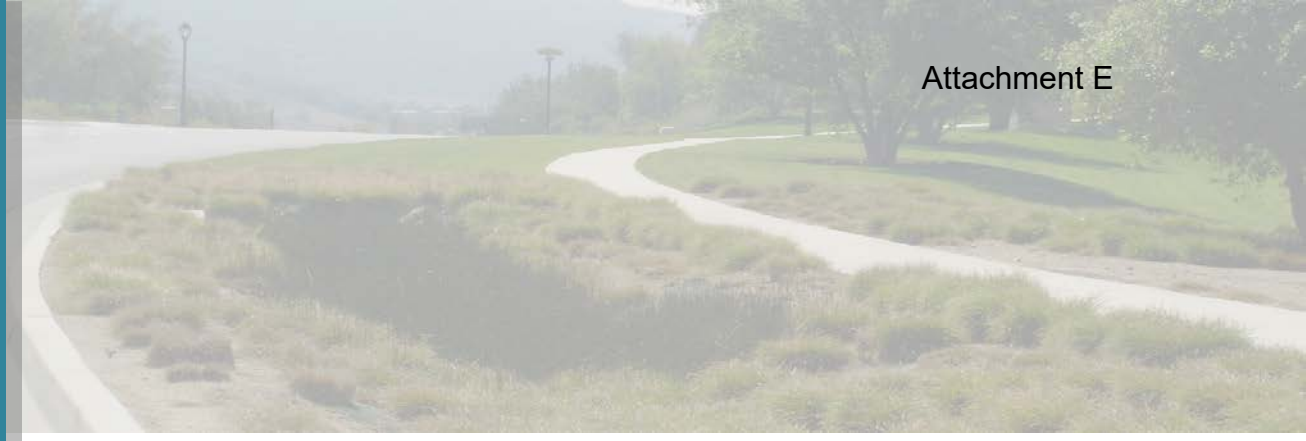
All records must be maintained for at least five (5) years and must be made available for review upon request.

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed



Appendix I
Noise Modeling

Roadway Traffic Noise - Existing

Street	Roadway Segment	Existing Land Uses Located Along Roadway Segment	Traffic Noise Levels (dBA CNEL) Existing (2020)	Existing with Project	Increase over Existing	Significant Impact?
Crawford Canyon Road	n/o Newport Avenue	Residential	67.8	68.2	0.3	No
Newport Avenue	at Project Driveway	Residential	73.5	73.8	0.3	No

TRAFFIC NOISE ANALYSIS TOOL

Project: Crooked Creek
Scenario: Existing (2020)
Source: Translutions

Roadway	Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
				Auto	MT	HT	Auto	MT	HT		
Crawford Canyon Road	n/o Newport Avenue	Hard	20	35	35	30	783	16	8	67.8	68.1
Newport Avenue	at Project Driveway	Hard	30	50	50	45	1556	32	16	73.5	73.8

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project: Crooked Creek
Scenario: Existing (2020) with Project
Source: Translutions

Roadway	Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
				Auto	MT	HT	Auto	MT	HT		
Crawford Canyon Road	n/o Newport Avenue	Hard	20	35	35	30	786	16	8	67.9	68.2
Newport Avenue	at Project Driveway	Hard	30	50	50	45	1567	32	16	73.5	73.8

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

Summary

File Name on Meter	R1
File Name on PC	SLM_0004983_LxT_Data_063.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	Crawford Canyon Park
Job Description	
Note	

Measurement

Description	
Start	2020-09-10 08:49:44
Stop	2020-09-10 09:04:44
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-09-10 08:43:43
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT2B
Microphone Correction	Off
Integration Method	Exponential
Overload	144.5 dB

	A	C	Z
Under Range Peak	**100.8**	97.8	102.8 dB
Under Range Limit	**49.8**	47.8	55.8 dB
Noise Floor	36.7	37.3	44.9 dB

Results

L_{ASeq}	52.2	dB
LASE	81.8	dB
EAS	16.740	µPa²h
EAS8	535.666	µPa²h
EAS40	2.678	mPa²h
$L_{Apeak\ (max)}$	2020-09-10 08:58:46	89.1 dB
L_{ASmax}	2020-09-10 08:54:57	59.8 dB
L_{ASmin}	2020-09-10 09:01:43	41.4 dB
SEA	-99.9	dB

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

L_{CSeq}	64.4 dB
L_{ASeq}	52.2 dB
L_{CSeq} - L_{ASeq}	12.1 dB
L_{AIeq}	59.3 dB
L_{Aeq}	52.2 dB
L_{AIeq} - L_{Aeq}	7.1 dB

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	52.2					
$L_{S(max)}$	59.8	2020/09/10 8:54:57				
$L_{S(min)}$	41.4	2020/09/10 9:01:43				
$L_{Peak(max)}$	89.1	2020/09/10 8:58:46				

# Overloads	0
Overload Duration	0.0 s

Summary

File Name on Meter	R2
File Name on PC	SLM_0004983_LxT_Data_064.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	Crawford Canyon Park
Job Description	
Note	

Measurement

Description	
Start	2020-09-10 09:07:57
Stop	2020-09-10 09:22:57
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-09-10 08:43:42
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT2B			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	144.5 dB			
	A		**C**	**Z**
Under Range Peak	**100.8**		97.8	102.8 dB
Under Range Limit	**49.8**		47.8	55.8 dB
Noise Floor	36.7		37.3	44.9 dB

Results

L_{ASeq}	55.6 dB			
LASE	85.1 dB			
EAS	36.327 µPa²h			
EAS8	1.162 mPa²h			
EAS40	5.812 mPa²h			
$L_{Apeak\ (max)}$	2020-09-10 09:13:26		90.7 dB	
L_{ASmax}	2020-09-10 09:15:05		71.6 dB	
L_{ASmin}	2020-09-10 09:20:11		43.6 dB	
SEA	-99.9 dB			
LAS > 85.0 dB (Exceedance Counts / Duration)	0		0.0 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0 s	
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0		0.0 s	
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0		0.0 s	
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0		0.0 s	
L_{CSeq}	67.0 dB			
L_{ASeq}	55.6 dB			
L_{CSeq} - L_{ASeq}	11.3 dB			
L_{AIeq}	59.0 dB			
L_{Aeq}	55.6 dB			
L_{AIeq} - L_{Aeq}	3.4 dB			

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	55.6					
$L_{S(max)}$	71.6	2020/09/10 9:15:05				
$L_{S(min)}$	43.6	2020/09/10 9:20:11				
$L_{Peak(max)}$	90.7	2020/09/10 9:13:26				

# Overloads	0	
Overload Duration	0.0 s	

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5 dB	
Threshold	90	80 dB	
Criterion Level	90	90 dB	
Criterion Duration	8	8 h	

Results

Dose	-99.9	-99.9 %	
Projected Dose	-99.9	-99.9 %	
TWA (Projected)	-99.9	-99.9 dB	
TWA (t)	-99.9	-99.9 dB	
Lep (t)	40.6	40.6 dB	

Statistics

LAS5.00	59.4 dB	
LAS10.00	58.3 dB	
LAS33.30	55.1 dB	
LAS50.00	53.4 dB	
LAS66.60	51.5 dB	
LAS90.00	47.9 dB	

Summary

File Name on Meter	R3
File Name on PC	SLM_0004983_LxT_Data_065.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	Crawford Canyon Park
Job Description	
Note	

Measurement

Description	
Start	2020-09-10 09:24:42
Stop	2020-09-10 09:39:42
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-09-10 08:43:42
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT2B			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	144.5 dB			
	A		**C**	**Z**
Under Range Peak	**100.8**		97.8	102.8 dB
Under Range Limit	**49.8**		47.8	55.8 dB
Noise Floor	36.7		37.3	44.9 dB

Results

LASeq	68.0 dB			
LASE	97.6 dB			
EAS	633.370 µPa²h			
EAS8	20.268 mPa²h			
EAS40	101.339 mPa²h			
LApeak (max)	2020-09-10 09:29:52		100.1 dB	
LASmax	2020-09-10 09:32:37		85.8 dB	
LASmin	2020-09-10 09:34:05		42.1 dB	
SEA	-99.9 dB			
LAS > 85.0 dB (Exceedance Counts / Duration)	1		1.6 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0 s	
LApeak > 135.0 dB (Exceedance Counts / Duration)	0		0.0 s	
LApeak > 137.0 dB (Exceedance Counts / Duration)	0		0.0 s	
LApeak > 140.0 dB (Exceedance Counts / Duration)	0		0.0 s	
LCSeq	77.8 dB			
LASeq	68.0 dB			
LCSeq - LASeq	9.8 dB			
LAIeq	70.6 dB			
LAeq	68.0 dB			
LAIeq - LAeq	2.5 dB			

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	68.0					
LS(max)	85.8	2020/09/10 9:32:37				
LS(min)	42.1	2020/09/10 9:34:05				
LPeak(max)	100.1	2020/09/10 9:29:52				

# Overloads	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	-99.9	0.01	%
Projected Dose	-99.9	0.21	%
TWA (Projected)	-99.9	45.6	dB
TWA (t)	-99.9	20.6	dB
Lep (t)	53.0	53.0	dB

Statistics

LAS5.00	74.0	dB
LAS10.00	71.8	dB
LAS33.30	66.0	dB
LAS50.00	62.4	dB
LAS66.60	57.2	dB
LAS90.00	46.9	dB

Summary

File Name on Meter	R4
File Name on PC	SLM_0004983_LxT_Data_066.02.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	Crawford Canyon Park
Job Description	
Note	

Measurement

Description	
Start	2020-09-10 09:47:21
Stop	2020-09-10 10:02:21
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-09-10 08:43:42
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT2B
Microphone Correction	Off
Integration Method	Exponential
Overload	144.5 dB

	A	**C**	**Z**
Under Range Peak	**100.8**	97.8	102.8 dB
Under Range Limit	**49.8**	47.8	55.8 dB
Noise Floor	36.7	37.3	44.9 dB

Results

L_{ASeq}		61.9 dB	
LASE		91.4 dB	
EAS		154.100 µPa²h	
EAS8		4.931 mPa²h	
EAS40		24.656 mPa²h	
$L_{Apeak\ (max)}$	2020-09-10 09:50:49		94.2 dB
L_{ASmax}	2020-09-10 09:48:59		79.2 dB
L_{ASmin}	2020-09-10 09:49:20		42.3 dB
SEA		-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)		0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)		0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)		0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)		0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)		0	0.0 s
L_{CSeq}		69.5 dB	
L_{ASeq}		61.9 dB	
L_{CSeq} - L_{ASeq}		7.6 dB	
L_{AIeq}		64.6 dB	
L_{Aeq}		61.9 dB	
L_{AIeq} - L_{Aeq}		2.7 dB	

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	61.9					
$L_{S(max)}$	79.2	2020/09/10 9:48:59				
$L_{S(min)}$	42.3	2020/09/10 9:49:20				
$L_{Peak(max)}$	94.2	2020/09/10 9:50:49				

# Overloads	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	-99.9	-99.9	%
Projected Dose	-99.9	-99.9	%
TWA (Projected)	-99.9	-99.9	dB
TWA (t)	-99.9	-99.9	dB
Lep (t)	46.8	46.8	dB

Statistics

LAS5.00	68.6	dB
LAS10.00	65.5	dB
LAS33.30	57.9	dB
LAS50.00	53.9	dB
LAS66.60	50.7	dB
LAS90.00	46.1	dB

Appendix J
Transportation Analysis Memorandum

translutions, inc.
17632 Irvine Boulevard, Suite 200,
Tustin, California 92780
Phone (949)656-3131 Fax (949)445-3131
solutions@translutions.com

December 7, 2020

Mr. Brian J. Allee
Managing Associate
Environmental Science Associates
2121 Alton Parkway, Suite 100
Irvine, California 92606

Subject: Crawford Canyon Park, Transportation Analysis

Dear Brian:

Translutions, Inc. (Translutions) is pleased to provide this letter discussing the trip generation, access analysis, and vehicle miles traveled (VMT) analysis for the proposed Crawford Canyon Park. The County is proposing to develop the Crawford Canyon Park (Project), a 2.5-acre neighborhood park located at the northwest corner of Newport Avenue and Crawford Canyon Road in North Tustin. Recreational amenities are anticipated to include walkways, trails, pedestrian bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. The Project would not include barbeques, restroom facilities, or any habitable structures. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. Figure 1 illustrates the site plan.



Source: RJM Design Group

Figure 1 – Site Plan

PROJECT TRIP GENERATION

The trip generation for the proposed project are based on rates based on rates for Land Use 411 - "Public Park" from the Institute of Transportation Engineers (ITE) *Trip Generation (10th Edition)*. Based on the description in the *Trip Generation*, Public parks are owned and operated by a municipal, county, state, or federal agency. The parks surveyed vary widely as to location, type, and number of facilities, including boating or swimming facilities, beaches, hiking trails, ball fields, soccer fields, campsites, and picnic facilities. The sites surveyed varied from 4 acres to 1,154 acres. Since the trip generation rate varies substantially based on size, the rates used in this evaluation are based on the data for the 4-acre park. Table A shows the trip generation for the proposed project.

Table A - Project Trip Generation

			Peak Hour						Daily
			AM Peak Hour			PM Peak Hour			
Land Use		Units	In	Out	Total	In	Out	Total	
Weekday	2.5	Acre	2.655	1.845	4.500	1.925	1.575	3.500	34.000
Inbound/Outbound Splits			59%	41%	100%	55%	45%	100%	50%/50%
Weekday Trip Generation			7	4	11	5	4	9	85
Saturday[2]	2.5	Acre				2.475	2.025	4.500	22.750
Inbound/Outbound Splits						55%	45%	100%	50%/50%
Saturday Trip Generation						6	5	11	57
Sunday[2]	2.5	Acre				1.950	3.050	5.000	19.500
Inbound/Outbound Splits						39%	61%	100%	50%/50%
Sunday Trip Generation						5	8	13	49

Notes:

[1] Rates based on 4-acre park for Land Use 411 - "Public Park" from Institute of Transportation Engineers (ITE) Trip Generation (10th Ed.).

[2] Peak hour rates for generator

As seen on Table A, the project is forecast to generate approximately 85 daily trips on weekdays, 57 trips on Saturdays, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the project is forecast to generate approximately 11 trips during the a.m. peak hour and 9 trips during the p.m. peak hour. On weekends, the project is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday.

ACCESS ANALYSIS

While the trips generated by the project are less than the threshold requiring a traffic study based on County requirements, an evaluation of project access was conducted to evaluate traffic operations. Due to the proximity of the intersection of Crawford Canyon Road/Newport Avenue to the proposed driveway, the analysis also includes the intersection of Crawford Canyon Road/Newport Avenue. This analysis was conducted for weekday peak hours only since traffic on adjacent streets are typically highest on weekday peak hours.

Project Trips. Forecast project trips were calculated at the study intersections. The trip distribution for the project was forecast based on the location of the park in relation to residential uses in the area. The trip generation was applied to the trip distribution to obtain project trip assignment.

Traffic Volumes. Due to the current pandemic, new traffic counts could not be obtained at the intersections as current traffic counts would be atypical because schools are closed, and many residents are working from home. Therefore, traffic counts at the intersection of Crawford Canyon Road/Newport Avenue from 2014 were obtained from Orange County Transportation Authority (OCTA). A growth rate of 2 percent per annum was applied to these counts to obtain 2020 traffic volumes. Attachment A includes the 2014 traffic counts and calculation of 2020 volumes.

Traffic Operations and Delay. The evaluation of the project driveway was conducted based on traffic delay. Delay ranges are generally expressed as levels of service (LOS). There is a strong correlation between delay and safety. Research has shown that accidents increase as LOS worsens, especially at unsignalized intersections. For example, a driver is likely to take unnecessary risks to make a turn after waiting beyond a certain amount of time to make that turn. The Highway Capacity Manual (HCM) accounts for this psychological factor and uses different delay metrics for stop controlled and signalized intersections. Therefore, this analysis was based on HCM methodologies using Synchro software. The County of Orange uses LOS D as the threshold for acceptable operations.

Table B shows the levels of service at the analysis intersections. As seen on Table B, both intersections operate at acceptable levels of service. At the project driveway, there are minimal delays in making turns in and out of the project driveway. Detailed LOS worksheets are included in Attachment B.

Table B: Existing Levels of Service

	Intersection	LOS Std.	Control	Without Project				With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1 .	Project Driveway/Newport Avenue	D	TWSC	Future Intersection				13.1	B	11.4	B
2 .	Crawford Canyon Road/Newport Avenue	D	Signal	28.3	C	27.3	C	28.4	C	27.4	C

Notes:

* Exceeds LOS Standard

TWSC = Two-Way Stop Control; For TWSC intersections, reported delay is for worst-case movement.

LOS = Level of Service

VMT SCREENING ANALYSIS

Senate Bill 743 (SB-743), which was codified in Public Resources Code section 21099, was signed by the Governor in 2013 and directed the Governor's Office of Planning and Research (OPR) to identify alternative metrics for evaluating transportation impacts under CEQA. Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Recently adopted changes to the CEQA Guidelines in response to Section 21099 include a new section (15064.3) that specifies that Vehicle Miles Traveled (VMT) is the most appropriate measure of transportation impacts. A separate Technical Advisory issued by OPR provides additional technical details on calculating VMT and assessing transportation impacts for various types of projects.

The County of Orange has prepared the *Final Draft Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* (Guidelines) for Land Use Projects in September 2020 to address changes to CEQA pursuant to SB-743 to include VMT analysis methodology and thresholds. Based on the Guidelines, once a development application is filed, project screening is conducted as the initial step. If the project meets any one of the screening criteria for VMT, the project may be presumed to create a less than significant impact in the area of transportation and circulation and no further analysis as to this topical environmental area is necessary. The Guidelines include the following screening criteria:

- Project in High-Quality Transit Area (HQTA): The project is within 0.5 mile (mi) of a Transit Priority Area (TPA) or an HQTA, unless the project is inconsistent with the RTP/SCS, has a floor area ratio (FAR) less than 0.75, provides an excessive amount of parking, or reduces the number of affordable residential units. In accordance with SB 743, "Transit priority areas" are defined as "an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program. A Major Transit Stop means: "a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service of 15 minutes or less during the morning and afternoon peak commute periods." An HQTA or Corridor is a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.
    - *The project does not have high quality transit nearby, and therefore does not qualify.*

- Low VMT Area Project: The project is in low VMT areas. The applicant may submit data from the most recent OCTAM version showing the proposed project is within a low VMT area, which may be used, at the discretion of staff, to screen out the project.
    - *The project does not fall under a low VMT area, and therefore, does not qualify.*

- Small Project: A project generates 500 or fewer average daily trips (ADT).
    - *The project generates less than 500 daily trips, and therefore, qualifies as a Small Project, and therefore, the project impacts are less than significant.*

- Public Facilities: The development of institutional/government and public service uses that support community health, safety or welfare are also screened from subsequent CEQA VMT analysis. The following includes some examples and is not an exhaustive list of public facilities that are screened from subsequent CEQA VMT analysis: police/sheriff stations, fire stations,

community centers, refuse stations, jails, and landfills. These facilities are already part of the community and, as a public service, the VMT is accounted for in the existing regional average.

- *The proposed project is a public facility that supports community health and welfare. Therefore, the project meets the screening criteria and impacts are less than significant.*

SUMMARY & CONCLUSION

As seen from the above discussion, the project is anticipated to generate approximately 85 daily trips on weekdays, 57 trips on Saturdays, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the project is forecast to generate approximately 11 trips during the a.m. peak hour and 9 trips during the p.m. peak hour. On weekends, the project is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday. The project driveway is expected to operate satisfactorily with minimal delays and the project is unlikely to increase traffic delays at other intersections significantly. In addition, the project is exempt from a VMT analysis based on the thresholds set by the County of Orange *Final Draft Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* based on the size of the project and the fact that the proposed project is a public facility. Therefore, the project's transportation impacts under CEQA are anticipated to be less than significant.

We hope you will find this information helpful. Should you have any questions, please don't hesitate to call me at (949) 656-3131.

Sincerely,

translutions, Inc.

Sandipan Bhattacharjee, P.E., T.E., AICP, ENV SP
Principal



Attachments:
Attachment A – Volume Development & Traffic Counts
Attachment B – Synchro Worksheets

ATTACHMENT A – VOLUME DEVELOPMENT & TRAFFIC COUNTS

translutions
the transportation solutions company...

Attachment A - Existing Peak Hour Volume Summary

	AM Peak Hour					PM Peak Hour				
	Yr. 2014 Traffic Volume	2014-2020 Traffic Growth	2020 Without Project	Project Trips	Yr. 2020 With Project	Yr. 2014 PCE Volume	2014-2020 Traffic Growth	2020 Without Project	Project Trips	Yr. 2020 With Project
1 . Project Driveway/Newport Avenue										
NBL	0	0	0	0	0	0	0	0	0	0
NBT	0	0	0	0	0	0	0	0	0	0
NBR	0	0	0	0	0	0	0	0	0	0
SBL	0	0	0	2	2	0	0	0	2	2
SBT	0	0	0	0	0	0	0	0	0	0
SBR	0	0	0	2	2	0	0	0	2	2
EBL	0	0	0	3	3	0	0	0	2	2
EBT	509	61	570	0	570	1,004	120	1,124	0	1,124
EBR	0	0	0	0	0	0	0	0	0	0
WBL	0	0	0	0	0	0	0	0	0	0
WBT	1,265	152	1,417	0	1,417	630	76	706	0	706
WBR	0	0	0	4	4	0	0	0	3	3
North Leg										
Approach	0	0	0	4	4	0	0	0	4	4
Departure	0	0	0	7	7	0	0	0	5	5
Total	0	0	0	11	11	0	0	0	9	9
South Leg										
Approach	0	0	0	0	0	0	0	0	0	0
Departure	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
East Leg										
Approach	1,265	152	1,417	4	1,421	630	76	706	3	709
Departure	509	61	570	2	572	1,004	120	1,124	2	1,126
Total	1,774	213	1,987	6	1,993	1,634	196	1,830	5	1,835
West Leg										
Approach	509	61	570	3	573	1,004	120	1,124	2	1,126
Departure	1,265	152	1,417	2	1,419	630	76	706	2	708
Total	1,774	213	1,987	5	1,992	1,634	196	1,830	4	1,834
Total Approaches										
Approach	1,774	213	1,987	11	1,998	1,634	196	1,830	9	1,839
Departure	1,774	213	1,987	11	1,998	1,634	196	1,830	9	1,839
Total	3,548	426	3,974	22	3,996	3,268	392	3,660	18	3,678

translutions
the transportation solutions company...

Attachment A - Existing Peak Hour Volume Summary

	AM Peak Hour					PM Peak Hour				
	Yr. 2014 Traffic Volume	2014-2020 Traffic Growth	2020 Without Project	Project Trips	Yr. 2020 With Project	Yr. 2014 PCE Volume	2014-2020 Traffic Growth	2020 Without Project	Project Trips	Yr. 2020 With Project
2 . Crawford Canyon Road/Newport Avenue										
NBL	0	0	0	0	0	0	0	0	0	0
NBT	0	0	0	0	0	0	0	0	0	0
NBR	0	0	0	0	0	0	0	0	0	0
SBL	92	11	103	0	103	85	10	95	0	95
SBT	0	0	0	0	0	0	0	0	0	0
SBR	463	56	519	2	521	132	16	148	2	150
EBL	68	8	76	1	77	355	43	398	1	399
EBT	441	53	494	1	495	649	78	727	1	728
EBR	0	0	0	0	0	0	0	0	0	0
WBL	0	0	0	0	0	0	0	0	0	0
WBT	802	96	898	2	900	498	60	558	2	560
WBR	97	12	109	0	109	85	10	95	0	95
North Leg										
Approach	555	67	622	2	624	217	26	243	2	245
Departure	165	20	185	1	186	440	53	493	1	494
Total	720	87	807	3	810	657	79	736	3	739
South Leg										
Approach	0	0	0	0	0	0	0	0	0	0
Departure	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
East Leg										
Approach	899	108	1,007	2	1,009	583	70	653	2	655
Departure	533	64	597	1	598	734	88	822	1	823
Total	1,432	172	1,604	3	1,607	1,317	158	1,475	3	1,478
West Leg										
Approach	509	61	570	2	572	1,004	121	1,125	2	1,127
Departure	1,265	152	1,417	4	1,421	630	76	706	4	710
Total	1,774	213	1,987	6	1,993	1,634	197	1,831	6	1,837
Total Approaches										
Approach	1,963	236	2,199	6	2,205	1,804	217	2,021	6	2,027
Departure	1,963	236	2,199	6	2,205	1,804	217	2,021	6	2,027
Total	3,926	472	4,398	12	4,410	3,608	434	4,042	12	4,054

ITM Peak Hour Summary

Prepared by:

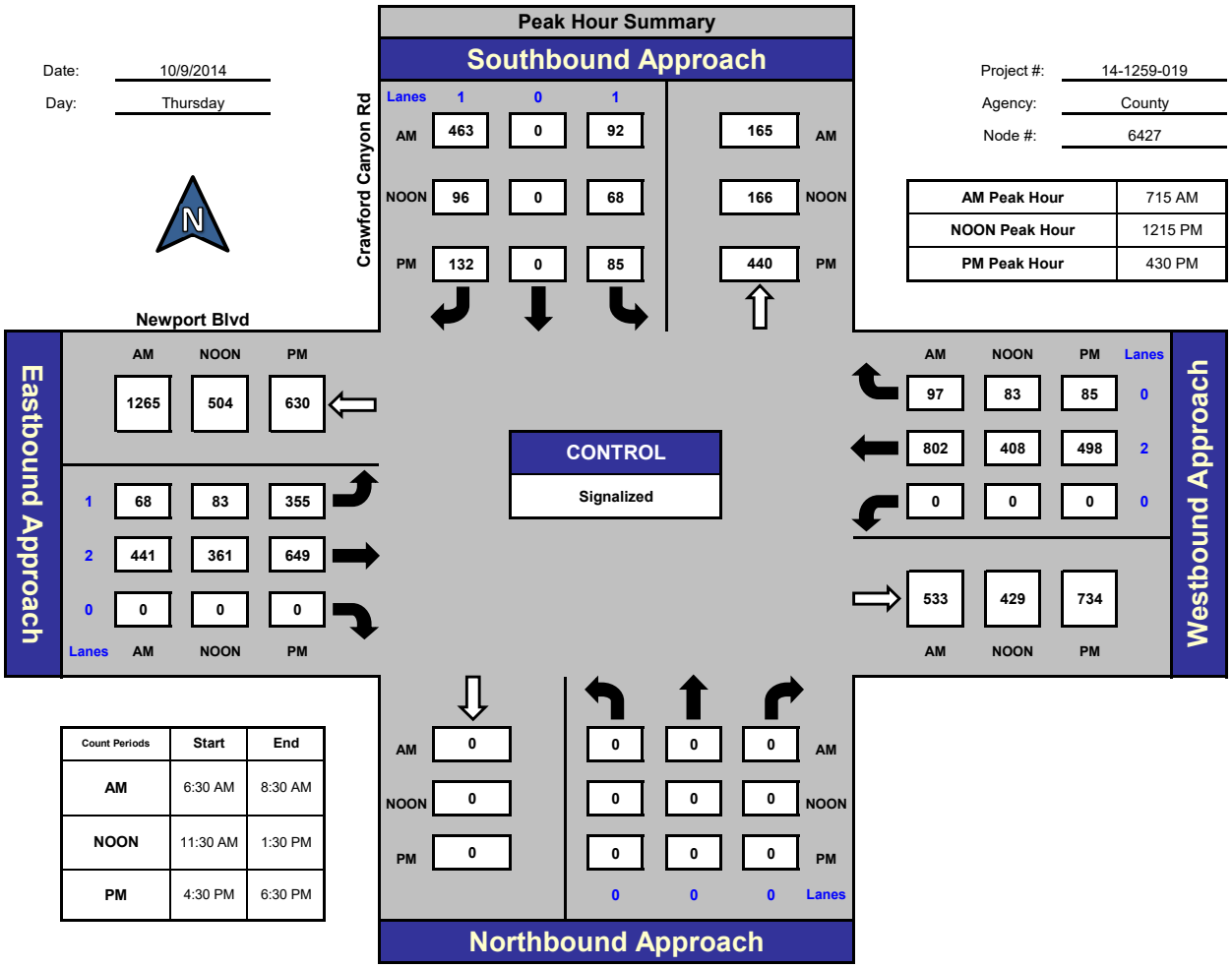
National Data & Surveying Services

Crawford Canyon Rd and Newport Blvd , County

Date: 10/9/2014
Day: Thursday

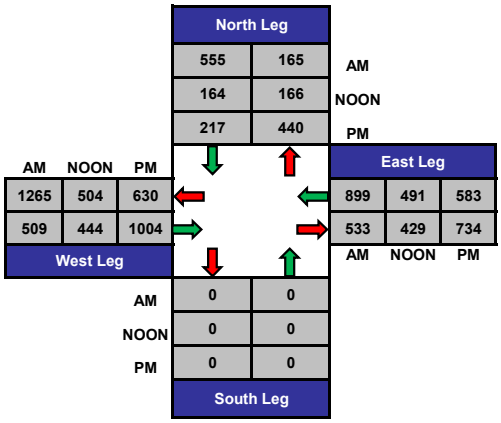
Project #: 14-1259-019
Agency: County
Node #: 6427

AM Peak Hour	715 AM
NOON Peak Hour	1215 PM
PM Peak Hour	430 PM

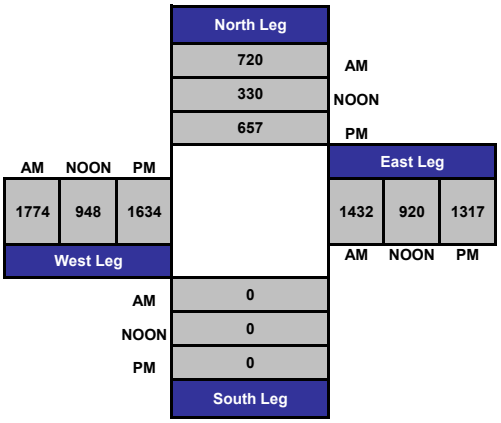


Count Periods	Start	End
AM	6:30 AM	8:30 AM
NOON	11:30 AM	1:30 PM
PM	4:30 PM	6:30 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 14-1259-019 **Day:** Thursday

City: County **Date:** 10/9/2014

AM

NS/EW Streets:	Crawford Canyon Rd			Crawford Canyon Rd			Newport Blvd			Newport Blvd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 0	NR 0	SL 1	ST 0	SR 1	EL 1	ET 2	ER 0	WL 0	WT 2	WR 0	TOTAL
6:30 AM	0	0	0	11	0	72	5	40	0	0	140	10	278
6:45 AM	0	0	0	21	0	87	10	75	0	0	117	13	323
7:00 AM	0	0	0	10	0	111	12	58	0	0	137	13	341
7:15 AM	0	0	0	14	0	155	11	77	0	0	213	21	491
7:30 AM	0	0	0	20	0	108	21	111	0	0	221	29	510
7:45 AM	0	0	0	30	0	67	21	123	0	0	169	31	441
8:00 AM	0	0	0	28	0	133	15	130	0	0	199	16	521
8:15 AM	0	0	0	26	0	116	25	124	0	0	175	15	481
TOTAL VOLUMES :	0	0	0	160	0	849	120	738	0	0	1371	148	3386
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	15.86%	0.00%	84.14%	13.99%	86.01%	0.00%	0.00%	90.26%	9.74%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	0	0	92	0	463	68	441	0	0	802	97	1963
PEAK HR FACTOR :	0.000			0.821			0.878			0.899			0.942

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 14-1259-019 **Day:** Thursday

City: County **Date:** 10/9/2014

PM

NS/EW Streets:	Crawford Canyon Rd			Crawford Canyon Rd			Newport Blvd			Newport Blvd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 0	NR 0	SL 1	ST 0	SR 1	EL 1	ET 2	ER 0	WL 0	WT 2	WR 0	TOTAL
4:30 PM	0	0	0	23	0	33	76	176	0	0	128	16	452
4:45 PM	0	0	0	27	0	30	84	159	0	0	125	19	444
5:00 PM	0	0	0	17	0	36	93	169	0	0	123	26	464
5:15 PM	0	0	0	18	0	33	102	145	0	0	122	24	444
5:30 PM	0	0	0	17	0	46	90	164	0	0	105	17	439
5:45 PM	0	0	0	19	0	25	85	138	0	0	124	19	410
6:00 PM	0	0	0	18	0	30	93	172	0	0	107	21	441
6:15 PM	0	0	0	26	0	36	75	152	0	0	87	20	396
TOTAL VOLUMES :	0	0	0	165	0	269	698	1275	0	0	921	162	3490
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	38.02%	0.00%	61.98%	35.38%	64.62%	0.00%	0.00%	85.04%	14.96%	
PEAK HR START TIME :	430 PM												TOTAL
PEAK HR VOL :	0	0	0	85	0	132	355	649	0	0	498	85	1804
PEAK HR FACTOR :	0.000			0.952			0.958			0.978			0.972

UTURNS			
NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 14-1259-019 **Day:** Thursday

City: County **Date:** 10/9/2014

NOON

NS/EW Streets:	Crawford Canyon Rd			Crawford Canyon Rd			Newport Blvd			Newport Blvd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 0	NR 0	SL 1	ST 0	SR 1	EL 1	ET 2	ER 0	WL 0	WT 2	WR 0	TOTAL
11:30 AM	0	0	0	18	0	34	28	97	0	0	104	19	300
11:45 AM	0	0	0	22	0	26	17	90	0	0	115	17	287
12:00 PM	0	0	0	14	0	16	16	78	0	0	84	24	232
12:15 PM	0	0	0	22	0	28	21	97	0	0	87	18	273
12:30 PM	0	0	0	15	0	18	23	83	0	0	111	27	277
12:45 PM	0	0	0	15	0	27	22	92	0	0	99	18	273
1:00 PM	0	0	0	16	0	23	17	89	0	0	111	20	276
1:15 PM	0	0	0	24	0	21	29	76	0	0	98	17	265
TOTAL VOLUMES :	0	0	0	146	0	193	173	702	0	0	809	160	2183
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	43.07%	0.00%	56.93%	19.77%	80.23%	0.00%	0.00%	83.49%	16.51%	
PEAK HR START TIME :	1215 PM												TOTAL
PEAK HR VOL :	0	0	0	68	0	96	83	361	0	0	408	83	1099
PEAK HR FACTOR :	0.000			0.820			0.941			0.889			0.992

UTURNS	NB	SB	EB	WB
	0	0	0	0

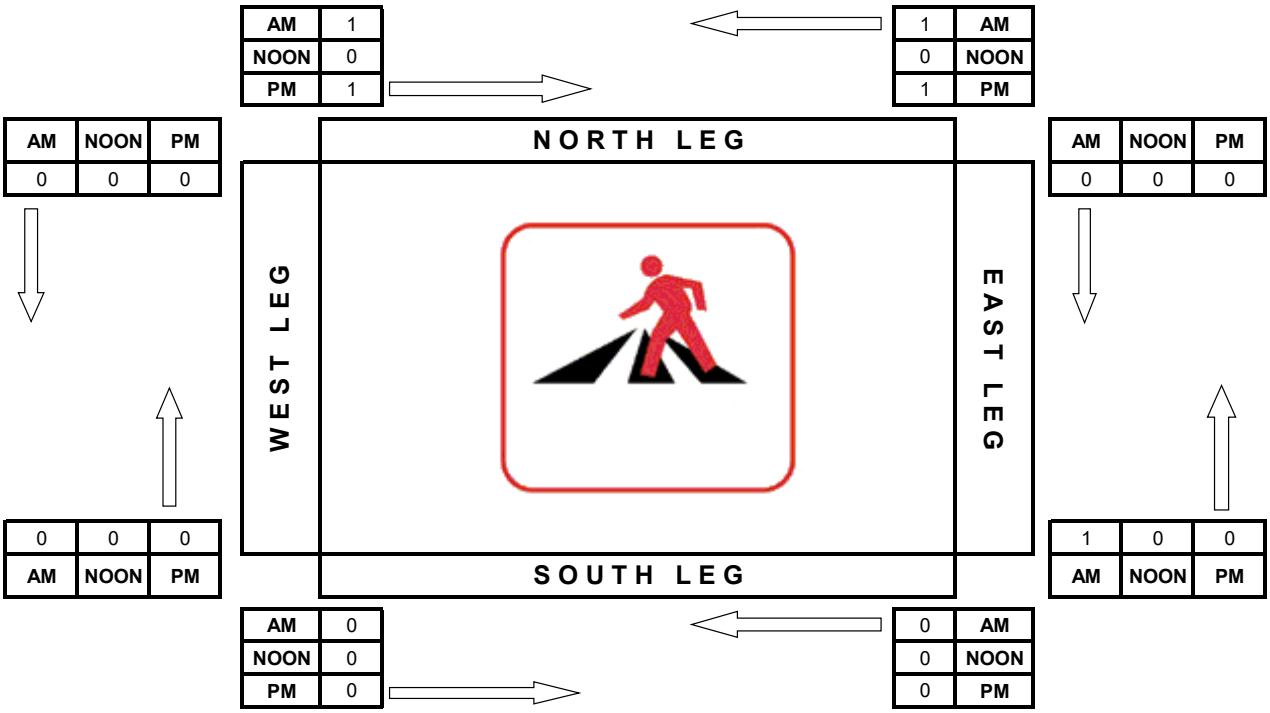
CONTROL : Signalized

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

Pedestrian Count Peak Hour

	Start:	End:
AM	6:30	8:30
NOON	11:30	13:30
PM	16:30	18:30

PROJECT#: 14-1259-019 Node #: 6427
N/S Street: Crawford Canyon Rd
E/W Street: Newport Ave
DATE: 10/9/2014 DAY: Thursday
CITY: Tustin



PREPARED BY NATIONAL DATA & SURVEYING SERVICES

Bicycle Count Peak Hour

	Start:	End:
AM	6:30	8:30
NOON	11:30	13:30
PM	16:30	18:30

PROJECT#: 14-1259-019 Node #: 6427
N/S Street: Crawford Canyon Rd
E/W Street: Newport Ave
DATE: 10/9/2014
CITY: Tustin

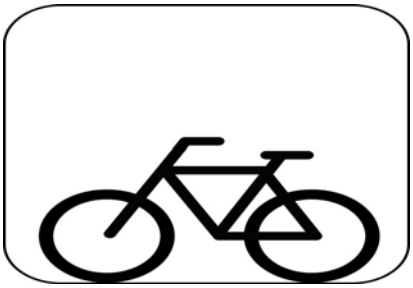
DAY: Thursday

AM	0	0	0
NOON	0	0	1
PM	1	0	0

NORTH LEG

AM	NOON	PM
0	0	0
2	0	4
0	0	0

WEST LEG



EAST LEG

AM	NOON	PM
0	2	0
4	0	0
0	0	0

SOUTH LEG

AM	0	0	0
NOON	0	0	0
PM	0	0	0

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 14-1259-019 Node #: 6427
N/S Street: Crawford Canyon Rd
E/W Street: Newport Ave
DATE: 10/9/2014 DAY: Thursday
CITY: Tustin

A M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
6:30 AM	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	1	0	0	0	1	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
TOTALS	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**

BIKES

TIME	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:30 AM	0	0	0	0	0	0	0	1	0	0	1	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	1	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	3	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	1	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**5**	**0**

N O O N

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
11:30 AM	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

BIKES

TIME	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	1	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**

P M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
6:00 PM	0	1	0	0	0	0	0	0
6:15 PM	1	0	0	0	0	0	0	0
TOTALS	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**

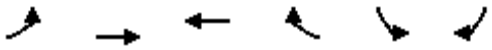
BIKES

TIME	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	2	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	0	0	1	0	1	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	1	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**4**	**0**	**0**	**0**	**0**

ATTACHMENT B – SYNCHRO WORKSHEETS

Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	76	494	898	109	103	519
Future Volume (vph)	76	494	898	109	103	519
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250			0	0	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.984			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3483	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3483	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			23			235
Link Speed (mph)		30	30		30	
Link Distance (ft)		572	1060		879	
Travel Time (s)		13.0	24.1		20.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	537	976	118	112	564
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	537	1094	0	112	564
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6

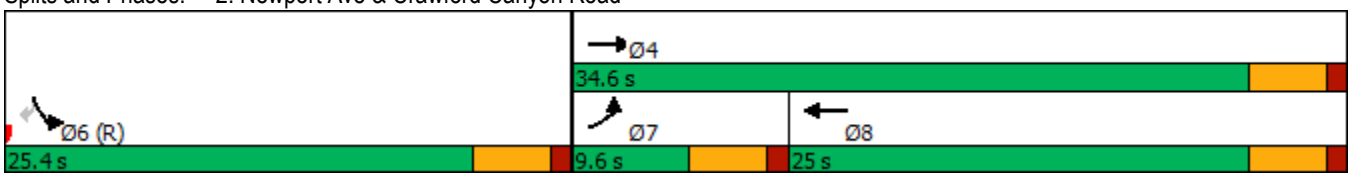
Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	7	4	8		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	9.6	34.6	25.0		25.4	25.4
Total Split (%)	16.0%	57.7%	41.7%		42.3%	42.3%
Maximum Green (s)	5.1	30.1	20.5		20.9	20.9
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	5.1	28.2	20.5		22.8	22.8
Actuated g/C Ratio	0.08	0.47	0.34		0.38	0.38
v/c Ratio	0.55	0.32	0.91		0.17	0.76
Control Delay	42.6	10.1	31.5		14.5	18.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	42.6	10.1	31.5		14.5	18.6
LOS	D	B	C		B	B
Approach Delay		14.5	31.5		17.9	
Approach LOS		B	C		B	

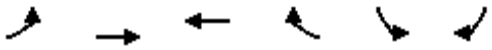
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 67.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



HCM 6th Signalized Intersection Summary
2: Newport Ave & Crawford Canyon Road

12/06/2020



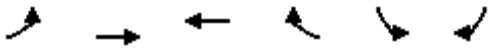
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	76	494	898	109	103	519
Future Volume (veh/h)	76	494	898	109	103	519
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	83	537	976	118	112	564
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	111	1684	1074	130	0	0
Arrive On Green	0.06	0.47	0.34	0.34	0.00	0.00
Sat Flow, veh/h	1781	3647	3285	386	0	
Grp Volume(v), veh/h	83	537	543	551	0.0	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1801		
Q Serve(g_s), s	2.7	5.6	17.5	17.5		
Cycle Q Clear(g_c), s	2.7	5.6	17.5	17.5		
Prop In Lane	1.00			0.21		
Lane Grp Cap(c), veh/h	111	1684	598	606		
V/C Ratio(X)	0.75	0.32	0.91	0.91		
Avail Cap(c_a), veh/h	151	1783	607	615		
HCM Platoon Ratio	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	27.7	9.8	19.0	19.0		
Incr Delay (d2), s/veh	12.5	0.1	17.5	17.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.5	1.9	9.3	9.4		
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.2	9.9	36.5	36.4		
LnGrp LOS	D	A	D	D		
Approach Vol, veh/h		620	1094			
Approach Delay, s/veh		13.9	36.5			
Approach LOS		B	D			

Timer - Assigned Phs				4		7	8
Phs Duration (G+Y+Rc), s				32.9		8.2	24.7
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				30.1		5.1	20.5
Max Q Clear Time (g_c+I1), s				7.6		4.7	19.5
Green Ext Time (p_c), s				3.7		0.0	0.7

Intersection Summary		
HCM 6th Ctrl Delay	28.3	
HCM 6th LOS	C	

Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	398	727	558	95	95	148
Future Volume (vph)	398	727	558	95	95	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250			0	0	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.978			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3461	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3461	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			26			161
Link Speed (mph)		30	30		30	
Link Distance (ft)		572	1060		879	
Travel Time (s)		13.0	24.1		20.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	433	790	607	103	103	161
Shared Lane Traffic (%)						
Lane Group Flow (vph)	433	790	710	0	103	161
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6

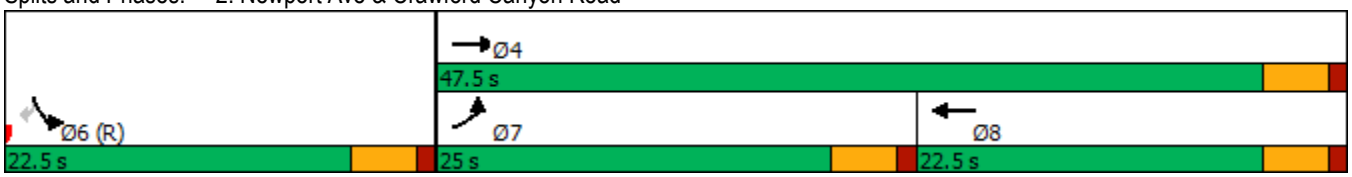
Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	7	4	8		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	25.0	47.5	22.5		22.5	22.5
Total Split (%)	35.7%	67.9%	32.1%		32.1%	32.1%
Maximum Green (s)	20.5	43.0	18.0		18.0	18.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	19.5	41.3	17.2		19.7	19.7
Actuated g/C Ratio	0.28	0.59	0.25		0.28	0.28
v/c Ratio	0.88	0.38	0.81		0.21	0.29
Control Delay	44.9	8.0	32.6		21.8	5.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	44.9	8.0	32.6		21.8	5.5
LOS	D	A	C		C	A
Approach Delay		21.0	32.6		11.9	
Approach LOS		C	C		B	

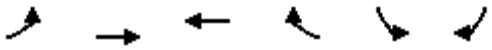
Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 23.7		Intersection LOS: C	
Intersection Capacity Utilization 57.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



HCM 6th Signalized Intersection Summary
2: Newport Ave & Crawford Canyon Road

12/06/2020



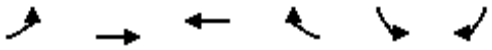
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	398	727	558	95	95	148
Future Volume (veh/h)	398	727	558	95	95	148
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	433	790	607	103	103	161
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	478	2020	717	121	0	0
Arrive On Green	0.27	0.57	0.24	0.24	0.00	0.00
Sat Flow, veh/h	1781	3647	3133	515	0	
Grp Volume(v), veh/h	433	790	354	356	0.0	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1778		
Q Serve(g_s), s	16.4	8.6	13.3	13.4		
Cycle Q Clear(g_c), s	16.4	8.6	13.3	13.4		
Prop In Lane	1.00			0.29		
Lane Grp Cap(c), veh/h	478	2020	419	419		
V/C Ratio(X)	0.91	0.39	0.84	0.85		
Avail Cap(c_a), veh/h	522	2183	457	457		
HCM Platoon Ratio	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	24.8	8.4	25.5	25.5		
Incr Delay (d2), s/veh	18.5	0.1	12.8	13.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	9.0	2.8	6.8	6.8		
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.3	8.5	38.3	38.6		
LnGrp LOS	D	A	D	D		
Approach Vol, veh/h		1223	710			
Approach Delay, s/veh		20.8	38.5			
Approach LOS		C	D			

Timer - Assigned Phs				4		7	8
Phs Duration (G+Y+Rc), s				44.3		23.3	21.0
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				43.0		20.5	18.0
Max Q Clear Time (g_c+I1), s				10.6		18.4	15.4
Green Ext Time (p_c), s				6.4		0.3	1.1

Intersection Summary	
HCM 6th Ctrl Delay	27.3
HCM 6th LOS	C

Lanes, Volumes, Timings
1: Newport Ave & Project Driveway

12/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	570	1417	4	2	2
Future Volume (vph)	3	570	1417	4	2	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt					0.932	
Flt Protected	0.950				0.976	
Satd. Flow (prot)	1770	3539	3539	0	1694	0
Flt Permitted	0.950				0.976	
Satd. Flow (perm)	1770	3539	3539	0	1694	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		919	572		283	
Travel Time (s)		20.9	13.0		6.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	620	1540	4	2	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	620	1544	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane					Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	570	1417	4	2	2
Future Vol, veh/h	3	570	1417	4	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	620	1540	4	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1544	0	-	0	1858	772
Stage 1	-	-	-	-	1542	-
Stage 2	-	-	-	-	316	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	*740	-	-	-	*228	*495
Stage 1	-	-	-	-	*467	-
Stage 2	-	-	-	-	*712	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*740	-	-	-	*228	*495
Mov Cap-2 Maneuver	-	-	-	-	*410	-
Stage 1	-	-	-	-	*465	-
Stage 2	-	-	-	-	*712	-

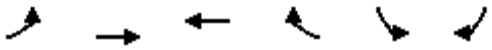
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 740	-	-	-	449
HCM Lane V/C Ratio	0.004	-	-	-	0.01
HCM Control Delay (s)	9.9	-	-	-	13.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	77	495	900	109	103	521
Future Volume (vph)	77	495	900	109	103	521
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250			0	0	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.984			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3483	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3483	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			23			235
Link Speed (mph)		30	30		30	
Link Distance (ft)		572	1060		879	
Travel Time (s)		13.0	24.1		20.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	538	978	118	112	566
Shared Lane Traffic (%)						
Lane Group Flow (vph)	84	538	1096	0	112	566
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6

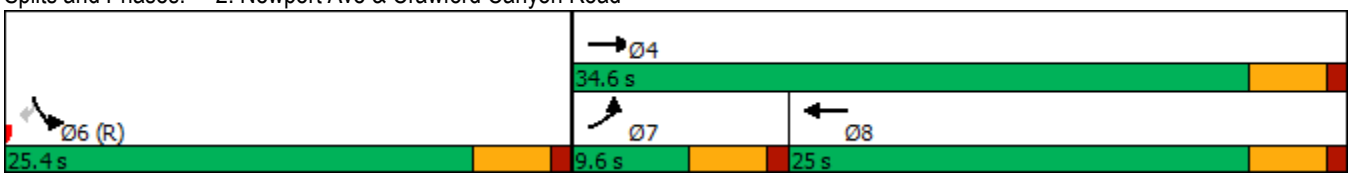
Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	7	4	8		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	9.6	34.6	25.0		25.4	25.4
Total Split (%)	16.0%	57.7%	41.7%		42.3%	42.3%
Maximum Green (s)	5.1	30.1	20.5		20.9	20.9
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	5.1	28.2	20.5		22.8	22.8
Actuated g/C Ratio	0.08	0.47	0.34		0.38	0.38
v/c Ratio	0.56	0.32	0.91		0.17	0.76
Control Delay	43.1	10.1	31.7		14.5	18.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	43.1	10.1	31.7		14.5	18.8
LOS	D	B	C		B	B
Approach Delay		14.6	31.7		18.0	
Approach LOS		B	C		B	

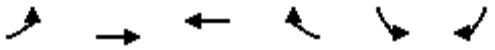
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 23.4		Intersection LOS: C	
Intersection Capacity Utilization 68.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



HCM 6th Signalized Intersection Summary
2: Newport Ave & Crawford Canyon Road

12/06/2020



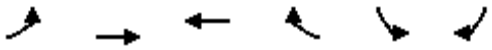
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	77	495	900	109	103	521
Future Volume (veh/h)	77	495	900	109	103	521
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	538	978	118	112	566
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	112	1686	1075	130	0	0
Arrive On Green	0.06	0.47	0.34	0.34	0.00	0.00
Sat Flow, veh/h	1781	3647	3286	385	0	
Grp Volume(v), veh/h	84	538	544	552	0.0	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1801		
Q Serve(g_s), s	2.8	5.6	17.6	17.6		
Cycle Q Clear(g_c), s	2.8	5.6	17.6	17.6		
Prop In Lane	1.00			0.21		
Lane Grp Cap(c), veh/h	112	1686	598	607		
V/C Ratio(X)	0.75	0.32	0.91	0.91		
Avail Cap(c_a), veh/h	151	1783	607	615		
HCM Platoon Ratio	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	27.7	9.8	19.0	19.0		
Incr Delay (d2), s/veh	13.1	0.1	17.6	17.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.5	1.9	9.3	9.4		
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.8	9.9	36.7	36.6		
LnGrp LOS	D	A	D	D		
Approach Vol, veh/h		622	1096			
Approach Delay, s/veh		14.0	36.6			
Approach LOS		B	D			

Timer - Assigned Phs				4		7	8
Phs Duration (G+Y+Rc), s				33.0		8.3	24.7
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				30.1		5.1	20.5
Max Q Clear Time (g_c+I1), s				7.6		4.8	19.6
Green Ext Time (p_c), s				3.7		0.0	0.6

Intersection Summary		
HCM 6th Ctrl Delay		28.4
HCM 6th LOS		C

Lanes, Volumes, Timings
1: Newport Ave & Project Driveway

12/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	1124	706	3	2	2
Future Volume (vph)	2	1124	706	3	2	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.999		0.932	
Flt Protected	0.950				0.976	
Satd. Flow (prot)	1770	3539	3536	0	1694	0
Flt Permitted	0.950				0.976	
Satd. Flow (perm)	1770	3539	3536	0	1694	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		919	572		283	
Travel Time (s)		20.9	13.0		6.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1222	767	3	2	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	1222	770	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane					Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	1124	706	3	2	2
Future Vol, veh/h	2	1124	706	3	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	1222	767	3	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	770	0	-	0	1384	385
Stage 1	-	-	-	-	769	-
Stage 2	-	-	-	-	615	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	*1200	-	-	-	*233	*802
Stage 1	-	-	-	-	*757	-
Stage 2	-	-	-	-	*502	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*1200	-	-	-	*232	*802
Mov Cap-2 Maneuver	-	-	-	-	*438	-
Stage 1	-	-	-	-	*755	-
Stage 2	-	-	-	-	*502	-

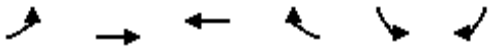
Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 1200	-	-	-	567
HCM Lane V/C Ratio	0.002	-	-	-	0.008
HCM Control Delay (s)	8	-	-	-	11.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	399	728	560	95	95	150
Future Volume (vph)	399	728	560	95	95	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250			0	0	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.978			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3461	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3461	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			26			163
Link Speed (mph)		30	30		30	
Link Distance (ft)		572	1060		879	
Travel Time (s)		13.0	24.1		20.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	434	791	609	103	103	163
Shared Lane Traffic (%)						
Lane Group Flow (vph)	434	791	712	0	103	163
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6

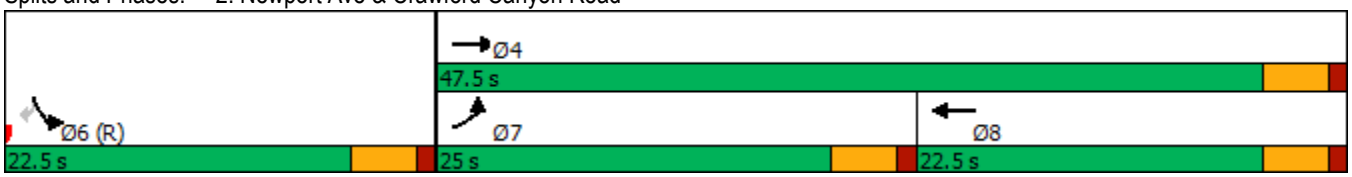
Lanes, Volumes, Timings
2: Newport Ave & Crawford Canyon Road

12/06/2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	7	4	8		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	25.0	47.5	22.5		22.5	22.5
Total Split (%)	35.7%	67.9%	32.1%		32.1%	32.1%
Maximum Green (s)	20.5	43.0	18.0		18.0	18.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	19.6	41.4	17.3		19.6	19.6
Actuated g/C Ratio	0.28	0.59	0.25		0.28	0.28
v/c Ratio	0.88	0.38	0.81		0.21	0.29
Control Delay	44.9	7.9	32.6		21.8	5.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	44.9	7.9	32.6		21.8	5.5
LOS	D	A	C		C	A
Approach Delay		21.0	32.6		11.8	
Approach LOS		C	C		B	

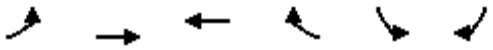
Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 23.7		Intersection LOS: C	
Intersection Capacity Utilization 57.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



HCM 6th Signalized Intersection Summary
2: Newport Ave & Crawford Canyon Road

12/06/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	399	728	560	95	95	150
Future Volume (veh/h)	399	728	560	95	95	150
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	791	609	103	103	163
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	479	2024	719	121	0	0
Arrive On Green	0.27	0.57	0.24	0.24	0.00	0.00
Sat Flow, veh/h	1781	3647	3135	513	0	
Grp Volume(v), veh/h	434	791	355	357	0.0	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1778		
Q Serve(g_s), s	16.5	8.6	13.4	13.4		
Cycle Q Clear(g_c), s	16.5	8.6	13.4	13.4		
Prop In Lane	1.00			0.29		
Lane Grp Cap(c), veh/h	479	2024	420	420		
V/C Ratio(X)	0.91	0.39	0.85	0.85		
Avail Cap(c_a), veh/h	522	2183	457	457		
HCM Platoon Ratio	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	24.7	8.3	25.5	25.5		
Incr Delay (d2), s/veh	18.6	0.1	12.9	13.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	9.0	2.8	6.8	6.9		
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.3	8.5	38.4	38.7		
LnGrp LOS	D	A	D	D		
Approach Vol, veh/h		1225	712			
Approach Delay, s/veh		20.8	38.6			
Approach LOS		C	D			

Timer - Assigned Phs				4		7	8
Phs Duration (G+Y+Rc), s				44.4		23.3	21.0
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				43.0		20.5	18.0
Max Q Clear Time (g_c+I1), s				10.6		18.5	15.4
Green Ext Time (p_c), s				6.4		0.3	1.1

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Appendix K
Tribal Cultural Resources

ORANGE COUNTY
OC Public Works

December 28, 2020

Mr. Andrew Salas, Chairman
Gabrieleño Band of Mission Indians - Kizh Nation
P.O. Box 393
Covina, CA 91723

VIA CERTIFIED MAIL

Subject: AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Chief Salas:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

The County of Orange (County) is proposing to develop a 2.5-acre neighborhood park and sidewalk extensions with associated roadway improvements (Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project or the Project). The proposed park (Crawford Canyon Park or the Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road and the proposed sidewalk extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue in North Tustin, in unincorporated Orange County; refer to **Figure 1**, **Regional Map**, **Figure 2**, **Local Project Vicinity** and **Figure 3**, **Topographic Map**. The Crawford Canyon Park would be located on a vacant 2.5-acre site within an area of existing single-family residences.

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, drinking fountains, a bioswale and bio-retention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4, Crawford Canyon Park Conceptual Site Plan**. The Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular

ORANGE COUNTY
OC Public Works

spaces, and equipped with bicycle racks would be provided onsite with vehicular access from Newport Avenue. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road. The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, with a maximum depth of ground disturbance of 2 feet, resulting in approximately 10,000 cubic yards of soil import. The County is proposing to begin construction in summer of 2021 with Crawford Canyon Park opening in spring of 2022.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the end of the Park Site to Country Haven Lane; refer to **Figure 5a** and **Figure 5b,** Crawford Canyon Road Sidewalk Extension Conceptual Plan. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, modifying drainage inlets and features, utility relocations and adjustments, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way. The Sidewalk Extension is anticipated to export up to approximately 280 cubic yards of native soil and import up to approximately 270 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced. The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022.

Should you have any questions related to this project, please feel free to contact me by phone at (714) 667-8815 or Cindy Salazar at (714) 667-8870.

Sincerely,

FOR Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

Attachment A: Project Maps
Figure 1: Regional Map
Figure 2: Local Project Vicinity
Figure 3: Topographic Map
Figure 4: Crawford Canyon Park Conceptual Site Plan
Figure 5a and Figure 5b: Crawford Canyon Road Sidewalk Extension Conceptual Plan

ORANGE COUNTY OC Public Works

December 28, 2020

Joyce Stanfield Perry
Juaneño Band of Mission Indians
4955 Paseo Segovia
Irvine, CA 92603

VIA CERTIFIED MAIL

Subject: AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Joyce Stanfield Perry:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

The County of Orange (County) is proposing to develop a 2.5-acre neighborhood park and sidewalk extensions with associated roadway improvements (Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project or the Project). The proposed park (Crawford Canyon Park or the Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road and the proposed sidewalk extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue in North Tustin, in unincorporated Orange County; refer to **Figure 1**, **Regional Map**, **Figure 2**, **Local Project Vicinity** and **Figure 3**, **Topographic Map**. The Crawford Canyon Park would be located on a vacant 2.5-acre site within an area of existing single-family residences.

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, drinking fountains, a bioswale and bio-retention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4, Crawford Canyon Park Conceptual Site Plan**. The Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular

County Administration South
601 North Ross Street
Santa Ana, California 92701

P.O. Box 4048
Santa Ana, CA 92702-4048

(714) 667-8800

info@ocpw.ocgov.com

OCPublicWorks.com

ORANGE COUNTY OC Public Works

spaces, and equipped with bicycle racks would be provided onsite with vehicular access from Newport Avenue. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road. The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, with a maximum depth of ground disturbance of 2 feet, resulting in approximately 10,000 cubic yards of soil import. The County is proposing to begin construction in summer of 2021 with Crawford Canyon Park opening in spring of 2022.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the end of the Park Site to Country Haven Lane; refer to **Figure 5a** and **Figure 5b,** Crawford Canyon Road Sidewalk Extension Conceptual Plan. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, modifying drainage inlets and features, utility relocations and adjustments, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way. The Sidewalk Extension is anticipated to export up to approximately 280 cubic yards of native soil and import up to approximately 270 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced. The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022.

Should you have any questions related to this project, please feel free to contact me by phone at (714) 667-8815 or Cindy Salazar at (714) 667-8870.

Sincerely,

FOR Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

Attachment A: Project Maps
Figure 1: Regional Map
Figure 2: Local Project Vicinity
Figure 3: Topographic Map
Figure 4: Crawford Canyon Park Conceptual Site Plan
Figure 5a and Figure 5b: Crawford Canyon Road Sidewalk Extension Conceptual Plan

ORANGE COUNTY
OC Public Works

December 28, 2020

Mr. Anthony Morales, Chief
San Gabriel Band of Mission Indians
PO Box 693
San Gabriel, CA 91778

VIA CERTIFIED MAIL

Subject: AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Chief Morales:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

The County of Orange (County) is proposing to develop a 2.5-acre neighborhood park and sidewalk extensions with associated roadway improvements (Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project or the Project). The proposed park (Crawford Canyon Park or the Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road and the proposed sidewalk extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue in North Tustin, in unincorporated Orange County; refer to **Figure 1**, **Regional Map**, **Figure 2**, **Local Project Vicinity** and **Figure 3**, **Topographic Map**. The Crawford Canyon Park would be located on a vacant 2.5-acre site within an area of existing single-family residences.

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, drinking fountains, a bioswale and bio-retention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4, Crawford Canyon Park Conceptual Site Plan**. The Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular

ORANGE COUNTY
OC Public Works

spaces, and equipped with bicycle racks would be provided onsite with vehicular access from Newport Avenue. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road. The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, with a maximum depth of ground disturbance of 2 feet, resulting in approximately 10,000 cubic yards of soil import. The County is proposing to begin construction in summer of 2021 with Crawford Canyon Park opening in spring of 2022.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the end of the Park Site to Country Haven Lane; refer to **Figure 5a** and **Figure 5b,** Crawford Canyon Road Sidewalk Extension Conceptual Plan. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, modifying drainage inlets and features, utility relocations and adjustments, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way. The Sidewalk Extension is anticipated to export up to approximately 280 cubic yards of native soil and import up to approximately 270 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced. The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022.

Should you have any questions related to this project, please feel free to contact me by phone at (714) 667-8815 or Cindy Salazar at (714) 667-8870.

Sincerely,

FOR Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

Attachment A: Project Maps
Figure 1: Regional Map
Figure 2: Local Project Vicinity
Figure 3: Topographic Map
Figure 4: Crawford Canyon Park Conceptual Site Plan
Figure 5a and Figure 5b: Crawford Canyon Road Sidewalk Extension Conceptual Plan

ORANGE COUNTY
OC Public Works

December 28, 2020

Mr. Joseph Ontiveros
Soboba Band of Luiseño Indians
PO Box 487
San Jacinto, CA 92581

VIA CERTIFIED MAIL

Subject: AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Joseph Ontiveros:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

The County of Orange (County) is proposing to develop a 2.5-acre neighborhood park and sidewalk extensions with associated roadway improvements (Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project or the Project). The proposed park (Crawford Canyon Park or the Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road and the proposed sidewalk extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue in North Tustin, in unincorporated Orange County; refer to **Figure 1**, **Regional Map**, **Figure 2**, **Local Project Vicinity** and **Figure 3**, **Topographic Map**. The Crawford Canyon Park would be located on a vacant 2.5-acre site within an area of existing single-family residences.

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, drinking fountains, a bioswale and bio-retention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4, Crawford Canyon Park Conceptual Site Plan**. The Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular

ORANGE COUNTY
OC Public Works

spaces, and equipped with bicycle racks would be provided onsite with vehicular access from Newport Avenue. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road. The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, with a maximum depth of ground disturbance of 2 feet, resulting in approximately 10,000 cubic yards of soil import. The County is proposing to begin construction in summer of 2021 with Crawford Canyon Park opening in spring of 2022.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the end of the Park Site to Country Haven Lane; refer to **Figure 5a** and **Figure 5b,** Crawford Canyon Road Sidewalk Extension Conceptual Plan. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, modifying drainage inlets and features, utility relocations and adjustments, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way. The Sidewalk Extension is anticipated to export up to approximately 280 cubic yards of native soil and import up to approximately 270 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced. The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022.

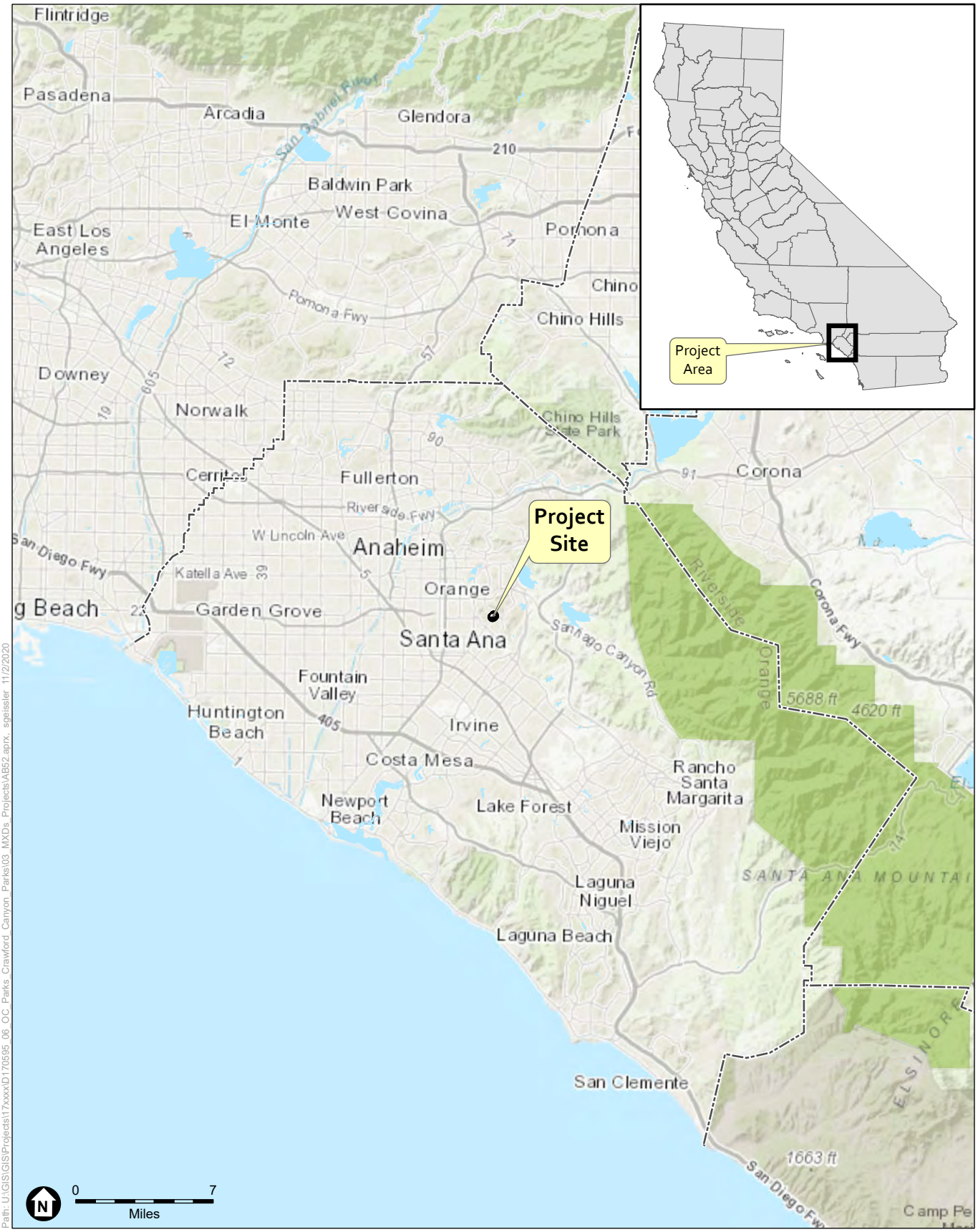
Should you have any questions related to this project, please feel free to contact me by phone at (714) 667-8815 or Cindy Salazar at (714) 667-8870.

Sincerely,

FOR Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

Attachment A: Project Maps
Figure 1: Regional Map
Figure 2: Local Project Vicinity
Figure 3: Topographic Map
Figure 4: Crawford Canyon Park Conceptual Site Plan
Figure 5a and Figure 5b: Crawford Canyon Road Sidewalk Extension Conceptual Plan



SOURCE: ESRI

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

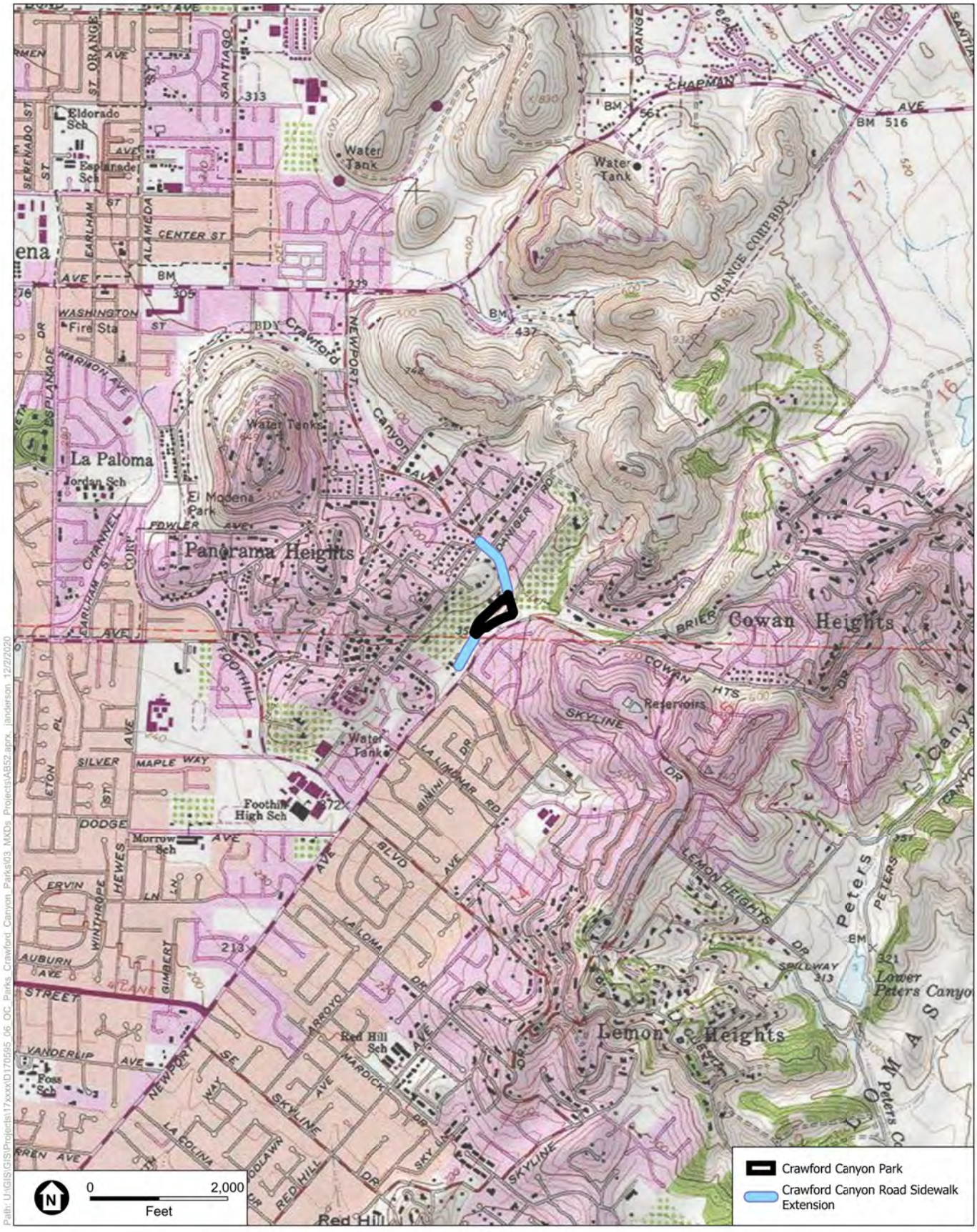
Figure 1
Regional Map



SOURCE: Mapbox, 2020.

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Figure 2
Local Vicinity Map



SOURCE: USGS Topographic Series (Orange, CA).

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Figure 3
Topographic Map



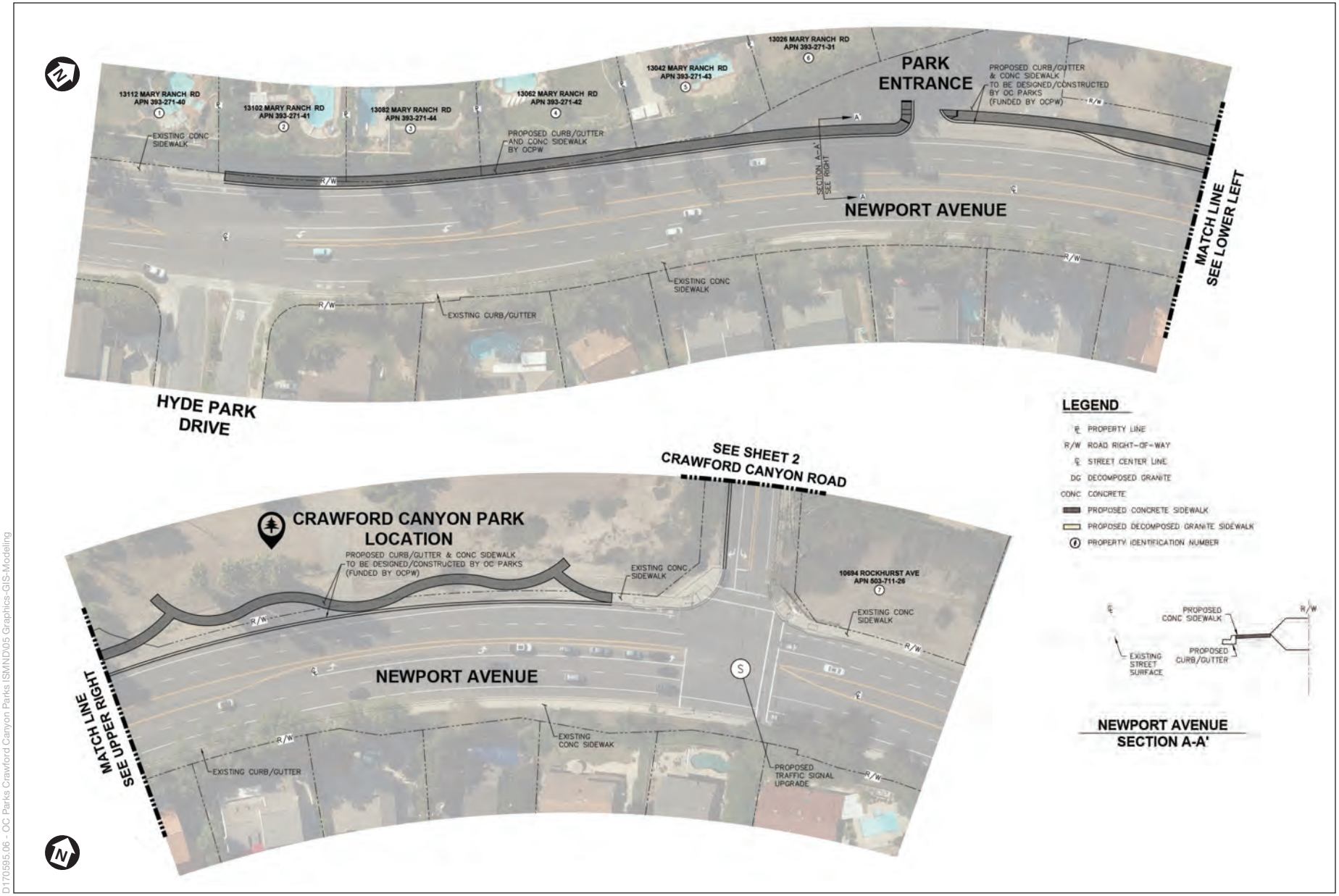
D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: RJM Design Group, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Figure 4
Crawford Canyon Park Conceptual Site Plan

ESA

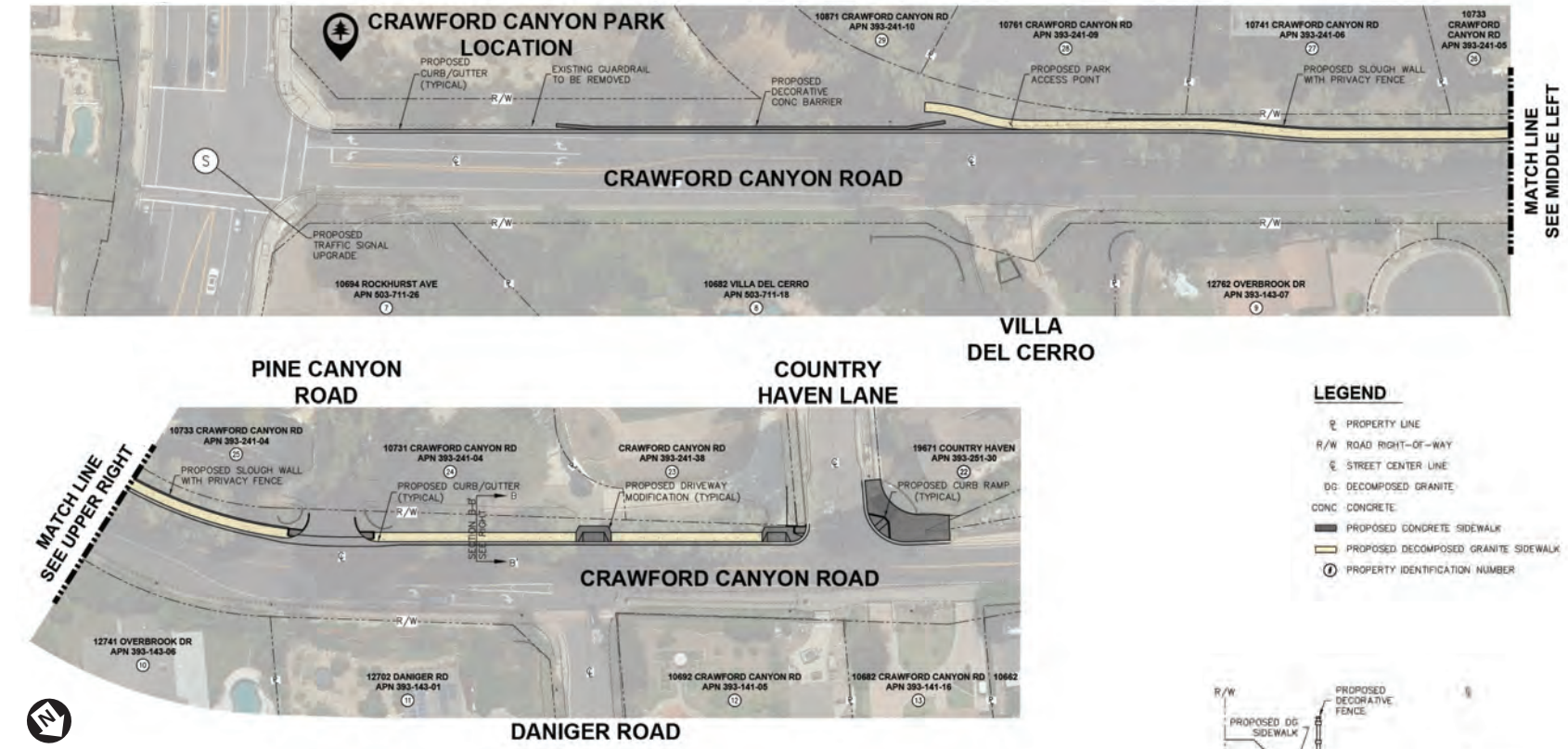


D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: County of Orange, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Figure 5a
Crawford Canyon Road Sidewalk Extension Conceptual Plan



D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: County of Orange, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Figure 5b
Crawford Canyon Road Sidewalk Extension Conceptual Plan

GABRIELENO BAND OF MISSION INDIANS - KIZH NATION
Historically known as The Gabrielino Tribal Council - San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

January 21, 2021

Project Name: Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project City of Orange

Dear Joanna Chang,

Thank you for your letter dated December 28, 2020 regarding AB52 consultation. The above proposed project location is within our Ancestral Tribal Territory; therefore, our Tribal Government requests to schedule a consultation with you as the lead agency, to discuss the project and the surrounding location in further detail.

Please contact us at your earliest convenience. ***Please Note:AB 52, "consultation" shall have the same meaning as provided in SB 18 (Govt. Code Section 65352.4).***

Thank you for your time,

Andrew Salas, Chairman
Gabrieleno Band of Mission Indians – Kizh Nation
1(844)390-0787

Andrew Salas, Chairman | Nadine Salas, Vice-Chairman | Dr. Christina Swindall Martinez, secretary
Albert Perez, treasurer I | Martha Gonzalez Lemos, treasurer II | Richard Gradias, Chairman of the council of Elders

PO Box 393 Covina, CA 91723 admin@gabrielenoindians.org