



LARS ANDERSEN & ASSOCIATES, INC.

CIVIL ENGINEERS • LAND SURVEYORS • PLANNERS
ADA COMPLIANCE • LEED ACCREDITED • STORM WATER QUALITY

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PRELIMINARY DRAINAGE STUDY
FOR
FEF SAN DIEGO

PREPARED: OCTOBER 19, 2020

PREPARED FOR:



FIRSTELEMENT FUEL

PREPARED BY:

LARS ANDERSEN & ASSOCIATES, INC

Introduction

The project site is an existing retail gasoline outlet and located at 1832 W Washington, San Diego. Storm water run-off currently discharges to existing drain inlets and storm water system, ultimately discharging to the bay. The site currently implements existing Best Management Practices (BMPs) such as storm drain stenciling/signage and mitigation of stormwater run-off from fueling area. The project includes the installation of hydrogen equipment, regrading of existing pavement, reconstruction of existing driveways, and installation of new landscaping. The project is considered a Standard Development Project per the Storm Water Requirements Applicability Checklist.

Methodology

The rational method was used to compare pre-development and post-development peak discharges of the project site. Table 3-1 of the San Diego County Hydrology Manual (Hydrology Manual) was used to determine the runoff coefficients (C) for the calculations. The C listed under Undisturbed Natural Terrain (Natural) was used for the on-site landscape and the C listed under Commercial/Industrial (N. Com) was used for the on-site impervious surfaces (see Table 1).

Table 1

Table 3-1 RUNOFF COEFFICIENTS FOR URBAN AREAS						
Land Use		Runoff Coefficient "C"				
NRCS Elements	County Elements	% IMPER.	Soil Type			
			A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, C_p , for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).

DU/A = dwelling units per acre

NRCS = National Resources Conservation Service

Figure 3-1 of the Hydrology Manual (Figure 1 below) and a 20-min, 100-year storm were used to determine the rainfall intensity for the discharge calculations.

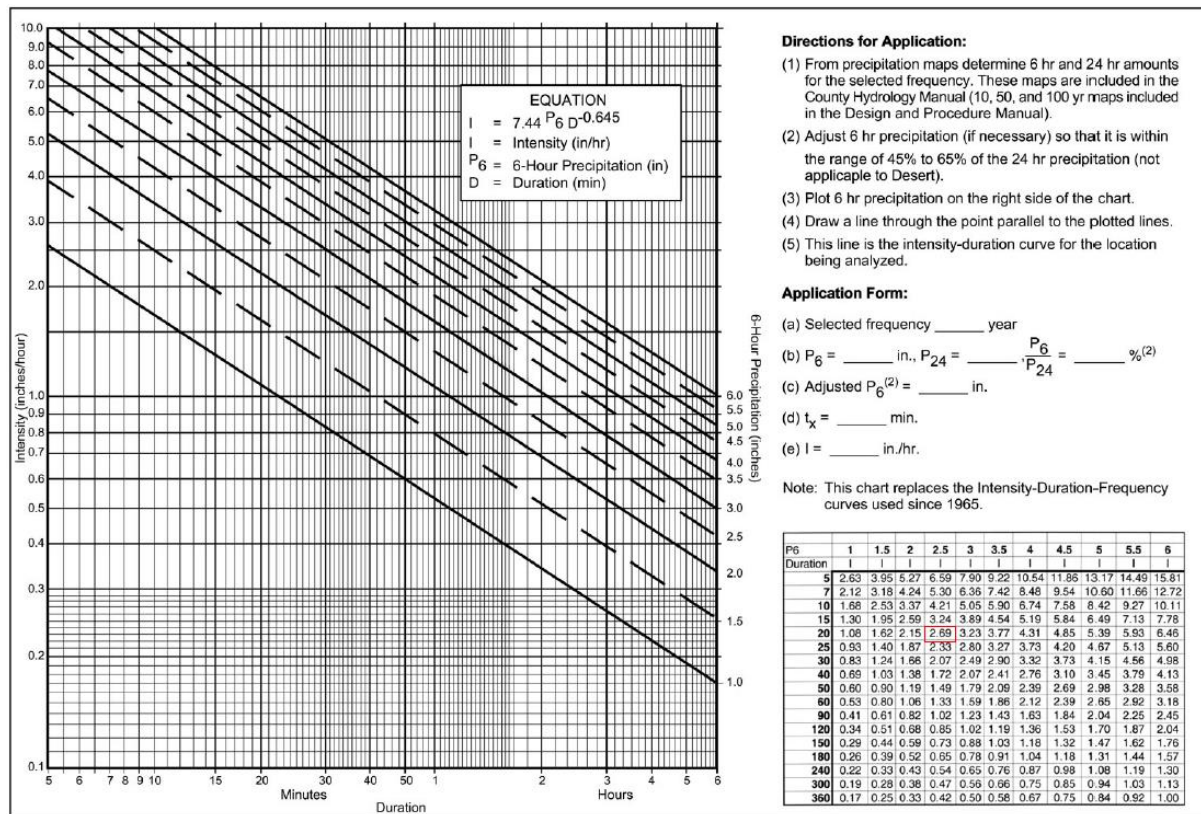


Figure 1

Conclusion and Results

The project calls for an increase of 191 sf (0.004 ac) of impervious surface (see Appendix A). Table 2 below shows that this almost insignificant amount of increased area creates an increase in peak flow of only 0.005 cfs.

Table 2

Pre/Post Hydrology Analysis							
	Landscape		Impervious		$\Sigma A \cdot C$	i (in/hr)	Q (cfs)
	A (ac)	C	A (ac)	C			
Pre-	0.104	0.35	0.367	0.79	0.327	2.69	0.879
Post-	0.100	0.35	0.372	0.79	0.329	2.69	0.884

Because of such a negligible increase in peak flow, there are no adverse effects to the down-stream systems. Thus, it can be determined that additional BMPs and stormwater management measures are not required. Furthermore, because there would be no adverse effects to the down-stream system, approval from the Regional Water Quality Control Board Under Federal Clean Water Act (CWA) sections 401 or 404 is not required either.

APPENDIX A

