



CORNERSTONE
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PRELIMINARY HYDROLOGY REPORT
for

**General Plan Amendment/Zone Change (GPA/ZC) No. 21-0184 located
at the northwest corner of Hosking Avenue and South H Street (APNs
515-020-05, -07, -08, -09, -30, and -44)**

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CEI Job # 414-06-00



PURPOSE

General Plan Amendment/Zone Change (GPA/ZC) No. 21-0184 is located at the northwest corner of Hosking Avenue and South H Street (APNs 515-020-05, -07, -08, -09, -30, and -44). The project envisions a commercial and industrial site development on approximately 84.7 acres. The project site is bounded by Berkshire Ave on the north, South H Street on the east, Hosking Ave on the south and State 99 on the west in Bakersfield, CA. The purpose of this study is to demonstrate the feasibility for development on this site and the expected method for handling project stormwater.

DESCRIPTION OF EXISTING WATERSHED

FEMA Flood Insurance Rate Maps generally describe the anticipated extent of flooding in a mapping area, however this project is located on Map Number 06029C2300E is not in print. The FEMA web site indicates that the project area is in "Zone X", an area of minimal flooding. We believe that the flood map is not in print because the entire map is in zone X. This portion of Bakersfield has never experienced flooding in the modern era.

METHODOLOGY

This is a preliminary study, meant to demonstrate the feasibility of onsite stormwater retention and the general approach to stormwater routing. The method in this report will be limited to the preliminary design of the stormwater retention sump.

City of Bakersfield and the County of Kern use virtually identical formulas for the design of a retention basin, with one exception. City of Bakersfield uses a 1.8" storm event which is a conservative approximation of a 1-day/10yr storm event. In other words, this is a rainfall amount that would have a 10% annual chance of occurring in a single day at this site. The County of Kern uses a more conservative approach. The County requires capacity for a 5-day/10yr storm event based upon the most current NOAA Atlas 14 data. For this site, the City requires calculations to be based upon a 1.8" storm while Kern County would require a 2.3" storm event. This site is in the City so the minimum standard is the City standard. The City of Bakersfield has experienced storm events in the last 20 years which have exceeded the City design standard over a 5 day period, resulting in localized flooding. Because the anticipated development needs to be free of local flooding, we recommend to design the sump capacity to the County standard. The result will exceed the minimum City standard.

We have included the adjacent Del Papa property (APN 515-020-39) in this analysis. So while the GPA/SC project is 84.7 acres, the hydrology analysis tributary area is 101 acres which includes the stormwater runoff from the project site, the Del Papa site and the adjacent streets, Berkshire, H street and Hosking.

RETENTION BASIN ANALYSIS

The affected project area is 101 acres of onsite and offsite tributary area. A 10-year, 5-day rainfall amount of 2.3 inches was used; this value was taken from NOAA Atlas 14, Volume 6, Version 2. A runoff coefficient of 0.90 was used due to the balance of pavement, asphalt, and possible landscaping. Using these values yields a runoff volume of 17.6 acre-feet. The onsite basin is sized such that a design storm event over the entire project area, in a fully developed

condition will be accommodated. The capacity of the retention basin at a water depth of 8 feet is 17.6 acre-feet.

SUMMARY

The on-site retention basin will be designed to retain a 5-day/10yr storm event. The minimum storage requirement for the City of Bakersfield is the retention of a 1.8” storm event and the minimum storage capacity to meet this standard is a basin sized to contain 13.6 acre-feet. The stormwater basin for this project will be designed to retain 17.6 acre-feet.

APPENDIX

Hydrology Exhibit

NOAA Atlas 14 data table

Retention Basin Calculation and Precipitation Information

Point precipitation frequency estimates (inches)

NOAA Atlas 14 Volume 6 Version 2

Data type: Precipitation depth

Time series type: Partial duration

Project area: Southwest

Location n: California USA

Station Name: -

Latitude: 35.2514°

Longitude: -119.0131°

Elevation (USGS): 339.39 ft

PRECIPITATION FREQUENCY ESTIMATES

by duration	1	2	5	10	25	50	100	200
5-min:	0.067	0.086	0.113	0.138	0.175	0.207	0.243	0.283
10-min:	0.097	0.123	0.162	0.197	0.251	0.296	0.348	0.405
15-min:	0.117	0.149	0.196	0.239	0.303	0.359	0.42	0.49
30-min:	0.161	0.206	0.271	0.329	0.418	0.495	0.58	0.677
60-min:	0.226	0.289	0.38	0.462	0.587	0.695	0.815	0.95
2-hr:	0.325	0.408	0.528	0.634	0.791	0.924	1.07	1.23
3-hr:	0.388	0.488	0.629	0.753	0.936	1.09	1.26	1.44
6-hr:	0.497	0.629	0.813	0.973	1.21	1.4	1.6	1.82
12-hr:	0.593	0.773	1.02	1.24	1.55	1.8	2.06	2.35
24-hr:	0.723	0.975	1.32	1.62	2.04	2.38	2.74	3.13
2-day:	0.835	1.14	1.56	1.91	2.42	2.84	3.28	3.76
3-day:	0.895	1.22	1.68	2.08	2.64	3.09	3.58	4.11
4-day:	0.948	1.3	1.79	2.22	2.82	3.31	3.83	4.39
7-day:	1.07	1.47	2.04	2.53	3.22	3.77	4.35	4.96
10-day:	1.14	1.58	2.2	2.73	3.48	4.08	4.7	5.35
20-day:	1.37	1.93	2.72	3.41	4.39	5.18	6	6.86
30-day:	1.6	2.25	3.2	4.03	5.24	6.2	7.2	8.25
45-day:	1.92	2.7	3.85	4.86	6.34	7.56	8.81	10.1
60-day:	2.2	3.08	4.39	5.55	7.25	8.65	10.1	11.6

Date/time (GMT): Fri Jul 2 20:23:10 2021

pyRunTime: 0.0232779979706

PRELIMINARY DRAINAGE HOSKINGS GPA/ZC 21-0184

GENERAL NOTES

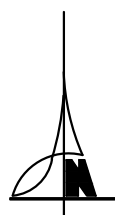
- ① SUMP VOLUME REQUIRED = 13.6 ACRE FEET
SUMP VOLUME PROVIDED = 17.6 ACRE FEET

COLLECTION SYSTEM WILL CONSIST OF PIPES AND SURFACE DRAINAGE FACILITIES.

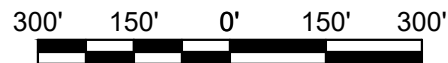
GENERAL STATISTICS

TRIBUTARY AREA = 101 ACRES
RUNOFF COEFFICIENT = 0.9
RAINFALL EVENT: NOAA ATLAS 14
10 YEAR/5 DAY = 2.3"

PROPOSED SUMP LOCATION



GRAPHIC SCALE



(IN FEET)
1 inch = 300 ft.

