HEALTHPEAK PROPERTIES, INC.

3020 CALLAN ROAD NEW BUILDINGS

Drainage Report

3020/3030 Callan Road
SAN DIEGO, CA 92121

D-SHEET NO.: XXXXX-D
PROJECT NO.: XXXXX
APN: 340-010-44

January 2020

Project Applicant:
Healthpeak Properties, Inc.
420 Stevens Avenue, Suite 170
Solana Beach, Ca 92075
858-847-9936

Prepared By:

Kimley»Horn

KIMLEY-HORN AND ASSOCIATES, INC.
401 B STREET, SUITE 600
SAN DIEGO, CA 92101
(619)234-9411

This Drainage Report has been prepared by Kimley-Horn and Associates, Inc. under the direct supervision of the following Registered Civil engineer. The undersigned attests to the technical data contained in this study, and to the qualifications of technical specialists providing engineering computations upon which the recommendations and conclusions are based.

Registered Civil Engineer

Date

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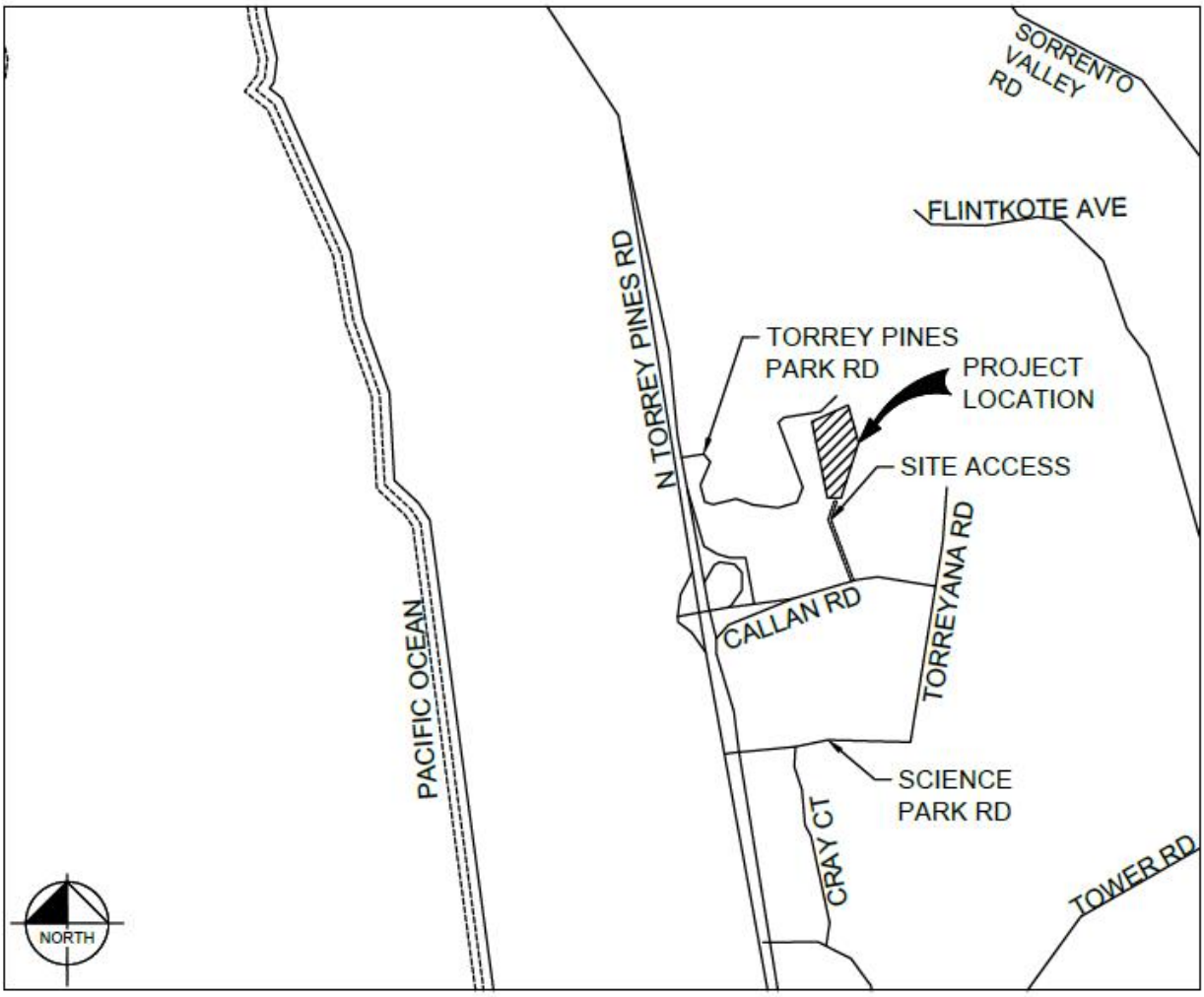
1 PROJECT DESCRIPTION

1.1 PROJECT DESCRIPTION

The proposed 3020 Callan Road project consists of a redevelopment on a 5.03-acre area located west of Interstate-5 off-ramp on Callan Road in the City of San Diego, CA, see **Figure 1-1** for Vicinity Map. The project proposes demolition of an existing 91,000 square foot building and construction of two new buildings totaling approximately 148,000 square feet with shared underground parking (2-1/2 levels of buildings over 2-1/2 levels underground parking). The project includes new building, surface parking, driveway improvements, as well as roadway and parking on the adjacent parcels to unite the surrounding properties to a single scientific research park campus. Also included in the project are grading, drainage, sewer and water utility services.

Figure 1–1 Vicinity Map



2 HYDROLOGIC ANALYSIS

2.1 ASSUMPTIONS

Contour information, aerial photographs and site observations were used to delineate the watershed boundary and drainage sub-basins for the project.

2.2 METHODOLOGY

The Rational Method was used to analyze the 100-year storm hydrology for the project and to determine the require proposed pipe and inlet sizes. This methodology is typically used for small basins less than 500 acres in size because a uniform rainfall distribution is assumed for the entire duration. Parameters for precipitation, intensity, runoff coefficients and times of concentration were based on the County of San Diego Hydrology Manual, 2003. Excerpts from the Hydrology Manual are contained in **Appendix B**.

2.2.1 EXISTING SITE HYDROLOGY

The project site is currently fully developed and slopes from south to northeast. Throughout the project area storm runoff is collected in existing curb and grate inlets. Within each of the existing parking lots there are curb inlets at the southeast corners that convey runoff east and outlet onto the surface before sheet flowing north to Penasquitos Creek. The property north of the site consists of a greenhouse that also conveys all storm runoff into the same storm system. All runoff from the property west of the site sheet flows into an existing detention basin adjacent to the private road north of the site and does not impact the project area.

The tributary area for curb inlets 1-9 on the attached **Existing Drainage Exhibit in Appendix A** have been delineated as DMA A, B, C, D, E, F, G, H, I, and J and are shown on the exhibit. Refer to **Table 2-1** for the calculated discharge to associated curb inlets from the existing project site.

Table 2–1 Existing Conditions Hydrology

DMA	Runoff Coefficient	Area (acres)	Intensity (in/hr)	T_c (min)	Flow Rate 100 Year (cfs)
A	0.85	0.38	6.1	5	1.97
B	0.85	0.94	6.1	5	4.87
C	0.85	0.56	6.1	5	2.90
D	0.85	1.07	6.1	5	5.55
E	0.85	0.45	6.1	5	2.33
F	0.85	0.65	6.1	5	3.37
G	0.85	1.40	6.1	5	7.26
H	0.85	1.24	6.1	5	6.43
I	0.85	0.86	6.1	5	4.56
J	0.85	1.89	6.1	5	9.80

2.2.2 PROPOSED SITE HYDROLOGY

The area of disturbance for the proposed redevelopment of 3020 Callan Road is approximately 6.97 acers and shown as DMA A, E, and H. DMA D, F and G consist of a 0.78-acres, 0.57-acres, and 1.38-acres respectively are made of up existing landscape, Torrey Pine trees, and an existing greenhouse development that are to be undisturbed and protected in place. As these areas are not a part of the project they are not included in the overall water quality calculations for the site but are included in sizing calculations for the proposed storm drain infrastructure that are affected. The flows from DMA D and G will be directed to a concrete brow ditch and grate inlets which will bypass the runoff that is being routed to the proposed underground water quality systems and will outlet to the existing storm drains at the south east side of the property. Flows from DMA F will also bypass the proposed underground storm system and continue to be routed through existing storm drains that outlet at the east side of the property.

DMA A is made up of sub areas DMA B and DMA C totaling 5.48-acres of the project area. Runoff from DMA B is collected and routed to two modular wetland units at the southeast corner of the site before being stored in an underground vault. Runoff from DMA C is collected and routed to a modular wetland at the northeast corner of the site before being routed to an underground vault. All stormwater from DMA B and C is stored in a single underground vault which has been sized for the total water quality and hydromodification volume as shown on the attached **Proposed Drainage Exhibit in Appendix A.** From there it will slowly discharge to the existing 18" storm drain in the middle of the property where it will flow east before sheet flowing north into Penasquitos Creek.

DMA E and H are west of the immediate project area on the adjacent property and therefore have separate underground systems. Each DMA's respective runoff is collected and routed through a modular wetland, into an underground vault and finally slowly outlet into the existing storm drains where it is conveyed east to the known outflow locations.

Table 2–2 Proposed Conditions Hydrology

DMA	Runoff Coefficient	Area (acres)	Intensity (in/hr)	T_c (min)	Flow Rate 100 Year (cfs)
A	-	-	-	-	-
B	0.85	3.23	6.1	5	16.75
C	0.85	1.81	6.1	5	9.38
D	0.85	0.78	6.1	5	4.04
E	0.85	1.15	6.1	5	5.96
F	0.85	1.38	6.1	5	7.16
G	0.85	0.21	6.1	5	1.09
H	0.85	0.34	6.1	5	1.76

Per the City of San Diego BMP Design Manual, January 2018 Edition, Table G.2-2: Unit Runoff Ratios for Sizing Factor Method, a Q_2 ratio of 0.439 cfs/acre is the natural runoff ratio for Lindbergh, soil group D, with a steep slope (see **Appendix B**). For the total project area of disturbance (6.97 acres), the natural runoff is 3.06cfs. To satisfy hydromodification requirements, 10% of the natural runoff for the area of disturbance will be discharged from the underground vault at a rate of 0.306 cfs. The discharge from the underground

vault will be added to the other remaining flows leading to the existing 18" storm drain at the east side of the property. Refer to **Table 2-2** for proposed mitigated flow for the project area.

Table 2–3 Proposed Mitigated Flow

	Q_2 Ratio	Area of Disturbance	Runoff	Mitigated Runoff for Hydromodification
DMA	(cfs/acre)	(acres)	(cfs)	(cfs)
A	0.439	5.48	2.41	0.241
E	0.439	1.15	0.50	0.050
H	0.439	0.34	0.15	0.015
Total	0.439	6.97	3.06	0.306

3 RESULTS

3.1 DRAINAGE IMPROVEMENTS

The existing flows from DMA G and D will be captured and routed to the existing storm drains that are to remain. The existing flow form DMA F will be captured in existing inlets and routed to the existing storm drains that are to remain. Flows from DMA B, C, E, and H will be captured, stored, and treated before being conveyed at a mitigated flow rate to the existing 18" storm outlet pipes. There will be no negative impacts to the site or surrounding properties due to the proposed development.

3.2 CEQA

- Due to the mitigated flow of the project to meet hydromodification requirements the proposed improvements will have no negative impacts to any adjacent properties.

- The project is not subject to Regional Water Quality Board approval under Federal Clean Water Act (CWA) section 401 or 404. The proposed project is only subject to the requirements as set forth in the general permit.

APPENDICES

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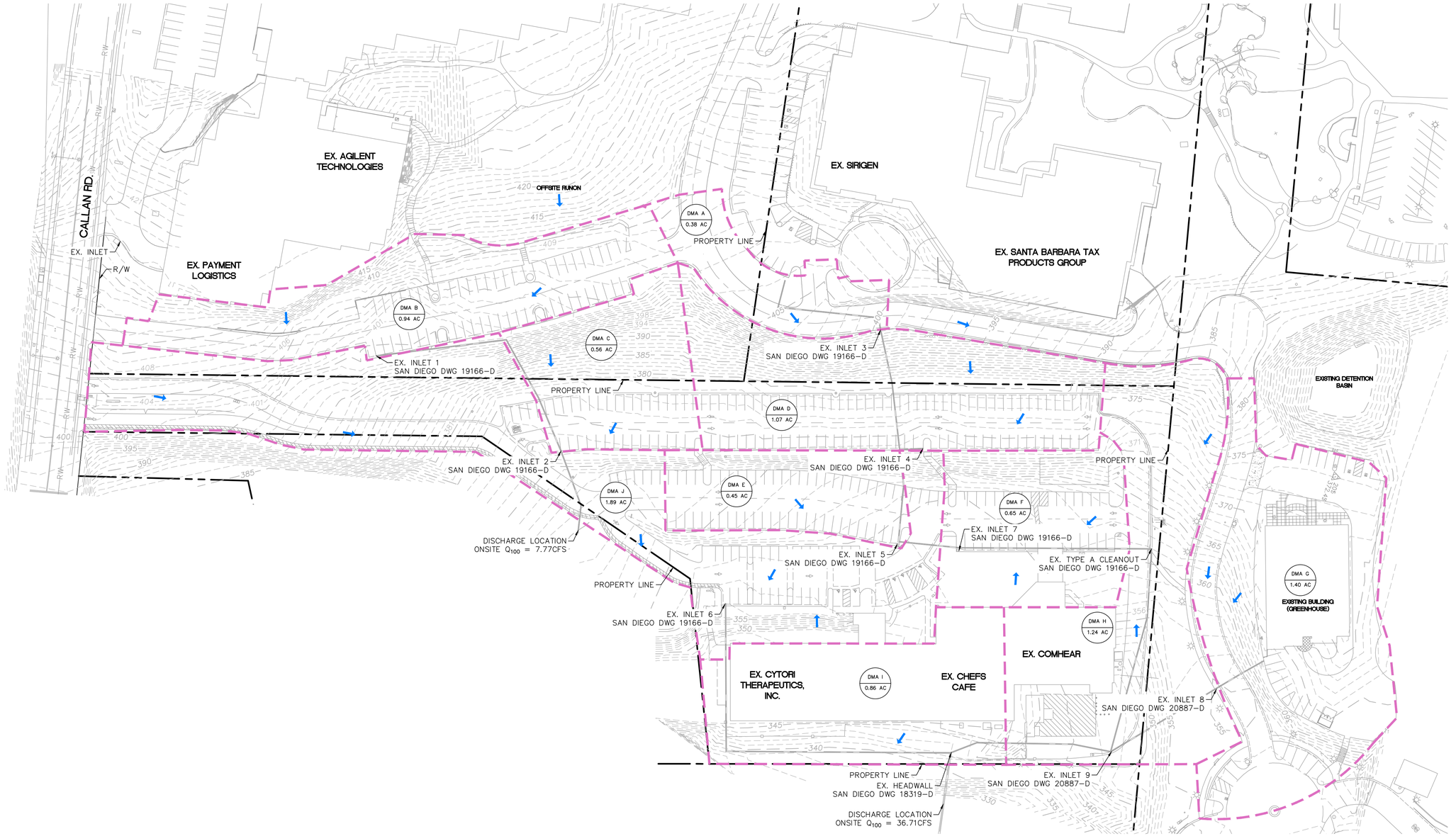
APPENDIX A

HYDROLOGY EXHIBITS



LEGEND

DMA / AREA

DMA BOUNDARY

OVERLAND FLOW DIRECTION

EXISTING STORM DRAIN

PROPERTY LINE/RIGHT-OF-WAY

DMA TABULAR SUMMARY

DMA ID	AREA	CURB INLET ID
A	0.38 AC	3
B	0.94 AC	1
C	0.56 AC	2
D	1.07 AC	4
E	0.45 AC	5
F	0.65 AC	7
G	1.40 AC	8
H	1.24 AC	9
I	0.86 AC	–
J	1.89 AC	6

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

No.	REVISIONS	DATE	BY

Kimley»Horn
401 B STREET, SUITE 600, SAN DIEGO, CA 92101
PHONE: 619-234-9411
WWW.KIMLEY-HORN.COM

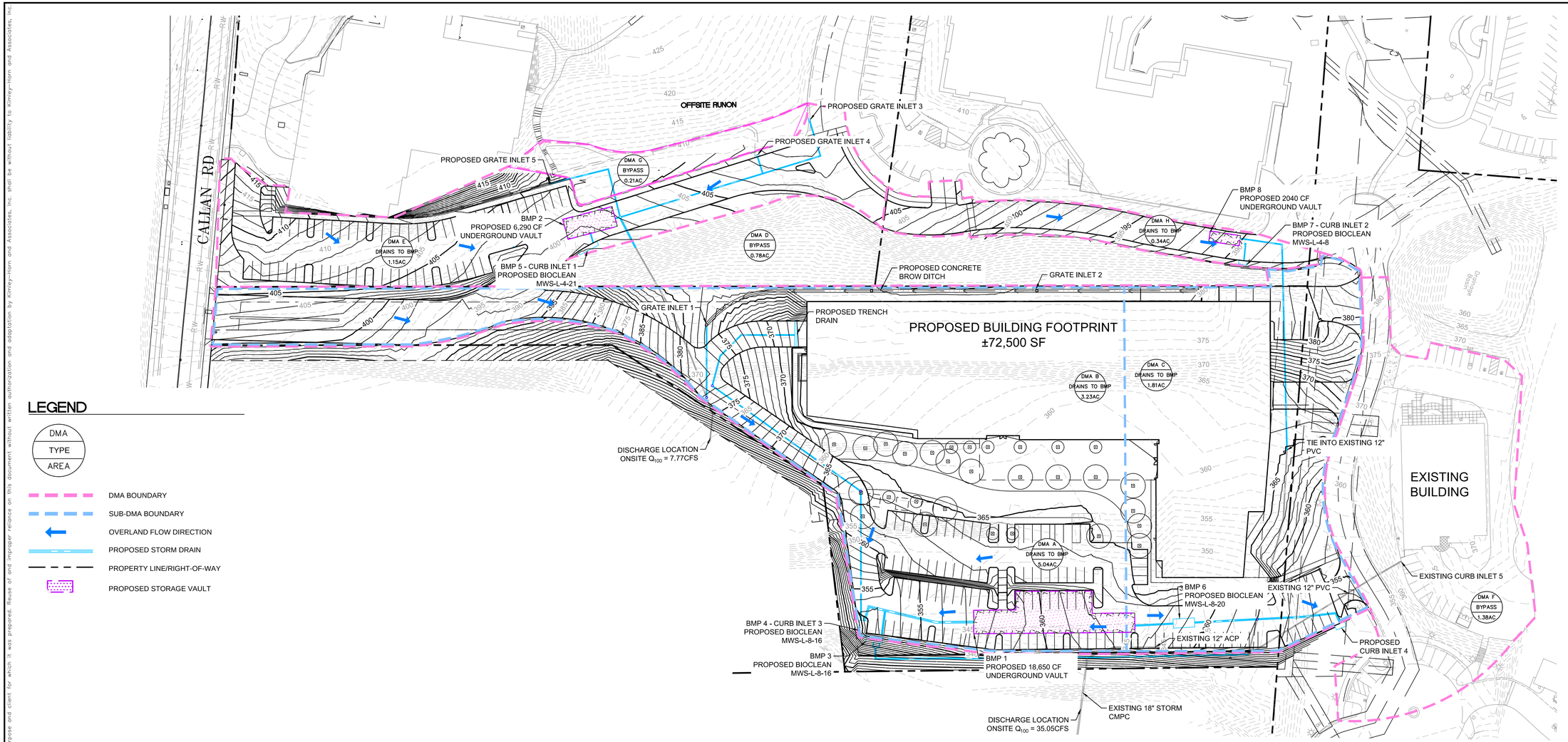
KHA PROJECT 195136002
DATE JANUARY 2020
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

3020 CALLAN ROAD

EXISTING HYDROLOGY EXHIBIT

3020 CALLAN RD.
SAN DIEGO, CA 92121

SHEET NUMBER
1 OF 1



LEGEND

DMA / TYPE / AREA

- DMA BOUNDARY
- SUB-DMA BOUNDARY
- OVERLAND FLOW DIRECTION
- PROPOSED STORM DRAIN
- PROPERTY LINE/RIGHT-OF-WAY
- PROPOSED STORAGE VAULT

DMA TABULAR SUMMARY

DMA ID	DMA SUB-ID	TYPE	AREA	CURB INLET ID	GRATE INLET ID
A	B	DRAINS TO BMP	3.23AC	3	
	C	DRAINS TO BMP	1.81 AC	4	
D	-	BYPASS	0.78AC		1, 2
E	-	DRAINS TO BMP	1.15 AC	1	
F	-	BYPASS	1.38 AC	5	
G	-	BYPASS	0.21 AC		3, 4, 5
H	-	DRAINS TO BMP	0.34 AC	2	

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

NO.	REVISIONS	DATE	BY

Kimley»Horn
401 B STREET, SUITE 600, SAN DIEGO, CA 92101
PHONE: 619-234-9411
WWW.KIMLEY-HORN.COM

KHA PROJECT 195136002
DATE JANUARY 2020
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

3020 CALLAN ROAD

PROPOSED HYDROLOGY EXHIBIT

3020 CALLAN RD.
SAN DIEGO, CA 92121

SHEET NUMBER
1 OF 1

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APPENDIX B

HYDROMODIFICATION EXCERPTS

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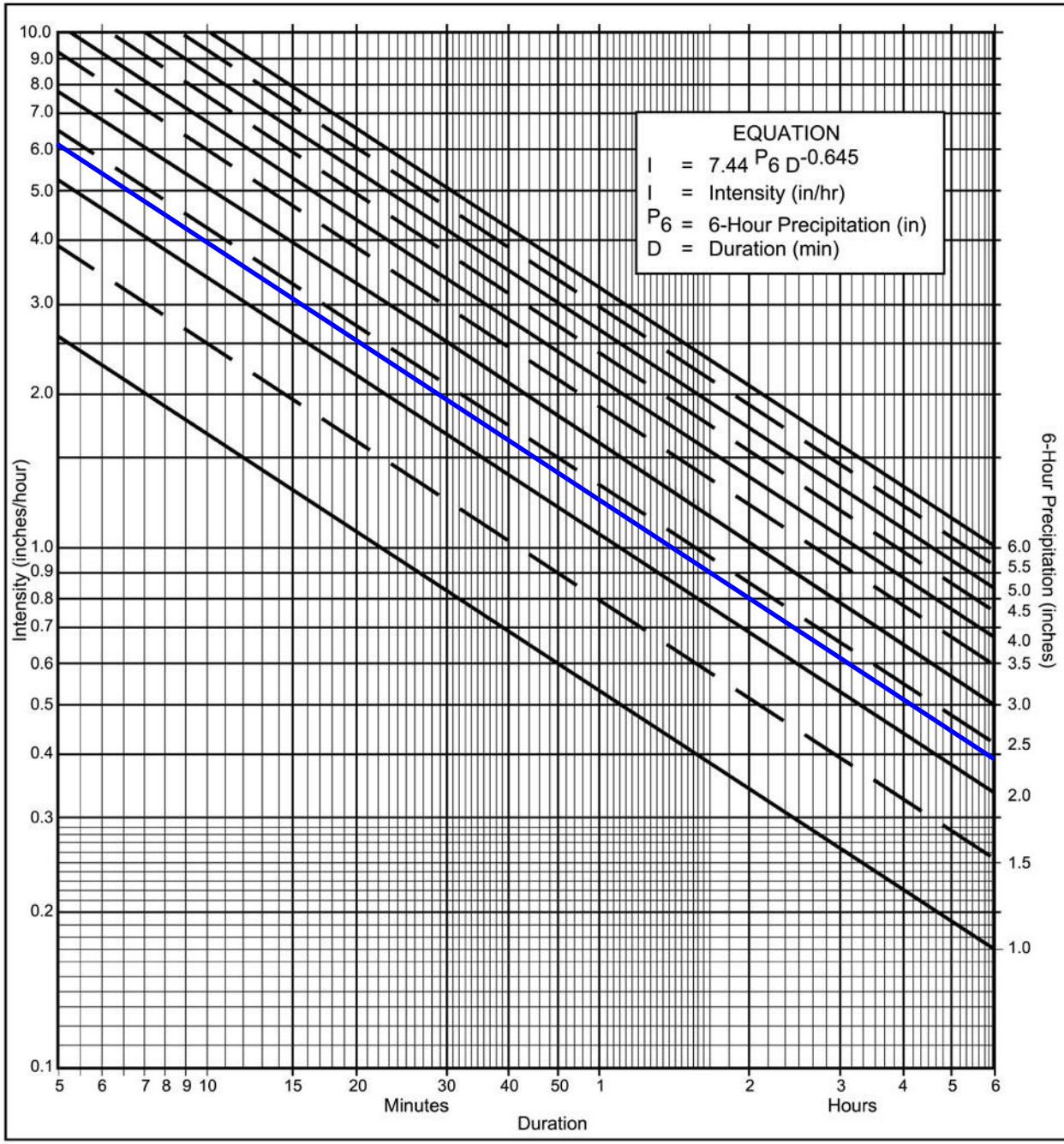
biofiltered, project-specific continuous simulation modeling is recommended. Refer to Sections 5.6 and 6.3.6.

Table G.2-6: Sizing Factors for Hydromodification Flow Control Cistern BMPs Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	Rain Gauge	V
$0.1Q_2$	A	Flat	Lindbergh	0.54
$0.1Q_2$	A	Moderate	Lindbergh	0.51
$0.1Q_2$	A	Steep	Lindbergh	0.49
$0.1Q_2$	B	Flat	Lindbergh	0.19
$0.1Q_2$	B	Moderate	Lindbergh	0.18
$0.1Q_2$	B	Steep	Lindbergh	0.18
$0.1Q_2$	C	Flat	Lindbergh	0.11
$0.1Q_2$	C	Moderate	Lindbergh	0.11
$0.1Q_2$	C	Steep	Lindbergh	0.11
$0.1Q_2$	D	Flat	Lindbergh	0.09
$0.1Q_2$	D	Moderate	Lindbergh	0.09
$0.1Q_2$	D	Steep	Lindbergh	0.09
$0.1Q_2$	A	Flat	Oceanside	0.26
$0.1Q_2$	A	Moderate	Oceanside	0.25
$0.1Q_2$	A	Steep	Oceanside	0.25
$0.1Q_2$	B	Flat	Oceanside	0.16
$0.1Q_2$	B	Moderate	Oceanside	0.16
$0.1Q_2$	B	Steep	Oceanside	0.16
$0.1Q_2$	C	Flat	Oceanside	0.14
$0.1Q_2$	C	Moderate	Oceanside	0.14
$0.1Q_2$	C	Steep	Oceanside	0.14
$0.1Q_2$	D	Flat	Oceanside	0.12
$0.1Q_2$	D	Moderate	Oceanside	0.12
$0.1Q_2$	D	Steep	Oceanside	0.12
$0.1Q_2$	A	Flat	L Wohlford	0.53
$0.1Q_2$	A	Moderate	L Wohlford	0.49
$0.1Q_2$	A	Steep	L Wohlford	0.49
$0.1Q_2$	B	Flat	L Wohlford	0.28
$0.1Q_2$	B	Moderate	L Wohlford	0.28
$0.1Q_2$	B	Steep	L Wohlford	0.28

Rain Gauge	Soil	Slope	Q_2 (cfs/acre)	Q_{10} (cfs/ac)
Oceanside	B	Low	0.377	0.875
Oceanside	B	Moderate	0.391	0.879
Oceanside	B	Steep	0.395	0.881
Oceanside	C	Low	0.488	0.981
Oceanside	C	Moderate	0.497	0.985
Oceanside	C	Steep	0.499	0.986
Oceanside	D	Low	0.571	0.998
Oceanside	D	Moderate	0.575	0.999
Oceanside	D	Steep	0.576	0.999
Lindbergh	A	Low	0.057	0.384
Lindbergh	A	Moderate	0.073	0.399
Lindbergh	A	Steep	0.082	0.403
Lindbergh	B	Low	0.199	0.496
Lindbergh	B	Moderate	0.220	0.509
Lindbergh	B	Steep	0.230	0.513
Lindbergh	C	Low	0.335	0.601
Lindbergh	C	Moderate	0.349	0.610
Lindbergh	C	Steep	0.354	0.613
Lindbergh	D	Low	0.429	0.751
Lindbergh	D	Moderate	0.437	0.753
Lindbergh	D	Steep	0.439	0.753



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.3 in., P_{24} = 3.8, $\frac{P_6}{P_{24}}$ = 60.5 %(2)

(c) Adjusted P_6(2) = 2.3 in.

(d) t_x = 5 min.

(e) I = 6.1 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

PROJECT LOCATION

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH
SD

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
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N W E S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

PROJECT LOCATION

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH
SD

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

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N W E S

3 0 3 Miles