Appendix L
HYDROLOGY STUDY

HYDROLOGY STUDY

Henry Mayo Hospital
23861 McBean parkway
Santa Clarita, CA

Prepared for

Henry Mayo Newhall Memorial Hospital
28345 McBean Parkway
Valencia, CA 91355
&
G & L Realty
439 North Bedford Drive
Beverly Hills, CA

PREPARED BY
DCA CIVIL ENGINEERING GROUP
17625 Crenshaw blvd., Ste. 300
Torrance, CA 90504

05/13/2008

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1 PURPOSE AND SCOPE

The purpose of this study is to identify, on a preliminary basis, the pre- and post-development hydrologic conditions of the site. This study will be used as an aid for the site development with the existing condition and to assist in creating conditions to be considered during the final design and construction of the site. A separate, more detailed, hydrology study will be completed and submitted to be reviewed as part of the final engineering and development of the site improvement plans.

2. SITE DESCRIPTION AND EXISITING CONDITION

Currently, the 30-acre site is built with medical buildings, asphalt pavement and landscape areas. The site is located on McBean parkway between Avenida Navarre and Rockwell Canyon Road in the City of Santa Clarita, California. The project will consist of several medical office buildings and parking structures with paved parking areas, driveways, concrete curbs and sidewalks. The property is surrounded by developed land with significantly sloped landscape area northwesterly and southerly; the northwest and south with single-family residential, the properties to north consists of commercial and industrial buildings.

The post-development storm water runoff will surface flow via concrete v-gutters, curb & gutter and asphalt pavement toward several on-site catch basins. Slopes of the pavement and concrete will vary from 0.5% to 5%. Each catch basin will discharge storm water flows to McBean parkway as sheet flow and into LADPW storm drain pipe per recorded plans P.D.# 1190, which is located in northwest of the property with 18 ft. wide storm drain easement.

An offsite tributary drainage area and drainage pathway across the property has been identified with the attached hydrology exhibit. This additional flow will be incorporated into the on-site hydrologic analysis and will be directed through the site, following along its historical drainage path, into the on-site loop road.

3 METHODOLOGY

In order to determine the appropriate design to be utilized to study the adequacy of the existing drainage facilities, the project area was determined as a tributary area for the existing and proposed site flow rates. Nine sub-areas were determined for the proposed development condition to indicate rainfall runoff. We have included an Exhibit showing the existing site topography and the proposed site tributary areas.

The methodology described in the Los Angeles County Department of Public Works Hydrology Manual was used to compute storm water flow rates from the project site to the existing storm drain system. Analysis of the site hydrology was performed for the 25-year storm frequencies.

The hydrologic method used in this study was based on procedures described in the Los Angles County Department of Public Works Hydrology Manual. The LADPW Tc Calculator was used to generate the 25-year peak discharge and time of concentration. Appendix 1 provides the computer program output results.

4 RESULTS

The hydrology calculations demonstrates that the proposed development will be able to be protected from flooding through the use of on-site storm drain and the runoff dose not significantly affect the adjacent property and drainage system. The flowing table shows summarized results (see appendix 1).

SITE HYDROLOGY

Pre-Development Condition		
Area Designation	Area(AC)	Q_{25}(CFS)
1	1.20	2.82
2	3.65	5.94
3	2.28	5.35
4	0.45	1.21
5	2.98	6.36
6	1.05	2.82
7	0.53	1.42
8	0.69	1.69
9	0.28	0.75
10	0.14	0.38
11	0.22	0.59
12	0.19	0.51
13	1.08	1.98
14	0.75	2.02
15	1.89	3.80
16	1.23	2.48
17	0.32	0.86
18	0.54	1.45
19	0.85	2.29
20	0.35	0.94
21	2.52	4.83
22	0.88	2.0
23	0.37	0.90
24	0.87	1.52
25	2.42	4.64
26	1.56	3.33
27	0.15	0.4
28	0.37	0.99
29	0.59	1.59
Total	30.4	**65.86**

Post-Development Condition		
Area Designation	Area(AC)	Q_{25}(CFS)
1	2.78	7.46
2	3.65	5.94
3	2.28	5.35
4	0.66	1.77
5	0.59	1.44
6	1.88	3.61
7	0.52	1.4
8	0.69	1.69
9	0.20	0.54
10	0.24	0.65
11	0.20	0.54
12	0.19	0.51
13	1.09	2.0
14	0.77	2.07
15	1.87	3.76
16	1.23	2.48
17	0.32	0.86
18	0.54	1.45
19	0.63	1.69
20	1.13	1.97
21	2.06	3.95
22	1.43	3.49
23	0.37	0.90
24	0.51	0.89
25	2.52	4.83
26	1.62	3.46
27	0.13	0.35
28	0.30	0.81
Total	30.4	**65.86**

* See Attached Tc Calculator Results Appendix 1

5 SUMMARY

In comparison, the post-development tributary areas generate approximately 64.30cfs, which is slightly less than 65.82cfs of the pre-developed condition flow rates, computed by Tc Calculator. That amount of generated runoff will not affect the existing on-site and street drainage systems and can carry the rainfall runoff from the proposed development. In addition, the proposed on-site drainage system will be designed to convey the on-site runoff based on the precise site design stage.

6 LIMITATIONS

This report was based on the Los Angeles county Department of Public Works and their representative. Evaluation of the appropriateness of guidelines and the accuracy of County data was beyond the scope of this study.

Usage of this report is limited to address the purpose and scope previously defined by the project owner. The contents of this report are professional opinion and as such, are not to be considered a guaranty or warranty.

The opinions presented in this report have been derived in accordance with current standards of civil engineering practice. This report may not contain sufficient information for other parties or other purposes.

Respectfully submitted,

DCA Civil Engineering Group

Charles S. Cummins
Principal Engineer
R.C.E. No. 34526

Appendix 1
Hydrologic Information and Runoff Results

Henry Mayo Newhall Memorial Hospital

TC DATA (PRE-DEVELOPED CONDITION)

Project	Subarea	Area	%imp	Frequency	Soil Type	Length	Slope	Isohyet	Fire Factor
Henry Mayo	1	1.20	0.2	25	97	387	0.242	5.18	0
Henry Mayo	2	3.65	0.2	25	97	1084	0.093	5.18	0
Henry Mayo	3	2.28	0.2	25	97	536	0.182	5.18	0
Henry Mayo	4	0.45	0.8	25	97	169	0.011	5.18	0
Henry Mayo	5	2.98	0.8	25	97	501	0.011	5.18	0
Henry Mayo	6	1.05	0.8	25	97	286	0.020	5.18	0
Henry Mayo	7	0.53	0.8	25	97	316	0.021	5.18	0
Henry Mayo	8	0.69	0.8	25	97	420	0.020	5.18	0
Henry Mayo	9	0.28	0.8	25	97	110	0.009	5.18	0
Henry Mayo	10	0.14	0.8	25	97	91	0.008	5.18	0
Henry Mayo	11	0.22	0.8	25	97	146	0.034	5.18	0
Henry Mayo	12	0.19	0.8	25	97	201	0.016	5.18	0
Henry Mayo	13	1.08	0.8	25	97	766	0.007	5.18	0
Henry Mayo	14	0.75	0.8	25	97	255	0.032	5.18	0
Henry Mayo	15	1.89	0.8	25	97	609	0.011	5.18	0
Henry Mayo	16	1.23	0.8	25	97	430	0.003	5.18	0
Henry Mayo	17	0.32	0.8	25	97	77	0.078	5.18	0
Henry Mayo	18	0.54	0.8	25	97	198	0.018	5.18	0
Henry Mayo	19	0.85	0.8	25	97	229	0.014	5.18	0
Henry Mayo	20	0.35	0.8	25	97	127	0.010	5.18	0
Henry Mayo	21	2.52	0.8	25	97	777	0.012	5.18	0
Henry Mayo	22	0.88	0.8	25	97	437	0.009	5.18	0
Henry Mayo	23	0.37	0.8	25	97	211	0.003	5.18	0
Henry Mayo	24	0.87	0.8	25	97	1079	0.013	5.18	0
Henry Mayo	25	2.42	0.8	25	97	648	0.008	5.18	0
Henry Mayo	26	1.56	0.8	25	97	438	0.008	5.18	0
Henry Mayo	27	0.15	0.8	25	97	214	0.027	5.18	0
Henry Mayo	28	0.37	0.8	25	97	257	0.014	5.18	0
Henry Mayo	29	0.59	0.8	25	97	166	0.044	5.18	0
	Total:	30.40							

TC RESULTS (PRE-DEVELOPED CONDITION)

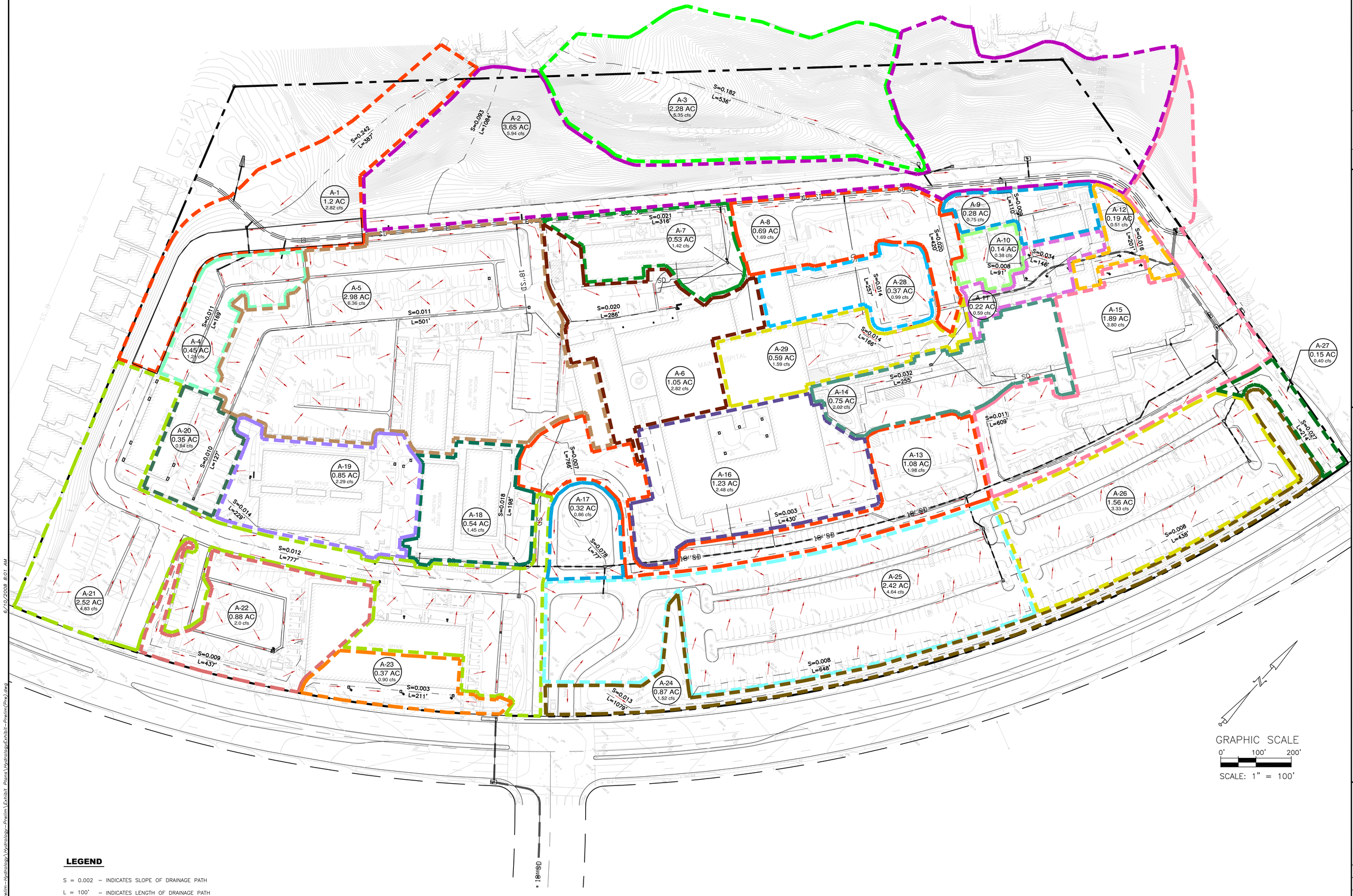
Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
Henry Mayo	1	1.20	0.2	25	97	387	0.242	5.18	5	3.09	0.73	0.76	2.82
Henry Mayo	2	3.65	0.2	25	97	1084	0.093	5.18	10	2.23	0.69	0.73	5.94
Henry Mayo	3	2.28	0.2	25	97	536	0.182	5.18	5	3.09	0.73	0.76	5.35
Henry Mayo	4	0.45	0.8	25	97	169	0.011	5.18	5	3.09	0.73	0.87	1.21
Henry Mayo	5	2.98	0.8	25	97	501	0.011	5.18	8	2.48	0.70	0.86	6.36
Henry Mayo	6	1.05	0.8	25	97	286	0.020	5.18	5	3.09	0.73	0.87	2.82
Henry Mayo	7	0.53	0.8	25	97	316	0.021	5.18	5	3.09	0.73	0.87	1.42
Henry Mayo	8	0.69	0.8	25	97	420	0.020	5.18	6	2.84	0.72	0.86	1.69
Henry Mayo	9	0.28	0.8	25	97	110	0.009	5.18	5	3.09	0.73	0.87	0.75
Henry Mayo	10	0.14	0.8	25	97	91	0.008	5.18	5	3.09	0.73	0.87	0.38
Henry Mayo	11	0.22	0.8	25	97	146	0.034	5.18	5	3.09	0.73	0.87	0.59
Henry Mayo	12	0.19	0.8	25	97	201	0.016	5.18	5	3.09	0.73	0.87	0.51
Henry Mayo	13	1.08	0.8	25	97	766	0.007	5.18	11	2.13	0.68	0.86	1.98
Henry Mayo	14	0.75	0.8	25	97	255	0.032	5.18	5	3.09	0.73	0.87	2.02
Henry Mayo	15	1.89	0.8	25	97	609	0.011	5.18	9	2.34	0.69	0.86	3.80
Henry Mayo	16	1.23	0.8	25	97	430	0.003	5.18	9	2.34	0.69	0.86	2.48
Henry Mayo	17	0.32	0.8	25	97	77	0.078	5.18	5	3.09	0.73	0.87	0.86
Henry Mayo	18	0.54	0.8	25	97	198	0.018	5.18	5	3.09	0.73	0.87	1.45
Henry Mayo	19	0.85	0.8	25	97	229	0.014	5.18	5	3.09	0.73	0.87	2.29
Henry Mayo	20	0.35	0.8	25	97	127	0.010	5.18	5	3.09	0.73	0.87	0.94
Henry Mayo	21	2.52	0.8	25	97	777	0.012	5.18	10	2.23	0.69	0.86	4.83
Henry Mayo	22	0.88	0.8	25	97	437	0.009	5.18	7	2.64	0.71	0.86	2.00
Henry Mayo	23	0.37	0.8	25	97	211	0.003	5.18	6	2.84	0.72	0.86	0.90
Henry Mayo	24	0.87	0.8	25	97	1079	0.013	5.18	12	2.05	0.67	0.85	1.52
Henry Mayo	25	2.42	0.8	25	97	648	0.008	5.18	10	2.23	0.69	0.86	4.64
Henry Mayo	26	1.56	0.8	25	97	438	0.008	5.18	8	2.48	0.70	0.86	3.33
Henry Mayo	27	0.15	0.8	25	97	214	0.027	5.18	5	3.09	0.73	0.87	0.40
Henry Mayo	28	0.37	0.8	25	97	257	0.014	5.18	5	3.09	0.73	0.87	0.99
Henry Mayo	29	0.59	0.8	25	97	166	0.044	5.18	5	3.09	0.73	0.87	1.59
	Total:	30.40										Total:	**65.86**

TC DATA (POST-DEVELOPED CONDITION)

Project	Subarea	Area	%imp	Frequency	Soil Type	Length	Slope	Isohyet	Fire Factor
Henry Mayo	1	2.78	0.5	25	97	387	0.242	5.18	0
Henry Mayo	2	3.65	0.2	25	97	1084	0.093	5.18	0
Henry Mayo	3	2.28	0.2	25	97	536	0.182	5.18	0
Henry Mayo	4	0.66	0.8	25	97	228	0.044	5.18	0
Henry Mayo	5	0.59	0.8	25	97	372	0.025	5.18	0
Henry Mayo	6	1.88	0.8	25	97	515	0.004	5.18	0
Henry Mayo	7	0.52	0.8	25	97	316	0.021	5.18	0
Henry Mayo	8	0.69	0.8	25	97	420	0.020	5.18	0
Henry Mayo	9	0.20	0.8	25	97	110	0.011	5.18	0
Henry Mayo	10	0.24	0.8	25	97	183	0.004	5.18	0
Henry Mayo	11	0.20	0.8	25	97	146	0.034	5.18	0
Henry Mayo	12	0.19	0.8	25	97	201	0.016	5.18	0
Henry Mayo	13	1.09	0.8	25	97	766	0.007	5.18	0
Henry Mayo	14	0.77	0.8	25	97	226	0.011	5.18	0
Henry Mayo	15	1.87	0.8	25	97	609	0.011	5.18	0
Henry Mayo	16	1.23	0.8	25	97	430	0.003	5.18	0
Henry Mayo	17	0.32	0.8	25	97	77	0.078	5.18	0
Henry Mayo	18	0.54	0.8	25	97	198	0.018	5.18	0
Henry Mayo	19	0.63	0.8	25	97	276	0.016	5.18	0
Henry Mayo	20	1.13	0.8	25	97	377	0.002	5.18	0
Henry Mayo	21	2.06	0.8	25	97	777	0.012	5.18	0
Henry Mayo	22	1.43	0.8	25	97	353	0.014	5.18	0
Henry Mayo	23	0.37	0.8	25	97	211	0.003	5.18	0
Henry Mayo	24	0.51	0.8	25	97	1079	0.013	5.18	0
Henry Mayo	25	2.52	0.8	25	97	672	0.008	5.18	0
Henry Mayo	26	1.62	0.8	25	97	561	0.008	5.18	0
Henry Mayo	27	0.13	0.8	25	97	179	0.026	5.18	0
Henry Mayo	28	0.30	0.8	25	97	155	0.014	5.18	0
	Total:	30.40							

TC RESULTS (POST-DEVELOPED CONDITION)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
Henry Mayo	1	2.78	0.7	25	97	387	0.242	5.18	5	3.09	0.73	0.85	7.46
Henry Mayo	2	3.65	0.2	25	97	1084	0.093	5.18	10	2.23	0.69	0.73	5.94
Henry Mayo	3	2.28	0.2	25	97	536	0.182	5.18	5	3.09	0.73	0.76	5.35
Henry Mayo	4	0.66	0.8	25	97	228	0.044	5.18	5	3.09	0.73	0.87	1.77
Henry Mayo	5	0.59	0.8	25	97	372	0.025	5.18	6	2.84	0.72	0.86	1.44
Henry Mayo	6	1.88	0.8	25	97	515	0.004	5.18	10	2.23	0.69	0.86	3.61
Henry Mayo	7	0.52	0.8	25	97	316	0.021	5.18	5	3.09	0.73	0.87	1.4
Henry Mayo	8	0.69	0.8	25	97	420	0.020	5.18	6	2.84	0.72	0.86	1.69
Henry Mayo	9	0.2	0.8	25	97	110	0.011	5.18	5	3.09	0.73	0.87	0.54
Henry Mayo	10	0.24	0.8	25	97	183	0.004	5.18	5	3.09	0.73	0.87	0.65
Henry Mayo	11	0.2	0.8	25	97	146	0.034	5.18	5	3.09	0.73	0.87	0.54
Henry Mayo	12	0.19	0.8	25	97	226	0.016	5.18	5	3.09	0.73	0.87	0.51
Henry Mayo	13	1.09	0.8	25	97	766	0.007	5.18	11	2.13	0.68	0.86	2
Henry Mayo	14	0.77	0.8	25	97	210	0.011	5.18	5	3.09	0.73	0.87	2.07
Henry Mayo	15	1.87	0.8	25	97	609	0.011	5.18	9	2.34	0.69	0.86	3.76
Henry Mayo	16	1.23	0.8	25	97	430	0.003	5.18	9	2.34	0.69	0.86	2.48
Henry Mayo	17	0.32	0.8	25	97	77	0.078	5.18	5	3.09	0.73	0.87	0.86
Henry Mayo	18	0.54	0.8	25	97	198	0.018	5.18	5	3.09	0.73	0.87	1.45
Henry Mayo	19	0.63	0.8	25	97	276	0.016	5.18	5	3.09	0.73	0.87	1.69
Henry Mayo	20	1.13	0.8	25	97	372	0.002	5.18	12	2.05	0.67	0.85	1.97
Henry Mayo	21	2.06	0.8	25	97	777	0.012	5.18	10	2.23	0.69	0.86	3.95
Henry Mayo	22	1.43	0.8	25	97	353	0.014	5.18	6	2.84	0.72	0.86	3.49
Henry Mayo	23	0.37	0.8	25	97	211	0.003	5.18	6	2.84	0.72	0.86	0.9
Henry Mayo	24	0.51	0.8	25	97	1079	0.013	5.18	12	2.05	0.67	0.85	0.89
Henry Mayo	25	2.52	0.8	25	97	672	0.008	5.18	10	2.23	0.69	0.86	4.83
Henry Mayo	26	1.62	0.8	25	97	561	0.008	5.18	8	2.48	0.7	0.86	3.46
Henry Mayo	27	0.13	0.8	25	97	179	0.026	5.18	5	3.09	0.73	0.87	0.35
Henry Mayo	28	0.3	0.8	25	97	155	0.014	5.18	5	3.09	0.73	0.87	0.81
	Total:	30.40										Total:	**65.86**



LEGEND

S = 0.002 – INDICATES SLOPE OF DRAINAGE PATH

L = 100' – INDICATES LENGTH OF DRAINAGE PATH

→ – INDICATES DIRECTION OF FLOW

– · – · – INDICATES LONGEST SUBAREA FLOWLINE

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NO.	DATE	REVISION

DCA CIVIL ENGINEERING GROUP
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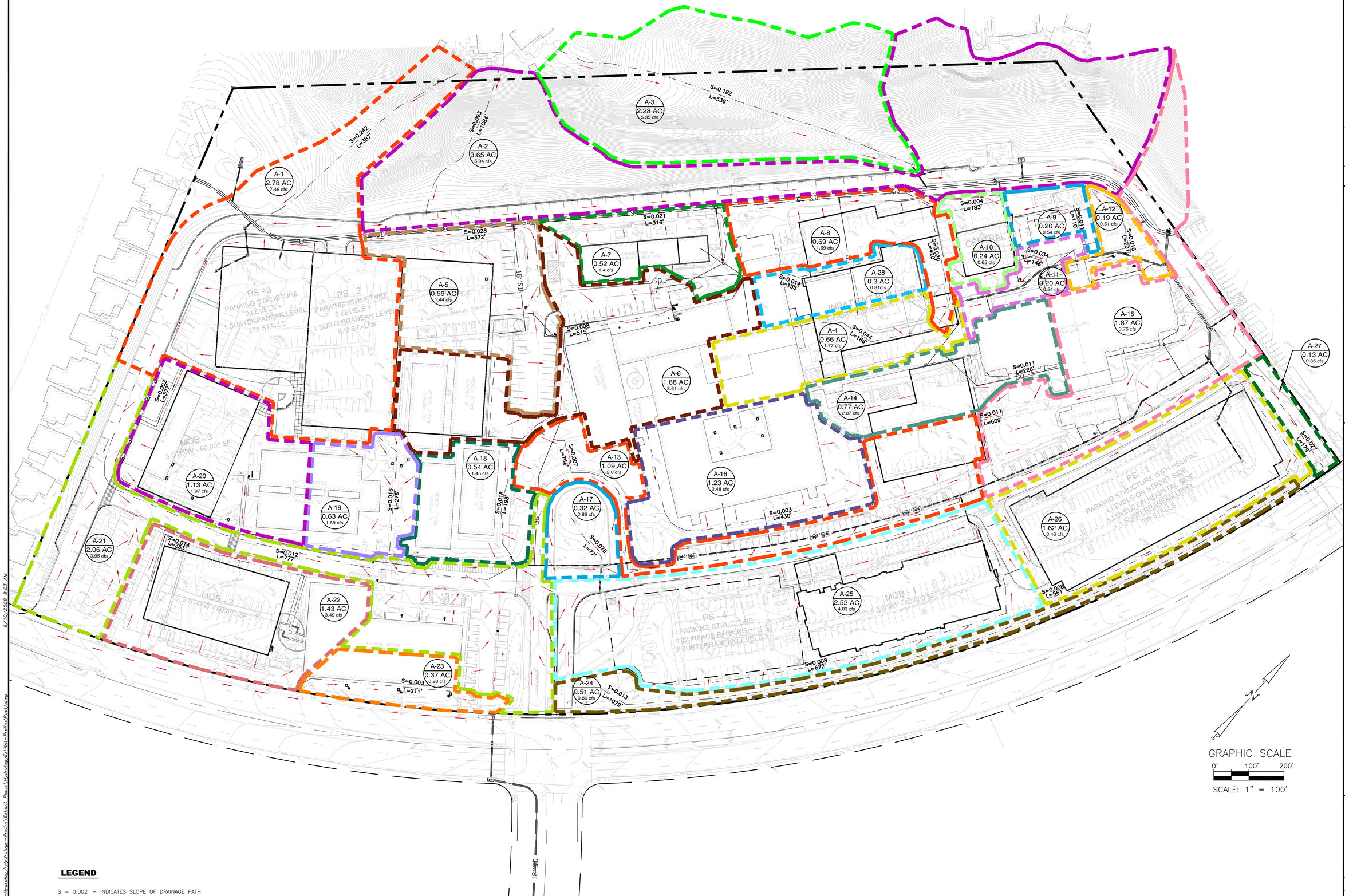
23845 McBEAN PARKWAY
VALENCIA, CALIFORNIA 91355
PRELIMINARY HYDROLOGY PLAN
PRE-DEVELOPED CONDITION

PROFESSIONAL STAMP

REGISTERED PROFESSIONAL ENGINEER
CHARLES S. CUMMINGS
NO. 34526
EXP. 9/30/09
CIVIL
STATE OF CALIFORNIA

DATE: 05/13/2008
SCALE: AS SHOWN
DESIGNED: HCK DRAWN: HCK
SHEET NO.
C-1
SHEET 1 OF 1
PROJECT NO. 08-1373-1864.000-1012



LEGEND

S = 0.002 – INDICATES SLOPE OF DRAINAGE PATH

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GRAPHIC SCALE

0' 100' 200'

SCALE: 1" = 100'

NO.	DATE	REVISION

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HENRY MAYO NEWHALL MEMORIAL HOSPITAL
23845 McBEAN PARKWAY
VALENCIA, CALIFORNIA 91355
PRELIMINARY HYDROLOGY PLAN
POST-DEVELOPED CONDITION

PROFESSIONAL STAMP

REGISTERED PROFESSIONAL ENGINEER
CHARLES S. CUMMINGS
NO. 34536
EXP. 9/30/09
CIVIL
STATE OF CALIFORNIA

DATE: 05/13/2008
SCALE: AS SHOWN
DESIGNED: HCK DRAWN: HCK
SHEET NO.

C-1

SHEET 1 OF 1

PROJECT NO. 08-1373-1864.000-1012

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