TECHNICAL ADDENDUM

FOR THE

MASTER DEVELOPMENT DRAINAGE STUDY FOR SKYWAY HEIGHTS COLORADO SPRINGS, COLORADO

April 1992

Prepared for:

SCHUCK INTERESTS

Prepared by:

KLH Engineering, Inc.
208 Sutton Lane
Colorado Springs, CO 80907
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April 27, 1992

Mr. Dave Lethbridge
City of Colorado Springs
Engineering Division
30 South Nevada Avenue
Colorado Springs, CO 80903

Re: Technical Addendum for the Master Development Drainage Study for Skyway Heights
(KLH Project No. 91-559-00)

Dear Dave:

In accordance with the subdivision regulations for the City of Colorado Springs, a Master Development Drainage Study has been completed for the above referenced project. This is a technical addendum to be used as a reference for the above study. One copy of this addendum is on file with the City Engineering Division.

Enclosed are hydrologic calculations and summary sheets.

Please contact us if you have any questions or desire further information.

Sincerely,
KLH Engineering, Inc.

Brian J. Huth, P.E.

Enclosure
skyway\mstrdrpt.doc

SKYWAY HEIGHTS
JOB NO. 91-559-00

TABLE 1
BASIN HYDROLOGY - HISTORIC & DEVELOPED
- MASTER SUMMARY -

	LOCATION	TRIBUTARY AREA (ACRES)	***** PEAK FLOW ***** **** HISTORIC **** 10 YEAR (CFS)	100 YEAR (CFS)	*** DEVELOPED *** 10 YEAR (CFS)	100 YEAR (CFS)
OFF-SITE FLOWS:	OS-1	25.56			25	48
	OS-2	2.4			2.7	5.5
	OS-3	1.43			1.8	3.5
	OS-4	7.69			7.6	15.4
	OS-5	8.98			9	18
	OS-6	n/a				
	OS-7	4.04			4.6	9.2
	OS-8	0.24			0.3	0.7
	OS-9	209 (19.65)			20	112 (39)
	OS-10	4.61			5.3	10.5
	OS-11	0.7			1	2.1
	OS-12	3.16			3.9	7.8
	OS-13	21.33			21	42
PRIMARY DRAINAGEWAYS: On-site Flows only	1	6.26	8.1	16.8	9.7	19.3
	2	13.37	17	36	23	45
	3	2.61	3.7	7.4	4.5	8.5
	4/5	15.71	20	42	29	56
	6	8.9	10	20	16	28
	7	3.27	4.7	9.5	6.3	11.9
	8	1.88	2.9	5.8	2.9	5.8
PRIMARY DRAINAGEWAYS: With On-site and Off-site Flows	1	34.22	31	62	27 [32]	43 [64]
	2	31.31	29	57	19 [33]	33 [63]
	4	8.35	11	22	17	30
	5	220 (30.59)	28	96 (56)	27 [30]	99 [119 (59)]
	4/5	228 (39.44)	37	99 (73)	35 [43]	108 [129 (82)]
	6	9.14	11	21	17	29
	7	7.88	8	16	9.1	18
	8	27.07	26	52	26	52
	6/7/8	45.64	44	86	50	94

By: bjh 04-Mar-92 Skyway\flowsmry.wq1

NOTE: 1) For the other minor on-site basins, (the inlet and miscellaneous basins), see the appropriate tables.
2) The figures in ( ) do not include flows from Gold Camp Road.
3) The figures in [ ] are undetained flows.

SKYWAY HEIGHTS
JOB NO. 91-559-00

TABLE 2
POND HYDRAULIC SUMMARY
Existing Ponds - (10 year / 100 year Data)

Pond	1	2	3	4	5	6	8	9	10
Depth, Max (ft)	9.5'	5'	11.5'	10'	6'	7'	8'	9'	5.5'

ORIGINAL DESIGN VOLUMES:

Volume (cf)	39300	3025	24700	20550	2750	3975	21500	28550	4175
Flow In (cfs)	31/60	20/37	24/47	21/37	4/6	3/5	30/121	26/113	7/14
Flow Out (cfs)	19/36	20/37	15/26	21/34	3/5	2/5	25/112	23/100	7/15
Depth, Actual (ft)	5.4'/7.6'	3.6'/4.5'	4.1'/6.0'	4.5'/6.5'	2.7'/3.2'	2.6'/3.1'	1.9'/7.8'	2.2'/8.1'	2.1'/3.4'

EXISTING VOLUMES:

Volume (cf)	18557	1555	9906	20159	3940	6288	5258	1891	3570
Flow In (cfs)	31/60	27/47	21/37	29/49	4/6	4/6	30/121	31/121	7/14
Flow Out (cfs)	26/45	28/47	21/34	26/41	4/6	1/3	31/121	33/121	7/15
Depth, Actual (ft)	6.3'/9.6'	4.0'/5.0'	5.0'/8.2'	5.2'/8.1'	2.9'/3.5'	2.3'/2.7'	3.3'/8.9'	3.8'/10.2'	2.1'/3.4'

PROPOSED VOLUMES:

Volume (cf)	39065	1555	36342	20159	3940	6288	23898	22327	3570
Flow In (cfs)	31/60	27/42	24/47	21/35	4/3	3/5	30/121	27/109	7/14
Flow Out (cfs)	26/40	22/38	27/42	19/32	6/5	3/4	26/109	26/98	7/15
Depth, Actual (ft)	5.6'/7.6'	3.7'/4.6'	3.8'/5.4'	4.3'/6.1'	2.9'/3.2'	2.7'/3.1'	2.0'/7.6'	2.4'/7.9'	2.1'/3.4'

DETENTION SUMMARY:

Basin	1	2	4/5	7
W/O Detention	32/64	33/63	43/129 (82)	9/18
W/ Detention	27/43	19/33	35/108 (61)	9/18
Detained amounts	5/21	14/30	8/21 (21)	0/0

By: bjh 10-Apr-92 Skyway\Pondsmry.wq1

Note: The flows in ( ) do not include the overflow from Gold Camp Road.

SKYWAY HEIGHTS
JOB NO.91-559-00

TABLE 3
INLET HYDRAULICS

INLET #	SIZE (ft)	STREET SLOPE (%)		DESIGN FLOW (cfs)	FLOW SPREAD (ft)	DEPTH AT PAN (ft)	% of flow PICKUP (%)	INLET FLOW PICKUP (cfs)	INLET FLOW BYPASS (cfs)	ALLOWABLE STREET CAPACITY (1/2) ST. SECTION
5	6.0'	8.3%	10 YR.	1.7	5.90	0.12	0.28	0.5	1.2	20.6
			100 YR.	3	7.30	0.15	0.25	0.8	2.2	99
6	6.0'	8.3%	10 YR.	2.4	6.70	0.13	0.23	0.6	1.8	20.6
			100 YR.	4.1	8.20	0.16	0.22	0.9	3.2	99
8	6.0'	6.7%	10 YR.	0.9	4.90	0.10	0.38	0.3	0.6	18.8
			100 YR.	1.4	5.70	0.11	0.36	0.5	0.9	90
11	6.0'	4.0%	10 YR.	5.2	10.30	0.21	0.22	1.1	4.1	14.6
			100 YR.	9.2	12.80	0.26	0.22	2	7.2	70
12	8.0'	6.0%	10 YR.	0.9	5.00	0.10	0.50	0.45	0.45	17.8
			100 YR.	1.7	6.30	0.13	0.40	0.7	1	86
13	8.0'	6.0%	10 YR.	2.9	7.70	0.15	0.38	1.1	1.8	17.8
			100 YR.	5	9.40	0.19	0.30	1.5	3.5	86
14	10.0'	10.0%	10 YR.	4.5	8.20	0.16	0.34	1.5	3	23.6
			100 YR.	7.6	10.00	0.20	0.27	2.1	5.5	110
15	15.0'	10.0%	10 YR.	1.6	5.60	0.11	0.65	1	0.6	23.6
			100 YR.	2.8	6.90	0.14	0.56	1.6	1.2	110

Skyway\inlet.wq1

Inlets-on-grade (10 yr./100 yr.data)
Note: Inlets #1,2,3,4,7,9 &10 are sump inlets

PRIMARY DRAINAGEWAYS — WITHOUT DETENTION —

MAJOR BASIN	SUB BASIN	AREA: PLANIMETER READING	AREA: Ac.	BASIN: LENGTH	BASIN: HEIGHT	Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW: Qp	FLOW: Qp	RETURN PERIOD
									BEAR CREEK FLOW REDUCE		HISTORIC .39 .40	DEV	
MAJOR ON-SITE CHANNELS:													
	DP 1		34.22			25	3.05 / 4.55			.31 / .41	31 / 62	32 / 64	10 / 100
	DP 1.1		33.42			24.1	3.1 / 4.6			.31 / .41		32 / 63	
	DP 1.2		33.21			24.1	3.1 / 4.6			.31 / .41		32 / 63	
	DP 1.3		31.49			23.4	3.2 / 4.7			.31 / .41		31 / 61	
	DP 1.4		31.21			23.4	3.2 / 4.7		10-20 / 50-60	.31 / .41		31 / 60	
	DP 1.5		4.95			18	3.55 / 5.40			.32 / .42		5.6 / 11.2	
	DP 2		32.07			25	3.05 / 4.55			.34 / .49	29 / 57	33 / 63	
	DP 2.1		31.47			25	3.05 / 4.55			.34 / .44		32 / 62	
	DP 2.2		28.09			25	3.05 / 4.55			.32 / .42		27 / 54	
	DP 2.3		23.73			23.3	3.2 / 4.7		5-10 / 20-30	.32 / .42		24 / 47	
	DP 2.4		23.60			23.3	3.2 / 4.7			.32 / .42		24 / 47	
	DP 2.5		20.33			23.3	3.2 / 4.7			.31 / .41		20 / 39	
	DP 2.6		16.67			21.5	3.3 / 5.0			.30 / .40		17 / 33	

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

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KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 1-28-92

PRIMARY DRAINAGEWAYS
— WITHOUT DETENTION —

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT	Min.					Q	q_p	
MAJOR	ON-SITE CHANNELS: CONTD								BEAR CREEK FLOW		HISTORIC .30 .40	DEV.	
	DP 3		2.61	640		9.8	4.7 / 7.1	A	MISC	.37 / .46	3.7 / 7.4	4.5 / 8.5	10 / 100
	DP 4	DP 4.1 I 14	8.35			11.9	4.3 / 6.6			.47 / .55	11 / 22	17 / 30	
	DP 4.1	DP 4.2 I 21	6.57			11.9	4.3 / 6.6			.46 / .54		13 / 23	
	DP 4.2		5.55			11.9	4.3 / 6.6			.41 / .50		9.8 / 18	
	DP 4.3		2.39			9.4	4.7 / 7.2			.48 / .56		5.4 / 9.6	
	DP 4.4		1.61			8.9	4.8 / 7.3			.50 / .58		3.9 / 6.8	
	DP 5.0	DP 4.0 DP 5.1	39.44			24.2	3.1 / 4.6			.35 / .45	37 / 73	43 / 82	
	DP 5.1		30.59			24.2	3.1 / 4.6			.32 / .42	28 / 56	30 / 59	
	DP 5.2		29.81			23.7	22 / 4.7			.32 / .42		31 / 59	
	DP 5.3		28.85			22.7	3.2 / 4.8		10-20 / 40-50	.32 / .42		30 / 58	
	DP 5.4		6.37			18.7	3.5 / 5.3			.32 / .42		7.1 / 14.2	
	DP 5.5		21.07			22.7	3.2 / 4.8			.31 / .41		21 / 41	

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

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KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 1-28-92

PRIMARY DRAINAGEWAYS
— WITHOUT DETENTION —

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	q_p	
MAJOR ON-SITE CHANNELS:													
	DP6		9.14			16.5	3.8 / 5.7	A	MISC	.48 / .56		17 / 29	10 / 100
	DP6.1		7.42			15.5	3.8 / 5.8			.49 / .57		14 / 25	
	DP6.2		4.44			14.5	4.0 / 6.0			.51 / .59		9.1 / 15.7	
	DP7		7.88			19.2	3.4 / 5.2			.34 / .44	8 / 16	9.1 / 18	
	DP7.1		6.81			17.9	3.6 / 5.6			.34 / .44		8.3 / 16.7	
	DP7.2		5.87			17.9	3.6 / 5.6			.31 / .41		6.6 / 13.5	
	DP8		27.07			22.4	3.2 / 4.8			.30 / .40	26 / 52	26 / 52	
	DP8.1		4.97			14.2	4.0 / 6.0			.32 / .42		6.4 / 12.5	
	DP8.2		1.21			9.8	4.7 / 7.1			.34 / .44		1.9 / 3.8	
	DP678	DP 6 DP 7 DP 8	45.64			23	3.2 / 4.7		10-20 / 50-70	.34 / .44	44 / 86	50 / 94	

DP 1.0

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HYDROLOGY:

LOCATION: DEV. DP 1.0 (OUTFALL OF POND E2 @ E. PROP. LINE)

AREA = 33.42 Ac (DP1.1) + 0.8 Ac (DP1.0) = 34.22 Ac

SOIL OR LANDUSE: A_{SOIL}

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP1.1	.31	.41	98%
DP1.0 ROOF 0.06 Ac	.90	.95	- 0.2%
NATURAL 0.74	.30	.40	2%
COMPOSIT C=	.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 24.1 MIN (DP1.1)

NAT. CHANNEL FLOW: L=320' S=9.4 V_{ec}=6 t_c = 0.9 MIN

T_c = 24.1 + 0.9 = 25.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.05

I_{100} = 4.55

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 x 3.05 x 34.22
= 32 CFS

Q_{100} = .41 x 4.55 x 34.22
= 64 CFS

HISTORIC

.30 x 3.05 x 34.22
= 31 CFS

.40 x 4.55 x 34.22
= 62 CFS

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DP 1.1

HYDROLOGY:

LOCATION: DEV D.P. 1.1 (@OUTLET OF PIPE FROM POND E2)

AREA = 33.21 (DP1.2) + 1/4 x [0.82 (I6)] = 53.42 Ac

SOIL OR LANDUSE: ASOIL ↳ 125% OF PICKUP OF STREET FLOWS

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP1.2	.31	.41	99%
I6	.61	.69	1%
COMPOSIT C =	.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 24.1 MIN (DP1.2)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.1

I_{100} = 4.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 x 3.1 x 33.42

= 32 CFS

Q_{100} = .41 x 4.6 x 33.42

= 63 CFS

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(DP 1.2)

HYDROLOGY:

LOCATION: DEV DP 1.2 (INLET & CHANNEL FLOWS INTO POND E2)

AREA = 31.49 (DP1.3) + 1.54 Ac (DP1.2) + ¼ x [0.72 (I5)] = 33.21

SOIL OR LANDUSE: ↑ ±25% PICKUP OF STREET FLOWS

RUNOFF COEFFICIENT "C":		C_{10}	C_{100}	%AREA
DP 1.3		.31	.41	95%
DP 1.2	ROOFS 0.11 AC	.90	.95	0.4%
	NATURAL	.30	.40	4%
I 5	0.18 Ac	.47	.56	0.6%
COMPOSIT C=		.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 23.4 min (DP 1.3)

NAT CHANNEL FLOW: L=200' S= 7% V_{ec} = 5 T_c = 0.7

T_c = 23.4 + 0.7 = 24.1 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.1

I_{100} = 4.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 x 3.1 x 33.21

= 32 CFS

Q_{100} = .41 x 4.6 x 33.21

= 63 CFS

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(DP 1.3)

HYDROLOGY:

LOCATION: DEV. DP. 1.3 (@OUTLET OF PIPE FROM POND E1)

AREA = 31.21 (DP 1.4) + 0.28 Ac (I2) = 31.49 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 1.4	.31	.41	99%
I2	.66	.73	1%
COMPOSIT C =	.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 23.4 MIN (DP 1.4)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 x 3.2 x 31.49

= 31 CFS

Q_{100} = .41 x 4.7 x 31.49

= 61 CFS

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(DP 1.4)

HYDROLOGY:

LOCATION: DEV. D.P. 1.4 (INLET & CHANNEL FLOW TO POND E1)

AREA = 4.95 (DP1.5) + 0.70 (I1) + 25.56 (OS-1) = 31.21 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 1.5	.32	.42	16%
I 1	.59	.66	2%
OS-1	.30	.40	82%
COMPOSIT C=	.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 23.4

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .31 × 3.2 × 31.21

= 31 CFS

Q_{100} = .41 × 4.7 × 31.21

= 60 CFS

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DP 1.5

HYDROLOGY:

LOCATION: DEV. D.P. 1.5 (CHANNEL FLOW INTO POND E1, FROM OS-2)

AREA = 2.40 Ac (OS-2) + 2.55 Ac (DP1.5) = 4.95 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
OS-2	.30	.40	48%
DP 1.5 ROOFS .14AC	.90	.95	3%
NATURAL	.30	.40	49%
COMPOSIT C =	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 15.7 (OS-2)

NATURAL CHANNEL FLOW: L = 550 S = 12% V_{el} = 4 FPS T_c = 2.3 MIN

T_c = 15.7 + 2.3 = 18.0

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.55

I_{100} = 5.40

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 × 3.55 × 4.95

= 5.6 CFS

Q_{100} = .42 × 5.4 × 4.95

= 11.2 CFS

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(DP 2)

HYDROLOGY:

LOCATION: DEV DP 2.0 (BELOW POND E4 @ E. PROP LINE)

AREA = 30.87 Ac (DP2.1) + 0.60 Ac = 31.47 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 2.1	.34	.44	99%
ROOF .05Ac	.90	.95	.2%
NATURAL .39 Ac	.30	.40	1%
COMPOSIT C=	.34	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 25 MIN (DP 2.2)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.05

I_{100} = 4.55

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .34 x 3.05 x 31.47
= 33 CFS

Q_{100} = .44 x 4.55 x 31.47
= 63 CFS

HISTORIC

.30 x 3.05 x 31.47
= 29 CFS

.40 x 4.55 x 31.47
= 57 CFS

DP 2.1

SWH
1-27-92 BTH

HYDROLOGY:

LOCATION: DEV. D.P. 2.1 (POND E4 WITH INLET FLOWS FROM I9 & I10)

AREA = 28.09 Ac (DP2.2) + 1.14 (I9) + 0.48 (I10) + 3/4 x [0.72 (I5) + 0.82 (I6)] = 30.87 Ac

SOIL OR LANDUSE: A SOIL

(INLETS 5 & 6 PICK UP ONLY ±25% OF FLOWS)

RUNOFF COEFFICIENT "C":

	C_{10}	C_{100}	%AREA
DP 2.2	.32	.42	91%
I 5	.47	.56	2%
I 6	.61	.69	2
I 9	.53	.61	4%
I 10	.74	.81	1.0%
COMPOSIT C=	.34	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 25.0 MIN (DP 2.2)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.05

I_{100} = 4.55

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .34 x 3.05 x 30.87

= 32 CFS

Q_{100} = .44 x 4.55 x 30.87

= 62 CFS

DP 2.2

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1-27-92 BTH

HYDROLOGY:

LOCATION: DEV. D.P. 2.2 (CHANNEL FLOW TO POND E)

AREA = 4.36 (DP 2.2) + 23.73 (DP 2.3) = 28.09 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
D.P. 2.3	.32	.42	85%
ROOFS 0.36 AC	.90	.95	1%
NATURAL 4.0 AC	.30	.40	14%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 23.3 MIN (DP 2.3)

NAT. CHANNEL FLOW: L=600 S=10% VEL= 6 FPS T_c = 1.7 MIN

T_c = 23.3 + 1.7 = 25.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.05

I_{100} = 4.55

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 * 3.05 * 28.09

= 27 CFS

Q_{100} = .42 * 4.55 * 28.09

= 54 CFS

(DP 2.3)

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HYDROLOGY:

LOCATION: DEN D.P. 2.3 (PIPE OUTLET FLOW, BELOW POND E3)

AREA = 23.60 (DP 2.4) + 0.13 $A_c^{(I4)}$ = 23.73 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 2.4	.32	.42	99%
I4	.67	.74	1%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 23.3 MIN (DP 2.4)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 x 3.2 x 23.73

= 24 CFS

Q_{100} = .42 x 4.7 x 23.73

= 47 CFS

SWH
1-27-92 BJH

(DP 2.4)

HYDROLOGY:

LOCATION: DEV. D.P. 2.4 (POND 3 WITH INLET FLOW FROM I3)

AREA = 20.33 (DP2.5) + 3.27 (I3) = 23.60 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 2.5	.31	.41	86%
I3	.37	.46	14%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

t_c (DP2.5) = 23.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .32 × 3.2 × 23.60

= 24 CFS

Q_{100} = .42 × 4.7 × 23.60

= 47 CFS

SWH
1-22-92 BJH

(DP 2.5)

HYDROLOGY:

LOCATION: DEV. D.P. 2.5 (CHANNEL FLOW INTO POND E3)

AREA = 16.67 Ac (DP 2.6) + 3.66 Ac = 20.33 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":		C_{10}	C_{100}	%AREA
DP 2.6		.30	.40	82%
NATURAL	3.43	.30	.40	17%
ROOFS	.23 Ac	.90	.95	1%
COMPOSIT C =		.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c (DP 2.6) = 21.5 MIN

NAT. CHANNEL FLOW: L = 550' S = 10% VEL = 5 FPS T_c = 1.8 MIN

T_c = 21.5 + 1.8 = 23.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 × 3.2 × 20.33

= 20 CFS

Q_{100} = .41 × 4.7 × 20.33

= 39 CFS

SWH
1-27-92 BJH

(DP 2.6)

HYDROLOGY:

LOCATION: DEV. D.P. 2.6 (COMBINED CHANNEL FLOW FROM OS-4 & OS-5)

AREA = 8.98 (OS-5) + 7.69 (OS-4) = 16.67 AC

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 Ac. Res.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 21.5 MIN (OS-4)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.3

I_{100} = 5.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.3 × 16.67

= 17 CFS

Q_{100} = .40 × 5.0 × 16.67

= 33 CFS

(DP 3)

HYDROLOGY:

LOCATION: DEV DP 3 (@ E. PROP. LINE)

AREA = 2.61 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
ROOFS	.90	.95	11%
NATURAL	.30	.40	89%
COMPOSIT C=	.37	.46	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 200' S= 20% T_c = 2.4 MIN

NAT. CHANNEL FLOW: L= 440' S= 12% VEL= 3 T_c = 2.4

T_c = 2.4 + 2.4 = 9.8 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.7

I_{100} = 7.1

PEAK FLOW: Q = CIA (CFS)

		HISTORIC
Q_{10} = .37 x 4.7 x 2.61		.30 x 4.7 x 2.61
= 4.5 CFS	Δ= 0.8 CFS	= 3.7 CFS
Q_{100} = .46 x 7.1 x 2.61		.40 x 7.1 x 2.61
= 8.5 CFS	Δ= 1.1 CFS	= 7.4 CFS

DEV DP 4

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. D.P. 4 (½ ANDROMEDA DR. @ E. PROP. LINE)

AREA = 6.57 (DP4.1) + 1.78 Ac (I14) = 8.35 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 4.1	.46	.54	79%
I14	.50	.58	21%
COMPOSIT C =	.47	.55	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 16.9 MIN (DP 4.1)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .47 x 4.3 x 8.35
= 17 CFS Δ = 6 CFS

Q_{100} = .55 x 6.6 x 8.35
= 30 CFS Δ = 8 CFS

HISTORIC

.30 x 4.3 x 8.35
= 11 CFS

.40 x 6.6 x 8.35
= 22 CFS

DEV
DP 4.1

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. DESIGN PT. 4.1

AREA = 5.55 (DP4.2) + 1.02 Ac (I21) = 6.57 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 4.2	.41	.50	84%
I-21	.66	.73	16%
COMPOSIT C=	.46	.54	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 11.9 MIN (DP 4.2)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.6

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .46 x 4.3 x 6.57

= 13 CFS

Q_{100} = .54 x 6.6 x 6.57

= 23 CFS

DEV DP 4.2

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. D.P. 4.1 (FLOWS INTO BACK SIDE OF INLET #14)

AREA = 2.39 Ac (ADJUSTED DP 4.3) + 3.16 (4.2) = 5.55 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
D.P. 4.3	.48	.56	43%
D.P. 4.2	.35	.45	57%
COMPOSIT C=	.41	.50	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 9.4 MIN (DP 4.3)

NAT CHANNEL FLOW: L=600' S=10% Vel= 4 FPS T_c = 2.5 MIN

T_c = 9.4 + 2.5 = 11.9 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .41 x 4.3 x 5.55

= 9.8 CFS

Q_{100} = .50 x 6.6 x 5.55

= 18.3 CFS

DEV
(DP 4.3)

SWH
1-27-92 BTH

HYDROLOGY:

LOCATION: DEV. DESIGN PT. 4.3 (@ POND E6, @ BONNIE VISTA & PEGASUS)

AREA = 0.28 Ac + 1.61 Ac (DP 4.4) = 1.89 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":		C_{10}	C_{100}	%AREA
DP 4.3	0.28 Ac	.35	.45	15%
DP 4.4	1.61 Ac	.50	.58	85%
COMPOSIT C=		.48	.56	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 8.9 MIN (DP 4.4)

+ 0.5 MIN POND DETENTION

T_c = 8.9 + 0.5 = 9.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.7

I_{100} = 7.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .48 × 4.7 × 1.89 Ac

= 4.3 CFS

Q_{100} = .56 × 7.2 × 1.89 Ac

= 7.6 CFS

INLET FLOW:

ADJUSTED AREA = 2.39 Ac

⇒ Q_{10} = 5.4 CFS (INCLUDES 1.1 CFS INLET FLOW)

⇒ Q_{10} = 9.6 CFS (INCLUDES 2.0 CFS INLET FLOW)

DEV
DP 4.4

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. D.P. 4.4 (@ ANDES, ALONG S. SIDE CONNIE VISTA)

AREA = 1.57 Ac + 0.04 Ac (OS-6) = 1.61 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":		C_{10}	C_{100}	%AREA
BASIN I18	0.42 Ac	.76	.82	26%
I19	0.24 Ac	.63	.70	15%
DP4.4	0.95 Ac	.35	.45	59%
	COMPOSIT C =	.50	.58	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=250' S= 16% t_c = 8.9 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.8

I_{100} = 7.3

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .50 x 4.8 x 1.61

= 3.9 CFS

Q_{100} = .58 x 7.3 x 1.61

= 6.8 CFS

SWH (DP 5.0)
1-28-92 BTH

HYDROLOGY:

LOCATION: DEV. D.P. 5.0 (TOTAL COMBINED FLOWS ON ANDROMEDA DR. @ E. PROP. LINE

AREA = 30.59 (DP5.1) + 8.35 (DP4) + 0.50 (I-15) = 39.44 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP5.1	.32	.42	78%
DP4	.47	.55	21%
I-9	.63	.70	1%
COMPOSIT C=	.35	.45	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 24.2 MIN (DP5.1)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.1

I_{100} = 4.6

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .35 × 3.1 × 39.44
= 43 CFS

Q_{100} = .45 × 4.6 × 39.44
= 82 CFS

HISTORIC

.30 × 3.1 × 39.44
= 37 CFS

.40 × 4.6 × 39.44
= 73 CFS

SWH
1-28-92 BJH

DP 5.1

HYDROLOGY:

LOCATION: DEV. DP 5.1 (GARDINER GULCH @ INLET #15 / @ E. PROP. LINE)

AREA = 29.81 (DP5.2) + 0.78 = 30.59

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP5.2	.32	.42	97%
ROOF .09AC	.90	.95	—
NATURAL	.30	.40	3%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 23.7 (DP5.2)

NAT. CHANNEL FLOW: L=270 S=9 V_{EL}=7 t_c = 0.5

T_c = 23.7 + 0.5 = 24.2 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.1

I_{100} = 4.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 × 3.1 × 30.59
= 30 CFS

Q_{100} = .42 × 4.6 × 30.59
= 59 CFS

HISTORIC

.30 × 3.1 × 30.59
= 28 CFS

.40 × 4.6 × 30.59
= 56 CFS

SWH
1-28-92 BJH

(DP 5.2)

HYDROLOGY:

LOCATION: DEV. DP 5.2 (@ POND E9, CHANNEL & INLET FLOWS)

AREA = 28.85 (DP5.3) + 0.90 + 0.4x[0.16 (I8)] = 29.81 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP5.3	.32	.42	97%
I8	.90	.95	~~.4%~~
ROOF (.06 > .11, .05)	.90	.95	>
NATURAL	.30	.40	3%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 22.7 MIN (DP5.3)

NAT CHANNEL FLOW: L=400 S=.8 VEL=7 T_c = 1.0

T_c = 22.7 + 1.0 = 23.7

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 x 3.2 x 29.81

= 31 CFS

Q_{100} = .42 x 4.7 x 29.81

= 59 CFS

SWM

1-27-92 BJH

DEV (DP5.3)

HYDROLOGY:

LOCATION: DEV. D.P. 5.4 (COMBINED FLOWS FROM OS-7 & OS-9 @ CONFLUENCE W/ GARDINER GULCH)

AREA = 6.37 (DP5.4) + 21.07 (DP5.5) + 0.65 + .5%[0.4 (I12)] + .4[1.40 (I13)] = 28.85

± % OF PICKUP OF STREET FLOWS

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP5.4	.32	.42	22%
DP5.5	.31	.41	73%
I 12	.39	.48	1%
I 13	.51	.59	2%
ROOF	.90	.95	—
NATURAL	.30	.40	2%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 22.7 (DP5.5)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.8

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 × 3.2 × 28.85

= 30 CFS

Q_{100} = .42 × 4.8 × 28.85

= 58 CFS

DEV
DP 5.4

SWH
1-28-92 BJH

HYDROLOGY:

LOCATION: DEV. DP 5.4 (FLOWS FROM OS-7 BEFORE CONFLUENCE W/ GARDINER GULCH)

AREA = 4.04 (OS-7) + 2.33 = 6.37 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
OS-7	.30	.40	63%
ROOFS .28 Ac	.90	.95	4%
NATURAL	.30	.40	33%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

t_c = 15.9 (OS-7)

NAT. CHANNEL FLOW: L=680 S=10% VEL=4 t_c = 2.8 MIN

T_c = 15.9 + 2.8 = 18.7 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.5

I_{100} = 5.3

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 x 3.5 x 6.37

= 7.1 CFS

Q_{100} = .42 x 5.3 x 6.37

= 14.2 CFS

SWH
1-28-92 BJH

(DP 5.5)

HYDROLOGY:

LOCATION: DEV. D.P. 5.5 (GARDINER GULCH BEFORE CONFLUENCE)

AREA = 19.65 (OS-9) + 0.24 (W. OF SAGITTARIUS PT) + 1.18 (W/ OS-7 E. OF SAGITTARIUS PT) = 21.07 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
OS-9	.30	.40	93%
ROOF .14 Ac	.90	.95	1%
NATURAL	.30	.40	6%
COMPOSIT C=	.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 21.0 (OS-9)

NAT. CHANNEL FLOW: L=600 S= 8% VEL = 6 T_c = 1.7 MIN

t_c = 21.0 + 1.7 = 22.7 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.8

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 × 3.2 × 21.07

= 21 CFS

Q_{100} = .41 × 4.8 × 21.07

= 41 CFS

DEV
(DP6.0)

SWH
1-27-92 BNH

HYDROLOGY:

LOCATION: DEV. DESIGN PT. 6 (PEGASUS DR @ N. END OF SITE)

AREA = 7.42 Ac. (DP6.1) + 1.72 = 9.14 Ac

SOIL OR LANDUSE: A_{SOIL}

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
(DP6.1)	.49	.57	81%
(DP6.0) ROOF .47Ac	.90	.95	5%
NATURAL 1.25Ac	.30	.40	14%
COMPOSIT C =	.48	.56	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 15.5 MIN

STREET FLOW: L = 420' S = 7.9 V_{EL} = 7FPS T_c = 1.0

T_c = 15.5 + 1.0 = 16.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .48 × 3.8 × 9.14

= 17 CFS *

ALLOWABLE ST. FLOW 6.7%

37.6 CFS OK

Q_{100} = .56 × 5.7 × 9.14

= 29 CFS *

181 CFS OK

* THESE FLOWS DO NOT ACKNOWLEDGE THE PRESENCE OF INLETS # 11, 12 & 13. WHICH

DEV (DP6.1)

SWH 1-27-92 BJTH

HYDROLOGY:

LOCATION: DEV. DESIGN PT. 6.1 (ST. FLOWS TO N.W. COR OF PEGASUS DR & SERPENS PT)

AREA = 4.44 Ac (DP6.2) + 2.98 = 7.42 Ac

SOIL OR LANDUSE: A SOIL LD LD

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
(DP6.2)	.51	.59	60 %
DP6.1 ROOF	.90	.95	10 %
NATURAL	.30	.40	30 %
COMPOSIT C=	.49	.57	100 %

TIME OF CONCENTRATION: T_c MINUTES

T_c VERY 14.5 MIN (I13)

STREET FLOW: L= 310 S= 5% VEL= 5 FPS T_c = 1.0 MIN

T_c = 15.5

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.8

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .49 × 3.8 × 7.42

= 14.1 CFS

Q_{100} = .57 × 5.8 × 7.42

= 25.1 CFS

½ ST ALLOW ST. FLOW 4%

14.6 CFS OK

70 CFS OK

DEV

SWH (OP6.2)

1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. DESIGN Pt. 6.2 (ST. FLOWS AT N. W. COR OF PEGASUS & SERPENS PL. @ POND E B)

AREA = 2.05 Ac (I11) + 0.04 Ac (OS-6) + 0.55 Ac (6.2) + 0.40 (I12) + 1.40 (I13) = 4.44 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":		C_{10}	C_{100}	%AREA
BASIN 11		.54	.62	46%
12		.39	.48	9%
13		.51	.59	32%
STREET	.18 Ac	.90	.95	4%
NATURAL	.38	.30	.40	9%
COMPOSIT C =		.51	.59	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 14.5 MIN (I13)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.0

I_{100} = 6.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .51 x 4.0 x 4.44

= 9.1 CFS

Q_{100} = .59 x 6.0 x 4.44

= 15.7 CFS

SWH
1-28-92 BJH

(DP 7)

HYDROLOGY:

LOCATION: DEV. D.P. 7.0

AREA = 6.81 Ac ($\overset{DP}{7.1}$) + 1.07 ($\overset{DP}{7.0}$) = 7.88 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 7.1	.34	.44	86%
ROOF	.90	.95	1%
NATURAL	.30	.40	13%
COMPOSIT C=	.34	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 17.9 MIN ($\overset{DP}{7.1}$)

NAT CHANNEL FLOW: L=320 S=11% VEL=4 T_c = 1.3

T_c = 17.9 + 1.3 = 19.2 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.4

I_{100} = 5.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .34 x 3.4 x 7.88
= 9.1 CFS

Q_{100} = .44 x 5.2 x 7.88
= 18 CFS

HISTORIC

.30 x 3.4 x 7.88
= 8 CFS

.40 x 5.2 x 7.88
= 16 CFS

DEV

(DP 7.1)

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. DESIGN PT. 7.1 (PIPE OUTLETS BELOW ENGLISH VIEW)

AREA = 5.87 Ac (DP 7.2) + 0.94 Ac (I7) = 6.81 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 7.1	.31	.41	86%
BASIN I7	.51	.59	14%
COMPOSIT C=	.34	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 17.9 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.6

I_{100} = 5.6

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .34 x 3.6 x 6.81

= 8.3 CFS

Q_{100} = .44 x 5.6 x 6.81

= 16.7 CFS

DP7.2

HYDROLOGY:

LOCATION: DEV. DESIGN POINT 7.2 (@ POND #10 ON ENGLISH VIEW)

AREA = 4.61 Ac (OS-10) + 1.26 Ac = 5.87 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
ON-SITE	.35	.45	21%
OFF-SITE #10	.30	.40	79%
COMPOSIT C=	.31	.41	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 16.2 MIN (OS-10)

NAT. CHANNEL FLOW: L= 450' S= 9% VEL= 4.5 T_c = 1.7 MIN

T_c = 16.2 + 1.7 = 17.9 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.6

I_{100} = 5.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .31 x 3.6 x 5.87

= 6.6 CFS

Q_{100} = .41 x 5.6 x 5.87

= 13.5 CFS

DP 8.0

SWH
1-28-92 BJH

HYDROLOGY:

LOCATION: DEV. DP 8 (@ N.W. COR OF SITE @ PROP. LINE)

AREA = 4.97 Ac (DP 8.1) + 0.77 + 21.33 (OS-13) = 27.07 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 8.1	.32	.42	18%
OS-13	.30	.40	79%
ONSITE/ROOF	.90	.95	—
NATURAL	.30	.40	3%
COMPOSIT C =	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

t_c = 21.7 MIN (OS-13)

NAT CHANNEL FLOW: L = 260' S = 9% V_{EL} = 6 T_c = 0.7 MIN

T_c = 21.7 + 0.7 = 22.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.8

PEAK FLOW: Q = CIA (CFS)

HISTORIC

Q_{10} = .30 x 3.2 x 27.07
= 26 CFS — SAME

Q_{100} = .40 x 4.8 x 27.07
= 52 CFS — SAME

DEV
(DP8.1)

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: DEV. DESIGN PT 8.1 (@ W. SIDE ENGLISH VIEW FROM OS-12)

AREA = 3.16 (OS-12) + 1.21 (DP 8.2) + 0.60 = 4.97 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
OS-12	.30	.40	84%
DP 8.2	.34	.44	24%
ROOF .05 Ac	.90	.95	1%
NATURAL	.30	.40	11%
COMPOSIT C=	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c (OS-12) = 13.3

NAT CHANNEL FLOW: L = 250 S = 9% V_{el} = 4.5 T_c = 0.9

T_c = 13.3 + 0.9 = 14.2 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.0

I_{100} = 6.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .32 x 4.0 x 4.97

= 6.4 CFS

Q_{100} = .42 x 6.0 x 4.97

= 12.5 CFS

DEV
DP 8.2

SWH
1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. DESIGN PT 8.2 (@W. SIDE ENGLISH VIEW FROM OS-11)

AREA = 0.70 Ac (OS-11) + 0.51 Ac = 1.21 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
OS-11	.30	.40	58%
ROOFS	.90	.95	7%
NATURAL	.30	.40	35%
COMPOSIT C =	.34	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 8.5 (OS-11)

NATURAL CHANNEL FLOW: L = 320' S = 9.4% VEL = 4 FPS T_c = 1.3

T_c = 8.5 + 1.3 = 9.8 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.7

I_{100} = 7.1

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .34 x 4.7 x 1.21

= 1.9 CFS

Q_{100} = .44 x 7.1 x 1.21

= 3.8 CFS

DP 678

HYDROLOGY:

LOCATION: DEV DP 6-7-8 (@ N. END OF SITE ON PEGASUS DR)

AREA = 9.14 (DP6) + 7.88 (DP7) + 27.07 (DP8) + 1.55 (OFFSITE) = 45.64 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP6	.48	.56	20%
DP7	.34	.44	17%
DP8	.30	.40	63%
COMPOSIT C =	.34	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 22.4 MIN (DP8)

NAT CHANNEL FLOW: L = 250 S = 10 VEL = 7 T_c = 0.6

T_c = 22.4 + 0.6 = 23.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .34 x 3.2 x 45.64
= 50 CFS

Q_{100} = .44 x 4.7 x 45.64
= 94 CFS

HISTORIC

.30 x 3.2 x 45.64
= 44 CFS

.40 x 4.7 x 45.64
= 86 CFS

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	q_p	
											HISTORIC .39 .40	DEVELOPED	
ON-SITE: MISCELLANEOUS													
	M1		0.25	100		7	5.2 / 8.0	A	UNDEV. 1 DU/2 Ac REQ.	.30 / .40	SAME	0.4 / 0.8	10 / 100
	M2		0.6	600		11.7	4.4 / 6.7			.39 / .48	1.5 / 2.9	1.0 / 1.9	
	M3		1.95	400		12	4.3 / 6.5			.35 / .45	4.3 / 8.5	2.9 / 5.7	
	M4		0.24	150		6.4	5.4 / 8.4			.30 / .40	SAME	0.4 / 0.8	
	M5		0.13	80		5.5	5.8 / 8.8			.33 / .43	SAME	0.3 / 0.5	
	M6		0.85	180		7.4	5.0 / 7.7			.32 / .42	1.5 / 3.1	1.4 / 2.7	
	M7		0.67	200		9.3	4.8 / 7.2			.36 / .46	1.2 / 2.3	1.2 / 2.2	
	M8		0.74	600		5.0	6.0 / 9.0			.64 / .71	0 / 0	2.8 / 4.7	
	M9		0.30	140		8.0	5.0 / 7.6			.35 / .44	SAME	0.5 / 1.0	
	M10		1.00	100		9.4	4.7 / 7.2			.38 / .48	2.7 / 5.6	1.8 / 3.5	
	M11		0.73	150		7.6	5.0 / 7.8			.30 / .40	4.3 / 8.5	1.1 / 2.3	
	M12		0.39	200		7.4	5.0 / 7.8			.34 / .43	SAME	0.7 / 1.3	

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

PAGE 1 of 1

KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 1-29-92

DEV
(M1)

SWH
~~1-22-91~~ BJH
1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M1 (MISCELLANEOUS #1, ALONG CONSTELLATION DR.)

AREA = 10677 SF = 0.25 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
½ Ac Res	.30	.40	100

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 100' S = 10% T_c = 7MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.2

I_{100} = 8.0

PEAK FLOW: Q = CIA (CFS)

HISTORIC

Q_{10} = .30 × 5.2 × 0.25
= 0.4 CFS — SAME

Q_{100} = .40 × 8.0 × 0.25
= 0.8 CFS — SAME

DEV
(M2)

SWH
~~1-22-98~~ BJH
~~1-29-98~~
4-10-92

HYDROLOGY:

LOCATION: DEV. BASIN M2

AREA = 0.6 AC

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL .51AC	.30	.40	85%
ROOFS .09AC	.90	.95	15%
COMPOSIT C=	.39	.48	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=250 S=10% T_c= 11.1 MIN

NAT CHANNEL: L= 100 S= 10% VEL= 3.0 T_c= 0.6

T_c = 11.1 + 0.6 = 11.7 MIN.

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.4

I_{100} = 6.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .39 x 4.4 x 0.6

= 1.10 CFS

Q_{100} = .48 x 6.7 x 0.6

= 1.9 CFS

HISTORIC

.30 x 4.0 x 1.22

= 1.5 CFS

.40 x 6.0 x 1.22

= 2.9 CFS

DEV
(M3)

SWH
1-22-92. BJH
1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M3

AREA = 84946 SF = 1.95 Ac

SOIL OR LANDUSE: A_{SOIL}

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	91%
ROOFS	.90	.95	9%
COMPOSIT C=	.35	.45	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=400' S=13% T_c = 12.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.5

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .35 × 4.3 × 1.95

= 2.9 CFS

Q_{100} = .45 × 6.5 × 1.95

= 5.7 CFS

HISTORIC

.30 × 3.8 × 3.73

= 4.3 CFS

.40 × 5.7 × 3.73

= 8.5 CFS

OVERLAND FLOW: L=500' T_c = 14.7

NAT. CHAN. FLOW: L= 300 T_c = 1.3

DEV (M4)

SWH 1-22-98 BJH
1-29-98

HYDROLOGY:

LOCATION: DEV. BASIN M4

AREA = 0.24 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL (TRUE)	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=150' S=20% T_c = 6.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.4

I_{100} = 8.4

PEAK FLOW: Q = CIA (CFS) HISTORIC

Q_{10} = .30 * 5.4 * 0.24 SAME

= 0.4 CFS

Q_{100} = .40 * 8.4 * 0.24 SAME

= 0.8 CFS

DEV (M5)

SWH 1-22-92. BJH 1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M5

AREA = 5850 SF = 0.13 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	95%
ROOF	.90	.95	5%
COMPOSIT C=	.33	.43	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 80 S= 12% T_c = 5.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.8

I_{100} = 8.8

PEAK FLOW: Q = CIA (CFS)

	HISTORIC
Q_{10} = .33 x 5.8 x 0.13	.30 x 5.8 x 0.15
= 0.3 CFS	= 0.3 CFS
Q_{100} = .43 x 8.8 x 0.13	.40 x 8.8 0.15
= 0.5 CFS	= 0.5 CFS

DEV

(M6)

SWH

~~1-22-92~~ BJH

1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M6

AREA = 37147 SF = 0.85 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	96%
ROOFS -	.90	.95	4%
COMPOSIT C =	.32	.42	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 180' S = 17% T_c = 7.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.0

I_{100} = 7.7

PEAK FLOW: Q = CIA (CFS)

		HISTORIC	
Q_{10} =	.32 x 5.0 x 0.85	.30 x 4.8	x1.06
	= 1.4 CFS	= 1.5 CFS	
Q_{100} =	.42 x 7.7 x 0.85	.40 x 7.2	x1.06
	= 2.7 CFS	= 3.1 CFS	

OVERLAND FLOW: L = 250 T_c = 9.3

DEV
(M7)

SWH
1-22-92 BTH
1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M7

AREA = 29094 SF = 0.67 AC

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	90%
ROOFS ~	.90	.95	10%
COMPOSIT C=	.36	.46	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=200' S=10% T_c = 9.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.8

I_{100} = 7.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .36 x 4.8 x 0.67
= 1.2 CFS

Q_{100} = .46 x 7.2 x 0.67
= 2.2 CFS

HISTORIC

.30 X 4.2 X.92
= 1.2 CFS

.40 X 6.3 X0.92
= 2.3 CFS

OVERLAND FLOW: L=350 T_c = 13.1

DEV
(M8)

SWH
1-22-92 BTH
1-29-92.

HYDROLOGY:

LOCATION: DEV. BASIN M8

AREA = 32314 SF = 0.74 AC

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET FLOW/BLDG	.90	.95	.57
NATURAL	.30	.40	.43
COMPOSIT C =	.64	.71	100%

TIME OF CONCENTRATION: T_c MINUTES

STREET FLOW: L = 600' S = 11% V_{ei} = 8 FPS T_c = 1.25 MIN

→ USE 5.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: Q = CIA (CFS) HISTORIC

Q_{10} = .64 x 6.0 x 0.74 NONE

= 2.8 CFS

Q_{100} = .71 x 9.0 x 0.74 NONE

= 4.7 CFS

DEV
(M9)

SWH
~~1-22-92~~ BJH
1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M9

AREA = 13103 SF = 0.30 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	92%
ROOFS	.90	.95	8%
COMPOSIT C=	.35	.44	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 140 S= 9% T_c = 8.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.0

I_{100} = 7.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .35 × 5.0 × 0.30
= 0.5 CFS

Q_{100} = .44 × 7.6 × 0.30
= 1.0 CFS

HISTORIC

.30 × 5.0 × 0.32
= .5 CFS

.40 × 7.6 × 0.32
= 1.0 CFS

DEV
M10

SCWH
1-22-92
1-29-92 RJH

HYDROLOGY:

LOCATION: DEV. BASIN M10

AREA = 43342 SF = 1.00 AC

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	86%
ROOFS	.90	.95	14%
COMPOSIT C=	.38	.48	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=230' S= 14% T_c = 8.9 MIN

NAT. CHANNEL FLOW: L= 100' S= 12% VEL = 2.5 FPS t_c = 0.6 MIN

T_c = 8.9 + 0.6 = 9.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.7

I_{100} = 7.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .38 × 4.7 × 1.00
= 1.8 CFS

Q_{100} = .48 × 7.2 × 1.00
= 3.5 CFS

HISTORIC

.30 × 3.8 × 2.4
= 2.7 CFS

.40 × 5.8 × 2.4
= 5.6 CFS

OVERLAND FLOW: L= 500' T_c = 14
NAT CHANNEL L= 300 T_c = 1.3

DEV
(M11)

SWH
~~1-22-92~~ BJH
1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M11

AREA = 31599 SF = 0.73 Ac

SOIL OR LANDUSE: A, SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
HISTORIC, UNDEV.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 150 S = 12% t_c = 7.6 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.0

I_{100} = 7.8

PEAK FLOW: Q = CIA (CFS)

	HISTORIC
Q_{10} = .30 x 5.0 x 0.73	.30 x 3.9 x3.67
= 1.1 CFS	= 4.3 CFS
Q_{100} = .40 x 7.8 x 0.73	.40 x 5.8 x3.67
= 2.3 CFS	= 8.5 CFS

OVERLAND FLOW: L= 500' t_c = 14.7
NATURAL CHANNEL: L=200' t_c = 0.8

Dev (M12)

SWH
~~1-22-92~~ BTH
1-29-92

HYDROLOGY:

LOCATION: DEV. BASIN M12

AREA = 16785 SF = 0.39 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL	.30	.40	94%
ROOFS	.90	.95	6%
COMPOSIT C=	.34	.43	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 200 S= 20% T_c = 7.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.0

I_{100} = 7.8

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .34 x 5.0 x 0.39
= 0.7 CFS

Q_{100} = .43 x 7.8 x 0.39
= 1.3 CFS

HISTORIC

.30 x 5.0 x .44
= 6.6 CFS

.40 x 7.8 x .44
= 1.4 CFS

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	q_p	
ON-SITE FLOWS:													
DP1	DEV		6.26			11.6	4.3 / 6.7	ASOIL		.36 / .46		9.7 / 19.3	10 / 100
	HIST		"			"	"			.30 / .40		8.1 / 16.8	
DP 2	DEV		13.37			11.6	4.3 / 6.7			.40 / .50		23 / 45	
	HIST		"			"	"			.30 / .40		17 / 36	
DP 3	DEV		2.61			9.8	4.7 / 7.1			.37 / .46		4.5 / 8.5	
	HIST		"			"	"			.30 / .40		3.7 / 7.4	
DP 4/5	DEV		15.71			11.6	4.3 / 6.7			.43 / .53		29 / 56	
	HIST		"			"	"			.30 / .40		20 / 42	
DP 6	DEV		8.90			16.5	3.8 / 5.7			.48 / .56		16 / 28	
	HIST	w/PEGASUS IN PLACE AS SHOWN	"			"	"			.30 / .40		10 / 20	
DP 7	DEV		3.27			8.9	4.8 / 7.3			.40 / .50		6.3 / 11.9	
	HIST		"			"	"			.30 / .40		4.7 / 9.5	
DP 8	DEV		1.88			7.5	5.1 / 7.7			.30 / .40		2.9 / 5.8	
	HIST		"			"	"			.30 / .40		2.9 / 5.8	
DP 678	DEV / HIST		14.08			16.5	3.8 / 5.7			.44 / .53		24 / 16 / 43 / 32	

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

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KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 2-3-92

DEV/HIST

(DP 1) ON-SITE ONLY

SWH
2-3-92 BJH

HYDROLOGY:

LOCATION: DP 1 [ON-SITE ONLY - DEVELOPED & HISTORIC]

AREA = 34.22 Ac(DP1) − 25.56 (OS-1) − 2.4 (OS-2) = 6.26 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP1	.31	.41	100%
OS-1 & OS-2	.30	.40	82%
ONSITE FLOW COMPOSIT C=	.36	.46	18%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=140' S=25% T_c= 6.1

NAT CHANNEL FLOW: L= 600 S= 10% Vel=3.5 T_c= 2.9

" " " L= 700 S= 10% Vel=4.5 t_c= 2.6

T_c = 6.1 + 2.9 + 2.6 = 11.6 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .36 x 4.3 x 6.26

= 9.7 CFS Δ = 1.6 CFS

Q_{100} = .46 x 6.7 x 6.26

= 19.3 CFS Δ = 2.5 CFS

HISTORIC

.30 x 4.3 x 6.26

= 8.1 CFS

.40 x 6.7 x 6.26

= 16.8 CFS

DEV/HIST

SWH (DP 2)

2-3-92 BTH ON-SITE ONLY

HYDROLOGY:

LOCATION: DP 2 [ON-SITE ONLY - DEVELOPED & HIST]

AREA = 31.47 Ac (DP2) - 1.43(OS-3) - 7.69(OS-4) - 8.98(OS-5) = 13.37 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP2	.34	.44	100%
OS-3,4,5	.30	.40	58%
ON-SITE FLOW COMPOSITE C=	.40	.50	42%

TIME OF CONCENTRATION: T_c MINUTES

t_c = 11.6 MIN (DP1 ON-SITE)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .40 x 4.3 x 13.37

= 23 CFS Δ=6 CFS

Q_{100} = .50 x 6.7 x 13.37

= 45 CFS Δ=9 CFS

HISTORIC

.30 x 4.3 x 13.37

= 17 CFS

.40 x 6.7 x 13.37

= 36 CFS

DEV. \ HIST.
(DP 4/5)
ON-SITE ONLY

SCWH
2-3-92 BJH

HYDROLOGY:

LOCATION: DP 4/5 [ON-SITE ONLY - DEVELOPED & HISTORIC]

AREA = 39.44 AC (DA5) − 0.04 (OS-6) − 4.04 (OS-7) − 19.65 (OS-9) = 15.71 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 4/5	.35	.45	100 %
OS 6-7-9	.30	.40	.60
ONSITE FLOW COMPOSIT C=	.43	.53	.40

TIME OF CONCENTRATION: T_c MINUTES

$T_c \triangleq$ 11.6 MIN (APPROX SAME AS DP1)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.3

I_{100} = 6.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .43 x 4.3 x 15.71

= 29 CFS Δ = 9 CFS

Q_{100} = .53 x 6.7 x 15.71

= 56 CFS Δ = 14 CFS

HISTORIC

.30 x 4.3 x 15.71

= 20 CFS

.40 x 6.7 x 15.71

= 42 CFS

DEV/HIST

(DP 6) ON-SITE ONLY!

SWH
2-3-92 BTH

HYDROLOGY:

LOCATION: DP 6 [ON-SITE ONLY - DEVELOPED & HISTORIC]

AREA = 9.14 Ac (DP6) − 0.24 Ac (OS-B) = 8.90 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 6	.48	.56	100%
OS-B	.30	.40	3%
ON-SITE FLOW COMPOSIT C=	.48	.56	97%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 16.5 MIN (DP6)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .48 × 3.8 × 8.90

= 16 CFS Δ=6 CFS

Q_{100} = .56 × 5.7 × 8.90

= 28 CFS Δ=8 CFS

HISTORIC

.30 × 3.8 × 8.9

= 10 CFS

.40 × 5.7 × 8.9

= 20 CFS

DEV\HIST

(DP 7)

ON-SITE ONLY!

SWH
2-3-92 BJH

HYDROLOGY:

LOCATION: DP 7 [ON-SITE ONLY — DEVELOPED & HISTORIC]

AREA = 7.88 Ac (OP6) − 4.61 (OS-10) = 3.27 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 7	.34	.44	100%
OS-10	.30	.40	59%
ON-SITE FLOW COMPOSIT C =	.40	.50	.41 %

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 120 S = 26% T_c = 5.6 MIN

NAT CHANNEL FLOW: L = 800 S = 11% VEL = 4 T_c = 3.3

T_c = 5.6 + 3.3 = 8.9 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.8

I_{100} = 7.3

PEAK FLOW: Q = CIA (CFS)

	HISTORIC
Q_{10} = .40 x 4.8 x 3.27	.30 x 4.8 x 3.27
= 6.3 CFS Δ = 1.6 CFS	= 4.7 CFS
Q_{100} = .50 x 7.3 x 3.27	.40 x 7.3 x 3.27
= 11.9 CFS Δ = 2.4 CFS	= 9.5 CFS

DEV/HIST
(OP 8)
ON-SITE ONLY!

SWH
2-3-92 BTH

HYDROLOGY:

LOCATION: DP 8 [ON-SITE ONLY — DEVELOPED & HISTORIC]

AREA = 27.07 Ac (DP8) - 0.7(OS-11) -3.16 (OS-12) -21.33 (OS-13) = 1.88 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP 8	.30	.40	100%
OS-11,12,13	.30	.40	93%
ON-SITE FLOW COMPOSITE C=	.30	.40	7%

TIME OF CONCENTRATION: T_c MINUTES

t_c = 7.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.1

I_{100} = 7.7

PEAK FLOW: Q = CIA (CFS)

HISTORIC

Q_{10} = .30 x 5.1 x 1.88

= 2.9 CFS

SAME

Q_{100} = .40 x 7.7 x 1.88

= 5.8 CFS

SAME

DEV/HIST
(DP 678)
ON-SITE/ ONLY.

SWH
2-3-92 BJH

HYDROLOGY:

LOCATION: DP 6-7-8 [ON-SITE ONLY, DEVELOPED & HISTORIC]

AREA = 8.90 (DP6) + 3.27 (DP7) + 1.88 (DP8) = 14.08 AC

SOIL OR LANDUSE: A_{SOIL}

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
DP6	.48	.56	64%
DP7	.40	.50	23%
DP8	.30	.40	13%
COMPOSIT C =	.44	.53	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 16.5 MIN (DP6)

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .44 × 3.8 × 14.08

= 24 CFS

Q_{100} = .53 × 5.7 × 14.08

= 43 CFS

HISTORIC w/PEGASUS IN PLACE

.30 × 3.8 × 14.08

= 16 CFS

.40 × 5.7 × 14.08

= 32 CFS

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	q_p	
INLET	FLOWS:												
	I1		0.70	610		5.0	6.0 / 9.0	A	MISC	.59 / .66		2.5 / 4.1	10 / 100
	I2		0.29			5.0	6.0 / 9.0			.66 / .73		1.1 / 1.9	
	I3		3.27			16.3	3.8 / 5.6			.37 / .46		4.6 / 8.4	
	I4		0.13			5.0	6.0 / 9.0			.67 / .74		0.5 / 0.9	
	I5		0.72			8.3	4.9 / 7.5			.47 / .56		1.7 / 3.0	
	I6		0.82			9.4	4.7 / 7.2			.61 / .69		2.4 / 4.1	
	I7		0.94			7.5	5.1 / 7.7			.51 / .59		2.4 / 4.3	
	I8		0.16			5.0	6.0 / 9.0			.90 / .95		0.9 / 1.4	
	I9		1.14			10.3	4.5 / 6.9			.53 / .61		2.7 / 4.8	
	I10		1.08			5.0	6.0 / 9.0			.74 / .79		4.7 / 7.7	
	I11		2.09			9.4	4.7 / 7.2			.54 / .62		5.3 / 9.3	
	I12		0.40			5.0	6.0 / 9.0			.39 / .48		0.9 / 1.7	
	I13		1.40			14.5	4.0 / 6.0			.51 / .59		2.9 / 5.0	
	I14		1.78			8.7	5.0 / 7.4			.50 / .58		4.5 / 7.6	
	I15		0.50			5.1	6.0 / 9.0			.54 / .62		1.6 / 2.8	

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

PAGE 1 of 2

KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 1-28-92

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	q_p	
INLET	FLOWS, CONTD:												
						S	6.0 / 9.0	A	MISC	.76 / .82		1.9 / 3.1	10 / 100
	~~I18~~		0.42			S	6.0 / 9.0			.63 / .70		0.9 / 1.5	
	~~I19~~		0.24			S	6.0 / 9.0			.68 / .75		1.5 / 2.4	
	~~I20~~		0.36			S	6.0 / 9.0			.66 / .73		4.0 / 6.7	
	I21		1.02										

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

PAGE 2 of 2

KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 1-28-92

DEV
(I1)

SWH
1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I1 (INLET #1, ON PEGASUS DR., W. SIDE AT POND E1

AREA = 0.70 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	48%
NATURAL	.30	.40	52%
COMPOSIT C=	.59	.66	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=40' S= 40% t_c = 2.8

STREET FLOW: L=520' S= 9% VEL = 7 FPS ⇒ 1.3 MIN

t_c = 2.8 + 1.3 = ~~4.1~~ ⇒ 5.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .59 × 6.0 × 0.70

= 2.5 CFS

Q_{100} = .66 × 9.0 × 0.70

= 4.1 CFS

$Q_c = 3.0 L d_i^{0.5}$

INLET: 4' D-10-R INLET, SUMP ⇒ $d_{i_{10}}$ = 0.35' OK

$d_{i_{100}}$ = 0.49' OK

DEV (I2)

SWH
1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I2 (INLET #2, W. SIDE OF PEGASUS @ POND E1)

AREA = 0.29 Ac

SOIL OR LANDUSE: ASOIL, STREET

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	60%
UNDEV	.30	.40	40%
COMPOSIT C =	.66	.73	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .66 x 6.0 x 0.29

= 1.1 CFS

Q_{100} = .73 x 9.0 x 0.29

= 1.9 CFS

INLET: 4'D-10-R, SUMP ⇒ di_{10} = 0.20' OK

di_{100} = 0.29' OK

DEV. (I3)

SW4
1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I3 (INLET #3, W. SIDE OF PEGASUS DR. N. OF PHOENIX VIEW)

AREA = 1.43 Ac (OS-3) + 1.84 (I3) = 3.27

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":		C_{10}	C_{100}	%AREA
OS-3	1.43 Ac	.30	.40	44%
STREET/BLDG	0.36 Ac	.90	.95	11%
NATURAL		.30	.40	45%
COMPOSIT C=		.37	.46	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c OS-3 = 13.7 MIN

NAT. CHANNEL FLOW: L=210 S=13% Vel=3.5 T_c = 1.0

STREET FLOW: L=750 S=6.7% Vel=8 T_c = 1.6

T_c = 13.7 + 1.0 + 1.6 = 16.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .37 × 3.8 × 3.27

= 4.6 CFS

Q_{100} = .46 × 5.6 × 3.27

= 8.4 CFS

INLET: 4' D-10-R, SUMP : di_{10} = 0.53' ok

di_{100} = 0.79' ok

DEV. (I4)

SWH
1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I4 (INLET #4, E. SIDE PEGASUS @ POND E3)

AREA = 0.13 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	62%
UNDEV./LANDSCAPED	.30	.40	38%
	.67	.74	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 5 MIN.

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .67 x 6.0 x 0.13

= 0.5 CFS

Q_{100} = .74 x 9.0 x 0.13

= 0.9 CFS

INLET FLOW: 4' D-10-R, SUMP ⇒ di_{10} = 0.12' OK

di_{100} = 0.18' OK

DEV
(IS)

SWH
1-23-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I5 (INLET #5, W.S. OF CHARTWELL VIEW @ PONDEZ)

AREA = 31212 SF = 0.72 AC

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET / ROOFS .21 AC	.90	.95	29%
NATURAL	.30	.40	71%
COMPOSIT C=	.47	.56	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=150' S=14% T_c = 7.7 MIN

STREET FLOW: L= 270' S= 10% V_{EL} = 7 FPS T_c = 0.6 MIN

T_c = 7.7 + 0.6 = 8.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.9

I_{100} = 7.5

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .47 x 4.9 x .72

= 1.7 CFS

Q_{100} = .56 x 7.5 x .72

= 3.0 CFS

DEV

SWH (I6)

1-23-92 BTH

HYDROLOGY:

LOCATION: DEV. BASIN I6 (INLET #6, E. SIDE CHARTWELL VIEW @ POND E2)

AREA = 35589 SF = 0.82 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET/ROOFS .43 Ac	.90	.95	52 %
NATURAL	.30	.40	48 %
COMPOSIT C=	.61	.69	100 %

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=150 S= 13 T_c = 7.8 MIN

STREET FLOW: L=380 S= 4% VEL = 4 T_c = 1.6

T_c = 7.8 + 1.6 = 9.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.7

I_{100} = 7.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .61 x 4.7 x 0.82

= 2.4 CFS

Q_{100} = .69 x 7.2 x 0.82

= 4.1 CFS

DEV
(I7)

SWH
1-23-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I7 (INLET #7, SUMP IN ENGLISH VIEW)

AREA = 40971 SF = 0.94 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET/ROOFS .33 Ac	.90	.95	.35
NATURAL	.30	.40	.65
COMPOSIT C=	.51	.59	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=100' S=13% t_c=6.4 MIN

STREET FLOW: L=450' S=7% VEL=7FPS t_c=1.1

t_c = 6.4 + 1.1 = 7.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.1

I_{100} = 7.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .51 × 5.1 × 0.94

= 2.4 CFS

Q_{100} = .59 × 7.7 × 0.94

= 4.3 CFS

INLET: 4' D-10-R, SUMP, di_{10} = 0.34' OK

di_{100} = 0.50' OK

DEV

SWH

I8

1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I8 (INLET #8, S. SIDE ANDROMEDA DR. @ POND E9

AREA = 0.16 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET FLOW	.90	.95	100%

TIME OF CONCENTRATION: T_c MINUTES

t_c = 5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .90 × 6.0 × 0.16

= 0.9 CFS

Q_{100} = .95 × 9.0 × 0.16

= 1.4 CFS

DEV

SWH (I9)

1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I9 (INLET #9, W. SIDE CHARTWELL DR @ POND E4)

AREA = 49552 SF = 1.14 AC

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREETS / ROOFS	.90	.95	.39
NATURAL	.30	.40	.61
COMPOSIT C =	.53	.61	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 280' S= 20% T_c = 9.3 MIN

STREET FLOW: L= 440' S= 7% VEL=7FPS T_c = 1.0

T_c = 9.3 + 1.0 = 10.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.5

I_{100} = 6.9

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .53 x 4.5 x 1.14

= 2.7 CFS

Q_{100} = .61 x 6.9 x 1.14

= 4.8 CFS

INLET: 4' D-10-R, SUMP, di_{10} = 0.37' OK

di_{100} = 0.54' OK

DEV
(I-10)

SWH
1-22-92 BTH

HYDROLOGY:

LOCATION: DEV. BASIN I10 (INLET #10, AT LOW PT. OF CHARTWELL VIEW E. SIDE)

AREA = 1.08 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	70%
UNDEV/LANDSCAPING	.30	.40	30%
	.71	.79	100%

.2576
.123

TIME OF CONCENTRATION: T_c MINUTES

t_c = 5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .72 x 6.0 x 1.08

= 4.7 CFS

Q_{100} = .79 x 9.0 x 1.08

= 7.7 CFS

INLET: 6'D-10-R, SUMP => di_{10} = 0.24' OK

di_{100} = 0.44' OK

DEV
(I11)

SWH
1-23-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I11, (INLET #11,

AREA = 89337 SF = 2.05 Ac + 0.04 (OS-6) = 2.09 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREETS/ROOFS .81	.90	.95	.40
NATURAL	.30	.40	.60
COMPOSIT C=	.54	.62	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 180' S= 17% t_c = 7.9 MIN

STREET FLOW: L= 720 S=8.6% Vel = 8 FPS t_c = 1.5 MIN

t_c = 7.9 + 1.5 = 9.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.7

I_{100} = 7.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .54 x 4.7 x 2.09

= 5.3 CFS

Q_{100} = .62 x 7.2 x 2.09

= 9.3 CFS

DEV
(I12)

SWH
1-23-92 BTH

HYDROLOGY:

LOCATION: DEV. BASIN I12 (INLET #12, N. SIDE SERPENS POINT JUST W. OF PEGASUS @ POND E8)

AREA = 17332 SF = 0.40 AC

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREETS / ROOFS	.90	.95	15%
NATURAL	.30	.40	85%
COMPOSIT C=	.39	.48	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L= 30' S= 12% T_c = 3.6

STREET FLOW: L= 380' S= 10% V_{el} = 10FPS T_c = 0.6

$T_c = 3.6 + 0.6 = 4.2 \Rightarrow$ USE 5.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

$I_{10} = 6.0$

$I_{100} = 9.0$

PEAK FLOW: $Q = CIA$ (CFS)

$Q_{10} = .39 \times 6.0 \times 0.40$

$= 0.9$ CFS

$Q_{100} = .48 \times 9.0 \times 0.40$

$= 1.7$ CFS

DEV

SWH (I13)

1-23-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I13 (INLET #3, S. SIDE SERPENS POINT JUST W. OF PEGASUS @ POND E8)

AREA = 1.16 + 0.24 (OS-8) = 1.40 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREETS / ROOFS .49Ac	.90	.95	.35
NATURAL	.30	.40	.65
COMPOSIT C =	.51	.59	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 350 S = 11 T_c = 12.7

STREET FLOW: L = 860' S = 8% VEL = 8FPS T_c = 1.8

T_c = 12.7 + 1.8 = 14.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.0

I_{100} = 6.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .51 x 4.0 x 1.40

= 2.9 CFS

Q_{100} = .59 x 6.0 x 1.40

= 5.0 CFS

REVISED
NO INLET HERE!

SWH
1-23-92 BJH

DEV
I-14

HYDROLOGY:

LOCATION: DEV. BASIN I-14 (INLET #14, E. SIDE PEGASUS @ POND E6)

AREA = 0.03 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	100%

TIME OF CONCENTRATION: T_c MINUTES

t_c = 5MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .90 x 6.0 x 0.03

= 0.2 CFS

Q_{100} = .95 x 9.0 x 0.03

= 0.3 CFS

REVISED
No Inlet Here

HYDROLOGY:

LOCATION: DES BASIN I15 (INLET #15, N. SIDE ANDROMEDA DR @ POND E9)

AREA = 0.04 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	100%

TIME OF CONCENTRATION: T_c MINUTES

5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .90 x 6.0 x 0.04

= 0.2 CFS

Q_{100} = .95 x 9.0 x 0.04

= 0.3 CFS

DEV
(I14)

SWH
1-23-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I14 (INLET #114 NEW INLET ON S. SIDE ANDROMEDA DR. @ E. PROP. LINE)

AREA = 77348 SF = 1.78 Ac

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
SUB $3	.68	.75	20%
STREETS/ROOFS .35Ac	.90	.95	20%
NATURAL	.30	.40	60%
COMPOSIT C=	.50	.58	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=180 S=17% T_c = 7.9

STREET FLOW: L=360 S=8% VEL=8FPS T_c = 0.8

T_c = 7.9 + 0.8 = 8.7 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 5.0

I_{100} = 7.4

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .50 x 5.0 x 1.78

= 4.5 CFS

Q_{100} = .58 x 7.4 x 1.78

= 7.6 CFS

DEV

SWH (I15)

1-23-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I15 (INLET #15, N. SIDE ANDROMEDA @ E. PROP. LINE)

AREA = 21,818 SF = 0.50 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET / ROOF 0.20Ac	.90	.95	.40
NATURAL	.30	.40	.60
COMPOSIT C=	.54	.62	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=70 S=20 t_c = 4.7

STREET FLOW: L=220 S=10 VEL= 9FPS t_c = 0.4

t_c = 4.7 + 0.4 = 5.1 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .54 x 6.0 x 0.50

= 1.6 CFS

Q_{100} = .62 x 9.0 x 0.50

= 2.8 CFS

DEV
(I18)

SCWH
1-22-92 BJH

HYDROLOGY:

LOCATION: DEV. BASIN I18 (SWALE FROM AQUARIUS POINT)

AREA = 0.42 Ac

SOIL OR LANDUSE: ASOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET	.90	.95	76%
UNDEV	.30	.40	24%
COMPOSIT C=	.76	.82	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .76 * 6.0 * 0.42

= 1.9 CFS

Q_{100} = .82 * 9.0 * 0.42

= 3.1 CFS

PROPOSED INLET: 4'D-10-R, SUMP: di_{10} = 0.29' OK

di_{100} = 0.41' OK

DEV

(I21)

SWH
1-27-92 BJH

HYDROLOGY: FUTURE INLET

LOCATION: DEV. BASIN I20 (INLET #20, @ N. (LOWER) END OF BONNIE VISTA POINT)

AREA = 1.02 AC

SOIL OR LANDUSE:

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
STREET 0.6 AC	.90	.95	60%
NATURAL 0.4 AC	.30	.40	40%
COMPOSIT C =	.66	.73	100%

TIME OF CONCENTRATION: T_c MINUTES

T_c = 5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 6.0

I_{100} = 9.0

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .66 x 6.0 x 1.02

= 4.0 CFS

Q_{100} = .73 x 9.0 x 1.02

= 6.7 CFS

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	FLOW		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	q_p	
	OS-1		25.56	2600		23.4	3.2 / 4.7	A SOIL	3Ac Res.	.30 / .40		25 / 48	10 / 100
	OS-2		2.40	800		15.7	3.8 / 5.75					2.7 / 5.5	
	OS-3		1.43	500		13.7	4.1 / 6.2					1.8 / 3.5	
	OS-4		7.69	2300		21.5	3.3 / 5.0					7.6 / 15.4	
	OS-5		8.98	1550		21	3.3 / 5.0					9.0 / 18	
	OS-6			-									
	OS-7		4.04	8.00		15.9	3.8 / 5.7					4.6 / 9.2	
	OS-8		0.24	250		10.1	4.6 / 7.0					0.3 / 0.7	
	OS-9		19.65	2300		21.0	3.35 / 5.0					20 / 39	
	OS-9+												
	OS-10		4.61	1200		16.2	3.8 / 5.7					5.3 / 10.5	
	OS-11		0.70	250		8.5	4.9 / 7.4					1.0 / 2.1	
	OS-12		3.16	800		13.3	4.1 / 6.2					3.9 / 7.8	
	OS-13		21.23	2350		21.7	3.25 / 4.9					21 / 42	

HYDROLOGIC COMPUTATION – BASIC DATA
RATIONAL METHOD Q=CIA

PAGE 1 of 1

KLH Engineering Consultants, Inc.
PROJECT: SKYWAY HEIGHTS

By: BJH
Date: 1-3-92

SWH (OS-1)
91-559-00
1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-1

AREA = 1113576 SF = 25.56 Ac

SOIL OR LANDUSE: ASOIL 3 ACRE LOTS

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3AC LOTS	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500' S = 18% T_c = 12.9 MIN

NATURAL CHANNEL FLOW: L = 600' S = 15% VEL = 2 FPS T_c = 5 MIN

" " " : L = 1500' S = 10% VEL = 4.5 T_c = 5.5 MIN

T_c = 12.9 + 5 + 5 + 5 = 23.4 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 x 3.2 x 25.56

= 25 CFS

Q_{100} = .40 x 4.7 x 25.56

= 48 CFS

SWH (OS-2)
1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-2*

AREA = 104432 SF = 2.40 AC

SOIL OR LANDUSE: A SOIL 3 AC RES

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC. RES.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500' S = 14% T_c = 14 MIN

NAT. CHANNEL FLOW: L = 300' S = 13% VEL = 3 T_c = 1.7

T_c = 14 + 1.7 = 15.7 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.75

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.8 × 2.40

= 2.7 CFS

Q_{100} = .40 × 5.75 × 2.40

= 5.5 CFS

OS-3

SWH
1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-3

AREA = 62265 SF = 1.43 AC

SOIL OR LANDUSE: A/B SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC RES	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=500' S=15% T_c = 13.7 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.1

I_{100} = 6.2

PEAK FLOW: $Q = CIA$ (CFS)

Q_{10} = .30 × 4.1 × 1.43

= 1.8 CFS

Q_{100} = .40 × 6.2 × 1.43

= 3.5 CFS

SWH (OS-4)
1-3-92 BTH

HYDROLOGY:

LOCATION: BASIN OS-4

AREA = 334952 SF = 7.69 AC

SOIL OR LANDUSE: A/B SOIL 3 AC. RES.

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC. RES.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500 S = 18% T_c = 12.9 MIN

NAT. CHANNEL FLOW: L = 1800' S = 10% V_{EL} = 3.5 FPS T_c = 8.6 MIN

T_c = 12.9 + 8.6 = 21.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.3

I_{100} = 5.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.3 × 7.69

= 7.6 CFS

Q_{100} = .40 × 5.0 × 7.69

= 15.4 CFS

HIST
OS-5

SWH
~~1-3-92~~ BJH
1-22-92

HYDROLOGY:

LOCATION: BASIN OS-5

AREA = 195004+ BONNIE VISTA 195956 = 8.98 AC

SOIL OR LANDUSE: A/B SOIL 3 Ac. Res.

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 Ac. Res	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=500' S=12% T_c= 14.7 MIN

NAT CHANNEL FLOW: L=1500' S=11% VEL = 4.0 T_c = 6.3 MIN

T_c = 14.7 + 6.3 = 21.0 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.35

I_{100} = 5.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.3 × 8.98

= 9.0 CFS

Q_{100} = .40 × 5.0 × 8.98

= 18.0 CFS

SWH 1-3-92 (OS-7) BJH

HYDROLOGY:

LOCATION: BASIN OS-7

AREA = 175810 SF = 4.04 AC

SOIL OR LANDUSE: A/B SOIL 3 AC. RES.

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC. RES.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 400 S = 10% T_c = 14.0 MIN

NAT CHANNEL FLOW: L = 400 S = 12% VEL = 3.5 T_c = 1.9 MIN

T_c = 14.0 + 1.9 = 15.9 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.8 × 4.04

= 4.6 CFS

Q_{100} = .40 × 5.7 × 4.04

= 9.2 CFS

HIST
OS-8

SCWH
1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-8

AREA = 10237 SF = 0.24 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC. RES.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L=250' S=13% T_c = 10.1 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.6

I_{100} = 7.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 4.6 × 0.24

= 0.3 CFS

Q_{100} = .40 × 7.0 × 0.24

= 0.7 CFS

OS-9

SWH
1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-9

AREA = 855809 ÷ 19.65 Ac

SOIL OR LANDUSE: A/B SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 Ac Res	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500 S = 20% T_c = 12.4

NAT. CHANNEL FLOW: L = 1800 S = 9.4 Vel = 3.5 T_c = 8.6

T_c = 12.4 + 8.6 = 21.0

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.35

I_{100} = 5.0

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.35 × 19.65

= 20 CFS

Q_{100} = .40 × 5.0 × 19.65

= 39 CFS

OS-10

SWH
1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-10

AREA = 200616 SF = 4.61 AC

SOIL OR LANDUSE: A/B SOIL 3 Ac. Res.

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 Ac. Res.	.30	.40	100 %

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500 S = 18 T_c = 12.9

NAT CHANNEL FLOW: L = 700' S = 11 VEL = 3.5 T_c = 3.3

T_c = 12.9 + 3.3 = 16.2 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.8

I_{100} = 5.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.8 × 4.61

= 5.3 CFS

Q_{100} = .40 × 5.7 × 4.61

= 10.5 CFS

DRO
05-11

SWH
1-27-92 BJH

HYDROLOGY:

LOCATION: OFF-SITE BASIN #11

AREA = 0.70 Ac

SOIL OR LANDUSE: A SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3Ac. Res.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOWS: L=250 S=22% t_c = 8.5 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.9

I_{100} = 7.4

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 4.9 × 0.70

= 1.0 CFS

Q_{100} = .40 × 7.4 × 0.70

= 2.1 CFS

OS-12

SWH 1-3-92 BJH

HYDROLOGY:

LOCATION: BASIN OS-12

AREA = 137607 SF = 3.16 AC

SOIL OR LANDUSE: A/B SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC. RES.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 400 S = 20 T_c = 11.1

NAT. CHANNEL FLOW: L = 400 S = 15 VEL = 3 T_c = 2.2

T_c = 11.1 + 2.2 = 13.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 4.1

I_{100} = 6.2

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 4.1 × 3.16

= 3.9 CFS

Q_{100} = .40 × 6.2 × 3.16

= 7.8 CFS

OS-13

SWH
1-3-92 BTH

HYDROLOGY:

LOCATION: BASIN OS-13

AREA = 924641 SF = 21.23 AC

SOIL OR LANDUSE: A/B SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
3 AC. RES.	.30	.40	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500 S = 18 T_c = 12.9 MIN

NAT. CHANNEL FLOW: L = 1850 S = 7% VEL = 3.5 T_c = 8.8

T_c = 12.9 + 8.8 = 21.7 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.25

I_{100} = 4.9

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .30 × 3.25 × 21.23

= 21 CFS

Q_{100} = .40 × 4.9 × 21.23

= 42 CFS

HYDROLOGY:

LOCATION: BASIN OS-GCR (GOLD CAMP Rd.)

AREA = ½ × 0.29 MI² = 92.8 Ac

SOIL OR LANDUSE: 85% B, 15% C

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
UNDEV. HILLSIDE - B SOIL	.35	.45	85%
" " - C SOIL	.45	.55	15%
COMPOSIT C =	.37	.47	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500 S = 25% T_c = 9.4 MIN

NAT CHANNEL FLOW: L = 1300 S = 3% Vel = 6 T_c = 3.6 MIN

" " " : L = 3400' S = 3.4% Vel = 5 T_c = 11.3

T_c = 9.4 + 3.6 + 11.3 = 24.3 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.1

I_{100} = 4.6

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .37 × 3.1 × 92.8

= 106 CFS

Q_{100} = .47 × 4.6 × 92.8

= 201 CFS

SWH
1-27-92 BJH

(GCR)

100 YR ONLY

HYDROLOGY:

LOCATION: OFF SITE BASIN "GCR"

AREA = 0.04 MI + 0.11 MI + 0.14 MI = 0.29 MI = 186 Ac

ADJUST = 150 Ac

SOIL OR LANDUSE: #46, KUTLER, C/D SOIL

RUNOFF COEFFICIENT "C":	C_{10}	C_{100}	%AREA
NATURAL, C/D	.35	.45	100%

TIME OF CONCENTRATION: T_c MINUTES

OVERLAND FLOW: L = 500 S = 50% t_c = 8.6

NAT. CHANNEL FLOW: L = 1200 S = 37% Vel = 5 t_c = 4.0

ROADSIDE DITCH: L = 3200 S = 4% Vel = 5 t_c = 10.7

t_c = 8.6 + 4.0 + 10.7 = 23.3 MIN

ADJUST TO 27 MIN

INTENSITY: I (IN/HR) FIG. 5-1

I_{10} = 3.2

I_{100} = 4.7

PEAK FLOW: Q = CIA (CFS)

Q_{10} = .35 × 3.2 × 186/2

= 104 CFS ⇒ ADJUST ~ DONT NEED 10 YR - NO OVERTOP OF GOLD CAMP Rd.!

Q_{100} = .45 × 4.7 × 186/2

= 197 CFS ⇒ ADJUST .25 × 4.3 × 150/2 = 81 CFS