B

Type

X

Plans

GRD00-0135

Permit Number

2436

Street Number

DOTTON AVE

Street Name

SRO

Community Code

043-041-040

APN

- JOB DESCRIPTION -

JOB NUMBER: 9701GL
DATE: 12/03/97
DESCRIPTION: DUTTON PLACE-LOW RUN-REVISED
CLIENT: FARRAR/NAIFY

DESIGN STORM: 10 YEAR

DUTTON PLACE 1.
ENCLOSED TO SHOW HOW WE ESTABLISHED STARTING HGL FOR HYDRAULICS

- MINOR LOSSES TO BE CONSIDERED -

SUDDEN ENLARGEMENT: NO
SUDDEN CONTRACTION: NO
ENTRANCE LOSS: NO
BEND LOSS: NO
ANGLE LOSS: YES
JUNCTION LOSS: YES
MANHOLE LOSS: YES
CATCH BASIN LOSS: YES

FILE COPY

Supplimental for Verification

- GENERAL PIPE DATA -

NUMBER OF PIPES IN SYSTEM: 4

MANNING NUMBER, IF CONSTANT: 0.014

- SPECIFIC PIPE DATA -

PIPE #	UP. NODE	LOW. NODE	INVERT	LENGTH	DIAM	FLOW	SLOPE	MANN
1	2	1	121.20	61.29	18.00	2.24	0.00506	0.014
2	3	2	121.51	76.51	18.00	0.79	0.00392	0.014
3	4	3	121.81	323.95	18.00	0.79	0.00401	0.014
4	5	2	121.51	38.50	18.00	1.86	0.00494	0.014

- GENERAL NODE DATA -

NUMBER OF NODES IN SYSTEM: 5

NODE #1 IS AT THE LOWER END OF THE LOWEST PIPE.
DESIGN HGL AT NODE #1: 127.3

ENTRANCE LOSS COEFF, IF CONSTANT: N/A

USE 10-CHARACTER NODE DESCRIPTIONS? YES
CONSIDER HEADWATER IN CALCULATIONS? NO
CHECK CALCULATED AGAINST MAXIMUM HGL AT EACH NODE? YES

- SPECIFIC NODE DATA -

SDMH 1	1	RND	5.00	N/A	121.06	127.90	N/A	N/A	N/A
CB 1	2	REC	3.00	N/A	121.51	126.86	N/A	N/A	90
SDMH 2	3	RND	4.00	N/A	121.81	127.50	N/A	N/A	N/A
CB 3	4	REC	4.00	N/A	123.11	131.39	N/A	N/A	N/A
CB 2	5	REC	4.00	N/A	121.70	126.86	N/A	N/A	N/A

- BACKWATER CALCULATIONS -

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
										127.30	
SDMH 1	1	121.06					0.00	0.00			127.90
									127.32	127.30	
PIPE #	1	BW	0.0004	1.15	0.02	0.03					
									127.35	127.33	
CB 1	2	121.51					0.01	0.00			126.86
									127.36	127.34	
PIPE #	4	BW	0.0004	1.05	0.02	0.01					
									127.37	127.36	
CB 2	5	121.70						0.00			126.86
										127.36	

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
CB 1	2	121.51									126.86
									127.35	127.34	
PIPE #	2	BW	0.2001	0.45	0.00	0.01					
									127.35	127.35	
SDMH 2	3	121.81					0.00	0.00			127.50
									127.35	127.35	
PIPE #	3	BW	0.2001	0.45	0.20	0.02					
									127.37	127.37	
CB 3	4	123.11						0.02			131.39
										127.37	

ESTABLISHED STARTING HGL$_{10}$ FOR DUTTON III RUN

127.35

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON PLACE-LOW RUN-REVISED
OPERATOR: RTB
DATE : 12/04/97

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: CB 3										
			0.680	0.550						
10	10.00	2.11	0.680	0.550	0.79	PIPE	18.00	324.0	0.45	
25	10.00	2.41			0.90				0.51	
100	10.00	3.00			1.12				0.64	
POINT: STMH 2										
		+	0.000	0.550						
10	22.10	1.39	0.680	0.550	0.52	PIPE	18.00	76.5	0.29	
25	20.60	1.66			0.62				0.35	
100	18.50	2.17			0.81				0.46	
POINT: CB 1										
		+	2.250	0.550						
10	26.43	1.26	2.930	0.550	2.04	PIPE	18.00	61.3	1.15	
25	24.23	1.53			2.46				1.39	
100	21.28	2.01			3.25				1.84	

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON PLACE-LOW RUN-REVISED
OPERATOR: RTB
DATE : 12/04/97

K = 1.20

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: CB 2										
			1.600	0.550						
10	10.00	2.11	1.300	0.530	1.96	PIPE	18.00	38.5	1.05	
25	10.00	2.41			2.13				1.20	
100	10.00	3.00			2.64				1.50	

Checked

- JOB DESCRIPTION -

JOB NUMBER: 98018N
DATE: 12/17/99
DESCRIPTION: DUTTON PLACE III-GLORIA PARK
2436 DUTTON AVENUE
CLIENT:GEO. DEXTER
DESIGN STORM: 10 YEAR

COPY

- MINOR LOSSES TO BE CONSIDERED -

SUDDEN ENLARGEMENT: NO
SUDDEN CONTRACTION: NO
ENTRANCE LOSS: NO
BEND LOSS: NO
ANGLE LOSS: YES
JUNCTION LOSS: YES
MANHOLE LOSS: YES
CATCH BASIN LOSS: YES

- GENERAL PIPE DATA -

NUMBER OF PIPES IN SYSTEM: 23

MANNING NUMBER, IF CONSTANT: 0

- SPECIFIC PIPE DATA -

PIPE #	UP. NODE	LOW. NODE	INVERT	LENGTH	DIAM	FLOW	SLOPE	MANN
1	2	1	121.81	323.95	18.00	0.96	0.00401	0.014
2	3	2	127.80	8.00	8.00	0.33	0.01000	0.012
3	4	3	127.88	67.00	8.00	0.29	0.00507	0.012
4	5	4	128.22	24.00	6.00	0.24	0.00833	0.012
5	6	5	128.42	4.00	6.00	0.18	0.00500	0.012
6	7	6	128.44	51.00	6.00	0.14	0.00510	0.012
7	8	7	128.70	4.00	6.00	0.11	0.00500	0.012
8	9	8	128.72	51.00	6.00	0.08	0.00510	0.012
9	10	9	128.98	4.00	6.00	0.05	0.00500	0.012
10	11	1	125.20	12.00	8.00	0.24	0.01833	0.012
11	12	11	125.42	31.00	6.00	0.19	0.01839	0.012
12	13	12	125.99	55.00	6.00	0.12	0.01764	0.012
13	14	13	126.96	55.00	6.00	0.08	0.01764	0.012
14	15	14	127.93	45.00	6.00	0.08	0.00511	0.012
15	16	15	128.16	8.00	6.00	0.03	0.00500	0.012
16	17	3	127.88	81.00	6.00	0.06	0.02988	0.012
17	18	11	125.42	28.00	6.00	0.07	0.03107	0.012
18	19	18	126.29	21.00	6.00	0.07	0.00524	0.012
19	20	19	126.40	19.00	6.00	0.06	0.00526	0.012
20	21	12	125.99	43.00	6.00	0.09	0.01535	0.012
21	22	21	126.65	10.00	6.00	0.09	0.01500	0.012
22	23	13	126.96	41.00	6.00	0.07	0.03390	0.012
23	24	23	128.35	10.00	6.00	0.07	0.01500	0.012

- GENERAL NODE DATA -

NUMBER OF NODES IN SYSTEM: 24

NODE #1 IS AT THE LOWER END OF THE LOWEST PIPE.
DESIGN HGL AT NODE #1: 127.35

ENTRANCE LOSS COEFF, IF CONSTANT: N/A

USE 10-CHARACTER NODE DESCRIPTIONS? YES
CONSIDER HEADWATER IN CALCULATIONS? NO
CHECK CALCULATED AGAINST MAXIMUM HGL AT EACH NODE? YES

- SPECIFIC NODE DATA -

NODE DESCRIPT.	NODE #	NODE TYPE	DIM/ ANGL	ENTR COEF	INVERT	MAX HGL	HW	BEND ANGLE	JUNCT ANGLE
EX SDMH	1	RND	4.00	N/A	121.81	127.50	N/A	N/A	N/A
EX CB	2	REC	4.00	N/A	123.11	131.49	N/A	N/A	N/A
DI 1	3	REC	1.00	N/A	127.88	131.80	N/A	N/A	45
AD 12	4	RND	1.00	N/A	128.22	130.70	N/A	N/A	N/A
DI 2	5	REC	1.00	N/A	128.42	131.00	N/A	N/A	N/A
AD 11	6	RND	1.00	N/A	128.44	130.65	N/A	N/A	N/A
AD 9	7	RND	1.00	N/A	128.70	130.65	N/A	N/A	N/A
AD 10	8	RND	1.00	N/A	128.72	130.50	N/A	N/A	N/A
AD 7	9	RND	1.00	N/A	128.98	130.65	N/A	N/A	N/A
AD 8	10	RND	1.00	N/A	129.00	130.50	N/A	N/A	N/A
JB 1	11	REC	1.00	N/A	125.42	128.00	N/A	N/A	45
WYE	12	JCT	N/A	N/A	125.99	N/A	N/A	N/A	45
WYE	13	JCT	N/A	N/A	126.96	N/A	N/A	N/A	45
SDCO 3	14	RND	0.50	N/A	127.93	129.60	N/A	N/A	N/A
AD 6	15	RND	1.00	N/A	128.16	129.60	N/A	N/A	N/A
AD 5	16	RND	1.00	N/A	128.20	129.70	N/A	N/A	N/A
AD 13	17	RND	1.00	N/A	130.30	131.80	N/A	N/A	N/A
BEND	18	ANG	45.00	N/A	126.29	N/A	N/A	N/A	N/A
AD 1	19	RND	1.00	N/A	126.40	128.30	N/A	N/A	N/A
AD 2	20	RND	1.00	N/A	126.50	128.00	N/A	N/A	N/A
SDCO 1	21	RND	0.50	N/A	126.65	128.40	N/A	N/A	N/A
AD 3	22	RND	1.00	N/A	126.80	128.30	N/A	N/A	N/A
SDCO 2	23	RND	0.50	N/A	128.35	129.36	N/A	N/A	N/A
AD 4	24	RND	1.00	N/A	128.50	130.00	N/A	N/A	N/A

- BACKWATER CALCULATIONS -

AKA TG = TC

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
										127.35 ✓	
Start BW											
EX SDMH	1	121.81					0.00	0.00			127.50 ✓
									127.35	127.35 ✓	
PIPE #	1	BW	0.0001	0.54	0.00	0.03					
									127.39	127.38	
EX CB	2	123.11					0.00	0.00			131.49 ✓
									128.18	128.03 ✓	
PIPE #	2	0.23	0.0006	3.16	0.15	0.01					
									128.26	128.11	
DI 1	3	127.88					0.02	0.00			131.80 ✓
									128.24	128.16 ✓	
PIPE #	3	0.25	0.0005	2.36	0.09	0.03					
									128.56	128.47	

TC = 5.89 ok

AD 12	4	128.22					0.09	0.00			130.70
									128.65	128.56	
PIPE #	4	0.25	0.0016	2.41	0.09	0.04					
		0.23		2.71	0.11						
									128.76	128.65	
DI 2	5	128.42					0.01	0.00			131.00
									128.73	128.66	
PIPE #	5	0.23	0.0009	2.04	0.06	0.00					
		0.22		2.10	0.07						
									128.73	128.66	
AD 11	6	128.44					0.01	0.00			130.65
									128.74	128.71	
PIPE #	6	0.25	0.0005	1.41	0.03	0.03					
		0.19		2.02	0.06						
									128.96	128.89	
AD 9	7	128.70					0.01	0.00			130.65
									128.94	128.90	
PIPE #	7	0.19	0.0003	1.59	0.04	0.00					
		0.18		1.76	0.05						
									128.95	128.90	
AD 10	8	128.72					0.01	0.00			130.50
									128.95	128.93	
PIPE #	8	0.20	0.0002	1.09	0.02	0.01					
		0.14		1.70	0.04						
									129.17	129.12	
AD 7	9	128.98					0.00	0.00			130.65
									129.15	129.13	
PIPE #	9	0.14	0.0001	1.06	0.02	0.00					
		0.13		1.26	0.02						
									129.15	129.13	
AD 8	10	129.00						0.00			130.50
										129.13	

OK all HGL's Below TG
Dobie

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
DI 1	3	127.88									131.80
									128.16	128.16	
PIPE #	16	0.23	0.0001	0.69	0.01	0.01					
		0.08		2.85	0.13						
									130.51	130.38	
AD 13	17	130.30						0.00			131.80
										130.38	

OK Dobie

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
EX SDMH	1	121.81									127.50
									127.36	127.35	
PIPE #	10	BW	0.0003	0.69	0.01	0.00					
									127.36	127.35	
JB 1	11	125.42					0.01	0.00			128.00
									127.37	127.35	
PIPE #	11	BW	0.0010	0.97	0.01	0.03					
									127.40	127.38	
WYE	12	125.99					0.01	0.00			
									127.41	127.41	
PIPE #	12	BW	0.0004	0.61	0.01	0.02					
		0.47		0.63	0.01						
									127.43	127.43	

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
WYE	13	126.96					0.00	0.00			
									127.44	127.44	
PIPE #	13	0.47	0.0002	0.42	0.00	0.01					
		0.11		2.65	0.11						
									128.14	128.04	
SDCO 3	14	127.93					0.00	0.00			129.60
									128.12	128.07	
PIPE #	14	0.14	0.0002	1.64	0.04	0.01					
									128.35	128.30	
AD 6	15	128.16					0.01	0.00			129.60
									128.32	128.31	
PIPE #	15	0.14	0.0000	0.64	0.01	0.00					
		0.11		0.92	0.01						
									128.32	128.31	
AD 5	16	128.20						0.00			129.70
										128.31	

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
WYE	13	126.96									
									127.44	127.44	
PIPE #	22	0.47	0.0001	0.37	0.00	0.01					
		0.08		3.33	0.17						
									128.60	128.43	
SDCO 2	23	128.35					0.00	0.00			129.36
									128.55	128.46	
PIPE #	23	0.11	0.0001	2.45	0.09	0.00					
									128.70	128.61	
AD 4	24	128.50						0.00			130.00
										128.61	

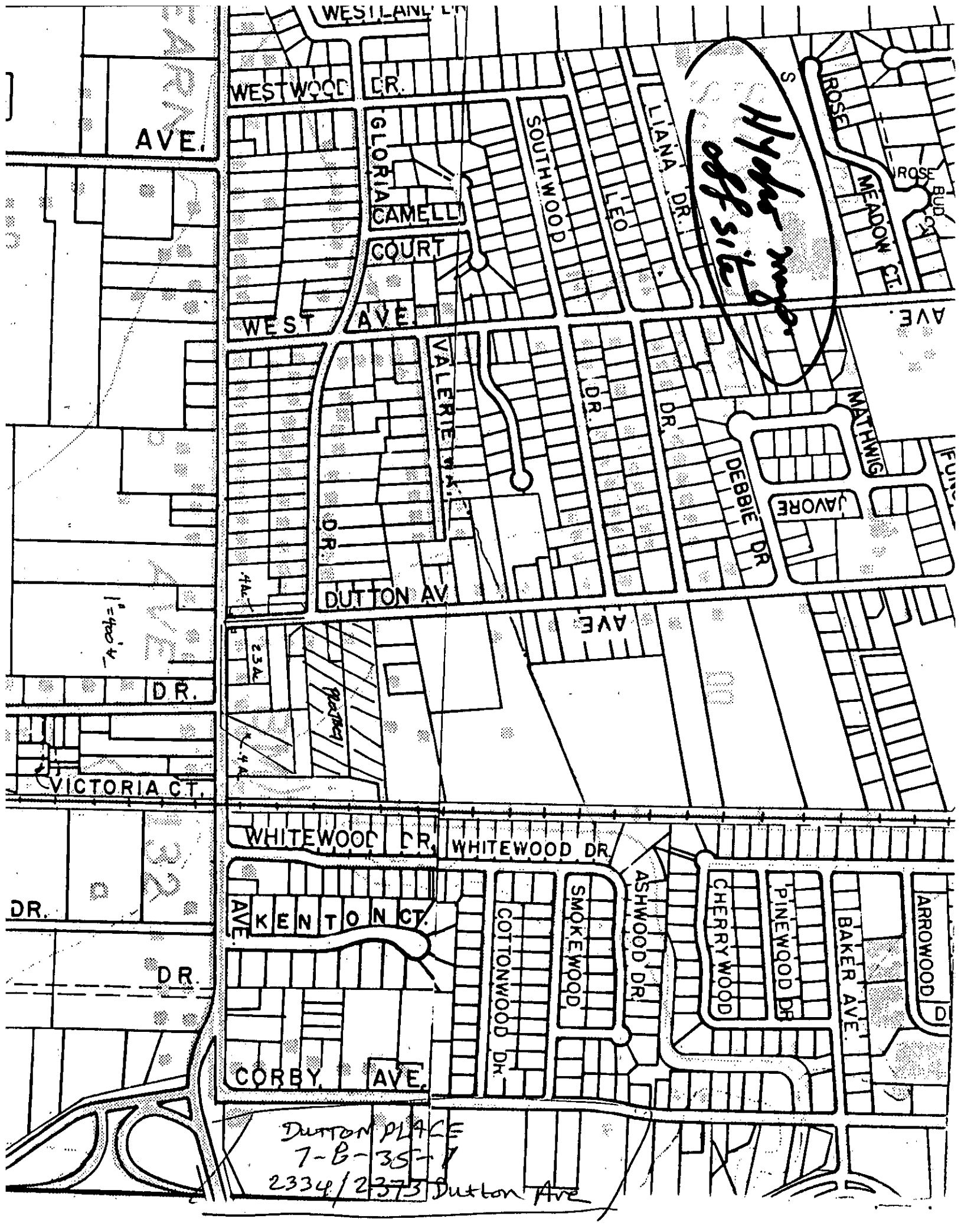
DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
WYE	12	125.99									
									127.41	127.41	
PIPE #	20	BW	0.0002	0.46	0.00	0.01					
									127.42	127.42	
SDCO 1	21	126.65					0.00	0.00			128.40
									127.42	127.42	
PIPE #	21	BW	0.0002	0.46	0.00	0.00					
									127.42	127.42	
AD 3	22	126.80						0.00			128.30
										127.42	

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
JB 1	11	125.42									128.00
									127.36	127.35	
PIPE #	17	BW	0.0001	0.36	0.00	0.00					
									127.36	127.36	
BEND	18	126.29					0.00	0.00			
									127.36	127.36	
PIPE #	18	BW	0.0001	0.36	0.00	0.00					
									127.36	127.36	

```
AD 1           19 126.40                                    0.00  0.00\_______________  128.30✓
-----------------------------------------------------------------------/ 127.36 127.36✓
     PIPE #  19  BW   0.0001  0.31  0.00  0.00                         \_______________
-----------------------------------------------------------------------/ 127.37 127.36
AD 2           20 126.50                                          0.00\_______________  128.00✓
-----------------------------------------------------------------------/        127.36✓
```

4/21/2000 – Checked for TG=ELEV VS. HGL ALL OK

[signature]


WESTWOOD DR.
GLORIA CAMELL COURT
SOUTHWOOD
LIANA DR.
LEO
ROSE
MEADOW CT.
WEST AVE
VALERIE
DR.
DEBBIE DR
MATHWIG
JAVORE
DUTTON AV
AVE
VICTORIA CT.
WHITEWOOD DR.
KENTON CT.
COTTONWOOD DR.
SMOKEWOOD
ASHWOOD DR.
CHERRYWOOD
PINEWOOD DR.
BAKER AVE.
ARROWOOD
CORBY AVE.
DUTTON PLACE
7-B-35-A
2334/2373 Dutton Ave

DUTTON PLACE III / GLOSEN PARK
INLET CAPACITY ANALYSIS

Checked K Dahl

CHECK STRUCTURES W/ LARGEST FLOWS. THEREFORE, ALL OTHERS W/ LESSER FLOWS O.K. BY COMPARISON.

$Q = CIAK$

DROP INLETS (SRCP EK)

(D1 NO 1) MAX $Q = 1.00(.55)(1.68)(.36) = 0.33$ cfs

W/H = 0.2' MAX $Q = 0.54$ cfs > .33 cfs

OKAY

SEE SRCP FLOW CHART ENCLOSED

AREA DRAINS: (SRCP SR-6)

(AD #2) MAX $Q = 1.00(.55)(1.76)(0.30) = 0.29$ cfs

TRY H = 0.2'

$Q = .61\left(\frac{0.283}{2}\right)\sqrt{32}$

$Q = 0.31$ cfs > 0.29 cfs OKAY

(SEE GRATE ANALYSIS ENCLOSED)

Title	Date	Dwg. No.
GRATE FLOW CAPACITIES FOR STANDARD GALVANIZED STEEL GRATES	JULY 1985	
	Rev. AUG. 1988	Page No.

Santa Rosa Cast Products Company 471 WEST COLLEGE AVE. • SANTA ROSA, CA 95401 • (707) 546-5016

DESIGN CRITERIA

1. GRATE IS IN SUMP AREA (LOW POINT)
2. $Q = 3.0 \times P \times H^{3/2}$ = WEIR DISCHARGE IN ~~C.F.M~~ C.F.S.
   WHERE
   - P = 1/2 PERIMETER IN FEET (ASSUME 35 → 40 PERCENT OF THE PERIMETER IS BLOCKED WITH DEBRIS AND 10 → 15 PERCENT IS TAKEN UP BY THE GRATE BEARING BARS)
   - H = WATER DEPTH IN FEET ABOVE GRATE (WATER DEPTHS GREATER THAN 0.4 FEET ARE NOT APPLICABLE. RECOMMENDED DEPTH FOR DESIGN PURPOSES IS 0.2 FEET)
3. $A = Q/CI$ = AREA IN ACRES
   WHERE
   - Q = WEIR DISCHARGE IN C.F.S.
   - C = 0.9 FOR PAVED AREAS
   - I = 2.1 INCHES PER HOUR FOR T = 10 MINUTES

FLOW CAPACITY TABLE

S.R.C.P. MODEL	INSIDE GRATE DIMENSION a" x b"	P = a+b IN FEET	H = 0.1'		H = 0.2'		H = 0.3'		H = 0.4'	
			Q cfs	A acre	Q	A	Q	A	Q	A
EK	12 x 12	2.00	0.19	0.10	0.54	0.28	0.99	0.52	1.52	0.80
BK	16 x 16	2.67	0.25	0.13	0.72	0.38	1.32	0.70	2.03	1.07
IK	16 x 24	3.33	0.32	0.17	0.89	0.47	1.64	0.87	2.53	1.34
2K	24 x 24	4.00	0.38	0.20	1.07	0.57	1.97	1.04	3.04	1.61
3K	24 x 30	4.50	0.43	0.23	1.21	0.64	2.22	1.17	3.42	1.81
5K	30 x 30	5.00	0.47	0.25	1.34	0.71	2.46	1.30	3.79	2.01
IL	24 x 36	5.00	0.47	0.25	1.34	0.71	2.46	1.30	3.79	2.01
IM	36 x 36	6.00	0.57	0.30	1.61	0.85	2.96	1.56	4.55	2.41
3L	24 x 48	6.00	0.57	0.30	1.61	0.85	2.96	1.56	4.55	2.41
3M	36 x 48	7.00	0.66	0.35	1.88	0.99	3.45	1.83	5.31	2.81
IR	48 x 48	8.00	0.76	0.40	2.15	1.14	3.94	2.09	6.07	3.21

Job No.

SRCP SR-6/SR-8

GRATE OPENINGS:

1 - ½" x 10.5"	$A = 0.0365\ ft^2$
2 - ½" x 10.3"	$A = 0.0715\ ft^2$
2 - ½" x 9.7"	$A = 0.0674\ ft^2$
2 - ½" x 8.6"	$A = 0.0597\ ft^2$
2 - ½" x 6.9"	$A = 0.0479\ ft^2$
	$A_T = 0.2630\ ft^2$

$C_d = .61$

$Q = .61\left(\frac{0.2630}{2}\right)\sqrt{2gh}$

ENTER Q AND SOLVE FOR h (HEAD ABOVE GRATE)

BEDFORD/ASSOCIATES
CONSULTING CIVIL ENGINEERS
320 COLLEGE AVENUE, SUITE 224
SANTA ROSA, CALIFORNIA 95401
707/579-9075 FAX 707/579-0570

California RCE 25168
Nevada RCE 10975
Washington RCE 30938

GLORIA PARK SUBDIVISION
HYDROLOGY AND HYDRAULICS
DISCUSSION
01/05/00

This Project ties directly into the storm drain system of Dutton Place Subdivision Phase 1 which has been reviewed and approved by the County of Sonoma PRMD Drainage Review Division.

Starting HGL's for the ten year return storm analysis were derived from the ten year HGL from the Dutton Place Subdivision Phase 1 hydraulic analysis.

The storm drain system as designed has no condition where the ten year HGL is above a top of grate elevation or above a gutter flow line elevation.

See calculation package and hydrology map enclosed.

wpc1129 / #98018

Check

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3
OPERATOR: RTB
DATE : 12/17/99

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 8										
			0.040✓	0.550						
10	10.00	2.11	0.040	0.550	0.05	PIPE	6.00	4.0	0.24	
25	10.00	2.41			0.05				0.27	
100	10.00	3.00			0.07				0.34	
POINT: AD 7										
		+	0.030✓	0.550						
10	10.28	2.08	0.070	0.550	0.08	PIPE	6.00	51.0	0.41	
25	10.25	2.38			0.09				0.47	
100	10.20	2.97			0.11				0.58	
POINT: AD 10										
		+	0.040✓	0.550						
10	12.37	1.89	0.110	0.550	0.11	PIPE	6.00	4.0	0.58	
25	12.07	2.19			0.13				0.67	
100	11.66	2.77			0.17				0.85	

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 9										
**********										
		+	0.030✓	0.550						
10	12.48	1.88	0.140	0.550	0.14	PIPE	6.00	51.0	0.74	
25	12.17	2.18			0.17				0.85	
100	11.74	2.76			0.21				1.08	
POINT: AD 11										
**********										
		+	0.040✓	0.550						
10	13.64	1.79	0.180	0.550	0.18	PIPE	6.00	4.0	0.90	
25	13.17	2.09			0.21				1.05	
100	12.52	2.67			0.26				1.34	
POINT: DI 2										
**********										
		+	0.060✓	0.550						
10	13.71	1.79	0.240	0.550	0.24	PIPE	6.00	24.0	1.20	
25	13.23	2.08			0.28				1.40	
100	12.57	2.66			0.35				1.79	
POINT: AD 12										
**********										
		+	0.060✓	0.550						
10	14.04	1.76	0.300	0.550	0.29	PIPE	8.00	67.0	0.83	
25	13.51	2.06			0.34				0.97	
100	12.79	2.64			0.43				1.25	

THIS AREA SHOULD BE "0.01" BUT .06 IS MORE CONSERVATIVE (OK)

POINT: DI 1										
**********										
		+	0.060	0.550						
10	15.38	1.68	0.360	0.550	0.33	PIPE	8.00	8.0	0.95	
25	14.66	1.98			0.39				1.12	
100	13.69	2.54			0.50				1.44	

DI 1

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: EX CB										
**********										
		+	0.680	0.550						
10	15.52	1.67	1.040	0.550	0.96	PIPE	18.00	324.0	0.54	
25	14.78	1.97			1.13				0.64	
100	13.78	2.53			1.45				0.82	
POINT: EX SDMH										
**********										
		+	0.270	0.550						
10	25.49	1.29	1.310	0.550	0.93	PIPE	18.00	76.5	0.53	
25	23.26	1.56			1.12				0.64	
100	20.37	2.06			1.48				0.84	

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3
OPERATOR: RTB
DATE : 11/16/99

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
			0.050	0.550						
10	10.20	2.11	0.050	0.550	0.06	PIPE	6.00	81.0	0.30	
25	10.00	2.41			0.07				0.34	
100	10.00	3.00			0.08				0.42	

POINT: AD 13
****

Checked K. Dl

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3
OPERATOR: RTB
DATE : 11/16/99

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 2										
			0.050✓	0.550						
10	10.00	2.11	0.050	0.550	0.06	PIPE	6.00	19.0	0.30	
25	10.00	2.41			0.07				0.34	
100	10.00	3.00			0.08				0.42	
POINT: AD 1										
		+	0.010✓	0.550						
10	11.07	2.00	0.060	0.550	0.07	PIPE	6.00	21.0	0.34	
25	10.94	2.30			0.08				0.39	
100	10.75	2.83			0.10				0.49	
POINT: BEND										
		+	0.000	0.550						
10	12.11	1.91	0.060	0.550	0.06	PIPE	6.00	28.0	0.32	
25	11.84	2.21			0.07				0.37	
100	11.47	2.79			0.09				0.47	

HYDROLOGIC STUDY
by
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320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3
OPERATOR: RTB
DATE : 11/16/99

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 3										
			0.080 ✓	0.550						
10	10.00	2.11	0.080	0.550	0.09	PIPE	6.00	10.0	0.47	
25	10.00	2.41			0.11				0.54	
100	10.00	3.00			0.13				0.67	
POINT: SDCO										
		+	0.000	0.550						
10	10.35	2.07	0.080	0.550	0.09	PIPE	6.00	43.0	0.46	
25	10.31	2.37			0.10				0.53	
100	10.25	2.96			0.13				0.66	

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OPERATOR: RTB
DATE : 11/16/99

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 4										
			0.060 ✓	0.550						
10	10.00	2.11	0.060	0.550	0.07	PIPE	6.00	10.0	0.35	
25	10.00	2.41			0.08				0.40	
100	10.00	3.00			0.10				0.50	
POINT: SDCO										
		+	0.000	0.550						
10	10.47	2.06	0.060	0.550	0.07	PIPE	6.00	41.0	0.35	
25	10.41	2.36			0.08				0.40	
100	10.33	2.95			0.10				0.50	

Checked
K. Dahle

HYDROLOGIC STUDY
by
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320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3
OPERATOR: RTB
DATE : 11/16/99

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 5										
			0.030✓	0.550						
10	10.00	2.11	0.030	0.550	0.03	PIPE	6.00	8.0	0.18	
25	10.00	2.41			0.04				0.20	
100	10.00	3.00			0.05				0.25	
POINT: AD 6										
		+	0.040✓	0.550						
10	10.75	2.03	0.070	0.550	0.08	PIPE	6.00	45.0	0.40	
25	10.66	2.33			0.09				0.46	
100	10.53	2.92			0.11				0.57	
POINT: SDCO										
		+	0.000	0.550						
10	12.64	1.86	0.070	0.550	0.07	PIPE	6.00	55.0	0.37	
25	12.30	2.16			0.08				0.42	
100	11.84	2.75			0.11				0.54	

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
			+ 0.060	0.550						
10	15.14	1.70	0.130	0.550	0.12	PIPE	6.00	55.0	0.62	
25	14.46	1.99			0.14				0.73	
100	13.54	2.56			0.18				0.93	
POINT: SD WYE										
**********										
			+ 0.080	0.550						
10	16.62	1.61	0.210	0.550	0.19	PIPE	6.00	31.0	0.93	
25	15.72	1.91			0.22				1.12	
100	14.52	2.46			0.28				1.45	
POINT: JB 1										
**********										
			+ 0.060	0.550						
10	17.17	1.59	0.270	0.550	0.24	PIPE	8.00	12.0	0.68	
25	16.18	1.88			0.28				0.80	
100	14.88	2.43			0.36				1.04	

- JOB DESCRIPTION -

JOB NUMBER: R1
DATE: 04/28/00
DESCRIPTION: GLORIA PARK
REVISED RUN-R1

DESIGN STORM: 10 YEAR

- MINOR LOSSES TO BE CONSIDERED -

SUDDEN ENLARGEMENT: NO
SUDDEN CONTRACTION: NO
ENTRANCE LOSS: NO
BEND LOSS: NO
ANGLE LOSS: YES
JUNCTION LOSS: YES
MANHOLE LOSS: YES
CATCH BASIN LOSS: YES

- GENERAL PIPE DATA -

NUMBER OF PIPES IN SYSTEM: 3

MANNING NUMBER, IF CONSTANT: 0.012

- SPECIFIC PIPE DATA -

PIPE #	UP. NODE	LOW. NODE	INVERT	LENGTH	DIAM	FLOW	SLOPE	MANN
1	2	1	122.21	15.00	6.00	0.07	0.15600	0.012
2	3	2	126.05	30.00	6.00	0.07	0.01167	0.012
3	4	3	126.40	19.00	6.00	0.06	0.00526	0.012

- GENERAL NODE DATA -

NUMBER OF NODES IN SYSTEM: 4

NODE #1 IS AT THE LOWER END OF THE LOWEST PIPE.
DESIGN HGL AT NODE #1: 127.34

ENTRANCE LOSS COEFF, IF CONSTANT: N/A

USE 10-CHARACTER NODE DESCRIPTIONS? YES
CONSIDER HEADWATER IN CALCULATIONS? NO
CHECK CALCULATED AGAINST MAXIMUM HGL AT EACH NODE? YES

- SPECIFIC NODE DATA -

DESCRIPT.	#	TYPE	ANGL	COEF		HGL		ANGLE	ANGLE
TEE	1	JCT	N/A	N/A	121.71	N/A	N/A	N/A	N/A
DI 3	2	REC	1.00	N/A	124.55	127.55	N/A	N/A	N/A
AD 1	3	RND	1.00	N/A	126.40	128.30	N/A	N/A	N/A
AD 2	4	RND	1.00	N/A	126.50	128.00	N/A	N/A	N/A

- BACKWATER CALCULATIONS -

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
										127.34	
TEE	1	121.71					0.00	0.00	_____		
									/ 127.34	127.34	
PIPE #	1	BW	0.0001	0.36	0.00	0.00			_____		
									/ 127.34	127.34	
DI 3	2	124.55					0.00	0.00	_____		127.55
									/ 127.34	127.34	
PIPE #	2	BW	0.0001	0.36	0.00	0.00			_____		
									/ 127.35	127.35	
AD 1	3	126.40					0.00	0.00	_____		128.30
									/ 127.35	127.35	
PIPE #	3	BW	0.0001	0.31	0.00	0.00			_____		
									/ 127.35	127.35	
AD 2	4	126.50						0.00	_____		128.00
									/	127.35	

- JOB DESCRIPTION -

JOB NUMBER: R2
DATE: 04/28/00
DESCRIPTION: GLORIA PARK
REVISED RUN-R2

DESIGN STORM: 10 YEAR

- MINOR LOSSES TO BE CONSIDERED -

SUDDEN ENLARGEMENT: NO
SUDDEN CONTRACTION: NO
ENTRANCE LOSS: NO
BEND LOSS: NO
ANGLE LOSS: YES
JUNCTION LOSS: YES
MANHOLE LOSS: YES
CATCH BASIN LOSS: YES

- GENERAL PIPE DATA -

NUMBER OF PIPES IN SYSTEM: 3

MANNING NUMBER, IF CONSTANT: 0.012

- SPECIFIC PIPE DATA -

PIPE #	UP. NODE	LOW. NODE	INVERT	LENGTH	DIAM	FLOW	SLOPE	MANN
1	2	1	122.42	16.00	6.00	0.09	0.15000	0.012
2	3	2	125.93	48.00	6.00	0.09	0.01500	0.012
3	4	3	126.65	10.00	6.00	0.07	0.01500	0.012

- GENERAL NODE DATA -

NUMBER OF NODES IN SYSTEM: 4

NODE #1 IS AT THE LOWER END OF THE LOWEST PIPE.
DESIGN HGL AT NODE #1: 127.35

ENTRANCE LOSS COEFF, IF CONSTANT: N/A

USE 10-CHARACTER NODE DESCRIPTIONS? YES
CONSIDER HEADWATER IN CALCULATIONS? NO
CHECK CALCULATED AGAINST MAXIMUM HGL AT EACH NODE? YES

- SPECIFIC NODE DATA -

DESCRIPT.	#	TYPE	ANGL	COEF	HGL		ANGLE	ANGLE
TEE	1	JCT	N/A	N/A	121.92	N/A	N/A	N/A	N/A
DI 4	2	REC	1.00	N/A	124.82	127.82	N/A	N/A	N/A
AD 14	3	RND	1.00	N/A	126.65	129.00	N/A	N/A	N/A
AD 3	4	RND	1.00	N/A	126.80	128.30	N/A	N/A	N/A

- BACKWATER CALCULATIONS -

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
										127.35	
TEE	1	121.92					0.00	0.00			
									127.35	127.35	
PIPE #	1	BW	0.0002	0.46	0.00	0.00					
									127.36	127.35	
DI 4	2	124.82					0.00	0.00			127.82
									127.36	127.35	
PIPE #	2	BW	0.0002	0.46	0.00	0.01					
									127.37	127.36	
AD 14	3	126.65					0.00	0.00			129.00
									127.37	127.37	
PIPE #	3	BW	0.0001	0.36	0.00	0.00					
									127.37	127.37	
AD 3	4	126.80						0.00			128.30
										127.37	

- JOB DESCRIPTION -

JOB NUMBER: R3
DATE: 04/28/00
DESCRIPTION: GLORIA PARK
REVISED RUN-R3

DESIGN STORM: 10 YEAR

- MINOR LOSSES TO BE CONSIDERED -

SUDDEN ENLARGEMENT: NO
SUDDEN CONTRACTION: NO
ENTRANCE LOSS: NO
BEND LOSS: NO
ANGLE LOSS: YES
JUNCTION LOSS: YES
MANHOLE LOSS: YES
CATCH BASIN LOSS: YES

- GENERAL PIPE DATA -

NUMBER OF PIPES IN SYSTEM: 3

MANNING NUMBER, IF CONSTANT: 0.012

- SPECIFIC PIPE DATA -

PIPE #	UP. NODE	LOW. NODE	INVERT	LENGTH	DIAM	FLOW	SLOPE	MANN
1	2	1	122.64	16.00	6.00	0.07	0.15375	0.012
2	3	2	126.60	46.00	6.00	0.07	0.03804	0.012
3	4	3	128.35	10.00	6.00	0.03	0.01500	0.012

- GENERAL NODE DATA -

NUMBER OF NODES IN SYSTEM: 4

NODE #1 IS AT THE LOWER END OF THE LOWEST PIPE.
DESIGN HGL AT NODE #1: 127.35

ENTRANCE LOSS COEFF, IF CONSTANT: N/A

USE 10-CHARACTER NODE DESCRIPTIONS? YES
CONSIDER HEADWATER IN CALCULATIONS? NO
CHECK CALCULATED AGAINST MAXIMUM HGL AT EACH NODE? YES

- SPECIFIC NODE DATA -

DESCRIPT.	#	TYPE	ANGL	COEF	HGL		ANGLE	ANGLE
TEE	1	JCT	N/A	N/A	122.14	N/A	N/A	N/A	N/A
DI 5	2	REC	1.00	N/A	125.10	128.10	N/A	N/A	N/A
AD 15	3	RND	1.00	N/A	128.35	129.40	N/A	N/A	N/A
AD 4	4	RND	1.00	N/A	128.50	130.00	N/A	N/A	N/A

- BACKWATER CALCULATIONS -

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
										127.35	
TEE	1	122.14					0.00	0.00			
									127.35	127.35	
PIPE #	1	BW	0.0001	0.36	0.00	0.00					
									127.35	127.35	
DI 5	2	125.10					0.00	0.00			128.10
									127.35	127.35	
PIPE #	2	BW	0.0001	0.36	0.00	0.01					
		0.08		3.33	0.17						
									128.60	128.43	
AD 15	3	128.35					0.00	0.00			129.40
									128.46	128.43	
PIPE #	3	0.08	0.0000	1.43	0.03	0.00					
		0.07		1.94	0.06						
									128.62	128.57	
AD 4	4	128.50						0.00			130.00
										128.57	

- JOB DESCRIPTION -

JOB NUMBER: R4
DATE: 04/28/00
DESCRIPTION: GLORIA PARK
REVISED RUN-R4

DESIGN STORM: 10 YEAR

- MINOR LOSSES TO BE CONSIDERED -

SUDDEN ENLARGEMENT: NO
SUDDEN CONTRACTION: NO
ENTRANCE LOSS: NO
BEND LOSS: NO
ANGLE LOSS: YES
JUNCTION LOSS: YES
MANHOLE LOSS: YES
CATCH BASIN LOSS: YES

- GENERAL PIPE DATA -

NUMBER OF PIPES IN SYSTEM: 3

MANNING NUMBER, IF CONSTANT: 0.012

- SPECIFIC PIPE DATA -

PIPE #	UP. NODE	LOW. NODE	INVERT	LENGTH	DIAM	FLOW	SLOPE	MANN
1	2	1	122.60	16.00	6.00	0.08	0.20000	0.012
2	3	2	127.30	55.00	6.00	0.08	0.01600	0.012
3	4	3	128.18	4.00	6.00	0.03	0.00500	0.012

- GENERAL NODE DATA -

NUMBER OF NODES IN SYSTEM: 4

NODE #1 IS AT THE LOWER END OF THE LOWEST PIPE.
DESIGN HGL AT NODE #1: 127.36

ENTRANCE LOSS COEFF, IF CONSTANT: N/A

USE 10-CHARACTER NODE DESCRIPTIONS? YES
CONSIDER HEADWATER IN CALCULATIONS? NO
CHECK CALCULATED AGAINST MAXIMUM HGL AT EACH NODE? YES

- SPECIFIC NODE DATA -

NODE	NODE	NODE	PIPE	ENTR.	INVERT	MAX.	HGL	BEND	JUNCT

DESCRIPT.	#	TYPE	ANGL	COEF	HGL		ANGLE	ANGLE
TEE	1	JCT	N/A	N/A	122.35	N/A	N/A	N/A	N/A
DI 6	2	REC	1.00	N/A	125.80	128.80	N/A	N/A	N/A
AD 6	3	RND	1.00	N/A	128.18	129.60	N/A	N/A	N/A
AD 5	4	RND	1.00	N/A	128.20	129.70	N/A	N/A	N/A

- BACKWATER CALCULATIONS -

DESCR	#	D/INV	SF	V	VH	HF	HM	HW	EGL	HGL	MAX HGL
										127.36	
TEE	1	122.35					0.00	0.00	127.36	127.36	
PIPE #	1	BW	0.0002	0.41	0.00	0.00			127.37	127.36	
DI 6	2	125.80					0.00	0.00	127.51	127.41	128.80
PIPE #	2	0.11	0.0002	2.65	0.11	0.01			128.39	128.29	
AD 6	3	128.18					0.02	0.00	128.32	128.30	129.60
PIPE #	3	0.11	0.0000	0.99	0.02	0.00					
		0.10		1.01	0.02				128.32	128.30	
AD 5	4	128.20						0.00			129.70
										128.30	

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3-REVISED R4
OPERATOR: RTB
DATE : 04/27/00

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 5										
			0.030	0.550						
10	10.00	2.11	0.030	0.550	0.03	PIPE	6.00	4.0	0.18	
25	10.00	2.41			0.04				0.20	
100	10.00	3.00			0.05				0.25	
POINT: AD 6										
		+	0.040	0.550						
10	10.38	2.07	0.070	0.550	0.08	PIPE	6.00	55.0	0.41	
25	10.33	2.37			0.09				0.46	
100	10.26	2.96			0.11				0.58	
POINT: DI 6										
		+	0.010	0.550						
10	12.64	1.86	0.080	0.550	0.08	PIPE	6.00	16.0	0.42	
25	12.30	2.16			0.10				0.48	
100	11.84	2.75			0.12				0.62	

HYDROLOGIC STUDY
by
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JOB : DUTTON 3-REVISED R3
OPERATOR: RTB
DATE : 04/27/00

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 4										
**********										
			0.030	0.550						
10	10.00	2.11	0.030	0.550	0.03	PIPE	6.00	10.0	0.18	
25	10.00	2.41			0.04				0.20	
100	10.00	3.00			0.05				0.25	
POINT: AD 15										
**********										
		+	0.030	0.550						
10	10.94	2.01	0.060	0.550	0.07	PIPE	6.00	46.0	0.34	
25	10.82	2.31			0.08				0.39	
100	10.66	2.90			0.10				0.49	
POINT: DI 5										
**********										
		+	0.010	0.550						
10	13.21	1.82	0.070	0.550	0.07	PIPE	6.00	16.0	0.36	
25	12.80	2.12			0.08				0.42	
100	12.23	2.70			0.10				0.53	

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3-REVISED R2
OPERATOR: RTB
DATE : 04/27/00

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 3										
			0.060	0.550						
10	10.00	2.11	0.060	0.550	0.07	PIPE	6.00	10.0	0.35	
25	10.00	2.41			0.08				0.40	
100	10.00	3.00			0.10				0.50	
POINT: AD 14										
		+	0.020	0.550						
10	10.47	2.06	0.080	0.550	0.09	PIPE	6.00	48.0	0.46	
25	10.41	2.36			0.10				0.53	
100	10.33	2.95			0.13				0.66	
POINT: DI 4										
		+	0.010	0.550						
10	12.20	1.90	0.090	0.550	0.09	PIPE	6.00	16.0	0.48	
25	11.93	2.20			0.11				0.55	
100	11.54	2.78			0.14				0.70	

HYDROLOGIC STUDY
by
BEDFORD ASSOCIATES
320 COLLEGE AVENUE, #224
Santa Rosa, CA 95401

JOB : DUTTON 3-REVISED
OPERATOR: RTB
DATE : 04/27/00

K = 1.00

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)
POINT: AD 2										
			0.050	0.550						
10	10.00	2.11	0.050	0.550	0.06	PIPE	6.00	19.0	0.30	
25	10.00	2.41			0.07				0.34	
100	10.00	3.00			0.08				0.42	
POINT: AD 1										
		+	0.010	0.550						
10	11.07	2.00	0.060	0.550	0.07	PIPE	6.00	35.0	0.34	
25	10.94	2.30			0.08				0.39	
100	10.75	2.89			0.10				0.49	
POINT: DI 3										
		+	0.010	0.550						
10	12.81	1.85	0.070	0.550	0.07	PIPE	6.00	15.0	0.36	
25	12.45	2.15			0.08				0.42	
100	11.95	2.73			0.11				0.54	

GLORIA PARK SUBD'N
JB # 9801B
GUTTER FLOW ANALYSIS
5/1/00

$$\text{AREA} = \frac{50' \times 365'}{43560} = 0.44 \text{ ACRES (CONSERVATIVE)}$$

$K = 1.0$

$C = 0.80$ (CONSERVATIVE)

$I = 2.11$

$$Q_{10} = (1.0)(0.80)(2.11)(0.44) = 0.74 \text{ CFS}$$

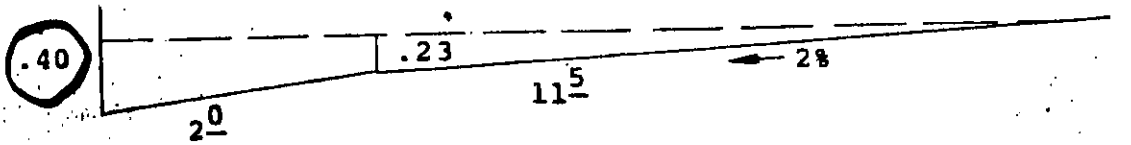
Q_{10} ALLOWABLE W/ MAX. DEPTH OF GUTTER FLOW @ 0.40' = 3.69 CFS
(SEE NOMOGRAPH ATTACHED)

$0.74 \text{ CFS} < 3.69 \text{ CFS}$ $\therefore$ OK

REGISTERED PROFESSIONAL ENGINEER
RICHARD TANNER BEDFORD
No. C 25168
Exp. 12/31/01
CIVIL
STATE OF CALIFORNIA

5/1/00

ALLOWABLE FLOWS IN STANDARD STREET AT Y = 0.40



$$A = \frac{.40 + .23}{2} \times 2 + \frac{.23 \times 11.5}{2} = 0.63 + 1.32 = 1.95$$

$$P = .40 + 2.00 + 11.50 = 13.90$$

$$R = A/P = \frac{1.95}{13.90} = 0.140$$

$$Q = \frac{1.486}{n} \times A \times R\ 2/3 \times S\ 1/2 \qquad V = Q/A = \frac{52.0 \times S\ 1/2}{1.95}$$

$$= \frac{1.486}{0.015} \times 1.95 \times 0.140\ 2/3 \times S\ 1/2 \qquad = 26.7 \times S\ 1/2$$

$$= 52.0 \times S\ 1/2$$

S	S 1/2	Q	V
.003	.055	2.86	1.47
.004	.063	3.24	1.68
.005	.071	3.69	1.89
.006	.077	4.00	2.05
.007	.084	4.47	2.22
.008	.089	4.63	2.37
.009	.095	4.94	2.54
.010	.100	5.20	2.67
.011	.105	5.46	2.80
.012	.110	5.71	2.94
.013	.114	5.93	3.04
.014	.118	6.14	3.15
.015	.122	6.34	3.26
.016	.126	6.55	3.36
.017	.130	6.76	3.47
.018	.134	6.97	3.58
.019	.138	7.17	3.68
0.020	.141	7.33	3.76
0.03	.173	9.01	4.62
0.04	.200	10.40	5.34
0.05	.224	11.63	5.97
0.06	.245	12.74	6.54
0.07	.265	13.76	7.06
0.08	.283	14.71	7.55
0.10	.316	16.44	8.44
0.12	.346	18.01	9.25
0.14	.374	19.46	9.99
0.15	.387	20.14	10.34