Volume 6: Subbasin Data – "D" Subbasins

Loop 303/White Tanks ADMPU Area Hydrologic Analysis in Maricopa County, Arizona

Flood Control District of Maricopa County

Version 1.2/ September 2009
HDR Project No. 079902
FCD Contract No. 2007C031

Registered Professional Engineer (Civil)
CERTIFICATE NO.
35571
LINDA A.
POTTER
Date Signed 9/4/09
ARIZONA U.S.A.
Expires 12/31/09

D01

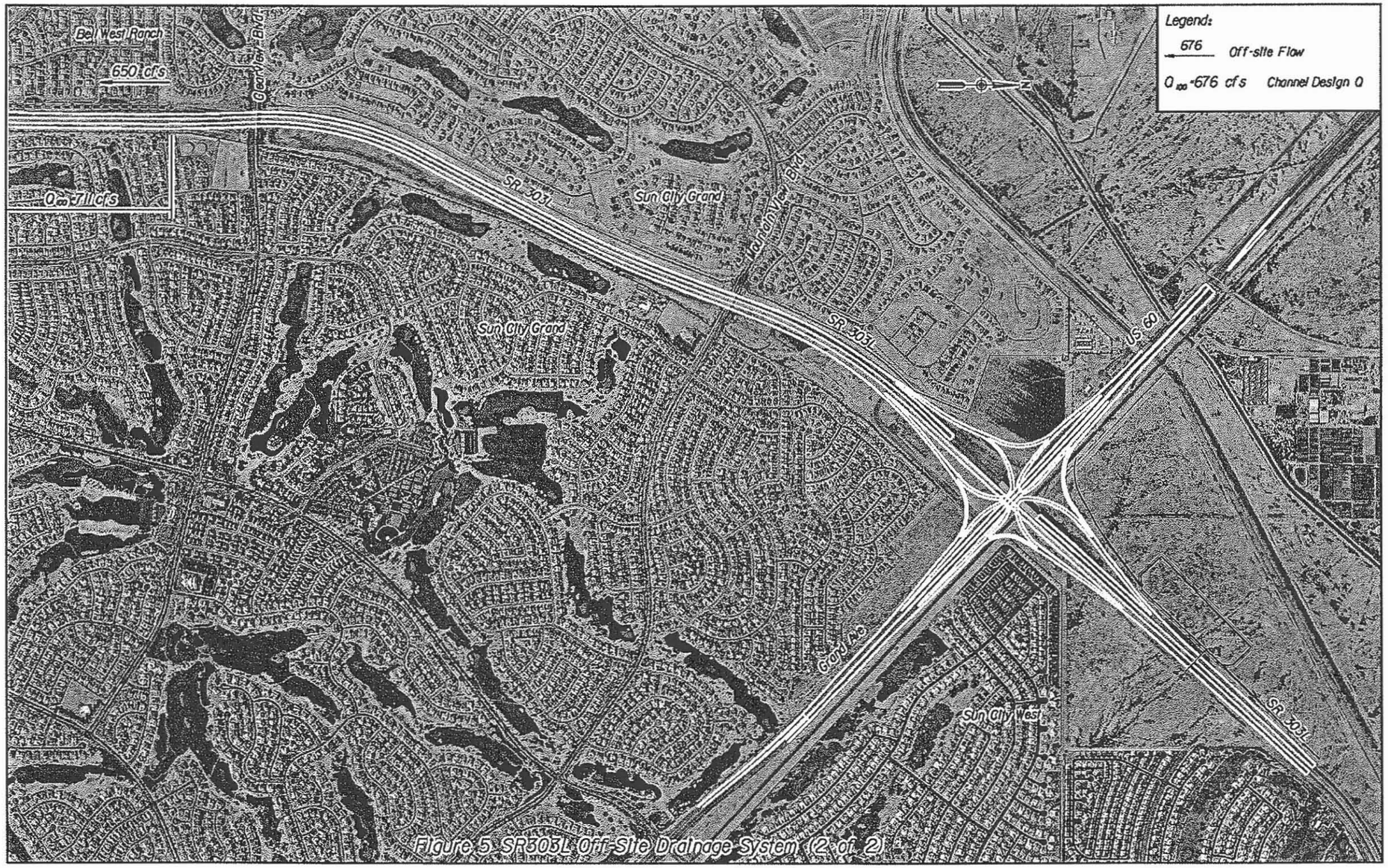
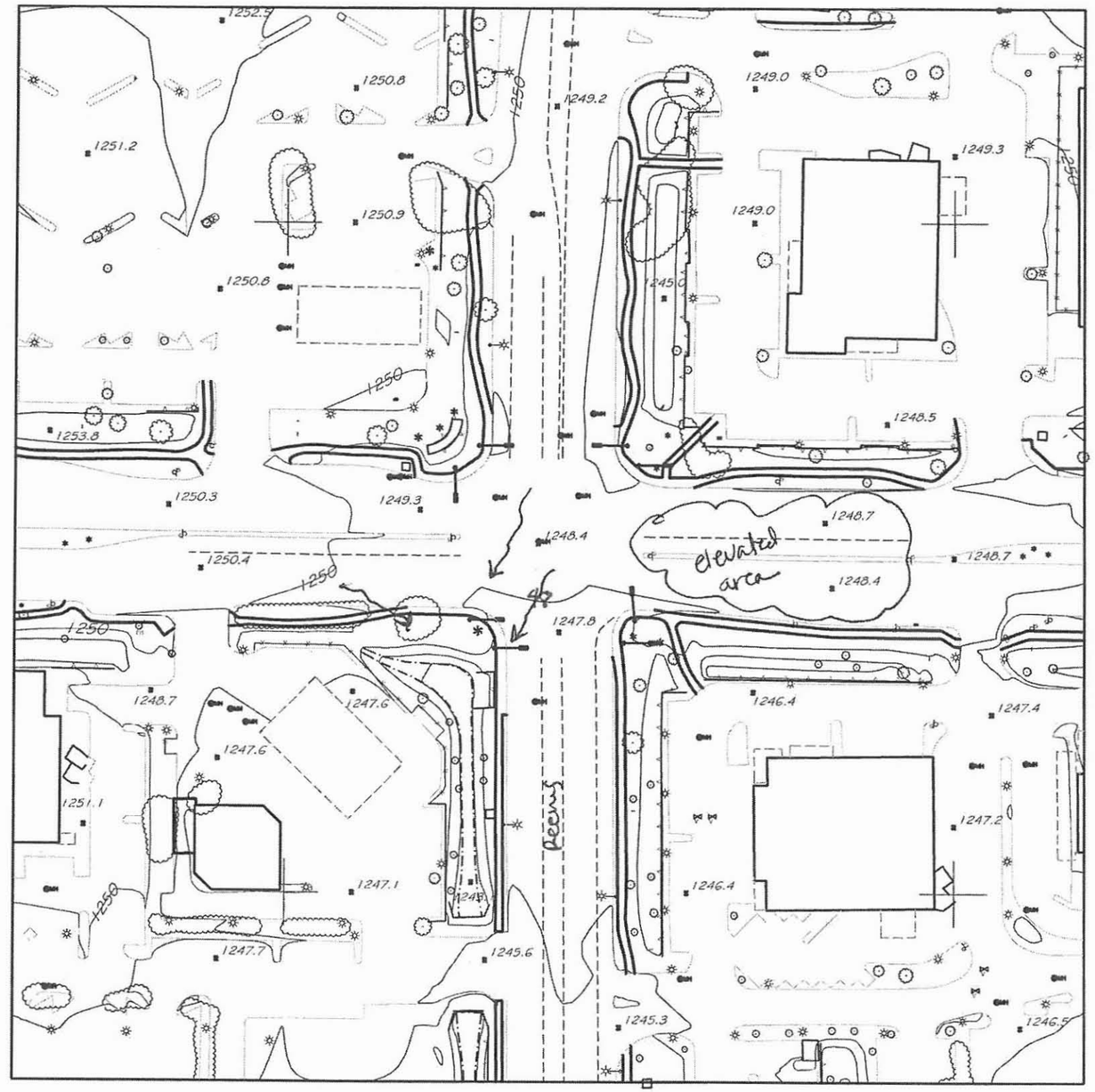


Figure 5 – SR303L Off-Site Drainage System
2 of 2

D02

1" = 100' Bell @ Reems

Bell



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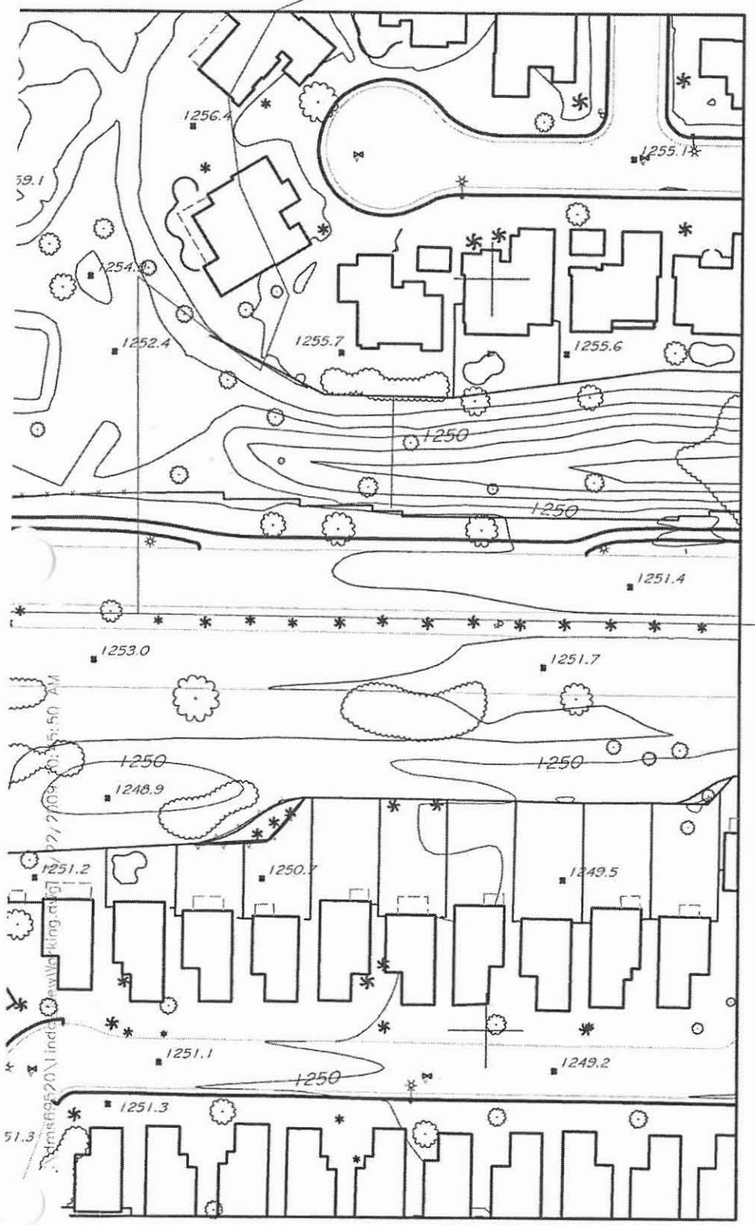
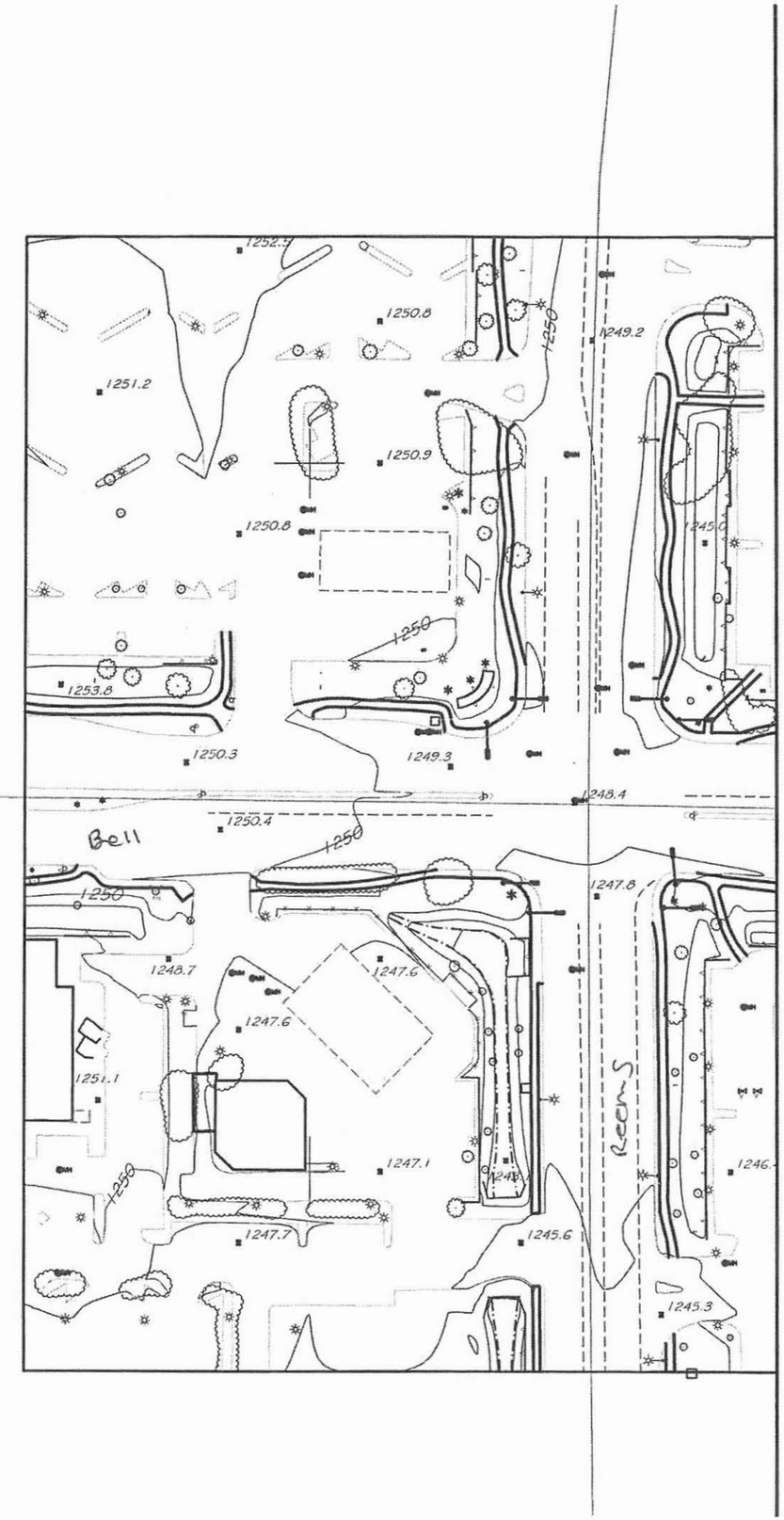
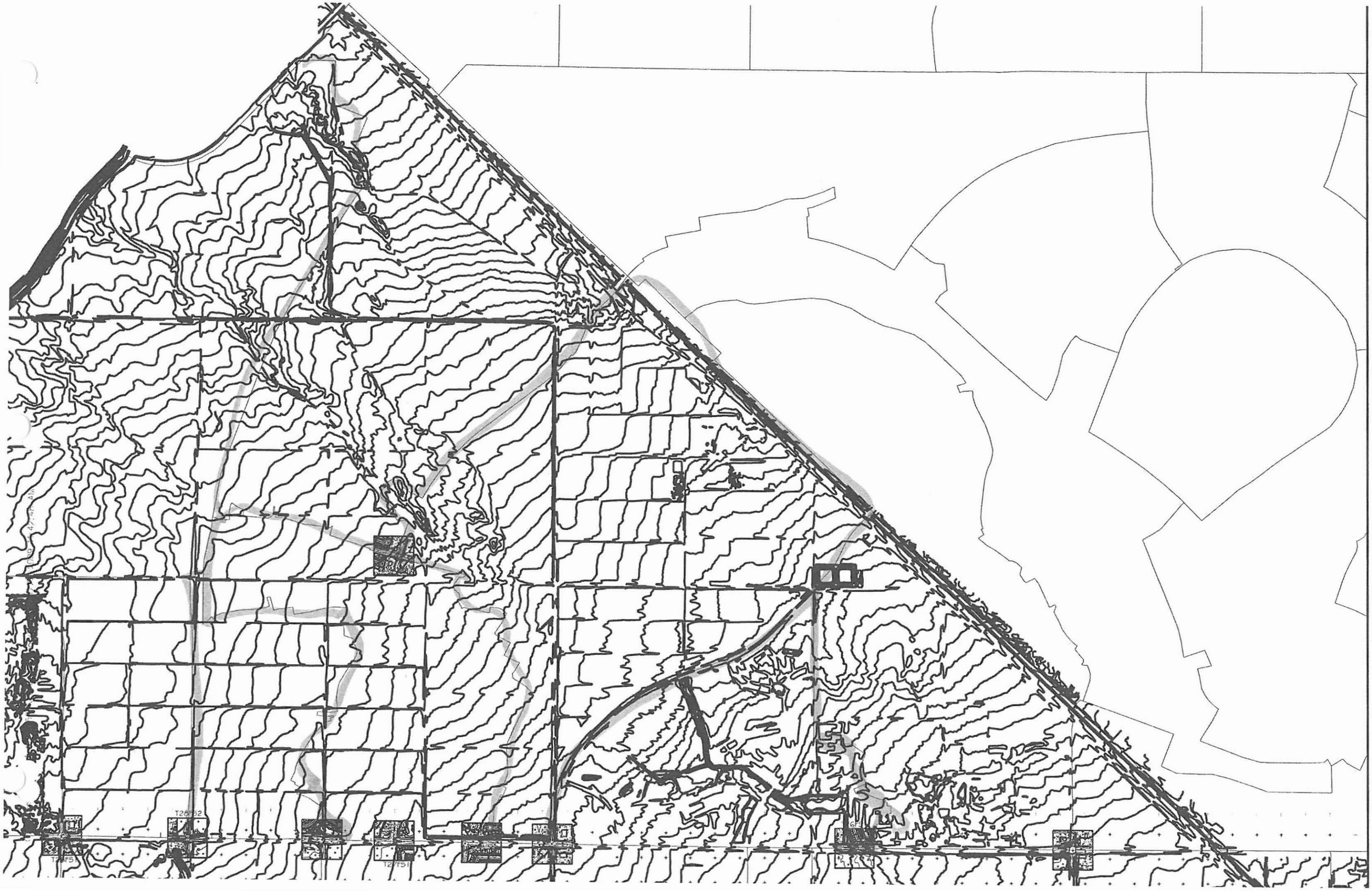
1" = 100'
Bell at Reems






T25/52
T25/51
T27/51

D03

DD03
Bell Between
Bullard & Litchfield

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Bell Road

Project Description

Solve For	Discharge

Input Data

Channel Slope	0.00641	ft/ft
Gutter Width	6.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Spread	42.00	ft
Roughness Coefficient	0.013	

Results

Discharge	118.45	ft^3/s
Flow Area	18.36	ft^2
Depth	1.08	ft
Gutter Depression	0.24	ft
Velocity	6.45	ft/s

D04

DD04 SE

Project: Loop 303/White Tanks ADMPU AHA | HDR Prj. No.: 79902 | By: JM | Date: 2/10/2009
Task: Street Intersection Diversions | Client Prj. No.: 2007C031 | Checked: LP | Date: 3/10/09

	R/W, ft.	PW, ft.	F, ft
a	174	102	31
m	173	104	29.5
c	137	67	30
r	178	71	49.5

N-S D/S street R/W (ft)	178
Main flow to	EAST
Diversion to	SOUTH
Crown Direction	E-W
N-S street name	BR
E-W street name	LR

Conveyance, $K = (1.49/n)*(A^{1.67}/P^{0.67})$
Q = discharge, cfs
n = Manning's roughness
A = flow area, sq. ft.
P = wet perimeter, ft.
S = longitudinal slope, ft/ft

Capacity, $Q = K*S^{0.5}$

Curb height = 0.5 ft.
Weir Flow down side streets, $Q=CLH^{1.5}$
C = 2.9
L = weir length, ft.
H = flow depth, ft.

Streets
BR = Bell Road
LR = Litchfield Road
a = Bell Road U/S
m = Bell Road D/S
c = Litchfield Road U/S
r = Litchfield Road D/S

Diversion ID	Direction	Side	STREET PARAMETERS: Street Type (a)	Top of Slope Elev., ft	Bottom of Slope Elev., ft.	Slope Length, ft.	Ave. Long. Slope, ft/ft	Top of Crown ft.
DD04SE	E-W	U/S	a	1206.0	1204.7	241.6	0.0052	1.02
		D/S	m	1204.0	1203.3	235.5	0.0028	1.04
	N-S	U/S	c	1205.3	1204.0	259.6	0.0047	0.67
		D/S	r	1204.4	1204.3	357.7	0.0001	0.71
			Average Gutter Elev. at Curb Returns, ft					
		U/S	1204.4					
		D/S	1203.8					

Conveyance (K) of one side of E-W Streets (cfs)

	crown	curb	sidewalk	ROW	ft above crown		
U/S	1504.2	227.3	332.9	1605.4			
D/S	crown	curb	sidewalk	ROW	0.50 ft above E-W D/S crown	1.00	2.00
	1627.0	227.3	302.9	1455.9	5849.8	11849.1	28358.6
WSEL Elevations (ft)	1204.81	1204.27	1204.34	1204.78	1205.31	1205.81	1206.81

Conveyance (K) of N-S Streets (cfs)

	crown	curb	sidewalk	ROW	ft above crown		
U/S	888.3	454.6	665.8	2971.7			
D/S	crown	curb	sidewalk	ROW	0.83 ft above N-S D/S crown	1.33	2.33
	1034.2	454.6	665.8	5676.6	10068.2	22157.5	53028.9
WSEL Elevations (ft)	1204.48	1204.27	1204.36	1205.07	1205.31	1205.81	1206.81

FLOW CAPACITIES U/S OF INTERSECTION (cfs)

E-W crown	curb	sidewalk	ROW	above crown
216.4	32.7	47.9	230.9	
N-S crown	curb	sidewalk	ROW	above crown
60.6	31.0	45.5	202.9	

FLOW CAPACITIES D/S OF INTERSECTION (cfs)

E-W crown	curb	sidewalk	ROW	0.5 ft	1 ft	2 ft
172.3	24.1	32.1	154.2	619.0	1255.0	3003.0
N-S crown	curb	sidewalk	ROW	0.83 ft above E-W D/S crown	1.33 ft	2.33 ft
7.7	3.4	5.0	42.4	75.0	166.0	397.0

STORM DRAIN OR DITCH CAPACITY (cfs) E-W	N-S
0	
	0

WEIR FLOW OVER E-W CROWN (cfs)

crown	curb	sidewalk	ROW	0.5 ft over	1 ft over	2 ft over
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
0.0	0.0	0.0	0.0	182.5	516.2	1460.0

D/S INTERSECTION PARAMETERS

Location E-W Street	Location N-S Street	Street Slope, S, West ft/ft	Street Slope, S, South ft/ft	R/W Width West (1/2) ft.	R/W Width South ft.
LR		0.00280		173	
	BR		0.00006		178

D/S SLOPE, R/W AND COMPOSITE RATIOS

Slope Ratios,SR, (S^1/2) E-W (SR-W) $S_w^{1/2}/(S_w^{1/2}+S_s^{1/2})$	Slope Ratios,SR, (S^1/2) N-S (SR-S) $S_s^{1/2}/(Sw^{1/2}+Ss^{1/2})$	R/W Ratios, R/WR, E-W (R/WR-W) $W_w/(W_w+W_s)$	R/W Ratios, R/WR, N-S (R/WR-S) $W_s/(W_w+W_s)$	Composite Ratios,CR, E-W, 1/2 street (CR-W)	Composite Ratios,CR, N-S (CR-S)
0.876		0.493		0.327	
	0.124		0.507		0.673

		storm d.	1/2@crown	curb	sidewalk	ROW	0.5 ft over	1 ft over	2 ft over
INFLOW CAPACITY (DI)	0.0	0.0	86.1	15.4	21.0	158.5	512.0	904.0	1940.0
E-W OUTFLOW CAPACITY (NORTH SIDE)	0.0	0.0	86.1	12.0	16.0	77.0	127.0	111.0	41.0
E-W OUTFLOW CAPACITY (SOUTH SIDE)	0.0	0.0	0.0	0.0	0.0	39.1	126.0	259.0	621.0
STORM DRAIN CAPACITY TO WEST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STORM DRAIN CAPACITY TO SOUTH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTFLOW CAPACITY TO SOUTH (DQ)	0.0	0.0	0.0	3.4	5.0	42.4	259.0	534.0	1278.0

	storm d.	1/2@crowr	curb	sidewalk	ROW	0.5 ft over	1 ft over	2 ft over
	0.0	0.0	15.4	21.0	86.1	158.5	512.0	904.0	1940
	0.0	0.0			86.1	158.5	512.0	904.0	1940

INFLOW CAPACITY (DI), cfs						
0.0	0.0	86.1	158.5	512.0	904.0	1940.0

OUTFLOW CAPACITY TO SOUTH (DQ), cfs						
0.0	0.0	0.0	42.4	259.0	534.0	1278.0

Bell Road U/S

ROW to ROW (ft)	174	Curb Height	0.5	Street Cross Slope, LT	0.02
Curb to Curb (face) (ft)	102	Top of Curb Width	0.5	Street Cross Slope, RT	0.02
Width of SW (ft)	6			SW Cross Slope, LT	0.015
SW to ROW (ft)	30			SW Cross Slope, RT	0.015

SW to ROW slope, LT	0.015
SW to ROW slope, RT	0.015

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	29.5	35.5	36	36	87	138	138	138.5	144.5	174
y	0.02	-0.43	-0.52	-0.52	-1.02	0.00	-1.02	-0.52	-0.52	-0.43	0.02

<----- LEFT | RIGHT ------->

						Depth
TOP curb elev. (ft)	-0.52	curb-crown	-0.52	crown Conv	3008.4	1.02
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50
TOP ROW elev. (ft)	0.02	SW-curb	0.09	SW Conv K	665.8	0.59
gutter elevation (ft)	-1.02	ROW-SW	0.45	ROW Conv K	3210.7	1.04
TOP SW elev. (ft)	-0.43	SW-crown	-0.43	.5 ft over full	11298.8	1.52
max flow depth (ft)	1.02	ROW-crown	0.02	1 ft over full	23393.7	2.02
n1 (pavement)	0.0160	crown-gutter	1.02	2 ft over full	56654.6	3.02
n2 (curb)	0.0160	ROW-gutter	1.04	3 ft over full	101123	4.02
n3 (SW)	0.0160	SW-gutter	0.59			
n4 (overland)	0.0250					

		HALF P	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
n_c crown (composit)	0.0192	P1 (pavement)	51.01	25.00	29.51	51.01	51.01	51.01	51.01	51.01
n_c curb (composit)	0.0160	P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
n_c SW (composit)	0.0159	P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
n_c ROW (composit)	0.0192	P4 (SW)	6.00	0.00	6.00	6.00	6.00	6.00	6.00	6.00
n_c .5 ft over (comp)	0.0192	P5 (ROW)	28.67	0.00	0.00	30.00	30.02	30.46	31.46	31.46
n_c 1 ft over (comp)	0.0193	ΣP	86.68	25.50	36.51	88.01	88.03	88.47	89.47	89.47
n_c 2 ft over (comp)	0.0193									
n_c 3 ft over (comp)	0.0193									

HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
A2	2.77	0.00	2.77	2.77	2.77	2.77	2.77	2.77
A3	26.27	0.00	0.00	26.27	26.27	26.27	26.27	26.27
A4	0.00	0.00	0.00	1.74	1.74	1.74	1.74	1.74
A5					41.76	85.26	172.26	259.26
ΣA	35.29	6.25	9.02	37.03	78.79	122.29	209.29	296.29

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.52	1.02	1	1	1	1	1
SW-crown	-0.43	0.93	6.25	2.77	26.27	1.74	41.76
ROW-crown	0.02	0.48					
			P1	P2	P3	P4	P5
			1	1	1	1	1
			51.01	0.50	0.50	6.00	30.00

		1	A1	A2	A3	A4	A5
curb-crown	-0.52	1.52	1	1	1	1	1
SW-crown	-0.43	1.43	6.25	2.77	26.27	1.74	85.26
ROW-crown	0.02	0.98					
1+curb-crown	0.48	0.52	P1	P2	P3	P4	P5
			1	1	1	1	1
			51.01	0.50	0.50	6.00	30.46

		2	A1	A2	A3	A4	A5
curb-crown	-0.52	2.52	1	1	1	1	1
SW-crown	-0.43	2.43	6.25	2.77	26.27	1.74	172.26
ROW-crown	0.02	1.98					
2+curb-crown	1.48	0.52	P1	P2	P3	P4	P5
			1	1	1	1	1
			51.01	0.50	0.50	6.00	31.46

		3	A1	A2	A3	A4	A5
curb-crown	-0.52	3.52	1	1	1	1	1
SW-crown	-0.43	3.43	6.25	2.77	26.27	1.74	259.26
ROW-crown	0.02	2.98					
3+curb-crown	2.48	0.52	P1	P2	P3	P4	P5
			1	1	1	1	1
			51.01	0.50	0.50	6.00	32.46

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.77	28.01	1.76
2	6.25	2.77	26.27	1.74
3	6.25	29.03	-30.89	32.63
4	26.01	-26.52	4.91	32.63
2	6.25	2.77	26.27	1.74

CASE
2

Top	Area calculator - Crown > ROW	(Full Street)	(Half Street)	1	Components 2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
RW	A3 (sq ft)	56.02	28.01	6.75	2.70	0.23	18.34
crown	A4 (sq ft)	3.52	1.76	0.6	0.12	0.01	1.03
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - ROW > Crown > SW	(Full Street)	(Half Street)	1	Components 2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
crown	A3 (sq ft)	52.54	26.27	8.74	0.22	17.31	
RW	A4 (sq ft)	3.48	1.74	0.7067	0.01	1.02	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - SW > Crown > TC	(Full Street)	(Half Street)	1	Components 2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
crown	A2 (sq ft)	58.06	29.03	9.01	0.26	19.76	
back SW	A3 (sq ft)	-61.78	-30.89	-8.74	-0.22	-21.93	
RW	A4 (sq ft)	65.26	32.63	9.45	0.225	22.95	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - TC > Crown > GUTTER	(Full Street)	(Half Street)	1	Components 2	3	4
crown	A1 (sq ft)	52.02	26.01	26.01			
curb	A2 (sq ft)	-53.04	-26.52	-26.52			
back SW	A3 (sq ft)	9.82	4.91	0.27	0.05	4.59	
RW	A4 (sq ft)	65.26	32.63	9.45	0.225	22.95	
	A5 (sq ft)	0.00	0.00				

Depth Sorter

Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Conveyance (cfs)
0	0	0	0	0	0
1.02	0.50	0.50	0.50	0.50	454.6
0.50	1.02	0.59	0.59	0.59	665.8
0.59	0.59	1.02	1.02	1.02	3008.4
1.04	1.04	1.04	1.04	1.04	3210.7
1.52	1.52	1.52	1.52	1.52	11298.8
2.02	2.02	2.02	2.02	2.02	23393.7
3.02	3.02	3.02	3.02	3.02	56654.6
4.02	4.02	4.02	4.02	4.02	101123

Bell Road D/S

ROW to ROW (ft)	173	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	104	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	5			SW Cross Slope, LT	0.015		
SW to ROW (ft)	29.5			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	29	34	34.5	34.5	86.5	138.5	138.5	139	144	173
y	-0.03	-0.47	-0.54	-0.54	-1.04	0.00	-1.04	-0.54	-0.54	-0.47	-0.03

<----- LEFT | RIGHT ------->

							Depth
TOP curb elev. (ft)	-0.54	curb-crown	-0.54	crown Conv	3253.9	1.04	
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50	
TOP ROW elev. (ft)	-0.03	SW-curb	0.07	SW Conv K	605.8	0.57	
gutter elevation (ft)	-1.04	ROW-SW	0.44	ROW Conv K	2911.8	1.01	
TOP SW elev. (ft)	-0.47	SW-crown	-0.47	.5 ft over full	11699.5	1.54	
max flow depth (ft)	1.04	ROW-crown	-0.03	1 ft over full	23698.1	2.04	
n1 (pavement)	0.0160	crown-gutter	1.04	2 ft over full	56717.1	3.04	
n2 (curb)	0.0160	ROW-gutter	1.01	3 ft over full	99995.6	4.04	
n3 (SW)	0.0160	SW-gutter	0.57				
n4 (overland)	0.0250						

			crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
n_c crown (composit)	0.0192	HALF P								
n_c curb (composit)	0.0160	P1 (pavement)	52.01	25.00	28.51	50.50	52.01	52.01	52.01	52.01
n_c SW (composit)	0.0158	P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
n_c ROW (composit)	0.0193	P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
n_c .5 ft over (comp)	0.0192	P4 (SW)	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00
n_c 1 ft over (comp)	0.0193	P5 (ROW)	29.53	0.00	0.00	29.50	30.03	31.03	32.03	33.03
n_c 2 ft over (comp)	0.0194	ΣP	87.54	25.50	34.51	86.01	88.04	89.04	90.04	91.04
n_c 3 ft over (comp)	0.0195									

HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
A2	2.08	0.00	2.08	2.08	2.08	2.08	2.08	2.08
A3	26.29	0.00	0.00	26.29	26.29	26.29	26.29	26.29
A4	2.59	0.00	0.00	0.00	2.59	2.59	2.59	2.59
A5					43.25	86.50	173.00	259.50
ΣA	37.21	6.25	8.33	34.62	80.46	123.71	210.21	296.71

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.54	1.04	1	1	1	1	1
SW-crown	-0.47	0.97	6.25	2.08	26.29	2.59	43.25
ROW-crown	-0.03	0.53					
			P1	P2	P3	P4	P5
			1	1	1	1	1
			52.01	0.50	0.50	5.00	29.50

		1	A1	A2	A3	A4	A5
curb-crown	-0.54	1.54	1	1	1	1	1
SW-crown	-0.47	1.47	6.25	2.08	26.29	2.59	86.50
ROW-crown	-0.03	1.03					
1+curb-crown	0.46	0.54	P1	P2	P3	P4	P5
			1	1	1	1	1
			52.01	0.50	0.50	5.00	29.99

		2	A1	A2	A3	A4	A5
curb-crown	-0.54	2.54	1	1	1	1	1
SW-crown	-0.47	2.47	6.25	2.08	26.29	2.59	173.00
ROW-crown	-0.03	2.03					
2+curb-crown	1.46	0.54	P1	P2	P3	P4	P5
			1	1	1	1	1
			52.01	0.50	0.50	5.00	30.99

		3	A1	A2	A3	A4	A5
curb-crown	-0.54	3.54	1	1	1	1	1
SW-crown	-0.47	3.47	6.25	2.08	26.29	2.59	259.50
ROW-crown	-0.03	3.03					
3+curb-crown	2.46	0.54	P1	P2	P3	P4	P5
			1	1	1	1	1
			52.01	0.50	0.50	5.00	31.99

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.08	26.29	2.59
2	6.25	2.08	28.87	-2.64
3	6.25	30.78	-34.31	31.79
4	27.04	-28.08	3.85	31.79
1	6.25	2.08	26.29	2.59

CASE
1

Top	Area calculator - Crown > ROW		(Full Street)	(Half Street)	1	2	Components 3	4
curb	A1	(sq ft)	12.50	6.25	6.25			
back SW	A2	(sq ft)	4.16	2.08	0.18	0.04	1.87	
RW	A3	(sq ft)	52.58	26.29	6.49	2.20	0.22	17.38
crown	A4	(sq ft)	5.18	2.59	0.885	0.15	0.015	1.54
	A5	(sq ft)	0.00	0.00				

Top	Area calculator - ROW > Crown > SW		(Full Street)	(Half Street)	1	2	Components 3	4
curb	A1	(sq ft)	12.50	6.25	6.25			
back SW	A2	(sq ft)	4.16	2.08	0.18	0.04	1.87	
crown	A3	(sq ft)	57.74	28.87	9.71	0.24	18.92	
RW	A4	(sq ft)	-5.28	-2.64	-1.063	-0.015	-1.56	
	A5	(sq ft)	0.00	0.00				

Top	Area calculator - SW > Crown > TC		(Full Street)	(Half Street)	1	2	Components 3	4
curb	A1	(sq ft)	12.50	6.25	6.25			
crown	A2	(sq ft)	61.56	30.78	9.72	0.27	20.79	
back SW	A3	(sq ft)	-68.62	-34.31	-9.64	-0.24	-24.44	
RW	A4	(sq ft)	63.58	31.79	8.69	0.22	22.88	
	A5	(sq ft)	0.00	0.00				

Top	Area calculator - TC > Crown > GUTTER		(Full Street)	(Half Street)	1	2	Components 3	4
crown	A1	(sq ft)	54.08	27.04	27.04			
curb	A2	(sq ft)	-56.16	-28.08	-28.08			
back SW	A3	(sq ft)	7.70	3.85	0.18	0.04	3.64	
RW	A4	(sq ft)	63.58	31.79	8.69	0.22	22.88	
	A5	(sq ft)	0.00	0.00				

Depth Sorter

Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Conveyance (cfs)
0	0	0	0	0	0
1.04	0.50	0.50	0.50	0.50	454.6
0.50	1.04	0.57	0.57	0.57	605.8
0.57	0.57	1.04	1.01	1.01	2911.8
1.01	1.01	1.01	1.04	1.04	3253.9
1.54	1.54	1.54	1.54	1.54	11699.5
2.04	2.04	2.04	2.04	2.04	23698.1
3.04	3.04	3.04	3.04	3.04	56717.1
4.04	4.04	4.04	4.04	4.04	99995.6

Litchfield Road U/S

ROW to ROW (ft)	137	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	67	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	6			SW Cross Slope, LT	0.015		
SW to ROW (ft)	29			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	28.5	34.5	35	35	68.5	102	102	102.5	108.5	137
y	0.36	-0.08	-0.17	-0.17	-0.67	0.00	-0.67	-0.17	-0.17	-0.08	0.36

<----- LEFT | RIGHT ------->

TOP curb elev. (ft)	-0.17	curb-crown	-0.17	crown Conv	888.3	Depth 0.67
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50
TOP ROW elev. (ft)	0.36	SW-curb	0.09	SW Conv K	665.8	0.59
gutter elevation (ft)	-0.67	ROW-SW	0.44	ROW Conv K	2971.7	1.03
TOP SW elev. (ft)	-0.08	SW-crown	-0.08	.5 ft over full	4532.2	1.17
max flow depth (ft)	0.67	ROW-crown	0.36	1 ft over full	12132.3	1.67
n1 (pavement)	0.0160	crown-gutter	0.67	2 ft over full	34689.7	2.67
n2 (curb)	0.0160	ROW-gutter	1.03	3 ft over full	66061.1	3.67
n3 (SW)	0.0160	SW-gutter	0.59			
n4 (overland)	0.0250					

n_c crown (composit)	0.0170	HALF P	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
n_c curb (composit)	0.0160	P1 (pavement)	33.51	25.00	29.51	33.51	33.51	33.51	33.51	33.51
n_c SW (composit)	0.0159	P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
n_c ROW (composit)	0.0199	P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
n_c .5 ft over (comp)	0.0200	P4 (SW)	6.00	0.00	6.00	6.00	6.00	6.00	6.00	6.00
n_c 1 ft over (comp)	0.0200	P5 (ROW)	5.33	0.00	0.00	29.00	29.36	29.47	30.47	30.47
n_c 2 ft over (comp)	0.0200	ΣP	45.84	25.50	36.51	69.51	69.87	69.98	70.98	70.98
n_c 3 ft over (comp)	0.0200									
		HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
		A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
		A2	2.77	0.00	2.77	2.77	2.77	2.77	2.77	2.77
		A3	3.25	0.00	0.00	3.25	3.25	3.25	3.25	3.25
		A4	0.00	0.00	0.00	20.58	20.58	20.58	20.58	20.58
		A5					9.59	43.84	112.34	180.84
		ΣA	12.27	6.25	9.02	32.85	42.44	76.69	145.19	213.69

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.17	0.67	1	1	1	1	1
SW-crown	-0.08	0.58	6.25	2.77	3.25	20.58	9.59
ROW-crown	0.36	0.14					
			P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	6.00	29.00

		1	A1	A2	A3	A4	A5
curb-crown	-0.17	1.17	1	1	1	1	1
SW-crown	-0.08	1.08	6.25	2.77	3.25	20.58	43.84
ROW-crown	0.36	0.64					
1+curb-crown	0.83	0.17	P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	6.00	29.47

		2	A1	A2	A3	A4	A5
curb-crown	-0.17	2.17	1	1	1	1	1
SW-crown	-0.08	2.08	6.25	2.77	3.25	20.58	112.34
ROW-crown	0.36	1.64					
2+curb-crown	1.83	0.17	P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	6.00	30.47

		3	A1	A2	A3	A4	A5
curb-crown	-0.17	3.17	1	1	1	1	1
SW-crown	-0.08	3.08	6.25	2.77	3.25	20.58	180.84
ROW-crown	0.36	2.64					
3+curb-crown	2.83	0.17	P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	6.00	31.47

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.77	27.06	28.08
2	6.25	2.77	3.25	20.58
3	6.25	6.02	-3.41	23.98
4	11.22	-5.70	3.33	23.98
2	6.25	2.77	3.25	20.58

CASE
2

Top	Area calculator - **Crown > ROW**	(Full Street)	(Half Street)	Components 1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
RW	A3 (sq ft)	54.12	27.06	6.38	2.64	0.22	17.82
crown	A4 (sq ft)	56.16	28.08	10.44	2.16	0.18	15.30
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **ROW > Crown > SW**	(Full Street)	(Half Street)	Components 1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
crown	A3 (sq ft)	6.50	3.25	0.69	0.04	2.52	
RW	A4 (sq ft)	41.16	20.58	8.34	0.18	12.06	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **SW > Crown > TC**	(Full Street)	(Half Street)	Components 1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
crown	A2 (sq ft)	12.04	6.02	0.96	0.09	4.97	
back SW	A3 (sq ft)	-6.82	-3.41	-0.69	-0.04	-2.68	
RW	A4 (sq ft)	47.96	23.98	9.02	0.22	14.74	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **TC > Crown > GUTTER**	(Full Street)	(Half Street)	Components 1	2	3	4
crown	A1 (sq ft)	22.44	11.22	11.223			
curb	A2 (sq ft)	-11.40	-5.70	-5.70			
back SW	A3 (sq ft)	6.66	3.33	0.27	0.05	3.02	
RW	A4 (sq ft)	47.96	23.98	9.02	0.22	14.74	
	A5 (sq ft)	0.00	0.00				

Litchfield Road D/S

ROW to ROW (ft)	178	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	71	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	6			SW Cross Slope, LT	0.015		
SW to ROW (ft)	47.5			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	47	53	53.5	53.5	89	124.5	124.5	125	131	178
y	0.59	-0.12	-0.21	-0.21	-0.71	0.00	-0.71	-0.21	-0.21	-0.12	0.59

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TOP curb elev. (ft)	-0.21	curb-crown	-0.21	crown Conv	1034.2	Depth 0.71	
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50	
TOP ROW elev. (ft)	0.59	SW-curb	0.09	SW Conv K	665.8	0.59	
gutter elevation (ft)	-0.71	ROW-SW	0.71	ROW Conv K	5676.6	1.30	
TOP SW elev. (ft)	-0.12	SW-crown	-0.12	.5 ft over full	9434.8	1.21	
max flow depth (ft)	0.71	ROW-crown	0.59	1 ft over full	13178.9	1.71	
n1 (pavement)	0.0160	crown-gutter	0.71	2 ft over full	40386.9	2.71	
n2 (curb)	0.0160	ROW-gutter	1.30	3 ft over full	78696	3.71	
n3 (SW)	0.0160	SW-gutter	0.59				
n4 (overland)	0.0250						
n_c crown (composit)	0.0175						
n_c curb (composit)	0.0160						
n_c SW (composit)	0.0159						
n_c ROW (composit)	0.0209						
n_c .5 ft over (comp)	0.0160						
n_c 1 ft over (comp)	0.0210						
n_c 2 ft over (comp)	0.0210						
n_c 3 ft over (comp)	0.0210						

HALF P	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
P1 (pavement)	35.51	25.00	29.51	35.51	35.51	35.51	35.51	35.51
P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
P4 (SW)	6.00	0.00	6.00	6.00	6.00	6.00	6.00	6.00
P5 (ROW)	8.00	0.00	0.00	47.51	0.59	47.71	48.71	48.71
ΣP	50.51	25.50	36.51	90.01	43.10	90.21	91.21	91.21

HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
A2	2.77	0.00	2.77	2.77	2.77	2.77	2.77	2.77
A3	5.16	0.00	0.00	5.16	5.16	5.16	5.16	5.16
A4	0.00	0.00	0.00	41.15	33.41	41.15	41.15	41.15
A5					FALSE	36.49	125.49	214.49
ΣA	14.18	6.25	9.02	55.33	47.59	91.82	180.82	269.82

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.21	0.71	1	1	1	0	0
SW-crown	-0.12	0.62	6.25	2.77	5.16	33.41	FALSE
ROW-crown	0.59	-0.09					
			P1	P2	P3	P4	P5
			1	1	1	1	0
			35.51	0.50	0.50	6.00	0.00

		1	A1	A2	A3	A4	A5
curb-crown	-0.21	1.21	1	1	1	1	1
SW-crown	-0.12	1.12	6.25	2.77	5.16	41.15	36.49
ROW-crown	0.59	0.41					
1+curb-crown	0.79	0.21	P1	P2	P3	P4	P5
			1	1	1	1	1
			35.51	0.50	0.50	6.00	47.71

		2	A1	A2	A3	A4	A5
curb-crown	-0.21	2.21	1	1	1	1	1
SW-crown	-0.12	2.12	6.25	2.77	5.16	41.15	125.49
ROW-crown	0.59	1.41					
2+curb-crown	1.79	0.21	P1	P2	P3	P4	P5
			1	1	1	1	1
			35.51	0.50	0.50	6.00	48.71

		3	A1	A2	A3	A4	A5
curb-crown	-0.21	3.21	1	1	1	1	1
SW-crown	-0.12	3.12	6.25	2.77	5.16	41.15	214.49
ROW-crown	0.59	2.41					
3+curb-crown	2.79	0.21	P1	P2	P3	P4	P5
			1	1	1	1	1
			35.51	0.50	0.50	6.00	49.71

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.77	55.03	61.51
2	6.25	2.77	5.16	41.15
3	6.25	7.93	-5.52	46.68
4	12.60	-7.46	3.51	46.68
2	6.25	2.77	5.16	41.15

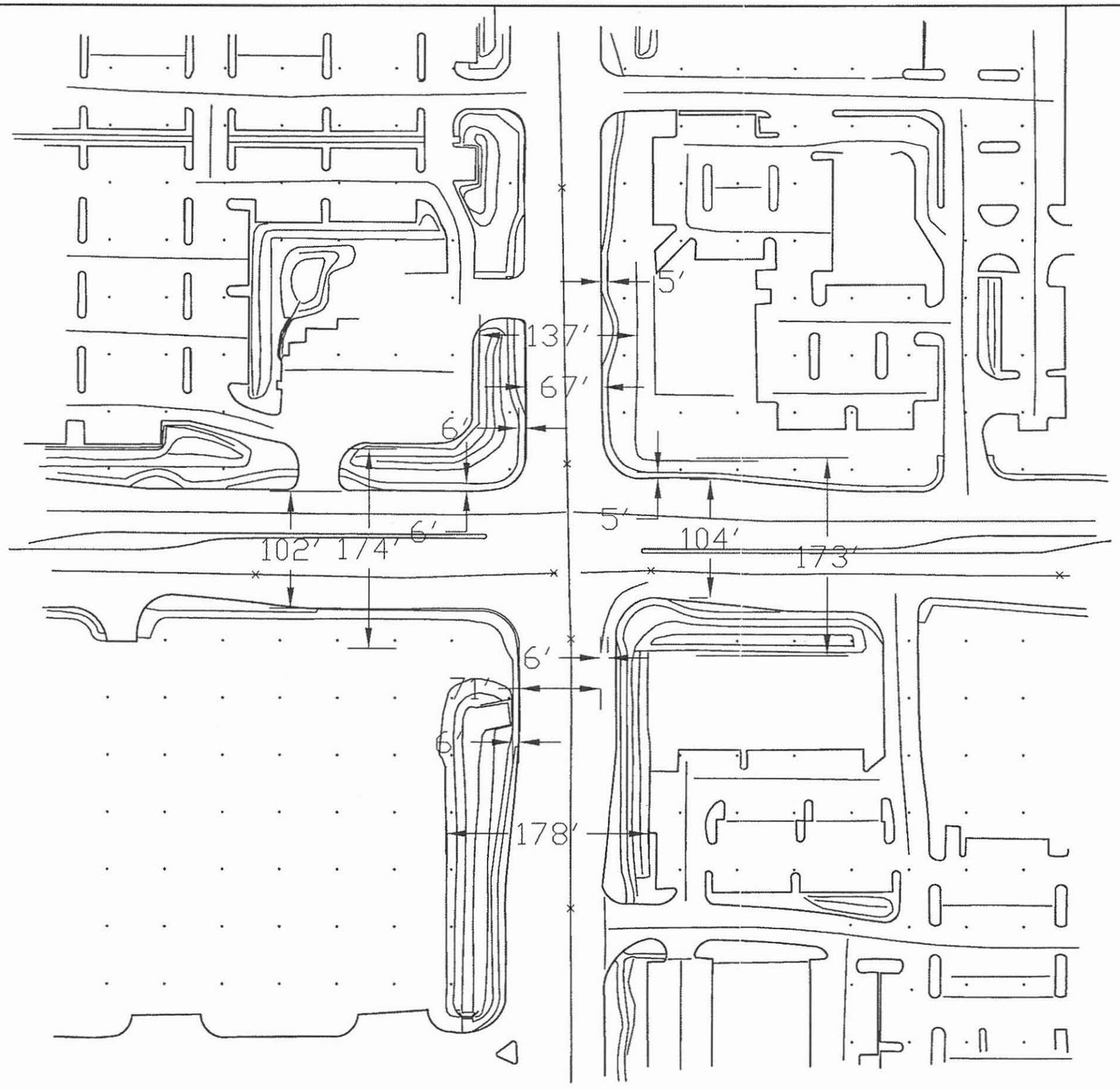
CASE
2

Top	Area calculator - **Crown > ROW**	(Full Street)	(Half Street)	1	2	Components 3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
RW	A3 (sq ft)	110.06	55.03	16.86	4.26	0.36	33.55
crown	A4 (sq ft)	123.02	61.51	28.025	3.54	0.295	29.65
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **ROW > Crown > SW**	(Full Street)	(Half Street)	1	2	Components 3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
crown	A3 (sq ft)	10.32	5.16	1.20	0.06	3.90	
RW	A4 (sq ft)	82.30	41.15	19.913	0.295	20.945	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **SW > Crown > TC**	(Full Street)	(Half Street)	1	2	Components 3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
crown	A2 (sq ft)	15.86	7.93	1.47	0.11	6.35	
back SW	A3 (sq ft)	-11.04	-5.52	-1.20	-0.06	-4.26	
RW	A4 (sq ft)	93.36	46.68	21.123	0.355	25.205	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **TC > Crown > GUTTER**	(Full Street)	(Half Street)	1	2	Components 3	4
crown	A1 (sq ft)	25.20	12.60	12.603			
curb	A2 (sq ft)	-14.92	-7.46	-7.46			
back SW	A3 (sq ft)	7.02	3.51	0.27	0.05	3.20	
RW	A4 (sq ft)	93.36	46.68	21.123	0.355	25.205	
	A5 (sq ft)	0.00	0.00				



BELL ROAD AND LITCHFIELD ROAD

N

100' 0' 100' 200'
SCALE: 1"= 100 FEET

LEGEND

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NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

LOOP 303 WHITE TANKS AREA DRAINAGE
MASTER PLAN AREA UPDATE HYDROLOGIC ANALYSIS
CONTRACT NUMBER: FCD 2007C031

EXISTING CONDITIONS HYDROLOGY
SPLIT FLOW ANALYSIS

HDR ENGINEERING, INC.
3200 East Camelback Road, Suite 350
PHOENIX, ARIZONA 85018-2311
(602) 522-7700

	BY	DATE
DESIGN	J. MOYER	09/19/08
DESIGN CHK.	L. POTTER	09/19/08
PLANS	J. MOYER	09/19/08
PLANS CHK.	L. POTTER	09/19/08

D05

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D06

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D07

FINAL DRAINAGE REPORT
FOR THE INTERIM CONDITION

WESTFIELD COMMONS

SOUTHEAST CORNER OF BELL ROAD
AT SARIVAL AVENUE

SURPRISE, ARIZONA

PREPARED BY:
OLSSON ASSOCIATES
7250 N. 16TH STREET, SUITE 210
PHOENIX, ARIZONA 85020
LEN SWARTZ, P.E.
(602) 748-1000

Registered Professional Engineer (Civil)
CERTIFICATE NO. 42245
LEONARD J. SWARTZ
Date Signed 1/9/08
ARIZONA, U.S.A.

MAY 15, 2007
Revised: January 4, 2008

OLSSON PROJECT NO. A05-1538

OLSSON ASSOCIATES

D07/D10

The Castellina Village report includes an analysis of the Bell Road capacity in the area of the subject site. The analysis of Bell Road conducted in the report supports previous studies which state the capacity of Bell Road adjacent to the subject site is 430 cfs. Additional reports were also investigated to determine the flow rates which require mitigation by the subject site. Based on earlier studies, 860 cfs will enter the intersection of Bell Road and Sarival Avenue during the 100-year event. At that point, the flow is split; 430 cfs will be conveyed downstream within Bell Road and the remaining 430 cfs will be conveyed through the subject site.

b) Loop 303 Corridor/ White Tanks Area Drainage Master Plan Update (ADMPU)

The Loop 303 Corridor/White Tanks Area Drainage Master Plan Update (ADMPU) was prepared by URS. The report is an update to the original ADMP study, analyzing the impact of flooding of the White Tanks/Ague Fria drainage area.

The ADMPU study has identified 860 cfs at the intersection of Bell Road and Sarival Avenue during the 100-year event, prior to any 303 improvements. Half of the flow continues downstream within Bell Road, while the other half traverses across the subject site (identical to conditions used in the Castellina Village report). After the 303 improvements are constructed, the 100-year runoff at the intersection of Bell Road and Sarival Avenue will be reduced to 586 cfs, of which 430 cfs is conveyed within Bell Road while the remainder is directed through the subject site.

c) Final Drainage Report for Mountain Vista Ranch Parcel 10 (MVR10)

The Mountain Vista Ranch Parcel 10 report was prepared by American Engineering Company. Parcel 10 of the Mountain Vista Ranch subdivision is located just east of the subject site. The MVR10 report references an earlier study of the White Tanks area. The earlier study stated that a flow of 556 cfs would reach the intersection of Bell Road and Sarival Avenue during the 100-year event. A split flow would direct 376 cfs within Bell Road while 180 cfs would enter the subject site. The report proposed a berm along the frontage of Bell Road to increase the roadway capacity to 428 cfs. The report also proposed a drainage channel west of Parcel 10 to convey the remaining runoff to the south.

1.1.5 Regional Drainage Plan/Characteristics

The Castellina Village Drainage Report (2006) discussed in Section 1.1.4a, and the ADMPU Study (2004) discussed in Section 1.1.4b serve as the regional drainage plans for the subject area.

Off-site drainage entering the subject site will be considered in two separate scenarios; pre- and post-303 Corridor improvements. In the first scenario, termed the "interim" condition or pre-303 improvements, 860 cfs will be the assumed off-site flow at the intersection of Bell Road & N. 160th Avenue during the 100-year event. In the second scenario, termed the "final" condition or post-303 improvements, 586 cfs will be the assumed off-site flow at the same intersection during the 100-year event.

2.0 HYDROLOGIC ANALYSIS

2.1 Off-Site Hydrology

2.1.1 Off-site Impacts to Proposed Project Site

As discussed in Section 1.1.4., the Castellina Village report indicates that 430 cfs of off-site flows traverse the subject site. Also, per the ADMPU, the 303 Corridor improvements will reduce the off-site flow impacting the subject site to 156 cfs.

Refer to Section 3.1.2 for a discussion of the mitigation plan for the off-site runoff impacting the subject site.

2.1.2 Development of Off-Site Peak Discharges

In the interim condition, all lots are designed to collect & store runoff generated due to the construction of roadway improvements (refer to the Interim Drainage Plan, DR1 in the appendix for basin delineation). In the developed condition, each lot owner will be responsible for collecting & storing on-site flows, as well as the half-street drainage from adjacent roadways. As a part of the approval process, each lot owner should be required to submit a final drainage report to verify conformance with the criteria of this study.

Basin DA1 includes half-street drainage from both Bell Road and Sarival Avenue. Basins DA2 through DA5 include half-street drainage from Bell Road. Basin DA6 includes half-street drainage from Sarival Avenue, and since basin DA7 is land-locked within the lots, no additional half-street drainage is included in the runoff calculations. Basin D8 does not include any additional half-street runoff, since basins DA9 & DA10 encompass the entire N. 160th Avenue right-of-way.

2.1.3 Conveyance of Off-Site Discharge

Refer to Section 3.1.2 for a discussion of the mitigation plan for the off-site runoff impacting the subject site.

2.1.4 Discharge at the Entrance and Exit Points

Currently, the 100-year off-site runoff (430 cfs) impacting the subject site would enter the property as the flow over-tops the existing Bell Road curb. From there, the runoff would sheet flow across the site into an existing swale at the eastern property edge, and discharge to an existing retention pond near the southeast corner of the property.

2.1.5 Existing Land Use

Currently, the subject site is undeveloped, as described in Section 1.1.2. The off-site flows impacting the subject site are generated by a large basin to the northwest, which is comprised primarily of residential development, with roadways, parks & light commercial development intermittently scattered throughout the basin.

2.2 On-Site Hydrology

2.2.1 Methodology and Criteria

This report utilizes drainage design criteria as stated in the Maricopa County Drainage Design Manual (MCDDM) in conjunction with design recommendations per the Master Drainage Study for Loop 303 Corridor/White Tanks Area Drainage Master Plan Update, prepared by URS. The Master Drainage Study includes proposed on-site drainage conveyance recommendations, retention recommendations and over-all basin calculations for the subject site. Per the Master Study, on-site retention will be provided for the 100-year, 2-hour storm event (2.8 inches). The half-street frontage drainage along Bell Road and along Sarival Avenue will also be accommodated within the on-site retention recommendations for the final condition. In the interim condition, each lot will contain its own dedicated retention pond, sized to accommodate the runoff volumes listed in Tables 3 & 4 (refer to Table 5 for Pre-Development runoff volumes).

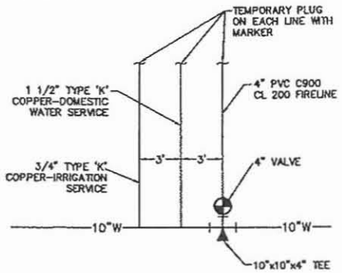
Upon full development, each individual lot should be designed to collect & retain the flows designated in this report (refer to Table 2). This report provides recommended underground retention pipe sizing to accommodate each lot's 100-year, 2-hour runoff volume, based upon weighted runoff coefficients listed within Table 3-2 of the MCDDM. Design of the underground detention systems will be the responsibility of each individual lot owner, and should conform to the City of Surprise Underground Retention/Detention Systems Standards & Specifications. It is anticipated that each lot will be developed as commercial/retail space.

2.2.2 Existing Condition Discharges

The site is currently undeveloped and surface drains to an existing retention facility near the southeast corner of the property. The undeveloped site was determined to discharge 37.8 cfs to the existing retention pond (refer to calculations in the Appendix), in addition to the 430 cfs off-site flow.

2.2.3 Proposed Condition Discharges

In the interim condition, basins DA1 through DA8 will discharge into dedicated retention ponds while basins DA9 & DA10 will discharge into the channel which parallels N. 160th Avenue (refer to the Interim Drainage Plan, DR1 in the Appendix).



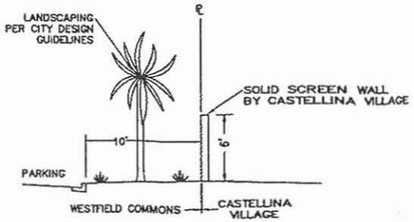
TYPICAL FIRELINE, WATER SERVICE AND IRRIGATION CONNECTION CLUSTER

NOT TO SCALE

BOUNDARY AND LOT LINE GEOMETRY TABLES

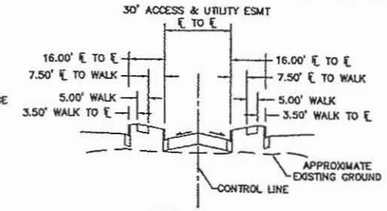
LINE TABLE		
LINE	LENGTH	BEARING
L1	55.00	S89°24'05"E
L2	55.00	S89°24'05"E
L3	65.00	N00°35'55"E
L4	28.27	N45°33'55"E
L5	28.94	S44°24'05"E
L6	18.06	S45°35'55"W
L7	28.88	S44°24'05"E
L8	18.09	S45°35'55"W
L9	28.88	S44°24'05"E
L10	18.09	S45°35'55"W
L11	91.26	N25°27'38"E
L12	96.12	N25°27'38"E
L13	87.53	N18°06'42"E
L14	90.76	N18°06'42"E
L15		NOT USED
L16	155.72	N00°31'55"E
L17		NOT USED
L18	171.15	N17°08'07"W
L19	52.41	N17°08'07"W
L20	118.74	N17°08'07"W
L21	22.87	N40°02'08"E

CURVE TABLE			
CURVE	RADIUS	LENGTH	DELTA
C1	200.00	166.78	47°46'42"
C2	200.00	166.78	47°46'42"
C3	200.00	89.88	25°45'00"
C4	200.00	76.89	22°01'42"
C5	294.50	36.72	7°08'37"
C6	143.00	43.46	17°25'20"
C7	373.00	58.91	9°02'59"
C8	50.00	15.42	17°40'01"
C9			NOT USED
C10	162.00	7.79	2°45'24"
C11	323.00	98.50	17°26'20"



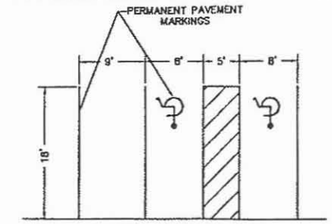
SECTION A-A
ADJACENT TO RESIDENTIAL TO THE SOUTH

NOT TO SCALE



SECTION B-B
ENTRY ROAD AND PEDESTRIAN ACCESS

NOT TO SCALE



TYPICAL PARKING STALL DETAIL

NOT TO SCALE

KEY NOTES

1. TRASH ENCLOSURE
2. FIRE HYDRANT
3. TYPICAL WATER SERVICE CLUSTER (SEE DETAIL, THIS SHEET)
4. SANITARY SEWER SERVICE
5. POTENTIAL LOW POINT RE: INDIVIDUAL SITE PLAN
6. BOX CULVERT
7. TYPICAL PARKING STALL
8. 8" WATER STUB FOR FUTURE WATER MAIN LOOP

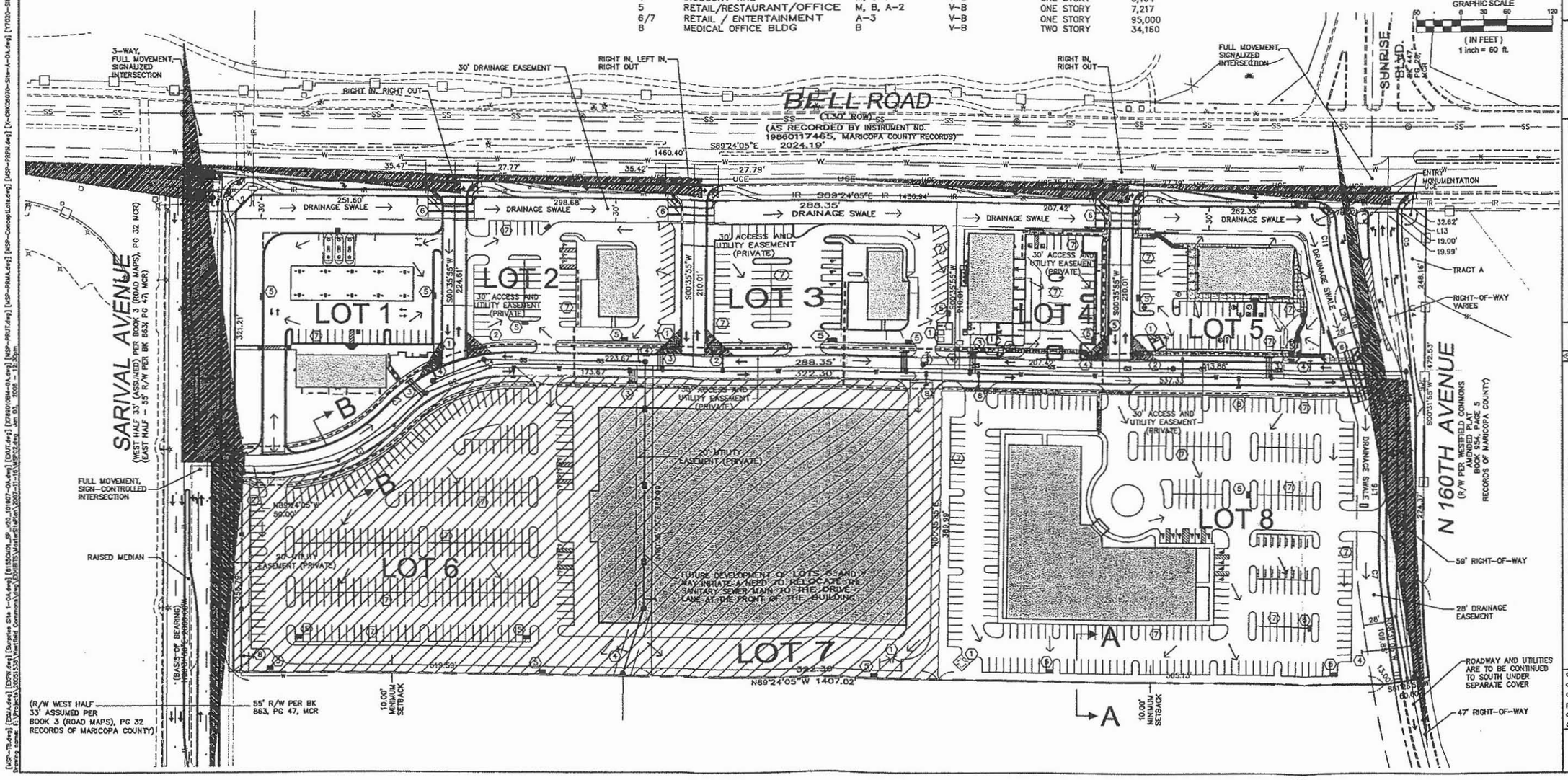
OCCUPANCY TABLE

LOT	OCCUPANCY	OCCUPANCY CLASSIFICATION	CONSTRUCTION TYPE	HEIGHT	SF
1	CIRCLE K STORE	M	V-B	ONE STORY	4,400
2	BANK W/ DRIVE-THRU	B	V-B	ONE STORY	4,082
3	FAST FOOD W/DRIVE-THRU	A-2	V-B	ONE STORY	3,954
4	DISCOUNT TIRE	M, S-1	V-B	ONE STORY	6,164
5	RETAIL/RESTAURANT/OFFICE	M, B, A-2	V-B	ONE STORY	7,217
6/7	RETAIL / ENTERTAINMENT	A-3	V-B	ONE STORY	95,000
8	MEDICAL OFFICE BLDG	B	V-B	TWO STORY	34,160

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 ft.



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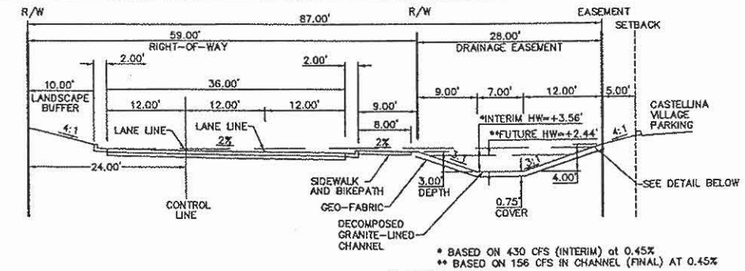
REVISIONS

MASTER SITE PLAN
OVERALL PLAN

WESTFIELD COMMONS
COUNTY OF MARICOPA
SE CORNER BELL ROAD AT SARIVAL AVENUE
CITY OF SURPRISE, ARIZONA 2006

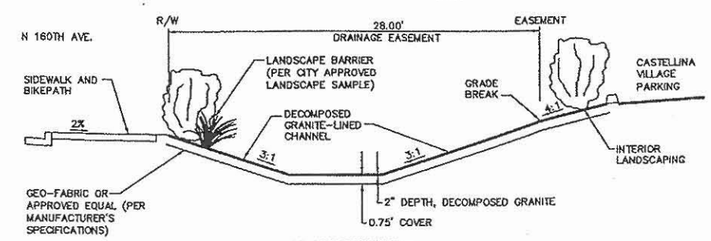
drawn by:	SDS
checked by:	WEP
approved by:	WEP
project no.:	A05-1538
dwg name:	MSP02
date:	11/30/07

SHEET
MSP02
2 OF 2 SHEETS

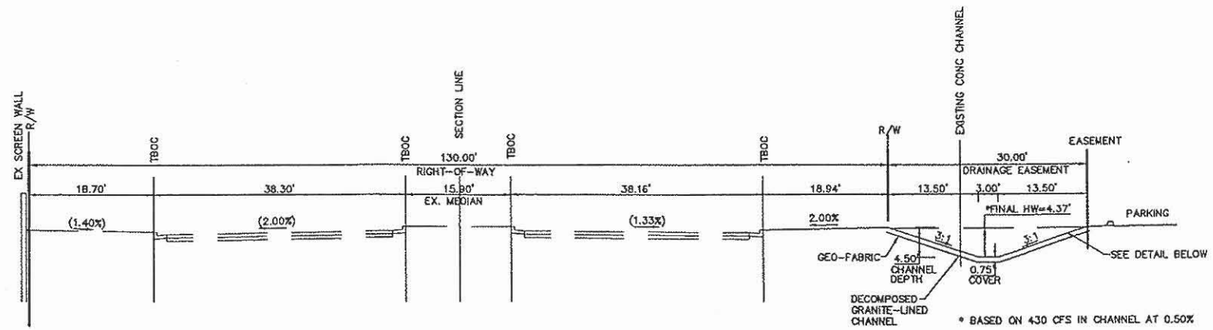


* BASED ON 430 CFS (INTERIM) at 0.45%
** BASED ON 156 CFS IN CHANNEL (FINAL) AT 0.45%

N. 160TH AVENUE
TYPICAL COMMERCIAL CROSS-SECTION
1"=10'

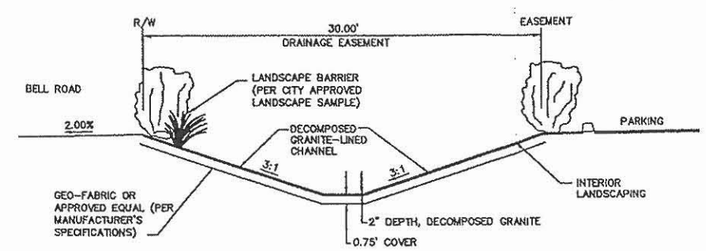


N. 160TH AVENUE
TYPICAL LANDSCAPED CHANNEL
1"=5'



* BASED ON 430 CFS IN CHANNEL AT 0.50%

BELL ROAD
TYPICAL CROSS-SECTION
1"=10'



BELL ROAD
TYPICAL LANDSCAPED CHANNEL
1"=5'

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REVISIONS

MASTER SITE PLAN
TYPICAL SECTIONS
WESTFIELD COMMONS
COUNTY OF MARICOPA
SE CORNER BELL ROAD AT SARIVAL AVENUE
CITY OF SURPRISE, ARIZONA
2006

drawn by:	SDS
checked by:	WEP
approved by:	WEP
project no.:	A06-1538
dwg name:	MSP092507
date:	11/26/07

SHEET
MSP02
2 OF 2 SHEETS

[MSP-TB.dwg] [EXHA.dwg] [DEPN.dwg] [Surprise Site 1-0A.dwg] [BASSCAN1_SP_v20_101607-0A.dwg] [EXUT.dwg] [X7800108-0A.dwg] [MSP-PRUT.dwg] [MSP-PRNA.dwg] [MSP-ConceptLots.dwg] [MSP-PRPN.dwg] [X-CRX06070-Site-A-0A.dwg] [Y7020-Site-0A.dwg]
Drawing name: F:\Projects\20051538\Westfield Commons\Dwg\DWGS\Master Plan\Y2007-1-18\MSP02.dwg Jan 03, 2008 - 12:33pm

D06D07

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00504	ft/ft
Normal Depth	1.14	ft

Section Definitions

Station (ft)	Elevation (ft)
1+00.00	1264.38
1+00.00	1264.00
1+18.70	1263.74
1+18.70	1263.24
1+57.00	1264.00
1+57.00	1264.50
1+72.90	1264.50
1+72.90	1264.00
2+11.06	1263.50
2+11.06	1264.00
2+30.00	1264.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(1+00.00, 1264.38)	(2+30.00, 1264.38)	0.013

Results

Discharge	369.71	ft^3/s
Elevation Range	1263.24 to 1264.50 ft	
Flow Area	66.28	ft^2
Wetted Perimeter	116.26	ft
Top Width	114.10	ft
Normal Depth	1.14	ft
Critical Depth	1.28	ft

D06D07

Results

Critical Slope	0.00295	ft/ft
Velocity	5.58	ft/s
Velocity Head	0.48	ft
Specific Energy	1.62	ft
Froude Number	1.29	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.14	ft
Critical Depth	1.28	ft
Channel Slope	0.00504	ft/ft
Critical Slope	0.00295	ft/ft

D06D07

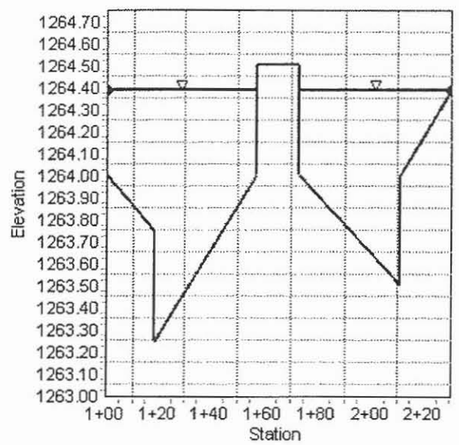
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00504	ft/ft
Normal Depth	1.14	ft
Discharge	369.71	ft³/s

Cross Section Image



D08

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D09

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D10

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/22/08
		Checked	LP
		Date	3/10/09
		Sheet	1
		Of	x

Location: Greenway at Reems (DD10)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	29.7	29.5	150	29.6	29.3	0	0.00	29.8	0.2	40.25	30.3	0.7	263.55	DONE	30.8	1.2	591.54	DONE
south	29.5	28.8	248	29.15	29.3	0.15	43.22	29.8	0.65	389.89	30.3	1.15	917.53		30.8	1.65	1576.88	
east	28.8	29.6	320	29.2	29.3	0.1	30.36	29.8	0.6	446.17	30.3	1.1	1107.54		30.8	1.6	1942.90	
east	29.6	29.8	85	29.7	29.3	0	0.00	29.8	0.1	8.06	30.3	0.6	118.51		30.8	1.1	294.19	
east	29.8	29.8	120	29.8	29.3	0	0.00	29.8	0	0.00	30.3	0.5	127.28		30.8	1	360.00	
east	29.8	29.8	1	29.8	29.3	0	0.00	29.8	0	0.00	30.3	0.5	1.06		30.8	1	3.00	
east	29.8	29.8	1	29.8	29.3	0	0.00	29.8	0	0.00	30.3	0.5	1.06		30.8	1	3.00	
east	29.8	29.8	1	29.8	29.3	0	0.00	29.8	0	0.00	30.3	0.5	1.06		30.8	1	3.00	
east	29.8	29.8	1	29.8	29.3	0	0.00	29.8	0	0.00	30.3	0.5	1.06		30.8	1	3.00	
						TOTALS:	73.58			884.37			2538.65				4777.52	

Graph Computations:

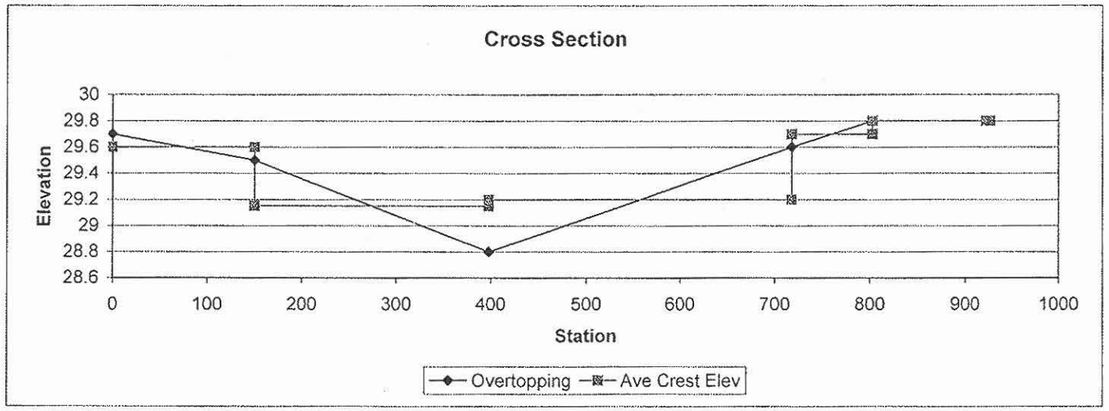
Station	Elevation
0	29.7
150	29.5
398	28.8
718	29.6
803	29.8
923	29.8
924	29.8
925	29.8
926	29.8
927	29.8

Weir Approximation:

Station	Elevation
0	29.6
150	29.6
150	29.15
398	29.15
398	29.2
718	29.2
718	29.7
803	29.7
803	29.8
923	29.8
923	29.8
924	29.8
924	29.8
925	29.8
925	29.8
926	29.8
926	29.8
927	29.8

Culvert Flows (cfs):

south	1490
southeast	0
east	0



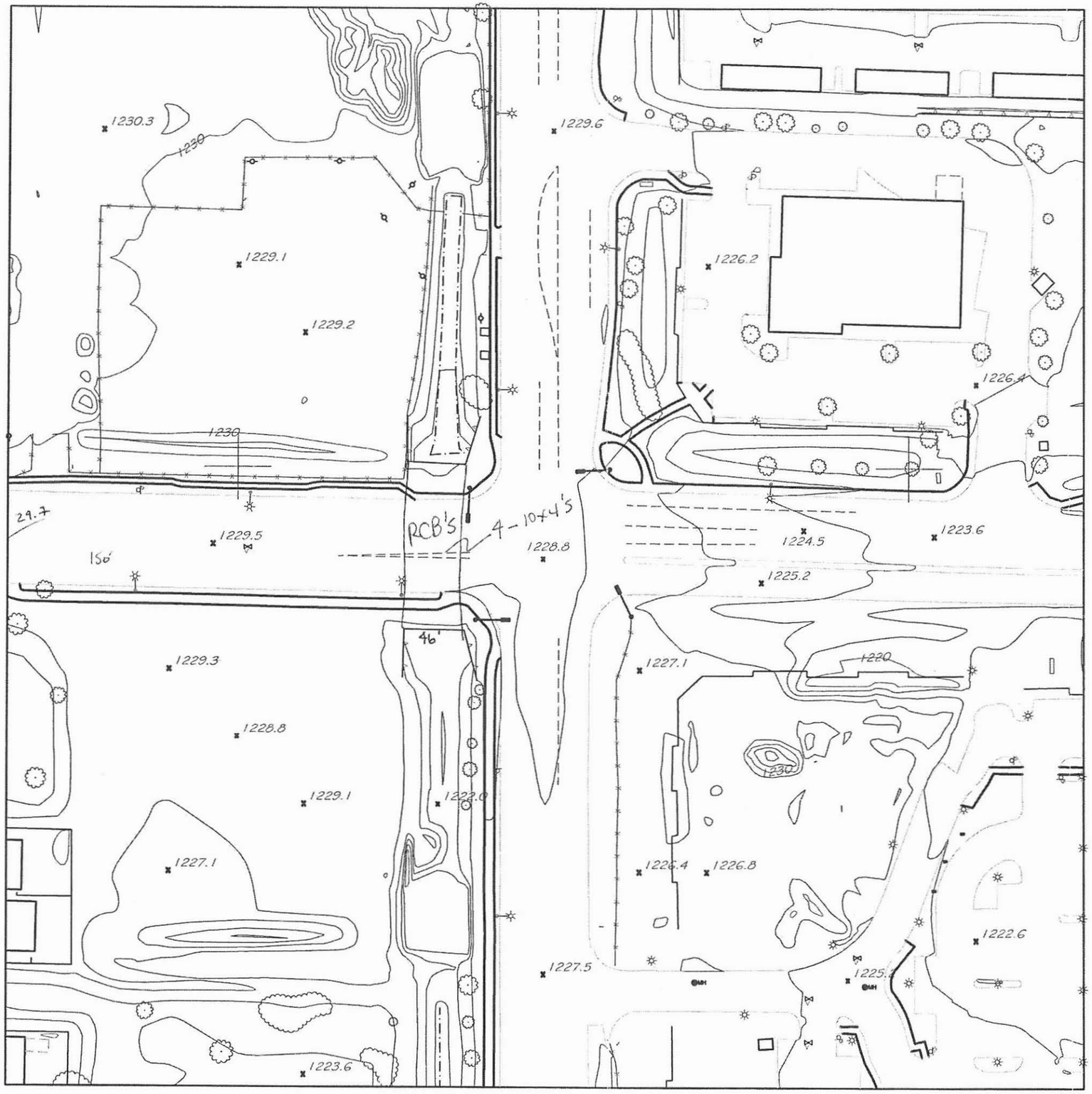
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	1533.22	98%	Q(south)	1920.14	81%	Q(south)	2671.08	66%	Q(south)	3658.42	58%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	30.36	2%	Q(east)	454.23	19%	Q(east)	1357.58	34%	Q(east)	2609.09	42%
	1563.58			2374.37			4028.65			6267.52	

First DI	East to South			
Inflow	1563.58	2374.37	4028.65	6267.52
Outflow	1533.22	1920.14	2671.08	3658.42

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	1533.22	1920.14	2671.08	3658.42
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast

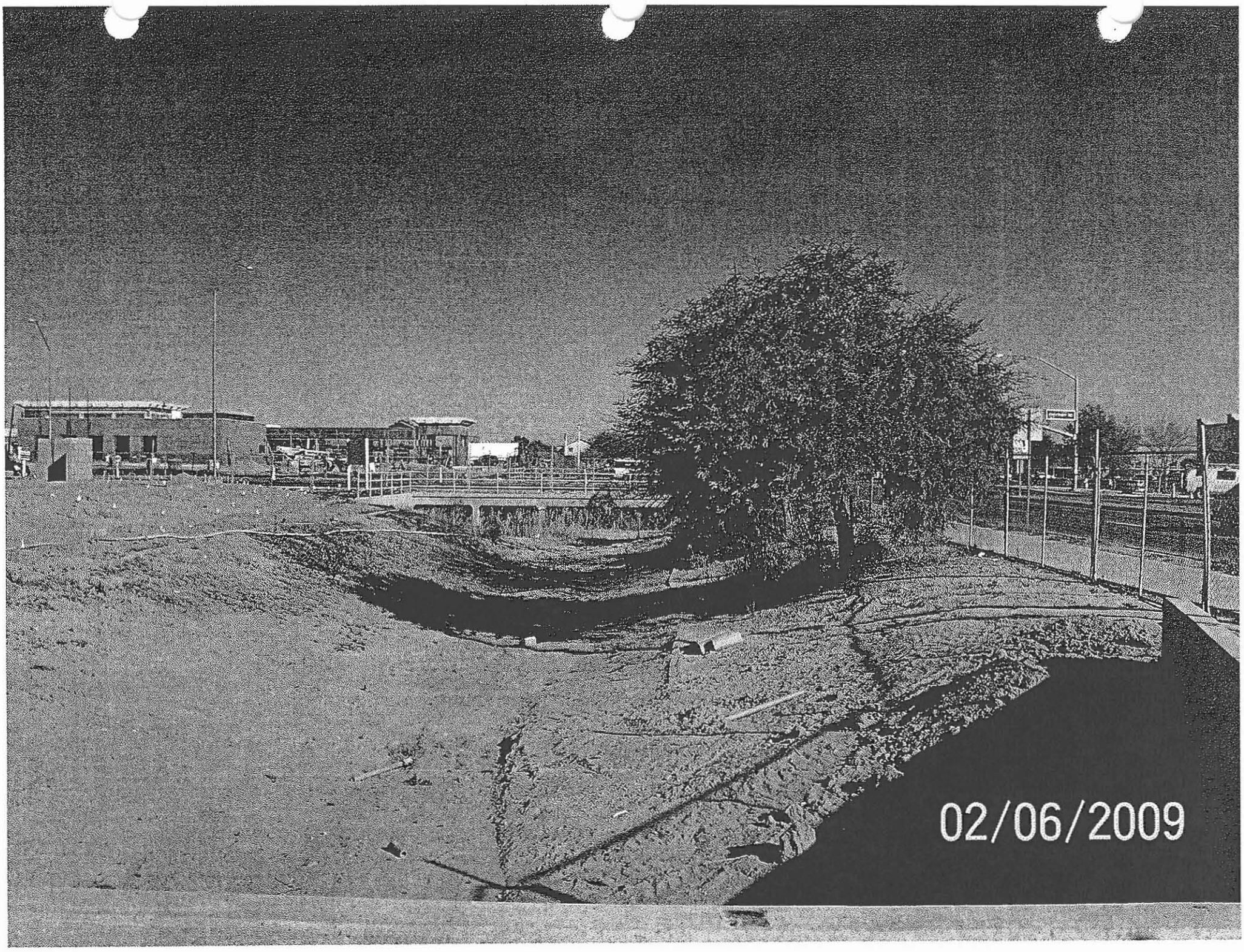


Greenway @ Reems (DD10)

Qcap ≅ 1,490 cfs

C:\PW g:\PHX\dms69520\Linda_NewWorking.dwg, 10/21/2008 10:50:46 AM

N 15th Dr
W Greenway Rd
W Greenway Rd
W Greenway Rd
15732
15731
15900
15259
N Reems Rd
N Reems Rd
W Caribbean Ln
W Caribbean Ln
15555
N 15th Ln


02/06/2009

FINAL DRAINAGE REPORT
FOR THE INTERIM CONDITION

WESTFIELD COMMONS

SOUTHEAST CORNER OF BELL ROAD
AT SARIVAL AVENUE

SURPRISE, ARIZONA

PREPARED BY:
OLSSON ASSOCIATES
7250 N. 16TH STREET, SUITE 210
PHOENIX, ARIZONA 85020
LEN SWARTZ, P.E.
(602) 748-1000

Registered Professional Engineer (Civil)
CERTIFICATE NO. 42245
LEONARD J. SWARTZ
Date Signed 1/4/08
ARIZONA, U.S.A.

MAY 15, 2007
Revised: January 4, 2008

OLSSON PROJECT NO. A05-1538

OLSSON ASSOCIATES

D07/D10

The Castellina Village report includes an analysis of the Bell Road capacity in the area of the subject site. The analysis of Bell Road conducted in the report supports previous studies which state the capacity of Bell Road adjacent to the subject site is 430 cfs. Additional reports were also investigated to determine the flow rates which require mitigation by the subject site. Based on earlier studies, 860 cfs will enter the intersection of Bell Road and Sarival Avenue during the 100-year event. At that point, the flow is split; 430 cfs will be conveyed downstream within Bell Road and the remaining 430 cfs will be conveyed through the subject site.

b) Loop 303 Corridor/ White Tanks Area Drainage Master Plan Update (ADMPU)

The Loop 303 Corridor/White Tanks Area Drainage Master Plan Update (ADMPU) was prepared by URS. The report is an update to the original ADMP study, analyzing the impact of flooding of the White Tanks/Ague Fria drainage area.

The ADMPU study has identified 860 cfs at the intersection of Bell Road and Sarival Avenue during the 100-year event, prior to any 303 improvements. Half of the flow continues downstream within Bell Road, while the other half traverses across the subject site (identical to conditions used in the Castellina Village report). After the 303 improvements are constructed, the 100-year runoff at the intersection of Bell Road and Sarival Avenue will be reduced to 586 cfs, of which 430 cfs is conveyed within Bell Road while the remainder is directed through the subject site.

c) Final Drainage Report for Mountain Vista Ranch Parcel 10 (MVR10)

The Mountain Vista Ranch Parcel 10 report was prepared by American Engineering Company. Parcel 10 of the Mountain Vista Ranch subdivision is located just east of the subject site. The MVR10 report references an earlier study of the White Tanks area. The earlier study stated that a flow of 556 cfs would reach the intersection of Bell Road and Sarival Avenue during the 100-year event. A split flow would direct 376 cfs within Bell Road while 180 cfs would enter the subject site. The report proposed a berm along the frontage of Bell Road to increase the roadway capacity to 428 cfs. The report also proposed a drainage channel west of Parcel 10 to convey the remaining runoff to the south.

1.1.5 Regional Drainage Plan/Characteristics

The Castellina Village Drainage Report (2006) discussed in Section 1.1.4a, and the ADMPU Study (2004) discussed in Section 1.1.4b serve as the regional drainage plans for the subject area.

Off-site drainage entering the subject site will be considered in two separate scenarios; pre- and post-303 Corridor improvements. In the first scenario, termed the "interim" condition or pre-303 improvements, 860 cfs will be the assumed off-site flow at the intersection of Bell Road & N. 160th Avenue during the 100-year event. In the second scenario, termed the "final" condition or post-303 improvements, 586 cfs will be the assumed off-site flow at the same intersection during the 100-year event.

2.0 HYDROLOGIC ANALYSIS

2.1 Off-Site Hydrology

2.1.1 Off-site Impacts to Proposed Project Site

As discussed in Section 1.1.4., the Castellina Village report indicates that 430 cfs of off-site flows traverse the subject site. Also, per the ADMPU, the 303 Corridor improvements will reduce the off-site flow impacting the subject site to 156 cfs.

Refer to Section 3.1.2 for a discussion of the mitigation plan for the off-site runoff impacting the subject site.

2.1.2 Development of Off-Site Peak Discharges

In the interim condition, all lots are designed to collect & store runoff generated due to the construction of roadway improvements (refer to the Interim Drainage Plan, DR1 in the appendix for basin delineation). In the developed condition, each lot owner will be responsible for collecting & storing on-site flows, as well as the half-street drainage from adjacent roadways. As a part of the approval process, each lot owner should be required to submit a final drainage report to verify conformance with the criteria of this study.

Basin DA1 includes half-street drainage from both Bell Road and Sarival Avenue. Basins DA2 through DA5 include half-street drainage from Bell Road. Basin DA6 includes half-street drainage from Sarival Avenue, and since basin DA7 is land-locked within the lots, no additional half-street drainage is included in the runoff calculations. Basin D8 does not include any additional half-street runoff, since basins DA9 & DA10 encompass the entire N. 160th Avenue right-of-way.

2.1.3 Conveyance of Off-Site Discharge

Refer to Section 3.1.2 for a discussion of the mitigation plan for the off-site runoff impacting the subject site.

2.1.4 Discharge at the Entrance and Exit Points

Currently, the 100-year off-site runoff (430 cfs) impacting the subject site would enter the property as the flow over-tops the existing Bell Road curb. From there, the runoff would sheet flow across the site into an existing swale at the eastern property edge, and discharge to an existing retention pond near the southeast corner of the property.

2.1.5 Existing Land Use

Currently, the subject site is undeveloped, as described in Section 1.1.2. The off-site flows impacting the subject site are generated by a large basin to the northwest, which is comprised primarily of residential development, with roadways, parks & light commercial development intermittently scattered throughout the basin.

2.2 On-Site Hydrology

2.2.1 Methodology and Criteria

This report utilizes drainage design criteria as stated in the Maricopa County Drainage Design Manual (MCDDM) in conjunction with design recommendations per the Master Drainage Study for Loop 303 Corridor/White Tanks Area Drainage Master Plan Update, prepared by URS. The Master Drainage Study includes proposed on-site drainage conveyance recommendations, retention recommendations and over-all basin calculations for the subject site. Per the Master Study, on-site retention will be provided for the 100-year, 2-hour storm event (2.8 inches). The half-street frontage drainage along Bell Road and along Sarival Avenue will also be accommodated within the on-site retention recommendations for the final condition. In the interim condition, each lot will contain its own dedicated retention pond, sized to accommodate the runoff volumes listed in Tables 3 & 4 (refer to Table 5 for Pre-Development runoff volumes).

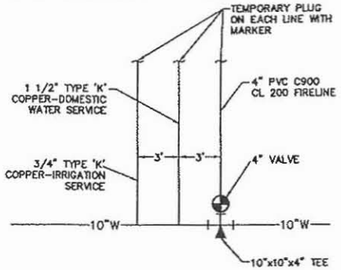
Upon full development, each individual lot should be designed to collect & retain the flows designated in this report (refer to Table 2). This report provides recommended underground retention pipe sizing to accommodate each lot's 100-year, 2-hour runoff volume, based upon weighted runoff coefficients listed within Table 3-2 of the MCDDM. Design of the underground detention systems will be the responsibility of each individual lot owner, and should conform to the City of Surprise Underground Retention/Detention Systems Standards & Specifications. It is anticipated that each lot will be developed as commercial/retail space.

2.2.2 Existing Condition Discharges

The site is currently undeveloped and surface drains to an existing retention facility near the southeast corner of the property. The undeveloped site was determined to discharge 37.8 cfs to the existing retention pond (refer to calculations in the Appendix), in addition to the 430 cfs off-site flow.

2.2.3 Proposed Condition Discharges

In the interim condition, basins DA1 through DA8 will discharge into dedicated retention ponds while basins DA9 & DA10 will discharge into the channel which parallels N. 160th Avenue (refer to the Interim Drainage Plan, DR1 in the Appendix).



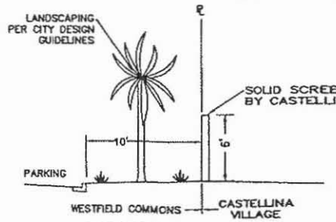
TYPICAL FIRELINE, WATER SERVICE AND IRRIGATION CONNECTION CLUSTER

NOT TO SCALE

BOUNDARY AND LOT LINE GEOMETRY TABLES

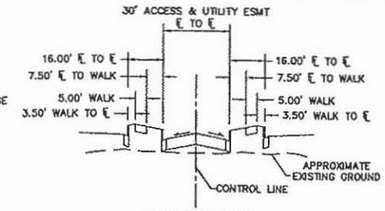
LINE TABLE		
LINE	LENGTH	BEARING
L1	55.00	S89°24'05"E
L2	55.00	S89°24'05"E
L3	65.00	N00°35'55"E
L4	28.27	N45°35'55"E
L5	28.94	S44°24'05"E
L6	18.06	S45°35'55"W
L7	28.88	S44°24'05"E
L8	18.09	S45°35'55"W
L9	28.88	S44°24'05"E
L10	18.09	S45°35'55"W
L11	91.26	N25°27'38"E
L12	96.12	N25°27'38"E
L13	87.53	N18°06'42"E
L14	90.76	N18°06'42"E
L15		NOT USED
L16	155.72	N00°31'55"E
L17		NOT USED
L18	171.15	N17°08'07"W
L19	52.41	N17°08'07"W
L20	118.74	N17°08'07"W
L21	22.87	N40°02'08"E

CURVE TABLE			
CURVE	RADIUS	LENGTH	DELTA
C1	200.00	166.78	47°46'42"
C2	200.00	166.78	47°46'42"
C3	200.00	89.88	25°45'00"
C4	200.00	76.89	22°01'42"
C5	294.50	36.72	7°08'37"
C6	143.00	43.48	17°25'20"
C7	373.00	58.91	9°02'59"
C8	50.00	15.42	17°40'01"
C9			NOT USED
C10	162.00	7.79	2°45'24"
C11	323.00	98.50	17°28'20"



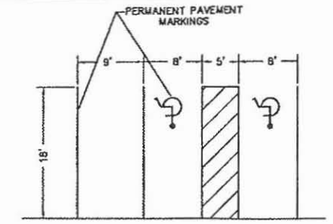
SECTION A-A
ADJACENT TO RESIDENTIAL TO THE SOUTH

NOT TO SCALE



SECTION B-B
ENTRY ROAD AND PEDESTRIAN ACCESS

NOT TO SCALE



TYPICAL PARKING STALL DETAIL

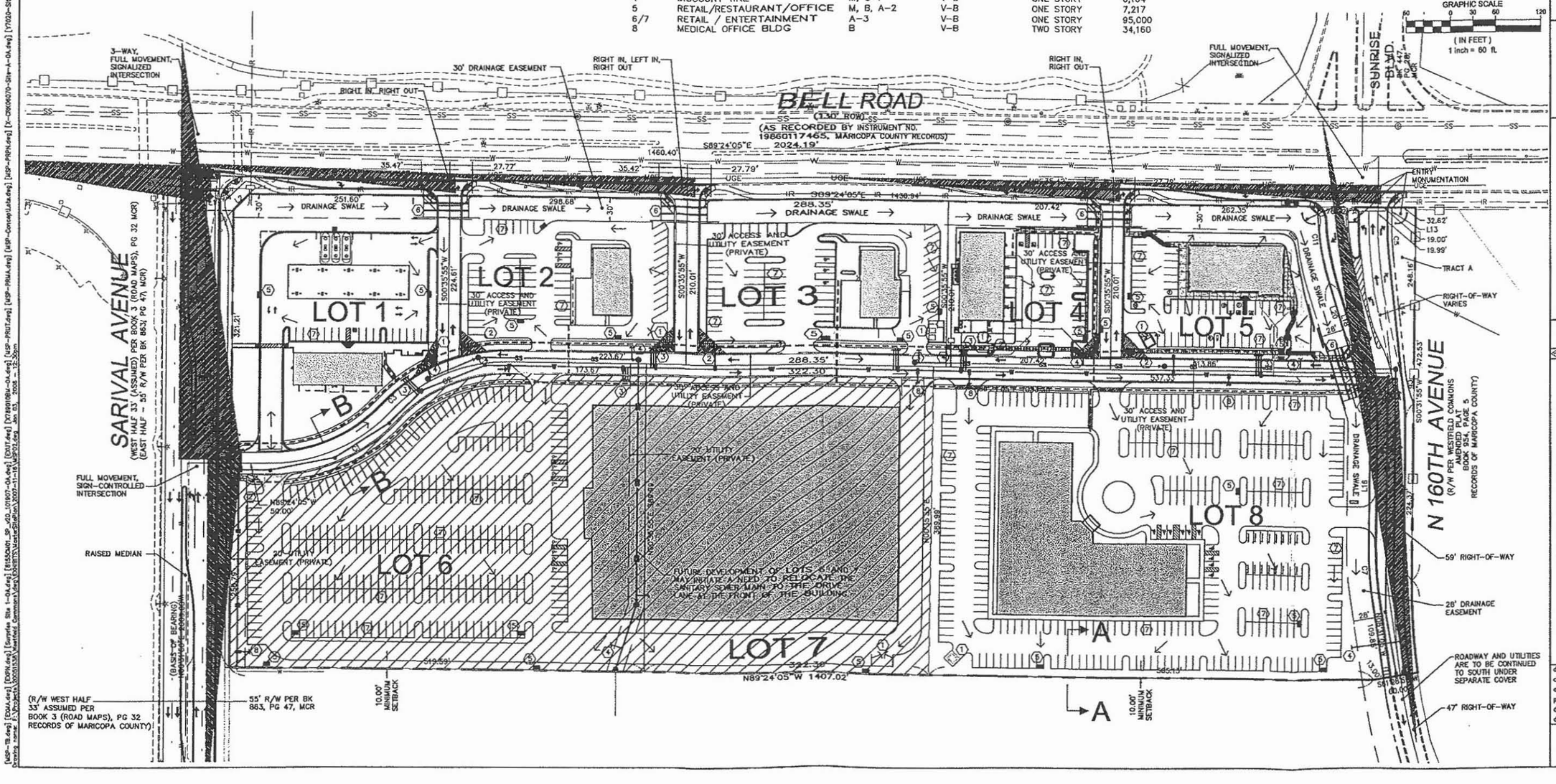
NOT TO SCALE

KEY NOTES

1. TRASH ENCLOSURE
2. FIRE HYDRANT
3. TYPICAL WATER SERVICE CLUSTER (SEE DETAIL, THIS SHEET)
4. SANITARY SEWER SERVICE
5. POTENTIAL LOW POINT RE: INDIVIDUAL SITE PLAN
6. BOX CULVERT
7. TYPICAL PARKING STALL
8. 8" WATER STUB FOR FUTURE WATER MAIN LOOP

OCCUPANCY TABLE

LOT	OCCUPANCY	OCCUPANCY CLASSIFICATION	CONSTRUCTION TYPE	HEIGHT	SF
1	CIRCLE K STORE	M	V-B	ONE STORY	4,400
2	BANK W/ DRIVE-THRU	B	V-B	ONE STORY	4,082
3	FAST FOOD W/DRIVE-THRU	A-2	V-B	ONE STORY	3,954
4	DISCOUNT TIRE	M, S-1	V-B	ONE STORY	6,164
5	RETAIL/RESTAURANT/OFFICE	M, B, A-2	V-B	ONE STORY	7,217
6/7	RETAIL / ENTERTAINMENT	A-3	V-B	ONE STORY	95,000
8	MEDICAL OFFICE BLDG	B	V-B	TWO STORY	34,160



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REVISIONS

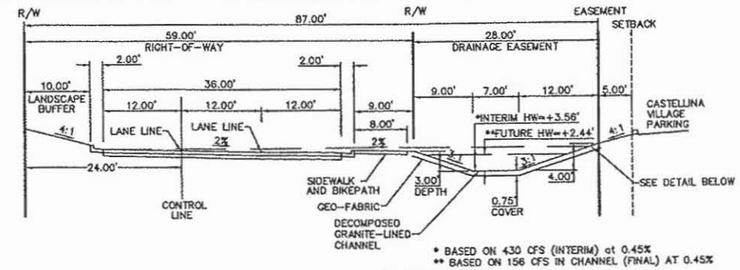
MASTER SITE PLAN
OVERALL PLAN

WESTFIELD COMMONS
COUNTY OF MARICOPA
SE CORNER BELL ROAD AT SARIVAL AVENUE
CITY OF SURPRISE, ARIZONA

2006

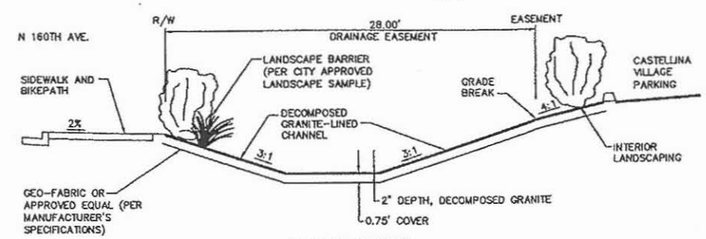
drawn by:	SDS
checked by:	WEP
approved by:	WEP
project no.:	A05-1538
dwg name:	MSP02
date:	11/30/07

SHEET
MSP02
2 OF 2 SHEETS

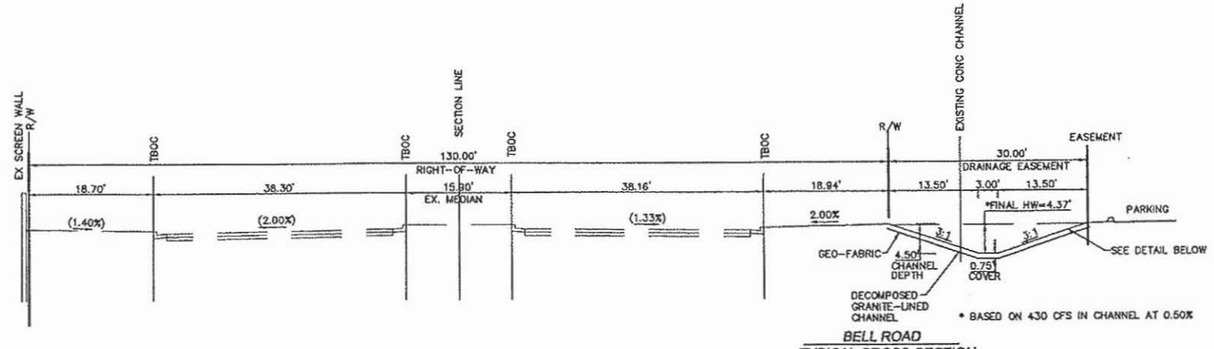


* BASED ON 430 CFS (INTERIM) at 0.45%
** BASED ON 156 CFS IN CHANNEL (FINAL) AT 0.45%

N. 160TH AVENUE
TYPICAL COMMERCIAL CROSS-SECTION
1"=10'

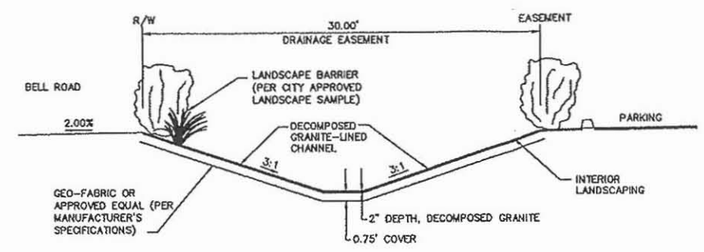


N. 160TH AVENUE
TYPICAL LANDSCAPED CHANNEL
1"=5'



* BASED ON 430 CFS IN CHANNEL AT 0.50%

BELL ROAD
TYPICAL CROSS-SECTION
1"=10'



BELL ROAD
TYPICAL LANDSCAPED CHANNEL
1"=5'

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REVISIONS

MASTER SITE PLAN
TYPICAL SECTIONS
WESTFIELD COMMONS
COUNTY OF MARICOPA
SE CORNER BELL ROAD AT SARIVAL AVENUE
CITY OF SURPRISE, ARIZONA
2006

drawn by:	SDS
checked by:	WEP
approved by:	WEP
project no.:	A08-153A
dwg name:	MSP092507
date:	11/30/07

SHEET
MSP02
2 OF 2 SHEETS

[MSP-TB.dwg] [CDAA.dwg] [DOPN.dwg] [Surprise Site 1-OA.dwg] [B153CA01_SP_v20_101607-OA.dwg] [DUIT.dwg] [XTBX0101M-OA.dwg] [MSP-PRUT.dwg] [MSP-PRUA.dwg] [MSP-ConceptLots.dwg] [MSP-PRPL.dwg] [X-OPK06070-Site-A-OA.dwg] [T7020-Site-OA.dwg]
Drawing name: F:\Projects\20051538\Westfield Commons\dwg\SHEETS\MasterSitePlan\2007-11-16\MSP02.dwg Jan 03, 2008 - 12:30pm

D11

Computation

Job No.	79902	No.	
Project	Loop 303 / White Tanks ADMPU AHA	Computed	AM
Date	10/27/08		
Subject	Weir Flow Analysis	Checked	CN
Date	3/10/09		
Task	Weir Calculations	Sheet	1
Of	x		

Location: Greenway at Parkview (DD11)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	16	15	260	15.5	14	0	0.00	14.5	0	0.00	15	0	0.00	CHECK	15.5	0	0.00	DONE
south	15	14	260	14.5	14	0	0.00	14.5	0	0.00	15	0.5	275.77		15.5	1	780.00	
south	14	13.8	270	13.9	14	0.1	25.61	14.5	0.6	376.45	15	1.1	934.49		15.5	1.6	1639.32	
southeast	13.8	13.8	20	13.8	14	0.2	5.37	14.5	0.7	35.14	15	1.2	78.87		15.5	1.7	132.99	
east	13.8	14	30	13.9	14	0.1	2.85	14.5	0.6	41.83	15	1.1	103.83		15.5	1.6	182.15	
east	14	15	88	14.5	14	0	0.00	14.5	0	0.00	15	0.5	93.34		15.5	1	264.00	
east	15	16	87	15.5	14	0	0.00	14.5	0	0.00	15	0	0.00		15.5	0	0.00	
east	16	16	235	16	14	0	0.00	14.5	0	0.00	15	0	0.00		15.5	0	0.00	
east	16	16	235	16	14	0	0.00	14.5	0	0.00	15	0	0.00		15.5	0	0.00	
						TOTALS:	33.83			453.42			1486.30				2998.46	

Graph Computations:

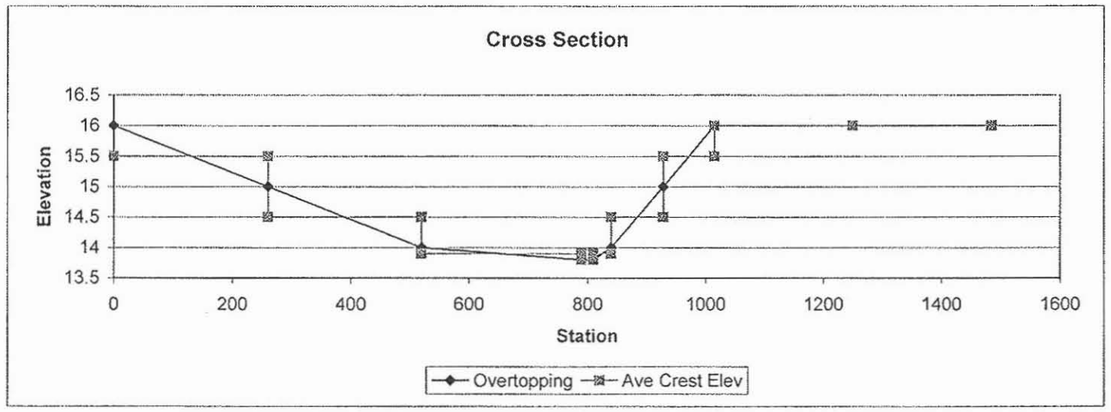
Station	Elevation
0	16
260	15
520	14
790	13.8
810	13.8
840	14
928	15
1015	16
1250	16
1485	16

Weir Approximation:

Station	Elevation
0	15.5
260	15.5
260	14.5
520	14.5
520	13.9
790	13.9
790	13.8
810	13.8
810	13.9
840	13.9
840	14.5
928	14.5
928	15.5
1015	15.5
1015	16
1250	16
1250	16
1485	16

Culvert Flows (cfs):

south	0
southeast	0
east	0



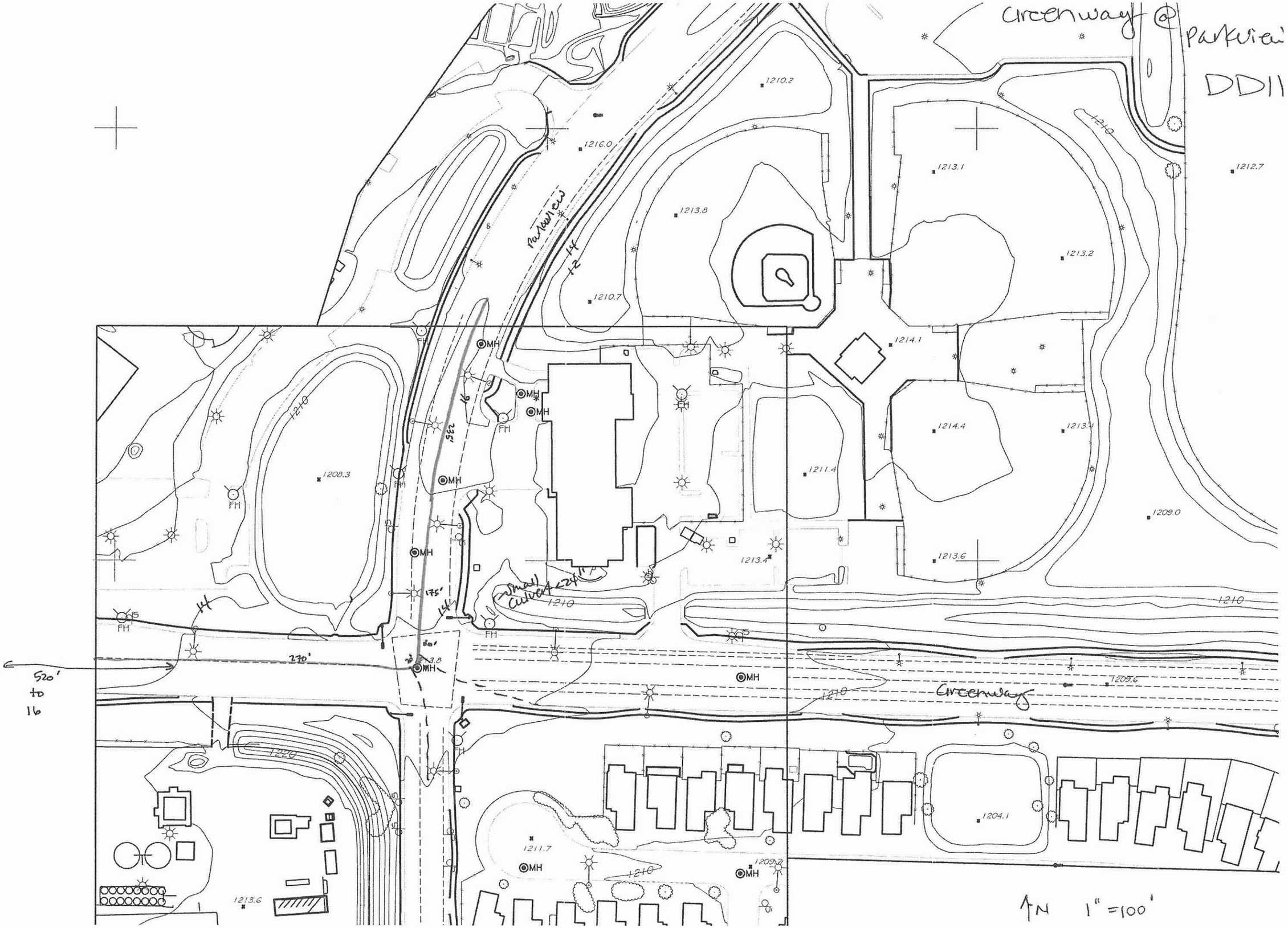
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	25.61	76%	Q(south)	376.45	83%	Q(south)	1210.26	81%	Q(south)	2419.32	81%
Q(southeast)	5.37	16%	Q(southeast)	35.14	8%	Q(southeast)	78.87	5%	Q(southeast)	132.99	4%
Q(east)	2.85	8%	Q(east)	41.83	9%	Q(east)	197.17	13%	Q(east)	446.15	15%
	33.83			453.42			1486.30			2998.46	

First DI	East to South			
Inflow	33.83	453.42	1486.30	2998.46
Outflow	25.61	376.45	1210.26	2419.32

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	8.21	76.97	276.04	579.14
Outflow	5.37	35.14	78.87	132.99

Assumes diversion is to southeast



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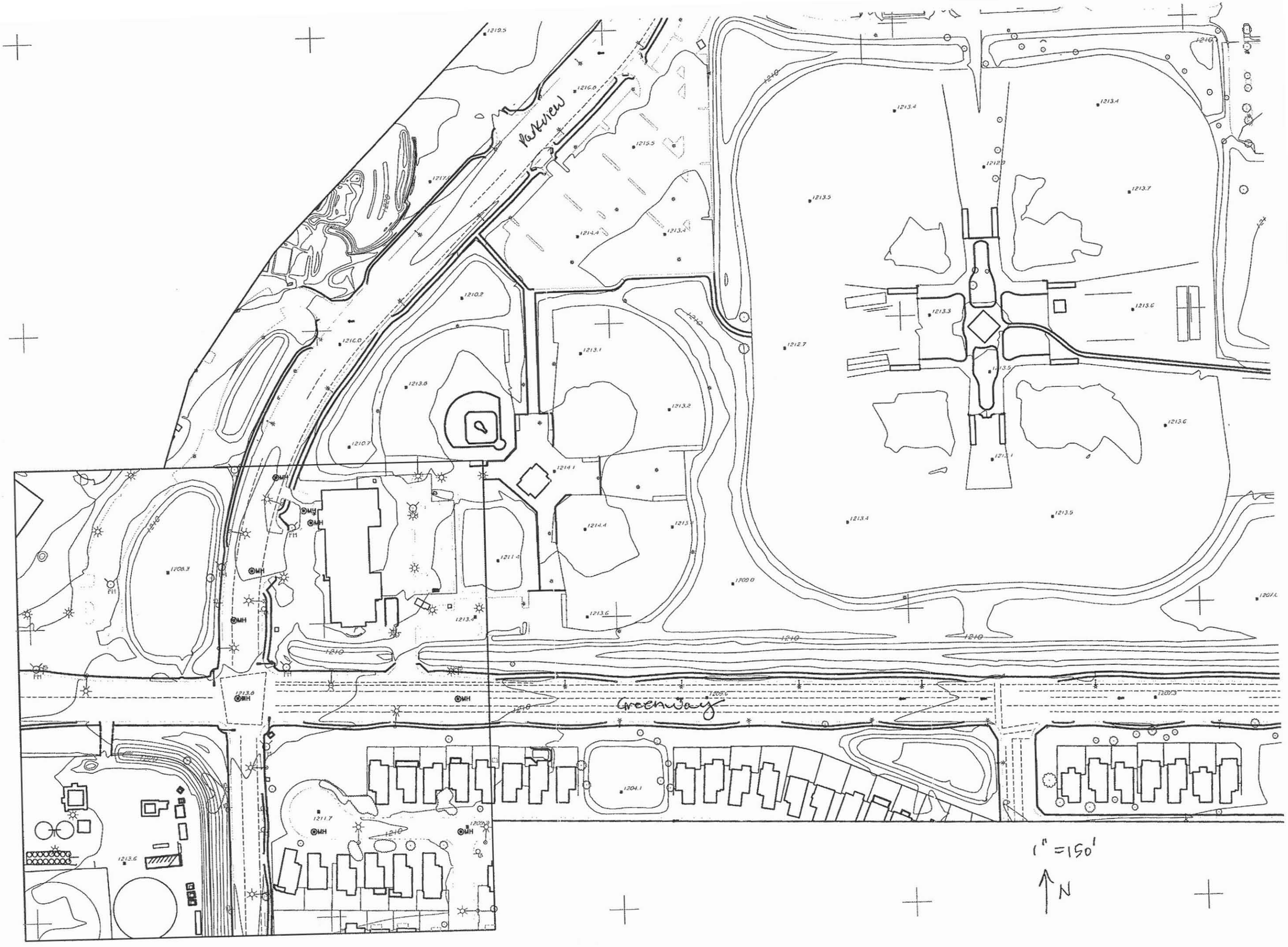
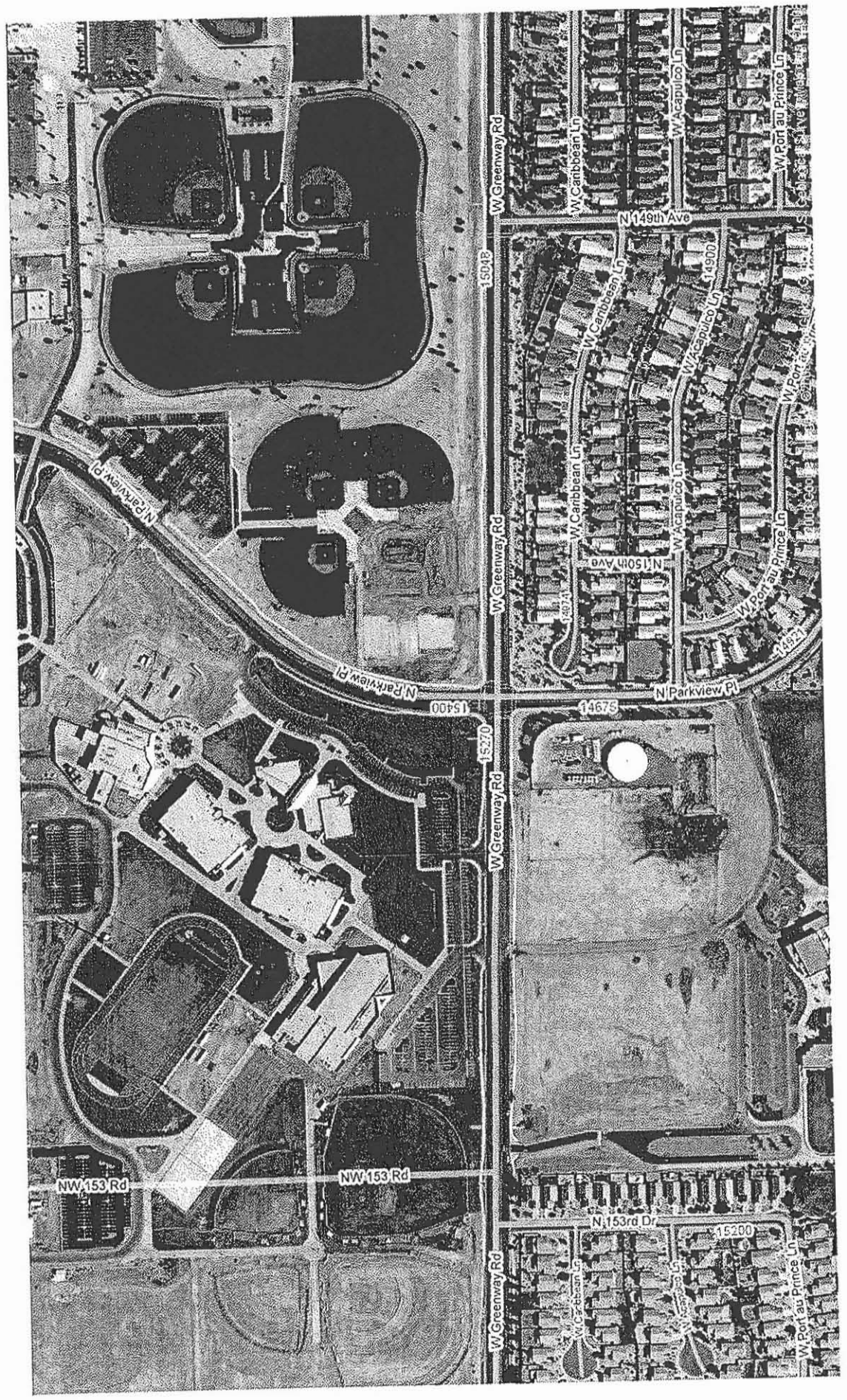
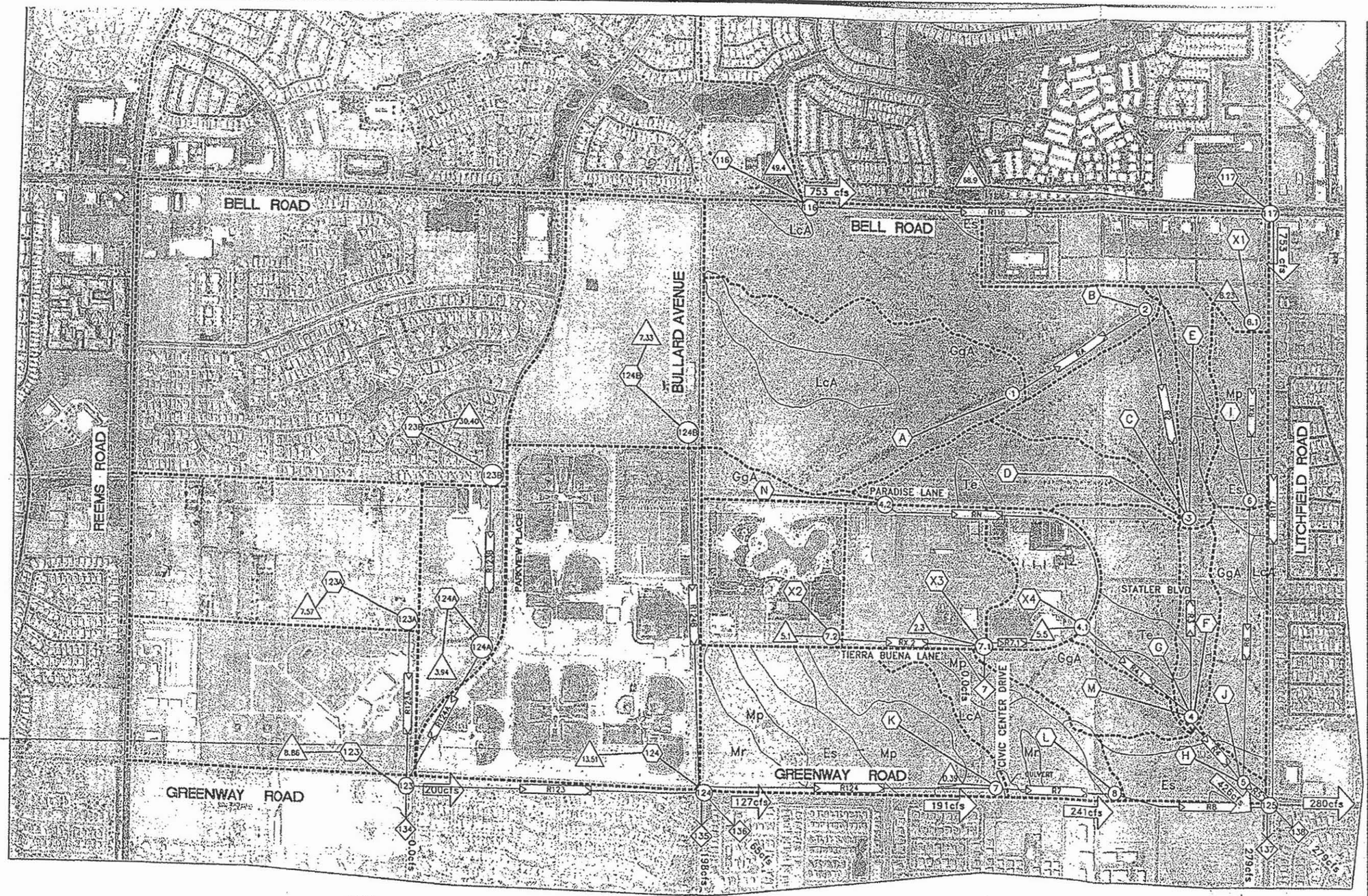

Parkview
Greenway
1" = 150'
N


W Greenway Rd
W Canbean Ln
W Capulco Ln
W Port au Prince Ln
N 149th Ave
14900
15040
N Parkview Pl
15400
14675
15270
N 150th Ave
NW 153 Rd
N 153rd Dr
15200



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GREENWAY ROAD
BETWEEN BULLARD AVE & LITCHFIELD RD
SURPRISE, AZ

MODIFIED EXISTING DRAINAGE EXHIBIT

CMX PROJ.: 7635	DATE: Feb 2008
DESIGNED:	SCALE: AS NOTED
DRAWN:	APPROVED:
REV.	

DWG. NO. 1

SHT. 1 OF 1

Offsite Drainage Area Summary Table

7635 Greeway Road
Prepared by: Edna Mae Prieto Date: 2/4/2008
Updated by: Aubrey Thomas Date: 7/16/2008

V = CIA V = Volume (ac-ft)
i = rainfall depth (ft) where i = 2.8 / 12 = 0.23
A = The drainage area (acres)

Drainage Area ID(s)	Drainage Subarea ID(s)	Residential (ft^2)	Area: Commercial (ft^2)	Park (ft^2)	Desert (ft^2)	Total (ft^2)	Total (ac)	C Coefficient	I (ft)	V = CIA (ac-ft)	V with ADMP Reduction Factor of 80% (ac-ft)
	A1	0	602,469	0	0	602,469	13.83	0.90	0.23	2.90	2.32
	A2	0	0	0	367,039	367,039	8.43	0.50	0.23	0.98	0.79
	A3	0	0	0	365,643	365,643	8.39	0.50	0.23	0.98	0.78
	A4	0	275,773	0	0	275,773	6.33	0.90	0.23	1.33	1.06
	A5	0	0	0	467,882	467,882	10.74	0.50	0.23	1.25	1.00
	A6	0	710,546	0	0	710,546	16.31	0.90	0.23	3.43	2.74
	A7	7,234,970	0	0	0	7,234,970	166.09	0.70	0.23	27.13	21.70
123B						10,024,320	230.13			38.00	30.40
	123A	0	0	0	3,534,645	3,534,645	81.14	0.50	0.23	9.47	7.57
123A						3,534,645	81.14			9.47	7.57
	A9	0	792,624	0	0	792,624	18.20	0.90	0.23	3.82	3.06
	A10	0	0	0	213,741	213,741	4.91	0.50	0.23	0.57	0.46
	A11	0	0	0	103,866	103,866	2.38	0.50	0.23	0.28	0.22
	A12	0	0	2,388,600	0	2,388,600	54.83	0.50	0.23	6.40	5.12
123						3,498,830	80.32			11.07	8.86
	A13	0	0	0	224,526	224,526	5.15	0.50	0.23	0.60	0.48
	A14	0	534,758	0	0	534,758	12.28	0.90	0.23	2.58	2.06
	A15	0	0	651,213	0	651,213	14.95	0.50	0.23	1.74	1.40
124A						1,410,497	32.38			4.92	3.94
	B1	0	0	0	3,419,227	3,419,227	78.49	0.50	0.23	9.16	7.33
124B						3,419,227	78.49			9.16	7.33
	B2	0	0	6,304,858	0	6,304,858	144.74	0.50	0.23	16.89	13.51
124						6,304,858	144.74			16.89	13.51
	C1	0	0	1,902,018	0	1,902,018	43.66	0.50	0.23	5.09	4.08
	C2	0	0	0	844,535	844,535	19.39	0.50	0.23	2.26	1.81
	C3	0	1,961,106	0	0	1,961,106	45.02	0.90	0.23	9.45	7.56
City Center						4,707,659	108.07			16.81	13.45

Land use	100-Year C Coefficient
Residential	0.70
Commercial	0.90
Park	0.50
Desert	0.50

D12

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	CP
		Date	3/10/09
		Sheet	1
		Of	x

Location: Greenway at Bullard (DD12)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	6	5	300	5.5	4.2	0	0.00	4.7	0	0.00	5.2	0	0.00	CHECK	5.7	0.2	80.50	DONE
south	5	4	300	4.5	4.2	0	0.00	4.7	0.2	80.50	5.2	0.7	527.10		5.7	1.2	1183.08	
south	4	3.8	40	3.9	4.2	0.3	19.72	4.7	0.8	85.87	5.2	1.3	177.87		5.7	1.8	289.79	
southeast	3.8	3.8	32	3.8	4.2	0.4	24.29	4.7	0.9	81.97	5.2	1.4	159.02		5.7	1.9	251.42	
east	3.8	4	50	3.9	4.2	0.3	24.65	4.7	0.8	107.33	5.2	1.3	222.33		5.7	1.8	362.24	
east	4	5	57	4.5	4.2	0	0.00	4.7	0.2	15.29	5.2	0.7	100.15		5.7	1.2	224.79	
east	5	6	58	5.5	4.2	0	0.00	4.7	0	0.00	5.2	0	0.00		5.7	0.2	15.56	
east	6	7	190	6.5	4.2	0	0.00	4.7	0	0.00	5.2	0	0.00		5.7	0	0.00	
east	7	8	190	7.5	4.2	0	0.00	4.7	0	0.00	5.2	0	0.00		5.7	0	0.00	
						TOTALS:	68.65			370.96			1186.47				2407.39	

Graph Computations:

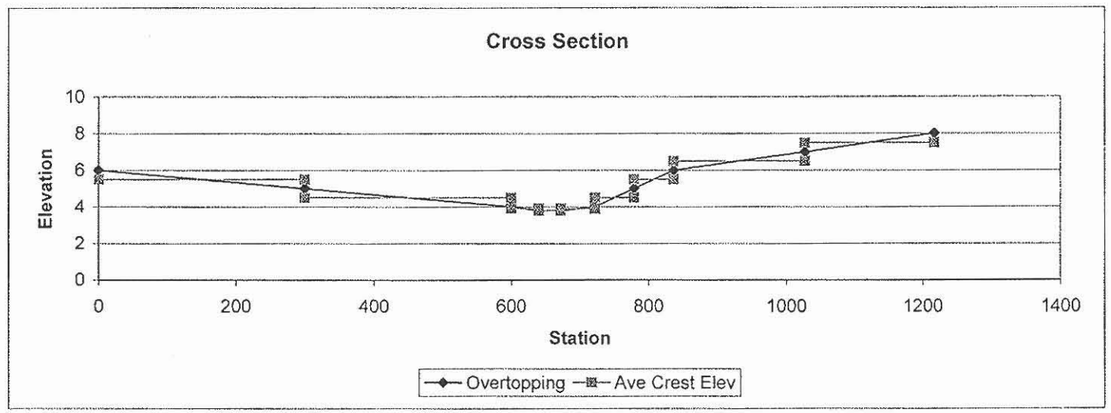
Station	Elevation
0	6
300	5
600	4
640	3.8
672	3.8
722	4
779	5
837	6
1027	7
1217	8

Weir Approximation:

Station	Elevation
0	5.5
300	5.5
300	4.5
600	4.5
600	3.9
640	3.9
640	3.8
672	3.8
672	3.9
722	3.9
722	4.5
779	4.5
779	5.5
837	5.5
837	6.5
1027	6.5
1027	7.5
1217	7.5

Culvert Flows (cfs):

south	0
southeast	0
east	0



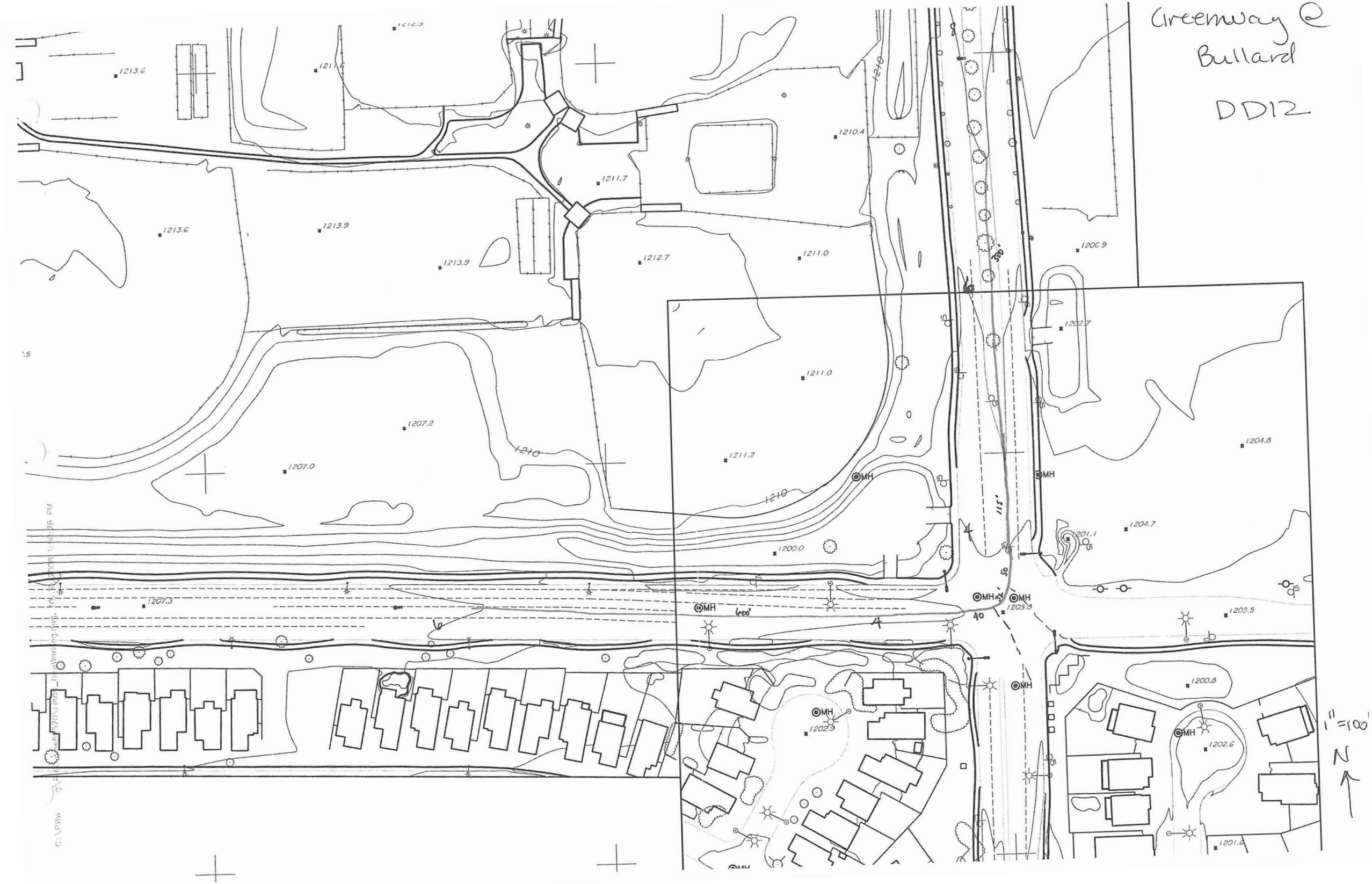
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	19.72	29%	Q(south)	166.36	45%	Q(south)	704.96	59%	Q(south)	1553.37	65%
Q(southeast)	24.29	35%	Q(southeast)	81.97	22%	Q(southeast)	159.02	13%	Q(southeast)	251.42	10%
Q(east)	24.65	36%	Q(east)	122.63	33%	Q(east)	322.48	27%	Q(east)	602.59	25%
	68.65			370.96			1186.47			2407.39	

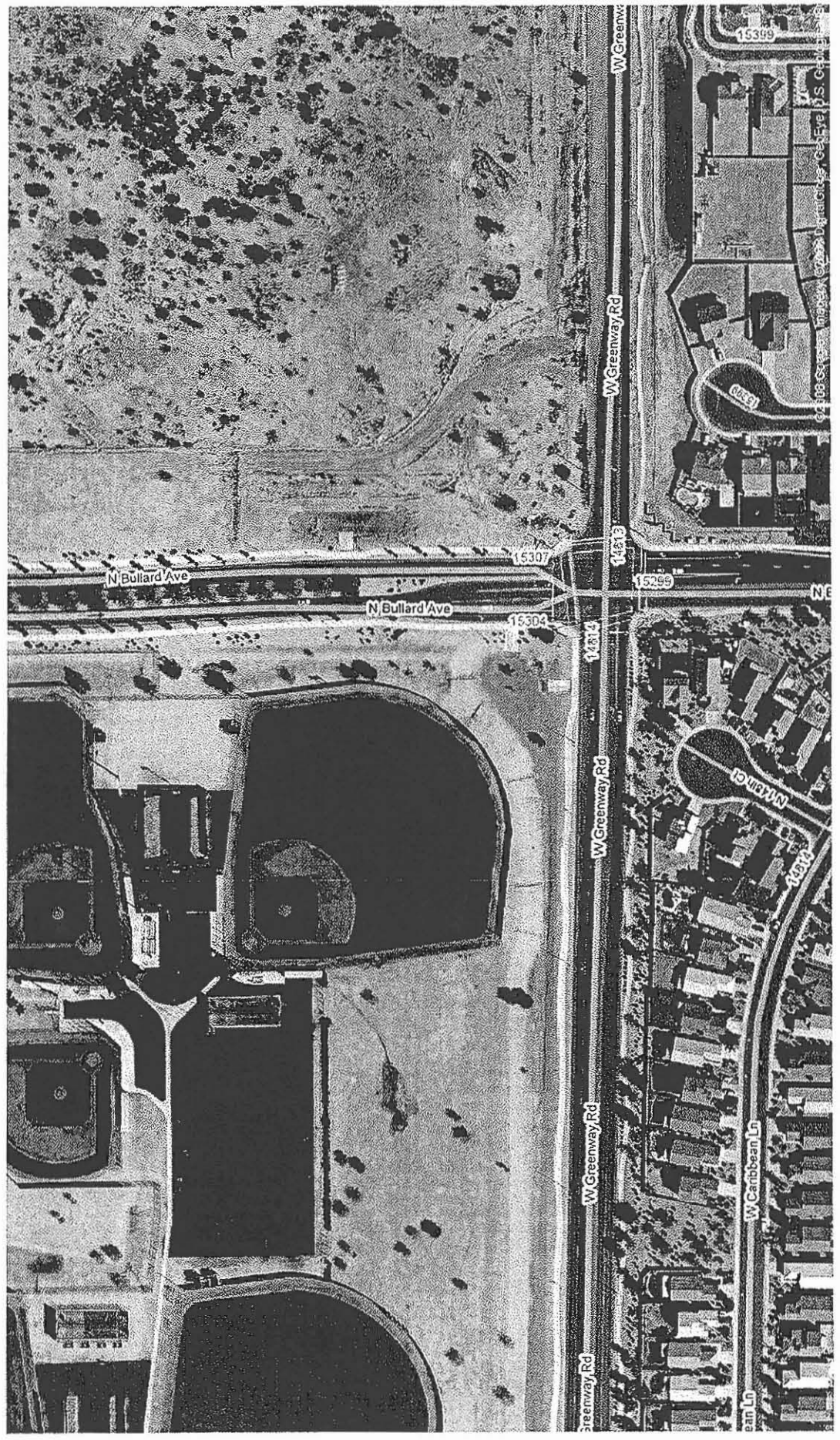
First DI	East to South			
Inflow	68.65	370.96	1186.47	2407.39
Outflow	19.72	166.36	704.96	1553.37

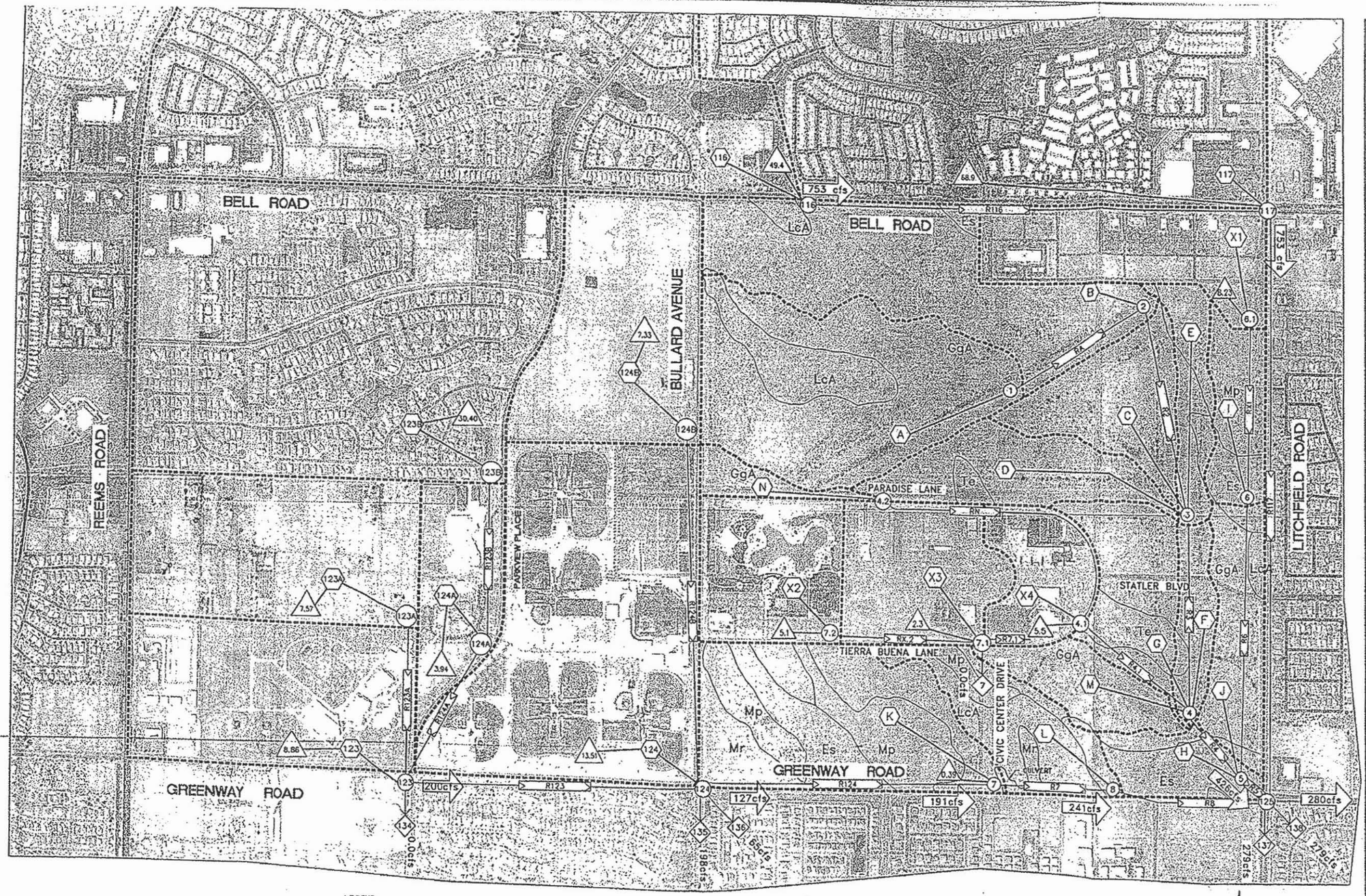
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	48.93	204.59	481.51	854.01
Outflow	24.29	81.97	159.02	251.42

Assumes diversion is to southeast


Greenway @
Bullard
DD12
1213.6
1213.6
1213.9
1213.9
1211.7
1212.7
1210.4
1211.0
1211.0
1211.2
1206.9
1202.7
1204.8
1204.7
1207.2
1207.0
1207.3
1200.0
1203.8
1203.5
1200.8
1202.6
1202.9
1201.6
201.1
1210
MH
600'
115'
40
1" = 100'
N


N Bullard Ave
N Bullard Ave
15307
15304
15299
15399
14313
14314
W Greenway Rd
W Greenway Rd
W Greenway Rd
W Caribbean Ln
N Kara Ct
16018
QUEST



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GREENWAY ROAD

BETWEEN BULLARD AVE & LITCHFIELD RD
SURPRISE, AZ

MODIFIED EXISTING DRAINAGE EXHIBIT

CMX PROJ:76335	DATE: Feb 2008	SCALE: AS NOTED
DESIGNED:	DRAWN:	APPROVED:
REV.		

DWG. NO. 1

SHT. 1 OF 1

Offsite Drainage Area Summary Table

7635 Greeway Road
Prepared by: Edna Mae Prieto Date: 2/4/2008
Updated by: Aubrey Thomas Date: 7/16/2008

V = CIA V = Volume (ac-ft)
i = rainfall depth (ft) where i = 2.8 / 12 = 0.23
A = The drainage area (acres)

			Area								
Drainage Area ID(s)	Drainage Subarea ID(s)	Residential (ft^2)	Commercial (ft^2)	Park (ft^2)	Desert (ft^2)	Total (ft^2)	Total (ac)	C Coefficient	I (ft)	V = CIA (ac-ft)	V with ADMP Reduction Factor of 80% (ac-ft)
	A1	0	602,469	0	0	602,469	13.83	0.90	0.23	2.90	2.32
	A2	0	0	0	367,039	367,039	8.43	0.50	0.23	0.98	0.79
	A3	0	0	0	365,643	365,643	8.39	0.50	0.23	0.98	0.78
	A4	0	275,773	0	0	275,773	6.33	0.90	0.23	1.33	1.06
	A5	0	0	0	467,882	467,882	10.74	0.50	0.23	1.25	1.00
	A6	0	710,546	0	0	710,546	16.31	0.90	0.23	3.43	2.74
	A7	7,234,970	0	0	0	7,234,970	166.09	0.70	0.23	27.13	21.70
123B						10,024,320	230.13			38.00	30.40
	123A	0	0	0	3,534,645	3,534,645	81.14	0.50	0.23	9.47	7.57
123A						3,534,645	81.14			9.47	7.57
	A9	0	792,624	0	0	792,624	18.20	0.90	0.23	3.82	3.06
	A10	0	0	0	213,741	213,741	4.91	0.50	0.23	0.57	0.46
	A11	0	0	0	103,866	103,866	2.38	0.50	0.23	0.28	0.22
	A12	0	0	2,388,600	0	2,388,600	54.83	0.50	0.23	6.40	5.12
123						3,498,830	80.32			11.07	8.86
	A13	0	0	0	224,526	224,526	5.15	0.50	0.23	0.60	0.48
	A14	0	534,758	0	0	534,758	12.28	0.90	0.23	2.58	2.06
	A15	0	0	651,213	0	651,213	14.95	0.50	0.23	1.74	1.40
124A						1,410,497	32.38			4.92	3.94
	B1	0	0	0	3,419,227	3,419,227	78.49	0.50	0.23	9.16	7.33
124B						3,419,227	78.49			9.16	7.33
	B2	0	0	6,304,858	0	6,304,858	144.74	0.50	0.23	16.89	13.51
124						6,304,858	144.74			16.89	13.51
	C1	0	0	1,902,018	0	1,902,018	43.66	0.50	0.23	5.09	4.08
	C2	0	0	0	844,535	844,535	19.39	0.50	0.23	2.26	1.81
	C3	0	1,961,106	0	0	1,961,106	45.02	0.90	0.23	9.45	7.56
City Center						4,707,659	108.07			16.81	13.45

Land use	100-Year C Coefficient
Residential	0.70
Commercial	0.90
Park	0.50
Desert	0.50

D13

Computation

Job No.	79902	No.	
Computed	AM	Date	10/27/08
Checked	GP	Date	3/10/09
Sheet	1	Of	x

Project: Loop 303 / White Tanks ADMPU AHA

Subject: Weir Flow Analysis

Task: Weir Calculations

Location: Greenway at Litchfield (DD13)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	88.2	87.2	296	87.7	86.5	0	0.00	87	0	0.00	87.5	0	0.00	CHECK	88	0.3	145.91	DONE
south	87.2	86.5	136	86.85	86.5	0	0.00	87	0.15	23.70	87.5	0.65	213.81		88	1.15	503.16	
south	86.5	86	50	86.25	86.5	0.25	18.75	87	0.75	97.43	87.5	1.25	209.63		88	1.75	347.25	
southeast	86	86	66	86	86.5	0.5	70.00	87	1	198.00	87.5	1.5	363.75		88	2	560.03	
southeast	86	86	40	86	86.5	0.5	42.43	87	1	120.00	87.5	1.5	220.45		88	2	339.41	
east	86	87	85	86.5	86.5	0	0.00	87	0.5	90.16	87.5	1	255.00		88	1.5	468.46	
east	87	88	85	87.5	86.5	0	0.00	87	0	0.00	87.5	0	0.00		88	0.5	90.16	
east	88	89	150	88.5	86.5	0	0.00	87	0	0.00	87.5	0	0.00		88	0	0.00	
east	89	89	1	89	86.5	0	0.00	87	0	0.00	87.5	0	0.00		88	0	0.00	
						TOTALS:	131.18			529.29			1262.65				2454.39	

Graph Computations:

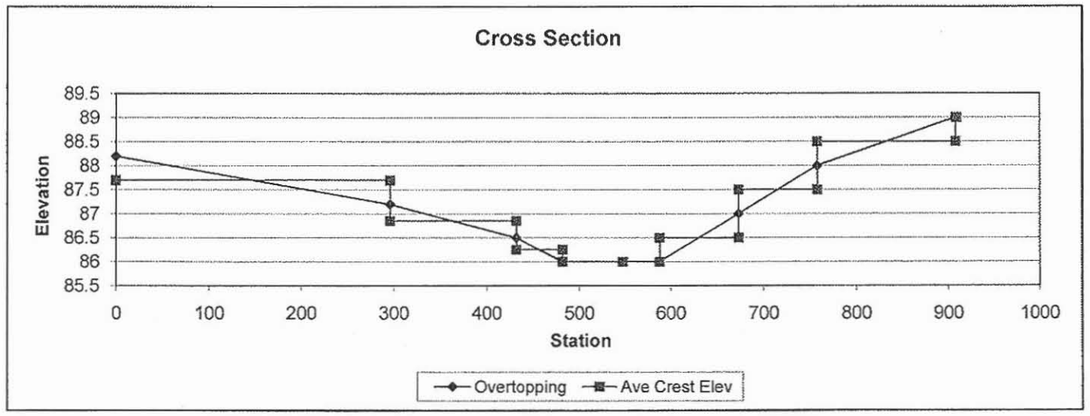
Station	Elevation
0	88.2
296	87.2
432	86.5
482	86
548	86
588	86
673	87
758	88
908	89
909	89

Weir Approximation:

Station	Elevation
0	87.7
296	87.7
296	86.85
432	86.85
432	86.25
482	86.25
482	86
548	86
548	86
588	86
588	86.5
673	86.5
673	87.5
758	87.5
758	88.5
908	88.5
908	89
909	89

Culvert Flows (cfs):

south	0	
southeast	0	
east	388	10'x3'RCB Dbl



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	18.75	4%	Q(south)	121.13	13%	Q(south)	423.44	26%	Q(south)	996.33	35%
Q(southeast)	112.43	22%	Q(southeast)	318.00	35%	Q(southeast)	584.20	35%	Q(southeast)	899.44	32%
Q(east)	388.00	75%	Q(east)	478.16	52%	Q(east)	643.00	39%	Q(east)	946.62	33%
	519.18			917.29			1650.65			2842.39	

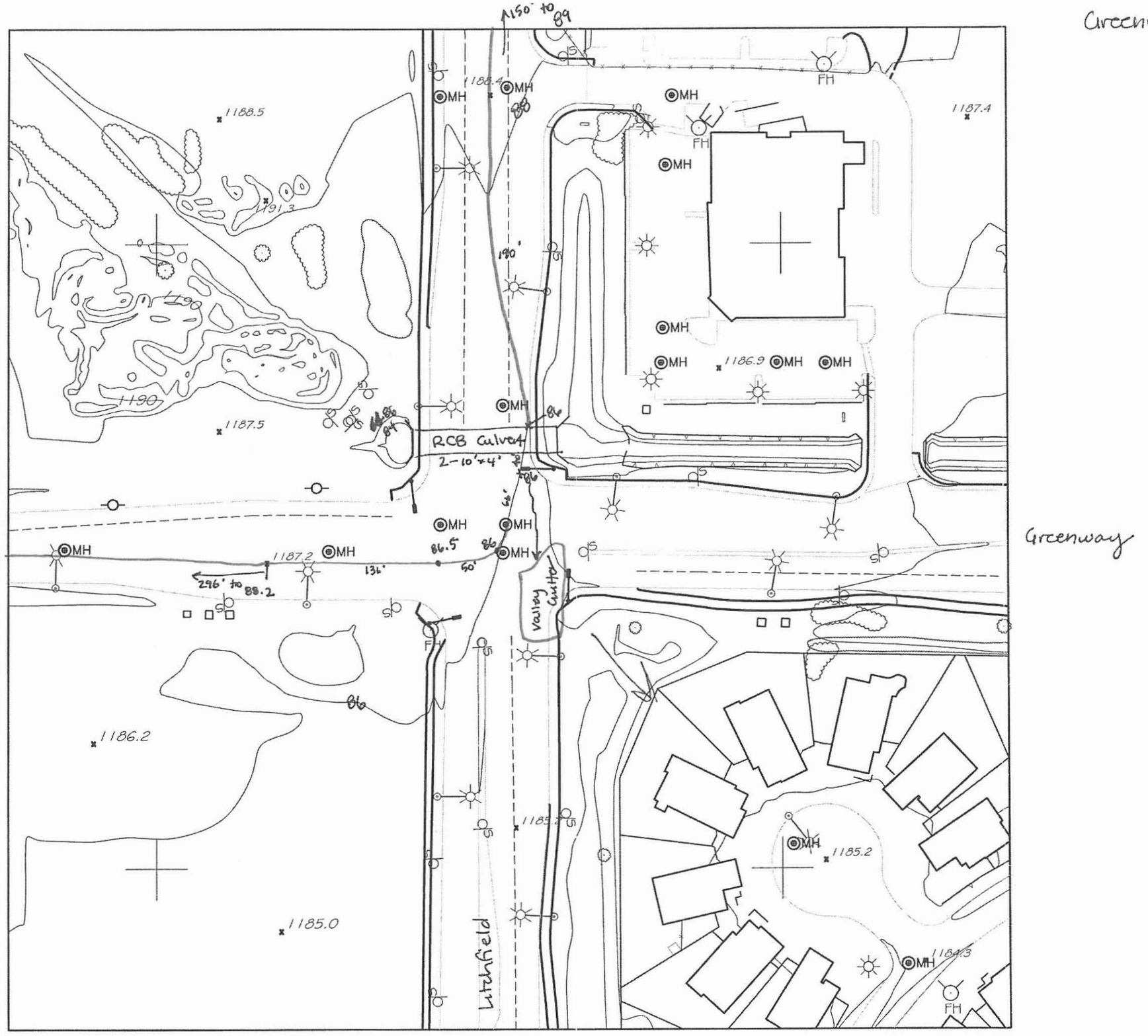
First DI	East to South			
Inflow	519.18	917.29	1650.65	2842.39
Outflow	18.75	121.13	423.44	996.33

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	500.43	796.16	1227.20	1846.06
Outflow	112.43	318.00	584.20	899.44

Assumes diversion is to southeast

Greenway @ Litchfield
DD13



C:\PWw J:\PHX\cms69520\Linda_NewWorking.dwg, 10/17/2008 3:01:20 PM

N Litchfield Rd
15401
N Litchfield Rd
15177
N Litchfi
19400
15178
W Greenway Rd
13300
W Greenway Rd
W Greenway Rd
24039
15196
N 140th Dr
W Greenway Rd
N 139th Ln
N 139th Ln
13800
13801

Culvert Calculator Report
DD13LitchfieldGreenway

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	87.00 ft	Headwater Depth/ Height	1.33
Computed Headwater Elevation	87.00 ft	Discharge	388.10 cfs
Inlet Control HW Elev	87.00 ft	Tailwater Elevation	84.00 ft
Outlet Control HW Elev	86.97 ft	Control Type	Inlet Control

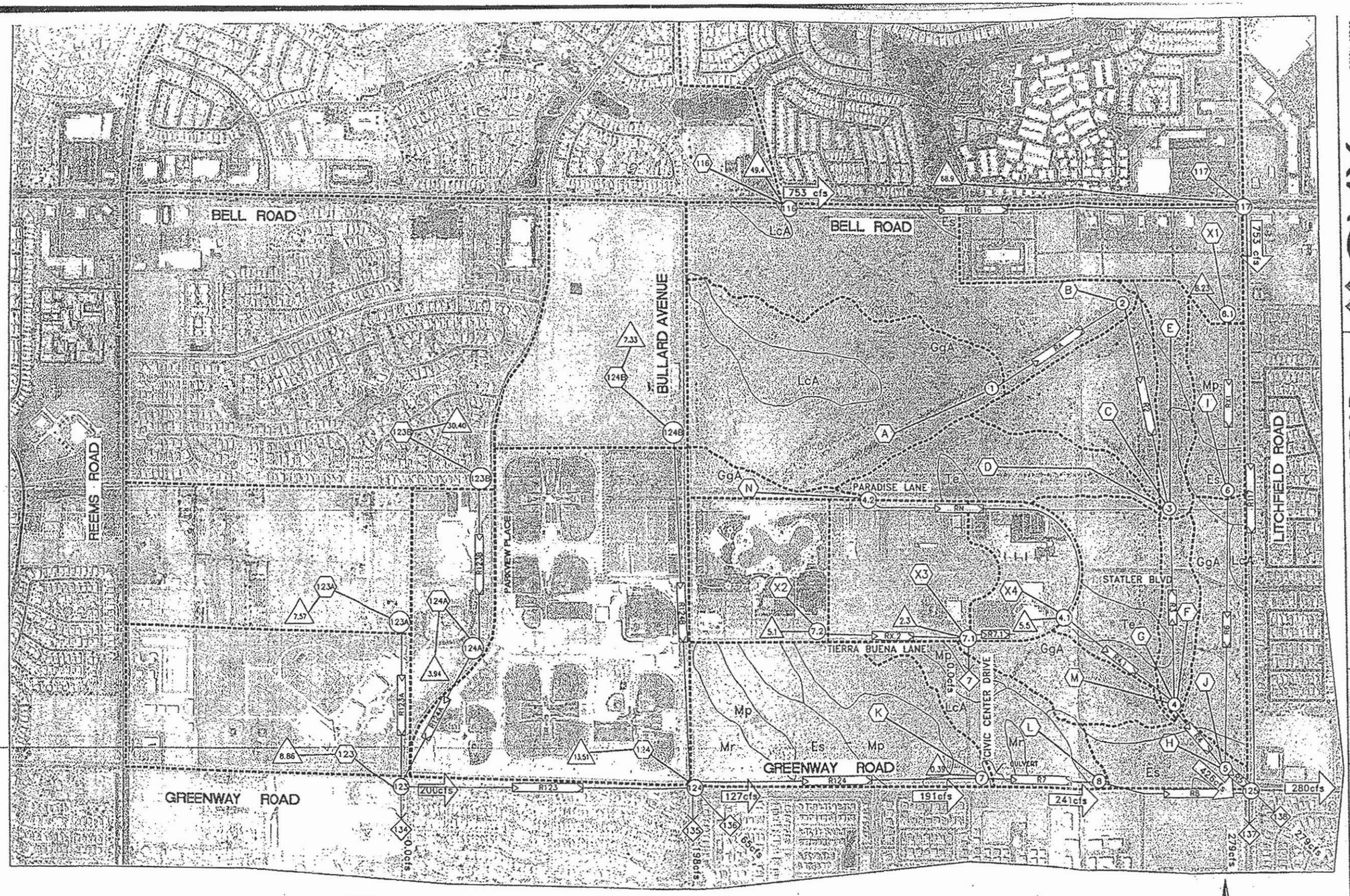
Grades			
Upstream Invert	83.00 ft	Downstream Invert	82.50 ft
Length	114.00 ft	Constructed Slope	0.004386 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	2.27 ft
Slope Type	Mild	Normal Depth	2.28 ft
Flow Regime	Subcritical	Critical Depth	2.27 ft
Velocity Downstream	8.55 ft/s	Critical Slope	0.004435 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	5.00 ft
Section Size	5 x 3 ft	Rise	3.00 ft
Number Sections	4		

Outlet Control Properties			
Outlet Control HW Elev	86.97 ft	Upstream Velocity Head	1.13 ft
Ke	0.50	Entrance Loss	0.56 ft

Inlet Control Properties			
Inlet Control HW Elev	87.00 ft	Flow Control	Transition
Inlet Type	90 and 15 ° wingwall flares	Area Full	60.0 ft²
K	0.06100	HDS 5 Chart	8
M	0.75000	HDS 5 Scale	2
C	0.04000	Equation Form	1
Y	0.80000		



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GREENWAY ROAD

BETWEEN BULLARD AVE & LITCHFIELD RD
SURPRISE, AZ

MODIFIED EXISTING DRAINAGE EXHIBIT

CMX PROJ: 76335	SCALE: AS NOTED
DATE: Feb 2008	
DESIGNED:	APPROVED:
DRAWN:	
REV.	
DWG. NO. 1	SHT. 1 OF 1

Offsite Drainage Area Summary Table

7635 Greeway Road
Prepared by: Edna Mae Prieto Date: 2/4/2008
Updated by: Aubrey Thomas Date: 7/16/2008

V = CIA V = Volume (ac-ft)
i = rainfall depth (ft) where i = 2.8 / 12 = 0.23
A = The drainage area (acres)

			Area								
Drainage Area ID(s)	Drainage Subarea ID(s)	Residential (ft^2)	Commercial (ft^2)	Park (ft^2)	Desert (ft^2)	Total (ft^2)	Total (ac)	C Coefficient	I (ft)	V = CIA (ac-ft)	V with ADMP Reduction Factor of 80% (ac-ft)
	A1	0	602,469	0	0	602,469	13.83	0.90	0.23	2.90	2.32
	A2	0	0	0	367,039	367,039	8.43	0.50	0.23	0.98	0.79
	A3	0	0	0	365,643	365,643	8.39	0.50	0.23	0.98	0.78
	A4	0	275,773	0	0	275,773	6.33	0.90	0.23	1.33	1.06
	A5	0	0	0	467,882	467,882	10.74	0.50	0.23	1.25	1.00
	A6	0	710,546	0	0	710,546	16.31	0.90	0.23	3.43	2.74
	A7	7,234,970	0	0	0	7,234,970	166.09	0.70	0.23	27.13	21.70
123B						10,024,320	230.13			38.00	30.40
	123A	0	0	0	3,534,645	3,534,645	81.14	0.50	0.23	9.47	7.57
123A						3,534,645	81.14			9.47	7.57
	A9	0	792,624	0	0	792,624	18.20	0.90	0.23	3.82	3.06
	A10	0	0	0	213,741	213,741	4.91	0.50	0.23	0.57	0.46
	A11	0	0	0	103,866	103,866	2.38	0.50	0.23	0.28	0.22
	A12	0	0	2,388,600	0	2,388,600	54.83	0.50	0.23	6.40	5.12
123						3,498,830	80.32			11.07	8.86
	A13	0	0	0	224,526	224,526	5.15	0.50	0.23	0.60	0.48
	A14	0	534,758	0	0	534,758	12.28	0.90	0.23	2.58	2.06
	A15	0	0	651,213	0	651,213	14.95	0.50	0.23	1.74	1.40
124A						1,410,497	32.38			4.92	3.94
	B1	0	0	0	3,419,227	3,419,227	78.49	0.50	0.23	9.16	7.33
124B						3,419,227	78.49			9.16	7.33
	B2	0	0	6,304,858	0	6,304,858	144.74	0.50	0.23	16.89	13.51
124						6,304,858	144.74			16.89	13.51
	C1	0	0	1,902,018	0	1,902,018	43.66	0.50	0.23	5.09	4.08
	C2	0	0	0	844,535	844,535	19.39	0.50	0.23	2.26	1.81
	C3	0	1,961,106	0	0	1,961,106	45.02	0.90	0.23	9.45	7.56
City Center						4,707,659	108.07			16.81	13.45

Land use	100-Year C Coefficient
Residential	0.70
Commercial	0.90
Park	0.50
Desert	0.50

D14

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	CP
		Date	3/10/09
		Sheet	1
		Of	x

Location: Greenway at Dysart (DD14)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	69.1	68	210	68.55	67.7	0	0.00	68.2	0	0.00	68.7	0.15	36.60	CHECK	69.2	0.65	330.15	DONE
south	68	67.1	110	67.55	67.7	0.15	19.17	68.2	0.65	172.94	68.7	1.15	406.97		69.2	1.65	699.42	
south	67.1	67	8	67.05	67.7	0.65	12.58	68.2	1.15	29.60	68.7	1.65	50.87		69.2	2.15	75.66	
south	67	67.1	8	67.05	67.7	0.65	12.58	68.2	1.15	29.60	68.7	1.65	50.87		69.2	2.15	75.66	
east	67.1	68	150	67.55	67.7	0.15	26.14	68.2	0.65	235.82	68.7	1.15	554.96		69.2	1.65	953.76	
east	68	69.4	162	68.7	67.7	0	0.00	68.2	0	0.00	68.7	0	0.00		69.2	0.5	171.83	
east	69.4	69.5	1	69.45	67.7	0	0.00	68.2	0	0.00	68.7	0	0.00		69.2	0	0.00	
east	69.5	69.6	1	69.55	67.7	0	0.00	68.2	0	0.00	68.7	0	0.00		69.2	0	0.00	
east	69.6	69.7	1	69.65	67.7	0	0.00	68.2	0	0.00	68.7	0	0.00		69.2	0	0.00	
						TOTALS:	70.47			467.95			1100.26				2306.48	

Graph Computations:

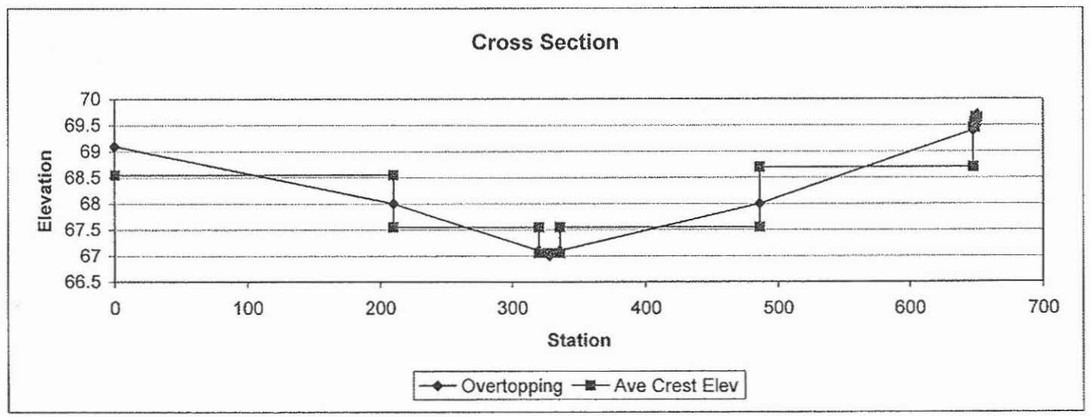
Station	Elevation
0	69.1
210	68
320	67.1
328	67
336	67.1
486	68
648	69.4
649	69.5
650	69.6
651	69.7

Weir Approximation:

Station	Elevation
0	68.55
210	68.55
210	67.55
320	67.55
320	67.05
328	67.05
328	67.05
336	67.05
336	67.55
486	67.55
486	68.7
648	68.7
648	69.45
649	69.45
649	69.55
650	69.55
650	69.65
651	69.65

Culvert Flows (cfs):

south	225	6-30"RCPs
southeast	0	
east	0	



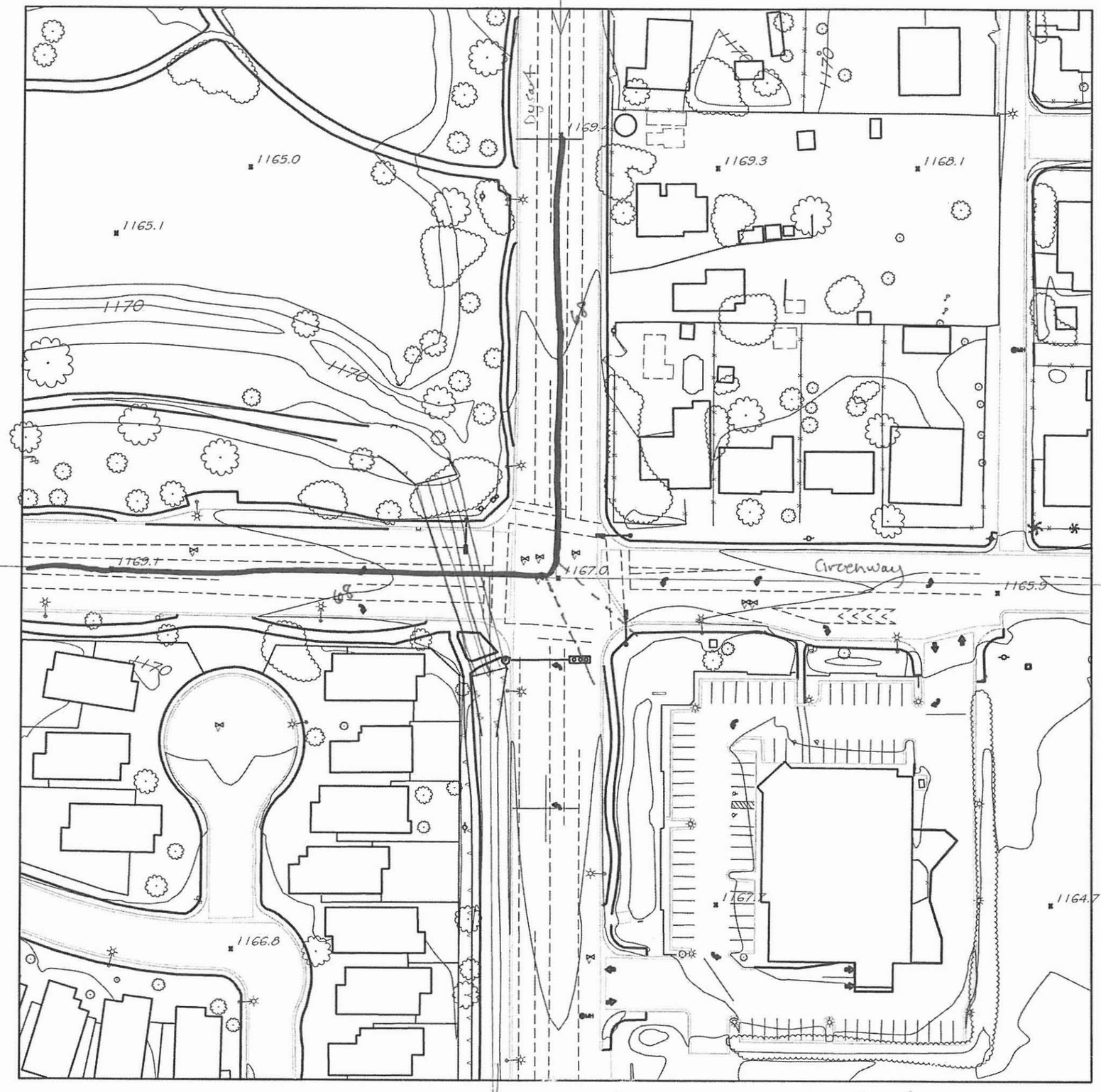
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	269.33	91%	Q(south)	457.13	66%	Q(south)	770.30	58%	Q(south)	1405.89	56%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	26.14	9%	Q(east)	235.82	34%	Q(east)	554.96	42%	Q(east)	1125.59	44%
	295.47			692.95			1325.26			2531.48	

First DI	East to South			
Inflow	295.47	692.95	1325.26	2531.48
Outflow	269.33	457.13	770.30	1405.89

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	26.14	235.82	554.96	1125.59
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast


N 955000
Greenway
@
Dysart
CPD14
Dysart
1165.0
1165.1
1169.4
1169.3
1168.1
1170
1170
1170
1169.1
1167.0
Greenway
1165.9
1170
1166.8
1167.2
1164.7
Culverts = 6 - 30" RCP's w/ headwalls
N 954500
1" = 80'
N
ends up in D26 basin

Culvert Calculator Report
GreenwayDysart

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	1,168.00 ft	Headwater Depth/Height	1.60
Computed Headwater Elev	1,168.00 ft	Discharge	225.51 cfs
Inlet Control HW Elev.	1,168.00 ft	Tailwater Elevation	1,166.00 ft
Outlet Control HW Elev.	1,168.00 ft	Control Type	Inlet Control

Grades			
Upstream Invert	1,164.00 ft	Downstream Invert	1,163.50 ft
Length	75.00 ft	Constructed Slope	0.006667 ft/ft

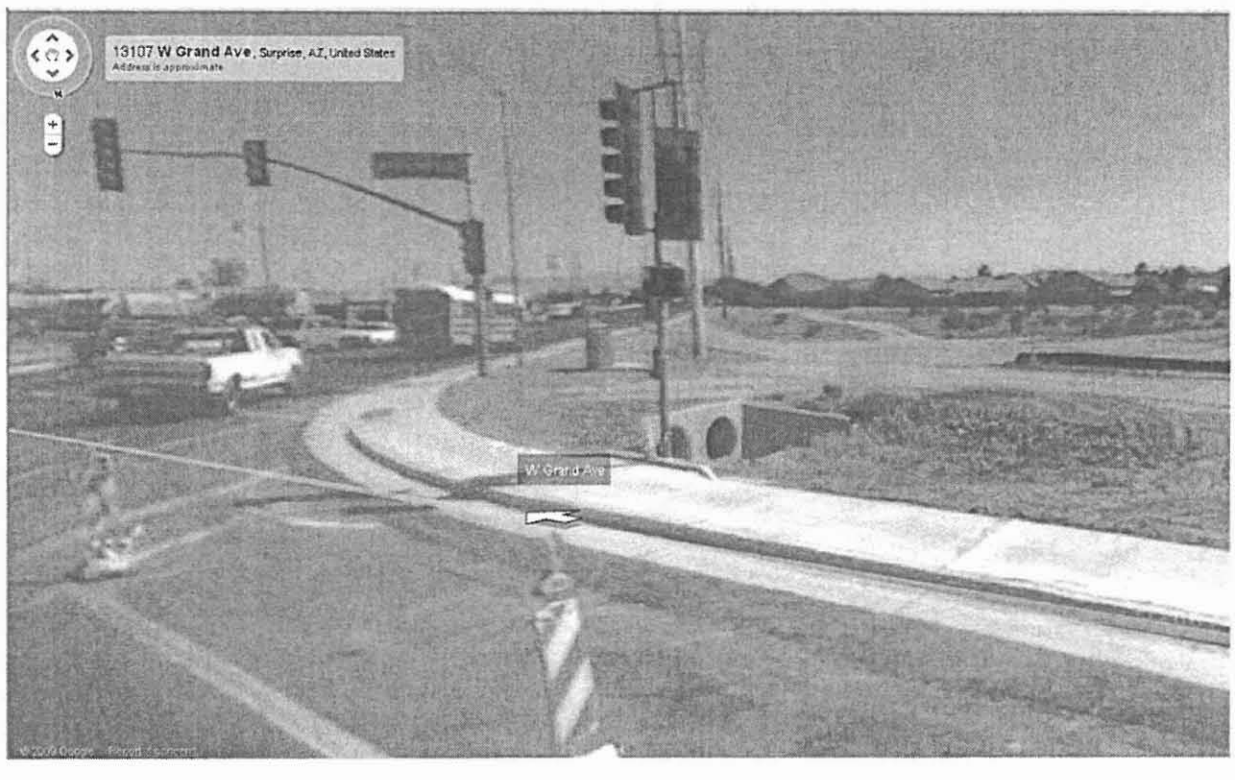
Hydraulic Profile			
Profile	PressureProfile	Depth, Downstream	2.50 ft
Slope Type	N/A	Normal Depth	N/A ft
Flow Regime	N/A	Critical Depth	2.07 ft
Velocity Downstream	7.66 ft/s	Critical Slope	0.008221 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	6		

Outlet Control Properties			
Outlet Control HW Elev.	1,168.00 ft	Upstream Velocity Head	0.91 ft
Ke	0.50	Entrance Loss	0.46 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,168.00 ft	Flow Control	Submerged
Inlet Type	Square edge w/headwall	Area Full	29.5 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Diversion D14A



Culverts under Dysart

= 2 - 36" RCP's

Diversion @ D14A
Grand @ Dysart

Culvert Calculator Report
CulvertDysartatGrandD14A

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	10.00 ft	Headwater Depth/Height	1.67
Computed Headwater Elev	10.00 ft	Discharge	122.67 cfs
Inlet Control HW Elev.	10.00 ft	Tailwater Elevation	6.00 ft
Outlet Control HW Elev.	9.97 ft	Control Type	Inlet Control

Grades			
Upstream Invert	5.00 ft	Downstream Invert	4.45 ft
Length	120.00 ft	Constructed Slope	0.004583 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	2.53 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.53 ft
Velocity Downstream	9.66 ft/s	Critical Slope	0.008085 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	9.97 ft	Upstream Velocity Head	1.17 ft
Ke	0.50	Entrance Loss	0.59 ft

Inlet Control Properties			
Inlet Control HW Elev.	10.00 ft	Flow Control	Submerged
Inlet Type	Square edge w/headwall	Area Full	14.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

SRD14

Rating Table Report
GreenwayDysart

Range Data:

	Minimum	Maximum	Increment
Allowable HW E	1,164.00	1,169.00	1.00 ft

HW Elev. (ft)	Discharge (cfs) (culvert)	+ weir	=	Total flow	Storage
1,164.00	0.00	+ 0	=	0	0
1,165.00	23.61	+ 0	=	23.6	0.32
1,166.00	83.75	+ 0	=	83.8	4.12
1,167.00	162.01	+ 0	=	162.0	17.03
1,168.00	225.51	+ 420	=	645.5	40.40
1,169.00	269.54	+ 2100	=	2369.5	95.21

See excel spreadsheet

D15

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D16

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/22/08
		Checked	CP
		Date	3/10/09
		Sheet	1
		Of	x

Location: Waddell at Sarival (DD16)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	24	23	308	23.5	22	0	0.00	22.5	0	0.00	23	0	0.00	CHECK	23.5	0	0.00	DONE
south	23	22.3	215	22.65	22	0	0.00	22.5	0	0.00	23	0.35	133.56		23.5	0.85	505.46	
south	22.3	22	93	22.15	22	0	0.00	22.5	0.35	57.77	23	0.85	218.64		23.5	1.35	437.63	
south	22	21.7	220	21.85	22	0.15	38.34	22.5	0.65	345.87	23	1.15	813.94		23.5	1.65	1398.85	
southeast	21.7	21.7	15	21.7	22	0.3	7.39	22.5	0.8	32.20	23	1.3	66.70		23.5	1.8	108.67	
east	21.7	22	36	21.85	22	0.15	6.27	22.5	0.65	56.60	23	1.15	133.19		23.5	1.65	228.90	
east	22	23	200	22.5	22	0	0.00	22.5	0	0.00	23	0.5	212.13		23.5	1	600.00	
east	23	23.5	100	23.25	22	0	0.00	22.5	0	0.00	23	0	0.00		23.5	0.25	37.50	
east	23.5	24	50	23.75	22	0	0.00	22.5	0	0.00	23	0	0.00		23.5	0	0.00	
						TOTALS:	52.01			492.44			1578.16				3317.01	

Graph Computations:

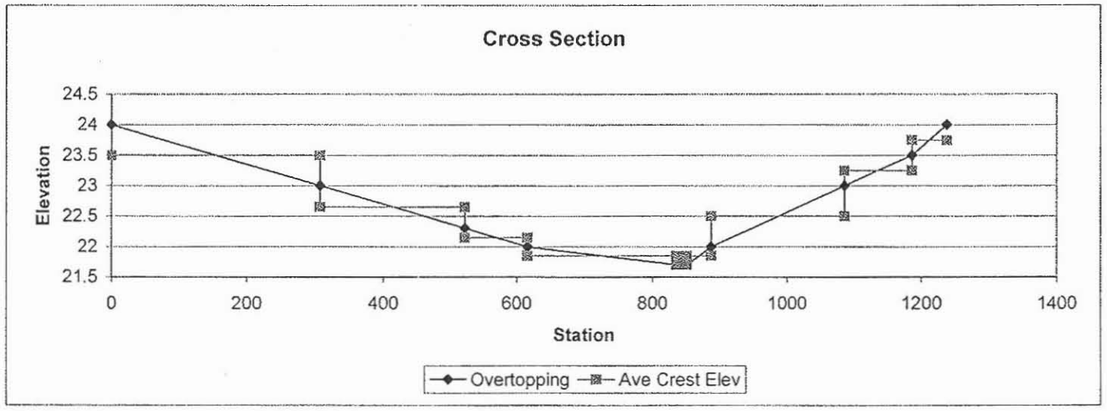
Station	Elevation
0	24
308	23
523	22.3
616	22
836	21.7
851	21.7
887	22
1087	23
1187	23.5
1237	24

Weir Approximation:

Station	Elevation
0	23.5
308	23.5
308	22.65
523	22.65
523	22.15
616	22.15
616	21.85
836	21.85
836	21.7
851	21.7
851	21.85
887	21.85
887	22.5
1087	22.5
1087	23.25
1187	23.25
1187	23.75
1237	23.75

Culvert Flows (cfs):

south	0
southeast	0
east	0



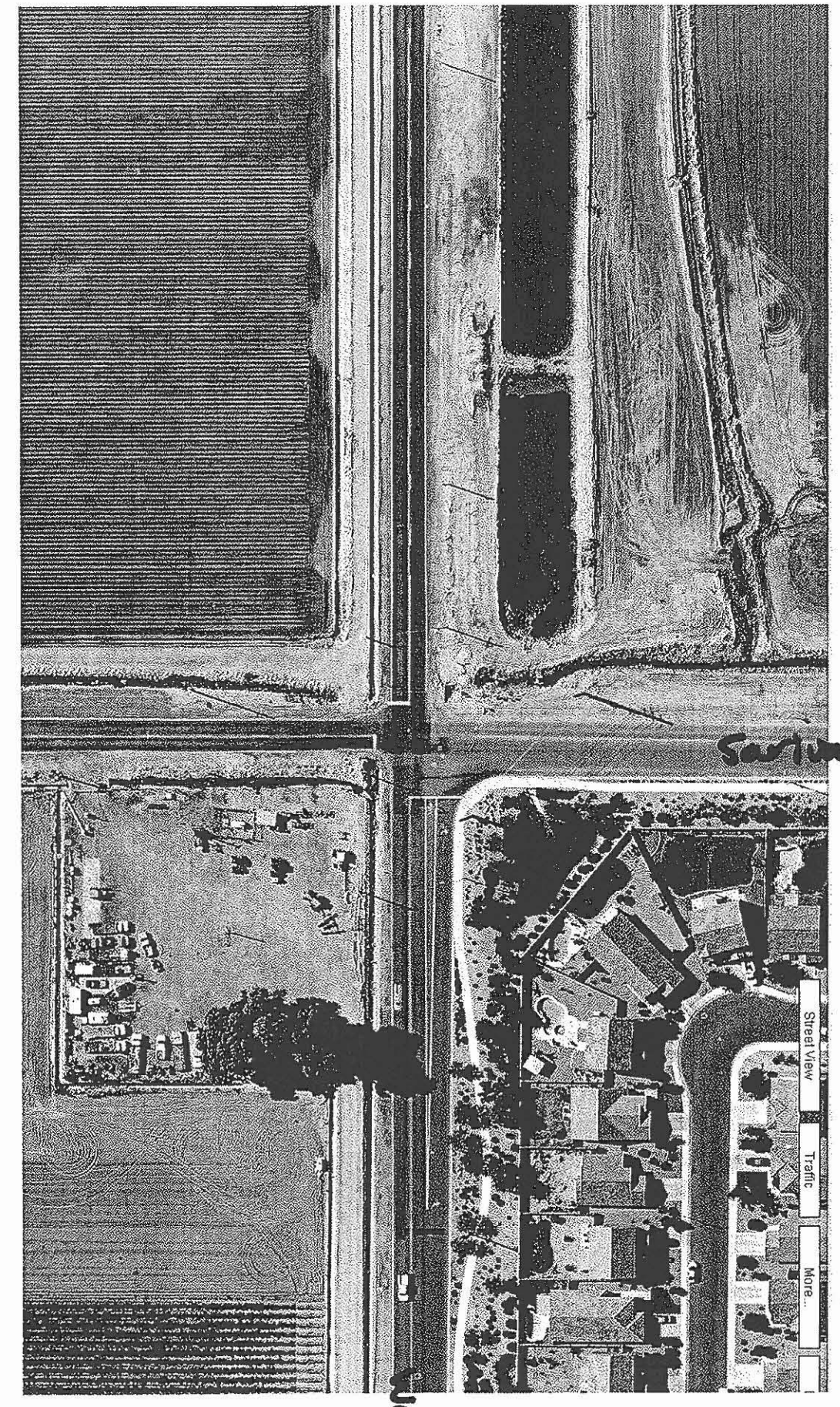
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	38.34	74%	Q(south)	403.64	82%	Q(south)	1166.13	74%	Q(south)	2341.94	71%
Q(southeast)	7.39	14%	Q(southeast)	32.20	7%	Q(southeast)	66.70	4%	Q(southeast)	108.67	3%
Q(east)	6.27	12%	Q(east)	56.60	11%	Q(east)	345.32	22%	Q(east)	866.40	26%
	52.01			492.44			1578.16			3317.01	

First DI	East to South			
Inflow	52.01	492.44	1578.16	3317.01
Outflow	38.34	403.64	1166.13	2341.94

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	13.67	88.80	412.02	975.07
Outflow	7.39	32.20	66.70	108.67

Assumes diversion is to southeast



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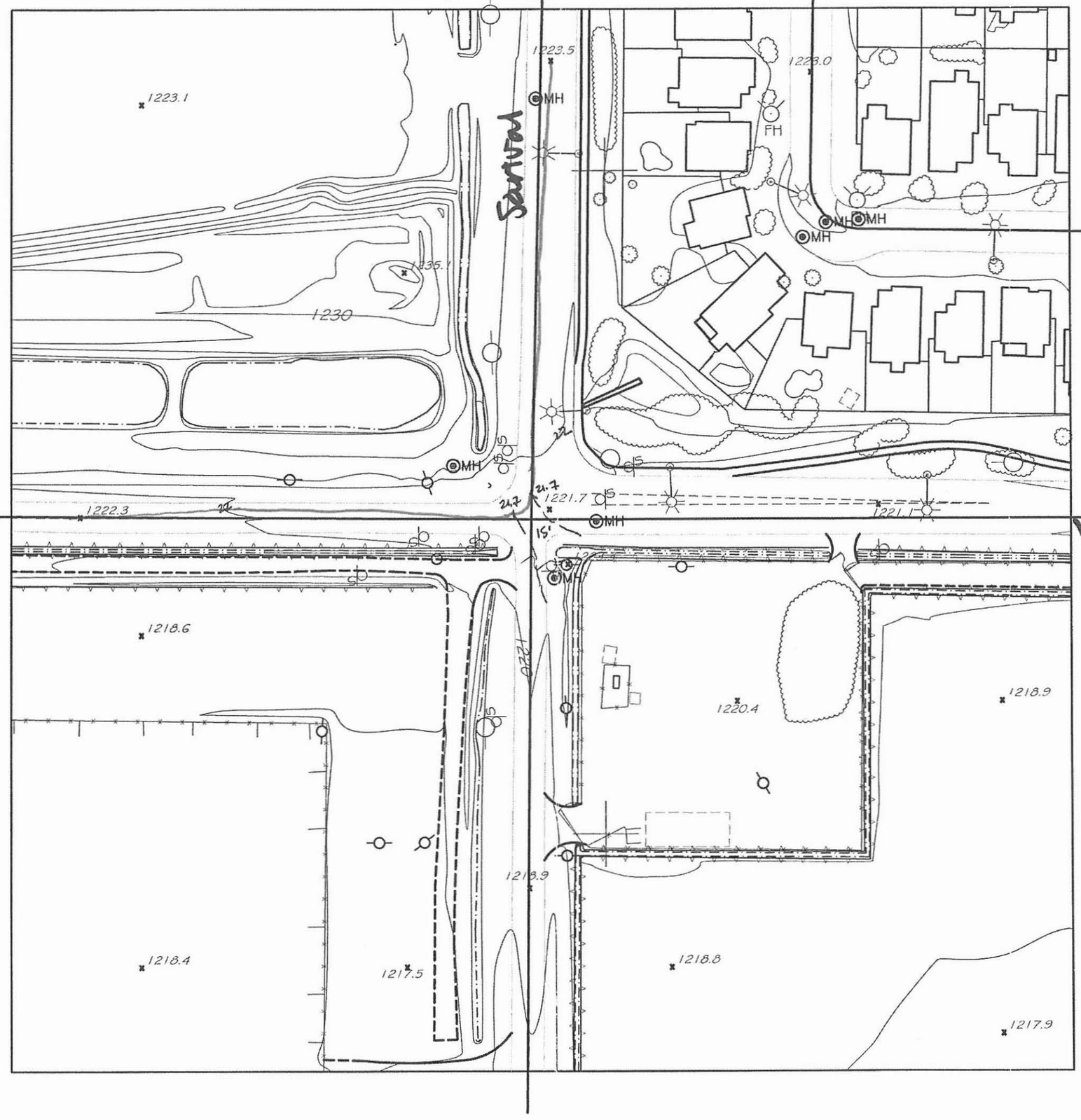

DD16

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D17

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D18

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D19

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
Location: Waddell at Reems (DD19)		Date	10/27/08
		Checked	cf
		Date	3/10/09
		Sheet	1
		Of	x

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	10	8.8	380	9.4	8	0	0.00	8.5	0	0.00	9	0	0.00	CHECK	9.5	0.1	36.05	DONE
south	8.8	8	266	8.4	8	0	0.00	8.5	0.1	25.23	9	0.6	370.88		9.5	1.1	920.64	
south	8	7.4	78	7.7	8	0.3	38.45	8.5	0.8	167.44	9	1.3	346.84		9.5	1.8	565.10	
south	7.4	7.4	14	7.4	8	0.6	19.52	8.5	1.1	48.45	9	1.6	85.00		9.5	2.1	127.81	
southeast	7.4	7.4	20	7.4	8	0.6	27.89	8.5	1.1	69.22	9	1.6	121.43		9.5	2.1	182.59	
east	7.4	8	44	7.7	8	0.3	21.69	8.5	0.8	94.45	9	1.3	195.65		9.5	1.8	318.77	
east	8	9	134	8.5	8	0	0.00	8.5	0	0.00	9	0.5	142.13		9.5	1	402.00	
east	9	10	134	9.5	8	0	0.00	8.5	0	0.00	9	0	0.00		9.5	0	0.00	
east	10	10	1	10	8	0	0.00	8.5	0	0.00	9	0	0.00		9.5	0	0.00	
						TOTALS:	107.55			404.80			1261.93				2552.97	

Graph Computations:

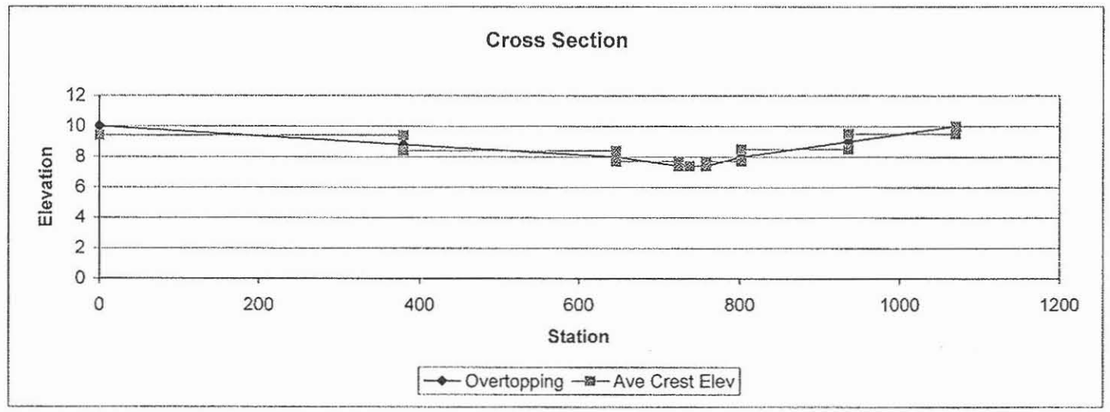
Station	Elevation
0	10
380	8.8
646	8
724	7.4
738	7.4
758	7.4
802	8
936	9
1070	10
1071	10

Weir Approximation:

Station	Elevation
0	9.4
380	9.4
380	8.4
646	8.4
646	7.7
724	7.7
724	7.4
738	7.4
738	7.4
758	7.4
758	7.7
802	7.7
802	8.5
936	8.5
936	9.5
1070	9.5
1070	10
1071	10

Culvert Flows (cfs):

south	0
southeast	0
east	0



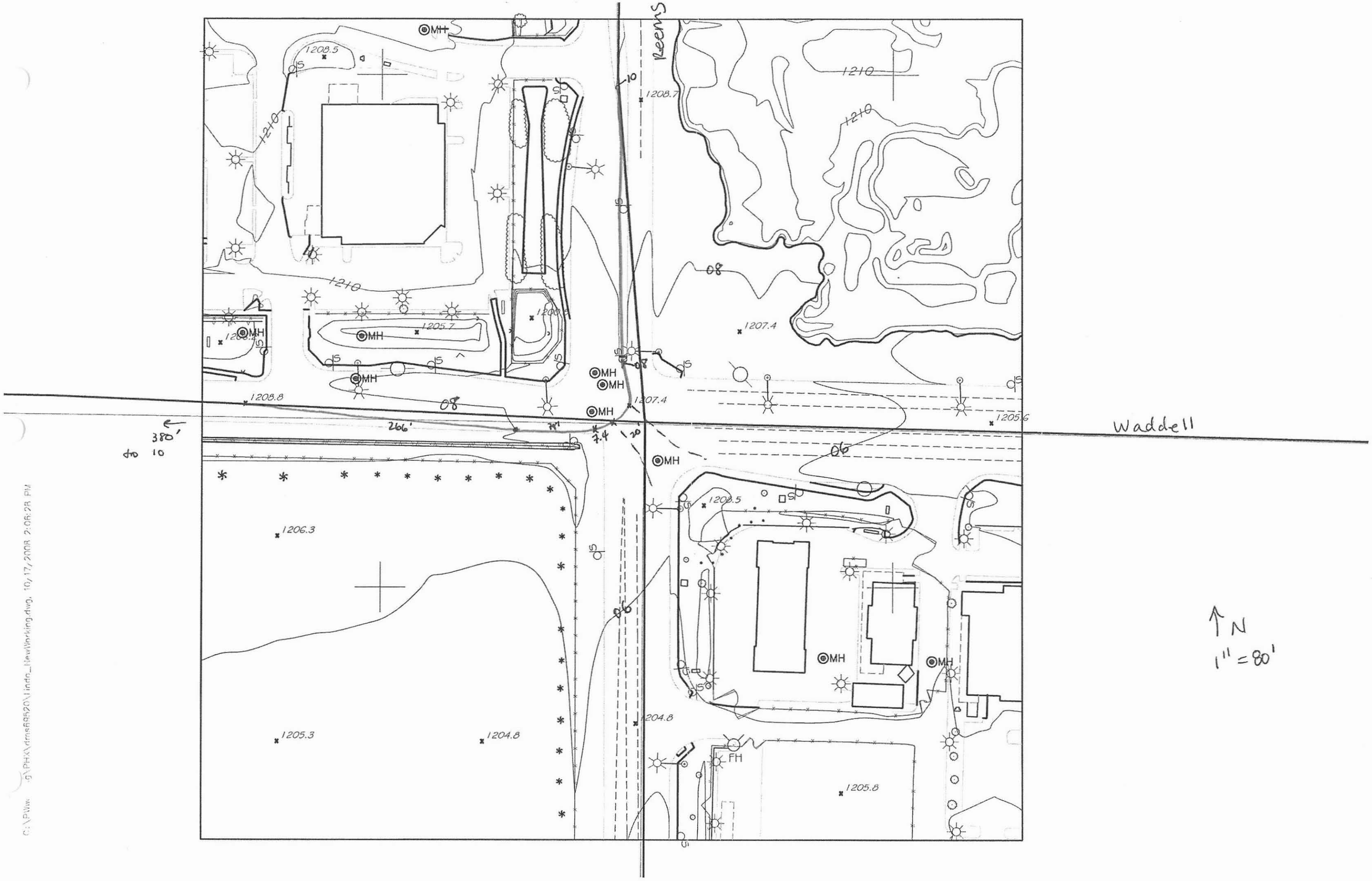
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	57.97	54%	Q(south)	241.13	60%	Q(south)	802.72	64%	Q(south)	1649.61	65%
Q(southeast)	27.89	26%	Q(southeast)	69.22	17%	Q(southeast)	121.43	10%	Q(southeast)	182.59	7%
Q(east)	21.69	20%	Q(east)	94.45	23%	Q(east)	337.78	27%	Q(east)	720.77	28%
	107.55			404.80			1261.93			2552.97	

First DI	East to South			
Inflow	107.55	404.80	1261.93	2552.97
Outflow	57.97	241.13	802.72	1649.61

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	49.58	163.67	459.21	903.37
Outflow	27.89	69.22	121.43	182.59

Assumes diversion is to southeast



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W Waddell Rd
W Waddell Rd
N Reems Rd
13500
13500
13700
N Reems Rd
W Waddell Rd
W Waddell Rd

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D21

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	CB
		Date	3/10/09
		Sheet	1
		Of	x

Location: Waddell at Bullard (DD21)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	84.3	83.3	275	83.8	82.5	0	0.00	83	0	0.00	83.5	0	0.00	CHECK	84	0.2	73.79	DONE
south	83.3	82	188	82.65	82.5	0	0.00	83	0.35	116.78	83.5	0.85	441.98		84	1.35	884.67	
south	82	81.8	36	81.9	82.5	0.6	50.19	83	1.1	124.60	83.5	1.6	218.58		84	2.1	328.66	
south	81.8	82	64	81.9	82.5	0.6	89.23	83	1.1	221.51	83.5	1.6	388.58		84	2.1	584.29	
southeast	82	82.1	40	82.05	82.5	0.45	36.22	83	0.95	111.11	83.5	1.45	209.52		84	1.95	326.76	
east	82.1	82.75	150	82.425	82.5	0.075	9.24	83	0.575	196.21	83.5	1.075	501.56		84	1.575	889.47	
east	82.75	83.4	150	83.075	82.5	0	0.00	83	0	0.00	83.5	0.425	124.68		84	0.925	400.34	
east	83.4	84.4	238	83.9	82.5	0	0.00	83	0	0.00	83.5	0	0.00		84	0.1	22.58	
east	84.4	84.5	5	84.45	82.5	0	0.00	83	0	0.00	83.5	0	0.00		84	0	0.00	
						TOTALS:	184.89			770.21			1884.91				3510.57	

Graph Computations:

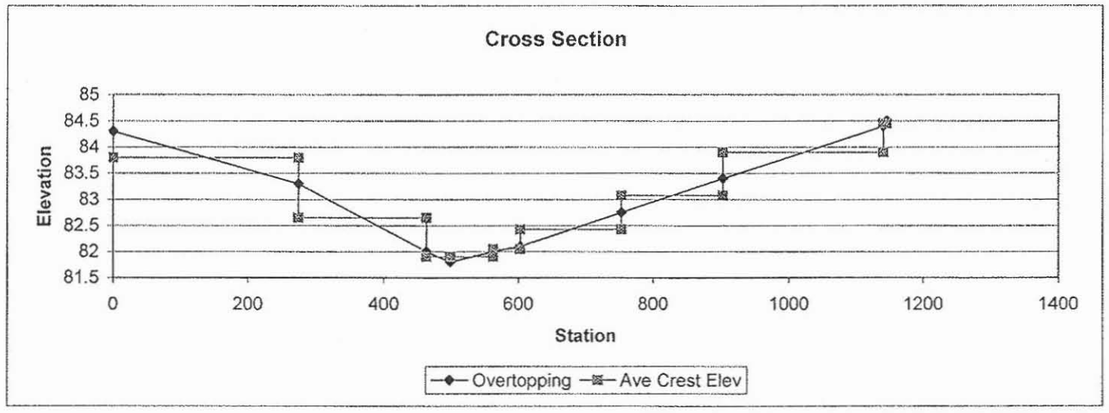
Station	Elevation
0	84.3
275	83.3
463	82
499	81.8
563	82
603	82.1
753	82.75
903	83.4
1141	84.4
1146	84.5

Weir Approximation:

Station	Elevation
0	83.8
275	83.8
275	82.65
463	82.65
463	81.9
499	81.9
499	81.9
563	81.9
563	82.05
603	82.05
603	82.425
753	82.425
753	83.075
903	83.075
903	83.9
1141	83.9
1141	84.45
1146	84.45

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	139.43	75%	Q(south)	462.89	60%	Q(south)	1049.14	56%	Q(south)	1871.41	53%
Q(southeast)	36.22	20%	Q(southeast)	111.11	14%	Q(southeast)	209.52	11%	Q(southeast)	326.76	9%
Q(east)	9.24	5%	Q(east)	196.21	25%	Q(east)	626.24	33%	Q(east)	1312.39	37%
	184.89			770.21			1884.91			3510.57	

First DI	East to South			
Inflow	184.89	770.21	1884.91	3510.57
Outflow	139.43	462.89	1049.14	1871.41

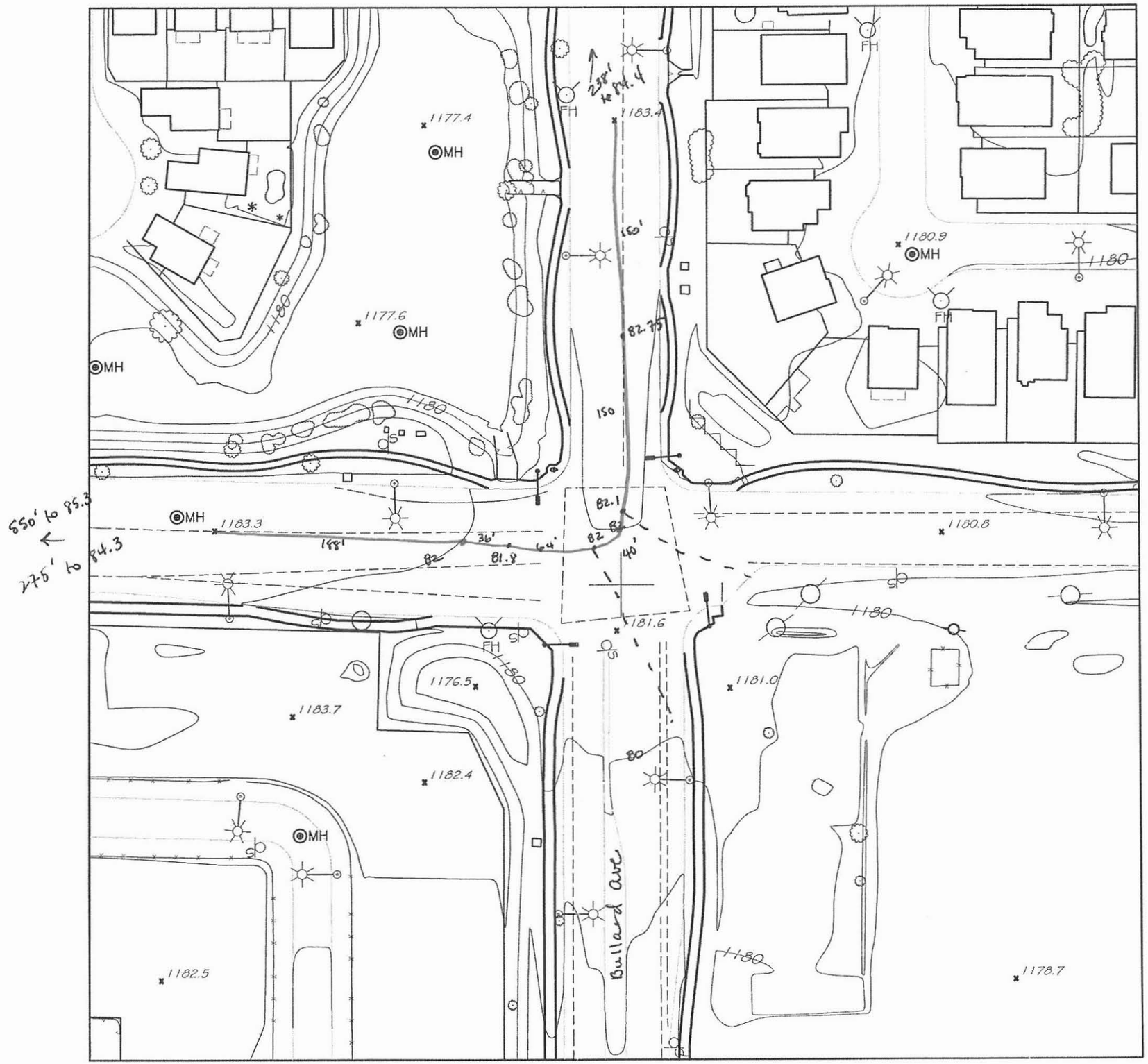
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	45.47	307.32	835.77	1639.15
Outflow	36.22	111.11	209.52	326.76

Assumes diversion is to southeast

Waddell @ Bullard

DD21



N

1" = 80'

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W Boca Raton Rd
13900
N Bullard Ave
13600
N Bullard Ave
W Waddell Rd
14600
W Waddell Rd
14700
W Waddell Rd
N 147th Ln
13800
W Adeline Way
14700

D22

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D23

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	
		Date	3/10/09
		Sheet	1
		Of	x

Location: Waddell at Litchfield (DD23)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	63.8	62.8	250	63.3	61.8	0	0.00	62.3	0	0.00	62.8	0	0.00	CHECK	63.3	0	0.00	DONE
south	62.8	61.8	250	62.3	61.8	0	0.00	62.3	0	0.00	62.8	0.5	265.17		63.3	1	750.00	
south	61.8	61.2	104	61.5	61.8	0.3	51.27	62.3	0.8	223.25	62.8	1.3	462.46		63.3	1.8	753.47	
southeast	61.2	61.2	40	61.2	61.8	0.6	55.77	62.3	1.1	138.44	62.8	1.6	242.86		63.3	2.1	365.18	
east	61.2	61.5	40	61.35	61.8	0.45	36.22	62.3	0.95	111.11	62.8	1.45	209.52		63.3	1.95	326.76	
east	61.5	62	16	61.75	61.8	0.05	0.54	62.3	0.55	19.58	62.8	1.05	51.64		63.3	1.55	92.63	
east	62	63	150	62.5	61.8	0	0.00	62.3	0	0.00	62.8	0.3	73.94		63.3	0.8	321.99	
east	63	64	150	63.5	61.8	0	0.00	62.3	0	0.00	62.8	0	0.00		63.3	0	0.00	
east	64	64	1	64	61.8	0	0.00	62.3	0	0.00	62.8	0	0.00		63.3	0	0.00	
						TOTALS:	143.80			492.38			1305.59				2610.03	

Graph Computations:

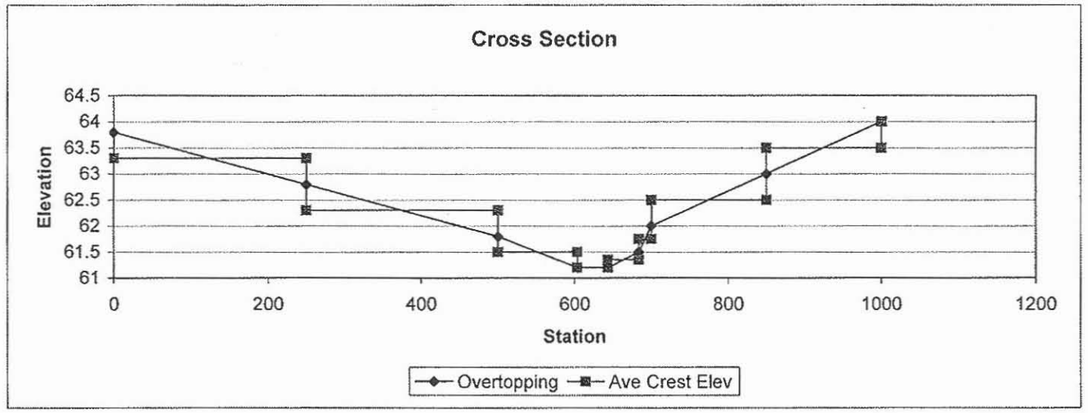
Station	Elevation
0	63.8
250	62.8
500	61.8
604	61.2
644	61.2
684	61.5
700	62
850	63
1000	64
1001	64

Weir Approximation:

Station	Elevation
0	63.3
250	63.3
250	62.3
500	62.3
500	61.5
604	61.5
604	61.2
644	61.2
644	61.35
684	61.35
684	61.75
700	61.75
700	62.5
850	62.5
850	63.5
1000	63.5
1000	64
1001	64

Culvert Flows (cfs):

south	0
southeast	0
east	375



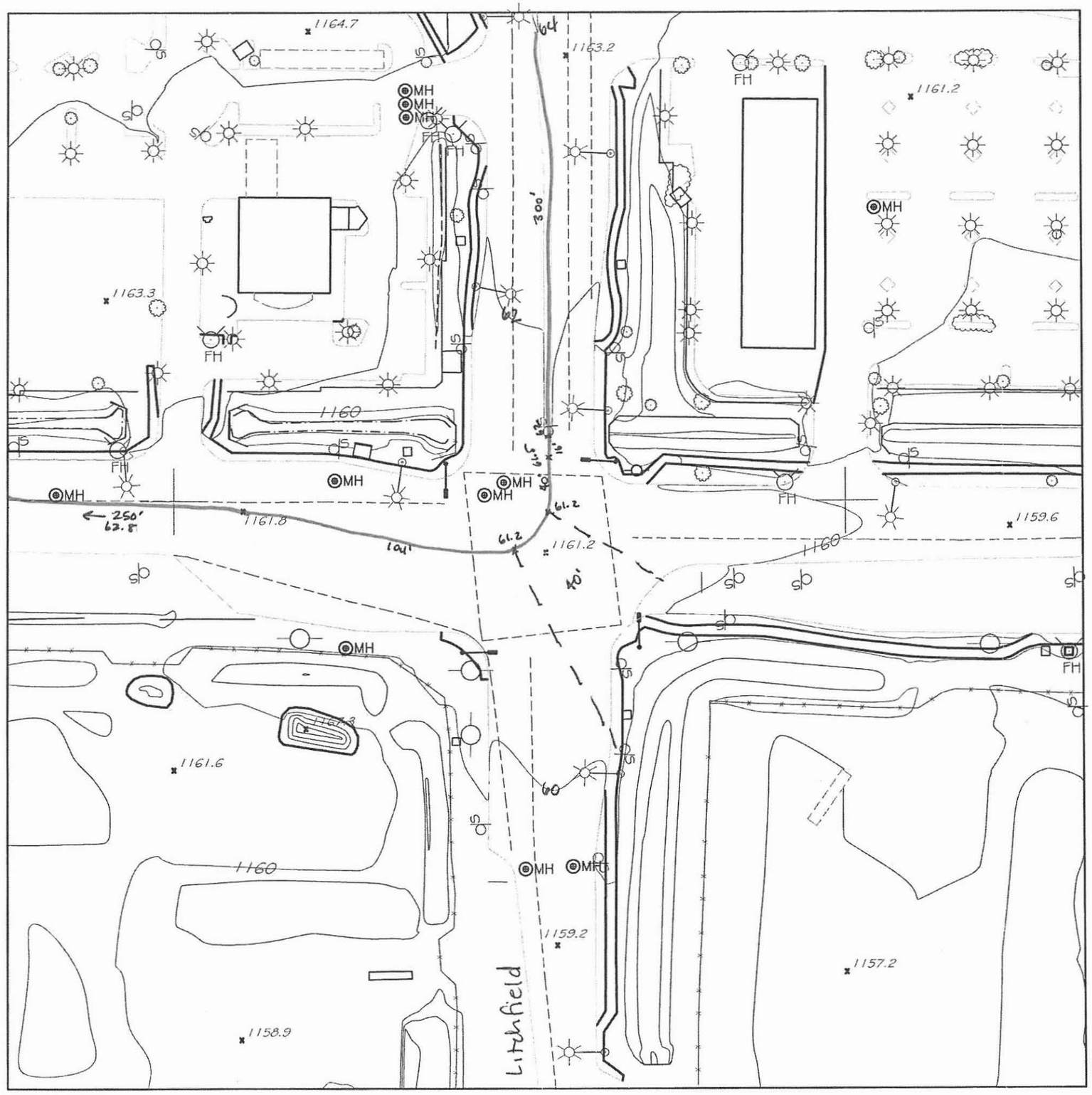
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	51.27	10%	Q(south)	223.25	26%	Q(south)	727.62	43%	Q(south)	1503.47	50%
Q(southeast)	55.77	11%	Q(southeast)	138.44	16%	Q(southeast)	242.86	14%	Q(southeast)	365.18	12%
Q(east)	411.76	79%	Q(east)	505.69	58%	Q(east)	710.11	42%	Q(east)	1116.38	37%
	518.80			867.38			1680.59			2985.03	

First DI	East to South			
Inflow	518.80	867.38	1680.59	2985.03
Outflow	51.27	223.25	727.62	1503.47

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	467.53	644.13	952.97	1481.57
Outflow	55.77	138.44	242.86	365.18

Assumes diversion is to southeast



Waddell/
TB

1" = 80'
N

G:\PW\ J:\PHX\dms68520\Linda_NewWorking.dwg, 10/17/2008 2:45:26 PM

Culvert Calculator Report
WaddellatLitchfieldDD23

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	61.50 ft	Headwater Depth/Height	1.12
Computed Headwater Elev	61.50 ft	Discharge	374.56 cfs
Inlet Control HW Elev.	61.43 ft	Tailwater Elevation	57.00 ft
Outlet Control HW Elev.	61.50 ft	Control Type	Entrance Control

Grades			
Upstream Invert	57.00 ft	Downstream Invert	56.00 ft
Length	125.00 ft	Constructed Slope	0.008000 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	2.25 ft
Slope Type	Steep	Normal Depth	2.16 ft
Flow Regime	Supercritical	Critical Depth	2.81 ft
Velocity Downstream	11.90 ft/s	Critical Slope	0.003830 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	7.00 ft
Section Size	7 x 4 ft	Rise	4.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	61.50 ft	Upstream Velocity Head	1.41 ft
Ke	0.20	Entrance Loss	0.28 ft

Inlet Control Properties			
Inlet Control HW Elev.	61.43 ft	Flow Control	Unsubmerged
Inlet Type	90° headwall w 45° bevels	Area Full	56.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

N Litchfield Rd
N Litchfield Rd
N Litchfield Rd
N Litchfield Rd
W Waddell Rd
W Waddell Rd
W Waddell Rd
13650
13699
13700
13799

D24

D24

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*             JUN   1998             *
*          VERSION 4.1               *
*                                    *
*  DATE   23MAR09  TIME  11:43:35    *
*                                    *
**************************************
```

```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616       *
*         (916) 756-1104             *
*                                    *
**************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID      HDR ENGINEERING INC. 3-23-09, FILE:RECPLAN.DAT
   2          ID      EDITS FOR WADDELL CAR
   3          ID      MODIFIES AREA AROUND WADDELL/DYSART AND WEST CACTUS BASIN AREA FOR
   4          ID      PROPOSED IMPROVEMENTS
   5          ID      ASPEN CONSULTING ENGINEERS, JCS, 4-25-08, FILE: 303EWP.DAT, 100-YR 24-HR
   6          ID      NOTES:
   7          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
   8          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
   9          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
  10          ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
  11          ID        DRAFT PREFERRED ALTERNATIVE LEVEL III
  12          ID
  13          ID        INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
  14          ID        SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
  15          ID        BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
  16          ID        LUKE AIR FORCE BASE CRASH ZONE AREA
  17          ID
  18          ID        **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
  19          ID        WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  20          ID        Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  21          ID        TANKS/AGUA FRIA ADMS, Date: October 1991
  22          ID
  23          ID        REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  24          ID        100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
  25          ID
  26          ID                                      REVISED BY URS     DATE: 01-14-04
  27          ID                                                         FILE: L33PE4H.DAT
  28          ID
  29          ID       NOTES:
  30          ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  31          ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  32          ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  33          ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  34          ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  35          ID           THE WLB MODEL.
  36          ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  37          ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  38          ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  39          ID           DRAINAGE REPORTS.
  40          ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  41          ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
  42          ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  43          ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  44          ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  45          ID           STORM.
  46          ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
  47          ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
  48          ID           THE DATA FILE BY THE FCDMC.
  49          ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
  50          ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
  51          ID
              *DIAGRAM
```

HEC-1 INPUT PAGE 2

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  52          IT       5                    600
  53          IO       5
  54          IN      15
  55          JD    4.03    .001
  56          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
```

```
1484          UI      6.      6.      6.      6.      6.      6.      6.      6.      6.      0.
1485          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1486          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1487          KK  137T
1488          KM    Divert Retention in Subbasin 137
1489          DT  137R      37.2
1490          DI       0   10000
1491          DQ       0   10000
              *

1492          KK   CP137
1493          KM         ADD HYDROGRAPHS AT CP137 (137 + DR137 FROM 125 + 136)
1494          HC       3    5.58

1495          KK   1D137
1496          KM          DIVERT FROM CP137 TO CP149
1497          DT   DI149
1498          DI       0       6     169     684    1659    3199    5400    8353   12141
1499          DQ       0       2      56     228     553    1066    1800    2784    4047

1500          KK   2D137
1501          KM          DIVERT FROM CP137 TO CP153
1502          DT   DI153
1503          DI       0       4     113     456    1106    2133    3600    6553    8094
1504          DQ       0       2      56     228     553    1066    1800    2784    4047
              * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE

1505          KK    R137
1506          KM   ROUTE FLOW THROUGH THE RIPRAP CHANNEL IN SURPRISE POINT
1507          KM   CHANNEL GEOMETRY FROM SURPRISE POINTE LOMR
1508          RS       6    FLOW      -1
1509          RC   0.035   0.035   0.035    4800  0.0044
1510          RX     894     906     912     918     926     930     934     942
1511          RY    1157    1155    1154    1153    1153    1154    1155    1157
              * RS     22              -1       0
              * RC    .08     .03     .03    2640   .0021
              * RX   1000    2200    2310    2320    2340    2368    2369    2370
              * RY   1162    1156  1156.5    1156    1156    1157    1157    1157
```

D23D24


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1512          KK   2D125
1513          KM         RETURN DIVERT AT CP125
1514          DR   DI138

1515          KK    R125
1516          KM         ROUTE FLOW FROM CP125 TO CP138
1517          RS      50              -1       0
1518          RC    .075    .075    .075    7500   .0048
1519          RX    1000    1050    1100    1200    2020    2198    2250    2300
1520          RY    1171  1170.5  1170.5    1170    1170  1170.5  1170.5    1171
              *

1521          KK     138
1522          KM   BASIN 138
1523          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1524          KM    L=      1.0  Lca=       .5   S=   28.0  Kn= .120  LAG=  70.5
1525          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1526          BA     .54
1527          LG     .25     .25    5.00     .34      35
1528          UI     26.     26.     26.     70.     96.    119.    133.    147.    162.    182.
1529          UI    201.    239.    298.    336.    285.    247.    221.    202.    178.    159.
1530          UI    142.    126.    109.     83.     59.     46.     43.     42.     31.     26.
1531          UI     26.     17.      8.      8.      8.      8.      8.      8.      8.      8.
1532          UI      8.      8.      0.      0.      0.      0.      0.      0.      0.      0.
1533          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1534          KK  138T
1535          KM    Divert Retention in Subbasin 138
1536          DT  138R      44.2
1537          DI       0   10000
1538          DQ       0   10000
              *

1539          KK   1I138
1540          KM         ADD HYDROGRAPHS AT CP138
1541          HC       2   22.08
              * KK CP138

1542          KK    !RR1
1543          KM         ADD HYDROGRAPHS AT CP138 (137 + 138)
1544          HC       2    6.12
              *
              * ALT-1 RJS 5-25-01
              *

1545          KK    DRR1
1546          KM   DIVERT TO REVERSE FLOW SOUTH ACROSS RXR
1547          KM   HDR MODIFY ALT 1 CHANNEL ON WADDELL
1548          DT   2D153
1549          DI       0   10000
1550          DQ       0       0
              * INSERT DESIGN ROUTE FOR EL MIRAGE CHANNEL
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	
		Date	3/10/09
		Sheet	1
		Of	x

Location: Waddell near Dysart (DD24)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	57.3	56.3	300	56.8	56.1	0	0.00	56.6	0	0.00	57.1	0.3	147.89	CHECK	57.6	0.8	643.99	DONE
south	56.3	56	90	56.15	56.1	0	0.00	56.6	0.45	81.50	57.1	0.95	250.01		57.6	1.45	471.43	
east	56	55.5	28	55.75	56.1	0.35	17.39	56.6	0.85	65.83	57.1	1.35	131.76		57.6	1.85	211.37	
east	55.5	56	6	55.75	56.1	0.35	3.73	56.6	0.85	14.11	57.1	1.35	28.23		57.6	1.85	45.29	
east	56	56	28	56	56.1	0.1	2.66	56.6	0.6	39.04	57.1	1.1	96.91		57.6	1.6	170.00	
east	56	55.7	44	55.85	56.1	0.25	16.50	56.6	0.75	85.74	57.1	1.25	184.48		57.6	1.75	305.58	
east	55.7	56	40	55.85	56.1	0.25	15.00	56.6	0.75	77.94	57.1	1.25	167.71		57.6	1.75	277.80	
east	56	56.8	10	56.4	56.1	0	0.00	56.6	0.2	2.68	57.1	0.7	17.57		57.6	1.2	39.44	
east	56.8	56.8	230	56.8	56.1	0	0.00	56.6	0	0.00	57.1	0.3	113.38		57.6	0.8	493.72	
						TOTALS:	55.28			366.84			1137.92				2658.63	

Graph Computations:

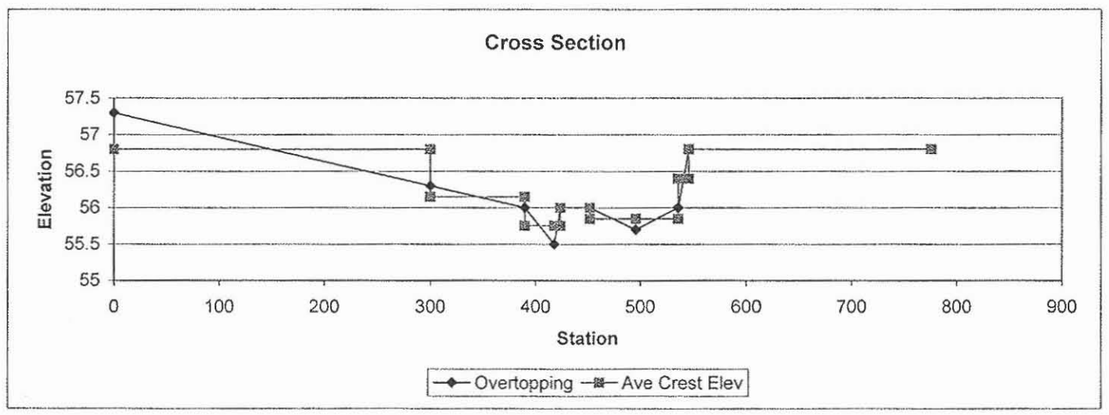
Station	Elevation
0	57.3
300	56.3
390	56
418	55.5
424	56
452	56
496	55.7
536	56
546	56.8
776	56.8

Weir Approximation:

Station	Elevation
0	56.8
300	56.8
300	56.15
390	56.15
390	55.75
418	55.75
418	55.75
424	55.75
424	56
452	56
452	55.85
496	55.85
496	55.85
536	55.85
536	56.4
546	56.4
546	56.8
776	56.8

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	0.00	0%	Q(south)	81.50	22%	Q(south)	397.89	35%	Q(south)	1115.42	42%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	55.28	100%	Q(east)	285.34	78%	Q(east)	740.03	65%	Q(east)	1543.21	58%
	55.28			366.84			1137.92			2658.63	

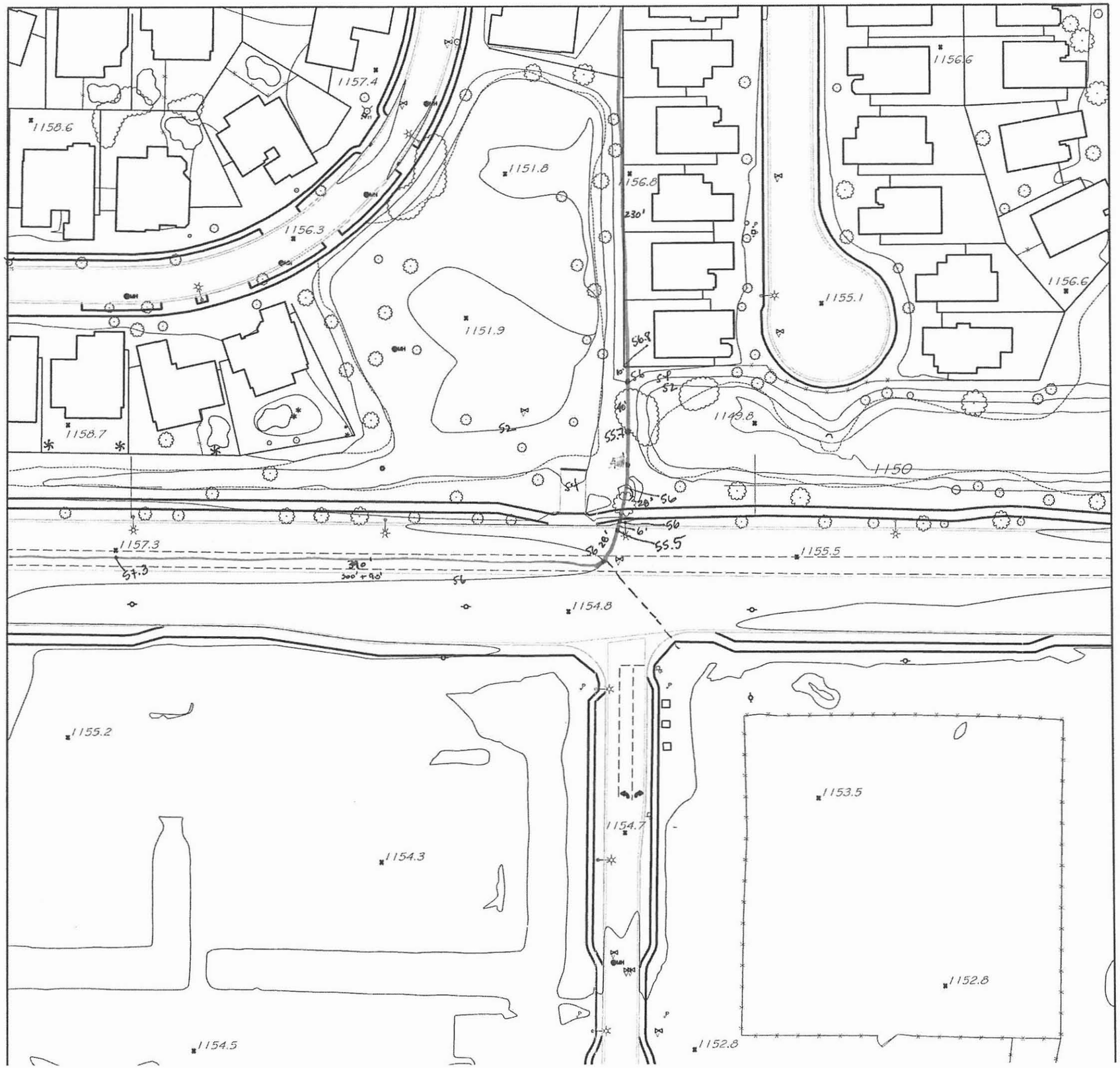
First DI	East to South			
Inflow	55.28	366.84	1137.92	2658.63
Outflow	0.00	81.50	397.89	1115.42

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	55.28	285.34	740.03	1543.21
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast

DD24
Waddell btwn
Dysart & Litchfield



1" = 80'
N

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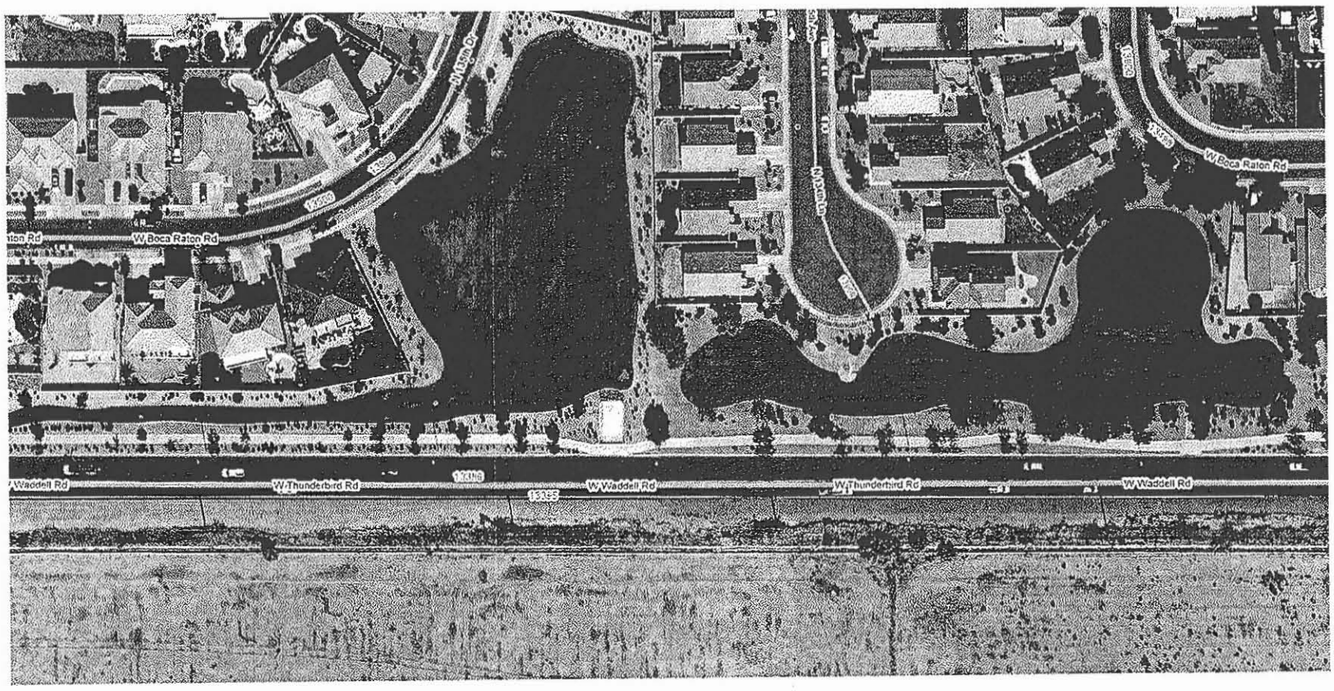
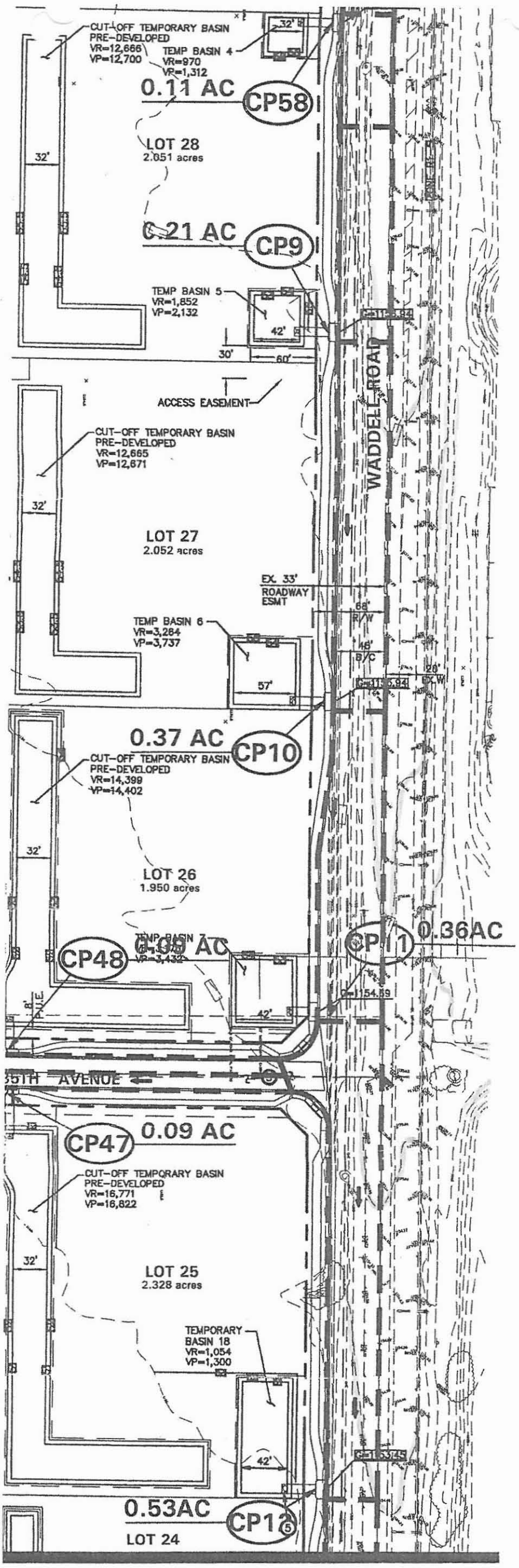

W Boca Raton Rd
W Boca Raton Rd
W Waddell Rd
W Thunderbird Rd
W Waddell Rd
W Thunderbird Rd
W Waddell Rd



HUNTER
ENGINEERING
10450 NORTH 74TH STREET,
SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

PRELIMINARY
PLANS
—
NOT FOR
CONSTRUCTION

DRAINAGE EXHIBIT "B"

SEC LITCHFIELD ROAD & WADDELL ROAD
SURPRISE POINTE
SURPRISE, ARIZONA

THESE PLANS ARE
NOT APPROVED FOR
CONSTRUCTION
WITHOUT AN
APPROVED SIGNATURE
FROM THE GOVERNING
MUNICIPALITY.

HE JOB NO.:
KESH003

SCALE
1"=100'

SHEET
2 OF 3

CALL TWO WORKING DAYS
BEFORE YOU DIG
(602)263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

D25

D25

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*            JUN   1998              *
*          VERSION 4.1               *
*                                    *
*    I DATE   23MAR09  TIME  11:43:35 *
*                                    *
**  ************************************
```

```
**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616      *
*           (916) 756-1104           *
*                                    *
**************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                   HEC-1 INPUT                                          PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID      HDR ENGINEERING INC. 3-23-09, FILE:RECPLAN.DAT
    2           ID      EDITS FOR WADDELL CAR
    3           ID      MODIFIES AREA AROUND WADDELL/DYSART AND WEST CACTUS BASIN AREA FOR
    4           ID      PROPOSED IMPROVEMENTS
    5           ID      ASPEN CONSULTING ENGINEERS, JCS, 4-25-08, FILE: 303EWP.DAT, 100-YR 24-HR
    6           ID      NOTES:
    7           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
    8           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
    9           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   10           ID      AND R238.
                        * ***********************************************************************
                        * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                        * ***********************************************************************
   11           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   12           ID
   13           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   14           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   15           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   16           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   17           ID
   18           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   19           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   20           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   21           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   22           ID
   23           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   24           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   25           ID
   26           ID                                     REVISED BY URS     DATE: 01-14-04
   27           ID                                                        FILE: L33PE4H.DAT
   28           ID
   29           ID        NOTES:
   30           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   31           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   32           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   33           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   34           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   35           ID           THE WLB MODEL.
   36           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   37           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   38           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   39           ID           DRAINAGE REPORTS.
   40           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   41           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   42           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   43           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   44           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   45           ID           STORM.
   46           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
   47           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   48           ID           THE DATA FILE BY THE FCDMC.
   49           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   50           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   51           ID
                *DIAGRAM
                                                HEC-1 INPUT                                     PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   52           IT       5                      600
   53           IO       5
   54           IN      15
   55           JD    4.03     .001
   56           PC    .000     .002     .005     .008     .011     .014     .017     .020     .023     .026
```

```
1551          KK    R138
1552          KM        ROUTE REMAINDER FROM CP138 TO CP138A
1553          RS       1          -1        0
1554          RC    0.03    0.03    0.03    2460  0.0020
1555          RX    1000    1018    1019    1020    1026    1027    1028    1046
1556          RY    1100    1094    1094    1094    1094    1094    1094    1100
              *
```

D24 D25

```
1557          KK    138A
1558          KM   BASIN 138A
1559          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1560          KM    L=      1.3  Lca=       .6   S=   24.0  Kn= .030  LAG=  21.4
1561          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1562          BA     .46
1563          LG     .25     .25    4.90     .32   35.00
1564          UI     75.    299.    448.    701.    781.    527.    357.    169.    100.     51.
1565          UI     22.     22.      0.      0.      0.      0.      0.      0.      0.      0.
1566          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1567          KK  138AT
1568          KM        DIVERSION-RETENTION 138A
1569          DT  138AR    40.30
1570          DI       0   10000
1571          DQ       0   10000
              * EL MIRAGE CHANNEL AT CP138A

1572          KK  1I138A
              * KK   EM3
1573          KM        ADD HYDROGRAPHS AT CP138 (138 + 138A)
1574          HC       2    6.05

1575          KK  2I138A
1576          KM        ADD HYDROGRAPHS AT CP138 (138 + 126)
1577          HC       2   24.81
              *
              * ***********************************************************************
              * ***THE FOLLOWING SECTION TAKEN FROM NEW SUPER BASIN 2D WITH NEW SOILS*****
              * ***********************************************************************
              *

1578          KK   2D137
1579          KM        RETURN DIVERT AT CP137
1580          DR   DI153

1581          KK    R137
1582          KM        ROUTE FLOW FROM CP137 TO CP153
1583          RS      51          -1        0
1584          RC    .075    .075    .075    5600   .0018
1585          RX     900    1000    1200    1450    1800    2000    2300    2450
1586          RY  1156.5    1156    1155  1154.7  1154.7    1155    1156  1156.5
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1587          KK     153
1588          KM   PER SURPRISE POINT, AREA OF BASIN 153 INCREASED FROM 0.20 SQ MI
1589          KM   TO 0.31 SQ MI, AND BASIN 152 REDUCED FROM 0.35 SQ MI TO 0.25 SQ MI
1590          KM   LG RECORD REVISED PER SURPRISE POINTE LOMR TO REFLECT THE
1591          KM   DEVELOPMENT
1592          BA     .31
1593          LG     .15     .00    5.76    0.32      55
1594          UI      7.      7.      7.      7.     17.     24.     28.     33.     35.     39.
1595          UI     41.     44.     48.     53.     56.     65.     79.     87.     91.     79.
1596          UI     71.     65.     60.     56.     52.     47.     43.     40.     36.     33.
1597          UI     29.     24.     20.     13.     12.     12.     12.     12.      8.      7.
1598          UI      7.      7.      5.      2.      2.      2.      2.      2.      2.      2.
1599          UI      2.      2.      2.      2.      2.      2.      0.      0.      0.      0.
1600          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1601          KK  153OUT
1602          KM   RETENTION VOLUME PER DEI LOMR HEC-1 FOR SURPRISE POINTE
1603          DT  153RET    25.9
1604          DI       0   10000
1605          DQ       0   10000

1606          KK    DRR1
1607          KM        RETURN DIVERT AT CP151
1608          DR   2D153
              * DESIGN ROUTE
              * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE

1609          KK    RRR1
1610          KM   ROUTE RR1 TO RR2
1611          RS     1.0          -1.0     0.0
1612          RC   0.030   0.030   0.030    1323  0.0035
1613          RX       0    22.8    24.8    26.8    28.8    30.8    32.8    55.6
1614          RY  1154.6  1150.8  1150.8  1150.8  1150.8  1150.8  1150.8  1154.6
              * KK CP153

1615          KK    !RR2
1616          KM        ADD HYDROGRAPHS AT CP153
1617          HC       3   21.92
              *

1618          KK   DRRR2
1619          KM   DIVERT TO 152 SOUTH
1620          DT   3D152
1621          DI       0   10000
1622          DQ       0   10000
```

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	[illegible]
		Date	3/10/09
		Sheet	1
		Of	x

Location: Waddell at Dysart (DD25)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	52	51	310	51.5	51	0	0.00	51.5	0	0.00	52	0.5	328.80	CHECK	52.5	1	930.00	DONE
south	51	50.6	120	50.8	51	0.2	32.20	51.5	0.7	210.84	52	1.2	473.23		52.5	1.7	797.95	
south	50.6	51	100	50.8	51	0.2	26.83	51.5	0.7	175.70	52	1.2	394.36		52.5	1.7	664.96	
south	51	51.4	130	51.2	51	0	0.00	51.5	0.3	64.08	52	0.8	279.06		52.5	1.3	578.07	
south	51.4	50.7	275	51.05	51	0	0.00	51.5	0.45	249.04	52	0.95	763.91		52.5	1.45	1440.48	
south	50.7	51.2	325	50.95	51	0.05	10.90	51.5	0.55	397.69	52	1.05	1049.03		52.5	1.55	1881.49	
southeast	51.2	51	130	51.1	51	0	0.00	51.5	0.4	98.66	52	0.9	332.99		52.5	1.4	646.04	
southeast	51	51	10	51	51	0	0.00	51.5	0.5	10.61	52	1	30.00		52.5	1.5	55.11	
east	51	52	490	51.5	51	0	0.00	51.5	0	0.00	52	0.5	519.72		52.5	1	1470.00	
						TOTALS:	69.93			1206.63			4171.11				8464.09	

Graph Computations:

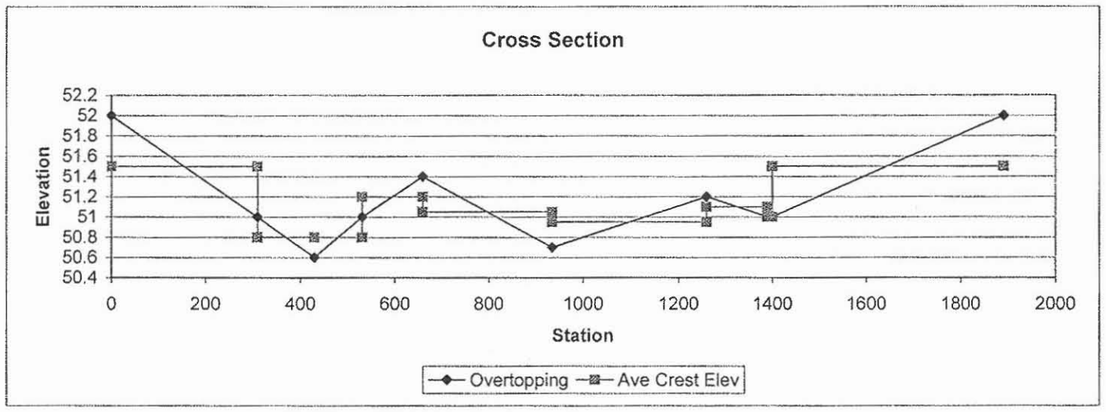
Station	Elevation
0	52
310	51
430	50.6
530	51
660	51.4
935	50.7
1260	51.2
1390	51
1400	51
1890	52

Weir Approximation:

Station	Elevation
0	51.5
310	51.5
310	50.8
430	50.8
430	50.8
530	50.8
530	51.2
660	51.2
660	51.05
935	51.05
935	50.95
1260	50.95
1260	51.1
1390	51.1
1390	51
1400	51
1400	51.5
1890	51.5

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	69.93	100%	Q(south)	1097.36	91%	Q(south)	3288.40	79%	Q(south)	6292.94	74%
Q(southeast)	0.00	0%	Q(southeast)	109.27	9%	Q(southeast)	362.99	9%	Q(southeast)	701.15	8%
Q(east)	0.00	0%	Q(east)	0.00	0%	Q(east)	519.72	12%	Q(east)	1470.00	17%
	69.93			1206.63			4171.11			8464.09	

First DI	East to South			
Inflow	69.93	1206.63	4171.11	8464.09
Outflow	69.93	1097.36	3288.40	6292.94

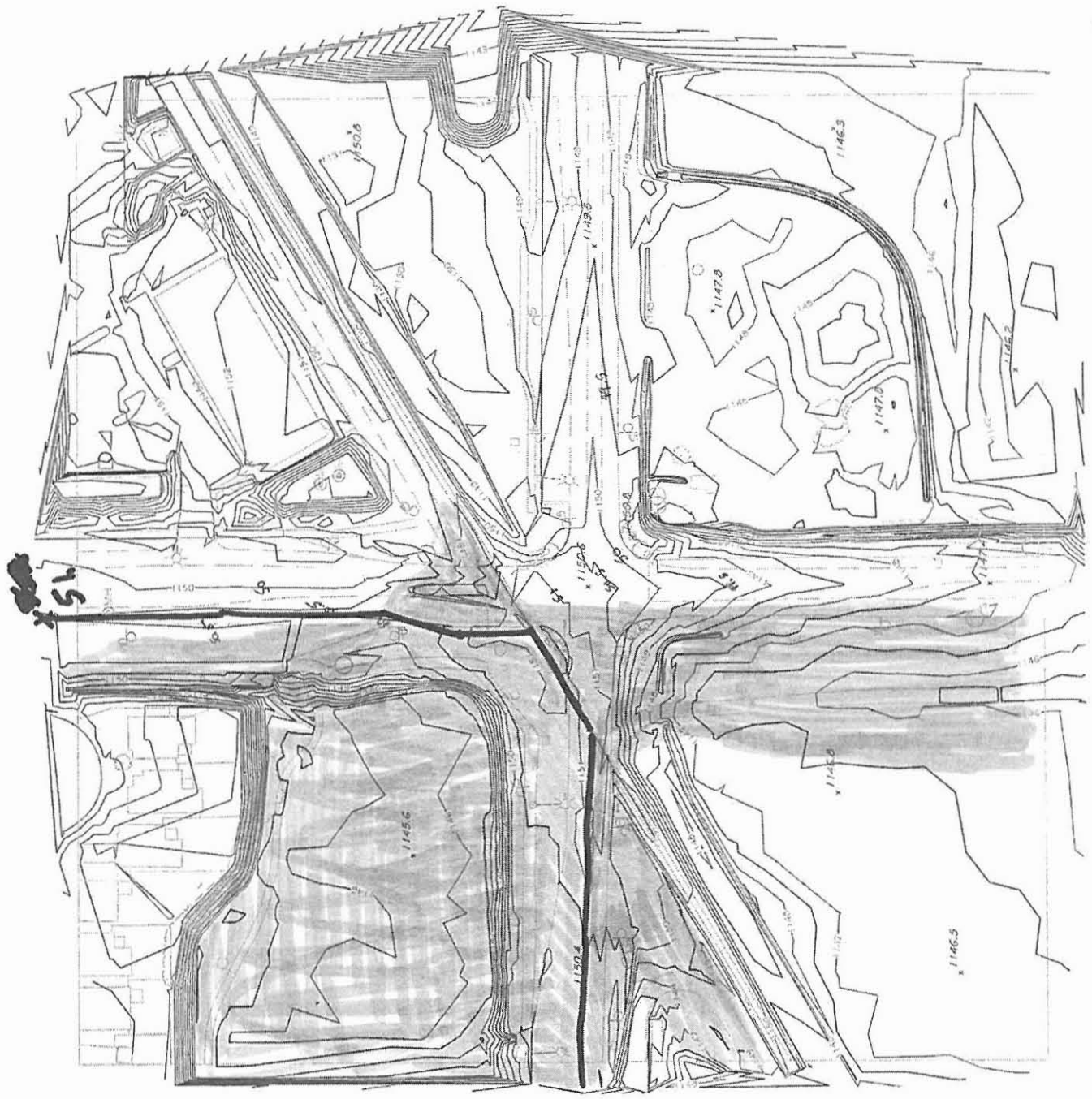
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	0.00	109.27	882.71	2171.15
Outflow	0.00	109.27	362.99	701.15

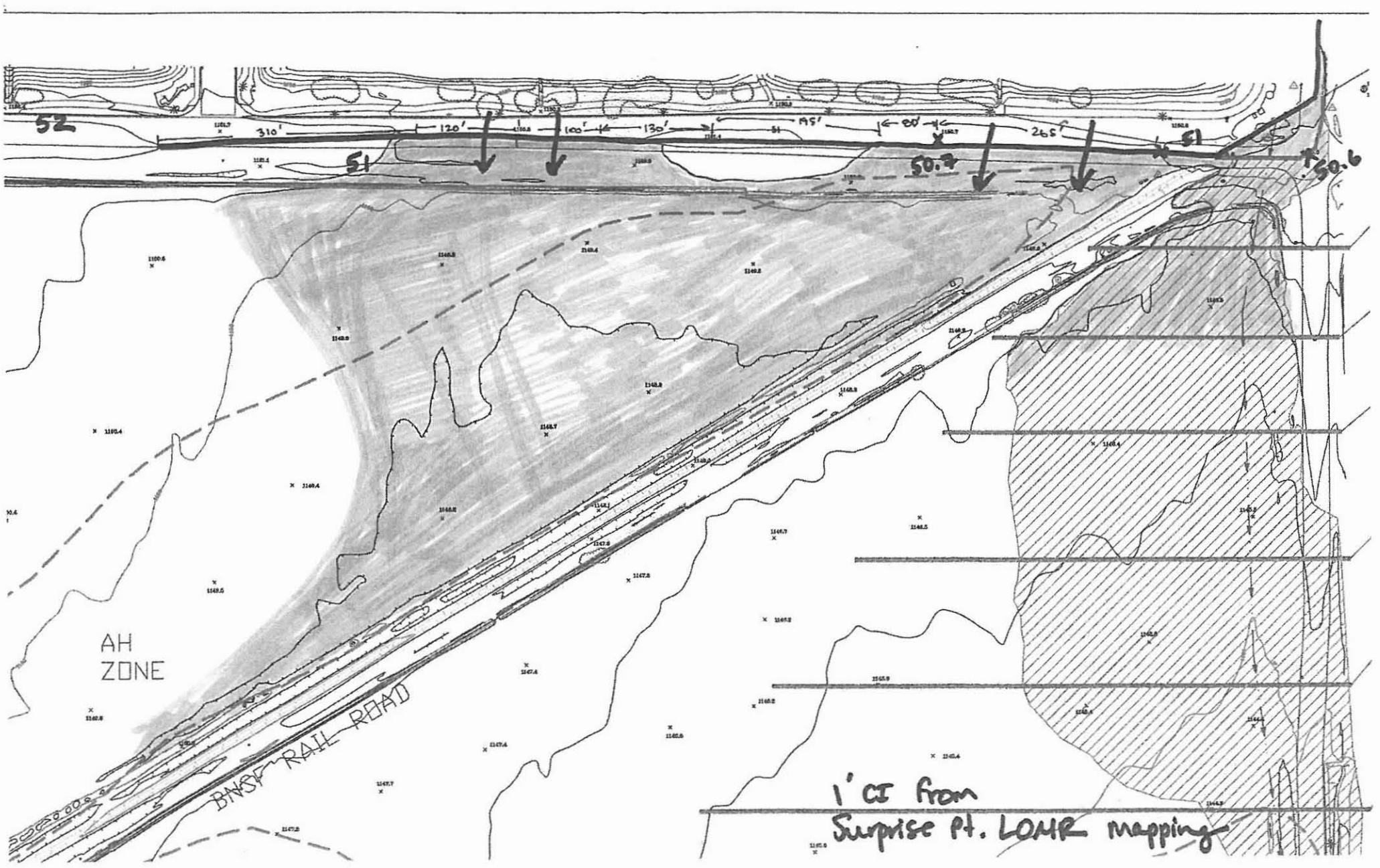
Assumes diversion is to southeast

Intersection of Waddell and Dysart

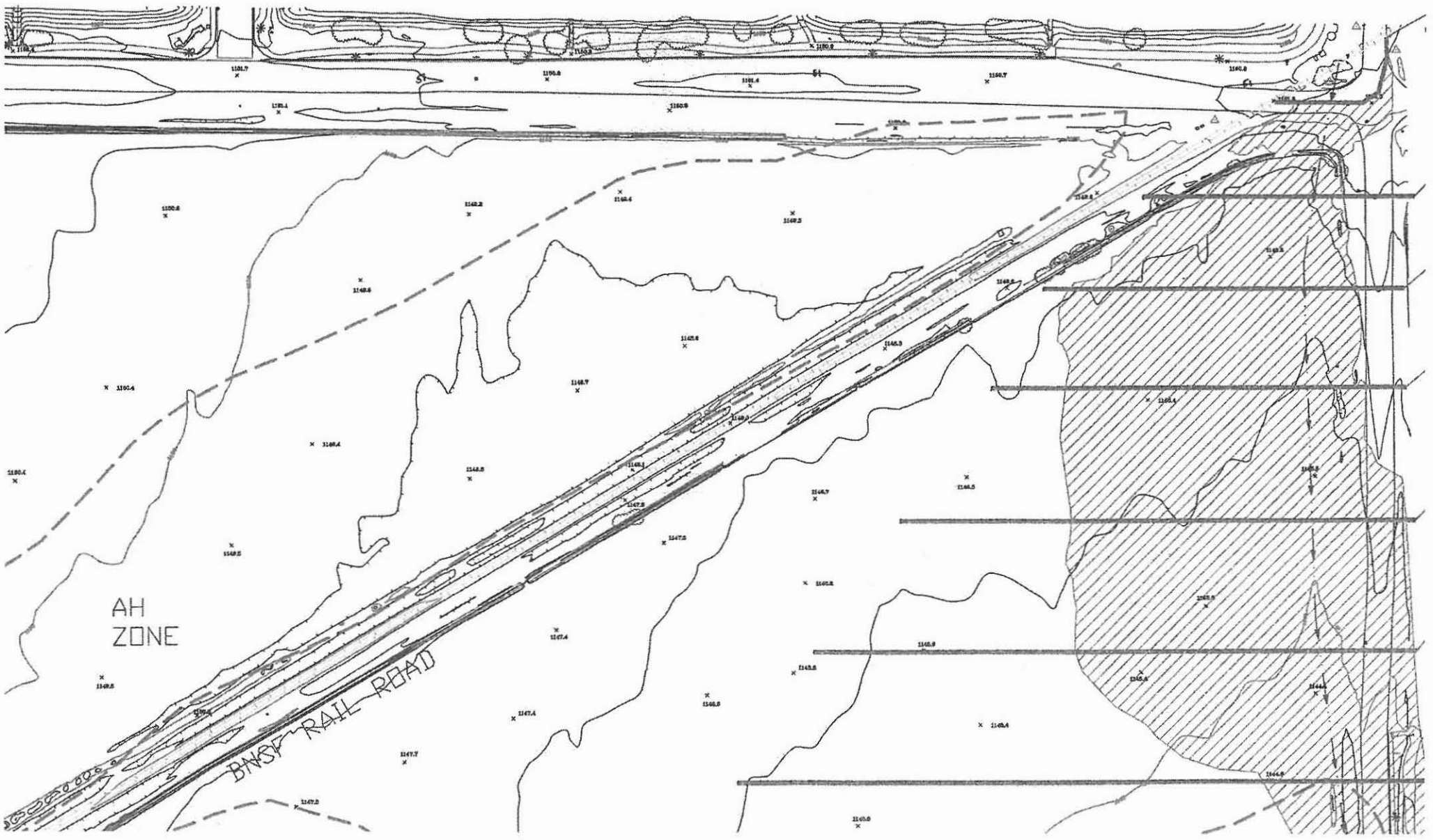
Note: generated from 2' CI topo (NOT accurate to 0.5')

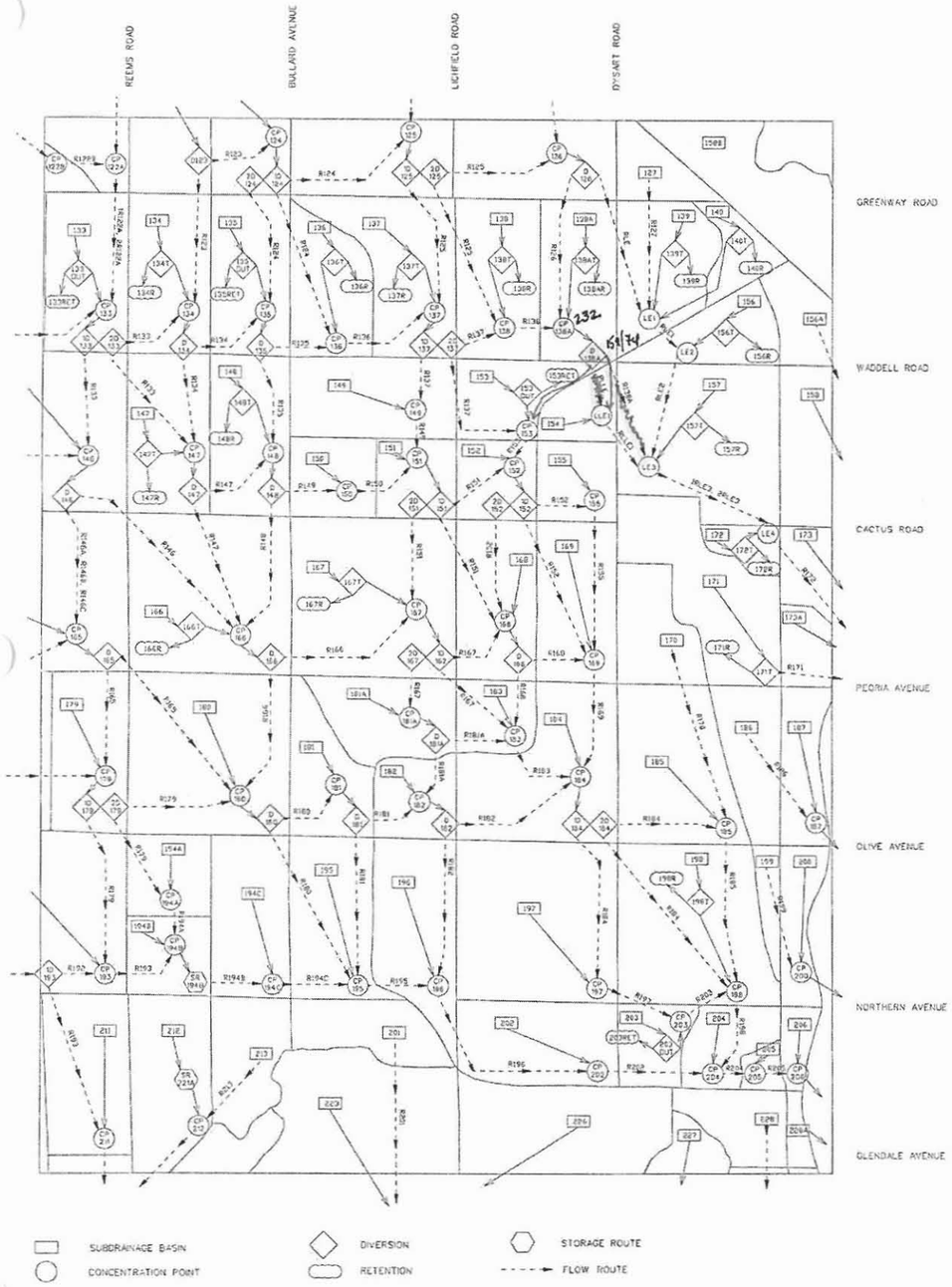


15


52
310'
120'
100'
130'
51
195'
80'
265'
51
51
50.7
50.6
AH
ZONE
BNSF RAIL ROAD
1' CI from
Surprise Pt. LOMR mapping

1' CI mapping - Surprise Pt. LOMR



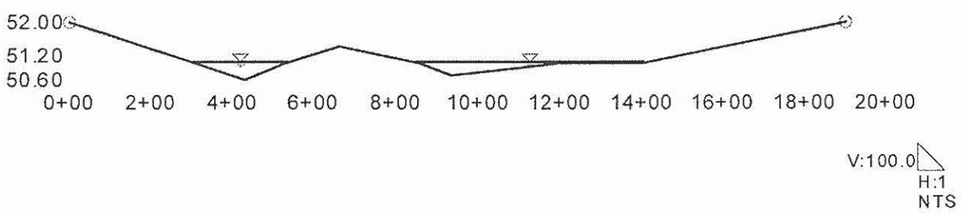


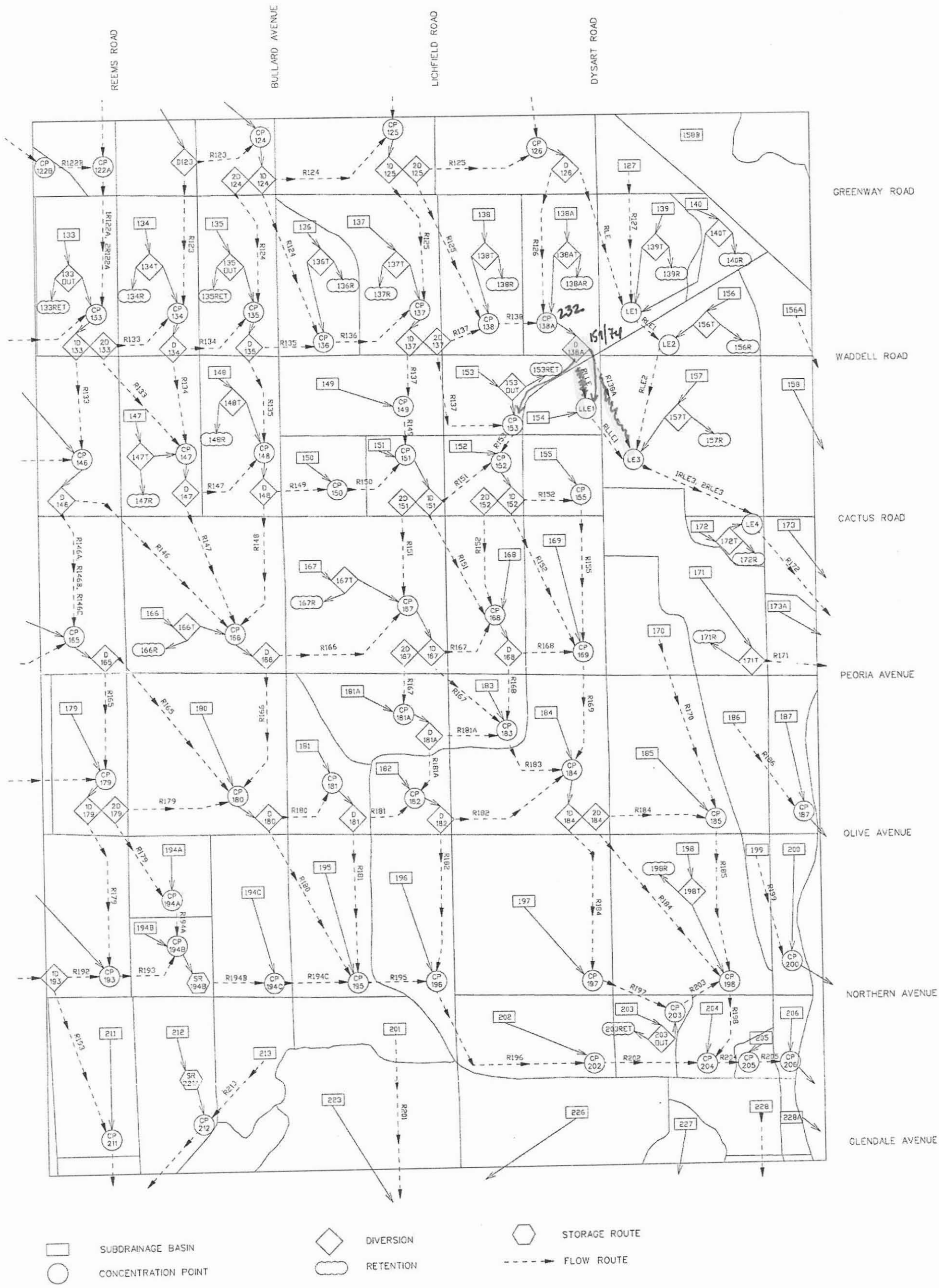
EXISTING CONDITIONS HYDROLOGY MAP

Cross Section
Cross Section for Irregular Channel

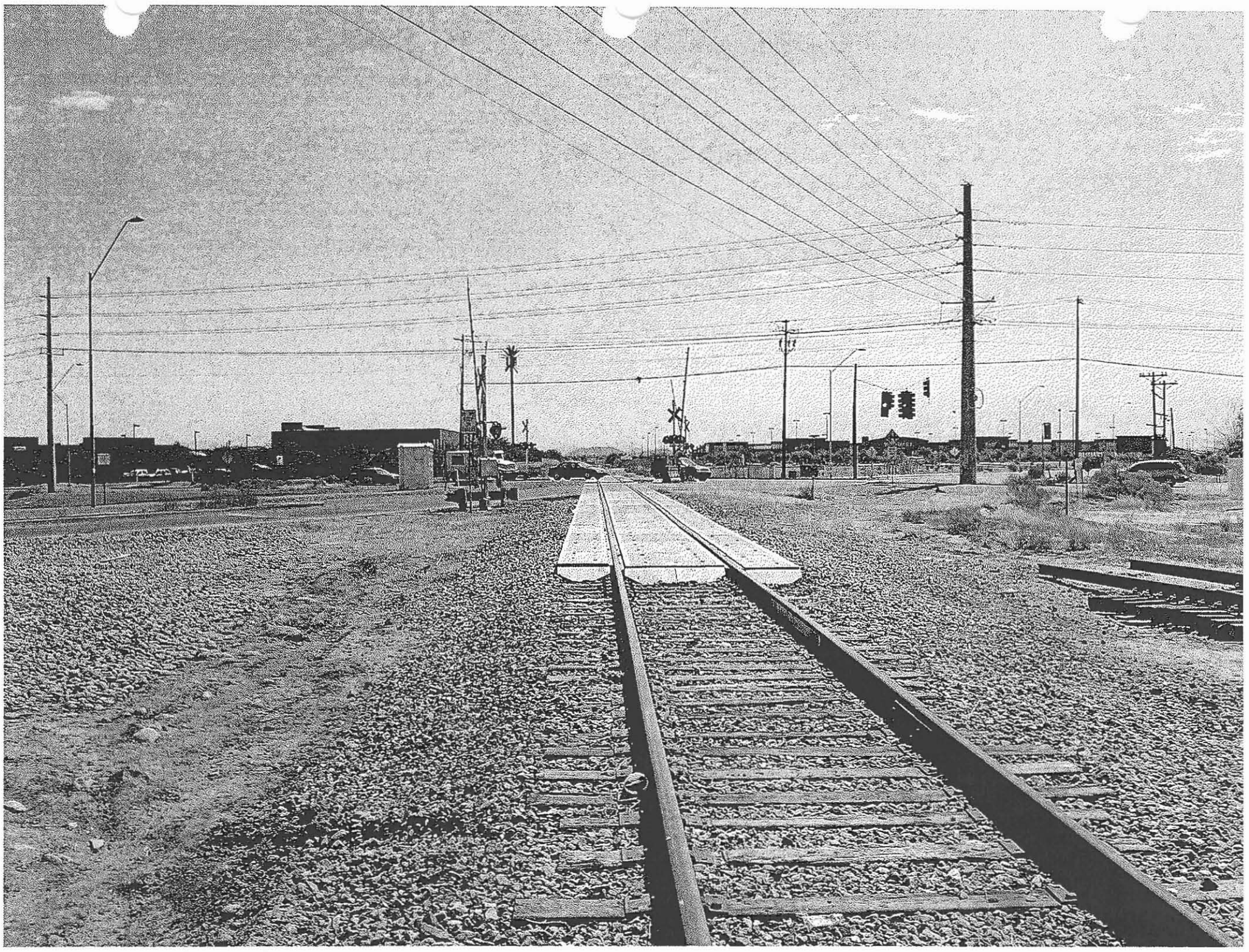
Project Description	
Worksheet	Irregular Chan
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Deptl

Section Data		
Mannings Coefi	0.025	
Slope	0.020000	ft/ft
Water Surface I	51.01	ft
Elevation Rang	0 to 52.00	
Discharge	232.00	cfs





EXISTING CONDITIONS HYDROLOGY MAP



HDR | ONE COMPANY *Many Solutions*	Project: L303/WT ADMPO AHA	Computed: LP	Date: 9/16/08
	Subject: Split Flow analysis	Checked: FB	Date: 9/16/08
	Task:	Page:	of:
	Job #:	No: 79902	

analysis of Waddell / Dysart intersection:

Basis:
- 1' CI topo for Surprise Point LOMR (Hunter Eng./ DEI) - 2006
- 2' CI topo @ intersection - 2008 (this project)
- 2' CI topo for entire area, 1990, FCDMC
- 2008 aerial photography

Existing Conditions:
- Upstream retention basin
  - all upstream offsite flows enter basin
- Basin must fill, then overtop roadway high points

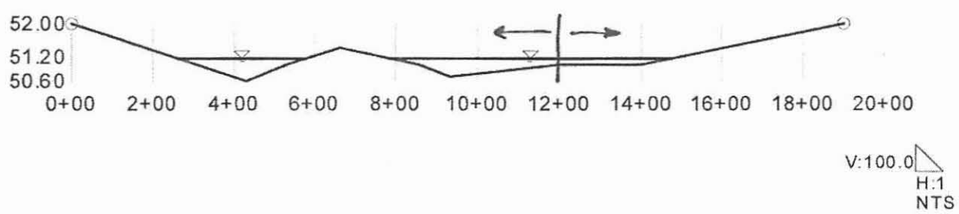
Overtopping:
- based on weir equation (HY-8 (FHWA))
- checked via Manning's equation (FlowMaster)
- Probable initial flows - Camelback CAR Hydrology model (≈ 300 cfs during 100 yr. event.)
- Low points exist on Waddell

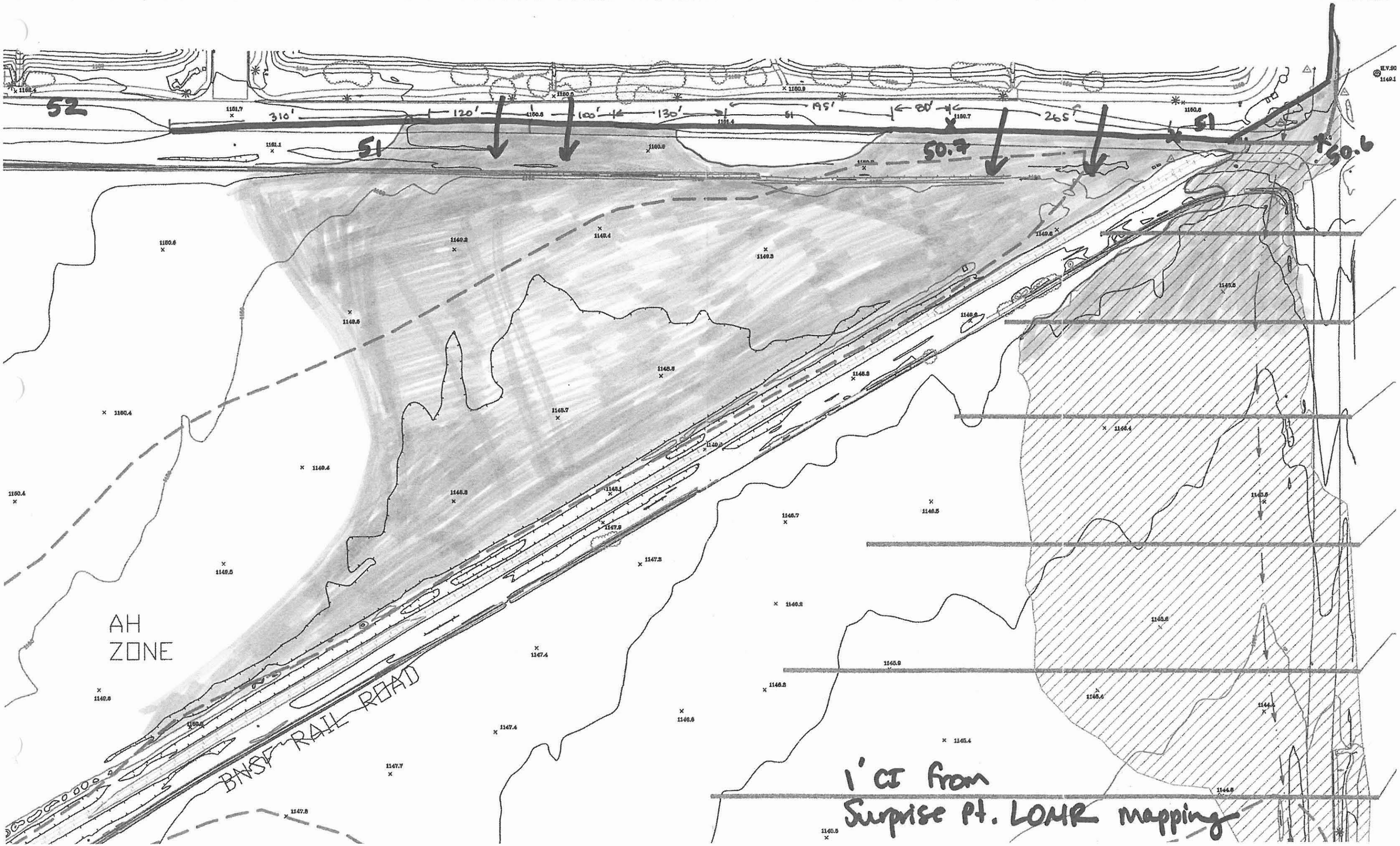
Results:
- most flow will stay to west of railroad tracks
- See attached map

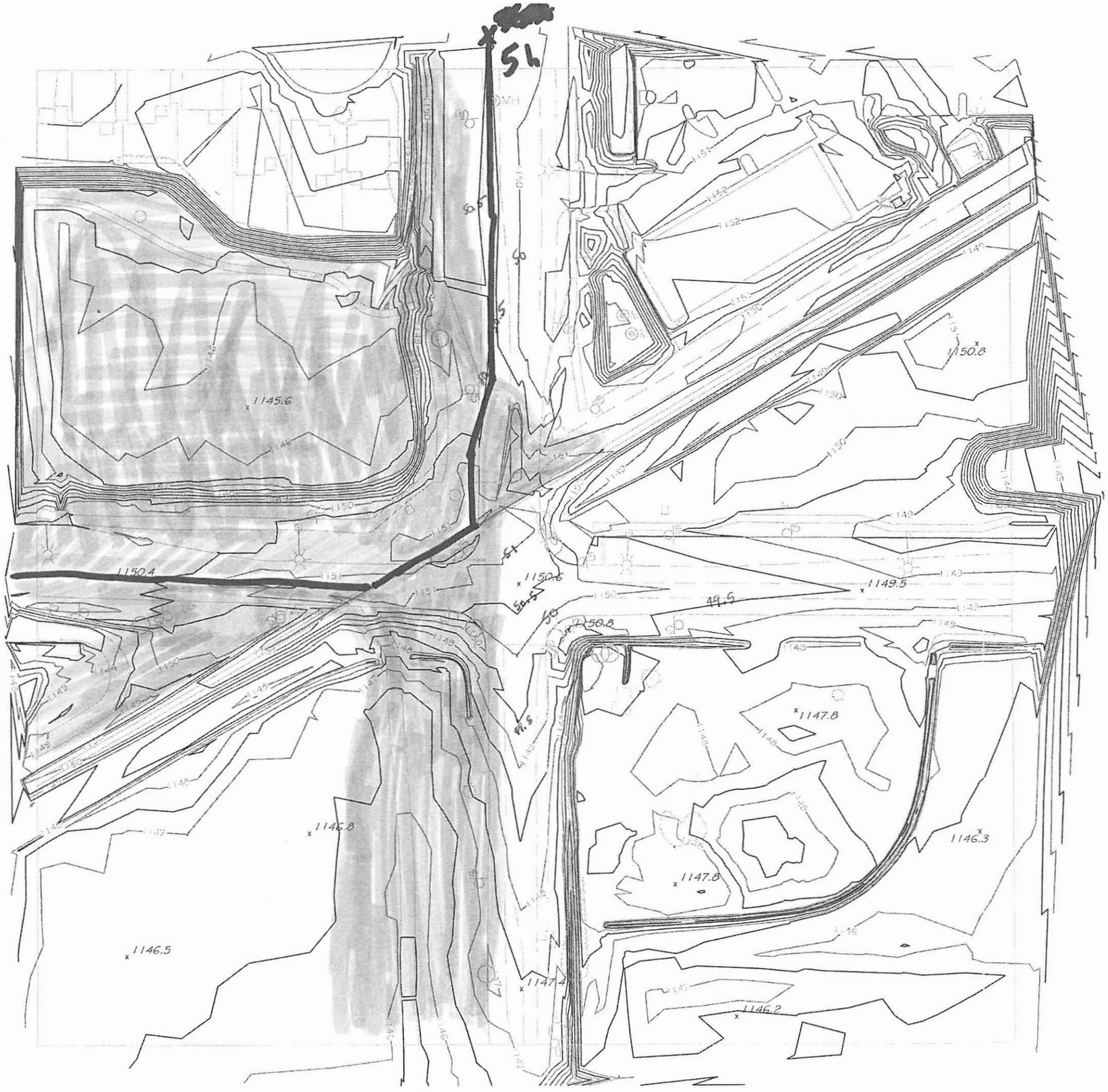
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Irregular Chan
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Deptl

Section Data		
Mannings Coefi	0.025	
Slope	0.002000	ft/ft
Water Surface I	51.15	ft
Elevation Rang	0 to 52.00	
Discharge	232.00	cfs



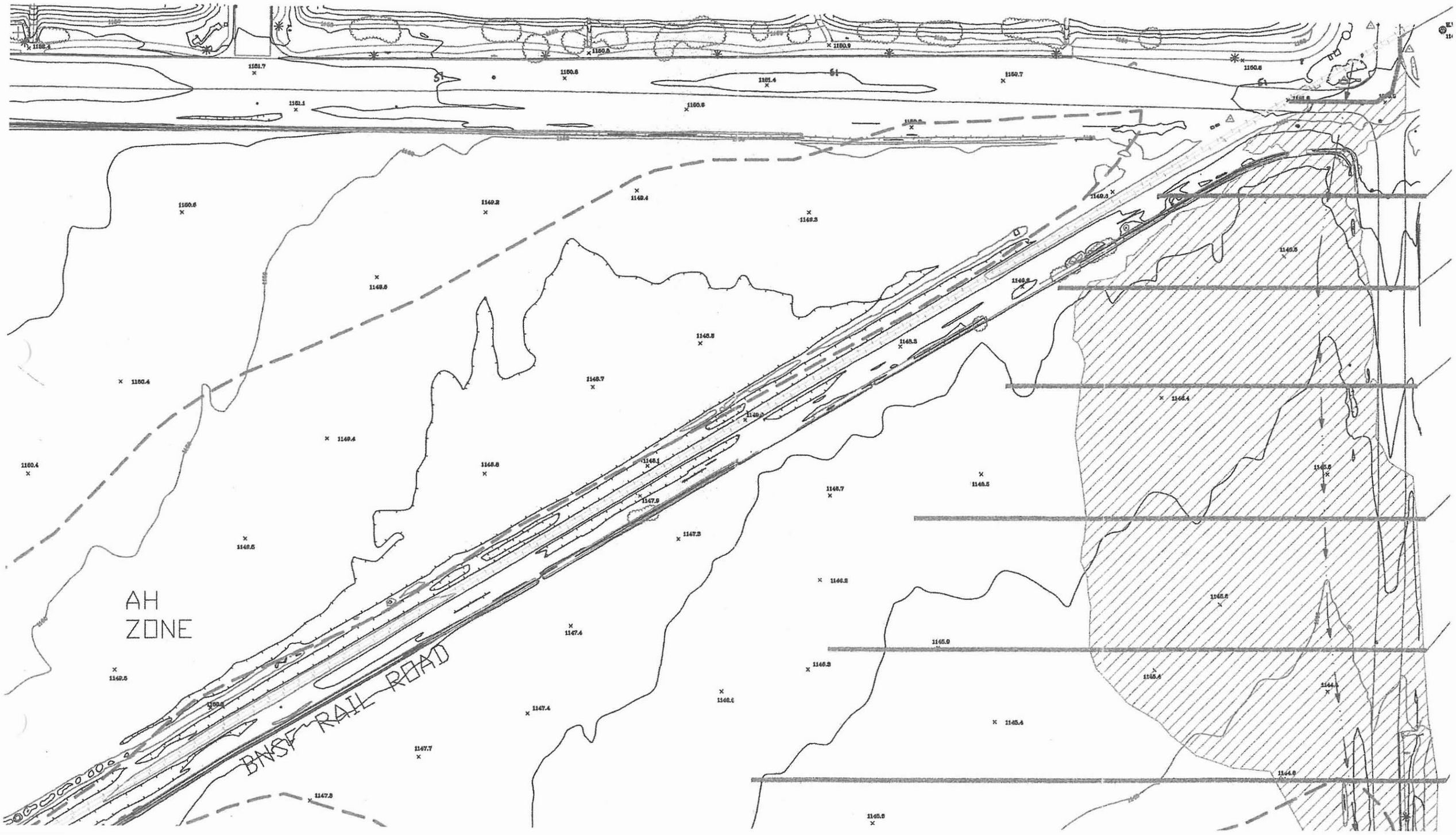

52
310'
120'
100'
130'
195'
80'
265'
51
51
50.7
50.6
AH
ZONE
BNSF RAIL ROAD
1' CI from
Surprise Pt. LOMR mapping



Note:
generated
from 2' CI
topo
(NOT accurate
to 0.5')

C:\PWworking\PHX\dmes0782\SENSITIVITY_ANALYSIS_LARFIS.DWG, 9/11/2008 2:09:33 PM

1' CI mapping - Surprise Pt. LOMR



Rating Table for SRD25

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	1154.00	ft
Crest Elevation	1151.00	ft
Weir Coefficient	2.60	US
Crest Length	300.00	ft

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
1146.00		
1148.00		
1150.00		
1152.00	780.00	2.60
1154.00	4053.00	4.50

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Project:	Loop 303 ADMPU AHA	Computed:	ATM	Date:	10/27/08
Subject:	Hydrology	Checked:	CP	Date:	3/10/09
Task:	Stage-Storage Table				
Job #:	79902				

SRD25

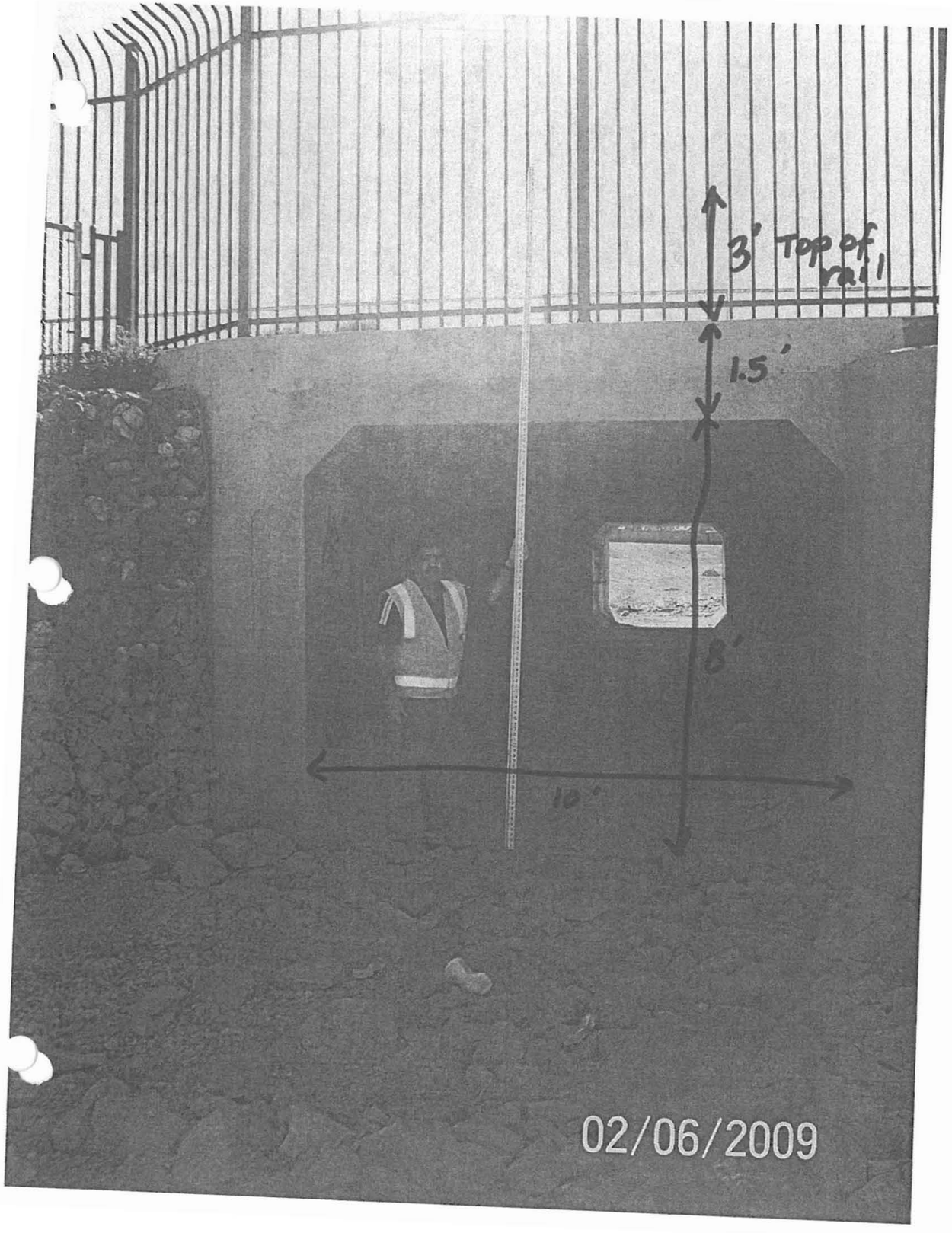
Elevation	Area (sq. ft.)	Volume (ac-ft)
1146	148979	0.00
1148	169889	7.32
1150	271045	20.24
1152	295576	39.02
1154	341132	58.47

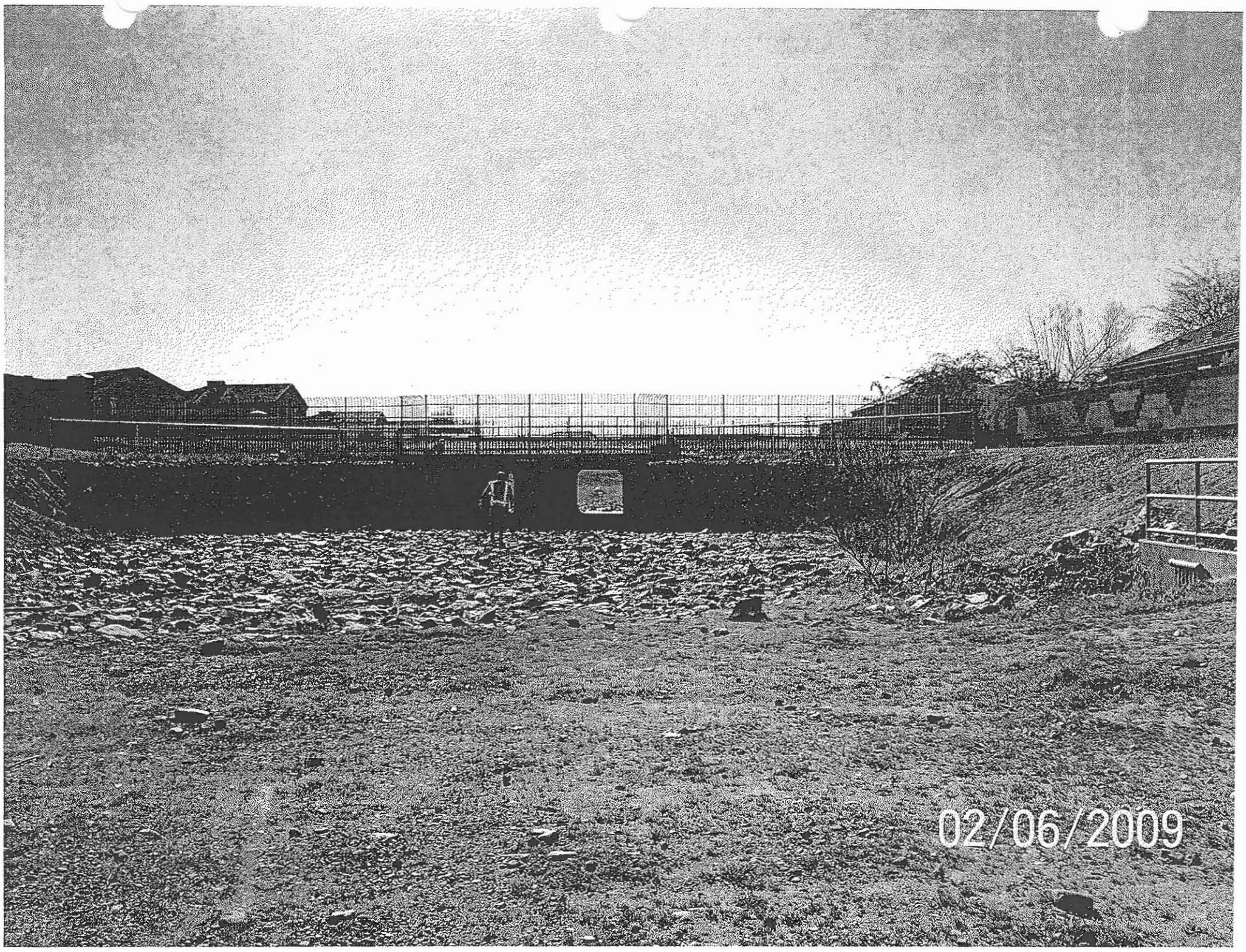
1" = 200

D26

Storage Route 26
Documentation

2 - 10+8 RCBC


3' Top of rail
1.5'
8'
10'
02/06/2009


02/06/2009

02/06/2009

Rating Table Report
StorageRouteD26

Range Data:

	Minimum	Maximum	Increment	
Allowable HW E	100.00	108.00	2.00	ft

HW Elev. (ft)	Discharge (cfs)	Storage
100.00	0.00	0
102.00	158.54	0
104.00	448.43	0
106.00	823.81	3.2
108.00	1,268.35	5.0

Top of tracks = 112.5

Culvert Calculator Report
StorageRouteD26

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	112.50 ft	Headwater Depth/Height	1.56
Computed Headwater Elev	112.50 ft	Discharge	2,208.03 cfs
Inlet Control HW Elev.	112.50 ft	Tailwater Elevation	101.00 ft
Outlet Control HW Elev.	111.58 ft	Control Type	Inlet Control

Grades			
Upstream Invert	100.00 ft	Downstream Invert	99.00 ft
Length	100.00 ft	Constructed Slope	0.010000 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	6.00 ft
Slope Type	Steep	Normal Depth	5.18 ft
Flow Regime	Supercritical	Critical Depth	7.24 ft
Velocity Downstream	18.41 ft/s	Critical Slope	0.004199 ft/ft

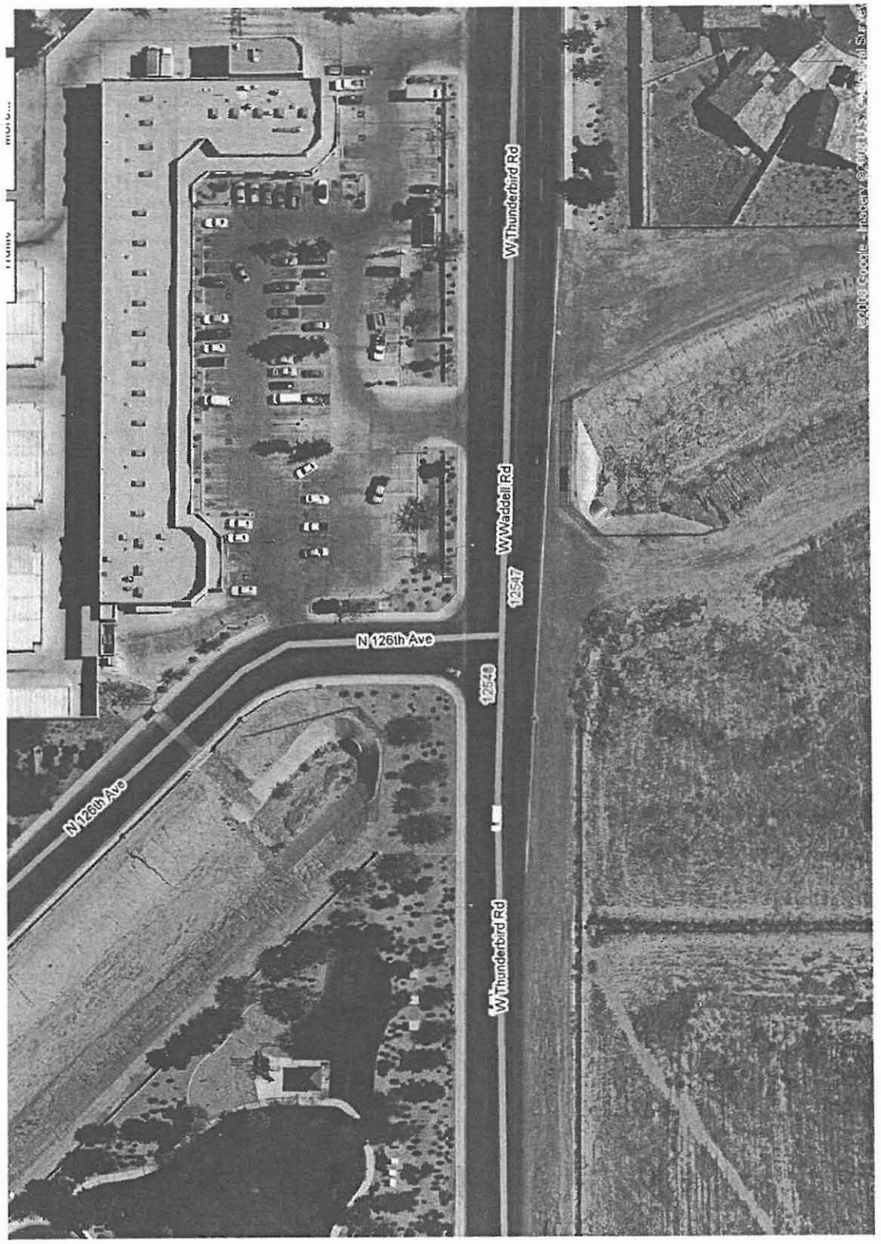
Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	10.00 ft
Section Size	10 x 8 ft	Rise	8.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	111.58 ft	Upstream Velocity Head	3.62 ft
Ke	0.20	Entrance Loss	0.72 ft

Inlet Control Properties			
Inlet Control HW Elev.	112.50 ft	Flow Control	Submerged
Inlet Type	90° headwall w 45° bevels	Area Full	160.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

D27

Storage Route D27 Documentation



Rating Table Report
SRD27

Range Data:

	Minimum	Maximum	Increment	
Allowable HW E	1,140.00	1,154.00	2.00	ft

HW Elev. (ft)	Discharge (cfs)	Storage ac-ft
1,140.00	0.00	0
1,142.00	52.26	0
1,144.00	202.33	0
1,146.00	415.11	0
1,148.00	657.85	0
1,150.00	905.65	0
1,152.00	1,126.79	62.25 − 39.45 = 22.8
1,154.00	2,998.76	90.86 − 39.45 = 51.41

no storage until top of pipe reached

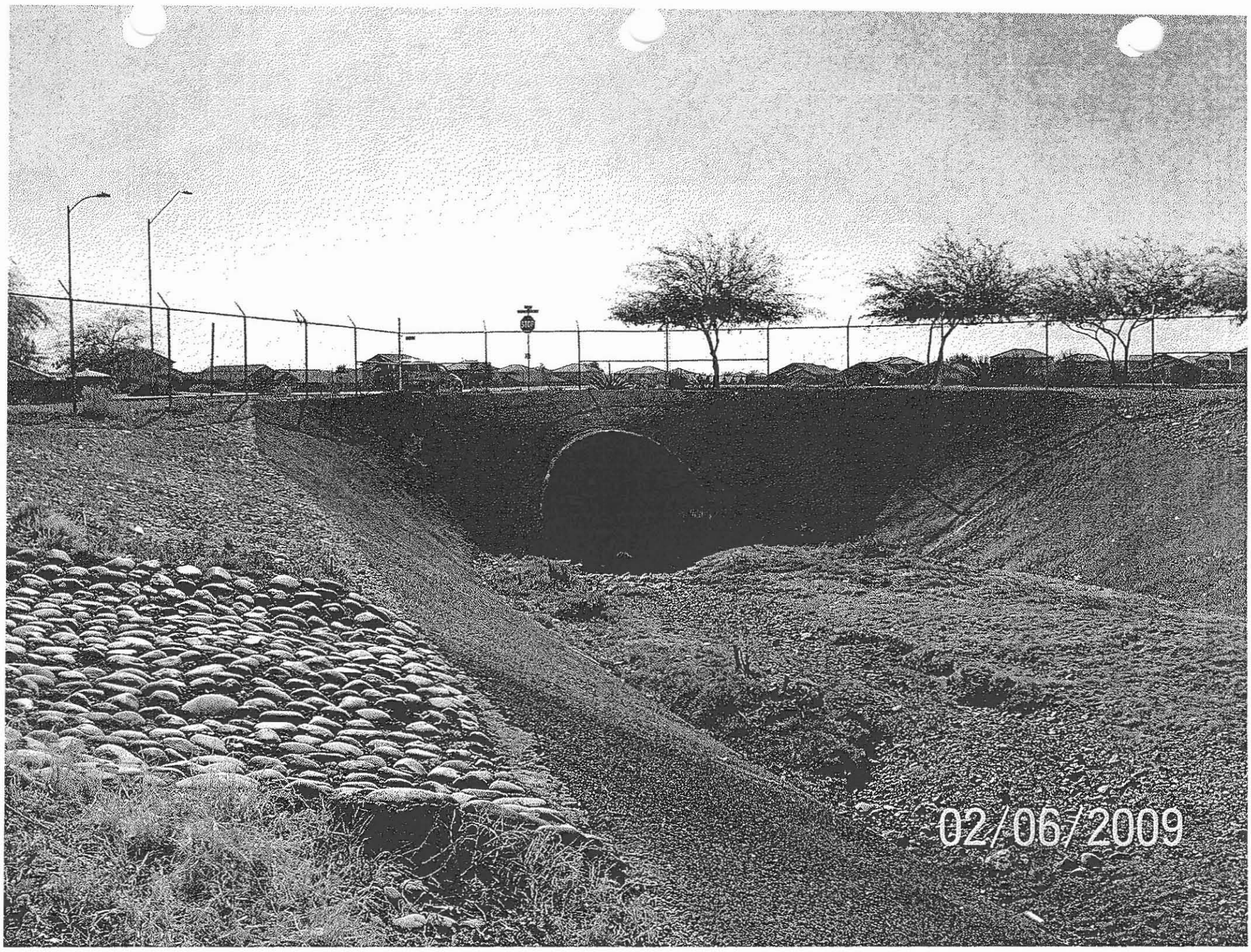
active channel area subtracted from storage above

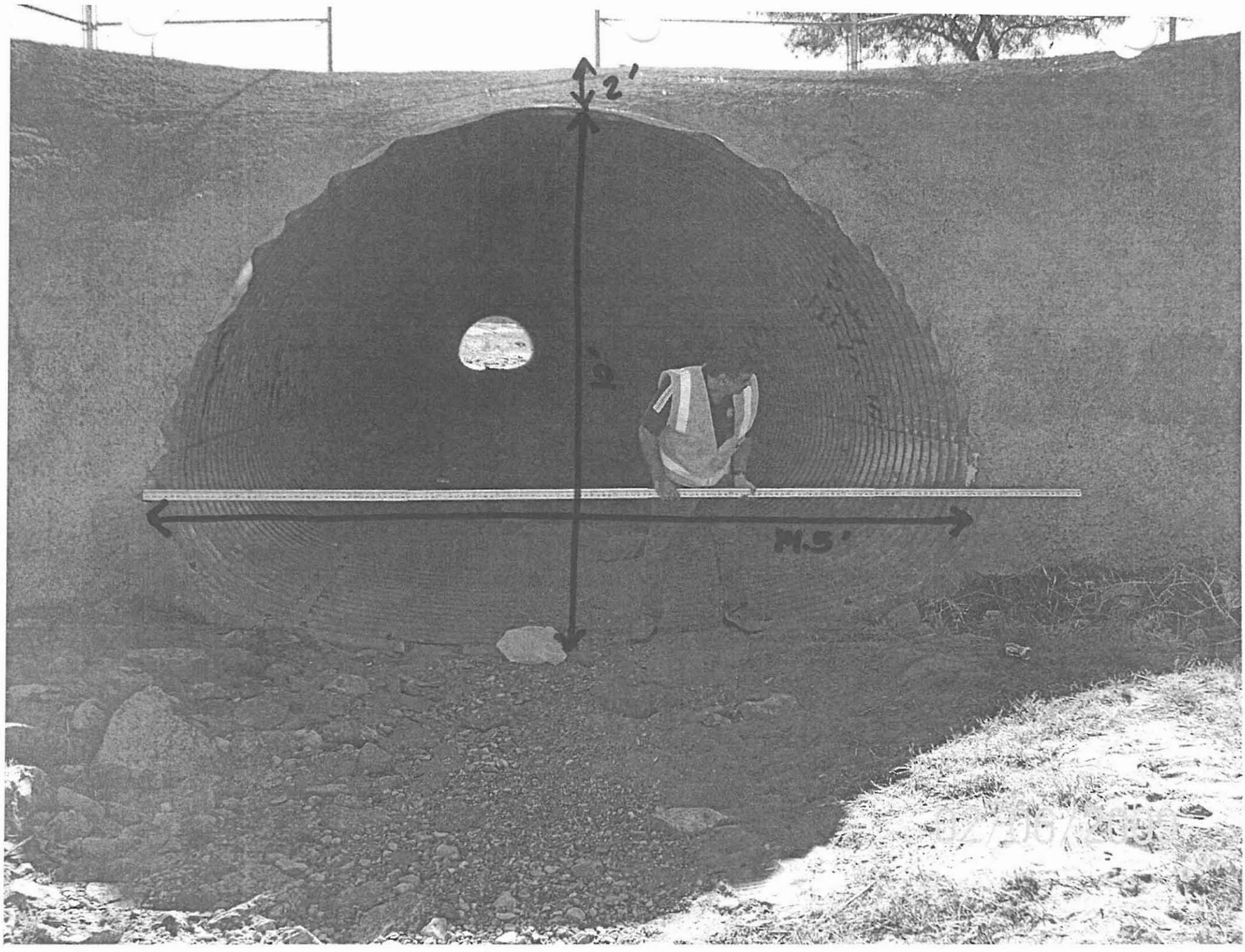
HDR | ONE COMPANY *Many Solutions*℠

Project:	Loop 303 ADMPU AHA	Computed:	AM	Date:	10/27/08
Subject:	Hydrology	Checked:	[illegible]	Date:	3/10/09
Task:	Stage-Storage Table				
Job #:	79902				

SRD27

Elevation	Area (sq. ft.)	Volume (ac-ft)
1140	17017	0.00
1142	33456	1.16
1144	67842	4.65
1146	107575	12.08
1148	144291	23.13
1150	199368	39.45
1152	252580	62.25
1154	312801	90.86


STOP
02/06/2009


2'
2'
14.5'

Culvert Analysis Report
Culvert-1

Culvert Summary			
Computed Headwater Elev	N/A ft	Discharge	0.00 cfs
Inlet Control HW Elev.	N/A ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev.	N/A ft	Control Type	Inlet Control
Headwater Depth/Height	0.00		

Grades			
Upstream Invert	1,140.00 ft	Downstream Invert	1,139.00 ft
Length	200.00 ft	Constructed Slope	0.005000 ft/ft

Hydraulic Profile			
Profile	Dry	Depth, Downstream	0.00 ft
Slope Type	Dry	Normal Depth	0.00 ft
Flow Regime	Subcritical	Critical Depth	0.00 ft
Velocity Downstream	0.00 ft/s	Critical Slope	0.000000 ft/ft

Section			
Section Shape	Arch	Mannings Coefficient	0.035
Section Material	Aluminum structural plate 32 in CR	Span	14.67 ft
Section Size	176 x 116 inch	Rise	9.67 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	N/A ft	Upstream Velocity Head	0.00 ft
Ke	0.50	Entrance Loss	0.00 ft

Inlet Control Properties			
Inlet Control HW Elev.	N/A ft	Flow Control	N/A
Inlet Type	90° headwall	Area Full	109.9 ft²
K	0.00830	HDS 5 Chart	34
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

CP
D26
SR
D20
D26
D2
CP
D27

D28

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D29

1202.5
1205.1
1200
1198.0
1191.3
1198.9
1200
1196.3
1199.5
1200
1199.5
Cactus
1190
MH
1191.2
1194.4
1195.8
1195.1
1195.4
Sewval
1" = 80'
N

D30

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	
		Date	3/10/09
		Sheet	1
		Of	x

Location: Cactus at Reems (DD30)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	72	71	280	71.5	70.5	0	0.00	71	0	0.00	71.5	0	0.00	CHECK	72	0.5	296.98	DONE
south	71	70	280	70.5	70.5	0	0.00	71	0.5	296.98	71.5	1	840.00		72	1.5	1543.18	
south	70	70	20	70	70.5	0.5	21.21	71	1	60.00	71.5	1.5	110.23		72	2	169.71	
east	70	70	20	70	70.5	0.5	21.21	71	1	60.00	71.5	1.5	110.23		72	2	169.71	
east	70	71	110	70.5	70.5	0	0.00	71	0.5	116.67	71.5	1	330.00		72	1.5	606.25	
east	71	72	110	71.5	70.5	0	0.00	71	0	0.00	71.5	0	0.00		72	0.5	116.67	
east	72	72	1	72	70.5	0	0.00	71	0	0.00	71.5	0	0.00		72	0	0.00	
east	72	72	1	72	70.5	0	0.00	71	0	0.00	71.5	0	0.00		72	0	0.00	
east	72	72	1	72	70.5	0	0.00	71	0	0.00	71.5	0	0.00		72	0	0.00	
						TOTALS:	42.43			533.66			1390.45				2902.50	

Graph Computations:

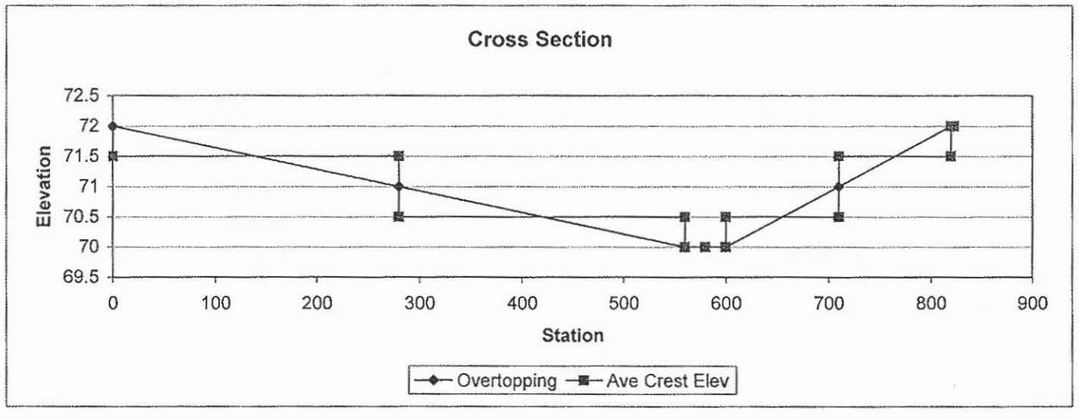
Station	Elevation
0	72
280	71
560	70
580	70
600	70
710	71
820	72
821	72
822	72
823	72

Weir Approximation:

Station	Elevation
0	71.5
280	71.5
280	70.5
560	70.5
560	70
580	70
580	70
600	70
600	70.5
710	70.5
710	71.5
820	71.5
820	72
821	72
821	72
822	72
822	72
823	72

Culvert Flows (cfs):

south	765
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	786.21	97%	Q(south)	1121.98	86%	Q(south)	1715.23	80%	Q(south)	2774.87	76%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	21.21	3%	Q(east)	176.67	14%	Q(east)	440.23	20%	Q(east)	892.63	24%
	807.43			1298.66			2155.45			3667.50	

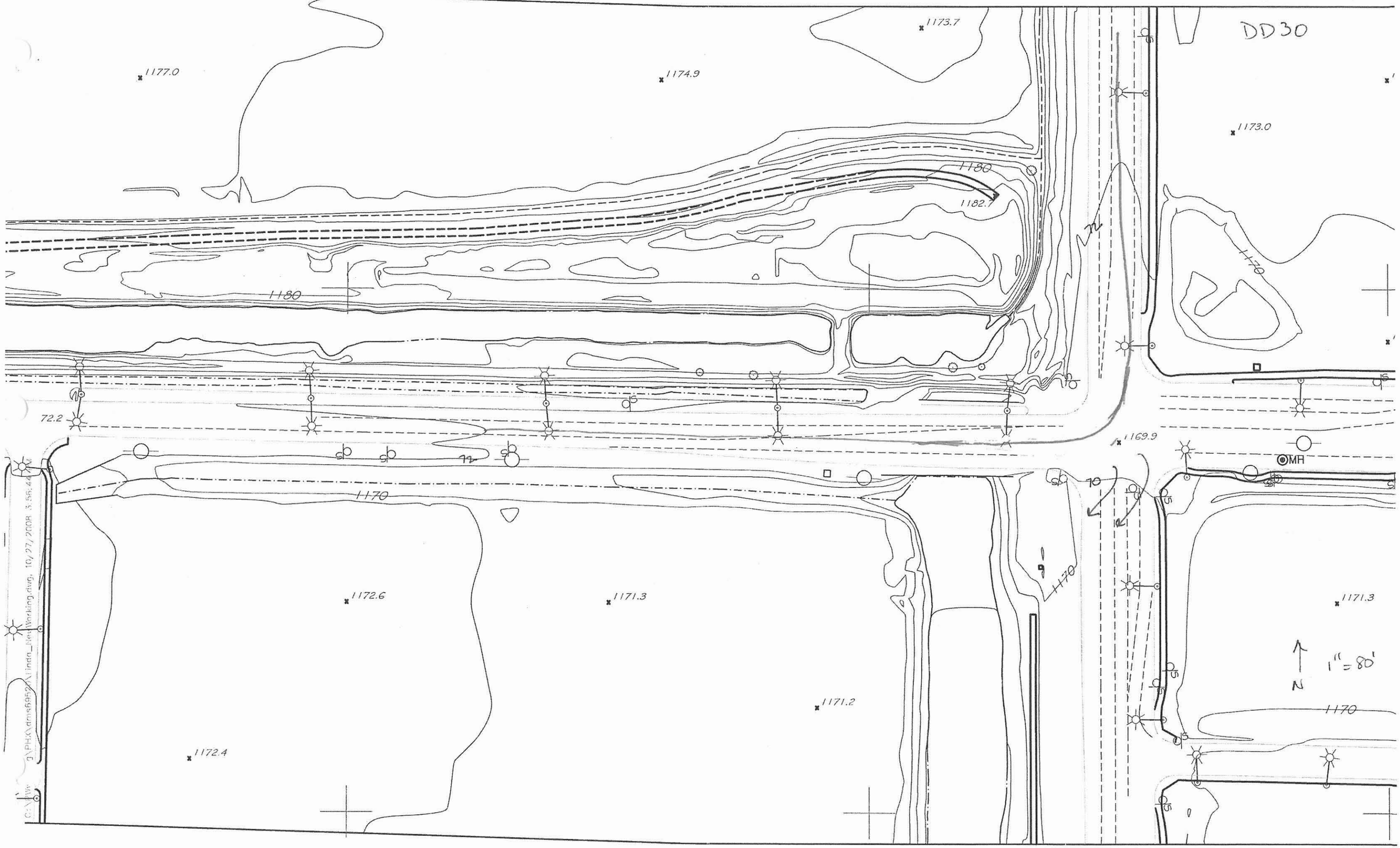
First DI	East to South			
Inflow	807.43	1298.66	2155.45	3667.50
Outflow	786.21	1121.98	1715.23	2774.87

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	21.21	176.67	440.23	892.63
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast

Cactus @ Reems



Acoma
Cactus
1173.7
1174.9
1172.5
1173.0
1180
1171.2
1170
1172.6
1171.3
MH
1" = 80'
N

Field Notes

M. SRD27 - RR and Thunderbird — P13 - at pipe
Arch pipe CMP 10'x14.5' — P14 - Pipe + overtopping.
10' + 2' = 12' top of box + overtopping.

9. Beardsley Canal @ Waddell - flow conveyed south along canal.

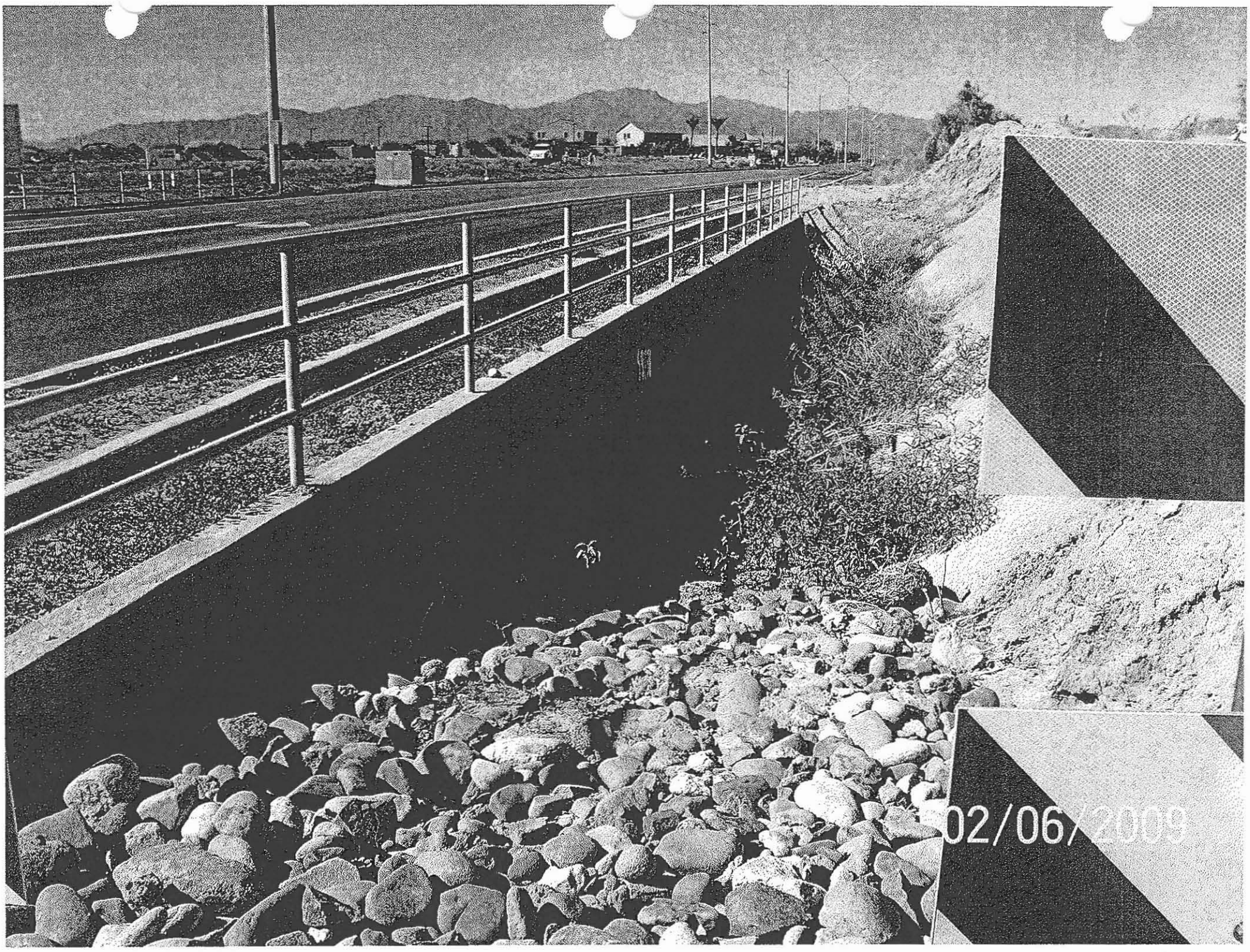
9. Beardsley Canal at Cactus - flow conveyed south

6. Cactus - east of Bullard - channel
- no connectivity between Bullard + 151 Ave. on
- north side of Cactus - no channel, just a series of narrow basins, but can be used for routing .02 n-value.
- basins stop about 400' east of Reems Rd. -

Q CPD30 - Cactus @ Reems Rd. - 4 - 10'x3' cbc - Plugged on north side + siltedin on south side
P15 - north side of cactus at cbc - box plugged
P16 - South Side box
P17 - View looking west along south side of Cactus - channel outfalls into Reem Rd Channel

3. Channel along south side of Cactus conveys flow east in channel - bottom: river run, banks: grass. / no channel on north side of Cactus.

2. Cactus @ Sarival - all flows will go east from north + south side of Cactus. in channel on south side of Cactus.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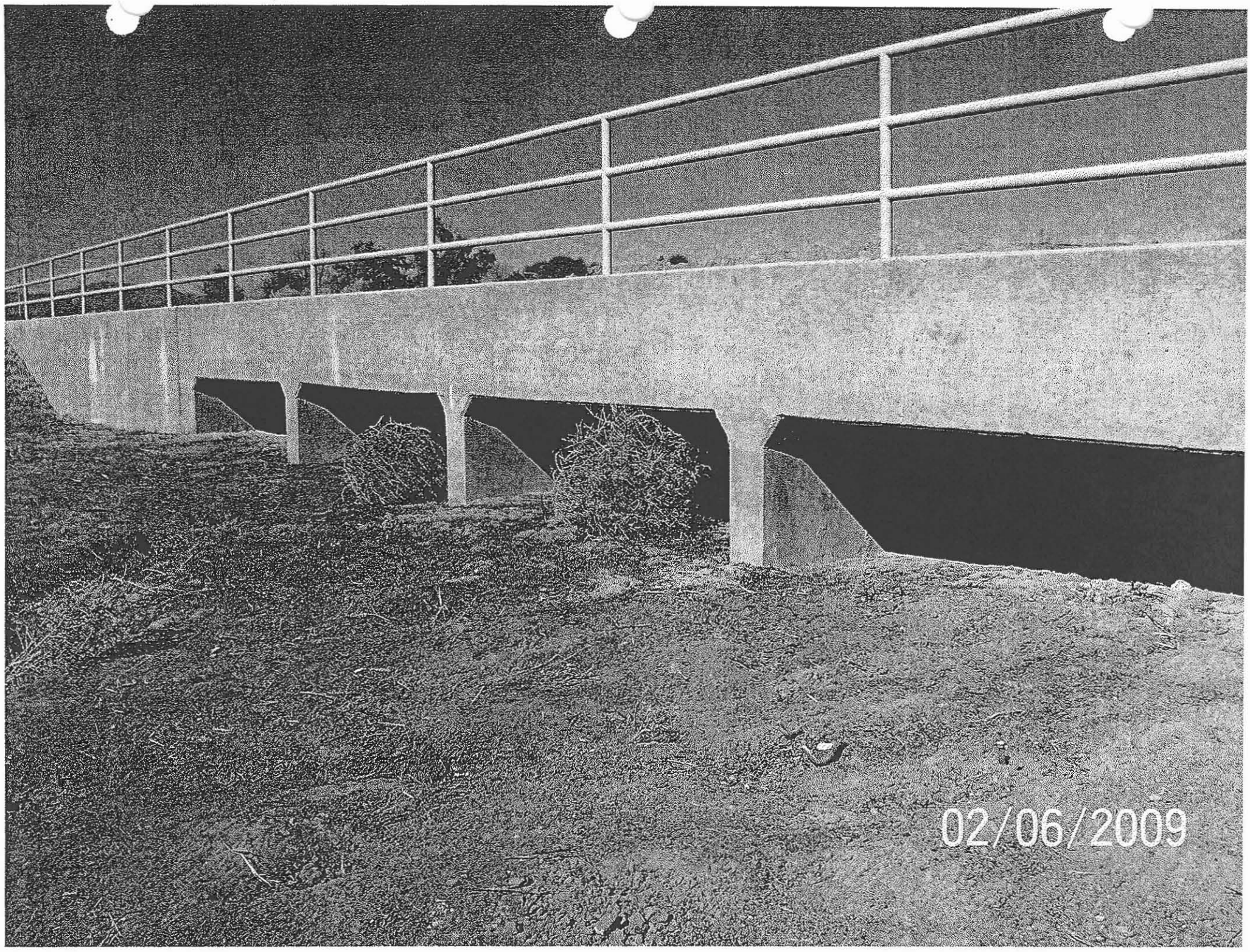
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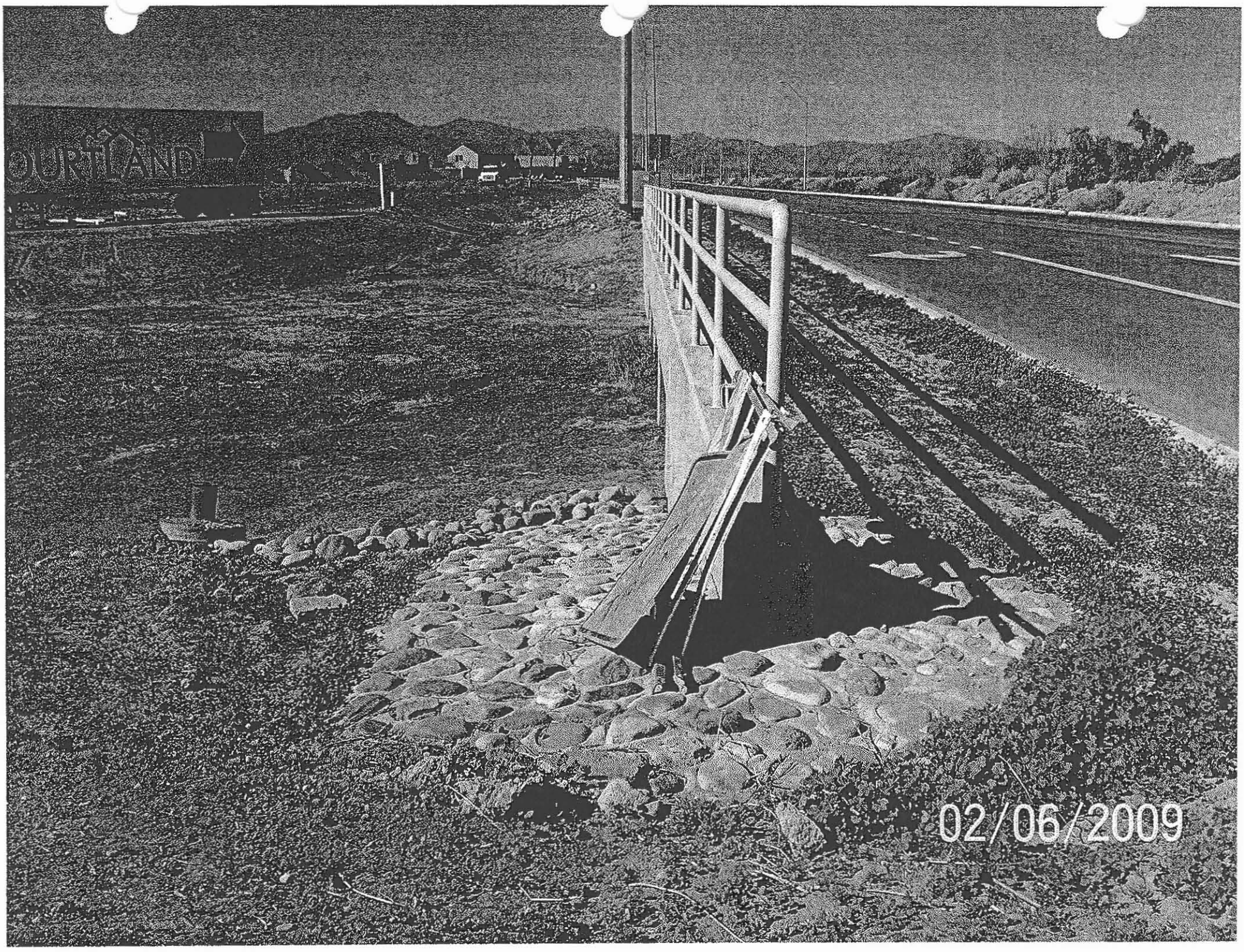
OURTLAND
02/06/2009

Culvert Calculator Report
CactusReems

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	71.00 ft	Headwater Depth/Height	2.50
Computed Headwater Elev	71.00 ft	Discharge	764.78 cfs
Inlet Control HW Elev.	71.00 ft	Tailwater Elevation	66.00 ft
Outlet Control HW Elev.	70.06 ft	Control Type	Inlet Control

Grades			
Upstream Invert	66.00 ft	Downstream Invert	65.50 ft
Length	71.00 ft	Constructed Slope	0.007042 ft/ft

Hydraulic Profile			
Profile	PressureProfile	Depth, Downstream	2.00 ft
Slope Type	N/A	Normal Depth	N/A ft
Flow Regime	N/A	Critical Depth	2.00 ft
Velocity Downstream	9.56 ft/s	Critical Slope	0.012011 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	4.00 ft
Section Size	4 x 2 ft	Rise	2.00 ft
Number Sections	10		

→ to account for 2' sediment (=4-10'x2' boxes ±)

Outlet Control Properties			
Outlet Control HW Elev.	70.06 ft	Upstream Velocity Head	1.42 ft
Ke	0.20	Entrance Loss	0.28 ft

Inlet Control Properties			
Inlet Control HW Elev.	71.00 ft	Flow Control	Submerged
Inlet Type	headwall w 3/4 inch chamfers	Area Full	80.0 ft²
K	0.51500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	1
C	0.03750	Equation Form	2
Y	0.79000		

D31

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

DD32SE

2/10/2009

Project: **Loop 303/White Tanks ADMPU AHA** HDR Prj. No.: **79902** By: **JM** Date: **2/10/2009**
Task: **Street Intersection Diversions** Client Prj. No.: **2007C031** Checked: Date: 3/10/09

	R/W, ft.	PW, ft.	F, ft
a	203	67	63
m	184	68	53
c	91	53	14
r	78	51	9.5

N-S D/S street R/W (ft)	78
Main flow to	EAST
Diversion to	SOUTH
Crown Direction	E-W
N-S street name	CR
E-W street name	BR

Conveyance, $K = (1.49/n)*(A^{1.67}/P^{0.67})$
Q = discharge, cfs
n = Manning's roughness
A = flow area, sq. ft.
P = wet perimeter, ft.
S = longitudinal slope, ft/ft

Capacity, $Q = K*S^{0.5}$

Curb height = 0.5 ft.
Weir Flow down side streets, $Q=CLH^{1.5}$
C = 2.9
L = weir length, ft.
H = flow depth, ft.

Streets
CR = Cactus Road
BR = North 150th Lane
a = Cactus Road U/S
m = Cactus Road D/S
c = North 150th Lane U/S
r = North 150th Lane D/S

Diversion ID	Direction	Side	STREET PARAMETERS: Street Type (a)	Top of Slope Elev., ft	Bottom of Slope Elev., ft.	Slope Length, ft.	Ave. Long. Slope, ft/ft	Top of Crown ft.
DD32SE	E-W	U/S	a	1167.3	1165.8	291.2	0.0051	0.67
		D/S	m	1165.8	1165.8	152.6	0.0003	0.68
	N-S	U/S	c	1165.9	1165.8	370.8	0.0001	0.53
		D/S	r	1165.8	1163.2	350.2	0.0073	0.51
			Average Gutter Elev. at Curb Returns, ft					
		U/S	1165.6					
		D/S	1165.1					

Conveyance (K) of one side of E-W Streets (cfs)	crown	curb	sidewalk	ROW	ft above crown		
U/S	455.7	227.3	381.0	4206.9			
D/S	crown	curb	sidewalk	ROW	0.50 ft above E-W D/S crown	1.00	2.00
	455.1	227.3	302.9	3196.8	4387.3	6059.2	19533.5
WSEL Elevations (ft)	1165.80	1165.62	1165.69	1166.49	1166.30	1166.80	1167.80

Conveyance (K) of N-S Streets (cfs)	crown	curb	sidewalk	ROW	ft above crown		
U/S	506.6	454.6	693.9	1363.9			
D/S	crown	curb	sidewalk	ROW	0.67 ft above N-S D/S crown	1.17	2.17
	438.2	454.6	670.2	1030.7	4597.2	10086.5	24863.5
WSEL Elevations (ft)	1165.63	1165.62	1165.70	1165.83	1166.30	1166.80	1167.80

FLOW CAPACITIES U/S OF INTERSECTION (cfs)	crown	curb	sidewalk	ROW	above crown
E-W	65.2	32.5	54.5	601.9	
N-S	5.3	4.7	7.2	14.2	

FLOW CAPACITIES D/S OF INTERSECTION (cfs)	crown	curb	sidewalk	ROW	0.5 ft	1 ft	2 ft
E-W	14.7	7.4	9.8	103.5	142.0	196.0	633.0
N-S	37.5	38.9	57.4	88.3	394.0	864.0	2130.0

STORM DRAIN OR DITCH CAPACITY (cfs)	E-W	N-S
	0	
		0

WEIR FLOW OVER E-W CROWN (cfs)	crown	curb	sidewalk	ROW	0.5 ft over	1 ft over	2 ft over
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	0.0	0.0	0.0	0.0	9.0	128.2	323.3

D/S INTERSECTION PARAMETERS: Location E-W Street	Location N-S Street	Street Slope, S, West ft/ft	Street Slope, S, South ft/ft	R/W Width West (1/2) ft.	R/W Width South ft.
BR		0.00026		184	
	CR		0.00734		78

D/S SLOPE, R/W AND COMPOSITE RATIOS	Slope Ratios,SR, (S^1/2) E-W (SR-W) $S_w^{1/2}/(S_w^{1/2}+S_s^{1/2})$	Slope Ratios,SR, (S^1/2) N-S (SR-S) $S_s^{1/2}/(Sw^{1/2}+Ss^{1/2})$	R/W Ratios, R/WR, E-W (R/WR-W) $W_w/(W_w+W_s)$	R/W Ratios, R/WR, N-S (R/WR-S) $W_s/(W_w+W_s)$	Composite Ratios,CR, E-W, 1/2 street (CR-W)	Composite Ratios,CR, N-S (CR-S)
	0.159		0.702		0.541	
		0.841		0.298		0.459

		storm d.	1/2@crown	curb	sidewalk	ROW	0.5 ft over	1 ft over	2 ft over
INFLOW CAPACITY (DI)	0.0	0.0	7.4	28.9	41.0	151.6	527.0	1011.0	2605.0
E-W OUTFLOW CAPACITY (NORTH SIDE)	0.0	0.0	7.4	4.0	5.0	52.0	62.0	49.0	158.0
E-W OUTFLOW CAPACITY (SOUTH SIDE)	0.0	0.0	0.0	23.1	33.7	75.8	252.0	520.0	1324.0
STORM DRAIN CAPACITY TO WEST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STORM DRAIN CAPACITY TO SOUTH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTFLOW CAPACITY TO SOUTH (DQ)	0.0	0.0	0.0	1.8	2.3	23.9	213.0	442.0	1123.0

	storm d.	1/2@crowr	curb	sidewalk	ROW	0.5 ft over	1 ft over	2 ft over
	0.0	0.0	7.4	28.9	41.0	151.6	527.0	1011.0	2605
	0.0	0.0	7.4	28.9	41.0	151.6	527.0	1011.0	2605

INFLOW CAPACITY (DI), cfs								
0.0	0.0	7.4	28.9	41.0	151.6	527.0	1011.0	2605.0

OUTFLOW CAPACITY TO SOUTH (DQ), cfs							
0.0	0.0	1.8	2.3	23.9	213.0	442.0	1123.0

Cactus Road U/S

ROW to ROW (ft)	203	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	67	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	8			SW Cross Slope, LT	0.015		
SW to ROW (ft)	60			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	59.5	67.5	68	68	101.5	135	135	135.5	143.5	203
y	0.85	-0.05	-0.17	-0.17	-0.67	0.00	-0.67	-0.17	-0.17	-0.05	0.85

<----- LEFT | RIGHT ------->

							Depth
TOP curb elev. (ft)	-0.17	curb-crown	-0.17	crown Conv	911.4		0.67
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6		0.50
TOP ROW elev. (ft)	0.85	SW-curb	0.12	SW Conv K	761.9		0.62
gutter elevation (ft)	-0.67	ROW-SW	0.90	ROW Conv K	8413.8		1.52
TOP SW elev. (ft)	-0.05	SW-crown	-0.05	.5 ft over full	8043.5		1.17
max flow depth (ft)	0.67	ROW-crown	0.85	1 ft over full	11453.7		1.67
n1 (pavement)	0.0160	crown-gutter	0.67	2 ft over full	39952.2		2.67
n2 (curb)	0.0160	ROW-gutter	1.52	3 ft over full	81137.5		3.67
n3 (SW)	0.0160	SW-gutter	0.62				
n4 (overland)	0.0250						
n_c crown (composit)	0.0166						
n_c curb (composit)	0.0160						
n_c SW (composit)	0.0159						
n_c ROW (composit)	0.0215						
n_c .5 ft over (comp)	0.0161						
n_c 1 ft over (comp)	0.0215						
n_c 2 ft over (comp)	0.0215						
n_c 3 ft over (comp)	0.0215						

HALF P	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
P1 (pavement)	33.51	25.00	31.01	33.51	33.51	33.51	33.51	33.51
P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
P4 (SW)	8.00	0.00	8.00	8.00	8.00	8.00	8.00	8.00
P5 (ROW)	3.33	0.00	0.00	60.01	0.85	60.01	60.99	60.99
ΣP	45.84	25.50	40.01	102.51	43.36	102.51	103.49	103.49

HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
A2	3.90	0.00	3.90	3.90	3.90	3.90	3.90	3.90
A3	2.12	0.00	0.00	2.12	2.12	2.12	2.12	2.12
A4	0.00	0.00	0.00	62.62	31.18	62.62	62.62	62.62
A5					FALSE	15.23	116.73	218.23
ΣA	12.27	6.25	10.15	74.89	43.45	90.12	191.62	293.12

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.17	0.67	1	1	1	0	0
SW-crown	-0.05	0.55	6.25	3.90	2.12	31.18	FALSE
ROW-crown	0.85	-0.35					
			P1	P2	P3	P4	P5
			1	1	1	1	0
			33.51	0.50	0.50	8.00	0.00

		1	A1	A2	A3	A4	A5
curb-crown	-0.17	1.17	1	1	1	1	1
SW-crown	-0.05	1.05	6.25	3.90	2.12	62.62	15.23
ROW-crown	0.85	0.15					
1+curb-crown	0.83	0.17	P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	8.00	60.01

		2	A1	A2	A3	A4	A5
curb-crown	-0.17	2.17	1	1	1	1	1
SW-crown	-0.05	2.05	6.25	3.90	2.12	62.62	116.73
ROW-crown	0.85	1.15					
2+curb-crown	1.83	0.17	P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	8.00	60.99

		3	A1	A2	A3	A4	A5
curb-crown	-0.17	3.17	1	1	1	1	1
SW-crown	-0.05	3.05	6.25	3.90	2.12	62.62	218.23
ROW-crown	0.85	2.15					
3+curb-crown	2.83	0.17	P1	P2	P3	P4	P5
			1	1	1	1	1
			33.51	0.50	0.50	8.00	61.99

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	3.90	82.80	104.76
2	6.25	3.90	2.12	62.62
3	6.25	6.02	-2.18	64.80
4	11.22	-5.70	4.56	64.80
2	6.25	3.90	2.12	62.62

CASE

2

Top	Area calculator - **Crown > ROW**					Components	
		(Full Street)	(Half Street)	1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	7.80	3.90	0.48	0.06	3.36	
RW	A3 (sq ft)	165.60	82.80	27.00	7.20	0.45	48.15
crown	A4 (sq ft)	209.52	104.76	51	6.8	0.425	46.54
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **ROW > Crown > SW**					Components	
		(Full Street)	(Half Street)	1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	7.80	3.90	0.48	0.06	3.36	
crown	A3 (sq ft)	4.24	2.12	0.48	0.03	1.61	
RW	A4 (sq ft)	125.24	62.62	33.717	0.425	28.475	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **SW > Crown > TC**					Components	
		(Full Street)	(Half Street)	1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
crown	A2 (sq ft)	12.04	6.02	0.96	0.09	4.97	
back SW	A3 (sq ft)	-4.36	-2.18	-0.48	-0.03	-1.68	
RW	A4 (sq ft)	129.60	64.80	34.2	0.45	30.15	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **TC > Crown > GUTTER**					Components	
		(Full Street)	(Half Street)	1	2	3	4
crown	A1 (sq ft)	22.44	11.22	11.223			
curb	A2 (sq ft)	-11.40	-5.70	-5.70			
back SW	A3 (sq ft)	9.12	4.56	0.48	0.06	4.02	
RW	A4 (sq ft)	129.60	64.80	34.2	0.45	30.15	
	A5 (sq ft)	0.00	0.00				

Depth Sorter

Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Conveyance (cfs)
0	0	0	0	0	0
0.67	0.50	0.50	0.50	0.50	454.6
0.50	0.67	0.62	0.62	0.62	761.9
0.62	0.62	0.67	0.67	0.67	911.4
1.52	1.52	1.17	1.17	1.17	8043.5
1.17	1.17	1.52	1.52	1.52	8413.8
1.67	1.67	1.67	1.67	1.67	11453.7
2.67	2.67	2.67	2.67	2.67	39952.2
3.67	3.67	3.67	3.67	3.67	81137.5

Cactus Road D/S

ROW to ROW (ft)	184	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	68	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	5			SW Cross Slope, LT	0.015		
SW to ROW (ft)	53			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	52.5	57.5	58	58	92	126	126	126.5	131.5	184
y	0.69	-0.11	-0.18	-0.18	-0.68	0.00	-0.68	-0.18	-0.18	-0.11	0.69

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						Depth
TOP curb elev. (ft)	-0.18	curb-crown	-0.18	crown Conv	910.2	0.68
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50
TOP ROW elev. (ft)	0.69	SW-curb	0.07	SW Conv K	605.8	0.57
gutter elevation (ft)	-0.68	ROW-SW	0.80	ROW Conv K	6393.5	1.37
TOP SW elev. (ft)	-0.11	SW-crown	-0.11	.5 ft over full	8774.5	1.18
max flow depth (ft)	0.68	ROW-crown	0.69	1 ft over full	12118.3	1.68
n1 (pavement)	0.0160	crown-gutter	0.68	2 ft over full	39067.0	2.68
n2 (curb)	0.0160	ROW-gutter	1.37	3 ft over full	77408	3.68
n3 (SW)	0.0160	SW-gutter	0.57			
n4 (overland)	0.0250					

		HALF P	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
n_c crown (composit)	0.0174	P1 (pavement)	34.01	25.00	28.51	34.01	34.01	34.01	34.01	34.01
n_c curb (composit)	0.0160	P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
n_c SW (composit)	0.0158	P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
n_c ROW (composit)	0.0213	P4 (SW)	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00
n_c .5 ft over (comp)	0.0160	P5 (ROW)	7.33	0.00	0.00	53.01	0.69	53.14	54.14	54.14
n_c 1 ft over (comp)	0.0213	ΣP	47.34	25.50	34.51	93.01	40.70	93.14	94.14	94.14
n_c 2 ft over (comp)	0.0214									
n_c 3 ft over (comp)	0.0214									

HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
A2	2.08	0.00	2.08	2.08	2.08	2.08	2.08	2.08
A3	4.45	0.00	0.00	4.45	4.45	4.45	4.45	4.45
A4	0.00	0.00	0.00	48.07	31.79	48.07	48.07	48.07
A5					FALSE	28.52	120.52	212.52
ΣA	12.78	6.25	8.33	60.85	44.57	89.37	181.37	273.37

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.18	0.68	1	1	1	0	0
SW-crown	-0.11	0.61	6.25	2.08	4.45	31.79	FALSE
ROW-crown	0.69	-0.19					
			P1	P2	P3	P4	P5
			1	1	1	1	0
			34.01	0.50	0.50	5.00	0.00

		1	A1	A2	A3	A4	A5
curb-crown	-0.18	1.18	1	1	1	1	1
SW-crown	-0.11	1.11	6.25	2.08	4.45	48.07	28.52
ROW-crown	0.69	0.31					
1+curb-crown	0.82	0.18	P1	P2	P3	P4	P5
			1	1	1	1	1
			34.01	0.50	0.50	5.00	53.14

		2	A1	A2	A3	A4	A5
curb-crown	-0.18	2.18	1	1	1	1	1
SW-crown	-0.11	2.11	6.25	2.08	4.45	48.07	120.52
ROW-crown	0.69	1.31					
2+curb-crown	1.82	0.18	P1	P2	P3	P4	P5
			1	1	1	1	1
			34.01	0.50	0.50	5.00	54.14

		3	A1	A2	A3	A4	A5
curb-crown	-0.18	3.18	1	1	1	1	1
SW-crown	-0.11	3.11	6.25	2.08	4.45	48.07	212.52
ROW-crown	0.69	2.31					
3+curb-crown	2.82	0.18	P1	P2	P3	P4	P5
			1	1	1	1	1
			34.01	0.50	0.50	5.00	55.14

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.08	64.40	75.73
2	6.25	2.08	4.45	48.07
3	6.25	6.48	-4.73	52.80
4	11.56	-6.12	2.59	52.80
2	6.25	2.08	4.45	48.07

CASE
2

Top Area calculator - **Crown > ROW**

			(Full Street)	(Half Street)	Components 1	2	3	4
curb	A1	(sq ft)	12.50	6.25	6.25			
back SW	A2	(sq ft)	4.16	2.08	0.18	0.04	1.87	
RW	A3	(sq ft)	128.80	64.40	21.20	4.00	0.40	38.80
crown	A4	(sq ft)	151.46	75.73	36.57	3.45	0.345	35.36
	A5	(sq ft)	0.00	0.00				

Top Area calculator - **ROW > Crown > SW**

			(Full Street)	(Half Street)	Components 1	2	3	4
curb	A1	(sq ft)	12.50	6.25	6.25			
back SW	A2	(sq ft)	4.16	2.08	0.18	0.04	1.87	
crown	A3	(sq ft)	8.90	4.45	0.95	0.06	3.44	
RW	A4	(sq ft)	96.14	48.07	24.265	0.345	23.46	
	A5	(sq ft)	0.00	0.00				

Top Area calculator - **SW > Crown > TC**

			(Full Street)	(Half Street)	Components 1	2	3	4
curb	A1	(sq ft)	12.50	6.25	6.25			
crown	A2	(sq ft)	12.96	6.48	1.08	0.09	5.31	
back SW	A3	(sq ft)	-9.46	-4.73	-0.94	-0.06	-3.74	
RW	A4	(sq ft)	105.60	52.80	25.2	0.4	27.2	
	A5	(sq ft)	0.00	0.00				

Top Area calculator - **TC > Crown > GUTTER**

			(Full Street)	(Half Street)	Components 1	2	3	4
crown	A1	(sq ft)	23.12	11.56	11.56			
curb	A2	(sq ft)	-12.24	-6.12	-6.12			
back SW	A3	(sq ft)	5.18	2.59	0.18	0.04	2.38	
RW	A4	(sq ft)	105.60	52.80	25.2	0.4	27.2	
	A5	(sq ft)	0.00	0.00				

Depth Sorter

Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Conveyance (cfs)
0	0	0	0	0	0
0.68	0.50	0.50	0.50	0.50	454.6
0.50	0.68	0.57	0.57	0.57	605.8
0.57	0.57	0.68	0.68	0.68	910.2
1.37	1.37	1.18	1.18	1.18	8774.5
1.18	1.18	1.37	1.37	1.37	6393.5
1.68	1.68	1.68	1.68	1.68	12118.3
2.68	2.68	2.68	2.68	2.68	39067
3.68	3.68	3.68	3.68	3.68	77408

North 150th Lane U/S

ROW to ROW (ft)	91	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	53	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	6			SW Cross Slope, LT	0.015		
SW to ROW (ft)	13			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	12.5	18.5	19	19	45.5	72	72	72.5	78.5	91
y	0.26	0.06	-0.03	-0.03	-0.53	0.00	-0.53	-0.03	-0.03	0.06	0.26

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						Depth	
TOP curb elev. (ft)	-0.03	curb-crown	-0.03	crown Conv	506.6	0.53	
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50	
TOP ROW elev. (ft)	0.26	SW-curb	0.09	SW Conv K	693.9	0.59	
gutter elevation (ft)	-0.53	ROW-SW	0.20	ROW Conv K	1363.9	0.79	
TOP SW elev. (ft)	0.06	SW-crown	0.06	.5 ft over full	3178.5	1.03	
max flow depth (ft)	0.53	ROW-crown	0.26	1 ft over full	8525.2	1.53	
n1 (pavement)	0.0160	crown-gutter	0.53	2 ft over full	24329.2	2.53	
n2 (curb)	0.0160	ROW-gutter	0.79	3 ft over full	46444.8	3.53	
n3 (SW)	0.0160	SW-gutter	0.59				
n4 (overland)	0.0250						

n_c crown (composit)	0.0158	HALF P	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
n_c curb (composit)	0.0160	P1 (pavement)	25.00	25.00	26.51	26.51	25.00	25.00	25.00	25.00
n_c SW (composit)	0.0158	P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
n_c ROW (composit)	0.0186	P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50	0.50
n_c .5 ft over (comp)	0.0187	P4 (SW)	4.00	0.00	6.00	6.00	6.00	6.00	6.00	6.00
n_c 1 ft over (comp)	0.0188	P5 (ROW)	0.00	0.00	0.00	13.00	13.21	13.71	14.71	14.71
n_c 2 ft over (comp)	0.0190	ΣP	30.01	25.50	33.51	46.51	45.22	45.72	46.72	46.72
n_c 3 ft over (comp)	0.0190									

HALF A	crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
A2	0.82	0.00	0.82	0.82	0.82	0.82	0.82	0.82
A3	0.00	0.00	1.86	1.86	1.86	1.86	1.86	1.86
A4	0.00	0.00	0.00	7.90	7.90	7.90	7.90	7.90
A5					10.92	33.67	79.17	124.67
ΣA	7.07	6.25	8.93	16.83	27.75	50.50	96.00	141.50

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.03	0.53	1	1	1	1	1
SW-crown	0.06	0.44	6.25	0.82	1.86	7.90	10.92
ROW-crown	0.26	0.24					
			P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	6.00	13.21

		1	A1	A2	A3	A4	A5
curb-crown	-0.03	1.03	1	1	1	1	1
SW-crown	0.06	0.94	6.25	0.82	1.86	7.90	33.67
ROW-crown	0.26	0.74					
1+curb-crown	0.97	0.03	P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	6.00	13.71

		2	A1	A2	A3	A4	A5
curb-crown	-0.03	2.03	1	1	1	1	1
SW-crown	0.06	1.94	6.25	0.82	1.86	7.90	79.17
ROW-crown	0.26	1.74					
2+curb-crown	1.97	0.03	P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	6.00	14.71

		3	A1	A2	A3	A4	A5
curb-crown	-0.03	3.03	1	1	1	1	1
SW-crown	0.06	2.94	6.25	0.82	1.86	7.90	124.67
ROW-crown	0.26	2.74					
3+curb-crown	2.97	0.03	P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	6.00	15.71

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.77	9.50	13.65
2	6.25	2.77	2.19	10.79
3	6.25	0.82	1.86	7.90
4	7.02	-0.80	2.70	7.90
3	6.25	0.82	1.86	7.90

CASE

3

Top	Area calculator - **Crown > ROW**	(Full Street)	(Half Street)	1	2	3	4
				Components			
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
RW	A3 (sq ft)	19.00	9.50	1.30	1.20	0.10	6.90
crown	A4 (sq ft)	27.30	13.65	3.38	1.56	0.13	8.58
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **ROW > Crown > SW**	(Full Street)	(Half Street)	1	2	3	4
				Components			
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	5.54	2.77	0.27	0.05	2.45	
crown	A3 (sq ft)	4.38	2.19	0.48	0.03	1.68	
RW	A4 (sq ft)	21.58	10.79	3.77	0.13	6.89	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **SW > Crown > TC**	(Full Street)	(Half Street)	1	2	3	4
				Components			
curb	A1 (sq ft)	12.50	6.25	6.25			
crown	A2 (sq ft)	1.64	0.82	0.03	0.02	0.77	
back SW	A3 (sq ft)	3.72	1.86	0.24	0.03	1.59	
RW	A4 (sq ft)	15.80	7.90	2.5	0.1	5.3	
	A5 (sq ft)	0.00	0.00				

Top	Area calculator - **TC > Crown > GUTTER**	(Full Street)	(Half Street)	1	2	3	4
				Components			
crown	A1 (sq ft)	14.04	7.02	7.0225			
curb	A2 (sq ft)	-1.60	-0.80	-0.80			
back SW	A3 (sq ft)	5.40	2.70	0.27	0.05	2.39	
RW	A4 (sq ft)	15.80	7.90	2.5	0.1	5.3	
	A5 (sq ft)	0.00	0.00				

North 150th Lane D/S

ROW to ROW (ft)	78	Curb Height	0.5	Street Cross Slope, LT	0.02	SW to ROW slope, LT	0.015
Curb to Curb (face) (ft)	51	Top of Curb Width	0.5	Street Cross Slope, RT	0.02	SW to ROW slope, RT	0.015
Width of SW (ft)	5			SW Cross Slope, LT	0.015		
SW to ROW (ft)	8.5			SW Cross Slope, RT	0.015		

	ROW, LT	Back SW, LT	Top Curb, Back, LT	Top Curb, Face, LT	Gutter, LT	Crown	Gutter, RT	Top Curb, Face RT	Top Curb, Back, RT	Back SW, RT	ROW, RT
x	0	8	13	13.5	13.5	39	64.5	64.5	65	70	78
y	0.20	0.07	-0.01	-0.01	-0.51	0.00	-0.51	-0.01	-0.01	0.07	0.20

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TOP curb elev. (ft)	-0.01	curb-crown	-0.01	crown Conv	438.2	Depth 0.51	
TOP crown elev. (ft)	0.00	curb-gutter	0.50	curb Conv K	454.6	0.50	
TOP ROW elev. (ft)	0.20	SW-curb	0.08	SW Conv K	670.2	0.58	
gutter elevation (ft)	-0.51	ROW-SW	0.13	ROW Conv K	1030.7	0.71	
TOP SW elev. (ft)	0.07	SW-crown	0.07	.5 ft over full	2981.6	1.01	
max flow depth (ft)	0.51	ROW-crown	0.20	1 ft over full	7733.3	1.51	
n1 (pavement)	0.0160	crown-gutter	0.51	2 ft over full	21575.5	2.51	
n2 (curb)	0.0160	ROW-gutter	0.71	3 ft over full	40916.8	3.51	
n3 (SW)	0.0160	SW-gutter	0.58				
n4 (overland)	0.0250						

		crown elevation	curb elevation	SW elevation	ROW elevation	.5 ft over crown elevation	1 ft over crown elevation	2 ft over elevation	3 ft over elevation
n_c crown (composit)	0.0158	HALF P							
n_c curb (composit)	0.0160	P1 (pavement)	25.00	25.00	25.51	25.51	25.00	25.00	25.00
n_c SW (composit)	0.0158	P2 (face curb)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
n_c ROW (composit)	0.0180	P3 (top curb)	0.50	0.00	0.50	0.50	0.50	0.50	0.50
n_c .5 ft over (comp)	0.0180	P4 (SW)	4.33	0.00	5.00	5.00	5.00	5.00	5.00
n_c 1 ft over (comp)	0.0181	P5 (ROW)	0.00	0.00	0.00	8.50	8.79	9.29	10.29
n_c 2 ft over (comp)	0.0183	ΣP	30.34	25.50	31.51	40.01	39.80	40.30	41.30
n_c 3 ft over (comp)	0.0183								
		HALF A							
		A1	6.25	6.25	6.25	6.25	6.25	6.25	6.25
		A2	0.26	0.00	0.26	0.26	0.26	0.26	0.26
		A3	0.00	0.00	2.02	2.02	2.02	2.02	2.02
		A4	0.00	0.00	0.00	4.58	4.58	4.58	4.58
		A5					11.70	31.20	70.20	109.20
		ΣA	6.51	6.25	8.53	13.11	24.81	44.31	83.31	122.31

		0.5	A1	A2	A3	A4	A5
curb-crown	-0.01	0.51	1	1	1	1	1
SW-crown	0.07	0.43	6.25	0.26	2.02	4.58	11.70
ROW-crown	0.20	0.30					
			P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	5.00	8.79

		1	A1	A2	A3	A4	A5
curb-crown	-0.01	1.01	1	1	1	1	1
SW-crown	0.07	0.93	6.25	0.26	2.02	4.58	31.20
ROW-crown	0.20	0.80					
1+curb-crown	0.99	0.01	P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	5.00	9.29

		2	A1	A2	A3	A4	A5
curb-crown	-0.01	2.01	1	1	1	1	1
SW-crown	0.07	1.93	6.25	0.26	2.02	4.58	70.20
ROW-crown	0.20	1.80					
2+curb-crown	1.99	0.01	P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	5.00	10.29

		3	A1	A2	A3	A4	A5
curb-crown	-0.01	3.01	1	1	1	1	1
SW-crown	0.07	2.93	6.25	0.26	2.02	4.58	109.20
ROW-crown	0.20	2.80					
3+curb-crown	2.99	0.01	P1	P2	P3	P4	P5
			1	1	1	1	1
			25.00	0.50	0.50	5.00	11.29

CASE	A1 (sq ft)	A2 (sq ft)	A3 (sq ft)	A4
1	6.25	2.40	5.46	8.90
2	6.25	2.40	2.46	7.52
3	6.25	0.26	2.02	4.58
4	6.50	-0.26	2.28	4.58
3	6.25	0.26	2.02	4.58

CASE
3

Top — Area calculator - **Crown > ROW**

		(Full Street)	(Half Street)	1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	4.80	2.40	0.20	0.04	2.16	
RW	A3 (sq ft)	10.92	5.46	0.55	0.65	0.07	4.19
crown	A4 (sq ft)	17.80	8.90	1.7	1	0.1	6.10
	A5 (sq ft)	0.00	0.00				

Top — Area calculator - **ROW > Crown > SW**

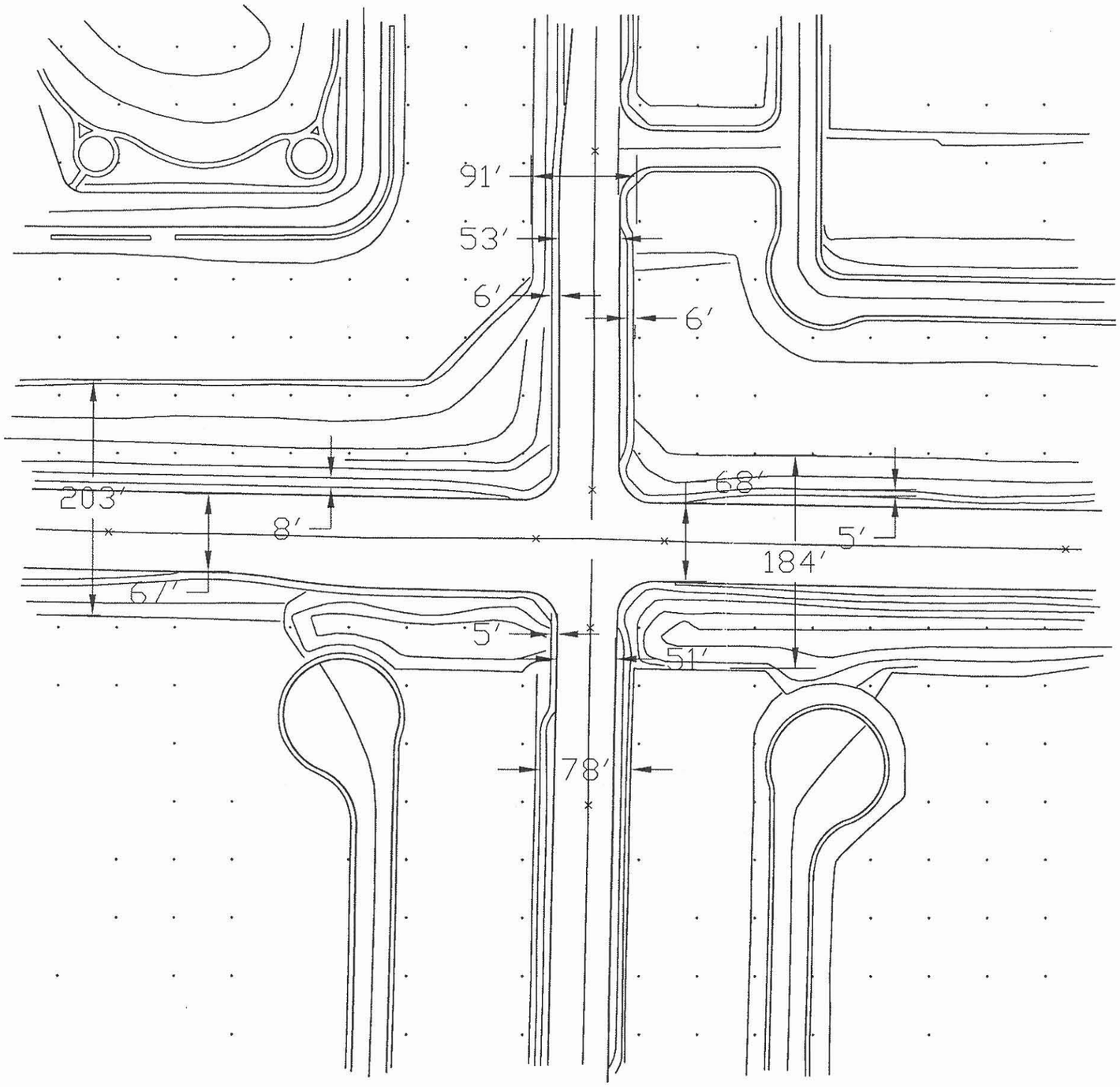
		(Full Street)	(Half Street)	1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
back SW	A2 (sq ft)	4.80	2.40	0.20	0.04	2.16	
crown	A3 (sq ft)	4.92	2.46	0.51	0.04	1.91	
RW	A4 (sq ft)	15.04	7.52	2.3167	0.1	5.1	
	A5 (sq ft)	0.00	0.00				

Top — Area calculator - **SW > Crown > TC**

		(Full Street)	(Half Street)	1	2	3	4
curb	A1 (sq ft)	12.50	6.25	6.25			
crown	A2 (sq ft)	0.52	0.26	0.00	0.01	0.25	
back SW	A3 (sq ft)	4.04	2.02	0.20	0.04	1.79	
RW	A4 (sq ft)	9.16	4.58	1.2025	0.065	3.315	
	A5 (sq ft)	0.00	0.00				

Top — Area calculator - **TC > Crown > GUTTER**

		(Full Street)	(Half Street)	1	2	3	4
crown	A1 (sq ft)	13.00	6.50	6.5025			
curb	A2 (sq ft)	-0.52	-0.26	-0.26			
back SW	A3 (sq ft)	4.56	2.28	0.20	0.04	2.04	
RW	A4 (sq ft)	9.16	4.58	1.2025	0.065	3.315	
	A5 (sq ft)	0.00	0.00				



CACTUS ROAD AT HALF MILE BETWEEN BULLARD AVENUE AND REEMS ROAD (N. 150th Ln)

N

100' 0' 100' 200'
SCALE: 1"= 100 FEET

LEGEND

ONE COMPANY | *Many Solutions*™

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 WHITE TANKS AREA DRAINAGE
MASTER PLAN AREA UPDATE HYDROLOGIC ANALYSIS
CONTRACT NUMBER: FCD 2007C031

EXISTING CONDITIONS HYDROLOGY
SPLIT FLOW ANALYSIS

HDR ENGINEERING, INC.
3200 East Camelback Road, Suite 350
PHOENIX, ARIZONA 85018-2311
(602) 522-7700

	BY	DATE
DESIGN	J. MOYER	09/19/08
DESIGN CHK.	L. POTTER	09/19/08
PLANS	J. MOYER	09/19/08
PLANS CHK.	L. POTTER	09/19/08

D33

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	
		Date	3/10/09
		Sheet	1
		Of	x

Location: Cactus at Bullard (DD33)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	58	57	406	57.5	56.2	0	0.00	56.7	0	0.00	57.2	0	0.00	CHECK	57.7	0.2	108.94	DONE
south	57	56	406	56.5	56.2	0	0.00	56.7	0.2	108.94	57.2	0.7	713.34		57.7	1.2	1601.10	
south	56	55.7	118	55.85	56.2	0.35	73.30	56.7	0.85	277.42	57.2	1.35	555.27		57.7	1.85	890.76	
southeast	55.7	55.7	30	55.7	56.2	0.5	31.82	56.7	1	90.00	57.2	1.5	165.34		57.7	2	254.56	
east	55.7	56	50	55.85	56.2	0.35	31.06	56.7	0.85	117.55	57.2	1.35	235.28		57.7	1.85	377.44	
east	56	57	360	56.5	56.2	0	0.00	56.7	0.2	96.60	57.2	0.7	632.51		57.7	1.2	1419.70	
east	57	58	360	57.5	56.2	0	0.00	56.7	0	0.00	57.2	0	0.00		57.7	0.2	96.60	
east	58	58	1	58	56.2	0	0.00	56.7	0	0.00	57.2	0	0.00		57.7	0	0.00	
east	58	58	1	58	56.2	0	0.00	56.7	0	0.00	57.2	0	0.00		57.7	0	0.00	
						TOTALS:	136.18			690.50			2301.75				4749.10	

Graph Computations:

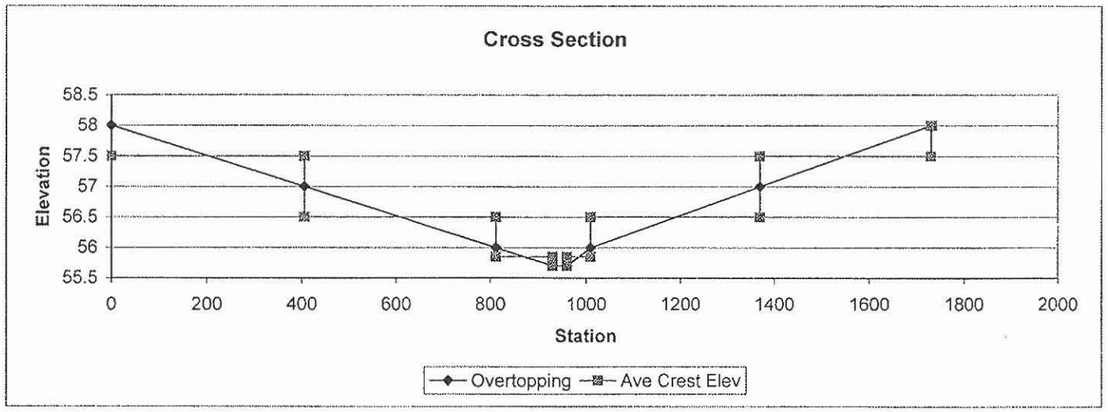
Station	Elevation
0	58
406	57
812	56
930	55.7
960	55.7
1010	56
1370	57
1730	58
1731	58
1732	58

Weir Approximation:

Station	Elevation
0	57.5
406	57.5
406	56.5
812	56.5
812	55.85
930	55.85
930	55.7
960	55.7
960	55.85
1010	55.85
1010	56.5
1370	56.5
1370	57.5
1730	57.5
1730	58
1731	58
1731	58
1732	58

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	73.30	54%	Q(south)	386.36	56%	Q(south)	1268.61	55%	Q(south)	2600.80	55%
Q(southeast)	31.82	23%	Q(southeast)	90.00	13%	Q(southeast)	165.34	7%	Q(southeast)	254.56	5%
Q(east)	31.06	23%	Q(east)	214.15	31%	Q(east)	867.80	38%	Q(east)	1893.74	40%
	136.18			690.50			2301.75			4749.10	

First DI	East to South			
Inflow	136.18	690.50	2301.75	4749.10
Outflow	73.30	386.36	1268.61	2600.80

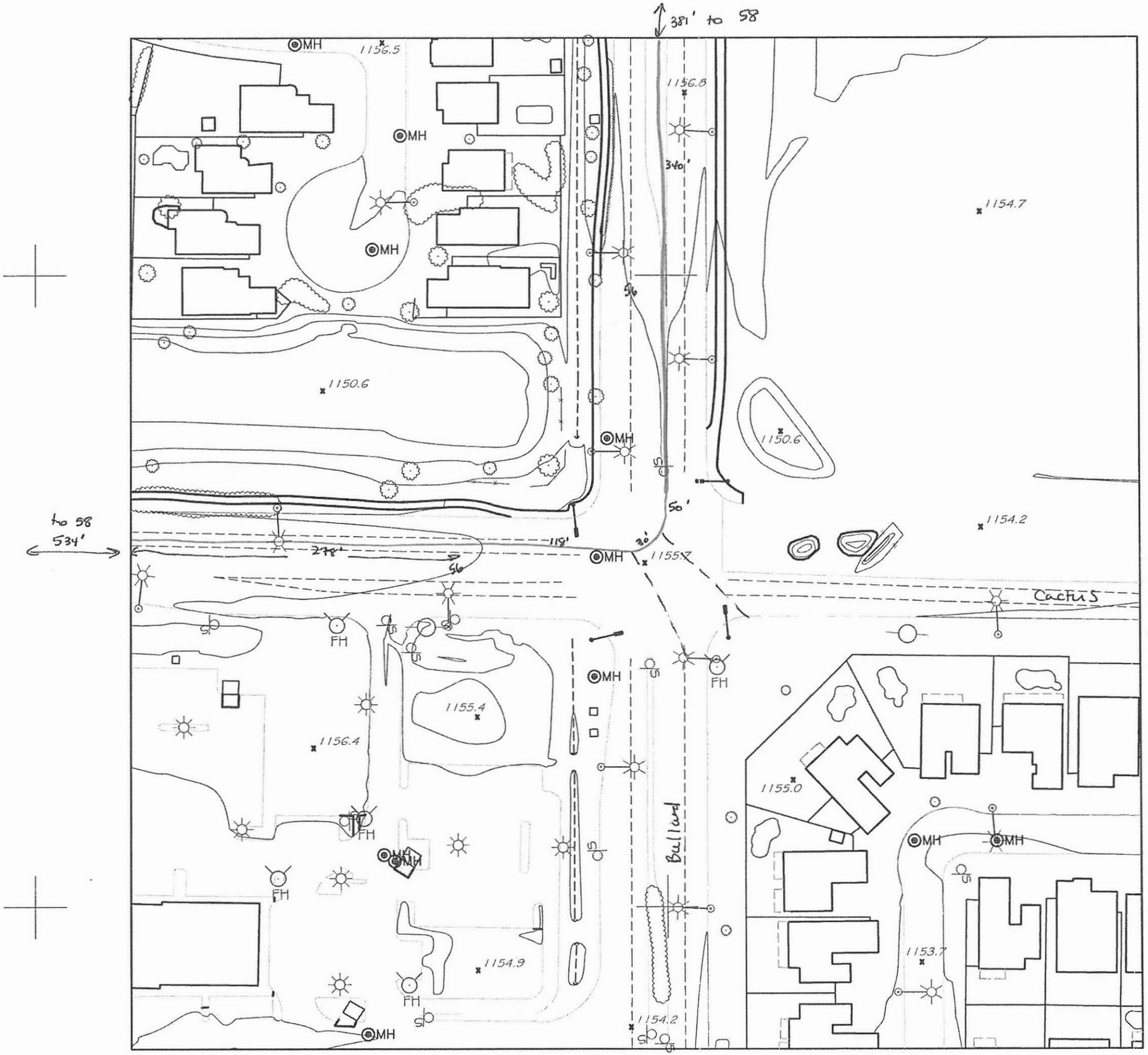
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	62.88	304.15	1033.14	2148.29
Outflow	31.82	90.00	165.34	254.56

Assumes diversion is to southeast

Cactus @ Bullard

DD33



N

1" = 80'

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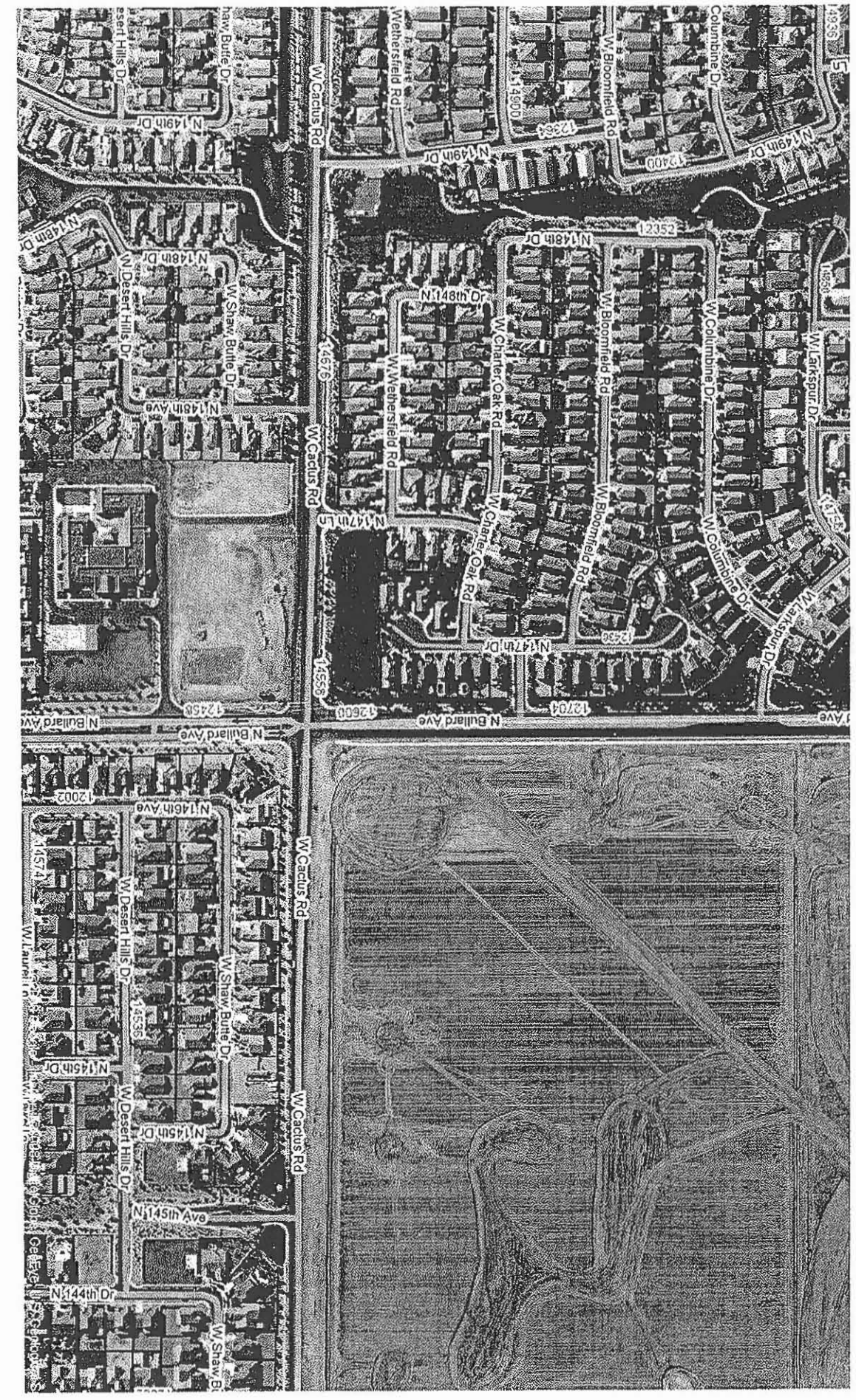
W Cactus Rd
N 148th Dr
W Bloomfield Rd
W Columbine Dr
W Larkspur Dr
W Charter Oak Rd
W Wethersfield Rd
N 147th Dr
N 148th Ave
W Desert Hills Dr
W Shaw Butte Dr
N Bullard Ave
N 146th Ave
N 145th Ave
N 144th Dr
N 145th Dr
W Desert Hills Dr
W Shaw Butte Dr
W Cactus Rd
N Bullard Ave
12353
12400
12354
12250
12704
12600
12450
12002
14676
14559
14536
14574

D34

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D35

Computation

Job No.	79902	No.	
Project	Loop 303 / White Tanks ADMPU AHA	Computed	AM
Date	10/27/08		
Subject	Weir Flow Analysis	Checked	
Date	3/12/09		
Task	Weir Calculations	Sheet	1
Of	x		

Location: Litchfield, 1/2 mi south of Waddell (DD35)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	53	52.5	274	52.75	51	0	0.00	51.5	0	0.00	52	0	0.00	CHECK	52.5	0	0.00	DONE
south	52.5	52	274	52.25	51	0	0.00	51.5	0	0.00	52	0	0.00		52.5	0.25	102.75	
south	52	51	150	51.5	51	0	0.00	51.5	0	0.00	52	0.5	159.10		52.5	1	450.00	
south	51	50.5	50	50.75	51	0.25	18.75	51.5	0.75	97.43	52	1.25	209.63		52.5	1.75	347.25	
east	50.5	51	250	50.75	51	0.25	93.75	51.5	0.75	487.14	52	1.25	1048.16		52.5	1.75	1736.27	
east	51	52	500	51.5	51	0	0.00	51.5	0	0.00	52	0.5	530.33		52.5	1	1500.00	
east	52	53	500	52.5	51	0	0.00	51.5	0	0.00	52	0	0.00		52.5	0	0.00	
east	53	53	1	53	51	0	0.00	51.5	0	0.00	52	0	0.00		52.5	0	0.00	
east	53	53	1	53	51	0	0.00	51.5	0	0.00	52	0	0.00		52.5	0	0.00	
						TOTALS:	112.50			584.57			1947.22				4136.28	

Graph Computations:

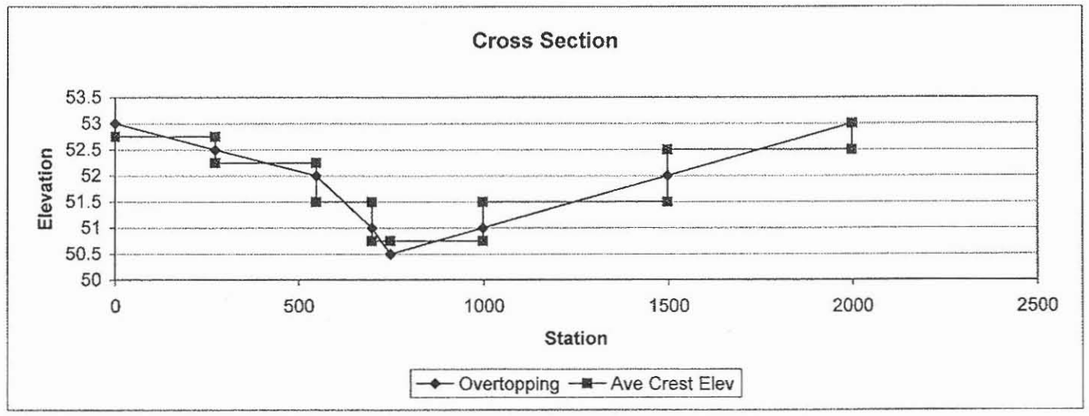
Station	Elevation
0	53
274	52.5
548	52
698	51
748	50.5
998	51
1498	52
1998	53
1999	53
2000	53

Weir Approximation:

Station	Elevation
0	52.75
274	52.75
274	52.25
548	52.25
548	51.5
698	51.5
698	50.75
748	50.75
748	50.75
998	50.75
998	51.5
1498	51.5
1498	52.5
1998	52.5
1998	53
1999	53
1999	53
2000	53

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	18.75	17%	Q(south)	97.43	17%	Q(south)	368.73	19%	Q(south)	900.00	22%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	93.75	83%	Q(east)	487.14	83%	Q(east)	1578.49	81%	Q(east)	3236.27	78%
	112.50			584.57			1947.22			4136.28	

First DI	East to South			
Inflow	112.50	584.57	1947.22	4136.28
Outflow	18.75	97.43	368.73	900.00

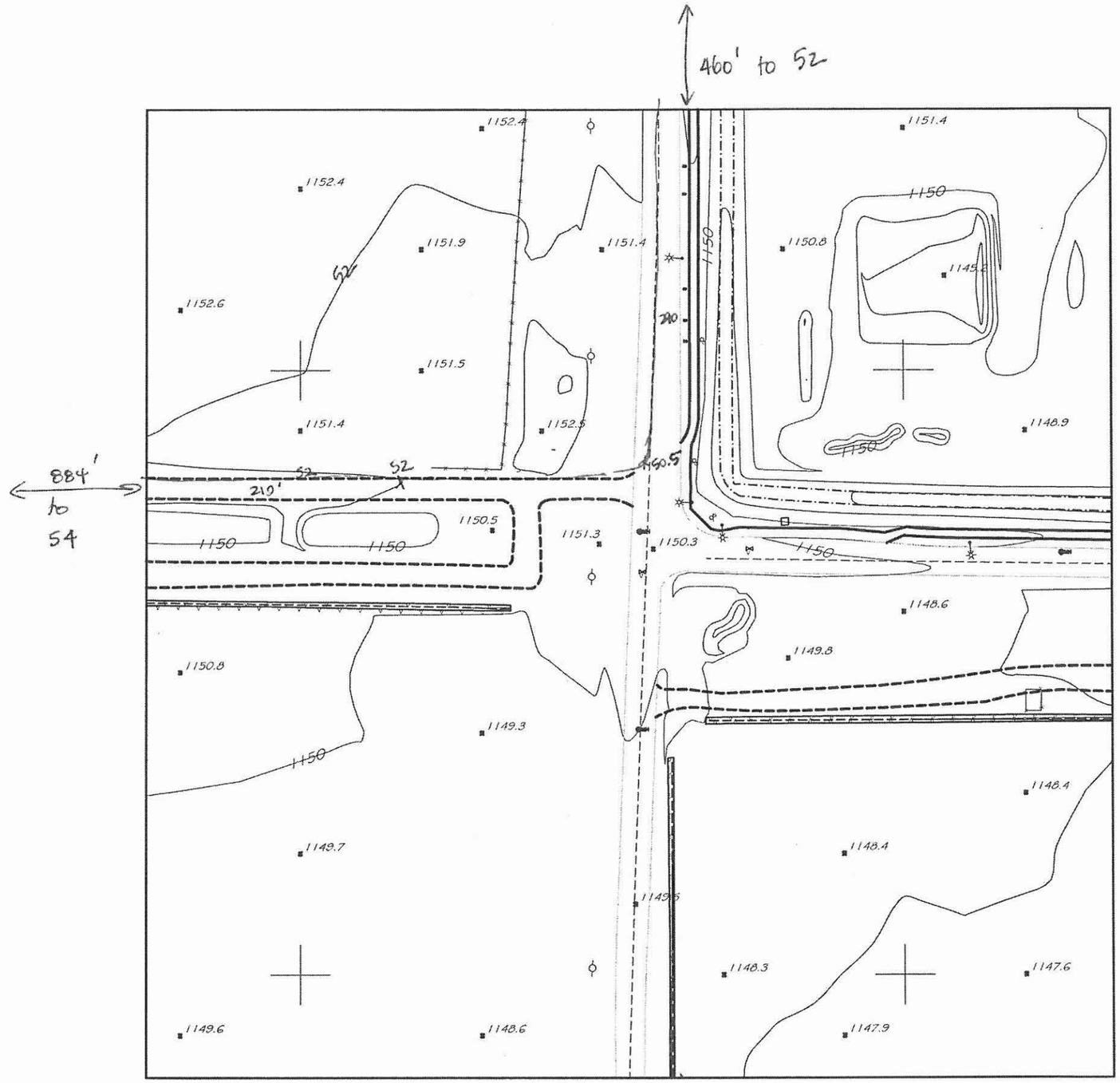
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	93.75	487.14	1578.49	3236.27
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast

DD35

Litchfield Rd, 1/2 mi between Waddell & Cactus



1" = 100'

N

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N Litchfield Rd
N Litchfield Rd
W Dahlia Dr
N 141st Dr
N 140th Dr
N 140th Ave
14000
W Aster Dr
N 140th Ln
12700
W Windrose Dr
N 140th Dr
N Corrine Dr

D36

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Computed	AHM	Date	10/28/2008
Subject	Weir Flow Analysis	Checked	tl	Date	3/10/09
Task	Weir Calculations	Sheet	1	Of	x

Location: Cactus & Litchfield (D36)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	1142.3	1141.6	230	1141.95	1140.5	0	0.00	1141	0	0.00	1141.5	0	0.00	CHECK	1142	0.05	7.71	DONE
south	1141.6	1141.1	200	1141.35	1140.5	0	0.00	1141	0	0.00	1141.5	0.15	34.86		1142	0.65	314.43	
south	1141.1	1140.7	460	1140.9	1140.5	0	0.00	1141	0.1	43.64	1141.5	0.6	641.37		1142	1.1	1592.09	
south	1140.7	1140.7	43	1140.7	1140.5	0	0.00	1141	0.3	21.20	1141.5	0.8	92.30		1142	1.3	191.21	
southeast	1140.7	1140.9	20	1140.8	1140.5	0	0.00	1141	0.2	5.37	1141.5	0.7	35.14		1142	1.2	78.87	
east	1140.9	1141.5	70	1141.2	1140.5	0	0.00	1141	0	0.00	1141.5	0.3	34.51		1142	0.8	150.26	
east	1141.5	1141.5	320	1141.5	1140.5	0	0.00	1141	0	0.00	1141.5	0	0.00		1142	0.5	339.41	
east	1141.5	1142	310	1141.75	1140.5	0	0.00	1141	0	0.00	1141.5	0	0.00		1142	0.25	116.25	
east	1142	1143.1	290	1142.55	1140.5	0	0.00	1141	0	0.00	1141.5	0	0.00		1142	0	0.00	
						TOTALS:	0.00			70.20			838.17				2790.24	

Graph Computations:

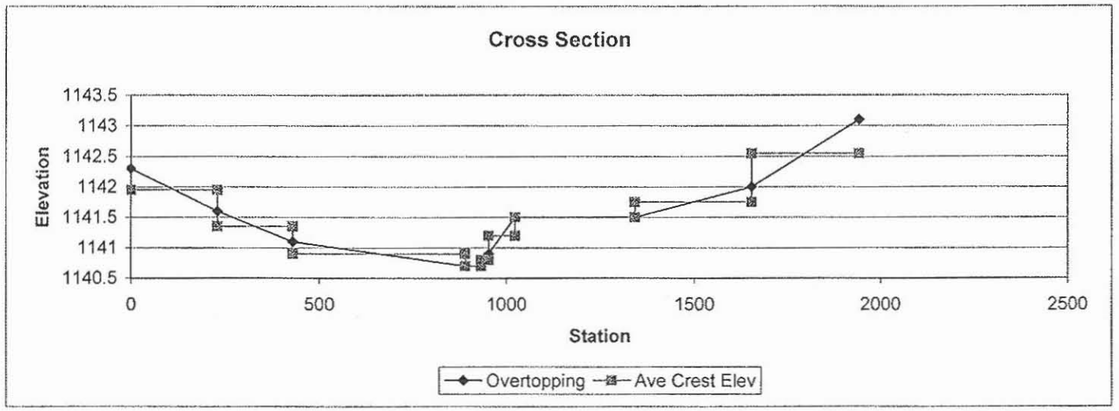
Station	Elevation
0	1142.3
230	1141.6
430	1141.1
890	1140.7
933	1140.7
953	1140.9
1023	1141.5
1343	1141.5
1653	1142
1943	1143.1

Weir Approximation:

Station	Elevation
0	1141.95
230	1141.95
230	1141.35
430	1141.35
430	1140.9
890	1140.9
890	1140.7
933	1140.7
933	1140.8
953	1140.8
953	1141.2
1023	1141.2
1023	1141.5
1343	1141.5
1343	1141.75
1653	1141.75
1653	1142.55
1943	1142.55

Culvert Flows (cfs):

south	0
southeast	0
east	0



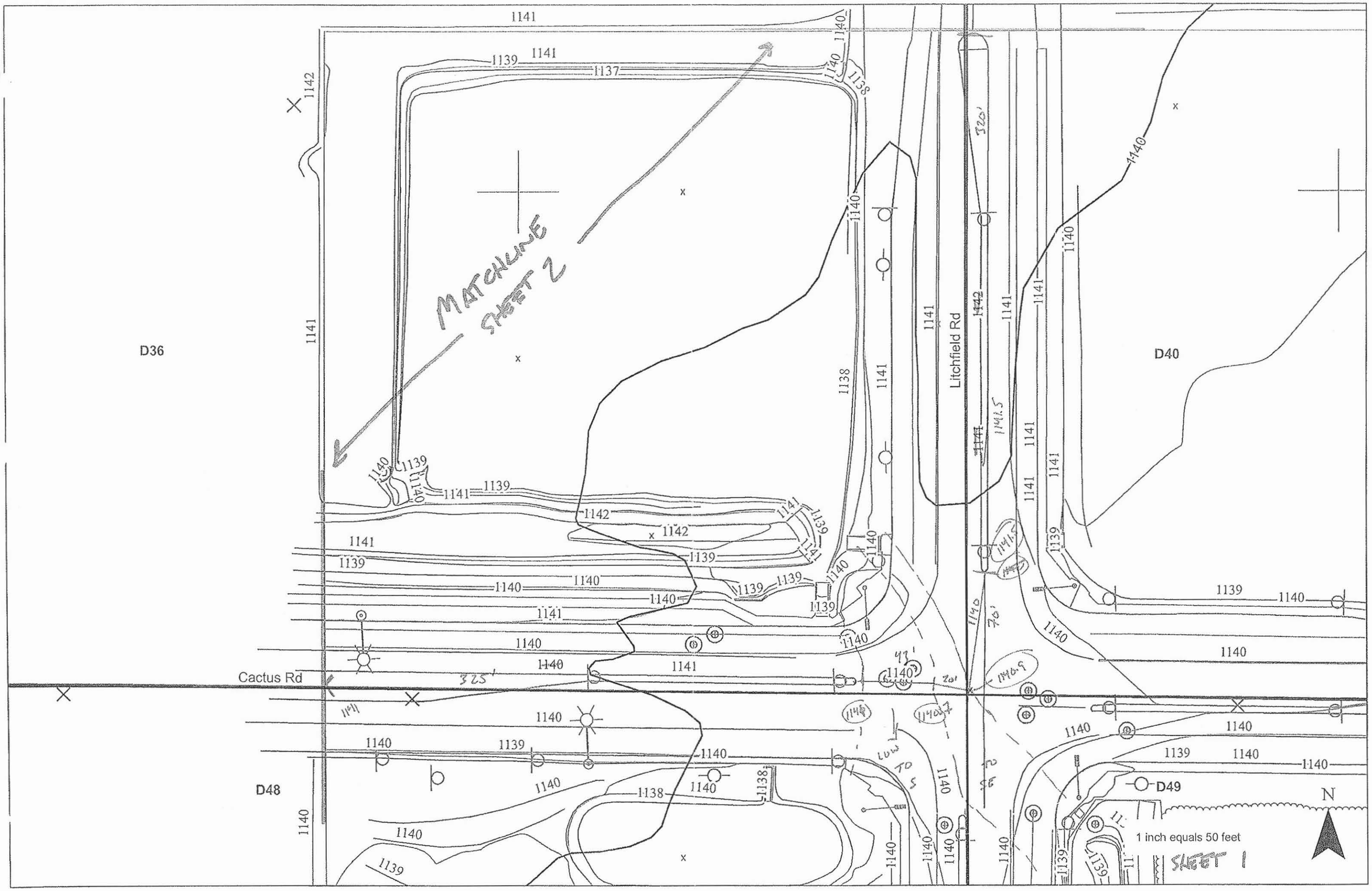
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	0.00	0%	Q(south)	64.84	92%	Q(south)	768.53	92%	Q(south)	2105.44	75%
Q(southeast)	0.00	0%	Q(southeast)	5.37	8%	Q(southeast)	35.14	4%	Q(southeast)	78.87	3%
Q(east)	0.00	0%	Q(east)	0.00	0%	Q(east)	34.51	4%	Q(east)	605.93	22%
	0.00			70.20			838.17			2790.24	

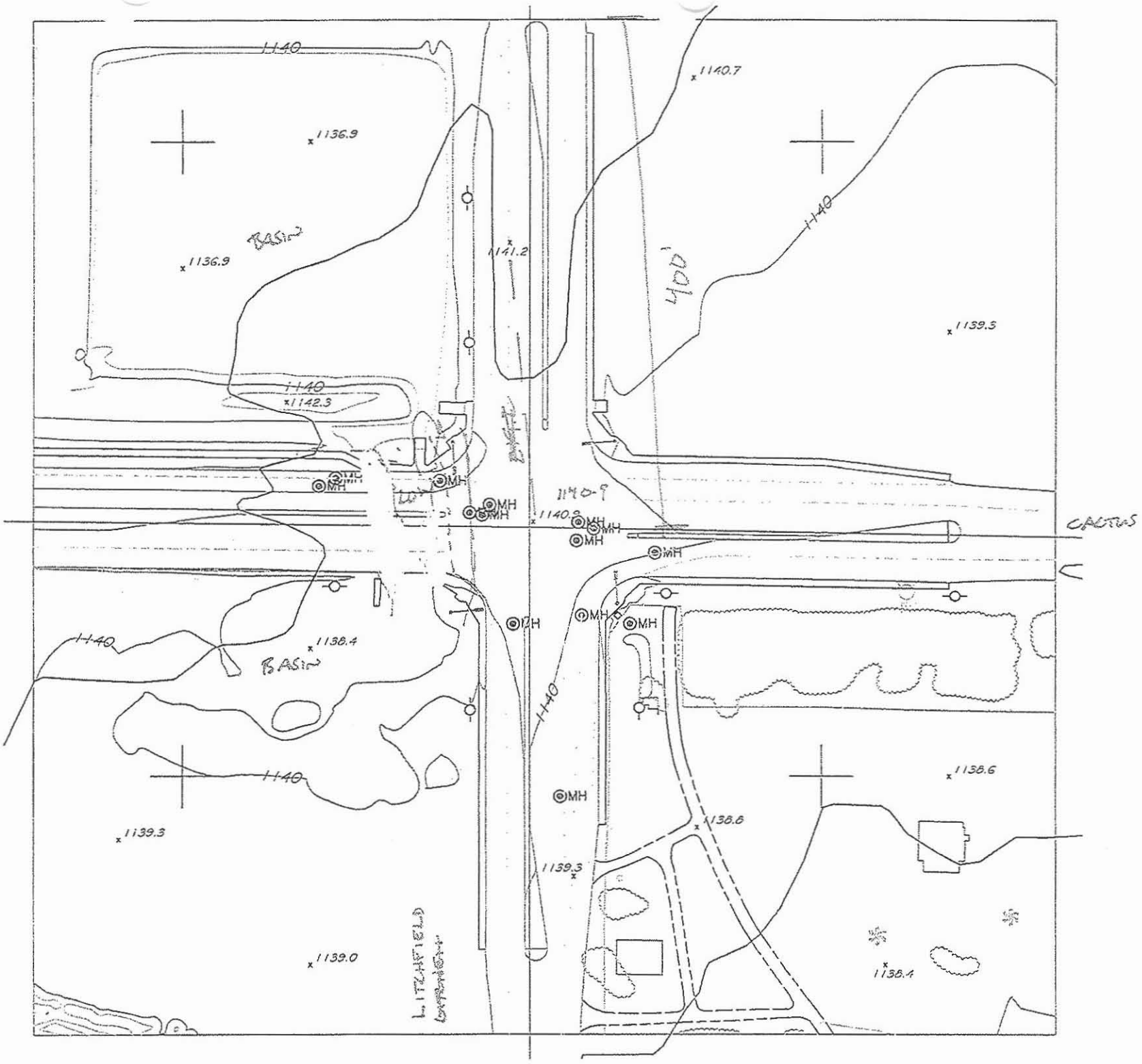
First DI	East to South			
Inflow	0.00	70.20	838.17	2790.24
Outflow	0.00	64.84	768.53	2105.44

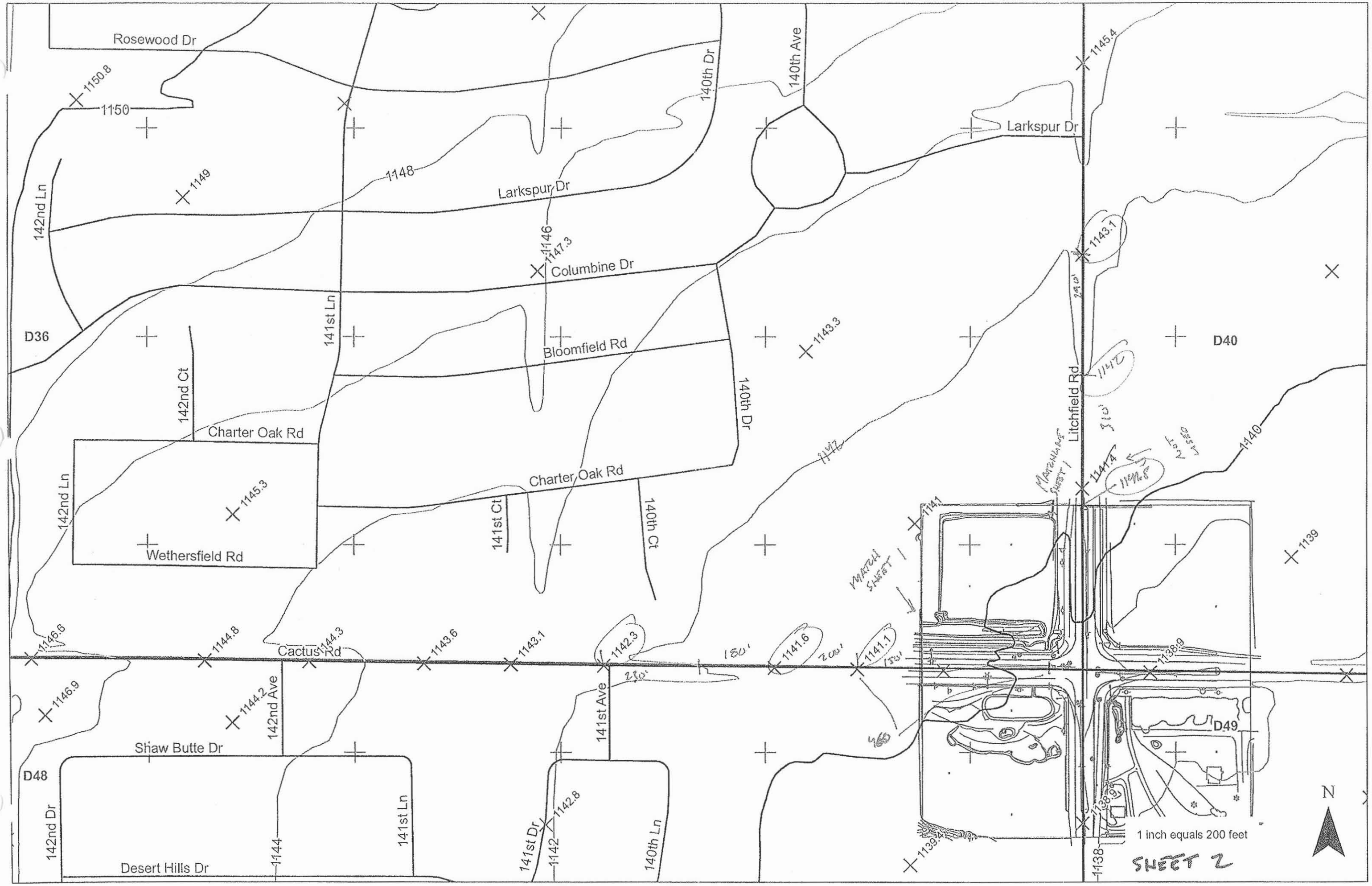
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	0.00	5.37	69.65	684.80
Outflow	0.00	5.37	35.14	78.87

Assumes diversion is to southeast


MATCHLINE SHEET 2
D36
D40
D48
D49
Litchfield Rd
Cactus Rd
1 inch equals 50 feet
N
SHEET 1


1140
1140.7
1136.9
BASIN
1136.9
1141.2
400'
1140
1139.3
1140
1142.3
MH
MH
MH
1140.9
1140.8
MH
MH
MH
CACTUS
MH
MH
MH
1140
1138.4
BASIN
1140
1140
1138.6
MH
1138.6
1139.3
1139.3
1139.0
LITCHFIELD
1138.4


Rosewood Dr
1150.8
1150
1149
1148
142nd Ln
Larkspur Dr
140th Dr
140th Ave
1145.4
Larkspur Dr
1146
1147.3
Columbine Dr
1143.1
D36
141st Ln
Bloomfield Rd
1143.3
D40
142nd Ct
Charter Oak Rd
140th Dr
Litchfield Rd
1140
Charter Oak Rd
1145.3
142nd Ln
Wethersfield Rd
141st Ct
140th Ct
1141.4
1141
1139
1146.6
1144.8
Cactus Rd
1144.3
1143.6
1143.1
1142.3
1141.6
1141.1
1138.9
1146.9
1144.2
142nd Ave
141st Ave
D49
Shaw Butte Dr
D48
142nd Dr
1144
141st Ln
141st Dr
1142.8
1142
140th Ln
1139.4
1138
1 inch equals 200 feet
N
SHEET 2

D56

INFRASTRUCTURE DRAINAGE REPORT
FOR
VERAMONTE

PREPARED FOR

INCA DEVELOPMENT C/O PROTITLEMENT
8501 N. SCOTTSDALE ROAD, SUITE 260
SCOTTSDALE, AZ 85253

PREPARED BY

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CERTIFICATE NO.
37342
PATRICK M.
MORACA
Date Signed 01/19/04
ARIZONA, U.S.A.

JANUARY 2004
1st Submittal: OCTOBER 2003
DEA PROJECT NO. CRAL0015

1.0 INTRODUCTION

This final drainage report has been prepared under a contract from INCA Development c/o Protitlements, Developer of Veramonte project. The purpose of this report is to provide the hydrologic and hydraulic analyses, required by the City of Surprise, to support the Infrastructure Improvements Plan submittal for the Veramonte project. Preparation of this report has been done in accordance with the procedures detailed in the City of Surprise's *Comprehensive Development Guide* (Reference #1).

The Veramonte project site is located in the City of Surprise, Arizona. The project site is approximately the southeast quarter of Section 16, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian. The site is bound by Litchfield Road on the east, Cactus Road on the south, 143rd Avenue Alignment on the west, and Sweetwater Avenue Alignment on the north. Figure 1, located in Appendix A, illustrates the location of the project in relationship to the Town of Surprise street system.

The Veramonte project consists of 159.55 ± acre development containing 6 single-family development parcels, two mixed-employment/commercial parcels, and one Neighborhood Park. The infrastructure improvements are 25.81 ± acres including the landscape and drainage tracts. The two mixed-employment/commercial parcels are 18.41 ± acres and 9.78 ± acres and will not be developed as part of this project. The Neighborhood Park is 8.30 ± acres and will be rough graded with the infrastructure. On-site improvements include full roadway sections with asphalt pavement, roll and vertical curbing, gutter and sidewalks, retention basins, and graded building pads. Off-site improvements include half-street sections adjacent to the property along Cactus Road and a portion of Litchfield Road along the property line.

Exhibit A, located in the back pocket, illustrates the drainage concept and proposed improvements for the project.

2.0 EXISTING DRAINAGE CONDITIONS

The proposed site is located west of the Agua Fria River on an undeveloped parcel that has historically been used for agricultural production. The general lay of the land is sloping in the southeasterly direction at an average slope of 0.4%. Currently the upstream watershed is transitioning from agricultural production to residential and commercial development. The adjacent phased master planned residential community, Marley Park, is a portion of Section 16 along with three-quarters of Section 17. Rancho Gabriela Phase I is an existing residential development, which completes the remaining quarter of Section 17.

flow to 105 cfs at this point. Pertinent excerpts from the Updated White Tanks ADMP and the Marley Park Drainage Report are included in Appendices H and I respectively.

The current FEMA Flood Insurance Rate Map (FIRM) for the Veramonte project site, map number 04013C1605 H (Revised July 19, 2001) shows that the project is located in flood hazard Zone X. Zone X is defined as, *"Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood."* A copy of the current FIRM panel is in Appendix B.

3.0 PROPOSED DRAINAGE CONCEPT

The proposed drainage concept is presented in three parts: on-site drainage, off-site drainage, and retention requirements. The hydrologic analysis is summarized in section 4.0 and the hydraulic analysis is summarized in section 5.0. See Exhibit A, located in the back pocket, for a graphical illustration of the proposed drainage concept.

3.1 On-site Drainage Conveyance

On-site storm water runoff is conveyed through the site by the paved roadway sections with normal crowns and either 4-inch roll or 6-inch vertical curb. Figure 2, located in Appendix A, illustrates the proposed roadway cross-sections. Lots will be graded to drain into the roadway on which they front. The roadways will convey on-site runoff towards the retention facilities. Catch basins and scuppers will be used to direct the flows from the streets into the retention basins.

The roadway sections have been designed to convey the 10-year peak flows between the curbs and 50-year peak flows within the cross section between buildings (front yards and streets). The lowest finish floor elevation of each lot is designed to be free from inundation from the 100-year storm event.

3.2 Off-site Drainage Conveyance

The City of Surprise general drainage management for developments within the White Tanks ADMP allows for the design of drainage structures for the future condition peak flows (when future condition flow is less than the existing condition flow) with the finish floor elevations designed for the higher of the flows. When future flows are greater than the existing flows the required drainage infrastructure design is for the higher future flow.

Two channels are proposed to convey off-site flow. Based on the Updated White Tanks ADMP, a drainage way will be constructed along the west side of Litchfield Road to convey the

future flow condition of 181 cfs. This drainage way will be constructed along the limits of Litchfield Road improvements for this project. Adjacent pad finish floor elevations for the future Mixed-Employment/Commercial properties should be based on the higher flow at the time of development.

A drainage way will also be constructed on the north side of Cactus Road from 143rd Avenue to Litchfield Road. This drainage way will be sized to convey the future flow condition of 90 cfs from the ADMP. Adjacent pad finish floor elevations will be set with a minimum freeboard of one foot from the water surface elevation from the future flow condition of 90 cfs and above the existing flow condition of 190 cfs. The runoff that concentrates at the northwest corner of Litchfield and Cactus Roads will be conveyed south and east. 4 - 24" storm drain pipes will be constructed under the portion of Cactus Road that will be improved as part of the Infrastructure Paving Plans. These pipes will be plugged until the south side of Cactus Road is improved by others. An additional drainage structure will need to be constructed under Litchfield Road by the party responsible for Litchfield Road improvements.

3.3 Retention Requirements

City of Surprise requires that the runoff generated by the 100-year, 2-hour storm event be retained on-site. The required retention volume for the project site is estimated as follows:

$$V_R = (D/12)\ A\ C_w$$

Where:

V_R = Estimated volume in cubic feet
D = 2.8 inches
C_W = Weighted runoff coefficient (Fig. 3, Appendix A)
A = Drainage area in acres

The required volume will be retained within several retention facilities. The typical basin will have 4:1 side slopes and a maximum water depth of 3-ft. The calculations for the retention volumes are located in Appendix D. A summary of the required retention volume calculations is provided in Table 3.1.

Summary of Retention Requirements
Table 3.1

Retention Basin Designation	Volume Required (ac-ft)	Volume Provided (ac-ft)	Balance (ac-ft)	Overflow to (Basin)
4	1.89	1.00	-0.89	5
5	0.56 (+0.89)	1.53	0.07	-
7	0.25	0.31	0.06	-
8	0.82	0.83	0.01	-
9	2.19	2.63	0.44	-

Summary of Retention Requirements
Table 3.1

Retention Basin Designation	Volume Required (ac-ft)	Volume Provided (ac-ft)	Balance (ac-ft)	Overflow to (Basin)
10	1.21	1.24	0.03	-
12	1.63	1.87	0.24	-
13	0.27	1.31	1.04	-
14	2.29	3.04	0.75	-
TEMP 1	1.62	1.76	0.14	-
17N	0.06	0.06	0	-
17S	0.06	0.06	0	-
TEMP 2	0.25	0.30	0.05	-
TEMP 3	0.79	0.94	0.15	

As required by the City of Surprise, water retained on-site will be dissipated within 36 hours. Drywells will be provided for any basin with a ponding depth of 1 foot or more that do not dissipate in 36 hours. Percolation tests will be conducted after construction activities have been completed. The number of drywells needed for each basin has been determined using a dissipation rate of 0.5 cfs based on the City of Surprise Guidelines. A summary of the required drywells is provided in Table 3.2.

Summary of Drywell Requirements
Table 3.2

Retention Basin Designation	Volume Retained (ac-ft)	Drywells Required	Drain Time (hours)
4	1.89	2	22.9
5	1.46	1	35.3
7	0.25	1	6.1
8	0.82	1	19.8
9	2.19	2	26.5
10	1.21	1	29.3
12	1.63	2	19.7
13	0.27	1	6.5
14	2.29	2	27.7

CRAL0015
VERAMONTE
DRYWELL CALCULATIONS

Required Drain Time 36 hours

Maximum Dissipation Rate 0.50 cfs

0.50 cfs x 36 hours = 64800 cfs

Drywells required = (v - a x (p / 2) x 36) * 43560 / 64800

Where : a is the average area in acres
d is the depth of retention in feet
p is the percolation rate in cfh/sf
v is the basin volume in acre-feet

Retention Basin	Basin Volume (ac-ft)	Top Area (ac)	Bottom Area (ac)	Depth (ft)	Percolation Rate (cfh/sf)	Drywells Required	Drain Time (hr)
4	1.89	0.42	0.26	3.00	0.000	2	22.9
5	1.46	0.60	0.43	3.00	0.000	1	35.3
7	0.25	0.14	0.07	3.00	0.000	1	6.1
8	0.82	0.35	0.20	3.00	0.000	1	19.8
9	2.19	1.25	0.67	2.75	0.000	2	26.5
10	1.21	0.51	0.32	3.00	0.000	1	29.3
12	1.63	0.77	0.48	3.00	0.000	2	19.7
13	0.27	0.57	0.30	3.00	0.000	1	6.5
14	2.29	1.19	0.85	3.00	0.000	2	27.7
TEMP 1*	1.62	1.81	1.71	1.00	0.000	N/A	N/A
17N*	0.06	0.07	0.04	1.00	0.000	N/A	N/A
17S*	0.06	0.07	0.04	1.00	0.000	N/A	N/A
TEMP 2*	0.25	0.33	0.27	1.00	0.000	N/A	N/A
Total						13	

*Temporary basins and basins with a depth of 1' or less do not require drywells.

D37

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Computed	AM	Date	10/27/08
Subject	Weir Flow Analysis	Checked		Date	3/10/09
Task	Weir Calculations	Sheet	1	Of	x

Location: Railroad Tracks btwn Cactus and Waddell (DD37)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	51.2	51.2	500	51.2	50.5	0	0.00	51	0	0.00	51.5	0.3	246.48	DONE	52	0.8	1073.31	DONE
south	51.2	50.6	20	50.9	50.5	0	0.00	51	0.1	1.90	51.5	0.6	27.89		52	1.1	69.22	
south	50.6	51	10	50.8	50.5	0	0.00	51	0.2	2.68	51.5	0.7	17.57		52	1.2	39.44	
south	51	52	20	51.5	50.5	0	0.00	51	0	0.00	51.5	0	0.00		52	0.5	21.21	
east	52	52	80	52	50.5	0	0.00	51	0	0.00	51.5	0	0.00		52	0	0.00	
east	52	51	180	51.5	50.5	0	0.00	51	0	0.00	51.5	0	0.00		52	0.5	190.92	
east	51	50	185	50.5	50.5	0	0.00	51	0.5	196.22	51.5	1	555.00		52	1.5	1019.60	
east	50	49.3	250	49.65	50.5	0.85	587.75	51	1.35	1176.42	51.5	1.85	1887.20		52	2.35	2701.86	
east	49.3	50	370	49.65	50.5	0.85	869.86	51	1.35	1741.10	51.5	1.85	2793.06		52	2.35	3998.75	
						TOTALS:	1457.61			3118.32			5527.20				9114.32	

Graph Computations:

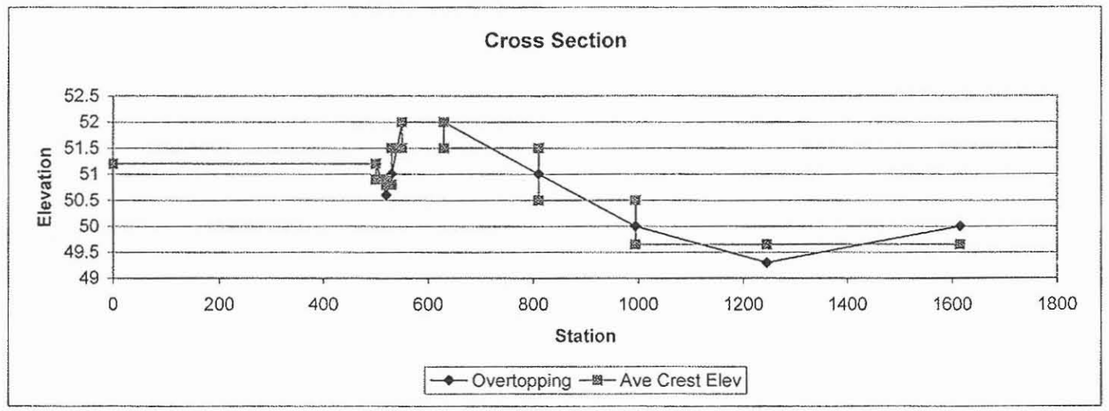
Station	Elevation
0	51.2
500	51.2
520	50.6
530	51
550	52
630	52
810	51
995	50
1245	49.3
1615	50

Weir Approximation:

Station	Elevation
0	51.2
500	51.2
500	50.9
520	50.9
520	50.8
530	50.8
530	51.5
550	51.5
550	52
630	52
630	51.5
810	51.5
810	50.5
995	50.5
995	49.65
1245	49.65
1245	49.65
1615	49.65

Culvert Flows (cfs):

south	0
southeast	0
east	0



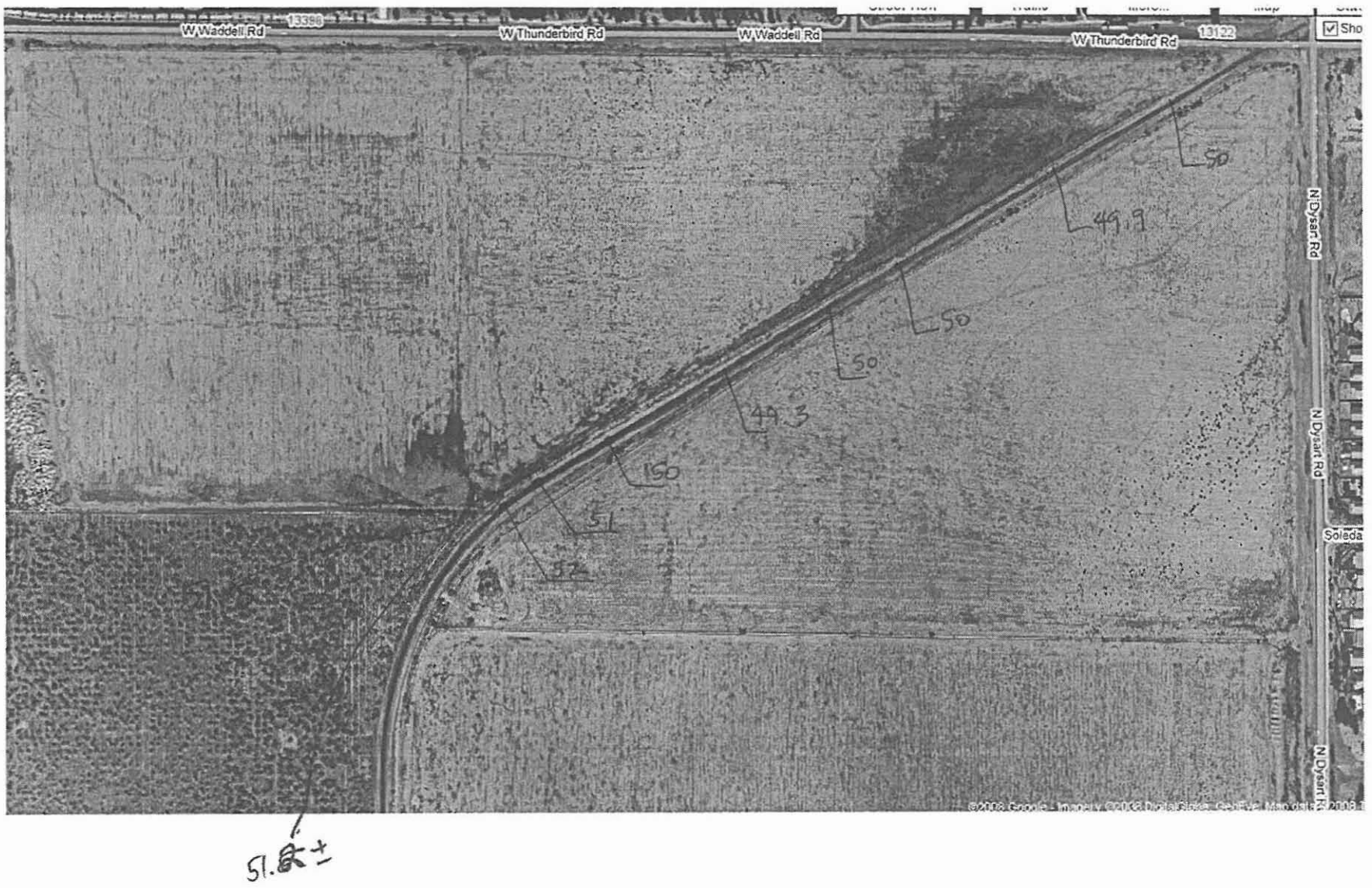
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	0.00	0%	Q(south)	4.58	0%	Q(south)	291.93	5%	Q(south)	1203.18	13%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	1457.61	100%	Q(east)	3113.74	100%	Q(east)	5235.27	95%	Q(east)	7911.14	87%
	1457.61			3118.32			5527.20			9114.32	

First DI	East to South			
Inflow	1457.61	3118.32	5527.20	9114.32
Outflow	0.00	4.58	291.93	1203.18

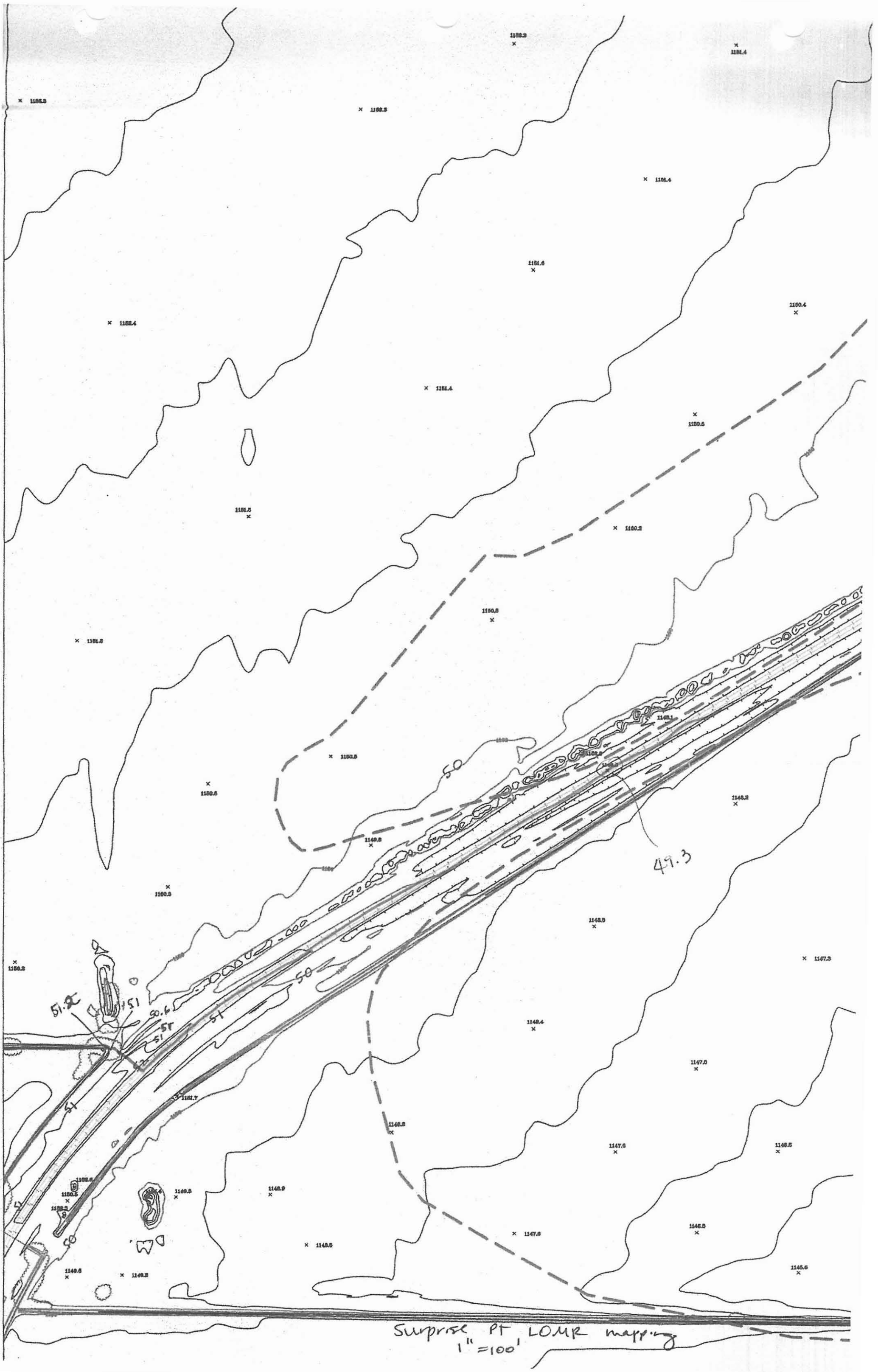
Assumes diversion is to south

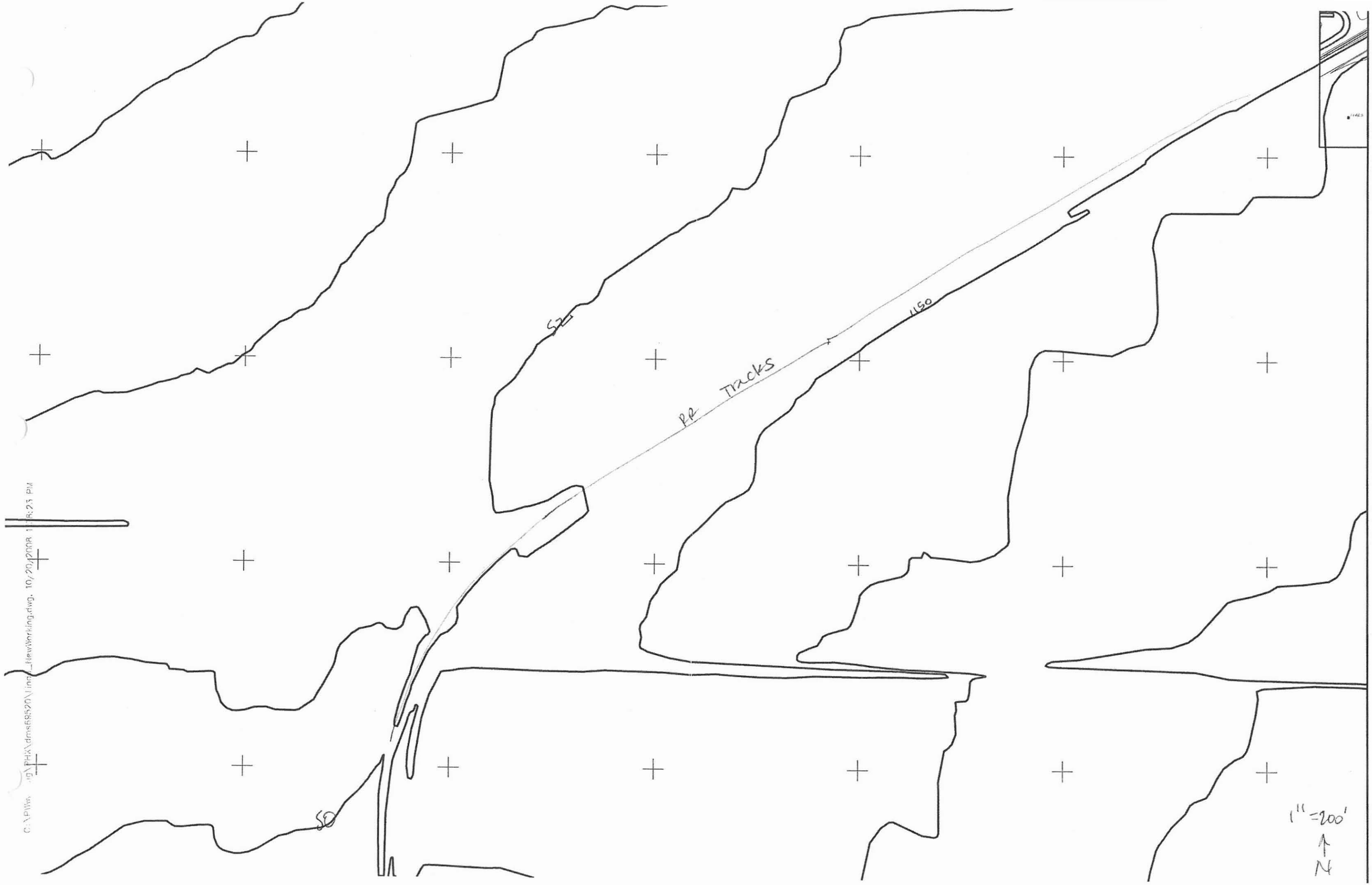
Second DI	East to Southeast			
Inflow	1457.61	3113.74	5235.27	7911.14
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast


W Waddell Rd
13390
W Thunderbird Rd
W Waddell Rd
W Thunderbird Rd
13122
N Dysart Rd
N Dysart Rd
Soleda
N Dysart Rd
50
49.9
50
50
49.3
150
51
52
51.5±

DD37

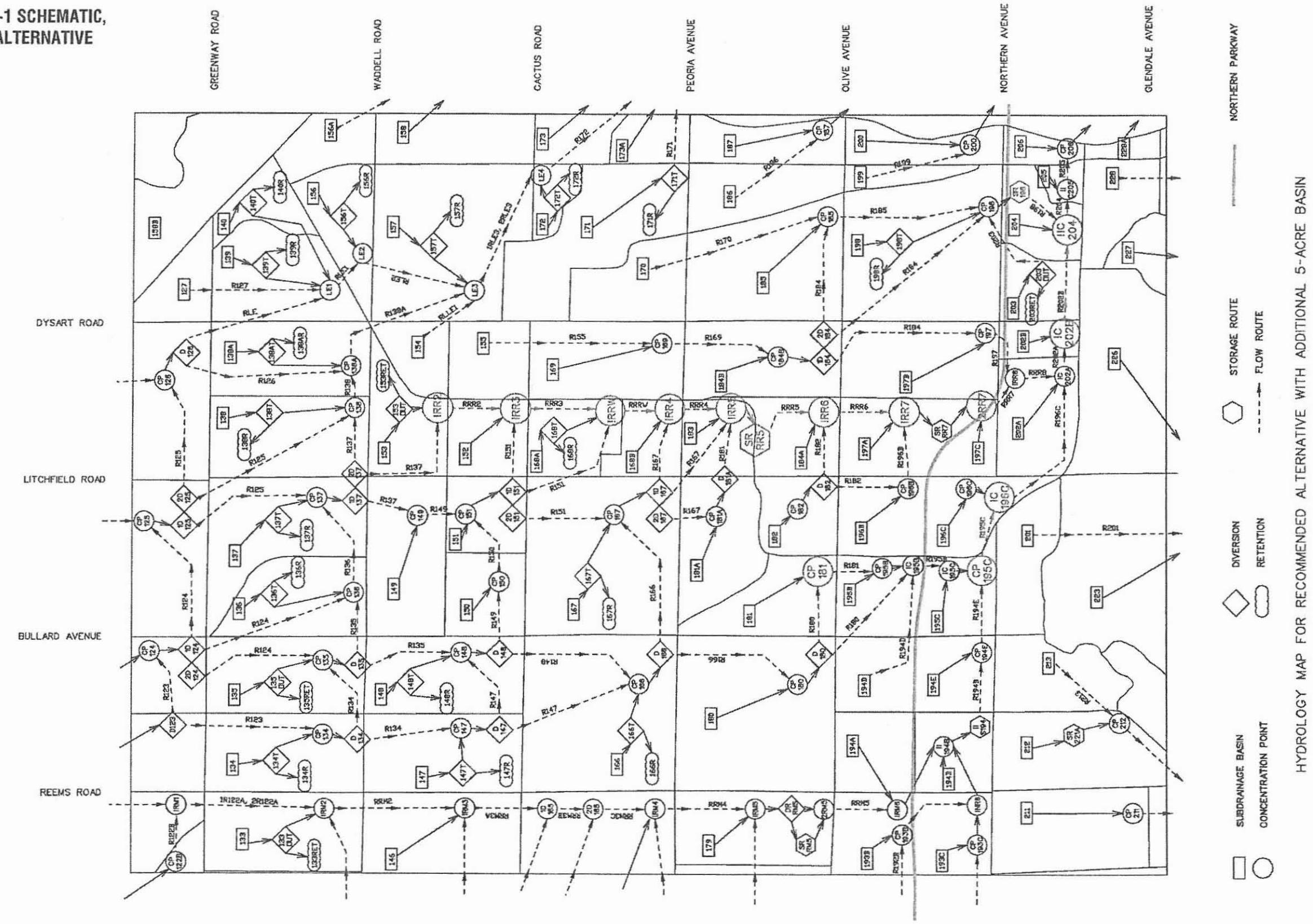

50
49.3
51.2
51
50.6
51
51
51
50
51
50
Surprise Pt LOMR mapping
1" =100'



C:\PWw...ng\PHX\dms68520\Linq_FlewWorking.dwg, 10/20/2008 11:18:23 PM

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN

D38

D38

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            JUN   1998             *
*          VERSION 4.1              *
*                                   *
*     RUN DATE   06FEB09  TIME  14:20:20  *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                   HEC-1 INPUT                                   PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
    2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
    3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
    4           ID   MODIFICATIONS:
    5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
    6           ID   (2) SURPRISE WWTP WAS UPDATED
    7           ID   (3) NORTHERN PARKWAY WAS UPDATED
    8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
    9           ID
   10           ID  ***********************************************************************
   11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
   12           ID      NOTES:
   13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
   14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
   15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   16           ID      AND R238.
                        * ***********************************************************************
                        * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                        * ***********************************************************************
   17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   18           ID
   19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   23           ID
   24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   28           ID
   29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   30           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   31           ID
   32           ID                                   REVISED BY URS     DATE: 01-14-04
   33           ID                                                      FILE: L33PE4H.DAT
   34           ID
   35           ID        NOTES:
   36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   41           ID           THE WLB MODEL.
   42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   45           ID           DRAINAGE REPORTS.
   46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   47           ID           GRAND,  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   51           ID           STORM.
   52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
                                              HEC-1 INPUT                                PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   54           ID           THE DATA FILE BY THE FCDMC.
   55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   57           ID
```

```
                 * KM DIVERT TO REVERSE FLOW SOUTH ACROSS RXR
                 * DT 2D153
                 * DI     0   10000
                 * DQ     0   10000
                 * INSERT DESIGN ROUTE FOR EL MIRAGE CHANNEL
                                          HEC-1 INPUT                                                    PAGE 40

LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1555             KK    R138
1556             KM        ROUTE REMAINDER FROM CP138 TO CP138A
1557             RS       1          -1         0
1558             RC    0.03    0.03    0.03    2460  0.0020
1559             RX    1000    1036    1037    1038    1039    1040    1041    1077
1560             RY    1100    1094    1094    1094    1094    1094    1094    1100
                 *

1561             KK    138A
1562             KM   BASIN 138A
1563             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1564             KM    L=       1.3  Lca=       .6   S=   24.0  Kn= .030  LAG=  21.4
1565             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1566             BA     .46
1567             LG     .25     .25    4.90     .32   35.00
1568             UI     75.    299.    448.    701.    781.    527.    357.    169.    100.     51.
1569             UI     22.     22.      0.      0.      0.      0.      0.      0.      0.      0.
1570             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1571             KK   138AT
1572             KM        DIVERSION-RETENTION 138A
1573             DT   138AR   40.30
1574             DI       0   10000
1575             DQ       0   10000
                 * EL MIRAGE CHANNEL AT CP138A

1576             KK  1I138A
                 * KK   EM3
1577             KM        ADD HYDROGRAPHS AT CP138 (138 + 138A)
1578             HC       2    6.05

1579             KK  2I138A
1580             KM        ADD HYDROGRAPHS AT CP138 (138 + 126)
1581             HC       2   24.81
                 *
                 * ***********************************************************************
                 * ***THE FOLLOWING SECTION TAKEN FROM NEW SUPER BASIN 2D WITH NEW SOILS*****
                 * ***********************************************************************
                 *

1582             KK   2D137
1583             KM        RETURN DIVERT AT CP137
1584             DR   DI153

1585             KK    R137
1586             KM  ROUTE FLOW THROUGH THE RIPRAP CHANNEL IN SURPRISE POINTE
1587             KM  CHANNEL GEOMETRY FROM SURPRISE POINTE LOMR
1588             RS       6    FLOW       -1                                    D23D33
1589             RC    .035    .035    .035    4800   .0044
1590             RX     894     906     912     918     926     930     934     942
1591             RY    1157    1155    1154    1153    1153    1154    1155    1157
                 * KK   R137
                 * KM       ROUTE FLOW FROM CP137 TO CP153
                 * RS    51            -1         0
                 * RC  .075    .075    .075    5600   .0018
                 * RX   900    1000    1200    1450    1800    2000    2300    2450
                 * RY1156.5    1156    1155  1154.7  1154.7    1155    1156  1156.5
                 *
                 * KK   153
                 * KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 153
                 * BA   .20
                 * LG   .50     .00    5.76    0.32     .00
1                                         HEC-1 INPUT                                                    PAGE 41

LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1592             KK     153
1593             KM   PER SURPRISE POINTE, AREA OF BASIN 153 INCREASED FROM 0.20 SQ MI
1594             KM   TO 0.31 SQ MI, AND BASIN 152 REDUCED FROM 0.35 SQ MI TO 0.25 SQ MI.
1595             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1596             KM    L=       .7  Lca=       .4   S=   20.0  Kn= .030  LAG=  14.9
1597             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1598             KM   LG RECORD REVISED PER SURPRISE POINTE LOMR TO REFLECT THE
1599             KM   DEVELOPMENT
1600             BA     .31
1601             LG     .15     .00    5.76    0.32      55
1602             UI    124.    382.    706.    611.    349.    134.     54.     21.      0.      0.
1603             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1604             KK  153OUT
1605             KM        RETENTION VOLUME PER DEI LOMR HEC-1 FOR SURPRISE POINTE
1606             DT  153RET    25.9
1607             DI       0   10000
1608             DQ       0   10000

1609             KK    DRR1
1610             KM        RETURN DIVERT AT CP151
1611             DR   2D153
                 * DESIGN ROUTE
                 * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE
```

Computation

Job No.	79902	No.	
Project	Loop 303 / White Tanks ADMPU AHA	Computed	AM
Date	10/27/08		
Subject	Weir Flow Analysis	Checked	LP
Date	3/10/09		
Task	Weir Calculations	Sheet	1
Of	x		

Location: Railroad Tracks btwn Cactus and Waddell (DD38)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	99	98	512	98.5	97.8	0	0.00	98.3	0	0.00	98.8	0.3	252.39	CHECK	99.3	0.8	1099.07	DONE
south	98	97.3	900	97.65	97.8	0.15	156.86	98.3	0.65	1414.93	98.8	1.15	3329.74		99.3	1.65	5722.55	
southeast	97.3	97.5	20	97.4	97.8	0.4	15.18	98.3	0.9	51.23	98.8	1.4	99.39		99.3	1.9	157.14	
east	97.5	97.5	6	97.5	97.8	0.3	2.96	98.3	0.8	12.88	98.8	1.3	26.68		99.3	1.8	43.47	
east	97.5	98	105	97.75	97.8	0.05	3.52	98.3	0.55	128.49	98.8	1.05	338.92		99.3	1.55	607.87	
east	98	99	168	98.5	97.8	0	0.00	98.3	0	0.00	98.8	0.3	82.82		99.3	0.8	360.63	
east	99	100	167	99.5	97.8	0	0.00	98.3	0	0.00	98.8	0	0.00		99.3	0	0.00	
east	100	100	1	100	97.8	0	0.00	98.3	0	0.00	98.8	0	0.00		99.3	0	0.00	
east	100	100	1	100	97.8	0	0.00	98.3	0	0.00	98.8	0	0.00		99.3	0	0.00	
						TOTALS:	178.51			1607.52			4129.94				7990.73	

Graph Computations:

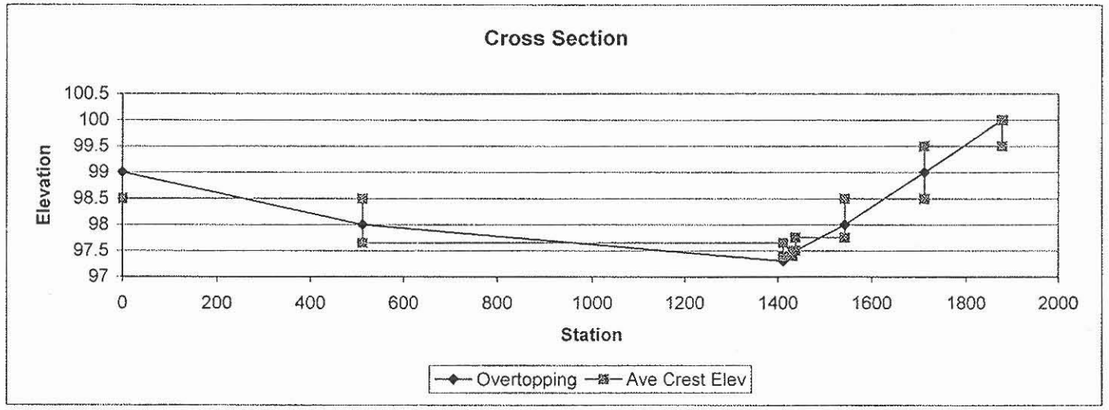
Station	Elevation
0	99
512	98
1412	97.3
1432	97.5
1438	97.5
1543	98
1711	99
1878	100
1879	100
1880	100

Weir Approximation:

Station	Elevation
0	98.5
512	98.5
512	97.65
1412	97.65
1412	97.4
1432	97.4
1432	97.5
1438	97.5
1438	97.75
1543	97.75
1543	98.5
1711	98.5
1711	99.5
1878	99.5
1878	100
1879	100
1879	100
1880	100

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	156.86	88%	Q(south)	1414.93	88%	Q(south)	3582.13	87%	Q(south)	6821.62	85%
Q(southeast)	15.18	9%	Q(southeast)	51.23	3%	Q(southeast)	99.39	2%	Q(southeast)	157.14	2%
Q(east)	6.48	4%	Q(east)	141.37	9%	Q(east)	448.41	11%	Q(east)	1011.97	13%
	178.51			1607.52			4129.94			7990.73	

First DI	East to South			
Inflow	178.51	1607.52	4129.94	7990.73
Outflow	156.86	1414.93	3582.13	6821.62

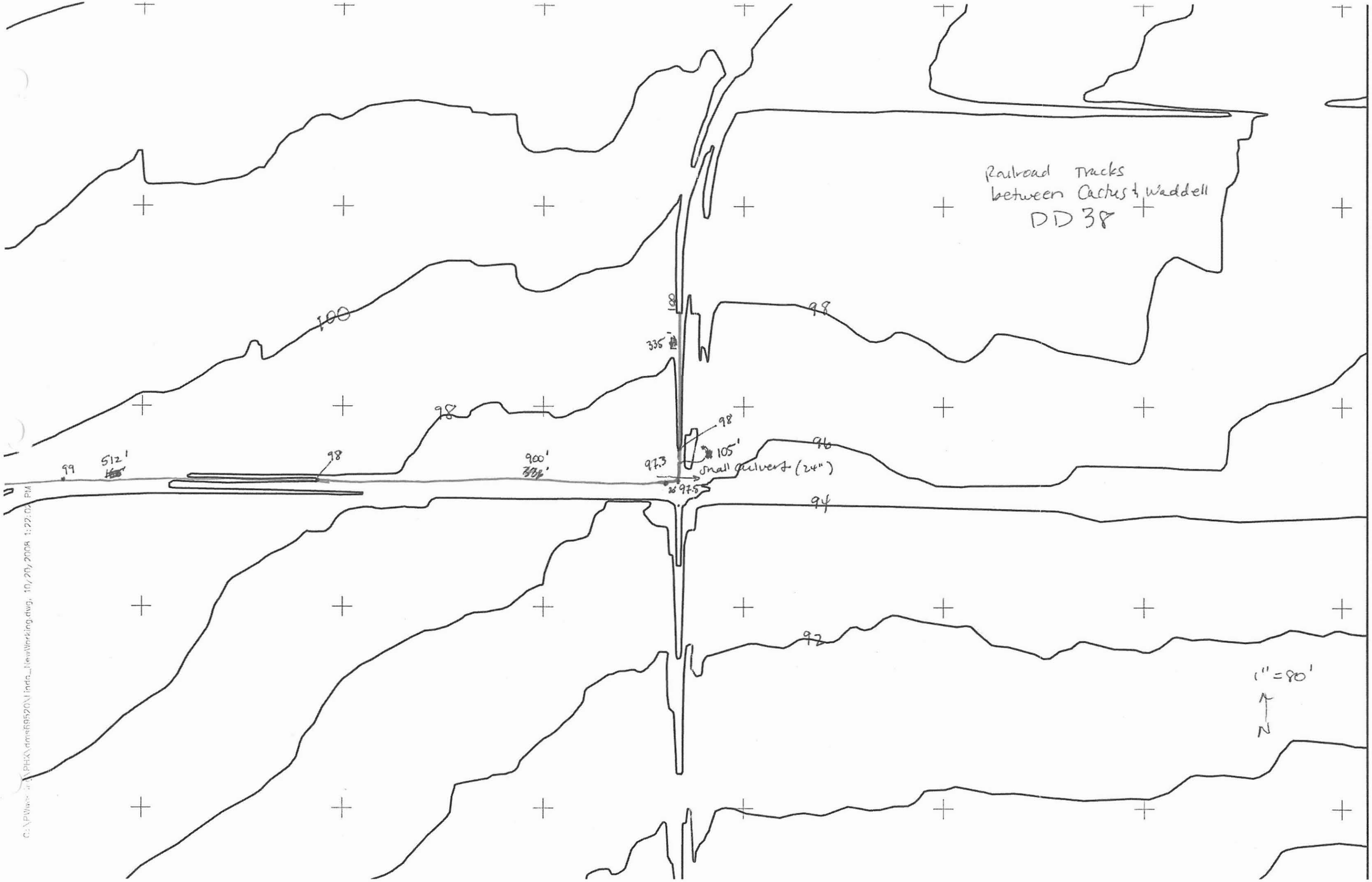
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	21.66	192.59	547.80	1169.11
Outflow	15.18	51.23	99.39	157.14

Assumes diversion is to southeast

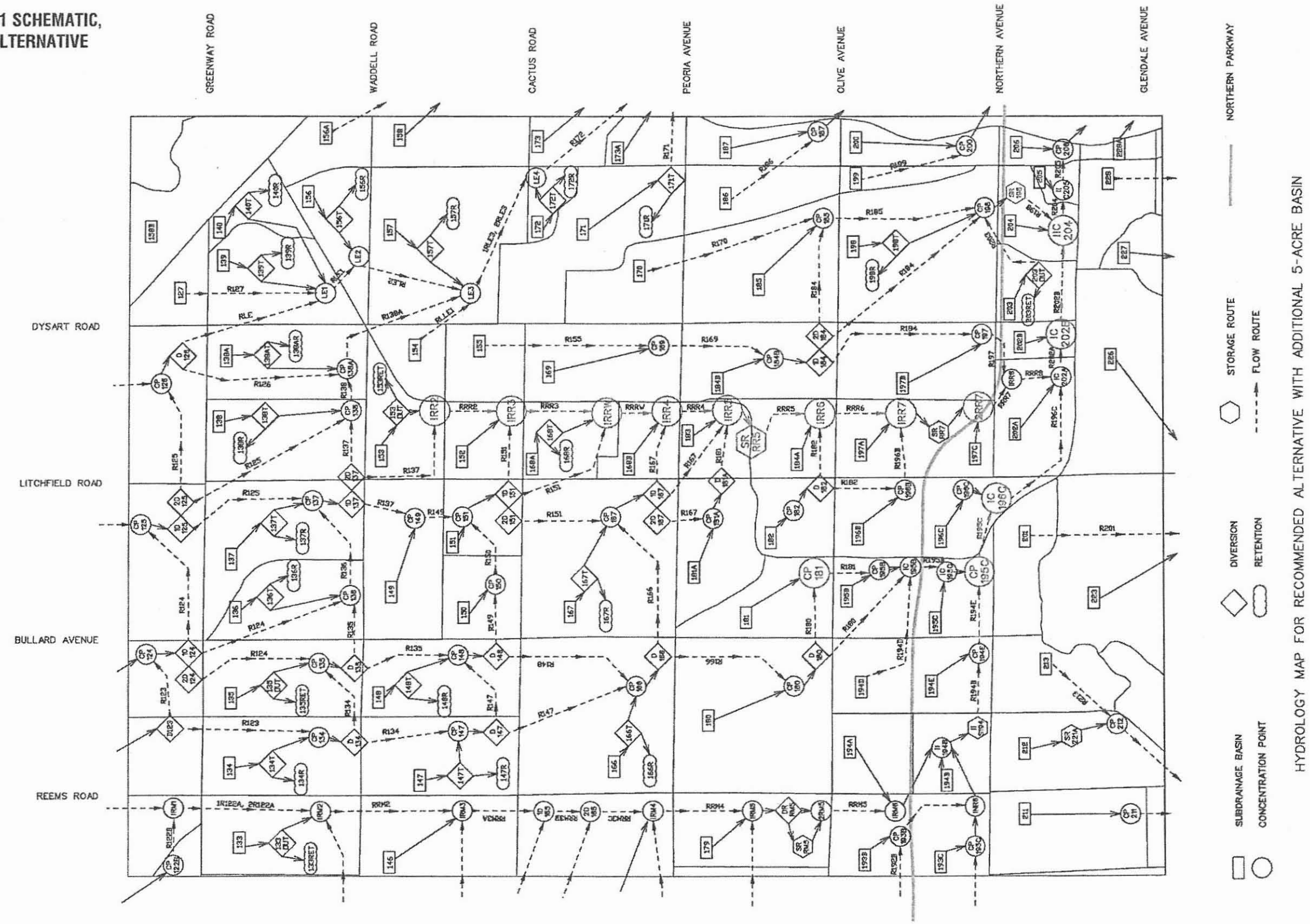
RR Tracks
btwn Cactus & Waddell

↑
N


Railroad Tracks
between Cactus & Waddell
DD 38
100
98
98
98
98
96
94
92
99
512'
900'
335'
105'
97.3
97.5
small culvert (24")
1" = 80'
N

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN

D39

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*             JUN   1998            *
*          VERSION 4.1              *
*                                   *
*     DATE   23MAR09  TIME  11:43:35 *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID      HDR ENGINEERING INC. 3-23-09, FILE:RECPLAN.DAT
  2           ID      EDITS FOR WADDELL CAR
  3           ID      MODIFIES AREA AROUND WADDELL/DYSART AND WEST CACTUS BASIN AREA FOR
  4           ID      PROPOSED IMPROVEMENTS
  5           ID      ASPEN CONSULTING ENGINEERS, JCS, 4-25-08, FILE: 303EWP.DAT, 100-YR 24-HR
  6           ID      NOTES:
  7           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
  8           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
  9           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
 10           ID      AND R238.
              * ***************************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***************************************************************************
 11           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
 12           ID
 13           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
 14           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
 15           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
 16           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
 17           ID
 18           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
 19           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
 20           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
 21           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
 22           ID
 23           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
 24           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
 25           ID
 26           ID                                     REVISED BY URS     DATE: 01-14-04
 27           ID                                                        FILE: L33PE4H.DAT
 28           ID
 29           ID       NOTES:
 30           ID       1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
 31           ID          2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
 32           ID       2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
 33           ID       3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
 34           ID          GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
 35           ID          THE WLB MODEL.
 36           ID       4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
 37           ID          WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
 38           ID          CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
 39           ID          DRAINAGE REPORTS.
 40           ID       5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
 41           ID          GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
 42           ID          ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
 43           ID       6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
 44           ID       7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
 45           ID          STORM.
 46           ID       8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
 47           ID       9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
 48           ID          THE DATA FILE BY THE FCDMC.
 49           ID      10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
 50           ID          AREAS #3 & #4) WERE ESTIMATED BY EEC.
 51           ID
              *DIAGRAM
```

HEC-1 INPUT PAGE 2

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 52           IT       5                    600
 53           IO       5
 54           IN      15
 55           JD    4.03    .001
 56           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
```

```
1623          KK  CP138A
1624          KM        ADD HYDROGRAPHS AT CP138A
1625          HC       2   23.68
              *
              * ALT-1 RJS 5-25-01
              *
              *
              * TURN DIVERT OFF PER LEVEL III
              *
1                                   HEC-1 INPUT                                                    PAGE 42

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1626          KK   D138A
1627          KM        DIVERT TO CP154 FROM CP138A
1628          DT   DI154
1629          DI       0      44     392    1366    3326    6347   10546   16046
1630          DQ       0      44     392    1366    3326    6347   10546   16046

1631          KK   R138A
1632          KM        ROUTE REMAINDER FROM CP138A TO CP157
1633          RS      15              -1       0
1634          RC    .075     .04    .075    6708   .0051
1635          RX    1000    1001    1580    2290    2450    2710    2799    2800
1636          RY    1140    1140    1138    1136    1136    1138    1140    1140

1637          KK   D138A
1638          KM        RETURN DIVERT AT CP138A
1639          DR   DI154
              * KK R138A
              * KM        ROUTE FLOW FROM CP138A TO CP154
              * RS    15              -1       0
              * RC   .08     .08     .08    2640   .0026
              * RX  1000    1001    1002    1025    1160    1840    2099    2100
              * RY  1145    1145    1145    1144    1144    1146    1148    1148
              * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY

1640          KK    RLLE
1641          KM        ROUTE REMAINDER FROM CP138A TO CP157
1642          RS     1.4              -1       0
1643          RC    0.03    0.03    0.03    2020   0.004
1644          RX       0      20      25      30      35    41.5    51.1    82.3
1645          RY      10       0       0       0       0       0     4.8      10
              *
```

D25 D39

```
1646          KK     154
1647          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 154
1648          BA     .17
1649          LG     .50     .00    5.88     .30     .00
1650          UI     12.     12.     36.     53.     64.     74.     87.    106.    146.    142.
1651          UI    114.     98.     82.     69.     58.     43.     27.     21.     19.     12.
1652          UI     12.      5.      4.      4.      4.      4.      4.      4.      0.      0.
1653          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * KK154OUT
              * KM       DIVERSION-RETENTION
              * DT154RET    16.8
              * DI     0   10000
              * DQ     0   10000
              * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY
              * KK CP154

1654          KK    LLE1
1655          KM        ADD HYDROGRAPHS AT CP154
1656          HC       2    0.33
              * KK  R154
              * KM        ROUTE FLOW FROM CP154 TO CP157
              * RS    19              -1       0
              * RC   .07     .06     .07    5800   .0048
              * RX  1000    1001    1580    2290    2450    2710    3199    3200
              * RY  1140    1140    1138    1136    1136    1138    1140    1140
1                                   HEC-1 INPUT                                                    PAGE 43

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

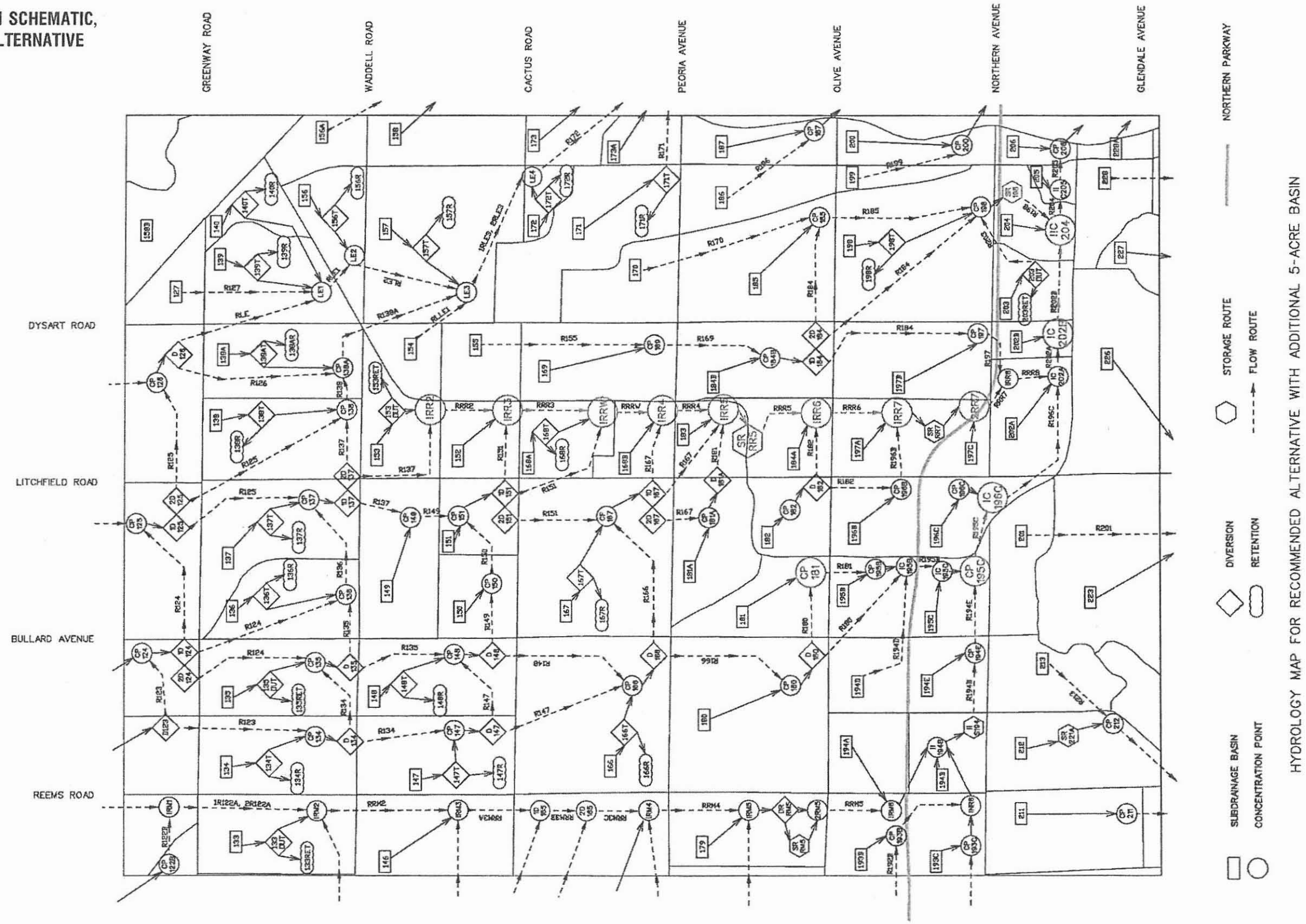
1657          KK   RLLE1
1658          KM        ROUTE FLOW FROM CP154 TO CP157
1659          RS     4.7              -1       0
1660          RC    0.03    0.03    0.03    4950  0.0039
1661          RX       0      30      38      54    76.5     104     139     154
1662          RY      10       4       4       0       0       0       7      10
              *

1663          KK     157
1664          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 157
1665          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1666          KM    L=      1.3  Lca=       .6   S=   26.8  Kn= .084  LAG=  59.9
1667          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1668          BA     .89
1669          LG     .24     .25    5.20     .28   34.00
1670          UI     50.     50.     78.    175.    219.    257.    289.    326.    373.    435.
1671          UI    560.    646.    535.    458.    407.    359.    312.    272.    238.    189.
1672          UI    133.     89.     84.     82.     51.     50.     43.     15.     15.     15.
1673          UI     15.     15.     15.     15.     15.      0.      0.      0.      0.      0.
1674          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1675          KK  157T
1676          KM    Divert Retention in Subbasin 157
1677          DT  157R      70.3
1678          DI       0   10000
```

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



D40

D40

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN   1998               *
*           VERSION 4.1                *
*                                      *
     'N DATE   06FEB09  TIME  14:20:20 *
*                                      *
*>    ************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X        XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
   2          ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
   3          ID   PREPARED BY ASPEN CONSULTING ENGINEERS
   4          ID   MODIFICATIONS:
   5          ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
   6          ID   (2) SURPRISE WWTP WAS UPDATED
   7          ID   (3) NORTHERN PARKWAY WAS UPDATED
   8          ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
   9          ID
  10          ID  ***********************************************************************
  11          ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
  12          ID      NOTES:
  13          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
  14          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
  15          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
  16          ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
  17          ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
  18          ID
  19          ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
  20          ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
  21          ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
  22          ID         LUKE AIR FORCE BASE CRASH ZONE AREA
  23          ID
  24          ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
  25          ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  26          ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  27          ID         TANKS/AGUA FRIA ADMS, Date: October 1991
  28          ID
  29          ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  30          ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
  31          ID
  32          ID                                      REVISED BY URS     DATE: 01-14-04
  33          ID                                                         FILE: L33PE4H.DAT
  34          ID
  35          ID        NOTES:
  36          ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  37          ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  38          ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  39          ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  40          ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  41          ID           THE WLB MODEL.
  42          ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  43          ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  44          ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  45          ID           DRAINAGE REPORTS.
  46          ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  47          ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
  48          ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  49          ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  50          ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  51          ID           STORM.
  52          ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  53          ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
  54          ID           THE DATA FILE BY THE FCDMC.
  55          ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
  56          ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
  57          ID
```

```
3074        KM        ROUTE REMAINDER FROM CP182 TO CP184
            * RS    14                -1       0
            * RC  .075      .04      .04    5280   .0023
3075        RS       7                -1       0
3076        RC    .075      .04      .04    2640   .0023
3077        RX    1000     1001     1700    2340    2450    2463    2464    2465
3078        RY    1104     1104     1102    1100    1100    1101    1101    1101
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

3079        KK   DR182
3080        KM   DIVERT FLOW TO !RR6
3081        DT   1DRR6
3082        DI       0   10000
3083        DQ       0   10000

3084        KK    DRR2
3085        KM        RETURN DIVERT AT CP151
3086        DR   3D152
            * DESIGN ROUTE
            * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE

3087        KK    RRR2
3088        KM   ROUTE RR2 TO RR3
3089        RS       3              -1.0      0.0
3090        RC   0.035    0.035   0.035     2595  0.0015
3091        RX       0       10      20       36      76      92     100     110
3092        RY    1140     1140    1140     1136    1136    1140    1140    1140
            * RS     1                -1       0
            * RC  0.03    0.028    0.03     3960   .0021
            * RX  1000     1021    1035     1070    1100    1110    1121    1142
            * RY  1100     1093    1093     1093    1093    1093    1093    1100
```

D38 D40

```
3093        KK   2D151
3094        KM        RETURN DIVERT AT CP151
3095        DR   DI152

3096        KK    R151
3097        KM        ROUTE FLOW FROM CP151 TO CP152
3098        RS       6                -1       0
3099        RC     .08     .035     .035    2600   .0027
3100        RX    1000     1090     1710    2160    2240    2268    2269    2270
3101        RY    1141     1140     1138    1136    1136    1137    1137    1137
            *
```

D36 D40

```
            * KK   152
            * KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 152
            * BA   .35

3102        KK     152
3103        KM   PER SURPRISE POINTE, AREA OF BASIN 153 INCREASED FROM 0.20 SQ MI
3104        KM   TO 0.31 SQ MI, AND BASIN 152 REDUCED FROM 0.35 SQ MI TO 0.25 SQ MI.
3105        KM   THE UNIT HYDROGRAPH WAS TAKEN FROM BASIN 155 WHICH HAS ALMOST THE
3106        KM   SAME CHARACTERISTICS (AREA, SLOPE, SHAPE) AS BASIN 152.
3107        BA    0.25
3108        LG     .50      .00     5.10      .43      .00
3109        UI     15.      15.      29.      56.      72.      83.      93.     107.     122.     156.
3110        UI    195.     177.     147.     129.     113.      98.      85.      73.      57.      39.
3111        UI     27.      26.      23.      15.      15.       8.       5.       5.       5.       5.
3112        UI      5.       5.       5.       0.       0.       0.       0.       0.       0.       0.
3113        UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
            * KK152OUT
            * KM       DIVERSION-RETENTION
            * DT152RET    35.2
            * DI     0   10000
            * DQ     0   10000
            *
            * ALT-2 RJS 5-25-01
            *
            * KK CP152
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

3114        KK    !RR3
            * KO     1                                21
3115        KM        ADD HYDROGRAPHS AT CP152
3116        HC       3    8.61
            *
            * ALT-2 RJS 5-25-01
            *

3117        KK   1D152
3118        KM        DIVERT TO CP169 FROM CP152
3119        DT   1D169
3120        DI       0      334      482     1536     3508     6291     9848    14192
3121        DQ       0        0        0        0        0        0        0        0
            *
            * ALT-2 RJS 5-25-01
            *

3122        KK   2D152
3123        KM        DIVERT TO CP155 FROM CP152
3124        DT   DI155
3125        DI       0      334      433     1136     2450     4305     6677     9573
3126        DQ       0        0        0        0        0        0        0        0
            *
            * DIVIDE SUBBASIN 168 INTO 168A AND 168B 10-03-08
            * UPDATE THE WWTP DEVELOPMENT IN 168A 10-03-08
            *
```

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No. 79902	No.
Subject	Weir Flow Analysis	Computed AM	Date 10/28/08
Task	Weir Calculations	Checked LP	Date 3/10/09
		Sheet 1	Of x

Location: Cactus at Railroad Tracks (DD40)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	37	36	215	36.5	36.3	0	0.00	36.8	0.3	105.98	37.3	0.8	461.52	DONE	37.8	1.3	956.04	DONE
south	36	36.4	30	36.2	36.3	0.1	2.85	36.8	0.6	41.83	37.3	1.1	103.83		37.8	1.6	182.15	
southeast	36.4	36.4	2	36.4	36.3	0	0.00	36.8	0.4	1.52	37.3	0.9	5.12		37.8	1.4	9.94	
east	36.4	36	20	36.2	36.3	0.1	1.90	36.8	0.6	27.89	37.3	1.1	69.22		37.8	1.6	121.43	
east	36	37	500	36.5	36.3	0	0.00	36.8	0.3	246.48	37.3	0.8	1073.31		37.8	1.3	2223.34	
east	37	37	1	37	36.3	0	0.00	36.8	0	0.00	37.3	0.3	0.49		37.8	0.8	2.15	
east	37	37	1	37	36.3	0	0.00	36.8	0	0.00	37.3	0.3	0.49		37.8	0.8	2.15	
east	37	37	1	37	36.3	0	0.00	36.8	0	0.00	37.3	0.3	0.49		37.8	0.8	2.15	
east	37	37	1	37	36.3	0	0.00	36.8	0	0.00	37.3	0.3	0.49		37.8	0.8	2.15	
						TOTALS:	4.74			423.69			1714.99				3501.48	

Graph Computations:

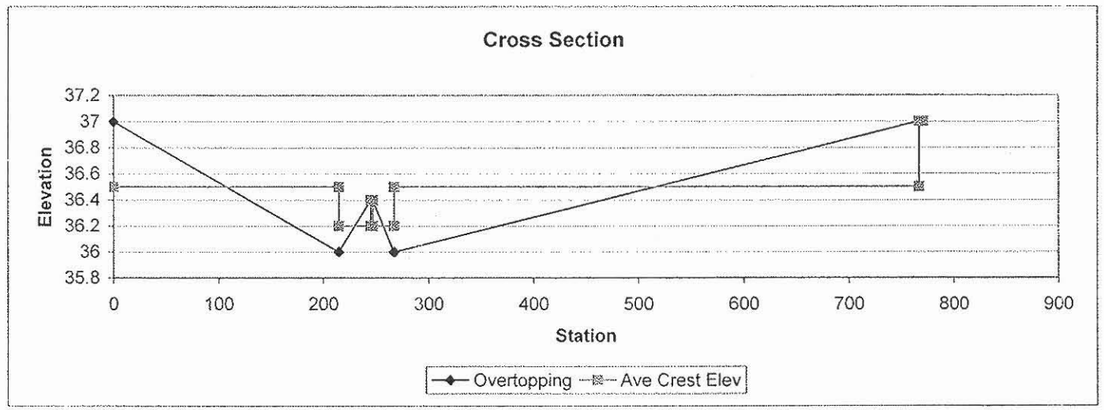
Station	Elevation
0	37
215	36
245	36.4
247	36.4
267	36
767	37
768	37
769	37
770	37
771	37

Weir Approximation:

Station	Elevation
0	36.5
215	36.5
215	36.2
245	36.2
245	36.4
247	36.4
247	36.2
267	36.2
267	36.5
767	36.5
767	37
768	37
768	37
769	37
769	37
770	37
770	37
771	37

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	2.85	60%	Q(south)	147.81	35%	Q(south)	565.36	33%	Q(south)	1138.18	33%
Q(southeast)	0.00	0%	Q(southeast)	1.52	0%	Q(southeast)	5.12	0%	Q(southeast)	9.94	0%
Q(east)	1.90	40%	Q(east)	274.36	65%	Q(east)	1144.51	67%	Q(east)	2353.36	67%
	4.74			423.69			1714.99			3501.48	

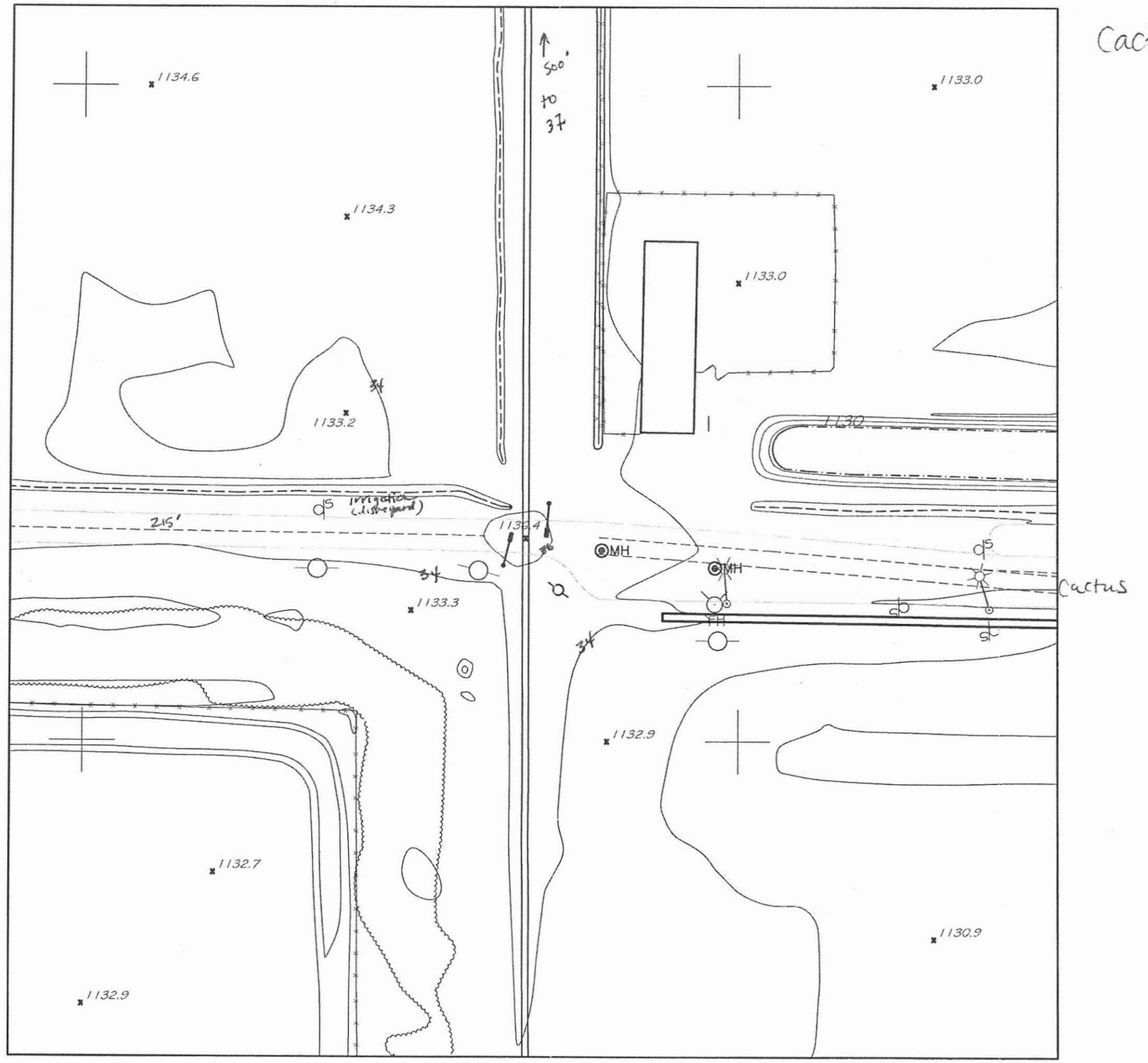
First DI	East to South			
Inflow	4.74	423.69	1714.99	3501.48
Outflow	2.85	147.81	565.36	1138.18

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	1.90	275.88	1149.63	2363.30
Outflow	0.00	1.52	5.12	9.94

Assumes diversion is to southeast

Cactus @ RR Tracks
(DD40)



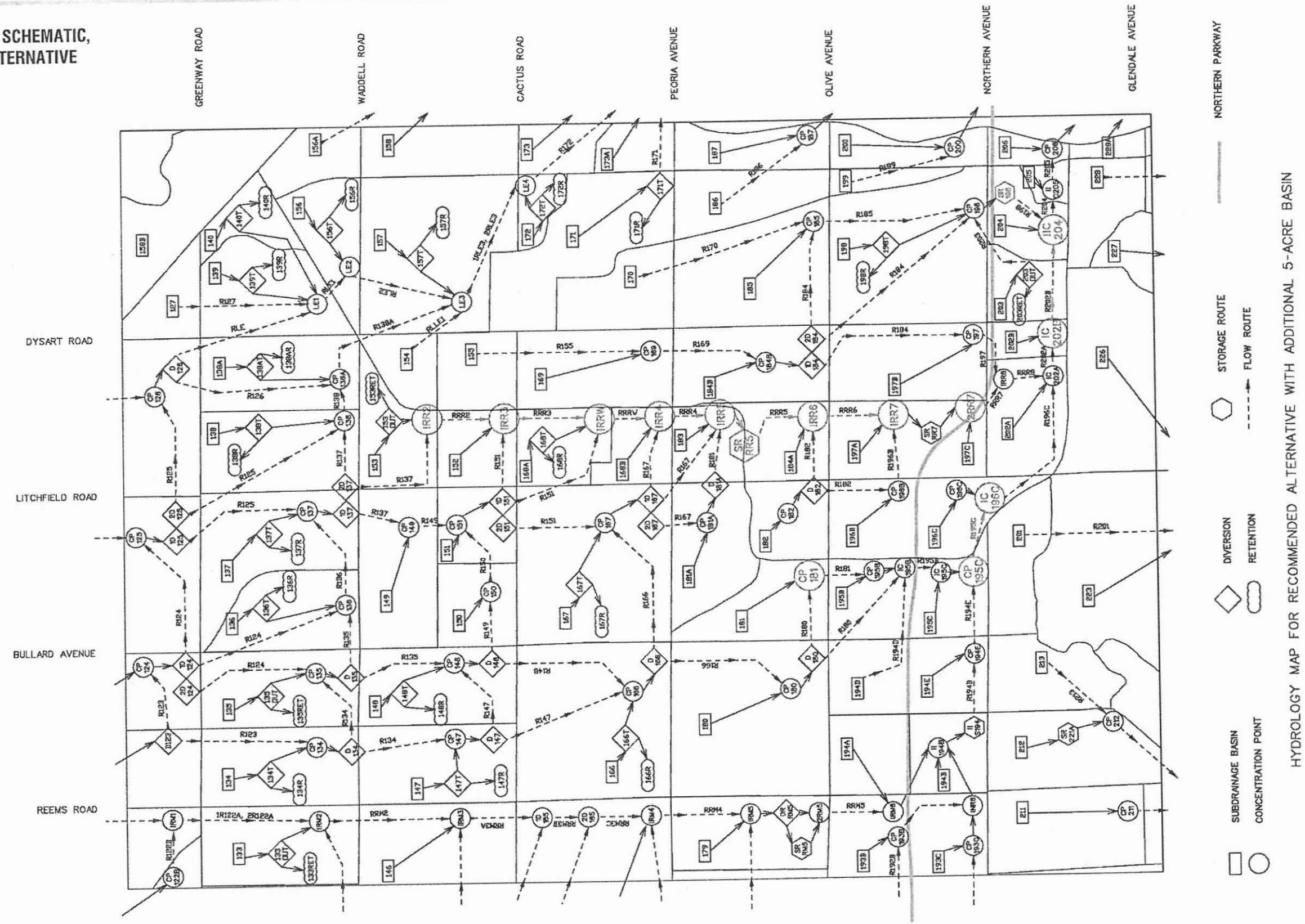
37

C:\PW\PHX\mms59520\landis_NewWorking.dwg, 10/20/2008 1:04:01 PM

W Cactus Rd
W Cactus Rd
W Cactus Rd
W Cactus Rd
13475

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN

D41

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D42

D42

```
L****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN   1998               *
*           VERSION 4.1                *
*                                      *
*      DATE   23MAR09  TIME  11:43:35  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X    X         XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X    X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                          HEC-1 INPUT                                          PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID      HDR ENGINEERING INC. 3-23-09, FILE:RECPLAN.DAT
    2           ID      EDITS FOR WADDELL CAR
    3           ID      MODIFIES AREA AROUND WADDELL/DYSART AND WEST CACTUS BASIN AREA FOR
    4           ID      PROPOSED IMPROVEMENTS
    5           ID      ASPEN CONSULTING ENGINEERS, JCS, 4-25-08, FILE: 303EWP.DAT, 100-YR 24-HR
    6           ID      NOTES:
    7           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
    8           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
    9           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   10           ID      AND R238.
                * ************************************************************************
                * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                * ************************************************************************
   11           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   12           ID
   13           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   14           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   15           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   16           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   17           ID
   18           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   19           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   20           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   21           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   22           ID
   23           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   24           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   25           ID
   26           ID                                       REVISED BY URS     DATE: 01-14-04
   27           ID                                                          FILE: L33PE4H.DAT
   28           ID
   29           ID        NOTES:
   30           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   31           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   32           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   33           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   34           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   35           ID           THE WLB MODEL.
   36           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   37           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   38           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   39           ID           DRAINAGE REPORTS.
   40           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   41           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   42           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   43           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   44           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   45           ID           STORM.
   46           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
   47           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   48           ID           THE DATA FILE BY THE FCDMC.
   49           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   50           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   51           ID
                *DIAGRAM
                                                HEC-1 INPUT                                          PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   52           IT       5                    600
   53           IO       5
   54           IN      15
   55           JD    4.03     .001
   56           PC    .000     .002     .005     .008     .011     .014     .017     .020     .023     .026
```

```
1623          KK  CP138A
1624          KM        ADD HYDROGRAPHS AT CP138A
1625          HC       2   23.68
              *
              * ALT-1 RJS 5-25-01
              *
              *
              * TURN DIVERT OFF PER LEVEL III
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1626          KK   D138A
1627          KM        DIVERT TO CP154 FROM CP138A
1628          DT   DI154
1629          DI       0      44     392    1366    3326    6347   10546   16046
1630          DQ       0      44     392    1366    3326    6347   10546   16046

1631          KK   R138A
1632          KM        ROUTE REMAINDER FROM CP138A TO CP157
1633          RS      15              -1       0
1634          RC    .075     .04    .075    6708   .0051
1635          RX    1000    1001    1580    2290    2450    2710    2799    2800
1636          RY    1140    1140    1138    1136    1136    1138    1140    1140

1637          KK   D138A
1638          KM        RETURN DIVERT AT CP138A
1639          DR   DI154
              * KK R138A
              * KM        ROUTE FLOW FROM CP138A TO CP154
              * RS    15              -1       0
              * RC   .08     .08     .08    2640   .0026
              * RX  1000    1001    1002    1025    1160    1840    2099    2100
              * RY  1145    1145    1145    1144    1144    1146    1148    1148
              * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY

1640          KK    RLLE
1641          KM        ROUTE REMAINDER FROM CP138A TO CP157
1642          RS     1.4              -1       0
1643          RC    0.03    0.03    0.03    2020   0.004
1644          RX       0      20      25      30      35    41.5    51.1    82.3
1645          RY      10       0       0       0       0       0     4.8      10
              *

1646          KK     154
1647          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 154
1648          BA     .17
1649          LG     .50     .00    5.88     .30     .00
1650          UI     12.     12.     36.     53.     64.     74.     87.    106.    146.    142.
1651          UI    114.     98.     82.     69.     58.     43.     27.     21.     19.     12.
1652          UI     12.      5.      4.      4.      4.      4.      4.      4.      0.      0.
1653          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * KK154OUT
              * KM       DIVERSION-RETENTION
              * DT154RET     16.8
              * DI      0   10000
              * DQ      0   10000
              * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY
              * KK CP154

1654          KK    LLE1
1655          KM        ADD HYDROGRAPHS AT CP154
1656          HC       2    0.33
              * KK  R154
              * KM        ROUTE FLOW FROM CP154 TO CP157
              * RS    19              -1       0
              * RC   .07     .06     .07    5800   .0048
              * RX  1000    1001    1580    2290    2450    2710    3199    3200
              * RY  1140    1140    1138    1136    1136    1138    1140    1140
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1657          KK   RLLE1
1658          KM        ROUTE FLOW FROM CP154 TO CP157
1659          RS     4.7              -1       0
1660          RC    0.03    0.03    0.03    4950  0.0039
1661          RX       0      30      38      54    76.5     104     139     154
1662          RY      10       4       4       0       0       0       7      10
              *

1663          KK     157
1664          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 157
1665          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1666          KM    L=       1.3  Lca=        .6   S=   26.8  Kn= .084  LAG=  59.9
1667          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1668          BA     .89
1669          LG     .24     .25    5.20     .28   34.00
1670          UI     50.     50.     78.    175.    219.    257.    289.    326.    373.    435.
1671          UI    560.    646.    535.    458.    407.    359.    312.    272.    238.    189.
1672          UI    133.     89.     84.     82.     51.     50.     43.     15.     15.     15.
1673          UI     15.     15.     15.     15.     15.      0.      0.      0.      0.      0.
1674          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1675          KK  157T
1676          KM    Divert Retention in Subbasin 157
1677          DT  157R      70.3
1678          DI       0   10000
```

D39D42

```
            * REMOVE PONDING AT RAILROAD WITH PROPOSED CHANNEL
            *
            * KK SR139
            * KM      STOAGE ROUTE BEHIND RAILROAD.
            * RS     1    STOR       0       0
            * SV     0    1.14    3.12    6.43   29.35
            * SQ     0       0     170    1037    5977
            * SE1046.2  1047.2  1047.5    1048    1049
            *
            * KK  R139
            * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1744        KK    RLE1
1745        KM        ROUTE FLOW FROM CP139 TO CP156
1746        RS     1.6            -1.0     0.0
1747        RC   0.030   0.030   0.030    1980  0.0023
1748        RX     0.0    19.2    29.2    39.2    49.2    59.2    69.2    88.4
1749        RY  1137.5  1132.7  1132.7  1132.7  1132.7  1132.7  1132.7  1137.5
            *

1750        KK     156
1751        KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 156
1752        BA     .30
1753        LG     .21     .25    5.00     .29     48.
1754        UI     18.     18.     33.     64.     82.     94.    106.    121.    139.    173.
1755        UI    223.    206.    171.    149.    132.    113.     99.     85.     69.     47.
1756        UI     31.     30.     28.     18.     18.     12.      5.      5.      5.      5.
1757        UI      5.      5.      5.      5.      0.      0.      0.      0.      0.      0.
1758        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1759        KK  156T
1760        KM    Divert Retention in Subbasin 156
1761        DT  156R      25.5
1762        DI       0   10000
1763        DQ       0   10000
            *
            * KK CP156
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1764        KK    !LE2
1765        KM   ADD HYDROGRAPHS AT LE2
1766        HC       2    1.18
            *
            * KK  R156
            * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1767        KK    RLE2
1768        KM        ROUTE FLOW FROM CP156 TO CP157
1769        RS     3.4            -1.0     0.0
1770        RC   0.030   0.030   0.030    4888  0.0020
1771        RX     0.0    24.4    34.4    44.4    54.4    64.4    74.4    98.8
1772        RY  1128.5  1122.4  1122.4  1122.4  1122.4  1122.4  1122.4  1128.5
            *
            * KK CP157
```

D27D42

```
1773        KK    !LE3
1774        KM   ADD HYDROGRAPHS AT LE3 (CP157)
1775        HC       2     1.65
            * KK  R157
            * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY
            * KK  R157
            * KM      ROUTE FLOW FROM CP157 TO CP172
            * RS     3             -1       0
            * RC  .035     .022     .06    1150   .0035
            * RX  1000     1001    1020    1035    1075    1090    1210    1770
            * RY  1117     1117    1116    1114    1114    1115    1113    1117
            * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1776        KK   SRLE3
1777        KM   STORAGE ROUTE PONDED AREA BEHIND CACTUS ROAD W/ 20'x10' CONARCH
1778        RS       1    STOR       0       0
1779        SV       0    0.64     4.6    17.3    27.6    56.0
1780        SQ       0       0     139     426     827    1295
1781        SE  1105.3    1108    1110    1112    1114    1116
            *

1782        KK    RLE3
1783        KM        ROUTE FLOW FROM CP157 TO CP172
1784        RS     1.5            -1.0     0.0
1785        RC   0.030   0.030   0.030    1570  0.0020
1786        RX     0.0    10.0    22.0    97.0   171.0   172.0   184.0   194.0
1787        RY     3.5     3.0     0.0     0.0     0.0     0.0     3.0     3.5
            *

1788        KK     172
1789        KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 172
1790        BA     .12
1791        LG     .21     .25    4.58     .33      9.
1792        UI      9.      9.     28.     39.     47.     55.     66.     82.    112.     96.
1793        UI     79.     68.     56.     47.     39.     26.     16.     15.     11.      9.
1794        UI      6.      3.      3.      3.      3.      3.      3.      0.      0.      0.
1795        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
                 * REMOVE PONDING AT RAILROAD WITH PROPOSED CHANNEL
                 *
                 * KK SR139
                 * KM      STOAGE ROUTE BEHIND RAILROAD.
                 * RS     1    STOR       0       0
                 * SV     0    1.14    3.12    6.43   29.35
                 * SQ     0       0     170    1037    5977
                 * SE1046.2  1047.2  1047.5    1048    1049
                 *
                 * KK  R139
                 * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1744             KK    RLE1
1745             KM        ROUTE FLOW FROM CP139 TO CP156
1746             RS     1.6            -1.0     0.0
1747             RC   0.030   0.030   0.030    1980  0.0023
1748             RX     0.0    19.2    29.2    39.2    49.2    59.2    69.2    88.4
1749             RY  1137.5  1132.7  1132.7  1132.7  1132.7  1132.7  1132.7  1137.5
                 *

1750             KK     156
1751             KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 156
1752             BA     .30
1753             LG     .21     .25    5.00     .29     48.
1754             UI     18.     18.     33.     64.     82.     94.    106.    121.    139.    173.
1755             UI    223.    206.    171.    149.    132.    113.     99.     85.     69.     47.
1756             UI     31.     30.     28.     18.     18.     12.      5.      5.      5.      5.
1757             UI      5.      5.      5.      5.      0.      0.      0.      0.      0.      0.
1758             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                 *

1759             KK  156T
1760             KM    Divert Retention in Subbasin 156
1761             DT  156R      25.5
1762             DI       0   10000
1763             DQ       0   10000
                 *
                 * KK CP156
```



```
LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1764             KK    !LE2
1765             KM   ADD HYDROGRAPHS AT LE2
1766             HC       2    1.18
                 *
                 * KK  R156
                 * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1767             KK    RLE2
1768             KM        ROUTE FLOW FROM CP156 TO CP157
1769             RS     3.4            -1.0     0.0
1770             RC   0.030   0.030   0.030    4888  0.0020
1771             RX     0.0    24.4    34.4    44.4    54.4    64.4    74.4    98.8
1772             RY  1128.5  1122.4  1122.4  1122.4  1122.4  1122.4  1122.4  1128.5
                 *
                 * KK CP157

1773             KK    !LE3
1774             KM   ADD HYDROGRAPHS AT LE3 (CP157)
1775             HC       2    1.65
                 * KK  R157
                 * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY
                 * KK  R157
                 * KM      ROUTE FLOW FROM CP157 TO CP172
                 * RS     3              -1       0
                 * RC  .035    .022     .06    1150   .0035
                 * RX  1000    1001    1020    1035    1075    1090    1210    1770
                 * RY  1117    1117    1116    1114    1114    1115    1113    1117
                 * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1776             KK   SRLE3
1777             KM   STORAGE ROUTE PONDED AREA BEHIND CACTUS ROAD W/ 20'x10' CONARCH
1778             RS       1    STOR       0       0
1779             SV       0    0.64     4.6    17.3    27.6    56.0
1780             SQ       0       0     139     426     827    1295
1781             SE  1105.3    1108    1110    1112    1114    1116
                 *
```

SRD42

```
1782             KK    RLE3
1783             KM        ROUTE FLOW FROM CP157 TO CP172
1784             RS     1.5            -1.0     0.0
1785             RC   0.030   0.030   0.030    1570  0.0020
1786             RX     0.0    10.0    22.0    97.0   171.0   172.0   184.0   194.0
1787             RY     3.5     3.0     0.0     0.0     0.0     0.0     3.0     3.5
                 *

1788             KK     172
1789             KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 172
1790             BA     .12
1791             LG     .21     .25    4.58     .33      9.
1792             UI      9.      9.     28.     39.     47.     55.     66.     82.    112.     96.
1793             UI     79.     68.     56.     47.     39.     26.     16.     15.     11.      9.
1794             UI      6.      3.      3.      3.      3.      3.      3.      0.      0.      0.
1795             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                 *
```



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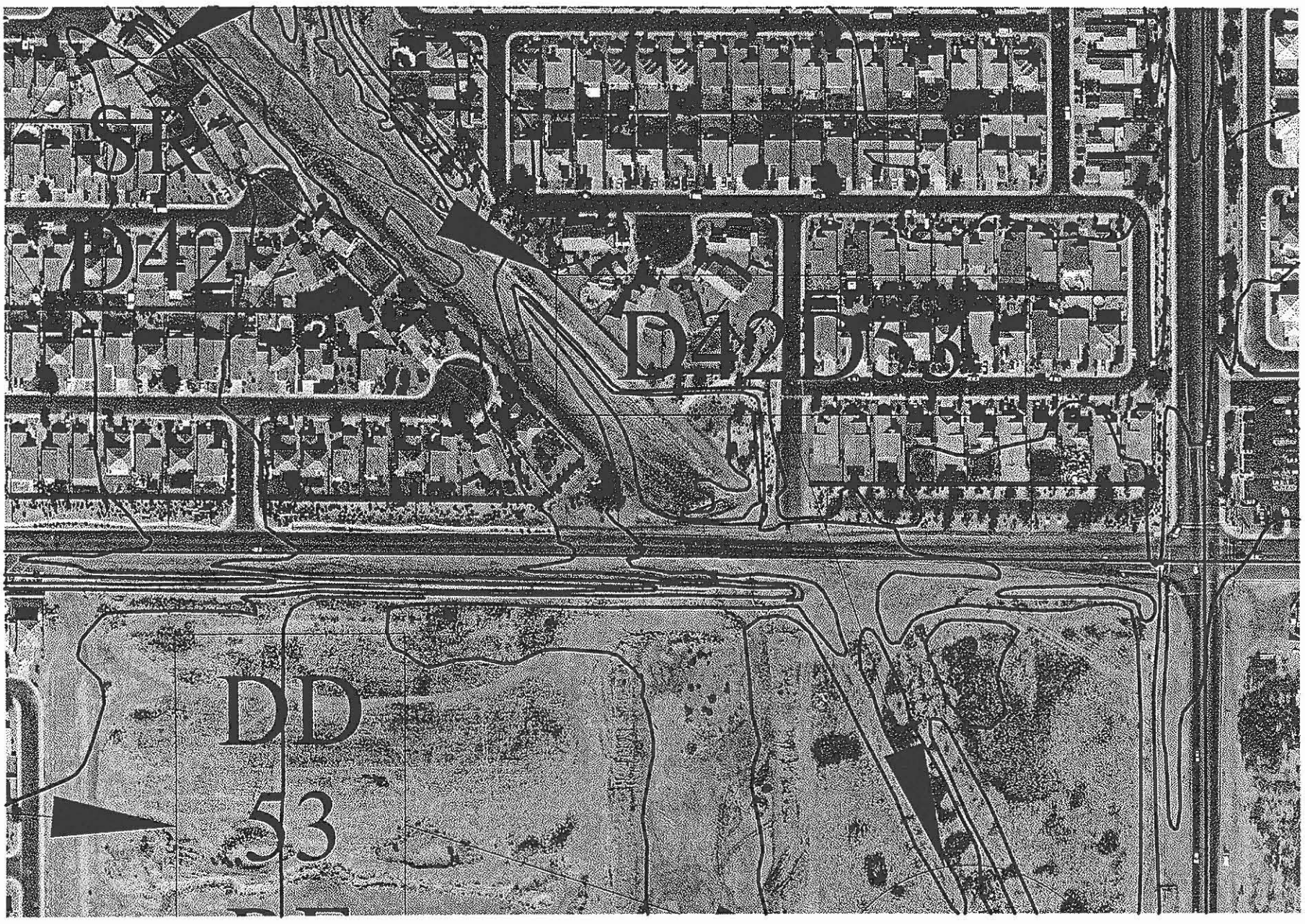
LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

1"=20'



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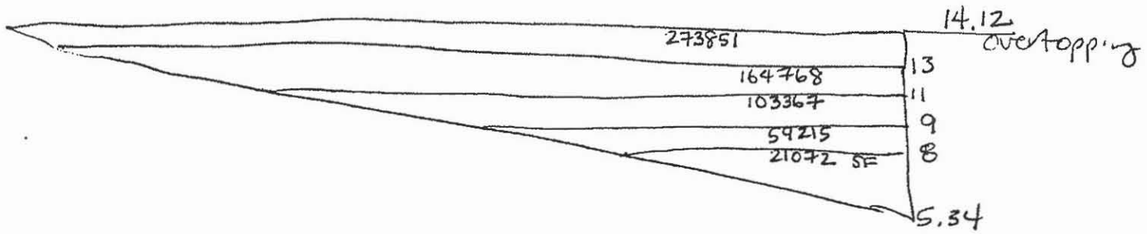
Project:		Computed: LP	Date: 12/18/08
Subject: Cactus @ Lower El Mirage Wash		Checked:	Date:
Task:		Page:	of:
Job #:		No:	

SRD42

Rating curve, storage behind Cactus @ Lower EL Mirage Wash



SV = volume in ac-ft

@ elev. 8, vol = 1/2 (2.66')(21072 sf)
= 28026 cuft = 0.64 ac-ft

@ elev 9, vol = 1/2 (3.66 ft)(59215 sq ft)
= 108363 cuft = 2.49 ac-ft

@ elev 11, vol = 1/2 (5.66 ft)(103367 sf)
= 292529 cu ft = 6.7 ac-ft

@ elev 13, vol = 1/2 (7.66 ft)(164768 sf)
= 631061 cuft = 14.5 ac-ft

@ elev 14.12, vol = 1/2 (8.78)(273851)
= 1202206 cuft = 27.6 ac-ft

SV	0	0.64	2.49	6.7	14.5	27.6	56.0
SQ	0	0	0	66	93	108	123 plus weir
SE	1105.34	1108	1109	1111	1113	1114.12	1116

Rating Table Report
CactusatLowerElMirageWash

Range Data:				
	Minimum	Maximum	Increment	
Allowable HW E	8.00	18.00	1.00	ft

HW Elev. (ft)	Discharge (cfs)
8.00	0.00
9.00	0.00
10.00	46.64
11.00	65.96
12.00	80.79
13.00	93.29
14.00	104.30
15.00	114.25
16.00	123.41
17.00	131.93
18.00	139.93

Culvert Calculator Report
CactusatLowerElMirageWash

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	15.00	ft	Headwater Depth/Height	4.83	
Computed Headwater Elev:	15.00	ft	Discharge	114.25	cfs
Inlet Control HW Elev.	11.38	ft	Tailwater Elevation	9.00	ft
Outlet Control HW Elev.	15.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5.34	ft	Downstream Invert	4.94	ft
Length	115.00	ft	Constructed Slope	0.003478	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	4.06	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	1.94	ft
Velocity Downstream	12.12	ft/s	Critical Slope	0.024989	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	15.00	ft	Upstream Velocity Head	2.28	ft
Ke	0.20		Entrance Loss	0.46	ft

Inlet Control Properties					
Inlet Control HW Elev.	11.38	ft	Flow Control	Submerged	
Inlet Type	Groove end projecting		Area Full	9.4	ft^2
K	0.00450		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Future

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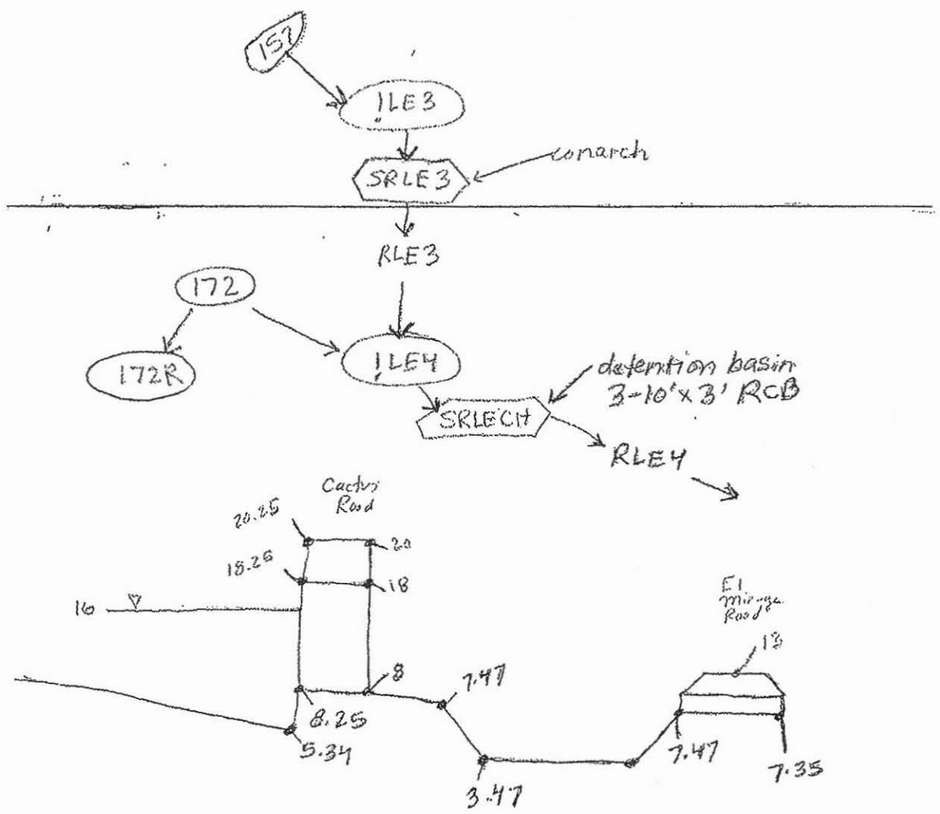
Project: Waddell CAR	Computed: JM	Date: 2/2/09	
Subject: Recommended Plan	Checked: LP	Date: 2/5/09	
Task: Revised HEC-1 Schematic	Page: 1	of: 1	
Job #:	No:		

West Cactus Detention Basin Area



Storage Routes

RECOMMENDED PLAN

SRLE3 (SRD42)

SV	0.00	0.64	4.60	17.30	27.60	56.00
SQ	0	0	139	426	827	1295
SE	1105.34	1108	1110	1112	1114	1116

SRLECH (SRD53)

SV	0.00	7.69	15.72	24.09	33.37	38.57	48.05	57.88	68.06
SQ	0	0	0	0	0	106	329	547	731
SE	1103.47	1104.47	1105.47	1106.47	1107.47	1109	1110	1111	1112

D43

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D44

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D45

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	[illegible]
		Date	3/10/09
		Sheet	1
		Of	x

Location: Peoria at Sarival (DD45)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	70	69	133	69.5	67.2	0	0.00	67.7	0	0.00	68.2	0	0.00	CHECK	68.7	0	0.00	DONE
south	69	68	133	68.5	67.2	0	0.00	67.7	0	0.00	68.2	0	0.00		68.7	0.2	35.69	
south	68	67.2	28	67.6	67.2	0	0.00	67.7	0.1	2.66	68.2	0.6	39.04		68.7	1.1	96.91	
south	67.2	66.4	28	66.8	67.2	0.4	21.25	67.7	0.9	71.72	68.2	1.4	139.15		68.7	1.9	219.99	
southeast	66.4	66.4	30	66.4	67.2	0.8	64.40	67.7	1.3	133.40	68.2	1.8	217.35		68.7	2.3	313.93	
east	66.4	67.2	85	66.8	67.2	0.4	64.51	67.7	0.9	217.72	68.2	1.4	422.41		68.7	1.9	667.84	
east	67.2	68	85	67.6	67.2	0	0.00	67.7	0.1	8.06	68.2	0.6	118.51		68.7	1.1	294.19	
east	68	69.1	162	68.55	67.2	0	0.00	67.7	0	0.00	68.2	0	0.00		68.7	0.15	28.23	
east	69.1	69.2	20	69.15	67.2	0	0.00	67.7	0	0.00	68.2	0	0.00		68.7	0	0.00	
						TOTALS:	150.16			433.56			936.45				1656.78	

Graph Computations:

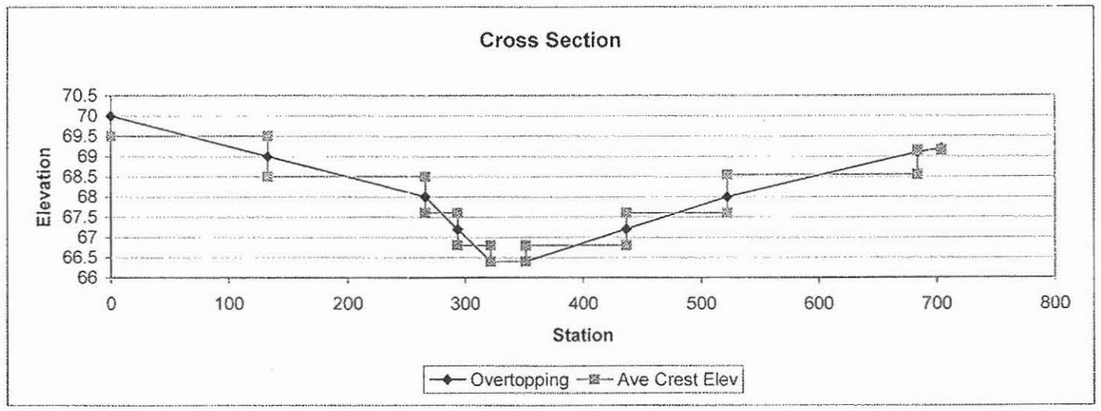
Station	Elevation
0	70
133	69
266	68
294	67.2
322	66.4
352	66.4
437	67.2
522	68
684	69.1
704	69.2

Weir Approximation:

Station	Elevation
0	69.5
133	69.5
133	68.5
266	68.5
266	67.6
294	67.6
294	66.8
322	66.8
322	66.4
352	66.4
352	66.8
437	66.8
437	67.6
522	67.6
522	68.55
684	68.55
684	69.15
704	69.15

Culvert Flows (cfs):

south	0
southeast	0
east	0



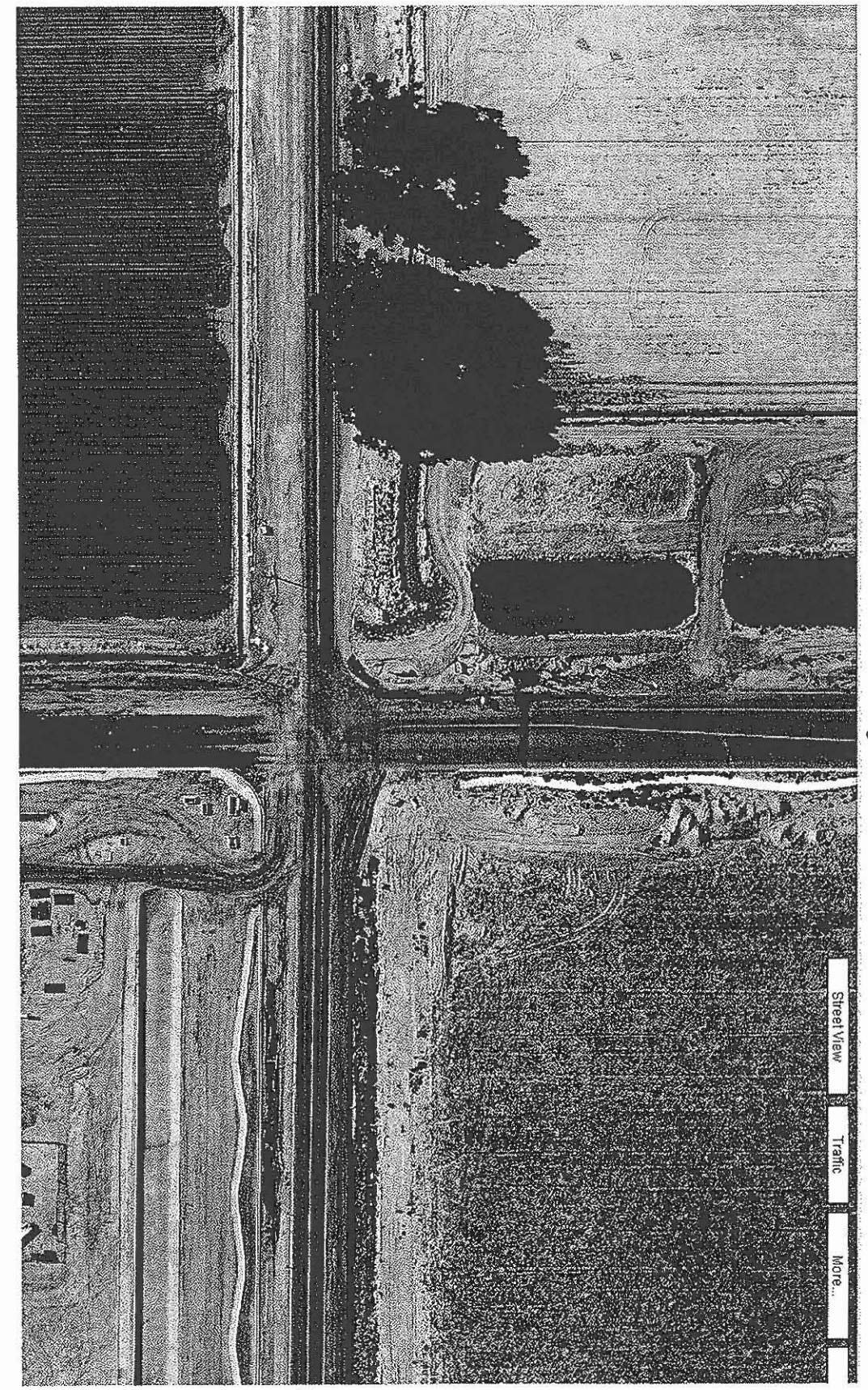
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	21.25	14%	Q(south)	74.38	17%	Q(south)	178.19	19%	Q(south)	352.59	21%
Q(southeast)	64.40	43%	Q(southeast)	133.40	31%	Q(southeast)	217.35	23%	Q(southeast)	313.93	19%
Q(east)	64.51	43%	Q(east)	225.79	52%	Q(east)	540.92	58%	Q(east)	990.26	60%
	150.16			433.56			936.45			1656.78	

First DI	East to South			
Inflow	150.16	433.56	936.45	1656.78
Outflow	21.25	74.38	178.19	352.59

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	128.91	359.19	758.27	1304.19
Outflow	64.40	133.40	217.35	313.93

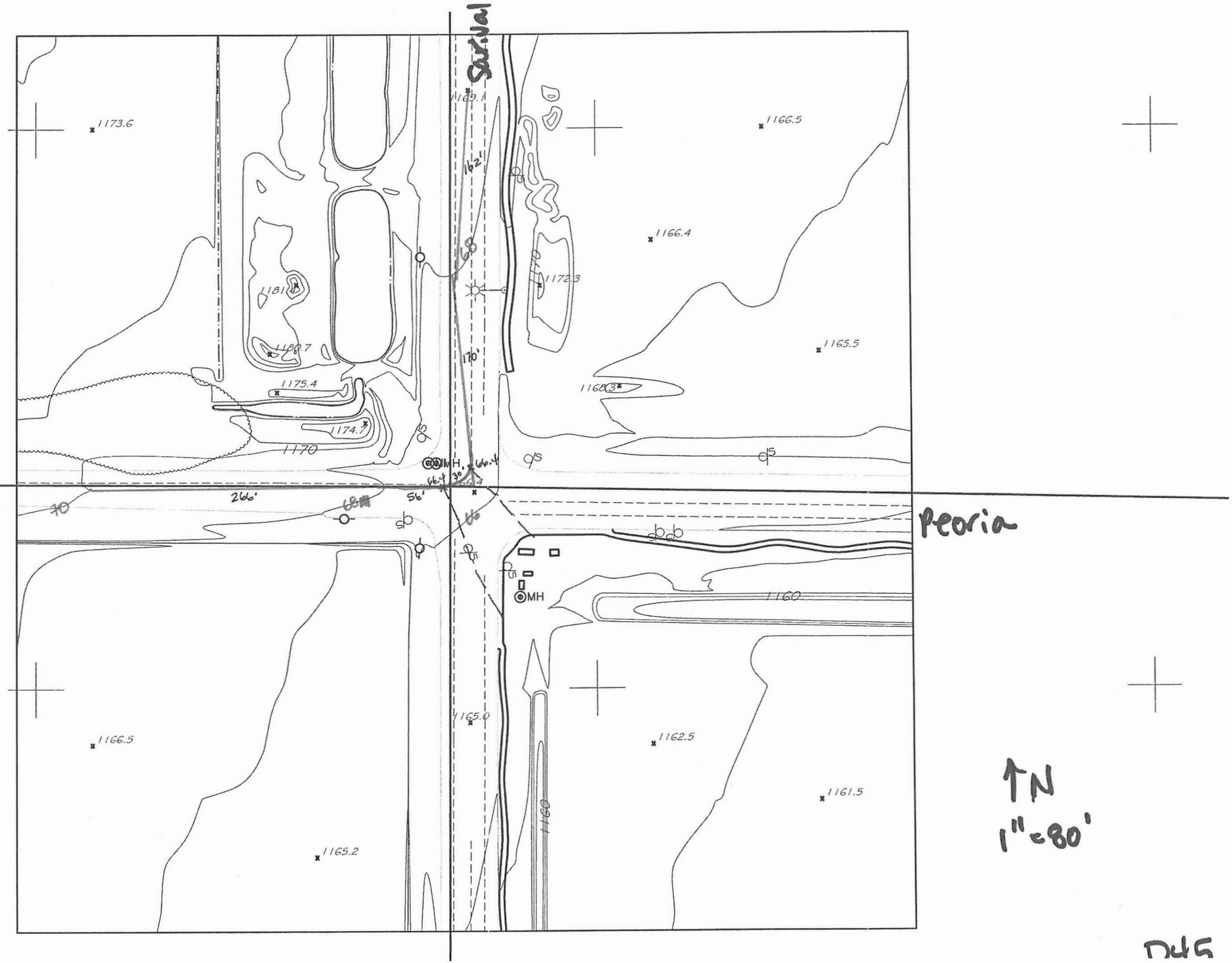
Assumes diversion is to southeast



Sarita.

Revia

Dus



DUG

C:\PIWo JPHA\dms8078.3\Topo-1.303 Intersections-North.dwg, 10/9/2008 4:27:19

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Computed	AHM	Date	10/27/2008
Subject	Weir Flow Analysis	Checked		Date	3/10/09
Task	Weir Calculations	Sheet	1	Of	x

Location: Peoria & Reems (D46)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	1149	1148	110	1148.5	1146.5	0	0.00	1147	0	0.00	1147.5	0	0.00	CHECK	1148	0	0.00	DONE
south	1148	1147.3	205	1147.65	1146.5	0	0.00	1147	0	0.00	1147.5	0	0.00		1148	0.35	127.34	
south	1147.3	1146	310	1146.65	1146.5	0	0.00	1147	0.35	192.57	1147.5	0.85	728.80		1148	1.35	1458.76	
southeast	1146	1146.2	10	1146.1	1146.5	0.4	7.59	1147	0.9	25.61	1147.5	1.4	49.70		1148	1.9	78.57	
southeast	1146.2	1146	12	1146.1	1146.5	0.4	9.11	1147	0.9	30.74	1147.5	1.4	59.63		1148	1.9	94.28	
east	1146	1147.6	250	1146.8	1146.5	0	0.00	1147	0.2	67.08	1147.5	0.7	439.25		1148	1.2	985.90	
east	1147.6	1148	95	1147.8	1146.5	0	0.00	1147	0	0.00	1147.5	0	0.00		1148	0.2	25.49	
east	1148	1149	360	1148.5	1146.5	0	0.00	1147	0	0.00	1147.5	0	0.00		1148	0	0.00	
east	1149	1149.5	10	1149.25	1146.5	0	0.00	1147	0	0.00	1147.5	0	0.00		1148	0	0.00	
						TOTALS:	16.70			316.00			1277.38				2770.35	

Graph Computations:

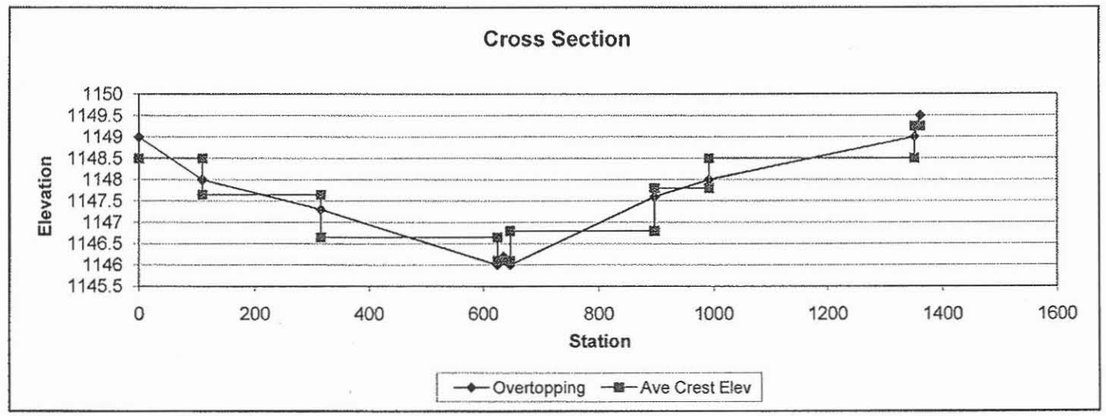
Station	Elevation
0	1149
110	1148
315	1147.3
625	1146
635	1146.2
647	1146
897	1147.6
992	1148
1352	1149
1362	1149.5

Weir Approximation:

Station	Elevation
0	1148.5
110	1148.5
110	1147.65
315	1147.65
315	1146.65
625	1146.65
625	1146.1
635	1146.1
635	1146.1
647	1146.1
647	1146.8
897	1146.8
897	1147.8
992	1147.8
992	1148.5
1352	1148.5
1352	1149.25
1362	1149.25

Culvert Flows (cfs):

south	2342 6 – 10' x 4' RCBC's
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	2342.00	99%	Q(south)	2534.57	95%	Q(south)	3070.80	85%	Q(south)	3928.10	77%
Q(southeast)	16.70	1%	Q(southeast)	56.35	2%	Q(southeast)	109.33	3%	Q(southeast)	172.85	3%
Q(east)	0.00	0%	Q(east)	67.08	3%	Q(east)	439.25	12%	Q(east)	1011.39	20%
	2358.70			2658.00			3619.38			5112.35	

First DI	East to South			
Inflow	2358.70	2658.00	3619.38	5112.35
Outflow	2342.00	2534.57	3070.80	3928.10

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	16.70	123.43	548.58	1184.24
Outflow	16.70	56.35	109.33	172.85

Assumes diversion is to southeast

Culvert Calculator Report
PeoriaReemsDD46

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	1,147.00 ft	Headwater Depth/ Height	1.75
Computed Headwater Elevation	1,147.00 ft	Discharge	2,342.31 cfs
Inlet Control HW Elev	1,147.00 ft	Tailwater Elevation	1,144.00 ft
Outlet Control HW Elev	1,146.67 ft	Control Type	Inlet Control

Grades			
Upstream Invert	1,140.00 ft	Downstream Invert	1,139.50 ft
Length	100.00 ft	Constructed Slope	0.005000 ft/ft

Hydraulic Profile			
Profile	Pressure	Depth, Downstream	3.22 ft
Slope Type	N/A	Normal Depth	3.12 ft
Flow Regime	N/A	Critical Depth	3.62 ft
Velocity Downstream	12.13 ft/s	Critical Slope	0.003315 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	10.00 ft
Section Size	10 x 4 ft	Rise	4.00 ft
Number Sections	6		

Outlet Control Properties			
Outlet Control HW Elev	1,146.67 ft	Upstream Velocity Head	1.81 ft
Ke	0.50	Entrance Loss	0.74 ft

Inlet Control Properties			
Inlet Control HW Elev	1,147.00 ft	Flow Control	Submerged
Inlet Type	90 and 15 ° wingwall flares	Area Full	240.0 ft²
K	0.06100	HDS 5 Chart	8
M	0.75000	HDS 5 Scale	2
C	0.04000	Equation Form	1
Y	0.80000		

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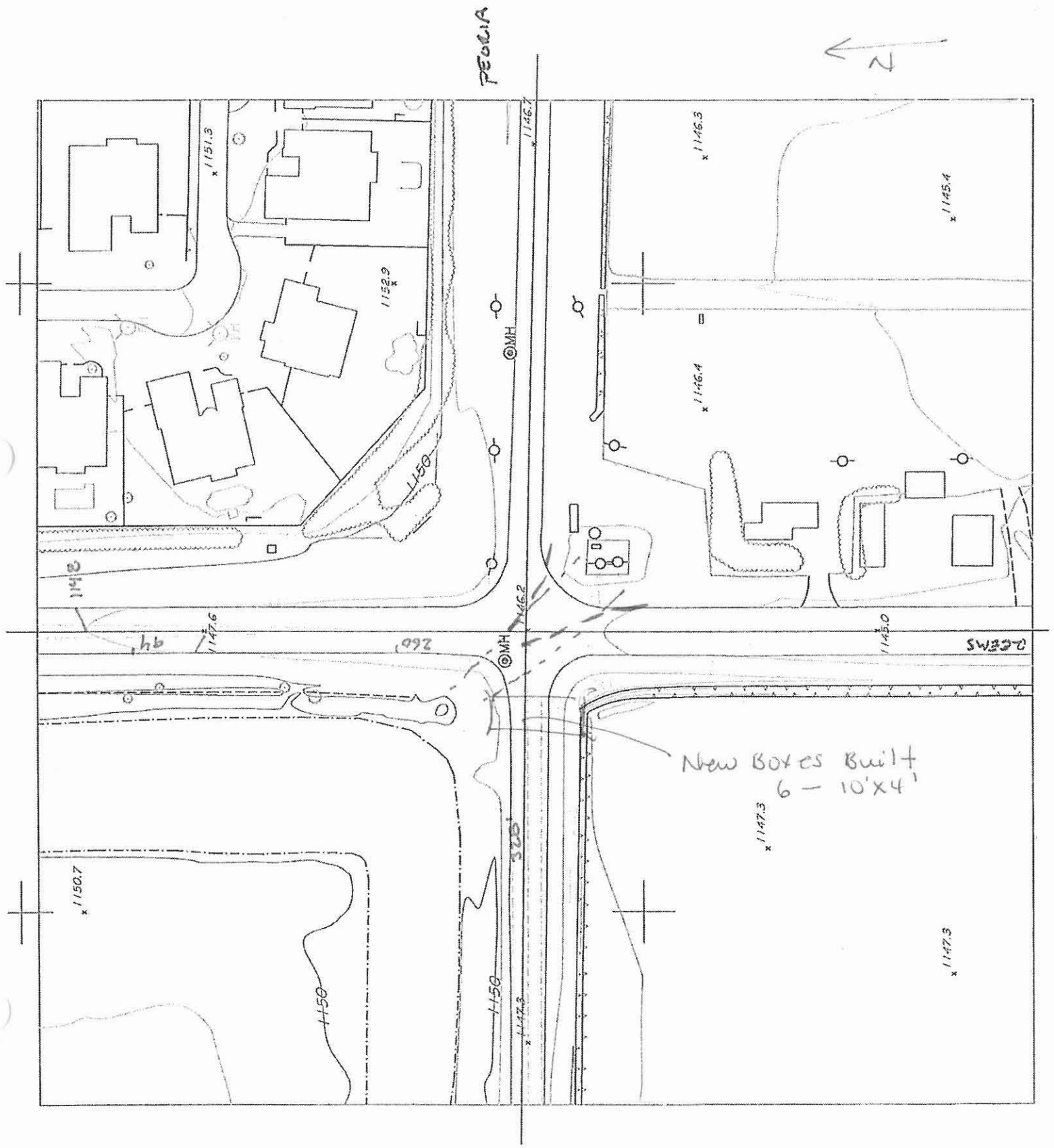
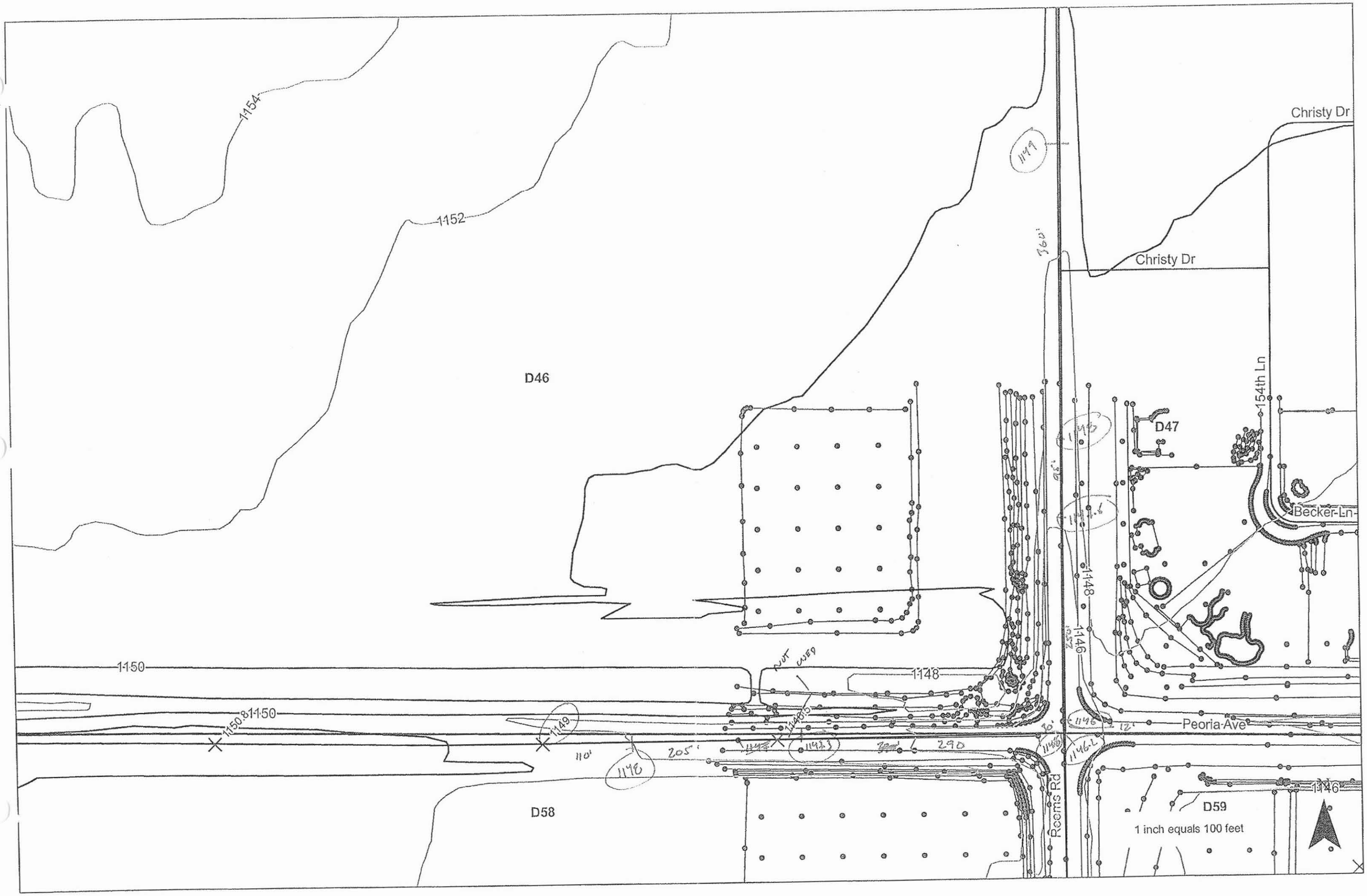

PEORIA
ACEMS
N
MH
MH
1151.3
1152.9
1150
1149.2
1147.6
1146.2
1146.7
1146.3
1146.4
1145.4
1145.0
1147.3
1147.3
1147.3
1147.3
1150.7
1150
1150
94'
260'
325'
New Boxes Built
6 — 10'x4'


1154
1152
D46
Christy Dr
Christy Dr
154th Ln
D47
Becker Ln
1148
1146
1150
1150
1150
1148
Peoria Ave
Reems Rd
D58
D59
1 inch equals 100 feet

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	tl
		Date	3/10/09
		Sheet	1
		Of	X

Location: Peoria at Bullard (DD47)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	82	81	690	81.5	80	0	0.00	80.5	0	0.00	81	0	0.00	CHECK	81.5	0	0.00	DONE
south	81	80	690	80.5	80	0	0.00	80.5	0	0.00	81	0.5	731.86		81.5	1	2070.00	
south	80	79.5	673	79.75	80	0.25	252.38	80.5	0.75	1311.38	81	1.25	2821.64		81.5	1.75	4674.05	
south	79.5	79.5	337	79.5	80	0.5	357.44	80.5	1	1011.00	81	1.5	1857.33		81.5	2	2859.54	
east	79.5	80	220	79.75	80	0.25	82.50	80.5	0.75	428.68	81	1.25	922.38		81.5	1.75	1527.92	
east	80	81	340	80.5	80	0	0.00	80.5	0	0.00	81	0.5	360.62		81.5	1	1020.00	
east	81	82	340	81.5	80	0	0.00	80.5	0	0.00	81	0	0.00		81.5	0	0.00	
east	82	82	1	82	80	0	0.00	80.5	0	0.00	81	0	0.00		81.5	0	0.00	
east	82	82	1	82	80	0	0.00	80.5	0	0.00	81	0	0.00		81.5	0	0.00	
						TOTALS:	692.32			2751.06			6693.82				12151.51	

Graph Computations:

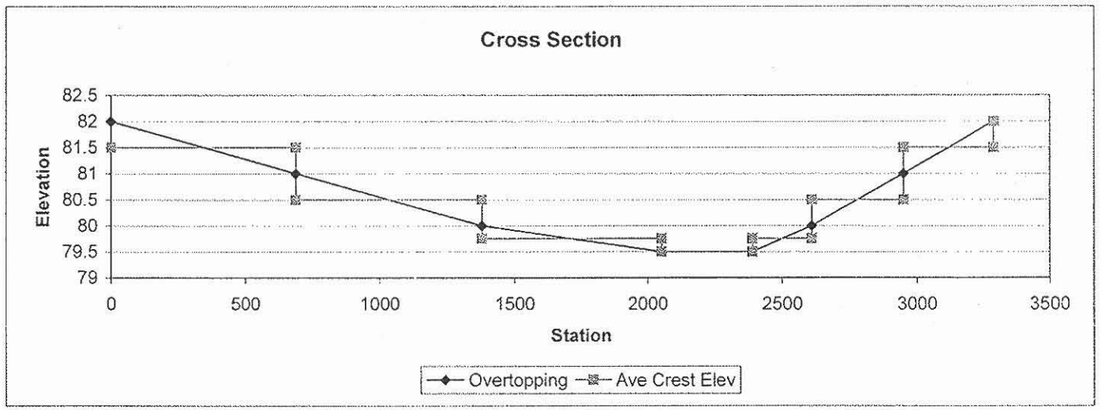
Station	Elevation
0	82
690	81
1380	80
2053	79.5
2390	79.5
2610	80
2950	81
3290	82
3291	82
3292	82

Weir Approximation:

Station	Elevation
0	81.5
690	81.5
690	80.5
1380	80.5
1380	79.75
2053	79.75
2053	79.5
2390	79.5
2390	79.75
2610	79.75
2610	80.5
2950	80.5
2950	81.5
3290	81.5
3290	82
3291	82
3291	82
3292	82

Culvert Flows (cfs):

south	0
southeast	0
east	0



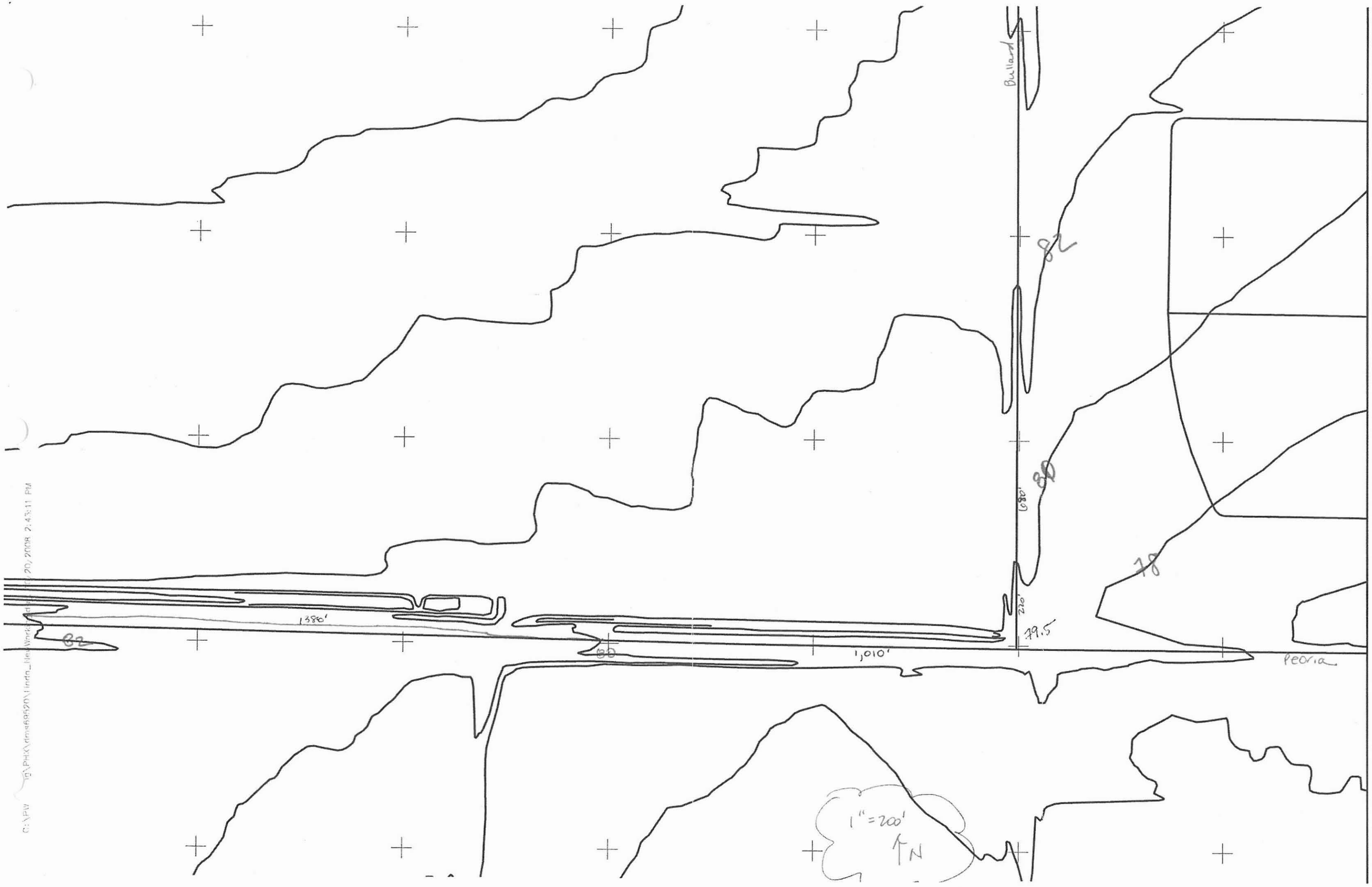
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	609.82	88%	Q(south)	2322.38	84%	Q(south)	5410.82	81%	Q(south)	9603.59	79%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	82.50	12%	Q(east)	428.68	16%	Q(east)	1283.00	19%	Q(east)	2547.92	21%
	692.32			2751.06			6693.82			12151.51	

First DI	East to South			
Inflow	692.32	2751.06	6693.82	12151.51
Outflow	609.82	2322.38	5410.82	9603.59

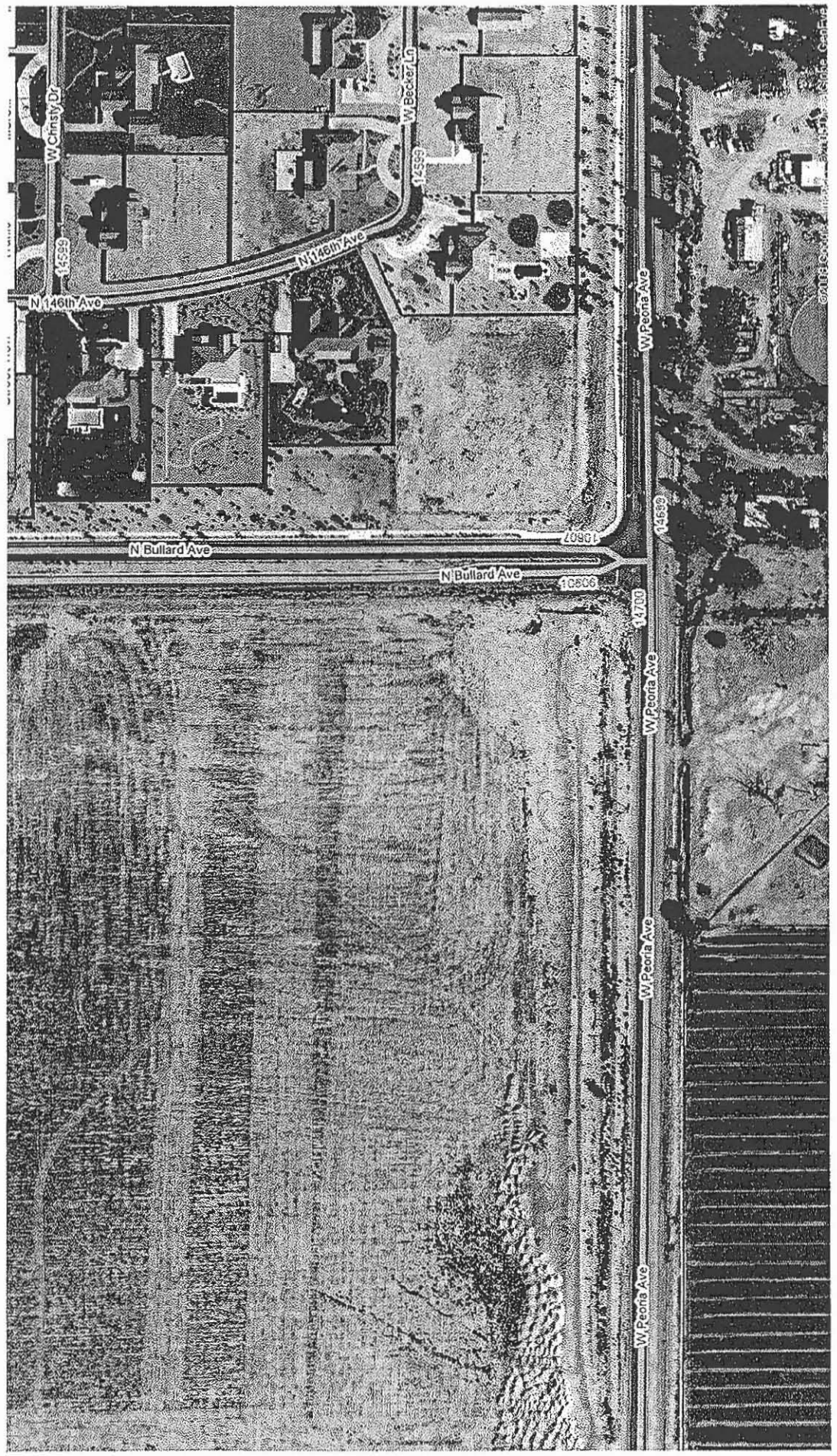
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	82.50	428.68	1283.00	2547.92
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast



C:\PW g:\PHX\dma69520\lindn_file\Work 20, 2008 2:43:11 PM


W Christy Dr
14539
N 146th Ave
N 146th Ave
W Becker Ln
14539
W Peoria Ave
14539
10807
N Bullard Ave
N Bullard Ave
10806
14700
W Peoria Ave
W Peoria Ave

D48

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Computed	AHM	Date	10/27/2008
Subject	Weir Flow Analysis	Checked	LP	Date	3/10/09
Task	Weir Calculations	Sheet	1	Of	x

Location: Peoria & Litchfield (D48)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	1126.7	1126	640	1126.35	1125	0	0.00	1125.5	0	0.00	1126	0	0.00	CHECK	1126.5	0.15	111.54	DONE
south	1126	1125.1	140	1125.55	1125	0	0.00	1125.5	0	0.00	1126	0.45	126.79		1126.5	0.95	388.90	
south	1125.1	1124.4	440	1124.75	1125	0.25	165.00	1125.5	0.75	857.37	1126	1.25	1844.76		1126.5	1.75	3055.84	
south	1124.4	1124.5	300	1124.45	1125	0.55	367.10	1125.5	1.05	968.34	1126	1.55	1736.76		1126.5	2.05	2641.64	
southeast	1124.5	1124.7	30	1124.6	1125	0.4	22.77	1125.5	0.9	76.84	1126	1.4	149.09		1126.5	1.9	235.71	
east	1124.7	1124.9	260	1124.8	1125	0.2	69.77	1125.5	0.7	456.82	1126	1.2	1025.34		1126.5	1.7	1728.89	
east	1124.9	1125.2	260	1125.05	1125	0	0.00	1125.5	0.45	235.46	1126	0.95	722.24		1126.5	1.45	1361.90	
east	1125.2	1126	240	1125.6	1125	0	0.00	1125.5	0	0.00	1126	0.4	182.15		1126.5	0.9	614.75	
east	1126	1126.9	365	1126.45	1125	0	0.00	1125.5	0	0.00	1126	0	0.00		1126.5	0.05	12.24	
						TOTALS:	624.64			2594.82			5787.11				10151.41	

Graph Computations:

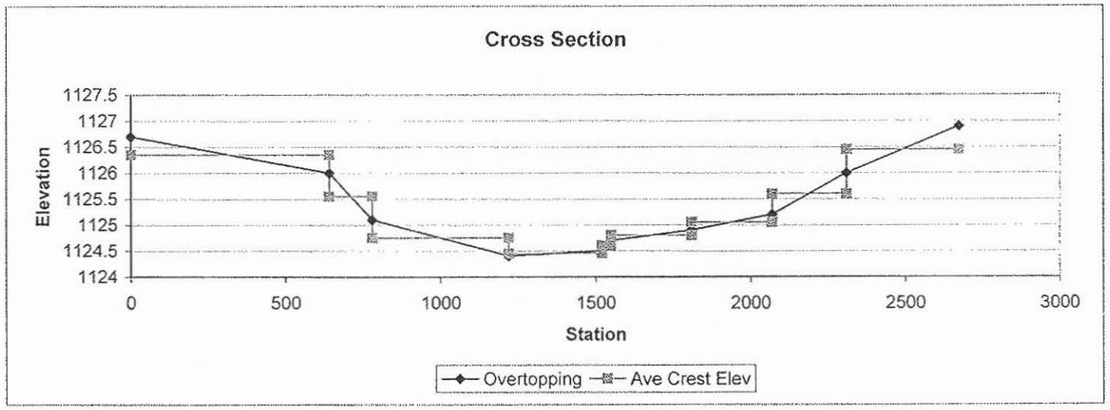
Station	Elevation
0	1126.7
640	1126
780	1125.1
1220	1124.4
1520	1124.5
1550	1124.7
1810	1124.9
2070	1125.2
2310	1126
2675	1126.9

Weir Approximation:

Station	Elevation
0	1126.35
640	1126.35
640	1125.55
780	1125.55
780	1124.75
1220	1124.75
1220	1124.45
1520	1124.45
1520	1124.6
1550	1124.6
1550	1124.8
1810	1124.8
1810	1125.05
2070	1125.05
2070	1125.6
2310	1125.6
2310	1126.45
2675	1126.45

Culvert Flows (cfs):

south	0
southeast	0
east	0



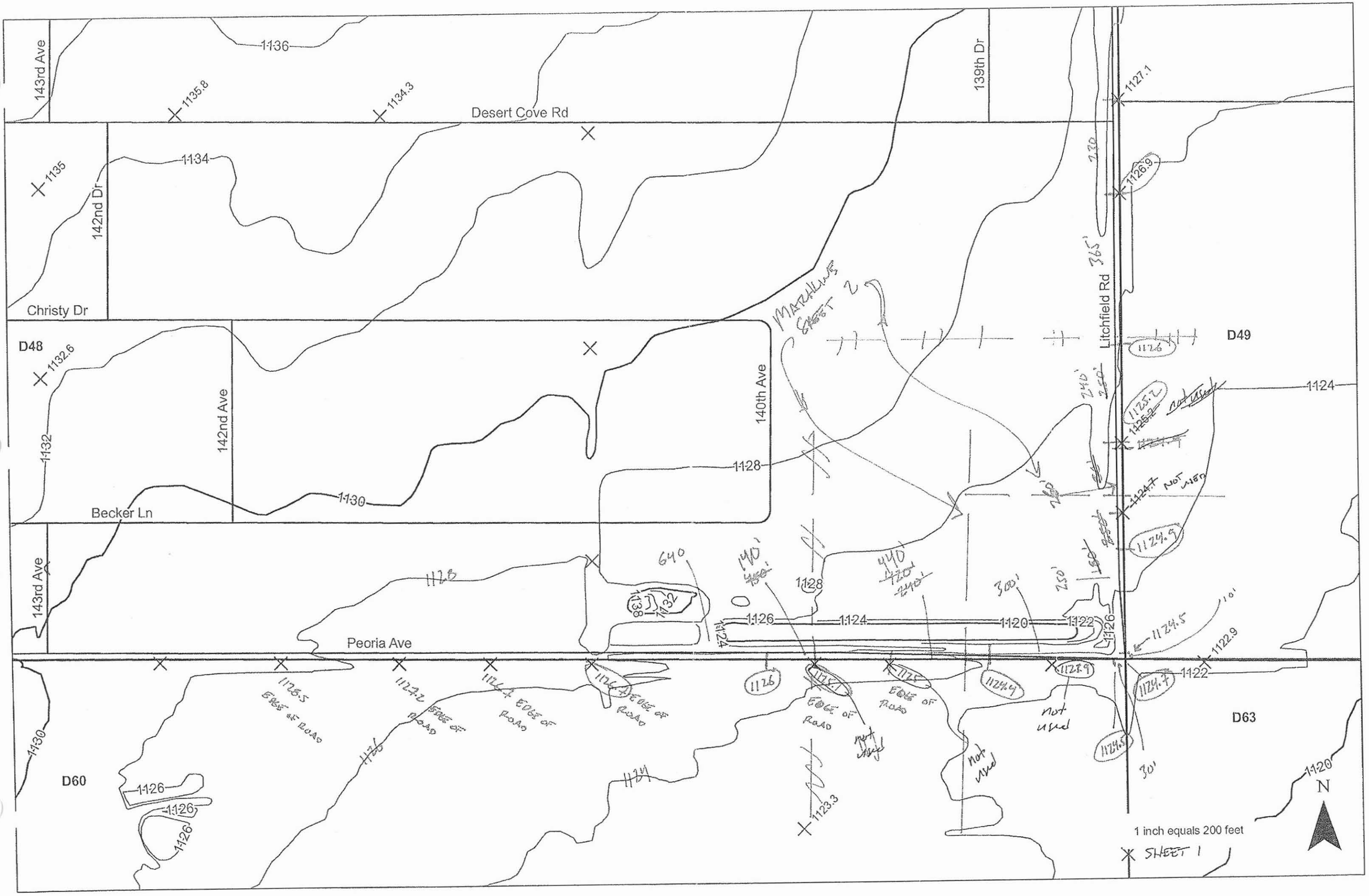
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	532.10	85%	Q(south)	1825.70	70%	Q(south)	3708.30	64%	Q(south)	6197.92	61%
Q(southeast)	22.77	4%	Q(southeast)	76.84	3%	Q(southeast)	149.09	3%	Q(southeast)	235.71	2%
Q(east)	69.77	11%	Q(east)	692.27	27%	Q(east)	1929.72	33%	Q(east)	3717.79	37%
	624.64			2594.82			5787.11			10151.41	

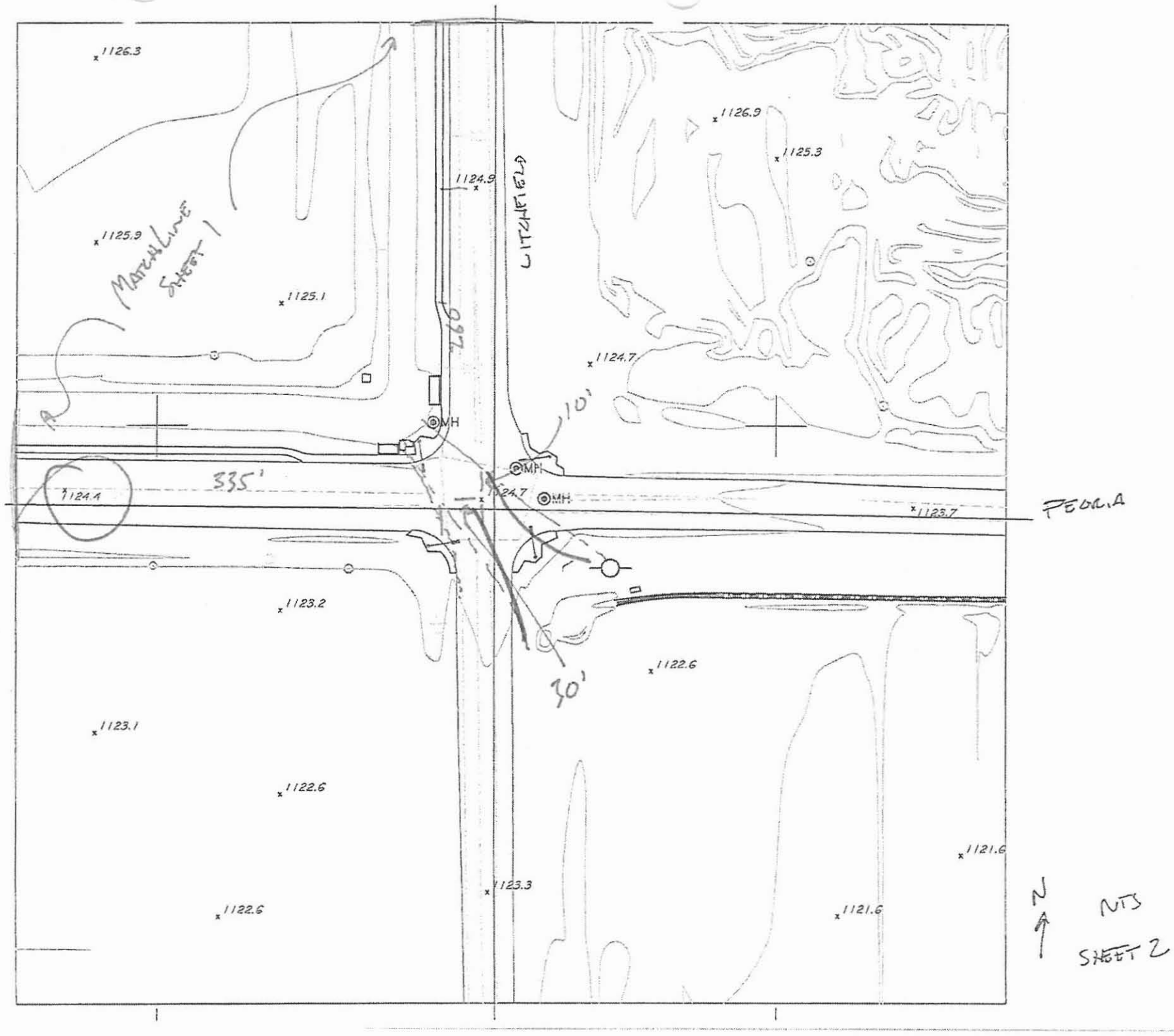
First DI	East to South			
Inflow	624.64	2594.82	5787.11	10151.41
Outflow	532.10	1825.70	3708.30	6197.92

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	92.53	769.12	2078.81	3953.49
Outflow	22.77	76.84	149.09	235.71

Assumes diversion is to southeast


143rd Ave
Desert Cove Rd
139th Dr
142nd Dr
Christy Dr
D48
142nd Ave
140th Ave
Becker Ln
Litchfield Rd
D49
Peoria Ave
D60
D63
1 inch equals 200 feet
N


1126.3
1126.9
1125.3
1124.9
1125.9
MATCHLINE SHEET 1
1125.1
LITCHFIELD
297'
1124.7
10'
MH
MH
335'
1124.4
1124.7
MH
1123.7
PEORIA
1123.2
1122.6
30'
1123.1
1122.6
1121.6
1123.3
1122.6
1121.6
N
NTS
SHEET 2

Peoria Litchfield

D49

D49

```
1**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*              JUN   1998                    *
*            VERSION 4.1                     *
*                                            *
*   RUN DATE   06FEB09  TIME  14:20:20       *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*   U.S. ARMY CORPS OF ENGINEERS             *
*   HYDROLOGIC ENGINEERING CENTER            *
*         609 SECOND STREET                  *
*      DAVIS, CALIFORNIA 95616               *
*         (916) 756-1104                     *
*                                            *
**********************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
   2          ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
   3          ID   PREPARED BY ASPEN CONSULTING ENGINEERS
   4          ID   MODIFICATIONS:
   5          ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
   6          ID   (2) SURPRISE WWTP WAS UPDATED
   7          ID   (3) NORTHERN PARKWAY WAS UPDATED
   8          ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
   9          ID
  10          ID  ***********************************************************************
  11          ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
  12          ID      NOTES:
  13          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
  14          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
  15          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
  16          ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
  17          ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
  18          ID
  19          ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
  20          ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
  21          ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
  22          ID         LUKE AIR FORCE BASE CRASH ZONE AREA
  23          ID
  24          ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
  25          ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  26          ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  27          ID         TANKS/AGUA FRIA ADMS, Date: October 1991
  28          ID
  29          ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  30          ID         100-YEAR, 24-HOUR STORM                 original file: WTADMS.24
  31          ID
  32          ID                                   REVISED BY URS     DATE: 01-14-04
  33          ID                                                      FILE: L33PE4H.DAT
  34          ID
  35          ID       NOTES:
  36          ID       1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  37          ID          2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  38          ID       2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  39          ID       3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  40          ID          GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  41          ID          THE WLB MODEL.
  42          ID       4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  43          ID          WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  44          ID          CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  45          ID          DRAINAGE REPORTS.
  46          ID       5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  47          ID          GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
  48          ID          ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  49          ID          CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  50          ID          REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  51          ID          STORM.
  52          ID          REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```

HEC-1 INPUT PAGE 2

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  53          ID       9. P
  54          ID          THERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
  55          ID      10. AVTA FILE BY THE FCDMC.
  56          ID          ARE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
  57          ID             3 & #4) WERE ESTIMATED BY EEC.
```

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	LP
		Date	3/10/09
		Sheet	1
		Of	x

Location: Peoria at Railroad Tracks (DD49)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	18.4	17.9	143	18.15	17.4	0	0.00	17.9	0	0.00	18.4	0.25	53.63	CHECK	18.9	0.75	278.64	DONE
south	17.9	17.4	143	17.65	17.4	0	0.00	17.9	0.25	53.63	18.4	0.75	278.64		18.9	1.25	599.55	
south	17.4	17.2	338	17.3	17.4	0.1	32.07	17.9	0.6	471.26	18.4	1.1	1169.84		18.9	1.6	2052.19	
south	17.2	17.3	20	17.25	17.4	0.15	3.49	17.9	0.65	31.44	18.4	1.15	73.99		18.9	1.65	127.17	
southeast	17.3	17.3	8	17.3	17.4	0.1	0.76	17.9	0.6	11.15	18.4	1.1	27.69		18.9	1.6	48.57	
east	17.3	17.3	40	17.3	17.4	0.1	3.79	17.9	0.6	55.77	18.4	1.1	138.44		18.9	1.6	242.86	
east	17.3	17.5	306	17.4	17.4	0	0.00	17.9	0.5	324.56	18.4	1	918.00		18.9	1.5	1686.47	
east	17.5	18	172	17.75	17.4	0	0.00	17.9	0.15	29.98	18.4	0.65	270.41		18.9	1.15	636.35	
east	18	18.5	172	18.25	17.4	0	0.00	17.9	0	0.00	18.4	0.15	29.98		18.9	0.65	270.41	
						TOTALS:	40.10			977.80			2960.62				5942.22	

Graph Computations:

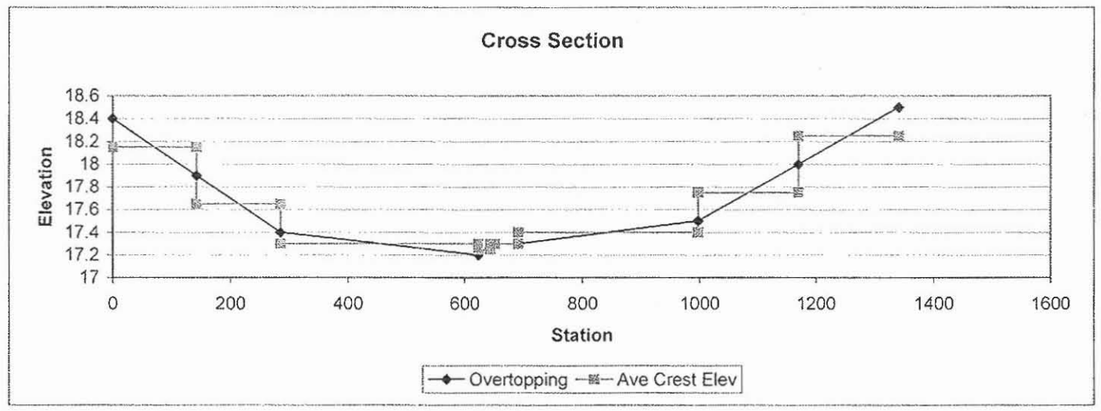
Station	Elevation
0	18.4
143	17.9
286	17.4
624	17.2
644	17.3
652	17.3
692	17.3
998	17.5
1170	18
1342	18.5

Weir Approximation:

Station	Elevation
0	18.15
143	18.15
143	17.65
286	17.65
286	17.3
624	17.3
624	17.25
644	17.25
644	17.3
652	17.3
652	17.3
692	17.3
692	17.4
998	17.4
998	17.75
1170	17.75
1170	18.25
1342	18.25

Culvert Flows (cfs):

south	0
southeast	0
east	40 estimate, ~~check~~ inlet clogged



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	35.55	44%	Q(south)	556.33	55%	Q(south)	1576.10	53%	Q(south)	3057.55	51%
Q(southeast)	0.76	1%	Q(southeast)	11.15	1%	Q(southeast)	27.69	1%	Q(southeast)	48.57	1%
Q(east)	43.79	55%	Q(east)	450.31	44%	Q(east)	1396.83	47%	Q(east)	2876.10	48%
	80.10			1017.80			3000.62			5982.22	

First DI	East to South			
Inflow	80.10	1017.80	3000.62	5982.22
Outflow	35.55	556.33	1576.10	3057.55

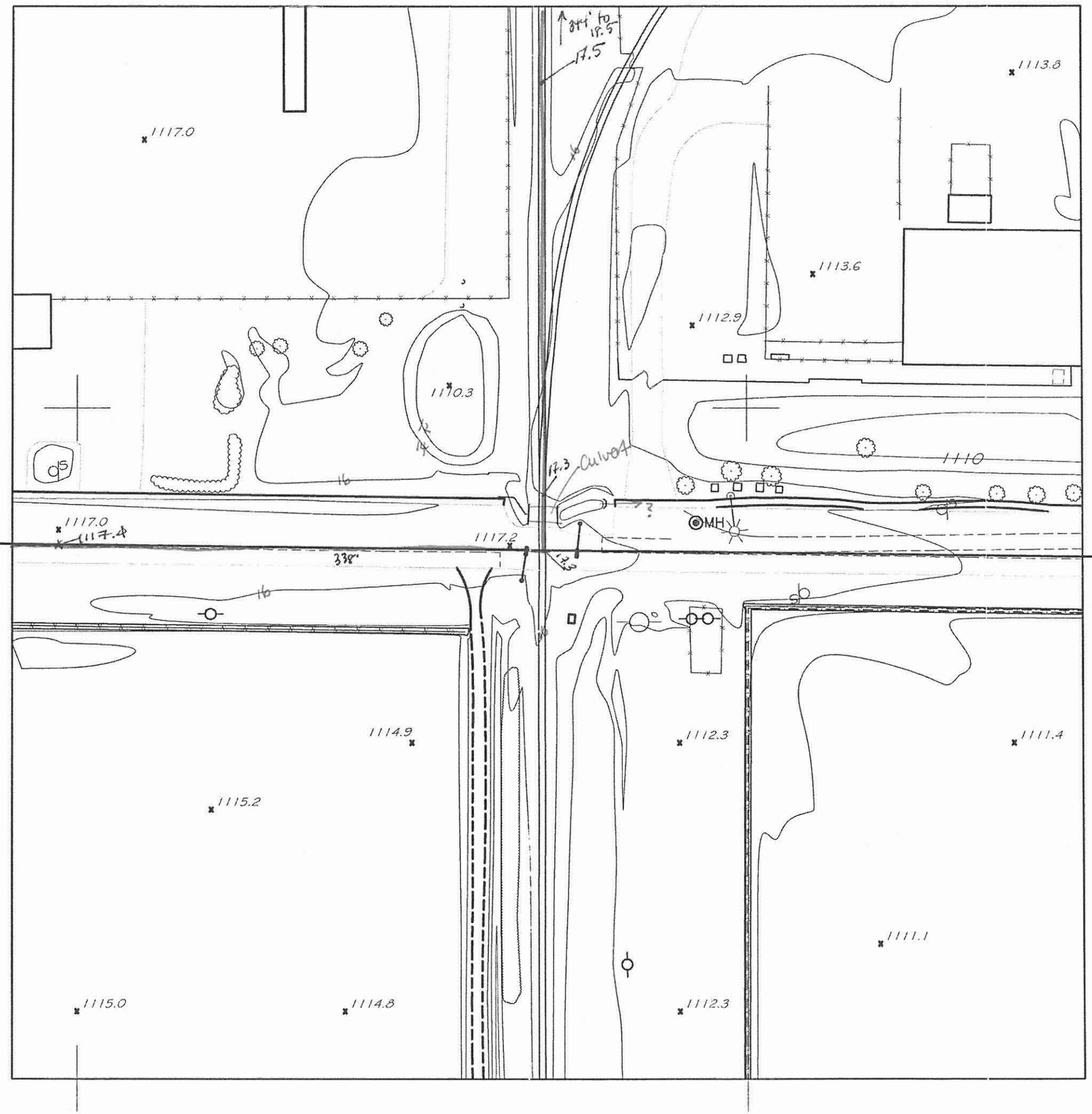
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	44.55	461.46	1424.52	2924.67
Outflow	0.76	11.15	27.69	48.57

Assumes diversion is to southeast

Peoria @ RR tracks

DD49

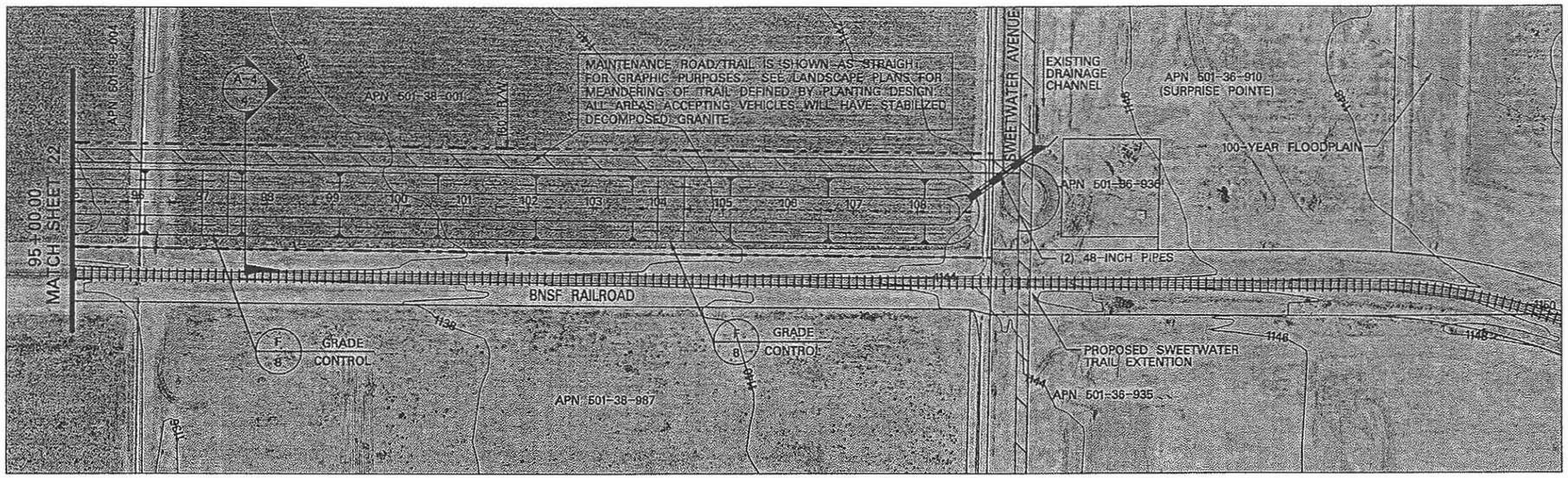


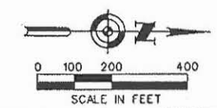
N

1" = 80'

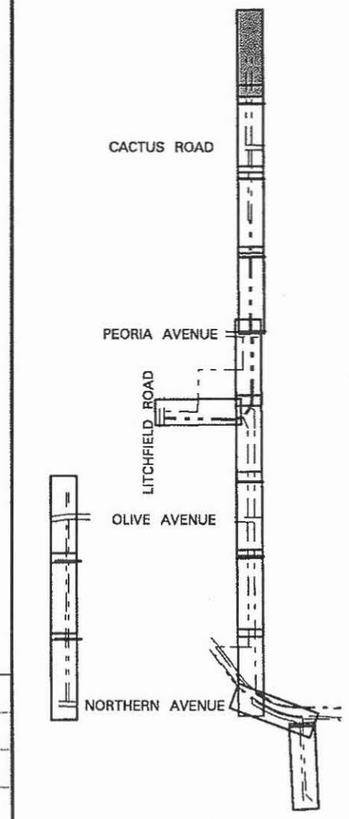
C:\PWworking\PHX\dms68320\linda_NewWorking.dwg, 10/21/2008 8:46:58 AM

D38D49

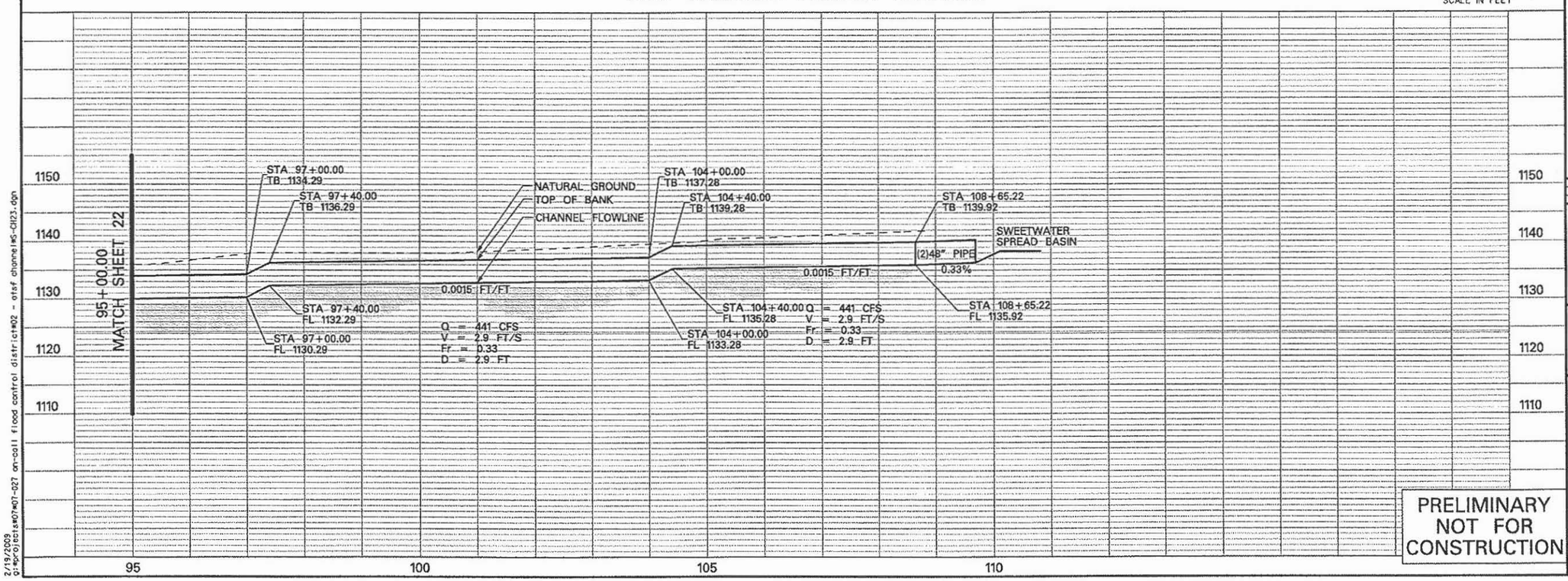




BNSF RAILROAD PRIMARY CHANNEL



KEY MAP



PRELIMINARY NOT FOR CONSTRUCTION

NO.	REVISION	BY	DATE
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions

201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN Date Signed 2/19/09 ARIZONA, U.S.A.
EXPIRES 3/31/09

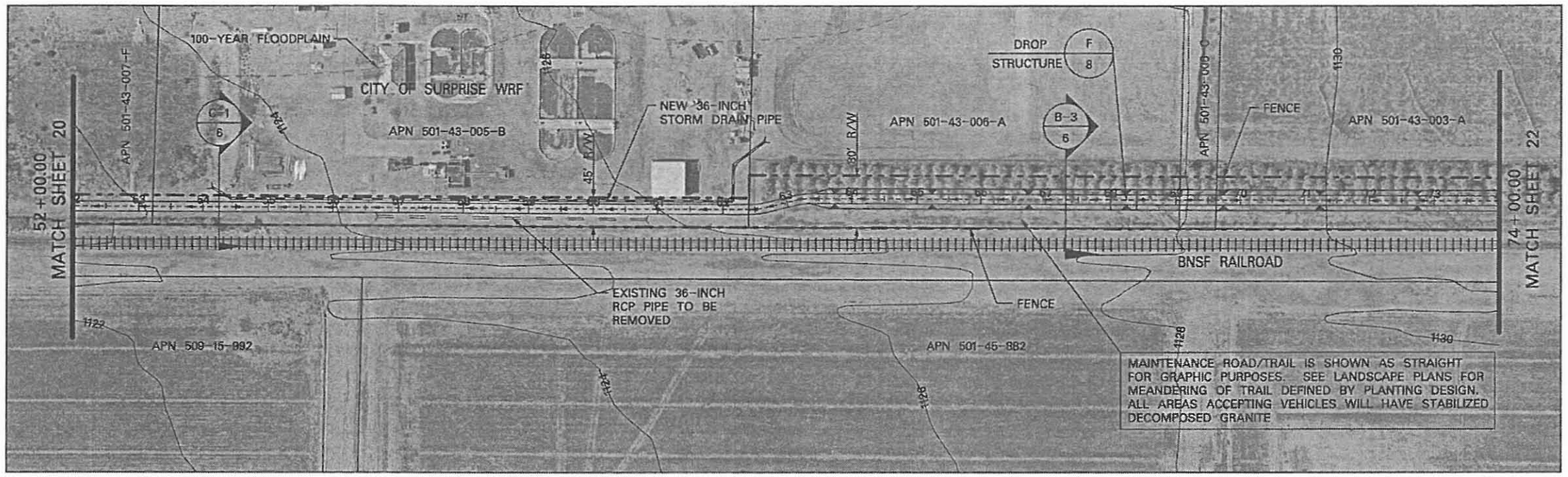
	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

SHEET 23 OF 44

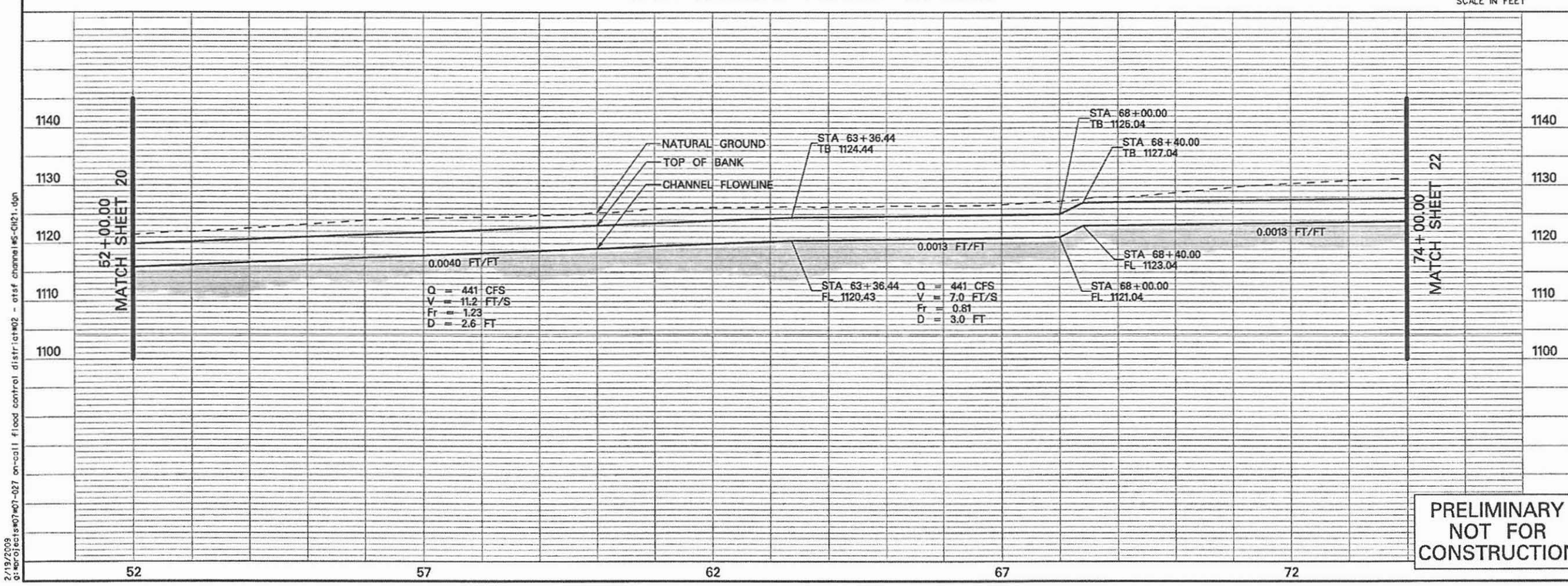
2/19/2009
g:\projects\a07\07-027 on-call flood control district\02 - atsf channel\#5-ch23.dgn

D40D49

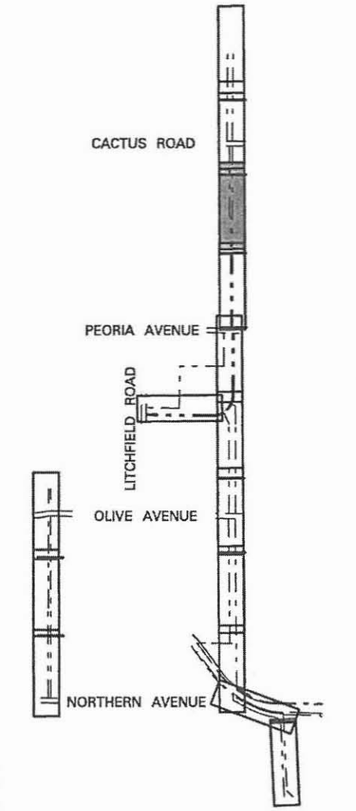


BNSF RAILROAD PRIMARY CHANNEL

0 100 200 400
SCALE IN FEET



PRELIMINARY NOT FOR CONSTRUCTION



KEY MAP

NO.	REVISION	BY	DATE
2			
1			

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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CERTIFICATE NO. 19690
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ARIZONA, U.S.A.
EXPIRES 3/31/09

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

SHEET 21 OF 44

2/19/2009
g:\projects\#07\07-027 on-call flood control district\#02 - atsf channel\#5-ch21.dgn

D50

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D51

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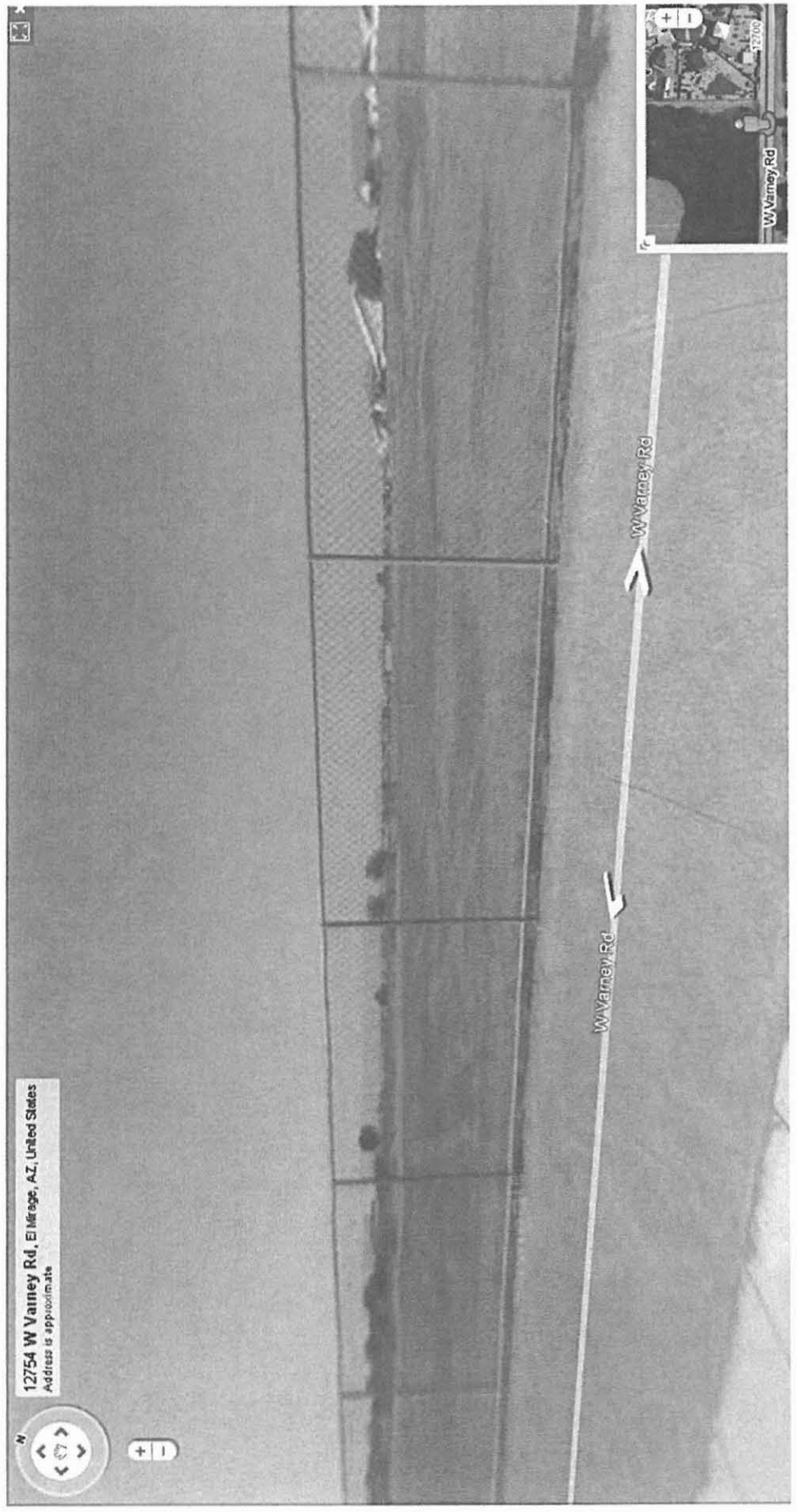
For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D52

D52

Site Visit
indicated
Retention



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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D53

D63

```
1*************************************
 *                                   *
 *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
 *          JUN   1998               *
 *        VERSION 4.1                *
 *                                   *
 *      DATE   23MAR09  TIME  11:43:35 *
 *                                   *
 **.  ***********************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                    HEC-1 INPUT                                    PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID      HDR ENGINEERING INC. 3-23-09, FILE:RECPLAN.DAT
    2           ID      EDITS FOR WADDELL CAR
    3           ID      MODIFIES AREA AROUND WADDELL/DYSART AND WEST CACTUS BASIN AREA FOR
    4           ID      PROPOSED IMPROVEMENTS
    5           ID      ASPEN CONSULTING ENGINEERS, JCS, 4-25-08, FILE: 303EWP.DAT, 100-YR 24-HR
    6           ID      NOTES:
    7           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
    8           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
    9           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   10           ID      AND R238.
                * ***********************************************************************
                * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                * ***********************************************************************
   11           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   12           ID
   13           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   14           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   15           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   16           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   17           ID
   18           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   19           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   20           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   21           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   22           ID
   23           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   24           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   25           ID
   26           ID                                     REVISED BY URS     DATE: 01-14-04
   27           ID                                                        FILE: L33PE4H.DAT
   28           ID
   29           ID        NOTES:
   30           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   31           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   32           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   33           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   34           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   35           ID           THE WLB MODEL.
   36           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   37           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   38           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   39           ID           DRAINAGE REPORTS.
   40           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   41           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   42           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   43           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   44           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   45           ID           STORM.
   46           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
   47           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   48           ID           THE DATA FILE BY THE FCDMC.
   49           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   50           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   51           ID
                *DIAGRAM
                                     HEC-1 INPUT                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   52           IT       5                    600
   53           IO       5
   54           IN      15
   55           JD    4.03     .001
   56           PC    .000     .002     .005     .008     .011     .014     .017     .020     .023     .026
```

```
              * REMOVE PONDING AT RAILROAD WITH PROPOSED CHANNEL
              *
              * KK SR139
              * KM       STOAGE ROUTE BEHIND RAILROAD.
              * RS     1    STOR        0        0
              * SV     0    1.14     3.12     6.43    29.35
              * SQ     0       0      170     1037     5977
              * SE1046.2  1047.2  1047.5     1048     1049
              *
              * KK  R139
              * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1744          KK    RLE1
1745          KM        ROUTE FLOW FROM CP139 TO CP156
1746          RS     1.6              -1.0      0.0
1747          RC   0.030   0.030   0.030    1980  0.0023
1748          RX     0.0    19.2    29.2    39.2    49.2    59.2    69.2    88.4
1749          RY  1137.5  1132.7  1132.7  1132.7  1132.7  1132.7  1132.7  1137.5
              *

1750          KK     156
1751          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 156
1752          BA     .30
1753          LG     .21     .25    5.00     .29     48.
1754          UI     18.     18.     33.     64.     82.     94.    106.    121.    139.    173.
1755          UI    223.    206.    171.    149.    132.    113.     99.     85.     69.     47.
1756          UI     31.     30.     28.     18.     18.     12.      5.      5.      5.      5.
1757          UI      5.      5.      5.      5.      0.      0.      0.      0.      0.      0.
1758          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1759          KK  156T
1760          KM    Divert Retention in Subbasin 156
1761          DT  156R      25.5
1762          DI       0   10000
1763          DQ       0   10000
              *
              * KK CP156
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1764          KK    !LE2
1765          KM   ADD HYDROGRAPHS AT LE2
1766          HC       2    1.18
              *
              * KK  R156
              * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1767          KK    RLE2
1768          KM        ROUTE FLOW FROM CP156 TO CP157
1769          RS     3.4              -1.0      0.0
1770          RC   0.030   0.030   0.030    4888  0.0020
1771          RX     0.0    24.4    34.4    44.4    54.4    64.4    74.4    98.8
1772          RY  1128.5  1122.4  1122.4  1122.4  1122.4  1122.4  1122.4  1128.5
              *
              * KK CP157

1773          KK    !LE3
1774          KM   ADD HYDROGRAPHS AT LE3 (CP157)
1775          HC       2    1.65
              * KK  R157
              * PER EL MIRAGE CHANNELIZATION OF LOWER EL MIRAGE WASH AND TRIBUTARY
              * KK  R157
              * KM       ROUTE FLOW FROM CP157 TO CP172
              * RS     3              -1       0
              * RC  .035    .022     .06    1150   .0035
              * RX  1000    1001    1020    1035    1075    1090    1210    1770
              * RY  1117    1117    1116    1114    1114    1115    1113    1117
              * PER CHANNELIZATION OF LOWER EL MIRAGE WASH

1776          KK   SRLE3
1777          KM   STORAGE ROUTE PONDED AREA BEHIND CACTUS ROAD W/ 20'X10' CONARCH
1778          RS       1    STOR        0        0
1779          SV       0    0.64     4.6     17.3    27.6    56.0
1780          SQ       0       0     139      426     827    1295
1781          SE  1105.3    1108    1110     1112    1114    1116
              *

1782          KK    RLE3
1783          KM        ROUTE FLOW FROM CP157 TO CP172
1784          RS     1.5              -1.0      0.0
1785          RC   0.030   0.030   0.030    1570  0.0020
1786          RX     0.0    10.0    22.0    97.0   171.0   172.0   184.0   194.0
1787          RY     3.5     3.0     0.0     0.0     0.0     0.0     3.0     3.5
              *
```

D42D53

```
1788          KK     172
1789          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 172
1790          BA     .12
1791          LG     .21     .25    4.58     .33      9.
1792          UI      9.      9.     28.     39.     47.     55.     66.     82.    112.     96.
1793          UI     79.     68.     56.     47.     39.     26.     16.     15.     11.      9.
1794          UI      6.      3.      3.      3.      3.      3.      3.      0.      0.      0.
1795          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
1796          KK  172T
1797          KM    Divert Retention in Subbasin 172
1798          DT  172R       2.4
1799          DI       0   10000
1800          DQ       0   10000
              *
              * MODIFY PER LEVEL III
              *
              * KK CP172
```

DDS3RE

```
1801          KK    !LE4
              * KO     1                                21
1802          KM   ADD HYDROGRAPHS AT LE4 (CP172)
1803          HC       2    1.77

1804          KK  SRLECH
              * KO     1                                21
1805          KM   STORAGE ROUTE THROUGH DETENTION BASIN BEHIND EXISTING 2-10'x3'x115 RCB: ADD 1
1806          RS       1     STOR       0       0
1807          SV    5.72   11.59   18.17   24.91   32.01   39.46   67.53   67.53   67.53
1808          SQ       0       0       0       0       0       0       0     329     890
1809          SE  1098.5  1099.5  1100.5  1101.5  1102.5  1103.5  1107.5    1110    1113
              * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE
```

SRDS3

```
1810          KK    RLE4
1811          RS     1.6            -1.0     0.0
1812          RC   0.030   0.030   0.030  4875.3  0.0038
1813          RX     0.0      36      39      42      45      48      51      87
1814          RY  1102.8  1096.8  1096.8  1096.8  1096.8  1096.8  1096.8  1102.8
              *

1815          KK     173
1816          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 173
1817          BA     .31
1818          LG     .21     .25    4.00     .58      7.
1819          UI     15.     15.     15.     43.     57.     71.     79.     87.     96.    109.
1820          UI    121.    146.    184.    191.    160.    139.    125.    114.    100.     90.
1821          UI     79.     71.     57.     43.     27.     26.     25.     22.     15.     15.
1822          UI     14.      5.      5.      5.      5.      5.      5.      5.      5.      5.
1823          UI      5.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1824          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1825          KK  173T
1826          KM    Divert Retention in Subbasin 173
1827          DT  173R       7.1
1828          DI       0   10000
1829          DQ       0   10000
              *
              * MODIFY PER LEVEL III
              *
              * KK CP173
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1830          KK    !LE5
1831          KM   ADD HYDROGRAPHS AT LE5 (CP173)
1832          HC       2    2.08
              *
              * ***********************************************************************
              * ***THE FOLLOWING SECTION TAKEN FROM NEW SUPER BASIN 2E WITH NEW SOILS*****
              * ***********************************************************************
              *

1833          KK    156A
1834          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 156A
1835          BA     .31
1836          LG     .12     .25    4.38     .46   20.00
1837          UI     82.    276.    434.    664.    443.    275.    114.     65.     18.     18.
1838          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1839          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1840          KK   R156A
1841          KM        ROUTE FLOW FROM CP156A TO CP158
1842          RS      34              -1       0
1843          RC     .07     .07     .07    5400   .0030
1844          RX    1000    1001    1002    1380    2200    2838    2839    2840
1845          RY    1117    1117    1117    1116    1116    1118    1118    1118
              *

1846          KK     158
1847          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 158
1848          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1849          KM    L=      1.4  Lca=       .7   S=   20.7  Kn= .034  LAG=  27.3
1850          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1851          BA     .97
1852          LG     .26     .26    4.20     .55   25.00
1853          UI    120.    350.    615.    802.   1158.   1393.   1004.    753.    547.    280.
1854          UI    196.    120.     54.     37.     37.     37.      0.      0.      0.      0.
1855          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1856          KK  158OUT
1857          KM        DIVERSION-RETENTION
1858          DT  158RET   61.74
1859          DI       0   10000
1860          DQ       0   10000

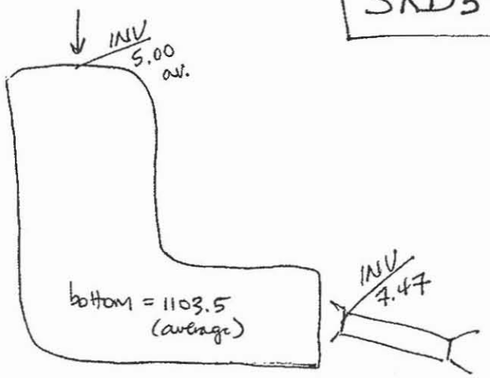
1861          KK   CP158
1862          KM        ADD HYDROGRAPHS AT CP158
1863          HC       2    1.28
```

Storage Route D53

HDR | ONE COMPANY *Many Solutions*™

Project: Existing Conditions		Computed: LP	Date:
Subject:		Checked:	Date:
Task:		Page:	of:
Job #:		No:	

SRD53



volume between inverts = (3.97 ft)(267644 sf)
= 1062547 cf or 24.4 ac-ft

@ elev 7.47 , vol = 24.4 ac ft

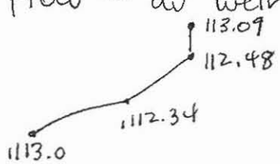
@ elev 9.47 , vol = (5.97)(267644)
= 1597835 or 36.7 ac-ft

@ elev 11.47 , vol = (7.97)(267644)
= 2133123 or 49.0 ac ft

@ elev 13.47, vol = ~~(9.97)(~~) = 132.1 ac ft
(9.97)267644 + (2.5)(1233956) = 132.1 ac-ft

@ elev 15.0m, vol = (11.5)(267644) + (3.5)(1233956)
= 169.8 ac ft

weir flow – av weir elev =



Length = 172.1 ft
av. elev = 1112.7

Q = $CLH^{3/2}$
C = 2.6
L = 172.1
H varies

} see attached rating curve.

SQ = weir + culvert disch.

SV	24.4	36.7	49.0	132.1	169.8	
SQ	0	98	303	375 + 513 = 888	1642	
SE	1107.47	1109.47	1111.47	1113.47	1115.0	

Rating Curve for Broad Crested Weir - 1

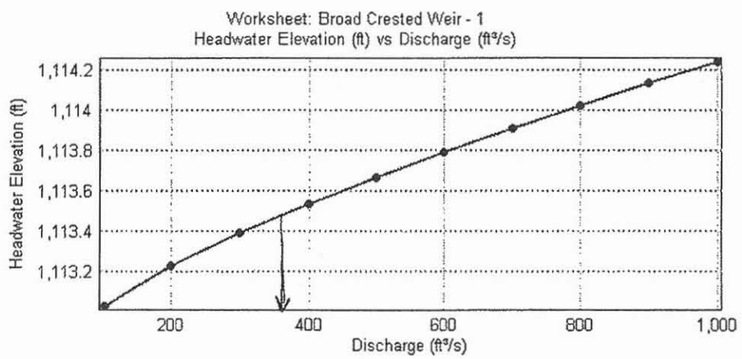
Project Description

Solve For	Headwater Elevation

Input Data

Discharge	1000.00	ft³/s
Crest Elevation	1112.70	ft
Tailwater Elevation	1110.00	ft
Crest Surface Type	Paved	
Crest Breadth	90.00	ft
Crest Length	172.10	ft

Rating Curve Plot



Rating Table Report
ElMirageRdatLowerElMirageWash

Range Data:

	Minimum	Maximum	Increment	
Allowable HW E	7.47	15.00	1.00	ft

HW Elev. (ft)	Discharge (cfs)
7.47	0.00
8.47	0.00
9.47	98.15
10.47	196.21
11.47	302.54
12.47	423.29
13.47	513.41
14.47	600.35
15.00	641.67

Culvert Calculator Report
ElMirageRdatLowerElMirageWash

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	13.00	ft	Headwater Depth/Height	1.75	
Computed Headwater Elev	14.47	ft	Discharge	600.00	cfs
Inlet Control HW Elev.	14.47	ft	Tailwater Elevation	9.00	ft
Outlet Control HW Elev.	14.06	ft	Control Type	Inlet Control	

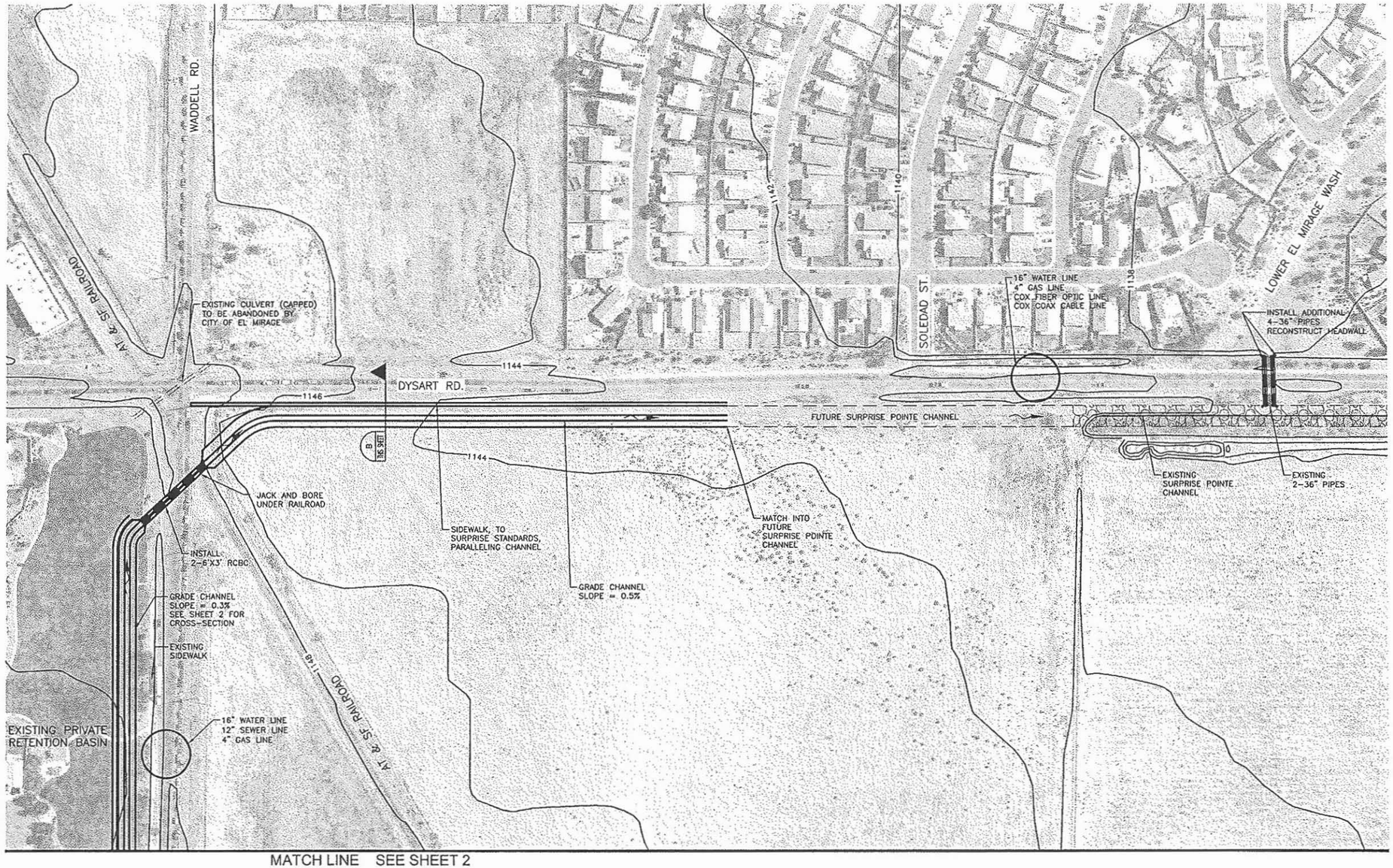
Grades					
Upstream Invert	7.47	ft	Downstream Invert	7.35	ft
Length	113.00	ft	Constructed Slope	0.001062	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	3.52	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	3.52	ft
Velocity Downstream	10.65	ft/s	Critical Slope	0.003757	ft/ft

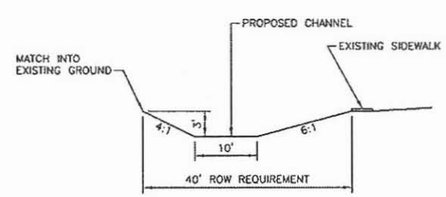
Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	8.00	ft
Section Size	8 x 4	ft	Rise	4.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	14.06	ft	Upstream Velocity Head	1.37	ft
Ke	0.70		Entrance Loss	0.96	ft

Inlet Control Properties					
Inlet Control HW Elev.	14.47	ft	Flow Control	Submerged	
Inlet Type	0° wingwall flares		Area Full	64.0	ft²
K	0.06100		HDS 5 Chart	8	
M	0.75000		HDS 5 Scale	3	
C	0.04230		Equation Form	1	
Y	0.82000				



MATCH LINE SEE SHEET 2



DYSART ROAD CHANNEL

NTS

B

100' 0' 100' 200'

SCALE: 1" = 100'

LEGEND

- EXISTING CULVERT
- PROPOSED CULVERT
- RIP-RAP
- STORMWATER FLOW DIRECTION
- 1154 — CONTOUR ELEVATION AMSL
- UNDERGROUND UTILITY LOCATION IN ROADWAY

NOTES

SURVEY INFORMATION:

PROJECT NO. FCD 89-50
PROJECT NAME: WHITE TANKS-AGUA FRIA ADMS
TOPOGRAPHIC MAP DATE: 2/15/1990
VERTICAL DATUM: NGVD29
HORIZONTAL DATUM: NAD27
CONTOUR INTERVAL = 2 FEET

ABBREVIATIONS:

RCBC = REINFORCED CONCRETE BOX CULVERT
AMSL = ABOVE MEAN SEA LEVEL

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WADDELL ROAD CAR
CONTRACT NUMBER: FCD 2007C015
CONCEPTUAL LEVEL PLANS

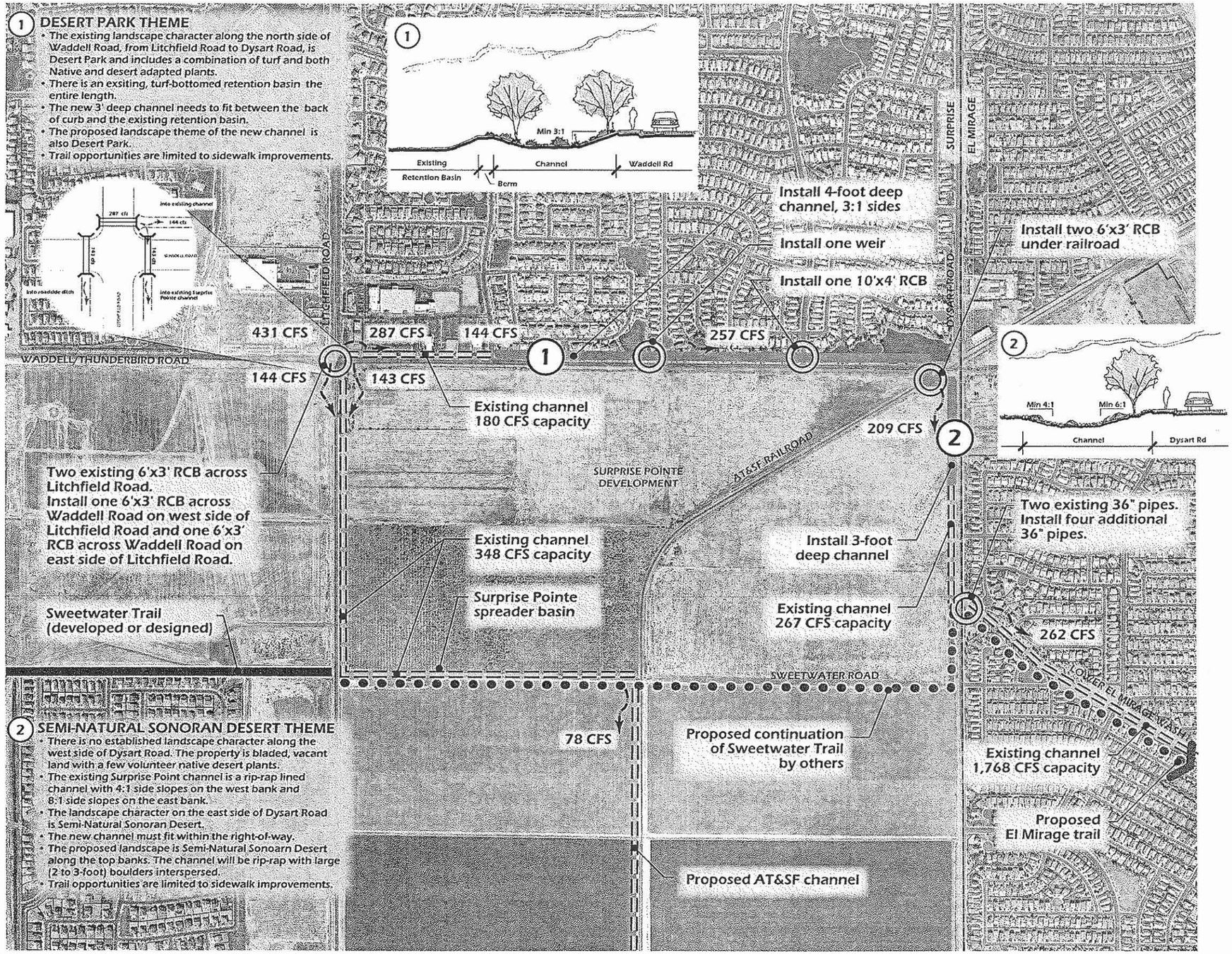
DYSART ROAD

PRELIMINARY NOT FOR CONSTRUCTION

HDR ENGINEERING, INC.
3200 East Camelback Road, Suite 350
PHOENIX, ARIZONA 85018-2311
(602) 522-7700

	BY	DATE
DESIGN	JM	02-12-09
DESIGN CHK.	LP/SM	02-12-09
PLANS	JM/DC	02-12-09
PLANS CHK.	LP/SM	02-12-09

SHEET 3 OF 4



Existing channel or channel proposed by others

Channel

Culvert or pipe location

Flow direction

Municipal trails

Developed or designed trails

RCB = reinforced concrete box
CFS = cubic feet per second

Flood Control District of Maricopa County

HDR
ONE COMPANY | *Many Solutions*™

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WADDELL ROAD CAR
CONTRACT NUMBER: FCD 2007C015

WADDELL ROAD AREA
RECOMMENDED ALTERNATIVE

HDR ENGINEERING, INC.
3200 East Camelback Road, Suite 350
PHOENIX, ARIZONA 85018-2311
(602) 522-7700

	BY	DATE
DESIGN	JM/LEP	02-05-09
DESIGN CHK.	LAP	02-05-09
PLANS	JM/LEP	02-05-09
PLANS CHK.	LAP	02-05-09

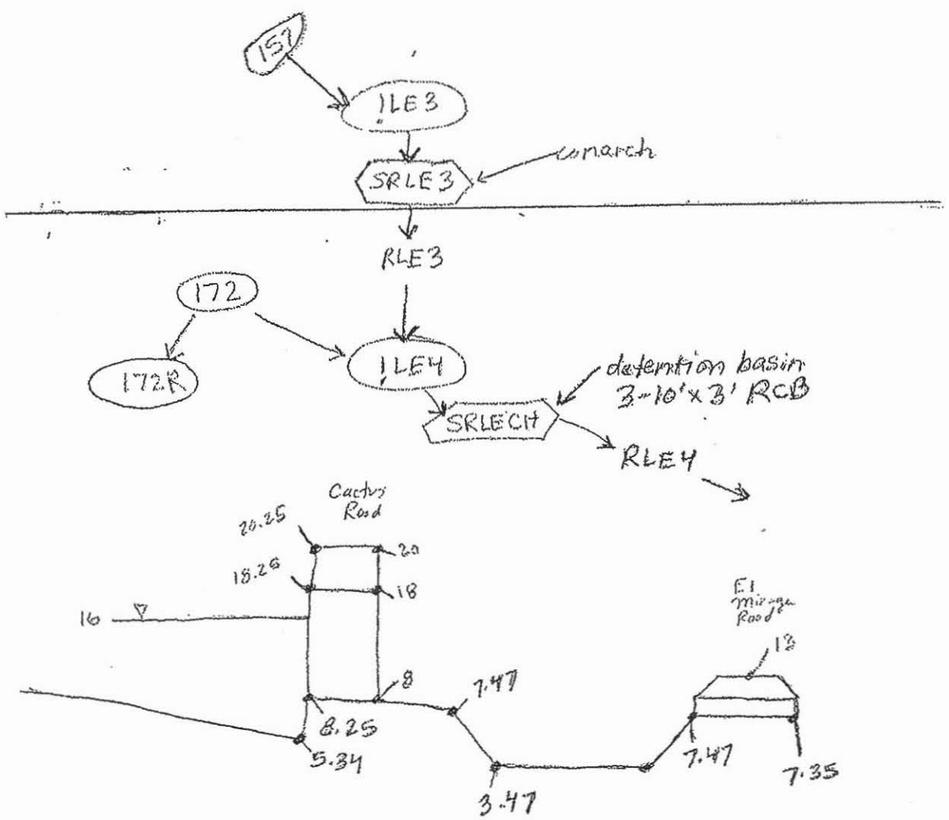
EXHIBIT 7

Future

Project: Waddell CAR	Computed: JM	Date: 2/2/09	
Subject: Recommended Plan	Checked: LP	Date: 2/5/09	
Task: Revised HEC-1 Schematic	Page: 1	of: 1	
Job #:	No:		

HDR | ONE COMPANY Many Solutions

West Cactus Detention Basin Area



Storage Routes

RECOMMENDED PLAN

SRLE3 (SRD42)

SV	0.00	0.64	4.60	17.30	27.60	56.00
SQ	0	0	139	426	827	1295
SE	1105.34	1108	1110	1112	1114	1116

SRLECH (SRD53)

SV	0.00	7.69	15.72	24.09	33.37	38.57	48.05	57.88	68.06
SQ	0	0	0	0	0	106	329	547	731
SE	1103.47	1104.47	1105.47	1106.47	1107.47	1109	1110	1111	1112

D54

D54

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*            JUN   1998              *
*          VERSION 4.1               *
*                                    *
*    DATE   23MAR09  TIME  11:43:35  *
*                                    *
**************************************
```

```
**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104            *
*                                    *
**************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                   HEC-1 INPUT                                          PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID      HDR ENGINEERING INC. 3-23-09, FILE:RECPLAN.DAT
    2           ID      EDITS FOR WADDELL CAR
    3           ID      MODIFIES AREA AROUND WADDELL/DYSART AND WEST CACTUS BASIN AREA FOR
    4           ID      PROPOSED IMPROVEMENTS
    5           ID      ASPEN CONSULTING ENGINEERS, JCS, 4-25-08, FILE: 303EWP.DAT, 100-YR 24-HR
    6           ID      NOTES:
    7           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
    8           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
    9           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   10           ID      AND R238.
                * ******************************************************************************
                * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                * ******************************************************************************
   11           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   12           ID
   13           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   14           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   15           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   16           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   17           ID
   18           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   19           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   20           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   21           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   22           ID
   23           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   24           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   25           ID
   26           ID                                       REVISED BY URS     DATE: 01-14-04
   27           ID                                                          FILE: L33PE4H.DAT
   28           ID
   29           ID        NOTES:
   30           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   31           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   32           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   33           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   34           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   35           ID           THE WLB MODEL.
   36           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   37           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   38           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   39           ID           DRAINAGE REPORTS.
   40           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   41           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   42           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   43           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   44           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   45           ID           STORM.
   46           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
   47           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   48           ID           THE DATA FILE BY THE FCDMC.
   49           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   50           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   51           ID
                *DIAGRAM
```

```
1                                   HEC-1 INPUT                                          PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   52           IT       5                    600
   53           IO       5
   54           IN      15
   55           JD    4.03    .001
   56           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
```

```
1796          KK  172T
1797          KM    Divert Retention in Subbasin 172
1798          DT  172R       2.4
1799          DI       0   10000
1800          DQ       0   10000
              *
              * MODIFY PER LEVEL III
              *
              * KK CP172

1801          KK    !LE4
              * KO     1                                21
1802          KM   ADD HYDROGRAPHS AT LE4 (CP172)
1803          HC       2    1.77

1804          KK  SRLECH
              * KO     1                                21
1805          KM   STORAGE ROUTE THROUGH DETENTION BASIN BEHIND EXISTING 2-10'x3'x115 RCB: ADD 1
1806          RS       1    STOR      0       0
1807          SV    5.72   11.59   18.17   24.91   32.01   39.46   67.53   67.53   67.53
1808          SQ       0       0       0       0       0       0       0     329     890
1809          SE  1098.5  1099.5  1100.5  1101.5  1102.5  1103.5  1107.5    1110    1113
              * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE

1810          KK    RLE4
1811          RS     1.6            -1.0     0.0
1812          RC   0.030   0.030   0.030  4875.3  0.0038
1813          RX     0.0      36      39      42      45      48      51      87
1814          RY  1102.8  1096.8  1096.8  1096.8  1096.8  1096.8  1096.8  1102.8
              *

1815          KK     173
1816          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 173
1817          BA     .31
1818          LG     .21     .25    4.00     .58      7.
1819          UI     15.     15.     15.     43.     57.     71.     79.     87.     96.    109.
1820          UI    121.    146.    184.    191.    160.    139.    125.    114.    100.     90.
1821          UI     79.     71.     57.     43.     27.     26.     25.     22.     15.     15.
1822          UI     14.      5.      5.      5.      5.      5.      5.      5.      5.      5.
1823          UI      5.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1824          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1825          KK  173T
1826          KM    Divert Retention in Subbasin 173
1827          DT  173R       7.1
1828          DI       0   10000
1829          DQ       0   10000
              *
              * MODIFY PER LEVEL III
              *
              * KK CP173
```

D53 D54


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1830          KK    !LE5
1831          KM   ADD HYDROGRAPHS AT LE5 (CP173)
1832          HC       2    2.08
              *
              * ************************************************************************
              * ***THE FOLLOWING SECTION TAKEN FROM NEW SUPER BASIN 2E WITH NEW SOILS*****
              * ************************************************************************
              *

1833          KK    156A
1834          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 156A
1835          BA     .31
1836          LG     .12     .25    4.38     .46   20.00
1837          UI     82.    276.    434.    664.    443.    275.    114.     65.     18.     18.
1838          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1839          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1840          KK   R156A
1841          KM        ROUTE FLOW FROM CP156A TO CP158
1842          RS      34              -1       0
1843          RC     .07     .07     .07    5400   .0030
1844          RX    1000    1001    1002    1380    2200    2838    2839    2840
1845          RY    1117    1117    1117    1116    1116    1118    1118    1118
              *

1846          KK     158
1847          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 158
1848          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1849          KM    L=       1.4  Lca=       .7   S=   20.7  Kn= .034  LAG=  27.3
1850          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1851          BA     .97
1852          LG     .26     .26    4.20     .55   25.00
1853          UI    120.    350.    615.    802.   1158.   1393.   1004.    753.    547.    280.
1854          UI    196.    120.     54.     37.     37.     37.      0.      0.      0.      0.
1855          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1856          KK  158OUT
1857          KM        DIVERSION-RETENTION
1858          DT  158RET   61.74
1859          DI       0   10000
1860          DQ       0   10000

1861          KK   CP158
1862          KM        ADD HYDROGRAPHS AT CP158
1863          HC       2    1.28
```

D55

This Section Intentionally Left Blank

For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D56

This Section Intentionally Left Blank

For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

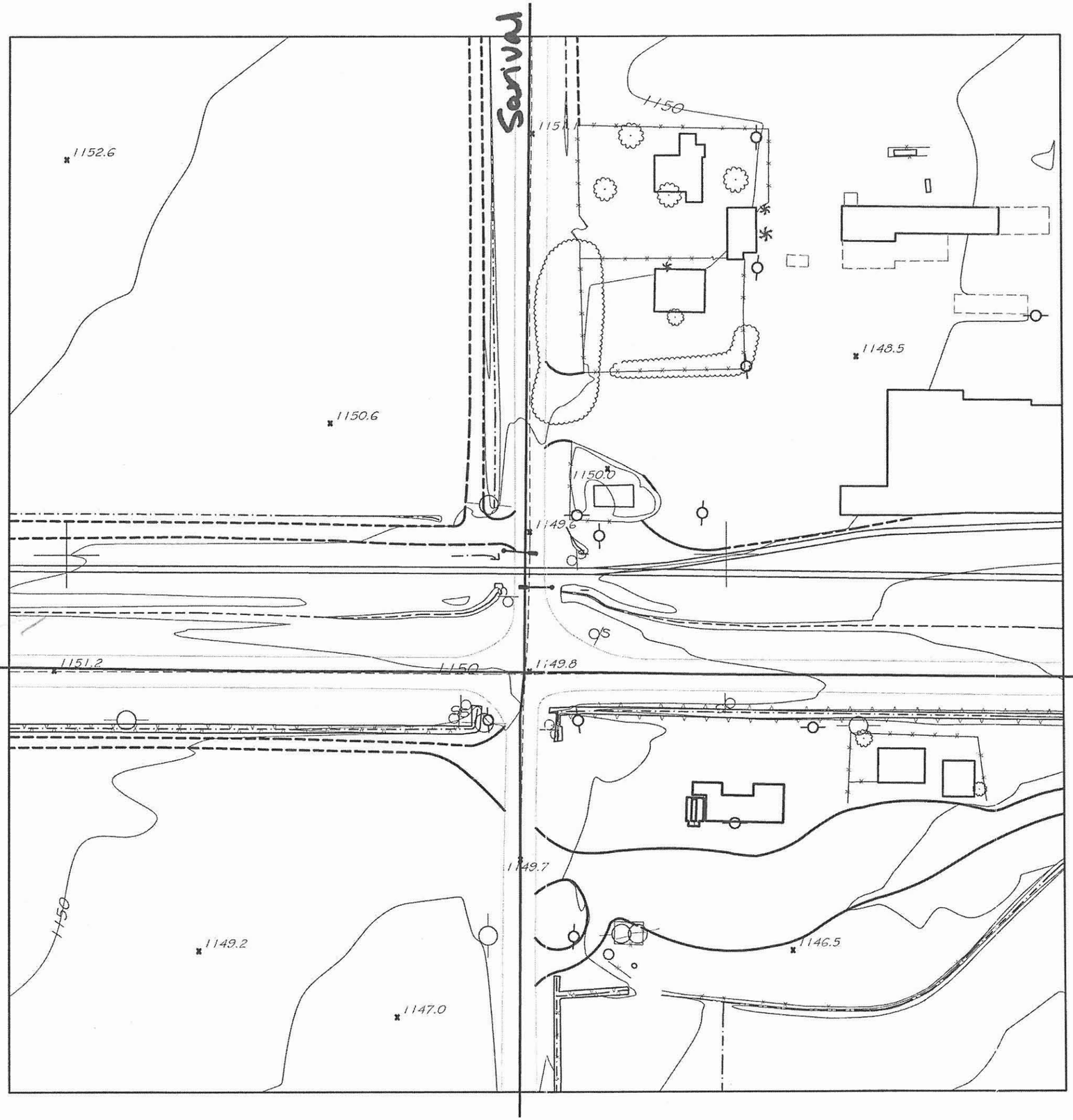
D57

Jarivel

Olive

(All flow to east)

D37



check capacity of ditch

only flow from DL34

D37
D57

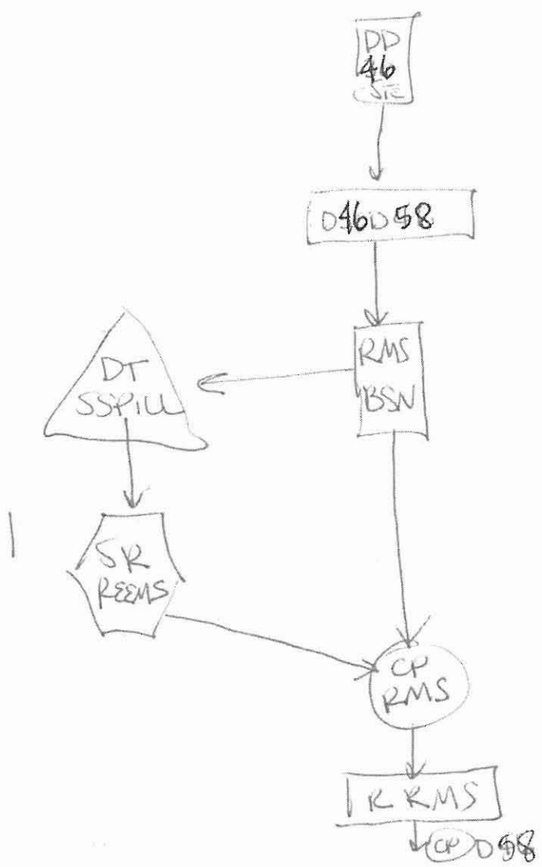
C:\PWin ...PHX\dms80783\Topo-1303 Intersections-North.dwg, 10/9/2008 4:22:15

```
KKRMSBSN
KO      1       2
KM   DIVERT SIDE WEIR FLOWS INTO REEMS ROAD BASIN
KM   THE REST BYPASSES THE BASIN AND COMBINES WITH BASIN OUTFLOW
DTSSPILL
DI      0     371     512     724    1062    2173    2607    2728
        0     152     257     416     669    1501    1826    2065

KKRSPILL
KM  RETURN FLOWS SPILLED INTO THE BASIN
KO      1       2
DRSSPILL
*
KK REEMS
KO      1       2
KM  ROUTE SPILLED FLOWS THROUGH THE BASIN
RS      1    ELEV    1125      -1
SV      0    11.5    55.4     202     228     256
SE   1125    1127  1129.5    1136    1137    1138
SQ      0    12.5      38    76.2     129    1583
*
KK CPRMS
KO      1       2
KM COMBINE BASIN FLOW WITH BY-PASS FLOW
HC      2
*
KK  RRMS
KO      1       2
KM  ROUTE BASIN OUTFLOW AND BY-PASS TO OLIVE AVENUE
RS      4              -1
RC 0.035   0.035   0.035    3150  0.0011
RX      0       5      30      90     110     170     185     190
RY   1135    1124    1134    1127    1127  1134.5  1134.5    1135
```

add this sequence in after D30D46

Route for D46D58



D58

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*          JUN   1998                *
*        VERSION 4.1                 *
*                                    *
*   DATE   15OCT08  TIME  17:44:14   *
*                                    *
**************************************
```

```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616       *
*          (916) 756-1104            *
*                                    *
**************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID      7-31-2008 JWH - ENTERED REVISED RATING CURVE FOR WEIR FLOW AT "REEMS" TO
   2          ID                REFLECT HIGHER Q'S ENTERING THE CULVERT AT PEORIA AND REEMS RD.
   3          ID                ALSO, ADDED REVISED DI/DQ CARDS FOR DIVERT TO SIDE WEIR AT
   4          ID                "RMSBSN" TO REFLECT HIGHER INFLOW FROM CP165.
   5          ID
   6          ID      7-21-2008 JWH - CHANGED DIVERT AT D179 TO INDICATE PROPOSED 2-6X10
   7          ID                CULVERT AT OLIVE AVENUE AND REEMS ROAD. DELETED DIVERT CARDS
   8          ID                AT 1D179 AND 2D179. ALSO ADDED ROUTED FLOW FROM CP179 TO CP193.
   9          ID
  10          ID      7-10-2008 JWH - REMOVED THE HYDROGRAPH COMBINATION (HC CARD) AT 1I165
  11          ID                TO SHOW THE APPROPRIATE ROUTING (R146C) OF COMBINED FLOWS
  12          ID                AT 2D165 (Q=1845 CFS) TO CP165, WHICH CVL USED AS DESIGN FLOW
  13          ID                FOR REEMS ROAD CHANNEL AT GREER RANCH (SEE CLOMR SUBMITTAL)
  14          ID                DATED (REVISED) MARCH 16,2004.
  15          ID
  16          ID                ADDED SEQUENCE FOR REEMS ROAD CHANNEL AND BASIN
  17          ID
  18          ID        5 - 09 - 0 1
  19          ID
  20          ID        WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  21          ID        Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  22          ID        TANKS/AGUA FRIA ADMS, Date: October 1991
  23          ID
  24          ID       REVISED BY DAVID EVANS AND ASSOC. JULY 2001
  25          ID    REVISED BY COE & VAN LOO CONSULTANTS INC. AUG 2002
  26          ID       MODIFICATIONS REFLECT DETAILED HYDRAULIC ANALYSES ALONG
  27          ID       REEMS ROAD AND CACTUS ROAD
  28          ID
  29          ID        REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  30          ID        100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
  31          ID
  32          ID        SOME NOMENCLATURE CHANGES HAVE BEEN MADE PER REQUEST OF
  33          ID        FCDMC - 5-09-01
  34          ID                                   REVISED BY URS     DATE: 5-09-01
  35          ID                                                      FILE: L303M6I.DAT
  36          ID                                   REVISED BY DEA     DATE: 7-31-01
  37          ID                                                      FILE: DEA.DAT
  38          ID                                   REVISED BY CVL     DATE: 8-01-02
  39          ID                                                      FILE: REEMSREV.DAT
  40          ID
  41          ID
  42          ID
  43          ID       NOTES:
  44          ID       1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  45          ID          2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  46          ID       2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  47          ID       3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  48          ID          GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  49          ID          THE WLB MODEL.
  50          ID       4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  51          ID          WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  52          ID          CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  53          ID          DRAINAGE REPORTS.
  54          ID       5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  55          ID          GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  56          ID          ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  57          ID       6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  58          ID       7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  59          ID          STORM.
  60          ID       8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```

```
2261          RY    1185    1185    1185    1184    1184    1186    1188    1190

2262          KK   CP164
2263          KM        ADD HYDROGRAPHS AT CP164
2264          HC       2   15.08

2265          KK    D164
2266          KM        DIVERT TO CP177 FROM CP164
2267          DT   DI177
2268          DI       0     295    1091    2467    4521    7345   11030
2269          DQ       0      22     124     352     743    1329    2143

2270          KK    R164
2271          KM        ROUTE REMAINDER FROM CP164 TO CP165
2272          RS       7                -1       0
2273          RC     .04     .04    .075    4900   .0043
2274          RX    1000    1250    1730    2220    2320    2338    2339    2340
2275          RY    1164    1162    1160    1158    1158    1159    1159    1159
              *
1                                          HEC-1 INPUT                                                    PAGE 55

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


2276          KK    165B
2277          KM        RUN-OFF FROM SUB-BASIN 165B
2278          BA     .45
2279          LG     .50     .00    4.66     .53     .00
2280          UI     21.     21.     21.     47.     76.     91.    104.    117.    126.    139.
2281          UI    156.    171.    204.    251.    279.    238.    208.    187.    171.    155.
2282          UI    138.    125.    110.    101.     84.     63.     44.     38.     36.     35.
2283          UI     26.     21.     21.     19.      7.      7.      7.      7.      7.      7.
2284          UI      7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
2285          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * KK 1I165
              * KM      ADD HYDROGRAPHS AT CP165
              * HC     2   12.53

2286          KK   2I165
2287          KM        ADD HYDROGRAPHS AT CP165
2288          HC       2   15.98

2289          KK   CP165
2290          KM        ADD HYDROGRAPHS AT CP165
2291          HC       2   22.84
              *
              *
2292          KM    THIS SECTION ADDED AND MODIFIED BY JWH 7-31-08 FCDMC TO SHOW
2293          KM    REEMS ROAD BASIN PROJECT
              *
              *

2294          KK    D165
2295          KM        DIVERT TO CP180 FROM CP165
2296          KM        MODIFIES DIVERT TO INDICATE 6-4X10 CULVERT PROPOSED AT PEORIA
2297          DT   DI180
2298          DI       0    1000    2800   10000
2299          DQ       0       1       2    7200
              *

2300          KK    R165
2301          KM        ROUTE TO BASIN NEW CHANNEL
2302          RS       3                -1       0
2303          RC    .035    .035    .035    2200   .0011
2304          RX       0       5      25      90     110     185     200     201
2305          RY    1146    1145  1144.5    1137    1137    1145    1145    1146
              *

2306          KK  RMSBSN
2307          KM     DIVERT SIDE WEIR FLOWS INTO REEMS ROAD BASIN
2308          KM     THE REST BYPASSES THE BASIN AND COMBINES WITH BASIN OUTFLOW
2309          DT  SSPILL
2310          DI       0     371     512     724    1062    2173    2607    2728
2311          DQ       0     152     257     416     669    1501    1826    2065
              *
1                                          HEC-1 INPUT                                                    PAGE 56

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


2312          KK  RSPILL
2313          KO       1
2314          KM    RETURN FLOWS SPILLED INTO THE BASIN
2315          DR  SSPILL
              *

2316          KK   REEMS
2317          KO       1       2
2318          KM    ROUTE SPILLED FLOWS THROUGH THE BASIN
2319          RS       1    ELEV    1125
2320          SV       0    11.5    55.4     202     228     256
2321          SE    1125    1127  1129.5    1136    1137    1138
2322          SQ       0    12.5      38    76.2     129    1570
              *

2323          KK   CPRMS
2324          KM   COMBINE BASIN FLOW WITH BY-PASS FLOW
2325          HC       2
              *

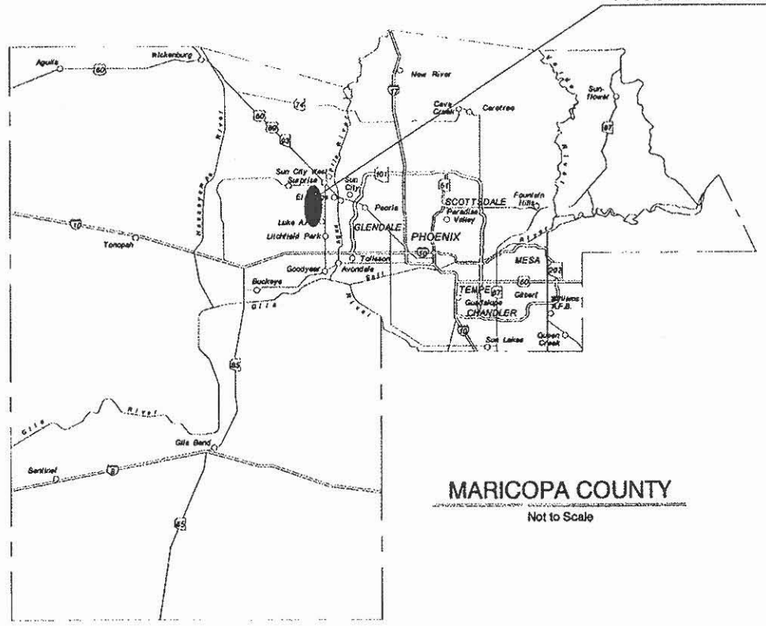
2326          KK    RRMS
2327          KM    ROUTE BASIN OUTFLOW AND BY-PASS TO OLIVE AVENUE
```

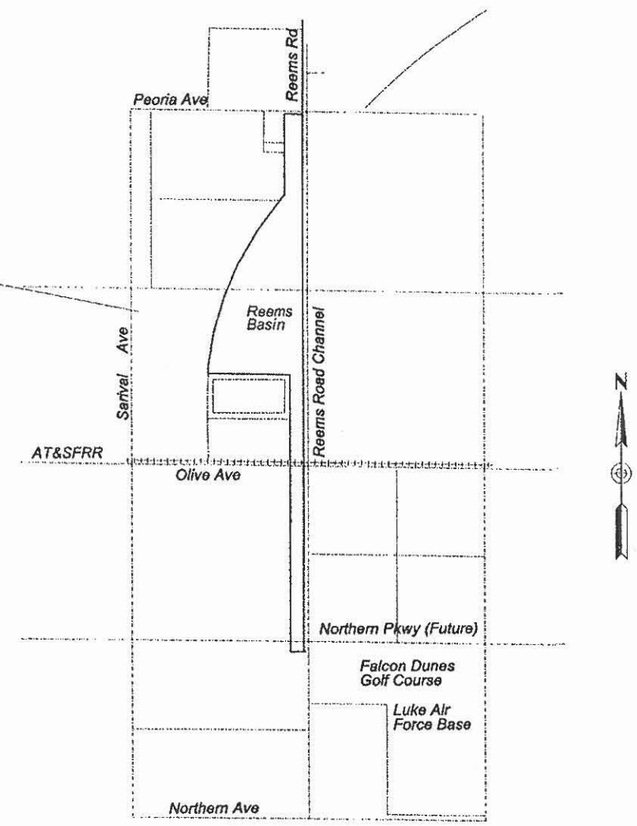
D46D58

Storage Route D58

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

IN COOPERATION WITH
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
PLANS FOR THE CONSTRUCTION OF
REEMS ROAD CHANNEL AND BASIN
FCD PROJECT CONTROL NO. 4701231
FCD CONTRACT NO. 2005CO18





9-15-2008

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ISSUE RECOMMENDED BY:

Barbara Ohlen — 1-22-08
PROJECT MANAGER — DATE

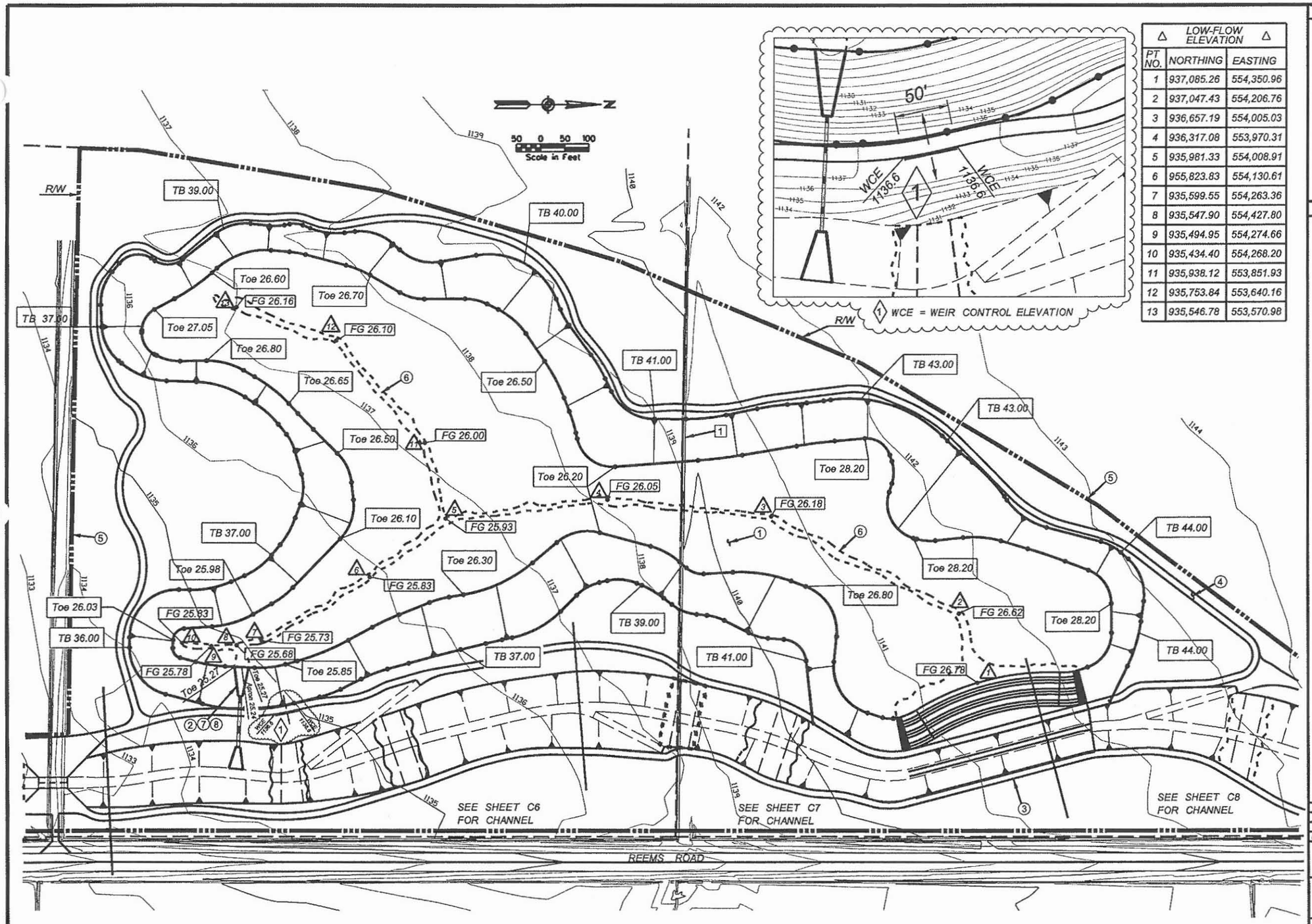
ISSUED FOR PUBLIC BIDDING BY:

1/23/08
CHIEF ENGINEER & GENERAL MANAGER — DATE

BOARD OF DIRECTORS OF
THE FLOOD CONTROL DISTRICT

ANDY KUNASEK - CHAIRMAN

DISTRICT 1	FULTON BROCK
DISTRICT 2	DON STAPLEY
DISTRICT 3	ANDY KUNASEK
DISTRICT 4	MAX WILSON
DISTRICT 5	MARY ROSE WILCOX



△ LOW-FLOW ELEVATION △		
PT NO.	NORTHING	EASTING
1	937,085.26	554,350.96
2	937,047.43	554,206.76
3	936,657.19	554,005.03
4	936,317.08	553,970.31
5	935,981.33	554,008.91
6	955,823.83	554,130.61
7	935,599.55	554,263.36
8	935,547.90	554,427.80
9	935,494.95	554,274.66
10	935,434.40	554,268.20
11	935,938.12	553,851.93
12	935,753.84	553,640.16
13	935,546.78	553,570.98

REMOVE

1. REMOVE CONCRETE LINED DITCH — 1,140 LF

CONSTRUCTION

1. EXCAVATE BASIN — 437,800 CY
2. CONSTRUCT INLET STRUCTURE SEE SHEET NO. D9, SD1 — 1 EA
3. CONSTRUCT WEIR STRUCTURE SEE SHEET NO. D6 — 1 EA
4. CONSTRUCT 4" ABC MAINTENANCE ROAD — 6,182 SY
5. INSTALL WIRE FENCE — 4,153 LF
6. INSTALL RIPRAP — 4,762 CY
7. CONSTRUCT HANDRAIL — 140 LF
8. CONSTRUCT ACCESS BARRIER PER DETAIL DRAWING B1.2 MODIFIED, SD1 — 1 EA

SEE SHEET LP3-LP8 FOR LANDSCAPE MOUND INFORMATION

TWO WORKING DAYS BEFORE YOU DIG, CALL 602-263-1100 BLUE STAKE

WCE = WEIR CONTROL ELEVATION

9-15-2008

NO.	REVISION	BY	DATE
3			
2			
1	ADDED BASIN EMERGENCY SPILLWAY	WAG	6/5/2008

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

REEMS ROAD CHANNEL AND BASIN
FCD PROJECT NO. 470-12-31
CONTRACT FCD 2005 C018

	BY	DATE
DESIGNED	WAG	11/07
DRAWN	FRC	11/07
CHECKED	JRR	11/07

DRAWING NO. GB1R

BASIN GRADING PLAN

SHEET 34 OF 59

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	[illegible]
		Date	3/10/09
		Sheet	1
		Of	x

Location: Olive at Reems (DD58)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	28	27	193	27.5	26.5	0	0.00	27	0	0.00	27.5	0	0.00	CHECK	28	0.5	204.71	DONE
south	27	26	193	26.5	26.5	0	0.00	27	0.5	204.71	27.5	1	579.00		28	1.5	1063.69	
south	26	26.1	36	26.05	26.5	0.45	32.60	27	0.95	100.00	27.5	1.45	188.57		28	1.95	294.09	
southeast	26.1	26.2	10	26.15	26.5	0.35	6.21	27	0.85	23.51	27.5	1.35	47.06		28	1.85	75.49	
east	26.2	26.3	50	26.25	26.5	0.25	18.75	27	0.75	97.43	27.5	1.25	209.63		28	1.75	347.25	
east	26.3	27	125	26.65	26.5	0	0.00	27	0.35	77.65	27.5	0.85	293.87		28	1.35	588.21	
east	27	28	150	27.5	26.5	0	0.00	27	0	0.00	27.5	0	0.00		28	0.5	159.10	
east	28	29	150	28.5	26.5	0	0.00	27	0	0.00	27.5	0	0.00		28	0	0.00	
east	29	29	1	29	26.5	0	0.00	27	0	0.00	27.5	0	0.00		28	0	0.00	
						TOTALS:	57.56			503.30			1318.13				2732.54	

Graph Computations:

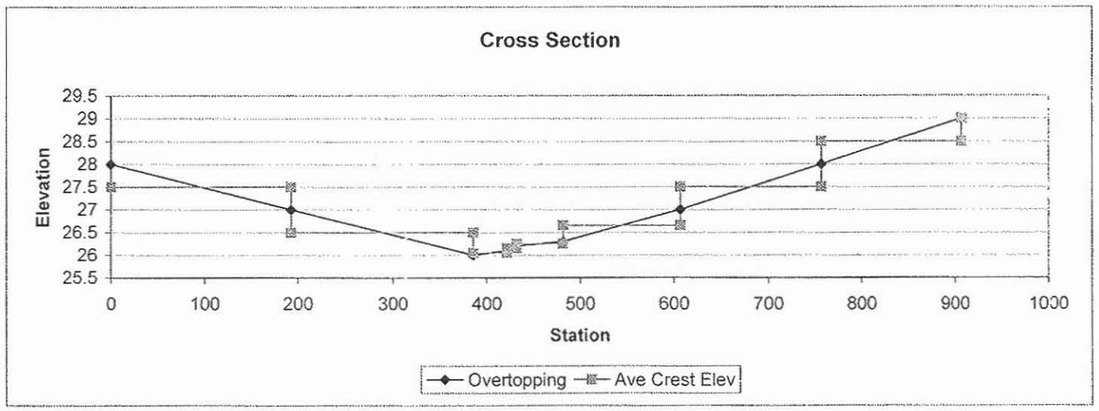
Station	Elevation
0	28
193	27
386	26
422	26.1
432	26.2
482	26.3
607	27
757	28
907	29
908	29

Weir Approximation:

Station	Elevation
0	27.5
193	27.5
193	26.5
386	26.5
386	26.05
422	26.05
422	26.15
432	26.15
432	26.25
482	26.25
482	26.65
607	26.65
607	27.5
757	27.5
757	28.5
907	28.5
907	29
908	29

Culvert Flows (cfs):

south	0
southeast	0
east	0



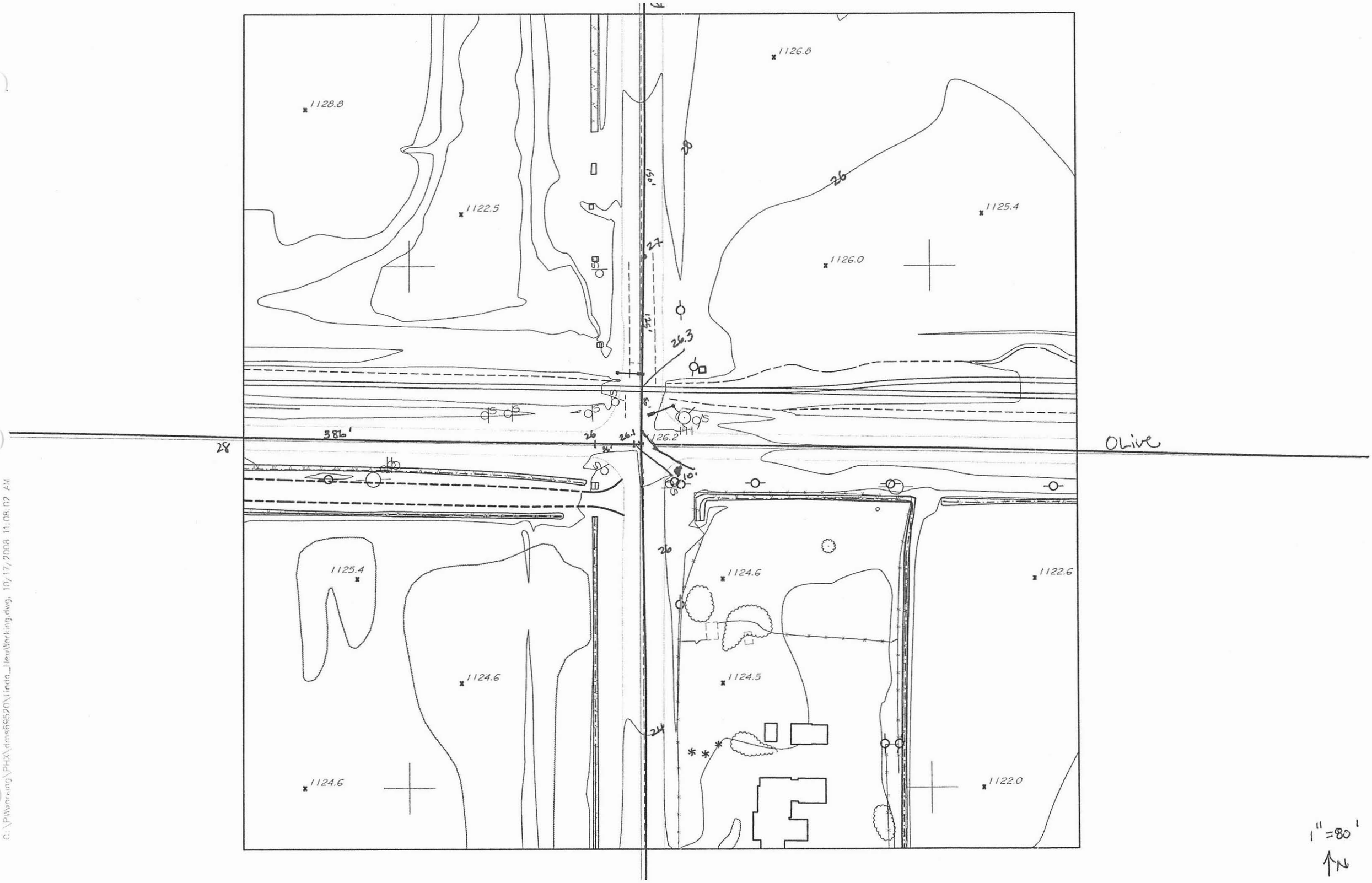
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	32.60	57%	Q(south)	304.71	61%	Q(south)	767.57	58%	Q(south)	1562.49	57%
Q(southeast)	6.21	11%	Q(southeast)	23.51	5%	Q(southeast)	47.06	4%	Q(southeast)	75.49	3%
Q(east)	18.75	33%	Q(east)	175.08	35%	Q(east)	503.50	38%	Q(east)	1094.56	40%
	57.56			503.30			1318.13			2732.54	

First DI	East to South			
Inflow	57.56	503.30	1318.13	2732.54
Outflow	32.60	304.71	767.57	1562.49

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	24.96	198.59	550.56	1170.05
Outflow	6.21	23.51	47.06	75.49

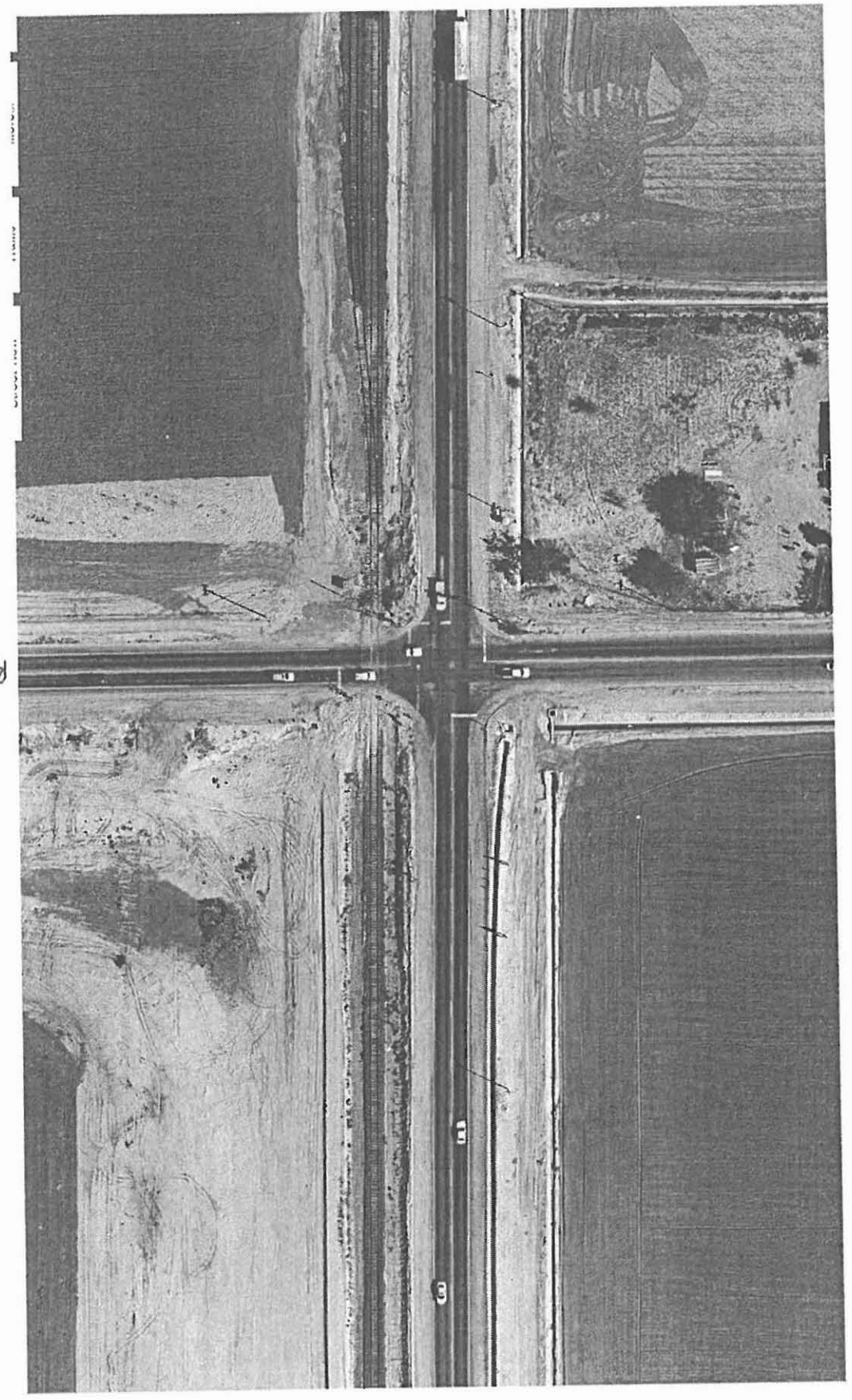
Assumes diversion is to southeast



C:\PWWorking\PHX\dms69520\Linda_NewWorking.dwg, 10/17/2008 11:08:02 AM

Olive

← 2



Peters

D59

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	
		Date	3/10/09
		Sheet	1
		Of	x

Location: Olive at Bullard (DD59)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	14	13	305	13.5	12.2	0	0.00	12.7	0	0.00	13.2	0	0.00	CHECK	13.7	0.2	81.84	DONE
south	13	12	305	12.5	12.2	0	0.00	12.7	0.2	81.84	13.2	0.7	535.88		13.7	1.2	1202.80	
south	12	11.5	250	11.75	12.2	0.45	226.40	12.7	0.95	694.46	13.2	1.45	1309.52		13.7	1.95	2042.27	
south	11.5	12	250	11.75	12.2	0.45	226.40	12.7	0.95	694.46	13.2	1.45	1309.52		13.7	1.95	2042.27	
south	12	12	360	12	12.2	0.2	96.60	12.7	0.7	632.51	13.2	1.2	1419.70		13.7	1.7	2393.85	
east	12	12	110	12	12.2	0.2	29.52	12.7	0.7	193.27	13.2	1.2	433.80		13.7	1.7	731.45	
east	12	13	310	12.5	12.2	0	0.00	12.7	0.2	83.18	13.2	0.7	544.67		13.7	1.2	1222.52	
east	13	14	310	13.5	12.2	0	0.00	12.7	0	0.00	13.2	0	0.00		13.7	0.2	83.18	
east	14	15	1	14.5	12.2	0	0.00	12.7	0	0.00	13.2	0	0.00		13.7	0	0.00	
						TOTALS:	578.92			2379.72			5553.09				9800.18	

Graph Computations:

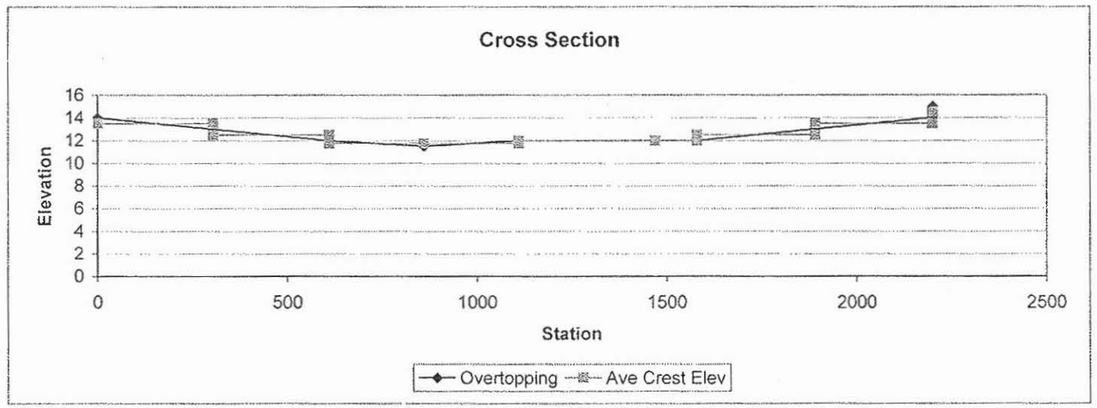
Station	Elevation
0	14
305	13
610	12
860	11.5
1110	12
1470	12
1580	12
1890	13
2200	14
2201	15

Weir Approximation:

Station	Elevation
0	13.5
305	13.5
305	12.5
610	12.5
610	11.75
860	11.75
860	11.75
1110	11.75
1110	12
1470	12
1470	12
1580	12
1580	12.5
1890	12.5
1890	13.5
2200	13.5
2200	14.5
2201	14.5

Culvert Flows (cfs):

south	0
southeast	0
east	0



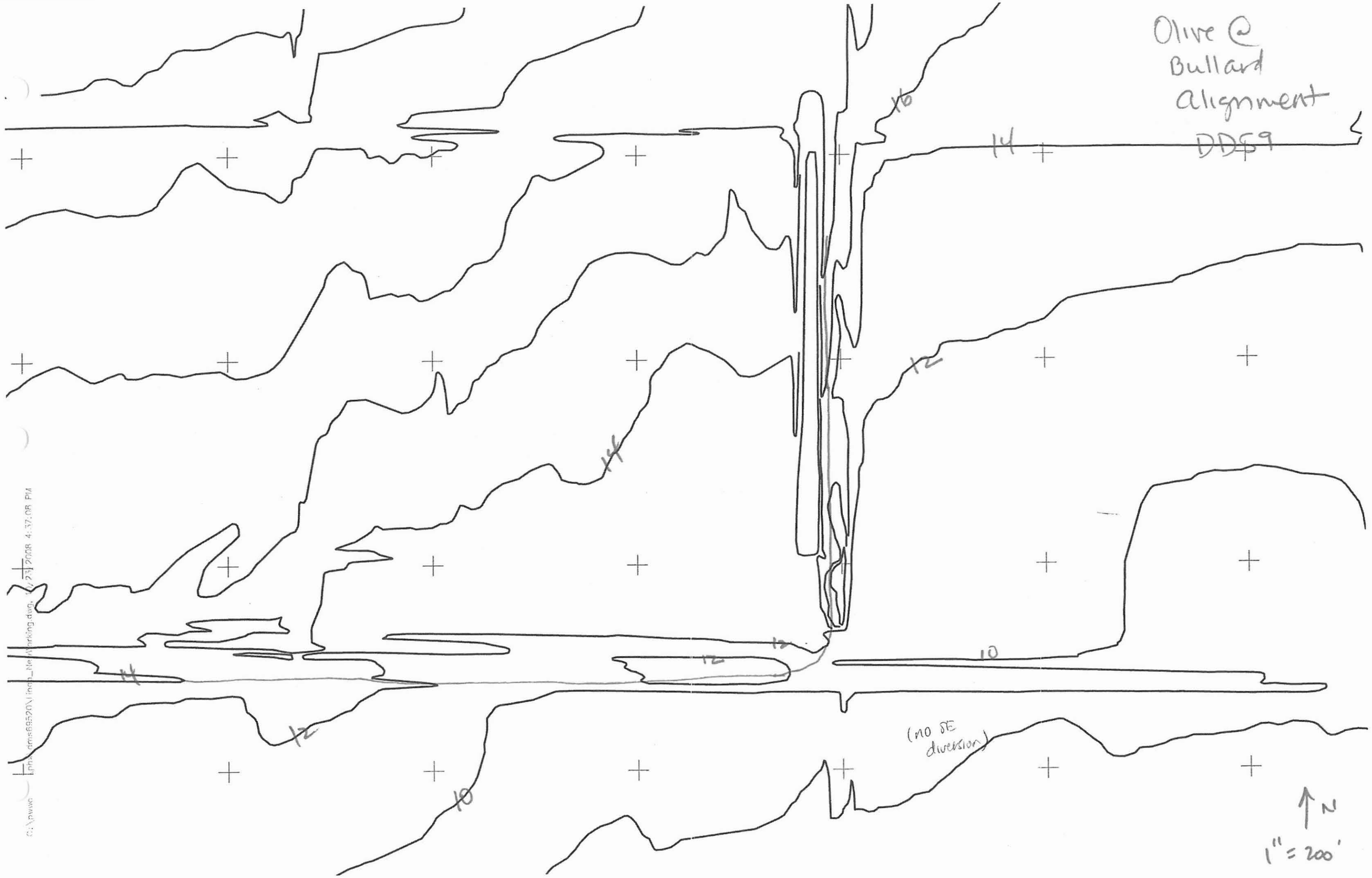
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	549.40	95%	Q(south)	2103.27	88%	Q(south)	4574.62	82%	Q(south)	7763.03	79%
Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%	Q(southeast)	0.00	0%
Q(east)	29.52	5%	Q(east)	276.45	12%	Q(east)	978.46	18%	Q(east)	2037.15	21%
	578.92			2379.72			5553.09			9800.18	

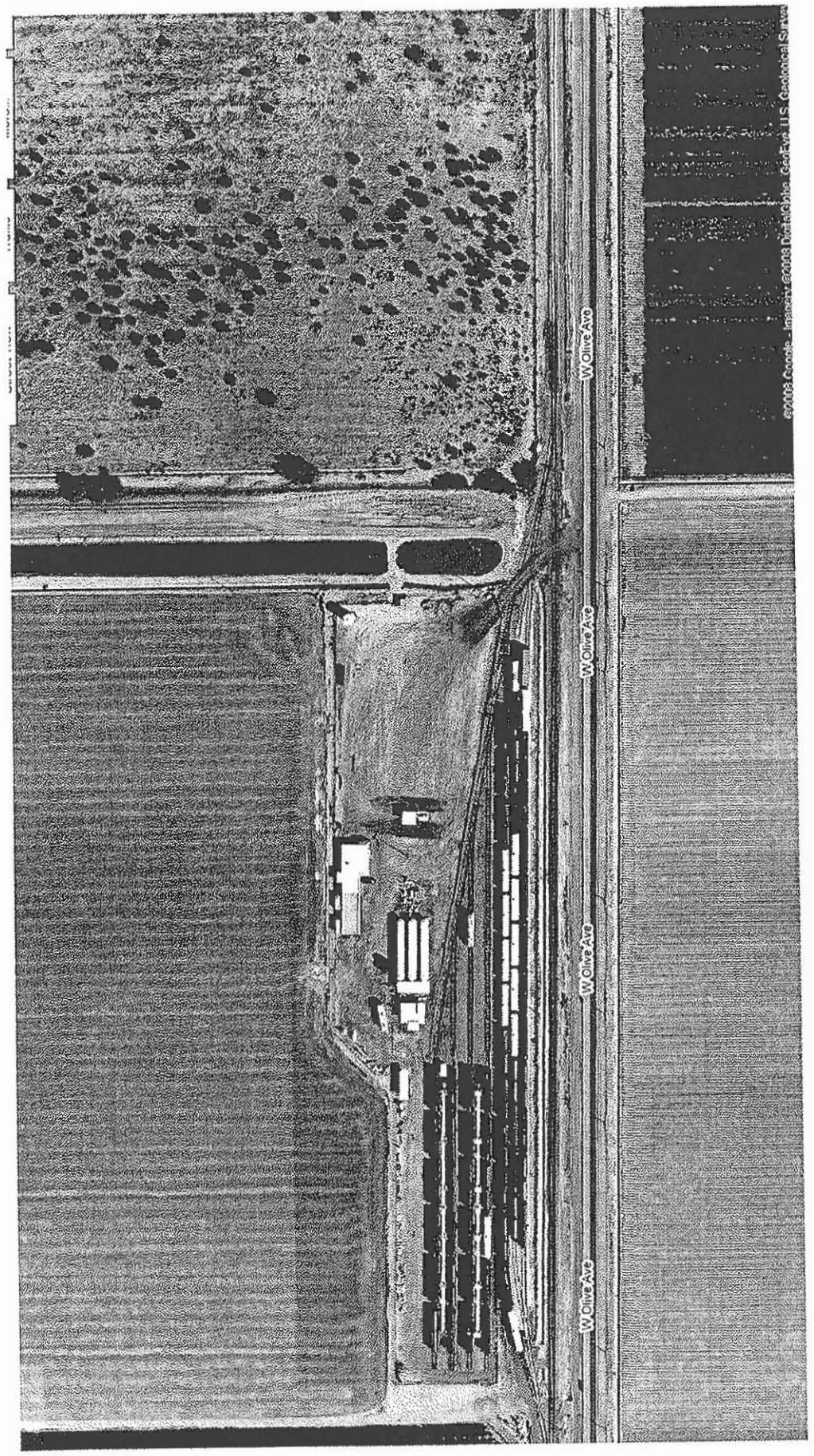
First DI	East to South			
Inflow	578.92	2379.72	5553.09	9800.18
Outflow	549.40	2103.27	4574.62	7763.03

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	29.52	276.45	978.46	2037.15
Outflow	0.00	0.00	0.00	0.00

Assumes diversion is to southeast


Olive @
Bullard
alignment
DD59
16
14
12
14
12
12
14
12
10
10
(no SE
diversion)
N
1" = 200'


W Olive Ave
W Olive Ave
W Olive Ave
W Olive Ave
©2008 Google - Imagery ©2008 DigitalGlobe, GeoEye, U.S. Geological Survey

D60

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	19/27/08
		Checked	[illegible]
		Date	3/10/09
		Sheet	1
		Of	x

Location: Litchfield Road at Railroad Tracks (DD60)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	15	14.5	105	14.75	13.9	0	0.00	14.4	0	0.00	14.9	0.15	18.30	CHECK	15.4	0.65	165.07	DONE
south	14.5	14	106	14.25	13.9	0	0.00	14.4	0.15	18.47	14.9	0.65	166.65		15.4	1.15	392.17	
south	14	13.5	325	13.75	13.9	0.15	56.64	14.4	0.65	510.95	14.9	1.15	1202.41		15.4	1.65	2066.48	
south	13.5	13.5	5	13.5	13.9	0.4	3.79	14.4	0.9	12.81	14.9	1.4	24.85		15.4	1.9	39.28	
southeast	13.5	13.5	6	13.5	13.9	0.4	4.55	14.4	0.9	15.37	14.9	1.4	29.82		15.4	1.9	47.14	
east	13.5	14	155	13.75	13.9	0.15	27.01	14.4	0.65	243.68	14.9	1.15	573.46		15.4	1.65	985.55	
east	14	14.5	98	14.25	13.9	0	0.00	14.4	0.15	17.08	14.9	0.65	154.07		15.4	1.15	362.57	
east	14.5	15	98	14.75	13.9	0	0.00	14.4	0	0.00	14.9	0.15	17.08		15.4	0.65	154.07	
east	15	15.1	10	15.05	13.9	0	0.00	14.4	0	0.00	14.9	0	0.00		15.4	0.35	6.21	
						TOTALS:	92.00			818.36			2186.62				4218.55	

Graph Computations:

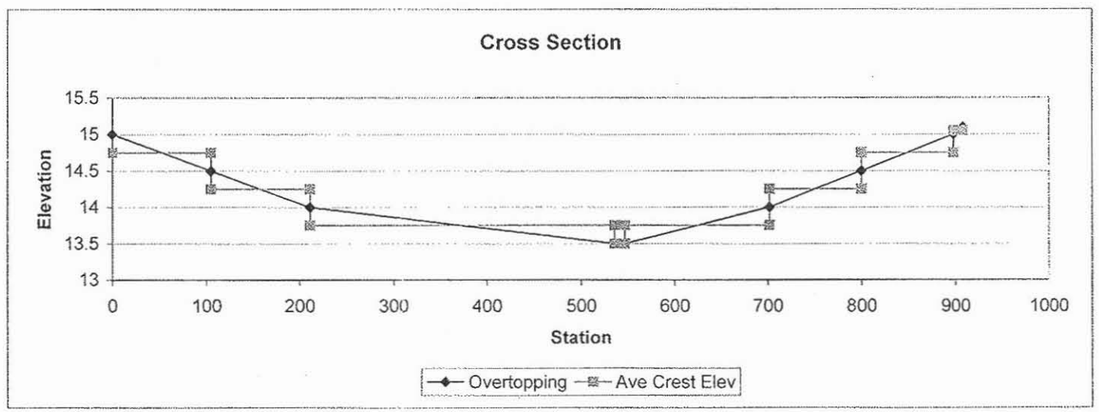
Station	Elevation
0	15
105	14.5
211	14
536	13.5
541	13.5
547	13.5
702	14
800	14.5
898	15
908	15.1

Weir Approximation:

Station	Elevation
0	14.75
105	14.75
105	14.25
211	14.25
211	13.75
536	13.75
536	13.5
541	13.5
541	13.5
547	13.5
547	13.75
702	13.75
702	14.25
800	14.25
800	14.75
898	14.75
898	15.05
908	15.05

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	60.44	66%	Q(south)	542.23	66%	Q(south)	1412.20	65%	Q(south)	2663.01	63%
Q(southeast)	4.55	5%	Q(southeast)	15.37	2%	Q(southeast)	29.82	1%	Q(southeast)	47.14	1%
Q(east)	27.01	29%	Q(east)	260.76	32%	Q(east)	744.61	34%	Q(east)	1508.40	36%
	92.00			818.36			2186.62			4218.55	

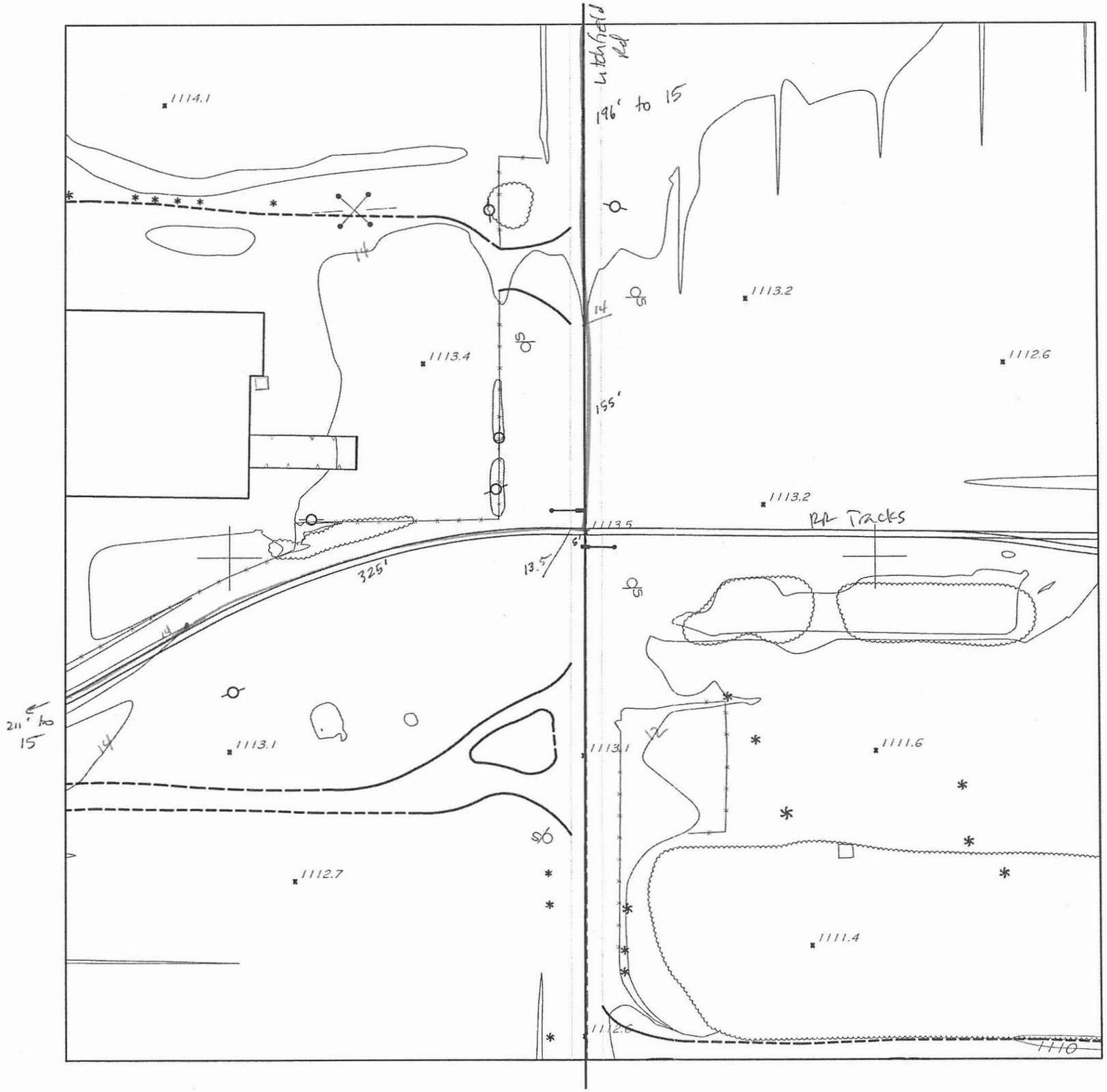
First DI	East to South			
Inflow	92.00	818.36	2186.62	4218.55
Outflow	60.44	542.23	1412.20	2663.01

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	31.57	276.13	774.42	1555.55
Outflow	4.55	15.37	29.82	47.14

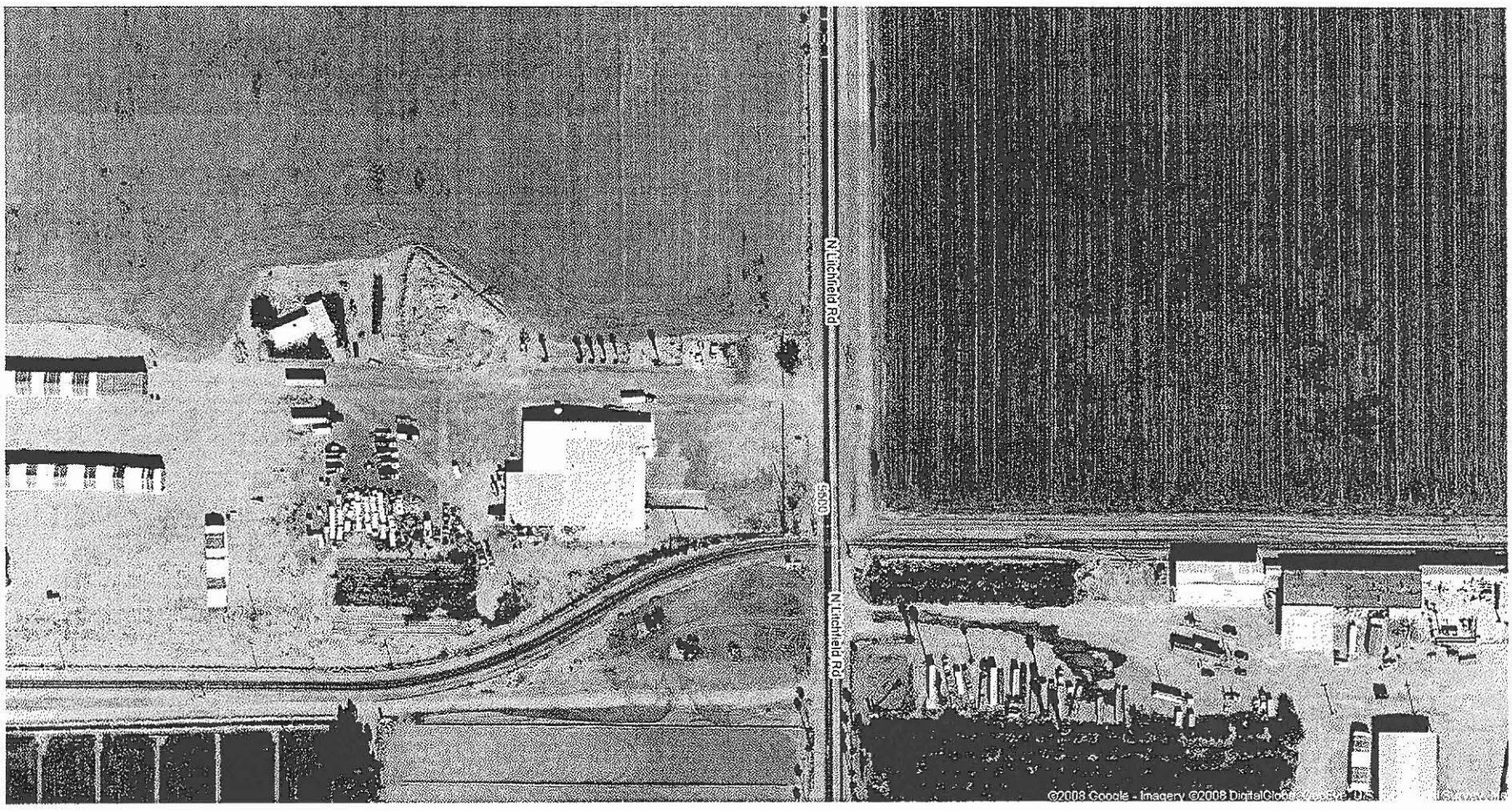
Assumes diversion is to southeast

Litchfield Road
@
RR Tracks
DD60

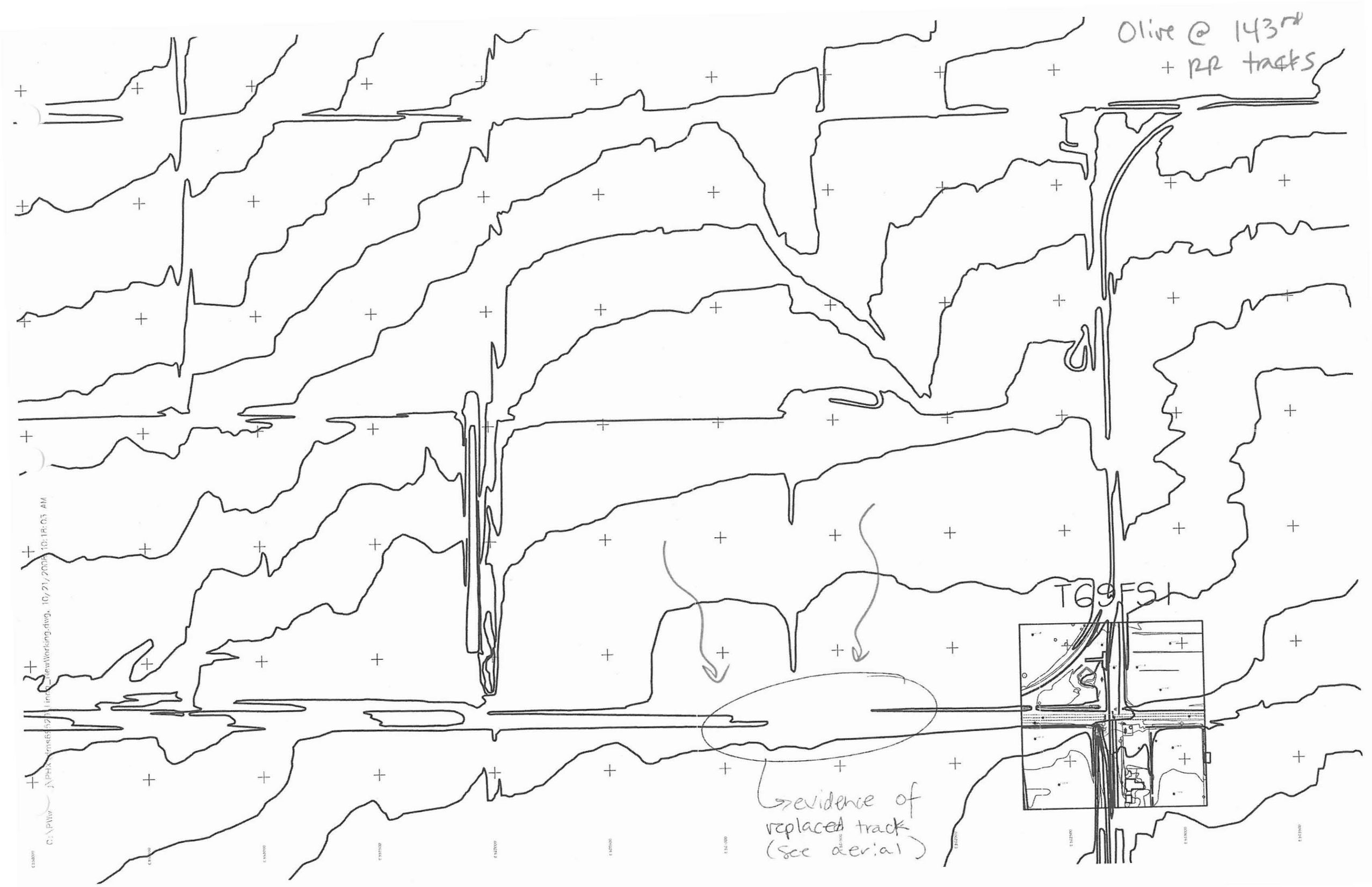


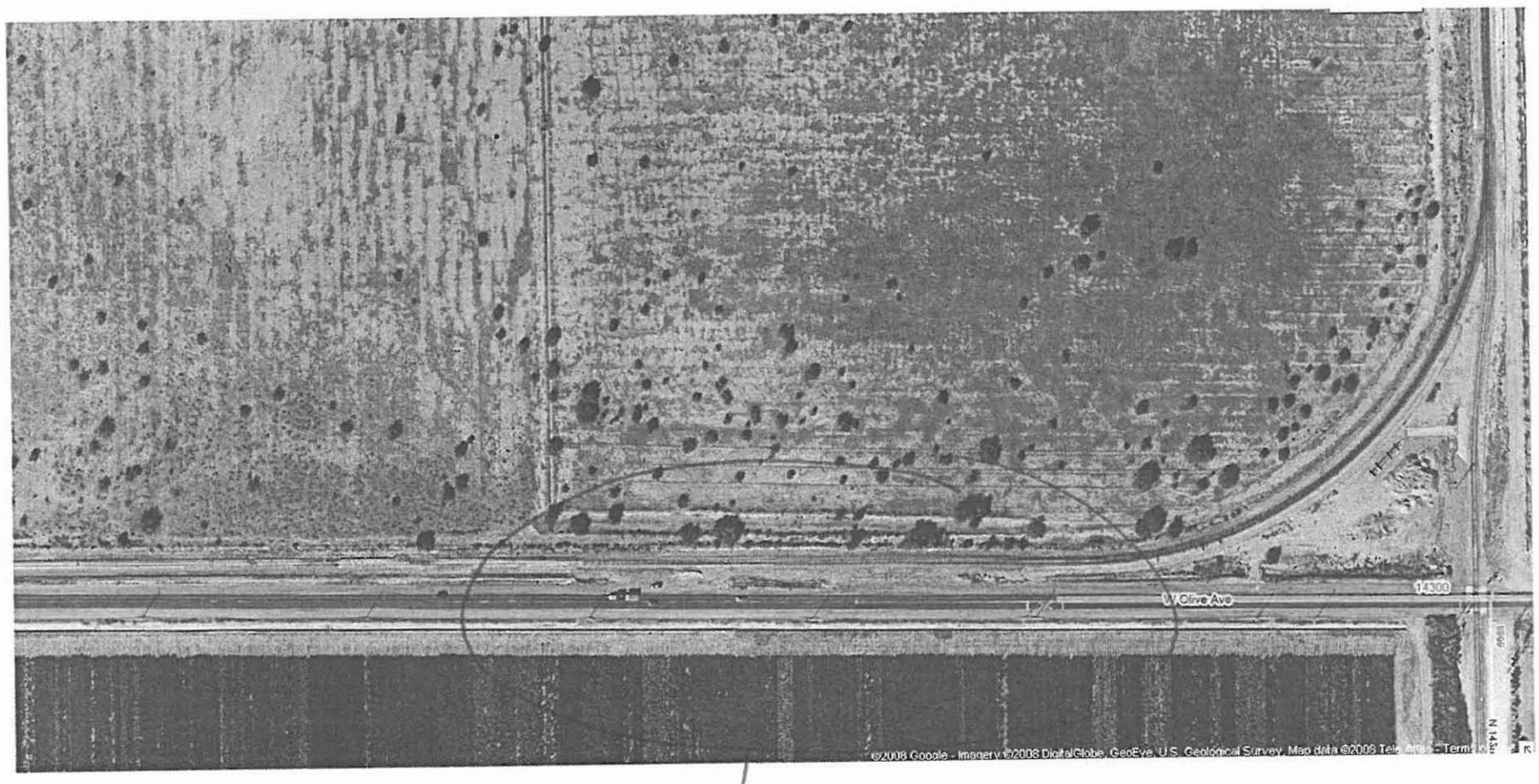
N

1" = 80'


N Litchfield Rd
5000
N Litchfield Rd
©2008 Google - Imagery ©2008 DigitalGlobe, Sanborn, DS

D61


Olive @ 143rd
+ RR tracks
T69FS1
evidence of
replaced track
(see aerial)


W Olive Ave
14300
©2008 Google - Imagery ©2008 DigitalGlobe, GeoEye, U.S. Geological Survey, Map data ©2008 Tele Atlas - Term

new tracks

D62

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Job No.	79902
Subject	Weir Flow Analysis	No.	
Task	Weir Calculations	Computed	AM
		Date	10/27/08
		Checked	
		Date	3/10/09
		Sheet	1
		Of	x

Location: Olive at Litchfield Road (DD62)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	6.1	5.6	134	5.85	5	0	0.00	5.5	0	0.00	6	0.15	23.35	CHECK	6.5	0.65	210.67	DONE
south	5.6	5.1	134	5.35	5	0	0.00	5.5	0.15	23.35	6	0.65	210.67		6.5	1.15	495.76	
south	5.1	4.7	250	4.9	5	0.1	23.72	5.5	0.6	348.57	6	1.1	865.27		6.5	1.6	1517.89	
south	4.7	4.8	72	4.75	5	0.25	27.00	5.5	0.75	140.30	6	1.25	301.87		6.5	1.75	500.05	
southeast	4.8	4.8	30	4.8	5	0.2	8.05	5.5	0.7	52.71	6	1.2	118.31		6.5	1.7	199.49	
east	4.8	5.05	133	4.925	5	0.075	8.20	5.5	0.575	173.97	6	1.075	444.72		6.5	1.575	788.67	
east	5.05	5.3	133	5.175	5	0	0.00	5.5	0.325	73.93	6	0.825	298.99		6.5	1.325	608.55	
east	5.3	5.8	100	5.55	5	0	0.00	5.5	0	0.00	6	0.45	90.56		6.5	0.95	277.78	
east	5.8	6.3	100	6.05	5	0	0.00	5.5	0	0.00	6	0	0.00		6.5	0.45	90.56	
						TOTALS:	66.96			812.82			2353.73				4689.42	

Graph Computations:

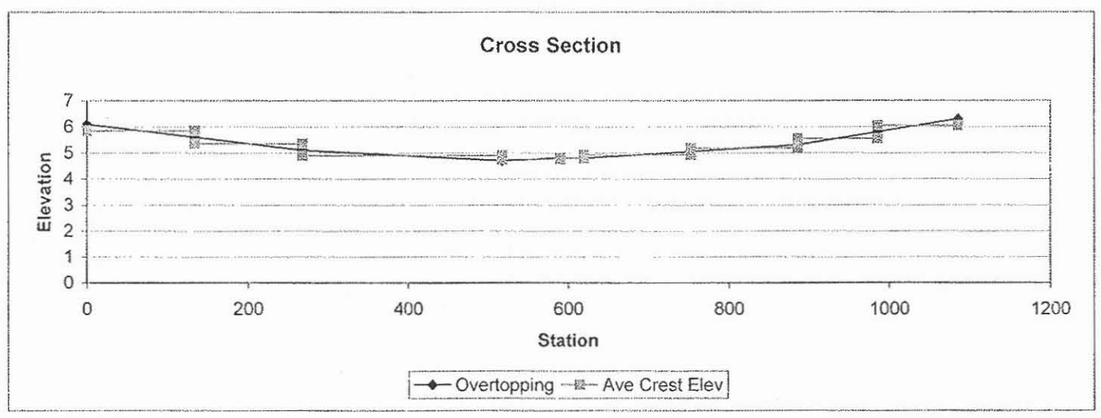
Station	Elevation
0	6.1
134	5.6
268	5.1
518	4.7
590	4.8
620	4.8
753	5.05
886	5.3
986	5.8
1086	6.3

Weir Approximation:

Station	Elevation
0	5.85
134	5.85
134	5.35
268	5.35
268	4.9
518	4.9
518	4.75
590	4.75
590	4.8
620	4.8
620	4.925
753	4.925
753	5.175
886	5.175
886	5.55
986	5.55
986	6.05
1086	6.05

Culvert Flows (cfs):

south	0
southeast	0
east	0



Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	50.72	76%	Q(south)	512.22	63%	Q(south)	1401.16	60%	Q(south)	2724.37	58%
Q(southeast)	8.05	12%	Q(southeast)	52.71	6%	Q(southeast)	118.31	5%	Q(southeast)	199.49	4%
Q(east)	8.20	12%	Q(east)	247.90	30%	Q(east)	834.27	35%	Q(east)	1765.56	38%
	66.96			812.82			2353.73			4689.42	

First DI	East to South			
Inflow	66.96	812.82	2353.73	4689.42
Outflow	50.72	512.22	1401.16	2724.37

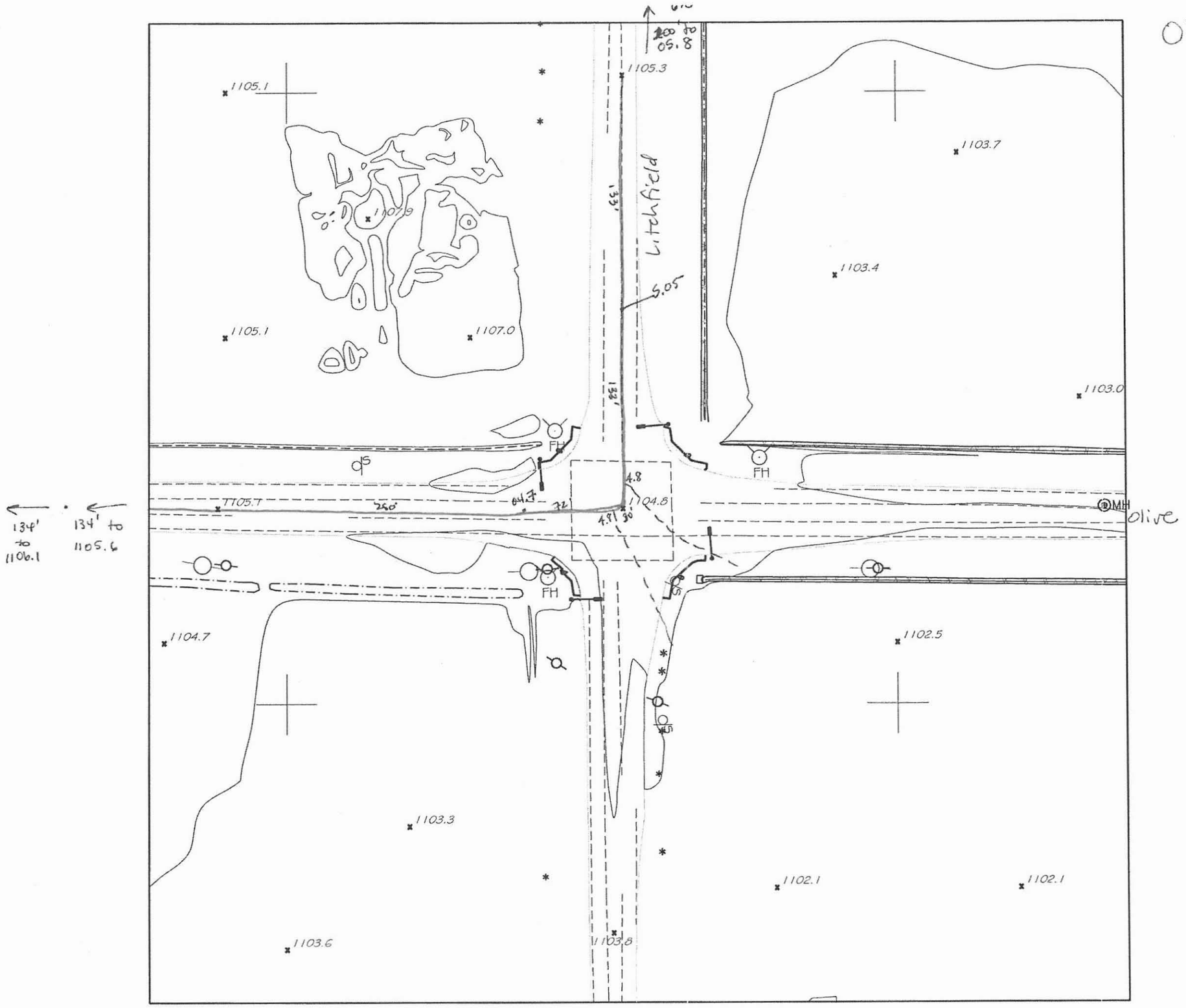
Assumes diversion is to south

Second DI	East to Southeast			
Inflow	16.25	300.61	952.58	1965.05
Outflow	8.05	52.71	118.31	199.49

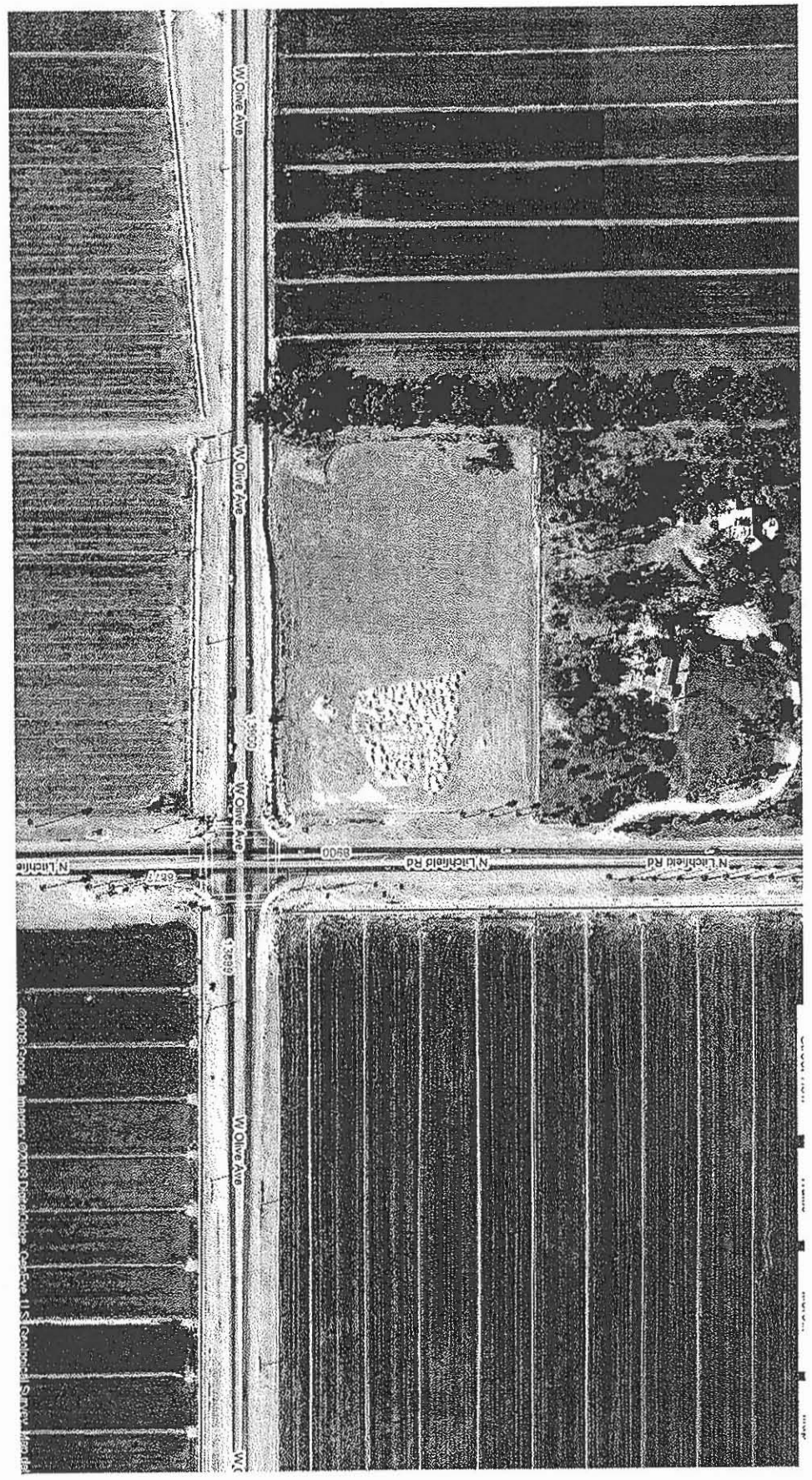
Assumes diversion is to southeast

Olive @ Litchfield

DD62



C:\PW\ g:\PHX\dms69520\Indo_1\ewWorking.dwg, 10/31/2008 9:48:17 AM


W Olive Ave
W Olive Ave
W Olive Ave
W Olive Ave
N Lickhill Rd
N Lickhill Rd
N Lickhill Rd
6900
6700
6800

D63

D63

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   06FEB09  TIME  14:20:20  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
  2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
  3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
  4           ID   MODIFICATIONS:
  5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
  6           ID   (2) SURPRISE WWTP WAS UPDATED
  7           ID   (3) NORTHERN PARKWAY WAS UPDATED
  8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
  9           ID
 10           ID ***********************************************************************
 11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
 12           ID      NOTES:
 13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
 14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
 15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
 16           ID     AND R238.
              ID * ***********************************************************************
              ID * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              ID * ***********************************************************************
 17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
 18           ID
 19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
 20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
 21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
 22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
 23           ID
 24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
 25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
 26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
 27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
 28           ID
 29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
 30           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
 31           ID
 32           ID                                     REVISED BY URS     DATE: 01-14-04
 33           ID                                                        FILE: L33PE4H.DAT
 34           ID
 35           ID        NOTES:
 36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
 37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
 38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
 39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
 40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
 41           ID           THE WLB MODEL.
 42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
 43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
 44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
 45           ID           DRAINAGE REPORTS.
 46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
 47           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
 48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
 49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
 50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
 51           ID           STORM.
 52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
 54           ID           THE DATA FILE BY THE FCDMC.
 55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
 56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
 57           ID
```

```
KK    !RR4
KM        ADD HYDROGRAPHS AT CP168
HC       3   11.07
* TURN OFF DIVERT PROP. ALTERNATIVE 5-25-01

KK    D168
KM        DIVERT TO CP169 FROM CP168
DT   2D169
DI       0       4     282    1072    2510    4582    7322   10770
DQ       0       0       0       0       0       0       0       0
*
* KK  R168
* PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE

KK    RRR4
KM    ROUTE REMAINDER RR4 TO RR5
RS     1.0                -1.0     0.0
RC   0.035   0.035   0.035     950  0.0015
RX       0      10      20      36      86     102     110     120
RY    1114    1114    1114    1110    1110    1114    1114    1114
* RS     1                -1       0
* RC  0.03    0.03    0.03    4500  0.0020
* RX  1000    1042    1048    1054    1060    1066    1072    1114
* RY  1100    1093    1093    1093    1093    1093    1093    1100
*
```

D49D63

```
KK   1D167
KM        RETURN DIVERT AT CP167
DR   1D183

KK    R167
KM        ROUTE FLOW FROM CP167 TO CP183
RS      19                -1       0
RC    .075    .075    .075    2250   .0071
RX    1000    1001    1002    1210    2310    2558    2559    2560
RY    1115    1115    1115    1114    1114    1115    1115    1115
*

KK     183
KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 183
BA     .21
LG     .50     .00    4.32     .62     .00
UI     20.     38.     84.    109.    134.    172.    247.    206.    164.    131.
UI    104.     74.     40.     33.     22.     16.      6.      6.      6.      6.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

UI      6.      0.      0.      0.      0.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

KK   D181A
KM        RETURN DIVERT AT CP181A
DR   2D183

KK    R181
KM  ROUTE FLOW TO PEORIA BASIN
RS       1                -1       0
RC   0.035   0.035   0.035     900  0.0015
RX       0      10      20      36      66      82      90     100
RY    1110    1110    1110    1106    1106    1110    1110    1110
*

KK    !RR5
KM        ADD HYDROGRAPHS AT CP183
KM   TAREA=11.07(!RR4)+0.39(181A)+0.21(183)=11.67
KO                                          21
HC       4   11.67
*
* INSERT ON-LINE BASIN 10-06-08
* STORAGE ROUTE THROUGH PROPOSED BASIN AT RR5

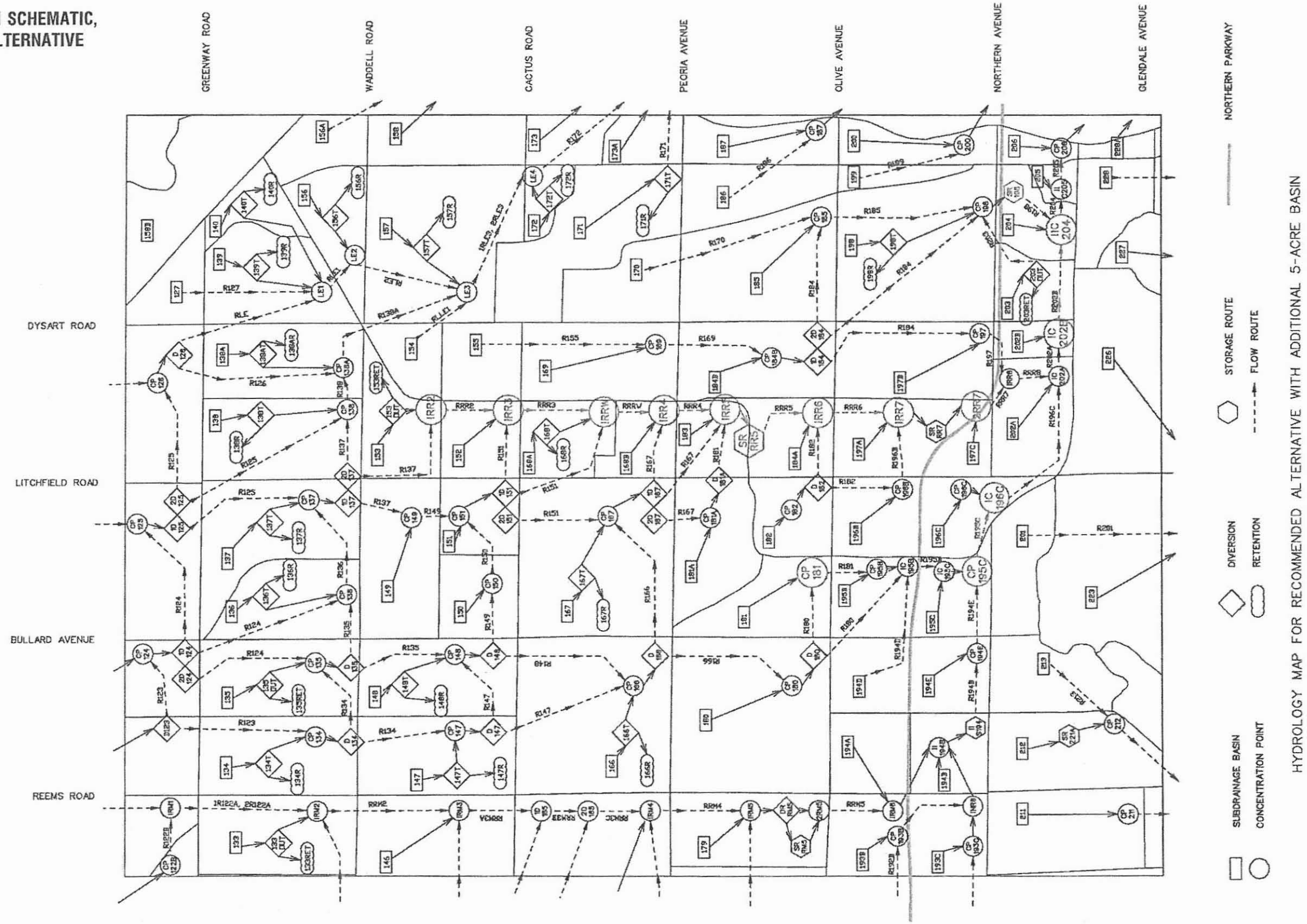
KK   SRRR5
KM   STORAGE ROUTE
KM   36" PIPE CULVERT OUTLET, INV=1095'
KM   10'X8' PEDESTRIAN CROSSING UNDER THE RAILROAD, INV=1096'
KM   PEDESTRIAN CROSSING WAS SEPARATED FROM CULVERT BY 30' WEIR AT
KM   AN ELEVATION OF 1100'. LOWER BASIN BOT=1095', TOP=1102'.
KM   UPPER BASIN BOT=1102', TOP=1112'.
KO                                          21
RS       1    STOR       0       0
SV       0    4.55    22.1    52.9   108.2   174.6     245     336     397
SQ       0      35      60     335     715     915    1065    1225    1385
SE    1095    1098    1100    1102    1104    1106    1108    1110    1112
*
```

SRDC3

```
KK    DRR6
KM   DIVERT FLOW FROM !RR5 TO !RR6
DT   2DRR6
DI       0   10000
DQ       0   10000
*
* ALT-1 RJS 5-25-01
*
* KK CP183
* KK  !RR6
* KO     1                                    21
* KM      ADD HYDROGRAPHS AT CP183
* HC     2   11.67
* DIVERT PER ALTERNATIVE 5-25-01
* KK  DRR6
* KM DIVERT RR6 TO RR7
```

Basins D64 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN

Future

HDR | ONE COMPANY *Many Solutions*℠

Project:	Loop 303 ADMPU AHA	Computed:	AM	Date:	10/27/08
Subject:	Hydrology	Checked:	SP	Date:	3/10/09
Task:	Stage-Storage Table				
Job #:	79902				

SRD63

Elevation	Area (sq. ft.)	Volume (ac-ft)
1096	1920000	0.00
1098	1967616	89.25
1100	2015744	182.89
1102	2064384	281.00
1104	3200000	483.41
1106	3265322	742.12
1108	3331157	908.61

Rating Table Report
SRD63

Range Data:

	Minimum	Maximum	Increment	
Allowable HW E	1,096.00	1,108.00	2.00	ft

HW Elev. (ft)	Discharge (cfs)
1,096.00	0.00
1,098.00	95.13
1,100.00	269.06
1,102.00	494.29
1,104.00	761.01
1,106.00	1,034.31
1,108.00	1,268.68

Culvert Analysis Report
Culvert-1

Culvert Summary			
Computed Headwater Elev	1,098.07 ft	Discharge	99.96 cfs
Inlet Control HW Elev.	1,098.03 ft	Tailwater Elevation	986.00 ft
Outlet Control HW Elev.	1,098.07 ft	Control Type	Entrance Control
Headwater Depth/Height	0.26		

Grades			
Upstream Invert	1,096.00 ft	Downstream Invert	1,094.43 ft
Length	143.00 ft	Constructed Slope	0.010979 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	0.86 ft
Slope Type	Steep	Normal Depth	0.85 ft
Flow Regime	Supercritical	Critical Depth	1.29 ft
Velocity Downstream	9.72 ft/s	Critical Slope	0.002933 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	12.00 ft
Section Size	12 x 8 ft	Rise	8.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	1,098.07 ft	Upstream Velocity Head	0.65 ft
Ke	0.20	Entrance Loss	0.13 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,098.03 ft	Flow Control	Unsubmerged
Inlet Type	90° headwall w 45° bevels	Area Full	96.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

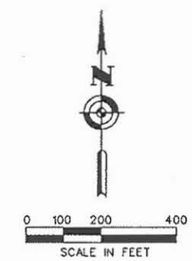
Culvert Analysis Report
Weir

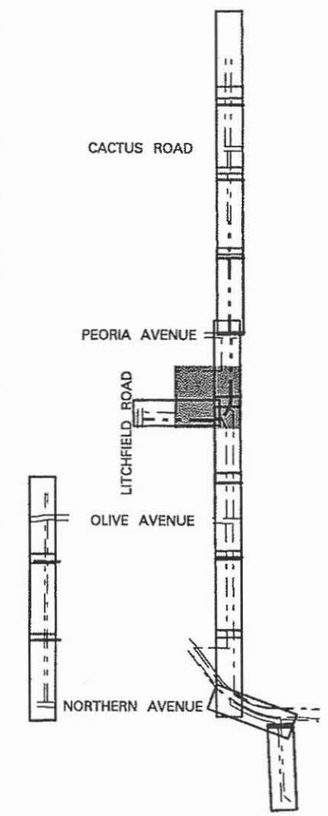
Hydraulic Component(s): Roadway (Constant Elevation)

Discharge	0.00	cfs	Allowable HW Elevation	1,098.07	ft
Roadway Width	143.00	ft	Overtopping Coefficient	2.90	US
Length	200.00	ft	Crest Elevation	1,110.00	ft
Headwater Elevation	N/A	ft	Discharge Coefficient (Cr)	2.90	
Submergence Factor (Kt)	1.00				

Sta (ft)	Elev. (ft)
0.00	1,110.00
200.00	1,110.00

SRD63





KEY MAP

NO.	REVISION	BY	DATE
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/09

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

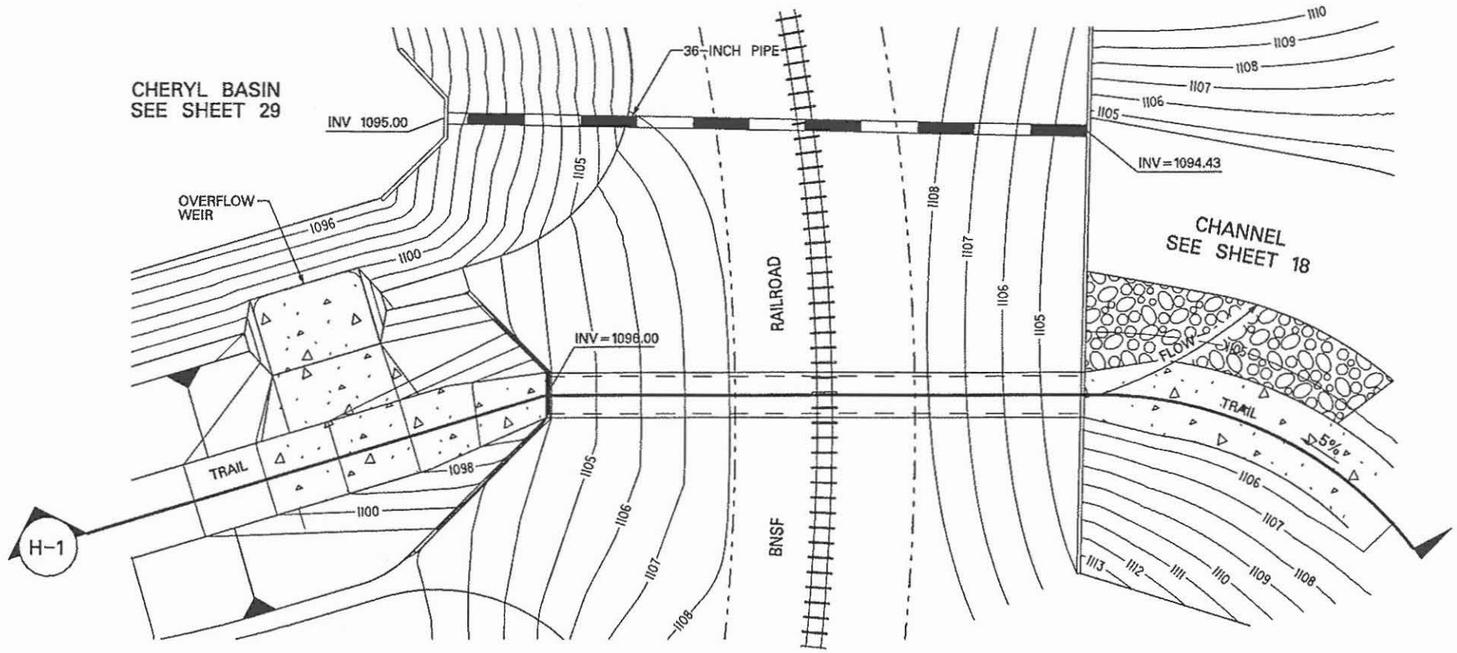
CHERYL BASIN

SHEET 29 OF 44

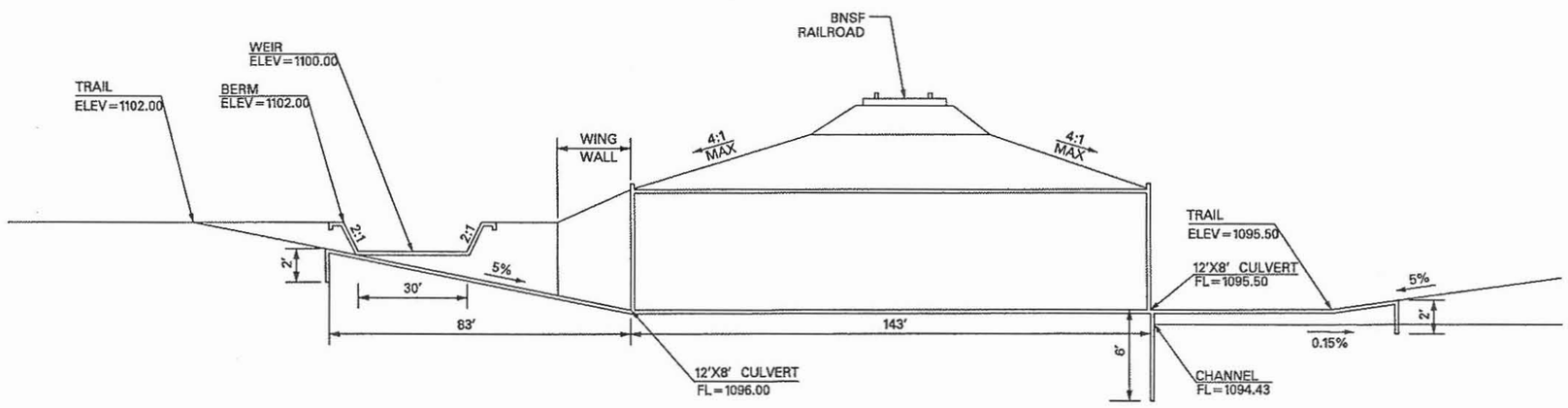
PRELIMINARY NOT FOR CONSTRUCTION

2/19/2009
g:\projects\07\07-027 on-call flood control district\02 - atsf channel\S-CH29.dgn

ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH

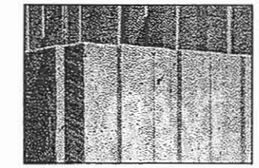


H / 18,29 RAILROAD UNDERPASS DETAIL
HORIZONTAL SCALE 1"=20'/1"=40'
VERTICAL SCALE 1"=5'/1"=10'

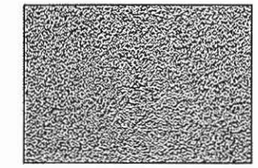


H-1 SECTION
HORIZONTAL SCALE 1"=20'/1"=40'
VERTICAL SCALE 1"=5'/1"=10'

PRELIMINARY NOT FOR CONSTRUCTION



FORM



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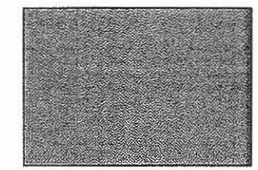

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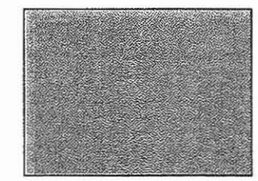

SANDSTONE FRONT

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN Date Signed ARIZONA, U.S.A.
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PLANS CHK.		

DETAILS

SHEET 11 OF 44

2/19/2009
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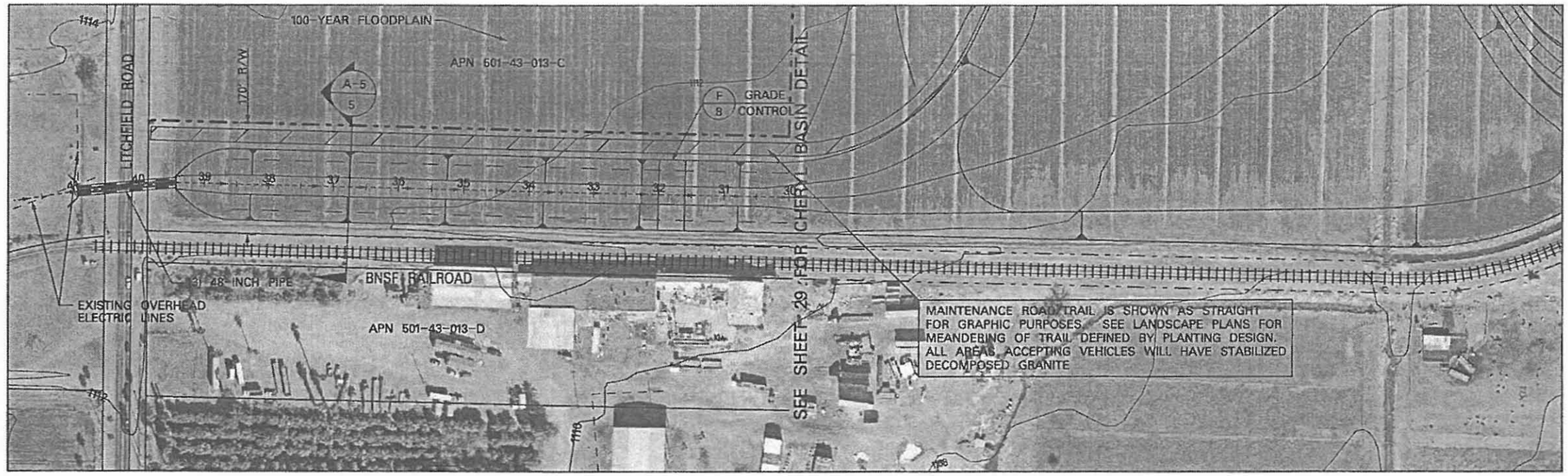

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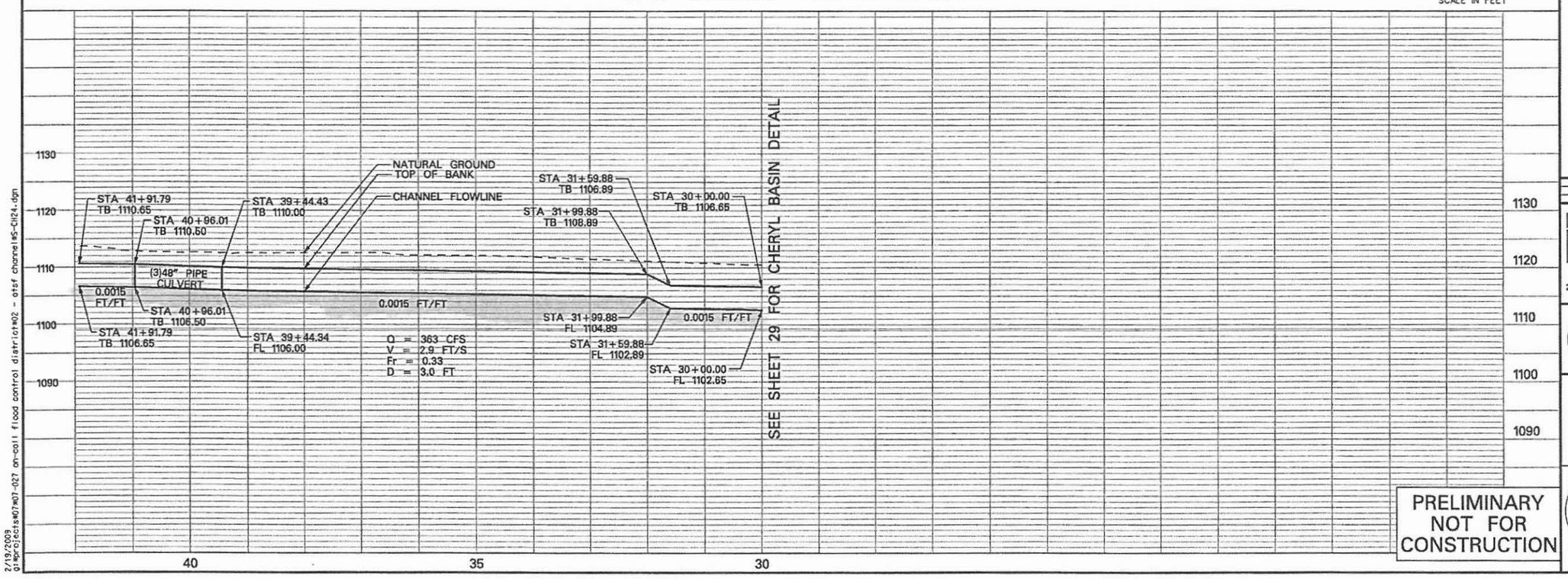

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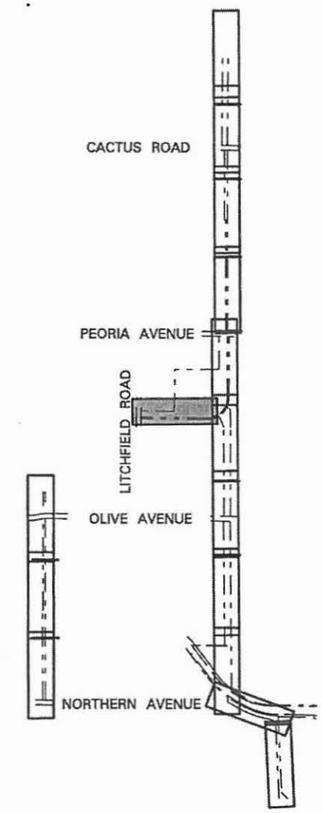

KEY MAP

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SHEET 24 OF 44

2/19/2009
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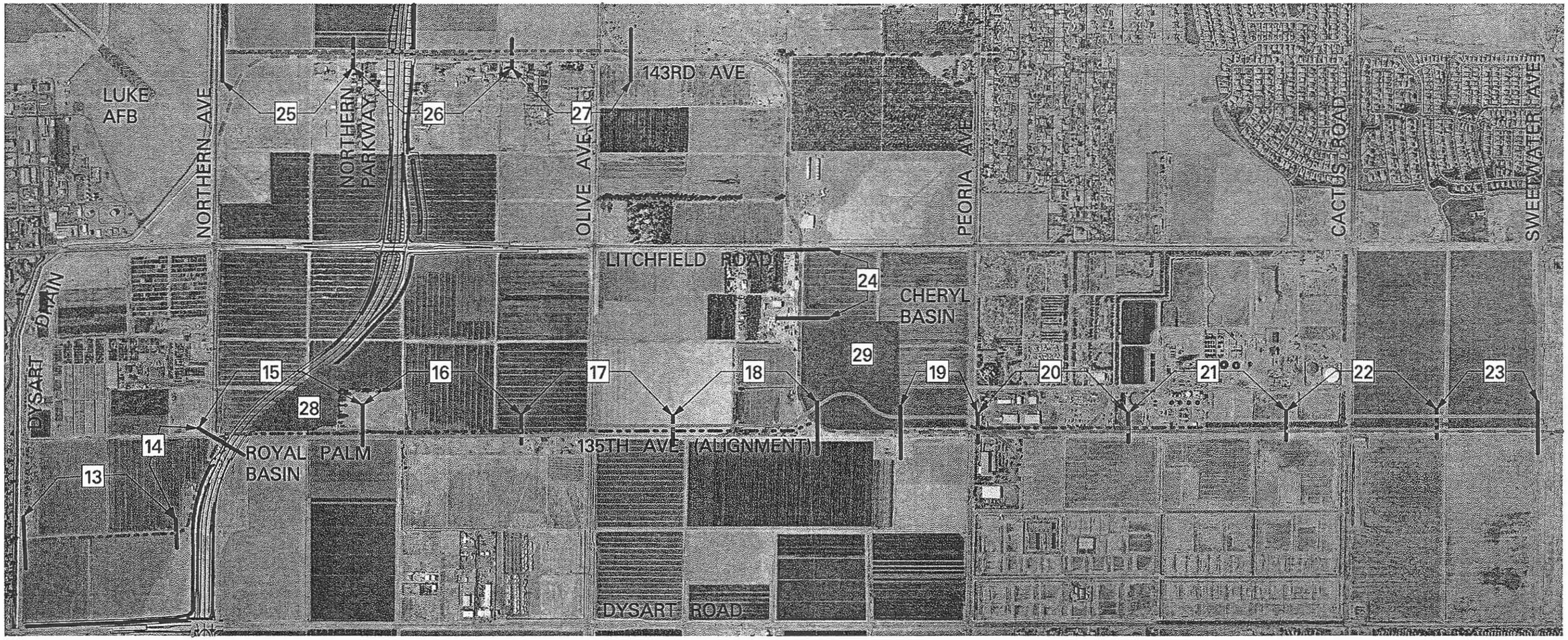

INDEX MAP

LEGEND

- BNSF RAILROAD (FORMERLY AT&SF)
- 14 — SHEET NUMBER
- TRAIL ALIGNMENT
- CHANNEL ALIGNMENT
- DETENTION BASIN

0 700 1400 2800

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INDEX

SHEET 2 OF 44

2/19/2009
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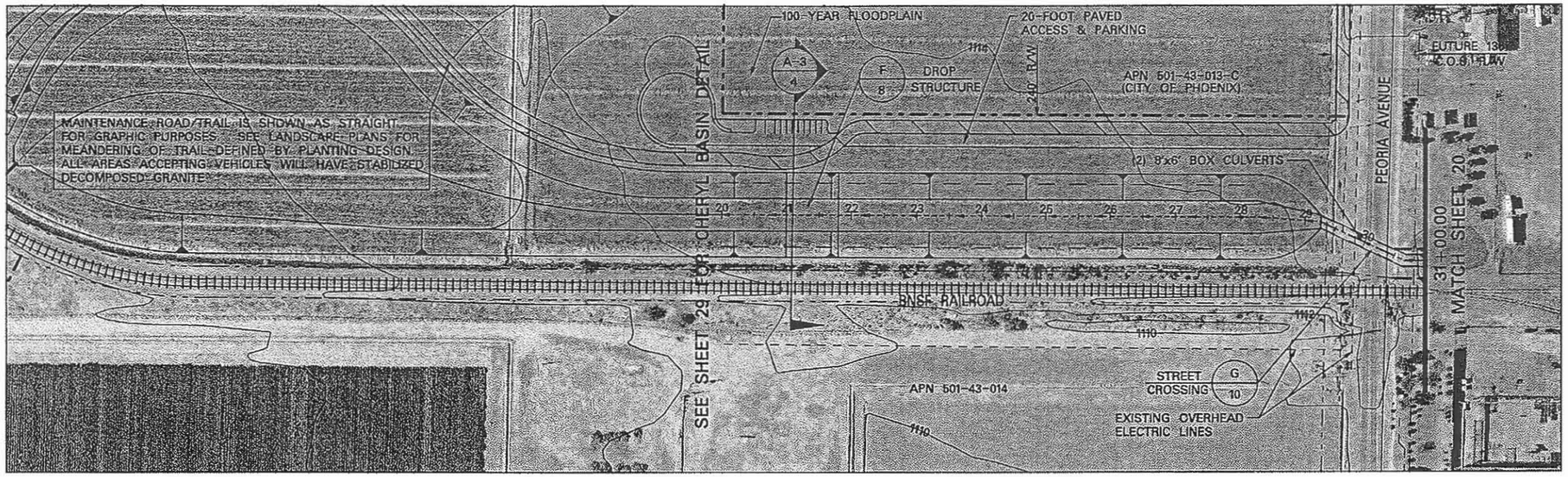

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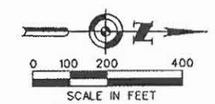

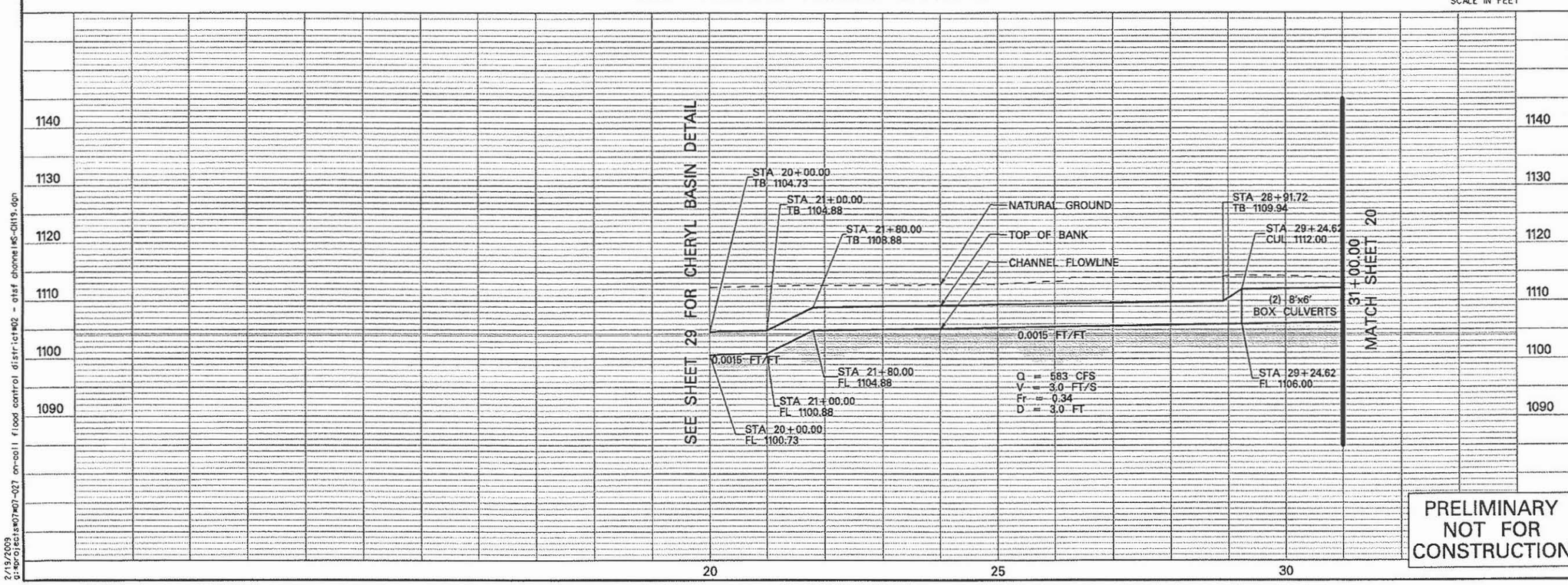

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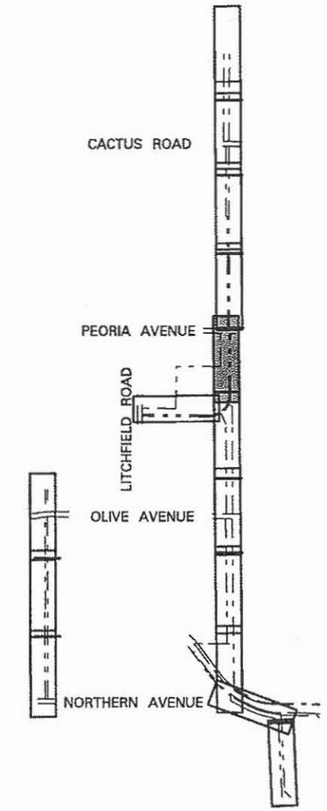

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SHEET 19 OF 44

2/19/2009
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1**************************************                **************************************
 *                                    *                *                                    *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *             *   U.S. ARMY CORPS OF ENGINEERS     *
 *            JUN   1998              *                *   HYDROLOGIC ENGINEERING CENTER    *
 *          VERSION 4.1               *                *          609 SECOND STREET         *
 *                                    *                *       DAVIS, CALIFORNIA 95616      *
 *  RUN DATE   06FEB09  TIME  14:20:20 *                *          (916) 756-1104            *
 *                                    *                *                                    *
   ***********************************                **************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX    X       XXXXX   X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
   2          ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
   3          ID   PREPARED BY ASPEN CONSULTING ENGINEERS
   4          ID   MODIFICATIONS:
   5          ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
   6          ID   (2) SURPRISE WWTP WAS UPDATED
   7          ID   (3) NORTHERN PARKWAY WAS UPDATED
   8          ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
   9          ID
  10          ID  ************************************************************************
  11          ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
  12          ID      NOTES:
  13          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
  14          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
  15          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
  16          ID      AND R238.
              * ************************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ************************************************************************
  17          ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
  18          ID
  19          ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
  20          ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
  21          ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
  22          ID         LUKE AIR FORCE BASE CRASH ZONE AREA
  23          ID
  24          ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
  25          ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  26          ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  27          ID         TANKS/AGUA FRIA ADMS, Date: October 1991
  28          ID
  29          ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  30          ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
  31          ID
  32          ID                                       REVISED BY URS     DATE: 01-14-04
  33          ID                                                          FILE: L33PE4H.DAT
  34          ID
  35          ID        NOTES:
  36          ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  37          ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  38          ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  39          ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  40          ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  41          ID           THE WLB MODEL.
  42          ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  43          ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  44          ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  45          ID           DRAINAGE REPORTS.
  46          ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  47          ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
  48          ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  49          ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  50          ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  51          ID           STORM.
  52          ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  53          ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
  54          ID           THE DATA FILE BY THE FCDMC.
  55          ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
  56          ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
  57          ID
```

```
KK    196C
KM  RUNOFF HYDROGRAPH FROM SUB-BASIN 196 (S. HALF OF FORMER SUB-BASIN 196)
BA     .28
LG     .46      .03     4.58      .53     2.00
UI     13.      13.      13.      21.      43.      51.      60.      66.      72.      78.
UI     86.      95.     105.     126.     154.     164.     140.     123.     112.     103.
UI     94.      83.      76.      69.      62.      55.      44.      35.      22.      22.
UI     21.      21.      15.      13.      13.      12.       4.       4.       4.       4.
UI      4.       4.       4.       4.       4.       4.       4.       0.       0.       0.
UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
*

KK  CP196C
KM        ADD HYDROGRAPHS AT CP196C
KM        TOTAL FLOW IN LITCHFIELD RD STORM DRAIN
HC       2   13.30
*

KK  !C196C
KM        ADD HYDROGRAPHS AT CP196C
KM        TOTAL FLOW IN DYSART DRAIN
KO                                      21
HC       2   51.58
*

KK   R196C
KM        ROUTE FLOW FROM CP196C TO CP202 (TOTAL FLOW IN EXISTING DYSART DRAIN)
RS       2              -1       0
RC     .02     .016     .02     5460    .0015
RX    1000     1001    1008     1020    1030     1042     1074     1075
RY    1085     1078    1076     1070    1070     1076     1078     1085
*
*   MODIFIED PER NORTHERN PARKWAY AND ATSF CHANNEL HRC 12/11/2008
*

KK   DRRR6
KM   RETURN FLOW FROM !RR5
DR   2DRRR6

KK    RRR5
KM    ROUTE RR5 TO RR6
RS       3              -1.0      0.0
RC   0.035    0.035    0.035     2580   0.0015
RX       0       10       20       36       86      102      110      120
RY    1114     1114     1114     1110     1110     1114     1114     1114
*

KK   DRRR6
KM   RETURN FLOW FROM !RR5
DR   1DRRR6
*
```

D63 D64


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

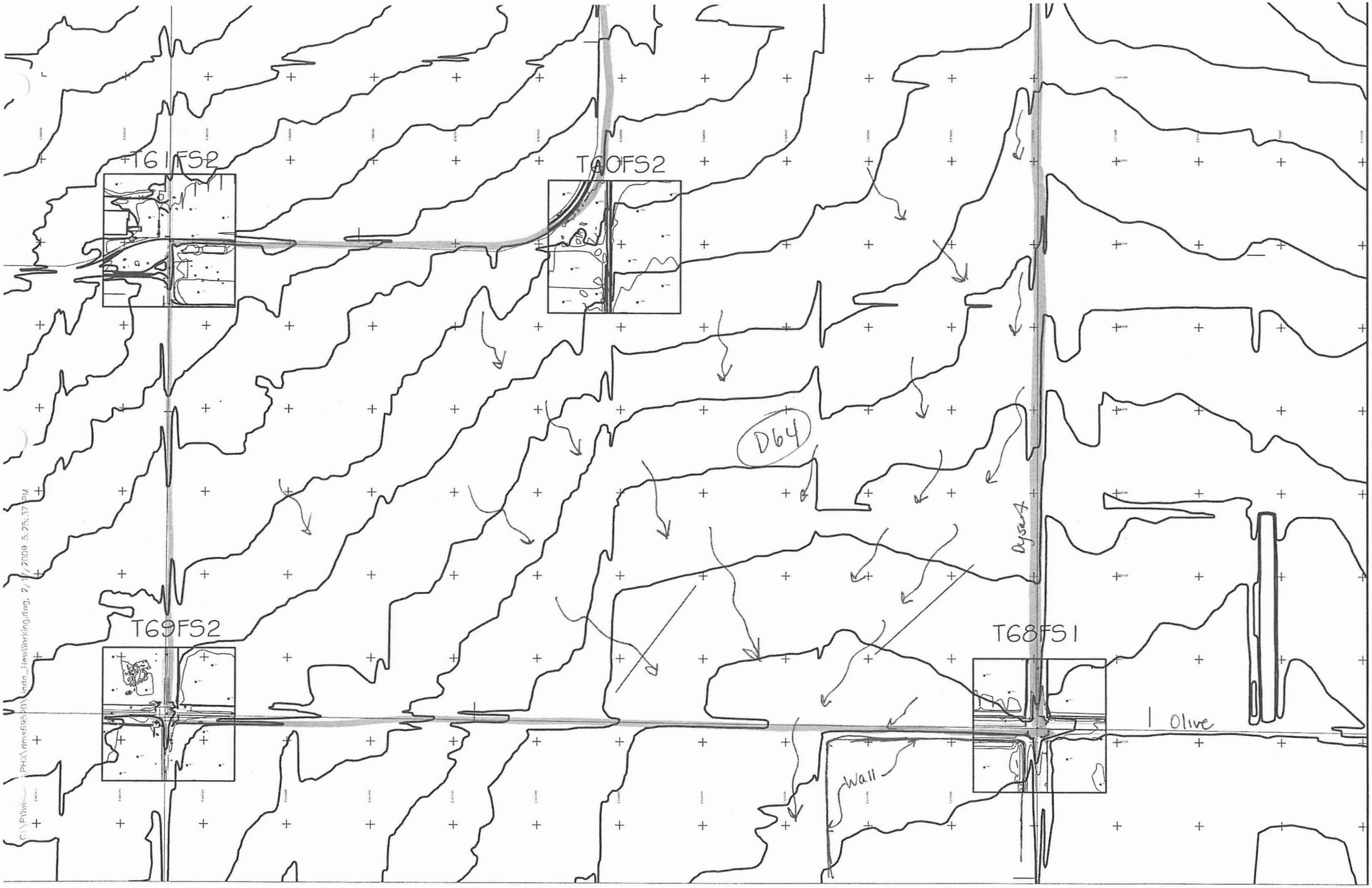
KK    184A
KM   BASIN 184A
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .7  Lca=        .4   S=   24.7  Kn= .120  LAG=  57.1
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA     .28
LG     .50      .00     4.74      .51      .00
UI     16.      16.      31.      59.      76.      88.      98.     113.     129.     161.
UI    208.     192.     160.     139.     124.     106.      93.      80.      65.      44.
UI     29.      28.      26.      16.      16.      11.       5.       5.       5.       5.
UI      5.       5.       5.       5.       0.       0.       0.       0.       0.       0.
UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
*

KK    !RR6
KM   COMBINE HYDROGRAPHS AT !RR6
KM   TAREA=11.67(!RR5)+0.24(182)+0.28(184A)=12.19
HC       3   12.19

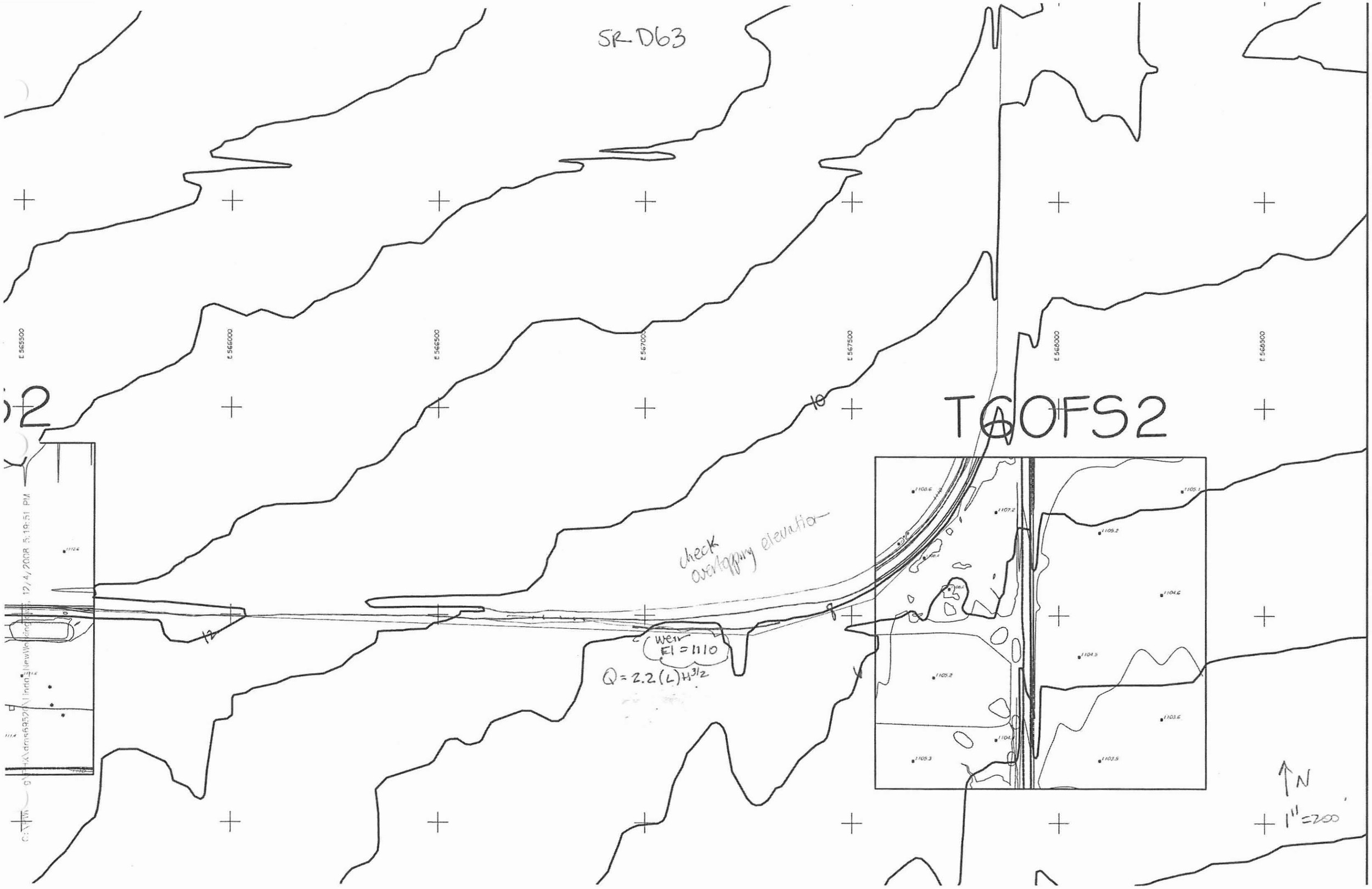
KK    RRR6
KM   ROUTE FLOW FROM !RR6 TO !RR7
RS       5              -1.0      0.0
RC   0.035    0.035    0.035     4000   0.0015
RX       0       10       20       36       86      102      110      120
RY    1114     1114     1114     1110     1110     1114     1114     1114
*

KK    197A
KM   BASIN 197A
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=       1.1  Lca=        .7   S=   19.6  Kn= .120  LAG=  88.0
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA     .36
LG     .48      .01     4.66      .53     3.00
UI     14.      14.      14.      14.      44.      51.      60.      66.      74.      79.
UI     85.      93.     103.     112.     131.     156.     181.     166.     144.     130.
UI    119.     111.     102.      91.      84.      76.      69.      64.      54.      42.
UI     33.      24.      24.      23.      23.      17.      14.      14.      14.       8.
UI      4.       4.       4.       4.       4.       4.       4.       4.       4.       4.
UI      4.       4.       0.       0.       0.       0.       0.       0.       0.       0.
UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
*

KK   DR196
KM   RETURN FLOW FROM CP196B
```

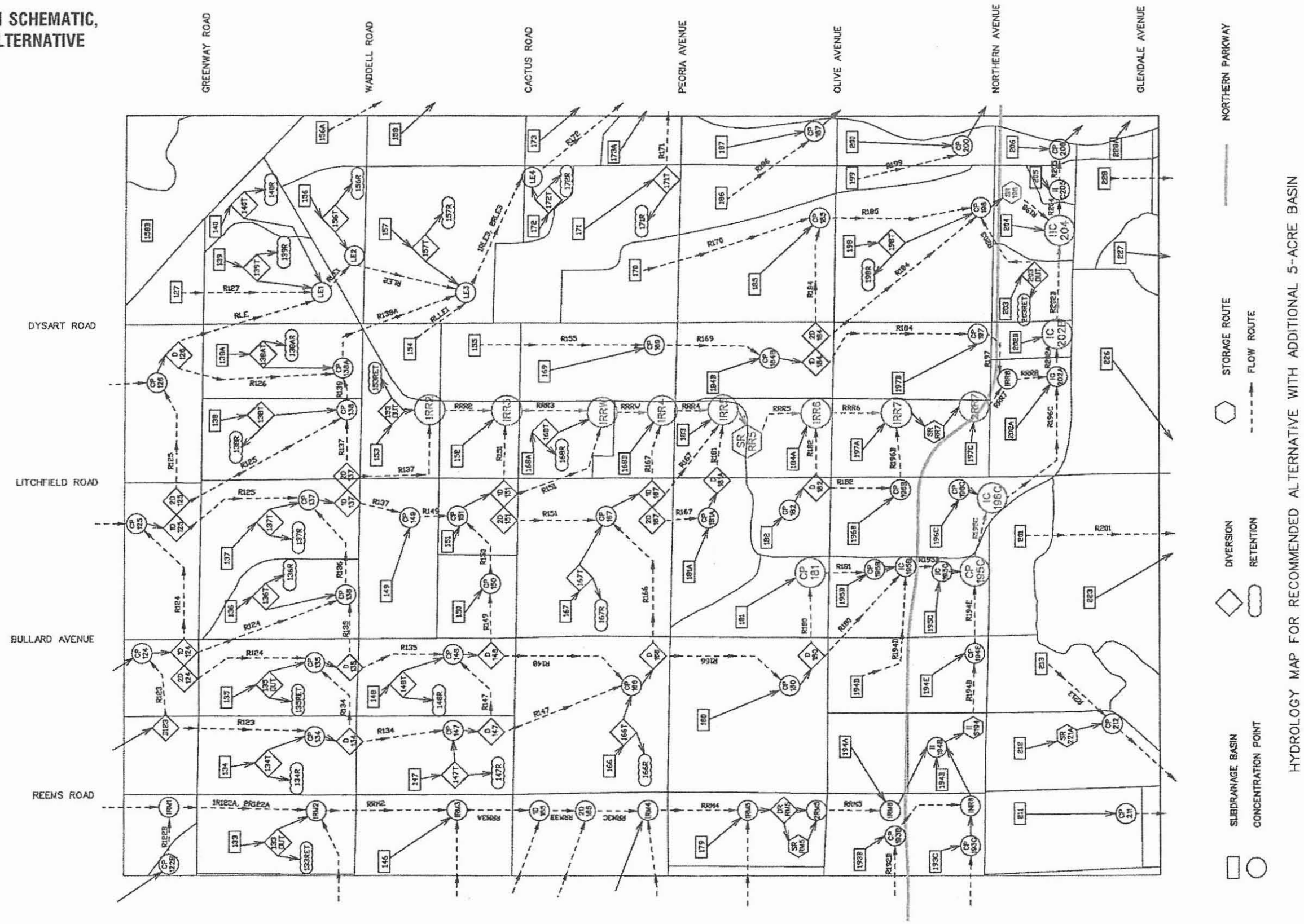

T61FS2
T70FS2
D64
Dysart
T69FS2
T68FS1
Olive
Wall

Storage Route D63


SR-D63
TGOFS2
check overlapping elevation
weir
El = 1110
Q = 2.2(L)H^3/2
N
1" = 200'

Basins D61 → D77, D54 - D40
D63, D64, D74, D75
FUTURE - CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



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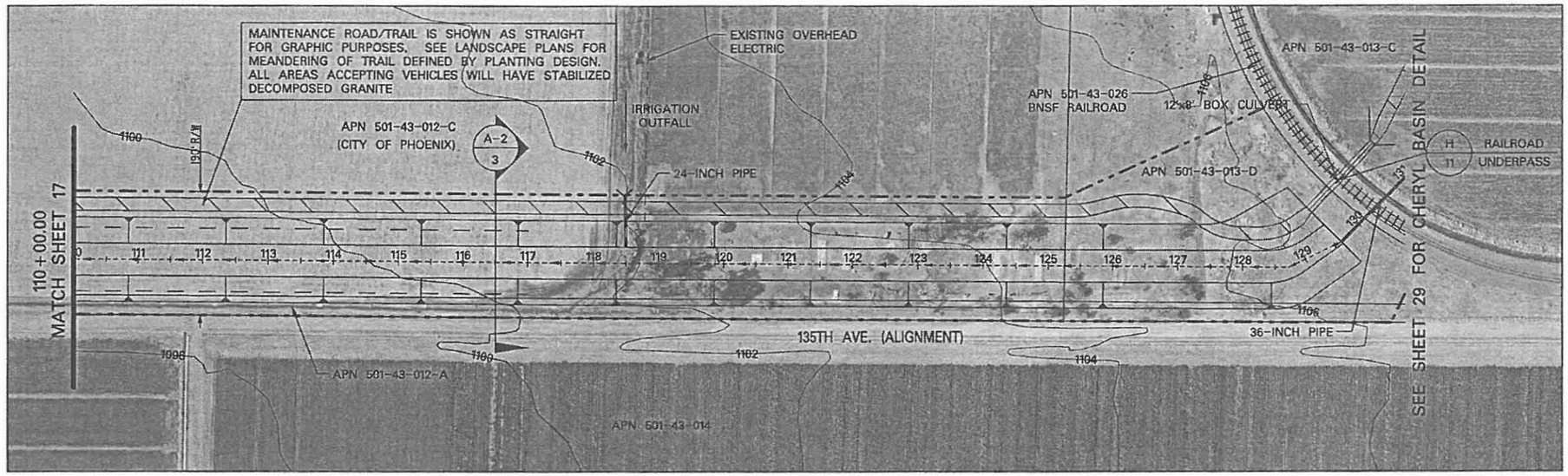
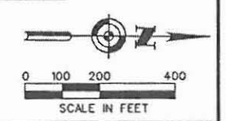
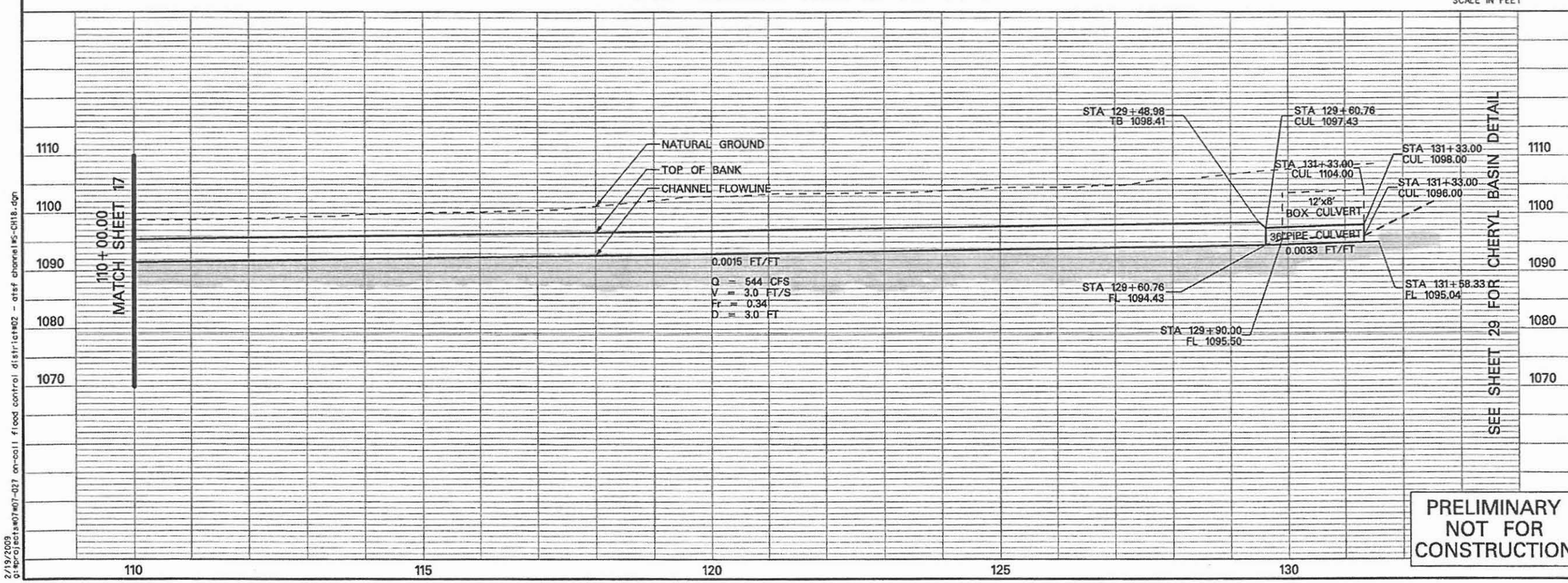




BNSF RAILROAD PRIMARY CHANNEL



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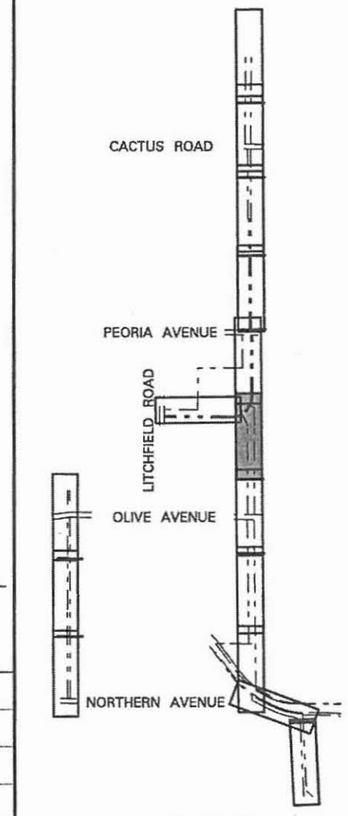

KEY MAP

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PLANS		
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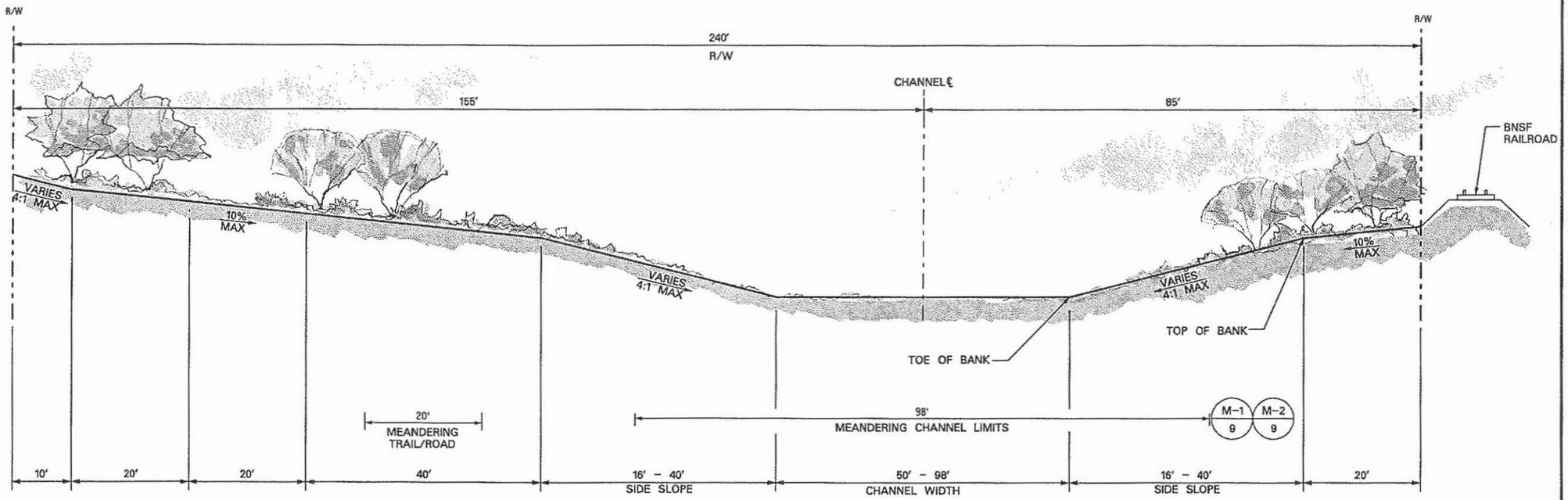
PLAN AND PROFILE

SHEET 18 OF 44

2/19/2009
q:\projects\07\07-027 on-call flood control districts\02 - atsf channel\5-CH18.dgn



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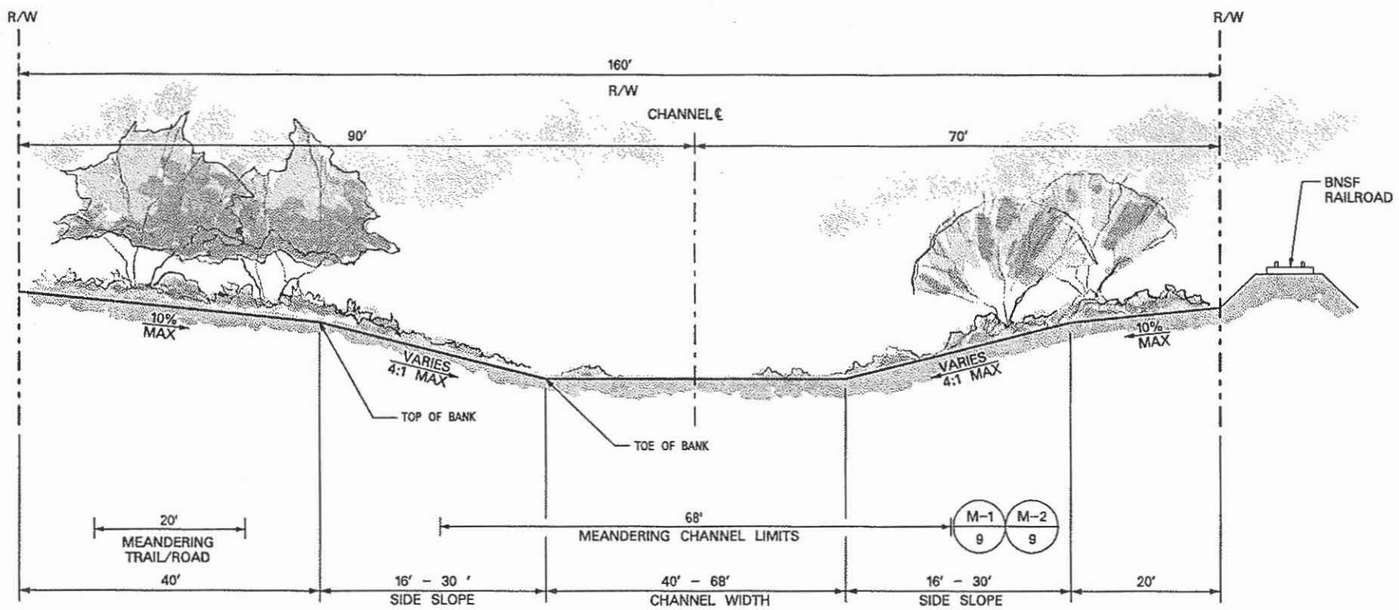

A-4 / 22-23 SECTION
SCALE 1" = 10'/1" = 20'

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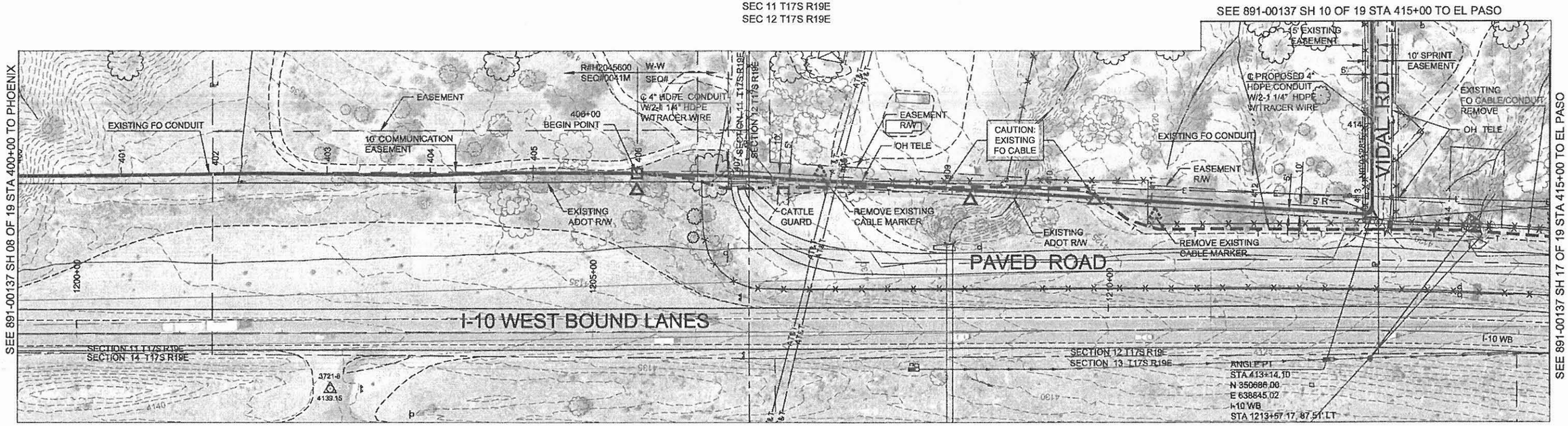
PLANS CHK.		

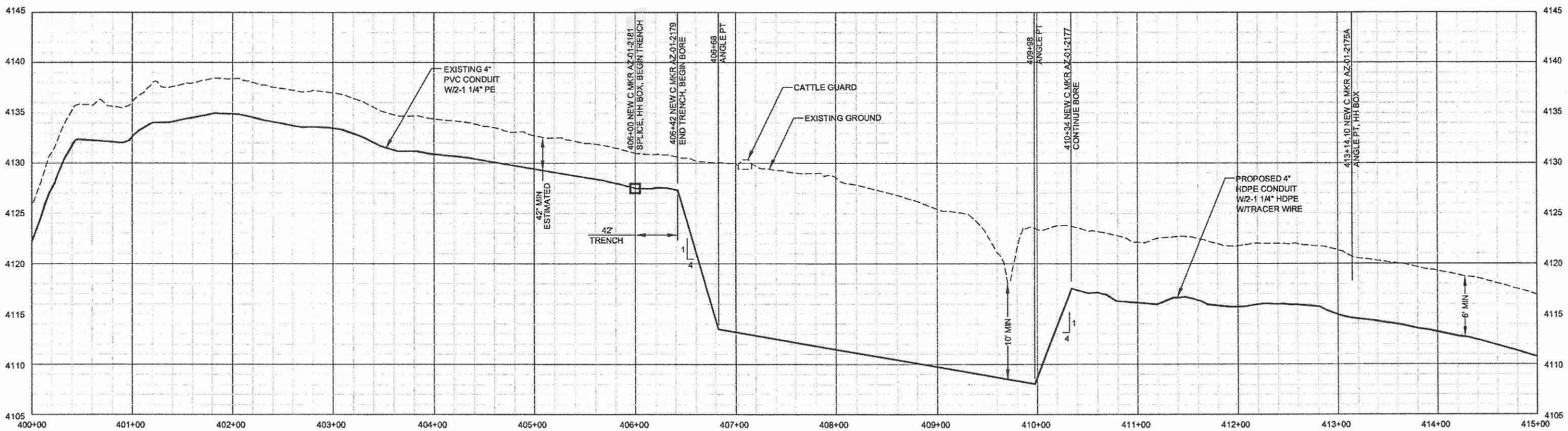
SECTIONS

SHEET 4 OF 44

2/19/2009
d:\projects\K07K07-027 on-call flood control district#02 - atsf channel#5-CH04.dgn

COCHISE CO, AZ
SEC 11 T17S R19E
SEC 12 T17S R19E





QUANTITIES THIS SHEET	
DESCRIPTION	QUANTITY
4" HDPE CONDUIT W/2-1 1/4" HDPE, PLOWED	0 LF
4" HDPE CONDUIT W/2-1 1/4" HDPE, DIRECT BORE	858 LF
4" HDPE CONDUIT W/2-1 1/4" HDPE, TRENCH	42 LF
NEW CABLE MARKER	3 EA
REMOVE EXISTING SPRINT FO CABLE	900 LF
REMOVE EXISTING CABLE MARKER	2 EA

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE LOCATIONS
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

CALL BEFORE YOU DIG
1-800-521-0579

PROPRIETARY INFORMATION
NOT FOR DISCLOSURE OR REPRODUCTION

HDR

Sprint

PRINTED SHEET SIZE / DRAWING SCALE	
11" x 17" (B)	1" = 100'
22" x 34" (D)	1" = 50'
RELEASE DATE: - -	ISSUE NUMBER: 01

NORTH

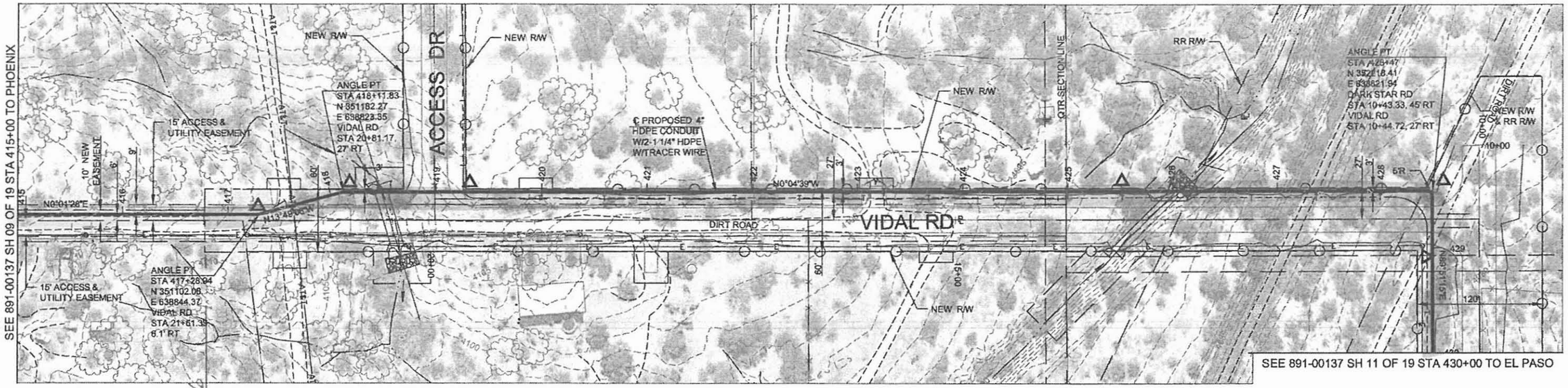
OLD DRAWING NUMBER
WBS:
PRINT NO:
ENG. CO:
APPD DATE:

FIBER OPTIC WORK ORDER DRAWING
CABLE ROUTE DETAIL

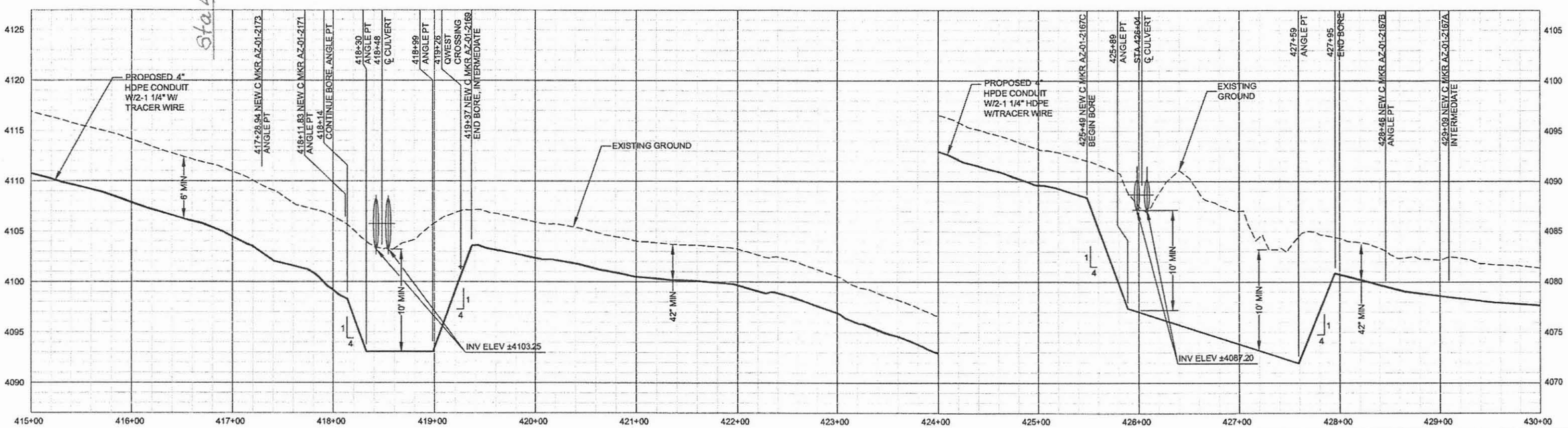
HDR / ARCH I-10 / SR 90 RELOCATION

SHEET 09 OF 19 | NTWRK406-00-000-891-00137

COCHISE CO, AZ
SEC 12 T17S R19E



Sta 416+76



QUANTITIES THIS SHEET	
DESCRIPTION	QUANTITY
4" PVC CONDUIT W/2-1 1/4" PE, PLOWED	817 LF
4" PVC CONDUIT W/2-1 1/4" PE, DIRECT BORE	683 LF
4" PVC CONDUIT W/2-1 1/4" PE, TRENCH	0 LF
NEW CABLE MARKER	6 EA

602-263-1100
1-800-STAKE-IT

CALL BEFORE YOU DIG
1-800-521-0579

PROPRIETARY INFORMATION
NOT FOR DISCLOSURE OR REPRODUCTION

HDR

Sprint

PRINTED SHEET SIZE / DRAWING SCALE	
11" x 17" (B)	1" = 100'
22" x 34" (D)	1" = 50'
RELEASE DATE: - -	ISSUE NUMBER: 01

NORTH

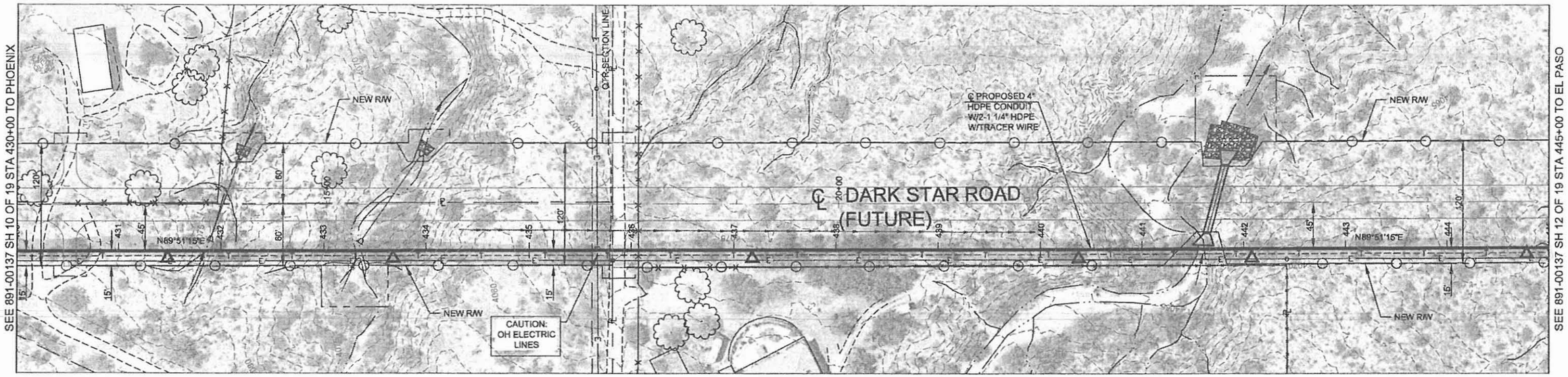
OLD DRAWING NUMBER
WBS:
PRINT NO:
ENG. CO:
APPD DATE:

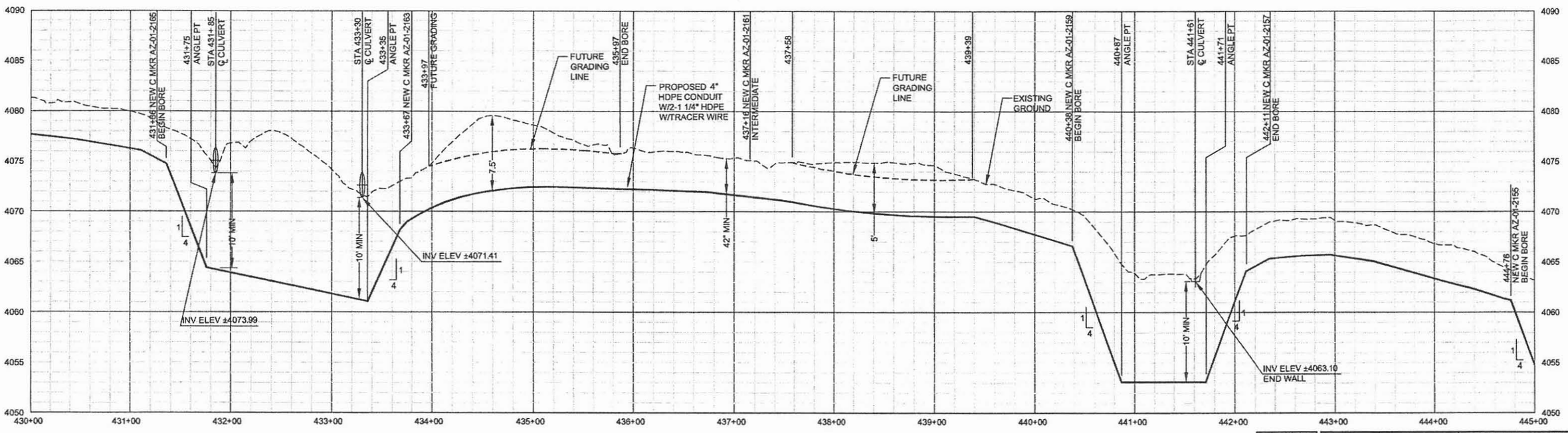
FIBER OPTIC WORK ORDER DRAWING
CABLE ROUTE DETAIL

HDR / ARCH I-10 / SR 90 RELOCATION

SHEET 10 OF 19 | NTWRK406-00-000-891-00137

COCHISE CO, AZ
SEC 12 T17S R19E





QUANTITIES THIS SHEET	
DESCRIPTION	QUANTITY
4" PVC CONDUIT W/2-1 1/4" PE, PLOWED	842 LF
4" PVC CONDUIT W/2-1 1/4" PE, DIRECT BORE	658 LF
4" PVC CONDUIT W/2-1 1/4" PE, TRENCH	0 LF
NEW CABLE MARKER	5 EA

THIS WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUESTAKES
602-263-1100
1-800-STAKE-IT
(MARICOPA COUNTY)

CALL BEFORE YOU DIG
USA
1-800-521-0579

PROPRIETARY INFORMATION
NOT FOR DISCLOSURE OR REPRODUCTION

NORTH	OLD DRAWING NUMBER
	WBS:
	PRINT NO:
	ENG. CO:
	APPD DATE:

HDR

Sprint

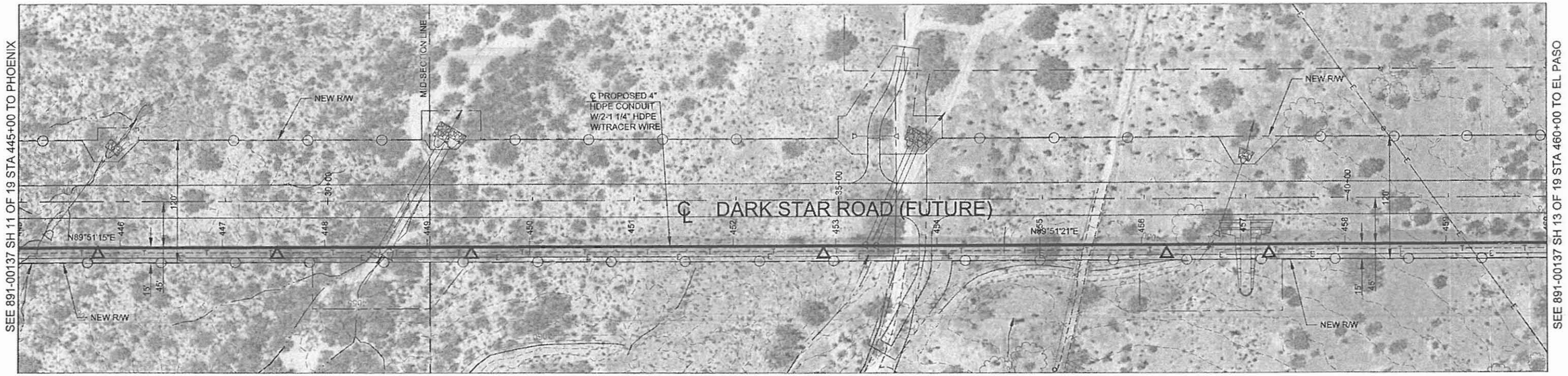
PRINTED SHEET SIZE / DRAWING SCALE	
11" x 17" (B)	1" = 100'
22" x 34" (D)	1" = 50'
RELEASE DATE: - -	ISSUE NUMBER: 01

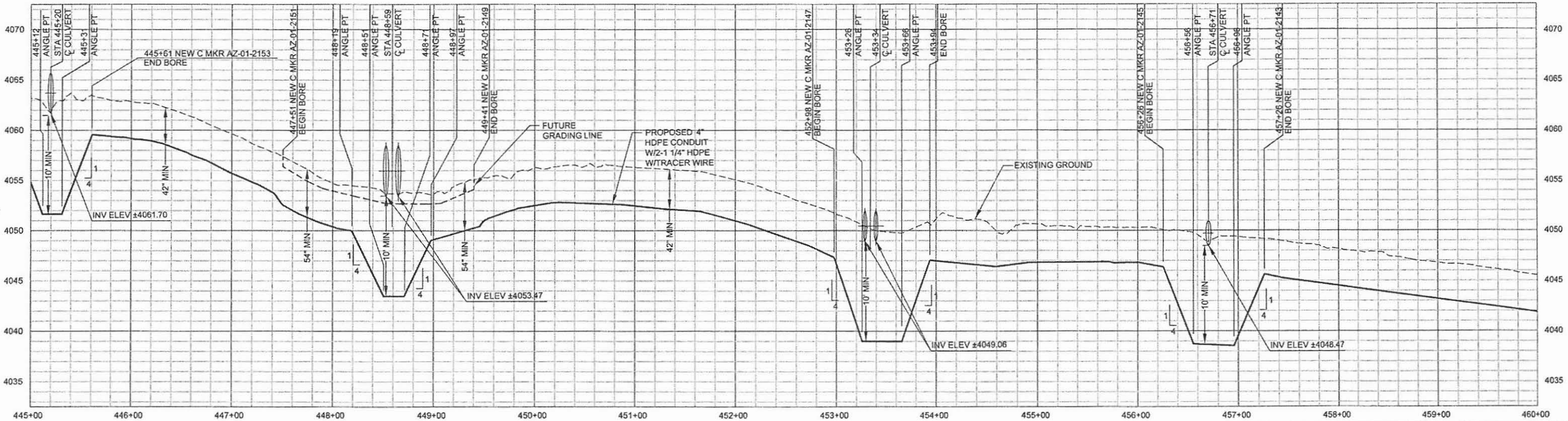
FIBER OPTIC WORK ORDER DRAWING
CABLE ROUTE DETAIL

HDR / ARCH I-10 / SR 90 RELOCATION

SHEET 11 OF 19 | NTWRK406-00-000-891-00137

COCHISE CO, AZ
SEC 12 T17S R19E





QUANTITIES THIS SHEET		
DESCRIPTION	QUANTITY	
4" PVC CONDUIT W/2-1 1/4" PE, PLOWED	1053	LF
4" PVC CONDUIT W/2-1 1/4" PE, DIRECT BORE	447	LF
4" PVC CONDUIT W/2-1 1/4" PE, TRENCH	0	LF
NEW CABLE MARKER	7	LF

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUESTAKERS
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

CALL BEFORE YOU DIG USA 1-800-521-0579

PROPRIETARY INFORMATION
NOT FOR DISCLOSURE OR REPRODUCTION

NORTH

OLD DRAWING NUMBER
WBS:
PRINT NO:
ENG. CO:
APPD DATE:

HDR

Sprint

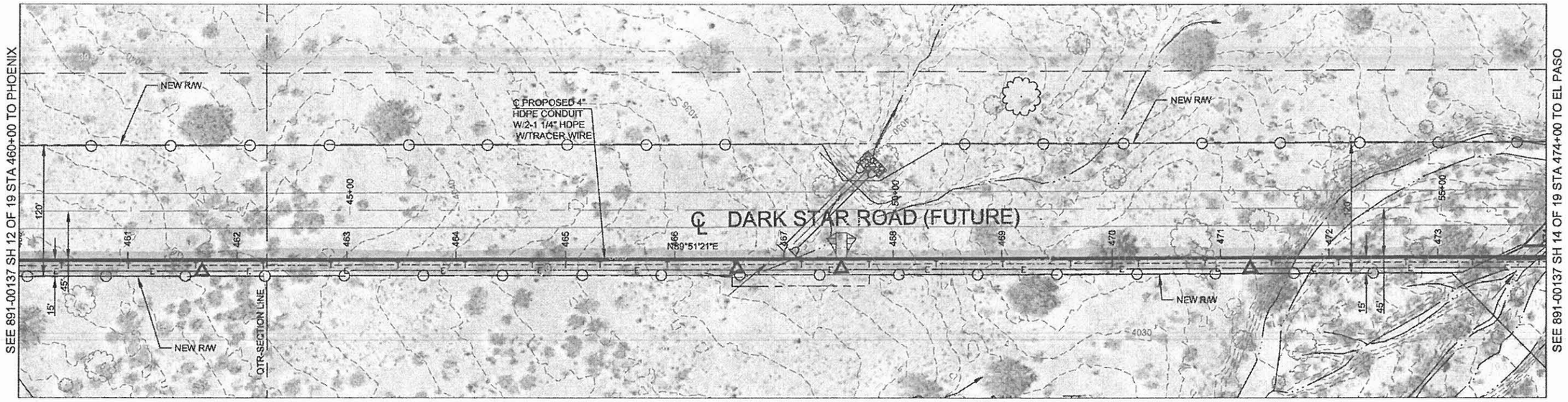
PRINTED SHEET SIZE / DRAWING SCALE	
11" x 17" (B)	1" = 100'
22" x 34" (D)	1" = 50'
RELEASE DATE: - -	ISSUE NUMBER: 01

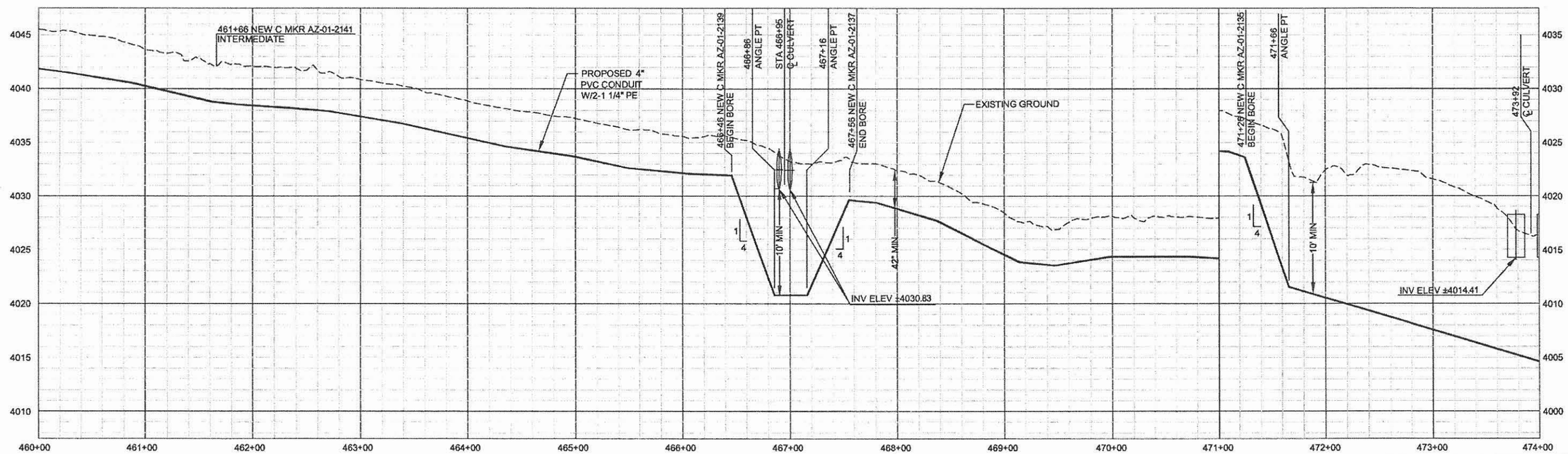
FIBER OPTIC WORK ORDER DRAWING
CABLE ROUTE DETAIL

HDR / ARCH I-10 / SR 90 RELOCATION

SHEET 12 OF 19 | NTWRK406-00-000-891-00137

COCHISE CO, AZ
SEC 12 T17S R19E





QUANTITIES THIS SHEET	
DESCRIPTION	QUANTITY
4" HDPE CONDUIT, PLOWED	1016 LF
4" HDPE CONDUIT, DIRECT BORE	384 LF
4" HDPE CONDUIT, TRENCH	0 LF
NEW CABLE MARKER	4 EA

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE LOCATIONS
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

CALL BEFORE YOU DIG
1-800-521-0579

PROPRIETARY INFORMATION
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NORTH

OLD DRAWING NUMBER
WBS:
PRINT NO:
ENG. CO:
APPD DATE:

HDR

Sprint

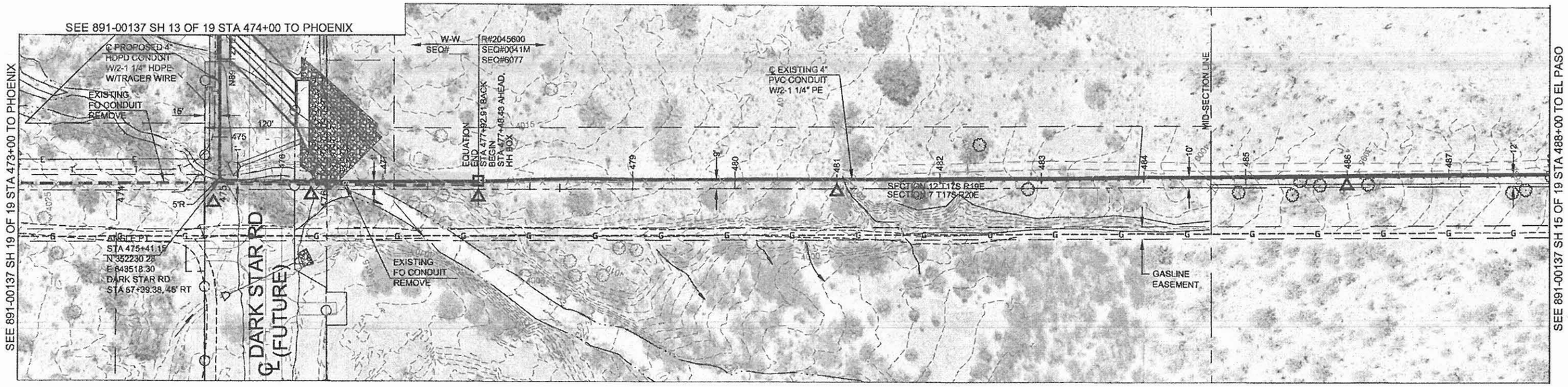
PRINTED SHEET SIZE / DRAWING SCALE	
11" x 17" (B)	1" = 100'
22" x 34" (D)	1" = 50'
RELEASE DATE: - -	ISSUE NUMBER: 01

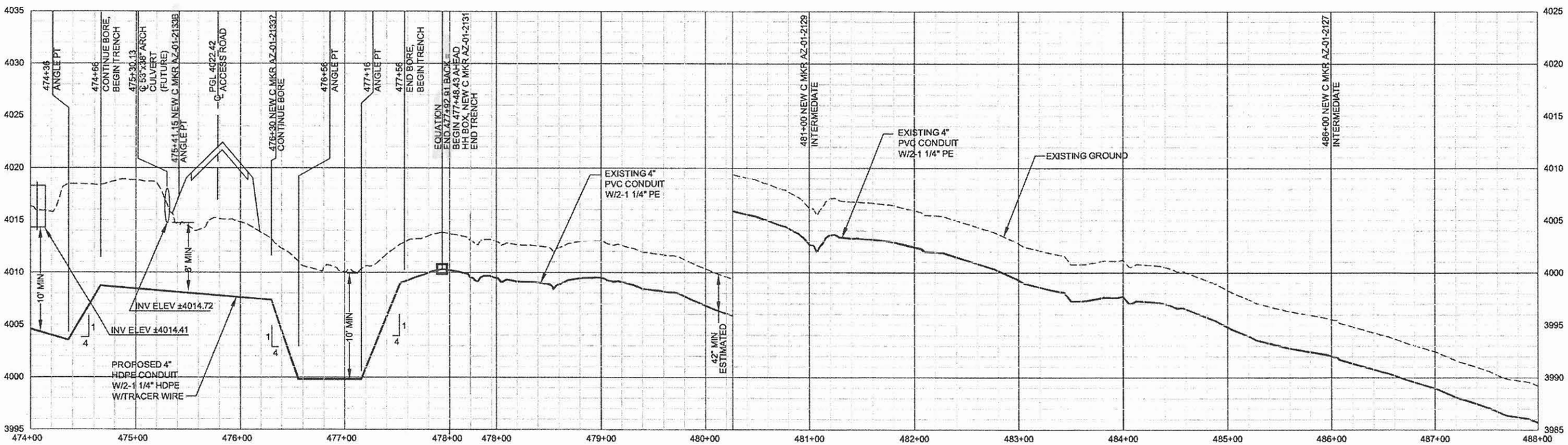
FIBER OPTIC WORK ORDER DRAWING
CABLE ROUTE DETAIL

HDR / ARCH I-10 / SR 90 RELOCATION

SHEET 13 OF 19 | NTWRK406-00-000-891-00137

COCHISE CO, AZ
SEC 12 T17S R19E





QUANTITIES THIS SHEET	
DESCRIPTION	QUANTITY
2" HDPE CONDUIT, PLOWED	0 LF
2" HDPE CONDUIT, DIRECT BORE	356 LF
2" HDPE CONDUIT, TRENCH	37 LF
REMOVE EXISTING SPRINT FO CABLE	448 LF
NEW CABLE MARKER	5 EA

THIS MORNING HAVE BEFORE YOU DIG CALL FOR THE MARKERS
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

CALL BEFORE YOU DIG
1-800-521-0579

PROPRIETARY INFORMATION
NOT FOR DISCLOSURE OR REPRODUCTION

HDR

Sprint

PRINTED SHEET SIZE / DRAWING SCALE	
11" x 17" (B)	1" = 100'
22" x 34" (D)	1" = 50'
RELEASE DATE: - -	ISSUE NUMBER: 01

NORTH

OLD DRAWING NUMBER
WBS:
PRINT NO:
ENG. CO:
APPD DATE:

FIBER OPTIC WORK ORDER DRAWING
CABLE ROUTE DETAIL

HDR / ARCH I-10 / SR 90 RELOCATION

SHEET 14 OF 19 | NTWRK406-00-000-891-00137

D65

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D66

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D67

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For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D68

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Location: Northern & Sarival (D68)	Computed	AHM	Date	10/27/2008
Subject	Weir Flow Analysis		Checked		Date	3/16/09
Task	Weir Calculations		Sheet	1	Of	x

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	1130	1129	140	1129.5	1128	0	0.00	1128.5	0	0.00	1129	0	0.00	CHECK	1129.5	0	0.00	DONE
south	1129	1128	210	1128.5	1128	0	0.00	1128.5	0	0.00	1129	0.5	222.74		1129.5	1	630.00	
south	1128	1128	220	1128	1128	0	0.00	1128.5	0.5	233.35	1129	1	660.00		1129.5	1.5	1212.50	
south	1128	1127.2	260	1127.6	1128	0.4	197.33	1128.5	0.9	665.98	1129	1.4	1292.07		1129.5	1.9	2042.80	
southeast	1127.2	1127.4	10	1127.3	1128	0.7	17.57	1128.5	1.2	39.44	1129	1.7	66.50		1129.5	2.2	97.89	
east	1127.4	1127.2	20	1127.3	1128	0.7	35.14	1128.5	1.2	78.87	1129	1.7	132.99		1129.5	2.2	195.79	
east	1127.2	1129	280	1128.1	1128	0	0.00	1128.5	0.4	212.51	1129	0.9	717.20		1129.5	1.4	1391.46	
east	1129	1129.1	500	1129.05	1128	0	0.00	1128.5	0	0.00	1129	0	0.00		1129.5	0.45	452.80	
east	1129.1	1130	170	1129.55	1128	0	0.00	1128.5	0	0.00	1129	0	0.00		1129.5	0	0.00	
						TOTALS:	250.04			1230.13			3091.50				6023.24	

Graph Computations:

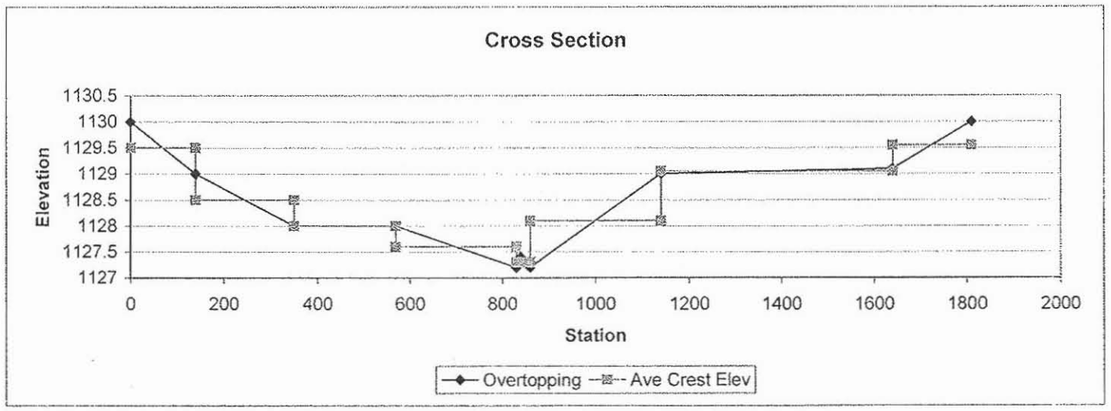
Station	Elevation
0	1130
140	1129
350	1128
570	1128
830	1127.2
840	1127.4
860	1127.2
1140	1129
1640	1129.1
1810	1130

Weir Approximation:

Station	Elevation
0	1129.5
140	1129.5
140	1128.5
350	1128.5
350	1128
570	1128
570	1127.6
830	1127.6
830	1127.3
840	1127.3
840	1127.3
860	1127.3
860	1128.1
1140	1128.1
1140	1129.05
1640	1129.05
1640	1129.55
1810	1129.55

Culvert Flows (cfs):

south	0
southeast	0
east	0



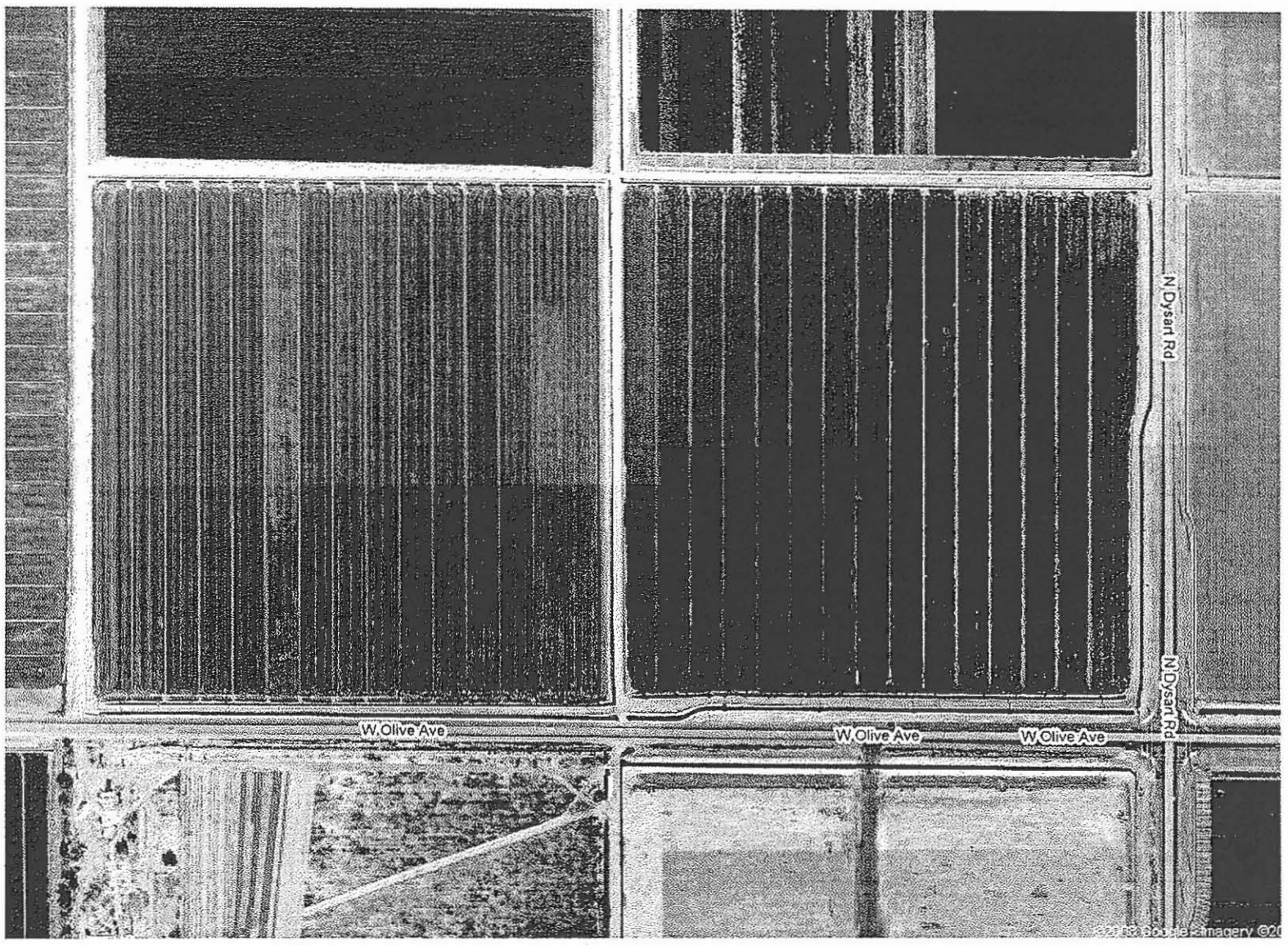
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	197.33	79%	Q(south)	899.32	73%	Q(south)	2174.81	70%	Q(south)	3885.29	65%
Q(southeast)	17.57	7%	Q(southeast)	39.44	3%	Q(southeast)	66.50	2%	Q(southeast)	97.89	2%
Q(east)	35.14	14%	Q(east)	291.38	24%	Q(east)	850.20	28%	Q(east)	2040.05	34%
	250.04			1230.13			3091.50			6023.24	

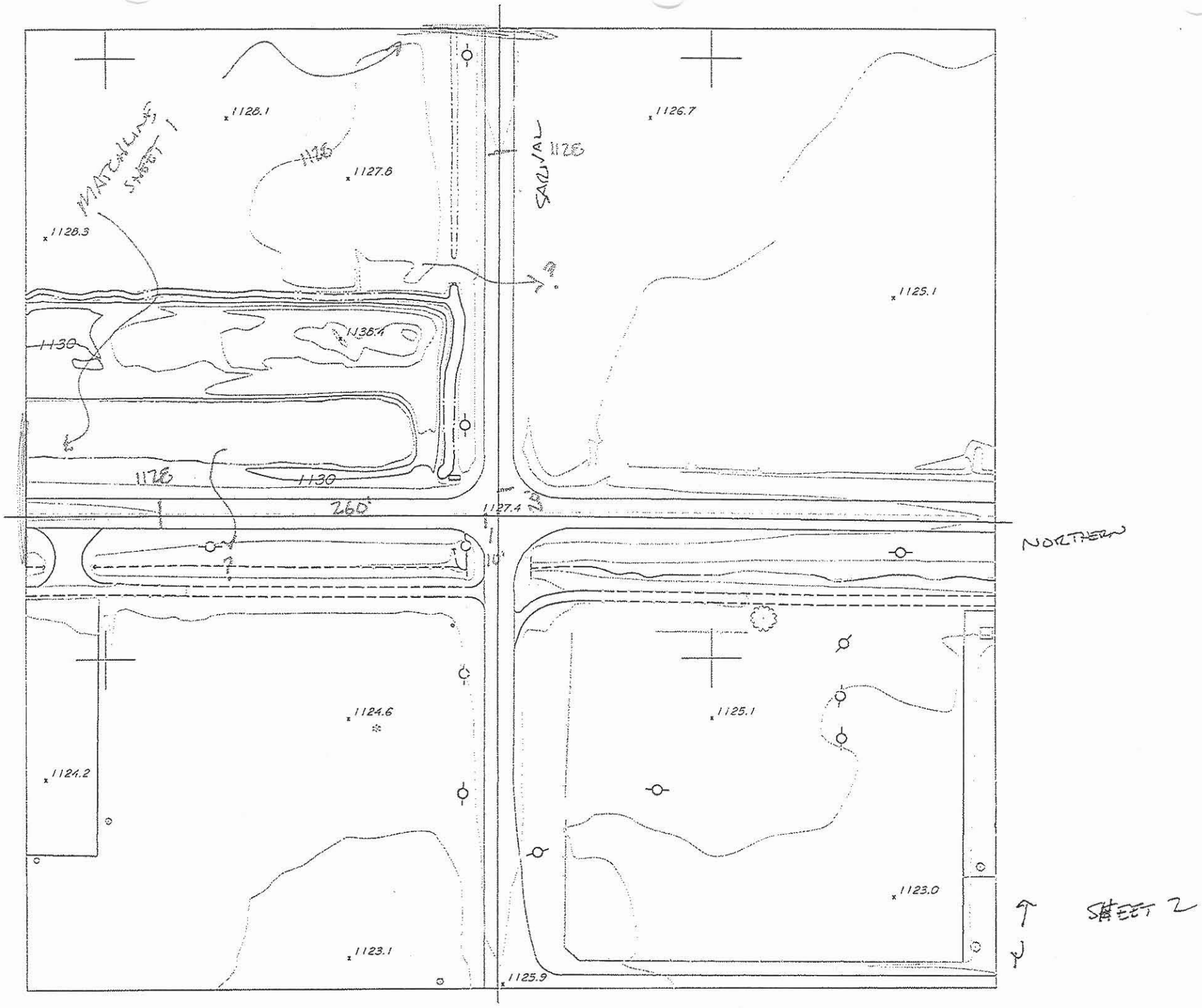
First DI	East to South			
Inflow	250.04	1230.13	3091.50	6023.24
Outflow	197.33	899.32	2174.81	3885.29

Assumes diversion is to south

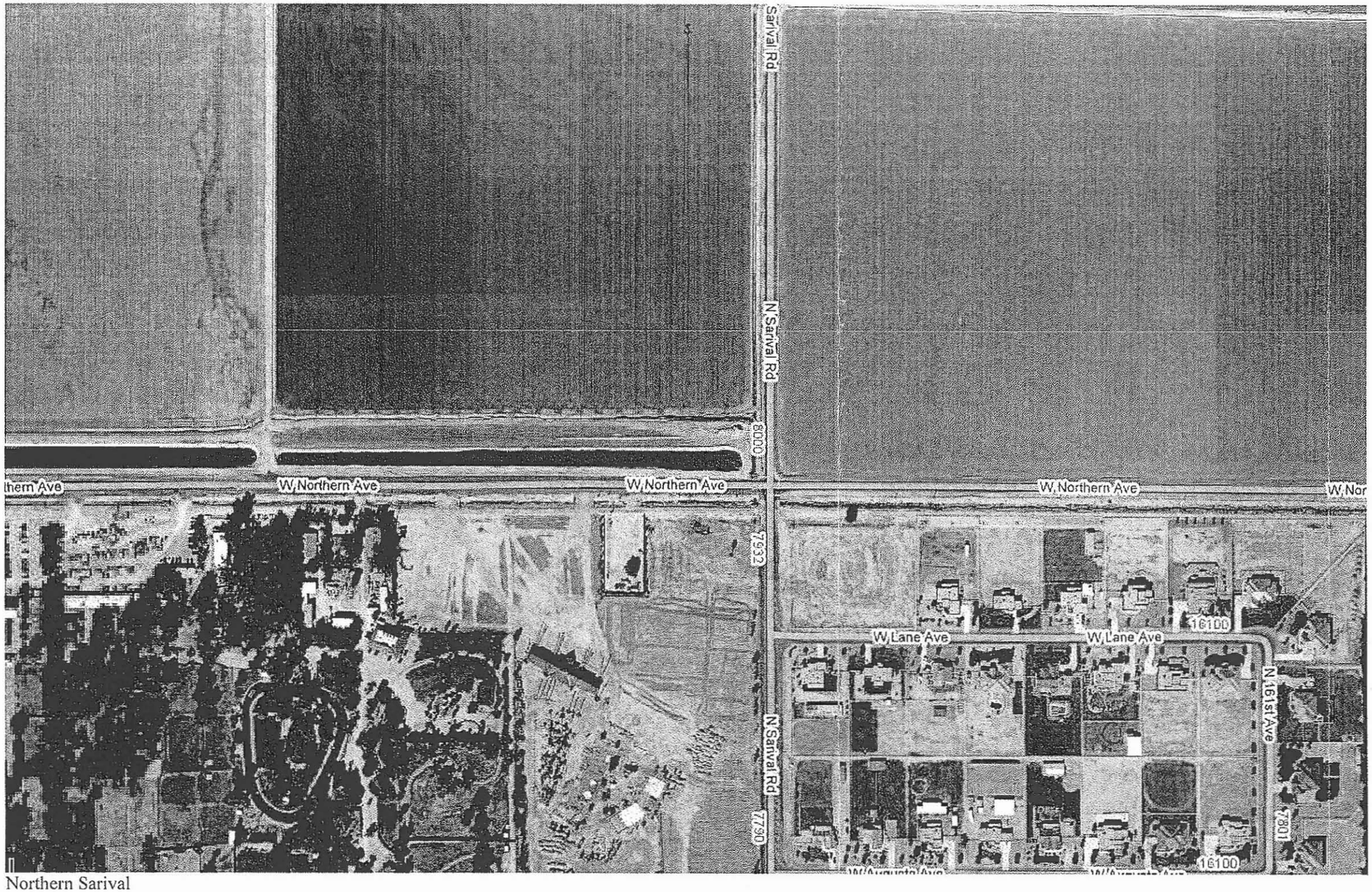
Second DI	East to Southeast			
Inflow	52.71	330.81	916.69	2137.95
Outflow	17.57	39.44	66.50	97.89

Assumes diversion is to southeast


N Dysart Rd
N Dysart Rd
W Olive Ave
W Olive Ave
W Olive Ave
W Olive Ave


1128.1
1126.7
1127.6
1128.3
1125.1
1130
1128
1130
1128
1130
260'
1127.4
10'
NORTHERN
1124.6
1124.2
1125.1
1123.0
1123.1
1125.9
SARJVAL
MATCHLINE SHEET 1
SHEET 2

1146
1144
1142
1138
1134
1132
1131.5
1131.5
1145.2
L39
D68
1141.1
1140
1140
1138.7
1136
1138
1140
1138
1136
1137
1134.7
1134.6
1135
1132.9
1132.7
1130.9
1130
1135.8
1128
1126
1134
1132
1134
1128.3
1126
1134
1128
1126
1126
1124.8
1125
1120
1122
1129.5
1128
1126
1126.5
D69
1129.1
1130
Northern Ave
SR 303
Tal Ave
B40
B41
MATCHLINE SHEET 2
1 inch equals 200 feet
N



Northern Sarival

D69

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Computed	AHM	Date	10/27/2008
Subject	Weir Flow Analysis	Checked		Date	3/10/09
Task	Weir Calculations	Sheet	1	Of	x

Location: Northern & Reems (D69)

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	1106.9	1106	400	1106.45	1105	0	0.00	1105.5	0	0.00	1106	0	0.00	CHECK	1106.5	0.05	13.42	DONE
south	1106	1105	200	1105.5	1105	0	0.00	1105.5	0	0.00	1106	0.5	212.13		1106.5	1	600.00	
south	1105	1104	120	1104.5	1105	0.5	127.28	1105.5	1	360.00	1106	1.5	661.36		1106.5	2	1018.23	
southeast	1104	1104.2	20	1104.1	1105	0.9	51.23	1105.5	1.4	99.39	1106	1.9	157.14		1106.5	2.4	223.08	
southeast	1104.2	1104	20	1104.1	1105	0.9	51.23	1105.5	1.4	99.39	1106	1.9	157.14		1106.5	2.4	223.08	
east	1104	1104	320	1104	1105	1	960.00	1105.5	1.5	1763.63	1106	2	2715.29		1106.5	2.5	3794.73	
east	1104	1104.8	240	1104.4	1105	0.6	334.63	1105.5	1.1	830.66	1106	1.6	1457.18		1106.5	2.1	2191.10	
east	1104.8	1106	260	1105.4	1105	0	0.00	1105.5	0.1	24.67	1106	0.6	362.51		1106.5	1.1	899.88	
east	1106	1106.8	300	1106.4	1105	0	0.00	1105.5	0	0.00	1106	0	0.00		1106.5	0.1	28.46	
						TOTALS:	1524.36			3177.74			5722.75				8991.99	

Graph Computations:

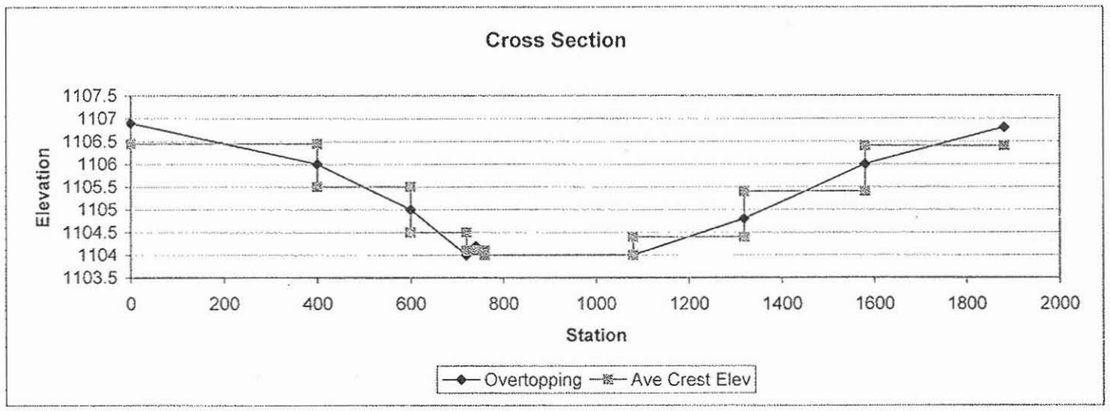
Station	Elevation
0	1106.9
400	1106
600	1105
720	1104
740	1104.2
760	1104
1080	1104
1320	1104.8
1580	1106
1880	1106.8

Weir Approximation:

Station	Elevation
0	1106.45
400	1106.45
400	1105.5
600	1105.5
600	1104.5
720	1104.5
720	1104.1
740	1104.1
740	1104.1
760	1104.1
760	1104
1080	1104
1080	1104.4
1320	1104.4
1320	1105.4
1580	1105.4
1580	1106.4
1880	1106.4

Culvert Flows (cfs):

south	0
southeast	0
east	0



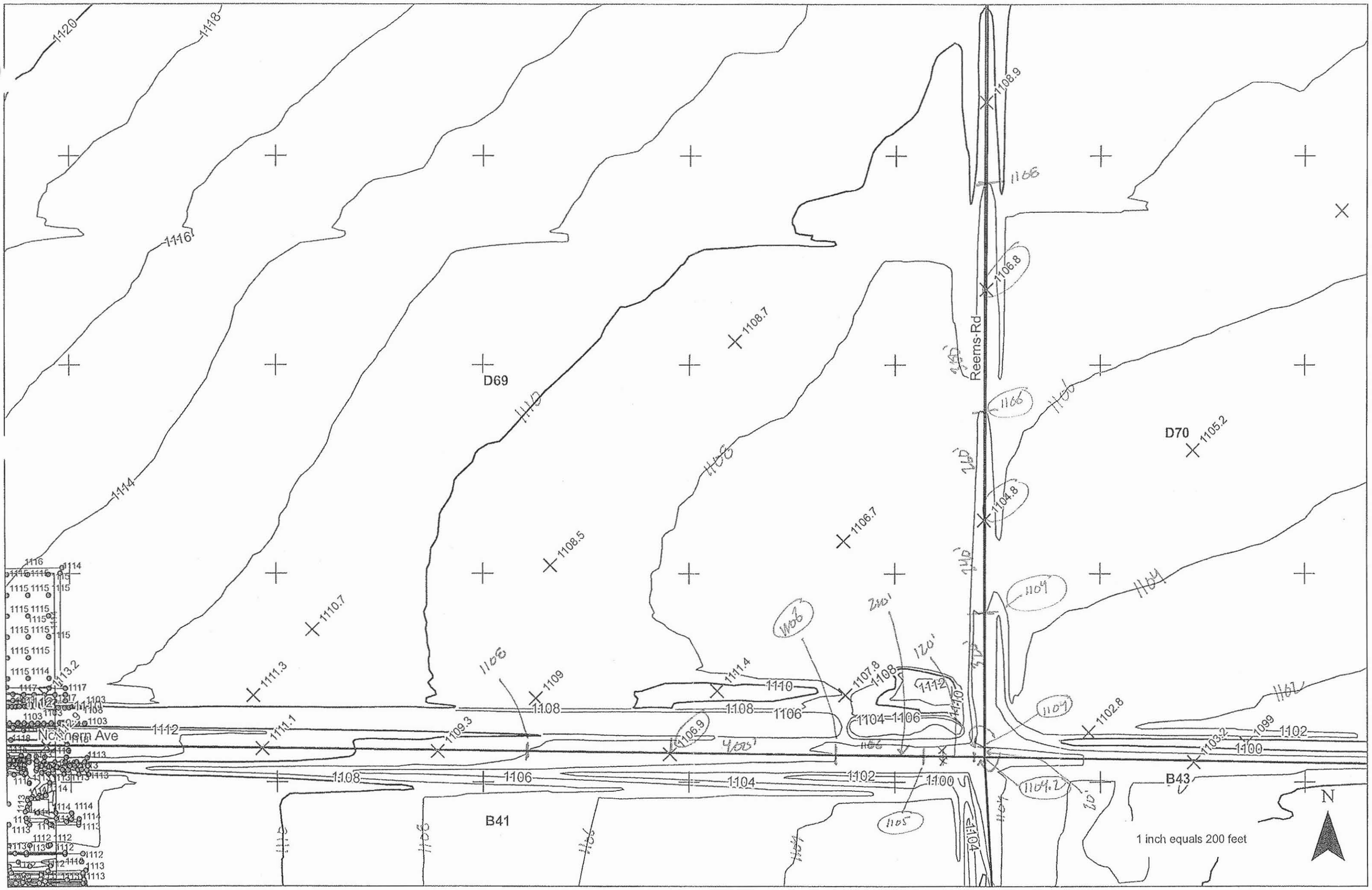
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	127.28	8%	Q(south)	360.00	11%	Q(south)	873.49	15%	Q(south)	1631.65	18%
Q(southeast)	102.46	7%	Q(southeast)	198.78	6%	Q(southeast)	314.28	5%	Q(southeast)	446.17	5%
Q(east)	1294.63	85%	Q(east)	2618.95	82%	Q(east)	4534.98	79%	Q(east)	6914.17	77%
	1524.36			3177.74			5722.75			8991.99	

First DI	East to South			
Inflow	1524.36	3177.74	5722.75	8991.99
Outflow	127.28	360.00	873.49	1631.65

Assumes diversion is to south

Second DI	East to Southeast			
Inflow	1397.08	2817.74	4849.26	7360.34
Outflow	102.46	198.78	314.28	446.17

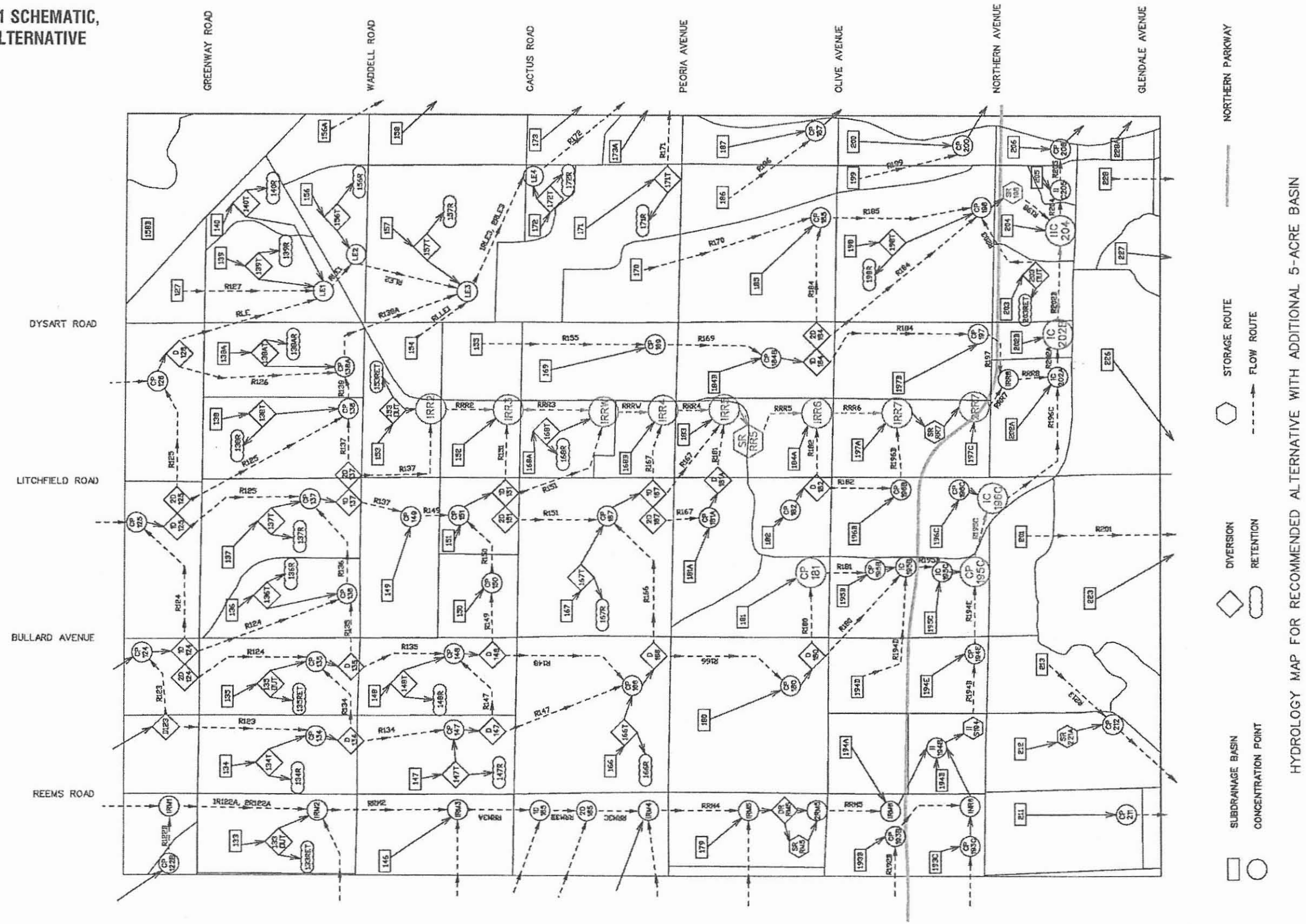
Assumes diversion is to southeast


1120
1118
1116
1114
1112
1110
1108
1106
1104
1102
1100
1099
1108.9
1106.8
1108.7
1106.7
1105.2
1104.8
1110.7
1108.5
1111.3
1111.1
1109.3
1106.9
1109
1111.4
1107.8
1113.2
1103.2
1102.8
1104.2
D69
D70
B41
B43
Reems Rd
Northern Ave
1 inch equals 200 feet
N

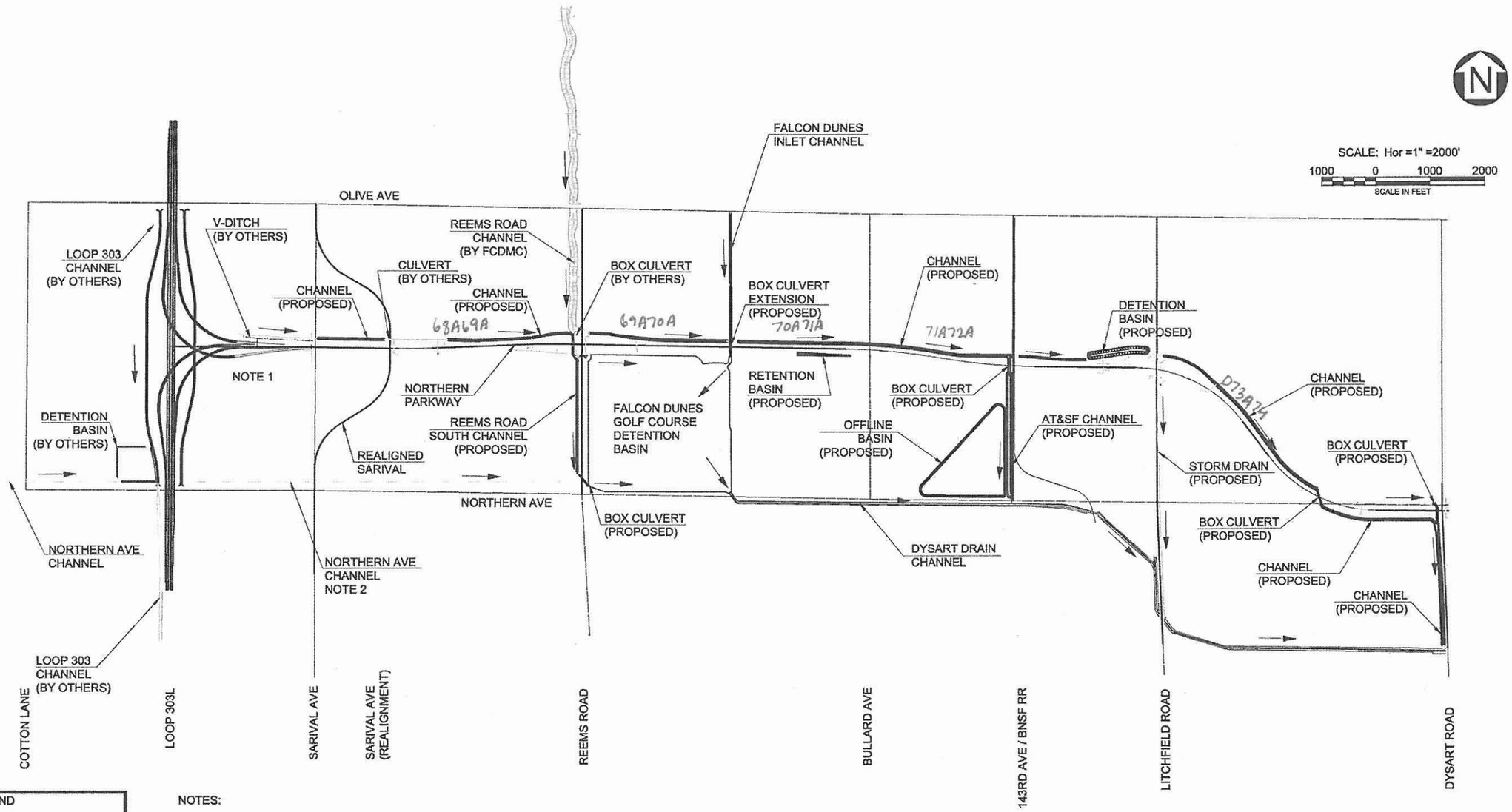
Street View
Traffic
More...
Map
Satellite
Terrain
Show labels
N Reems Rd
8000
15744
15632
W Northern Ave
W Northern Ave
W Northern Ave
W Northern Ave
N Reems Rd

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN



SEE FIGURE 5-2

LEGEND

- STORM DRAIN (PROPOSED) & FLOW DIRECTION
- CHANNEL & (PROPOSED) FLOW DIRECTION
- RETENTION / DETENTION BASIN

NOTES:

1) ALL LOOP 303 - NORTHERN PARKWAY TRAFFIC INTERCHANGE RUNOFF WILL BE ROUTED SOUTHWARD ALONG LOOP 303 DETENTION BASINS AND CHANNEL.
2) LOOP 303/WHITE TANKS ADMP CONCEPT - EAST OF LOOP 303, NORTHERN AVENUE CHANNEL NOT NEEDED.
3) ALL ITEMS SHOWN ARE EXISTING UNLESS STATED OTHERWISE.

FIGURE 5-1
PROPOSED NORTHERN PARKWAY DRAINAGE IMPROVEMENTS - WEST

SEE FIGURE 5-1

SEE FIGURE 5-3

SCALE: Hor =1" =2000'

1000 0 1000 2000

SCALE IN FEET

Olive Ave

PROPOSED LOW FLOW CHANNEL (BY OTHERS)

RIVER CHANNEL (BY OTHERS)

100-YR FLOODPLAIN (EXISTING)

EQUIPMENT PASS (PROPOSED)

100-YR FLOODPLAIN (EXISTING)

RETENTION BASIN (MODIFY)

STORM DRAIN (PROPOSED)

NORTHERN PARKWAY

CULVERTS (PROPOSED)

RIVER CHANNELIZATION (BY OTHERS)

DETENTION BASIN (ENLARGE)

PUMP STATION (PROPOSED)

BRIDGE (EXISTING)

STORM DRAIN (PROPOSED)

RIVER

FRIA

CHANNEL (PROPOSED)

STORM DRAIN (PROPOSED)

AGUA

BRIDGE (PROPOSED)

RETENTION BASINS (PROPOSED)

PKWY BRIDGE (PROPOSED)

NEW RIVER

EASTBOUND BRIDGE (PROPOSED)

DYSART DRAIN CHANNEL

El Mirage

115th

111th

107th

103rd

99th

LEGEND

STORM DRAIN (PROPOSED) & FLOW DIRECTION

CHANNEL & (PROPOSED) FLOW DIRECTION

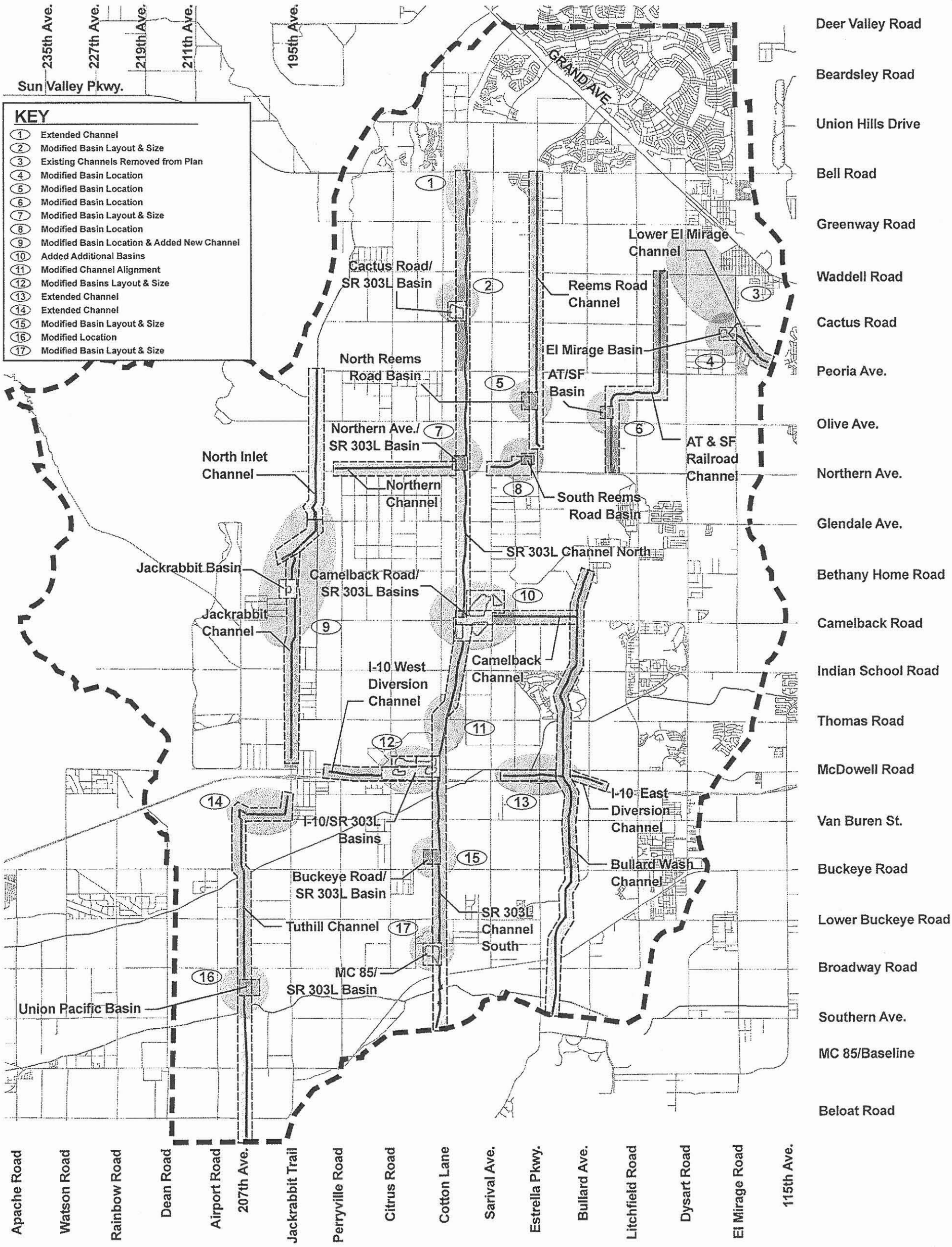
RETENTION / DETENTION BASIN

FIGURE 5-2
PROPOSED NORTHERN PARKWAY DRAINAGE IMPROVEMENTS - CENTRAL

W28, S70, L72, B65, D69
L09, L13, L19, L27, L34

Table 2.4B
Proposed Basin Summary
Existing Condition Hydrology

Channel/ Location ID	Qin (cfs)	Qout (cfs)	Vin (ac-ft)	Peak Storage (ac-ft)	Max. Vol. Provided (ac-ft)	Peak Stage (ft)	on/off line	Combined Total Outflow (cfs)	Length Low-Flow Basin Drain (ft)	Prop. Bot. Elev. (ft)	Prop. Top Elev. (ft)	Design FB (ft)	Actual FB (ft)	Backwater
Jackrabbit Channel														
SRJR1 (N. of Camelback)	850	65	42	41.5	43.9	1185.5	off-line	151	8,323	1,173.5	1,186.0	0.0	0.5	-----
Tuthill Channel														
SRTC5 (@ RxR)	1,646	550	109	108.5	108.5	898.0	off-line	618	4,390	890.0	898.0	0.0	-0.6	-----
I-10 Channel West														
SR10W7	1593	741	282	85.2	85.2	1022.0	on-line	N/A	2,487	1,010.5	1,022.0	0.0	0.0	-----
L303 Channel														
SRLP2 (Cactus Road)	2311	311	543	440	440.0	1212.0	off-line	587	5,630	1,197.0	1,212.0	0.0	0.0	-----
SRLP5 (Northern)	4241	442	354	334	333.0	1141.0	off-line	1380	6,934	1,126.0	1,141.0	0.0	0.0	-----
SRLP8 (Camelback)	2102	340	1081	705.9	700.0	1065.0	on-line	N/A	14,062	1,059.0	1,065.0	0.0	0.0	-----
SRLP12 (I-10)	1781	701	1166	591.5	590.0	1016.0	on-line	N/A	4,961	1,001.0	1,016.0	0.0	0.0	-----
SRLP14 (Yuma/Buckeye)	695	523	823	189.0	190.0	968.0	on-line	N/A	4,092	959.0	968.0	0.0	0.0	-----
SRLP16 (MC85)	751	448	938	325.0	325.0	913.0	on-line	N/A	2,872	903.0	913.0	0.0	0.0	-----
Reems/Northern Channel														
SRRM5 (Olive)	1,752	198	189	165.0	165.0	1134.0	off-line	818	1,449	1,127.0	1,134.0	0.0	0.0	-----
BSNR6(Northern)	477	0	55	55.0	61.1	1107.5	in-line	0	1,413	1,095.0	1,108.5	0.0	1.2	-----
AT&SF Railroad Channel														
SRRR7 (@Olive)	1,770	1285	331	81.3	142.7	1105.6	off-line	1439	1,832	1,097.5	1,111.5	0.0	6.1	-----
Lower El Mirage Channel														
(SRLE4 SW corner of Cactus and El Mirage)	1,312	813	191	56.9	80.0	1111.4	off-line	852	2,069	1,104.5	1,114.0	0.0	2.1	-----
Bullard Wash														
SRBD1S (I-10 and Bullard Wash)	2682	2011	813	134.9	138.0	990.2	off-line	575 - ADOT	4,390	978.5	990.2	0.0	-0.2	-----
								2239 - BLRD						



Basin & Channel Locations

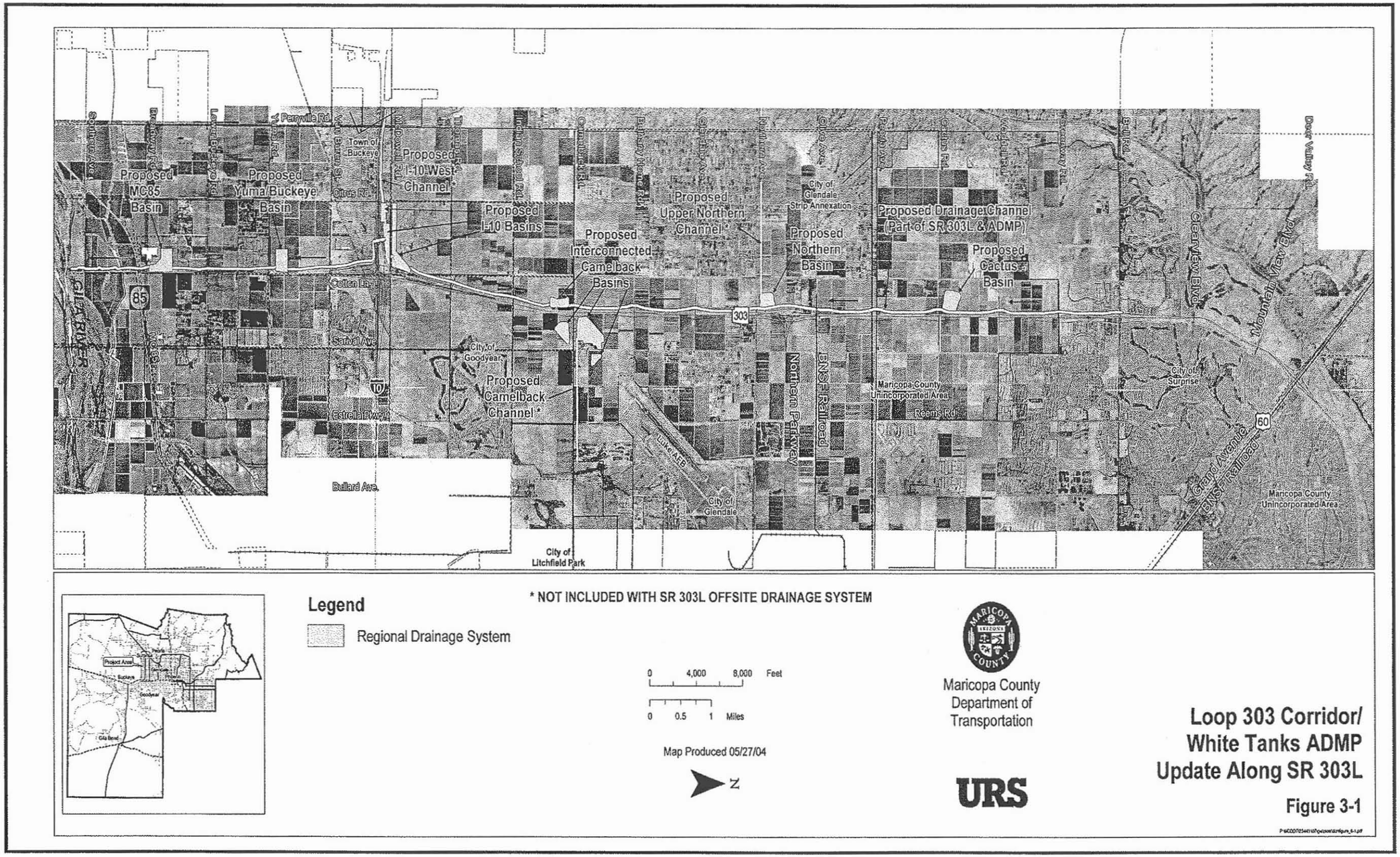


Figure 3 - Loop 303 Corridor/White Tanks ADMP Update Along SR303L

Table 2.2A
Proposed Channel Summary
Existing Condition Hydrology

Channel Name	Concentration Point	Qexist	[1]Approximate Qcap (cfs)	DS Invert (ft)	WSEL (ft)	Flow Depth (ft)	Channel Depth (ft)	Bottom Width (ft)	Side Slope (H:V)	Design s (ft/ft)	(Q/A) V ft/s	Froude Number F_N	Channel [3]Tw (ft)	(WSEL) [3]Tw (ft)
Camelback Channel														
	!CM2	372	372	1052.7	1056.5	3.8	4.7	5	(6:1)	*0.0020*	3.6	0.44	132	51
	!CM3	485	485	1047.5	1051.8	4.2	5.4	5	(6:1)	*0.0020*	3.8	0.45	143	57
	!CM4	783	783	1040.7	1044.8	4.1	6.3	26	(4:1)	*0.0020*	4.5	0.46	152	59
Jackrabbit Channel														
	!JR1	953	953	1177.1	1182.6	5.5	6.9	5	(6:1)	*0.0021*	4.6	0.47	167	71
	!JR2	813	813	1165.0	1169.3	4.3	5.3	15	(6:1)	*0.0025*	4.7	0.51	154	67
	!JR3	933	933	1147.4	1150.4	4.0	4.4	15	(6:1)	*0.0046*	6.1	0.61	140	51
	!JR4	1,324	1,324	1109.9	1114.3	4.4	4.4	25	(6:1)	*0.0035*	5.9	0.61	153	78
	!JR5	1,683	1,683	1080.3	1084.6	4.3	4.3	40	(6:1)	*0.0033*	6.0	0.60	171	92
SR303L URS DCR - Channel														
	!LP0	772	772	1275.6	1279.0	3.4	5.5	10	(2:1)	*0.0049*	13.7	1.57	62	24
	!LP	854	854	1247.9	1251.5	3.5	5.4	10	(2:1)	*0.0050*	14.3	1.61	62	24
	!LP1	1,612	1,612	1227.3	1232.5	5.1	5.9	12	(2:1)	*0.0031*	14.1	1.33	66	33
Cactus Road Basin	!LP2	2,898	2,898	1209.8	1215.9	6.0	6.1	20	(2:1)	*0.0026*	15.0	1.26	74	44
offline low flow/bypass channel	2LP2	587	587	1200.0	1202.6	2.5	4.8	20	(2:1)	*0.0026*	9.3	1.14	69	30
	!LP3	2,140	2,140	1180.8	1185.9	5.0	5.1	21	(2:1)	*0.0027*	13.8	1.26	71	41
	!LP4	2,636	2,636	1160.7	1165.9	5.2	5.2	26	(2:1)	*0.0025*	14.1	1.24	77	47
	!LP5	2,624	2,636	1136.3	1141.5	5.2	5.2	26	(2:1)	*0.0025*	14.0	1.23	77	47
offline low flow/bypass channel	2LP5	1,380	1,380	1130.4	1133.8	3.4	3.7	26	(2:1)	*0.0032*	12.5	1.32	71	40
	!LP6	1,539	1,539	1110.0	1115.1	5.1	6.4	16	(2:1)	*0.0020*	11.6	1.07	72	36
	!LP7	1,770	1,770	1087.1	1092.2	5.0	6.2	19	(2:1)	*0.0021*	12.1	1.10	74	39
	!LP8	2,097	2,097	1065.8	1070.7	4.9	6.1	26	(2:1)	*0.0020*	12.1	1.09	80	46
	!LP9	557	557	1047.9	1052.2	4.2	4.3	5	(2:1)	*0.0023*	9.8	1.08	52	22
	!LP10	624	624	1032.4	1036.1	3.7	3.7	5	(2:1)	*0.0052*	13.7	1.58	50	20
	!LP11	988	988	1014.5	1019.2	4.7	5.7	5	(2:1)	*0.0047*	14.8	1.56	58	24
	!LP13	697	701	984.8	988.5	3.6	3.8	8	(2:1)	*0.0041*	12.7	1.45	53	23
	!LP14	695	701	966.2	969.7	3.5	3.7	8	(2:1)	*0.0048*	13.5	1.54	53	22
	!LP15	676	676	934.2	937.7	3.4	4.2	8	(2:1)	*0.0048*	13.3	1.54	55	22
	!LP16	751	751	914.8	918.3	3.5	4.2	8	(2:1)	*0.0056*	14.5	1.67	55	22
	!LP17	447	448	884.3	888.7	4.3	5.5	5	(2:1)	*0.0013*	7.6	0.82	57	23
Upper Northern Channel														
	!NR1	256	256	1219.0	0.0	2.7	3.6	5	(6:1)	*0.0050*	4.6	0.66	115	37
	!NR2	1,309	1,309	1182.2	1186.3	4.0	4.1	30	(6:1)	*0.0039*	6.1	0.65	155	79
	!NR3	2,246	2,246	1143.5	1148.5	5.0	5.0	45	(6:1)	*0.0028*	6.0	0.56	189	105
	!NR4	2,308	2,308	1136.0	1141.0	5.0	5.0	50	(6:1)	*0.0025*	5.8	0.54	195	110
Lower Northern Channel	!NR5	262	262	1122.6	1125.9	3.3	4.3	5	(6:1)	*0.0020*	3.3	0.43	126	45
	!NR6	477	477	1096.7	1100.2	3.4	4.5	5	(6:1)	*0.0053*	5.5	0.71	129	47
Reems Road Channel														
	[2]RM1	709	516	1222.1	1226.6	4.5	5.7	6.5	(3:1)	*0.0040*	5.8	0.63	105	34
	[2]RM2	957	1,382	1208.2	1214.3	6.0	7.7	11.5	(4:1)	*0.0032*	6.5	0.60	147	60
	!RM3	1,366	1,366	1167.8	1172.0	4.1	4.2	30	(6:1)	*0.0037*	6.0	0.63	157	80
	!RM4	1,640	1,640	1142.7	1147.7	5.0	5.0	30	(6:1)	*0.0025*	5.5	0.53	169	90
	!RM5	2,179	2,179	1119.4	1124.6	5.1	5.2	40	(6:1)	*0.0027*	6.0	0.57	185	102
	!RM6	826	826	1100.6	1105.0	4.3	5.3	10	(6:1)	*0.0034*	5.3	0.59	148	63

Table 2.2A (continued)
Proposed Channel Summary
Existing Condition Hydrology

Channel Name	Concentration Point	Qexist	[1]Approximate Qcap (cfs)	DS Invert (ft)	WSEL (ft)	Flow Depth (ft)	Channel Depth (ft)	Bottom Width (ft)	Side Slope (H:V)	Design s (ft/ft)	(Q/A) V ft/s	Froude Number F_N	Channel [3]Tw (ft)	(WSEL) [3]Tw (ft)
AT&SF Railroad Channel														
	!RR1	425	425	1150.8	1154.5	3.6	3.9	10	(6:1)	*0.0020*	3.7	0.44	126	54
	!RR2	492	492	1146.2	1149.7	3.4	3.5	10	(6:1)	*0.0035*	4.7	0.58	120	52
	!RR3	785	785	1127.9	1131.9	4.0	4.0	10	(6:1)	*0.0046*	5.9	0.68	127	58
	!RR4	936	936	1110.1	1114.4	4.3	4.3	15	(6:1)	*0.0034*	5.4	0.59	139	67
	!RR5	970	970	1103.3	1108.5	5.2	5.2	15	(6:1)	*0.0015*	4.0	0.41	153	77
	!RR6	1,733	1,733	1098.8	1105.5	6.7	6.7	15	(6:1)	*0.0015*	4.7	0.42	176	95
	!RR7	1,770	1,770	1095.1	1101.9	6.8	6.8	15	(6:1)	*0.0015*	4.7	0.42	178	97
	!RR8	1,585	1,585	1081.1	1086.9	5.8	5.8	15	(6:1)	*0.0025*	5.5	0.53	162	85
Lower El Mirage Channel														
	!LE4	1,356	1,356	1107.2	1111.9	4.7	6.8	35	(3:1)	*0.0026*	5.9	0.54	151	63
	!LE5	865	865	1086.6	1090.6	4.0	5.1	15	(6:1)	*0.0038*	5.6	0.63	152	63
Bullard Wash Channel														
	!BD1N	2,103	2,103	1057.0	1047.3	5.2	7.0	45	(6:1)	*0.0020*	5.3	0.49	219	109
	!BD2N	3,244	3,244	1044.1	1049.8	5.7	7.8	65	(6:1)	*0.0020*	5.8	0.49	258	133
	!BD3N	3,410	3,410	1015.6	1020.7	5.0	6.7	65	(10:1)	*0.0027*	5.9	0.56	312	167
	!BD4N	3,248	3,410	1006.0	1010.8	4.7	6.4	102	(9:1)	*0.0018*	5.0	0.47	335	188
	!BD1S	3,556	3,556	985.5	990.4	4.9	6.4	90	(6:1)	*0.0025*	6.1	0.55	269	149
	!BD2S	2,321	2,321	980.9	984.4	3.5	3.8	95	(6:1)	*0.0033*	5.8	0.60	235	137
I-10 West Diversion Channel														
	!10W1	970	970	1045.8	N/A	3.8	4.5	25	(6:1)	*0.0035*	5.4	0.60	155	71
	!10W2	1,010	1,010	1039.7	1043.4	3.7	4.2	25	(6:1)	*0.0042*	5.9	0.66	150	69
	!10W3	1,046	1,046	1032.7	1036.5	3.7	4.1	25	(6:1)	*0.0042*	5.9	0.66	148	71
	!10W4	1,175	1,175	1028.5	1032.4	3.8	4.3	30	(6:1)	*0.0038*	5.8	0.63	158	77
	!10W5	1,588	1,588	1014.6	1018.9	4.3	5.0	35	(6:1)	*0.0036*	6.1	0.62	175	87
	!10W7	1,593	1,593	1014.6	1019.6	5.0	5.7	35	(6:1)	*0.0020*	5.0	0.48	186	95
	!10W8	743	743	1005.8	1010.5	4.6	5.5	10	(6:1)	*0.0020*	4.2	0.46	151	66
Tuthill Channel														
	!TC1	1,417	1,417	998.7	1003.5	4.7	5.8	20	(6:1)	*0.0037*	6.2	0.63	168	78
	!TC2	1,553	1,553	991.8	997.1	5.2	6.1	25	(6:1)	*0.0023*	5.3	0.51	180	89
	!TC3	1,491	1,491	957.0	961.9	4.8	5.1	25	(6:1)	*0.0029*	5.7	0.57	163	84
	!TC4	1,546	1,546	914.7	919.3	4.6	4.6	30	(6:1)	*0.0032*	5.9	0.59	163	85
	!TC5	1,926	1,926	886.8	891.4	4.6	4.6	40	(6:1)	*0.0033*	6.3	0.61	176	95
	!TC6	646	646	882.3	885.9	3.6	3.6	15	(6:1)	*0.0035*	5.0	0.59	128	58
	!TC7	1,323	1,323	863.6	867.8	4.1	4.2	45	(6:1)	*0.0020*	4.6	0.47	176	95
	!TC8	1,506	1,506	859.4	864.6	5.2	5.2	45	(6:1)	*0.0011*	3.8	0.35	192	107
	!TC9	1,503	1,506	854.8	860.1	5.3	5.3	45	(6:1)	*0.0010*	3.7	0.34	193	109
I-10 East Diversion Channel														
	10CE-US	575	575	984.5	988.6	4.1	4.5	12	(6:1)	*0.0019*	3.9	0.44	138	61
	10CE1	556	575	978.5	985.2	4.1	4.5	12	(6:1)	*0.0018*	3.8	0.43	138	62
I-10 Central Channel														
	!10C1	79	79	1005.4	1007.7	2.2	2.3	2	(6:1)	*0.0020*	2.4	0.40	90	29
	!10C2	131	131	1002.6	1005.3	2.7	2.7	2	(6:1)	*0.0020*	2.8	0.41	96	34
	!10C3	170	170	995.9	998.9	3.0	3.0	2	(6:1)	*0.0020*	2.9	0.42	101	38
	!10C4	243	243	982.2	985.5	3.2	3.3	2	(6:1)	*0.0026*	3.6	0.49	105	41

1. By normal depth computation.
2. Channel reach exists.
3. Top width.

CIP models

D69A

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1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN  1998             *
 *          VERSION 4.1              *
 *                                   *
 *  RUN DATE   06FEB09  TIME  14:20:20  *
 *                                   *
 *************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
   2          ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
   3          ID   PREPARED BY ASPEN CONSULTING ENGINEERS
   4          ID   MODIFICATIONS:
   5          ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
   6          ID   (2) SURPRISE WWTP WAS UPDATED
   7          ID   (3) NORTHERN PARKWAY WAS UPDATED
   8          ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
   9          ID
  10          ID  ***********************************************************************
  11          ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
  12          ID      NOTES:
  13          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
  14          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
  15          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
  16          ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
  17          ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
  18          ID
  19          ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
  20          ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
  21          ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
  22          ID         LUKE AIR FORCE BASE CRASH ZONE AREA
  23          ID
  24          ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
  25          ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  26          ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  27          ID         TANKS/AGUA FRIA ADMS, Date: October 1991
  28          ID
  29          ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  30          ID         100-YEAR, 24-HOUR STORM                original file: WTADMS.24
  31          ID
  32          ID                                   REVISED BY URS     DATE: 01-14-04
  33          ID                                                      FILE: L33PE4H.DAT
  34          ID
  35          ID        NOTES:
  36          ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  37          ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  38          ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  39          ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  40          ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  41          ID           THE WLB MODEL.
  42          ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  43          ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  44          ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  45          ID           DRAINAGE REPORTS.
  46          ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  47          ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
  48          ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  49          ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  50          ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  51          ID           STORM.
  52          ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```

HEC-1 INPUT PAGE 2

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  53          ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
  54          ID           THE DATA FILE BY THE FCDMC.
  55          ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
  56          ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
  57          ID
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

3851          SE    1126    1127  1127.5    1128  1128.5    1129    1130    1134    1138    1141

3852          KK    2LP5
3853          KM   COMBINE ROUTED FLOW FROM OFFLINE BASIN WITH MAIN-CHANNEL FLOW AT !LP2
3854          HC       2   21.07
              * DIVERT 'FLOW BY' PER CO#13-#14 PART II SOUTH IN SR303L

3855          KK  DC192A
3856          KM   DIVERT CP192A (LP5) FOR RETRIEVAL LATER
              * PER SR303L DCR CONCEPT, ALL FLOW GOES SOUTH
3857          DT  4D209A
3858          DI       0     100    1000    3000    6000   12000
3859          DQ       0     100    1000    3000    6000   12000
              * DQ     0      25     250     750    1500    3000

3860          KK    2NR4
3861          KM   COMBINE ROUTED FLOW FROM OFFLINE BASIN WITH MAIN-CHANNEL FLOW AT !NR4
3862          HC       2   21.07
              *
              * PER LEVEL III PRELIMINARY-DRAFT PREFERRED ALTERNATIVE-CHANNEL WILL NOT
              * START HERE SINCE FLOW IS NOT HIGH ENOUGH - THEREFORE, TURN ON ORIGINAL
              * 'EXISTING CONDITION' ROUTE

3863          KK    RNR4
3864          KM   ROUTE REMAINDER FROM NR4 TO NR5 (CP192A TO CP192)
3865          RS       1              -1       0
3866          RC    0.03    0.03    0.03    2640  0.0042
3867          RX    1000    1018    1027    1036    1045    1054    1063    1081
3868          RY    1100    1097    1097    1097    1097    1097    1097    1100
              * DESIGN ROUTE
              * RS   1.7              -1.0     0.0
              * RC 0.030   0.030   0.030    2640  0.0020
              * RX     0    42.6    49.6    56.6    63.6    70.6    77.6   120.2
              * RY1137.2  1130.1  1130.1  1130.1  1130.1  1130.1  1130.1  1137.2
              *
              *
              * ******************************************************************
              * BEGIN MODIFICATIONS FOR NORTHERN PARKWAY
              * ******************************************************************

3869          KK    192B
3870          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 192B (PART OF FORMER SUB-BASIN 192)
3871          KM       NORTH OF NORTHERN PKWY
3872          BA     .26
3873          LG     .50     .00    4.05     .72     .00
3874          UI     15.     15.     29.     56.     72.     83.     93.    107.    122.    154.
3875          UI    195.    178.    148.    130.    114.     98.     85.     74.     58.     40.
3876          UI     27.     26.     23.     15.     15.      9.      5.      5.      5.      5.
3877          UI      5.      5.      5.      0.      0.      0.      0.      0.      0.      0.
3878          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

3879          KK   R192B
3880          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY (SARIVAL RD TO REEMS RD)
3881          KM       PROPOSED 12-FOOT BOTTOM WIDTH CHANNEL, 2:1 SS, CONC BANK LINING
3882          RS       4              -1       0
3883          RC   0.025   0.025   0.025    4860   0.003
3884          RX    1500    1501    1588    1600    1612    1630    1699    1700
3885          RY    1146    1145    1145    1142    1142    1145    1145    1146
              *
```

68A69A

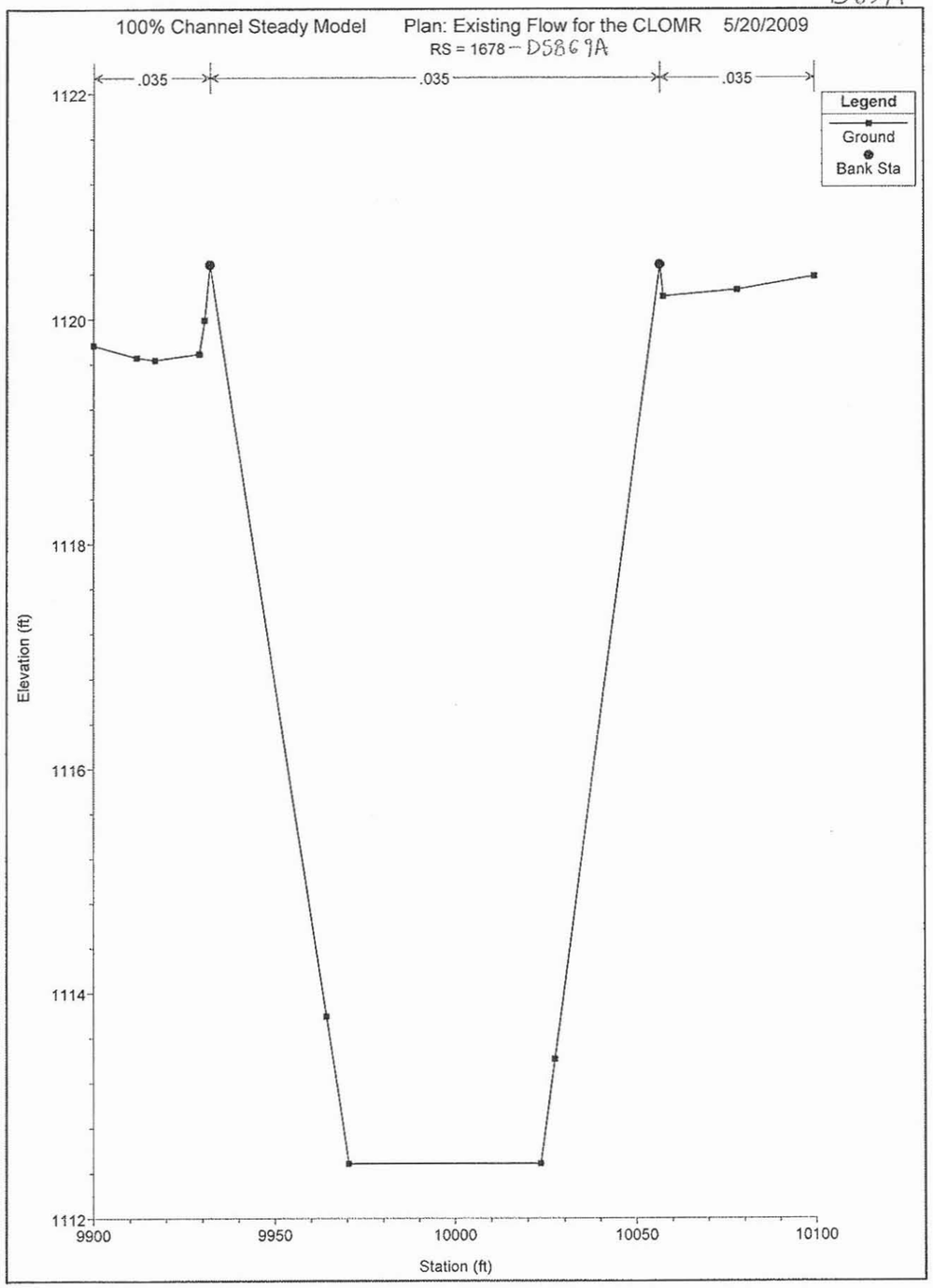
```
3886          KK    193B
3887          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 193B (N. HALF OF FORMER SUB-BASIN 193)
3888          KM       NORTH OF NORTHERN PKWY
3889          BA     .46
3890          LG     .50     .00    4.66     .53     .00
3891          UI     18.     18.     18.     23.     61.     70.     84.     93.    101.    109.
3892          UI    119.    132.    143.    162.    201.    228.    234.    201.    178.    163.
3893          UI    150.    138.    124.    113.    102.     93.     86.     71.     53.     40.
3894          UI     33.     32.     30.     30.     18.     18.     18.     16.      6.      6.
3895          UI      6.      6.      6.      6.      6.      6.      6.      6.      6.      6.
3896          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
3897          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

3898          KK  CP193B
3899          KM       ADD HYDROGRAPHS AT (CP193B)
3900          KM       AT NORTHERN PARKWAY AND REEMS RD
3901          HC       2   18.89
              *

3902          KK   R193B
3903          KM   ROUTE COMBINED RUNOFF OF SUB-BASINS 192B AND 193B ALONG REEMS ROAD
3904          KM   THIS 12-FOOT BOTTOM WIDTH UNLINED CHANNEL
3905          RS       2              -1.0     0.0
3906          RC   0.025   0.017   0.025    2510  0.0025
3907          RX    1000    1001    1378    1390    1402    1420    1999    2000
3908          RY    1112    1110    1110    1106    1106    1110    1110    1112
              *
              * ******************************************************************
              *    MODIFIED PER NORTHERN PKWY

3909          KK    192C
3910          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 192C (FORMERLY SUB-BASIN 192)
3911          KM       SOUTH OF NORTHERN PKWY
```

D69A


100% Channel Steady Model
Plan: Existing Flow for the CLOMR 5/20/2009
RS = 1678 – D5869A
.035
.035
.035
Legend
Ground
Bank Sta
1122
1120
1118
1116
1114
1112
Elevation (ft)
9900
9950
10000
10050
10100
Station (ft)

D70

FCDMC 3/2/09

Falcon Dunes
stage - storage

D70

DATUM	AREA (SQ FT)	VOLUME (CU FT)	VOLUME (AC FT)
-1079	442	0	0.0
-1080	3103	1576	0.0
-1081	7391	6336	0.1
-1082	13188	16248	0.4
-1083	25585	34453	0.8
-1084	42152	67565	1.6
-1085	62191	118724	2.7
-1086	84901	190884	4.4
-1087	110371	287623	6.6
-1088	141175	412721	9.5
-1089	182768	569940	13.1
-1090	239694	776645	17.8
-1091	326587	1050465	24.1
-1092	437077	1422652	32.7
-1093	582391	1919723	44.1
-1094	802722	2583597	59.3
-1095	1066523	3507807	80.5
-1096	1347130	4692472	107.7
-1097	1666798	6177663	141.8
-1098	1973158	7982051	183.2
-1099	2254352	10080341	231.4
-1100	2514396	12454319	285.9

Storage
- recalculated by FCDMC 3/2009 based on updated topo

DYSART DRAIN DETENTION BASIN

PROPOSED BASIN MODIFICATIONS

Prepared
for

Luke Air Force Base
Contract No. F02604-94-D0010/5007

March 31, 1995

A Member of the
Stanley Technology Group

SFC ENGINEERING COMPANY

A470.931

The modified basin geometry was established to maintain the same elevation vs volume characteristics as the original design. The modified volumes are compared to the original volumes in Table 3.

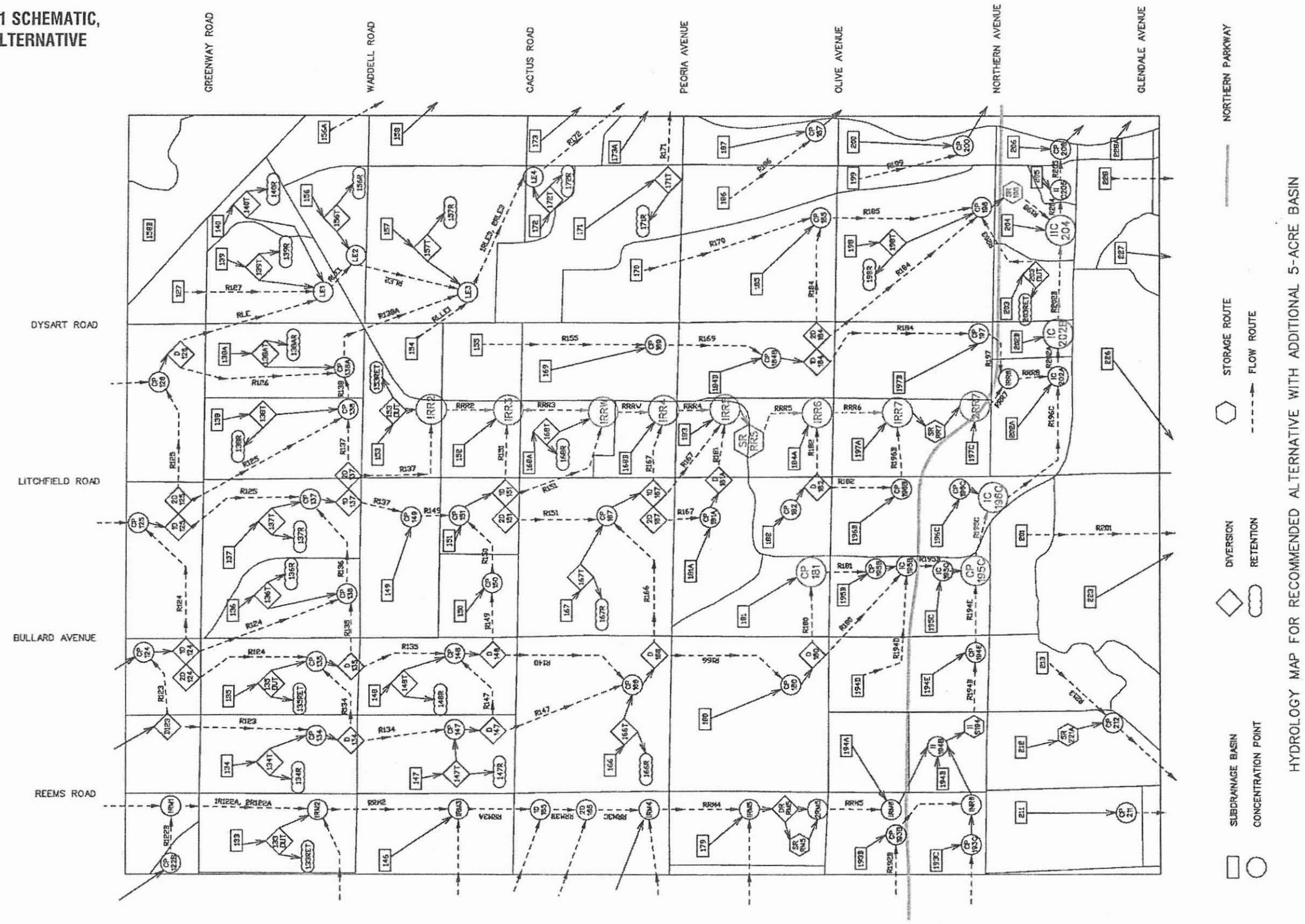
Table 3
Modified Dysart Drain Detention Basin

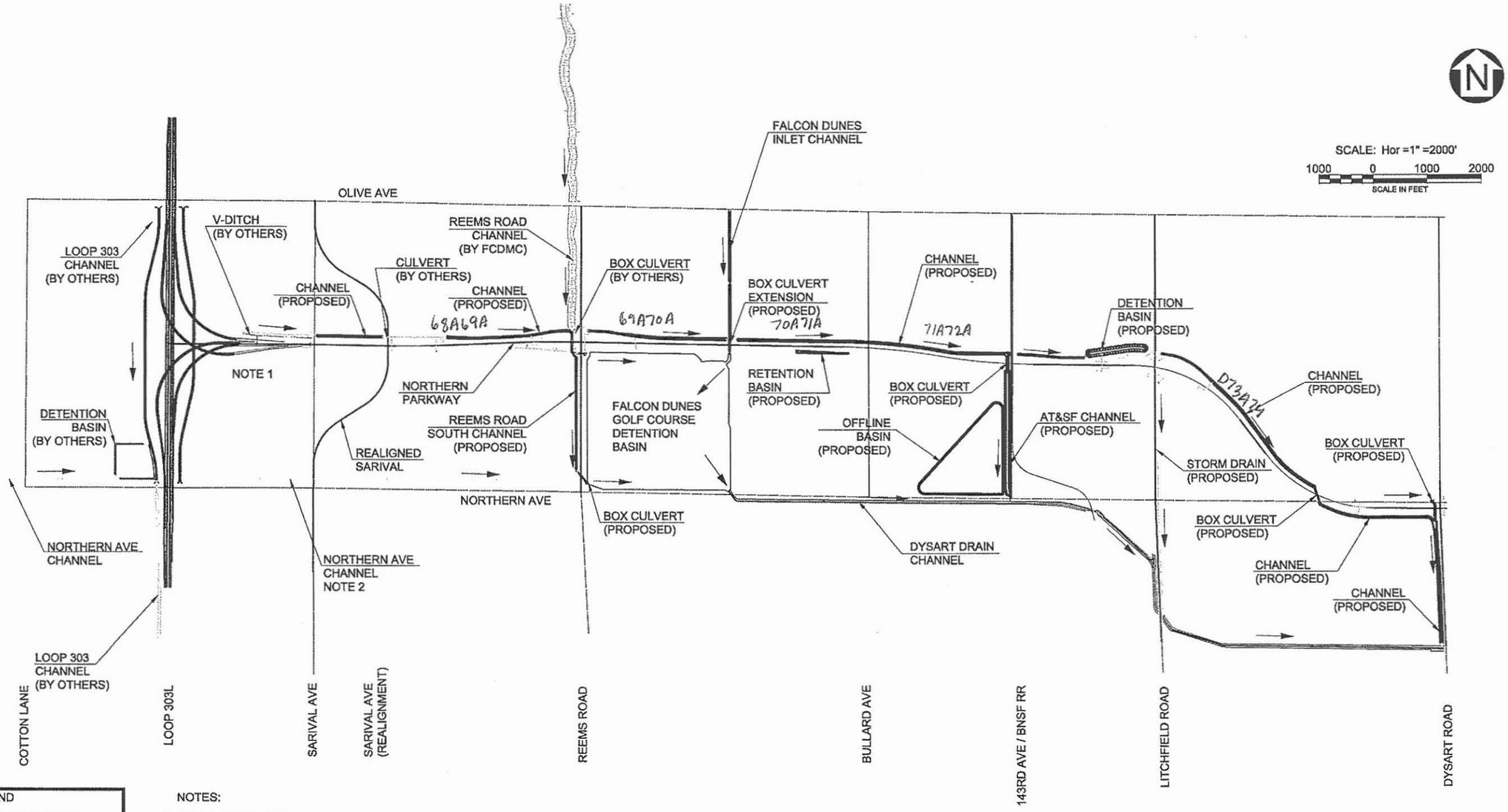
Elevation	Outflow (CFS)	Original Design Storage (acre-feet)	Modified Storage (acre-feet)
1089.89	0	0	0
1092.50	67	0	13.5
1093.50	110	10.4	41.4
1094.50	160	42.8	83.5
1095.50	211	99.0	133.6
1097.00	300	202.1	216.3
1102.00	555	561.6	563.7

The modified elevation vs volume data was inserted into the HEC-1 model to verify the hydraulic performance of the modified basin. The resulting maximum water surface elevation in the basin was 1099.9 with a peak outflow of 447 cfs compared to elevation 1099.9 and 446 cfs respectively for the original basin design.

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE





SEE FIGURE 5-2

LEGEND

- STORM DRAIN (PROPOSED) & FLOW DIRECTION
- CHANNEL & (PROPOSED) FLOW DIRECTION
- RETENTION / DETENTION BASIN

NOTES:

1) ALL LOOP 303 - NORTHERN PARKWAY TRAFFIC INTERCHANGE RUNOFF WILL BE ROUTED SOUTHWARD ALONG LOOP 303 DETENTION BASINS AND CHANNEL.
2) LOOP 303/WHITE TANKS ADMP CONCEPT - EAST OF LOOP 303, NORTHERN AVENUE CHANNEL NOT NEEDED.
3) ALL ITEMS SHOWN ARE EXISTING UNLESS STATED OTHERWISE.

FIGURE 5-1
PROPOSED NORTHERN PARKWAY DRAINAGE IMPROVEMENTS - WEST

D71

TRIAL VERSION of TIFFDLL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

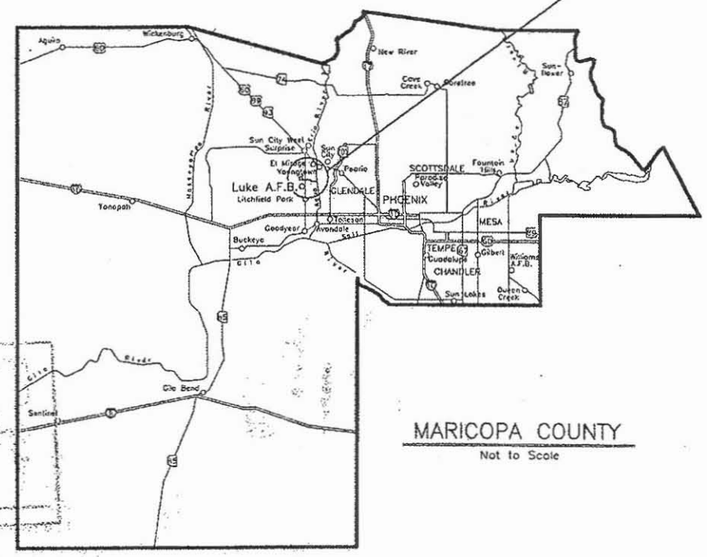
PLANS FOR THE CONSTRUCTION OF:

DYSART DRAIN IMPROVEMENTS PROJECT
REEMS ROAD TO AGUA FRIA RIVER
CHANNEL IMPROVEMENTS

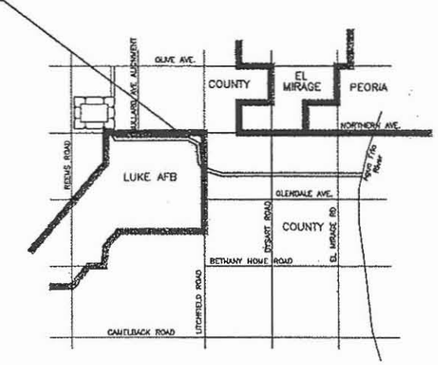
PROJECT NO. FCD 94-38
LAFB NO. 87-3002

D71, D72, D73, D78, D79, D80

PROJECT NO. FCD 94-38



MARICOPA COUNTY
Not to Scale



VICINITY MAP
Not to Scale

"AS BUILT DRAWING"

49

DYSART DRAIN IMPROVEMENTS
REEMS RD. TO AGUA FRIA
CHANNEL IMPROVEMENTS
AS BUILTS
FCD 94-38 470

\P81-194.019\DWGS\PH-III\DD-G01.DWG VIEW = SITE 1=40

Two working days before you dig, CALL FOR THE BLUE STAKES
Ariz. Blue Stake, Inc.
CALL COLLECT
263-1100

NBS/LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1593
(602) 468-1688 FAX 956-4538

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

CHIEF ENGINEER AND GENERAL MANAGER — DATE

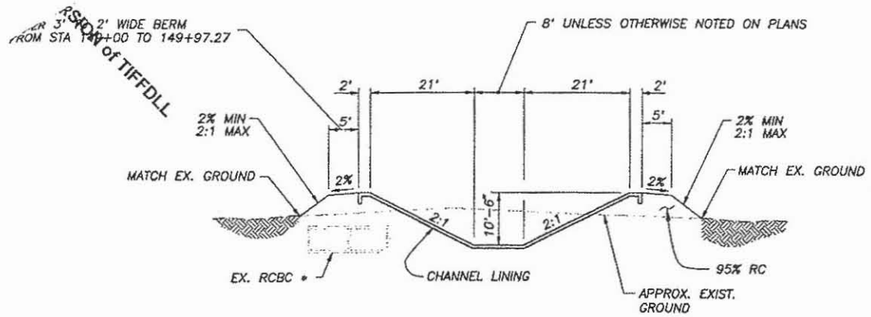
BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT

TOM RAWLES – CHAIRMAN

DISTRICT 1 TOM RAWLES
DISTRICT 2 DON STAPLEY
DISTRICT 3 BETSEY BAYLESS
DISTRICT 4 EDWARD KING
DISTRICT 5 MARY ROSE GARRIDO WILCOX

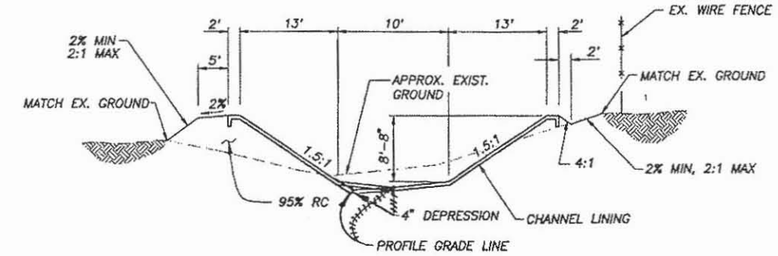
NBS/LOWRY PROJECT NO. P81-194.019

SHEET G01/7

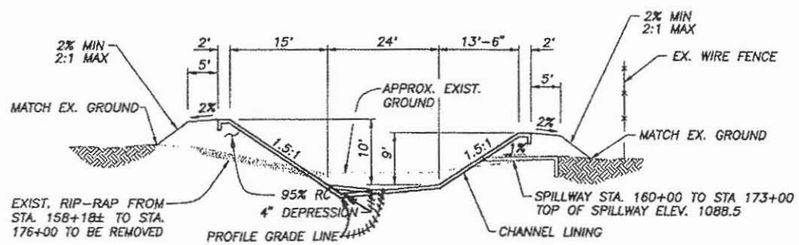


* SEE SHEET S05/6 FOR DETAILS

TYPICAL SECTION NO. 10
STA. 149+00 TO STA. 158+00
NO SCALE



TYPICAL SECTION NO. 13
STA. 187+50 TO STA. 205+00
NO SCALE



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STA. 158+00 TO STA. 176+00
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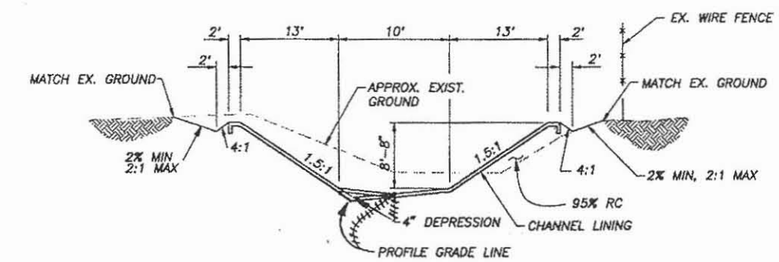

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STA. 205+00 TO STA. 217+21.25
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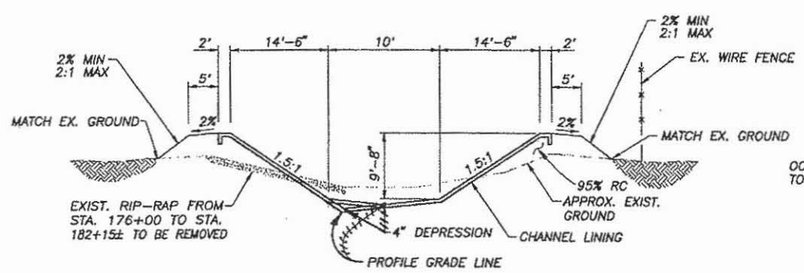

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STA. 176+50 TO STA. 187+00
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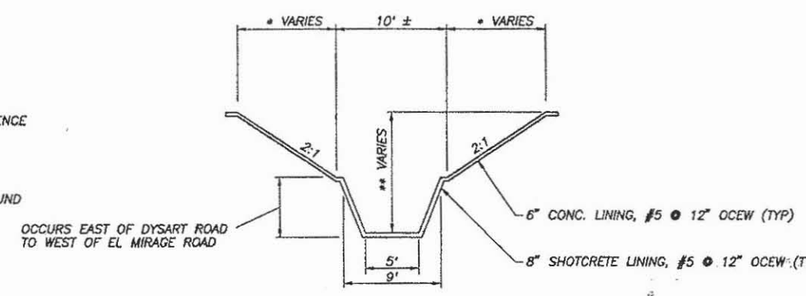


TYPICAL SECTION NO. 15
(EXISTING CHANNEL TO BE REMOVED)
NO SCALE

* VARIES FROM 15± TO 19± FEET

** VARIES FROM 7.5± TO 15± FEET

"AS-BUILT DRAWING"

THE WORK SHOWN HEREON WAS PERFORMED UNDER MY DIRECTION AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

11-99

NO.	REVISION	DATE
3		
2		
1		

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY

DYSART DRAIN IMPROVEMENT PROJECT
CHANNEL IMPROVEMENTS
TYPICAL SECTIONS
SECTIONS NO. 10 THROUGH NO. 13

	BY	DATE
DESIGNED	S. YINGLING	5/94
DRAWN	S. YINGLING	5/94
CHECKED	C. GOPPERTON	5/95

NBS/LOWRY
ENGINEERS & TECHNICIANS

NBS/LOWRY PROJECT NO. P81-194-019

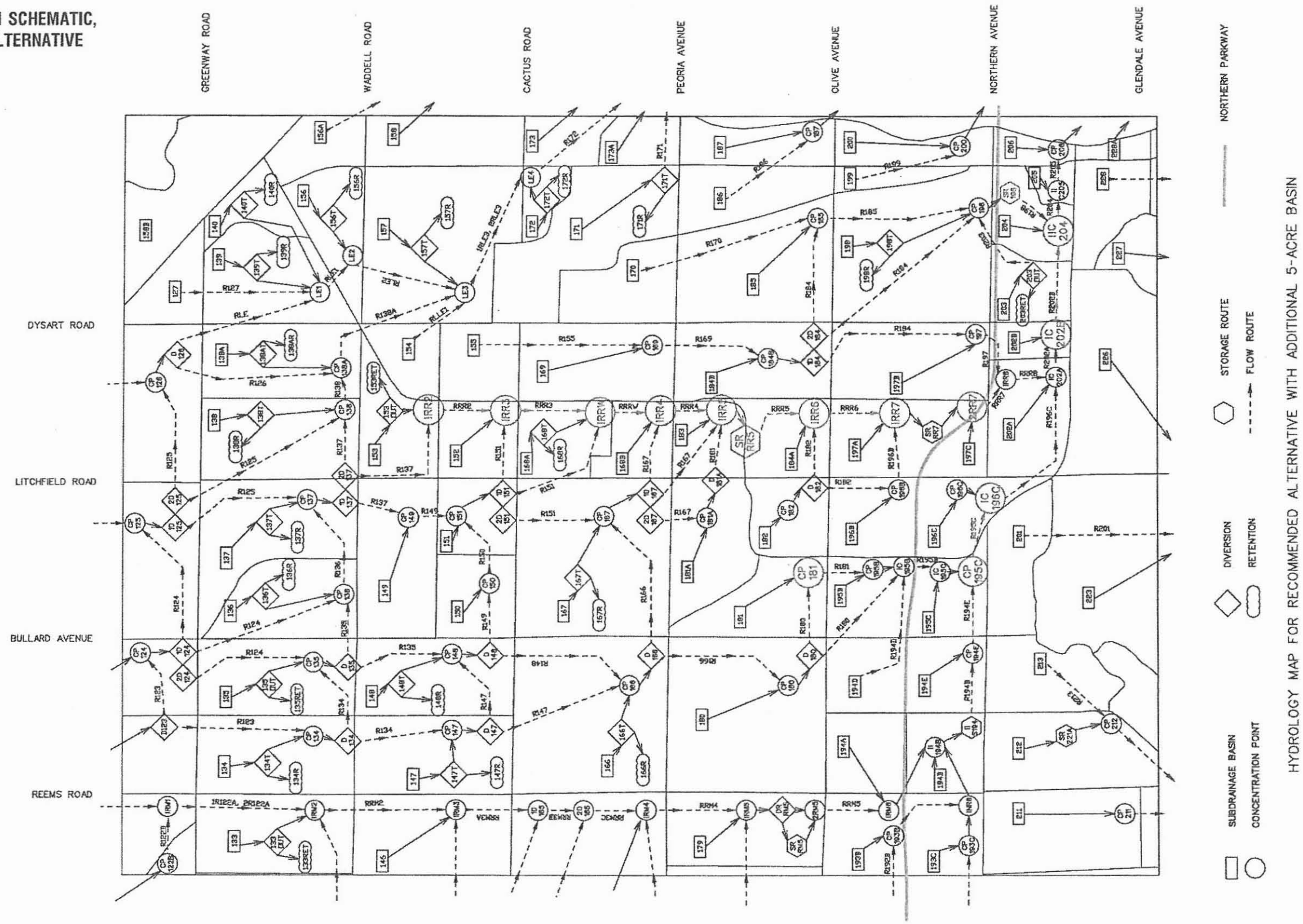
SHEET D03/16

D10D11-D11
D11D12-D12

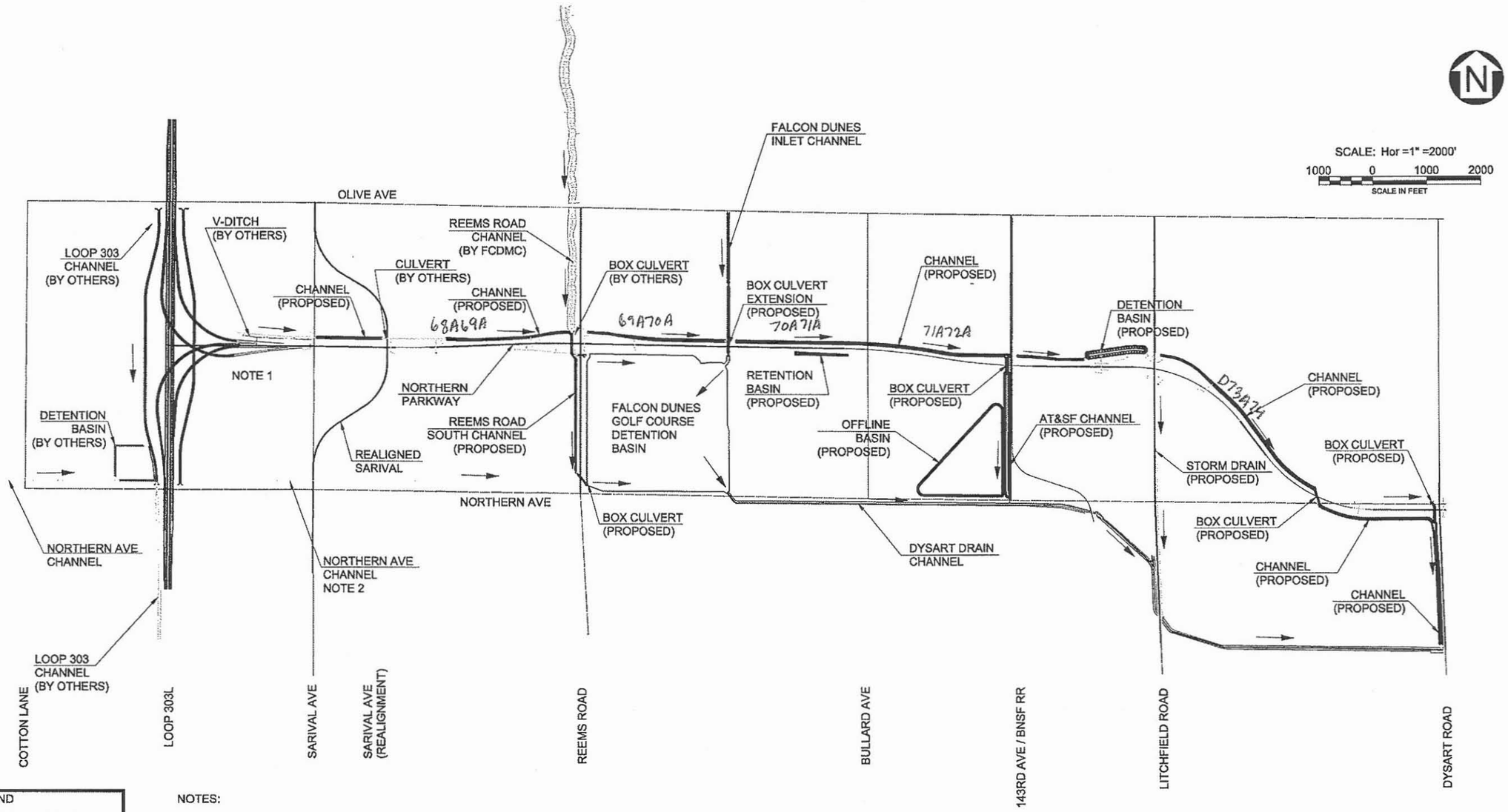
\P81-194.019\DWGS\PH-II\DD-D03.DWG VIEW = SITE 1 = 20 MSPACE

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN



SEE FIGURE 5-2

LEGEND

- STORM DRAIN (PROPOSED) & FLOW DIRECTION
- CHANNEL & (PROPOSED) FLOW DIRECTION
- RETENTION / DETENTION BASIN

NOTES:

1) ALL LOOP 303 - NORTHERN PARKWAY TRAFFIC INTERCHANGE RUNOFF WILL BE ROUTED SOUTHWARD ALONG LOOP 303 DETENTION BASINS AND CHANNEL.
2) LOOP 303/WHITE TANKS ADMP CONCEPT - EAST OF LOOP 303, NORTHERN AVENUE CHANNEL NOT NEEDED.
3) ALL ITEMS SHOWN ARE EXISTING UNLESS STATED OTHERWISE.

FIGURE 5-1
PROPOSED NORTHERN PARKWAY DRAINAGE IMPROVEMENTS - WEST

D72

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          JUN   1998               *
*        VERSION 4.1                *
*                                   *
     RUN DATE   06FEB09  TIME  14:20:20  *
*                                   *
*************************************
```

CIP models

```
****************************.
*
*   U.S. ARMY CORPS OF ENGINEE.
*   HYDROLOGIC ENGINEERING CENT.
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
*          (916) 756-1104
*
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                    HEC-1 INPUT                                    PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
    2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
    3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
    4           ID   MODIFICATIONS:
    5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
    6           ID   (2) SURPRISE WWTP WAS UPDATED
    7           ID   (3) NORTHERN PARKWAY WAS UPDATED
    8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
    9           ID
   10           ID  ***********************************************************************
   11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
   12           ID      NOTES:
   13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
   14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
   15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   16           ID      AND R238.
                        * ********************************************************************
                        * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                        * ********************************************************************
   17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   18           ID
   19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   23           ID
   24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   28           ID
   29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   30           ID         100-YEAR, 24-HOUR STORM                    original file: WTADMS.24
   31           ID
   32           ID                                        REVISED BY URS     DATE: 01-14-04
   33           ID                                                           FILE: L33PE4H.DAT
   34           ID
   35           ID        NOTES:
   36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   41           ID           THE WLB MODEL.
   42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   45           ID           DRAINAGE REPORTS.
   46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   47           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   51           ID           STORM.
   52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
                                        HEC-1 INPUT                                    PAGE  2

 LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   54           ID           THE DATA FILE BY THE FCDMC.
   55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   57           ID
```

```
                 * UI   10.     10.     10.     10.     10.     10.     10.     10.     10.     1
                 * UI   10.     10.      0.      0.      0.      0.      0.      0.      0.
                 * UI    0.      0.      0.      0.      0.      0.      0.      0.      0.

3458             KK   CP197
3459             KM        ADD HYDROGRAPHS AT CP197
3460             KO                                  21
3461             HC       2   42.06

3462             KK   DI202
3463             KM   DIVERT FLOW WEST TO AT&SF CHANNEL ALONG NORTHERN PKWY
3464             DT   DI202
3465             DI       0   10000
3466             DQ       0   10000

3467             KK    R197
3468             KM        ROUTE FLOW FROM CP197 TO CP203
3469             RS       8      -1       0
3470             RC    .035    .035    .015    2650   .0004
3471             RX    1000    1001    1002    1030    1200    1350    1809    1810
3472             RY    1078    1078    1078  1077.5  1077.5    1078    1080    1080
                 *

3473             KK     203
3474             KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 203
3475             BA     .11
3476             LG     .35     .38    4.82     .29     .00
3477             UI     16.     60.     92.    131.    189.    135.     96.     62.     29.     19.
3478             UI      9.      5.      5.      0.      0.      0.      0.      0.      0.      0.
3479             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

3480             KK  203OUT
3481             KM        DIVERSION-RETENTION
3482             DT  203RET    6.65
3483             DI       0   10000
3484             DQ       0   10000

3485             KK   CP203
3486             KM        ADD HYDROGRAPHS AT CP203
3487             HC       2   42.17
```



```
LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

3488             KK   CP198
3489             KM        ADD HYDROGRAPHS AT CP198
3490             KO                                  21
3491             HC       2   44.06
                 * ADD AN ON-LINE DETENTION BASIN HRC 01/09/2009

3492             KK   SR198
3493             KM   STORAGE ROUTE
3494             KM   BASIN BOTTOM 1079', SURFACE AREA 5AC
3495             KM   OUTLET PIPE (2)36", INV=1076', WEIR 60' WIDE AT 1080'
3496             RS       1    STOR       0       0
3497             SV       0       3       7      12      17      22      27      32
3498             SQ       0      16      40      76     104     304     674    1096
3499             SE    1076    1077    1078    1079    1080    1081    1082    1083
                 * END OF ON-LINE DETENTION BASIN

3500             KK    R198
3501             KM        ROUTE FLOW FROM CP198 TO CP204
3502             RS       2      -1       0
3503             RC     .03    .025     .03    3120   .0029
3504             RX    1000    1050    1070    1090    1190    1220    1230    1270
3505             RY    1083    1082    1078    1076    1076    1078    1080    1083
                 *
                 * ***********************************************************************
                 * ***THE FOLLOWING SECTION TAKEN FROM NEW SUPER BASIN 2K WITH NEW SOILS*****
                 * ***********************************************************************
                 *

3506             KK     204
3507             KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 204
3508             BA     .27
3509             LG     .35     .37    4.82     .29     .00
3510             UI     42.    172.    257.    396.    462.    312.    214.    105.     61.     33.
3511             UI     13.     13.      0.      0.      0.      0.      0.      0.      0.      0.
3512             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

3513             KK   1I204
3514             KM        ADD HYDROGRAPHS AT CP204
3515             HC       2   44.33
                 *

3516             KK     174
3517             KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 174
3518             BA     .45
3519             LG     .27     .27    4.58     .42      29
3520             UI     62.    218.    346.    474.    735.    574.    418.    294.    145.     94.
3521             UI     57.     19.     19.     19.      0.      0.      0.      0.      0.      0.
3522             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                 *
```

SRD72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LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

3523             KK    174T
3524             KM    Divert Retention in Subbasin 174
3525             DT    174R    27.9
```

D72

```
1*************************************                    *************************************
 *                                   *                    *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS    *
 *             JUN   1998            *                    *   HYDROLOGIC ENGINEERING CENTER   *
 *           VERSION 4.1             *                    *         609 SECOND STREET         *
 *                                   *                    *      DAVIS, CALIFORNIA 95616      *
   'N DATE   06FEB09  TIME  14:20:20  *                    *         (916) 756-1104            *
 *                                   *                    *                                   *
 *.    ***********************************                *************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                          HEC-1 INPUT                                                PAGE  1

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
   2          ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
   3          ID   PREPARED BY ASPEN CONSULTING ENGINEERS
   4          ID   MODIFICATIONS:
   5          ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
   6          ID   (2) SURPRISE WWTP WAS UPDATED
   7          ID   (3) NORTHERN PARKWAY WAS UPDATED
   8          ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
   9          ID
  10          ID  ***********************************************************************
  11          ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
  12          ID      NOTES:
  13          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
  14          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
  15          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
  16          ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
  17          ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
  18          ID
  19          ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
  20          ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
  21          ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
  22          ID         LUKE AIR FORCE BASE CRASH ZONE AREA
  23          ID
  24          ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
  25          ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
  26          ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
  27          ID         TANKS/AGUA FRIA ADMS, Date: October 1991
  28          ID
  29          ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
  30          ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
  31          ID
  32          ID                                       REVISED BY URS     DATE: 01-14-04
  33          ID                                                          FILE: L33PE4H.DAT
  34          ID
  35          ID        NOTES:
  36          ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
  37          ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
  38          ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
  39          ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
  40          ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
  41          ID           THE WLB MODEL.
  42          ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
  43          ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
  44          ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
  45          ID           DRAINAGE REPORTS.
  46          ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
  47          ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
  48          ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
  49          ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
  50          ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
  51          ID           STORM.
  52          ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
                                          HEC-1 INPUT                                                PAGE  2

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  53          ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
  54          ID           THE DATA FILE BY THE FCDMC.
  55          ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
  56          ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
  57          ID
```

```
4052          RC    .016    .016    .016    3750   .0011
4053          RX    2000    2007    2013    2020    2030    2037    2043    2050
4054          RY  1094.5  1091.2  1087.8  1084.5  1084.5  1087.8  1091.2  1094.5
              *
              * ***********************************************************************
              *

4055          KK    194D
4056          KM    NEW RUNOFF HYDROGRAPH FOR SUB-BASIN 194D (PART OF FORMER SUB-BASIN 194C)
4057          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4058          KM    L=       .9  Lca=      .5   S=   19.5  Kn= .120  LAG=  70.9
4059          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4060          BA     .24
4061          LG     .50     .00    3.75     .46     .00
4062          UI     11.     11.     11.     31.     42.     52.     58.     65.     71.     80.
4063          UI     88.    105.    130.    149.    128.    110.     99.     90.     80.     71.
4064          UI     64.     56.     49.     38.     28.     20.     19.     19.     15.     11.
4065          UI     11.      9.      3.      3.      3.      3.      3.      3.      3.      3.
4066          UI      3.      3.      0.      0.      0.      0.      0.      0.      0.      0.
4067          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4068          KK   R194D
4069          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY (BULLARD AVE TO AT&SF RR CHANNEL)
4070          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4071          RS       2              -1       0
4072          RC   0.025   0.025   0.025    2660   0.003
4073          RX    1500    1501    1588    1600    1612    1630    1699    1700
4074          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4075          KK    D180
4076          KM       RETURN DIVERT AT CP180
4077          DR   1D195
              *

4078          KK    R180
4079          KM       ROUTE FLOW FROM CP180 TO CP195B
4080          RS      40              -1       0
4081          RC     .08     .08     .08    3730   .0031
4082          RX    1000    1001    1002    1350    2300    2448    2449    2450
4083          RY    1101    1101    1100    1099    1099    1100    1101    1101
              *

4084          KK    195B
4085          KM    RUNOFF HYDROGRAPH FOR SUB-BASIN 195B (PART OF FORMER SUB-BASIN 195)
4086          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4087          KM   L=       .9  Lca=       .5   S=   15.6  Kn= .120  LAG=  74.2
4088          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4089          BA     .26
4090          LG     .50     .00    4.82     .49     .00
4091          UI     12.     12.     12.     27.     42.     51.     58.     64.     70.     78.
4092          UI     87.     97.    118.    145.    148.    125.    110.     99.     91.     81.
4093          UI     73.     65.     58.     51.     40.     31.     21.     20.     19.     17.
4094          UI     12.     12.     12.      5.      4.      4.      4.      4.      4.      4.
4095          UI      4.      4.      4.      4.      0.      0.      0.      0.      0.      0.
4096          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4097          KK    D181
4098          KM       RETURN DIVERT AT CP181
4099          DR   2D195

4100          KK    R181
4101          KM       ROUTE FLOW FROM CP181 TO CP195
4102          KM       ALONG CONCRETE RECTANGULAR CHANNEL, 15' BOTTOM WIDTH
4103          RS       1              -1       0
4104          RC   0.013   0.013   0.013    2800   0.004
4105          RX       0      10      19      20      35      36      40      50
4106          RY    1104    1104    1104    1100    1100    1104    1104    1104
              *

4107          KK  CP195B
4108          KM       TOTAL FLOW IN ROADSIDE CHANNEL DUE TO NORTHERN PKWY
4109          KM       ALSO TOTAL FLOW INTO NEW CBC CROSSING NORTHERN PKWY
4110          HC       2   31.16
              *

4111          KK  !C195B
4112          KM       ADD R180 SHEET FLOW FROM NW AND
4113          KM       R181 FLOW BESIDE AT&SF TRACKS FROM NORTH WITH NORTHERN PKWY FLOW
4114          KM       TOTAL FLOW INTO NEW CBC UNDER NORTHERN PARKWAY
4115          HC       3   26.83
              *
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4116          KK   R195B
4117          KM      CHANNEL ROUTING ALONG PROPOSED AT&SF RR CHANNEL
4118          KM     15' BOTTOM WIDTH, 2:1 SS, CONC LINED BANKS
4119          RS       1              -1       0
4120          RC   0.013   0.013   0.013    2300   0.004
4121          RX       0      10      20      28      43      51      60      70
4122          RY    1100    1100    1100    1096    1096    1100    1100    1100
              *
              *    MODIFIED PER NORTHERN PKWY
```

D72A72

TRIAL VERSION of TIFFDLL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

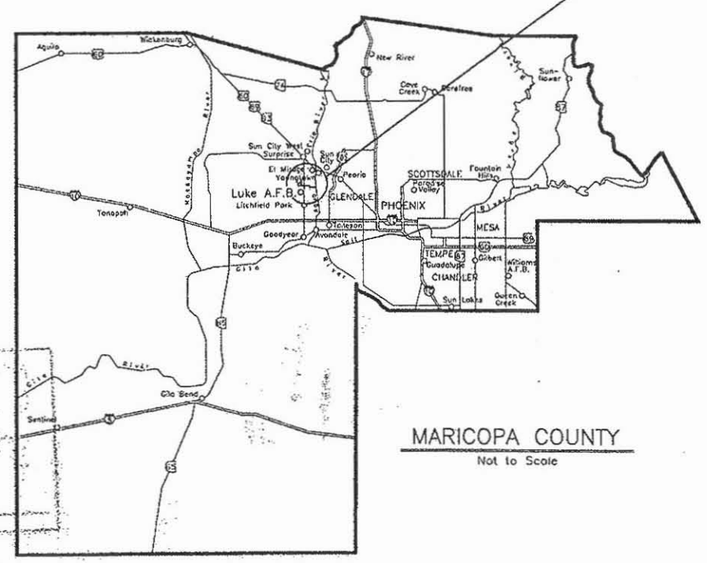
PLANS FOR THE CONSTRUCTION OF:

DYSART DRAIN IMPROVEMENTS PROJECT
REEMS ROAD TO AGUA FRIA RIVER
CHANNEL IMPROVEMENTS

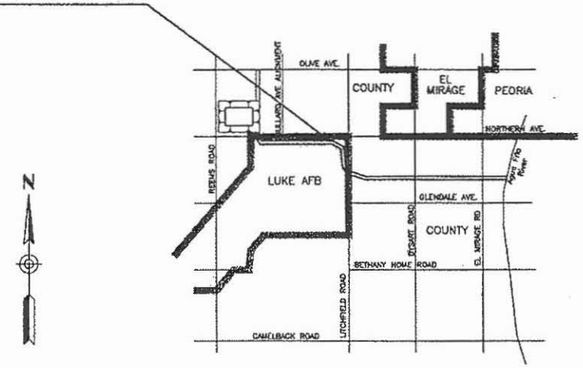
PROJECT NO. FCD 94-38
LAFB NO. 87-3002

DTL(D12) D13,D18,
D19, D80

PROJECT NO. FCD 94-38



MARICOPA COUNTY
Not to Scale



VICINITY MAP
Not to Scale

"AS BUILT DRAWING"

263-1100

NBS LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1999
(602) 468-1688 FAX 956-4536

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

CHIEF ENGINEER AND GENERAL MANAGER — DATE 9-6-95

BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT

TOM RAWLES – CHAIRMAN

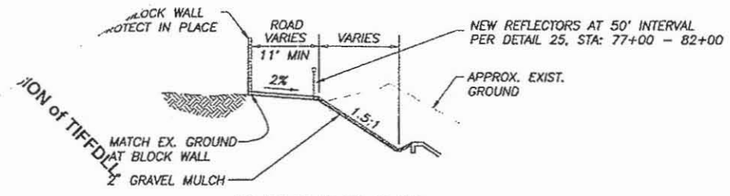
DISTRICT 1 TOM RAWLES
DISTRICT 2 DON STAPLEY
DISTRICT 3 BETSEY BAYLESS
DISTRICT 4 EDWARD KING
DISTRICT 5 MARY ROSE GARRIDO WILCOX

NBS/LOWRY PROJECT NO. P81-194.019 — SHEET G01/7

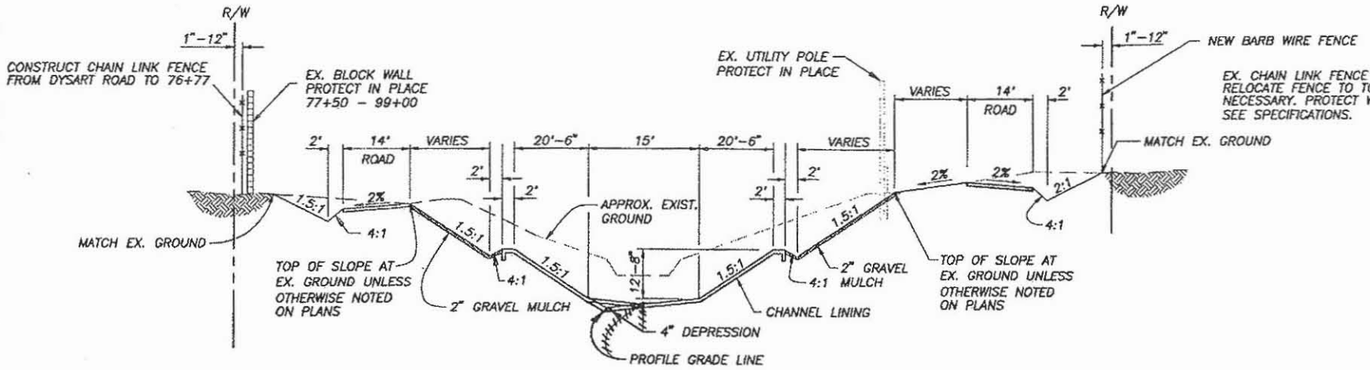
49

DYSART DRAIN IMPROVEMENTS
REEMS RD. TO AGUA FRIA
CHANNEL IMPROVEMENTS
AS BUILTS
FCD 94-38 470

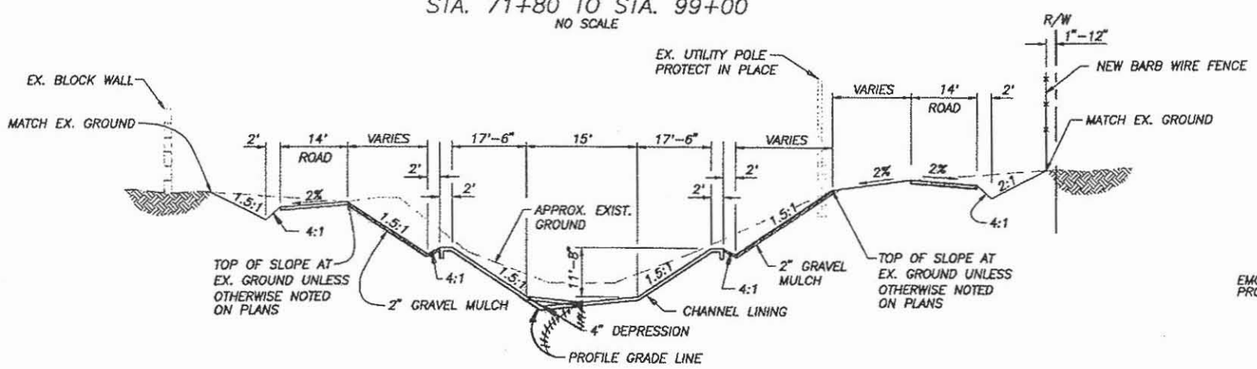
\P81-194.019\DWGS\PH-M\DD-G01.DWG VIEW = SITE 1=40



STA. 77+50 TO STA. 81+55
(SOUTH SIDE)



TYPICAL SECTION NO. 4
STA. 71+80 TO STA. 99+00
NO SCALE



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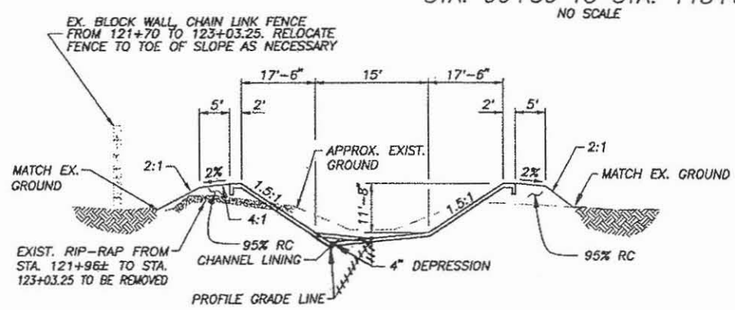
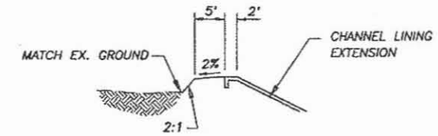
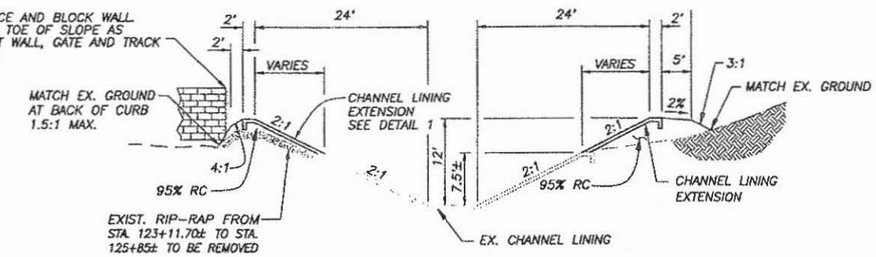
STA. 99+50 TO STA. 113+00
NO SCALE



TYPICAL SECTION NO. 6
STA. 113+00 TO STA. 123+03.25 BK
NO SCALE

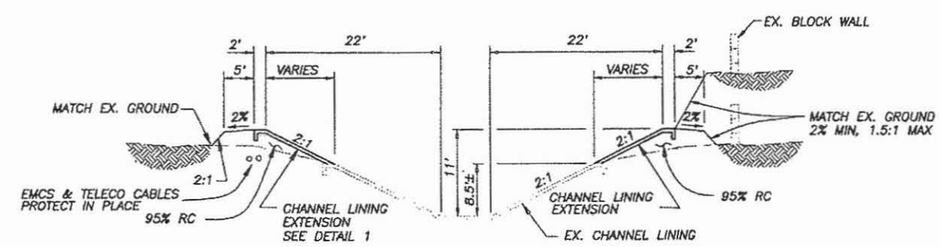


WEST OF LITCHFIELD RD.

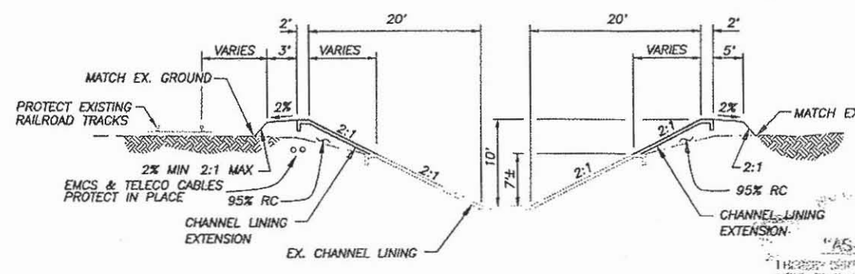


EAST OF LITCHFIELD RD.

TYPICAL SECTION NO. 7
STA. 123+11.70 AH TO STA. 128+70.12
NO SCALE



TYPICAL SECTION NO. 8
STA. 129+20.12 TO STA. 139+18.19
NO SCALE



TYPICAL SECTION NO. 9
STA. 139+18.19 TO STA. 149+00
NO SCALE

"AS-BUILT DRAWINGS"
THESE SHEETS REFLECT THE AS-BUILT DRAWINGS. MODIFICATIONS OF THE WORK SHOWN HEREON WERE MADE UNDER MY SUPERVISION AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

263-1100

NO.	REVISION		DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DYSART DRAIN IMPROVEMENT PROJECT
CHANNEL IMPROVEMENTS
TYPICAL SECTIONS
SECTIONS NO. 4 THROUGH NO. 9

	BY	DATE
DESIGNED	S. YINGLING	5/94
DRAWN	S. YINGLING	5/94
CHECKED	C. GOPPERTON	5/95

NBS LOWRY
ENGINEERS & PLANNERS
2902 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1541
(602) 942-1985 · FAX 954-0521

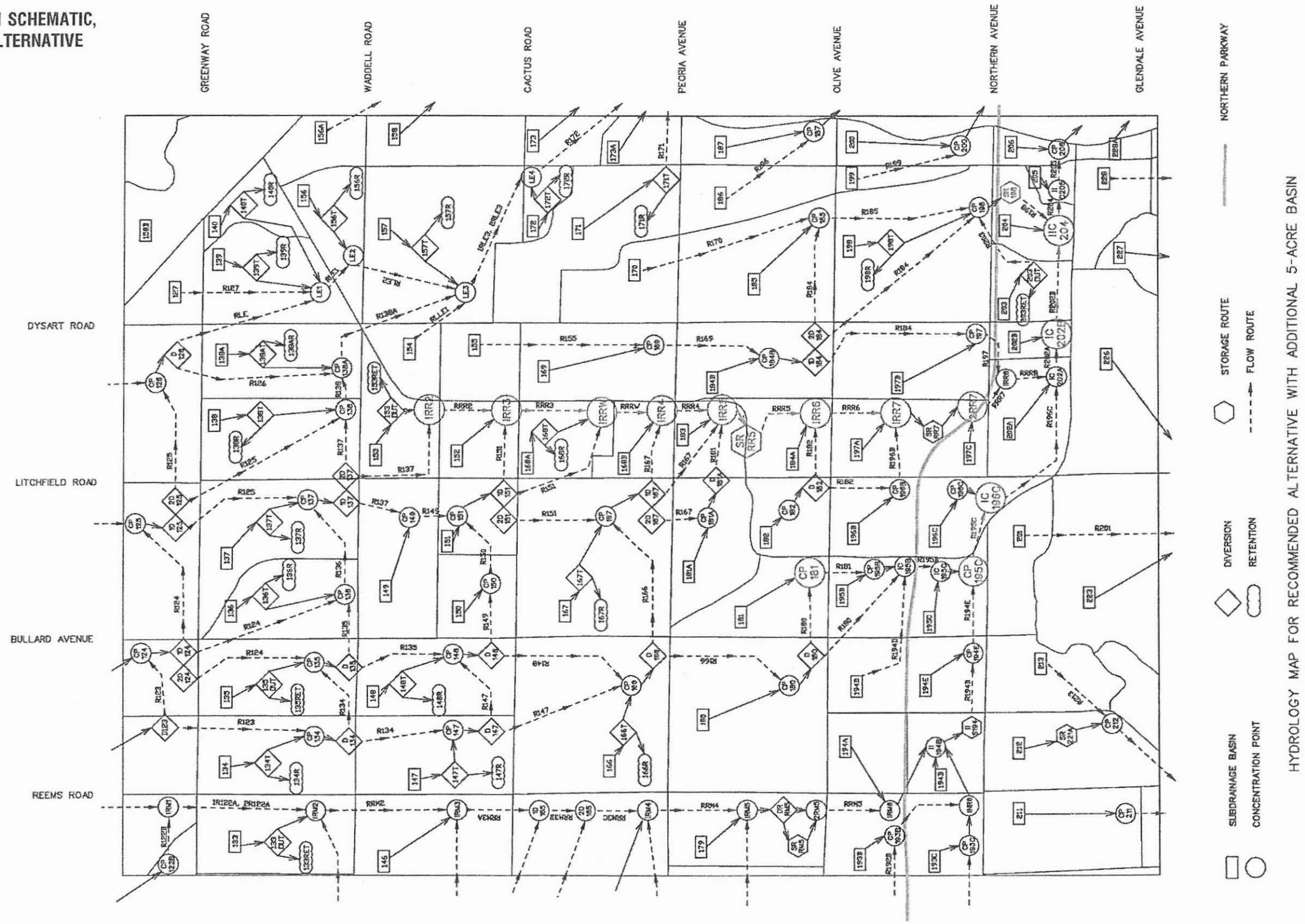
NBS/LOWRY PROJECT NO. P81-194-019
SHEET D02/16

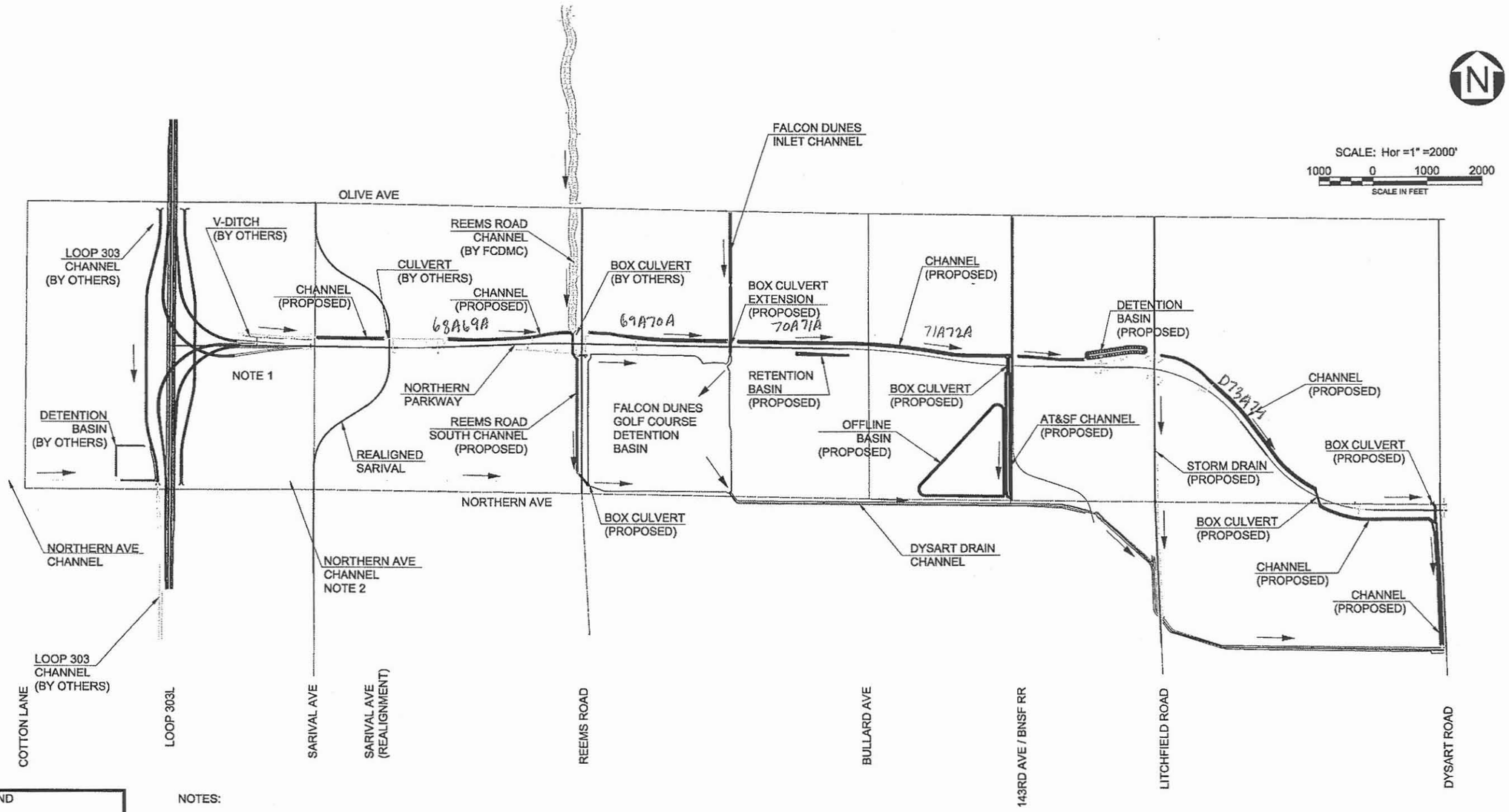
D7D13-D13
D13D78-D78

\P81-194.019\DWGS\PH-01\DD-D02.DWG VIEW = SITE 1 = 20 MSPACE

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE





SEE FIGURE 5-2

LEGEND

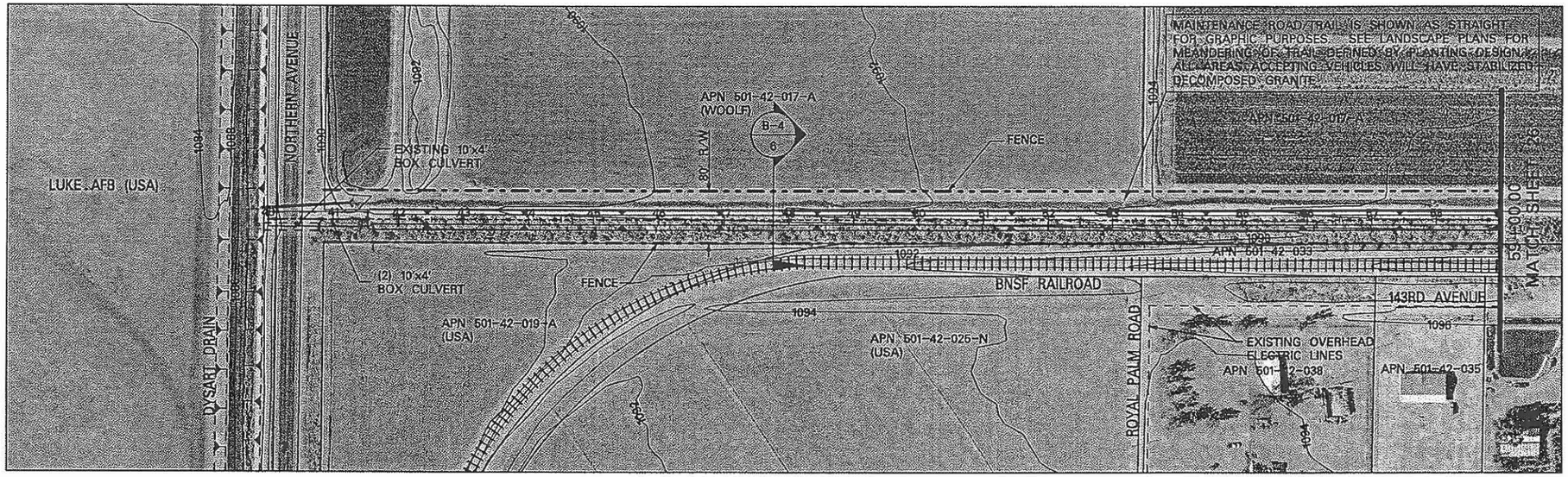
- STORM DRAIN (PROPOSED) & FLOW DIRECTION
- CHANNEL & (PROPOSED) FLOW DIRECTION
- RETENTION / DETENTION BASIN

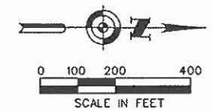
NOTES:

1) ALL LOOP 303 - NORTHERN PARKWAY TRAFFIC INTERCHANGE RUNOFF WILL BE ROUTED SOUTHWARD ALONG LOOP 303 DETENTION BASINS AND CHANNEL.
2) LOOP 303/WHITE TANKS ADMP CONCEPT - EAST OF LOOP 303, NORTHERN AVENUE CHANNEL NOT NEEDED.
3) ALL ITEMS SHOWN ARE EXISTING UNLESS STATED OTHERWISE.

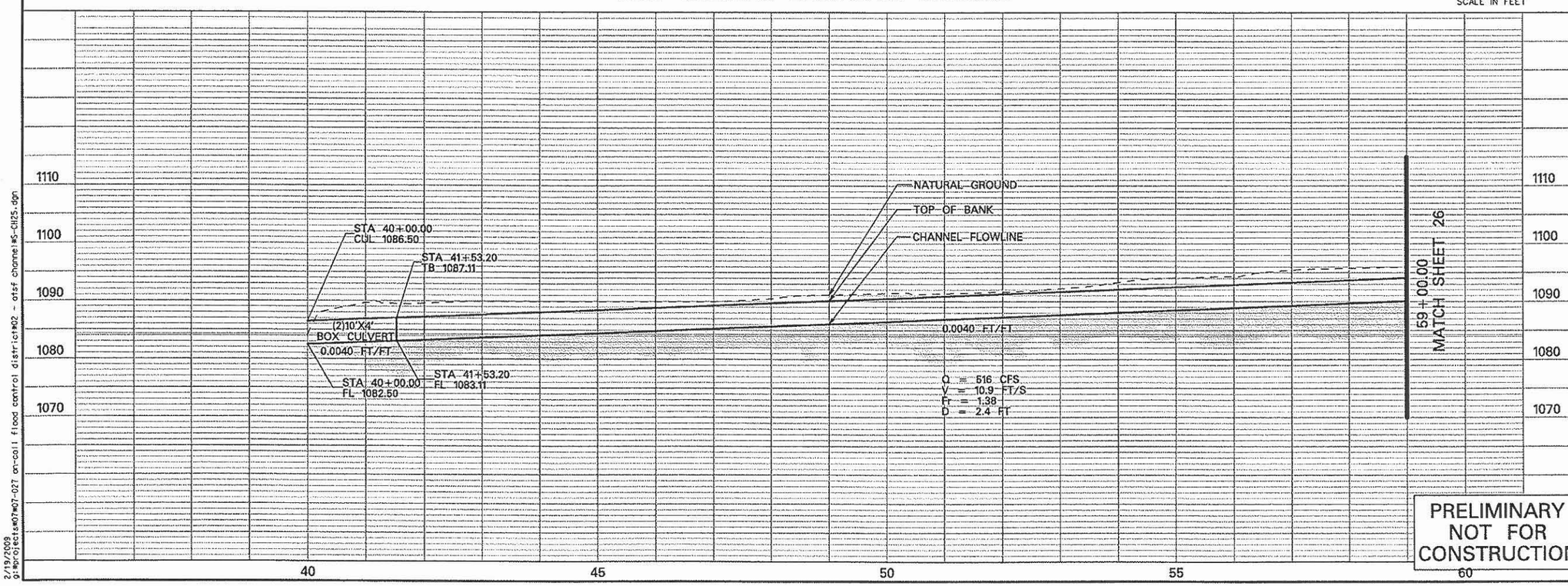
FIGURE 5-1
PROPOSED NORTHERN PARKWAY DRAINAGE IMPROVEMENTS - WEST

D72A72

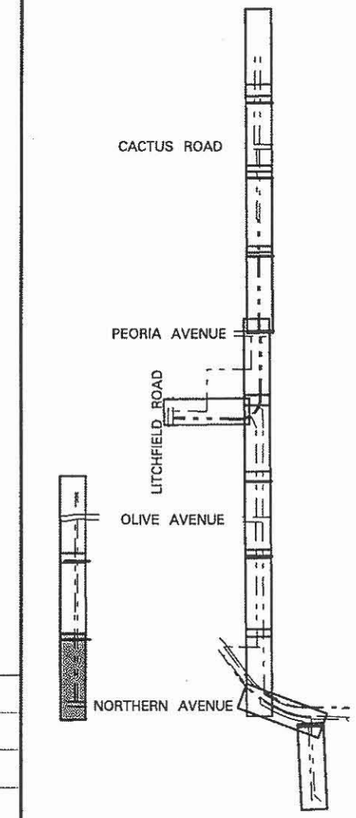




BNSF RAILROAD SECONDARY CHANNEL



PRELIMINARY NOT FOR CONSTRUCTION



KEY MAP

NO.	REVISION	BY	DATE
2			
1			

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creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/09

	BY	DATE
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DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

SHEET 25 OF 44

2/19/2009
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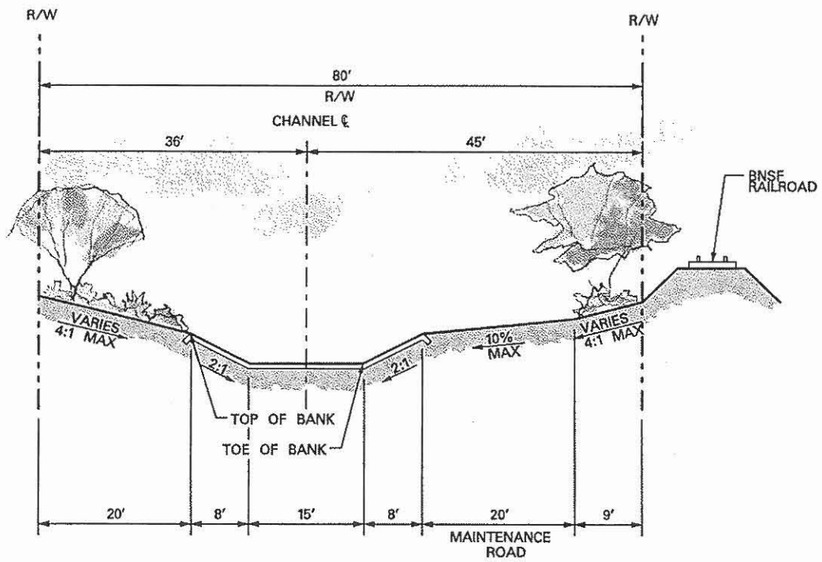

B-3 / 21-22 SECTION
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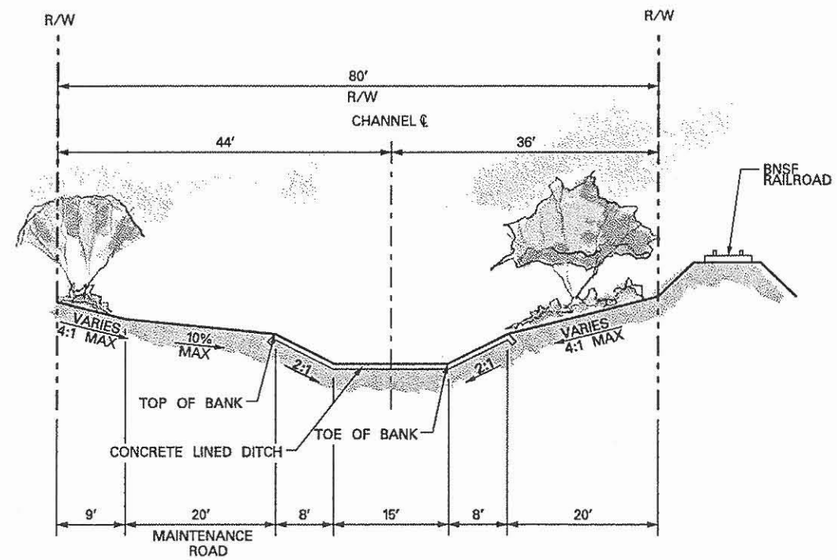

B-4 / 25-26 SECTION
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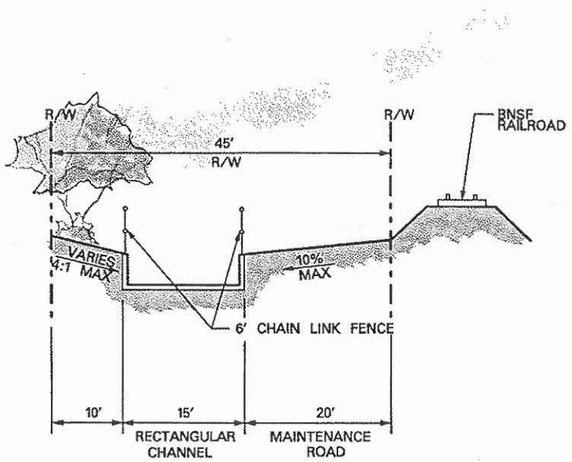

C-1 / 21-20 SECTION
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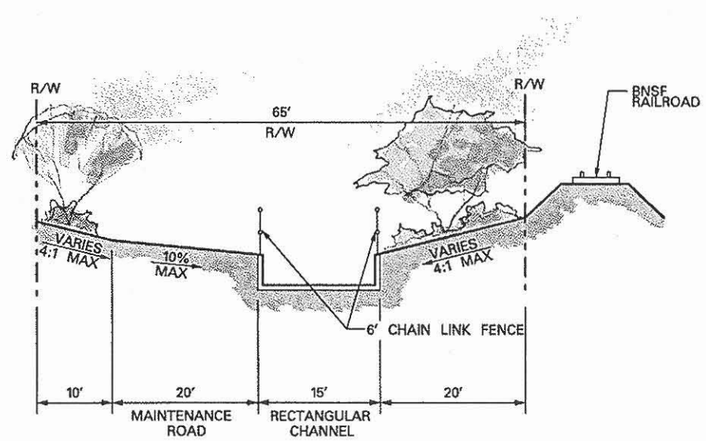

C-2 / 26-27 SECTION
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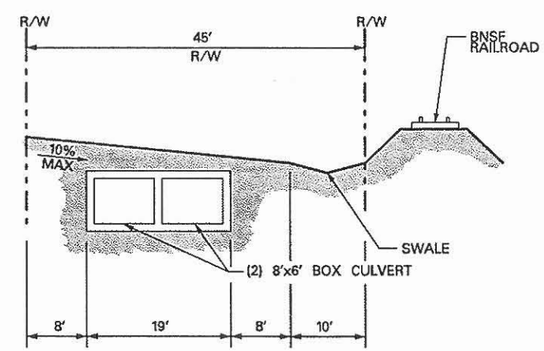

D / 20 SECTION
SCALE 1"=10'/1"=20'

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

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PLANS CHK.		

SECTIONS

SHEET 6 OF 44

2/19/2009
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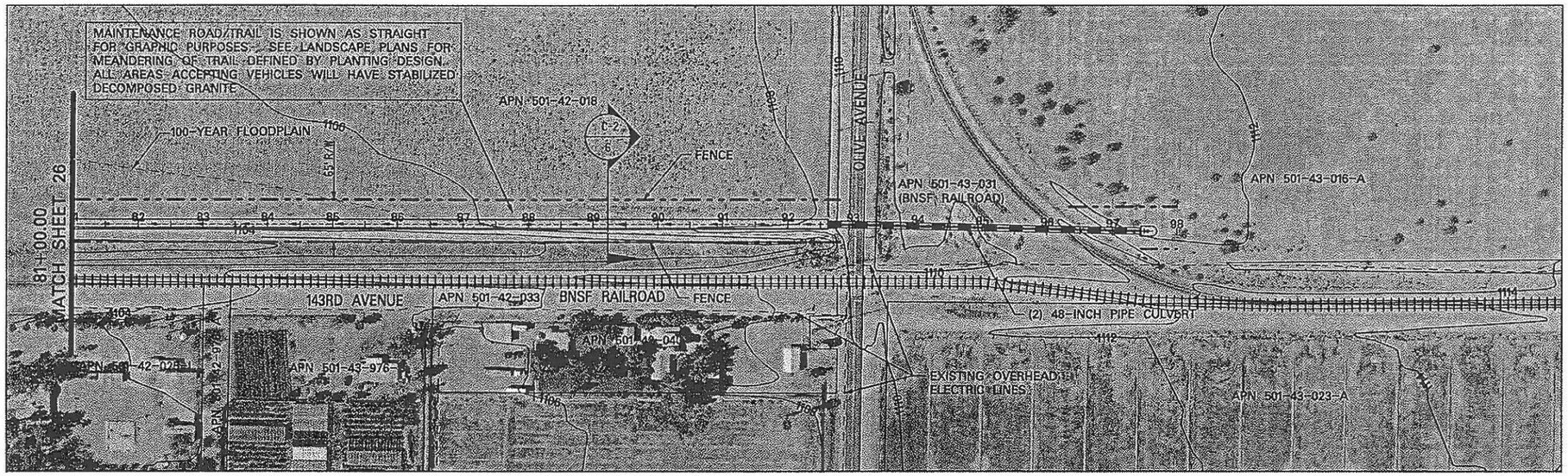
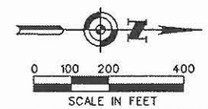
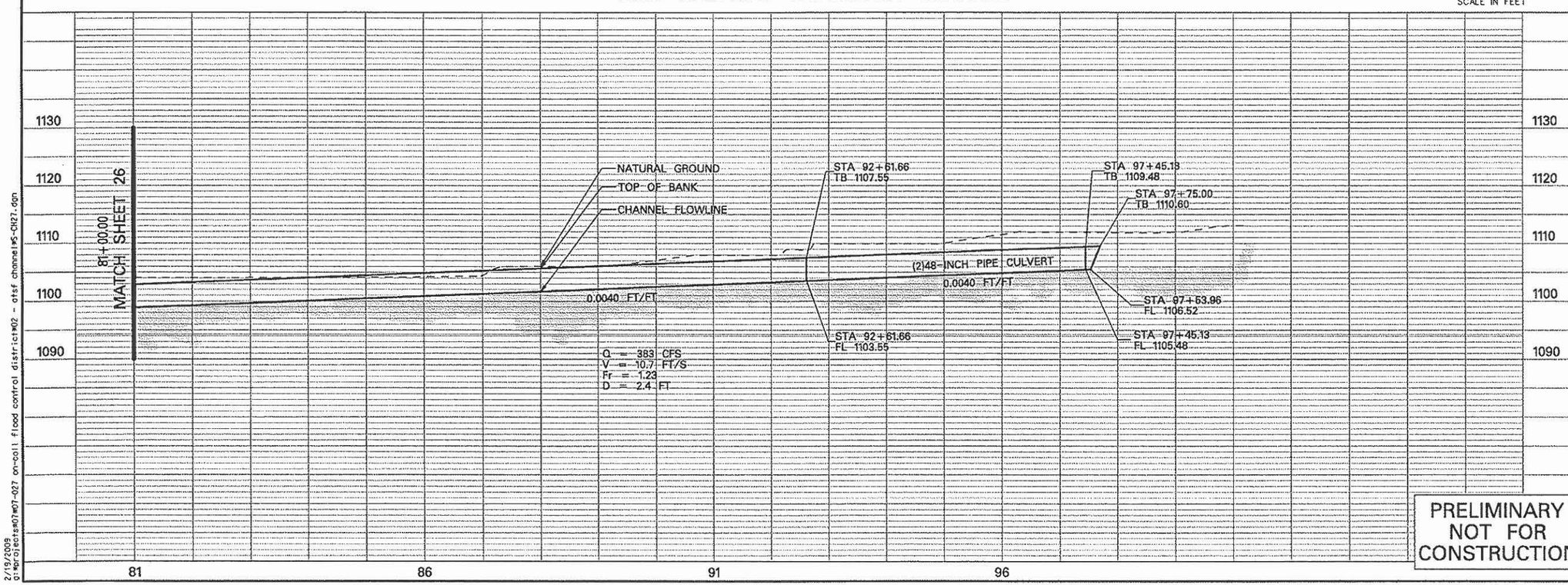
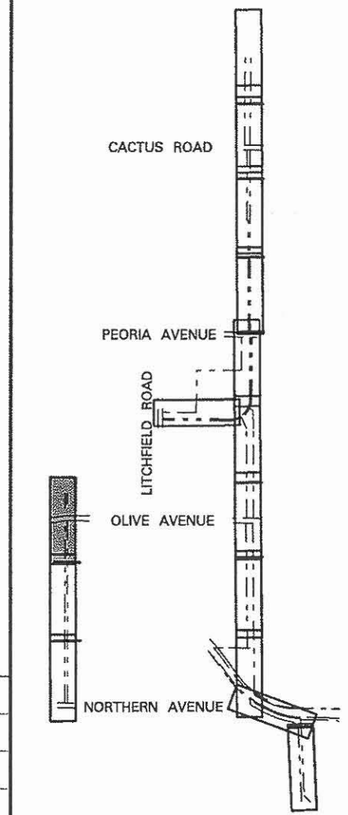


BNSF RAILROAD SECONDARY CHANNEL





PRELIMINARY NOT FOR CONSTRUCTION



KEY MAP

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PLANS CHK.		

PLAN AND PROFILE

SHEET 27 OF 44

2/19/2009
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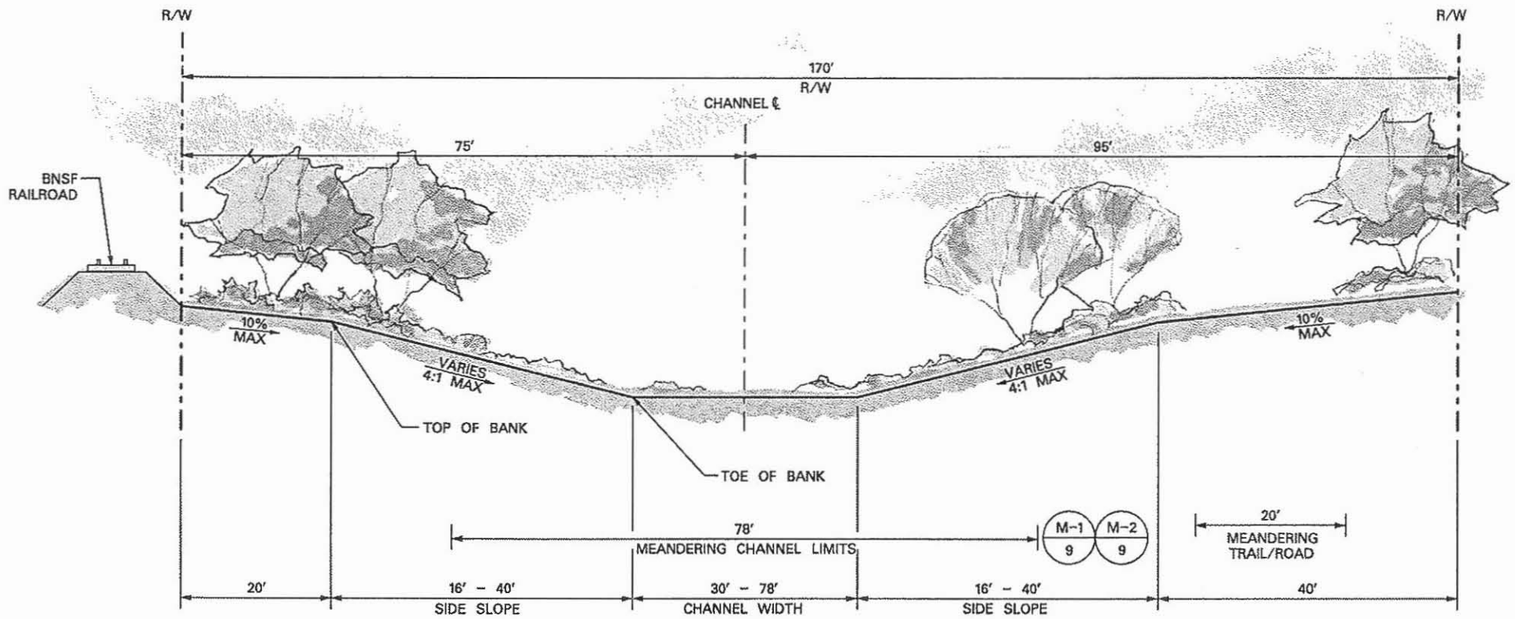

A-5 / 24 SECTION
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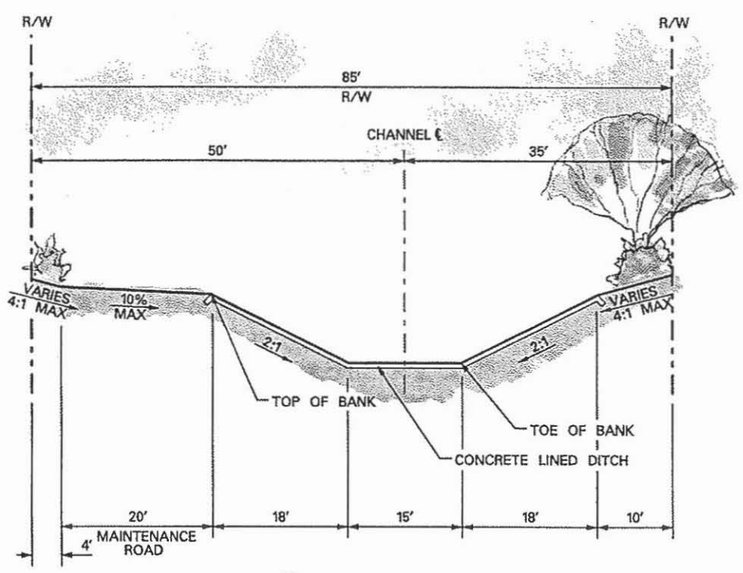

B-1 / 13 SECTION
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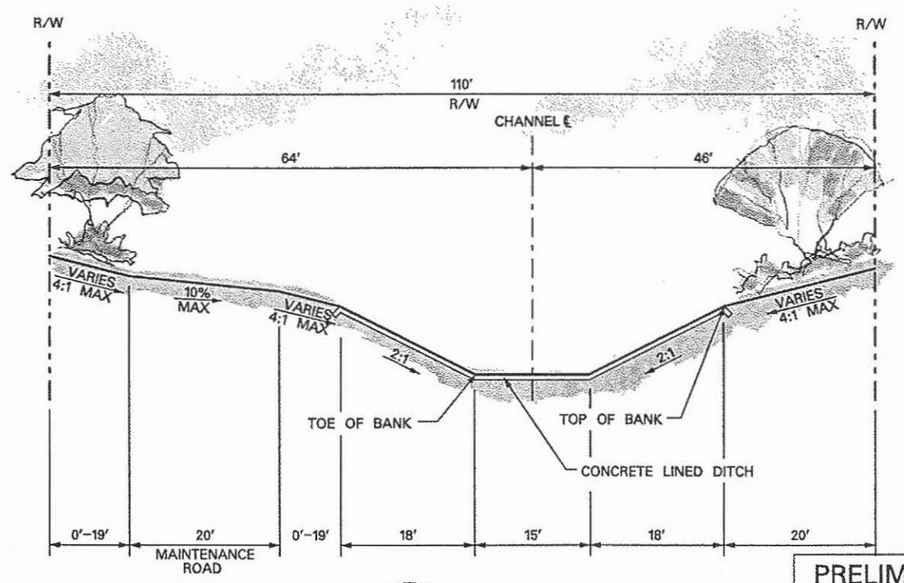

B-2 / 14 SECTION
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

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DESIGN CHK.		
PLANS		
PLANS CHK.		

SECTIONS

SHEET 5 OF 44

2/19/2009
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CIP models

D72A

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *            JUN   1998             *
 *          VERSION 4.1              *
 *                                   *
   RUN DATE   06FEB09  TIME  14:20:20  *
   *                                   *
     *************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                    HEC-1 INPUT                                    PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
    2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
    3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
    4           ID   MODIFICATIONS:
    5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
    6           ID   (2) SURPRISE WWTP WAS UPDATED
    7           ID   (3) NORTHERN PARKWAY WAS UPDATED
    8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
    9           ID
   10           ID  ***********************************************************************
   11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
   12           ID      NOTES:
   13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
   14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
   15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   16           ID      AND R238.
                * ***********************************************************************
                * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                * ***********************************************************************
   17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   18           ID
   19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   23           ID
   24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   28           ID
   29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   30           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   31           ID
   32           ID                                       REVISED BY URS     DATE: 01-14-04
   33           ID                                                          FILE: L33PE4H.DAT
   34           ID
   35           ID        NOTES:
   36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   41           ID           THE WLB MODEL.
   42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   45           ID           DRAINAGE REPORTS.
   46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   47           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   51           ID           STORM.
   52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
                                         HEC-1 INPUT                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   54           ID           THE DATA FILE BY THE FCDMC.
   55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   57           ID
```

```
4052          RC    .016    .016    .016    3750   .0011
4053          RX    2000    2007    2013    2020    2030    2037    2043    2050
4054          RY  1094.5  1091.2  1087.8  1084.5  1084.5  1087.8  1091.2  1094.5
              *
              * ************************************************************************
              *

4055          KK    194D
4056          KM    NEW RUNOFF HYDROGRAPH FOR SUB-BASIN 194D (PART OF FORMER SUB-BASIN 194C)
4057          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4058          KM    L=        .9  Lca=       .5    S=   19.5  Kn= .120  LAG=  70.9
4059          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4060          BA     .24
4061          LG     .50     .00    3.75     .46     .00
4062          UI     11.     11.     11.     31.     42.     52.     58.     65.     71.     80.
4063          UI     88.    105.    130.    149.    128.    110.     99.     90.     80.     71.
4064          UI     64.     56.     49.     38.     28.     20.     19.     19.     15.     11.
4065          UI     11.      9.      3.      3.      3.      3.      3.      3.      3.      3.
4066          UI      3.      3.      0.      0.      0.      0.      0.      0.      0.      0.
4067          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4068          KK   R194D
4069          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY (BULLARD AVE TO AT&SF RR CHANNEL)
4070          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4071          RS       2              -1       0
4072          RC   0.025   0.025   0.025    2660   0.003
4073          RX    1500    1501    1588    1600    1612    1630    1699    1700
4074          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
```

71A 72A


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4075          KK    D180
4076          KM        RETURN DIVERT AT CP180
4077          DR   1D195
              *

4078          KK    R180
4079          KM        ROUTE FLOW FROM CP180 TO CP195B
4080          RS      40              -1       0
4081          RC     .08     .08     .08    3730   .0031
4082          RX    1000    1001    1002    1350    2300    2448    2449    2450
4083          RY    1101    1101    1100    1099    1099    1100    1101    1101
              *

4084          KK    195B
4085          KM    RUNOFF HYDROGRAPH FOR SUB-BASIN 195B (PART OF FORMER SUB-BASIN 195)
4086          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4087          KM   L=        .9  Lca=       .5    S=   15.6  Kn= .120  LAG=  74.2
4088          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4089          BA     .26
4090          LG     .50     .00    4.82     .49     .00
4091          UI     12.     12.     12.     27.     42.     51.     58.     64.     70.     78.
4092          UI     87.     97.    118.    145.    148.    125.    110.     99.     91.     81.
4093          UI     73.     65.     58.     51.     40.     31.     21.     20.     19.     17.
4094          UI     12.     12.     12.      5.      4.      4.      4.      4.      4.      4.
4095          UI      4.      4.      4.      4.      0.      0.      0.      0.      0.      0.
4096          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4097          KK    D181
4098          KM        RETURN DIVERT AT CP181
4099          DR   2D195

4100          KK    R181
4101          KM        ROUTE FLOW FROM CP181 TO CP195
4102          KM        ALONG CONCRETE RECTANGULAR CHANNEL, 15' BOTTOM WIDTH
4103          RS       1              -1       0
4104          RC   0.013   0.013   0.013    2800   0.004
4105          RX       0      10      19      20      35      36      40      50
4106          RY    1104    1104    1104    1100    1100    1104    1104    1104
              *

4107          KK  CP195B
4108          KM        TOTAL FLOW IN ROADSIDE CHANNEL DUE TO NORTHERN PKWY
4109          KM        ALSO TOTAL FLOW INTO NEW CBC CROSSING NORTHERN PKWY
4110          HC       2   31.16
              *

4111          KK  !C195B
4112          KM        ADD R180 SHEET FLOW FROM NW AND
4113          KM        R181 FLOW BESIDE AT&SF TRACKS FROM NORTH WITH NORTHERN PKWY FLOW
4114          KM        TOTAL FLOW INTO NEW CBC UNDER NORTHERN PARKWAY
4115          HC       3   26.83
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4116          KK   R195B
4117          KM      CHANNEL ROUTING ALONG PROPOSED AT&SF RR CHANNEL
4118          KM      15' BOTTOM WIDTH, 2:1 SS, CONC LINED BANKS
4119          RS       1              -1       0
4120          RC   0.013   0.013   0.013    2300   0.004
4121          RX       0      10      20      28      43      51      60      70
4122          RY    1100    1100    1100    1096    1096    1100    1100    1100
              *
              *    MODIFIED PER NORTHERN PKWY
```

D72A

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN   1998            *
 *           VERSION 4.1             *
                                     *
      N DATE   06FEB09  TIME  14:20:20  *
                                     *
 **    ***********************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*   HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
  2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
  3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
  4           ID   MODIFICATIONS:
  5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
  6           ID   (2) SURPRISE WWTP WAS UPDATED
  7           ID   (3) NORTHERN PARKWAY WAS UPDATED
  8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
  9           ID
 10           ID  ************************************************************************
 11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
 12           ID      NOTES:
 13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
 14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
 15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
 16           ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
 17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
 18           ID
 19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
 20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
 21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
 22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
 23           ID
 24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
 25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
 26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
 27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
 28           ID
 29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
 30           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
 31           ID
 32           ID                                   REVISED BY URS     DATE: 01-14-04
 33           ID                                                      FILE: L33PE4H.DAT
 34           ID
 35           ID        NOTES:
 36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
 37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
 38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
 39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
 40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
 41           ID           THE WLB MODEL.
 42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
 43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
 44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
 45           ID           DRAINAGE REPORTS.
 46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
 47           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
 48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
 49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
 50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
 51           ID           STORM.
 52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
 54           ID           THE DATA FILE BY THE FCDMC.
 55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
 56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
 57           ID
```

```
4052          RC    .016    .016    .016    3750   .0011
4053          RX    2000    2007    2013    2020    2030    2037    2043    2050
4054          RY  1094.5  1091.2  1087.8  1084.5  1084.5  1087.8  1091.2  1094.5
              *
              * ***********************************************************************
              *

4055          KK    194D
4056          KM    NEW RUNOFF HYDROGRAPH FOR SUB-BASIN 194D (PART OF FORMER SUB-BASIN 194C)
4057          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4058          KM    L=        .9  Lca=        .5   S=    19.5  Kn= .120  LAG=  70.9
4059          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4060          BA     .24
4061          LG     .50     .00    3.75     .46     .00
4062          UI     11.     11.     11.     31.     42.     52.     58.     65.     71.     80.
4063          UI     88.    105.    130.    149.    128.    110.     99.     90.     80.     71.
4064          UI     64.     56.     49.     38.     28.     20.     19.     19.     15.     11.
4065          UI     11.      9.      3.      3.      3.      3.      3.      3.      3.      3.
4066          UI      3.      3.      0.      0.      0.      0.      0.      0.      0.      0.
4067          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4068          KK   R194D
4069          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY (BULLARD AVE TO AT&SF RR CHANNEL)
4070          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4071          RS       2              -1       0
4072          RC   0.025   0.025   0.025    2660   0.003
4073          RX    1500    1501    1588    1600    1612    1630    1699    1700
4074          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
```

1 HEC-1 INPUT PAGE107

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4075          KK    D180
4076          KM        RETURN DIVERT AT CP180
4077          DR   1D195
              *

4078          KK    R180
4079          KM        ROUTE FLOW FROM CP180 TO CP195B
4080          RS      40              -1       0
4081          RC     .08     .08     .08    3730   .0031
4082          RX    1000    1001    1002    1350    2300    2448    2449    2450
4083          RY    1101    1101    1100    1099    1099    1100    1101    1101
              *

4084          KK    195B
4085          KM    RUNOFF HYDROGRAPH FOR SUB-BASIN 195B (PART OF FORMER SUB-BASIN 195)
4086          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4087          KM   L=        .9  Lca=        .5   S=    15.6  Kn= .120  LAG=  74.2
4088          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4089          BA     .26
4090          LG     .50     .00    4.82     .49     .00
4091          UI     12.     12.     12.     27.     42.     51.     58.     64.     70.     78.
4092          UI     87.     97.    118.    145.    148.    125.    110.     99.     91.     81.
4093          UI     73.     65.     58.     51.     40.     31.     21.     20.     19.     17.
4094          UI     12.     12.     12.      5.      4.      4.      4.      4.      4.      4.
4095          UI      4.      4.      4.      4.      0.      0.      0.      0.      0.      0.
4096          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4097          KK    D181
4098          KM        RETURN DIVERT AT CP181
4099          DR   2D195

4100          KK    R181
4101          KM        ROUTE FLOW FROM CP181 TO CP195
4102          KM        ALONG CONCRETE RECTANGULAR CHANNEL, 15' BOTTOM WIDTH
4103          RS       1              -1       0
4104          RC   0.013   0.013   0.013    2800   0.004
4105          RX       0      10      19      20      35      36      40      50
4106          RY    1104    1104    1104    1100    1100    1104    1104    1104
              *
```

D6172A

```
4107          KK  CP195B
4108          KM        TOTAL FLOW IN ROADSIDE CHANNEL DUE TO NORTHERN PKWY
4109          KM        ALSO TOTAL FLOW INTO NEW CBC CROSSING NORTHERN PKWY
4110          HC       2   31.16
              *

4111          KK  !C195B
4112          KM        ADD R180 SHEET FLOW FROM NW AND
4113          KM        R181 FLOW BESIDE AT&SF TRACKS FROM NORTH WITH NORTHERN PKWY FLOW
4114          KM        TOTAL FLOW INTO NEW CBC UNDER NORTHERN PARKWAY
4115          HC       3   26.83
              *
```

1 HEC-1 INPUT PAGE108

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4116          KK   R195B
4117          KM       CHANNEL ROUTING ALONG PROPOSED AT&SF RR CHANNEL
4118          KM       15' BOTTOM WIDTH, 2:1 SS, CONC LINED BANKS
4119          RS       1              -1       0
4120          RC   0.013   0.013   0.013    2300   0.004
4121          RX       0      10      20      28      43      51      60      70
4122          RY    1100    1100    1100    1096    1096    1100    1100    1100
              *
              *    MODIFIED PER NORTHERN PKWY
```

D73

TRIAL VERSION of TIFFDLL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

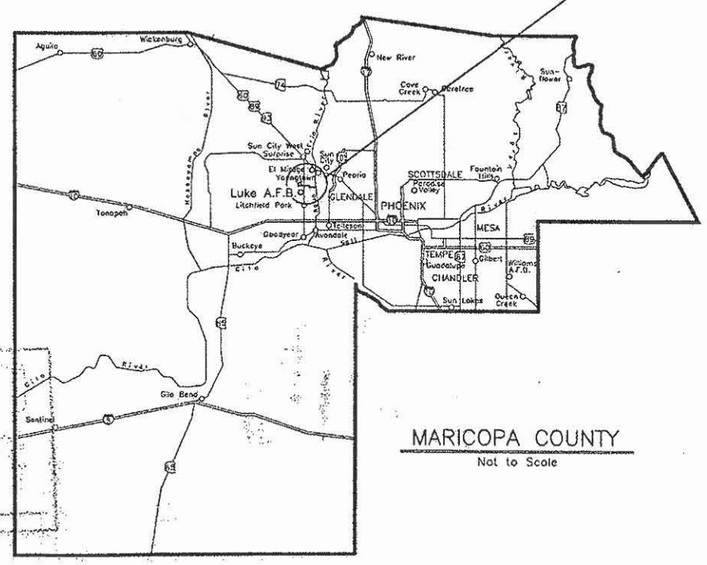
PLANS FOR THE CONSTRUCTION OF:

DYSART DRAIN IMPROVEMENTS PROJECT
REEMS ROAD TO AGUA FRIA RIVER
CHANNEL IMPROVEMENTS

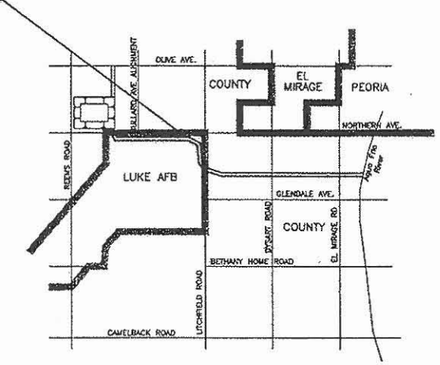
PROJECT NO. FCD 94-38
LAFB NO. 87-3002

D71, D72, D73, D78, D79, D80

PROJECT NO. FCD 94-38



MARICOPA COUNTY
Not to Scale



VICINITY MAP
Not to Scale

"AS BUILT DRAWINGS"

49

DYSART DRAIN IMPROVEMENTS
REEMS RD. TO AGUA FRIA
CHANNEL IMPROVEMENTS
AS BUILTS
FCD 94-38 470

\PB1-194.019\DWGS\PH-III\DD-G01.DWG VIEW = SITE 1=40

NBS/LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 160
Phoenix, Arizona 85008-1599
(602) 468-1668 FAX 956-4538

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

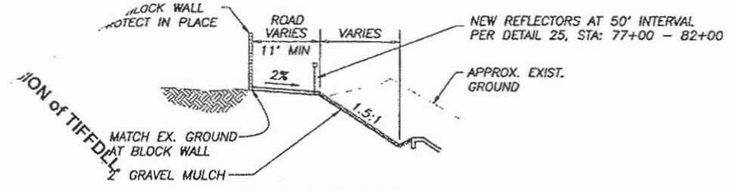
CHIEF ENGINEER AND GENERAL MANAGER — DATE

BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT

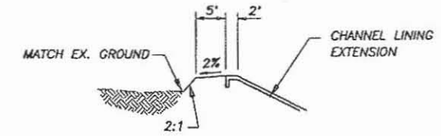
TOM RAWLES – CHAIRMAN

DISTRICT 1 TOM RAWLES
DISTRICT 2 DON STAPLEY
DISTRICT 3 BETSEY BAYLESS
DISTRICT 4 EDWARD KING
DISTRICT 5 MARY ROSE GARRIDO WILCOX

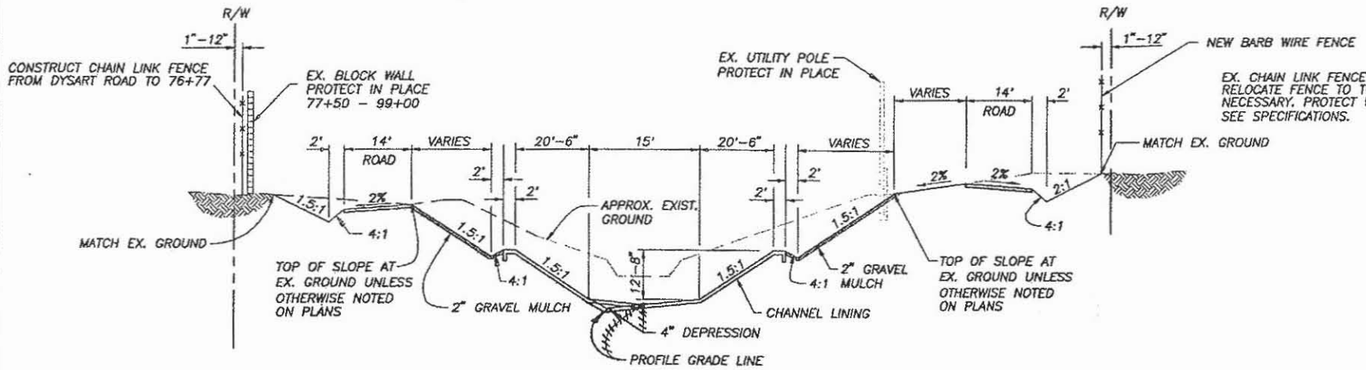
NBS/LOWRY PROJECT NO. PB1-194.019 | SHEET G01/7



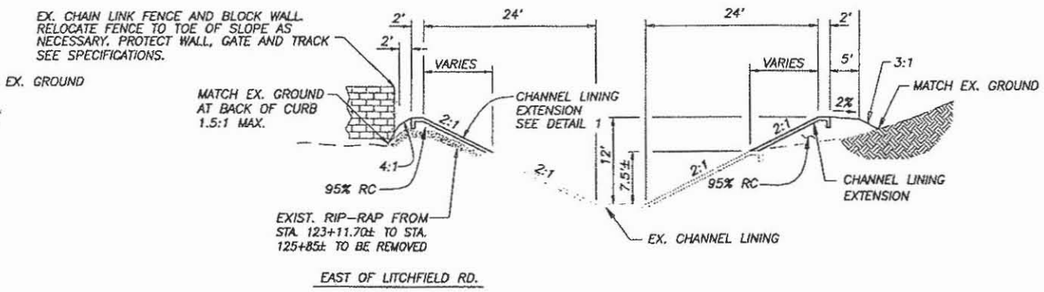
STA. 77+50 TO STA. 81+55
(SOUTH SIDE)



WEST OF LITCHFIELD RD.

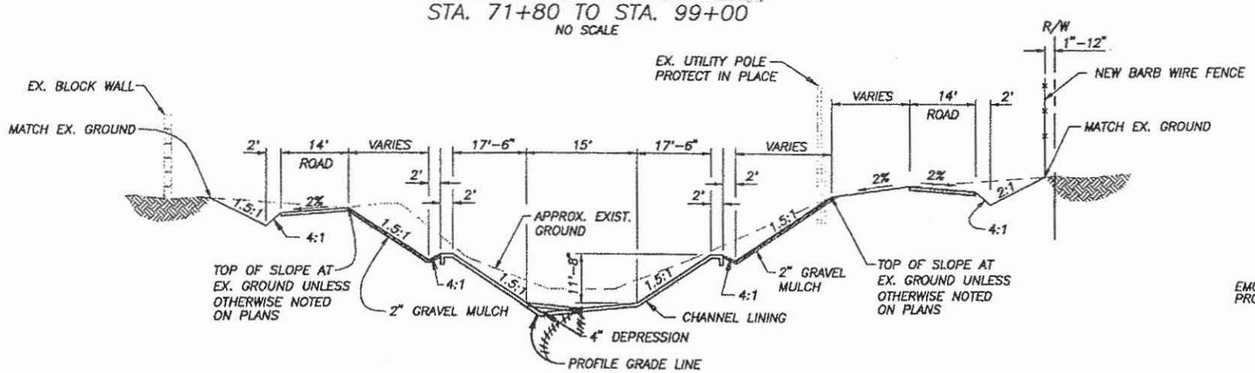


TYPICAL SECTION NO. 4
STA. 71+80 TO STA. 99+00
NO SCALE

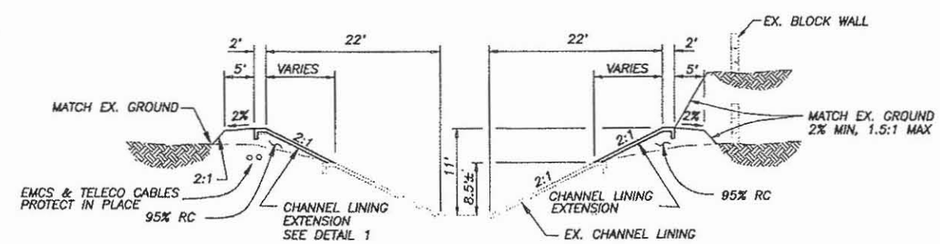


EAST OF LITCHFIELD RD.

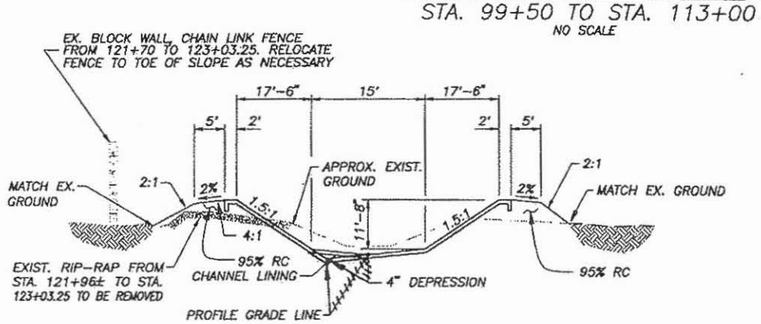
TYPICAL SECTION NO. 7
STA. 123+11.70 AH TO STA. 128+70.12
NO SCALE



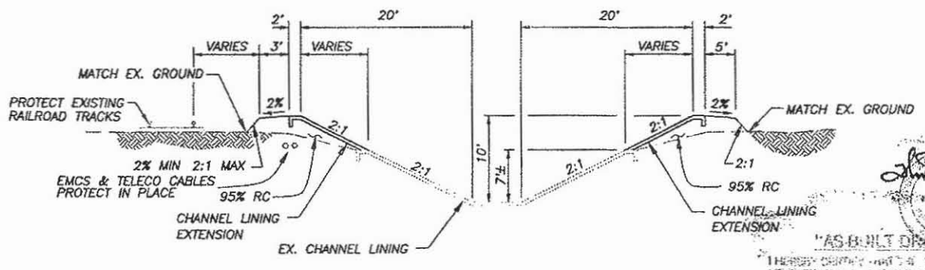
TYPICAL SECTION NO. 5
STA. 99+50 TO STA. 113+00
NO SCALE



TYPICAL SECTION NO. 8
STA. 129+20.12 TO STA. 139+18.19
NO SCALE



TYPICAL SECTION NO. 6
STA. 113+00 TO STA. 123+03.25 BK
NO SCALE



TYPICAL SECTION NO. 9
STA. 139+18.19 TO STA. 149+00
NO SCALE

"AS-BUILT DRAWING"

263-1100

NO.	REVISION	DATE
3		
2		
1		

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY
DYSART DRAIN IMPROVEMENT PROJECT
CHANNEL IMPROVEMENTS
TYPICAL SECTIONS
SECTIONS NO. 4 THROUGH NO. 9

	BY	DATE
DESIGNED	S. YINGLING	5/94
DRAWN	S. YINGLING	5/94
CHECKED	C. GOPPERTON	5/95

NBS LOWRY
ENGINEERS & PLANNERS
7500 North 16th Street, Ste. 100
Phoenix, Arizona 85020-1581
(602) 942-1188 · FAX 995-0635

NBS/LOWRY PROJECT NO. PB1-194-019

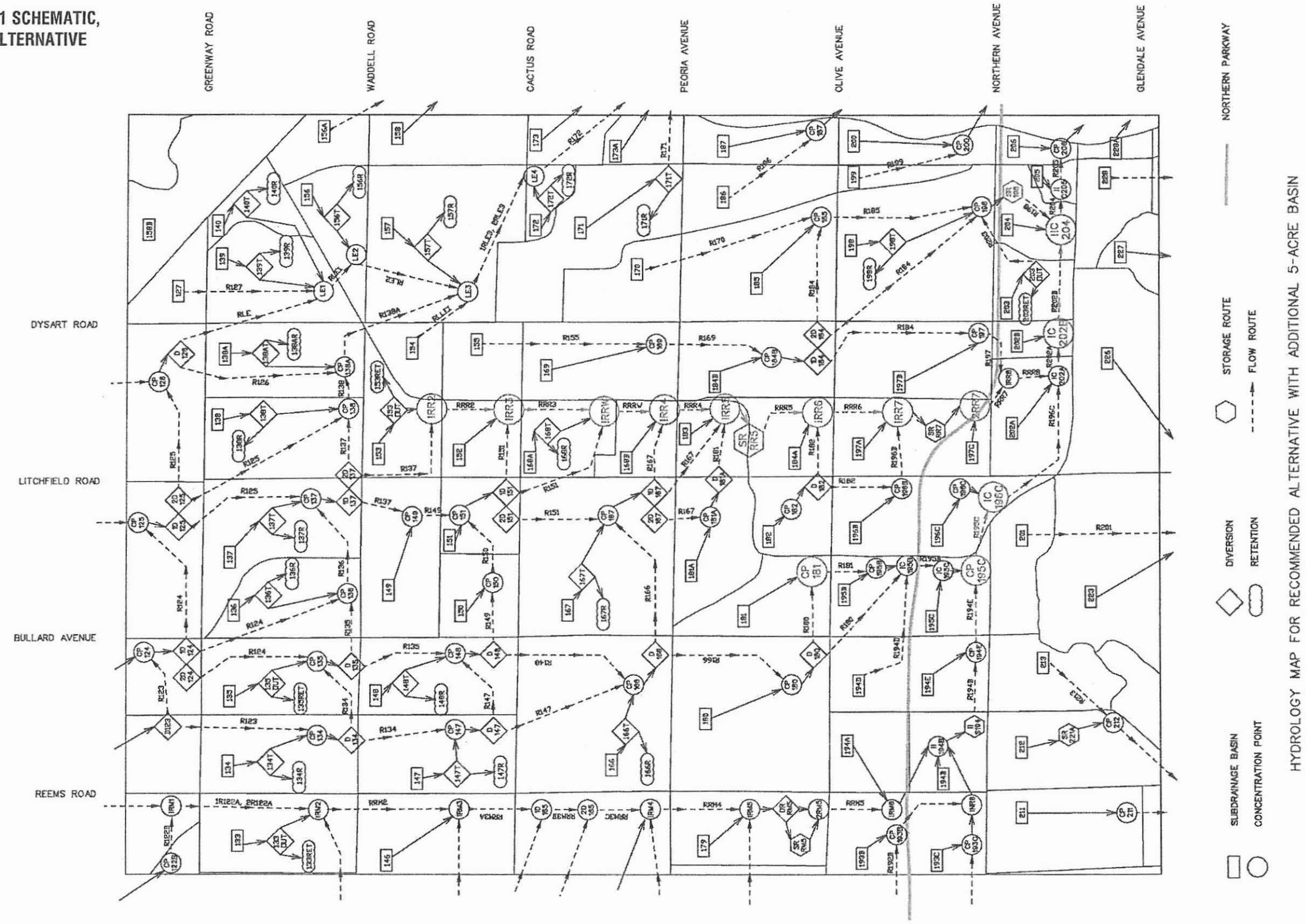
SHEET D02/16

D02D13-D13
D13D18-D18

\PB1-194.019\DWGS\PH-IA\DD-D02.DWG VIEW = SITE 1 = 20 MSPACE

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN

D74

CIP models

D74

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
 *            JUN   1998             *
 *          VERSION 4.1              *
 *                                   *
      RUN DATE   06FEB09  TIME  14:20:20  *
 *                                   *
 *************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X    X         XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X    X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
  2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
  3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
  4           ID   MODIFICATIONS:
  5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
  6           ID   (2) SURPRISE WWTP WAS UPDATED
  7           ID   (3) NORTHERN PARKWAY WAS UPDATED
  8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
  9           ID
 10           ID  ************************************************************************
 11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
 12           ID      NOTES:
 13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
 14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
 15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
 16           ID      AND R238.
              * ***********************************************************************
              * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
              * ***********************************************************************
 17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
 18           ID
 19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
 20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
 21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
 22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
 23           ID
 24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
 25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
 26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
 27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
 28           ID
 29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
 30           ID         100-YEAR, 24-HOUR STORM                 original file: WTADMS.24
 31           ID
 32           ID                                   REVISED BY URS     DATE: 01-14-04
 33           ID                                                      FILE: L33PE4H.DAT
 34           ID
 35           ID        NOTES:
 36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
 37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
 38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
 39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
 40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
 41           ID           THE WLB MODEL.
 42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
 43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
 44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
 45           ID           DRAINAGE REPORTS.
 46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
 47           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
 48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
 49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
 50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
 51           ID           STORM.
 52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
 54           ID           THE DATA FILE BY THE FCDMC.
 55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
 56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
 57           ID
```

```
4178          KK    196C
4179          KM  RUNOFF HYDROGRAPH FROM SUB-BASIN 196 (S. HALF OF FORMER SUB-BASIN 196)
4180          BA     .28
4181          LG     .46      .03     4.58      .53     2.00
4182          UI     13.      13.      13.      21.      43.      51.      60.      66.      72.      78.
4183          UI     86.      95.     105.     126.     154.     164.     140.     123.     112.     103.
4184          UI     94.      83.      76.      69.      62.      55.      44.      35.      22.      22.
4185          UI     21.      21.      15.      13.      13.      12.       4.       4.       4.       4.
4186          UI      4.       4.       4.       4.       4.       4.       4.       0.       0.       0.
4187          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
              *

4188          KK  CP196C
4189          KM        ADD HYDROGRAPHS AT CP196C
4190          KM        TOTAL FLOW IN LITCHFIELD RD STORM DRAIN
4191          HC       2   13.30
              *

4192          KK  !C196C
4193          KM        ADD HYDROGRAPHS AT CP196C
4194          KM        TOTAL FLOW IN DYSART DRAIN
4195          KO                                      21
4196          HC       2   51.58
              *

4197          KK   R196C
4198          KM        ROUTE FLOW FROM CP196C TO CP202 (TOTAL FLOW IN EXISTING DYSART DRAIN)
4199          RS       2                -1        0
4200          RC     .02     .016      .02     5460   .0015
4201          RX    1000     1001     1008     1020     1030     1042     1074     1075
4202          RY    1085     1078     1076     1070     1070     1076     1078     1085
              *
              *   MODIFIED PER NORTHERN PARKWAY AND ATSF CHANNEL HRC 12/11/2008
              *

4203          KK   DRRR6
4204          KM   RETURN FLOW FROM !RR5
4205          DR   2DRRR6

4206          KK    RRR5
4207          KM    ROUTE RR5 TO RR6
4208          RS       3               -1.0       0.0
4209          RC   0.035    0.035    0.035     2580  0.0015
4210          RX       0       10       20       36       86      102      110      120
4211          RY    1114     1114     1114     1110     1110     1114     1114     1114
              *

4212          KK   DRRR6
4213          KM   RETURN FLOW FROM !RR5
4214          DR   1DRRR6
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4215          KK    184A
4216          KM   BASIN 184A
4217          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4218          KM    L=        .7  Lca=        .4   S=    24.7  Kn= .120  LAG=  57.1
4219          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4220          BA     .28
4221          LG     .50      .00     4.74      .51      .00
4222          UI     16.      16.      31.      59.      76.      88.      98.     113.     129.     161.
4223          UI    208.     192.     160.     139.     124.     106.      93.      80.      65.      44.
4224          UI     29.      28.      26.      16.      16.      11.       5.       5.       5.       5.
4225          UI      5.       5.       5.       5.       0.       0.       0.       0.       0.       0.
4226          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
              *

4227          KK    !RR6
4228          KM   COMBINE HYDROGRAPHS AT !RR6
4229          KM   TAREA=11.67(!RR5)+0.24(182)+0.28(184A)=12.19
4230          HC       3   12.19

4231          KK    RRR6
4232          KM   ROUTE FLOW FROM !RR6 TO !RR7
4233          RS       5               -1.0       0.0
4234          RC   0.035    0.035    0.035     4000  0.0015
4235          RX       0       10       20       36       86      102      110      120
4236          RY    1114     1114     1114     1110     1110     1114     1114     1114
              *

4237          KK    197A
4238          KM   BASIN 197A
4239          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4240          KM    L=       1.1  Lca=        .7   S=    19.6  Kn= .120  LAG=  88.0
4241          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4242          BA     .36
4243          LG     .48      .01     4.66      .53     3.00
4244          UI     14.      14.      14.      14.      44.      51.      60.      66.      74.      79.
4245          UI     85.      93.     103.     112.     131.     156.     181.     166.     144.     130.
4246          UI    119.     111.     102.      91.      84.      76.      69.      64.      54.      42.
4247          UI     33.      24.      24.      23.      23.      17.      14.      14.      14.       8.
4248          UI      4.       4.       4.       4.       4.       4.       4.       4.       4.       4.
4249          UI      4.       4.       0.       0.       0.       0.       0.       0.       0.       0.
4250          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
              *

4251          KK   DR196
4252          KM   RETURN FLOW FROM CP1968
```

D64D74

```
4253          DR   D196B

4254          KK   R196B
4255          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY
4256          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4257          RS       2              -1       0
4258          RC   0.025   0.025   0.025    2050   0.003
4259          RX    1500    1501    1588    1600    1612    1630    1699    1700
4260          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
```

073A74


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4261          KK    !RR7
4262          KM   COMBINE HYDROGRAPHS AT !RR7
4263          KM   TAREA=12.19(!RR6)+0.50(197A)+0.52(CP196B)=13.21
4264          KO                                      21
4265          HC       3   13.21
              *
              * ADD AN ON-LINE DETENTION BASIN TO ATTENUATE FLOW
              *

4266          KK   SRRR7
4267          KM   STORAGE ROUTE
4268          KM   BASIN BOT=1073', TOP=1082', SURFACE AREA 10AC
4269          KM   OUTLET PIPE 36", INV=1073', WEIR 30' WIDE AT 1077'
4270          KO                                      21
4271          RS       1    STOR       0       0
4272          SV       0     0.5     4.2    12.7    23.7      36      49      62      75      89
4273          SQ       0       5      20      35      50     152     325     500     550     620
4274          SE    1073    1074    1075    1076    1077    1078    1079    1080    1081    1082
              * KM OUTLET CULVERT 10'X6', INV=1073'
              * RS      1    STOR       0       0
              * SV      0       3       7      12      18      25      33      42      52
              * SQ      0      30      80     150     230     320     410     500     550       6
              * SE   1073    1074    1075    1076    1077    1078    1079    1080    1081      10
              *
              * END OF ON-LINE BASIN
              *

4275          KK    197C
4276          KM   RUNOFF HYDROGRAPH FROM SUB-BASIN 197C (PART OF FORMER SUB-BASIN 197)
4277          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4278          KM   L=      1.2  Lca=       .6   S=   16.9  Kn= .120  LAG=  88.8
4279          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4280          BA     .14
4281          LG     .50     .00    4.66     .53     .00
4282          UI      8.      8.      8.      8.     26.     31.     36.     40.     45.     48.
4283          UI     51.     56.     62.     67.     78.     94.    108.    103.     90.     80.
4284          UI     74.     68.     63.     57.     52.     48.     43.     40.     34.     27.
4285          UI     22.     15.     15.     14.     14.     12.      8.      8.      8.      7.
4286          UI      3.      3.      3.      3.      3.      3.      3.      3.      3.      3.
4287          UI      3.      3.      3.      0.      0.      0.      0.      0.      0.      0.
4288          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4289          KK    2RR7
4290          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4291          HC       2   13.35
              *

4292          KK    RRR7
4293          KM   ROUTE FLOW FROM !RR7 TO !RR8
4294          RS       1              -1.0     0.0
4295          RC   0.013   0.013   0.013    1500  0.0013
4296          RX       0      10      20      28      43      51      60      70
4297          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4298          KK   DR202
4299          KM  RETRIEVE FLOW FROM CP197
4300          DR   DI202

4301          KK    R197
4302          KM   CHANNEL ROUTING WESTWARD ALONG S. SIDE OF NORTHERN PKWY
4303          KM   CHANNEL GEOMETRY WERE TAKEN FROM NORTHERN PKWY HEC-1
4304          KM   ROUTING FROM !!197 TO !RR8
4305          KM   24-FOOT BOTTOM WIDTH, 4:1 BS, 6:1 FS, 3' FLOW DEPTH
4306          KM   EARTHEN CHANNEL (UNLINED)
4307          RS       1              -1       0
4308          RC   0.025   0.025   0.025    1300   0.003
4309          RX    1500    1501    1588    1600    1624    1642    1697    1700
4310          RY    1096    1095    1094    1091    1091    1094    1095    1096
              *

4311          KK    !RR8
4312          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4313          HC       2   15.10

4314          KK    RRR8
4315          KM   ROUTE FLOW FROM !RR8 TO !!C202A
4316          RS       1              -1.0     0.0
4317          RC   0.013   0.013   0.013    2300  0.0013
4318          RX       0      10      20      28      43      51      60      70
4319          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
```

Job No.	79902	No.	

Computation

Project	Loop 303 / White Tanks ADMPU AHA	Location: Northern & Dysart (D74)	Computed	AHM	Date 10/23/2008
Subject	Weir Flow Analysis		Checked	AP	Date 3/10/09
Task	Weir Calculations		Sheet	1	Of x

Segment	Start Elevation (ft amsl)	End Elevation (ft amsl)	Length L(ft)	Crest Ave Elevation (ft)	Start Calc Elev Iter 1	Iter 1 H (ft)	Q1 (cfs)	Start Calc Elev Iter 2	Iter 2 H (ft)	Q2	Start Calc Elev Iter 3	Iter 3 H (ft)	Q3	Another iteration?	Start Calc Elev Iter 4	Iter 4 H (ft)	Q4	Another iteration?
south	1081	1080.7	275	1080.85	1079.5	0	0.00	1080	0	0.00	1080.5	0	0.00	CHECK	1081	0.15	47.93	DONE
south	1080.7	1080	560	1080.35	1079.5	0	0.00	1080	0	0.00	1080.5	0.15	97.60		1081	0.65	880.40	
south	1080	1079.1	710	1079.55	1079.5	0	0.00	1080	0.45	642.98	1080.5	0.95	1972.26		1081	1.45	3719.05	
south	1079.1	1078.8	740	1078.95	1079.5	0.55	905.52	1080	1.05	2388.56	1080.5	1.55	4284.01		1081	2.05	6516.04	
south	1078.8	1078.7	300	1078.75	1079.5	0.75	584.57	1080	1.25	1257.79	1080.5	1.75	2083.53		1081	2.25	3037.50	
southeast	1078.7	1078.7	40	1078.7	1079.5	0.8	85.87	1080	1.3	177.87	1080.5	1.8	289.79		1081	2.3	418.57	
east	1078.7	1079.5	220	1079.1	1079.5	0.4	166.97	1080	0.9	563.52	1080.5	1.4	1093.29		1081	1.9	1728.52	
east	1079.5	1080.3	640	1079.9	1079.5	0	0.00	1080	0.1	60.72	1080.5	0.6	892.34		1081	1.1	2215.08	
east	1080.3	1081.1	360	1080.7	1079.5	0	0.00	1080	0	0.00	1080.5	0	0.00		1081	0.3	177.46	
						TOTALS:	1742.92			5091.43			10712.82				18740.55	

Graph Computations:

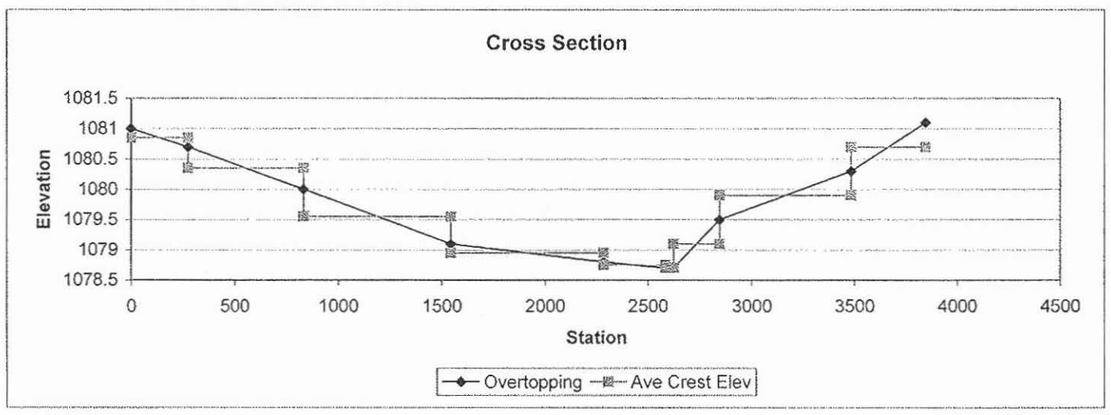
Station	Elevation
0	1081
275	1080.7
835	1080
1545	1079.1
2285	1078.8
2585	1078.7
2625	1078.7
2845	1079.5
3485	1080.3
3845	1081.1

Weir Approximation:

Station	Elevation
0	1080.85
275	1080.85
275	1080.35
835	1080.35
835	1079.55
1545	1079.55
1545	1078.95
2285	1078.95
2285	1078.75
2585	1078.75
2585	1078.7
2625	1078.7
2625	1079.1
2845	1079.1
2845	1079.9
3485	1079.9
3485	1080.7
3845	1080.7

Culvert Flows (cfs):

south	0
southeast	0
east	0



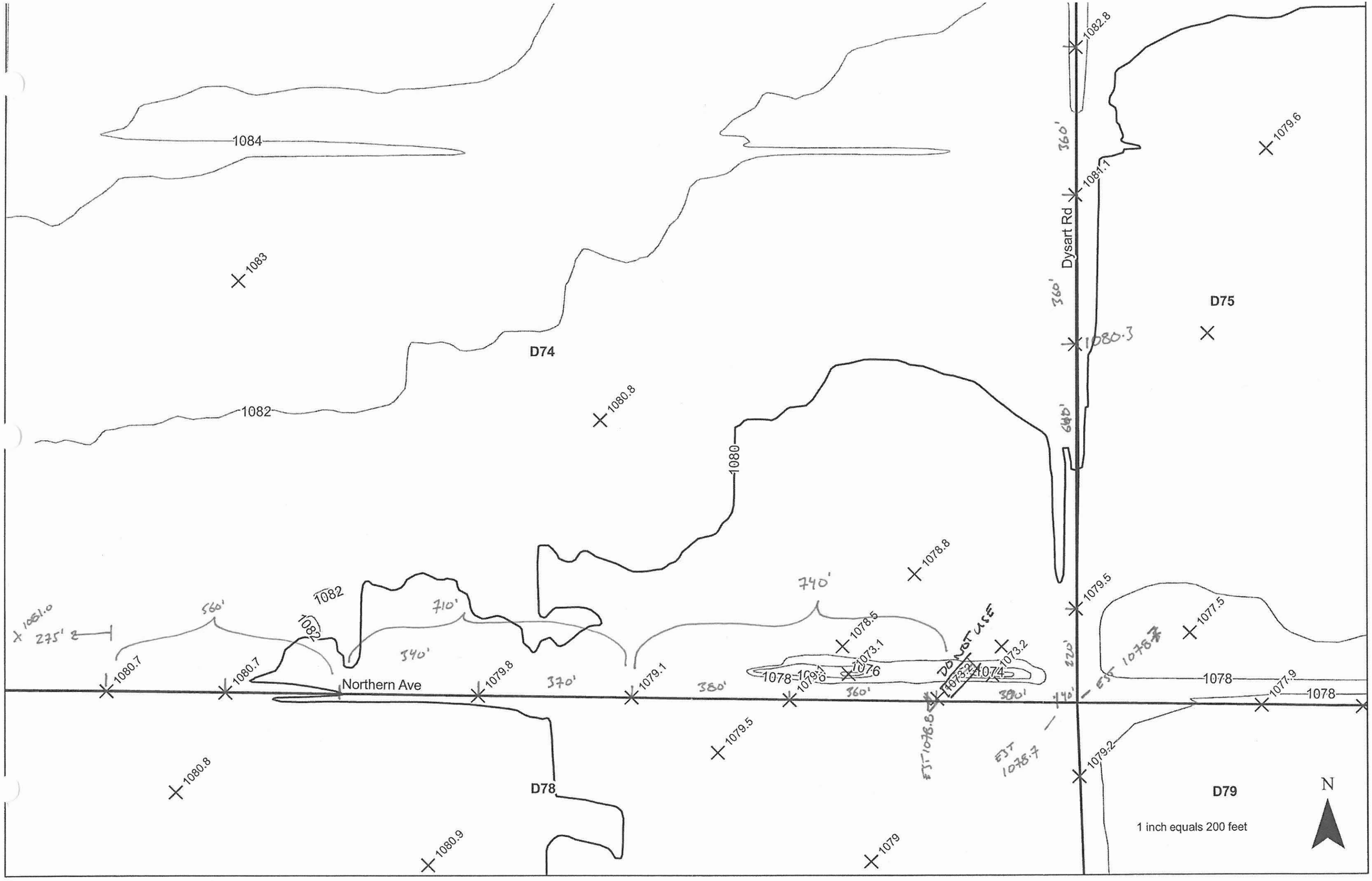
Iteration Iter 1			Iteration Iter 2			Iteration Iter 3			Iteration Iter 4		
Q(south)	1490.08	85%	Q(south)	4289.33	84%	Q(south)	8437.40	79%	Q(south)	14200.91	76%
Q(southeast)	85.87	5%	Q(southeast)	177.87	3%	Q(southeast)	289.79	3%	Q(southeast)	418.57	2%
Q(east)	166.97	10%	Q(east)	624.23	12%	Q(east)	1985.63	19%	Q(east)	4121.07	22%
	1742.92			5091.43			10712.82			18740.55	

First DI	East to South			
Inflow	1742.92	5091.43	10712.82	18740.55
Outflow	1490.08	4289.33	8437.40	14200.91

Assumes diversion is to south

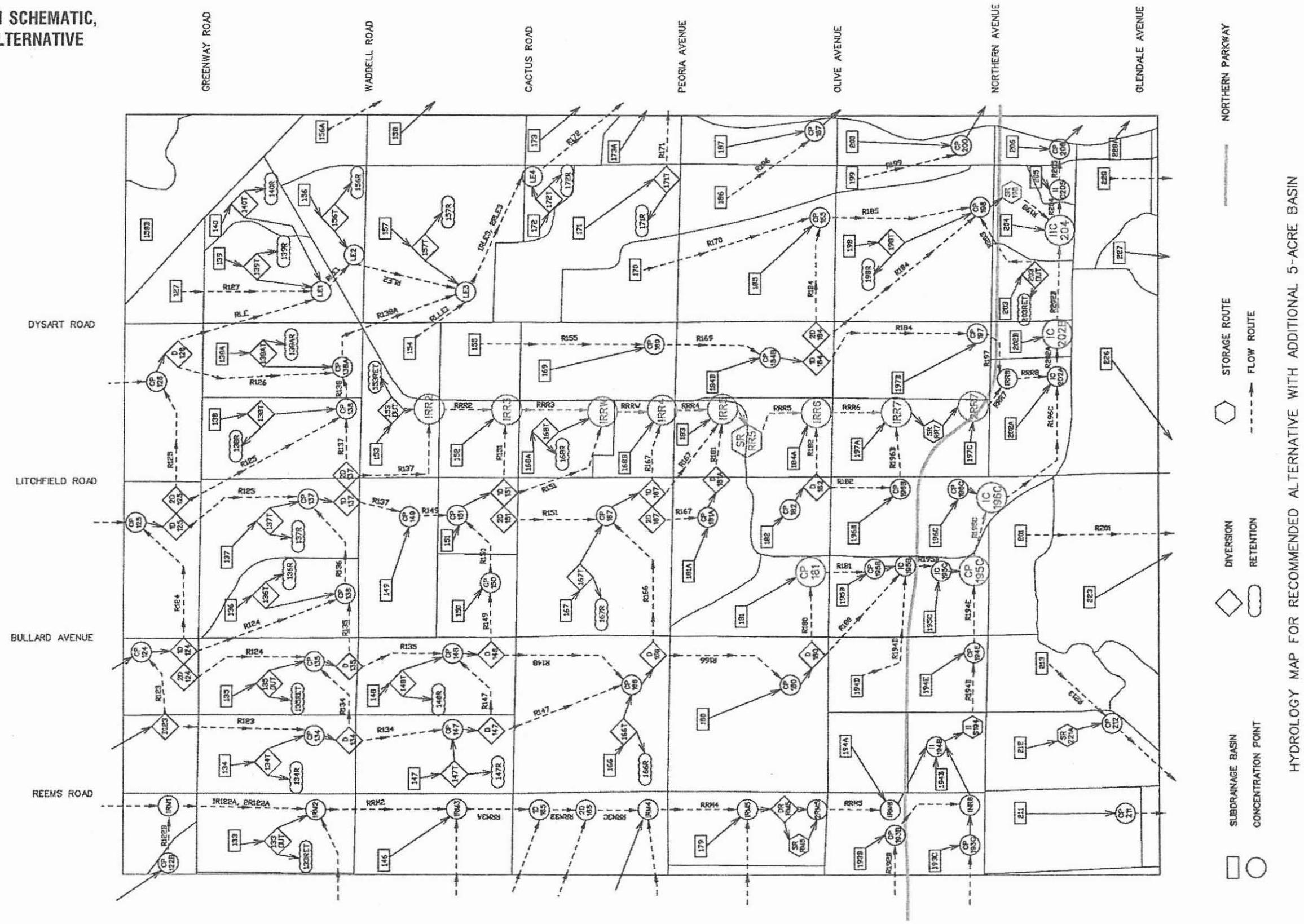
Second DI	East to Southeast			
Inflow	252.83	802.10	2275.42	4539.64
Outflow	85.87	177.87	289.79	418.57

Assumes diversion is to southeast

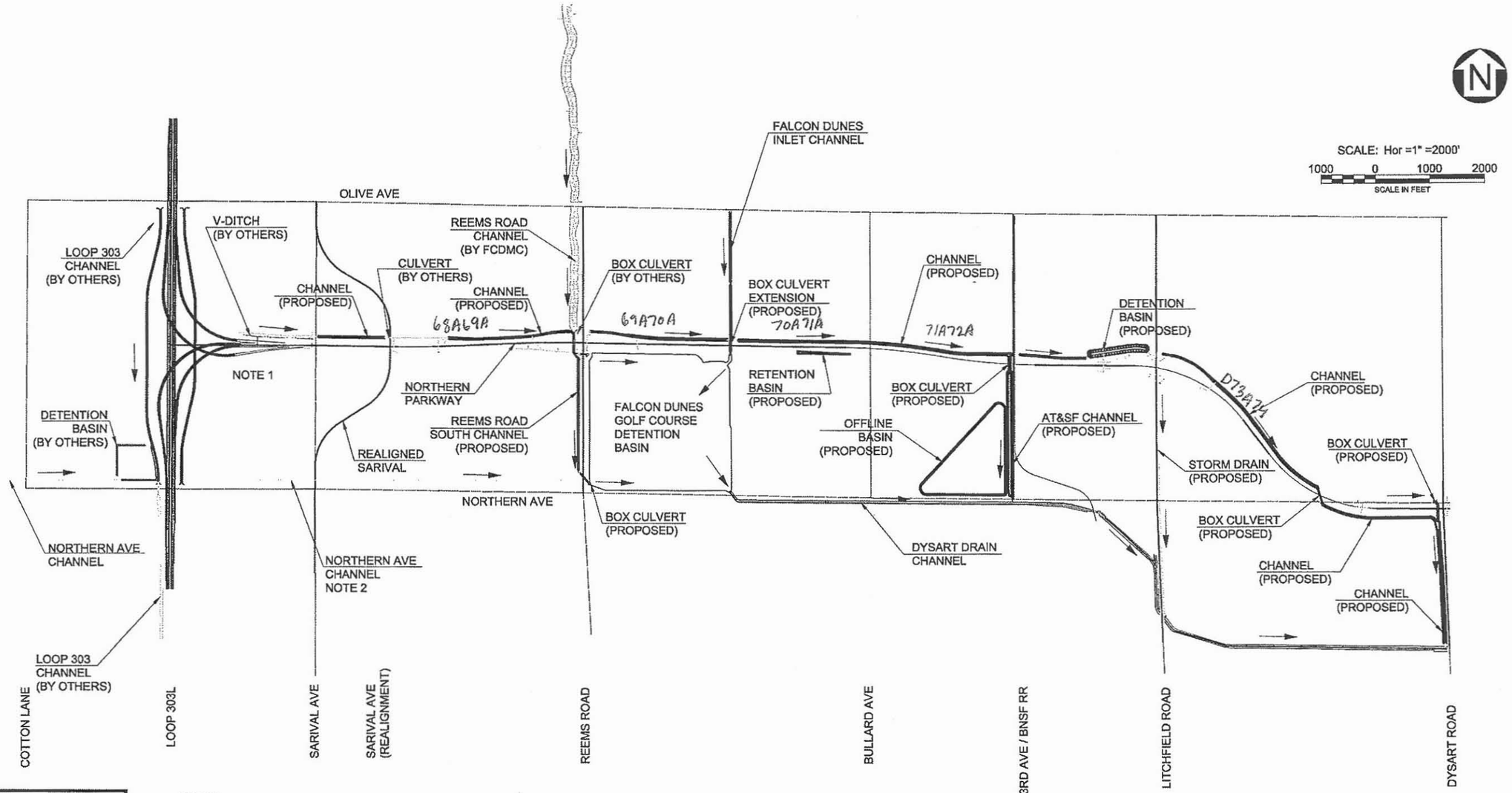

1084
1083
D74
1082
1080.8
1080
1082.8
360'
1081.1
Dysart Rd
360'
1079.6
D75
1080.3
640'
1078.8
740'
1079.5
1077.5
1081.0
275'
560'
1082
1082
710'
340'
Northern Ave
1080.7
1080.7
1079.8
370'
1079.1
380'
1078.5
1073.1
1078
1079.1
1076
360'
DO NOT USE
1073.2
1074
380'
740'
220'
EST 1078.7
1078
1077.9
1078
EST 1078.8
EST 1078.7
1079.5
1079.2
1080.8
D78
1080.9
1079
D79
N
1 inch equals 200 feet

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



HYDROLOGY MAP FOR RECOMMENDED ALTERNATIVE WITH ADDITIONAL 5-ACRE BASIN



SEE FIGURE 5-2

LEGEND

- STORM DRAIN (PROPOSED) & FLOW DIRECTION
- CHANNEL & (PROPOSED) FLOW DIRECTION
- RETENTION / DETENTION BASIN

NOTES:

1) ALL LOOP 303 - NORTHERN PARKWAY TRAFFIC INTERCHANGE RUNOFF WILL BE ROUTED SOUTHWARD ALONG LOOP 303 DETENTION BASINS AND CHANNEL.
2) LOOP 303/WHITE TANKS ADMP CONCEPT - EAST OF LOOP 303, NORTHERN AVENUE CHANNEL NOT NEEDED.
3) ALL ITEMS SHOWN ARE EXISTING UNLESS STATED OTHERWISE.

FIGURE 5-1
PROPOSED NORTHERN PARKWAY DRAINAGE IMPROVEMENTS - WEST

Future

HDR | ONE COMPANY *Many Solutions*℠

Project:	Loop 303 ADMPU AHA	Computed:	AM	Date:	10/27/08
Subject:	Hydrology	Checked:	LP	Date:	3/10/09
Task:	Stage-Storage Table				
Job #:	79902				

SRD74

Elevation	Area (sq. ft.)	Volume (ac-ft)
1072	3520000	0.00
1074	3611520	163.72
1076	3703552	335.86
1078	3796096	516.50
1080	3889152	705.72
1082	3982720	903.57
1084	4076800	1110.13
1086	4171392	1325.47

Rating Table Report
SRD74

Range Data:

	Minimum	Maximum	Increment	
Allowable HW E	1,072.00	1,086.00	2.00	ft

HW Elev. (ft)	Discharge (cfs)
1,072.00	0.00
1,074.00	31.91
1,076.00	152.23
1,078.00	321.85
1,080.00	530.84
1,082.00	692.26
1,084.00	841.74
1,086.00	2,679.95

Culvert Analysis Report
Culvert-1

Culvert Summary			
Computed Headwater Elev	1,075.25 ft	Discharge	100.01 cfs
Inlet Control HW Elev.	1,075.21 ft	Tailwater Elevation	986.00 ft
Outlet Control HW Elev.	1,075.25 ft	Control Type	Entrance Control
Headwater Depth/Height	0.39		

Grades			
Upstream Invert	1,072.91 ft	Downstream Invert	1,071.69 ft
Length	370.00 ft	Constructed Slope	0.003297 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.42 ft
Slope Type	Steep	Normal Depth	1.42 ft
Flow Regime	Supercritical	Critical Depth	1.46 ft
Velocity Downstream	7.03 ft/s	Critical Slope	0.003055 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	10.00 ft
Section Size	10 x 6 ft	Rise	6.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	1,075.25 ft	Upstream Velocity Head	0.73 ft
Ke	0.20	Entrance Loss	0.15 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,075.21 ft	Flow Control	Unsubmerged
Inlet Type	90° headwall w 45° bevels	Area Full	60.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

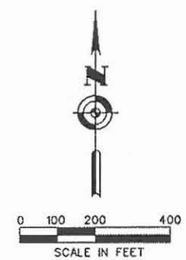
Culvert Analysis Report
Weir

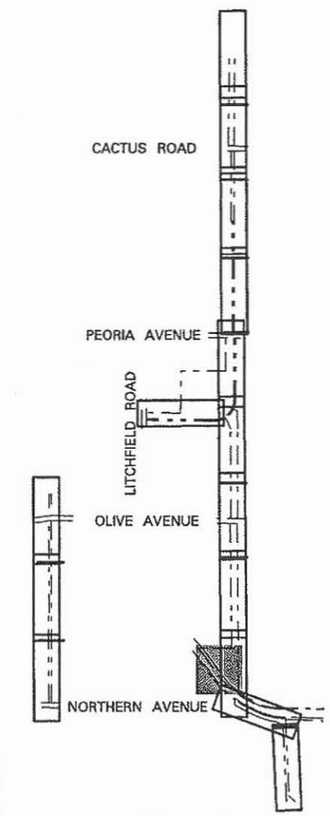
Hydraulic Component(s): Roadway (Constant Elevation)

Discharge	0.00	cfs	Allowable HW Elevation	1,075.25	ft
Roadway Width	200.00	ft	Overtopping Coefficient	2.90	US
Length	200.00	ft	Crest Elevation	1,084.00	ft
Headwater Elevation	N/A	ft	Discharge Coefficient (Cr)	2.90	
Submergence Factor (Kt)	1.00				

Sta (ft)	Elev. (ft)
0.00	1,084.00
200.00	1,084.00

SRD74





KEY MAP

NO.	REVISION	BY	DATE
2			
1			

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Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

PRELIMINARY
NOT FOR
CONSTRUCTION

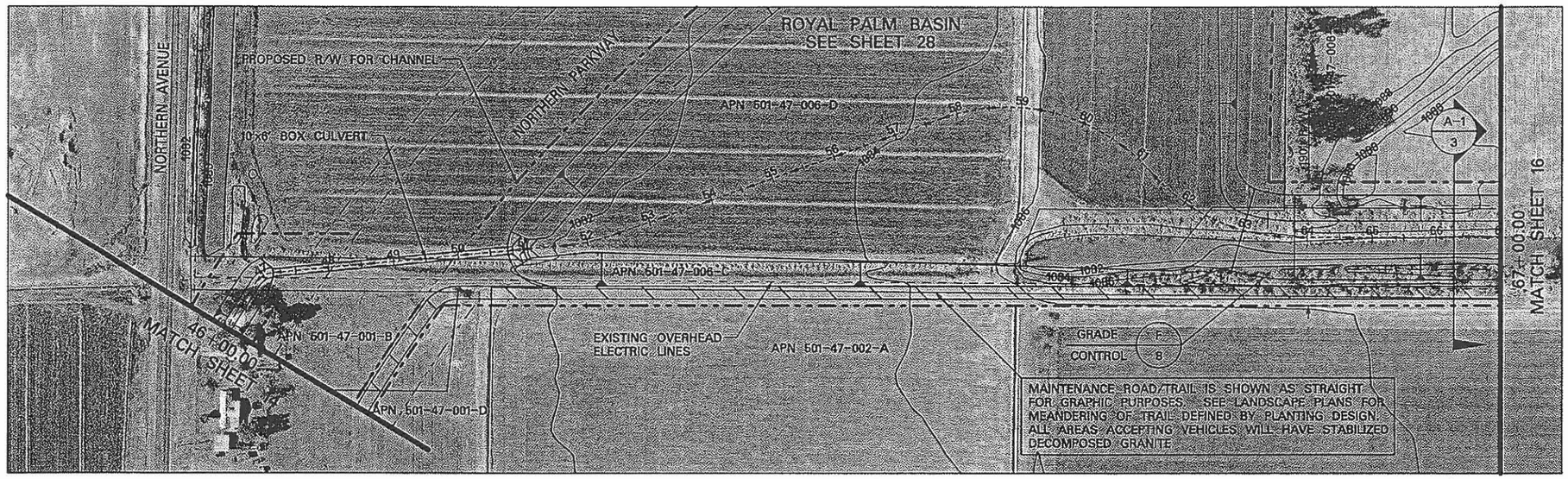
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
19690
PAUL W.R. HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/09

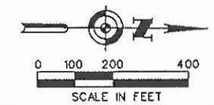
	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

ROYAL PALM BASIN

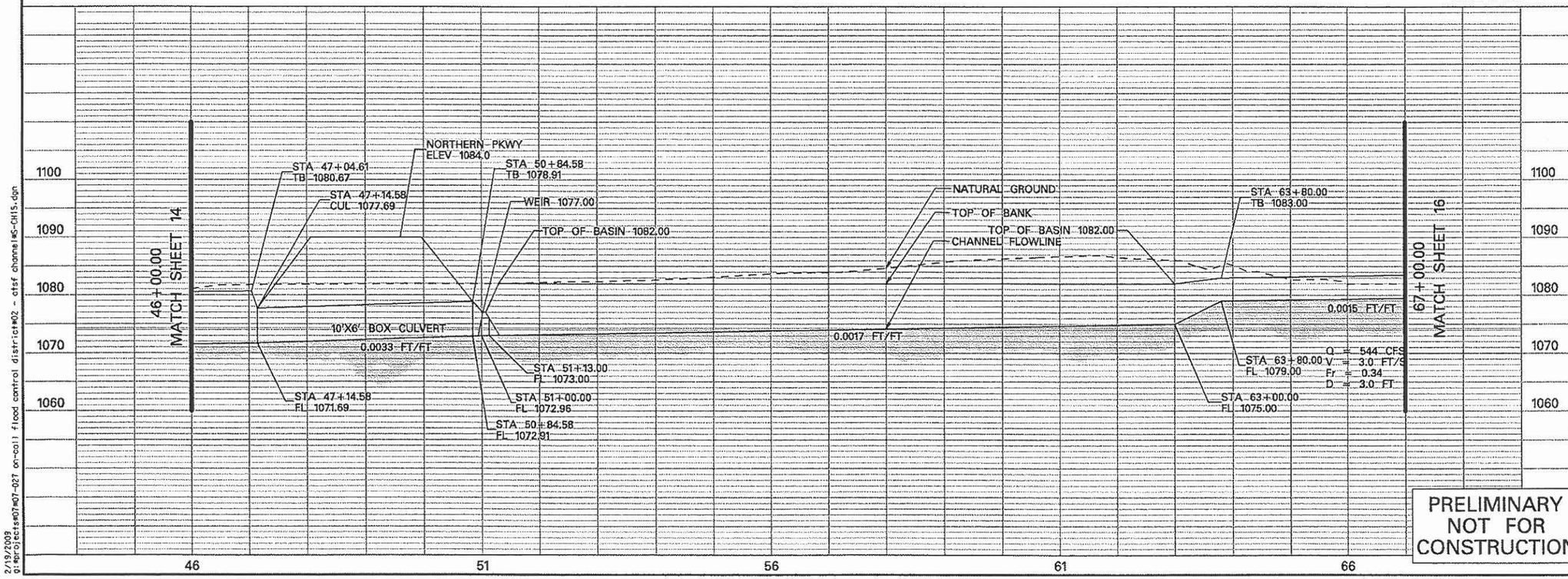
SHEET 28 OF 44

2/19/2009
G:\projects\07\07-027 on-call flood control district\02 - atsf channel\5-Ch28.dgn

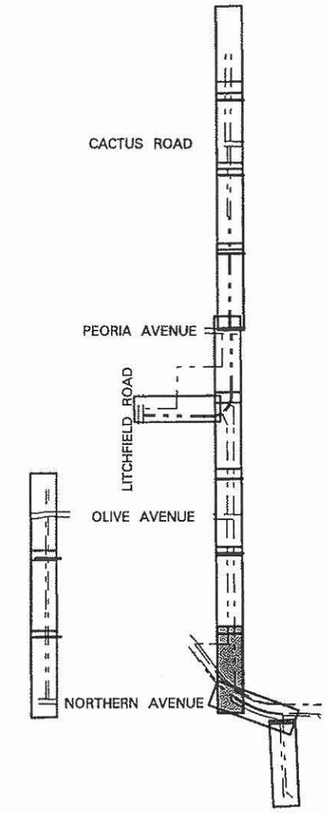




BNSF RAILROAD PRIMARY CHANNEL



PRELIMINARY
NOT FOR
CONSTRUCTION



KEY MAP

NO.	REVISION	BY	DATE
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/09

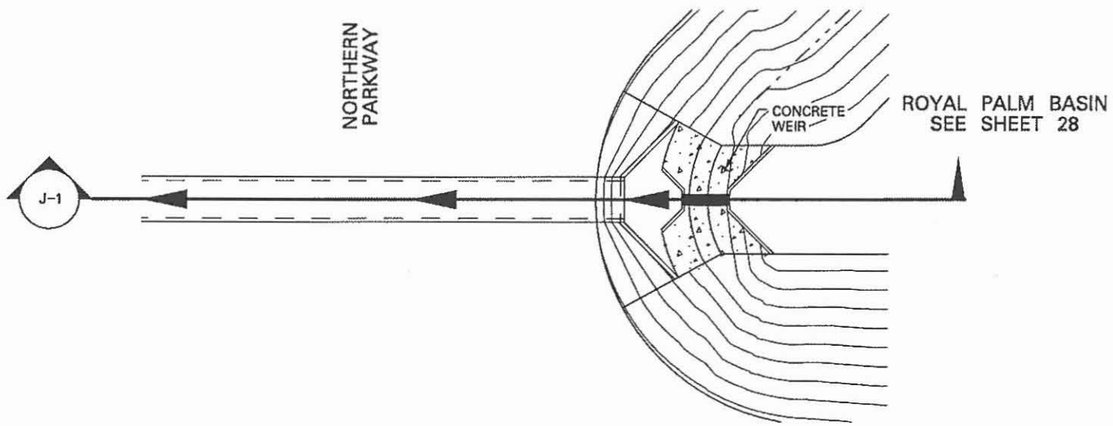
	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

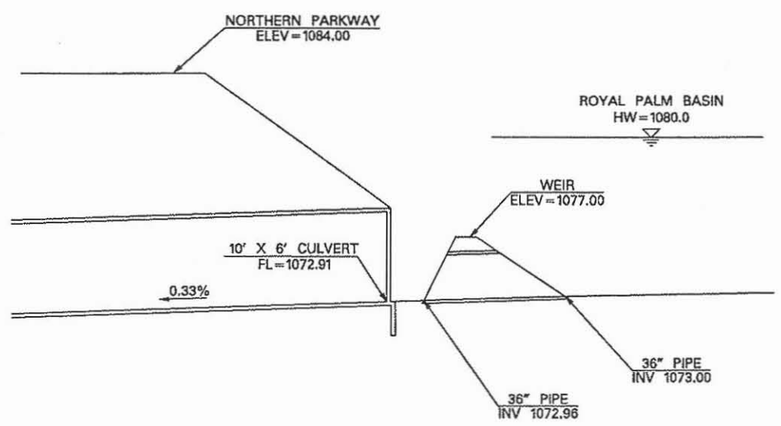
SHEET 15 OF 44

2/19/2009
g:\projects\#07\07-027 on-call flood control district\#02 - atsf channel\05-CH15.dgn

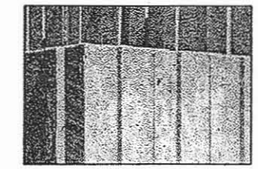
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



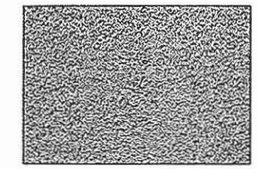
J / 28 ROYAL PALM BASIN OUTLET STRUCTURE DETAIL
HORIZONTAL SCALE 1"=20'/1"=40'
VERTICAL SCALE 1"=5'/1"=10'



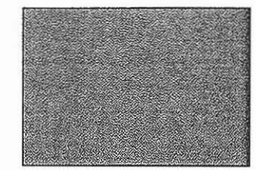
J-1 SECTION
HORIZONTAL SCALE 1"=20'/1"=40'
VERTICAL SCALE 1"=5'/1"=10'



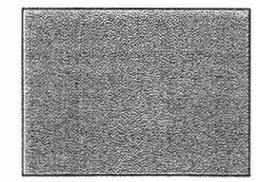
FORM



CONCRETE TEXTURE



MESA BUFF FRONT



SANDSTONE FRONT

NO.	REVISION	BY	DATE
2			
1			

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN Date Signed ARIZONA, U.S.A.
EXPIRES 3/31/09

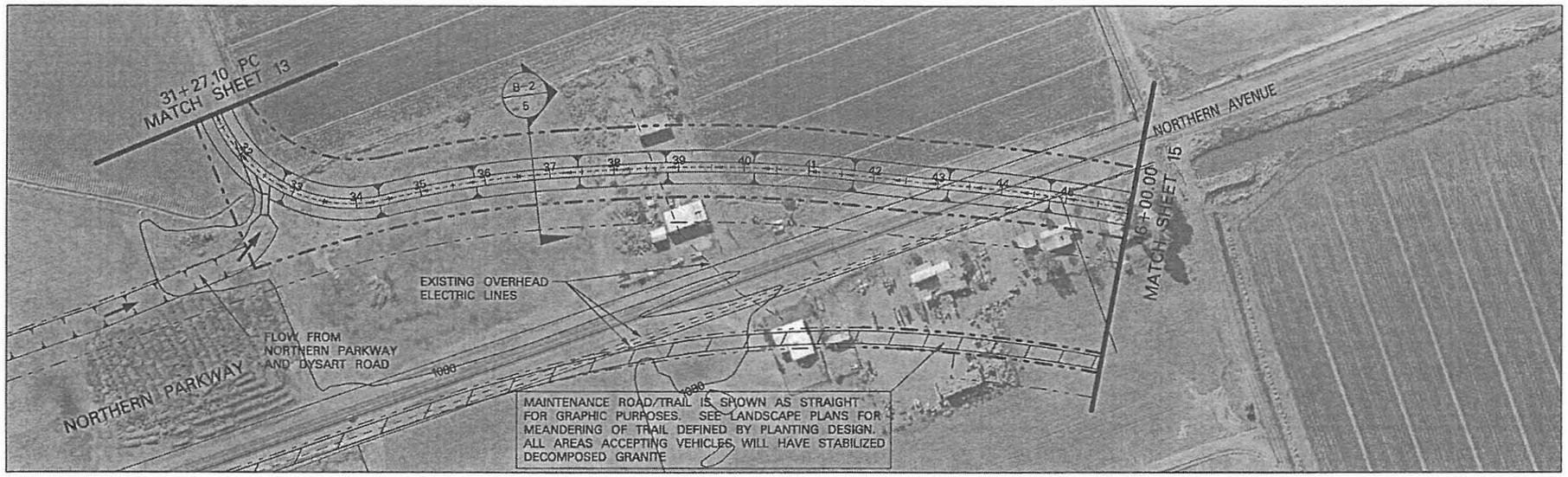
DETAILS

SHEET 12 OF 44

PRELIMINARY NOT FOR CONSTRUCTION

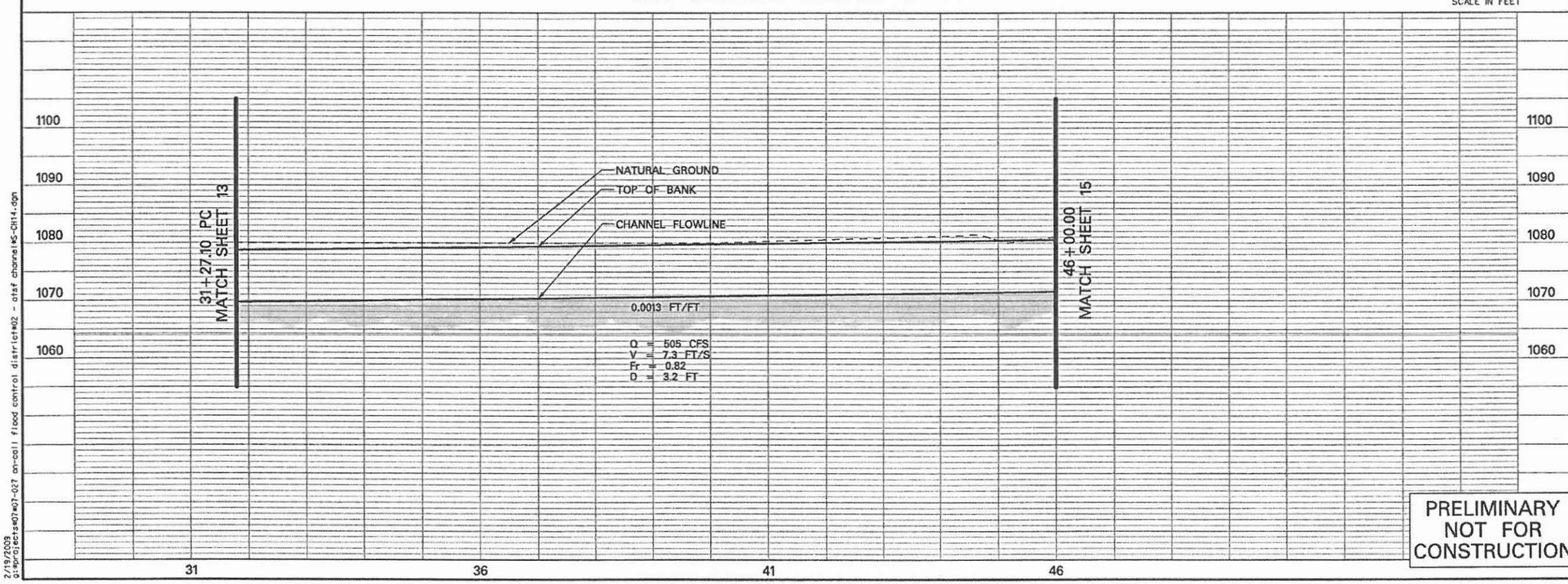
2/19/2009
g:\projects\#07\07-027 on-call flood control district\02 - atsf channel\S-CH12.dgn

D7474A

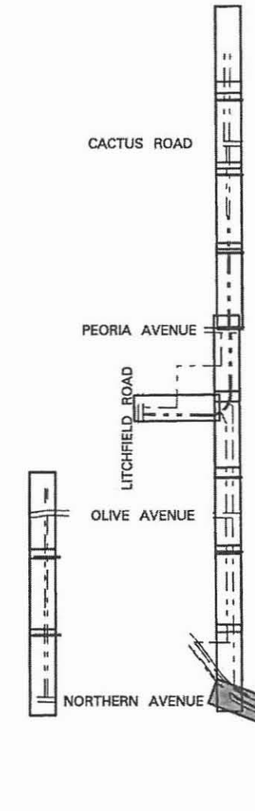


BNSF RAILROAD PRIMARY CHANNEL

0 100 200 400
SCALE IN FEET



PRELIMINARY
NOT FOR
CONSTRUCTION



KEY MAP

NO.	REVISION	BY	DATE
2			
1			

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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 19690
PAUL W.R. HOSKIN
Date Signed
ARIZONA, U.S.A.
EXPIRES 3/31/09

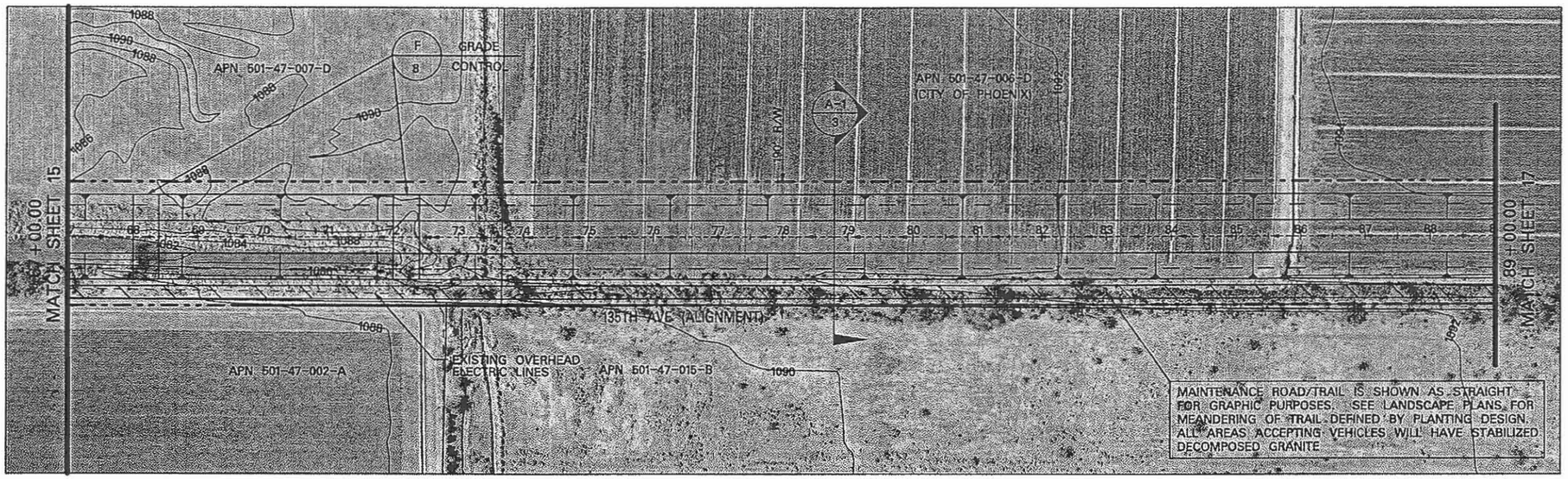
	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

SHEET 14 OF 44

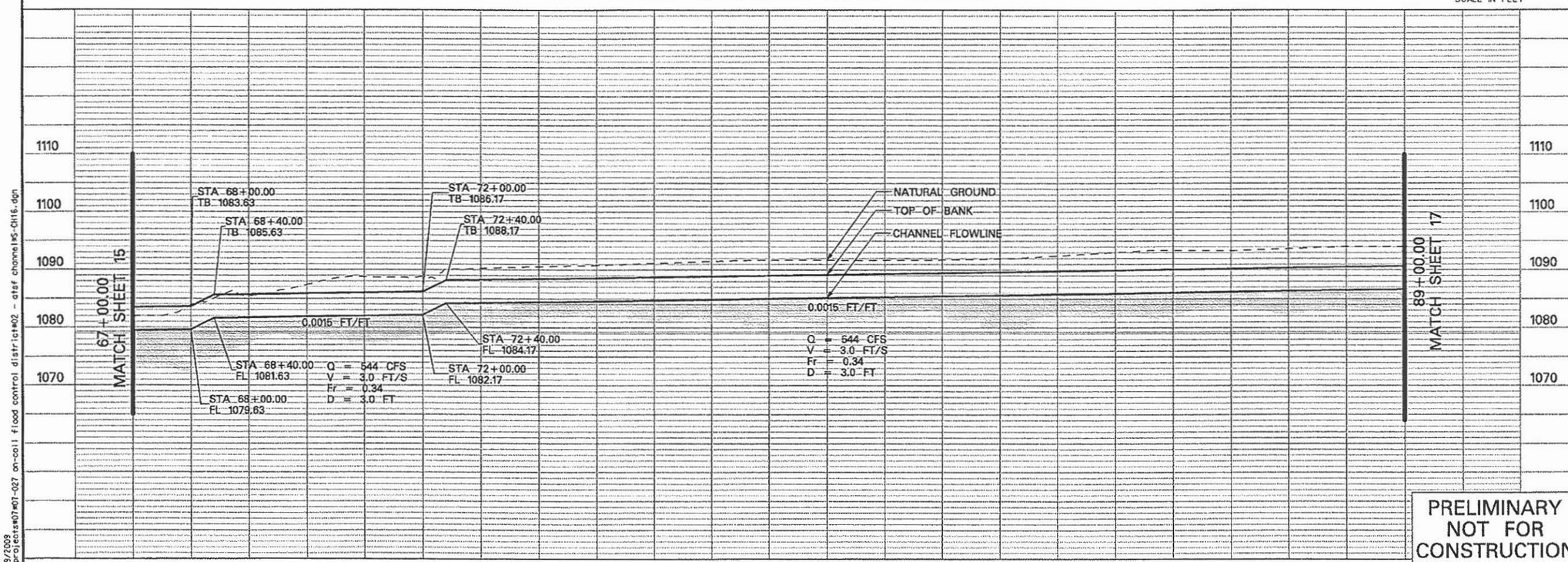
2/19/2009
g:\projects\07\07-027 on-call flood control district\02 - atsf channel\S-CH14.dgn

D64074



0 100 200 400
SCALE IN FEET

BNSF RAILROAD PRIMARY CHANNEL



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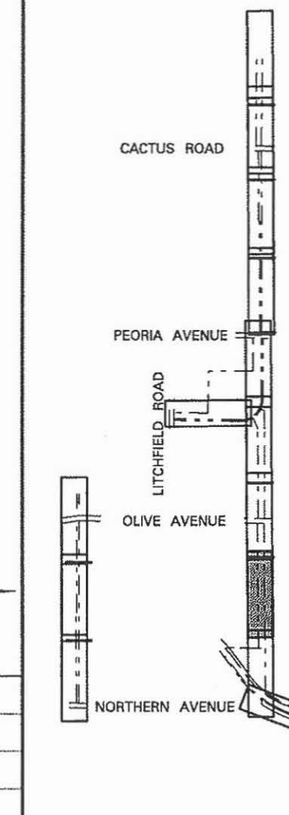

KEY MAP

NO.	REVISION	BY	DATE
2			
1			

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/09

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

SHEET 16 OF 44

2/19/2009
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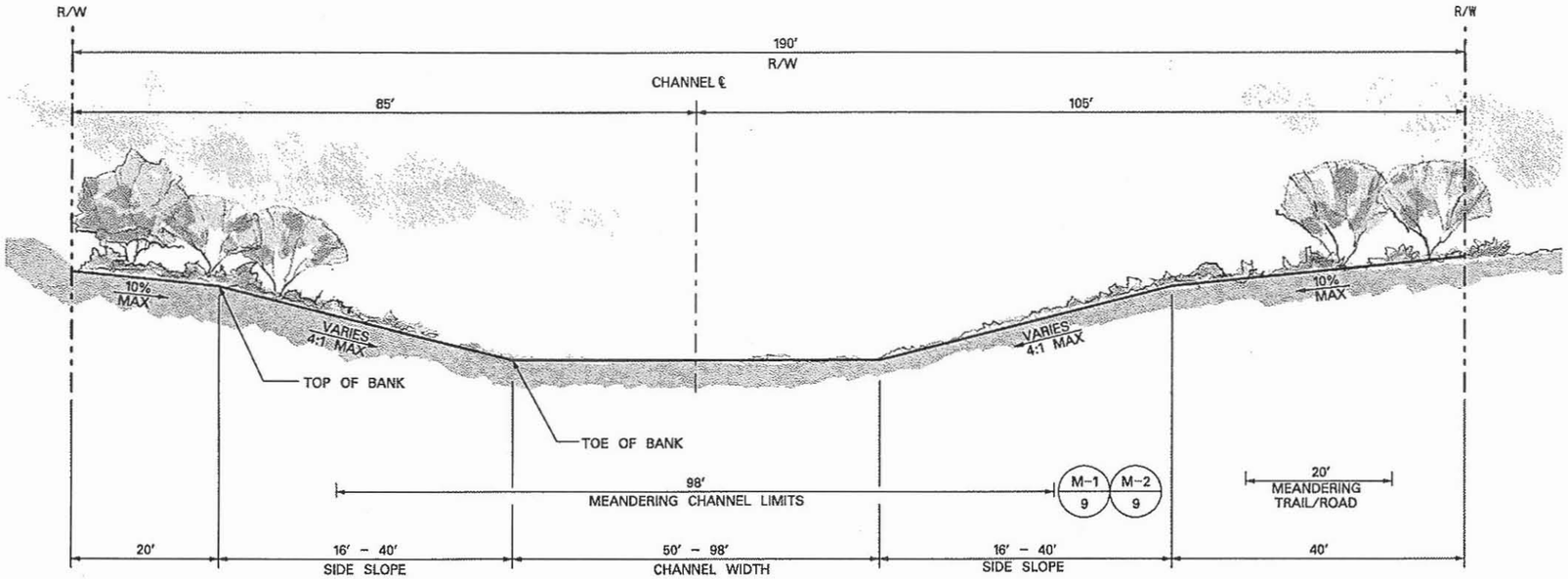
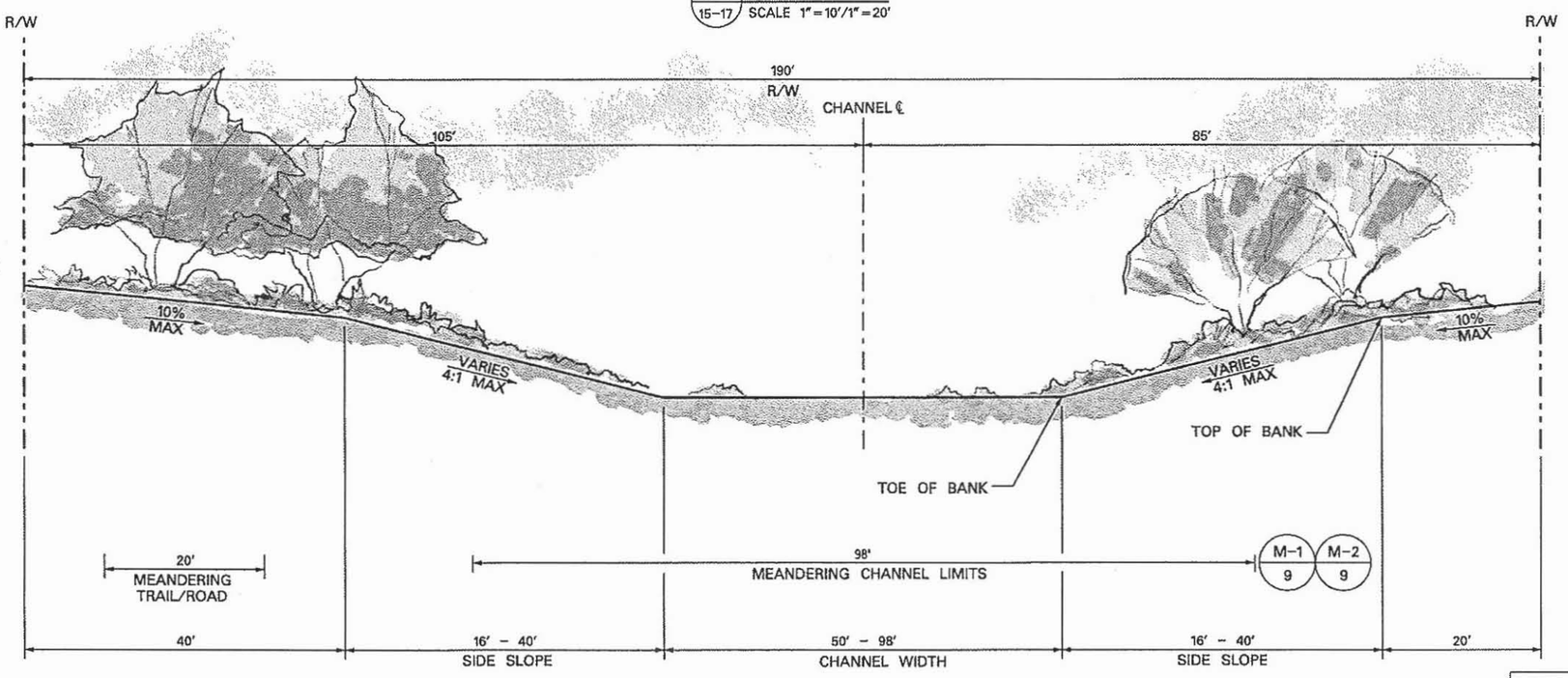


A-1 / 15-17 SECTION
SCALE 1"=10'/1"=20'



A-2 / 17-18 SECTION
SCALE 1"=10'/1"=20'

PRELIMINARY NOT FOR CONSTRUCTION

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN Date Signed 2/19/09 ARIZONA, U.S.A.
EXPIRES 3/31/09

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

SECTIONS

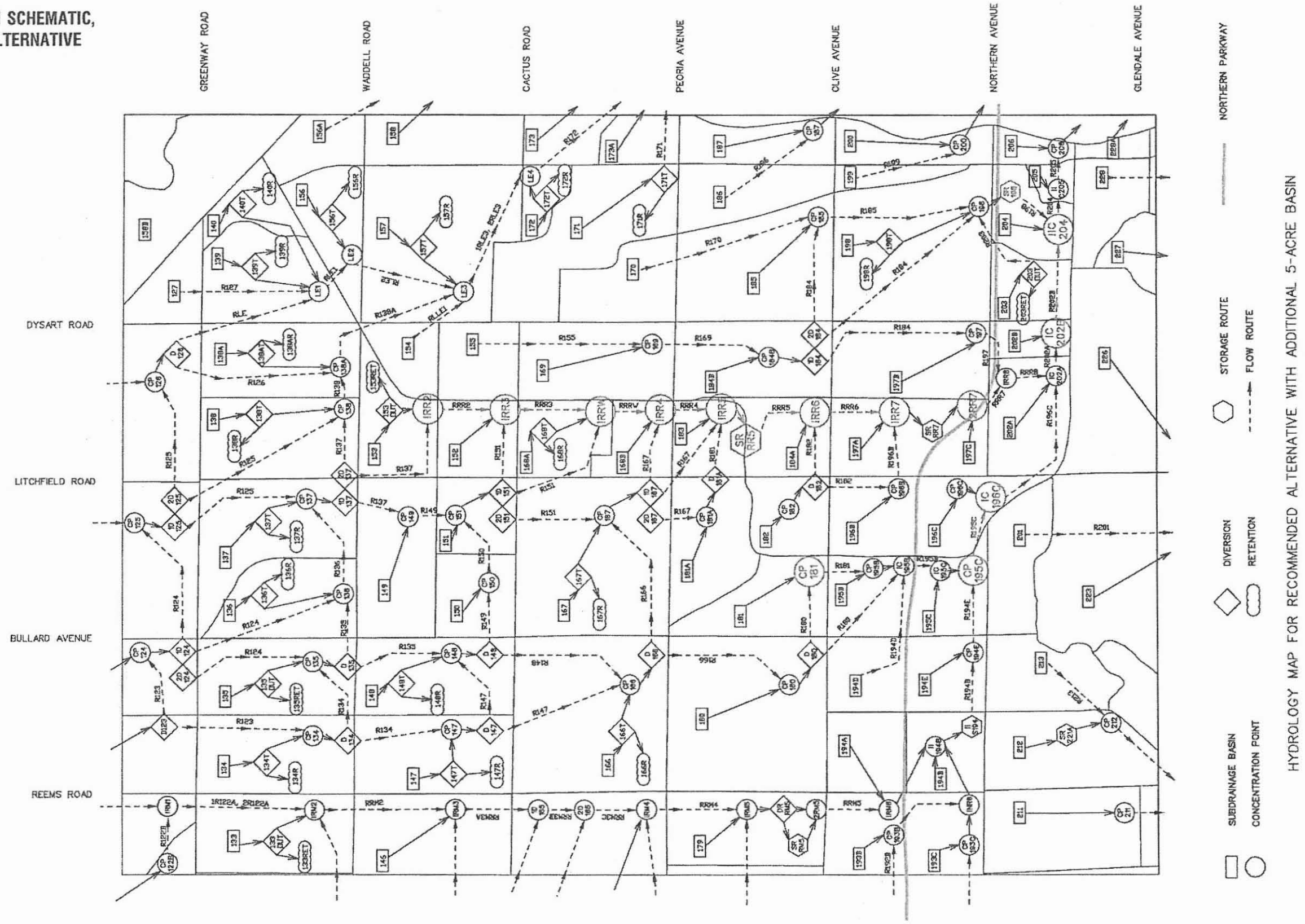
SHEET 3 OF 44

2/19/2009
g:\projects\07\07-027 on-call flood control district\02 - atsf channel\5-C103.dgn

D75

Basins D69 → D74, D37 – D40
D63, D64, D74, D75
FUTURE – CIP

FIGURE 11 – HEC-1 SCHEMATIC, RECOMMENDED ALTERNATIVE



D76

This Section Intentionally Left Blank

For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D77

This Section Intentionally Left Blank

For information on this sub-basin, reference the hydrology model
Loop 303/White Tanks ADMPU Area Hydrologic Analysis

D78

TRIAL VERSION of TIFFDLL

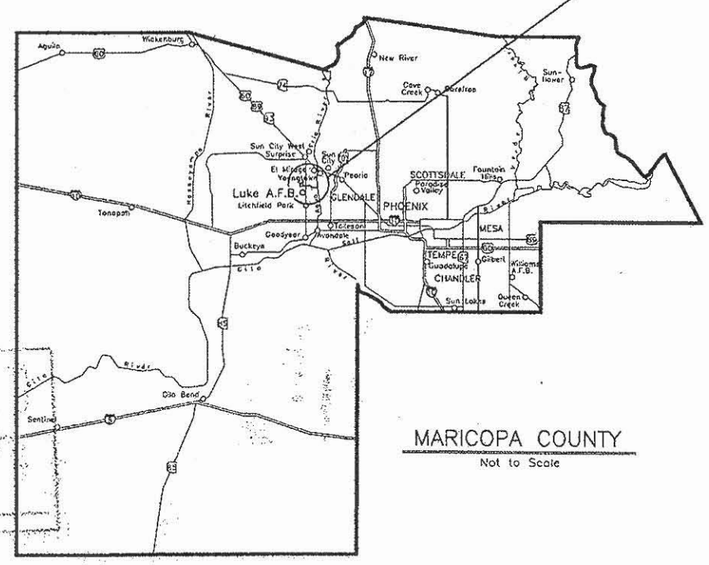
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PLANS FOR THE CONSTRUCTION OF:

DYSART DRAIN IMPROVEMENTS PROJECT
REEMS ROAD TO AGUA FRIA RIVER
CHANNEL IMPROVEMENTS

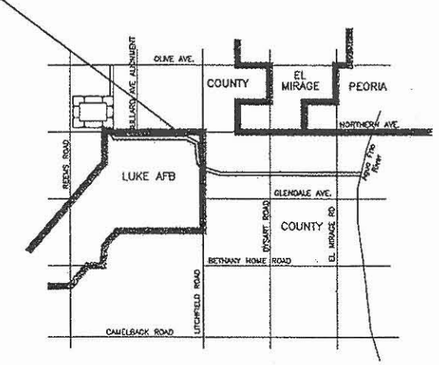
PROJECT NO. FCD 94-38
LAFB NO. 87-3002

PROJECT NO. FCD 94-38



MARICOPA COUNTY
Not to Scale

N



VICINITY MAP
Not to Scale

"AS BUILT DRAWINGS"

49

DYSART DRAIN IMPROVEMENTS
REEMS RD. TO AGUA FRIA
CHANNEL IMPROVEMENTS
AS BUILTS
FCD 94-38 470

\PB1-194.019\DWGS\PH-III\DD-G01.DWG VIEW = SITE 1=40

Two working days before you dig CALL FOR THE BLUE STAKES Blue Stake Center CALL COLLECT 263-1100

NBS/LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1599
(602) 468-1668 FAX 956-4538

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

CHIEF ENGINEER AND GENERAL MANAGER — DATE

BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT

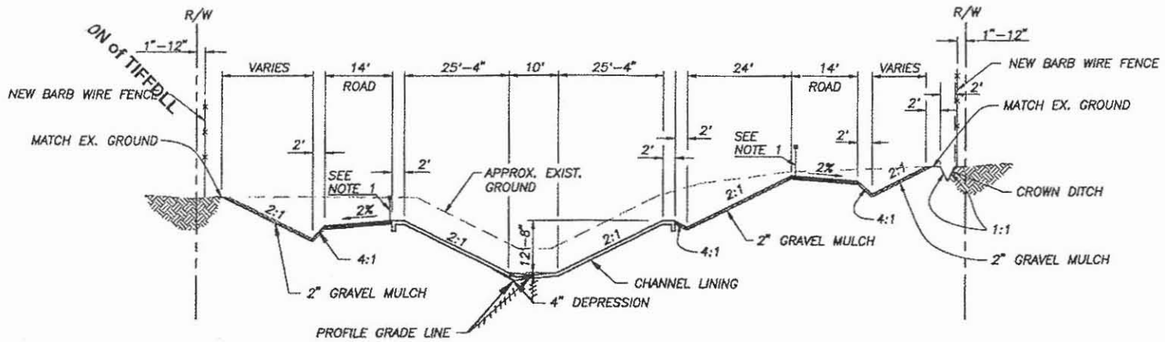
TOM RAWLES – CHAIRMAN

DISTRICT 1 TOM RAWLES
DISTRICT 2 DON STAPLEY
DISTRICT 3 BETSEY BAYLESS
DISTRICT 4 EDWARD KING
DISTRICT 5 MARY ROSE GARRIDO WILCOX

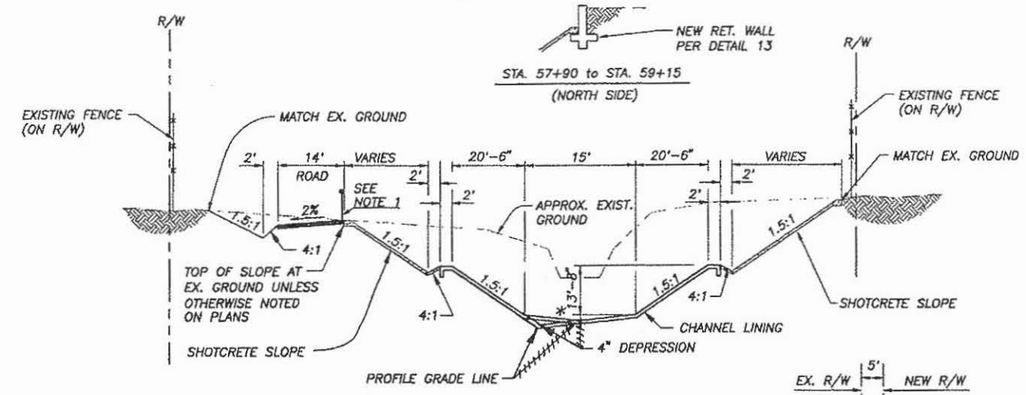
NBS/LOWRY PROJECT NO. PB1-194.019

SHEET G01/7

DTL DTZ DTE 079 D80

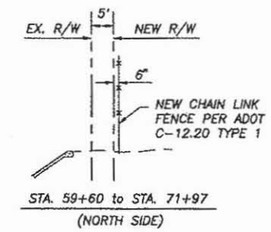


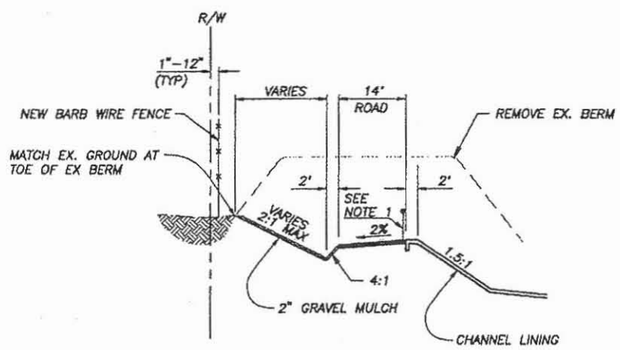
TYPICAL SECTION NO. 1
STA. 10+35.40 TO STA. 19+00
NO SCALE



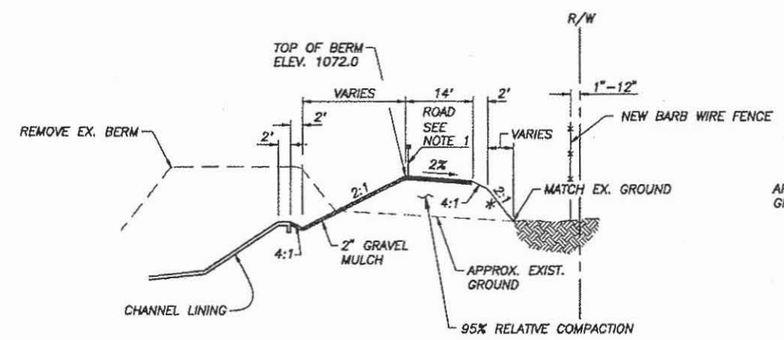
* TRANSITION TO 12'-8" FROM 71+30 TO 71+80

TYPICAL SECTION NO. 3
STA. 55+00 TO STA. 71+80
NO SCALE



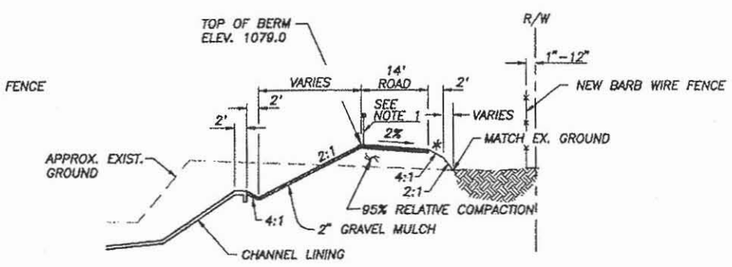


STA. 27+00 to STA. 37+00
(SOUTH SIDE)



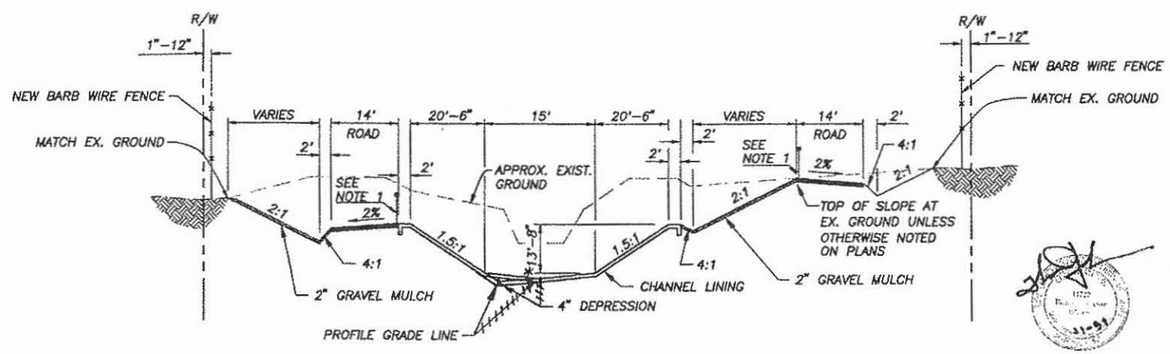
* SEE PLAN FOR RIPRAP PLACEMENT

STA. 28+30 to STA. 35+70
(NORTH SIDE)



* SEE PLAN FOR RIPRAP PLACEMENT

STA. 44+70 to STA. 48+70
(NORTH SIDE)



* 12'-8" - 22+00 TO 28+00
14'-8" - 19+50 TO 21+00
14'-8" - 29+00 TO 37+00

TYPICAL SECTION NO. 2
STA. 19+50 TO STA. 55+00
NO SCALE

"AS-BUILT DRAWING"
I HEREBY CERTIFY THAT THE "AS-BUILT DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NOTES:

1. NEW REFLECTOR PER DETAIL 25 PLACED AT 50 FOOT INTERVALS.

NO.	REVISION		DATE
3			
2			
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DYSART DRAIN IMPROVEMENT PROJECT
CHANNEL IMPROVEMENTS
TYPICAL SECTIONS
SECTIONS NO. 1 THROUGH NO. 3

	BY	DATE
DESIGNED	S. YINGLING	4/94
DRAWN	S. YINGLING	4/94
CHECKED	C. GOPPERTON	5/95

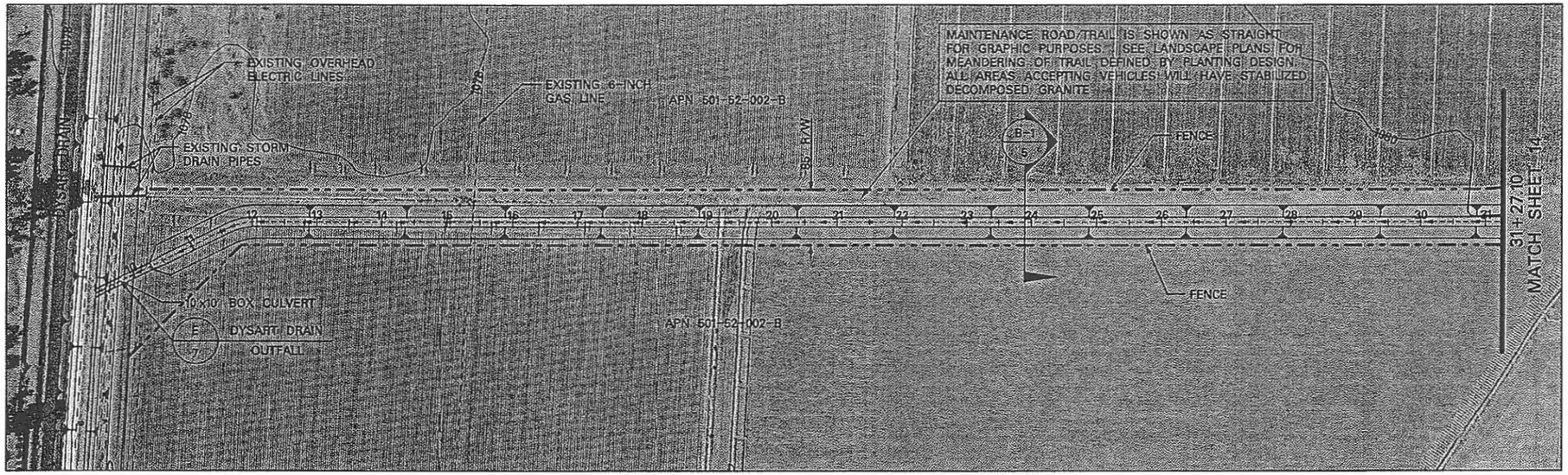
NBS LOWRY
ENGINEERS & PLANNERS

NBS/LOWRY PROJECT NO. P81-194-019
SHEET D01/16

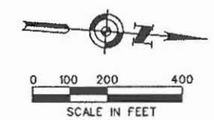
D79D80-D80
D78D79-D79

\P81-194.019\DWGS\PH-III\DD-001.DWG VIEW = SITE 1. = 20 MSPACE

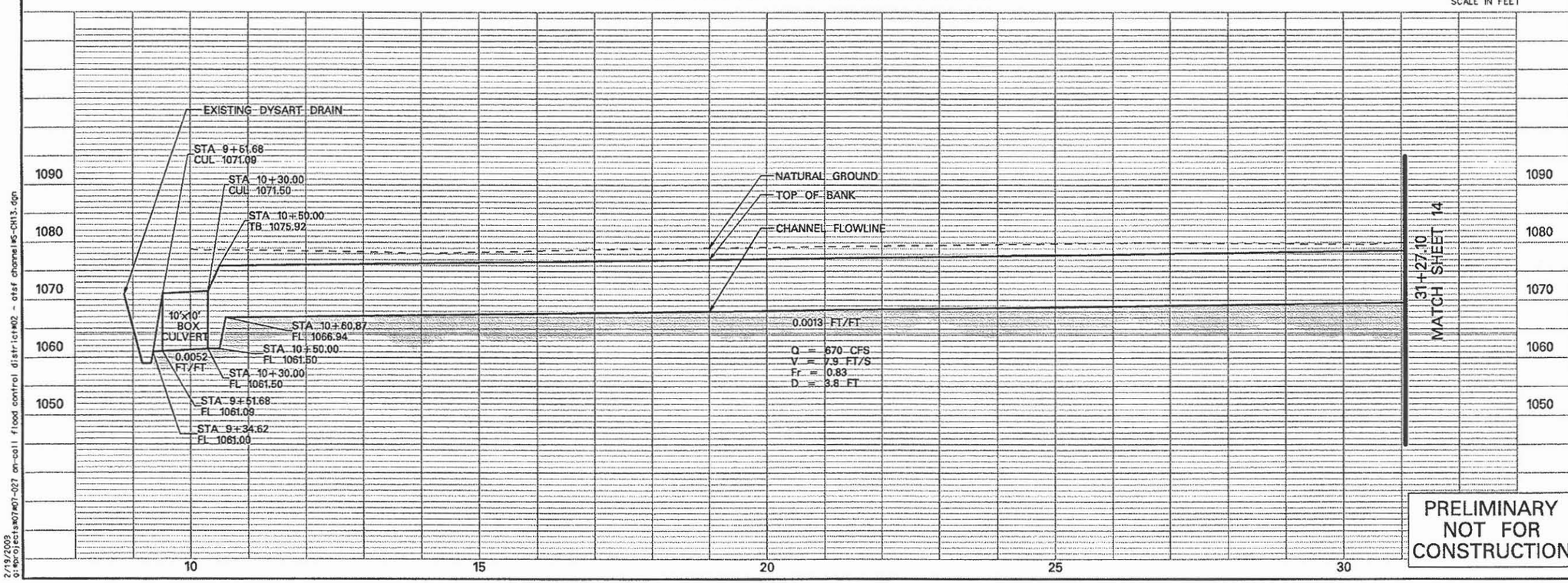
D74A78



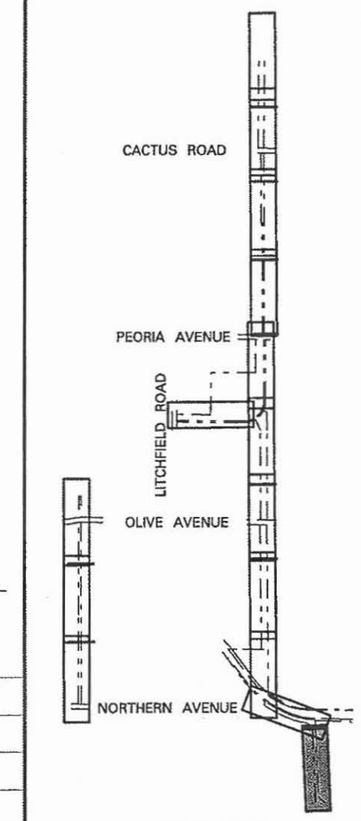
MATCH SHEET 14



BNSF RAILROAD PRIMARY CHANNEL



PRELIMINARY NOT FOR CONSTRUCTION



KEY MAP

NO.	REVISION	BY	DATE
2			
1			

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

AT&SF RAILROAD CHANNEL AND BASIN PRELIMINARY PLANS

CONTRACT FCD 2007 C016 (2)

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN Date Signed ARIZONA, U.S.A.
EXPIRES 3/31/09

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

PLAN AND PROFILE

SHEET 13 OF 44

2/19/2009
q:\projects\07\07-027 on-call flood control district\02 - atsf channel\5-CH13.dgn

CIP models

D78B

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1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN   1998            *
 *          VERSION 4.1              *
 *                                   *
 *   RUN DATE   06FEB09  TIME  14:20:20  *
 *                                   *
   *************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                          HEC-1 INPUT                                                    PAGE  1

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

         1          ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
         2          ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
         3          ID   PREPARED BY ASPEN CONSULTING ENGINEERS
         4          ID   MODIFICATIONS:
         5          ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
         6          ID   (2) SURPRISE WWTP WAS UPDATED
         7          ID   (3) NORTHERN PARKWAY WAS UPDATED
         8          ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
         9          ID
        10          ID  ***********************************************************************
        11          ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
        12          ID      NOTES:
        13          ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
        14          ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
        15          ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
        16          ID      AND R238.
                    * ***********************************************************************
                    * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                    * ***********************************************************************
        17          ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
        18          ID
        19          ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
        20          ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
        21          ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
        22          ID         LUKE AIR FORCE BASE CRASH ZONE AREA
        23          ID
        24          ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
        25          ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
        26          ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
        27          ID         TANKS/AGUA FRIA ADMS, Date: October 1991
        28          ID
        29          ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
        30          ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
        31          ID
        32          ID                                       REVISED BY URS     DATE: 01-14-04
        33          ID                                                          FILE: L33PE4H.DAT
        34          ID
        35          ID        NOTES:
        36          ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
        37          ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
        38          ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
        39          ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
        40          ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
        41          ID           THE WLB MODEL.
        42          ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
        43          ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
        44          ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
        45          ID           DRAINAGE REPORTS.
        46          ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
        47          ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
        48          ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
        49          ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
        50          ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
        51          ID           STORM.
        52          ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
                                          HEC-1 INPUT                                                    PAGE  2

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

        53          ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
        54          ID           THE DATA FILE BY THE FCDMC.
        55          ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
        56          ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
        57          ID
```

```
4253          DR   D196B

4254          KK   R196B
4255          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY
4256          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4257          RS       2              -1       0
4258          RC   0.025   0.025   0.025    2050   0.003
4259          RX    1500    1501    1588    1600    1612    1630    1699    1700
4260          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
1                                   HEC-1 INPUT                                          PAGE112

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4261          KK    !RR7
4262          KM   COMBINE HYDROGRAPHS AT !RR7
4263          KM   TAREA=12.19(!RR6)+0.50(197A)+0.52(CP196B)=13.21
4264          KO                                    21
4265          HC       3   13.21
              *
              * ADD AN ON-LINE DETENTION BASIN TO ATTENUATE FLOW
              *

4266          KK   SRRR7
4267          KM   STORAGE ROUTE
4268          KM   BASIN BOT=1073', TOP=1082', SURFACE AREA 10AC
4269          KM   OUTLET PIPE 36", INV=1073', WEIR 30' WIDE AT 1077'
4270          KO                                    21
4271          RS       1    STOR       0       0
4272          SV       0     0.5     4.2    12.7    23.7      36      49      62      75      89
4273          SQ       0       5      20      35      50     152     325     500     550     620
4274          SE    1073    1074    1075    1076    1077    1078    1079    1080    1081    1082
              * KM OUTLET CULVERT 10'X6', INV=1073'
              * RS       1    STOR       0       0
              * SV       0       3       7      12      18      25      33      42      52
              * SQ       0      30      80     150     230     320     410     500     550     6
              * SE    1073    1074    1075    1076    1077    1078    1079    1080    1081    10
              *
              * END OF ON-LINE BASIN
              *

4275          KK    197C
4276          KM   RUNOFF HYDROGRAPH FROM SUB-BASIN 197C (PART OF FORMER SUB-BASIN 197)
4277          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4278          KM   L=      1.2  Lca=       .6   S=   16.9  Kn= .120  LAG=  88.8
4279          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4280          BA     .14
4281          LG     .50     .00    4.66     .53     .00
4282          UI      8.      8.      8.      8.     26.     31.     36.     40.     45.     48.
4283          UI     51.     56.     62.     67.     78.     94.    108.    103.     90.     80.
4284          UI     74.     68.     63.     57.     52.     48.     43.     40.     34.     27.
4285          UI     22.     15.     15.     14.     14.     12.      8.      8.      8.      7.
4286          UI      3.      3.      3.      3.      3.      3.      3.      3.      3.      3.
4287          UI      3.      3.      3.      0.      0.      0.      0.      0.      0.      0.
4288          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4289          KK    2RR7
4290          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4291          HC       2   13.35
              *

4292          KK    RRR7
4293          KM   ROUTE FLOW FROM !RR7 TO !RR8
4294          RS       1              -1.0     0.0
4295          RC   0.013   0.013   0.013    1500  0.0013
4296          RX       0      10      20      28      43      51      60      70
4297          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
1                                   HEC-1 INPUT                                          PAGE113

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4298          KK   DR202
4299          KM  RETRIEVE FLOW FROM CP197
4300          DR   DI202

4301          KK    R197
4302          KM   CHANNEL ROUTING WESTWARD ALONG S. SIDE OF NORTHERN PKWY
4303          KM   CHANNEL GEOMETRY WERE TAKEN FROM NORTHERN PKWY HEC-1
4304          KM   ROUTING FROM !!197 TO !RR8
4305          KM   24-FOOT BOTTOM WIDTH, 4:1 BS, 6:1 FS, 3' FLOW DEPTH
4306          KM   EARTHEN CHANNEL (UNLINED)
4307          RS       1              -1       0
4308          RC   0.025   0.025   0.025    1300   0.003
4309          RX    1500    1501    1588    1600    1624    1642    1697    1700
4310          RY    1096    1095    1094    1091    1091    1094    1095    1096
              *

4311          KK    !RR8
4312          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4313          HC       2   15.10

4314          KK    RRR8
4315          KM   ROUTE FLOW FROM !RR8 TO !!C202A
4316          RS       1              -1.0     0.0
4317          RC   0.013   0.013   0.013    2300  0.0013
4318          RX       0      10      20      28      43      51      60      70
4319          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
```

D78ACP

```
4253          DR   D196B

4254          KK   R196B
4255          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY
4256          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4257          RS       2            -1       0
4258          RC   0.025   0.025   0.025    2050   0.003
4259          RX    1500    1501    1588    1600    1612    1630    1699    1700
4260          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
1                                   HEC-1 INPUT                                                    PAGE112

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4261          KK    !RR7
4262          KM   COMBINE HYDROGRAPHS AT !RR7
4263          KM   TAREA=12.19(!RR6)+0.50(197A)+0.52(CP196B)=13.21
4264          KO                                        21
4265          HC       3   13.21
              *
              * ADD AN ON-LINE DETENTION BASIN TO ATTENUATE FLOW
              *

4266          KK   SRRR7
4267          KM   STORAGE ROUTE
4268          KM   BASIN BOT=1073', TOP=1082', SURFACE AREA 10AC
4269          KM   OUTLET PIPE 36", INV=1073', WEIR 30' WIDE AT 1077'
4270          KO                                        21
4271          RS       1    STOR       0       0
4272          SV       0     0.5     4.2    12.7    23.7      36      49      62      75      89
4273          SQ       0       5      20      35      50     152     325     500     550     620
4274          SE    1073    1074    1075    1076    1077    1078    1079    1080    1081    1082
              * KM OUTLET CULVERT 10'X6', INV=1073'
              * RS     1    STOR       0       0
              * SV     0       3       7      12      18      25      33      42      52
              * SQ     0      30      80     150     230     320     410     500     550       6
              * SE  1073    1074    1075    1076    1077    1078    1079    1080    1081      10
              *
              * END OF ON-LINE BASIN
              *

4275          KK    197C
4276          KM   RUNOFF HYDROGRAPH FROM SUB-BASIN 197C (PART OF FORMER SUB-BASIN 197)
4277          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4278          KM   L=      1.2  Lca=       .6   S=   16.9  Kn= .120  LAG=  88.8
4279          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4280          BA     .14
4281          LG     .50     .00    4.66     .53     .00
4282          UI      8.      8.      8.      8.     26.     31.     36.     40.     45.     48.
4283          UI     51.     56.     62.     67.     78.     94.    108.    103.     90.     80.
4284          UI     74.     68.     63.     57.     52.     48.     43.     40.     34.     27.
4285          UI     22.     15.     15.     14.     14.     12.      8.      8.      8.      7.
4286          UI      3.      3.      3.      3.      3.      3.      3.      3.      3.      3.
4287          UI      3.      3.      3.      0.      0.      0.      0.      0.      0.      0.
4288          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4289          KK    2RR7
4290          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4291          HC       2   13.35
              *

4292          KK    RRR7
4293          KM   ROUTE FLOW FROM !RR7 TO !RR8
4294          RS       1           -1.0     0.0
4295          RC   0.013   0.013   0.013    1500  0.0013
4296          RX       0      10      20      28      43      51      60      70
4297          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
1                                   HEC-1 INPUT                                                    PAGE113

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4298          KK   DR202
4299          KM  RETRIEVE FLOW FROM CP197
4300          DR   DI202

4301          KK    R197
4302          KM   CHANNEL ROUTING WESTWARD ALONG S. SIDE OF NORTHERN PKWY
4303          KM   CHANNEL GEOMETRY WERE TAKEN FROM NORTHERN PKWY HEC-1
4304          KM   ROUTING FROM !!197 TO !RR8
4305          KM   24-FOOT BOTTOM WIDTH, 4:1 BS, 6:1 FS, 3' FLOW DEPTH
4306          KM   EARTHEN CHANNEL (UNLINED)
4307          RS       1            -1       0
4308          RC   0.025   0.025   0.025    1300   0.003
4309          RX    1500    1501    1588    1600    1624    1642    1697    1700
4310          RY    1096    1095    1094    1091    1091    1094    1095    1096
              *

4311          KK    !RR8
4312          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4313          HC       2   15.10

4314          KK    RRR8
4315          KM   ROUTE FLOW FROM !RR8 TO !!C202A
4316          RS       1           -1.0     0.0
4317          RC   0.013   0.013   0.013    2300  0.0013
4318          RX       0      10      20      28      43      51      60      70
4319          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
```

D74A78

```
4253          DR   D196B

4254          KK   R196B
4255          KM       CHANNEL ROUTING ALONG NORTHERN PARKWAY
4256          KM       12-FOOT BOTTOM WIDTH, 4:1 BACKSLOPE, 6:1 FORESLOPE, UNLINED
4257          RS       2              -1       0
4258          RC   0.025   0.025   0.025    2050   0.003
4259          RX    1500    1501    1588    1600    1612    1630    1699    1700
4260          RY    1102    1101    1101    1098    1098    1101    1101    1102
              *
1                                          HEC-1 INPUT                                                    PAGE112

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4261          KK    !RR7
4262          KM   COMBINE HYDROGRAPHS AT !RR7
4263          KM   TAREA=12.19(!RR6)+0.50(197A)+0.52(CP196B)=13.21
4264          KO                                        21
4265          HC       3   13.21
              *
              * ADD AN ON-LINE DETENTION BASIN TO ATTENUATE FLOW
              *

4266          KK   SRRR7
4267          KM   STORAGE ROUTE
4268          KM   BASIN BOT=1073', TOP=1082', SURFACE AREA 10AC
4269          KM   OUTLET PIPE 36", INV=1073', WEIR 30' WIDE AT 1077'
4270          KO                                        21
4271          RS       1    STOR       0       0
4272          SV       0     0.5     4.2    12.7    23.7      36      49      62      75      89
4273          SQ       0       5      20      35      50     152     325     500     550     620
4274          SE    1073    1074    1075    1076    1077    1078    1079    1080    1081    1082
              * KM OUTLET CULVERT 10'X6', INV=1073'
              * RS     1    STOR       0       0
              * SV     0       3       7      12      18      25      33      42      52
              * SQ     0      30      80     150     230     320     410     500     550     6
              * SE  1073    1074    1075    1076    1077    1078    1079    1080    1081    10
              *
              * END OF ON-LINE BASIN
              *

4275          KK    197C
4276          KM   RUNOFF HYDROGRAPH FROM SUB-BASIN 197C (PART OF FORMER SUB-BASIN 197)
4277          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
4278          KM   L=      1.2  Lca=       .6   S=   16.9  Kn= .120  LAG=  88.8
4279          KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
4280          BA     .14
4281          LG     .50     .00    4.66     .53     .00
4282          UI      8.      8.      8.      8.     26.     31.     36.     40.     45.     48.
4283          UI     51.     56.     62.     67.     78.     94.    108.    103.     90.     80.
4284          UI     74.     68.     63.     57.     52.     48.     43.     40.     34.     27.
4285          UI     22.     15.     15.     14.     14.     12.      8.      8.      8.      7.
4286          UI      3.      3.      3.      3.      3.      3.      3.      3.      3.      3.
4287          UI      3.      3.      3.      0.      0.      0.      0.      0.      0.      0.
4288          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

4289          KK    2RR7
4290          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4291          HC       2   13.35
              *

4292          KK    RRR7
4293          KM   ROUTE FLOW FROM !RR7 TO !RR8
4294          RS       1              -1.0     0.0
4295          RC   0.013   0.013   0.013    1500  0.0013
4296          RX       0      10      20      28      43      51      60      70
4297          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
1                                          HEC-1 INPUT                                                    PAGE113

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

4298          KK   DR202
4299          KM  RETRIEVE FLOW FROM CP197
4300          DR   DI202

4301          KK    R197
4302          KM   CHANNEL ROUTING WESTWARD ALONG S. SIDE OF NORTHERN PKWY
4303          KM   CHANNEL GEOMETRY WERE TAKEN FROM NORTHERN PKWY HEC-1
4304          KM   ROUTING FROM !!197 TO !RR8
4305          KM   24-FOOT BOTTOM WIDTH, 4:1 BS, 6:1 FS, 3' FLOW DEPTH
4306          KM   EARTHEN CHANNEL (UNLINED)
4307          RS       1              -1       0
4308          RC   0.025   0.025   0.025    1300   0.003
4309          RX    1500    1501    1588    1600    1624    1642    1697    1700
4310          RY    1096    1095    1094    1091    1091    1094    1095    1096
              *

4311          KK    !RR8
4312          KM   COMBINE FLOW FROM OFFLINE BASIN AND DRAINAGE BASIN 197C
4313          HC       2   15.10

4314          KK    RRR8
4315          KM   ROUTE FLOW FROM !RR8 TO !!C202A
4316          RS       1              -1.0     0.0
4317          RC   0.013   0.013   0.013    2300  0.0013
4318          RX       0      10      20      28      43      51      60      70
4319          RY    1080    1080    1080    1076    1076    1080    1080    1080
              *
```

78A78B

D79

CIP models

D79

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            JUN   1998             *
*          VERSION 4.1              *
*                                   *
*   RUN DATE   06FEB09  TIME  14:20:20  *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                   HEC-1 INPUT                                   PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID   PREPARED BY HOSKIN RYAN CONSULTANTS ON 12/11/2008 FOR PROPOSED ATSF
    2           ID   CHANNEL AND BASIN (RECOMMENDED ALTERNATIVE), BASED ON CAMELBACL CAR
    3           ID   PREPARED BY ASPEN CONSULTING ENGINEERS
    4           ID   MODIFICATIONS:
    5           ID   (1) SURPRISE POINTE DEVELOPMENT WAS UPDATED
    6           ID   (2) SURPRISE WWTP WAS UPDATED
    7           ID   (3) NORTHERN PARKWAY WAS UPDATED
    8           ID   (4) ATSF RECOMMENDED ALTERNATIVE WAS UPDATED
    9           ID
   10           ID  ************************************************************************
   11           ID      ASPEN CONSULTING ENGINEERS, JCS, xx-xx-08, FILE: 303EWP.DAT, 100-YR 24-HR
   12           ID      NOTES:
   13           ID      UPDATE LG CARD AND DEVELOPMENT RETENTION DIVERSIONS FOR EACH SUBBASIN.
   14           ID      CHANGE MODEL TO REFLECT THE NEW SUNCOR CHANNEL SOUTH OF CAMELBACK RD.
   15           ID      BETWEEN STATE ROUTE 303 AND BULLARD WASH.  KK RECORD CHANGED ARE R237,
   16           ID      AND R238.
                        * ***********************************************************************
                        * *  THE FOLLOWING IS THE MODEL RECIEVED BY ASPEN FROM FCDMC ON 06/08/07
                        * ***********************************************************************
   17           ID         DRAFT PREFERRED ALTERNATIVE LEVEL III
   18           ID
   19           ID         INCORPORATE ALTERNATIVE #3 FROM CHANGE ORDER #14 INTO
   20           ID         SR 303L OFFSITE FLOOD CONTROL FACILITY - NORTHERN AND CACTUS
   21           ID         BASINS ARE NOW OFFLINE WITH MULTIPLE BASINS LOCATED WITHIN
   22           ID         LUKE AIR FORCE BASE CRASH ZONE AREA
   23           ID
   24           ID         **ADOT BASIN GEOMETRY REPRESENTS MOST RECENT 2' CONTOURS**
   25           ID         WHITE TANKS AREA DRAINAGE MASTER STUDY *UPDATE*
   26           ID         Original MODEL BY THE WLB Group for FCDMC AS PART OF THE WHITE
   27           ID         TANKS/AGUA FRIA ADMS, Date: October 1991
   28           ID
   29           ID         REVISED HYDROLOGY HEC-1 RUN FOR WHITE TANKS ADMS
   30           ID         100-YEAR, 24-HOUR STORM                  original file: WTADMS.24
   31           ID
   32           ID                                     REVISED BY URS     DATE: 01-14-04
   33           ID                                                        FILE: L33PE4H.DAT
   34           ID
   35           ID        NOTES:
   36           ID        1. THIS HEC-1 MODEL CONTAINS THE FOLLOWING SUPER BASINS: WHITE TANKS 3,
   37           ID           2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2 & 3, 4 THRU 26.
   38           ID        2. REVISED TO REFLECT UPDATED SOILS MAPS AND NEW DEVELOPMENT.
   39           ID        3. AVERAGE XKSAT VALUES FOR EACH SUBBASIN WAS RECEIVED FROM FCDMC
   40           ID           GIS DATA AND THEN ADJUSTED FOR VEGETATION, OR LEFT AS ORIGINALLY IN
   41           ID           THE WLB MODEL.
   42           ID        4. FOR NEW DEVELOPMENTS ONLY 80% OF REPORTED PROVIDED RETENTION
   43           ID           WAS INCLUDED IN THIS MODEL (AS A CONSERVATIVE ESTIMATE). RETENTION
   44           ID           CAPACITIES WERE ESTIMATED BY EEC FOR DEVELOPMENTS WITH NO
   45           ID           DRAINAGE REPORTS.
   46           ID        5. REVISED DRAINAGE BOUNDARIES BASED UPON FIELD INSPECTION OF SUN CITY.
   47           ID           GRAND.  COMBINED SEVERAL BASINS TOGETHER TO MAKE NEW BASINS 114 &115.
   48           ID           ALSO REROUTED SUBBASINS 100A, 101, 102A AND 106 TO THE SOUTH TO 113A.
   49           ID        6. CHANNEL ROUTE ALONG REEMS ROAD UPDATED TO REFLECT NEW CONSTRUCTION.
   50           ID        7. REVISED SCS TYPE II RAINFALL DISTRIBUTION FOR THE 24-HOUR GENERAL
   51           ID           STORM.
   52           ID        8. REVISED RAINFALL DEPTH-AREA REDUCTION FACTORS.
                                          HEC-1 INPUT                                   PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   53           ID        9. PSIF WERE ADJUSTED BASED ON THE VALUES OF XKSAT AND WERE EDITED INTO
   54           ID           THE DATA FILE BY THE FCDMC.
   55           ID       10. AVERAGE XKSAT VALUES FOR SUBBASINS WITH BORROW PITS (WHITE TANKS
   56           ID           AREAS #3 & #4) WERE ESTIMATED BY EEC.
   57           ID
```

```
            * UI   10.     10.     10.     10.     10.     10.     10.     10.     10.     1
            * UI   10.     10.      0.      0.      0.      0.      0.      0.      0.
            * UI    0.      0.      0.      0.      0.      0.      0.      0.      0.

            KK   CP197
            KM        ADD HYDROGRAPHS AT CP197
            KO                                  21
            HC       2   42.06

            KK   DI202
            KM   DIVERT FLOW WEST TO AT&SF CHANNEL ALONG NORTHERN PKWY
            DT   DI202
            DI       0   10000
            DQ       0   10000

            KK    R197
            KM        ROUTE FLOW FROM CP197 TO CP203
            RS       8              -1       0
            RC    .035    .035    .015    2650   .0004
            RX    1000    1001    1002    1030    1200    1350    1809    1810
            RY    1078    1078    1078  1077.5  1077.5    1078    1080    1080
            *

            KK     203
            KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 203
            BA     .11
            LG     .35     .38    4.82     .29     .00
            UI     16.     60.     92.    131.    189.    135.     96.     62.     29.     19.
            UI      9.      5.      5.      0.      0.      0.      0.      0.      0.      0.
            UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

            KK  203OUT
            KM        DIVERSION-RETENTION
            DT  203RET    6.65
            DI       0   10000
            DQ       0   10000

            KK   CP203
            KM        ADD HYDROGRAPHS AT CP203
            HC       2   42.17
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            KK   CP198
            KM        ADD HYDROGRAPHS AT CP198
            KO                                  21
            HC       2   44.06
            * ADD AN ON-LINE DETENTION BASIN HRC 01/09/2009

            KK   SR198
            KM   STORAGE ROUTE
            KM   BASIN BOTTOM 1079', SURFACE AREA 5AC
            KM   OUTLET PIPE (2)36", INV=1076', WEIR 60' WIDE AT 1080'
            RS       1    STOR       0       0
            SV       0       3       7      12      17      22      27      32
            SQ       0      16      40      76     104     304     674    1096
            SE    1076    1077    1078    1079    1080    1081    1082    1083
            * END OF ON-LINE DETENTION BASIN

            KK    R198
            KM        ROUTE FLOW FROM CP198 TO CP204
            RS       2              -1       0
            RC     .03    .025     .03    3120   .0029
            RX    1000    1050    1070    1090    1190    1220    1230    1270
            RY    1083    1082    1078    1076    1076    1078    1080    1083
            *
            * ***********************************************************************
            * ***THE FOLLOWING SECTION TAKEN FROM NEW SUPER BASIN 2K WITH NEW SOILS*****
            * ***********************************************************************
            *

            KK     204
            KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 204
            BA     .27
            LG     .35     .37    4.82     .29     .00
            UI     42.    172.    257.    396.    462.    312.    214.    105.     61.     33.
            UI     13.     13.      0.      0.      0.      0.      0.      0.      0.      0.
            UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

            KK   1I204
            KM        ADD HYDROGRAPHS AT CP204
            HC       2   44.33
            *

            KK     174
            KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 174
            BA     .45
            LG     .27     .27    4.58     .42      29
            UI     62.    218.    346.    474.    735.    574.    418.    294.    145.     94.
            UI     57.     19.     19.     19.      0.      0.      0.      0.      0.      0.
            UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
```

D75079


```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            KK    174T
            KM    Divert Retention in Subbasin 174
            DT    174R    27.9
```

TRIAL VERSION of TIFFDLL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

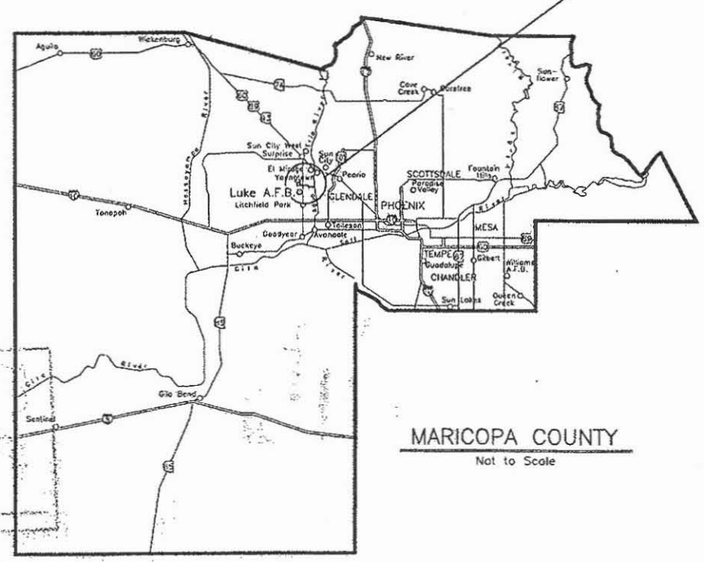
PLANS FOR THE CONSTRUCTION OF:

DYSART DRAIN IMPROVEMENTS PROJECT
REEMS ROAD TO AGUA FRIA RIVER
CHANNEL IMPROVEMENTS

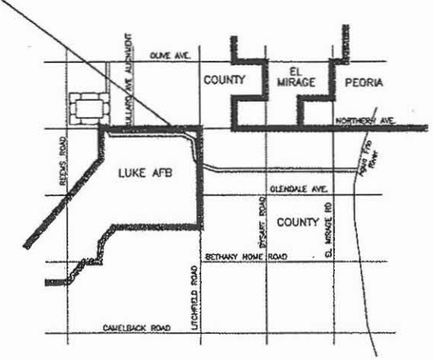
PROJECT NO. FCD 94-38
LAFB NO. 87-3002

D71, D72, D73, D78, D79, D80

PROJECT NO. FCD 94-38



MARICOPA COUNTY
Not to Scale



N

VICINITY MAP
Not to Scale

"AS BUILT DRAWINGS"

49

DYSART DRAIN IMPROVEMENTS
REEMS RD. TO AGUA FRIA
CHANNEL IMPROVEMENTS
AS BUILTS
FCD 94-38
470

\P81-194.019\DWGS\PH-III\DD-G01.DWG VIEW = SITE 1=40

CALL FOR THE BLUE STAKES
2S3-1100

NBS/LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1999
(602) 468-1668 FAX 956-4538

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

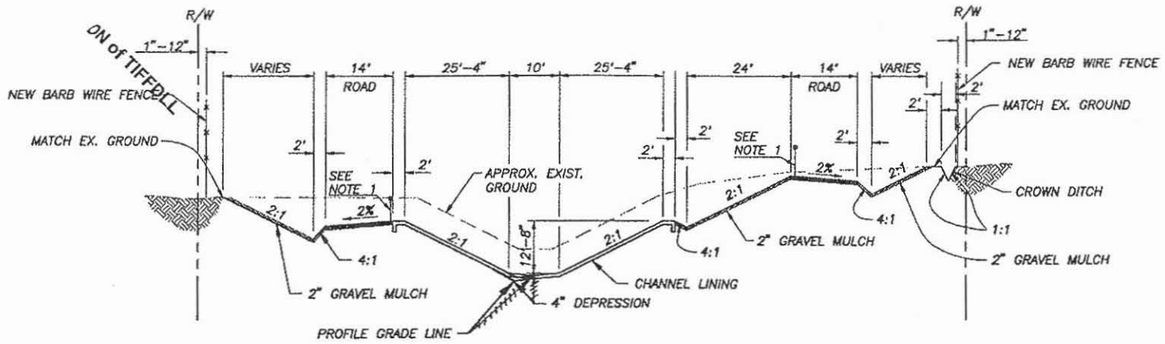
CHIEF ENGINEER AND GENERAL MANAGER — DATE 9-5-95

BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT

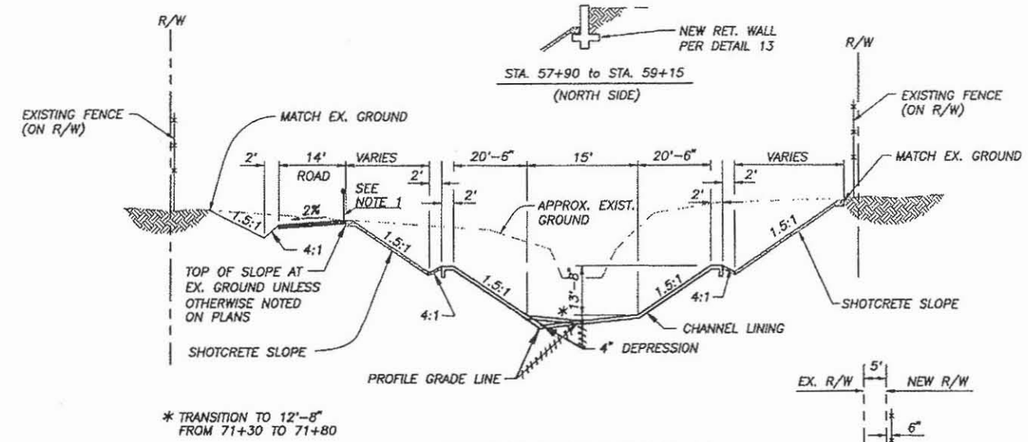
TOM RAWLES – CHAIRMAN

DISTRICT 1 TOM RAWLES
DISTRICT 2 DON STAPLEY
DISTRICT 3 BETSEY BAYLESS
DISTRICT 4 EDWARD KING
DISTRICT 5 MARY ROSE GARRIDO WILCOX

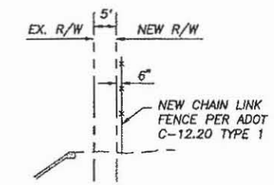
NBS/LOWRY PROJECT NO. P81-194.019 | SHEET G01/7



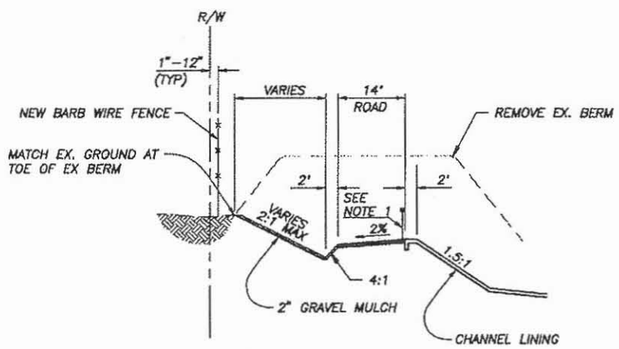
TYPICAL SECTION NO. 1
STA. 10+35.40 TO STA. 19+00
NO SCALE



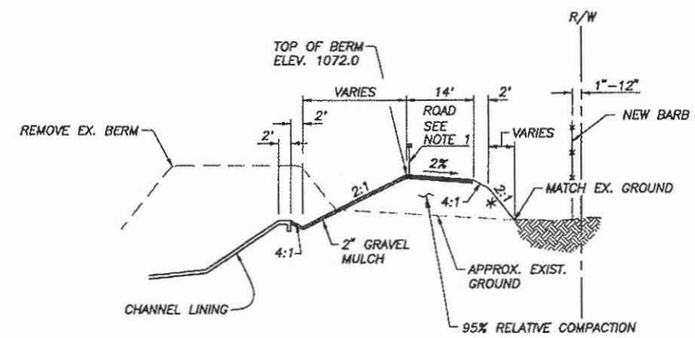
TYPICAL SECTION NO. 3
STA. 55+00 TO STA. 71+80
NO SCALE



STA. 59+60 to STA. 71+97
(NORTH SIDE)

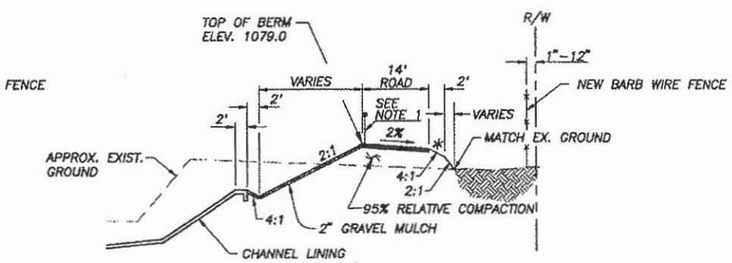


STA. 27+00 to STA. 37+00
(SOUTH SIDE)



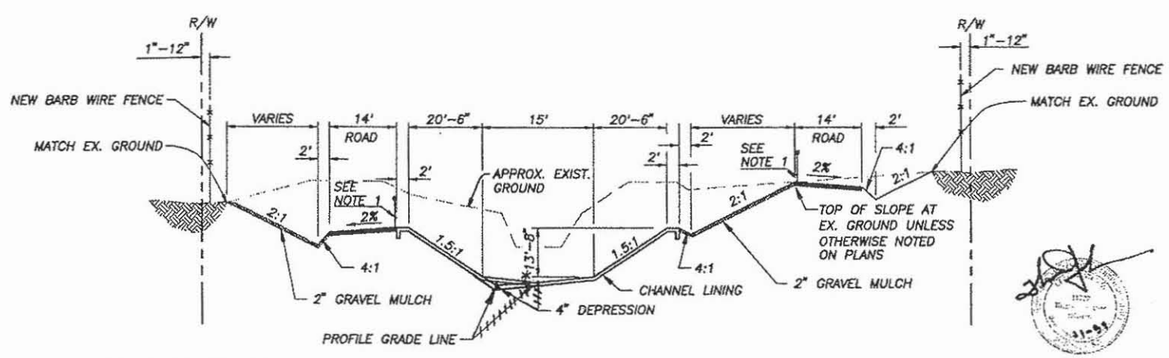
* SEE PLAN FOR RIPRAP PLACEMENT

STA. 28+30 to STA. 35+70
(NORTH SIDE)



* SEE PLAN FOR RIPRAP PLACEMENT

STA. 44+70 to STA. 48+70
(NORTH SIDE)



* 12'–8" – 22+00 TO 28+00
14'–8" – 19+50 TO 21+00
14'–8" – 29+00 TO 37+00

TYPICAL SECTION NO. 2
STA. 19+50 TO STA. 55+00
NO SCALE

"AS-BUILT DRAWING"
I HEREBY CERTIFY THAT THE "AS-BUILT DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NOTES:

1. NEW REFLECTOR PER DETAIL 25 PLACED AT 50 FOOT INTERVALS.

NO.	REVISION	DATE
3		
2		
1		

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DYSART DRAIN IMPROVEMENT PROJECT
CHANNEL IMPROVEMENTS
TYPICAL SECTIONS
SECTIONS NO. 1 THROUGH NO. 3

	BY	DATE
DESIGNED	S. YINGLING	4/94
DRAWN	S. YINGLING	4/94
CHECKED	C. GOPPERTON	5/95

NBS LOWRY
ENGINEERS & PLANNERS
3550 North 44th Street, Ste. 167
Phoenix, Arizona 85008-1591
(602) 468-1485 FAX 956-4336

NBS/LOWRY PROJECT NO. P81-194-019
SHEET D01/16

D1D79-D80
D1D80-D80

\P81-194.019\DWGS\PH-II\D0-D01.DWG VIEW = SITE 1 = 20 MSPACE

D80

TRIAL VERSION of TIFFDLL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

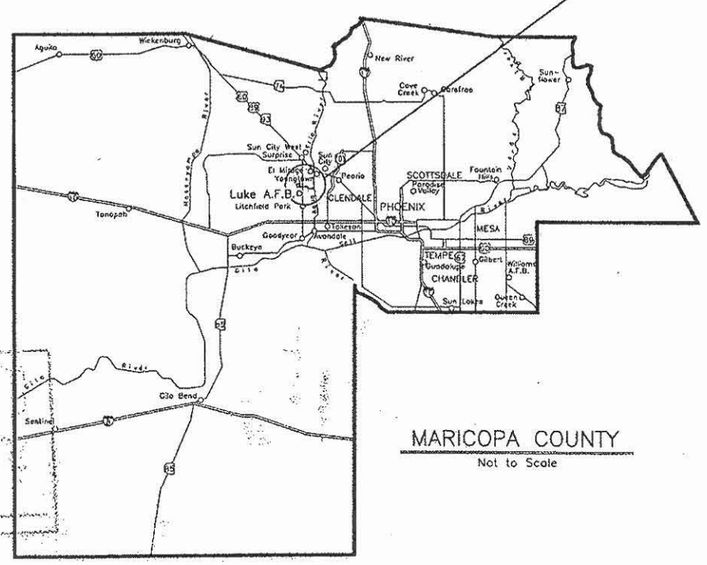
PLANS FOR THE CONSTRUCTION OF:

DYSART DRAIN IMPROVEMENTS PROJECT
REEMS ROAD TO AGUA FRIA RIVER
CHANNEL IMPROVEMENTS

PROJECT NO. FCD 94-38
LAFB NO. 87-3002

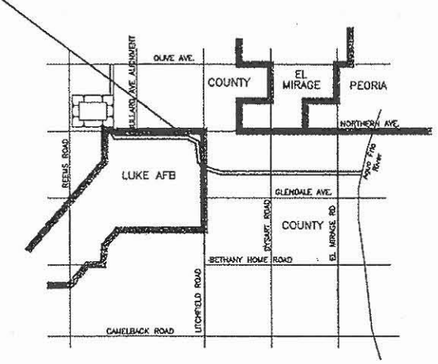
D71, D72, D73, D78, D79, D80

PROJECT NO. FCD 94-38



MARICOPA COUNTY
Not to Scale

N



VICINITY MAP
Not to Scale

"AS-BUILT DRAWINGS"

49

DYSART DRAIN IMPROVEMENTS
REEMS RD. TO AGUA FRIA
CHANNEL IMPROVEMENTS
AS BUILTS
FCD 94-38 470

\P81-194.019\DWGS\PH-III\DD-G01.DWG VIEW = SITE 1=40

263-1100

NBS LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1599
(602) 468-1688 FAX 956-4538

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

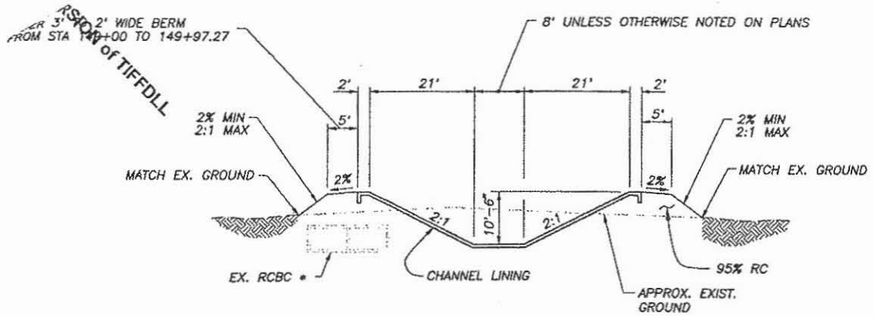
CHIEF ENGINEER AND GENERAL MANAGER — DATE

BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT

TOM RAWLES – CHAIRMAN

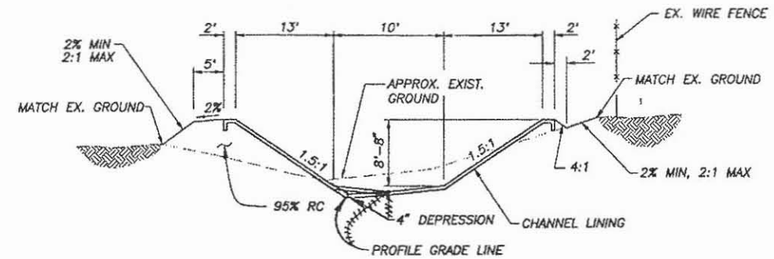
DISTRICT 1 TOM RAWLES
DISTRICT 2 DON STAPLEY
DISTRICT 3 BETSEY BAYLESS
DISTRICT 4 EDWARD KING
DISTRICT 5 MARY ROSE GARRIDO WILCOX

NBS/LOWRY PROJECT NO. P81-194.019 | SHEET G01/7

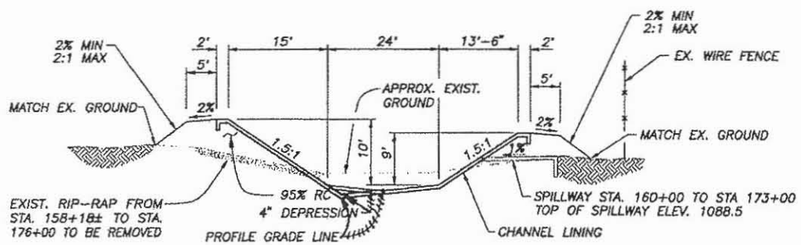


* SEE SHEET S05/6 FOR DETAILS

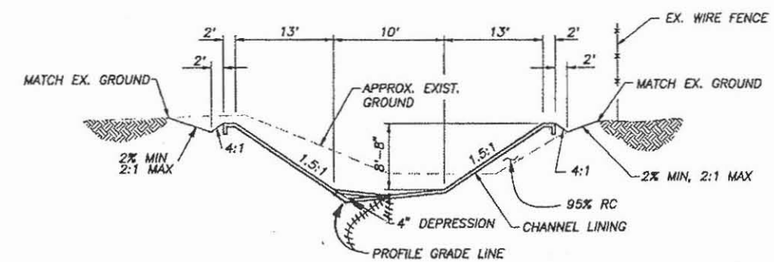
TYPICAL SECTION NO. 10
STA. 149+00 TO STA. 158+00
NO SCALE



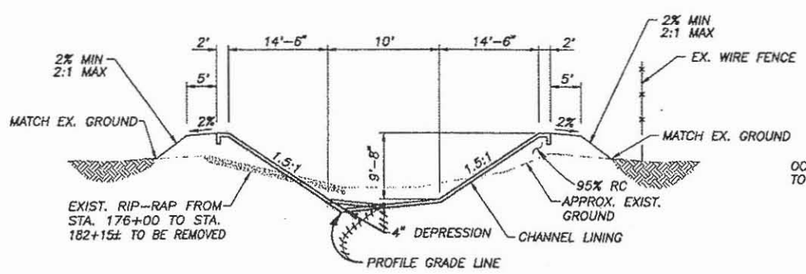
TYPICAL SECTION NO. 13
STA. 187+50 TO STA. 205+00
NO SCALE



TYPICAL SECTION NO. 11
STA. 158+00 TO STA. 176+00
NO SCALE



TYPICAL SECTION NO. 14
STA. 205+00 TO STA. 217+21.25
NO SCALE



TYPICAL SECTION NO. 12
STA. 176+50 TO STA. 187+00
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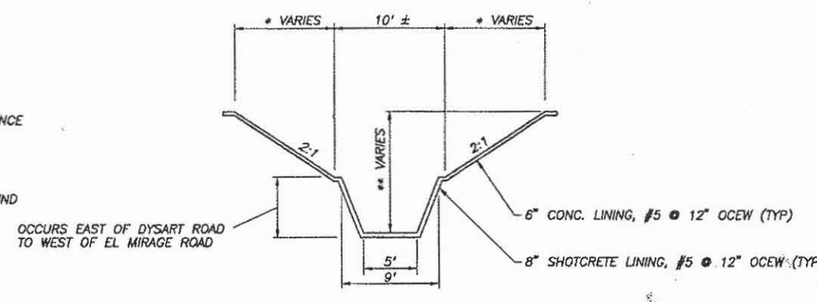

TYPICAL SECTION NO. 15
(EXISTING CHANNEL TO BE REMOVED)
NO SCALE

* VARIES FROM 15± TO 19± FEET

** VARIES FROM 7.5± TO 15± FEET

"AS-BUILT" REVISIONS
THE INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY OTHERS AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NO.	REVISION		DATE
3			
2			
1			

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY
DYSART DRAIN IMPROVEMENT PROJECT
CHANNEL IMPROVEMENTS
TYPICAL SECTIONS
SECTIONS NO. 10 THROUGH NO. 13

	BY	DATE
DESIGNED	S. YINGLING	5/94
DRAWN	S. YINGLING	5/94
CHECKED	C. GOPPERTON	5/95

NBS/LOWRY PROJECT NO. P81-194-019

SHEET D03/16

D10071-D71
D10072-D72