HERMOSA VISTA /HAWES ROAD
STORM DRAIN AND BASIN PROJECT

DESIGN DATA REPORT

February 2008
WP #052640

FCD Contract No. 2005C009
PCN 420.02.31

Prepared For: **Flood Control District of Maricopa County**
2801 West Durango Street
Phoenix, Arizona 85009

Prepared in Cooperation with: **City of Mesa**
20 East Main Street, 5th Floor
Mesa, Arizona 85211

Prepared By: **Wood, Patel & Associates, Inc.**
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Registered Professional Engineer (Civil)
CERTIFICATE NO.
24999
JEFFREY R.
MINCH
DATE SIGNED 2-20-08
ARIZONA, U.S.A.
EXPIRES 9-30-09

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Registered Professional Engineer (Civil)
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HYDROLOGY

WOOD/PATEL

MEMO

TO: Jeff Minch, P.E.

FROM: Dave Lutzky, P.E. DBL

DATE: 2-19-08

RE: Hermosa Vista/Hawes Road Storm Drain and Basin Project (70% Submittal)

SUBJECT: Hydrologic Calculations

I. INTRODUCTION

Since the completion of the Culver-Hawes Basin Design Concept Report (DCR) in October 2005, a number of hydrologic parameters have changed within the project area. In 2006, the McDowell Road Storm Drain and Basin Project introduced subsequent updates to the DCR hydrology and is the base model on which Wood/Patel has added further updates described here. These updates support the Final design of the Hermosa Vista/Hawes Road Storm Drain and Basin Project.

II. HEC-1 UPDATE

The base HEC-1 model for the project reflects the design of the McDowell Storm Drain and Basin Project. For the design of the Hermosa Vista/Hawes Road Storm Drain and Basin Project, Wood/Patel has made minor revisions to the base model. Wood/Patel updated the subbasin delineations bounded by McDowell Road to the north, Hawes Road to the east, and Hermosa Vista to the south (see HEC-1 schematic, this section). These sub-basins were generalized in the DCR and McDowell models. The updated subbasin concentration points occur every 1/4-mile along the proposed alignment. The resulting discharges from the new model were then used to size the storm drain trunk line. The HEC-1 output summary as well as the DDMS hydrologic parameters are included with this memo, along with Figure 1 (Subbasin Boundary Map), Figure 2 (Soils Map), and Figure 3 (HEC-1 Schematic).

The HEC-1 model was also updated to change the flow routing method along the path of the proposed storm drain. The previous model used a generalized channel routing procedure. Those routes that represent the proposed storm drain now use pipe routing routines. Figure 4 shows the drainage system design along with the 100-year design flows used to size the system.

Other changes to the model include the assumed detention volume associated with the existing Madrid Subdivision. The updated model now reflects design retention volumes for 100-yr, 2-hr as diversions out of the runoff hydrographs. Also, per direction from FCDMC, the open areas immediately adjacent to the Culver-Hawes Basin are assumed to have 100-yr, 2-hr detention applied per City of Mesa design standards.

The update involves the hydrology of the 88th Street/McDowell Road intersection. The two HEC-1 subbasins that contribute to this area were revised slightly in their delineation.

As outlined in the Culver-Hawes DCR, several options were introduced to mitigate flooding problems observed at the intersection of 88th Street and McDowell Road. 88th Street, north of McDowell contains cross-culverts and on-grade catch basins that are intended to convey offsite flow west into the Thunder Mountain subdivision. However, the longitudinal slope of 88th Street diminishes the interception capacity of those structures and as a

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result, a majority of the offsite flow bypasses the catch basins and drains south to the intersection. Field investigations indicate however, that the majority of the flow contributing from sub-basin (395A) appears to concentrate at or very near the McDowell Road intersection, as opposed to collecting in 88th Street well north of McDowell Road.

As a result, subbasin 395A was redelineated to reflect all of its flows concentrating at the intersection of 88th Street/McDowell. Flows from the drainage area that gets intercepted by the cross-culverts was added to the Thunder Mountain subbasin, (390C).

The McDowell HEC-1 model also had subbasin 395A being routed entirely through Thunder Mountain. The updated model first combines 395A and 395B and finally routes the combined flow to 390C.

Supporting calculations for the local hydrology of 88th Street are included with this memo.

Table 1 below summarizes the HEC-1 design points and peak flows used to size the storm drain system.

Location Description	Concentration Point	Discharge (cfs)
Madrid Basin Outlet	B370W	338
McDowell/88th Street	CP395	169
Diversion from Thunder Mtn. Channel to south	TOC-H	108
Thunder Mtn Basin	C370	418
Hawes Rd. and Willetta St.	C390S	418
Hawes Rd. and Culver St. (Basin Outlet)	CC380B	133
Hawes Rd. and Culver St.	CCH	153
Hawes Rd. and Hermosa Vista	C38B3c	166
Hermosa Vista and 82nd St.	C380B1	195
Hermosa Vista and 80th St.	C380B2	237
Hermosa Vista and 78th St.	C400B1	283
Hermosa Vista and 76th St. (Sossaman)	C400B2	315
Hermosa Vista and FRS Outlet Structure	C400B4	384

Table 1. HEC-1 Summary

III. RATIONAL METHOD CALCULATIONS

The Rational Method was used to size the storm drain inlets. The Rational Method subbasins are common with the HEC-1 subbasins, however they are subdivisions of the HEC-1 subbasins to show points where inlets are to be located. Figure 5 illustrates the Rational Method subbasin boundaries along with the 10 and 100-yr peak discharges associated with the design points. Rational Method calculations and the supporting documentation are also included with this memo. Table 2 below summarizes the design points for inlet locations along with the 10 and 100 year peak flows.

Subbasin	Area	Q_{10}	Q_{100}
	ac	cfs	cfs
15	41	46	100
20	5	8	16
25	7	11	23
30	34	41	88
35	20	25	54
40	6	9	19
45	16	21	44
50	21	29	61
55	6	10	21
60	12	17	37
65	6	9	20
70	1	2	4
75	4	7	14
80	2	4	7
85	1	2	4
90	5	8	16
95	6	10	21
100	3	11	22
105	11	18	61*
106	11	18	37
107	8	13	27
108	18	29	60
110	3	6	11
115	8	14	29
120	6	10	21
125	4	7	14
130	6	11	22

Table 2. Rational Method Summary
* Subbasin 105 receives 24 cfs from Subbasin 106 to total 61 cfs.

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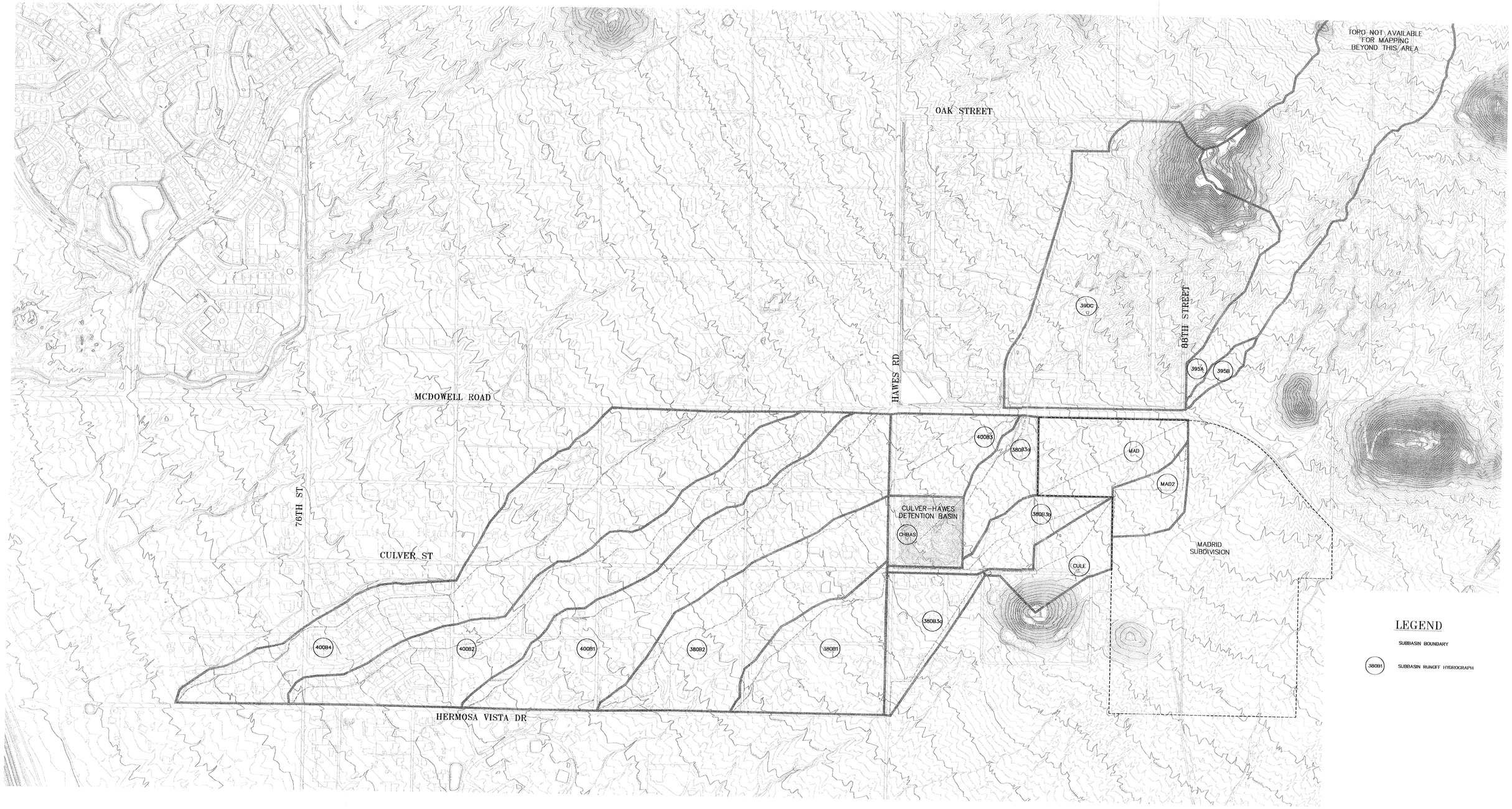

HERMOSA VISTA/HAWES ROAD
STORM DRAIN & BASIN PROJECT

FIGURE 1
HEC-1
SUBBASIN MAP

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
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WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT
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POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 33.462301 N 111.649832 W 1771 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Thu Mar 22 2007

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Help | D

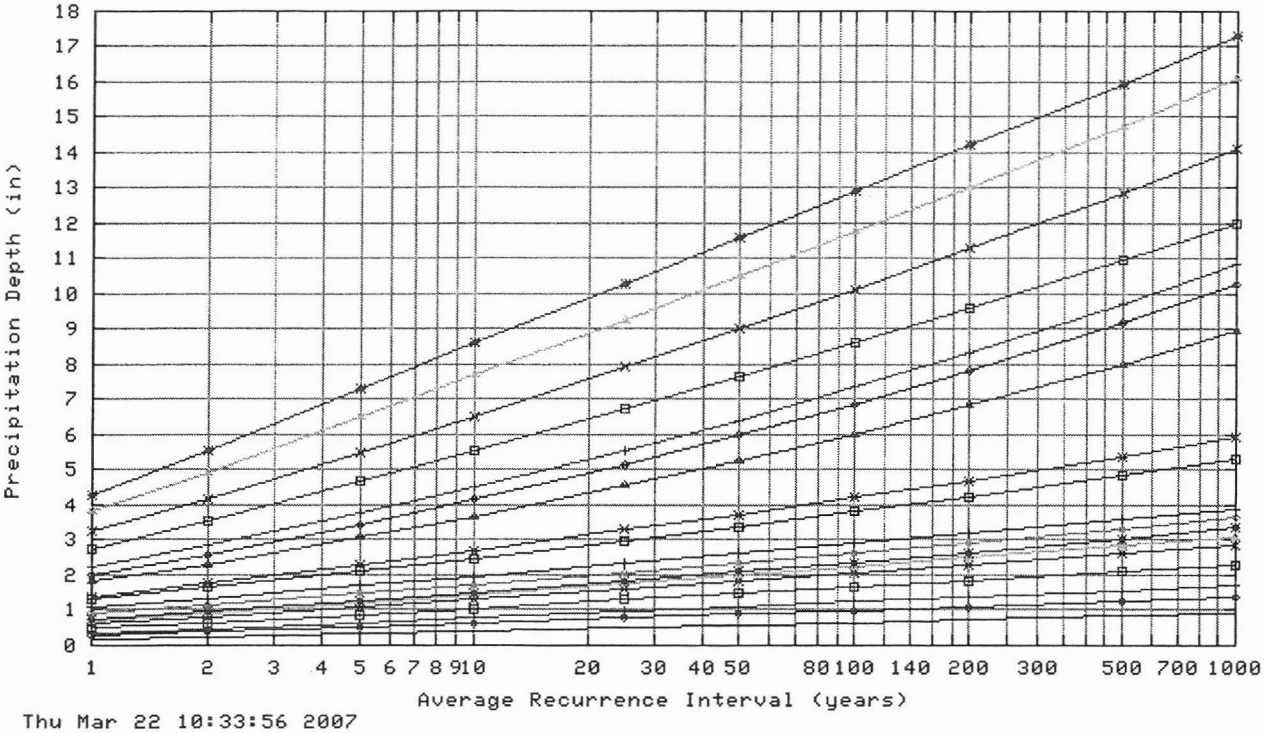
Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.20	0.30	0.37	0.50	0.62	0.70	0.75	0.92	1.06	1.31	1.39	1.81	2.03	2.21	2.76	3.24	3.83	4.31
2	0.26	0.39	0.48	0.65	0.81	0.91	0.96	1.16	1.34	1.65	1.77	2.31	2.60	2.84	3.55	4.17	4.94	5.57
5	0.35	0.53	0.66	0.88	1.09	1.21	1.26	1.48	1.69	2.11	2.30	3.06	3.45	3.76	4.68	5.50	6.50	7.32
10	0.42	0.63	0.78	1.06	1.31	1.44	1.50	1.73	1.96	2.48	2.71	3.68	4.15	4.50	5.56	6.52	7.69	8.61
25	0.51	0.78	0.96	1.29	1.60	1.75	1.83	2.08	2.33	2.99	3.29	4.55	5.16	5.57	6.75	7.92	9.27	10.31
50	0.58	0.89	1.10	1.48	1.83	1.99	2.09	2.35	2.62	3.40	3.74	5.26	5.98	6.43	7.68	9.01	10.49	11.59
100	0.66	1.00	1.24	1.67	2.06	2.24	2.36	2.63	2.91	3.82	4.22	6.03	6.87	7.35	8.63	10.13	11.75	12.90
200	0.73	1.11	1.38	1.86	2.30	2.49	2.65	2.93	3.21	4.25	4.71	6.84	7.82	8.33	9.62	11.29	13.03	14.21
500	0.83	1.26	1.57	2.11	2.61	2.83	3.04	3.33	3.60	4.86	5.39	8.00	9.18	9.73	10.97	12.87	14.77	15.96
1000	0.91	1.38	1.71	2.30	2.85	3.09	3.36	3.64	3.91	5.33	5.93	8.95	10.30	10.87	12.02	14.11	16.14	17.31

Text version of table

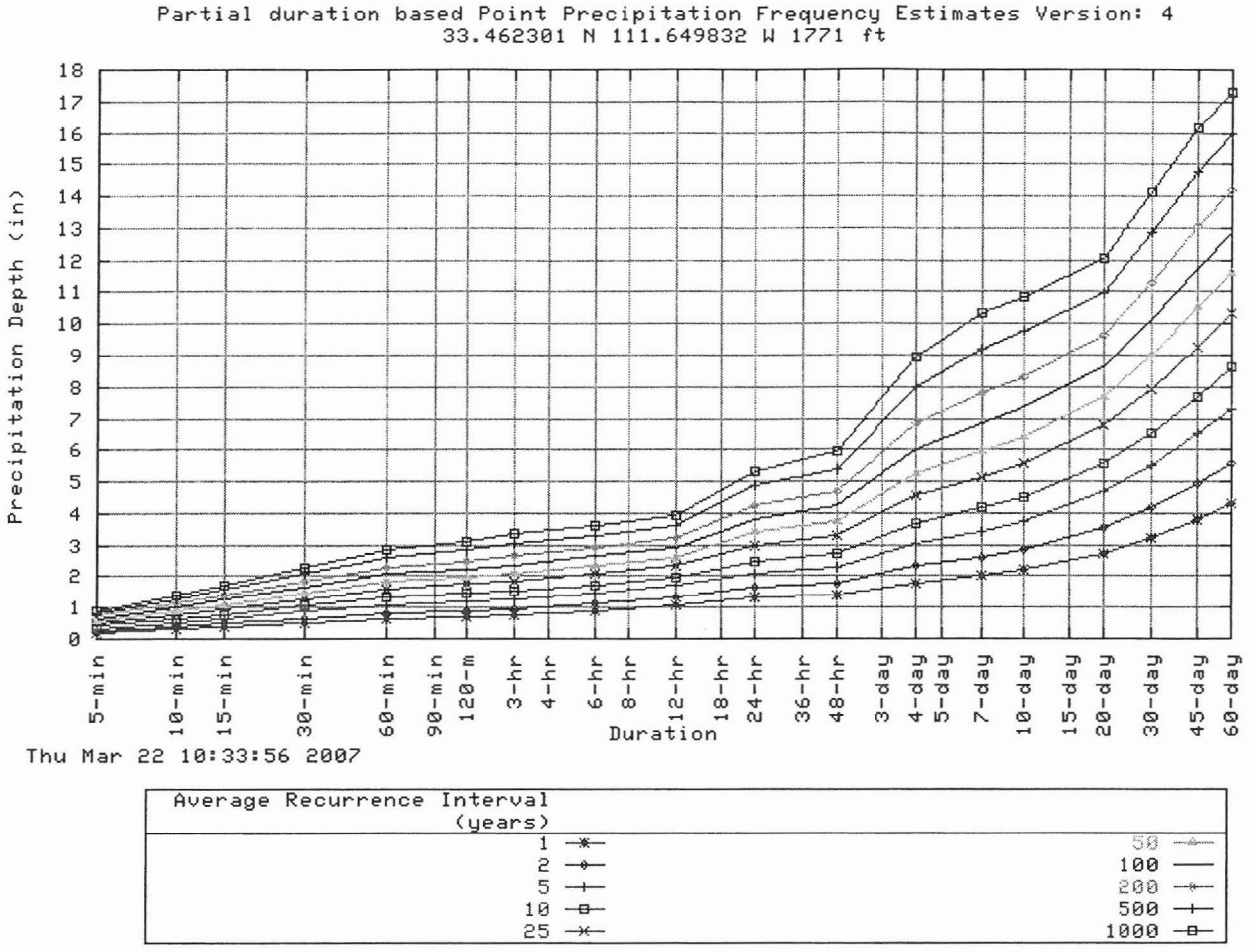
* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to the documentation for more information. NOTE: Formatting forces estimates near zero to appear as zero.

Partial duration based Point Precipitation Frequency Estimates Version: 4
33.462301 N 111.649832 W 1771 ft



Thu Mar 22 10:33:56 2007

Duration			
5-min	120-m	48-hr	30-day
10-min	3-hr	4-day	45-day
15-min	6-hr	7-day	60-day
30-min	12-hr	10-day	
60-min	24-hr	20-day	



Confidence Limits -

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.25	0.38	0.48	0.64	0.79	0.86	0.94	1.08	1.23	1.49	1.59	2.02	2.27	2.47	3.08	3.60	4.25	4.78
2	0.33	0.50	0.62	0.84	1.04	1.12	1.21	1.37	1.54	1.89	2.02	2.59	2.91	3.16	3.96	4.63	5.49	6.18
5	0.45	0.68	0.84	1.13	1.40	1.48	1.57	1.75	1.94	2.41	2.61	3.43	3.87	4.19	5.23	6.11	7.24	8.13
10	0.53	0.81	1.00	1.34	1.66	1.76	1.86	2.04	2.25	2.83	3.08	4.11	4.65	5.02	6.20	7.24	8.57	9.57
25	0.64	0.98	1.22	1.64	2.02	2.14	2.25	2.44	2.67	3.40	3.73	5.08	5.77	6.19	7.53	8.79	10.34	11.47
50	0.73	1.11	1.38	1.86	2.30	2.44	2.56	2.75	3.00	3.85	4.24	5.87	6.69	7.15	8.56	10.00	11.72	12.90
100	0.82	1.25	1.55	2.08	2.58	2.74	2.90	3.09	3.34	4.33	4.79	6.73	7.69	8.19	9.65	11.26	13.13	14.38
200	0.91	1.39	1.72	2.31	2.87	3.03	3.25	3.43	3.67	4.83	5.37	7.65	8.77	9.29	10.77	12.57	14.59	15.86
500	1.03	1.57	1.95	2.63	3.25	3.45	3.73	3.90	4.16	5.53	6.18	8.97	10.33	10.88	12.32	14.39	16.61	17.88
1000	1.13	1.72	2.13	2.87	3.55	3.80	4.13	4.29	4.55	6.11	6.82	10.08	11.64	12.20	13.56	15.85	18.22	19.46

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

*** Lower bound of the 90% confidence interval**

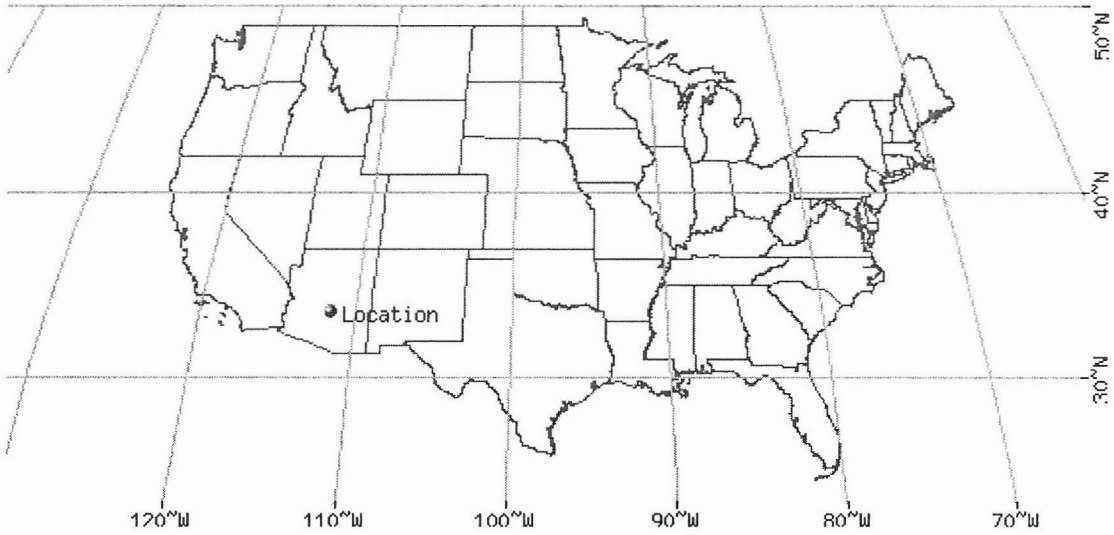
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.16	0.24	0.30	0.41	0.50	0.58	0.62	0.79	0.93	1.16	1.24	1.62	1.81	1.99	2.48	2.92	3.44	3.88
2	0.21	0.32	0.40	0.53	0.66	0.75	0.80	1.00	1.17	1.47	1.57	2.08	2.33	2.55	3.19	3.76	4.44	5.01
5	0.28	0.43	0.53	0.71	0.88	0.99	1.04	1.26	1.47	1.87	2.04	2.74	3.08	3.37	4.20	4.94	5.83	6.57
10	0.33	0.51	0.63	0.85	1.05	1.17	1.23	1.47	1.70	2.19	2.39	3.27	3.69	4.03	4.96	5.86	6.87	7.70
25	0.40	0.61	0.76	1.02	1.27	1.41	1.47	1.74	1.99	2.62	2.87	4.03	4.55	4.95	6.00	7.07	8.26	9.19
50	0.45	0.69	0.85	1.15	1.43	1.58	1.66	1.94	2.21	2.95	3.24	4.63	5.25	5.67	6.79	8.01	9.29	10.28
100	0.50	0.76	0.95	1.28	1.58	1.75	1.85	2.13	2.42	3.29	3.62	5.26	5.97	6.44	7.59	8.95	10.35	11.39
200	0.55	0.84	1.04	1.40	1.73	1.91	2.04	2.33	2.63	3.62	4.00	5.91	6.74	7.23	8.41	9.91	11.39	12.47
500	0.61	0.93	1.15	1.55	1.92	2.11	2.28	2.58	2.89	4.05	4.50	6.81	7.79	8.32	9.48	11.18	12.78	13.88
1000	0.65	0.99	1.23	1.66	2.06	2.26	2.46	2.75	3.08	4.39	4.87	7.54	8.63	9.19	10.29	12.15	13.84	14.92

* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.
** These precipitation frequency estimates are based on a partial duration maxima series. **ARI** is the Average Recurrence Interval.

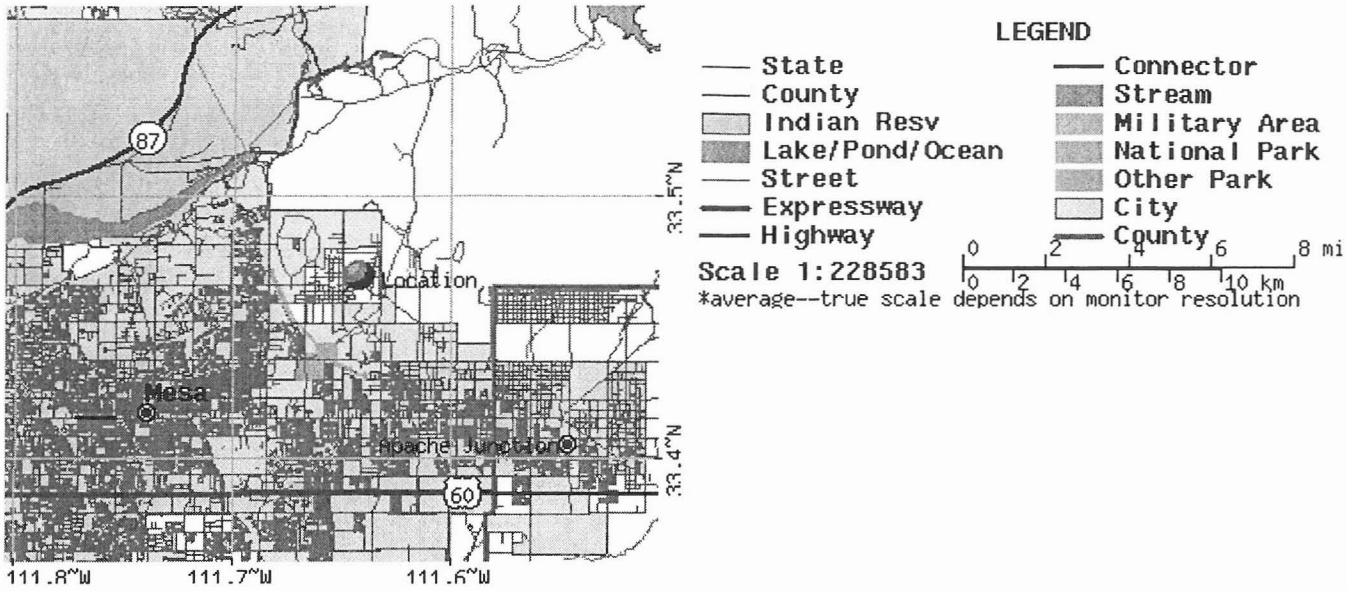
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Maps -



These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

Please read disclaimer for more information.



Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available
from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information
about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study,
please refer to our documentation.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (33.462301/-111.649832). Digital ASCII data can be obtained directly from **NCDC**.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps**.

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910

(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Rainfall Data

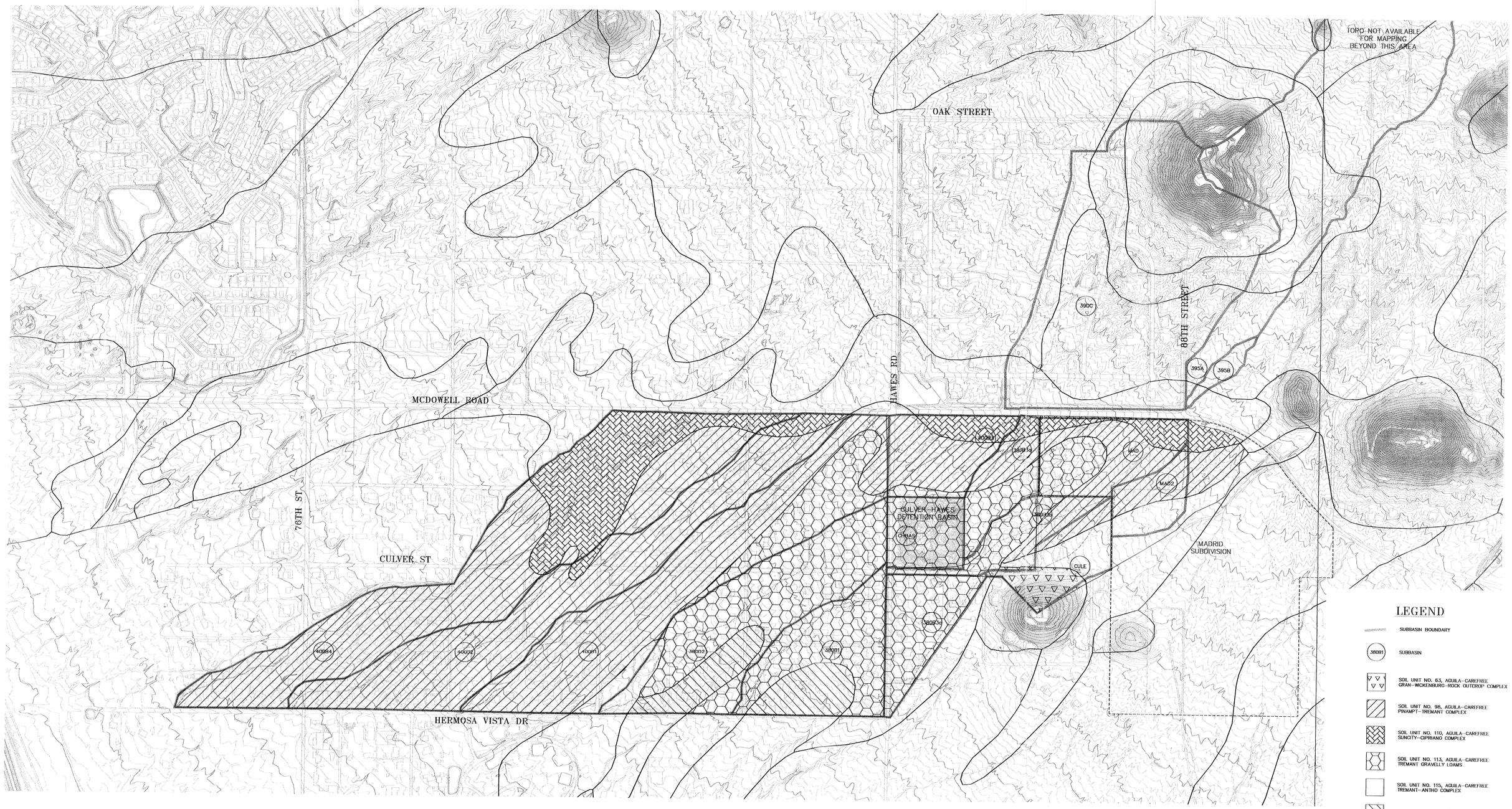
Primary Zone Number: **7** Latitude: **0.0** Elevation: **0**

Short Duration Zone Number: **8** Longitude: **0.0**

	Point Values (in)					
Duration	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
5 MIN	0.26	0.33	0.38	0.45	0.50	0.56
10 MIN	0.39	0.50	0.58	0.69	0.77	0.86
15 MIN	0.47	0.62	0.73	0.87	0.99	1.10
30 MIN	0.62	0.83	0.98	1.18	1.33	1.49
1 HOUR	0.76	1.03	1.21	1.47	1.66	1.86
2 HOUR	0.89	1.19	1.40	1.68	1.90	2.12
3 HOUR	0.99	1.30	1.52	1.83	2.06	2.30
6 HOUR	1.16	1.51	1.76	2.10	2.37	2.63
12 HOUR	1.40	1.84	2.15	2.57	2.90	3.22
24 HOUR	1.65	2.18	2.54	3.04	3.43	3.82

Hermos[illegible]ta
HEC-1 Soils distribution by sub-basin

Subbasin	Area	Soil Unit No. 63		Soil Unit No. 98		Soil Unit No. 110		Soil Unit No. 113		Soil Unit No. 115		Soil Unit No. 118	
	sq-mi	sq-mi	% area	sq-mi	% area	sq-mi	% area	sq-mi	% area	sq-mi	% area	sq-mi	% area
400B4	0.124			0.083	0.67	0.041	0.33						
400B2	0.083			0.078	0.94	0.005	0.06						
400B1	0.092			0.067	0.73			0.021	0.23	0.004	0.04		
380B2	0.066							0.050	0.76	0.004	0.06	0.012	0.18
380B1	0.042							0.030	0.72			0.012	0.28
400B3	0.024			0.016	0.67	0.006	0.25	0.002	0.08				
380B3a	0.017			0.006	0.37	0.002	0.11	0.009	0.52				
MAD	0.025			0.013	0.53	0.006	0.23	0.006	0.24				
380B3b	0.016			0.006	0.40			0.009	0.60				
CHBAS	0.015							0.015	1.00				
380B3c	0.022							0.022	1.00				
MAD2	0.020			0.012	0.60					0.008	0.40		
CULE	0.016	0.005	0.30	0.003	0.20					0.008	0.50		



HERMOSA VISTA/HAWES ROAD
STORM DRAIN & BASIN PROJECT

FIGURE 2
HEC-1
SOILS MAP

WOOD/PATEL
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Soil Data

	Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
Major Basin 01								
	400B4	Aguila/Carefree	98	0.083	66.9	0.37		
		Aguila/Carefree	110	0.041	33.1	0.13		
	400B2	Aguila/Carefree	98	0.078	94.0	0.37		
		Aguila/Carefree	110	0.005	6.0	0.13		
	400B1	Aguila/Carefree	98	0.067	72.8	0.37		
		Aguila/Carefree	113	0.021	22.8	0.39		
		Aguila/Carefree	115	0.004	4.3	0.39		
	380B2	Aguila/Carefree	113	0.050	75.8	0.39		
		Aguila/Carefree	115	0.004	6.1	0.39		
		Aguila/Carefree	118	0.012	18.2	0.42		
	380B1	Aguila/Carefree	113	0.030	71.4	0.39		
		Aguila/Carefree	118	0.012	28.6	0.42		
	380B3a	Aguila/Carefree	98	0.006	35.3	0.37		
		Aguila/Carefree	110	0.002	11.8	0.13		
		Aguila/Carefree	113	0.009	52.9	0.39		
	MAD	Aguila/Carefree	113	0.006	24.0	0.39		
		Aguila/Carefree	98	0.013	52.0	0.37		
		Aguila/Carefree	110	0.006	24.0	0.13		
	380B3b	Aguila/Carefree	98	0.006	37.5	0.37		
		Aguila/Carefree	113	0.010	62.5	0.39		
	CHBAS	Aguila/Carefree	113	0.015	100.0	0.39		
	380B3C	Aguila/Carefree	113	0.022	100.0	0.39		
	400B3	Aguila/Carefree	113	0.002	8.3	0.39		
		Aguila/Carefree	110	0.006	25.0	0.13		
		Aguila/Carefree	98	0.016	66.7	0.37		
	MAD2	Aguila/Carefree	98	0.012	60.0	0.37		
		Aguila/Carefree	115	0.008	40.0	0.39		
	CULE	Aguila/Carefree	63	0.005	31.3	0.14	25.0	100
		Aguila/Carefree	98	0.003	18.8	0.37		
		Aguila/Carefree	115	0.008	50.0	0.39		

* Custom Value (not default value)

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
Major Basin: 01										
400B4	V.L.D.R.	0.120	100.0	Normal	20.0	5	0.30	0.050	Low	0.054
400B2	V.L.D.R.	0.080	100.0	Normal	20.0	5	0.30	0.050	Low	0.056
400B1	V.L.D.R.	0.090	100.0	Normal	20.0	5	0.30	0.050	Low	0.056
380B2	V.L.D.R.	0.070	100.0	Normal	20.0	5	0.30	0.050	Low	0.057
380B1	V.L.D.R.	0.040	100.0	Normal	20.0	5	0.30	0.050	Low	0.061
400B3	M.D.R.	0.040	100.0	Normal	50.0	30	0.25	0.050	Low	0.061
380B3a	M.D.R.	0.040	100.0	Normal	50.0	30	0.25	0.050	Low	0.061
MAD	M.D.R.	0.040	100.0	Normal	50.0	30	0.25	0.050	Low	0.061
380B3b	M.D.R.	0.040	100.0	Normal	50.0	30	0.25	0.050	Low	0.061
CHBAS	OPEN	0.040	100.0	Dry	10.0		0.10	0.020	Min	0.031
380B3c	V.L.D.R.	0.040	100.0	Normal	20.0	5	0.30	0.050	Low	0.061
MAD2	M.D.R.	0.020	100.0	Normal	50.0	30	0.25	0.050	Low	0.065
CULE	V.L.D.R.	0.016	100.0	Normal	20.0	5	0.30	0.050	Low	0.066

* Custom Value (not default value)

HERMOSA VISTA HAWES ROAD
STORM DRAIN AND BASIN PROJECT
HEC-1 Sub-basin Parameters for Off-site Sub-basins

subbasin	area	area	area	length	length	high	low
new name	sq-ft	ac	sq-mi	ft	mi	ft	ft
400B4	3452482	79	0.124	5720	1.08	1734	1602
400B2	2305693	53	0.083	5766	1.09	1746	1618
400B1	2577094	59	0.092	4825	0.91	1752	1640
380B2	1847984	42	0.066	3277	0.62	1742	1662
380B1	1176272	27	0.042	2103	0.40	1732	1684
400B3	660636	15	0.024	1446	0.27	1780	1742
380B3a	463131	11	0.017	970	0.18	1780	1746
MAD	683538	16	0.025	1500	0.28	1816	1772
380B3b	436726	10	0.016	2160	0.41	1788	1730
CHBAS	429929	10	0.015	500	0.09	1740	1728
380B3c	615807	14	0.022	1600	0.30	1750	1708
MAD2	552033	13	0.020	1270	0.24	1814	1786
CULE	459637	11	0.016	1420	0.27	1788	1750

Wood, Patel & Associates, Inc.
052640 - Hermosa Vista/Hawes Road Storm Drain and Basin project

Sub Basin Data

6/17/2007

Basin: 01 | Storms: Multiple | Duration: 24 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

Sub Basin ID	Sub Basin Parameters: Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	Rainfall Losses: IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		Return Period (Years): 2	5	10	25	50	100
400B4	0.12	1.08	122.2	122.2	Natural	0.054	0.30	0.25	4.70	0.29	5	**Tc (hrs)**	0.92	0.80	0.74	0.67	0.63	0.60
												Vel (f/s)	1.72	1.98	2.14	2.36	2.50	2.64
												R (hrs)	1.18	1.01	0.93	0.83	0.78	0.73
400B2	0.08	1.09	117.4	117.4	Natural	0.056	0.30	0.25	4.25	0.39	5	**Tc (hrs)**	1.00	0.85	0.79	0.72	0.67	0.64
												Vel (f/s)	1.60	1.87	2.01	2.22	2.37	2.51
												R (hrs)	1.63	1.37	1.27	1.14	1.06	1.00
400B1	0.09	0.91	123.1	123.1	Natural	0.056	0.30	0.25	4.10	0.42	5	**Tc (hrs)**	0.91	0.77	0.72	0.65	0.61	0.58
												Vel (f/s)	1.47	1.72	1.86	2.04	2.18	2.31
												R (hrs)	1.20	1.01	0.93	0.83	0.77	0.73
380B2	0.07	0.62	129.0	129.0	Natural	0.057	0.30	0.25	3.95	0.44	5	**Tc (hrs)**	0.75	0.64	0.59	0.54	0.50	0.48
												Vel (f/s)	1.21	1.43	1.54	1.69	1.81	1.91
												R (hrs)	0.86	0.72	0.66	0.60	0.56	0.52
380B1	0.04	0.40	120.0	120.0	Natural	0.061	0.30	0.25	3.95	0.44	5	**Tc (hrs)**	0.64	0.54	0.50	0.46	0.43	0.41
												Vel (f/s)	0.92	1.08	1.16	1.28	1.37	1.45
												R (hrs)	0.66	0.55	0.51	0.46	0.42	0.40
400B3	0.02	0.27	140.7	140.7	Natural	0.061	0.25	0.25	4.55	0.41	30	**Tc (hrs)**	0.39	0.36	0.34	0.31	0.30	0.29
												Vel (f/s)	1.01	1.12	1.18	1.26	1.32	1.38
												R (hrs)	0.39	0.35	0.33	0.30	0.29	0.27
380B3a	0.02	0.18	188.9	188.9	Natural	0.061	0.25	0.25	4.30	0.48	30	**Tc (hrs)**	0.30	0.27	0.25	0.24	0.23	0.22
												Vel (f/s)	0.89	0.99	1.04	1.11	1.17	1.23
												R (hrs)	0.25	0.22	0.21	0.19	0.18	0.17
MAD	0.03	0.28	157.1	157.1	Natural	0.061	0.25	0.25	4.55	0.41	30	**Tc (hrs)**	0.39	0.35	0.33	0.31	0.29	0.28
												Vel (f/s)	1.06	1.17	1.24	1.33	1.40	1.46
												R (hrs)	0.38	0.34	0.32	0.30	0.28	0.27
380B3b	0.02	0.41	141.5	141.5	Natural	0.061	0.25	0.25	4.10	0.53	30	**Tc (hrs)**	0.49	0.44	0.42	0.39	0.37	0.36
												Vel (f/s)	1.22	1.36	1.43	1.53	1.61	1.68

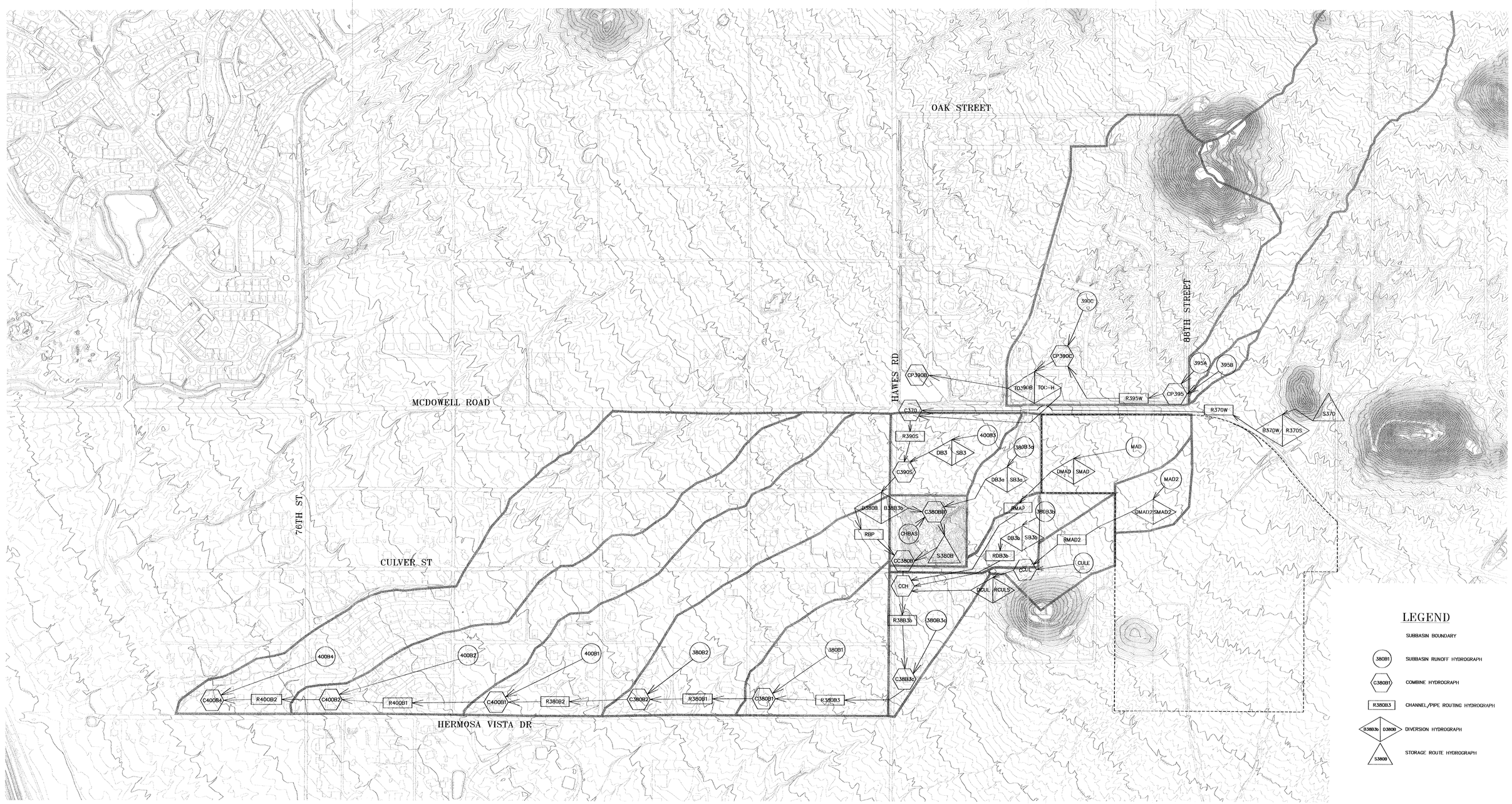
* Non default value

Sub Basin Data

Basin: 01 | Storms: Multiple | Duration: 24 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
												R (hrs)	0.87	0.78	0.73	0.68	0.64	0.61
CHBAS	0.02	0.09	133.3	133.3	Natural	0.031	0.10	0.35	4.00	0.39		**Tc (hrs)**	0.22	0.18	0.17	0.15	0.14	0.13
												Vel (f/s)	0.61	0.72	0.78	0.87	0.93	0.99
												R (hrs)	0.11	0.09	0.08	0.07	0.07	0.06
380B3c	0.02	0.30	140.0	140.0	Natural	0.061	0.30	0.25	4.00	0.43	5	**Tc (hrs)**	0.53	0.45	0.42	0.38	0.35	0.33
												Vel (f/s)	0.84	0.98	1.06	1.17	1.25	1.32
												R (hrs)	0.61	0.51	0.47	0.42	0.39	0.37
MAD2	0.02	0.24	116.7	116.7	Natural	0.065	0.25	0.25	4.10	0.53	30	**Tc (hrs)**	0.41	0.37	0.35	0.33	0.31	0.30
												Vel (f/s)	0.85	0.95	1.00	1.07	1.12	1.17
												R (hrs)	0.41	0.37	0.35	0.32	0.30	0.29
CULE	0.02	0.27	140.7	140.7	Natural	0.066	0.30	0.25	4.60	0.31	13	**Tc (hrs)**	0.45	0.40	0.38	0.34	0.33	0.31
												Vel (f/s)	0.88	0.99	1.06	1.15	1.21	1.28
												R (hrs)	0.57	0.50	0.46	0.42	0.40	0.37

* Non default value



HERMOSA VISTA/HAWES ROAD STORM DRAIN & BASIN PROJECT

FIGURE 3
SUBBASIN MAP &
HEC-1 SCHEMATIC

WOOD/PATEL
LAND DEVELOPMENT ■ WATER RESOURCES
TRANSPORTATION / TRAFFIC
WATER / WASTEWATER ■ SURVEYING
CONSTRUCTION MANAGEMENT
(602) 335-8500
PHOENIX ■ MESA ■ TUCSON

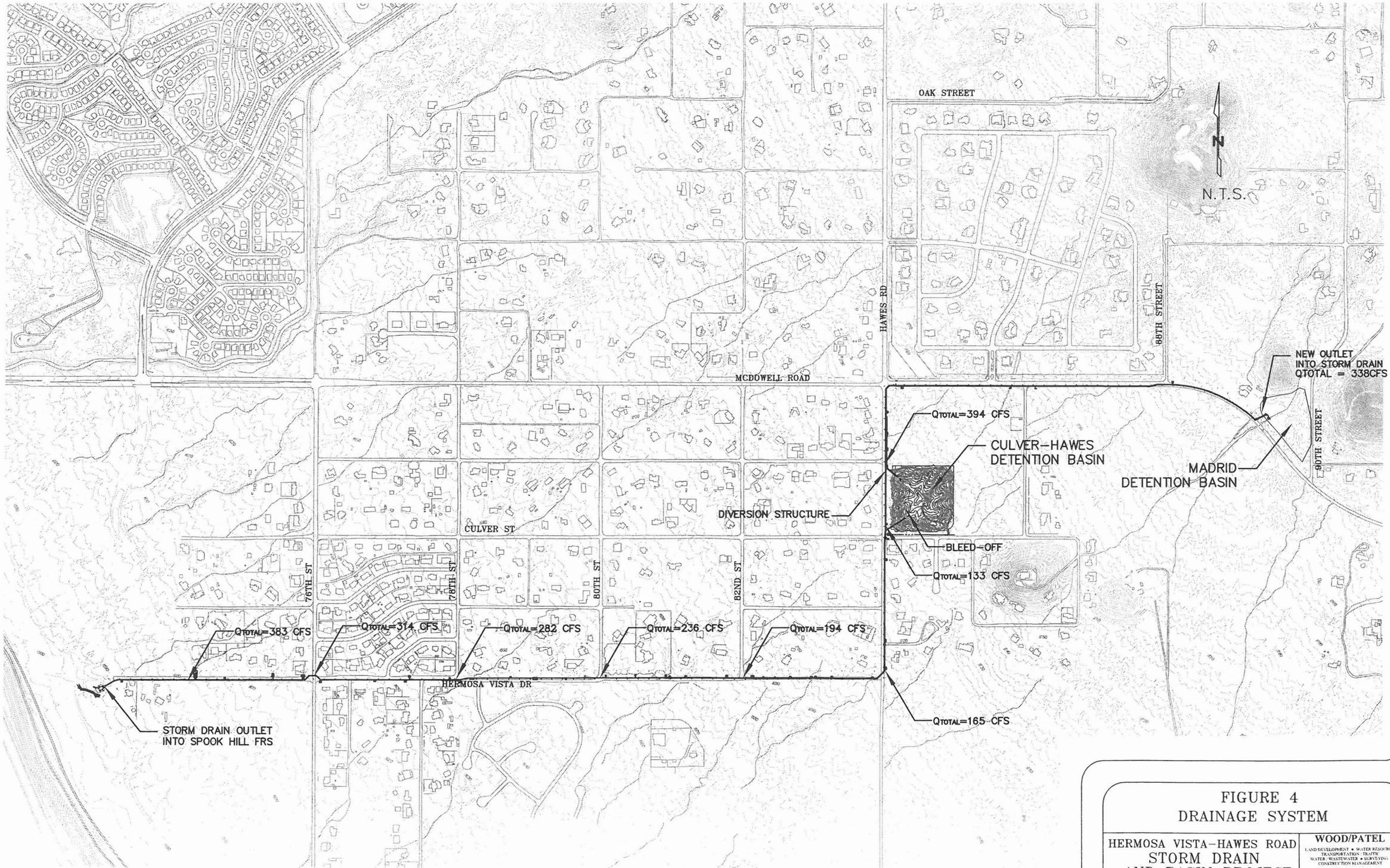


FIGURE 4
DRAINAGE SYSTEM

HERMOSA VISTA–HAWES ROAD
STORM DRAIN
AND BASIN PROJECT

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
TRANSPORTATION • TRAFFIC
WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT
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```
1****************************************                    *******************
*                                      *                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORP
*             JUN   1998               *                    *   HYDROLOGIC ENG
*           VERSION 4.1                *                    *         609 SECO
*                                      *                    *      DAVIS, CALI
*  RUN DATE   19FEB08  TIME  14:00:30  *                    *          (916) 7
*                                      *                    *
****************************************                    *******************

                                        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 HEC

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

1                                          HEC-1 INPUT

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

        1           ID   Hermosa Vista - Hawes Road Storm Drain and Basin Project
        2           ID   Wood,Patel & Associates, Inc., March, 2006
        3           ID
        4           ID   The McDowell Road Basin and Storm Drain Design model
        5           ID   (update to Spook Hill ADMP, April 2006) was used as a base for this model.
        6           ID
        7           ID   This model assumes that the Oak Street detention basin is installed,
        8           ID   and all flows pass through the Thunder Mountain detention basin.
        9           ID
       10           ID   Return Period = 100 Years, Rainfall Duration = 24 Hours
       11           ID
       12           ID   METHODOLOGY
       13           ID   THE US CORPS OF ENGINEERS FLOW HYDROGRAPH PACKAGE HEC-1 DATED JUNE 1998 V4.1
       14           ID   SCS TYPE II RAINFALL DISTRIBUTION
       15           ID   CLARK UNIT HYDROGRAPH
       16           ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
       17           ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
                    *
                    *DIAGRAM
       18           IT       2                    2000
       19           IO       5
       20           IN      15
       21           JD    3.82    0.01
       22           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
       23           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
       24           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
       25           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
       26           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
       27           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
       28           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
       29           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
       30           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
       31           PC    .983    .986    .989    .992    .995    .998   1.000
       32           JD   3.787    1.00
       33           JD   3.677    5.80
       34           JD   3.574   10.66
       35           JD   3.539   13.70
       36           JD   3.467   20.00
       37           JD   3.315   50.00
                    *

       38           KK      10
```

```
 39          KM   SUB-BASIN 10
 40          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 41          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .996
 42          KM     L = 2.00  Kb = .044  Adj. Slope =  165.0
 43          BA    .690
 44          LG    .350    .310   7.600    .090  16.000
 45          UC    .421    .305
 46          UA       0       3       5       8      12      20      43      75      90      96
 47          UA     100
             *
1                                          HEC-1 INPUT

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

 48          KK     R10
 49          KM   ROUTING OF FLOW FROM SUB-BASIN 10 TO R12
 50          RS       4    FLOW      -1
 51          RC    .045     .03    .045    8700    .021
 52          RX       0       1       2      17      27      42      43      44
 53          RY       5       5       5       0       0       5       5       5
             *

 54          KK     R12
 55          KM   ROUTING OF FLOW FROM R12 TO SUB-BASIN 20
 56          RS       7    FLOW      -1
 57          RC    .045     .03    .045    4500     .01
 58          RX       0       1      45    52.5    72.5      80     124     125
 59          RY       4     2.5     2.5       0       0     2.5     2.5       4
             *

 60          KK      20
 61          KM   SUB-BASIN 20
 62          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 63          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .993
 64          KM     L = 2.50  Kb = .040  Adj. Slope =   88.0
 65          BA   1.167
 66          LG    .310    .290   5.800    .220  11.000
 67          UC    .629    .422
 68          UA       0       5      16      30      65      77      84      90      94      97
 69          UA     100
             *

 70          KK     D20
 71          KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
 72          KM        MAXIMUM VOLUME DIVERSION = 47.8 acre-feet
 73          DT    BS20    47.8
 74          DI       0   10000
 75          DQ       0   10000
             *

 76          KK    RT20
 77          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
 78          DR    BS20
             *

 79          KK     S20
 80          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
 81          KM   BLEEDOFF FLOW = 17 CFS
             *  KO     3
 82          RS       1    STOR       0
 83          SV       0     .01    47.8      70
 84          SQ       0     0.5    17.0      50
             *
1                                          HEC-1 INPUT

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

 85          KK     C20
 86          KM   HYDROGRAPH COMBINATION
 87          HC       3
             *

 88          KK     R20
 89          KM        ROUTE FLOW THROUGH BULLDOG FLOODWAY FROM APACHE JUNCTION FRS
 90          RS       1    FLOW      -1
 91          RC    .016    .016    .016     990    .004
 92          RX       0       5       7    14.5    34.5      42      44      50
 93          RY       4       2       2       0       0       2       2       4
```

```
                *
 94             KK      40
 95             KM   SUB-BASIN 40
 96             KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 97             KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
 98             KM     L = 3.08  Kb = .036  Adj. Slope =  189.0
 99             BA   2.227
100             LG    .320    .300   4.900    .310  11.000
101             UC    .492    .262
102             UA       0       3       5       8      12      20      43      75      90      96
103             UA     100
                *

104             KK     D40
105             KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
106             KM        MAXIMUM VOLUME DIVERSION = 39.1 acre-feet
107             DT    BS40    39.1
108             DI       0   10000
109             DQ       0   10000
                *

110             KK    RT40
111             KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
112             DR    BS40
                *

113             KK     S40
114             KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
115             KM   BLEEDOFF FLOW = 14 CFS
116             RS       1    STOR       0
117             SV       0     .01    39.1      60
118             SQ       0     0.5    14.0      40
                *

119             KK     C40
120             KM   HYDROGRAPH COMBINATION
121             HC       3
                *
                                          HEC-1 INPUT

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

122             KK      60
123             KM   SUB-BASIN 60
124             KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
125             KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .989
126             KM     L = 4.19  Kb = .038  Adj. Slope =  209.6
127             BA   1.751
128             LG    .320    .340   5.800    .190  10.000
129             UC    .592    .472
130             UA       0       3       5       8      12      20      43      75      90      96
131             UA     100
                *
                *

132             KK     D60
133             KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
134             KM        MAXIMUM VOLUME DIVERSION = 4.60 acre-feet
135             DT    BS60     4.6
136             DI       0   10000
137             DQ       0   10000
                *

138             KK    RT60
139             KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
140             DR    BS60
                *

141             KK    SB60
142             KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
143             KM   BLEEDOFF FLOW = 2 CFS
144             RS       1    STOR       0
145             SV       0     .01     4.6      10
146             SQ       0     0.5     2.0      10
                *

147             KK     C60
148             KM   HYDROGRAPH COMBINATION
```

```
 149          HC       3
              *
              *

 150          KK     S60
 151          KM   APACHE JUNCTION FRS AS-BUILT PLANS 12/19/88
 152          KM   OUTLET PIPE=30"RCP; L=136.6'; INLET INV.=1783.5; OUTLET INV.=1783
 153          KM   EMERGENCY SPILLWAY ELEV.=1799.77'; PRINCIPAL SPILLWAY ELEV.=1793.5'
 154          KM   STORAGE VOLUME BELOW PRINCIPAL SPILLWAY FOR SEDIMENT = 100 ACRE-FEET
              *  ESE = 1799.77 ft; PSE = 1793.5 ft; Sediment Vol. = 130 Ac-Ft.
 155          RS       1    STOR       0
 156          SV       0    46.8     106     130   161.2   170.7   230.7   322.2     543   812.9
 157          SV    1122  1470.1    1865
 158          SQ       0    0.01    0.02    26.3    74.4    91.2    96.2   102.4   113.9    1650
 159          SQ    7700   15200   26200
 160          SE   791.4     793   794.1   794.5     795   795.1     796   797.1   799.4   801.7
 161          SE     804   806.3   808.6
              *
1                                          HEC-1 INPUT

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

 162          KK     R60
 163          KM        ROUTE FLOW THROUGH BULLDOG FLOODWAY FROM APACHE JUNCTION FRS
 164          RS       2    FLOW      -1
 165          RC    .016    .016    .016    2850    .012
 166          RX       0       1       2     2.1     5.6     5.7       6       7
 167          RY     4.5     3.5     3.5       0       0     3.5     3.5     4.5
              *

 168          KK    RR60
 169          KM   ROUTE FLOW FROM BULLDOG FLOODWAY TO SUB-BASIN 80
 170          RS       3    FLOW      -1
 171          RC    .016    .016    .016    3500    .005
 172          RX       0       1       2     2.1     7.1     7.2       8       9
 173          RY     4.5     3.5     3.5       0       0     3.5     3.5     4.5
              *

 174          KK      80
 175          KM   SUB-BASIN 80
 176          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 177          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .991
 178          KM     L = 2.69  Kb = .039  Adj. Slope =  229.8
 179          BA   1.493
 180          LG    .320    .300   5.600    .220   7.000
 181          UC    .429    .254
 182          UA       0       5      16      30      65      77      84      90      94      97
 183          UA     100
              *

 184          KK     D80
 185          KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
 186          KM        MAXIMUM VOLUME DIVERSION = 18.9 acre-feet
 187          DT    BS80    18.9
 188          DI       0   10000
 189          DQ       0   10000
              *

 190          KK    RT80
 191          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
 192          DR    BS80
              *

 193          KK     S80
 194          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
 195          KM   BLEEDOFF FLOW =  7 CFS
 196          RS       1    STOR       0
 197          SV       0     .01    18.9      30
 198          SQ       0     1.0     7.0      20
              *
1                                          HEC-1 INPUT

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

 199          KK     C80
 200          KM   HYDROGRAPH COMBINATION
 201          HC       2
              *
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```
202          KK    CC80
203          KM   HYDROGRAPH COMBINATION FOR FLOW FROM APACHE JUNCTION FRS & SUB-BASIN 80
204          HC       2   1.493
             *

205          KK     R80
206          KM   ROUTE FLOW FROM SUB-BASIN 80 TO SUB-BASIN 100
207          RS       2    FLOW      -1
208          RC    .025    .016    .025    1200    .003
209          RX       0       2       6     6.1    41.1    41.2    56.2    58.2
210          RY     5.5     4.5     4.5       0       0     4.5     4.5     5.5
             *

211          KK     100
212          KM   SUB-BASIN 100
213          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
214          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
215          KM     L = 1.94  Kb = .045  Adj. Slope =  108.0
216          BA    .488
217          LG    .300    .250   5.100    .280   9.000
218          UC    .517    .455
219          UA       0       5      16      30      65      77      84      90      94      97
220          UA     100
             *

221          KK    D100
222          KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
223          KM        MAXIMUM VOLUME DIVERSION = 10.0 acre-feet
224          DT   BS100    10.0
225          DI       0   10000
226          DQ       0   10000
             *

227          KK   RT100
228          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
229          DR   BS100
             *

230          KK    S100
231          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
232          KM   BLEEDOFF FLOW =  4 CFS
233          RS       1    STOR       0
234          SV       0     .01    10.0      20
235          SQ       0     1.0     4.0      10
             *
1                                          HEC-1 INPUT

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

236          KK    C100
237          KM   HYDROGRAPH COMBINATION FOR FLOW FROM SUB-BASIN 80 & 100
238          HC       3
             *

239          KK    R100
240          KM   ROUTE FLOW FROM SUB-BASIN 100 TO SUB-BASIN 120
241          RS       1    FLOW      -1
242          RC    .016    .016    .016     940    .004
243          RX       0       1       2     2.1    52.1    52.2      53      54
244          RY     4.5     4.5     4.5       0       0     4.5     4.5     4.5
             *

245          KK     120
246          KM   SUB-BASIN 120
247          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
248          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
249          KM     L = 3.07  Kb = .037  Adj. Slope =  239.0
250          BA   2.197
251          LG    .330    .280   6.800    .130  12.000
252          UC    .429    .227
253          UA       0       3       5       8      12      20      43      75      90      96
254          UA     100
             *

255          KK    D120
256          KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
257          KM        MAXIMUM VOLUME DIVERSION = 5.7 acre-feet
258          DT   BS120     5.7
```

```
259          DI       0   10000
260          DQ       0   10000
             *

261          KK   RT120
262          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
263          DR   BS120
             *

264          KK    S120
265          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
266          KM   BLEEDOFF FLOW =  2 CFS
267          RS       1    STOR       0
268          SV       0     .01     5.7      15
269          SQ       0     1.0     2.0      10
             *

270          KK    C120
271          KM   HYDROGRAPH COMBINATION FOR FLOW FROM SUB-BASIN 100 & 120
272          HC       3
             *
1                                        HEC-1 INPUT

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

273          KK    R120
274          KM   ROUTE FLOW FROM SUB-BASIN 120 TO SIGNAL BUTTE FRS
275          RS       2    FLOW      -1
276          RC    .025    .016    .025    2100    .005
277          RX       0       6      10    10.1    60.1    60.2    74.2    80.2
278          RY       8       5       5       0       0       5       5       8
             *

279          KK     140
280          KM   SUB-BASIN 140
281          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
282          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .996
283          KM     L = 1.61  Kb = .044  Adj. Slope =  149.0
284          BA    .598
285          LG    .310    .280   4.200    .440   5.000
286          UC    .421    .278
287          UA       0       5      16      30      65      77      84      90      94      97
288          UA     100
             *
             *

289          KK    D140
290          KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
291          KM        MAXIMUM VOLUME DIVERSION = 5.9 acre-feet
292          DT   BS140     5.9
293          DI       0   10000
294          DQ       0   10000
             *

295          KK   RT140
296          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
297          DR   BS140
             *

298          KK    S140
299          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
300          KM   BLEEDOFF FLOW =  2 CFS
301          RS       1    STOR       0
302          SV       0     .01     5.9      15
303          SQ       0     1.0     2.0      10
             *
             *

304          KK    C140
305          KM   HYDROGRAPH COMBINATION
306          HC       3
             *
             *
                                         HEC-1 INPUT

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

307          KK     150
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```
308          KM   SUB-BASIN 150
309          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
310          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
311          KM     L = 1.50  Kb = .047  Adj. Slope =  314.6
312          BA    .407
313          LG    .350    .360   5.100    .260   7.000
314          UC    .296    .221
315          UA       0       3       5       8      12      20      43      75      90      96
316          UA     100
             *

317          KK    R150
318          KM   ROUTING OF FLOW FROM SUB-BASIN 150 TO R152
319          RS       2    FLOW      -1
320          RC    .045     .04    .045    3100    .032
321          RX       0       1       2      23      33      54      55      56
322          RY       7       7       7       0       0       7       7       7
             *

323          KK    R152
324          KM   ROUTING OF FLOW FROM R152 TO SUB-BASIN 160
325          RS       3    FLOW      -1
326          RC    .045     .03    .045    5900    .019
327          RX       0       1       2       8      33      39      40      41
328          RY       2       2       2       0       0       2       2       2
             *

329          KK     160
330          KM   SUB-BASIN 160
331          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
332          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
333          KM     L = 2.10  Kb = .047  Adj. Slope =  129.0
334          BA    .365
335          LG    .340    .330   4.150    .440   1.000
336          UC    .587    .659
337          UA       0       3       5       8      12      20      43      75      90      96
338          UA     100
             *
             *

339          KK    D160
340          KM        100-YEAR 2-HOUR ONSITE RETENTION BASIN
341          KM        MAXIMUM VOLUME DIVERSION = 1.2 acre-feet
342          DT   BS160     1.2
343          DI       0   10000
344          DQ       0   10000
             *
1                                          HEC-1 INPUT

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

345          KK   RT160
346          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
347          DR   BS160
             *

348          KK    S160
349          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
350          KM   BLEEDOFF FLOW =  1 CFS
351          RS       1    STOR       0
352          SV       0     .01     1.2      10
353          SQ       0     0.5     1.0      10
             *

354          KK    C160
355          KM   HYDROGRAPH COMBINATION
356          HC       3
             *
             *

357          KK     180
358          KM   SUB-BASIN 180
359          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
360          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
361          KM     L = 2.42  Kb = .041  Adj. Slope =  140.0
362          BA   1.014
363          LG    .350    .350   4.150    .430    .000
364          UC    .571    .400
365          UA       0       3       5       8      12      20      43      75      90      96
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366          UA     100
             *

367          KK    C180
368          KM   HYDROGRAPH COMBINATION FOR SIGNAL BUTTE FRS
369          HC       3
             *

370          KK     210
371          KM   SUB-BASIN 210
372          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
373          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
374          KM     L = 1.84  Kb = .043  Adj. Slope =  315.0
375          BA    .792
376          LG    .350    .360   6.800    .130   4.000
377          UC    .313    .189
378          UA       0       3       5       8      12      20      43      75      90      96
379          UA     100
             *

380          KK    R210
381          KM   ROUTING OF FLOW FROM SUB-BASIN 210 TO SUB-BASIN 220
382          RS       2    FLOW      -1
383          RC    .045     .03    .045    5100    .022
384          RX       0       1       2      14      34      46      47      48
385          RY       4       4       4       0       0       4       4       4
             *
1                                                HEC-1 INPUT

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

386          KK     240
387          KM   SUB-BASIN 240
388          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
389          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .992
390          KM     L = 3.50  Kb = .039  Adj. Slope =  298.6
391          BA   1.408
392          LG    .350    .370   5.300    .230   2.000
393          UC    .467    .356
394          UA       0       3       5       8      12      20      43      75      90      96
395          UA     100
             *

396          KK    C240
397          KM   HYDROGRAPH COMBINATION FOR SUB-BASIN 240 & 220
398          HC       2
             *

399          KK    S240
400          KM    WEIR GEOMETRY OBTAINED FROM AS-BUILT PLANS @ PASS MTN. DIVERSION.
401          KM   WEIR STORAGE DATA OBTAINED FROM 2' CONTOUR MAPPING.
402          RS       1    STOR       0
403          SA    1.38    14.2    36.5
404          SE     1.7       5      11
405          SS       5      42       3     1.5
             *

406          KK    R240
407          KM   ROUTE FLOW FROM SUB-BASIN 240 TO SUB-BASIN 220
408          KM   PASS MOUNTAIN DIVERSION
409          RS       1    FLOW      -1
410          RC    .035    .025    .035    1800    .005
411          RX       0      15      30      39      69      81      96     111
412          RY     3.6     3.3       3       0       0       3       3       4
             *

413          KK     220
414          KM   SUB-BASIN 220
415          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
416          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
417          KM     L = 1.92  Kb = .046  Adj. Slope =  315.0
418          BA    .473
419          LG    .350    .350   7.000    .120   5.000
420          UC    .333    .282
421          UA       0       3       5       8      12      20      43      75      90      96
422          UA     100
             *

423          KK    C220
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 424          KM   HYDROGRAPH COMBINATION FOR SUB-BASIN 240 & 220
 425          HC       2
              *
                                          HEC-1 INPUT

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


 426          KK   SW220
 427          KM    WEIR GEOMETRY OBTAINED FROM AS-BUILT PLANS @ PASS MTN. DIVERSION.
 428          KM   WEIR STORAGE DATA OBTAINED FROM 2' CONTOUR MAPPING.
 429          RS       1    STOR       0
 430          SA     .78     4.1    13.7
 431          SE       1       3      10
 432          SS       3      65       3     1.5
              *

 433          KK    R220
 434          KM   ROUTE FLOW FROM SUB-BASIN 220 TO SUB-BASIN 200
 435          KM   PASS MOUNTAIN DIVERSION
 436          RS       1    FLOW      -1
 437          RC    .035    .025    .035    1250    .005
 438          RX       0      50     100     109     139     148     178     184
 439          RY       5       4       3       0       0       3       3       5
              *

 440          KK     190
 441          KM   SUB-BASIN 190
 442          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 443          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
 444          KM     L = 1.91  Kb = .042  Adj. Slope =  315.0
 445          BA    .918
 446          LG    .350    .390   5.800    .190   8.000
 447          UC    .321    .185
 448          UA       0       3       5       8      12      20      43      75      90      96
 449          UA     100
              *

 450          KK    R190
 451          KM   ROUTING OF FLOW FROM SUB-BASIN 190 TO SUB-BASIN 200
 452          RS       2    FLOW      -1
 453          RC    .045     .03    .045    4740     .03
 454          RX       0       1       2      17      37      52      53      54
 455          RY       5       5       5       0       0       5       5       5
              *

 456          KK    R192
 457          KM   ROUTING OF FLOW FROM SUB-BASIN 190 TO SUB-BASIN 200
 458          RS       3    FLOW      -1
 459          RC    .045    .035    .045    2200    .018
 460          RX       0       1      50      59      79      88     137     138
 461          RY     4.5       3       3       0       0       3       3     4.5
              *

 462          KK     200
 463          KM   SUB-BASIN 200
 464          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 465          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
 466          KM     L = 1.58  Kb = .045  Adj. Slope =  305.6
 467          BA    .530
 468          LG    .350    .390   5.700    .200  10.000
 469          UC    .300    .201
1                                         HEC-1 INPUT

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

 470          UA       0       3       5       8      12      20      43      75      90      96
 471          UA     100
              *

 472          KK    C200
 473          KM   HYDROGRAPH COMBINATION FOR SUB-BASIN 220 & 200
 474          HC       3
              *

 475          KK   SW200
 476          KM    WEIR GEOMETRY OBTAINED FROM AS-BUILT PLANS @ PASS MTN. DIVERSION.
 477          KM   WEIR STORAGE DATA OBTAINED FROM 2' CONTOUR MAPPING.
 478          RS       1    STOR       0
 479          SA    2.56     3.1     9.4
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```
480          SE       0       3      10
481          SS       3     112       3     1.5
             *

482          KK    R200
483          KM   ROUTE FLOW FROM SUB-BASIN 200 TO SIGNAL BUTTE FRS through storage
484          RS       1    FLOW      -1
485          RC    .035    .025    .035     650    .005
486          RX       0       1       2      17     117     132     133     134
487          RY       5       5       5       0       0       5       5       5
             *

488          KK   SS200
489          KM    WEIR GEOMETRY OBTAINED FROM AS-BUILT PLANS @ PASS MTN. DIVERSION.
490          KM   WEIR STORAGE DATA OBTAINED FROM 2' CONTOUR MAPPING.
491          RS       1    STOR       0
492          SA       8     9.2     9.2
493          SE       0       7      10
494          SS       7     251       3     1.5
             *

495          KK   RR200
496          KM   ROUTE FLOW FROM SUB-BASIN 200 TO SIGNAL BUTTE FRS
497          RS       4    FLOW      -1
498          RC    .035    .025    .035    3150    .005
499          RX       0       1       2      17     117     132     133     134
500          RY       5       5       5       0       0       5       5       5
             *

501          KK   CC180
502          KM   HYDROGRAPH COMBINATION FOR SIGNAL BUTTE FRS
503          HC       2
             *

504          KK    S180
505          KM   SIGNAL BUTTE FRS DATED 1/28/85
506          KM   OUTLET PIPE=36"RCP; L= 147';  INLET INV.=1690; OUTLET INV.=1687
507          KM   EMERGENCY SPILLWAY ELEV.=1712.4; PRINCIPAL SPILLWAY ELEV.=1701
508          KM   STORAGE VOLUME BELOW PRINCIPAL SPILLWAY FOR SEDIMENT = 250 ACRE-FEET
             *  ESE = 1712.4 ft; PSE = 1701.0 ft; Sediment Vol. = 247 Ac-Ft.
509          RS       1    STOR       0
1                                          HEC-1 INPUT

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

510          SV       0   172.1   273.3   482.2   871.3  1101.5  1163.5  1294.1  1390.2  1432.1
511          SV  1446.1  1578.8  1733.6  1980.3  2712.2    3121    3530
512          SQ       0    10.2    10.7   121.8   138.4   145.9   147.7   151.4     154     155
513          SQ     156     390     820    1950    6600    9500   12400
514          SE     696     700   701.4     704     708     710   710.5   711.5   712.2   712.5
515          SE   712.6   713.5   714.5     716     720     722     724
             *

516          KK    R180
517          KM   Routing length updated using Signal Butte Floodway plans dated March 1983
518          KM   Routing length increased 100' from 1500' to 1600'    12/12/00
519          KM   CHANNEL GEOMETRY FOR SIGNAL BUTTE FRS OBTAINED FROM AS-BUILT PLANS.
520          KM   ROUTE FLOW FROM SIGNAL BUTTE FRS TO SUB-BASIN 260
521          RS       1    FLOW      -1
522          RC    .035    .025    .035    1600    .003
523          RX       0       1       2    22.6    38.6    59.2      60      61
524          RY     9.3     9.3     9.3       0       0     9.3     9.3     9.3
             *

525          KK     260
526          KM   SUB-BASIN 260
527          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
528          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
529          KM     L =  .81  Kb = .046  Adj. Slope =   68.0
530          BA    .263
531          LG    .280    .210   6.600    .160  11.000
532          UC    .350    .209
533          UA       0       5      16      30      65      77      84      90      94      97
534          UA     100
             *

535          KK    C260
536          KM   HYDROGRAPH COMBINATION FOR OUTFLOW OF SIGNAL BUTTE FRS & SUB-BASIN 260
537          HC       2    .263
             *
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538          KK    R260
539          KM   Routing length updated using Signal Butte Floodway plans dated March 1983
540          KM   Routing length unchanged     12/12/00
541          KM   CHANNEL GEOMETRY FOR SIGNAL BUTTE FRS OBTAINED FROM AS-BUILT PLANS.
542          KM   ROUTE FLOW FROM SUB-BASIN 260 TO SUB-BASIN 280
543          RS       3    FLOW      -1
544          RC    .035    .025    .035    2300    .003
545          RX       0       1       2    23.4    43.4    64.8      65      66
546          RY     9.7     9.7     9.7       0       0     9.7     9.7     9.7
             *

547          KK     280
548          KM   SUB-BASIN 280
549          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
550          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
551          KM     L =  .77  Kb = .048  Adj. Slope =   84.0
552          BA    .319
553          LG    .300    .250   5.300    .290  15.000
554          UC    .329    .168
1                                          HEC-1 INPUT

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

555          UA       0       5      16      30      65      77      84      90      94      97
556          UA     100
             *

557          KK    C280
558          KM   HYDROGRAPH COMBINATION FOR SUB-BASIN 260 & SUB-BASIN 280
559          HC       2
             *

560          KK    R280
561          KM   Routing length updated using Signal Butte Floodway plans dated March 1983
562          KM   Routing length decreased 400' from 2500' to 2100'    12/12/00
563          KM   CHANNEL GEOMETRY FOR SIGNAL BUTTE FRS OBTAINED FROM AS-BUILT PLANS.
564          KM   ROUTE FLOW FROM SUB-BASIN 280 TO SUB-BASIN 300
565          RS       3    FLOW      -1
566          RC    .035    .025    .035    2100    .003
567          RX       0       1       2    23.4    43.4    64.8      65      66
568          RY     9.7     9.7     9.7       0       0     9.7     9.7     9.7
             *

569          KK     300
570          KM   SUB-BASIN 300
571          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
572          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
573          KM     L =  .78  Kb = .049  Adj. Slope =  103.0
574          BA    .289
575          LG    .300    .250   4.200    .520  16.000
576          UC    .321    .174
577          UA       0       5      16      30      65      77      84      90      94      97
578          UA     100
             *

579          KK    C300
580          KM   HYDROGRAPH COMBINATION OF SUB-BASIN 280 & 300
581          HC       2
             *
             *

582          KK    R300
583          KM   Routing length updated using Signal Butte Floodway plans dated March 1983
584          KM   Routing length increased 300' from 2200' to 2500'    12/12/00
585          KM   CHANNEL GEOMETRY FOR SIGNAL BUTTE FRS OBTAINED FROM AS-BUILT PLANS.
586          KM   ROUTE FLOW FROM SUB-BASIN 300 TO START OF FLOODWAY CONCRETE CHANNEL
587          RS       2    FLOW      -1
588          RC    .035    .025    .035    2500    .003
589          RX       0       1       2    23.4    55.4    76.8      77      78
590          RY     9.7     9.7     9.7       0       0     9.7     9.7     9.7
             *
             *
1                                          HEC-1 INPUT

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

591          KK    305A
592          KM   SUB-BASIN 305A
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593          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
594          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
595          KM     L =  .98  Kb = .048  Adj. Slope =   82.0
596          BA    .316
597          LG    .340    .320   4.600    .350  12.000
598          UC    .400    .254
599          UA       0       5      16      30      65      77      84      90      94      97
600          UA     100
             *
             *

601          KK    C305
602          KM   HYDROGRAPH COMBINATION OF SUB-BASIN 300 AND 305A
603          HC       2
             *

604          KK    R305
605          KM   Routing length updated using Signal Butte Floodway plans dated March 1983
606          KM   CHANNEL GEOMETRY FOR SPOOK HILL FRS OBTAINED FROM AS-BUILTS PLANS.
607          KM   CONTINUE TO ROUTE FLOW WITHIN CONCRETE CHANNEL TO SPOOK HILL FRS
608          RS       2    FLOW      -1
609          RC    .016    .016    .016    4000   .0146
610          RX       0       1       2     2.1    16.1    16.2      17      18
611          RY     7.5     7.5     7.5       0       0     7.5     7.5     7.5
             *
             *

612          KK   320B1
613          KM   SUB-BASIN 320B1
614          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
615          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
616          KM     L = 1.13  Kb = .046  Adj. Slope =  106.0
617          BA    .454
618          LG    .300    .260   4.800    .310  17.000
619          UC    .375    .215
620          UA       0       5      16      30      65      77      84      90      94      97
621          UA     100
             *
             *

622          KK  D320B1
623          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
624          KM   DETENTION/RETENTION BASINS LOCATED WITHIN THREE SUBDIVISIONS
625          KM   SIERRA HEIGHTS       FALCON RIDGE    & MARBLE CREEK
626          KM        MAXIMUM VOLUME DIVERSION =  9.3 acre-feet
627          DT  B320B1    9.30
628          DI       0   10000
629          DQ       0   10000
             *
1                                          HEC-1 INPUT

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


630          KK  T320B1
631          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
632          DR  B320B1
             *

633          KK  S320B1
634          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
635          KM   9.30 ACRE-FEETx43560/36x3600=4.cfs
636          RS       1    STOR       0
637          SV       0     .01     9.3    15.0
638          SQ       0     0.5     4.0    50.0
             *

639          KK  C320B1
640          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
641          HC       3
             *
             *

642          KK     350
643          KM   SUB-BASIN 350
644          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
645          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
646          KM     L = 2.22  Kb = .041  Adj. Slope =  315.0
647          BA    .997
648          LG    .350    .350   4.550    .340   4.000
```

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649          UC    .363    .227
650          UA       0       3       5       8      12      20      43      75      90      96
651          UA     100
             *

652          KK    D350
653          KM   DIVERT FLOW FROM SUB-BASIN 350. FOR MODELING PURPOSES THE SPLIT FLOW WILL
654          KM   BE ROUTED BETWEEN SUB-BASINS 355 & 310. THE MAIN FLOW WILL ROUTED TO 310
655          DT   SF350
656          DI       0    5000
657          DQ       0    2500
             *

658          KK    R350
659          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING
660          KM   ROUTING OF MAIN FLOW FROM DIVERSION OF SUB-BASIN 350 TO SUB-BASIN 310
661          RS       7    FLOW      -1
662          RC    .045    .035    .045    5150    .025
663          RX       0       1      40      46      56      62     102     103
664          RY       3       2       2       0       0       2       2       3
             *

665          KK     310
666          KM   SUB-BASIN 310
667          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
668          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
669          KM     L = 2.70  Kb = .045  Adj. Slope =  283.5
670          BA    .538
1                                          HEC-1 INPUT

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

671          LG    .350    .350   3.910    .480    .000
672          UC    .483    .520
673          UA       0       3       5       8      12      20      43      75      90      96
674          UA     100
             *

675          KK    C310
676          KM   HYDROGRAPH COMBINATION OF SUB-BASINS 350 & 310
677          HC       2    1.04
             *

678          KK    R310
679          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
680          KM   ROUTING OF FLOW FROM SUB-BASIN 310 TO 320B
681          RS      10    FLOW      -1
682          RC    .045    .035    .045    8550    .022
683          RX       0       1      40      46      56      62     102     103
684          RY       3       2       2       0       0       2       2       3
             *
             *

685          KK    305B
686          KM   SUB-BASIN 305B
687          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
688          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
689          KM     L = 1.70  Kb = .047  Adj. Slope =  124.0
690          BA    .386
691          LG    .350    .350   4.500    .350    .000
692          UC    .492    .443
693          UA       0       3       5       8      12      20      43      75      90      96
694          UA     100
             *
             *

695          KK   R305B
696          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
697          KM   ROUTING OF FLOW FROM SUB-BASINS 305B TO SUB-BASIN 320B2.
698          RS       3    FLOW      -1
699          RC    .045    .035    .045    1700    .016
700          RX       0       1      40      46      56      62     102     103
701          RY       3       2       2       0       0       2       2       3
             *
             *

702          KK   320B2
703          KM   SUB-BASIN 320B2
704          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
705          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
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 706          KM     L = 1.08  Kb = .050  Adj. Slope =  120.0
 707          BA    .220
 708          LG    .300    .270   4.500    .380   9.000
 709          UC    .375    .314
 710          UA       0       5      16      30      65      77      84      90      94      97
 711          UA     100
              *
              *
1                                          HEC-1 INPUT

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

 712          KK  D320B2
 713          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
 714          KM   DETENTION/RETENTION BASINS LOCATED WITHIN THREE SUBDIVISIONS
 715          KM   SIERRA HEIGHTS       FALCON RIDGE    & MARBLE CREEK
 716          KM        MAXIMUM VOLUME DIVERSION =  3.32acre-feet
 717          DT  B320B2    3.32
 718          DI       0   10000
 719          DQ       0   10000
              *

 720          KK  T320B2
 721          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
 722          DR  B320B2
              *

 723          KK  S320B2
 724          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
 725          KM   3.32 ACRE-FEETx43560/36x3600=1.2cfs
 726          RS       1    STOR       0
 727          SV       0     .01     3.3     5.0
 728          SQ       0     0.5     1.2    15.0
              *
              *

 729          KK  C320B2
 730          KM    Combine R305B, R310 and 320B2
 731          HC       4
              *
              *

 732          KK  R320B2
 733          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
 734          KM   ROUTING OF FLOW FROM SUB-BASINS 320B2 TO SUB-BASIN 340B.
 735          RS       2    FLOW      -1
 736          RC    .045    .035    .045    1000    .016
 737          RX       0       1      40      46      56      62     102     103
 738          RY       5       2       2       0       0       2       2       5
              *
              *

 739          KK    340B
 740          KM   SUB-BASIN 340B
 741          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 742          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 743          KM     L =  .85  Kb = .049  Adj. Slope =  238.5
 744          BA    .290
 745          LG    .280    .250   4.000    .560  23.000
 746          UC    .242    .136
 747          UA       0       5      16      30      65      77      84      90      94      97
 748          UA     100
              *
              *
1                                          HEC-1 INPUT

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

 749          KK   D340B
 750          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
 751          KM   DETENTION/RETENTION BASINS LOCATED WITHIN THREE SUBDIVISIONS
 752          KM   GRANDVIEW ESTATES    BOULDER MOUNTAIN & 33% OF MESA HIGHLANDS
 753          KM        MAXIMUM VOLUME DIVERSION = 15.6 acre-feet
 754          DT  BS340B    15.6
 755          DI       0   10000
 756          DQ       0   10000
              *
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757          KK  RT340B
758          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
759          DR  BS340B
             *

760          KK   S340B
761          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
762          KM    15.6 ACRE-FEETx43560/36x3600= 5.2cfs
763          RS       1    STOR       0
764          SV       0     .01    15.6      20
765          SQ       0     1.0     5.2      50
             *

766          KK   C340B
767          KM   HYDROGRAPH COMBINATION
768          HC       3
             *
             *

769          KK  DD340B
770          KM   DIVERT FLOW INTO OFFLINE DETENTION BASIN LOCATED WITHIN SUB-BASINS 340B.
771          DT   BS340
772          DI       0     200    1000    2000    5000
773          DQ       0       0     800    1800    4800
             *

774          KK   RT340
775          KM   RETRIEVE FLOW FROM DIVERSION
776          DR   BS340
             *

777          KK  SS340B
778          KM   RETRIEVE FLOW INTO OFFLINE BASIN AND BLEED OFF WITHIN 36 HOURS.
779          KM      55 ACRE-FEETx43560/36x3600 = 19cfs
780          RS       1    STOR       0
781          SV       0     .01      55      60
782          SQ       0     3.0      50     100
             *
                                   HEC-1 INPUT

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

783          KK  CD340B
784          KM   HYDROGRAPH COMBINATION
785          HC       2
             *

786          KK   RT350
787          KM   RETRIEVE SPLIT FLOW FROM DIVERSION OF SUB-BASIN 350
788          DR   SF350
             *

789          KK   RR350
790          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
791          KM   ROUTING OF FLOW FROM SPLIT OF SUB-BASIN 350 TO 355
792          RS       7    FLOW      -1
793          RC    .045    .035    .045    6050    .025
794          RX       0       1      40      46      56      62     102     103
795          RY       3       2       2       0       0       2       2       3
             *
             *

796          KK     355
797          KM   SUB-BASIN 355
798          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
799          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .996
800          KM     L = 3.00  Kb = .044  Adj. Slope =  284.0
801          BA    .676
802          LG    .340    .340   4.450    .370   4.000
803          UC    .488    .502
804          UA       0       3       5       8      12      20      43      75      90      96
805          UA     100
             *

806          KK    C355
807          KM   HYDROGRAPH COMBINATION OF SUB-BASIN 355 AND THE SPLIT FLOW FROM SUB-BASIN 350
808          HC       2  1.1745
             *
             *
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809          KK    D355
810          KM        DIVERT FLOW INTO OFFLINE BASIN
811          KM        MAXIMUM VOLUME DIVERSION = 18 acre-feet
812          DT   BS355
813          DI       0     100     450    1000    2000    5000
814          DQ       0       0       0     550    1550    4550
             *
             *

815          KK   RT355
816          KM   RETRIEVE FLOW FROM DIVERSION INTO OFFLINE BASIN
817          DR   BS355
             *
             *
1                                        HEC-1 INPUT

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

818          KK    S355
819          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
820          KM   18.0 ACRE-FEETx43560/36x3600= 6.0CFS
821          RS       1    STOR       0
822          SV       0     .01    18.0    25.0
823          SQ       0     2.0      40      50
             *
             *

824          KK   CC355
825          KM   HYDROGRAPH COMBINATION
826          HC       2
             *
             *

827          KK    R355
828          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
829          KM   ROUTING OF FLOW FROM SUB-BASIN 355 TO SUB-BASIN 340B
830          RS       1    FLOW      -1
831          RC    .045    .035    .045    4000    .025
832          RX       0       1      40      46      56      62     102     103
833          RY       3       2       2       0       0       2       2       3
             *
             *

834          KK  CC340B
835          KM   HYDROGRAPH COMBINATION
836          HC       2
             *

837          KK   R340B
838          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
839          KM   ROUTING OF FLOW FROM SUB-BASIN 340B TO SUB-BASIN 340A2.
840          RS       2    FLOW      -1
841          RC    .045    .035    .045    1500    .027
842          RX       0       1      40      46      56      62     102     103
843          RY       3       2       2       0       0       2       2       3
             *
             *

844          KK   340A2
845          KM   SUB-BASIN 340A2
846          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
847          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
848          KM     L =  .48  Kb = .047  Adj. Slope =  297.9
849          BA    .037
850          LG    .230    .310   5.300    .250  55.000
851          UC    .158    .174
852          UA       0       5      16      30      65      77      84      90      94      97
853          UA     100
             *
             *
1                                        HEC-1 INPUT

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

854          KK  D340A2
855          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
856          KM        MAXIMUM VOLUME DIVERSION = 2.2 acre-feet
```

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857          DT  B340A2     2.2
858          DI       0   10000
859          DQ       0   10000
             *

860          KK  T340A2
861          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
862          DR  B340A2
             *

863          KK  S340A2
864          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
865          KM    2.20 ACRE-FEETx43560/36x3600= 1.0cfs
866          RS       1    STOR       0
867          SV       0     .01     2.2     5.0
868          SQ       0     0.5     1.0    10.0
             *

869          KK  C340A2
870          KM   HYDROGRAPH COMBINATION
871          HC       3
             *
             *

872          KK  R340A2
873          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
874          KM   ROUTING OF FLOW FROM SUB-BASIN 340A2 TO SUB-BASIN 320B.
875          RS       5    FLOW      -1
876          RC    .045    .035    .045    4500    .020
877          RX       0       1      40      46      56      62     102     103
878          RY       3       2       2       0       0       2       2       3
             *
             *

879          KK  CC320B
880          KM   HYDROGRAPH COMBINATION
881          HC       2
             *
             *

882          KK   R320B
883          KM   Routing Flow from 320B1 to 320A
884          KM   Routing length updated using Signal Butte Floodway plans dated March 1983
885          KM   CHANNEL GEOMETRY FOR SPOOK HILL FRS OBTAINED FROM AS-BUILTS PLANS.
886          KM   CONTINUE TO ROUTE FLOW WITHIN CONCRETE CHANNEL TO SPOOK HILL FRS
887          RS       1    FLOW      -1
888          RC    .016    .016    .016    1500   .0146
889          RX       0       1       2     2.1    16.1    16.2      17      18
890          RY     7.5     7.5     7.5       0       0     7.5     7.5     7.5
             *
             *
1                                          HEC-1 INPUT

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

891          KK    320A
892          KM   SUB-BASIN 320A
893          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
894          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
895          KM     L = 1.07  Kb = .049  Adj. Slope =   93.0
896          BA    .270
897          LG    .280    .250   4.300    .490  25.000
898          UC    .404    .301
899          UA       0       5      16      30      65      77      84      90      94      97
900          UA     100
             *
             *

901          KK   D320A
902          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
903          KM   DETENTION/RETENTION BASINS LOCATED WITHIN THREE SUBDIVISIONS
904          KM   GRANDVIEW ESTATES    BOULDER MOUNTAIN & 33% OF MESA HIGHLANDS
905          KM        MAXIMUM VOLUME DIVERSION = 11.8 acre-feet
906          DT  BS320A    11.8
907          DI       0   10000
908          DQ       0   10000
             *

909          KK  RT320A
```

```
910          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
911          DR  BS320A
             *

912          KK   S320A
913          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
914          KM    11.8 ACRE-FEETx43560/36x3600= 4.0cfs
915          RS       1    STOR       0
916          SV       0     .01    11.8      20
917          SQ       0     1.0     4.0    40.0
             *

918          KK    C320
919          KM   HYDROGRAPH COMBINATION
920          HC       3
             *
             *

921          KK   340A1
922          KM   SUB-BASIN 340A1
923          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
924          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .993
925          KM     L = 1.80  Kb = .045  Adj. Slope =  117.0
926          BA   1.089
927          LG    .250    .250   4.150    .560  24.000
928          UC    .500    .261
929          UA       0       5      16      30      65      77      84      90      94      97
930          UA     100
             *
             *
1                                          HEC-1 INPUT

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

931          KK  D340A1
932          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
933          KM   DETENTION/RETENTION BASINS LOCATED WITHIN THREE SUBDIVISIONS
934          KM   GRANDVIEW ESTATES    BOULDER MOUNTAIN & 33% OF MESA HIGHLANDS
935          KM        MAXIMUM VOLUME DIVERSION = 91.9 acre-feet
936          DT  B340A1    91.9
937          DI       0   10000
938          DQ       0   10000
             *

939          KK  T340A1
940          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
941          DR  B340A1
             *

942          KK  S340A1
943          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
944          KM    91.9 ACRE-FEETx43560/36x3600=30.9cfs
945          RS       1    STOR       0
946          SV       0     .01    91.9     120
947          SQ       0     3.0    20.9     300
             *
             *

948          KK  C340A1
949          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
950          HC       2
             *
             *

951          KK    C340
952          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
953          HC       2
             *
             *

954          KK     360
955          KM   SUB-BASIN 360
956          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
957          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
958          KM     L = 2.10  Kb = .044  Adj. Slope =  124.0
959          BA    .880
960          LG    .260    .250   4.100    .570  23.000
961          UC    .538    .362
962          UA       0       5      16      30      65      77      84      90      94      97
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 963          UA     100
              *

 964          KK    D360
 965          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
 966          KM   DETENTION/RETENTION BASINS LOCATED WITHIN 33% OF MESA HIGHLANDS
 967          KM        MAXIMUM VOLUME DIVERSION = 49.5 acre-feet
 968          DT   BS360    49.5
 969          DI       0   10000
1                                        HEC-1 INPUT

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

 970          DQ       0   10000
              *

 971          KK   RT360
 972          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
 973          DR   BS360
              *

 974          KK    S360
 975          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
 976          KM    49.5 ACRE-FEETx43560/36x3600=16.6 cfs
 977          RS       1    STOR       0
 978          SV       0     .01    49.5      70
 979          SQ       0     3.0    16.6     150
              *

 980          KK    C360
 981          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
 982          HC       3
              *

 983          KK    380A
 984          KM   SUB-BASIN 380A
 985          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 986          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 987          KM     L =  .66  Kb = .076  Adj. Slope =   91.0
 988          BA    .261
 989          LG    .170    .250   4.100    .710  21.000
 990          UC    .425    .221
 991          UA       0       3       5       8      12      20      43      75      90      96
 992          UA     100
              *

 993          KK   C380A
 994          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
 995          HC       2
              *

 996          KK    400A
 997          KM   SUB-BASIN 400A
 998          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
 999          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
1000          KM     L =  .28  Kb = .094  Adj. Slope =   71.0
1001          BA    .048
1002          LG    .250    .290   4.000    .640    .000
1003          UC    .317    .211
1004          UA       0       3       5       8      12      20      43      75      90      96
1005          UA     100
              *
1                                        HEC-1 INPUT

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

1006          KK   C400A
1007          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
1008          HC       2
              *

1009          KK     370
1010          KM   SUB-BASIN 370
1011          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1012          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .996
1013          KM     L = 1.90  Kb = .044  Adj. Slope =  203.5
1014          BA    .672
1015          LG    .340    .320   4.650    .330   8.000
1016          UC    .404    .284
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```
1017          UA       0       3       5       8      12      20      43      75      90      96
1018          UA     100
              * KO     1
              *

1019          KK    S370
1020          KM   Online Detention Basin at Madrid Subdivision
1021          KM   Basin Bottom Elevation = 1822.9 ft
1022          KM   Route through 24" pipe for 404 low flow and
1023          KM   Route through 72" pipe to west along McDowell
1024          KM   2-8'x3' RCBC as emergency spillway
1025          RS       1    STOR       0
1026          SA       0    2.06    2.18    2.30    2.42    2.55    2.68    2.81    2.85    2.95
1027          SE    1823  1823.5    1824    1825    1826    1827    1828    1829  1829.5    1830
1028          SQ       0       3       5      49     130     225     284     341     410     519
              * KO     1
              *

1029          KK    D370
1030          KM   Split the out flow to pipe along McDowell Road and to Madrid subdivision
1031          DT   B370W
1032          DI     0.0      98     157     221     270     313     350     380     800
1033          DQ       0      89     141     199     243     282     315     340     380
              *

1034          KK   R370S
1035          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
1036          KM   ROUTING FLOW to SUB-BASINS 380B1
1037          RS      12    FLOW      -1
1038          RC    .045    .035    .045    8800    .023
1039          RX       0       1      40      46      56      62     102     103
1040          RY       3       2       2       0       0       2       2       3
              *

1041          KK   380B1
1042          KM   SUB-BASIN 380B1
1043          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1044          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
1045          KM     L = 1.61  Kb = .047  Adj. Slope =  124.0
1046          BA    .369
1047          LG    .300    .250   4.200    .520  16.000
1                                          HEC-1 INPUT

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

1048          UC    .471    .414
1049          UA       0       5      16      30      65      77      84      90      94      97
1050          UA     100
              *

1051          KK  D380B1
1052          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
1053          KM   DETENTION/RETENTION BASINS LOCATED WITHIN MESA HIGHLANDS
1054          KM        MAXIMUM VOLUME DIVERSION = 10.5 acre-feet
1055          DT  B380B1    10.5
1056          DI       0   10000
1057          DQ       0   10000
              *

1058          KK  T380B1
1059          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
1060          DR  B380B1
              *

1061          KK  S380B1
1062          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
1063          KM    10.5 ACRE-FEETx43560/36x3600=3.5cfs
1064          RS       1    STOR       0
1065          SV       0     .01    10.5    20.0
1066          SQ       0     1.0     3.5    50.0
              *

1067          KK  C380B1
1068          KM   HYDROGRAPH COMBINATION
1069          HC       3
              *

1070          KK  R380B1
1071          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
1072          KM   ROUTING OF FLOW FROM SUB-BASINS 380B1 TO SUB-BASIN 400B1.
```

```
1073          RS       7    FLOW      -1
1074          RC    .045    .035    .045    2600    .023
1075          RX       0       1      40      46      56      62     102     103
1076          RY       3       2       2       0       0       2       2       3
              *

1077          KK   400B1
1078          KM   SUB-BASIN 400B1
1079          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1080          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
1081          KM     L =  .93  Kb = .057  Adj. Slope =   91.0
1082          BA    .385
1083          LG    .280    .250   4.100    .590  12.000
1084          UC    .433    .238
1085          UA       0       5      16      30      65      77      84      90      94      97
1086          UA     100
              *
1                                          HEC-1 INPUT

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

1087          KK  D400B1
1088          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
1089          KM   DETENTION/RETENTION BASIN LOCATED WITHIN SAGUARO VISTA SUBDIVISION
1090          KM        MAXIMUM VOLUME DIVERSION = 5.6 ACRE-FEET
1091          DT  B400B1     5.6
1092          DI       0   10000
1093          DQ       0   10000
              *

1094          KK  T400B1
1095          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
1096          DR  B400B1
              *

1097          KK  S400B1
1098          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
1099          KM     5.6 ACRE-FEETx43560/36x3600 = 2 cfs
1100          RS       1    STOR       0
1101          SV       0     .01     5.6    10.0
1102          SQ       0       1       2    20.0
              *

1103          KK  C400B1
1104          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
1105          HC       2
              *

1106          KK  CC400B
1107          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
1108          HC       3
              *

1109          KK   420A2
1110          KM   SUB-BASIN 420A2
1111          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1112          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
1113          KM     L =  .26  Kb = .064  Adj. Slope =   96.0
1114          BA    .022
1115          LG    .350    .350   4.150    .430    .000
1116          UC    .208    .194
1117          UA       0       5      16      30      65      77      84      90      94      97
1118          UA     100
              *

1119          KK  C400A2
1120          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
1121          HC       2
              *
1                                          HEC-1 INPUT

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

1122          KK   T370W
1123          KM   RETRIEVE FLOW FROM DIVERSION of ONLINE BASIN
1124          DR   B370W
              *
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1125          KK   R370W
1126          KM   ROUTING OF FLOW FROM DIVERSION B370W (MADRID BASIN) TO Hawes along McDowell.
1127          RK    3640     .02    .013            CIRC       6
              *

1128          KK    395A
1129          KM   SUB-BASIN 395A
1130          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1131          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1132          KM     L = 1.48  Kb = .051  Adj. Slope =  216.6
1133          BA    .161
1134          LG    .310    .270   4.800    .300   9.000
1135          UC    .358    .421
1136          UA       0       5      16      30      65      77      84      90      94      97
1137          UA     100
              *

1138          KK    395B
1139          KM   SUB-BASIN 395B
1140          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1141          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
1142          KM     L =  .18  Kb = .075  Adj. Slope =  167.0
1143          BA    .004
1144          LG    .300    .250   5.100    .270   5.000
1145          UC    .150    .266
1146          UA       0       5      16      30      65      77      84      90      94      97
1147          UA     100
              *

1148          KK  CP395
1149          KM   Combine hydrographs from 395A and 395B.
1150          HC       2
              *

1151          KK  R395W
1152          KM   Route runoff hydrograph from CP395 to concentration point 390C in existing
1153          KM   channel along McDowell Road
1154          KM   CHANNEL GEOMETRY OBTAINED FROM 2' CONTOUR MAPPING.
1155          RS       3    FLOW      -1
1156          RC   0.045   0.035   0.045    1380   0.027
1157          RX       0       1       3       6      28      31      34      37
1158          RY       2       2       1       0       0       1       2       3
              *
1                                          HEC-1 INPUT

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

1159          KK    390C
1160          KM   SUB-BASIN 390C
1161          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1162          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1163          KM     L =  .53  Kb = .054  Adj. Slope =  162.0
1164          BA    .147
1165          LG    .300    .250   5.300    .290  20.000
1166          UC    .221    .139
1167          UA       0       5      16      30      65      77      84      90      94      97
1168          UA     100
              *

1169          KK  CP390C
1170          KM   Combine routed hydrographs from CP395 with runoff hydrograph from
1171          KM   subbasin 390C
1172          HC       2
              *

1173          KK   TOC-H
1174          KM   Divert into proposed storm drain for Culver-Hawes detention
1175          KM   basin.  Diversion determined by rating curve.
1176          DT  TO390B
1177          DI       0       8      29      86     244     457    1000
1178          DQ       0       0       0      31     159     342     885
              *

1179          KK    C370
1180          KM   COMBINE FLOWS IN STORMDRAIN ALONG McDOWELL FROM LaMADRID BASIN AND THUNDER
1181          KM   MOUNTAIN BASIN
1182          HC       2    1.30
              *
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1183          KK   R390S
1184          KM   Route Flow South to C390S.
1185          RK    1320     .02    .013            CIRC       6
              *

1186          KK   400B3
1187          KM   SUB-BASIN 400B3
1188          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1189          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
1190          KM     L =  .27  Kb = .061  Adj. Slope =  140.7
1191          BA    .024
1192          LG    .250    .250   4.550    .410  30.000
1193          UC    .337    .326
1194          UA       0       3       5       8      12      20      43      75      90      96
1195          UA     100
              *
1                                                HEC-1 INPUT

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


1196          KK     DB3
1197          KM   DIVERT FLOW INTO FUTURE RETENTION BASIN IN SUBBASIN 400B3
1198          KM   100YR-2HR VOLUME = 2.33 ACRE-FEET
1199          KM   FOR RETENTION VOL REQUIRED, USE V=DAC
1200          DT  SB3       2.33
1201          DI       0   10000
1202          DQ       0   10000
              *

1203          KK   C390S
1204          KM   HYDROGRAPH COMBINATION of flow from R390S AND DB3, north of CULVER-HAWES Basi
              * KO     1
1205          HC       2
              *

1206          KK   D380B
1207          KM   DIVERT FLOW INTO OFFLINE DETENTION BASIN
1208          KM   ***CULVER-HAWES BASIN***
1209          KM   B38B3b - TO BASIN
1210          KM   D380B - BYPASS
              *  KO     1
1211          DT  B38B3b
1212          DI       0     100     200     300     400
1213          DQ       0      40     123     213     305
              *

1214          KK     RBP
1215          KM   ROUTING OF BY-PASS FLOW FROM SPLITTER STRUCTURE TO CC380B.
1216          RD    500     .02    .013            CIRC       6
              *

1217          KK  RT380B
1218          KM   RETRIEVE FLOW FROM DIVERSION STRUCTURE - TO BASIN
1219          DR  B38B3b
              *

1220          KK  380B3a
1221          KM   SUB-BASIN 380B3a
1222          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1223          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1224          KM     L =  .18  Kb = .061  Adj. Slope =  188.9
1225          BA    .017
1226          LG    .250    .250   4.300    .480  30.000
1227          UC    .253    .208
1228          UA       0       3       5       8      12      20      43      75      90      96
1229          UA     100
              * KO     1
              *
1                                                HEC-1 INPUT

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


1230          KK    DB3a
1231          KM   DIVERT FLOW INTO FUTURE RETENTION BASIN IN SUBBASIN 380B3a
1232          KM   100YR-2HR VOLUME = 1.64 ACRE-FEET
1233          DT    SB3a    1.64
1234          DI       0   10000
1235          DQ       0   10000
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                 * KO     1
                 *

1236             KK   CHBAS
1237             KM   SUB-BASIN CHBAS - CULVER-HAWES BASIN PARCEL (10 AC)
1238             KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1239             KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1240             KM     L =  .09  Kb = .031  Adj. Slope =  133.3
1241             BA    .015
1242             LG    .100    .350   4.000    .390    .000
1243             UC    .170    .082
1244             UA       0       3       5       8      12      20      43      75      90      96
1245             UA     100
                 * KO     1
                 *

1246             KK  C380BB
1247             KM   Total Basin Inflows from North and East Areas
                 * KO     1
1248             HC       3
                 *

1249             KK   S380B
1250             KM   RETRIEVE FLOW INTO OFFLINE BASIN AND BLEED OFF WITHIN 36 HOURS.
                 *  KO     1
1251             RS       1    STOR       0
1252             SA     .86     2.2    3.22    4.55    5.25
1253             SE    1728    1732    1736    1740    1742
1254             SQ       0      26      41      52      56
                 * KO     1
                 *

1255             KK  CC380B
1256             KM   HYDROGRAPH COMBINATION at outlet of Basin "S380B"
1257             HC       2
                 *

1258             KK     MAD
1259             KM   SUB-BASIN MAD - NORTH-WEST PORTION OF MADRID SUBDIVISION
1260             KM   (SUBBASIN '1' IN "AMENDED DRAINAGE REPORT FOR MADRID SUBDIVISION",
1261             KM   D & M ENGINEERING, 10-15-99)
1262             KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1263             KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1264             KM     L =  .28  Kb = .061  Adj. Slope =  157.1
1265             BA    .025
1266             LG    .250    .250   4.550    .410  30.000
1267             UC    .332    .322
1268             UA       0       3       5       8      12      20      43      75      90      96
1                                                HEC-1 INPUT

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

1269             UA     100
                 *

1270             KK    DMAD
1271             KM   DIVERT FLOW INTO ONLINE RETENTION BASIN "A" WITHIN MADRID
1272             KM   (AS DOCUMENTED IN "AMENDED DRAINAGE REPORT FOR MADRID SUBDIVISION",
1273             KM   D & M ENGINEERING, 10-15-99)
1274             KM   VOLUME PROVIDED = 1.93 acre-feet
1275             DT    SMAD    1.93
1276             DI       0   10000
1277             DQ       0   10000
                 *

1278             KK    RMAD
1279             KM   ROUTING OF FLOW FROM DMAD TO COMBINE CCH
1280             RK    1700    .026    .030            TRAP       4
                 *

1281             KK  380B3b
1282             KM   SUB-BASIN 380B3b
1283             KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1284             KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1285             KM     L =  .41  Kb = .061  Adj. Slope =  141.5
1286             BA    .016
1287             LG    .250    .250   4.100    .530  30.000
1288             UC    .420    .731
1289             UA       0       3       5       8      12      20      43      75      90      96
1290             UA     100
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                 *
1291             KK    DB3b
1292             KM   DIVERT FLOW INTO ONLINE RETENTION BASIN WITHIN SUBBASIN 380B3b
1293             KM   NOTE: ONLY AREA OF 380B3b WEST OF WATERBURY ROAD IS CONSIDERED FOR
1294             KM   FUTURE RETENTION CALCULATIONS.  TOTAL SUBBASIN AREA = .016 SQ-MI
1295             KM   AREA CONSIDERED FOR FUTURE RETENTION = .01 SQ-MI (63%)
1296             KM   100YR-2HR VOLUME = 0.99 acre-feet
1297             DT  SB3b       .99
1298             DI     0   10000
1299             DQ     0   10000
                 *

1300             KK   RDB3b
1301             KM   ROUTING OF FLOW FROM DB3b TO COMBINE CCH
1302             RK    1300    .026    .030            TRAP       4
                 *

1303             KK    MAD2   BASIN
1304             KM   SUB-BASIN MAD2 - CENTRAL NORTH-WEST PORTION OF MADRID SUBDIVISION
1305             KM   (SUBBASIN '2' IN "AMENDED DRAINAGE REPORT FOR MADRID SUBDIVISION",
1306             KM   D & M ENGINEERING, 10-15-99)
1307             BA    .020
1308             LG    .250    .250   4.100    .530  30.000
1309             UC    .352    .345
1310             UA       0       3       5       8      12      20      43      75      90      96
1311             UA     100
                 *
1                                          HEC-1 INPUT

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

1312             KK   DMAD2
1313             KM   DIVERT FLOW INTO ONLINE RETENTION BASIN "E" WITHIN MADRID
1314             KM   (AS DOCUMENTED IN "AMENDED DRAINAGE REPORT FOR MADRID SUBDIVISION",
1315             KM   D & M ENGINEERING, 10-15-99)
1316             KM   VOLUME PROVIDED = 1.00 acre-feet
1317             DT   SMAD2    1.00
1318             DI       0   10000
1319             DQ       0   10000
                 *

1320             KK   RMAD2
1321             KM   ROUTING OF FLOW FROM MAD2 TO COMBINE CCUL
1322             RK    1200    .026    .015            TRAP
                 *

1323             KK    CULE   BASIN
1324             KM    SUBBASIN REPRESENTING AREA SOUTHWEST OF MADRID SUBDIVISION
1325             KM    AND EAST END OF CULVER STREET
1326             BA    .016
1327             LG    .300    .250   4.600    .310  13.000
1328             UC    .375    .462
1329             UA       0       3       5       8      12      20      43      75      90      96
1330             UA     100
                 *

1331             KK    CCUL
1332             KM   HYDROGRAPH COMBINATION OF FLOWS AT CULVER/85TH ST INTERSECTION
1333             KM   FROM RMAD2 AND CULE
1334             HC       2
                 *

1335             KK    DCUL
1336             KM   DIVERT PORTION OF FLOW SOUTH AT CULVER/85TH ST INTERSECTION
1337             DT   RCULS
1338             DI       0      24      50     100     200     300
1339             DQ       0       0      26      76     176     276
                 *

1340             KK  CCH
1341             KM   HYDROGRAPH COMBINATION OF FLOWS AT CULVER/HAWES INTERSECTION
1342             KM   FROM CC380B, DMAD, AND DB3b
1343             HC       4
                 *

1344             KK  R38B3b
1345             KM   ROUTING OF FLOW FROM CCH TO COMBINE C380B3c
1346             RD    1320     .02    .013            CIRC     5.5
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                    *
1                                          HEC-1 INPUT

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

1347          KK  380B3c
1348          KM   SUB-BASIN 380B3c
1349          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1350          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1351          KM     L =  .58  Kb = .061  Adj. Slope =  137.9
1352          BA    .022
1353          LG    .300    .250   4.000    .430   5.000
1354          UC    .415    .469
1355          UA       0       3       5       8      12      20      43      75      90      96
1356          UA     100
              *

1357          KK  C38B3c
1358          KM   HYDROGRAPH COMBINATION of R38B3b and 380B3c
1359          HC       2
              *

1360          KK  R380B3
1361          KM   ROUTING OF FLOW FROM SUB-BASINS 380B3c TO SUB-BASIN 380B1.
1362          RD    1320     .02    .013            CIRC       6
              *

1363          KK   380B1
1364          KM   SUB-BASIN 380B1
1365          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1366          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1367          KM     L =  .40  Kb = .061  Adj. Slope =  120.0
1368          BA    .042
1369          LG    .300    .250   3.950    .440   5.000
1370          UC    .504    .506
1371          UA       0       3       5       8      12      20      43      75      90      96
1372          UA     100
              *

1373          KK  C380B1
1374          KM   Combine hydrographs from R380B3 and Sub-basin 380B1
1375          HC       2
              *

1376          KK  R380B1
1377          KM   ROUTE FLOW FROM C380B1 to C380B2.
1378          RD    1320     .02    .013            CIRC       6
              *

1379          KK   380B2
1380          KM   SUB-BASIN 380B2
1381          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1382          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1383          KM     L =  .62  Kb = .057  Adj. Slope =  129.0
1384          BA    .066
1385          LG    .300    .250   3.950    .440   5.000
1386          UC    .592    .664
1387          UA       0       3       5       8      12      20      43      75      90      96
1388          UA     100
              *
1                                          HEC-1 INPUT

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

1389          KK  C380B2
1390          KM   Combine hydrographs from R380B1 and Sub-basin 380B2
1391          HC       2
              *

1392          KK  R380B2
1393          KM   ROUTE FLOW FROM C380B2 to C400B1.
1394          RD    1320     .02    .013            CIRC     6.5
              *

1395          KK   400B1
1396          KM   SUB-BASIN 400B1
1397          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1398          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
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1399          KM     L =  .91  Kb = .056  Adj. Slope =  123.1
1400          BA    .092
1401          LG    .300    .250   4.100    .420   5.000
1402          UC    .719    .927
1403          UA       0       3       5       8      12      20      43      75      90      96
1404          UA     100
              *

1405          KK  C400B1
1406          KM   Combine hydrographs from R380B2 and Sub-basin 400B1
1407          HC       2
              *

1408          KK  R400B1
1409          KM   ROUTE FLOW FROM C400B1 to C400B2.
1410          RD    1320     .02    .013            CIRC       7
              *

1411          KK   400B2
1412          KM   SUB-BASIN 400B2
1413          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1414          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1415          KM     L = 1.09  Kb = .056  Adj. Slope =  117.4
1416          BA    .083
1417          LG    .300    .250   4.250    .390   5.000
1418          UC    .794   1.268
1419          UA       0       3       5       8      12      20      43      75      90      96
1420          UA     100
              *

1421          KK  C400B2
1422          KM   Combine hydrographs from R400B1 and Sub-basin 400B2
1423          HC       2
              *
1                                        HEC-1 INPUT

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

1424          KK  R400B2
1425          KM   ROUTE FLOW FROM C400B2 to C400B4.
1426          RD    1320     .02    .013            CIRC     7.5
              *

1427          KK   400B4
1428          KM   SUB-BASIN 400B4
1429          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1430          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
1431          KM     L = 1.08  Kb = .054  Adj. Slope =  122.2
1432          BA    .124
1433          LG    .300    .250   4.700    .290   5.000
1434          UC    .741    .927
1435          UA       0       3       5       8      12      20      43      75      90      96
1436          UA     100
              *

1437          KK  C400B4
1438          KM   Combine hydrographs from R400B2 and Sub-basin 400B4
1439          HC       2
              *

1440          KK  R400B4
1441          KM   ROUTE FLOW FROM C400B4 TO SUB-BASIN 420A1.
1442          RD    1320     .02    .013            CIRC       8
              *

1443          KK   420A1
1444          KM   SUB-BASIN 420A1
1445          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
1446          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
1447          KM     L = 1.20  Kb = .044  Adj. Slope =  108.0
1448          BA    .566
1449          LG    .300    .270   4.250    .480  17.000
1450          UC    .387    .207
1451          UA       0       5      16      30      65      77      84      90      94      97
1452          UA     100
              *

1453          KK  D420A1
1454          KM        DIVERT FLOW INTO ONLINE  DETENTION BASIN
```

```
1455          KM   DETENTION/RETENTION BASINS LOCATED WITHIN GRAY FOX SUBDIVISION
1456          KM        MAXIMUM VOLUME DIVERSION = 11.2 acre-feet
1457          DT  B420A1    11.2
1458          DI       0   10000
1459          DQ       0   10000
              *

1460          KK  T420A1
1461          KM   RETRIEVE FLOW FROM DIVERSION INTO ONLINE BASIN
1462          DR  B420A1
              *
1                                                HEC-1 INPUT

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


1463          KK  S420A1
1464          KM   RETRIEVE FLOW INTO FICTICIOUS BASIN AND BLEED OFF WITHIN 36 HOURS.
1465          KM    11.2 ACRE-FEETx43560/36x3600= 4cfs
1466          RS       1    STOR       0
1467          SV       0     .01    11.2      20
1468          SQ       0     1.0     4.0      40
              *

1469          KK   C420A
1470          KM   HYDROGRAPH COMBINATION FOR SPOOK HILL FRS
1471          HC       4
1472          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    38          10
                 V
                 V
    48         R10
                 V
                 V
    54         R12
                 .
                 .
    60           .          20
                 .           .
                 .           .
    73           .           .------->    BS20
    70           .         D20
                 .           .
                 .           .
    78           .           .            .<-------    BS20
    76           .           .        RT20
                 .           .           V
                 .           .           V
    79           .           .         S20
                 .           .           .
                 .           .           .
    85         C20.......................
                 V
                 V
    88         R20
                 .
                 .
    94           .          40
                 .           .
                 .           .
   107           .           .------->    BS40
   104           .         D40
                 .           .
                 .           .
   112           .           .            .<-------    BS40
   110           .           .        RT40
                 .           .           V
                 .           .           V
   113           .           .         S40
                 .           .           .
                 .           .           .
   119         C40.......................
                 .
```

```
                .
122             .          60
                .           .
                .           .
135             .           .-------->    BS60
132             .         D60
                .           .
                .           .
140             .           .           .<-------    BS60
138             .           .        RT60
                .           .           V
                .           .           V
141             .           .        SB60
                .           .           .
                .           .           .
147           C60........................
                V
                V
150           S60
                V
                V
162           R60
                V
                V
168          RR60
                .
                .
174             .          80
                .           .
                .           .
187             .           .-------->    BS80
184             .         D80
                .           .
                .           .
192             .           .           .<-------    BS80
190             .           .        RT80
                .           .           V
                .           .           V
193             .           .         S80
                .           .           .
                .           .           .
199             .         C80............
                .           .
                .           .
202          CC80............
                V
                V
205           R80
                .
                .
211             .         100
                .           .
                .           .
224             .           .-------->   BS100
221             .        D100
                .           .
                .           .
229             .           .           .<-------   BS100
227             .           .       RT100
                .           .           V
                .           .           V
230             .           .        S100
                .           .           .
                .           .           .
236          C100........................
                V
                V
239          R100
                .
                .
245             .         120
                .           .
                .           .
258             .           .-------->   BS120
255             .        D120
                .           .
                .           .
263             .           .           .<-------   BS120
261             .           .       RT120
                .           .           V
```

```
                .           .           V
264             .           .        S120
                .           .           .
                .           .           .
270          C120.......................
                V
                V
273          R120
                .
                .
279             .         140
                .           .
                .           .
292             .           .-------->   BS140
289             .        D140
                .           .
                .           .
297             .           .           .<-------   BS140
295             .           .       RT140
                .           .           V
                .           .           V
298             .           .        S140
                .           .           .
                .           .           .
304          C140.......................
                .
                .
307             .         150
                .           V
                .           V
317             .        R150
                .           V
                .           V
323             .        R152
                .           .
                .           .
329             .           .         160
                .           .           .
                .           .           .
342             .           .           .-------->   BS160
339             .           .        D160
                .           .           .
                .           .           .
347             .           .           .           .<-------   BS160
345             .           .           .       RT160
                .           .           .           V
                .           .           .           V
348             .           .           .        S160
                .           .           .           .
                .           .           .           .
354             .        C160........................
                .           .
                .           .
357             .           .         180
                .           .           .
                .           .           .
367          C180.......................
                .
                .
370             .         210
                .           V
                .           V
380             .        R210
                .           .
                .           .
386             .           .         240
                .           .           .
                .           .           .
396             .        C240............
                .           V
                .           V
399             .        S240
                .           V
                .           V
406             .        R240
                .           .
                .           .
413             .           .         220
                .           .           .
                .           .           .
```

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423          .        C220............
             .           V
             .           V
426          .       SW220
             .           V
             .           V
433          .        R220
             .           .
             .           .
440          .           .        190
             .           .          V
             .           .          V
450          .           .       R190
             .           .          V
             .           .          V
456          .           .       R192
             .           .          .
             .           .          .
462          .           .          .        200
             .           .          .          .
             .           .          .          .
472          .        C200......................
             .           V
             .           V
475          .       SW200
             .           V
             .           V
482          .        R200
             .           V
             .           V
488          .       SS200
             .           V
             .           V
495          .       RR200
             .           .
             .           .
501      CC180............
             V
             V
504       S180
             V
             V
516       R180
             .
             .
525          .         260
             .           .
             .           .
535       C260............
             V
             V
538       R260
             .
             .
547          .         280
             .           .
             .           .
557       C280............
             V
             V
560       R280
             .
             .
569          .         300
             .           .
             .           .
579       C300............
             V
             V
582       R300
             .
             .
591          .        305A
             .           .
             .           .
601       C305............
             V
             V
604       R305
             .
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                .
612             .       320B1
                .           .
                .           .
627             .           .-------> B320B1
622             .      D320B1
                .           .
                .           .
632             .           .           .<-------  B320B1
630             .           .      T320B1
                .           .           V
                .           .           V
633             .           .      S320B1
                .           .           .
                .           .           .
639       C320B1.......................
                .
                .
642             .         350
                .           .
                .           .
655             .           .------->   SF350
652             .        D350
                .           V
                .           V
658             .        R350
                .           .
                .           .
665             .           .         310
                .           .           .
                .           .           .
675             .        C310............
                .           V
                .           V
678             .        R310
                .           .
                .           .
685             .           .        305B
                .           .           V
                .           .           V
695             .           .       R305B
                .           .           .
                .           .           .
702             .           .           .       320B2
                .           .           .           .
                .           .           .           .
717             .           .           .           .-------> B320B2
712             .           .           .      D320B2
                .           .           .           .
                .           .           .           .
722             .           .           .           .           .<-------  B320B2
720             .           .           .           .      T320B2
                .           .           .           .           V
                .           .           .           .           V
723             .           .           .           .      S320B2
                .           .           .           .           .
                .           .           .           .           .
729             .      C320B2.................................
                .           V
                .           V
732             .      R320B2
                .           .
                .           .
739             .           .        340B
                .           .           .
                .           .           .
754             .           .           .-------> BS340B
749             .           .       D340B
                .           .           .
                .           .           .
759             .           .           .           .<-------  BS340B
757             .           .           .      RT340B
                .           .           .           V
                .           .           .           V
760             .           .           .       S340B
                .           .           .           .
                .           .           .           .
766             .       C340B......................
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771          .           .-------->   BS340
769          .      DD340B
             .           .
             .           .
776          .           .           .<-------   BS340
774          .           .       RT340
             .           .           V
             .           .           V
777          .           .      SS340B
             .           .           .
             .           .           .
783          .      CD340B............
             .           .
             .           .
788          .           .           .<-------   SF350
786          .           .       RT350
             .           .           V
             .           .           V
789          .           .       RR350
             .           .           .
             .           .           .
796          .           .           .         355
             .           .           .           .
             .           .           .           .
806          .           .        C355............
             .           .           .
             .           .           .
812          .           .           .-------->   BS355
809          .           .        D355
             .           .           .
             .           .           .
817          .           .           .           .<-------   BS355
815          .           .           .       RT355
             .           .           .           V
             .           .           .           V
818          .           .           .        S355
             .           .           .           .
             .           .           .           .
824          .           .       CC355............
             .           .           V
             .           .           V
827          .           .        R355
             .           .           .
             .           .           .
834          .      CC340B............
             .           V
             .           V
837          .       R340B
             .           .
             .           .
844          .           .       340A2
             .           .           .
             .           .           .
857          .           .           .-------->  B340A2
854          .           .      D340A2
             .           .           .
             .           .           .
862          .           .           .           .<-------  B340A2
860          .           .           .      T340A2
             .           .           .           V
             .           .           .           V
863          .           .           .      S340A2
             .           .           .           .
             .           .           .           .
869          .      C340A2........................
             .           V
             .           V
872          .      R340A2
             .           .
             .           .
879     CC320B............
             V
             V
882      R320B
             .
             .
891          .        320A
             .           .
             .           .
906          .           .-------->  BS320A
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 901          .       D320A
              .           .
              .           .
 911          .           .           .<-------  BS320A
 909          .           .      RT320A
              .           .           V
              .           .           V
 912          .           .       S320A
              .           .           .
              .           .           .
 918       C320.......................
              .
              .
 921          .       340A1
              .           .
              .           .
 936          .           .------->  B340A1
 931          .      D340A1
              .           .
              .           .
 941          .           .           .<-------  B340A1
 939          .           .      T340A1
              .           .           V
              .           .           V
 942          .           .      S340A1
              .           .           .
              .           .           .
 948          .      C340A1............
              .           .
              .           .
 951       C340............
              .
              .
 954          .         360
              .           .
              .           .
 968          .           .------->   BS360
 964          .        D360
              .           .
              .           .
 973          .           .           .<-------   BS360
 971          .           .       RT360
              .           .           V
              .           .           V
 974          .           .        S360
              .           .           .
              .           .           .
 980       C360.......................
              .
              .
 983          .        380A
              .           .
              .           .
 993      C380A............
              .
              .
 996          .        400A
              .           .
              .           .
1006      C400A............
              .
              .
1009          .         370
              .           V
              .           V
1019          .        S370
              .           .
              .           .
1031          .           .------->   B370W
1029          .        D370
              .           V
              .           V
1034          .       R370S
              .           .
              .           .
1041          .           .       380B1
              .           .           .
              .           .           .
1055          .           .           .------->  B380B1
1051          .           .      D380B1
```

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                .           .           .
                .           .           .
1060            .           .           .           .<-------  B380B1
1058            .           .           .      T380B1
                .           .           .           V
                .           .           .           V
1061            .           .           .      S380B1
                .           .           .           .
                .           .           .           .
1067            .      C380B1.......................
                .           V
                .           V
1070            .      R380B1
                .           .
                .           .
1077            .           .       400B1
                .           .           .
                .           .           .
1091            .           .           .-------> B400B1
1087            .           .      D400B1
                .           .           .
                .           .           .
1096            .           .           .           .<-------  B400B1
1094            .           .           .      T400B1
                .           .           .           V
                .           .           .           V
1097            .           .           .      S400B1
                .           .           .           .
                .           .           .           .
1103            .           .      C400B1............
                .           .           .
                .           .           .
1106      CC400B........................
                .
                .
1109            .       420A2
                .           .
                .           .
1119      C400A2............
                .
                .
1124            .           .<-------   B370W
1122            .       T370W
                .           V
                .           V
1125            .       R370W
                .           .
                .           .
1128            .           .        395A
                .           .           .
                .           .           .
1138            .           .           .        395B
                .           .           .           .
                .           .           .           .
1148            .           .      CP395 ............
                .           .           V
                .           .           V
1151            .           .      R395W
                .           .           .
                .           .           .
1159            .           .           .        390C
                .           .           .           .
                .           .           .           .
1169            .           .      CP390C............
                .           .           .
                .           .           .
1176            .           .           .-------> TO390B
1173            .           .       TOC-H
                .           .           .
                .           .           .
1179            .        C370............
                .           V
                .           V
1183            .       R390S
                .           .
                .           .
1186            .           .       400B3
                .           .           .
                .           .           .
1200            .           .           .-------> SB3
```

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1196          .           .         DB3
              .           .           .
              .           .           .
1203          .      C390S............
              .           .
              .           .
1211          .           .-------> B38B3b
1206          .      D380B
              .          V
              .          V
1214          .        RBP
              .           .
              .           .
1219          .           .           .<-------  B38B3b
1217          .           .      RT380B
              .           .           .
              .           .           .
1220          .           .           .      380B3a
              .           .           .           .
              .           .           .           .
1233          .           .           .           .-------->    SB3a
1230          .           .           .        DB3a
              .           .           .           :
              .           .           .           .
1236          .           .           .           .       CHBAS
              .           .           .           .           .
              .           .           .           .           .
1246          .           .      C380BB.......................
              .           .           V
              .           .           V
1249          .           .       S380B
              .           .           .
              .           .           .
1255          .     CC380B............
              .           .
              .           .
1258          .           .         MAD
              .           .           .
              .           .           .
1275          .           .           .-------->    SMAD
1270          .           .        DMAD
              .           .           V
              .           .           V
1278          .           .        RMAD
              .           .           .
              .           .           .
1281          .           .           .      380B3b
              .           .           .           .
              .           .           .           .
1297          .           .           .           .-------> SB3b
1291          .           .           .        DB3b
              .           .           .           V
              .           .           .           V
1300          .           .           .       RDB3b
              .           .           .           .
              .           .           .           .
1303          .           .           .           .        MAD2
              .           .           .           .           .
              .           .           .           .           .
1317          .           .           .           .           .-------->   SMAD2
1312          .           .           .           .       DMAD2
              .           .           .           .           V
              .           .           .           .           V
1320          .           .           .           .       RMAD2
              .           .           .           .           .
              .           .           .           .           .
1323          .           .           .           .           .        CULE
              .           .           .           .           .           .
              .           .           .           .           .           .
1331          .           .           .           .        CCUL............
              .           .           .           .           .
              .           .           .           .           .
1337          .           .           .           .           .-------->   RCULS
1335          .           .           .           .        DCUL
              .           .           .           .           .
              .           .           .           .           .
1340          .     CCH   ...................................
              .          V
              .          V
1344          .     R38B3b
```

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                .           .
                .           .
  1347          .           .      380B3c
                .           .           .
                .           .           .
  1357          .      C38B3c............
                .           V
                .           V
  1360          .      R380B3
                .           .
                .           .
  1363          .           .       380B1
                .           .           .
                .           .           .
  1373          .      C380B1............
                .           V
                .           V
  1376          .      R380B1
                .           .
                .           .
  1379          .           .       380B2
                .           .           .
                .           .           .
  1389          .      C380B2............
                .           V
                .           V
  1392          .      R380B2
                .           .
                .           .
  1395          .           .       400B1
                .           .           .
                .           .           .
  1405          .      C400B1............
                .           V
                .           V
  1408          .      R400B1
                .           .
                .           .
  1411          .           .       400B2
                .           .           .
                .           .           .
  1421          .      C400B2............
                .           V
                .           V
  1424          .      R400B2
                .           .
                .           .
  1427          .           .       400B4
                .           .           .
                .           .           .
  1437          .      C400B4............
                .           V
                .           V
  1440          .      R400B4
                .           .
                .           .
  1443          .           .       420A1
                .           .           .
                .           .           .
  1457          .           .           .-------> B420A1
  1453          .           .      D420A1
                .           .           .
                .           .           .
  1462          .           .           .          .<-------  B420A1
  1460          .           .           .     T420A1
                .           .           .          V
                .           .           .     .    V
  1463          .           .           .     S420A1
                .           .           .          .
                .           .           .          .
  1469       C420A.................................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************                    *******************
                                         *                    *
   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                    *   U.S. ARMY CORP
*              JUN   1998               *                    *   HYDROLOGIC ENG
*            VERSION 4.1                *                    *         609 SECO
*                                       *                    *      DAVIS, CALI
*  RUN DATE   19FEB08  TIME  14:00:30   *                    *          (916) 7
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*                                        *                                                    *
*****************************************                                                    ********************

                         Hermosa Vista - Hawes Road Storm Drain and Basin Project
                         Wood,Patel & Associates, Inc., March, 2006

                         The McDowell Road Basin and Storm Drain Design model
                         (update to Spook Hill ADMP, April 2006) was used as a base for this model.

                         This model assumes that the Oak Street detention basin is installed,
                         and all flows pass through the Thunder Mountain detention basin.

                         Return Period = 100 Years, Rainfall Duration = 24 Hours

                         METHODOLOGY
                         THE US CORPS OF ENGINEERS FLOW HYDROGRAPH PACKAGE HEC-1 DATED JUNE 1998 V4.1
                         SCS TYPE II RAINFALL DISTRIBUTION
                         CLARK UNIT HYDROGRAPH
                         GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
                         NORMAL DEPTH STORAGE CHANNEL ROUTING

19 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                      NMIN           2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      3    0  ENDING DATE
                    NDTIME        1838  ENDING TIME
                     ICENT          19  CENTURY MARK

               COMPUTATION INTERVAL     .03 HOURS
                    TOTAL TIME BASE   66.63 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

21 JD          INDEX STORM NO. 1
                      STRM        3.82  PRECIPITATION DEPTH
                      TRDA         .01  TRANSPOSITION DRAINAGE AREA

22 PI            PRECIPITATION PATTERN
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32 JD INDEX STORM NO. 2

STRM	3.79	PRECIPITATION DEPTH
TRDA	1.00	TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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33 JD INDEX STORM NO. 3

STRM 3.68 PRECIPITATION DEPTH

TRDA 5.80 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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34 JD INDEX STORM NO. 4

STRM 3.57 PRECIPITATION DEPTH

TRDA 10.66 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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35 JD INDEX STORM NO. 5

STRM 3.54 PRECIPITATION DEPTH

TRDA 13.70 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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36 JD INDEX STORM NO. 6

STRM 3.47 PRECIPITATION DEPTH

TRDA 20.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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37 JD INDEX STORM NO. 7

STRM 3.32 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE
+	HYDROGRAPH AT	10	972.	12.27	119.	33.	12.	.69	
+	ROUTED TO	R10	903.	12.40	119.	33.	12.	.69	
+	ROUTED TO	R12	845.	12.60	119.	33.	12.	.69	
+	HYDROGRAPH AT	20	1103.	12.23	165.	45.	16.	1.17	
+	DIVERSION TO	BS20	1103.	12.23	92.	24.	9.	1.17	
+	HYDROGRAPH AT	D20	839.	12.50	79.	21.	8.	1.17	
+	HYDROGRAPH AT	RT20	1103.	12.23	92.	24.	9.	1.17	
+	ROUTED TO	S20	16.	12.50	15.	12.	7.	1.17	
+	3 COMBINED AT	C20	1554.	12.57	207.	63.	26.	1.86	
+	ROUTED TO	R20	1554.	12.57	207.	63.	26.	1.86	
+	HYDROGRAPH AT	40	2753.	12.30	286.	79.	28.	2.23	
+	DIVERSION TO	BS40	1789.	12.13	72.	20.	7.	2.23	

	HYDROGRAPH AT	D40	2753.	12.30	227.	59.	21.	2.23
+	HYDROGRAPH AT	RT40	1789.	12.13	72.	20.	7.	2.23
+	ROUTED TO	S40	13.	12.20	12.	10.	6.	2.23
+	3 COMBINED AT	C40	3088.	12.33	437.	129.	52.	4.08
+	HYDROGRAPH AT	60	1654.	12.40	244.	66.	24.	1.75
+	DIVERSION TO	BS60	11.	9.17	7.	2.	1.	1.75
+	HYDROGRAPH AT	D60	1654.	12.40	244.	64.	23.	1.75
+	HYDROGRAPH AT	RT60	11.	9.17	7.	2.	1.	1.75
+	ROUTED TO	SB60	2.	9.33	2.	1.	1.	1.75
+	3 COMBINED AT	C60	4599.	12.33	665.	190.	75.	5.84
+	ROUTED TO	S60	101.	14.77	101.	98.	54.	5.84
+	ROUTED TO	R60	101.	14.77	101.	98.	53.	5.84
	ROUTED TO	RR60	101.	14.87	101.	98.	53.	5.84
+	HYDROGRAPH AT	80	1951.	12.13	199.	53.	19.	1.49
+	DIVERSION TO	BS80	945.	11.93	35.	10.	3.	1.49
+	HYDROGRAPH AT	D80	1951.	12.13	170.	43.	16.	1.49
+	HYDROGRAPH AT	RT80	945.	11.93	35.	10.	3.	1.49
+	ROUTED TO	S80	7.	12.00	6.	5.	3.	1.49
+	2 COMBINED AT	C80	1958.	12.13	176.	48.	19.	1.49
+	2 COMBINED AT	CC80	1958.	12.13	264.	144.	75.	1.49
+	ROUTED TO	R80	1950.	12.17	263.	144.	75.	1.49
+	HYDROGRAPH AT	100	453.	12.20	66.	18.	6.	.49
+	DIVERSION TO	BS100	422.	12.13	19.	5.	2.	.49
+	HYDROGRAPH AT	D100	453.	12.20	50.	13.	5.	.49
	HYDROGRAPH AT	RT100	422.	12.13	19.	5.	2.	.49
+	ROUTED TO	S100	4.	12.20	3.	3.	2.	.49
	3 COMBINED AT							

+		C100	2352.	12.20	314.	159.	80.	1.98
	ROUTED TO	R100	2303.	12.23	313.	159.	80.	1.98
	HYDROGRAPH AT							
+		120	3345.	12.27	342.	93.	34.	2.20
	DIVERSION TO							
+		BS120	13.	7.50	10.	3.	1.	2.20
	HYDROGRAPH AT							
+		D120	3345.	12.27	342.	90.	33.	2.20
	HYDROGRAPH AT							
+		RT120	13.	7.50	10.	3.	1.	2.20
	ROUTED TO							
+		S120	2.	8.00	2.	2.	1.	2.20
	3 COMBINED AT							
+		C120	5561.	12.23	633.	242.	112.	4.18
	ROUTED TO							
+		R120	5512.	12.27	633.	242.	111.	4.18
	HYDROGRAPH AT							
+		140	665.	12.13	67.	18.	6.	.60
	DIVERSION TO							
+		BS140	369.	11.97	11.	3.	1.	.60
	HYDROGRAPH AT							
+		D140	665.	12.13	58.	15.	5.	.60
	HYDROGRAPH AT							
+		RT140	369.	11.97	11.	3.	1.	.60
	ROUTED TO							
		S140	2.	12.03	2.	2.	1.	.60
	3 COMBINED AT							
+		C140	6028.	12.27	687.	257.	117.	4.78
	HYDROGRAPH AT							
+		150	594.	12.17	51.	14.	5.	.41
	ROUTED TO							
+		R150	567.	12.23	51.	14.	5.	.41
	ROUTED TO							
+		R152	513.	12.33	51.	14.	5.	.41
	HYDROGRAPH AT							
+		160	225.	12.40	36.	9.	3.	.37
	DIVERSION TO							
+		BS160	82.	12.13	2.	1.	0.	.37
	HYDROGRAPH AT							
+		D160	225.	12.40	34.	9.	3.	.37
	HYDROGRAPH AT							
+		RT160	82.	12.13	2.	1.	0.	.37
	ROUTED TO							
+		S160	1.	12.20	1.	1.	0.	.37
	3 COMBINED AT							
+		C160	732.	12.37	86.	23.	8.	.77
	HYDROGRAPH AT							
+		180	851.	12.37	98.	25.	9.	1.01
	3 COMBINED AT							
		C180	7186.	12.27	850.	298.	131.	6.56
	HYDROGRAPH AT							
+		210	1323.	12.17	111.	29.	10.	.79

+	ROUTED TO	R210	1247.	12.23	111.	29.	10.	.79
+	HYDROGRAPH AT	240	1513.	12.30	167.	42.	15.	1.41
+	2 COMBINED AT	C240	2684.	12.27	273.	70.	25.	2.20
+	ROUTED TO	S240	799.	12.70	226.	59.	21.	2.20
+	ROUTED TO	R240	795.	12.77	225.	59.	21.	2.20
+	HYDROGRAPH AT	220	677.	12.20	68.	18.	6.	.47
+	2 COMBINED AT	C220	955.	12.60	288.	75.	27.	2.67
+	ROUTED TO	SW220	895.	12.80	280.	73.	26.	2.67
+	ROUTED TO	R220	893.	12.87	280.	73.	26.	2.67
+	HYDROGRAPH AT	190	1471.	12.17	123.	33.	12.	.92
+	ROUTED TO	R190	1415.	12.23	123.	33.	12.	.92
+	ROUTED TO	R192	1359.	12.30	123.	33.	12.	.92
+	HYDROGRAPH AT	200	832.	12.17	72.	20.	7.	.53
+	3 COMBINED AT	C200	2264.	12.30	459.	122.	44.	4.12
+	ROUTED TO	SW200	2144.	12.37	454.	119.	43.	4.12
+	ROUTED TO	R200	2135.	12.37	454.	119.	43.	4.12
+	ROUTED TO	SS200	1364.	12.73	333.	88.	32.	4.12
+	ROUTED TO	RR200	1343.	12.83	331.	88.	32.	4.12
+	2 COMBINED AT	CC180	7186.	12.27	1159.	382.	161.	10.68
+	ROUTED TO	S180	124.	24.43	124.	124.	88.	10.68
+	ROUTED TO	R180	124.	24.47	124.	124.	88.	10.68
+	HYDROGRAPH AT	260	427.	12.10	42.	11.	4.	.26
+	2 COMBINED AT	C260	429.	12.10	139.	130.	102.	.26
+	ROUTED TO	R260	411.	12.20	139.	130.	102.	.26
+	HYDROGRAPH AT	280	528.	12.10	46.	13.	5.	.32
+	2 COMBINED AT	C280	893.	12.13	180.	140.	106.	.58
+	ROUTED TO	R280	870.	12.20	179.	140.	106.	.58

	HYDROGRAPH AT	300	428.	12.10	37.	11.	4.	.29
+	2 COMBINED AT	C300	1235.	12.17	213.	149.	110.	.87
+	ROUTED TO	R300	1189.	12.23	212.	149.	109.	.87
+	HYDROGRAPH AT	305A	395.	12.13	41.	11.	4.	.32
+	2 COMBINED AT	C305	1534.	12.20	249.	158.	113.	1.19
+	ROUTED TO	R305	1520.	12.23	249.	158.	113.	1.19
+	HYDROGRAPH AT	320B1	660.	12.13	66.	19.	7.	.45
+	DIVERSION TO	B320B1	364.	11.93	16.	5.	2.	.45
+	HYDROGRAPH AT	D320B1	660.	12.13	54.	14.	5.	.45
+	HYDROGRAPH AT	T320B1	364.	11.93	16.	5.	2.	.45
+	ROUTED TO	S320B1	4.	12.00	3.	3.	2.	.45
+	3 COMBINED AT	C320B1	2042.	12.20	303.	174.	118.	1.64
	HYDROGRAPH AT	350	1315.	12.20	112.	29.	11.	1.00
+	DIVERSION TO	SF350	658.	12.20	56.	15.	5.	1.00
+	HYDROGRAPH AT	D350	658.	12.20	56.	15.	5.	1.00
+	ROUTED TO	R350	593.	12.40	56.	15.	5.	1.00
+	HYDROGRAPH AT	310	381.	12.33	50.	13.	5.	.54
+	2 COMBINED AT	C310	950.	12.37	106.	27.	10.	1.04
+	ROUTED TO	R310	865.	12.67	106.	27.	10.	1.04
+	HYDROGRAPH AT	305B	333.	12.33	40.	10.	4.	.39
+	ROUTED TO	R305B	318.	12.43	40.	10.	4.	.39
+	HYDROGRAPH AT	320B2	251.	12.13	28.	7.	3.	.22
+	DIVERSION TO	B320B2	176.	12.00	6.	2.	1.	.22
+	HYDROGRAPH AT	D320B2	251.	12.13	22.	6.	2.	.22
	HYDROGRAPH AT	T320B2	176.	12.00	6.	2.	1.	.22
+	ROUTED TO	S320B2	1.	12.03	1.	1.	1.	.22
	4 COMBINED AT							

+	C320B2	1150.	12.63	167.	43.	16.	1.65
ROUTED TO	R320B2	1144.	12.67	167.	43.	16.	1.65
HYDROGRAPH AT +	340B	498.	12.07	41.	12.	4.	.29
DIVERSION TO +	BS340B	498.	12.07	29.	8.	3.	.29
HYDROGRAPH AT +	D340B	286.	12.20	15.	4.	2.	.29
HYDROGRAPH AT +	RT340B	498.	12.07	29.	8.	3.	.29
ROUTED TO +	S340B	5.	12.20	5.	4.	3.	.29
3 COMBINED AT +	C340B	1166.	12.67	185.	50.	20.	1.94
DIVERSION TO +	BS340	966.	12.67	113.	28.	10.	1.94
HYDROGRAPH AT +	DD340B	200.	12.10	71.	22.	10.	1.94
HYDROGRAPH AT +	RT340	966.	12.67	113.	28.	10.	1.94
ROUTED TO +	SS340B	48.	13.40	41.	24.	10.	1.94
2 COMBINED AT +	CD340B	248.	13.40	109.	46.	20.	1.94
HYDROGRAPH AT	RT350	658.	12.20	56.	15.	5.	1.00
ROUTED TO +	RR350	570.	12.43	56.	15.	5.	1.00
HYDROGRAPH AT +	355	546.	12.33	75.	19.	7.	.68
2 COMBINED AT +	C355	1061.	12.40	130.	34.	12.	1.17
DIVERSION TO +	BS355	611.	12.40	40.	10.	4.	1.17
HYDROGRAPH AT +	D355	450.	12.13	90.	24.	9.	1.17
HYDROGRAPH AT +	RT355	611.	12.40	40.	10.	4.	1.17
ROUTED TO +	S355	40.	12.77	26.	10.	4.	1.17
2 COMBINED AT +	CC355	490.	12.77	115.	34.	12.	1.17
ROUTED TO +	R355	478.	12.77	115.	34.	12.	1.17
2 COMBINED AT +	CC340B	707.	12.77	220.	78.	31.	3.11
ROUTED TO +	R340B	703.	12.80	219.	78.	31.	3.11
HYDROGRAPH AT	340A2	73.	12.03	8.	3.	1.	.04
DIVERSION TO +	B340A2	65.	11.97	4.	1.	0.	.04

+	HYDROGRAPH AT	D340A2	73.	12.03	5.	1.	1.	.04
	HYDROGRAPH AT	T340A2	65.	11.97	4.	1.	0.	.04
+	ROUTED TO	S340A2	1.	12.03	1.	1.	0.	.04
+	3 COMBINED AT	C340A2	710.	12.80	225.	80.	32.	3.15
+	ROUTED TO	R340A2	703.	12.93	225.	80.	32.	3.15
+	2 COMBINED AT	CC320B	2211.	12.23	516.	250.	147.	4.79
+	ROUTED TO	R320B	2204.	12.23	515.	250.	147.	4.79
+	HYDROGRAPH AT	320A	316.	12.13	40.	12.	4.	.27
+	DIVERSION TO	BS320A	316.	12.13	22.	6.	2.	.27
+	HYDROGRAPH AT	D320A	267.	12.27	22.	6.	2.	.27
+	HYDROGRAPH AT	RT320A	316.	12.13	22.	6.	2.	.27
+	ROUTED TO	S320A	4.	12.27	3.	3.	2.	.27
+	3 COMBINED AT	C320	2378.	12.30	538.	258.	151.	5.06
+	HYDROGRAPH AT	340A1	1254.	12.17	154.	46.	17.	1.09
+	DIVERSION TO	B340A1	1254.	12.17	154.	46.	17.	1.09
+	HYDROGRAPH AT	D340A1	0.	.00	0.	0.	0.	1.09
+	HYDROGRAPH AT	T340A1	1254.	12.17	154.	46.	17.	1.09
+	ROUTED TO	S340A1	18.	15.30	18.	16.	12.	1.09
+	2 COMBINED AT	C340A1	18.	15.30	18.	16.	12.	1.09
+	2 COMBINED AT	C340	2378.	12.30	552.	273.	161.	6.15
+	HYDROGRAPH AT	360	840.	12.20	122.	36.	13.	.88
+	DIVERSION TO	BS360	840.	12.20	93.	25.	9.	.88
+	HYDROGRAPH AT	D360	366.	12.67	40.	12.	4.	.88
+	HYDROGRAPH AT	RT360	840.	12.20	93.	25.	9.	.88
+	ROUTED TO	S360	15.	12.67	15.	12.	8.	.88
+	3 COMBINED AT	C360	2378.	12.30	596.	294.	172.	7.03
+	HYDROGRAPH AT	380A	323.	12.27	33.	10.	4.	.26

	2 COMBINED AT						
		C380A	2639.	12.30	617.	299.	173.	7.29
	HYDROGRAPH AT						
+		400A	57.	12.20	4.	1.	0.	.05
	2 COMBINED AT						
+		C400A	2676.	12.30	621.	300.	173.	7.34
	HYDROGRAPH AT						
+		370	817.	12.23	83.	22.	8.	.67
	ROUTED TO						
+		S370	503.	12.43	81.	22.	8.	.67
	DIVERSION TO						
+		B370W	352.	12.43	69.	19.	7.	.67
	HYDROGRAPH AT						
+		D370	151.	12.43	12.	3.	1.	.67
	ROUTED TO						
+		R370S	123.	12.73	12.	3.	1.	.67
	HYDROGRAPH AT						
+		380B1	330.	12.20	47.	14.	5.	.37
	DIVERSION TO						
+		B380B1	330.	12.20	19.	5.	2.	.37
	HYDROGRAPH AT						
+		D380B1	312.	12.27	31.	8.	3.	.37
	HYDROGRAPH AT						
+		T380B1	330.	12.20	19.	5.	2.	.37
	ROUTED TO						
		S380B1	3.	12.27	3.	3.	2.	.37
	3 COMBINED AT						
+		C380B1	314.	12.27	46.	14.	6.	1.04
	ROUTED TO						
+		R380B1	287.	12.43	45.	14.	6.	1.04
	HYDROGRAPH AT						
+		400B1	441.	12.13	45.	13.	5.	.38
	DIVERSION TO						
+		B400B1	240.	11.97	10.	3.	1.	.38
	HYDROGRAPH AT						
+		D400B1	441.	12.13	37.	10.	3.	.38
	HYDROGRAPH AT						
+		T400B1	240.	11.97	10.	3.	1.	.38
	ROUTED TO						
+		S400B1	2.	12.03	2.	2.	1.	.38
	2 COMBINED AT						
+		C400B1	443.	12.13	39.	11.	5.	.38
	3 COMBINED AT						
+		CC400B	2957.	12.30	685.	319.	180.	8.76
	HYDROGRAPH AT						
+		420A2	31.	12.07	2.	1.	0.	.02
	2 COMBINED AT						
+		C400A2	2967.	12.30	687.	320.	180.	8.78
	HYDROGRAPH AT						
		T370W	352.	12.43	69.	19.	7.	.67
	ROUTED TO						
+		R370W	352.	12.47	69.	19.	7.	.67
	HYDROGRAPH AT						

+		395A	165.	12.13	21.	6.	2.	.16
	HYDROGRAPH AT	395B	6.	12.03	1.	0.	0.	.00
	2 COMBINED AT							
+		CP395	169.	12.13	22.	6.	2.	.16
	ROUTED TO							
+		R395W	168.	12.17	22.	6.	2.	.16
	HYDROGRAPH AT							
+		390C	275.	12.07	22.	6.	2.	.15
	2 COMBINED AT							
+		CP390C	410.	12.07	44.	12.	4.	.31
	DIVERSION TO							
+		TO390B	302.	12.07	23.	6.	2.	.31
	HYDROGRAPH AT							
+		TOC-H	108.	12.07	21.	7.	2.	.31
	2 COMBINED AT							
+		C370	418.	12.40	90.	26.	9.	1.30
	ROUTED TO							
+		R390S	418.	12.40	90.	26.	9.	1.30
	HYDROGRAPH AT							
+		400B3	31.	12.20	4.	1.	0.	.02
	DIVERSION TO							
+		SB3	31.	12.20	4.	1.	0.	.02
	HYDROGRAPH AT							
+		DB3	0.	23.53	0.	0.	0.	.02
	2 COMBINED AT							
		C390S	418.	12.40	90.	26.	9.	1.32
	DIVERSION TO							
+		B38B3b	322.	12.40	58.	16.	6.	1.32
	HYDROGRAPH AT							
+		D380B	96.	12.40	32.	10.	4.	1.32
	ROUTED TO							
+		RBP	96.	12.43	32.	10.	4.	1.32
	HYDROGRAPH AT							
+		RT380B	322.	12.40	58.	16.	6.	1.32
	HYDROGRAPH AT							
+		380B3a	27.	12.13	3.	1.	0.	.02
	DIVERSION TO							
+		SB3a	27.	12.13	3.	1.	0.	.02
	HYDROGRAPH AT							
+		DB3a	0.	23.80	0.	0.	0.	.02
	HYDROGRAPH AT							
+		CHBAS	30.	12.07	2.	0.	0.	.01
	3 COMBINED AT							
+		C380BB	324.	12.40	60.	16.	6.	.03
	ROUTED TO							
+		S380B	46.	13.50	40.	16.	6.	.03
	2 COMBINED AT							
+		CC380B	133.	12.70	69.	26.	9.	1.36
	HYDROGRAPH AT							
		MAD	32.	12.20	4.	1.	0.	.03
	DIVERSION TO							
+		SMAD	32.	12.20	4.	1.	0.	.03

	HYDROGRAPH AT						
+	DMAD	6.	12.93	1.	0.	0.	.03
	ROUTED TO						
	RMAD	5.	13.00	1.	0.	0.	.03
	HYDROGRAPH AT						
+	380B3b	12.	12.30	3.	1.	0.	.02
	DIVERSION TO						
+	SB3b	12.	12.30	2.	0.	0.	.02
	HYDROGRAPH AT						
+	DB3b	5.	13.10	1.	0.	0.	.02
	ROUTED TO						
+	RDB3b	5.	13.17	1.	0.	0.	.02
	HYDROGRAPH AT						
+	MAD2	23.	12.23	3.	1.	0.	.02
	DIVERSION TO						
+	SMAD2	23.	12.23	2.	1.	0.	.02
	HYDROGRAPH AT						
+	DMAD2	17.	12.37	2.	0.	0.	.02
	ROUTED TO						
+	RMAD2	17.	12.40	2.	0.	0.	.02
	HYDROGRAPH AT						
+	CULE	16.	12.23	2.	1.	0.	.02
	2 COMBINED AT						
+	CCUL	30.	12.40	4.	1.	0.	.04
	DIVERSION TO						
+	RCULS	6.	12.40	0.	0.	0.	.04
	HYDROGRAPH AT						
+	DCUL	24.	12.40	4.	1.	0.	.04
	4 COMBINED AT						
+	CCH	153.	12.50	74.	27.	10.	1.43
	ROUTED TO						
+	R38B3b	152.	12.50	74.	27.	10.	1.43
	HYDROGRAPH AT						
+	380B3c	20.	12.27	3.	1.	0.	.02
	2 COMBINED AT						
+	C38B3c	166.	12.47	76.	28.	10.	1.45
	ROUTED TO						
+	R380B3	166.	12.50	76.	28.	10.	1.45
	HYDROGRAPH AT						
+	380B1	35.	12.33	5.	1.	0.	.04
	2 COMBINED AT						
+	C380B1	195.	12.47	81.	29.	11.	1.50
	ROUTED TO						
+	R380B1	195.	12.47	81.	29.	11.	1.50
	HYDROGRAPH AT						
+	380B2	45.	12.40	8.	2.	1.	.07
	2 COMBINED AT						
+	C380B2	237.	12.47	89.	31.	11.	1.56
	ROUTED TO						
+	R380B2	237.	12.47	89.	31.	11.	1.56
	HYDROGRAPH AT						
	400B1	48.	12.50	11.	3.	1.	.09
	2 COMBINED AT						
+	C400B1	283.	12.50	99.	34.	12.	1.65

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          ROUTED TO
                          R400B1      283.   12.50        99.        34.        12.      1.65
          HYDROGRAPH AT
+                          400B2       35.   12.60        10.         3.         1.       .08
          2 COMBINED AT
+                         C400B2      315.   12.50       109.        36.        13.      1.74
          ROUTED TO
+                         R400B2      315.   12.53       109.        36.        13.      1.74
          HYDROGRAPH AT
+                          400B4       71.   12.53        16.         4.         2.       .12
          2 COMBINED AT
+                         C400B4      384.   12.53       124.        40.        15.      1.86
          ROUTED TO
+                         R400B4      383.   12.53       124.        40.        15.      1.86
          HYDROGRAPH AT
+                          420A1      759.   12.13        74.        21.         8.       .57
          DIVERSION TO
+                         B420A1      478.   11.97        20.         6.         2.       .57
          HYDROGRAPH AT
+                         D420A1      759.   12.13        60.        16.         6.       .57
          HYDROGRAPH AT
+                         T420A1      478.   11.97        20.         6.         2.       .57
          ROUTED TO
+                         S420A1        4.   12.03         3.         3.         2.       .57
          4 COMBINED AT
                          C420A      3609.   12.30       846.       368.       198.     11.21
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SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	DT (MIN)	INTERPOLATED TO COMPUTATION INTERVAL PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
FOR STORM = 1	STORM AREA (SQ MI) =			.01					
R370W	MANE	.85	352.58	747.69	1.07	2.00	352.53	748.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3819E+02 EXCESS= .0000E+00 OUTFLOW= .3819E+02 BASIN STORAGE= .8331E-10 PE

FOR STORM = 2	STORM AREA (SQ MI) =			1.00					
R370W	MANE	.70	351.57	747.38	1.06	2.00	351.51	748.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3789E+02 EXCESS= .0000E+00 OUTFLOW= .3790E+02 BASIN STORAGE= .8954E-10 PE

FOR STORM = 3	STORM AREA (SQ MI) =			5.80					
R370W	MANE	.82	347.88	749.09	1.03	2.00	347.83	748.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3687E+02 EXCESS= .0000E+00 OUTFLOW= .3687E+02 BASIN STORAGE= .8134E-10 PE

FOR STORM = 4	STORM AREA (SQ MI) =			10.66					
R370W	MANE	.85	344.32	749.95	1.00	2.00	344.31	750.00	1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3580E+02 EXCESS= .0000E+00 OUTFLOW= .3580E+02 BASIN STORAGE= .8395E-10 PE

FOR STORM = 5	STORM AREA (SQ MI) =			13.70					
R370W	MANE	.84	343.07	749.46	.99	2.00	343.03	750.00	.99

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CONTINUITY SUMMARY (AC-FT) - INFLOW= .3540E+02 EXCESS= .0000E+00 OUTFLOW= .3541E+02 BASIN STORAGE= .8323E-10 PE

        FOR STORM = 6  STORM AREA (SQ MI) =      20.00
           R370W  MANE          .75    341.05    750.05       .96      2.00    341.05    750.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3449E+02 EXCESS= .0000E+00 OUTFLOW= .3449E+02 BASIN STORAGE= .7576E-10 PE

        FOR STORM = 7  STORM AREA (SQ MI) =      50.00
           R370W  MANE          .78    310.68    751.53       .90      2.00    310.05    752.00         .90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3212E+02 EXCESS= .0000E+00 OUTFLOW= .3212E+02 BASIN STORAGE= .8444E-10 PE

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
           R390S  MANE          .27    420.67    744.27       .74      2.00    420.64    744.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5147E+02 EXCESS= .0000E+00 OUTFLOW= .5147E+02 BASIN STORAGE= .8990E-10 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
           R390S  MANE          .27    419.06    744.43       .74      2.00    418.98    744.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5106E+02 EXCESS= .0000E+00 OUTFLOW= .5106E+02 BASIN STORAGE= .9643E-10 PE

        FOR STORM = 3  STORM AREA (SQ MI) =       5.80
           R390S  MANE          .33    413.26    742.95       .72      2.00    413.19    744.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4970E+02 EXCESS= .0000E+00 OUTFLOW= .4969E+02 BASIN STORAGE= .8848E-10 PE

        FOR STORM = 4  STORM AREA (SQ MI) =      10.66
           R390S  MANE          .33    408.23    744.89       .70      2.00    407.77    746.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4830E+02 EXCESS= .0000E+00 OUTFLOW= .4830E+02 BASIN STORAGE= .9076E-10 PE

        FOR STORM = 5  STORM AREA (SQ MI) =      13.70
           R390S  MANE          .33    405.83    746.57       .69      2.00    405.13    746.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4780E+02 EXCESS= .0000E+00 OUTFLOW= .4780E+02 BASIN STORAGE= .9027E-10 PE

        FOR STORM = 6  STORM AREA (SQ MI) =      20.00
           R390S  MANE          .34    401.76    748.74       .67      2.00    401.30    748.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4666E+02 EXCESS= .0000E+00 OUTFLOW= .4666E+02 BASIN STORAGE= .8278E-10 PE

        FOR STORM = 7  STORM AREA (SQ MI) =      50.00
           R390S  MANE          .34    367.43    750.46       .63      2.00    367.18    750.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4381E+02 EXCESS= .0000E+00 OUTFLOW= .4381E+02 BASIN STORAGE= .9109E-10 PE

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
             RBP  MANE          .43     96.65    744.55       .28      2.00     96.63    744.00         .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1980E+02 EXCESS= .0000E+00 OUTFLOW= .1980E+02 BASIN STORAGE= .4021E-04 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             RBP  MANE          .43     96.51    744.78       .28      2.00     96.48    744.00         .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1969E+02 EXCESS= .0000E+00 OUTFLOW= .1969E+02 BASIN STORAGE= .4020E-04 PE
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          FOR STORM = 3  STORM AREA (SQ MI) =       5.80
               RBP  MANE          .43     96.06    744.62       .27      2.00     96.03    746.00         .27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1933E+02 EXCESS= .0000E+00 OUTFLOW= .1933E+02 BASIN STORAGE= .4017E-04 PE

          FOR STORM = 4  STORM AREA (SQ MI) =      10.66
               RBP  MANE          .43     95.62    746.58       .27      2.00     95.57    746.00         .27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1900E+02 EXCESS= .0000E+00 OUTFLOW= .1900E+02 BASIN STORAGE= .4013E-04 PE

          FOR STORM = 5  STORM AREA (SQ MI) =      13.70
               RBP  MANE          .43     95.42    746.91       .27      2.00     95.40    748.00         .27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1888E+02 EXCESS= .0000E+00 OUTFLOW= .1888E+02 BASIN STORAGE= .4011E-04 PE

          FOR STORM = 6  STORM AREA (SQ MI) =      20.00
               RBP  MANE          .43     95.10    748.68       .26      2.00     95.06    750.00         .26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1862E+02 EXCESS= .0000E+00 OUTFLOW= .1862E+02 BASIN STORAGE= .4019E-04 PE

          FOR STORM = 7  STORM AREA (SQ MI) =      50.00
               RBP  MANE          .43     92.37    750.48       .25      2.00     92.34    750.00         .25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1800E+02 EXCESS= .0000E+00 OUTFLOW= .1800E+02 BASIN STORAGE= .4014E-04 PE

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
              RMAD  MANE          .71      5.94    777.57       .41      2.00      5.85    778.00         .41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5405E+00 EXCESS= .0000E+00 OUTFLOW= .5470E+00 BASIN STORAGE= .2019E-05 PE

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
              RMAD  MANE          .85      5.22    780.95       .39      2.00      5.03    782.00         .39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5140E+00 EXCESS= .0000E+00 OUTFLOW= .5226E+00 BASIN STORAGE= .2017E-05 PE

          FOR STORM = 3  STORM AREA (SQ MI) =       5.80
              RMAD  MANE          .76      3.34    793.28       .33      2.00      3.29    794.00         .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4254E+00 EXCESS= .0000E+00 OUTFLOW= .4346E+00 BASIN STORAGE= .2182E-05 PE

          FOR STORM = 4  STORM AREA (SQ MI) =      10.66
              RMAD  MANE          .78      1.79    814.91       .26      2.00      1.76    816.00         .26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3422E+00 EXCESS= .0000E+00 OUTFLOW= .3488E+00 BASIN STORAGE= .2168E-05 PE

          FOR STORM = 5  STORM AREA (SQ MI) =      13.70
              RMAD  MANE          .71      1.35    827.44       .24      2.00      1.33    828.00         .24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3139E+00 EXCESS= .0000E+00 OUTFLOW= .3195E+00 BASIN STORAGE= .2066E-05 PE

          FOR STORM = 6  STORM AREA (SQ MI) =      20.00
              RMAD  MANE          .78       .69    870.80       .19      2.00       .69    870.00         .19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2555E+00 EXCESS= .0000E+00 OUTFLOW= .2597E+00 BASIN STORAGE= .1980E-05 PE

          FOR STORM = 7  STORM AREA (SQ MI) =      50.00
              RMAD  MANE          .55       .30   1097.15       .09      2.00       .30   1098.00         .09
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .1316E+00 EXCESS= .0000E+00 OUTFLOW= .1176E+00 BASIN STORAGE= .1814E-05 PE

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
             RDB3b  MANE          .82      4.85    788.88       .64      2.00      4.80    790.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5387E+00 EXCESS= .0000E+00 OUTFLOW= .5443E+00 BASIN STORAGE= .1346E-05 PE

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             RDB3b  MANE          .84      4.80    789.39       .62      2.00      4.74    790.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5217E+00 EXCESS= .0000E+00 OUTFLOW= .5294E+00 BASIN STORAGE= .1187E-05 PE

          FOR STORM = 3  STORM AREA (SQ MI) =       5.80
             RDB3b  MANE          .69      3.99    797.15       .55      2.00      3.95    798.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4647E+00 EXCESS= .0000E+00 OUTFLOW= .4724E+00 BASIN STORAGE= .1299E-05 PE

          FOR STORM = 4  STORM AREA (SQ MI) =      10.66
             RDB3b  MANE          .77      3.39    804.46       .49      2.00      3.36    804.00         .49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4112E+00 EXCESS= .0000E+00 OUTFLOW= .4167E+00 BASIN STORAGE= .1100E-05 PE

          FOR STORM = 5  STORM AREA (SQ MI) =      13.70
             RDB3b  MANE          .70      3.16    807.66       .47      2.00      3.14    808.00         .47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3930E+00 EXCESS= .0000E+00 OUTFLOW= .3970E+00 BASIN STORAGE= .1309E-05 PE

          FOR STORM = 6  STORM AREA (SQ MI) =      20.00
             RDB3b  MANE          .72      2.74    814.21       .42      2.00      2.66    816.00         .42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3555E+00 EXCESS= .0000E+00 OUTFLOW= .3570E+00 BASIN STORAGE= .1298E-05 PE

          FOR STORM = 7  STORM AREA (SQ MI) =      50.00
             RDB3b  MANE          .80      1.81    835.09       .33      2.00      1.80    836.00         .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2758E+00 EXCESS= .0000E+00 OUTFLOW= .2797E+00 BASIN STORAGE= .1202E-05 PE

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
             RMAD2  MANE          .32     17.82    743.32       .85      2.00     17.41    744.00         .85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9114E+00 EXCESS= .0000E+00 OUTFLOW= .9055E+00 BASIN STORAGE= .1922E-10 PE

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             RMAD2  MANE          .68     16.18    745.49       .83      2.00     15.86    746.00         .83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8901E+00 EXCESS= .0000E+00 OUTFLOW= .8899E+00 BASIN STORAGE= .2706E-10 PE

          FOR STORM = 3  STORM AREA (SQ MI) =       5.80
             RMAD2  MANE          .68     14.45    747.01       .77      2.00     14.34    746.00         .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8189E+00 EXCESS= .0000E+00 OUTFLOW= .8210E+00 BASIN STORAGE= .2747E-10 PE

          FOR STORM = 4  STORM AREA (SQ MI) =      10.66
             RMAD2  MANE          .34     13.36    747.46       .70      2.00     13.24    748.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7520E+00 EXCESS= .0000E+00 OUTFLOW= .7480E+00 BASIN STORAGE= .1835E-10 PE
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        FOR STORM = 5  STORM AREA (SQ MI) =       13.70
           RMAD2  MANE          .58     12.62    749.38       .69      2.00     12.31    750.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7293E+00 EXCESS= .0000E+00 OUTFLOW= .7314E+00 BASIN STORAGE= .2808E-10 PE

        FOR STORM = 6  STORM AREA (SQ MI) =       20.00
           RMAD2  MANE          .66     11.33    751.32       .64      2.00     11.04    752.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6823E+00 EXCESS= .0000E+00 OUTFLOW= .6838E+00 BASIN STORAGE= .2779E-10 PE

        FOR STORM = 7  STORM AREA (SQ MI) =       50.00
           RMAD2  MANE          .62      8.98    755.13       .55      2.00      8.83    756.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5827E+00 EXCESS= .0000E+00 OUTFLOW= .5845E+00 BASIN STORAGE= .2725E-10 PE

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          R38B3b  MANE         1.04    153.15    750.95       .73      2.00    153.09    752.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5555E+02 EXCESS= .0000E+00 OUTFLOW= .5555E+02 BASIN STORAGE= .1074E-03 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          R38B3b  MANE         1.04    152.76    751.25       .72      2.00    152.54    752.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5504E+02 EXCESS= .0000E+00 OUTFLOW= .5504E+02 BASIN STORAGE= .1072E-03 PE

        FOR STORM = 3  STORM AREA (SQ MI) =       5.80
          R38B3b  MANE         1.04    151.18    750.00       .70      2.00    151.18    750.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5337E+02 EXCESS= .0000E+00 OUTFLOW= .5337E+02 BASIN STORAGE= .1070E-03 PE

        FOR STORM = 4  STORM AREA (SQ MI) =      10.66
          R38B3b  MANE         1.04    150.01    749.38       .68      2.00    149.71    750.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5169E+02 EXCESS= .0000E+00 OUTFLOW= .5169E+02 BASIN STORAGE= .1075E-03 PE

        FOR STORM = 5  STORM AREA (SQ MI) =      13.70
          R38B3b  MANE         1.05    148.19    751.61       .67      2.00    148.06    752.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5109E+02 EXCESS= .0000E+00 OUTFLOW= .5109E+02 BASIN STORAGE= .1075E-03 PE

        FOR STORM = 6  STORM AREA (SQ MI) =      20.00
          R38B3b  MANE         1.05    146.24    752.58       .65      2.00    146.23    752.00         .65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4974E+02 EXCESS= .0000E+00 OUTFLOW= .4974E+02 BASIN STORAGE= .1076E-03 PE

        FOR STORM = 7  STORM AREA (SQ MI) =      50.00
          R38B3b  MANE         1.06    139.59    756.33       .61      2.00    139.45    758.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4646E+02 EXCESS= .0000E+00 OUTFLOW= .4646E+02 BASIN STORAGE= .1072E-03 PE

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          R380B3  MANE         1.01    167.06    747.88       .73      2.00    166.99    748.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5690E+02 EXCESS= .0000E+00 OUTFLOW= .5690E+02 BASIN STORAGE= .1064E-03 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
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  R380B3  MANE        1.01    166.51    748.24       .73      2.00    166.50    748.00         .73

NTINUITY SUMMARY (AC-FT) - INFLOW= .5637E+02 EXCESS= .0000E+00 OUTFLOW= .5637E+02 BASIN STORAGE= .1060E-03 PE

FOR STORM = 3  STORM AREA (SQ MI) =       5.80
  R380B3  MANE        1.01    164.69    749.83       .70      2.00    164.57    750.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5464E+02 EXCESS= .0000E+00 OUTFLOW= .5464E+02 BASIN STORAGE= .1061E-03 PE

FOR STORM = 4  STORM AREA (SQ MI) =      10.66
  R380B3  MANE        1.02    161.83    751.26       .68      2.00    161.33    752.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5291E+02 EXCESS= .0000E+00 OUTFLOW= .5291E+02 BASIN STORAGE= .1061E-03 PE

FOR STORM = 5  STORM AREA (SQ MI) =      13.70
  R380B3  MANE        1.02    159.66    751.65       .67      2.00    159.55    752.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5229E+02 EXCESS= .0000E+00 OUTFLOW= .5229E+02 BASIN STORAGE= .1059E-03 PE

FOR STORM = 6  STORM AREA (SQ MI) =      20.00
  R380B3  MANE        1.02    157.13    753.78       .66      2.00    156.94    754.00         .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5090E+02 EXCESS= .0000E+00 OUTFLOW= .5090E+02 BASIN STORAGE= .1061E-03 PE

FOR STORM = 7  STORM AREA (SQ MI) =      50.00
  R380B3  MANE        1.03    148.33    757.42       .61      2.00    148.13    758.00         .61

NTINUITY SUMMARY (AC-FT) - INFLOW= .4753E+02 EXCESS= .0000E+00 OUTFLOW= .4753E+02 BASIN STORAGE= .1062E-03 PE

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  R380B1  MANE         .98    196.92    748.71       .74      2.00    196.85    748.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5947E+02 EXCESS= .0000E+00 OUTFLOW= .5947E+02 BASIN STORAGE= .1063E-03 PE

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  R380B1  MANE         .98    196.13    748.40       .74      2.00    196.05    748.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5891E+02 EXCESS= .0000E+00 OUTFLOW= .5891E+02 BASIN STORAGE= .1058E-03 PE

FOR STORM = 3  STORM AREA (SQ MI) =       5.80
  R380B1  MANE         .98    191.55    750.17       .71      2.00    191.55    750.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5706E+02 EXCESS= .0000E+00 OUTFLOW= .5706E+02 BASIN STORAGE= .1058E-03 PE

FOR STORM = 4  STORM AREA (SQ MI) =      10.66
  R380B1  MANE         .99    185.38    752.04       .69      2.00    185.36    752.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5522E+02 EXCESS= .0000E+00 OUTFLOW= .5522E+02 BASIN STORAGE= .1058E-03 PE

FOR STORM = 5  STORM AREA (SQ MI) =      13.70
  R380B1  MANE         .99    183.02    751.82       .68      2.00    183.02    752.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5457E+02 EXCESS= .0000E+00 OUTFLOW= .5457E+02 BASIN STORAGE= .1064E-03 PE

FOR STORM = 6  STORM AREA (SQ MI) =      20.00
  R380B1  MANE        1.00    178.33    753.83       .67      2.00    178.30    754.00         .67
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .5310E+02 EXCESS= .0000E+00 OUTFLOW= .5310E+02 BASIN STORAGE= .1061E-03 PE

        FOR STORM = 7  STORM AREA (SQ MI) =      50.00
          R380B1  MANE          1.01    167.60    745.10       .62      2.00    167.56    746.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4957E+02 EXCESS= .0000E+00 OUTFLOW= .4957E+02 BASIN STORAGE= .1060E-03 PE

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          R380B2  MANE           .93    240.39    748.96       .76      2.00    240.18    748.00         .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6351E+02 EXCESS= .0000E+00 OUTFLOW= .6351E+02 BASIN STORAGE= .1051E-03 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          R380B2  MANE           .93    239.02    748.90       .75      2.00    238.92    748.00         .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6289E+02 EXCESS= .0000E+00 OUTFLOW= .6289E+02 BASIN STORAGE= .1052E-03 PE

        FOR STORM = 3  STORM AREA (SQ MI) =       5.80
          R380B2  MANE           .94    231.50    750.10       .73      2.00    231.49    750.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6087E+02 EXCESS= .0000E+00 OUTFLOW= .6087E+02 BASIN STORAGE= .1049E-03 PE

        FOR STORM = 4  STORM AREA (SQ MI) =      10.66
          R380B2  MANE           .94    221.81    752.56       .71      2.00    221.59    752.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5886E+02 EXCESS= .0000E+00 OUTFLOW= .5886E+02 BASIN STORAGE= .1053E-03 PE

        FOR STORM = 5  STORM AREA (SQ MI) =      13.70
          R380B2  MANE           .95    219.02    752.66       .70      2.00    218.96    752.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5814E+02 EXCESS= .0000E+00 OUTFLOW= .5814E+02 BASIN STORAGE= .1048E-03 PE

        FOR STORM = 6  STORM AREA (SQ MI) =      20.00
          R380B2  MANE           .95    213.18    745.39       .68      2.00    212.99    746.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5656E+02 EXCESS= .0000E+00 OUTFLOW= .5656E+02 BASIN STORAGE= .1048E-03 PE

        FOR STORM = 7  STORM AREA (SQ MI) =      50.00
          R380B2  MANE           .96    203.41    745.93       .63      2.00    203.38    746.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5277E+02 EXCESS= .0000E+00 OUTFLOW= .5277E+02 BASIN STORAGE= .1051E-03 PE

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          R400B1  MANE           .89    288.08    750.00       .78      2.00    288.08    750.00         .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6919E+02 EXCESS= .0000E+00 OUTFLOW= .6919E+02 BASIN STORAGE= .1037E-03 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          R400B1  MANE           .89    286.03    749.31       .78      2.00    285.94    750.00         .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6850E+02 EXCESS= .0000E+00 OUTFLOW= .6850E+02 BASIN STORAGE= .1038E-03 PE

        FOR STORM = 3  STORM AREA (SQ MI) =       5.80
          R400B1  MANE           .89    276.81    751.32       .75      2.00    276.40    750.00         .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6622E+02 EXCESS= .0000E+00 OUTFLOW= .6622E+02 BASIN STORAGE= .1036E-03 PE
```

```
          FOR STORM = 4  STORM AREA (SQ MI) =       10.66
            R400B1  MANE          .90    264.92    752.55       .72      2.00    264.59    752.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6398E+02 EXCESS= .0000E+00 OUTFLOW= .6398E+02 BASIN STORAGE= .1039E-03 PE

          FOR STORM = 5  STORM AREA (SQ MI) =       13.70
            R400B1  MANE          .90    261.70    752.63       .72      2.00    261.55    752.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6318E+02 EXCESS= .0000E+00 OUTFLOW= .6318E+02 BASIN STORAGE= .1042E-03 PE

          FOR STORM = 6  STORM AREA (SQ MI) =       20.00
            R400B1  MANE          .91    252.56    754.41       .70      2.00    252.51    754.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6143E+02 EXCESS= .0000E+00 OUTFLOW= .6143E+02 BASIN STORAGE= .1043E-03 PE

          FOR STORM = 7  STORM AREA (SQ MI) =       50.00
            R400B1  MANE          .92    239.81    747.54       .65      2.00    239.78    748.00         .65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5729E+02 EXCESS= .0000E+00 OUTFLOW= .5729E+02 BASIN STORAGE= .1037E-03 PE

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
            R400B2  MANE          .86    321.00    751.21       .80      2.00    320.65    752.00         .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7440E+02 EXCESS= .0000E+00 OUTFLOW= .7440E+02 BASIN STORAGE= .1033E-03 PE

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
            R400B2  MANE          .86    318.41    751.56       .79      2.00    318.00    752.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7365E+02 EXCESS= .0000E+00 OUTFLOW= .7365E+02 BASIN STORAGE= .1028E-03 PE

          FOR STORM = 3  STORM AREA (SQ MI) =       5.80
            R400B2  MANE          .87    308.09    752.13       .77      2.00    308.05    752.00         .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7114E+02 EXCESS= .0000E+00 OUTFLOW= .7114E+02 BASIN STORAGE= .1029E-03 PE

          FOR STORM = 4  STORM AREA (SQ MI) =       10.66
            R400B2  MANE          .87    295.42    753.35       .74      2.00    295.36    754.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6868E+02 EXCESS= .0000E+00 OUTFLOW= .6868E+02 BASIN STORAGE= .1029E-03 PE

          FOR STORM = 5  STORM AREA (SQ MI) =       13.70
            R400B2  MANE          .88    291.84    753.47       .73      2.00    291.68    754.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6781E+02 EXCESS= .0000E+00 OUTFLOW= .6781E+02 BASIN STORAGE= .1029E-03 PE

          FOR STORM = 6  STORM AREA (SQ MI) =       20.00
            R400B2  MANE          .88    282.12    754.98       .71      2.00    281.93    754.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6591E+02 EXCESS= .0000E+00 OUTFLOW= .6591E+02 BASIN STORAGE= .1032E-03 PE

          FOR STORM = 7  STORM AREA (SQ MI) =       50.00
            R400B2  MANE          .89    264.98    750.16       .66      2.00    264.93    750.00         .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6145E+02 EXCESS= .0000E+00 OUTFLOW= .6145E+02 BASIN STORAGE= .1030E-03 PE

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
            R400B4  MANE          .82    391.50    751.69       .83      2.00    391.48    752.00         .83
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8283E+02 EXCESS= .0000E+00 OUTFLOW= .8283E+02 BASIN STORAGE= .1021E-03 PE

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          R400B4  MANE          .82    387.97    752.24       .83      2.00    387.96    752.00         .83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8196E+02 EXCESS= .0000E+00 OUTFLOW= .8196E+02 BASIN STORAGE= .1023E-03 PE

        FOR STORM = 3  STORM AREA (SQ MI) =       5.80
          R400B4  MANE          .83    375.11    753.24       .80      2.00    374.44    752.00         .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7909E+02 EXCESS= .0000E+00 OUTFLOW= .7909E+02 BASIN STORAGE= .1018E-03 PE

        FOR STORM = 4  STORM AREA (SQ MI) =      10.66
          R400B4  MANE          .83    359.30    753.97       .77      2.00    359.30    754.00         .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7628E+02 EXCESS= .0000E+00 OUTFLOW= .7628E+02 BASIN STORAGE= .1025E-03 PE

        FOR STORM = 5  STORM AREA (SQ MI) =      13.70
          R400B4  MANE          .84    354.78    753.43       .76      2.00    354.69    754.00         .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7529E+02 EXCESS= .0000E+00 OUTFLOW= .7529E+02 BASIN STORAGE= .1024E-03 PE

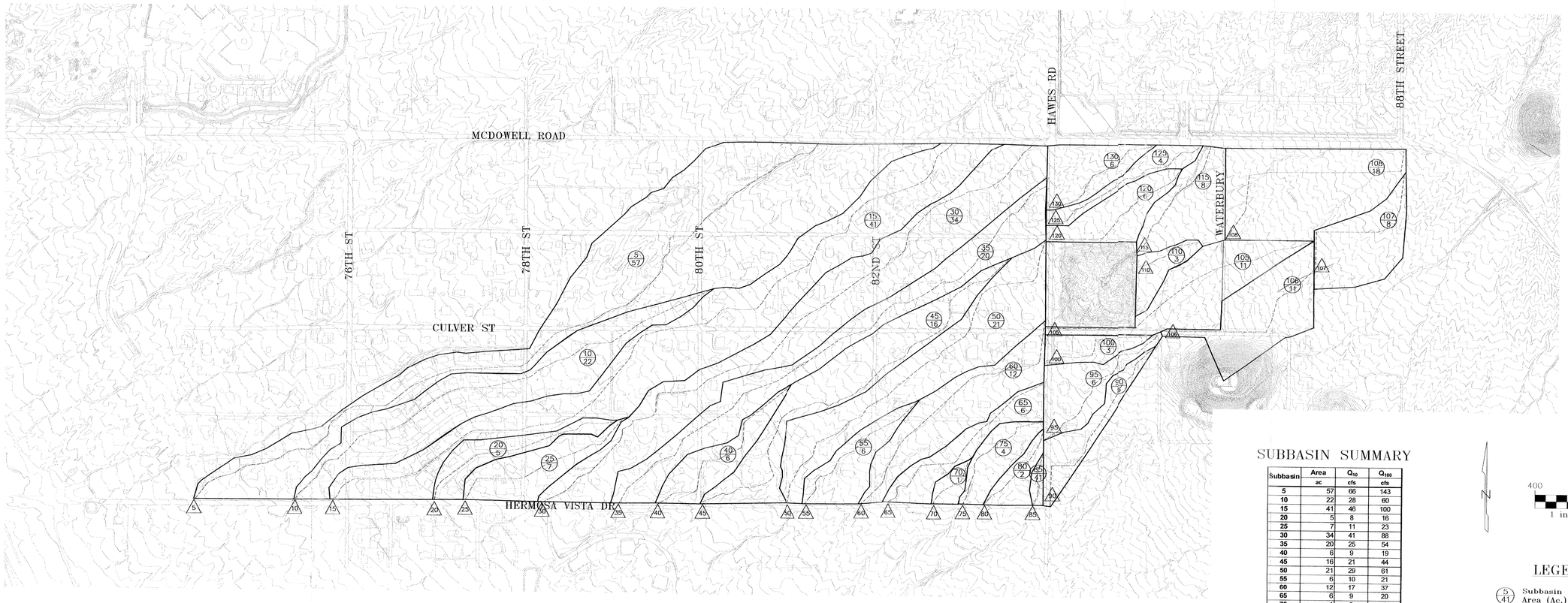
        FOR STORM = 6  STORM AREA (SQ MI) =      20.00
          R400B4  MANE          .84    342.92    754.33       .74      2.00    342.92    754.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7314E+02 EXCESS= .0000E+00 OUTFLOW= .7314E+02 BASIN STORAGE= .1023E-03 PE

        FOR STORM = 7  STORM AREA (SQ MI) =      50.00
          R400B4  MANE          .85    322.06    751.19       .69      2.00    321.99    752.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6820E+02 EXCESS= .0000E+00 OUTFLOW= .6820E+02 BASIN STORAGE= .1023E-03 PE


*** NORMAL END OF HEC-1 ***
```



SUBBASIN SUMMARY

Subbasin	Area	Q_{10}	Q_{100}
	ac	cfs	cfs
5	57	66	143
10	22	28	60
15	41	46	100
20	5	8	16
25	7	11	23
30	34	41	88
35	20	25	54
40	6	9	19
45	16	21	44
50	21	29	61
55	6	10	21
60	12	17	37
65	6	9	20
70	1	2	4
75	4	7	14
80	2	4	7
85	1	2	4
90	5	8	16
95	6	10	21
100	3	11	22
105	11	18	37
106	11	18	37
107	8	13	27
108	18	29	60
110	3	6	11
115	8	14	29
120	6	10	21
125	4	7	14
130	6	11	22

N

400 0 200 400

1 inch = 400 ft.

LEGEND

- (5 / 41) Subbasin I.D. Area (Ac.)
- (5) Design Point for Inlets
- Subbasin Boundary
- Flow Path

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HERMOSA VISTA/HAWES ROAD STORM DRAIN & BASIN PROJECT

FIGURE 5 RATIONAL METHOD DRAINAGE MAP

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
TRANSPORTATION / TRAFFIC
WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT
(602) 335-8500
PHOENIX • MESA • TUCSON

HERMOSA VISTA HAWES ROAD
STORM DRAIN AND BASIN PROJECT
Rational Method Hydrology for off-site sub-basins

Rational Subbasin	Part of HEC-1 Basin	area	area	length	high	low	Q_{10}	Q_{100}
		sq-ft	ac	ft	ft	ft	cfs	cfs
5	400B4	2503811	57	5720	1734	1602	66	143
10	400B4	946494	22	3634	1684	1604	28	60
15	400B2	1794198	41	5766	1738	1618	46	100
20	400B2	213525	5	1535	1658	1630	8	16
25	400B2	293892	7	1402	1660	1632	11	23
30	400B1	1469239	34	4825	1752	1640	41	88
35	400B1	867006	20	4150	1750	1650	25	54
40	400B1	240206	6	1500	1686	1654	9	19
45	380B2	704627	16	3277	1732	1662	21	44
50	380B2	896113	21	2966	1742	1672	29	61
55	380B2	248046	6	1226	1704	1674	10	21
60	380B1	536739	12	2103	1730	1684	17	37
65	380B1	256565	6	1561	1726	1688	9	20
70	380B1	56973	1	426	1706	1694	2	4
75	380B1	181259	4	946	1720	1696	7	14
80	380B1	105781	2	733	1720	1700	4	7
85	380B1	28165	1	390	1716	1706	2	4
90	380B3C	217242	5	1567	1748	1708	8	16
95	380B3C	261176	6	1161	1748	1718	10	21
100	380B3C	134047	3	854	1748	1728	11	22
105	380B3B	486393	11	2182	1824	1730	18	37
106	CULE	458692	11	1377	1784	1750	18	37
107	MAD2	358195	8	1257	1814	1784	13	27
108	MAD	775833	18	1817	1826	1772	29	60
110	380B3A	129671	3	558	1768	1750	6	11
115	380B3A	341826	8	995	1780	1756	14	29
120	400B3	255185	6	1181	1774	1742	10	21
125	400B3	152674	4	1295	1780	1744	7	14
130	400B3	261565	6	930	1770	1746	11	22

Hermosa Vista
10yr-6hr rainfall = 1.9 in

Note: Rational Method hydrology was used for these subbasins for sizing of inlets on storm drain trunkline

Table 3.2
C Coefficients for Use with the Rational Method

Land Use	Return Period			
	2-10 Year	25 Year	50 Year	100 Year
Streets and Roads				
Paved Roads	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Gravel Roadways & Shoulders	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Industrial Areas				
Heavy	0.70 – 0.80	0.77 – 0.88	0.84 – 0.95	0.88 – 0.95
Light	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Business Areas				
Downtown	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Neighborhood	0.55 – 0.65	0.61 – 0.72	0.66 – 0.78	0.69 – 0.81
Residential Areas				
Lawns – Flat	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
– Steep	0.25 – 0.40	0.28 – 0.44	0.30 – 0.48	0.31 – 0.50
Suburban	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Single Family	0.45 – 0.55	0.50 – 0.61	0.54 – 0.66	0.56 – 0.69
Multi-Unit	0.50 – 0.60	0.55 – 0.66	0.60 – 0.72	0.63 – 0.75
Apartments	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Parks/Cemetaries	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
Playgrounds	0.40 – 0.50	0.44 – 0.55	0.48 – 0.60	0.50 – 0.63
Agricultural Areas	0.10 – 0.20	0.11 – 0.22	0.12 – 0.24	0.13 – 0.25
Bare Ground	0.20 – 0.30	0.22 – 0.33	0.24 – 0.36	0.25 – 0.38
Undeveloped Desert	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Mountain Terrain (Slopes > 10%)	0.60 – 0.80	0.66 – 0.88	0.72 – 0.95	0.75 – 0.95

Note: Values of C for 25, 50 and 100 Year were derived using frequency adjustment factors of 1.10, 1.20, and 1.25, respectively, with an upper limit of 0.95 for C for the 2-10 Year values.

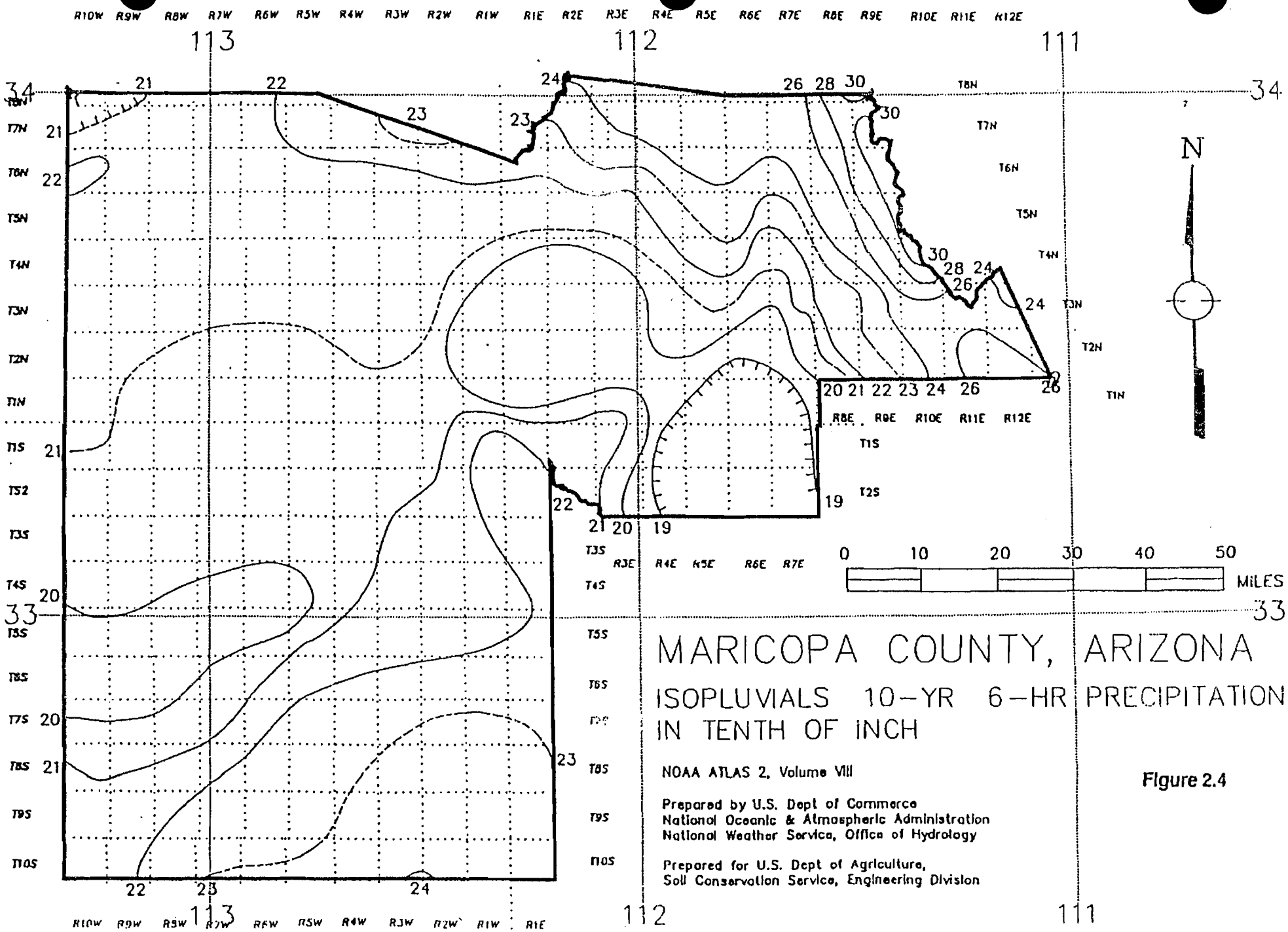
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 10-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
0 10 20 30 40 50
MILES
113
112
111
34
33

Figure 2.4

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 5

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 5720.00 ft

Basin Area: 57.000 acres

High Elevation: 1734.00 ft

Low Elevation: 1602.00 ft

Average Slope: 0.0231 ft/ft

Roughness, Kb: 0.0290 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	38	54	66	93	118	143
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	19.9	17.4	16.2	14.7	13.9	13.1
i (in/hr)	1.9	2.7	3.3	4.2	4.9	5.7

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:46 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

Author: Frank M. Koo, P.E.
Email: gufrank@engsoftwarecenter.com
URL: http://www.engsoftwarecenter.com/rational.html

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 10

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 3634.00 ft

Basin Area: 22.000 acres

High Elevation: 1684.00 ft

Low Elevation: 1604.00 ft

Average Slope: 0.0220 ft/ft

Roughness, Kb: 0.0316 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	17	23	28	40	50	60
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	16.1	14.2	13.2	12.0	11.4	10.7
i (in/hr)	2.1	3.0	3.6	4.7	5.4	6.3

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:46 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

Author: Frank M. Koo, P.E.
Email: gufrank@engsoftwarecenter.com
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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 15

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 5766.00 ft

Basin Area: 41.000 acres

High Elevation: 1738.00 ft

Low Elevation: 1618.00 ft

Average Slope: 0.0208 ft/ft

Roughness, Kb: 0.0299 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	27	38	46	65	83	100
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	21.2	18.6	17.3	15.7	14.8	14.0
i (in/hr)	1.9	2.6	3.2	4.1	4.8	5.6

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:46 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 20

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1535.00 ft

Basin Area: 5.000 acres

High Elevation: 1658.00 ft

Low Elevation: 1630.00 ft

Average Slope: 0.0182 ft/ft

Roughness, Kb: 0.0356 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	4	6	8	10	13	16
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	11.0	9.7	9.1	8.3	7.9	7.5
i (in/hr)	2.6	3.6	4.3	5.4	6.2	7.2

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:46 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

Author: Frank M. Koo, P.E.
Email: gufrank@engsoftwarecenter.com
URL: http://www.engsoftwarecenter.com/rational.html

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 25

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1402.00 ft

Basin Area: 7.000 acres

High Elevation: 1660.00 ft

Low Elevation: 1632.00 ft

Average Slope: 0.0200 ft/ft

Roughness, Kb: 0.0347 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	7	9	11	15	19	23
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	9.9	8.8	8.2	7.5	7.1	6.7
i (in/hr)	2.7	3.7	4.5	5.6	6.5	7.5

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:47 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 30

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 4825.00 ft

Basin Area: 34.000 acres

High Elevation: 1752.00 ft

Low Elevation: 1640.00 ft

Average Slope: 0.0232 ft/ft

Roughness, Kb: 0.0304 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	24	34	41	58	73	88
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	18.4	16.1	15.0	13.6	12.9	12.2
i (in/hr)	2.0	2.8	3.4	4.4	5.1	5.9

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 35

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 4150.00 ft

Basin Area: 20.000 acres

High Elevation: 1750.00 ft

Low Elevation: 1650.00 ft

Average Slope: 0.0241 ft/ft

Roughness, Kb: 0.0319 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	15	21	25	35	44	54
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	17.0	14.9	13.9	12.6	12.0	11.3
i (in/hr)	2.1	2.9	3.5	4.6	5.3	6.1

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 40

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1500.00 ft

Basin Area: 6.000 acres

High Elevation: 1686.00 ft

Low Elevation: 1654.00 ft

Average Slope: 0.0213 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	8	9	13	16	19
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	10.2	9.0	8.4	7.7	7.3	6.9
i (in/hr)	2.7	3.7	4.4	5.6	6.4	7.4

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 45

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 3277.00 ft

Basin Area: 16.000 acres

High Elevation: 1732.00 ft

Low Elevation: 1662.00 ft

Average Slope: 0.0214 ft/ft

Roughness, Kb: 0.0325 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	12	17	21	29	37	44
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	15.6	13.7	12.8	11.6	11.0	10.4
i (in/hr)	2.2	3.1	3.7	4.7	5.5	6.3

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 50

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 2966.00 ft

Basin Area: 21.000 acres

High Elevation: 1742.00 ft

Low Elevation: 1672.00 ft

Average Slope: 0.0236 ft/ft

Roughness, Kb: 0.0317 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	17	24	29	40	50	61
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	13.9	12.2	11.4	10.4	9.8	9.3
i (in/hr)	2.3	3.2	3.9	5.0	5.7	6.6

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 55

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1226.00 ft

Basin Area: 6.000 acres

High Elevation: 1704.00 ft

Low Elevation: 1674.00 ft

Average Slope: 0.0245 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	8	10	14	17	21
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	8.6	7.6	7.1	6.5	6.2	5.9
i (in/hr)	2.9	4.0	4.8	5.9	6.8	7.9

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 60

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 2103.00 ft

Basin Area: 12.000 acres

High Elevation: 1730.00 ft

Low Elevation: 1684.00 ft

Average Slope: 0.0219 ft/ft

Roughness, Kb: 0.0333 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	10	15	17	24	31	37
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	11.9	10.5	9.8	9.0	8.5	8.1
i (in/hr)	2.5	3.5	4.1	5.3	6.1	7.0

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 65

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1561.00 ft

Basin Area: 6.000 acres

High Elevation: 1726.00 ft

Low Elevation: 1688.00 ft

Average Slope: 0.0243 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	8	9	13	16	20
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	9.9	8.8	8.2	7.5	7.1	6.7
i (in/hr)	2.7	3.7	4.5	5.6	6.5	7.5

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 70

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 426.00 ft

Basin Area: 1.000 acres

High Elevation: 1706.00 ft

Low Elevation: 1694.00 ft

Average Slope: 0.0282 ft/ft

Roughness, Kb: 0.0400 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	1	2	2	2	3	4
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	5.0	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.5	4.6	5.4	6.4	7.3	8.3

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 75

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 946.00 ft

Basin Area: 4.000 acres

High Elevation: 1720.00 ft

Low Elevation: 1696.00 ft

Average Slope: 0.0254 ft/ft

Roughness, Kb: 0.0362 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	4	6	7	10	12	14
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	7.4	6.6	6.1	5.7	5.4	5.1
i (in/hr)	3.0	4.2	5.0	6.2	7.2	8.2

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 80

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 733.00 ft

Basin Area: 2.000 acres

High Elevation: 1720.00 ft

Low Elevation: 1700.00 ft

Average Slope: 0.0273 ft/ft

Roughness, Kb: 0.0381 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	2	3	4	5	6	7
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	6.4	5.7	5.3	5.0	5.0	5.0
i (in/hr)	3.2	4.4	5.3	6.4	7.3	8.3

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 85

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 390.00 ft

Basin Area: 1.000 acres

High Elevation: 1716.00 ft

Low Elevation: 1706.00 ft

Average Slope: 0.0256 ft/ft

Roughness, Kb: 0.0400 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	1	2	2	2	3	4
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	5.0	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.5	4.6	5.4	6.4	7.3	8.3

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 90

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1567.00 ft

Basin Area: 5.000 acres

High Elevation: 1748.00 ft

Low Elevation: 1708.00 ft

Average Slope: 0.0255 ft/ft

Roughness, Kb: 0.0356 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	5	7	8	11	14	16
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	9.9	8.7	8.1	7.4	7.1	6.7
i (in/hr)	2.7	3.8	4.5	5.7	6.5	7.5

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 95

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1161.00 ft

Basin Area: 6.000 acres

High Elevation: 1748.00 ft

Low Elevation: 1718.00 ft

Average Slope: 0.0258 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	9	10	14	17	21
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	8.1	7.2	6.7	6.2	5.9	5.6
i (in/hr)	2.9	4.1	4.8	6.0	6.9	8.0

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 100

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 854.00 ft

Basin Area: 6.000 acres

High Elevation: 1748.00 ft

Low Elevation: 1728.00 ft

Average Slope: 0.0234 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	7	9	11	14	18	22
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	7.0	6.2	5.8	5.4	5.1	5.0
i (in/hr)	3.1	4.3	5.1	6.3	7.3	8.3

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 108

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1817.00 ft

Basin Area: 18.000 acres

High Elevation: 1826.00 ft

Low Elevation: 1772.00 ft

Average Slope: 0.0297 ft/ft

Roughness, Kb: 0.0322 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	17	24	29	40	50	60
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	9.6	8.4	7.9	7.2	6.9	6.5
i (in/hr)	2.7	3.8	4.6	5.7	6.6	7.6

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 107

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1257.00 ft

Basin Area: 8.000 acres

High Elevation: 1814.00 ft

Low Elevation: 1784.00 ft

Average Slope: 0.0239 ft/ft

Roughness, Kb: 0.0344 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	8	11	13	18	23	27
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	8.7	7.7	7.2	6.6	6.2	5.9
i (in/hr)	2.9	4.0	4.7	5.9	6.8	7.8

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 106

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1377.00 ft

Basin Area: 11.000 acres

High Elevation: 1784.00 ft

Low Elevation: 1750.00 ft

Average Slope: 0.0247 ft/ft

Roughness, Kb: 0.0335 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	11	15	18	25	31	37
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	8.9	7.9	7.3	6.7	6.4	6.1
i (in/hr)	2.8	3.9	4.7	5.9	6.7	7.8

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Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 105

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 2182.00 ft

Basin Area: 11.000 acres

High Elevation: 1824.00 ft

Low Elevation: 1730.00 ft

Average Slope: 0.0431 ft/ft

Roughness, Kb: 0.0335 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	11	15	18	24	30	37
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	9.5	8.4	7.9	7.2	6.8	6.5
i (in/hr)	2.7	3.8	4.6	5.7	6.6	7.6

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 110

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 558.00 ft

Basin Area: 3.000 acres

High Elevation: 1768.00 ft

Low Elevation: 1750.00 ft

Average Slope: 0.0323 ft/ft

Roughness, Kb: 0.0370 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	4	5	6	7	9	11
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	5.1	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.5	4.6	5.4	6.4	7.3	8.3

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:50 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

Author: Frank M. Koo, P.E.
Email: gufrank@engsoftwarecenter.com
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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 115

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 995.00 ft

Basin Area: 8.000 acres

High Elevation: 1780.00 ft

Low Elevation: 1756.00 ft

Average Slope: 0.0241 ft/ft

Roughness, Kb: 0.0344 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	8	12	14	19	24	29
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	7.5	6.7	6.2	5.7	5.4	5.2
i (in/hr)	3.0	4.2	5.0	6.2	7.1	8.2

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:50 p

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 120

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1181.00 ft

Basin Area: 6.000 acres

High Elevation: 1774.00 ft

Low Elevation: 1742.00 ft

Average Slope: 0.0271 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	9	10	14	18	21
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	8.1	7.1	6.7	6.2	5.8	5.5
i (in/hr)	2.9	4.1	4.9	6.0	7.0	8.0

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:51 p

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 125

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 1295.00 ft

Basin Area: 4.000 acres

High Elevation: 1780.00 ft

Low Elevation: 1744.00 ft

Average Slope: 0.0278 ft/ft

Roughness, Kb: 0.0362 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	4	6	7	9	11	14
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	8.6	7.6	7.1	6.5	6.2	5.9
i (in/hr)	2.9	4.0	4.7	5.9	6.8	7.8

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:51 p

File: W:\2005Projects\052640 Hermosa Vista-Hawes Road\Project Support\Hydro\Hydrology\HermosaVistaOffsite.rat

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: Hermosa Vista/Hawes Road Storm

Project Description: WP# 052640

Drainage Point: 130

Location: Hermosa Vista-Hawes

Drainage Basin Data

Water Course Length: 930.00 ft

Basin Area: 6.000 acres

High Elevation: 1770.00 ft

Low Elevation: 1746.00 ft

Average Slope: 0.0258 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.350

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	9	11	14	18	22
C	0.350	0.350	0.350	0.385	0.420	0.438
Tc (min)	7.2	6.3	5.9	5.5	5.2	5.0
i (in/hr)	3.1	4.3	5.1	6.2	7.2	8.3

Computed by: JLL, Wood/Patel
Tuesday, June 05, 2007 5:37:51 p

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LEGEND

- (395F) Rational Subbasin Label
- Rational Subbasin Boundary
- (395A) HEC-1 Subbasin Label
- HEC-1 Subbasin Boundary
- Flow Line
- Cross Culvert
- Q100=27cfs — Subbasin Flow
- Q100=27cfs — Flow West
- Q100=2cfs — Flow South

N

200 0 100 200

1 inch = 200 ft.

HERMOSA VISTA/HAWES ROAD STORM DRAIN PROJECT

88TH ST DRAINAGE MAP

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
TRANSPORTATION / TRAFFIC
WATER / WASTEWATER • SURVEYING
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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: C1

Location: 395 C

Drainage Basin Data

Water Course Length: 1095.00 ft

Basin Area: 6.100 acres

High Elevation: 2060.00 ft

Low Elevation: 1844.00 ft

Average Slope: 0.1973 ft/ft

Roughness, Kb: 0.1304 (C)

10-Year Runoff Coefficient: 0.600

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	11	15	18	24	30	36
C	0.600	0.600	0.600	0.660	0.720	0.750
Tc (min)	8.4	7.4	6.9	6.4	6.0	5.7
i (in/hr)	2.9	4.0	4.8	6.0	6.9	7.9

Computed by: ,
Wednesday, March 21, 2007 10:57:35 a

Author: Frank M. Koo, P.E.
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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: C2

Location: 395 D

Drainage Basin Data

Water Course Length: 302.00 ft

Basin Area: 0.600 acres

High Elevation: 1853.00 ft

Low Elevation: 1840.00 ft

Average Slope: 0.0430 ft/ft

Roughness, Kb: 0.1555 (C)

10-Year Runoff Coefficient: 0.400

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	1	1	1	2	2	2
C	0.400	0.400	0.400	0.440	0.480	0.500
Tc (min)	7.6	6.7	6.3	5.8	5.5	5.2
i (in/hr)	3.0	4.2	5.0	6.1	7.1	8.2

Computed by: ,
Wednesday, March 21, 2007 10:57:35 a

Author: Frank M. Koo, P.E.
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URL: http://www.engsoftwarecenter.com/rational.html

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: C3

Location: 395 E

Drainage Basin Data

Water Course Length: 1663.00 ft

Basin Area: 5.300 acres

High Elevation: 2060.00 ft

Low Elevation: 1836.00 ft

Average Slope: 0.1347 ft/ft

Roughness, Kb: 0.1319 (C)

10-Year Runoff Coefficient: 0.600

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	8	11	13	18	23	27
C	0.600	0.600	0.600	0.660	0.720	0.750
Tc (min)	12.5	11.0	10.3	9.3	8.9	8.4
i (in/hr)	2.4	3.4	4.1	5.2	6.0	6.9

Computed by: ,
Wednesday, March 21, 2007 10:57:35 a

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: C4

Location: 395 F

Drainage Basin Data

Water Course Length: 1122.00 ft

Basin Area: 3.400 acres

High Elevation: 1870.00 ft

Low Elevation: 1828.00 ft

Average Slope: 0.0374 ft/ft

Roughness, Kb: 0.1367 (C)

10-Year Runoff Coefficient: 0.400

10-Year 6 Hour Rainfall Depth: 1.90 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	3	4	5	7	9	11
C	0.400	0.400	0.400	0.440	0.480	0.500
Tc (min)	16.3	14.3	13.4	12.1	11.5	10.9
i (in/hr)	2.1	3.0	3.6	4.6	5.4	6.2

Computed by: ,
Wednesday, March 21, 2007 10:57:35 a

Author: Frank M. Koo, P.E.
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HYDRAULICS

WOOD/PATEL

MEMO

TO: Jeff Minch, P.E.

FROM: Dave Lutzky, P.E.

DATE: 2-19-08

RE: Hermosa Vista/Hawes Road Storm Drain and Basin Project (Final Submittal)

SUBJECT: Hydraulic Calculations

I. INTRODUCTION

This memo summarizes the assumptions and supporting calculations for the Final hydraulic design, as outlined in the Design Concept Report (DCR).

The proposed system includes a storm drain beginning at the Madrid Basin (on-line), which conveys flows west in the McDowell Road ROW to Hawes Road, turns and proceeds south within the Hawes Road ROW to Willetta Street. At Willetta Street a diversion structure diverts flood flow southeast to an off-line detention basin, the Culver-Hawes Basin. For most storms, runoff conveyed in the storm drain by-passes the basin and continues south. The by-pass and Culver-Hawes Basin bleed-off merge at the southwest corner of the basin and continue south to Hermosa Vista, where the storm drain turns west and continues within the Hermosa Vista ROW to the Spook Hill Floodwater Retarding Structure (FRS). See StormCAD plan view maps included with this memo.

Hydraulic design constraints as dictated by the Flood Control District of Maricopa County (FCDMC) are outlined briefly here, as well as a summary of the hydraulic modeling results of the Final design.

II. CONSTRAINTS

Based on the project scope, the District has directed the use of reinforced concrete pipe (RGRCP) for this project and as a result made an allowance for maximum velocities near 20 ft/sec with an absolute maximum velocity of 25 ft/sec.

III. STORM DRAIN HYDRAULICS

HEC-1 was used to quantify the design inflow for the storm drain trunk-line. The Final hydraulic design was accomplished with StormCAD, using the results of the HEC-1 model to adjust the pipe size. The StormCAD model assumes standard values for headlosses at manholes and junctions and uses a Mannings's "n" roughness coefficient of 0.013 for the RGRCP material. Additionally, the design profile included no "drops" at manholes to avoid structural problems resulting from high velocity flow.

The results of the Final pipe profile show velocities generally below 20 feet/second. The introduction of RGRCP in lieu of CMP has also allowed a reduction in design pipe diameter by 6-inches throughout the system while still maintaining open channel flow conditions. A detailed StormCAD pipe summary and hydraulic profile for the Final design is provided with this memo.

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IV. CULVER-HAWES BASIN

The analysis for Culver-Hawes Basin was performed by utilizing a combination of HEC-1 and STORMCAD in an iterative process to determine the hydraulic performance of the splitter structure. Inflows from the splitter structure into the detention basin are such that the water surface elevation (WSE) shall not exceed 1739 ft which provides 3 ft of freeboard from the existing ground line.

For the initial sizing of the splitter bypass pipes, a diversion flow rating curve was developed and routed hydrologically through the proposed detention basin using HEC-1. The computed stage in the output was then checked and the diversions adjusted until the split produced a stage at or near WSE 1739. The peak inflow to the splitter structure is 394 cfs.

STORMCAD cannot model the splitter structure as a single entity, therefore the splitter and bypass pipes were analyzed separately. Adjustments made to the assumed flows and pipe geometry was made until the HGL of the two separate pipes converged. The splitter structure is designed to perform as an offline detention with low flows continuing through the storm drain system. Therefore, an adverse grade totaling 2.5 feet was applied to the splitter pipe that enters the detention pond.

The splitter structure rating curve was developed by hydraulically modeling flows in the splitter pipe in 100 cfs increments to compute the HGL just upstream of the splitting structure. This HGL was then used as an inlet control WSE for computing the carrying capacity of the bypass pipe. The computed bypass pipe flows was then subtracted from the total inflows to the splitter structure and the HGL was recomputed for the iterated splitter pipe flows. This was done until the changes in the flows in the splitter pipe and HGL computations converged with the previous run. The rating curve was developed for assumed peaks flows of 100 to 400 cfs in 100 cfs increments. A tailwater condition was also applied to splitter pipe hydraulic analysis by reading the timing from the HEC-1 output on the peak inflows into the splitter structure (100 cfs increments) and computing the corresponding Culver-Hawes detention stage at the corresponding times. Head loss through the structure (K value) was assumed to be 0.4 times the velocity heads.

Simple continuity was also checked to ensure that:

$$Q_{BY\text{-}PASS} + Q_{BASIN} = Q_{INFLOW}$$

A peak inflow of 299 cfs enters the Culver Hawes detention basin via a 66-inch pipe and 95 cfs continues through the splitter structure via 36-inch pipe. The total peak inflow to the diversion structure is 95+299 = 394 cfs.

A summary of these flows and their supporting calculations are provided with this memo.

A second method of analysis was used check the results of the Culver-Hawes splitter structure hydraulic calculations. The method used was the computer modeling program EPASWMM version 5.0.011. The EPA Storm Water Management Model (SWMM) is a dynamic rainfall-runoff simulation model used for single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas. The runoff component of SWMM operates on a collection of subcatchment areas that receive precipitation and generate runoff and pollutant loads. The routing portion of SWMM transports this runoff through a system of pipes, channels, storage/treatment devices, pumps, and regulators. SWMM tracks the quantity and quality of runoff generated within each subcatchment, and the flow rate, flow depth, and quality of water in each pipe and channel during a simulation period comprised of multiple time steps.

In this case, a storm drain system model was input into the program based on the design plans of the trunkline, splitter structure, detention basin stage area rating curve and the basin outlet pipe. Time series flows were obtained from hydrographs from the project hydrology model (HEC-1). The results of the computations were within 5% of the conventional methods discussed in the previous paragrph.

V. STORM DRAIN INLET HYDRAULICS AND CROSS CULVERTS

The design of the inlets along the storm drain incorporated similar design as that used on the McDowell Road Storm Drain Project. The basis of the inlet design is a modified MAG 537 in which the grate is mounted on legs 4 inches above the frame. This allows extra capacity for flow to enter the catch basin, beyond the potentially limiting capacity of the grate alone.

Where existing non-404 washes intersect the roadways, inlets have been designed to capture the entire offsite flow. In this configuration, the inlet frame is mounted in the standard manner where the frame is at ground level. However, where 404 washes cross the roadway, cross culverts convey the entire offsite flow beneath the roadway. In these cases, the inlet frame elevation is designed to be 6 inches above finished grade. This allows initial flows to bypass the inlet and continue through the existing cross culvert. Head produced from flows beyond the capacity of the cross culvert then allows flow to enter the catch basin. The inlet calculations supporting the inlet design are included with this memo.

It should be noted that most of the existing cross culvert inlets required modification for several reasons. Trenching for the trunk line of the storm drain requires removal of the inlet headwall and some portion of the culvert in most cases. Many of the cross culverts are sets of culverts and, as part of the design requirements needed to have all but one culvert inlet plugged in order to limit flow to "404" flow. In all of these cases, a new length of pipe and flared end section is added to the remaining single culvert.

VI. HYDRAULICS AND SCOUR PREVENTION MEASURES AT SPECIAL STRUCTURES

Several additional elements within the project required design and implementation into the project. These elements include a stilling basin outlet at the Spook Hill FRS, riprap design within Culver-Hawes Basin, and a rating curve for the diversion structure at McDowell Road/Thunder Mountain.

VII. 88TH STREET HYDRAULICS

The 88th Street drainage features include 40 foot long apron along the west side of 88th Street, near McDowell Road. The apron will require removal of approximately 40 feet of curb and gutter and installation of the apron and bollards. The apron will allow flows to enter the Thunder Mountain Channel that parallels McDowell Road. The hydraulic calculations that support this design are included with this memo.

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Scenario: Base

Pipe Report

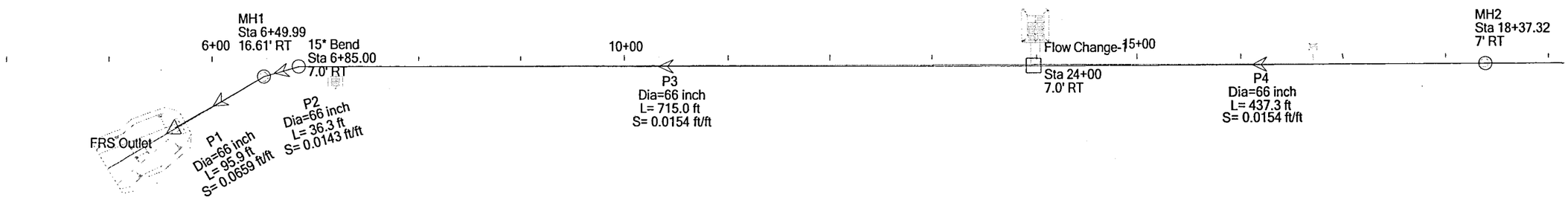
Label	Upstream Node	Total System Flow (cfs)	Length (ft)	Section Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Energy Grade Line In (ft)	Energy Grade Line Out (ft)	Average Velocity (ft/s)
P36	MADRID-INL	338.00	109.6	72 inch	1,821.00	1,820.40	1,829.25	1,828.21	1,826.97	1,826.31	1,829.19	1,828.55	11.98
P35	MH24	338.00	486.1	66 inch	1,820.30	1,815.44	1,828.21	1,825.55	1,825.27	1,820.48	1,828.75	1,823.89	14.89
P34	MH23	338.00	497.2	66 inch	1,815.34	1,799.24	1,825.55	1,813.00	1,820.31	1,805.36	1,823.79	1,808.51	14.60
P33	MH22	338.00	72.2	66 inch	1,799.14	1,797.76	1,813.00	1,812.50	1,804.38	1,803.77	1,807.64	1,806.92	14.35
P32	12* Bend-3	338.00	821.0	66 inch	1,797.76	1,781.44	1,812.50	1,791.40	1,802.73	1,786.48	1,806.21	1,789.89	14.89
P31	MH21	338.00	246.0	66 inch	1,781.34	1,768.31	1,791.40	1,785.88	1,786.31	1,777.90	1,789.79	1,781.05	14.60
P30	MH20	338.00	239.9	66 inch	1,768.21	1,767.10	1,785.88	1,781.05	1,777.75	1,775.32	1,780.89	1,778.46	14.23
P29	MH19	394.00	713.9	66 inch	1,767.00	1,753.94	1,781.05	1,764.44	1,772.18	1,759.24	1,776.66	1,763.62	16.88
P28	MH18	394.00	343.3	66 inch	1,753.84	1,742.61	1,764.44	1,757.72	1,759.02	1,754.16	1,763.50	1,758.43	16.79
P27	MH17	394.00	62.0	66 inch	1,742.51	1,741.55	1,757.72	1,756.30	1,753.94	1,753.09	1,758.22	1,757.36	16.58
P26	45* Bend	394.00	41.3	66 inch	1,741.45	1,740.85	1,756.30	1,754.40	1,751.81	1,751.24	1,756.08	1,755.51	16.58
P25	MH16	394.00	677.1	66 inch	1,740.75	1,728.82	1,754.40	1,741.70	1,749.96	1,740.63	1,754.23	1,744.91	16.58
P24	MH15	394.00	46.8	66 inch	1,728.72	1,728.50	1,741.70	1,740.85	1,740.42	1,739.78	1,744.69	1,744.05	16.58
Ch-ou	CH-outlet	50.00	221.2	24 inch	1,727.00	1,724.00	1,742.00	1,731.66	1,738.46	1,727.65	1,742.39	1,731.59	15.92
P23	ST3	95.00	583.8	36 inch	1,728.40	1,724.00	1,740.85	1,731.66	1,739.49	1,727.65	1,742.30	1,730.46	13.44
P22	ST2	133.00	107.8	48 inch	1,724.00	1,722.93	1,731.66	1,730.08	1,727.44	1,726.57	1,729.52	1,728.48	11.32
P21	MH14	152.00	789.4	48 inch	1,722.83	1,707.73	1,730.08	1,717.56	1,726.44	1,710.35	1,728.96	1,715.07	15.07
P20	MH13	152.00	407.0	54 inch	1,707.23	1,700.30	1,717.56	1,708.70	1,710.85	1,704.58	1,712.76	1,706.05	10.41
P19	MH12	165.00	95.2	54 inch	1,700.20	1,698.62	1,708.70	1,708.40	1,703.95	1,702.90	1,706.06	1,704.64	11.11
P18	MH11	165.00	381.6	54 inch	1,698.52	1,690.82	1,708.40	1,701.10	1,702.27	1,694.57	1,704.38	1,696.68	11.64
P17	MH10	165.00	800.0	54 inch	1,690.72	1,674.44	1,701.10	1,687.73	1,694.47	1,678.47	1,696.58	1,680.34	11.32
P16	MH9	194.00	800.0	54 inch	1,674.34	1,661.08	1,687.73	1,671.00	1,678.33	1,665.11	1,680.96	1,667.70	12.96
P15	MH8	194.00	800.0	54 inch	1,660.98	1,645.05	1,671.00	1,658.00	1,664.97	1,650.48	1,667.60	1,652.79	12.60
P14	MH7	236.00	795.2	54 inch	1,644.95	1,630.71	1,658.00	1,644.00	1,650.30	1,638.85	1,653.73	1,642.27	14.84
P13	MH6	236.00	227.0	54 inch	1,630.61	1,627.41	1,644.00	1,640.50	1,638.68	1,635.41	1,642.10	1,638.83	14.84
P12	12* Bend-2	236.00	83.0	54 inch	1,627.41	1,626.23	1,640.50	1,639.00	1,634.38	1,633.19	1,637.81	1,636.61	14.84
P11	12* Bend-1	236.00	496.0	54 inch	1,626.23	1,619.69	1,639.00	1,631.00	1,632.16	1,625.02	1,635.58	1,628.44	14.84
P10	MH5	282.00	780.6	60 inch	1,618.69	1,602.97	1,631.00	1,619.00	1,623.29	1,611.64	1,626.75	1,614.85	14.65
P9	MH4	282.00	52.3	60 inch	1,602.87	1,601.88	1,619.00	1,620.00	1,610.68	1,610.07	1,613.89	1,613.27	14.36
P8	45* bend-2	282.00	70.8	60 inch	1,601.88	1,600.52	1,620.00	1,619.00	1,609.11	1,608.28	1,612.31	1,611.48	14.36
P7	MH3	282.00	52.3	60 inch	1,600.02	1,599.69	1,619.00	1,617.00	1,607.31	1,606.70	1,610.52	1,609.91	14.36
P6	45* Bend-1	282.00	21.3	66 inch	1,599.69	1,599.55	1,617.00	1,616.00	1,606.04	1,605.89	1,608.23	1,608.08	11.87
P5	Flow change-	314.00	561.9	66 inch	1,599.55	1,595.80	1,616.00	1,608.70	1,605.76	1,600.70	1,608.47	1,603.77	13.63
P4	MH2	314.00	437.3	66 inch	1,595.70	1,588.98	1,608.70	1,601.50	1,600.55	1,594.93	1,603.66	1,597.65	13.69
P3	Flow Change	383.00	715.0	66 inch	1,588.98	1,577.94	1,601.50	1,592.00	1,594.73	1,585.43	1,598.77	1,589.47	16.12
P2	15* Bend	383.00	36.3	66 inch	1,577.94	1,577.42	1,592.00	1,592.00	1,584.22	1,583.74	1,588.26	1,587.78	16.12
P1	MH1	383.00	95.9	66 inch	1,577.32	1,571.00	1,592.00	1,578.00	1,582.46	1,581.20	1,586.73	1,585.24	16.35

Scenario: Base

Node Report

Label	Total Flow (cfs)	Calculated Station (ft)	Hydraulic Grade Line In (ft)	Energy Grade Line In (ft)	Velocity In (ft/s)	Velocity Out (ft/s)
MADRID-INL	338.00	35+74.78	1,828.08	1,830.30	11.96	11.96
MH24	338.00	34+65.18	1,826.31	1,829.79	14.96	14.96
MH23	338.00	29+79.07	1,820.48	1,823.96	14.96	14.96
MH22	338.00	24+81.87	1,805.36	1,808.61	14.47	14.47
12* Bend-3	338.00	24+09.72	1,803.77	1,807.25	14.96	14.96
MH21	338.00	15+88.72	1,786.48	1,789.96	14.96	14.96
MH20	338.00	13+42.72	1,777.90	1,781.05	14.23	14.23
MH19	394.00	11+02.85	1,775.32	1,779.80	16.99	16.99
MH18	394.00	03+88.91	1,759.24	1,763.73	16.99	16.99
MH17	394.00	00+45.66	1,754.16	1,758.43	16.58	16.58
45* Bend	394.00	99+83.65	1,753.09	1,757.36	16.58	16.58
MH16	394.00	99+42.34	1,751.24	1,755.51	16.58	16.58
MH15	394.00	92+65.24	1,740.63	1,744.91	16.58	16.58
CH-outlet	50.00	88+55.84	1,738.96	1,742.89	15.92	15.92
ST3	95.00	92+18.40	1,739.78	1,742.58	13.44	13.44
ST2	133.00	86+34.64	1,727.65	1,729.73	11.56	11.56
MH14	152.00	85+26.79	1,726.57	1,729.09	12.73	12.73
MH13	152.00	77+37.39	1,710.94	1,712.86	11.10	11.10
MH12	165.00	73+30.39	1,704.58	1,706.69	11.65	11.65
MH11	165.00	72+35.14	1,702.90	1,705.01	11.65	11.65
MH10	165.00	68+53.55	1,694.57	1,696.69	11.65	11.65
MH9	194.00	60+53.55	1,678.47	1,681.09	13.00	13.00
MH8	194.00	52+53.55	1,665.11	1,667.73	13.00	13.00
MH7	236.00	44+53.50	1,650.48	1,653.90	14.84	14.84
MH6	236.00	36+58.33	1,638.85	1,642.27	14.84	14.84
12* Bend-2	236.00	34+31.37	1,635.41	1,638.83	14.84	14.84
12* Bend-1	236.00	33+48.37	1,633.19	1,636.61	14.84	14.84
MH5	282.00	28+52.40	1,625.02	1,628.48	14.93	14.93
MH4	282.00	20+71.77	1,611.64	1,614.85	14.36	14.36
45* bend-2	282.00	20+19.44	1,610.07	1,613.27	14.36	14.36
MH3	282.00	19+48.63	1,608.28	1,611.48	14.36	14.36
45* Bend-1	282.00	18+96.30	1,606.70	1,608.89	11.87	11.87
Flow change-	314.00	18+75.01	1,605.89	1,608.61	13.22	13.22
MH2	314.00	13+13.11	1,600.70	1,603.82	14.16	14.16
Flow Change	383.00	8+75.79	1,594.93	1,598.97	16.12	16.12
15* Bend	383.00	1+60.79	1,585.43	1,589.47	16.12	16.12
MH1	383.00	1+24.47	1,583.74	1,588.01	16.57	16.57
FRS Outlet	383.00		1,581.20	1,581.20	0.00	0.00

Scenario: Base



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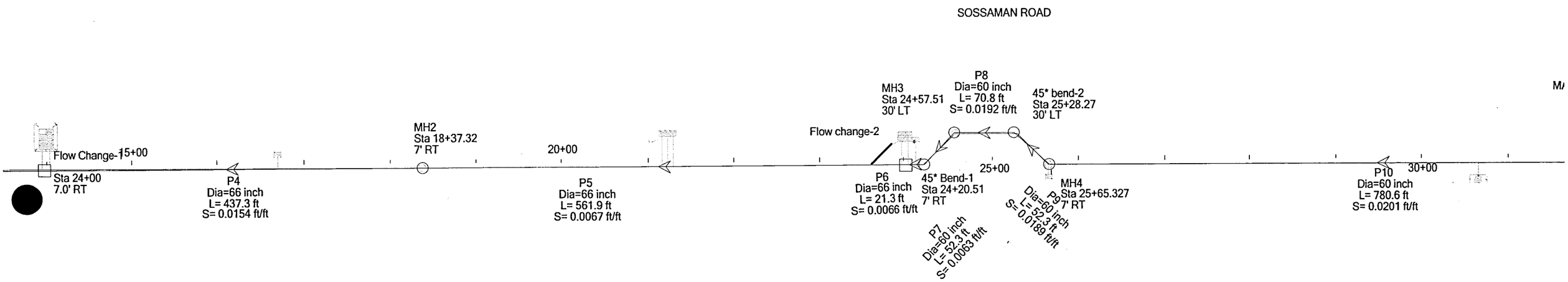
Scenario: Base



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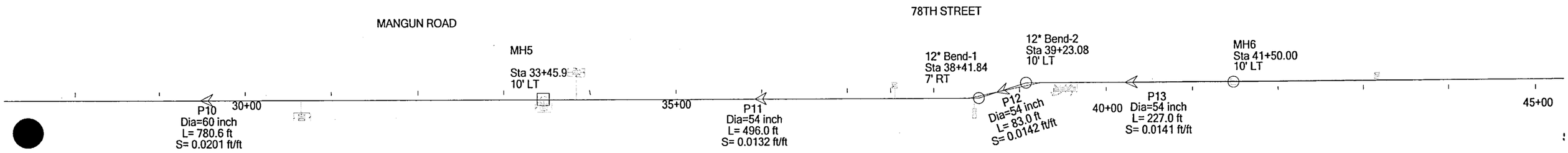
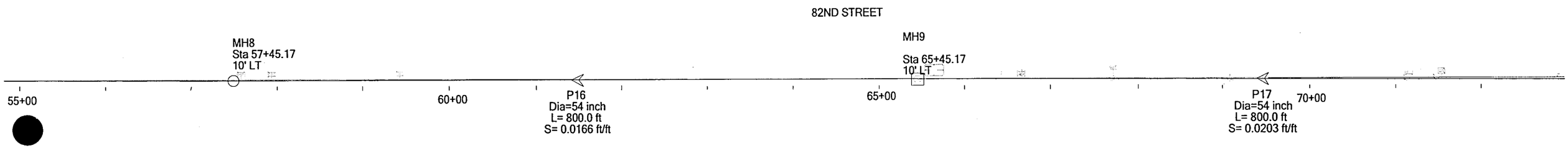
Scenario: Base



Scenario: Base



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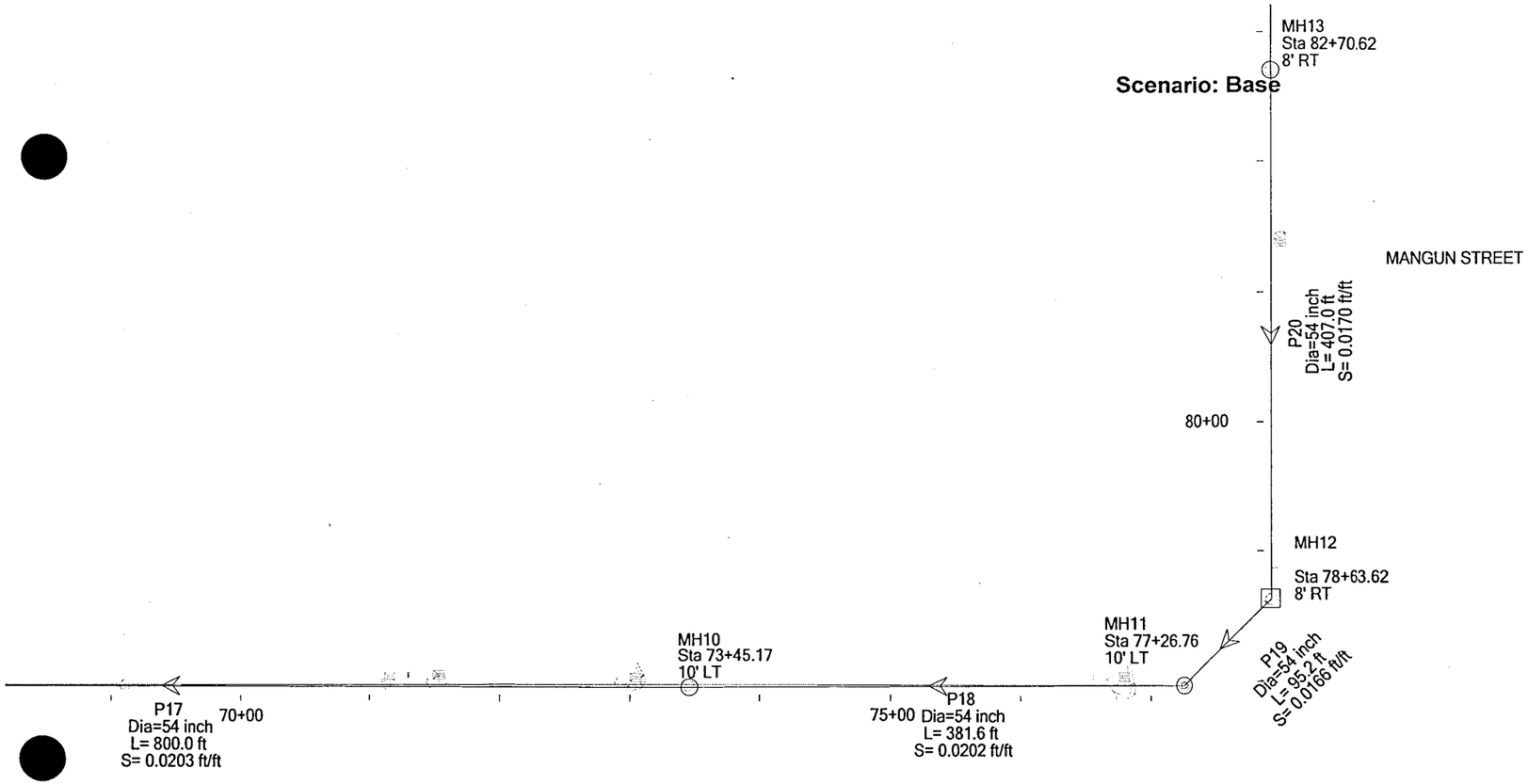

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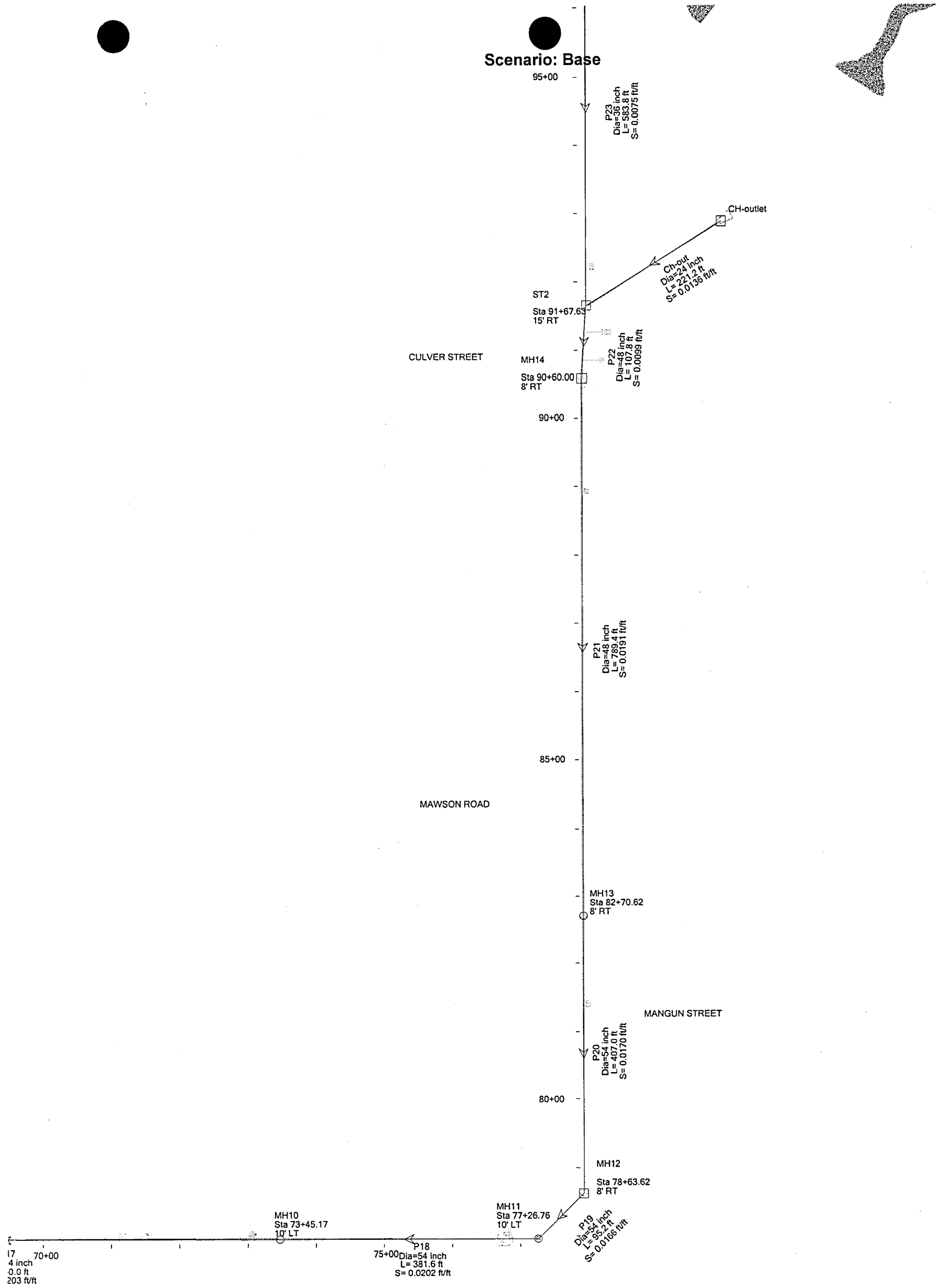
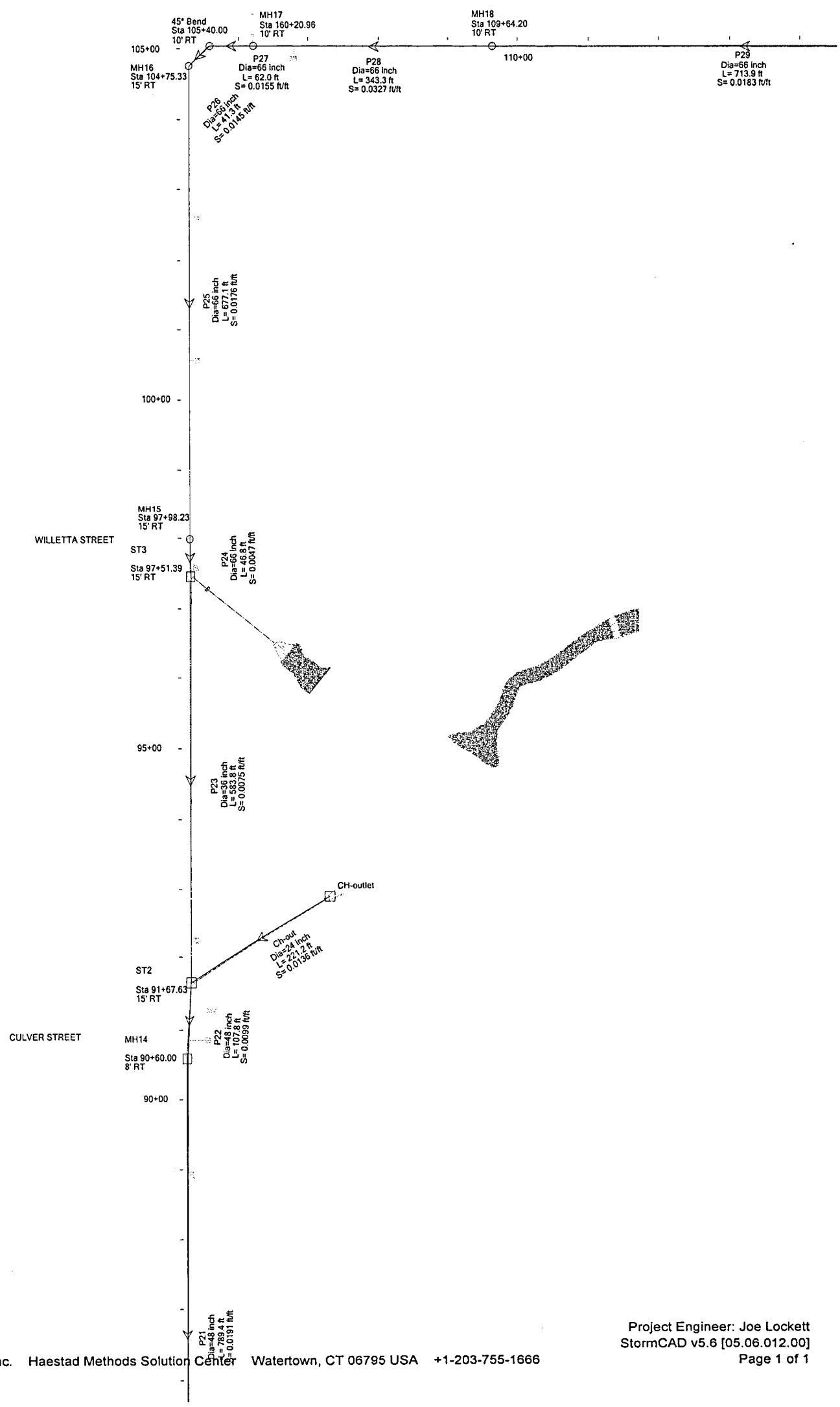
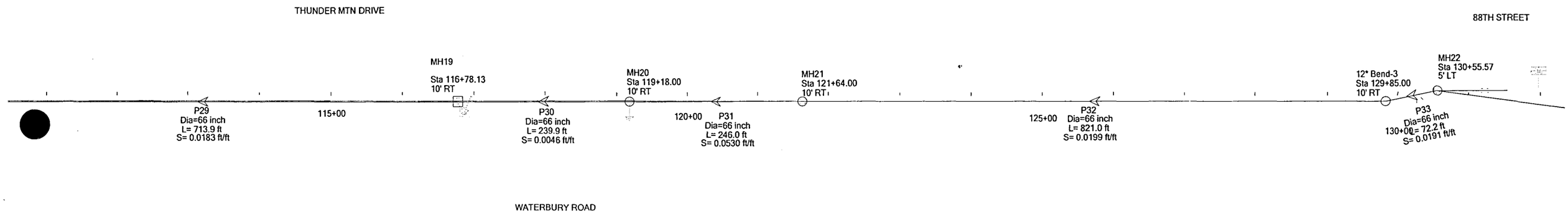

Scenario: Base
95+00
P23
Dia=36 inch
L= 583.8 ft
S= 0.0075 ft/ft
CH-outlet
Ch-out
Dia=24 inch
L= 221.2 ft
S= 0.0136 ft/ft
ST2
Sta 91+67.63
15' RT
CULVER STREET
MH14
Sta 90+60.00
8' RT
P22
Dia=48 inch
L= 107.8 ft
S= 0.0099 ft/ft
90+00
P21
Dia=48 inch
L= 789.4 ft
S= 0.0191 ft/ft
85+00
MAWSON ROAD
MH13
Sta 82+70.62
8' RT
MANGUN STREET
P20
Dia=54 inch
L= 407.0 ft
S= 0.0170 ft/ft
80+00
MH12
Sta 78+63.62
8' RT
MH11
Sta 77+26.76
10' LT
P19
Dia=54 inch
L= 95.2 ft
S= 0.0166 ft/ft
MH10
Sta 73+45.17
10' LT
P18
Dia=54 inch
L= 381.6 ft
S= 0.0202 ft/ft
75+00
70+00

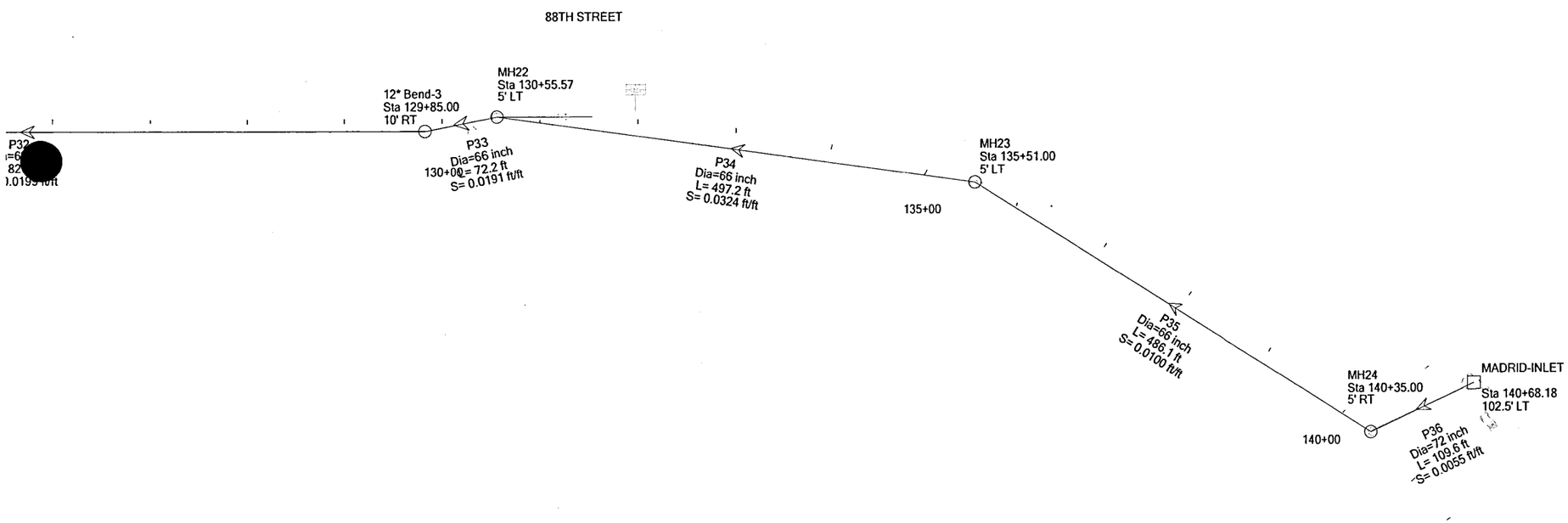
Scenario: Base



Scenario: Base



Scenario: Base



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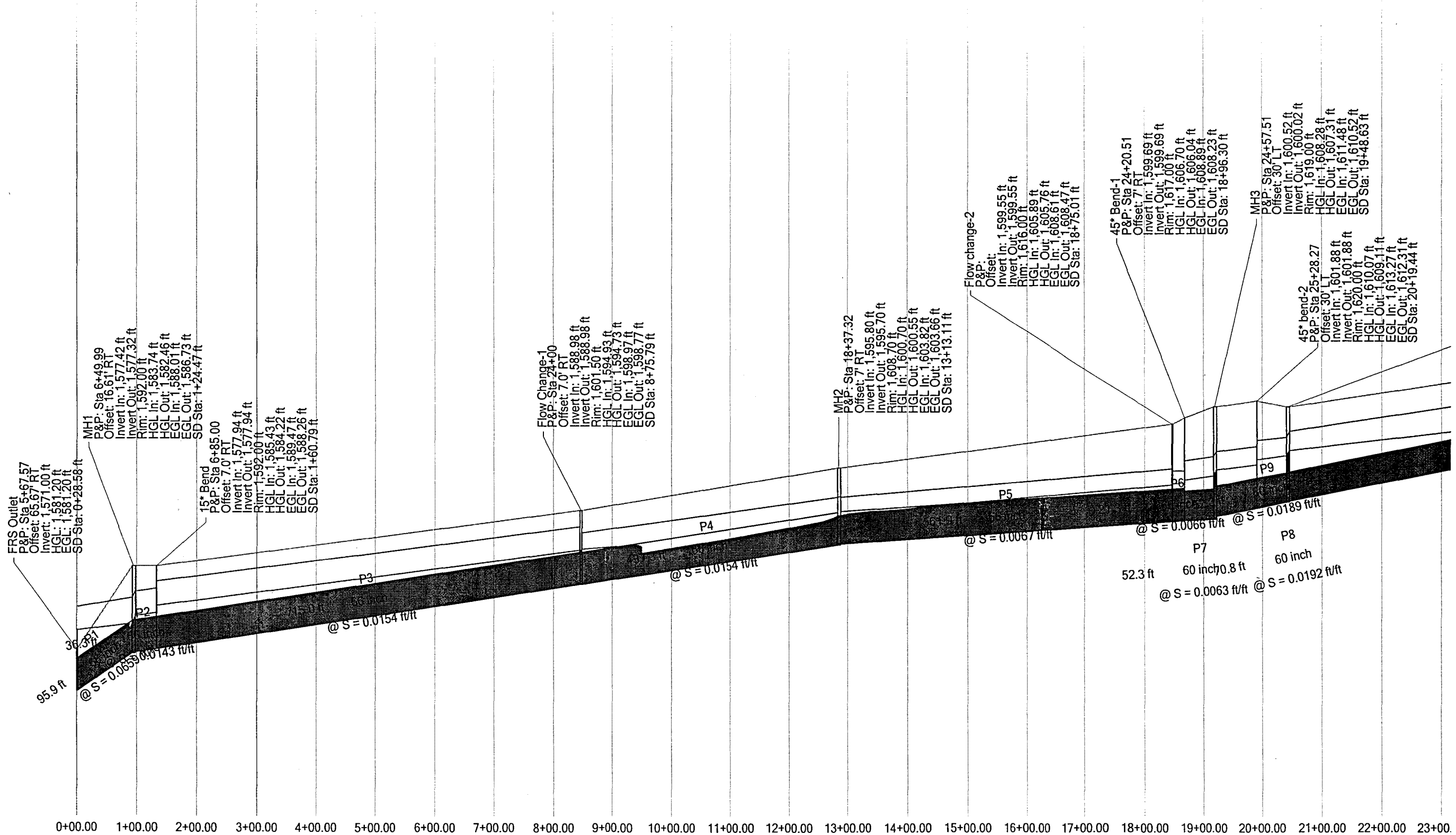
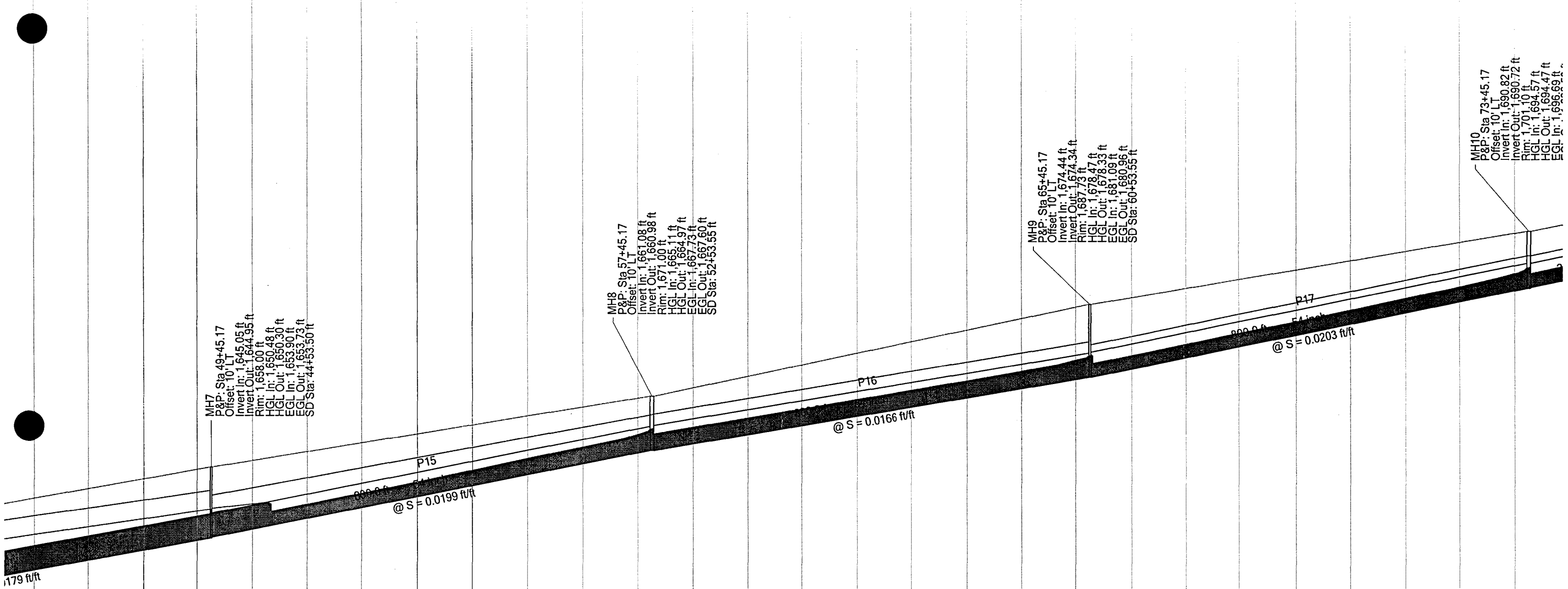
Profile
Scenario: Base



Profile
Scenario: Base



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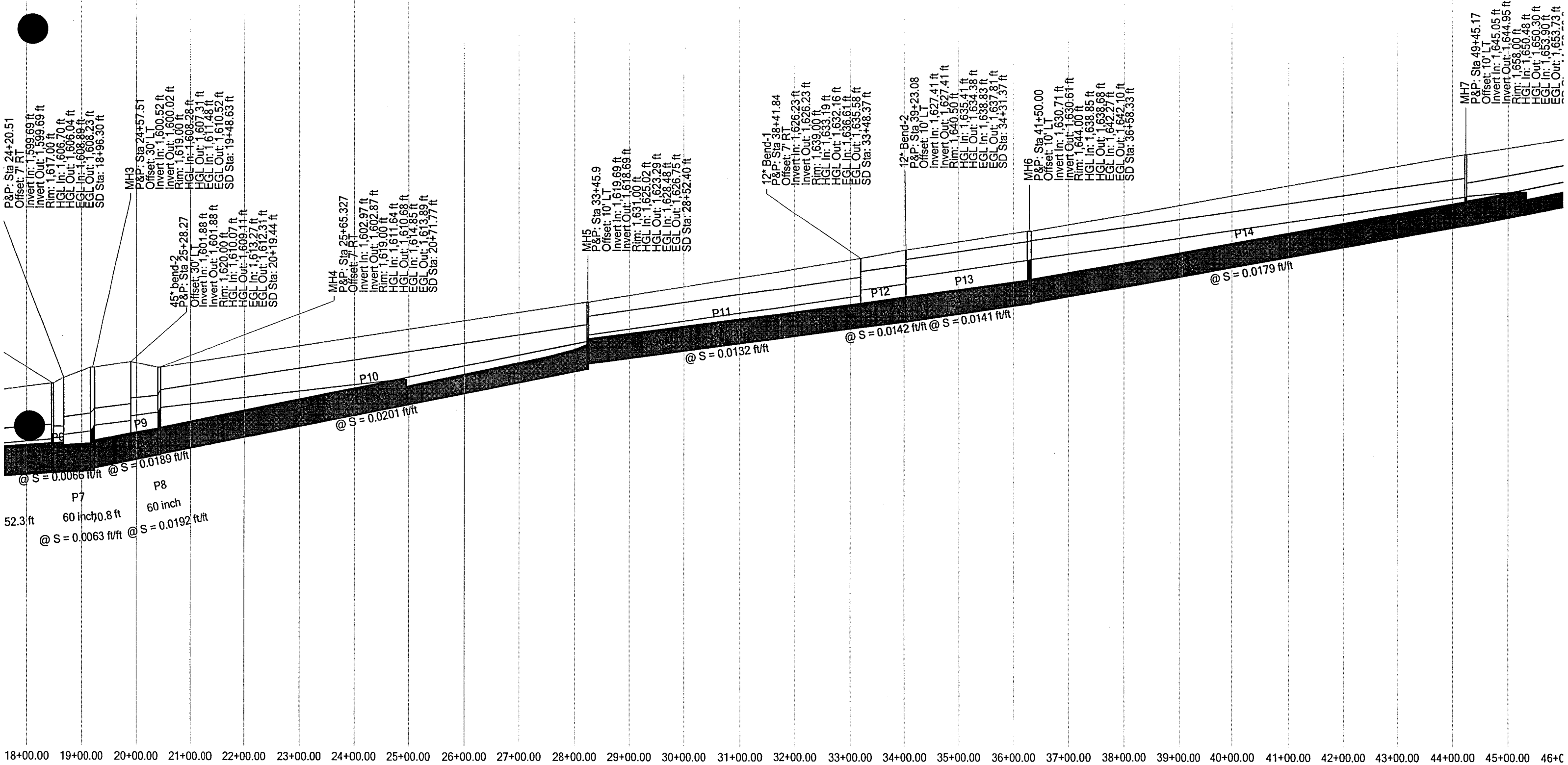
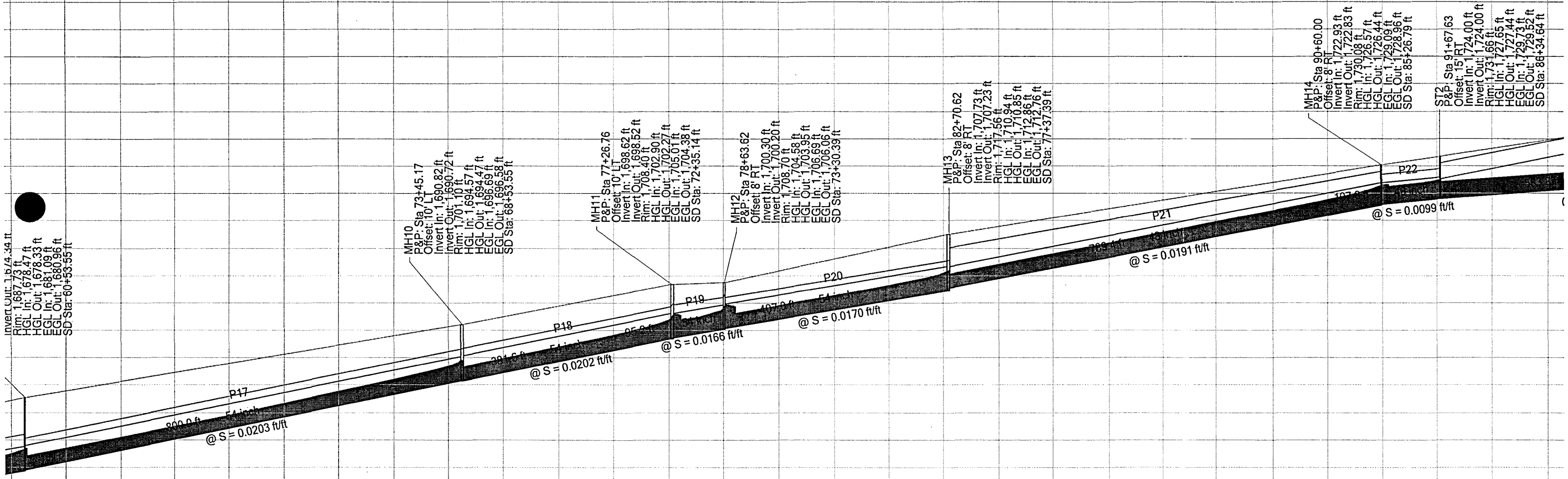
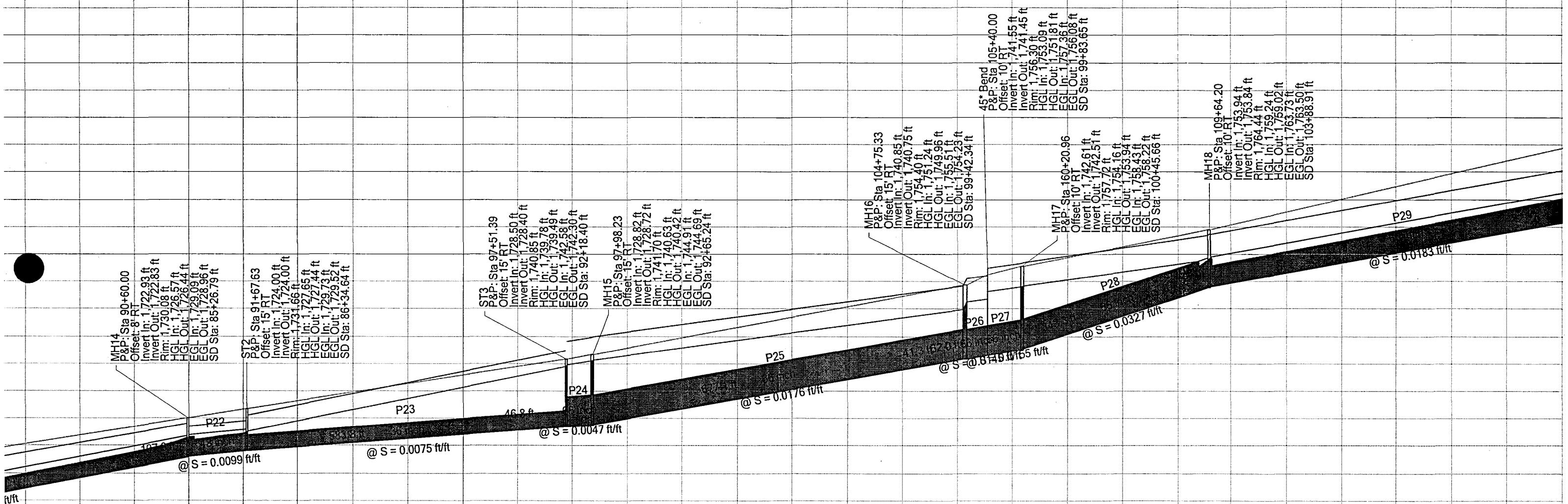
Profile
Scenario: Base



Profile
Scenario: Base



Profile
Scenario: Base



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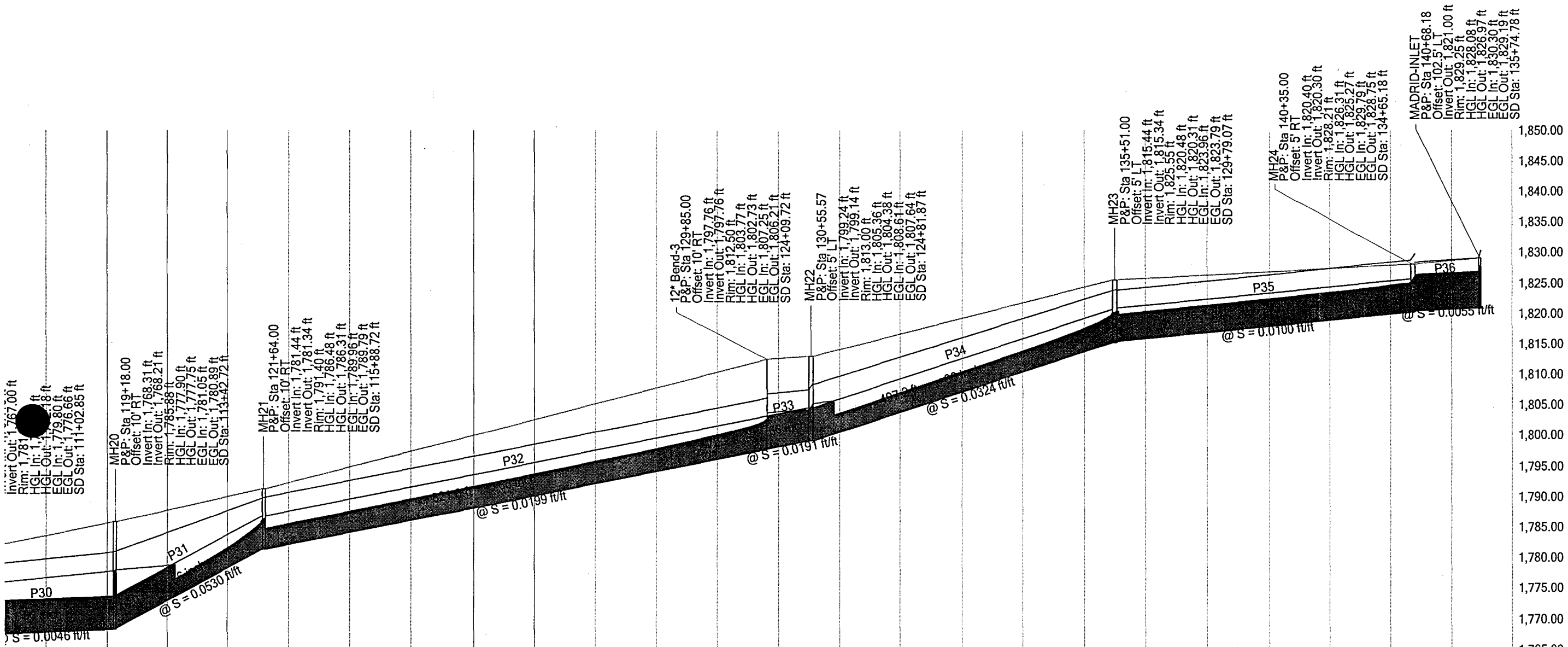
Profile
Scenario: Base



Title: Hermosa Vista-Hawes Road Storm Drain and Basin Project
w:\...\stormcad\hermosa_hawes_100% submittal.stm
02/19/08 04:28:46 PM

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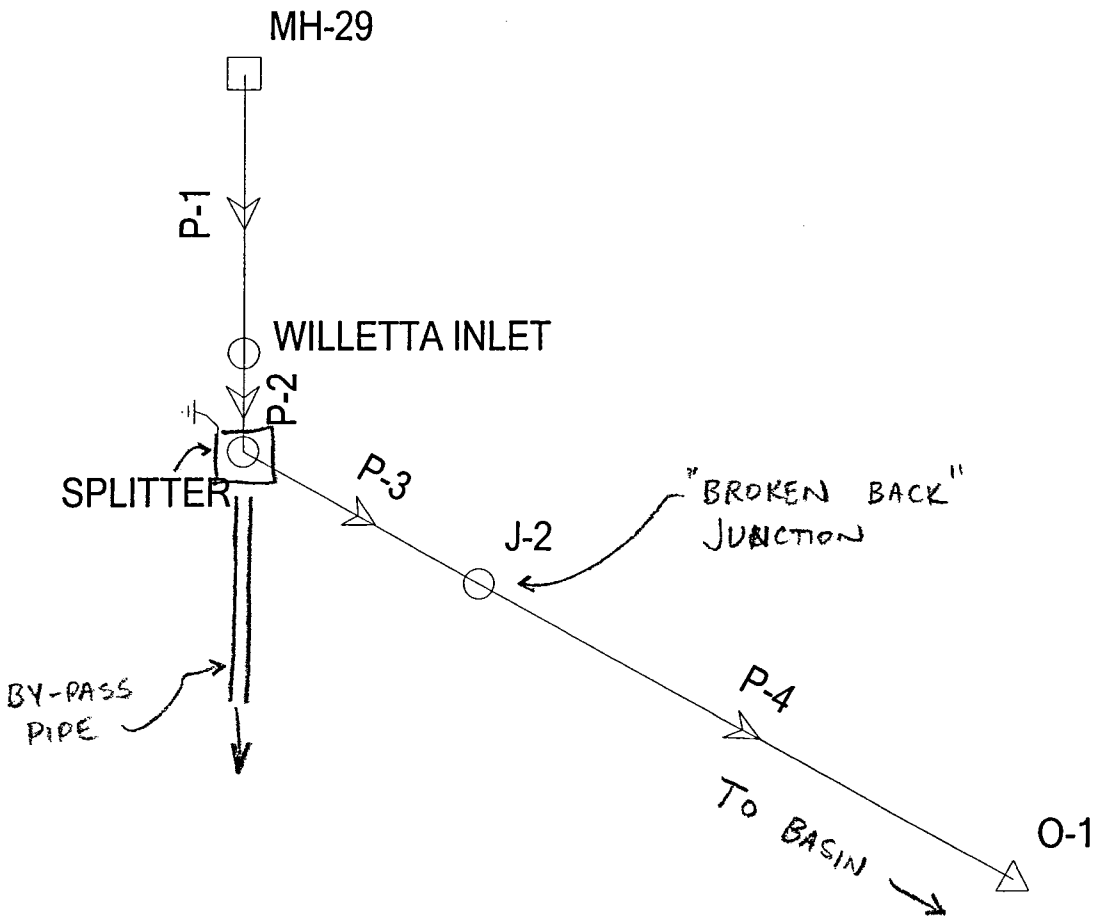
Project Engineer: Joe Lockett
StormCAD v5.6 [05.06.012.00]

DIVERSION STRUCTURE RATING SUMMARY

Assumed Q into structure	Tailwater El[2]	Resulting HGL in Splitter Structure	Head on By-pass (HGL - Splitter invert)	Q bypass	Calculated Q into basin
cfs			ft	cfs	cfs
400	1734	1737.6	9.1	**95**	**305**
300	1732	1736.5	8.0	**87**	**213**
200	1730	1735.2	6.7	**77**	**123**
100	1729	1733.3	4.8	**60**	**40**
DI					DQ

1. StormCAD was used to calculate HGL in splitter structure for varying flows. See attached StormCAD output showing each iteration.
2. Storm CAD modeling assumes stage in basin as calculated in HEC-1. This is used as the tailwater condition.
3. Pipe to basin has "broken back" to provide 2.5 feet of ponding in splitter before discharging flows to basin.
4. Splitter structure invert = 1728.5
5. Broken back invert = 1731
6. Basin invert = 1728
7. Q bypass is based on separate inlet control calculation (attached)
8. The splitter structure rating curve is entered into the HEC-1 model as DI and DQ cards.

Scenario: Base



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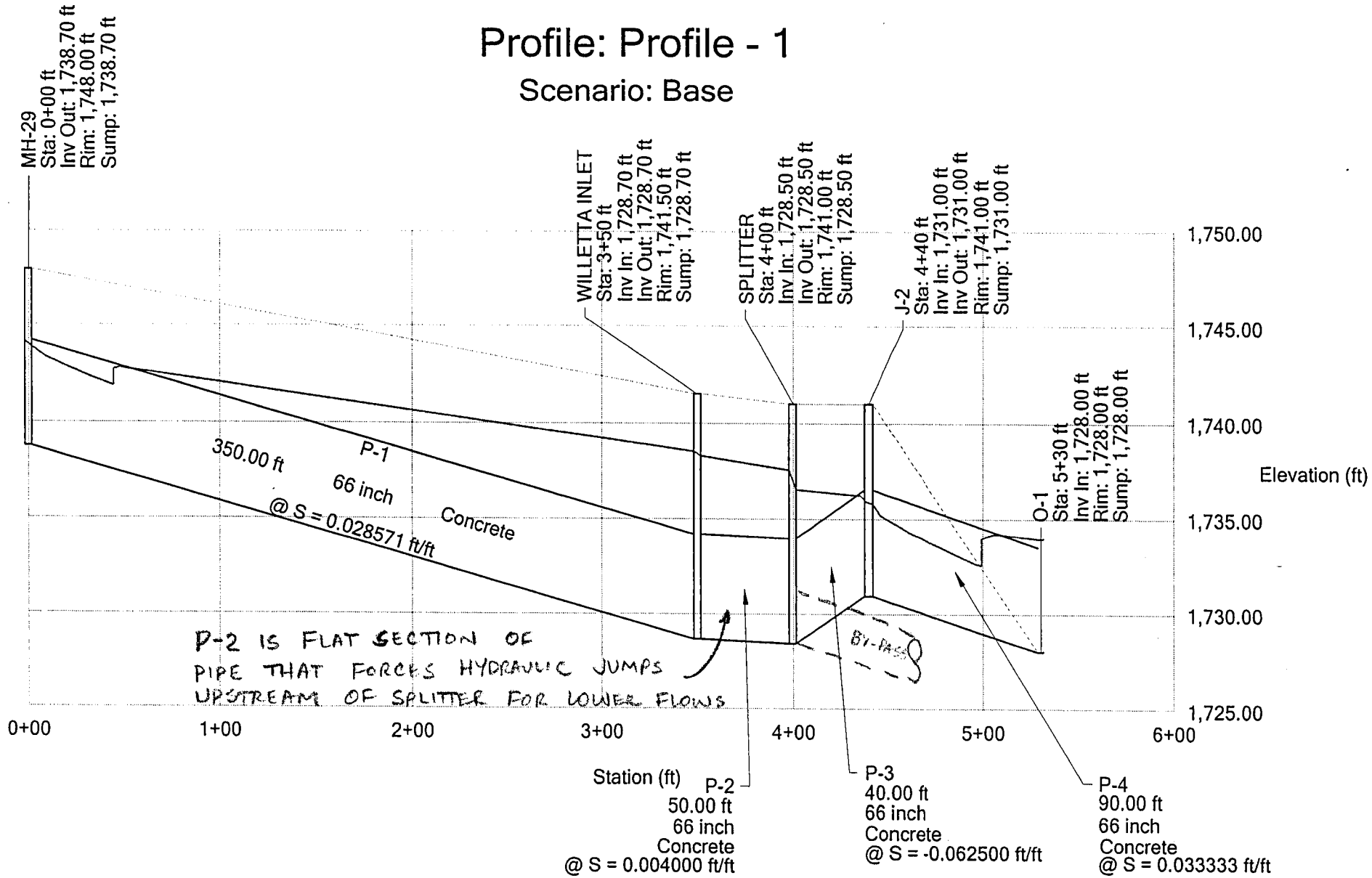
Profile: Profile - 1

Scenario: Base



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Iteration	Q_{in} Assumed Q into structure	Divert out of StormCAD at junction	Assumed tailwater El[2]	Resulting HGL in Splitter Structure[1]	Head on By-pass (HGL - Splitter invert)	$Q_{by\text{-}pass}$ Calculated Q bypass (inlet control)[7]	Q_{basin} Calculated Q into basin
	cfs	cfs			ft	cfs	cfs
1	**400**		1734	1738.8	10.3	**102**	298
2	**400**	**102**	1734	1737.5	9.0	**95**	305
3	**400**	**95**	1734	1737.6	9.1	**95**	305
4	**400**	**95**	1734	1737.6	9.1	**95**	305

1. StormCAD was used to calculate HGL in splitter structure for varying flows. See attached StormCAD output showing each iteration.
2. Storm CAD modeling assumes stage in basin as calculated in HEC-1. This is used as the tailwater condition.
3. Pipe to basin has "broken back" to provide 2.5 feet of ponding in splitter before discharging flows to basin.
4. Splitter structure invert = 1728.5
5. Broken back invert = 1731
6. Basin invert = 1728
7. Calculated Q bypass is based on separate inlet control calculation (attached)
8. **K=0.4**

Scenario: Base

ITERATION 1
FOR 400 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ou (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.23	400.00	0.00	4.61	1,736.42	1,736.19
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	1.76	400.00	0.00	4.41	1,738.78	1,737.02
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.22	400.00	0.00	4.41	1,739.71	1,739.49

Scenario: Base

Junction Report

ITERATION 2
FOR 400 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ov (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.14	298.00	0.00	2.90	1,735.90	1,735.75
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.98	298.00	102.00	2.44	1,737.51	1,736.53
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.22	400.00	0.00	4.41	1,738.44	1,738.22

Scenario: Base

Junction Report

ITERATION 3
FOR 400 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.15	305.00	0.00	2.99	1,735.95	1,735.80
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	1.02	305.00	95.00	2.56	1,737.59	1,736.57
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.22	400.00	0.00	4.41	1,738.52	1,738.30

1737.59

Iteration	Q_{in} Assumed Q into structure	Divert out of StormCAD at junction	Assumed tailwater El[2]	Resulting HGL in Splitter Structure[1]	Head on By-pass (HGL - Splitter invert)	$Q_{by\text{-}pass}$ Calculated Q bypass (inlet control)[7]	Q_{basin} Calculated Q into basin
	cfs	cfs			ft	cfs	cfs
1	**300**		1732	1737.5	9.0	**95**	**205**
2	**300**	**95**	1732	1736.4	7.9	**86**	**214**
3	**300**	**86**	1732	1736.5	8	**87**	**213**
4	**300**	**87**	1732	1736.5	8	**87**	**213**

1. StormCAD was used to calculate HGL in splitter structure for varying flows. See attached StormCAD output showing each iteration.
2. Storm CAD modeling assumes stage in basin as calculated in HEC-1. This is used as the tailwater condition.
3. Pipe to basin has "broken back" to provide 2.5 feet of ponding in splitter before discharging flows to basin.
4. Splitter structure invert = 1728.5
5. Broken back invert = 1731
6. Basin invert = 1728
7. Calculated Q bypass is based on separate inlet control calculation (attached)
8. **K=0.4**

Scenario: Base

ITERATION 1

Junction Report

FOR 300 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ou (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.15	300.00	0.00	2.92	1,735.91	1,735.77
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.99	300.00	0.00	2.48	1,737.53	1,736.54
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.12	300.00	0.00	2.48	1,738.05	1,737.93

Scenario: Base

ITERATION 2
FOR 300 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.09	205.00	0.00	1.90	1,735.10	1,735.01
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.46	205.00	95.00	1.16	1,736.36	1,735.90
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.12	300.00	0.00	2.48	1,736.89	1,736.76

Scenario: Base

ITERATION 3

Junction Report

FOR 300 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Out (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.10	214.00	0.00	1.98	1,735.19	1,735.10
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.50	214.00	86.00	1.26	1,736.48	1,735.98
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.12	300.00	0.00	2.48	1,737.00	1,736.88

Scenario: Base

ITERATION 4
FOR 300 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ou (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.10	213.00	0.00	1.97	1,735.18	1,735.09
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.50	213.00	87.00	1.25	1,736.47	1,735.97
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.12	300.00	0.00	2.48	1,736.99	1,736.87

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Iteration	Q_{in} Assumed Q into structure	Divert out of StormCAD at junction	Assumed tailwater El[2]	Resulting HGL in Splitter Structure[1]	Head on By-pass (HGL - Splitter invert)	$Q_{by\text{-}pass}$ Calculated Q bypass (inlet control)[7]	Q_{basin} Calculated Q into basin
	cfs	cfs			ft	cfs	cfs
1	**200**		1730	1736.3	7.8	**86**	**114**
2	**200**	**86**	1730	1735	6.5	**75**	**125**
3	**200**	**75**	1730	1735.2	6.7	**77**	**123**
4	**200**	**77**	1730	1735.2	6.7	**77**	**123**

1. StormCAD was used to calculate HGL in splitter structure for varying flows. See attached StormCAD output showing each iteration.
2. Storm CAD modeling assumes stage in basin as calculated in HEC-1. This is used as the tailwater condition.
3. Pipe to basin has "broken back" to provide 2.5 feet of ponding in splitter before discharging flows to basin.
4. Splitter structure invert = 1728.5
5. Broken back invert = 1731
6. Basin invert = 1728
7. Calculated Q bypass is based on separate inlet control calculation (attached)
8. **K=0.4**

Scenario: Base

ITERATION 1
FOR 200 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ou (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.09	200.00	0.00	1.85	1,735.05	1,734.96
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.44	200.00	0.00	1.10	1,736.30	1,735.86
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.06	200.00	0.00	1.10	1,736.53	1,736.47

Scenario: Base

ITERATION 2

Junction Report

FOR 200 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ov (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.06	114.00	0.00	1.19	1,734.02	1,733.96
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.14	114.00	86.00	0.36	1,734.99	1,734.85
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.06	200.00	0.00	1.10	1,735.22	1,735.17

Scenario: Base

ITERATION 3

Junction Report

FOR 200 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.06	125.00	0.00	1.27	1,734.17	1,734.11
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.17	125.00	75.00	0.43	1,735.18	1,735.01
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.06	200.00	0.00	1.10	1,735.41	1,735.36

Scenario: Base

ITERATION 4
FOR 200 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow O (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.06	123.00	0.00	1.25	1,734.14	1,734.08
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.17	123.00	77.00	0.42	1,735.15	1,734.98
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.06	200.00	0.00	1.10	1,735.38	1,735.32

Iteration	Q_{in} Assumed Q into structure	Divert out of StormCAD at junction	Assumed tailwater El[2]	Resulting HGL in Splitter Structure[1]	Head on By-pass (HGL - Splitter invert)	$Q_{by\text{-}pass}$ Calculated Q bypass (inlet control)[7]	Q_{basin} Calculated Q into basin
	cfs	cfs			ft	cfs	cfs
1	**100**		1729	1734.7	6.2	**73**	**27**
2	**100**	**73**	1729	1732.9	4.4	**55**	**45**
3	**100**	**55**	1729	1733.5	5	**62**	**38**
4	**100**	**62**	1729	1733.3	4.8	**59**	**41**
5	**100**	**59**	1729	1733.4	4.9	**61**	**39**
6	**100**	**61**	1729	1733.3	4.8	**59**	**41**

1. StormCAD was used to calculate HGL in splitter structure for varying flows. See attached StormCAD output showing each iteration.
2. Storm CAD modeling assumes stage in basin as calculated in HEC-1. This is used as the tailwater condition.
3. Pipe to basin has "broken back" to provide 2.5 feet of ponding in splitter before discharging flows to basin.
4. Splitter structure invert = 1728.5
5. Broken back invert = 1731
6. Basin invert = 1728
7. Calculated Q bypass is based on separate inlet control calculation (attached)
8. **K=0.4**

Scenario: Base

ITERATION 1

Junction Report

FOR 100 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow O (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.05	100.00	0.00	1.09	1,733.82	1,733.76
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.11	100.00	0.00	0.28	1,734.73	1,734.62
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.01	100.00	0.00	0.28	1,734.79	1,734.78

Scenario: Base

Junction Report

ITERATION 2
FOR 100 CFS

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.02	27.00	0.00	0.50	1,732.43	1,732.40
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.01	27.00	73.00	0.03	1,732.90	1,732.89
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.02	100.00	0.00	0.41	1,732.94	1,732.92

Scenario: Base

ITERATION 3
FOR 100 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ov (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.03	45.00	0.00	0.66	1,732.86	1,732.82
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.02	45.00	55.00	0.06	1,733.47	1,733.45
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.02	100.00	0.00	0.32	1,733.51	1,733.50

Scenario: Base

ITERATION 4
FOR 100 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Ov (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.03	38.00	0.00	0.60	1,732.70	1,732.67
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.02	38.00	62.00	0.05	1,733.27	1,733.25
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.02	100.00	0.00	0.35	1,733.31	1,733.29

Scenario: Base

ITERATION 5
FOR 100 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Out (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.03	41.00	0.00	0.63	1,732.77	1,732.74
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.02	41.00	59.00	0.05	1,733.36	1,733.34
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.02	100.00	0.00	0.33	1,733.40	1,733.38

Scenario: Base

ITERATION 6
FOR 100 CFS

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Headloss Coefficient	Headloss Method	Gravity Element Headloss (ft)	Total Flow (cfs)	Diverted Flow Out (cfs)	Velocity Head In (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
J-2	0+90	1,741.00	1,741.00	1,731.00	0.05	Standard	0.03	39.00	0.00	0.61	1,732.72	1,732.69
SPLITTER	1+30	1,741.00	1,741.00	1,728.50	0.40	Standard	0.02	39.00	61.00	0.05	1,733.30	1,733.28
WILLETTA INLE	1+80	1,741.50	1,741.50	1,728.70	0.05	Standard	0.02	100.00	0.00	0.34	1,733.34	1,733.32

36" BY-PASS
(INLET CONTROL)

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

June 6, 2007

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Diameter (ft)	3.0
FHWA Chart Number	1
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.013
Entrance Loss Coefficient of Culvert Opening	0.5
Culvert Length (ft)	257.0
Invert Elevation at Downstream end of Culvert (ft)	1,723.8
Invert Elevation at Upstream end of Culvert (ft)	1,728.5
Culvert Slope (ft/ft)	0.0183
Starting Flow Rate (cfs)	1.0
Incremental Flow Rate (cfs)	2.0
Ending Flow Rate (cfs)	121.0
Starting Tailwater Depth (ft)	0.0
Incremental Tailwater Depth (ft)	0.0
Ending Tailwater Depth (ft)	0.0

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
1.0	0.0	0.39	0.0	0.22	0.31	0.22	4.24
3.0	0.0	0.7	0.0	0.37	0.54	0.37	5.9
5.0	0.0	0.92	0.0	0.48	0.7	0.48	6.84
7.0	0.0	1.11	0.0	0.57	0.83	0.57	7.57
9.0	0.0	1.28	0.0	0.64	0.95	0.64	8.16
11.0	0.0	1.43	0.0	0.71	1.05	0.71	8.65
13.0	0.0	1.58	0.0	0.77	1.15	0.77	9.06
15.0	0.0	1.72	0.0	0.83	1.24	0.83	9.45
17.0	0.0	1.85	0.0	0.88	1.32	0.88	9.79
19.0	0.0	1.98	0.0	0.94	1.4	0.94	10.1
21.0	0.0	2.11	0.0	0.98	1.47	0.98	10.4
23.0	0.0	2.23	0.0	1.03	1.54	1.03	10.67
25.0	0.0	2.36	0.0	1.08	1.61	1.08	10.92
27.0	0.0	2.48	0.0	1.13	1.68	1.13	11.14
29.0	0.0	2.6	0.0	1.17	1.74	1.17	11.36
31.0	0.0	2.72	0.0	1.21	1.81	1.21	11.58
33.0	0.0	2.84	0.0	1.26	1.86	1.26	11.77
35.0	0.0	2.97	0.0	1.3	1.92	1.3	11.95
37.0	0.0	3.09	0.0	1.34	1.98	1.34	12.12
39.0	0.0	3.21	0.0	1.38	2.03	1.38	12.3
41.0	0.0	3.34	0.0	1.42	2.09	1.42	12.46
43.0	0.0	3.47	0.0	1.46	2.14	1.46	12.61
45.0	0.0	3.67	0.0	1.5	2.19	1.5	12.75
47.0	0.0	3.81	0.0	1.54	2.23	1.54	12.9
49.0	0.0	3.9	0.0	1.58	2.28	1.58	13.02
51.0	0.0	4.05	0.0	1.62	2.32	1.62	13.15
53.0	0.0	4.22	0.0	1.65	2.37	1.65	13.27
55.0	0.0	4.39	0.0	1.69	2.41	1.69	13.39
57.0	0.0	4.57	0.0	1.73	2.45	1.73	13.5
59.0	0.0	4.76	0.0	1.77	2.48	1.77	13.6
61.0	0.0	4.95	0.0	1.81	2.52	1.81	13.71
63.0	0.0	5.14	0.0	1.85	2.55	1.85	13.79
65.0	0.0	5.35	0.0	1.89	2.59	1.89	13.89
67.0	0.0	5.56	0.0	1.93	2.62	1.93	13.98
69.0	0.0	5.77	0.0	1.97	2.64	1.97	14.06
71.0	0.0	6.0	0.0	2.01	2.67	2.01	14.13
73.0	0.0	6.23	0.0	2.05	2.7	2.05	14.21

75.0	0.0	6.46	0.0	2.09	2.72	2.09	14.27
77.0	0.0	6.71	0.0	2.13	2.74	2.13	14.33
79.0	0.0	6.95	0.0	2.18	2.76	2.18	14.39
81.0	0.0	7.21	0.0	2.22	2.78	2.22	14.44
83.0	0.0	7.47	0.0	2.27	2.8	2.27	14.48
85.0	0.0	7.74	0.0	2.32	2.81	2.32	14.51
87.0	0.0	8.01	0.0	2.37	2.83	2.37	14.54
89.0	0.0	8.29	0.0	2.42	2.84	2.42	14.55
91.0	0.0	8.58	0.0	2.48	2.85	2.48	14.54
93.0	0.0	8.87	0.0	2.55	2.86	2.55	14.51
95.0	0.0	9.17	0.0	2.64	2.87	2.64	14.44
97.0	0.0	9.48	0.0	2.8	2.88	2.8	14.13
99.0	0.0	9.79	5.42	3.0	2.89	3.0	14.01
101.0	0.0	10.11	5.73	3.0	2.9	3.0	14.29
103.0	0.0	10.43	6.04	3.0	2.91	3.0	14.57
105.0	0.0	10.76	6.35	3.0	2.91	3.0	14.85
107.0	0.0	11.1	6.66	3.0	2.92	3.0	15.14
109.0	0.0	11.45	6.98	3.0	2.92	3.0	15.42
111.0	0.0	11.8	7.31	3.0	2.93	3.0	15.7
113.0	0.0	12.15	7.64	3.0	2.93	3.0	15.99
115.0	0.0	12.52	7.97	3.0	2.94	3.0	16.27
117.0	0.0	12.89	8.32	3.0	2.94	3.0	16.55
119.0	0.0	13.26	8.67	3.0	2.95	3.0	16.84
121.0	0.0	13.64	9.02	3.0	2.95	3.0	17.12

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HERMOSA VISTA HAWES ROAD
STORM DRAIN AND BASIN PROJECT
Rational Method Hydrology for off-site sub-basins

Rational Subbasin	Part of HEC-1 Basin	area sq-ft	area ac	length ft	high ft	low ft	Q10 cfs	Q100 cfs	Factor of Safety (FS)	Design Flow FS * Q_{100}	No. of Single MAG 537 20	No. of Double MAG 537 34	Design Grate	Number of Catch Basins	Design Capacity
5	400B4	2503811	57	5720	1734	1602	66	143	1.5	214.5	11	7	Double	7	238
10	400B4	946494	22	3634	1684	1604	28	60	1.5	90	5	3	Double	3	102
15	400B2	1794198	41	5766	1738	1618	46	100	1.5	150	8	5	Double	5	170
20	400B2	213525	5	1535	1658	1630	8	16	1.5	24	2	1	Double	1	34
25	400B2	293892	7	1402	1660	1632	11	23	1.5	34.5	2	2	Double	2	68
30	400B1	1469239	34	4825	1752	1640	41	88	1.5	132	7	4	Double	4	136
35	400B1	867006	20	4150	1750	1650	25	54	1.5	81	5	3	Double	3	102
40	400B1	240206	6	1500	1686	1654	9	19	1.5	28.5	2	1	Double	1	34
45	380B2	704627	16	3277	1732	1662	21	44	1.5	66	4	2	Double	2	68
50	380B2	896113	21	2966	1742	1672	29	61	1.5	91.5	5	3	Double	3	102
55	380B2	248046	6	1226	1704	1674	10	21	1	21	2	1	Double	1	34
60	380B1	536739	12	2103	1730	1684	17	37	1	37	2	2	Single	2	40
65	380B1	256565	6	1561	1726	1688	9	20	1	20	1	1	Single	1	20
70	380B1	56973	1	426	1706	1694	2	4	1	4	1	1	Single	1	20
75	380B1	181259	4	946	1720	1696	7	14	1	14	1	1	Single	1	20
80	380B1	105781	2	733	1720	1700	4	7	1	7	1	1	Single	1	20
85	380B1	28165	1	390	1716	1706	2	4	1	4	1	1	Single	1	20
90	380B3C	217242	5	1567	1748	1708	8	16	1	16	1	1	Single	1	20
95	380B3C	261176	6	1161	1748	1718	10	21	1	21	2	1	Double	1	34
100	380B3C	134047	3	854	1748	1728	11	22	1	22	2	1	Double	1	34
105	380B3B	486393	11	2182	1824	1730	18	61	1	61	4	2	Double	2	68
120	400B3	255185	6	1181	1774	1742	10	21	1	21	2	1	Double	1	34
125	400B3	152674	4	1295	1780	1744	7	14	1	14	1	1	Single	1	20
130	400B3	261565	6	930	1770	1746	11	22	1	22	2	1	Double	1	34

1. Subbasin 105 (37 cfs) receives 24 cfs from subbasin 106, totalling 61 cfs.
2. Catch basin design is based on a MAG 537 catch basin raised 6" above ground. The design also includes a MAG 539 grate mounted 4" above the top of the catch basin frame. This yields a 4" vertical opening around the perimeter of the basin for initial flows to enter. Ponding in excess of the height of the opening enter through the raised grate.
3. The estimations noted herein are based on a combined inlet capacity that takes into account weir/orifice conditions on the 4" vertical opening as well as the raised grate.
4. The estimations noted herein reflect the number of grates required to achieve the desired capacity at 1.5 feet of ponding depth.

HERMOSA VISTA - HAWES ROAD
STORM DRAIN AND BASIN PROJECT
Rational Method Hydrology for off-site sub-basins

Weir EQ. $Q_i = C_w P d^{1.5} Cf$

Orifice EQ. $Q_i = C_o A (2gd)^{0.5} Cf$

MAG 537 Catch Basin - Single Grate
Modified MAG 539 - Single Grate

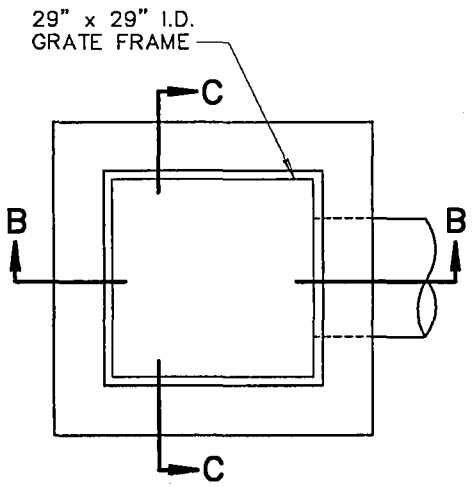
4" Vertical Opening (below grate)			Grate			Design Capacity
Cw = 3.0 P(ft) = 8 Area (ft^2) = 2.67 Cf = 0.8			Co = 0.67 P (ft) = 6.25 Area (ft^2)= 2.25 Cf = 0.5			Total 4" Vertical Opening + Grate Capacity
d (ft)	Weir (cfs)	Orifice (cfs)	d (ft)	Weir (cfs)	Orifice (cfs)	(cfs)
0.00	0.00	0.00				0.00
0.10	0.61	3.63				0.61
0.20	1.72	5.14				1.72
0.30	3.15	6.29				3.15
0.40	4.86	7.26				4.86
0.50	6.79	8.12	0.00	0.00	0.00	6.79
0.60	8.92	8.90	0.10	0.30	1.91	9.19
0.70	11.24	9.61	0.20	0.84	2.71	10.45
0.80	13.74	10.27	0.30	1.54	3.31	11.81
0.90	16.39	10.90	0.40	2.37	3.83	13.27
1.00	19.20	11.48	0.50	3.31	4.28	14.80
1.10	22.15	12.05	0.60	4.36	4.69	16.40
1.20	25.24	12.58	0.70	5.49	5.06	17.64
1.30	28.46	13.09	0.80	6.71	5.41	18.50
1.40	31.80	13.59	0.90	8.00	5.74	19.33
1.50	35.27	14.07	1.00	9.38	6.05	20.11
1.60	38.86	14.53	1.10	10.82	6.34	20.87
1.70	42.56	14.97	1.20	12.32	6.63	21.60
1.80	46.37	15.41	1.30	13.90	6.90	22.31
1.90	50.28	15.83	1.40	15.53	7.16	22.99
2.00	54.31	16.24	1.50	17.22	7.41	23.65
2.10	58.43	16.64	1.60	18.97	7.65	24.29
2.20	62.65	17.03	1.70	20.78	7.89	24.92
2.30	66.97	17.42	1.80	22.64	8.12	25.53
2.40	71.39	17.79	1.90	24.55	8.34	26.13
2.50	75.89	18.16	2.00	26.52	8.55	26.71

Weir EQ. $Q_i = C_w P d^{1.5} Cf$

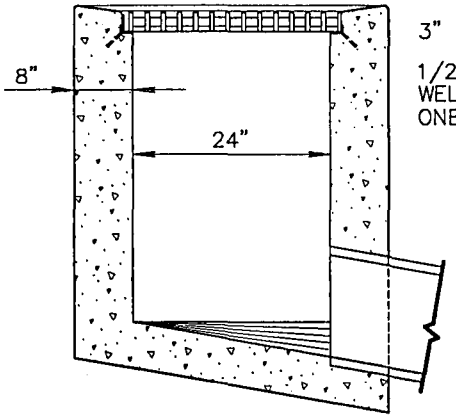
Orifice EQ. $Q_i = C_o A (2gd)^{0.5} Cf$

MAG 537 Catch Basin - Double Grate
Modified MAG 539 - Double Grate

4" Vertical Opening (below grate)			Grate			Design Capacity
Cw = 3.0 P (ft) = 12 Area (ft^2) = 4.0 Cf = 0.8			Co = 0.67 P (ft) = 9.33 Area (ft^2)= 4.83 Cf = 0.5			Total 4" Vertical Opening + Grate Capacity
d (ft)	Weir (cfs)	Orifice (cfs)	d (ft)	Weir (cfs)	Orifice (cfs)	(cfs)
0.00	0.00	0.00				0.00
0.10	0.91	5.44				0.91
0.20	2.58	7.69				2.58
0.30	4.73	9.42				4.73
0.40	7.29	10.88				7.29
0.50	10.18	12.17	0.00	0.00	0.00	10.18
0.60	13.39	13.33	0.10	0.44	4.11	13.77
0.70	16.87	14.40	0.20	1.25	5.81	15.65
0.80	20.61	15.39	0.30	2.30	7.11	17.69
0.90	24.59	16.32	0.40	3.54	8.21	19.86
1.00	28.80	17.21	0.50	4.95	9.18	22.15
1.10	33.23	18.05	0.60	6.50	10.06	24.55
1.20	37.86	18.85	0.70	8.20	10.86	27.04
1.30	42.69	19.62	0.80	10.01	11.61	29.63
1.40	47.71	20.36	0.90	11.95	12.32	32.31
1.50	52.91	21.07	1.00	14.00	12.98	34.06
1.60	58.29	21.76	1.10	16.15	13.62	35.38
1.70	63.84	22.43	1.20	18.40	14.22	36.66
1.80	69.55	23.08	1.30	20.74	14.80	37.89
1.90	75.43	23.72	1.40	23.18	15.36	39.08
2.00	81.46	24.33	1.50	25.71	15.90	40.24
2.10	87.64	24.93	1.60	28.32	16.42	41.36
2.20	93.98	25.52	1.70	31.02	16.93	42.45
2.30	100.46	26.09	1.80	33.80	17.42	43.51
2.40	107.08	26.65	1.90	36.65	17.90	44.55
2.50	113.84	27.20	2.00	39.58	18.36	45.57

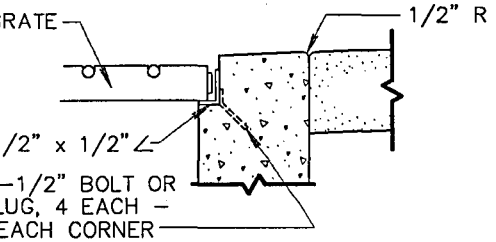


PLAN



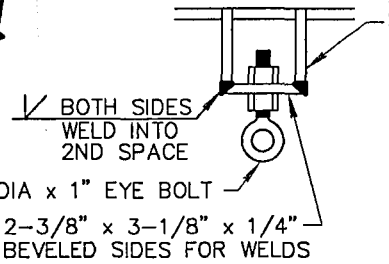
SECTION B–B

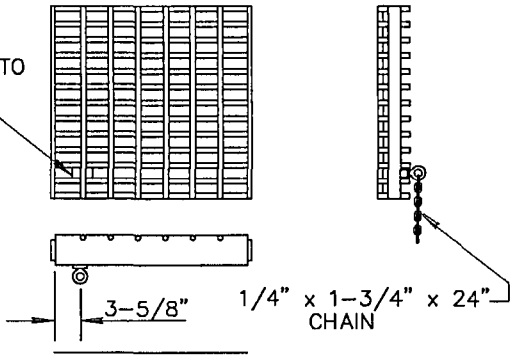
SINGLE GRATE



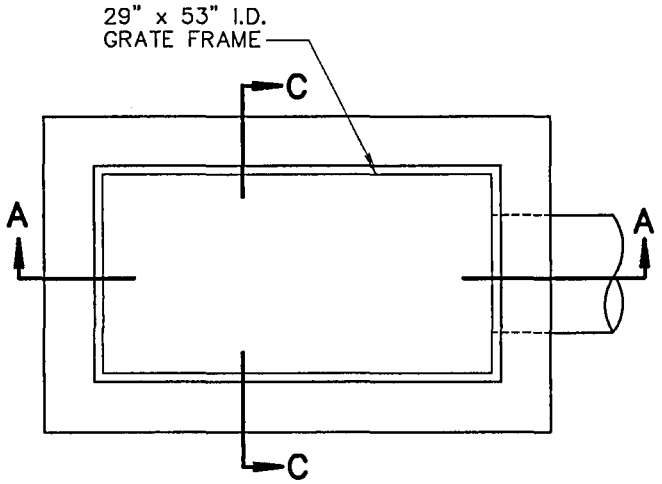
DETAIL OF ANGLE FRAME
GRATE SUPPORT

ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725. EXPOSED EDGES SHALL BE FINISHED WITH A 1/2" RADIUS.

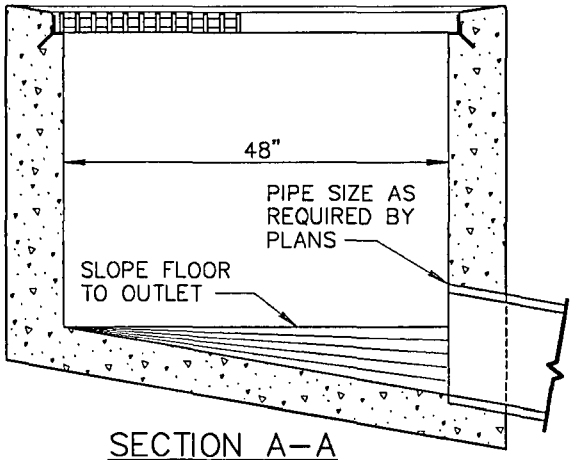




BAR GRATE
SEE DETAIL 539

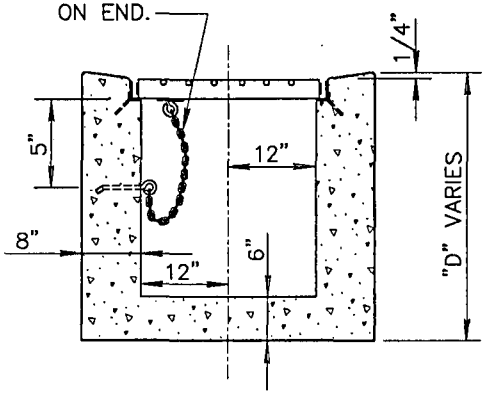


PLAN



SECTION A–A

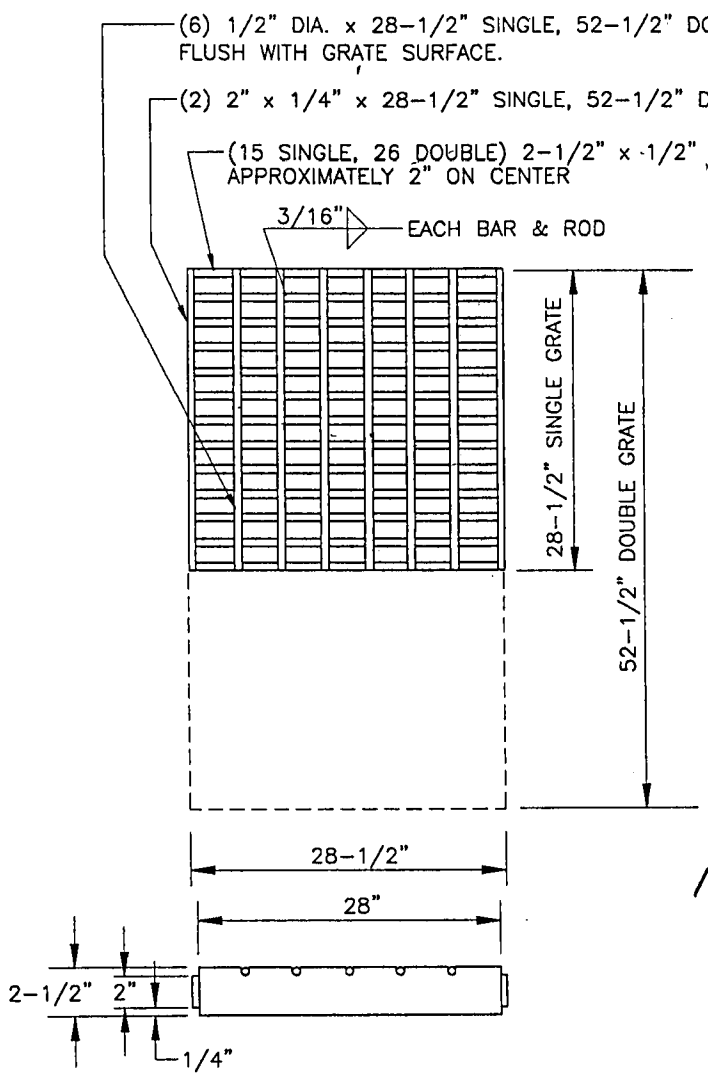
DOUBLE GRATE



SECTION C–C

DETAIL NO.			REVISED	DETAIL NO.
537	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	CATCH BASIN – TYPE 'G'	01–03–2002	537

JRM 7/13/07



$\left(\frac{6 \times 1/2}{12}\right) = 0.25' \times 4' = 1^{\#}$

$\left(\frac{26 \times 1/2}{12}\right) = 1.08' \times 2' = 2.167^{\#}$

TOTAL BAR AREA $= 3.167^{\#}$

NET AREA $= (2' \times 4') - 3.167^{\#} = \underline{4.833^{\#}}$

= (MAG 537 INTERIOR DIMENSIONS) − (TOTAL BAR AREA)

NOTES:

1. ALL STEEL SHALL BE IN ACCORDANCE WITH A.S.T.M. A-36.
2. WELDING SHALL BE IN ACCORDANCE WITH A.W.S. SPECIFICATIONS.
3. FRAME AND GRATE SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS BEFORE DELIVERY.
4. THE COMPLETED ASSEMBLY SHALL BE GIVEN ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECTION 790.
5. THE GRATE SHALL BE FABRICATED TO WITHIN 1/8" SPECIFIED DIMENSIONS.

NET PERIMETER = MAG 537 INTERIOR DIMENSIONS − BAR WIDTHS

$= [2(2) + 2(4)] - [2(0.25) + 2(1.08)]$

$= \underline{9.33'}$

DETAIL NO.				REVISED	DETAIL NO.
539	MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	GRATES FOR CATCH BASINS, TYPE G AND H		539

AL NOTES:

ASHTO CLASS "C" SPLICE.
N OR NOTED. IN BEAMS AND SLABS NOT ON
; OVER SUPPORTS AND TOP BARS AT MID-SPAN

IONS I LAP LENGTH MINIMUM. SEE DETAILS FOR

APPROVED LOCATIONS.

N ARE MAXIMUM ON CENTER AND ALL REINFORCING IS
NOTED.

RCING TO MATCH AND LAP WITH HORIZONTAL
INTERSECTIONS OF WALLS. BEAMS AND FOOTINGS PER
-66).

CING TO FOUNDATIONS.

NG EMBEDDED ITEMS IN POSITION BEFORE PLACING

ER A.C.I. DETAILING MANUAL (SP-66). FABRICATE
CLUDE ELEVATIONS SHOWING REINFORCING STEEL AT ALL
.

CONFORMANCE WITH AWS D1.4-92. USE LOW

HTO. ACI 318-89 AND C.R.S.I. STANDARDS.

S AND WELDS

AND HANDBOOKS APPLY.

ASTM A36 OR "DUAL CLASSIFICATION" ASTM
KS IMUM. EXCEPT WHERE SPECIFICALLY

FY = 35 KSI MINIMUM.

STM A307.

LOW HYDROGEN. "JET" WELDING RODS (E7024) SHALL
RAL STEEL WELDING.

NOS TO A TRUE PLANE. TORCH CUT IS NOT ALLOWED.

NG SOCIETY CODES AND STANDARDS. ALL WELDERS
ES AND HAVE CURRENT EXPERIENCE IN THE TYPE OF
ES SHALL BE THOSE ISSUED BY AN ACCEPTED
f AWS.

WELD SYMBOL MAY BE MADE IN THE FIELD WITH
ENGINEER.

ICATE AFTER ENGINEER'S REVIEW.

NG SHALL BE DONE IN A CITY APPROVED FABRICATOR'S

IVEN ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD
.A.G. STD. SECTION 790.

CONDITIONS PRIOR TO STARTING WORK. NOTIFY THE
S OR INCONSISTENCIES.

NG CONDITIONS SHOWN ON DRAWINGS.

ENINGS AND INSERTS WITH APPROPRIATE TRADES.

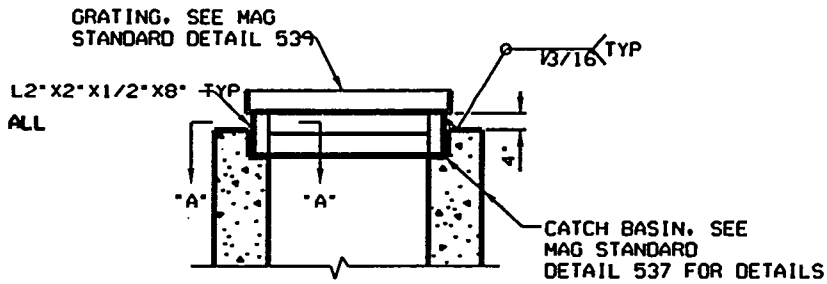
RARY BRACING. SHORING. GUYING. OR OTHER MEANS
AN HOLD STRUCTURAL ELEMENTS IN PLACE

SUPPLEMENTARY NOTES (CONT)

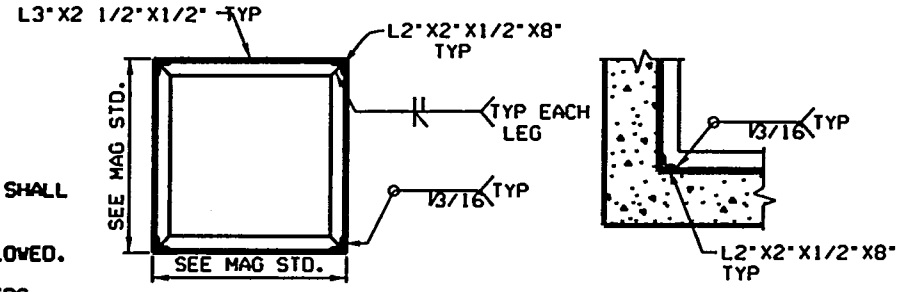
5. THE COST OF ADDITIONAL DESIGN WORK DUE TO ERRORS OR OMISSIONS IN CONSTRUCTION SHALL BE DONE BY THE CONTRACTOR.

6. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL AND SIGNATURE OF AN ENGINEER REGISTERED IN ARIZONA. IF THIS ENGINEERING DESIGN REQUIRES SPECIAL STRUCTURAL INSPECTION. THEY SHALL BE RESPONSIBLE FOR THE INSPECTION.

7. DETAILS ON THE STRUCTURAL DRAWINGS ARE TYPICAL. VERIFY ALL DIMENSIONS WITH THE CIVIL DRAWINGS.



CATCH BASIN SECTION
NOT TO SCALE



GRATE SEAT - PLAN
NOT TO SCALE

SECTION A-A
NOT TO SCALE

CATCH BASIN RAISED GRATE DETAILS
NOT TO SCALE

RAISED OPENING AREA CONTROLLED
BY CATCH BASIN INTERIOR DIMENSIONS

DOUBLE — PERIMETER = 12'

$$AREA = \left(\frac{4''}{12}\right)(12') = 4^{\square'}$$

Riprap Basin Design for Pipe Culvert Outlets

Ref: FHWA, HEC No. 14, 1983. Hydraulic Design of Energy Dissipators for Culverts and Channels, Chapter XI.

Project Name: Hermosa Vista **Location:** HVD SD FRS OUTLET

Given Data:

Design Flow (Q)	=	400	cfs
Pipe Diameter (D)	=	7.5	ft
Brink Depth (Yo)	=	3.3	ft
Exit Flow Area (A)	=	22	ft^2
Normal Flow Depth (Ye)	=	3.32	ft
Tailwater Depth (TW)	=	2.2	ft
Exit Flow Velocity (Vo)	=	18.2	ft/s
Exit Flow Froude Number: Fr=Vo/(gYo)^0.5	=	1.76	

Determine:

Scour hole depth (Hs) in feet;
The length of energy dissipating pool (Ls=Lt+Lb) in feet;
The overall length of the basin (L) in feet

Solutions:

Check ratio of TW/Ye	=	0.66	(<0.75, OK)
Try value of d50/Ye	=	0.40	(0.25<d50/Ye<0.45)
d50	=	1.33	ft
Ratio of Hs/Ye(Fr,d50/Ye) (from Fig. XI-2)	=	1.5	
Scour hole depth (Hs)	=	5.0	ft
Check ratio of Hs/d50	=	3.8	(2<Hs/d50<4, OK)
Length of energy dissipating pool Ls	=	50	ft
Total length of the basin L	=	74.6	ft

Riprap Design Spreadsheet

References: US DOT, FHWA, Highways in the River Environment
Hydraulic and Environmental Design Considerations
May 1975, pVI-24.

US DOT, FHWA, Hydraulic Design of Energy Dissipators
for Culverts and Channel. Sept. 1983, pII-5-II-9.

FCDMC, Drainage Design Manual for Maricpa County
Arizona, Vol. II - Hydraulics. January 1996, p5.75-5.77.

Project Name: Pinnacle Peak Bridge/Culvert Outlet

Wood/Patel # 052940
Location: Hermosa Vista
Culver-Hawes Basin Inlet
RIPRAP DESIGN

1. Riprap Size D50

Max. flow width Wo =	5.5	ft
Max. culvert flow depth h =	4.07	ft
Tailwater depth TW =	4	ft
Exit Velocity Ve =	11.31	fps
Tailwater velocity Vd =	2	fps
Wash bottom width =	20	ft
Computed Riprap Size D50 =	10.0	in
Design Riprap Size D50 =	**12**	in

2. Riprap Sizes D15 and D85

Design Riprap Size D15 =	**5**	in
Design Riprap Size D85 =	**18**	in

3. Riprap Apron Length

Riprap Apron Length =	**56**	ft

4. Rirap Apron Width

Min. Riprap Apron Width =	**14**	ft
Max. Riprap Apron Width =	**28**	ft

5. Riprap Thickness

Riprap Thickness =	**24**	in

6. Total Riprap Volume

Riprap Rock Volume =	**86**	CY

WP # 052640

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channel - 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

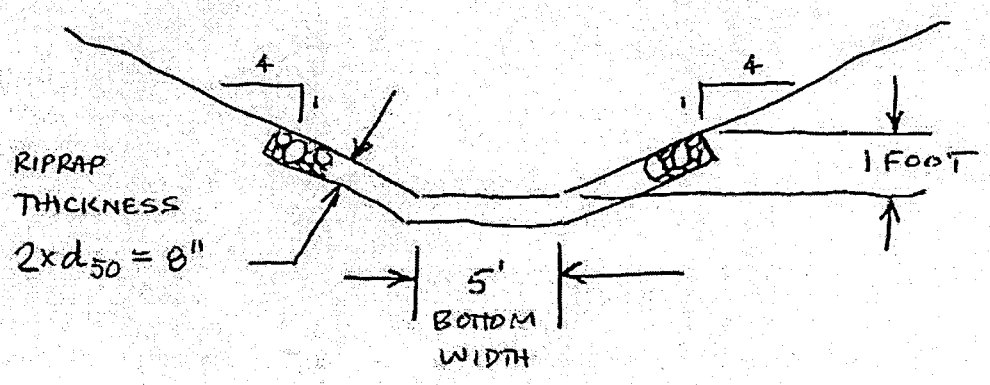
LOW FLOW DRAINAGE CHANNEL @ NE CORNER OF CULVER-HAWES BASIN

Input Data		
Mannings Coefficient	0.035	
Slope	0.100000	ft/ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Bottom Width	5.00	ft
Discharge	29.00	cfs

Results		
Depth	0.54	ft
Flow Area	3.9	ft²
Wetted Perimeter	9.49	ft
Top Width	9.35	ft
Critical Depth	0.81	ft
Critical Slope	0.021869	ft/ft
Velocity	7.43	ft/s
Velocity Head	0.86	ft
Specific Energy	1.40	ft
Froude Number	2.03	
Flow Type	Supercritical	

MINIMUM VERTICAL HEIGHT UP SIDES RIPRAP SHOULD BE PLACED USE 1 FOOT

USE d_{50} = 4" ROCK IN CHANNEL



48" Thunder Mountain Diversion
Hydraulic Rating Curve

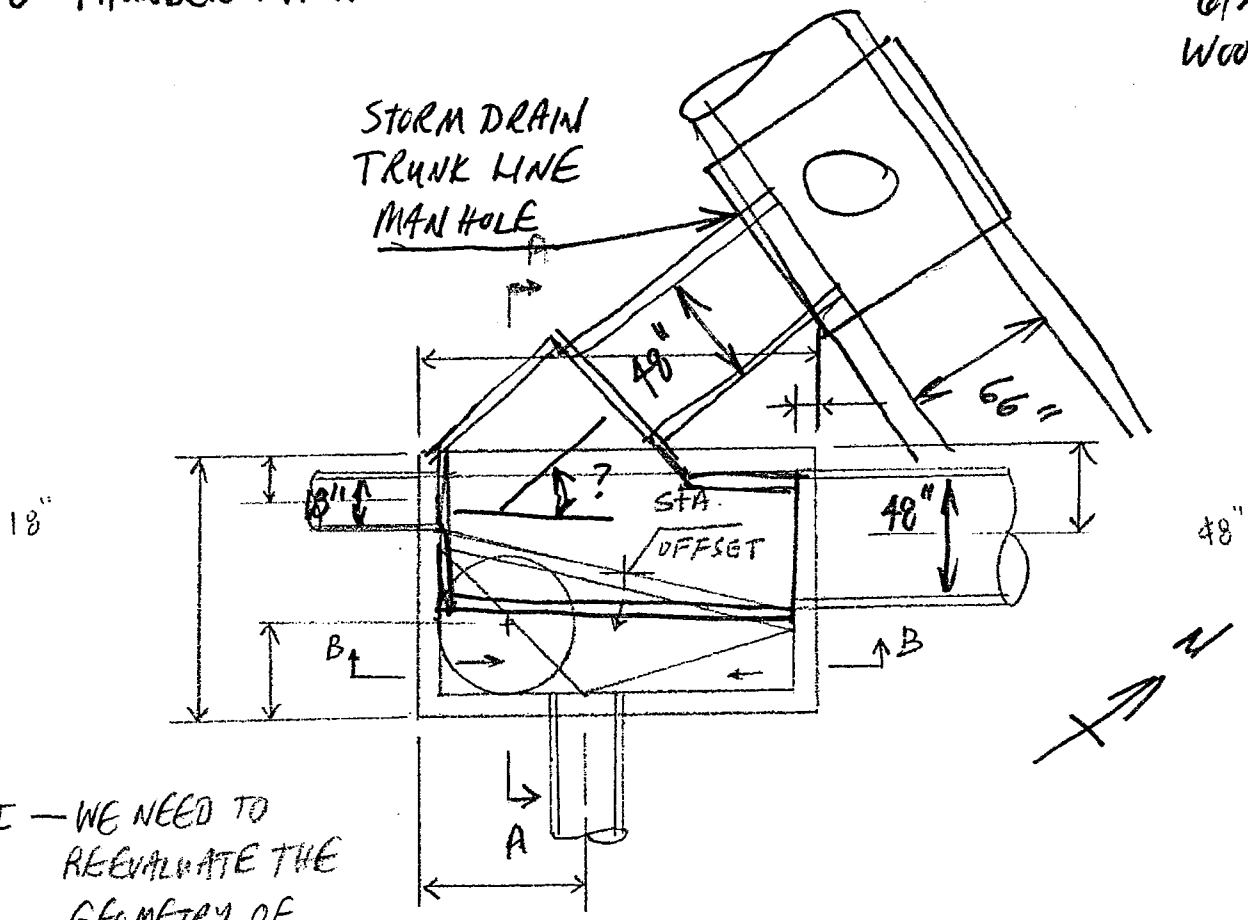
18" Culvert			48" Culvert		
DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROI DEPTH (ft)	DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)
0	10	0	0	10	0
5	11.15	1.15	10	10.74	0.74
10	12.12	2.12	20	11.38	1.38
15	13.71	3.71	30	11.91	1.91
18.21	15.08	5.08	40	12.36	2.36
18.67	15.29	5.29	50	12.76	2.76
19.02	15.46	5.46	60	13.14	3.14
19.32	15.6	5.6	70	13.52	3.52
19.6	15.74	5.74	80	13.92	3.92
19.86	15.87	5.87	90	14.34	4.34
20.08	15.98	5.98	100	14.8	4.8

Depth	Discharge	Depth	Discharge
0	0	0	0
1.15	5	0.74	10
2.12	10	1.38	20
3.71	15	1.91	30
5.08	18.21	2.36	40
5.29	18.67	2.76	50
5.46	19.02	3.14	60
5.6	19.32	3.52	70
5.74	19.6	3.92	80
5.87	19.86	4.34	90
5.98	20.08	4.8	100

18" at invert		48" offset 0.5' higher		Combined rating	
0	0.0			0	0.0
0.5	2.2	0	0.0	0.5	2.2
1	4.3	0.5	6.8	1	11.1
1.5	6.8	1	14.1	1.5	20.9
2	9.4	1.5	22.3	2	31.6
2.5	11.2	2	32.0	2.5	43.2
3	12.8	2.5	43.5	3	56.3
3.5	14.3	3	56.3	3.5	70.7
4	15.7	3.5	69.5	4	85.2
4.5	16.9	4	81.9	4.5	98.8
5	18.0	4.5	93.5	5	111.5
5.5	19.1				

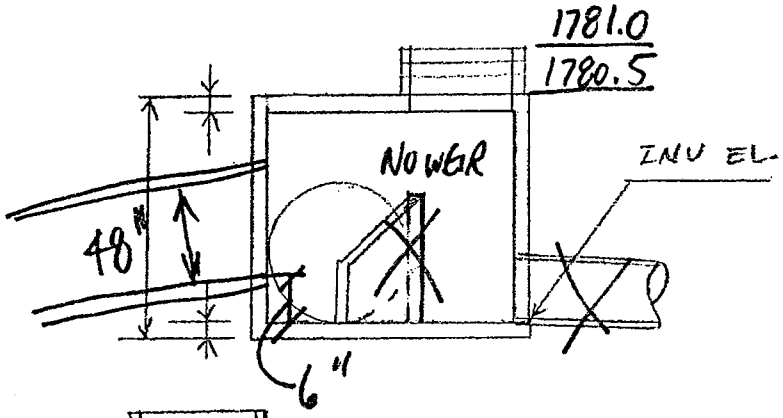
48" THUNDER MTN. DIVERSION STRUCTURE

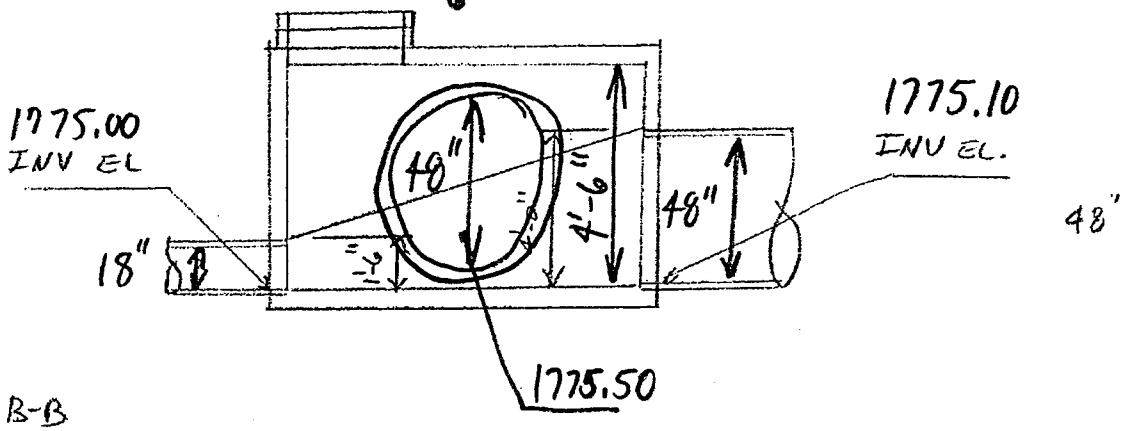
JRM
6/21/07
WOOD/PATEL



FADI — WE NEED TO REEVALUATE THE GEOMETRY OF THIS STRUCTURE

SECTION A-A





SECTION B-B

MADRID STAGE DISCHARGE RATING CURVES

HEC-1 Storage Routing Outflows (ID S370)				
ELEV	Q_{TOTAL}	$Q_{(72" Pipe)}$	$Q_{(24" pipe)}$	$Q_{(ES)}$
1823	0	0	0	0
1823.5	3	0	3	0
1824	5	0	5	0
1825	49	39	10	0
1826	130	110	20	0
1827	225	198	27	0
1828	284	252	33	0
1829	341	304	38	0
1829.5	410	322	40	48
1830	519	340	42	137
1830.5	648	354	44	251
1831	794	362	46	386

HEC-1 Stage calculation	
ELEV	Q (cfs)
1829.9	503
Q	Elev
410	1829.5
518	1830

Check results	
72" Pipe Q	338
24" Pipe Q	42
ES Q	124
Total	503

Rating Curves

72" SD EGL		Weir flow 72" Inlet		24" Low Flow		Emergency Spillway$_{(ES)}$	
Elev	Flow	Elev	Flow	Elev	Flow	Elev (H)	Flow
1823.76	50	1824	0.0	1823	0	1829.5	48
1825.03	100	1825	39.0	1825	10	1830	137
1826.08	150	1826	110.3	1826	20	1830.5	251
1827.04	200	1827	202.6	1827.5	30	1831	386
1827.97	250	1828	312.0	1829.5	40	$Q_{(weir)} = CLH^{3/2}$	
1828.90	300	1829	436.0	1832.18	50	C = 3	
1830.27	350	1829.5	503.0			L = 45.5	
1833.23	400	1830	573.2			Spillway H= 1829	
		1830.5	646.3				
		1831	722.3				
		$Q_{(weir)} = CLH^{3/2}$					
		C = 3					
		L = 13					
		Spillway H= 1824					

MADRID BASIN STAGE AREA/VOLUME RATING CURVES

CAD Measured			Adjusted for 1ac-ft Sediment		
Elev	Area (ft^2)	Area (ac)	Area (ac)	Inc Vol	Σ VOL
	0	0			
1823	89803	2.1	0.00	0.00	**0.00**
1823.5	92384	2.1	2.1	0.5	**0.5**
1824	94965	2.2	2.2	1.1	**1.6**
1825	100210	2.3	2.3	2.2	**3.8**
1826	105439	2.4	2.4	2.4	**6.2**
1827	110925	2.5	2.5	2.5	**8.7**
1828	116568	2.7	2.7	2.6	**11.3**
1829	122445	2.8	2.8	2.7	**14.0**
1829.5	125478.5	2.9	2.9	1.4	**15.5**
1830	128512	3.0	3.0	1.5	**16.9**
1831	135112	3.1	3.1	3.0	**20.0**

PROJECT GEOMETRY

```
            Project Name: DBL
             Description:
Horizontal Alignment Name: 500001
             Description: COMBINED ROADWAY CL
                   Style: Default
            Input Factor: 1.00
                                          STATION      NORTHING       EASTING

Element: Linear
            POB (  100001)                 4+00.00    894506.361    773973.820
             PI (  100002)                25+06.28    894510.842    776080.092
        Tangent Direction:          N 89^52'41" E
           Tangent Length:               2106.277

Element: Linear
             PI (  100002)                25+06.28    894510.842    776080.092
             PI (  100003)                38+26.59    894511.309    777400.403
        Tangent Direction:          N 89^58'47" E
           Tangent Length:               1320.311

Element: Linear
             PI (  100003)                38+26.59    894511.309    777400.403
             PI (  100004)                51+49.01    894516.088    778722.812
        Tangent Direction:          N 89^47'35" E
           Tangent Length:               1322.418

Element: Linear
             PI (  100004)                51+49.01    894516.088    778722.812
             PI (  100005)                77+86.29    894511.564    781360.089
        Tangent Direction:          S 89^54'06" E
           Tangent Length:               2637.281

Element: Linear
             PI (  100005)                77+86.29    894511.564    781360.089
             PI (  100402)                90+97.10    895822.375    781359.359
        Tangent Direction:          N  0^01'55" W
           Tangent Length:               1310.811

Element: Linear
             PI (  100402)                90+97.10    895822.375    781359.359
             PI (  100302)               105+14.67    897239.944    781359.935
        Tangent Direction:          N  0^01'24" E
           Tangent Length:               1417.569

Element: Linear
             PI (  100302)               105+14.67    897239.944    781359.935
             PI (  100303)               118+35.32    897235.621    782680.585
        Tangent Direction:          S 89^48'45" E
           Tangent Length:               1320.657

Element: Linear
             PI (  100303)               118+35.32    897235.621    782680.585
             PC (  100304)               131+53.83    897231.789    783999.083
        Tangent Direction:          S 89^50'01" E
           Tangent Length:               1318.504

Element: Circular
             PC (  100304)               131+53.83    897231.789    783999.083
             PI (        )               136+88.18    897230.236    784533.430
             CC (  100305)                            896085.878    783995.753
             PT (  100307)               141+53.83    896819.904    784875.712
                   Radius:                1145.916
                    Delta:               50^00'00" Right
  Degree of Curvature(Arc):               5^00'00"
                   Length:                1000.000
                  Tangent:                 534.349
                    Chord:                 968.570
          Middle Ordinate:                 107.363
                 External:                 118.462
        Tangent Direction:          S 89^50'01" E
         Radial Direction:          S  0^09'59" W
          Chord Direction:          S 64^50'01" E
```

```
          Radial Direction:      S 50^09'59" W
         Tangent Direction:      S 39^50'01" E

Elements are not collinear

Element: Linear
              PT (  100307)          141+53.83    896819.904    784875.712
             POE (  100308)          145+13.87    896543.448    785106.362
         Tangent Direction:      S 39^50'19" E
            Tangent Length:            360.038
```

Project Name: DBL
Description:
Horizontal Alignment Name: 200601
Description: STORM DRAIN
Style: Default
Input Factor: 1.00

	STATION	NORTHING	EASTING
Element: Linear			
POB (200601)	-0+50.88	894400.290	774073.316
PI (200602)	1+24.47	894490.232	774223.845
Tangent Direction:	N 59^08'30" E		
Tangent Length:	175.352		
Element: Linear			
PI (200602)	1+24.47	894490.232	774223.845
PI (200603)	1+60.79	894499.967	774258.834
Tangent Direction:	N 74^27'05" E		
Tangent Length:	36.319		
Element: Linear			
PI (200603)	1+60.79	894499.967	774258.834
PI (200604)	13+13.11	894502.419	775411.152
Tangent Direction:	N 89^52'41" E		
Tangent Length:	1152.320		
Element: Linear			
PI (200604)	13+13.11	894502.419	775411.152
PI (200605)	18+96.30	894503.660	775994.340
Tangent Direction:	N 89^52'41" E		
Tangent Length:	583.190		
Element: Linear			
PI (200605)	18+96.30	894503.660	775994.340
PI (200606)	19+48.63	894540.738	776031.262
Tangent Direction:	N 44^52'41" E		
Tangent Length:	52.326		
Element: Linear			
PI (200606)	19+48.63	894540.738	776031.262
PI (200607)	20+19.44	894540.850	776102.075
Tangent Direction:	N 89^54'35" E		
Tangent Length:	70.813		
Element: Linear			
PI (200607)	20+19.44	894540.850	776102.075
PI (200608)	20+71.77	894503.863	776139.088
Tangent Direction:	S 45^01'13" E		
Tangent Length:	52.326		
Element: Linear			
PI (200608)	20+71.77	894503.863	776139.088
PI (200609)	28+52.40	894504.139	776919.718
Tangent Direction:	N 89^58'47" E		
Tangent Length:	780.630		
Element: Linear			
PI (200609)	28+52.40	894504.139	776919.718
PI (200610)	33+48.36	894504.364	777415.680
Tangent Direction:	N 89^58'26" E		
Tangent Length:	495.963		
Element: Linear			
PI (200610)	33+48.36	894504.364	777415.680
PI (200611)	34+31.36	894521.658	777496.859
Tangent Direction:	N 77^58'26" E		
Tangent Length:	83.000		
Element: Linear			
PI (200611)	34+31.36	894521.658	777496.859
PI (200900)	36+58.28	894522.478	777723.777
Tangent Direction:	N 89^47'35" E		

```
          Tangent Length:            226.920

Element: Linear
             PI (  200900)          36+58.28    894522.478    777723.777
             PI (  200612)          44+53.45    894525.351    778518.942
        Tangent Direction:      N 89^47'35" E
          Tangent Length:            795.170

Element: Linear
             PI (  200612)          44+53.45    894525.351    778518.942
             PI (  200613)          52+53.50    894525.065    779318.993
        Tangent Direction:      S 89^58'46" E
          Tangent Length:            800.051

Element: Linear
             PI (  200613)          52+53.50    894525.065    779318.993
             PI (  200614)          60+53.50    894523.693    780118.992
        Tangent Direction:      S 89^54'06" E
          Tangent Length:            800.000

Element: Linear
             PI (  200614)          60+53.50    894523.693    780118.992
             PI (  200615)          68+53.50    894522.321    780918.990
        Tangent Direction:      S 89^54'06" E
          Tangent Length:            800.000

Element: Linear
             PI (  200615)          68+53.50    894522.321    780918.990
             PI (  200616)          72+35.09    894521.666    781300.580
        Tangent Direction:      S 89^54'06" E
          Tangent Length:            381.590

Element: Linear
             PI (  200616)          72+35.09    894521.666    781300.580
             PI (  200617)          73+30.34    894588.901    781368.046
        Tangent Direction:      N 45^05'54" E
          Tangent Length:             95.248

Element: Linear
             PI (  200617)          73+30.34    894588.901    781368.046
             PI (  200618)          77+37.34    894995.902    781367.819
        Tangent Direction:      N  0^01'55" W
          Tangent Length:            407.001

Element: Linear
             PI (  200618)          77+37.34    894995.902    781367.819
             PI (  200619)          85+26.72    895785.282    781367.380
        Tangent Direction:      N  0^01'55" W
          Tangent Length:            789.380

Element: Linear
             PI (  200619)          85+26.72    895785.282    781367.380
             PI (  200620)          86+34.57    895892.901    781374.388
        Tangent Direction:      N  3^43'33" E
          Tangent Length:            107.847

Element: Linear
             PI (  200620)          86+34.57    895892.901    781374.388
             PI (  200621)          92+18.33    896476.661    781374.625
        Tangent Direction:      N  0^01'24" E
          Tangent Length:            583.760

Element: Linear
             PI (  200621)          92+18.33    896476.661    781374.625
             PI (  200622)          92+65.17    896523.501    781374.644
        Tangent Direction:      N  0^01'24" E
          Tangent Length:             46.840

Element: Linear
             PI (  200622)          92+65.17    896523.501    781374.644
             PI (  200623)          99+42.27    897200.601    781374.919
        Tangent Direction:      N  0^01'24" E
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```
          Tangent Length:            677.100

Element: Linear
             PI (  200623)          99+42.27    897200.601    781374.919
             PI (  200624)          99+83.57    897229.799    781404.141
       Tangent Direction:      N 45^01'24" E
          Tangent Length:             41.309

Element: Linear
             PI (  200624)          99+83.57    897229.799    781404.141
             PI (  200625)         100+45.63    897229.596    781466.195
       Tangent Direction:      S 89^48'45" E
          Tangent Length:             62.055

Element: Linear
             PI (  200625)         100+45.63    897229.596    781466.195
             PI (  200626)         103+88.87    897228.473    781809.433
       Tangent Direction:      S 89^48'45" E
          Tangent Length:            343.240

Element: Linear
             PI (  200626)         103+88.87    897228.473    781809.433
             PI (  200627)         111+02.80    897226.136    782523.359
       Tangent Direction:      S 89^48'45" E
          Tangent Length:            713.930

Element: Linear
             PI (  200627)         111+02.80    897226.136    782523.359
             PI (  200628)         113+42.67    897225.381    782763.232
       Tangent Direction:      S 89^49'11" E
          Tangent Length:            239.874

Element: Linear
             PI (  200628)         113+42.67    897225.381    782763.232
             PI (  200629)         115+88.67    897224.666    783009.231
       Tangent Direction:      S 89^50'01" E
          Tangent Length:            246.000

Element: Linear
             PI (  200629)         115+88.67    897224.666    783009.231
             PI (  200630)         124+09.67    897222.280    783830.227
       Tangent Direction:      S 89^50'01" E
          Tangent Length:            821.000

Element: Linear
             PI (  200630)         124+09.67    897222.280    783830.227
             PI (  200631)         124+81.82    897237.075    783900.840
       Tangent Direction:      N 78^09'59" E
          Tangent Length:             72.146

Element: Linear
             PI (  200631)         124+81.82    897237.075    783900.840
             PC (  200632)         125+80.07    897236.789    783999.095
       Tangent Direction:      S 89^50'01" E
          Tangent Length:             98.256

Element: Circular
             PC (  200632)         125+80.07    897236.789    783999.095
             PI (        )         127+81.55    897236.203    784200.571
             CC (  200850)                      896085.874    783995.751
            PCC (  200633)         129+78.98    897167.212    784389.864
                   Radius:          1150.920
                    Delta:         19^51'31" Right
  Degree of Curvature(Arc):         4^58'42"
                   Length:           398.908
                  Tangent:           201.475
                    Chord:           396.914
        Middle Ordinate:              17.239
                 External:            17.502
       Tangent Direction:      S 89^50'01" E
        Radial Direction:      S  0^09'59" W
        Chord Direction:       S 79^54'15" E
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```
         Radial Direction:      S 20^01'31" W
        Tangent Direction:      S 69^58'29" E

Element: Circular
            PCC (  200633)          129+78.98    897167.212    784389.864
             PI (        )          132+25.72    897082.722    784621.681
             CC (  200850)                       896085.874    783995.751
             PT (  200634)          134+65.09    896910.630    784798.493
                   Radius:           1150.920
                    Delta:          24^12'00" Right
  Degree of Curvature(Arc):          4^58'42"
                   Length:            486.112
                  Tangent:            246.735
                    Chord:            482.507
          Middle Ordinate:             25.570
                 External:             26.150
        Tangent Direction:      S 69^58'29" E
         Radial Direction:      S 20^01'31" W
          Chord Direction:      S 57^52'29" E
         Radial Direction:      S 44^13'30" W
        Tangent Direction:      S 45^46'30" E

Elements are not collinear

Element: Linear
             PT (  200634)          134+65.09    896910.630    784798.493
             PI (  200635)          135+68.59    896954.915    784892.032
        Tangent Direction:      N 64^39'55" E
           Tangent Length:            103.493

Element: Linear
             PI (  200635)          135+68.59    896954.915    784892.032
            POE (  200636)          135+75.09    896960.082    784895.978
        Tangent Direction:      N 37^21'37" E
           Tangent Length:              6.501
```

UTILITY POTHOLE DATA

HERMOSA VISTA FILE
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June 18, 2007

Jeff Minch
Wood Patel & Associates, Inc.
2051 W. Northern Avenue, Ste. 100
Phoenix, AZ 85021

RECEIVED
JUN 20 2007
WOOD/PATEL

Re: RLS Sealed Testhole Databook for Hermosa Vista

Dear Mr. Minch:

Attached please find the RLS sealed testhole databook for Hermosa Vista. Please feel free to contact me with any questions.

I am enclosing one of Art Mehler's and mine business cards. You may also find out more about us by visiting our website at www.aztec.us. Please let me know if there is any additional information that we can provide for you.

Very truly yours,

Marie Jubie

Marie Jubie
Project Specialist

Enclosure(s)
(1) Testhole Databook – Hermosa Vista

AZTEC
www.aztec.us

Testhole Data Summary

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

Date: 5/31/2007

Project Number: AZU0704-003

Project Name: Hermosa Vista

TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Coordinates		Stationing		Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
						Northing	Easting	Stationing	Offset					
1	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	6"	ACP	894482.94	774243.64	6+69.58	4.25 Rt	1589.99	1586.21	1585.63	3.78	
2	76th Street & Hermosa Vista Drive	5/22/2007	SRP Electric	Four 2" & Two 4"	PVC	894494.58	774454.32	8+80.28	6.96 Lft	1593.09	1589.03	1588.49	4.06	
3	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	14"	ACP	894522.76	774983.98	14+27.45	8.06 Lft	1602.00	1597.88	1596.53	4.12	
4	76th Street & Hermosa Vista Drive	5/22/2007	SRP Electric	4"	PVC	894539.95	775065.07	15+11.82	1.12 Lft	1604.31	1600.07	1599.69	4.24	
5	76th Street & Hermosa Vista Drive	5/22/2007	Cox Communications	Two 2"	PVC	894538.80	775260.70	17+07.45	.42 Rt	1606.89	1604.13	1603.89	2.76	
6	76th Street & Hermosa Vista Drive	5/22/2007	Qwest Local Network	1"	PE	894532.86	776035.37	24+82.10	7.89 Rt	1618.65	1616.55	1616.47	2.10	
7	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	16"	DIP	894541.14	776063.66	25+10.40	.33 Lft	1619.46	1610.61	1609.16	8.85	
8	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Sewer	18"	VCP	894541.10	776069.82	25+16.57	.28 Lft	1619.63	1610.23	1608.35	9.40	
9	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	12"	ACP	894524.01	776111.85	25+67.14	4.31 Rt	1619.66	1615.64	1614.48	4.02	
10	Mangun Street & Hermosa Vista Drive	5/22/2007	SRP Electric	None	None									No facility found in the requested location per SRP Bluestake markings.
11	78th Street & Hermosa Vista Drive	5/22/2007	SRP Electric	Six 2"	PVC	894524.01	777559.00	40+13.80	.23 Lft	1640.82	1637.72	1636.92	3.10	
12A	78th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	12"	DIP	894524.06	777614.80	40+69.60	.17 Lft	1641.55	1636.55	1635.45	5.00	
12B	78th Street & Hermosa Vista	5/22/2007	City of Mesa Gas	2"	PE	894524.06	777614.90	40+69.70	.17 Lft	1641.59	1637.89	1637.69	3.70	
13	79th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Gas	4"	PE	894508.42	778086.69	45+41.45	16.40 Rt	1649.21	1645.31	1644.93	3.90	
14	80th Street & Hermosa Vista Drive	5/23/2007	SRP Electric	3"	PVC	894524.58	778377.69	48+32.49	.82 Rt	1654.11	1648.91	1648.62	5.20	

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TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Coordinates		Stationing		Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
						Northing	Easting	Stationing	Offset					
15	80th Street & Hermosa Vista Drive	5/23/2007	City of Mesa Water	12"	ACP	894523.83	778748.56	52+03.36	2.22 Rt	1661.50	1657.56	1656.40	3.94	
16	Hermosa Vista Drive east of 80th Street	5/23/2007	City of Mesa Water	6"	ACP	894524.55	779384.90	58+39.70	0.40 Rt	1672.63	1670.33	1669.75	2.30	
17	82nd Street & Hermosa Vista Drive	5/23/2007	Qwest Local Network	1.5"	PE	894521.26	780057.31	65+12.12	2.54 Rt	1685.91	1682.85	1682.72	3.06	
18	Channing & Hermosa Vista Drive	5/23/2007	City of Mesa Water	12"	DIP	894522.07	780293.44	67+48.25	1.33 Rt	1691.23	1684.91	1683.81	6.32	
19A	Hawes Road & Hermosa Vista Drive	5/23/2007	City of Mesa Water	12"	DIP	894540.80	781315.95	77+79.77	2.66 Lft	1707.22	1701.12	1700.02	6.10	
19B	Hawes Road & Hermosa Vista Drive	5/23/2007	Unknown	See Below	See Below	894541.66	781317.15	77+81.23	2.42 Lft	1707.23	1704.03	1702.93	3.20	Found one 4" PVC conduit and one 2" PE cable in the same hole as #19A.
20	Hawes Road & Hermosa Vista Drive	5/23/2007	Qwest Local Network	Two 2"	PE	894545.47	781321.89	77+87.28	1.77 Lft	1707.38	1704.08	1703.68	3.30	
21	Hawes Road & Hermosa Vista Drive	5/23/2007	City of Mesa Water	20"	ACP	894547.63	781329.88	77+94.45	2.34	1708.00	1701.80	1699.86	6.20	
21A	Hawes Road & Hermosa Vista Drive	5/23/2007	Unknown	1.75"	PE	894548.21	781326.54	77+92.50	.43 Lft	1707.90	1702.40	1702.25	5.50	
22	Hawes Road & Hermosa Vista Drive	5/23/2007	Sewer	12"	PVC	894576.03	781357.42	78+34.01	1.72 Rt	1708.52	1697.60	1696.54	10.92	
23	Haews Road & Hermosa Vista Drive	6/1/2007	Qwest Local Network	2"	PE	894569.22	781340.81	78+17.45	5.21 Lft	1708.54	1704.24	1704.07	4.30	
24	Hermosa Vista Drive & Hawes Road	6/1/2007	Qwest Local Network	None	None									No facility in the requested location per Qwest Bluestake markings.
25	Hawes Road & Mangun Road	5/23/2007	City of Mesa Water	6"	ACP	894825.72	781374.14	80+90.31	.93 Lft	1713.92	1712.28	1711.70	1.64	
26	Hawes Road & Culver Street	5/23/2007	City of Mesa Water	6"	ACP	895805.94	781376.45	90+70.53	1.44 Rt	1730.53	1727.69	1727.11	2.84	
27	Hawes Road & Culver Street	5/24/2007	SRP Electric	None	None									No facility in the requested location per SRP Bluestake markings.

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Testhole Data Summary

Date: 5/31/2007

Project Number: AZU0704-003

Project Name: Hermosa Vista

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ARIZONA U.S.A.

TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Coordinates		Stationing		Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
						Northing	Easting	Stationing	Offset					
28	Hawes Road & Culver Street	5/25/2007	City of Mesa Sewer	8"	PVC	895825.26	781377.50	90+89.85	2.48 Rt	1730.79	1721.65	1720.93	9.14	
29	Hawes Road & Culver Street	5/25/2007	City of Mesa Water	20"	ACP	895843.91	781377.28	91+08.50	2.26 Rt	1730.94	1725.38	1723.44	5.56	
30	Hawes Road & Willetta Street	5/25/2007	City of Mesa Water	12"	ACP	896544.97	781373.55	98+09.56	1.43 Lft	1742.51	1738.03	1736.87	4.48	
31	Hawes Road & McDowell Road	5/25/2007	City of Mesa Water	2"	STL	896863.45	781382.70	101+28.04	7.75 Rt	1748.27	1745.17	1744.97	3.10	
32	Hawes Road & McDowell Road	5/31/2007	Qwest Local Network	None	None									No facility in the requested location per Qwest Bluestake markings.
33	Hawes Road & McDowell Road	5/31/2007	SRP Electric	24" Wide	Concrete Duct	897191.59	781425.14	105+26.23	38.15 Rt	1755.33	1751.53	1749.93	3.80	
34	Hawes Road & McDowell Road	5/25/2007	SRP Electric	Four 4"	PVC	897220.80	781457.22	105+58.21	8.84 Rt	1756.89	1747.61	1747.23	9.28	
35	Hawes Road & McDowell Road	5/25/2007	City of Mesa Storm Drain	30"	RCP	897222.70	781466.36	105+67.35	6.91 Rt	1757.28	1755.18	1752.10	2.10	
36	Waterbury Road & McDowell Road	5/24/2007	Qwest Local Network	4"	PVC	897214.27	782653.95	117+54.96	11.67 Rt	1783.30	1778.30	1777.92	5.00	
37	Waterbury Road & McDowell Road	5/24/2007	SRP Electric	Three 3"	PVC	897214.28	782653.61	117+54.62	11.67 Rt	1783.21	1776.71	1776.42	6.50	
38	Waterbury Road & McDowell Road	5/24/2007	City of Mesa Water	20"	DIP	897214.01	782680.20	117+81.21	11.95 Rt	1783.95	1778.35	1776.55	5.60	
39	Waterbury Road & McDowell Road	5/24/2007	City of Mesa Water	20"	DIP	897213.65	782686.20	117+87.21	12.19 Rt	1784.08	1777.98	1776.18	6.10	
40	Waterbury Road & McDowell Road	5/24/2007	None	None	None	897214.94	782710.50	118+11.51	10.83 Rt	1784.58		1779.58		Dug to a depth of 5' in the requested location and no facility was found. Unable to
40A	Waterbury Road & McDowell Road	5/24/2007	None	None	None	897215.50	782699.71	118+00.71	10.30 Rt	1784.33		1777.33		Dug to a depth of 7' in the requested location and no facility was found.
40B	Waterbury Road & McDowell Road	5/24/2007	None	None	None	897213.63	782694.22	117+95.23	12.19 Rt	1784.19		1774.19		Dug to a depth of 10' in the requested location and no facility was found.

AZTEC
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Testhole Data Summary

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

Date: 5/31/2007

Project Number: AZU0704-003

Project Name: Hermosa Vista

TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Coordinates		Stationing		Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
						Northing	Easting	Stationing	Offset					
41	Waterbury Road & McDowell Road	5/24/2007	City of Mesa Gas	4"	Coated STL	897214.00	782679.26	117+80.27	11.86 Rt	1783.94	1781.04	1780.66	2.90	
42	Waterbury Road & McDowell Road	5/31/2007	City of Mesa Water	20"	DIP	897213.10	782724.83	118+25.84	12.62 Rt	1784.82	1778.80	1777.00	6.02	
42A	Waterbury Road & McDowell Road	5/31/2007	None	None	None	897214.23	782704.74	118+05.75	11.56 Rt	1784.40		1772.40		Dug to a depth of 12' in the requested location and no facility was found.
43	88th Street & McDowell Road	5/24/2007	City of Mesa Sewer	12"	PVC	897247.86	783907.94	130+15.05	10.79 Lft	1814.65	1808.35	1807.29	6.30	
44	88th Street & McDowell Road	6/1/2007	Ciy of Mesa Sewer	60" Wide	Slurry	897244.67	783994.35	131+01.47	7.86 Lft	1817.01	1816.81	1810.01	0.20	
45	88th Street & McDowell Road	5/31/2007	Gas	None	None	897247.64	784037.73	131+44.47	11.61 Lft	1818.23		1811.23		No facility found at requested location per Bluestake. Aztec crew
46	88th Street & McDowell Road	5/31/2007	SRP Electric	Three 2.5"	PVC	897230.82	784210.23	133+16.02	13.98 Lft	1822.01	1817.21	1816.97	4.80	
47	88th Street & McDowell Road	5/24/2007	Qwest Local Network	None	None									No facility in the requested location per Qwest Bluestake markings.
48	88th Street & McDowell Road	5/31/2007	City of Mesa Gas	0.75"	PE	897065.90	784622.14	137+57.40	12.30 Lft	1827.81	1824.01	1823.95	3.80	
49	88th Street & McDowell Road	6/1/2007	City of Mesa Sewer	8"	PVC	896939.23	784793.78	139+58.33	32.90 Rt	1828.77	1818.57	1817.85	10.20	
50	McDowell Road east of 88th Street	5/31/2007	Storm Drain	None	None									No facility in the requested location per Bluestake markings.
51	88th Street & McDowell Road	6/1/2007	SRP Electric	2"	PVC	896951.34	784806.00	739+74.56	27.20 Rt	1828.94	1826.54	1826.34	2.40	
52	Hawes Road & Willetta Street	6/1/2007	City of Mesa Water	4"	ACP	896182.21	781374.68	94+46.80	.31 Lft	1736.46	1732.94	1732.54	3.52	

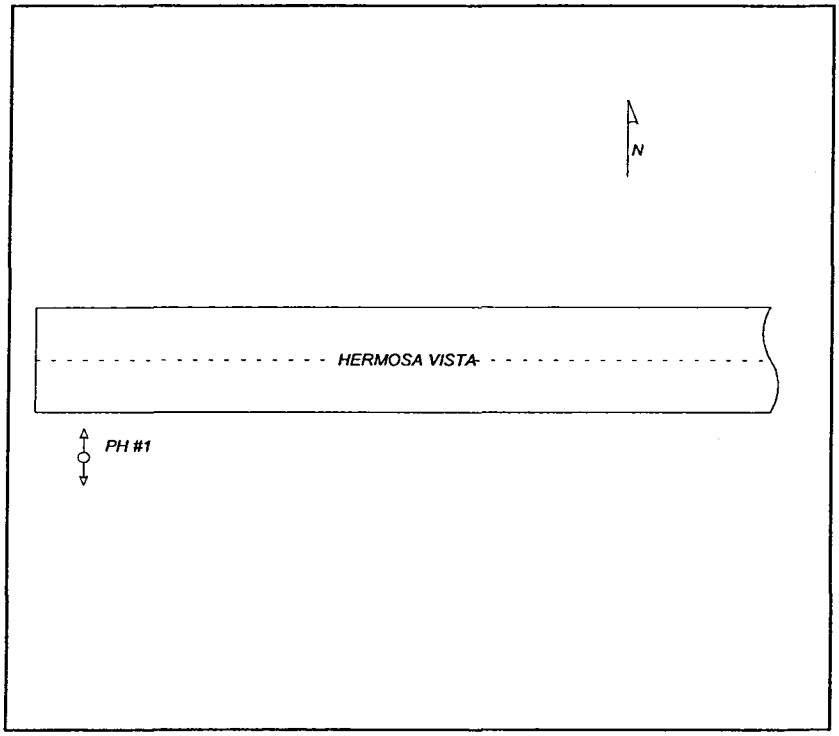
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	1	SUE Crew	D. Perez
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/8/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1589.99	WIDTH/O.D. 6.91"	
TOP ELEVATION	1586.21		3.78 TOP DEPTH (FEET)
BOTTOM ELEVATION	1585.63		4.36 BOTTOM (FEET)

COORDINATES: NORTHING	894482.94	EASTING	774243.64
STATIONING: STATION	6+69.58	OFFSET	4.25 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	6"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

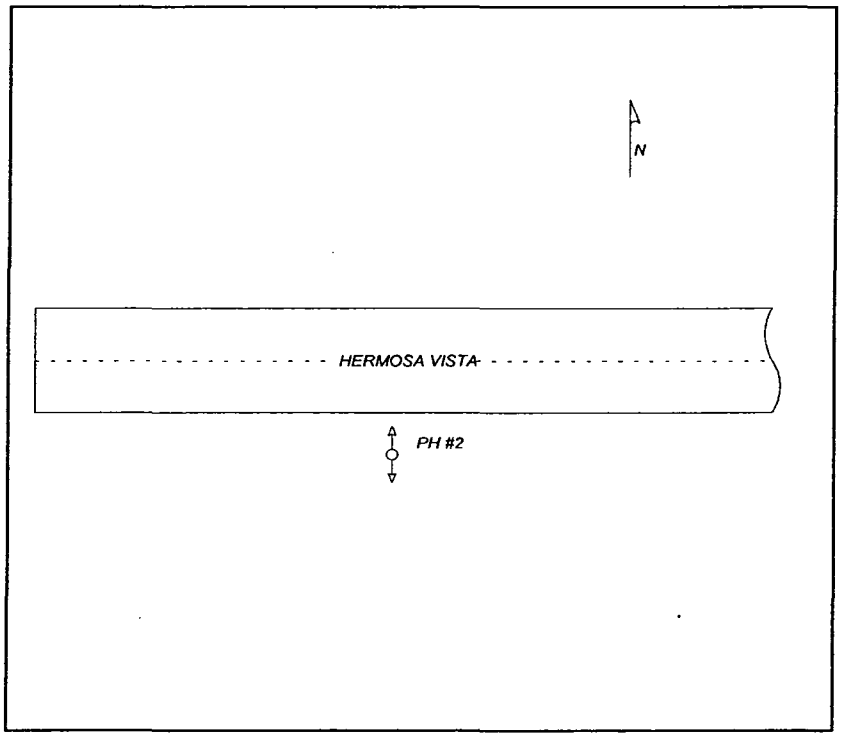
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	2	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/15/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Red

CROSS SECTION - NOT TO SCALE

FACING: South

SURFACE ELEVATION	1593.09	WIDTH/O.D. 32"	
TOP ELEVATION	1589.03	4.06	TOP DEPTH (FEET)
BOTTOM ELEVATION	1588.49	4.60	BOTTOM (FEET)

COORDINATES: NORTHING	894494.58	EASTING	774454.32
STATIONING: STATION	8+80.28	OFFSET	6.96 Lft
PAVING THICKNESS	3"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	Four 2" & Two 4"	TYPE	PVC
FACILITY OWNER	SRP Electric		

COMMENTS:

PREPARED BY: M. Jubie

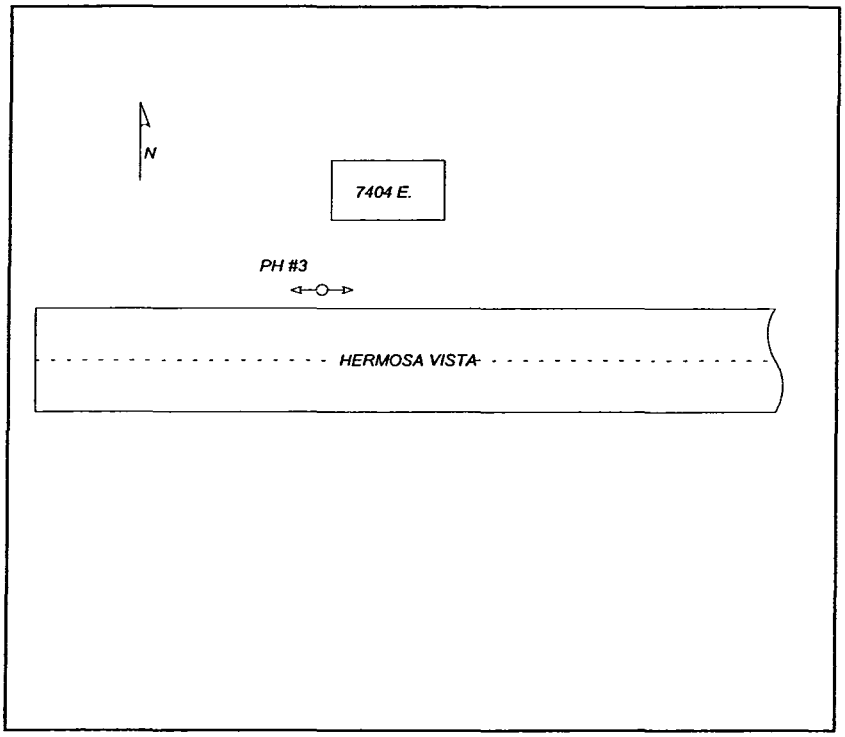
CHECKED BY: A. Mehler

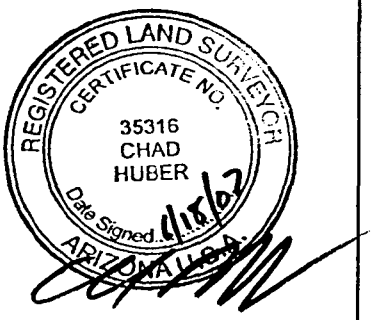
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	3	SUE Crew	D. Perez
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr.	
21215-1=(#5 from plans)	
N: 894511.56	
E: 781359.09	
Elev. = 1707.29	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1602.00	WIDTH/O.D. 16.22"	
TOP ELEVATION	1597.88		4.12 TOP DEPTH (FEET)
BOTTOM ELEVATION	1596.53		5.47 BOTTOM (FEET)

COORDINATES: NORTHING	894522.76	EASTING	774983.98
STATIONING: STATION	14+27.45	OFFSET	8.06 Lft
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	14"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

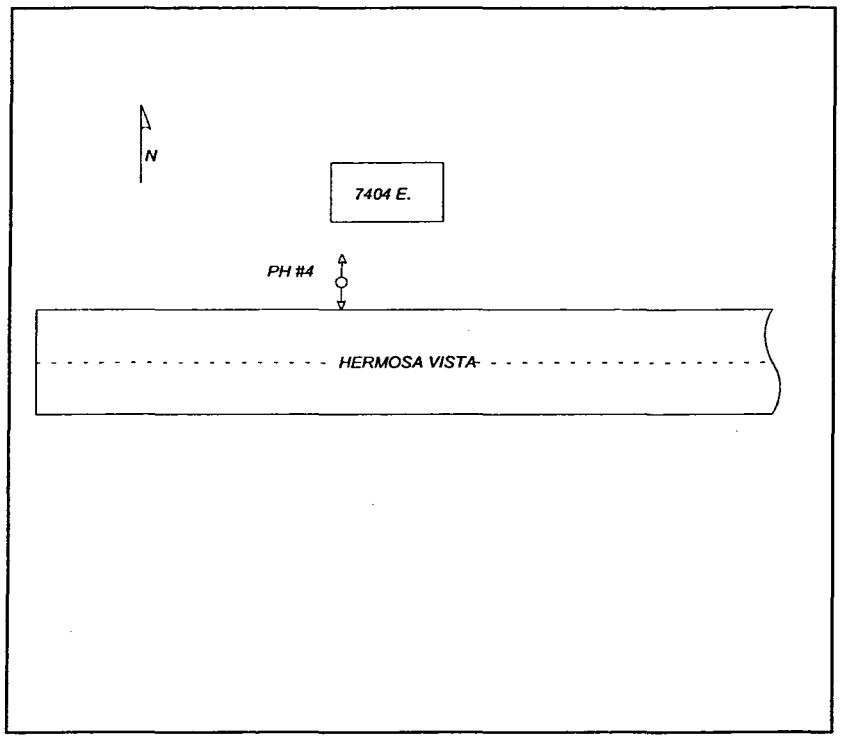
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	4	SUE Crew	D. Perez
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: North SURFACE ELEVATION: 1604.31 WIDTH/O.D.: 4.5" TOP ELEVATION: 1600.07 — TOP DEPTH (FEET): 4.24 BOTTOM ELEVATION: 1599.69 — BOTTOM (FEET): 4.62
RIBBON COLOR: Red	

COORDINATES: NORTHING	894539.95	EASTING	775065.07
STATIONING: STATION	15+11.82	OFFSET	1.12 Lft
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	4"	TYPE	PVC
FACILITY OWNER	SRP Electric		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

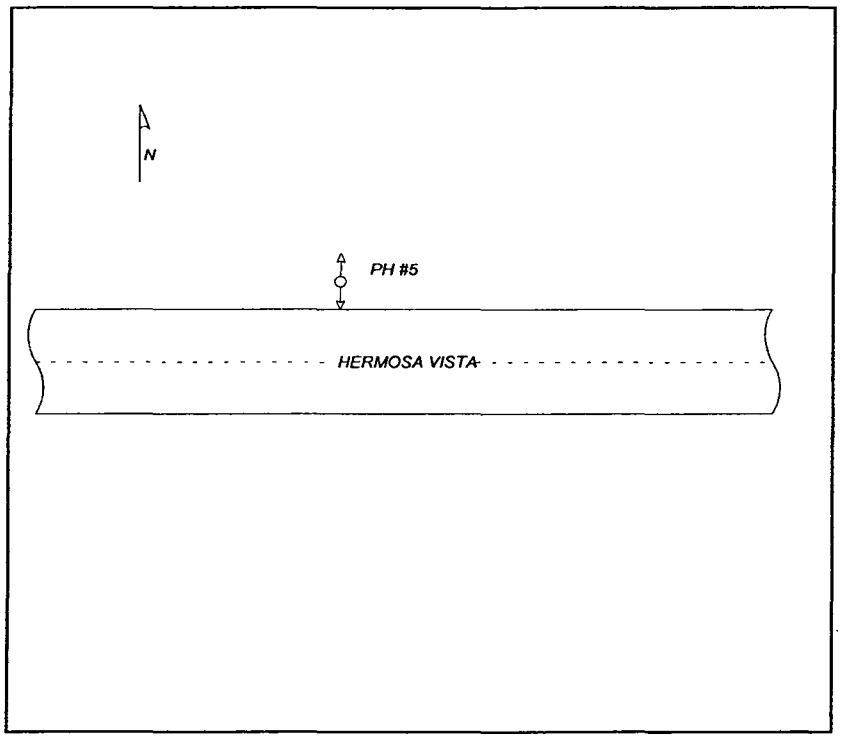
TEST HOLE DATA REPORT

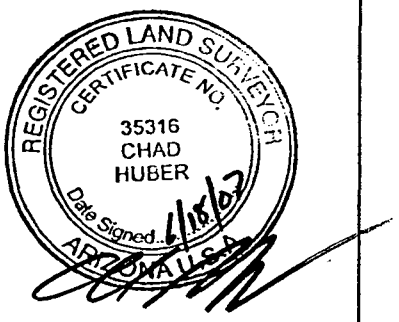
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	5	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	North		
	SURFACE ELEVATION	1606.89	WIDTH/O.D. 6"	
	TOP ELEVATION	1604.13	2.76	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1603.89	3.00	BOTTOM (FEET)
RIBBON COLOR Orange				

COORDINATES: NORTHING	894538.80	EASTING	775260.70
STATIONING: STATION	17+07.45	OFFSET	.42 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	Two 2"	TYPE	PVC	FACILITY OWNER	Cox Communications

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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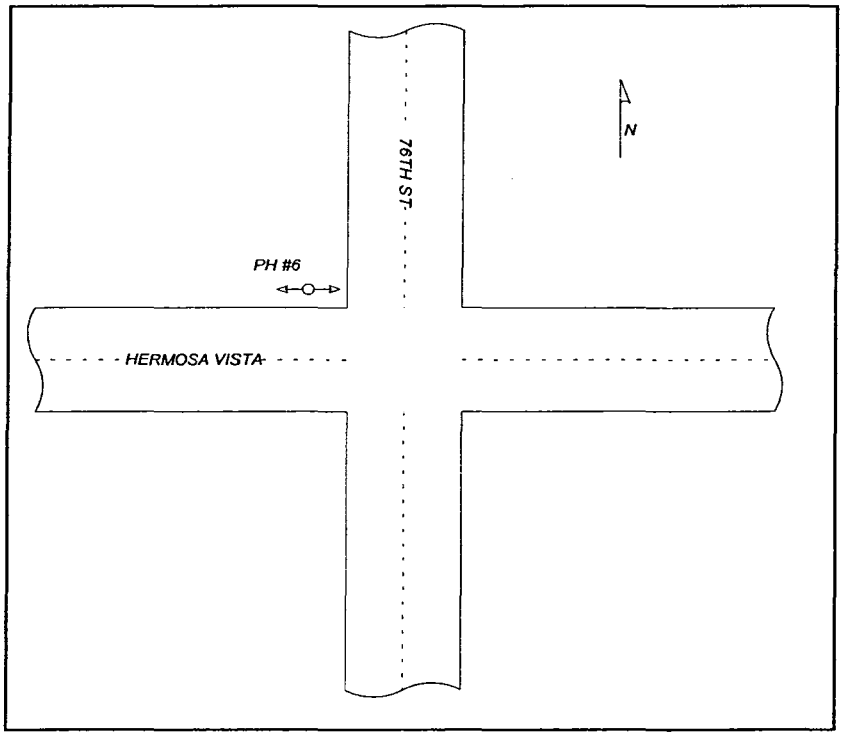
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	6	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: West SURFACE ELEVATION: 1618.65 WIDTH/O.D.: 1" TOP ELEVATION: 1616.55 — 2.10 TOP DEPTH (FEET) BOTTOM ELEVATION: 1616.47 — 2.18 BOTTOM (FEET)
RIBBON COLOR: Orange	

COORDINATES: NORTHING	894532.86	EASTING	776035.37
STATIONING: STATION	24+82.10	OFFSET	7.89 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	1"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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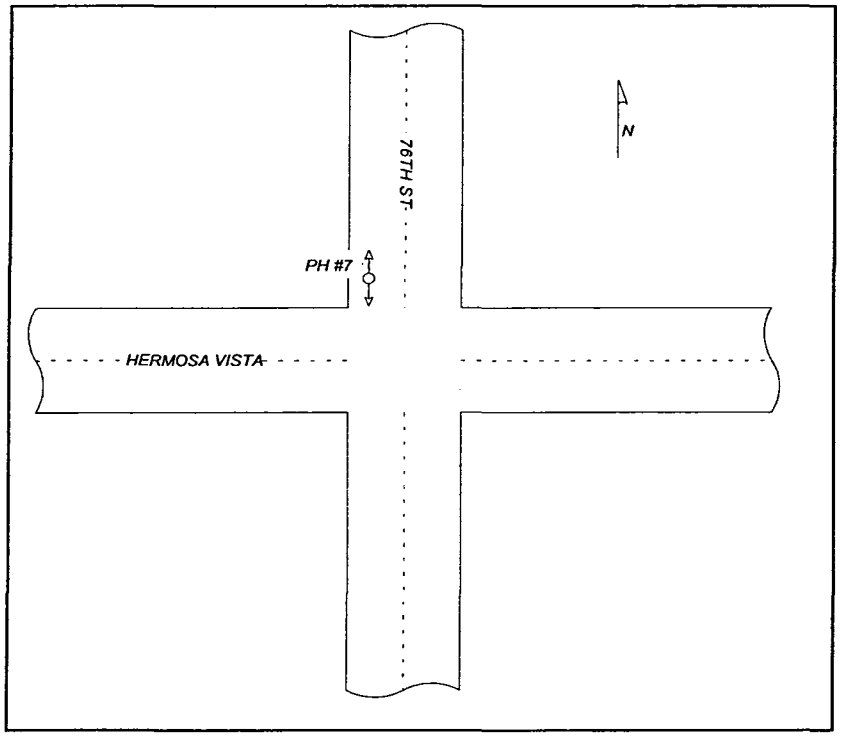
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	7	SUE Crew	D. Perez
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1619.46	WIDTH/O.D. 17.4"		
TOP ELEVATION	1610.61		8.85	TOP DEPTH (FEET)
BOTTOM ELEVATION	1609.16		10.30	BOTTOM (FEET)

COORDINATES: NORTHING	894541.14	EASTING	776063.66
STATIONING: STATION	25+10.40	OFFSET	.33 Lft
PAVING THICKNESS	3"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	16"
TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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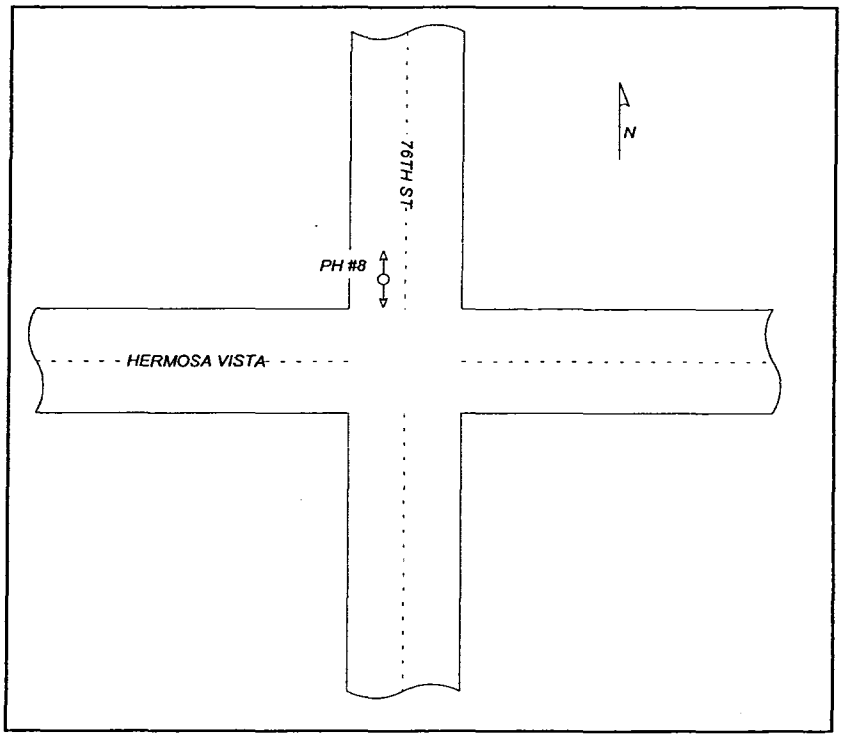
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	8	SUE Crew	D. Perez
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: North SURFACE ELEVATION: 1619.63 WIDTH/O.D.: 22.6 TOP ELEVATION: 1610.23 — TOP DEPTH (FEET): 9.40 BOTTOM ELEVATION: 1608.35 — BOTTOM (FEET): 11.28
RIBBON COLOR: Green	

COORDINATES: NORTHING	894541.10	EASTING	776069.82
STATIONING: STATION	25+16.57	OFFSET	.28 Lft

PAVING THICKNESS	3"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	18"	TYPE	VCP	FACILITY OWNER	City of Mesa Sewer

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

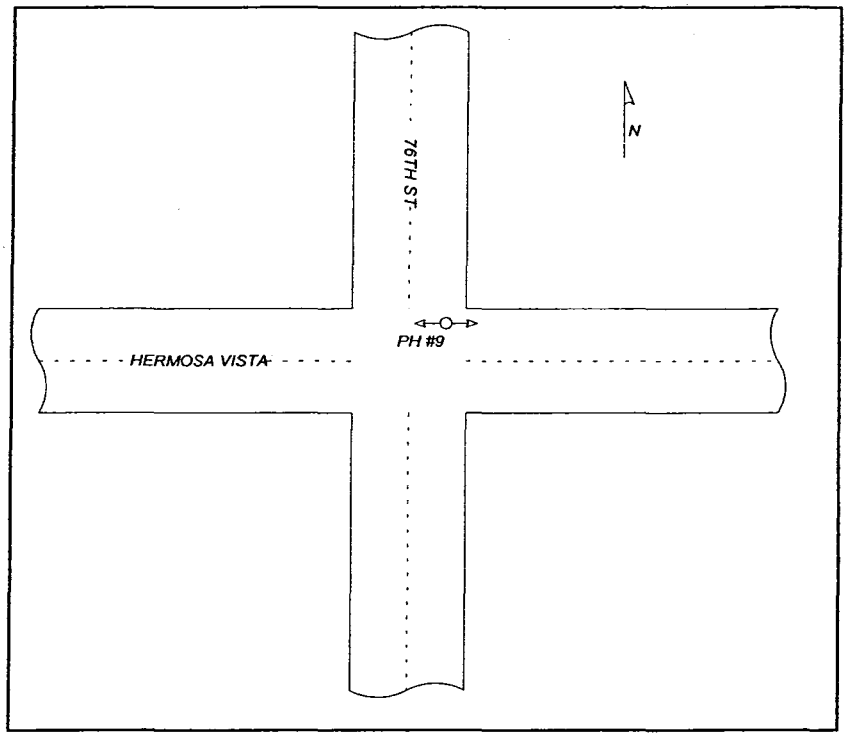
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	9	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: East SURFACE ELEVATION: 1619.66 WIDTH/O.D.: 13.92" TOP ELEVATION: 1615.64 — TOP DEPTH (FEET): 4.02 BOTTOM ELEVATION: 1614.48 — BOTTOM (FEET): 5.18
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894524.01	EASTING	776111.85
STATIONING: STATION	25+67.14	OFFSET	4.31 Rt
PAVING THICKNESS	3"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	12"
TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	10	SUE Crew	D. Perez
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Mangun Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) _____ BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER SRP Electric

COMMENTS:

No facility found in the requested location per SRP Bluestake markings.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

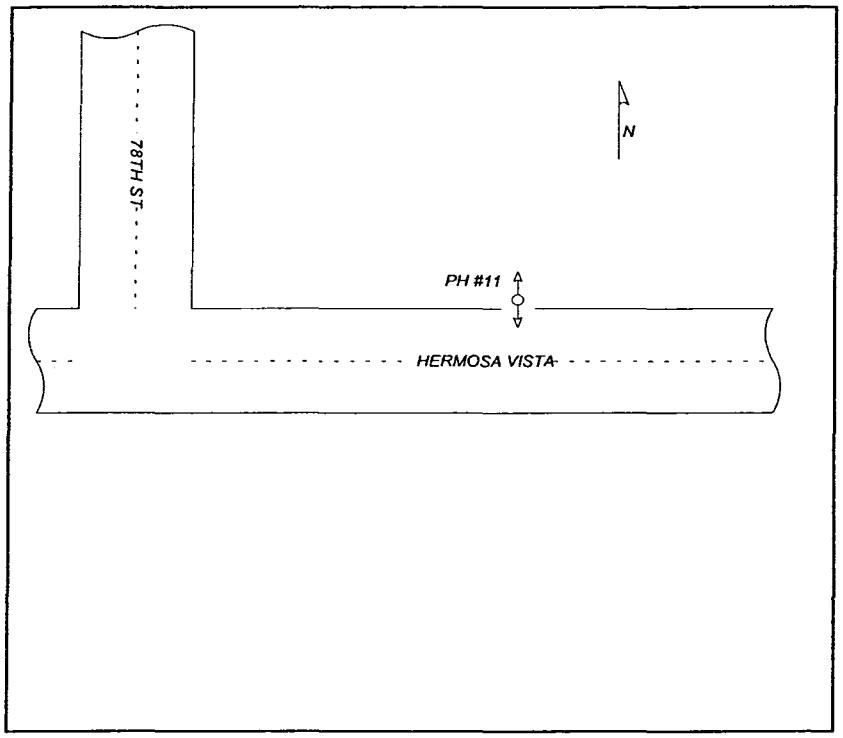
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	11	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	78th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Red

CROSS SECTION - NOT TO SCALE

FACING: South

SURFACE ELEVATION	1640.82	WIDTH/O.D. 18"	
TOP ELEVATION	1637.72	3.10	TOP DEPTH (FEET)
BOTTOM ELEVATION	1636.92	3.90	BOTTOM (FEET)

COORDINATES: NORTHING	894524.01	EASTING	777559.00
STATIONING: STATION	40+13.80	OFFSET	.23 Lft
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	Six 2"	TYPE	PVC
FACILITY OWNER	SRP Electric		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

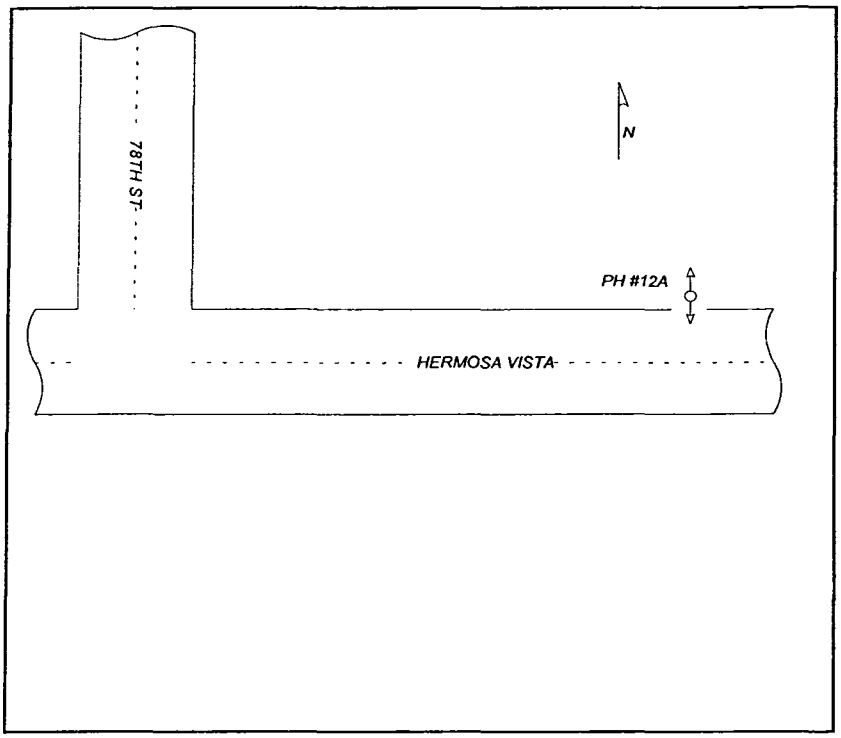
TEST HOLE DATA REPORT

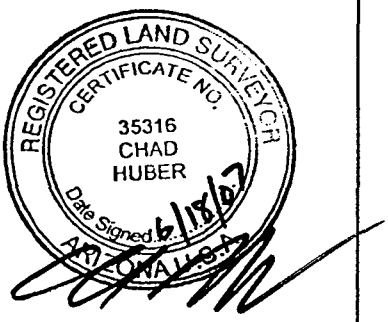
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	12A	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	78th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr.	
21215-1=(#5 from plans)	
N: 894511.56	
E: 781359.09	
Elev. = 1707.29	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1641.55	WIDTH/O.D. 13.2"	
TOP ELEVATION	1636.55	5.00	TOP DEPTH (FEET)
BOTTOM ELEVATION	1635.45	6.10	BOTTOM (FEET)

COORDINATES: NORTHING	894524.06	EASTING	777614.80
STATIONING: STATION	40+69.60	OFFSET	.17 Lft

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

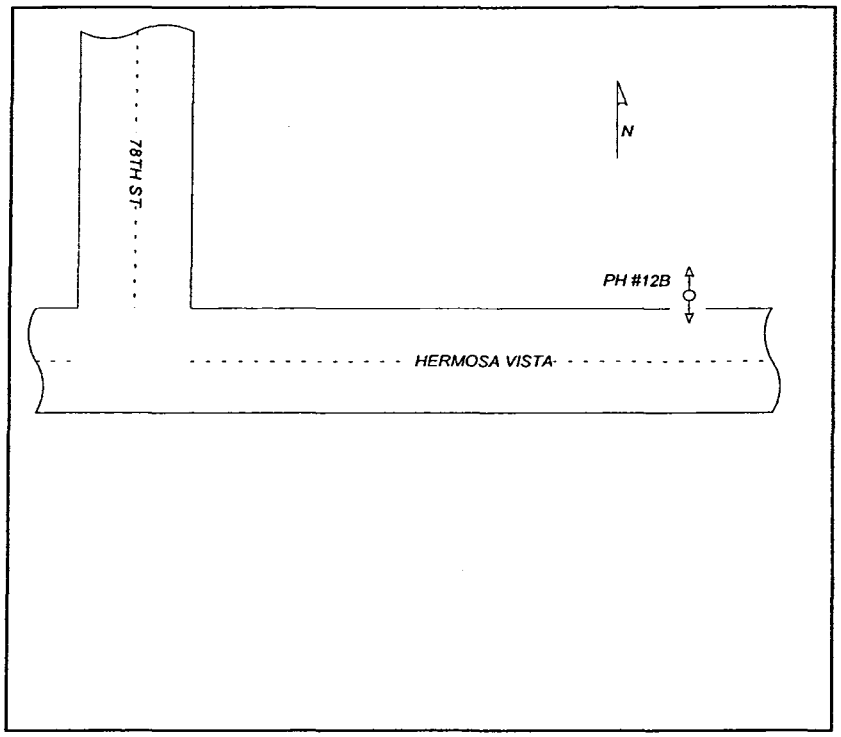
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	12B	SUE Crew	J. Nowels
Date Dug	5/22/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	78th Street & Hermosa Vista		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: East SURFACE ELEVATION: 1641.59 WIDTH/O.D.: 2.38" TOP ELEVATION: 1637.89 — TOP DEPTH (FEET): 3.70 BOTTOM ELEVATION: 1637.69 — BOTTOM (FEET): 3.90
RIBBON COLOR: Yellow	

COORDINATES: NORTHING 894524.06 EASTING 777614.90

STATIONING: STATION 40+69.70 OFFSET .17 Lft

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 2" TYPE PE FACILITY OWNER City of Mesa Gas

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

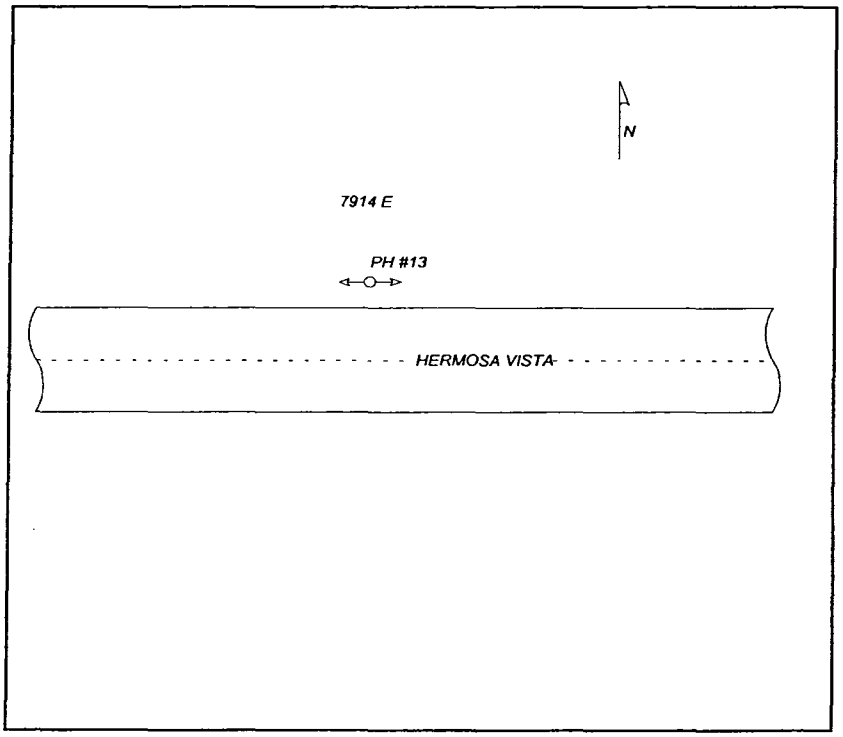
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	13	SUE Crew	J. Garcia
Date Dug	5/22/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	79th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29
RIBBON COLOR: Yellow

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1649.21	WIDTH/O.D. 4.5"		
TOP ELEVATION	1645.31		3.90	TOP DEPTH (FEET)
BOTTOM ELEVATION	1644.93		4.28	BOTTOM (FEET)

COORDINATES: NORTHING 894508.42 EASTING 778086.69

STATIONING: STATION 45+41.45 OFFSET 16.40 Rt

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 4" TYPE PE FACILITY OWNER City of Mesa Gas

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

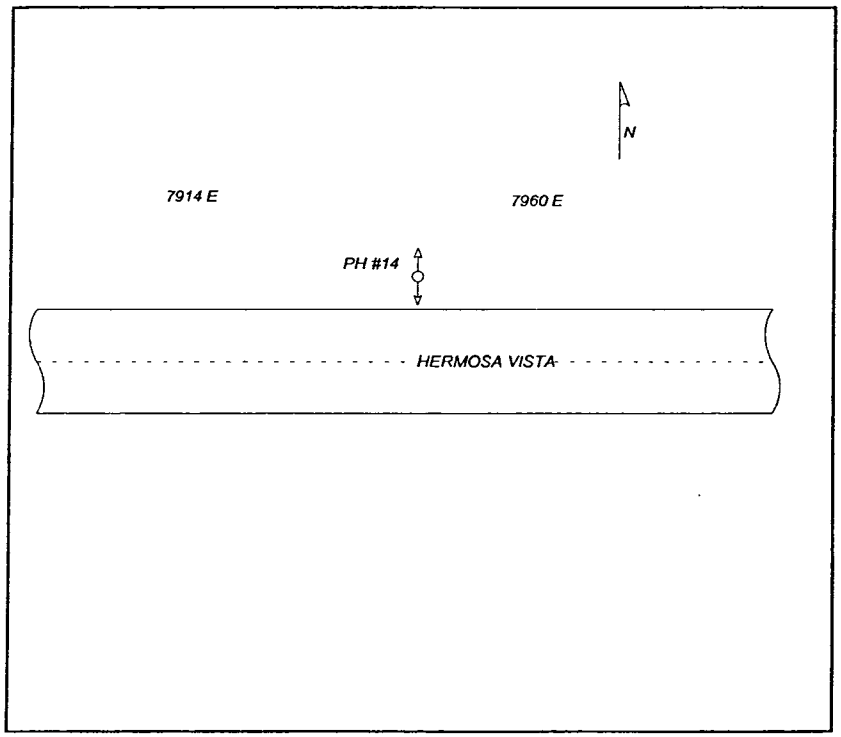
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	14	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	80th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr.	
21215-1=(#5 from plans)	
N: 894511.56	
E: 781359.09	
Elev. = 1707.29	
RIBBON COLOR	Red

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1654.11	WIDTH/O.D. 3.5"		
TOP ELEVATION	1648.91		5.20	TOP DEPTH (FEET)
BOTTOM ELEVATION	1648.62		5.49	BOTTOM (FEET)

COORDINATES: NORTHING	894524.58	EASTING	778377.69
STATIONING: STATION	48+32.49	OFFSET	.82 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	3"	TYPE	PVC	FACILITY OWNER	SRP Electric

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

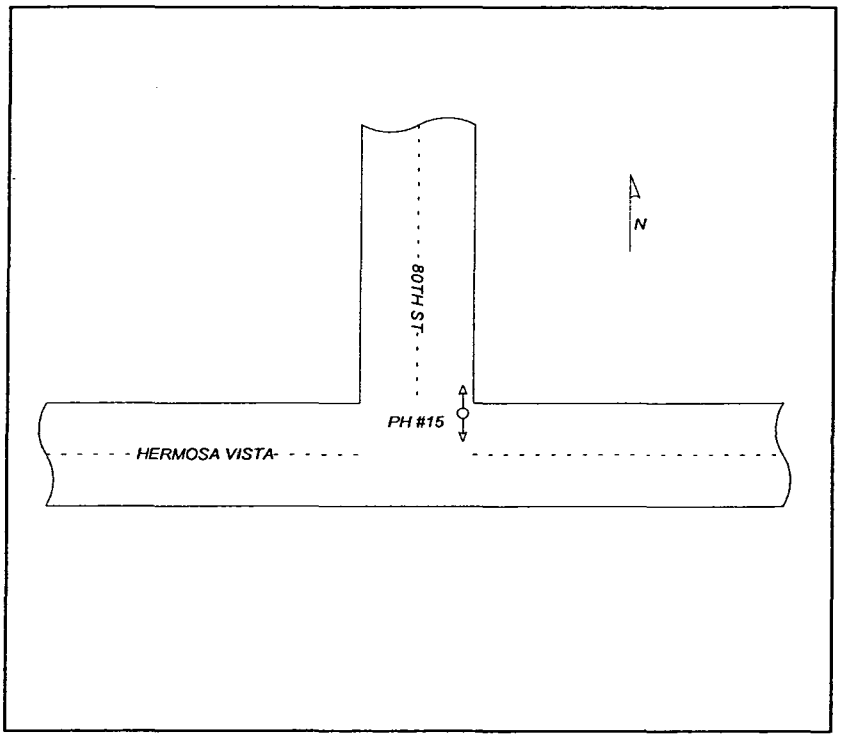
TEST HOLE DATA REPORT

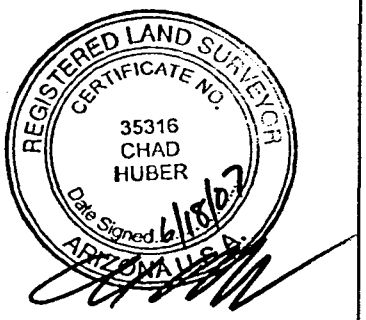
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	15	SUE Crew	J. Nowels
Date Dug	5/23/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	80th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr.	
21215-1=(#5 from plans)	
N: 894511.56	
E: 781359.09	
Elev. = 1707.29	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: South

SURFACE ELEVATION	1661.50	WIDTH/O.D. 13.92"	
TOP ELEVATION	1657.56		3.94 TOP DEPTH (FEET)
BOTTOM ELEVATION	1656.40		5.10 BOTTOM (FEET)

COORDINATES: NORTHING	894523.83	EASTING	778748.56
STATIONING: STATION	52+03.36	OFFSET	2.22 Rt

PAVING THICKNESS	3"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	12"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

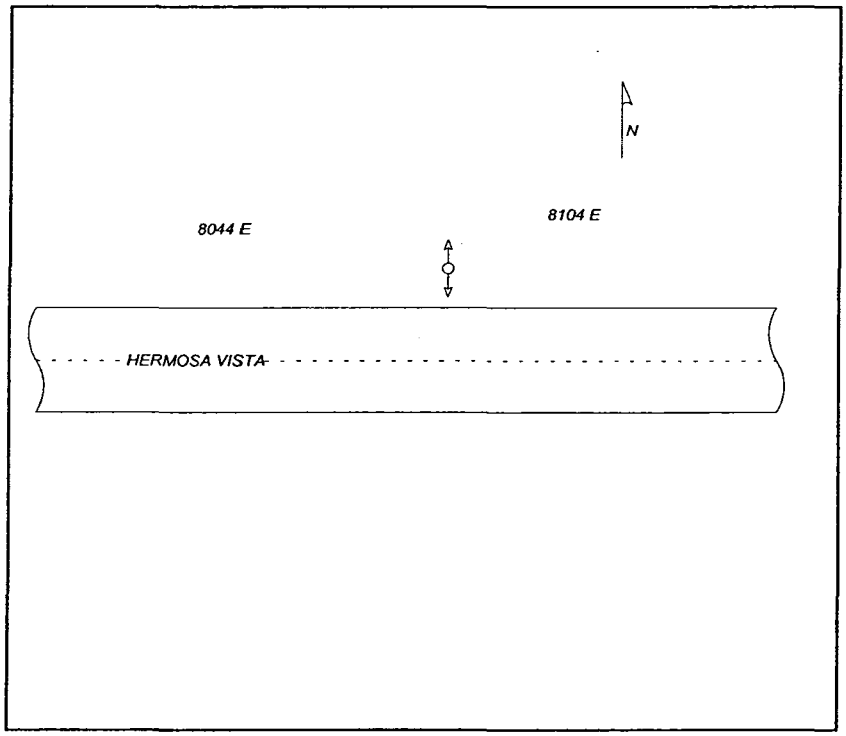
TEST HOLE DATA REPORT

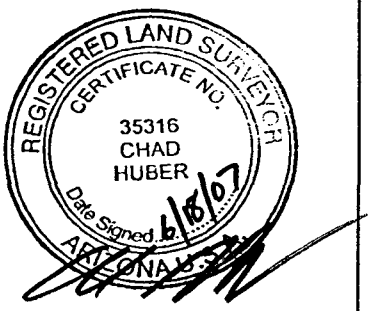
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	16	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hermosa Vista Drive east of 80th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	North		
	SURFACE ELEVATION	1672.63	WIDTH/O.D. 6.91"	
	TOP ELEVATION	1670.33		2.30 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1669.75		2.88 BOTTOM (FEET)
RIBBON COLOR Blue				

COORDINATES: NORTHING	894524.55	EASTING	779384.90
STATIONING: STATION	58+39.70	OFFSET	0.40 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	6"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

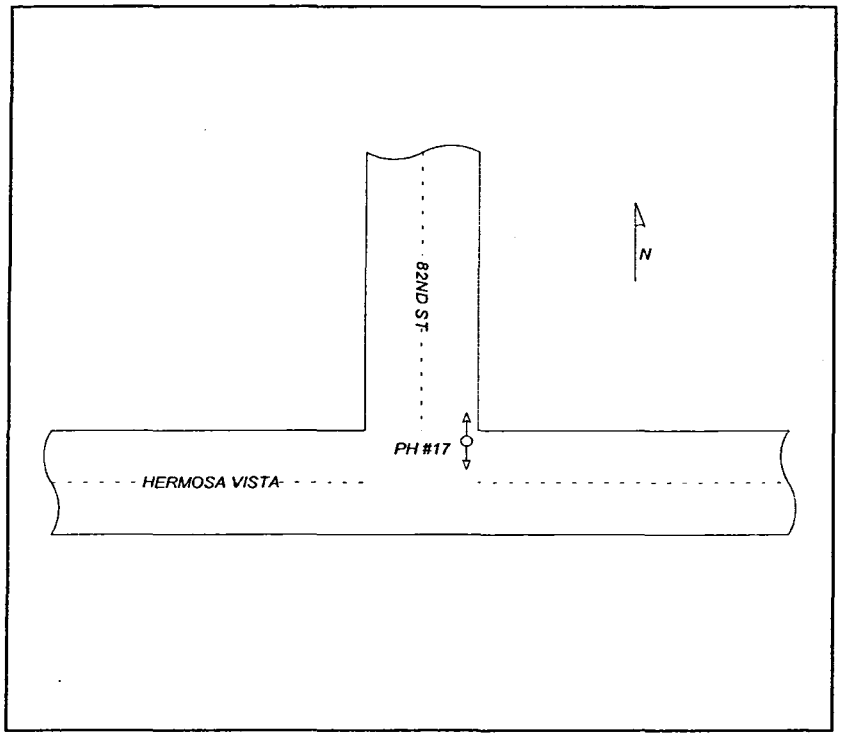
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	17	SUE Crew	J. Nowels
Date Dug	5/23/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	82nd Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr.	
21215-1=(#5 from plans)	
N: 894511.56	
E: 781359.09	
Elev. = 1707.29	
RIBBON COLOR	Orange

CROSS SECTION - NOT TO SCALE

FACING	North			
SURFACE ELEVATION	1685.91	WIDTH/O.D. 1.5"		
TOP ELEVATION	1682.85		3.06	TOP DEPTH (FEET)
BOTTOM ELEVATION	1682.72		3.19	BOTTOM (FEET)

COORDINATES: NORTHING	894521.26	EASTING	780057.31
STATIONING: STATION	65+12.12	OFFSET	2.54 Rt

PAVING THICKNESS	4"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	1.5"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

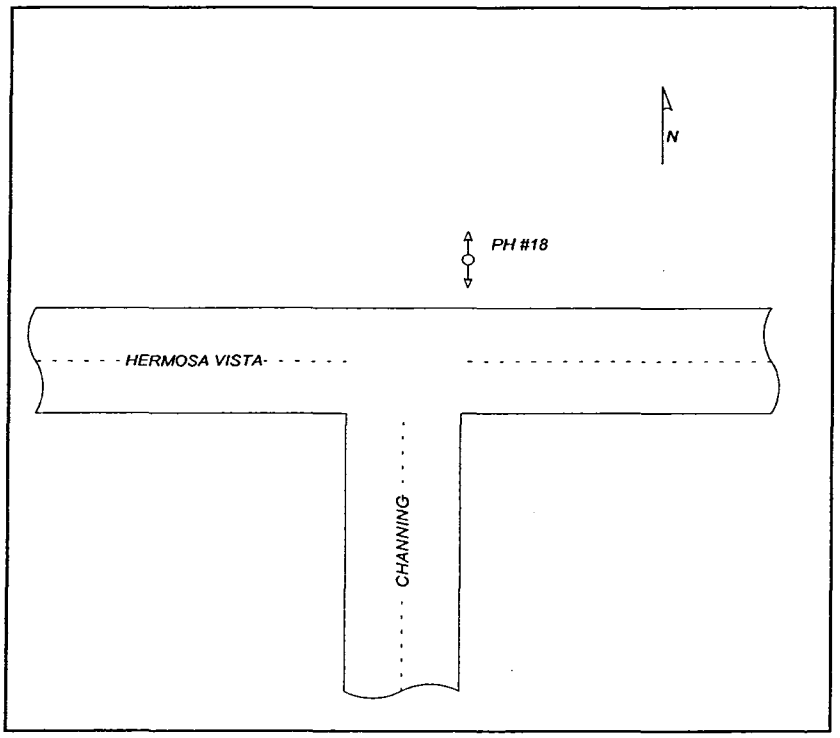
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	18	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Channing & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1691.23	WIDTH/O.D. 13.2"	
TOP ELEVATION	1684.91		6.32 TOP DEPTH (FEET)
BOTTOM ELEVATION	1683.81		7.42 BOTTOM (FEET)

COORDINATES: NORTHING 894522.07 EASTING 780293.44

STATIONING: STATION 67+48.25 OFFSET 1.33 Rt

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE DIP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

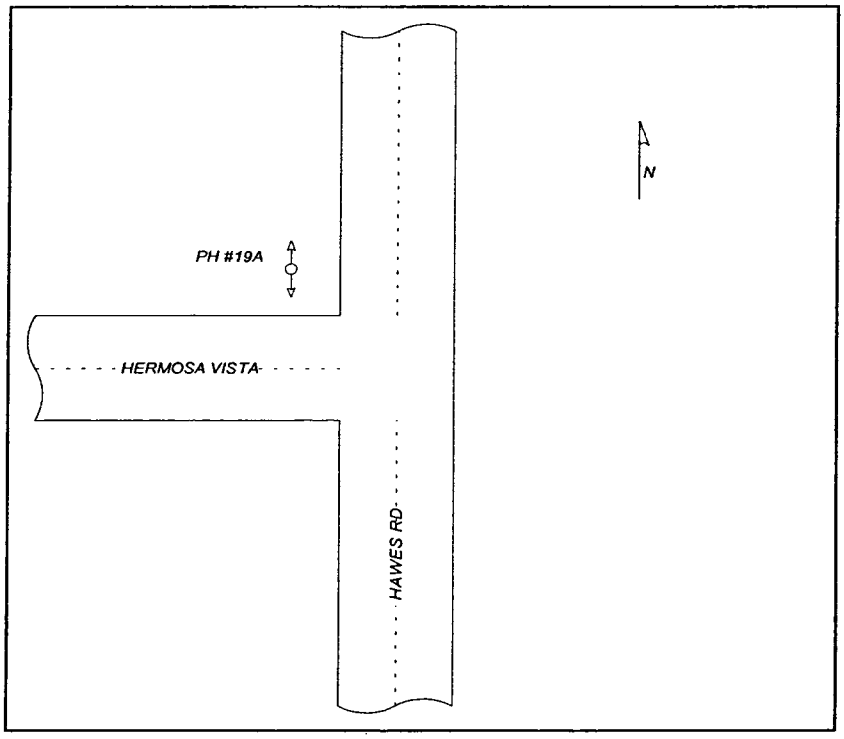
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	19A	SUE Crew	J. Nowels
Date Dug	5/23/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	North	
	SURFACE ELEVATION	1707.22	
	WIDTH/O.D.	13.2"	
	TOP ELEVATION	1701.12	6.10 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1700.02	7.20 BOTTOM (FEET)
RIBBON COLOR	Blue		

COORDINATES: NORTHING	894540.80	EASTING	781315.95
STATIONING: STATION	77+79.77	OFFSET	2.66 Lft

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

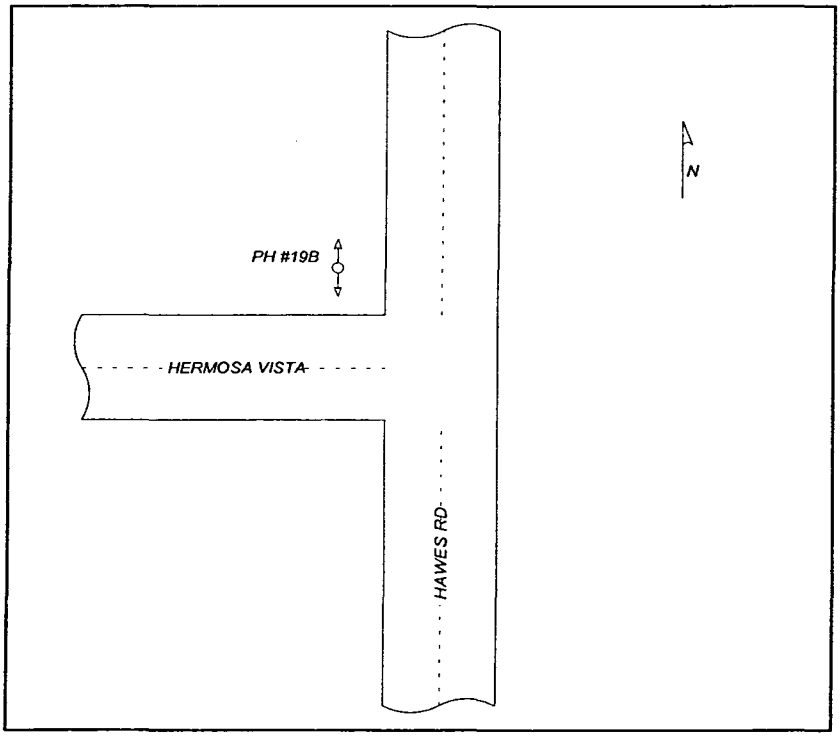
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	19B	SUE Crew	J. Nowels
Date Dug	5/23/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: South SURFACE ELEVATION: 1707.23 WIDTH/O.D.: 8" TOP ELEVATION: 1704.03 — TOP DEPTH (FEET): 3.20 BOTTOM ELEVATION: 1702.93 — BOTTOM (FEET): 4.30
RIBBON COLOR: White	

COORDINATES: NORTHING	894541.66	EASTING	781317.15
STATIONING: STATION	77+81.23	OFFSET	2.42 Lft

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	See Below	TYPE	See Below	FACILITY OWNER	Unknown

COMMENTS:

Found one 4" PVC conduit and one 2" PE cable in the same hole as #19A.

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

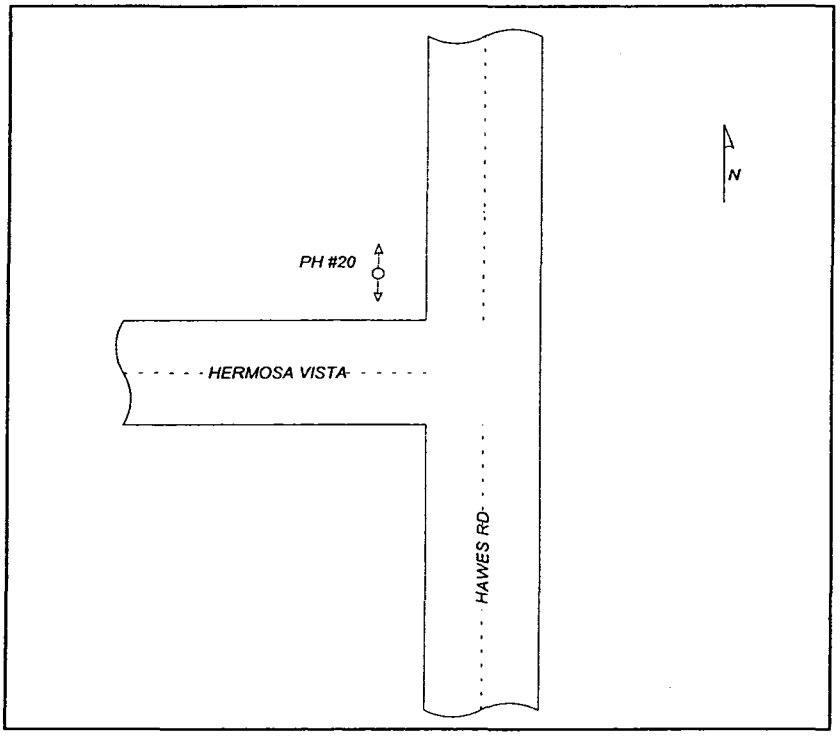
TEST HOLE DATA REPORT

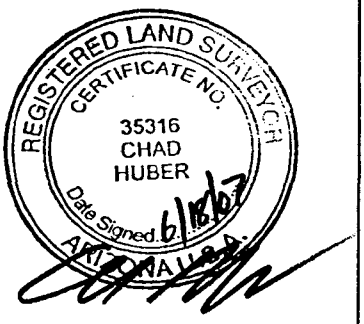
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	20	SUE Crew	J. Nowels
Date Dug	5/23/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: North SURFACE ELEVATION: 1707.38 WIDTH/O.D.: 30" TOP ELEVATION: 1704.08 — TOP DEPTH (FEET): 3.30 BOTTOM ELEVATION: 1703.68 — BOTTOM (FEET): 3.70
RIBBON COLOR: Orange	

COORDINATES: NORTHING	894545.47	EASTING	781321.89
STATIONING: STATION	77+87.28	OFFSET	1.77 Lft
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	Two 2"	TYPE	PE
FACILITY OWNER	Qwest Local Network		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

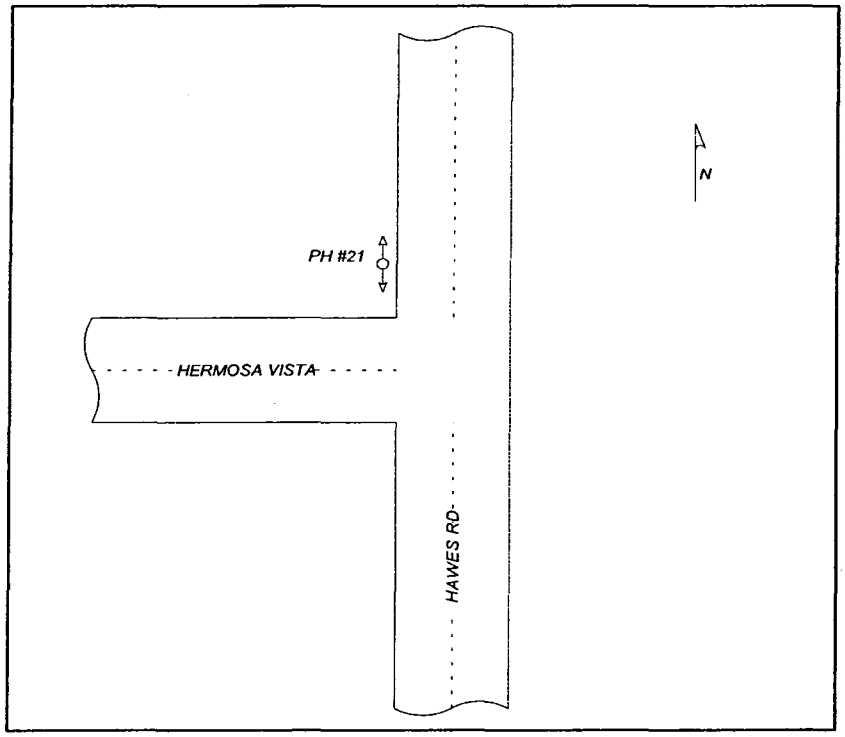
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	21	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING	North		
SURFACE ELEVATION	1708.00	WIDTH/O.D. 23.28"	
TOP ELEVATION	1701.80	6.20	TOP DEPTH (FEET)
BOTTOM ELEVATION	1699.86	8.14	BOTTOM (FEET)

COORDINATES: NORTHING	894547.63	EASTING	781329.88
STATIONING: STATION	77+94.45	OFFSET	2.34 Rt
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	20"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

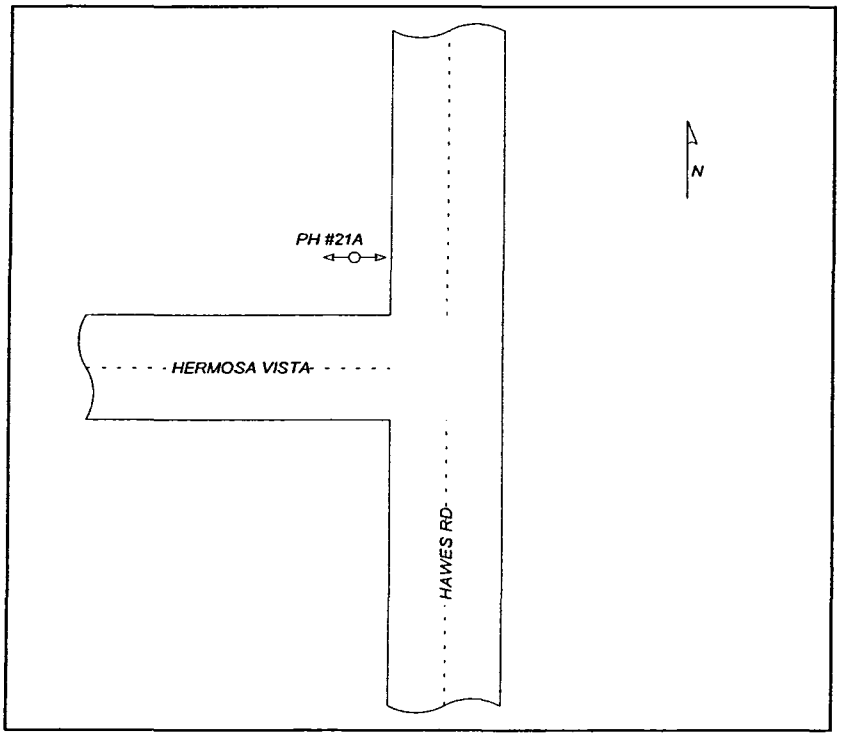
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	21A	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
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HUBER
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ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: West SURFACE ELEVATION: 1707.90 WIDTH/O.D.: 1.75" TOP ELEVATION: 1702.40 — TOP DEPTH (FEET): 5.50 BOTTOM ELEVATION: 1702.25 — BOTTOM (FEET): 5.65
RIBBON COLOR: White	

COORDINATES: NORTHING	894548.21	EASTING	781326.54
STATIONING: STATION	77+92.50	OFFSET	.43 Lft
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	1.75"	TYPE	PE
FACILITY OWNER	Unknown		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

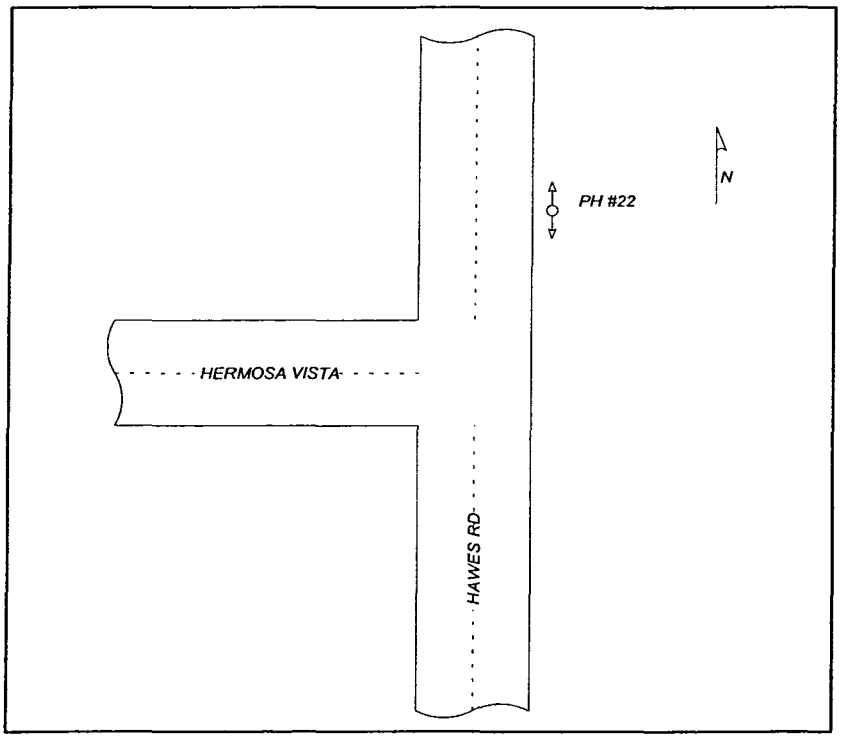
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	22	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Green

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1708.52	WIDTH/O.D. 12.75"	
TOP ELEVATION	1697.60	10.92	TOP DEPTH (FEET)
BOTTOM ELEVATION	1696.54	11.98	BOTTOM (FEET)

COORDINATES: NORTHING	894576.03	EASTING	781357.42
STATIONING: STATION	78+34.01	OFFSET	1.72 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	PVC	FACILITY OWNER	Sewer

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

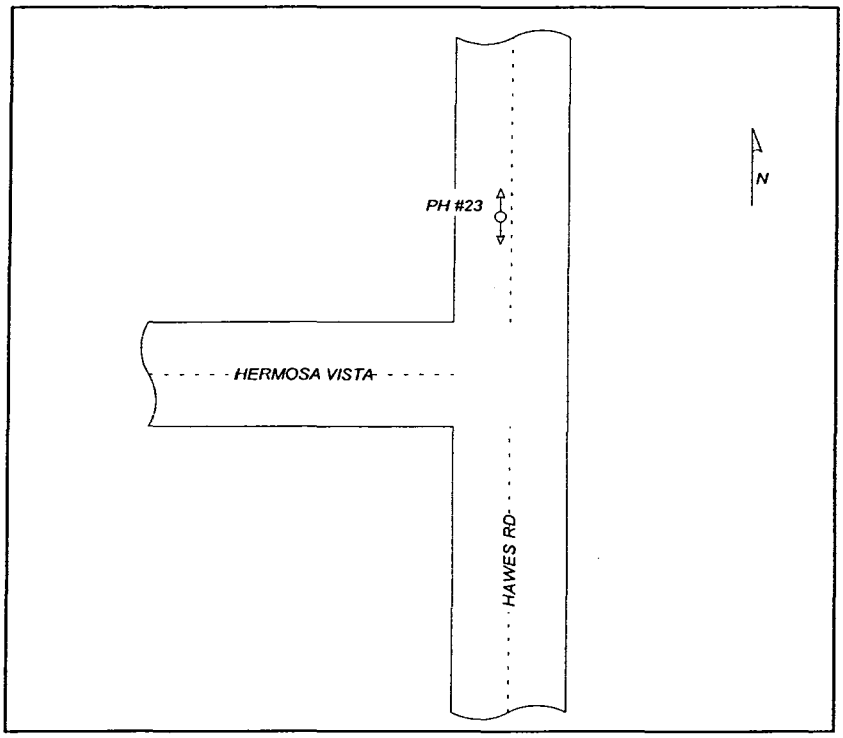
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	23	SUE Crew	J. Garcia
Date Dug	6/1/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Haews Road & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Orange

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1708.54	WIDTH/O.D. 2"		
TOP ELEVATION	1704.24		4.30	TOP DEPTH (FEET)
BOTTOM ELEVATION	1704.07		4.47	BOTTOM (FEET)

COORDINATES: NORTHING	894569.22	EASTING	781340.81
STATIONING: STATION	78+17.45	OFFSET	5.21 Lft

PAVING THICKNESS	4"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	2"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	24	SUE Crew	J. Garcia
Date Dug	6/1/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hermosa Vista Drive & Hawes Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA, U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) _____ BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER Qwest Local Network

COMMENTS:

No facility in the requested location per Qwest Bluestake markings.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

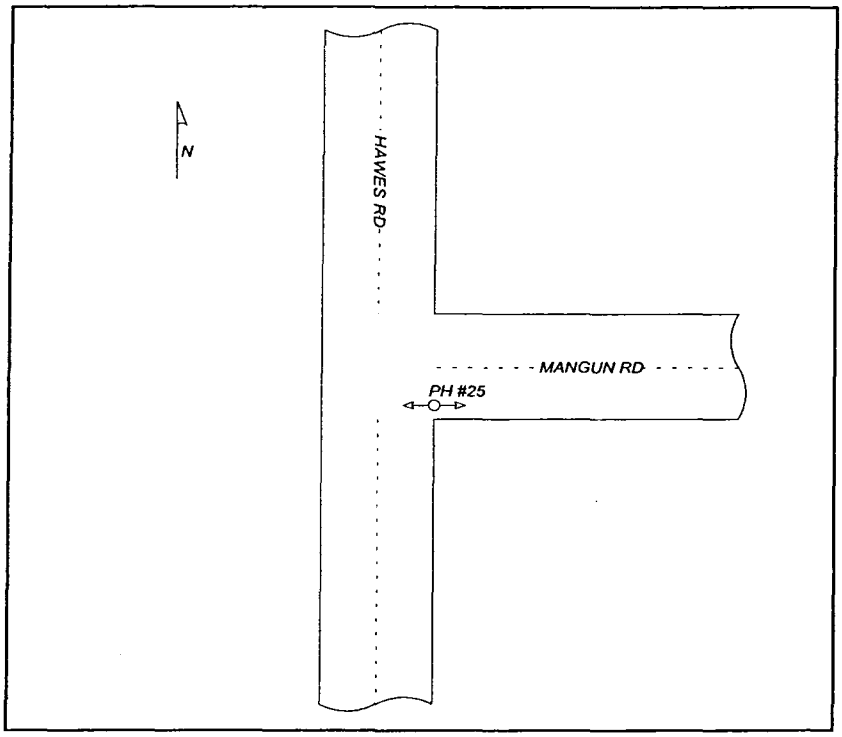
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	25	SUE Crew	J. Nowels
Date Dug	5/23/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Mangun Road		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: West

WIDTH/O.D. 6.91"

SURFACE ELEVATION	1713.92	
TOP ELEVATION	1712.28	1.64 TOP DEPTH (FEET)
BOTTOM ELEVATION	1711.70	2.22 BOTTOM (FEET)

COORDINATES: NORTHING	894825.72	EASTING	781374.14
STATIONING: STATION	80+90.31	OFFSET	.93 Lft
PAVING THICKNESS	3"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	6"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

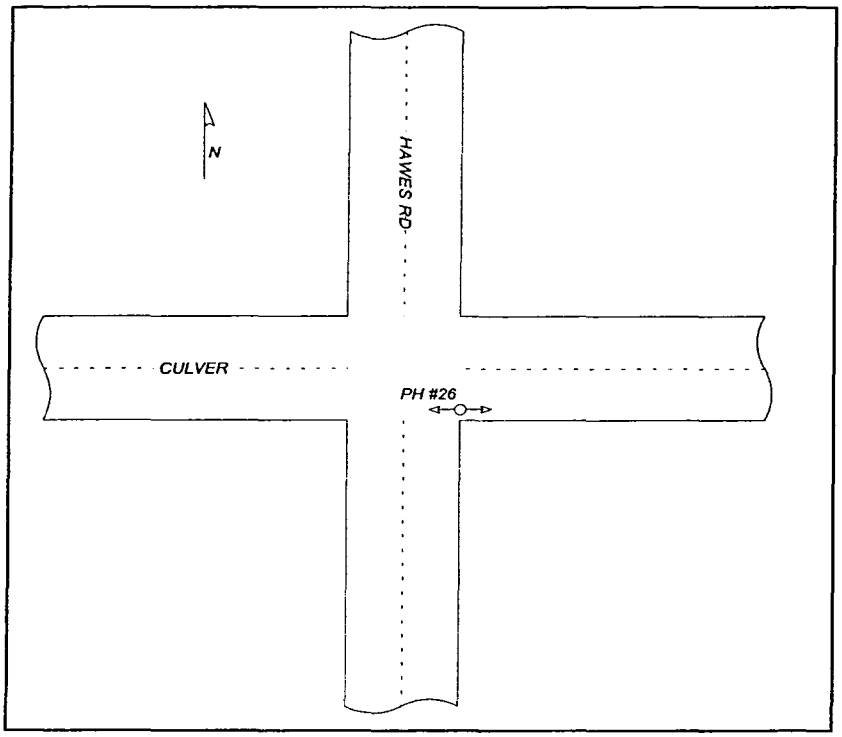
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	26	SUE Crew	J. Garcia
Date Dug	5/23/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Culver Street		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	East		
	SURFACE ELEVATION	1730.53	WIDTH/O.D. 6.91"	
	TOP ELEVATION	1727.69	2.84	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1727.11	3.42	BOTTOM (FEET)
RIBBON COLOR Blue				

COORDINATES:	NORTHING	895805.94	EASTING	781376.45	
STATIONING:	STATION	90+70.53	OFFSET	1.44 Rt	
PAVING THICKNESS	3"	PAVING TYPE	Asphalt	SOIL CONDITION	Cobble
SIZE	6"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	27	SUE Crew	D. Perez
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Culver Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) _____ BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER SRP Electric

COMMENTS:

No facility in the requested location per SRP Bluestake markings.

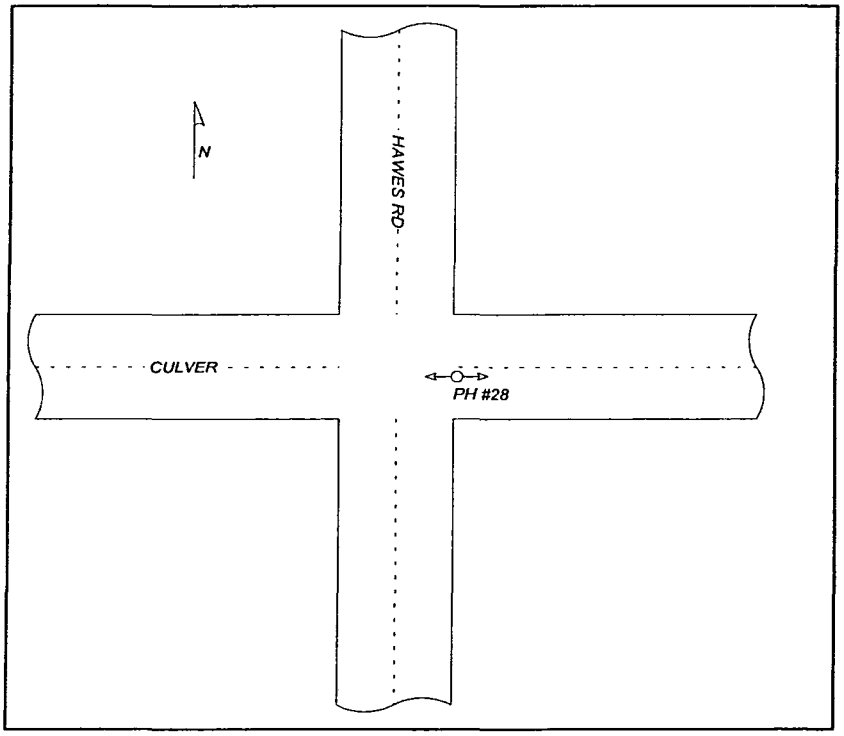
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	28	SUE Crew	D. Perez
Date Dug	5/25/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Culver Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Green

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1730.79	WIDTH/O.D. 8.63"		
TOP ELEVATION	1721.65		9.14	TOP DEPTH (FEET)
BOTTOM ELEVATION	1720.93		9.86	BOTTOM (FEET)

COORDINATES: NORTHING	895825.26	EASTING	781377.50
STATIONING: STATION	90+89.85	OFFSET	2.48 Rt

PAVING THICKNESS	2"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	8"	TYPE	PVC	FACILITY OWNER	City of Mesa Sewer

COMMENTS:

PREPARED BY: M. Jubie

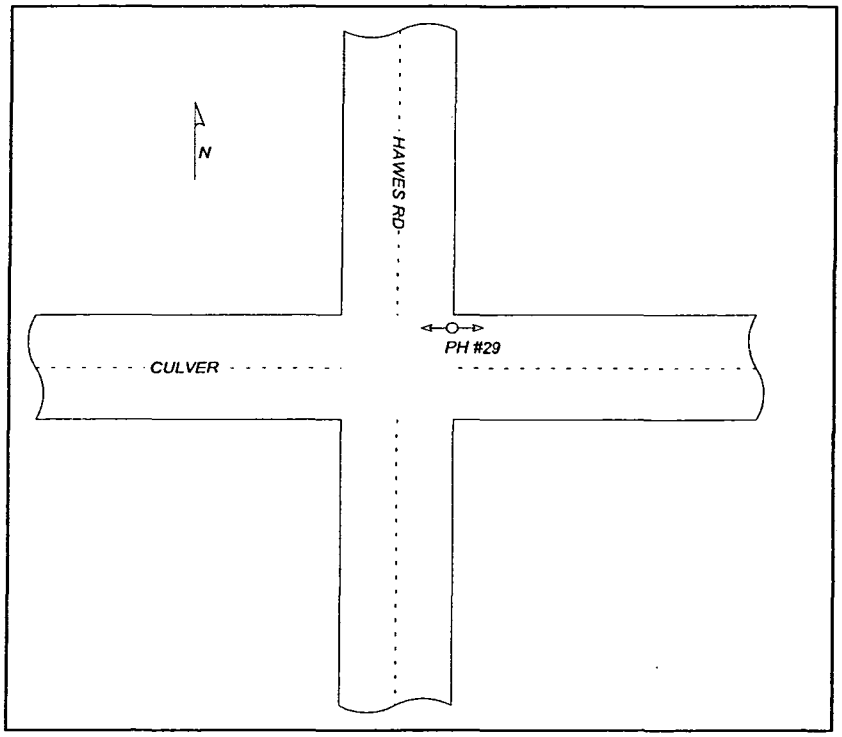
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	29	SUE Crew	D. Perez
Date Dug	5/25/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Culver Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1730.94	WIDTH/O.D. 23.28"	
TOP ELEVATION	1725.38		5.56 TOP DEPTH (FEET)
BOTTOM ELEVATION	1723.44		7.50 BOTTOM (FEET)

COORDINATES: NORTHING 895843.91 EASTING 781377.28

STATIONING: STATION 91+08.50 OFFSET 2.26 Rt

PAVING THICKNESS 2" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE 20" TYPE ACP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

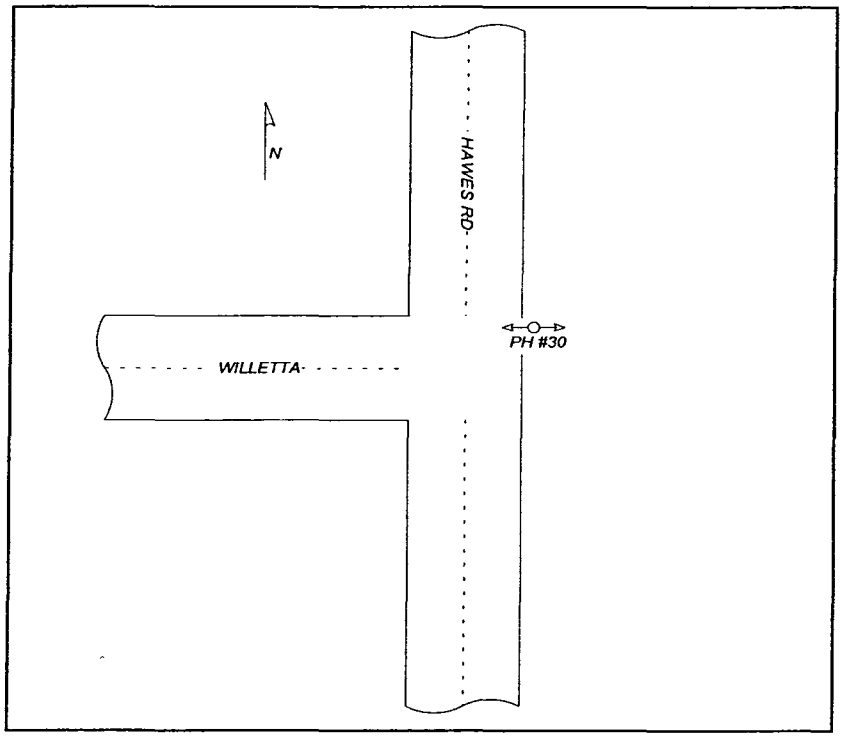
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	30	SUE Crew	D. Perez
Date Dug	5/25/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Willetta Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1742.51	WIDTH/O.D. 13.92"	
TOP ELEVATION	1738.03		4.48 TOP DEPTH (FEET)
BOTTOM ELEVATION	1736.87		5.64 BOTTOM (FEET)

COORDINATES: NORTHING 896544.97 EASTING 781373.55

STATIONING: STATION 98+09.56 OFFSET 1.43 Lft

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE ACP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

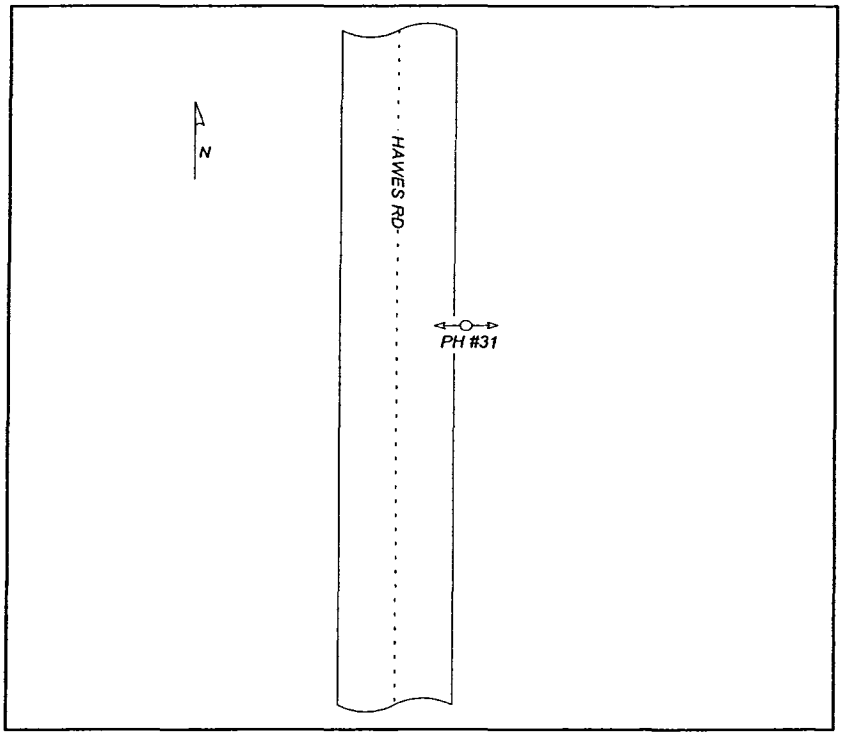
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	31	SUE Crew	D. Perez
Date Dug	5/25/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1748.27	WIDTH/O.D. 2.38"	
TOP ELEVATION	1745.17		3.10 TOP DEPTH (FEET)
BOTTOM ELEVATION	1744.97		3.30 BOTTOM (FEET)

COORDINATES: NORTHING	896863.45	EASTING	781382.70
STATIONING: STATION	101+28.04	OFFSET	7.75 Rt
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	2"	TYPE	STL
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	32	SUE Crew	J. McCarty
Date Dug	5/31/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) BOTTOM ELEVATION _____ BOTTOM (FEET)
RIBBON COLOR None	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER Qwest Local Network

COMMENTS:

No facility in the requested location per Qwest Bluestake markings.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

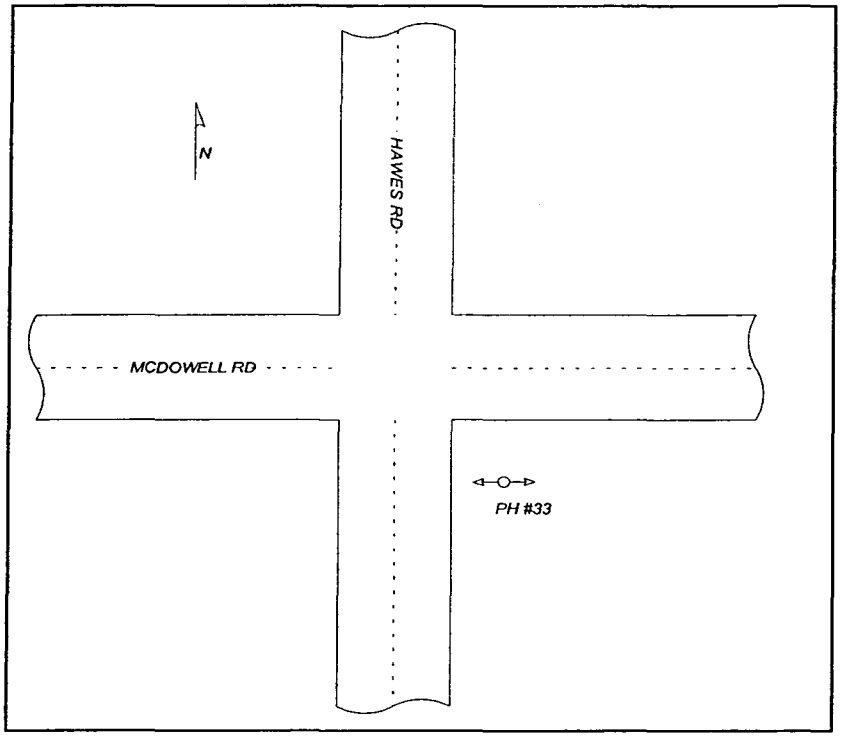
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	33	SUE Crew	J. Garcia
Date Dug	5/31/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ Hawes Rd & Hermosa Vista Dr.	
21215-1=(#5 from plans)	
N: 894511.56	
E: 781359.09	
Elev. = 1707.29	
RIBBON COLOR	Red

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1755.33	WIDTH/O.D. 24"	
TOP ELEVATION	1751.53	3.80	TOP DEPTH (FEET)
BOTTOM ELEVATION	1749.93	5.40	BOTTOM (FEET)

COORDINATES: NORTHING	897191.59	EASTING	781425.14
STATIONING: STATION	105+26.23	OFFSET	38.15 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	24" Wide	TYPE	Concrete Duct	FACILITY OWNER	SRP Electric

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

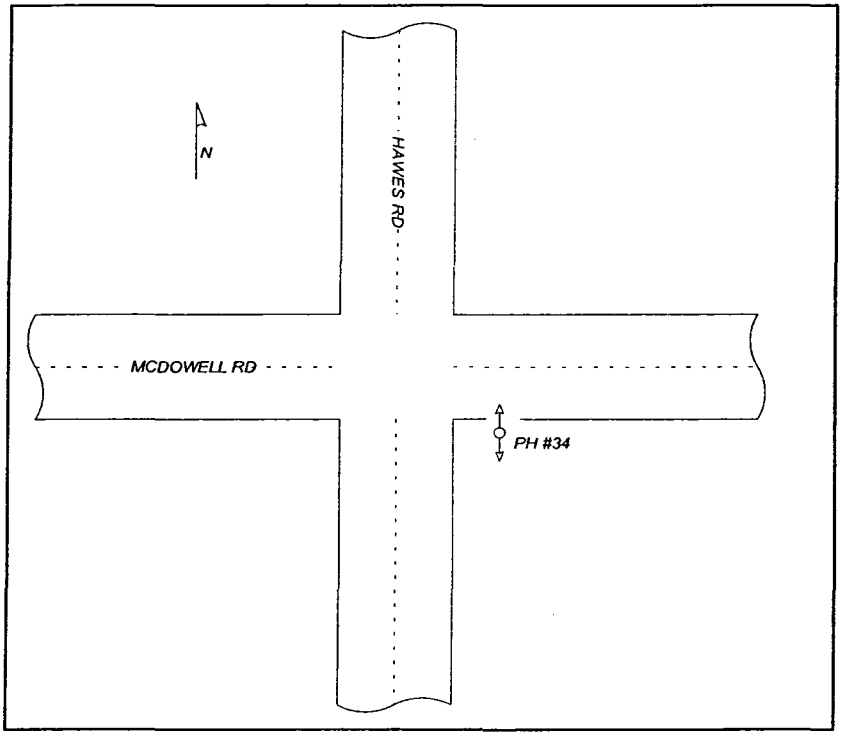
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	34	SUE Crew	D. Perez
Date Dug	5/25/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29

RIBBON COLOR: Red

CROSS SECTION - NOT TO SCALE

FACING: North

SURFACE ELEVATION	1756.89	WIDTH/O.D. 13"		
TOP ELEVATION	1747.61		9.28	TOP DEPTH (FEET)
BOTTOM ELEVATION	1747.23		9.66	BOTTOM (FEET)

COORDINATES: NORTHING 897220.80 EASTING 781457.22

STATIONING: STATION 105+58.21 OFFSET 8.84 Rt

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE Four 4" TYPE PVC FACILITY OWNER SRP Electric

COMMENTS:

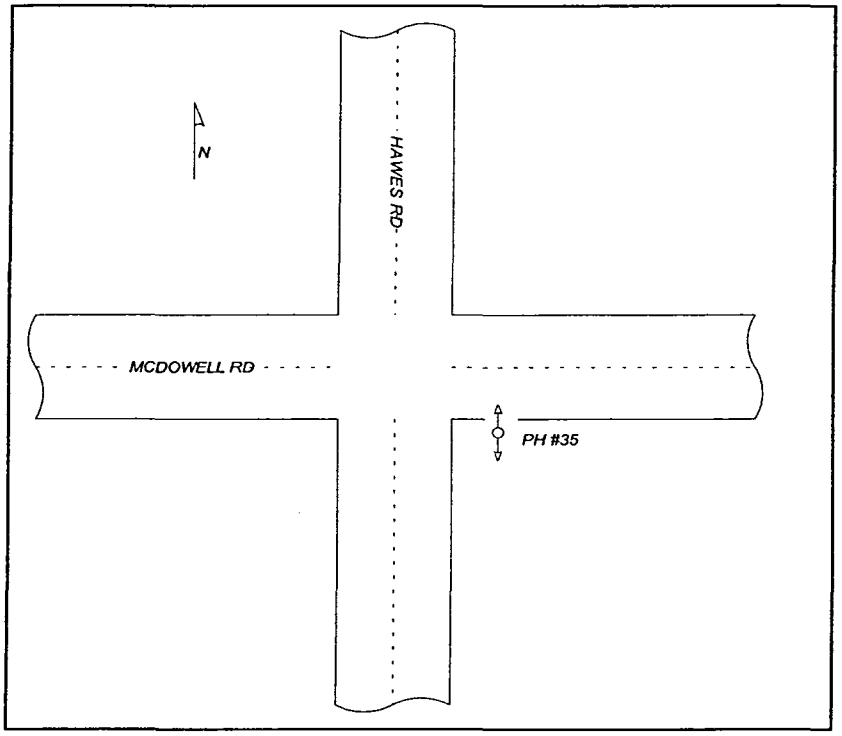
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

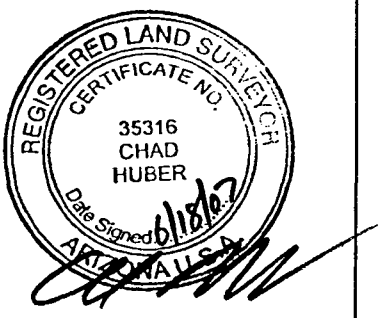
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	35	SUE Crew	D. Perez
Date Dug	5/25/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	North	
	SURFACE ELEVATION	1757.28	WIDTH/O.D. 37"
	TOP ELEVATION	1755.18	2.10 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1752.10	5.18 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES: NORTHING	897222.70	EASTING	781466.36
STATIONING: STATION	105+67.35	OFFSET	6.91 Rt

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	30"	TYPE	RCP	FACILITY OWNER	City of Mesa Storm Drain

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

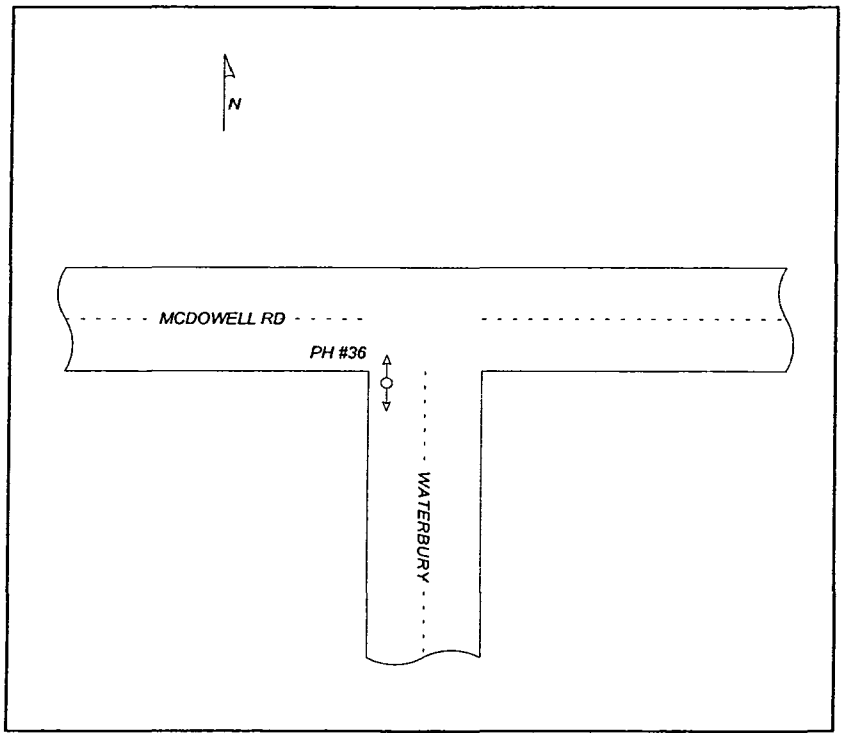
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	36	SUE Crew	J. Garcia
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: North SURFACE ELEVATION: 1783.30 WIDTH/O.D.: 4.5" TOP ELEVATION: 1778.30	5.00	TOP DEPTH (FEET)
	BOTTOM ELEVATION: 1777.92	5.38	BOTTOM (FEET)
RIBBON COLOR: Orange			

COORDINATES: NORTHING	897214.27	EASTING	782653.95
STATIONING: STATION	117+54.96	OFFSET	11.67 Rt
PAVING THICKNESS	2"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	4"	TYPE	PVC
FACILITY OWNER	Qwest Local Network		

COMMENTS:

PREPARED BY: M. Jubie

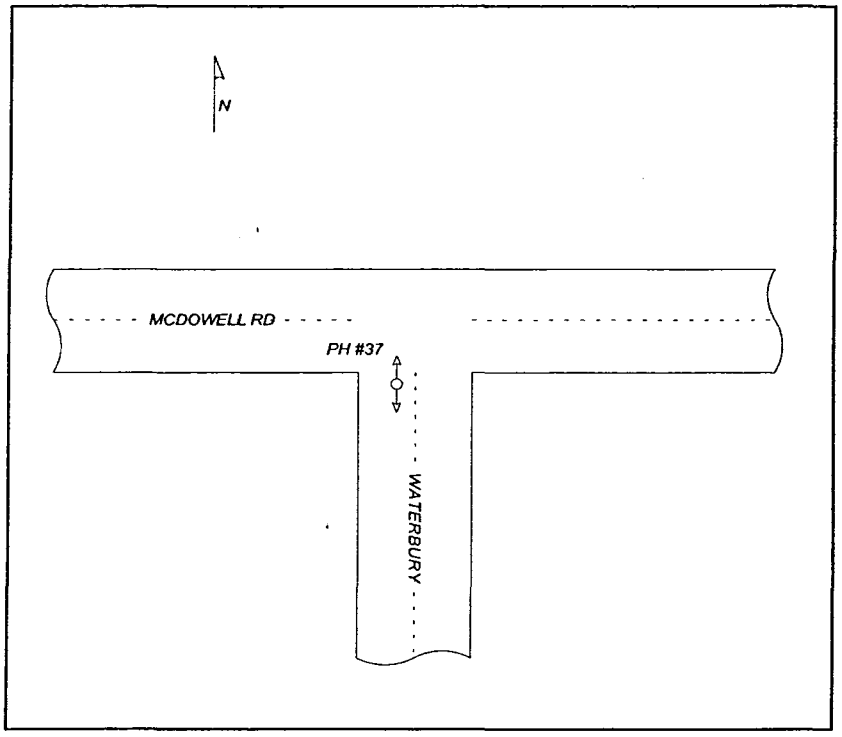
CHECKED BY: A. Mehler

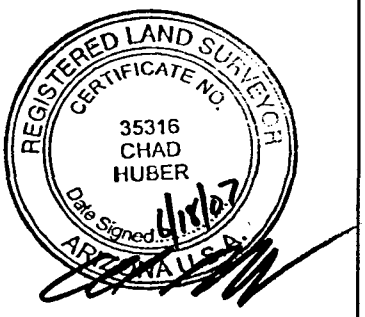
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	37	SUE Crew	J. Garcia
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: North SURFACE ELEVATION: 1783.21 WIDTH/O.D.: 14" TOP ELEVATION: 1776.71 — TOP DEPTH (FEET): 6.50 BOTTOM ELEVATION: 1776.42 — BOTTOM (FEET): 6.79
RIBBON COLOR: Red	

COORDINATES: NORTHING 897214.28 EASTING 782653.61

STATIONING: STATION 117+54.62 OFFSET 11.67 Rt

PAVING THICKNESS 2" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE Three 3" TYPE PVC FACILITY OWNER SRP Electric

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

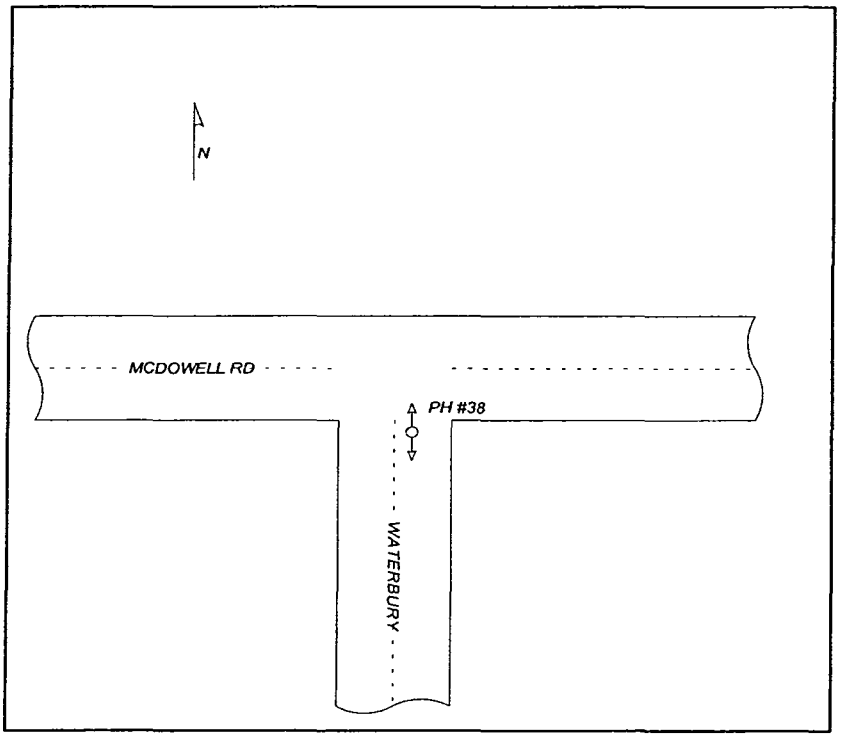
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	38	SUE Crew	J. Garcia
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING	North		
SURFACE ELEVATION	1783.95	WIDTH/O.D. 21.6"	
TOP ELEVATION	1778.35	5.60	TOP DEPTH (FEET)
BOTTOM ELEVATION	1776.55	7.40	BOTTOM (FEET)

COORDINATES: NORTHING	897214.01	EASTING	782680.20
STATIONING: STATION	117+81.21	OFFSET	11.95 Rt
PAVING THICKNESS	2"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	20"
TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

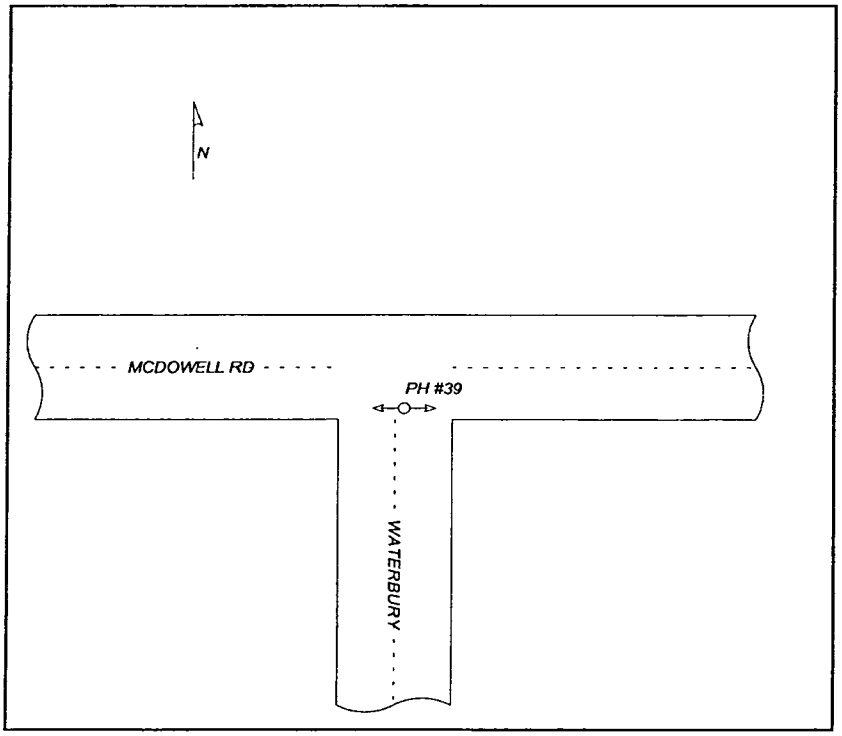
CHECKED BY: A. Mehler

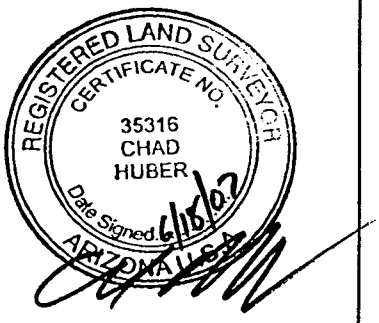
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	39	SUE Crew	J. Garcia
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: West SURFACE ELEVATION: 1784.08 WIDTH/O.D.: 21.6" TOP ELEVATION: 1777.98 — 6.10 TOP DEPTH (FEET) BOTTOM ELEVATION: 1776.18 — 7.90 BOTTOM (FEET)
RIBBON COLOR: Blue	

COORDINATES: NORTHING	897213.65	EASTING	782686.20
STATIONING: STATION	117+87.21	OFFSET	12.19 Rt
PAVING THICKNESS	3"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	20"	TYPE	DIP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	40	SUE Crew	J. Nowels
Date Dug	5/24/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION 1784.58 ↔ WIDTH/O.D. TOP ELEVATION _____ TOP DEPTH (FEET) BOTTOM ELEVATION 1779.58 5.00 BOTTOM (FEET)
RIBBON COLOR PK Only	

COORDINATES: NORTHING 897214.94 EASTING 782710.50

STATIONING: STATION 118+11.51 OFFSET 10.83 Rt

PAVING THICKNESS 4" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

Dug to a depth of 5' in the requested location and no facility was found. Unable to dig any further due to soil conditions.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	40A	SUE Crew	J. Nowels
Date Dug	5/24/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION 1784.33 ↔ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) BOTTOM ELEVATION 1777.33 7.00 BOTTOM (FEET)
RIBBON COLOR PK Only	

COORDINATES: NORTHING 897215.50 EASTING 782699.71

STATIONING: STATION 118+00.71 OFFSET 10.30 Rt

PAVING THICKNESS 4" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

Dug to a depth of 7' in the requested location and no facility was found.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	40B	SUE Crew	J. Nowels
Date Dug	5/24/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION 1784.19 — WIDTH/O.D. _____ TOP ELEVATION _____ — TOP DEPTH (FEET) _____ BOTTOM ELEVATION 1774.19 — BOTTOM (FEET) 10.00
RIBBON COLOR PK Only	

COORDINATES: NORTHING 897213.63 EASTING 782694.22

STATIONING: STATION 117+95.23 OFFSET 12.19 Rt

PAVING THICKNESS 4" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

Dug to a depth of 10' in the requested location and no facility was found.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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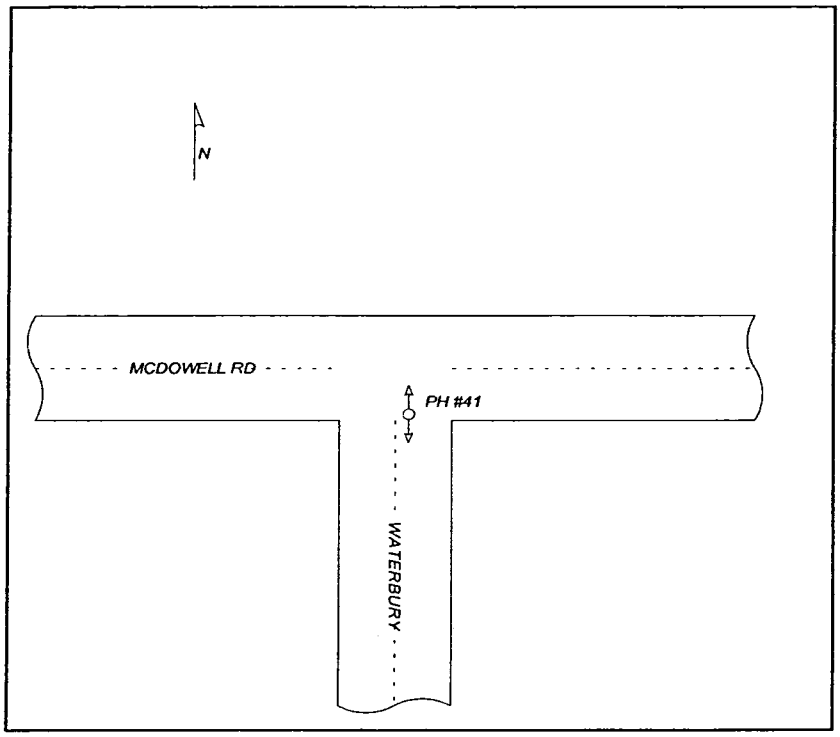
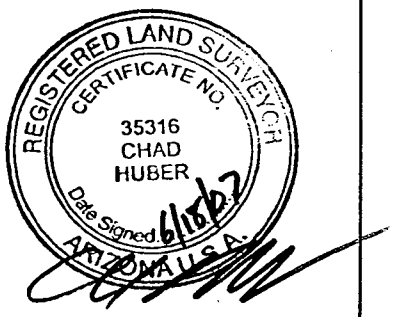
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	41	SUE Crew	J. Garcia
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: North SURFACE ELEVATION: 1783.94 WIDTH/O.D.: 4.5" TOP ELEVATION: 1781.04 — TOP DEPTH (FEET): 2.90 BOTTOM ELEVATION: 1780.66 — BOTTOM (FEET): 3.28
RIBBON COLOR: Yellow	

COORDINATES: NORTHING	897214.00	EASTING	782679.26
STATIONING: STATION	117+80.27	OFFSET	11.86 Rt
PAVING THICKNESS	2"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	4"
TYPE	Coated STL	FACILITY OWNER	City of Mesa Gas

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

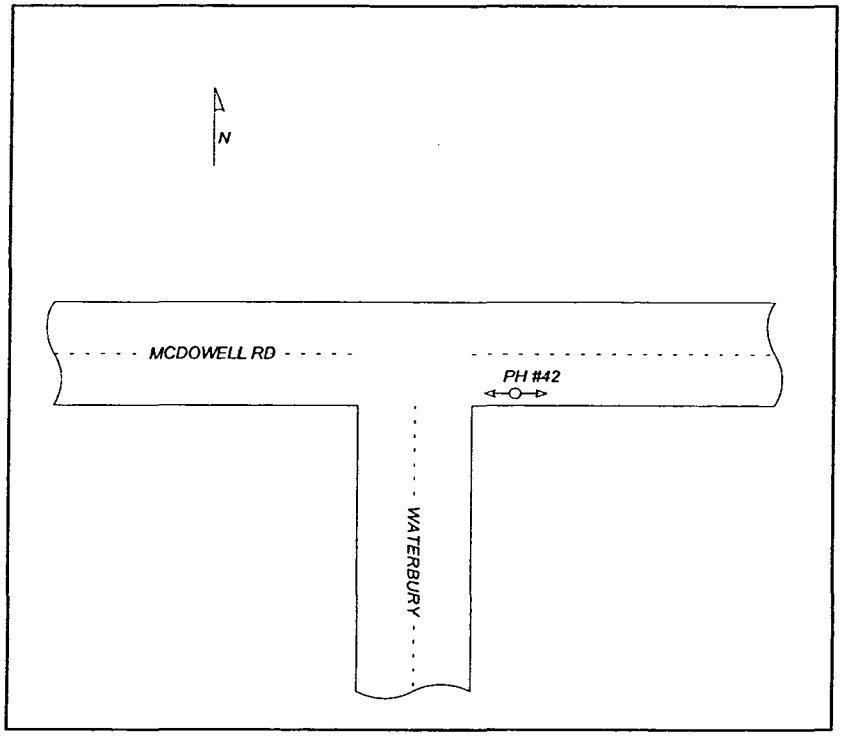
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	42	SUE Crew	D. Perez
Date Dug	5/31/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1784.82	WIDTH/O.D. 21.6"	
TOP ELEVATION	1778.80		6.02 TOP DEPTH (FEET)
BOTTOM ELEVATION	1777.00		7.82 BOTTOM (FEET)

COORDINATES: NORTHING	897213.10	EASTING	782724.83
STATIONING: STATION	118+25.84	OFFSET	12.62 Rt

PAVING THICKNESS	4"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	20"	TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	42A	SUE Crew	D. Perez
Date Dug	5/31/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Waterbury Road & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/15/07
ARIZONA U.S.A.

SITE BENCHMARK

BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29

RIBBON COLOR PK Only

CROSS SECTION - NOT TO SCALE

FACING _____

SURFACE ELEVATION 1784.40 ↔ WIDTH/O.D. _____

TOP ELEVATION _____ TOP DEPTH (FEET) _____

BOTTOM ELEVATION 1772.40 BOTTOM (FEET) 12.00

COORDINATES: NORTHING 897214.23 EASTING 782704.74

STATIONING: STATION 118+05.75 OFFSET 11.56 Rt

PAVING THICKNESS 4" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

Dug to a depth of 12' in the requested location and no facility was found.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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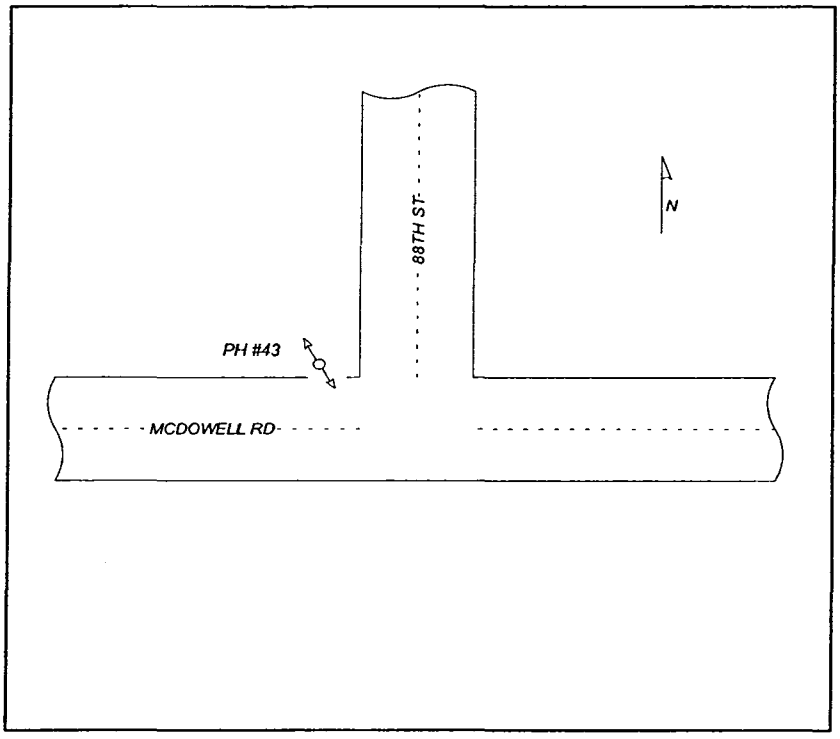
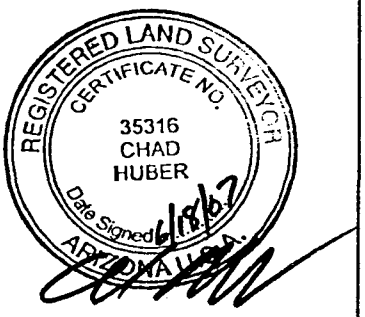
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	43	SUE Crew	J. Garcia
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	North		
	SURFACE ELEVATION	1814.65	WIDTH/O.D. 12.75"	
	TOP ELEVATION	1808.35		6.30 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1807.29		7.36 BOTTOM (FEET)
RIBBON COLOR Green				

COORDINATES:	NORTHING	897247.86	EASTING	783907.94	
STATIONING:	STATION	130+15.05	OFFSET	10.79 Lft	
PAVING THICKNESS	4"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	12"	TYPE	PVC	FACILITY OWNER	City of Mesa Sewer

COMMENTS:

PREPARED BY: M. Jubie

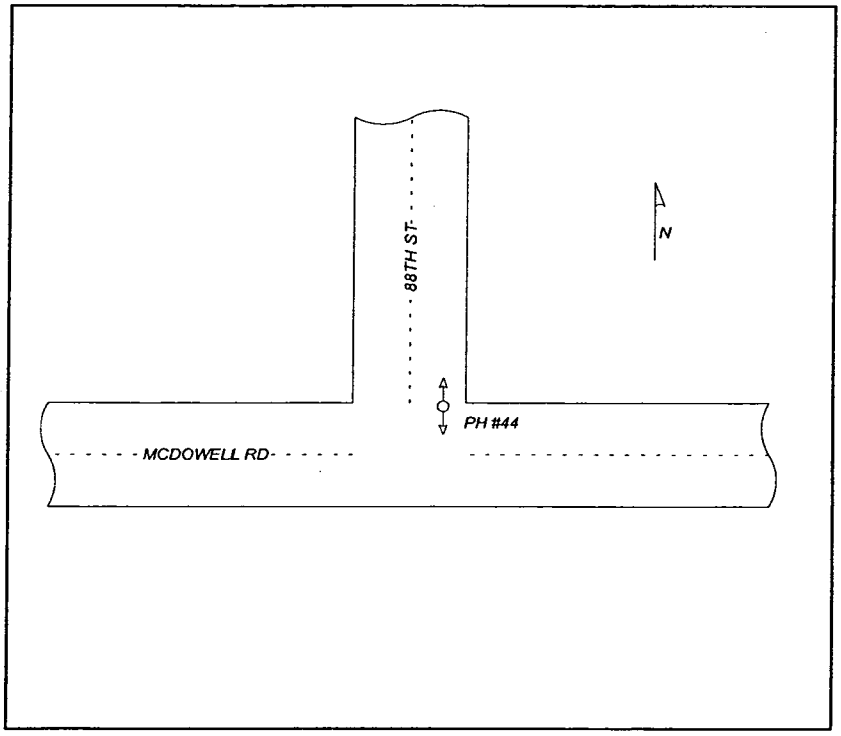
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	44	SUE Crew	J. Nowels
Date Dug	6/1/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	South	
	SURFACE ELEVATION	1817.01	
	WIDTH/O.D.	60"	
	TOP ELEVATION	1816.81	0.20 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1810.01	7.00 BOTTOM (FEET)
RIBBON COLOR	Green		

COORDINATES: NORTHING	897244.67	EASTING	783994.35
STATIONING: STATION	131+01.47	OFFSET	7.86 Lft
PAVING THICKNESS	2"	PAVING TYPE	Asphalt
SOIL CONDITION	Slurry / Dirt		
SIZE	60" Wide	TYPE	Slurry
FACILITY OWNER	Ciy of Mesa Sewer		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	45	SUE Crew	J. Garcia
Date Dug	5/31/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/8/07
ARIZONA, U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION 1818.23 — WIDTH/O.D. _____ TOP ELEVATION _____ — TOP DEPTH (FEET) _____ BOTTOM ELEVATION 1811.23 — BOTTOM (FEET) 7.00
RIBBON COLOR None	

COORDINATES: NORTHING 897247.64 EASTING 784037.73

STATIONING: STATION 131+44.47 OFFSET 11.61 Lft

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER Gas

COMMENTS:

No facility found at requested location per Bluestake. Aztec crew attampted to confirm location electronically with no results.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

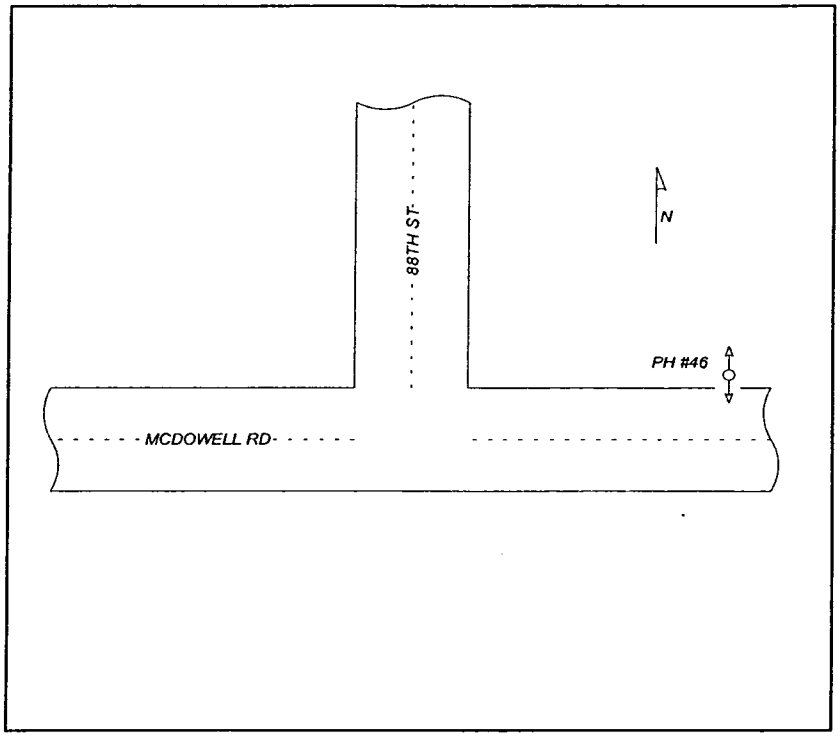
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	46	SUE Crew	J. Garcia
Date Dug	5/31/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29

RIBBON COLOR Red

CROSS SECTION - NOT TO SCALE

FACING North

SURFACE ELEVATION	1822.01	WIDTH/O.D. 11"	
TOP ELEVATION	1817.21		4.80 TOP DEPTH (FEET)
BOTTOM ELEVATION	1816.97		5.04 BOTTOM (FEET)

COORDINATES: NORTHING 897230.82 EASTING 784210.23

STATIONING: STATION 133+16.02 OFFSET 13.98 Lft

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE Three 2.5" TYPE PVC FACILITY OWNER SRP Electric

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	47	SUE Crew	D. Perez
Date Dug	5/24/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) _____ BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER Qwest Local Network

COMMENTS:

No facility in the requested location per Qwest Bluestake markings.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

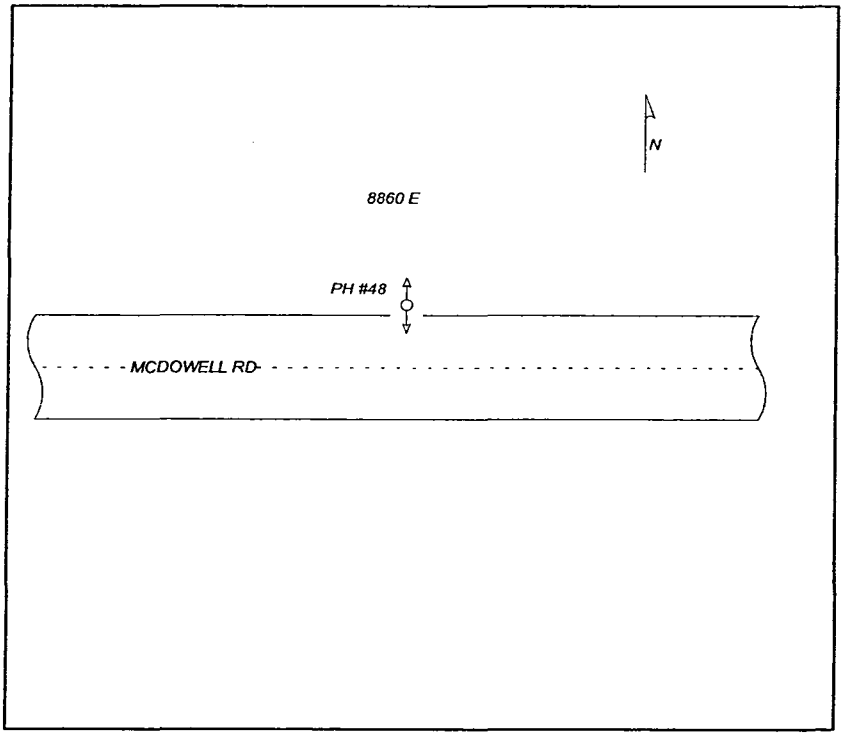
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	48	SUE Crew	J. Garcia
Date Dug	5/31/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	North		
	SURFACE ELEVATION	1827.81	WIDTH/O.D. 0.75"	
	TOP ELEVATION	1824.01		3.80 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1823.95		3.86 BOTTOM (FEET)
RIBBON COLOR Yellow				

COORDINATES: NORTHING	897065.90	EASTING	784622.14
STATIONING: STATION	137+57.40	OFFSET	12.30 Lft

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	0.75"	TYPE	PE	FACILITY OWNER	City of Mesa Gas

COMMENTS:

PREPARED BY: M. Jubie

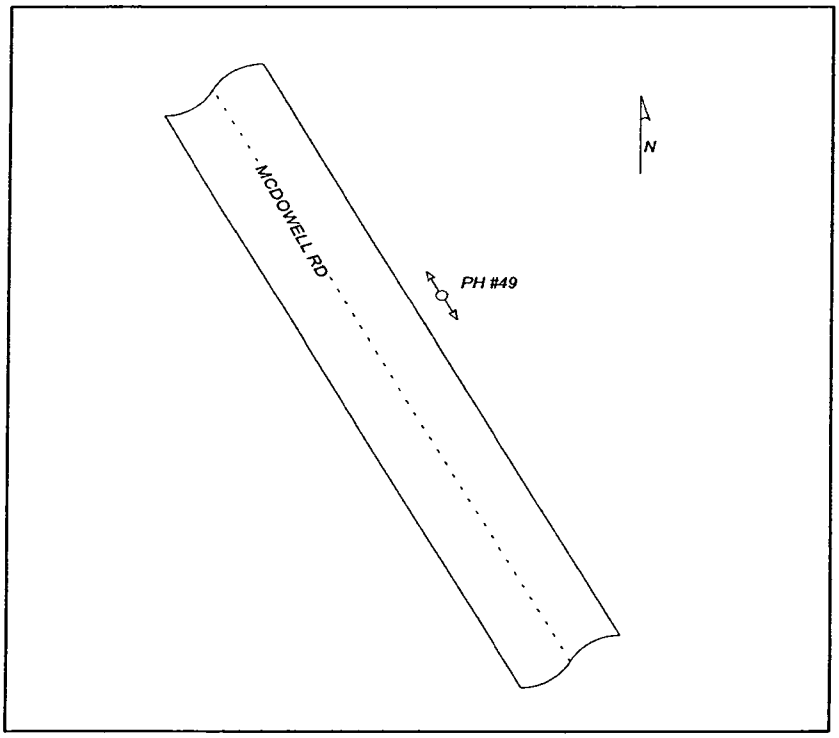
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	49	SUE Crew	J. Garcia
Date Dug	6/1/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING: West SURFACE ELEVATION: 1828.77 WIDTH/O.D.: 8.63" TOP ELEVATION: 1818.57 — TOP DEPTH (FEET): 10.20 BOTTOM ELEVATION: 1817.85 — BOTTOM (FEET): 10.92
RIBBON COLOR: Green	

COORDINATES: NORTHING 896939.23 EASTING 784793.78

STATIONING: STATION 139+58.33 OFFSET 32.90 Rt

PAVING THICKNESS 3" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE 8" TYPE PVC FACILITY OWNER City of Mesa Sewer

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

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Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	50	SUE Crew	J. McCarty
Date Dug	5/31/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	McDowell Road east of 88th Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) _____ BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER Storm Drain

COMMENTS:

No facility in the requested location per Bluestake markings.

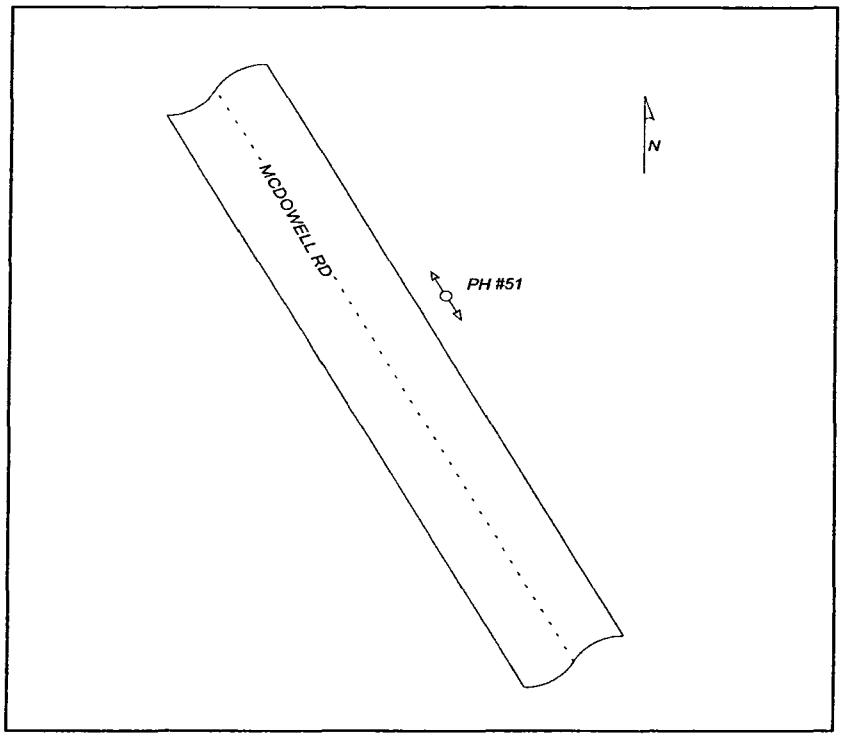
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	51	SUE Crew	J. Garcia
Date Dug	6/1/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	88th Street & McDowell Road		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 6/18/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ Hawes Rd & Hermosa Vista Dr. 21215-1=(#5 from plans) N: 894511.56 E: 781359.09 Elev. = 1707.29	FACING	West		
	SURFACE ELEVATION	1828.94	WIDTH/O.D. 2.38"	
	TOP ELEVATION	1826.54	2.40	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1826.34	2.60	BOTTOM (FEET)
RIBBON COLOR Red				

COORDINATES:	NORTHING	896951.34	EASTING	784806.00	
STATIONING:	STATION	739+74.56	OFFSET	27.20 Rt	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	2"	TYPE	PVC	FACILITY OWNER	SRP Electric

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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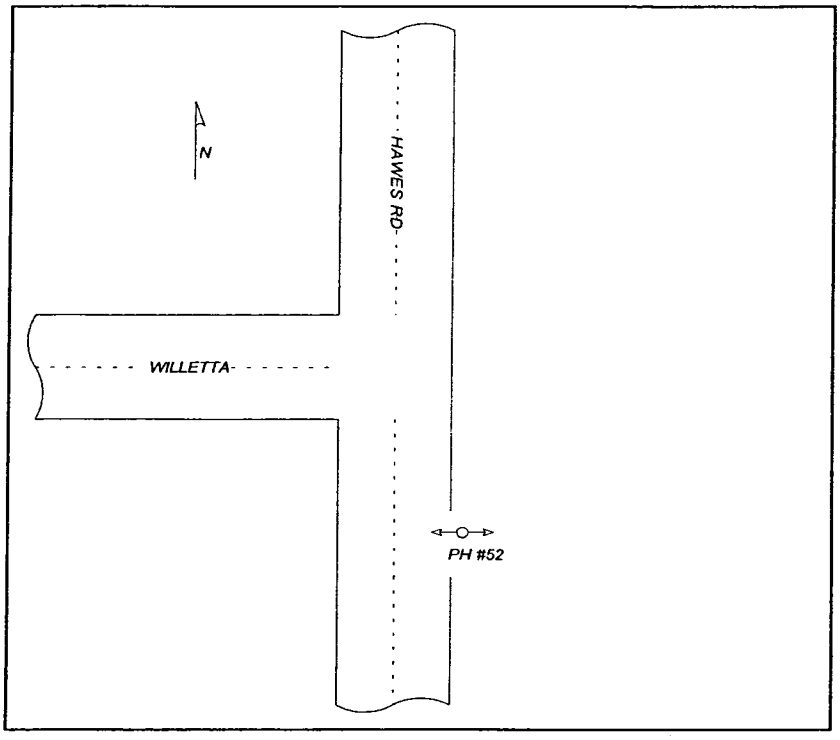
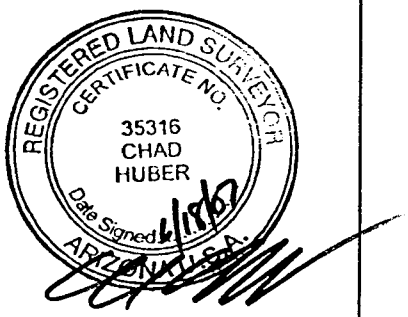
Tel. (602)458-0402 Fax. (602)458-9359

Test Hole #	52	SUE Crew	J. Nowels
Date Dug	6/1/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	003	County	Maricopa
Location	Hawes Road & Willetta Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK
BCHH @ Hawes Rd & Hermosa Vista Dr.
21215-1=(#5 from plans)
N: 894511.56
E: 781359.09
Elev. = 1707.29
RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1736.46	WIDTH/O.D. 4.81"	
TOP ELEVATION	1732.94		3.52 TOP DEPTH (FEET)
BOTTOM ELEVATION	1732.54		3.92 BOTTOM (FEET)

COORDINATES: NORTHING	896182.21	EASTING	781374.68
STATIONING: STATION	94+46.80	OFFSET	.31 Lft

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	4"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

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Surveyors • Program Managers
Consultants • Utility Locators
Construction Administrators

Art Mehler
Project Manager Utility Locating

direct: 602-458-9295
cell: 602-316-3290
phone: 602-454-0402
fax: 602-458-9359
email: amehler@aztec.us

4561 East McDowell Rd, Phoenix, AZ 85008-4505

October 26, 2007

Jeff Minch
Wood, Patel & Associates, Inc.
2051 W Northern Avenue, Ste. 100
Phoenix, AZ 85021

RECEIVED
OCT 30 2007
WOOD/PATEL

Re: RLS Sealed Testhole Databook for Hermosa Vista

Dear Mr. Minch:

Attached please find the RLS sealed testhole databook for Hermosa Vista. Please feel free to contact me with any questions.

I am enclosing one of Art Mehler's business cards. You may also find out more about us by visiting our website at www.aztec.us. Please let me know if there is any additional information that we can provide for you.

Very truly yours,

Marie Huber

Marie Huber
Project Specialist

Enclosure(s)
(1) Testhole Databook – City Scape

Testhole Data Summary

AZTEC
www.aztec.us

Date: 9/20/2007

Project Number: AZU0704-005

Project Name: Hermosa Vista II

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Coordinates		Stationing		Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
						Northing	Easting	Stationing	Offset					
1	7301 E Hermosa Vista Drive	10/5/2007	Electric	Three 4"	PVC	894494.92	774352.93	7+79.09	12.25 RT	1591.64	1586.84	1586.46	4.80	
2	Hermosa Vista Drive 1700' west of Sossaman Road	9/25/2007	City of Mesa Water	12"	DIP	894513.75	774374.66	8+00.85	6.54 LT	1591.96	1583.72	1582.62	8.24	Found facility on sixth attempt.
2A	Hermosa Vista Drive 1700' west of Sossaman Road	9/25/2007	Storm Drain	30"	RCP	894523.64	774375.83	8+02.04	16.42 LT	1593.15	1591.43	1588.36	1.72	
3	7301 E Herrmosa Vista Drive	10/5/2007	Cox Communications	Two 2"	PVC	894516.37	774440.32	8+66.52	9.02 LT	1592.56	1588.24	1587.60	4.32	
4	Hermosa Vista Drive 1100' west of Sossaman Road	9/13/2007	City of Mesa Water	12"	ACP	894522.75	774975.76	14+01.97	14.26 LT	1601.78	1597.92	1596.76	3.86	
5	Hermosa Vista Drive 1000' west of Sossaman Road	10/5/2007	Salt River Project	1.5"	PVC	894514.45	775065.30	14+91.49	5.77 LT	1603.23	1600.72	1600.59	2.51	
6	Hermosa Vista 1000' west of Sossaman Road	10/5/2007	City of Mesa Water	6"	DIP	894513.51	775079.89	15+06.08	4.80 LT	1603.24	1599.14	1598.56	4.10	
7	Hermosa Vista Drive 1000' west of Sossaman Road	10/5/2007	Cox Communications	2"	PVC	894514.92	775091.37	15+17.56	6.19 LT	1603.33	1601.13	1600.93	2.20	
8	Hermosa Vista Drive 800' west of Sossaman Road	9/13/2007	City of Mesa Water	12"	ACP	894523.36	775242.14	16+68.35	14.30 LT	1605.52	1601.16	1600.00	4.36	
9	Hermosa Vista Drive 400' west of Sossaman Road	9/13/2007	City of Mesa Water	12"	ACP	894523.81	775697.01	21+23.22	13.78 LT	1612.28	1603.66	1602.50	8.62	
10	Hermosa Vista Drive & 76th Street	9/13/2007	City of Mesa Water	12"	ACP	894525.35	775984.55	24+10.77	14.71 LT	1616.63	1613.59	1612.43	3.04	
11	Hermosa Vista Drive & Sossaman Road	9/13/2007	Qwest Local Network	1"	PE	894532.55	775988.95	24+15.18	21.90 LT	1616.44	1615.34	1615.26	1.10	
12	73rd Street & Hermosa Vista Drive	10/5/2007	Electric	Three 4"	PVC	894516.49	774454.25	8+80.45	9.11 LT	1592.88	1586.58	1586.20	6.30	
13	7426 E Hermosa Vista Drive	10/9/2007	Cox Communications	2"	PVC	894519.87	775261.68	16+87.88	10.77 LT	1605.58	1603.08	1602.88	2.50	
14	Pothole Cancelled													Pothole Cancelled.

														Pothole Cancelled.
15	Pothole Cancelled													
16	Pothole Cancelled													Pothole Cancelled.
17	Pothole Cancelled													Pothole Cancelled.
18	Pothole Cancelled													Pothole Cancelled.
19	Hermosa Vista Drive & Mangun Street	9/19/2007	None	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service,
20	Hermosa Vista Drive 200' east of Mangun Street	9/24/2007	City of Mesa Water	12"	ACP	894526.47	776956.16	33+82.35	15.31 LT	1631.73	1627.51	1626.35	4.22	
20A	Hermosa Vista Drive 200' east of Mangun Street	9/13/2007	Unknown	One 2" & One 1.5"	PVC	894538.71	776957.79	33+83.98	27.56 LT	1632.03	1627.73	1627.43	4.30	Found water line 9-24-07 to be surveyed soon.
21	Hermosa Vista Drive & Mangun Street	9/13/2007	City of Mesa Water	8"	ACP	894544.98	776953.89	33+80.08	33.83 LT	1632.04	1628.54	1627.78	3.50	
22	Hermosa Vista Drive & 78th Street	9/13/2007	City of Mesa Water	12"	ACP	894526.03	777331.64	37+57.83	14.75 LT	1637.61	1633.41	1632.25	4.20	
23	Hermosa Vista Drive & 78th Street	9/19/2007	None	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service,
24	Hermosa Vista Drive 200' east of 78th Street	9/19/2007	None	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service,
25	Hermosa Vista Drive 300' west of 80th Street	9/14/2007	Gas	4"	PE	894509.34	778395.21	48+21.38	5.57 RT	1655.01	1649.77	1649.39	5.24	
26	Hermosa Vista Drive & west of 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894541.08	778482.98	49+09.26	25.85 LT	1656.33	1650.93	1649.77	5.40	
27	Hermosa Vista Drive & 80th Street	9/19/2007	None	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service,
28	Hermosa Vista Drive & 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894536.72	778774.36	52+00.51	20.72 LT	1661.35	1656.95	1655.79	4.40	
29	Hermosa Vista Drive & 80th Street	9/13/2007	City of Mesa Water	6"	ACP	894542.26	778774.28	52+00.43	26.26 LT	1661.10	1657.20	1656.62	3.90	
30	Hermosa Vista Drive 300' east of 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894536.85	779068.84	54+95.00	21.35 LT	1667.35	1662.83	1661.67	4.52	
31	Hermosa Vista Drive 300' east of 80th Street	9/13/2007	City of Mesa Water	6"	ACP	894541.73	779066.49	54+92.64	26.23 LT	1667.39	1664.49	1663.91	2.90	
32	Hermosa Vista Drive 550' east of 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894537.17	779317.68	57+43.83	22.10 LT	1671.49	1666.05	1664.89	5.44	
33	Hermosa Vista Drive 550' east of 80th Street	9/13/2007	City of Mesa Water	6"	ACP	894542.18	779318.15	57+44.29	27.12 LT	1671.69	1667.47	1666.89	4.22	

34	Hermosa Vista Drive 600' east of 80th Street	9/19/2007	None	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service,
35	Hermosa Vista Drive 200' west of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894537.54	779519.53	59+45.68	22.82 LT	1673.07	1668.17	1667.01	4.90	
36	Hermosa Vista Drive 200' west of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894536.65	779902.92	63+29.08	22.59 LT	1682.99	1677.05	1675.89	5.94	
37	Hermosa Vista Drive 100' east of 82nd Street	9/25/2007	City of Mesa Water	12"	ACP	894530.89	780139.27	65+65.44	17.23 LT	1687.09	1681.79	1680.63	5.30	Found at correct station on the 6th attempt.
38	Hermosa Vista Drive 100' east of 82nd Street	9/14/2007	Qwest Local Network	2"	PE	894531.87	780139.64	65+65.80	18.21 LT	1686.85	1684.55	1684.38	2.30	
38A	Hermosa Vista Drive 100' east of 82nd Street	9/14/2007	Cox Communications	See Comments	See Comments	894530.19	780139.30	65+65.46	16.53 LT	1687.00	1682.60	1682.02	4.40	Found one 4" PVC conduit & one 2" PE cable.
39	Hermosa Vista Drive 200' east of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894539.52	780238.78	66+64.93	26.03 LT	1688.79	1684.69	1688.79	4.10	
40	Hermosa Vista Drive 200' east of 82nd Street	9/14/2007	Qwest Local Network	One 2" & One 1"	PE	894533.52	780238.74	66+64.90	20.03 LT	1688.86	1686.26	1685.92	2.60	
41	Hermosa Vista Drive 300' east of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894540.16	780345.17	67+71.32	26.86 LT	1691.27	1687.71	1686.55	3.56	
42	Hermosa Vista Drive 300' east of 82nd Street	9/14/2007	Qwest Local Network	One 2" & One 1"	PE	894534.34	780343.37	67+69.53	21.03 LT	1690.90	1688.82	1688.60	2.08	
43	Hermosa Vista Drive 400' east of 82nd Street	9/17/2007	City of Mesa Water	12"	ACP	894540.96	780496.31	69+22.46	27.91 LT	1694.35	1688.13	1686.97	6.22	
44	Hermosa Vista Drive 400' east of 82nd Street	9/17/2007	Qwest Local Network	2"	PE	894536.67	780499.31	69+25.46	23.63 LT	1694.54	1690.88	1690.71	3.66	
45	Hermosa Vista Drive 600' west of Hawes Road	9/17/2007	City of Mesa Water	12"	ACP	894540.25	780696.13	71+22.28	27.55 LT	1695.41	1690.31	1689.15	5.10	
46	Hermosa Vista Drive 600' west of Hawes Road	9/17/2007	Qwest Local Network	2"	PE	894535.83	780695.35	71+21.51	23.13 LT	1695.21	1692.41	1692.24	2.80	
47	Hermosa Vista Drive 550' west of Hawes Road	9/17/2007	City of Mesa Water	12"	ACP	894539.92	780730.65	71+56.80	27.27 LT	1695.75	1691.35	1690.19	4.40	
48	Hermosa Vista Drive 550' west of Hawes Road	9/17/2007	Qwest Local Network	2"	PE	894535.11	780729.85	71+56.00	22.47 LT	1695.55	1693.31	1693.14	2.24	
49	Hermosa Vista Drive 400' west of Hawes Road	9/17/2007	City of Mesa Water	12"	ACP	894540.14	780876.05	73+02.19	27.75 LT	1698.62	1694.92	1693.76	3.70	
50	Hermosa Vista Drive 400' west of Hawes Road	9/17/2007	Qwest Local Network	2"	PE	894535.59	780875.47	73+01.63	23.19 LT	1698.47	1696.67	1696.50	1.80	
51	Hermosa Vista Drive & Hawes Road	9/17/2007	Qwest Local Network	Two 4"	PVC	894534.84	781256.16	76+82.32	23.10 LT	1705.23	1701.57	1700.63	3.66	
52	Hermosa Vista Drive & Hawes Road	9/17/2007	Electric	24" Wide	Slurry Duct	894514.51	781301.88	77+28.07	2.84 LT	1707.65	1706.55	1701.65	1.10	

53	Hawes Road & Mangun Road	10/9/2007	City of Mesa Sewer	N/A	Manhole	894836.44	781354.98	81+11.16	4.93 LT	1714.18	1714.18	1702.03	0.00	
54	Hawes Road & Culver Street	9/19/2007	City of Mesa Water	6"	ACP	895806.12	781372.64	90+80.83	13.27 RT	1730.26	1727.24	1726.66	3.02	
55	Hawes Road & Willetta Street	9/19/2007	City of Mesa Water	12"	ACP	896545.06	781370.66	98+19.79	11.01 RT	1742.52	1737.92	1736.76	4.60	
56	McDowell Road & Hawes Road	9/18/2007	City of Mesa Water	8"	ACP	897260.53	781505.44	106+60.10	21.06 LT	1758.25	1754.35	1753.59	3.90	
57	McDowell Road & Hawes Road	9/19/2007	City of Mesa Water	None	None	897246.36	781504.95	106+59.66	6.89 LT	1758.47		1753.47		Dug to a depth of 5', hit hard dirt and unable to dig deeper.
58	McDowell Road & Hawes Road	9/19/2007	Gas	4"	STL	897267.86	781507.67	106+62.31	28.40 LT	1758.17	1755.37	1754.99	2.80	
59	McDowell Road & Hawes Road	9/18/2007	Qwest Local Network	1"	PE	897265.68	781507.55	106+62.19	26.22 LT	1758.17	1754.85	1754.77	3.32	
60	McDowell Road & Hawes Road	9/18/2007	City of Mesa Water	20"	DIP	897266.90	781507.72	106+62.36	27.44 LT	1758.20	1753.08	1751.28	5.12	
61	McDowell Road &b Hawes Road	9/18/2007	Cox Communications	3"	PVC	897271.32	781507.23	106+61.86	31.86 LT	1758.10	1755.26	1754.97	2.84	
62	Waterbury & MacDowell Rd.	9/27/2007	N/A	None	None	897213.39	782668.75	118+23.56	22.27 RT	1783.71	0.00	1778.71	0.00	Dug to 5' deep and swept 6' wide. No facility found.
63	Waterbury & McDowell Rd.	9/27/2007	City of Mesa Water	8"	ACP	897214.30	782672.17	118+26.97	21.35 RT	1783.79	1778.17	1777.41	5.62	
64	Waterbury & McDowell Rd.	9/27/2007	N/A	None	None	897213.47	782676.15	118+30.97	22.16 RT	1783.91	0.00	1778.91	0.00	Dug to a depth of 5'. No facility found.
65	McDowell Road & Waterbury Road	9/17/2007	Gas	4"	STL	897212.67	782763.50	119+18.30	22.71 RT	1785.47	1781.77	1781.39	3.70	
66	McDowell Road & Waterbury Road	9/17/2007	City of Mesa Water	20"	DIP	897213.12	782762.98	119+17.78	22.26 RT	1785.48	1778.48	1776.68	7.00	
67	McDowell Road & Waterbury Road	9/17/2007	City of Mesa Water	6"	ACP	897196.29	782767.82	119+22.67	39.08 RT	1785.44	1780.82	1780.24	4.62	
68	McDowell Road & 88th Street	9/19/2007	Water	12"	DIP	897250.74	784041.44	131+95.41	19.84 LT	1818.32	1813.52	1812.42	4.80	
69	McDowell Road & 88th Street	9/19/2007	Cox Communications	4"	PVC	897264.97	784037.65	131+91.20	33.92 LT	1818.85	1815.25	1814.87	3.60	
70	McDowell Road & 88th Street	9/19/2007	Qwest Local Network	1"	PE	897268.75	784038.51	131+91.89	37.73 LT	1819.07	1815.97	1815.89	3.10	
71	88th St. & McDowell Rd.	9/27/2007	N/A	None	None	897223.26	784037.20	131+92.24	7.78 RT	1817.37	0.00	1810.87	0.00	Dug to a depth of 6.5' deep. No facility found.
72	McDowell Road & 88th Street	9/19/2007	Cox Communications	36" Wide	Concrete Duct	897231.78	784199.98	133+52.61	18.04 LT	1821.62	1821.02	1817.72	0.60	

73	McDowell Road 900' east of 88th Street	9/19/2007	None	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service,
74	McDowell Road 900' east of 88th Street	10/2/2007	City of Mesa Storm Drain	24"	CMP	896938.00	784753.32	139+83.26	5.74 RT	1827.82	1824.62	1822.54	3.20	
75	McDowell Road 900' east of 88th Street	9/19/2007	City of Mesa Sewer	10"	PVC	896905.14	784829.80	140+60.74	23.20 LT	1828.58	1818.28	1817.38	10.30	
76	McDowell Road 900' east of 88th Street	9/19/2007	Electric	2"	PVC	896911.52	784846.73	140+67.81	39.77 LT	1828.94	1826.54	1826.34	2.40	Dug to a depth of 5', hit hard dirt and unable to dig deeper. This hole was requested as a
76A	McDowell Road 900' east of 88th Street	9/27/2007	City of Mesa Water	12"	DIP	896909.27	784844.61	140+67.94	36.68 LT	1828.81	1823.29	1822.19	5.52	
77	McDowell Road 900' east of 88th Street	9/19/2007	Cox Communications	36" Wide	Concrete Duct	896901.38	784844.78	140+73.57	31.32 LT	1828.69	1822.89	1821.29	5.80	
78	Hermosa Vista Drive 500' west of 80th Street	9/14/2007	Gas	4"	PE	894509.64	778123.88	45+50.06	4.28 RT	1648.70	1645.40	1645.02	3.30	
79	McDowell Road & Hawes Road	9/20/2007	Electric	24" Wide	Concrete Duct	897190.84	781384.05	104+65.57	24.13 RT	1754.44	1749.74	1747.73	4.70	
80	76th Street & Hermosa Vista Drive	10/5/2007	City of Mesa Water	24" & 16"	DIP	894490.80	776061.93	24+88.07	20.01 RT	1618.28	1610.08	1607.93	8.20	16" DIP water runs north to south. 24" water runs at a T intersection to the west.
81	76th Street & Hermosa Vista Drive	10/5/2007	City of Mesa Water	24"	DIP	894491.27	776055.25	24+81.39	19.52 RT	1618.10	1609.40	1607.25	8.70	Found 24" water at an elbow.

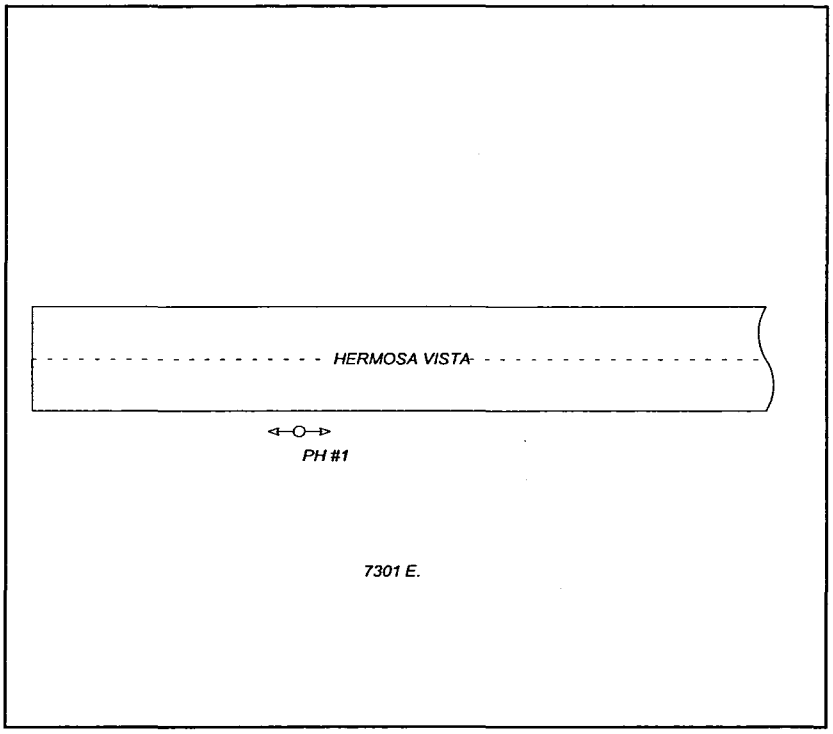
TEST HOLE DATA REPORT

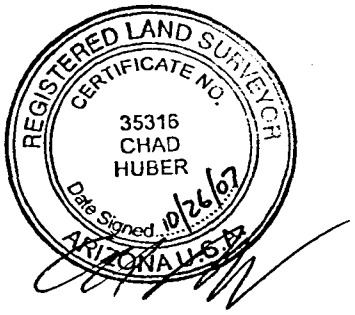
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	1	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	7301 E Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	
BCHH @ HAWES RD & HERMOSA VISTA DR	
ELEV. = 1707.29'	
RIBBON COLOR	Red

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1591.64	WIDTH/O.D. 15"	
TOP ELEVATION	1586.84	4.80	TOP DEPTH (FEET)
BOTTOM ELEVATION	1586.46	5.18	BOTTOM (FEET)

COORDINATES: NORTHING 894494.92 EASTING 774352.93

STATIONING: STATION 7+79.09 OFFSET 12.25 RT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE Three 4" TYPE PVC FACILITY OWNER Electric

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

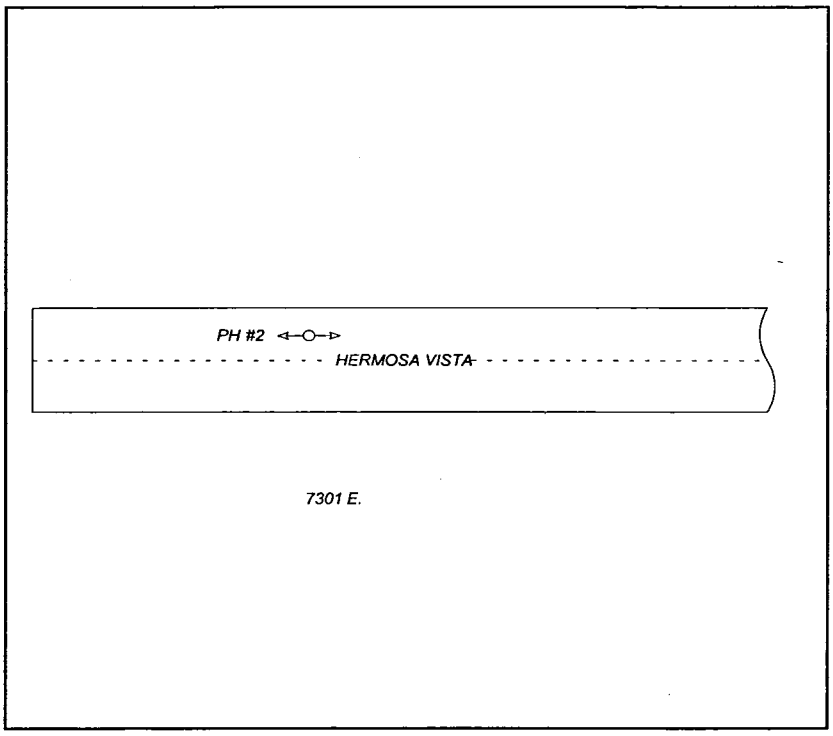
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	2	SUE Crew	J. Garcia
Date Dug	9/25/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 1700' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West		
ELEV. = 1707.29'	SURFACE ELEVATION	1591.96	WIDTH/O.D. 13.2	
	TOP ELEVATION	1583.72	8.24	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1582.62	9.34	BOTTOM (FEET)
RIBBON COLOR Blue				

COORDINATES: NORTHING	894513.75	EASTING	774374.66
STATIONING: STATION	8+00.85	OFFSET	6.54 LT

PAVING THICKNESS	2"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	12"	TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

Found facility on sixth attempt.

PREPARED BY: M. Jubie

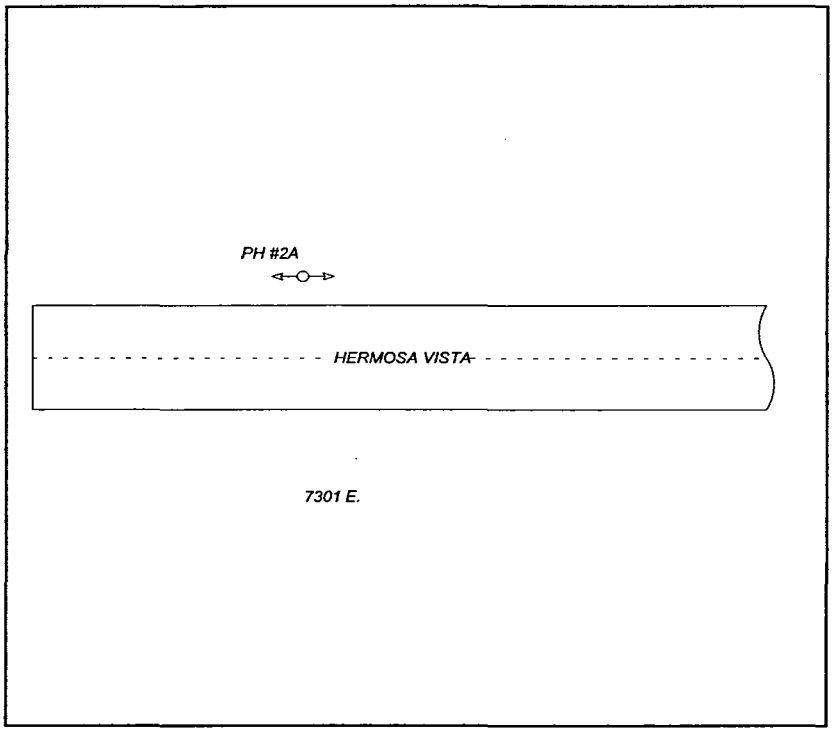
CHECKED BY: A. Mehler

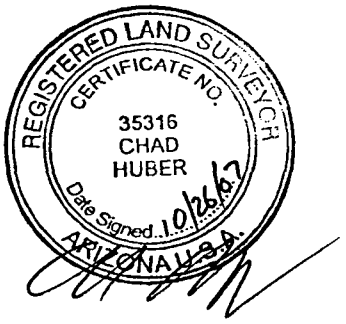
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	2A	SUE Crew	J. Garcia
Date Dug	9/25/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 1700' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1593.15
	WIDTH/O.D.: 37"
	TOP ELEVATION: 1591.43 — TOP DEPTH (FEET): 1.72
	BOTTOM ELEVATION: 1588.36 — BOTTOM (FEET): 4.79
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894523.64	EASTING	774375.83
STATIONING: STATION	8+02.04	OFFSET	16.42 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	30"	TYPE	RCP
FACILITY OWNER	Storm Drain		

COMMENTS:

PREPARED BY: M. Jubie

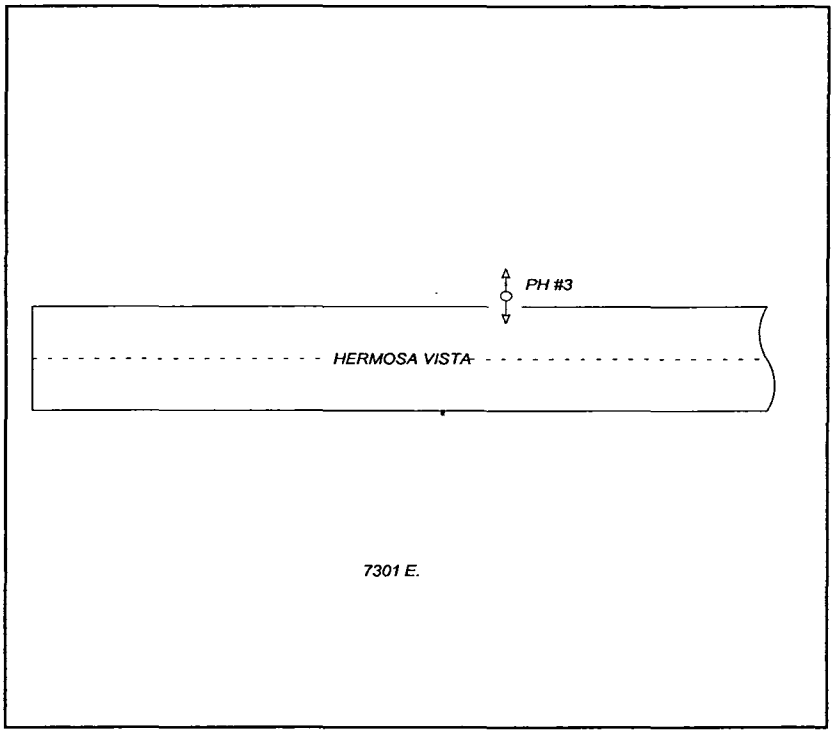
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	3	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	7301 E Herrmosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: North
ELEV. = 1707.29'	SURFACE ELEVATION: 1592.56
	WIDTH/O.D.: 4"
	TOP ELEVATION: 1588.24 — TOP DEPTH (FEET): 4.32
	BOTTOM ELEVATION: 1587.60 — BOTTOM (FEET): 4.96
RIBBON COLOR: Orange	

COORDINATES: NORTHING 894516.37 EASTING 774440.32

STATIONING: STATION 8+66.52 OFFSET 9.02 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE Two 2" TYPE PVC FACILITY OWNER Cox Communications

COMMENTS:

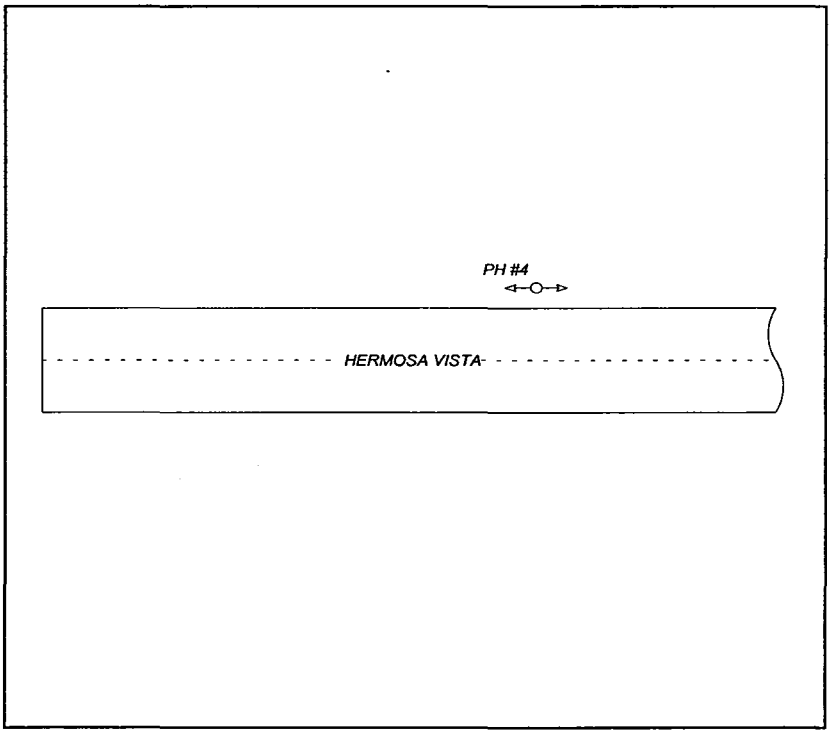
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	4	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 1100' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ HAWES RD & HERMOSA VISTA DR	
ELEV. = 1707.29'	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1601.78	WIDTH/O.D. 13.92"	
TOP ELEVATION	1597.92	3.86	TOP DEPTH (FEET)
BOTTOM ELEVATION	1596.76	5.02	BOTTOM (FEET)

COORDINATES: NORTHING	894522.75	EASTING	774975.76
STATIONING: STATION	14+01.97	OFFSET	14.26 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

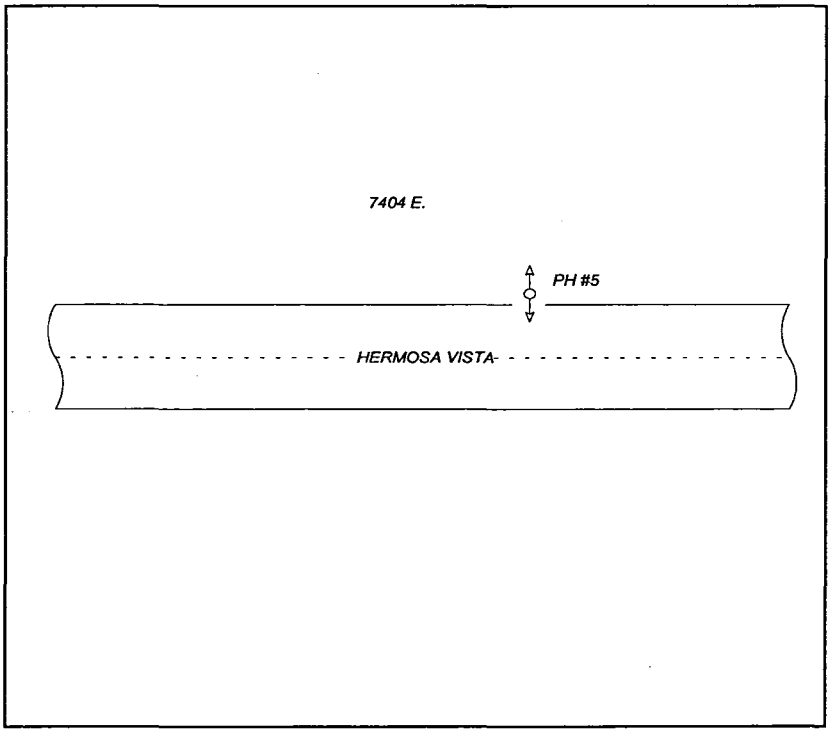
CHECKED BY: A. Mehler

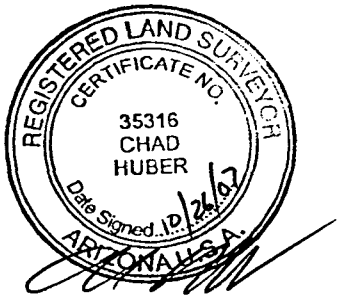
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	5	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 1000' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	North	
ELEV. = 1707.29'	SURFACE ELEVATION	1603.23	
	WIDTH/O.D.	1.5"	
	TOP ELEVATION	1600.72	2.51 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1600.59	2.64 BOTTOM (FEET)
RIBBON COLOR	Red		

COORDINATES: NORTHING	894514.45	EASTING	775065.30
STATIONING: STATION	14+91.49	OFFSET	5.77 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	1.5"	TYPE	PVC
FACILITY OWNER	Salt River Project		

COMMENTS:

PREPARED BY: M. Jubie

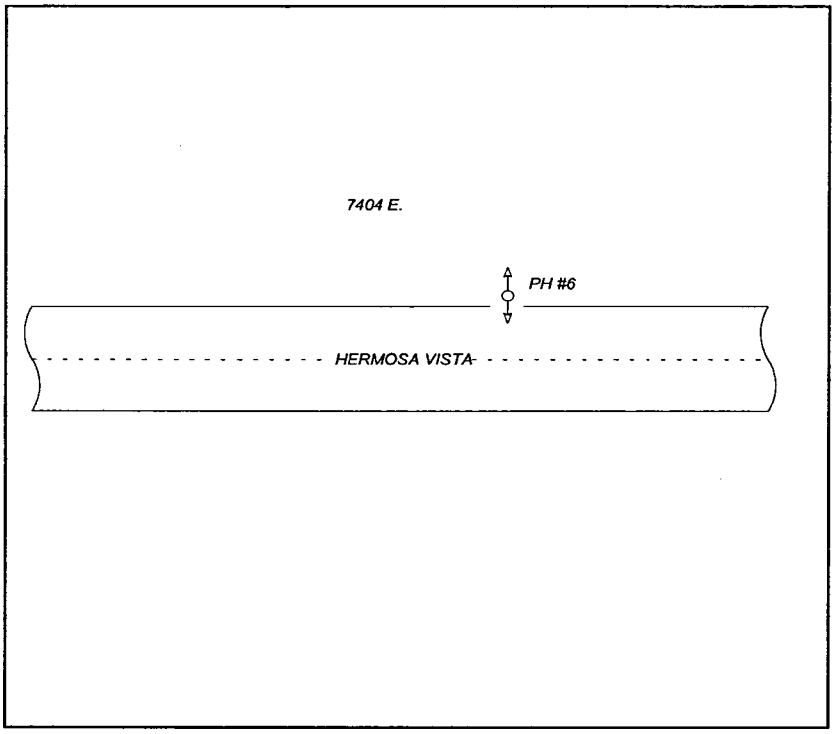
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	6	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista 1000' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	North	
ELEV. = 1707.29'	SURFACE ELEVATION	1603.24	
	WIDTH/O.D.	6.9"	
	TOP ELEVATION	1599.14	4.10 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1598.56	4.68 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES: NORTHING 894513.51 EASTING 775079.89

STATIONING: STATION 15+06.08 OFFSET 4.80 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 6" TYPE DIP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

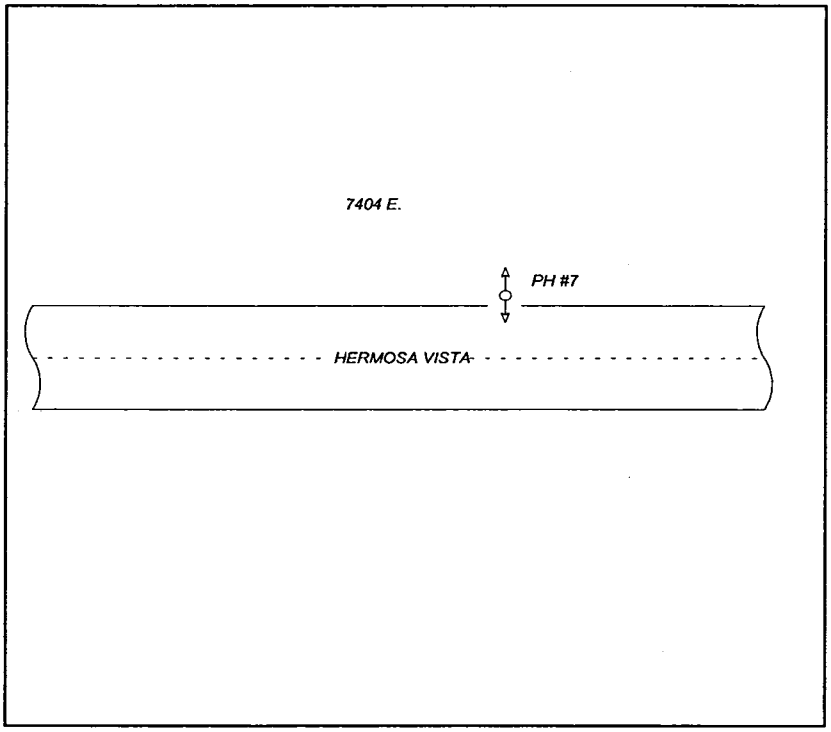
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	7	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 1000' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: North
ELEV. = 1707.29'	SURFACE ELEVATION: 1603.33
	WIDTH/O.D.: 2.38"
	TOP ELEVATION: 1601.13 — TOP DEPTH (FEET): 2.20
	BOTTOM ELEVATION: 1600.93 — BOTTOM (FEET): 2.40
RIBBON COLOR: Orange	

COORDINATES: NORTHING	894514.92	EASTING	775091.37
STATIONING: STATION	15+17.56	OFFSET	6.19 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	2"	TYPE	PVC
FACILITY OWNER	Cox Communications		

COMMENTS:

PREPARED BY: M. Jubie

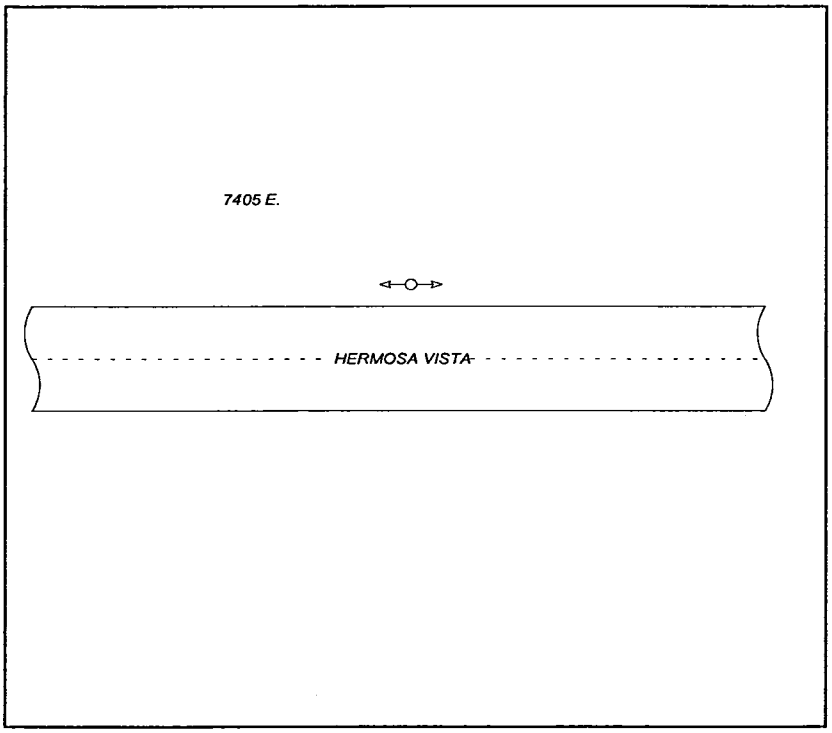
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	8	SUE Crew	J. Nowels
Date Dug	9/13/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 800' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: East
ELEV. = 1707.29'	SURFACE ELEVATION: 1605.52
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1601.16 — TOP DEPTH (FEET): 4.36
	BOTTOM ELEVATION: 1600.00 — BOTTOM (FEET): 5.52
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894523.36	EASTING	775242.14
STATIONING: STATION	16+68.35	OFFSET	14.30 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

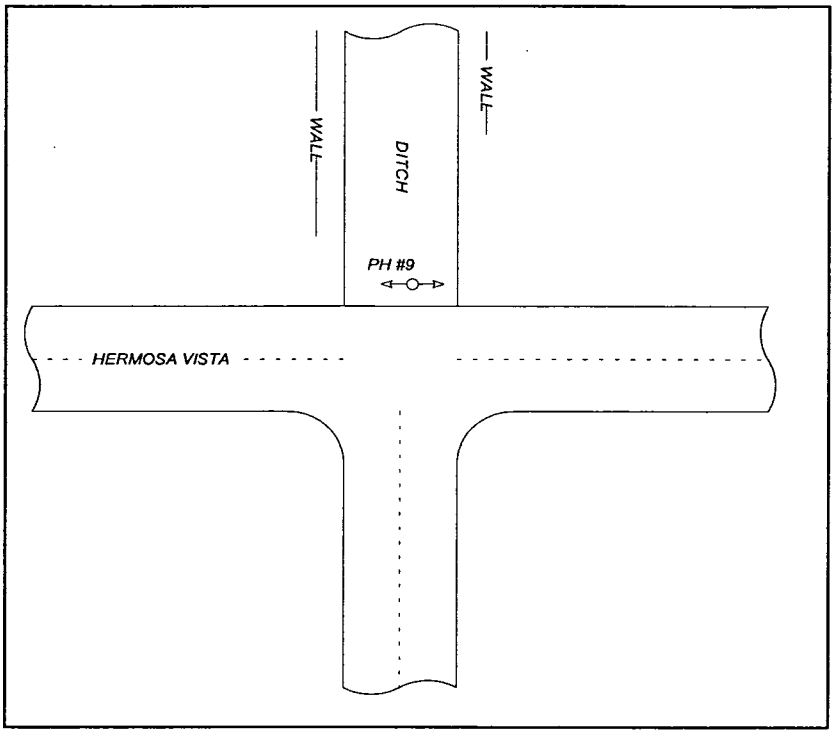
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	9	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 400' west of Sossaman Road		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/22/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: East
ELEV. = 1707.29'	SURFACE ELEVATION: 1612.28
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1603.66 — TOP DEPTH (FEET): 8.62
	BOTTOM ELEVATION: 1602.50 — BOTTOM (FEET): 9.78
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894523.81	EASTING	775697.01
STATIONING: STATION	21+23.22	OFFSET	13.78 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

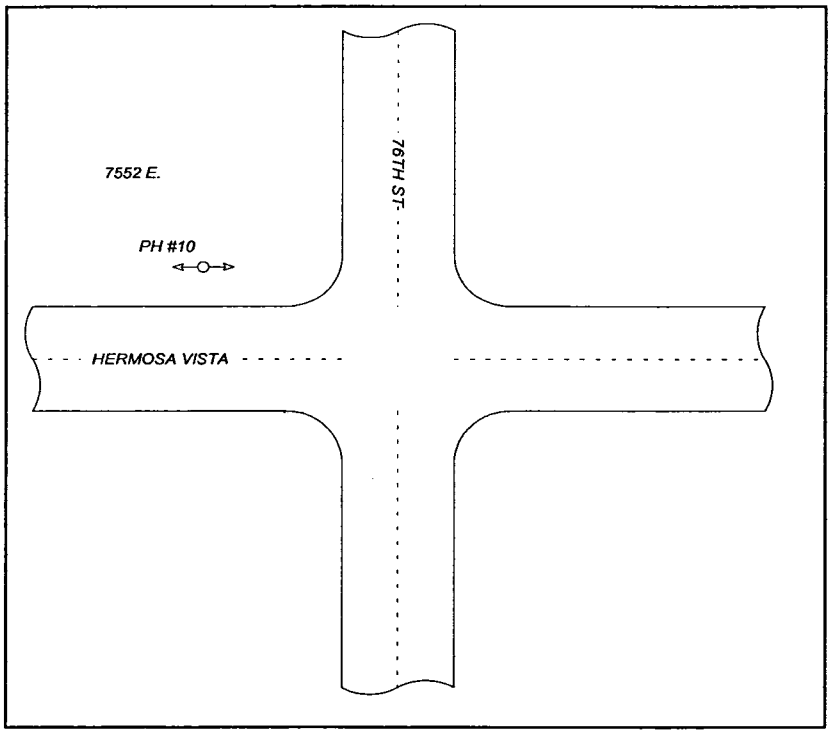
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	10	SUE Crew	J. Nowels
Date Dug	9/13/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & 76th Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: East
ELEV. = 1707.29'	SURFACE ELEVATION: 1616.63
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1613.59 — TOP DEPTH (FEET): 3.04
	BOTTOM ELEVATION: 1612.43 — BOTTOM (FEET): 4.20
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894525.35	EASTING	775984.55
STATIONING: STATION	24+10.77	OFFSET	14.71 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

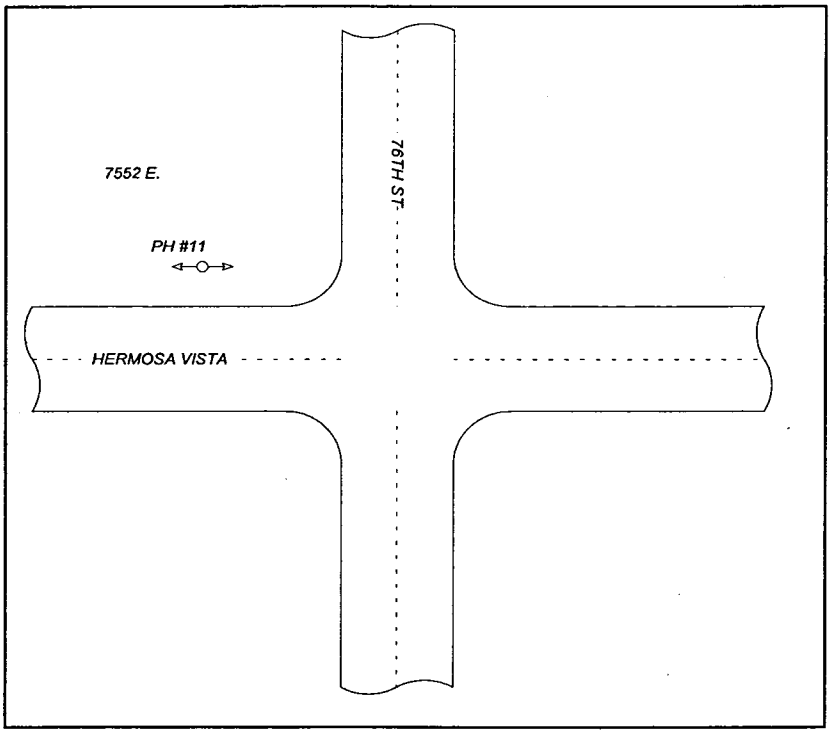
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	11	SUE Crew	J. Nowels
Date Dug	~~9/13/2007~~	~~Truck #~~	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & Sossaman Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	East	
ELEV. = 1707.29'	SURFACE ELEVATION	1616.44	WIDTH/O.D. 1"
	TOP ELEVATION	1615.34	1.10 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1615.26	1.18 BOTTOM (FEET)
RIBBON COLOR	Orange		

COORDINATES: NORTHING	894532.55	EASTING	775988.95
STATIONING: STATION	24+15.18	OFFSET	21.90 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	1"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

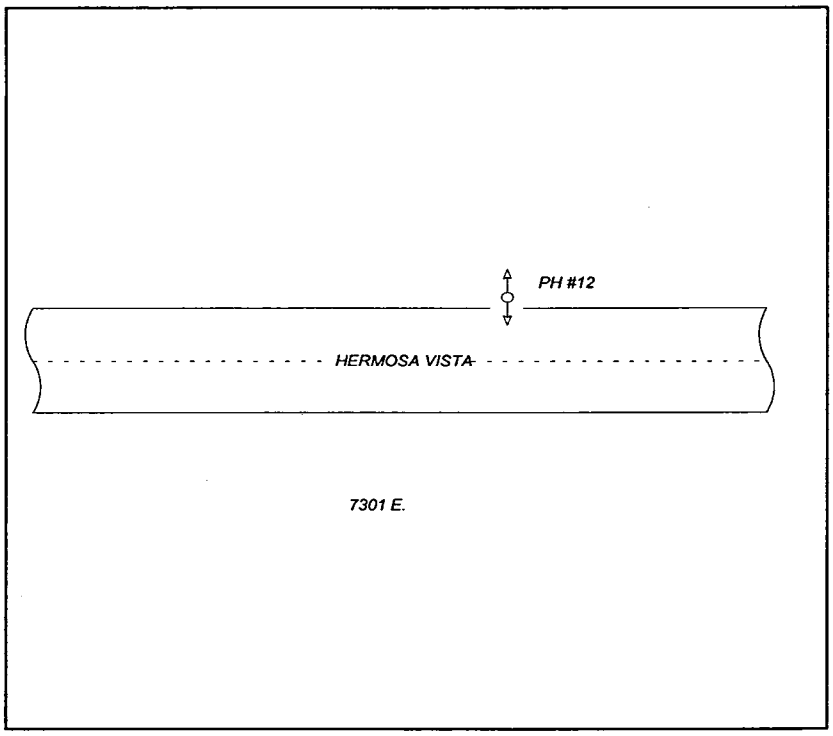
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	12	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	73rd Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: North
ELEV. = 1707.29'	SURFACE ELEVATION: 1592.88
	WIDTH/O.D.: 15"
	TOP ELEVATION: 1586.58 — TOP DEPTH (FEET): 6.30
	BOTTOM ELEVATION: 1586.20 — BOTTOM (FEET): 6.68
RIBBON COLOR: Red	

COORDINATES: NORTHING	894516.49	EASTING	774454.25
STATIONING: STATION	8+80.45	OFFSET	9.11 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	Three 4"	TYPE	PVC	FACILITY OWNER	Electric

COMMENTS:

PREPARED BY: M. Jubie

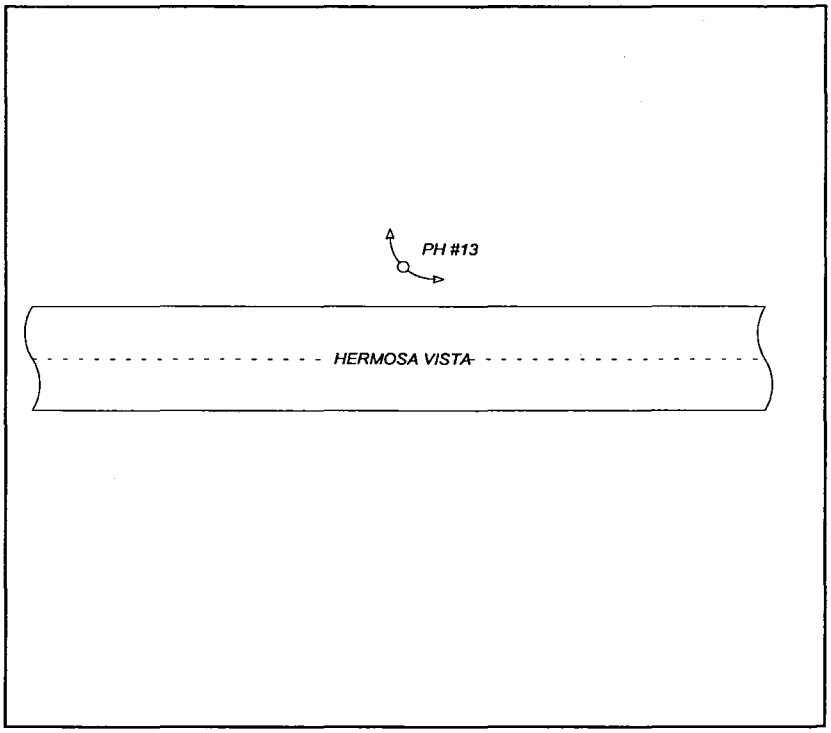
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	13	SUE Crew	D. Perez
Date Dug	10/9/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	7426 E Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA, U.S.A.

SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR Orange

CROSS SECTION - NOT TO SCALE

FACING North

SURFACE ELEVATION	1605.58	WIDTH/O.D. 2.38"	
TOP ELEVATION	1603.08	2.50	TOP DEPTH (FEET)
BOTTOM ELEVATION	1602.88	2.70	BOTTOM (FEET)

COORDINATES: NORTHING 894519.87 EASTING 775261.68

STATIONING: STATION 16+87.88 OFFSET 10.77 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 2" TYPE PVC FACILITY OWNER Cox Communications

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	14	SUE Crew	
Date Dug		Truck #	
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Pothole Cancelled		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING
ELEV. = 1707.29'	SURFACE ELEVATION WIDTH/O.D. TOP ELEVATION TOP DEPTH (FEET) BOTTOM ELEVATION BOTTOM (FEET)
RIBBON COLOR	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS _____ PAVING TYPE _____ SOIL CONDITION _____

SIZE _____ TYPE _____ FACILITY OWNER _____

COMMENTS:

Pothole Cancelled.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	15	SUE Crew	
Date Dug		Truck #	
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Pothole Cancelled		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR ELEV. = 1707.29'	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. _____ TOP ELEVATION _____ TOP DEPTH (FEET) _____ BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS _____ PAVING TYPE _____ SOIL CONDITION _____

SIZE _____ TYPE _____ FACILITY OWNER _____

COMMENTS:

Pothole Cancelled.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	16	SUE Crew	
Date Dug		Truck #	
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Pothole Cancelled		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 12/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING _____
ELEV. = 1707.29'	SURFACE ELEVATION _____ WIDTH/O.D. _____
	TOP ELEVATION _____ TOP DEPTH (FEET) _____
	BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR	

COORDINATES: NORTHING _____ EASTING _____

STATIONING: STATION _____ OFFSET _____

PAVING THICKNESS _____ PAVING TYPE _____ SOIL CONDITION _____

SIZE _____ TYPE _____ FACILITY OWNER _____

COMMENTS:

Pothole Cancelled.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	17	SUE Crew	
Date Dug		Truck #	
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Pothole Cancelled		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR

CROSS SECTION - NOT TO SCALE

FACING

SURFACE ELEVATION

WIDTH/O.D.

TOP ELEVATION

TOP DEPTH (FEET)

BOTTOM ELEVATION

BOTTOM (FEET)

COORDINATES: NORTHING EASTING

STATIONING: STATION OFFSET

PAVING THICKNESS PAVING TYPE SOIL CONDITION

SIZE TYPE FACILITY OWNER

COMMENTS:

Pothole Cancelled.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	18	SUE Crew	
Date Dug		Truck #	
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Pothole Cancelled		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR

CROSS SECTION - NOT TO SCALE

FACING

SURFACE ELEVATION

WIDTH/O.D.

TOP ELEVATION

TOP DEPTH (FEET)

BOTTOM ELEVATION

BOTTOM (FEET)

COORDINATES: NORTHING EASTING

STATIONING: STATION OFFSET

PAVING THICKNESS PAVING TYPE SOIL CONDITION

SIZE TYPE FACILITY OWNER

COMMENTS:

Pothole Cancelled.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	19	SUE Crew	J. Brandt
Date Dug	9/19/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & Mangun Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING _____
ELEV. = 1707.29'	SURFACE ELEVATION _____ WIDTH/O.D.
	TOP ELEVATION _____ TOP DEPTH (FEET)
	BOTTOM ELEVATION _____ BOTTOM (FEET)
RIBBON COLOR None	

COORDINATES: NORTHING None EASTING None

STATIONING: STATION None OFFSET None

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

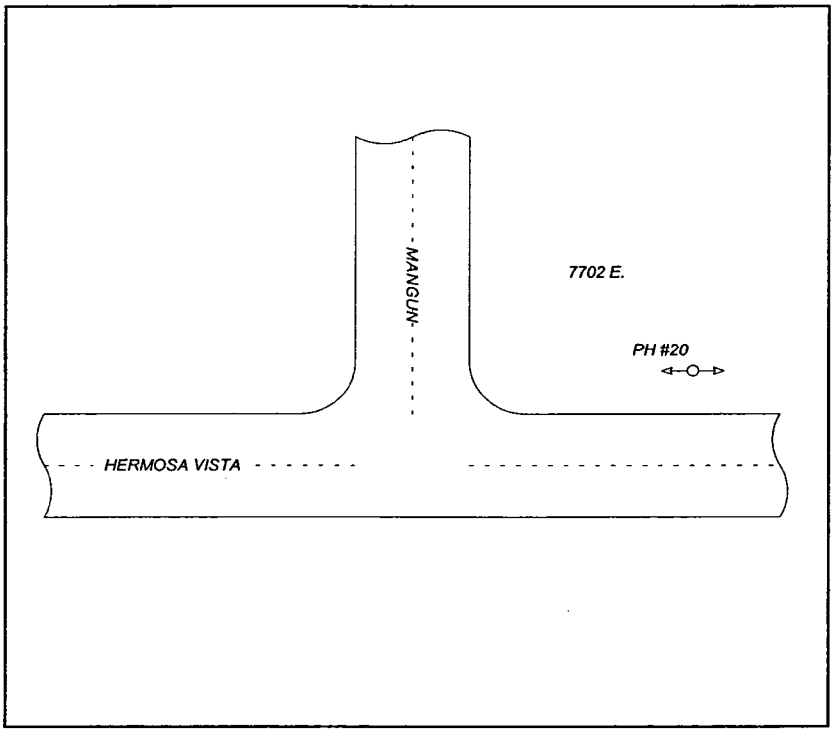
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	20	SUE Crew	J. Nowels
Date Dug	9/24/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' east of Mangun Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1631.73
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1627.51 — TOP DEPTH (FEET): 4.22
	BOTTOM ELEVATION: 1626.35 — BOTTOM (FEET): 5.38
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894526.47	EASTING	776956.16
STATIONING: STATION	33+82.35	OFFSET	15.31 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

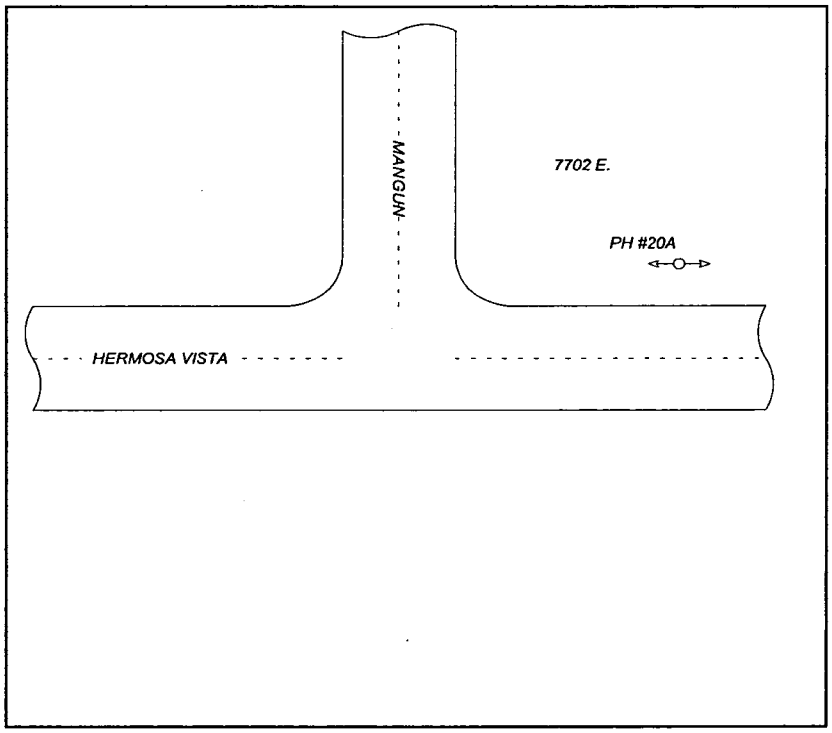
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	20A	SUE Crew	J. Nowels
Date Dug	9/13/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' east of Mangun Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1632.03
	WIDTH/O.D.: 6"
	TOP ELEVATION: 1627.73 — TOP DEPTH (FEET): 4.30
	BOTTOM ELEVATION: 1627.43 — BOTTOM (FEET): 4.60
RIBBON COLOR: White	

COORDINATES: NORTHING 894538.71 EASTING 776957.79

STATIONING: STATION 33+83.98 OFFSET 27.56 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE One 2" & One 1.5" TYPE PVC FACILITY OWNER Unknown

COMMENTS:

Found water line 9-24-07 to be surveyed soon.

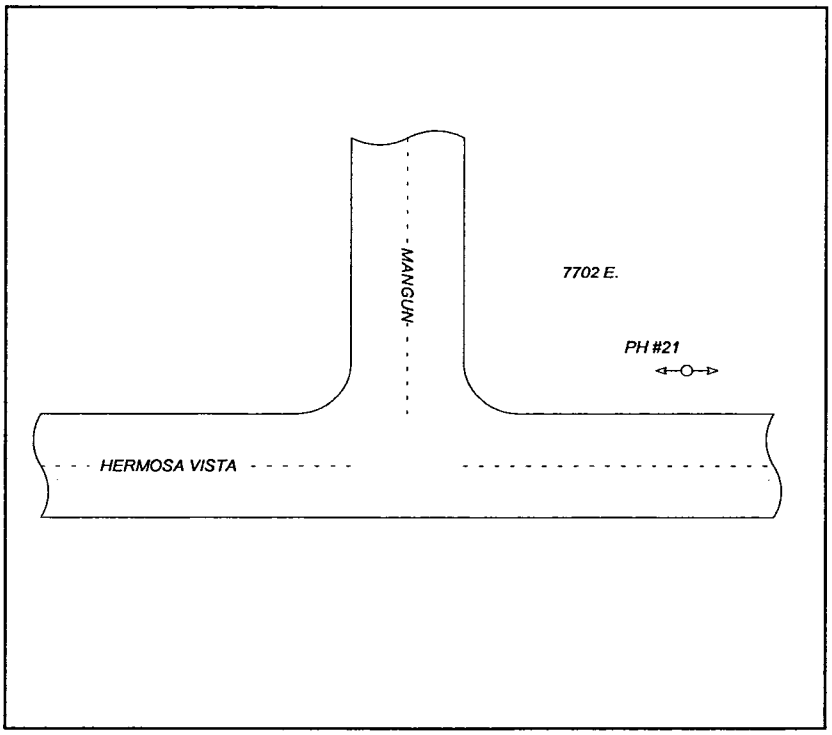
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	21	SUE Crew	J. Nowels
Date Dug	9/13/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & Mangun Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1632.04
	WIDTH/O.D.: 9.11"
	TOP ELEVATION: 1628.54 — TOP DEPTH (FEET): 3.50
	BOTTOM ELEVATION: 1627.78 — BOTTOM (FEET): 4.26
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894544.98	EASTING	776953.89
STATIONING: STATION	33+80.08	OFFSET	33.83 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	8"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

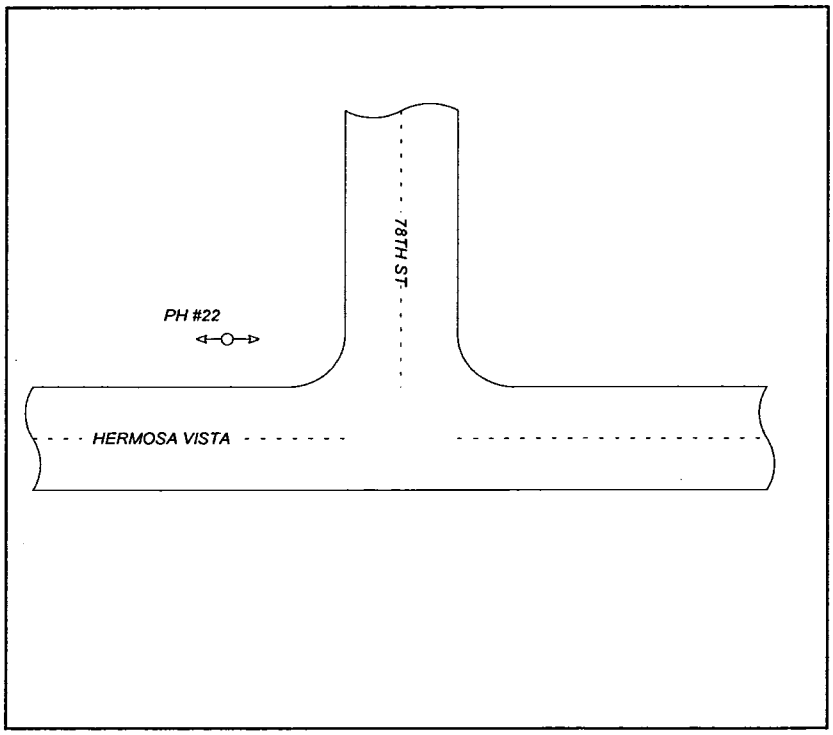
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	22	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & 78th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1637.61
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1633.41 — TOP DEPTH (FEET): 4.20
	BOTTOM ELEVATION: 1632.25 — BOTTOM (FEET): 5.36
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894526.03	EASTING	777331.64
STATIONING: STATION	37+57.83	OFFSET	14.75 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	23	SUE Crew	J. Brandt
Date Dug	9/19/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & 78th Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR ELEV. = 1707.29'	FACING _____ SURFACE ELEVATION _____ WIDTH/O.D. TOP ELEVATION _____ TOP DEPTH (FEET) BOTTOM ELEVATION _____ BOTTOM (FEET)
RIBBON COLOR None	

COORDINATES: NORTHING None EASTING None

STATIONING: STATION None OFFSET None

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	24	SUE Crew	J. Brandt
Date Dug	9/19/2007	Truck #	~~738~~
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' east of 78th Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR None

CROSS SECTION - NOT TO SCALE

FACING _____

SURFACE ELEVATION _____ WIDTH/O.D. _____

TOP ELEVATION _____ TOP DEPTH (FEET) _____

BOTTOM ELEVATION _____ BOTTOM (FEET) _____

COORDINATES: NORTHING None EASTING None

STATIONING: STATION None OFFSET None

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

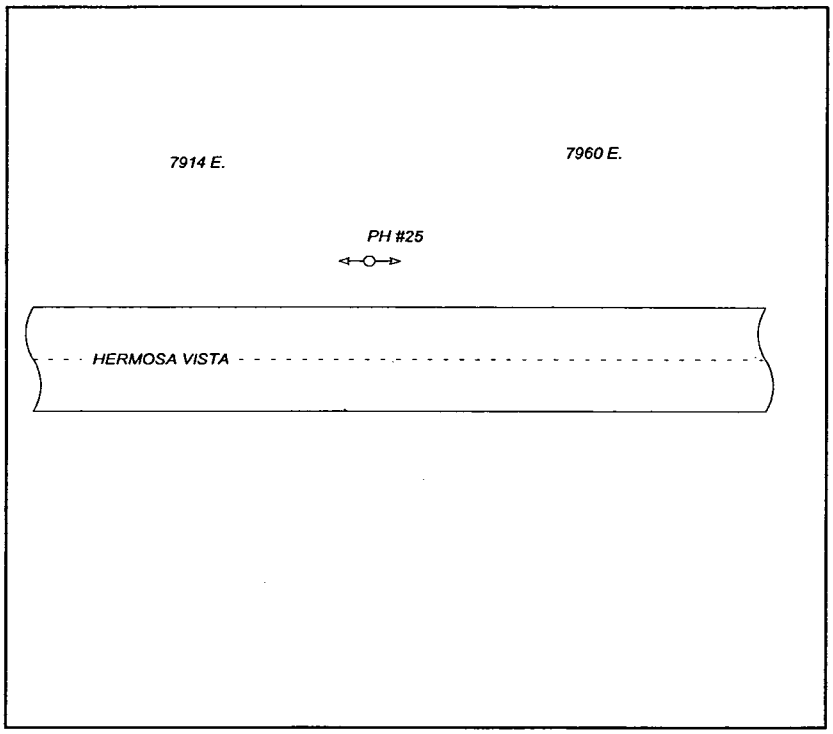
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	25	SUE Crew	J. Garcia
Date Dug	9/14/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 300' west of 80th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1655.01
	WIDTH/O.D.: 4.5"
	TOP ELEVATION: 1649.77 — TOP DEPTH (FEET): 5.24
	BOTTOM ELEVATION: 1649.39 — BOTTOM (FEET): 5.62
RIBBON COLOR: Yellow	

COORDINATES: NORTHING	894509.34	EASTING	778395.21
STATIONING: STATION	48+21.38	OFFSET	5.57 RT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	4"	TYPE	PE
FACILITY OWNER	Gas		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

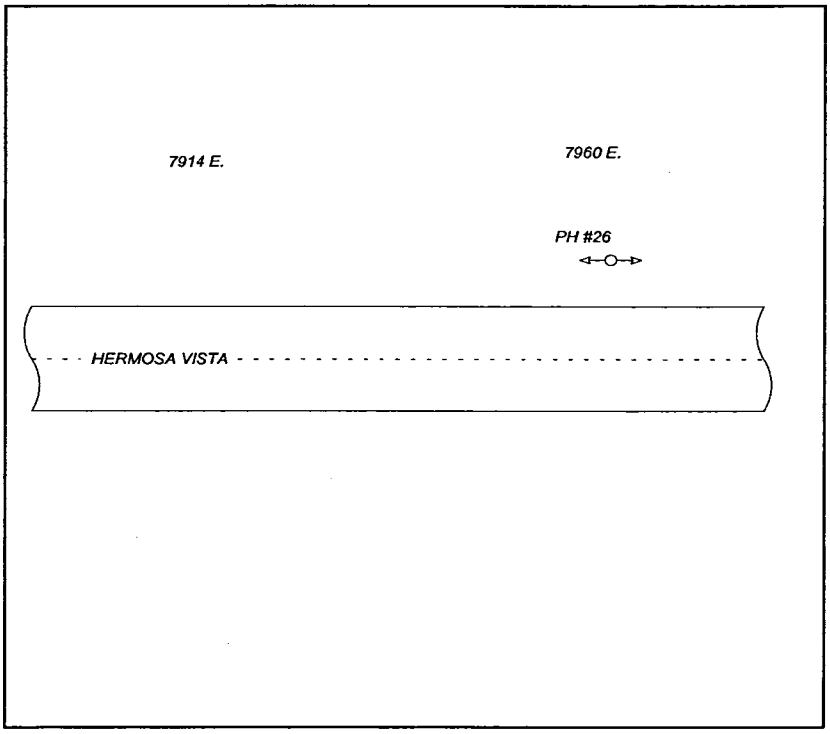
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	26	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & west of 80th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1656.33
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1650.93 — TOP DEPTH (FEET): 5.40
	BOTTOM ELEVATION: 1649.77 — BOTTOM (FEET): 6.56
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894541.08	EASTING	778482.98
STATIONING: STATION	49+09.26	OFFSET	25.85 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	27	SUE Crew	J. Brandt
Date Dug	9/19/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & 80th Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING _____
ELEV. = 1707.29'	SURFACE ELEVATION _____ WIDTH/O.D. _____
	TOP ELEVATION _____ TOP DEPTH (FEET) _____
	BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING None EASTING None

STATIONING: STATION None OFFSET None

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

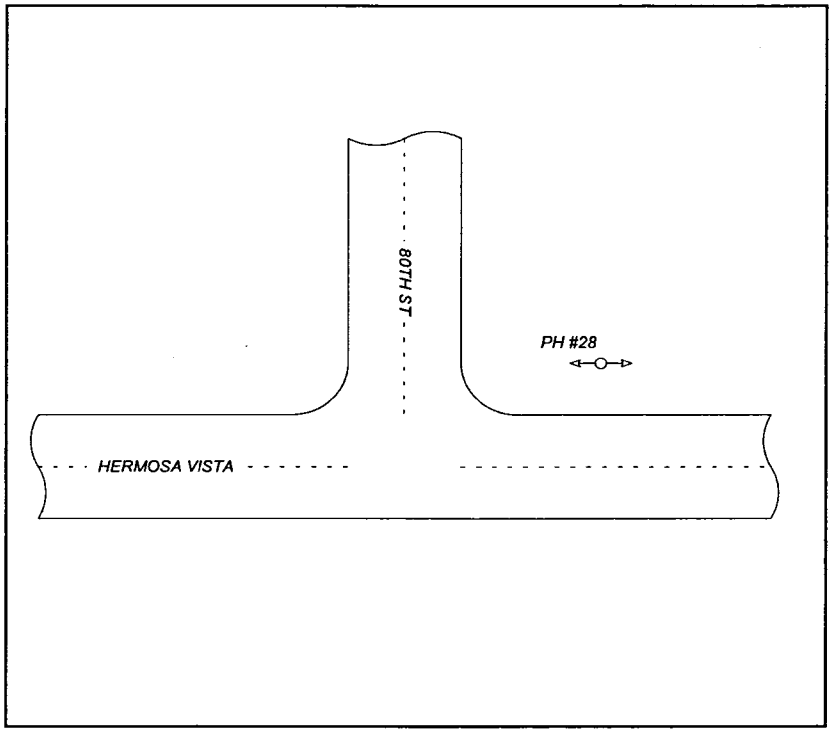
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	28	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & 80th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1661.35
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1656.95 — TOP DEPTH (FEET): 4.40
	BOTTOM ELEVATION: 1655.79 — BOTTOM (FEET): 5.56
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894536.72	EASTING	778774.36
STATIONING: STATION	52+00.51	OFFSET	20.72 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

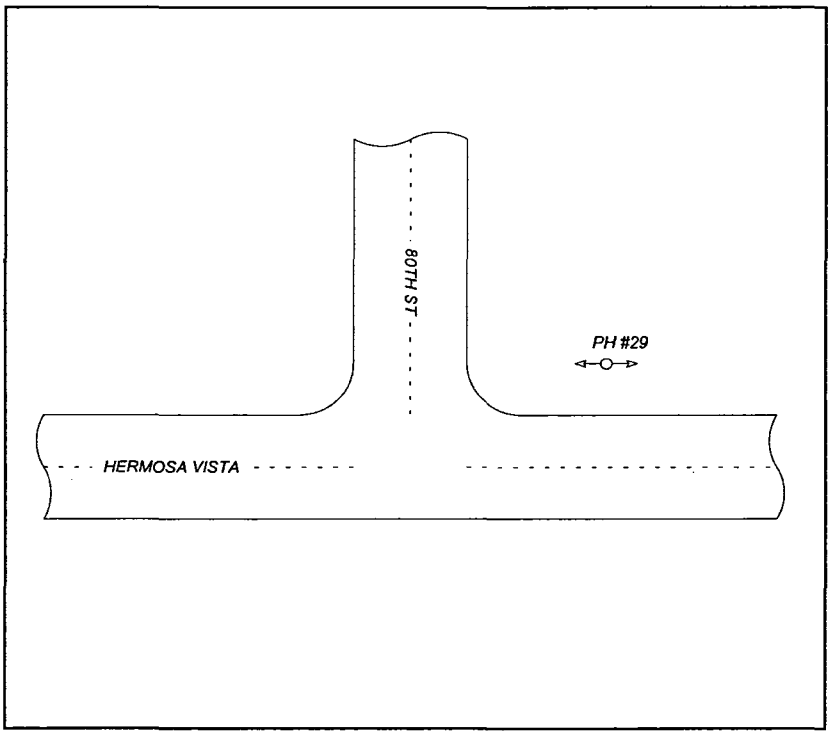
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	29	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & 80th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1661.10
	WIDTH/O.D.: 6.91"
	TOP ELEVATION: 1657.20 — TOP DEPTH (FEET): 3.90
	BOTTOM ELEVATION: 1656.62 — BOTTOM (FEET): 4.48
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894542.26	EASTING	778774.28
STATIONING: STATION	52+00.43	OFFSET	26.26 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	6"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

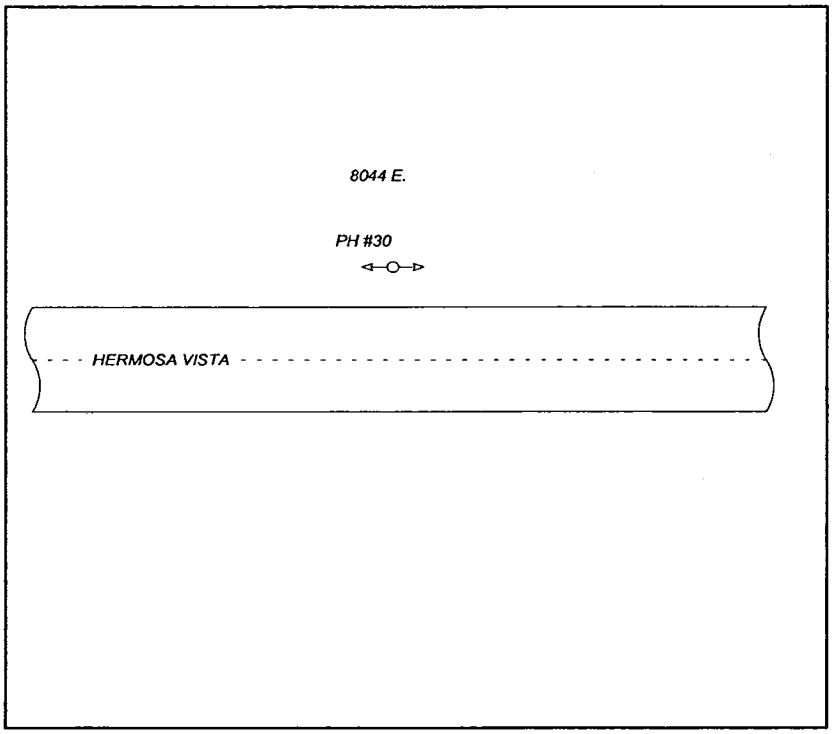
CHECKED BY: A. Mehler

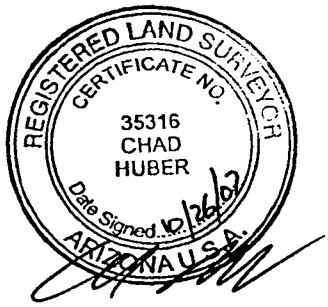
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	30	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 300' east of 80th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1667.35
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1662.83 — TOP DEPTH (FEET): 4.52
	BOTTOM ELEVATION: 1661.67 — BOTTOM (FEET): 5.68
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894536.85	EASTING	779068.84
STATIONING: STATION	54+95.00	OFFSET	21.35 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

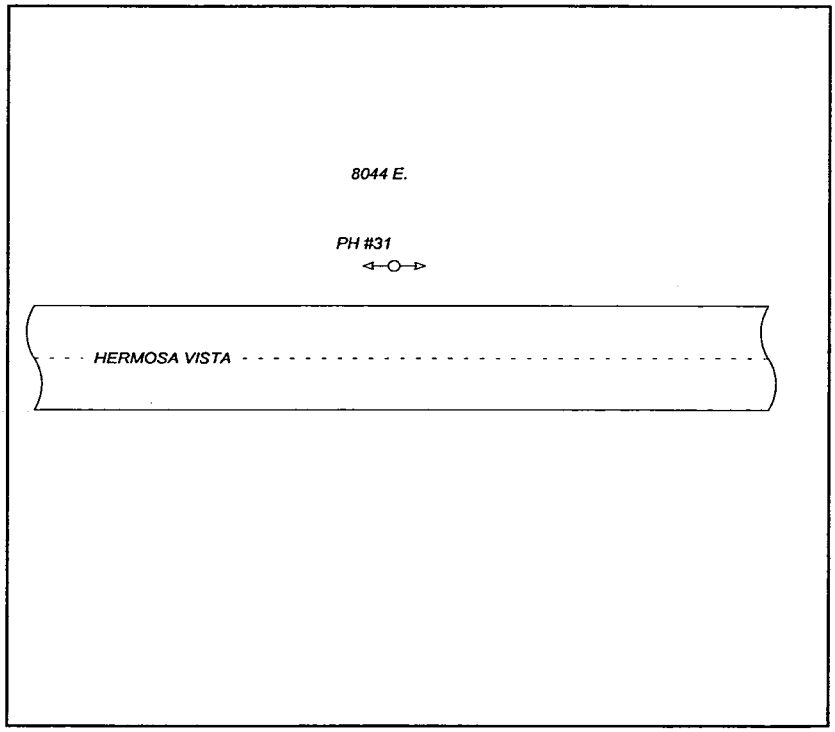
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	31	SUE Crew	J. Garcia
Date Dug	9/13/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 300' east of 80th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West		
ELEV. = 1707.29'	SURFACE ELEVATION	1667.39	WIDTH/O.D. 6.91"	
	TOP ELEVATION	1664.49	2.90	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1663.91	3.48	BOTTOM (FEET)
RIBBON COLOR Blue				

COORDINATES:	NORTHING	894541.73	EASTING	779066.49	
STATIONING:	STATION	54+92.64	OFFSET	26.23 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	6"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

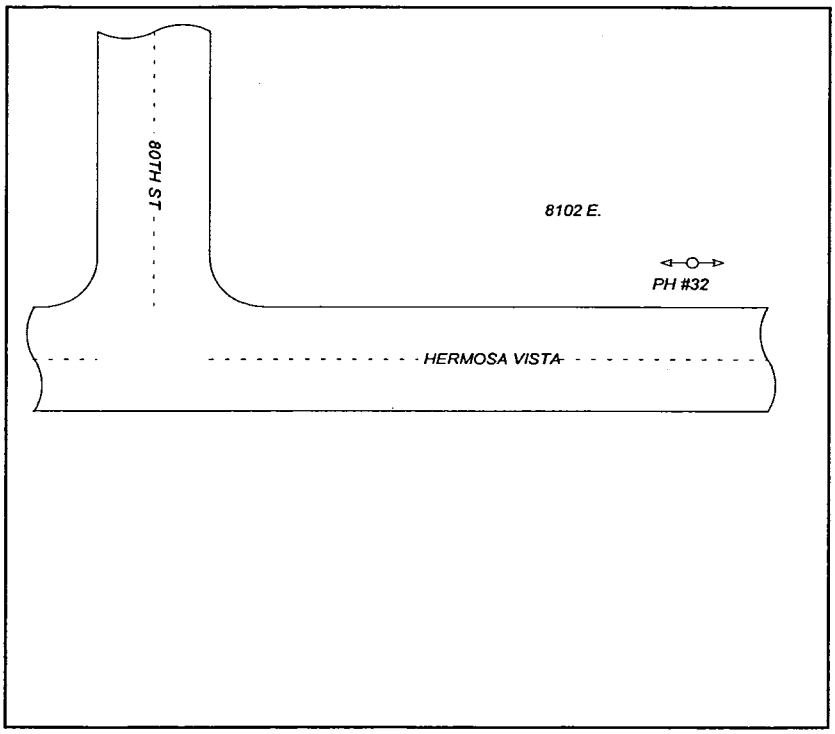
CHECKED BY: A. Mehler

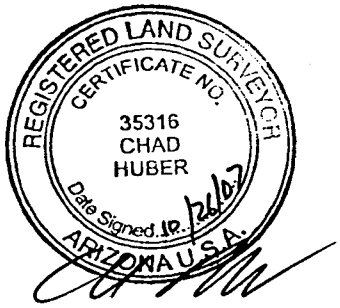
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	32	SUE Crew	J. Nowels
Date Dug	9/13/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 550' east of 80th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1671.49	
	WIDTH/O.D.	13.92"	
	TOP ELEVATION	1666.05	5.44 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1664.89	6.60 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES:	NORTHING	894537.17	EASTING	779317.68	
STATIONING:	STATION	57+43.83	OFFSET	22.10 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

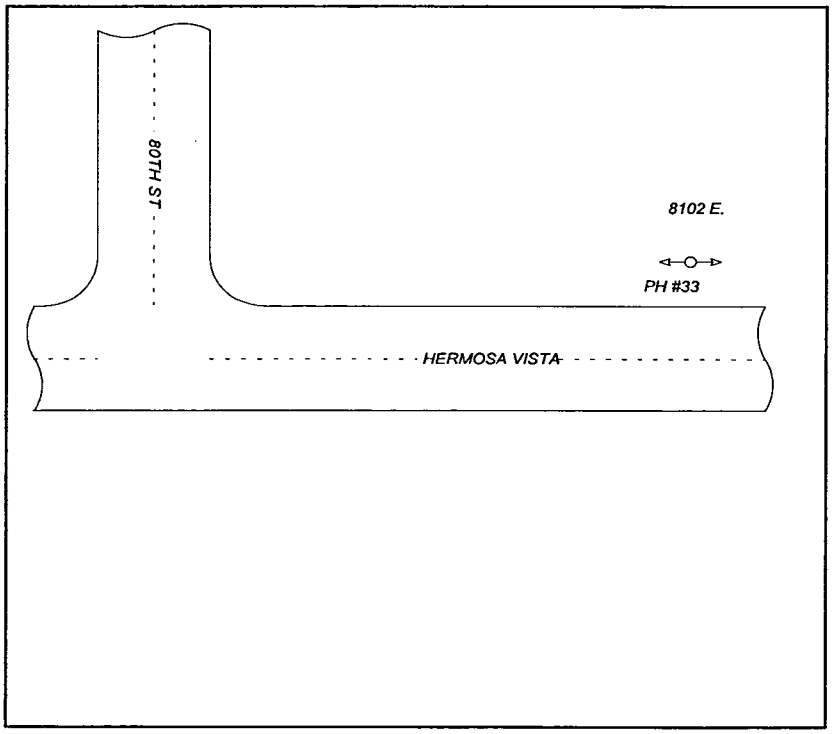
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	33	SUE Crew	J. Nowels
Date Dug	9/13/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 550' east of 80th Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1671.69	
	WIDTH/O.D.	6.91"	
	TOP ELEVATION	1667.47	4.22 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1666.89	4.80 BOTTOM (FEET)
RIBBON COLOR	Blue		

COORDINATES: NORTHING	894542.18	EASTING	779318.15
STATIONING: STATION	57+44.29	OFFSET	27.12 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	6"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	34	SUE Crew	J. Brandt
Date Dug	9/19/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 600' east of 80th Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING _____
ELEV. = 1707.29'	SURFACE ELEVATION _____ WIDTH/O.D. _____
	TOP ELEVATION _____ TOP DEPTH (FEET) _____
	BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING None EASTING None

STATIONING: STATION None OFFSET None

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

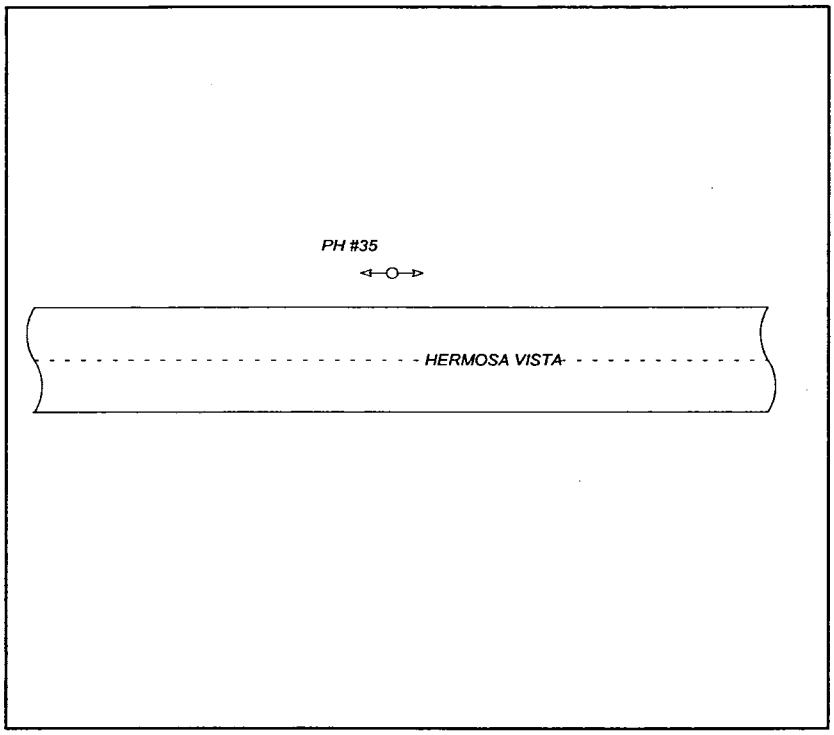
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	35	SUE Crew	J. Garcia
Date Dug	~~9/14/2007~~	~~Truck #~~	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' west of 82nd Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West		
ELEV. = 1707.29'	SURFACE ELEVATION	1673.07	WIDTH/O.D. 13.92"	
	TOP ELEVATION	1668.17	4.90	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1667.01	6.06	BOTTOM (FEET)
RIBBON COLOR Blue				

COORDINATES:	NORTHING	894537.54	EASTING	779519.53	
STATIONING:	STATION	59+45.68	OFFSET	22.82 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

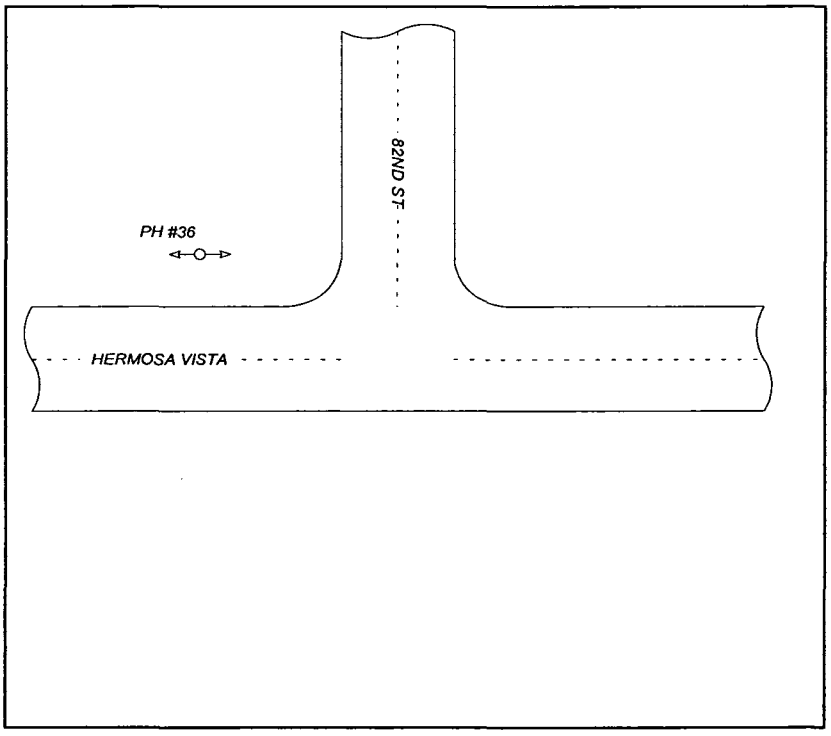
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	36	SUE Crew	J. Nowels
Date Dug	9/14/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' west of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1682.99	
	WIDTH/O.D.	13.92"	
	TOP ELEVATION	1677.05	5.94 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1675.89	7.10 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES: NORTHING	894536.65	EASTING	779902.92
STATIONING: STATION	63+29.08	OFFSET	22.59 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

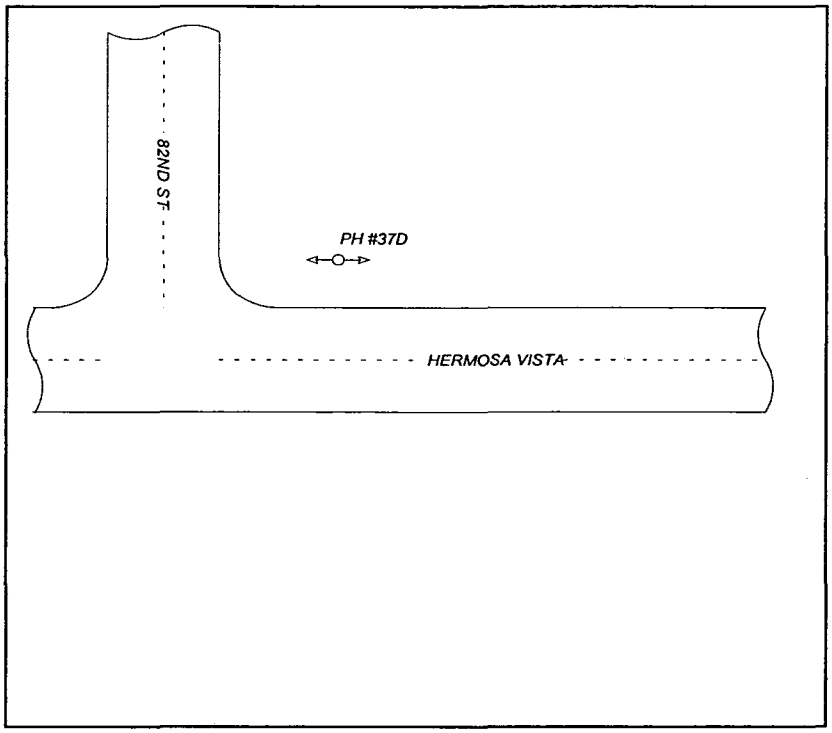
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	37	SUE Crew	J. Garcia
Date Dug	9/25/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 100' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: East
ELEV. = 1707.29'	SURFACE ELEVATION: 1687.09
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1681.79 — TOP DEPTH (FEET): 5.30
	BOTTOM ELEVATION: 1680.63 — BOTTOM (FEET): 6.46
RIBBON COLOR: Blue	

COORDINATES: NORTHING 894530.89 EASTING 780139.27

STATIONING: STATION 65+65.44 OFFSET 17.23 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE 12" TYPE ACP FACILITY OWNER City of Mesa Water

COMMENTS:

Found at correct station on the 6th attempt.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

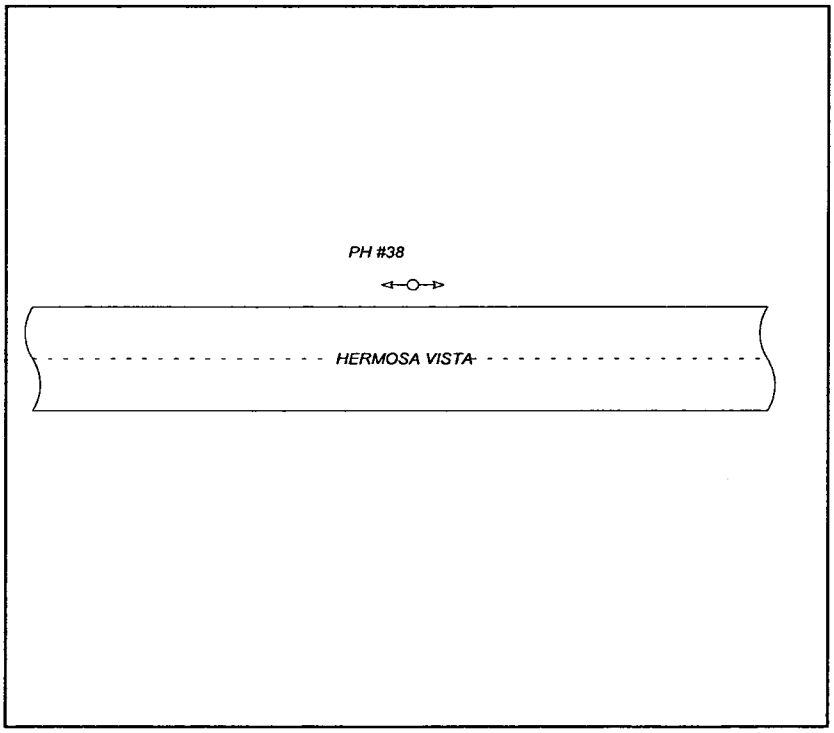
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	38	SUE Crew	J. Garcia
Date Dug	9/14/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 100' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West		
ELEV. = 1707.29'	SURFACE ELEVATION	1686.85	WIDTH/O.D. 2"	
	TOP ELEVATION	1684.55	2.30	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1684.38	2.47	BOTTOM (FEET)
RIBBON COLOR Orange				

COORDINATES: NORTHING 894531.87 EASTING 780139.64

STATIONING: STATION 65+65.80 OFFSET 18.21 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 2" TYPE PE FACILITY OWNER Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

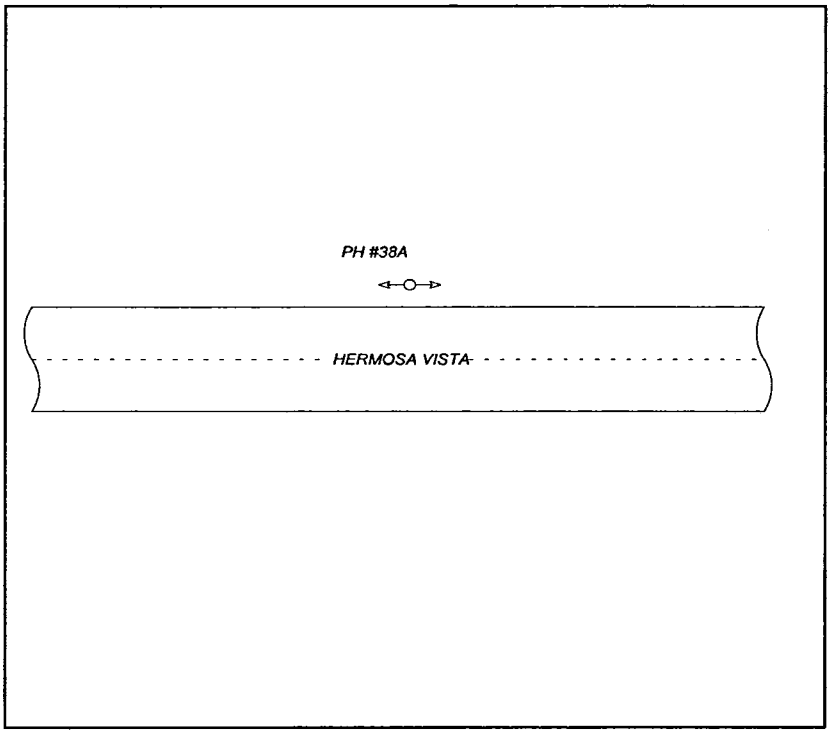
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	38A	SUE Crew	J. Garcia
Date Dug	9/14/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 100' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Orange

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1687.00	WIDTH/O.D. 6"	
TOP ELEVATION	1682.60	4.40	TOP DEPTH (FEET)
BOTTOM ELEVATION	1682.02	4.98	BOTTOM (FEET)

COORDINATES: NORTHING 894530.19 EASTING 780139.30

STATIONING: STATION 65+65.46 OFFSET 16.53 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE See Comments TYPE See Comments FACILITY OWNER Cox Communications

COMMENTS:

Found one 4" PVC conduit & one 2" PE cable.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

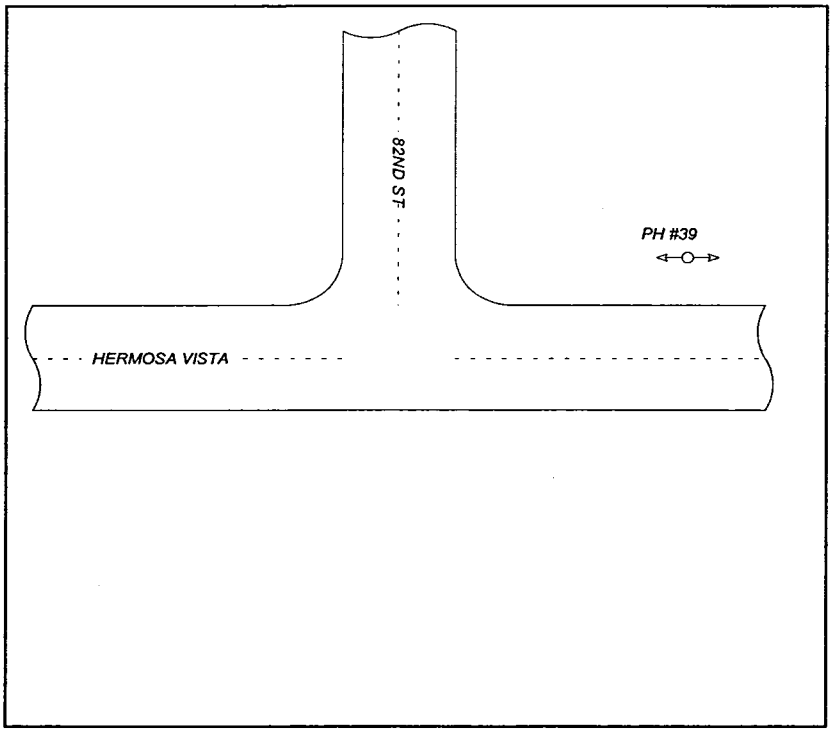
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	39	SUE Crew	J. Nowels
Date Dug	9/14/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1688.79
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1684.69 — TOP DEPTH (FEET): 4.10
	BOTTOM ELEVATION: 1688.79 — BOTTOM (FEET)
RIBBON COLOR: Blue	

COORDINATES: NORTHING	894539.52	EASTING	780238.78
STATIONING: STATION	66+64.93	OFFSET	26.03 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	12"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

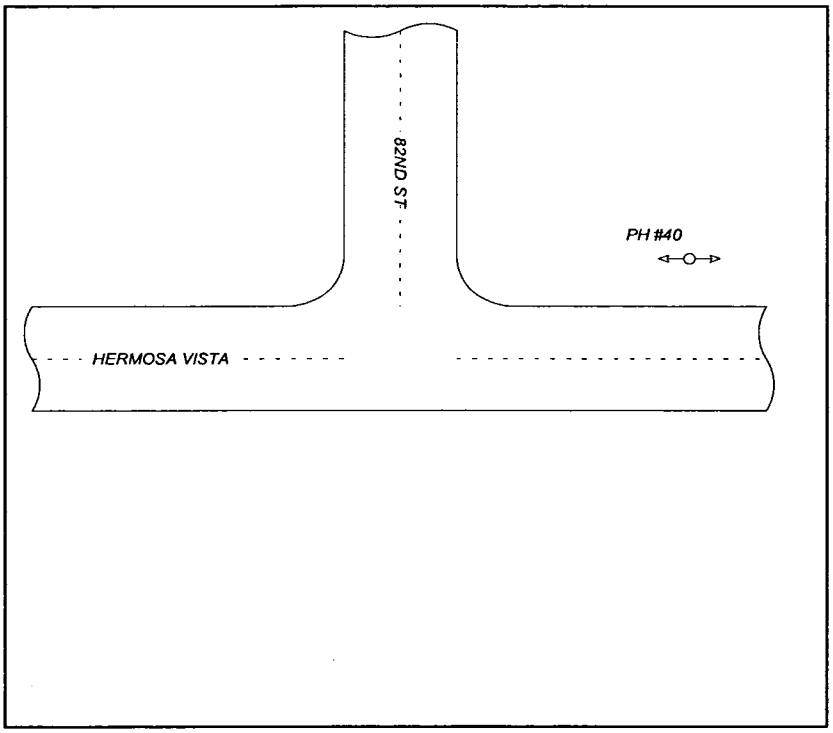
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	40	SUE Crew	J. Nowels
Date Dug	9/14/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 200' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1688.86
	WIDTH/O.D.: 4"
	TOP ELEVATION: 1686.26 — TOP DEPTH (FEET): 2.60
	BOTTOM ELEVATION: 1685.92 — BOTTOM (FEET): 2.94
RIBBON COLOR: Orange	

COORDINATES: NORTHING	894533.52	EASTING	780238.74
STATIONING: STATION	66+64.90	OFFSET	20.03 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	One 2" & One 1"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

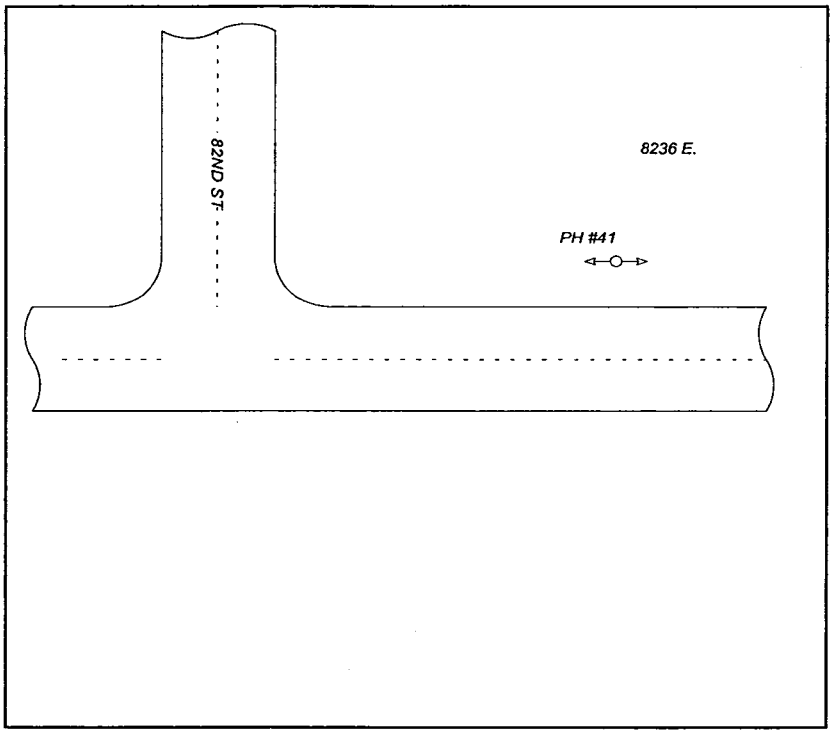
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	41	SUE Crew	J. Nowels
Date Dug	9/14/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 300' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ HAWES RD & HERMOSA VISTA DR	
ELEV. = 1707.29'	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1691.27	WIDTH/O.D. 13.92"	
TOP ELEVATION	1687.71	3.56	TOP DEPTH (FEET)
BOTTOM ELEVATION	1686.55	4.72	BOTTOM (FEET)

COORDINATES:	NORTHING	894540.16	EASTING	780345.17	
STATIONING:	STATION	67+71.32	OFFSET	26.86 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

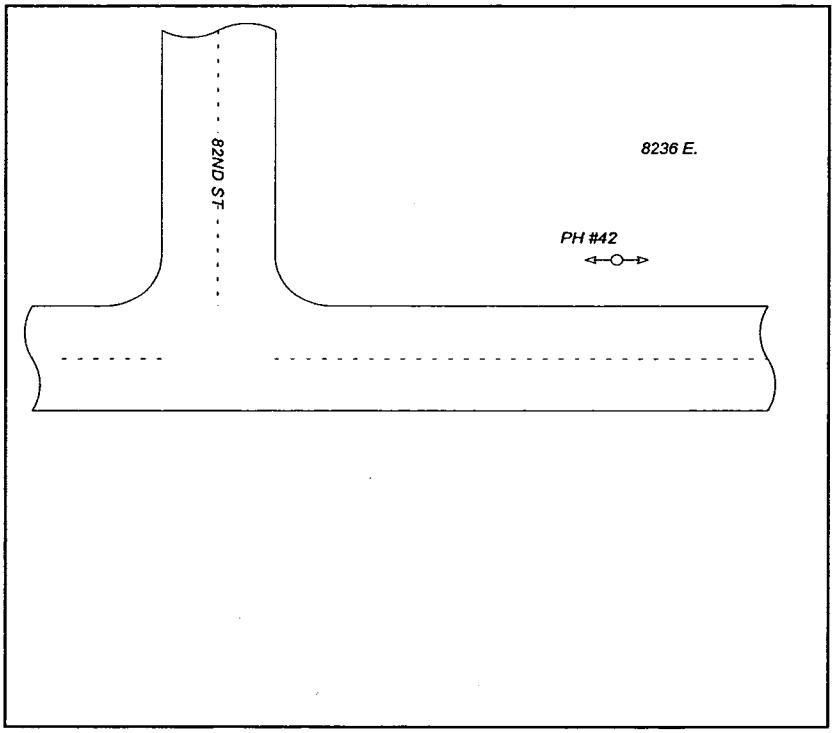
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	42	SUE Crew	J. Nowels
Date Dug	9/14/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 300' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1690.90
	WIDTH/O.D.: 6"
	TOP ELEVATION: 1688.82 — TOP DEPTH (FEET): 2.08
	BOTTOM ELEVATION: 1688.60 — BOTTOM (FEET): 2.30
RIBBON COLOR: Orange	

COORDINATES: NORTHING	894534.34	EASTING	780343.37
STATIONING: STATION	67+69.53	OFFSET	21.03 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	One 2" & One 1"	TYPE	PE
FACILITY OWNER	Qwest Local Network		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

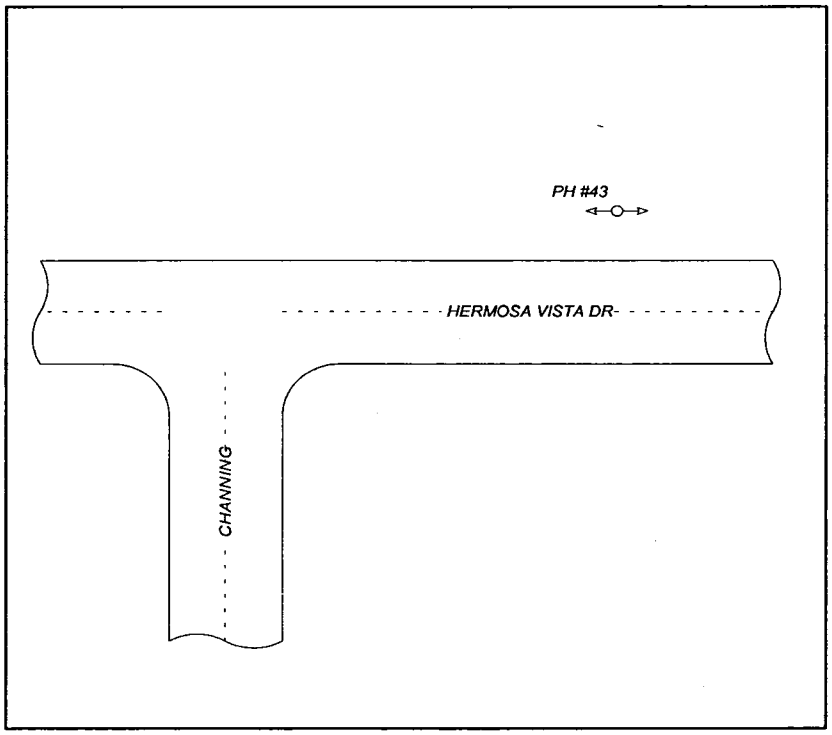
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	43	SUE Crew	J. Nowels
Date Dug	9/17/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 400' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1694.35
	WIDTH/O.D.: 13.92"
	TOP ELEVATION: 1688.13 — TOP DEPTH (FEET): 6.22
	BOTTOM ELEVATION: 1686.97 — BOTTOM (FEET): 7.38
RIBBON COLOR: Blue	

COORDINATES: NORTHING 894540.96 EASTING 780496.31

STATIONING: STATION 69+22.46 OFFSET 27.91 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE ACP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

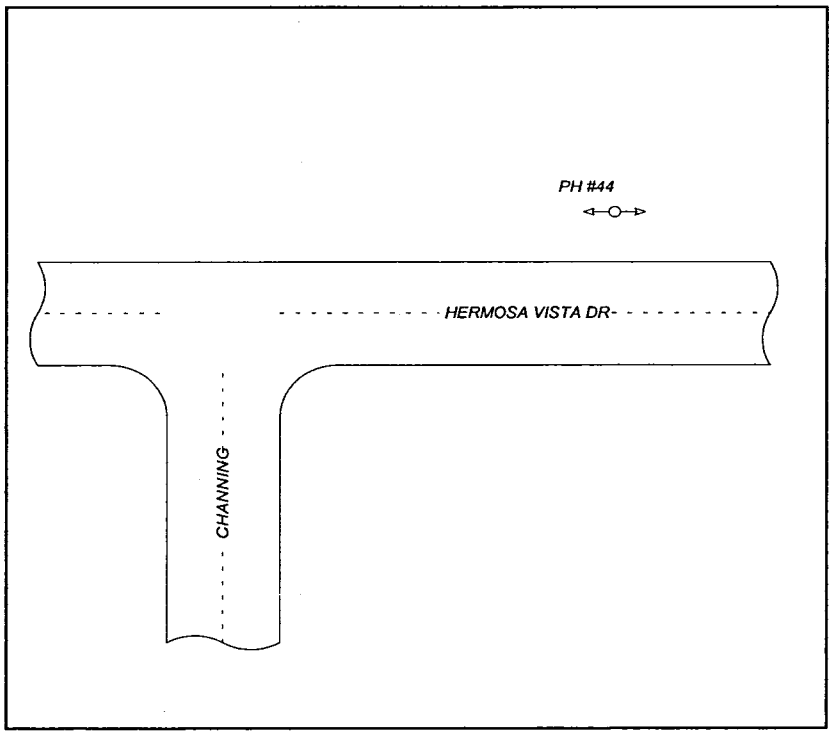
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	44	SUE Crew	J. Nowels
Date Dug	9/17/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 400' east of 82nd Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1694.54
	WIDTH/O.D.: 2"
	TOP ELEVATION: 1690.88 — TOP DEPTH (FEET): 3.66
	BOTTOM ELEVATION: 1690.71 — BOTTOM (FEET): 3.83
RIBBON COLOR: Orange	

COORDINATES: NORTHING	894536.67	EASTING	780499.31
STATIONING: STATION	69+25.46	OFFSET	23.63 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	2"	TYPE	PE
FACILITY OWNER	Qwest Local Network		

COMMENTS:

PREPARED BY: M. Jubie

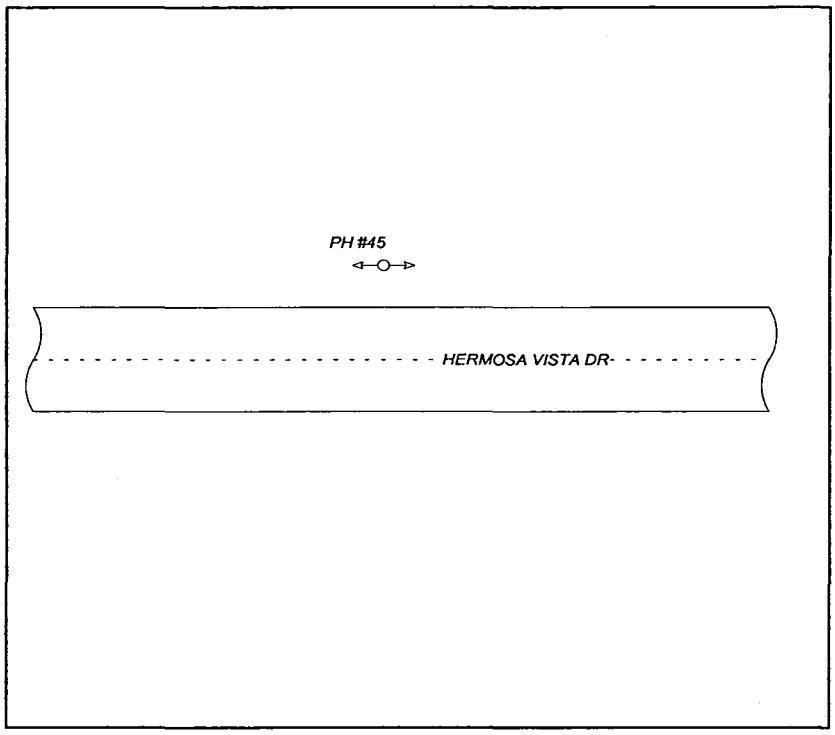
CHECKED BY: A. Mehler

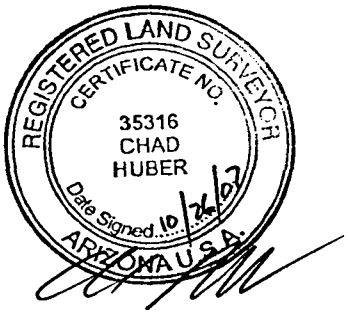
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	45	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 600' west of Hawes Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1695.41	WIDTH/O.D. 13.92"
	TOP ELEVATION	1690.31	5.10 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1689.15	6.26 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES: NORTHING 894540.25 EASTING 780696.13

STATIONING: STATION 71+22.28 OFFSET 27.55 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE ACP FACILITY OWNER City of Mesa Water

COMMENTS:

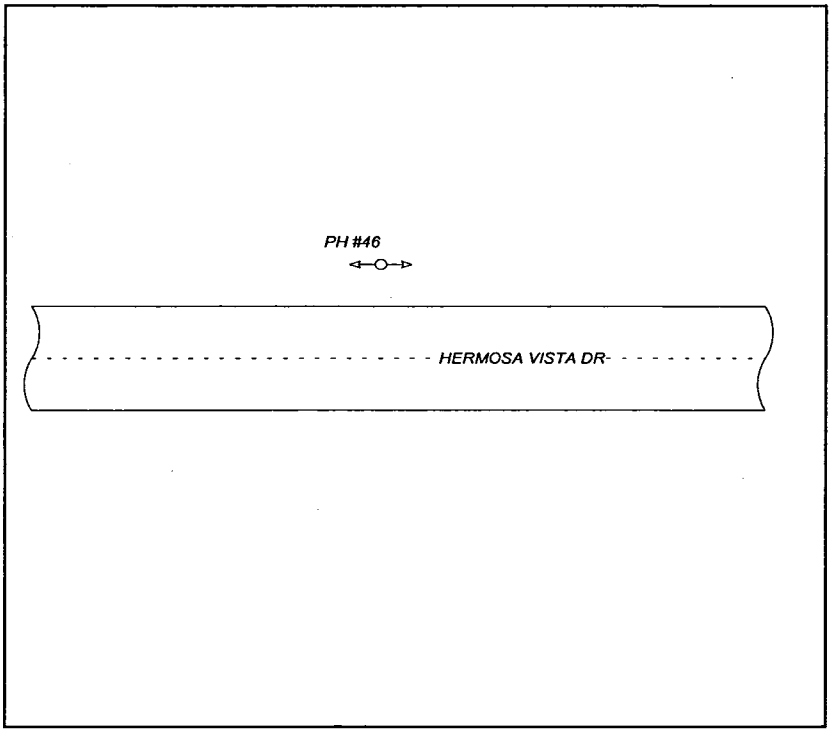
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

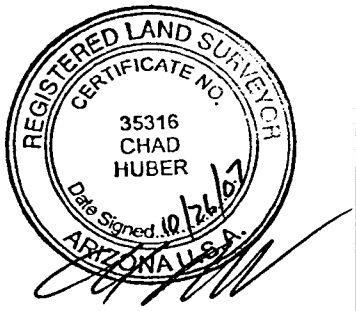
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	46	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 600' west of Hawes Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Orange

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1695.21	WIDTH/O.D. 2"		
TOP ELEVATION	1692.41		2.80	TOP DEPTH (FEET)
BOTTOM ELEVATION	1692.24		2.97	BOTTOM (FEET)

COORDINATES: NORTHING 894535.83 EASTING 780695.35

STATIONING: STATION 71+21.51 OFFSET 23.13 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 2" TYPE PE FACILITY OWNER Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

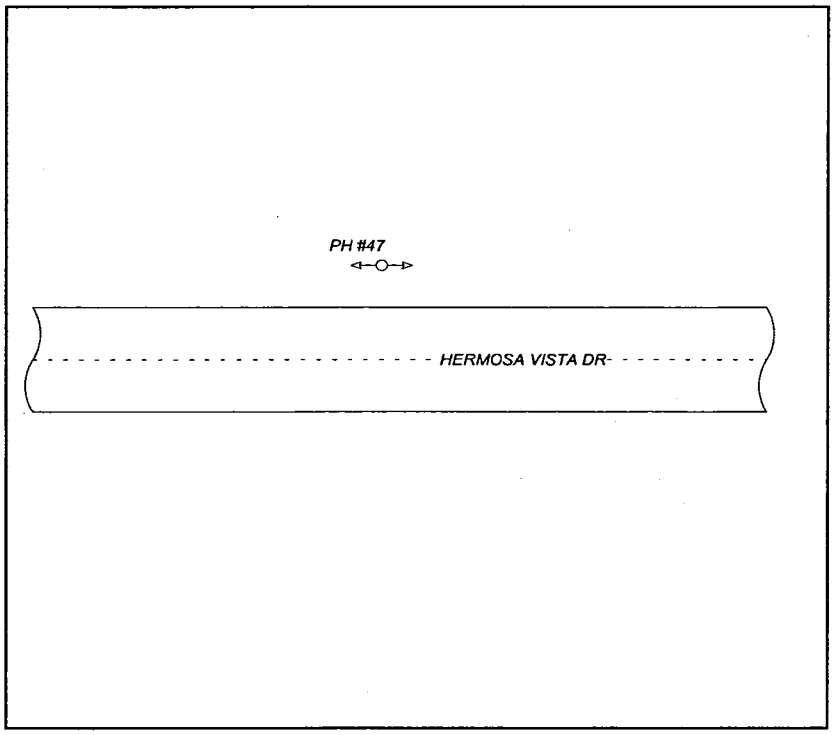
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	47	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 550' west of Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ HAWES RD & HERMOSA VISTA DR	
ELEV. = 1707.29'	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1695.75	WIDTH/O.D. 13.92"	
TOP ELEVATION	1691.35	4.40	TOP DEPTH (FEET)
BOTTOM ELEVATION	1690.19	5.56	BOTTOM (FEET)

COORDINATES: NORTHING	894539.92	EASTING	780730.65
STATIONING: STATION	71+56.80	OFFSET	27.27 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	12"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

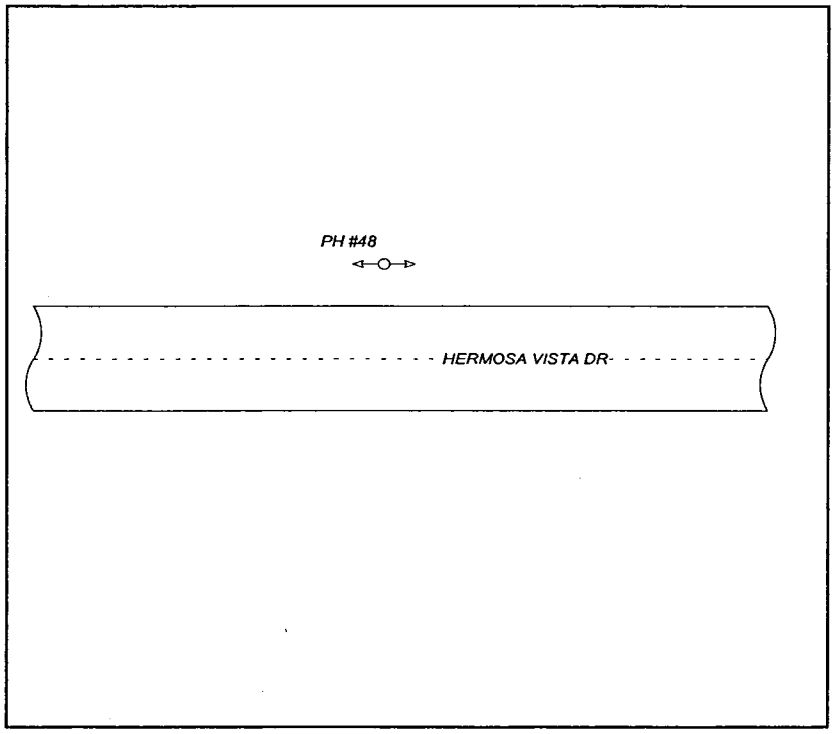
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	48	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 550' west of Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Orange

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1695.55	WIDTH/O.D. 2"	
TOP ELEVATION	1693.31	2.24	TOP DEPTH (FEET)
BOTTOM ELEVATION	1693.14	2.41	BOTTOM (FEET)

COORDINATES: NORTHING	894535.11	EASTING	780729.85
STATIONING: STATION	71+56.00	OFFSET	22.47 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	2"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

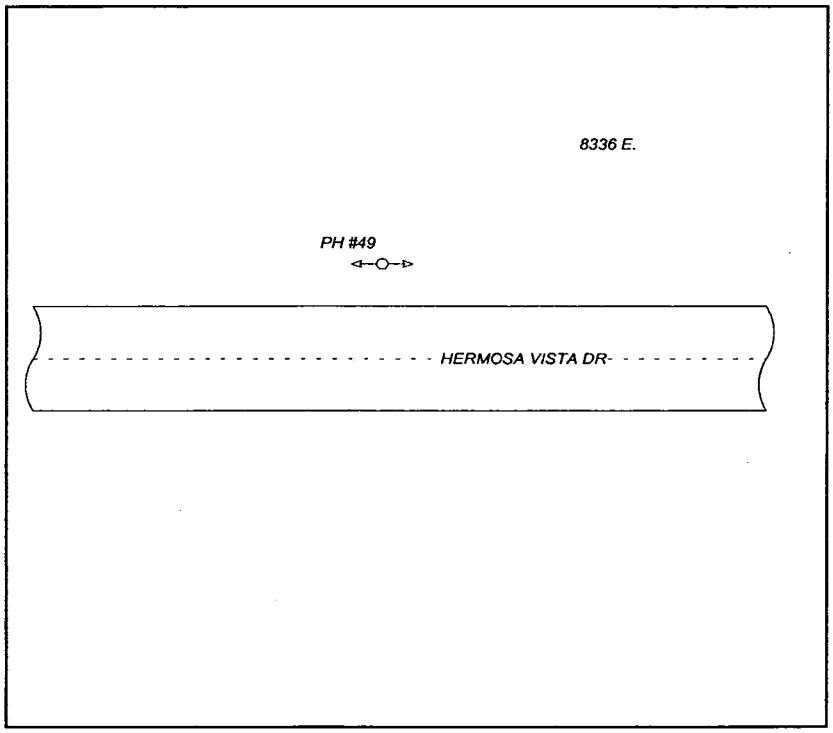
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	49	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 400' west of Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR Blue

CROSS SECTION - NOT TO SCALE

FACING West

SURFACE ELEVATION	1698.62	WIDTH/O.D. 13.92"	
TOP ELEVATION	1694.92	3.70	TOP DEPTH (FEET)
BOTTOM ELEVATION	1693.76	4.86	BOTTOM (FEET)

COORDINATES: NORTHING 894540.14 EASTING 780876.05

STATIONING: STATION 73+02.19 OFFSET 27.75 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE ACP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

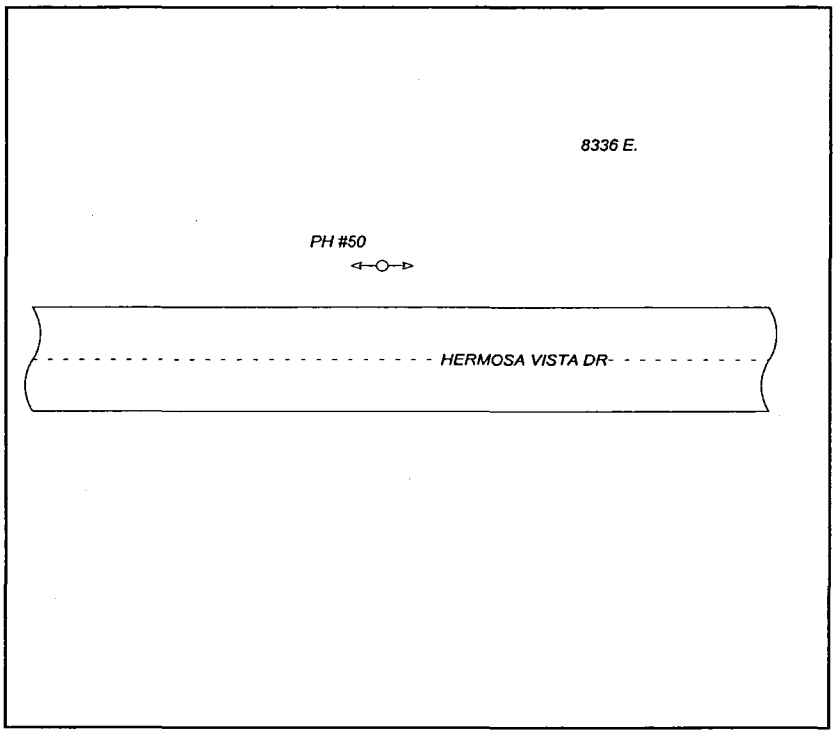
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	50	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 400' west of Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1698.47	
	WIDTH/O.D.	2"	
	TOP ELEVATION	1696.67	1.80 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1696.50	1.97 BOTTOM (FEET)
RIBBON COLOR	Orange		

COORDINATES: NORTHING	894535.59	EASTING	780875.47
STATIONING: STATION	73+01.63	OFFSET	23.19 LT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	2"	TYPE	PE
FACILITY OWNER	Qwest Local Network		

COMMENTS:

PREPARED BY: M. Jubie

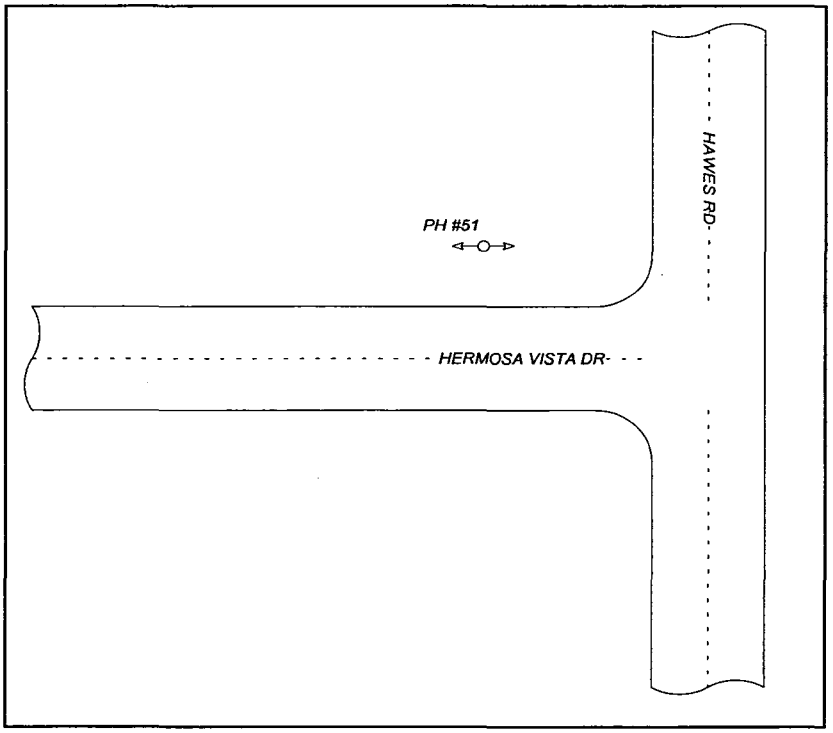
CHECKED BY: A. Mehler

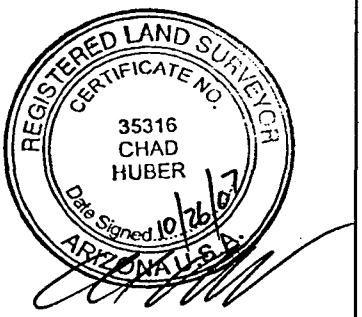
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	51	SUE Crew	J. Nowels
Date Dug	9/17/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & Hawes Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	North		
ELEV. = 1707.29'	SURFACE ELEVATION	1705.23	WIDTH/O.D. 8"	
	TOP ELEVATION	1701.57	3.66	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1700.63	4.60	BOTTOM (FEET)
RIBBON COLOR	Orange			

COORDINATES:	NORTHING	894534.84	EASTING	781256.16	
STATIONING:	STATION	76+82.32	OFFSET	23.10 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	Two 4"	TYPE	PVC	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

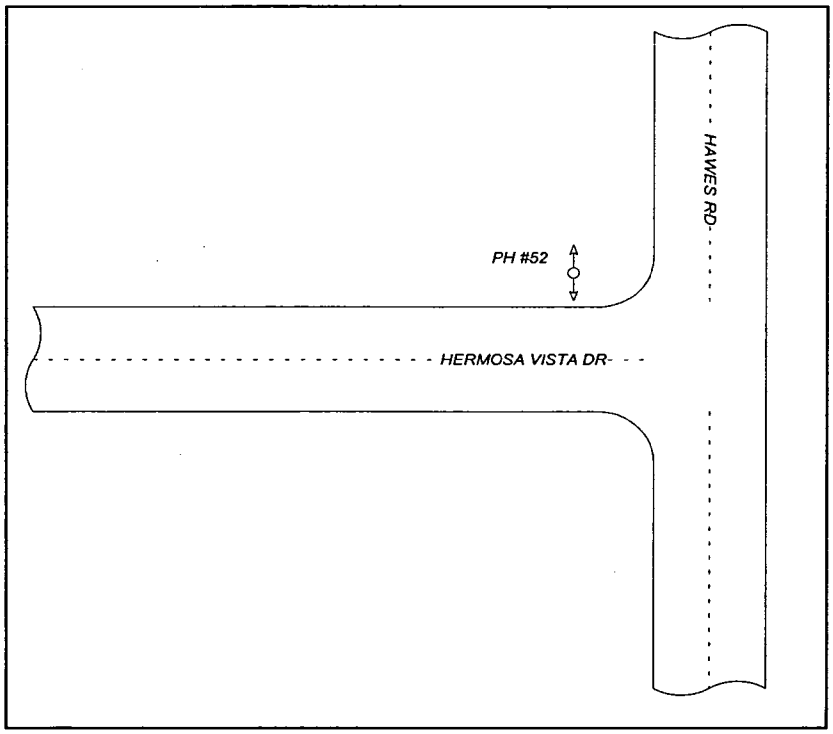
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	52	SUE Crew	J. Nowels
Date Dug	9/17/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive & Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	South	
ELEV. = 1707.29'	SURFACE ELEVATION	1707.65	
	WIDTH/O.D.	24"	
	TOP ELEVATION	1706.55	1.10 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1701.65	6.00 BOTTOM (FEET)
RIBBON COLOR Red			

COORDINATES:	NORTHING	894514.51	EASTING	781301.88	
STATIONING:	STATION	77+28.07	OFFSET	2.84 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	24" Wide	TYPE	Slurry Duct	FACILITY OWNER	Electric

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	53	SUE Crew	C. Allen
Date Surveyed	10/9/2007	Truck #	600
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hawes Road & Mangun Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	East		
ELEV. = 1707.29'	SURFACE ELEVATION	1714.18	WIDTH/O.D. N/A	
	TOP ELEVATION	1714.18	0.00	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1702.03	12.15	BOTTOM (FEET)
RIBBON COLOR Green				

COORDINATES:	NORTHING	894836.44	EASTING	781354.98	
STATIONING:	STATION	81+11.16	OFFSET	4.93 LT	
PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	None
SIZE	N/A	TYPE	Manhole	FACILITY OWNER	City of Mesa Sewer

COMMENTS:

PREPARED BY: M. Jubie

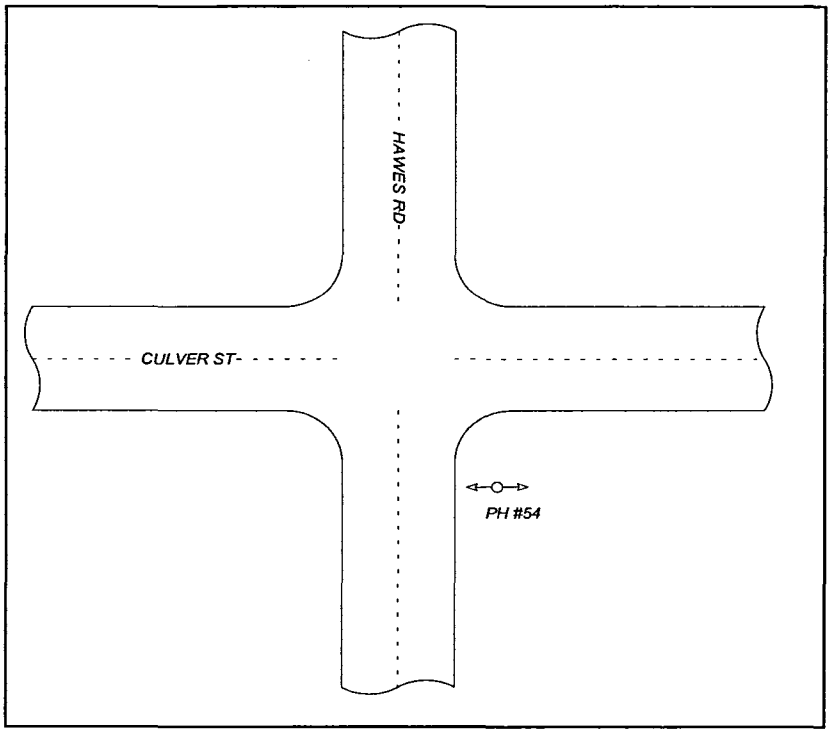
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	54	SUE Crew	J. Nowels
Date Dug	9/19/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hawes Road & Culver Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1730.26	
	WIDTH/O.D.	6.91"	
	TOP ELEVATION	1727.24	3.02 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1726.66	3.60 BOTTOM (FEET)
RIBBON COLOR	Blue		

COORDINATES: NORTHING	895806.12	EASTING	781372.64
STATIONING: STATION	90+80.83	OFFSET	13.27 RT
PAVING THICKNESS	4"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	6"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

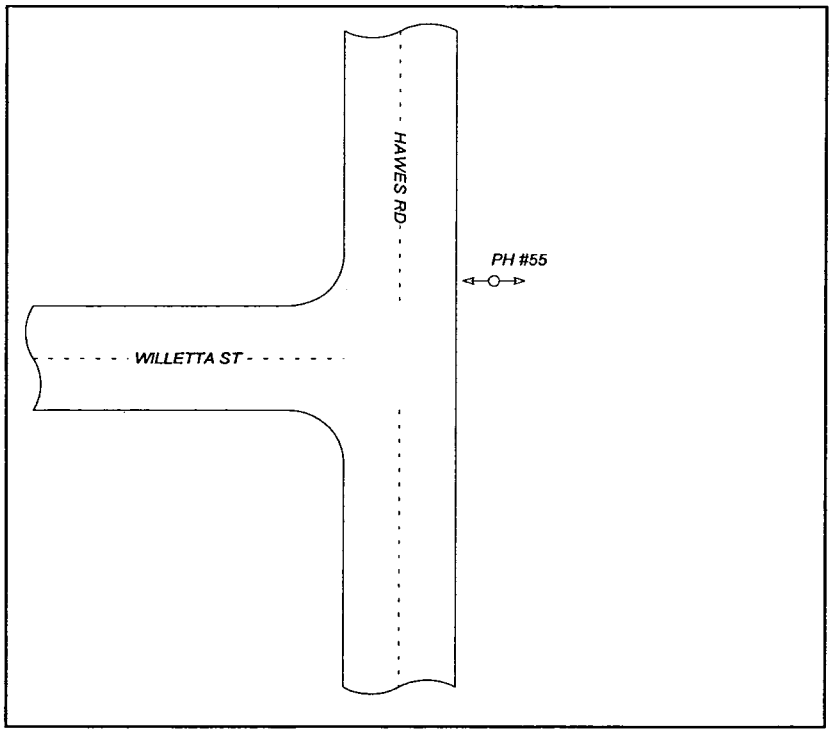
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	55	SUE Crew	J. Nowels
Date Dug	9/19/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hawes Road & Willetta Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1742.52	
	WIDTH/O.D.	13.92"	
	TOP ELEVATION	1737.92	4.60 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1736.76	5.76 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES: NORTHING	896545.06	EASTING	781370.66
STATIONING: STATION	98+19.79	OFFSET	11.01 RT
PAVING THICKNESS	3"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	12"
TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

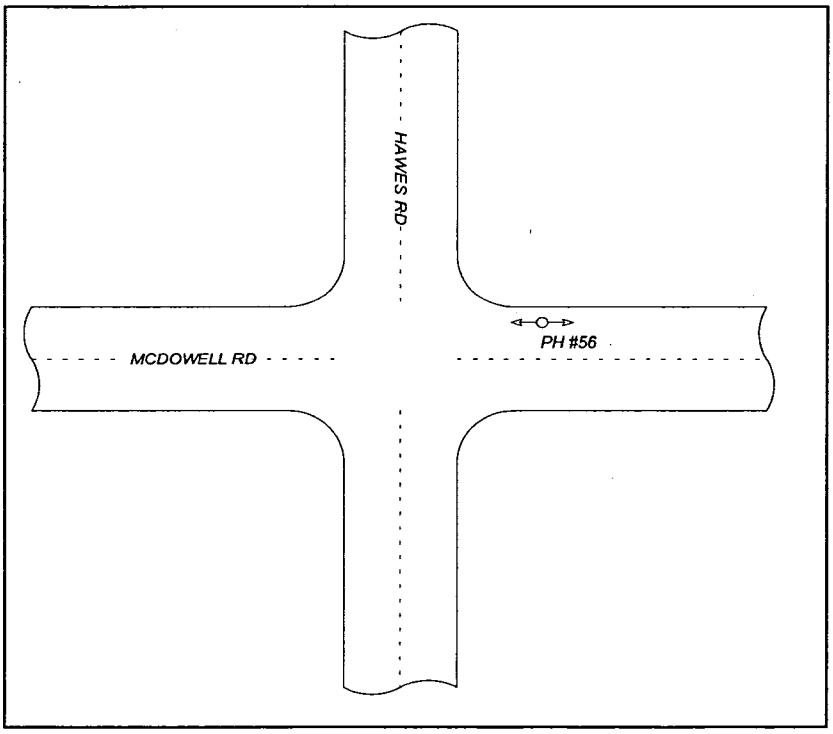
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	56	SUE Crew	J. Garcia
Date Dug	9/18/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1758.25	
	WIDTH/O.D.	9.11"	
	TOP ELEVATION	1754.35	3.90 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1753.59	4.66 BOTTOM (FEET)
RIBBON COLOR	Blue		

COORDINATES: NORTHING	897260.53	EASTING	781505.44
STATIONING: STATION	106+60.10	OFFSET	21.06 LT

PAVING THICKNESS	3"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	8"	TYPE	ACP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	57	SUE Crew	J. Nowels
Date Dug	9/19/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Hawes Road		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING
ELEV. = 1707.29'	SURFACE ELEVATION 1758.47 — WIDTH/O.D.
	TOP ELEVATION — TOP DEPTH (FEET)
	BOTTOM ELEVATION 1753.47 — 5.00 BOTTOM (FEET)
RIBBON COLOR White Paint	

COORDINATES: NORTHING 897246.36 EASTING 781504.95

STATIONING: STATION 106+59.66 OFFSET 6.89 LT

PAVING THICKNESS 4" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER City of Mesa Water

COMMENTS:

Dug to a depth of 5', hit hard dirt and unable to dig deeper.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

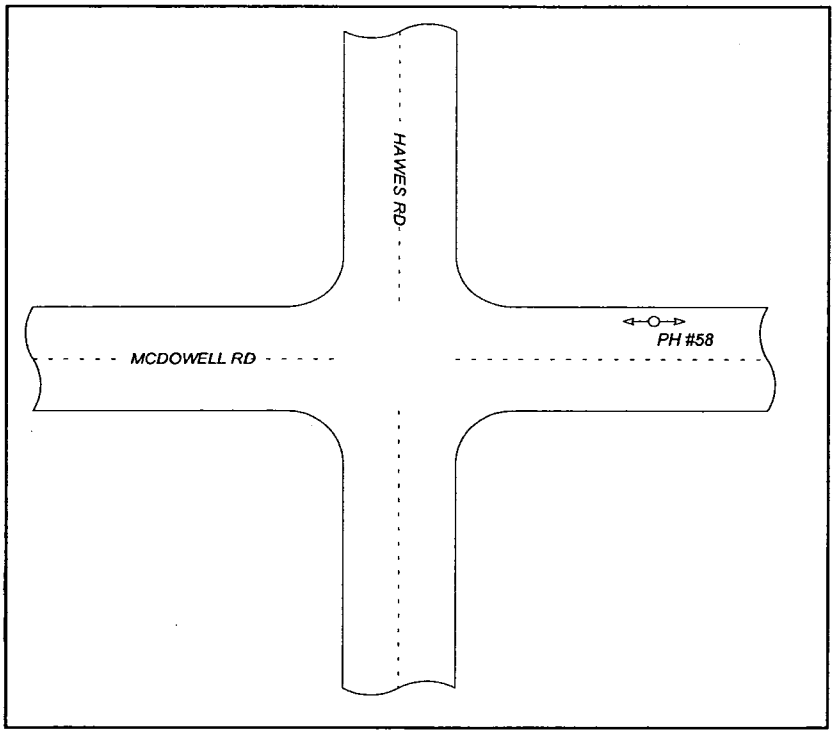
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	58	SUE Crew	J. Nowels
Date Dug	9/19/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1758.17
	WIDTH/O.D.: 4.5"
	TOP ELEVATION: 1755.37 — TOP DEPTH (FEET): 2.80
	BOTTOM ELEVATION: 1754.99 — BOTTOM (FEET): 3.18
RIBBON COLOR: Yellow	

COORDINATES: NORTHING	897267.86	EASTING	781507.67
STATIONING: STATION	106+62.31	OFFSET	28.40 LT
PAVING THICKNESS	5"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	4"	TYPE	STL
FACILITY OWNER	Gas		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

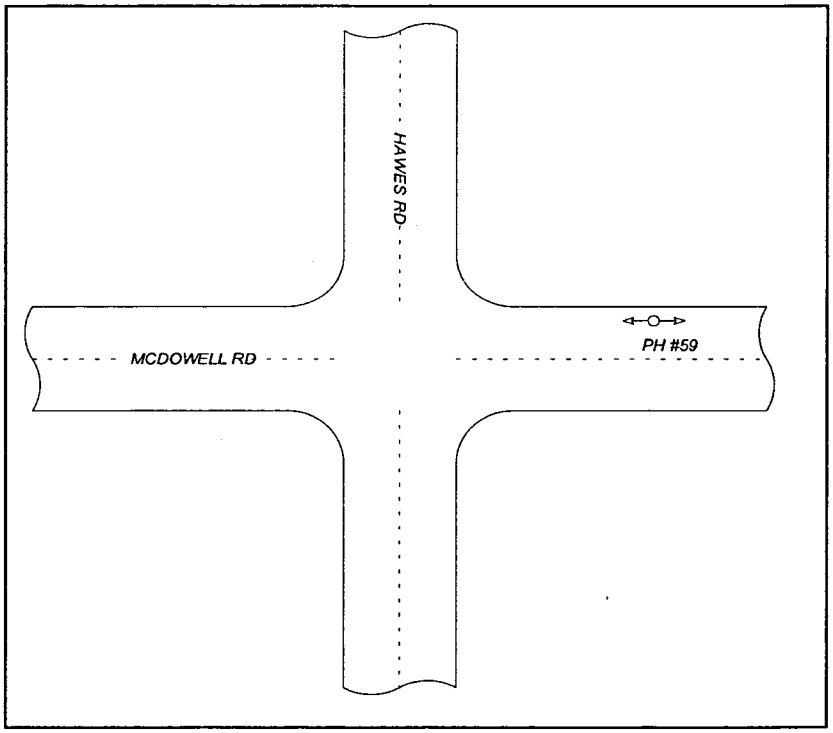
TEST HOLE DATA REPORT

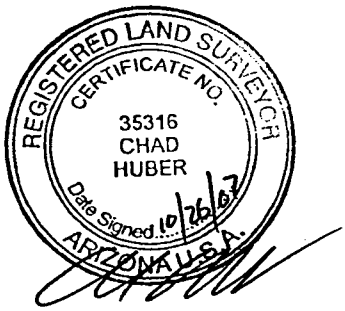
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	59	SUE Crew	J. Nowels
Date Dug	9/18/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Hawes Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West		
ELEV. = 1707.29'	SURFACE ELEVATION	1758.17	WIDTH/O.D. 1"	
	TOP ELEVATION	1754.85	3.32	TOP DEPTH (FEET)
	BOTTOM ELEVATION	1754.77	3.40	BOTTOM (FEET)
RIBBON COLOR Orange				

COORDINATES:	NORTHING	897265.68	EASTING	781507.55	
STATIONING:	STATION	106+62.19	OFFSET	26.22 LT	
PAVING THICKNESS	6"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	1"	TYPE	PE	FACILITY OWNER	Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

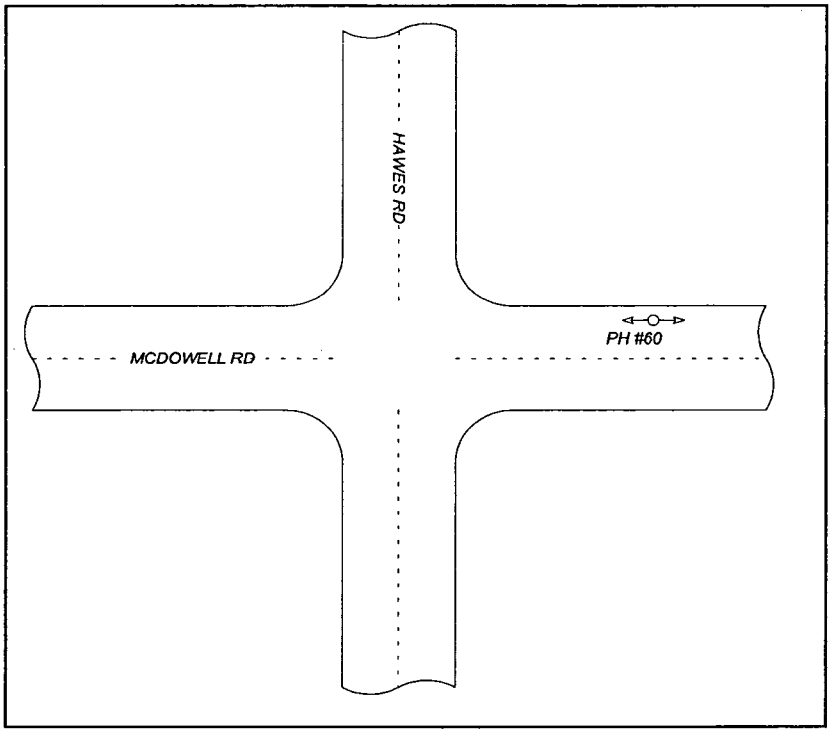
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	60	SUE Crew	J. Nowels
Date Dug	9/18/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Hawes Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1758.20	
	WIDTH/O.D.	21.6"	
	TOP ELEVATION	1753.08	5.12 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1751.28	6.92 BOTTOM (FEET)
RIBBON COLOR Blue			

COORDINATES: NORTHING	897266.90	EASTING	781507.72
STATIONING: STATION	106+62.36	OFFSET	27.44 LT

PAVING THICKNESS	6"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	20"	TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

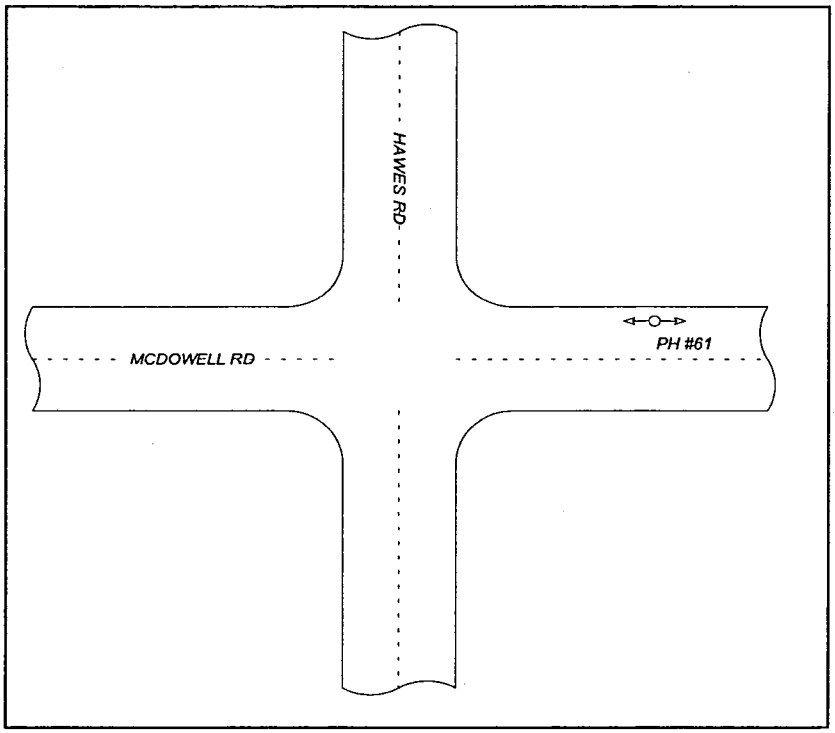
TEST HOLE DATA REPORT

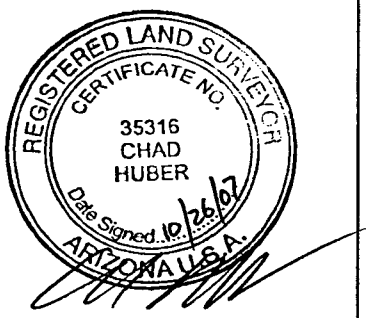
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	61	SUE Crew	J. Nowels
Date Dug	9/18/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road &b Hawes Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Orange

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1758.10	WIDTH/O.D. 3.5"	
TOP ELEVATION	1755.26	2.84	TOP DEPTH (FEET)
BOTTOM ELEVATION	1754.97	3.13	BOTTOM (FEET)

COORDINATES: NORTHING	897271.32	EASTING	781507.23
STATIONING: STATION	106+61.86	OFFSET	31.86 LT
PAVING THICKNESS	6"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	3"	TYPE	PVC
FACILITY OWNER	Cox Communications		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	62	SUE Crew	J. Nowells
Date Dug	9/27/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Waterbury & MacDowell Rd.		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE			
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING			
ELEV. = 1707.29'	SURFACE ELEVATION	1783.71	WIDTH/O.D.	
	TOP ELEVATION			TOP DEPTH (FEET)
	BOTTOM ELEVATION	1778.71		5.00 BOTTOM (FEET)
RIBBON COLOR None				

COORDINATES: NORTHING 897213.39 EASTING 782668.75

STATIONING: STATION 118+23.56 OFFSET 22.27 RT

PAVING THICKNESS 6" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER N/A

COMMENTS:

Dug to 5' deep and swept 6' wide. No facility found.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

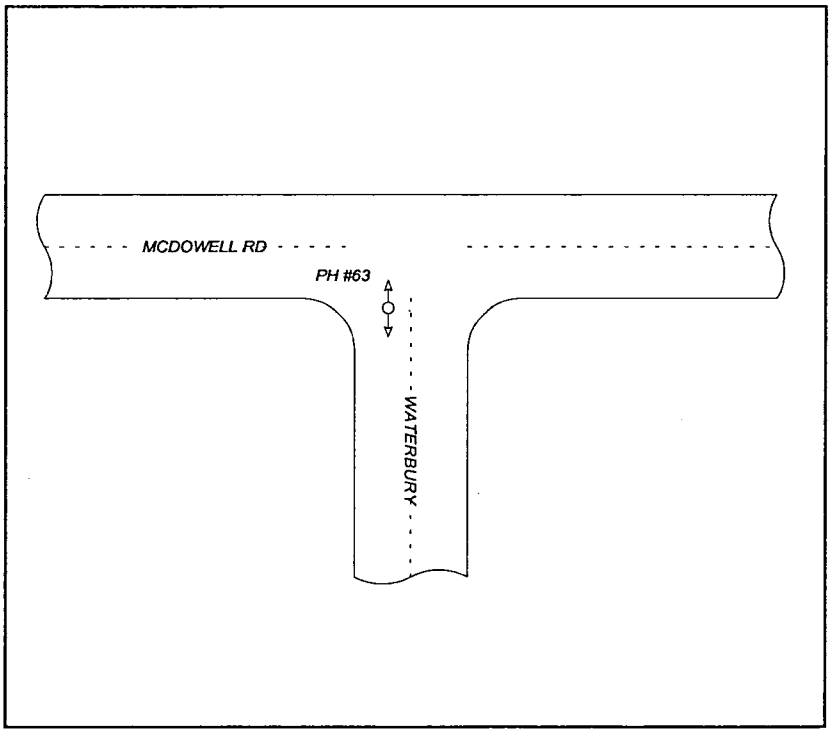
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	63	SUE Crew	J. Nowells
Date Dug	9/27/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Waterbury & McDowell Rd.		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: North
ELEV. = 1707.29'	SURFACE ELEVATION: 1783.79
	WIDTH/O.D.: 9.11
	TOP ELEVATION: 1778.17 — TOP DEPTH (FEET): 5.62
	BOTTOM ELEVATION: 1777.41 — BOTTOM (FEET): 6.38
RIBBON COLOR: Blue	

COORDINATES: NORTHING	897214.30	EASTING	782672.17
STATIONING: STATION	118+26.97	OFFSET	21.35 RT
PAVING THICKNESS	6"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	8"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	64	SUE Crew	J. Nowells
Date Dug	9/27/2007	Truck #	9182
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Waterbury & McDowell Rd.		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING
ELEV. = 1707.29'	SURFACE ELEVATION 1783.91 — WIDTH/O.D.
	TOP ELEVATION — TOP DEPTH (FEET)
	BOTTOM ELEVATION 1778.91 — 5.00 BOTTOM (FEET)
RIBBON COLOR None	

COORDINATES: NORTHING 897213.47 EASTING 782676.15

STATIONING: STATION 118+30.97 OFFSET 22.16 RT

PAVING THICKNESS 6" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER N/A

COMMENTS:

Dug to a depth of 5'. No facility found.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

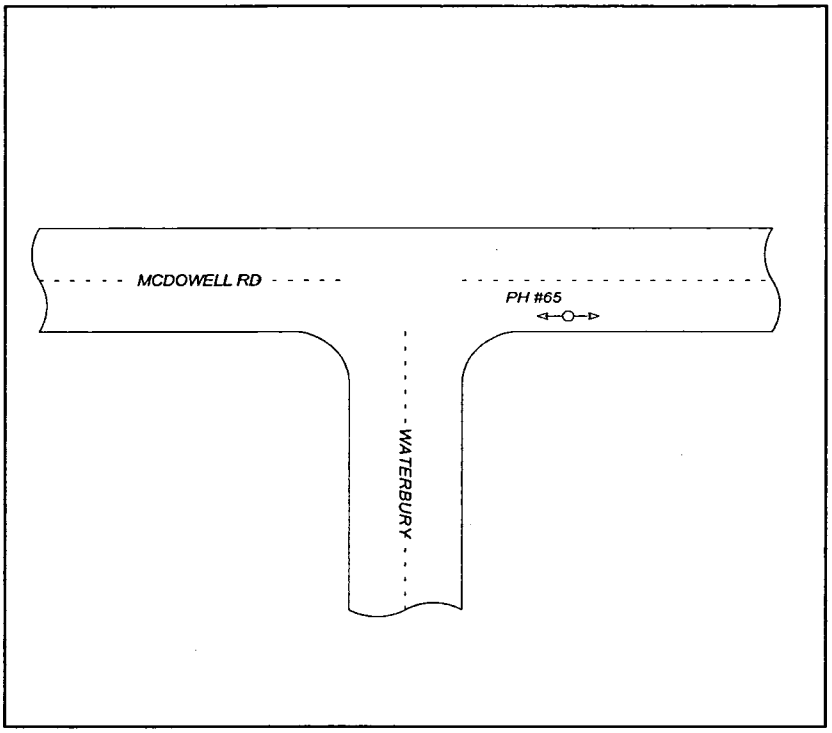
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	65	SUE Crew	J. Nowels
Date Dug	9/17/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Waterbury Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1785.47
	WIDTH/O.D.: 4.5"
	TOP ELEVATION: 1781.77 — TOP DEPTH (FEET): 3.70
	BOTTOM ELEVATION: 1781.39 — BOTTOM (FEET): 4.08
RIBBON COLOR: Yellow	

COORDINATES: NORTHING	897212.67	EASTING	782763.50
STATIONING: STATION	119+18.30	OFFSET	22.71 RT
PAVING THICKNESS	4"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt		
SIZE	4"	TYPE	STL
FACILITY OWNER	Gas		

COMMENTS:

PREPARED BY: M. Jubie

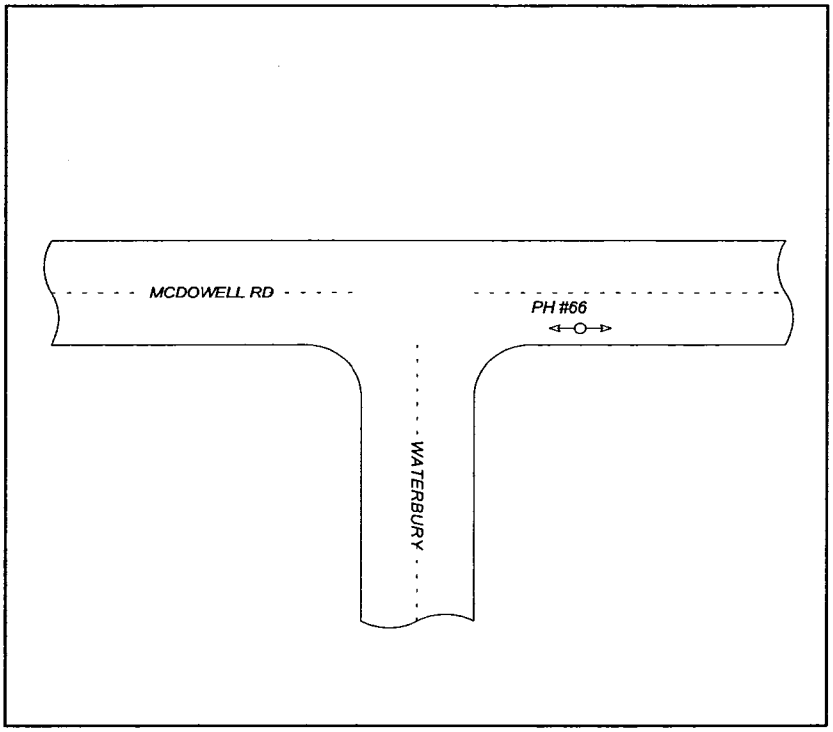
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	66	SUE Crew	J. Nowels
Date Dug	9/17/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Waterbury Road		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1785.48
	WIDTH/O.D.: 21.6"
	TOP ELEVATION: 1778.48 — TOP DEPTH (FEET): 7.00
	BOTTOM ELEVATION: 1776.68 — BOTTOM (FEET): 8.80
RIBBON COLOR: Blue	

COORDINATES: NORTHING	897213.12	EASTING	782762.98
STATIONING: STATION	119+17.78	OFFSET	22.26 RT
PAVING THICKNESS	4"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	20"
TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

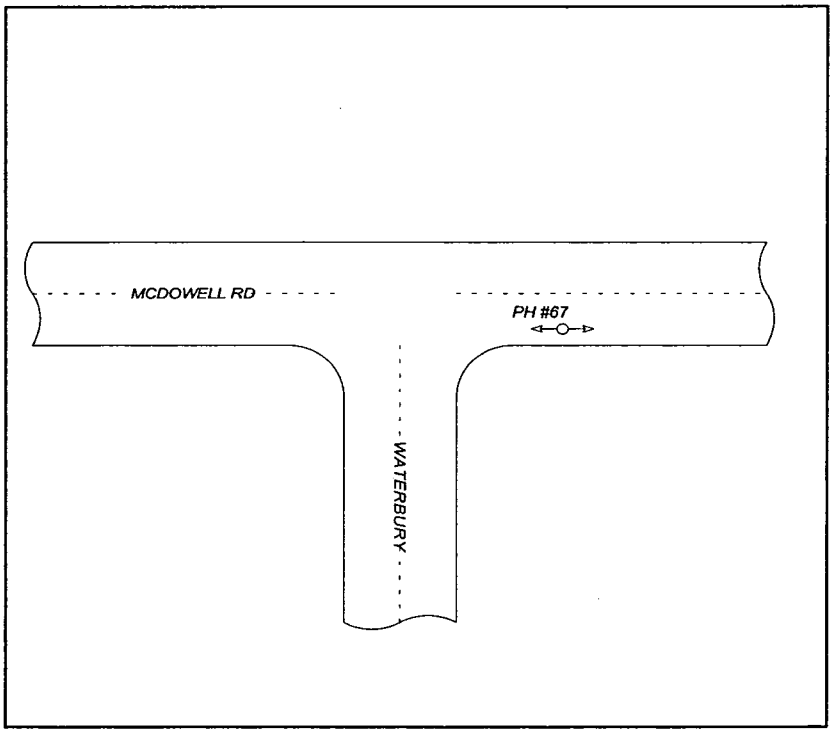
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	67	SUE Crew	J. Garcia
Date Dug	9/17/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Waterbury Road		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1785.44
	WIDTH/O.D.: 6.91"
	TOP ELEVATION: 1780.82 — TOP DEPTH (FEET): 4.62
	BOTTOM ELEVATION: 1780.24 — BOTTOM (FEET): 5.20
RIBBON COLOR: Blue	

COORDINATES: NORTHING	897196.29	EASTING	782767.82
STATIONING: STATION	119+22.67	OFFSET	39.08 RT
PAVING THICKNESS	None	PAVING TYPE	None
SOIL CONDITION	Dirt		
SIZE	6"	TYPE	ACP
FACILITY OWNER	City of Mesa Water		

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
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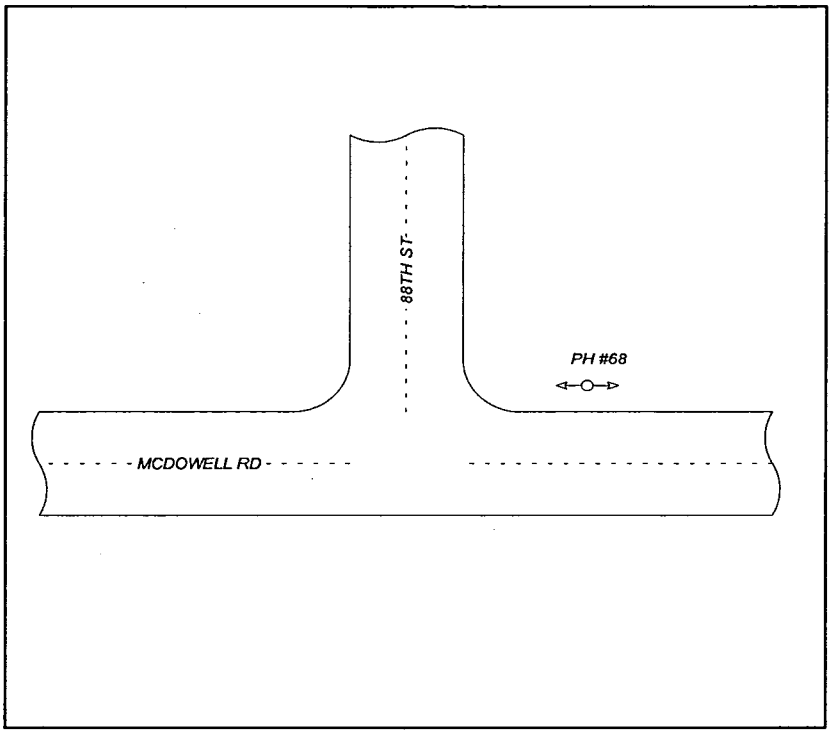
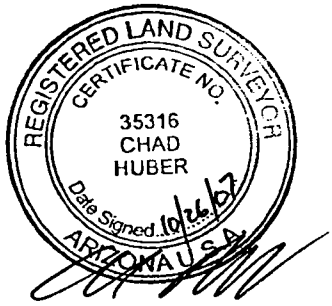
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	68	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & 88th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR Blue

CROSS SECTION - NOT TO SCALE

FACING West

SURFACE ELEVATION	1818.32	WIDTH/O.D. 13.2"	
TOP ELEVATION	1813.52	4.80	TOP DEPTH (FEET)
BOTTOM ELEVATION	1812.42	5.90	BOTTOM (FEET)

COORDINATES: NORTHING 897250.74 EASTING 784041.44

STATIONING: STATION 131+95.41 OFFSET 19.84 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE DIP FACILITY OWNER Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

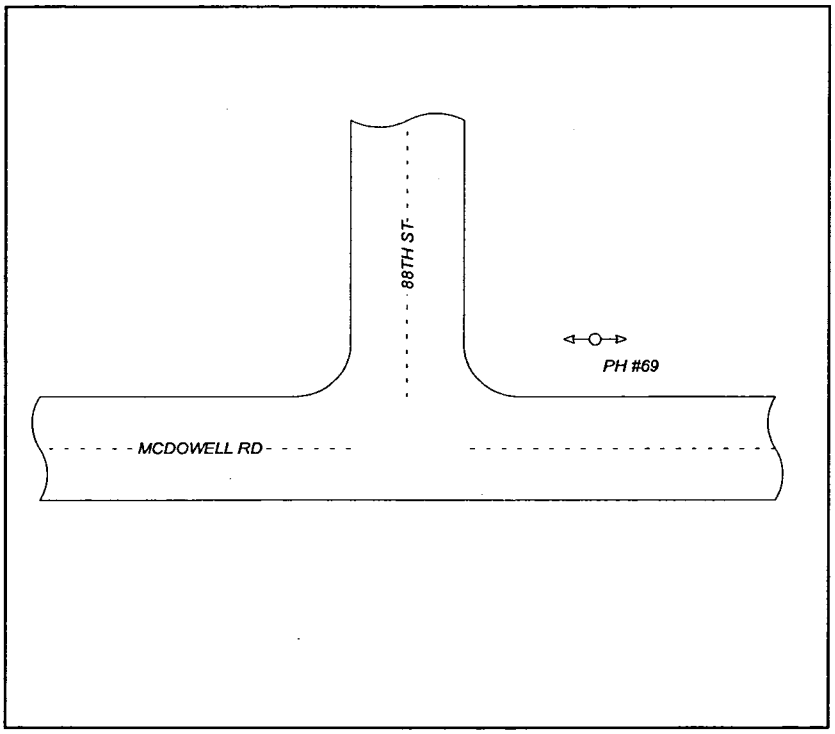
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	69	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & 88th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1818.85
	WIDTH/O.D.: 4.5"
	TOP ELEVATION: 1815.25 — TOP DEPTH (FEET): 3.60
	BOTTOM ELEVATION: 1814.87 — BOTTOM (FEET): 3.98
RIBBON COLOR: Orange	

COORDINATES: NORTHING	897264.97	EASTING	784037.65
STATIONING: STATION	131+91.20	OFFSET	33.92 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	4"	TYPE	PVC	FACILITY OWNER	Cox Communications

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

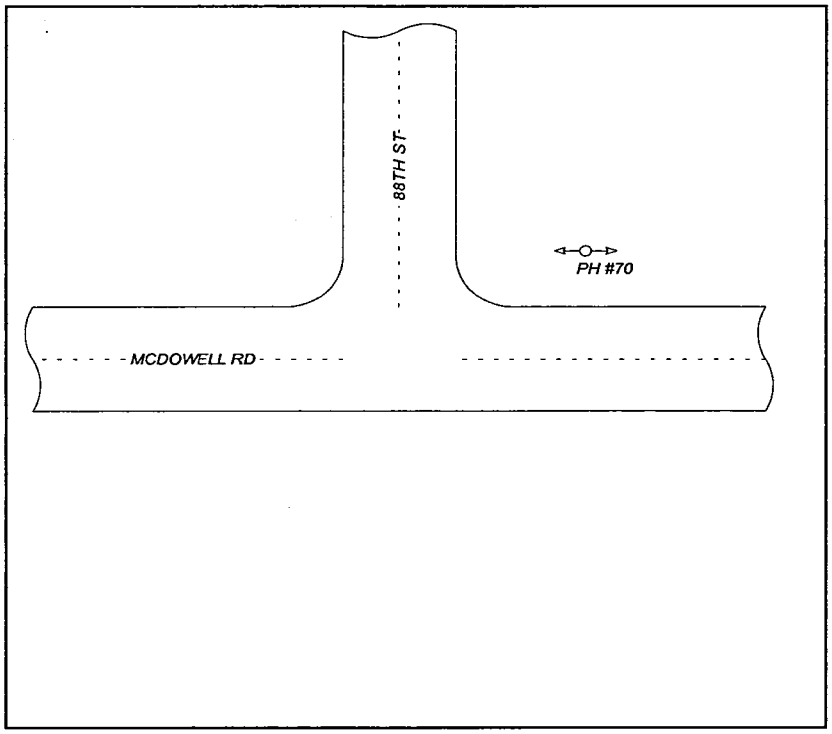
TEST HOLE DATA REPORT

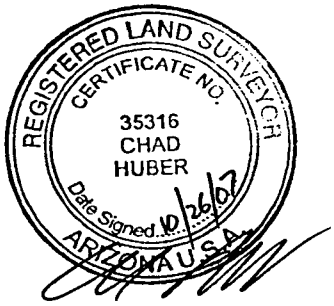
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	70	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & 88th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR Orange

CROSS SECTION - NOT TO SCALE

FACING West

SURFACE ELEVATION	1819.07	WIDTH/O.D. 1"	
TOP ELEVATION	1815.97	3.10	TOP DEPTH (FEET)
BOTTOM ELEVATION	1815.89	3.18	BOTTOM (FEET)

COORDINATES: NORTHING 897268.75 EASTING 784038.51

STATIONING: STATION 131+91.89 OFFSET 37.73 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 1" TYPE PE FACILITY OWNER Qwest Local Network

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	71	SUE Crew	J. Garcia
Date Dug	9/27/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	88th St. & McDowell Rd.		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING
ELEV. = 1707.29'	SURFACE ELEVATION 1817.37 — WIDTH/O.D.
	TOP ELEVATION — TOP DEPTH (FEET)
	BOTTOM ELEVATION 1810.87 — 6.50 BOTTOM (FEET)
RIBBON COLOR	

COORDINATES: NORTHING 897223.26 EASTING 784037.20

STATIONING: STATION 131+92.24 OFFSET 7.78 RT

PAVING THICKNESS 3" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE None TYPE None FACILITY OWNER N/A

COMMENTS:

Dug to a depth of 6.5' deep. No facility found.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

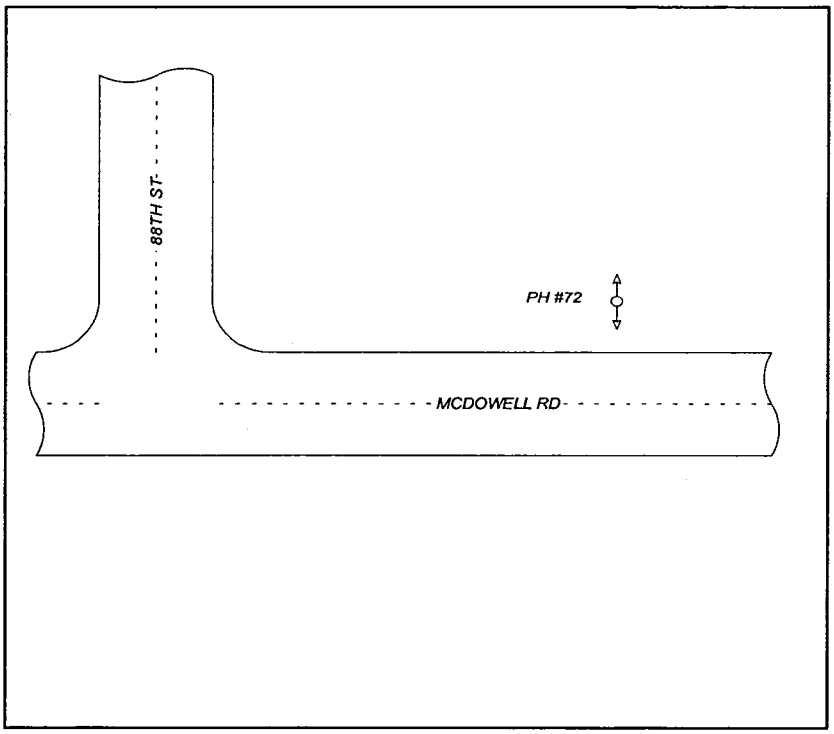
TEST HOLE DATA REPORT

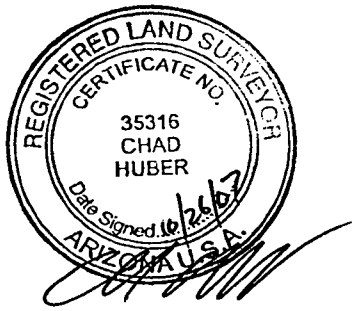
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	72	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & 88th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	North	
ELEV. = 1707.29'	SURFACE ELEVATION	1821.62	
	WIDTH/O.D.	36"	
	TOP ELEVATION	1821.02	0.60 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1817.72	3.90 BOTTOM (FEET)
RIBBON COLOR	Orange		

COORDINATES: NORTHING	897231.78	EASTING	784199.98
STATIONING: STATION	133+52.61	OFFSET	18.04 LT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	36" Wide	TYPE	Concrete Duct	FACILITY OWNER	Cox Communications

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	73	SUE Crew	J. Brandt
Date Dug	9/19/2007	Truck #	738
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road 900' east of 88th Street		

LOCATION PLAN - NOT TO SCALE

N

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING _____
ELEV. = 1707.29'	SURFACE ELEVATION _____ WIDTH/O.D. _____
	TOP ELEVATION _____ TOP DEPTH (FEET) _____
	BOTTOM ELEVATION _____ BOTTOM (FEET) _____
RIBBON COLOR None	

COORDINATES: NORTHING None EASTING None

STATIONING: STATION None OFFSET None

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION None

SIZE None TYPE None FACILITY OWNER None

COMMENTS:

No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

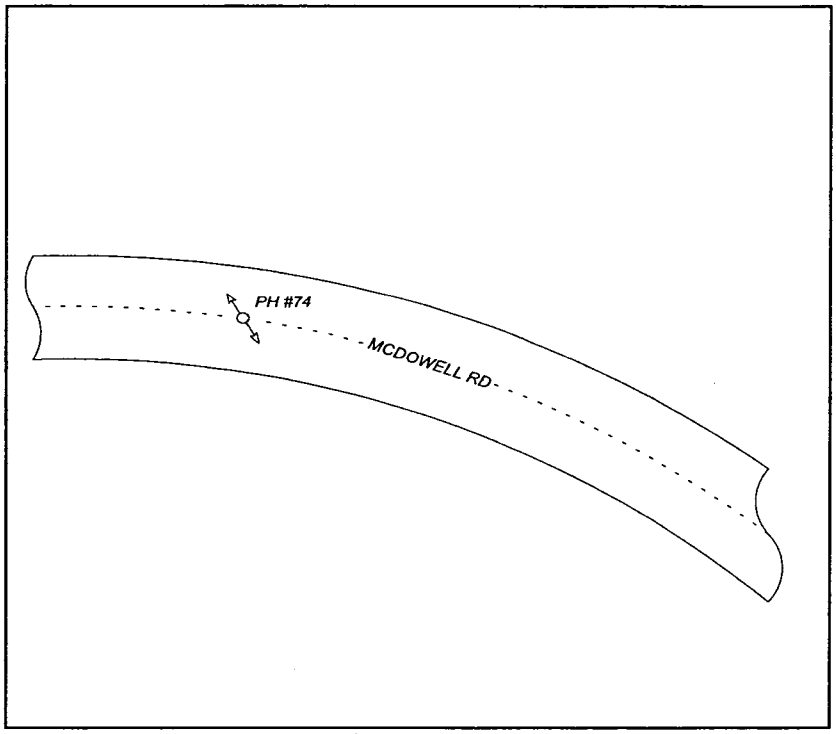
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	74	SUE Crew	J. Garcia
Date Dug	10/2/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road 900' east of 88th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	North	
ELEV. = 1707.29'	SURFACE ELEVATION	1827.82	
	WIDTH/O.D.	25"	
	TOP ELEVATION	1824.62	3.20 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1822.54	5.28 BOTTOM (FEET)
RIBBON COLOR Green			

COORDINATES: NORTHING	896938.00	EASTING	784753.32
STATIONING: STATION	139+83.26	OFFSET	5.74 RT
PAVING THICKNESS	4"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	24"
TYPE	CMP	FACILITY OWNER	City of Mesa Storm Drain

COMMENTS:

PREPARED BY: M. Jubie

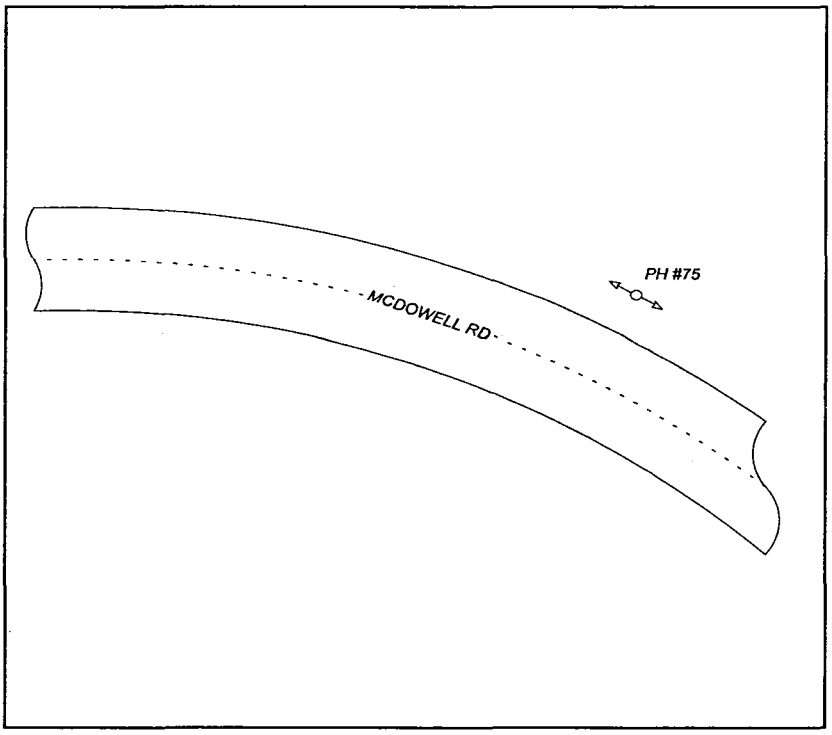
CHECKED BY: A. Mehler

TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	75	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road 900' east of 88th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	CROSS SECTION - NOT TO SCALE		
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING	West	
ELEV. = 1707.29'	SURFACE ELEVATION	1828.58	
	WIDTH/O.D.	10.75"	
	TOP ELEVATION	1818.28	10.30 TOP DEPTH (FEET)
	BOTTOM ELEVATION	1817.38	11.20 BOTTOM (FEET)
RIBBON COLOR Green			

COORDINATES: NORTHING	896905.14	EASTING	784829.80
STATIONING: STATION	140+60.74	OFFSET	23.20 LT
PAVING THICKNESS	4"	PAVING TYPE	Asphalt
SOIL CONDITION	Dirt	SIZE	10"
TYPE	PVC	FACILITY OWNER	City of Mesa Sewer

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

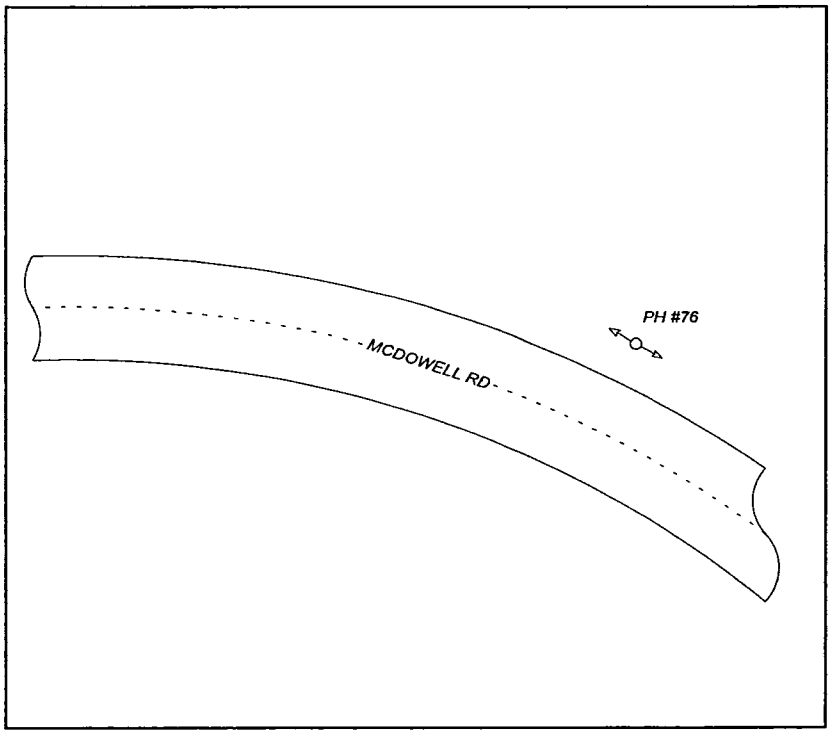
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	76	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road 900' east of 88th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Red

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1828.94	WIDTH/O.D. 2.38"		
TOP ELEVATION	1826.54		2.40	TOP DEPTH (FEET)
BOTTOM ELEVATION	1826.34		2.60	BOTTOM (FEET)

COORDINATES: NORTHING 896911.52 EASTING 784846.73

STATIONING: STATION 140+67.81 OFFSET 39.77 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 2" TYPE PVC FACILITY OWNER Electric

COMMENTS:

Dug to a depth of 5', hit hard dirt and unable to dig deeper. This hole was requested as a water line.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

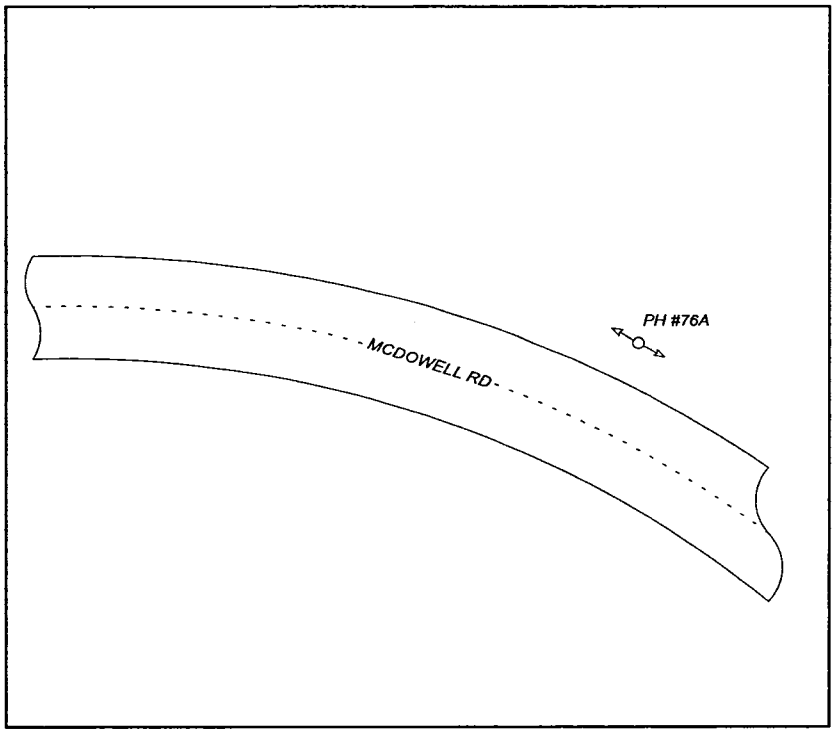
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	76A	SUE Crew	J. Garcia
Date Dug	9/27/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road 900' east of 88th Street		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK	
BCHH @ HAWES RD & HERMOSA VISTA DR	
ELEV. = 1707.29'	
RIBBON COLOR	Blue

CROSS SECTION - NOT TO SCALE

FACING: West

SURFACE ELEVATION	1828.81	WIDTH/O.D. 13.2	
TOP ELEVATION	1823.29	5.52	TOP DEPTH (FEET)
BOTTOM ELEVATION	1822.19	6.62	BOTTOM (FEET)

COORDINATES: NORTHING 896909.27 EASTING 784844.61

STATIONING: STATION 140+67.94 OFFSET 36.68 LT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 12" TYPE DIP FACILITY OWNER City of Mesa Water

COMMENTS:

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

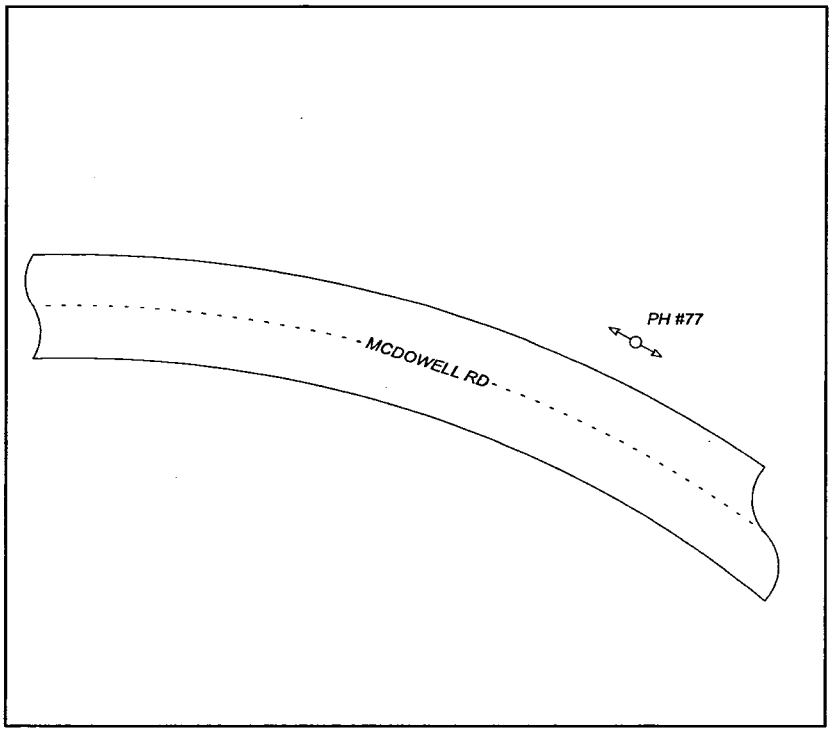
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	77	SUE Crew	J. Garcia
Date Dug	9/19/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road 900' east of 88th Street		

LOCATION PLAN - NOT TO SCALE



REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35316
CHAD
HUBER
Date Signed 10/26/07
ARIZONA U.S.A.

SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1828.69
	WIDTH/O.D.: 36"
	TOP ELEVATION: 1822.89 — TOP DEPTH (FEET): 5.80
	BOTTOM ELEVATION: 1821.29 — BOTTOM (FEET): 7.40
RIBBON COLOR: Orange	

COORDINATES: NORTHING	896901.38	EASTING	784844.78
STATIONING: STATION	140+73.57	OFFSET	31.32 LT

PAVING THICKNESS	4"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	36" Wide	TYPE	Concrete Duct	FACILITY OWNER	Cox Communications

COMMENTS:

PREPARED BY: M. Jubie

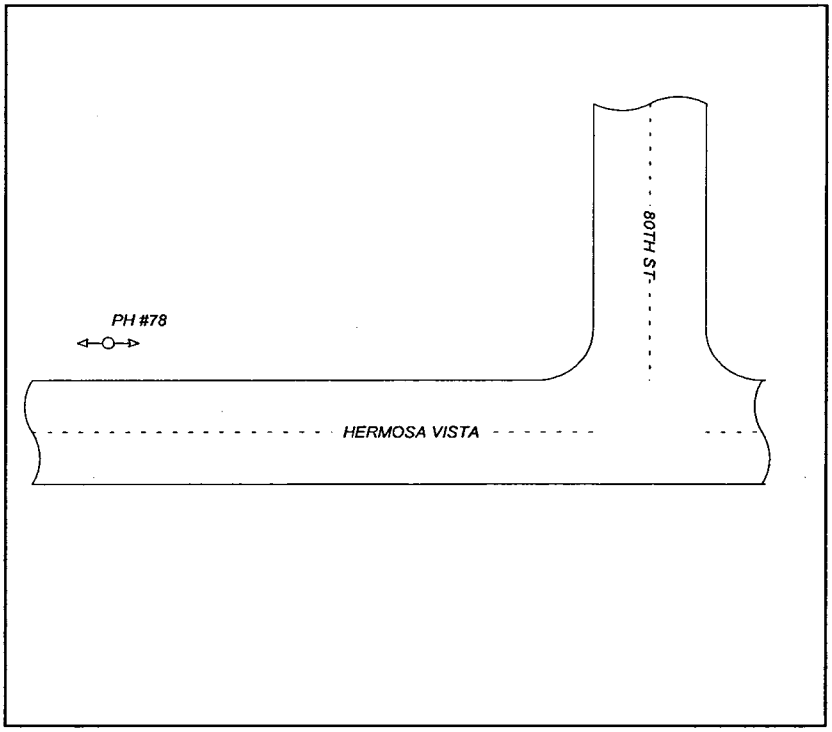
CHECKED BY: A. Mehler

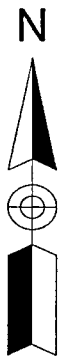
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	78	SUE Crew	J. Nowels
Date Dug	9/14/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	Hermosa Vista Drive 500' west of 80th Street		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK	CROSS SECTION - NOT TO SCALE
BCHH @ HAWES RD & HERMOSA VISTA DR	FACING: West
ELEV. = 1707.29'	SURFACE ELEVATION: 1648.70
	WIDTH/O.D.: 4.5"
	TOP ELEVATION: 1645.40 — TOP DEPTH (FEET): 3.30
	BOTTOM ELEVATION: 1645.02 — BOTTOM (FEET): 3.68
RIBBON COLOR: Yellow	

COORDINATES: NORTHING	894509.64	EASTING	778123.88
STATIONING: STATION	45+50.06	OFFSET	4.28 RT

PAVING THICKNESS	None	PAVING TYPE	None	SOIL CONDITION	Dirt
SIZE	4"	TYPE	PE	FACILITY OWNER	Gas

COMMENTS:

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

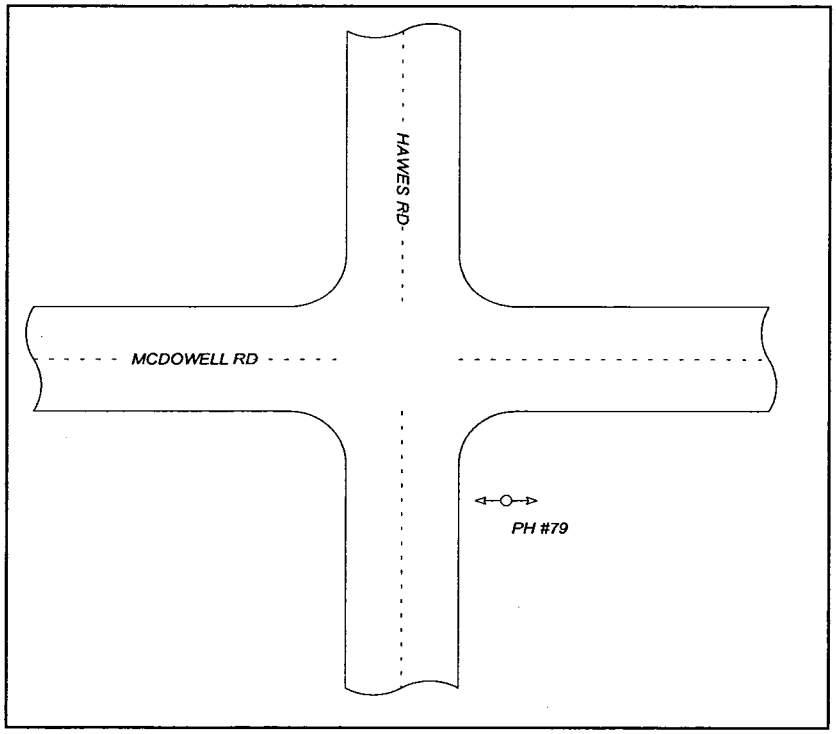
TEST HOLE DATA REPORT

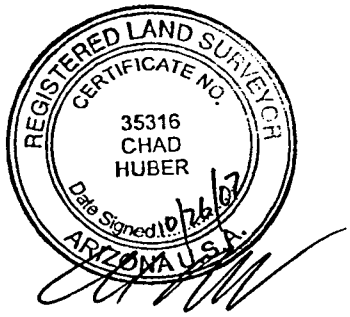
AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	79	SUE Crew	J. Garcia
Date Dug	9/20/2007	Truck #	9218
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	McDowell Road & Hawes Road		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Red

CROSS SECTION - NOT TO SCALE

FACING: East

SURFACE ELEVATION	1754.44	WIDTH/O.D. 24"	
TOP ELEVATION	1749.74	4.70	TOP DEPTH (FEET)
BOTTOM ELEVATION	1747.73	6.71	BOTTOM (FEET)

COORDINATES: NORTHING 897190.84 EASTING 781384.05

STATIONING: STATION 104+65.57 OFFSET 24.13 RT

PAVING THICKNESS None PAVING TYPE None SOIL CONDITION Dirt

SIZE 24" Wide TYPE Concrete Duct FACILITY OWNER Electric

COMMENTS:

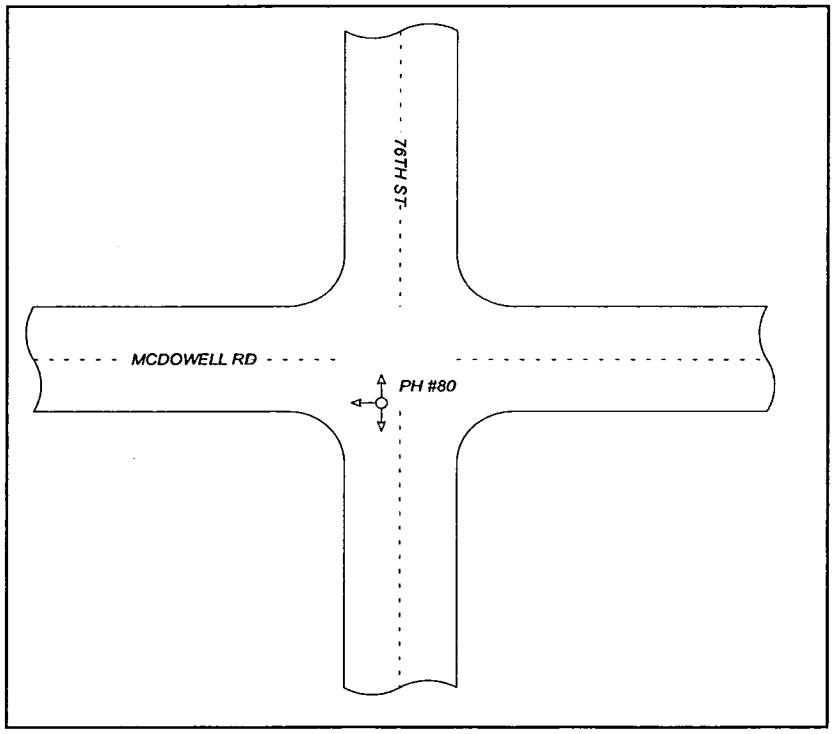
PREPARED BY: M. Jubie CHECKED BY: A. Mehler

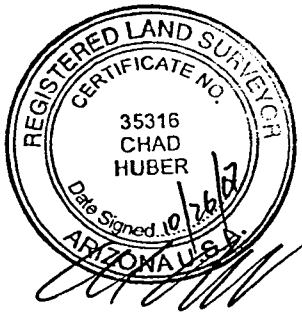
TEST HOLE DATA REPORT

AZTEC
www.aztec.us
4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	80	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE





SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: South

SURFACE ELEVATION	1618.28	WIDTH/O.D. 25.8	
TOP ELEVATION	1610.08	8.20	TOP DEPTH (FEET)
BOTTOM ELEVATION	1607.93	10.35	BOTTOM (FEET)

COORDINATES: NORTHING 894490.80 EASTING 776061.93

STATIONING: STATION 24+88.07 OFFSET 20.01 RT

PAVING THICKNESS 4" PAVING TYPE Asphalt SOIL CONDITION Dirt

SIZE 24" & 16" TYPE DIP FACILITY OWNER City of Mesa Water

COMMENTS:

16" DIP water runs north to south. 24" water runs at a T intersection to the west.

PREPARED BY: M. Jubie CHECKED BY: A. Mehler

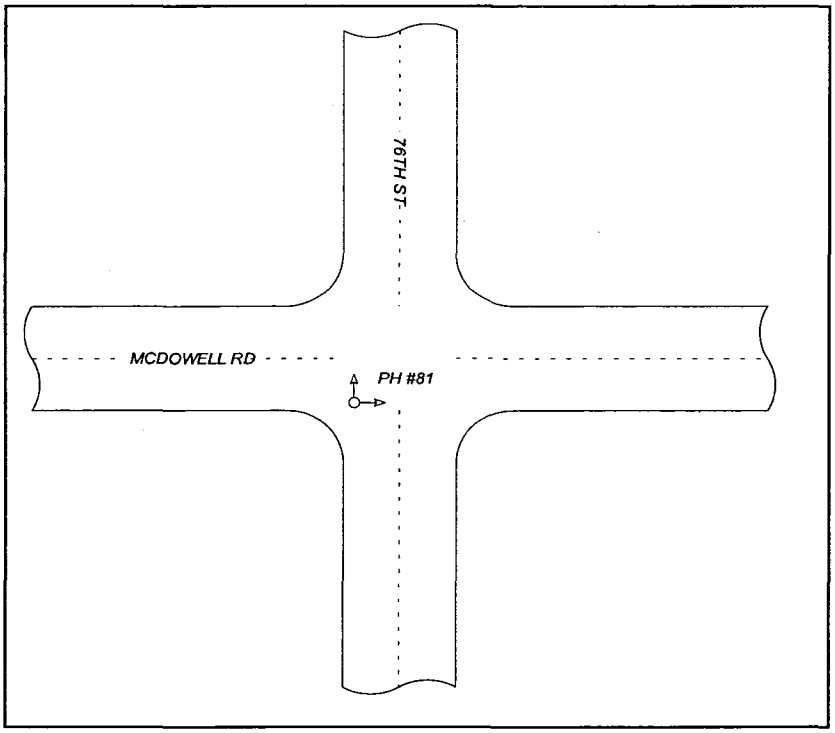
TEST HOLE DATA REPORT

AZTEC
www.aztec.us

4561 East McDowell Road, Phoenix, AZ 85008-4504
Tel. (602)454-0402 Fax. (602)458-9359

Test Hole #	81	SUE Crew	J. Garcia
Date Dug	10/5/2007	Truck #	929
Project #	AZU0704	City	Mesa
Phase #	005	County	Maricopa
Location	76th Street & Hermosa Vista Drive		

LOCATION PLAN - NOT TO SCALE



SITE BENCHMARK

BCHH @ HAWES RD & HERMOSA VISTA DR

ELEV. = 1707.29'

RIBBON COLOR: Blue

CROSS SECTION - NOT TO SCALE

FACING: North / East

SURFACE ELEVATION	1618.10	WIDTH/O.D. 25.8"	
TOP ELEVATION	1609.40	8.70	TOP DEPTH (FEET)
BOTTOM ELEVATION	1607.25	10.85	BOTTOM (FEET)

COORDINATES: NORTHING	894491.27	EASTING	776055.25
STATIONING: STATION	24+81.39	OFFSET	19.52 RT

PAVING THICKNESS	4"	PAVING TYPE	Asphalt	SOIL CONDITION	Dirt
SIZE	24"	TYPE	DIP	FACILITY OWNER	City of Mesa Water

COMMENTS:

Found 24" water at an elbow.

PREPARED BY: M. Jubie

CHECKED BY: A. Mehler

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
1	1	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	6"	ACP	894482.94	774243.64	6+69.58	4.25 Rt	1589.99	1586.21	1585.63	3.78	0
2	2	76th Street & Hermosa Vista Drive	5/22/2007	SRP Electric	Four 2" & Two 4"	PVC	894494.58	774454.32	8+80.28	6.96 Lft	1593.09	1589.03	1588.49	4.06	0
3	3	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	14"	ACP	894522.76	774983.98	14+27.45	8.06 Lft	1602.00	1597.88	1596.53	4.12	0
4	4	76th Street & Hermosa Vista Drive	5/22/2007	SRP Electric	4"	PVC	894539.95	775065.07	15+11.82	1.12 Lft	1604.31	1600.07	1599.69	4.24	0
5	5	76th Street & Hermosa Vista Drive	5/22/2007	Cox Communications	Two 2"	PVC	894538.80	775260.70	17+07.45	.42 Rt	1606.89	1604.13	1603.89	2.76	0
6	6	76th Street & Hermosa Vista Drive	5/22/2007	Qwest Local Network	1"	PE	894532.86	776035.37	24+82.10	7.89 Rt	1618.65	1616.55	1616.47	2.10	0
7	7	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	16"	DIP	894541.14	776063.66	25+10.40	.33 Lft	1619.46	1610.61	1609.16	8.85	0
8	8	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Sewer	18"	VCP	894541.10	776069.82	25+16.57	.28 Lft	1619.63	1610.23	1608.35	9.40	0
9	9	76th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	12"	ACP	894524.01	776111.85	25+67.14	4.31 Rt	1619.66	1615.64	1614.48	4.02	0
11	11	78th Street & Hermosa Vista Drive	5/22/2007	SRP Electric	Six 2"	PVC	894524.01	777559.00	40+13.80	.23 Lft	1640.82	1637.72	1636.92	3.10	0
12	12A	78th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Water	12"	DIP	894524.06	777614.80	40+69.60	.17 Lft	1641.55	1636.55	1635.45	5.00	0
13	12B	78th Street & Hermosa Vista	5/22/2007	City of Mesa Gas	2"	PE	894524.06	777614.90	40+69.70	.17 Lft	1641.59	1637.89	1637.69	3.70	0
14	13	79th Street & Hermosa Vista Drive	5/22/2007	City of Mesa Gas	4"	PE	894508.42	778086.69	45+41.45	16.40 Rt	1649.21	1645.31	1644.93	3.90	0
15	14	80th Street & Hermosa Vista Drive	5/23/2007	SRP Electric	3"	PVC	894524.58	778377.69	48+32.49	.82 Rt	1654.11	1648.91	1648.62	5.20	0
16	15	80th Street & Hermosa Vista Drive	5/23/2007	City of Mesa Water	12"	ACP	894523.83	778748.56	52+03.36	2.22 Rt	1661.50	1657.56	1656.40	3.94	0
17	16	Hermosa Vista Drive east of 80th Street	5/23/2007	City of Mesa Water	6"	ACP	894524.55	779384.90	58+39.70	0.40 Rt	1672.63	1670.33	1669.75	2.30	0
18	17	82nd Street & Hermosa Vista Drive	5/23/2007	Qwest Local Network	1.5"	PE	894521.26	780057.31	65+12.12	2.54 Rt	1685.91	1682.85	1682.72	3.06	0
19	18	Channing & Hermosa Vista Drive	5/23/2007	City of Mesa Water	12"	DIP	894522.07	780293.44	67+48.25	1.33 Rt	1691.23	1684.91	1683.81	6.32	0
20	19A	Hawes Road & Hermosa Vista Drive	5/23/2007	City of Mesa Water	12"	DIP	894540.80	781315.95	77+79.77	2.66 Lft	1707.22	1701.12	1700.02	6.10	0
21	19B	Hawes Road & Hermosa Vista Drive	5/23/2007	Unknown	See Below	See Below	894541.66	781317.15	77+81.23	2.42 Lft	1707.23	1704.03	1702.93	3.20	Found one 4" PVC conduit and one 2" PE cable in the same hole as #19A.
22	20	Hawes Road & Hermosa Vista Drive	5/23/2007	Qwest Local Network	Two 2"	PE	894545.47	781321.89	77+87.28	1.77 Lft	1707.38	1704.08	1703.68	3.30	0
23	21	Hawes Road & Hermosa Vista Drive	5/23/2007	City of Mesa Water	20"	ACP	894547.63	781329.88	77+94.45	2.34	1708.00	1701.80	1699.86	6.20	0

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
24	21A	Hawes Road & Hermosa Vista Drive	5/23/2007	Unknown	1.75"	PE	894548.21	781326.54	77+92.50	.43 Lft	1707.90	1702.40	1702.25	5.50	0
25	22	Hawes Road & Hermosa Vista Drive	5/23/2007	Sewer	12"	PVC	894576.03	781357.42	78+34.01	1.72 Rt	1708.52	1697.60	1696.54	10.92	0
26	23	Haews Road & Hermosa Vista Drive	6/1/2007	Qwest Local Network	2"	PE	894569.22	781340.81	78+17.45	5.21 Lft	1708.54	1704.24	1704.07	4.30	0
28	25	Hawes Road & Mangun Road	5/23/2007	City of Mesa Water	6"	ACP	894825.72	781374.14	80+90.31	.93 Lft	1713.92	1712.28	1711.70	1.64	0
29	26	Hawes Road & Culver Street	5/23/2007	City of Mesa Water	6"	ACP	895805.94	781376.45	90+70.53	1.44 Rt	1730.53	1727.69	1727.11	2.84	0
31	28	Hawes Road & Culver Street	5/25/2007	City of Mesa Sewer	8"	PVC	895825.26	781377.50	90+89.85	2.48 Rt	1730.79	1721.65	1720.93	9.14	0
32	29	Hawes Road & Culver Street	5/25/2007	City of Mesa Water	20"	ACP	895843.91	781377.28	91+08.50	2.26 Rt	1730.94	1725.38	1723.44	5.56	0
33	30	Hawes Road & Willetta Street	5/25/2007	City of Mesa Water	12"	ACP	896544.97	781373.55	98+09.56	1.43 Lft	1742.51	1738.03	1736.87	4.48	0
34	31	Hawes Road & McDowell Road	5/25/2007	City of Mesa Water	2"	STL	896863.45	781382.70	101+28.04	7.75 Rt	1748.27	1745.17	1744.97	3.10	0
36	33	Hawes Road & McDowell Road	5/31/2007	SRP Electric	24" Wide	Concrete Duct	897191.59	781425.14	105+26.23	38.15 Rt	1755.33	1751.53	1749.93	3.80	0
37	34	Hawes Road & McDowell Road	5/25/2007	SRP Electric	Four 4"	PVC	897220.80	781457.22	105+58.21	8.84 Rt	1756.89	1747.61	1747.23	9.28	0
38	35	Hawes Road & McDowell Road	5/25/2007	City of Mesa Storm Drain	30"	RCP	897222.70	781466.36	105+67.35	6.91 Rt	1757.28	1755.18	1752.10	2.10	0
39	36	Waterbury Road & McDowell Road	5/24/2007	Qwest Local Network	4"	PVC	897214.27	782653.95	117+54.96	11.67 Rt	1783.30	1778.30	1777.92	5.00	0
40	37	Waterbury Road & McDowell Road	5/24/2007	SRP Electric	Three 3"	PVC	897214.28	782653.61	117+54.62	11.67 Rt	1783.21	1776.71	1776.42	6.50	0
41	38	Waterbury Road & McDowell Road	5/24/2007	City of Mesa Water	20"	DIP	897214.01	782680.20	117+81.21	11.95 Rt	1783.95	1778.35	1776.55	5.60	0
42	39	Waterbury Road & McDowell Road	5/24/2007	City of Mesa Water	20"	DIP	897213.65	782686.20	117+87.21	12.19 Rt	1784.08	1777.98	1776.18	6.10	0
46	41	Waterbury Road & McDowell Road	5/24/2007	City of Mesa Gas	4"	Coated STL	897214.00	782679.26	117+80.27	11.86 Rt	1783.94	1781.04	1780.66	2.90	0
47	42	Waterbury Road & McDowell Road	5/31/2007	City of Mesa Water	20"	DIP	897213.10	782724.83	118+25.84	12.62 Rt	1784.82	1778.80	1777.00	6.02	0
49	43	88th Street & McDowell Road	5/24/2007	City of Mesa Sewer	12"	PVC	897247.86	783907.94	130+15.05	10.79 Lft	1814.65	1808.35	1807.29	6.30	0
50	44	88th Street & McDowell Road	6/1/2007	Ciy of Mesa Sewer	60" Wide	Slurry	897244.67	783994.35	131+01.47	7.86 Lft	1817.01	1816.81	1810.01	0.20	0
52	46	88th Street & McDowell Road	5/31/2007	Salt River Project Electric	Three 2.5"	PVC	897230.82	784210.23	133+16.02	13.98 Lft	1822.01	1817.21	1816.97	4.80	0
54	48	88th Street & McDowell Road	5/31/2007	City of Mesa Gas	0.75"	PE	897065.90	784622.14	137+57.40	12.30 Lft	1827.81	1824.01	1823.95	3.80	0

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
55	49	88th Street & McDowell Road	6/1/2007	City of Mesa Sewer	8"	PVC	896939.23	784793.78	139+58.33	32.90 Rt	1828.77	1818.57	1817.85	10.20	0
57	51	88th Street & McDowell Road	6/1/2007	SRP Electric	2"	PVC	896951.34	784806.00	739+74.56	27.20 Rt	1828.94	1826.54	1826.34	2.40	0
58	52	Hawes Road & Willetta Street	6/1/2007	City of Mesa Water	4"	ACP	896182.21	781374.68	94+46.80	.31 Lft	1736.46	1732.94	1732.54	3.52	0
59	1	7301 E Hermosa Vista Drive	10/5/2007	Electric	Three 4"	PVC	894494.92	774352.93	7+79.09	12.25 RT	1591.64	1586.84	1586.46	4.80	Found facility on sixth attempt.
60	2	Hermosa Vista Drive 1700' west of Sossaman Roa	9/25/2007	City of Mesa Water	12"	DIP	894513.75	774374.66	8+00.85	6.54 LT	1591.96	1583.72	1582.62	8.24	
61	2A	Hermosa Vista Drive 1700' west of Sossaman Roa	9/25/2007	Storm Drain	30"	RCP	894523.64	774375.83	8+02.04	16.42 LT	1593.15	1591.43	1588.36	1.72	
62	3	7301 E Herrmosa Vista Drive	10/5/2007	Cox Communications	Two 2"	PVC	894516.37	774440.32	8+66.52	9.02 LT	1592.56	1588.24	1587.60	4.32	
63	4	Hermosa Vista Drive 1100' west of Sossaman Roa	9/13/2007	City of Mesa Water	12"	ACP	894522.75	774975.76	14+01.97	14.26 LT	1601.78	1597.92	1596.76	3.86	
64	5	Hermosa Vista Drive 1000' west of Sossaman Roa	10/5/2007	Salt River Project	1.5"	PVC	894514.45	775065.30	14+91.49	5.77 LT	1603.23	1600.72	1600.59	2.51	
65	6	Hermosa Vista 1000' west of Sossaman Road	10/5/2007	City of Mesa Water	6"	DIP	894513.51	775079.89	15+06.08	4.80 LT	1603.24	1599.14	1598.56	4.10	
66	7	Hermosa Vista Drive 1000' west of Sossaman Roa	10/5/2007	Cox Communications	2"	PVC	894514.92	775091.37	15+17.56	6.19 LT	1603.33	1601.13	1600.93	2.20	
67	8	Hermosa Vista Drive 800' west of Sossaman Road	9/13/2007	City of Mesa Water	12"	ACP	894523.36	775242.14	16+68.35	14.30 LT	1605.52	1601.16	1600.00	4.36	
68	9	Hermosa Vista Drive 400' west of Sossaman Road	9/13/2007	City of Mesa Water	12"	ACP	894523.81	775697.01	21+23.22	13.78 LT	1612.28	1603.66	1602.50	8.62	
69	10	Hermosa Vista Drive & 76th Street	9/13/2007	City of Mesa Water	12"	ACP	894525.35	775984.55	24+10.77	14.71 LT	1616.63	1613.59	1612.43	3.04	
70	11	Hermosa Vista Drive & Sossaman Road	9/13/2007	Qwest Local Network	1"	PE	894532.55	775988.95	24+15.18	21.90 LT	1616.44	1615.34	1615.26	1.10	
71	12	73rd Street & Hermosa Vista Drive	10/5/2007	Electric	Three 4"	PVC	894516.49	774454.25	8+80.45	9.11 LT	1592.88	1586.58	1586.20	6.30	
72	13	7426 E Hermosa Vista Drive	10/9/2007	Cox Communications	2"	PVC	894519.87	775261.68	16+87.88	10.77 LT	1605.58	1603.08	1602.88	2.50	
79	20	Hermosa Vista Drive 200' east of Mangun Street	9/24/2007	City of Mesa Water	12"	ACP	894526.47	776956.16	33+82.35	15.31 LT	1631.73	1627.51	1626.35	4.22	Found water line 9-24-07 to be surveyed soon.
80	20A	Hermosa Vista Drive 200' east of Mangun Street	9/13/2007	Unknown	One 2" & One 1.5"	PVC	894538.71	776957.79	33+83.98	27.56 LT	1632.03	1627.73	1627.43	4.30	
81	21	Hermosa Vista Drive & Mangun Street	9/13/2007	City of Mesa Water	8"	ACP	894544.98	776953.89	33+80.08	33.83 LT	1632.04	1628.54	1627.78	3.50	
82	22	Hermosa Vista Drive & 78th Street	9/13/2007	City of Mesa Water	12"	ACP	894526.03	777331.64	37+57.83	14.75 LT	1637.61	1633.41	1632.25	4.20	
85	25	Hermosa Vista Drive 300' west of 80th Street	9/14/2007	Gas	4"	PE	894509.34	778395.21	48+21.38	5.57 RT	1655.01	1649.77	1649.39	5.24	

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
86	26	Hermosa Vista Drive & west of 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894541.08	778482.98	49+09.26	25.85 LT	1656.33	1650.93	1649.77	5.40	
88	28	Hermosa Vista Drive & 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894536.72	778774.36	52+00.51	20.72 LT	1661.35	1656.95	1655.79	4.40	
89	29	Hermosa Vista Drive & 80th Street	9/13/2007	City of Mesa Water	6"	ACP	894542.26	778774.28	52+00.43	26.26 LT	1661.10	1657.20	1656.62	3.90	
90	30	Hermosa Vista Drive 300' east of 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894536.85	779068.84	54+95.00	21.35 LT	1667.35	1662.83	1661.67	4.52	
91	31	Hermosa Vista Drive 300' east of 80th Street	9/13/2007	City of Mesa Water	6"	ACP	894541.73	779066.49	54+92.64	26.23 LT	1667.39	1664.49	1663.91	2.90	
92	32	Hermosa Vista Drive 550' east of 80th Street	9/13/2007	City of Mesa Water	12"	ACP	894537.17	779317.68	57+43.83	22.10 LT	1671.49	1666.05	1664.89	5.44	
93	33	Hermosa Vista Drive 550' east of 80th Street	9/13/2007	City of Mesa Water	6"	ACP	894542.18	779318.15	57+44.29	27.12 LT	1671.69	1667.47	1666.89	4.22	
95	35	Hermosa Vista Drive 200' west of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894537.54	779519.53	59+45.68	22.82 LT	1673.07	1668.17	1667.01	4.90	
96	36	Hermosa Vista Drive 200' west of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894536.65	779902.92	63+29.08	22.59 LT	1682.99	1677.05	1675.89	5.94	
97	37	Hermosa Vista Drive 100' east of 82nd Street	9/25/2007	City of Mesa Water	12"	ACP	894530.89	780139.27	65+65.44	17.23 LT	1687.09	1681.79	1680.63	5.30	Found at correct station on the 6th attempt.
98	38	Hermosa Vista Drive 100' east of 82nd Street	9/14/2007	Qwest Local Network	2"	PE	894531.87	780139.64	65+65.80	18.21 LT	1686.85	1684.55	1684.38	2.30	
99	38A	Hermosa Vista Drive 100' east of 82nd Street	9/14/2007	Cox Communications	See Comments	See Comments	894530.19	780139.30	65+65.46	16.53 LT	1687.00	1682.60	1682.02	4.40	Found one 4" PVC conduit & one 2" PE cable.
100	39	Hermosa Vista Drive 200' east of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894539.52	780238.78	66+64.93	26.03 LT	1688.79	1684.69	1688.79	4.10	
101	40	Hermosa Vista Drive 200' east of 82nd Street	9/14/2007	Qwest Local Network	One 2" & One 1"	PE	894533.52	780238.74	66+64.90	20.03 LT	1688.86	1686.26	1685.92	2.60	
102	41	Hermosa Vista Drive 300' east of 82nd Street	9/14/2007	City of Mesa Water	12"	ACP	894540.16	780345.17	67+71.32	26.86 LT	1691.27	1687.71	1686.55	3.56	
103	42	Hermosa Vista Drive 300' east of 82nd Street	9/14/2007	Qwest Local Network	One 2" & One 1"	PE	894534.34	780343.37	67+69.53	21.03 LT	1690.90	1688.82	1688.60	2.08	
104	43	Hermosa Vista Drive 400' east of 82nd Street	9/17/2007	City of Mesa Water	12"	ACP	894540.96	780496.31	69+22.46	27.91 LT	1694.35	1688.13	1686.97	6.22	
105	44	Hermosa Vista Drive 400' east of 82nd Street	9/17/2007	Qwest Local Network	2"	PE	894536.67	780499.31	69+25.46	23.63 LT	1694.54	1690.88	1690.71	3.66	
106	45	Hermosa Vista Drive 600' west of Hawes Road	9/17/2007	City of Mesa Water	12"	ACP	894540.25	780696.13	71+22.28	27.55 LT	1695.41	1690.31	1689.15	5.10	
107	46	Hermosa Vista Drive 600' west of Hawes Road	9/17/2007	Qwest Local Network	2"	PE	894535.83	780695.35	71+21.51	23.13 LT	1695.21	1692.41	1692.24	2.80	
108	47	Hermosa Vista Drive 550' west of Hawes Road	9/17/2007	City of Mesa Water	12"	ACP	894539.92	780730.65	71+56.80	27.27 LT	1695.75	1691.35	1690.19	4.40	
109	48	Hermosa Vista Drive 550' west of Hawes Road	9/17/2007	Qwest Local Network	2"	PE	894535.11	780729.85	71+56.00	22.47 LT	1695.55	1693.31	1693.14	2.24	

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
110	49	Hermosa Vista Drive 400' west of Hawes Road	9/17/2007	City of Mesa Water	12"	ACP	894540.14	780876.05	73+02.19	27.75 LT	1698.62	1694.92	1693.76	3.70	
111	50	Hermosa Vista Drive 400' west of Hawes Road	9/17/2007	Qwest Local Network	2"	PE	894535.59	780875.47	73+01.63	23.19 LT	1698.47	1696.67	1696.50	1.80	
112	51	Hermosa Vista Drive & Hawes Road	9/17/2007	Qwest Local Network	Two 4"	PVC	894534.84	781256.16	76+82.32	23.10 LT	1705.23	1701.57	1700.63	3.66	
113	52	Hermosa Vista Drive & Hawes Road	9/17/2007	Electric	24" Wide	Slurry Duct	894514.51	781301.88	77+28.07	2.84 LT	1707.65	1706.55	1701.65	1.10	
114	53	Hawes Road & Mangun Road	10/9/2007	City of Mesa Sewer	N/A	Manhole	894836.44	781354.98	81+11.16	4.93 LT	1714.18	1714.18	1702.03	0.00	
115	54	Hawes Road & Culver Street	9/19/2007	City of Mesa Water	6"	ACP	895806.12	781372.64	90+80.83	13.27 RT	1730.26	1727.24	1726.66	3.02	
116	55	Hawes Road & Willetta Street	9/19/2007	City of Mesa Water	12"	ACP	896545.06	781370.66	98+19.79	11.01 RT	1742.52	1737.92	1736.76	4.60	
117	56	McDowell Road & Hawes Road	9/18/2007	City of Mesa Water	8"	ACP	897260.53	781505.44	106+60.10	21.06 LT	1758.25	1754.35	1753.59	3.90	
118	57	McDowell Road & Hawes Road	9/19/2007	City of Mesa Water	None	None	897246.36	781504.95	106+59.66	6.89 LT	1758.47		1753.47		Dug to a depth of 5', hit hard dirt and unable to dig deeper.
119	58	McDowell Road & Hawes Road	9/19/2007	Gas	4"	STL	897267.86	781507.67	106+62.31	28.40 LT	1758.17	1755.37	1754.99	2.80	
120	59	McDowell Road & Hawes Road	9/18/2007	Qwest Local Network	1"	PE	897265.68	781507.55	106+62.19	26.22 LT	1758.17	1754.85	1754.77	3.32	
121	60	McDowell Road & Hawes Road	9/18/2007	City of Mesa Water	20"	DIP	897266.90	781507.72	106+62.36	27.44 LT	1758.20	1753.08	1751.28	5.12	
122	61	McDowell Road &b Hawes Road	9/18/2007	Cox Communications	3"	PVC	897271.32	781507.23	106+61.86	31.86 LT	1758.10	1755.26	1754.97	2.84	
124	63	Waterbury & McDowell Rd.	9/27/2007	City of Mesa Water	8"	ACP	897214.30	782672.17	118+26.97	21.35 RT	1783.79	1778.17	1777.41	5.62	
125	64	Waterbury & McDowell Rd.	9/27/2007	N/A	None	None	897213.47	782676.15	118+30.97	22.16 RT	1783.91	0.00	1778.91	0.00	Dug to a depth of 5'. No facility found.
126	65	McDowell Road & Waterbury Road	9/17/2007	Gas	4"	STL	897212.67	782763.50	119+18.30	22.71 RT	1785.47	1781.77	1781.39	3.70	
127	66	McDowell Road & Waterbury Road	9/17/2007	City of Mesa Water	20"	DIP	897213.12	782762.98	119+17.78	22.26 RT	1785.48	1778.48	1776.68	7.00	
128	67	McDowell Road & Waterbury Road	9/17/2007	City of Mesa Water	6"	ACP	897196.29	782767.82	119+22.67	39.08 RT	1785.44	1780.82	1780.24	4.62	
129	68	McDowell Road & 88th Street	9/19/2007	Water	12"	DIP	897250.74	784041.44	131+95.41	19.84 LT	1818.32	1813.52	1812.42	4.80	
130	69	McDowell Road & 88th Street	9/19/2007	Cox Communications	4"	PVC	897264.97	784037.65	131+91.20	33.92 LT	1818.85	1815.25	1814.87	3.60	
131	70	McDowell Road & 88th Street	9/19/2007	Qwest Local Network	1"	PE	897268.75	784038.51	131+91.89	37.73 LT	1819.07	1815.97	1815.89	3.10	
133	72	McDowell Road & 88th Street	9/19/2007	Cox Communications	36" Wide	Concrete Duct	897231.78	784199.98	133+52.61	18.04 LT	1821.62	1821.02	1817.72	0.60	

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
135	74	McDowell Road 900' east of 88th Street	10/2/2007	City of Mesa Storm Drain	24"	CMP	896938.00	784753.32	139+83.26	5.74 RT	1827.82	1824.62	1822.54	3.20	
136	75	McDowell Road 900' east of 88th Street	9/19/2007	City of Mesa Sewer	10"	PVC	896905.14	784829.80	140+60.74	23.20 LT	1828.58	1818.28	1817.38	10.30	
137	76	McDowell Road 900' east of 88th Street	9/19/2007	Electric	2"	PVC	896911.52	784846.73	140+67.81	39.77 LT	1828.94	1826.54	1826.34	2.40	Dug to a depth of 5', hit hard dirt and unable to dig deeper. This hole was requested as a water line.
138	76A	McDowell Road 900' east of 88th Street	9/27/2007	City of Mesa Water	12"	DIP	896909.27	784844.61	140+67.94	36.68 LT	1828.81	1823.29	1822.19	5.52	
139	77	McDowell Road 900' east of 88th Street	9/19/2007	Cox Communications	36" Wide	Concrete Duct	896901.38	784844.78	140+73.57	31.32 LT	1828.69	1822.89	1821.29	5.80	
140	78	Hermosa Vista Drive 500' west of 80th Street	9/14/2007	Gas	4"	PE	894509.64	778123.88	45+50.06	4.28 RT	1648.70	1645.40	1645.02	3.30	
141	79	McDowell Road & Hawes Road	9/20/2007	Electric	24" Wide	Concrete Duct	897190.84	781384.05	104+65.57	24.13 RT	1754.44	1749.74	1747.73	4.70	
142	80	76th Street & Hermosa Vista Drive	10/5/2007	City of Mesa Water	24" & 16"	DIP	894490.80	776061.93	24+88.07	20.01 RT	1618.28	1610.08	1607.93	8.20	16" DIP water runs north to south. 24" water runs at a T intersection to the west.
143	81	76th Street & Hermosa Vista Drive	10/5/2007	City of Mesa Water	24"	DIP	894491.27	776055.25	24+81.39	19.52 RT	1618.10	1609.40	1607.25	8.70	Found 24" water at an elbow.

TESTHOLE DATA SUMMARY

COGO #	TH #	Location	Date of Excavation	Utility Owner	Utility Size	Utility Description	Northing	Easting	Stationing	Offset	Ground Elevation	Top Elevation	Bottom Elevation	Depth of Cover	Comments
10	10	Mangun Street & Hermosa Vista Drive	5/22/2007	0	None	None					0.00	0.00	0.00	0.00	No facility found in the requested location per bluestake markings.
27	24	0	6/1/2007	0	0	0					0.00	0.00	0.00	0.00	No conflict per Quest Blue Stake response.
30	27	Hawes Road & Culver Street	5/24/2007	0	0	0					0.00	0.00	0.00	0.00	No facility in the requested location per bluestake markings.
35	32	0	5/31/2007	0	0	0					0.00	0.00	0.00	0.00	No Telephone per Qwest Blue Stake response.
43	40	Waterbury Road & McDowell Road	5/24/2007	0	None	None	897214.94	782710.50	118+11.51	10.83 Rt	1784.58	1784.58	1779.58	0.00	Dug to a depth of 5' in the requested location and no facility was found. Unable to dig any further due to soil conditions.
44	40A	Waterbury Road & McDowell Road	5/24/2007	0	None	None	897215.50	782699.71	118+00.71	10.30 Rt	1784.33	1784.33	1777.33	0.00	Dug to a depth of 7' in the requested location and no facility was found.
45	40B	Waterbury Road & McDowell Road	5/24/2007	0	None	None	897213.63	782694.22	117+95.23	12.19 Rt	1784.19	1784.19	1774.19	0.00	Dug to a depth of 10' in the requested location and no facility was found.
48	42A	Waterbury Road & McDowell Road	5/31/2007	0	None	None	897214.23	782704.74	118+05.75	11.56 Rt	1784.40	1784.40	1772.40	0.00	Dug to a depth of 12' in the requested location and no facility was found.
51	45	0	5/31/2007	0	0	0	897247.64	784037.73	131+44.47	11.61 Lft	1818.23	1818.23	1811.23	0.00	No facility found at requested location. No gas in area per Blue Stake. Aztec crew attampted to confirm location electronically with no results.
53	47	88th Street & McDowell Road	5/24/2007	0	None	None					0.00	0.00	0.00	0.00	No facility in the requested location per bluestake markings.
56	50	0	1/0/1900	0	0	0					0.00	0.00	0.00	0.00	No conflict per Blue Stake.
73	14	Pothole Cancelled		0											Pothole Cancelled.
74	15	Pothole Cancelled		0											Pothole Cancelled.
75	16	Pothole Cancelled		0											Pothole Cancelled.
76	17	Pothole Cancelled		0											Pothole Cancelled.
77	18	Pothole Cancelled		0											Pothole Cancelled.
78	19	Hermosa Vista Drive & Mangun Street	9/19/2007	0	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.
83	23	Hermosa Vista Drive & 78th Street	9/19/2007	0	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.
84	24	Hermosa Vista Drive 200' east of 78th Street	9/19/2007	0	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.
87	27	Hermosa Vista Drive & 80th Street	9/19/2007	0	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.
94	34	Hermosa Vista Drive 600' east of 80th Street	9/19/2007	0	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.
123	62	Waterbury & MacDowell Rd.	9/27/2007	0	None	None	897213.39	782668.75	118+23.56	22.27 RT	1783.71	0.00	1778.71	0.00	Dug to 5' deep and swept 6' wide. No facility found.
132	71	88th St. & McDowell Rd.	9/27/2007	0	None	None	897223.26	784037.20	131+92.24	7.78 RT	1817.37	0.00	1810.87	0.00	Dug to a depth of 6.5' deep. No facility found.
134	73	McDowell Road 900' east of 88th Street	9/19/2007	0	None	None	None	None	None	None					No facility in the requested location per Paul with ELM Utility and Locating Service, 602-695-2183.

PAAC MEETING MINUTES

Hermosa Vista/Hawes Road Storm Drain and Basin Project
FCD Contract No 2005C009
PCN 420.02.31

Project Aesthetics Advisory Committee
Meeting Minutes

Meeting Date: April 10, 2007 **Time:** 6:00 pm to 8:00 pm
Location: Desert Hills Baptist Church, 8326 E. McDowell Rd.
Purpose: Working Committee to Review Project Landscape Aesthetics

Meeting No. 1- Project Aesthetics Advisory Committee (PAAC)

Attendees

Scott Vogel, FCDMC
Jon Loxley, FCDMC
Nicole Scheider, FCDMC
Afshin Ahouraiyan, FCDMC
Fred Rustman, City of Mesa
Judy Nowak, Thunder Mountain
Jerry Seeman, SHNAA Board
Ann Soloski, Thunder Mountain
Barry Wallace, Madrid HOA
Ash Patel, Wood/Patel
Jeff Minch, Wood/Patel
Scott Peters, EPG
Renee Gillespie, EPG

Summary of Meeting

Welcome/Introductions- Scott Vogel, FCDMC

All present introduced themselves and their relationship with the project.

Purpose of the PAAC- Scott Vogel, FCDMC

Scott Vogel stated that the PAAC group includes representatives of organized neighborhoods along the project corridors, and its purpose is to gain feedback from the representatives on the project design and aesthetics. Three of the five organized neighborhoods were represented. Scott also indicated that the PAAC meeting was scheduled prior to the Public Open House so that potential issues, questions, or concerns could be identified and addressed prior to or at the public meeting.

Project Background- Spook Hill ADMP, Culver Hawes Basin DCR- Ash Patel

Ash discussed that the District hired Wood/Patel five years ago for the Spook Hill Area Drainage Master Plan (ADMP) Update project to study the areas' hydrology and develop an understanding of the potential and occurring flood problems. Ash indicated that there

were two initial steps in addressing an ADMP. The first step is to identify the flooding problems in the area, develop multiple ideas for resolving those problems factoring in all aspects of the problem, and come up with the best solution. The second step is to implement the design. He also noted that the District receives input from the public through each step of the process.

Ash indicated that the basin site identified in the ADMP at 88th Street and McDowell Road had since been developed into residential lots. As a result, the District identified the Culver and Hawes site, and prepared a Design Concept Report for the Culver-Hawes Basin. By relocating the basin downstream, stormwater flows will not be intercepted prior 88th Street. Through this project, the District is working to modify 88th Street to direct flows into the Thunder Mountain channel running along McDowell Road where they were originally designed to go.

Project Schedule & Storm Drain Design- Jeff Minch

Jeff Minch indicated that the box culvert crossing from the Madrid basin would be modified with a 24-inch pipe to constrict water flowing into the subdivision.

PAAC members asked whether or not MCDOT was responsible for providing protection from a 100-year flood event. Jeff indicated that they were *not*; however, they are responsible for flooding impacts resulting from their roadways.

Jeff presented the drainage problem at the intersection of McDowell Road and 88th street. Jeff indicated that as part of the project, the profile of the road is proposed to be redesigned so that there would be a dip across 88th street to allow the drainage to flow into the Thunder Mountain channel running along the north side of McDowell road as originally designed.

Jeff stated that the alignment of the storm drain was designed so that its placement would avoid existing utilities and minimize impact on traffic during construction.

A question was raised as to why the trees along the north and south sides of McDowell road were tagged if they weren't being removed for the placement of the storm drain. Scott Peters indicated that the plant survey was conducted at the same time as the topographic survey for the project, and that it was now okay to remove the red, white, and blue tags.

A question was raised regarding protection of the existing washes. Jeff Minch indicated that when the area north of the basin develops, the developer will have to address the Section 404 wash conditions. Concern was also voiced regarding the drainage system stopping water that filled existing washes. PAAC members expressed that it was important that runoff continue filling their washes in order to maintain the existing vegetation and character of the area. Scott Vogel stated that low flow structures were being incorporated in the design so that the existing washes would still receive initial flows.

Jeff stated that frequent storms would bypass the basin and flow through the storm drain directly to the Spookhill FRS. Only significant storms will fill the basin. Jeff indicated that the storm drain would be reduced from 66-inch to 36-inch at the basin. Flows from the 66-inch storm drain that exceeded the 36-inch storm drain capacity will be diverted into the basin. The basin will hold the flows until the large storm passes. After the larger storm passes, the basin would then drain into the storm drain system. The storm drain will collect additional stormwater along McDowell Road, Hawes Road, and Hermosa Vista Drive.

Jeff indicated that the project will be three to four years out for construction, depending on project funding.

Members of the PAAC expressed concern that water that should be detained by the Madrid Basin was bypassing the basin and flooding the subdivision. Barry Wallace stated that the Madrid Subdivision HOA is dealing with flooding issues with the developer.

Jeff presented the alignment of the storm drain along Hermosa Vista Drive to Sossaman Road. He pointed out that, where it was possible, the storm drain was designed to stay outside of the existing pavement. He also pointed out that the storm drain alignment shifted near Sossaman Road to avoid an existing waterline. The proposed alignment is also designed to avoid existing utilities west of Sossaman Road to the Spookhill FRS.

The question was raised as to how long it would take to construct this project. Scott Vogel indicated that 12-14 months were anticipated for construction. The PAAC expressed that they would like to have the project developed as soon as possible.

Landscape Aesthetics (Review of Culver Hawes Design and Plant Inventory) - Scott Peters

Scott Peters presented the design for the Culver/Hawes basin that was developed as part of the Culver Hawes Design Concept Report (DCR). Scott presented that the DCR studied the existing hydrology, landforms and vegetation of the site. The grading plan was designed to resemble character of the existing landform surrounding the site and incorporate berms (a maximum of six feet higher than natural grade) on the downstream side of the basin to allow for the basin to achieve the needed capacity while minimizing cut on the upstream side of the site. The berms also serve to screen the maintenance road.

Jerry Seeman expressed that a maintenance road was not needed, that the presence of a maintenance road around the basin was inconsistent with the concept of keeping the basin natural, and that the he would rather see more of the site revegetated. Jerry asked what equipment was needed to maintain the basin. Scott Vogel stated that there needed to be access for removal of trash, silt, and plant litter. Jerry pointed out that those items could be addressed without the use of heavy equipment. As silt removal was discussed, Jerry pointed out that the removal of the silt in the basin would cause further loss of vegetation.

Scott Peters indicated that the basin was going to be hydroseeded with a seed mix consistent with of the existing plant material found on the site. Jerry stated that hydroseed DOES NOT WORK on these soils. He further explained that if the site was going to be hydroseed, adequate watering was critical for establishment.

Scott Peters explained that there was going to be a smooth wire fence surrounding the site. Concern was raised regarding the aesthetics of the smooth wire fencing. The use of boulders was suggested in place of the fencing. It was ultimately agreed that smooth wire fencing was unobtrusive, and if fencing was needed, smooth wire fencing was the way to go.

Scott Peters explained that the plan was to salvage the existing saguaros and cacti located on the site. Additionally, existing trees that are impacted by grading would be mulched and spread throughout the basin site. He further stated that tall pot trees of the same species of the existing trees would be incorporated into the basin, and that the number of tall pot trees planted would reflect the density of the existing trees inventoried on the site plus the addition of extra trees to account for some mortality.

Jerry Seeman brought up the issue of heavy equipment being brought into the basin for the salvaging of plant material and watering. He was concerned about the damage from the equipment and that hydroseed and salvaged plant material get enough water, which he indicated, was imperative for their survivability. This further emphasized the need for an access road around the site.

Jerry asked if the trees to be removed could be sold to local homeowners. He also asked if they could be salvaged and used to screen the reservoir located at Scarlet and Hawes Road. The District and the City of Mesa, respectively agreed to look into these options.

Open Discussion, Group Members

Concern was expressed as to where the staging area for construction would be located, and specifically over what additional areas may be impacted by the construction equipment and project staging. Scott Vogel indicated that at this point it was unknown because it was the responsibility of the contractor to determine where it would be located. PAAC members asked the District to consider options for staging areas and including requirements in the specifications to minimize additional disturbance of the area due to staging.

<u>Conclusion</u>

The PAAC generally supported the storm drain alignment and design of the basin. It was requested that:

1) the District minimize the area of the maintenance road,
2) the City of Mesa considers salvaging the trees and use them to screen the reservoir,

3) the District consider allowing the trees to be removed to be salvaged by the local residents, and
4) the District consider options for staging areas including requirements in the specifications to minimize additional disturbance of the area.

Attachments – Sign-in Sheet

Hermosa Vista/Hawes Road Storm Drain and Basin Project
Contract FCD 2005C009

Project Aesthetics Advisory Committee (PAAC) Meeting
Tuesday April 10, 2007, 6:00 PM to 8:00 PM
at the Desert Hills Baptist Church
8326 E. McDowell Road
Mesa, Arizona 85207

Meeting Sign in Sheet

Present	Name	Organization	Phone	Email
Agency Representatives				
				(nicoleschneider@
CM	Scott Vogel	Flood Control District of Maricopa County	(602) 506-4771	csv@mail.maricopa.gov
JL	Jon Loxley	Flood Control District of Maricopa County	(602) 506-2956	jonloxley@mail.maricopa.gov
NKS	Nicole Schneider	Flood Control District of Maricopa County	(602) 506-6762	dch@mail.maricopa.gov)
AA	Afshin Ahouraiyan	Flood Control District of Maricopa County	(602) 506-4519	afa@mail.maricopa.gov
	Leo Trinidad	Maricopa County Department of Transportation	(602) 506-8626	leotrinidad@mail.maricopa.gov
FR	Fred Rustam	City of Mesa	(480) 644-4688	fred.rustam@cityofmesa.org
PAAC Members				
JN	Judy Nowak	Thunder Mountain	(480) 354-1697	jmowak79@earthlink.net
	Bill Puffer	SHNAA Board		wjp5207@msn.com
	Jerry Seeman	SHNAA Board	(480) 380-9535	Azgulch@yahoo.com
	Yvonne Schmidt	SHNAA Board	(480) 357-5674	yrschmidt@hotmail.com
MG	Mark Giannini	BARRY WALLACE Madrid HOA	(480) 635-6152	msgiannini@gmail.com
	Michael Moore	Las Sendas Community Association	(480) 357-8780	mmoore@thetrailhead.org
	Al Stimach	Saguaro Vista HOA	(480) 218-7199	
AES	Ann Seloski	Thunder Mountain	(480) 380-5308	aeseloski@worldnet.att.net
Consultant Team				
AP	Ash Patel	Wood/Patel	(602) 335-8500	apatel@woodpatel.com
JKM	Jeff Minch	Wood/Patel	(602) 335-8500	jminch@woodpatel.com
	Joe Lockett	Wood/Patel	(602) 335-8500	jlockett@woodpatel.com
	Scott Peters	EPG	(602) 956-4370	speters@epgaz.com
	Marsha Miller	KDA	(602) 368-9644	marsha@kdacreative.com
RG	Renee Gillespie	EPG	(602) 956-4370	rgillespie@epgaz.com

Hermosa Vista/Hawes Road Storm Drain and Basin Project
FCD Contract No 2005C009
PCN 420.02.31

Project Aesthetics Advisory Committee
Meeting Minutes

Meeting Date: July 24, 2007 **Time:** 6:30 pm to 8:00 pm
Location: Desert Hills Baptist Church, 8326 E. McDowell Rd.
Purpose: Working Committee to Review Project Landscape Aesthetics

Meeting No. 2 - Project Aesthetics Advisory Committee (PAAC)

Attendees

Scott Vogel, FCDMC
Jon Loxley, FCDMC
Nicole Scheider, FCDMC
Afshin Ahouraiyan, FCDMC
Fred Rustman, City of Mesa
Ann Soloski, Thunder Mountain
Bill Puffer, SHNAA Board
Ash Patel, Wood/Patel
Jeff Minch, Wood/Patel
Dave Lutzky, Wood/Patel
Scott Peters, EPG
Renee Gillespie, EPG

Summary of Meeting

Welcome/Introductions- Scott Vogel, FCDMC

All present introduced themselves and their relationship with the project.

Purpose of the PAAC Meeting and Project Schedule - Scott Vogel, FCDMC

Scott indicated that the construction plans for the Hermosa Vista / Hawes Road Basin and Storm Drain Project are at the 70% submittal phase. The purpose of the second PAAC meeting is to review the changes since the 40% submittal.

Storm Drain Alignment - Jeff Minch

Jeff noted that the storm drain alignment had been adjusted in a few locations, and that the inlet structures were also refined. One of the adjustments is located near the corner of Hermosa Vista and Sossaman Road. The alignment had to be shifted in this area to avoid existing telephone and water lines. The alignment was designed outside of the pavement on the north side of Hermosa Vista Road to minimize road reconstruction. The District is pursuing an easement between 78th and 80th Street where there is currently only a half-street right-of-way.

Bill Puffer was concerned that the existing culverts located near 78th Street along Hermosa Vista were not functioning properly and that there were no openings in the curb. Jeff Minch confirmed that the issue should be corrected by the new storm drain system with its multiple catch basin inlets.

Bill also questioned if there would be enough stormwater flow to flush out the storm drain so that it would not get clogged with sediment and result in flooding. Scott Vogel indicated that this should not be an issue with the new storm drain system since the system is being designed to intercept the 100-year design flows assuming the cross-culvert pipes are clogged.

Bill indicated that residents along Hermosa Vista Road near Sossaman Road may be concerned with the construction, as their houses are closer to the road and proposed storm drain alignment. Afshin Ahouraiyan asked Bill to contact the homeowners and/or give him the homeowner's contact information so that he could contact them regarding the project. The intent would be to discuss the project before construction so that any issues and concerns that they may have could be addressed before the project goes to construction.

Jeff Minch pointed out that the storm drain alignment is offset approximately 8 feet east of the Hawes Road east edge of pavement near the intersection of Hermosa Vista and Hawes Road to minimize residential disruption.

Jeff also explained that as part of this project, the curb on 88th Street at McDowell Road was going to be reprofiled to create an apron to direct the storm water flows toward the existing channel where they where originally designed to flow.

Bill asked if the Hermosa Vista / Hawes Road storm drain was constructed before the McDowell Road Basin and Storm Drain Project, would it be able to hold both Madrid and Thunder Mountain storm water. He was told that the two projects are designed to function together as a complete system.

Bill brought up that there currently is a problem with storm water from 90th Street not getting into the Madrid basin. Scott Vogel stated that it was the District's understanding that MCDOT was planning/designing the road to have a more defined dip to direct flows into the basin and are still working on acquiring the right-of-way needed for the project.

Landscape Aesthetics - Scott Peters

Scott Peters explained to the PAAC members that the planting design is based on the planting plan developed in the Design Concept Report (DCR), and is now being refined as part of the construction documents for the project.

He explained that the construction documents include salvage plans that delineate the existing vegetation identified on the basin site; which areas of the site will be affected by construction; and which plants will remain-in-place, be salvaged, or be removed. The

basin is being designed to minimize impacts to existing vegetation. Areas that are to remain undisturbed are to be protected during construction. Scott explained that the saguaros within the disturbed areas of the site are going to be salvaged and replanted within the basin site. Trees are not going to be salvaged because irrigation is not available. Bill asked if the trees to be removed were going to be available for salvage by the public. Jon Loxley, Scott Vogel, and Scott Peters indicated that the District typically makes them available for salvage and would do so with this project.

Scott indicated that the design of the basin was configured to be natural in character. Changes to the grading design were made from the design in the DCR to protect the existing vegetation. Also, the planting plan takes into account the identified quantities of existing species and adds 20+ percent to account for mortality.

Bill asked how high the berm along Hawes Road is. Scott indicated that it was no more than six feet above existing grade at the highest point.

Ann asked what species were included in the seed mix. Scott explained that the seed mix contains the same plant species that were currently found on the sight and that were consistent with the City of Mesa's Desert Upland guidelines. He also explained the concept of the tall pot planting process and described the success on the McMicken Dam project using this method without irrigation.

Bill asked where the nursery was going to be located. Scott indicated that it would be up to the contractor to determine the location. The contractor will have to obtain approval from the District for the nursery location. Scott further explained that the contractor would also be responsible for mortality that surpassed 10% of the salvaged plants.

Bill wondered what the consequences would be if the contractor violated the protected areas or failed to adhere to the construction provisions. Scott noted that a consequence for violation has not yet been defined but will be, and that a District Construction Manager will be overseeing the construction and would be responsible to assure the contractor protects the designated areas. Scott Vogel stated that the Flood Control District establishes a relationship with the contractor before construction to develop a clear understanding of the goals of the project, minimize any potential problems, and to discuss construction standards and guides.

Open Discussion- Group Members

Bill stated that it appeared that the design team has addressed the issues and concerns brought up by the public.

It was noted that the Oak Street Basin would also be developed in the future, and that the same design team developed a concept design for the basin as part of the land acquisition process. The basin will likely be constructed after McDowell Road Basin and Hermosa Vista / Hawes Road Storm Drain and Basin projects are completed.

Bill asked if there would be any irrigation to the basin planting. Scott Peters stated that there would not be and that the vegetation would rely on natural precipitation. Scott Vogel asked if the seed would stay dormant until precipitation occurred. Scott Peters and Jon Loxley explained that it would, and that the Flood Control District committed to re-hydroseed if needed. They further explained that the District would work with the contractor to schedule the planting before one of the two wet seasons to increase the success of the hydroseeding.

Bill wondered if the tall pot plants were going to start off small. Jon Loxley explained that the tall pot plants are approximately 12" to 18" tall when planted.

Scott Vogel noted that the District and the City of Mesa are considering switching the order of construction between the Hermosa Vista / Hawes Road Storm Drain and Basin Project and the McDowell Road Basin and Storm Drain Project to address the flooding issues occurring through the Madrid subdivision and along Hermosa Vista Road first.

Next PAAC Meeting (Meeting No. 3)

The next PAAC meeting is tentatively planned for October 2007. The date has not yet been determined. Scott Vogel will notify the PAAC members in advance of the final PAAC meeting.

Conclusion

The PAAC generally supported the storm drain alignment and design of the basin. It was requested that:

1) The District consider consequences for the contractor should the areas not to be disturbed be damaged by construction activities, and
2) The District consider salvaging trees on the basin site.

Attachments – Sign-in Sheet

Hermosa Vista/Hawes Road Storm Drain and Basin Project
Contract FCD 2005C009

Project Aesthetics Advisory Committee (PAAC) Meeting
Tuesday July 24, 2007, 6:00 PM to 8:00 PM
at the Desert Hills Baptist Church
8326 E. McDowell Road
Mesa, Arizona 85207

Meeting Sign in Sheet

Present	Name	Organization	Phone	Email
Agency Representatives				
CSV	Scott Vogel	Flood Control District of Maricopa County	(602) 506-4771	csv@mail.maricopa.gov
	Jon Loxley	Flood Control District of Maricopa County	(602) 506-2956	jonloxley@mail.maricopa.gov
	Nicole Scheider	Flood Control District of Maricopa County	(602) 506-6762	nicolescheider@mail.maricopa.gov
AFA	Afshin Ahouraiyan	Flood Control District of Maricopa County	(602) 506-4519	afa@mail.maricopa.gov
	Leo Trinidad	Maricopa County Department of Transportation	(602) 506-8626	leotrinidad@mail.maricopa.gov
FR	Fred Rustam	City of Mesa	(480) 644-4688	fred.rustam@cityofmesa.org
PAAC Members				
	Judy Nowak	Thunder Mountain	(480) 354-1697	jrnowak79@earthlink.net
WJP	Bill Puffer	SHNAA Board	480-986-2655	wjp5207@msn.com
	Jerry Seeman	SHNAA Board	(480) 380-9535	Azgulch@yahoo.com
	Yvonne Schmidt	SHNAA Board	(480) 357-5674	yrschmidt@hotmail.com
	Mark Giannini	Madrid HOA	(480) 635-6152	msgiannini@gmail.com
	Michael Moore	Las Sendas Community Association	(480) 357-8780	mmoore@thetrailhead.org
	Al Stimach	Saguaro Vista HOA	(480) 218-7199	
AES	Ann Soloski	Thunder Mountain	(480) 380-5308	aesoloski@worldnet.att.net
Consultant Team				
AP	Ash Patel	Wood/Patel	(602) 335-8500	apatel@woodpatel.com
JRM	Jeff Minch	Wood/Patel	(602) 335-8500	jminch@woodpatel.com
	Joe Lockett	Wood/Patel	(602) 335-8500	jlockett@woodpatel.com
	Scott Peters	EPG	(602) 956-4370	speters@epgaz.com
RG	Renee Gillespie	EPG	(602) 956-4370	rgillespie@epgaz.com
	Marsha Miller	KDA	(602) 368-9644	marsha@kdacreative.com
DLL	Dave Lotzley	Wood/Patel		DLotzley@woodpatel.com

Hermosa Vista/Hawes Road Storm Drain and Basin Project
FCD Contract No 2005C009
PCN 420.02.31

Project Aesthetics Advisory Committee
Meeting Minutes

Meeting Date: November 13, 2007 **Time:** 6:30 pm to 8:00 pm
Location: Desert Hills Baptist Church, 8326 E. McDowell Rd., Mesa, Arizona
Purpose: Working Committee to Review Project Design & Landscape Aesthetics

Meeting No. 3 - Project Aesthetics Advisory Committee (PAAC)

Attendees

Scott Vogel, FCDMC
Jon Loxley, FCDMC
Afshin Ahouraiyan, FCDMC
Fred Rustman, City of Mesa
Judy Nowak, Thunder Mountain
Ann Soloski, Thunder Mountain
Bill Puffer, SHNAA Board
Jerry Seeman, SHNAA Board
Yvonne Schmidt, SHNAA Board
Jeff Minch, Wood/Patel
Scott Peters, EPG

Summary of Meeting

Welcome/Introductions- Scott Vogel, FCDMC

All present introduced themselves and their relationship with the project.

Purpose of the PAAC Meeting and Project Schedule - Scott Vogel, FCDMC

Scott indicated that the construction plans for the Hermosa Vista / Hawes Road Basin and Storm Drain Project are at the 100% submittal phase. The purpose of the third and final PAAC meeting is to review the changes since the 70% submittal and inform the members of the construction schedule. Scott indicated that the current schedule is to complete the construction documents by the end of the year, advertise for construction April 2, 2008, with construction notice to proceed July 1, 2008.

Storm Drain Alignment – Jeff Minch

- The following items were discussed with the PAAC regarding the final storm drain alignment:
    - A number of culverts/inlets were added to intercept local drainage along the roadway alignments.
    - The storm drain alignment was adjusted in Hermosa Vista Drive to avoid a water vault at the Sossaman Road intersection.

- The alignment between 78th Street and the outlet was adjusted to avoid existing utilities, adjacent improvements, and provide for a future sanitary sewer system extension.
- The city utility easement will be used as well as a new drainage easement acquired between 80th and 78th streets for the storm drain system.
- The system is designed to allow the initial storm water flows to continue downstream and maintain vegetation while larger flows will be picked up by storm drain inlets.
- The grated inlets along the roadway will be elevated slightly above the surrounding ground to intercept sediment laden stormwater and convey it through the new storm drain system. Maintenance will still be required for the cross culverts.

- It was noted that the roads may be closed at times during construction to all but local traffic.
- Mesa noted that they do not allow more than 300-foot open trench at one time during construction.
- Construction will likely take between 12 and 15 months
  - Per the contract, the Contractor will be required to pay +/- $1,300 per day for not completing the project on time. The District will enforce this item in the contract.

- The project will not be revegetating areas within the right-of-way or on private property that are bladed/graded.
- The District will contact homeowners west of Sossaman Road impacted by the project.
- The 100% design keeps construction on the east side of Hawes Road.
- The Culver–Hawes Basin is designed to be an off-line basin (initial flows will bypass the basin).
- A 66-inch diameter pipe will connect to a 36-inch pipe at the basin. Flows greater than the 36-inch pipe can carry will be diverted into the basin.
- Catch basins have been located to capture flows running down Culver Street east of Hawes Road.
- The District should be aware that there is an assisted care home on southeast corner of Culver Street and Hawes Road.
- The storm drain alignment stays on south side of McDowell Road until 88th Street where it will cross over to the north side and connect to the Madrid Basin.
- A new structure will be constructed at the upstream side of the existing box culvert under McDowell Road in the Madrid Basin. The structure is designed to cut-off up to the 100-year design storm event and direct the storm flows into the new storm drain. If the storm event exceeds the 100-year event, excess flows will enter the existing box culverts. Minor flow will continue through the box (via an 18-inch pipe) to sustain vegetation downstream.
- Project is not addressing flooding issues associated with 90th Street. The District understands that MCDOT is addressing these issues. The timing of this project is currently unknown by the project team.

- The 88th Street flows are designed to enter the channel along McDowell Road; however, the current improvements don't capture the runoff. The new design will depress the curb and re-profile the road to help direct flows into the channel as originally planned for the Thunder Mountain subdivision. Additional rip rap will be installed to prevent erosion.
- There is an outlet at the Thunder Mountain basin that directs flows back into wash south of McDowell Road. This water will be intercepted by the new storm drain system.
- The Thunder Mountain HOA will still have maintenance responsibility for the basin and channel within the limits of the subdivision.
- The system will be an all gravity flow system and will not have any pumps.
- The District will acquire a drainage easement for the new structures at the Madrid Basin. The District will maintain the easement area and structures. The subdivision HOA will still maintain the basin.

Landscape Aesthetics – Scott Peters

The following items were discussed with the PAAC regarding the project landscape aesthetics:

- The simulated desert varnish treatment ("Permeon" or "Desert Varnish") of visual structures was described to the PAAC. Visible surface concrete, aggregate and metal materials will be treated with a chemical which creates a patina color that blends into the natural surrounding desert.
- PAAC members questioned how the desert varnish treatment works. Scott explained that the treatment utilizes metals and weak acid to create the chemical reaction to produce the naturally appearing desert varnish on the materials.
- The PAAC expressed concern regarding potential fading. It was noted that future applications of the "permeon" could be applied by the FCDMC if necessary.
- The team has inventoried the saguaro and trees with a caliper greater than 2" on the basin site and noted those that can be salvaged.
- During construction protective fencing (gold rope) will be installed to protect existing vegetation to remain in place from construction.
- No irrigation system is proposed for the project.
- The FCDMC will be filing notice with the Department of Agriculture to clear the basin site for construction.
    - The FCDMC will publicly auction the salvageable plants identified to be destroyed as part of the project construction.
    - It is currently planned to advertise for plant salvage in January with the basin site available to salvage companies from February to March.
    - All salvageable saguaros will be salvaged and replanted on the basin site.
    - Smaller cacti will also be salvaged and replanted on the basin site as noted in the landscape plans.
    - The remaining vegetation will be mulched and mixed into the topsoil to promote the revegetation of the site.
- The team presented an overview of the project grading and planting plan for the basin site.

- New items incorporated into the design include riprap (loose rock) and a concrete ford for the maintenance road at the top of the northeast corner of the basin at an existing wash.
- The maintenance road will consist of 2" thick screened decomposed granite on top of 4" thick ABC (rock) for all weather access.
- Sediment wattles are proposed to mitigate initial slope erosion and riling following the basin construction. The wattles will be left in place at the completion of construction and will ultimately decompose into the surrounding landscape.
- The team noted that test sites of the tall pot plant have been very successful (80% survival rate). The team has tried to compensate for the mortality rate by increasing the number of tall pots planted on the site.
- The team indicated that the primary tree species on the site are Foothills Palo Verde and Ironwood. Three seed mixes are proposed for the project as noted in the landscape plans.
- One of the PAAC members requested that the team replace *Acacia constricta* - White Thorn Acacia, with *Justicia californica* – Chuparosa; and add *Calliandra eriophylla* - Pink Fairy Duster, *Hyptis emoryi* - Desert Lavender, and *Trixis californical* – Trixis to Hydroseed Mix-A. The team will revise the seed mixes.

Other Discussions – PAAC

- The PAAC questioned how they could contact the FCDMC if problems arise during construction. Scott noted that the project will have a hotline phone number for the public. The FCDMC and the Contractor will have to address comments on the hotline for the duration of the construction.
- The FCDMC also noted that the project status will be updated on the District's website.

Conclusion

The PAAC supported the storm drain alignment and design of the basin. The PAAC also expressed gratitude to the FCDMC staff and design team's responsiveness to the local property owner concerns.

Attachments – Agenda, Sign-in Sheet

Flood Control District of Maricopa County
Hermosa Vista / Hawes Road Storm Drain and Basin Project
FCD 2005C009

PAAC MEETING #3 AGENDA

Meeting Date: Tuesday, November 13, 2007 **Time:** 6:30 pm

Location: Desert Hills Baptist Church, 8326 E. McDowell Rd., Mesa, AZ 85207

Purpose: Review 100% Storm Drain Alignment and Project Landscape Aesthetics

Meeting No. 3 – Project Aesthetics Advisory Committee (PAAC)

Item No.	Topic of Discussion	Speaker	Time
1.	Welcome/Introductions	Scott Vogel	2 min.
2.	Purpose of the PAAC Meeting & Project Schedule	Scott Vogel	3 min.
3.	Storm Drain Alignment	Jeff Minch	25 min.
4.	Landscape Aesthetics – Culver Hawes Basin • Review Plant Salvage Plan • Review Grading Plan • Review Landscape Planting Plan	Scott Peters	30 min.
5.	Open Discussion	Group Members	30 min.

Hermosa Vista/Hawes Road Storm Drain and Basin Project
Contract FCD 2005C009

Project Aesthetics Advisory Committee (PAAC) Meeting
Tuesday November 13, 2007, 6:30 PM to 8:00 PM
at the Desert Hills Baptist Church
8326 E. McDowell Road
Mesa, Arizona 85207

Meeting Sign in Sheet

Present	Name	Organization	Phone	Email
Agency Representatives				
	Scott Vogel	Flood Control District of Maricopa County	(602) 506-4771	csv@mail.maricopa.gov
	Jon Loxley	Flood Control District of Maricopa County	(602) 506-2956	jonloxley@mail.maricopa.gov
	Nicole Scheider	Flood Control District of Maricopa County	(602) 506-6762	nicolescheider@mail.maricopa.gov
	Afshin Ahouraiyan	Flood Control District of Maricopa County	(602) 506-4519	afa@mail.maricopa.gov
	Fred Rustam	City of Mesa	(480) 644-4688	fred.rustam@cityofmesa.org
	Leo Trinidad	Maricopa County Department of Transportation	(602) 506-8626	leotrinidad@mail.maricopa.gov
PAAC Members				
	Judy Nowak	Thunder Mountain	(480) 354-1697	jmowak79@earthlink.net
	Bill Puffer	SHNAA Board	(480) 986-2655	wjp5207@msn.com
	Jerry Seeman	SHNAA Board	(480) 380-9535	Azgulch@yahoo.com
	Yvonne Schmidt	SHNAA Board	(480) 357-5674	yrschmidt@hotmail.com
	Mark Giannini	Madrid HOA	(480) 635-6152	msgiannini@gmail.com
	Michael Moore	Las Sendas Community Association	(480) 357-8780	mmoore@thetrailhead.org
	Al Stimach	Saguaro Vista HOA	(480) 218-7199	
	Ann Soloski	Thunder Mountain	(480) 380-5308	acsoloski@worldnet.att.net
Consultant Team				
	Ash Patel	Wood/Patel	(602) 335-8500	apatel@woodpatel.com
	Jeff Minch	Wood/Patel	(602) 335-8500	jminch@woodpatel.com
	Dave Lutzky	Wood/Patel	(602) 335-8500	dlutzky@woodpatel.com
	Scott Peters	EPG	(602) 956-4370	speters@epgaz.com
	Renee Gillespie	EPG	(602) 956-4370	rgillespie@epgaz.com
	Marsha Miller	KDA	(602) 368-9644	marsha@kdacreative.com

WATERLINE THRUST BLOCK CALCULATIONS

Anchor Block Calculations

Hawes Road 20" Waterline Sta 91+21.18 & Sta. 78+24.4		
Input		
Diameter =	20	in
Vertical Angle =	45	degrees
Soil Bearing =	3000	lb/sf
Test Pressure[a] =	200	psi
Concrete Block =	150	lb/cf
Safety Factor =	1.5	
f's =	24	ksi
Calculated		
Vertical Angle =	0.7853982	radians
Area of Pipe =	314.16	sq in
Vertical Force =	66643	lbs
Horizontal Force =	27605	lbs
Size of block =	444.3	cu ft
Min Block Dim. =	7.6	ft - each side
Area Required D/S Side =	9.2	sf
Area Provided D/S Side =	58.2	sf
Verify Side Area of Anchor[b] =	OK	See note (b) below
Bar Area =	1.39	sq in
Min Bar Size =	11	#
Min # 5 Bars Needed [c] =	5	Each
"A" - Dim. Hook =	2'-0"	

Input Cell =

Note:
(a) - Test Pressure Per MAG Spec. 610.13
(b) - Verify side area of anchor is sufficient to restrain horizontal component of force.
(c) - In lieu of large diameter bar, several #5 bars can be used.

Equations Used:

Area of pipe = $(\pi/4)*(\text{Diameter}^2)$

Vertical Force = (Test Pressure)*(Area of Pipe)*(sin(Vertical Angle))*Safety Factor

Horizontal Force = (Test Pressure)*(Area)*(1-cos(Vertical Angle))*Safety Factor

Size of block = (Force)/(Block Density)

Reference:
American Water Works Association (AWWA) Manual M41, Second Edition
Ductile-Iron Pipe and Fittings

Thrust Block Calculations

Hawes Road 20" Waterline Sta 91+21.18 & Sta. 78+24.4		
Input		
Diameter =	20	in
Horizontal Angle =	45	degrees
Soil Bearing =	3000	lb/sf
Test Pressure[(a)] =	200	psi
Safety Factor =	1.5	
Calculated		
Horizontal Angle =	0.78539816	radians
Area of pipe =	314.16	sq in
Force =	72134.13	lbs
Size of block =	24.04	sq ft

Input Cell =

Note:
(a) - Test Pressure Per MAG Spec. 610.13

Equations Used:

Area of pipe = $(\pi/4)*(\text{Diameter}^2)$

Force = (Test Pressure)*(Area of Pipe)*(2*(sin(Horizontal Angle)/2))*Safety Factor

Size of block = (Force)/(Soil Bearing)

Block Size Notes:

Height of Block, (h) = Less than or equal to 1/2 (Ht) and not less than Pipe Diameter
Ht = Total depth from surface to bottom of block

Width of Block, (b) = 1 to 2 times (h)
Block should be placed against undisturbed soil. If not possible, fill must be compacted to 90% Standard Proctor density.

Reference:
American Water Works Association (AWWA) Manual M41, Second Edition
Ductile-Iron Pipe and Fittings

VALUE ENGINEERING/
CONSTRUCTABILITY MEETING MINUTES

WOOD/PATEL

MEETING MINUTES

Date Prepared: June 4, 2007

MEETING DATE:	Tuesday, May 15, 2007 1:00 p.m. – 5:30 p.m.
LOCATION:	Flood Control District of Maricopa County (FCDMC) Buckhorn Mesa Conference Room
PROJECT:	Hermosa Vista/Hawes Road Storm Drain and Basin Project Contract FCD 2005C009 PCN 420.02.31
WP PROJ. #:	052640
SUBJECT:	Value Engineering/Constructability Meeting
ATTENDEES:	Sign-in sheet attached

The following meeting minutes set forth our understanding of the discussions and decisions made at this meeting. If you have any questions, additions, or comments please contact the author immediately at (602) 335-8500. If we do not hear from you within 10 days, we will assume that our understandings are the same. We are proceeding based upon the contents of these meeting minutes.

Prepared by: Jeff Minch

I. INTRODUCTIONS

The meeting attendees made self introductions.

II. VALUE ENGINEERING/CONSTRUCTABILITY ITEMS

Scott noted that the purpose of the meeting was to review and make decisions regarding the direction to take on various project issues impacting how the project performs and constructability of the project. Scott summarized the general meeting structure as defined below:

1. Item Development
    a. Describe Issue/ Feature
    b. Define Function
    c. Design/ Performance/ Constructability Concerns
2. Alternative Solutions
    a. Brainstorm Alternatives
    b. Discussion
    c. Rating of Alternatives
3. Document Decisions

Provided below is a summary of the decisions made for each of the issues discussed.

<u>ISSUES</u>

A. Layout of Basin Diversion Structure

Wood/Patel described the proposed concept behind the diversion structure into the Culver-Hawes Basin. The concept uses an adverse slope "broken back" pipe as the outlet to the detention basin which directs initial

more frequent flows to bypass the detention basin. The team concurred with the proposed concept but requested that Wood/Patel address the following technical issues:

1. Flatten the upstream slope of the inflow pipe to minimize turbulence and potential for a hydraulic jump at the diversions structure.
2. Evaluate junction losses as part of hydraulic analysis of the diversion structure.
3. Consider implication in variation in junction loss assumption on operation of storm drain and basin capacity.

Examples of similar storm drain diversion structures that were developed for or in partnership with the District include:

- 67th Avenue and Grand Avenue (Northern Avenue) – Northeast and northwest corners of the basin
- 79th Avenue and Northern Avenue
- Orangewood and 71st Avenue
- Desert Amethyst Project (91st Avenue one-quarter mile south of Union Hills Drive)

Wood/Patel will provide supporting calculations to the District for review and concurrence prior to the 70% submittal. Attached is the agreed upon a schematic exhibit of the proposed diversion structure concept.

B. FRS Outlet Structure

The current design concept is to implement a Bureau of Reclamation impact basin at the outlet of the Hermosa Vista storm drain into the Spook Hill FRS. Wood/Patel will confirm with ADOT that similar structures will be implemented along the FRS or revise the design to be consistent with any accepted VE proposals by the contractor.

C. 45-degree bends in storm drain

The team discussed the advantages and disadvantages of using structures at significant bends in the storm drain system. A major technical concern was the flow velocity and resulting hydraulic losses. The team agreed to implement prefabricated fittings instead of structures. Even though pipe collars would likely be preferred by Contractor, they will not be permitted and noted in the specifications. Structures designed at the Contractor's expense would be considered.

D. Thunder Mountain 48-inch pipe connection to the mainline

It was agreed that the team would develop a structure that will by-pass the capacity of an 18-inch pipe to maintain the Waters of the U.S. downstream of McDowell Road. Flows in excess of this capacity would be diverted into the storm drain system. Wood/Patel to research combined sewer diversion structures that may be applicable.

E. Madrid Basin Storm Drain Outlet & Box Outlet

Several alternative configurations were discussed. The potential sanitary sewer conflict with the new storm drain outlet from the Madrid Basin will be potholed. It is unclear whether the sanitary sewer was installed for future development (*City of Mesa to evaluate*). Wood/Patel's survey indicated a dry manhole in this area.

Other issues discussed regarding the current configuration included:

- Current configuration provides emergency spillway for flows exceeding 100-year design event,
- Consider using curb on storm drain inlet apron to direct initial flows to box and maintain Waters of the U.S.,
- Evaluate storm drain conflict at sanitary sewer ,
- Consider vertical opening vs. low level pipe opening at box inlet to convey Waters of the U.S.

One alternative configuration identified to avoid the sanitary sewer conflict was to connect the 66-inch pipe into the 4-foot tall box with a structure. The box culvert cells would be blocked with the exception of a small

opening to maintain the Waters of the U.S. and an access barrier would be added to the box culvert inlet (see attached sketch).

F. 88th Street Modifications/Thunder Mountain South Channel

Several design issues were discussed including:

- Large catch basin with pipe outlet (difficult to daylight to Thunder Mountain Channel),
- Uncertainty of design discharge associated with hydrology due to development (houses and walls),
- Facility maintenance responsibilities and aesthetics,
- Momentum of flow to the south and the potential need catch basins along McDowell Road,
- Trench drain across street.

The project team agreed to implement the 40% concept which included lowering the west curb profile, dropping the curb, adding bollards, and adding an apron for erosion protection. It was agreed to extend the limits of the apron and dropped curb 15 to 20 feet to the north to account for the uncertainty with turning the flow west. Supporting hydrologic and hydraulic calculations will be provided with the 70% submittal. A sketch and initial calculations are attached to these meeting minutes for reference.

G. Culver-Hawes Basin Inlet (66-inch)

Several design issues were discussed including:

- Trash and safety (access barrier requirement),
- Energy dissipation (riprap/boulders),
- Plantings to discourage access/screen structure,
- Operations and maintenance – sediment removal (not considered necessary to be noted in maintenance plan),
- Weathered steel access barrier and hand rail.

The storm drain inlet to the basin was discussed by the project team. After discussing alternative configurations, it was agreed upon to use a standard type flared outlet headwall with vertical access barrier, weathered steel safety hand railing, and stained concrete with out form liner. The team will evaluate substituting grouted boulders for typical baffle blocks to accomplish the storm drain outlet energy dissipation. The grout may be covered with native desert varnish to disguise this structural element.

H. Culver-Hawes Basin Outlet (24-inch)

The major concern associated with the basin outlet structure was the potential clogging from debris. Wood/Patel presented photographs of a "SCS" cage type system used on a previous project (10th Street Wash). A "SCS" type cage built on tiers up the slope with vertical bars was also discussed. A stepped cage system was also identified as an alternative (see attached sketches).

The District proposed a "trench drain" system up the slope which ties into the outlet headwall. This system has been implemented successfully in Southern California. Since no consensus could be reached on the system to advance to 70% submittal, the discussion was tabled for a later date.

Subsequent to the meeting, the District requested that Wood/Patel advance the "trench drain" concept for the Culver-Hawes Basin outlet.

I. Storm Drain Inlet and 404 Bypass System

A major issue design issue associated with the storm drain inlet system is the ability to intercept sediment laden flows and convey the sediment to the storm drain trunk line without clogging. In addition, initial flows need to be maintained where Waters of the U.S. are defined. The initial concept presented (sketch attached) is consistent with the system used on the McDowell Road storm drain project. This system used a MAG Standard 537 catch basin with a raised inlet (see attached).

The team agreed to implement the same inlet system for smaller concentration points. At locations where the concentrated flows are significant, Wood/Patel proposed using a MAG Standard 501-5 headwall drop inlet with length as a potential variable (see attached sketch). The District expressed concern regarding whether the slopes would be traversable (4:1) considering the inlets would be adjacent to residential streets.

Wood/Patel will develop concept sketches of the drop inlet for District and MCDOT review.

If you have any corrections or additions to the minutes of this meeting, please contact Jeff Minch by email at jminch@woodpatel.com or phone at (602) 335-8577.

Distribution: Attendees, Project file

Attachments: Agenda, sketches and calculations, meeting sign-in sheet

D:\Local Files\Projects\Hermosa Vista\Minutes\5-15-07 meeting minutes.doc

AGENDA

Hermosa Vista/Hawes Road Storm Drain and Basin Project
Value Engineering/Constructability Meeting
At the Flood Control District of Maricopa County (1:00 to 4:00 p.m.)
Contract No. FCD 2005C009
PCN 420.02.31
May 15, 2007

Meeting Purpose: Review and make decisions regarding the direction to take on various project issues impacting how the project performs and constructability of the project.

I. INTRODUCTIONS

II. VALUE ENGINEERING/CONSTRUCTABILITY ITEMS

1. Item Development
    a. Describe Issue/ Feature
    b. Define Function
    c. Design/ Performance/ Constructability Concerns
2. Alternative Solutions
    a. Brainstorm Alternatives
    b. Discussion
    c. Rating of Alternatives
3. Document Decisions

ISSUES

A. Layout of Basin Diversion Structure

B. FRS Outlet Structure

C. 45-degree bends in storm drain

D. Thunder Mountain 48-inch pipe connection to the mainline

AGENDA

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E. Madrid Basin Storm Drain Outlet & Box Outlet

F. 88th Street Modifications/Thunder Mountain South Channel

G. Culver-Hawes Basin Inlet

H. Culver-Hawes Basin Outlet

I. Storm Drain Inlet and 404 Bypass System

J. Others

III. ACTION ITEMS

WOOD/PATEL

LAND DEVELOPMENT • WATER RESOURCES • WATER/WASTEWATER • TRANSPORTATION/TRAFFIC • SURVEYING • CONSTRUCTION MANAGEMENT

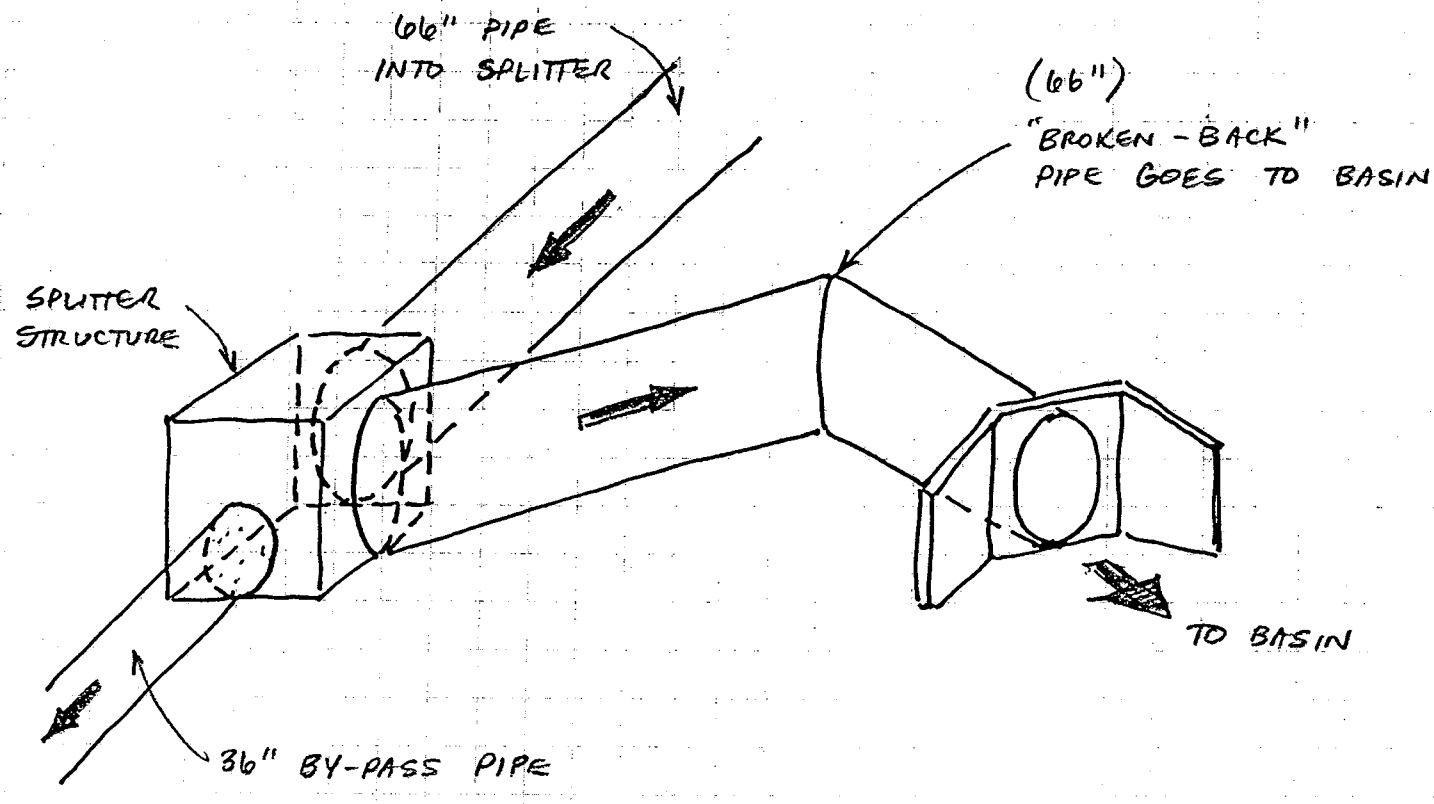
(A)

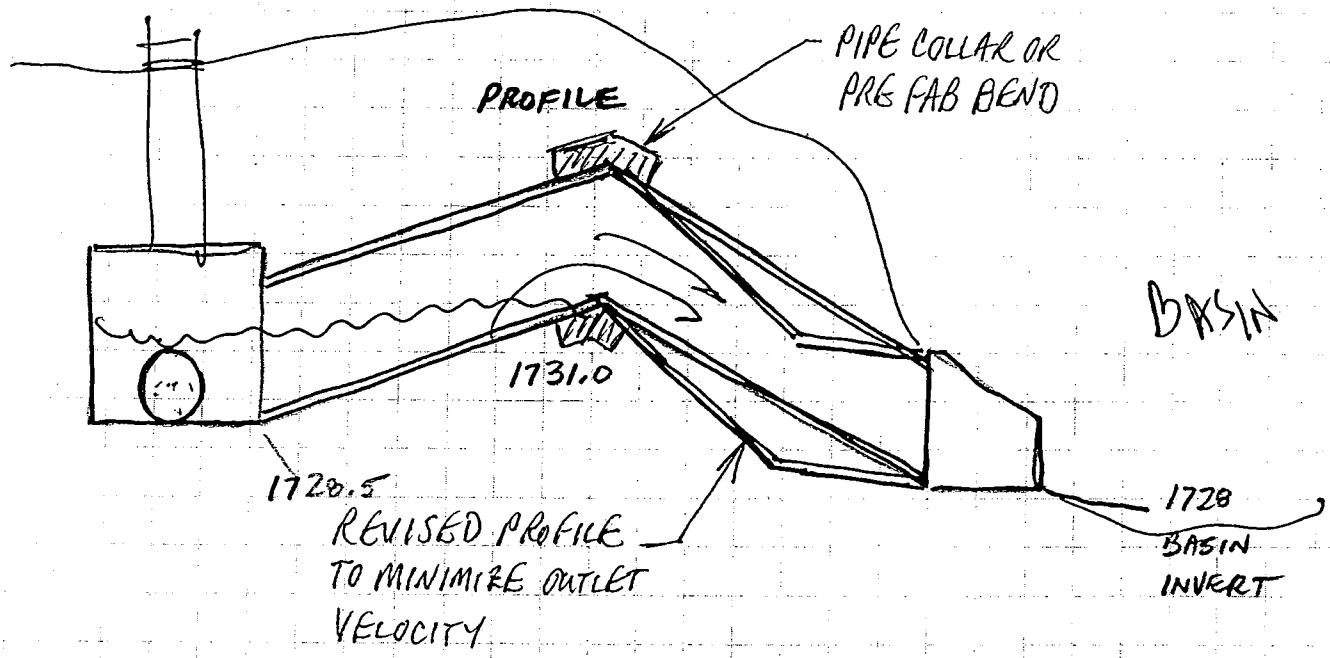
PROJECT HERMOSA VISTA NO. 052640

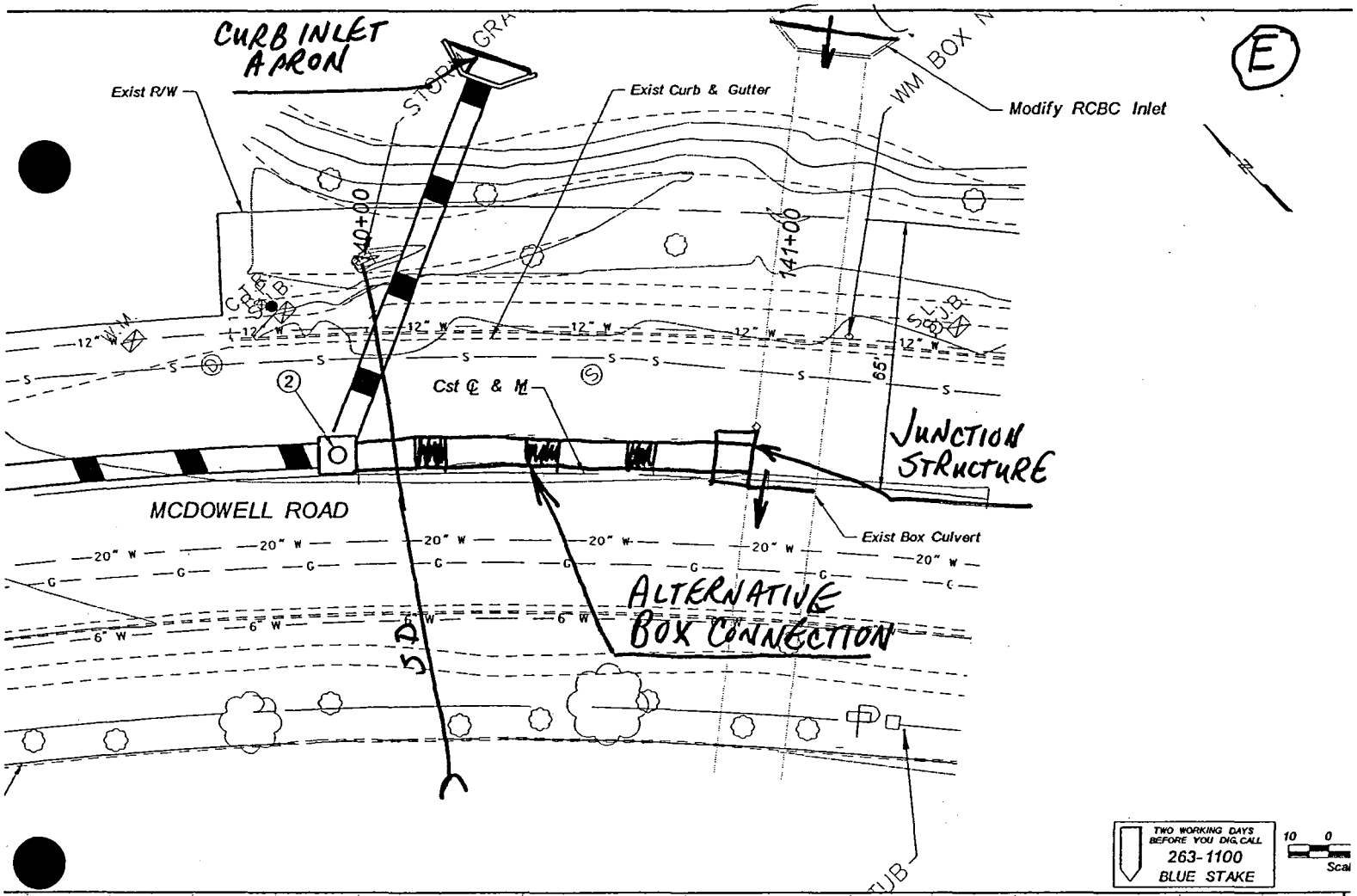
CALC'D BY JLL CHK'D BY

SHEET 1 OF 1 DATE 5-15

CONCEPT SPLITTER STRUCTURE
AT CULVER-HAWES BASIN



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Exist R/W
Exist Curb & Gutter
Modify RCBC Inlet
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Cst ℄ & ML
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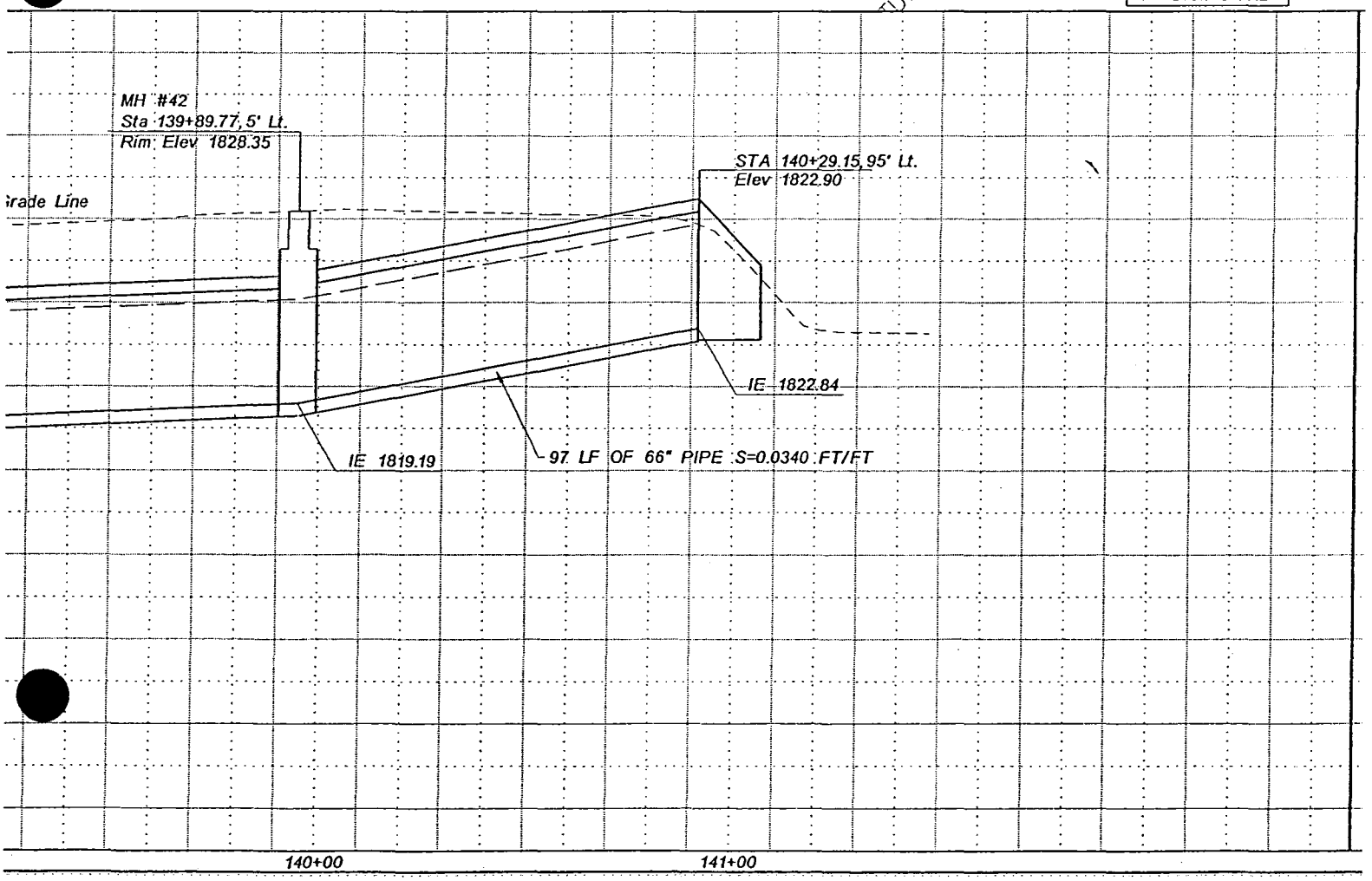
MCDOWELL ROAD
Exist Box Culvert
ALTERNATIVE BOX CONNECTION
TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE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Rim Elev 1828.35
STA 140+29.15, 95' Lt.
Elev 1822.90
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IE 1819.19
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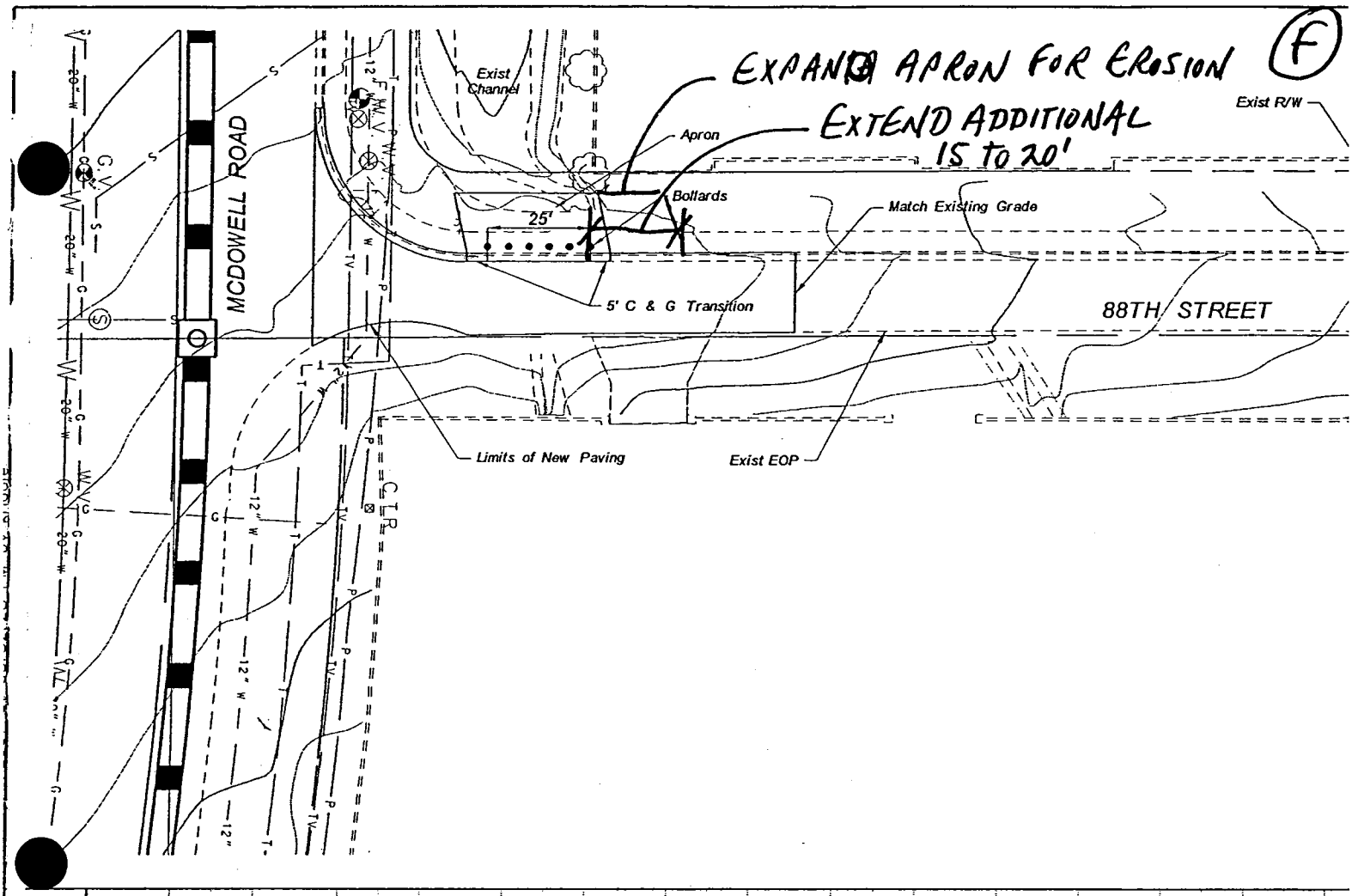
141+00


EXPAND APRON FOR EROSION
EXTEND ADDITIONAL 15 TO 20'
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Exist R/W
Exist Channel
Apron
Bollards
25'
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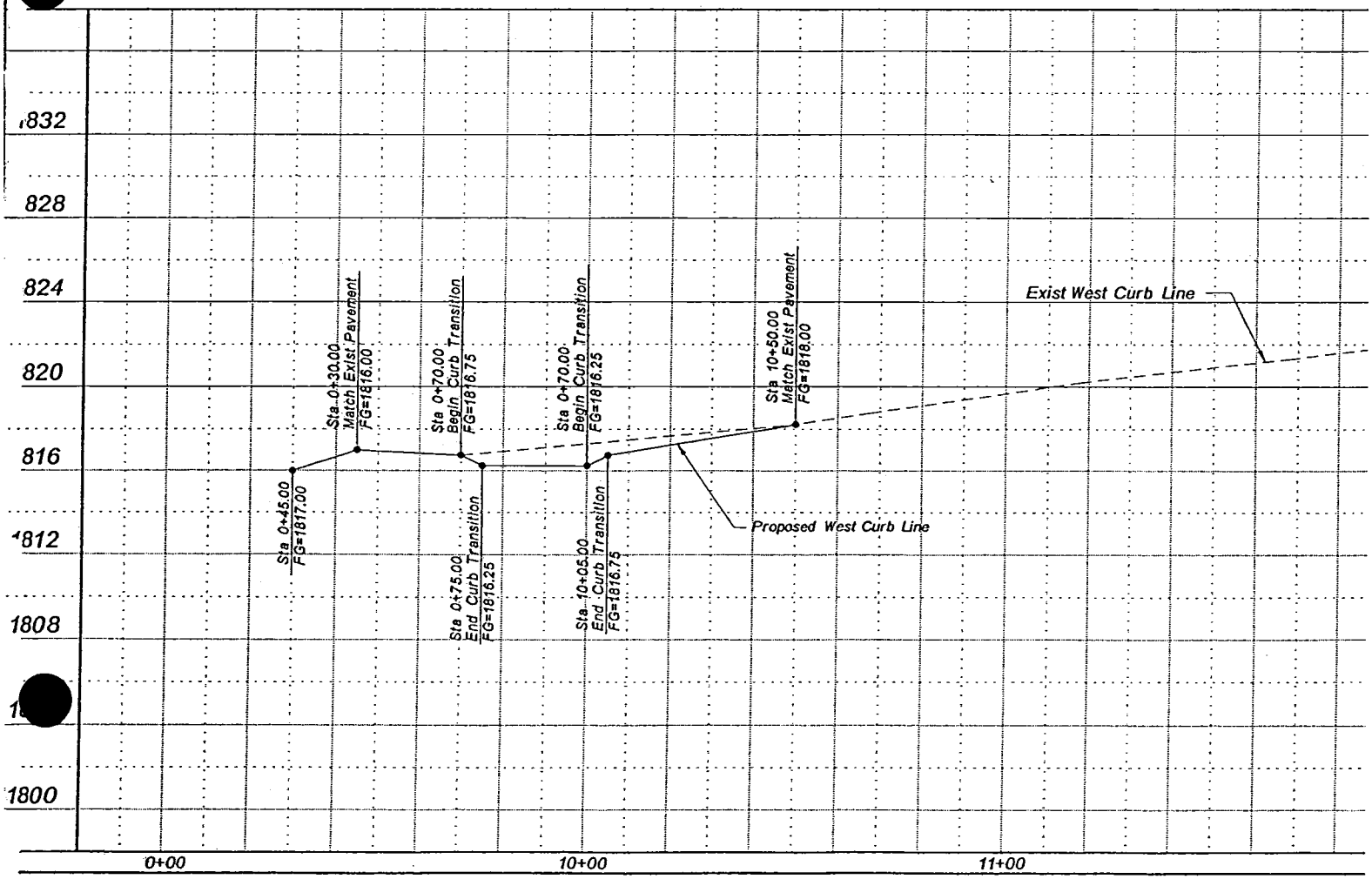
5' C & G Transition
MCDOWELL ROAD
88TH STREET
Limits of New Paving
Exist EOP
C.L.R.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Proposed West Curb Line
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10+00
11+00

88TH STREET HYDRAULICS

1/2 STREET CAP. @ 20' US OF INLET

Street Capacity Computations

6" Vertical Curb

Description: Calculation of Local Street Flow Conveyance Capacity for Local Street

References: Federal Highway Administration, Hydraulic Engineering Circular No. 22, "Drainage of Highway Pavements", November 1996

Date: 05/15/07

Known Values:

Depth of Flow =	0.5 ft
Cross Slope =	0.026 $^{ft}/_{ft}$
Street Width (F/C to F/C) =	39 ft
Manning's "n" Value=	0.015

Calculated Values:

Referenced Equations:

$Q = 0.56 * (S_x^{1.67}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)

$Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)

where Q = flow rate, cfs; S_x = cross slope, ft/ft; S = longitudinal slope, ft/ft; T = width of flow, ft; A = conveyance area, sq ft; R = hydraulic radius, ft

Longitudinal Slope ft/ft	*Conveyance Area sq ft*	*Velocity fps*	*Full Street Flow Capacity (1) cfs*	*1/2 Street Flow Without Overtopping, cfs (1)(2)*	*1/2 Street Flow with Overtopping, cfs (1)(3)*
0.0030	9.62	2.57	25	12	12
0.0035	9.62	2.78	27	13	13
0.0040	9.62	2.97	29	14	14
0.0045	9.62	3.15	30	15	15
0.0050	9.62	3.32	32	16	16
0.0055	9.62	3.48	33	17	17
0.0060	9.62	3.64	35	17	17
0.0065	9.62	3.78	36	18	18
0.0070	9.62	3.93	38	19	19
0.0075	9.62	4.06	39	20	20
0.0080	9.62	4.20	40	20	20
0.0085	9.62	4.33	42	21	21
0.0090	9.62	4.45	43	21	21
0.0095	9.62	4.57	44	22	22
0.0100	9.62	4.69	45	23	23
0.0105	9.62	4.81	46	23	23
0.0110	9.62	4.92	47	24	24
0.0115	9.62	5.03	48	24	24
0.0120	9.62	5.14	49	25	25
0.0125	9.62	5.25	50	25	25
0.0130	9.62	5.35	51	26	26
0.0230	9.62	7.12	68	34	34
0.0330	9.62	8.52	82	41	41
0.0430	9.62	9.73	94	47	47
0.0530	9.62	10.80	104	52	52
0.0630	9.62	11.78	113	57	57

Notes:

1.) Street flow capacity does not include local gutter depression effect.

2.) Half-street flow capacity is limited to the lower of the crown elevation or top of curb elevation.

3.) Includes flows above the crown elevation up to the specified flow depth elevation.

88TH ST. HYDRAULICS 1/2 STREET CAPACITY @ INLET

Street Capacity Computations

6" Vertical Curb

Description: Calculation of Local Street Flow Conveyance Capacity for Local Street

References: Federal Highway Administration, Hydraulic Engineering Circular No. 22, "Drainage of Highway Pavements", November 1996

Date: 05/15/07

Known Values:

Depth of Flow =	0.5 ft
Cross Slope =	0.017 ft/ft
Street Width (F/C to F/C) =	39 ft
Manning's "n" Value=	0.015

Calculated Values:

Referenced Equations:

$Q = 0.56 * (S_x^{1.67}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)

$Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)

where Q = flow rate, cfs; S_x = cross slope, ft/ft; S = longitudinal slope, ft/ft; T = width of flow, ft; A = conveyance area, sq ft; R = hydraulic radius, ft

Longitudinal Slope ft/ft	*Conveyance Area sq ft*	*Velocity fps*	*Full Street Flow Capacity (1) cfs*	*1/2 Street Flow Without Overtopping, cfs (1)(2)*	*1/2 Street Flow with Overtopping, cfs (1)(3)*
0.0030	13.04	2.56	33	6	17
0.0035	13.04	2.76	36	7	18
0.0040	13.04	2.96	39	7	19
0.0045	13.04	3.14	41	8	20
0.0050	13.04	3.30	43	8	22
0.0055	13.04	3.47	45	9	23
0.0060	13.04	3.62	47	9	24
0.0065	13.04	3.77	49	9	25
0.0070	13.04	3.91	51	10	25
0.0075	13.04	4.05	53	10	26
0.0080	13.04	4.18	54	10	27
0.0085	13.04	4.31	56	11	28
0.0090	13.04	4.43	58	11	29
0.0095	13.04	4.56	59	11	30
0.0100	13.04	4.67	61	12	30
0.0105	13.04	4.79	62	12	31
0.0110	13.04	4.90	64	12	32
0.0115	13.04	5.01	65	12	33
0.0120	13.04	5.12	67	13	33
0.0125	13.04	5.23	68	13	34
0.0130	13.04	5.33	69	13	35
0.0230	13.04	7.09	92	17	46
0.0330	13.04	8.49	111	21	55
0.0430	13.04	9.69	126	24	63
0.0530	13.04	10.76	140	27	70
0.0630	13.04	11.73	153	29	76

Notes:

1.) Street flow capacity does not include local gutter depression effect.

2.) Half-street flow capacity is limited to the lower of the crown elevation or top of curb elevation.

3.) Includes flows above the crown elevation up to the specified flow depth elevation.

• 88TH ST. / McDOWELL RD.
• PROPOSED THUNDER MTN CHANNEL INLET OFF OF 88TH STREET

Worksheet for Trapezoidal Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Bottom Width

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.05000	ft/ft
Normal Depth	0.75	ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	170.00	ft^3/s

Results

Bottom Width	25.68	ft
Flow Area	24.88	ft^2
Wetted Perimeter	40.75	ft
Top Width	40.68	ft
Critical Depth	0.97	ft
Critical Slope	0.01960	ft/ft
Velocity	6.83	ft/s
Velocity Head	0.73	ft
Specific Energy	1.48	ft
Froude Number	1.54	
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	0.75	ft
Critical Depth	0.97	ft
Channel Slope	0.05000	ft/ft
Critical Slope	0.01960	ft/ft

Cross Section for Trapezoidal Channel - 1

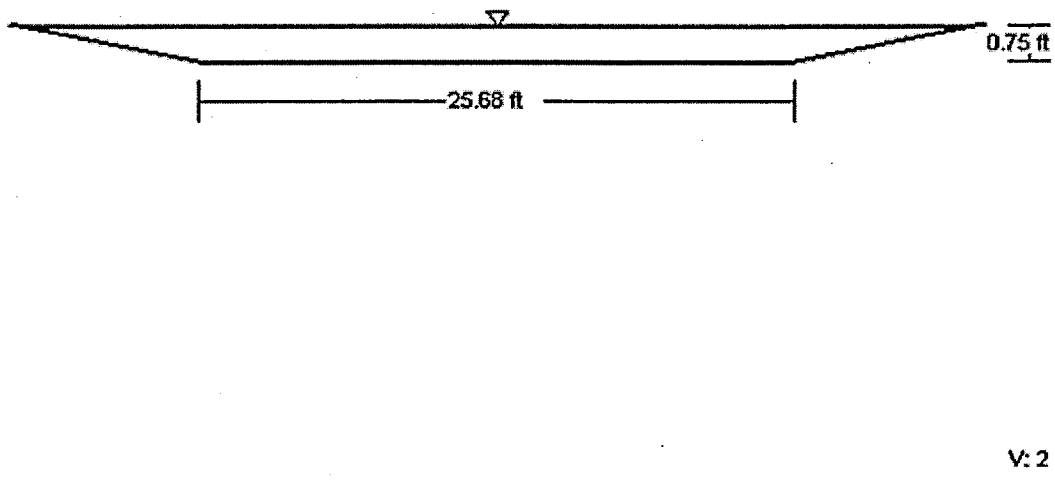
Project Description

Friction Method	Manning Formula
Solve For	Bottom Width

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.05000	ft/ft
Normal Depth	0.75	ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	25.68	ft
Discharge	170.00	ft^3/s

Cross Section Image



Controlling Cross Section for 88th Street (20' US of inlet)

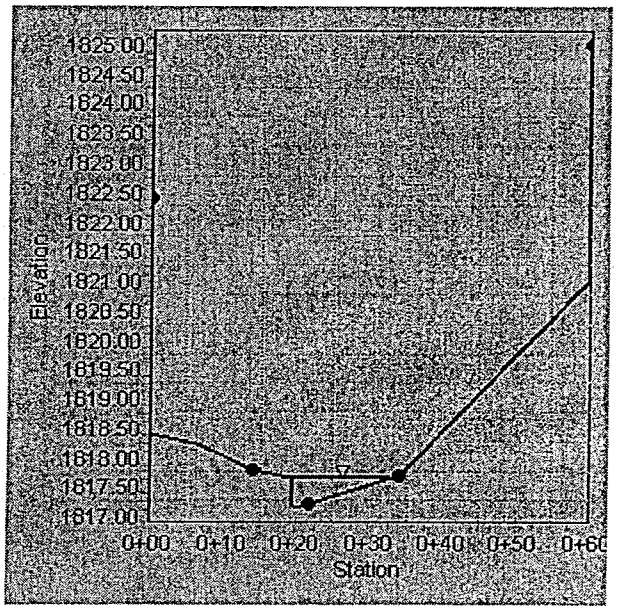
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.03300	ft/ft
Normal Depth	0.50	ft
Discharge	25.13	ft³/s @ TOP OF CURB

Cross Section Image



Rating Curve for 88th St controlling section

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.03300	ft/ft
Normal Depth	0.50	ft

Section Definitions

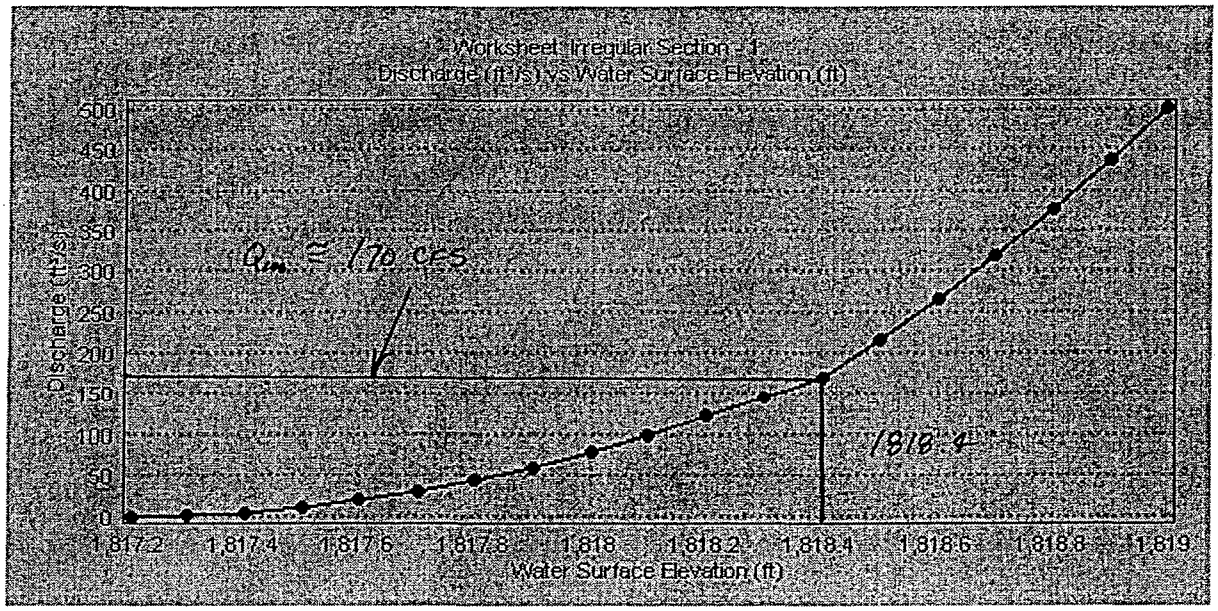
Station (ft)	Elevation (ft)	
0+00.00	1822.40	
0+00.00	1818.39	
0+06.50	1818.22	
0+14.00	1817.78	B SIDEWALK
0+19.00	1817.65	BC
0+19.50	1817.65	TC (FC)
0+19.50	1817.14	GUTTER
0+21.50	1817.20	EOP (WEST)
0+34.00	1817.68	EOP (EAST)
0+60.00	1821.00	
0+60.00	1825.00	

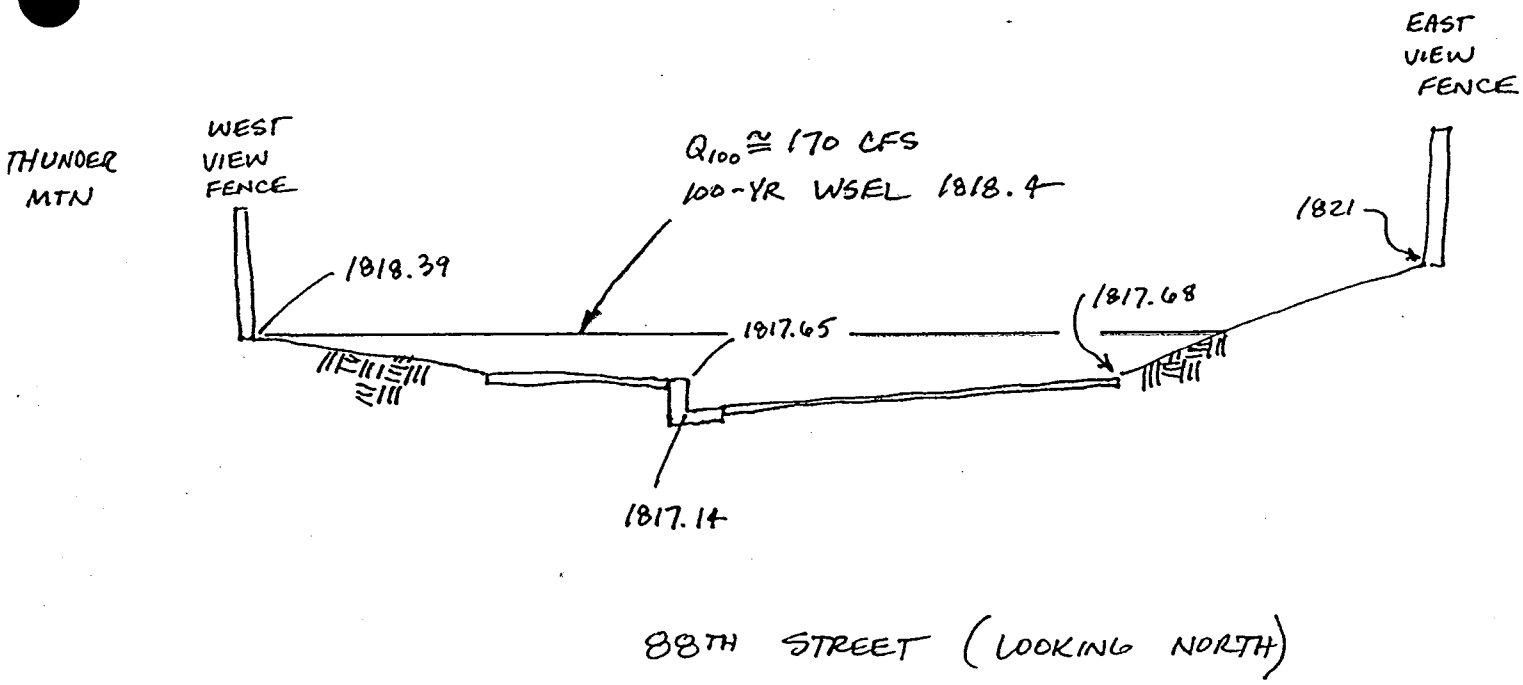
Roughness Segment Definitions

Start Station		Ending Station	Roughness Coefficient
(0+00.00, 1822.40)	LANDSCAPE	(0+14.00, 1817.78)	0.035
(0+14.00, 1817.78)	SIDEWALK/C&G	(0+21.50, 1817.20)	0.013
(0+21.50, 1817.20)	ASPHALT	(0+34.00, 1817.68)	0.015
(0+34.00, 1817.68)	LANDSCAPE	(0+60.00, 1825.00)	0.035

Rating Curve for 88th St controlling section

Rating Curve Plot





WOOD/PATEL

LAND DEVELOPMENT • WATER RESOURCES • WATER/WASTEWATER • TRANSPORTATION/TRAFFIC • SURVEYING • CONSTRUCTION MANAGEMENT

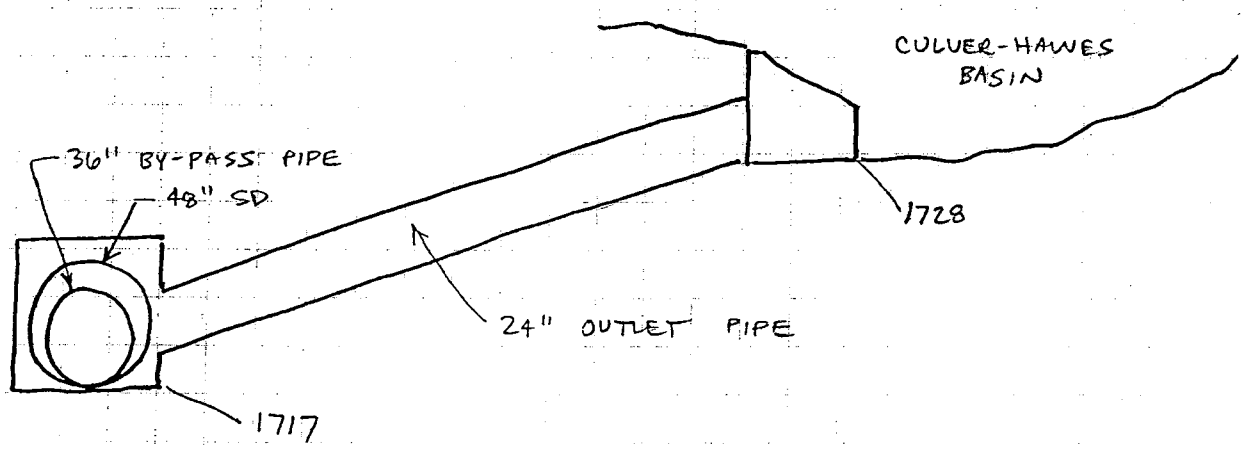
(H)

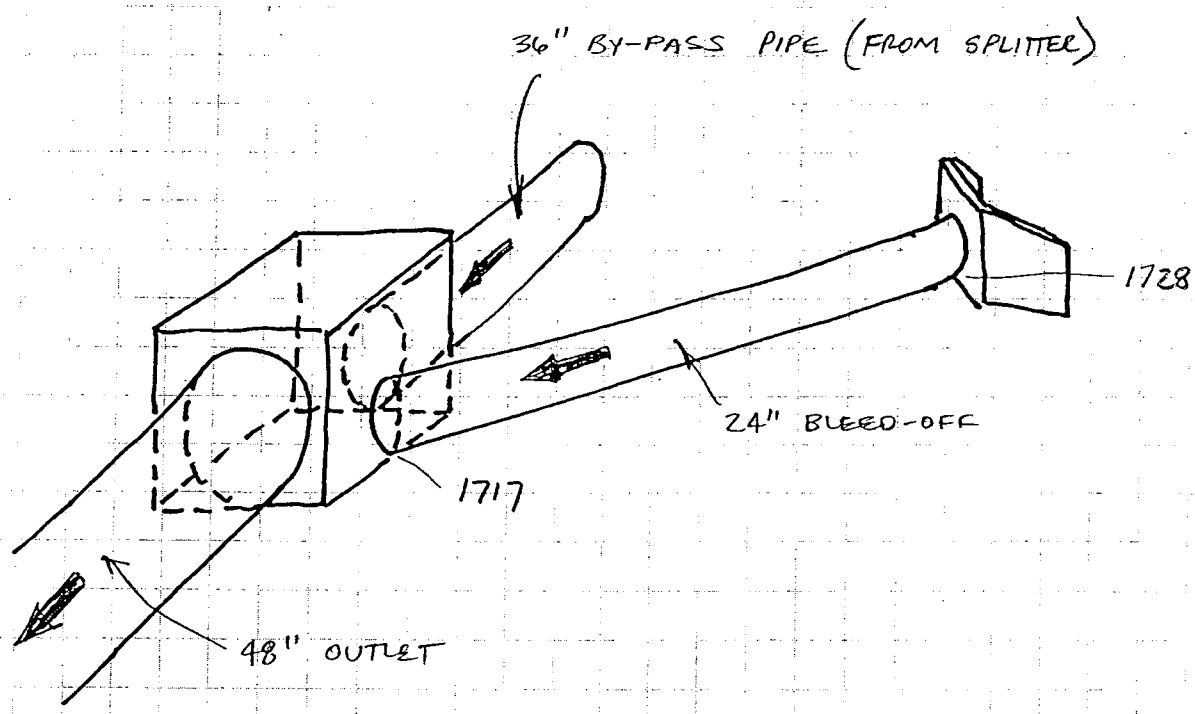
PROJECT HERMOSA No. 052640

CALC'D BY JLL CHK'D BY

SHEET 1 OF 1 DATE

CONCEPT BASIN OUTLET





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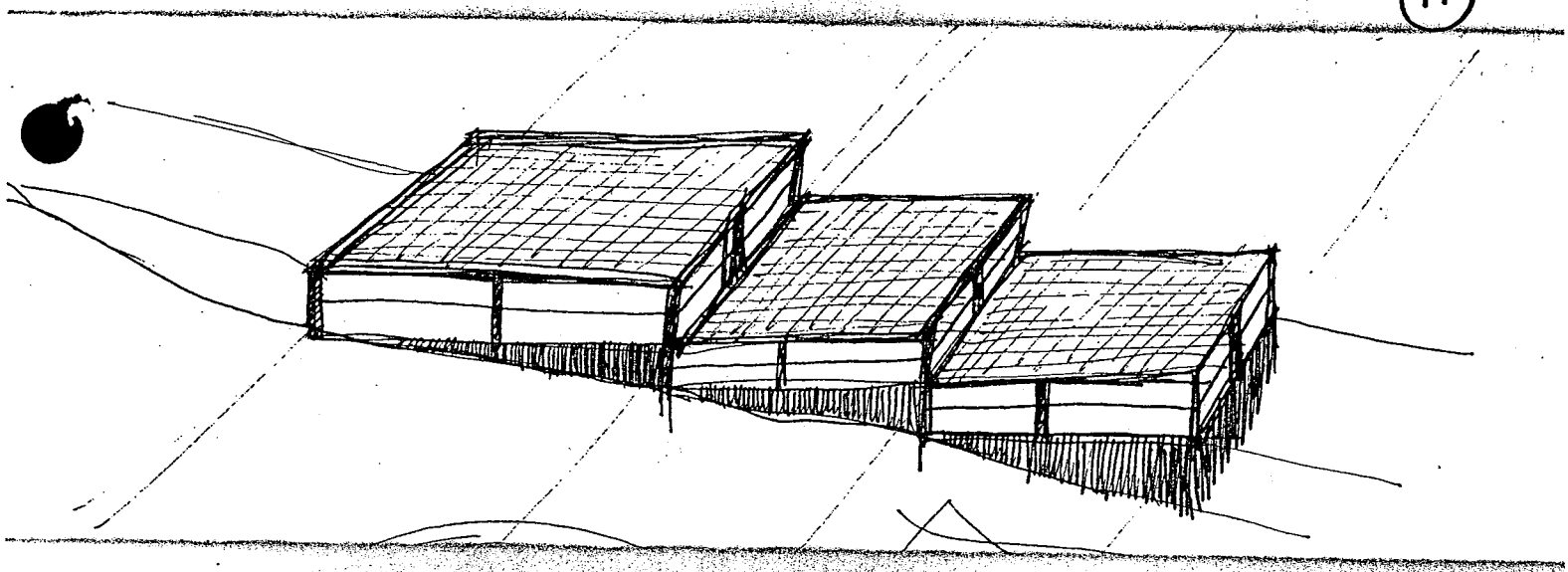


WOOD/PATEL

LAND DEVELOPMENT • WATER RESOURCES • WATER/WASTEWATER • TRANSPORTATION/TRAFFIC • SURVEYING • CONSTRUCTION MANAGEMENT

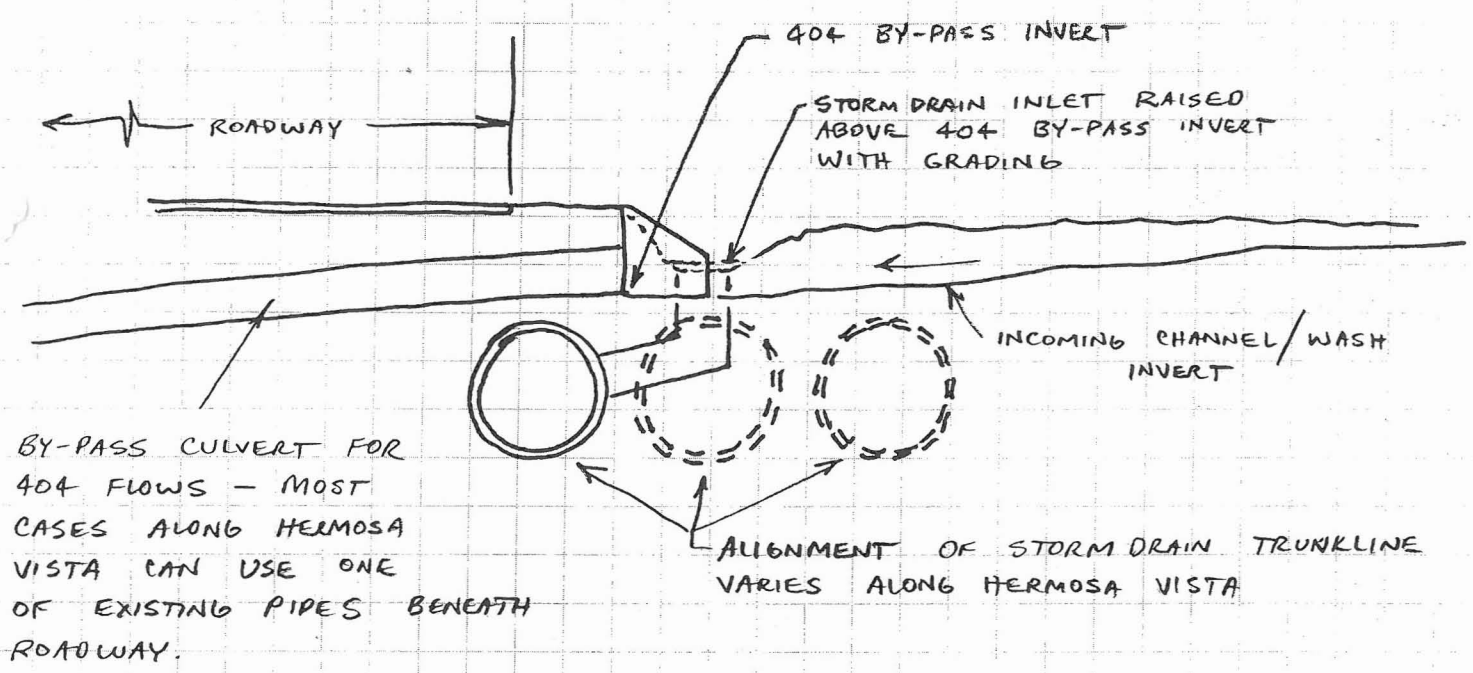
(I)

PROJECT HERMOSA VISTA NO. 052640

CALC'D BY JLL CHK'D BY

SHEET 1 OF 1 DATE 4-20-07

CONCEPT INLET / BY-PASS FOR STORMDRAIN AT WASH CROSSINGS.



NOTES:

ASS . . SPLICE.
IC N BEAMS AND SLABS NOT ON
SU RTS AND TOP BARS AT MID-SPAN

P LENGTH MINIMUM. SEE DETAILS FOR

ED LOCATIONS.

XIMUM ON CENTER AND ALL REINFORCING IS
D.

O MATCH AND LAP WITH HORIZONTAL
SECTIONS OF WALLS, BEAMS AND FOOTINGS PER

OUNDATIONS.

DED ITEMS IN POSITION BEFORE PLACING

ETAILING MANUAL (SP-66). FABRICATE
EVATIONS SHOWING REINFORCING STEEL AT ALL

NCE WITH AWS D1.4-92. USE LOW

18-89 AND C.R.S.I. STANDARDS.

WELDS

DBOOKS APPLY.

36 "DUAL CLASSIFICATION" ASTM
X WHERE SPECIFICALLY

IIMUM.

GEN. "JET" WELDING RODS (E7024) SHALL
STEEL WELDING.

A TRUE PLANE. TORCH CUT IS NOT ALLOWED.

TY CODES AND STANDARDS. ALL WELDERS
HAVE CURRENT EXPERIENCE IN THE TYPE OF
BE THOSE ISSUED BY AN ACCEPTED

YMBOL MAY BE MADE IN THE FIELD WITH
ER.

ER ENGINEER'S REVIEW.

BE DONE IN A CITY APPROVED FABRICATOR'S

SHOP COAT OF NO. 1 PAINT AND TWO FIELD
SECTION 790.

S PRIOR TO STARTING WORK. NOTIFY THE
INCONSISTENCIES.

NS SHOWN ON DRAWINGS.

ND ERTS WITH APPROPRIATE TRADES,

RACING, SHORING, GUYING, OR OTHER MEANS
O HOLD STRUCTURAL ELEMENTS IN PLACE

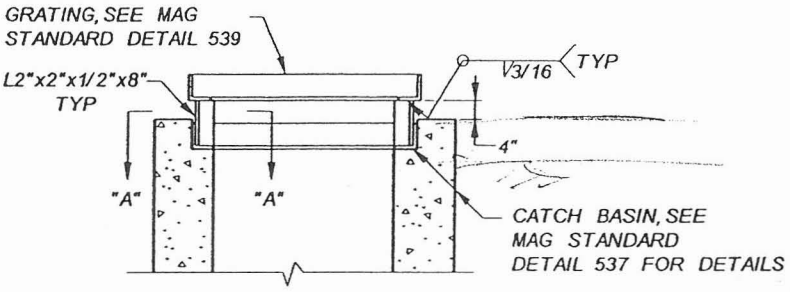
I

SUPPLEMENTARY NOTES (CONT)

5. THE COST OF ADDITIONAL DESIGN WORK DUE TO ERRORS OR OMISSIONS IN CONSTRUCTION SHALL BE DONE BY THE CONTRACTOR.

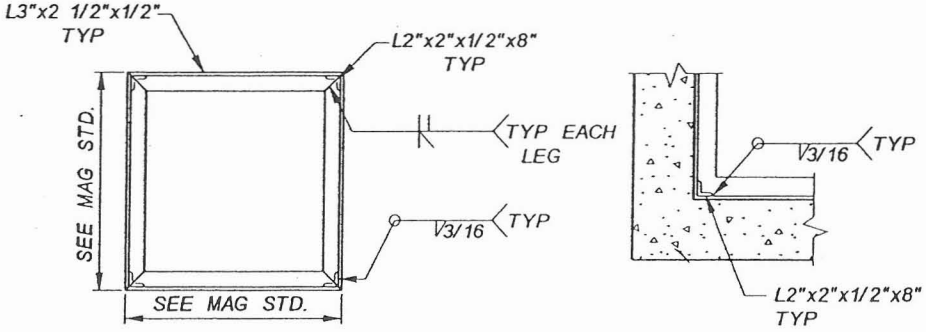
6. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL AND SIGNATURE OF AN ENGINEER REGISTERED IN ARIZONA. IF THIS ENGINEERING DESIGN REQUIRES SPECIAL STRUCTURAL INSPECTION, THEY SHALL BE RESPONSIBLE FOR THE INSPECTION.

7. DETAILS ON THE STRUCTURAL DRAWINGS ARE TYPICAL. VERIFY ALL DIMENSIONS WITH THE CIVIL DRAWINGS.



CATCH BASIN SECTION

NOT TO SCALE



GRATE SEAT - PLAN

NOT TO SCALE

SECTION A-A

NOT TO SCALE

CATCH BASIN RAISED GRATE DETAILS

NOT TO SCALE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

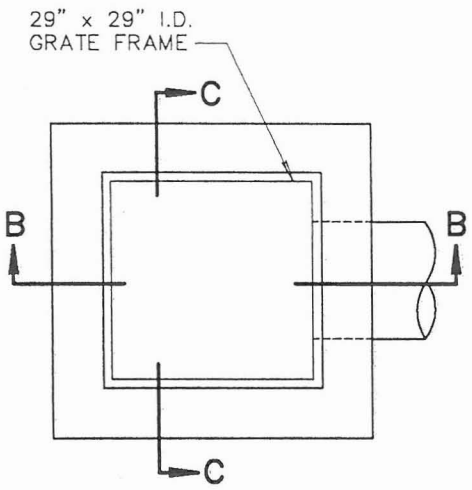
MCDOWELL ROAD BASIN
AND STORM DRAIN PROJECT
PCN 420.03.31

100%
PRELIMINARY NOT FOR CONSTRUCTION

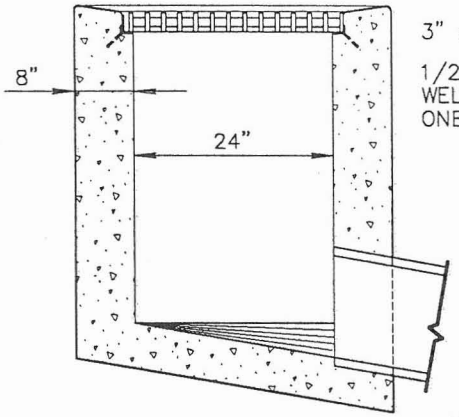
	BY	DATE
DESIGNED	SMN	06/09/06
DRAWN	MSK	06/09/06
CHECKED	KJK/DJL	06/09/06

Kimley-Horn and Associates, Inc.

DRAWING NO. ST1 | STRUCTURAL NOTES | SHEET 43 OF 73

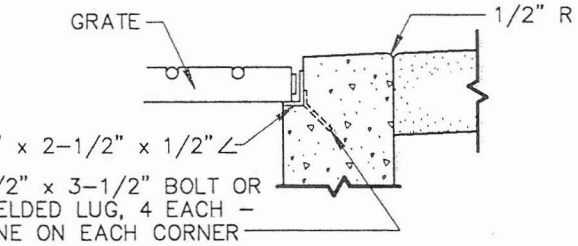


PLAN



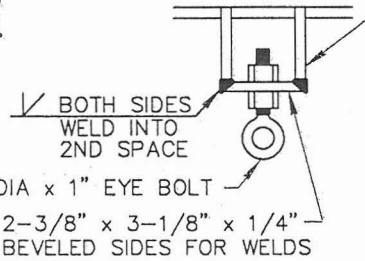
SECTION B–B

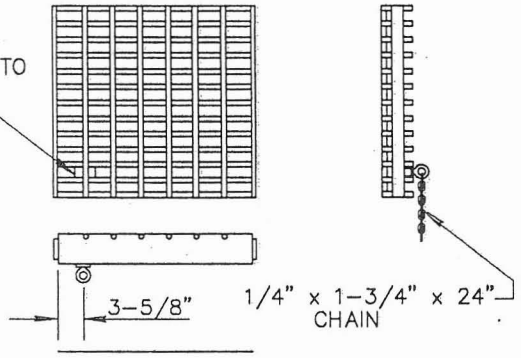
SINGLE GRATE



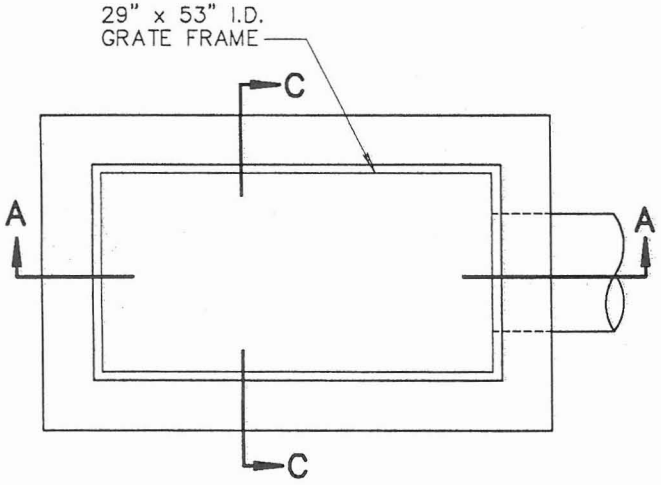
DETAIL OF ANGLE FRAME
GRATE SUPPORT

ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725. EXPOSED EDGES SHALL BE FINISHED WITH A 1/2" RADIUS.

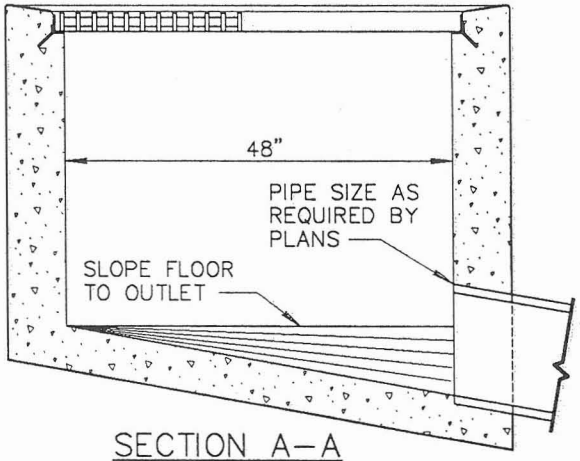




BAR GRATE
SEE DETAIL 539

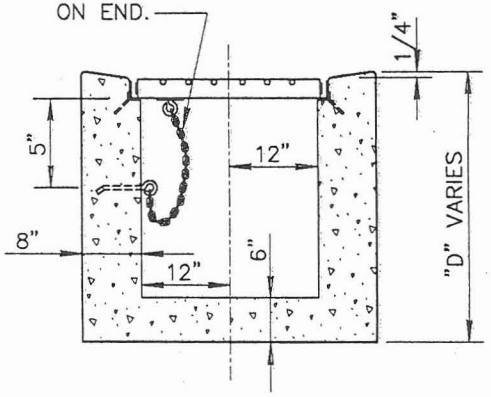


PLAN



SECTION A–A

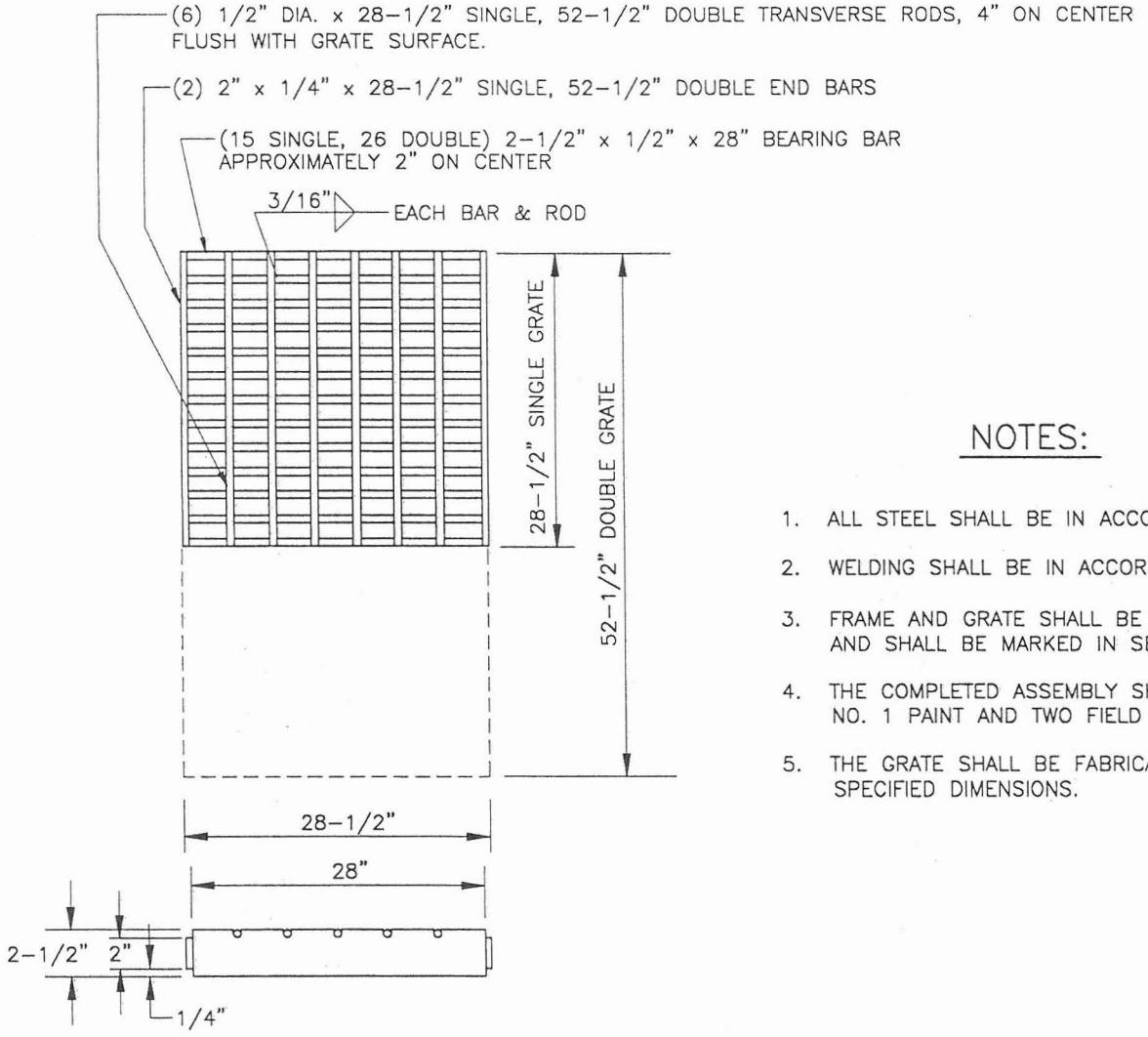
DOUBLE GRATE



SECTION C–C

DETAIL NO.			REVISED	DETAIL NO.
537	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	CATCH BASIN – TYPE 'G'	01–03–2002	537

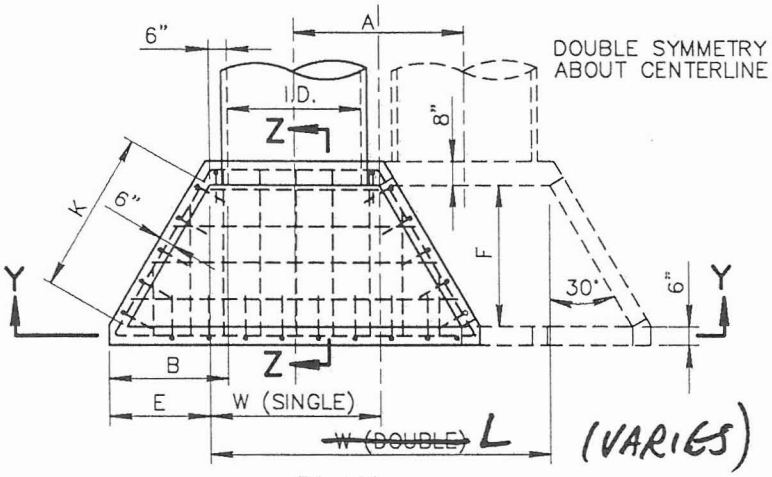
I



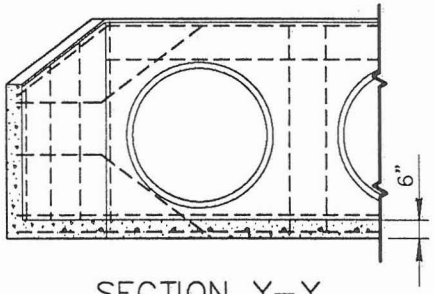
NOTES:

1. ALL STEEL SHALL BE IN ACCORDANCE WITH A.S.T.M. A-36.
2. WELDING SHALL BE IN ACCORDANCE WITH A.W.S. SPECIFICATIONS.
3. FRAME AND GRATE SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS BEFORE DELIVERY.
4. THE COMPLETED ASSEMBLY SHALL BE GIVEN ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECTION 790.
5. THE GRATE SHALL BE FABRICATED TO WITHIN 1/8" SPECIFIED DIMENSIONS.

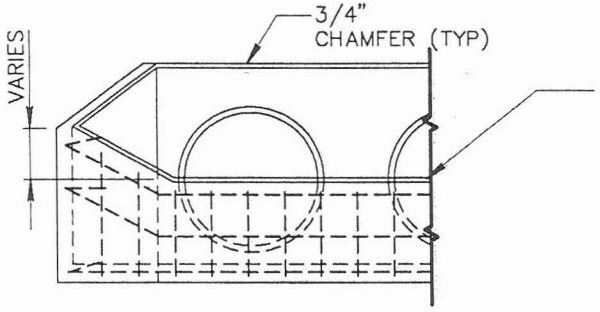
DETAIL NO.				REVISED	DETAIL NO.
539	MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	GRATES FOR CATCH BASINS, TYPE G AND H		539



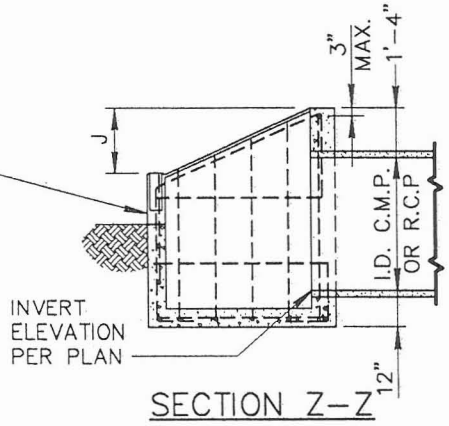
PLAN



SECTION Y–Y



ELEVATION



SECTION Z–Z

PIPE	DIMENSIONS							
I.D.	W		A	B	E	F	J	K
	SINGLE	DOUBLE						
18"	2'–6"	5'–2"	2'–8"	1'–3"	0'–9"	1'–3·5/8"	9"	1'–6"
24"	3'–0"	6'–6"	3'–6"	1'–7·1/2"	1'–1·1/2"	1'–11·3/8"	11"	2'–3"
30"	3'–6"	7'–10"	4'–4"	2'–0"	1'–6"	2'–7·1/4"	1'–1"	3'–0"
36"	4'–0"	9'–2"	5'–2"	2'–4·1/2"	1'–10·1/2"	3'–3"	1'–4"	3'–9"
42"	4'–6"	10–6"	6'–0"	2'–9"	2'–3"	3'–10·3/4"	1'–6"	4'–6"

NOTES:

1. HIGH POINT OF HEADWALL SHALL NOT PROJECT MORE THAN 3" ABOVE SLOPE.
2. ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725.
3. ALL REINFORCING BARS SHALL BE NO. 4, 12" C TO C AND 3" CLEAR TO INSIDE OF FLOOR AND WALLS.

DETAIL NO.				REVISED	DETAIL NO.
501-5	MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	HEADWALL DROP INLET		501-5

Hermosa Vista/Hawes Road Storm Drain and Basin Project
Contract FCD 2005C009

VE/Constructability Meeting
Tuesday, May 15, 2007, 1:00 PM to 4:00 PM
at the Flood Control District of Maricopa County

Meeting Sign in Sheet

Present	Name	Organization	Phone	Email
CSV	Scott Vogel	FCDMC	(602) 506-4771	csv@mail.maricopa.gov
	Joe Rumann	FCDMC	(602) 506-7137	jmr@mail.maricopa.gov
GSM	Gary Maiers	FCDMC	(602) 506-0562	gsm@mail.maricopa.gov
	Jon Loxley	FCDMC	(602) 506-2956	jonloxley@mail.maricopa.gov
	Dennis Holcomb	FCDMC	(602) 549-6885	dbh@mail.maricopa.gov
	Pedro Melo-Rodriguez	FCDMC	(602) 506-2956	pedromelorodriguez@mail.maricopa.gov
	Kumar Hanumiah	FCDMC	(602) 506-1506	kvh@mail.maricopa.gov
	Bob Stevens	FCDMC	(602) 506-4073	rbs@mail.maricopa.gov
JRR	Jeff Riddle	FCDMC	(602) 506-4602	jrr@mail.maricopa.gov
	Nicole K. Scheider	FCDMC	(602) 506-6762	nicolescheider@mail.maricopa.gov
GHS	Gary Shapiro	FCDMC	(602) 506 3076	ghs@mail.maricopa.gov
FR	Fred Rustam	City of Mesa	(480) 644-4688	fred.rustam@cityofmesa.org
AP	Ash Patel	Wood/Patel	(602) 335-8500	apatel@woodpatel.com
JM	Jeff Minch	Wood/Patel	(602) 335-8500	jminch@woodpatel.com
	Joe Lockett	Wood/Patel	(602) 335-8500	jlockett@woodpatel.com
SP	Scott Peters	EPG	(602) 956-4370	speters@epgaz.com
	Marsha Miller	KDA	(602) 368-9644	marsha@kdacreative.com
	Fadi Jalaghi	Premier	(480) 829-6000	fjalaghi@pre-engr.com
	Steven Nowaczyk	Ninyo & Moore	(602) 243-1600	steve.nowaczyk@ninyoandmoore.com
	Kevin Porter	Ninyo & Moore	(602) 243-1600	kporter@ninyoandmoore.com
CMS	Mike Stanley	FCD	(602)980-0451	CMS@mail.maricopa.gov