PROJECT ENGINEERING
CONSULTANTS, LTD.
ENGINEERS • PLANNERS • SURVEYORS

SURVEY REPORT

Guadalupe Drainage Improvement Project

CONTRACT NO. 99-17

Prepared by:

Project Engineering Consultants, Ltd.
2320 West Peoria, Suite C-122
Phoenix, Arizona 85019

March, 2000

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16863
LARRY M.
MALDONADO
Date Signed 3-9-00
ARIZONA, U.S.A.

Survey Report

For

Guadalupe Drainage Improvement Project

FCD 99-17

Data Collection

Sverdrup Civil, Inc. provided Project Engineering Consultants, Ltd. (PEC) with a copy of the Survey Report prepared by Pentacore Arizona for this project. Data from this report was the basis for the supplemental surveying that was performed by PEC at Calle Cerritos and Avenida Del Yaqui, Guadalupe Road, South Retention Basin, and the Warner Pit Area.

Horizontal Control

Horizontal control was performed using Kinematic GPS. The GPS network was tied into existing control from the Survey Report using a least squares best fit:

PEC Pt#	PEC Northing	PEC Easting	Survey Report Pt#	Survey Report Northing	Survey Report Easting	Description
12	859985.314	685899.686	2	859985.383	685899.796	BCHH @ Priest and Guadalupe
13	859972.193	688535.989	3	859971.988	688536.081	BCHH @ Hardy and Guadalupe
17	857326.520	685899.568	37	857326.601	685899.407	BCHH

Vertical Control

Vertical control was based on control from the Survey Report. The primary bench mark used by PEC was the brass cap in the handhole at the intersection of Guadalupe Road and Avenida Del Yaqui (Elevation = 1249.64). This was the primary bench mark that was used by Pentacore Arizona.

ERMs

Pt #	Elevation	Description
311	1223.65	Chiseled "X" on east corner of concrete PP base, +/- west of west edge of pavement of Priest Drive, +/- 50' south of center of Highline Canal
312	1224.301	Chiseled "□" in southeast corner of concrete PP base, +/-1000' east of Priest Drive on northside of Highline Canal
313	1224.538	Chiseled "□" in southeast corner of concrete PP base, +/-2300' east southeast of Priest Drive on northside of Highline Canal
314	1224.806	Chiseled "□" in southeast corner of concrete PP base, +/-3000' east of Priest Drive on northside of Highline Canal
315	1225.726	Chiseled "□" in southeast corner of concrete PP base, +/-3500' east of Priest Drive on northeast side of Highline Canal
316	1225.859	Chiseled "□" in southwest corner of concrete PP base, +/-35' south of Guadalupe Road on eastside of Highline Canal
317	1226.549	Chiseled "□" in southwest corner of concrete PP base, +/-1100' south of Guadalupe Road on eastside of Highline Canal
318	1226.762	Aluminum Cap in southwest corner of concrete PP base, +/-2200' south of Guadalupe Road on eastside of Highline Canal

GUAD_TOP.ASC

```
50,863935.980045,685100.757619,  1232.767814,EP
51,863909.389857,685098.798470,  1232.934870,EP
52,863909.745993,685126.267965,  1232.863240,EP
53,863909.431292,685136.015280,  1233.109390,WALL
54,863931.841005,685136.028987,  1232.895596,WALL
55,863938.431981,685143.157795,  1232.894687,WALL
56,863938.715072,685150.092835,  1233.024572,WALL
57,863939.332639,685172.361132,  1233.084512,WALL
58,863949.755497,685173.115682,  1232.532516,NG
59,863955.657870,685173.046032,  1232.458125,EP
60,863969.086202,685173.132780,  1232.399440,P
61,863983.264596,685174.271746,  1232.176976,EP
62,863992.319555,685174.713140,  1231.815433,NG
63,863999.576251,685174.750493,  1232.266438,FNC
64,863983.161198,685200.053038,  1232.262139,EP
65,863970.238390,685200.156755,  1232.542622,P
66,863955.929957,685200.026201,  1232.582857,EP
67,863948.400168,685150.085200,  1232.561695,NG
68,863955.686779,685150.162422,  1232.443751,EP
69,863969.125668,685150.996171,  1232.413575,P
70,863982.974494,685151.338452,  1232.172153,EP
71,863991.210318,685150.982858,  1232.041878,NG
72,863999.749108,685151.503356,  1232.186444,FNC
73,864018.465252,685102.572461,  1232.071848,NG
74,864014.256018,685153.599697,  1232.692312,NG
75,864008.256172,685153.647589,  1231.627951,NG
76,864016.757375,685155.400530,  1231.624178,NG
77,864016.305907,685174.616659,  1231.782099,NG
78,860007.061006,687942.403338,  1224.332980,L
79,860008.579645,687942.319506,  1224.198056,G
80,860009.194689,687942.363819,  1224.586352,TC
81,860009.065490,687988.567096,  1223.918971,TC
82,860008.448399,687988.523401,  1223.388264,G
83,860007.030619,687988.538852,  1223.509156,L
84,860006.846944,688058.775365,  1222.592735,L
85,860008.105647,688058.695199,  1222.492117,G
86,860008.711453,688058.679811,  1223.018546,TC
87,860006.708694,688076.393745,  1222.369843,L
88,860006.127476,688140.059245,  1221.474638,L
89,860007.515627,688140.059445,  1221.368665,G
90,860008.065415,688140.019980,  1221.953424,TC
91,859974.282993,688140.707873,  1222.628428,P
92,859941.313352,688140.983740,  1222.026147,L
93,859939.955411,688140.885966,  1221.987599,G
94,859939.272261,688140.857936,  1222.563576,TC
95,859939.677235,688076.582195,  1223.412060,TC
96,859940.376745,688076.546437,  1222.855787,G
97,859941.727012,688076.510130,  1222.899111,L
98,859974.652055,688077.251181,  1223.483152,P
99,859975.025042,687988.632604,  1224.624307,P
```

```
100,859942.656731,687988.090751,  1224.252076,EP
101,859941.983284,687941.244514,  1224.924709,EP
102,859975.424526,687942.386232,  1225.420247,P
103,857218.023255,687803.670067,  1226.853050,TCD
104,857218.035455,687803.006792,  1226.838718,TCD1
105,857177.817744,687802.675913,  1227.182656,TCD1
106,857177.785790,687800.052918,  1227.117760,TCD1
107,857177.431206,687803.230456,  1227.214135,TCD
108,857177.413325,687800.425970,  1227.172493,TCD
109,857170.366136,687799.886798,  1227.187367,TCD
110,857170.103476,687799.491911,  1227.108918,TCD1
111,857169.941986,687802.960770,  1226.876773,TCD1
112,857170.254587,687803.557013,  1227.074049,TCD
113,857145.182905,687803.722418,  1226.741433,TCD
114,857145.151544,687803.080960,  1226.712140,TCD1
115,857219.877330,687787.578773,  1227.230862,TCD2
116,857219.911704,687787.023081,  1227.249935,TCD3
117,857178.663151,687783.512133,  1227.164584,TCD3
118,857178.898989,687784.350937,  1227.052808,TCD2
119,857178.657239,687787.311623,  1227.146758,TCD2
120,857178.362836,687787.041214,  1227.184384,TCD3
121,857171.087045,687786.620471,  1227.176467,TCD3
122,857170.775893,687787.009296,  1227.115749,TCD2
123,857170.990460,687782.928592,  1226.961948,TCD2
124,857171.361517,687782.227001,  1227.010173,TCD3
125,857145.581402,687781.507556,  1226.990076,TCD2
126,857145.824836,687780.459907,  1227.169047,TCD3
127,857162.953778,687784.272691,  1223.742935,INV
128,857177.914758,687761.136904,  1224.256617,INV
129,857144.809265,687755.487626,  1226.528726,FCE
130,857166.593337,687757.170087,  1226.652683,FCE
131,857216.546800,687760.910701,  1227.036684,FCE
132,857229.278633,687747.407457,  1226.862671,NG
133,857168.384318,687738.520770,  1225.885796,NG
134,857145.689636,687737.169881,  1225.571367,NG
135,857218.569117,687800.392726,  1222.444695,TOE
136,857178.239413,687800.033458,  1222.817326,TOE
137,857170.692615,687799.276864,  1222.578603,TOE
138,857170.478904,687799.201509,  1225.231192,TOP LIP
139,857169.930502,687799.514932,  1222.909480,TOE
140,857143.519818,687798.453618,  1222.116947,TOE
141,857156.691637,687800.332944,  1224.132341,HIGH WATER
142,857142.818050,687786.664757,  1222.103062,TOE
143,857170.773360,687787.286178,  1222.332092,TOE
144,857171.334358,687786.958026,  1225.269319,TOP LIP
145,857171.303152,687787.142537,  1222.257669,TOE
146,857178.717602,687787.965397,  1222.254336,TOE
147,857219.949730,687791.632124,  1222.637270,TOE
148,857144.582539,687821.638714,  1226.405026,NG
149,857185.029099,687824.928862,  1226.580487,NG
```

150,857217.158536,687828.403401, 1226.720263,NG

SEC-20.ASC

104,	849364.61686,	685905.86262,	1219.54395,	BCHH
105,	846709.77058,	685908.10744,	1211.13501,	BCHH
106,	844057.98055,	685912.26213,	1200.79700,	BCHH
107,	844019.12112,	680605.94407,	0.00000,	BCHH
109,	848855.94450,	684756.88919,	1226.72595,	BC Flush
110,	848521.84639,	684682.86326,	1225.81006,	BC Flush
111,	848476.35735,	684638.31729,	1225.65002,	BC Flush
112,	848470.18581,	683919.74676,	1230.12500,	BC Flush
113,	848514.70077,	683874.27172,	1230.55798,	BC Flush
114,	848865.47592,	683871.32804,	1231.56494,	BC Flush
115,	848910.84994,	683915.86999,	1231.41101,	BC Flush

Topo. Asc

```
101, 846838.25583, 684476.97514,   1218.52405,Rebar
102, 846745.47797, 684378.64516,   1214.35706,Rebar
103, 846663.99486, 684485.05741,   1221.71899,"+" in Concrete (BM)
120, 846844.60181, 684572.35461,   1221.72440,TD
121, 846802.77078, 684553.06488,   1221.65665,TD
122, 846761.59481, 684532.24329,   1221.64169,TD
123, 846724.84911, 684512.68704,   1221.59164,TD
124, 846677.68469, 684486.41271,   1221.34842,TD
125, 846669.36523, 684480.04010,   1221.73392,CONC
126, 846668.17136, 684482.09583,   1221.73880,CONC
127, 846666.78531, 684481.32502,   1221.71982,CONC
128, 846662.04408, 684489.39251,   1221.67758,CONC
129, 846663.34188, 684490.23647,   1221.67136,CONC
130, 846662.02915, 684492.25279,   1221.68655,CONC
131, 846659.66062, 684490.80276,   1221.65390,CONC
132, 846666.95286, 684478.52908,   1221.69308,CONC
133, 846664.04173, 684485.07376,   1221.71896,TBM 103
134, 846672.03222, 684496.65247,   1221.49649,TD
135, 846719.38095, 684523.20340,   1221.51907,TD
136, 846756.45234, 684543.12812,   1221.61935,TD
137, 846798.03601, 684564.13662,   1221.58328,TD
138, 846839.86328, 684583.34866,   1221.61978,TD
139, 846693.01941, 684475.31425,   1220.06448,ER
140, 846698.55981, 684463.56098,   1219.75174,FNC
141, 846740.21224, 684482.60603,   1219.42404,FNC
142, 846733.27814, 684497.96974,   1220.15860,ER
143, 846770.18629, 684516.73877,   1220.46817,ER
144, 846776.50954, 684499.91847,   1219.83200,FNC
145, 846814.31947, 684517.72593,   1220.10410,FNC
146, 846810.65346, 684536.71465,   1220.77194,ER
147, 846852.52227, 684556.90230,   1220.75705,ER
148, 846860.16423, 684539.88410,   1220.24460,FNC
149, 846888.37124, 684489.41468,   1217.44095,NG
150, 846859.99326, 684456.74557,   1214.95468,NG
151, 846835.00405, 684442.45887,   1213.77908,NG
152, 846790.91009, 684442.23392,   1215.19101,NG
153, 846753.97121, 684426.02067,   1215.76614,NG
154, 846746.31785, 684400.19588,   1215.33932,NG
155, 846733.08639, 684394.46868,   1215.52658,NG
156, 846716.72809, 684433.03769,   1217.73215,NG
157, 846757.09625, 684461.71768,   1218.09946,NG
158, 846805.38873, 684484.34244,   1219.21286,NG
159, 846866.12849, 684516.35988,   1219.66525,NG
160, 846706.98304, 684408.45787,   1219.52884,NG
161, 846726.07121, 684391.65176,   1219.91830,NG
162, 846711.17518, 684342.39422,   1219.97006,NG
163, 846732.70665, 684343.84018,   1219.20047,NG
164, 846715.86260, 684285.45237,   1220.75107,NG
165, 846739.64871, 684283.60552,   1217.26620,NG
166, 846752.86477, 684285.49718,   1212.18930,NG
```

217,	846804.13569,	684397.60589,	1199.54141,CONC
218,	846806.17136,	684396.32848,	1193.67856,CONC
219,	846811.23223,	684400.67850,	1193.49490,CONC
220,	846810.41068,	684402.85055,	1199.55899,CONC
221,	846805.31857,	684409.00401,	1199.59842,CONC
222,	846826.99629,	684382.63670,	1190.73508,CONC
223,	846825.73858,	684383.00207,	1185.85397,CONC
224,	846843.48298,	684360.82984,	1176.49484,CONC
225,	846843.85358,	684360.61128,	1181.71597,CONC
226,	846838.64688,	684356.60870,	1181.73123,CONC
227,	846838.70860,	684357.08569,	1176.62045,CONC
228,	846820.65467,	684378.93258,	1185.87399,CONC
229,	846820.40258,	684377.78759,	1190.92960,CONC
230,	846828.44437,	684346.67383,	1181.37106,RIF RAF
231,	846841.75226,	684353.27632,	1175.47708,RIF RAF
232,	846848.61876,	684358.88878,	1175.35214,RIF RAF
233,	846858.31148,	684368.11932,	1180.06400,RIF RAF
234,	846881.82559,	684336.30306,	1175.57266,RIF RAF
235,	846874.74698,	684328.90185,	1170.61172,RIF RAF
236,	846866.62579,	684322.21780,	1170.80002,RIF RAF
237,	846860.24191,	684313.53152,	1175.08322,RIF RAF
238,	846885.44715,	684281.88328,	1172.63919,RIF RAF
239,	846893.87977,	684288.80643,	1168.01285,RIF RAF
240,	846899.66656,	684294.63140,	1167.82712,RIF RAF
241,	846911.05789,	684302.81506,	1173.02603,RIF RAF
242,	846933.46387,	684277.85974,	1171.19327,RIF RAF
243,	846924.63436,	684271.87215,	1168.45889,RIF RAF
244,	846912.53195,	684266.01420,	1167.73038,RIF RAF
245,	846907.12076,	684252.85165,	1170.91031,RIF RAF
246,	846936.68141,	684219.81264,	1169.23019,RIF RAF
247,	846969.30923,	684230.85586,	1168.80643,RIF RAF
248,	846983.73011,	684209.56619,	1167.55801,RIF RAF
249,	846980.19470,	684196.83391,	1166.16037,RIF RAF
250,	846974.55965,	684192.19335,	1166.01700,RIF RAF
251,	846963.64231,	684191.90376,	1167.44681,RIF RAF
252,	846802.32673,	684405.96522,	1193.65317,INV
253,	846722.93719,	684515.91389,	1217.52103,BD
254,	846948.13903,	684223.69847,	1166.81900,RIPRAP
255,	846958.08659,	684227.05761,	1166.81900,RIPRAP
256,	846721.05515,	684519.77861,	1217.53897,BD
257,	846759.88407,	684535.86829,	1217.61899,BD
258,	846758.18031,	684539.48315,	1217.62900,BD
259,	846799.62010,	684560.42368,	1217.68900,BD
260,	846801.19828,	684556.74857,	1217.67899,BD
261,	846841.44076,	684579.69871,	1217.72897,BD
262,	846843.02580,	684576.03089,	1217.72897,BD
501,	846838.25583,	684476.97514,	1218.48898,REBAR
502,	846745.45166,	684378.61728,	1214.31900,REBAR

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2}D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2}D = \frac{50 \tan \frac{1}{2}I}{T}$

$R = T \cot. \frac{1}{2}I$

$R = \frac{50}{\text{Sin. } \frac{1}{2}D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

Tan. def. = ½ chord def.

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

Right Angle Triangles. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Leveling. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574\ d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3}d^2$. The combined correction is negative.

Probable Error. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Elan Publishing Co., Inc. Meredith, N.H. 03253

Job # 99071

GUADALUPE Dranige

GPS Session A Pg # 1

B Pg # 2

C Pg # 3

Crossections on Guadalupe Pg # 4 - 20

Guadalupe Level Loop Pg # 18

Crossections on Calle Cerrito Pg # 21-22

Calle Cerrito Level loop Pg # 32-33

Crossections on Avenida del Yaqui Pg # 25 - 31

Avenida del Yaqui Level loop Pg # 32 - 33

Level loop for whole Job Pg # 34 - 35

Topo I-10 Off Ramp Pg # 36

Level Loop Guadalupe

To ADOT Gravell Pit Pg # 37 - 42

" " Second loop Pg # 43 -

STA	PT #	Time on	Time off	HI	EPOCHS
Base #2	1	8:46	★ 10:15-10:30	1.942	
Base #3	2	9:04	10:56	1.821	
Rover	10	9:38	9:48	2.034	120
	11	9:58	9:59		12
	12	10:14	10:15		
	★ Betwen	10:15 –	10:30	Unit 2	
	was Shutdown By who is unknown				
	when Restarted Battery was Dead				
Rover	Shutdown	at	10:47		

(1)

See Pg #2 For Pic.

Set Rebar ± 10' from W. EP of C. Yavo & ± 10' From EP. of GUADALUPE

Set PK on N. EP of GUADLUPE Betwen Parkside & C. YAVO on ℄ of Chanel

Found 3/4" Rebar in "Pipe in HH @ Calle Sonora & Avenida Del Yaqui ' To Surface

Found 1.5' Pipe in HH @ Baseline & Priest 1.05' To Surface

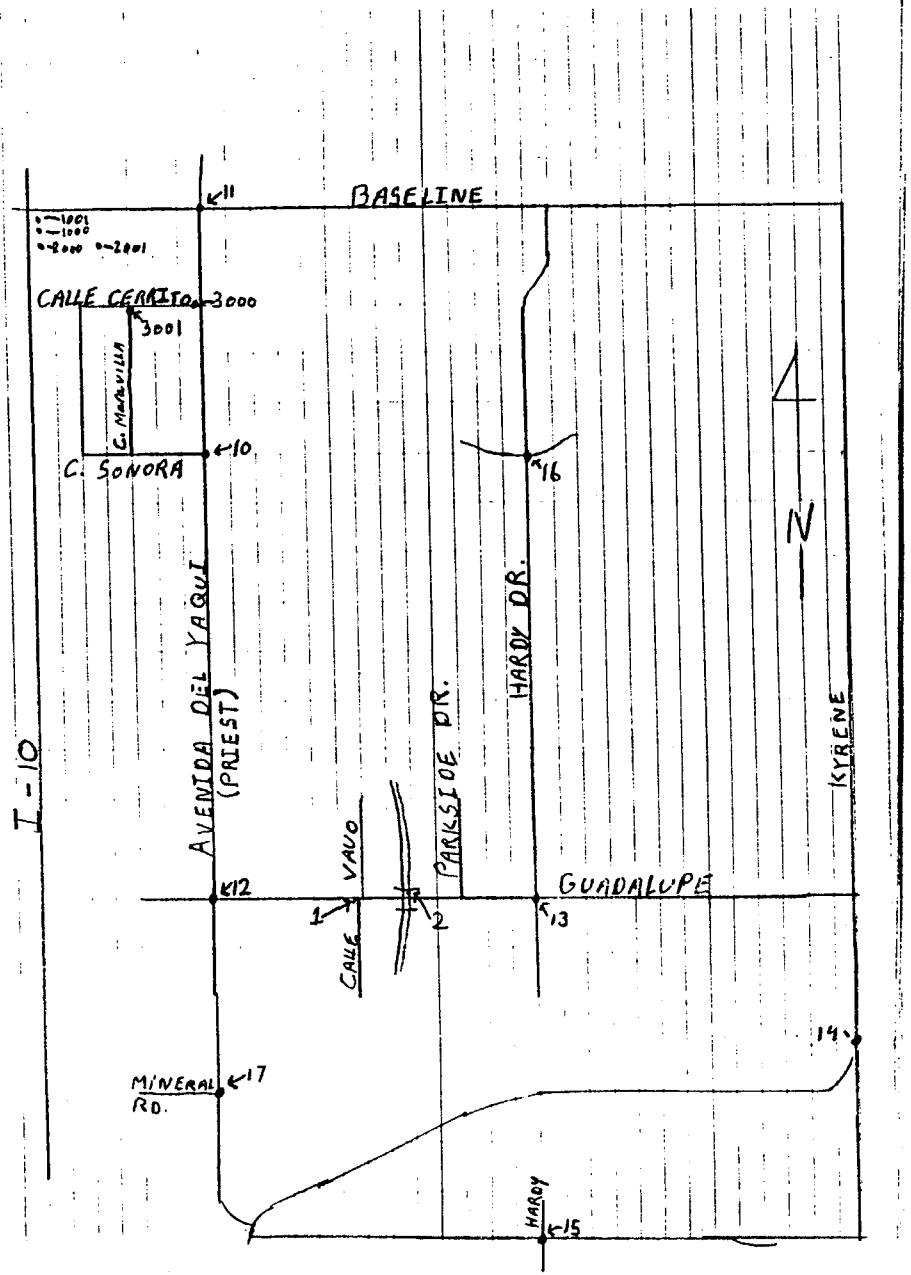
Found BC. in HH @ Avenida Del Yaqui & Guadalupe 0.35' To Surface

GPS Session 13

STA	PT #	Time on	Time off	HI	EPOCHS
Base #2	2	11:34		1.838	
Base #3	1	11:43		1.830	

No SATTLIT'S Loked on Rover

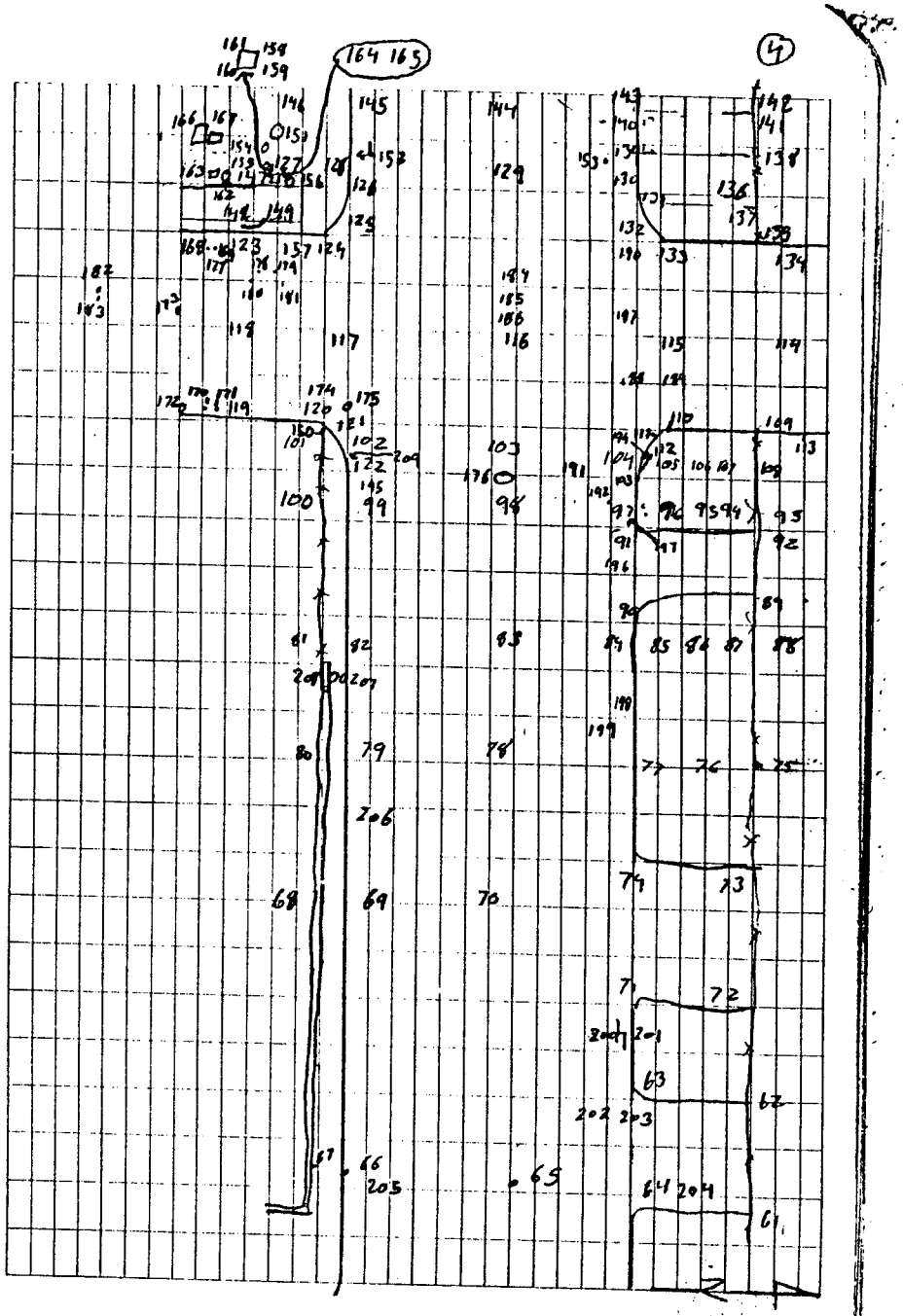
1249 64



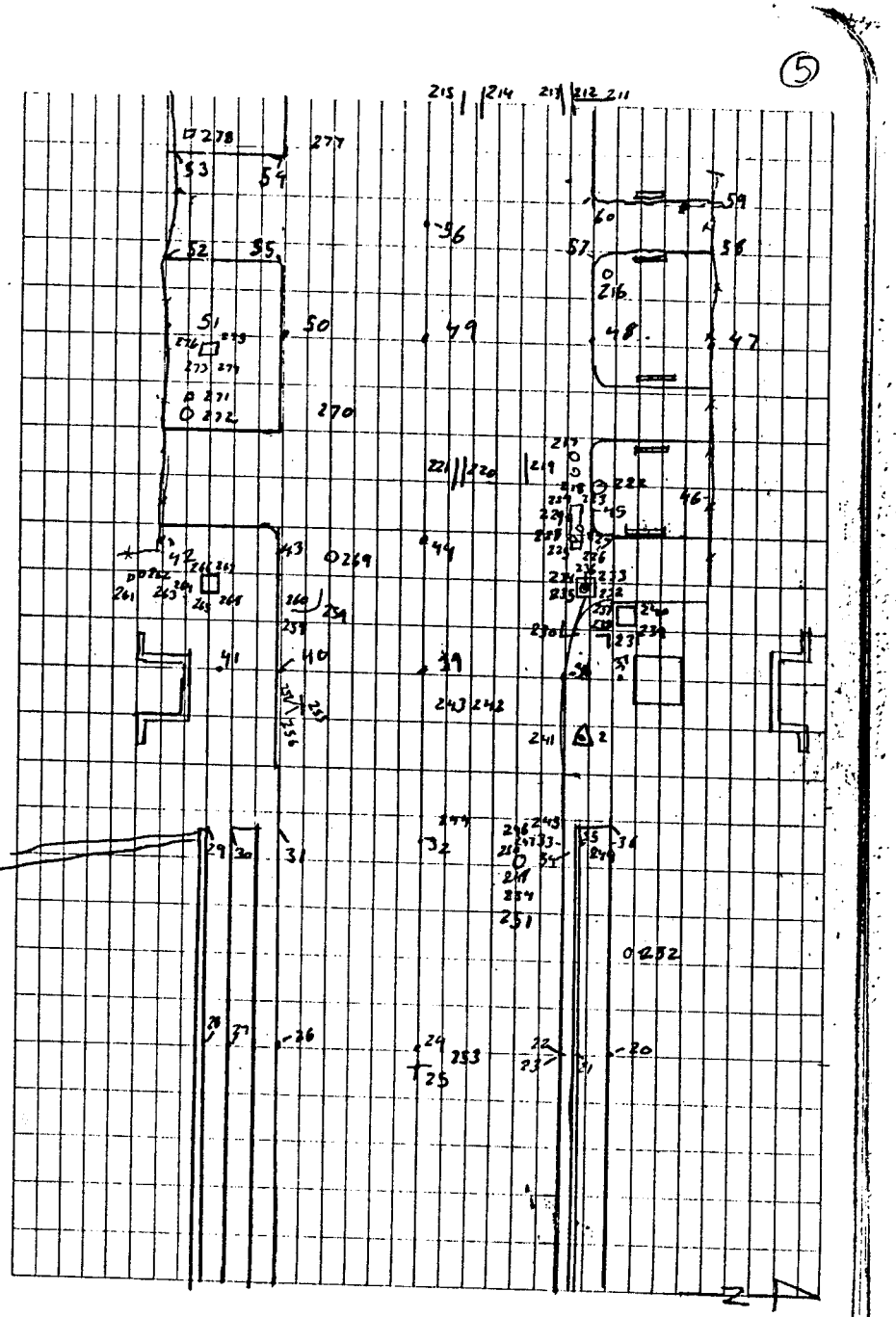
GPS "Session C"

STA	PT#	Time on	Time off	HI	EPOCHS	
Base #3	1	7:03	10:28	1.809		See Pg #1 for Dec. Pg #2 for Pic.
Base #2	2	7:11	10:35	1.867		See Pg #1 for Dec. Pg #2 for Pic.
Rover	10	7:25	7:35	2.034	120	See Pg #1 for Dec. Pg #2 for Pic
	* 12	7:44	7:45	2.034	12	See Pg #1 for Dec. Pg #2 for Pic. *(11)
	*(Note #11 Coded as #12 so #12 will be calc. #11)					
	* 11	7:58	7:59	2.034	12	See Pg #1 for Dec. Pg #2 for Pic. *(12)
	13	8:09	8:10			Found BC. HH @ Guadalupe & Hardy 0.63' To Surface
	14	8:28	8:29			Found BC. HH ± 250' N. of near Grover comes off of Kyrene @ Kyrene & Driveway of Kyrene Generation Station 0.47 To Surface
	15	8:44	8:45			Found BC. HH @ ELLIOT & Hardy 0.50' To Surface
	16	9:04	9:05			Found BC. F. @ Hardy & Cornell
	1000	9:13	9:14			Set Redar ± 40' E. of I-10 off Ramp ± 120 from S.EP of Baseline
	1001	9:16	9:17			Set Cotten Picker ± 70 N. of PT 1000
	2000	9:28	9:29			Set Cotten Picker ± 50' E. of I-10 off Ramp & ± 500' S. of Baseline
	2001	9:37	9:38			Set Cotten Picker 2 PP. from I-10 N. Bound off ramp in Right Away (Steel Power Pole)
	3000	9:49	9:50			Set PK in Pavement ± 7' from N. EP of Calle Cerritos & W. ± 30 from Avenida DEL YAQUI
	3001	9:56	9:57		12	Set PK on N. EP of Calle Cerritos & Calle Maravilla
	17	10:08	10:18	2.034	120	Found BC. HH @ Priest & Mineral 0.47' To Surface
	Rover off 10:20		End Session C			

PT	Code	Dec			HR
A@2					5.21
S@1					4.91
20	BW				0.25
21	TC				4.82
22	G				
23	LiP				
24	P				
25	Panel				
26	EP				
27	BW				
28	Wall				
29	"				
30	BW				
31	EP				
32	P				
33	LiP				
34	G				
35	TC				
36	BW				
37	NG				
38	EP				
39	P				
40	EP				
41	NG				
42	CIF				4.82



PT	Code	Dec			HR
43	EP				4.82
44	P				
45	EP				
46	CIF				
47	CIF				
48	EP				
49	P				
50	EP				
51	CIF				
52	EP	EP & CIF			
53	"	"			
54	EP				
55	EP				
56	P				
57	EP				
58	"	EP & CIF			
59	"	"			
60	"				
61	EP	EP & CIF			
62	"	"			
63	EP				
64	EP				
65	P				
66	EP				
67	wall				4.82



PT	Code	Dec.			HR
68	WALL				8.34
69	EP				
70	P				
71	EP				
72	EP	EP & CIF			
73	"	"			
74	EP				
75	CIF				
76	GB				
77	EP				
78	P				
79	EP				
80	WALL				
81	WALL	WALL & CIF			
82	EP				
83	P				
84	EP				
85	GD				
86	GD				
87	GB				
88	CIF				
89	EP	EP & CIF			
90	"				
91	"				
92	"	EP & CIF			8.34

PT	Code	Dec			HR.
93	CIF				8.34
94	GB				
95	"				
96	"				
97	EP				
98	P				
99	EP				
100	CIF				
101	CIF				
102	EP				
103	P				
104	EP				
105	GB				
106	"				5.35
107	"				
108	CIF				
	End	Setup			
$\bar{\Lambda}$@					5.22
B.S. @ 2					4.80
109	CLF	End CLF			4.82
110	EP				
111	EP				
112	EP				
113	EP				
114	P				4.82

PT #	Code	HR.	Dec.
115	P	4.82	
16	P		
17	P		
18	P		
19	EP		
120	EP		
21	EP		
22	EP		
23	LiP		
24	EP		
25	EP		
26	EP		
27	NG		
28	EP		
29	P		
130	EP		
31	EP		
32	EP		
33	EP		
34	EP		
35	CLF		Begin CIF
36	CIF		CLF & EP
37	EP		EP & CIF
38	EP		EP & CIF
139	EP	4.82	

PT #	Code	HR	Dec.
140	EP	4.82	
41	EP		CLF & EP
42	CIF		CIF & P
43	EP		
44	P		
45	EP		
46	NG		
47	BW		
48	TC		
49	G		
* 150	CIF	4.82	∡ CIF
		End SETUP	
52	OP		(orange Paint) USW 11-15 TO DUCT (S.)
53	YP		Yellow Paint line E.To W.
54	IGV		0.5' r
55	IGV		"
56	FH		
57	BP		BLUE Paint E.To W.
58	Conc		Concrete Pad for Cabel
59	"		Pad (L) 2.3' x (W) 1' x (H) 3.3'
60	"		
61	"		
62	PP		
63	TELCO		
64	DG		Down Guid for RP.

PT"	Code	HR	Dec.
165	DG		Down Guide for PP
66	Wm		1.9 x 2.8
67	Wm		2.1 x 1.4
68	BP		Water Line E. To W.
69	BP		" " "
170	BP		Water Line intersection N. To S. E. To W.
71	BP		" " "
72	WV		2.15' from Dirt To Rim
73	BP		End Blue Paint coming W. from WV. NoT or intersect
74	BP		Paint gone Apx. intersection for WL and Tleed To FH E. To W. & N. To S.
75	WV		4.3' From Dirt To Rim
76	WV		
77	OP		∡ from Telco Ped To west Heading N.E. To intersect with OP from Cabel Ped
78	OP		∡ from Cabel Ped To west
79	OP		" " "
180	OP		Point of intersection for Cabel & Telco
181	OP		Point of intersection for cabel
182	OP		Orange Paint for Utillites
183	SWG		South west Gas Lines

PT	Code	HR	Dec
TC 1		5.16	
BS@2		5.23	
151	PP	4.82	#6169
52	OP		(orang Paint) USW 11'-15' To Duct (5)
53	YP		(Yellow Paint) Line Runs E.-W.
54	ICV		
55	"		
56	FH		
57	BP		Line E.-W.
58	Conc		Concret Pad for cabel Ped
59	"		Ped deminsions (L W H) 2.3' x 1' x 3.3'
160	"		
61	"		
62	PP		#9202
63	TELCO		.6' x .6' x 3'
64	DG		Down Guid For PP Pt# 62
65	DG		" " "
66	wm	4.82	1.9' x 2.8'
67	wm	0.25	2.1' x 1.4'
68	BP	4.82	Blue Paint E.-W.
69	BP		" "
170	BP		intersect N.-S. To E.
71	BP		" " "
72	WV		2.15' from dirt to rim
173	BP	4.82	End Blue Paint coming from WV.

PT	Code	HR	Dec
174	BP	4.82	no Paint Apx. intersect
75	WV		4.3' from dirt To Rim
76	WV		4.59' from dirt To Rim
77	OP		∡ from Telco To w. heading N.E. To intersect OP from Cadel Ped
78	OP		∡ from cadel Ped To west
79	OP		" "
180	OP		Point of intersect for cabel & Telco
81	OP		Point of intersect for cabel
82	OP		
* 83	YP		Yellow Paint (SWG)
84	OP		
85	YP		
86	CP		found cotton Picker in PH @ C. Vaco vaul & Guadalupe
87	HH		found HH cap marked Surgy No PT insid just Elc. wires
88	WV		These Vaulves are
89	WV		Bolted on
190	WV		
91	YP		Painted "EP NGas"
92	YP		T. interset E-W - N.W.
93	YP		N.W. - N.E. To T. intersect
94	GV		
95	OP		Painted "USW 3'-7'" S.
96	YP		E - W
97	YP		E - W
198	YP	4.82	E - W

PT	Code	HR	Dec
199	YP	4.82	E-W
200	YP		T intersect E-W-N
1	YP		L intersect S-E
2	YP		E-W
3	YP		E-W
4	BP		" NW↑" ← SHOT
5	OP		E-W
6	OP		E-W
7	TELCO		.8r x 3' TALL
8	PP		# 41A
9	OP		E-W
210	MH	4.82	Sanitary Sewer
		End Setup	
TP 2		5.09	
BS 1		5.23	
211	YP	4.82	N-S To T. intersect
12	YP		E-W-N T. intersection
13	YP		E-W
14	YP		E-W "EPNGAS"
15	YP		E-W "EPNG"
16	SP		Broken & unused
17	WV		1.73' To Rim from dirt
18	WV		2.74 To Rim from dirt
19	YP		E-W
220	YP	4.82	E-W

PT	Code	HR	Dec
221	YP	4.82	
22	FH		
23	BP		N.W. Cor of Box
24	BP		S.W. Cor of Box
25	BP		S.E. Cor of Box
26	BP		N.E. Cor of Box
27	WV		2.99' from NUT To Rim
28	WV		2.93' From NUT To Rim
29	WV		2.96' from NUT To Rim
230	BP		L intersect W-N (⌐)
31	BP		L intersect S-E (⌋)
32	Conc		Concret Pad for MH PT# 36
33	"		
34	"		
35	"		
36	MH		SRP irrigation
37	Conc		outside Cor for Concret Storm drain
38	"		" " "
39	"		" " "
240	"		" " "
41	YP		"2" Plastic SWG"
42	YP		" EPNOAS"
43	YP		" EPNG"
44	YP		APx intersection E-W-N
245	YP	4.82	N-S "EPNG T.R." maybe "T.A"

PT	Code	HR.	Dec
246	BP	4.82	@ of Painted Box 5.6' x 3.4'
			"SRP IRR 24 in"
247	OP		"N ↑ cox USW 25'R" Arrow Points S.
248	MH		"SRP water"
249	BP		L intersect W-N (⌐)
250	RP		(Red Paint) "N/SRP" Points N.
51	BP		@ of Panited Box 4.7' x 3'
		4.82	"SRP IRR 24 in"
52	WV	0.25	Bolted on
53	YP	4.82	"EPNG" E-W
54	YP		"SWG" E-W
55	OP		3 way intersect E-W-SW-SE
56	OP		SE of PT # 55
57	OP		SW of PT # 55
58	BP		"NW↑" Points South
59	OP		∡ W-S
260	OP		
61	TELCO		(L W H) .6 x .6 x 3.5
62	PP		# 9207
63	DG		Down Guld for PP PT # 62
64	DG		" " "
65	Conc		outside cor. of concret
66	"		Storm drain
67	"		" "
68	"	4.82	" "

PT	Code	HR	Dec
269	MH	4.82	Sanitare Sewer
270	OP		E-W
71	TELCO		(L W H) .6' x .6' x 3.5'
72	PP		# 1911
73	Grate		Storm Drain
74	"		" "
75	"		" "
76	"		" "
77	BP		N-S
78	wm	4.82	2' x 1'
		END Setup	
Π@ 2		5.29	
B.S. 1		4.84	
279	inv.T	8.57	inv Shot for MH PT# 269 Pg#16
			Pipe Filled with waste
			Shot Top is end of line
			6.99' To Rim From Top of Pipe
280	inv	21.81	inv for MH PT # 210 Pg# 13
			Coming from W. & S. out to
			The N. over Flow E.
			16.12' To N. out Flow
			Rim Horz. shoot on
			N. Pipe

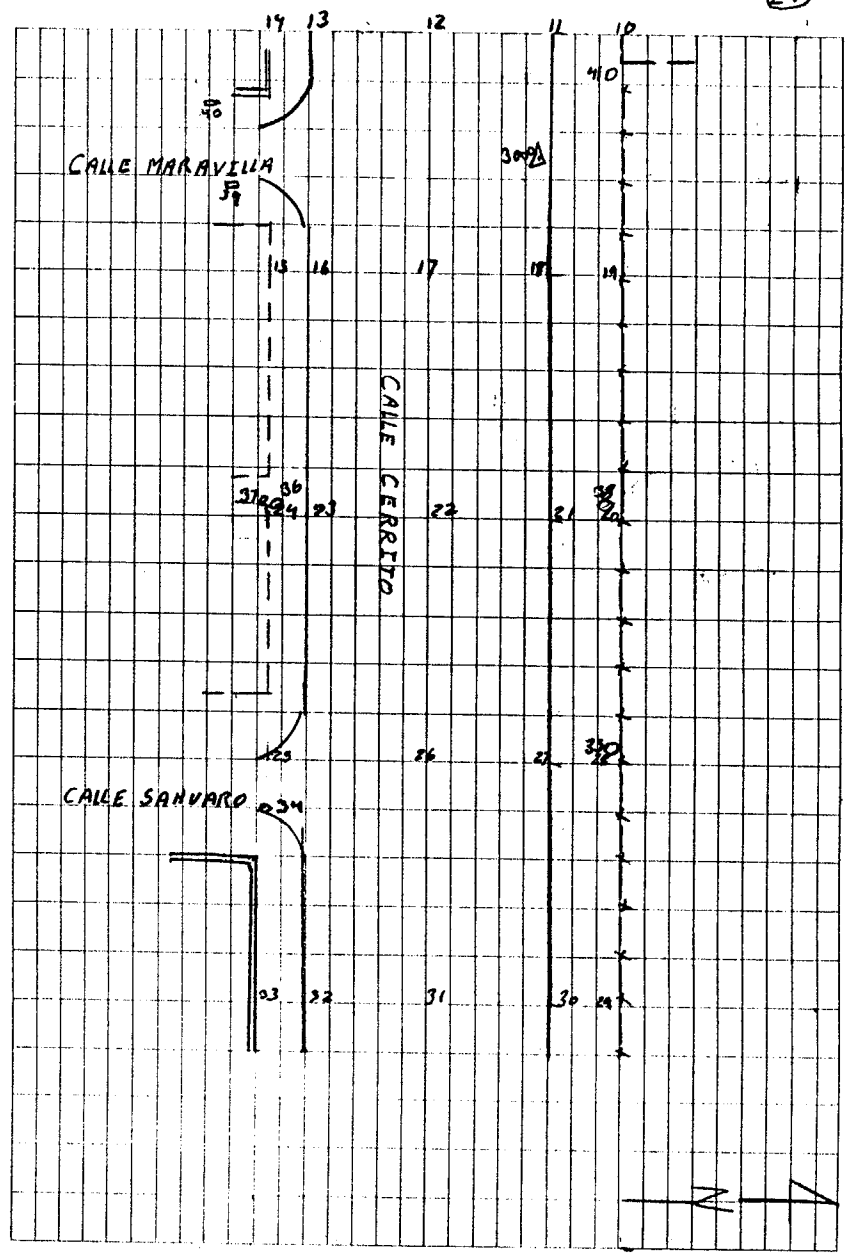
INV.

2.38' To Grate For S. Pipe of Storm Drain

PT #'s 237, 238, 239, 240 Pg 14 2.33' To Grate for West Pipe

PT	Code	HR	Dec		
TR 3001		5.09			
BSR 3000		4.97			
3010	CIF	4.82			
11	EP				
12	P				
13	EP				
14	NG				
15	CIF				
16	EP				
17	P				
18	EP				
19	BWF				
3020	BWF				
21	EP				
22	P				
23	EP				
24	CLF				
25	EP				
26	P				
27	EP				
28	NG	4.82			
29	BWF	3.0			
3030	EP	4.82			
31	P				
32	EP				

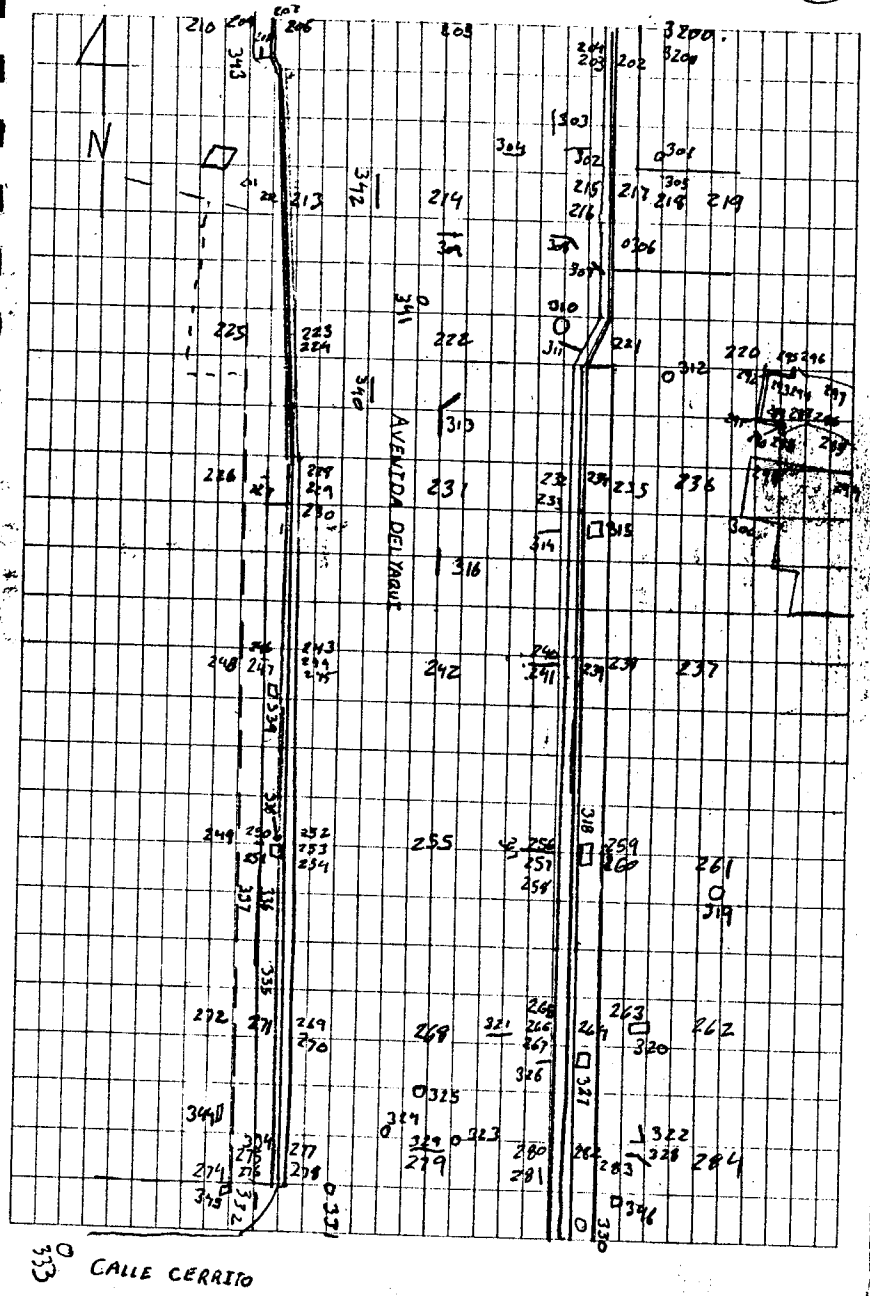
All numbers are in 3000 series



PT	Code	HR	Dec
3033	WALL	4.82	
34	WV		
35	PP		#62
36	FH		
37	WV		
38	PP		
39	WM		
40	WM		
41	PP	4.82	
		END SETUP	

PT	Code	HR	Dec
TC 3000		5.13	
B.S. 3001		4.86	
3002	PK	4.82	Set PK ±250 N. of Calle Cerrito
			& Avenida Del Yaqui ±30' E.
			From ℄ Avenida Del Yaqui
3003	PK	4.82	Set PK ±50 N. of Avenida Del -
			Yaqui in Back SW on E. side
		END SETUP	
TC 3002		5.13	
B.S. 3003		4.85	
3200	GB	4.82*	Please See Note on Pg #26
1	BSV		
2	TC		
3	G		
4	LiP		
3205	P		
6	LiP		
7	G		
8	TC		
9	BSV		
3210	NG		
11	NG		
12	TC		
13	P		
3214	P	4.82	

ALL Numbers are in 3000 Series



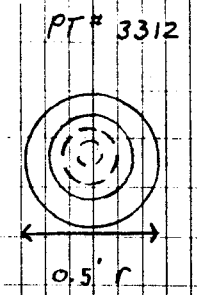
PT	Code	HR	Dec
3215	LiP	4.82	
16	G		
17	TC		
18	BSW		
19	P		
3220	NG	4.92	* Note Preceding shots Data collector was set to 4.85 HR
21	EP		
22	P		
23	P		
24	TC		
25	NG		
26	CIF		
27	BSW		
28	TC		
29	G		
3230	LiP		
31	P		
32	LiP		
33	G		
34	TC		
35	BSW		
36	P		
37	P		
38	BSW		
3239	TC	4.92	

PT	Code	HR	Dec
3240	G	4.82	
41	LiP		
42	P		
43	LiP		
44	P		GUTER has Been Filled
45	P		with Paving
46	TC		
47	BSW		
48	CIF		
49	CIF		
3250	BSW		
51	TC		
52	P		Guter Filed with Paving
53	P		" "
54	LiP		
55	P		
56	LiP		
57	P		Guter has Been Filed with Paving
58	P		" "
59	TC		
3260	BSW		
61	P		
62	P		
63	BSW		
64	TC	4.82	

PT	Code	HR	Dec		
3265	P	4.82	Gutter Filled with Paving		
66	P		"	"	"
67	LiP				
68	P				
69	LiP				
3270	G				
71	TC				
72	BSW				
73	CLF				
74	CIF				
75	BSW				
76	TC		end Curb Return		
77	G				
78	LiP				
79	P				
3280	LiP				
81	G				
82	TC				
83	BSW				
84	P	4.82			
		END SETUP			
T@ 3002		5.12			
B.S. 3003		4.84			
3285	Conc	4.82	end ℄		
3286	Conc	4.82	℄ Chanel		

PT	Code	HR	DCC		
3287	Conc		end ∡		
88	Conc		Top Channel		
89	WW		wing wall w. side 0.7' E.		
3290	WW		"	"	
91	HW		Head wall E. Side 0.7' W.		
92	HW		"	"	"
93	WW		wing wall w. side 0.7' E.		
94	WW		"	"	
95	Conc		Top of channell		
96	Conc		∡ Channell		
97	Conc		end ∡		
98	Cor	4.82	Cor. Building		
99	Cor	6.97	"	"	
3300	Cor	4.82	"	"	
1	FH				
2	RP		Red Paint "W" E.-W. To FH PT # 3301		
3	WP		White Paint N-S		
4	RP		E-W		
5	WP		N-S		
6	WV		Bolted on		
7	OP		SE-NW		
8	OP		∡ SE-W "PWR"		
9	OP		W-E "PWR"		
3310	MH		Sanitary Sewer		
3311	RP		SE-NW		

PT	Code	HR	Dec
3312	V		*(See diagram This Page) Unknown object Looks Like vent
13	WP		∡ NE.-S To MH PT# 3310
14	RP		E.-W from PT# 15
15	Box		2.3' x 3.4' Box Prsumed storm acces
16	WP		N-S
17	RP		E-W To PT# 3318
18	Box		2.3'x3.4 storm access ?
19	Grate		2.2' r drains for carwash
3320	WM		2.8' X 1.9
21	RP		E-W To WM PT# 3320
22	RP		∡ W-N from PT# 3320 To #3323
23	WV		0.45 To Locking Cap
24	WV		0.45 To Locking Cap
25	MH		Storm drain
26	RP		
27	Box		2.3'x 3.4' storm acces ?
28	YP		∡ SE-W
29	YP		E-W
3330	MH		Sanitary Sewer
31	WV		1.43 from dirt To Rim
32	OP	4.82	N-S "Sprint
33	MH	5.47	Sanitary sewer
34	BP	4.82	"WW" (S.W. N.W.)
35	OP		"1'↑ USW" (W.)
3336	BP		"WW" (S.W.) (N.W.)



PT	Code	HR	Dec		
3337	OP		N-S "SPRINT"		
38	Box		2.3' x 3.4'	Storm access	
39	Box		2.3 x 3.4'	Storm access	
3340	YP		N-S		
41	WV		Bolted on		
42	YP		N-S "2" Steel up swa"		
43	OP		"SPRINT" N-S		
44	Sign		Underground Gas warning sign		
45	Telco				
46	Telco				
		End Setup			
	MH	INV.			
PT	IN		OUT		HT To Rim
3310	South		North		19.84
3330	South	West	North		20.58
3325	End of Line		North		5.29
3333	South	West	North		8.22

PT	STA	+	−	ELVE	ADJ. ELVE
11	1			1208.72	1208.11
		5.86			
	2		3.03	1211.55	
		7.97			
	3		2.10	1217.42	
		7.98			
3002	4		1.39	1224.01	1224.332
		5.38			
3003	5		4.89	1224.50	1224.822
		5.13			
3000	6		4.60	1225.03	1225.352
		7.16			
	7		1.76	1230.43	
		6.85			
	8		4.23	1233.05	
		6.19			
3001	9		4.23	1235.01	1235.342
		4.21			
	10		6.15	1233.07	
		4.17			
	11		6.79	1230.45	
		1.84			
3000	12		7.25	1235.04	
		4.60			

PT	STA	+	−	ELEV	ADJ ELEV
3003	13		5.12	1224.52	
		4.61			
3002	14		5.10	1224.03	
		2.43			
	15		8.94	1217.52	
		2.21			
	16		6.97	1212.76	
		2.66			
11	17		6.70	1208.72	

PT	STA	+	−	ELVE	ADJ. ELVE
12				1249.64	1249.640
		5.485			
	1		5.024	1250.10	
		4.918			
	2		6.001	1249.018	
		4.357			
	3		6.427	1246.947	
		3.134			
	4		6.532	1243.549	
		3.375			
	5		7.497	1239.427	
		2.899			
	6		8.298	1234.029	
		2.495			
	7		7.206	1229.318	
		2.967			
	8		6.439	1225.846	
		5.313			
3000	9		5.799	1225.360	1225.352
		4.295			
	10		5.056	1224.599	
		3.910			
	11		4.301	1224.208	
		4.578			

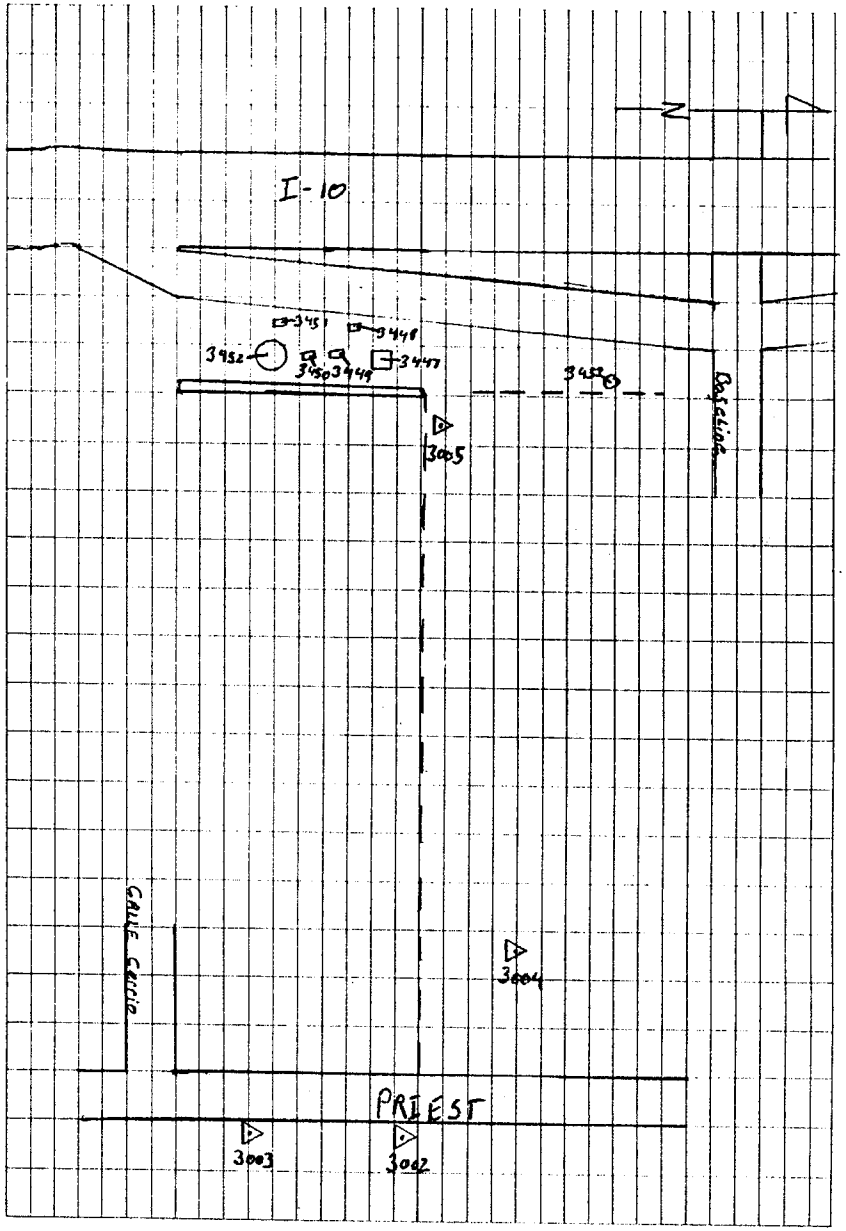
See Pg #1 for Dec. (Z&H Datum)

See Pg #3 for Dec.

PT	STA	+	-	ELVE	ADJ. ELVE
	12		4.871	1223.916	
		5.566			
	13		4.843	1224.638	
		4.718			
	14		5.506	1223.850	
		5.353			
	15		4.598	1224.605	
		5.720			
	16		5.689	1224.637	
		5.080			
	17		4.935	1224.781	
		4.916			
	18		4.379	1225.318	
		4.378			
	19		4.681	1225.015	
		4.478			
2	20		4.486	1225.007	1224.989
		6.838			
	21		0.999	1230.846	
		7.941			
	22		0.493	1238.294	
		8.476			
	23		1.190	1245.58	
		8.314			
12	24		4.232	1249.662	1249.640

See Pg# 1 for Dec.

PT	Code	HR	Dec		
TP 3002		5.22			
B.S. 3003		4.82			
3004	Set Rebar	4.82	Set Rebar ± 10' E. of		
			Best Rightaway marker		
			±500' w. of Priest drive		
		End Setup			
TP 3004		4.93			
B.S. 3002		4.82			
3005	CP	4.82	See Pg#3 PT 2000		
		End Setup			
TP 3005		5.19			
B.S. 3004		4.47			
3347	Grate	5.92	10.40 x 11.30 Conc Pad 3.33 x 2.10 Grate		
48	ICV	5.92	1.40' x 0.97'		
49	ICV	10.00	1.75' x 1.20'		
3350	ICV	10.00	1.75' x 1.20'		
51	J Box	10.00	1.3' x 2.05'		
52	MH	10.00	Sanitary Sewer		
3353	MH	25.43	Sanitary Sewer		
		End Setup			
PT	in		OUT		HR To Rim
3447			W. (does not go S.)		9.05
3452	S.		N.		11.70
3453	S.		N.		12.50



12-21-11
D Matelski
Q Duncan
D Workman

PT	STA	+	−	ELVE.	ADJ ELVE
2				1224.989	1224.989
		5.253			
	1		4.812	1225.431	
		4.510			
	2		4.369	1225.572	
		5.359			
	3		5.393	1225.538	
		4.760			
	4		5.160	1225.138	
		5.195			
BM11	5		2.986	1227.346	1227.268
		4.682			
	6		4.651	1227.377	
		3.957			
	7		5.171	1226.164	
		7.410			
	8		8.251	1225.322	
		4.686			
	9		4.008	1226.000	
		5.039			
	10		4.336	1226.704	
		4.988			
BM12	11		4.555	1227.137	1227.025
		4.648			

Rebar ~~for Ado~~. see Pg# 1

Chisled "⊠" on NE cor. of Concret Spill way W. side of channal ± 2500' S. of Guadalupa ± 1000' N of Grove Parkway ± 120' N.W. of Steel Power Pole # 150

~~Note [illegible] Run's underground [illegible]~~

Chisled "⊠" on NE end of NW. curb return @ Elliot & Mall acess Rd ± 1500 E. of Priest & Elliot

PT	STA	+	−	ELVE	ADJ ELVE
	12		8.224	1223.561	
		4.480			
	13		4.550	1223.491	
		4.732			
	14		6.239	1221.984	
		5.884			
*	15		3.035	1224.832	
		3.981			
	16		4.103	1224.710	
		3.825			
	17		8.476	1220.060	
		4.178			
	18		4.574	1219.664	
		5.679			
	19		2.088	1223.256	
		5.361			
BM 13	20		3.522	1225.095	1225.086
		2.626			
	21		3.873	1223.849	
		4.830			
	22		5.021	1223.657	
		4.494			
BM14	23		4.347	1223.804	1223.767
		4.141			

Chiled "□" in SW. corner of Flow gate ±200' S. of Auto DR. ±35' N. of Channel where it gets to surface

Chisled "□" on P.P. Base 3'± Pole N. of Priest & Canall Pole #33

PT	STA	+	−	ELVE	ADJ ELVE
	24		3.875	1224.071	
		4.610			
	25		4.647	1224.033	
		4.918			
BM 15	26		4.119	1224.832	1224.831
		3.361			
	27		4.721	1223.472	
		5.103			
	28		6.040	1222.535	
		4.657			
	29		4.213	1222.979	
		3.921			
	30		5.102	1221.798	
		4.385			
	31		5.140	1221.042	
		4.822			
BM16 (103)	32		4.134	1221.729	1221.718
		4.310			
	33		5.032	1221.007	
		5.246			
	34		4.491	1221.762	
		5.070			
	35		3.857	1222.975	
		4.124			

Chiled "□" in SE cor. of Channel Structer
For Road crosing ± 30' N. of EP of Warner Rd

Found Chisled "X" in center of Control valve
structer & channel ± 40' SE of SE cor of
CIF for ADOT Gravel Pit

PT	STA	+	-	ELVE	ADJ. ELVE
	36		4.574	1222.525	
		5.927			
	37		4.979	1223.473	
		4.836			
BM 15	38		3.456	1224.953	1224.831
		4.027			
	39		4.749	~~1224.131~~	
		4.365			
	40		5.638	~~1222.859~~	
		4.498			
	41		4.531	~~1222.826~~	
		5.334			
	42		3.345	~~1224.816~~	
		5.661			
	43		4.090	~~1226.387~~	
		4.566			
	44		3.398	~~1227.556~~	
		5.929			
	45		4.257	~~1229.228~~	
		5.399			
	46		4.424	~~1230.103~~	
		6.019			
	47		4.697	~~1231.525~~	
		5.666			

See Pg #39 for Desc.

PT	STA	+	−	ELVE	ADJ. ELVE
BM17	48		5.213	~~1234.977~~	1231.777
		5.154			
	49		4.630	~~1232.502~~	
		5.324			
	50		4.271	~~1233.536~~	
		4.914			
	51		3.687	~~1234.783~~	
		4.944			
	52		4.024	~~1235.703~~	
		4.805			
	53		4.043	~~1236.465~~	
		5.668			
	54		5.038	~~1237.095~~	
		6.110			
BM18	55		6.257	~~1236.977~~	1236.544
		6.723			
	56		3.777	~~1239.895~~	
		7.434			
	57		3.469	~~1243.861~~	
		6.015			
	58		4.064	~~1245.812~~	
		5.781			
	59		4.189	~~1247.404~~	
		5.238			

Found BC Flush @ Priest Dr. & Auto Dr.

Found BC Flush @ Priest Dr. & Grove Pkwy

PT	STA	+	−	ELVE	ADJ. ELVE
BM19	60		4.260	~~1248.331~~	1247.874
		4.606			
	61		4.044	~~1248.944~~	
		5.407			
	62		4.290	~~1250.061~~	
		5.238			
	63		4.863	~~1250.436~~	
		5.284			
	64		5.075		
		4.641			
*12	65		5.136	~~1250.151~~	1249.639
		4.410			
	66		8.773	~~1245.787~~	
		1.674			
	67		8.958	~~1238.503~~	
		1.797			
	68		7.385	~~1232.919~~	
		1.137			
	69		6.709	~~1227.313~~	
		4.289			
2	70		6.056	~~1225.576~~	1224.989

Found BC Flush @ PRIEST DR. & Bell DE Mar

See Pg# 1 for Dec. (ELVE 1249.640) ↔ Pg# 35

See Pg# for Dec. 1 (ELVE 1224.989) ↔ Pg# 35

PT	STA	+	-	ELEV
2	0			1224.989
		5.276		
	1		4.835	1225.429
		4.619		
	2		4.511	1225.538
		5.584		
	3		5.672	1225.450
		4.963		
	4		4.859	1225.554
		4.806		
Bm11	5		3.078	1227.282
		4.235		
	6		4.905	1226.611
		4.061		
	7		2.093	1228.579
		1.139		
	8		4.573	1225.145
		5.182		
	9		4.743	1225.583
		5.014		
	10		4.113	1226.485
		5.624		
Bm12	17		5.055	1227.054
		3.012		
	12		7.523	1222.543

see Pg# 37

see Pg# 37

PT	ST	+	−	ELEV
		4.924		
	13		4.064	1223.403
		4.884		
	14		6.384	1221.904
		6.341		
	15		3.497	1224.748
		3.950		
	16		4.012	1224.687
		3.739		
	17		4.393	1224.033
		4.697		
	18		4.967	1223.763
		4.423		
BM13	19		3.052	1225.135
		2.914		
	20		3.675	1224.374
		3.680		
	21		3.717	1224.338
		4.185		
	22		4.454	1224.068
		4.057		
	23		3.877	1224.249
		3.685		
	24		4.514	1223.420
		4.562		

SCC Pg # 38

	STA	+	−	ELVE	ADJ ELVE
BM14	25		4.155	1223.828	
		4.20			
	26		3.724	1224.304	
		4.514			
	27		4.595	1224.222	
		5.214			
	28		4.963	1224.473	
		4.282			
BM15	29		3.855	1224.899	
		3.924			
	30		4.367	1224.456	
		5.044			
	31		5.308	1224.192	
		3.553			
	32		4.802	1222.943	
		5.365			
	33		4.20	1224.108	
		5.327			
	34		3.689	1225.746	
		5.877			
	35		4.509	1227.114	
		6.046			
	36		4.296	1220.863	
		5.699			

Pg #38

Pg #39 # Note Loop To BM 16 (103) Pg #39-40

PT	STA	+	−	ELEV.	ADJ. ELEV.
	37		4.618	1229.945	
		6.108			
BM 17	38		4.186	1231.866	.111
		5.590			
	39		4.381	1233.075	
		6.102			
	40		4.145	1235.031	
		6.060			
	41		4.939	1236.152	
		7.554			
	42		4.412	1239.294	
		4.794			
BM 18	43		7.443	1236.644	.305
		6.999			
	44		4.271	1239.372	
		6.746			
	45		3.408	1242.710	
		6.421			
	46		4.135	1244.996	
		5.613			
	47		4.174	1246.436	
		5.352			
	48		4.689	1247.100	
		4.992			

See Pg # 41

See Pg # 41

PT	STA	+	−	ELVE	ADJ ELVE
BM 19	49		4.083	1248.008	.373
		4.853			
	50		4.335	1248.526	
		6.139			
	51		4.455	1250.209	
		4.501			
	52		4.536	1250.175	
		5.146			
12	53		5.557	1249.764	

See Pg# 42

See Pg# 1 for Dec Pg# 35 for ELVE of 1249.640

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2}D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2}D = \frac{50 \tan \frac{1}{2}I}{T}$

$R = T \cot. \frac{1}{2}I$

$R = \frac{50}{\text{Sin. } \frac{1}{2}D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

Right Angle Triangles. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Leveling. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574\ d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3}d^2$. The combined correction is negative.

Probable Error. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean =

$$\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

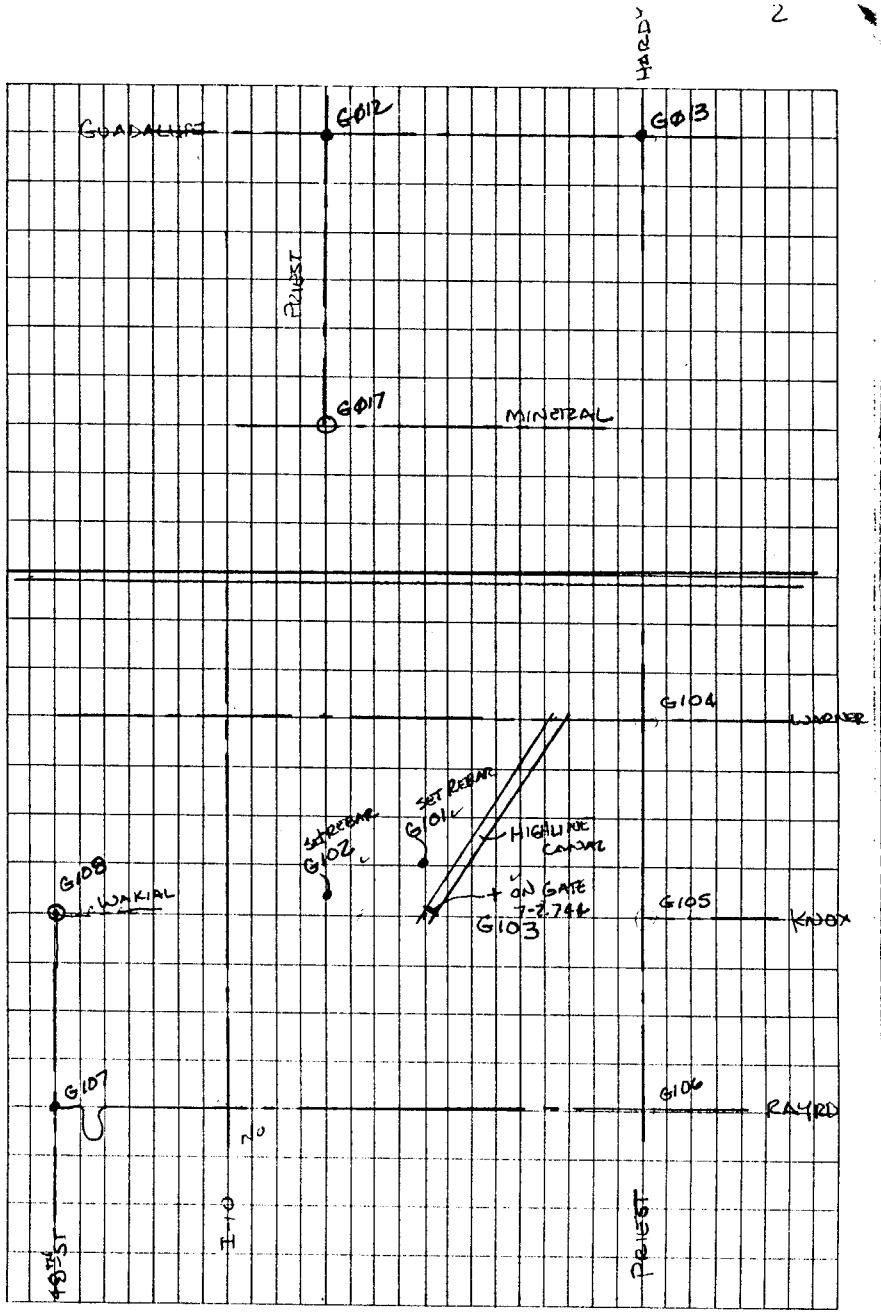
Elan Publishing Co., Inc. Meredith, N.H. 03253

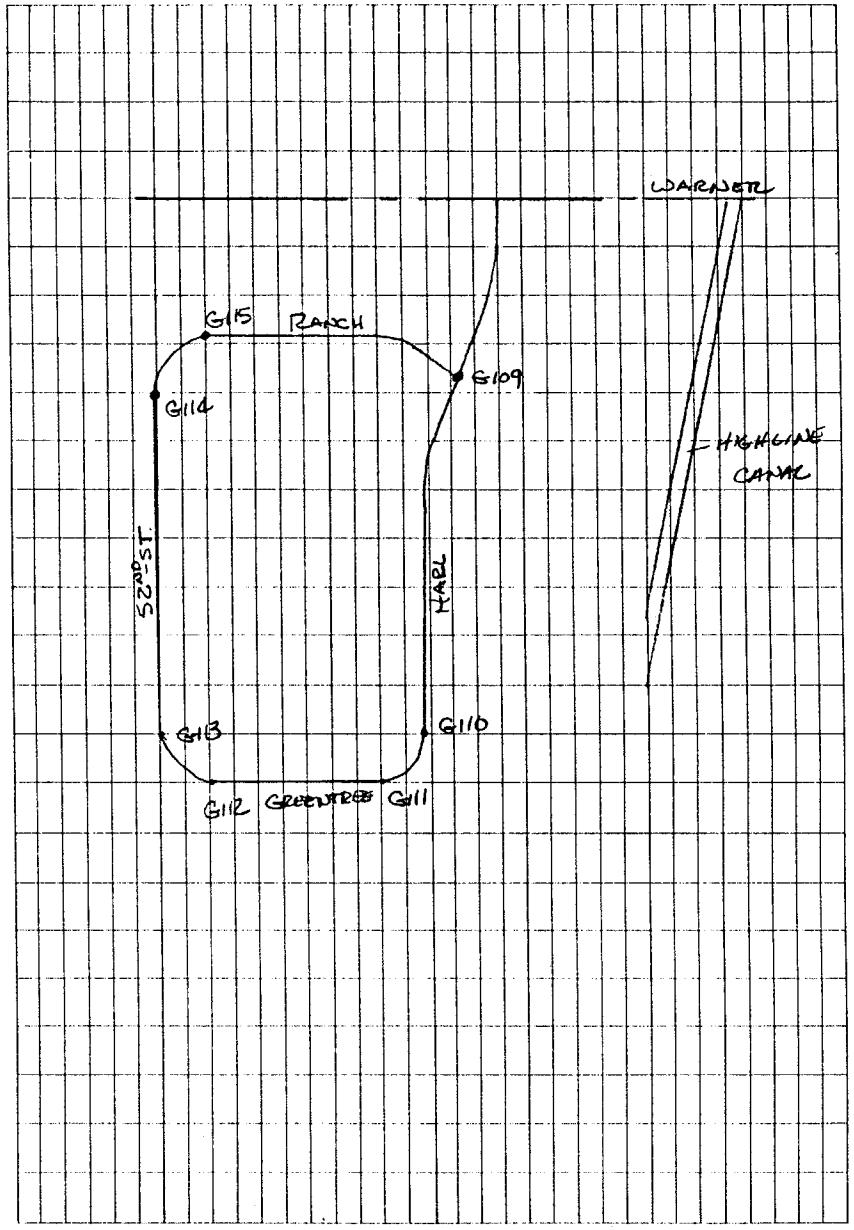
BOOK 2
GUADALUPE
DRAINAGE STUDY

DEC 29, 1999
JR
GA

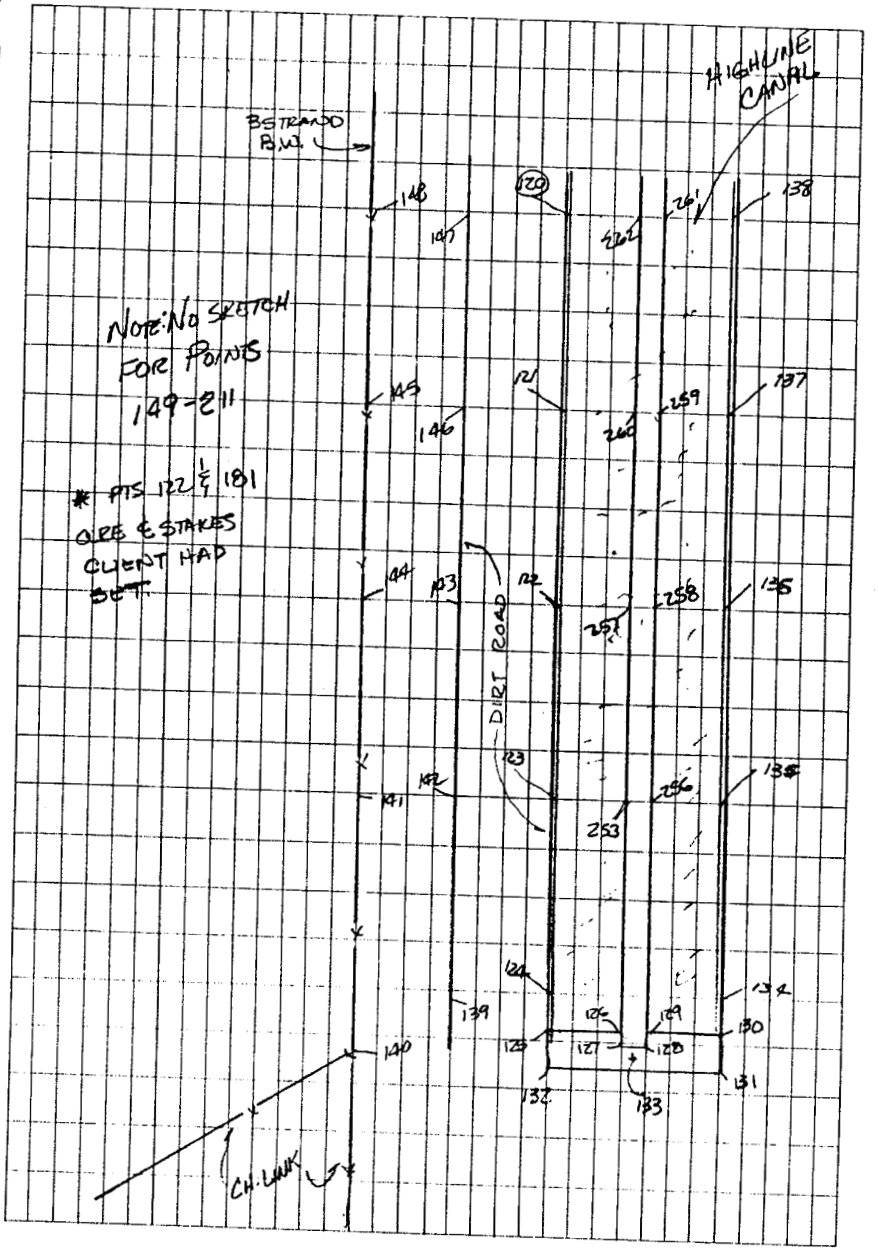
LEVEL LOOP FOR ERM'S
D.M. PG #15 TO PG # 18
M.S.

STA	ROD	OPER	UNIT	EPOCHS
G015	1.790	JKR	"A"	STATIC
G101	2.010	JKR	"B"	STATIC
G102	2.149	JKR	Rover	120
G103	"	"	"	12
G106	"	"	"	6
G105	"	"	"	6
G104	2.149	JKR	Rover	6
G017	"	"	"	6
G012	"	"	"	6
G109	"	"	"	6
G110	2.149	JKR	Rover	6
G111	"	"	"	6
G112	"	"	"	6
G113	"	"	"	6
G114	2.149	JKR	Rover	120

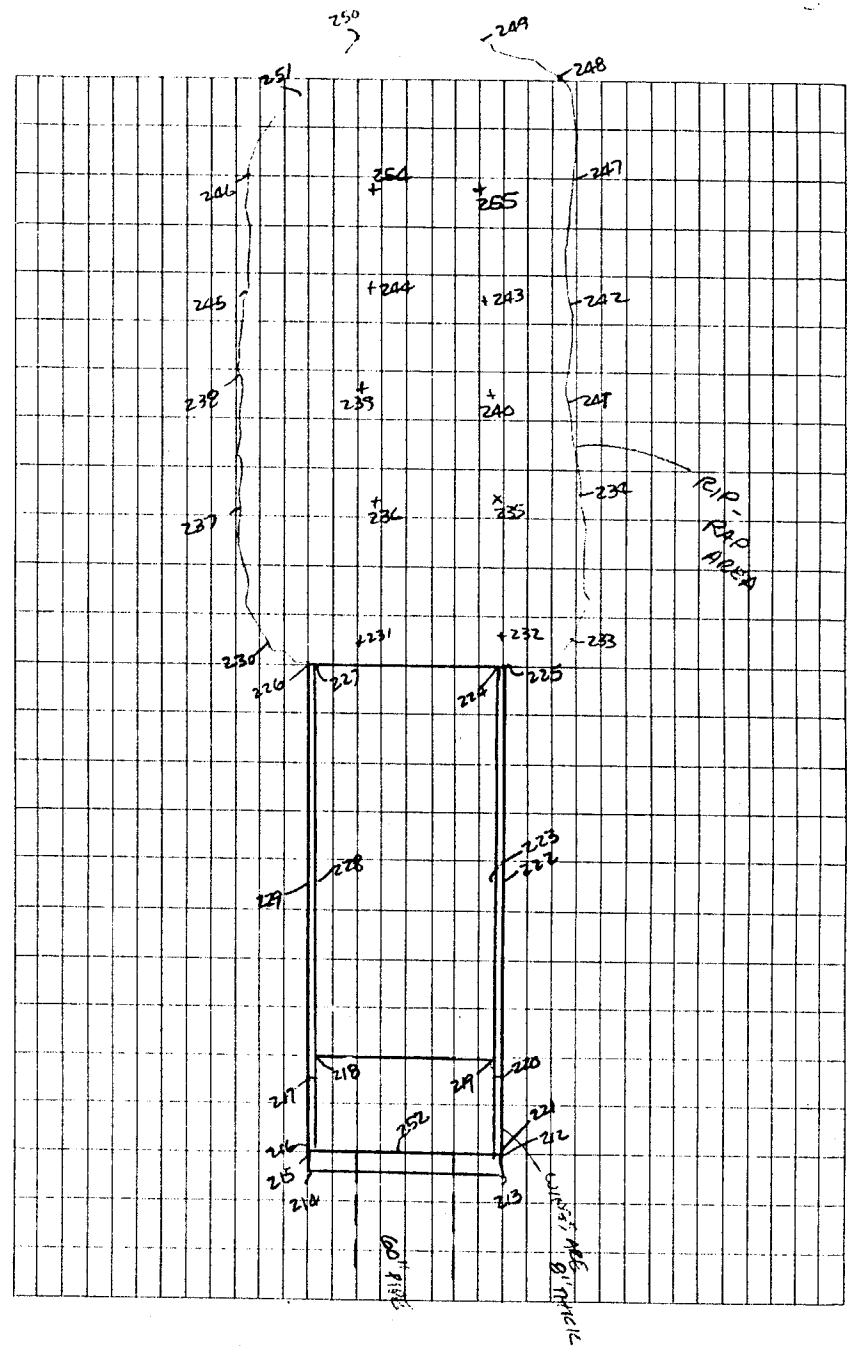



WARNER
G115
RANCH
G109
G114
HIGHLINE
CANAL
52ND ST
HARL
G113
G110
G112
GREENTREE
G111

STA	ROD	DESC.			
ASSUMED	DATA				
PT 102 =	5000 / 5000	EZ=1000.00			
PT 101 =	5135.229 / 5000.00	EZ = 1004.11			
⅄@102	5.25				
BS@101	5.22				
120	4.74	T.D			
121		T.D			
122		T.D			
123		T.D			
124	4.74	T.D			
125		Conc			
126		"			
127		"			
128	4.74	Conc			
129		"			
130		"			
131		"			
132	4.74	Conc			
133		TBM (ALSO GPS PT 6103)			
134		T.D			
135		T.D			
136		T.D			
137	4.74	T.D			



STA	POD	DESC			
138	4.74	T.D			
139		ER			
140		FENCE			
141		Fc			
142		ER			
143	4.74	ER			
144		Fc			
145		Fc			
146		ER			
147		ER			
148	4.74	Fc			
149		NG			
150		"			
151		"			
152		"			
153	4.74	NG			
154		"			
155		"			
156		"			
157		"			
158	4.74	NG			
159		"			
160		"			
161		"			
162		"			
163	4.74	NG			



STA	ROL	DESC			
164	4.74	N.G			
165		"			
166		"			
167		"			
168		"			
169	4.74	N.G			
170		"			
171		"			
172		"			
173		"			
174	4.74	NG			
175		"			
176		"			
177		"			
178		"			
179	4.74	NG			
180		"			
181		"			
182		"			
183		"			
184	4.74	NG			
185		"			
186		"			
187		"			
188		"			
189	4.74	NG			

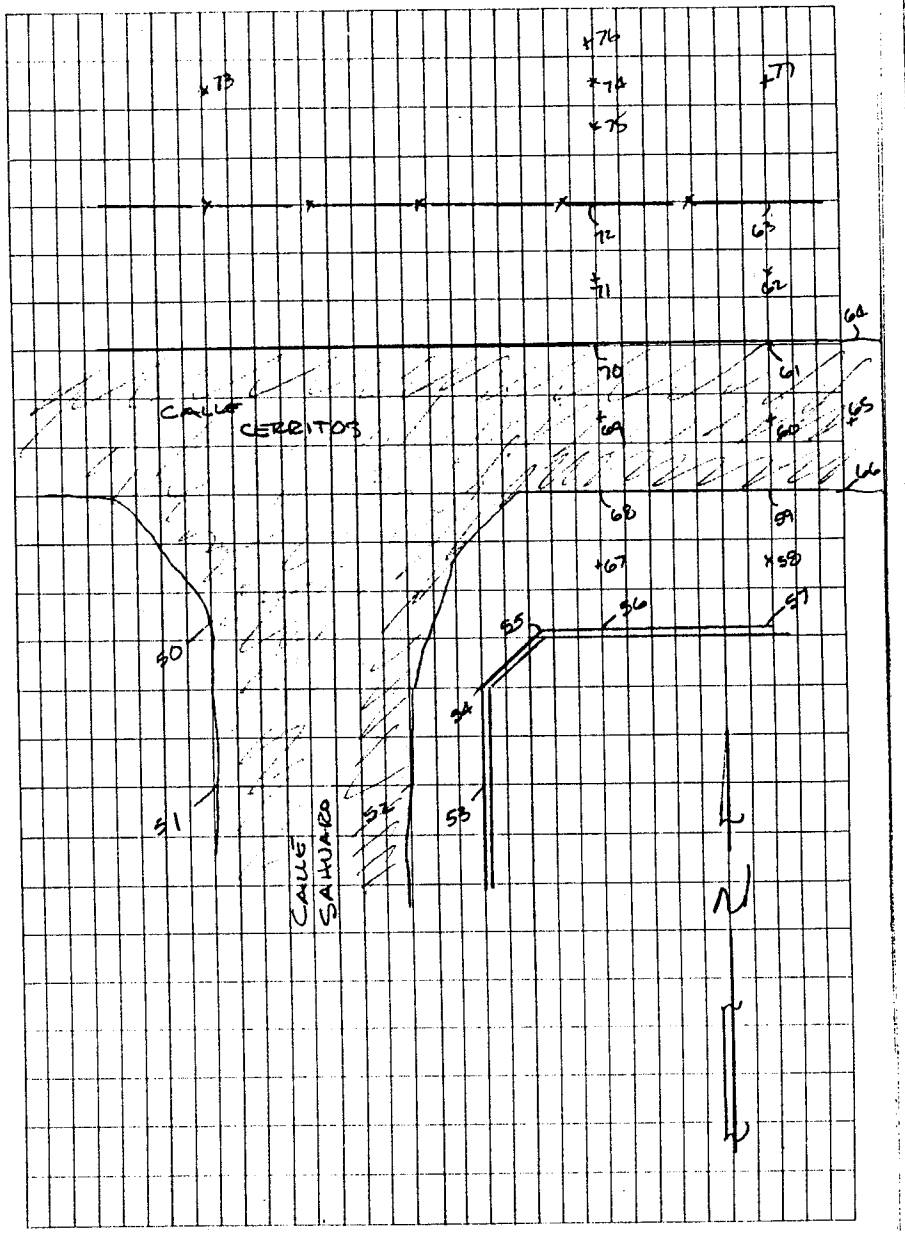
STA	COD	DESC			
190	4.74	NG			
191		"			
192		"			
193		"			
194		"			
195	4.74	NG			
196		"			
197		"			
198		"			
199		"			
200	4.74	NG			
201		"			
202		"			
203		"			
204		"			
205	4.74	NG			
206		"			
207		"			
208		"			
209		"			
210	4.74	NG			
211	4.74	NG			
212	8.74	H.W			
213		H.W			
214		H.W			
215	8.74	H.W			

STA	ROD	DESC			
216	8.74	Conc	W.WALL TOP		
217		"	W.W. TOP @ G.BRK		
218		"	FL @ G.BRK		
219		"	FL @ G.BRK		
220		"	W.W. TOP @ GB		
221	8.74	Conc	W.W. TOP		
222		"	W.W TOP		
223		"	FL		
224		"	FL		
225		"	WWTOP		
226	8.74	Conc	WW TOP		
227		"	FL		
228		"	FL		
229		Conc	WWTOP		
230		RIP RAP			
231	8.74	"			
232		"			
233		"			
234		"			
235		"			
236	8.74	RIP RAP			
237		"			
238		"			
239		"			
240		"			
241	8.74	RIP RAP			

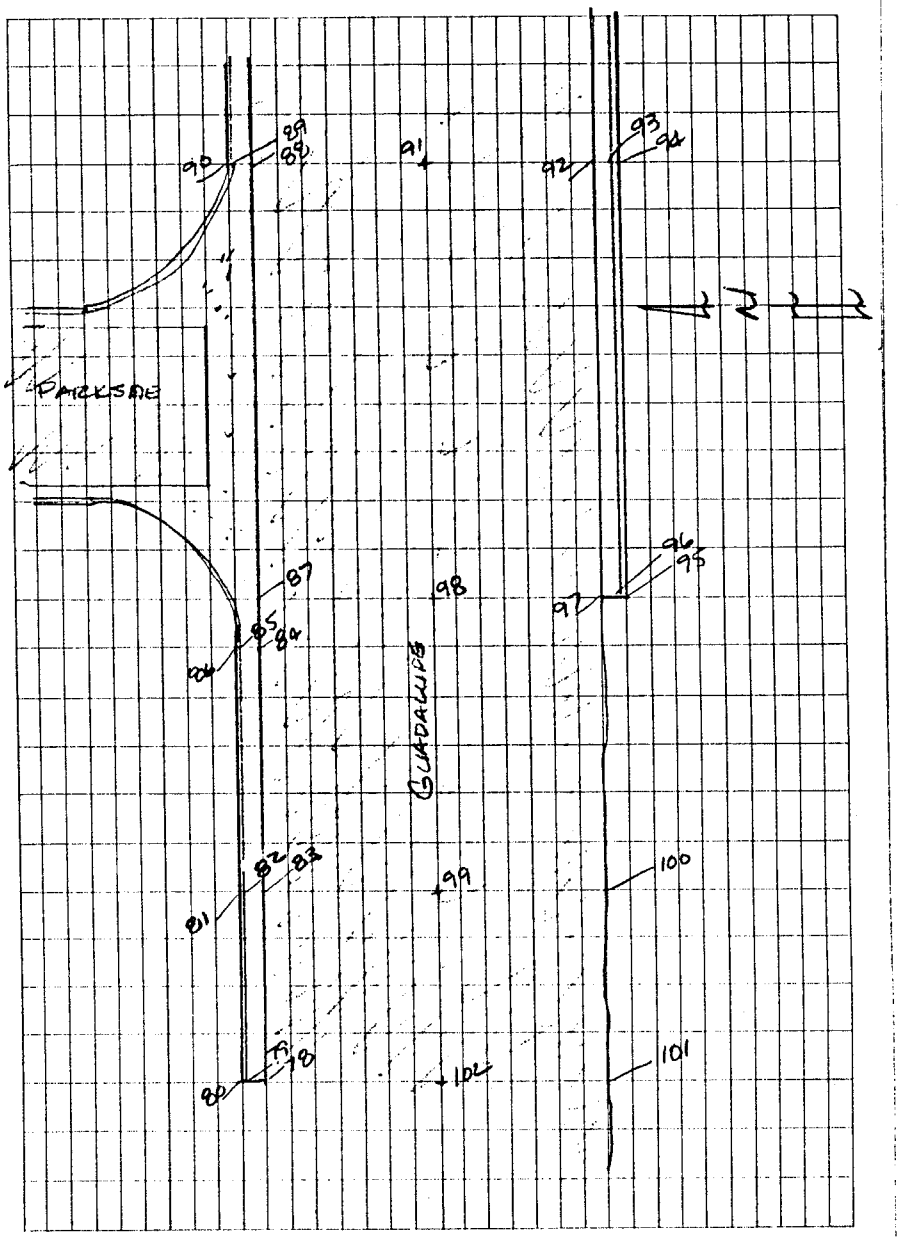
STA	ROD	DESC
242	12.36	RIP RAP
243		"
244		"
245		"
246		"
247	12.36	RIP RAP
248		"
249		"
250		"
251		RIP RAP
252		INV. OF 60" PIPE
253	12.36	BOTTOM DITCH (CANAL)
	POINTS HAND MEASURED & CALCULATED	
254	—	RIP RAP
255	—	RIP RAP
256	—	B.D
257	—	B.D
258	—	B.D
259	—	B.D
260	—	B.D
261	—	B.D
262	—	B.D

STA	ROD	DESC
TP@13	5.40	PK – NEW POINT
BS@10	5.55	PK – SAME AS #3001
50	4.98	EP
51		EP
52		EP
53		WALL
54	4.98	WALL
55		WALL
56		WALL
57		WALL
58	4.98	NG
59		EP
60		P
61		EP
62	4.98	NG
63		FC (4" B WIRE TYP)
64		EP
65		P
66		EP
67	4.98	NG
68		EP
69		P
70		EP
71		NG
72	4.98	FC

3" MASONRY



STA	ROD	DESC
73	4.98	NG
74		NG (HUMP)
75		NG
76		NG
77	4.98	NG
TC@15	5.51	PK SAME AS #2
BS@14	5.41	REBAR SAME AS #1
78	4.98	LIP
79		GUTTER
80		T.C.
81		TC
82	4.98	G
83		L
84		L
85		G
86	4.98	TC
87		L
88		L
89		G
90	4.98	TC
91		P
92		L
93		G
94	4.98	TC



95	498	TC			
96		G			
97		L			
98		P			
99	498	P			
100		EP			
101		EP			
102	498	P			

BS 5.
FS 4.64
5.39

CONTROL FOR TOPO
HIGHLINE CANAL

⊼ @ # 15 BS # 14 w/00-00-00 ∡RT

FS # 16

5.24

2-28-00

MS ⊼
GA ⊘

13

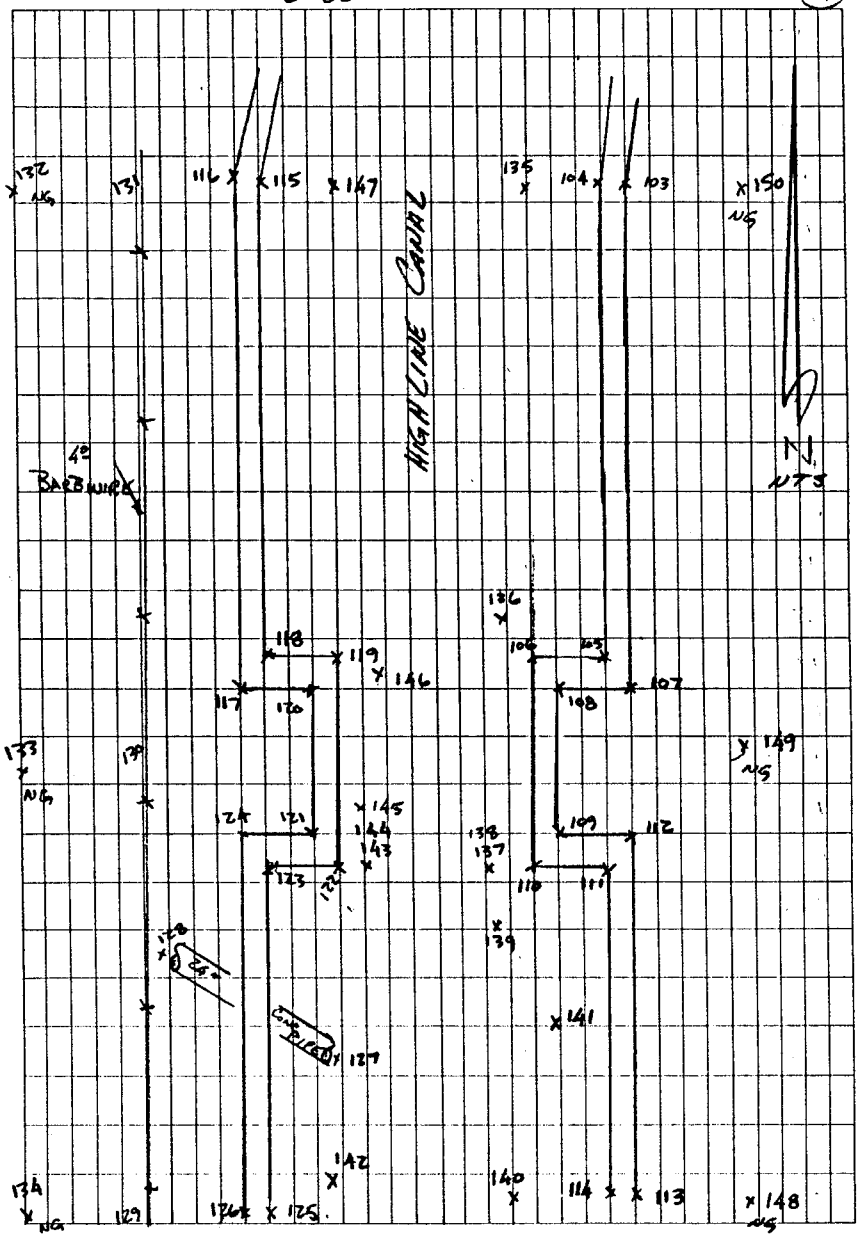
1010 HIGHLINE CANAL

STA	ROD	DESC.
103	4.80	TCD
104		TCD 1
105		TCD 1
106		TCD 1
107		TCD
108		TCD
109		TCD
110		TCD 1
111		TCD 1
112		TCD
113		TCD
114		TCD 1
115		TCD 2
116		TCD 3
117		TCD 3
118		TCD 2
119		TCD 2
120		TCD 3
121		TCD 3
122		TCD 2
123		TCD 2
124		TCD 3
125		TCD 2
126	4.80	TCD 3

MS Ø
GAT

2-28-00

(14)



1010 HIGHLINE CANAL

STA	HR	DESC
127	4.80	INV 24" CONC PIPE
128		" " "
129		FENCE 4e BARBWIRE
130		" " "
131		" " "
132		NG
133		"
134	4.80	"
135	8.41	TOE OF DITCH
136		" " "
137		" " "
138		TOP OF Up "SLOW DOWN FOR WATER"
139		TOE OF DITCH
140		" " "
141		HIGH WATER STAIN
142		TOE OF DITCH
143		" " "
144		SAME AS 138
145		TOE OF DITCH
146		" " "
147	8.41	" " "
148	4.80	NG
149		"
150		"

7-28-00

GAT
MS Ø

2-29-00 W.M. M.S.

STA	PT#	+	-	ELVE	ADJ ELVE
PoB	3000			1225.352	
		4.832			
TP1			7.654	1222.530	
TP2					
	ESTABLISH BM FOR ERM				
PoB	3000			1225.352	1225.352
		4.755			
TP1			5.848	1224.259	
		4.074			
TP2	311		4.686	1223.647	1223.650
		4.709			
TP3			4.096	1224.260	
		5.816			
PoB	3000		4.730	1225.346	

See Pg # 3 Book #7 For D&C. See Pg # 34 Book 1 For ELVE = 1225.352

Bad TP Restart See Above For D&C

FD - "X" in E. cor of PP Base ± 25' w. of Priest EP ± 50' S. of Channel alignment

See This Pg. For Dec. (ELVE = 1225.352)

STA	PT#	+	−	ELVE	ADJ ELVE
POB	311			1223.647	1223.650
		4.763			
TP1			5.329	1223.081	
		4.466			
TP2			3.949	1223.598	
		5.001			
TP3	312		4.300	1224.299	1224.301
		3.226			
TP4			4.129	1223.396	
		5.536			
TP5			5.130	1223.802	
		5.422			
TP6	313		4.688	1224.536	1224.538
		4.324			
TP7			4.605	1224.256	
		4.529			
TP8			4.348	1224.437	
		4.845			
TP9	314		4.477	1224.805	1224.806
		4.626			
TP10	315		3.705	1225.726	1225.726
		3.426			
TP11			4.359	1224.793	
		5.220			

See PS# 15 for Desc. & ELVE

Chisled "□" in S.E. Cor. of PP Base ± 1000' E of Priest on N. Side canall 2 PP. from Priest

Chiled "□" in S.E cor of PP Base (4th PP from Priest) ± 2,300' E. S.E. of Priest on N. Side of canall

Chiled "□" in S.E. cor. of PP Base ± 3000' E. of Priest (6th PP frame Priest) on N. Side channall

Chisled "□" S.E. cor of PP. Base ± 3500 E. of Priest (7th PP frame Priest on N.E. Side of canall 2 PP from Guadalupe)

STA	PT #	+	−	ELVE	ADJ ELVE
TP12			5.056	1224.957	
		5.197			
TP13	2		5.165	1224.989	1224.989
		5.712			
TP14	316		4.839	1225.862	1225.855
		4.235			
TP15			5.483	1224.614	
		5.417			
TP16			4.941	1225.089	
		5.347			
TP17	317		3.893	1226.543	1226.514
		3.801			
TP18			4.826	1225.518	
		5.098			
TP19	318		3.858	1226.758	1226.710
		3.414			
TP20	319		2.827	1227.344	1227.282
		2.854			
TP21	318		3.435	1226.763	
		3.802			
TP22			5.041	1225.524	
		4.858			
TP23	317		3.830	1226.552	
		4.026			

* Coded TP12 as unknown PT2 Bad shoot not PT2

See Pg #1 Book #1 For Dec. See Pg # 35 Book #1 For ELVE = 1224.989

Chisled "□" on S.W. cor of PP Base PP # 14 ± 35' S of Guadalupe (1st PP S. of Guad. Rd on E. Side Channell)

Chisled "□" on S.W. cor of PP Base ± 1100 S. of Guad. on E. Side of channell (3rd PP S. of Guad # 148)

FD-AIE-cap in S.W. cor. of PP Base ± 2200 S. of Guad. on E. Side of channell (4th PP S. of Guad # 149)

See Book #1 Pg # 43 For Dec. & ELVE = 1227.282 * (PT14 = Bnll)

See This Pg.

See This Pg.

STA	PT #	+	−	ELVE	ADJ ELVE
TP24			5.488	1225.090	
		4.723			
TP25			5.204	1224.609	
		5.601			
TP26	316		4.357	1225.852	
		5.480			
TP27	2		6.347	1224.985	

See Pg # 17

See Pg # 17