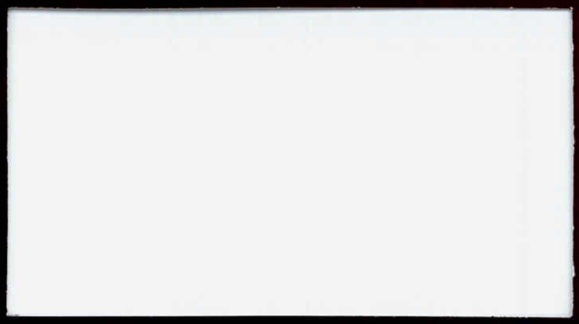

Stantec

OFFSITE HYDROLOGIC ANALYSIS
GENERAL MOTORS SITE AND
ASSOCIATED RAIL SPUR
AT STEAD, NEVADA

APRIL 2002

PREPARED FOR:

LEAR FAMILY TRUST
C/O GRANT THORNTON
100 WEST LIBERTY STREET, SUITE 770
RENO, NEVADA 89504

PROJECT NO. 80100532

Stantec Consulting Inc.
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stantec.com

Stantec

April 8, 2002
Project No. 80100532

Mr. James L. Murphy
LEAR FAMILY TRUST
c/o Grant Thornton
100 West Liberty Street, Suite 770
Reno, Nevada 89504

RE: **Offsite Hydrologic Analysis for the General Motors Site and Associated Rail Spur at Stead, Nevada**

Dear Mr. Murphy:

We are pleased to present the results of the offsite hydrologic analysis for the General Motors site and the proposed railroad spur located in Stead, north of downtown Reno, Nevada.

Introduction

The proposed project consists of a 394,000 square-foot building to be constructed on a 26.55-acre site with approximately 4700 lineal feet of industrial track (UPRR Railroad Extension). The site is located on the northwest corner of Echo Avenue and Moya Boulevard and the rail spur extends approximately from the northeast corner of the existing Michelin building to the northeast corner of the proposed GM site. The proposed improvements are contained in a portion of Section 30, T21N, R19E, MDM. See Figure 1, Vicinity Map.

Stantec previously prepared the report, *Drainage Report for General Motors Site*, dated February 2002, that detailed the onsite hydrologic analysis for the General Motors site.

Buildings

Environment

Industrial

Transportation

Urban Land

Offsite Hydrologic Analysis

In existing conditions, offsite flows from the north cross the GM site in a southwesterly direction. See Figure 2, Offsite Watershed Boundaries. Offsite watersheds were divided into two basins, Basin 1 and Basin 2. Flows from Basin 1 cross the airport property in a southwesterly direction to the east-west runway in the southern portion of the Reno Stead airport. These flows are then diverted west to the end of runway 8/26, then south through Basin 2 and southwesterly toward the GM site.

The Stead Drainage Master Plan (SDMP) was used as the basis for the analysis. The U.S. Army Corps of Engineers (COE) Flood Hydrograph package, HEC-1, Version 4.1 was used to perform the hydrologic modeling for the offsite watershed basins for the developed condition 100-year, 24-hour peak flow rates. Basin areas were delineated on USGS Quad Maps and supplemented with 1-foot contour interval topographic mapping. Precipitation within the HEC-1 program was modeled using a balanced storm distribution (PH card). Precipitation values were obtained from the National Weather Service's Precipitation Frequency Study of the United States, NOAA Atlas 14, Volume 1 – Semi-Arid Southwest United States (SSPFS, 1997). The SCS Curve Number method was used to determine curve number values for use in the hydrologic models. Hydrologic

soil groups for each basin were determined using the SCS Soil survey of Washoe County, Nevada, South Part and land uses were obtained from Washoe County and the City of Reno for full build-out conditions. The Lag time for Basin 1 was taken from the Stead Drainage Master Plan (SDMP). Basin SK3, from the SDMP, was re-delineated into Basin 1 to determine the contributing watershed for the GM site. The longest reach length did not change in the re-delineation. The U.S. Bureau of Reclamation Lag time equation was used to determine the lag time for Basin 1. The Time of Concentration equation was used for Basin 2. Given these parameters, the 100-year, 24-hour peak flow rate that reaches the GM site was found to be Q_{100}=1156 cfs.

Proposed Improvements

The peak discharge reaches the GM site at its northern boundary. Proposed improvements will divert the flow west along the northern site boundary and then south to the existing drainage path where it will sheet flow in a southwesterly direction to Silver Lake. See Figure 3, Hydraulic Work Map. The diversion, which will consist of a combination of berms and channels, will be contained within an easement located on the Airport property, north of the proposed rail spur and GM site and on offsite property to the west. The channel has a 50-foot bottom width with 3:1 side slopes and an approximate longitudinal slope of 0.08%. A minimum of 1-foot of freeboard is required above the 100-year water surface elevation. A minimum freeboard of 1.5-feet has been provided throughout the length of the channel. Velocities in the channel vary from 0.7 to 5.4 feet per second (fps). The channel will be lined with a PolyPavement soil solidifier to aid in preventing wind and water erosion of soils in the channel. This soil treatment was selected over a permanent channel lining due to the low velocities in the channel and that the channel is a temporary drainage structure. Maintenance of the soil treatment will be the responsibility of the owner.

The final design and grading plans for the offsite diversion channel have been prepared in conjunction with this offsite drainage report and are entitled *GM Service Parts Operations Offsite Drainage Diversion Channel* construction plans. The proposed improvements will eliminate the impact of offsite flows to the site and will convey them to their historic flow pattern.

Easement adjustments and utility relocation designs associated with the channel improvements will be provided by others.

A small watershed located northeast of the adjacent existing Michelin site contributes flows to the structure at the existing Michelin rail spur. Currently a triple 36-inch reinforced concrete pipe (RCP) structure conveys flow under the spur. The capacity of the existing triple 36-inch RCP is approximately 240 cfs. A triple 36-inch RCP structure is proposed for the rail extension crossing located just upstream of the Michelin spur and was designed to convey the same capacity as the existing Michelin spur crossing. The proposed RCP's convey approximately 255 cfs. See Figure 4, Rail Spur Culverts Map. The final design of these culverts are shown on the plans entitled *GM Service Parts Operations Rail Road Spur Project* construction plans.

Conclusions

The offsite 100-year, 24-hour peak flow rate contributing to the GM site for full build-out conditions is Q_{100}=1156 cfs. This flow will be diverted around the GM site via a combination of channel and berm improvements. A drainage structure equivalent to the conveyance capacity of the existing culverts located at the east end of the Michelin building will convey flows under the proposed rail spur extension. Final design and grading plans for the proposed improvements have been prepared.

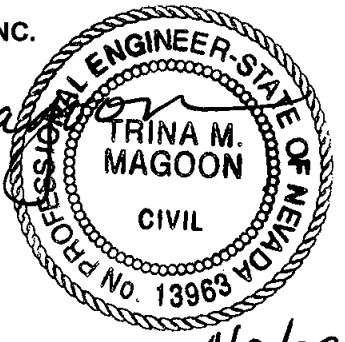
It has been a pleasure to be of service to you on this project. Should you have any questions, please do not hesitate to call.

Sincerely,

STANTEC CONSULTING INC.

Trina Magoon

Trina Magoon, PE
Water Resources Engineer

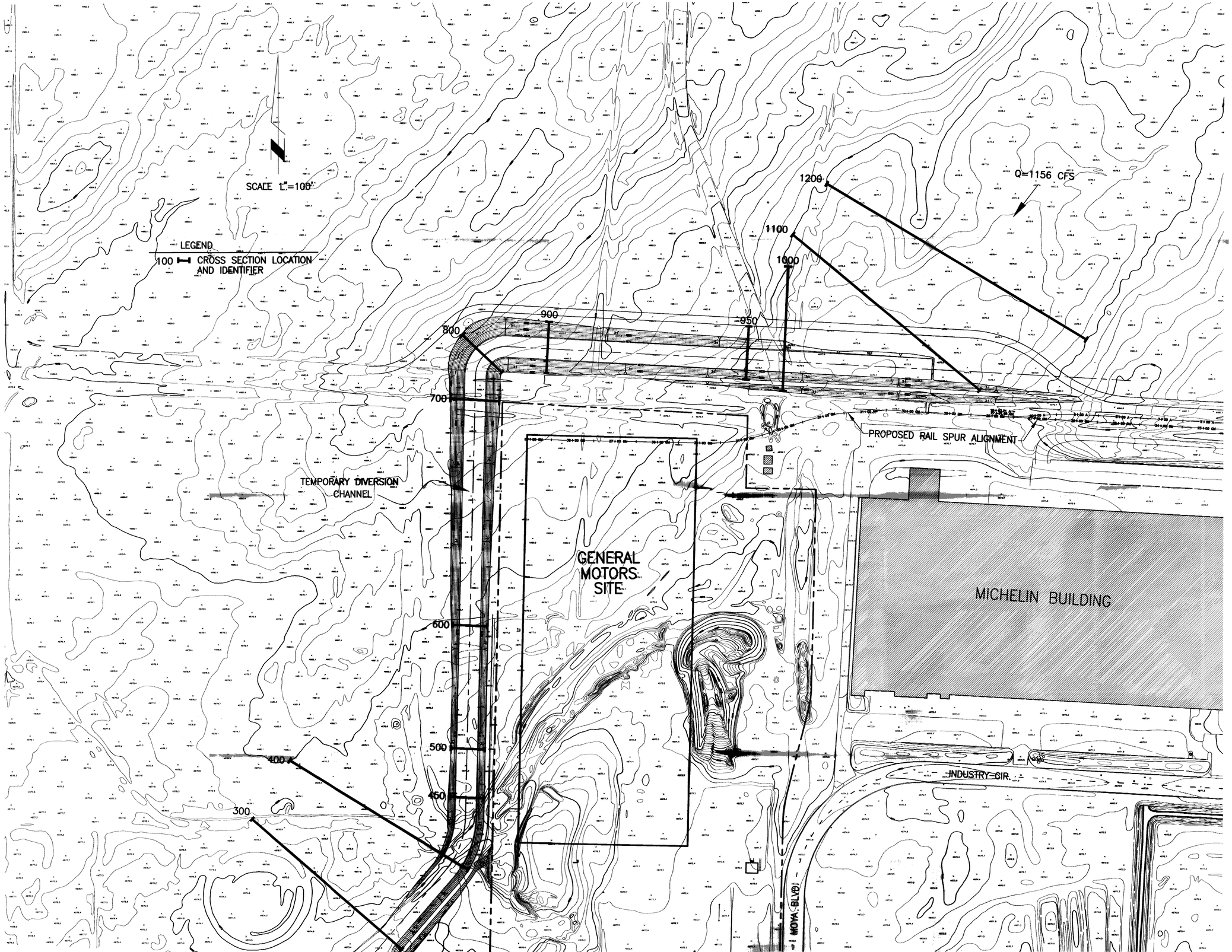


4/8/02

TMM:slp
Enclosures

cc: Mr. John R. Hanson – Prologis

P:\CIVIL\80100532\wpdocs\reports\532-offsitedrainagerpt.doc



P:\CIVIL\80100532\dwg\GM_HYDROLOGY.dwg
2002-04-08 01:26PM By: zbrandner

ORIGINAL SHEET - ARCH D

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Consultants

Legend

Notes

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name:	Dwn.	Chkd.	Dsgn.	YY.MM.DD

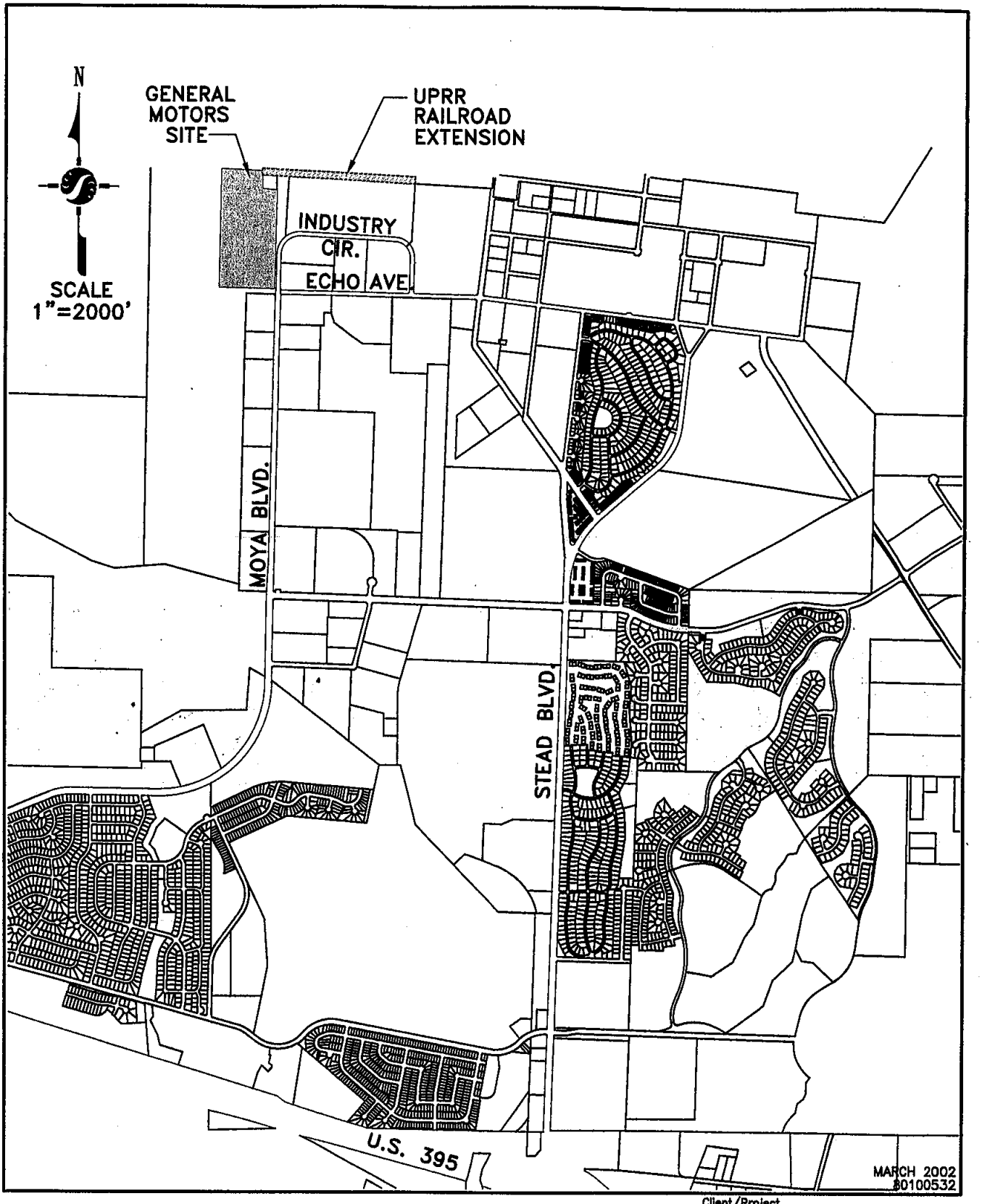
Permit-Seal

Client/Project
LEAR FAMILY TRUST

GM SERVICE PARTS OPERATIONS
OFFSITE DRAINAGE DIVERSION CHANNEL
Stead, NV U.S.A.

Title
HYDRAULIC WORK MAP

Project No.	Scale	
80100532	1"=100'	
Drawing No.	Sheet	Revision
3	of	0



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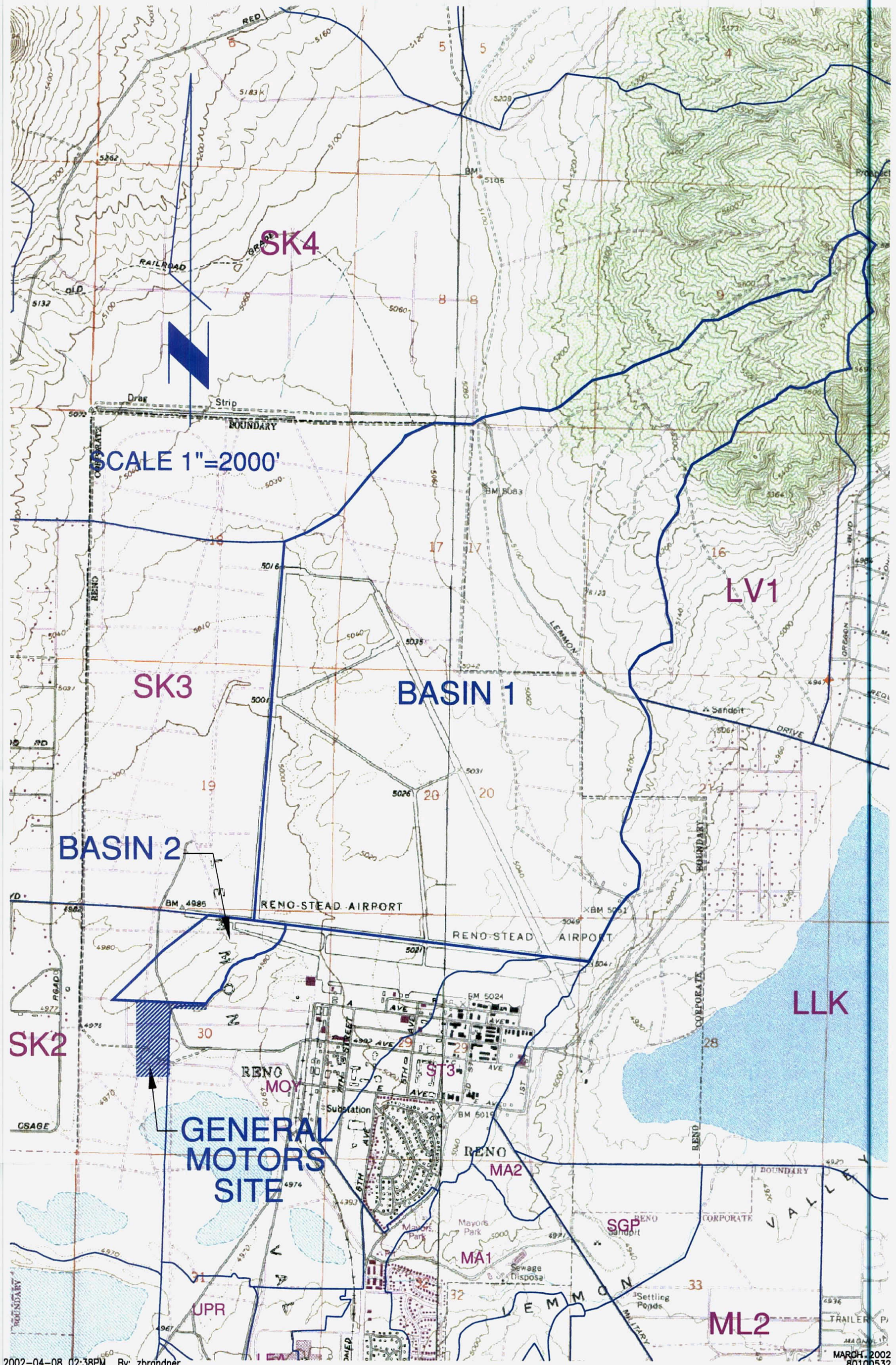
Client/Project
PROLOGIS
GENERAL MOTORS SITE

Figure No.
1.0

Title
VICINITY MAP



2002-04-08 02:38PM By: zbrandner

MARCH, 2002
80100532

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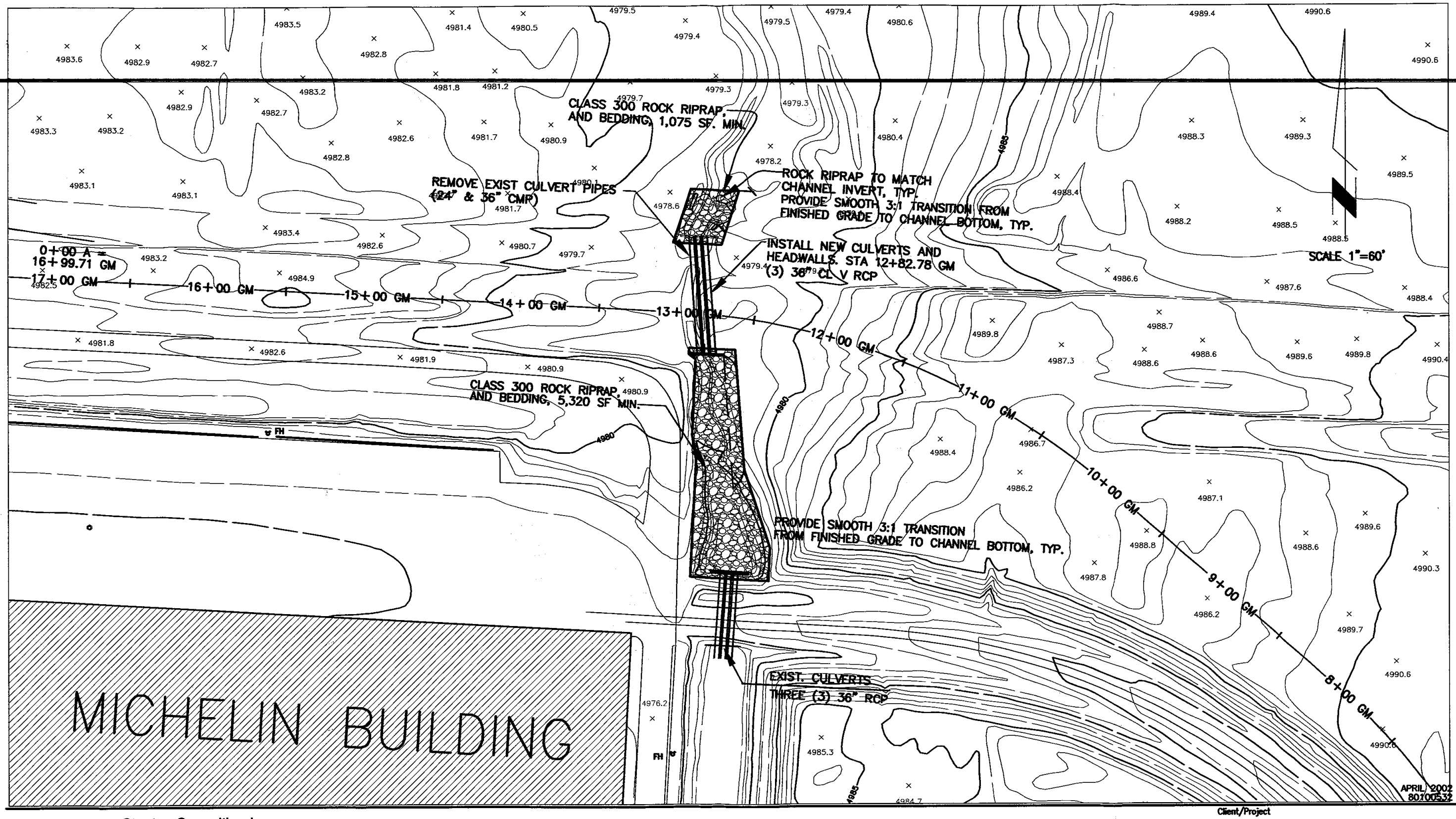
PROLOGIS
GENERAL MOTORS SITE

Figure No.
2.0

Title
OFFSITE WATERSHED BOUNDARIES



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Client/Project
LEAR FAMILY TRUST
GM SERVICE PARTS OPERATIONS
OFFSITE DRAINAGE DIVERSION CHANNEL

Figure No.
4

Title
RAIL SPUR CULVERTS MAP

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   05APR02  TIME  11:39:40   *
*                                       *
*****************************************
```

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

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

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

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


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

              *DIAGRAM
    1         ID       PROLOGIS GM MOTORS SITE
    2         ID
    3         ID       TAKEN FROM:
    4         ID       CITY OF RENO / STEAD DRAINAGE MASTER PLAN HEC-1 MODEL
    5         ID       PREPARED FOR CITY OF RENO, WASHOE COUNTY, NEVADA FEBRUARY 2000
    6         ID
    7         ID       100-YEAR, 24-HOUR EVENT PROPOSED CONDITIONS HYDROLOGIC MODEL
    8         ID       PREPARED BY STANTEC CONSULTING, RENO, NEVADA
    9         ID       JOB # :80100532
   10         ID       FILE NAME: GMOFF100.DAT
   11         ID       DATE:  MARCH 2002
   12         ID     ***************************************************************************
   13         ID       BALANCED STORM DISTRIBUTION (PH CARDS)
   14         ID       RAINFALL DEPTH FROM SSPFS, 1997
   15         ID       SCS CURVE NUMBER METHOD
   16         ID       MUSKINGUM CUNGE ROUTING
   17         ID     ***************************************************************************
   18         IT       5                    1200
   19         IO       5
              *  ***************************************************************************
              *       DEPTH AREA REDUCTION FACTORS
```

```
                 *  ******************************************************************************
                 *      AREA ( SQ. MI.)            DARF
                 *           0 -   2               1.00
                 *         2.1 -   8               0.99
                 *         8.1 -  16               0.98
                 *        16.1 -  29               0.97
                 *        29.1 -  43               0.96
                 *        43.1 -  65               0.95
                 *  ******************************************************************************
      20         JR    PREC    1.00    0.99    0.98    0.97    0.96    0.95
                 * ******************************************************************************
                 *

      21         KK  BASIN1   BASIN 1 (A PORTION OF STEAD DRAINAGE MASTER PLAN BASIN SK3)
      22         BA    3.51
      23         PH           0.001    0.63    1.15    1.91    2.12    2.28    2.61    3.29    3.97
      24         LS              79
      25         UD    1.58

      26         KK   DET 1   DETENTION CREATED BY AIRPORT ACCESS ROAD
      27         RS       1    STOR       0
      28         SA   0.106    0.54    1.06    1.74    2.87    5.06
      29         SE    4983    4984    4985    4986    4987    4988
      30         SQ    4.35   18.09   39.07   64.73  521.69 4390.92

      31         KK   RT B2
      32         RD    2000    .001    .035            TRAP      50      50
1                                                HEC-1 INPUT                                          PAGE  2

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


      33         KK  BASIN2   BASIN 2
      34         BA    .126
      35         PH           0.001    0.63    1.15    1.91    2.12    2.28    2.61    3.29    3.97
      36         LS              77
      37         UD    0.48

      38         KK  CP OFF
      39         HC       2
      40         ZZ
1
            SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   21      BASIN1
               V
               V
   26       DET 1
               V
               V
   31       RT B2
               .
               .
   33          .      BASIN2
               .          .
               .          .
```

```
 38      CP OFF.....

 ***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*                JUN   1998             *
*             VERSION 4.1               *
*                                       *
*    RUN DATE   05APR02  TIME  11:39:40 *
*                                       *
*****************************************

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

                        PROLOGIS GM MOTORS SITE

                        TAKEN FROM:
                        CITY OF RENO / STEAD DRAINAGE MASTER PLAN HEC-1 MODEL
                        PREPARED FOR CITY OF RENO, WASHOE COUNTY, NEVADA FEBRUARY 2000

                        100-YEAR, 24-HOUR EVENT PROPOSED CONDITIONS HYDROLOGIC MODEL
                        PREPARED BY STANTEC CONSULTING, RENO, NEVADA
                        JOB # :80100532
                        FILE NAME: GMOFF100.DAT
                        DATE:  MARCH 2002
                       ************************************************************************
                        BALANCED STORM DISTRIBUTION (PH CARDS)
                        RAINFALL DEPTH FROM SSPFS, 1997
                        SCS CURVE NUMBER METHOD
                        MUSKINGUM CUNGE ROUTING
                       ************************************************************************

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

    IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ       1200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      5   0  ENDING DATE
                    NDTIME       0355  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   99.92 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
```

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .99 .98 .97 .96 .95

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .99	RATIO 3 .98	RATIO 4 .97	RATIO 5 .96	RATIO 6 .95
HYDROGRAPH AT										
	BASIN1	3.51	1	FLOW	1187.	1167.	1146.	1126.	1106.	1086.
				TIME	13.75	13.75	13.75	13.75	13.75	13.75
ROUTED TO										
+	DET 1	3.51	1	FLOW	1188.	1167.	1147.	1126.	1106.	1086.
				TIME	13.75	13.75	13.75	13.75	13.75	13.75
			** PEAK STAGES IN FEET **							
			1	STAGE	4987.17	4987.17	4987.16	4987.16	4987.15	4987.15
				TIME	13.75	13.75	13.75	13.75	13.75	13.75
ROUTED TO										
	RT B2	3.51	1	FLOW	1165.	1145.	1124.	1104.	1084.	1065.
				TIME	13.92	13.92	13.92	14.00	14.00	14.00
HYDROGRAPH AT										
	BASIN2	.13	1	FLOW	95.	93.	91.	90.	88.	86.
				TIME	12.58	12.58	12.58	12.58	12.58	12.58
2 COMBINED AT										
	CP OFF	3.64	1	FLOW	1176.	1156.	1135.	1115.	1095.	1075.
				TIME	13.92	13.92	13.92	13.92	13.92	13.92

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
	RT B2 MANE	5.00	1164.90	835.00	2.09	5.00	1164.90	835.00	2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3918E+03 EXCESS= .0000E+00 OUTFLOW= .3912E+03 BASIN STORAGE= .4318E-07 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00									
	RT B2 MANE	5.00	1144.63	835.00	2.06	5.00	1144.63	835.00	2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3858E+03 EXCESS= .0000E+00 OUTFLOW= .3853E+03 BASIN STORAGE= .4318E-07 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RT B2 MANE	5.00	1124.41	835.00	2.03	5.00	1124.41	835.00	2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3798E+03 EXCESS= .0000E+00 OUTFLOW= .3793E+03 BASIN STORAGE= .4318E-07 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RT B2 MANE	5.00	1104.38	840.00	1.99	5.00	1104.38	840.00	1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3739E+03 EXCESS= .0000E+00 OUTFLOW= .3733E+03 BASIN STORAGE= .4318E-07 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RT B2 MANE	5.00	1084.49	840.00	1.96	5.00	1084.49	840.00	1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3679E+03 EXCESS= .0000E+00 OUTFLOW= .3674E+03 BASIN STORAGE= .4318E-07 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RT B2 MANE	5.00	1064.66	840.00	1.93	5.00	1064.66	840.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3620E+03 EXCESS= .0000E+00 OUTFLOW= .3615E+03 BASIN STORAGE= .4318E-07 PERCENT ERROR= .1

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

STANTEC CONSULTING INC.
950 Industrial Way
Sparks, Nevada 89431
Tel: (775) 358-6931 Fax: (775) 358-6954
Stantec

JOB NO. 80100582

SHEET _____ OF _____

PROJECT GM Motors Offsite Analysis DATE 3/4/02

SUBJECT Offsite Curve Numbers DESIGNED TM CHECKED _____

Basin 1

Public + Semi-Public	32,643,283.71 ft² = 749.39 ac.	33.3%
General Commercial	24,776,948.41 ft² = 568.80 ac	39.2%
Industrial	5,984,115.69 ft² = 137.38 ac	6.1%
Low Density Rural	3,450,148.03 ft² = 79.20 ac	17.6%
Parks + Recreation	3,730,477.75 ft² = 85.64 ac	3.8%
Neighborhood Commercial	13,541,580.96 ft² = 310.87 ac	
General Rural	13,731,668.01 ft² = 315.24 ac	
	✓ 2246.52 ac	100%

Basin 2

Public + Semi Public	1,400,851.38 ft² = 32.16 ac	40%
General Commercial	1,277,780.19 ft² = 29.33 ac	36.4%
General Rural	829,719.79 ft² = 19.05 ac	23.6%
	80.54 ac	100. %

Composite Curve Numbers

Basin 1

A = (33.3)(NA) + (39.2)(89) + (6.1)(81) + (17.6)(46) + (3.8)(45) = 65
B = (33.3)(58.5) + (39.2)(92) + (6.1)(88) + (17.6)(65) + (3.8)(58.5) = 75
C = (33.3)(71.0) + (39.2)(94) + (6.1)(91) + (17.6)(77) + (3.8)(71) = 80
D = (33.3)(77) + (39.2)(95) + (6.1)(93) + (17.6)(82) + (3.8)(77) = 86

Basin 2

A = (40)(45) + (36.4)(89) + (23.6)(45) = 61
B = (40)(58.5) + (36.4)(92) + (23.6)(58.5) = 71
C = (40)(71.0) + (36.4)(94) + (23.6)(71) = 79
D = (40)(77) + (36.4)(95) + (23.6)(77) = 84

Worksheet 2: Runoff curve number

Project: GM Motors Offsite Basin By: TMM Date: 3/4/02

Location: Basin 1 Chk Date:

Mark One Existing Developed X

Runoff curve number (CN)

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connectiod impervious area ratio)	CN 1 per line: Table 2-2	Fig. 2-3	Fig. 2-4	Area Mark 1 acres sq. mi. percent	Product of CN X area
A	39.2% General Commercial, 33.3% Public & Semi Public, 17.6% Low Den. Rural, 6.1% Industrial, 3.8% Parks & Rec.	65			3%	2.14
B	39.2% General Commercial, 33.3% Public & Semi Public, 17.6% Low Den. Rural, 6.1% Industrial, 3.8% Parks & Rec.	75			36%	27.00
C	39.2% General Commercial, 33.3% Public & Semi Public, 17.6% Low Den. Rural, 6.1% Industrial, 3.8% Parks & Rec.	80			37%	29.22
D	39.2% General Commercial, 33.3% Public & Semi Public, 17.6% Low Den. Rural, 6.1% Industrial, 3.8% Parks & Rec.	86			24%	20.80
		Totals =			100%	79.157629

CN (weighted) = (total product) / (total area) = 79.157629 **Use CN = 79**

Worksheet 2: Runoff curve number

Project:	GM Motors Offsite Basin							By:	TMM	Date:
Location:	Basin 2							Chk		Date:
Mark One		Existing		Developed	X					
	Runoff curve number (CN)									

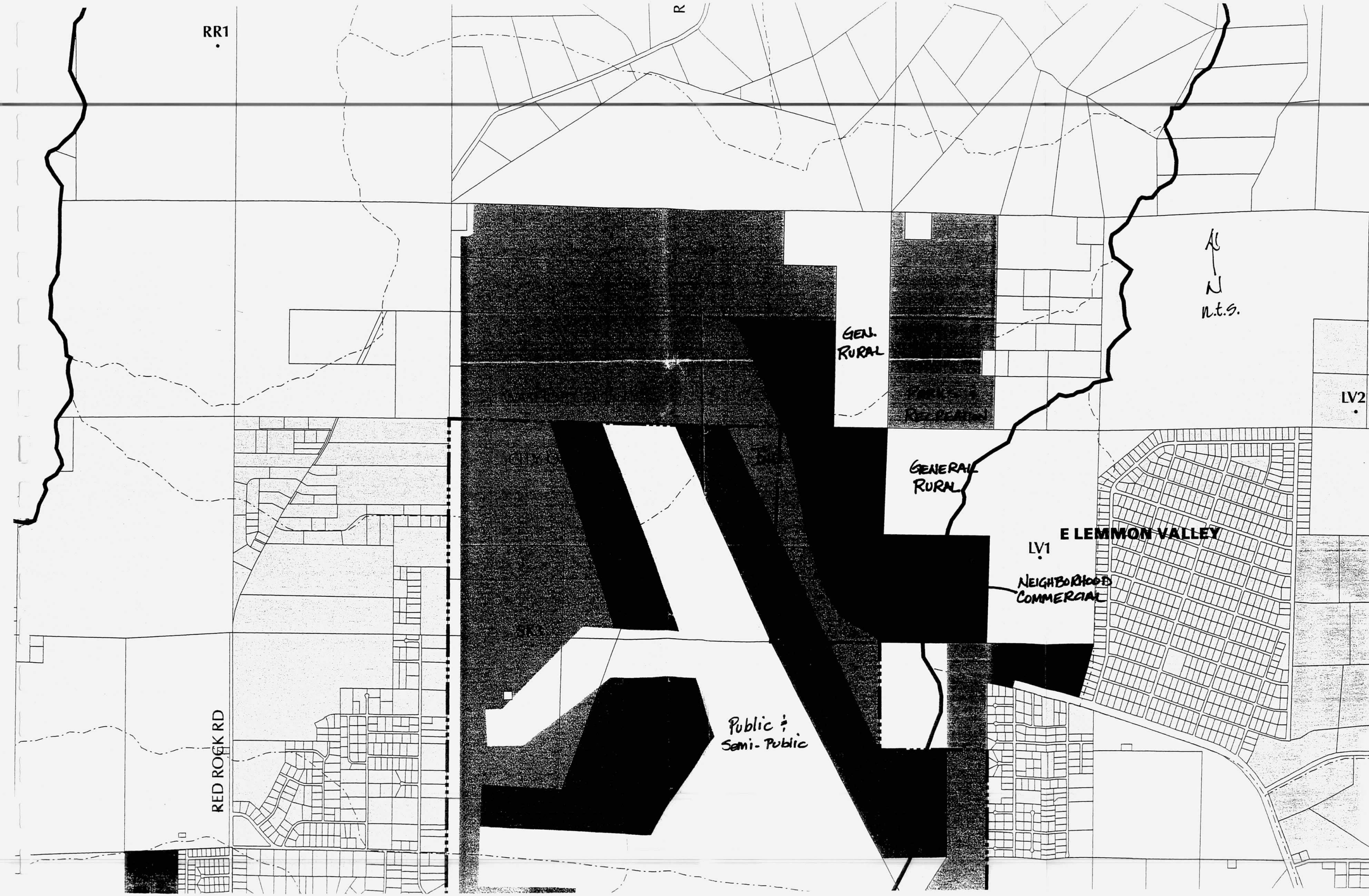
Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connectiod impervious area ratio)	CN 1 per line			Area Mark 1 acres sq. mi. percent
		Table 2-2	Fig. 2-3	Fig. 2-4	
A	40% Public & Semi Public, 36.4% General Commercial	61			3%
	23.6 General Rural				
B	40% Public & Semi Public, 36.4% General Commercial	71			36%
	23.6 General Rural				
C	40% Public & Semi Public, 36.4% General Commercial	79			37%
	23.6 General Rural				
D	40% Public & Semi Public, 36.4% General Commercial	84			24%
	23.6 General Rural				
		Totals =			100%
CN (weighted) = (total product) / (total area) =	76.73699	**Use CN =**			**77**

City of Reno - Stead Master Drainage Study
Proposed Curve Numbers

Basin	Proposed land use	CN designation	% cover by area	% Cover density	Curve number A	B	C	D	Product CN*Area CN*A	CN*B	CN*C	CN*D	% Soil group		Weighted CN	CN
SI2	Public roads	Streets/roads	35	n/a	78.0	81.0	86.0	89.0	27.3	28.4	30.1	31.2				
	General commercial	Business/commercial	2	n/a	89.0	92.0	94.0	95.0	1.8	1.8	1.9	1.9	A	0	0	
	Industrial	Industrial	7	n/a	81.0	88.0	91.0	93.0	5.7	6.2	6.4	6.5	B	4	282	
	Public & semi public\fac	Sagebrush w/grass	19	30		61.0	73.6	79.4	11.6	11.6	14.0	15.1	C	89	7083	
	General rural	Sagebrush w/grass	37	30		61.0	73.6	79.4	22.6	22.6	27.2	29.4	D	7	588	
			100						68.9	70.5	79.6	84.0		100	7953	79.5
SK1	Public roads	Streets/roads	3	n/a	54.0	70.0	80.0	85.0	1.6	2.1	2.4	2.6				
	Residential	1/2 acre residential	3	n/a	54.0	70.0	80.0	85.0	1.6	2.1	2.4	2.6				
	Residential	1 acre residential	25	n/a	51.0	68.0	79.0	84.0	12.8	17.0	19.8	21.0	A	0	11	
	Residential	2 acre residential	5	n/a	46.0	65.0	77.0	82.0	2.3	3.3	3.9	4.1	B	12	747	
	Parks & recreation	Park	4	Fair	49.0	69.0	79.0	84.0	2.0	2.8	3.2	3.4	C	61	4650	
	General rural	Sagebrush w/grass	60	30		61.0	73.6	79.4	36.6	36.6	44.2	47.6	D	27	2168	
			100						56.9	63.8	75.7	81.2		100	7576	75.8
SK2	Public roads	Streets/roads	3	n/a	81.0	88.0	91.0	93.0	2.4	2.6	2.7	2.8				
	Residential	1 acre residential	28	n/a	51.0	68.0	79.0	84.0	14.3	19.0	22.1	23.5				
	Residential	2 acre residential	7	n/a	46.0	65.0	77.0	82.0	3.2	4.6	5.4	5.7	A	0	6	
	Industrial	Industrial	25	n/a	81.0	88.0	91.0	93.0	20.3	22.0	22.8	23.3	B	21	1469	
	Public & semi public\fac	Park	11	Fair	49.0	69.0	79.0	84.0	5.4	7.6	8.7	9.2	C	32	2554	
	General rural	Sagebrush w/grass	26	30		61.0	73.6	79.4	15.9	15.9	19.1	20.6	D	48	4071	
			100						61.4	71.7	80.8	85.2		100	8101	81.0
SK3	Public roads	Streets/roads	1	n/a	81.0	88.0	91.0	93.0	0.8	0.9	0.9	0.9				
	Residential	1 acre residential	15	n/a	51.0	68.0	79.0	84.0	7.7	10.2	11.9	12.6				
	Residential	2 acre residential	1	n/a	46.0	65.0	77.0	82.0	0.5	0.7	0.8	0.8				
	General commercial	Business/commercial	18	n/a	89.0	92.0	94.0	95.0	16.0	16.6	16.9	17.1				
	Industrial	Industrial	14	n/a	81.0	88.0	91.0	93.0	11.3	12.3	12.7	13.0	A	2	99	
	Public & semi public\fac	Sagebrush w/grass	18	35		58.5	71.0	77.0	10.5	10.5	12.8	13.9	B	22	1557	
	Parks & recreation	Sagebrush w/grass	3	35		58.5	71.0	77.0	1.8	1.8	2.1	2.3	C	50	3937	
	General rural	Sagebrush w/grass	30	35		58.5	71.0	77.0	17.6	17.6	21.3	23.1	D	27	2245	
			100						66.1	70.4	79.4	83.8		100	7838	78.4
SK4	Residential	1 acre residential	7	n/a	51.0	68.0	79.0	84.0	3.6	4.8	5.5	5.9				
	General commercial	Business/commercial	4	n/a	89.0	92.0	94.0	95.0	3.6	3.7	3.8	3.8				
	Industrial	Industrial	29	n/a	81.0	88.0	91.0	93.0	23.5	25.5	26.4	27.0	A	1	85	
	Public & semi public\fac	Sagebrush w/grass	3	35		58.5	71.0	77.0	1.8	1.8	2.1	2.3	B	25	1706	
	Parks & recreation	Sagebrush w/grass	6	35		58.5	71.0	77.0	3.5	3.5	4.3	4.6	C	47	3670	
	General rural	Sagebrush w/grass	51	35		58.5	71.0	77.0	29.8	29.8	36.2	39.3	D	27	2246	
			100						65.7	69.1	78.3	82.9		100	7707	77.1

US BUREAU OF RECLAMATION METHOD

BASIN	K_n	L (ft)	L_c (ft)	EL_{hi}	EL_{lo}	S (ft/mi)	T_{LAG}
PA6		1010		5244	5191.6	274	0.00
PA7		2675		5242	5146	189	0.00
PAT	0.085	12035	5680	5640	4917	317	0.98
PE1a	0.09	1870	805	5680	5290	1101	0.24
PE1b	0.09	2665	1090	5850	5295.7	1098	0.30
PE2	0.09	6815	3475	6380	5292.7	842	0.62
PE3	0.09	2655	1045	5800	5281.8	1031	0.30
PE4	0.09	12950	5025	6462	5085	561	0.93
PE5	0.09	22110	12080	7250	5229.6	482	1.51
PE6	0.09	2935	1025	5440	5222.3	392	0.36
PE7	0.09	13600	6605	6330	5217.4	432	1.08
PH1	0.09	2830	1230	5480	5192.1	537	0.35
PW1	0.09	7400	3000	6650	5312	955	0.59
PW2	0.09	5235	2300	6269	5220	1058	0.48
PW3	0.09	12670	6830	7480	5084	998	0.92
PW4	0.09	13010	6130	8135	5067	1245	0.87
PW5	0.09	16300	11625	8266	5094	1027	1.19
PW6	0.09	17660	8360	8250	5105	940	1.11
PW7	0.09	18985	11595	8170	5316.5	794	1.31
RH1	0.09	7625	2855	5580	5114	323	0.71
RR1	0.09	25725	9905	6423	5128	266	1.64
RRI		1610		5130	5086.9	141	0.00
RSD		2680		5194	5088	209	0.00
SE1		3380		5130	5059	111	0.00
SE2		2160		5115	5064	125	0.00
SE3		1940		5080	5028	142	0.00
SE4		1690		5030	4996	106	0.00
SGP		3620		4982	4928	79	0.00
SI1		1855		5170	5107	179	0.00
SI2		1055		5162	5104	290	0.00
SK1	0.09	10655	4110	5720	4970	372	0.87
SK2	0.09	18095	7060	5700	4960	216	1.35
SK3	0.09	22765	8945	5896	4980	212	1.58
SK4	0.09	21940	6045	6030	5017	244	1.34
SLE		3985		5198	5100	130	0.00
SLK		4100		5000	4960	52	0.00
SL1		1255		5236	5133	433	0.00
SL2		2625		5236	5112	249	0.00
SL3a		3320		5162	5003.5	252	0.00
SL3b		3885		5129	4978	205	0.00
SRS		3215		5223	5112.7	181	0.00
SS1a		2035		5224	5106	306	0.00
SS1b		700		5184	5122	468	0.00
SS2		3980		5168	5044	165	0.00
SS3		5075		5060	4978	85	0.00
ST1		4200		5164	5076	111	0.00


RR1
R
N
n.t.s.
GEN. RURAL
LV2
GENERAL RURAL
E LEMMON VALLEY
LV1
NEIGHBORHOOD COMMERCIAL
Public & Semi-Public
RED ROCK RD

STANTEC CONSULTING INC.
950 Industrial Way
Sparks, Nevada 89431
Tel: (775) 358-6931 Fax: (775) 358-6954
Stantec

JOB NO. _____

SHEET _____ OF _____

PROJECT Lag time DATE _____

SUBJECT _____ DESIGNED _____ CHECKED _____

$L = 2032'$

$\Delta E = 90 - 75 = 15'$

$S = .0074$ or 0.74%

$t_c = t_i + t_t$

$$t_i = \frac{1.8(1.1 - R)L_o^{1/2}}{S^{1/3}}$$

$R = 0.0132CN - 0.39 = .0132(77) - 0.39 = 0.63$

$L_o = 225'$

$S = 90 - 87/225 = 0.013 = 1.3\%$

$$t_i = \frac{1.8(1.1 - 0.63)(225)^{1/2}}{(1.3)^{1/3}} = 11.63 \text{ min}$$

$$t_t = \frac{L}{V(60)} = \frac{1807}{(.83)(60)} = 36.29 \text{ min}$$

$S = .0066$

$t_c = 11.63 + 36.29 = 47.92$

$LAG = 0.6(t_c) = 28.75/60 = 0.48 \text{ hr}$

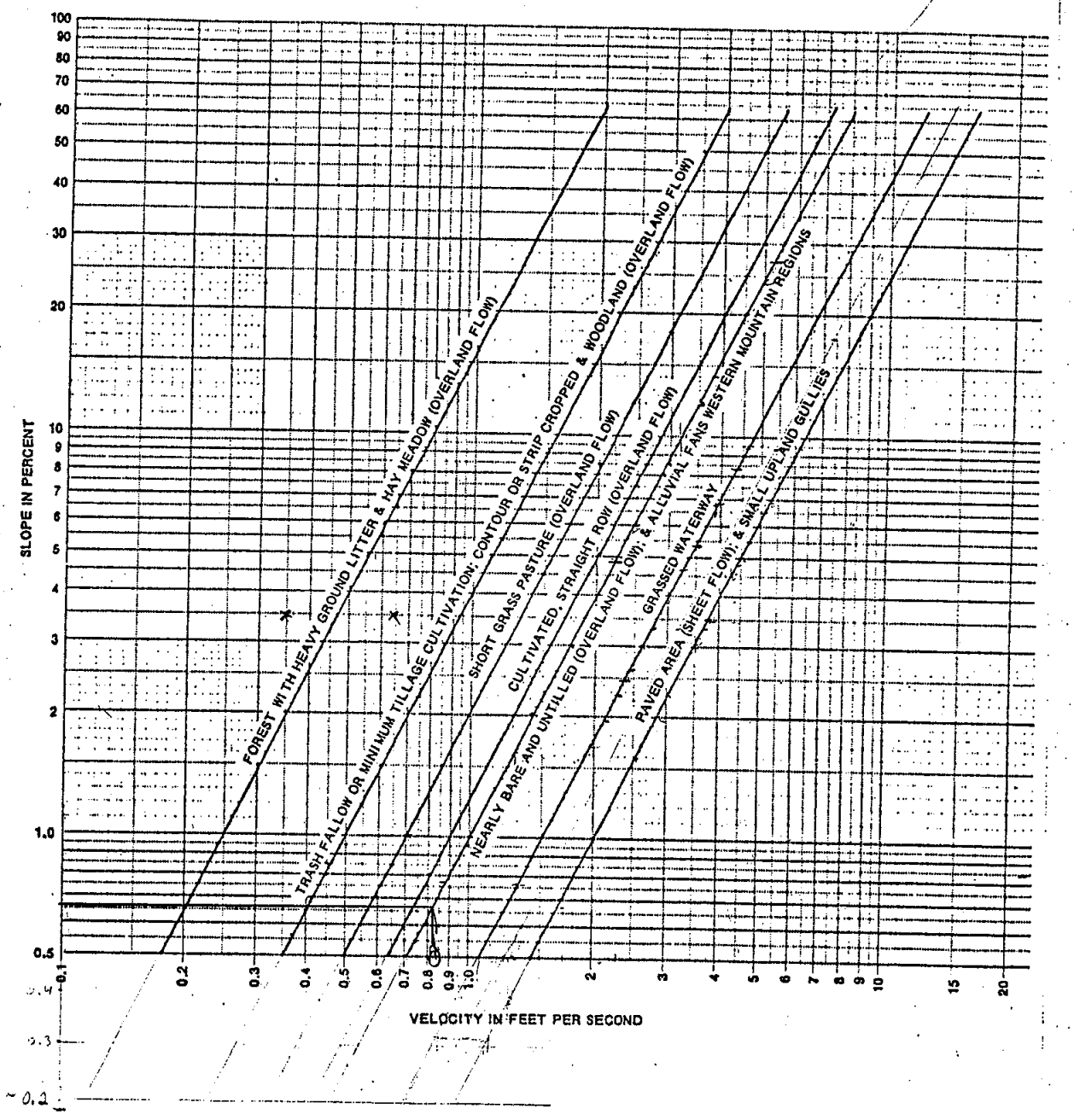


Figure 15.2.--Velocities for upland method of estimating T_c.

ELEV	AREA (sq ft)	VOL. (cu.ft)	CUM VOL (cu.ft)	OUTFLOW (cfs) PIPE	WEIR	TOTAL (cfs)
4983	4599.7	0	0	4.35	0	4.35
4984	23579.10	14089.4	14089.4	18.09	0	18.09
4985	46315.51	34947.3	49036.7	39.07	0	39.07
4986	75813.60	61064.6	110101.3	64.73	0	64.73
4987	125188.51	100501.1	210602.4	91.99	429.7	521.69
4988	220334.07	172761.3	383363.7	113.12	4277.8	4390.92
4989	355043.74	287688.9	671052.6	129.48	12247.8	12377.28

Checked by:

Designed by:

Stantec

Culvert Calculator Report
EXISTING CULVERTS

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	4,976.20	ft	Headwater Depth/ Height	2.35	
Computed Headwater Elevation	4,976.20	ft	Discharge	238.82	cfs
Inlet Control HW Elev	4,976.20	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev	4,975.44	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	4,969.15	ft	Downstream Invert	4,968.90	ft
Length	48.00	ft	Constructed Slope	0.005208	ft/ft

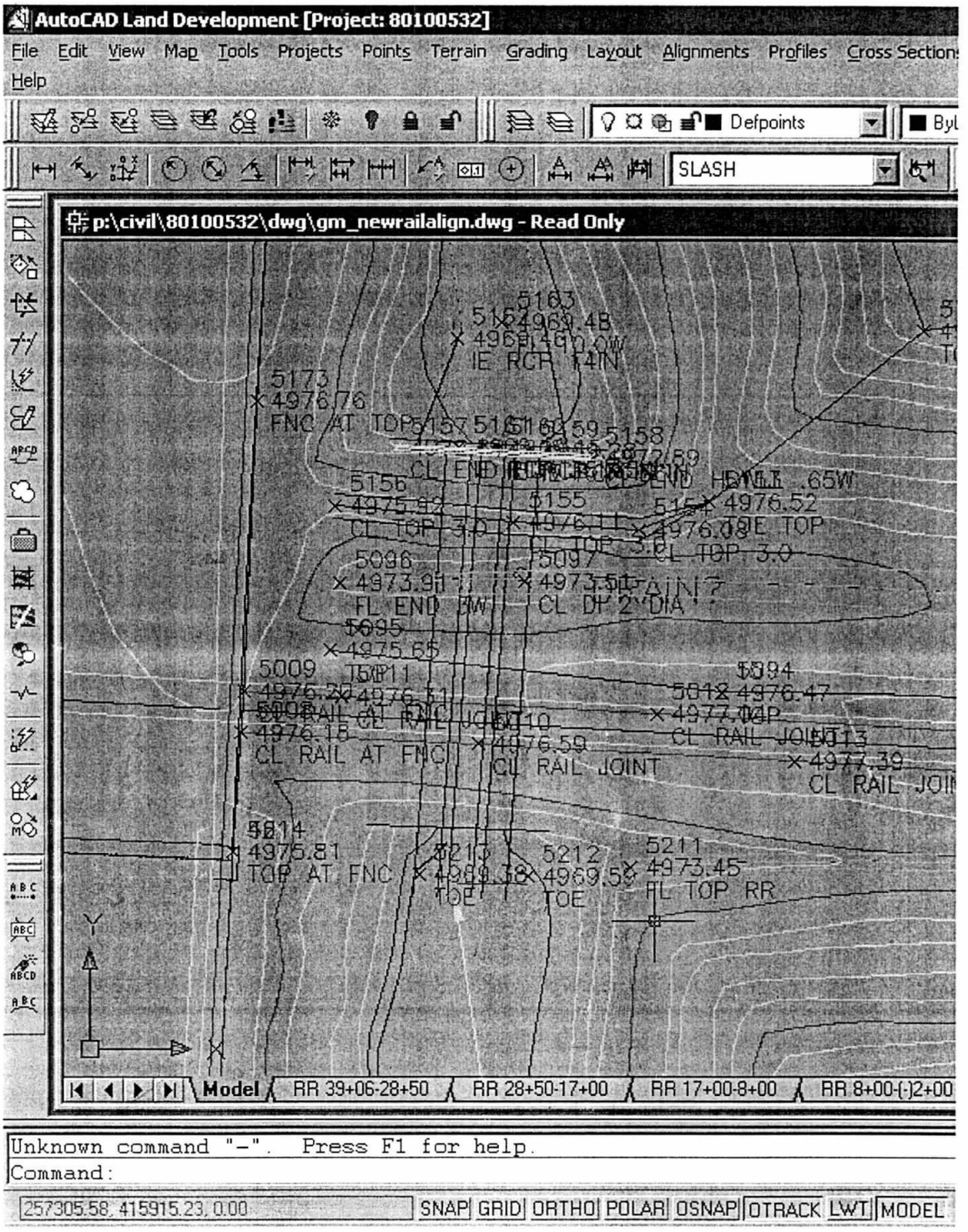
Hydraulic Profile					
Profile	CompositeM2Pressure		Depth, Downstream	2.77	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.77	ft
Velocity Downstream	11.68	ft/s	Critical Slope	0.012355	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev	4,975.44	ft	Upstream Velocity Head	1.97	ft
Ke	0.50		Entrance Loss	0.99	ft

Inlet Control Properties					
Inlet Control HW Elev	4,976.20	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	21.2	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

© Haestad Methods, Inc.
Stantech Consulting Inc.
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666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Help
Defpoints
SLASH
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4976.76
FNC AT TOP
5156
5155
4976.52
TOE TOP
5096
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FL END BW
5095
4975.65
5009
4976.18
CL RAIL AT FNC
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CL RAIL JOINT
4977.39
4975.81
TOP AT FNC
5212
4969.59
TOE
5211
4973.45
FL TOP RR
Model
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RR 17+00-8+00
RR 8+00-(-)2+00
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SNAP GRID ORTHO POLAR OSNAP OTRACK LWT MODEL

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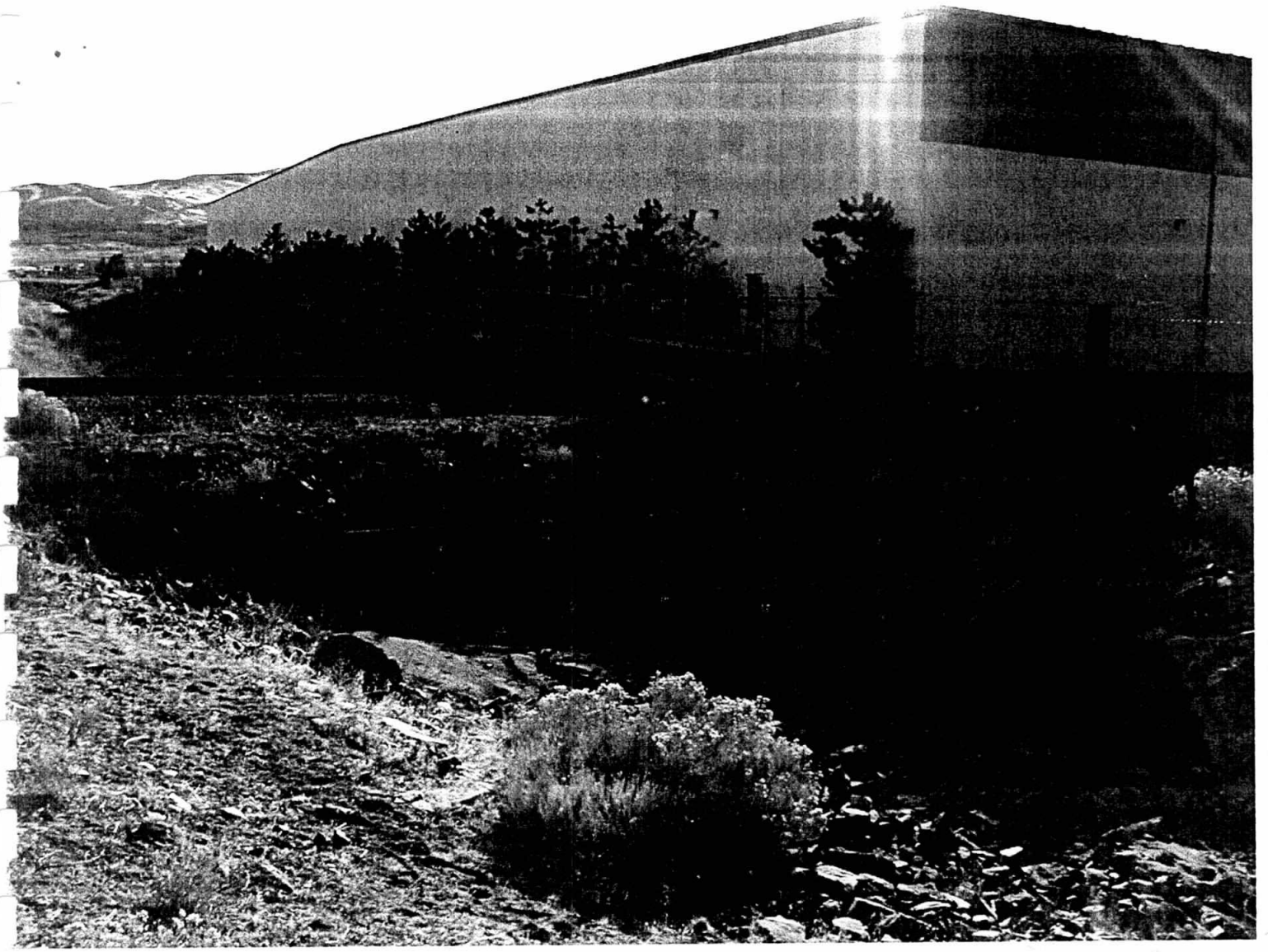
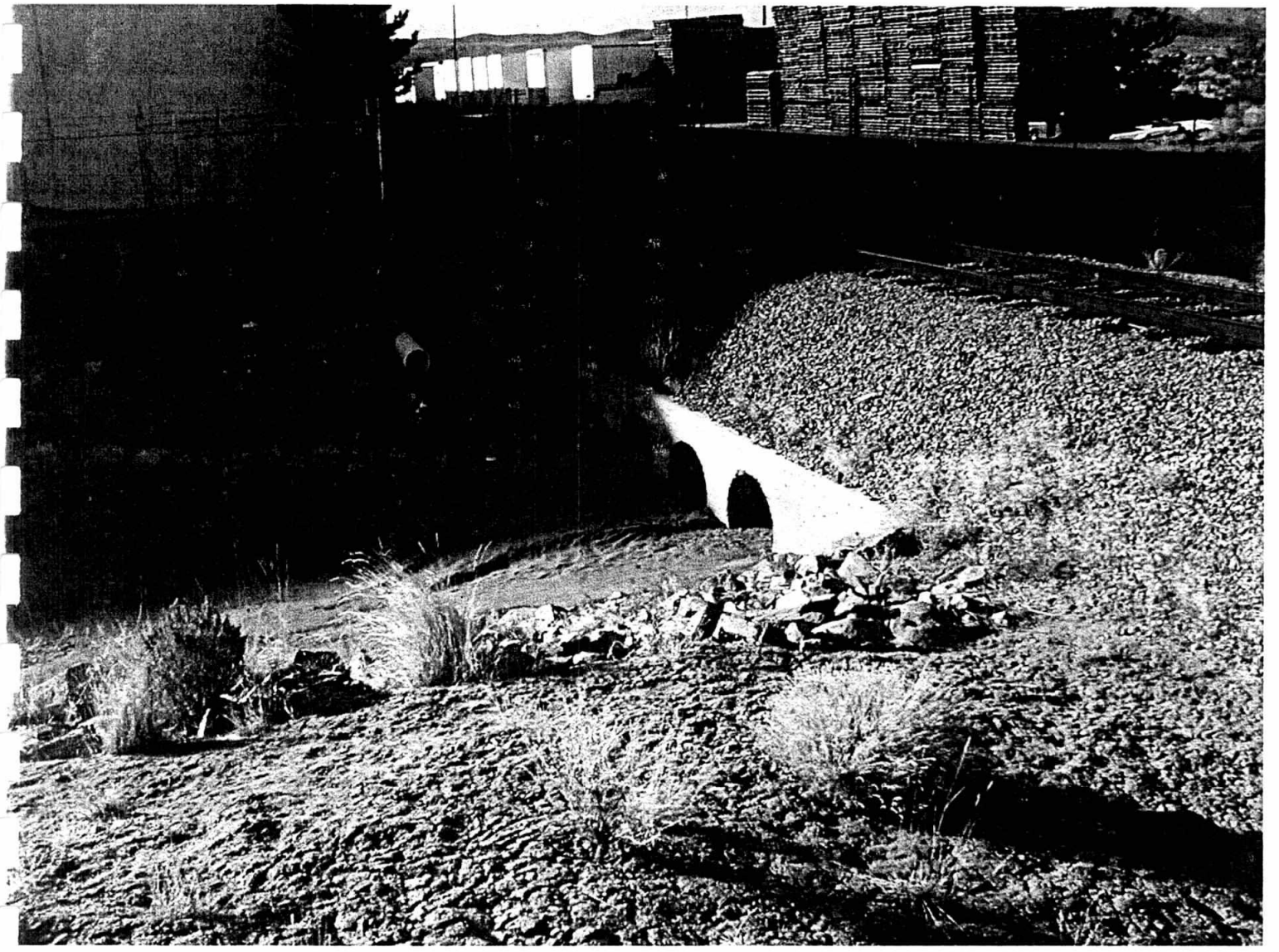
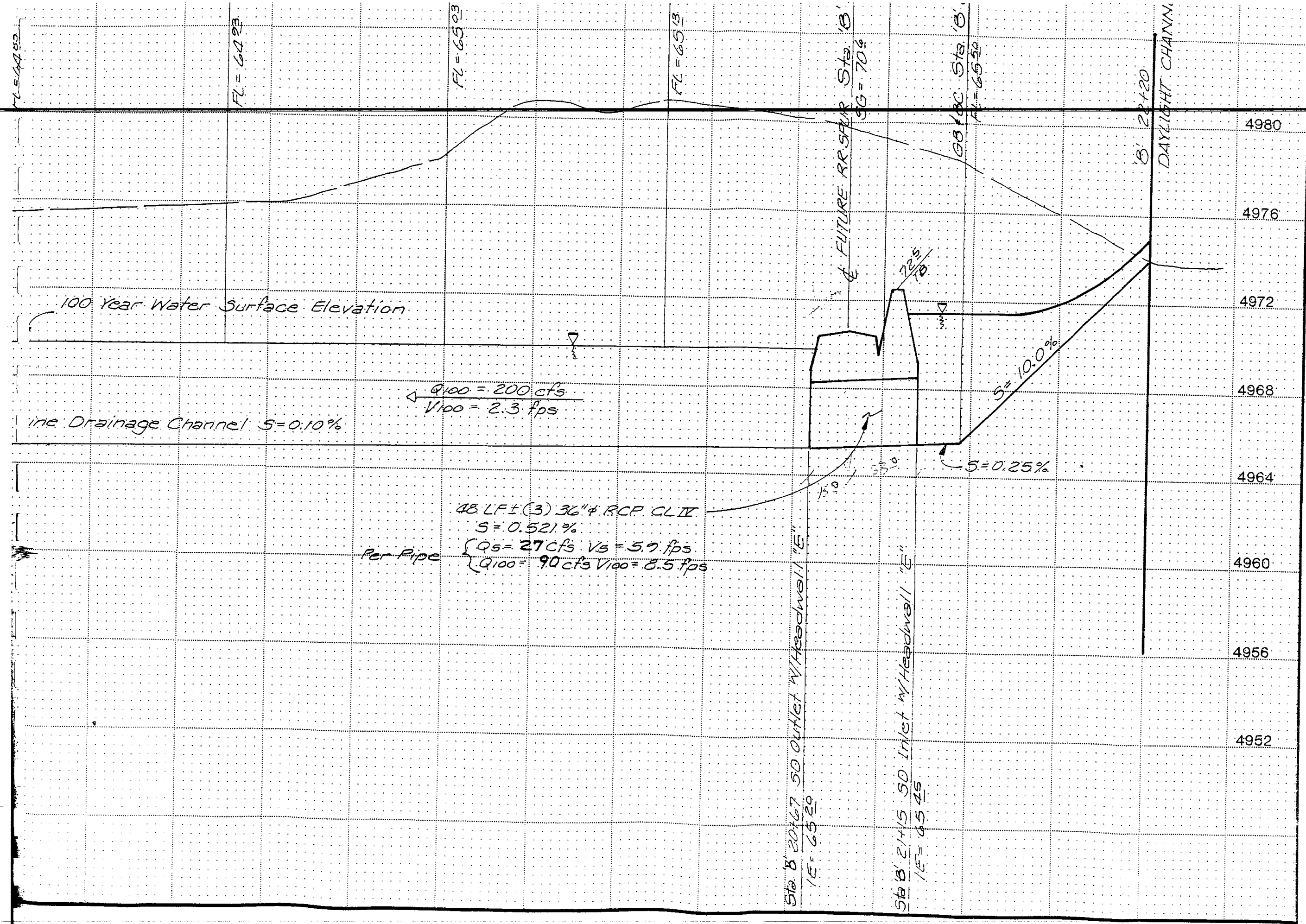






DRAINAGE CHANNEL "B"

SILVER LAKE BUSINESS CENTER PH
A DEVELOPMENT OF DERMODY PRO

RENO

JOB NO.	127-14-2
DESIGNED	LRV/WHW
DRAWN	HP-1000A/
COMP.	
CHECKED	
DATE	JULY 1991

P-9

11 OF SHEET

UTILITY COMPANIES' CERTIFICATE

The utility easements shown on this plat have been checked, accepted and approved by the undersigned utility companies.

John Green — 6-14-91
SIERRA PACIFIC POWER COMPANY — DATE

R. M. Rich — 6-18-91
NEVADA BELL — DATE

Patrick K. McGuire — 6-17-91
TCI CABLEVISION OF NEVADA, INC. — DATE

Maxine R. Zimmerman — 7-16-91
SILVER LAKE WATER DISTRIBUTION CO. — DATE

PARCEL MAP COMMITTEE CERTIFICATE

Approved and accepted by the Parcel Map Committee of the City of Reno, Washoe County, Nevada, this _____ day of _____, 1991. Conditional approval of this map was granted by the Parcel Map Committee on the _____ day of _____, 1991. Dedication of Moya Boulevard, Echo Avenue and Industry Circle is rejected by the City Council on this ____ day of _____, 1991, with the offer to remain open in accordance with the provisions of NRS Chapter 278.

_____ _____
CHAIRMAN, PARCEL MAP COMMITTEE — DATE

FILE NO. _____

FEE: _____

FILED FOR RECORD AT THE REQUEST OF _____

ON THIS _____ DAY OF _____ 1991, AT _____ MINUTES PAST _____ O'CLOCK, __.M., OFFICIAL RECORDS OF WASHOE COUNTY, NEVADA.

_____
COUNTY RECORDER

AMENDED PARCEL MAP #2494 FOR

DERMODY PROPERTIES

POR. S1/2 SEC. 30 & N1/2 SEC. 31., T21N, R19E, MDM
A DIVISION OF PARCEL C OF PARCEL MAP No. 2404, AND
A DIVISION OF PARCEL 2 OF PARCEL MAP No. 1726

RENO — WASHOE COUNTY — NEVADA

sea incorporated
CONSULTING ENGINEERS
SPARKS, NEVADA
LAS VEGAS, NEVADA
PHOENIX, ARIZONA

JOB NO.	127-16-1
DESIGNED	K.L.H.
DRAWN	HP 1000A
COMP.	KH 5-31-91
CHECKED	
DATE	APRIL 1991

Culvert Calculator Report
PROPOSED CULVERTS

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	4,984.52	ft	Headwater Depth/ Height	2.57	
Computed Headwater Elevation	4,984.52	ft	Discharge	254.44	cfs
Inlet Control HW Elev	4,984.52	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev	4,983.25	ft	Control Type	Inlet Control	

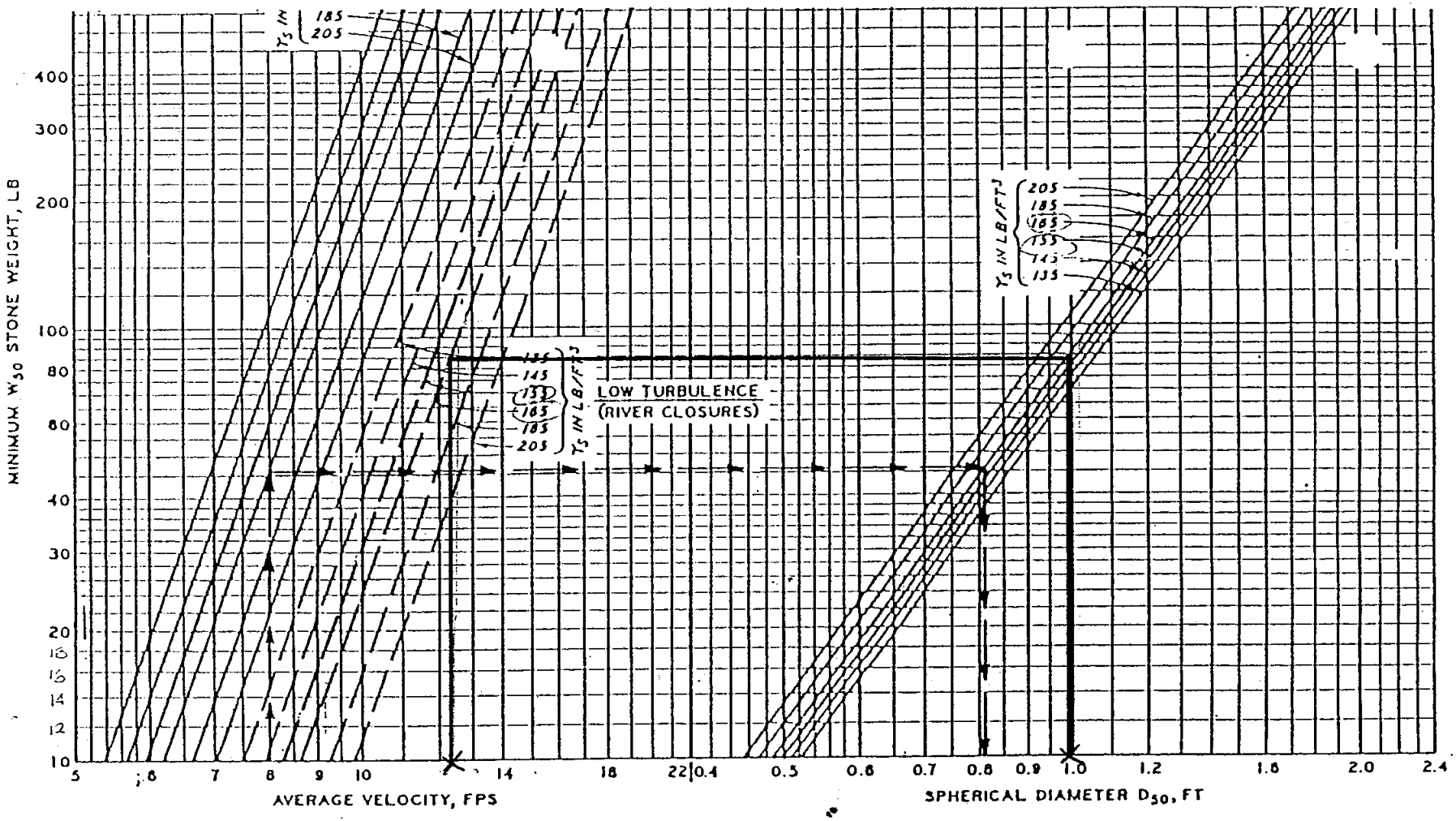
Grades					
Upstream Invert	4,976.80	ft	Downstream Invert	4,975.80	ft
Length	76.00	ft	Constructed Slope	0.013158	ft/ft

Hydraulic Profile					
Profile	CompositeM2Pressure		Depth, Downstream	2.81	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.81	ft
Velocity Downstream	12.32	ft/s	Critical Slope	0.013975	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev	4,983.25	ft	Upstream Velocity Head	2.24	ft
Ke	0.50		Entrance Loss	1.12	ft

Inlet Control Properties					
Inlet Control HW Elev	4,984.52	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	21.2	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				



BASIC EQUATIONS

$$V = C\left[2g\left(\frac{\gamma_s - \gamma_w}{\gamma_w}\right)\right]^{1/2}(D_{50})^{1/2}$$

$$D_{50} = \left(\frac{6W_{50}}{\pi\gamma_s}\right)^{1/3}$$

WHERE:
- V = VELOCITY, FPS
- γ_s = SPECIFIC STONE WEIGHT, LB/FT^3
- γ_w = SPECIFIC WEIGHT OF WATER, 62.5 LB/FT^3
- W_{50} = WEIGHT OF STONE. SUBSCRIPT DENOTES PERCENT OF TOTAL WEIGHT OF MATERIAL CONTAINING STONE OF LESS WEIGHT.
- D_{50} = SPHERICAL DIAMETER OF STONE HAVING THE SAME WEIGHT AS W_{50}
- C = ISBASH CONSTANT (0.86 FOR HIGH TURBULENCE LEVEL FLOW AND 1.20 FOR LOW TURBULENCE LEVEL FLOW)
- g = ACCELERATION OF GRAVITY, FT/SEC^2

STONE STABILITY
VELOCITY VS STONE DIAMETER

HYDRAULIC DESIGN CHART 712-1
(SHEET 1 OF 2)

REV 8-58, 9-70 WES 8-57

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
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PROJECT DATA
Project Title: GM OFFSITE DITCH
Project File : GMOFFSITE.prj
Run Date and Time: 4/3/2002 11:09:45 AM

Project in English units

PLAN DATA

Plan Title: Plan 10
Plan File : p:\CIVIL\80100532\HEC-RAS\GMOFFSITE.p10

Geometry Title: GM OFFSITE DITCH (ADJUSTED BERM)
Geometry File : p:\CIVIL\80100532\HEC-RAS\GMOFFSITE.g03

Flow Title : GM OFFSITE
Flow File : p:\CIVIL\80100532\HEC-RAS\GMOFFSITE.f01

Plan Summary Information:

Number of:	Cross Sections	= 12	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

Water surface calculation tolerance	= 0.003
Critical depth calculaton tolerance	= 0.003
Maximum number of interations	= 20
Maximum difference tolerance	= 0.1
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed at all cross sections
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: GM OFFSITE
Flow File : p:\CIVIL\80100532\HEC-RAS\GMOFFSITE.f01

Flow Data (cfs)

River	Reach	RS	PF 1
TEMP DITCH	GM SITE	1200	1156

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
TEMP DITCH	GM SITE	PF 1	Normal S = .0008	Normal S = .0008

GEOMETRY DATA

Geometry Title: GM OFFSITE DITCH (ADJUSTED BERM)
Geometry File : p:\CIVIL\80100532\HEC-RAS\GMOFFSITE.g03

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 1200

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4980	1015	4979	1060	4978	1102	4977	1164	4976
1290	4976.1	1401	4977	1420	4978	1444	4979	1470	4979.4
1509	4979	1552	4978	1661	4978	1700	4979	1750	4980

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.035	1060	.035	1420	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1060	1420	280	215	150	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4979.74	Element	0.035	0.035	0.035
Vel Head (ft)	0.01	Wt. n-Val.	280.00	215.00	150.00
W.S. Elev (ft)	4979.73	Reach Len. (ft)	59.21	1152.05	365.95
Crit W.S. (ft)	4977.11	Flow Area (sq ft)	59.21	1152.05	365.95
E.G. Slope (ft/ft)	0.000084	Area (sq ft)	23.96	974.91	157.13
Q Total (cfs)	1156.00	Flow (cfs)	55.91	360.00	316.38
Top Width (ft)	732.29	Top Width (ft)	0.40	0.85	0.43
Vel Total (ft/s)	0.73	Avg. Vel. (ft/s)	1.06	3.20	1.16
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)	2610.5	106203.5	17117.3
Conv. Total (cfs)	125931.3	Conv. (cfs)	55.95	360.05	316.43
Length Wtd. (ft)	204.31	Wetted Per. (ft)	0.01	0.02	0.01
Min Ch El (ft)	4976.00	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.18	Stream Power (lb/ft s)	0.49	25.02	3.11
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.34	6.85	2.25
C & E Loss (ft)	0.00	Cum SA (acres)			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 1100

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4981	1025	4976	1120	4975.2	1190	4975.8	1313	4976
1370	4976.5	1397	4976	1435	4975.6	1460	4976	1491	4977
1497	4978	1546	4979	1575	4980				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.035	1025	.035	1370	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1025	1370	465	260	55	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4979.73	Element	0.035	0.035	0.035
Vel Head (ft)	0.01	Wt. n-Val.	465.00	260.00	55.00
W.S. Elev (ft)	4979.72	Reach Len. (ft)	34.58	1354.19	520.93
Crit W.S. (ft)	4976.42	Flow Area (sq ft)	34.58	1354.19	520.93
E.G. Slope (ft/ft)	0.000038	Area (sq ft)	13.51	881.80	260.69
Q Total (cfs)	1156.00	Flow (cfs)	18.60	345.00	196.86
Top Width (ft)	560.45	Top Width (ft)	0.39	0.65	0.50
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)	1.86	3.93	2.65
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)	2191.4	143056.2	42293.1
Conv. Total (cfs)	187540.7	Conv. (cfs)	18.96	345.01	196.99
Length Wtd. (ft)	215.26	Wetted Per. (ft)	0.00	0.01	0.01
Min Ch El (ft)	4975.20	Shear (lb/sq ft)			

Alpha	1.04	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.18	18.84	1.58
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	5.11	1.36

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 1000

INPUT
Description: START OF DITCH
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4982	1021	4975	1021.84	4974.72	1071.16	4974.72	1072	4975
1085	4976	1095	4977	1143	4978	1170	4978	1195	4978
1240	4979	1270	4980						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1095	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1095	87	87	165	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4979.70	Element			
Vel Head (ft)	0.08	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	4979.62	Reach Len. (ft)	87.00	87.00	165.00
Crit W.S. (ft)	4977.03	Flow Area (sq ft)		366.66	242.58
E.G. Slope (ft/ft)	0.000370	Area (sq ft)		366.66	242.58
Q Total (cfs)	1156.00	Flow (cfs)		898.64	257.36
Top Width (ft)	251.54	Top Width (ft)		87.87	163.68
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)		2.45	1.06
Max Chl Dpth (ft)	4.90	Hydr. Depth (ft)		4.17	1.48
Conv. Total (cfs)	60127.9	Conv. (cfs)		46741.8	13386.0
Length Wtd. (ft)	95.68	Wetted Per. (ft)		88.80	163.71
Min Ch El (ft)	4974.72	Shear (lb/sq ft)		0.10	0.03
Alpha	1.37	Stream Power (lb/ft s)		0.23	0.04
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		13.70	1.10
C & E Loss (ft)	0.01	Cum SA (acres)		3.82	1.14

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 950

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4982	1022	4974.65	1072	4974.65	1094	4980	1102	4981
1127	4982								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1127	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1127	473	473	473	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4979.63	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.030	
W.S. Elev (ft)	4979.43	Reach Len. (ft)	473.00	473.00	473.00
Crit W.S. (ft)	4977.05	Flow Area (sq ft)		320.24	
E.G. Slope (ft/ft)	0.000911	Area (sq ft)		320.24	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	83.97	Top Width (ft)		83.97	
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)		3.61	
Max Chl Dpth (ft)	4.78	Hydr. Depth (ft)		3.81	
Conv. Total (cfs)	38308.3	Conv. (cfs)		38308.3	
Length Wtd. (ft)	473.00	Wetted Per. (ft)		85.32	
Min Ch El (ft)	4974.65	Shear (lb/sq ft)		0.21	

Alpha	1.00	Stream Power (lb/ft s)	0.77		
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	13.01	0.64	
C & E Loss (ft)	0.00	Cum SA (acres)	3.65	0.83	

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 900

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4985	1030	4975	1032.2	4974.27	1081.8	4974.27	1084	4975
1120	4987								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1120	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1120	105	150	207.99	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4979.17	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	4978.93	Reach Len. (ft)	105.00	150.00	207.99
Crit W.S. (ft)	4976.70	Flow Area (sq ft)		296.23	
E.G. Slope (ft/ft)	0.001067	Area (sq ft)		296.23	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	77.57	Top Width (ft)		77.57	
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)		3.90	
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)		3.82	
Conv. Total (cfs)	35389.7	Conv. (cfs)		35389.7	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		79.08	
Min Ch El (ft)	4974.27	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.97	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.67	0.64
C & E Loss (ft)	0.00	Cum SA (acres)		2.77	0.83

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 800

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4985	1030	4975	1032.55	4974.15	1082.45	4974.15	1085	4975
1130	4990								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1130	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1130	66.99	105	150	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4979.00	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	4978.76	Reach Len. (ft)	66.99	105.00	150.00
Crit W.S. (ft)	4976.57	Flow Area (sq ft)		293.97	
E.G. Slope (ft/ft)	0.001094	Area (sq ft)		293.97	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	77.57	Top Width (ft)		77.57	
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)		3.93	
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)		3.79	
Conv. Total (cfs)	34944.1	Conv. (cfs)		34944.1	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		79.07	
Min Ch El (ft)	4974.15	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.00	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		8.65	0.64
C & E Loss (ft)	0.00	Cum SA (acres)		2.51	0.83

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 700

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4985	1030	4975	1032.8	4974.06	1082.2	4974.06	1085	4975
1115	4985								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1115	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1115	528	528	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4978.88	Element			
Vel Head (ft)	0.25	Wt. n-Val.		0.030	
W.S. Elev (ft)	4978.64	Reach Len. (ft)	528.00	528.00	528.00
Crit W.S. (ft)	4976.49	Flow Area (sq ft)		288.61	
E.G. Slope (ft/ft)	0.001148	Area (sq ft)		288.61	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	76.81	Top Width (ft)		76.81	
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)		4.01	
Max Chl Dpth (ft)	4.57	Hydr. Depth (ft)		3.76	
Conv. Total (cfs)	34111.9	Conv. (cfs)		34111.9	
Length Wtd. (ft)	528.00	Wetted Per. (ft)		78.30	
Min Ch El (ft)	4974.06	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.06	
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)		7.95	0.64
C & E Loss (ft)	0.00	Cum SA (acres)		2.32	0.83

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 600

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4979.5	1016.2	4973.6	1066.2	4973.6	1082.4	4979

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1082.4	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.4	290	290	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4978.22	Element			
Vel Head (ft)	0.28	Wt. n-Val.		0.030	
W.S. Elev (ft)	4977.94	Reach Len. (ft)	290.00	290.00	290.00
Crit W.S. (ft)	4976.02	Flow Area (sq ft)		270.81	
E.G. Slope (ft/ft)	0.001374	Area (sq ft)		270.81	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	74.91	Top Width (ft)		74.91	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)		3.61	
Conv. Total (cfs)	31187.7	Conv. (cfs)		31187.7	
Length Wtd. (ft)	290.00	Wetted Per. (ft)		76.38	
Min Ch El (ft)	4973.60	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		1.30	
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)		4.56	0.64
C & E Loss (ft)	0.00	Cum SA (acres)		1.40	0.83

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 500

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4979	1016.8	4973.4	1066.8	4973.4	1080.6	4978

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1080.6	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1080.6	113	113	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4977.77	Element			
Vel Head (ft)	0.33	Wt. n-Val.		0.030	
W.S. Elev (ft)	4977.44	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	4975.82	Flow Area (sq ft)		250.60	
E.G. Slope (ft/ft)	0.001752	Area (sq ft)		250.60	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	74.21	Top Width (ft)		74.21	
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)		4.61	
Max Chl Dpth (ft)	4.04	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	27615.1	Conv. (cfs)		27615.1	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		75.52	
Min Ch El (ft)	4973.40	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		1.67	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		2.82	0.64
C & E Loss (ft)	0.00	Cum SA (acres)		0.90	0.83

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 450

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4979	1017.1	4973.3	1067.1	4973.3	1081.2	4978

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1081.2	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1081.2	180	155	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4977.55	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.030	
W.S. Elev (ft)	4977.19	Reach Len. (ft)	180.00	155.00	135.00
Crit W.S. (ft)	4975.72	Flow Area (sq ft)		239.90	
E.G. Slope (ft/ft)	0.001994	Area (sq ft)		239.90	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	73.34	Top Width (ft)		73.34	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.27	
Conv. Total (cfs)	25888.2	Conv. (cfs)		25888.2	
Length Wtd. (ft)	155.00	Wetted Per. (ft)		74.60	
Min Ch El (ft)	4973.30	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		1.93	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		2.19	0.64
C & E Loss (ft)	0.01	Cum SA (acres)		0.71	0.83

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 400

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4979	1017.4	4973.2	1067.4	4973.2	1075.8	4976	1083.8	4977
1098.8	4978	1136	4978	1231	4978	1241	4979	1491	4980

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1083.8	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1083.8	245	235	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4977.17	Element			
Vel Head (ft)	0.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	4976.71	Reach Len. (ft)	245.00	235.00	230.00
Crit W.S. (ft)	4975.61	Flow Area (sq ft)		213.74	
E.G. Slope (ft/ft)	0.002987	Area (sq ft)		213.74	
Q Total (cfs)	1156.00	Flow (cfs)		1156.00	
Top Width (ft)	74.61	Top Width (ft)		74.61	
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)		5.41	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	21152.4	Conv. (cfs)		21152.4	
Length Wtd. (ft)	234.46	Wetted Per. (ft)		75.68	
Min Ch El (ft)	4973.20	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.85	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		1.38	0.64
C & E Loss (ft)	0.10	Cum SA (acres)		0.45	0.83

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: TEMP DITCH
REACH: GM SITE RS: 300

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	4979	1018	4973	1068	4973	1099	4974	1147	4975
1169	4976	1195	4976.5	1225	4976.4	1247	4976	1275	4975.5
1322	4976	1467	4977						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.03	1099	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1099	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	4976.74	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	4976.62	Reach Len. (ft)			
Crit W.S. (ft)	4975.05	Flow Area (sq ft)		297.39	243.52
E.G. Slope (ft/ft)	0.000801	Area (sq ft)		297.39	243.52
Q Total (cfs)	1156.00	Flow (cfs)		908.44	247.56
Top Width (ft)	404.78	Top Width (ft)		91.86	312.92
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)		3.05	1.02
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		3.24	0.78
Conv. Total (cfs)	40840.5	Conv. (cfs)		32094.4	8746.1
Length Wtd. (ft)		Wetted Per. (ft)		92.46	312.97
Min Ch El (ft)	4973.00	Shear (lb/sq ft)		0.16	0.04
Alpha	1.65	Stream Power (lb/ft s)		0.49	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:TEMP DITCH

Reach	River Sta.	n1	n2	n3
GM SITE	1200	.035	.035	.035
GM SITE	1100	.035	.035	.035
GM SITE	1000	.03	.03	.035
GM SITE	950	.03	.03	.03
GM SITE	900	.03	.03	.03
GM SITE	800	.03	.03	.03
GM SITE	700	.03	.03	.03
GM SITE	600	.03	.03	.03
GM SITE	500	.03	.03	.03
GM SITE	450	.03	.03	.03
GM SITE	400	.03	.03	.035
GM SITE	300	.03	.03	.035

SUMMARY OF REACH LENGTHS

River: TEMP DITCH

Reach	River Sta.	Left	Channel	Right
GM SITE	1200	280	215	150
GM SITE	1100	465	260	55
GM SITE	1000	87	87	165
GM SITE	950	473	473	473
GM SITE	900	105	150	207.99
GM SITE	800	66.99	105	150
GM SITE	700	528	528	528
GM SITE	600	290	290	290
GM SITE	500	113	113	113
GM SITE	450	180	155	135
GM SITE	400	245	235	230
GM SITE	300	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: TEMP DITCH

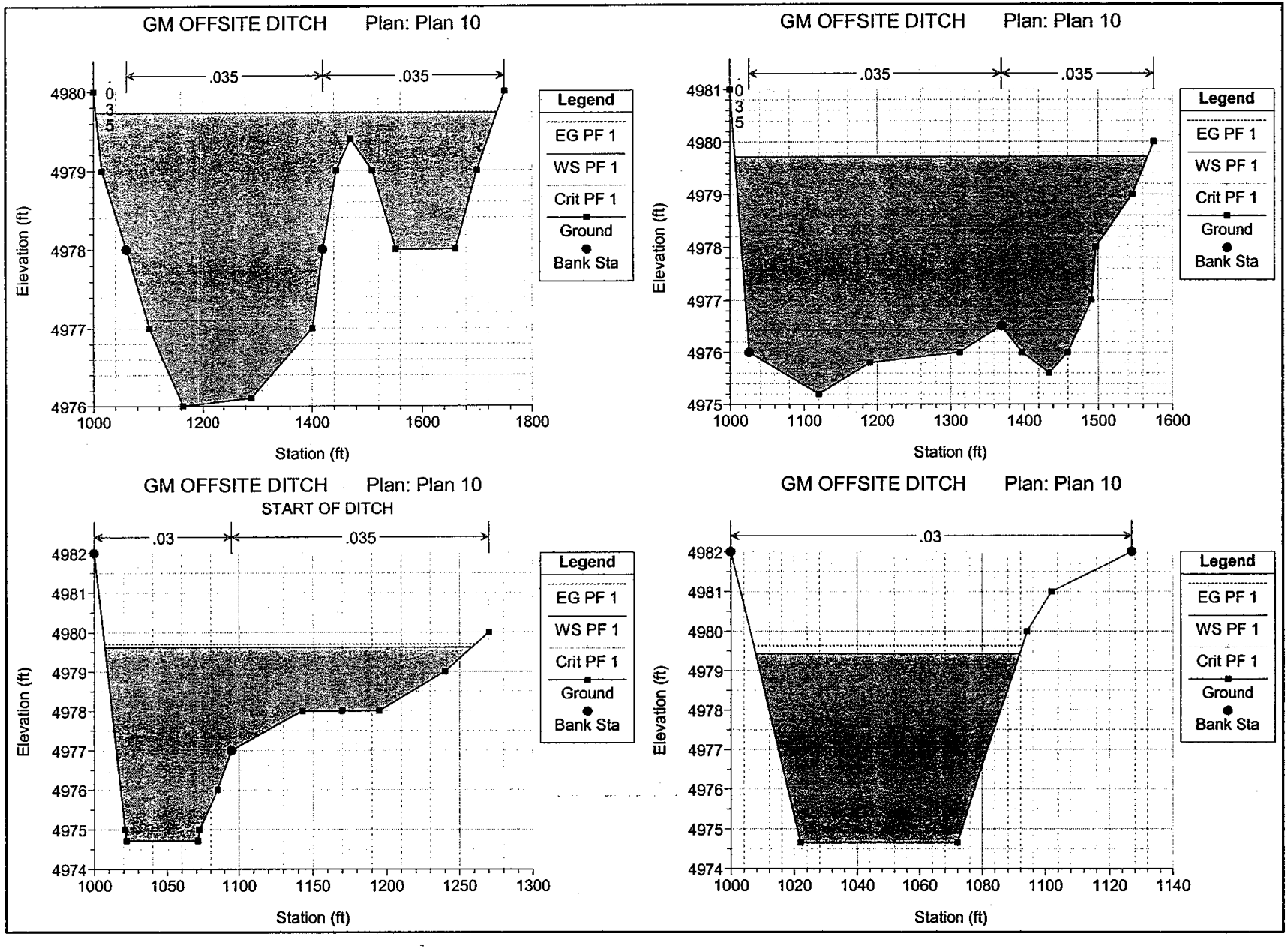
Reach	River Sta.	Contr.	Expan.
GM SITE	1200	.1	.3
GM SITE	1100	.1	.3
GM SITE	1000	.1	.3
GM SITE	950	.1	.3
GM SITE	900	.1	.3
GM SITE	800	.1	.3
GM SITE	700	.1	.3
GM SITE	600	.1	.3
GM SITE	500	.1	.3
GM SITE	450	.1	.3
GM SITE	400	.1	.3
GM SITE	300	.1	.3

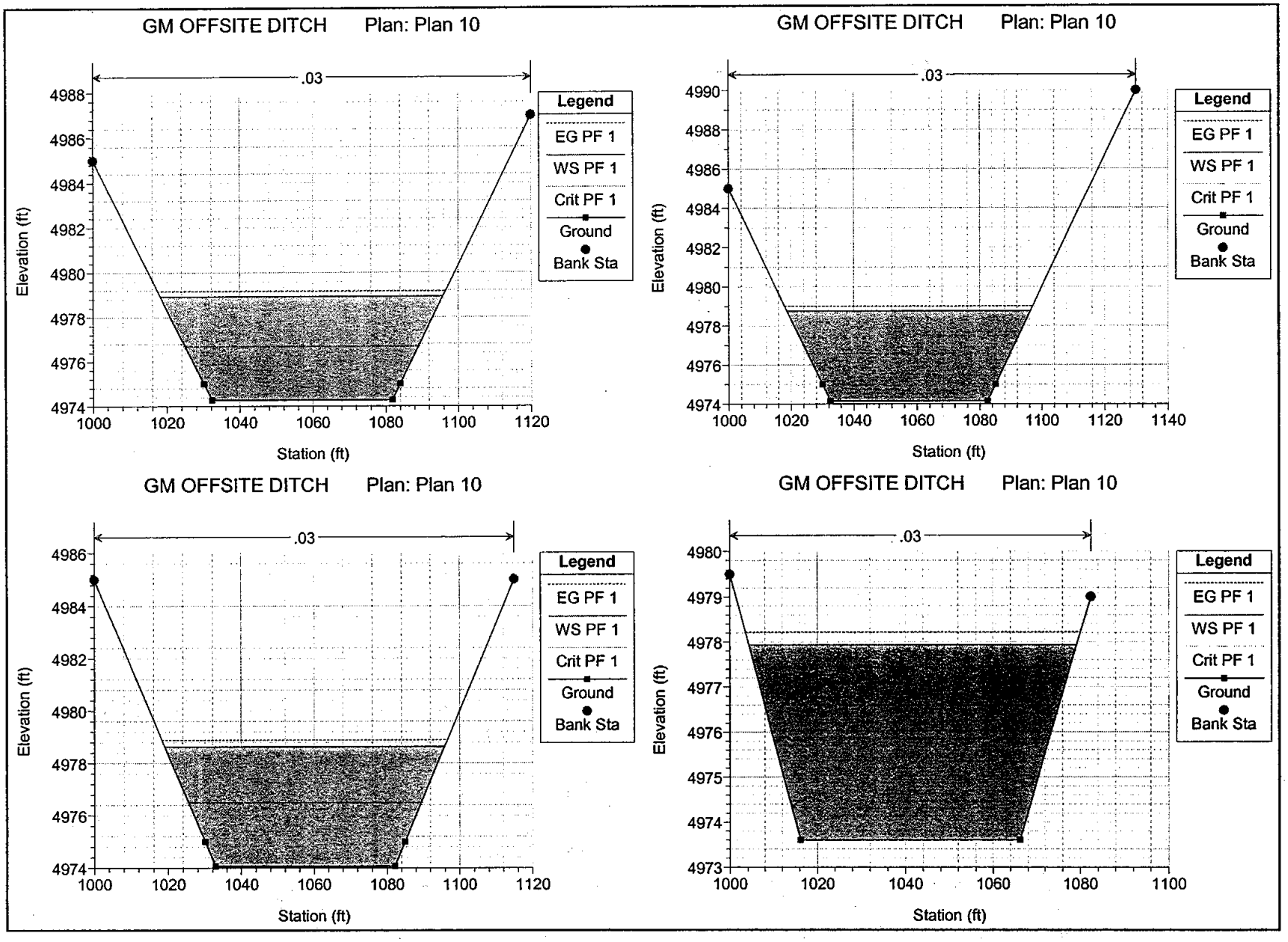
Profile Output Table - Standard Table 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
GM SITE	1200	1156.00	4976.00	4979.73	4977.11	4979.74	0.000084	0.85	1577.21	732.29	0.08
GM SITE	1100	1156.00	4975.20	4979.72	4976.42	4979.73	0.000038	0.65	1909.71	560.45	0.06
GM SITE	1000	1156.00	4974.72	4979.62	4977.03	4979.70	0.000370	2.45	609.24	251.54	0.21
GM SITE	950	1156.00	4974.65	4979.43	4977.05	4979.63	0.000911	3.61	320.24	83.97	0.33
GM SITE	900	1156.00	4974.27	4978.93	4976.70	4979.17	0.001067	3.90	296.23	77.57	0.35
GM SITE	800	1156.00	4974.15	4978.76	4976.57	4979.00	0.001094	3.93	293.97	77.57	0.36
GM SITE	700	1156.00	4974.06	4978.64	4976.49	4978.88	0.001148	4.01	288.61	76.81	0.36
GM SITE	600	1156.00	4973.60	4977.94	4976.02	4978.22	0.001374	4.27	270.81	74.91	0.40
GM SITE	500	1156.00	4973.40	4977.44	4975.82	4977.77	0.001752	4.61	250.60	74.21	0.44
GM SITE	450	1156.00	4973.30	4977.19	4975.72	4977.55	0.001994	4.82	239.90	73.34	0.47
GM SITE	400	1156.00	4973.20	4976.71	4975.61	4977.17	0.002987	5.41	213.74	74.61	0.56
GM SITE	300	1156.00	4973.00	4976.62	4975.05	4976.74	0.000801	3.05	540.91	404.78	0.30

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Plan 10

River: TEMP DITCH Reach: GM SITE RS: 1200 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: TEMP DITCH Reach: GM SITE RS: 1100 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: TEMP DITCH Reach: GM SITE RS: 1000 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: TEMP DITCH Reach: GM SITE RS: 400 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.


GM OFFSITE DITCH Plan: Plan 10
.035
.035
0
3
5
4980
4979
4978
4977
4976
1000
1200
1400
1600
1800
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
GM OFFSITE DITCH Plan: Plan 10
.035
.035
0
3
5
4981
4980
4979
4978
4977
4976
4975
1000
1100
1200
1300
1400
1500
1600
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
GM OFFSITE DITCH Plan: Plan 10
START OF DITCH
.03
.035
4982
4981
4980
4979
4978
4977
4976
4975
4974
1000
1050
1100
1150
1200
1250
1300
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
GM OFFSITE DITCH Plan: Plan 10
.03
4982
4981
4980
4979
4978
4977
4976
4975
4974
1000
1020
1040
1060
1080
1100
1120
1140
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


GM OFFSITE DITCH Plan: Plan 10
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4988
4986
4984
4982
4980
4978
4976
4974
1000
1020
1040
1060
1080
1100
1120
GM OFFSITE DITCH Plan: Plan 10
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4990
4988
4986
4984
4982
4980
4978
4976
4974
1000
1020
1040
1060
1080
1100
1120
1140
GM OFFSITE DITCH Plan: Plan 10
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4986
4984
4982
4980
4978
4976
4974
1000
1020
1040
1060
1080
1100
1120
GM OFFSITE DITCH Plan: Plan 10
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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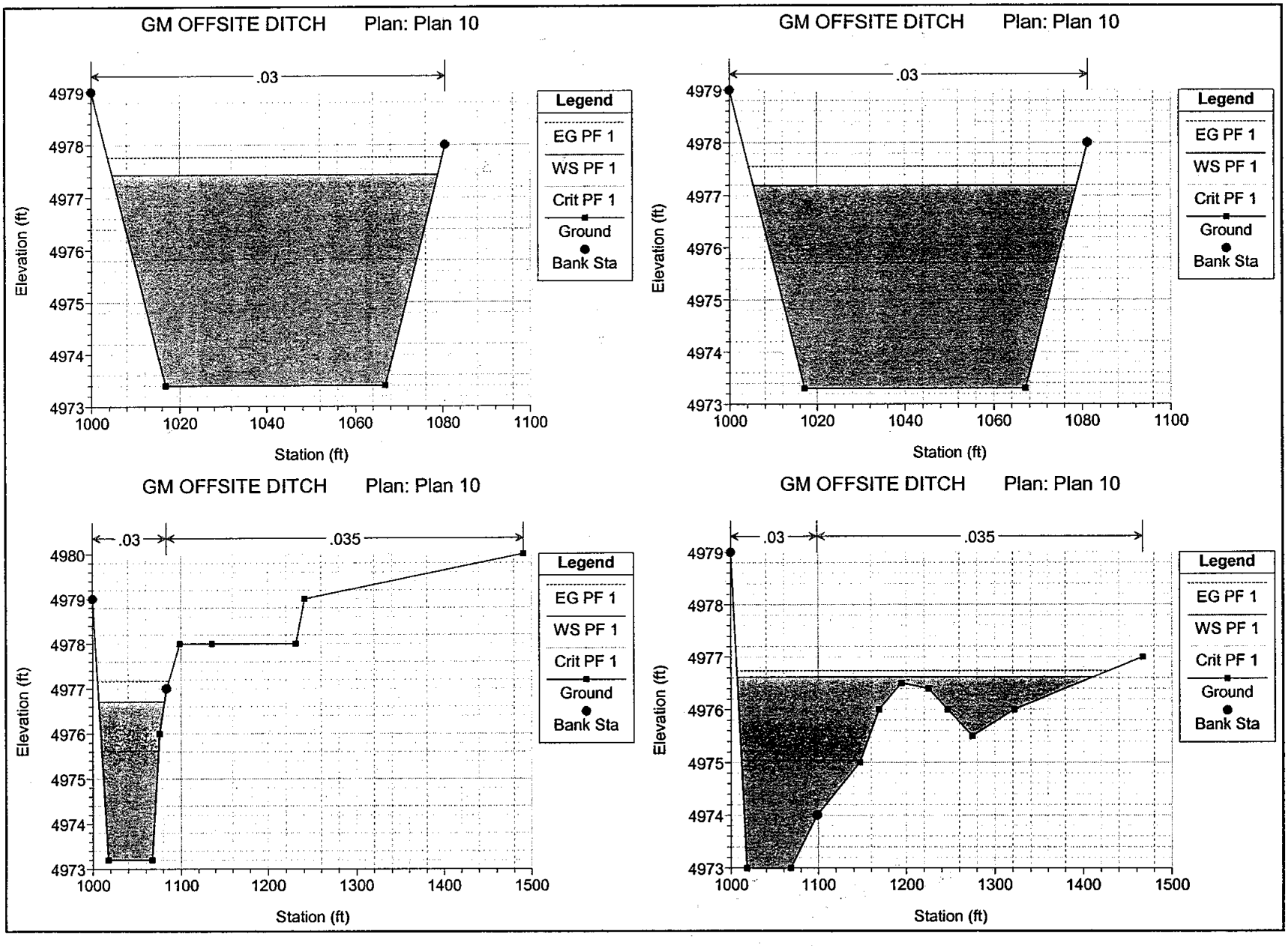
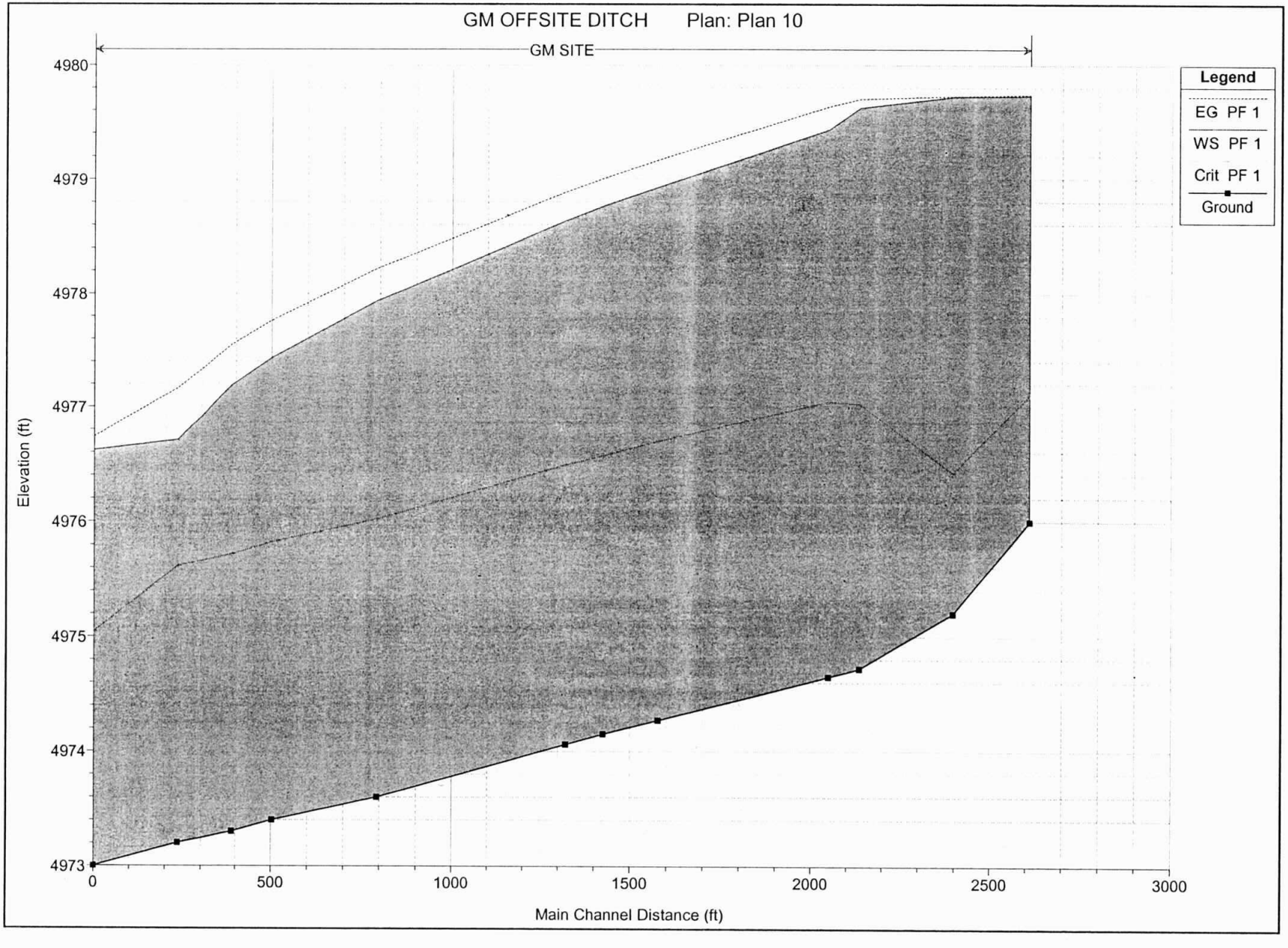
4979
4978
4977
4976
4975
4974
4973
1000
1020
1040
1060
1080
1100


GM OFFSITE DITCH Plan: Plan 10
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4979
4978
4977
4976
4975
4974
4973
1000
1020
1040
1060
1080
1100
GM OFFSITE DITCH Plan: Plan 10
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4979
4978
4977
4976
4975
4974
4973
1000
1020
1040
1060
1080
1100
GM OFFSITE DITCH Plan: Plan 10
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4980
4979
4978
4977
4976
4975
4974
4973
1000
1100
1200
1300
1400
1500
GM OFFSITE DITCH Plan: Plan 10
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4979
4978
4977
4976
4975
4974
4973
1000
1100
1200
1300
1400
1500


GM OFFSITE DITCH Plan: Plan 10
GM SITE
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
4980
4979
4978
4977
4976
4975
4974
4973
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)

HEC-RAS Plan: Plan 10 River: TEMP DITCH Reach: GM SITE Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
GM SITE	1200	1156.00	4976.00	4979.73	4977.11	4979.74	0.000084	0.85	1577.21	732.29	0.08
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GM SITE	700	1156.00	4974.06	4978.64	4976.49	4978.88	0.001148	4.01	288.61	76.81	0.36
GM SITE	600	1156.00	4973.60	4977.94	4976.02	4978.22	0.001374	4.27	270.81	74.91	0.40
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