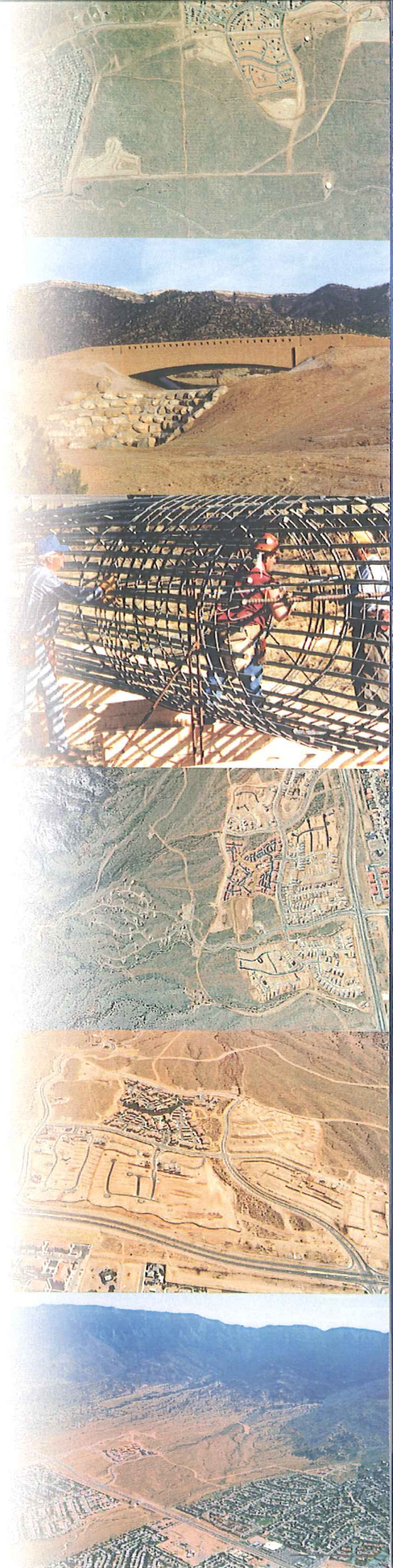
DRAINAGE STUDY
FOR
SUN GATE SUBDIVISION

(FORMERLY KNOWN AS
EL RANCHO GRANDE UNIT 12)



JANUARY 8, 2004

Prepared for:
Curb Inc.
6301 Indian School NE. Suite 208
Albuquerque, NM 87109

Rec 1/9/04

Bohannan ▲ Huston INC.

ENGINEERING ▲
SPATIAL DATA ▲
ADVANCED TECHNOLOGIES ▲

N-9/07

DRAINAGE STUDY
FOR
SUN GATE SUBDIVISION
(FORMERLY KNOWN AS EL RANCHO GRANDE UNIT 12)

January 8, 2004

Prepared for:

CURB INC.
6301 INDIAN SCHOOL NE - SUITE 208
ALBUQUERQUE, NM 87110

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON STREET NE
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PREPARED BY:

Rick L. Beltramo, P.E. Date 1/8/04

TABLE OF CONTENTS

APPENDICES

EXHIBITS

I. INTRODUCTION

This drainage study establishes a drainage management plan for the proposed development of Sun Gate Subdivision (formerly known as El Rancho Grande Unit 12). The Sun Gate Subdivision is approximately 21 acres of residential (R-2) land to be subdivided into 130 single family residential lots. The property is in the Rio Bravo Sector Plan and is located on Albuquerque's southwest mesa, south of the future Gibson Boulevard and west of Blake Road.

Sun Gate is in the Amole Arroyo Watershed and encompassed by the Amole-Hubbell Drainage Management Plan. In addition, a draft Drainage Management Plan (DMP) is being developed for the Gibson Boulevard corridor between 118th Street and the Amole Arroyo. The drainage area covered by the DMP is approximately 300 acres of residential, commercial, and special use zoned property that bound the north and south side of the future Gibson Boulevard between 118th Street to the west and the Amole Arroyo to the east. Sun Gate is in the Drainage Management Plan (DMP) area. Approval of the Gibson Boulevard DMP by the City of Albuquerque and AMAFCA is not required for approval of this Drainage Study for Sun Gate.

This study provides hydrologic and hydraulic analysis and provides a drainage management plan as necessary to support the planned 130-unit development. More specifically, this report is submitted in conjunction with the preliminary plat application. Preliminary plat approval and grading plan approval is requested. Prior to final plat and building permit approvals of this project, the City of Albuquerque (COA) must approve final grading plans and work order construction plans.

II. METHODOLOGY

Existing and proposed site hydrological conditions were analyzed for the 100-year, 6-hour storm in accordance with the revised Section 22.2, Hydrology, of the Development Process Manual (DPM) for the City of Albuquerque, dated January 1993. The Arid-lands Hydrologic Model (AHYMO) was utilized to determine peak flow rates for design of the storm drainage improvements within the project. The 100-year, 6-hour storm is used as the design event. The results are included in **Appendix A.** Street capacities were analyzed using Manning's equation, consistent with the revised DPM Section 22.2. The storm sewer system is analyzed

using current DPM methods for gravity flow conditions. All data and calculations supporting this study are located in **Appendix B.**

The hydrologic analysis is also based on the approved drainage report: *Amole-Hubbell Drainage Management Plan, Volume I, Final Facilities Plan Report* dated July 22, 1999, prepared by Leedshill-Herkenhoff, Inc.

III. EXISTING CONDITIONS

A. Topography

Sun Gate is currently undeveloped land with grades ranging from approximately 1% to 6%. The area generally slopes from northwest to southeast. Soils in the area have an SCS soil classification of BCC (Bluepoint loamy fine sand). BCC soils consist of deep, somewhat excessively drained soils formed in sandy alluvial soils, with rapid permeability, slow runoff characteristics, and severe hazard for wind erosion. Vegetation is light consisting mostly of native grasses.

B. Existing Drainage Patterns

Sun Gate is located in the Amole Arroyo Drainage Basin. The site generally drains from northwest to southeast. The only development in the area that has altered the natural drainage pattern of the area is El Rancho Grande Unit 11. This development diverts the offsite flow at the northwest corner of Unit 14 and prevents it from entering the site. The majority of the remaining offsite flow is conveyed south by a natural arroyo that is parallel to the western boundary of Units 14 and 15. Units 14 and 15 currently drain to offsite ponds.

IV. PROPOSED DEVELOPED CONDITIONS

Sun Gate subdivision is a proposed single-family residential development with 130 lots on 21 acres. Proposed street configurations are shown on the *Preliminary Plat*, **Exhibit 1.** The Amole-Hubbell DMP allows for full discharge of developed flows from the Amole Arroyo Basin to the Amole and Hubbell Lake storage facilities. The drainage concepts for Sun Gate is consistent with

those presented in the "Draft Master Drainage Study for the Gibson Boulevard Corridor between 118th Street and the Amole Arroyo". The Sun Gate drainage area corresponds to Basin DB8 in the Gibson Boulevard DMP.

The percent impervious land treatment for the proposed conditions is determined from Table A-5 of the DPM, Section 22.2. The land treatment values used in the AHYMO analysis are the same as the Gibson Boulevard DMP.

A. Offsite Flows

No offsite flows reach the site from the south or east because the natural ground slopes away from Sun Gate on these sides. The offsite flow from the north is intercepted by El Rancho Grande Unit 10 and Gibson Blvd..

The property to the west of Sun Gate is being developed as El Rancho Grande Units 14 and 15. The majority of the offsite flow to the west is conveyed south by a natural arroyo that is parallel to the western boundary of Units 14 and 15. A drainage swale will be graded west of Messina Drive that will convey this flow into the natural arroyo parallel to the western boundary. The temporary ponds created with Units 14 and 15 will be removed with the construction of Sun Gate and a master planned storm drain to be constructed in Open Range Avenue.

B. Onsite Flows

Developed runoff from Sun Gate will be conveyed by the internal street system to Garden Gate Lane, where it will be collected by a public storm drain system. Inlets are located along Garden Gate Lane at the east stub terminus and the intersection of Stone Gate Way. These inlets collect the runoff from the residential streets into a storm drain that discharges to the east at Open Range Avenue. See **Appendix B** for street capacity and inlet capacity calculations. This drainage plan proposes discharging 77.4 cfs to the storm drain in Open Range Avenue and Blake Road.

The storm drain outfall alignment for Sun Gate to the Amole Arroyo has not been identified at this time. The outfall alignment will be determined in the final Gibson

Boulevard DMP and constructed with future phases of the El Rancho Grande development. Therefore, interim facilities will be constructed to accept developed flows from Sun Gate. A retention pond sized to retain the 100-year, 24-hour storm volume will be constructed on Tract 34D-1-A, Lands of Curb Inc. just east of Blake Road. The pond will remain in place until all downstream storm drain improvements identified in the Gibson Boulevard DMP are in place and/or Tract 34-D-1-A is developed. See **Exhibit 2**, *Grading Plan*, for the location of the pond.

C. FEMA Floodplain

As designated on Panel 336 of 825 (Map number 35001C0336D) of the National Flood Insurance Program, Flood Insurance Rate Maps published by FEMA for Bernalillo County, New Mexico, effective date September 20, 1996, there is no existing flood hazard zone (zone AO) within the proposed development. See the FEMA Floodplain exhibit provided at the end of the report text.

V. CONCLUSION

This report provides a detailed study of the developed runoff and street capacities for the proposed Sun Gate Subdivision. Included is the preliminary plat, proposed conditions basin map, grading plan, infrastructure list, and all necessary hydrologic and hydraulic analyses. This drainage plan maintains the overall drainage pattern of the area and allows for the safe management of storm runoff in permanent as well as interim conditions.

FEMA EXHIBIT
GIBSON BOULEVARD CORRIDOR
APRIL 2003

N

500 250 0 500

1" = 500'

ZONE X

ZONE AO (DEPTH 2)

LIMIT OF DETAILED STUDY

ZONE AO (DEPTH 2)

ZONE AO (DEPTH 3)

ZONE A

ZONE X

ZONE A

100-YEAR FLOOD CONFINED TO CONSTRUCTED CHANNEL

PROPOSED EL RANCHO GRANDE UNIT NO. 10

PROPOSED EL RANCHO GRANDE UNIT NO. 11

GIBSON BLVD.

BLAKE ROAD

14

15

BERNALILLO COUNTY
UNINCORPORATED AREAS
350001

CITY OF ALBUQUERQUE
350002

BERNALILLO COUNTY
CITY OF ALBUQUERQUE

CORPORATE LIMITS

ANAYA STREET
BENITO STREET
CATALINA PLACE
DEL ELFEGO
CANYON
DELGADO
PECOS PLACE
RIO PUERCO TRAIL
GOSCHNING PLACE
VALTIERRA PLACE
DEL REY ROAD
TOVAR PLACE
LADRONES COURT
LADRONES STREET
PLACE
ANACONDA
ALPENDRO ROAD
SNOW VISTA BOULEVARD
DE ANZA DRIVE
Arroyo
GUADIANA PLACE
CARTAGENA AVE
MESSINA DRIVE
TICK RDE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 336 OF 825
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0336	D
BERNALILLO COUNTY, UNINCORPORATED AREAS	350001	0336	D

MAP NUMBER
35001C0336 D

EFFECTIVE DATE:
SEPTEMBER 20, 1996

Federal Emergency Management Agency

Bohannan ▲ Huston Inc.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

APPENDICES

APPENDIX A - AHYMO INPUT AND SUMMARY FILES FOR DEVELOPED CONDITIONS

APPENDIX B - STREET CAPACITY AND STORM DRAIN INLET ANALYSIS

APPENDIX C - INFRASTRUCTURE LIST

APPENDIX A

AHYMO INPUT AND SUMMARY FILES

DEVELOPED CONDITIONS

```
*S*                    PROJECT NAME:  SUNGATE SUBDIVISION (ERG 12)
*S*                    DATE:  JANUARY 7, 2004
*S*                    INPUT FILE NAME:  SUNGATE.HYM
*S*                    OUTUPUT FILE NAME:  SUNGATE.OUT
*S*                    PROJECT NUMBER:  040154
*S*                    COMMENTS:     100 YEAR-6 HOUR STORM
*S ////////////////////////////////////////////////////////////////////////
START                 TIME=0.0 HR PUNCH CODE=0
RAINFALL              TYPE=1     RAIN QUARTER=0.0
                      RAIN ONE=1.90 IN    RAIN SIX=2.20 IN
                      RAIN DAY=2.60 IN    DT=0.05 HRS
**************************************************************************
*S************************************************************************
COMPUTE NM HYD        ID=1     HYD NO=BASIN.A    DA=0.0084 SQ MI
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                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=1     CODE=1
*S************************************************************************
COMPUTE NM HYD        ID=2     HYD NO=BASIN.B    DA=0.0037 SQ MI
                      PER A=0.0   PER B=22.5   PER C=22.5    PER D=55.0
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=2     CODE=1
*S************************************************************************
*S          ADD BASINS A AND B FOR DISCHARGE INTO GARDEN GATE LANE EAST STUB
ADD HYD               ID=3     HYD NO=A.B    ID I=1    ID II=2
PRINT HYD             ID=3     CODE=1
*S************************************************************************
COMPUTE NM HYD        ID=4     HYD NO=BASIN.C    DA=0.0059 SQ MI
                      PER A=0.0   PER B=22.5   PER C=22.5    PER D=55.0
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=4     CODE=1
*S************************************************************************
COMPUTE NM HYD        ID=5     HYD NO=BASIN.D    DA=0.0074 SQ MI
                      PER A=0.0   PER B=22.5   PER C=22.5    PER D=55.0
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=5     CODE=1
*S************************************************************************
COMPUTE NM HYD        ID=6     HYD NO=BASIN.E    DA=0.009 SQ MI
                      PER A=0.0   PER B=22.5   PER C=22.5    PER D=55.0
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=6     CODE=1
*S************************************************************************
ADD HYD               ID=7     HYD NO=D.E    ID I=5    ID II=6
PRINT HYD             ID=7     CODE=1
*S************************************************************************
*S          ADD BASINS C, D, E FOR DISCHARGE INTO GARDEN GATE/STONE GATE INTERSECTION
ADD HYD               ID=8     HYD NO=C.D.E    ID I=4  ID II=7
PRINT HYD             ID=8     CODE=1
*S************************************************************************
*S          TOTAL DEVELOPED FLOW FROM SUN GATE SUBDIVISION
ADD HYD               ID=9     HYD NO=TOTAL    ID I=3  ID II=8
PRINT HYD             ID=9     CODE=1
*S************************************************************************
FINISH
```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =01/07/2004
INPUT FILE = SUNGATE.HYM USER NO.= AHYMO-S-9702c1BohanHu-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
S	PROJECT NAME: SUNGATE SUBDIVISION (ERG 12)									
S	DATE: JANUARY 7, 2004									
S	INPUT FILE NAME: SUNGATE.HYM									
S	OUTUPUT FILE NAME: SUNGATE.OUT									
S	PROJECT NUMBER: 040154									
S	COMMENTS: 100 YEAR-6 HOUR STORM									
*S	//									
START										TIME= .00
RAINFALL	TYPE= 1									RAIN6= 2.200
*S	**********									
COMPUTE NM HYD	BASIN.A	-	1	.00840	18.89	.653	1.45690	1.500	3.514	PER IMP= 55.00
*S	**********									
COMPUTE NM HYD	BASIN.B	-	2	.00370	8.33	.287	1.45690	1.500	3.517	PER IMP= 55.00
*S	**********									
*S	BASINS A AND B FOR DISCHARGE INTO GARDEN GATE LANE EAST STUB									
ADD HYD	A.B	1& 2	3	.01210	27.22	.940	1.45685	1.500	3.515	
*S	**********									
COMPUTE NM HYD	BASIN.C	-	4	.00590	13.27	.458	1.45690	1.500	3.515	PER IMP= 55.00
*S	**********									
COMPUTE NM HYD	BASIN.D	-	5	.00740	16.64	.575	1.45690	1.500	3.514	PER IMP= 55.00
*S	**********									
COMPUTE NM HYD	BASIN.E	-	6	.00900	20.24	.699	1.45690	1.500	3.513	PER IMP= 55.00
*S	**********									
ADD HYD	D.E	5& 6	7	.01640	36.88	1.274	1.45686	1.500	3.513	
*S	**********									
*S	D, E FOR DISCHARGE INTO GARDEN GATE/STONE GATE INTERSECTION									
ADD HYD	C.D.E	4& 7	8	.02230	50.15	1.733	1.45686	1.500	3.514	
*S	**********									
*S	TOTAL DEVELOPED FLOW FROM SUN GATE SUBDIVISION									
ADD HYD	TOTAL	3& 8	9	.03440	77.36	2.673	1.45686	1.500	3.514	
*S	**********									
FINISH										

APPENDIX B

STREET CAPACITY AND

STORM DRAIN INLET ANALYSIS

SUN GATE SUBDIVISION
Internal Street Capacity Calculations
January 2004

1. **Corral Gate Lane**
(See Basin Map)
Q = 8.3 cfs

The amount of developed runoff produced from Basin B does not exceed the street capacity. Therefore, inlets are not required on this street. Roll curb may be installed to the eastern edge of the basin. Flow will continue on the surface east towards Bridal Gate Trail. See PC stream output.

2. **Bridal Gate Trail**
(See Basin Map)
Q = 27.2 cfs

The total flow produced from Basins A and B does not exceed the street capacity. Therefore, inlets are not required on this street. Standard curb will be installed throughout Basin A. Flow will continue towards the east stub of Garden Gate Lane. See PC stream output.

3. **Garden Gate Lane**
(See Basin Map)
Q = 27.2 cfs

The total runoff from Basins A and B will be captured by an inlet at the east end of Garden Gate Lane. This inlet discharges into a temporary pond on the east side of Blake Road. The pond will be removed once the master planned storm drain in Blake Road is constructed. See PC stream output and inlet nomograph.

4. **Basin C**
(See Basin Map)
Q = 13.3 cfs

The runoff produced from Basin C does not exceed the street capacity for Iron Gate Trail and a portion of Garden Gate Lane. However, inlets will be placed at the intersection of Garden Gate Lane and Stone Gate Way to capture the flow produced from Basins C, D, and E. See PC stream output and inlet nomograph.

5. **Basins D and E**
(See Basin Map)
Q = 36.9 cfs

The flow in Meadow Gate Trail, Sun Gate Trail, and the west end of Garden Gate Lane does not exceed the street capacity for those roads, therefore, inlets are not required. Inlets will be placed in Garden Gate Lane near the intersection with Sun Gate Trail. Bypass runoff will be captured by a sump inlet at the intersection of Garden Gate Lane and Stone Gate Way.

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

CORRAL GATE LANE – BASIN B

MANNING'S N= .017 SLOPE= .0188

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.34	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.54	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.70	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	0.85	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	0.99	1.56	0.02	0.07	
0.06	0.06	0.06	0.1	1.97	1.12	1.88	0.02	0.08	
0.07	0.07	0.08	0.1	2.30	1.24	2.19	0.02	0.09	
0.08	0.08	0.10	0.1	2.63	1.36	2.50	0.03	0.11	
0.09	0.09	0.13	0.2	2.96	1.47	2.81	0.03	0.12	
0.10	0.10	0.16	0.2	3.29	1.57	3.13	0.04	0.14	
0.11	0.11	0.19	0.3	3.62	1.68	3.44	0.04	0.15	
0.12	0.12	0.23	0.4	3.95	1.78	3.75	0.05	0.17	
0.13	0.13	0.26	0.5	4.28	1.87	4.07	0.05	0.18	
0.14	0.14	0.31	0.6	5.15	1.84	4.93	0.05	0.19	
0.15	0.15	0.36	0.7	6.03	1.84	5.79	0.05	0.20	
0.16	0.16	0.43	0.8	6.91	1.87	6.65	0.05	0.21	
0.17	0.17	0.50	0.9	7.79	1.91	7.51	0.06	0.23	
0.18	0.18	0.58	1.1	8.67	1.97	8.38	0.06	0.24	
0.19	0.19	0.66	1.3	9.54	2.03	9.24	0.06	0.25	
0.20	0.20	0.76	1.6	10.42	2.09	10.10	0.07	0.27	
0.21	0.21	0.87	1.9	11.30	2.16	10.96	0.07	0.28	
0.22	0.22	0.98	2.2	12.18	2.23	11.83	0.08	0.30	
0.23	0.23	1.10	2.5	13.06	2.31	12.69	0.08	0.31	
0.24	0.24	1.23	2.9	13.93	2.38	13.55	0.09	0.33	
0.25	0.25	1.37	3.4	14.81	2.45	14.41	0.09	0.34	
0.26	0.26	1.52	3.8	15.69	2.53	15.27	0.10	0.36	
0.27	0.27	1.68	4.4	16.57	2.60	16.14	0.11	0.38	
0.28	0.28	1.84	4.9	17.45	2.68	17.00	0.11	0.39	
0.29	0.29	2.02	5.6	18.32	2.75	17.86	0.12	0.41	
0.30	0.30	2.20	6.2	19.20	2.83	18.72	0.12	0.42	
0.31	0.31	2.39	6.9	20.08	2.90	19.59	0.13	0.44	
0.32	0.32	2.59	7.7	20.96	2.98	20.45	0.14	0.46	
0.33	0.33	2.80	8.5	21.84	3.05	21.31	0.14	0.47	ACTUAL FLOW +
0.34	0.34	3.02	9.4	22.71	3.12	22.17	0.15	0.49	
0.35	0.35	3.25	10.4	23.59	3.19	23.03	0.16	0.51	ROLL CURB LIMIT
0.36	0.36	3.48	11.4	24.47	3.27	23.90	0.17	0.53	
0.37	0.37	3.72	12.4	25.35	3.34	24.76	0.17	0.54	
0.38	0.38	3.98	13.5	26.23	3.41	25.62	0.18	0.56	
0.39	0.39	4.24	14.7	27.10	3.48	26.48	0.19	0.58	
0.40	0.40	4.50	16.0	27.98	3.55	27.35	0.20	0.60	
0.41	0.41	4.78	17.3	28.86	3.62	28.21	0.20	0.61	
0.42	0.42	5.06	19.0	28.88	3.75	28.21	0.22	0.64	
0.43	0.43	5.35	20.8	28.90	3.89	28.22	0.24	0.67	

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	5.91	24.6	28.94	4.16	28.23	0.27	0.72	
0.46	0.46	6.19	26.5	28.96	4.29	28.23	0.29	0.75	
0.47	0.47	6.48	28.6	28.98	4.41	28.24	0.30	0.77	
0.48	0.48	6.76	30.7	29.01	4.54	28.24	0.32	0.80	
0.49	0.49	7.04	32.8	29.03	4.66	28.25	0.34	0.83	
0.50	0.50	7.32	35.0	29.05	4.78	28.25	0.36	0.86	STREET CAPACIT
0.51	0.51	7.61	37.3	29.07	4.90	28.26	0.37	0.88	
0.52	0.52	7.89	39.6	29.09	5.02	28.26	0.39	0.91	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

CORRAL GATE LANE – BASINS A+B

MANNING'S N= .017 SLOPE= .03

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.43	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.68	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	0.89	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	1.08	1.25	0.02	0.06	
0.05	0.05	0.04	0.0	1.64	1.25	1.56	0.02	0.07	
0.06	0.06	0.06	0.1	1.97	1.41	1.88	0.03	0.09	
0.07	0.07	0.08	0.1	2.30	1.57	2.19	0.04	0.11	
0.08	0.08	0.10	0.2	2.63	1.71	2.50	0.05	0.13	
0.09	0.09	0.13	0.2	2.96	1.85	2.81	0.05	0.14	
0.10	0.10	0.16	0.3	3.29	1.99	3.13	0.06	0.16	
0.11	0.11	0.19	0.4	3.62	2.12	3.44	0.07	0.18	
0.12	0.12	0.23	0.5	3.95	2.24	3.75	0.08	0.20	
0.13	0.13	0.26	0.6	4.28	2.37	4.07	0.09	0.22	
0.14	0.14	0.31	0.7	5.15	2.32	4.93	0.08	0.22	
0.15	0.15	0.36	0.8	6.03	2.32	5.79	0.08	0.23	
0.16	0.16	0.43	1.0	6.91	2.36	6.65	0.09	0.25	
0.17	0.17	0.50	1.2	7.79	2.41	7.51	0.09	0.26	
0.18	0.18	0.58	1.4	8.67	2.48	8.38	0.10	0.28	
0.19	0.19	0.66	1.7	9.54	2.56	9.24	0.10	0.29	
0.20	0.20	0.76	2.0	10.42	2.64	10.10	0.11	0.31	
0.21	0.21	0.87	2.4	11.30	2.73	10.96	0.12	0.33	
0.22	0.22	0.98	2.8	12.18	2.82	11.83	0.12	0.34	
0.23	0.23	1.10	3.2	13.06	2.91	12.69	0.13	0.36	
0.24	0.24	1.23	3.7	13.93	3.01	13.55	0.14	0.38	
0.25	0.25	1.37	4.3	14.81	3.10	14.41	0.15	0.40	
0.26	0.26	1.52	4.9	15.69	3.20	15.27	0.16	0.42	
0.27	0.27	1.68	5.5	16.57	3.29	16.14	0.17	0.44	
0.28	0.28	1.84	6.2	17.45	3.38	17.00	0.18	0.46	
0.29	0.29	2.02	7.0	18.32	3.48	17.86	0.19	0.48	
0.30	0.30	2.20	7.9	19.20	3.57	18.72	0.20	0.50	
0.31	0.31	2.39	8.8	20.08	3.67	19.59	0.21	0.52	
0.32	0.32	2.59	9.7	20.96	3.76	20.45	0.22	0.54	
0.33	0.33	2.80	10.8	21.84	3.85	21.31	0.23	0.56	ROLL CURB LIMIT
0.34	0.34	3.02	11.9	22.71	3.94	22.17	0.24	0.58	
0.35	0.35	3.25	13.1	23.59	4.03	23.03	0.25	0.60	
0.36	0.36	3.48	14.4	24.47	4.12	23.90	0.26	0.62	
0.37	0.37	3.72	15.7	25.35	4.21	24.76	0.28	0.65	
0.38	0.38	3.98	17.1	26.23	4.30	25.62	0.29	0.67	
0.39	0.39	4.24	18.6	27.10	4.39	26.48	0.30	0.69	
0.40	0.40	4.50	20.2	27.98	4.48	27.35	0.31	0.71	
0.41	0.41	4.78	21.8	28.86	4.57	28.21	0.32	0.73	
0.42	0.42	5.06	24.0	28.88	4.74	28.21	0.35	0.77	
0.43	0.43	5.35	26.3	28.90	4.92	28.22	0.38	0.81	

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	5.91	31.0	28.94	5.25	28.23	0.43	0.88	STREET CAPACITY + ACTUAL FLOW
0.46	0.46	6.19	33.5	28.96	5.41	28.23	0.46	0.92	
0.47	0.47	6.48	36.1	28.98	5.57	28.24	0.48	0.95	
0.48	0.48	6.76	38.7	29.01	5.73	28.24	0.51	0.99	
0.49	0.49	7.04	41.5	29.03	5.89	28.25	0.54	1.03	
0.50	0.50	7.32	44.3	29.05	6.04	28.25	0.57	1.07	
0.51	0.51	7.61	47.1	29.07	6.19	28.26	0.60	1.11	
0.52	0.52	7.89	50.0	29.09	6.34	28.26	0.62	1.14	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

BRIDAL GATE TRAIL – BASIN A

MANNING'S N= .017 SLOPE= .0328

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.45	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.71	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	0.93	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	1.13	1.25	0.02	0.06	
0.05	0.05	0.04	0.1	1.64	1.31	1.56	0.03	0.08	
0.06	0.06	0.06	0.1	1.97	1.48	1.88	0.03	0.09	
0.07	0.07	0.08	0.1	2.30	1.64	2.19	0.04	0.11	
0.08	0.08	0.10	0.2	2.63	1.79	2.50	0.05	0.13	
0.09	0.09	0.13	0.2	2.96	1.94	2.81	0.06	0.15	
0.10	0.10	0.16	0.3	3.29	2.08	3.13	0.07	0.17	
0.11	0.11	0.19	0.4	3.62	2.21	3.44	0.08	0.19	
0.12	0.12	0.23	0.5	3.95	2.35	3.75	0.09	0.21	
0.13	0.13	0.26	0.7	4.28	2.47	4.07	0.10	0.23	
0.14	0.14	0.31	0.8	5.15	2.43	4.93	0.09	0.23	
0.15	0.15	0.36	0.9	6.03	2.43	5.79	0.09	0.24	
0.16	0.16	0.43	1.0	6.91	2.47	6.65	0.09	0.25	
0.17	0.17	0.50	1.3	7.79	2.52	7.51	0.10	0.27	
0.18	0.18	0.58	1.5	8.67	2.60	8.38	0.10	0.28	
0.19	0.19	0.66	1.8	9.54	2.68	9.24	0.11	0.30	
0.20	0.20	0.76	2.1	10.42	2.76	10.10	0.12	0.32	
0.21	0.21	0.87	2.5	11.30	2.85	10.96	0.13	0.34	
0.22	0.22	0.98	2.9	12.18	2.95	11.83	0.14	0.36	
0.23	0.23	1.10	3.4	13.06	3.05	12.69	0.14	0.37	
0.24	0.24	1.23	3.9	13.93	3.14	13.55	0.15	0.39	
0.25	0.25	1.37	4.5	14.81	3.24	14.41	0.16	0.41	
0.26	0.26	1.52	5.1	15.69	3.34	15.27	0.17	0.43	
0.27	0.27	1.68	5.8	16.57	3.44	16.14	0.18	0.45	
0.28	0.28	1.84	6.5	17.45	3.54	17.00	0.19	0.47	
0.29	0.29	2.02	7.3	18.32	3.64	17.86	0.21	0.50	
0.30	0.30	2.20	8.2	19.20	3.74	18.72	0.22	0.52	
0.31	0.31	2.39	9.2	20.08	3.83	19.59	0.23	0.54	ROLL CURB LIMIT
0.32	0.32	2.59	10.2	20.96	3.93	20.45	0.24	0.56	
0.33	0.33	2.80	11.3	21.84	4.03	21.31	0.25	0.58	
0.34	0.34	3.02	12.4	22.71	4.12	22.17	0.26	0.60	
0.35	0.35	3.25	13.7	23.59	4.22	23.03	0.28	0.63	
0.36	0.36	3.48	15.0	24.47	4.31	23.90	0.29	0.65	
0.37	0.37	3.72	16.4	25.35	4.41	24.76	0.30	0.67	
0.38	0.38	3.98	17.9	26.23	4.50	25.62	0.31	0.69	
0.39	0.39	4.24	19.5	27.10	4.59	26.48	0.33	0.72	
0.40	0.40	4.50	21.1	27.98	4.68	27.35	0.34	0.74	
0.41	0.41	4.78	22.8	28.86	4.78	28.21	0.35	0.76	
0.42	0.42	5.06	25.1	28.88	4.96	28.21	0.38	0.80	
0.43	0.43	5.35	27.5	28.90	5.14	28.22	0.41	0.84	STREET CAPACITY < ACTUAL FLOW

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	32.5	28.94	5.49	28.23	0.47	0.92
0.46	0.46	6.19	35.1	28.96	5.66	28.23	0.50	0.96
0.47	0.47	6.48	37.7	28.98	5.83	28.24	0.53	1.00
0.48	0.48	6.76	40.5	29.01	5.99	28.24	0.56	1.04
0.49	0.49	7.04	43.4	29.03	6.16	28.25	0.59	1.08
0.50	0.50	7.32	46.3	29.05	6.32	28.25	0.62	1.12
0.51	0.51	7.61	49.3	29.07	6.48	28.26	0.65	1.16
0.52	0.52	7.89	52.3	29.09	6.63	28.26	0.68	1.20

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

GARDEN GATE LANE — BASIN A

MANNING'S N= .017 SLOPE= .007

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.21	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.33	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.43	0.94	0.00	0.03
0.04	0.04	0.03	0.0	1.32	0.52	1.25	0.00	0.04
0.05	0.05	0.04	0.0	1.64	0.60	1.56	0.01	0.06
0.06	0.06	0.06	0.0	1.97	0.68	1.88	0.01	0.07
0.07	0.07	0.08	0.1	2.30	0.76	2.19	0.01	0.08
0.08	0.08	0.10	0.1	2.63	0.83	2.50	0.01	0.09
0.09	0.09	0.13	0.1	2.96	0.89	2.81	0.01	0.10
0.10	0.10	0.16	0.2	3.29	0.96	3.13	0.01	0.11
0.11	0.11	0.19	0.2	3.62	1.02	3.44	0.02	0.13
0.12	0.12	0.23	0.2	3.95	1.08	3.75	0.02	0.14
0.13	0.13	0.26	0.3	4.28	1.14	4.07	0.02	0.15
0.14	0.14	0.31	0.3	5.15	1.12	4.93	0.02	0.16
0.15	0.15	0.36	0.4	6.03	1.12	5.79	0.02	0.17
0.16	0.16	0.43	0.5	6.91	1.14	6.65	0.02	0.18
0.17	0.17	0.50	0.6	7.79	1.17	7.51	0.02	0.19
0.18	0.18	0.58	0.7	8.67	1.20	8.38	0.02	0.20
0.19	0.19	0.66	0.8	9.54	1.24	9.24	0.02	0.21
0.20	0.20	0.76	1.0	10.42	1.28	10.10	0.03	0.23
0.21	0.21	0.87	1.1	11.30	1.32	10.96	0.03	0.24
0.22	0.22	0.98	1.3	12.18	1.36	11.83	0.03	0.25
0.23	0.23	1.10	1.6	13.06	1.41	12.69	0.03	0.26
0.24	0.24	1.23	1.8	13.93	1.45	13.55	0.03	0.27
0.25	0.25	1.37	2.1	14.81	1.50	14.41	0.03	0.28
0.26	0.26	1.52	2.3	15.69	1.54	15.27	0.04	0.30
0.27	0.27	1.68	2.7	16.57	1.59	16.14	0.04	0.31
0.28	0.28	1.84	3.0	17.45	1.63	17.00	0.04	0.32
0.29	0.29	2.02	3.4	18.32	1.68	17.86	0.04	0.33
0.30	0.30	2.20	3.8	19.20	1.73	18.72	0.05	0.35
0.31	0.31	2.39	4.2	20.08	1.77	19.59	0.05	0.36
0.32	0.32	2.59	4.7	20.96	1.82	20.45	0.05	0.37
0.33	0.33	2.80	5.2	21.84	1.86	21.31	0.05	0.38
0.34	0.34	3.02	5.8	22.71	1.90	22.17	0.06	0.40
0.35	0.35	3.25	6.3	23.59	1.95	23.03	0.06	0.41
0.36	0.36	3.48	6.9	24.47	1.99	23.90	0.06	0.42
0.37	0.37	3.72	7.6	25.35	2.04	24.76	0.06	0.43
0.38	0.38	3.98	8.3	26.23	2.08	25.62	0.07	0.45
0.39	0.39	4.24	9.0	27.10	2.12	26.48	0.07	0.46
0.40	0.40	4.50	9.7	27.98	2.16	27.35	0.07	0.47
0.41	0.41	4.78	10.6	28.86	2.21	28.21	0.08	0.49
0.42	0.42	5.06	11.6	28.88	2.29	28.21	0.08	0.50
0.43	0.43	5.35	12.7	28.90	2.37	28.22	0.09	0.52

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	15.0	28.94	2.54	28.23	0.10	0.55
0.46	0.46	6.19	16.2	28.96	2.62	28.23	0.11	0.57
0.47	0.47	6.48	17.4	28.98	2.69	28.24	0.11	0.58
0.48	0.48	6.76	18.7	29.01	2.77	28.24	0.12	0.60
0.49	0.49	7.04	20.0	29.03	2.84	28.25	0.13	0.62
0.50	0.50	7.32	21.4	29.05	2.92	28.25	0.13	0.63
0.51	0.51	7.61	22.8	29.07	2.99	28.26	0.14	0.65
0.52	0.52	7.89	24.2	29.09	3.06	28.26	0.15	0.67

0.53	0.53	8.17	25.6	29.11	3.14	28.27	0.15	0.68
0.54	0.54	8.45	27.1	29.13	3.21	28.27	0.16	0.70
0.55	0.55	8.74	28.6	29.15	3.28	28.28	0.17	0.72
0.56	0.56	9.02	30.2	29.17	3.34	28.28	0.17	0.73
0.57	0.57	9.30	31.7	29.19	3.41	28.29	0.18	0.75
0.58	0.58	9.59	33.3	29.21	3.48	28.29	0.19	0.77
0.59	0.59	9.87	35.0	29.23	3.55	28.30	0.20	0.79
0.60	0.60	10.15	36.7	29.25	3.61	28.30	0.20	0.80
0.61	0.61	10.43	38.4	29.27	3.68	28.31	0.21	0.82
0.62	0.62	10.72	40.1	29.29	3.74	28.31	0.22	0.84
0.63	0.63	11.00	41.9	29.31	3.80	28.32	0.22	0.85
0.64	0.64	11.28	43.6	29.34	3.87	28.32	0.23	0.87
0.65	0.65	11.57	45.5	29.36	3.93	28.33	0.24	0.89
0.66	0.66	11.85	47.3	29.38	3.99	28.33	0.25	0.91
0.67	0.67	12.13	49.2	29.40	4.05	28.34	0.26	0.93
0.68	0.68	12.42	50.0	30.44	4.02	30.30	0.25	0.93
0.69	0.69	12.72	50.8	31.49	4.00	31.34	0.25	0.94
0.70	0.70	13.06	51.0	33.45	3.91	32.39	0.24	0.94
0.71	0.71	13.39	52.1	34.50	3.89	33.44	0.24	0.95
0.72	0.72	13.73	53.2	35.54	3.88	34.48	0.23	0.95
0.73	0.73	14.08	54.5	36.59	3.87	35.53	0.23	0.96
0.74	0.74	14.44	55.7	37.64	3.86	36.58	0.23	0.97
0.75	0.75	14.81	57.1	38.68	3.86	37.62	0.23	0.98
0.76	0.76	15.19	58.5	39.73	3.85	38.67	0.23	0.99
0.77	0.77	15.58	60.0	40.78	3.85	39.72	0.23	1.00
0.78	0.78	15.98	61.6	41.83	3.85	40.77	0.23	1.01
0.79	0.79	16.40	63.2	42.87	3.85	41.81	0.23	1.02
0.80	0.80	16.82	64.9	43.92	3.86	42.86	0.23	1.03
0.81	0.81	17.25	66.6	44.97	3.86	43.91	0.23	1.04
0.82	0.82	17.70	68.5	46.01	3.87	44.95	0.23	1.05
0.83	0.83	18.15	70.4	47.06	3.88	46.00	0.23	1.06

ACTUAL FLOW

STREET CAPACITY

90

60" WING 40" @ TC

18.5" 18.5" NET OPEN AREA

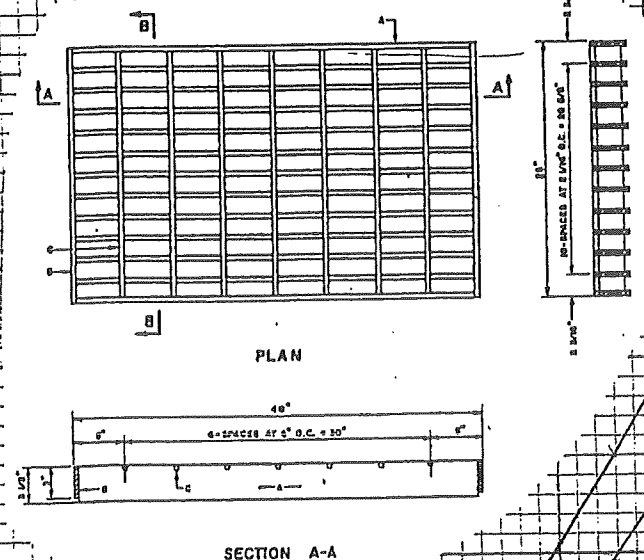
35.5"

GRATE @ 10" (0.83') BELOW TC

EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0\,h^{0.5} + 16.5\,h^{1.5}$	$43.9\,h^{0.5} + 16.5\,h^{1.5}$	$65.9\,h^{0.5} + 16.5\,h^{1.5}$	$87.8\,h^{0.5} + 16.5\,h^{1.5}$
2) 3-SIDED WEIR ($h \le 0.83'$)	$36.4\,h^{1.5}$	$46.2\,h^{1.5}$	$56.0\,h^{1.5}$	$65.7\,h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-.83)^{1.5}$	ADD TO 2): $22(h-.83)^{1.5}$	ADD TO 2): $33(h-.83)^{1.5}$	ADD TO 2): $44(h-.83)^{1.5}$

1) $Q = 0.6A\sqrt{2gh} + 3.3(5')h^{1.5}$

2) & 3) $Q = 3.3\,Ph^{1.5}$



$Q = 27.2$ GRATE CAPACITY (Q) IN CFS

TRIPLE GRATE

DOUBLE GRATE

SINGLE GRATE

TC 0.83'

HEAD (h) IN FEET

BOHANNAN-HUSTON INC.

PROJECT NAME Sun Gate SHEET ____ OF ____

PROJECT NO. Garden Gate Inlet BY ____ DATE ____

SUBJECT RATING CURVE FOR TYPE A INLETS CH'D ____ DATE ____

B-7

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

IRON GATE TRAIL – BASIN C

MANNING'S N= .017 SLOPE= .034

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.46	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.72	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	0.95	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	1.15	1.25	0.02	0.06	
0.05	0.05	0.04	0.1	1.64	1.33	1.56	0.03	0.08	
0.06	0.06	0.06	0.1	1.97	1.50	1.88	0.04	0.10	
0.07	0.07	0.08	0.1	2.30	1.67	2.19	0.04	0.11	
0.08	0.08	0.10	0.2	2.63	1.82	2.50	0.05	0.13	
0.09	0.09	0.13	0.2	2.96	1.97	2.81	0.06	0.15	
0.10	0.10	0.16	0.3	3.29	2.12	3.13	0.07	0.17	
0.11	0.11	0.19	0.4	3.62	2.25	3.44	0.08	0.19	
0.12	0.12	0.23	0.5	3.95	2.39	3.75	0.09	0.21	
0.13	0.13	0.26	0.7	4.28	2.52	4.07	0.10	0.23	
0.14	0.14	0.31	0.8	5.15	2.47	4.93	0.09	0.23	
0.15	0.15	0.36	0.9	6.03	2.47	5.79	0.10	0.25	
0.16	0.16	0.43	1.1	6.91	2.51	6.65	0.10	0.26	
0.17	0.17	0.50	1.3	7.79	2.57	7.51	0.10	0.27	
0.18	0.18	0.58	1.5	8.67	2.64	8.38	0.11	0.29	
0.19	0.19	0.66	1.8	9.54	2.72	9.24	0.12	0.31	
0.20	0.20	0.76	2.1	10.42	2.81	10.10	0.12	0.32	
0.21	0.21	0.87	2.5	11.30	2.91	10.96	0.13	0.34	
0.22	0.22	0.98	2.9	12.18	3.00	11.83	0.14	0.36	
0.23	0.23	1.10	3.4	13.06	3.10	12.69	0.15	0.38	
0.24	0.24	1.23	3.9	13.93	3.20	13.55	0.16	0.40	
0.25	0.25	1.37	4.5	14.81	3.30	14.41	0.17	0.42	
0.26	0.26	1.52	5.2	15.69	3.40	15.27	0.18	0.44	
0.27	0.27	1.68	5.9	16.57	3.50	16.14	0.19	0.46	
0.28	0.28	1.84	6.6	17.45	3.60	17.00	0.20	0.48	
0.29	0.29	2.02	7.5	18.32	3.70	17.86	0.21	0.50	
0.30	0.30	2.20	8.4	19.20	3.80	18.72	0.22	0.52	(LOT 77) ROLL CURB LIMIT
0.31	0.31	2.39	9.3	20.08	3.90	19.59	0.24	0.55	
0.32	0.32	2.59	10.4	20.96	4.00	20.45	0.25	0.57	
0.33	0.33	2.80	11.5	21.84	4.10	21.31	0.26	0.59	
0.34	0.34	3.02	12.7	22.71	4.20	22.17	0.27	0.61	
0.35	0.35	3.25	13.9	23.59	4.30	23.03	0.29	0.64	ACTUAL Q
0.36	0.36	3.48	15.3	24.47	4.39	23.90	0.30	0.66	
0.37	0.37	3.72	16.7	25.35	4.49	24.76	0.31	0.68	
0.38	0.38	3.98	18.2	26.23	4.58	25.62	0.33	0.71	
0.39	0.39	4.24	19.8	27.10	4.68	26.48	0.34	0.73	
0.40	0.40	4.50	21.5	27.98	4.77	27.35	0.35	0.75	
0.41	0.41	4.78	23.3	28.86	4.86	28.21	0.37	0.78	
0.42	0.42	5.06	25.6	28.88	5.05	28.21	0.40	0.82	
0.43	0.43	5.35	28.0	28.90	5.23	28.22	0.43	0.86	STREET CAPACITY

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	33.0	28.94	5.59	28.23	0.49	0.94
0.46	0.46	6.19	35.7	28.96	5.76	28.23	0.52	0.98
0.47	0.47	6.48	38.4	28.98	5.93	28.24	0.55	1.02
0.48	0.48	6.76	41.2	29.01	6.10	28.24	0.58	1.06
0.49	0.49	7.04	44.1	29.03	6.27	28.25	0.61	1.10
0.50	0.50	7.32	47.1	29.05	6.43	28.25	0.64	1.14
0.51	0.51	7.61	50.2	29.07	6.59	28.26	0.68	1.19
0.52	0.52	7.89	53.3	29.09	6.75	28.26	0.71	1.23

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

GARDEN GATE LANE — BASIN C

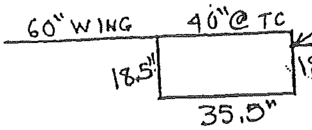
MANNING'S N= .017 SLOPE= .007

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.21	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.33	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.43	0.94	0.00	0.03
0.04	0.04	0.03	0.0	1.32	0.52	1.25	0.00	0.04
0.05	0.05	0.04	0.0	1.64	0.60	1.56	0.01	0.06
0.06	0.06	0.06	0.0	1.97	0.68	1.88	0.01	0.07
0.07	0.07	0.08	0.1	2.30	0.76	2.19	0.01	0.08
0.08	0.08	0.10	0.1	2.63	0.83	2.50	0.01	0.09
0.09	0.09	0.13	0.1	2.96	0.89	2.81	0.01	0.10
0.10	0.10	0.16	0.2	3.29	0.96	3.13	0.01	0.11
0.11	0.11	0.19	0.2	3.62	1.02	3.44	0.02	0.13
0.12	0.12	0.23	0.2	3.95	1.08	3.75	0.02	0.14
0.13	0.13	0.26	0.3	4.28	1.14	4.07	0.02	0.15
0.14	0.14	0.31	0.3	5.15	1.12	4.93	0.02	0.16
0.15	0.15	0.36	0.4	6.03	1.12	5.79	0.02	0.17
0.16	0.16	0.43	0.5	6.91	1.14	6.65	0.02	0.18
0.17	0.17	0.50	0.6	7.79	1.17	7.51	0.02	0.19
0.18	0.18	0.58	0.7	8.67	1.20	8.38	0.02	0.20
0.19	0.19	0.66	0.8	9.54	1.24	9.24	0.02	0.21
0.20	0.20	0.76	1.0	10.42	1.28	10.10	0.03	0.23
0.21	0.21	0.87	1.1	11.30	1.32	10.96	0.03	0.24
0.22	0.22	0.98	1.3	12.18	1.36	11.83	0.03	0.25
0.23	0.23	1.10	1.6	13.06	1.41	12.69	0.03	0.26
0.24	0.24	1.23	1.8	13.93	1.45	13.55	0.03	0.27
0.25	0.25	1.37	2.1	14.81	1.50	14.41	0.03	0.28
0.26	0.26	1.52	2.3	15.69	1.54	15.27	0.04	0.30
0.27	0.27	1.68	2.7	16.57	1.59	16.14	0.04	0.31
0.28	0.28	1.84	3.0	17.45	1.63	17.00	0.04	0.32
0.29	0.29	2.02	3.4	18.32	1.68	17.86	0.04	0.33
0.30	0.30	2.20	3.8	19.20	1.73	18.72	0.05	0.35
0.31	0.31	2.39	4.2	20.08	1.77	19.59	0.05	0.36
0.32	0.32	2.59	4.7	20.96	1.82	20.45	0.05	0.37
0.33	0.33	2.80	5.2	21.84	1.86	21.31	0.05	0.38
0.34	0.34	3.02	5.8	22.71	1.90	22.17	0.06	0.40
0.35	0.35	3.25	6.3	23.59	1.95	23.03	0.06	0.41
0.36	0.36	3.48	6.9	24.47	1.99	23.90	0.06	0.42
0.37	0.37	3.72	7.6	25.35	2.04	24.76	0.06	0.43
0.38	0.38	3.98	8.3	26.23	2.08	25.62	0.07	0.45
0.39	0.39	4.24	9.0	27.10	2.12	26.48	0.07	0.46
0.40	0.40	4.50	9.7	27.98	2.16	27.35	0.07	0.47
0.41	0.41	4.78	10.6	28.86	2.21	28.21	0.08	0.49
0.42	0.42	5.06	11.6	28.88	2.29	28.21	0.08	0.50
0.43	0.43	5.35	12.7	28.90	2.37	28.22	0.09	0.52

ACTUAL Q

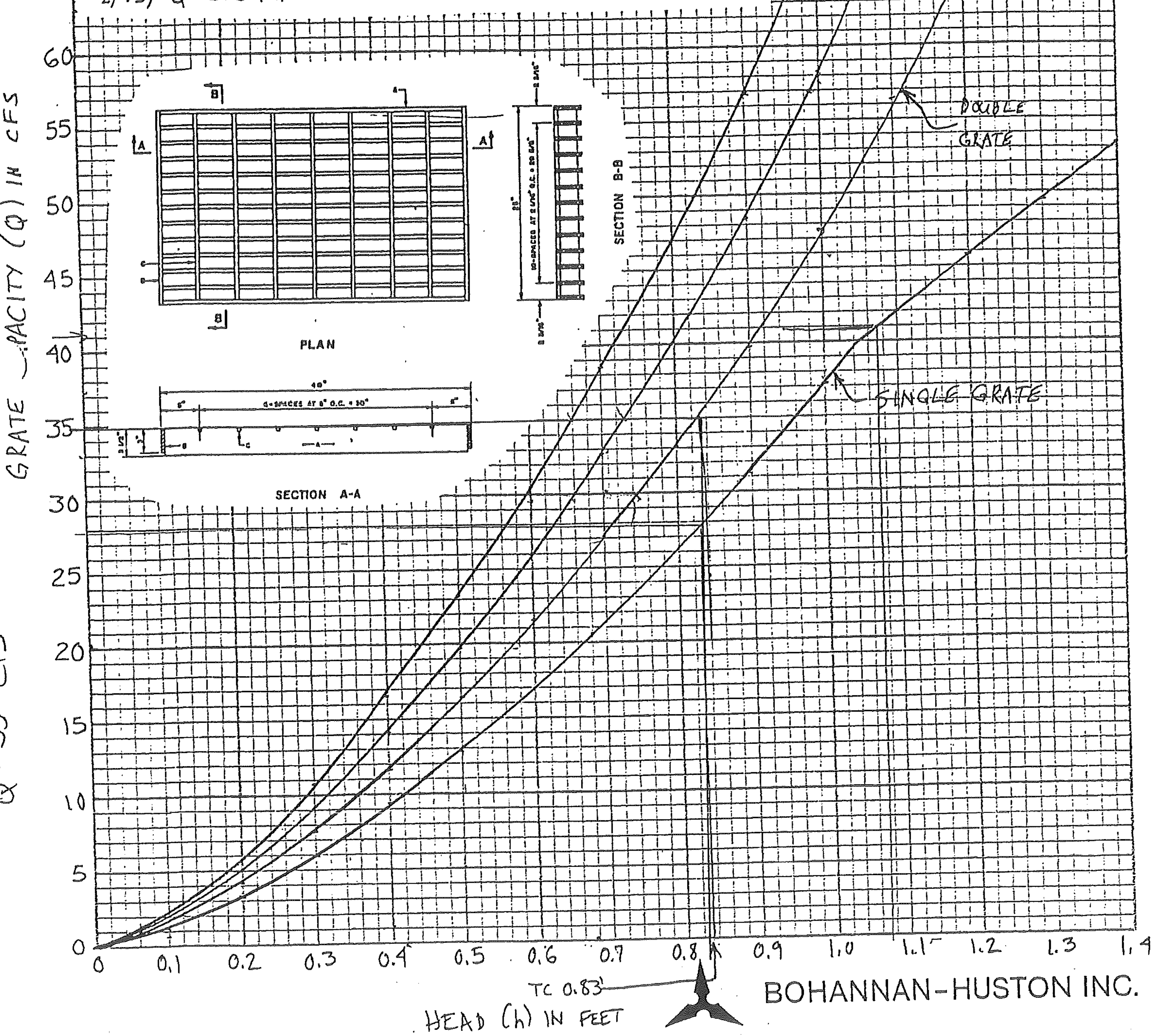
WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	15.0	28.94	2.54	28.23	0.10	0.55
0.46	0.46	6.19	16.2	28.96	2.62	28.23	0.11	0.57
0.47	0.47	6.48	17.4	28.98	2.69	28.24	0.11	0.58
0.48	0.48	6.76	18.7	29.01	2.77	28.24	0.12	0.60
0.49	0.49	7.04	20.0	29.03	2.84	28.25	0.13	0.62
0.50	0.50	7.32	21.4	29.05	2.92	28.25	0.13	0.63
0.51	0.51	7.61	22.8	29.07	2.99	28.26	0.14	0.65
0.52	0.52	7.89	24.2	29.09	3.06	28.26	0.15	0.67



EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0\,h^{0.5} + 16.5\,h^{1.5}$	$43.9\,h^{0.5} + 16.5\,h^{1.5}$	$65.9\,h^{0.5} + 16.5\,h^{1.5}$	$87.8\,h^{0.5} + 16.5\,h^{1.5}$
2) 3-SIDED WEIR ($h \le 0.83'$)	$36.4h^{1.5}$	$46.2h^{1.5}$	$56.0h^{1.5}$	$65.7h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-.83)^{1.5}$	ADD TO 2): $22(h-.83)^{1.5}$	ADD TO 2): $33(h-.83)^{1.5}$	ADD TO 2): $44(h-.83)^{1.5}$

1) $Q = 0.6A\sqrt{2gh} + 3.3(5')\,h^{1.5}$

2) & 3) $Q = 3.3\,P\,h^{1.5}$



Q=35 cfs

BOHANNAN-HUSTON INC.

PROJECT NAME Sun Gate SHEET ____ OF ____

PROJECT NO. Garden Gate + Stone Gate BY ____ DATE ____

SUBJECT RATING CURVE FOR TYPE A INLETS CH'D ____ DATE ____

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

SUN GATE TRAIL — BASIN D

MANNING'S N= .017 SLOPE= .0395

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.49	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.78	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	1.02	0.94	0.02	0.05	
0.04	0.04	0.03	0.0	1.32	1.24	1.25	0.02	0.06	
0.05	0.05	0.04	0.1	1.64	1.44	1.56	0.03	0.08	
0.06	0.06	0.06	0.1	1.97	1.62	1.88	0.04	0.10	
0.07	0.07	0.08	0.1	2.30	1.80	2.19	0.05	0.12	
0.08	0.08	0.10	0.2	2.63	1.96	2.50	0.06	0.14	
0.09	0.09	0.13	0.3	2.96	2.13	2.81	0.07	0.16	
0.10	0.10	0.16	0.4	3.29	2.28	3.13	0.08	0.18	
0.11	0.11	0.19	0.5	3.62	2.43	3.44	0.09	0.20	
0.12	0.12	0.23	0.6	3.95	2.57	3.75	0.10	0.22	
0.13	0.13	0.26	0.7	4.28	2.72	4.07	0.11	0.24	
0.14	0.14	0.31	0.8	5.15	2.66	4.93	0.11	0.25	
0.15	0.15	0.36	1.0	6.03	2.67	5.79	0.11	0.26	
0.16	0.16	0.43	1.2	6.91	2.71	6.65	0.11	0.27	
0.17	0.17	0.50	1.4	7.79	2.77	7.51	0.12	0.29	
0.18	0.18	0.58	1.6	8.67	2.85	8.38	0.13	0.31	
0.19	0.19	0.66	1.9	9.54	2.94	9.24	0.13	0.32	
0.20	0.20	0.76	2.3	10.42	3.03	10.10	0.14	0.34	
0.21	0.21	0.87	2.7	11.30	3.13	10.96	0.15	0.36	
0.22	0.22	0.98	3.2	12.18	3.24	11.83	0.16	0.38	
0.23	0.23	1.10	3.7	13.06	3.34	12.69	0.17	0.40	
0.24	0.24	1.23	4.3	13.93	3.45	13.55	0.18	0.42	
0.25	0.25	1.37	4.9	14.81	3.56	14.41	0.20	0.45	
0.26	0.26	1.52	5.6	15.69	3.67	15.27	0.21	0.47	
0.27	0.27	1.68	6.3	16.57	3.78	16.14	0.22	0.49	
0.28	0.28	1.84	7.2	17.45	3.88	17.00	0.23	0.51	
0.29	0.29	2.02	8.1	18.32	3.99	17.86	0.25	0.54	ROLL CURB LIMIT (LOT 55)
0.30	0.30	2.20	9.0	19.20	4.10	18.72	0.26	0.56	
0.31	0.31	2.39	10.1	20.08	4.21	19.59	0.27	0.58	
0.32	0.32	2.59	11.2	20.96	4.31	20.45	0.29	0.61	
0.33	0.33	2.80	12.4	21.84	4.42	21.31	0.30	0.63	
0.34	0.34	3.02	13.7	22.71	4.52	22.17	0.32	0.66	
0.35	0.35	3.25	15.0	23.59	4.63	23.03	0.33	0.68	
0.36	0.36	3.48	16.5	24.47	4.73	23.90	0.35	0.71	ACTUAL Q
0.37	0.37	3.72	18.0	25.35	4.84	24.76	0.36	0.73	
0.38	0.38	3.98	19.6	26.23	4.94	25.62	0.38	0.76	
0.39	0.39	4.24	21.3	27.10	5.04	26.48	0.39	0.78	
0.40	0.40	4.50	23.2	27.98	5.14	27.35	0.41	0.81	
0.41	0.41	4.78	25.1	28.86	5.24	28.21	0.43	0.84	
0.42	0.42	5.06	27.6	28.88	5.44	28.21	0.46	0.88	STREET CAPACITY
0.43	0.43	5.35	30.2	28.90	5.64	28.22	0.49	0.92	

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	35.6	28.94	6.03	28.23	0.56	1.01
0.46	0.46	6.19	38.5	28.96	6.21	28.23	0.60	1.06
0.47	0.47	6.48	41.4	28.98	6.40	28.24	0.64	1.11
0.48	0.48	6.76	44.5	29.01	6.58	28.24	0.67	1.15
0.49	0.49	7.04	47.6	29.03	6.76	28.25	0.71	1.20
0.50	0.50	7.32	50.8	29.05	6.93	28.25	0.75	1.25
0.51	0.51	7.61	54.1	29.07	7.11	28.26	0.78	1.29
0.52	0.52	7.89	57.4	29.09	7.28	28.26	0.82	1.34

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

MEADOW GATE TRAIL – BASIN E

MANNING'S N= .017 SLOPE= .0361

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.47	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.75	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	0.98	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	1.18	1.25	0.02	0.06	
0.05	0.05	0.04	0.1	1.64	1.37	1.56	0.03	0.08	
0.06	0.06	0.06	0.1	1.97	1.55	1.88	0.04	0.10	
0.07	0.07	0.08	0.1	2.30	1.72	2.19	0.05	0.12	
0.08	0.08	0.10	0.2	2.63	1.88	2.50	0.05	0.13	
0.09	0.09	0.13	0.3	2.96	2.03	2.81	0.06	0.15	
0.10	0.10	0.16	0.3	3.29	2.18	3.13	0.07	0.17	
0.11	0.11	0.19	0.4	3.62	2.32	3.44	0.08	0.19	
0.12	0.12	0.23	0.6	3.95	2.46	3.75	0.09	0.21	
0.13	0.13	0.26	0.7	4.28	2.60	4.07	0.10	0.23	
0.14	0.14	0.31	0.8	5.15	2.55	4.93	0.10	0.24	
0.15	0.15	0.36	0.9	6.03	2.55	5.79	0.10	0.25	
0.16	0.16	0.43	1.1	6.91	2.59	6.65	0.10	0.26	
0.17	0.17	0.50	1.3	7.79	2.65	7.51	0.11	0.28	
0.18	0.18	0.58	1.6	8.67	2.72	8.38	0.12	0.30	
0.19	0.19	0.66	1.9	9.54	2.81	9.24	0.12	0.31	
0.20	0.20	0.76	2.2	10.42	2.90	10.10	0.13	0.33	
0.21	0.21	0.87	2.6	11.30	3.00	10.96	0.14	0.35	
0.22	0.22	0.98	3.0	12.18	3.09	11.83	0.15	0.37	
0.23	0.23	1.10	3.5	13.06	3.20	12.69	0.16	0.39	
0.24	0.24	1.23	4.1	13.93	3.30	13.55	0.17	0.41	
0.25	0.25	1.37	4.7	14.81	3.40	14.41	0.18	0.43	
0.26	0.26	1.52	5.3	15.69	3.51	15.27	0.19	0.45	
0.27	0.27	1.68	6.1	16.57	3.61	16.14	0.20	0.47	
0.28	0.28	1.84	6.8	17.45	3.71	17.00	0.21	0.49	
0.29	0.29	2.02	7.7	18.32	3.82	17.86	0.23	0.52	ROLL CURB LIMIT (LOT 20)
0.30	0.30	2.20	8.6	19.20	3.92	18.72	0.24	0.54	
0.31	0.31	2.39	9.6	20.08	4.02	19.59	0.25	0.56	
0.32	0.32	2.59	10.7	20.96	4.12	20.45	0.26	0.58	
0.33	0.33	2.80	11.8	21.84	4.23	21.31	0.28	0.61	
0.34	0.34	3.02	13.1	22.71	4.33	22.17	0.29	0.63	
0.35	0.35	3.25	14.4	23.59	4.43	23.03	0.30	0.65	
0.36	0.36	3.48	15.7	24.47	4.52	23.90	0.32	0.68	
0.37	0.37	3.72	17.2	25.35	4.62	24.76	0.33	0.70	
0.38	0.38	3.98	18.8	26.23	4.72	25.62	0.35	0.73	
0.39	0.39	4.24	20.4	27.10	4.82	26.48	0.36	0.75	ACTUAL Q
0.40	0.40	4.50	22.1	27.98	4.91	27.35	0.38	0.78	
0.41	0.41	4.78	24.0	28.86	5.01	28.21	0.39	0.80	
0.42	0.42	5.06	26.4	28.88	5.20	28.21	0.42	0.84	
0.43	0.43	5.35	28.8	28.90	5.39	28.22	0.45	0.88	STREET CAPACITY

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	34.0	28.94	5.76	28.23	0.52	0.97
0.46	0.46	6.19	36.8	28.96	5.94	28.23	0.55	1.01
0.47	0.47	6.48	39.6	28.98	6.12	28.24	0.58	1.05
0.48	0.48	6.76	42.5	29.01	6.29	28.24	0.61	1.09
0.49	0.49	7.04	45.5	29.03	6.46	28.25	0.65	1.14
0.50	0.50	7.32	48.5	29.05	6.63	28.25	0.68	1.18
0.51	0.51	7.61	51.7	29.07	6.79	28.26	0.72	1.23
0.52	0.52	7.89	54.9	29.09	6.96	28.26	0.75	1.27

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

GARDEN GATE LANE — BASIN E

MANNING'S N= .017 SLOPE= .02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

☐ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.35	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.55	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.73	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	0.88	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	1.02	1.56	0.02	0.07	
0.06	0.06	0.06	0.1	1.97	1.15	1.88	0.02	0.08	
0.07	0.07	0.08	0.1	2.30	1.28	2.19	0.03	0.10	
0.08	0.08	0.10	0.1	2.63	1.40	2.50	0.03	0.11	
0.09	0.09	0.13	0.2	2.96	1.51	2.81	0.04	0.13	
0.10	0.10	0.16	0.3	3.29	1.62	3.13	0.04	0.14	
0.11	0.11	0.19	0.3	3.62	1.73	3.44	0.05	0.16	
0.12	0.12	0.23	0.4	3.95	1.83	3.75	0.05	0.17	
0.13	0.13	0.26	0.5	4.28	1.93	4.07	0.06	0.19	
0.14	0.14	0.31	0.6	5.15	1.89	4.93	0.06	0.20	
0.15	0.15	0.36	0.7	6.03	1.90	5.79	0.06	0.21	
0.16	0.16	0.43	0.8	6.91	1.93	6.65	0.06	0.22	
0.17	0.17	0.50	1.0	7.79	1.97	7.51	0.06	0.23	
0.18	0.18	0.58	1.2	8.67	2.03	8.38	0.06	0.24	
0.19	0.19	0.66	1.4	9.54	2.09	9.24	0.07	0.26	
0.20	0.20	0.76	1.6	10.42	2.16	10.10	0.07	0.27	
0.21	0.21	0.87	1.9	11.30	2.23	10.96	0.08	0.29	
0.22	0.22	0.98	2.3	12.18	2.30	11.83	0.08	0.30	
0.23	0.23	1.10	2.6	13.06	2.38	12.69	0.09	0.32	
0.24	0.24	1.23	3.0	13.93	2.45	13.55	0.09	0.33	
0.25	0.25	1.37	3.5	14.81	2.53	14.41	0.10	0.35	
0.26	0.26	1.52	4.0	15.69	2.61	15.27	0.11	0.37	
0.27	0.27	1.68	4.5	16.57	2.69	16.14	0.11	0.38	
0.28	0.28	1.84	5.1	17.45	2.76	17.00	0.12	0.40	
0.29	0.29	2.02	5.7	18.32	2.84	17.86	0.13	0.42	
0.30	0.30	2.20	6.4	19.20	2.92	18.72	0.13	0.43	
0.31	0.31	2.39	7.2	20.08	2.99	19.59	0.14	0.45	
0.32	0.32	2.59	8.0	20.96	3.07	20.45	0.15	0.47	
0.33	0.33	2.80	8.8	21.84	3.14	21.31	0.15	0.48	
0.34	0.34	3.02	9.7	22.71	3.22	22.17	0.16	0.50	
0.35	0.35	3.25	10.7	23.59	3.29	23.03	0.17	0.52	
0.36	0.36	3.48	11.7	24.47	3.37	23.90	0.18	0.54	
0.37	0.37	3.72	12.8	25.35	3.44	24.76	0.18	0.55	
0.38	0.38	3.98	14.0	26.23	3.51	25.62	0.19	0.57	
0.39	0.39	4.24	15.2	27.10	3.59	26.48	0.20	0.59	
0.40	0.40	4.50	16.5	27.98	3.66	27.35	0.21	0.61	
0.41	0.41	4.78	17.8	28.86	3.73	28.21	0.22	0.63	
0.42	0.42	5.06	19.6	28.88	3.87	28.21	0.23	0.65	ACTUAL Q
0.43	0.43	5.35	21.5	28.90	4.01	28.22	0.25	0.68	

☐ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	5.91	25.3	28.94	4.29	28.23	0.29	0.74	
0.46	0.46	6.19	27.4	28.96	4.42	28.23	0.30	0.76	
0.47	0.47	6.48	29.5	28.98	4.55	28.24	0.32	0.79	
0.48	0.48	6.76	31.6	29.01	4.68	28.24	0.34	0.82	
0.49	0.49	7.04	33.9	29.03	4.81	28.25	0.36	0.85	STREET CAPACITY
0.50	0.50	7.32	36.1	29.05	4.93	28.25	0.38	0.88	
0.51	0.51	7.61	38.5	29.07	5.06	28.26	0.40	0.91	
0.52	0.52	7.89	40.9	29.09	5.18	28.26	0.42	0.94	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

GARDEN GATE LANE – BASIN D

MANNING'S N= .017 SLOPE= .033

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

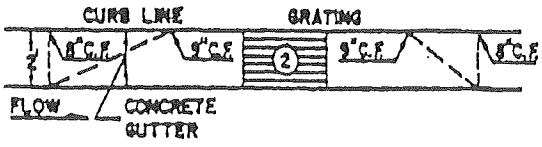
☐ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.45	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.71	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.93	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.13	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.31	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.48	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.64	2.19	0.04	0.11
0.08	0.08	0.10	0.2	2.63	1.80	2.50	0.05	0.13
0.09	0.09	0.13	0.2	2.96	1.94	2.81	0.06	0.15
0.10	0.10	0.16	0.3	3.29	2.08	3.13	0.07	0.17
0.11	0.11	0.19	0.4	3.62	2.22	3.44	0.08	0.19
0.12	0.12	0.23	0.5	3.95	2.35	3.75	0.09	0.21
0.13	0.13	0.26	0.7	4.28	2.48	4.07	0.10	0.23
0.14	0.14	0.31	0.8	5.15	2.43	4.93	0.09	0.23
0.15	0.15	0.36	0.9	6.03	2.44	5.79	0.09	0.24
0.16	0.16	0.43	1.1	6.91	2.47	6.65	0.10	0.26
0.17	0.17	0.50	1.3	7.79	2.53	7.51	0.10	0.27
0.18	0.18	0.58	1.5	8.67	2.60	8.38	0.11	0.29
0.19	0.19	0.66	1.8	9.54	2.68	9.24	0.11	0.30
0.20	0.20	0.76	2.1	10.42	2.77	10.10	0.12	0.32
0.21	0.21	0.87	2.5	11.30	2.86	10.96	0.13	0.34
0.22	0.22	0.98	2.9	12.18	2.96	11.83	0.14	0.36
0.23	0.23	1.10	3.4	13.06	3.06	12.69	0.14	0.37
0.24	0.24	1.23	3.9	13.93	3.15	13.55	0.15	0.39
0.25	0.25	1.37	4.5	14.81	3.25	14.41	0.16	0.41
0.26	0.26	1.52	5.1	15.69	3.35	15.27	0.17	0.43
0.27	0.27	1.68	5.8	16.57	3.45	16.14	0.18	0.45
0.28	0.28	1.84	6.5	17.45	3.55	17.00	0.20	0.48
0.29	0.29	2.02	7.4	18.32	3.65	17.86	0.21	0.50
0.30	0.30	2.20	8.2	19.20	3.75	18.72	0.22	0.52
0.31	0.31	2.39	9.2	20.08	3.85	19.59	0.23	0.54
0.32	0.32	2.59	10.2	20.96	3.94	20.45	0.24	0.56
0.33	0.33	2.80	11.3	21.84	4.04	21.31	0.25	0.58
0.34	0.34	3.02	12.5	22.71	4.14	22.17	0.27	0.61
0.35	0.35	3.25	13.7	23.59	4.23	23.03	0.28	0.63
0.36	0.36	3.48	15.1	24.47	4.33	23.90	0.29	0.65
0.37	0.37	3.72	16.5	25.35	4.42	24.76	0.30	0.67
0.38	0.38	3.98	17.9	26.23	4.51	25.62	0.32	0.70
0.39	0.39	4.24	19.5	27.10	4.61	26.48	0.33	0.72
0.40	0.40	4.50	21.2	27.98	4.70	27.35	0.34	0.74
0.41	0.41	4.78	22.9	28.86	4.79	28.21	0.36	0.77
0.42	0.42	5.06	25.2	28.88	4.97	28.21	0.38	0.80
0.43	0.43	5.35	27.6	28.90	5.16	28.22	0.41	0.84

STREET CAPACITY

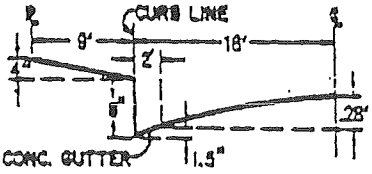
☐ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	32.6	28.94	5.51	28.23	0.47	0.92
0.46	0.46	6.19	35.2	28.96	5.68	28.23	0.50	0.96
0.47	0.47	6.48	37.9	28.98	5.85	28.24	0.53	1.00
0.48	0.48	6.76	40.6	29.01	6.01	28.24	0.56	1.04
0.49	0.49	7.04	43.5	29.03	6.18	28.25	0.59	1.08
0.50	0.50	7.32	46.4	29.05	6.34	28.25	0.62	1.12
0.51	0.51	7.61	49.4	29.07	6.50	28.26	0.66	1.17
0.52	0.52	7.89	52.5	29.09	6.65	28.26	0.69	1.21

ACTUAL Q = 36.8

GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

Q = 7.8 cfs

D = 0.46'

PLATE 22.3 D-5

Garden Gate Lane
Basin D
Slope = 3.3%

B-15/15

APPENDIX C

INFRASTRUCTURE LIST

Current DRC
Project No. _____

Date Submitted: January 8, 2004

Date Site Plan Approved: _____

Date Preliminary Plat Approved: _____

Date Preliminary Plat Expiers: _____

Figure 12

INFRASTRUCTURE LIST

EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

DRB Project No. _____

SUN GATE SUBDIVISION
PRELIMINARY PLAT

APPLICATION NO.

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
			ONSITE PUBLIC ROADWAY IMPROVEMENTS						
		30' EOA-F	ARTERIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON SOUTH SIDE ONLY	GIBSON BLVD.	MESA ARENOSO DR.	BLAKE ROAD	/	/	/
		24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON WEST SIDE ONLY	BLAKE ROAD	GIBSON BOULEVARD	OPEN RANGE AVENUE	/	/	/
		16' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON EAST SIDE ONLY	MESA ARENOSO DR	GIBSON BOULEVARD	OPEN RANGE AVENUE	/	/	/
		24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY	OPEN RANGE AVE.	BLAKE ROAD	MESA ARENOSO DRIVE	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY*	CORRAL GATE LANE	WEST STUB TERMINUS	MEADOW GATE TRAIL	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CORRAL GATE LANE	MEADOW GATE TRAIL	BRIDAL GATE TRAIL	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY*	CORRAL GATE LANE	BRIDAL GATE TRAIL	EAST STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	MEADOW GATE TRAIL	CORRAL GATE LANE	GARDEN GATE LANE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	SUN GATE TRAIL	CORRAL GATE LANE	GARDEN GATE LANE	/	/	/

I-2

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	IRON GATE TRAIL	CORRAL GATE LANE	GARDEN GATE LANE	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON SOUTH SIDE ONLY*	GARDEN GATE LANE	WEST STUB TERMINUS	MEADOW GATE TRAIL	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	GARDEN GATE LANE	MEADOW GATE TRAIL	BRIDAL GATE TRAIL	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON SOUTH SIDE ONLY*	GARDEN GATE LANE	BRIDAL GATE TRAIL	EAST STUB TERMINUS	/	/	/
							/	/	/

* SIDEWALKS TO BE DEFERRED PER DEFERRAL EXHIBIT 'B'.

STREET LIGHTS AS PER COA DPM

ONSITE PUBLIC STORM DRAIN IMPROVEMENTS

		18"-36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	GARDEN GATE LANE	EAST STUB TERMINUS	RETENTION POND	/	/	/
		66" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	OPEN RANGE AVENUE	MESA ARENOSA DR.	BLAKE ROAD	/	/	/
		18" - 36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	GARDEN GATE LANE	SUN GATE TRAIL	STONE GATE WAY	/	/	/
			2.7 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	TRACT 34D-1-A			/	/	/

NOTE: A GRADING AND DRAINAGE CERTIFICATION OF THE APPROVED GRADING PLAN IS REQUIRED PRIOR TO THE RELEASE OF FINANCIAL GUARANTEES.

NINA LEUNG PREPARED BY: PRINT NAME		DRB CHAIR	DATE	PARKS & RECREATION DEPARTMENT	DATE
BOHANNAN HUSTON INC. FIRM:		TRANSPORTATION DEVELOPMENT	DATE	AMAFCA	DATE
SIGNATURE	DATE	UTILITY DEVELOPMENT	DATE	CITY ENGINEER	DATE
MAXIMUM TIME ALLOW TO CONSTRUCT IMPROVEMENTS WITHOUT A DRB EXTENSION		NEW MEXICO UTILITIES INC.	DATE		DATE

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT	AGENT/OWNER

EXHIBITS

EXHIBIT 1 - PRELIMINARY PLAT

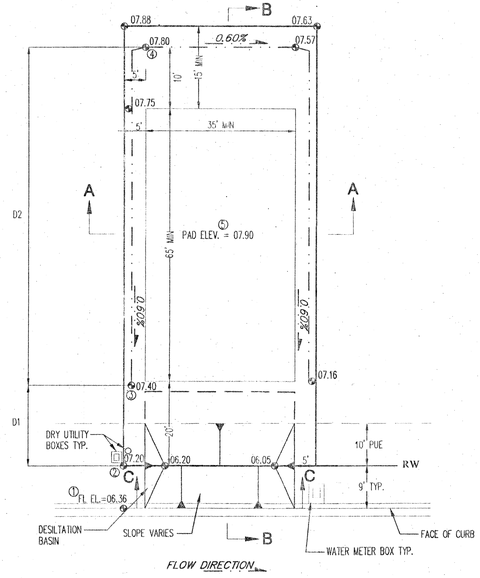
EXHIBIT 2 - GRADING PLAN

EXHIBIT 3 - DEVELOPED CONDITIONS BASIN MAP

EXHIBIT 4 - MASTER STORM DRAIN BASIN MAP

EXHIBIT 1

PRELIMINARY PLAT

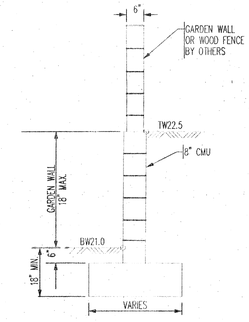


SUN GATE SUBDIVISION
TYPICAL LOT GRADE DETAIL
WITH DESILTATION BASIN FOR SEDIMENTATION CONTROL

NOT TO SCALE

TO SET SPOT ② – ADD 0.84' TO SPOT ①
TO SET SPOT ③ – MULTIPLY D1 BY 1.1% AND ADD TO SPOT ②
TO SET SPOT ④ – MULTIPLY D2 BY 0.5% AND ADD TO SPOT ③
TO SET SPOT ⑤ – ADD 0.2' TO SPOT ④

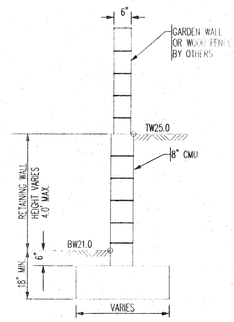
BOTTOM OF BASIN IS 1' BELOW PROPERTY LINE ELEVATION.
SEE GRADING PLANS FOR EXACT ELEVATIONS.
CONTRACTOR SHALL CONSTRUCT TEMPORARY DESILTATION BASIN AT EACH LOT.



TW=FINISHED GRADE ELEVATION AT TOP OF RETAINING WALL
BW=FINISHED GRADE ELEVATION AT BOTTOM OF RETAINING WALL

TYPICAL GARDEN WALL NOMENCLATURE
NOT TO SCALE

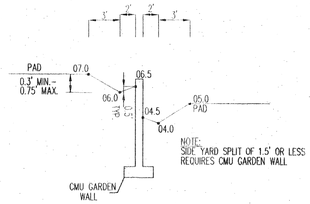
(RETAINING HEIGHT IS TAKEN TO BE DIFFERENCE IN FINISHED GRADES ON LEFT AND RIGHT SIDE OF WALL.)



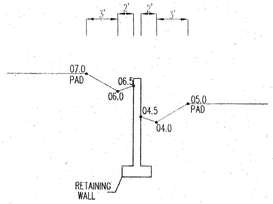
TW=FINISHED GRADE ELEVATION AT TOP OF RETAINING WALL
BW=FINISHED GRADE ELEVATION AT BOTTOM OF RETAINING WALL

TYPICAL RETAINING WALL NOMENCLATURE
NOT TO SCALE

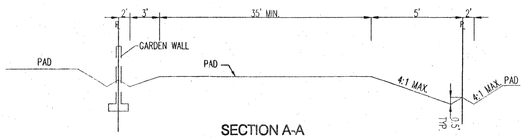
(RETAINING HEIGHT IS TAKEN TO BE DIFFERENCE IN FINISHED GRADES ON LEFT AND RIGHT SIDE OF WALL.)



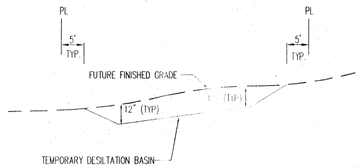
SIDE YARD GARDEN WALL DETAIL
NOT TO SCALE



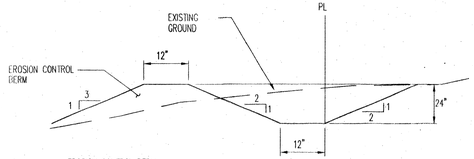
SIDE YARD RETAINING WALL DETAIL
NOT TO SCALE



SECTION A-A
TYPICAL SIDE YARD SWALE
NOT TO SCALE



SECTION C-C
NOT TO SCALE



EROSION CONTROL BERM

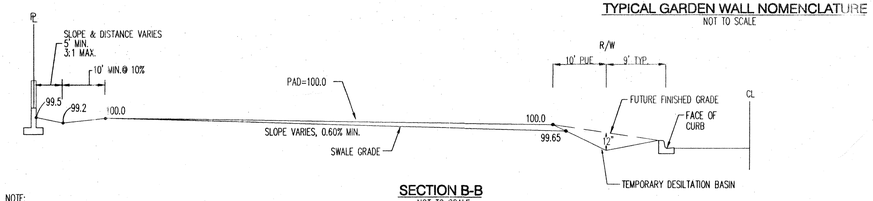
1. TO PREVENT EROSION FROM THE SITE, DURING GRADING & CONSTRUCTION OPERATIONS, A BERM OF THE ABOVE DIMENSIONS SHALL BE MAINTAINED ON THE WEST WEST BOUNDARY OF THE SITE.

2. WIND EROSION SHALL BE PREVENTED BY MAINTAINING AN ADEQUATELY MOISTENED SITE.

3. AFTER CONSTRUCTION ALL SURFACES WILL BE PAVED OR LANDSCAPED TO PREVENT EROSION.

4. CONTRACTOR MUST OBTAIN A TOP SOIL DISTURBANCE PERMIT FROM ENVIRONMENTAL HEALTH DIVISION PRIOR TO CONSTRUCTION

EROSION CONTROL PLAN
NOT TO SCALE



SECTION B-B
NOT TO SCALE

NOTE:

1. CONTRACTOR IS TO MASS GRADE ROADS TO 2' BEYOND FUTURE CURB. EXCESS FROM DRY UTILITY TRENCH IS TO BE USED TO BACK FILL BEHIND CURB.

2. FRONT YARDS ARE TO BE GRADED AS SHOWN ON THIS DETAL FOR FINAL GRADING AND CERTIFICATION THIS DETAIL TO BE COORDINATED WITH.

3. HOME BUILDER TO BRING FRONT YARD TO ULTIMATE FRONT YARD GRADES AFTER HOME CONSTRUCTION IS COMPLETED. SEE ULTIMATE FRONT YARD GRADING DETAIL ON THIS SHEET.

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January 08, 2004 – 1:04pm

AS-BUILT INFORMATION
CONTRACTOR DATE
STAKED BY DATE
INSPECTORS FIELD NOTES BY DATE
VERIFICATION BY DATE
CORRECTED BY DATE

BENCH MARKS
ACS BRASS TABLET STAMPED "TRANS"
Geographic Position (NAD 1927)
N.M. State Plane Coordinates (Central Zone)
X= 354,899.45 Y= 1,471,822.67
Ground-to-Grid Factor = 0.99967921
ΔCC = -00°16'42"
SLD 1929 Elevation = 5118.43

MICROFILM INFORMATION
RECORDED BY DATE
NO.

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL
RICHARD L. BOHANNAN NEW MEXICO 10598 REGISTERED PROFESSIONAL ENGINEER

No.	Date	REMARKS REVISIONS DESIGN	By
		Designed By: SJS	DATE: 01/04
		Drawn By: DH	DATE: 01/04
		Checked By: RLB	DATE: 01/04

Bohannan ▲ Huston Inc.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

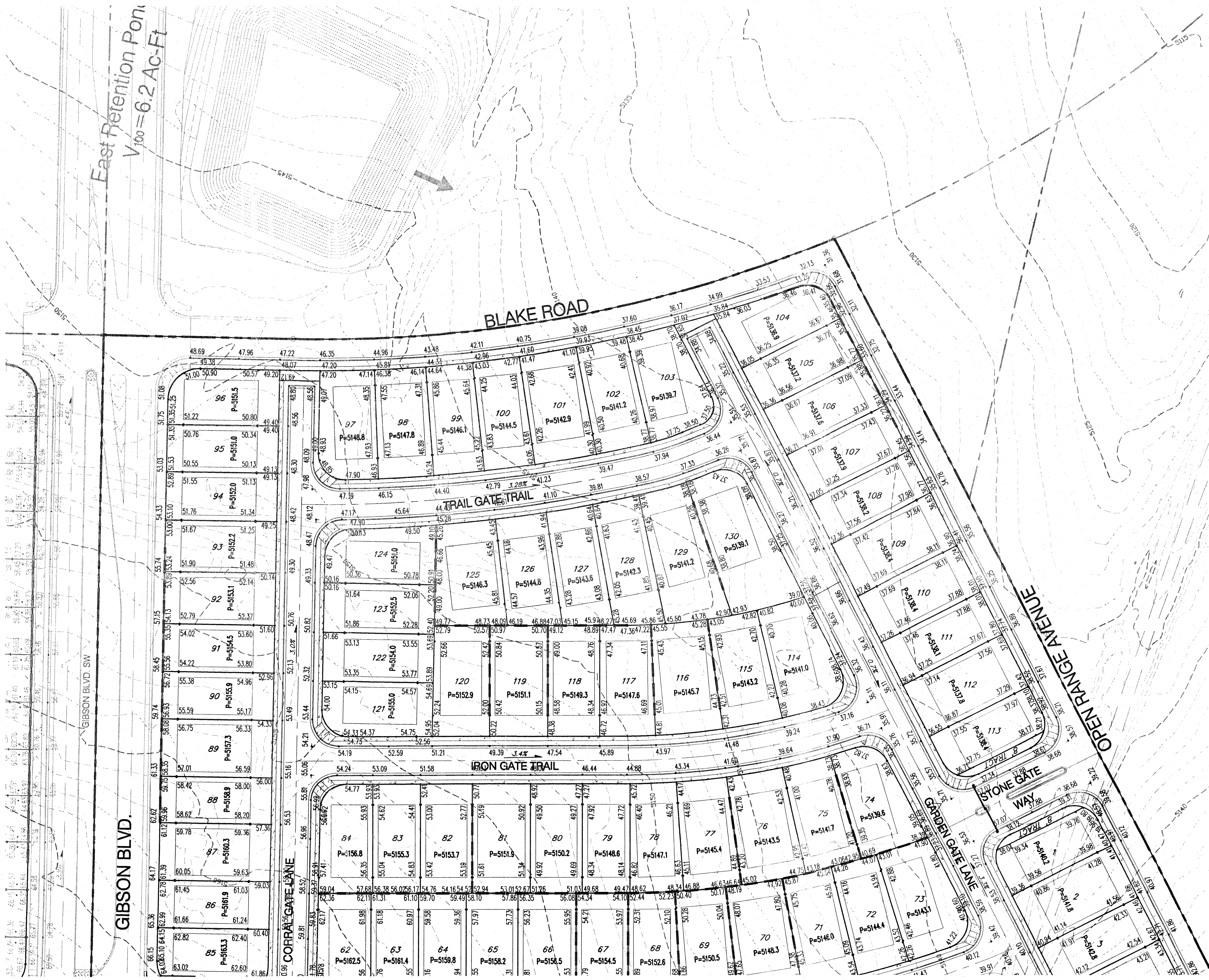
SUN GATE SUBDIVISION
GRADING AND DRAINAGE PLAN
GRADING DETAILS

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.

Zone Map No. N-9-Z

Sheet 3 Of 3



50 25 0 50
1" = 50'

GENERAL NOTES

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5. ALL SPOT ELEVATIONS ARE TO FLOWLINE UNLESS OTHERWISE NOTED.

6. BOULDERS GREATER THAN 3 FEET IN DIAMETER EXCAVATED DURING GRADING ACTIVITIES SHALL BE STOCKPILED AND DISPOSED OF AT THE DISCRETION OF THE OWNER.

7. ALL WALLS SHOWN ARE TO BE PLACED ALONG PROPERTY LINE. WALLS ARE SHOWN OFFSET FOR VISUAL PURPOSE ONLY.

LEGEND

Symbol	Description
(91.62)	FUTURE SPOT ELEVATION
91.62	PROPOSED SPOT ELEVATION
× 92.46	EXISTING SPOT ELEVATION (GRND & TC)
	EXISTING CURB & GUTTER
	PROPOSED MOUNTABLE CURB & GUTTER
	PROPOSED STANDARD CURB & GUTTER
	EXISTING CONTOUR W/ INDEX ELEVATION
	FLOW ARROW
	PROPOSED RETAINING WALL
	PROPOSED GARDEN WALL, CONCRETE FILLED TO 1-FOOT DEPTH
	PROPOSED SLOPE
	PROPOSED STORM DRAIN
	PROPOSED STORM DRAIN MANHOLE
	PROPOSED STORM DRAIN INLET
	PROPOSED CATTLE GUARD INLET
	WALL DRAIN

AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICROFILM INFORMATION

RECORDED BY	DATE
NO.	

BENCH MARKS

ACS BRASS TABLET STAMPED "TRANS"
Geographic Position (NAD 1927)
N.M. State Plane Coordinates (Central Zone)
X= 354,899.45 Y= 1,471,822.67
Ground-to-Grid Factor = 0.99967921
$\Delta\alpha$ = -00°16'42"
SLD 1929 Elevation = 5118.43

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

RICHARD LYNN BERTRAMO, NEW MEXICO, 10896, PROFESSIONAL ENGINEER

No.	Date	REMARKS
		REVISIONS
		DESIGN

Designed By: SJS
Drawn By: DH
Checked By: RLB
DATE: 01/04
DATE: 01/04
DATE: 01/04

ROUGH GRADING (±0.5'):

APPROVED FOR ROUGH GRADING DATE

Bohannan ▲ Huston INC.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

SUN GATE SUBDIVISION
GRADING AND DRAINAGE PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
	N-9-Z	2	3

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January 08, 2004 - 1:05pm

GENERAL NOTES

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LEGEND

- (91.62) FUTURE SPOT ELEVATION
- 91.62 PROPOSED SPOT ELEVATION
- × 92.46 EXISTING SPOT ELEVATION (GRND & TC)
- EXISTING CURB & GUTTER
- PROPOSED MOUNTABLE CURB & GUTTER
- PROPOSED STANDARD CURB & GUTTER
- EXISTING CONTOUR W/ INDEX ELEVATION
- FLOW ARROW
- PROPOSED RETAINING WALL
- PROPOSED GARDEN WALL, CONCRETE FILLED TO 1-FOOT DEPTH
- PROPOSED SLOPE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET
- PROPOSED CATTLE GUARD INLET
- WALL DRAIN

AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICROFILM INFORMATION

RECORDED BY	DATE
NO.	

BENCH MARKS

ACS BRASS TABLET STAMPED "TRANS"
Geographic Position (NAD 1927)
N.M. State Plane Coordinates (Central Zone)
X= 354,899.45 Y= 1,471,822.67
Ground-to-Grid Factor = 0.99967921
$\Delta\alpha$ = -00°16'42"
SLD 1929 Elevation = 5118.43

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

RICHARD LYNN BELTRAMO NEW MEXICO 10596 REGISTERED PROFESSIONAL ENGINEER

No.	Date	REMARKS	By

REVISIONS

DESIGN

Designed By: SJS DATE:01/04
Drawn By: DH DATE:01/04
Checked By: RLB DATE:01/04

Bohannan ▲ Huston INC.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

SUN GATE SUBDIVISION
GRADING AND DRAINAGE PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No. | Zone Map No. N-9-Z | Sheet 1 Of 3

ROUGH GRADING (±0.5'):

APPROVED FOR ROUGH GRADING DATE

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January 08, 2004 - 1:06pm

EXHIBIT 2

GRADING PLAN

EXHIBIT 4
MASTER STORM DRAIN BASIN MAP

PIPE	FROM AP	TO AP	SIZE (IN)	LENGTH (FT)	SLOPE (%)	FLOW (CFS)	PIPE CAP (CFS)
P1	2	4	54	1775	2.30	237	301
P2	5	6	60	900	1.40	248	307
P3	6	7	66	1100	1.50	394	411
P4	7	8	78	1050	1.00	463	524
P5	8	9	78	1230	2.50	560	829

N

300 150 0 300

1 inch = 300 feet

ENGINEER'S SEAL

RICHARD LYNN BELTRAMO
NEW MEXICO
10596
REGISTERED PROFESSIONAL ENGINEER

Bohannan ▲ Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

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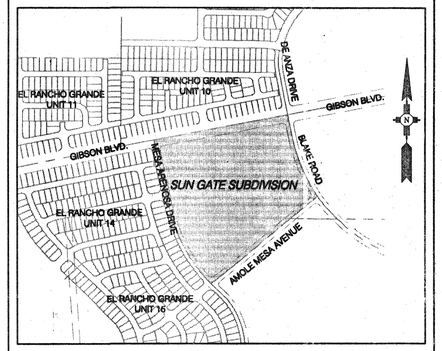
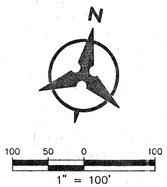
EXHIBIT 3

DEVELOPED CONDITIONS BASIN MAP

EXHIBIT 4

MASTER STORM DRAIN BASIN MAP





LEGEND

- SUBDIVISION BOUNDARY LINE
- EXISTING SUBDIVISION BOUNDARY
- NEW LOT LINE
- ADJOINING PROPERTY LINE
- ▲ CENTERLINE MONUMENT TO BE INSTALLED
- △ CITY OF ALBUQUERQUE SURVEY CONTROL MONUMENT

KEYED NOTES

(A) 10' PUBLIC UTILITY EASEMENT

PRELIMINARY PLAT FOR
SUN GATE SUBDIVISION
TRACT 33C-1-A
LANDS OF SALAZAR FAMILY TRUST, SALAZAR QUATRO TRUST, JSJ INVESTMENT COMPANY AND FALBA HANNETT

LEGAL DESCRIPTION

TRACT 33C-1-A LANDS OF SALAZAR FAMILY TRUST, SALAZAR QUATRO TRUST, JSJ INVESTMENT COMPANY AND FALBA HANNETT. (BOOK 2003C, PAGE 357, DATE 10-05-03)

GENERAL NOTES

1. EXISTING ZONING: R-2 ALLOWING R-T AND R-LT (RIO BRAVO SECTOR PLAN)
   PROPOSED DEVELOPMENT: R-2 ALLOWING R-T AND R-LT
2. PROPOSED NET ACREAGE: 20.78 AC
   NUMBER OF LOTS: 130
   PROPOSED DENSITY: 6.26 DU/AC
3. MIN. LOT DIMENSIONS: 45' X 105'
   MINIMUM LOT AREA: 4725 SQ FT
4. ALL UTILITIES AND STORM DRAIN IMPROVEMENTS ARE TO BE PUBLIC, AND TO BE DEDICATED TO THE CITY OF ALBUQUERQUE FOR MAINTENANCE.
   PROPOSED DEVELOPMENT: R-2 ALLOWING R-T AND R-LT
5. PRIVATE ACCESS: THIS SUBDIVISION IS PLANNED TO BE A GATED COMMUNITY. ALL ROADS WITHIN THE DEVELOPMENT EXIST WITHIN TRACT "A". PRIVATE ACCESS, PUBLIC DRAINAGE, WATER, AND SANITARY SEWER EASEMENT ON TRACT "A".
6. HOMEOWNERS ASSOCIATION: THIS SUBDIVISION WILL HAVE A HOMEOWNERS ASSOCIATION. THE HOMEOWNERS ASSOCIATION WILL OWN TRACTS "A", "B", "C", "D", "E", "F", "G", "H", AND "J" AND BE RESPONSIBLE FOR MAINTENANCE INCLUDING STREET AND LANDSCAPE IMPROVEMENTS.
7. TRACTS "B", "C", "D", "E", "F", "G", "H", AND "J" ARE LANDSCAPE TRACTS ENCUMBERED BY PRIVATE PEDESTRIAN ACCESS EASEMENTS
8. LOT SETBACKS SHALL BE 20' TO GARAGE, 5' SIDEYARD, AND 15' BACKYARD
9. NO INDIVIDUAL LOTS SHALL BE ALLOWED DIRECT ACCESS TO MESA ARENOSA DRIVE, OPEN RANGE AVENUE, AND/OR BLAKE ROAD.

SITE DATA

ZONE ATLAS NO.	N-9-Z
ZONING	R-2 ALLOWING R-T AND R-LT
MILES OF FULL WIDTH STREETS CREATED	.92 MILES
NO. OF EXISTING PARCELS	1
NO. OF LOTS CREATED	130
DENSITY	6.26 DU/AC

SURVEY NOTES:

1. ALL BOUNDARY CORNERS SHOWN (●) ARE FOUND REBAR W\CAP.
2. ALL STREET CENTERLINE MONUMENTATION SHALL BE INSTALLED AT ALL CENTERLINE PC'S, PTS, ANGLE POINTS, AND STREET INTERSECTIONS AND SHOWN THUS (▲) AND WILL BE MARKED BY (4") ALUMINUM CAP STAMPED "CITY OF ALBUQUERQUE CENTERLINE MONUMENTATION MARKED, DO NOT DISTURB PLS 7719".
3. THE SUBDIVISION BOUNDARY WILL BE TIED TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM AS SHOWN.
4. BASIS OF BEARINGS WILL BE NEW MEXICO STATE PLANE BEARINGS.
5. DISTANCES SHALL BE GROUND DISTANCES.
6. MANHOLES WILL BE OFFSET AT ALL POINTS OF CURVATURE, TANGENCY STREET INTERSECTIONS, AND ALL OTHER ANGLE POINTS TO ALLOW USE OF CENTERLINE MONUMENTATION.

APPROVED

CITY SURVEYOR — DATE 1-8-04

BO JOHNSON
VICE PRESIDENT, CURB INC. — DATE 1/8/04

Bohannan ▲ Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

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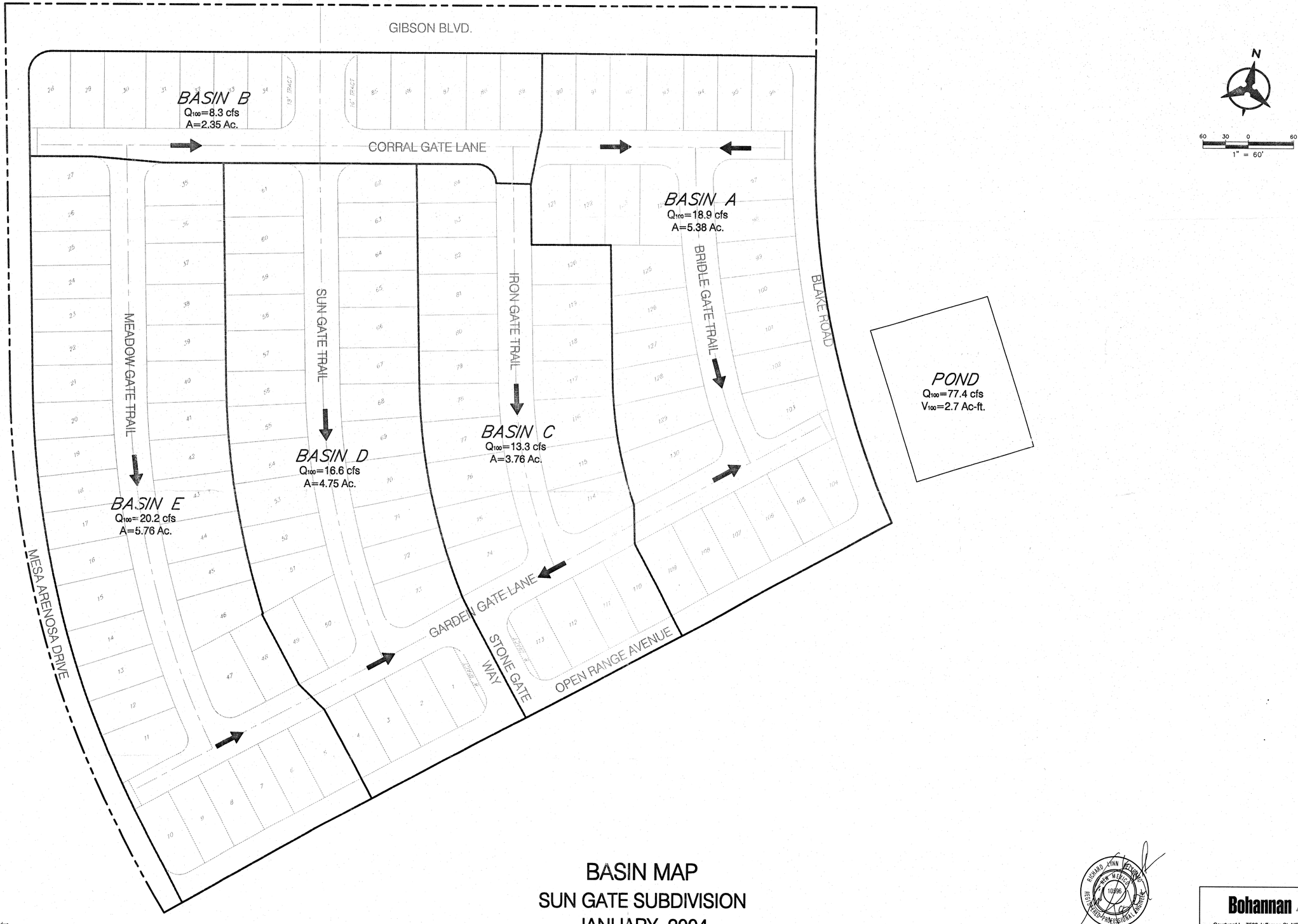
January 08, 2004 - 8:05am



BASIN MAP
SUN GATE SUBDIVISION
JANUARY, 2004

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January 08, 2004 - 9:50am

RICHARD LYNN BOHANNAN NEW MEXICO 10396 REGISTERED PROFESSIONAL ENGINEER

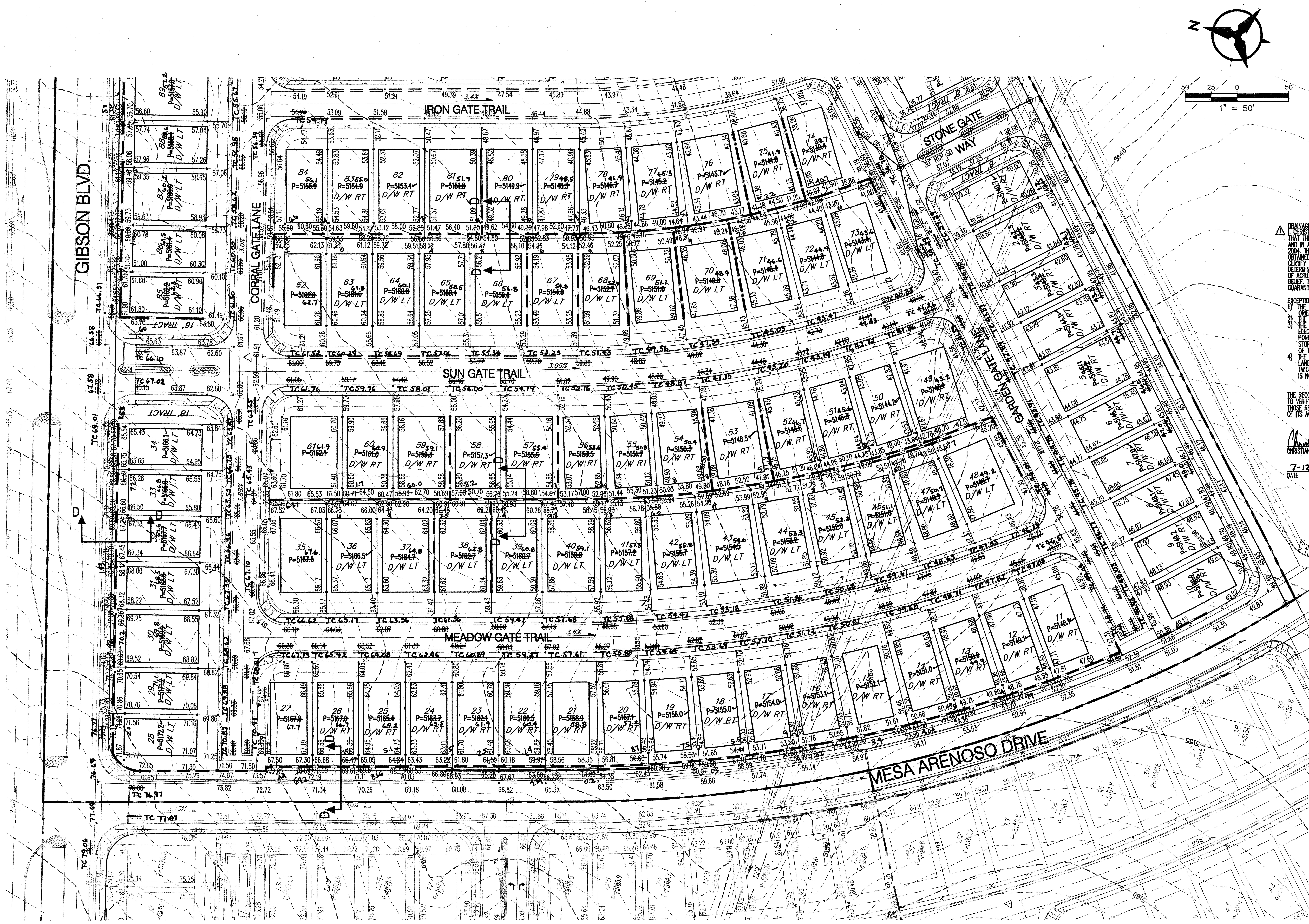
Bohannan ▲ Huston Inc.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

Bohannan ▲ Huston INC.

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332



GENERAL NOTES

1. CONTRACTOR MUST OBTAIN A TOPSOIL DISTURBANCE PERMIT FROM THE ENVIRONMENTAL HEALTH DIVISION PRIOR TO CONSTRUCTION.

2. THE CONTRACTOR IS TO REFER TO EARTHWORK SPECIFICATION AS NOTED IN THE SOILS REPORT.

3. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE, AND FEDERAL DUST CONTROL MEASURES & REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.

4. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE LOTS INTO PUBLIC RIGHT-OF-WAY. THIS CAN BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AS PER DETAIL, SHEET 3, AND WETTING THE SOIL TO KEEP IT FROM BLOWING.

5. ALL SPOT ELEVATIONS ARE TO FLOWLINE UNLESS OTHERWISE NOTED.

6. BOULDERS GREATER THAN 3 FEET IN DIAMETER EXCAVATED DURING GRADING ACTIVITIES SHALL BE STOCKPILED AND DISPOSED OF AT THE DISCRETION OF THE OWNER.

7. ALL WALLS SHOWN ARE TO BE PLACED ALONG PROPERTY LINE. WALLS ARE SHOWN OFFSET FOR VISUAL PURPOSE ONLY.

8. WHEN SPECIFIED AS EITHER LEFT(LT) OR RIGHT(RT), THE DRIVEWAY SHALL BE LOCATED ON THAT SIDE OF THE LOT AS VIEWED FROM THE STREET LOOKING TOWARD THE LOT IN QUESTION.

△ DRAINAGE CERTIFICATION
I, CHRISTIAN J. SHOLTIS, NMPE 16244, OF THE FIRM BOHANNAN HUSTON, INC. HEREBY CERTIFY THAT THIS PROJECT HAS BEEN GRADED AND WILL DRAIN IN SUBSTANTIAL COMPLIANCE WITH AND IN ACCORDANCE WITH THE DESIGN INTENT OF THE APPROVED PLAN DATED, JANUARY 8, 2004. THE RECORD INFORMATION EDITED ONTO THE ORIGINAL DESIGN DOCUMENT HAS BEEN OBTAINED BY TIMOTHY ALDRICH, NMPS 7719, OF THE FIRM ALDRICH LAND SURVEYING. I FURTHER CERTIFY THAT I HAVE PERSONALLY VISITED THE PROJECT SITE ON JULY 11, 2005, AND HAVE DETERMINED BY VISUAL INSPECTION THAT THE SURVEY DATA PROVIDED IS REPRESENTATIVE OF ACTUAL SITE CONDITIONS AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. THIS CERTIFICATION IS SUMBITTED IN SUPPORT OF A REQUEST FOR SIA/ FINANCIAL GUARANTY RELEASE.

EXCEPTIONS TO THE APPROVED PLAN ARE NOTED BELOW:
1) THE ORIENTATION OF LOTS 47-50 AND 121-124 WERE ROTATED 90 DEG TO MATCH THE ORIENTATION OF THE REMAINING LOTS ON THE BLOCK.
2) THE SIDEYARD SLOPES WERE REVISED TO UTILIZE 1% SLOPES INSTEAD OF 0.5% SLOPES.
3) THE TEMPORARY STORM WATER POND ON TRACT 34-D-1-A WAS NOT BUILT. THE DEVELOPER ELECTED TO BUILD A PUBLIC STORM DRAIN IN BLAKE ROAD IN LIEU OF THE TEMPORARY POND. AS OF 7-11-05, THIS STORM DRAIN IS IN PLACE AND OPERATIONALAND CONVEYS STORMWATER FROM THE PROJECT SITE TO THE EXISTING AMOLE ARROYO LOCATED EAST OF THE SITE. THE STORM DRAIN HAS BEEN BUILT BY PROJ. NO. 736782.
4) THE EMERGENCY OVERFLOW THRU THE NEW WALL AT THE NORTH END OF GARDEN GATE LANE WAS NOT BUILT. THE STORM INLET AT THIS LOCATION HAS CAPACITY TO ACCEPT TWICE THE 100-YEAR DEVELOPED FLOWRATE; THEREFORE, THE EMERGENCY OVERFLOW IS NOT NEEDED.

THE RECORD INFORMATION PRESENTED HEREON IS NOT NECESSARILY COMPLETE AND INTENDED ONLY TO VERIFY SUBSTANTIAL COMPLIANCE OF THE GRADING AND DRAINAGE ASPECTS OF THIS PROJECT. THOSE RELYING ON THEIS REOCRD DOCUMENT ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE USING IT FOR ANY OTHER PURPOSE.

[illegible]
CHRISTIAN J. SHOLTIS, NMPE 16244

7-12-05
DATE

CHRISTIAN J. SHOLTIS
NEW MEXICO
16244
LICENSED PROFESSIONAL ENGINEER

LEGEND

- ● (91.62) FUTURE SPOT ELEVATION
- ● 91.62 PROPOSED SPOT ELEVATION
- × 92.46 EXISTING SPOT ELEVATION (GRND & TC)
- EXISTING CURB & GUTTER
- PROPOSED MOUNTABLE CURB & GUTTER
- PROPOSED STANDARD CURB & GUTTER
- 5470 EXISTING CONTOUR W/ INDEX ELEVATION
- FLOW ARROW
- PROPOSED RETAINING WALL
- PROPOSED GARDEN WALL, CONCRETE FILLED TO 1-FOOT DEPTH
- PROPOSED SLOPE
- PROPOSED STORM DRAIN
- ◉ PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET
- PROPOSED CATTLE GUARD INLET
- ← WALL DRAIN
- *P=5154.1 D/W RT* PAD ELEVATION WITH DRIVEWAY LOCATION SPECIFIED, SEE NOTE 8 ABOVE

AS-BUILT INFORMATION	
CONTRACTOR	DATE
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICROFILM INFORMATION	
RECORDED BY	DATE
NO.	

BENCH MARKS
ACS BRASS TABLET STAMPED "TRANS"
Geographic Position (NAD 1927)
N.M. State Plane Coordinates (Central Zone)
X= 354,899.45 Y= 1,471,822.67
Ground-to-Grid Factor = 0.99967921
Δα = -00°16'42"
SLD 1929 Elevation = 5118.43

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL
CHRISTIAN J. SHOLTIS
NEW MEXICO
16244
LICENSED PROFESSIONAL ENGINEER
5-5-04

REVISIONS

No.	Date	REMARKS	By
△	7-05	GRADING AND DRAINAGE CERTIFICATION	CJS

DESIGN
Designed By: CJS DATE:03/04
Drawn By: DH DATE:01/04
Checked By: RLB DATE:01/04

Bohannan ▲ Huston INC.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

SUN GATE SUBDIVISION
GRADING AND DRAINAGE PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
	N-9-Z	1	3

ROUGH GRADING	(±0.5'):
APPROVED FOR ROUGH GRADING	DATE

P:\040154\cdp\general\040154_GP01.dwg
May 05, 2004 - 1:05pm

N

50 25 0 50

1" = 50'

GENERAL NOTES

1. CONTRACTOR MUST OBTAIN A TOPSOIL DISTURBANCE PERMIT FROM THE ENVIRONMENTAL HEALTH DIVISION PRIOR TO CONSTRUCTION.

2. THE CONTRACTOR IS TO REFER TO EARTHWORK SPECIFICATION AS NOTED IN THE SOILS REPORT.

3. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE, AND FEDERAL DUST CONTROL MEASURES & REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.

4. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE LOTS INTO PUBLIC RIGHT-OF-WAY. THIS CAN BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AS PER DETAIL, SHEET 3, AND WETTING THE SOIL TO KEEP IT FROM BLOWING.

5. ALL SPOT ELEVATIONS ARE TO FLOWLINE UNLESS OTHERWISE NOTED.

6. BOULDERS GREATER THAN 3 FEET IN DIAMETER EXCAVATED DURING GRADING ACTIVITIES SHALL BE STOCKPILED AND DISPOSED OF AT THE DISCRETION OF THE OWNER.

7. ALL WALLS SHOWN ARE TO BE PLACED ALONG PROPERTY LINE. WALLS ARE SHOWN OFFSET FOR VISUAL PURPOSE ONLY.

8. WHEN SPECIFIED AS EITHER LEFT(LT) OR RIGHT(RT), THE DRIVEWAY SHALL BE LOCATED ON THAT SIDE OF THE LOT AS VIEWED FROM THE STREET LOOKING TOWARD THE LOT IN QUESTION.

△ DRAINAGE CERTIFICATION
I, CHRISTIAN J. SHOLTIS, NMPE 16244, OF THE FIRM BOHANNAN HUSTON, INC. HEREBY CERTIFY THAT THIS PROJECT HAS BEEN GRADED AND WILL DRAIN IN SUBSTANTIAL COMPLIANCE WITH AND IN ACCORDANCE WITH THE DESIGN INTENT OF THE APPROVED PLAN DATED, JANUARY 8, 2004. THE RECORD INFORMATION EDITED ONTO THE ORIGINAL DESIGN DOCUMENT HAS BEEN OBTAINED BY TIMOTHY ALDRICH, NMPS 7719, OF THE FIRM ALDRICH LAND SURVEYING. I FURTHER CERTIFY THAT I HAVE PERSONALLY VISITED THE PROJECT SITE ON JULY 11, 2005, AND HAVE DETERMINED BY VISUAL INSPECTION THAT THE SURVEY DATA PROVIDED IS REPRESENTATIVE OF ACTUAL SITE CONDITIONS AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. THIS CERTIFICATION IS SUMBITTED IN SUPPORT OF A REQUEST FOR SIA/ FINANCIAL GUARANTY RELEASE.

EXCEPTIONS TO THE APPROVED PLAN ARE NOTED BELOW:
1) THE ORIENTATION OF LOTS 47-50 AND 121-124 WERE ROTATED 90 DEG TO MATCH THE ORIENTATION OF THE REMAINING LOTS ON THE BLOCK.
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CHRISTIAN J. SHOLTIS, NMPE 16244

7-12-05
DATE

CHRISTIAN J. SHOLTIS NEW MEXICO 16244 LICENSED PROFESSIONAL ENGINEER

LEGEND

(91.62)	FUTURE SPOT ELEVATION
91.62	PROPOSED SPOT ELEVATION
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	PROPOSED STORM DRAIN MANHOLE
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	PROPOSED CATTLE GUARD INLET
	WALL DRAIN
P=5154.1 D/W RT	PAD ELEVATION WITH DRIVEWAY LOCATION SPECIFIED, SEE NOTE 8 ABOVE

ROUGH GRADING	(±0.5'):
APPROVED FOR ROUGH GRADING	DATE

Bohannan ▲ Huston Inc.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

SUN GATE SUBDIVISION
GRADING AND DRAINAGE PLAN

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
	N-9-Z	2	3

AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICROFILM INFORMATION

RECORDED BY	DATE
NO.	

BENCH MARKS

ACS BRASS TABLET STAMPED "TRANS"
Geographic Position (NAD 1927)
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SLD 1929 Elevation = 5118.43

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

CHRISTIAN J. SHOLTIS NEW MEXICO 16244 LICENSED PROFESSIONAL ENGINEER
5-5-04

REVISIONS

No.	Date	REMARKS	By
△	7-05	GRADING AND DRAINAGE CERTIFICATION	CJS

DESIGN

Designed By: CJS	DATE:03/04
Drawn By: DH	DATE:01/04
Checked By: RLB	DATE:01/04

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	PROPOSED STORM DRAIN
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	PROPOSED STORM DRAIN INLET
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AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	DATE
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RECORDED BY	DATE
NO.	

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SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

RICHARD LYNN BELTRAN
NEW MEXICO
10596
REGISTERED PROFESSIONAL ENGINEER

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: SJS DATE:01/04
Drawn By: DH DATE:01/04
Checked By: RLB DATE:01/04

Bohannan ▲ Huston INC.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

SUN GATE SUBDIVISION
GRADING AND DRAINAGE PLAN

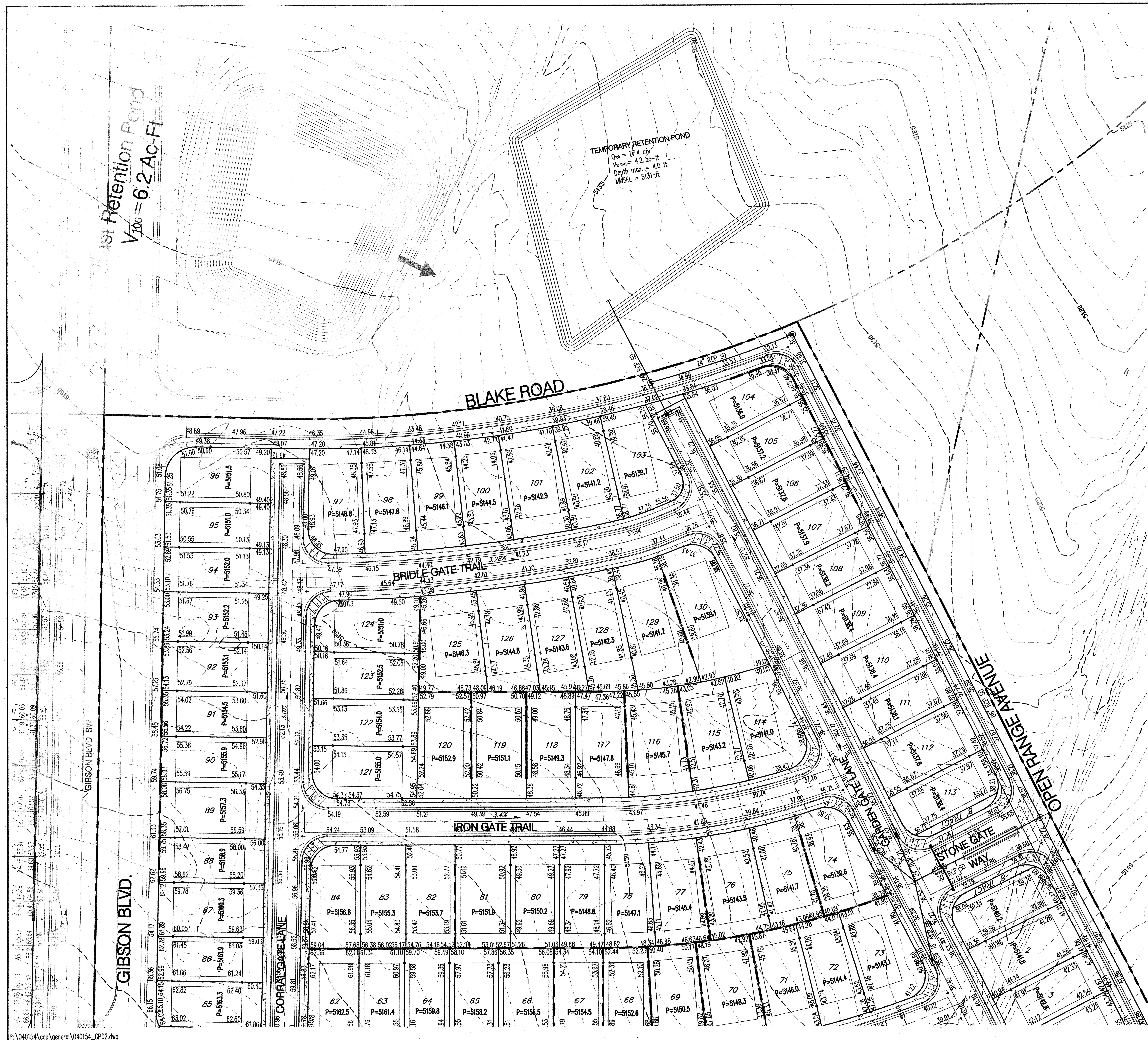
Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
	N-9-Z	1	3

ROUGH GRADING (±0.5'):
[illegible] 3/1/04
APPROVED FOR ROUGH GRADING DATE

DRB APPROVED PLAN

P:\040154\cdp\general\040154_GP01.dwg
February 25, 2004 - 2:08pm



P:\040154\cdp\general\040154_GP02.dwg
February 25, 2004 – 2:11pm

N

50 25 0 50
1" = 50'

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	PROPOSED STORM DRAIN INLET
	PROPOSED CATTLE GUARD INLET
←	WALL DRAIN

ROUGH GRADING (±0.5'):
[illegible] 3/1/04
APPROVED FOR ROUGH GRADING DATE

AS-BUILT INFORMATION
CONTRACTOR DATE
WORK STAKED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS CORRECTED BY DATE

MICROFILM INFORMATION
RECORDED BY DATE
NO.

BENCH MARKS
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SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
RICHARD LYNN BELTRAMO
NEW MEXICO
10596
REGISTERED PROFESSIONAL ENGINEER

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: SJS DATE:01/04
Drawn By: DH DATE:01/04
Checked By: RLB DATE:01/04

Bohannan ▲ Huston INC.
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

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GRADING AND DRAINAGE PLAN

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City Project No.	Zone Map No.	Sheet	Of
	N-9-Z	2	3

DRB APPROVED PLAN