



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 22, 2002

Ronald Bohannon, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

RE: **SPANISH SUN SUBDIVISION** (G-17/D36)
Engineers Certification For Release of Financial Guaranty
Engineers Stamp dated 4/10/2001
Engineer's Certification dated 1/18/2002

Dear Mr. Bohannon:

Based upon the information provided in your submittal dated 1/18/2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification requirements for release of financial guaranty for the above mentioned project.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Public Works Department
BAB

C: Arlene Portillo, PWD – #642181
File

DRAINAGE INFORMATION SHEET

(REV. 11/01/2001)

PROJECT TITLE: Spanish Sun Subdivision ZONE ATLAS/DRG. FILE #: G-17/D36
DRB #: EPC #: WORK ORDER: 642181

LEGAL DESCRIPTION: Tract A of Monroe Assoc. - Tract 1
CITY ADDRESS: Monroe Street

ENGINEERING FIRM: TIERRA WEST, LLC CONTACT: Ronald Bohannon
ADDRESS: 8509 JEFFERSON NE PHONE: (505) 858-3100
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87113

OWNER: Western Security Real Estate, Inc. CONTACT: Fred Seeley
ADDRESS: 3511 Carlisle NE PHONE: 888-9777
CITY, STATE: Albuquerque, NM ZIP CODE: 87110-1665

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: Precision Surveys, Inc. CONTACT: Larry Medrano
ADDRESS: 8414-D Jefferson St. NE PHONE: (505)858-5700
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87113

CONTRACTOR: Albuquerque Excavators CONTACT: Jerry Padilla
ADDRESS: 7201 Isleta SW PHONE: (505)873-5000
CITY, STATE: Isleta, NM ZIP CODE: 87022

CHECK TYPE OF SUBMITTAL:

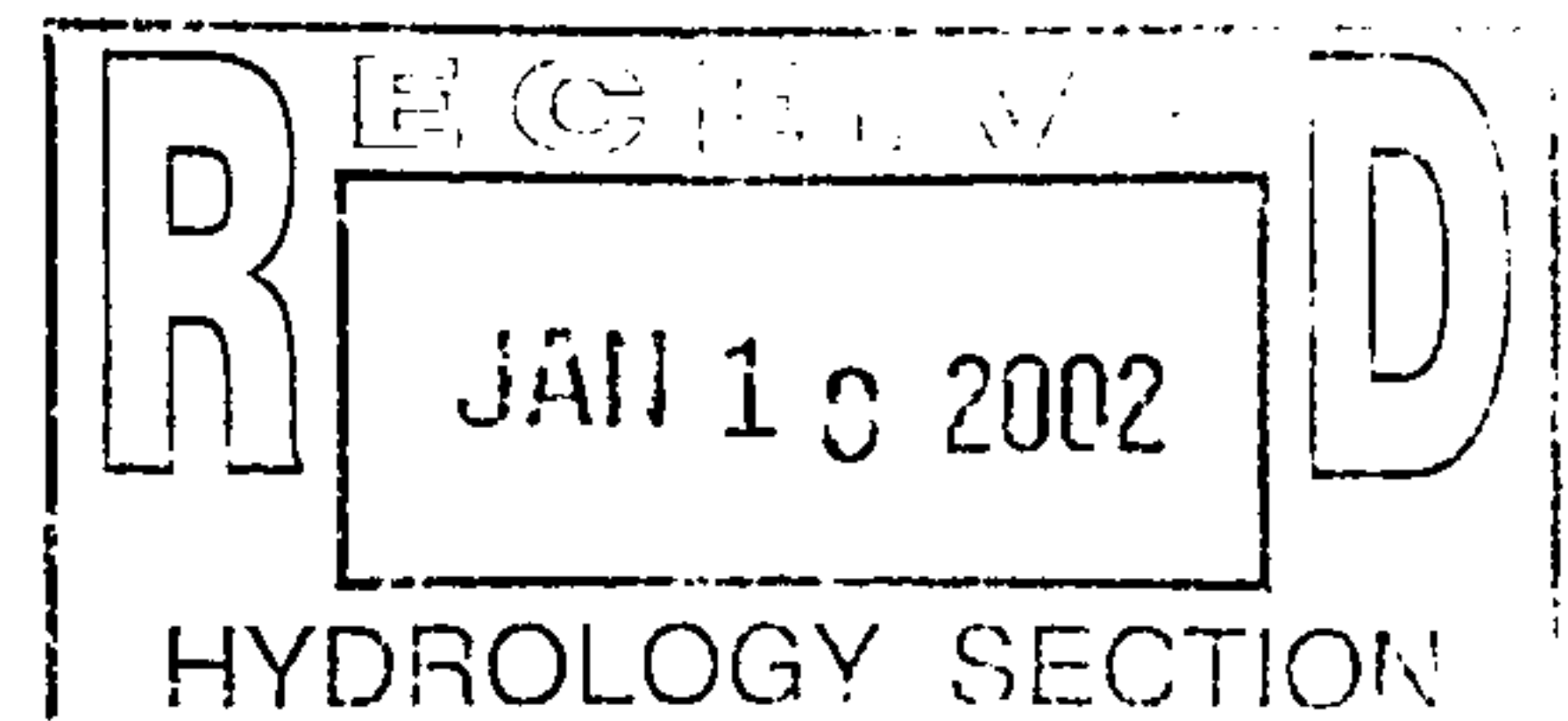
- ☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ ENGINEERS CERTIFICATION (TCL)
☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
☒ OTHER - G & D As-builts

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANACIAL GUARANTEE RELEASE
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☒ CERTIFICATE OF OCCUPANCY (PERM.)
☐ CERTIFICATE OF OCCUPANCY (TEMP.)
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY) - Release of Financial Guarantee:

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
☒ NO
☐ COPY PROVIDED



DATE SUBMITTED: 1/18/02 BY: Ronald Bohannon

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plans:** Required for approval of Site Development Plans greater than five (5) acres
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

(505) 858-3100
fax (505) 858-1118

twllc@tierrawestllc.com
1-800-245-3102

January 10, 2002

Mrs. Terri Martin
City of Albuquerque
Albuquerque Public Works Department
P.O. Box 1293
Albuquerque, NM 87103

**RE: Final Certification of Drainage and Release of Financial
Guarantees, Spanish Sun Subdivision (G-17/D36), Tract A
of Monroe Associates – Tract 1, Vista Grande Land Company ADD. No. 1**

Dear Terri:

Enclosed please find one copy of the as-built Grading and Drainage Plan and the Information Sheet for the Spanish Sun Subdivision. Albuquerque Excavators completed the utility, paving and curb and gutter required on the site. Construction of on site retaining walls is complete. All work is in substantial compliance with the approved Grading and Drainage Plan. As-built information was provided by Precision Surveying. We are, therefore, requesting Final Certification of Drainage and Release of Financial Guarantees.

If you have any questions, please do not hesitate to contact me.

Sincerely,



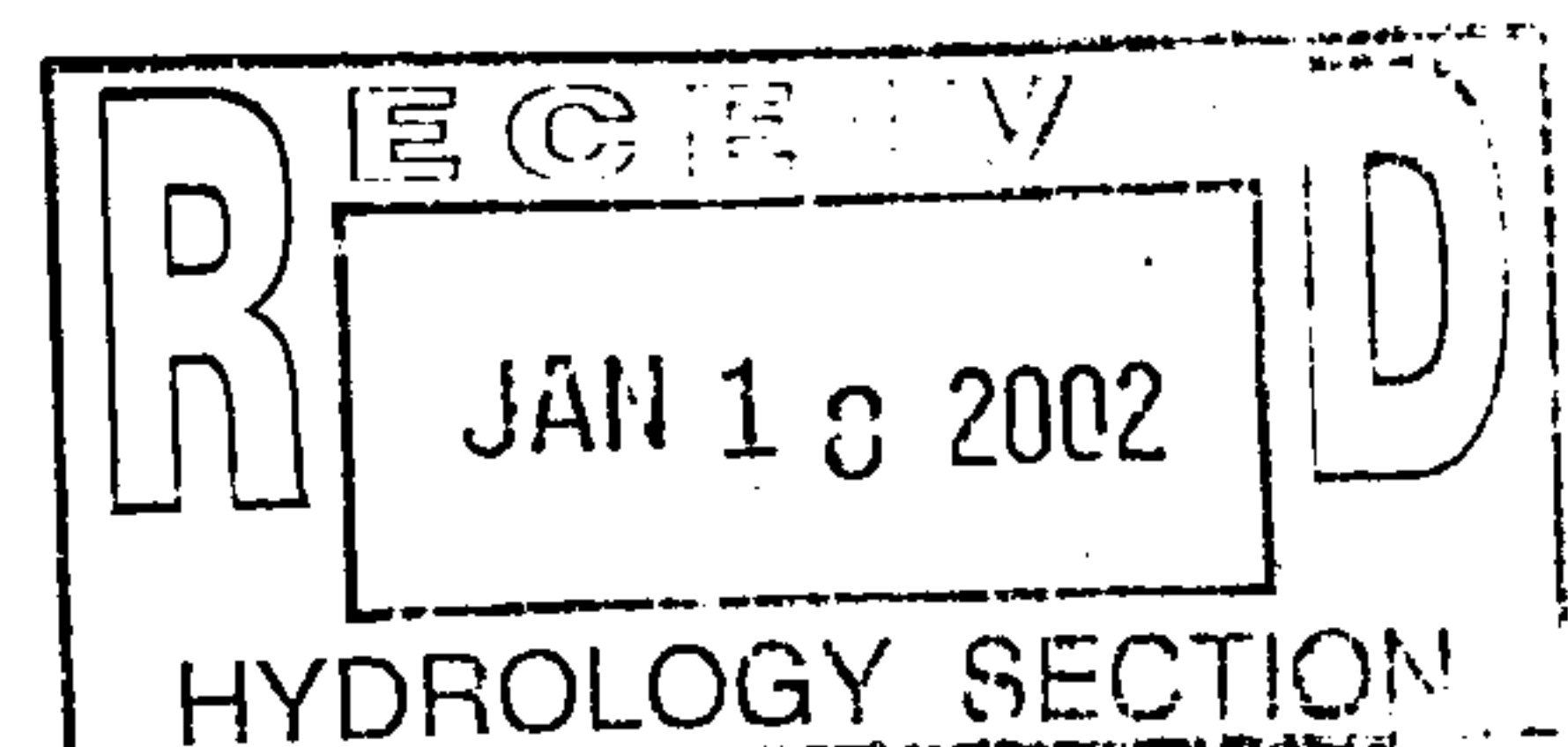
Ronald R. Bohannon, PE

Enclosures

cc: Fred Seeley (w/out enclosures)

JN 990043
RRB/ma

990043.994311102.FinaldrgCert&release





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 22, 2002

Ron Bohannon, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

**Re: Spanish Sun Subdivision Amended Grading Plan
Engineer's Stamp dated 4-10-01 (G17/D36)**

Dear Mr. Bohannon,

Based upon the information provided in your submittal dated 1-4-02, the above referenced plan is approved as amended for Final Plat. All other approvals that you were asking for are moot since the Work Order has been issued.

Please be advised that this is now the plan that must be certified prior to release of the SIA for this subdivision.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, PWD
Development and Building Services

C: file



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 22, 2002

Ron Bohannon, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Spanish Sun Subdivision Amended Grading Plan
Engineer's Stamp dated 4-10-01 (G17/D36)

Dear Mr. Bohannon,

Based upon the information provided in your submittal dated 1-4-02, the above referenced plan is approved as amended for Final Plat. All other approvals that you were asking for are moot since the Work Order has been issued.

Please be advised that this is now the plan that must be certified prior to release of the SIA for this subdivision.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, PWD
Development and Building Services

C: file

DRAINAGE INFORMATION SHEET
(REV. 11/01/2001)

PROJECT TITLE: Spanish Sun ZONE MAP/DRG. FILE #: 6-17/036
DRB #: _____ EPC#: _____ WORK ORDER#: 642181

LEGAL DESCRIPTION: Tract A of Monroe Associates - Tract 1, Vista Grande Land Co.
CITY ADDRESS: Monroe Street

ENGINEERING FIRM: Tierra West, LLC
ADDRESS: 8509 Jefferson
CITY, STATE: Alb. NM

CONTACT: David Soule
PHONE: 858-3100
ZIP CODE: 87103

OWNER: Spanish Sun LLC
ADDRESS: 3511 Carlisle
CITY, STATE: Alb NM

CONTACT: Fred Sealey
PHONE: 888-9777
ZIP CODE: 87110

ARCHITECT: N/A
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

SURVEYOR: Precision Survey
ADDRESS: 8414 Jefferson
CITY, STATE: Alb NM

CONTACT: Larry McJannet
PHONE: 856-5700
ZIP CODE: _____

CONTRACTOR: N/A
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

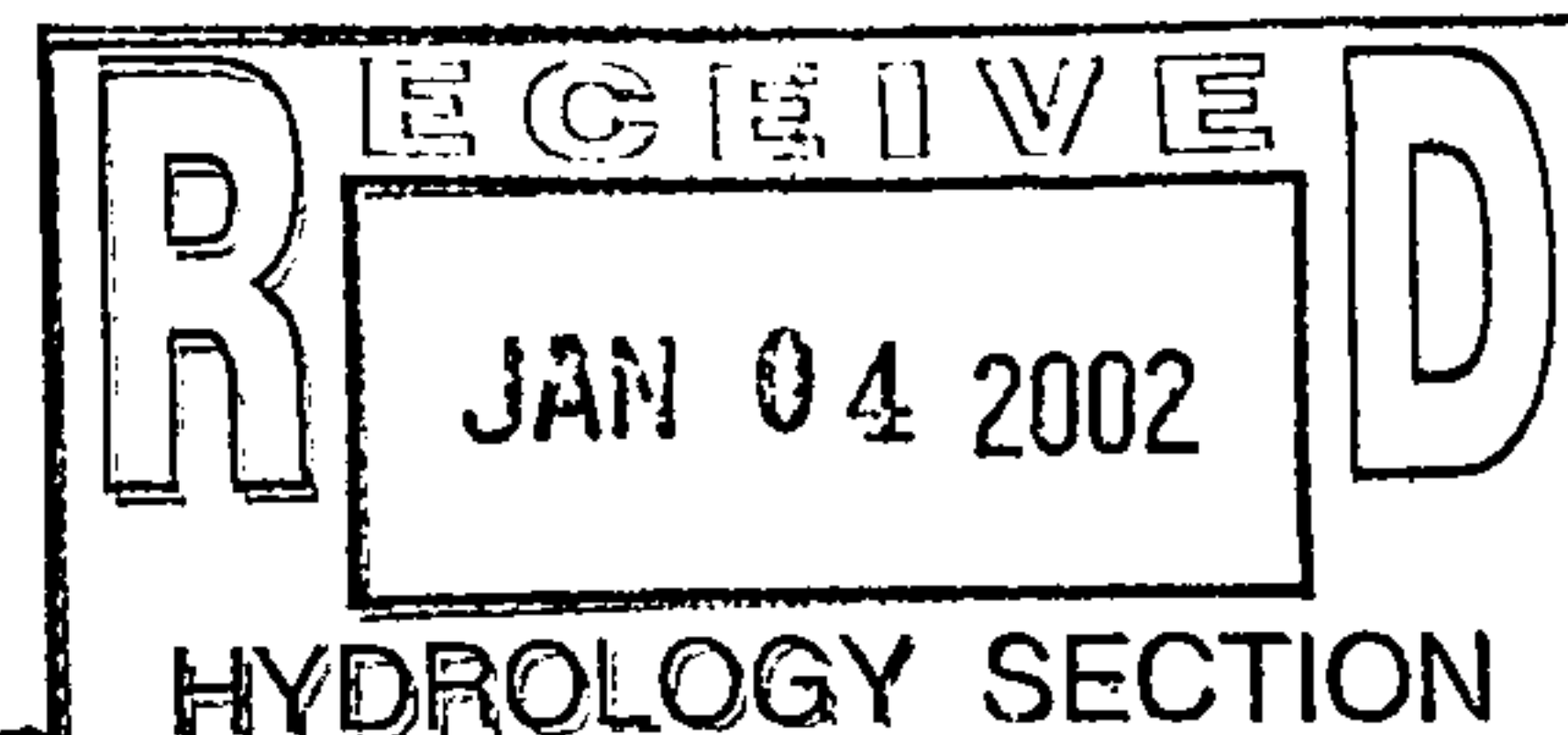
- ☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☒ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ ENGINEERS CERTIFICATION (TCL)
☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANCIAL GUARANTEE RELEASE
☒ PRELIMINARY PLAT APPROVAL
☒ S. DEV. PLAN FOR SUB'D. APPROVAL
☒ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☒ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☒ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY (PERM.)
☐ CERTIFICATE OF OCCUPANCY (TEMP.)
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
☒ NO
☐ COPY PROVIDED



DATE SUBMITTED: January 4 2002 BY: David Soule

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

JS 990043
Heming
Diaries
cc: Fwd E Glen.

December 5, 2000

Ron Bohannon, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Spanish Sun Subdivision Private Pond City Proj # 642181
Engineer's Stamp dated 1-17-00 (G17/D36)

Dear Mr. Bohannon,

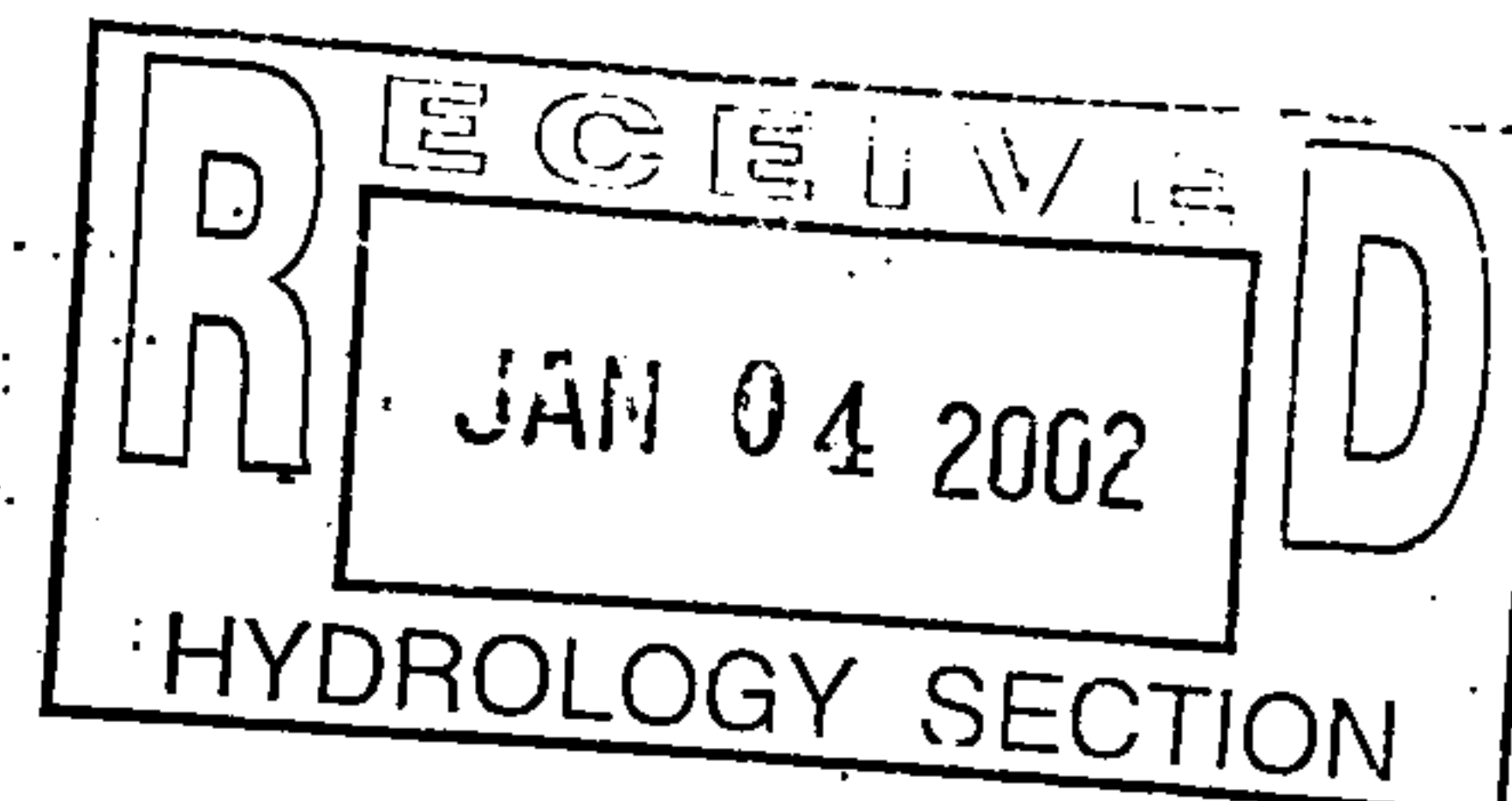
Based upon the information provided in your submittal and our meeting, it has been decided that the above-mentioned pond is not desired, due to maintenance concerns, and will hereby be deleted from the plan. I request that you amend the Infrastructure List in order to facilitate the release of the financial guarantee. This may be done administratively at your earliest convenience. Secondly, I request that the plan and profile for the entrance road be amended (by change order) to facilitate acceptance by the City.

If you have any questions, you can contact me at 924-3986

Sincerely,

Bradley L. Bingham, PE
Hydrology Review Engineer

C: Loren Meinz, CoA
Kevin Broderick, CoA
Peter Change, CoA
file



TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

(505) 858-3100
fax (505) 858-1118

twllc@tierrawestllc.com
1-800-245-3102

January 3, 2002

Mr. Brad Bingham, PE
Hydrology Section
City of Albuquerque
600 2nd Street NW
Albuquerque, New Mexico 87103

RE: Spanish Sun - Drainage Re submittal (G17/D36)

Dear Brad:

In our preparation of the grading certification for this site we were unable to locate a plan that had the stamp date of 1/17/00, which you refer to as being approved in the enclosed letter. After reviewing the files, we feel the correct grading plan has a stamp date of 4/10/01. As you are aware, we modified the plan to eliminate the public onsite pond. Please review the enclosed grading plan, since this is the plan we intend to certify.

Should you have any questions regarding this submittal, please do not hesitate to call me.

Sincerely,



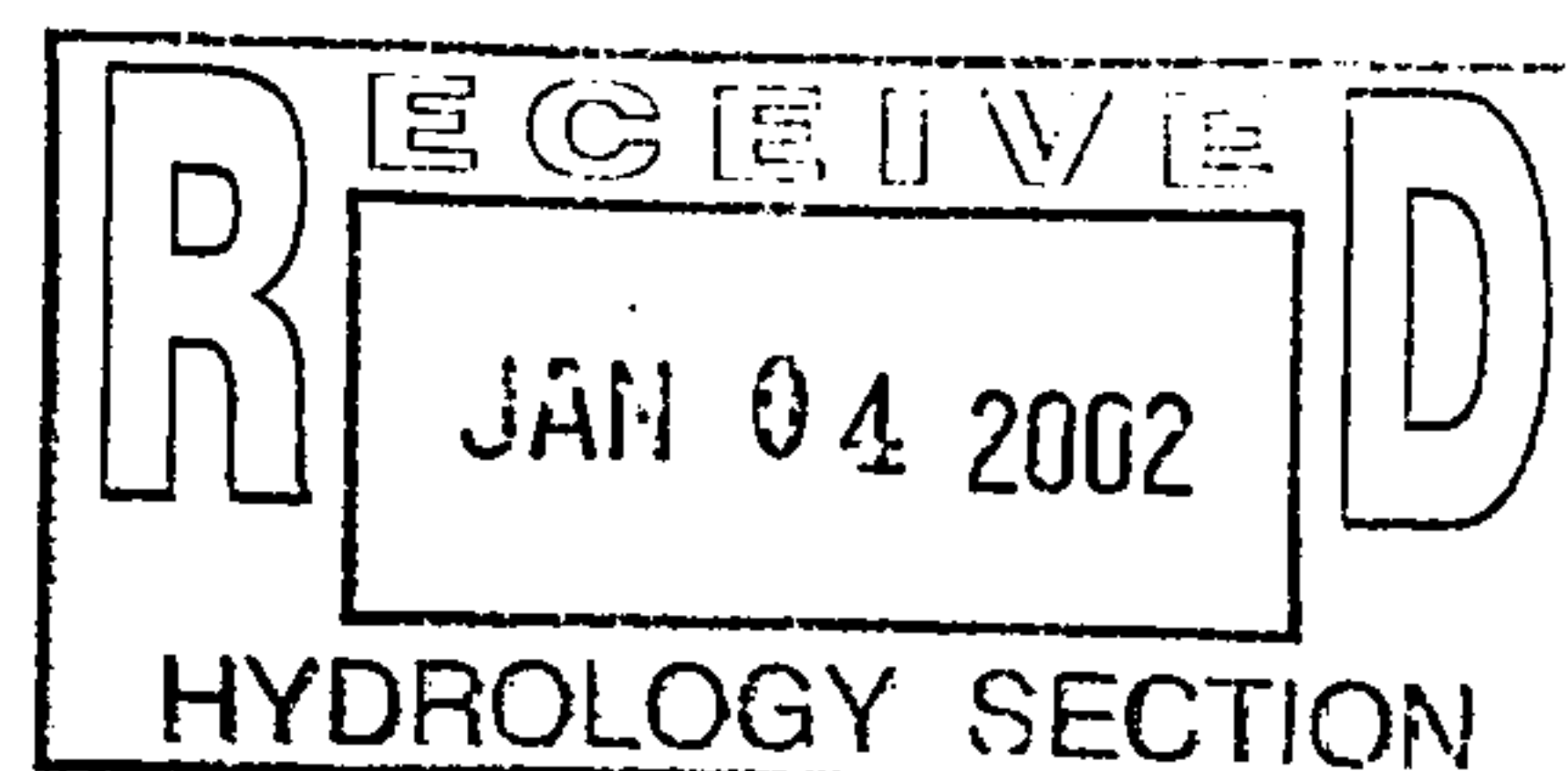
David Soule, P.E.

Enclosures

cc: Mr. Fred Seeley

JN 990043
ds

990043bb010302





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 5, 2000

Ron Bohannon, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Spanish Sun Subdivision Private Pond City Proj # 642181
Engineer's Stamp dated 1-17-00 (G17/D36)

Dear Mr. Bohannon,

Based upon the information provided in your submittal and our meeting, it has been decided that the above-mentioned pond is not desired, due to maintenance concerns, and will hereby be deleted from the plan. I request that you amend the Infrastructure List in order to facilitate the release of the financial guarantee. This may be done administratively at your earliest convenience. Secondly, I request that the plan and profile for the entrance road be amended (by change order) to facilitate acceptance by the City.

If you have any questions, you can contact me at 924-3986

Sincerely,

Bradley L. Bingham, PE
Hydrology Review Engineer

C: Loren Meinz, CoA
Kevin Broderick, CoA
Peter Change, CoA
file

Street Capacity Calculations

Douglas Macarther-250west of washington- with basins ~~A, B, C, H/2~~ ^{A, B, C, H/2}

33' F-F Street Section with 8" curb

Slope= 0.01

Q = 86.55

For water depths less than 0.125 feet

Y= Water depth
Area = $8 \cdot Y^2$
P= $\text{SQRT}(257 \cdot Y^2) + Y$
n= 0.017

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0002	0.0004	0.2452	0.0025	0.4321	0.0029
0.02	0.0032	0.3406	0.0094	0.0012	0.0025	0.3892	0.0078	0.4850	0.0070
0.04	0.0128	0.6812	0.0188	0.0079	0.0158	0.6178	0.0247	0.5444	0.0167
0.06	0.0288	1.0219	0.0282	0.0233	0.0466	0.8095	0.0486	0.5824	0.0278
0.08	0.0512	1.3625	0.0376	0.0502	0.1004	0.9807	0.0785	0.6110	0.0399
0.1	0.0800	1.7031	0.0470	0.0910	0.1821	1.1380	0.1138	0.6342	0.0527
0.12	0.1152	2.0437	0.0564	0.1480	0.2961	1.2851	0.1542	0.6537	0.0661
0.125	0.1250	2.1289	0.0587	0.1651	0.3301	1.3205	0.1651	0.6582	0.0696

For water depths greater than 0.125 ft but less than 0.405 ft

Y1= Y-0.125
A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
P2= $P1 + \text{SQRT}(2501 \cdot Y1^2)$

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.1754	0.3507	1.2930	0.1681	0.6320	0.0681
0.16	0.2256	3.9143	0.0576	0.2943	0.5886	1.3044	0.2087	0.5747	0.0727
0.2	0.4156	5.9547	0.0698	0.6159	1.2318	1.4818	0.2964	0.5839	0.0931
0.24	0.6856	7.9951	0.0858	1.1655	2.3309	1.6999	0.4080	0.6115	0.1197
0.28	1.0356	10.0355	0.1032	1.9917	3.9833	1.9232	0.5385	0.6405	0.1497
0.32	1.4656	12.0759	0.1214	3.1405	6.2810	2.1428	0.6857	0.6675	0.1818
0.3464	1.7932	13.4225	0.1336	4.0965	8.1930	2.2844	0.7913	0.6840	0.2040
0.39	2.4106	15.6466	0.1541	6.0558	12.1117	2.5121	0.9797	0.7089	0.2419
0.405	2.6450	16.4117	0.1612	6.8472	13.6943	2.5887	1.0484	0.7169	0.2553

For water depths greater than 0.405 ft but less than 0.667 ft

Y2= Y - 0.405
A3= $A2 + Y2 \cdot 16.5$
P3= $P2 + Y2$

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.7275	16.4167	0.1661	7.2053	14.4107	2.6417	1.0831	0.7271	0.2638
0.44	3.2225	16.4467	0.1959	9.5025	19.0050	2.9488	1.2975	0.7834	0.3148
0.47	3.7175	16.4767	0.2256	12.0432	24.0864	3.2396	1.5226	0.8327	0.3663
0.5	4.2125	16.5067	0.2552	14.8148	29.6296	3.5169	1.7584	0.8765	0.4183
0.525	4.6250	16.5317	0.2798	17.2933	34.5866	3.7391	1.9630	0.9094	0.4619
0.55	5.0375	16.5567	0.3043	19.9195	39.8391	3.9542	2.1748	0.9396	0.5059
0.575	5.4500	16.5817	0.3287	22.6888	45.3776	4.1631	2.3938	0.9675	0.5501
0.63	6.3575	16.6367	0.3821	29.2641	58.5283	4.6031	2.8999	1.0220	0.6485
0.667	6.9680	16.6737	0.4179	34.0457	68.0914	4.8860	3.2590	1.0543	0.7154

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= $A3 + 16.5 \cdot Y3 + 25 \cdot Y3^2$
P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.5397	18.3240	0.4115	36.4599	72.9197	4.8357	3.3850	1.0186	0.7173
0.73	8.1067	19.8243	0.4089	39.0403	78.0806	4.8158	3.5155	0.9933	0.7235
0.75	8.5097	20.8245	0.4086	40.9618	81.9236	4.8135	3.6101	0.9795	0.7295
0.77	8.9327	21.8247	0.4093	43.0438	86.0876	4.8187	3.7104	0.9677	0.7369
0.8	9.6047	23.3250	0.4118	46.4690	92.9380	4.8381	3.8705	0.9532	0.7503
0.82	10.0777	24.3252	0.4143	48.9556	97.9113	4.8578	3.9834	0.9454	0.7605
0.85	10.8247	25.8255	0.4191	52.9946	*****	4.8957	4.1613	0.9358	0.7775

G17 / D36

POND

Reclamation

CS2

Street Capacity Calculations

Douglas Macarther-250west of washington- with basins A,B,C, ~~H#8~~

33' F-F Street Section with 8" curb

Slope= 0.007

$Q = 75.7^8$

For water depths less than 0.125 feet

Y= Water depth

Area = $8 \cdot Y^2$

P= $\text{SQRT}(257 \cdot Y^2) + Y$

n= 0.017

Depth (ft)	rea (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0002	0.0003	0.2051	0.0021	0.3615	0.0022
0.02	0.0032	0.3406	0.0094	0.0010	0.0021	0.3256	0.0065	0.4058	0.0052
0.04	0.0128	0.6812	0.0188	0.0066	0.0132	0.5169	0.0207	0.4554	0.0126
0.06	0.0288	1.0219	0.0282	0.0195	0.0390	0.6773	0.0406	0.4873	0.0211
0.08	0.0512	1.3625	0.0376	0.0420	0.0840	0.8205	0.0656	0.5112	0.0303
0.1	0.0800	1.7031	0.0470	0.0762	0.1523	0.9521	0.0952	0.5306	0.0402
0.12	0.1152	2.0437	0.0564	0.1239	0.2477	1.0752	0.1290	0.5470	0.0505
0.125	0.1250	2.1289	0.0587	0.1381	0.2762	1.1048	0.1381	0.5507	0.0532

For water depths greater than 0.125 ft but less than 0.405 ft

Y1= Y-0.125

A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$

P2= $P1 + \text{SQRT}(2501 \cdot Y1^2)$

Depth (ft)	rea (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.1467	0.2934	1.0818	0.1406	0.5287	0.0519
0.16	0.2256	3.9143	0.0576	0.2462	0.4924	1.0913	0.1746	0.4808	0.0550
0.2	0.4156	5.9547	0.0698	0.5153	1.0306	1.2398	0.2480	0.4885	0.0706
0.24	0.6856	7.9951	0.0858	0.9751	1.9502	1.4222	0.3413	0.5116	0.0911
0.28	1.0356	10.0355	0.1032	1.6663	3.3327	1.6090	0.4505	0.5359	0.1142
0.32	1.4656	12.0759	0.1214	2.6275	5.2550	1.7928	0.5737	0.5585	0.1391
0.3464	1.7932	13.4225	0.1336	3.4274	6.8548	1.9113	0.6621	0.5723	0.1563
0.39	2.4106	15.6466	0.1541	5.0667	10.1333	2.1018	0.8197	0.5931	0.1858
0.405	2.6450	16.4117	0.1612	5.7287	11.4575	2.1659	0.8772	0.5998	0.1963

For water depths greater than 0.405 ft but less than 0.667 ft

Y2= Y - 0.405

A3= $A2 + Y2 \cdot 16.5$

P3= $P2 + Y2$

Depth (ft)	rea (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.7275	16.4167	0.1661	6.0284	12.0568	2.2102	0.9062	0.6083	0.2030
0.44	3.2225	16.4467	0.1959	7.9504	15.9008	2.4671	1.0855	0.6555	0.2434
0.47	3.7175	16.4767	0.2256	10.0761	20.1521	2.7104	1.2739	0.6967	0.2843
0.5	4.2125	16.5067	0.2552	12.3950	24.7899	2.9424	1.4712	0.7333	0.3257
0.525	4.6250	16.5317	0.2798	14.4686	28.9372	3.1283	1.6424	0.7609	0.3604
0.55	5.0375	16.5567	0.3043	16.6659	33.3317	3.3084	1.8196	0.7861	0.3955
0.575	5.4500	16.5817	0.3287	18.9828	37.9656	3.4831	2.0028	0.8095	0.4308
0.63	6.3575	16.6367	0.3821	24.4841	48.9683	3.8512	2.4263	0.8551	0.5094
0.667	6.9680	16.6737	0.4179	28.4847	56.9693	4.0879	2.7266	0.8821	0.5629

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= $A3 + 16.5 \cdot Y3 + 25 \cdot Y3^2$

P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	rea (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.5397	18.3240	0.4115	30.5045	61.0090	4.0458	2.8321	0.8522	0.5633
0.73	8.1067	19.8243	0.4089	32.6635	65.3269	4.0292	2.9413	0.8311	0.5674
0.75	8.5097	20.8245	0.4086	34.2711	68.5422	4.0273	3.0205	0.8195	0.5717
0.77	8.9327	21.8247	0.4093	36.0130	72.0260	4.0316	3.1043	0.8097	0.5771
0.8	9.6047	23.3250	0.4118	38.8788	77.7575	4.0479	3.2383	0.7975	0.5870
0.82	10.0777	24.3252	0.4143	40.9592	81.9185	4.0643	3.3328	0.7910	0.5947
0.85	10.8247	25.8255	0.4191	44.3385	88.6770	4.0960	3.4816	0.7829	0.6077

Street Capacity Calculations

Douglas Macarther-250west of washington- with basins A,B,C, H# 17
 33' F-F Street Section with 8" curb $Q = 97.33$
 Slope= 0.006

For water depths less than 0.125 feet

Y= Water depth
 Area = $8 \cdot Y^2$
 P= $\text{SQRT}(257 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0002	0.0003	0.1899	0.0019	0.3347	0.0019
0.02	0.0032	0.3406	0.0094	0.0010	0.0019	0.3015	0.0060	0.3757	0.0046
0.04	0.0128	0.6812	0.0188	0.0061	0.0123	0.4785	0.0191	0.4217	0.0111
0.06	0.0288	1.0219	0.0282	0.0181	0.0361	0.6271	0.0376	0.4511	0.0186
0.08	0.0512	1.3625	0.0376	0.0389	0.0778	0.7596	0.0608	0.4733	0.0268
0.1	0.0800	1.7031	0.0470	0.0705	0.1410	0.8815	0.0881	0.4912	0.0356
0.12	0.1152	2.0437	0.0564	0.1147	0.2293	0.9954	0.1194	0.5064	0.0448
0.125	0.1250	2.1289	0.0587	0.1279	0.2557	1.0229	0.1279	0.5098	0.0472

For water depths greater than 0.125 ft but less than 0.405 ft

Y1= Y-0.125
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2)$

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.1358	0.2717	1.0016	0.1302	0.4895	0.0460
0.16	0.2256	3.9143	0.0576	0.2280	0.4559	1.0103	0.1617	0.4451	0.0486
0.2	0.4156	5.9547	0.0698	0.4771	0.9541	1.1478	0.2296	0.4523	0.0624
0.24	0.6856	7.9951	0.0858	0.9028	1.8055	1.3167	0.3160	0.4736	0.0806
0.28	1.0356	10.0355	0.1032	1.5427	3.0855	1.4897	0.4171	0.4961	0.1012
0.32	1.4656	12.0759	0.1214	2.4326	4.8652	1.6598	0.5311	0.5171	0.1235
0.3464	1.7932	13.4225	0.1336	3.1731	6.3463	1.7695	0.6130	0.5298	0.1388
0.39	2.4106	15.6466	0.1541	4.6908	9.3816	1.9459	0.7589	0.5491	0.1652
0.405	2.6450	16.4117	0.1612	5.3038	10.6076	2.0052	0.8121	0.5553	0.1745

For water depths greater than 0.405 ft but less than 0.667 ft

Y2= Y - 0.405
 A3= $A2 + Y2 \cdot 16.5$
 P3= $P2 + Y2$

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.7275	16.4167	0.1661	5.5812	11.1624	2.0463	0.8390	0.5632	0.1806
0.44	3.2225	16.4467	0.1959	7.3606	14.7212	2.2841	1.0050	0.6068	0.2170
0.47	3.7175	16.4767	0.2256	9.3286	18.6572	2.5094	1.1794	0.6450	0.2539
0.5	4.2125	16.5067	0.2552	11.4755	22.9510	2.7242	1.3621	0.6789	0.2913
0.525	4.6250	16.5317	0.2798	13.3953	26.7907	2.8963	1.5206	0.7044	0.3227
0.55	5.0375	16.5567	0.3043	15.4296	30.8592	3.0629	1.6846	0.7278	0.3544
0.575	5.4500	16.5817	0.3287	17.5747	35.1493	3.2247	1.8542	0.7494	0.3863
0.63	6.3575	16.6367	0.3821	22.6679	45.3358	3.5655	2.2463	0.7916	0.4575
0.667	6.9680	16.6737	0.4179	26.3717	52.7434	3.7847	2.5244	0.8167	0.5059

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
 A4= $A3 + 16.5 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	rea (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.5397	18.3240	0.4115	28.2417	56.4834	3.7457	2.6220	0.7890	0.5059
0.73	8.1067	19.8243	0.4089	30.2405	60.4810	3.7303	2.7231	0.7694	0.5092
0.75	8.5097	20.8245	0.4086	31.7289	63.4577	3.7285	2.7964	0.7587	0.5128
0.77	8.9327	21.8247	0.4093	33.3416	66.6832	3.7325	2.8740	0.7496	0.5175
0.8	9.6047	23.3250	0.4118	35.9947	71.9895	3.7476	2.9981	0.7384	0.5262
0.82	10.0777	24.3252	0.4143	37.9209	75.8418	3.7628	3.0855	0.7323	0.5330
0.85	10.8247	25.8255	0.4191	41.0495	82.0989	3.7922	3.2234	0.7249	0.5445

exceeds capacity

CS 4

Street Capacity Calculations

Douglas Macarther-250 west of Washington - with basins A,B,C, 105 H, I

33' F-F Street Section with 8" curb

Slope = 0.0033

Q = 10811

For water depths less than 0.125 feet

$$\begin{aligned} Y &= \text{Water depth} \\ \text{Area} &= 8 \cdot Y^2 \\ P &= \text{SQRT}(257 \cdot Y^2) + Y \\ n &= 0.017 \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0001	0.0002	0.1408	0.0014	0.2482	0.0011
0.02	0.0032	0.3406	0.0094	0.0007	0.0014	0.2236	0.0045	0.2786	0.0027
0.04	0.0128	0.6812	0.0188	0.0045	0.0091	0.3549	0.0142	0.3127	0.0067
0.06	0.0288	1.0219	0.0282	0.0134	0.0268	0.4650	0.0279	0.3346	0.0113
0.08	0.0512	1.3625	0.0376	0.0288	0.0577	0.5634	0.0451	0.3510	0.0164
0.1	0.0800	1.7031	0.0470	0.0523	0.1046	0.6537	0.0654	0.3643	0.0218
0.12	0.1152	2.0437	0.0564	0.0850	0.1701	0.7382	0.0886	0.3755	0.0275
0.125	0.1250	2.1289	0.0587	0.0948	0.1896	0.7586	0.0948	0.3781	0.0290

For water depths greater than 0.125 ft but less than 0.405 ft

$$\begin{aligned} Y1 &= Y - 0.125 \\ A2 &= A1 + 2 \cdot Y1 + 25 \cdot Y1^2 \\ P2 &= P1 + \text{SQRT}(2501 \cdot Y1^2) \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.1007	0.2015	0.7428	0.0966	0.3630	0.0282
0.16	0.2256	3.9143	0.0576	0.1691	0.3381	0.7493	0.1199	0.3301	0.0295
0.2	0.4156	5.9547	0.0698	0.3538	0.7076	0.8512	0.1702	0.3354	0.0378
0.24	0.6856	7.9951	0.0858	0.6695	1.3390	0.9765	0.2344	0.3513	0.0492
0.28	1.0356	10.0355	0.1032	1.1441	2.2882	1.1048	0.3093	0.3679	0.0621
0.32	1.4656	12.0759	0.1214	1.8041	3.6081	1.2309	0.3939	0.3835	0.0760
0.3464	1.7932	13.4225	0.1336	2.3533	4.7065	1.3123	0.4546	0.3929	0.0857
0.39	2.4106	15.6466	0.1541	3.4788	6.9576	1.4431	0.5628	0.4072	0.1024
0.405	2.6450	16.4117	0.1612	3.9334	7.8668	1.4871	0.6023	0.4118	0.1084

For water depths greater than 0.405 ft but less than 0.667 ft

$$\begin{aligned} Y2 &= Y - 0.405 \\ A3 &= A2 + Y2 \cdot 16.5 \\ P3 &= P2 + Y2 \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.7275	16.4167	0.1661	4.1391	8.2783	1.5176	0.6222	0.4177	0.1123
0.44	3.2225	16.4467	0.1959	5.4588	10.9176	1.6940	0.7453	0.4500	0.1361
0.47	3.7175	16.4767	0.2256	6.9183	13.8366	1.8610	0.8747	0.4784	0.1604
0.5	4.2125	16.5067	0.2552	8.5105	17.0209	2.0203	1.0101	0.5035	0.1850
0.525	4.6250	16.5317	0.2798	9.9342	19.8685	2.1479	1.1277	0.5224	0.2059
0.55	5.0375	16.5567	0.3043	11.4429	22.8858	2.2715	1.2493	0.5398	0.2269
0.575	5.4500	16.5817	0.3287	13.0337	26.0674	2.3915	1.3751	0.5558	0.2481
0.63	6.3575	16.6367	0.3821	16.8110	33.6219	2.6443	1.6659	0.5871	0.2956
0.667	6.9680	16.6737	0.4179	19.5578	39.1155	2.8068	1.8721	0.6056	0.3280

For water depths greater than 0.667 ft but less than 0.847 ft

$$\begin{aligned} Y3 &= Y - 0.667 \\ A4 &= A3 + 16.5 \cdot Y3 + 25 \cdot Y3^2 \\ P4 &= P3 + \text{SQRT}(2501 \cdot Y3^2) \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.5397	18.3240	0.4115	20.9446	41.8892	2.7779	1.9445	0.5851	0.3268
0.73	8.1067	19.8243	0.4089	22.4270	44.8539	2.7665	2.0195	0.5706	0.3280
0.75	8.5097	20.8245	0.4086	23.5308	47.0615	2.7652	2.0739	0.5627	0.3298
0.77	8.9327	21.8247	0.4093	24.7268	49.4536	2.7681	2.1314	0.5559	0.3324
0.8	9.6047	23.3250	0.4118	26.6944	53.3888	2.7793	2.2234	0.5476	0.3374
0.82	10.0777	24.3252	0.4143	28.1229	56.2457	2.7906	2.2883	0.5431	0.3415
0.85	10.8247	25.8255	0.4191	30.4431	60.8862	2.8124	2.3905	0.5376	0.3484

e 4(111)

TIERRA WEST LLC

4421 McLeod Road NE, Suite D, Albuquerque, NM 87109

Phone (505) 883-7592 - Fax (505) 883-7034

RUNOFF CALCULATIONSDate: November 8, 1999Project: Spanish Sun offsite basins

Zone Atlas:

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 2

Land treatment descriptions are in Table A-4.

1. RUNOFF RATE COMPUTATIONUse Equation A-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$ Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

DEVELOPED RATE OF RUNOFF (CFS)									
BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q
Basin A	1.56	0.00	2.28	1.73	3.14	1.52	4.70	5.14	32.26
Basin B	1.56	0.00	2.28	0.10	3.14	0.02	4.70	0.91	4.56
Basin C	1.56	0.43	2.28	1.73	3.14	1.29	4.70	5.18	38.96
Basin D	1.56	0.14	2.28	0.59	3.14	0.44	4.70	1.76	13.26
Basin E	1.56	0.17	2.28	0.70	3.14	0.52	4.70	2.09	15.75
Basin F	1.56	0.19	2.28	0.77	3.14	0.58	4.70	2.33	17.51
Basin G	1.56	0.04	2.28	0.17	3.14	0.13	4.70	0.52	3.88
Basin H	1.56	0.24	2.28	0.96	3.14	0.72	4.70	2.86	21.55
Basin I	1.56	0.12	2.28	0.48	3.14	0.36	4.70	1.43	10.78

2. RUNOFF VOLUME COMPUTATION

Use Equation A-5 to compute weighted excess precipitation:

$$\text{Weighted E} = "E" = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / (A_A + A_B + A_C + A_D)$$

TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

(505) 858-3100
fax (505) 858-1118

e-mail: twdms@aol.com
1-800-245-3102

April 20, 2000

Mr. Brad Bingham, PE
Hydrology Section
City of Albuquerque
600 2nd Street NW
Albuquerque, New Mexico 87103

RE: Spanish Sun - Drainage Re submittal

Dear Brad:

This letter is in response to your written verbal comments received today for the referenced project. We revised the grading plan to address your comments as follows:

1. A valley gutter has been added at rundown.
2. An additional sidewalk culvert has been added at the pond outlet
3. The top of the flood wall was changed to 79.00
4. The extra bollard at the pond outlet has been removed

Should you have any questions regarding this submittal, please do not hesitate to call me.

Sincerely,

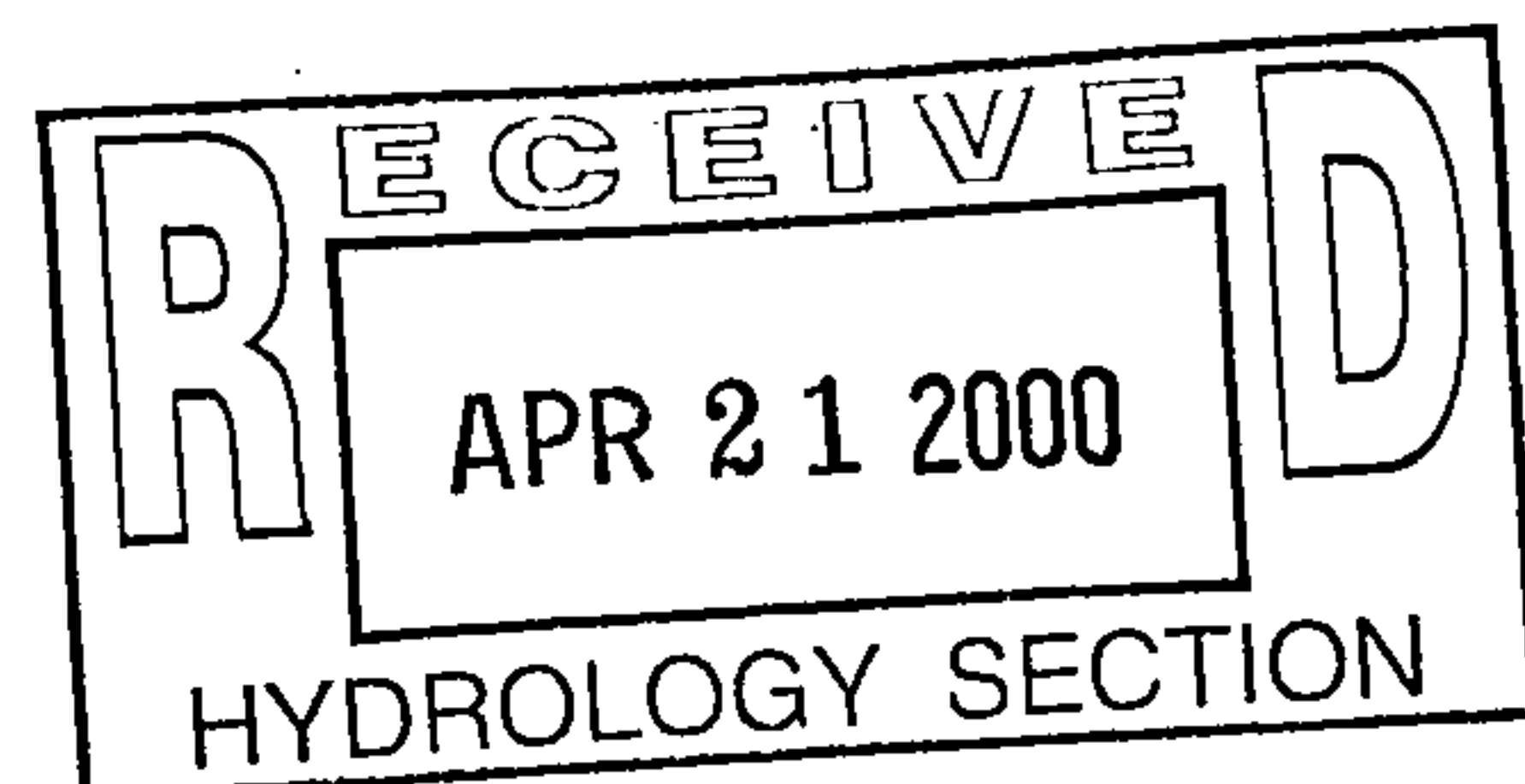


David Soule, P.E.

Enclosures

cc: Mr. Fred Seeley

JN 990043
ds



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G-17/0036



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 25, 2000

Ron Bohannon, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Spanish Sun Subdivision Drainage Report
Engineer's Stamp dated 4-20-00 (G17/D36)

Dear Mr. Bohannon,

Based upon the information provided in your submittal dated 4-21-00, the above referenced plan is approved for Site Development Plan for Subdivision, Site Development Plan for Building Permit, Preliminary and Final Plat, Building Permit and Grading Permit.

Prior to Final Plat sign-off, the Subdivision Improvements Agreement (SIA) must be executed. Please be advised that the Grading and Drainage Certification is required prior to release of the SIA for this subdivision.

If you have any questions, you can contact me at 924-3986

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Hydrology Review Engineer

C: file

DRAINAGE INFORMATION SHEET

PROJECT TITLE:	<u>SPANISH SUN SUBDIVISION</u>	ZONE ATLAS/DRNG. FILE #:	<u>G-17</u>
DRB #:	<u> </u>	EPC #:	<u> </u>
WORK ORDER #:	<u> </u>		
LEGAL DESCRIPTION:	<u>TRACT A OF MONROE ASSOCIATES -TRACT 1,VISTA GRANDE LAND COMPANY ADD. NO.1</u>		
CITY ADDRESS:	<u>MONROE STREET</u>		
ENGINEERING FIRM:	<u>TIERRA WEST, LLC</u>	CONTACT:	<u>DAVID SOULE</u>
ADDRESS:	<u>4421 McCleod Rd. NE Suite D, 87109</u>	PHONE:	<u>(505) 883-7592</u>
OWNER:	<u>MR. FRED SEELY</u>	CONTACT:	<u>FRED SEELY</u>
ADDRESS:	<u>3511 CARLISLE NE</u>	PHONE:	<u> </u>
ARCHITECT:	<u> </u>	CONTACT:	<u> </u>
ADDRESS:	<u> </u>	PHONE:	<u> </u>
SURVEYOR:	<u>Precision Surveys</u>	CONTACT:	<u>Larry Medrano</u>
ADDRESS:	<u>2929 Coors Blvd NW Suite 309</u>	PHONE:	<u>(505)839-0569</u>
CONTRACTOR:	<u> </u>	CONTACT:	<u> </u>
ADDRESS:	<u> </u>	PHONE:	<u> </u>

TYPE OF SUBMITTAL:

<u>X</u>	DRAINAGE REPORT
<u>X</u>	DRAINAGE PLAN
<u> </u>	CONCEPTUAL GRADING & DRAINAGE PLAN
<u>X</u>	GRADING PLAN
<u> </u>	EROSION CONTROL PLAN
<u> </u>	ENGINEER'S CERTIFICATION
<u> </u>	OTHER

PRE-DESIGN MEETING:

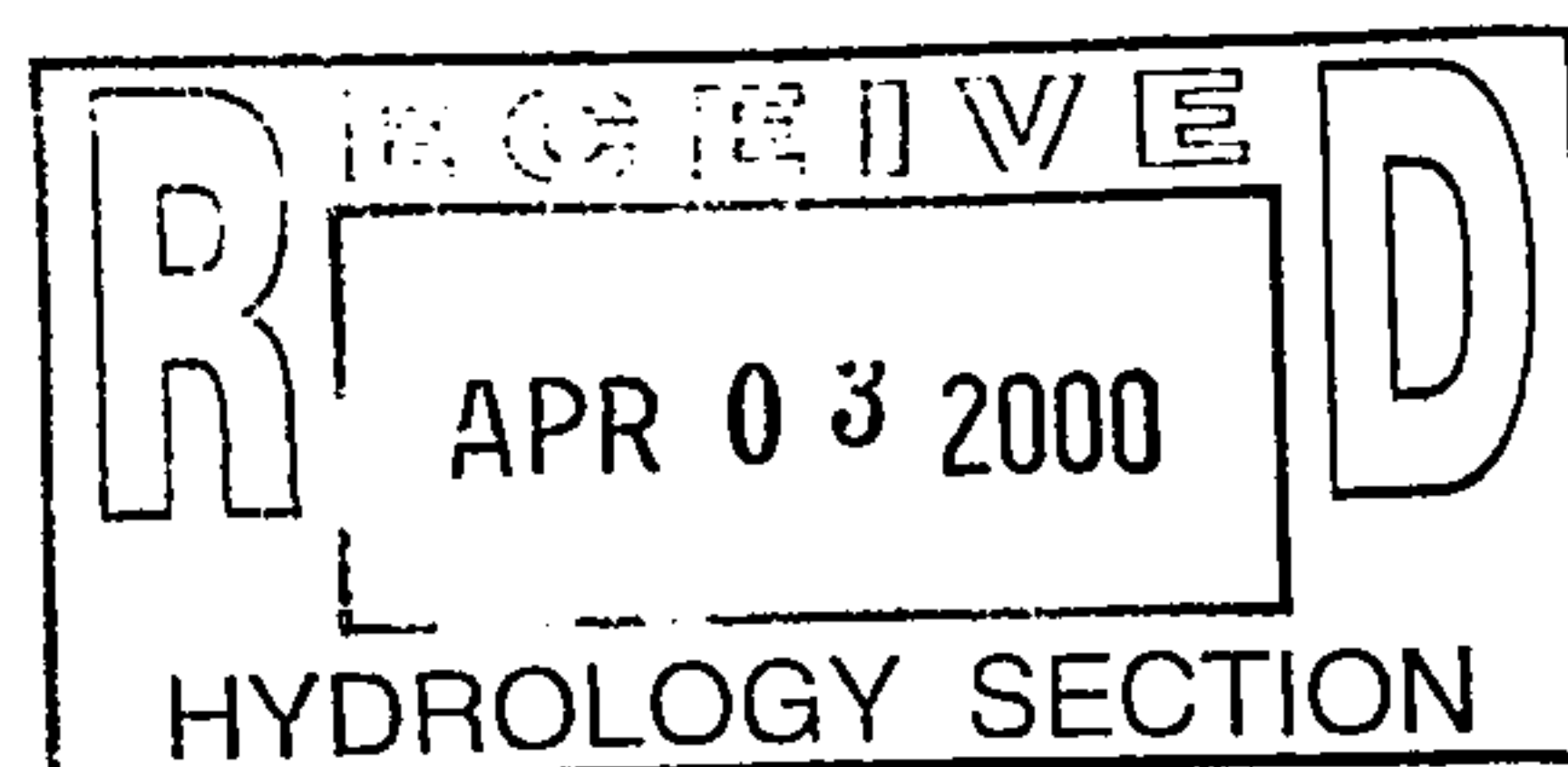
<u> </u>	YES
<u>X</u>	NO
<u> </u>	COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

<u> </u>	SKETCH PLAN APPROVAL
<u>X</u>	PRELIMINARY PLAT APPROVAL
<u>X</u>	S. DEV. PLAN FOR SUB'D. APPROVAL
<u>X</u>	S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
<u> </u>	SECTOR PLAN APPROVAL
<u>X</u>	FINAL PLAT APPROVAL
<u> </u>	FOUNDATION PERMIT APPROVAL
<u>X</u>	BUILDING PERMIT APPROVAL
<u> </u>	CERTIFICATE OF OCCUPANCY APPROVAL
<u>X</u>	GRADING PERMIT APPROVAL
<u> </u>	PAVING PERMIT APPROVAL
<u> </u>	S. A. D. DRAINAGE REPORT
<u> </u>	DRAINAGE REQUIREMENTS
<u> </u>	OTHER

DATE SUBMITTED: 03/28/00

BY: DAVID SOULE



REVISED
DRAINAGE REPORT

for

**Spanish Sun Subdivision
Albuquerque, New Mexico**

Prepared by

Tierra West, LLC
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

Prepared for
Mr. Fred Seely
Western Securities Real Estate
3511 Carlisle NE
Albuquerque NM 87110-1665

March 2000


Ronald R. Bohannon P.E. No. 7868

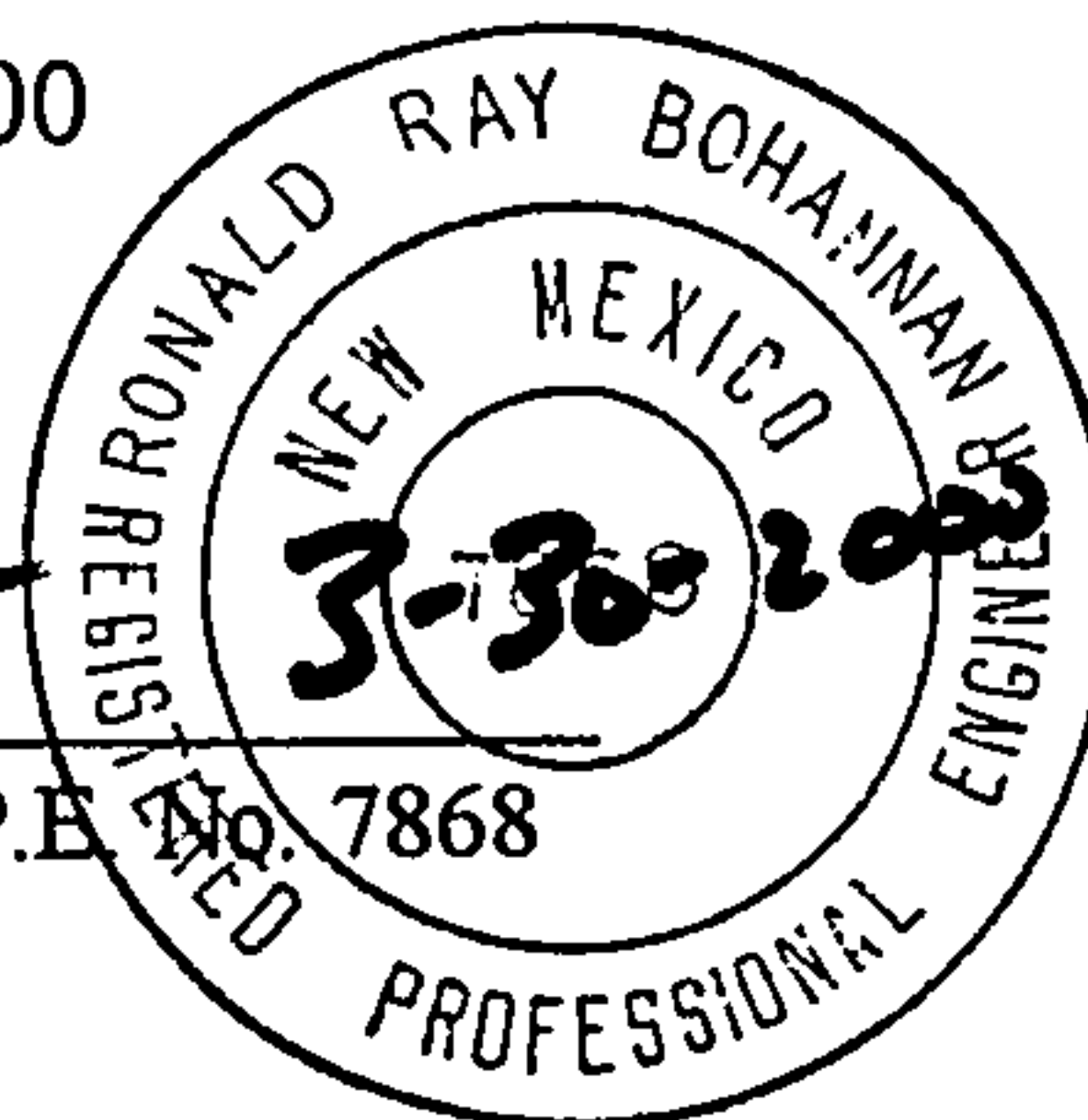


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Drainage Basin Map	5
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Appendix

Hydraulic Calculations	A
Pond Volumes and Orifice Information	B
AHYMO Analysis	C
Infrastructure List	D

Map Pocket

Site Grading and Drainage Plan

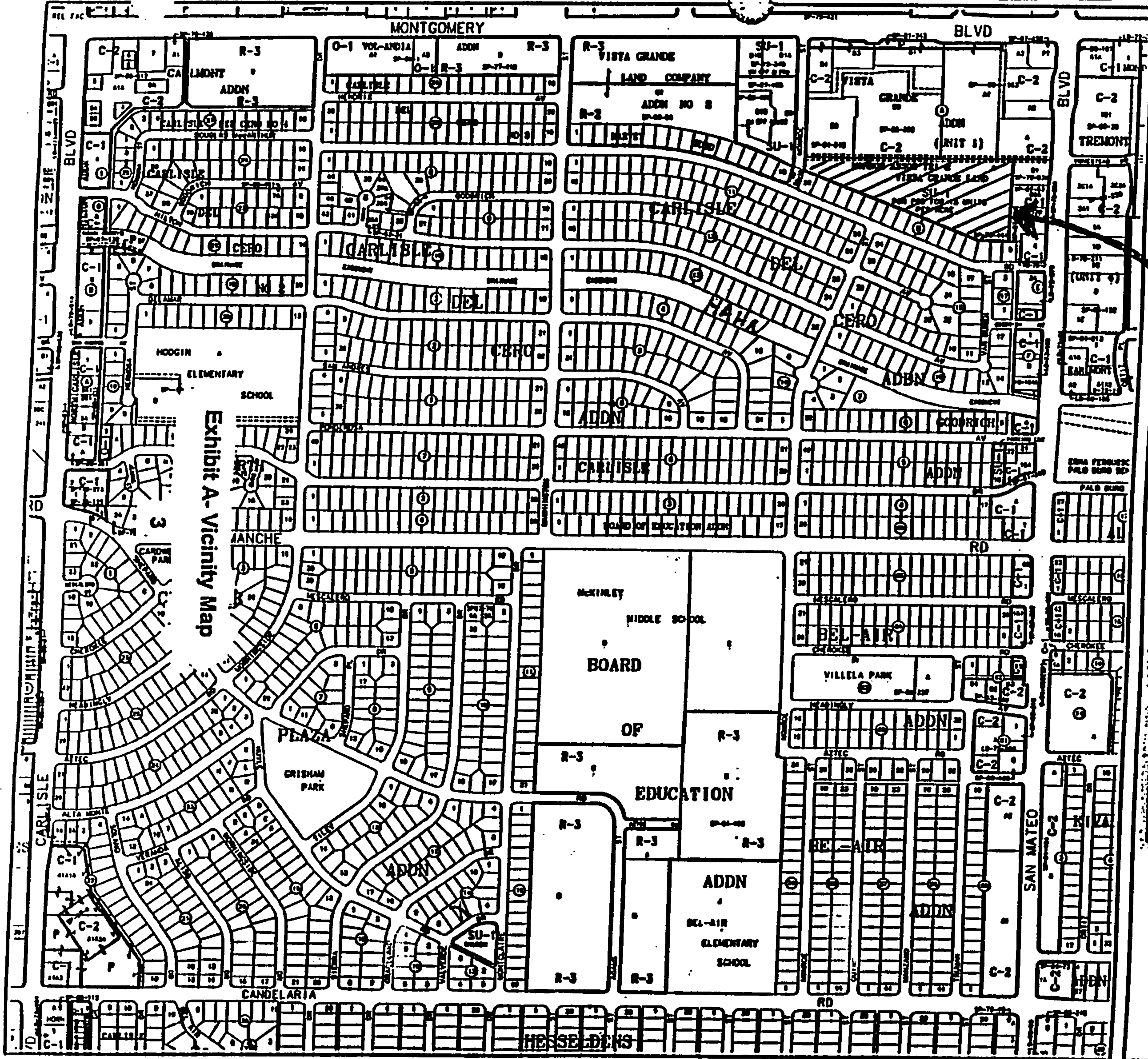
PURPOSE

The purpose of this report is to prove the development of the subject 7.362 acre property for the use as a residential subdivision is in accordance with the DPM Chapter 22, and the proposed improvements do not adversely effect the surrounding properties nor the upstream or downstream facilities.

INTRODUCTION

The subject of this report as shown on the Exhibit A vicinity map is a 7.362 acre parcel of land located between Monroe Street and San Mateo and Douglas Mac Arthur and Montgomery. The site is located on Zone Atlas page G-17. This infill site is currently undeveloped and is bound on all sides by developed property. The legal description of the property is Parcel A of Monroe Associates-Tract 1, Vista Grande Land Company's Addition #1. As shown on FIRM map 35001C0139D, the site lies within flood zone X.

This site has been analyzed previously by Jeff Mortenson & Associates. A drainage management plan was approved for this site by City of Albuquerque hydrology section in 1989. The existing drainage file can be found under G-17-D36. Based upon this report the site has an allowable discharge of 23.4 cfs. After analyzing the assumption of this previously approved analysis we determined the increased discharge rate is improper since only a portion of this site was located with the basin leading to the Hahn as shown within the Albuquerque Master Drainage Study and the downstream facilities are near or at capacity . Therefore we propose to limit the discharge rate to the historical flow and will match the existing discharge rates.

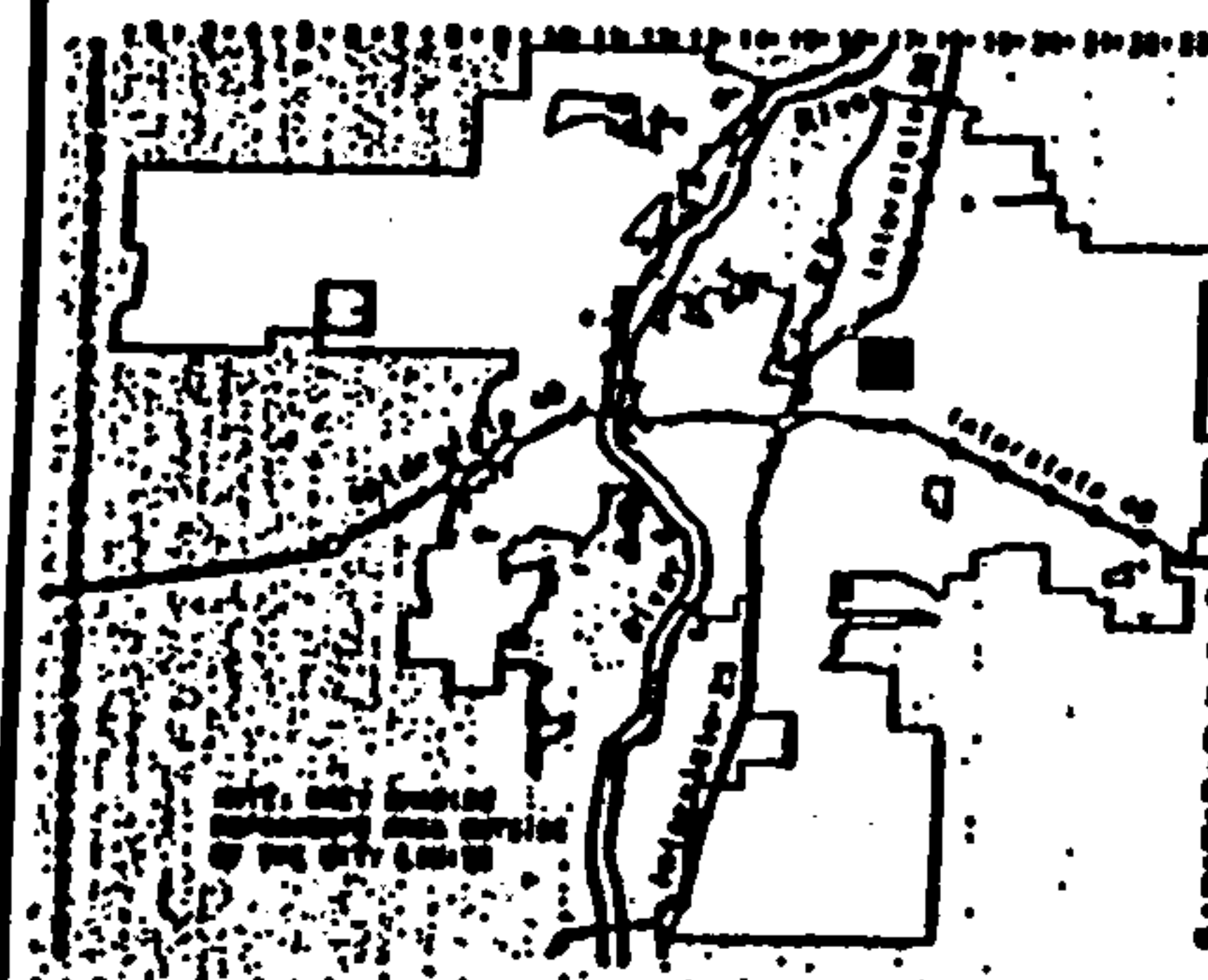
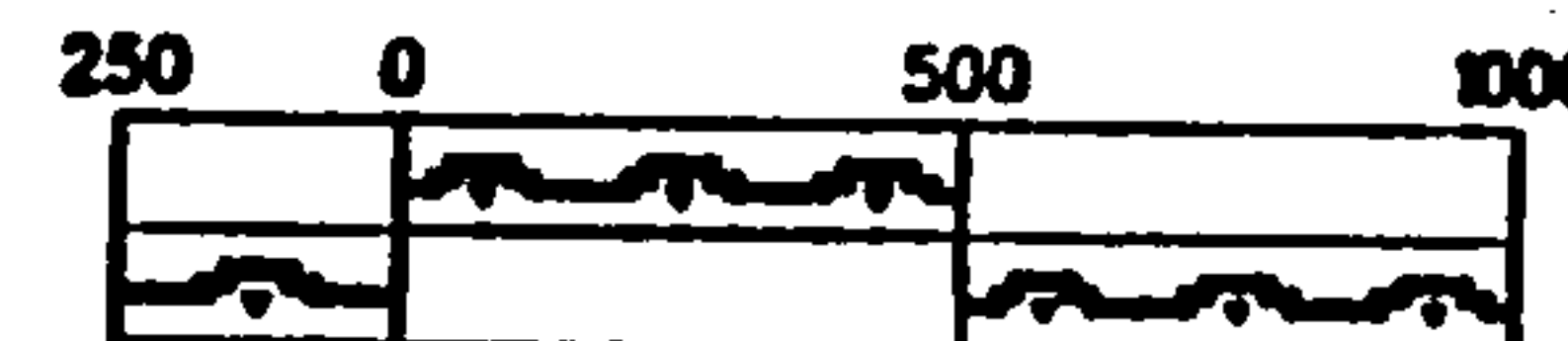


CITY OF
ALBUQUERQUE
A. George G. Smith, Mayor
PLANNING DEPARTMENT
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SITE

GRAPHIC SCALE IN FEET



Zone Atlas Page
G-17-Z

Map Amended through
September 16, 1999

EXISTING CONDITIONS

The site slopes from east to west with a general grades between 1-3 %. The site appears to have been partially rough graded in the past due to the smooth and level surface features. The site is criss-crossed with pedestrian or small vehicular trails. No offsite flows enter site from the south or west. Concentrated flows from the east pass through the site along the far northern border. The site currently sheet flows from east to west discharging on to Monroe street. Once the undeveloped flow from this site enters Monroe Street they are conveyed to the south to Douglas MacArthur Road, which conveys this flow west to Morningside heading south discharging into the Hahn Arroyo.

PROPOSED CONDITIONS

The proposed improvements consists of a 68 unit residential subdivision. The majority of the development will be duplex homes sharing a common wall. The site is split into 6 drainage basins. As shown in Exhibit B, Basin A thru E consist of the internal roadways and private lots while basin F contains the existing pavement and new landscape area and curb and gutter which will lay outside of the subdivision wall. Basin G consists of the area east of this site which currently discharge to the northeast corner of the site. Each private lot will drain to the street with the exception of lots 16-20. In the case of lots 16-20, all the developed roof runoff will discharge to the street and the rear yards will pond only the runoff generated within the rear yards. The flows developed within basins C and D are conveyed via Rojo Sun Way to Spanish Sun Drive. The flows developed within basins E is conveyed via Sun Cove Trail to Spanish Sun Lane. A combined flow rate of 26.67 cfs from basins A,B,C, and D are then conveyed west on Spanish Sun Lane. This flow is captured by a 18' wide rundown and conveyed to a detention pond located at the far west corner of the site. The outlet flow from this detention pond

is limited to a maximum rate of 15.46 CFS by a 8" by 40" opening constructed at the outlet. The maximum water surface elevation for the detention pond is 5178.63 MSL. The flow exiting the site through this orifice is conveyed to Monroe street by a 6' wide rundown.

In an emergency overflow event, the pond will rise to elevation 5178.64 at which point the water will spill out the entrance rundown into Spanish Sun Lane and continue to Monroe. The total developed flows leaving this site, which includes the routed flows from the detention pond, Basin B and Basin F; have a maximum predicted 100 year discharge rate of 16.58 CFS. Once this flow leaves the site it will be contained within the Monroe Street Right of Way and continue its historical path south to Douglas Mac Arthur Avenue. The offsite flows generated to the east of the site have a peak discharge rate of 2.15 cfs. This flow will remain offsite and be conveyed within the private access easement along the north side of the development.

Appendix A contain the calculations proving the streets and rundowns capacities. The pond volumes and orifice controlled discharge rates are located within Appendix B. The AHYMO model of the site is located within Appendix C. Since the proposed improvement are to take place within public right of way a copy of the proposed infrastructure list can be found in Appendix D.

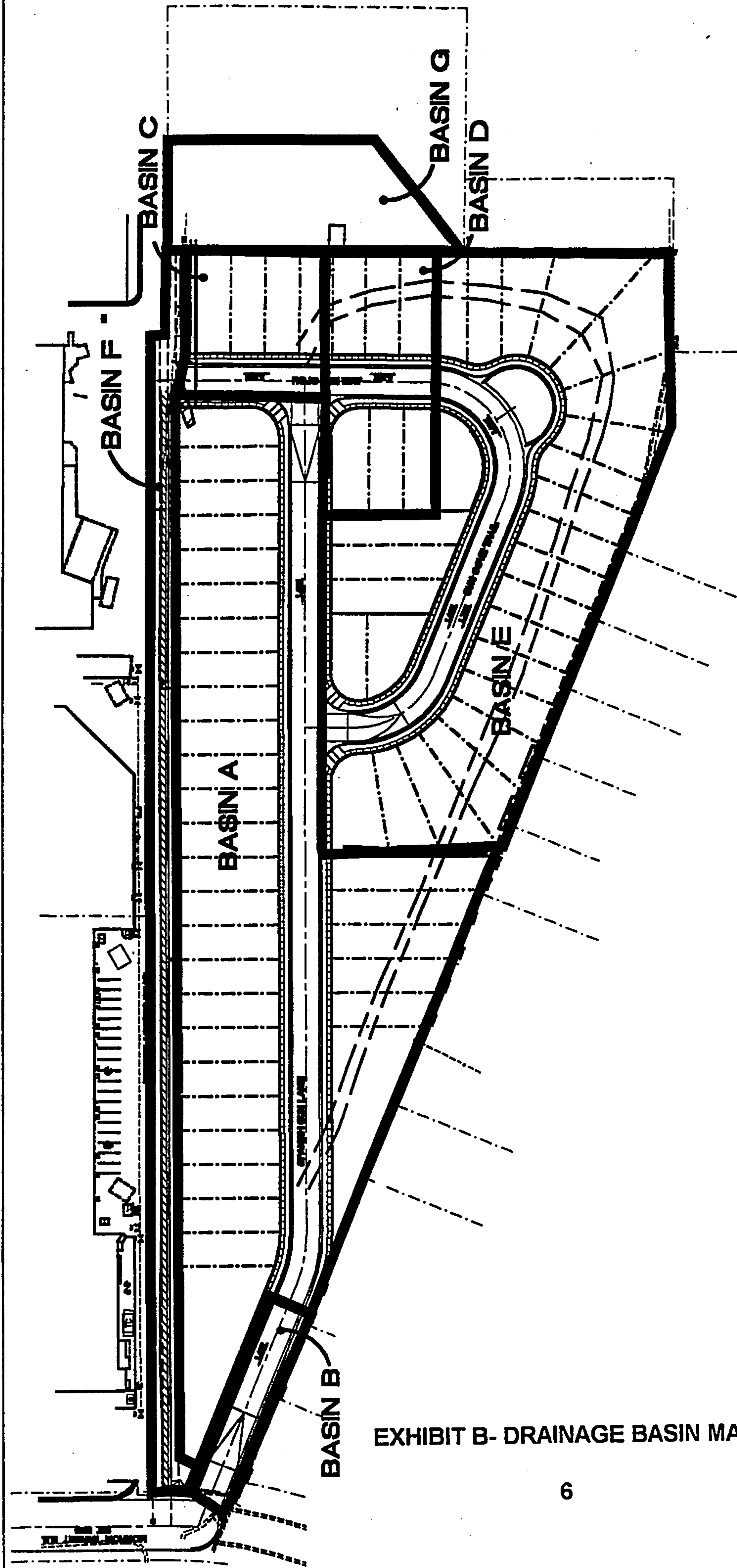


EXHIBIT B- DRAINAGE BASIN MAP

SPANISH SUN SUBDIVISION	DRAWN BY LVS
	DATE 01-08-08
DRAINAGE BASIN MAP	DRAWING NO. SPASUBSNDWG
	JOB # TERRA WEST, LLC 4431 WALTON ROAD, N.E., SUITE 2000 ALBUQUERQUE, NEW MEXICO 87112 (505) 263-7502

SUMMARY AND RECOMMENDATIONS

This site is an infill site surrounded on all sides by developed parcels. The site in its existing condition has a maximum predicted discharge of 16.52 CFS during a 100 year storm event. The proposed improvement consists of a single detention pond with and controlled outlet. The proposed improvement will maintain the existing historical drainage patterns. The proposed improvements will generate a predicted maximum discharge of 16.58 CFS during a 100 year storm event. The proposed development of this tract will generate a peak discharge rate.06 CFS higher than existing. The development of this site is consistent with the Albuquerque Master Drainage Plan and the DPM, chapter 22, Hydrology section. Since this site encompassed more than 5 acres, a NPDES permit is required prior to any construction activity. It is recommended this development be approved for rough grading, Site Plan for Subdivision, Site Plan for Building Permit and Final Plat approval.

APPENDIX A

HYDRAULIC CALCULATIONS

1. RUNOFF RATE COMPUTATION

EXISTING RATE OF RUNOFF (CFS)							
	AREA	LAND TREATMENT(%)				Q100	V100
BASIN	SQ MI	A _A	A _B	A _C	A _D	CFS	AC FT
Basin 1	.0111	55.00	15.00	15.00	15.00	16.52	0.52

DEVELOPED RATE OF RUNOFF (CFS)							
	AREA	LAND TREATMENT (%)				Q100	V100
BASIN	SQ MI	A _A	A _B	A _C	A _D	CFS	AC FT
Basin A	.0051	0.00	17.50	17.50	65.00	13.1	0.46
Basin B	.0003	0.00	7.50	7.50	85.00	.76	0.03
Basin C	.0008	0.00	17.50	17.50	65.00	2.10	0.07
Basin D	.0006	0.00	17.50	17.50	65.00	1.47	0.05
Basin E	.0039	5.00	15.00	15.00	65.00	10.0	0.35
Basin F	.0004	0.00	15.00	15.00	70.00	1.11	0.04
Basin G	.0008	0.00	10.00	15.00	75.00	2.15	0.08
						16.58 *	1.08

*Routed

Curb opening to pond

Weir Equation:

$$Q = CLH^{3/2}$$

Q = flow (cfs)

C = 2.75

H = Curb Height (ft)

L = width of opening

*What is depth
when L = 3'*

$$Q_{\max} = 2.75(18)^{3/2} = 27.14 \text{ cfs}$$

$$Q_{\text{req}} = 26.67 \text{ cfs}$$

Channel Capacity

	Top Width	Bottom Width	Depth	Area	WP	R	Slope	Q Provided	Q Required	Velocity
	(ft)	(ft)	(ft)	(ft^2)	(ft)		(%)	(cfs)	(cfs)	(ft/s)
Channel at top of pond	18	18	0.67	12.06	19.34	0.623578	2	109.11	18.25	1.51
Channel at bottom of pond	3	3	0.67	2.01	4.34	0.463134	25	52.73	18.25	9.08
channel at pond outlet	6	6	0.67	4.02	7.34	0.547684	0.5	16.68	14.95	3.72

Manning's Equation:

$$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$$

A = Area

R = A/WP

S = Slope

n = 0.017

Street Capacity Calculations

Rojo Sun Way
 28' F-F Street Section with 4" curb
 Slope= 0.028

For water depths less than 0.0625 feet

Y= Water depth
 Area = $16 \cdot Y^2$
 P= $\text{SQRT}(1025 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.330156	0.004846	0.00067	0.00134	0.418873	0.004189	0.738167	0.006575
0.02	0.0064	0.660312	0.009692	0.004255	0.008511	0.66492	0.013298	0.828564	0.01548
0.025	0.01	0.825391	0.012115	0.007716	0.015431	0.771571	0.019289	0.859959	0.020373
0.035	0.0196	1.155547	0.016962	0.018926	0.037851	0.965594	0.033796	0.909563	0.030803
0.045	0.0324	1.485703	0.021808	0.036992	0.073983	1.141715	0.051377	0.94847	0.041917
0.055	0.0484	1.815859	0.026654	0.063169	0.126338	1.305142	0.071783	0.980728	0.053588
0.06	0.0576	1.980937	0.029077	0.079666	0.159332	1.383089	0.082985	0.995054	0.059604
0.0625	0.0625	2.063476	0.030289	0.088828	0.177656	1.421246	0.088828	1.001847	0.062654

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.063506	2.088981	0.030401	0.09048	0.18096	1.424744	0.089759	1.000319	0.063027
0.1	0.172656	3.976351	0.043421	0.311982	0.623964	1.806955	0.180695	1.006977	0.100931
0.13	0.311406	5.506651	0.056551	0.671072	1.342145	2.154974	0.280147	1.053277	0.139261
0.16	0.495156	7.036951	0.070365	1.23442	2.46884	2.492991	0.398879	1.09833	0.181082
0.2	0.810156	9.077351	0.08925	2.366596	4.733192	2.92116	0.584232	1.151098	0.240591
0.24	1.205156	11.11775	0.108399	4.007528	8.015055	3.325318	0.798076	1.196188	0.303363
0.28	1.680156	13.15815	0.127689	6.231632	12.46326	3.70896	1.038509	1.235222	0.368765
0.3025	1.9825	14.30588	0.138579	7.765354	15.53071	3.91695	1.184877	1.25504	0.406553

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
 A3= $A2 + Y2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.30638	0.139064	7.810924	15.62185	3.926074	1.1896	1.256924	0.408002
0.308	2.0595	14.31138	0.143906	8.272389	16.54478	4.016698	1.237143	1.275457	0.42251
0.312	2.1155	14.31538	0.147778	8.649057	17.29811	4.088422	1.275588	1.289884	0.434134
0.316	2.1715	14.31938	0.151648	9.032318	18.06464	4.159483	1.314397	1.303971	0.445773
0.32	2.2275	14.32338	0.155515	9.42211	18.84422	4.229903	1.353569	1.317733	0.457429
0.324	2.2835	14.32738	0.15938	9.818372	19.63674	4.299703	1.393104	1.331184	0.469102
0.331	2.3815	14.33438	0.166139	10.52723	21.05446	4.420419	1.463159	1.354009	0.489569
0.333	2.4095	14.33638	0.168069	10.73332	21.46665	4.454585	1.483377	1.360371	0.495426

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.4364	0.168851	10.89215	21.78431	4.468393	1.496912	1.360508	0.498465
0.36	2.805725	15.68665	0.178861	13.02779	26.05558	4.643287	1.671583	1.363786	0.537279
0.39	3.288725	17.18695	0.19135	15.97334	31.94668	4.857	1.89423	1.370591	0.585686
0.42	3.816725	18.68725	0.204242	19.3614	38.72281	5.072779	2.130567	1.37941	0.635812
0.45	4.389725	20.18755	0.217447	23.21785	46.43571	5.289136	2.380111	1.389474	0.687433
0.48	5.007725	21.68785	0.2309	27.56801	55.13602	5.505097	2.642446	1.400285	0.740375
0.513	5.7395	23.33818	0.245928	32.95296	65.90591	5.741433	2.945355	1.412647	0.799974

Street Capacity Calculations

Sun Cove Trail
28' F-F Street Section with 4" curb
 Slope= 0.0141

For water depths less than 0.0625 feet

Y= Water depth
 Area = $16 \cdot Y^2$
 P= $\text{SQRT}(1025 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.335115	0.004774	0.000471	0.000942	0.294304	0.002943	0.518643	0.003877
0.015	0.0036	0.502673	0.007162	0.001388	0.002777	0.385648	0.005785	0.554903	0.006458
0.02	0.0064	0.670231	0.009549	0.00299	0.00598	0.467179	0.009344	0.582157	0.009265
0.025	0.01	0.837788	0.011936	0.005421	0.010842	0.542113	0.013553	0.604216	0.012251
0.03	0.0144	1.005346	0.014323	0.008815	0.017631	0.612178	0.018365	0.622858	0.015386
0.04	0.0256	1.340461	0.019098	0.018985	0.03797	0.7416	0.029664	0.653449	0.022028
0.05	0.04	1.675577	0.023872	0.034422	0.068844	0.860551	0.043028	0.678209	0.029082
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374
0.1	0.207813	4.007346	0.051858	0.299958	0.599917	1.443409	0.144341	0.80438	0.07426
0.15	0.620313	6.557846	0.094591	1.336666	2.673332	2.154827	0.323224	0.98048	0.1461
0.2	1.282813	9.108346	0.140839	3.604334	7.208669	2.809713	0.561943	1.107182	0.228737
0.244	2.072613	11.35279	0.182564	6.923218	13.84644	3.340334	0.815041	1.1917	0.306934
0.26	2.407813	12.16895	0.197865	8.486239	16.97248	3.52446	0.91636	1.218086	0.33637
0.29	3.105313	13.69925	0.226678	11.98277	23.96554	3.858797	1.119051	1.262772	0.392806
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
 A3= $A2 + Y2^2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763
0.305	3.4575	14.33937	0.241119	13.90261	27.80522	4.021001	1.226405	1.283088	0.421567
0.31	3.5275	14.34437	0.245915	14.37155	28.74309	4.074145	1.262985	1.289519	0.431197
0.315	3.5975	14.34937	0.250708	14.84655	29.6931	4.126908	1.299976	1.295811	0.440855
0.32	3.6675	14.35437	0.255497	15.32758	30.65516	4.179299	1.337376	1.301969	0.450542
0.325	3.7375	14.35937	0.260283	15.81459	31.62917	4.231327	1.375181	1.307998	0.460256
0.33	3.8075	14.36437	0.265066	16.30753	32.61506	4.283002	1.413391	1.313903	0.469998
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856
0.375	4.4816	16.46779	0.272143	19.53489	39.06979	4.35891	1.634591	1.254395	0.503662
0.4	4.899725	17.71804	0.276539	21.58681	43.17362	4.405719	1.762288	1.227606	0.522665
0.42	5.256725	18.71824	0.280834	23.39887	46.79774	4.451226	1.869515	1.210395	0.53898
0.45	5.829725	20.21854	0.288336	26.40947	52.81894	4.53014	2.038563	1.190083	0.56508
0.475	6.3416	21.46879	0.295387	29.19482	58.38964	4.603699	2.186757	1.177151	0.588149
0.513	7.1795	23.36917	0.307221	33.92925	67.8585	4.725851	2.424362	1.162769	0.625213

Street Capacity Calculations

Spanish Sun Lane above Sun cove
28' F-F Street Section with 4" curb
 Slope= 0.014

For water depths less than 0.0625 feet

$$\begin{aligned} Y &= \text{Water depth} \\ \text{Area} &= 16 \cdot Y^2 \\ P &= \text{SQRT}(1025 \cdot Y^2) + Y \\ n &= 0.017 \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.335115	0.004774	0.000471	0.000942	0.294304	0.002943	0.518643	0.003877
0.015	0.0036	0.502673	0.007162	0.001388	0.002777	0.385648	0.005785	0.554903	0.008458
0.02	0.0064	0.670231	0.009549	0.00299	0.00598	0.467179	0.009344	0.582157	0.009265
0.025	0.01	0.837788	0.011936	0.005421	0.010842	0.542113	0.013553	0.604216	0.012251
0.03	0.0144	1.005346	0.014323	0.008815	0.017631	0.612178	0.018365	0.622858	0.015386
0.04	0.0256	1.340461	0.019098	0.018985	0.03797	0.7416	0.029664	0.653449	0.022028
0.05	0.04	1.675577	0.023872	0.034422	0.068844	0.860551	0.043028	0.678209	0.029082
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374

For water depths greater than 0.0625 ft but less than 0.3025 ft

$$\begin{aligned} Y1 &= Y - 0.0625 \\ A2 &= A1 + 2 \cdot Y1 + 25 \cdot Y1^2 \\ P2 &= P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1 \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374
0.1	0.207813	4.007346	0.051858	0.299958	0.599917	1.443409	0.144341	0.80438	0.07426
0.15	0.620313	6.557846	0.094591	1.336666	2.673332	2.154827	0.323224	0.98048	0.1461
0.2	1.282813	9.108346	0.140839	3.604334	7.208669	2.809713	0.561943	1.107182	0.228737
0.244	2.072613	11.35279	0.182584	6.923218	13.84644	3.340334	0.815041	1.1917	0.306934
0.26	2.407813	12.16895	0.197865	8.486239	16.97248	3.52446	0.91636	1.218086	0.33637
0.29	3.105313	13.69925	0.226678	11.98277	23.96554	3.858797	1.119051	1.262772	0.392806
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763

For water depths greater than 0.3025 ft but less than 0.333 ft

$$\begin{aligned} Y2 &= Y - 0.3025 \\ A3 &= A2 + Y2^2 \cdot 14 \\ P3 &= P2 + Y2 \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763
0.305	3.4575	14.33937	0.241119	13.90261	27.80522	4.021001	1.226405	1.283088	0.421567
0.31	3.5275	14.34437	0.245915	14.37155	28.74309	4.074145	1.262985	1.289519	0.431197
0.315	3.5975	14.34937	0.250708	14.84655	29.6931	4.126908	1.299976	1.295811	0.440855
0.32	3.6675	14.35437	0.255497	15.32758	30.65516	4.179299	1.337376	1.301969	0.450542
0.325	3.7375	14.35937	0.260283	15.81459	31.62917	4.231327	1.375181	1.307998	0.460256
0.33	3.8075	14.36437	0.265066	16.30753	32.61506	4.283002	1.413391	1.313903	0.469998
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856

For water depths greater than 0.333 ft but less than 0.513 ft

$$\begin{aligned} Y3 &= Y - 0.333 \\ A4 &= A3 + 14 \cdot Y3 + 25 \cdot Y3^2 \\ P4 &= P3 + \text{SQRT}(2501 \cdot Y3^2) \end{aligned}$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856
0.375	4.4816	16.46779	0.272143	19.53489	39.06979	4.35891	1.634591	1.254395	0.503662
0.4	4.899725	17.71804	0.276539	21.58681	43.17362	4.405719	1.762288	1.227606	0.522665
0.42	5.256725	18.71824	0.280834	23.39887	46.79774	4.451226	1.869515	1.210395	0.53898
0.45	5.829725	20.21854	0.288336	26.40947	52.81894	4.53014	2.038563	1.190083	0.56508
0.475	6.3416	21.46879	0.295387	29.19482	58.38964	4.603699	2.186757	1.177151	0.588149
0.513	7.1795	23.36917	0.307221	33.92925	67.8585	4.725851	2.424362	1.162769	0.625213

Street Capacity Calculations

Spanish Sun lane- below sun cove
28' F-F Street Section with 8" curb
 Slope= 0.014

For water depths less than 0.125 feet

Y= Water depth
 Area = $8 \cdot Y^2$
 P= $\text{SQRT}(257 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.170312	0.004697	0.000232	0.000464	0.290088	0.002901	0.511213	0.00379
0.02	0.0032	0.340624	0.009395	0.001474	0.002947	0.460486	0.00921	0.573818	0.009063
0.04	0.0128	0.681249	0.018789	0.009356	0.018713	0.730976	0.029239	0.644088	0.021563
0.06	0.0288	1.021873	0.028184	0.027586	0.055172	0.95785	0.057471	0.689119	0.03572
0.08	0.0512	1.362498	0.037578	0.05941	0.11882	1.160353	0.092828	0.722965	0.051051
0.1	0.08	1.703122	0.046973	0.107718	0.215435	1.34647	0.134647	0.750358	0.067306
0.12	0.1152	2.043746	0.056367	0.175161	0.350321	1.520492	0.182459	0.77351	0.084331
0.125	0.125	2.128902	0.058716	0.195305	0.39061	1.56244	0.195305	0.77879	0.088695

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.383952	0.056891	0.207492	0.414984	1.529896	0.198887	0.74776	0.087066
0.16	0.225625	3.914252	0.057642	0.348214	0.696429	1.543332	0.246933	0.679942	0.093409
0.2	0.415625	5.954652	0.069798	0.728728	1.457457	1.753332	0.350666	0.690909	0.119519
0.24	0.685625	7.995052	0.085756	1.378999	2.757999	2.011303	0.482713	0.723509	0.153319
0.3045	1.289506	11.2852	0.114265	3.14051	6.281021	2.435436	0.74159	0.777777	0.215663
0.32	1.465625	12.07585	0.121368	3.715867	7.431734	2.535346	0.811311	0.789831	0.231613
0.36	1.975625	14.11625	0.139954	5.508016	11.01603	2.787986	1.003675	0.818863	0.274096
0.365	2.045	14.3713	0.142297	5.764903	11.52981	2.819024	1.028944	0.822289	0.279527

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365
 A3= $A2 + Y2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.3763	0.147117	6.096114	12.19223	2.882323	1.06646	0.835053	0.289499
0.41	2.675	14.4163	0.185554	9.00059	18.00118	3.364706	1.37953	0.926035	0.369744
0.45	3.235	14.4563	0.223778	12.33255	24.6651	3.812226	1.715502	1.001485	0.450891
0.49	3.795	14.4963	0.261791	16.06258	32.12517	4.232565	2.073957	1.065559	0.532979
0.54	4.495	14.5463	0.309013	21.24948	42.49896	4.72736	2.552774	1.133689	0.636895
0.59	5.195	14.5963	0.355912	26.98451	53.96903	5.194324	3.064651	1.191722	0.742193
0.63	5.755	14.6363	0.3932	31.9464	63.89279	5.551068	3.497173	1.232476	0.827368
0.667	6.273	14.6733	0.427511	36.81918	73.63837	5.86947	3.914936	1.266508	0.906849

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.32363	0.41426	38.8662	77.7324	5.747546	4.023282	1.210613	0.898508
0.72	7.085225	17.32383	0.408987	40.37638	80.75275	5.698672	4.103044	1.183531	0.897733
0.74	7.428225	18.32403	0.405382	42.08186	84.16373	5.66513	4.192196	1.160556	0.899651
0.76	7.791225	19.32423	0.403184	43.97866	87.95732	5.64464	4.289926	1.141042	0.903917
0.78	8.174225	20.32443	0.402187	46.06446	92.12891	5.63533	4.395557	1.12446	0.910244
0.8	8.577225	21.32463	0.402221	48.33825	96.67649	5.635651	4.508521	1.110379	0.918395
0.847	9.603	23.6751	0.405616	54.42322	108.8464	5.667314	4.800215	1.085195	0.943636

Street Capacity Calculations

Spanish Sun at rundown

28' F-F Street Section with 8" curb with Superelevated Cross-section

Slope= 0.014

For water depths less than 0.125 feet

Y= Water depth

Area = $8 \cdot Y^2$

P= $\text{SQRT}(257 \cdot Y^2) + Y$

n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.17	0.00	0.000	0.29	0.00	0.51	0.00379
0.025	0.005	0.43	0.01	0.003	0.53	0.01	0.60	0.01199
0.04	0.0128	0.68	0.02	0.009	0.73	0.03	0.64	0.02156
0.055	0.0242	0.94	0.03	0.022	0.90	0.05	0.68	0.03206
0.07	0.0392	1.19	0.03	0.042	1.06	0.07	0.71	0.04326
0.085	0.0578	1.45	0.04	0.070	1.21	0.10	0.73	0.05504
0.1	0.08	1.70	0.05	0.108	1.35	0.13	0.75	0.06731
0.125	0.125	2.13	0.06	0.195	1.56	0.20	0.78	0.08869

For water depths greater than 0.125 ft but less than 0.605 ft

Y1= Y-0.125

A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$

P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.126	0.127	2.18	0.06	0.20	1.55	0.20	0.77	0.08827
0.2	0.416	5.95	0.07	0.73	1.75	0.35	0.69	0.11952
0.27	0.941	9.53	0.10	2.08	2.21	0.60	0.75	0.1814
0.34	1.711	13.10	0.13	4.55	2.66	0.91	0.80	0.25263
0.41	2.726	16.67	0.16	8.43	3.09	1.27	0.85	0.32946
0.4605	3.610	19.24	0.19	12.24	3.39	1.56	0.88	0.38749
0.5198	4.811	22.27	0.22	17.92	3.72	1.94	0.91	0.45796
0.605	6.845	26.61	0.26	28.63	4.18	2.53	0.95	0.56294

For water depths greater than 0.605 ft but less than 0.667 ft

Y3= Y - 0.605

A4= $A3 + 26.0 \cdot Y3 + 8 \cdot Y3^2$

P4= $P3 + Y3 + \text{SQRT}(257 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.606	6.871	26.63	0.26	28.80	4.19	2.54	0.95	0.56485
0.62	7.237	26.87	0.27	31.22	4.31	2.67	0.97	0.59145
0.635	7.632	27.12	0.28	33.90	4.44	2.82	0.98	0.6199
0.65	8.031	27.38	0.29	36.67	4.57	2.97	1.00	0.6483
0.667	8.488	27.67	0.31	39.93	4.70	3.14	1.02	0.68043

Street Capacity Calculations

PRIVATE ACCESS EASEMENT

14' F-E Street Section with 8" curb

Slope= 0.02

For water depths less than 0.125 feet

Y= Water depth
Area = $8 \cdot Y^2$
P= $\text{SQRT}(257 \cdot Y^2) + Y$
n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.170312	0.004697	0.000277	0.000555	0.346722	0.003467	0.611017	0.004983
0.02	0.0032	0.340624	0.009395	0.001761	0.003522	0.550386	0.011008	0.685843	0.011824
0.04	0.0128	0.681249	0.018789	0.011183	0.022366	0.873684	0.034947	0.769833	0.027921
0.06	0.0288	1.021873	0.028184	0.032972	0.065943	1.14485	0.068691	0.823654	0.046056
0.08	0.0512	1.362498	0.037578	0.071009	0.142017	1.386887	0.110951	0.864108	0.065629
0.1	0.08	1.703122	0.046973	0.128747	0.257494	1.60934	0.160934	0.89685	0.086333
0.12	0.1152	2.043746	0.056367	0.209357	0.418714	1.817336	0.21808	0.924521	0.107978
0.125	0.125	2.128902	0.058716	0.233434	0.466868	1.867473	0.233434	0.930832	0.113519

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125
A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.383952	0.056891	0.248001	0.496001	1.828576	0.237715	0.893745	0.111702
0.16	0.225625	3.914252	0.057642	0.416196	0.832392	1.844635	0.295142	0.812686	0.120538
0.2	0.415625	5.954652	0.069798	0.870997	1.741994	2.095632	0.419126	0.825795	0.154077
0.24	0.685625	7.995052	0.085756	1.64822	3.296439	2.403967	0.576952	0.864759	0.197092
0.3045	1.289506	11.2852	0.114265	3.753628	7.507256	2.910903	0.88637	0.929622	0.276045
0.32	1.465625	12.07585	0.121368	4.44131	8.882621	3.030318	0.969702	0.944029	0.296197
0.36	1.975625	14.11625	0.139954	6.583338	13.16668	3.332281	1.199621	0.978729	0.349802
0.365	2.045	14.3713	0.142297	6.890377	13.78075	3.369378	1.229823	0.982823	0.356649

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365
A3= $A2 + Y2^2 \cdot 14$
P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.3763	0.147117	7.28625	14.5725	3.445035	1.274663	0.998079	0.369052
0.41	2.675	14.4163	0.185554	10.75776	21.51552	4.021593	1.648853	1.106823	0.468713
0.45	3.235	14.4563	0.223778	14.74022	29.48043	4.556481	2.050417	1.197003	0.569302
0.49	3.795	14.4963	0.261791	19.19846	38.39692	5.058882	2.478852	1.273587	0.670926
0.54	4.495	14.5463	0.309013	25.39799	50.79598	5.650275	3.051149	1.355017	0.799438
0.59	5.195	14.5963	0.355912	32.25266	64.50533	6.208405	3.662959	1.424381	0.929548
0.63	5.755	14.6363	0.3932	38.18325	76.36649	6.634795	4.179921	1.47309	1.034728
0.667	6.273	14.6733	0.427511	44.00734	88.01468	7.015358	4.679244	1.513767	1.132835

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.32363	0.41426	46.45399	92.90799	6.869631	4.808742	1.44696	1.124557
0.72	7.085225	17.32383	0.408987	48.259	96.518	6.811216	4.904076	1.41459	1.12469
0.74	7.428225	18.32403	0.405382	50.29745	100.5949	6.771126	5.010633	1.38713	1.128067
0.76	7.791225	19.32423	0.403184	52.56455	105.1291	6.746635	5.127443	1.363806	1.134276
0.78	8.174225	20.32443	0.402187	55.05755	110.1151	6.735508	5.253696	1.343987	1.142973
0.8	8.577225	21.32463	0.402221	57.77525	115.5505	6.735891	5.388713	1.327156	1.153873
0.847	9.603	23.6751	0.405616	65.04819	130.0964	6.773736	5.737354	1.297056	1.186849

APPENDIX B

POND VOLUMES AND ORIFICE CALCULATIONS

VOLUME CALCULATIONS

POND B

Ab - Bottom Of The Pond Surface Area

At - Top Of The Pond Surface Area

D - Water Depth

Dt - Total Pond Depth

C - Change In Surface Area / Water Depth

$$\text{Volume} = \text{Ab} * \text{D} + 0.5 * \text{C} * \text{D}^2$$

$$\text{C} = (\text{At} - \text{Ab}) / \text{Dt}$$

$$\text{Ab} = 4,350.00$$

$$\text{At} = 6,250.00$$

$$\text{Dt} = 2.50$$

$$\text{C} = 760.00$$

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
76.5	0	0	0.0000
77.00	0.5	0.0499	4.6303
77.25	0.75	0.0754	7.3212
77.50	1	0.1020	9.2607
77.75	1.25	0.1297	10.8591
78.00	1.5	0.1585	12.2507
78.25	1.75	0.1884	13.4996
78.50	2	0.2194	14.6424
78.75	2.25	0.2514	15.7022
79.00	2.5	0.2846	16.6949

Orifice Equation

$$Q = \text{CA} \text{ SQRT}(2gH)$$

$$\text{C} = 0.636^*$$

$$\text{Width(in)} = 40$$

$$\text{Height (in)} = 8$$

$$\text{Area (ft}^2\text{)} = 2.222222$$

$$g = 32.2$$

$$\text{H (Ft)} = \text{Depth of water above center of orifice}$$

$$\text{Q (CFS)} = \text{Flow}$$

*Boveys coefficient for Rectangular orifices per Brater and King Handbook of Hydrualics

APPENDIX C

AHYMO ANALYSIS

```
*****
*                               Spanish Sun Subdivision                               *
*****
*       100-YEAR, 6-HR STORM                                                       *
*****
*
START                               TIME=0.0
*
*
RAINFALL                           TYPE=1 RAIN QUARTER=0.0 IN
                                   RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                                   RAIN DAY=2.75 IN DT=0.03333 HR
*
* BASIN A
COMPUTE NM HYD                     ID=1 HYD NO=100.1 AREA=0.005113 SQ MI
                                   PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
                                   TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD                          ID=1 CODE=1

* BASIN C

COMPUTE NM HYD                     ID=2 HYD NO=100.2 AREA=0.000814 SQ MI
                                   PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
                                   TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD                          ID=2 CODE=1

* BASIN D
COMPUTE NM HYD                     ID=3 HYD NO=100.3 AREA=0.000566 SQ MI
                                   PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
                                   TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD                          ID=3 CODE=1

* BASIN B
*
```

```
COMPUTE NM HYD      ID=5 HYD NO=100.5 AREA=0.000263 SQ MI
                     PER A=0.00 PER B=7.50 PER C=7.50 PER D=85.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=5 CODE=1
*
*
* BASIN E
*
COMPUTE NM HYD      ID=7 HYD NO=100.7 AREA=0.003967 SQ MI
                     PER A=5.00 PER B=15.0 PER C=15.0 PER D=65.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=7 CODE=1
*
*
* BASIN F
*
COMPUTE NM HYD      ID=8 HYD NO=100.8 AREA=0.000418 SQ MI
                     PER A=00.00 PER B=15.00 PER C=15.00 PER D=70.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=8 CODE=1
* EXISTING SITE
*
*
* BASIN G
*
COMPUTE NM HYD      ID=9 HYD NO=100.9 AREA=0.000790 SQ MI
                     PER A=00.00 PER B=10.00 PER C=15.00 PER D=75.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=9 CODE=1
* EXISTING SITE
*
COMPUTE NM HYD      ID=10 HYD NO=100.10 AREA=0.011141 SQ MI
                     PER A=55.0 PER B=15.0 PER C=15.00 PER D=15.00
                     TP=-0.1333 HR MASS RAINFALL=-1
```

PRINT HYD ID=10 CODE=1

*

*

*ADD ONSITE BASINS

ADD HYD ID=21 HYD NO=102.1 ID=1 ID=2
 ADD HYD ID=22 HYD NO=102.2 ID=21 ID=3
 ADD HYD ID=23 HYD NO=102.3 ID=22 ID=7
 PRINT HYD ID=23 CODE=1

*POND B

ROUTE RESERVOIR	ID=32 HYD NO=200.1 INFLOW ID=23 CODE=24	OUTFLOW (CFS)	STORAGE (AC-FT)	ELEVATION (FT)
	0	.0000		76.50
	4.6303	.0497		77.00
	7.3212	.0754		77.25
	9.2607	.1020		77.50
	10.8591	.1297		77.75
	12.2507	.1585		78.00
	13.4996	.1884		78.25
	14.6424	.2194		78.50
	15.7022	.2514		78.75
	16.6949	.2846		79.00

PRINT HYD ID=32 CODE=1

*

*ADD BASIN B AND F AND ROUTED POND A FOR TOTAL DISCHARGE

ADD HYD ID=25 HYD NO=102.2 ID=32 ID=5
 ADD HYD ID=26 HYD NO=102.2 ID=25 ID=8
 PRINT HYD ID=26 CODE=1

FINISH

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
 RUN DATE (MON/DAY/YR) = 03/28/2000
 START TIME (HR:MIN:SEC) = 14:16:29 USER NO.= R_BOHANN.I01
 INPUT FILE = c:\ahymo\spansun5.txt

```

*****
*                               Spanish Sun Subdivision                               *
*****
*       100-YEAR, 6-HR STORM       *
*****
*
START                TIME=0.0
*
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                     RAIN DAY=2.75 IN DT=0.03333 HR
  
```

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.

40 HR.

DT =	.033330 HOURS			END TIME =	5.999400 HOURS	
	.0000	.0016	.0033	.0049	.0066	.0084
	.0120	.0139	.0158	.0178	.0199	.0219
	.0263	.0286	.0309	.0333	.0358	.0384
	.0439	.0467	.0497	.0529	.0561	.0596
	.0669	.0709	.0751	.0807	.0866	.0930
	.1371	.1840	.2514	.3434	.4644	.6186
	1.0449	1.2624	1.3533	1.4300	1.4982	1.5602
	1.6704	1.7200	1.7664	1.8102	1.8514	1.8904
	1.9622	1.9953	2.0268	2.0566	2.0850	2.0915
	2.1033	2.1088	2.1140	2.1191	2.1239	2.1285
	2.1373	2.1414	2.1454	2.1494	2.1531	2.1568
						2.1604

Out

2.1639	2.1673	2.1706	2.1739	2.1771	2.1802	2.1832
2.1862	2.1891	2.1919	2.1947	2.1975	2.2002	2.2028
2.2054	2.2080	2.2105	2.2130	2.2154	2.2178	2.2202
2.2225	2.2248	2.2270	2.2293	2.2315	2.2336	2.2358
2.2379	2.2399	2.2420	2.2440	2.2460	2.2480	2.2500
2.2519	2.2538	2.2557	2.2576	2.2594	2.2612	2.2631
2.2648	2.2666	2.2684	2.2701	2.2718	2.2735	2.2752
2.2769	2.2785	2.2802	2.2818	2.2834	2.2850	2.2866
2.2881	2.2897	2.2912	2.2928	2.2943	2.2958	2.2973
2.2987	2.3002	2.3017	2.3031	2.3045	2.3060	2.3074
2.3088	2.3102	2.3115	2.3129	2.3143	2.3156	2.3169
2.3183	2.3196	2.3209	2.3222	2.3235	2.3248	2.3261
2.3273	2.3286	2.3298	2.3311	2.3323	2.3335	2.3348
2.3360	2.3372	2.3384	2.3396	2.3408	2.3419	2.3431
2.3443	2.3454	2.3466	2.3477	2.3488	2.3500	

*

* BASIN A

COMPUTE NM HYD

ID=1 HYD NO=100.1 AREA=0.005113 SQ MI

PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00

TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
= 7.106420
UNIT PEAK = 13.121 CFS UNIT VOLUME = .9985 B = 526.28 P60 =
2.0100
AREA = .003323 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO
UR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N
= 3.944947
UNIT PEAK = 4.7186 CFS UNIT VOLUME = .9976 B = 351.48 P60 =

2.0100

UR AREA = .001790 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HO

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 100.10

RUNOFF VOLUME = 1.70281 INCHES = .4643 ACRE-FEET
PEAK DISCHARGE RATE = 13.10 CFS AT 1.500 HOURS BASIN AREA = .0051 SQ. M

I.

* BASIN C

COMPUTE NM HYD ID=2 HYD NO=100.2 AREA=0.000814 SQ MI
PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
= 7.106420
UNIT PEAK = 2.0889 CFS UNIT VOLUME = .9941 B = 526.28 P60 =
2.0100 AREA = .000529 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO
UR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N
= 3.944947

Out

2.0100 UNIT PEAK = .75122 CFS UNIT VOLUME = .9825 B = 351.48 P60 =
UR AREA = .000285 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HO
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 100.20

I. RUNOFF VOLUME = 1.70281 INCHES = .0739 ACRE-FEET
PEAK DISCHARGE RATE = 2.10 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. M

* BASIN D
COMPUTE NM HYD

ID=3 HYD NO=100.3 AREA=0.000566 SQ MI
PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
TP=-0.1333 HR MASS RAINFALL=-1

= 7.106420 K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
2.0100 UNIT PEAK = 1.4525 CFS UNIT VOLUME = .9911 B = 526.28 P60 =
UR AREA = .000368 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

= 3.944947 K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N

Out

2.0100 UNIT PEAK = .52235 CFS UNIT VOLUME = .9744 B = 351.48 P60 =
UR AREA = .000198 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HO
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 100.30

I. RUNOFF VOLUME = 1.70281 INCHES = .0514 ACRE-FEET
PEAK DISCHARGE RATE = 1.47 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. M

* BASIN B

*

COMPUTE NM HYD ID=5 HYD NO=100.5 AREA=0.000263 SQ MI
PER A=0.00 PER B=7.50 PER C=7.50 PER D=85.00
TP=-0.1333 HR MASS RAINFALL=-1

2.0100 K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
= 7.106420
UR UNIT PEAK = .88259 CFS UNIT VOLUME = .9862 B = 526.28 P60 =
AREA = .000224 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N

Out

= 3.944947
UNIT PEAK = .10402 CFS UNIT VOLUME = .8745 B = 351.48 P60 =
2.0100
AREA = .000039 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HO
UR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=5 CODE=1

PARTIAL HYDROGRAPH 100.50

RUNOFF VOLUME = 1.93856 INCHES = .0272 ACRE-FEET
PEAK DISCHARGE RATE = .76 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. M
I.

*
*
* BASIN E
*

COMPUTE NM HYD ID=7 HYD NO=100.7 AREA=0.003967 SQ MI
PER A=5.00 PER B=15.0 PER C=15.0 PER D=65.00
TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
= 7.106420
UNIT PEAK = 10.180 CFS UNIT VOLUME = .9982 B = 526.28 P60 =
2.0100
AREA = .002579 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO
UR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .125536HR TP = .133300HR K/TP RATIO = .941759 SHAPE CONSTANT, N
 = 3.754406
 UNIT PEAK = 3.5253 CFS UNIT VOLUME = .9963 B = 338.45 P60 =
 2.0100
 AREA = .001388 SQ MI IA = .45714 INCHES INF = 1.13000 INCHES PER HO
 UR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=7 CODE=1

PARTIAL HYDROGRAPH 100.70

RUNOFF VOLUME = 1.67811 INCHES = .3550 ACRE-FEET
 PEAK DISCHARGE RATE = 10.00 CFS AT 1.500 HOURS BASIN AREA = .0040 SQ. M
 I.

*

* BASIN F

*

COMPUTE NM HYD ID=8 HYD NO=100.8 AREA=0.000418 SQ MI
 PER A=00.00 PER B=15.00 PER C=15.00 PER D=70.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
 = 7.106420
 UNIT PEAK = 1.1552 CFS UNIT VOLUME = .9897 B = 526.28 P60 =
 2.0100
 AREA = .000293 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO
 UR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTANT, N
 = 3.944947
 UNIT PEAK = .33065 CFS UNIT VOLUME = .9591 B = 351.48 P60 =
 2.0100
 AREA = .000125 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HO
 UR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=8 CODE=1

PARTIAL HYDROGRAPH 100.80

RUNOFF VOLUME = 1.76175 INCHES = .0393 ACRE-FEET
 PEAK DISCHARGE RATE = 1.11 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. M
 I.

* EXISTING SITE
 *

* BASIN G
 *

COMPUTE NM HYD ID=9 HYD NO=100.9 AREA=0.000790 SQ MI
 PER A=00.00 PER B=10.00 PER C=15.00 PER D=75.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
 = 7.106420
 UNIT PEAK = 2.3392 CFS UNIT VOLUME = .9941 B = 526.28 P60 =

2.0100

UR

AREA = .000593 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .117303HR TP = .133300HR K/TP RATIO = .879990 SHAPE CONSTANT, N
= 4.033581

UNIT PEAK = .52954 CFS UNIT VOLUME = .9759 B = 357.40 P60 =

2.0100

UR

AREA = .000198 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HO

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=9 CODE=1

PARTIAL HYDROGRAPH 100.90

RUNOFF VOLUME = 1.82947 INCHES = .0771 ACRE-FEET
PEAK DISCHARGE RATE = 2.15 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. M

I.

* EXISTING SITE

*

COMPUTE NM HYD

ID=10 HYD NO=100.10 AREA=0.011141 SQ MI
PER A=55.0 PER B=15.0 PER C=15.00 PER D=15.00
TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N
= 7.106420

UNIT PEAK = 6.5978 CFS UNIT VOLUME = .9976 B = 526.28 P60 =

2.0100

UR

AREA = .001671 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HO

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .145900HR TP = .133300HR K/TP RATIO = 1.094523 SHAPE CONSTANT, N
= 3.228984

UNIT PEAK = 21.312 CFS UNIT VOLUME = .9995 B = 299.99 P60 =

2.0100

UR

AREA = .009470 SQ MI IA = .57059 INCHES INF = 1.44765 INCHES PER HO

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=10 CODE=1

PARTIAL HYDROGRAPH 100.10

RUNOFF VOLUME = .87141 INCHES = .5178 ACRE-FEET
PEAK DISCHARGE RATE = 16.52 CFS AT 1.500 HOURS BASIN AREA = .0111 SQ. M

I.

*

*

*ADD ONSITE BASINS

ADD HYD

ID=21 HYD NO=102.1 ID=1 ID=2

ADD HYD

ID=22 HYD NO=102.2 ID=21 ID=3

ADD HYD

ID=23 HYD NO=102.3 ID=22 ID=7

PRINT HYD

ID=23 CODE=1

Out

PARTIAL HYDROGRAPH 102.30

RUNOFF VOLUME = 1.69334 INCHES = .9447 ACRE-FEET
PEAK DISCHARGE RATE = 26.67 CFS AT 1.500 HOURS BASIN AREA = .0105 SQ. M

I.

*POND B

ROUTE RESERVOIR

ID=32 HYD NO=200.1 INFLOW ID=23 CODE=24

OUTFLOW (CFS) STORAGE (AC-FT) ELEVATION (FT)

0	.0000	76.50
4.6303	.0497	77.00
7.3212	.0754	77.25
9.2607	.1020	77.50
10.8591	.1297	77.75
12.2507	.1585	78.00
13.4996	.1884	78.25
14.6424	.2194	78.50
15.7022	.2514	78.75
16.6949	.2846	79.00

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	76.50	.000	.00
.80	.00	76.50	.000	.00

Out

1.60	18.88	78.65	.238	15.27
2.40	1.05	76.73	.023	2.17
3.20	.19	76.53	.003	.25
4.00	.12	76.51	.001	.13
4.80	.12	76.51	.001	.12
5.60	.13	76.51	.001	.13
6.40	.01	76.50	.000	.03

PEAK DISCHARGE = 15.460 CFS - PEAK OCCURS AT HOUR 1.63
MAXIMUM WATER SURFACE ELEVATION = 78.693
MAXIMUM STORAGE = .2441 AC-FT INCREMENTAL TIME= .033330HRS

PRINT HYD ID=32 CODE=1

PARTIAL HYDROGRAPH 200.10

RUNOFF VOLUME = 1.69334 INCHES = .9447 ACRE-FEET
PEAK DISCHARGE RATE = 15.46 CFS AT 1.633 HOURS BASIN AREA = .0105 SQ. M

I.

*

*ADD BASIN B AND F AND ROUTED POND A FOR TOTAL DISCHARGE
ADD HYD ID=25 HYD NO=102.2 ID=32 ID=5
ADD HYD ID=26 HYD NO=102.2 ID=25 ID=8
PRINT HYD ID=26 CODE=1

PARTIAL HYDROGRAPH 102.20

RUNOFF VOLUME = 1.70163 INCHES = 1.0111 ACRE-FEET

Out

I. PEAK DISCHARGE RATE = 16.58 CFS AT 1.600 HOURS BASIN AREA = .0111 SQ. M

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 14:16:30

APPENDIX D

INFRASTRUCTURE LIST

DRB Case No:
DRC Project Number:
Prelim. Plat Approved:
Prelim. Plat Expires:
Site Plan Approved:
Date Submitted:

"EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENTS
DEVELOPMENT REVIEW BOARD (DRB)REQUIRED INFRASTRUCTURE LISTING
FOR: Spanish Sun Subdivision

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 processs 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 Cair 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 of the financial guarantees. All such revisions require approval b the DRC Chair, the User Department and the 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.

Public Improvements

Size	Type Improvement	Location	From	To
28' F-F	Residential Paving	Spanish Sun Avenue	Monroe Street	Red Sun Drive
	Curb & Gutter, Sidewalks 4'			
28' F-F	Residential Paving	Sun Cove Road	Spanish Sun Avenue	Red Sun Drive
	Curb & Gutter, Sidewalks 4'			
28' F-F	Residential Paving	Red Sun Drive	North Property Line	Sun Cove Road
	Curb & Gutter, Sidewalks 4'			
8' F-E	Residential Paving	Private Access Road	Monroe Street	East Property Line
	Curb & Gutter			
6"	Water PVC Line	Spanish Sun Avenue	Monroe Street	Red Sun Drive
6"	Water PVC Line	Sun Cove Road	Spanish Sun Avenue	Red Sun Drive
6"	Water PVC Line	Red Sun Drive	Private Access Road	Sun Cove Road
8"	SAS Gravity Line	Spanish Sun Avenue	Monroe Street	Red Sun Drive
8"	SAS Gravity Line	Sun Cove Road	Spanish Sun Avenue	Red Sun Drive
8"	SAS Gravity Line	Red Sun Drive	Private Access Road	Sun Cove Road
Water infrastructure to include Valves, Fittings, Valve Boxes, Fire Hydrant as required				
Sanitary Sewer to include Manholes and Service Connection as required				
Storm Sewer to include Manholes, Drop Inlets and Connection to Outfall as required				
Residential Street Lights Per DPM				
Internal Sidewalks deferred				
Certified Grading & Drainage with Private Walls & Private Drainage (Non-work order item) Required for SIA/Financial Release				

6) PRIVATE Agreement & covenant
DETENTION POND TRACT C

Agent/Owner Name:
 'Ronald R. Bohannon, P.E.
Firm: Tierra West LLC

Development Review Board Member Approvals

Transportation Dev. Date

Utility Dev. Date

Parks & GS. Date

City Engineer Date

AMAFCA Date

DRB Chairman Date

DRC Revisions				
Revisions	Date	DRC Chair	User Department	Agent/Owner

TIERRA WEST, LLC

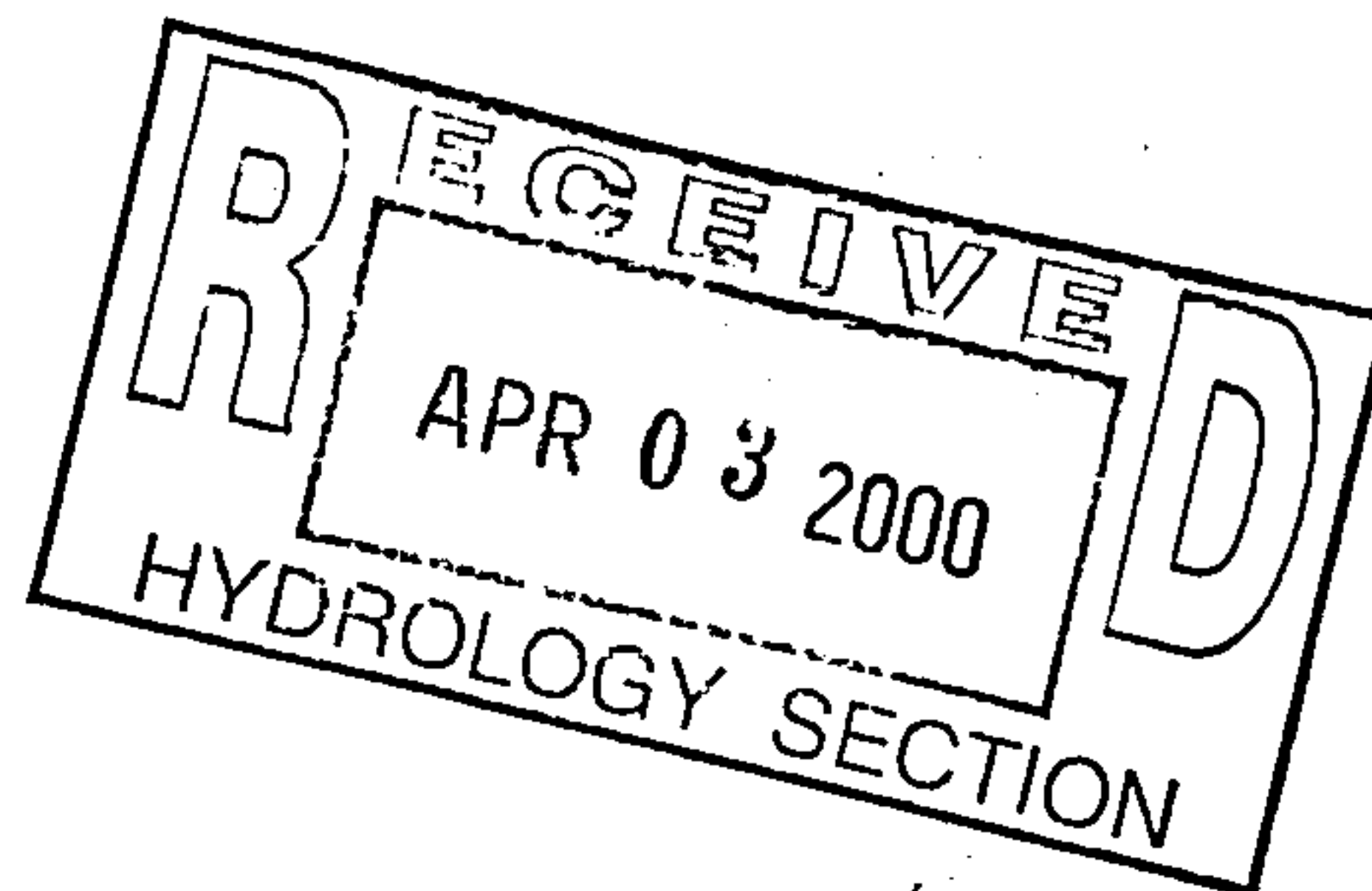
8509 Jefferson NE
Albuquerque, NM 87113

(505) 858-3100
fax (505) 858-1118

e-mail: twdms@aol.com
1-800-245-3102

March 30, 2000

Mr. Bradley L Bingham, PE
Hydrology Department
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103



RE: Spanish Sun Subdivision (G17/D36)
Revised Grading and Drainage Report

Dear Bradley:

This letter is in response to your written comments for the referenced projected dated 3-7-00. The grading and Drainage plan has been revised in response to these comments. The following is how your comments were incorporated into the new grading plan and drainage report:

- 1- Is your proposed pond planned to be private? The city will not accept a pond for maintenance if the detained volume is less than 2 ac-ft., and even then, it must be supported by a storm drain. It would be prudent to investigate downstream street capacity to justify free discharge, even though your basin isn't exactly inclusive to the one in the AMDS.

This detention pond is to be private. The maintenance of this parcel shall be the sole responsibility of the Spanish Sun Home Owners Association. The downstream drainage facilities has been analyzed and determined to be at or near capacity, therefore free discharge is not a viable drainage solution.

2. Please quantify the upstream flow that you mentioned in the report. Provide analysis that this flow will be kept in the new curb.

The offsite basin has been shown on the basin map within the report. The flows generated by this offsite basin have been accounted for and the capacity of the private access easement has been demonstrated within Appendix A of the revised

report.

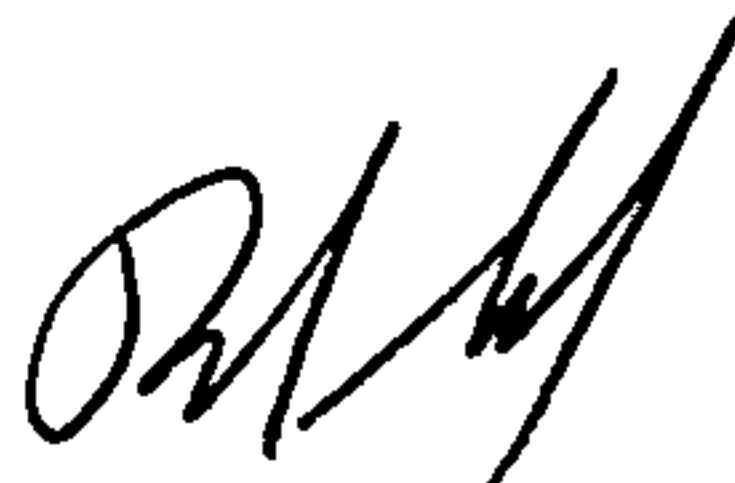
3. Please add additional spot elevations to your typical lot grading detail to better define the back and side yard swales. Please add lot numbers since you describe a few lots (16-20) that "don't drain to the street." Please keep in mind that all developed (roof) runoff must drain to the street.

The typical lot grading detail has been modified to include additional spot elevations to better define the rear and side yard swales. I have enclosed the master paving plan which show the lot numbers. If the lot numbers were added to the grading plan, the text would be hard to read. A note has been added to the grading plan allowing only the flows generated within the rear yards of lots 16-20 to be ponded. All developed flow will be directed to the street.

4. What is proposed for the triangular area on the south side of Spanish Sun?
This is to be used as a private park to be maintained by the Spanish Sun Home Owners Association.

Should you have any questions regarding this re submittal or require any additional information, please do not hesitate to call me.

Sincerely,



David Soule, P.E.

Enclosure

Cc: Fred Seeley

JN 990043

ds

DRAINAGE INFORMATION SHEET

PROJECT TITLE: SPANISH SUN SUBDIVISION ZONE ATLAS/DRNG. FILE #: G-17 / 10836

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: TRACT A OF MONROE ASSOCIATES -TRACT 1,VISTA GRANDE LAND COMPANY ADD. NO.1

CITY ADDRESS: MONROE STREET

ENGINEERING FIRM: TIERRA WEST, LLC CONTACT: DAVID SOULE

ADDRESS: 4421 McCleod Rd. NE Suite D, 87109 PHONE: (505) 883-7592

OWNER: MR. FRED SEELY CONTACT: FRED SEELY

ADDRESS: 3511 CARLISLE NE PHONE: _____

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: Precision Surveys CONTACT: Larry Medrano

ADDRESS: 2929 Coors Blvd NW Suite 309 PHONE: (505)839-0569

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT

☒ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

☒ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

☒ NO

____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAN APPROVAL

☒ PRELIMINARY PLAT APPROVAL

☒ S. DEV. PLAN FOR SUB'D. APPROVAL

☒ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

____ SECTOR PLAN APPROVAL

☒ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

☒ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

☒ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

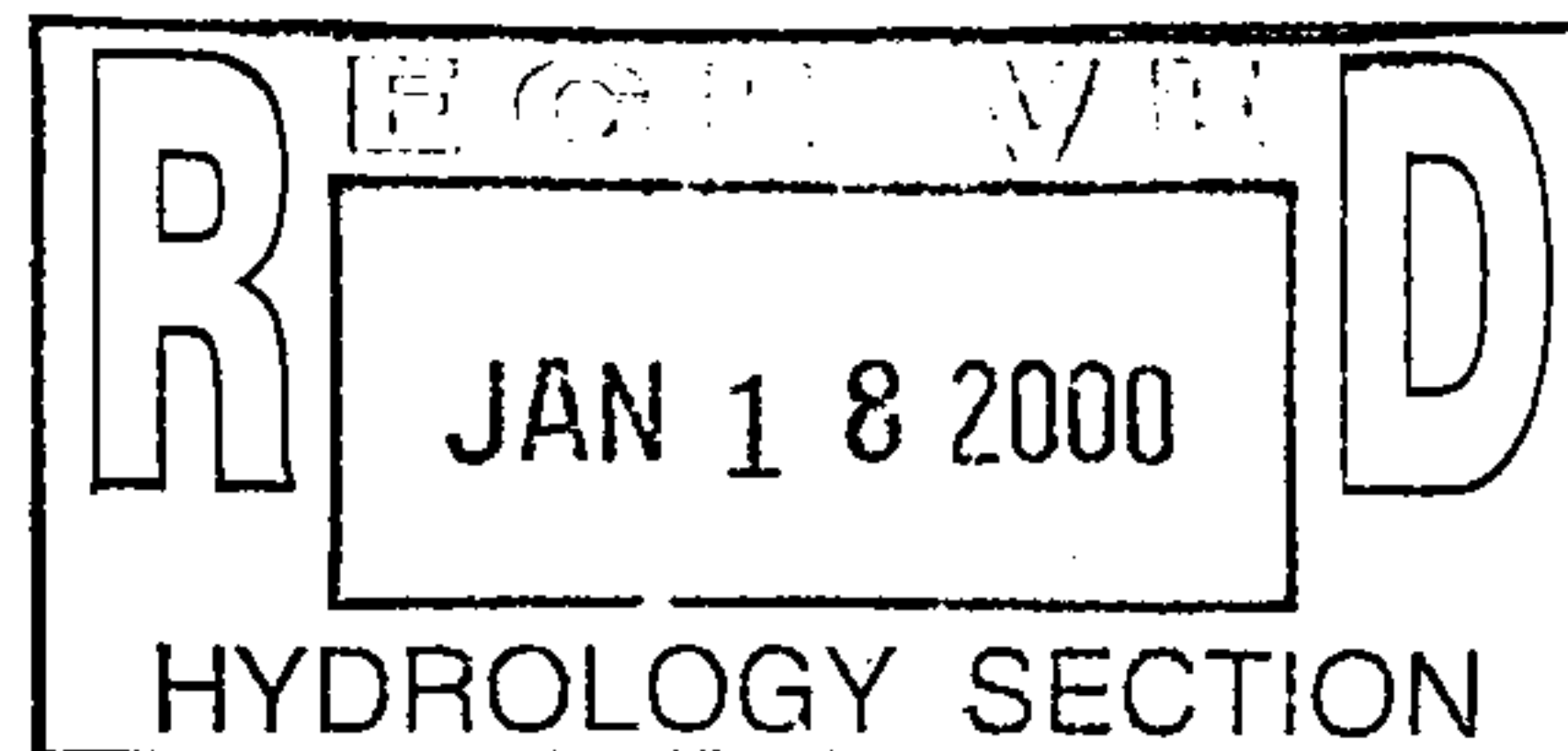
____ S. A. D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER

DATE SUBMITTED: 01/17/00

BY: DAVID SOULE



DRAINAGE REPORT

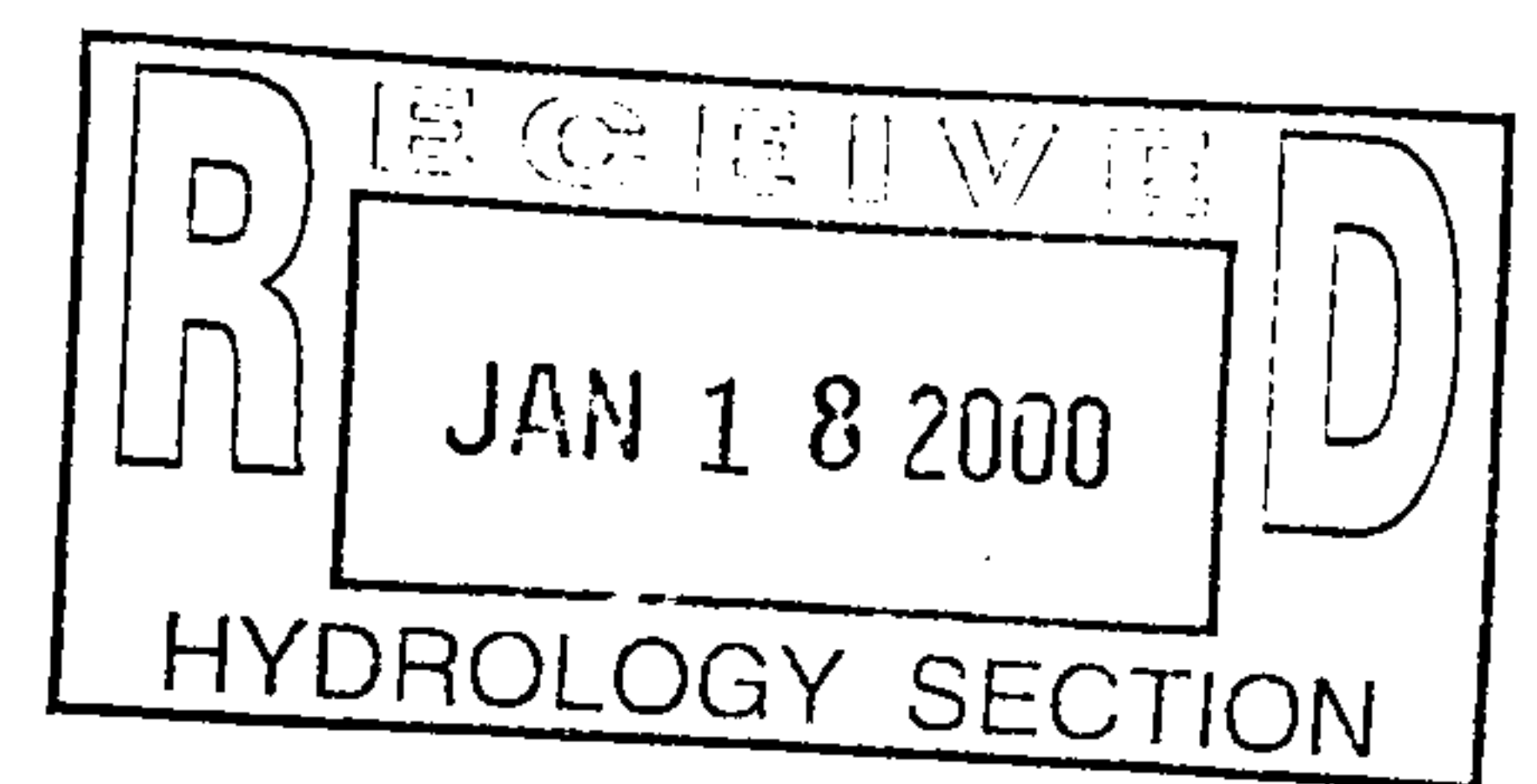
for

**Spanish Sun Subdivision
Albuquerque, New Mexico**

Prepared by

Tierra West, LLC
4421 McLeod Road NE, Suite D
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January 2000



Ronald R. Bohannon P.E. No. 7868

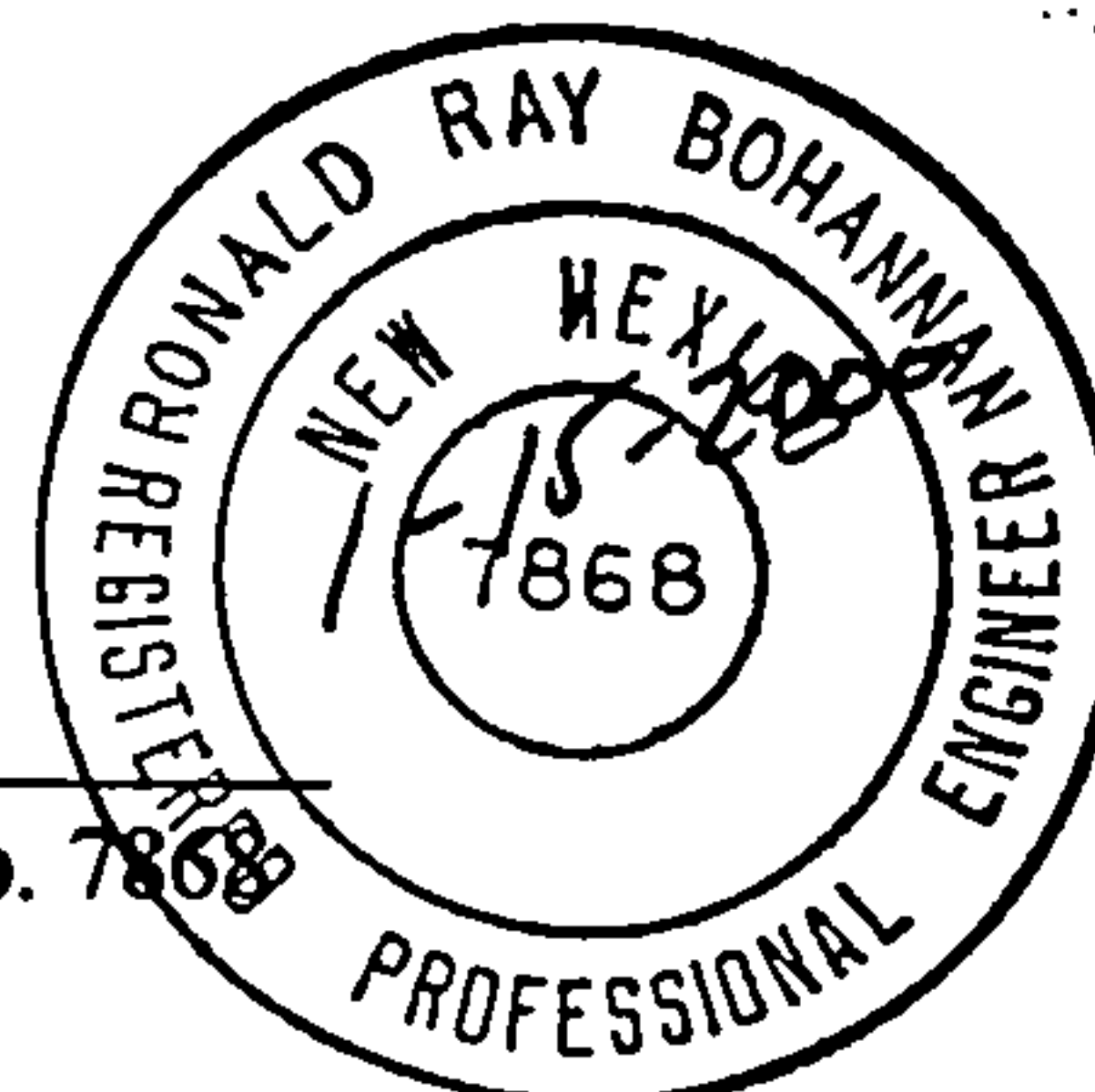


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Map Pocket

Site Grading and Drainage Plan

PURPOSE

The purpose of this report is to prove the development of the subject 7.362 acre property for the use as a residential subdivision is in accordance with the DPM Chapter 22, and the proposed improvements do not adversely effect the surrounding properties nor the upstream or downstream facilities.

INTRODUCTION

The subject of this report as shown on the Exhibit A vicinity map is a 7.362 acre parcel of land located between Monroe Street and San Mateo and Douglas Mac Arthur and Montgomery. The site is located on Zone Atlas page G-17. This infill site is currently undeveloped and is bound on all sides by developed property. The legal description of the property is Parcel A of Monroe Associates-Tract 1, Vista Grande Land Company's Addition #1. As shown on FIRM map 35001C0139D, the site lies within flood zone X.

This site has been analyzed previously by Jeff Mortenson & Associates. A drainage management plan was approved for this site by City of Albuquerque hydrology section in 1989. The existing drainage file can be found under G-17-D36. Based upon this report the site has an allowable discharge of 23.4 cfs. After analyzing the assumption of this previously approved analysis we determined the increased discharge rate is improper since only a portion of this site was located with the basin leading to the Hahn as shown within the Albuquerque Master Drainage Study. Therefore we propose to limit the discharge rate to the historical flow and will match the existing discharge rates.

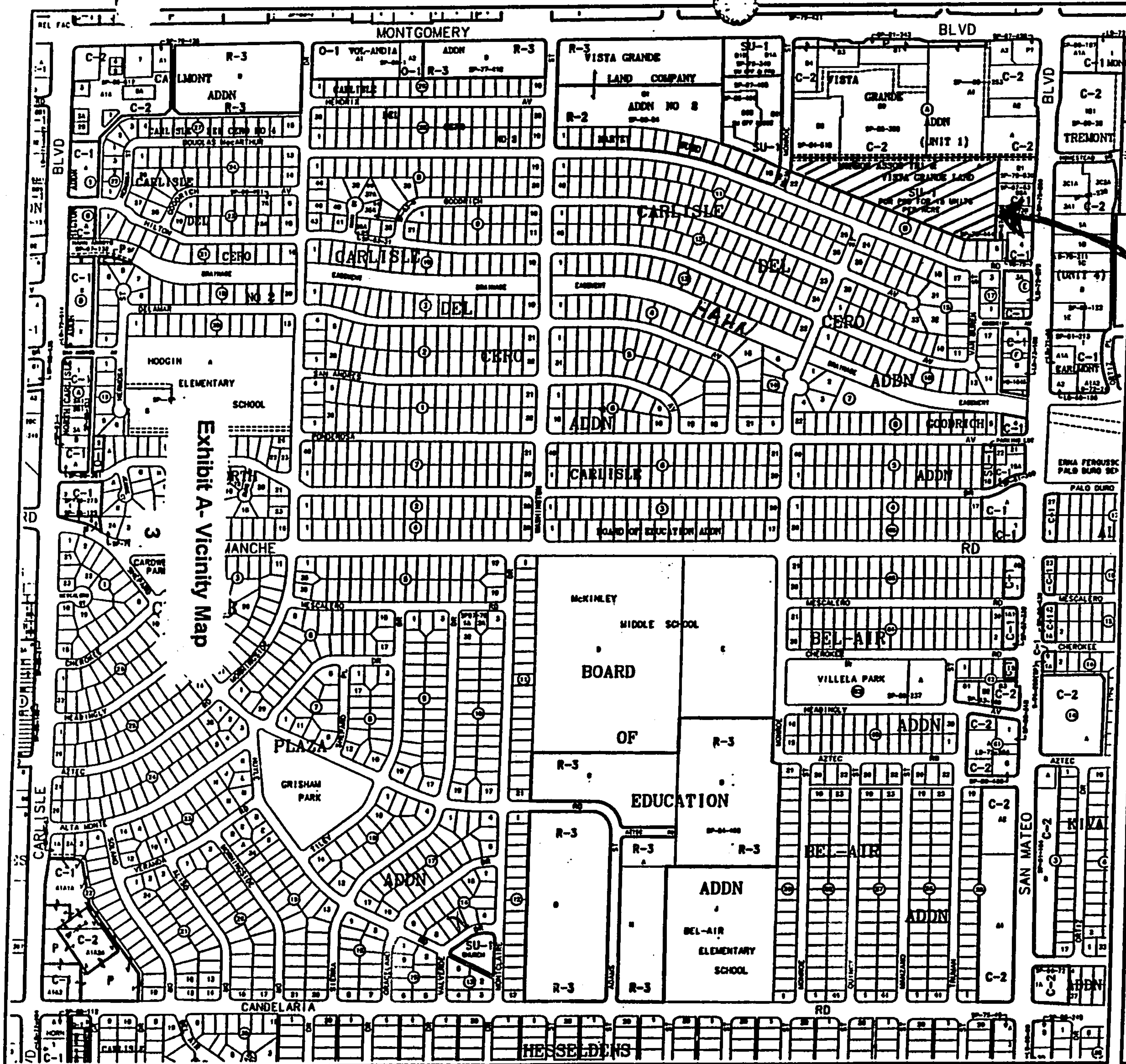
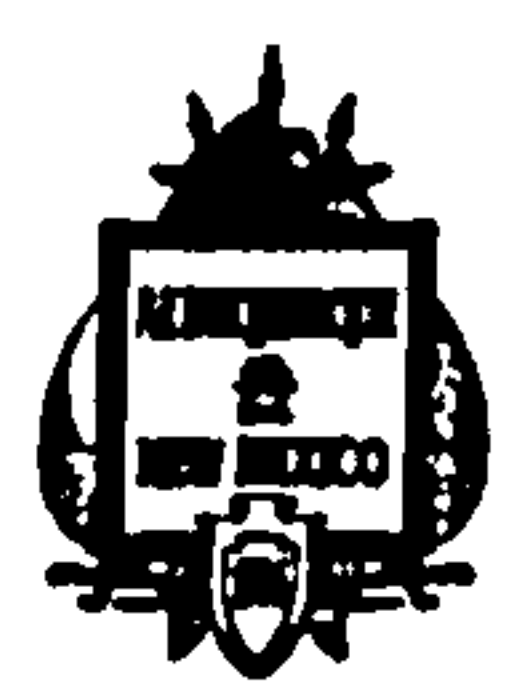


Exhibit A- Vicinity Map

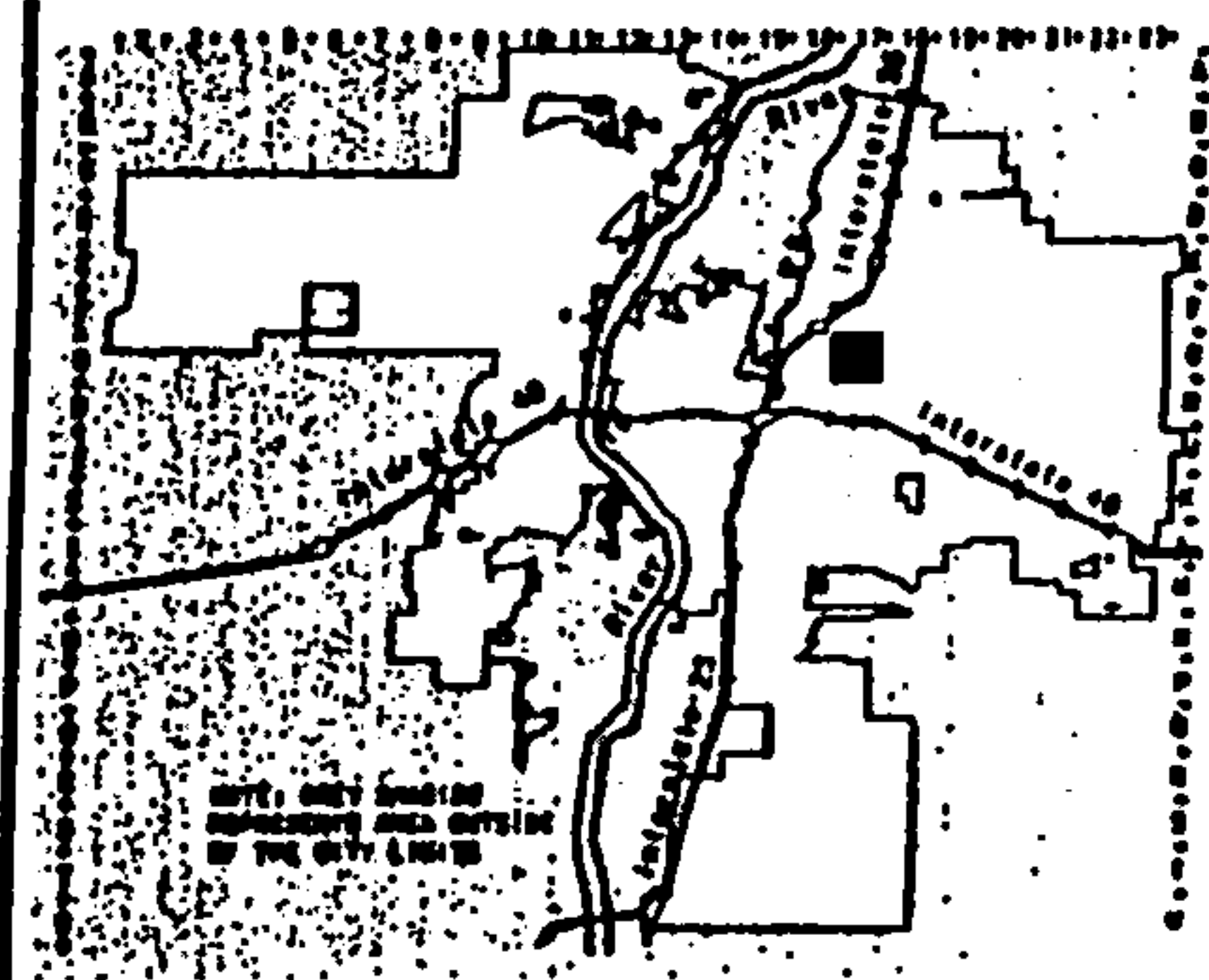
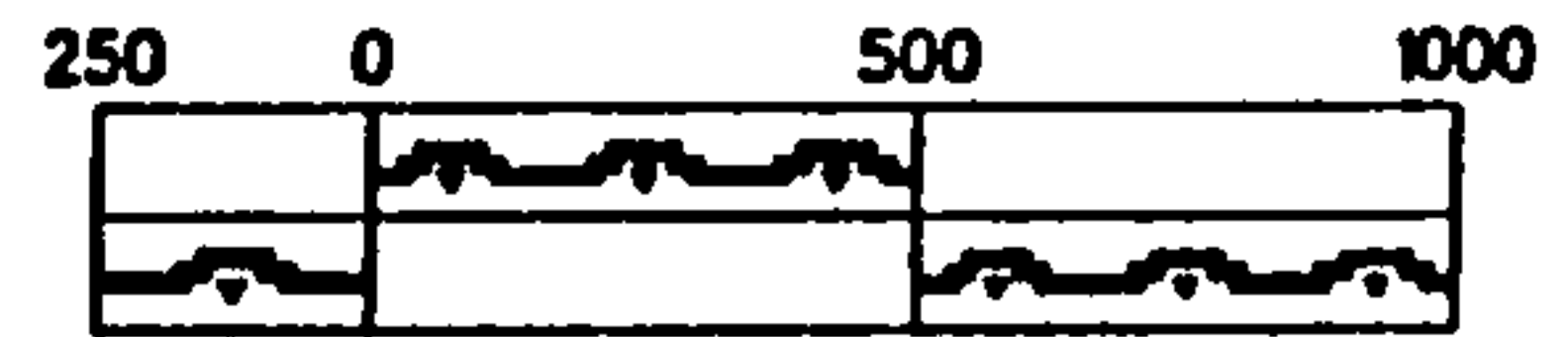
SITE



CITY OF
Albuquerque
A large G growth I service S plan
PLANNING DEPARTMENT
© Copyright 1999



GRAPHIC SCALE IN FEET



Zone Atlas Page
G-17-Z

Map Amended through
September 16, 1999

EXISTING CONDITIONS

The site slopes from east to west with a general grades between 1-3 %. The site appears to have been partially rough graded in the past due to the smooth and level surface features. The site is criss-crossed with pedestrian or small vehicular trails. No offsite flows enter site from the south or west. Concentrated flows from the east pass through the site along the far northern border. The site currently sheet flows from east to west discharging on to Monroe street. Once the undeveloped flow from this site enters Monroe Street they are conveyed to the south to Douglas MacArthur Road, which conveys this flow west to Morningside heading south discharging into the Hahn Arroyo.

WHAT
ARE YOU
GOING TO
DO ABOUT
THIS?
How much?

PROPOSED CONDITIONS

The proposed improvements consists of a 68 unit residential subdivision. The majority of the development will be duplex homes sharing a common wall. The site is split into 6 drainage basins. As shown in Exhibit B, Basin A thru E consist of the internal roadways and private lots while basin F contains the existing pavement and new landscape area and curb and gutter which will lay outside of the subdivision wall. Each private lot will drain to the street with the exception of lots 16-20. The flows developed within basins C and D are conveyed via Rojo Sun Way to Spanish Sun Drive. The flows developed within basins E is conveyed via Sun Cove Trail to Spanish Sun Lane. A combined flow rate of 26.67 cfs from basins A,B,C, and D are then conveyed west on Spanish Sun Lane. This flow is captured by a 18' wide rundown and conveyed to a detention pond located at the far west corner of the site. The outlet flow from this detention pond is limited to a maximum rate of 15.46 CFS by a 8" by 40" opening constructed at the outlet. The maximum water surface elevation for the detention pond is 5178.63 MSL. The flow exiting the site through this orifice is conveyed to Monroe street by a 6' wide rundown.

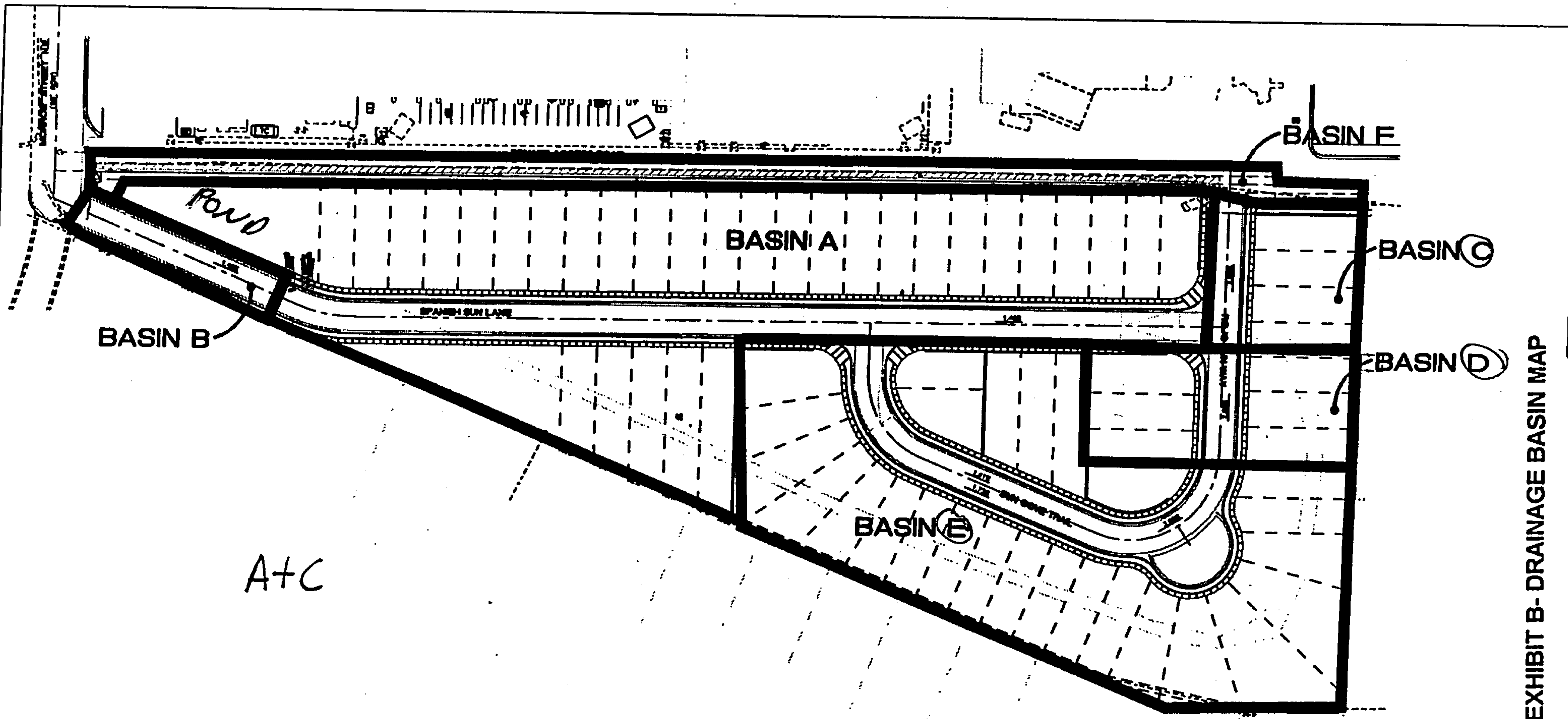


EXHIBIT B- DRAINAGE BASIN MAP

SPANISH SUN SUBDIVISION DRAINAGE BASIN MAP	DRAWN BY DPS
	DATE 01-08-00
	9943BASIN.DWG
TERRA WEST, LLC 4421 MCLEOD ROAD, N.E., SUITE D ALBUQUERQUE, NEW MEXICO 87109 (505)883-7592	
	JOB / 990043

In an emergency overflow event, the pond will rise to elevation 5178.64 at which point the water will spill out the entrance rundown into Spanish Sun Lane and continue to Monroe. The total developed flows leaving this site, which includes the routed flows from the detention pond, Basin B and Basin F; have a maximum predicted 100 year discharge rate of 16.58 CFS. Once this flow leaves the site it will be contained within the Monroe Street Right of Way and continue its historical path south to Douglas Mac Arthur Avenue

Appendix A contain the calculations proving the streets and rundowns capacities. The pond volumes and orifice controlled discharge rates are located within Appendix B. The AHYMO model of the site is located within Appendix C. Since the proposed improvement are to take place within public right of way a copy of the proposed infrastructure list can be found in Appendix D.

SUMMARY AND RECOMMENDATIONS

This site is an infill site surrounded on all sides by developed parcels. The site in its existing condition has a maximum predicted discharge of 16.52 CFS during a 100 year storm event. The proposed improvement consists of a single detention pond with and controlled outlet. The proposed improvement will maintain the existing historical drainage patterns. The proposed improvements will generate a predicted maximum discharge of 16.58 CFS during a 100 year storm event. The proposed development of this tract will generate a peak discharge rate.08 CFS higher than existing. The development of this site is consistent with the Albuquerque Master Drainage Plan and the DPM, chapter 22, Hydrology section. Since this site encompassed more than 5 acres, a NPDES permit is required prior to any construction activity. It is recommended this development be approved for rough grading, Site Plan for Subdivision, Site Plan for Building Permit and Final Plat approval.

APPENDIX A

HYDRAULIC CALCULATIONS

Curb opening to pond

Weir Equation:

$$Q = CLH^{3/2}$$

Q = flow (cfs)

C = 2.95

H = Curb Height (ft) .67

L = width of opening 18

$$Q_{\max} = 2.95(18)(.67)^{3/2} = 29.12 \text{ cfs}$$

$$Q_{\text{req}} = 26.67 \text{ cfs}$$

Channel Capacity

	Top Width	Bottom Width	Depth	Area	WP	R	Slope	Q Provided	Q Required	Velocity
	(ft)	(ft)	(ft)	(ft^2)	(ft)		(%)	(cfs)	(cfs)	(ft/s)
Channel at top of pond	18	18	0.67	12.06	19.34	0.623578	2	109.11	18.25	1.51
Channel at bottom of pond	3	3	0.67	2.01	4.34	0.463134	25	52.73	8.37	4.16
channel at pond outlet	6	6	0.67	4.02	7.34	0.547684	0.5	16.68	14.95	3.72

Manning's Equation:

$$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$$

A = Area

R = $\frac{D/4}{P}$

S = Slope

n = 0.017

give actual
depth

SHOULD BE
SAME

Street Capacity Calculations

Rojo Sun Way
28' F-F Street Section with 4" curb
 Slope= 0.028

For water depths less than 0.0625 feet

Y= Water depth
 Area = $16 \cdot Y^2$
 P= $\text{SQRT}(1025 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.330156	0.004846	0.00067	0.00134	0.418873	0.004189	0.738167	0.006575
0.02	0.0064	0.660312	0.009692	0.004255	0.008511	0.66492	0.013298	0.828564	0.01548
0.025	0.01	0.825391	0.012115	0.007716	0.015431	0.771571	0.019289	0.859959	0.020373
0.035	0.0196	1.155547	0.016962	0.018926	0.037851	0.965594	0.033796	0.909563	0.030803
0.045	0.0324	1.485703	0.021808	0.036992	0.073983	1.141715	0.051377	0.94847	0.041917
0.055	0.0484	1.815859	0.026654	0.063169	0.126338	1.305142	0.071783	0.980728	0.053588
0.06	0.0576	1.980937	0.029077	0.079666	0.159332	1.383089	0.082985	0.995054	0.059604
0.0625	0.0625	2.063476	0.030289	0.088828	0.177656	1.421246	0.088828	1.001847	0.062654

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.063506	2.088981	0.030401	0.09048	0.18096	1.424744	0.089759	1.000319	0.063027
0.1	0.172656	3.976351	0.043421	0.311982	0.623964	1.806955	0.180695	1.006977	0.100931
0.13	0.311406	5.506651	0.056551	0.671072	1.342145	2.154974	0.280147	1.053277	0.139261
0.16	0.495156	7.036951	0.070365	1.23442	2.46884	2.492991	0.398879	1.09833	0.181082
0.2	0.810156	9.077351	0.08925	2.366596	4.733192	2.92116	0.584232	1.151098	0.240591
0.24	1.205156	11.11775	0.108399	4.007528	8.015055	3.325318	0.798076	1.196188	0.303363
0.28	1.680156	13.15815	0.127689	6.231632	12.46326	3.70896	1.038509	1.235222	0.368765
0.3025	1.9825	14.30588	0.138579	7.765354	15.53071	3.91695	1.184877	1.25504	0.406553

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
 A3= $A2 + Y2^2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.30638	0.139064	7.810924	15.62185	3.926074	1.1896	1.256924	0.408002
0.308	2.0595	14.31138	0.143906	8.272389	16.54478	4.016698	1.237143	1.275457	0.42251
0.312	2.1155	14.31538	0.147778	8.649057	17.29811	4.088422	1.275588	1.289884	0.434134
0.316	2.1715	14.31938	0.151648	9.032318	18.06464	4.159483	1.314397	1.303971	0.445773
0.32	2.2275	14.32338	0.155515	9.42211	18.84422	4.229903	1.353569	1.317733	0.457429
0.324	2.2835	14.32738	0.15938	9.818372	19.63674	4.299703	1.393104	1.331184	0.469102
0.331	2.3815	14.33438	0.166139	10.52723	21.05446	4.420419	1.463159	1.354009	0.489569
0.333	2.4095	14.33638	0.168069	10.73332	21.46665	4.454585	1.483377	1.360371	0.495426

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.4364	0.168851	10.89215	21.78431	4.468393	1.496912	1.360508	0.498465
0.36	2.805725	15.68665	0.178861	13.02779	26.05558	4.643287	1.671583	1.363786	0.537279
0.39	3.288725	17.18695	0.19135	15.97334	31.94668	4.857	1.89423	1.370591	0.585686
0.42	3.816725	18.68725	0.204242	19.3614	38.72281	5.072779	2.130567	1.37941	0.635812
0.45	4.389725	20.18755	0.217447	23.21785	46.43571	5.289136	2.380111	1.389474	0.687433
0.48	5.007725	21.68785	0.2309	27.56801	55.13602	5.505097	2.642446	1.400285	0.740375
0.513	5.7395	23.33818	0.245928	32.95296	65.90591	5.741433	2.945355	1.412647	0.799974

Street Capacity Calculations

Sun Cove Trail
28' F-F Street Section with 4" curb
 Slope= 0.0141

For water depths less than 0.0625 feet

Y= Water depth
 Area = $16 \cdot Y^2$
 P= $\text{SQRT}(1025 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.335115	0.004774	0.000471	0.000942	0.294304	0.002943	0.518643	0.003877
0.015	0.0036	0.502673	0.007162	0.001388	0.002777	0.385648	0.005785	0.554903	0.006458
0.02	0.0064	0.670231	0.009549	0.00299	0.00598	0.467179	0.009344	0.582157	0.009265
0.025	0.01	0.837788	0.011936	0.005421	0.010842	0.542113	0.013553	0.604216	0.012251
0.03	0.0144	1.005346	0.014323	0.008815	0.017631	0.612178	0.018365	0.622858	0.015386
0.04	0.0256	1.340461	0.019098	0.018985	0.03797	0.7416	0.029664	0.653449	0.022028
0.05	0.04	1.675577	0.023872	0.034422	0.068844	0.860551	0.043028	0.678209	0.029082
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374
0.1	0.207813	4.007346	0.051858	0.299958	0.599917	1.443409	0.144341	0.80438	0.07426
0.15	0.620313	6.557846	0.094591	1.336666	2.673332	2.154827	0.323224	0.98048	0.1461
0.2	1.282813	9.108346	0.140839	3.604334	7.208669	2.809713	0.561943	1.107182	0.228737
0.244	2.072613	11.35279	0.182564	6.923218	13.84644	3.340334	0.815041	1.1917	0.306934
0.26	2.407813	12.16895	0.197865	8.486239	16.97248	3.52446	0.91636	1.218086	0.33637
0.29	3.105313	13.69925	0.226678	11.98277	23.96554	3.858797	1.119051	1.262772	0.392806
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
 A3= $A2 + Y2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763
0.305	3.4575	14.33937	0.241119	13.90261	27.80522	4.021001	1.226405	1.283088	0.421567
0.31	3.5275	14.34437	0.245915	14.37155	28.74309	4.074145	1.262985	1.289519	0.431197
0.315	3.5975	14.34937	0.250708	14.84655	29.6931	4.126908	1.299976	1.295811	0.440855
0.32	3.6675	14.35437	0.255497	15.32758	30.65516	4.179299	1.337376	1.301969	0.450542
0.325	3.7375	14.35937	0.260283	15.81459	31.62917	4.231327	1.375181	1.307998	0.460256
0.33	3.8075	14.36437	0.265066	16.30753	32.61506	4.283002	1.413391	1.313903	0.469998
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856
0.375	4.4816	16.46779	0.272143	19.53489	39.06979	4.35891	1.634591	1.254395	0.503662
0.4	4.899725	17.71804	0.276539	21.58681	43.17362	4.405719	1.762288	1.227606	0.522665
0.42	5.256725	18.71824	0.280834	23.39887	46.79774	4.451226	1.869515	1.210395	0.53898
0.45	5.829725	20.21854	0.288336	26.40947	52.81894	4.53014	2.038563	1.190083	0.56508
0.475	6.3416	21.46879	0.295387	29.19482	58.38964	4.603699	2.186757	1.177151	0.588149
0.513	7.1795	23.36917	0.307221	33.92925	67.8585	4.725851	2.424362	1.162769	0.625213

Street Capacity Calculations

Spanish Sun Lane above Sun cove
28' F-F Street Section with 4" curb
 Slope= 0.014

For water depths less than 0.0625 feet

Y= Water depth
 Area = $16 \cdot Y^2$
 P= $\text{SQRT}(1025 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.335115	0.004774	0.000471	0.000942	0.294304	0.002943	0.518643	0.003877
0.015	0.0036	0.502673	0.007162	0.001388	0.002777	0.385648	0.005785	0.554903	0.006458
0.02	0.0064	0.670231	0.009549	0.00299	0.00598	0.467179	0.009344	0.582157	0.009265
0.025	0.01	0.837788	0.011936	0.005421	0.010842	0.542113	0.013553	0.604216	0.012251
0.03	0.0144	1.005346	0.014323	0.008815	0.017631	0.612178	0.018365	0.622858	0.015386
0.04	0.0256	1.340461	0.019098	0.018985	0.03797	0.7416	0.029664	0.653449	0.022028
0.05	0.04	1.675577	0.023872	0.034422	0.068844	0.860551	0.043028	0.678209	0.029082
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.0625	0.0625	2.094471	0.02984	0.062411	0.124823	0.998581	0.062411	0.703907	0.038374
0.1	0.207813	4.007346	0.051858	0.299958	0.599917	1.443409	0.144341	0.80438	0.07426
0.15	0.620313	6.557846	0.094591	1.336666	2.673332	2.154827	0.323224	0.98048	0.1461
0.2	1.282813	9.108346	0.140839	3.604334	7.208669	2.809713	0.561943	1.107182	0.228737
0.244	2.072613	11.35279	0.182564	6.923218	13.84644	3.340334	0.815041	1.1917	0.306934
0.26	2.407813	12.16895	0.197865	8.486239	16.97248	3.52446	0.91636	1.218086	0.33637
0.29	3.105313	13.69925	0.226678	11.98277	23.96554	3.858797	1.119051	1.262772	0.392806
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
 A3= $A2 + Y2^2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3025	3.4225	14.33687	0.23872	13.67043	27.34087	3.994283	1.208271	1.279818	0.416763
0.305	3.4575	14.33937	0.241119	13.90261	27.80522	4.021001	1.226405	1.283088	0.421567
0.31	3.5275	14.34437	0.245915	14.37155	28.74309	4.074145	1.262985	1.289519	0.431197
0.315	3.5975	14.34937	0.250708	14.84655	29.6931	4.126908	1.299976	1.295811	0.440855
0.32	3.6675	14.35437	0.255497	15.32758	30.65516	4.179299	1.337376	1.301969	0.450542
0.325	3.7375	14.35937	0.260283	15.81459	31.62917	4.231327	1.375181	1.307998	0.460256
0.33	3.8075	14.36437	0.265066	16.30753	32.61506	4.283002	1.413391	1.313903	0.469998
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.333	3.8495	14.36737	0.267934	16.60613	33.21226	4.313841	1.436509	1.317389	0.475856
0.375	4.4816	16.46779	0.272143	19.53489	39.06979	4.35891	1.634591	1.254395	0.503662
0.4	4.899725	17.71804	0.276539	21.58681	43.17362	4.405719	1.762288	1.227606	0.522665
0.42	5.256725	18.71824	0.280834	23.39887	46.79774	4.451226	1.869515	1.210395	0.53898
0.45	5.829725	20.21854	0.288336	26.40947	52.81894	4.53014	2.038563	1.190083	0.56508
0.475	6.3416	21.46879	0.295387	29.19482	58.38964	4.603699	2.186757	1.177151	0.588149
0.513	7.1795	23.36917	0.307221	33.92925	67.8585	4.725851	2.424362	1.162769	0.625213

Table 21.14 Values of C in $Q = CLH^{3/2}$ for Broad-Crested Weirs

Measured head H , ft	Breadth of crest of weir, ft										
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	5.00	10.00	15.00
0.2	2.80	2.75	2.69	2.62	2.54	2.48	2.44	2.38	2.34	2.49	2.48
0.4	2.92	2.80	2.72	2.64	2.61	2.60	2.58	2.54	2.50	2.56	2.55
0.6	3.08	2.89	2.75	2.64	2.61	2.60	2.68	2.69	2.70	2.70	2.70
0.8	3.30	3.04	2.85	2.68	2.60	2.60	2.67	2.68	2.68	2.69	2.69
1.0	3.32	3.14	2.98	2.75	2.66	2.64	2.65	2.67	2.68	2.68	2.68
1.2	3.32	3.20	3.08	2.86	2.70	2.65	2.64	2.67	2.66	2.69	2.69
1.4	3.32	3.26	3.20	2.92	2.77	2.68	2.64	2.65	2.65	2.67	2.67
1.6	3.32	3.29	3.28	3.07	2.89	2.75	2.68	2.66	2.65	2.64	2.64
1.8	3.32	3.32	3.31	3.07	2.88	2.74	2.68	2.66	2.65	2.64	2.63
2.0	3.32	3.31	3.30	3.03	2.85	2.76	2.72	2.68	2.65	2.64	2.63
2.5	3.32	3.32	3.31	3.28	3.07	2.89	2.81	2.72	2.67	2.64	2.63
3.0	3.32	3.32	3.32	3.32	3.20	3.05	2.92	2.73	2.66	2.64	2.63
3.5	3.32	3.32	3.32	3.32	3.32	3.19	2.97	2.76	2.68	2.64	2.63
4.0	3.32	3.32	3.32	3.32	3.32	3.32	3.07	2.79	2.70	2.64	2.63
4.5	3.32	3.32	3.32	3.32	3.32	3.32	3.32	1.88	2.74	2.64	2.63
5.0	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.07	2.79	2.64	2.63
5.5	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	2.88	2.64	2.63

21.35 Sediment Transfer and Deposition in Open Channels

Sediment from open channels has many undesirable effects: Reservoirs have a reduced useful life because of loss of storage through the accumulation of silt. Sediment causes a hazard in navigable channels and harbors and an increase in frequency of flooding due to aggravation of rivers and flood channels. Silting of arable land by flooding rivers destroys fertility when the silt originates from bank or gully erosion rather than from surface, or soil, erosion. The cost of operating irrigation systems is increased by the need for frequent dredging. Water-supply facilities have increased costs because of the necessity of providing desilting works and because of the wear on mechanical equipment, such as gates, valves, and turbines.

21.35.1 Sediment Deposition in Reservoirs

Deposition of silt results when the transporting forces of a river are dissipated as the river enters a

body of still water, such as a reservoir. Heavier silt sizes, those forming the bed load, are deposited in a delta as the river enters calm water. The smaller silt sizes, those carried in suspension, travel farther into the reservoir before deposition.

This incoming water, with its load of suspended silt, has a specific gravity greater than that of the clear water in the reservoir and may form a density current, rather than mixing immediately with the clear water. A density current, once formed, quickly moves to the bottom and flows in a dense cloud down the slopes of the reservoir until it is blocked by a dam. The dense flow then spreads out in this deeper area, where the stilling effect of the basin eventually causes deposition of the sediment. Deposits of fine sediment form about one-third of the volume of silt deposits in a reservoir. Much of all of this fine sediment is transported to its final location by density currents. The visible delta formed by the coarse sediments frequently distracts attention from the unseen bottom deposits of fine sediment, which are often of equal consequence.

Most reservoirs trap from 70 to almost 100% of the incoming sediment, depending on whether the reservoir is used for flood control or storage

control reservoirs a
after a storm, so the
carried out with the wa
This procedure red
30% after each stor
for water supply or p
on the other hand,
long enough for sett
matter to occur. Their di
generation of pow
flow downstream wi
of silt-laden storm f
The greater part of the
in a stream may be carr
The stream runs com
the remainder of the year.
Venting of much of the
is feasible through the
These currents are stable, o
extend to the reservoir out
are observed and their time
determined, appropriate ga
much of the fine sediment
can be vented before it
manent deposits. This v
extend the life of a reservoir
Numerous phenomena
such as loss of storage cap
of the dam by earthqua
ping, or failure of materia
manner of destruction, how
storage by deposition of silt
capacity lost through s
economically unfeasible bec
bution of deposits in a re
quantity present. The mos
avoiding a loss in reservoir
formation of permanent de
age of density currents and
ment production from ero
ther can be done, sufficien
provided in the design of th
site for depletion by siltin
economic lifetime.
Sediment production at
reservoirs or navigable wa
ed at costs proportionate to
However, nature may be e
at times through a progr
reducing sediment produc
normally found under virg

Street Capacity Calculations

Spanish Sun lane- below sun cove
28' F-F Street Section with 8" curb
 Slope= 0.014

For water depths less than 0.125 feet

Y= Water depth
 Area = $8 \cdot Y^2$
 P= $\text{SQRT}(257 \cdot Y^2) + Y$
 n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.170312	0.004697	0.000232	0.000464	0.290088	0.002901	0.511213	0.00379
0.02	0.0032	0.340624	0.009395	0.001474	0.002947	0.460486	0.00921	0.573818	0.009063
0.04	0.0128	0.681249	0.018789	0.009356	0.018713	0.730976	0.029239	0.644088	0.021563
0.06	0.0288	1.021873	0.028184	0.027586	0.055172	0.95785	0.057471	0.689119	0.03572
0.08	0.0512	1.362498	0.037578	0.05941	0.11882	1.160353	0.092828	0.722965	0.051051
0.1	0.08	1.703122	0.046973	0.107718	0.215435	1.34647	0.134647	0.750358	0.067306
0.12	0.1152	2.043746	0.056367	0.175161	0.350321	1.520492	0.182459	0.77351	0.084331
0.125	0.125	2.128902	0.058716	0.195305	0.39061	1.56244	0.195305	0.77879	0.088695

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.383952	0.056891	0.207492	0.414984	1.529896	0.198887	0.74776	0.087066
0.16	0.225625	3.914252	0.057642	0.348214	0.696429	1.543332	0.246933	0.679942	0.093409
0.2	0.415625	5.954652	0.069798	0.728728	1.457457	1.753332	0.350666	0.690909	0.119519
0.24	0.685625	7.995052	0.085756	1.378999	2.757999	2.011303	0.482713	0.723509	0.153319
0.3045	1.289506	11.2852	0.114265	3.14051	6.281021	2.435436	0.74159	0.777777	0.215663
0.32	1.465625	12.07585	0.121368	3.715867	7.431734	2.535346	0.811311	0.789831	0.231613
0.36	1.975625	14.11625	0.139954	5.508016	11.01603	2.787986	1.003675	0.818863	0.274096
0.365	2.045	14.3713	0.142297	5.764903	11.52981	2.819024	1.028944	0.822289	0.279527

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365
 A3= $A2 + Y2^2 \cdot 14$
 P3= $P2 + Y2$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.3763	0.147117	6.096114	12.19223	2.882323	1.06646	0.835053	0.289499
0.41	2.675	14.4163	0.185554	9.00059	18.00118	3.364706	1.37953	0.926035	0.369744
0.45	3.235	14.4563	0.223778	12.33255	24.6651	3.812226	1.715502	1.001485	0.450891
0.49	3.795	14.4963	0.261791	16.06258	32.12517	4.232565	2.073957	1.065559	0.532979
0.54	4.495	14.5463	0.309013	21.24948	42.49896	4.72736	2.552774	1.133689	0.636895
0.59	5.195	14.5963	0.355912	26.98451	53.96903	5.194324	3.064651	1.191722	0.742193
0.63	5.755	14.6363	0.3932	31.9464	63.89279	5.551068	3.497173	1.232476	0.827368
0.667	6.273	14.6733	0.427511	36.81918	73.63837	5.86947	3.914936	1.266508	0.906849

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
 A4= $A3 + 14 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.32363	0.41426	38.8662	77.7324	5.747546	4.023282	1.210613	0.898508
0.72	7.085225	17.32383	0.408987	40.37638	80.75275	5.698672	4.103044	1.183531	0.897733
0.74	7.428225	18.32403	0.405382	42.08186	84.16373	5.66513	4.192196	1.160556	0.899651
0.76	7.791225	19.32423	0.403184	43.97866	87.95732	5.64464	4.289926	1.141042	0.903917
0.78	8.174225	20.32443	0.402187	46.06446	92.12891	5.63533	4.395557	1.12446	0.910244
0.8	8.577225	21.32463	0.402221	48.33825	96.67649	5.635651	4.508521	1.110379	0.918395
0.847	9.603	23.6751	0.405616	54.42322	108.8464	5.667314	4.800215	1.085195	0.943636

Street Capacity Calculations

Spanish Sun at rundown

28' F-F Street Section with 8" curb with Superelevated Cross-section

Slope= 0.014

For water depths less than 0.125 feet

Y= Water depth

Area = $8 \cdot Y^2$

P= $\text{SQRT}(257 \cdot Y^2) + Y$

n= 0.017

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.17	0.00	0.000	0.29	0.00	0.51	0.00379
0.025	0.005	0.43	0.01	0.003	0.53	0.01	0.60	0.01199
0.04	0.0128	0.68	0.02	0.009	0.73	0.03	0.64	0.02156
0.055	0.0242	0.94	0.03	0.022	0.90	0.05	0.68	0.03206
0.07	0.0392	1.19	0.03	0.042	1.06	0.07	0.71	0.04326
0.085	0.0578	1.45	0.04	0.070	1.21	0.10	0.73	0.05504
0.1	0.08	1.70	0.05	0.108	1.35	0.13	0.75	0.06731
0.125	0.125	2.13	0.06	0.195	1.56	0.20	0.78	0.08869

For water depths greater than 0.125 ft but less than 0.605 ft

Y1= Y-0.125

A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$

P2= $P1 + \text{SQRT}(2501 \cdot Y1^2) + Y1$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.126	0.127	2.18	0.06	0.20	1.55	0.20	0.77	0.08827
0.2	0.416	5.95	0.07	0.73	1.75	0.35	0.69	0.11952
0.27	0.941	9.53	0.10	2.08	2.21	0.60	0.75	0.1814
0.34	1.711	13.10	0.13	4.55	2.66	0.91	0.80	0.25263
0.41	2.726	16.67	0.16	8.43	3.09	1.27	0.85	0.32946
0.4605	3.610	19.24	0.19	12.24	3.39	1.56	0.88	0.38749
0.5198	4.811	22.27	0.22	17.92	3.72	1.94	0.91	0.45796
0.605	6.845	26.61	0.26	28.63	4.18	2.53	0.95	0.56294

For water depths greater than 0.605 ft but less than 0.667 ft

Y3= Y - 0.605

A4= $A3 + 26.0 \cdot Y3 + 8 \cdot Y3^2$

P4= $P3 + Y3 + \text{SQRT}(257 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.606	6.871	26.63	0.26	28.80	4.19	2.54	0.95	0.56485
0.62	7.237	26.87	0.27	31.22	4.31	2.67	0.97	0.59145
0.635	7.632	27.12	0.28	33.90	4.44	2.82	0.98	0.6199
0.65	8.031	27.38	0.29	36.67	4.57	2.97	1.00	0.6483
0.667	8.488	27.67	0.31	39.93	4.70	3.14	1.02	0.68043

APPENDIX B

POND VOLUMES AND ORIFICE CALCULATIONS

VOLUME CALCULATIONS

POND B

Ab - Bottom Of The Pond Surface Area

At - Top Of The Pond Surface Area

D - Water Depth

Dt - Total Pond Depth

C - Change In Surface Area / Water Depth

$$\text{Volume} = \text{Ab} * \text{D} + 0.5 * \text{C} * \text{D}^2$$

$$\text{C} = (\text{At} - \text{Ab}) / \text{Dt}$$

$$\text{Ab} = 4,200.00$$

$$\text{At} = 6,020.00$$

$$\text{Dt} = 2.50$$

$$\text{C} = 728.00$$

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
76.5	0	0	0.0000
77.00	0.5	0.0482	4.1673
77.25	0.75	0.0728	6.5891
77.50	1	0.0985	8.3346
77.75	1.25	0.1252	9.7732
78.00	1.5	0.1530	11.0256
78.25	1.75	0.1818	12.1497
78.50	2	0.2116	13.1781
78.75	2.25	0.2425	14.1320
79.00	2.5	0.2745	15.0254

Orifice Equation

$$Q = \text{CA} \text{ SQRT}(2gH)$$

$$\text{C} = 0.636*$$

$$\text{Width(in)} = 36$$

$$\text{Height (in)} = 8$$

$$\text{Area (ft}^2\text{)} = 2$$

$$g = 32.2$$

$$\text{H (Ft)} = \text{Depth of water above center of orifice}$$

$$\text{Q (CFS)} = \text{Flow}$$

says 40" in writeup

*Boveys coefficient for Rectangular orifices per Brater and King Handbook of Hydrualics

APPENDIX C

AHYMO ANALYSIS

		<u>ID</u>	CFs	VOL
Basin " "	C	2	2.10	.07
	D	3	1.47	.05
	E	7	10.00	.36
	A	1	13.10	.46
	B	5	.76	
	F	8	1.11	

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
 RUN DATE (MON/DAY/YR) = 01/14/2000
 START TIME (HR:MIN:SEC) = 13:10:19 USER NO.= R_BOHANN.I01
 INPUT FILE = c:\ahymo\spansun5.txt

 * Spanish Sun Subdivision *

 * 100-YEAR, 6-HR STORM *

START TIME=0.0

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01 IN RAIN SIX=2.35 IN
 RAIN DAY=2.75 IN DT=0.03333 HR

AT 1.40 HR. COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK

DT = .033330 HOURS			END TIME = 5.999400 HOURS			
.0000	.0016	.0033	.0049	.0066	.0084	.0102
.0120	.0139	.0158	.0178	.0199	.0219	.0241
.0263	.0286	.0309	.0333	.0358	.0384	.0411
.0439	.0467	.0497	.0529	.0561	.0596	.0631
.0669	.0709	.0751	.0807	.0866	.0930	.1066
.1371	.1840	.2514	.3434	.4644	.6186	.8106
1.0449	1.2624	1.3533	1.4300	1.4982	1.5602	1.6174
1.6704	1.7200	1.7664	1.8102	1.8514	1.8904	1.9273
1.9622	1.9953	2.0268	2.0566	2.0850	2.0915	2.0976
2.1033	2.1088	2.1140	2.1191	2.1239	2.1285	2.1329
2.1373	2.1414	2.1454	2.1494	2.1531	2.1568	2.1604
2.1639	2.1673	2.1706	2.1739	2.1771	2.1802	2.1832
2.1862	2.1891	2.1919	2.1947	2.1975	2.2002	2.2028
2.2054	2.2080	2.2105	2.2130	2.2154	2.2178	2.2202
2.2225	2.2248	2.2270	2.2293	2.2315	2.2336	2.2358
2.2379	2.2399	2.2420	2.2440	2.2460	2.2480	2.2500
2.2519	2.2538	2.2557	2.2576	2.2594	2.2612	2.2631
2.2648	2.2666	2.2684	2.2701	2.2718	2.2735	2.2752
2.2769	2.2785	2.2802	2.2818	2.2834	2.2850	2.2866
2.2881	2.2897	2.2912	2.2928	2.2943	2.2958	2.2973
2.2987	2.3002	2.3017	2.3031	2.3045	2.3060	2.3074
2.3088	2.3102	2.3115	2.3129	2.3143	2.3156	2.3169
2.3183	2.3196	2.3209	2.3222	2.3235	2.3248	2.3261
2.3273	2.3286	2.3298	2.3311	2.3323	2.3335	2.3348
2.3360	2.3372	2.3384	2.3396	2.3408	2.3419	2.3431
2.3443	2.3454	2.3466	2.3477	2.3488	2.3500	

*
 * BASIN A
 COMPUTE NM HYD ID=1 HYD NO=100.1 AREA=0.005113 SQ MI
 PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = 13.121 CFS UNIT VOLUME = .9985 B = 526.28 P
 60 = 2.0100
 AREA = .003323 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTA
 NT, N = 3.944947
 UNIT PEAK = 4.7186 CFS UNIT VOLUME = .9976 B = 351.48 P
 60 = 2.0100
 AREA = .001790 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 100.10

RUNOFF VOLUME = 1.70281 INCHES = .4643 ACRE-FEET
 PEAK DISCHARGE RATE = 13.10 CFS AT 1.500 HOURS BASIN AREA = .0051
 SQ. MI.

* BASIN C

COMPUTE NM HYD ID=2 HYD NO=100.2 AREA=0.000814 SQ MI
 PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = 2.0889 CFS UNIT VOLUME = .9941 B = 526.28 P
 60 = 2.0100
 AREA = .000529 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTA
 NT, N = 3.944947
 UNIT PEAK = .75122 CFS UNIT VOLUME = .9825 B = 351.48 P
 60 = 2.0100
 AREA = .000285 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 100.20

RUNOFF VOLUME = 1.70281 INCHES = .0739 ACRE-FEET
 PEAK DISCHARGE RATE = 2.10 CFS AT 1.500 HOURS BASIN AREA = .0008
 SQ. MI.

* BASIN D

COMPUTE NM HYD ID=3 HYD NO=100.3 AREA=0.000566 SQ MI
 PER A=0.00 PER B=17.50 PER C=17.50 PER D=65.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = 1.4525 CFS UNIT VOLUME = .9911 B = 526.28 P
 60 = 2.0100
 AREA = .000368 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTA
 NT, N = 3.944947
 UNIT PEAK = .52235 CFS UNIT VOLUME = .9744 B = 351.48 P
 60 = 2.0100
 AREA = .000198 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 100.30

RUNOFF VOLUME = 1.70281 INCHES = .0514 ACRE-FEET
 PEAK DISCHARGE RATE = 1.47 CFS AT 1.500 HOURS BASIN AREA = .0006
 SQ. MI.

* BASIN B
 *

COMPUTE NM HYD ID=5 HYD NO=100.5 AREA=0.000263 SQ MI
 PER A=0.00 PER B=7.50 PER C=7.50 PER D=85.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = .88259 CFS UNIT VOLUME = .9862 B = 526.28 P
 60 = 2.0100
 AREA = .000224 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTA
 NT, N = 3.944947
 UNIT PEAK = .10402 CFS UNIT VOLUME = .8745 B = 351.48 P
 60 = 2.0100
 AREA = .000039 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES P
 ER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03
 3330

PRINT HYD ID=5 CODE=1

PARTIAL HYDROGRAPH 100.50

RUNOFF VOLUME = 1.93856 INCHES = .0272 ACRE-FEET
 PEAK DISCHARGE RATE = .76 CFS AT 1.500 HOURS BASIN AREA = .0003

SQ. MI.

*
*
*
*

* BASIN E

COMPUTE NM HYD

ID=7 HYD NO=100.7 AREA=0.003967 SQ MI
 PER A=5.00 PER B=15.0 PER C=15.0 PER D=65.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = 10.180 CFS UNIT VOLUME = .9982 B = 526.28 P
 60 = 2.0100
 AREA = .002579 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

K = .125536HR TP = .133300HR K/TP RATIO = .941759 SHAPE CONSTA
 NT, N = 3.754406
 UNIT PEAK = 3.5253 CFS UNIT VOLUME = .9963 B = 338.45 P
 60 = 2.0100
 AREA = .001388 SQ MI IA = .45714 INCHES INF = 1.13000 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

PRINT HYD

ID=7 CODE=1

PARTIAL HYDROGRAPH 100.70

RUNOFF VOLUME = 1.67811 INCHES = .3550 ACRE-FEET
 PEAK DISCHARGE RATE = 10.00 CFS AT 1.500 HOURS BASIN AREA = .0040
 SQ. MI.

*

* BASIN F

*

COMPUTE NM HYD

ID=8 HYD NO=100.8 AREA=0.000418 SQ MI
 PER A=00.00 PER B=15.00 PER C=15.00 PER D=70.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = 1.1552 CFS UNIT VOLUME = .9897 B = 526.28 P
 60 = 2.0100
 AREA = .000293 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

K = .119767HR TP = .133300HR K/TP RATIO = .898476 SHAPE CONSTA
 NT, N = 3.944947
 UNIT PEAK = .33065 CFS UNIT VOLUME = .9591 B = 351.48 P
 60 = 2.0100

AREA = .000125 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

PRINT HYD ID=8 CODE=1

PARTIAL HYDROGRAPH 100.80

RUNOFF VOLUME = 1.76175 INCHES = .0393 ACRE-FEET
 PEAK DISCHARGE RATE = 1.11 CFS AT 1.500 HOURS BASIN AREA = .0004
 SQ. MI.

* EXISTING SITE

*

COMPUTE NM HYD ID=9 HYD NO=100.9 AREA=0.011141 SQ MI
 PER A=55.0 PER B=15.0 PER C=15.00 PER D=15.00
 TP=-0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTA
 NT, N = 7.106420
 UNIT PEAK = 6.5978 CFS UNIT VOLUME = .9976 B = 526.28 P
 60 = 2.0100
 AREA = .001671 SQ MI IA = .10000 INCHES INF = .04000 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

K = .145900HR TP = .133300HR K/TP RATIO = 1.094523 SHAPE CONSTA
 NT, N = 3.228984
 UNIT PEAK = 21.312 CFS UNIT VOLUME = .9995 B = 299.99 P
 60 = 2.0100
 AREA = .009470 SQ MI IA = .57059 INCHES INF = 1.44765 INCHES P
 ER HOUR
 3330 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .03

PRINT HYD ID=9 CODE=1

PARTIAL HYDROGRAPH 100.90

RUNOFF VOLUME = .87141 INCHES = .5178 ACRE-FEET
 PEAK DISCHARGE RATE = 16.52 CFS AT 1.500 HOURS BASIN AREA = .0111
 SQ. MI.

*

*

*ADD ONSITE BASINS

ADD HYD ID=21 HYD NO=102.1 ID=1 ID=2
 ADD HYD ID=22 HYD NO=102.2 ID=21 ID=3

ADD HYD ID=23 HYD NO=102.3 ID=22 ID=7
 PRINT HYD ID=23 CODE=1

PARTIAL HYDROGRAPH 102.30

Out

RUNOFF VOLUME = 1.69334 INCHES = .9447 ACRE-FEET
PEAK DISCHARGE RATE = 26.67 CFS AT 1.500 HOURS BASIN AREA = .0105
SQ. MI.

*POND B
ROUTE RESERVOIR

ID=32 HYD NO=200.1 INFLOW ID=23 CODE=24
OUTFLOW (CFS) STORAGE (AC-FT) ELEVATION (FT)
0 .0000 76.50
4.6303 .0497 77.00
7.3212 .0754 77.25
9.2607 .1020 77.50
10.8591 .1297 77.75
12.2507 .1585 78.00
13.4996 .1884 78.25
14.6424 .2194 78.50
15.7022 .2514 78.75
16.6949 .2846 79.00

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	76.50	.000	.00
.80	.00	76.50	.000	.00
1.60	18.88	78.65	.238	15.27
2.40	1.05	76.73	.023	2.17
3.20	.19	76.53	.003	.25
4.00	.12	76.51	.001	.13
4.80	.12	76.51	.001	.12
5.60	.13	76.51	.001	.13
6.40	.01	76.50	.000	.03

PEAK DISCHARGE = 15.460 CFS - PEAK OCCURS AT HOUR 1.63
MAXIMUM WATER SURFACE ELEVATION = 78.637
MAXIMUM STORAGE = .2441 AC-FT INCREMENTAL TIME= .033330HRS

16.57

PRINT HYD ID=32 CODE=1

PARTIAL HYDROGRAPH 200.10

RUNOFF VOLUME = 1.69334 INCHES = .9447 ACRE-FEET
PEAK DISCHARGE RATE = 15.46 CFS AT 1.633 HOURS BASIN AREA = .0105
SQ. MI.

*

Out

F?

*ADD BASIN B AND E AND ROUTED POND A FOR TOTAL DISCHARGE
ADD HYD ID=25 HYD NO=102.2 ID=32 ID=5
ADD HYD ID=26 HYD NO=102.2 ID=25 ID=8
PRINT HYD ID=26 CODE=1

PARTIAL HYDROGRAPH 102.20

RUNOFF VOLUME = 1.70163 INCHES = 1.0111 ACRE-Feet
PEAK DISCHARGE RATE = 16.58 CFS AT 1.600 HOURS BASIN AREA = .0111
SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 13:10:19

VOLUME CALCULATIONS

POND B

Ab - Bottom Of The Pond Surface Area

At - Top Of The Pond Surface Area

D - Water Depth

Dt - Total Pond Depth

C - Change In Surface Area / Water Depth

$$\text{Volume} = \text{Ab} * \text{D} + 0.5 * \text{C} * \text{D}^2$$

$$\text{C} = (\text{At} - \text{Ab}) / \text{Dt}$$

$$\text{Ab} = 4,350.00$$

$$\text{At} = 6,250.00$$

$$\text{Dt} = 2.50$$

$$\text{C} = 760.00$$

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
76.5	0	0	0.0000
77.00	0.5	0.0499	4.6303
77.25	0.75	0.0754	7.3212
77.50	1	0.1020	9.2607
77.75	1.25	0.1297	10.8591
78.00	1.5	0.1585	12.2507
78.25	1.75	0.1884	13.4996
78.50	2	0.2194	14.6424
78.75	2.25	0.2514	15.7022
79.00	2.5	0.2846	16.6949

Orifice Equation

$$Q = \text{CA} \text{ SQRT}(2gH)$$

$$\text{C} = 0.636^*$$

$$\text{Width(in)} = 40$$

$$\text{Height (in)} = 8$$

$$\text{Area (ft}^2\text{)} = 2.222222$$

$$g = 32.2$$

$$\text{H (Ft)} = \text{Depth of water above center of orifice}$$

$$\text{Q (CFS)} = \text{Flow}$$

*Boveys coefficient for Rectangular orifices per Brater and King Handbook of Hydrualics

APPENDIX D

INFRASTRUCTURE LIST

DRB Case No: 99-251
DRC Project Number:
Prelim. Plat Approved:
Prelim. Plat Expires:
Site Plan Approved:
Date Submitted:

"EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENTS
DEVELOPMENT REVIEW BOARD (DRB)REQUIRED INFRASTRUCTURE LISTING
FOR: Spanish Sun Subdivision

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 of the financial guarantees. All such revisions require approval b the DRC Chair, the User Department and the 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.

Public Improvements

Size	Type Improvement	Location	From	To
28' F-F	Residential Paving Curb & Gutter, Sidewalks 4'	Spanish Sun Lane	Monroe Street	Rojo Sun Way
28' F-F	Residential Paving Curb & Gutter, Sidewalks 4'	Sun Cove Trail	Spanish Sun Lane	Rojo Sun Way
28' F-F	Residential Paving Curb & Gutter, Sidewalks 4'	Rojo Sun Way	North Property Line	Sun Cove Trail
8' F-E	Residential Paving Curb & Gutter	Private Access Road	Monroe Street	East Property Line
6"	Water PVC Line	Spanish Sun Lane	Monroe Street	Rojo Sun Way
6"	Water PVC Line	Sun Cove Trail	Spanish Sun Lane	Rojo Sun Way
6"	Water PVC Line	Rojo Sun Way	Private Access Road	Sun Cove Trail
8"	SAS Gravity Line	Spanish Sun Lane	Monroe Street	Rojo Sun Way
8"	SAS Gravity Line	Sun Cove Trail	Spanish Sun Lane	Rojo Sun Way
8"	SAS Gravity Line	Rojo Sun Way	Private Access Road	Sun Cove Trail
Water Infrastructure to include Valves, Fittings, Valve Boxes, Fire Hydrant as required				
Sanitary Sewer to include Manholes and Service Connection as required				
Storm Sewer to include Manholes, Drop Inlets and Connection to Outfall as required - Detention Pond w/ agreement to covenant				
Residential Street Lights Per DPM				
Internal Sidewalks deferred				
Certified Grading & Drainage with Private Walls & Private Drainage (Non-work order item) Required for SIA/Financial Release				

Agent/Owner Name: 'Ronald R. Bohannon, P.E.
Firm: Tierra West LLC

Development Review Board Member Approvals

Transportation Dev. _____ Date _____ Utility Dev. _____ Date _____ Parks & GS. _____ Date _____

City Engineer _____ Date _____ AMAFCA _____ Date _____ DRB Chairman _____ Date _____

DRC Revisions				
Revisions	Date	DRC Chair	User Department	Agent/Owner



City of Albuquerque

March 7, 2000

Ron Bohannon, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Spanish Sun Subdivision Drainage Report
Engineer's Stamp dated 1-17-00 (G17/D36)

Dear Mr. Bohannon,

Based upon the information provided in your submittal dated 1-18-00, the above referenced plan cannot be approved for Site Development Plan for Subdivision, Site Development Plan for Building Permit, Preliminary or Final Plat, Building Permit or Grading Permit until the following comments are addressed:

1. Is your proposed pond planned to be private? The City will not accept a pond for maintenance if the detained volume is less than 2 ac-ft., and even then, it must be supported by a storm drain. It would be prudent to investigate downstream street capacity to justify free discharge, even though your basin isn't exactly inclusive to the one in the AMDS.
2. Please quantify the upstream flows that you mention in the report. Provide analysis that this flow will be kept in the new curb.
3. Please add additional spot elevations to your typical lot grading detail to better define the back and side yard swales. Please add lot numbers since you describe a few lots (16-20) that "don't drain to the street." Please keep in mind that all developed (roof) runoff must drain to the street.
4. What is proposed for the triangular area on the south side of Spanish Sun?

If you have any questions about my comments, you can contact me at 924-3986

Sincerely,

Bradley L. Bingham
Bradley L. Bingham, PE
Hydrology Review Engineer

C: file

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
UTILITY DEVELOPMENT DIVISION/HYDROLOGY SECTION

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: G17 DATE: 7-20-89
EPC NO.: _____ DRB NO.: _____ ZONE: _____
SUBJECT: Residential Community
STREET ADDRESS: Parcel A Vista Grande
LEGAL DESCRIPTION: west of SAN Mateo E south of Montezuma

APPROVAL REQUESTED: _____ PRELIMINARY PLAT _____ FINAL PLAT
 X SITE DEVELOPMENT PLAN _____ BUILDING PERMIT
 _____ GRADING/PAVING PERMIT _____ OTHER _____

	WHO	REPRESENTING
ATTENDANCE:	<u>Leonard Utter</u>	_____
	<u>Carol A Montez</u>	_____
	_____	_____

FINDINGS:

- ① Need a conceptual drainage
- ② Need to check in the field if drainage basin match the AMD S Modeling map.
- ③ if basin match Modeling map then to see discharge would be appropriate if discharging to McArthur
- ④ Need to address if Monroe has curb & gutter.
- ⑤ Need to show plat which indicates the function of the ally.

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: <u>Carol A Montez</u>	SIGNED: <u>Leonard Utter</u>
TITLE: _____	TITLE: _____
DATE: <u>7-20-89</u>	DATE: <u>7-20-89</u>

****NOTE**** PLEASE PROVIDE A COPY OF THIS PRE-DESIGN FORM WITH THE DRAINAGE SUBMITTAL.

DEVELOPMENT & BUILDING SERVICE CENTER
ONE STOP

600 SECOND ST. N.W./2ND FLOOR

ATTENTION: _____

505-924-3900

Records Withdrawal Form

Project No. 617-D36

Date: 3-6-98

Project Title: _____

a. File

b. Mylars

c. Redlines/Comments

d. Other _____

Requested By: Tiwa West Phone No.: 883-7592
Company

Anticipated Return Date: _____

Receipt Acknowledged

I here by accept full responsibility for the security of the above noted records/plans until return receipt acknowledgement is completed. Records/plans will be returned to the Development & Building Services Center on or before the indicated anticipated return date.

Delivery Picked Up By:

Name: _____
Print

Organization: _____

Signed: _____
Phone No. _____

Date: _____

Office Use Only

Return Acknowledged

Received by: Walter G. B. Date: 3-9-98
Print

FILE COPY



KEN SCHULTZ
MAYOR

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 24, 1989

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR A RETIREMENT COMMUNITY FOR JTH
DEVELOPMENT CORPORATION (G-17/D36) ENGINEER'S STAMP DATED
AUGUST 5, 1989

Dear Mr. Mortensen:

Based on the information provided on your submittal of August 7, 1989, the referenced drainage plan is approved for Site Development.

Please be advised that prior to Building Permit release, we will need the following information:

1. Hydraulics and detail for the proposed concrete rundown.
2. Please provide me with a copy of the plat showing the intent of the existing alley.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+1063)

PUBLIC WORKS DEPARTMENT

Walter H. Nickerson, Jr., P.E.
Assistant Director Public Works

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

DRAINAGE INFORMATION SHEET
JTH DEVELOPMENT

PROJECT TITLE: RETIREMENT COMMUNITY ONE ATLAS/DRAINAGE FILE # G-17 1D34

LEGAL DESCRIPTION: PARCEL A, MONROE ASSOCIATION - TRACT 1

CITY ADDRESS: NOT KNOWN

ENGINEERING FIRM: JEFF MORTENSEN & ASSOC. CONTACT: LEONARD P. UTTER

ADDRESS: 811 DALLAS N.E. PHONE: 265-5611

OWNER: _____ CONTACT: ARCHITECT

ADDRESS: _____ PHONE: _____

ARCHITECT: HOLMES - SABATINI - EEDS CONTACT: MARK LEVINE

ADDRESS: 202 CENTRAL S.E. PHONE: 247-3705

SURVEYOR: JEFF MORTENSEN & ASSOC. CONTACT: LEONARD P. UTTER

ADDRESS: 811 DALLAS N.E. PHONE: 265-5611

CONTRACTOR: _____ CONTACT: ARCHITECT

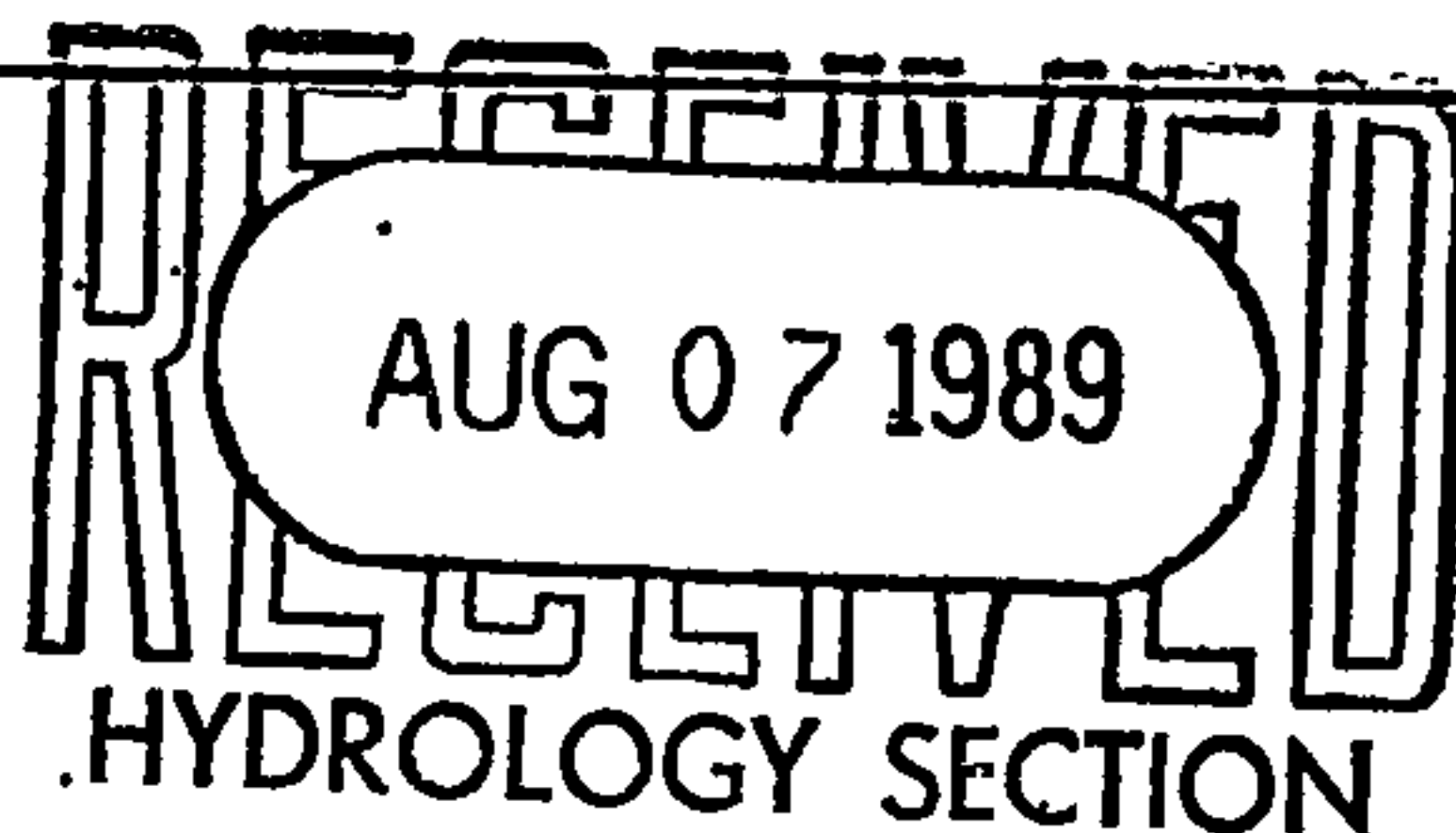
ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

☒ YES

☐ NO

☒ COPY OF CONFERENCE
RECAP SHEET PROVIDED



DRB NO. _____

EPC NO. _____

PROJECT NO. _____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT

☐ DRAINAGE PLAN

☒ CONCEPTUAL GRADING & DRAIN PLAN

☐ GRADING PLAN

☐ EROSION CONTROL PLAN

☐ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SECTOR PLAN APPROVAL

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☒ SITE DEVELOPMENT PLAN APPROVAL

☐ FINAL PLAT APPROVAL

☐ BUILDING PERMIT APPROVAL

☐ FOUNDATION PERMIT APPROVAL

☐ CERTIFICATE OF OCCUPANCY
APPROVAL

☐ ROUGH GRADING PERMIT APPROVAL

☐ GRADING/PAVING PERMIT APPROVAL

☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: 08-07-89

BY: Leonard P. Utter

890782

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
UTILITY DEVELOPMENT DIVISION/HYDROLOGY SECTION

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: G17 DATE: 7-20-89

EPC NO.: _____ DRB NO.: _____ ZONE: _____

SUBJECT: Residential Community

STREET ADDRESS: Parcel A Vista Grande

LEGAL DESCRIPTION: west of San Mateo & south of Montgomery

APPROVAL REQUESTED: ☐ PRELIMINARY PLAT ☐ FINAL PLAT
☒ SITE DEVELOPMENT PLAN ☐ BUILDING PERMIT
☐ GRADING/PAVING PERMIT ☐ OTHER

	WHO	REPRESENTING
ATTENDANCE:	<u>Leonard Utter</u>	_____
	<u>Caleb A. Mather</u>	_____
	_____	_____
	_____	_____

FINDINGS:

- ① Need a conceptual drainage
- ② Need to check in the field if drainage basin match the AMDS modeling map.
- ③ if basin match modeling map then tree discharge would be appropriate if discharging to McArthur
- ④ Need to address if Monroe has curb & gutter.
- ⑤ Need to show plat which indicates the function of the alley.

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Paul A. Montoya

SIGNED: Leonard Utter

TITLE: _____

TITLE: _____

DATE: 7-20-89

DATE: 7-20-89

****NOTE**** PLEASE PROVIDE A COPY OF THIS PRE-DESIGN FORM WITH THE DRAINAGE SUBMITTAL.

G-17/0034

#642181
CCN# 200100154

AGREEMENT AND COVENANT

This Agreement and Covenant, between the City of Albuquerque, New Mexico ("City") and **SPANISH SUN HOME OWNERS ASSOCIATION**, ("User") is made in Albuquerque, New Mexico and is entered into as of the date of recording this Agreement with the Bernalillo County Clerk.

1. Recital. The User is the owner of certain real property ("User's Property") located at **MONROE AND DOUGLAS MacARTHER**, in Albuquerque, New Mexico, and more particularly described as: (give legal description and filing information)

**Parcel A, Monroe Associates Tract 1, Vista Grande Land Co
Filed: October 24, 1979 VOL. C15, FOL. 161**

The City is the owner of certain real property, easement or public right-of-way ("City's Property") in the vicinity of, contiguous to, abutting or within User's Property, and more particularly described as:

SEE ATTACHED EXHIBIT "A"

The User wishes to construct upon, improve or repair and to maintain the following "Improvement" on the City's Property (or already has done so):

A sketch of the proposed or existing Improvement is attached as Exhibit A and made a part of this Agreement.

The City agrees to permit the Improvement to exist on the City's Property provided the User complies with the terms of this Agreement.

2. City Use of City's Property and City Liability. The City has the right to enter upon the City's Property at any time and perform whatever inspection, installation, maintenance, repair, modification or removal ("Work") it deems appropriate without liability to the User. If the Work affects the Improvement the City will not be financially or otherwise responsible for rebuilding or repairing the Improvement. The User promptly will repair the Improvement to the City's satisfaction. User will pay the cost of repairing the Improvement.

3. User's Responsibility for Improvement. The User will be solely responsible for constructing, maintaining, repairing and, if required, removing the Improvement, all in accordance with standards required by the City as per the approved Grading and Drainage Plan **G17/D36** on file at the City Engineer's office. The User will be solely responsible for paying all related costs. The User will be solely responsible for paying all related costs. The User will not permit the Improvement to constitute a hazard to the health or safety of the general public or to interfere with the City's use of the City's Property. The User will conform with all applicable laws, ordinances and regulations.

4. Use of the Improvement. If the City's Property is a public right-of-way, it shall be open to the use of the general public at all times, subject to reasonable curtailment during periods of construction, maintenance or repair.

5. Demand for Repair, Modification or Removal. The City may send written notice ("Notice") to the User requiring the User to repair, modify or remove the Improvement within 30 days ("Deadline") and the User will comply promptly with the requirements of the Notice. If removal is demanded, the City also may require the User to return the City's Property to its original condition by the Deadline. The User will perform all required work by the Deadline, at User's sole expense.

6. Failure to Perform by User and Emergency Work by City. If the User fails to comply with the terms of the Notice by the Deadline stated, or, if the City determines that an emergency condition exists, the City may perform the work itself. The City then may assess the User for the cost of the work and for any other expenses or damages which result from User's failure to perform. The User agrees promptly to pay the City the amount assessed. If the User fails to pay the City within thirty (30) days after the City gives the User written notice of the amount due, the City may impose a lien against User's Property for the total resulting amount.

7. Cancellation of Agreement and Release of Covenant. This Agreement may be canceled and User's covenants released by the City at will by the City's mailing to the User notice of the City's intention to record a Cancellation and Release with the Bernalillo County Clerk. The Cancellation and Release will be effective thirty (30) days after the date of mailing the notice to the User unless a later date is stated in the notice or the Cancellation and Release. After the effective date, the City will record the Cancellation and Release with the Bernalillo County Clerk.

8. Condemnation. If the City ever condemns any part of the User's Property, the User will forego all claims to compensation for any portion of User's structure, which encroaches, on City Property and for severance damage to the remaining portion of User's structure on User's Property.

9. Assessment. Nothing in this Agreement shall be construed to relieve the User, his heirs, assigns and successors from an assessment against User's Property for improvements to the City Property under a duly authorized and approved Special Assessment District. The parties specifically agree that the value of the Improvement will not reduce the amount assessed by the City.

10. Notice. For purposes of giving formal written notice to the User, User's address is:

**SPANISH SUN HOME OWNERS ASSOCIATION
3511 CARLISLE NE
ALBUQUERQUE, NM 87110**

Notice may be given to the User either in person or by mailing the notice by regular U.S. mail, postage paid. Notice will be considered to have been received by the User within 3 days after the notice is mailed if there is no actual evidence of receipt. The User may change User's address by giving written notice of the change by certified mail, return receipt requested, to the City Engineer at P.O. Box 1293, Albuquerque, New Mexico 87103.

11. Indemnification. The User agrees to defend, indemnify and hold harmless the City, its officials, agents and employees from and against any and all claims, actions, suits or proceedings of any kind brought against said parties as a result of User's use of the City's Property. To the extent, if at all, Section 56-7-1 NMSA 1978 is applicable to this Agreement, this Agreement to indemnify will not extend to liability, claims, damages, losses or expenses, including attorney's fees,

arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications by the indemnitee, or the agents or employees of the indemnitee; or (2) the giving of or the failure to give direction or instructions by the indemnitee, where such giving or failure to give directions or instructions is the primary cause of bodily injury to persons or damage to property.

12. Term. This Agreement shall continue until revoked by the City pursuant to Section 7 above.

13. Binding on User's Property. The covenants and obligations of the User set forth herein shall be binding on User, his heirs assigns and successors and on User's Property and constitute covenants running with User's Property until released by the City.

14. Entire Agreement. This Agreement contains the entire agreement of the parties and supersedes any and all other agreements or understandings, oral or written, whether previous to the execution hereof or contemporaneous herewith.

15. Changes of Agreement. Changes to this Agreement are not binding unless made in writing, signed by both parties.

16. Construction and Severability. If any part of this Agreement is held to be invalid or unenforceable, the remainder of the Agreement will remain valid and enforceable if the remainder is reasonably capable of completion.

17. Captions. The captions to the sections or paragraphs of this Agreement are not part of this Agreement and will not affect the meaning or construction of any of its provisions.

CITY OF ALBUQUERQUE:

By: _____
Chief Administrative Officer
Dated: _____

USER:

By: [Signature]
Title: Member
Dated: 7-25-00
By: [Signature]
Title: Member
Dated: 7/25/00

By: [Signature]
Title: Member
Dated: 7-25-00

APPROVED:

Reviewed by:

Director, Public Works Dept.

City Engineer
[Signature] 7/25/00

[Handwritten initials]

CITY'S ACKNOWLEDGMENT

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on the _____ day of _____,
by _____, Chief Administrative Officer for the City of Albuquerque, a New Mexico
municipal corporation, on behalf of the corporation.

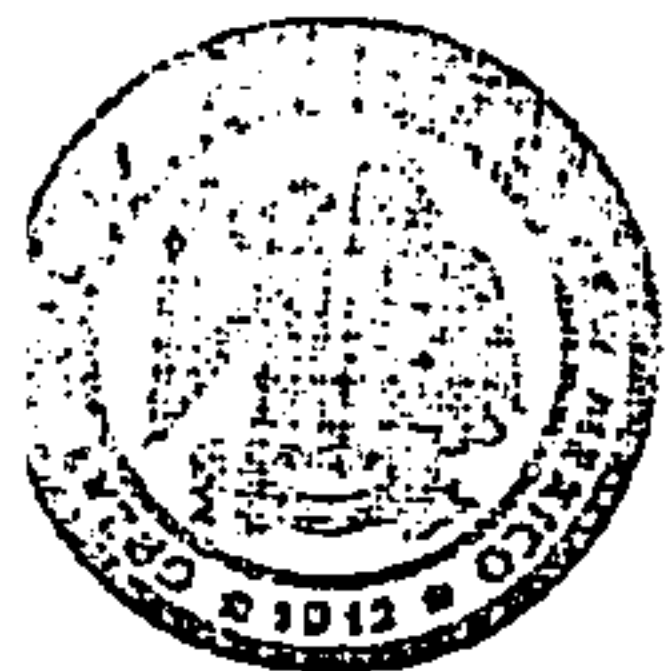
Notary Public

My Commission Expires:

USER'S ACKNOWLEDGMENT

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on the 25 day of July, 2000, by
Glen Garcia, Fred Seeley, Gina Seeley on behalf of
Spanish Sun Home Owners Association.



OFFICIAL SEAL
JAMIE FIFER
NOTARY PUBLIC - STATE OF NEW MEXICO

Jamie Fifer
Notary Public

My commission expires: 10/01/03

Curve Data

CURVE	RADIUS	LENGTH	TANGENT	CHORD	BEARING	DELTA
C1	30.00'	26.77'	14.35'	25.89'	N 42°12'55" W	51°07'07"

SKETCH

EXHIBIT

MONROE STREET, N.E.
(60' R.O.W.)

A.C.S. MONUMENT "9-F18"
STANDARD A.C.S. ALUMINUM CAP
(FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES
(CENTRAL ZONE-N.A.D. 1927)
X= 399,624.85
Y=1,504,295.63
GROUND TO GRID FACTOR=0.9996624
ELEV.= 5209.56
DELTA ALPHA ANGLE=-0°11'38"



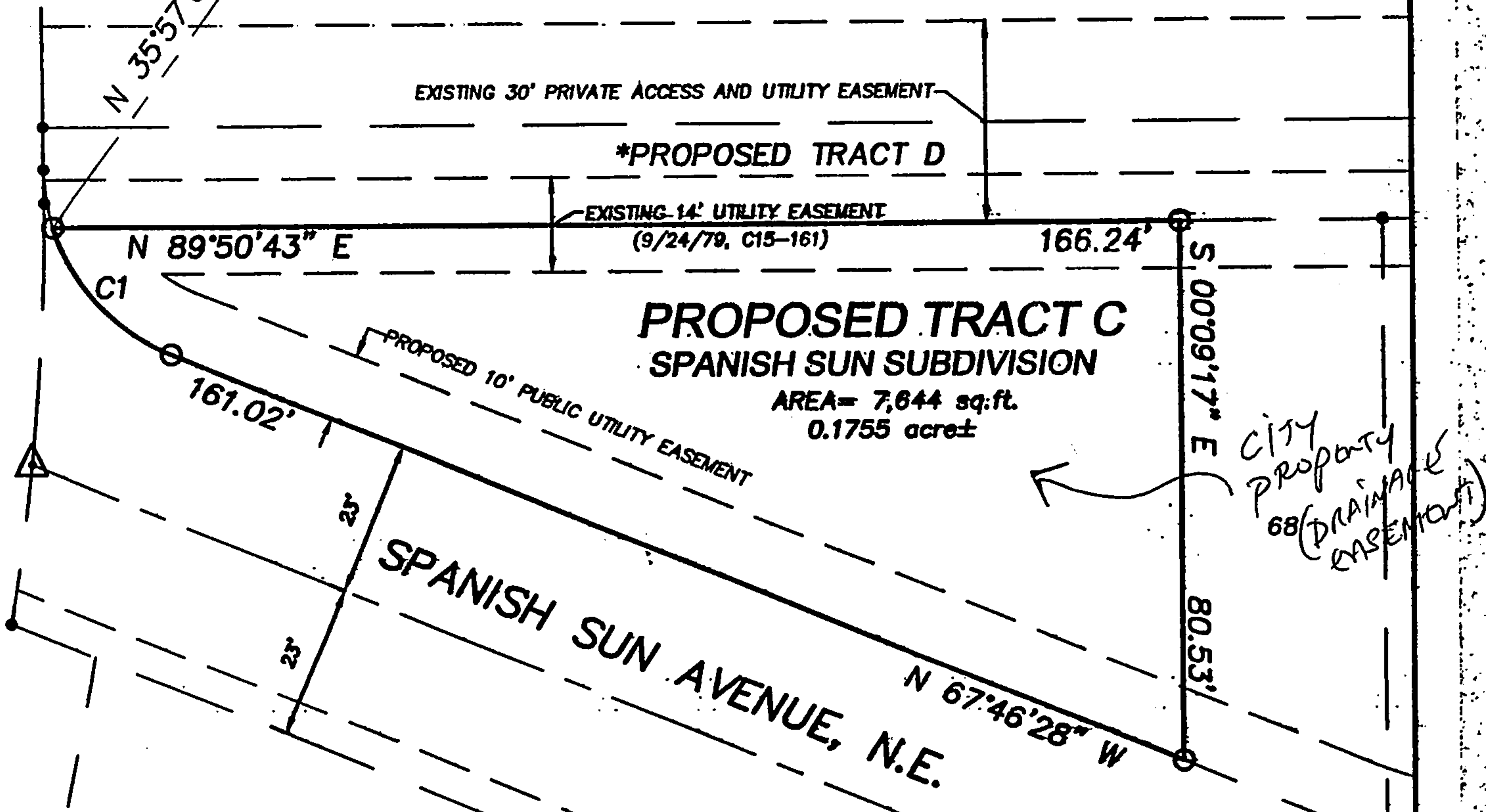
(IN FEET)

1 inch = 30. ft.

TRACT B-6, BLOCK A
VISTA GRANDE ADDITION
UNIT 1
(12/12/84, C25-171)

NOTE:

*FOR USE AS A PRIVATE ACCESS AND UTILITY EASEMENT
FOR THE BENEFIT OF THE SPANISH SUN HOMEOWNERS
ASSOCIATION. MAINTENANCE RESPONSIBILITY IS BY SAID
HOMEOWNERS ASSOCIATION.



LEGAL DESCRIPTION-Public Drainage Easement

A TRACT OF LAND LYING AND SITUATE WITHIN SECTION 2, TOWNSHIP 10, NORTH, RANGE 3 EAST, NEW MEXICO PRINCIPAL MERIDIAN, CITY OF ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO, COMPRISING OF A PORTION OF MONROE ASSOCIATES TRACT 1, AS THE SAME IS SHOWN AND DESIGNATED ON THE PLAT THEREOF, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO, ON OCTOBER 26, 1979, ON BOOK C15, FOLIO 161, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID TRACT, LYING ON THE PROPOSED NORTH RIGHT OF WAY LINE OF SPANISH SUN AVENUE, N.E. MARKED BY A SET REBAR WITH CAP "PS 11993", FROM WHENCE A TIE TO ACS MONUMENT "F-18" BEARS N 35°57'01" E, A DISTANCE OF 2394.78 FEET;

THENCE FROM SAID BEGINNING POINT N 89°50'43" E, A DISTANCE OF 166.24 FEET TO THE NORTHEAST CORNER OF SAID TRACT, MARKED BY A SET REBAR WITH CAP "PS 11993";

THENCE S 00°09'17" E, A DISTANCE OF 80.53 FEET TO THE SOUTHEAST CORNER OF SAID TRACT, LYING ON THE PROPOSED NORTH RIGHT OF WAY LINE OF SPANISH SUN AVENUE, N.E., MARKED BY A SET REBAR WITH CAP "PS 11993";

THENCE ALONG SAID PROPOSED NORTH RIGHT OF WAY LINE N 67°46'28" W, A DISTANCE OF 161.02 FEET TO A POINT OF CURVATURE, BEING THE SOUTHWEST CORNER OF SAID TRACT, MARKED BY A SET REBAR WITH CAP "PS 11993";

THENCE CONTINUING ALONG SAID PROPOSED NORTH RIGHT OF WAY LINE, ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 30.00 FEET, AN ARC LENGTH OF 26.77 FEET, A CHORD OF N 42°12'55" W, A DISTANCE OF 25.89 FEET TO THE POINT OF BEGINNING CONTAINING 0.1755 ACRE, MORE OR LESS.

SURVEYOR'S CERTIFICATE

I, LARRY W. MEDRANO LICENSED UNDER THE LAWS OF THE STATE OF NEW MEXICO, DO HEREBY CERTIFY THAT THIS EASEMENT SURVEY WAS PREPARED BY ME OR UNDER MY DIRECTION FROM NOTES OF AN ACTUAL FIELD SURVEY, AND THE SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Larry W. Medrano
LARRY W. MEDRANO
N.M.L.S. NO. 11993

7/19/2000
DATE

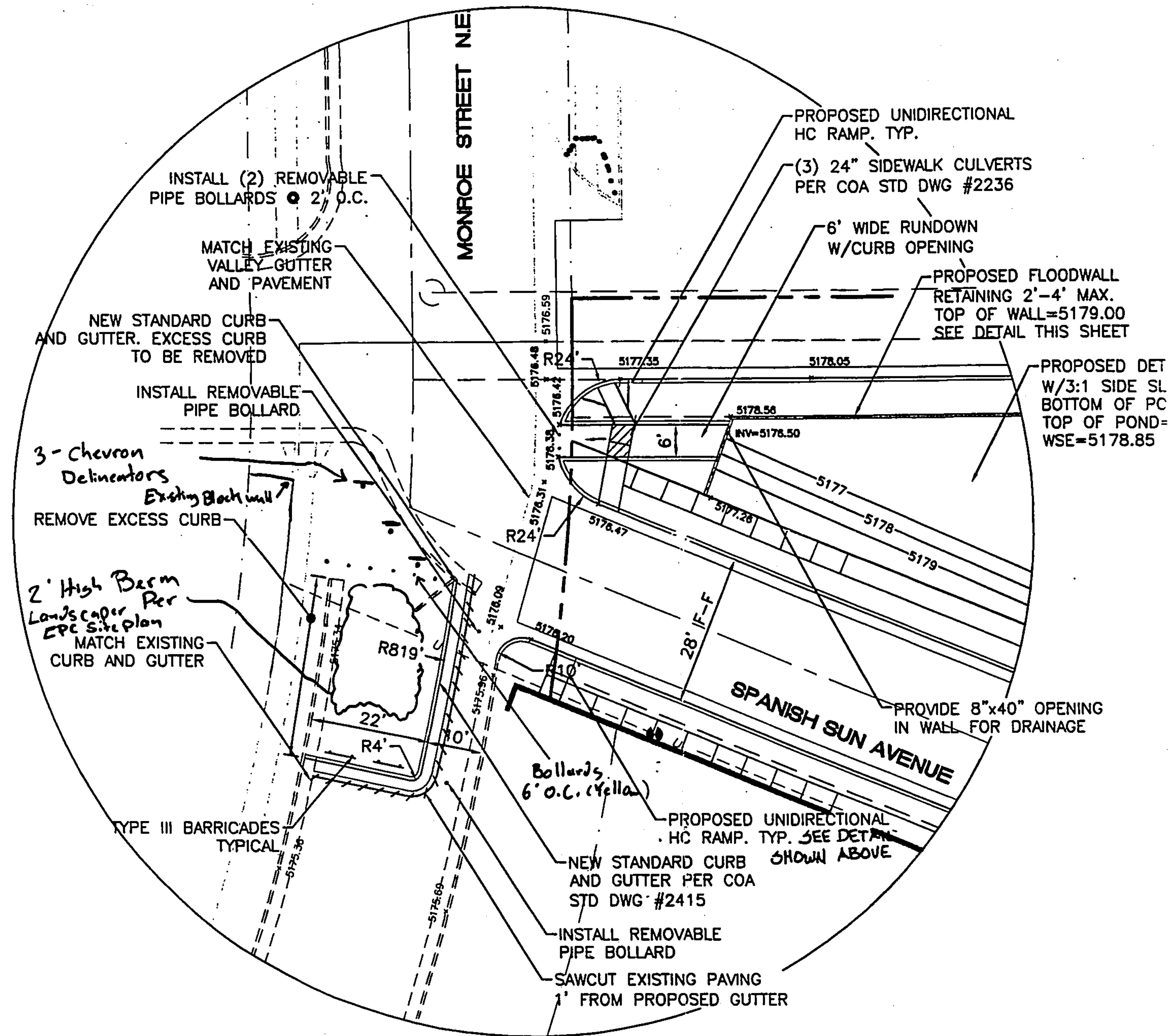
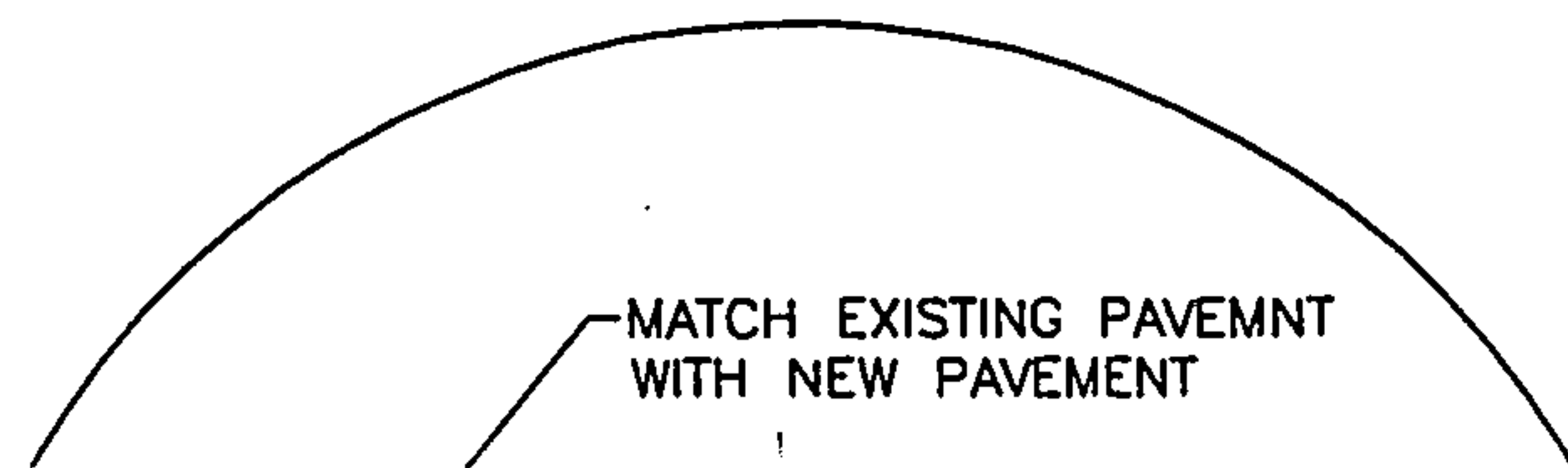
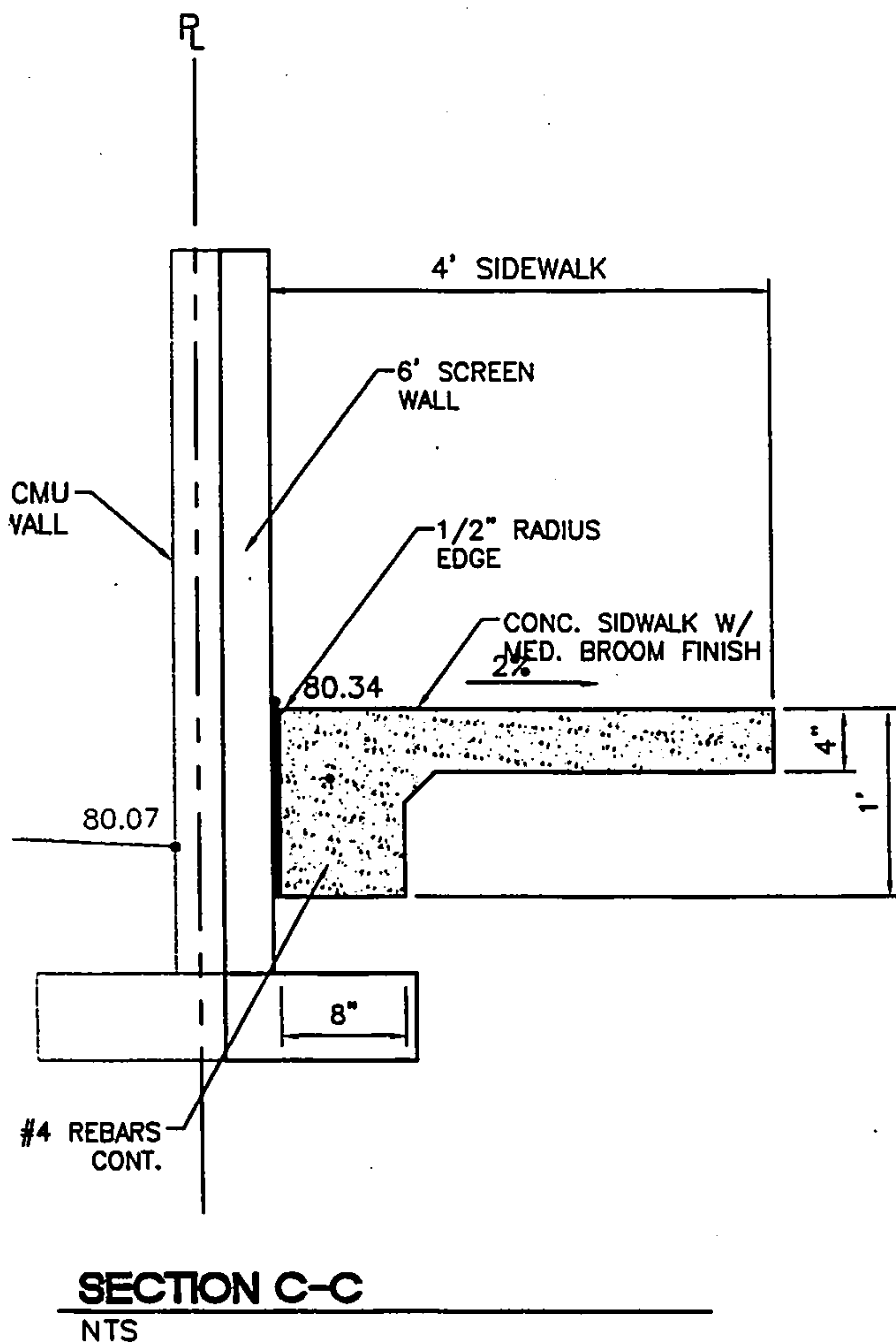
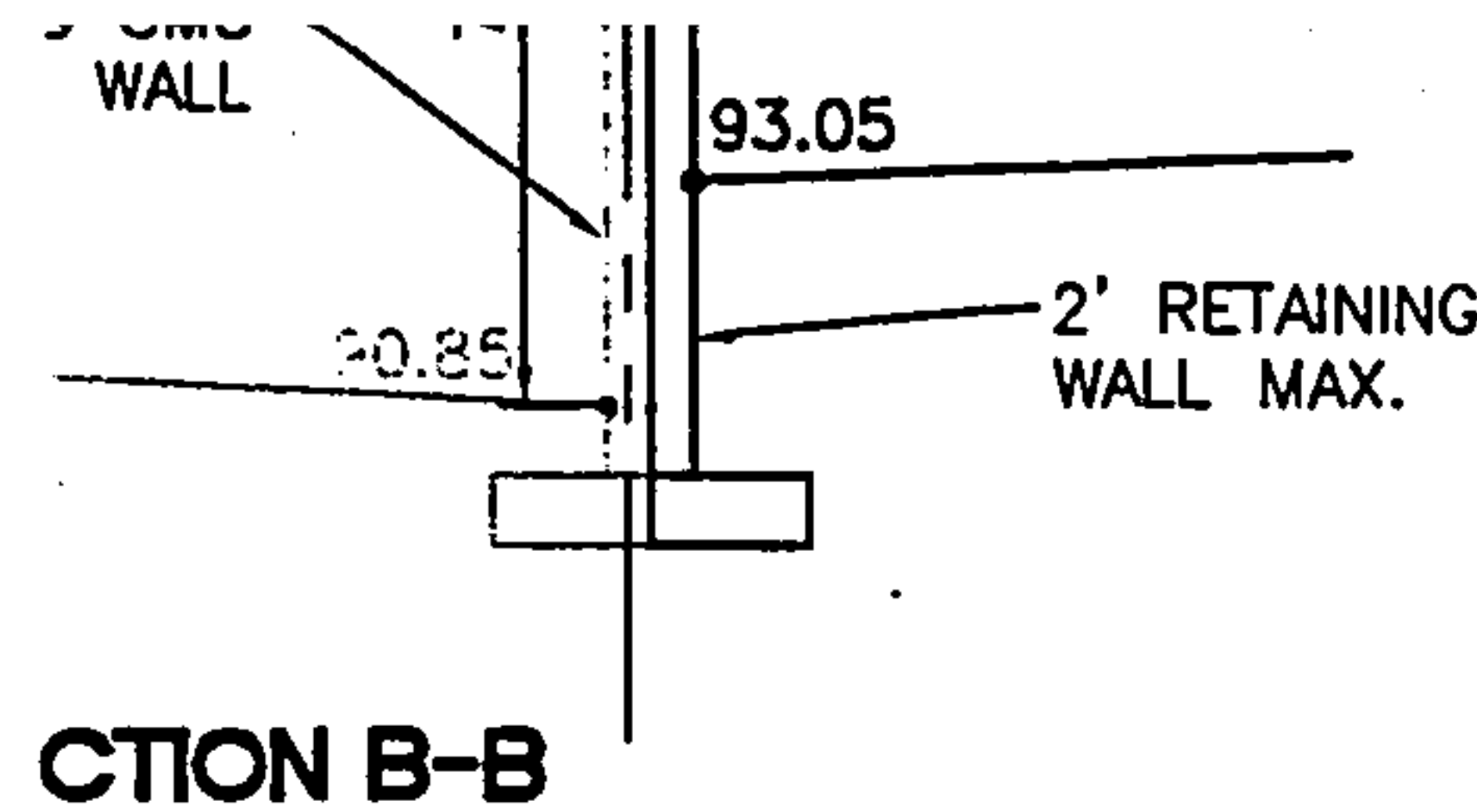


PRECISION SURVEYS

8414-D JEFFERSON STREET NE PHONE 505 856 5700
ALBUQUERQUE, NEW MEXICO 87113 FAX 806 856 7900

997139EX

EXHIBIT "A"
Page 3 of 3



ENLARGEMENT 'B'
SCALE: 1"=20'

CONTRACT CONTROL FORM

PRELIMINARY REVIEW

Contact Person TERRI Project # 642/81
Phone No. 924-3997 CCN# 200100154
New or Ext. # _____

Type of Agreement: AGREEMENT + COVENANT

Description/Project Name: SPANISH SUN SUBD
Public Works Dept./Div.: Project Review Section
Developer: SPANISH SUN HOMEOWNERS ASSOC.
Contract Amount \$ 0 SIA Contract Period: _____ - Perman.
Contract Amount \$ _____ SIA Contract Period: _____ - _____
Contract Amount \$ _____ S/W Contract Period: _____ - _____

DRAFT CONTRACT:

Rec'd by Legal: _____ Rejected/Returned to Dept.: 10/10/00 / RJC
Returned to Legal: 10/25/00 / _____ Approved: 10/25/00 Initials: RJC

FINANCIAL GUARANTY:

Letter of Credit No.: _____ Date: _____ Attached: Yes _____ No. _____ Initial _____
Other: Type _____ Date: _____ Attached: Yes _____ No. _____ Initial _____

FINAL CONTRACT REVIEW

APPROVALS REQUIRED:

	Date Delivered	Returned to Dept.	Approved By	Approval Date
Utility Div				
Hydrology Div	<u>8-8-00</u> <u>RJC</u>		<u>BLB</u>	<u>8/8/00</u>
Transportation Div				
DRC Chairman				
Legal Dept	<u>8-9-00</u> <u>RJC</u>		<u>RJC</u>	<u>10/25/00</u>
City Engineer				
PWD Director				
Finance				
City Clerk				
CAO				

DISTRIBUTION:

	Date:	By:
User Department.	_____	_____
Vendor	_____	_____
City Clerk	_____	_____
Treasury	_____	_____
Other: _____	_____	_____

ADDENDUM TO COVER PAGE

8-8-00

(Date)

TO: Kevin Curran, Assistant City Attorney, Legal Department

FROM: Project Administrator, Project Review Sec., PWD

SUBJECT: PROJECT TITLE: SPANISH SUN SUBD PROJECT # 642181

The attached documents have been review, approved, initialed and/or signed by the DRC Chairman and are submitted for your action as noted.

<u>ITEM</u>	<u>ACTION</u>		<u>Comments</u>
	<u>Review & Approval</u>	<u>Reference</u>	
Procedure "A".....	☐ ☐ ☐	☐ ☐	_____
Procedure "B".....	☐ ☐ ☐	☐ ☐	_____
Procedure "B" Modified Non Work Order.....	☐ ☐ ☐	☐ ☐	_____
Procedure "C".....	☐ ☐ ☐	☐ ☐	_____
Procedure "C" Modified.....	☐ ☐ ☐	☐ ☐	_____
Special Agreement.....	☐ ☐ ☐	☐ ☐	_____
Sidewalk Deferral Agreement.....	☐ ☐ ☐	☐ ☐	_____
Amendment.....	☐ ☐ ☐	☐ ☐	_____
Assignment.....	☐ ☐ ☐	☐ ☐	_____
Financial Guarantee.....	☐ ☐ ☐	☐ ☐	_____
Construction Paperwork:			
Contractors Proposal.....	☐ ☐ ☐	☐ ☐	_____
Performance/Warranty Bonds.....	☐ ☐ ☐	☐ ☐	_____
Labor/Material Bonds.....	☐ ☐ ☐	☐ ☐	_____
Certificate of Insurance.....	☐ ☐ ☐	☐ ☐	_____
Engineers Cost Estimate.....	☐ ☐ ☐	☐ ☐	_____
Extension.....	☐ ☐ ☐	☐ ☐	_____
Release/Agreement.....	☐ ☐ ☐	☐ ☐	_____
Release/Financial Guarantee.....	☐ ☐ ☐	☐ ☐	_____
Calling Notice.....	☐ ☐ ☐	☐ ☐	_____
Letter of Commitment.....	☐ ☐ ☐	☐ ☐	_____
Reduction Letter.....	☐ ☐ ☐	☐ ☐	_____
License Agreement.....	☐ ☐ ☐	☐ ☐	_____
Monitoring Well Permit.....	☐ ☐ ☐	☐ ☐	_____
Agreement & Covenant.....	☒ ☐ ☐	☐ ☐	_____
Drainage Covenant.....	☐ ☐ ☐	☐ ☐	_____
Revocable Permit.....	☐ ☐ ☐	☐ ☐	_____
Encroachment.....	☐ ☐ ☐	☐ ☐	_____
Permanent Easement.....	☐ ☐ ☐	☐ ☐	_____
Temporary Easement.....	☐ ☐ ☐	☐ ☐	_____

Other:

Please Call Terri at 924-3997 if you have any questions regarding the above or when the documents are ready to be picked up.

No. of Attachments (1)

