DRAINAGE REPORT

FOR

THE TUSCANY WEST SUBDIVISION, UNITS III & IV, (MAP # A11)

PREPARED FOR

CURB WEST, INC.
6301 INDIAN SCHOOL NE, # 680
ALBUQUERQUE, NEW MEXICO 87109

PREPARED BY

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JUNE 11, 1997

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I. PURPOSE AND SCOPE

1. Curb West, Inc. is currently planning for the development of The Tuscany West Subdivision, Units 3 and 4. The proposed development consists of approximately 27.5 acres and is to be subdivided into 144 single family residential lots.

The original Master Drainage Report, dated November 10, 1995, presented a Preliminary Drainage Management and Conceptual Grading Plan for this area approved by the City of Albuquerque in order that subsequent subdivision and development may commence. Tuscany 1, 2 and 3 were finalized with other reports.

This report presents a revised Drainage Management concept for the area between future Unser Boulevard and Tuscany 1 and 3 and from McMahon Boulevard to the Calabacillas Arroyo. It also presents the preliminary grading design for drainage purposes for Units #3 and #4 of the Tuscany West Subdivision. As a part of this report the Drainage Calculations for Tuscany West Unit #3 & #4 are supplied.

Final calculations for street flows and storm drain analysis will be supplied when improvement plans are done. Approximations for sizing of storm drain facilities are presented in this report.

II. SITE DESCRIPTION AND HISTORY

The project site is located on the north side of Bandelier Drive from Unser Boulevard, on the west, to Hillside St., NW in the Paradise Heights Unit 2 Subdivision on the east (see Plate 1 - Vicinity Map).

The Tuscany West Subdivision, Units 3 and 4 is comprised of Tracts 13A-1, 14A-1 and 15A-1 of Paradise North and a portion of Bandelier Dr., NW, situated within the town of Alameda Grant, "projected" sections 11 and 12, T11N, R2E, N.M.P.M., City of Albuquerque, Bernalillo County, New Mexico.

The existing terrain slopes from the ridgeline, at about the McMahon Blvd. right-of-way to the Calabacillas Arroyo. The site shows several terraced areas at progressively higher elevations moving North away from the Calabacillas Arroyo, they are coincident with the Rio Grande Rift uplift periods. The slope north of Bandelier Dr. has a average slope of 15%.

The site has previously been subdivided for single family homes, but not built. The site was restored to bulk land in the current Tracts 13A-1, 14A-1 and 15A-1 of Paradise North. The zoning for the site is RLT for Tracts 13A-1 and 11A-1 and 12A-1, RT for Tract 15A-1 and R1 for Tract 14A-1.

Drainage for this site has always been toward the Calabacillas. The Natural Ridge Line that runs approximately along the McMahon Blvd. right-of-way, from Bandelier Dr. to about 1000' west of Bandelier Dr., then the ridgeline moves south of McMahon Blvd. crossing through the Lands of Lincoln, Paradise Heights, Unit 2 and Tracts 13A-1 and 15A-1 of Paradise North (and several other smaller properties). This ridgeline demarks the split between the Calabacillas Arroyo Drainage Basin and the Black's Arroyo Drainage Basin. Research of the Black's Arroyo drainage plan show that the ridgeline is the dividing point. Ultimately from Unser Blvd. to Bandelier Dr., McMahon Blvd. will be the future separation between the Calabacillas' and Black's Drainage Basins, at least that is the premise we have taken in this report due to previous discussions with City of Albuquerque. Earlier subdivision plans for this area offered alternate, but similar drainage solutions.

III. DESIGN CRITERIA

A. Flood Control Regulations

The drainage plan presented in this report has been designed to comply with AMAFCA resolution 80-15, which requires that proposed land development projects be designed such that no flooding of private properties will occur during any storm up to and including the 100-year frequency event. Additionally, this drainage plan has been designed to comply with current "City of Albuquerque Drainage Ordinance" and Chapter 22 of the Development Process Manual (DPM), and subsequently adopted general policies of the City of Albuquerque.

1. 100-year storm:

   a. Stormwater flow depth not to exceed the top of curb in any street.

   b. Jump depth to be contained within right-of-way.

2. 10-year storm:

   a. Local street - velocity times depth less than 6.5.

   b. Arterial streets:

      I. Flow not to exceed a depth of 0.50.

      ii. Velocity times depth less than 6.5.
      iii. One driving lane in each direction free of stormwater.

B. Engineering Parameters

In accordance with AMAFCA criteria, all hydrological analysis is based on the 100-year frequency, 6-hour duration storm, as represented in Section 22.2, Hydrology, of the "Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, January 1993.

Ten-year, 6-hour values were also used for subcatchments, in accordance with City drainage policies regarding street flow.

The four rainfalls pertinent to the study are as follows:

	10-Year	100-Year
One-Hour	1.27 "	1.90 "
Six-Hour	1.47 "	2.20 "

IV. COMPUTATIONAL PROCEDURES

The analysis approach follows standard engineering practice. Key points of confluence were selected and the associated individual and aggregate contributing basins were subsequently defined.

Hydrological computations were accomplished by means of the January 1994 version of AHYMO Computer Program as developed by AMAFCA. The input parameters and resulting flows for the basins are summarized on Table 1. Summary and detailed input AHYMO printouts are contained in Appendix A. (Detailed AHYMO output provided on request).

Times of concentration were estimated using the Upland Method and then converted to times to peak (Lg), in accordance with the above referenced Section 22.2 which also establishes the minimum time of concentration as 12 minutes.

Flow characteristics for conveyance swales, channels, and streets were analyzed based on the Manning equation for uniform flow. Streets are assumed to have a 2% cross slope from lip of gutter to crown and curb and gutter per City of Albuquerque Standard details. Finished grade at the right-of-way is 0.33' above top of curb.

V. ON-SITE DRAINAGE

Drainage flows for on-site basins will be conveyed via street surface flows or within storm drain system to the outfall in Tuscany West Unit 1, at southeast corner of site, upstream of AMAFCA's existing grade control structure #1 within the Calabacillas Arroyo.

Flows in Bandelier Drive will be picked up at two locations; one at the intersection with Figaro Dr. & Hemlock Ave. (Basins #135 and #135.1) and the second at Salome Drive Intersection (Basins #145 and #145.1), these flows will then be conveyed via storm drain to the arroyo.

Basins #420 and #415 will be conveyed on surface via Othello Dr., Rigoletto Dr., Countess Rd./Maritca Dr., to inlets at intersection with Hemlock Ave. and then via pipe to the outfall to the arroyo.

Basin #410 flows on surface via Rigoletto Dr. to intersection with Hemlock Ave. The flows will be intercepted by inlets and then conveyed via pipe to the outfall.

Basin #405 will be conveyed on the surface on Rio Del Sole Drive to the intersection of Hemlock Ave. where it joins Basin #406.

Basin #406 will be conveyed on the surface via Hemlock Ave. to intersection with Maritca Dr. where it is intercepted by inlets and then conveyed via pipe to the outfall.

Basins #407 & #408 will flow on the surface of Hemlock Ave. to the intersections with of Rigoletto Dr. and Capriccio Rd. resepectively where they are picked up by inlets then conveyed via the storm drain system to the Calabacillas Arroyo.

Basin #425 will be conveyed on the surface via Capriccio Rd. to the intersection of Hemlock Ave. where it is picked up by inlets and conveyedvia pipe to the outfall.

Basin #409 will by conveyed on the surface via Hemlock Ave. to the intersection of Bandelier Dr. where it is picked up by inlets and conveyed via pipe to the outfall.

Basins #501, #505 & #510 will be conveyed on the surface of Marta Rd., Thais St. and Salome Dr. to the intersection of Bandelier Dr. where the flow will be intercepted by inlets and conveyed via pipe to the outfall.

VI. EROSION CONTROL

Control of excessive soil erosion into City streets and drainage improvements during construction will be accomplished by use of temporary lot line, water-trap berms. These will be windrowed into place following mass grading operations and left in place until each home is constructed and sold. Plate 3 illustrates the dimensions of these berms, and they will be located along those boundaries of each lot which are common to City rights-of-way or public easements.

TABLE 1
TUSCANY WEST #3 & #4
EXISTING DEVELOPMENT CONDITIONS

					LAND TREATMENT				INCREMENTAL		FUTURE TOTAL	
Basin I.D.	**Area (Sq.Mi.)**	**Contr. Basin**	**Sum Area (Sq.Mi.)**	**Tc (Min.)**	**A**	**B**	**C**	**D**	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Q_{100} (cfs**	**Q_{10} (cfs)**
Future Developments: Off-Site to Tuscany West #1												
420	0.0059		0.0059	12	---	30	30	40	12.33		12.33	
415	0.0076	420	0.0135	12	---	30	30	40	15.88		28.21	
405	0.0045		0.0045	12	---	30	30	40	9.41		9.41	
406	0.0014	405	0.0059	12	---	30	30	40	2.94		12.35	
407	0.0019	415/ 406	0.0213	12	---	30	30	40	3.98		44.54	
410	0.0024		0.0024	12	---	30	30	40	5.03		5.03	
408	0.0011	410 & 407	0.0248	12	---	30	30	40	2.31		51.88	
425	0.0050		0.0050	12	---	30	30	40	10.45		10.45	
409	0.0011	425 & 408	0.0309	12		30	30	40	2.31		64.64	
Q at N/S Bandelier Drive -----Q_{100} = 64.64 CFS												
135.1	0.0008	408	0.0317	12	---	5	5	90	2.2		66.83	
135	0.0008	135.1	0.0325	12	---	5	5	90	2.2		69.02	
Q in Bandelier Drive @ Hemlock Ave. Q_{100} = 4.4 CFS Q TOT = 69.02 CFS												
Q at Point "A:												
501	0.0034		0.0034	12	---	30	30	40	7.11		7.11	
505	0.0057	501	0.0057	12	---	30	30	40	11.91		19.03	
510	0.0030	501& 505	0.0121	12	---	30	30	40	6.28		25.31	
Q at N/S Bandelier Drive -----Q_{100} = 25.31CFS												
145.1	0.0009		0.0009	12	---	5	5	90	2.5		2.5	
145	0.0009	145.1 & 510	0.0139	12	---	5	5	90	2.5		30.23	
Tuscany West: : Q in Bandelier Drive at Point "B" Q_{100} = 5.0 CFS/QTOT = 30.23 CFS												
515	0.0038	145	0.0177	12	---	30	30	40	7.95		38.18	
Q at Point "C" in AIDA Q_{100} = 7.95 CFS												
440	0.0028		0.0028	12	---	30	30	40	5.9		5.9	
445	0.0023	440 & 135	0.0376	12	---	30	30	40	4.8		79.26	
450	0.0095	445	0.0471	12	---	30	30	40	19.8		100.53	

TABLE 1
TUSCANY WEST #1 & #2
EXISTING DEVELOPMENT CONDITIONS

					LAND TREATMENT				INCREMENTAL		FUTURE TOTAL	
Basin I.D.	**Area (Sq.Mi.)**	**Contr. Basin**	**Sum Area (Sq.Mi.)**	**Tc (Min.)**	**A**	**B**	**C**	**D**	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Q_{100} (cfs**	**Q_{10} (cfs)**
455	0.0071	450	0.0575	12	---	30	30	40	14.8		128.3	
460	0.0083	455& 515	0.0863	12	---	30	30	40	8.4		174.7	
Q100 Total in Proposed S.D. to Outfall @ Arroyo 174.7 CFS												
@ Point 'C'												
291	0.0017	--------	0.0017	12	---	30	30	40	2.5		2.5	
Q on Slope supporting Unser Blvd.,: Q = 2.5 CFS												
461	0.0012	--------	0.0012	12	---	50	50	---	1.9		1.9	
Q to Ponds (Rear yard) at East Boundry : Q = 1.9 CFS (Rear yard Q to be divided by 10 lots)												

TABLE 2
STREET FLOW CHARACTERISTICS

STREET	WIDTH	CURB TYPE	LOCATION	SLOPE %	Q	Dn	Dc	Vn	Vc	EG	*POOL DEPTH
BANDELIER	40 FT	STND		1.00	31.50	0.51	0.53	3.30	2.98	0.67	0.70
BANDELIER	40 FT	STND		2.28	58.10	0.54	0.67	5.40	3.63	0.99	0.93
BANDELIER	40 FT	STND		0.60	49.51	0.63	0.63	3.45	3.40	0.81	0.85
BANDELIER	40 FT	STND		0.06	57.93	0.66	0.67	3.61	3.63	0.87	0.93
BANDELIER	40 FT	STND		0.06	37.93	0.57	0.58	3.06	3.16	0.72	0.77
BANDELIER	40 FT	STND		1.93	33.00	0.46	0.54	4.18	3.03	0.68	0.72
SALOME	26 FT	MNT		2.00	7.11	0.25	0.29	2.01	2.80	0.37	0.44
RIGOLETTO	26 FT	MNT		4.00	5.03	0.20	0.25	1.89	3.34	0.37	0.47
THAIS	26 FT	MNT		4.00	11.91	0.26	0.34	2.42	4.13	0.53	0.67
THAIS	26 FT	MNT		6.00	11.91	0.25	0.34	2.42	4.81	0.61	0.79
THAIS	26 FT	MNT		8.00	7.11	0.20	0.29	2.01	4.72	0.55	0.72
RIGOLETTO	26 FT	MNT		8.00	5.03	0.18	0.25	1.89	4.35	0.47	0.62
THAIS	26 FT	MNT		2.62	11.91	0.28	0.34	2.42	3.54	0.48	0.58
RIGOLETTO	26 FT	MNT		1.36	8.00	0.28	0.29	2.18	2.50	0.37	0.41
COUNTESS	26 FT	MNT		1.00	12.33	0.33	0.34	2.44	2.66	0.44	0.48
MARITCA	26 FT	STD		2.31	28.21	0.43	0.54	3.29	4.81	0.79	0.99
SALOME	26 FT	STD		4.00	25.31	0.39	0.51	3.18	5.44	0.85	1.08
SALOME	26 FT	STD		8.00	25.31	0.35	0.51	6.70	6.70	1.05	1.38
CAPRICCIO	27 FT	MNT		4.00	10.45	0.25	0.32	2.31	4.0	0.50	0.63
CAPRICCO	27 FT	MNT		8.00	10.45	0.23	0.32	2.31	5.2	0.65	0.84
HEMLOCK	28 FT	STD		1.50	12.35	0.37	0.40	2.42	2.96	0.50	0.57
HEMLOCK	28 FT	STD		1.50	44.54	0.54	0.64	3.73	4.92	0.92	1.11
HEMLOCK	28 FT	STD		1.50	51.88	0.57	0.69	3.91	5.22	0.99	1.22
HEMLOCK	28 FT	STD		2.14	64.64	0.58	0.76	4.22	6.34	1.20	1.54
RIO DEL SOLE	28 FT	STD		2.90	9.41	0.31	0.37	2.26	3.55	0.50	0.61

- POOL DEPTH = Dc + 1.25 (Vc$\wedge$2)/(2g)

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BANDELIER	40 FT	STND		0.60	49.51	0.63	0.63	3.45	3.40	0.81	0.85
BANDELIER	40 FT	STND		0.06	57.93	0.66	0.67	3.61	3.63	0.87	0.93
BANDELIER	40 FT	STND		0.06	37.93	0.57	0.58	3.06	3.16	0.72	0.77
BANDELIER	40 FT	STND		1.93	33.00	0.46	0.54	4.18	3.03	0.68	0.72
SALOME	26 FT	MNT		2.00	7.11	0.25	0.29	2.01	2.80	0.37	0.44
RIGOLETTO	26 FT	MNT		4.00	5.03	0.20	0.25	1.89	3.34	0.37	0.47
THAIS	26 FT	MNT		4.00	11.91	0.26	0.34	2.42	4.13	0.53	0.67
THAIS	26 FT	MNT		6.00	11.91	0.25	0.34	2.42	4.81	0.61	0.79
THAIS	26 FT	MNT		8.00	7.11	0.20	0.29	2.01	4.72	0.55	0.72
RIGOLETTO	26 FT	MNT		8.00	5.03	0.18	0.25	1.89	4.35	0.47	0.62
THAIS	26 FT	MNT		2.62	11.91	0.28	0.34	2.42	3.54	0.48	0.58
RIGOLETTO	26 FT	MNT		1.36	8.00	0.28	0.29	2.18	2.50	0.37	0.41
COUNTESS	26 FT	MNT		1.00	12.33	0.33	0.34	2.44	2.66	0.44	0.48
MARITCA	26 FT	STD		2.31	28.21	0.43	0.54	3.29	4.81	0.79	0.99
SALOME	26 FT	STD		4.00	25.31	0.39	0.51	3.18	5.44	0.85	1.08
SALOME	26 FT	STD		8.00	25.31	0.35	0.51	6.70	6.70	1.05	1.38
CAPRICCIO	27 FT	MNT		4.00	10.45	0.25	0.32	2.31	4.0	0.50	0.63
CAPRICCO	27 FT	MNT	Hemlock	8.00	10.45	0.23	0.32	2.31	5.2	0.65	0.84
HEMLOCK	28 FT	STD		1.50	12.35	0.37	0.40	2.42	2.96	0.50	0.57
HEMLOCK	28 FT	STD		1.50	44.54	0.54	0.64	3.73	4.92	0.92	1.11
HEMLOCK	28 FT	STD	Capricio	1.50	51.88	0.57	0.69	3.91	5.22	0.99	1.22
HEMLOCK	28 FT	STD	Bandelier	2.14	64.64	0.58	0.76	4.22	6.34	1.20	1.54
RIO DEL SOLE	28 FT	STD		2.90	9.41	0.31	0.37	2.26	3.55	0.50	0.61

- POOL DEPTH = Dc + 1.25 (Vc^2)/(2g)