



March 2, 1998

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Charles A. Haegelin
President
Curb West, Inc.
6301 Indian School Rd. NE, Suite 680
Albuquerque, NM 87110

RE: TUSCANY WEST UNIT 2 ; CITY PROJECT NO. 5613.82; MAP NO. 2-11

Dear Mr. Haegelin:

This is to certify that the City of Albuquerque accepts the construction of the infrastructure provided in the Work Order Construction Plans, City Project No. 5613.82 in compliance with the completion of the required public infrastructure listed in the Subdivision Improvements Agreement (SIA) between Curb West, Inc. and the City of Albuquerque executed on July 1, 1997.

Having satisfied the requirements referenced above, the SIA and any associated Financial Guaranty, held by the City, can now be released. The Contractors one-year warranty period started at the date of acceptance by the City Engineer, dated March 2, 1998.

Please be advised this Certificate of Completion and Acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

Should you have any questions or issues regarding this project, please contact me.

Sincerely,

Ricardo B. Roybal, P.E.
City Engineer
Dev. & Bld. Services Div.
Public Works Department

Good for You, Albuquerque!





City of Albuquerque

P. O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103
PUBLIC WORKS DEPARTMENT

January 8, 1998

CERTIFICATE OF WORK ORDER COMPLETION

Curb West Inc.
6301 Indian School Rd. NE
Suite 680
Albuquerque, NM 87110

RE: Tuscany West Subdivision Unit 1 - PROJECT NO. 5613.81 (MAP NO. A-11)

Dear Sir:

This is to certify that the City of Albuquerque accepts Project No. 5613.81 as being completed according to approved plans and construction specifications. Please be advised this certificate of completion shall only become effective upon final plat approval and filling in the office of the Bernalillo County Clerk's Office.

The project is described as follows:

- Bandelier Drive - An 24' arterial pavement (includes 4' temporary pavement on north side), standard curb and gutter and 4' sidewalk (south side only), grade only north side (10' width) from the Westerly Pl. of Tuscany Unit 1 to the Easterly Pl. of lot block 5.
- Don Giovanni Place - An 28' face to face residential pavement with standard curb and gutter (both sides) from Bandelier to Carmen Road.
- Don Giovanni Cul de Sac - Residential pavement 25' face to face with mountable curb and gutter (both sides) from Don Giovanni and Carmen Rd. to the end of Cul-de-Sac at lot 13 block 1. An 60" RCP storm drain and appurtenances from the intersection of Carmen Rd. and Don Giovanni Pl. to the outfall in the Calabacillas Arroyo.
- Carmen Road - An 28' face to face residential pavement with standard curb and gutter (both sides) from Don Giovanni Pl. to the Westerly Pl. lot 12 block 2 (unit boundary), an 42" storm drain and appurtenances from the drainage easement to Don Giovanni Pl. An 36" storm drain and appurtenances from the Westerly Pl. lot 12 block 2 to the drainage easement.
- Aida Road - An 27' face to face residential pavement with mountable curb and gutter (both sides) from Don Giovanni Pl. to La Boheme Dr.
- Easement - An 36" storm drain and appurtenances from Carmen Rd. to the north side of Bandelier Dr.

Tuscany West Subdivision, Unit 1
Project No. 5613.81
January 8, 1998
Page 2

- La Boheme – An 25' face to face residential pavement with mountable curb and gutter (both sides) from Aida Rd. to Carmen Rd.

The contractor's correction period began the date of this letter and is effective for a period of one (1) year.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell B. Givler".

Russell B. Givler, P.E.
Chief Construction Engineer,
Public Works Department

cc: New Concepts
Community Sciences
Fred Aguirre, Hydrology, PWD
Tina Pohl, Engineering Group, PWD
Terri Martin, Engineering Group, PWD
Martin Barker, Materials Testing Lab
Linda Adamsko, Special Assessments, DFM
Sam Hall, Water Systems, PWD
Andre Houle, Street Maintenance, PWD
Rodger Green, Water/Wastewater Group, PWD
Ray Chavez, Traffic Engineering, PWD
Josie Jaramillo, New Meter Sales, Finance Group, PWD
Richard Zamora, Maps and Records, PWD
✓ John Ewing, Risk Management
f/Project No. 5613.81
f/Readers
f/Warranty:Contract



November 10, 1997

Martin J. Chávez, Mayor

Kent M. Whitman, P.E.
Community Sciences Corporation
P.O. Box 1328
Corrales, New Mexico 87048

**RE: Engineer's Certification for Tuscany West Subdivision, Units 1 & 2, (A11/D1A)
Submitted for Release of Financial Guarantees, Engineer's Certification Stamp
Dated 11/6/97.**

Dear Mr. Whitman:

The above referenced Engineer's Certifications for Tuscany West Units 1 and 2 are adequate to satisfy the Grading and Drainage certification requirements per the Infrastructure List dated November 5, 1996, and revised on April 8, 1997 for the release of Financial Guarantees for both Units.

If you should have any questions, or if I may be of further assistance to you, please contact me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB 96-359
Bo Johnson, Curb West Inc.
File

Good for You, Albuquerque!



GENEIVA MEEKER, CHAIR
DANIEL W. COOK, VICE-CHAIR
RONALD D. BROWN, SECRETARY-TREASURER
MICHAEL MURPHY, ASST. SECRETARY-TREASURER
TIM EICHENBERG, DIRECTOR

LARRY A. BLAIR
EXECUTIVE ENGINEER



**Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority**

2600 PROSPECT N.E. - ALBUQUERQUE, N.M. 87107
TELEPHONE (505) 884-2215

January 13, 1997

Mr. Mike Smith
Community Sciences Corporation
P.O. Box 1328
Corrales, New Mexico 87048

RE: Tuscany West Subdivision - Drainage Report and plans (dated 1-8-97)

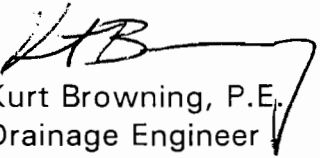
Dear Mike:

I have received the revised drainage report for the Tuscany West Subdivision and it is approved. AMAFCA signature on mylars is required. My three pages of comments from my October response still apply, however, several of these comments can be addressed through the drawing review process.

Thank you for abiding by the Simons-Li line regarding the revised layout of this subdivision. I only reviewed the Calabacillas Arroyo material in the report and the affects on the erosion setback, outfalls, etc. CSC has shown that this subdivision is protected from the single 100 year event (arroyo) as called out for in our existing agreement with CURB Inc. Additional comments from COA regarding the subdivision may be forthcoming.

Please send us a set of preliminary construction drawings for mark up. Similar layouts and details regarding the outfalls, bench, fill, reveg, soil cement, and rip-rap, as used for Tuscany "East" can be used. Should you have any questions, please call me.

Sincerely,
AMAFCA


Kurt Browning, P.E.
Drainage Engineer

c: Fred Aguirre, COA Hydrology

**DRAINAGE REPORT
FOR
THE TUSCANY WEST
SUBDIVISION,
UNITS I & II, (MAP # A11 & A12)**

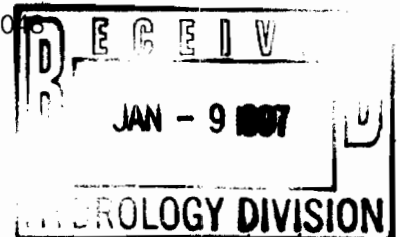
PREPARED FOR

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

PREPARED BY

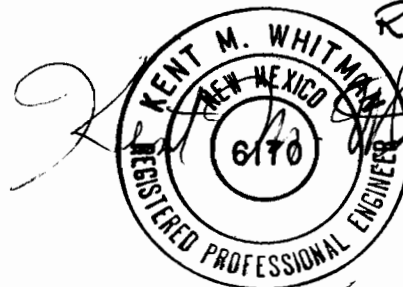
COMMUNITY SCIENCES CORPORATION
P. O. BOX 1328
CORRALES, NEW MEXICO 87006

THOMAS J. BELLON, JR.
PROJECT MANAGER



OCTOBER 28 1996

REVISED 1/8/97
REVISED 1/23/97



1/8/97
1/23/97

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I. PURPOSE AND SCOPE

1. Curb West, Inc. is currently planning for the development of The Tuscan West Subdivision, Units 1 and 2. The proposed development consists of approximately 25 acres and is to be subdivided into 108 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. Tuscan 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 Tuscan 1 and 3 and from McMahon Boulevard to the Calabacillas Arroyo. It also presents the preliminary grading design for drainage purposes for Units #1 and #2 of the Tuscan West Subdivision. As a part of this report the Grading Plans and Drainage Calculations for Tuscan West Unit #1 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 the Calabacillas Arroyo, between the Arroyo and Bandelier Drive and 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 Tuscan West Subdivision, Units 1 and 2 is comprised of Tracts 10A-1, 11A-1 and 12A-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 lower half of site, south of Bandelier Dr., is flat and above the 100 yr. floodplain, the upper portion, north of Bandelier Dr., is steeper (15% ± avg.). The Calabacillas Arroyo is at or near the southerly boundary of the project. The prudent line, addressed in another report, for this property is the Simons and Li line established about 1983.

The site has previously been subdivided for single family homes, but not built. The site was restored to bulk land in the current Tracts 10A-1, 11A-1 and 12A-1 of Paradise North. The zoning for the site is RLT for Tracts 10A-1 and 11A-1 and 12A-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:

	<u>10-Year</u>	<u>100-Year</u>
One-Hour	<u>1.27 "</u>	<u>1.90 "</u>
Six-Hour	<u>1.47 "</u>	<u>2.20 "</u>

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. OFF-SITE DRAINAGE

Off-site Drainage was revised slightly, due to some changes (i.e. street name changes and revised drainage boundries). Some basins presented in the 11-10-95 Master Drainage Report (approved) have been re-routed in this report. (See Table 3)

Off-site drainage for this project takes on 3 forms: (1) off-site areas actually tributary to the project site under natural conditions; (2) off-site areas that will or may become tributary to the project site as a result of future development, by this developer or by others; and (3) off-site areas tributary to the off-site infrastructure required for Tuscany #1 project, specifically McMahon Blvd. from Bandelier Dr. to Golf Course Rd.

Under natural/existing conditions off-site basins #420, #405, #400, and #415 (formerly #130) partially flow to Black's Arroyo, due to the location of the existing ridgeline, and the balance flows to the Calabacillas Arroyo. The portions of the above basins that drain toward the Calabacillas do so in a southeasterly direction, due to the existing terrain some of this flow ultimately crosses into the project site.

Under existing conditions, off-site basins #425, #430 (also formerly #130), #135, #135.1, combine with the partial flows from basins mentioned in previous paragraph and flow toward the project site and the arroyo. Under existing conditions, Basins #501, #505, #506, and #510 (formerly #140) along with #145 and #145.1 combine with the previously mentioned Basins & Flow toward project site. Provision for an earthen dike to direct water to a temporary pond in Basin #510, with overflow to the proposed storm drain system. The pond will intercept these flows before entering the project site. Basins #155, #156, #157 (formerly #155), #600, #605, #610, #615, #620, #625, #630, #635, #640 and #645 (formerly #175 and #165) will be trapped in a temporary pond near the Sicily Drive (future) and Bandelier Drive intersection, on the north side.

When the land North of Bandelier is developed basins #400, #405, #410, #415, #420, #425, and #430, flows will combine with basin #135 in Bandelier Drive and those flows will be conveyed via future storm drain systems through Tuscany West # 1 & 2, combining with their on-site flows, to the Calabacillas Arroyo. When land in Basins #501, #505, and #510 is developed, the flows will combine with Basin #145, and all of these captured flows will be conveyed in a proposed Storm Drain System through Tuscany West #1 to the Arroyo. An outfall will be provided upstream of existing Grade Control Structure #1.

Off-site basins, when developed, #155, #156, #600, #605, #610, #615, #620, #625, #630, #635, #640 and #645, and #150 and #154 will combine flows with basins #160, #170, and #180 in Bandelier Dr. to be picked up by a storm drain constructed with the Tuscany #1 project, capacity for these flows has been provided. In the interim natural condition a temporary pond will be provided and possibly temporary pipes will be provided to pick-up runoff.

Off-site basins #110, #111, #116 and #115 are located in the Tuscany #1 grading borrow site. Drainage from these basins will surface flow to retention pond and possibly a temporary pipe will be provided to intercept drainage (with Unit 3), this pipe, if necessary, will connect to proposed storm drain system in Tuscany Dr. (basin #125) and convey drainage to the Calabacillas Arroyo. When these basins are

developed, the storm drain system, proposed with Tuscany #3 project, will provide capacity for these areas. (Developed Q's).

Off-site basins #A, #105, #101, #100, and #100.1, under existing conditions, flow to Black's Arroyo. When McMahon Blvd. is ultimately developed the flows from these basins except #A will be conveyed on the surface to off-site basin #116. A portion of these flows will be collected in a future storm drain and connected to the proposed storm drain system of Tuscany #1 project. Tuscany #1 project has provided capacity for pick-up of these off-site flows in the design of the on-site storm drain system. Approximately 40cfs will be allowed to bypass the future inlets in McMahon Blvd. and combine with Basins #185 and #185.1, then flow to East to join with flows in McMahon at Bandelier Drive. Future development of these sites may require some on-site ponds. (to detain/retain Q's above the existing conditions). Basins #100.1 and #185.1 were added to match Smith Engineering Company Report for Proj. No. 5208.90. (See attached letter comparing reports) Basin #101 has been added to allow for half of Unser Blvd. North of Bandelier to flow to McMahon Blvd. The storm drain system constructed in McMahon Blvd. with Tuscany #1 has been designed to provide capacity for these additional flows (future) from the West. An extension and inlets will be needed at Bandelier Dr., West side (to be constructed by others). Basin #A however will still drain to Blacks Arroyo due to the adverse grades which preclude draining it to the Calabacillas systems.

VI. ON-SITE DRAINAGE

Drainage flows for on-site basins will be conveyed via street surface flows or within storm drain system to proposed outfall 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. (Basins #135 and #135.1) and the second at 750± feet east of Figaro Dr. Intersection (Basins #145 and #145.1), these flows will then be conveyed via storm drain to the arroyo.

Capacity for off-site flows from the north of Bandelier Dr. will be provided for in storm drain system at the pick-up points mentioned above.

Basins #440 and #445 will be conveyed on surface via Tosca Rd and Figaro Dr. To inlets at intersection with Carmen Rd. And then via pipe to the outfall to the arroyo.

Basin #450 flows on surface via La Traviata Place and Carmen Rd. To intersection with Figaro Dr. The flows will be intercepted by inlets and then conveyed via pipe to the outfall.

Basin #515 will be conveyed on the surface on Aida Road to the storm drain crossing where it is picked up and conveyed to the arroyo in the storm drain.

The above basins mentioned will then join with basin #455 in Carmen Rd. . Flows will be conveyed on the surface and in pipe under Carmen Rd. to the outfall .

Basin #520 will be conveyed on the surface via Aida Rd. to intersection with Don Giovanni Place where it joins Basin #462.

Basins #154, #462 & #520 will flow on the surface of Don Giovanni Place to intersection with Bandelier Drive, there this flow will join with flows from basins #150 and #150.1 to surface flow to existing inlets, constructed with Tuscany Unit #1 subdivision, at Napoli Pl. and then conveyed via the existing storm drain system to the Calabacillas Arroyo.

A row of split pad lots are proposed along the east side of Don Giovanni Place. These lots will have rear yard ponds (private) for collection of yard drainage only. The front yard and roof flows will be conveyed to the street. Rear yard ponds in Basin #461.

VII. 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.

VIII. SCOUR AND EROSION SETBACK

Sedimentation, erosion, and "Prudent line" set backs are addressed in several separate reports prepared by CSC (April, 1995 and addendum dated August, 1995), and Smith Engineers (dated 9/2/94 & 10/5/94). The recommendations of these reports has been and will be taken into account when final design plans are prepared. The prudent line concerns have been taken into account in the layout and preliminary grading of the proposed subdivision.

Included in this report are copies of: the Agreement between AMAFCA and Curb West, Inc., with regard to future bank protection; HEC-2 Runs for the Calabacillas Arroyo; additional arroyo cross sections located at 59+39 (upstream end of GCS #1), 62+00, 65+19, 69+00, and 72+00 (downstream end of Dam outlet) these sections show that the flows in the arroyo and the potential of lateral migration are minimized with the proposed future bank protection and that the "Summons-Li line"/South Property line are preserved and protected against the 30 years of dormant storm events and the single 100-year storm event; the exhibits from the approved April, 1995 and August, 1995 erosion reports. The recommendations and the proposed improvements in this report are compliant with the Approved ESB Reports (April '95 & August '95).

Scour was considered and calculated per the "Sediment and Erosion Design Guide". Scour consideration was taken at the outfall and rip-rap structures proposed adjacent to the Calabacillas Arroyo. The design of final plans will take into effect scour potential. (See calculations).

IX. TEMPORARY PONDS

Temporary Ponds were designed using DPM criteria. The Q's used for the sizing of these temporary ponds were for undeveloped conditions, no impervious areas, therefore the capacity is the volume for the 6 hour 100-year storm. (Calculations provided) The following is a summary of the calculated capacities needed:

POND #	Required Volume (cf)(calc)	DESIGN VOL (cf)
1 (prop.)	46,609 CF	70,000 CF
2 (prop)**	81,892 CF	100,000 CF
3 (existing)*	19,667 CF	76,000 CF
5 (existing)*	16,570 CF	20,000 CF

* Constructed with Tuscany Unit 1 (Existing)

** Proposed with Tuscany Unit 3 (Approved)

(See Section H of Appendix B for AHYMO Run = Tuscany P2.DAT)

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)
Future Developments: Off-Site to Tuscany West #1												
400	0.0072		0.0072	12	---	20	20	60	16.9		16.9	
405	0.0081	400	0.0153	12	---	20	20	60	19.0		35.8	
410	0.0002	405	0.0155	12	---	5	5	90	0.6		36.4	
415	0.0085	410	0.0240	12	---	30	30	40	17.8		54.1	
420	0.0053		0.0053	12	---	20	20	60	12.4		12.4	
425	0.0046	420	0.0099	12	---	20	20	60	10.8		23.2	
430	0.0003	425 & 415	0.0342	12	---	5	5	90	0.8		78.2	
Q at N/S Bandelier Drive -----Q ₁₀₀ = 78.2 CFS												
135.1	0.0008	430	0.0350	12	---	5	5	90	2.2		80.3	
135	0.0008	135.1	0.0358	12	---	5	5	90	2.2		82.5	
Q in Bandelier Drive @ Figaro Dr. Q ₁₀₀ = 4.4 CFS Q TOT = 82.5 CFS												
Q at Point "A:												
501	0.0052		0.0052	12	---	30	30	40	10.9		10.9	
505	0.0045	501	0.0097	12	---	30	30	40	9.4		20.3	
510	0.0023	505	0.0120	12	---	30	30	40	4.8		25.1	
Q at N/S Bandelier Drive -----Q ₁₀₀ = 25.1CFS												
145.1	0.0009		0.0009	12	---	5	5	90	2.5		2.5	
145	0.0009	145.1 & 510	0.0138	12	---	5	5	90	2.5		30.0	
Tuscany West: : Q in Bandelier Drive at Point "B" Q ₁₀₀ = 5.0 CFS/QTOT = 30.0 CFS												
515	0.0038	145	0.0176	12	---	30	30	40	8.0		38.0	
Q at Point "C" in AIDA Q ₁₀₀ = 8.0 CFS												
440	0.0028		0.0028	12	---	30	30	40	5.9		5.9	
445	0.0023	440 & 135	0.0409	12	---	30	30	40	4.8		92.3	
450	0.0095	445	0.0504	12	---	30	30	40	19.8		112.1	

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

Basin I.D.	Area (Sq.Mi.)	Contr. Basin	Sum Area (Sq.Mi.)	Tc (Min.)	LAND TREATMENT				INCREMENTAL		FUTURE TOTAL	
					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												
S @ 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)												
Drainage Areas tributary to Bandelier Drive/Tuscany Dr. And McMahon Storm Drain Systems: (Portions constructed with Tuscany #1, #2, and #3 and Paloma Del Sol projects)												
Future Developments -- Off-site to Tuscany #1, #2, and #3												
101	0.0046	---	0.0046	12	---	5	5	90	12.5		12.5	
100	0.0035	101	0.0081	12	---	5	5	90	9.5		22.0	
Q on S/S McMahon Blvd. At Point #1												
100.1	0.0035	100	0.0116	12	---	5	5	90	9.5		31.6	
105	0.0183	100.1	0.0299	12	---	30	30	40	38.2		69.8	
Total Q at Point #1; Q100 = 69.8CFS: Divide Q 40 CFS to McMahon and 29.8 CFS to Tuscany Drive												
116	0.0007	105D	-----	12	---	5	5	90	1.9		31.7	
111	0.0044	116	0.0199	12	---	20	20	60	10.3		42.0	
110	0.0007	111	0.0206	12	---	5	5	90	1.9		43.9	
115	0.0146	110	0.0352	12	---	21	22	57	33.7		77.6	
Total Q at Point #2 - Q100 = 83.7 CFS												
125	0.0090	115	0.0442	12	---	29	29	42	19.0		94.5	
Tuscany Dr. Q A TN/S Bandelier Drive Point #3 Q100 = 94.5 CFS												
Future Off-Site Developments - N/S Bandelier Dr. (P.H. #2):												
155	0.0131		0.0131	12		30	30	40	27.4		27.4	
506	0.0003		0.0003	12		5	5	90	0.8		28.2	
156	0.0082	506	0.0085	12		30	30	40	17.1		45.3	
157	0.0032	506 & 155	0.0248	12		30	30	40	6.7		52.0	
Total Q at Bandelier Drive in Hillside Drive - Q100 = 52.0 CFS												

TABLE 1
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)
150.1	0.0006	-----	0.0006	12	---	5	5	90	1.7		1.7	
150	0.0006	150.1	0.0012	12	---	5	5	90	1.7		3.3	
520	0.0029	-----	0.0041	12	---	30	30	40	6.1		6.1	
462	0.0031	-----	0.0072	12	---	30	30	40	6.5		6.5	
154	0.0029	150 &	0.0101	12	---	30	30	40	6.1		21.9	
		520 & 462										
160	0.0012	154 & 157	0.0301	12	---	5	5	90	3.3		75.6	
Q at Point #4 -- Q100 = 75.6 CFS												
Future developments - Off-site N/S Bandelier (Lds of Lincoln)												
605	0.0018	-----	0.0018	12	---	50	50	---	2.9		2.9	
610	0.0060	605	0.0078	12	---	20	20	60	14.1		16.9	
615	0.0026	610	0.0104	12	---	20	20	60	6.1		23.0	
635	0.0018	615	0.0122	12	---	20	20	60	4.2		27.2	
600	0.0019	-----	0.0019	12	---	50	50	---	3.0		3.0	
620	0.0079	600	0.0098	12	---	20	20	60	18.5		21.5	
625	0.0023	620	0.0121	12	---	20	20	60	5.4		26.9	
630	0.0032	625	0.0153	12	---	20	20	60	7.5		34.4	
640	0.0012	630	0.0165	12	---	20	20	60	2.8		37.2	
645	0.0009	635 & 640	0.0296	12	---	20	20	60	2.1		66.6	
Total Q at N/S Bandelier Drive @ Sicily - Q100 = 66.6 CFS												
170	0.0009	160 & 645	0.0606	12	---	5	5	90	2.5		143.7	
265	0.0025	170	0.0631	12	---	29	29	42	5.3		143.5	
180	0.0006	265 & 125	0.1079	12	---	5	5	90	1.7		239.6	
Total Q at Point #3 in Bandelier Drive : Q100 = 239.60CFS												
260	0.0005	180	0.1084	12	---	5	5	90	1.4		240.2	
255	0.0007	260	0.1091	12	---	29	29	42	1.5		241.6	
252	0.0090	255	0.1191	12	---	29	29	42	19.0		260.1	
250	0.0010	252	0.1191	12	---	5	5	90	2.7		263.5	
Total Q in Bandelier Drive @ W/S Sorrento: Q100 = 263.5 CFS												
Future Off-Site Developments:												
205	10.0006	-----	0.0006	12	---	15	15	70	1.5		1.5	
210	0.0027	205	0.0033	12	---	15	15	70	6.7		8.2	
Tuscany Unit #2 Development:												
215	0.0095	210	0.0128	12	---	29	29	42	20.1		27.3	
195	0.0022	215	0.0150	12	---	5	5	90	6.0		33.1	
220	0.0007	195	0.0157	12	---	5	5	90	1.9		35.3	
200	0.0013	220	0.0170	12	---	46	47	7	2.2		37.5	

**TABLE I
EXISTING DEVELOPMENT CONDITIONS**

Basin I.D.	Area (Sq.Mi.)	Contr. Basin	Sum Area (Sq.Mi.)	Tc (Min.)	LAND TREATMENT				INCREMENTAL		FUTURE TOTAL	
					A	B	C	D	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
230	0.0063	200	0.0233	12	---	29	29	42	13.3	-----	50.4	-----
Q in Bandelier Dr. @ Vecchio - Q100 = 50.4 CFS												
Future & Ex. Development - Off-Site (Commercial)												
225	0.0076	-----	0.0076	12	---	5	5	90	20.7	-----	20.7	
240	0.0077	225	0.0153	12		29	29	42	16.3		36.2	
235	0.0007	240 & 250	0.1584	12		5	5	90	1.9		347.22	
Total Q at Sump, Pt. - Outfall #1 (constructed with Tuscany #1) Q100 = 347.2 CFS												
Drainage areas to McMahon Blvd. Storm drain systems: (constructed with Tuscany and Paloma del Sol Projects).												
Future D.A.'s of McMahon Blvd. --- N/S												
185.1	0.0024	-----	0.0024	12	---	5	5	90	6.5	----	6.5	----
305	0.0015	185.1	0.0039	12	---	5	5	90	4.1	----	8.7	----
300	0.0018	305	0.0057	12	---	5	5	90	4.9	----	13.4	
310	0.0012	300	0.0069	12	---	5	5	90	3.3	----	16.6	
315	0.0093	310	0.0162	12	---	30	30	40	19.4	----	35.8	
320	0.0021	315	0.0183	12	---	5	5	90	5.7	----	35.2	
325	0.0030	320	0.0213	12	---	5	5	90	8.2	----	42.7	
335	0.0259	325	0.0472	12	---	30	30	40	54.1	----	87.6	
330	0.0012	335	0.0484	12	---	5	5	90	3.3	----	90.8	
At Sump, Pt. Total Q in N/S of McMahon Blvd. - Q100 = 90.8S												
Future & Ex. Development on south/side McMahon:												
185	0.0024	(40 CFS From 105)		12	---	5	5	90	6.5	----	46.5	
190	0.0014	185	0.0372	12	---	5	5	90	3.8	----	49.2	
295	0.0021	190	0.0393	12	---	5	5	90	5.7	----	49.9	
350	0.0012	295	0.0405	12	---	5	5	90	3.3	----	51.6	
At Sump Pt. Total Q on South Side McMahon Blvd. - Q100 = 49.1												
350	-----	&330	0.0889	----	---	---	---	---	---	----	136.4	-----
Total Q100 at Sump Point in McMahon Blvd. = 136.4												

TABLE I
EXISTING DEVELOPMENT CONDITIONS

					LAND TREATMENT				INCREMENTAL		FUTURE TO	
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)
McMahon Blvd. - Discharge to Golf Course Road:												
340	0.0034	----	0.0034	12	----	5	5	90	9.3	----	9.3	----
355	0.0033	340	0.0067	12	---	5	5	90	9.0	----	18.2	----
345	0.0032	355	0.0099	12	---	5	5	90	5.7	----	23.9	----
Q to G.C Road --Future S.D. System by others												
Paloma Del Sol Project (Tr. 1 A of Paradise North)												
360	0.0562	350	0.1451	12	----		23.5	53	126.5	-----	253.8	----
Total Q discharged to arroyo via outfalls constructed with Paloma Del Sol - Q100 = 253.8CFS												
Tuscany Unit #1 -- As constructed:												
270	0.0096	---	0.0096	12	---	27	27	46	20.8	----	20.8	----
275	0.0076	270	0.0172	12	---	27	27	46	16.5	----	34.8	----
280	0.0122	275	0.0294	12	---	27	27	46	26.4	----	57.6	----
Total Q discharged at outfall #2 (constructed) Q100 = 57.6 CFS												

TABLE 2
STREET FLOW CHARACTERISTICS

STREET	WIDT H	CURB TYPE	LOCATION	SLOPE %	Q	Dn	Dc	Vn	Vc	EG	F	*POOL DEPTH
BANDELIER	40 FT	STND		1.00	31.50	0.51	0.53	3.30	2.98	0.67	1.19	0.70
BANDELIER	40 FT	STND		2.28	58.10	0.54	0.67	5.40	3.63	0.99	1.84	0.93
BANDELIER	40 FT	STND		0.60	49.51	0.63	0.63	3.45	3.40	0.81	1.00	0.85
BANDELIER	40 FT	STND		0.06	57.93	0.66	0.67	3.61	3.63	0.87	1.01	0.93
BANDELIER	40 FT	STND		0.06	37.93	0.57	0.58	3.06	3.16	0.72	0.97	0.77
BANDELIER	40 FT	STND		1.93	33.00	0.46	0.54	4.18	3.03	0.68	1.62	0.72
TOSCA	25 FT	MNT		0.50	6.54	0.28	0.30	1.71	2.05	0.35	0.78	0.38
AIDA	25 FT	MNT		2.75	6.00	0.22	0.27	3.03	2.00	0.37	1.91	0.35
LA TRAVIATA	25 FT	MNT		1.08	6.00	0.26	0.27	2.13	2.00	0.33	1.13	0.35
CARMEN	25 FT	MNT		3.14	9.00	0.25	0.31	3.51	2.26	0.44	1.95	0.41
FIGARO	28 FT	STND	ALL	0.50	57.60	0.74	0.72	4.04	3.91	0.98	0.96	1.02
CARMEN	27 FT	MNT		0.51	5.10	0.27	0.25	1.67	1.93	0.31	0.89	0.32
CARMEN	28 FT	STND		0.51	18.85	0.48	0.46	2.53	2.80	0.58	0.87	0.61
CARMEN	28 FT	STND		1.88	33.35	0.59	0.57	3.14	3.37	0.75	0.91	0.79
CARMEN	28 FT	STND		0.51	54.50	0.72	0.70	3.83	3.97	0.95	0.95	0.95
DON GIOVANNI	28 FT	STND		0.51	56.50	0.73	0.72	3.88	4.01	0.97	0.95	1.03

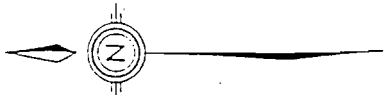
- POOL DEPTH = $D_c + 1.25 (V_c^2)/(2g)$

TABLE #3
NEW DRAINAGE BASINS AND
THE ORIGINAL MASTER DRAINAGE REPORT BASINS
- AREA COMPARISON -

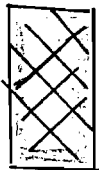
(New Number) Proposed Drainage Basin Numbers (Tuscany West)	(Old Number) Existing Drainage Basin Number (Per Master Drainage Report)
101	New
100.0 & 100.1	Same number and areas, no change
185.0 & 185.1	Same number and areas, no change
105	Same number and areas, no change
115 & 116	115
110, 111, 600 & portions of 605, 610 & 620	110
615, 625, 630, 635, 640, 645 & portions of 610 & 620	165 & 175
155, 156 & 157	Southerly portion of 155
400 & portion of 600	Northerly portion of 155
405, 410, 415, 420, 425 & 430	130
501, 505, 506 & 510	140
135.1 & 135	135
145.1 & 145	145 & 150
150.1 & 150	
285 & 290	Same number and areas, no change
291, 440, 445, 450, 455, 515, 520, 460, 462 & 154	292 & 152

Notes: (1) No changes to Tuscany #1, 2 & 3 Existing Basins (# 160, 170, 180, 260, 250, 235, 220, 200, 195, 215, 230, 240, 252, 125, 225, 210, 205, 270, 275, 280, 265 & 255) as outlined in Master Drainage Report. (2) No changes to basins in McMahon Blvd. And Paloma Del Sol as outlined in Approved Master Drainage Report. See attached Reference map, supplied from the approved Master Drainage Report for Tuscany Units 1,2 &3.

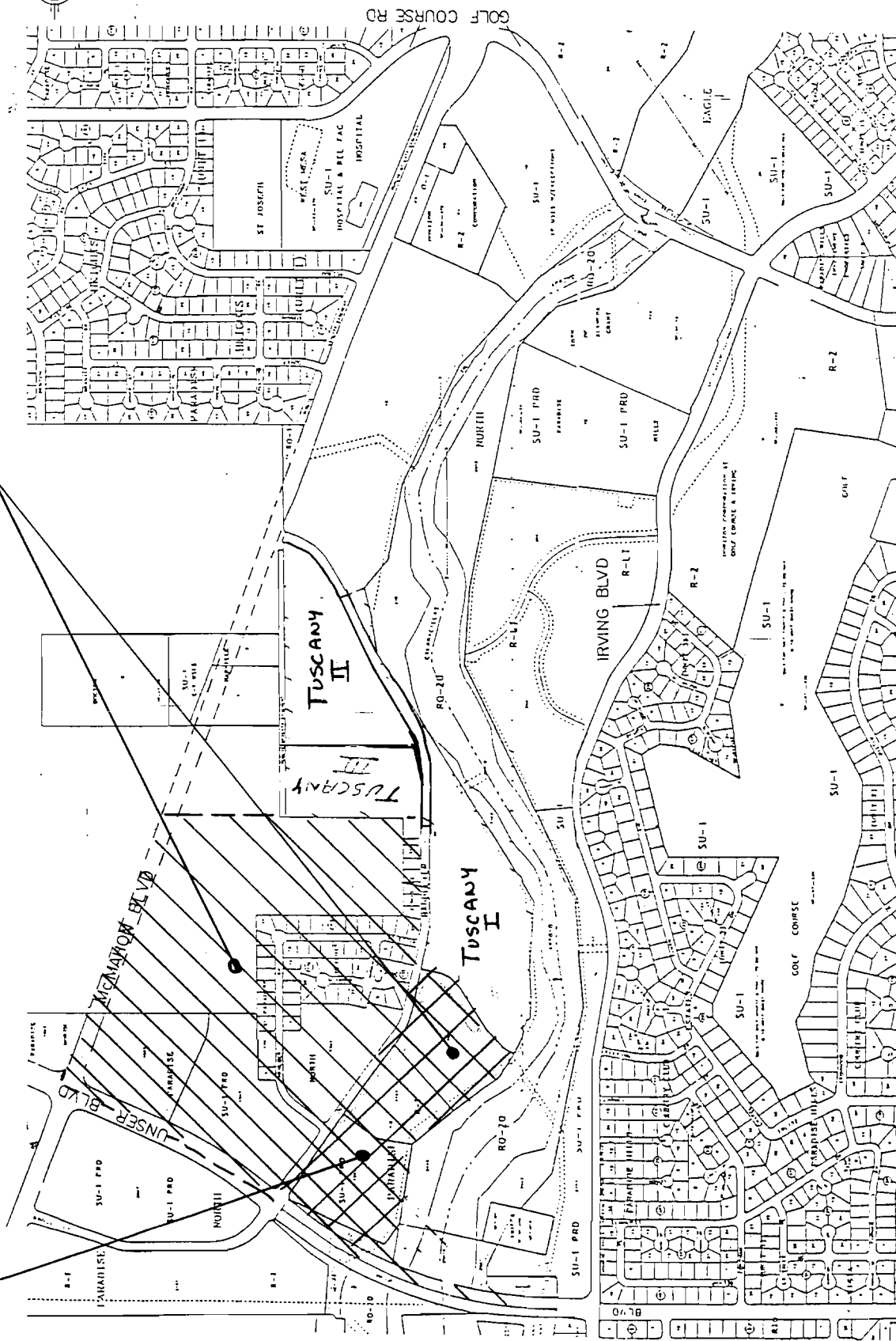
PLATE 1



ON-SITE
DRAINAGE AREAS
COVERED, THIS REPORT



SITE



VICINITY MAP
ZONE ATLAS A-11/12-2
NOT TO SCALE

APPENDIX B

HYDRAULIC CALCULATIONS

TABLE OF CONTENTS

- A. INLET CALCULATIONS (SUPPLIED AT FINAL DESIGN) & SCHEMATIC (PRELIMINARY)**
- B PIPE CAPACITY CALCULATIONS AND SKETCH (ROUGH)**
- C. FLOW IN RIGHT-OF-WAYS (HEC-2) CALCULATIONS (PRELIMINARY)**
- D. POND CALCULATIONS//AHYMO RUN**
- E. SCOUR CALCULATIONS**
- F. H.G.L. CALCULATIONS (SUPPLIED AT FINAL DESIGN)**
- G. TABLES & CALCULATIONS FOR TUSCANY SUBDIVISION**

TUSCANY WEST #1 & 2

291-18-030

ROUGH SIZING OF PIPESASSUME PIPES FULL & $S_f = S_o$ For

$$Q = 180.6 \text{ CFS} \quad @ \quad S_o = 1.0\%$$

$$K = Q / S_o^{5/2} = 1806 \quad \therefore \text{USE } 1967 = K \\ = 54" \text{ RCP MIN.}$$

$$* \text{ For Sum } Q = 207.2 \quad @ \quad S_o = 1.0\% \\ K = 2072 \text{ (CALC)} \quad \therefore \text{USE } 2604 = K \\ = \underline{\underline{60" \text{ RCP}}}$$

For

$$Q = 79.2 \text{ CFS} \quad @ \quad S_o = 3\% \\ K = \frac{Q}{S_o^{5/2}} = 457.3 \quad \therefore \text{USE } K = 666.9 \quad \& \quad \underline{\underline{36" \text{ RCP MIN.}}}$$

For

$$Q = 131.8 \text{ CFS} \quad @ \quad S_o = 3.5\% \\ K = \frac{Q}{S_o^{5/2}} = 704.5 \quad \therefore \text{USE } K = 1006 \quad \& \quad \underline{\underline{42" \text{ RCP MIN.}}}$$

For

$$Q = 26.6 \text{ CFS} \quad @ \quad S_o = 0.5\% \\ K = \frac{Q}{S_o^{5/2}} = 376.2 \quad \therefore \text{USE } K = 490.9 \quad \& \quad \underline{\underline{30" \text{ RCP MIN.}}}$$

For

$$Q = 35.0 \text{ CFS} \quad @ \quad S_o = 0.5\% \\ K = \frac{Q}{S_o^{5/2}} = 495.0 \quad \therefore \text{USE } K = 666.9 \quad \& \quad \underline{\underline{36" \text{ RCP MIN.}}}$$

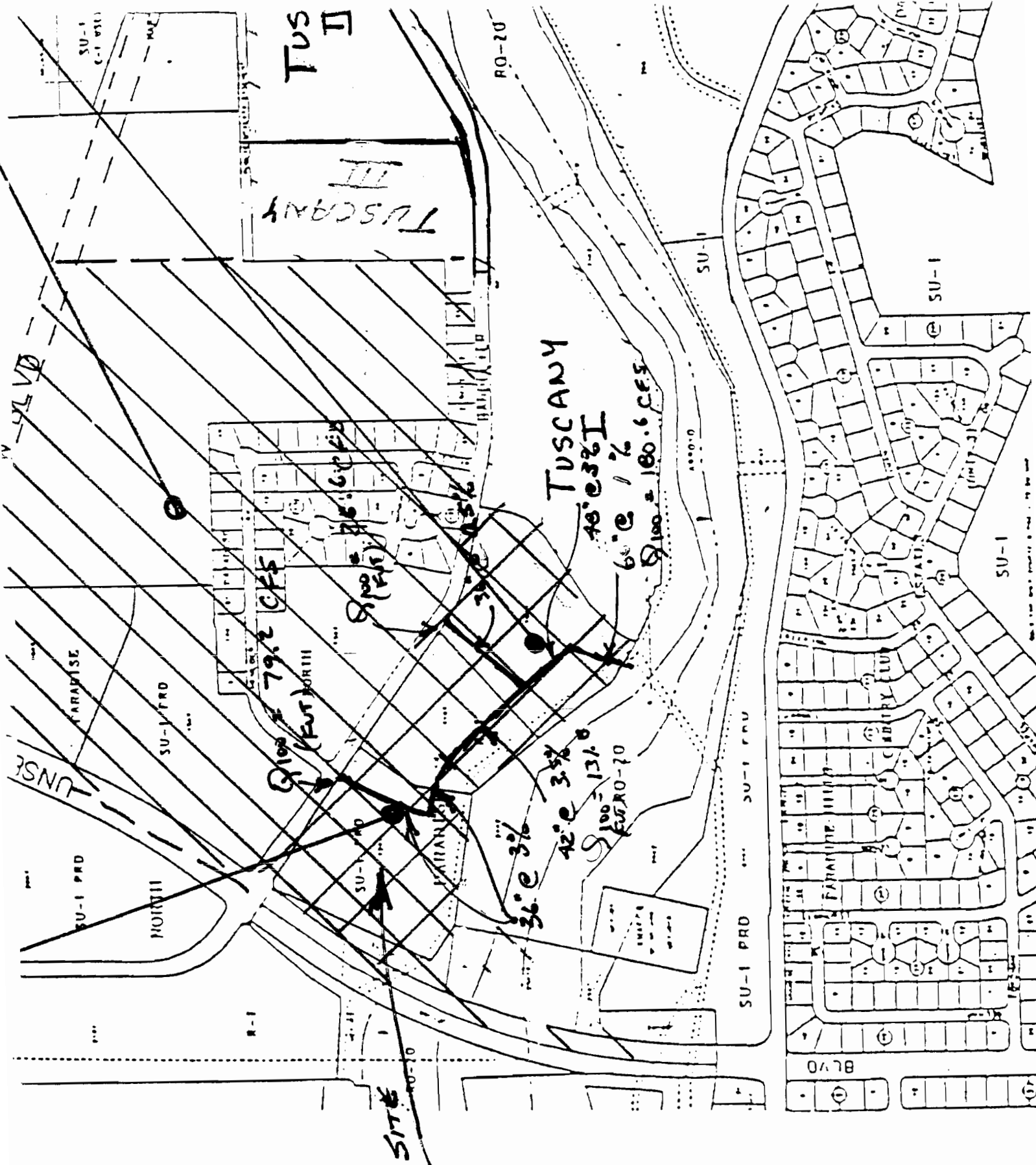
For

$$Q = 180.6 \text{ cfs}$$

$$S_o = 3.0\%$$

$$K = \frac{Q}{S_o^{1/2}} = 1042.7$$

\therefore USE $K = 1436$ / 48" RCP min



PROPOSED
STORM DRAIN

VICINITY MAP
ZONE ATLAS A-11/12-2
NOT TO SCALE

TUSCANY WEST #1 & #2TEMPORARY PONDS

CAPACITY DETERMINED BY EQ. 2-9 OF DPM SECTION 22.2.

$$V_{10d4} = V_{360} + A_D * (P_{10d4} - P_{360}) / 12 \text{ IN/FT.}$$

PROJECT IN ZONE #1; $P_{10d4} = 3.67$ & $P_{360} = 2.2 (+61A-2)$

ALL TEMPORARY PONDS WILL BE TAKING ONLY UNDEVELOPED Q'S (FLOWS) & NO IMPERVIOUS AREAS. THEREFORE $A_D = 0$, THUS THE VOLUMES ARE CALCULATED AS FOLLOWS:

$$V_{10d4} = V_{360} \quad (V_{360} \text{ IS TAKEN FROM AHYMO})$$

TEMPORARY POND PROPOSED WITH THIS DEVELOPMENT:

DA'S #130 & #140 WILL BE PONDED ON N/S BANDELIER DR. IN LOCATION, SHOWN APPROXIMATELY, ON DRAINAGE MAP (PLATE 2) (HYD #140 & 130)

$$V_{360} = V_{360}^{for \#140} + V_{360}^{for \#130} = \text{POND CAPACITY NEEDED}$$

$$V_{360} = 0.3137 \text{ AC-FT} + 0.7556 \text{ AC-FT} = 1.07 \text{ AC-FT}$$

$$V_{360} = 46,609.2 \text{ C.F. CAPACITY REQ'D}$$

TEMPORARY POND #3 - IN LOCATION PROPOSED WITH TUSCANY #3 GRADING PLAN - (HYD. #155, 165, 175 & 110)
DA'S #155, #165, #175 & #110 ONLY - TO BASIN (TEMP.) TO BE LOCATED N/S BANDELIER DR, OPPOSITE SICILY RD.

$$V_{360} = V_{360}^{for \#155} + V_{360}^{for \#165} + V_{360}^{for \#175} + V_{360}^{for \#110} = \text{POND CAPACITY}$$

$$V_{360} = 0.8838 + 0.2346 + 0.2319 + 0.5288 = 1.88 \text{ AC-FT}$$

$$V_{360} = 81,892.8 \text{ C.F. CAPACITY REQ'D.}$$

2/2

TUSCANY WEST #1 & #2

TEMPORARY POND ON TUSCANY #1 BORROW SITE:

(TEMP. POND #3 IN MASTER DRAINAGE REPT.) (HYD. #115)

THIS POND HAS BEEN CONSTRUCTED WITH TUSCANY UNIT #1, NORTH OF NLY $\frac{1}{2}$ OF TUSCANY #3. (DA #115)

$$V_{360} = V_{360}^{(for \#115)} = 0.4515 \text{ AC-FT} = \text{POND CAPACITY}$$

$$V_{360} = 19,667.3 \text{ C.F. CAPACITY REQ'D.}$$

POND CONSTRUCTED HAS CAPACITY = 76,000 C.F.
(PREVIOUS REQ'D DESIGN INCLUDED D.A. #110 too)

TEMPORARY POND #5 OF MASTER DRAINAGE REPORT, HAS BEEN CONSTRUCTED ON N/S McMAHON BLVD. OPPOSITE BANDELIER DRIVE.

$$\text{POND \#5 (HYD \#315.1)} \quad V_{360} = 0.3804 \text{ AC. FT} = 16,570 \text{ C.F.}$$

$$\text{POND CONSTRUCTED VOLUME} = 20,000 \text{ C.F.}$$

SUMMARY:

PONDS DESIGNED/CONSTRUCTED WILL HAVE MINIMUM CAPACITY CALCULATED. PONDS ARE SHOWN ON GRADING PLAN:

	<u>Calcd Vol.</u>	<u>Design Vol.</u>
POND w/ THIS Project	46,609 C.F.	70,000 C.F.
POND w/ TUSCANY #3	81,892 C.F.	100,000 C.F.

	<u>Calcd Vol.</u>	<u>Const. Vol.</u>
CONSTRUCTED POND #3	19,667 C.F.	76,000 C.F.
CONSTRUCTED POND #5	16,570 C.F.	20,000 C.F.

* ALL HYDRO CALCULATIONS SAME AS THOSE USED FOR TUSCANY MASTER DRAINAGE REPT., A COPY IS ATTACHED.

1/1

TUSCAN 4 WEST #1 & 2

291-13-030

LOCAL SCOUR @ BUFFALL

$$Q_{100} = 198.1 \pm \text{CFS} \quad \text{if } D = 72'' = 6'$$

$$t = 30 \text{ MIN}$$

$$t_0 = 316$$

$$\frac{h_s}{D} = \alpha \left(\frac{Q}{\sqrt{g} D^{5/2}} \right)^{\beta} \left(\frac{t}{t_0} \right)^{\gamma}$$

$$h_s = \left[2.72 \left(\frac{198.1}{\sqrt{32} (6)^{5/2}} \right)^{0.375} \left(\frac{30}{316} \right)^{0.10} \right] 6'$$

$$h_s = \underline{4.76'}$$

1/4

TUSCANY W20 + #1 & 2
SCOUR CALCULATIONS:

10-27-96
 TJB
 291-13-030

PER SECTION 3.5.4, "SCOUR ALONG A FLOODWALL,"
 IN THE "SEDIMENT AND EROSION DESIGN GUIDE,"

THE FOLLOWING ARE FORMULAE USED:

• FOR VERTICAL WALL — (P)

$$(0.73)Y = Y_s$$

| SECT. 3.5.4 (EQ. 3.28 SIM)

• FOR PARALLEL FLOWS —

$$\frac{Y_s}{Y} = 0.73 + 0.14 F_r^2 \quad | \quad (\text{EQ. 3.83}) (F_r = F_{\text{CRUDS}} \#)$$

• FOR "ATACK" AT AN ANGLE (θ) —

$$\frac{Y_s}{Y} = (0.73 + 0.14 F_r^2) \cos \theta + 4 F_r^{0.33} \sin \theta \quad | \quad (\text{EQ. 3.90})$$

THE REACH ADJACENT TO PROPOSED
 OUTFALL STRUCTURE IS SHOWN IN
 SECTION 59+39 (of this Report) and IS
 A VARIANT OF SECTION 65+19 (OF ORIGINAL
 ESB Report DATED 6/95)

THE OUTFALL REACH IS TO BE ANALYZED
 FOR THE DOMINANT STORM EVENT,
 $Q_D = 2500 \text{ CFS}$, AND FOR THE 100 YR
 STORM EVENT, $Q_{100} = 12,500 \text{ CFS}$.

2/4

TUSCANY WEST - SCOUR (CONT.)

10-27-96/TJB
291-18-030

@ OUTFALL (JUST 25' UPSTREAM of SECTION 59+39)
 \therefore USE 59+39 DATA:

$$Q_D = 2,500 \text{ CFS}$$

$$F_r = 0.96$$

$$Y = 2.30'$$

@ SUBCRITICAL FLOW
 FOR THIS REACH

$$* Q_{100} = 12,500 \text{ CFS}$$

$$F_r = 1.00$$

$$Y = 6.25'$$

@ SUBCRITICAL FLOW
 $\hat{F}_r = 1.01$
 $Y = 6.24'$

@ SUPERCRITICAL FLOW

* 100 YR STORM APPEARS TO BE RUNNING @ CRITICAL
 FOR THIS REACH, \therefore USE $F_r = 1.00$ & $Y = 6.25'$

FOR VERTICAL WALL -

$$\text{for } Q_D : Y_s = 0.73(2.3') = \underline{1.68'}$$

$$\text{for } Q_{100} : Y_s = 0.73(6.25') = \underline{4.56'}$$

FOR PARALLEL FLOW -

$$\text{for } Q_D : Y_s = [.73 + .14\pi(.96)^2] \times 2.30' = \underline{2.61'}$$

$$\text{for } Q_{100} : Y_s = [.73 + .14\pi(1.00)^2] \times 6.25' = \underline{7.31'}$$

FOR "ATTACK" @ AN ANGLE - TRY $\theta = 45^\circ$ & $\theta = 30^\circ$

$$\text{for } Q_D : \theta = 45^\circ ; \cos 45 = 0.71 ; \sin 45 = 0.71$$

$$Y_s = [.73 + .14\pi(.96)^2] \cos 45 + 4(.96)^{0.33} \sin 45 \times 2.30'$$

$$Y_s = \underline{8.30'} \quad (\theta = 45^\circ)$$

3/4 TOSCANY WEST SCOUR (CONT.)

10-27-96/TJB
291-18-030

for Q_D ; $\theta = 30^\circ$; $\cos 30^\circ = 0.50$; $\sin 30^\circ = 0.87$

$$Y_s = [1.73 + .14\pi(1.96)^2] \cos 30^\circ + 4(1.96)^{0.33} \sin 30^\circ \times 2.30' =$$

$$Y_s = \underline{8.24'} (\theta = 30^\circ)$$

for Q_{100} ; $\theta = 45^\circ$

$$Y_s = [1.73 + .14\pi(1.00)^2] \cos \theta + 4(1.00)^{0.33} \sin \theta \times 6.25' =$$

$$Y_s = \underline{22.94'} (\theta = 45^\circ)$$

for Q_{100} ; $\theta = 30^\circ$

$$Y_s = [1.73 + .14\pi(1.00)^2] \cos \theta + 4(1.00)^{0.33} \sin \theta \times 6.25' =$$

$$Y_s = \underline{25.41'} (\theta = 30^\circ)$$

CONCLUSIONS:

Bank Riprap & OUT FALL STRUCTURE IS OK FOR Dominant & 100 yr Storm Events, except for ANGULAR ATTACK. Parallel Flow is ANTICIPATED IN THIS REACH & will be Assured in FUTURE, when ALL Bank Protection, CITED IN ESB REPORT (DATED 8/95), is INSTALLED. UNDER EXISTING & PROPOSED CONDITIONS, per this Report & Subdivisions, the

4/4 TUSCANY West Scour (Cont.)

10-27-96/TJB
291-18-030

STEEPNESS OF THE BANKS WILL CONTAIN THE FLOWS AND "ENCOURAGE" PARALLEL FLOW TO THE PROPOSED OUTFALL STRUCTURES. ANGULAR ATTACK IS A MINIMAL RISK IN THIS SITUATION.

THE PROPOSED RAP-RAP AND OUTFALL STRUCTURE (SOIL CEMENT) WILL BE EMBEDDED A MINIMUM OF 6' BELOW THE EXISTING ARROYO BOTTOM/FLOWLINE, THIS SHOULD BE ADEQUATE TO ARREST SCOUR POTENTIAL. THE 5:1 SLOPE OUT INTO THE CHANNEL/ARROYO OF THE STRUCTURES WILL ALSO SERVE TO LIMIT SCOUR POTENTIAL.

AGREEMENT

**CLIENT AGREEMENT
WITH AMAFCA**

THIS AGREEMENT is made as of the 30th day of November, 1994, by and between the ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY, a political subdivision of the State of New Mexico ("AMAFCA") and CURB, INC., a New Mexico corporation ("Developer" which term includes successor owners of the property).

RECITALS:

1. Developer is the contract purchaser of the following described property, located in Bernalillo County, New Mexico (the "Property"):

Tracts numbered 5A, 6A, 8A, 9A, 10A-1, 11A-1, 12A-1, 13A-1, 14A and 15A-1 of PARADISE NORTH situate within the Town of Alameda Grant, City of Albuquerque, Bernalillo County, New Mexico, as the same is shown and designated on the vacation, amended plat and replat of said subdivision filed in the Office of the County Clerk of Bernalillo County, New Mexico, on August 9, 1990, in Map Book 90C, Folio 182

Lots 31 thru 39, inclusive, and Lots 53 thru 55, Block 6, Lot 9, Block 12, and Lots 8, 9, 23, 24 and 26, Block 13, of Paradise Heights Unit Two situate within the Town of Alameda Grant, City of Albuquerque, Bernalillo County, New Mexico, 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 May 7, 1968, in Map Book D3, Folio 199

Lots 1 thru 8, inclusive, in Block 12, of Paradise Heights Unit Two situate within the Town of Alameda Grant, Albuquerque, Bernalillo County, New Mexico, 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 March 28, 1980, in Map Book C16, Folio 125

Lot 9, Block 12, of Paradise Heights Unit Two situate within the Town of Alameda Grant, Albuquerque, Bernalillo County, New Mexico, 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 March 28, 1980, in Map Book C16, Folio 125, less and except Lot 9, Block 12, of Paradise Heights Unit Two situate within the Town of Alameda Grant, City of Albuquerque, Bernalillo County, New Mexico, 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 May 7, 1968, in Map Book D3, Folio 199

2. Developer intends to subdivide the Property into single family residential subdivisions (the "Subdivisions");

3. The southern boundary of the Property is a line adjacent to the Calabacillas Arroyo (the "Arroyo"), up to which development was considered prudent as determined by the April 11, 1983 report entitled "Erosion Study to Determine Boundaries for Adjacent

Development - Calabacillas Arroyo - Bernalillo County, New Mexico
by Simons-Li and Associates (the "SLA Line");

4. The SLA Line was established by 1980 vintage methodology, and based on twenty-five (25) years of typical storm events, or one 100-year storm.

5. Developer is purchasing the Property from MCO Properties L.P., a Delaware limited partnership, an entity related to the Horizon Corporation, a Delaware corporation ("Horizon");

6. Horizon dedicated easements to AMAFCA, replatted its properties, and has priced and contracted to sell its properties in reliance upon the SLA Line;

7. Criteria for erosion setback lines have changed, and are now based on current methodology, and more significantly on thirty (30) years of typical storm events, plus one 100-year storm.

8. The Developer has expended a substantial sum of money and effort to re-evaluate the potential for additional erosion for the portion of the Arroyo adjacent to the Property. As a result of the changes in the criteria for establishing the prudent line for development, the construction of the Swinburne Dam, and other factors, in order to preserve the SLA Line adjacent to the Properties, certain drainage improvements will need to be constructed within the Arroyo, which are anticipated to consist of the following (the "Drainage Improvements"):

- (a) Three (3) grade control structures within the stretch of the Arroyo adjacent to the Property (the "Grade Control Structures");

(b) Approximately 1300 feet of soil cement bank protection on the north side of the Arroyo (the "Bank Protection").

9. The Grade Control Structures have been tentatively programmed to be constructed by AMAFCA in 1999; AMAFCA has not programmed an expenditure for the Bank Protection, the cost of which is estimated to be \$325,000.00; and

10. The Developer has agreed to make a contribution towards the construction of the Bank Protection to preserve the SLA Line.

NOW, THEREFORE, the parties agree as follows:

1. Preservation of SLA Line: AMAFCA agrees that it will approve development of the Property up to the SLA Line subject to the Developer's consulting engineer providing a drainage report acceptable to AMAFCA which demonstrates that:

1.1 The SLA Line will be preserved, assuming the construction of the Drainage Improvements, and based upon analysis using thirty (30) years of typical storm events and one 100 year event criteria;

1.2 The portion of the Property to be developed is at least 25 feet outside of the erosion limits which would result from the occurrence of a one hundred year flood event as of the date of this Agreement without the construction of the Drainage Improvements, or outside the SLA Line, whichever is greater. The location of said 25-foot line shall be visibly marked in the field to AMAFCA's satisfaction.

2. Construction of Drainage Improvements: AMAFCA agrees to

construct the Drainage Improvements, when determined necessary and/or desirable by AMAFCA. -In the event that subsequent analysis by AMAFCA indicates that the Drainage Improvements need not be constructed, or that different drainage improvements shall be constructed, then AMAFCA shall have the right to elect not to build the Drainage Improvements or to build different drainage improvements.

3. Developer Contribution. Developer agrees to pay to AMAFCA the sum of \$200,000.00 as its contribution towards the cost of the Drainage Improvements (the "Developer Contribution"). \$100,000.00 shall be paid upon the sooner of (i) April 1, 1995, or (ii) upon request of final sign-off by AMAFCA of the first subdivision of a portion of the Property. The additional \$100,000.00 shall be paid upon the sooner of (i) October 1, 1995, or (ii) upon request of final sign-off by AMAFCA of the second subdivision of a portion of the Property. AMAFCA shall be under no obligation to grant final sign-off of any subdivision of portions of the Property south of Bandelier Road unless either (i) all of the Developer Contribution has been paid, or (ii) any deferral of the Developer's Contributions has been secured to the satisfaction of AMAFCA.

4. Protection of Simons-Li Line. AMAFCA agrees to provide such maintenance as is required to protect the SLA Line where it is adjacent to the Property.

5. Subdivision Improvements. Storm water outfalls and protection of the Arroyo bank associated with the outfalls shall be

located, designed and built to AMAFCA's satisfaction.

6. Resolution of Disputes. Disputes under this Agreement will be referred to binding arbitration under the provisions of the New Mexico Uniform Arbitration Act.

7. Assignment. This Agreement may not be assigned by either party without the written consent of the other party, which consent shall not be unreasonably withheld. However, AMAFCA consents to the sale of portions of the Property to The Presley Companies, a California corporation, or another developer (the "Successor"), and to the assumption by the Successor of obligations hereunder. The sale to Presley shall not relieve the Developer or the Property of its obligations hereunder.

8. Governing Laws. Except as otherwise specifically provided herein, this Agreement shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico.

9. Notices. All notices with respect to this agreement shall be in writing and shall be delivered personally, sent via confirmed telefax, or sent postage prepaid by United States Mail, certified mail, return receipt requested, to the addresses set forth below or such other addresses as hereafter specified in writing by one party to the other:

Albuquerque Metropolitan Arroyo Flood Control Authority
2600 Prospect Avenue, NE
Albuquerque, New Mexico 87107

Curb, Inc.
Attn: Mr. Charles Haegelin, President
6301 Indian School Road, NE
Suite 680
Albuquerque, New Mexico 87110

10. Entire Agreement. This Agreement contains the entire agreement between the parties hereto and all prior understandings, oral or in writing, by the parties hereto with respect to this agreement. No variations, modifications, supplements, waivers or changes herein or hereof shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

11. Severability. If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provisions to other persons or circumstance shall not be affected thereby and such provisions shall be enforced to the greatest extent permitted by law.

12. Attorneys Fees. In the event any action is instituted by any party for the purpose of enforcing or interpreting any provision of this Agreement, the prevailing party in such action shall be entitled to its reasonable attorney's fees and costs.

13. Binding Agreement. This Agreement shall inure to the benefit of and be binding upon the undersigned parties and their respective successors and assigns. Whenever in this Agreement a reference to Developer is made, such reference shall be deemed to include a reference to its successor owners of the Property.

14. Authority. Each individual signing for each of the parties hereunder, warrants and represents that he/she is an authorized agent of such party, on whose benefit he/she is executing this Agreement, and is authorized to execute the same.

16. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and said counterparts shall constitute but one and the same instrument which may sufficiently be evidenced by one counterpart.

ALBUQUERQUE METROPOLITAN ARROYO FLOOD
CONTROL AUTHORITY, a political subdivision
of the State of New Mexico

By: Wesley Cook
Its: Chairman

By: Charles A. Haegelin
Charles A. Haegelin
President

This instrument was acknowledged before me on December 1, 1994, by Daniel W. Cook, Chairman of the Albuquerque Metropolitan Arroyo Flood Control Authority, a political subdivision of the State of New Mexico.

Geraldine
Notary Public

May 22, 1995

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

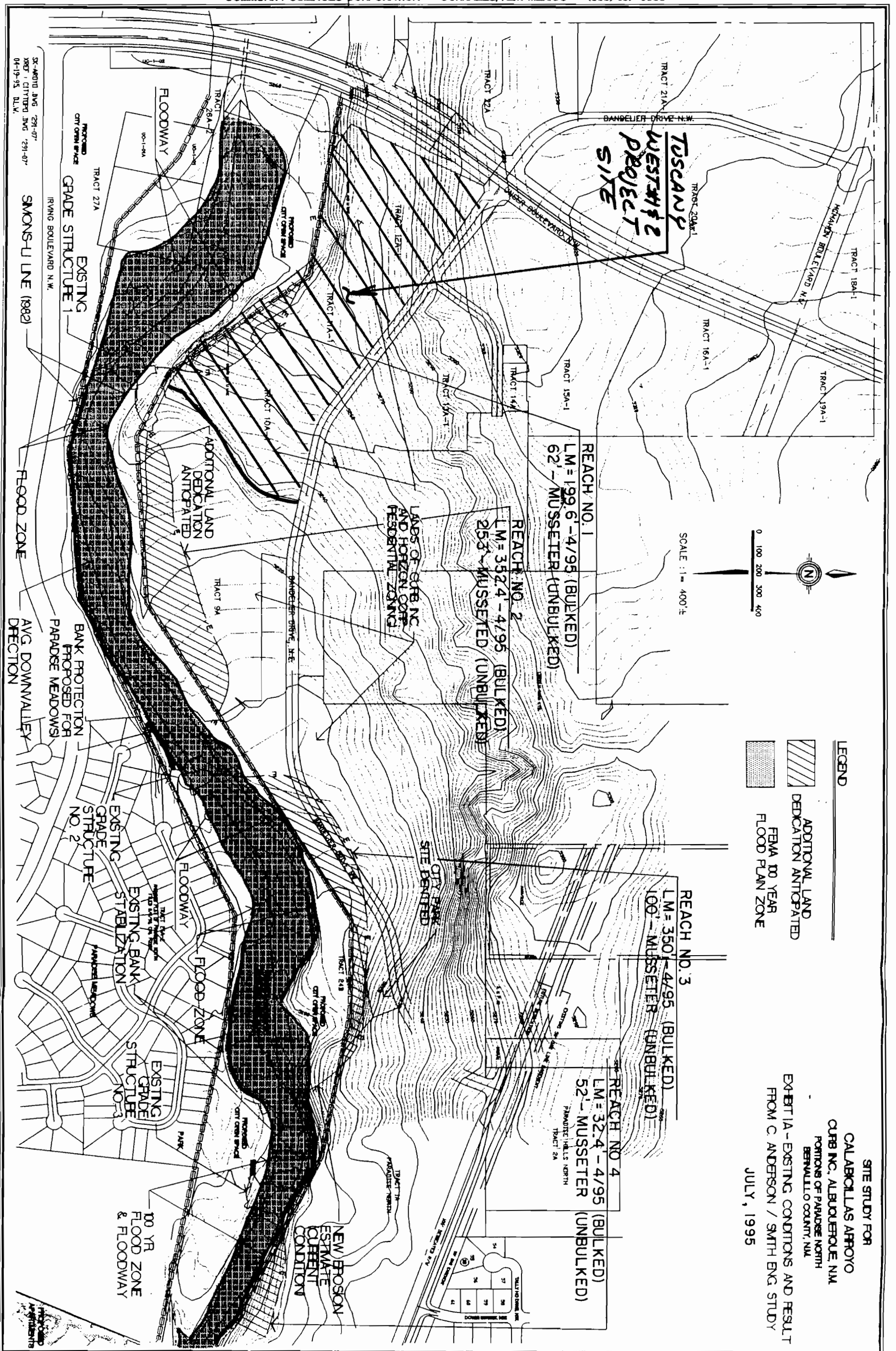
This instrument was acknowledged before me on November 30, 1994, by Charles A. Haegelin, President of Curb, Inc., a New Mexico corporation.

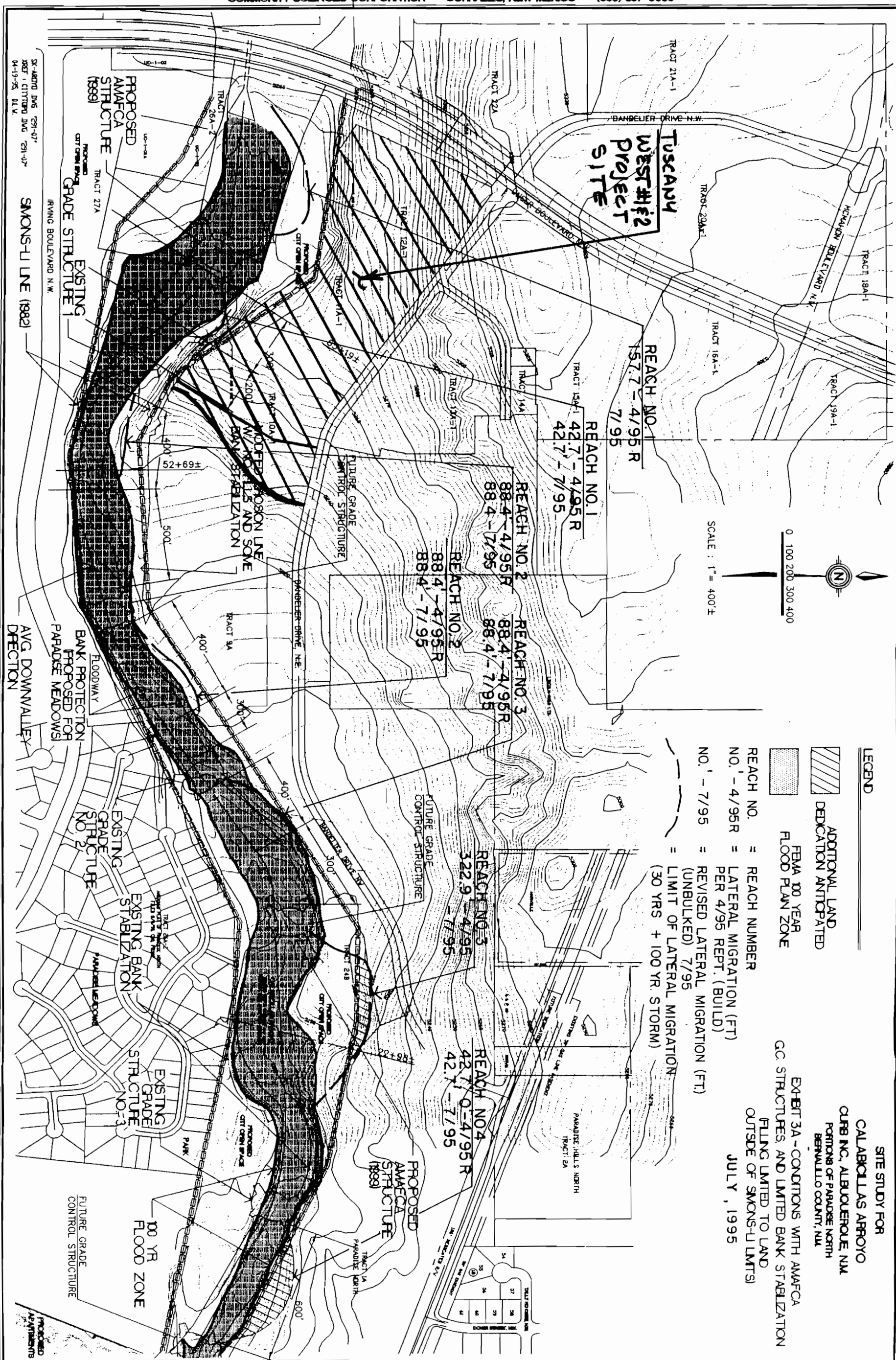
Lauren Lee Ward
Notary Public

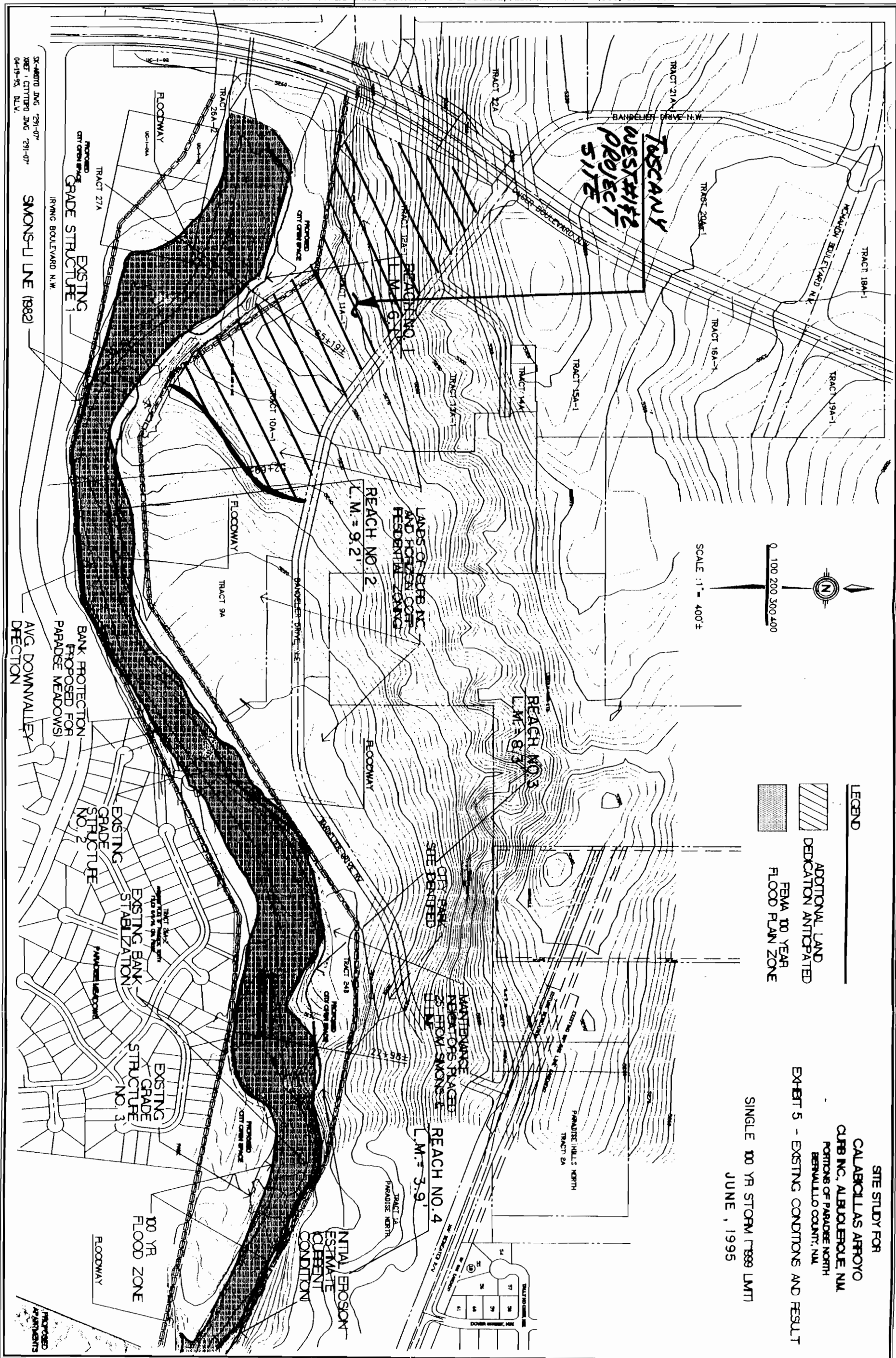
My Commission Expires:

11-13-97

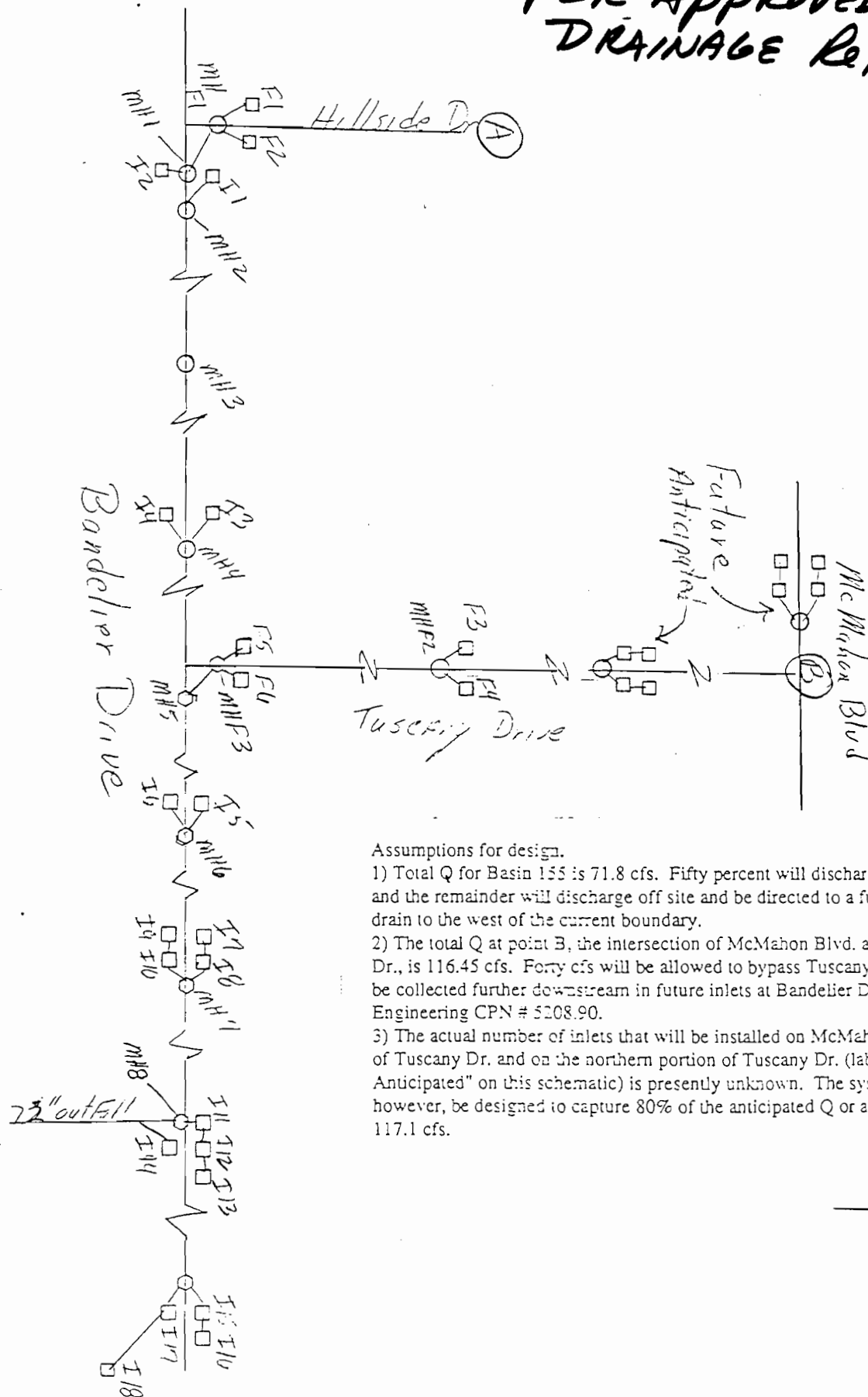
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STORM DRAIN System - INLET & HGL CALC.'S AS PER APPROVED MASTER DRAINAGE REPORT.



Assumptions for design.

- 1) Total Q for Basin 155 is 71.8 cfs. Fifty percent will discharge at point A and the remainder will discharge off site and be directed to a future storm drain to the west of the current boundary.
- 2) The total Q at point B, the intersection of McMahon Blvd. and Tuscan Dr., is 116.45 cfs. Forty cfs will be allowed to bypass Tuscan Dr. and will be collected further downstream in future inlets at Banelier Dr. per Smith Engineering CPN # 5208.90.
- 3) The actual number of inlets that will be installed on McMahon Blvd. west of Tuscan Dr. and on the northern portion of Tuscan Dr. (labeled as "Future Anticipated" on this schematic) is presently unknown. The system must, however, be designed to capture 80% of the anticipated Q or approximately 117.1 cfs.

CALCULATED BY _____

PROJECT

DESIGN FREQUENCY

DATE _____

DESIGN FREQUENCY										DATE
FLOW DIAGRAM (Indicate street slopes)										
Sym.	Drain Area	Q		Gap of Street	Gutter "d"	C.D.		Connector Pipe		V Depth
		Total	Inter.			No.	Size	Head	L	Dia.
Inlets		1+2	will take		Slows		From Hillside Ave			
And	a maximum of				10 cfs		From West on Bandelier			
1	See	15.75	8	7.75	.51					
2	Above	15.75	8	7.75	.51					
Note:	Surface	Slows	From north					add	42.6 cfs	
	to	15.5	cfs of bypass.				@ inlets		3+4=	58.1
3	165, 170 175, 180	29.05	11.5	17.55	.54					
4		29.05	11.5	17.55	.54					
	Total	bypass =	35.1				cfs.			

CATCH BASIN CALCULATION SHEET

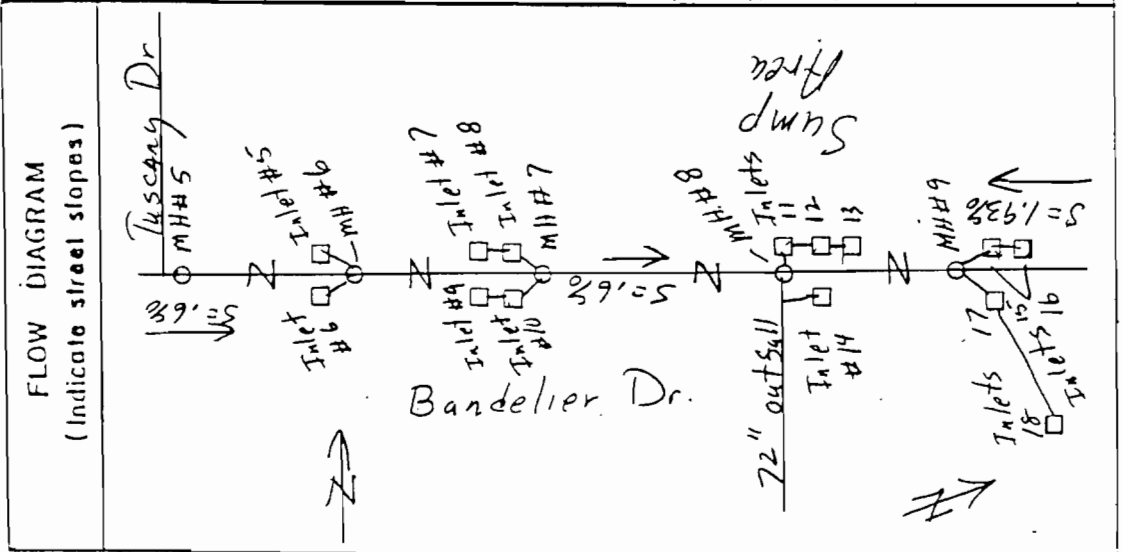
Shl. of _____

PROJECT _____

CALCULATED BY _____

DESIGN FREQUENCY _____

DATE _____



Sym.	Drain. Area	Q		Gap. of Steel	Gutter "d"	C.B.			Connector Pipe		V Depth
		Total	Inlet			No.	Size	Head	L	Dia.	
I5	Bypass from Tuscany I3+I4	24.75	9.6	15.15	.63						
I6		24.75	9.6	15.15	.63						
I7	Bypass 5+6 + Bypass 250, 252	28.96	10	18.96	.66						
I9	255	28.96	10	18.96	.66						
I8	Bypass 7	18.96	8.2	10.76	.57						
I10	Bypass 9	18.96	8.2	10.76	.57						
	Bypass to Sump										

PROJECT

CALCULATED BY

DATE _____

DESIGN FREQUENCY

FLOW DIAGRAM
(Indicate street slope)

$m_c m_{\text{Major}} \rightarrow 40 \text{ cfs}$

Please see note
concerning
Assumptions on
page 1.

$28 = 5$
 F_3
 F_4

Thurs May 19th

Diagram illustrating the forces acting on a block on an inclined plane. The forces shown are F_5 (normal force), F_6 (friction force), and F_7 (weight). The angle of the incline is 30° . The weight F_7 is decomposed into components $F_7 \sin 30^\circ$ and $F_7 \cos 30^\circ$.

Bardellier Drive

DESIGN FREQUENCY	FLOW DIAGRAM (Indicate street slopes)	Sym.	Drain Area	Q		Gap at Street	Gutter "d"	C.B.		Connector Pipe		V Depth
				Total	Inter.			No.	Size	Head	L	
	<p>Mc Mahon → 40 cfs</p> <p>76.45' ↓</p> <p>Please see note concerning assumptions on 29.92 page 1.</p> <p>F3 □ F4 □</p> <p>8% ↓</p> <p>8% ↓</p> <p>Tuscarora Dr.</p> <p>2</p> <p>F5 □ F4 □ MH #5</p> <p>5% ↓</p> <p>4% ↓</p>	F3		14.96	8	6.96	.37					
		F4		14.96	8	6.96	.37					
		F5	Bypass from F3 + F4 + Basin 125	16.2	9	7.2	.42					
		F6		16.2	9	7.2	.42					
			Total bypass			From Tuscarora Drive onto						
			Bandelier			14.4 cfs						

CATCH BASIN CALCULATION SHEET

22.3

Sht. of

CALCULATED BY

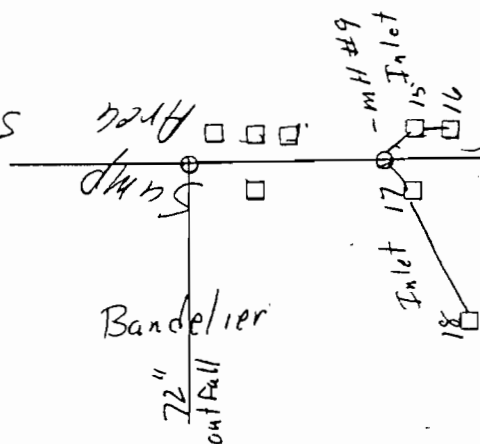
DATE

PROJECT

DESIGN FREQUENCY

FLOW DIAGRAM
(Indicate street slopes)

See attached calculations.



Sym.	Drain. Area	O	Cap. of 1/2 Street	Gutter "d"	C.B.			Connector Pipe		V Depth
					No.	Size		Head	L	
18	Park site	2.2	2.2							
17	Basins 215, 210 + 205	16.5	8.8	7.7		47				
16		16.5	8.8	7.7		47				
15	Bypass 16	7.17	5.3	2.44		37				
	Bypass to Sump					10.1	cf			

Sht. of -

PROJECT

DESIGN FREQUENCY

CALCULATED BY:

DATE _____

462

80

PLATE 22.3 D-10

DESIGN FREQUENCY		FLOW DIAGRAM (Indicate street slopes)		Bypass Cap-of Street									
Sym.	Drain Area	Q		Gutter "d"	C.B.		Connector Pipe		V Depth				
		Total	Inter.		No.	Size	Head	L.		Dia.			
Future Inlets													
Hillside Ave													
A water block													
the total basin Q													
Total surface flow													
is 35.9 cfs													
divided													
F1	155	17.95	7.2	10.75	.37								
F2	155	17.95	7.2	10.75	.37								

Flow Diagram (Indicate street slopes):

Hillside Ave (35.9 cfs) →

Water block →

4% slope

F1, F2, F MH

Bandelier Dr.

Calculations for Sump Basin on Bandeliee

Bypass from inlets to North-east 10.1 cfs

Bypass from inlets to West 21.5 cfs

Sky water from Basins 225, 230, 235, 240 50.3 cfs

Total Q @ Sump = 81.9 cfs

Assume equal distribution over 4 inlets $\Rightarrow 20.48$ cfs per inlet

Orifice calculation:

Area of orifice = 55% of gross area of grate
 $2 \times 7 \times .55 = 7.7 \text{ sq ft}$

$$V = Q/A = 20.48/7.7 = 2.66 \text{ cfs}$$

$$H = 1.2 V^2 / 2g = 1.2 (2.66)^2 / 64.4 = 0.132'$$

Assuming loss of 50% of Area $\Rightarrow V = 20.48/3.85$

$$H = 1.2 (5.32)^2 / 64.4 = .527'$$

$$V = 5.32 \text{ fps}$$

Weir Calculations: $Q = 2.7 L H^{3/2}$

Length of weir = 11'

$$20.48 = 2.7(11)(H^{3/2}) \Rightarrow H = .78'$$

Assuming loss of 50% of weir length.

$$20.48 = 2.7(5.5)(H^{3/2}) \Rightarrow H = 1.24'$$