HYDROLOGY

E17/D24

CLIFFORD PLAZA

E17-D40

2 PLANS

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

ENGINEERS & PHOTOGRAMMETRISTS

October 13, 1981

Mr. Charles Easterling
Principal Assistant City
Engineer – Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

RECEIVED
OCT 14 1981
CITY ENGINEER

RECEIVED
NOV 05 1981
ENGINEERING

Re: Conceptual Drainage Report for the Proposed Five-Acre Development on the Southwest Corner of Osuna and Kircher

Dear Chuck:

The purpose of this letter is to transmit the above-referenced conceptual drainage report for your review and comments. We anticipate the development plan for this project to be heard by the Environmental Planning Commission again in October or November, 1981. Your comments concerning drainage will greatly aid EPC in arriving at their decision. As a reference document for flows in Osuna and Kircher, we would like to refer you to our drainage study for the Interstate Industrial Tract submitted along with this conceptual report.

PROTECTION AGAINST UPLAND FLOWS

The flows in Kircher and Osuna were identified in the above-referenced report. In order to protect the site from flows in the adjoining streets, it is recommended that the berms along the streets and water blocks in the drives be established at least 2.2 feet above the flow line in the adjoining streets to ensure that the project is not inundated by flows entering the property from adjoining rights-of-way.

ON-SITE DEVELOPED FLOWS

It is recommended that the discharge from the developed site be controlled at a rate equal to the undeveloped flow rate from the property. To avoid further aggravating peak flows in Osuna, it is recommended that the discharge from the property be at the southwest corner of the development. This flow would then enter the swale along the east and south boundaries of the Rust Tractor site and eventually enter the Bear Canyon Arroyo. Since the flow rates will be controlled to predeveloped conditions, it should not cause a problem downstream.

10-14-81

If the above concepts meet with your approval, please advise and we will send the correspondence on to the Environmental Planning Commission. Should you have further recommendations concerning alternate ways of handling the drainage, please advise.

Sincerely yours,

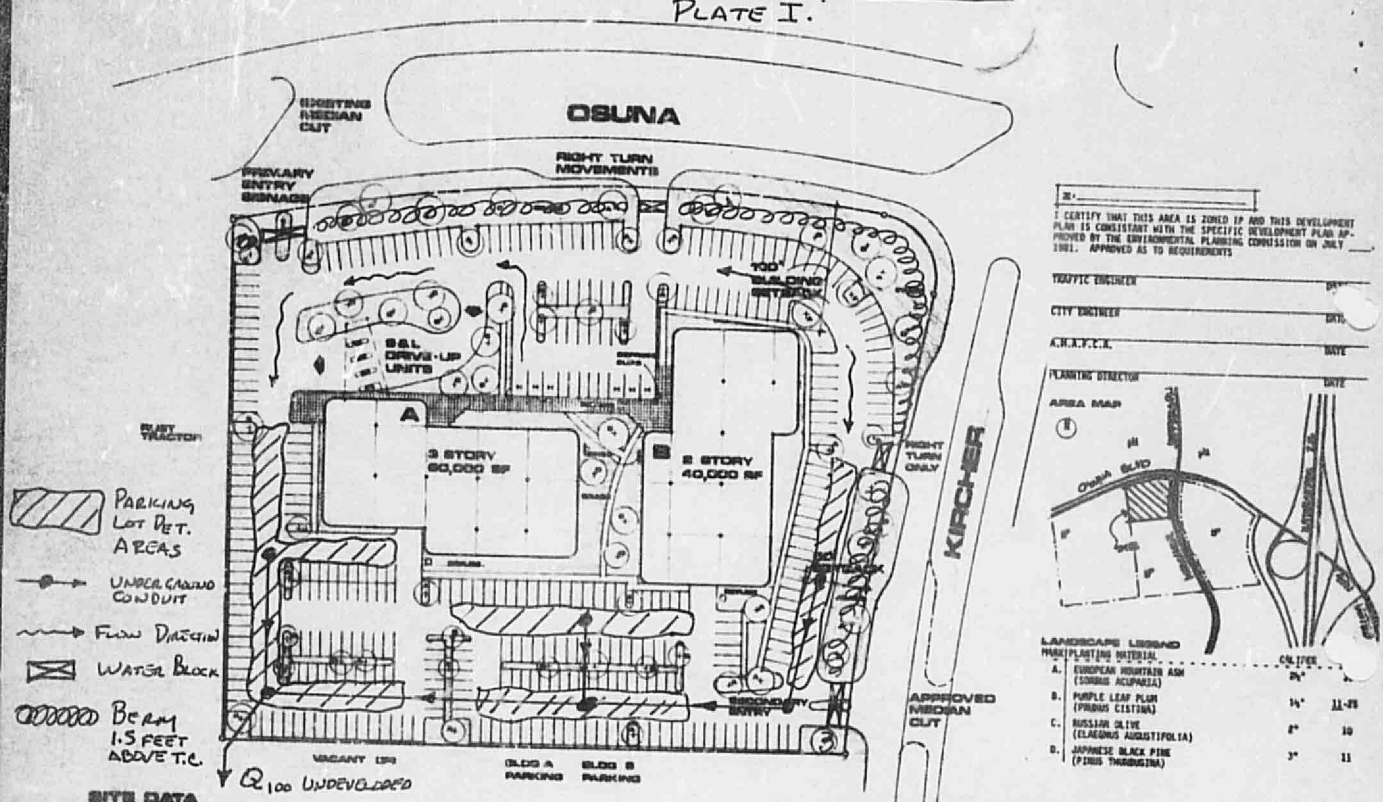
Michial M. Emery

Michial M. Emery, P.E.
Vice President

cc: Mr. Rich Leonard
Mr. Bob Wharton

MME/dlh
Job No. 1 130 0

CONCEPTUAL DRAINAGE REPORT
PLATE I.



SITE DATA

ZONE ATLAS:	PAGE E-17
LEGAL DESCRIPTION:	TRACT C-4, UNIT II INTERSTATE INDUSTRIAL PARK
ZONING:	I. P.
FARE ZONE:	2
BUILDING ZONE:	2
AREA BREAKDOWN:	
BUILDING FOOTPRINT	40,000 SF
LANDSCAPED AREA (EXCLUDING LANDSCAPED R.O.W.)	67,919 SF
PAVED AREA	115,708 SF
TOTAL SITE AREA	223,627 SF

BUILDING AREA (GROSS)	
BUILDING A	60,000 SF
BUILDING B	40,000 SF
TOTAL	100,000 SF
GROSS DENSITY	100,000 SF/223,627 SF = 44.7%

PARKING	REQUIRED*	AS DRAWN
BUILDING A	198	201
BUILDING B	140	160
TOTAL	338	361

* BASED ON TOTAL OF 84,000 SF OF NET LEASABLE AREA (14,000 SF/FLOOR)

DEVELOPMENT PLAN
CLIFFORD WEST OFFICE PARK

Developed by: Jack M Clifford & Company

MAY 29, 1981 KD

BOHANNAN-HUSTON INC.
ENGINEERS & PHOTOGRAMMETRISTS
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

October 13, 1981

Mr. Charles Easterling
Principal Assistant City
Engineer – Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Interstate Industrial Tract Drainage Study of Contributing Basins

Dear Chuck:

Enclosed, for your review and approval, are two copies of the above-referenced drainage study. By copy of this letter, we are transmitting one copy of this study to Mr. Rich Leonard for his files.

As you are aware, the Jack M. Clifford Company attempted to get a development plan on the southwest corner of Osuna and Kircher approved through the Environmental Planning Commission. A condition of approval for that site development plan was a definition of drainage impacts from flows in Osuna and Kircher. The purpose of this study is to define these conditions. The flows in Kircher and the flows in Osuna from Interstate 25 to the north diversion channel are defined. The results of this study indicate that, with minor adjustments in elevations, the property at the corner of Osuna and Kircher can be developed without fear of flooding.

If you should have any questions concerning this report, please feel free to contact this office.

RECEIVED
OCT 14 1981
CITY ENGINEER

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

cc: Mr. Rich Leonard
Mr. Bob Wharton

Enclosures

MME/dlh
Job No. 1 130 0

10-14-7H

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD., EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

October 21, 1981

Mr. Charles M. Easterling
Principal Assistant City
Engineer – Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RECEIVED
NOV 05 1981
ENGINEERING

Re: Proposed Five (5) Acre Development on the Southwest Corner of Osuna and Kircher

Dear Chuck:

As you are aware, the Jack M. Clifford Company attempted to get a development plan on the southwest corner of Osuna and Kircher approved by the Environmental Planning Commission. A condition of approval for that site development plan was a definition of drainage impacts from flows in Osuna and Kircher. On Thursday October 15, 1981, Bob Wharton, Dave Millikan and I met with you and Brian Burnett to discuss the Interstate Industrial Tract Drainage Study of Contributing Basins which was forwarded to your office a few days earlier. The purpose of that study was to define the flows in Kircher and the flows in Osuna between Interstate 25 and the North Diversion Channel. As discussed, the results of that study indicate, that with minor adjustments in elevations, the property at the corner of Osuna and Kircher can be developed without fear of flooding.

On October 13, 1981, our office submitted to you a Conceptual Drainage Report for the proposed five (5) acre development on the southwest corner of Osuna and Kircher. This report stated that berms along the streets and necessary water blocks in the driveways would be established for the property at the southwest corner of Osuna and Kircher. These measures are being taken to insure that the project is not inundated by flows entering the property from adjoining rights-of-way. In that letter, we also recommended that the discharge from the developed site be controlled at a rate equal to the undeveloped flow rate from the property.

To avoid further agrivating the peak flows in Osuna, we recommended that the discharge from the property be at the southwest corner of the development. These flows would then enter the swale on the east and south boundaries of the Rust Tractor site and eventually enter the Bear Canyon Arroyo. Since the flow rates will be controlled to predeveloped conditions, it should not cause a problem downstream.

RECEIVED
OCT 23 1981
CITY ENGINEER

PRINCIPALS
JERRY R. BOHANNAN, P. E. & L. S.
LARRY W. HUSTON
DONALD T. CREMANS, P. E.
C. J. (SKIP) MEAD, P. E.
MICHIAL M. EMERY, P. E.

ASSOCIATES
ANDRES ARAGON VIAMONTE, P. E.
JACK EICHORN
ROBERT H. GREENLEE, P. E.
G. LEE TRUSSELL
ISAAC J. PINO, P. E.
RAMON LARA, P. E.
DARRELL L. WADE, P. E.
PATRICK L. STIEHR, P. E.
DAVID M. Y. MILLIKAN, P. E.

We anticipate the development plan for this project to be heard by the Environmental Planning Commissions in November, 1981. If you feel the necessary questions concerning this parcel have been answered to allow EPC approval during that hearing, please sign in the space provided.

Thank you for your prompt review of these matters. If you should have any questions, please do not hesitate to contact Dave Millikan or me.

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

APPROVED

Date Oct 29 1981

By Charles M. Easterling

Charles M. Easterling
Principal Assistant City Engineer –
Hydrology
City of Albuquerque

cc: Mr. Bob Wharton

DMYM/dlh
Job No. 1 130 0

BOHANNAN-HUSTON INC.
ENGINEERS PLANNERS PHOTOGRAMMETRY
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

November 9, 1981

Mr. Charles M. Easterling
Principal Assistant City Engineer
Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RECEIVED
NOV 11 1981
ENGINEERING

Re: Interstate Industrial Tract Drainage Study of Contributing Basins

Dear Chuck:

During the preparation of the above mentioned drainage study, it was assumed that the flows collected in Wyoming Boulevard between Academy Road and the Pino Arroyo were removed at several locations. The flows which are in Wyoming Boulevard at its intersection with Cubero Drive were assumed to be conveyed within Cubero Drive to Academy Road and the Bear Arroyo. This would have resulted in basin boundaries similar to those indicated in the Northeast Heights Drainage Management Plan. It was also assumed that flows were removed from Wyoming Boulevard at its intersection with Burlison Drive.

Further investigation of this area has shown that this is not the case. It appears that all of the runoff entering Wyoming Boulevard at the intersection with Academy Road is carried to the north in Wyoming Boulevard. In addition, all of the flows that enter Wyoming Boulevard between Academy Road and the Pino Arroyo are conveyed to its crossing of the Pino Arroyo. This results in Wyoming Boulevard being at or near capacity (after anticipated development) in this area.

Since the basin boundaries and flow paths are different than those analyzed in the previously published study, a review of the results of that study was undertaken. A new contributing basin was defined (Basin 395). Flows from this basin and Basin 321 are carried within Wyoming Boulevard to the Pino Arroyo. The computer model was revised to reflect these changes. The resultant flow rates are indicated on Plates IA and IIA.

The effect of the revised flow patterns is that additional flows will enter Osuna Road from Basin 340 B (56 cfs vs 17 cfs). However, the impact of this change on the peak flow rates in Osuna is minor. Due to the difference between the time to peak for flows from Basin 340 B into Osuna Road and the other flows in Osuna Road, the peak flow rate in Osuna Road at the intersection of Kircher Parkway is virtually unchanged.

PRINCIPALS
JERRY R. BOHANNAN, P. E. & L.S.
LARRY W. HUSTON
DONALD T. CREMANS, P. E.
C.J. (SKIP) MEAD, P. E.
MICHIAL M. EMERY, P. E.

ASSOCIATES
ANDRES ARAGON VIAMONTE, P. E.
JACK EICHORN
ROBERT H. GREENLEE, P. E.
G. LEE TRUSSELL
ISAAC J. PINO, P. E.
RAMON LARA, P. E.
DARRELL L. WADE, P. E.
PATRICK L. STIEHR, P. E.
DAVID M. Y. MILLIKAN, P. E.

The conclusions and recommendations indicated in our previous reports should be modified as follows:

Item 3 should read: The box culvert beneath the west frontage road does not have adequate capacity to handle the peak incoming flow rate. Approximately 56 cfs is discharged from Basin 340 B to Osuna Road.

Item 5 should read: Approximately 72 cfs will be entering the Interstate Industrial area within the Osuna Road right-of-way.

All of the other conclusions and recommendations are applicable.

Both the revised and original analysis assumed that all of the contributing basins are developed. Therefore, the results indicated are conservative considering present conditions in the contributing basins.

Enclosed are Plate IA and IIA, which indicate the revised flow rates, and the supporting documentation. This letter and the enclosed information are intended to serve as Addendum Number I to the previous study.

If you have any questions, please call Dave Millikan or me.

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Richard Leonard
Mr. Bob Wharton

DMYM/js
Job No. 1 130 0

*Revised 11-9-81

TABULATION

PROJECT Interstate Industrial Tract Drainage Study JOB NO. 11300

SUBJECT Composite CN BY Smyrn DATE 9-24-81 CHK'D BY _____ DATE _____

		% Open AREA CN=61	% Low Density CN=80 (25%)	% Med Density CN=83 (50%)	% Townhouse CN=87 (65%)	% Apartment CN=89 (72%)	% Commercial or School CN=92 (85%)	% Paved CN=95 (100%)		Composite CN
301B			100							80
301A			100							80
302B		60		40						72
302A		40		60						76
303				100						83
304		40		40	20					77
305				40	60					86
306				100						83
307C		30		30	40					80
307B				60	40					85
307A		10			60		30			88
308				100						83
309				80	20					84
310		20		80						80
311		40		60						77
312				100						83
313		20		50	30					82
314				100						83
315				100						83
316				100						83
321		40			60					79
322				90	10					84
323				100						83
324				100						83
325				100						83
326				50				50		90
327				100						83
328				100						83
329				90				10		85
330					100					87
331				70			30			86
332				100						83
333						100				89
334		20		80						80
335						100				89
* 395		40			60					79

*Revised 11-9-81

TABULATION

PROJECT Interstate Industrial Drainage Study JOB NO. 1130

SUBJECT tc Computations BY Gryn DATE 9-21-81 CHK'D BY _____ DATE _____

BASIN		REACH LENGTH (FT)	UPPER ELEV. (FT)	LOWER ELEV. (FT)	SLOPE (FT/FT)	t_c (HRS)	$(\frac{2}{3} t_c)$ t_p (HRS)	$\frac{1}{2} t_p$ K (HRS)		VELOCITY (FPS)
302		7100	980	686	.0414	.4091	.2728	.1364		4.82
303		5600	914	704	.0375	.3540	.2360	.1180		4.39
304		3600	718	598	.0333	.2637	.1758	.0879		3.79
305		2500	712	610	.0408	.1842	.1228	.0614		3.77
306		2000	176	98	.0390	.1578	.1052	.0526		3.52
307		8600	632	390	.0281	.5505	.3670	.1835		4.34
308		3700	524	426	.0265	.2941	.1961	.0980		3.40
309		1350	38	00	.0281	.1323	.0882	.0441		2.83
310		800	400	376	.0300	.0862	.0575	.0287		2.58
311		950	98	80	.0189	.1176	.0784	.0392		2.24
312		2200	88	30	.0264	.1974	.1316	.0658		3.10
313		2500	82	32	.0200	.2424	.1616	.0808		2.86
314		4530	288	188	.0221	.3686	.2457	.1229		3.41
315		2200	138	92	.0209	.2159	.1440	.0720		2.83
316		1670	330	288	.0251	.1628	.1085	.0543		2.85
321		3000	75	36	.0130	.3292	.2195	.1097		2.53
322		2050	98	70	.0137	.2406	.1604	.0802		2.37
323		600	108	94	.0233	.0762	.0508	.0254		2.19
324		1150	96	70	.0226	.1272	.0848	.0424		2.51
325		2050	80	30	.0244	.1927	.1285	.0642		2.96
326		2900	72	04	.0234	.2558	.1705	.0853		3.15
327		2300	73	16	.0248	.2092	.1395	.0697		3.05
328		2700	70	08	.0230	.2437	.1625	.0812		3.08
329		3700	174	76	.0265	.2941	.1961	.0980		3.49
330		1000	78	53	.0250	.1098	.0732	.0366		2.53
331		2400	112	48	.0267	.2101	.1401	.0700		3.17
332		2500	98	40	.0232	.2289	.1526	.0763		3.03
333		850	59	34	.0294	.0911	.0607	.0304		2.59
334		1800	48	20	.0156	.0271	.1381	.0690		2.41
335		750	40	14	.0347	.0776	.0517	.0259		2.68
336		1300	40	14	.0200	.1465	.0977	.0488		2.46
337		1500	116	90	.0173	.1729	.1153	.0576		2.41
*395		4500	548	418	.0289	.3307	.2205	.1102		3.78

8/31/82

Note to File.

The computer output for the contributing watershed is contained in either of the following two files:

a) Interstate Industrial Contributing Drainage Basins

b) Pino Arroyo

Brad Burnett
CE/Hydro

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD., EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

November 11, 1982

Mr. Charles M. Easterling
Assistant City Engineer – Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Drainage Report for Clifford Plaza Commercial Site at the Southwest Corner of Kircher and Osuna

Dear Chuck:

Enclosed are three (3) copies of the above-referenced drainage report for your review and comments. We will appreciate your efforts to process these documents as quickly as you are able.

If you have any questions, or need additional information, please call Jim Domenick or me.

RECEIVED
NOV 15 1982
ENGINEERING

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

Enclosures

JVD/dlh
Job No. 2 081 2

PRINCIPALS
JERRY R. BOHANNAN, P. E. & L.S.
LARRY W. HUSTON
DONALD T. CREMANS, P. E.
C.J. (SKIP) MEAD, P. E.
MICHIAL M. EMERY, P. E.

ASSOCIATES
ANDRES ARAGON VIAMONTE, P. E.
JACK EICHORN
ROBERT H. GREENLEE, P. E.
G. LEE TRUSSELL
ISAAC J. PINO, P. E.
RAMON LARA, P. E.
DARRELL L. WADE, P. E.
PATRICK L. STIEHR, P. E.
DAVID M. Y. MILLIKAN, P. E.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

E17 - D40

December 8, 1982

Mr. Jim Domenick
Bohannan-Huston, Inc.
4125 Carlisle N.E.
Albuquerque, N.M. 87110

RE: CLIFFORD PLAZA DRAINAGE REPORT

Dear Jim:

I have made an initial review of the referenced plan and forward the following comments:

1. 2nd Paragraph - "Method of Analysis".

Comment: Making the conservative assumption that the watersheds had no "ponded" water probably counteracts the more liberal assumptions used in the program and in deciding the flow paths of the runoff (especially near the freeway). All things considered, the numbers are probably close.

2. Statement: "The proposed site development plan for this project is an office park consisting of two office buildings and parking facilities."

Comment: Will both buildings be constructed at the same time? If not, some erosion control measures may be necessary.

3. Statement: "When Tract C-3 is improved, storm drainage facilities will be necessary to convey the runoff south to the Bear Canyon Arroyo."

Comment: The necessary drainage easements will be required across lands not owned by the Clifford Company.

4. Statement: "The outfall from the .....The outlet from the pond will be limited to keep the flow entering the channel to that level."

Comment: As we've discussed, it will be necessary to acquire from Rust Tractor the necessary easements for these flows. In most cases, properties usually just design for undeveloped off-site flows. Since the frequency of runoff will increase significantly after development, it is important that Rust concurs with the Clifford plan.

5. Comments on Grading Plan sheets:

   a. Please identify the location of roof canals or downspouts.

   b. Will any erosion protection be required at the pipe outlet? At the curb outlet detail?

   c. What type of spillway is provided?

If you have any questions concerning these matters, please call.

Very truly yours,

Brian

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

20811

JACK M. CLIFFORD & COMPANY
2201 SAN PEDRO DRIVE NE
TWO SAN PEDRO PARK, SUITE 201
ALBUQUERQUE, NEW MEXICO 87110
PHONE (505) 884-5573

December 28, 1982

Mr. Jack Rust, President
Rust Tractor Company
4000 Osuna Road, NE
Albuquerque, New Mexico 87109

Attention: Mr. Al Herman

Re: Request for drainage easement

Dear Mr. Rust:

This letter is a formal request for a temporary drainage easement to allow the Jack M. Clifford Company to discharge storm runoff into the existing earthen channel on your property. More specifically, we would like permission to discharge water under a controlled rate from a temporary detention pond, as described in the "Clifford Plaza Drainage Report," of which you have a copy. We propose to control the rate of flow leaving the pond to approximately seven cubic feet per second, which will limit the peak flow in your channel to the predeveloped rate of 19.8 cfs. As we have discussed, this proposed drainage plan is a temporary solution, and we will have to work out a more comprehensive plan for the entire area when we develop the parcel on which the temporary drainage pond is to be located.

If you will grant us permission to discharge runoff into your channel in accordance with the referenced drainage report, will you please sign in the space provided below and return the original of this letter to us. Naturally, you will retain the right to revoke this permission at any time in the future. We would like to thank you for your assistance and cooperation in this matter. If you have any questions about this, please feel free to call me.

Sincerely,

Bob Wharton
Land Development Director

BW:pb

APPROVED:

Jack Rust, President
Rust Tractor Company

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6773 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

January 19, 1983

RECEIVED
JAN 24 1983
CITY ENGINEER

Mr. Brian Burnett
Civil Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Response to Comments on Clifford Plaza Drainage Report

Dear Brian:

Thank you for your comments on the referenced drainage report. I have addressed each below and hope this answers them to your satisfaction.

1. Method of Analysis

   – I agree with you that the discharges are reasonable.

2. Project Phasing

   – The present plan is to construct the project in two phases. The first phase will include the paving and landscaping for the entire project as well as the western building. The floor area of the second building will be planted with grass until it is constructed. Under this arrangement, no interim erosion protection will be needed.

3. Future Drainage Facilities for Tract C-3

   – When Tract C-3 is developed in the future, Jack M. Clifford and Company will acquire the necessary easements to convey storm runoff to the Bear Canyon Arroyo.

4. Outfall to Rust Tractor Channel

   – Bob Wharton and Jim Domenick met with Jack Rust and Al Herman at Rust Tractor several weeks ago and discussed our drainage plan with them at length. They are in favor of the plan and have signed an agreement giving Jack M. Clifford and Company the right to discharge from the pond to their ditch in accordance with our drainage report. A copy of their ageeement is enclosed for your files.

PRINCIPALS
JERRY R. BOHANNAN, P. E. & L.S.
LARRY W. HUSTON
DONALD T. CREMANS, P. E.
C.J. (SKIP) MEAD, P. E.
MICHIAL M. EMERY, P. E.

ASSOCIATES
ANDRES ARAGON VIAMONTE, P. E.
JACK EICHORN
ROBERT H. GREENLEE, P. E.
G. LEE TRUSSELL
ISAAC J. PINO, P. E.
RAMON LARA, P. E.
DARRELL L. WADE, P. E.
PATRICK L. STIEHR, P. E.
DAVID M. [illegible]IKAN, P. E.

- The Clifford and Rust Companies recognize that this is an interim solution to the overall drainage in the area. Both have a strong interest in seeing quality development of the area which will depend, in part, on proper handling of drainage. They plan to continue to work together to this end.

- Naturally, if any changes are made to the Rust facility which preclude the use of this outfall, we would expect to file an amended drainage plan subject to DPM standards.

5. Comments on Grading Plan Sheets

   a. The downspouts will come down the side of the building, then underground and will discharge into the parking lot through curb outlets. Their final locations have not yet been set, but they will not affect the drainage plan.

   b. We will dump cobble at the pipe and curb opening outlets, but do not plan on any major erosion protection measures.

   c. The spillway is simply a graded earth spillway to direct flows in excess of 100 year frequency to the south.

If you have any questions or need any additional information to approve this drainage report, please call Jim Domenick or me.

Sincerely,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

cc: Mr. Bob Wharton

Enclosure

JVD/dlh
Job No. 2 081 3

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

E17 - D40

February 9, 1983

Mr. Jim Domenick
Bohannan-Huston, Inc.
4125 Carlisle Blvd. N.E.
Albuquerque, N.M. 87107

RE: CLIFFORD PLAZA DRAINAGE REPORT

Dear Jim:

Based on your submittals of January 19, 1983 and February 2, 1983 the referenced report is approved in concept. Prior to release of a building permit, a grading plan must be submitted to this office to check compliance with the approved report. This plan should be prepared in accordance with the checklist items on page 109 of the DPM.

If you have any questions concerning these comments, please call.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

BOHANNAN-HUSTON INC.
4125 Carlisle Blvd. N.E. Albuquerque, N.M. 87107
(505) 881-2000

TELEPHONE CONFERENCE NOTES

JOB No. 20813

PROJECT TITLE CLIFFORD PLAZA

DATE 5/12/83 TIME 8:30 AM

CONVERSATION
BRIAN BURNETT OF CITY ENGINEERING
AND JIM DOMENICK OF BOHANNAN-HUSTON

SUBJECT DRAINAGE COVANENT (SEE APPENDIX C OF DRAINAGE REPORT)

CONTENT I CALLED BRIAN TO FIND OUT THE PROCEDURE FOR HAVING THE DRAINAGE COVANENT REVIEWED BY THE CITY LEGAL DEPARTMENT, + HE SAID A COVANENT WOULD NOT BE NECESSARY BECAUSE OWNER'S RESPONSIBILITIES ARE SPELLED OUT IN THE NEW DRAINAGE ORDINANCE.

WE WILL, HOWEVER, HAVE TO HAVE AN APPROVED DRAINAGE PLAN (AS DIFFERENTIATED FROM THE DRAINAGE REPORT) PRIOR TO RECEIVING A BUILDING PERMIT. THE DRAINAGE PLAN GOES TO BRIAN FOR APPROVAL.

J. Domenick

CC: JACK M CLIFFORD CO
BRIAN BURNETT

BOHANNAN-HUSTON INC.
ENGINEERS PLANNERS PHOTOGRAMMETRISTS
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
6713 VISCOUNT BLVD., EL PASO, TEXAS 79925 915 778-4491
330 GARFIELD, SANTA FE, NEW MEXICO 87501 505 988-7671

May 16, 1983

Mr. Brian Burnett
City Engineering/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

RECEIVED
MAY 17 1983
ENGINEERING

Re: Clifford Plaza Drainage Plan

Dear Brian:

Enclosed is a copy of the Clifford Plaza drainage plan for your review and approval for the building permit. The plan sheets are those submitted with the drainage report with some additional information concerning the roof drains, benchmark and phasing.

You will note that the Albuquerque Control Survey benchmark for this project is right across the street from the site, so we have not set another temporary benchmark on the site itself.

All site improvements, except the western building, will be constructed in the first phase. Since all paving, curb and gutter, etc., will be in place, we feel no interim drainage or erosion control measures will be needed to account for the phased construction.

The finished floor elevations of the buildings themselves have been raised two feet from those shown in the drainage report plates. The buildings will be on raised foundations in places, and all curb and gutter will remain as in the original drainage report, so this will not affect the operation of the drainage systems.

The roof drains are as shown on the drawings and empty into the parking lot through curb outlets.

PRINCIPALS
JERRY R. BOHANNAN, P. E. & L.S.
LARRY W. HUSTON
DONALD T. CREMANS, P. E.
C.J. (SKIP) MEAD, P. E.
MICHIAL M. EMERY, P. E.

ASSOCIATES
ANDRES ARAGON VIAMONTE, P. E.
JACK EICHORN
ROBERT H. GREENLEE, P. E.
G. LEE TRUSSELL
ISAAC J. PINO, P. E.
RAMON LARA, P. E.
DARRELL L. WADE, P. E.
PATRICK L. STIEHR, P. E.
DAVID M. Y. MILLIKAN, P. E.

We will appreciate your timely review of this drainage plan.

If you have questions about any of this, or need additional information, please do not hesitate to call Jim Domenick or me.

Sincerely,

Michial M. Emery, P.E.
Vice President

cc: Mr. Robert Kastning
Mr. Dick Engstrom

Enclosure

JVD/dlh
Job No. 2 081 3

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

E17 - D40

May 26, 1983

Mr. Jim Domenick
Bohannan-Huston, Inc.
4125 Carlisle N.E.
Albuquerque, N.M. 87110

RE: CLIFFORD PLAZA DRAINAGE PLAN

Dear Jim:

The referenced drainage plan is approved. Please see that the revised plans dated 5/83 are placed in the City construction sets.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Clifford Plaza Phase II ZONE ATLAS/DRNG.# E17-D40

LEGAL DESCRIPTION: _____

CITY ADDRESS: 4200 Osuna N.E., Albuquerque, NM

ENGINEERING FIRM: Bohannan-Huston, Inc. CONTACT: Brian Burnett

ADDRESS: 4125 Carlisle N.E. Albuq. NM 87107 PHONE: 881-2000

OWNER: Jack M. Clifford & Co. CONTACT: Robert Kastning

ADDRESS: P.O. Box 35640, Albuquerque, NM 87176
PHONE: 345-9011

ARCHITECT: Engstrom Associates CONTACT: Richard Engstrom

ADDRESS: 320 Central SW, Albuquerque, NM 87102

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

x YES (4/22/85)
___ NO
___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____
EPC NO. _____
PROJ. NO. _____

RECEIVED
APR 23 1985
HYDROLOGY SECTION

TYPE OF SUBMITTAL:

X DRAINAGE REPORT ADDENDUM
___ DRAINAGE PLAN
___ CONCEPTUAL GRADE & DRAIN PLAN
___ GRADING PLAN
___ EROSION CONTROL PLAN
___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
x BUILDING PERMIT APPROVAL
___ FOUNDATION PRMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
___ GRADING/PAVING PERMIT APPROVAL
___ OTHER _____ (SPECIFY)

DATE SUBMITTED: 4-22-85

BY: Brian Burnett

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
UNIVERSITY PLAZA, 330 GARFIELD SUITE 104 SANTA FE, N.M. 87509 505 988-7671
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491

April 22, 1985

Mr. Carlos Montoya
City/County Flood Plain Administrator
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RECEIVED
APR 23 1985
HYDROLOGY SECTION

Re: Drainage Plan Addendum - Clifford Plaza Phase II (E17-D4)

Dear Carlos:

The purpose of this letter is to formally document a modification to the drainage outfall system for the Clifford Plaza site. The attached grading plan for Clifford Plaza was approved by City Hydrology in February 1983. As the plan indicates, a holding pond has been planned at the southwest corner of the property. This facility was constructed during the Phase 1 development and was designed to store runoff generated by Phase II, as well. The client now wishes to enlarge the parking lot along the south end an additional 8640 square feet. This translates into an additional 1600 cubic feet of runoff that the pond must store in the developed condition. Due to the encroachment of the new parking lot into the original ponding area, a volume of 3800 cubic feet is also lost.

To insure that the pond has adequate capacity to store face at approximately elevation 5130.00, we propose that the configuration of the pond be modified as indicated on the grading plan. By regrading the most easterly side of the pond to a 5:1 slope, an additional 7500 cubic feet of storage is realized. This amply covers the 5400 cubic feet capacity (1600 cubic feet + 3800 cubic feet) required due to the larger impervious area and incroachment of the parking lot.

We request that the enclosed information be reviewed in an expeditious manner in order that the building permit can be obtained for the Phase II structure.

If you have any questions, please call.

Truly yours,

Brian G. Burnett

Brian G. Burnett, P.E.
Division Manager

cc: Mr. Richard Engstrom
Mr. Dan McDonald

BGB/mls
Job No. 5 166 0

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

May 24, 1985

Mr. Brian Burnett
Bohannan-Huston, Inc.
4125 Carlisle NE
Albuquerque, NM 87107

REF: DRAINAGE PLAN FOR CLIFFORD PLAZA PHASE II (E17-D40) RECEIVED APRIL 23, 1985

Dear Mr. Burnett:

The above referenced plan, dated April 22, 1985 is approved for Building permit.

Please attach a copy of this approved plan to the construction set prior to Hydrology sign-off.

If I can be of further assistance, please contact me at 766-7644.

Sincerely,

Carlos A. Montoya
City/County Flood Plain Admin.

CAM:mrk

CLIFFORD PLAZA

DRAINAGE REPORT

PREPARED FOR:

JACK M. CLIFFORD & COMPANY
2201 SAN PEDRO DRIVE, N.E.
ALBUQUERQUE, NEW MEXICO 87110

PREPARED BY:

BOHANNAN–HUSTON, INC.
4125 CARLISLE BOULEVARD, N.E.
ALBUQUERQUE, NEW MEXICO 87107

NOVEMBER 1982

LOCATION AND DESCRIPTION

This drainage report addresses Tract C-4 of the Interstate Industrial Park, a larger industrial development located in northwest Albuquerque between Interstate 25 and the Albuquerque Metropolitan Arroyo Flood Control Authority's North Diversion Channel. Tract C-4 is bounded by Osuna Road on the north, Kircher Boulevard on the east, and the property of Rust Tractor, Inc. on the west. Tract C-3, of the same property, forms the southern boundary. Figure 1 is a Vicinity Map showing the location of this property, and Figure 2 is a portion of the plat.

Tract C-4 has an area of 5.13 acres and consists of gravelly fine sandy loam soil (Embudo type) classified as Hydrologic Soil Group B (SCS criteria). The land slopes east to west at about a 2% grade and contains no well-defined natural channels. Figure 3 is a copy of the SCS soil map of the site.

METHOD OF ANALYSIS

Discharges and runoff volumes were computed for this parcel with the Rational Formula, in accordance with guidelines set out in Chapter 22 of the Development Process Manual. Computation for rainfall, runoff and pond volumes for the site are contained in Appendix A.

Off-site discharges for the upstream basin were obtained from the "Interstate Industrial Tract Drainage Study of Contributing Basins," prepared for Jack M. Clifford and Company, by Bohannan–Huston, Inc., in October 1981. This analysis did not consider that a certain amount of drainage area may be ponded on individual lots or parcels. The entire area within each basin was assumed to contribute runoff. Runoff curve numbers were based upon anticipated ultimate development. Since some ponding of runoff will likely be required for the development of these areas, the computed discharges can probably be considered conservative.

(probably counteracts the uncertainty in the program and assumptions.

EXISTING CONDITIONS

The study of the upland basins showed that off-site flows could affect this property if uncontrolled discharge of storm runoff is allowed for the contributing upland

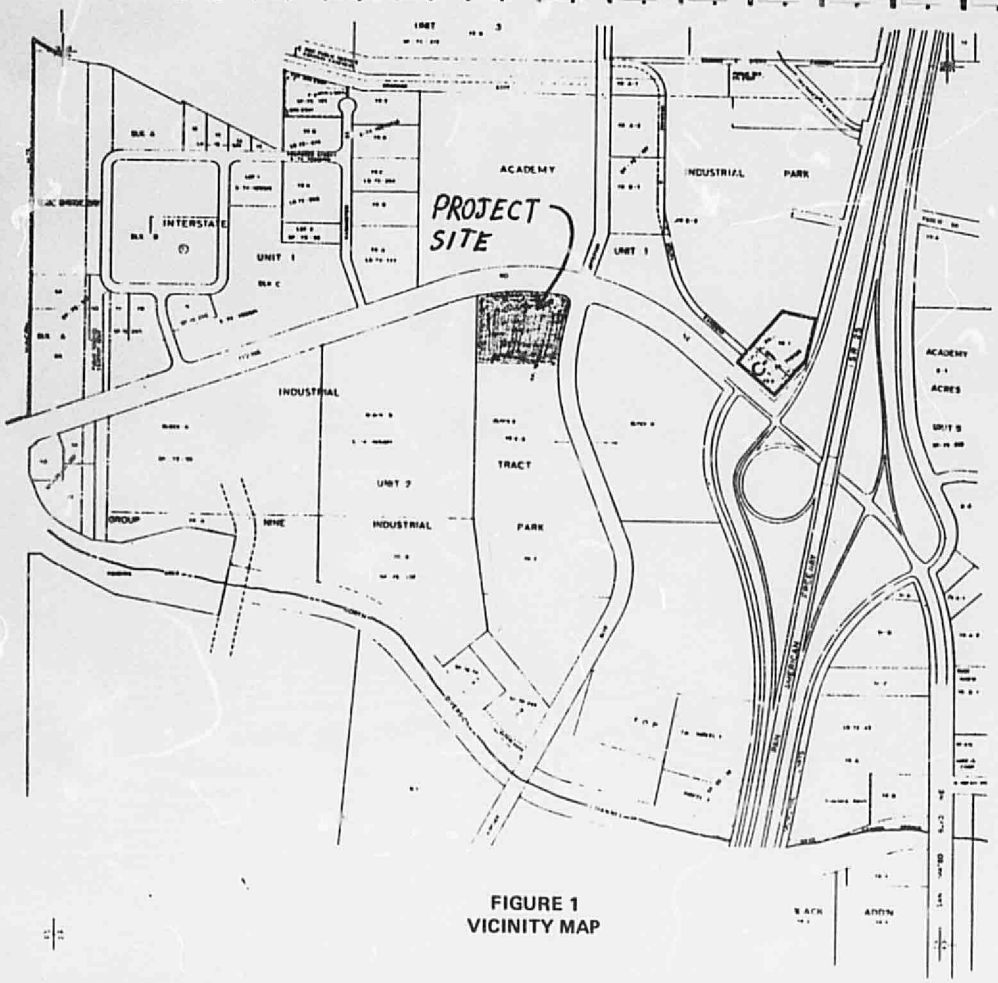
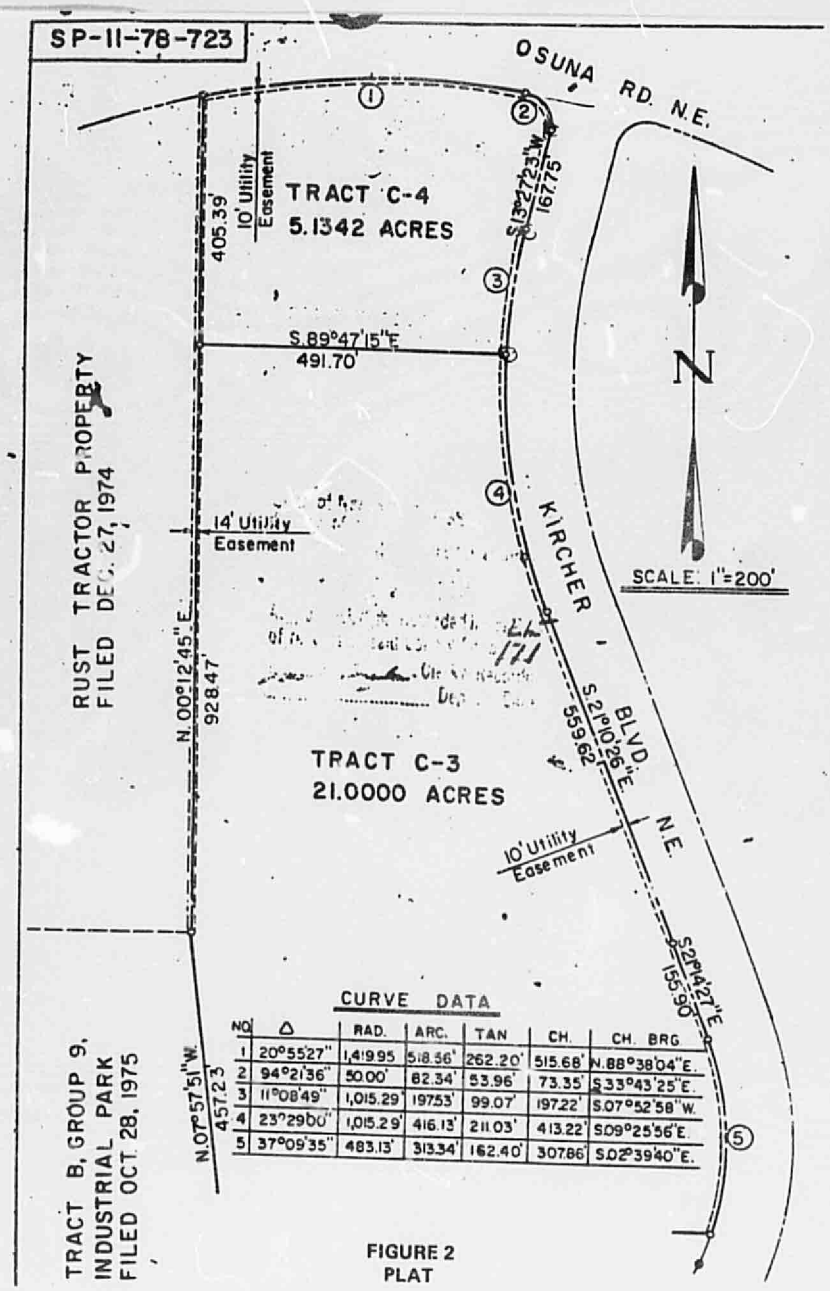


FIGURE 1
VICINITY MAP

E-17-2



CURVE DATA

NO	Δ	RAD.	ARC.	TAN	CH.	CH. BRG
1	20°55'27"	1,419.95	518.56'	262.20'	515.68'	N.88°38'04"E.
2	94°21'36"	50.00'	82.34'	53.96'	73.35'	S.33°43'25"E.
3	11°08'49"	1,015.29'	197.53'	99.07'	197.22'	S.07°52'58"W.
4	23°29'00"	1,015.29'	416.13'	211.03'	413.22'	S.09°25'56"E.
5	37°09'35"	483.13'	313.34'	162.40'	307.86'	S.02°39'40"E.

FIGURE 2
PLAT

FIGURE 3
SOILS MAP

drainage basin. The 100-year discharge of 207 cfs in Kircher is expected to flow 1.1 feet deep in the road, so some of this water would be above the curb height and could enter the property from the east near its southern boundary. Immediately south of the property is a swale which would convey any water coming off Kircher west to the Rust Tractor property. Since the construction of curb and gutter on Kircher, this swale will not normally carry runoff from parcels east of the road.

The study also estimated a 100-year discharge of 261 cfs in Osuna Road flowing less than 1.0 foot deep along the north boundary of the property. Since the ground at the property line is about one foot higher than the top of curb along Osuna Road, it is unlikely any of this runoff would enter the property. Figure 4 is a portion of Plate IA of the Interstate Industrial Tract Drainage Study and shows the discharges in Kircher and Osuna.

Under present conditions, the parcel can be considered as a single drainage basin with almost all of the runoff draining to the Rust Tractor Property. As sheet flow, the expected peak discharge from the 100-year storm is 8.2 cfs, and the expected volume is 0.32 acre-feet.

DEVELOPED CONDITIONS

The proposed site development plan for this project is an office park consisting of two office buildings (three stories, 50,000 square feet each) and parking facilities. The perimeter of the project will be landscaped in grass and will be graded to prevent the off-site flows from Kircher and Osuna from entering the site. Water blocks will be constructed at the access points from these streets. The grass berms and waterblocks will be established at least 2.2 feet above the flowline in the adjacent street, as specified in the approved Conceptual Drainage Report for the site, Appendix B contains copies of correspondence concerning that report.

Runoff from the site itself will be conveyed along the parking lot to the southwest corner of the site where it will be released to a temporary detention pond on the parcel immediately south of the site (Tract C-3). The land on which the pond will be located is also owned by the Jack M. Clifford Company and will be developed at some future time. When Tract C-3 is improved, storm drainage facilities will be necessary to convey the runoff south to the Bear Canyon Arroyo. These conveyance facilities

(storm sewer or channel) will be designed to also carry the runoff from Tract C-4. The detention pond will then be abandoned and the land on which it lies used for development purposes.

The outfall from the detention pond will be the drainage channel on the Rust Tractor property which carries runoff westward through the site. This channel was designed for 52 cfs, but the drainage report for that site (Herkenhoff, 1982) indicates a peak discharge of 19.8 cfs expected at the channel from the Clifford properties. The outlet from the pond will be limited to keep the flow entering the channel to that level. Since a portion (about five acres) of Tract C-3 will drain to the detention pond, the unrestricted flow entering the channel from that parcel will be 13.2 cfs rather than 19.8 cfs. Therefore, the outflow from the detention pond will be limited to 6.6 cfs. The outlet will be two 12" diameter CMPs with end sections. Figure 4 shows the general layout of the drainage plan.

The Jack M. Clifford Company will provide a temporary drainage easement for access to and maintenance of the detention pond by City personnel. However, maintenance of the pond will be the responsibility of the owner, and shall consist primarily of the removal of any sediment buildup therein. Appendix C is a copy of the proposed easement and maintenance agreement.

SUMMARY

The drainage plan presented in this report will take care of the runoff problem for Tract C-4 for the present time, and will also provide for the ultimate condition of the southern parcels developing as well. Runoff from all Clifford property to Rust Tractor is limited to predeveloped levels. Grass berms and water blocks will prevent upland flow from entering the site. Plates 1 and 2 are a grading plan for the developed site and detention pond, and illustrate the plan in detail.

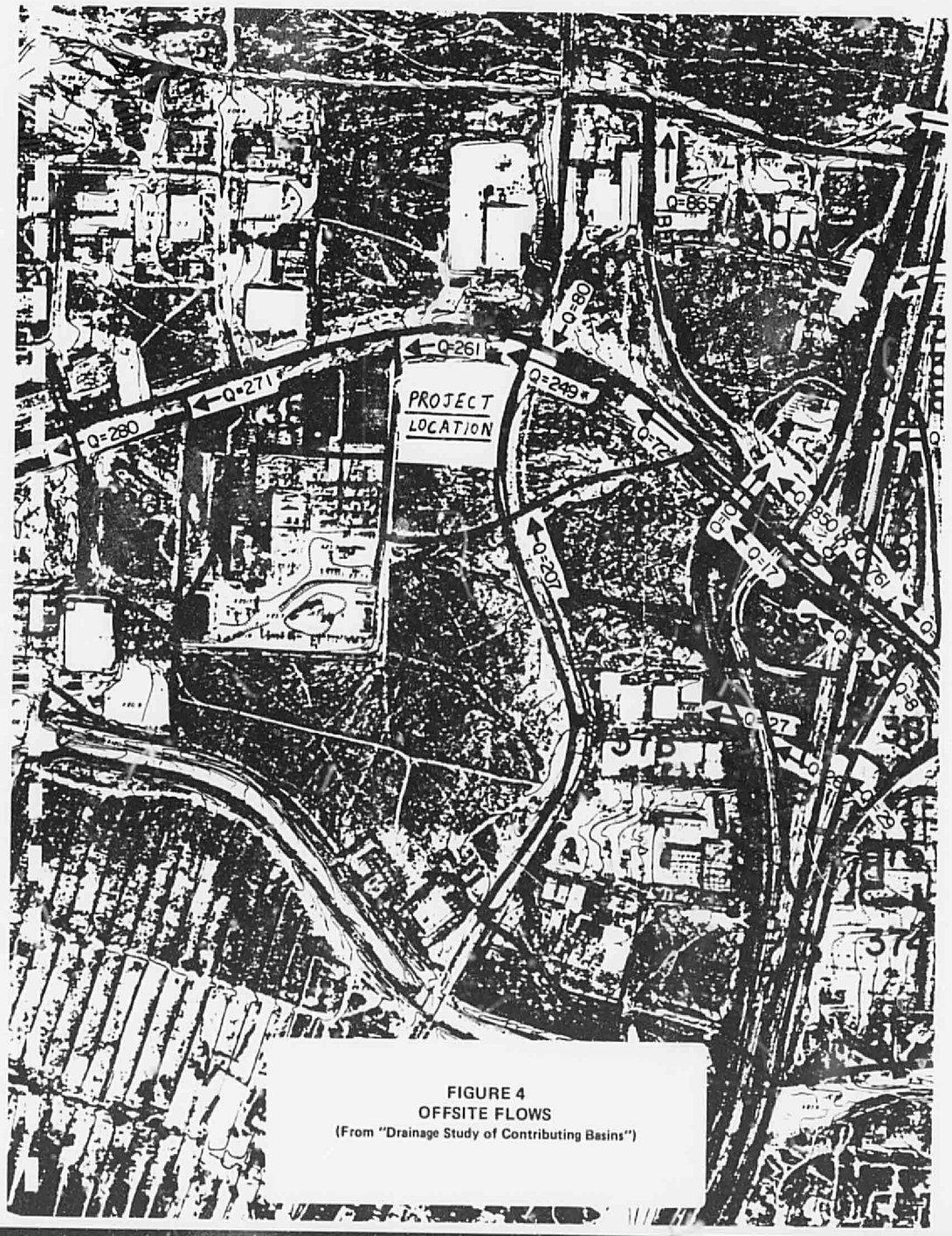


FIGURE 4
OFFSITE FLOWS
(From "Drainage Study of Contributing Basins")

THIS MICROIMAGE IS THE BEST POSSIBLE
REPRODUCTION DUE TO THE POOR QUALITY
OF THE ORIGINAL DOCUMENT

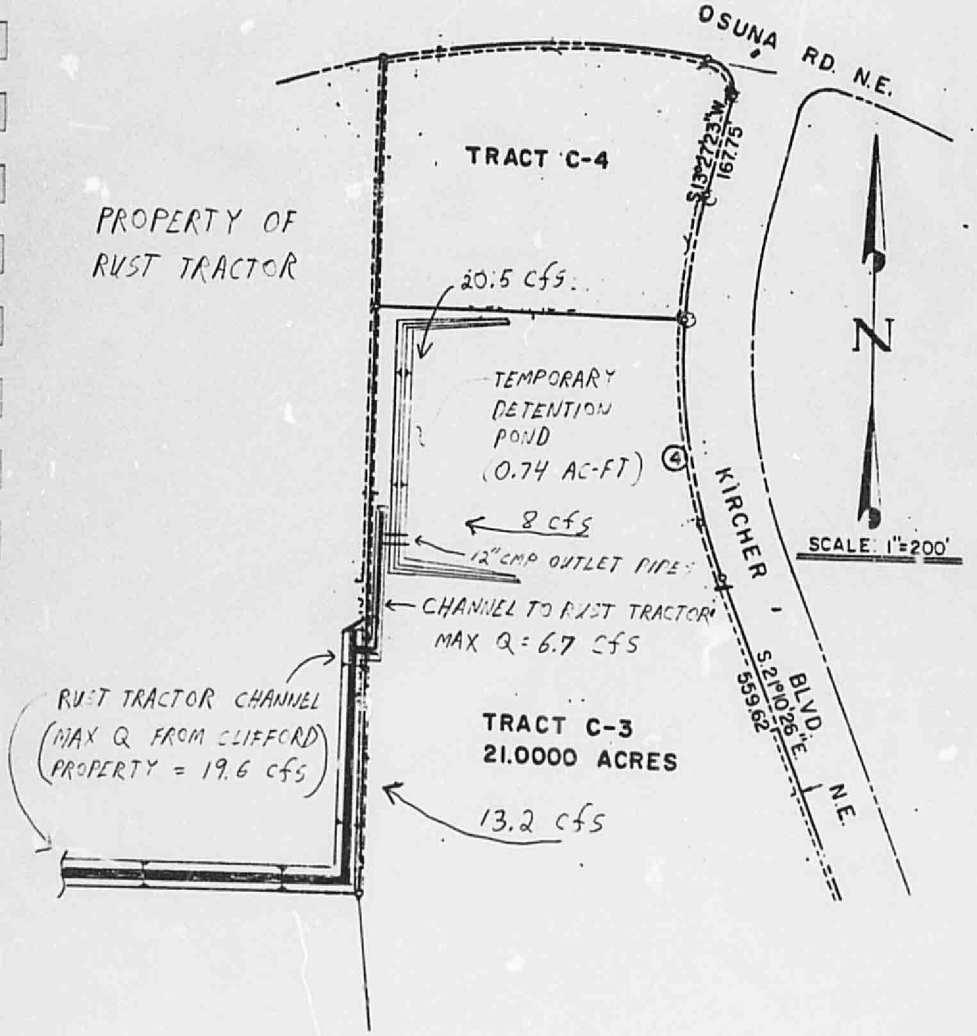


FIGURE 5
DRAINAGE PLAN

(storm sewer or channel) will be designed to also carry the runoff from Tract C-4. The detention pond will then be abandoned and the land on which it lies used for commercial development.

The outfall from the detention pond will be the drainage channel on the Rust Tractor property which carries runoff westward through the site. This channel was designed for 52 cfs, but the drainage report for that site (Herkenhoff, 1982) indicates a peak discharge of 19.8 cfs expected at the channel from the Clifford properties. The outlet from the pond will be limited to keep the flow entering the channel to that level. Since a portion (about five acres) of Tract C-3 will drain to the detention pond, the unrestricted flow entering the channel from that parcel will be 13.2 cfs rather than 19.8 cfs. Therefore, the outflow from the detention pond will be limited to 6.6 cfs. The outlet will be the 12" diameter CMP with end sections. Figure 4 shows the general layout of the drainage plan.

The Jack M. Clifford Company will provide a temporary drainage easement for access to and maintenance of the detention pond by City personnel. However, maintenance of the pond will be the responsibility of the owner, and shall consist primarily of the removal of any sediment buildup therein. Appendix C is a copy of the proposed easement and maintenance agreement.

SUMMARY

The drainage plan presented in this report will take care of the runoff problem for Tract C-4 for the present time, and will also provide for the ultimate condition of the southern parcels developing as well. Runoff from all Clifford property to Rust Tractor is limited to predeveloped levels. Grass berms and water blocks will prevent upland flow from entering the site. Plates 1 and 2 are a grading plan for the development site and detention pond, and illustrate the plan in detail.

REFERENCES

1. City of Albuquerque, Development Process Manual, Chapter 22.

2. Bohannan–Huston, Inc., Interstate Industrial Tract – Drainage Study of Contributing Basins, October 1981, and Addendum Number 1, dated November 1981.

3. U.S. Department of Agriculture, Soil Conservation Service and Forest Service, "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico," June 1977.

4. Gordon Herkenhoff & Associates, Rust Tractor – Revised Drainage Plan, February 1982.

APPENDIX A

COMPUTATIONS

I) EXISTING CONDITIONS

- AREA = 5.13 ACRES
- 1 HR - 100 YR RAINFALL = 2.2' (PLATE 22.2 D-1)
- SOILS ARE HYDROLOGIC GROUP B (Em B)
  (SEE SCS SOIL SURVEY, PLATE 21)

A) VOLUME

USE RATIONAL FORMULA TO DETERMINE RUNOFF VOLUME. USE PLATE 22.2 C-1 TO FIND 'C' FACTOR (0% IMPERVIOUS)

$C = 0.34 \Rightarrow$ RUNNOFF $= (0.34)(2.2') = 0.75$

RUNOFF VOLUME:

$$V = (5.13\ AC)(.75\ IN)\left(\frac{1\ FT}{12\ IN}\right) = 0.32\ AC\text{-}FT$$

B) PEAK DISCHARGE

$Q = CIA$ $\quad C = 0.34$

$A = 5.13\ AC$

PROJECT NAME	INTERSTATE INDUSTRIAL	SHEET 1	OF
PROJECT NO.	20810	BY JD	DATE 10 6 8
SUBJECT	DRAINAGE	CH'D	DATE

NEED T_c TO FIND I. USE KIRPICH TO GET T_c:

$$T_c = 0.0078 \frac{L^{0.77}}{S^{0.385}} \qquad \begin{cases} L = 630' \\ S = 0.017 \end{cases}$$

$\Rightarrow T_c = 5.4$ MINUTES

USE $T_c = 10$ MINUTES (MINIMUM ALLOWABLE)

GET I FROM PLATE 22.2 D-2

$$I = (6\text{HR RAIN})\ 6.84\ T_c^{-0.51}$$

$$= (2.2)(6.84)(10^{-0.51}) = 4.65\ \text{IN/HR}$$

$$\therefore Q_p = CIA = (0.34)(4.65)(5.13)$$

$$= 8.1\ \text{CFS} = 100\ \text{YR PEAK Q}$$

PROJECT NAME INTERSTATE INDUSTRIAL SHEET 2 OF
PROJECT NO. 20810 BY JD DATE 10 6 22
SUBJECT DRAINAGE CH'D DATE

II) DEVELOPED CONDITIONS

- % IMPERVIOUS = 90%

$\Rightarrow$ C = 0.86 FROM PLATE 22.2 C-1

A) VOLUME

$V = (5.13 \text{ ACRE})(2.2 \text{ IN RAIN})(0.86)\left(\frac{1}{12} \frac{\text{IN}}{\text{FT}}\right)$

$= 0.81$ AC FT

B) PEAK DISCHARGE

$Q = CIA$ $\quad C = 0.86$, $A = 5.13$ AC

SINCE T_c FOR UNDEVELOPED CONDITION WAS UNDER 10 MIN, THE DEVELOPED T_c IS ALSO UNDER 10 MIN —— USE $T_c = 10$ MIN

$\Rightarrow I = 4.65$ IN/HR (PLATE 22.2 D-2)

$\therefore Q = CIA = (0.86)(4.65)(5.13)$

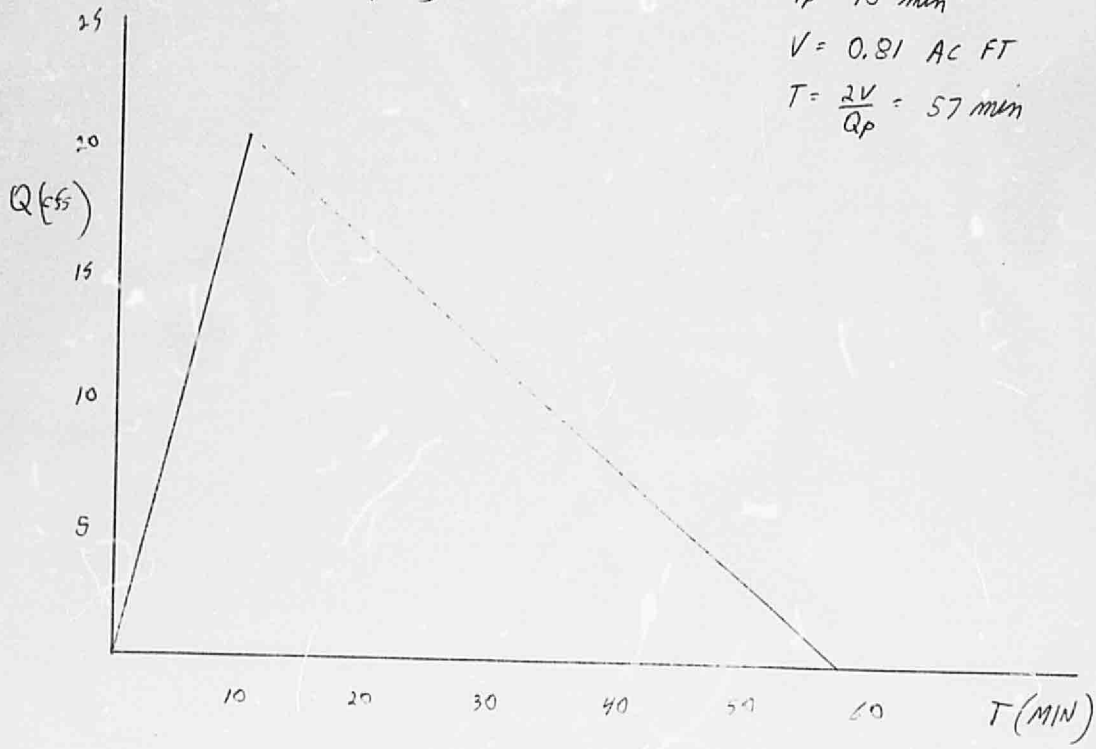
$= 20.51$ CFS

PROJECT NAME	INTERSTATE INDUSTRIAL	SHEET 3	OF
PROJECT NO.	20810	BY JP	DATE
SUBJECT	DRAINAGE	CH'D	DATE

PROJECT NAME CLIFFORD WEST
PROJECT NO 20813
SUBJECT
SHEET 4 OF
BY
DATE 10/27
CH'D
DATE

DEVELOPED HYD FROM SITE TO POND

$Q_p = 20.5$ CFS
$T_p = 10$ min
$V = 0.81$ AC FT
$T = \frac{2V}{Q_p} = 57$ min



III) FLOW FROM SITE WILL GO TO DETENTION POND NEAR S.W. CORNER. ABOUT 5 ACRES OF THE SOUTHERN PARCEL WILL ALSO DRAIN TO THIS POND

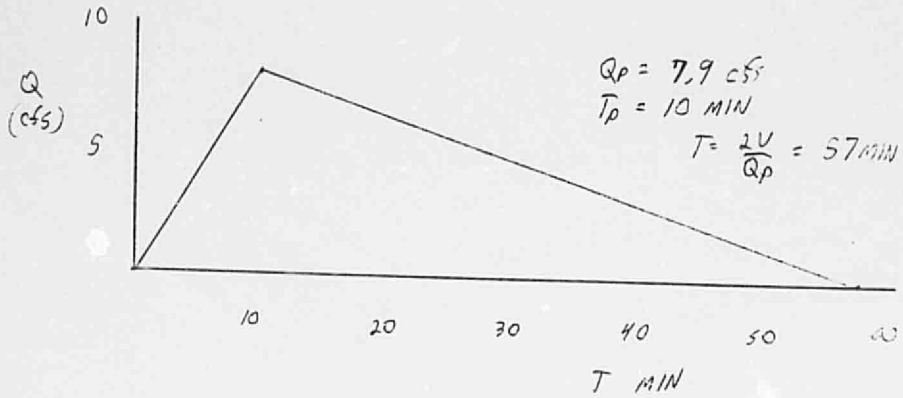
PEAK Q $\rightarrow$ $Q = CIA$

WHERE $C = 0.34$, $I = 4.65$ } SAME AS FOR NORTHERN (PROJECT) SITE, UNDEVELOPED

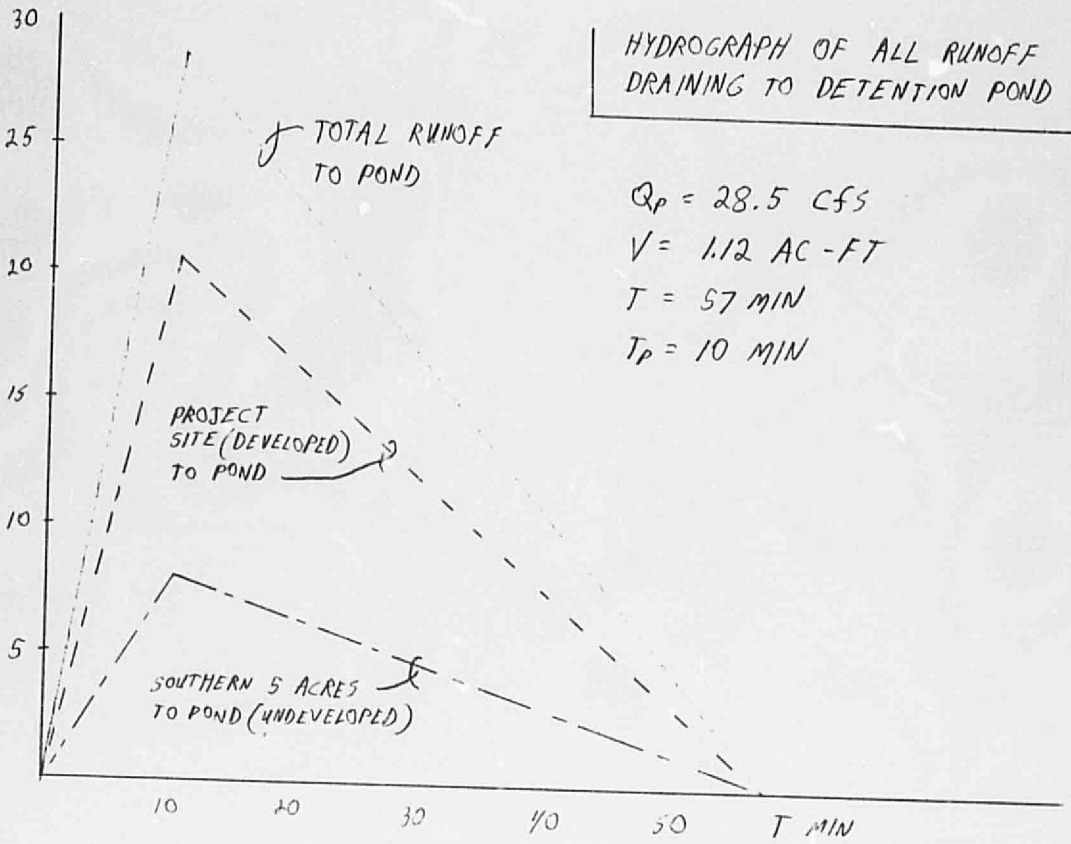
$A = 5$ AC

$Q = (0.34)(4.65)(5) = 7.9$ cfs

$V = (0.34)(2.2 \text{ IN})(5 \text{ AC})(\frac{1}{12}) = 0.31$ A-F



PROJECT NAME CLIFFORD WEST
PROJECT NO. 20213
SUBJECT
SHEET 5 OF
BY JJ DATE 10-27-
CH'D DATE



HYDROGRAPH OF ALL RUNOFF DRAINING TO DETENTION POND

Q_p = 28.5 cfs

V = 1.12 AC-FT

T = 57 MIN

T_p = 10 MIN

PROJECT NAME CLIFFORD WEST

PROJECT NO. 20813

SUBJECT

SHEET 8 OF

BY

DATE

CH'D

DATE

THE RUST TRACTOR DRAINAGE REPORT CALLS FOR 19.8 cfs ENTERING THE CHANNEL FROM CLIFFORD PROPERTY. THE OUTLET CAPACITY OF THE POND (TO THE CHANNEL) WILL BE LIMITED BY THE FLOW REACHING THE CHANNEL FROM THE AREA SOUTH OF THE POND (ABOUT 10.8 ACRES). FOR THE SAKE OF CONSISTENCY, USE THE METHODOLOGY FOR THIS PARCEL FROM <u>APPENDIX L</u> OF THE RUST TRACTOR DRAINAGE REPORT:

$L = 1100'$ (LONGEST PART OF BASIN IS TO THE SOUTH)

$\Delta H = 5154 - 5122 = 26'$

$C = 0.50$

$T_c = 50$ MIN

$i = 2.45$ IN/HR

$A = 15.8 - 5.0 = 10.8$ AC

$\longrightarrow Q_{100} = CiA = (0.5)(2.45)(10.8) = 13.2$ cfs

$\therefore$ THE POND CAN DISCHARGE $19.8 - 13.2$
$= 6.6$ cfs

PROJECT NAME CLIFFORD WEST
PROJECT NO. 20813
SUBJECT
SHEET 7 OF
BY JJ DATE
CH'D DATE

GORDON HERKENHOFF & ASSOCIATES, INC. 302 Eighth Street, N.W. Albuquerque, New Mexico 87102 (505) 247-0294 ENGINEERING COMPUTATIONS	NAME OF PROJECT			SHEET NUMBER OF
	COMPUTED BY SGC	CHECKED BY	JOB NUMBER	DATE

APPENDIX "L"

OFFSITE 25 – FLOW VERIFICATION:

AREA – 15.8 ACRES

C – 0.50 (1.25 × 0.40)

ΔH = 5154 − 5128 = 26 FT

L = 1100 FT

S = 2.4 %

T_c = 50 MIN

i = 2.45 IN/HR

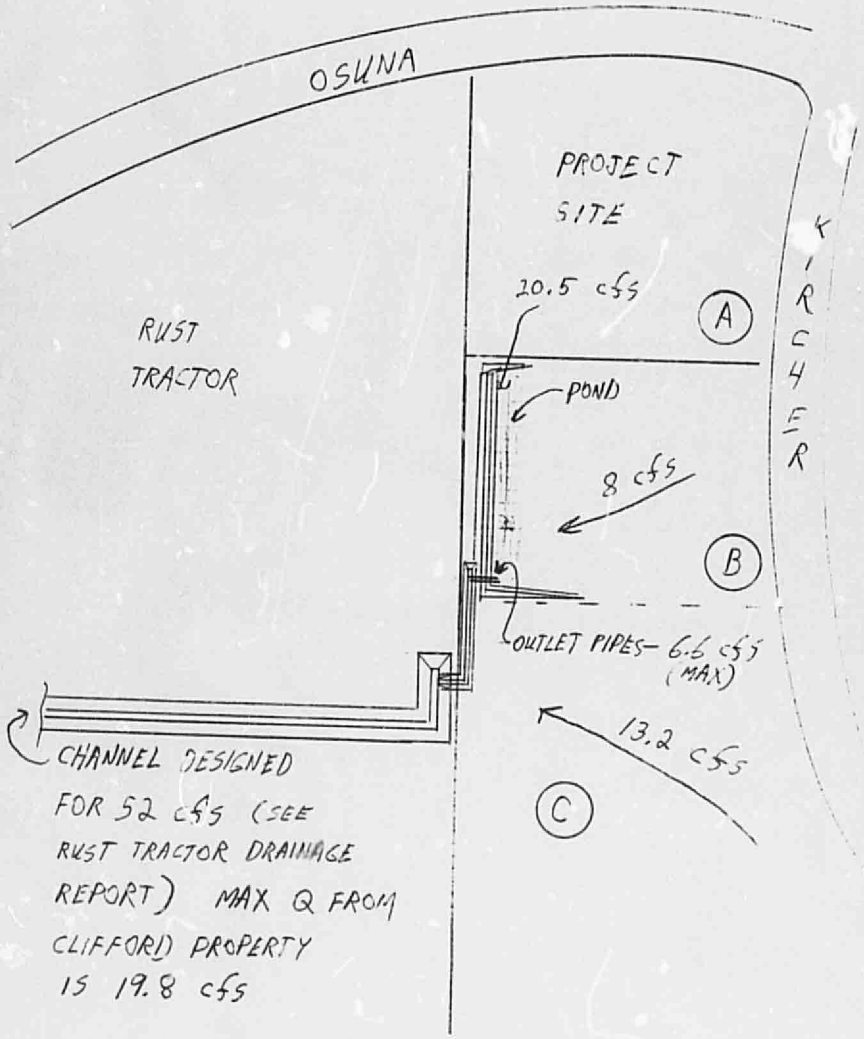
THEN: $Q_{100} = C i A$

or : Q_{100} = 0.50 × 2.45 × 15.8 = 19.36 cfs

THIS IS 32.64 CFS BELOW THE 52 CFS IN THE APPROVED 1994 DRAINAGE REPORT.

NOTE: THIS INFORMATION IS FROM FILES IN THE CITY ENGINEER'S OFFICE

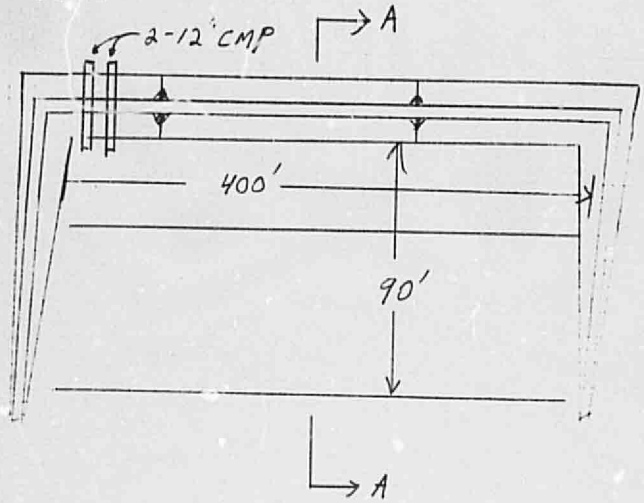
J. Dominick
10/27/92

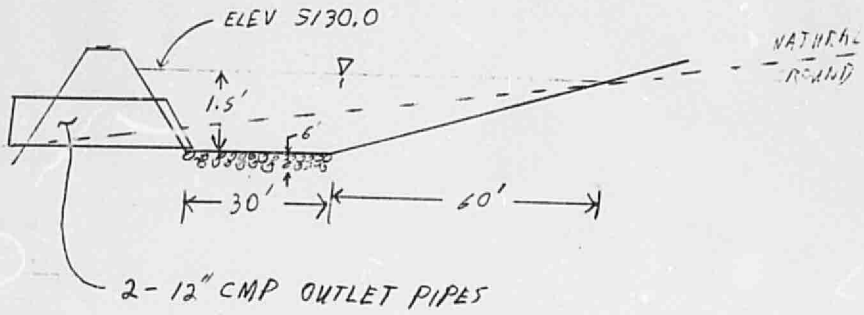


PROJECT NAME CLIFFORD WEST
PROJECT NO 20813
SUBJECT

SHEET 8 OF
BY JF DATE 10-27-22
CH'D DATE

FOR POND ROUTING, USE THE FOLLOWING POND GEOMETRY

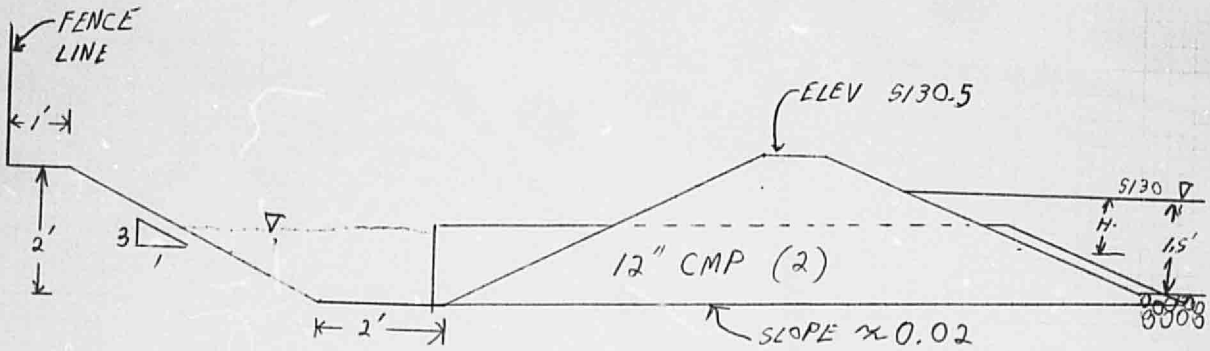




PROJECT NAME CLIFFORD WEST
PROJECT NO 20813
SUBJECT
SHEET 9 OF
BY JJ DATE 12-27-
CH'D DATE

PROJECT NAME CLIFFORD WEST
PROJECT NO. 20817
SUBJECT
SHEET 19 OF
BY
DATE 10/27/02
CH'D
DATE

DETENTION POND OUTLET



OUTFLOW FOR FLOOD ROUTING:

1) IF DEPTH IN POND IS LESS THAN 1.0', USE MANNINGS FLOW IN PIPE AT Y = POND DEPTH

2) IF DEPTH IN POND IS GREATER THAN 1.0', USE ORIFICE EQUATION.
$Q = C_D A \sqrt{2gH}$
$C_D = 0.54$ (INCLUDES GRATE LOSSES)
H IS MEASURED FROM CENTER OF PIPE

POND VOLUME AS A FUNCTION OF DEPTH

$$V = 400\left[30y + 20y^2\right]$$

THIS CAN BE REDUCED TO:

$$y = \sqrt{\left(\frac{V}{400} + 11.25\right)\left(\frac{1}{20}\right)} - 0.75$$

POND ROUTING

TIME MIN	INFLOW (CFS)	AVG INFLOW (CFS)	INCR VOLUME (FT^3)	OLD VOL + INC VOL (FT^3)	DEPTH IN POND (FROM ABOVE BR'N) (FT)	Q OUT (CFS)	Q OUT IN 5 MIN (FT^3)	VOL @ TIME "T" (FT^3)
0	0							
		7.2	2160					
5	14.3			2160	0.16	0.3	87	2072
		21.4	6420					
10	28.5			8472	0.52	2.8	839	7632
		27	8100					
15	25.5			15752	0.84	5.3	1595	14157
		25.9	7770					
20	22.4			21927	1.07	4.9	1472	20455
		20.9	6270					
25	19.4			26724	1.23	5.8	1740	24984
		17.9	5370					
30	16.4			30354	1.34	6.2	1869	28485
		14.8	4440					
35	13.3			32,925	1.41	6.5	1951	30,974
		11.8	3540					
40	10.3			34,514	1.46	6.7	1999	32,515
		8.3	2340					
45	7.3			35155	1.43	6.7	2022	33,133 ← MAX
		5.8	1740					
50	4.2			34873	1.47	6.7	2011	32,861
		2.7	810					
55	1.2			33671	1.43	6.6	1969	31702
		0.6	0					
60	0							
65								

PROJECT NAME ____ SHEET ____ OF ____
PROJECT NO. ____ BY ____ DATE ____
SUBJECT ____ CH'D ____ DATE ____

APPENDIX B

PERTINENT CORRESPONDENCE

BOHANNAN-HUSTON INC.
ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

October 13, 1981

Mr. Charles Easterling
Principal Assistant City
Engineer – Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Conceptual Drainage Report for the Proposed Five Acre Development on the Southwest Corner of Osuna and Kircher

Dear Chuck:

The purpose of this letter is to transmit the above-referenced conceptual drainage report for your review and comments. We anticipate the development plan for this project to be heard by the Environmental Planning Commission again in October or November, 1981. Your comments concerning drainage will greatly aid EPC in arriving at their decision. As a reference document for flows in Osuna and Kircher, we would like to refer you to our drainage study for the Interstate Industrial Tract submitted along with this conceptual report.

PROTECTION AGAINST UPLAND FLOWS

The flows in Kircher and Osuna were identified in the above-referenced report. In order to protect the site from flows in the adjoining streets, it is recommended that the berms along the streets and water blocks in the drives be established at least 2.2 feet above the flow line in the adjoining streets to ensure that the project is not inundated by flows entering the property from adjoining rights-of-way.

ON-SITE DEVELOPED FLOWS

It is recommended that the discharge from the developed site be controlled at a rate equal to the undeveloped flow rate from the property. To avoid further aggravating peak flows in Osuna, it is recommended that the discharge from the property be at the southwest corner of the development. This flow would then enter the swale along the east and south boundaries of the Rust Tractor site and eventually enter the Bear Canyon Arroyo. Since the flow rates will be controlled to predeveloped conditions, it should not cause a problem downstream.

If the above concepts meet with your approval, please advise and we will send the correspondence on to the Environmental Planning Commission. Should you have further recommendations concerning alternate ways of handling the drainage, please advise.

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

cc: Mr. Rich Leonard
Mr. Bob Wharton

MME/dlh
Job No. 1 130 0

APPENDIX C

DRAINAGE COVENANT AND EASEMENT

DRAINAGE COVENANT

THIS COVENANT made this _____ day of _____, 1982, by and between the City of Albuquerque, a municipal corporation, (City) and Jack M. Clifford and Company (Owner, which term includes successors and assigns.)

RECITAL

The Owner is owner of certain real property located at Kircher Boulevard, south of Osuna Boulevard, in Albuquerque, New Mexico, (the Property) and more particularly described as follows:

The west half of the northern five acres of Tract C-3, of Interstate Industrial Tract (see replat of Block C, Unit II, Interstate Industrial Tract and Tract C-1, Group Nine Industrial Tract, filed 21 December 1978).

That pursuant to City ordinances, regulations, and other applicable laws, the Owner is required to install and/or maintain certain drainage facilities on the Property, and the parties wish to provide for an agreement as to the obligations and responsibilities for same.

DESCRIPTION OF FACILITIES

The following facilities are to be constructed and/or maintained by the owner:

A temporary detention facility consisting of a two-foot high earth berm, two 12" diameter outlet pipes, and a two-foot deep earth channel. This facility will be abandoned upon development of the land on which it is located.

CONSTRUCTION OF DRAINAGE FACILITIES

The Owner shall construct the drainage facilities in accordance with standards, plans, and specifications prescribed and approved by the City.

MAINTENANCE OF FACILITIES

The Owner shall, at his cost in accordance with the standards, plans, and specifications prescribed by the City, maintain said drainage facility. The City shall have the right to enter periodically upon the Property to inspect the drainage facility.

FAILURE TO COMPLY AND LIEN

In the event that the Owner shall fail to construct the drainage facility in accordance with standards, plans, and specifications prescribed and approved by the City or fail to adequately maintain said facilities, the City shall give the Owner notice in writing to construct, correct, or maintain said facilities, and if the Owner fails to comply therewith within 60 days, the City may enter upon said property to perform the necessary construction or maintenance. The cost of the City's performing such construction or maintenance shall be paid by the Owner. In the event the Owner fails to pay said cost within thirty (30) days after being billed for same, the City may file a lien against the Property.

LIABILITY

The City shall not be liable for any damages to the Owner resulting from its construction, modification, or maintenance of said facilities.

NOTICE

The written notice provided for herein shall be accomplished by mailing same to:

Jack M. Clifford & Company
2201 San Pedro, N.E.
Albuquerque, NM 87110
Attention: Mr. Robert Wharton

The owner may change said address by filing written notice, certified mail, return receipt requested, to the City Engineer, City Hall, at 505 Marquette Street, Albuquerque, New Mexico 87103.

INDEMNIFICATION AND HOLD HARMLESS

The Owner 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 for or on account of any matter arising from the drainage facility provided for herein or the Owner's failure to construct, maintain, or modify the drainage facility under this Covenant.

COVENANT RUNNING WITH THE PROPERTY

The obligation of the Owner set forth herein shall be binding upon the Owner, his heirs, and assigns, and the property of the Owner as described herein and will run with said property until released by the City.

OWNER

Jack M. Clifford & Company

By _____

Title _____

REVIEWED BY THE LEGAL DEPARTMENT

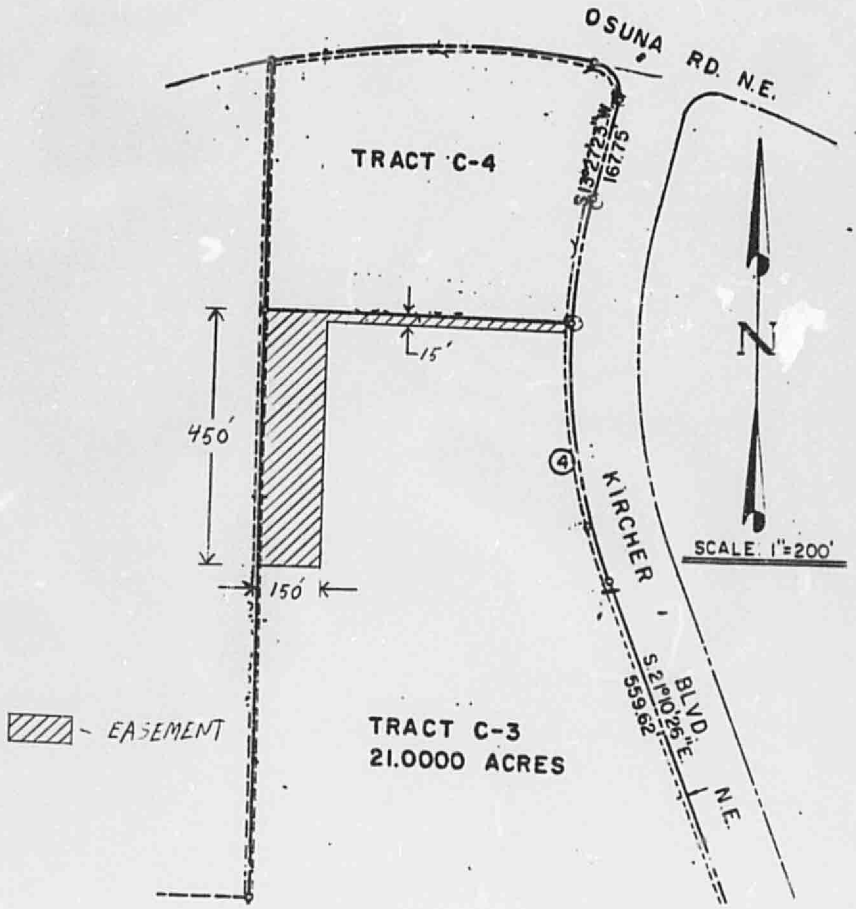
_____

Assistant City Attorney

CITY OF ALBUQUERQUE

_____

Chief Administrative Officer


OSUNA RD. N.E.
TRACT C-4
S13°27'25"W
167.75
15'
450'
150'
KIRCHER BLVD. N.E.
S2°10'26"E
559.62
N
SCALE 1"=200'
EASEMENT
TRACT C-3
21.0000 ACRES

HYDROLOGY

E17/D24

2 OF 2

0358