HYDROLOGY L20/D7 THREE PLANS

L20/D7

3 PLANS

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE REF. NO._____

March 30, 1979

TO: Phil Garc'a

FROM: Bruno Conegliano

SUBJECT: Zone Change for Tracts # & F, Lands of O. B. VAN CLEAVE Ad. No.3 Z.A. L-20

I have received the expression of concern of Mr. VanBerg, Manager of the Mobile Home Park immediately to the west of the referenced tract, in regard to the drainage conditions of the area. Even under the conditions of use as a drive-in Theater, substantial runoff from the east affected the Mobile Home development in question.

Inadequate storm sewer capabilities are a contributing factor to this problem in the area and great care will have to be exercised in the development of the referenced tracts in order to avoid further deterioration of the drainage conditions in this area and in the area west of Wyoming.

Please advise on any planning action that may be taken in this area. It is my opinion that a drainage study of the existing storm sewer facilities needs to be performed before concurrence with the development of these tracts is granted.

BC/ms

cc - Dick Heller
Jerry Davenport
Drainage File

FRED DENNEY & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 87114
(505) 898-2457

April 2, 1979

RECEIVED
APR 02 1979
CITY ENGINEERS

Mr. Bruno Conegliano
Drainage Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Report for Van Cleave
Mobile Home Park
Albuquerque, New Mexico
F.D. Job No. 383.12

Dear Mr. Conegliano:

Transmitted herewith are three (3) copies of subject drainage report for your review and approval.

It you have any questions or comments, please do not hesitate to contact us.

Very truly yours,

John A. Segotta

John A. Segotta

JAS/lm

Enclosures

Bob - Please Handle the processing (RSK)

FRED DENNEY & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 87114
(505) 898-2457

L 20-07

April 3, 1979

APR 03 '79

Mr. Richard Heller
City Engineer
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Van Cleave Place Mobile Home Park
F.D. Job No. 383.12

Dear Dick:

Transmitted herewith are 6 sets of prints and the mylar reproducible of the plans for subject project for your review and approval. Please note that all streets, water and sewer within the tract will be privately owned and maintained. The exception being the unmetered fire line. The outfall sewer line which empties to an existing manhole on General Hodges S.E. is shown in detail on sheets 7 and 8 of the plans. The water system will connect to a master meter from an existing 6" C.I. Main in Trumbull Avenue. A drainage plan and report was submitted to you on April 2, 1979.

If you have any questions or comments, please give us a call.

Very truly yours,

Louis W. Gross

Louis W. Gross

LWG/lm

Enclosures

cc: Charles Barnhart

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

MAYOR
David Rusk

April 17, 1979

Mr. John A. Segotta
Fred Denney & Assoc., Inc.
5643 Paradise Blvd. N.W.
Albuquerque, New Mexico 87114

Re: Drainage Report for Van Cleave Mobile Home Park

Dear Mr. Segotta:

I have received the drainage report for the referenced development and my comments are as follows:

The AMAFCA Resolution 72-2 specifies necessary conditions that must be satisfied before approval for proposed new development is granted. Nevertheless when in specific locations, poor drainage and/or flooding conditions are known to exist, the requirements of the City may be more stringent than those of the mentioned resolution.

Such is the case for the proposed mobile home development. Wyoming Blvd. in the proximity of Trumbull, Zuni and Central Ave. is known to be subject to flooding, which is the result, at least in part, of the uncontrolled runoff from the existing Drive-in Theaters. Eventhough the existing conditions of complete imperviousness of the grounds would be slightly improved by the proposed conversion of one of the theaters to a mobile home park, the modest reduction in the peak flow indicated in the drainage report is not sufficient to alleviate substantially the present poor drainage conditions. In order to grant approval to this development, I am therefore requesting that on this site ponding provisions be supplied to the same extent as of the initial conditions even those of bare ground with vegetative cover instead of a paved area. In other words the amount of runoff allowed to exit the site will be that which can be computed by using a runoff coefficient C=0.4.

The engineer will also have to evaluate the present conditions of Trumbull Ave. when he proposes to discharge the flow from this development. The watershed contributing its runoff to that street must be identified, the peak discharge evaluated together with the maximum depth and velocity of flow at critical points in the street (i.e. at the location of the changes in grade and at the intersection with Wyoming Blvd.).

The grading plan indicates that extensive regrading of the site will be performed, which will result in the raising of the ground level at the N.W. corner of the parcel by some 5.5 feet. Retaining walls will have to be provided at the boundary of the property to absorb the difference in elevation between the proposed elevations and the existing ground level. I want also at this point to call the attention of the engineer to Section 40C of the Zoning Code in regard to the maximum wall height between adjacent residential areas. Compliance with this requirement must be verifiable through an inspection of the site grading plan which must be furnished with much greater detail than the one submitted with the drainage report. I will be available to discuss these matters further if you find it necessary.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller, City Engineer
Rich Leonard, AMAFCA
Drainage File

FRED DENNEY & ASSOCIATES, INC.
CONSULTING ENGINEERS
5543 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 87114
(505) 898-2457

April 19, 1979

RECEIVED
APR 23 1979
CITY ENGINEERS

Mr. Bruno Conegliano
Drainage Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Dear Bruno:

We have received your communication pertaining to the Van Cleave Mobile Home Park.

We find nothing in the resolution giving you the authority to do what you are proposing. We've read it carefully and we see nothing that would make it the responsibility of an individual developer to correct any problems which exist in the area other than those which might be generated on his own property. Improvements in the Drive-In Theatre predate the drainage resolution and therefore we think that we probably could take the position that it is not necessary for us to store any water on the site.

As to the observation about the retaining walls, we submit that that is outside the purview of the Drainage Engineer and runs to regulations administered by other City Departments.

Please be advised that we will in the immediate future confer with people at higher levels of authority in City Government, with the Executive Engineer of the authority, and then we'll decide if an appeal to the Technical Standards Committee is to be initiated.

Very truly yours,

Fred Denney

Fred Denney

FD/lm

cc: Richard Heller
Richard Leonard
Gerald Davenport
Charles Barnhart

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEERS OFFICE

Memorandum - April 27, 1979

TO: Gerald Davenport, Director, Municipal Devel.

FROM: Bruno Congeliano, Assistant City Engr./Hydrology

RE: VAN CLEAVE MOBILE HOME PARK

Enclosed is a copy of the correspondence between myself and the engineer for the referenced project. I have held conversations with John Myers of the City Attorney's Office who has indicated he will forward an opinion in support of my position. The contention is that since the requirements indicated in my letter dated April 17, 1979 are in keeping with the public good, they should be complied with. John Myers is aware that no specific legislation exists at this time stipulating that the City may have more stringent requirements than those indicated in the A.M.A.F.C.A. resolution 72-2.

cc - Dick Heller
Rip Orr
✓ Drainage File

FRED DENNEY & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 87114
(505) 898-2457

May 9, 1979

Mr. Bruno Conegliano
Drainage Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Report for
Van Cleave Place Mobile
Home Park
F.D. Job No. 383.12

Dear Mr. Conegliano:

Transmitted herewith are computations and accompanying exhibits in which we have analyzed the carrying capacity of Trumbull Avenue so that we can demonstrate to you that the development of subject project will not create flooding problems on said street.

The following calculations are submitted in support of this statement:

Watershed Area & Runoff Carried By Trumbull Avenue: (See Exhibit B)

1. Watershed - Total Area = 55.13 Acres
2. Runoff Factor = 0.5
3. Tc = 4650 ÷ 2(60) = 38.75 Minutes
4. I = 189 ÷ (38.75 - 25) = 2.96 in/hr
5. Q = 55.13 x 2.96 x 0.5 = 81.60 cfs

Van Cleave Place Mobile Home Park

1. Total Area = 11.94 Acres
2. Runoff Factor = 0.762 (Computed in Drainage Report)
3. Tc = 1365 ÷ 2(60) = 11.38 Minutes (Computed in Drainage Report)
4. I = 2.96 in/hr (From 4 above)
5. Q = 11.94 x 2.96 x 0.762 = 26.93 cfs

Street Capacity (Typical City of Albuquerque Residential Street)

$A = (0.67 + 0.33)/2 \times 16.63 \times 2 = 16.63$ sq.ft.

$P = (16.01 + 0.69 + 0.46) \times 2 = 34.32$ ft.

$R = 16.63/34.32 = 0.485$

$n = 0.013$

Minimum slope on Trumbull Avenue = 1.1%

$Q = (1.486/0.013)(0.485)^{2/3}(0.0110)^{1/2}(16.63) = 123.07$ cfs

The carrying capacity of Trumbull Avenue at minimum slope is 123 cfs. As shown by the composite hydrograph (See Exhibit A), the carrying capacity of Trumbull Avenue is adequate to handle runoff from the watershed as well as runoff from subject development. It is therefore our contention that runoff from the project area will not adversely affect drainage conditions or carrying capacity on Trumbull Avenue.

We trust that the information provided herewith will enable you to make a positive decision with regards to subject project.

If you have further questions or comments, please call.

Very truly yours,

John A. Segotta

John A. Segotta

JAS/lm

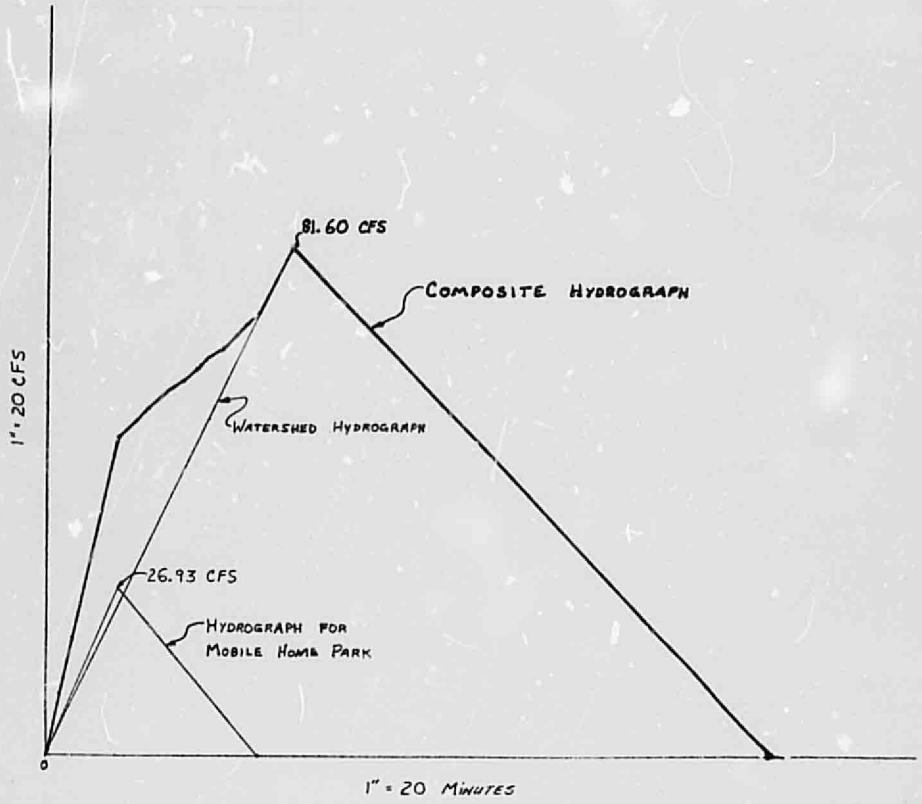
81.60 CFS
COMPOSITE HYDROGRAPH
1" = 20 CFS
WATERSHED HYDROGRAPH
26.93 CFS
HYDROGRAPH FOR
MOBILE HOME PARK
0
1" = 20 MINUTES

EXHIBIT A

FRED DENNEY & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 87114
(505) 898-2457

May 10, 1979

Mr. Bruno Conegliano
Drainage Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Report for
Van Cleave Place Mobile
Home Park
F.D. Job No. 383.12

Dear Mr. Conegliano:

Transmitted herewith are computations and accompanying exhibits in which we have analyzed the carrying capacity of Trumbull Avenue so that we can demonstrate to you that the development of subject project will not create flooding problems on said street.

The following calculations are submitted in support of this statement:

Watershed Area & Runoff Carried by Trumbull Avenue: (See Exhibit B)

1. Watershed - Total Area = 55.13 Acres

2. Runoff Factor = 0.5

3. Tc = 4650 ÷ 2(60) = 38.75 Minutes

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Van Cleave Place Mobile Home Park

1. Total Area = 11.94 Acres

2. Runoff Factor = 0.762 (Computed in Drainage Report)

3. Tc = 1365 ÷ 2(60) = 11.38 Minutes (Computed in Drainage Report)

4. I = 2.96 in/hr (From 4 above)

5. Q = 11.94 x 2.96 x 0.762 = 26.93 cfs

Street Capacity (Typical City of Albuquerque Residential Street)

A = (0.67 + 0.33)/2 x 16.63 x 2 = 16.63 sq.ft.

P = (16.01 + 0.69 + 0.46) x 2 = 34.32 ft.

R = 16.63/34.32 = 0.485

n = 0.013

Minimum slope on Trumbull Avenue = 1.1%

$Q = (1.486/0.013)(0.485)^{2/3}(0.0110)^{1/2}(16.63) = 123.07$ cfs

The carrying capacity of Trumbull Avenue at minimum slope is 123 cfs. As shown by the composite hydrograph (See Exhibit A), the carrying capacity of Trumbull Avenue is adequate to handle runoff from the watershed as well as runoff from subject development. It is therefore our contention that runoff from the project area will not adversely affect drainage conditions or carrying capacity on Trumbull Avenue.

We trust that the information provided herewith will enable you to make a positive decision with regards to subject project.

If you have further questions or comments, please call.

Very truly yours,

John A Segotta

John A. Segotta

JAS/lm

Attachment (Exhibit B)

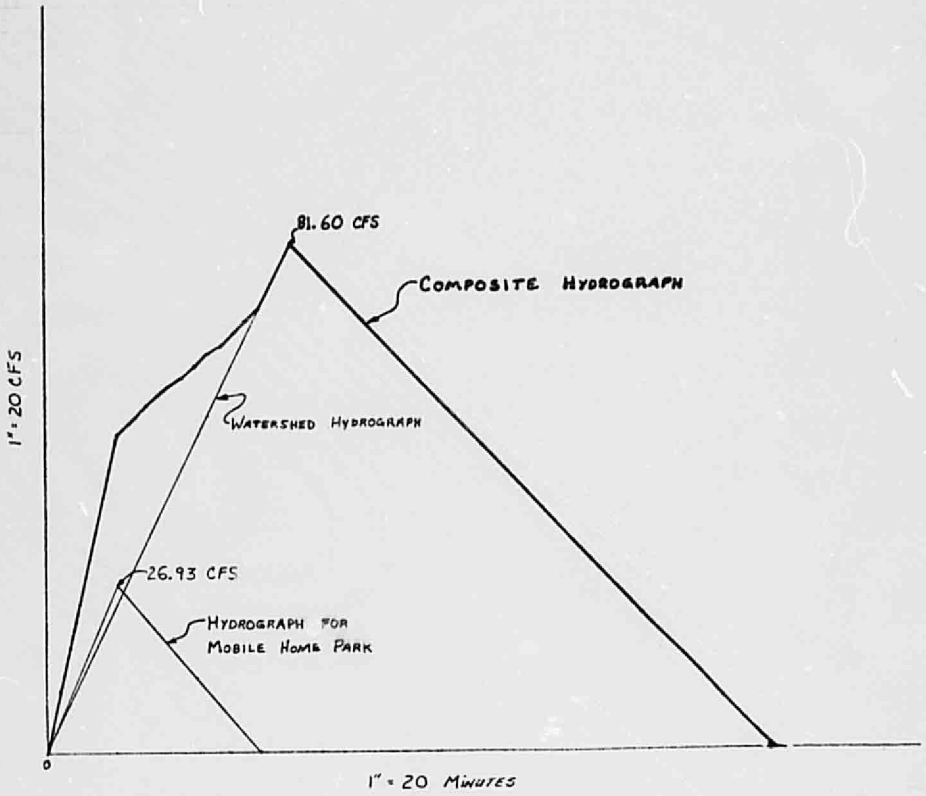
81.60 CFS
COMPOSITE HYDROGRAPH
1" = 20 CFS
WATERSHED HYDROGRAPH
26.93 CFS
HYDROGRAPH FOR
MOBILE HOME PARK
0
1" = 20 MINUTES

EXHIBIT A

FRED DENNEY & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 87114
(505) 898-2457

May 22, 1979

Mr. Bruno Conegliano
Assistant City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Plan
Van Cleave Mobile Home Park
F.D. Job No. 383.12

Dear Mr. Conegliano:

Transmitted herewith are three copies of the Grading Plan for subject project which was revised in accordance with your agreement with Mr. Charlie Barnhart. The revised Grading Plan reflects the change of the drainage exit from Trumble Avenue as was recommended in our drainage plan of April, 1979, to a point near the northwest corner. The peak discharge from the site will essentially be the same.

Very truly yours,

Louis W. Gross

LWG/lm

Enclosures

CLASSICS LIMITED

Mobile Home Sales Lot
11904 Central Ave., S.E.

Van Cleave Place
Mobile Home Park
9200 Trumbull, S.E.

2526 HAROLD PLACE, NORTH EAST ALBUQUERQUE, NEW MEXICO 87106

June 8, 1979

Mr. Jerry Porter
Albuquerque National Bank
Trust Department
Third and Roma, NW
Albuquerque, New Mexico

Re: Tract E Lands of Otto Van Cleave

Dear Mr. Porter:

We have submitted drainage plans to the City of Albuquerque indicating a fill of approximately 2 1/2 feet in the northwest corner of Tract E in order to drain the run-off from Tract E into Trumbull. We are advised by the City of Albuquerque that Trumbull cannot carry the additional run-off of Tract E and the City therefore, requested that we continue draining Tract E through the northwest corner of Tract E onto the other lands of the Van Cleave estate now developed into a mobile home park.

We have prepared and submitted plans to the City of Albuquerque showing the drainage to continue through the northwest corner, however, we are substantially reducing the amount of the drainage through removal of asphalt surfaces that have been there during its use as the Wyoming Drive-In Theater. Drainage to the northwest corner is the historical drainage to the property. However, the City would like to have concurrence from Albuquerque National Bank as trustee to continue using the historical drainage of the site with substantial reduction in flow. I have prepared a short statement at the bottom of this letter for your execution if the same is agreeable to you.

Very truly yours,

Charles E. Barnhart

CHARLES E. BARNHART
CEB/dcg

The Albuquerque National Bank, as trustee for the lands of Otto Van Cleave, has no objection to continuing the historical run-off pattern from Tract E, lands of Otto Van Cleave, with a substantial reduction to run-off flow.

Jerry Porter

Reading file

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

June 8, 1979

Mr. Lou Gross
Fred Denney and Assoc., Inc.
5643 Paradise Blvd. N.W.
Albuquerque, New Mexico 87114

Ref: Van Cleave Mobile Home Park

Dear Mr. Gross:

The revised grading plan for the referenced development is in agreement with the understanding reached with the developer Mr. Charles Barnhart. Formal consent by the owner of the land west to continue to receive the runoff from this parcel will allow the the immediate release of this project.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/ms

cc - Richard Heller, City Engineer
Richard Leonard, AMAFCA
Charles Barnhart
Drainage file

Rec'd. By FJA/HELLER

Date 8-15-79

PUBLIC WORKS DEPARTMENT
CITY ENGINEER OFFICE
DRAINAGE SECTION

COMPLAINT FORM

Subd. _____
Lot _____
Block _____
Zone Atlas _____

Address of complaint 9000 ZUNI S.E. (TERRACE MOBILE PARK)

Directions _____

Complainant MR VAN BERG Address _____ Phone 298-1061

Nature of Complaint:

- NEW MOBILE HOME MAY CAUSE PROBLEM TO THE ADJACENT PARK IF THE RUNOFF IS INCREASED.
- LOOK FOR ACCEPTED DEVELOPMENT PLAN

Investigated by: B. Montoya Date 8-20-79

Report of Investigation: See attached Remarks and maps

Sketch

REMARKS: Runoff water from Van Cleave Place Mobile Home Park which is under construction at this time is draining at the Northwest corner of said parcel on to the Terrace Mobile Park just North of Van Cleave Place Mobile Home Park. The increased run off is so large that combined with the runoff from the Terrace Mobile Park the drains along Wyoming Blvd. can not drain the run off fast enough so as not to cause ponding along the areas of the drains. Because of the increase runoff from the new mobile Park the mobile homes adjacent to the new mobile Park consequently are being flooded.

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - August 17, 1979

TO: R. S. Heller, City Engineer
FROM: Q. R. Kielich, Acting City Engineer QRK
SUBJECT: FLOODING OF TERRACE PARK MOBILE HOME PARK

1. I received a call from Mr. Van Berg, manager of Terrace Mobile Home Park on Zuni East of Wyoming at 9:00 P.M. on August 16, 1979. He was very irate since no response from the City Engineer's Office had been made to his previous request concerning his drainage problem. I went out to see him that night.

2. Originally, a very small run-off ran through his Mobile Home Park from the former Wyoming Drive-In Theatre. The new approved grading has dumped all of the run-off onto the Mobile Home Park. Last night many of the mobile homes had water running under them.

3. Fred Aguirre was to meet with him during the day but apparently was tied up and could not go out. Mr. Van Berg had waited all day for him. I have instructed Fred to go out and meet with Mr. Van Berg and report back to Bruno.

4. In addition to his problem of run-off from the newly graded trailer park, he has another problem in that the drainage from his Park onto Wyoming was blocked off when Wyoming was paved and sidewalks put in. Consideration might be given to providing him with pipes brought from the storm inlets to his low points and then allow him to install storm inlets on his property to drain onto City inlets. I believe that the cost would not be prohibitive.

5. Mr. Van Berg indicated that there was a decided lack of communication between the City and himself as to the transporting of run-off from the new mobile park through his mobile park.

6. Recommend that after all facts are gathered a meeting be set up between the City Engineer and Mr. Van Berg.

QRK/tsl

cc: Bruno Conegliano, Asst. City Engineer-Hydrology
Fred Aguirre, Asst. Hydrology Eng.

Goldberg - Mann & Associates, Inc.
Engineers - Planners
811 Dallas St., N.E. Albuquerque, New Mexico 87110 (505) 265-5611

November 5, 1979

9-90

Mr. Bruno Conegliano
Assistant City Engineer
Division of Engineering
P.O. Box 1293
Albuquerque, New Mexico 87103

L21-D1

Re: Drainage Plan at Cochiti Road and Shirley Street S.E.

Dear Bruno:

As per our meeting with Rip Orr on Wednesday, October 31, 1979, I am transmitting to you the following information.

Attached you will find a copy of the plan and profile sheets from special assessment district 194 prepared by Wilson and Company. The grades for Cochiti are shown on that sheet. I have sketched the building location on that sheet also. I believe this should answer your first question concerning the design of the street and the relationship of the building to the street.

Also I have estimated volume of runoff that will utilize the swale on the south side of the property. I estimate that the flow at the southwest corner of the project site will be approximately nine or ten cubic feet per second. I also estimate that the capacity of the swale at that point is approximately 32 cubic feet per second. Therefore, I feel that our building is reasonably well protected from normal stormwater runoff.

I request that you approve our drainage plan as soon as possible. If you have any questions or comments, please do not hesitate to call. Thank you.

Yours truly,

GOLDBERG-MANN & ASSOCIATES, INC.

Thomas T. Mann, Jr., P.E.
President

TTM:jj
Enc.

DRAINAGE REPORT
VAN CLEAVE PLACE MOBILE HOME PARK
ALBUQUERQUE, NEW MEXICO

PREPARED FOR
CHARLES E. BARNHART

APRIL, 1979

PREPARED BY
FRED DENNEY & ASSOCIATES, INC.
5643 PARADISE BLVD., N.W.
ALBUQUERQUE, NEW MEXICO 37114

I, Louis W. Gross, hereby certify that the enclosed documents and drawings were prepared under my supervision and are true and correct to the best of my knowledge and belief.

Louis W. Gross

New Mexico Registered Professional
Engineer and Land Surveyor No. 4100

LOUIS W. GROSS
NEW MEXICO
4100
REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR

DRAINAGE REPORT

Van Cleave Place Mobile Home Park

Albuquerque, New Mexico

I. PURPOSE:

The purpose of this report is to present the results of an analysis pertaining to drainage requirements in the subject area and a plan to provide for runoff which results from the development.

II. GENERAL:

This development is located within the City of Albuquerque on the South side of Central Avenue between Wyoming Boulevard, S.E. and Eubank Boulevard S.E. (previously the Wyoming Drive-In Theatre or Tract E of the Otto B. Van Cleave addition). The Wyoming Drive-In Theatre was constructed sometime prior to 1962.

III. DESCRIPTION OF SITE:

Van Cleave Place Mobile Home Park is bounded by Central Avenue on the North, by Tract F of the Otto B. Van Cleave addition on the East, by Trumbull Avenue S.E. on the South, and Tract C of the Otto B. Van Cleave addition on the West. (See Exhibit "A" for Location Map.) The development contains approximately 12 acres and slopes gently to the Northwest. In order to install utilities in the development a considerable amount of grading will be required. The grading will alter the topography resulting in a southwesterly slope. Internal runoff will therefore discharge onto Trumbull Avenue at the Southwest

entrance to the Mobile Home Park (See Exhibit "C"). The development presents a unique drainage situation because of the fact that the site has previously been occupied by a drive-in theatre which is completely paved. This has been the case previously to 1962 up to the present date. Therefore, the development will result in an improvement of the drainage conditions in the area because less runoff will be created from the development as opposed to existing conditions.

IV. EXTRANEOUS FLOW: (See Exhibit "D")

Streets will be sized to accommodate runoff developing within the mobile home park only. Runoff to the North and West is prohibited from entering onto the site by a combination rock and earth berm along these property lines. To the East of the development is the existing Terrace Drive-In Theatre. Runoff from this area is prohibited from entering into the development by an existing 5 foot block wall along the East boundary of the Van Cleave Place Mobile Home Park, also the West boundary of the Terrace Drive-In.

The drainage patterns of the site in its present condition follow a westerly direction and then South onto Trumbull Avenue. Trumbull Avenue drains West to Wyoming Boulevard and into the storm sewer system.

V. RUNOFF CRITERIA:

The Rational Method (Q = AIR) will be used to compute the runoff for a 100 year frequency storm. A "composite" runoff coefficient will be computed based on the runoff factors

for each of three types of surfaces receiving rainfall; roofed area, yard area and paved area. The Manning Equation $Q = (1.486/n)(R^{2/3}S^{1/2}A)$ will be used to check street capacities and to establish grades.

VI. COMPUTATIONS:

Intensities may be obtained from Exhibit "B" (City of Albuquerque-Master Plan for Drainage, 1961). Concentration times are determined using average velocities in developed area of 2 feet per second and undeveloped areas of 1.5 feet per second. A roughness coefficient (n) of 0.03 will be used in the Manning Equation.

DRAINAGE COMPUTATIONS:

1. Area: 520,076 sq.ft. = 11.94 acres
2. Composite Runoff Coefficient:

Impervious Area	= 376,300 sq.ft. =	8.64 acres
Landscaped & Natural Soil	= 143,776 sq.ft. =	3.30 acres
		11.94 acres

RUNOFF FACTORS:

1. Landscaped & Natural Soil = 0.4
2. Impervious Area = 0.9

Landscaped & Natural Soil	= 3.30 x 0.4 =	1.32
Impervious Area	= 8.64 x 0.9 =	7.78
		9.10

Composite Runoff Coefficient = 9.10 ÷ 11.94 = 0.762

3. Time of Concentration (Minimum Tc is 10 minutes as shown by Exhibit "B".)

   Tc = 1365 ÷ 2(60) = 11.38 minutes

4. Intensity

$189 \div (11.38 + 25) = 5.2$ in/hr

5A. Runoff (Q = AIR) After Development

$Q = 11.94 \times 5.2 \times 0.762 = 47.31$ cfs

5B. Runoff (Existing Condition, i.e. Completely Paved)

$Q = 11.94 \times 5.2 \times 0.900 = 55.88$ cfs > 47.31 cfs

Therefore, development will improve the drainage conditions.

6. Street Capacities

(See Street Sections - Exhibit "E".)

Street Section #1 (Typical Throughout Development)

$A = \left[\frac{1}{2}(.33)(14)+\frac{1}{2}(.33)(10)+\frac{1}{2}(3)(.33)(2)+(6)(.33)\right] \times 2 = 13.86\ ft^2$

$P = \left[10.01 + 3.02 + 3.02 + 14.00\right] \times 2 = 60.10$ ft.

$R = (13.86/60.10) = 0.231$

$n = 0.03$

The quantity of flow will be critical when the street slope is at a minimum. A slope of 0.43%, therefore will be used in the following calculation, as it will be the minimum slope of any of the major streets within the development.

$Q = (1.486/0.03)(0.231)^{2/3}(0.0043)^{1/2}(13.86) = 16.95$ cfs

Street Section #2 (120' Section which Discharges on Trumbull Avenue @ SW Corner.)

$A = \left[\frac{1}{2}(.33)(14)+\frac{1}{2}(3)(.33)(2)+(6)(.33)+\frac{1}{2}(10)(.67)+(20)(.33)\right] \times 2 =$

$= 30.46\ ft^2$

$P = \left[10.02 + 3.02 + 3.02 + 14.00\right] \times 2 = 60.12$ ft.

$R = (30.46/60.12) = 0.507$

$n = 0.03$

The street slope for this street section is 0.3%.

$Q = (1.486/0.03)(0.507)^{2/3}(0.0030)^{1/2}(30.46) = 52.54$ cfs

VII. CONCLUSIONS:

Based on preceding calculations, all streets will adequately handle the 100 year storm with street grades as designed. The internal runoff from the site will be discharged in the same area as is the existing condition. There will be no offsite flows entering onto the development.

In the event of a 100 year storm the site in its existing condition (completely paved) will create 55.88 cfs of runoff. After development, the site will discharge 47.31 cfs of runoff--a decrease of 8.57 cfs and therefore improving the drainage conditions in the area. No onsite ponding will therefore be required and each mobile home space will be graded to drain to the street. Runoff will be discharged onto Trumbull Avenue at the Southwest entrance to the mobile home park and follow existing drainage patterns to the storm sewer system on Wyoming Boulevard.

VIII. RECOMMENDATIONS:

1. That the subject subdivision be developed in accordance with the attached Grading Plan.

2. Since this plan improves existing drainage conditions, we recommend it be approved by the City of Albuquerque Drainage Engineer.

BIBLIOGRAPHY

AMAFCA Drainage Resolution 1972-2.

City of Albuquerque-Master Plan for Drainage, 1961.

Handbook of Hydraulics by King & Brater, 1963/

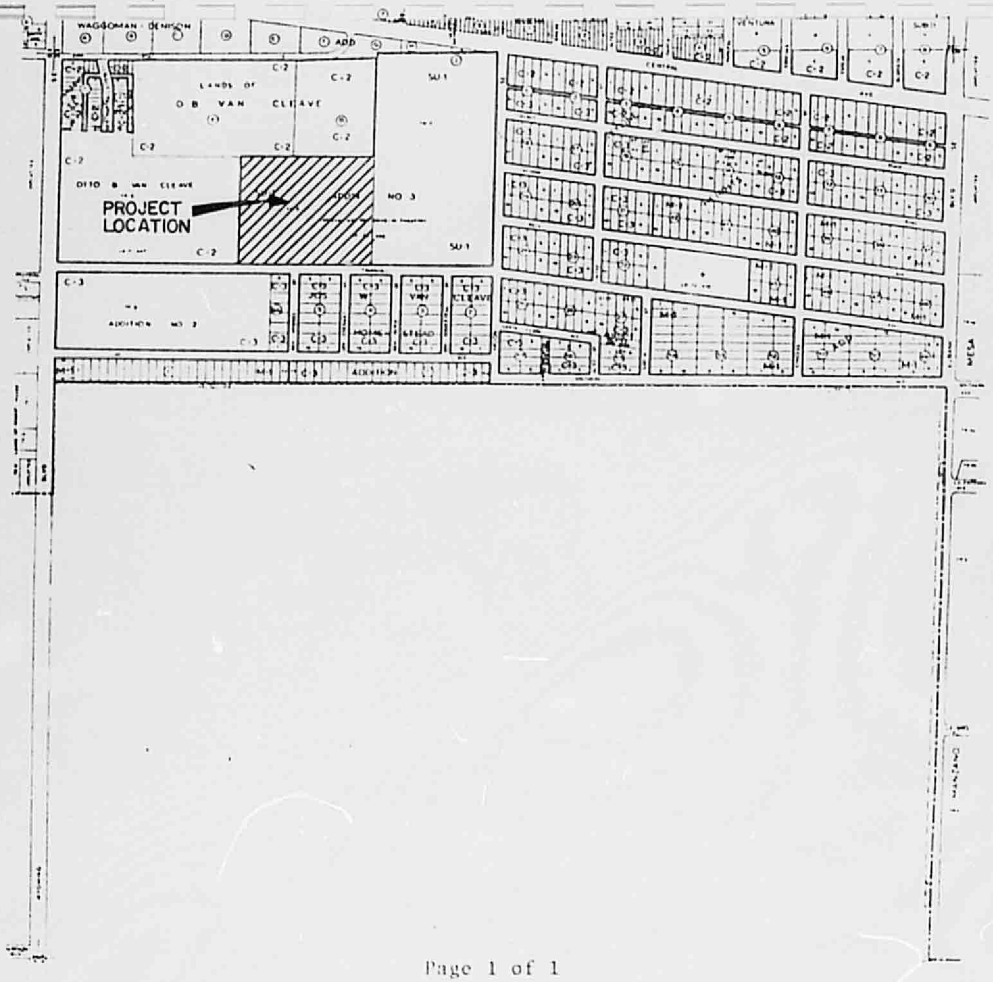

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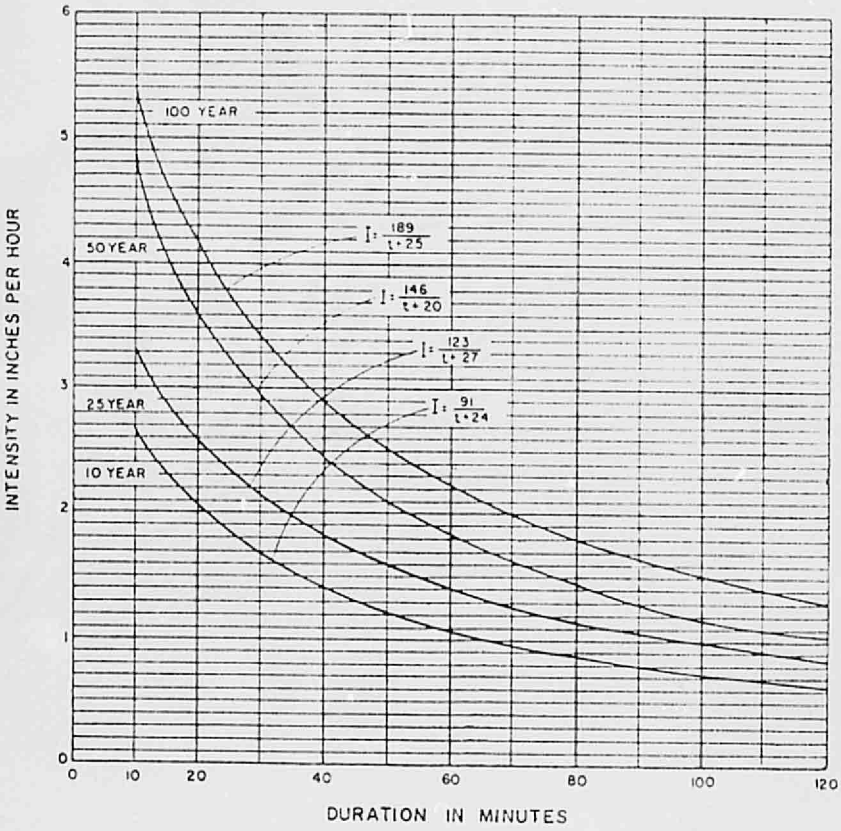
EXHIBIT A



MASTER PLAN OF DRAINAGE
CITY OF ALBUQUERQUE - NEW MEXI
AND ENVIRONS

INTENSITY DURATION
FREQUENCY CURVES

(ALBUQUERQUE AREA - 1961)

GORDON HERKENHOFF & ASSOC
CONSULTING ENGINEERS
ALBUQUERQUE, NEW MEXICO

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EXHIBIT B