HYDROLOGY H16/D6 TWO PLANS

H16/D6

2 Plans

File w/ Lomas Channel Workorder — Give Copy to Bruno

CITY OF ALBUQUERQUE, NEW MEXICO
OFFICE OF THE CITY ENGINEER

Date: 9-21-79

SUBJECT: Letter of Understanding Regarding Swimming Pool Discharge Lines

Property Address: 1726 Notre Dame NE

This office has no objection to the occassional discharge of swimming pool drain water into the unlined arroyo or unlined discharge channel adjacent to the property identified above, PROVIDED:

a) drain water is discharged in a non-erosive manner, and

b) the installation, revision and maintenance of the pool discharge pipe is the responsibility of the undersigned property owner, and

c) correction of any erosion of the arroyo or channel due to discharge of drain water is the responsibility of the undersigned property owners, and

d) this letter may be voided by the City Engineer in the event that a nuisance generating complaints to the City is created by the drain line.

What size pipe do you have?
2 inch

Approved:

for Richard Heller 9/13/79
City Engineer

Property Owner

RSH/fs

cc - Environmental Health Dept.
Drainage Inspector

CROWN MINING COMPANY, LTD.
2800 Richmond Drive NE
Albuquerque, New Mexico 87107

July 11, 1979

H16

RECEIVED
JUL 24 1979
CITY ENGINEER

Mr. H. R. Orr, Jr.
Acting Director of Public Works
City of Albuquerque
Albuquerque, New Mexico

Re: Channel Work Related to the Redivision Plat of Unit Three of Indian Plaza Addition for Crown Mining Company, Ltd.

Dear Sir:

Crown Mining Company hereby accepts your proposal to particiapte in the improvements in the channel work associated with the Indian Plaza Addition.

The extent of Crown Mining Company's participation will be in the amount of $25,000.

This acceptance is based on the improvements being completed by the City within six (6) months and all of the above funds being specifically applied to the channel work of the Indian Plaza Addition.

Very truly yours,

Bobby E. Jenkins
General Partner
Crown Mining Company, Ltd.

BEJ:ab

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

AUG 29 [illegible]

[illegible]
[illegible] Public [illegible]
[illegible] of Albuquerque
Albuquerque, New Mexico

[illegible] Chemical Waste Related
[illegible] Subdivision

Dear Sir:

[illegible], The Herald [illegible] you requested to participate in the
[illegible] of the chemical [illegible] the [illegible] Subdivision.

[illegible]

[illegible] being conducted by
[illegible] within 6 [illegible] being officially
[illegible] to the chemical [illegible] Subdivision.

Very truly yours,

[illegible]
President
Dunlop, Inc.

[illegible]/cm

[illegible]

[illegible] Albuquerque, New Mexico 87110
P.O. Box [illegible], Albuquerque, New Mexico 87110, 505-881-1494

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - September 7, 1978

TO: Bruno Conegliano, Assistant City Engineer-Hydrology
FROM: Q. R. Kielich, Assistant City Engineer-Design
SUBJECT: DESIGN OF LUNADA SUBDIVISION CHANNEL

Reference is made to memorandum from D. Sheppard to B. Kielich, subject as above, dated September 6, 1978, copy furnished to your section.

Please submit adequate hydrological data to the Design Section in order that the hydraulic parameters can be established for design of the Lunada Subdivision Channel. Also included in this submittal shall be the locations of all entry points of flows and the quantity of flows for each entry.

It is requested that your section determine the adequacy and capacities of the existing storm drainage facilities which will be required to accept the calculated run-offs. This data should be included with the above submittal.

The requested data will be furnished the Design Section not later than October 2, 1978.

QRK/tl

cc: H. R. Orr, Acting Director of Public Works
Bill Mueller, Division Head, Contracts & Management
D. Sheppard, Acting City Engineer

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - September 6, 1978

TO: Bob Kielich, Assistant City Engineer-Design
FROM: C. D. Sheppard, Acting City Engineer
Ref: Design for "Lunada Subdivision Channel"

Please prepare a design and construction drawings for lining of this channel west of Lunada Subdivision. The design should encompass the entire reach of the channel from Indian School Road North to the existing box culvert under Interstate 40. The design should be adequate to handle the anticipated 100 year flood. The channel will be constructed under the Block to Block contract and we have a committment to begin construction within 6 months.

In order to prevent problems such as we experienced with previous channel design and construction, I would like to urge that all aspects of this design receive detailed attention and your close supervision. Particularly, I think we should have quite complete design surveys with adequate topo, adequate hydrological and hydraulic development, detailed construction plans complete with adequate sections, and suitable attention to access for maintenance plus prevention of unauthorized access. The hydrology engineer should review both the preliminary hydrological and hydraulic design and the final construction drawings.

Funding for this project will be from a combination of Block/Block Storm Sewer funds and developer cash participation.

CDS/fs

cc - H. R. Orr Jr.
Bruno Conegliano
Bill Mueller

cc Bruno

CITY OF ALBUQUERQUE, NEW MEXICO
PUBLIC WORKS DEPARTMENT

MEMORANDUM -- August 18, 1978

TO: Mrs. Sondra L. West, Councillor, District No. 5

FROM: H. R. Orr, Jr., Acting Director of Public Works HRO/rs

SUBJECT: DRAINAGE CHANNEL
LUNADA SUBDIVISION

Having reviewed again the design plans for subject arroyo with the Acting City Engineer and with Bruno Conegliano, we prefer a different approach to the treatment of subject channel. Specifically, the channel required to carry the 100 year design storm from the existing pipe on the north side of Indian School Road and from the surface flow collected at the intersection of Rita Drive and Indian School Road should be designed northerly to the I-40 Box Culvert. Such a design is beyond the responsibility of the Lunada developer and incorporates a reach which has a previous commitment adjacent to the existing apartment units. We intend to prepare such a design in the office of the City Engineer and in that preparation reexamine the cross section of the channel, the side slopes necessary and the need for access. In the event that an access road is provided, it will be barricaded to vehicular access excepting service vehicles.

We also will ask from the developer of the Lunada Subdivision a financial contribution equivalent to his cost of channel improvements as that design has been developed and approved. While we feel it is important to design the reach of channel between Indian School Road and I-40, the additional City funds for the improvement may not permit construction of this total length; however, we will be obligated to construct at least the channel adjacent to the Lunada addition as soon as the new design is ready.

From the information now available to this office, it appears that a hard-lined channel will be necessary due to the velocity and width of right-of-way available.

HRO:rs
cc: Mr. Bruce Hicks, Council Liaison
Mr. C. D. Sheppard, Acting City Engineer
Mr. C. F. Porter, Administrative Assistant

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

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

AUG 11 1978

August 9, 1978

Dwyne

Mr. Earl Boule
Architectural Systems Company
3609 Palo Duro, N.E.
Albuquerque, NM 87110

Re: Lunada Subdivision

Dear Mr. Boule:

Following our most recent contract agreement to serve as your Turnkey engineers for the construction of theLunada Subdivision for Tamblen, Inc., we have been actively engaged in making the necessary arrangements so that construction can begin. There remains, however, one important matter that is as yet unresolved by the City. This matter concerns the construction of the drainage structure adjacent to your property. As directed by you in accordance with our agreement, we are attempting to have this problem resolved.

You will recall that a 70-foot right-of-way was dedicated by filed plat to accomodate drainage improvements. As the developer of the property, you were required to provide both the design and construction of these drainage improvements. As your design engineers, we prepared a drainage report for submittal to and approval by the City. You will find in the enclosures a copy of the letter of transmittal to the City, dated October 19, 1977, with which we submitted the drainage report. The main feature of that design included the use of drop structures and grading improvements to control the channel flow. In the subsequent reply by Bruno Conegliano, Assistant City Engineer—Hydrology, dated November 23, 1977, it was pointed out that drop structures would not be adequate, and that a channel lining would be required. Following a meeting with representatives of your corporation, the City, and our company, we revised the design and submitted the changes with a letter dated December 29, 1977. With this letter we also furnished the proposed channel section. The proposed channel section called for a gunite lined channel with a 10-foot bottom and 1.5:1 side slopes. The earth walls were proposed to be constructed at a 2:1 side slope, with a 12-foot access road to be built along the west right-of-way line. By correspondence dated December 30, 1977, David W. Quintana, Acting Assistant City Engineer—Hydrology, approved for the City, the revised drainage plan.

As a result of this approval, we proceeded with the complete engineering design of the entire subdivision. A part of this design included a grading plan, which including the excavation of the channel, was designed for a mass balance of excavation on site, with no additional fill required. The design was completed and submitted to the City for their first review on April 20, 1978, in accordance with the enclosed transmittal letter. After the review period, the drawings were returned to our office for a review and response to the comments. Absolutely no comment was made by the Assistant City Engineer—Hydrology, and of those commenting, no statement was made concerning the design section, grade, or location of the channel. On May 30, 1978, we submitted to the City for final approval, a set of reproducible plans and an

estimate of quantities. The estimate was approved and the plans were circulated for final approval. Since the May 30, 1978 submittal we have received no comment on the final plans from the City.

The problem at this time seems to be one of a neighborhood protest of the construction of the drainage facilities. Any number of reasons have been given for the protest, none of which are documented, and none of which we have been informed of. Ray Macy and Ike Pino of this office met with Verne Kimmick and Bob Kielich of the City to discuss the problem. Also in attendance was Steve Durkovich who acted as spokesman for the neighborhood. At that time, Mr. Durkovich stated that the protest was based on the problem of having children use the lined channel as a recreational area. Since that time we have heard other reasons for the protest, including the problem of the location of the access road on the west right-of-way line. It seems that this protest stems from the argument that motorcyclists will use the road as a dragstrip. As mentioned previously, we have not been apprised of the exact reason for which this protest has occurred.

We have been informed by the City that the final plans have been approved and signed by all departments of the City with the notable exception of the Assistant City Engineer—Hydrology. Apparently he is having problems with a drainage recommendation that his department has twice approved. It is most unfortunate that a possible disapproval of a previously twice approved drainage design is in the making.

We will continue to pursue this matter until it is resolved. Until such time that the City signs the plans you will be unable to begin construction. Hopefully the City will address this matter immediately, and in a manner that is consistent with all previous approvals for this project.

If there are further questions regarding this matter, please contact this office.

Sincerely,

Michael M. Emery

Michael M. Emery, P.E.
Vice President

cc: Mr. H. R. Orr, Jr.
Ms. Sondra West

IJP/mna
Job No. 78-143

May 30, 1978

Mr. V. H. Kimmick
City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Lunada Subdivision

Dear Mr. Kimmick:

The purpose of this letter is to transmit for final approval all necessary information for the Lunada Subdivision. Transmitted herewith is one set of mylar sepias of the plan set for the subdivision, prints with the City's comments and a copy of the quantity estimate. A final drainage report was submitted and has since been accepted and approved.

If there are any questions regarding this matter, please contact me or Ike Pino of this office.

Sincerely yours,

Michael H. Emery, P.E.
Vice President

Enclosures

IP/js
Job No. 77-161.1

April 20, 1978

Mr. W. R. Kielich
Assistant City Engineer,
Design
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Plan Sets for the Lunada Subdivision

Dear Mr. Kielich:

Enclosed are eight (8) prints of the plan sets for the Lunada Subdivision, Albuquerque, NM. These plans are submitted for comments, by the various City Departments, prior to the final submittal.

Your prompt attention to this matter would be greatly appreciated and if you have any questions, please do not hesitate to contact me or Mr. Isaac Pino at this office.

Sincerely yours,

Michael H. Emery, P.E.
Vice President

cc: Mr. Earl Boule
Enclosures

IP/js
Job No. 77-181.1

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

H16-D8

December 30, 1977

Mr. Michial M. Emery, P.E.
Bohannan-Huston
4125 Carlisle Blvd., NE
Albuquerque, New Mexico 87107

Dear Mr. Emery:

The modifications to the Indian Plaza Drainage Report have been reviewed and are approved by the City.

Sincerely yours,

David W. Quintana

David W. Quintana
Acting Asst. City Engineer
Hydrology

DWQ/gm

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

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

December 29, 1977

Mr. David Quintana
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Modifications to the Indian Plaza Drainage Report

Dear Mr. Quintana:

As a result of conversations held between yourself, Mr. Kimmick, Mr. George Paul, Mr. Boule, Mr. Whittmore, Mr. Zundel, and Mr. Macy on December 28, 1977, we present the following modifications to the Indian Plaza drainage report for your review and approval:

1. Provide as gentle a grade along the length of the channel as possible between Indian School Road and the north end of the prorerty to keep velocities down where the channel flow enters the natural arroyo.

2. Provide hard lining of the channel, either poured concrete or gunite in a section with enough capacity to carry runoff from the 60" culvert under Indian School Road.

3. Provide a 10' wide channel bottom with 1.5:1 side slopes in the concrete lined portion and 2:1 side slopes in all unlined portions.

4. Provide a cutoff wall with a minimum depth of 5' at the north end of the concrete channel lining.

5. Preserve the existing wire-tied riprap from the north curb line on Indian School Road to the invert of the existing 60" culvert.

6. The proposed curb inlet near the northwest corner of the property will be modified to hold back the internal runoff so that both the time to peak and peak rate of discharge more nearly match that of undeveloped conditions. A temporary ponding condition will exist in the street adjacent to the curb inlet. This is in compliance with a request from Mr. Bruno Conegliano and Mr. Kimmick at a meeting on December 7, 1977.

Cremans Inc.

Included with this letter is a drawing of the proposed channel profile and a typical cross section. Hydraulic characteristics for Mannings Uniform Flow are also given.

If you should have any questions regarding this matter, please feel free to contact me or Ray Macy of this office.

Sincerely,

Michial M. Emery

Michial M. Emery, P.E.
Chief Design Engineer

Enclosure

cc: Mr. Earl Bowie
Mr. Bill Zendel

RWM/dlh
Job No. 77-181

FILE 77-181

RECEIVED BWH NOV 28 1977

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

November 23, 1977

Ray Macy
Bohannan & Huston & Assoc.,Inc.
4125 Carlisle Blvd.,NE
Albuquerque, New Mexico

RE: Drainage report for Indian Plaza

Dear Ray:

I have reviewed the drainage report for Indian Plaza and I am not in agreement with the recommendations submitted. I make reference to my discussion on the necessity of providing effective control of the total volume of runoff as well as the peak discharge rate contained in my letter dated 11/22/77 for the Puerto del Cielo Subdivision.

In regard to the treatment necessary for the drainage channel on the west side of the property I see no alternative to a structual solution. The existing channel had eroded very badly and presently it is in places deeper than the 15 feet mentioned in the report. Futher, its meandering with consequent bank undercutting, needs to be stabilized and the proposed drop structures would not be able to achieve this purpose. I will need a series of x-sections (one every 100 ft.) and a profile of the existing channel, to evaluate the amount of reconstruction necessary and the type of protection that will have to be extended by others, outside the confines of this development. The drainage report will therefor have to receive substantial revision before it is accepted.

Very truly yours,

Bruno Conegliano
Asst. City Engineer - Hydrology

BC/gm
cc; V.M. Kimmick
Jim Smith
Drainage file

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

October 19, 1977

Mr. Bruno Conegliano
Assistant City Engineer - Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Drainage Report for Indian Plaza

Dear Mr. Conegliano:

Enclosed for your review and approval are three copies of the above-referenced drainage report. Major features of the report include the following:

1. Drop structures and grading improvements to the existing 70' drainage easement adjacent to the property.

2. Retention of rain falling within backyards.

3. Controlled roof runoff to front yards.

4. Discharge of internal runoff and the west half of Indian Plaza Drive through a storm sewer into the 70' drainage easement.

Please feel free to contact our office if you have any questions concerning this matter.

Sincerely,

Raymond W. Macy

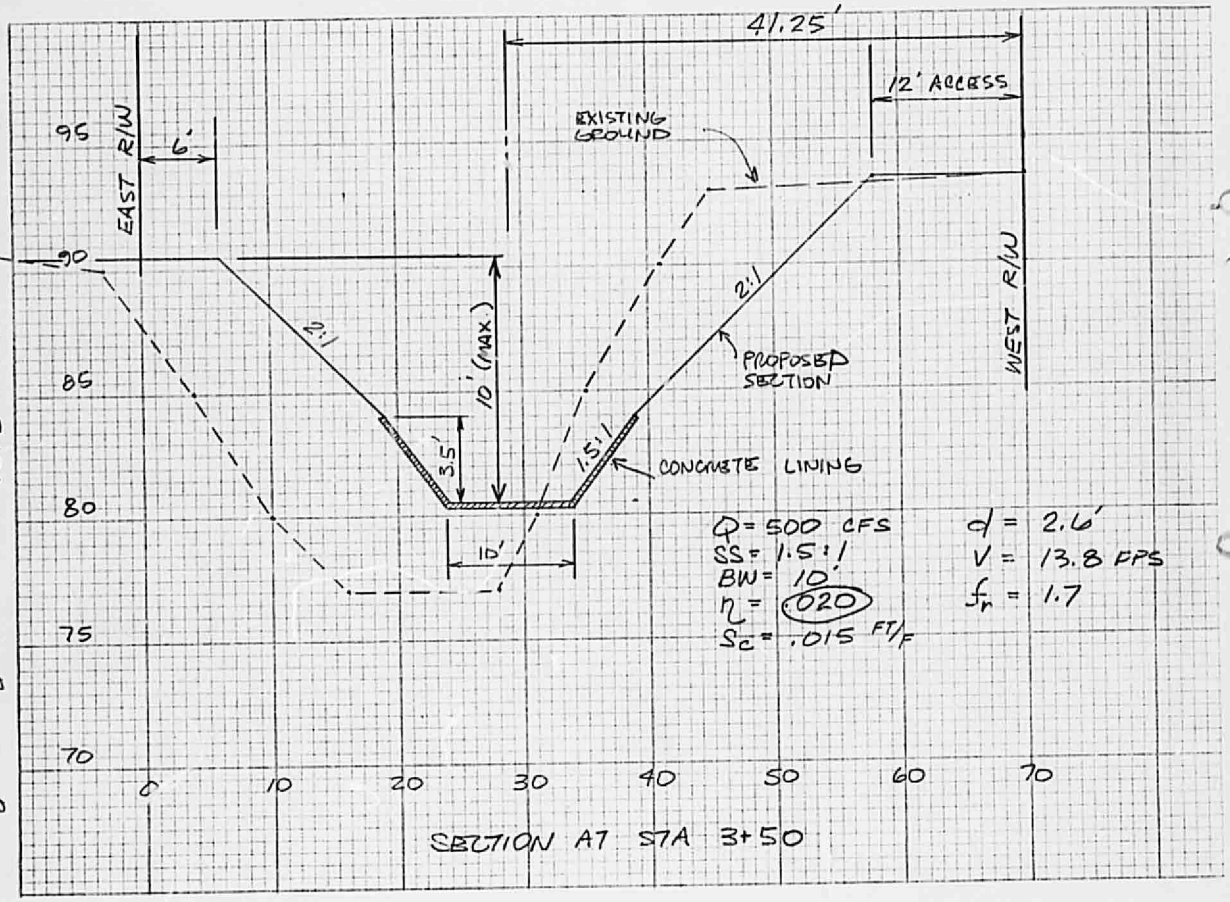
Raymond W. Macy, P.E.
Design Engineer

Enclosure

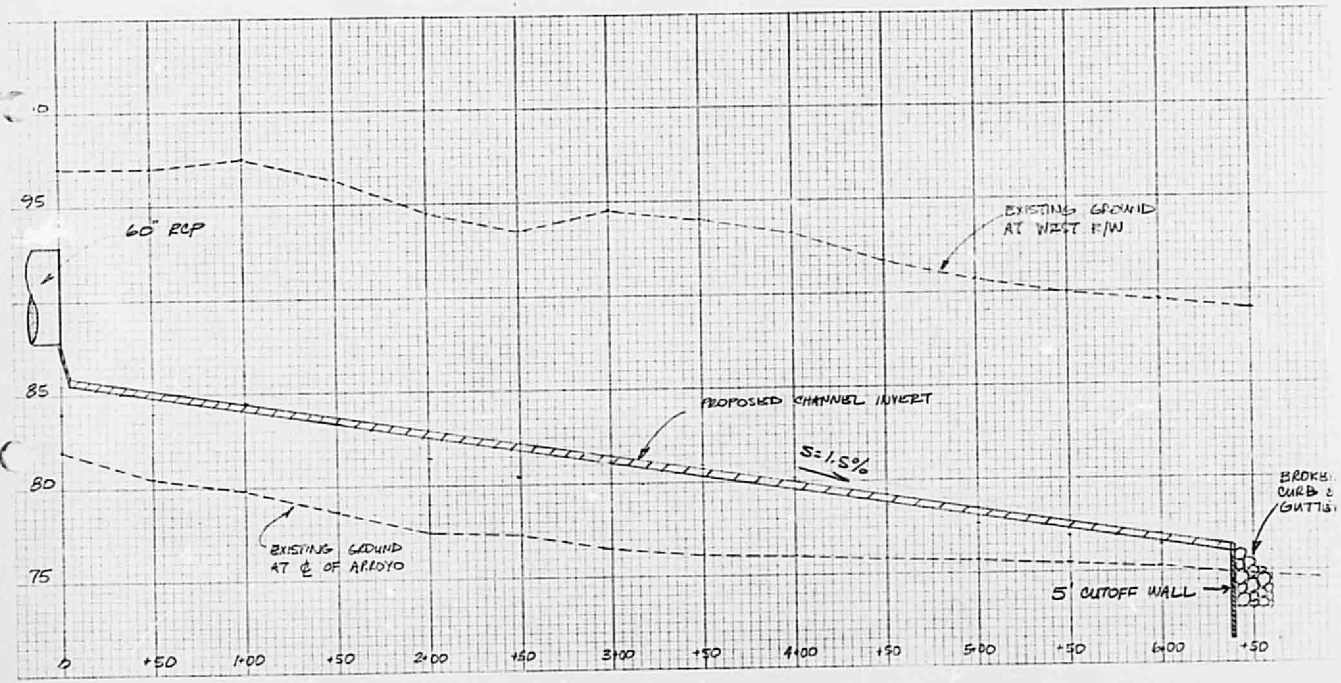
cc: Mr. William Zundel

RWM/mna
Job No. 77-181

Cremons Inc



PROJECT NAME INDIAN PLAZA
PROJECT NO. 77-181
SUBJECT DRAINAGE
SHEET 2 OF 2
BY RWM DATE 12-29-77
CH'D
DATE



PROJECT NAME
PROJECT NO. 77-181
SHEET OF
BY
DATE 12-29-77

ARCHITECTS 15 April 1976

City of Albuquerque
City Engineer
Drainage Engineer
400 Marquette, NW
Albuquerque, New Mexico 87103

Attn: Kleston Laws

Subj: Indian Plaza Apartments
3400 Block, Indian School Road, NE

Dear Mr Laws:

This is to assure you that the bank of the existing arroyo, adjacent to the westerly boundary of this site, will be stabilized where outfall of surface drainage occurs, in accordance with all applicable city requirements.

Sincerely yours,

Alan Rex

Alan Rex
REX/NORTON ARCHITECTS

cc: Crown Mining Corp.

Per discussion w/ Brown 5/20 this requirement is voided by construction letter of 7/11/79 by Mr. Jenkins.

Received 13 May 1976

Mr. Rex and I checked file and owner told City Commission in public meeting they would stabilize bank. Mr. Rex agreed such plans would be included prior to building permit appro.

8200 1/2 menaul n.e., suite 6 albuquerque, new mexico 87110 505/294-7200

FILE 77-181

DRAINAGE REPORT FOR INDIAN PLAZA

ZONE ATLAS SHEET
H-16

OCTOBER, 1977

BOHANNAN WESTMAN HUSTON

DRAINAGE REPORT
FOR
INDIAN PLAZA

ZONE ATLAS SHEET
H-16

OCTOBER, 1977

BOHANNAN-WESTMAN-HUSTON & ASSOCIATES INC.
4125 Carlisle Boulevard/NE Albuquerque, New Mexico 87107 Phone 881-2000

DRAINAGE REPORT
FOR
INDIAN PLAZA

ZONE ATLAS SHEET
H-16

OCTOBER, 1977

PREPARED FOR

ARAGON INDUSTRIES
P.O. BOX 346
GRESHAM, OREGON 97030

PREPARED BY

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

RAYMOND W. MACY
NEW MEXICO
6414
REGISTERED PROFESSIONAL ENGINEER

Raymond W. Macy

RAYMOND W. MACY, P.E.
N.M.P.E. NO. 6414

TABLE OF CONTENTS

	PAGE
PURPOSE	1
PROJECT LOCATION AND DESCRIPTION	1
HYDROLOGY	1
DRAINAGE BEFORE DEVELOPMENT	2
DRAINAGE AFTER DEVELOPMENT	2
RECOMMENDATIONS	3

APPENDIX

COMPUTATIONS

PLATES

PLATE I	LOCATION MAP
PLATE IIa	UPLAND DRAINAGE
PLATE IIb	INDIAN PLAZA UNDEVELOPED DRAINAGE
PLATE III	INDIAN PLAZA DEVELOPED DRAINAGE

DRAINAGE REPORT

FOR

INDIAN PLAZA

PURPOSE

The purpose of this report is to determine the storm water runoff from Indian Plaza and its contributory basins resulting from a 100-year frequency storm. Recommendations for development of the parcel are made with respect to controlling runoff from the parcel and upland basins.

PROJECT LOCATION AND DESCRIPTION

The study parcel is approximately 3.8 acres in Tract 7 of Indian Plaza, Unit Three. It is bounded on the east by Indian Plaza Drive and on the south by Indian School Road, approximately one block west of Carlisle Boulevard, as shown on Plate I.

The existing ground slopes from southeast to northwest at an average grade of one per cent. The land contains an area of fill composed of earth and discarded construction materials. Natural soils are of decomposed granite. Vegetation is sparse amounts of native grasses.

The proposed development is to be residential, with a density of approximately 9.5 units per acre. Zero side lot lines and flat roofs are expected to be common features.

HYDROLOGY

A peak runoff rate for each basin shown on Plates IIa and IIb was computed for a 100-year frequency storm using the rational formula. Rainfall intensities were selected from curves presented in the Master Plan of Drainage, 1963, for the Albuquerque area. Calculations are provided in the Appendix.

DRAINAGE BEFORE DEVELOPMENT

The upland area for Indian Plaza is composed of five basins within 465 acres of developed land to the south and east (see Plate IIa). In addition to surface flows from this area, storm sewerage conveys an additional 50 cfs from outside the upland basins. A total of 1332 cfs is delivered by street and 60" diameter storm sewer to an earth channel within a 70' utility right-of-way on the west boundary of the parcel. The channel has steep sideslopes and is approximately 15' deep. It empties into three 5' x 8' box culverts located under Interstate 40 approximately 680' north of Indian Plaza, where flows are conveyed to the north diversion channel.

Interior drainage consists of two small basins that drain directly to the channel (see Plate IIb). The total undeveloped runoff from the parcel is approximately 7.8 cfs.

DRAINAGE AFTER DEVELOPMENT

The existing earth channel will continue to recieve all upland flow, but will be regraded to a minimum depth of 8' with 2:1 sideslopes. A series of concrete drop structures, shown on Plate III, are suggested to stabilize channel erosion. A concrete apron at the invert of the storm sewer outlet is indicated to correct erosion problems at that location. The existing wire-tied riprap entrance for surface flow between Indian School Road and the channel should be satisfactory.

In accordance with the 1972-2 AMAFCA drainage resolution the following measures should be taken: (1) Roofs must drain to the front of the lot, with total roof runoff limited to a peak discharge of 50 gpm by use of canales. (2) Rear yards shall be graded flat, with fin. floor placed at least one foot above the rear yard elevation. Those rear yards along the parcel boundary shall

have a minimum of one 24 square-inch opening in the outside rear yard wall placed at 6" above yard elevation.

Runoff from the interior street and the west half of Indian Plaza Drive between Indian School Road and the north entrance to the development shall drain to the northwest corner of the interior street, where a double-C inlet will be provided. An 18" reinforced concrete pipe set within a 15' drainage easement will convey this flow to the channel. Two lots in the extreme northeast corner of the development shall drain onto Indian Plaza Drive, where the flow will enter an existing drainage path in the parking area of the adjacent development.

Total developed runoff with roof controls is approximately 7.8 cfs.

RECOMMENDATIONS

The following recommendations are made for the development of Indian Plaza:

1. Regrade the existing channel to a depth of 8 feet, with 2:1 sideslopes.
2. Construct a concrete apron around the existing storm sewer outlet.
3. Install at least 4 reinforced concrete drop structures in the channel to obtain a 1/2 % effective slope.
4. Grade rear yards of all lots flat.
5. Set fin. floor a minimum of 1 foot above the rear yard elevation.
6. Provide at least one 24 square inch opening in each rear yard wall along the outside property boundary, set 6" above yard elevation.
7. Provide canales in the roofs to release a maximum of 50 gpm to the front of each lot.
8. Provide 15 foot drainage easement at location shown on Plate III.

9. Install a double-C inlet and 18" diameter RCP in the drainage easement. Provide wire enclosed rip rap slope protection where the 18" RCP projects into the channel.

10. Drain interior street and west half of Indian Plaza Drive from Indian School Road to north entrance of the development through the double-C inlet.

11. Drain two lots marked as "Basin 3" on Plate III to Indian Plaza Drive.

APPENDIX

COMPUTATIONS

UPLAND DRAINAGE

DEFINITION OF SUBBASINS

SUBBASIN A DRAINS TO PT. 1 ONTO RITA AT CARLISLE

SUB BASIN B DRAINS TO PT. 2 ONTO RITA AT HANNETT

SUBBASIN C DRAINS TO PT. 4 CARLISLE - INDIAN SCHOOL, ½ GOES DOWN CARLISLE & ½ DOWN INDIAN SCHOOL

SUB BASIN D DRAINS TO INDIAN SCHOOL AT CHANNEL INLET (PT 5)

SUB BASIN E DRAINS DOWN INDIAN SCHOOL (PT 3) TO CARLISLE, WHERE ½ GOES DOWN INDIAN SCHOOL AND ½ DOWN CARLISLE

RUNOFF CALCULATIONS FOR SUBBASINS

BASIN	AREA	L	S	T_c	I	Q
A	261	5800	1.2%	22.6	3.97	694
B	105	3000	2.3	15.4	4.63	329
C	27	2000	1.5	13.2	4.95	90
D	57	1100	1.9	12.6	5.03	192
E	15	4800	1.9	19.2	4.23	43
	465					1348

WHERE: L = LENGTH OF WATERCOURSE (FT.)
S = SLOPE OF WATERCOURSE (%)
B = GROUND FACTOR = 0.77

$T_c = \log^{-1}[.3641(B) + .3554 \log(B) - .197 \log(S) + .3613]$ (Time Concentration)

$I = \frac{180}{25+T_c}$ = INTENSITY, IN/HR (Intensity Equation of Bernard Curve)

Q = FLOW (CFS) = CIA C = RUNOFF FACTOR = 0.67

FLOW AT SPECIFIED POINTS

PT. 1 → BASIN A = 694 CFS

PT. 2 → Basin A + Basin B = 1023 CFS

PT. 3 → Basin E = 43 CFS

PT. 4 → ½ Basin E + ½ Basin C = 66.5 CFS

PT. 5 → PT 1 + PT 2 + Basin D = 1823 CFS / MAX TO CHANNEL

PROJECT NAME INDIAN SCHOOL SHEET 1 OF
PROJECT NO. 77-191 BY LLP DATE 9/13/77
SUBJECT UPLAND DRAINAGE CH'D DATE

ADJUSTMENTS TO CHANNEL INLET FLOW

STORM SEWER DRAINS AREA SOUTH OF LOMAS BETWEEN WASHINGTON AND MONROE. THIS FLOW ENTERS THE CHANNEL IN. ADDITION TO OVERLAND & STORM SEWER FLOW WITHIN THE DEFINED BASINS (961.5 cfs). FLOW INTO THIS AREA IS LIMITED BY INLETS: A SINGLE-C (S/C) HANDLES APPROX. 5 cfs AND A DOUBLE-C (D/C) HANDLES 10 cfs. THUS, THE FOLLOWING:

Mesa Verde Avenue @ Montclaire Drive	3 @ S/C	
Washington and Lomas	11 @ S/C	
Jefferson south to Coma	3 @ S/C	5 @ D/C
	17 @ S/C	5 @ D/C
	17 × 5 cfs = 85 cfs	5 × 10 cfs = 50 cfs

PT 5. 961.5 + 85 + 50 = 1332 cfs

By Mannings:

Flow depth 7.16 ft 6.37 15' bottom

Velocity 7.75 fps 7.64

CAPACITY OF BOX CULVERTS TO EMBUDO ARROYO

channel slope = 1%
n = .013

use depth 4'-10"

Capacity 3870 cfs

PROJECT NAME INDIAN PLAZA SHEET 2 OF
PROJECT NO. 77-151 BY DATE 1/11/77
SUBJECT UPLAND DRAINAGE CH'D DATE

UNDEVELOPED RUNOFF

THERE ARE TWO SUBBASINS WITHIN THE PARCEL.

SUBBASIN I IS BASICALLY THE SOUTHWEST CORNER OF THE PARCEL, AND FLOWS INTO THE INLET PORTION OF THE CHANNEL.

SUBBASIN II DRAINS THE REMAINING PORTION OF THE PARCEL

AREA OF TOTAL PARCEL = 3.8 ACRES

AREA OF SUBBASIN I = .76 acres

AREA OF SUBBASIN II = 3.04 acres

* SLOPE = 5% L = 675 FT. B = 1.6 C = 0.45 (undeveloped area)

* $T_c = \log^{-1}[.3611(1.6) + .3554 \log(675) = .197 \log(3) = .3613] = 16.51$ min

* $I = \frac{187}{25+16.5} = 4.55$ inches/hour

* $Q = CIA = (0.45)(4.55)(3.8) = 7.78$ cfs $\frac{.76}{3.8}$ in Basin I = 1.56 and $\frac{3.04}{3.8}$ in Basin II = 6.22

TOTAL Q = 7.78 cfs UNDEVELOPED

DEVELOPED RUNOFF

ALL REAR YARDS WILL RETAIN ALL RAINFALL FALLING WITHIN THEIR FRONT YARDS AND DRIVE PADS WILL DRAIN TO THE STREET. ROOF RUNOFF TO THE STREET WILL BE CONTROLLED SUCH THAT THE NET RUNOFF OF DEVELOPED AREA DOES NOT EXCEED UNDEVELOPED.

Total Backyard Area — 40,450 ft² = .93 acre

Total Roof Area — 21,150 ft² = .48 acre

Total Hardened Surface - Interior Expired — 36,720 ft² = .85 acre

Runoff from Hardened Surfaces

* L = 720 FT S = 2% B = 0.77 C = 0.95 (pavement)

* $T_c = \log^{-1}[.3611(.77) + .3554 \log(720) = .197 \log(2) = .3613] = 9.17$ min

* $I = \frac{187}{25+10} = 5.40$ inches/hr USE $T_c = 10$ for computed value less than 10

* $Q = CIA = (0.95)(5.40)(0.85) = 4.36$ cfs

Less than Q undeveloped 7.78 - 4.36 = 3.42 cfs

* FOR DEFINITION OF SYMBOLS SEE SHEET 1

PROJECT NAME INDIAN PLAZA SHEET 3 OF

PROJECT NO. 77-181 BY WT DATE 9/13/77

SUBJECT INTERIOR DRAINAGE CH'D DATE

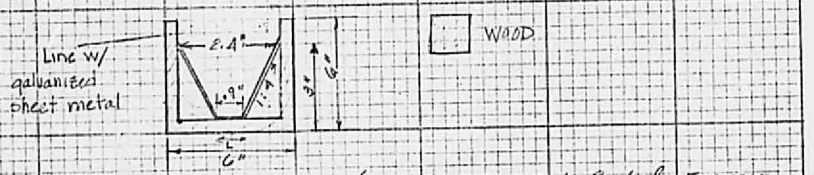
ROOF RUNOFF

Total allowed runoff 3.42 cfs

÷ 36 roofs = 0.095 cfs/roof

× 60 to convert to gpm = 50.13 gpm per roof
0.1137

CANALE DESIGN FOR 16.7 gpm (use 3 per roof) = 0.0317 cfs



CIPOLLETTI WEIR *(Sedlye, Design Data Book for Engineers Third Edition, 1960)

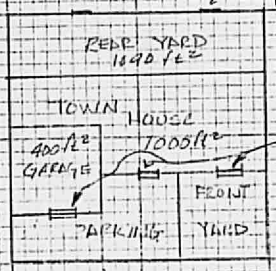
H = 3" = 0.25'

	H	Q per ft length
From Sedlye*	0.20	0.301 2 diff ÷ 2 = .126
	0.30	0.553
interpolate	0.25	0.4270 per ft

Calculate for Q = .0317

.0317 ÷ .4270 = .0742 ft × 12 = 0.89" → 0.9"

Rear yard wall opening 6"x4" @ 6" above yard grade



TYPICAL LOT

TOTAL Q = 0.216 cfs (including ½ of street)

× 36 = 7.78 cfs Total Developed Runoff

PROJECT NAME Indian Plaza SHEET 4 OF
PROJECT NO. 77-151 BY WCP DATE 10/6/77
SUBJECT Roof runoff and Typ. Lot CH'D DATE

DRAINAGE EASEMENT

Runoff from interior street 29 lots @ 0.22 cfs/lot = 6.38 cfs

Runoff from Indian Plaza Drive

460 ft of street x 16' wide C=0.77 C=0.95 S=1.5%

T_c = 8.14 > use 10 $I = \frac{189}{25+T_c}$ = 5.4

Q = 0.87 cfs

+ Runoff from 5 lots @ 0.2 cfs/lot = 1.1

Q_{IPD} = 1.97 cfs

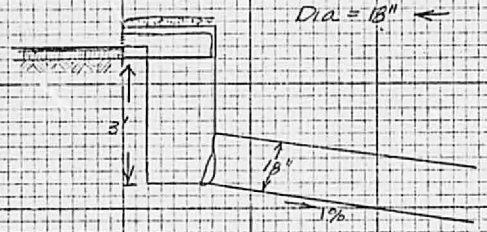
→ Runoff through easement = 6.38 + 1.97 = 8.35

Single C handles 5 cfs

Double C handles 10 cfs ← use DOUBLE C

From HydroConduit curves* 8.5 cfs w/3' Head + 1% slope

Dia = 18" ←



*HYDRAULIC ENGINEERING CIRCULAR
FOR SELECTION OF CULVERTS
APRIL 1964

PROJECT NAME	INDIAN PLAZA	SHEET 5	OF
PROJECT NO.	77-151	BY JJP	DATE 9/19/77
SUBJECT	SIZING OF INLET & RCP	CH'D	DATE

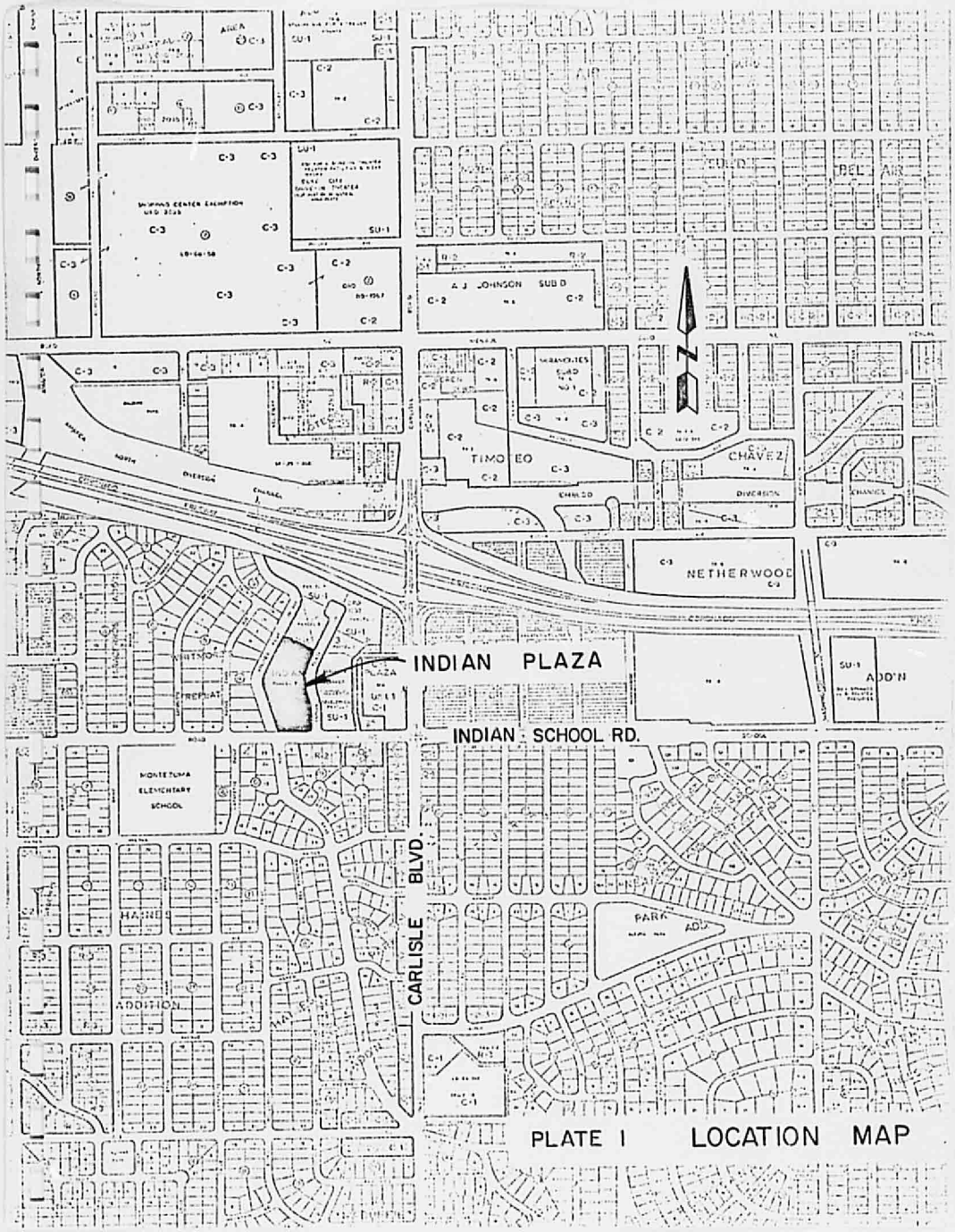


PLATE I LOCATION MAP

PLATE IIa UPLAND DRAINAGE

BOHANNAN WESTMAN HUSTON & ASSOCIATES, INC.