HYDROLOGY G21/D4 1 PLAN

G 21/D4

1 PLAN

CANDELARIA AND MORRIS

SUPERMARKET DEVELOPMENT

DRAINAGE MANAGEMENT PLAN

Prepared For:

Craddock Development Corporation

By:

Community Sciences Corporation

August, 1978

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NO. 6170
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SURVEYING
ENGINEERING
LAND PLANNING

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A) Purpose and Scope

Craddock Development Company is currently planning development of a 4-acre parcel in northeast Albuquerque into a commercial retail outlet. The purpose of this report is to present a drainage management plan for this development which is acceptable to the City of Albuquerque and to the Albuquerque Metropolitan Arroyo Flood Control Authority.

B) Site Location and Topography

The proposed development is located at the northwest corner of the intersection of Candelaria Road and Morris Street in northeast Albuquerque (See Plate 1). The ground surface slopes from northeast to southwest at an average rate of 2 1/2%. Soils consist largely of alluvial sands and silts and decomposed granite is the major soil constituent.

C) Design Criteria

1) Engineering Parameters:

For calculation of runoff rates and required storage volumes a C of 0.95 was assumed for the developed condition and a C of 0.4 was used for the undeveloped state.

All runoff calculations have been based on a 100 year-6 hour rainfall of 2.6" (0.22') per AMAFCA requirements.

Rate of runoff calculations have been based on the frequency - intensity - duration relationship for a 100 year storm as presented by Gordon Herkenhoff and Associates in their 1963 Master Plan of Drainage for the City of Albuquerque. This relationship is expressed by the following equation: $I = 189/(Tc+25)$.

2) Flood Control Regulations:

The drainage plan presented in this report has been designed to comply with the 1972 AMAFCA Resolution in regard to rate and volume of runoff leaving the site. That Resolution has been interpreted to say that the rate and volume of runoff allowed to leave the site after development shall be no greater than the rate and volume running off prior to development.

D) Computational Procedures

Appendix A contains samples of the various types of hydraulic calculations performed. Proposed swales were sized based on the Manning Equation for Uniform Flow. Street carrying capacities were calculated by means of the same equation.

Hydrological flow rate calculations are based on the rational runoff method. Times of concentration were all assumed to be 10 minutes or less. Volume calculations for satisfying overall ponding requirements were performed by multiplication of the developed composited C factor minus the natural C factor times the 100 year-6 hour rainfall (0.22') times the area to obtain cubic feet of water. Control outlets were sized based on the oriface equation and Zurn flo-control drains were selected based on the draindown time equation developed and provided by the manufacturer.

E) Off-Site Drainage

Examination of AMAFCA topography for the area reveals that flows could approach the site from the north and east. Flows approaching from the east will be intercepted by Morris Street and carried southward past the site. The drainage area to the north consists of the rear lot portions of the R1 properties bordering the site. Since field inspection has verified that all these lots are bounded by block yard walls, no runoff from these lots can reach the subject property. Therefore, offsite drainage is not considered to be a factor.

F) On-Site Drainage

In order to meet the AMAFCA requirements two forms of onsite ponding will be employed (See Plate 2). As shown in Appendix A, a net ponding volume of 21,593 C.F will be required. Each pond will be provided with controlled releases which will dissipate the pond volumes over a period of 24 hours. The roof of the proposed structure will be flat and will act as one of the ponding areas. Zurn Flo Control Roof drains will be employed to provide the controlled release. A total of six release notches in six drain units will be required (one notch per drain). The units shall be the Z-105 model with 3" high control notch. Scuppers shall be provided in the roof parapets at 3" above roof level for emergency overflow protection.

The second ponding area will be provided as a depressed section of the parking lot. This pond will have a drop inlet type drain with 0.18' Ø oriface to control outflow according to the criteria mentioned. Both roof drain outlets and parking lot pond outlet shall discharge into a landscaped infiltration area in order to allow as much water as possible to infiltrate. In addition, the row of parking occurring along the west property line will be gravel surfaced and flows occurring from areas north and west of the building shall be directed onto this gravel surface to facilitate infiltration. Any excess will be directed into a small landscaped area facing Candelaria.

APPENDIX A
CALCULATIONS

1) Required Ponding Volume:

Area = 4.16 acres = 181,210 SF
R = 2.6" = 0.22'
C_{DEV} = 0.95
C_{NAT} = 0.4

Volume = 0.22 (0.95 - 0.4) (181,210)
= 21,595 CF

2) Available Ponding Volume:

a) roof

Area = 42,900 SF
Volume available = 0.22 x 42,900
= 9,438 CF

b) parking lot pond

Area = 190 x 64 = 12,160 SF
Average Depth = 1'
Volume available = 12,160 CF

TOTAL VOLUME AVAILABLE = 21,598 C.F. OK

3) Required # of Zurn Control Notches:

$$n = \frac{A}{t \quad 0.134} \quad (3.178 + \ln h)$$

where

n = # of notches required
A = roof area (SF)
h = roof ponding depth (feet)

$\therefore n = 6$

4) Required Oriface Size - Parking Lot Pond Outlet:

As = pond surface area = 12,160 SF
T = 24 x 60^2 = 86,400 sec
Y_1 = 3.5'
Y_2 = 2'
Cd = 0.62

$$A_o = \frac{2\ As}{Cd\ T\ \sqrt{2g}} \left(\sqrt{Y_1} - \sqrt{Y_2} \right)$$

$$= 0.0258\ SF = \frac{\pi d^2}{4}$$

$$\therefore\ d = 0.18'$$

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

February 4, 1980

9-150

Mr. Fred Aguirre
City of Albuquerque
Flood Control
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Bag and Save Drainage Plan

Dear Fred:

As per our previous discussions, I have revised the drainage plan for Bag and Save. Transmitted herewith are two (2) copies of the revised plan.

As you requested, we are ponding an amount of water equal to or greater than that specified in the original drainage report. In order to pond that much water, we are having to pond water on the roofs as well as in the landscaped and parking areas. I believe this drainage plan meets all of the requirements that you set forth.

Therefore, please approve this plan so that we may begin construction as soon as possible.

If you have any questions or comments, please do not hesitate to call.

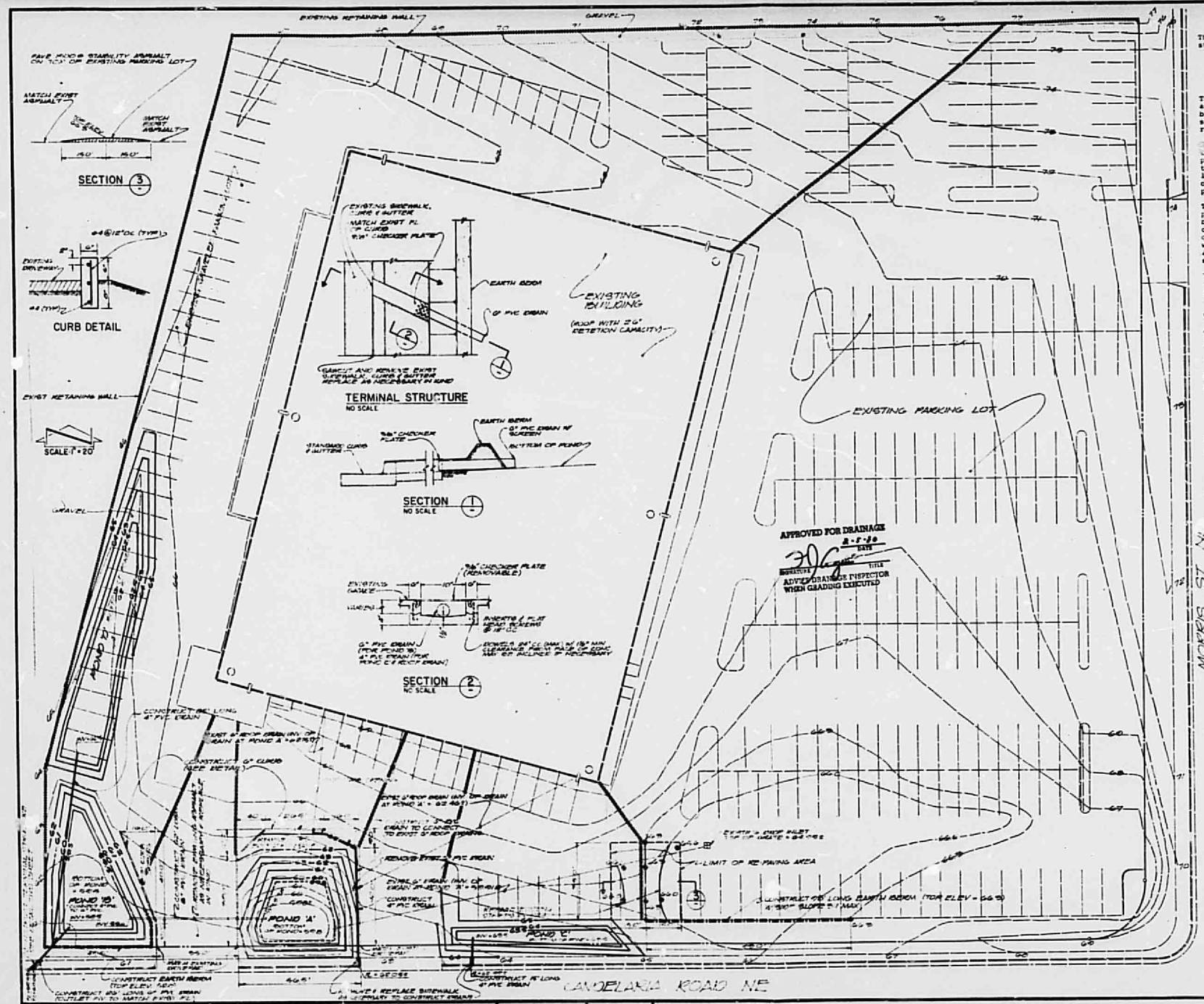
Thank you.

Yours truly,

GOLDBERG-MANN & ASSOCIATES, INC.

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

TTM:pe
Enc.



Drainage Plan

The following items concerning the Bag and Save Supermarket drainage study are contained hereon:

1. Vicinity Map
2. Flood Hazard Map
3. Grading Plan
4. Calculations

The project site is located on the north side of Candelaria Road N.E. and west of Morris Street N.E. The proposed project site has already been developed as a supermarket with some deficiency in the drainage system. Modification to the existing ponds must be made to allow all runoff from the site to be drained into Candelaria Road N.E.

There are 3' high block walls running along the north and west sides of the property. Candelaria Road N.E. and Morris Street N.E. border the property on the south and east sides. both are lower than the site, therefore, runoff from adjacent sites is negligible. The project site 1) does not lie in a flood plain, 2) does not lie adjacent to a natural or artificial water course and 3) has no drainage easements on the property.

The Grading Plan shows 1) existing contours at 1'-0" intervals, 2) proposed grades indicated by spot elevations and contours, 3) continuity between proposed and existing elevations, 4) that all runoff will be conveyed into ponds before leaving the site, 5) an earth dike be required along portions of the southern property line, 6) no retaining wall will be required, 7) that drains will be required for the ponds and 8) erosion will not result from offsite flows or the proposed construction.

The runoff from the impervious parking lot and building will be retained in six separate ponds (including building roof). The ponds will retain in excess of 100 percent of the runoff that results from a 100 year frequency storm.

CALCULATIONS

Area of Parcel = 181,210 s.f.
Impervious Area = 165,680 s.f.
(i) For Eastern Impervious Area:
Required Pond Volume = [redacted] x 0.1 = 7,642 c.f.
(ii) For Southern Impervious Area:
[redacted] + [redacted] + [redacted]) x 0.1 = 1,240 c.f.
Required Pond Volume for (i) and (ii) = 7,642 + 1,240 = 8,882 c.f.

Pond Volume for (i) and (ii):
Parking Lot = 29.4 x 400 x $\frac{1.3}{3}$ = 3,536 c.f.
Pond 'A' = 1,090 x 1.5 = 1,635 c.f.
Pond 'B' = 1,450 x 2.0 = 2,900 c.f.
Pond 'C' = 680 x 1.5 = 1,020 c.f.
Total Volume = 9,091 c.f.

Positive Discharge:
88,820 x 0.4 x 1.1 / 12 / 3,600 = 0.90 cfs.

Orifice Size: (Sump)
$Q = \frac{19.636}{7.5480}(0.61)(4^2)\sqrt{1} = 0.95$ cfs. $Q = CA\sqrt{2gH} = .61\left(\frac{\pi}{4}\right)^2 \frac{1}{4} \pi \sqrt{2g\,1'}$ 15ab

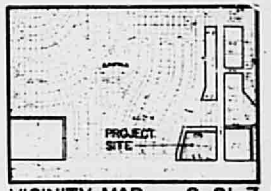
(ii) For Building Roof:
Required Pond Volume = 42,900 x $\frac{2.6}{12}$ = 9,438 c.f.
Pond Volume on Roof (with 2.6" detent capacity):
$\frac{2.6}{12}$ x 42,900 = 9,438 c.f.

Positive Discharge:
42,900 x 0.4 x 1.1 / 12 / 3,600 = 0.44 cfs.

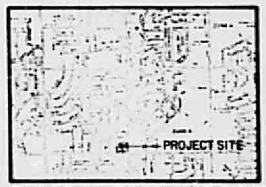
Orifice Size:
$Q = \frac{19.636}{7.5480}(0.61)(4^2)\sqrt{1} = 0.43$ cfs. $Q = CA\sqrt{2gH} = (.61)(\frac{\pi}{4})^2 \frac{1}{4} \sqrt{2g\,1'}$ 15ab

(iv) For Northern and Western Impervious Area:
Required Pond Volume = (10,260 + 11,900 + 5,700) x 0.1 = 2,786 c.f.
Pond Volume: Pond 'D' = 2,880 c.f.
Positive Discharge:
36,110 x 0.4 x 1.1 / 12 / 3,600 = 0.37 cfs.
Orifice Size:
$Q = \frac{19.636}{7.5480}(0.61)(4^2)\sqrt{1} = 0.43$ cfs.

Total Pond Volume = 9,091 + 9,438 + 2,880 = 21,409 c.f.



VICINITY MAP G-21-Z



FLOOD HAZARD MAP NO.11

Goldberg · Mann & Associates
Engineers-Planners

NO.	DATE	BY	REVISIONS

DESIGNED BY B.T.
DRAWN BY S.W.
APPROVED T.M.
JOB NO. 9-150
DATE 12/79

BAG AND SAVE DRAINAGE PLAN

FILE NO.
SHEET 1 OF 1

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

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

November 19, 1979

Mr. D. Christopher White
Craddock Development Co.
2600 Yale S.E.
Albuquerque, New Mexico 87106

Dear Mr. White:

Thank you for your letter of November 6, 1979. I have spoken with Robert Romero of the Zoning Section, and in conjunction with his action, I will allow the issuance of a Certificate of Occupancy for the Bag and Save building at 10301 Candelaria N.E.

This approval is granted on the agreement that you will submit a revised grading plan complying with the accepted drainage report. Both the revised plan and the requirements set forth by Zoning should be completed no later than January 2, 1980.

I hope you will find this arrangement satisfactory, but should you have any questions, please feel free to call on me.

Sincerely,

Fred Aguirre for Fred Aguirre
Fred Aguirre
Civil Engineer

FA/fs

cc - Sharon Gross, City Council Office
Drainage File
Bruno Conegliano, Asst. City Engineer-Hydrology
Richard Heller, City Engineer
File

Craddock
Development Company
2600 Yale S.E., Albuquerque, New Mexico 87106 (505) 842-9136

November 6,1979

Mr. Fred Aquirer
City of Albuquerque
Flood Control Department
P.O. Box 258/131 Adams,N.E.
Albuquerque,N.M.

Dear Fred,

This letter is to confirm our meeting of 11/1/79. We are, at this time, updating our drainage study on the Bag & Save Building at 10301 Candelaria,N.E. to assure you that we are meeting the requirements of our original report.

You are aware that this will take some time, and I would sincerely appreciate your approving us for a Certificate of Occupancy at this time even though we do not have final inspection approval. I assure you that the project will be completed to your specifications in the near future.

Thank you.

D.Christopher White
Vice President/Construction

29/79 I AGREE TO COMPLY TO ALL CITY REQUIREMENTS ON THIS PROJECT. To be complete by January 2, 1980.

APPROVED
CITY OF ALBUQUERQUE
Municipal Development Department

City Engineer — 11/13/79 Date

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

August 23, 1978

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

RE: PROPERTY AT CANDELARIA & MORRIS

Dear Mr. Whitman:

The drainage scheme for the property at Candelaria and Morris does not satisfy the requirements of the A.M.A.F.C.A. Res. 72-2 and is, therefore, not acceptable. Specifically, excess capacity in the downstream facilities must be available in order to allow the developed runoff to be released onto public facilities. In the absence of such extra capacity, the difference between existing and developed runoff must be retained on site and dispersed into the ground.

Candelaria Rd. has, in the past, been subjected to flooding and there is no information in the City on the present capability of this street to handle flood flows. In the absence of this information, I cannot concurr with the proposed detention scheme.

Very Truly Yours,

Bruno Conegliano
Asst. City Engineer-Hydrology

BC/tl

cc: C. D. Sheppard, Acting City Engineer
Rick Leonard, A.M.A.F.C.A.
File