

 **MURRAY-McCORMICK, INC.**
ENVIRONMENTAL DESIGN
ARCHITECTURE · ENGINEERING · PLANNING · SURVEYING

Received 27 Aug 76

August 23, 1976

Mr. Kleston H. Laws
Drainage Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Bellamah Commercial Center
Juan Tabo Boulevard at Indian School Road & Haines

Dear Mr. Laws:

A storm drain report on the referenced commercial site was prepared by Bohannon Westman Houston & Associates Inc., and dated July 12, 1973. Please find a copy enclosed for your reference. As you can see, the proposed construction of four rental storage sheds is in basic conformance with the original site plan and drainage report.

The catch basin at the northwest end of the project has been installed along with the discharge pipe under Indian School Road.

The placement of the existing pavement on grade did increase the gross area of pavement and rooftops that contribute to discharge into Haines Avenue (S.W. corner). This was intended to be 0.32 acres in the original report.

The new grading plan has 0.52 acres or $(1 \times 5.4 \times 0.52) 2.81$ c.f.s., draining to Haines Avenue. This flow compares favorably with the 2.43 c.f.s. allowed in the natural state.

By the construction of a 1600 cubic foot pond in the planter, 0.17 acres of watershed will be ponded $\frac{2.6}{12} (0.17 \times 43,560 = 1600)$.

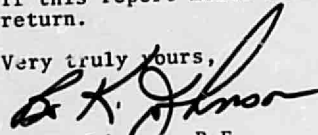
The remaining 0.17 acres will be ditched to flow to the existing catch basins.

Mr. Kleston H. Laws
August 23, 1976
Page Two

Future grading for this site should attempt to discharge to the north of the existing catch basin.

If this report meets with your approval, please sign below and return.

Very truly yours,


Bo K. Johnson, P.E.
Vice President

BKJ:dw

APPROVED:

CITY OF ALBUQUERQUE

Kleston H. Laws, trainage Engineer

Date


MURRAY-McCORMICK, INC.

BELLAMAH COMMERCIAL CENTER
Bernalillo County, New Mexico

**DRAINAGE
REPORT
for
Dale Bellamah
Corporation**

APPROVED FOR DRAINAGE

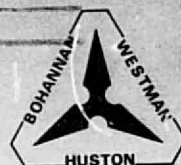
5 Feb 74

[Signature]
SIGNATURE

ACE
TITLE

AGENCIES _____

**JULY
1973**



July 12, 1973

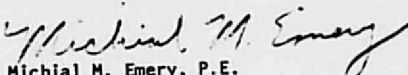
Mr. Larry Stroup
Dale Bellamah Corp.
1529 Eubank Blvd. N.E.
Albuquerque, New Mexico 87112

RE: Bellamah Commercial Center, Juan Tabo Boulevard,
Albuquerque

Dear Mr. Stroup:

We are transmitting two (2) copies of our drainage report on the Bellamah Commercial Center, Albuquerque, to you. We will also make copies of this report available to the Albuquerque Metropolitan Arroyo Flood Control Authority and to the City of Albuquerque upon your request.

Very truly yours,


Michael M. Emery, P.E.
Consulting Engineer

MME/mna
Enclosure

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.



4125 CARLISLE BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87107
PHONE 505 345-2881

DRAINAGE REPORT
BELLAMAH COMMERCIAL CENTER
ALBUQUERQUE, NEW MEXICO

FOR

DALE BELLAMAH CORPORATION

JULY 1973

BY

BOHANNAN WESTMAN HUSTON AND ASSOCIATES, INC.

4125 CARLISLE BLVD NE
ALBUQUERQUE, NEW MEXICO 87107



Michael M. Emery
Michael M. Emery, P.E.
Consulting Engineer

DRAINAGE REPORT
BELLAMAH COMMERCIAL CENTER

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	Table II	Calculations
	Plate I	Plan Plan

DRAINAGE REPORT
BELLAMAH COMMERCIAL CENTER

AUTHORIZATION AND INSTRUCTIONS

In March, 1973 Bohannon Westman Huston and Associates, Inc. were authorized by Mr. Larry Stroup of the Dale Bellamah Corporation to conduct a drainage study on the property to be occupied by Bellamah Commercial Center in the Northeast Heights of Albuquerque, New Mexico. A report of findings and recommendations was requested as a product of this study to insure that development will take place in a manner satisfactory to regulatory authorities having jurisdiction over the project area.

LOCATION

The proposed location of the Bellamah Commercial Center is on the West side of Juan Tabo Boulevard between Indian School Road and Haines Road.

DESIGN REQUIREMENTS AND STRATEGY

The Albuquerque Metropolitan Arroyo Flood Control Authority has jurisdiction over matters concerning drainage of storm waters in the location of the project. In their 1972 Drainage Resolution #2, paragraph B, the Authority has indicated two guidelines which directly apply to the development of the subject property.

These guidelines are essentially as follows:

- 1.) Storm water runoff from any parcel discharging into downstream drainage facilities shall not exceed the capacity of said facilities.

2.) Storm water runoff from any parcel shall discharge to downstream drainage facilities at no greater flow rate after development than was occurring before development.

Applying guideline #2 to the southern portion of the property which drains toward the southwestern corner and into Haines Road, it is seen that the storm water discharge occurring after development from the area must not exceed the present natural rate of discharge.

The first guideline may be applied to the northern portion of the parcel which drains toward the Embudo Canyon Arroyo. By means of improved drainage structures, the flows from this area can be sent under Indian School Road directly into a major drainage way (the Embudo Canyon Arroyo) which has a capacity that will not be exceeded with the additional runoff from the Bellamah property.

METHOD OF ANALYSIS

The property has been divided into three specific drainage areas for use in drainage calculations. (See Table I and Plate I) The first area is that area within the subject parcel which naturally drains to the southwestern corner. It was necessary to compute this area in order to establish the quantity of flow which naturally drains to the southwestern corner. The second area is that area which will drain to the southwestern corner of the property when final site grading is complete. It was necessary to compute this area in order to establish the quantity of flow which will drain to the southwestern corner after development. The third area is that area which will drain to the northwestern corner of the property when final site grading is complete. This area was used to calculate flows which will go to the Embudo

Canyon Arroyo, and to size the associated drainage structures.

In all drainage calculations a coefficient of runoff equal to 0.6 was used for natural ground. This coefficient assumes a surface of essentially bare, partially packed earth having low to moderate permeability. A runoff coefficient of 1.0 was used to calculate flows after development. This coefficient assumes that surfaces after development will consist mainly of roofs and pavement.

CONCLUSION

Calculations indicate that the proposed grading plan will meet the guidelines set forth by the Albuquerque Metropolitan Arroyo Flood Control Authority. (See Plate I and Table II) The increase in the potential rate of runoff to the southwestern corner of the parcel resulting from development will be more than compensated by the decrease in the size of this area due to ^{regarding} ~~regarding~~ and the flow at this point will actually be less after development than before. All flows draining to the northwestern corner of the parcel can be adequately conveyed into a major drainage way (the Embudo Arroyo) via a large drop inlet and a 21" concrete pipe under Indian School Road.

TABLE I
AREA TABULATIONS

<u>DESCRIPTION</u>	<u>AREA</u>
Total Property	4.23 acres
Area Draining to Southwestern Corner (natural)	0.75 acres
Area Draining to Southwestern Corner (developed)	0.32 acres
Area Draining to Northwestern Corner (developed)	3.91 acres

TABLE II
RUNOFF CALCULATIONS

<u>Area Description</u>	<u>Area</u>	<u>Concentration Time</u>	<u>Intensity</u>	<u>Runoff Coefficient</u>	<u>Flow Rate</u>
		10 minutes	5.4 in/hr.	0.6	2.43 cfs
Area draining to SW corner (natural)	0.75 acres				
		4.5 minutes	5.4 in/hr.	1.0	1.73 cfs
Area draining to SW corner (developed)	0.32 acres				< 2.43 cfs
		9 minutes	5.4 in/hr.	1.0	21.1 cfs
Area draining to NW corner (developed)	3.91 acres				

HYDRAULIC CALCULATIONS

1) Grate size:

$$Q = C_p CA \sqrt{2GH}$$

$$A = \frac{(21.1)}{(.67)(.6) \sqrt{64.4(1)}}$$

= 6.54 sq. ft. of clear open space required.

3 26"x38" grates have a clear open space of 7.6 sq. ft. > 6.54 sq. ft. therefore adequate.

2) Pipe Size:

Dia. = 21 in.

Slope = 2%

n = 0.013

Q = 21.5 cfs > 21.1 cfs therefore adequate.

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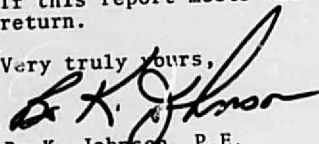
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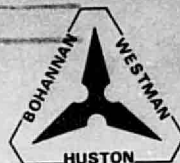
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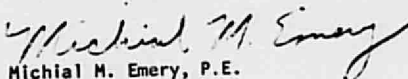
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