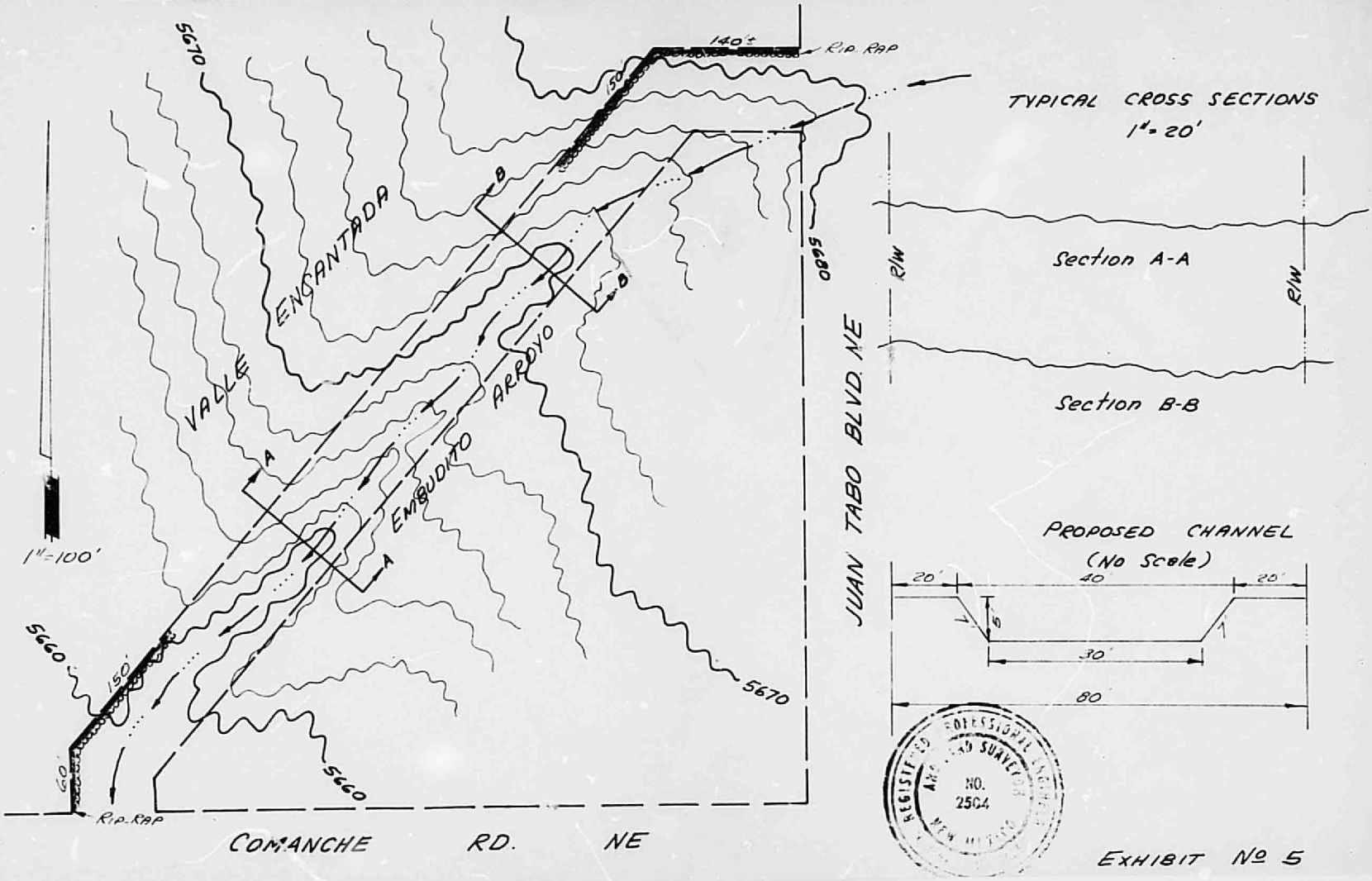
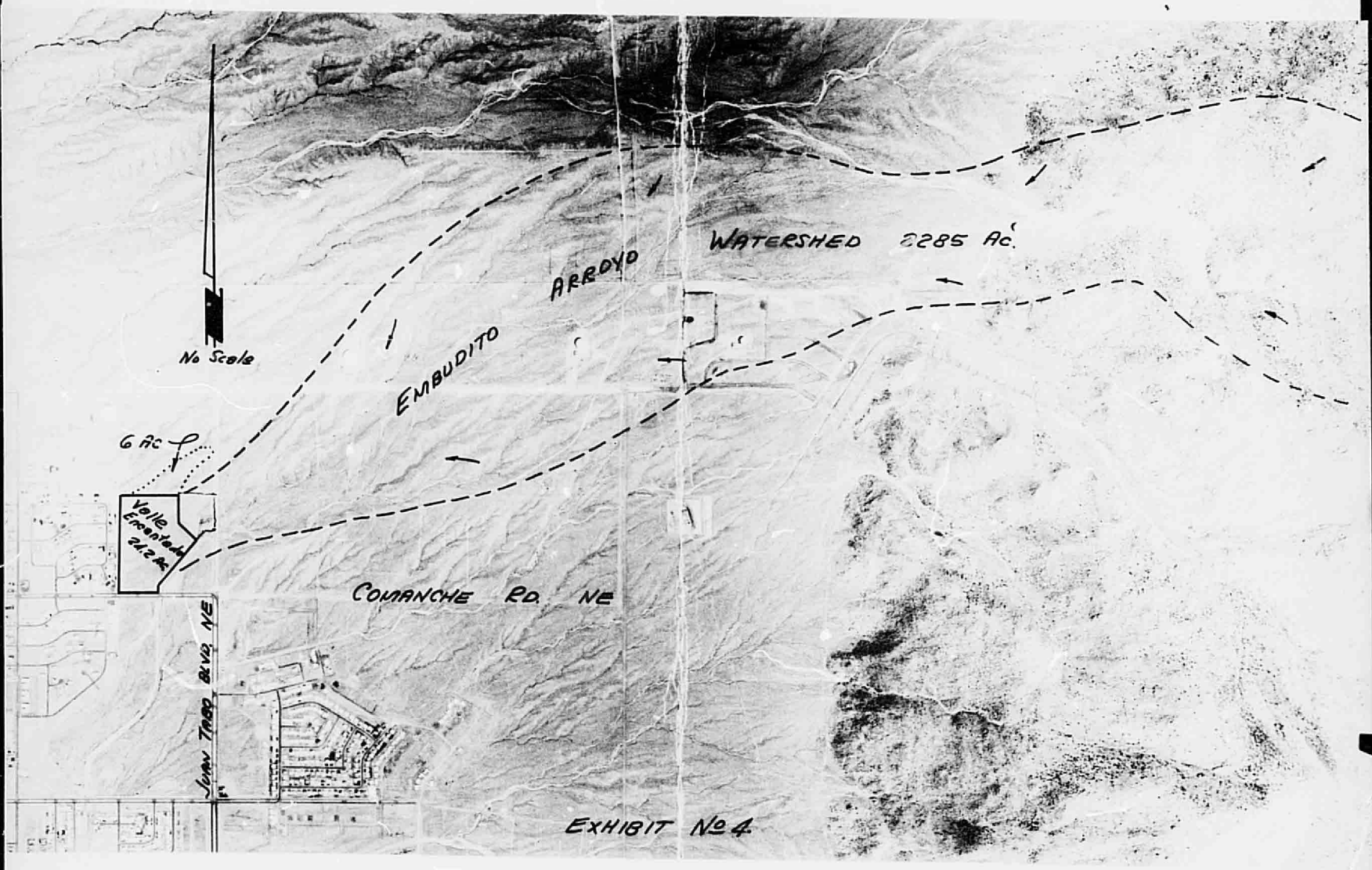
HYDROLOGY G21/D16 3 PLANS

G21/D16

3 PLANS


5670
140'±
R.P. RAP
50'
TYPICAL CROSS SECTIONS
1" = 20'
B
B
5680
R/W
Section A-A
R/W
VALLE ENCANTADA
ARROYO
EMBUDITO
Section B-B
A
A
JUAN TABO BLVD. NE
1" = 100'
PROPOSED CHANNEL
(No Scale)
20'
40
20'
6
1
1
30'
80
5660
150'
5670
60'
5660
R.P. RAP
COMANCHE RD. NE
REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
NO. 2504
NEW MEXICO
EXHIBIT No 5


No Scale
EMBUDITO ARROYO WATERSHED 2285 Ac.
6 Ac
Valle Espontaneo 2.12 Ac.
COMANCHE RD. NE
JUAN TABO BLVD. NE
EXHIBIT No 4.

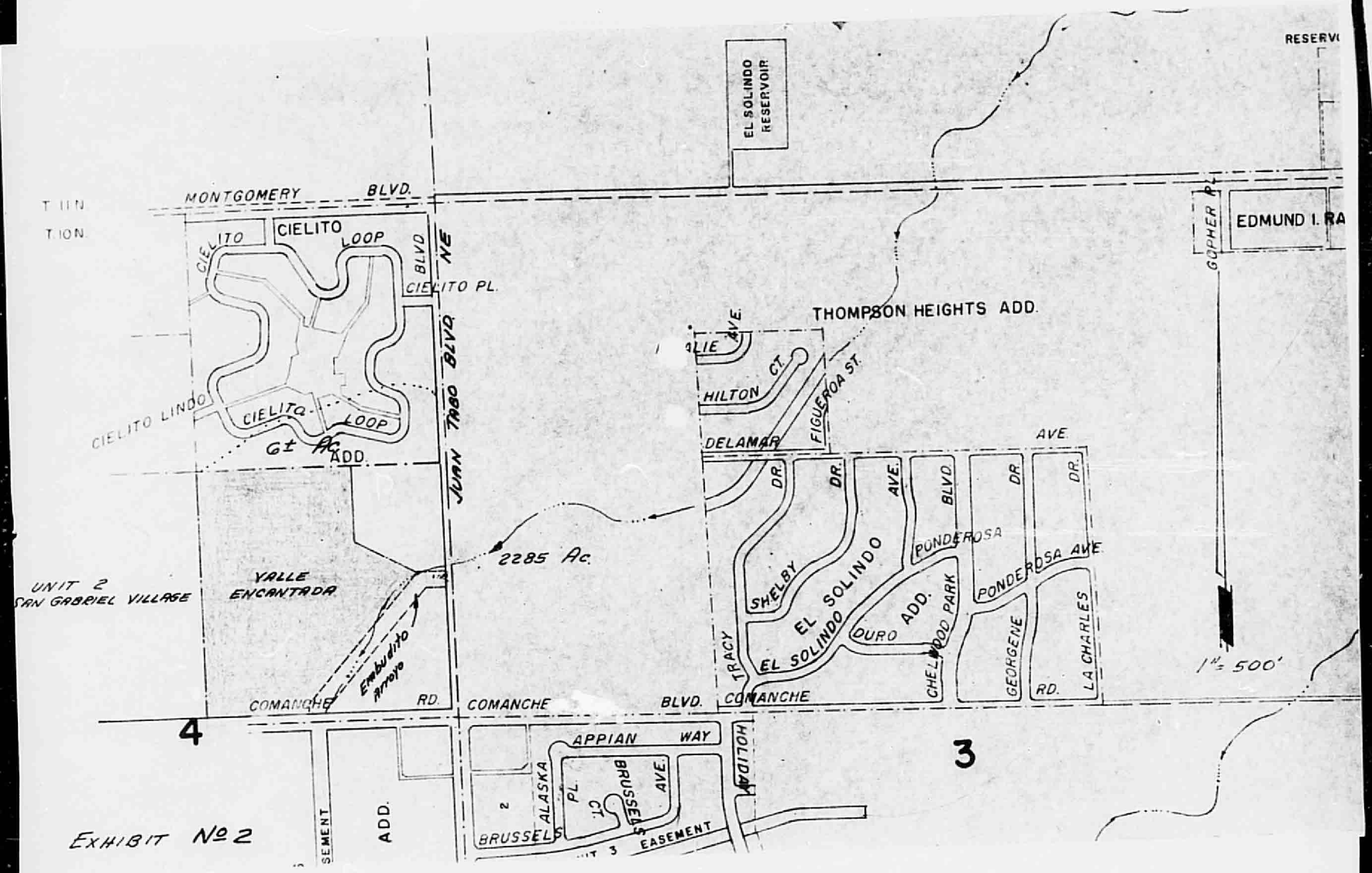


EXHIBIT No 2

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

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1. SUMMARY

2. NARRATIVE DRAINAGE ANALYSIS

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3. PORTIONS OF USGS QUADRANGLE MAP OUTLINING EMBUDITO WATERSHED

4. AERIAL PHOTOGRAPHS TAKEN IN 1965 BY KOOGLE & POULS ENGINEERS

5. EXISTING CONTOURS, TYPICAL CROSS SECTIONS AND PROPOSED NEW CHANNEL BOUNDARIES OF THE EMBUDITO ARROYO

SUMMARY:

THE EXTERIOR DRAINAGE GENERATED ON THE EMBUDITO WATERSHED PRODUCES THE ONLY POTENTIAL DRAINAGE PROBLEM TO THIS SUBDIVISION; HOWEVER, THE PROBLEM CAN BE ADEQUATELY HANDLED BY IMPROVING THE EXISTING CHANNEL TO PROVIDE A CROSS SECTION OF 150 SQUARE FEET, WITH AN AVERAGE SLOPE OF 3%, AND A MINIMUM OF 6 FEET FROM THE CHANNEL INVERT TO THE FINISHED GRADE OF ANY DWELLING BACKING TO THE CHANNEL. INTERIOR STORM WATER RUNOFF CAN BE HANDLED BY THE SYSTEM OF INTERNAL STREETS AND DRAINAGE EASEMENTS AS SHOWN ON EXHIBIT NO. 1.

DRAINAGE INVESTIGATION

VALLE ENCANTADA

ALBUQUERQUE, N. M.

PURPOSE:

TO REVIEW THE EXTERNAL AND INTERNAL DRAINAGE CHARACTERISTICS OF 24.4 ACRE TRACT TO BE DEVELOPED AS VALLE ENCANTADA, A SINGLE FAMILY RESIDENTIAL SUBDIVISION OF 83 LOTS. THE CITY OF ALBUQUERQUE HAS ESTABLISHED THE 100-YEAR RETURN FREQUENCY STORM AS THE STANDARD TO EVALUATE POTENTIAL DANGER FROM RAINSTORMS FOR THIS TYPE OF DEVELOPMENT.

LOCATION:

VALLE ENCANTADA IS LOCATED WITHIN THE CITY LIMITS OF NORTHEAST ALBUQUERQUE, BEING A PORTION OF THE WEST 810 FEET OF THE SW/4 OF THE NE/4 OF SECTION 4, T.10N.; R.4E.; N.M.P.M., THE TRACT IS BOUNDED ON THE NORTH BY THE CIELITO ADDITION, PLATTED IN 1959 BUT AS YET UNDEVELOPED, ON THE WEST BY UNIT NO. 2 SAN GABRIEL VILLAGE, ON THE SOUTH BY COMANCHE RD., NE., AND ON THE EAST BY UN-PLATTED LAND AND THE EMBUDITO ARROYO.

DRAINAGE CRITERIA AND REFERENCE:

(1) CITY OF ALBUQUERQUE 1963 DRAINAGE STUDY.

(2) 100-YEAR RETURN FREQUENCY STORM.

(3) FHA & VA DRAINAGE REQUIREMENTS.

THE RATIONAL FORMULA Q=AIR, IS USED IN THIS INVESTIGATION AS IT IS WIDELY ACCEPTED BY THE MAJORITY OF RECOGNIZED AUTHORITIES IN ENGINEERING OF DRAINAGE CONTROL FOR A WATERSHED OF THIS MAGNITUDE.

Q = RUNOFF IN CUBIC FEET PER SECOND.

A = AREA OF WATERSHED IN ACRES.

I = INTENSITY OF RAINFALL

R = RUNOFF FACTOR AS A PERCENTAGE OF THE AMOUNT OF RAINFALL.

ANALYSIS:

VALLE ENCANTADA CONTAINS 83 LOTS, TYPICALLY 80' BY 110' OF APPROXIMATELY 8800 SQUARE FEET. TYPICAL CONSTRUCTION OF THIS AREA INDICATES A PRICE RANGE OF $23,000 AND UP. REAR YARDS WILL BE WALLED. THE TRACT HAS A GENTLE SLOPE TO THE SOUTHWEST OF APPROXIMATELY 3.0%. MAGNITUDE OF THE NATURAL GRADE INDICATES USE OF GRADE CHANGE TYPE HOMES FOR OPTIMUM UTILIZATION OF THE TRACT.

EXTERNAL DRAINAGE: THE MAJOR EXTERIOR DRAINAGE INFLUENCE WHICH COULD AFFECT THE SUBJECT TRACT IS THE RUNOFF COLLECTED ON THE EMBUDITO ARROYO WATERSHED AND PRESENTLY BY-PASSING THE TRACT ALONG ITS EASTERLY BOUNDARY. THIS WATERSHED CONTAINS APPROXIMATELY 3.57 SQ. MILES (2285 ACRES) AND IS 5-1/2 MILES IN LENGTH, HEADING UP AT SOUTH SANDIA PEAK IN THE SANDIA MOUNTAINS, ELEVATION 9782 FEET.

EXTERNAL DRAINAGE (CONT.)

THE EMBUDITO ARROYO WATERSHED IS COVERED BY A VARIETY OF SURFACE CONDITIONS, NATIVE SOUTHWESTERN VEGETATIONS AND GRADIENTS. THE UPPER AND MAJOR PORTION IS COVERED WITH PINON, PINE, NATIVE GRASSES, MUCH EXPOSED ROCK WITH AN AVERAGE SLOPE OF 20.0%. THE BALANCE IS CHARACTERIZED BY DECOMPOSED GRANITE, PINON, NATIVE CACTUS, YUCCA, AND NATIVE GRASSES.

THE TOTAL WATERSHED IS APPROXIMATELY 5-1/2 MILES IN LENGTH, THEREFORE A MAXIMUM RUNOFF TIME (TIME NECESSARY FOR WATER FROM UPPER REACHES OF THE WATERSHED TO COLLECT AND RUN TO THE POINT OF CRITICAL OBSERVATION) OF 50 MINUTES WAS SELECTED. THE CITY OF ALBUQUERQUE 1963 STUDY INDICATES A RAINFALL INTENSITY FOR THIS DURATION OF 2.75 INCHES.

ON THIS BASIS, THE MAXIMUM RAINSTORM RUNOFF AT A POINT CROSSING JUAN TABO BLVD. N.E. AT THE SUBJECT TRACT WOULD BE 2200 CUBIC FEET PER SECOND, USING A RUNOFF FACTOR OF 0.35.

$Q = 2285 \times 2.75 \times 0.35 = 2200$ FT.^{3}/SEC.

THIS COMPARES WITH 1830 CFS FOUND BY APPLYING CHART NO. 2, PEAK RUNOFF AREA FREQUENCY CURVES, ALBUQUERQUE DRAINAGE STUDY FOR A 100-YEAR STORM, ON A DRAINAGE AREA OF THIS MAGNITUDE.

USING THE LARGER OF THE RUNOFF FIGURES FOR DESIGN PURPOSES AND ASSUMING A VELOCITY OF 15 FT./SEC. WE FIND A CHANNEL CROSS SECTION OF 150 SQ. FT. WOULD BE ADEQUATE; HOWEVER, IT WILL BE NECESSARY TO RIP-RAP THE FACE OF THE CHANNEL AT THE POINTS OF DIRECTION CHANGE. THESE POINTS ARE INDICATED ON EXHIBIT NO. 5.

EXISTING CROSS SECTIONS WERE TAKEN AT POINTS SHOWN ON EXHIBIT NO. 5 FROM THIS IT IS OBVIOUS THAT SOME RE-CHANNELIZATION WORK WILL BE NECESSARY.

IT WILL BE NECESSARY TO LEAVE A DRAINAGE EASEMENT IN THE APPROXIMATE LOCATION ON EXHIBIT NO. 1 TO HANDLE THE SMALL AMOUNT OF RUNOFF FROM THE SOUTHERLY PORTION OF THE PLATTED, BUT AS YET UNDEVELOPED CIELITO ADDITION.

INTERIOR DRAINAGE: INTERNAL DRAINAGE AS SHOWN ON EXHIBIT NO. 1 DOES NOT CONSTITUTE A HAZARD AND CAN ADEQUATELY CONTROL RUNOFF BY USE OF THE PROPOSED STREET SYSTEM.

RECOMMENDATIONS:

1. THAT THE EMBUDITO ARROYO DRAINAGE CHANNEL BE IMPROVED TO A MINIMUM CROSS SECTION OF 150 SQ. FT.; A TRAPEZOIDAL SECTION WITH 30' BOTTOM, A 40' TOP AND 5' DEPTH WOULD PROVIDE 175 SQ. FT.

2. THAT THE FINISH GRADE OF ANY DWELLING BACKING TO THE ARROYO BE AT LEAST 6' ABOVE THE CHANNEL INVERT.

3. THAT THE CHANNEL BE PROTECTED WITH RIP-RAP AT POINTS OF DIRECTIONAL CHANGE TO PREVENT SCOURING AND OVERFLOW.

4. AN 8' DRAINAGE EASEMENT IS NECESSARY BETWEEN LOTS 8 & 9 BLOCK 2 TO ALLOW WATER FROM THE AREA PLATTED AS CIELITO ADDITION TO DRAIN UNTIL THE AREA IS DEVELOPED.

5. AN 8' DRAINAGE EASEMENT IS NECESSARY BETWEEN LOTS 18 & 19 BLOCK 5, FOR DRAINAGE OF THE UNPLATTED AREA SHOWN ON EXHIBIT NO. 1.

CONCLUSION:

IT IS THE PROFESSIONAL OPINION OF THIS WRITER THAT THE SUBJECT TRACT CAN BE ECONOMICALLY DEVELOPED FOR SINGLE FAMILY RESIDENTIAL DWELLINGS, PROVIDED THAT THE RECOMMENDATIONS CONTAINED HEREIN ARE USED TO CONTROL THE RUNOFF FROM THE EMBUDITO ARROYO WATERSHED, AND THE DRAINAGE EASEMENTS ARE PROVIDED AS NOTED.

ROBERT L. H. BAKER PROF. ENG. NO. 2504

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR NO. 2504 NEW MEXICO ROBERT L. H. BAKER

OCT. 4, 1967

APPROVED:

WILLIAM T. STEVENS CITY ENGINEER

DATE