



U.S. Department of Housing and Urban Development
Fort Worth Regional Office, Region VI
1600 Throckmorton
P.O. Box 2905
Fort Worth, Texas 76113-2905

24 NOV 1987

Dwayne Sheppard, City Engineer
Municipal Development
P.O. Box 1293
Albuquerque, NM 87103

Dear Mr. Sheppard:

SUBJECT: Valencia Retirement Community
Project No. 116-36606
Albuquerque, New Mexico

The Citadel Mortgage Company has submitted an application for the proposed construction of 180 units to be located at 20 North Valencia in Albuquerque.

Please review the enclosed application and provide us with information concerning flood problems which could be expected on the site based on a 100-year flood frequency.

We appreciate your expeditious reply so that we can complete our review within the 30-day time limit.

If you have questions, contact the Housing Development Division at (817) 885-5909.

Sincerely,

Larry Mumford
Director
Housing Development Division

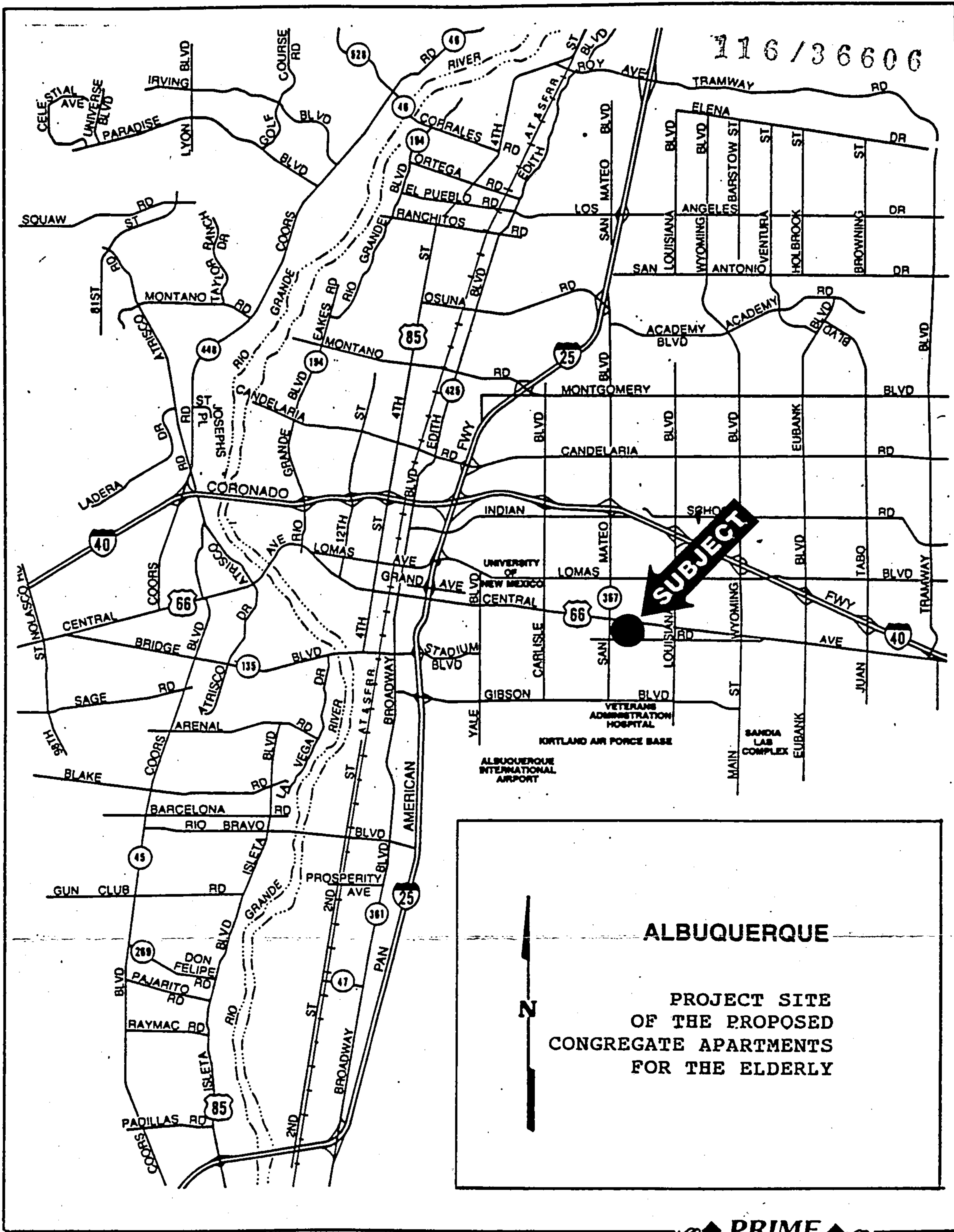
Enclosure

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NOV 30 1987

PLANNING
HYDROLOGY

116/36606





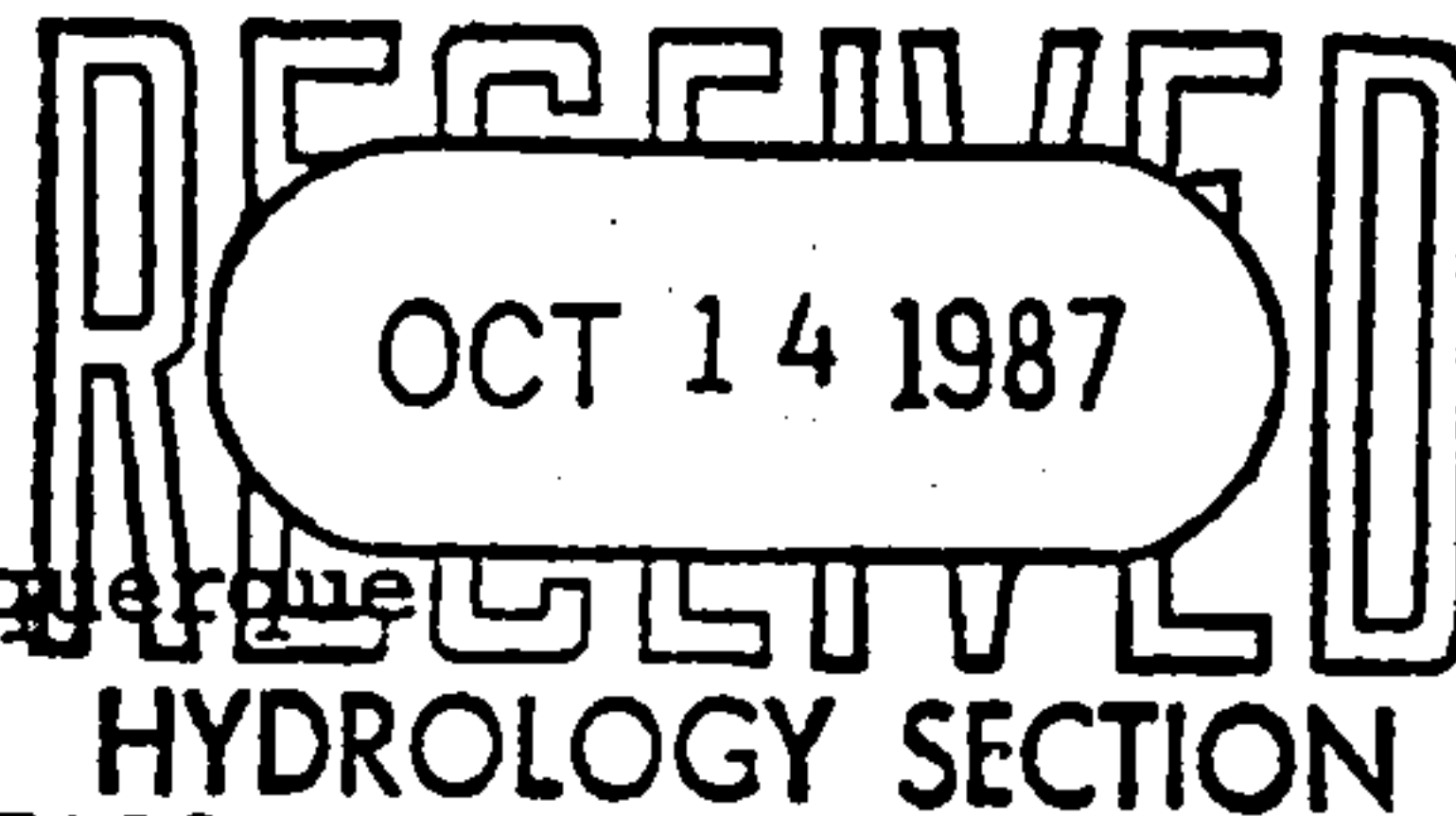
Federal Emergency Management Agency

Washington, D.C. 20472

OCT 9 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Ken Schultz
Mayor of the City of Albuquerque
401 Marquette Street
Albuquerque, New Mexico 87103



IA-RA-RS (102a)

Community: City of Albuquerque,
Bernalillo County,
New Mexico

Map Panel Number: 350002 0030 C
Effective Date of
this Revision: October 9, 1987

Dear Mayor Schultz:

This is in reference to a letter dated August 20, 1987, submitted by Mr. Thomas O. Isaacson, P.E., of Isaacson & Arfman, Consulting Engineering Associates, regarding the Flood Insurance Study (FIS) for your community. In his letter, Mr. Isaacson requested that the Federal Emergency Management Agency (FEMA) issue a Letter of Map Revision (LOMR) to reflect changes in flood hazards afforded by the completed Fairgrounds Storm Water Relief System for three properties. The three properties are identified as Tracts B-1 & B-2, Brown Place Addition; Lots 9-13 and 19-22, Block 37, Tijeras Place Addition; and Tracts 2-4 and 5A of the Assessment Plat of the Tijeras Place Improvement Company. With his request, Mr. Isaacson submitted the following: certified "as-built" plans dated August 20, 1987, of the Fairgrounds Storm Water Relief System; topographic mapping of the three properties dated August 1987; hand calculations used to determine the revised floodplain delineations dated August 1987; and documentation of the source data and engineering methodology used for the LOMR request.

Based on these data and the data previously submitted for the conditional LOMR that was issued on August 30, 1985, for the three properties, we have reduced the Special Flood Hazard Area, designated Zone AO (depth 1 foot) between San Pedro Drive and San Mateo Boulevard as depicted on the enclosed annotated portion of the Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) number 350002, panel 0030, dated October 14, 1983, for the City of Albuquerque, New Mexico.

Please note that Bohannon-Huston is in the process of restudying the flood hazard effects of the entire Fairgrounds Storm Water Relief System, which will include the effects on the three subject properties. Bohannon-Huston's flooding analyses are scheduled for submittal to the City of Albuquerque in the spring of 1988. We will review the technical data when it is submitted to us and take appropriate action to revise the FIRM. This LOMR will be superseded by the revised FIRM based on Bohannon-Huston's revised analyses.

Also note that National Flood Insurance Program regulation 44 CFR 60.3(b)(7) requires communities to "assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained." This provision is incorporated into your community's existing floodplain management regulations; consequently, responsibility for maintenance of the Fairgrounds Storm Water Relief System rests with your community.

This revision is effective as of the date of this letter. However, a review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any such requests must be based on scientific or technical data.

Due to present funding constraints, FEMA must limit the number of physical FIS, FIRM, and FBFM revisions processed. Consequently, we will not republish the FIS, FIRM, and FBFM for the City of Albuquerque to reflect the determination made by this LOMR. However, when your community's FIS, FIRM, and FBFM warrant a physical revision and republication in the future, the determination in this LOMR will be incorporated at that time.

Since this LOMR will not be printed and distributed to users such as insurance agents and lenders, the community will serve as the repository for the new data. We encourage you to disseminate widely throughout the community the information reflected by this LOMR in order that interested persons may offer new information or comments.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. As required by this legislation, a community must adopt and enforce floodplain management regulations in order to ensure continued eligibility to participate in the National Flood Insurance Program. Therefore, the City of Albuquerque must enforce these regulations using, at a minimum, the elevations and zone designations in the Special Flood Hazard Areas as shown on your community's FIRM, including the modifications made by this LOMR.

The map as listed above and as amended by this letter will be used for all flood insurance policies and renewals issued for your community.

A Consultation Coordination Officer has been designated to assist you with any problems you may have concerning this LOMR. This officer will be the primary FEMA contact for your community, and can be reached at the following address:

Mr. Alton S. Ray, Acting Chief
FEMA, Natural & Technological
Hazards Division
Federal Regional Center
800 North Loop 288
Denton, Texas 76201
(817) 898-9127

3

Any questions may be directed to your Consultation Coordination Officer.

Sincerely,

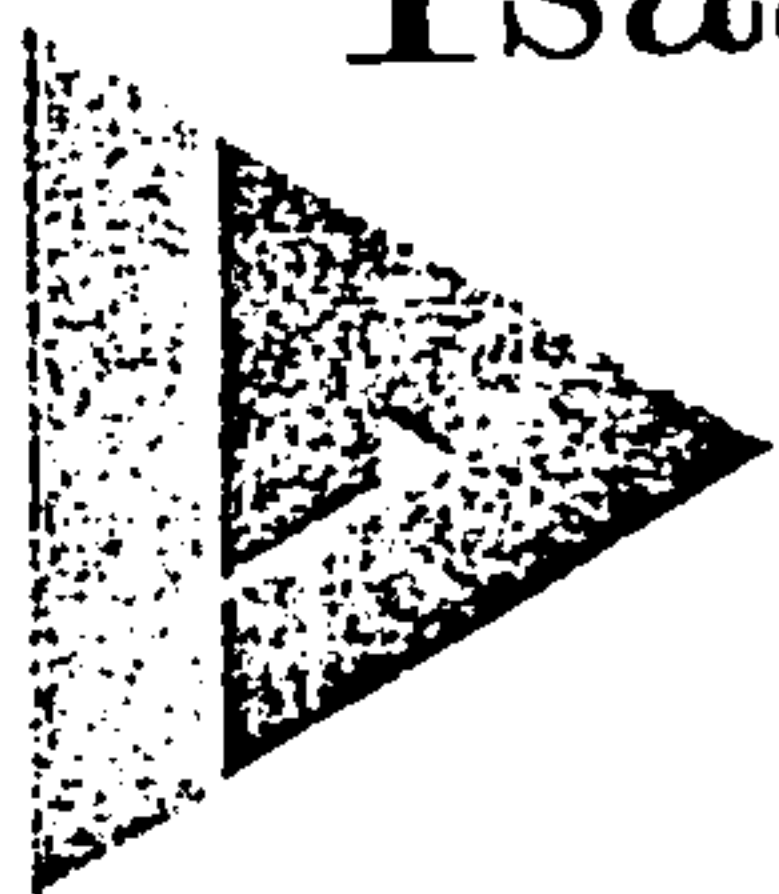


John L. Matticks
Chief, Risk Studies Division
Federal Insurance Administration

Enclosure

cc: Mr. Carlos Montoya, P.E., Floodplain Administrator
for the City of Albuquerque
Mr. Thomas O. Isaacson, P.E.

RECEIVED SEP 02 1987



Isaacson & Arfman, P.A.

Consulting Engineering
Associates

August 31, 1987

Mr. Dan Cook
Cook Development Group
506 Carmony NE
Albuquerque, N.M. 87107

Dear Dr. Cook:

We are including a copy of the response letter that we received from the Federal Emergency Management Agency (FEMA). It seems we are being scolded for our direct correspondence, but FEMA has received our submittal and the review process has begun.

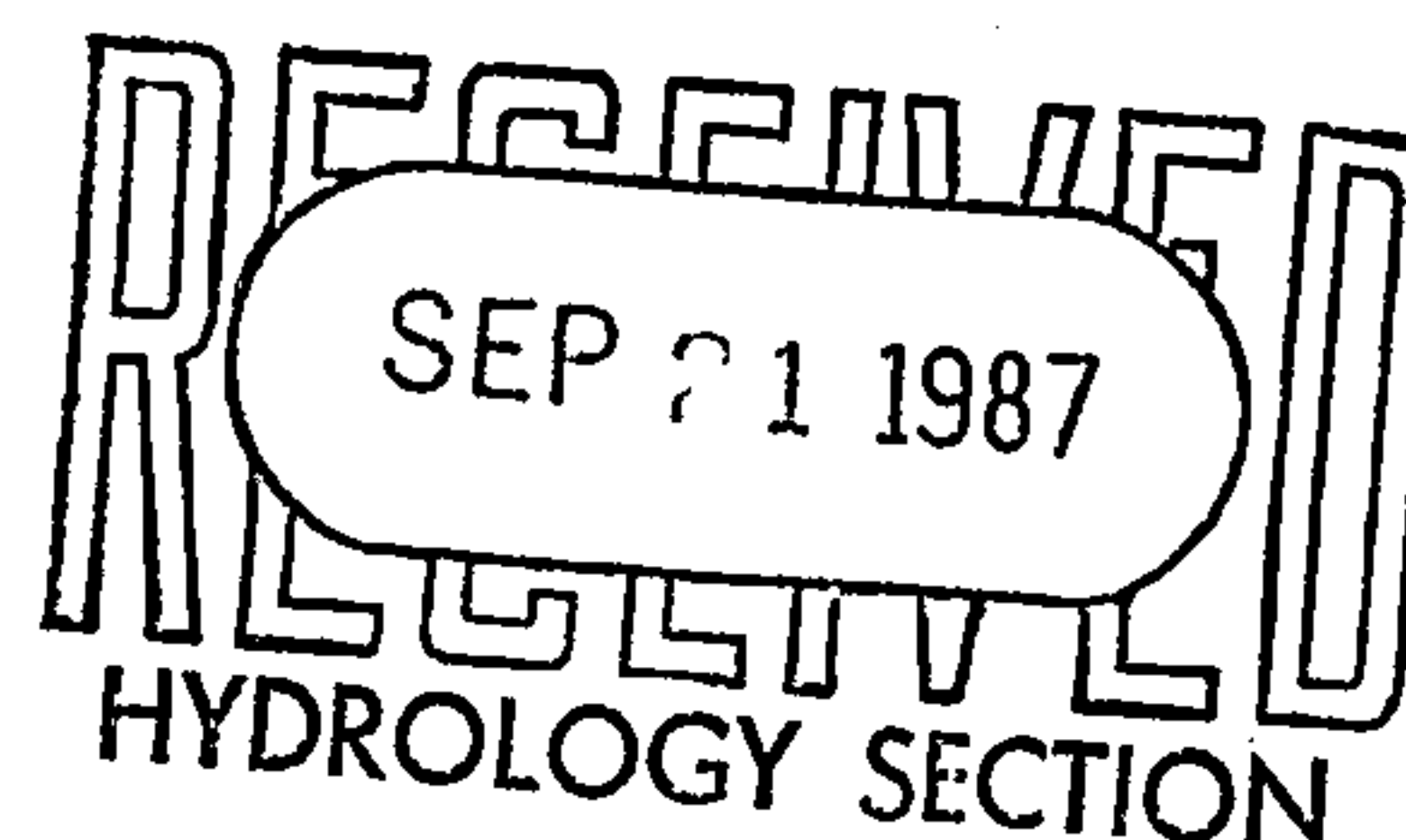
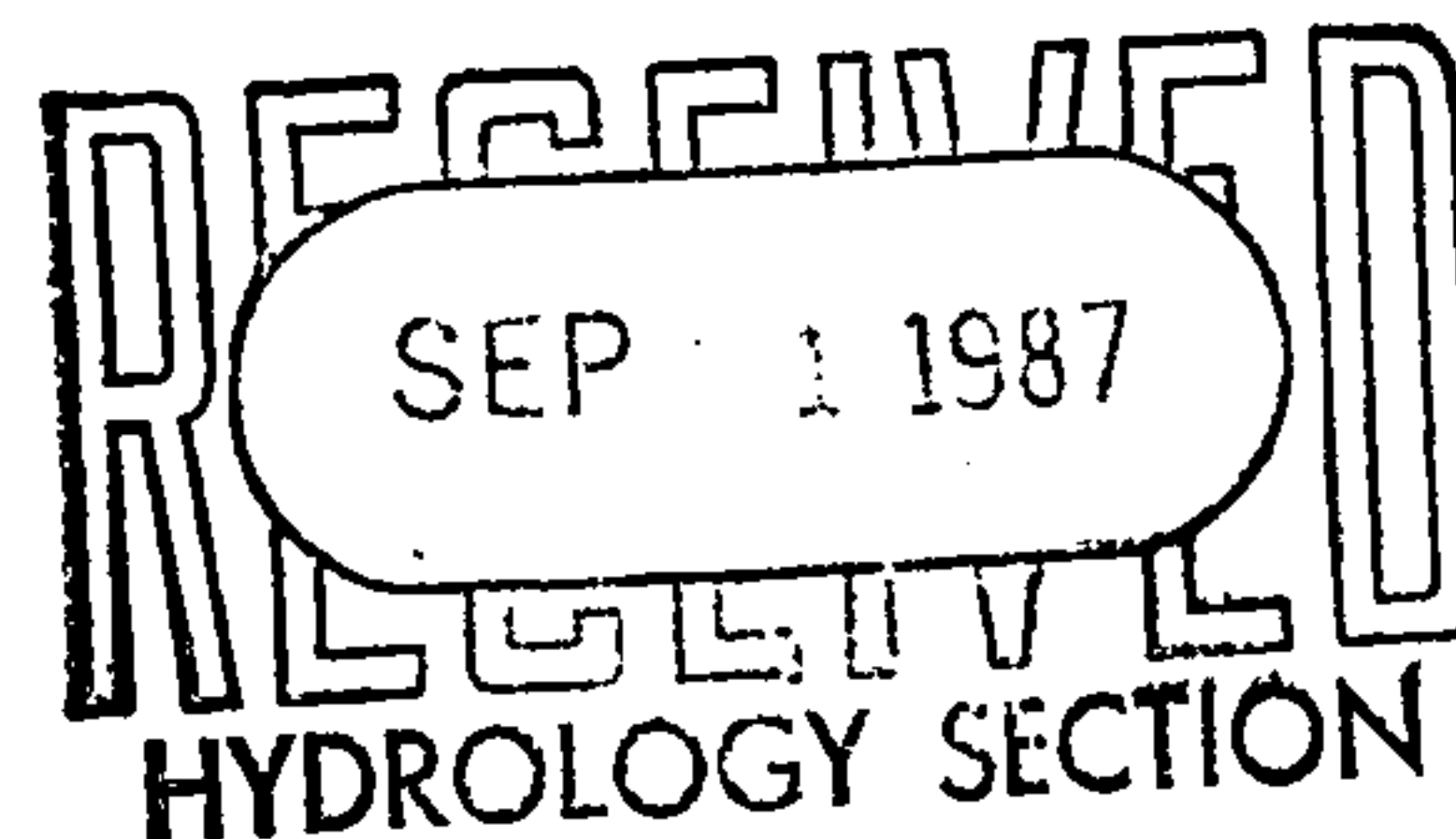
We will keep you informed of any new developments.

Cordially,

Scott M. McGee

SMM/acq

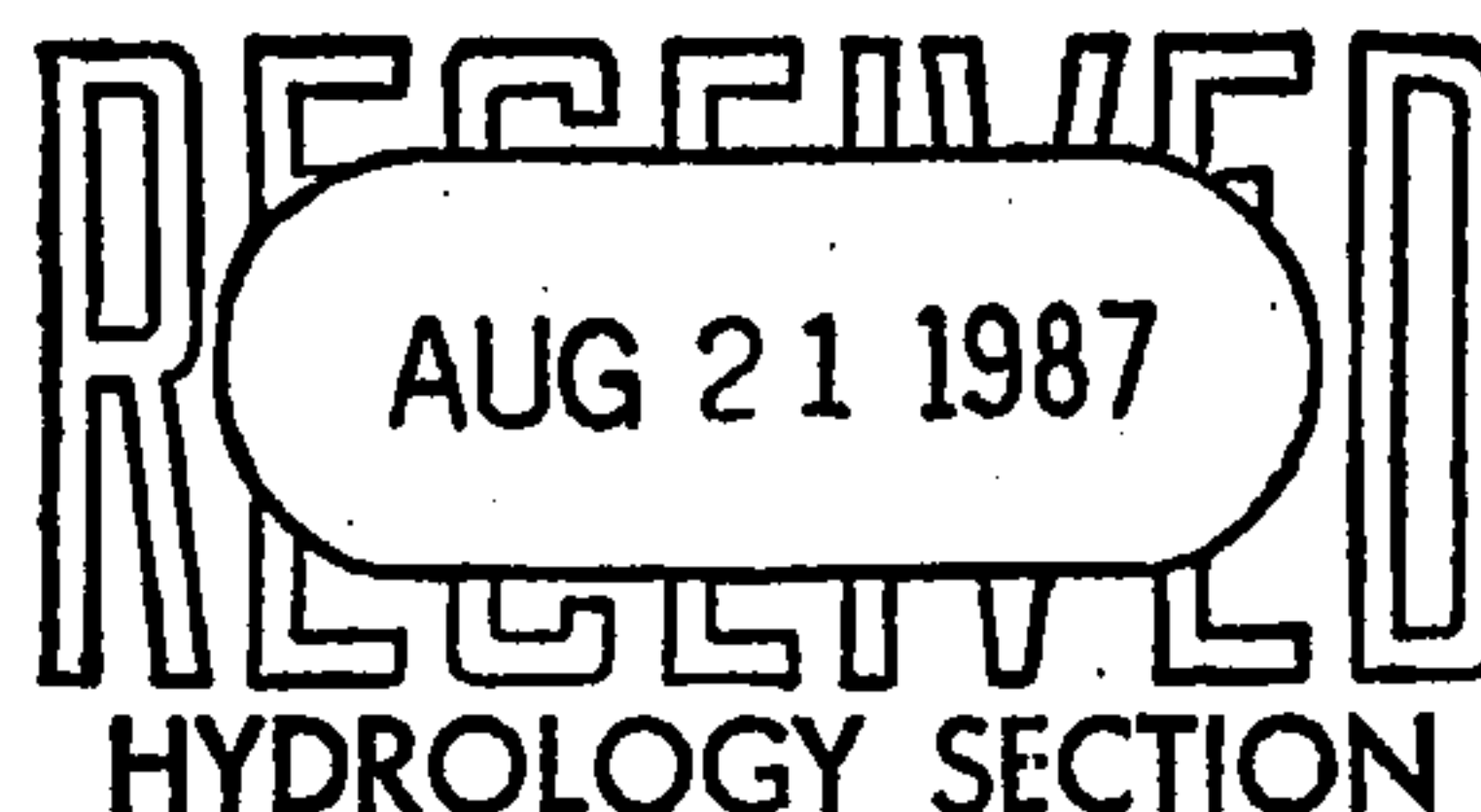
Attachment



Isaacson & Arfman, P.A.



Consulting Engineering
Associates



August 20, 1987

Federal Emergency Management Agency
500 C Street SW
Washington D.C. 20472

Re: Flood Insurance Rate Map revision request for 3 parcels located
northwest of San Pedro Dr. SE and Zuni Road SE in Albuquerque, N.M.
(Case No. 87-06-63R)

Dear Mr. John Matticks:

This submittal acknowledges your letter of June 23, 1987, and provides you with the data requested in that letter. Enclosed, please find certified "as-built" plans, additional maps, downstream sections, water depth calculations, and documentation of the source data and the engineering methodology used per your most recent request.

The Flood Insurance Study currently in effect, and used by the City of Albuquerque, is the Albuquerque Master Drainage Study (AMDS), which was completed in January of 1981. This analysis gives a basin by basin breakdown of 100-yr flow quantities. These quantities, established at various "analysis lines", are further broken down as total 100-yr peak flows and the remaining 100-yr overland flows, arrived at by deducting runoff amounts which can be carried in the underground storm sewer systems. Flooding boundaries and depths were determined by solving the Manning formula for area and depth at intervals throughout the drainage basins.

The Fairgrounds Storm Water Relief System (FSWRS) was designed to alleviate the widespread flooding experienced in this area. The basis then, for this Letter of Map Revision request, is the need to accurately reflect the impact of the recent storm sewer improvement on the effective Flood Insurance Rate Map. The analysis first submitted by this office, through Mr. Carlos Montoya of the Hydrology Section of the City of Albuquerque, on April 8, 1985, attempted to do just that.

The peak 100-yr flow rate, as given in the AMDS, was reduced by an amount equal to the intercepting capacity of the now existing FSWRS. The net 100-yr flow was then used iteratively in Manning's equation to establish new water surface elevations and corresponding water depths. This methodology was used to duplicate the AMDS method.

To more accurately show the transition area downstream, additional sections have been included for Madeira Dr. and San Mateo Blvd. which are supplementary to the original report submitted by this office. Flood

Mr. John Matticks
August 20, 1987
Page 2

boundary limits now coincide with the effective Flood Insurance Rate Map delineations as shown on the attached exhibit "Proposed Revised Flood Hazard Map".

The source data used for this submittal includes the Albuquerque Master Drainage Study, the report entitled "FIRM Change Request" (previously submitted by this office), City of Albuquerque 1"=200' topographic maps, City Storm Sewer Atlases, and field inspections of the area.

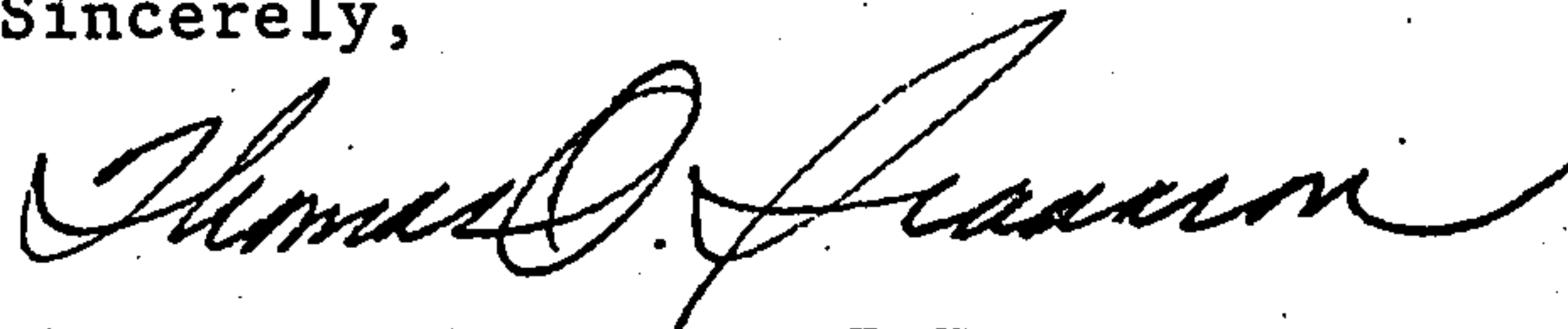
The final item that requires a response is your request to coordinate this revision submittal with the restudy that Bohannon Huston Inc. is currently preparing. After reading this restudy and talking with Mr. Jim Fink, Assistant City Engineer - Hydrology, City of Albuquerque, it seems apparent that this will not be possible.

The restudy, which is now in a preliminary stage and has not yet been approved, uses some criteria that is different from that used in the original AMDS. The changed criteria consists of new runoff curve numbers and new hydrographs which are intended to more closely model the precipitation patterns in Albuquerque. The peak 100-yr runoff rates in our study area have then been reduced from the figures given in the original AMDS. The restudy is not expected to be completed and accepted by the City until the spring of 1988.

Since the AMDS is still the effective Flood Insurance Study for this area, our office takes the position that these figures are the correct basis for this analysis. When and if the restudy by Bohannon Huston Inc. is approved, it is our understanding that all of the flood hazard area shown on the present FIRM will have been removed.

Should you have any questions regarding this submittal, please don't hesitate to call me at (505) 268-8828.

Sincerely,

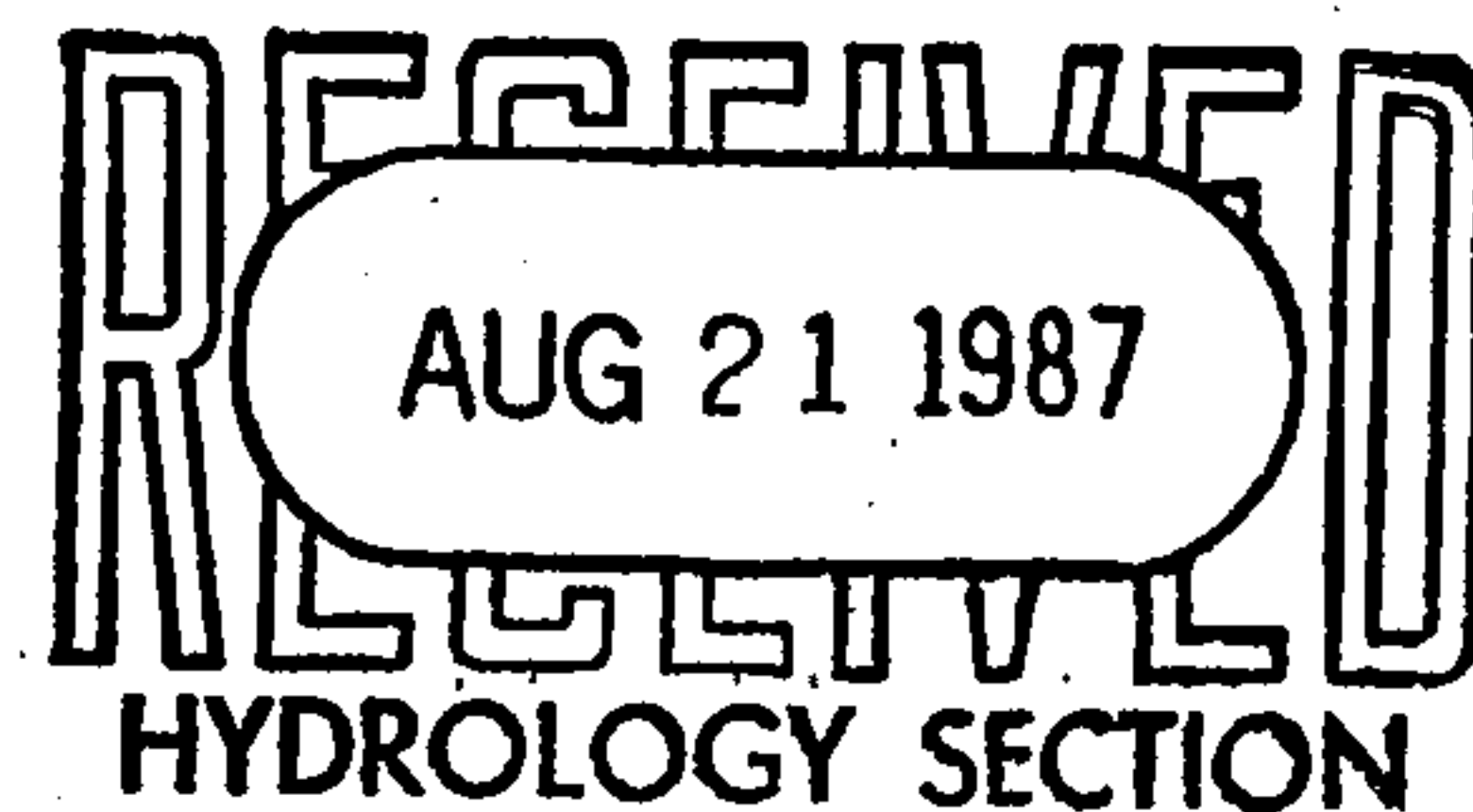


Thomas O. Isaacson, P.E.

TOI/acq

Enclosures

cc: Ms. Diane Leatherwood, w/o enclosures
Mr. Carlos Montoya w/ enclosures
Cook Development Group w/ enclosures



ADDENDUM APPENDIX

The following sheets are supporting calculations for this Addendum to the "FIRM CHANGE REQUEST" Report originally submitted 4-8-85.

Two additional sections (at Madeira Dr & San Mateo Blvd) have been included, which are supplementary to the four sections shown in the original report.

ESTIMATED FLOW @ MADEIRA DR (SECTION 5)

At Acoma & Madeira Dr

Additional Area

$$1052 \times .015 \times 200^2 \div 43560 = 14.5 \text{ acres}$$

Flow from additional area

$$(14.5 \text{ acres})(1.0 \text{ cfs/acre}) = 14.5 \text{ cfs}$$

+ Overland flow proceeding west

$$\text{on Acoma from Section 4} = \underline{22.2 \text{ cfs}}$$

$$36.7 \text{ cfs}$$

Less interception by 1 double inlet &

1 single inlet @ Palomas & Acoma

$$10 + 5 = 15 \text{ cfs}$$

$$\underline{15 \text{ cfs}}$$

$$\underline{\underline{21.7 \text{ cfs}}}$$

At Coal & Madeira

Additional Area

$$303 \times .015 \times 200^2 \div 43560 = 4.2 \text{ ac}$$

Flow from additional area

$$(4.2 \text{ acres})(1.0 \text{ cfs/acre}) = 4.2$$

+ Overland flow proceeding west

$$\text{on Coal from Section 4} = \underline{23.8 \text{ cfs}}$$

$$28.0 \text{ cfs}$$

Less interception by 2 single inlets

@ Coal & Madeira 2(5) =

$$\underline{10.0 \text{ cfs}}$$

$$\underline{\underline{18.0 \text{ cfs}}}$$

ESTIMATED FLOW @ MADEIRA DR (CONT.)

At Silver & Madeira

Contributing Area

$$942 (.015)(200)^2 / (43560) = 13.0 \text{ ac}$$

Flow from contributing area

$$(13.0 \text{ acres})(1.0 \text{ cfs/acre}) = \underline{\underline{13.0 \text{ cfs}}}$$

ESTIMATED FLOW @ SAN MATEO (SECTION 5)

At Acoma & San Mateo

Additional Area

$$660 \times .015 \times 200^2 \div 43560 = 9.1 \text{ acres}$$

Flow from additional area

$$(9.1 \text{ acres})(1.0 \text{ cfs/acre}) = 9.1 \text{ cfs}$$

+ Overland flow proceeding west

$$\text{on Acoma from Madeira} = \underline{21.7 \text{ cfs}}$$
$$30.8 \text{ cfs}$$

Less interception by 2 single inlets

$$\text{at San Mateo and Acoma: } 2 @ 5 = \underline{10.0 \text{ cfs}}$$
$$\underline{20.8 \text{ cfs}}$$

At Coal & San Mateo:

Additional Area

$$201 \times .015 \times 200^2 \div 43560 = 2.8 \text{ ac}$$

Flow from additional area

$$(2.8 \text{ acres})(1.0 \text{ cfs/acre}) = 2.8 \text{ cfs}$$

+ Overland flow proceeding west

$$\text{on Coal from Madeira:} = \underline{18.0 \text{ cfs}}$$
$$20.8 \text{ cfs}$$

Less interception by 2 single inlets

$$\text{@ San Mateo and Coal: } 2 @ 5 = \underline{10.0 \text{ cfs}}$$
$$\underline{10.8 \text{ cfs}}$$

ESTIMATED FLOW @ SAN MATEO (CONT.)

At Silver & San Mateo:

Contributing Area

$$260 \times .015 \times 200^2 \div 43560 = 3.6 \text{ ac}$$

Flow from contributing area

$$(3.6 \text{ acres})(1.0 \text{ cfs/acre}) = 3.6 \text{ cfs}$$

+ Overland flow proceeding west

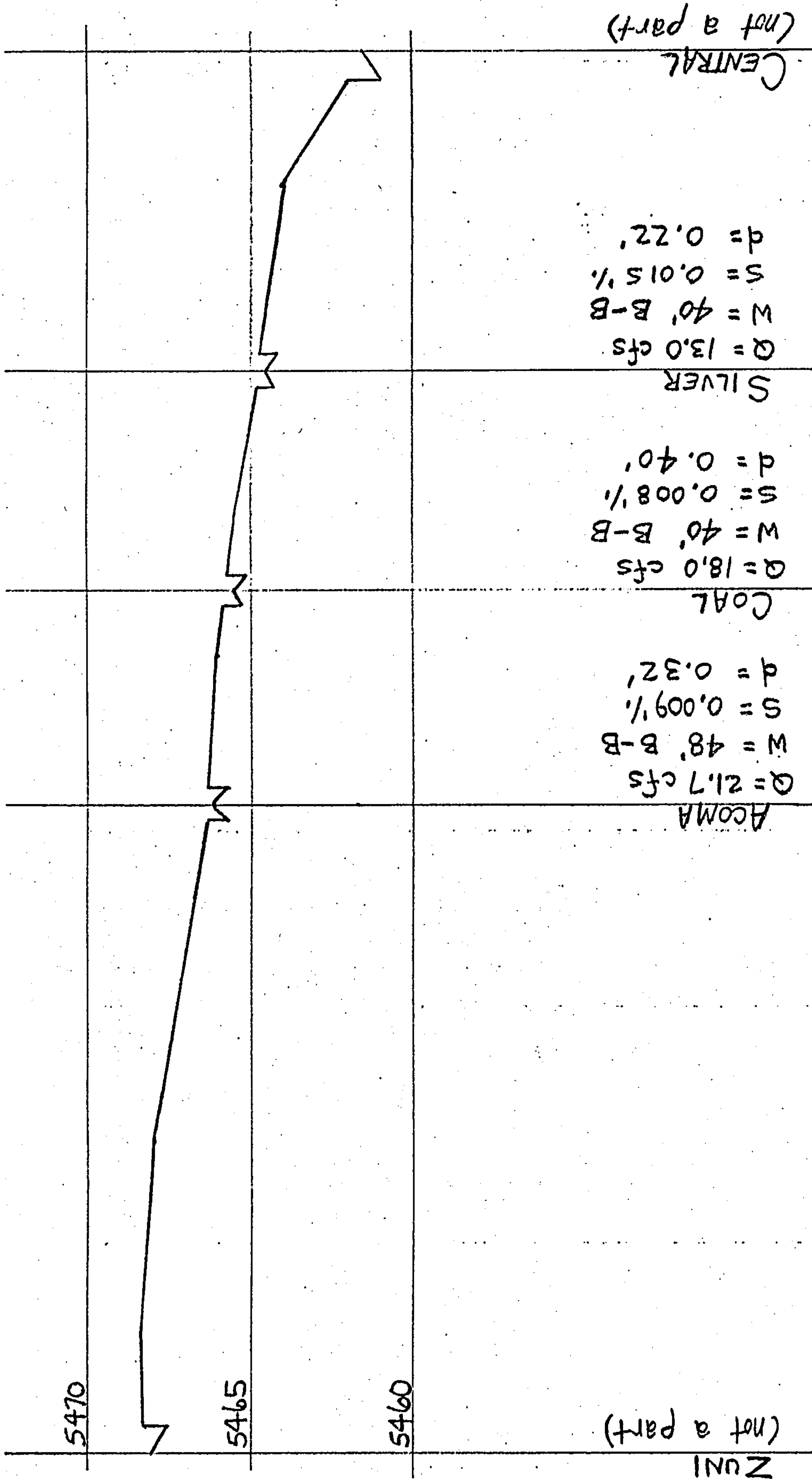
$$\text{on Silver from Madeira} = \underline{13.0 \text{ cfs}}$$

$$16.6 \text{ cfs}$$

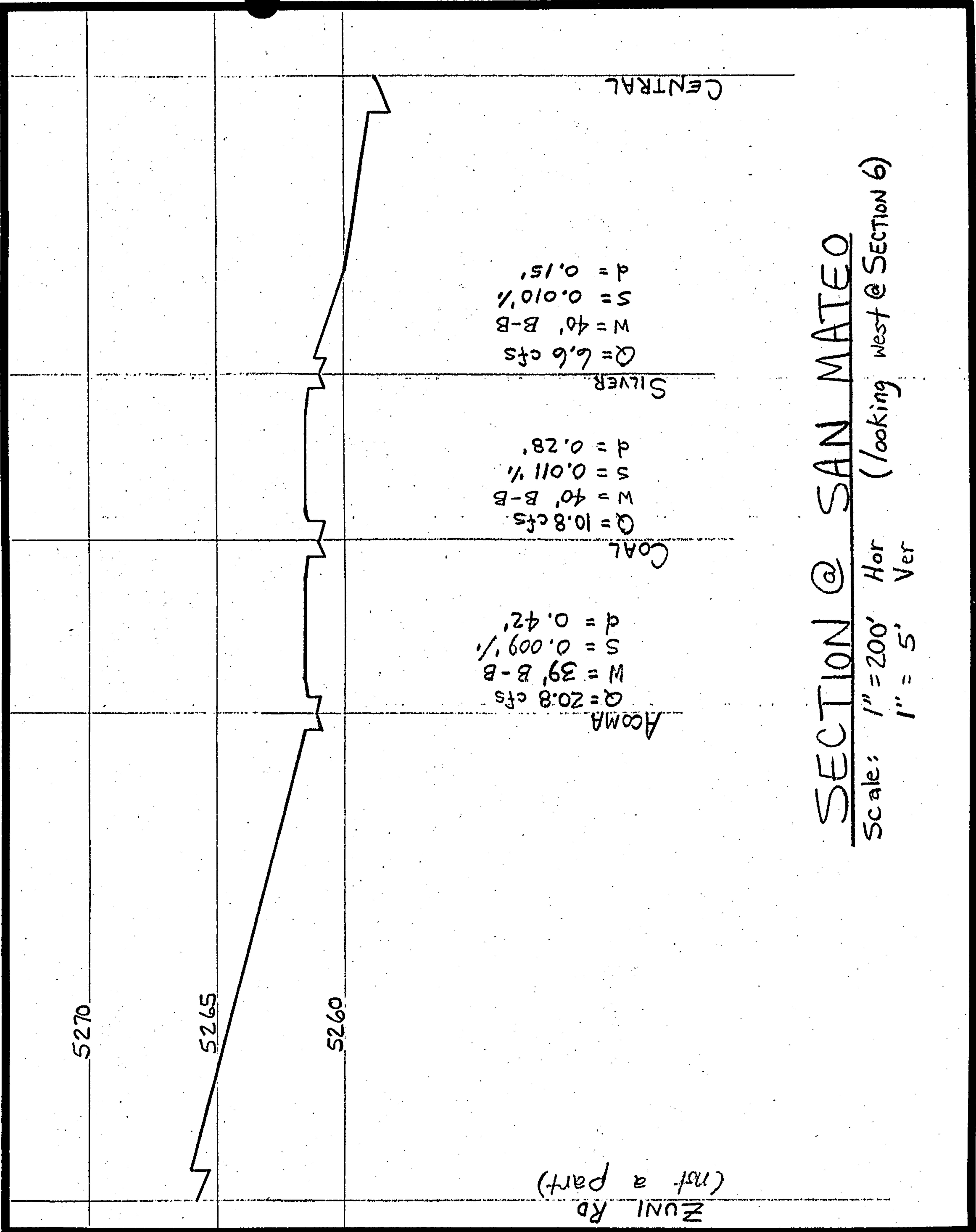
Less interception by 2 single inlets

$$\text{@ Silver and San Mateo: } 2(5) = \underline{10.0 \text{ cfs}}$$

$$\underline{\underline{6.6 \text{ cfs}}}$$



SECTION @ MADEIRA DR (SECTION 5)
 Scale: 1" = 200' Hor 1" = 5' Ver

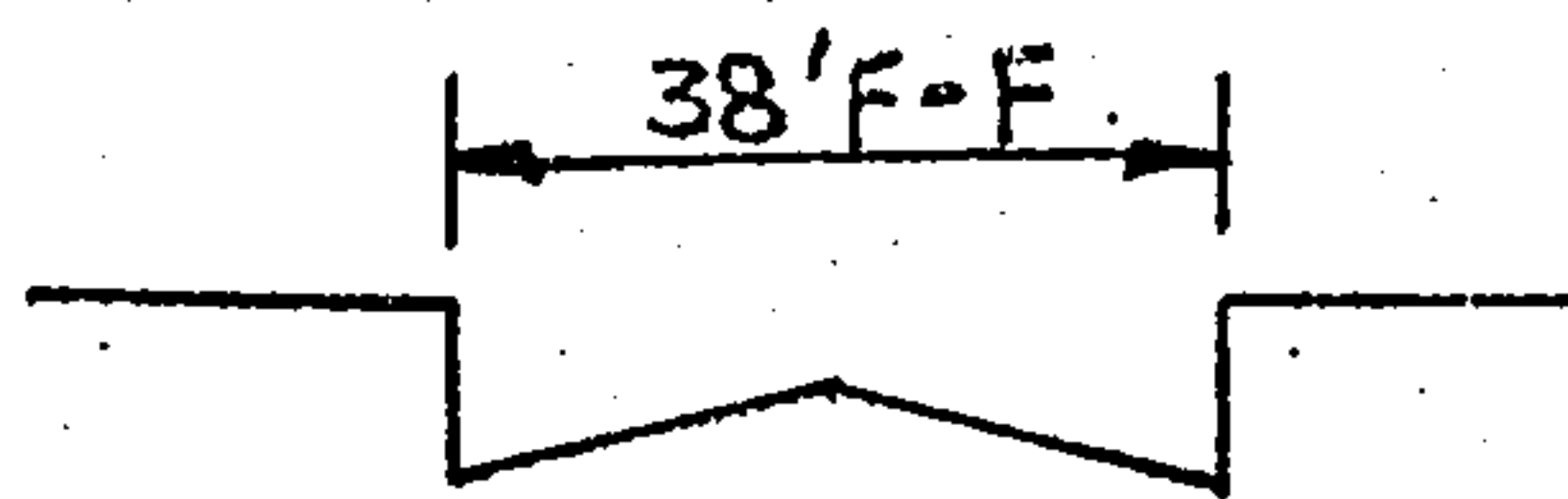


Isaacson &
Arfman, P.A.

SUBJECT FIRM Change (Completion) JOB NO. 54k
BY SMM DATE 8-19-87 SHEET NO. A7 OF

DEPTH OF FLOW DETERMINATION * (Manning eq.)

ACOMA



$$Q = 20.8 \text{ cfs}$$

$$S = 0.009 \text{ '}/\text{'}$$

Try $d = 0.4'$

$$A = \left[\frac{(0.4)(19)}{2} \right] 2 = 7.6 \text{ sq ft}$$

$$W.P. = 38 + 2(0.4) = 38.8 \text{ ft}$$

$$R = 7.6 \div 38.8 = 0.20$$

$$R^{2/3} = 0.337$$

$$\therefore Q = \frac{1.486}{0.02} (7.6)(0.337)(.009)^{1/2}$$

$$Q = 18.0 \text{ cfs}$$

Try $d = 0.5'$

$$A = \left[\frac{(0.5)(19)}{2} \right] 2 = 9.5 \text{ sq ft}$$

$$W.P. = 39 \text{ ft}$$

$$R = 9.5/39 = 0.24$$

$$R^{2/3} = 0.39$$

$$\therefore Q = \frac{1.486}{0.02} (9.5)(0.39)(.009)^{1/2}$$

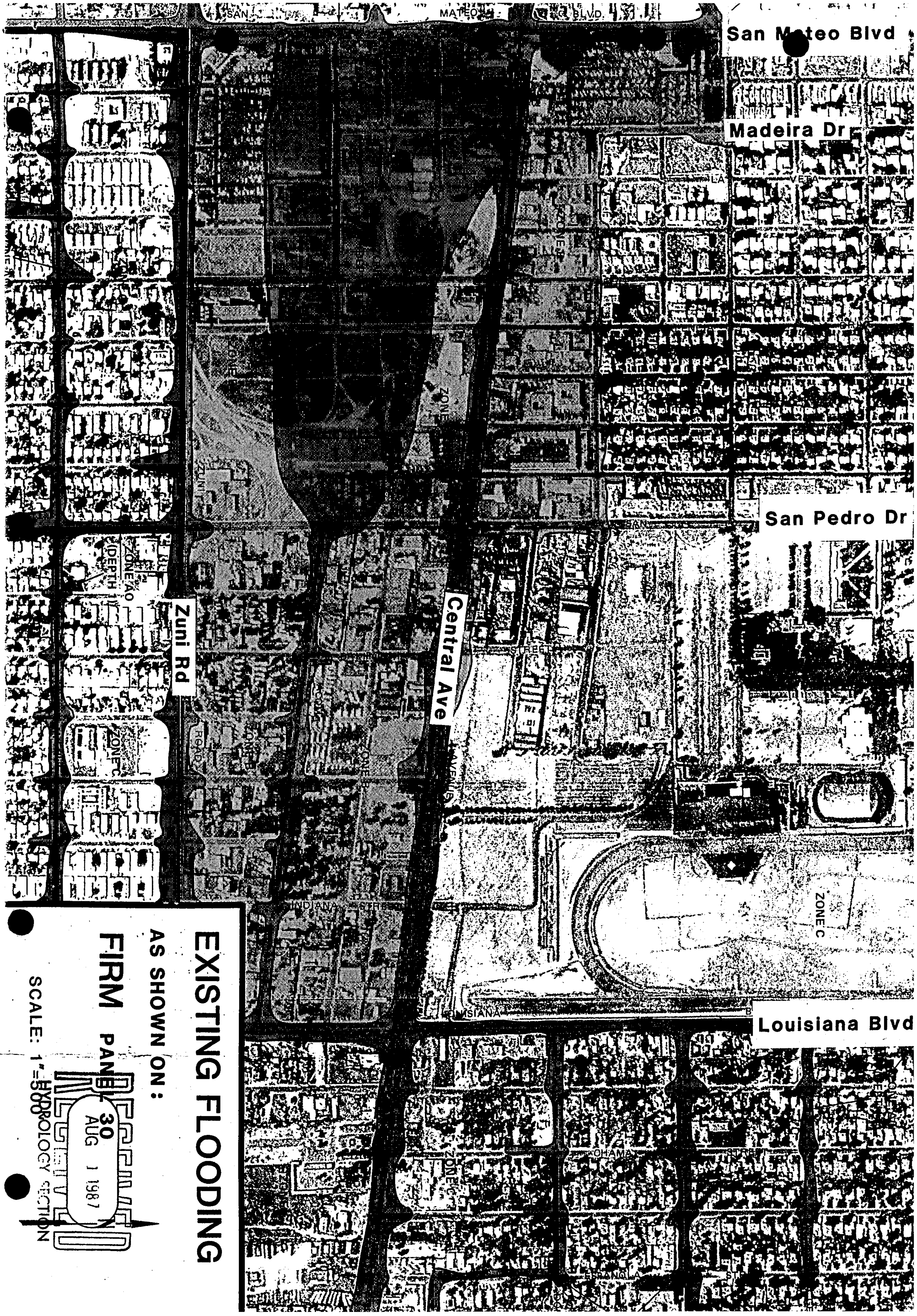
$$Q = 26.1 \text{ cfs}$$

$\rightarrow d = 0.42'$ (by interpolation)

* Typical - this sample calculation sheet is included to show methodology used for all flow depth determinations.

**BRITISH
HYDROLOGY SECTION**

AUG 21 1987



San Mateo Blvd

Madeira Dr

San Pedro Dr

ZONE C

Louisiana Blvd

Central Ave

Zuni Rd

EXISTING FLOODING

AS SHOWN ON:

FIRM **PANE** **30**

AUG 1 1987

SCALE: 1"=500' HYDROLOGY SECTION

San Mateo Blvd

Madeira Dr

San Pedro Dr

Central Ave

Zuni Rd

Louisiana Blvd

NOTES

1. This analysis only covers the area bounded by Central Ave. on the north, San Pedro Dr. on the east, Zuni Rd. on the south, and San Mateo Blvd. on the west.
2. Zone AO (Depth 1) flooding is shaded showing new limits for the 100-yr flooding. Actual water depths in the public street were found to be less than 0.5 feet, but flood boundaries are shown continuous between areas of flooding on private property.

PROPOSED REVISED

FLOOD HAZARD

MAP

AUG 21 1987

HYDROLOGY SECTION

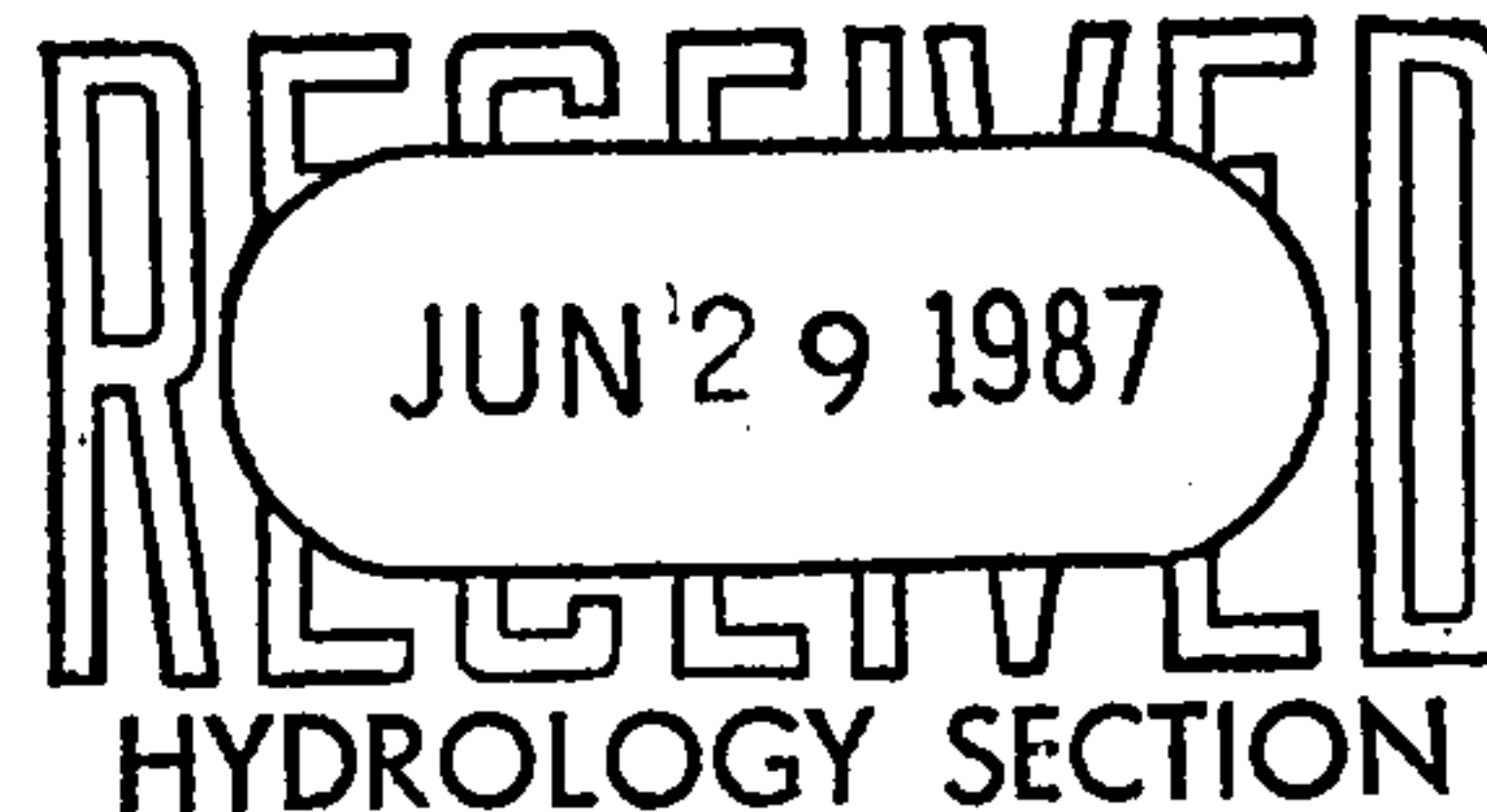
SCALE: 1"=500'



Federal Emergency Management Agency

Washington, D.C. 20472

JUN 23 1987



The Honorable Ken Schultz
Mayor of the City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Dear Mayor Schultz:

This is in reference to the Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) for your community. On January 21, 1986, we received correspondence from Mr. Carlos Montoya, Floodplain Administrator for the City of Albuquerque, regarding the Fairgrounds Storm Water Relief System project. Mr. Montoya requested, on behalf of Isaacson & Arfman, P.A., Consulting Engineering Associates, that the Federal Emergency Management Agency (FEMA) revise the FIS and FIRM to reflect the effects of the completed project on three properties within the City of Albuquerque.

On August 30, 1985, FEMA had issued a conditional Letter of Map Revision based on the proposed Fairgrounds Storm Water Relief System project. The three properties for which the conditional Letter of Map Revision was issued are Tracts B-1 and B-2, Brown Place Addition; Lots 9-13 and 19-22, Block 37, Tijeras Place Addition; and Tracts 2-4 and 5A of the Assessment Plat of the Tijeras Place Improvement Company. The conditional Letter of Map Revision (enclosed) stated that upon completion of the Fairgrounds project, your community could request a revision to the FIS and FIRM to reflect the effects of the completed project. The specific materials that should accompany the revision request were stated in the conditional Letter of Map Revision. On January 21, 1986, we received plans for the Fairgrounds project representing "as-built" conditions with Mr. Montoya's request for a FIRM revision. The processing of this, and several other revision requests in Albuquerque was temporarily suspended in order to investigate methodologies for analyzing flood hazards within alluvial fan floodplains. When the processing of Albuquerque's requests was resumed in December of 1986, we requested the additional materials as listed in the conditional Letter of Map Revision in order to comply with Mr. Montoya's request. In a telephone conversation on January 13, 1987, Mr. Montoya informed us that the City of Albuquerque had contracted Bohannon-Huston to restudy the flood hazards for the entire area affected by the Fairgrounds project, and that we should delay our processing of the revision request until the reanalysis was completed. To date, we have not received this reanalysis.

At this time, FEMA will reinitiate the revision request upon receipt of the following data:

1. "As-built" plans of the Fairgrounds System, certified by a registered engineer. (The plans received with Mr. Montoya's January 21, 1986 request were not certified.)
2. A written description of the methodology used to determine hydrologic and/or hydraulic parameters, if different from the effective FIS and FIRM.

3. Revised 100-year flood depth reflecting "as-built" conditions, including a determination of the appropriate shallow flooding zone. The upstream and downstream portions of the Special Flood Hazard Area should coincide with the effective FIS designation, i.e., normal depth calculations should be continued for a great enough distance upstream and downstream of the revised area until Special Flood Hazard Area designation and water-surface depths coincide with those in the effective FIS.
4. Delineation of the revised 100-year flood boundary.
 - a. This information should be shown on a map of suitable scale and topographic definition to provide reasonable accuracy.
 - b. All items should be labeled for easy cross-referencing to hydraulic model and summary data.
 - c. Upstream and downstream portions of the Special Flood Hazard Areas should coincide with the effective FIRM delineations.
5. Source data and engineering documentation for the previously mentioned items, as well as a bibliographic list of other sources of information used.

As previously mentioned, the City of Albuquerque has contracted with Bohannon-Huston to reanalyze flooding for the area affected by the Fairgrounds project. Analyses submitted for the three properties in question to support a revision request should be coordinated with Bohannon-Huston to assure that any subsequent revisions based on Bohannon-Huston's data do not supersede the revision for the three properties.

Should you have any questions regarding this matter, please do not hesitate to contact the Chief, Natural and Technological Hazards Division of the Federal Emergency Management Agency in Denton, Texas, at (817) 898-9127 or members of our Headquarters staff in Washington, D.C., at (202) 646-3461.

Sincerely,



John L. Matticks
Chief, Risk Studies Division
Federal Insurance Administration

Enclosure

cc: Mr. Carlos Montoya

Mr. Thomas O. Isaacson, Isaacson & Arfman, P.A., Consulting Engineering Associates



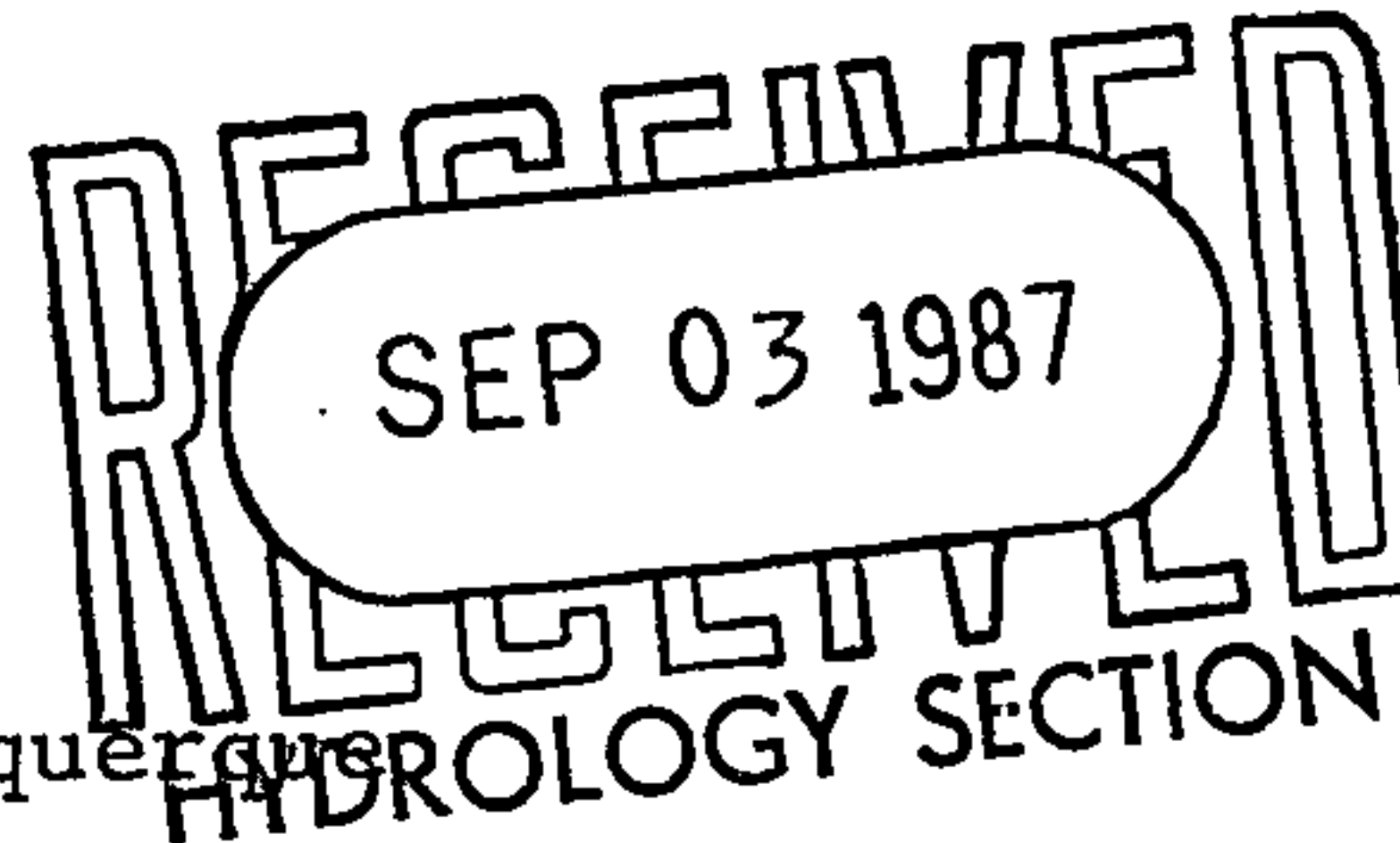
Federal Emergency Management Agency

Washington, D.C. 20472

AUG 27 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
IA-RA-RS (121A)



The Honorable Ken Schultz
Mayor of the City of Albuquerque
401 Marquette Street
Albuquerque, New Mexico 87103



RE: The City of Albuquerque, New Mexico
Flood Insurance Study

Dear Mayor Schultz:

This is to inform you that we are in receipt of information that may result in a revision to the National Flood Insurance Program (NFIP) maps for your community. A copy of the correspondence transmitting this information to us is enclosed for your review.

Please note that all requests for changes to effective NFIP maps, other than those initiated by the Federal Emergency Management Agency (FEMA), must be submitted to FEMA in writing by the Chief Executive Officer (CEO) of the affected community, or by an official designated by the CEO. Should the CEO refuse to submit such a request on behalf of another party, FEMA will agree to review it only if written evidence is provided indicating the CEO or designee has been requested to do so. Accordingly, this letter provides written notification of a request for a NFIP map revision.

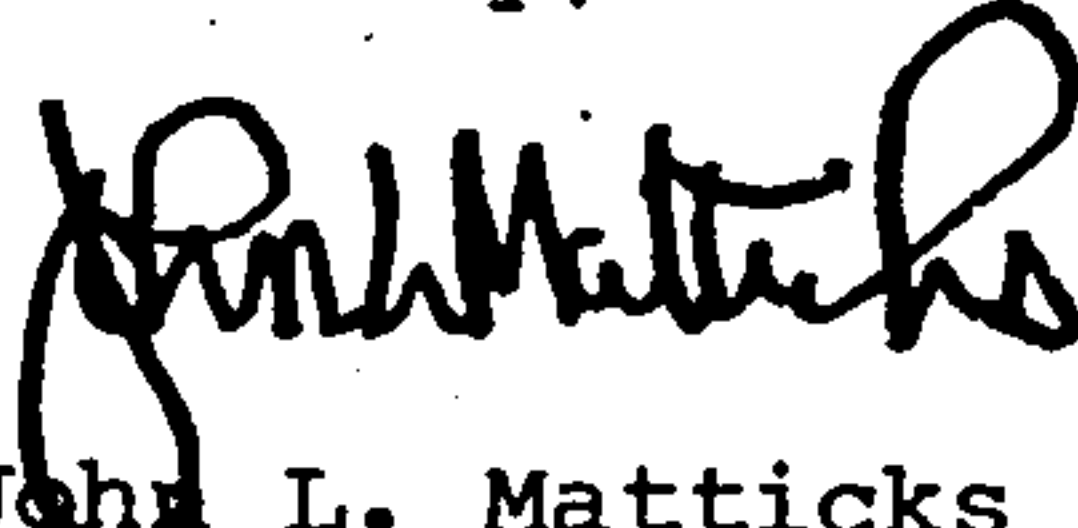
We have begun a review of the submitted information. Our consulting engineers may be contacting you by telephone to discuss flooding problems. Please make available to them any technical flood or topographic information you may have, and let them know about information that you believe may be available from other sources. After all technical data have been received and analyzed, the maps may be revised, if appropriate.

If you have comments or concerns regarding this proposed revision, please send your comments within 30 days to my attention at the following address:

Federal Emergency Management Agency
Federal Insurance Administration
Office of Risk Assessment
Risk Studies Division
500 C. Street, S.W.
Washington, D.C. 20472

If we do not hear from your community within 30 days, we will assume that you have no comments regarding this proposed revision. If we can be of further assistance, please contact members of our Headquarters staff in Washington, D.C., at (202) 646-2754.

Sincerely,



John L. Matticks
Chief, Risk Studies Division
Federal Insurance Administration

Enclosure

cc: Mr. Carlos Montoya, City Floodplain Administrator
Mr. Thomas Isaacson, P.E., Isaacson & Arfman, P.A.



Isaacson & Arfman, P.A.

Consulting Engineering
Associates

RECEIVED

Received 8/24/87
IA-RA-RS

August 20, 1987

AUG 24 1987

Federal Emergency Management Agency
500 C Street SW
Washington D.C. 20472

DEWBERRY & DAVIS

Re: Flood Insurance Rate Map revision request for 3 parcels located
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(Case No. 87-06-63R)

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Mr. John Matticks
August 20, 1987
Page 2

~~boundary limits now coincide with the effective Flood Insurance Rate Map delineations as shown on the attached exhibit "Proposed Revised Flood Hazard Map".~~

The source data used for this submittal includes the Albuquerque Master Drainage Study, the report entitled "FIRM Change Request" (previously submitted by this office), City of Albuquerque 1"=200' topographic maps, City Storm Sewer Atlases, and field inspections of the area.

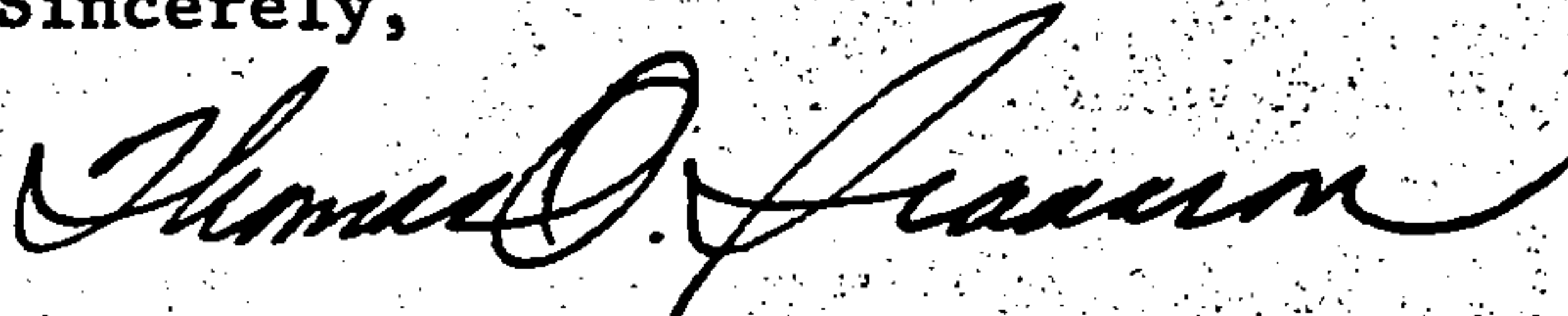
The final item that requires a response is your request to coordinate this revision submittal with the restudy that Bohannon Huston Inc. is currently preparing. After reading this restudy and talking with Mr. Jim Fink, Assistant City Engineer - Hydrology, City of Albuquerque, it seems apparent that this will not be possible.

The restudy, which is now in a preliminary stage and has not yet been approved, uses some criteria that is different from that used in the original AMDS. The changed criteria consists of new runoff curve numbers and new hydrographs which are intended to more closely model the precipitation patterns in Albuquerque. The peak 100-yr runoff rates in our study area have then been reduced from the figures given in the original AMDS. The restudy is not expected to be completed and accepted by the City until the spring of 1988.

Since the AMDS is still the effective Flood Insurance Study for this area, our office takes the position that these figures are the correct basis for this analysis. When and if the restudy by Bohannon Huston Inc. is approved, it is our understanding that all of the flood hazard area shown on the present FIRM will have been removed.

Should you have any questions regarding this submittal, please don't hesitate to call me at (505) 268-8828.

Sincerely,



Thomas O. Isaacson, P.E.

TOI/acq

Enclosures

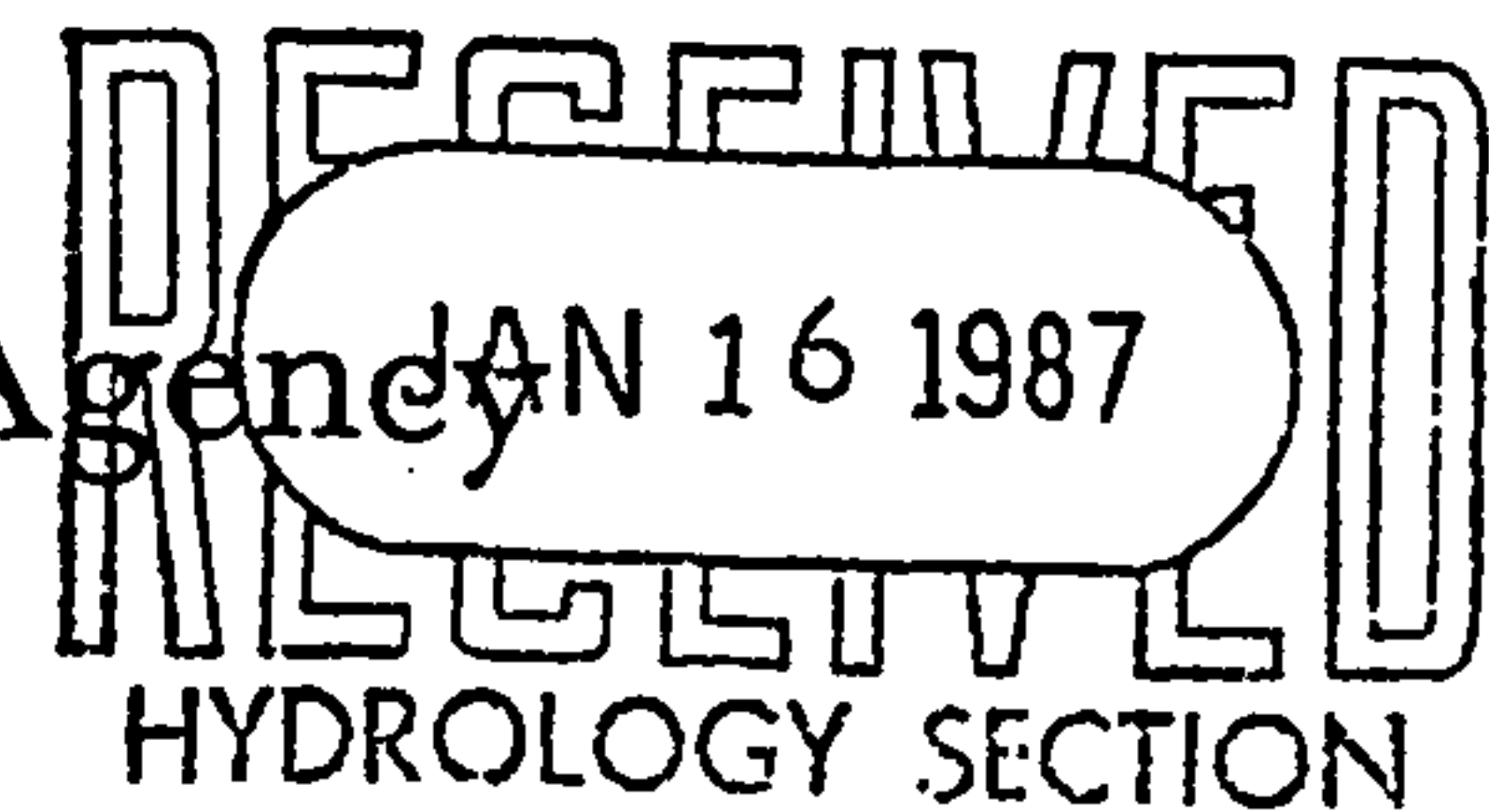
cc: Ms. Diane Leatherwood, w/o enclosures
Mr. Carlos Montoya w/ enclosures
Cook Development Group w/ enclosures



Federal Emergency Management Agency

Washington, D.C. 20472

December 31, 1986



The Honorable Harry E. Kinney
Mayor of the City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Dear Mayor Kinney:

This is in reference to a letter dated November 20, 1986, from Mr. Carlos Montoya, P.E., City of Albuquerque Floodplain Administrator. In his letter, Mr. Montoya inquired as to the status of several requests for Letters of Map Revision (LOMRs). The Federal Emergency Management Agency (FEMA) was requested to issue these LOMRs to change the Special Flood Hazard Areas depicted on your community's Flood Insurance Rate Map (FIRM) based on the construction of flood control structures along Bear Arroyo Tributary, Black Arroyo, and Arroyo del Pino. In our letter of July 15, 1986, FEMA informed your community that processing of the LOMR requests would be delayed while we assessed the effectiveness of these flood control structures in controlling flood discharges.

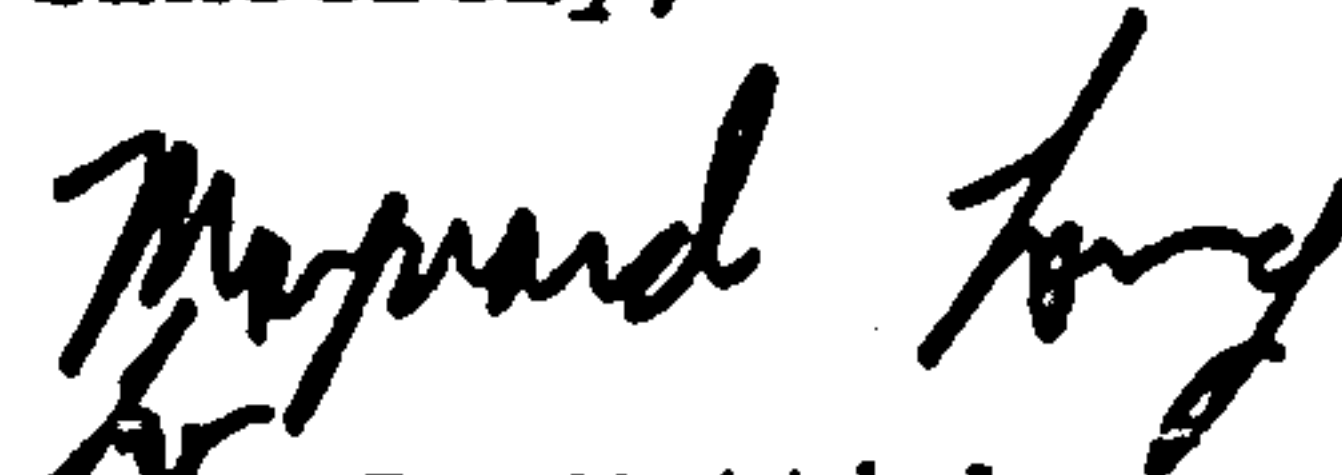
We apologize for the delay in processing these LOMR requests and regret that we did not respond within the 90 days specified in our July 15 letter. In assessing the effectiveness of the constructed flood control structures, we examined the state of the art in risk analysis and floodplain management on alluvial fans. Floodplain management approaches to development on alluvial fans range from allowing no development in those areas to constructing structural measures involving channelization, in some cases extending from the apex of the fan to the base. A comprehensive floodplain management effort on alluvial fans is required, and solutions cannot be developed by examining structures on an individual basis.

Based on the comprehensive floodplain management effort undertaken by the Albuquerque Metropolitan Arroyo Flood Control Authority in the City of Albuquerque, we will no longer delay the LOMR requests. We have begun review and processing procedures on the submitted requests and anticipate completion within 60 days of the date of this letter. We request, however, that your community provide us on a continuing basis with assessments of the performance of the flood control structures following significant storm events (greater than 10-year storm). We feel that such assessments will be useful in future evaluation of these type of LOMR requests.

Again, we regret any inconvenience that may have been caused your community as a result of the delayed processing of these LOMR requests. It is our hope that the research we have conducted will enable us to answer future requests

in a timely manner. Should you have any questions regarding this matter, please do not hesitate to contact the Chief, Natural and Technological Hazards Division of the Federal Emergency Management Agency in Denton, Texas, at (817) 898-5127, or members of our Headquarters staff in Washington, D.C., at (202) 646-2754.

Sincerely,



John L. Matticks
Acting Chief, Risk Studies Division
Federal Insurance Administration

cc: Mr. Carlos A. Montoya
Mr. Brian G. Burnett, P.E., Bohannon-Huston, Inc.
Mr. Kerry L. Davis, Bohannon-Huston, Inc.
Mr. Daniel Grochowski, P.E., Bohannon-Huston, Inc.
Mr. Thomas D. Isaacson, P.E., Isaacson & Arfman
Mr. Kent M. Whitman, P.E., Community Sciences Corporation

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103



HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

November 20, 1986

John L. Matticks
Acting Chief, Risk Studies Division
Federal Emergency Management Agency
Washington, D.C. 20472

RE: LETTER OF MAP REVISIONS FOR CITY OF ALBUQUERQUE

Dear Mr. Matticks:

On July 15, 1986, I received a letter from you requesting an extra 90 days review time for our LOMR requests. As of this date, we have not received any correspondence on our request.

The developers, engineers, and homeowners in the affected areas are very concerned because of the delays. The City or developers have constructed channels, storm drains, dikes, etc. to protect themselves from the 100 year runoff. However, the homeowners are still encumbered with flood insurance payments and the property is devalued because of the floodplain designation.

We do realize the importance of your review. If there is any incomplete designs or incorrect assumptions on our part, please request the information needed to complete your review.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

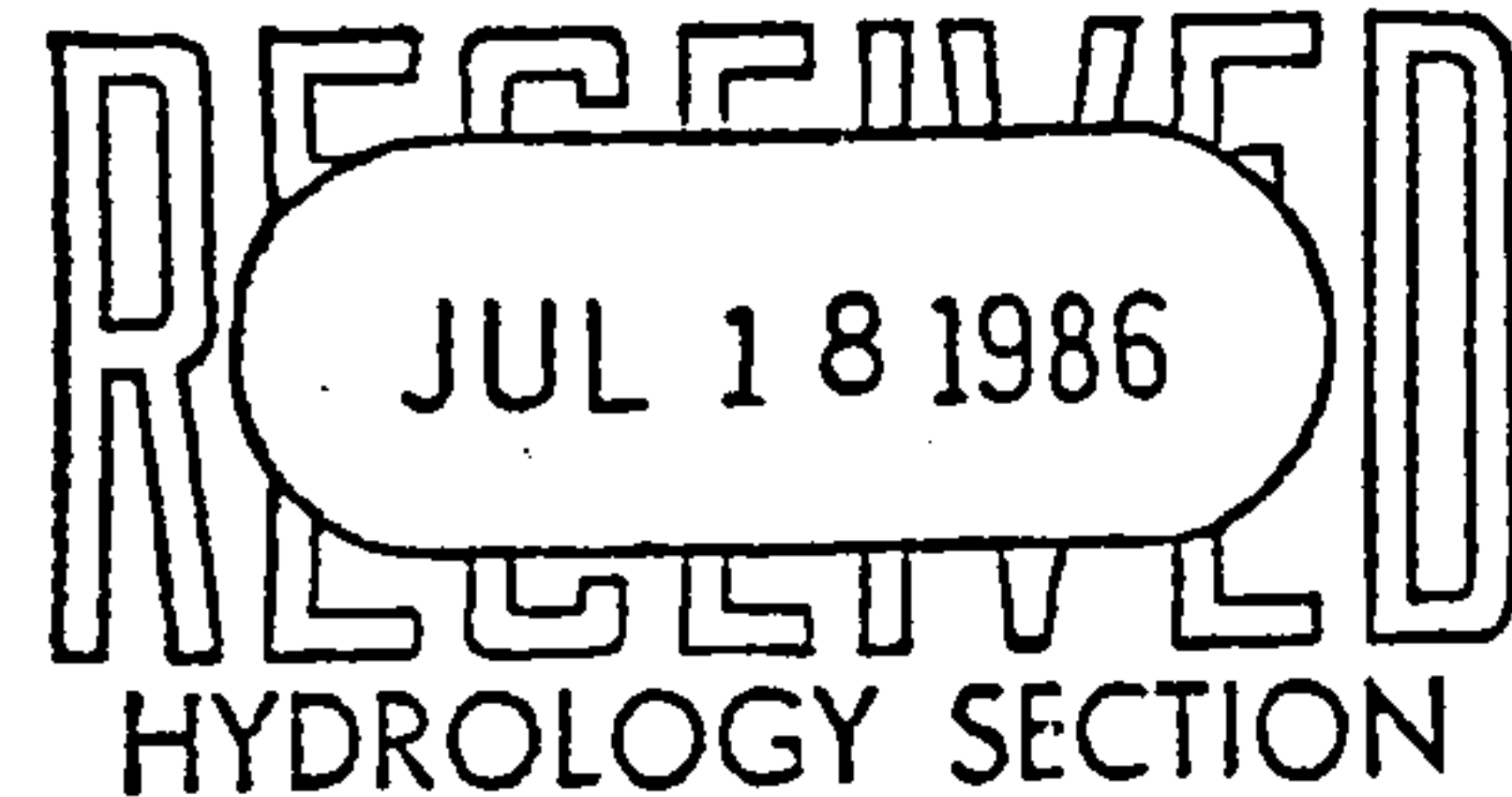


Federal Emergency Management Agency

Washington, D.C. 20472

July 15, 1986

The Honorable Harry E. Kinney
Mayor of the City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103



Dear Mayor Kinney:

This is in reference to the effective Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) for the City of Albuquerque. Over the past eight months, the Federal Emergency Management Agency (FEMA) has received a number of Letter of Map Revision (LOMR) requests from Mr. Carlos A. Montoya, Floodplain Administrator for your community. Mr. Montoya has requested these LOMRs to reflect changes in the Special Flood Hazard Areas depicted in your community's effective FIS and FIRM, afforded by the construction of flood control structures along Bear Arroyo Tributary, Black Arroyo, and Arroyo del Pino.

We recognize that your community is attempting to decrease flood hazards by constructing flood control structures such as high-velocity channels and diversion berms; however, the potential flood hazards in Albuquerque are very complex and dangerous. Therefore, FEMA is presently assessing the effectiveness of these flood control structures in controlling flood discharges. We regret the resulting delay in processing the LOMR requests submitted by Mr. Montoya, but we feel it is to your community's benefit that we provide a comprehensive review before initiating any revisions to the FIS and FIRM.

We anticipate being able to inform your community of the results of our review within ninety days of the date of this letter. Should you have any questions regarding this matter, please do not hesitate to contact the Chief, Natural and Technological Hazards Division of the Federal Emergency Management Agency in Denton, Texas, at (817) 898-5125, or members of our Headquarters staff in Washington, D.C., at (202) 646-2754.

Sincerely,

John L. Matticks
Acting Chief, Risk Studies Division
Federal Insurance Administration

cc: Mr. Brian G. Burnett, P.E., Bohannon-Huston, Inc.
Mr. Kerry L. Davis, Bohannon-Huston, Inc.
Mr. Daniel Grochowski, P.E., Bohannon-Huston, Inc.
Mr. Thomas D. Isaacson, P.E., Isaacson & Anfman
Mr. Carlos A. Montoya
Mr. Kent M. Whitman, P.E., Community Sciences Corporation

claudio antonio vigil & associates, p.a.

CAMA

March 24, 1986

RECEIVED MAR 25 1986

Mr. Dan Cook
Cook Construction
506 Carmony Rd., NE
Albuquerque, NM

Dear Mr. Cook:

Attached you will find a copy of the water and sewer availability statement. Fire walls can be added to reduce water flow requirements and thereby use the existing infrastructure.

We are anxious to complete the mortgage package. We await further instruction at your earliest convenience.

Sincerely,

CLAUDIO ANTONIO VIGIL & ASSOCIATES



Claudio Antonio Vigil
Architect/AIA

dep
encl.

MAR 18 1986

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103



Claudio A. Vigil & Associates
2340 Alamo SE # 101
Albuquerque, NM 87106

RECEIVED MAR 25 1986

RECEIVED
3-20-86

March 14, 1986

Mr. John R. Pelletier
Four Seasons Engineering, Limited
8009 Marble NE
Albuquerque, New Mexico 87110

RE: WATER AND SANITARY SEWER AVAILABILITY (K-18)

Dear Mr. Pelletier:

This statement of availability is issued in response to your inquiry of December 2, 1985. All statements made herein are contingent upon the information provided in that inquiry.

Subject Property: Tract 5A of the Tijeras Place Improvement

Proposed Development: Retirement Center of 178000 Square Feet

WATER:

Service is available via routine service connection to the existing 6-inch cast iron water line in Valencia Drive SE. Service connection must be coordinated through the Customer Services Office at 768-2840. Service will not be subject to Utility Expansion Charges.

SEWER:

Service is available via routine service connection to the existing 8-inch vitrified clay sanitary sewer line in Valencia Drive SE. Service connection must be coordinated through a licensed plumber. Installation must conform to the plumbing code as adopted, and to effective Department connection requirements. Service will not be subject to Utility Expansion Charges.

FIRE PROTECTION:

The existing water distribution network can deliver a maximum fire flow of 2200 GPM to the intersection of Valencia Drive and Acoma Road. If changes in construction plans can reduce the required fire flow (including sprinkler usage) to less than 2200 GPM, such might prove the most economical manner of development.

Mr. John R. Pelletier
March 14, 1986
Page Two

If 3037 GPM is to be required for fire flow, as submitted to this office, plus 300 GPM for sprinklers, infrastructure improvements in the vicinity of the proposed development must be accomplished. Firstly, the existing 6-inch line in Valencia Drive, from the south end of the proposed development site to

Central Avenue, must be paralleled with an 8-inch line. Secondly, the 6-inch and 12-inch cast iron lines in the intersection of Zuni Road and San Pedro Boulevard must be connected. This would be very costly since the intersection was recently reconstructed in concrete. Thirdly, an 8-inch on-site looped water line will be required with a minimum of three fire hydrants located within 300 feet of every point of the building.

Another alternative to meeting the fire flow of 3337 GPM (total) is to loop a 10-inch water line from the 10-inch line in San Pedro, securing an easement across the Save n' Gain property, splitting into two 8-inch lines, each tying to the 6-inch line in Valencia Drive. Again a minimum of three fire hydrants must be located within 300 feet of every point of each building. A 20-foot minimum easement will be required for the waterline. Additional easement area may be required for water meters and fire hydrants.

Modification of the building construction, such as adding fire walls, can reduce the fire flow requirements which can reduce the above requirements. It is recommended that the developer contact the Plan Checking Section of the Albuquerque Fire Marshall's Office for new fire protection requirements. Once obtained, forward a copy of these requirements to this office for verification of system adequacy. We will also re-evaluate the improvements required for fire protection.

The design and construction of public water lines and fire hydrants must be in accordance with the Development Process Manual and must be coordinated through the City Engineer's Office. The cost of the improvements are the responsibility of the developer.

This statement of availability will remain in effect for a period of one year and applies only to the proposed development identified herein. Its validity is in part contingent on the continuing accuracy of the information supplied by the developer. Changes in the proposed development may require re-evaluation of availability and should be brought to our attention as soon as possible. Any outstanding prorata and/or standby assessments must be paid at the time service is taken. All charges assessed and/or rates collected will be based on applicable ordinances and policies in effect at the time service is actually requested and authorized.

John R. Pelletier
March 14, 1986
Page Three

If you have any questions and/or comments please do not hesitate to contact me at 766-7354.

Sincerely,

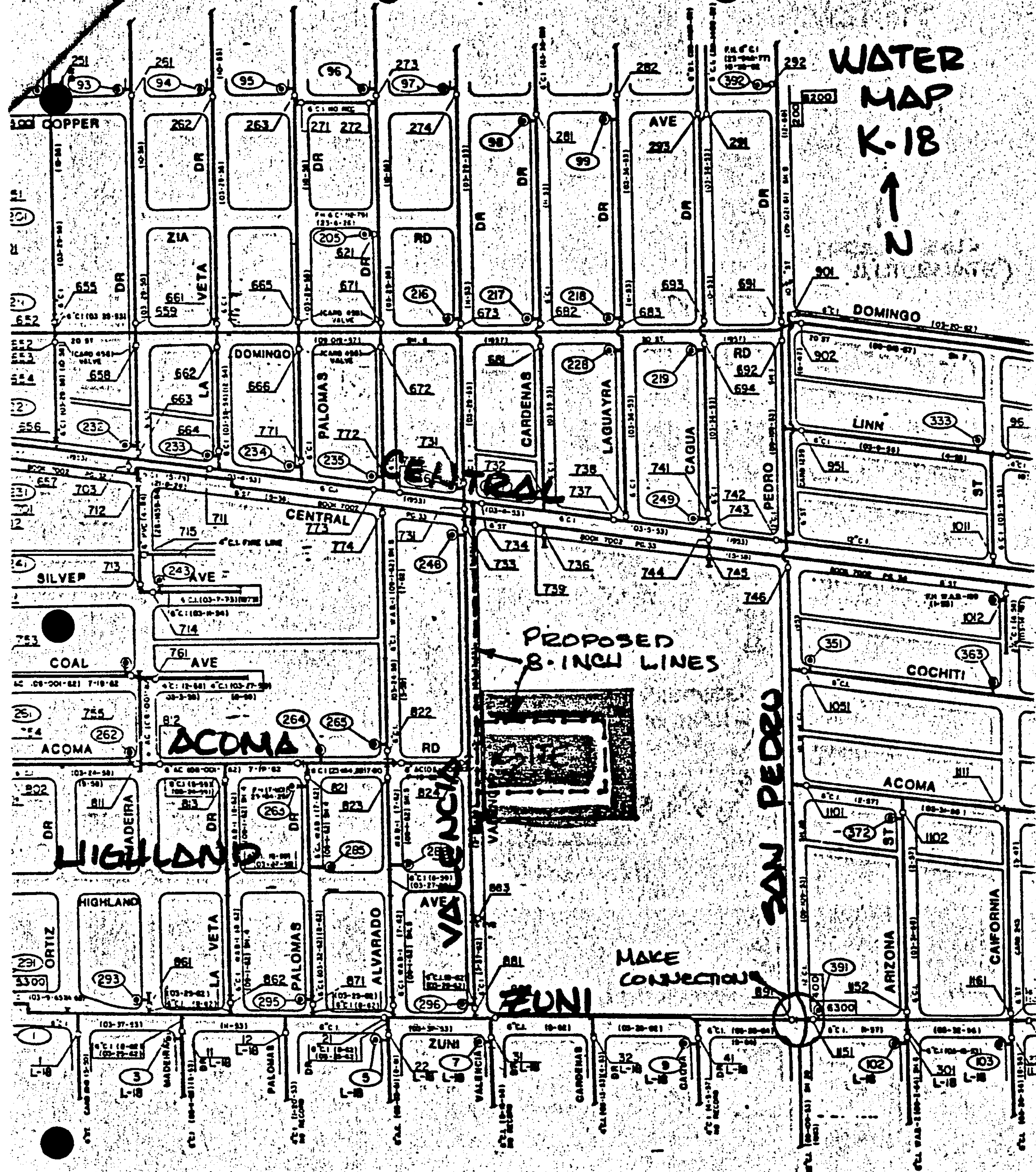
Rhonda G. Faught

Rhonda G. Faught, P.E.
Assistant Systems Engineer
Planning and Engineering Division
Water Utilities Department

RGF:lk

xc: W. Nickerson
C.F. Knott
J. Ertsgaard
J. Gutierrez, Customer Services
R. Robinson
D. Brosman, Liquid Waste (Re: facility line #135)
f/Availability (K-18)
f/Readers (log #12/08)
f/Tract 5A, Tijeras Place Improvement

WATER MAP K-18



PROPOSED
8-INCH LINES

ACOMA

HIGHLAND

ZUNI

MAKE
CONNECTION

SAN PEDRO

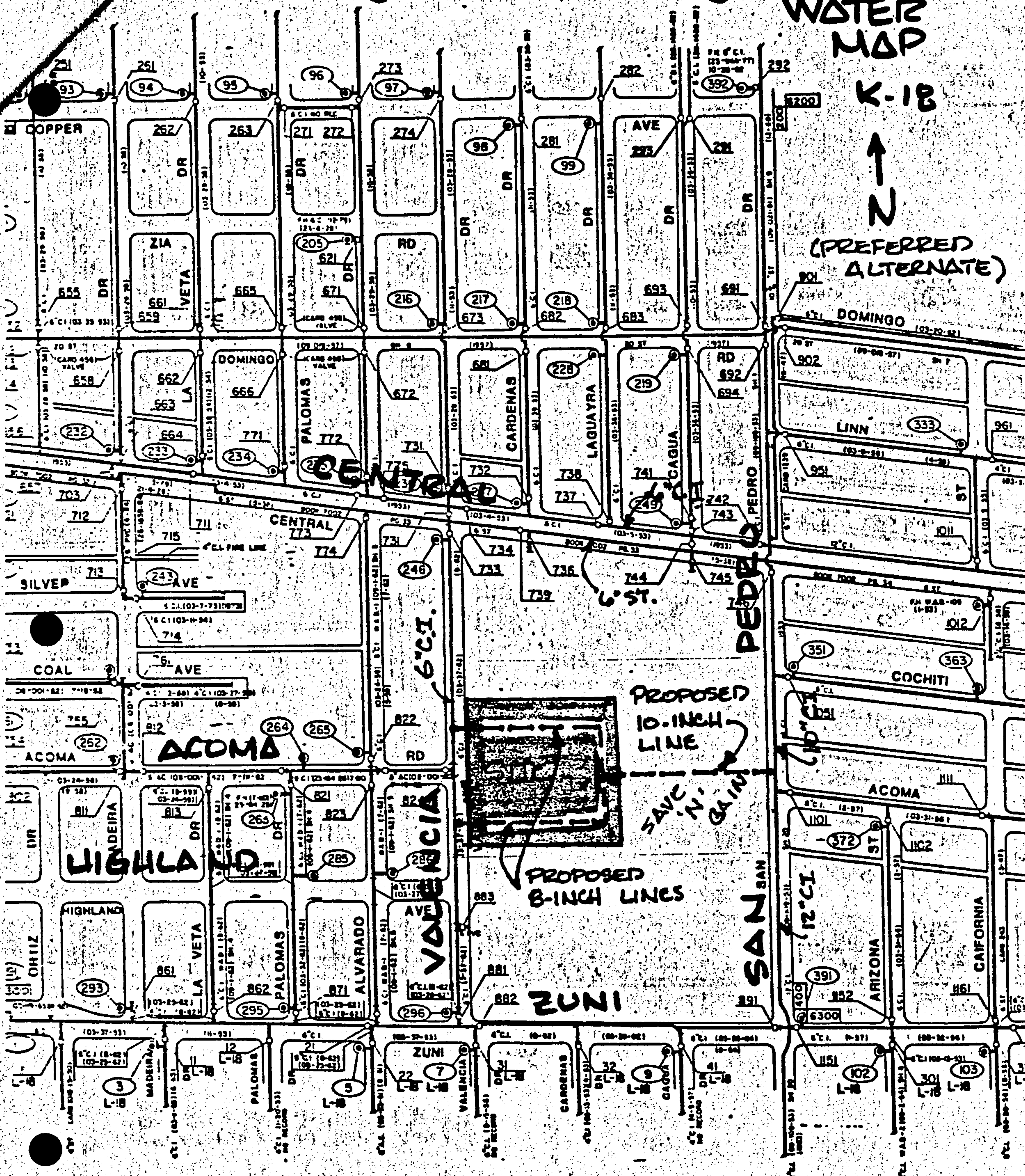
REVISIONS	
NO.	REMARKS
1	ECLE NO. 10000000
2	NO. 10000000
3	NO. 10000000
4	NO. 10000000
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6	NO. 10000000
7	NO. 10000000
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WATER MAP

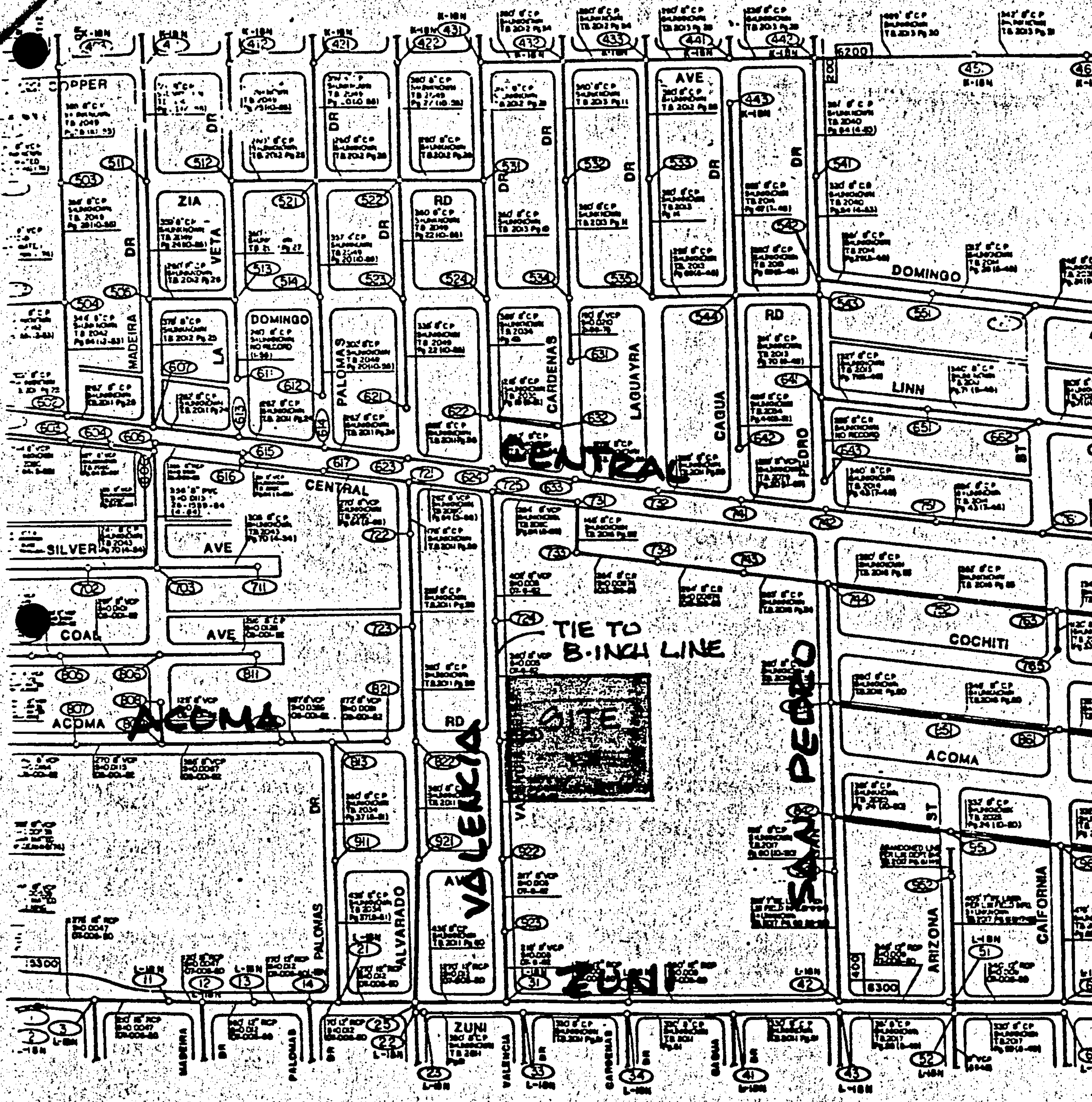
K-18



(PREFERRED ALTERNATE)



REVISIONS
1. 10-1-53
2. 10-1-53
3. 10-1-53
4. 10-1-53
5. 10-1-53
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10. 10-1-53



SEWER MAP
K-18





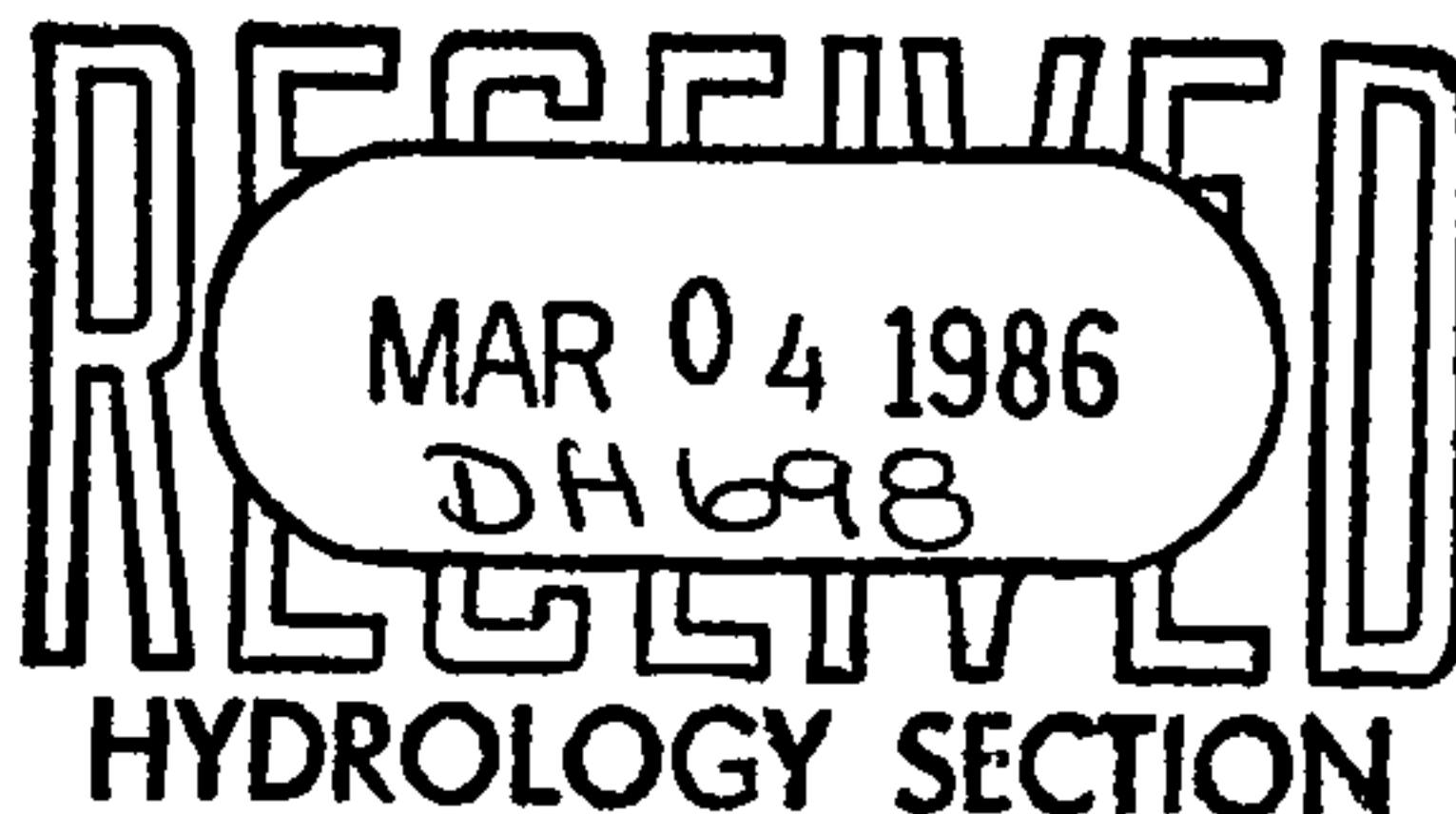
Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
IA-RA-RS (121 B)

The Honorable
Harry E. Kinney
Mayor of the
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103



RE: City of Albuquerque, Bernalillo County, New Mexico
Flood Insurance Study

Dear Mayor Kinney:

This is to inform you that information has been received which may result in a revision to the Flood Insurance Rate Map and Flood Boundary and Floodway Map as noted below:

Inquirer: Mr. Carlos A. Montoya
City Floodplain Administrator

Information Source: Wilson & Company
Engineers & Architects

We are reviewing the data used to prepare the maps, and our consulting engineers will be contacting you to discuss flooding problems. Please make available to them any technical flood or topographic information you may have, and let them know about information that you believe may be available from other sources. After all technical data have been received and analyzed, the maps will be revised, if necessary.

If we can be of further assistance, please let us know.

Sincerely,

John L. Matticks
Acting Chief, Risk Studies Division
Federal Insurance Administration

cc: Mr. Carlos A. Montoya
City Floodplain Administrator

FOX & ASSOCIATES OF NEW MEXICO, INC.

CONSULTING ENGINEERS AND GEOLOGISTS

ALBUQUERQUE OFFICE 3412 BRYN MAWR DRIVE, NE
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0900

SUBSURFACE INVESTIGATION

RETIREMENT CENTER

ON VALENCIA DRIVE

ALBUQUERQUE, NEW MEXICO

Prepared for:

Cook Construction Company, Inc.

Job No: 0117410

February 27, 1986

T A B L E O F C O N T E N T S

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GENERAL

This report presents the results of a subsurface investigation conducted for the proposed retirement center to be located on Valencia Drive south of Central Avenue in Albuquerque, New Mexico.

The investigation was made to determine the best types and depths of foundations, allowable soil bearing pressures, groundwater conditions, and special precautions which should be taken in the design and construction of the retirement center due to the site soil conditions.

The conclusions and recommendations presented are based on the data gathered during the site investigation, on the results of laboratory testing, and upon the applicable standards of our profession at the time this report was prepared. Data gathered during the field and laboratory investigations are presented in Figures 1 through 9, and Table 1.

PROPOSED CONSTRUCTION AND SITE CONDITIONS

It is our understanding that the subject site will be developed with a multi-story retirement complex. The layout of the proposed structures is indicated on the Test Hole Location Plan, Figure 1. The structures will be steel frame and four to

five stories in height. The bottom floors will be conventional concrete slabs-on-grade. An indoor swimming pool is to be located in one of the buildings. Maximum column and wall loads are not anticipated to exceed 200 kips and 1 kip per linear foot, respectively.

The site is bordered on the west by Valencia Drive with existing structures beyond. An open lot lies to the north with Central Avenue beyond. An existing shopping center lies to east while an existing medical building is situated to the south.

The site is presently undeveloped with some piles of trash and debris scattered across the lot. Vegetation on the site consists of weeds and grasses. The site is relatively flat. Utility lines parallel Valencia Drive.

SUBSURFACE CONDITIONS

To investigate site subsurface conditions, twelve (12) test holes were drilled at the locations indicated on the Test Hole Location Plan, Figure 1. As shown on the Logs of Test Holes, Figures 2 through 4, site subsurface conditions are relatively consistent.

In general, site surficial soils consist of very silty sands and very sandy silts. These soils were loose to medium dense and

slightly moist. Below the surficial soils, several of the test holes encountered a calcareously cemented silty sand. The caliche displayed a weak to moderate degree of cementation and should be excavatable by conventional equipment.

At greater depths the test holes encountered coarse to fine-grained sands of varying silt content. These soils were medium dense to very dense and had occasional lenses of silt and of gravelly sand. No groundwater or bedrock was encountered.

Although the soils have a high dry strength, they are susceptible to significant "collapse" upon an increase in natural moisture content. Refer to the Swell-Consolidation Tests, Figures 5 and 6.

FOUNDATIONS- CONVENTIONAL SPREAD FOOTINGS

The proposed structures may be supported on conventional spread footings bearing on a minimum of three (3) feet of controlled structural fill. The footings may be designed for an allowable soil bearing pressure of 3000 pounds per square foot. This value may be increased by one-third for short term loads due to wind and earthquakes.

The lateral limits of the overexcavation should extend a minimum of three (3) feet beyond all footing lines. Prior to

footing or fill placement, the natural soils exposed should be scarified to a depth of eight (8) inches and moisture conditioned to a near optimum ($\pm 2\%$) moisture content. The soils should then be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557 with a minimum of twenty (20) passes with a heavy vibratory roller. All structural fill should be placed and compacted as detailed in the attached Appendix. If vibratory compaction techniques pose a threat to the structural integrity of nearby buildings, static compaction techniques should be used.

Footings should be proportioned as much as practicable in order to minimize differential settlement. However, a minimum strip footing width of 16 inches and a minimum column footing dimension of 24 inches should be maintained. Exterior footings should be placed a minimum of 18 inches below final exterior grade for frost protection. Interior footings should be embedded a minimum of 12 inches below finish floor grade. Care should be taken to insure that all loose material on bearing surfaces are compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

Lateral foundation loads will be resisted by a combination of passive earth pressure against the sides of footings and friction along the base of the footing. Passive resistance may be taken as equivalent to a fluid whose density is 300 pounds per cubic foot. Frictional resistance may be determined by multiplying structure dead load by a coefficient of 0.40

Post construction settlement of footings designed and constructed as recommended above should not exceed 0.75 inches. Differential settlement between adjacent columns should not exceed one-half the above value.

All trash, debris or uncontrolled fill must be removed from beneath the proposed structures prior to footing, slab or fill placement. It is anticipated that on site material may be used as controlled structural fill provided all deleterious material is removed.

INTERIOR FLOOR SLAB CONSTRUCTION

All interior floor slabs should be supported on compacted natural soils or controlled structural fill if required to meet final grading plans. Prior to placement of slabs or fill, the natural soils exposed should be scarified, moistened to optimum moisture content ($\pm 2\%$) to a minimum depth of eight (8) inches, and compacted with a heavy roller to a minimum of 95% of maximum Proctor density as determined by ASTM D-1557.

Slabs must be separated from all bearing members, and utility lines to allow their independent movement. Where concentrated loads are anticipated, a gravel layer should be placed beneath the

slabs to help distribute these loads. Frequent joints should be scored in the slabs to control the location of any cracking.

Where lightly loaded interior walls are planned, these walls may be supported on thickened sections of the floor slab. The thickened sections should be a minimum of 12 inches in width and should not apply more than a 500 PSF pressure to the supporting soils. Wall loadings at thickened slab areas should not exceed 800 pounds per linear foot. Control joints should be provided at the thickened slab sections to help minimize floor slab cracking.

EXTERIOR SLABS

Backfill and any soil disturbed around the foundation walls should be compacted to a minimum of 90% of maximum Proctor density as determined by ASTM D-1557 prior to placing any exterior slabs or sidewalks. It is good practice to support small exterior slabs on haunches, or to structurally tie them to the foundations to prevent differential movement.

REINFORCING

Foundations, slabs and walls should be well reinforced to minimize the effects of differential movement. Refer to the foundation design for details.

SWIMMING POOL CONSTRUCTION

It is recommended that the pool be constructed of fiberglass or reinforced gunite concrete. These materials can withstand relatively large soil movements without cracking. However, because the pool will be in collapsible soils, care should be taken during construction to waterproof the pool so that leakage will not occur.

To prevent saturation of the underlying soils should some leakage take place, a drain system must be provided beneath the pool. The drain system should be constructed by providing a minimum six (6) inch layer of clean gravel (minimum 0.75 inch size) beneath the pool. The gravel layer should be sloped so that it will drain into tiles or perforated drain pipes. The layout for the perforated pipes should include at least one pipe running down the center of the pool lengthwise. Cross-connecting pipes should be placed to span the width of the pool. The cross-connecting pipes should be joined to the centerpipe with a solid T or cross connectors. The center pipe should be sloped to a positive gravity outfall or to a sump located in the equipment room, permitting pump discharge. The bottom of the excavation beneath the gravel layer must be lined with an impervious membrane such as "Moist Stop" or equivalent. This will help to keep the moisture content of the underlying soils stable should some pool leakage occur.

The soils that will support the deck slabs of the pool are stable at their natural moisture content. However, it should be anticipated that, when wetted, the slightly silty sands will collapse. To minimize any damage that should be caused by the possible collapse of the soils supporting the perimeter deck slabs, slabs should have a positive separation from the pool structure and all utility lines to allow their independent movement. Slabs should be placed directly on compacted natural soils or controlled structural fill, and they should be well reinforced to minimize any differential movement. Frequent joints should be scored in the slabs to control the location of any cracking.

Backfill around the pool area should be moistened to optimum moisture content ($\pm 2\%$) and compacted to a minimum of 95% of maximum density as determined by ASTM D-1557. The decking should be sloped for diversion of deck surface runoff away from the pool area. In no case should water be allowed to pond around the slab perimeter.

BACKFILL AND SURFACE DRAINAGE

Due to the moisture sensitivity of the site soils, it is very important that the recommendations presented in this and the following section are closely followed.

Soils supporting the structure, slabs and pavement should be prevented from being wetted after construction. Backfill around the foundations should be free of trash and construction debris, and should be moistened and compacted to a minimum of 90% of maximum density as determined by ASTM D-1557. Only enough water should be added to the backfill material to allow proper compaction. Do not puddle or jet backfill.

The final grade should have a good slope away from foundation walls and exterior slabs on all sides. A minimum slope of one (1) foot of fall in the first ten (10) feet from foundation walls is recommended in areas not protected by sidewalks and asphalt paving. Drainage from roofs, and all other surface water, should not be allowed to pond in the backfill areas or within ten (10) feet of foundations. Downspout extensions and splash blocks should be used to protect the ground surface where the ground is not covered by concrete or asphalt.

Ponding areas should be eliminated if possible. However, if they are required for the control of surface runoff they should be located as far from the foundation walls as possible, a minimum of fifteen (15) feet.

IRRIGATION OF LANDSCAPED AREAS

Do not install sprinkler system lines next to foundation walls or exterior slabs. If a sprinkler system is installed, the sprinklers should be placed so that the spray from the heads under full pressure does not fall within five (5) feet of foundation walls. Irrigation should be minimized and controlled. Any planters adjacent to the structure should be watertight or watered using controlled drip irrigation which discharges no more than two (2) gallons per hour per line. The main line for the drip irrigation system should be located a minimum of five (5) feet from the foundations. We recommend employing plants native to the area which require minimal irrigation. Any interior planters must be water tight.

EARTH PRESSURES AND RETAINING WALLS

Retaining walls constructed in conjunction with this project are not anticipated to exceed five (5) feet in height. If higher walls or unusual loading conditions (surcharges on backfill, sloping backfill, etc.) are anticipated, this office should be contacted to evaluate the applicability of the following recommendations.

The lateral earth pressures for the design of underground structures or retaining walls may be approximated by the following equivalent fluid pressures:

Active Earth Pressure = Equivalent Fluid Pressure for a Fluid Whose Density is 30 PCF.

Passive Earth Pressure = Equivalent Fluid Pressure for a Fluid Whose Density is 300 PCF.

Earth Pressure At Rest = Equivalent Fluid Pressure for a Fluid Whose Density is 50 PCF.

To mobilize the active earth pressure, the top of the retaining wall must rotate around the base, away from the backfill a distance of approximately $2/1000$ of the wall height. To mobilize the passive earth pressure, the wall or footing must move toward the backfill a distance of approximately $2/100$ of the wall height. The earth pressure at rest is present under static conditions.

The above forces should be assumed to act at the lower third point of the stress triangle. The earth pressure at rest should be used for the design of interior walls if the walls are braced at the top preventing rotation about the toe during backfilling. If the wall is able to rotate about the base the active earth pressure should be used for design. It is recommended that

retaining walls be designed with a safety factor of 2 against overturning and 1.5 against sliding. These values are based on Rankine theory and the assumptions of a horizontal backfill surface, a vertical wall, no surcharge, and free-draining backfill material. Frictional resistance against sliding may be determined by multiplying the structure dead load by a coefficient of 0.40.

Measures should be taken to prevent the build up of hydrostatic pressure behind retaining walls. Gravel drains should be provided behind interior retaining walls and weep holes should be provided for exterior retaining walls. Weep holes should be frequently spaced and placed near the base of the exterior walls.

Below grade walls and interior retaining walls should be moisture proofed. Staining of the concrete or damage to moisture sensitive wall coverings could result if the walls are not moisture proofed prior to backfilling.

Subsequent to moisture proofing, the backfill behind retaining walls should be moistened to optimum moisture content ($\pm 2\%$), and compacted to a minimum of 90% of maximum density as determined by ASTM D-1557. Only light, hand operated compaction equipment should be used near the wall.

If desired, the footings for retaining walls may be placed on compacted natural soils or controlled structural fill if required to meet final grading plans. Retaining wall footings may be

designed for a maximum soil bearing pressure of 2000 PSF. Bearing surfaces should be scarified to a minimum depth of eight (8) inches, moisture conditioned to a near optimum moisture content ($\pm 2\%$), and compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

TRENCHES AND EXCAVATIONS

All trenches and excavations greater than five (5) feet deep must be sloped, shored, sheeted, braced, or otherwise supported according to OSHA construction safety and health standards. Where unstable soil conditions are encountered in trenches shallower than five (5) feet, these trenches must also be sloped, shored, or supported.

Material excavated from the trench or spoil must be placed a minimum of two (2) feet from the edge of the excavation or trench. The spoil should be barricaded or retained in an effective manner such that no loose material can fall into the excavation or trench. Additional measures should be taken to provide an adequate support system in trenches which are excavated below the water table, in backfill areas, in loose unstable soils, and in "brittle" clays.

CONSTRUCTION INSPECTION

The recommendations outlined are based on our understanding of the current plans for the proposed structures. In the event that any changes in the nature, design or the location of the buildings as set forth in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

In any subsurface investigation, it is necessary to assume that the subsurface conditions do not vary greatly from the conditions encountered in the test holes. The analysis and recommendations submitted in this report are based in part on the data obtained from the soil borings. The nature and extent of any variations between soil borings may not become evident until construction. Therefore, it is recommended that we be retained to provide engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event that the subsurface conditions differ from those anticipated prior to the start of construction.

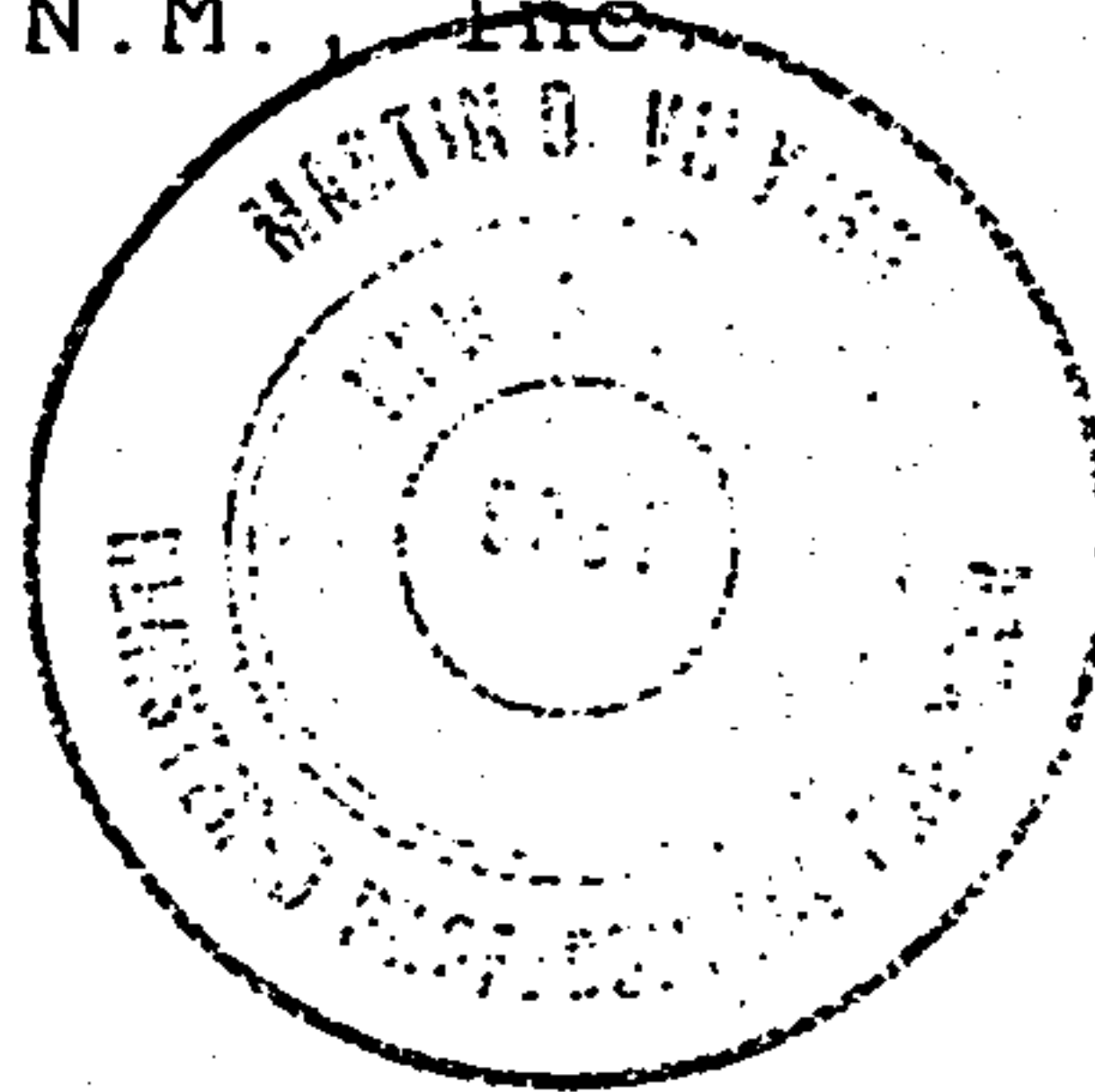
Fox & Associates of N.M., Inc.

Reviewed by:

Bryan Danielson

Bryan Danielson

Staff Engineer

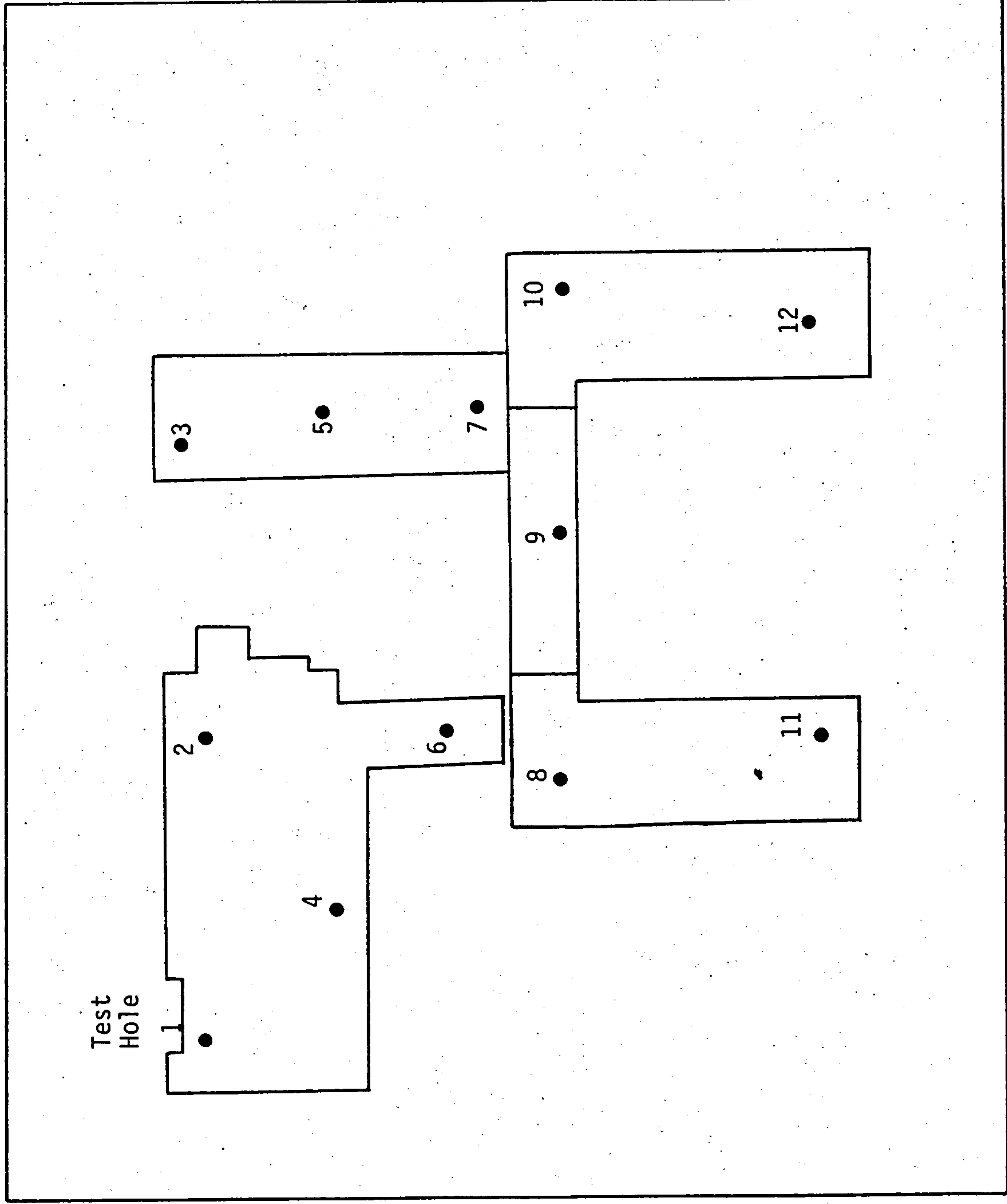


Martin D. Vinyard

Martin D. Vinyard, P.E.

Geotechnical Division Manager

▲
to
Central
Avenue



TEST HOLE LOCATION PLAN

Job No: 0117410

Date: 2/27/86

Figure 1

FOX Consulting Engineers and Geologists

Test Hole

1

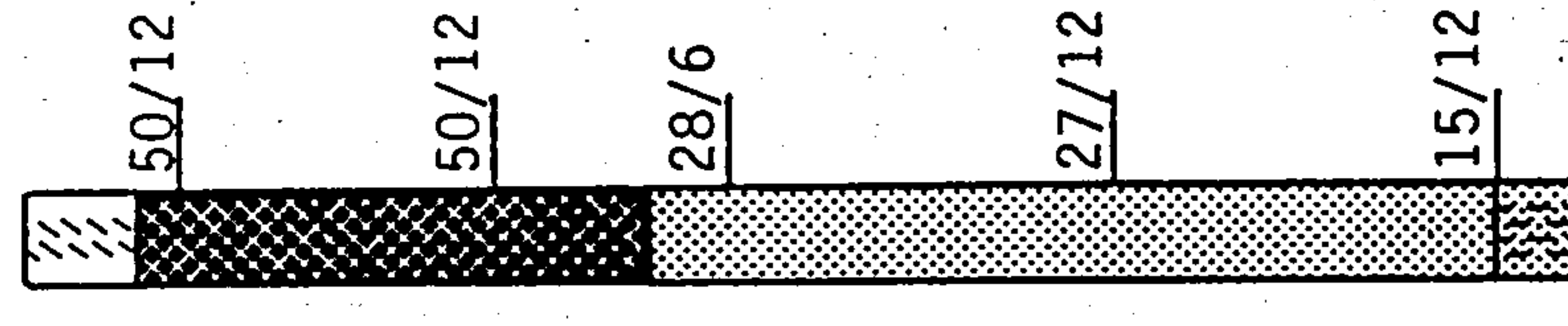
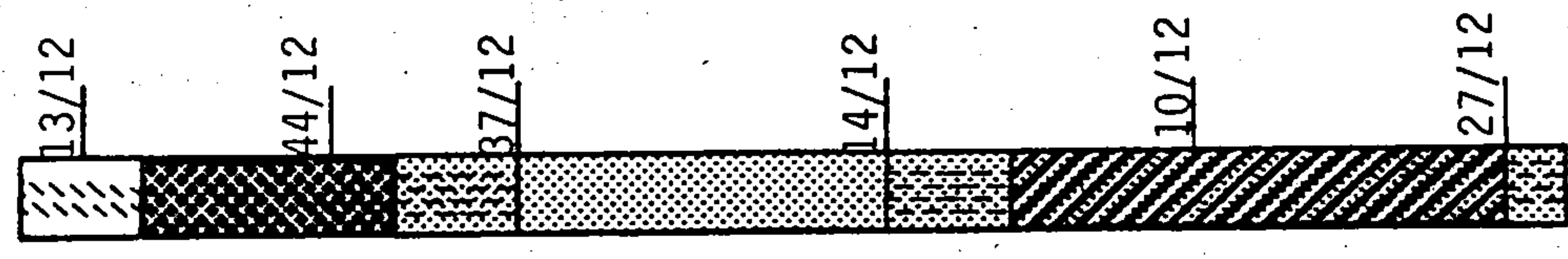
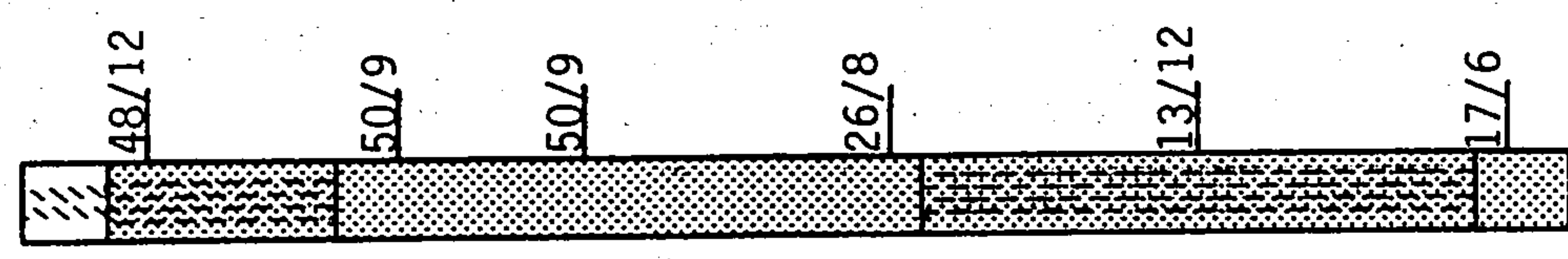
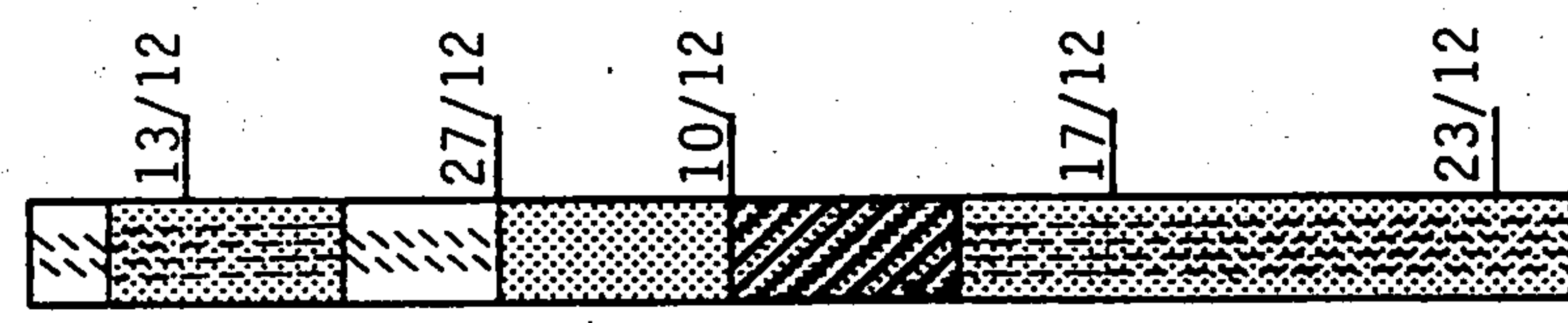
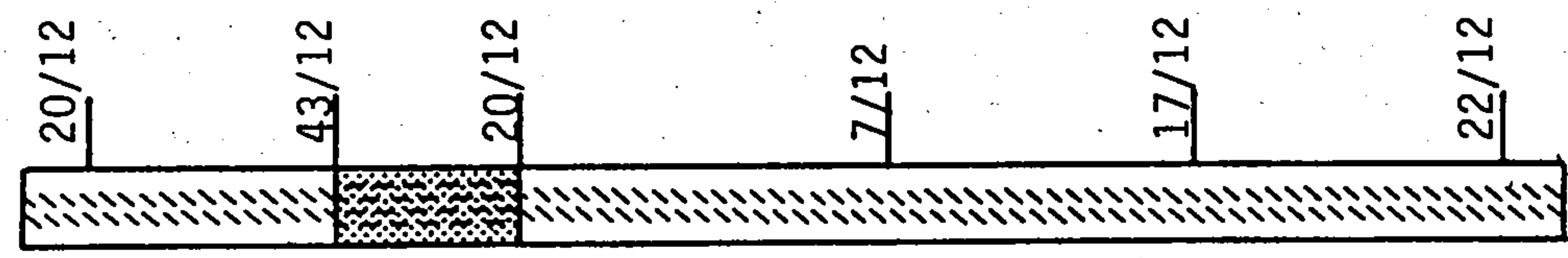
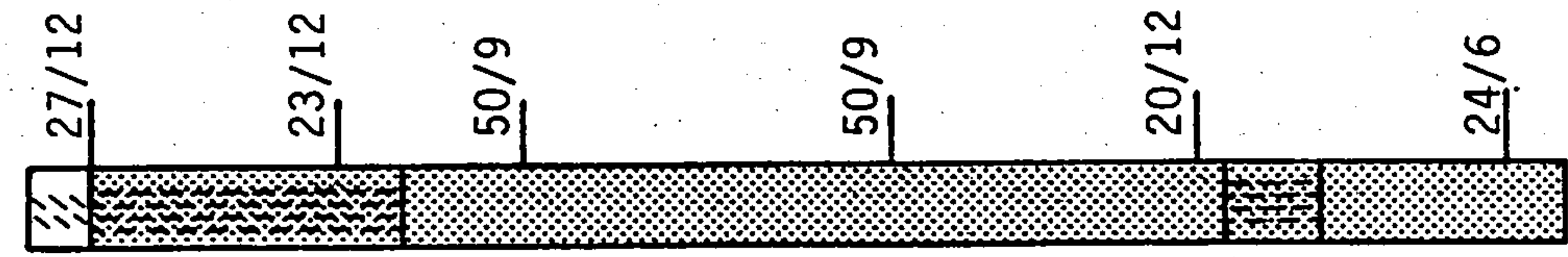
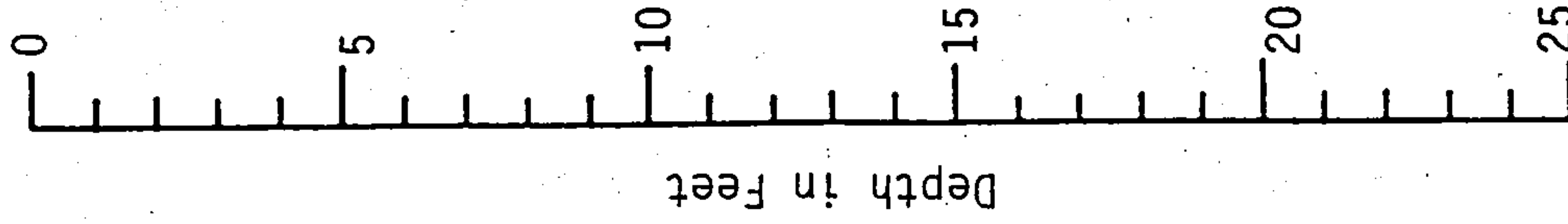
2

3

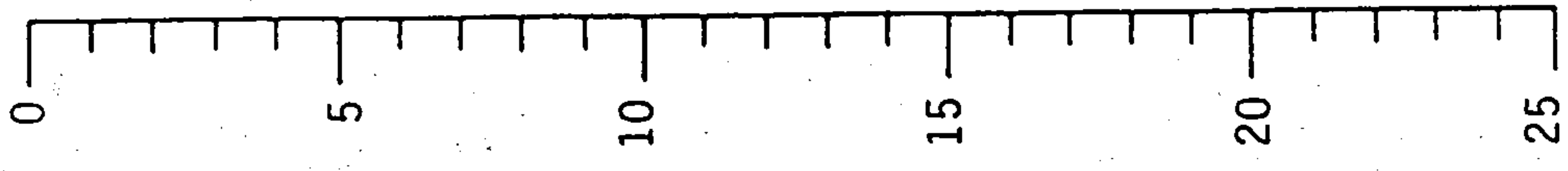
4

5

6



Depth in Feet



LOGS OF TEST HOLES

Job No: 0117410

Date: 2/27/86

Figure 2

Consulting Engineers and Geologists

FOX

TEST HOLE

7

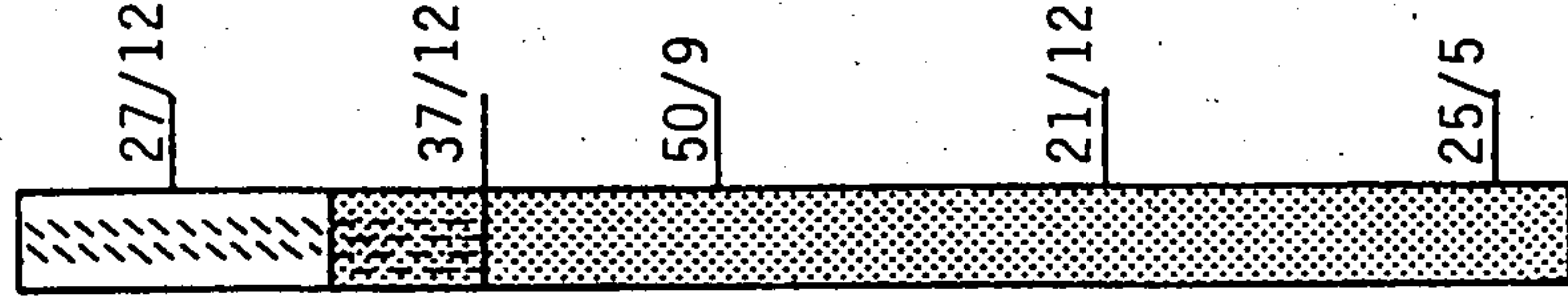
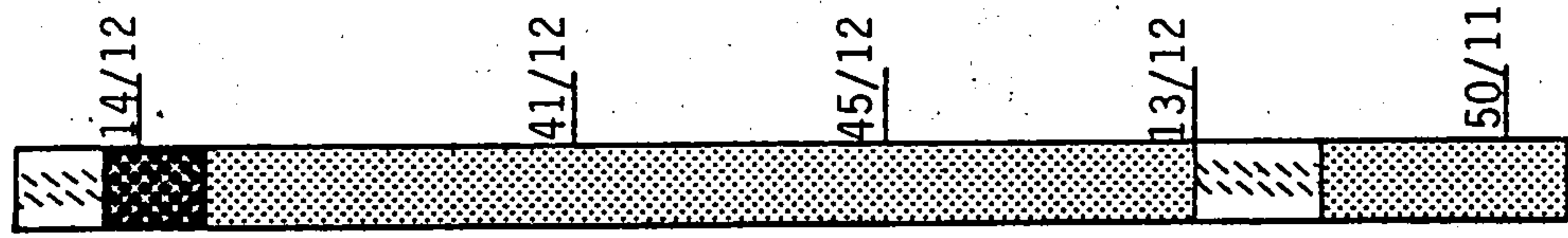
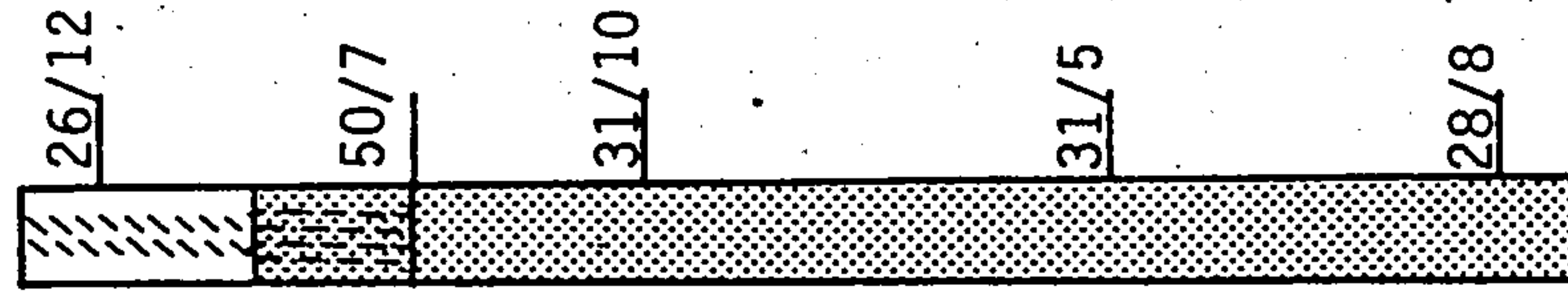
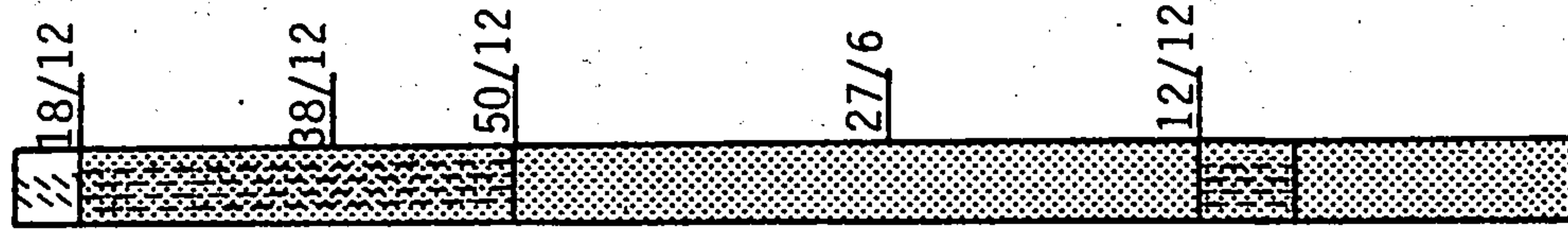
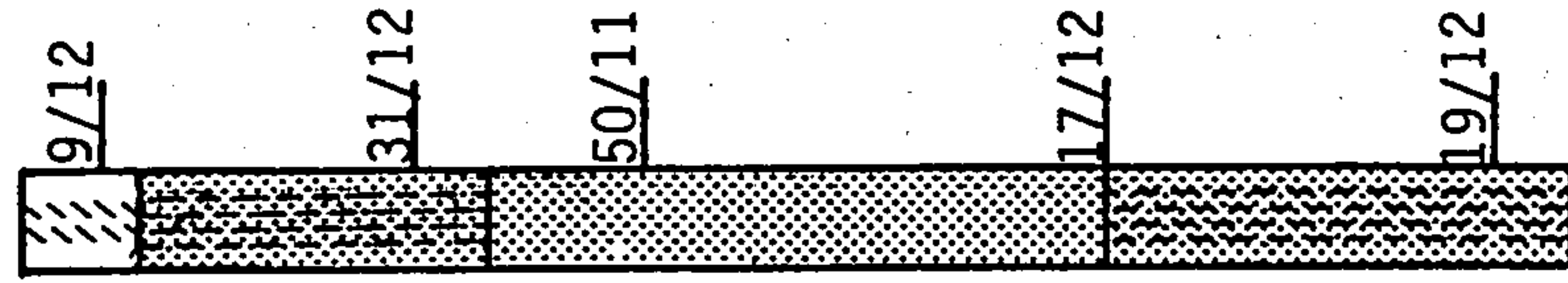
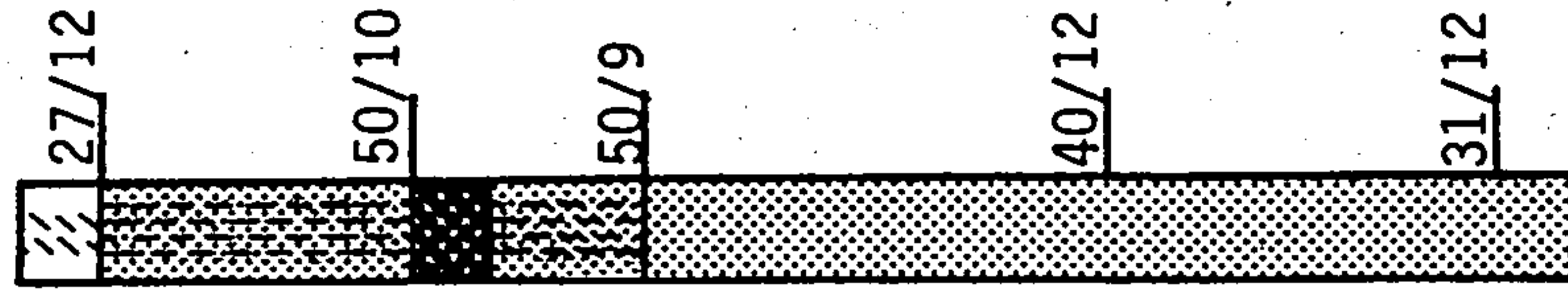
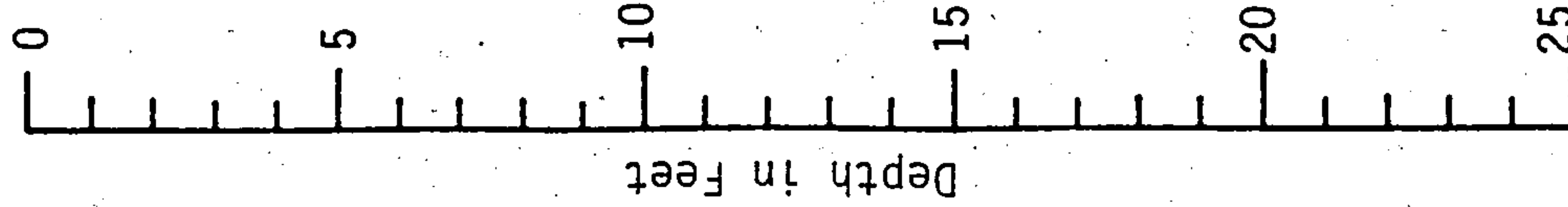
8

9

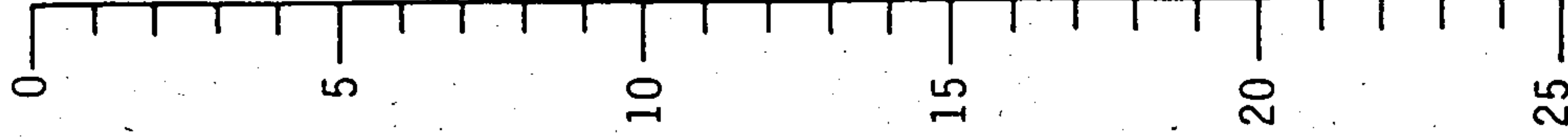
10

11

12



Depth in Feet



LOGS OF TEST HOLES

Job No: 0117410

Date: 2/27/86

Figure 3

FOX

Consulting Engineers and Geologists

LEGEND



CALICHE, calcareously cemented sand, slightly silty to very silty, weak to moderate cementation, white



SAND, very silty to SILT, very sandy, occasionally clayey, loose to medium dense, dry to slightly moist, light brown (SM-ML)



SAND, coarse to fine-grained, silty occasional trace clay, medium dense to dense, dry to slightly moist, occasional, light brown (SM)



SAND, mostly fine-grained, silty to slightly clayey, occasional trace gravel, medium dense (SC-SM)



SAND, coarse to fine-grained, gravelly, clean to slightly silty, medium dense to dense, dry to slightly moist, light brown (SP)

NOTES

1. Test holes were drilled on January 24 through 27, 1986, with a 6 5/8-inch diameter hollowstem continuous flight flight power auger.
2. (27/12) location of Standard Penetration Test; indicates that 27 blows with a 140-pound hammer, falling 30 inches, were required to drive a 2-inch diameter sampler 12 inches.
3. The location of borings were approximately determined by measurement from exiting topography. The location of the borings should be considered accurate only to the degree implied by the method use.
4. The stratification lines represent the approximate boundary between soil types and the transition may be gradual.
5. Neither bedrock nor groundwater was encountered in the test holes.

LOGS OF TEST HOLES

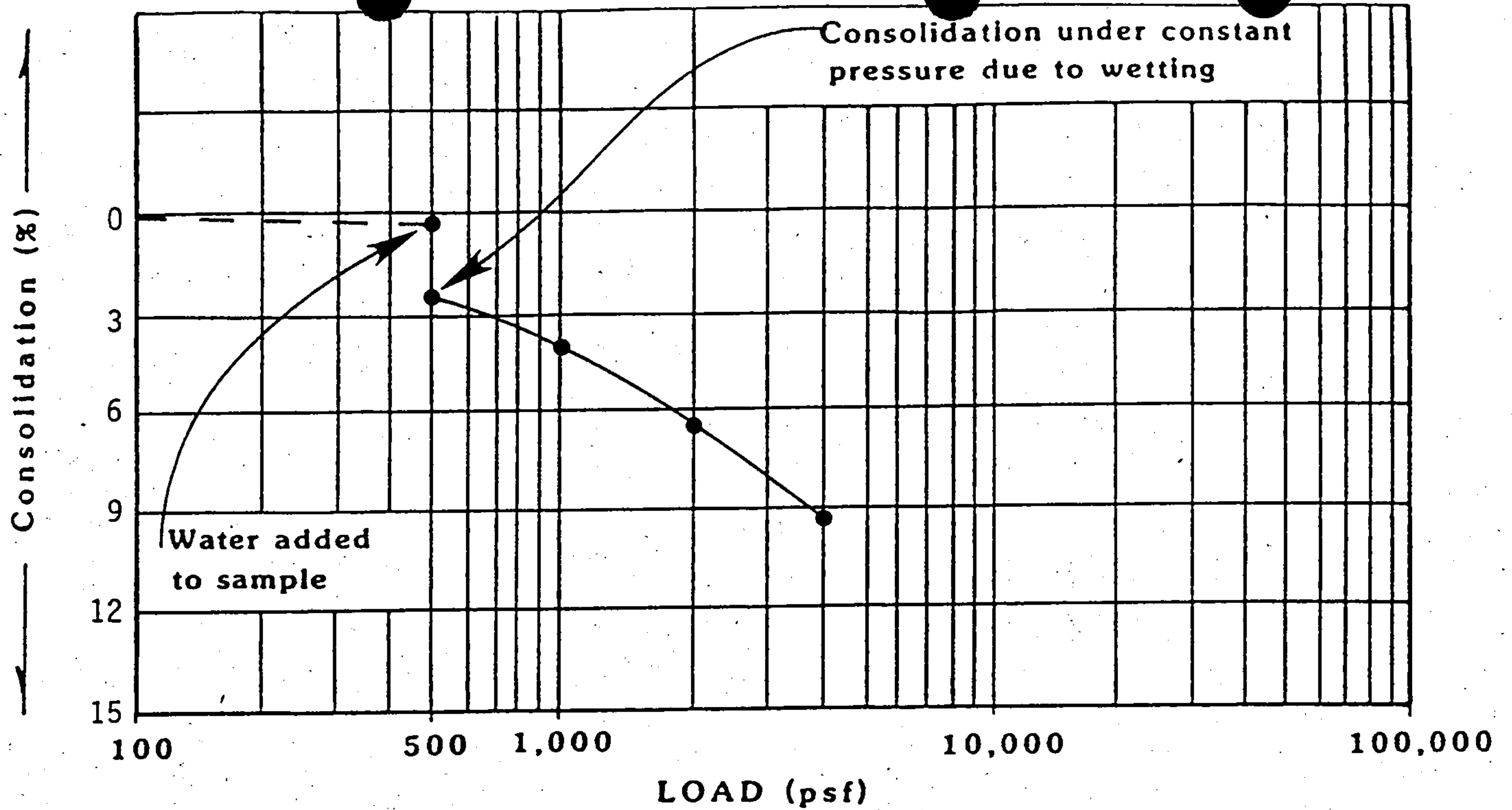
Job No: 0117410

Date: 2/27/86

Figure 4

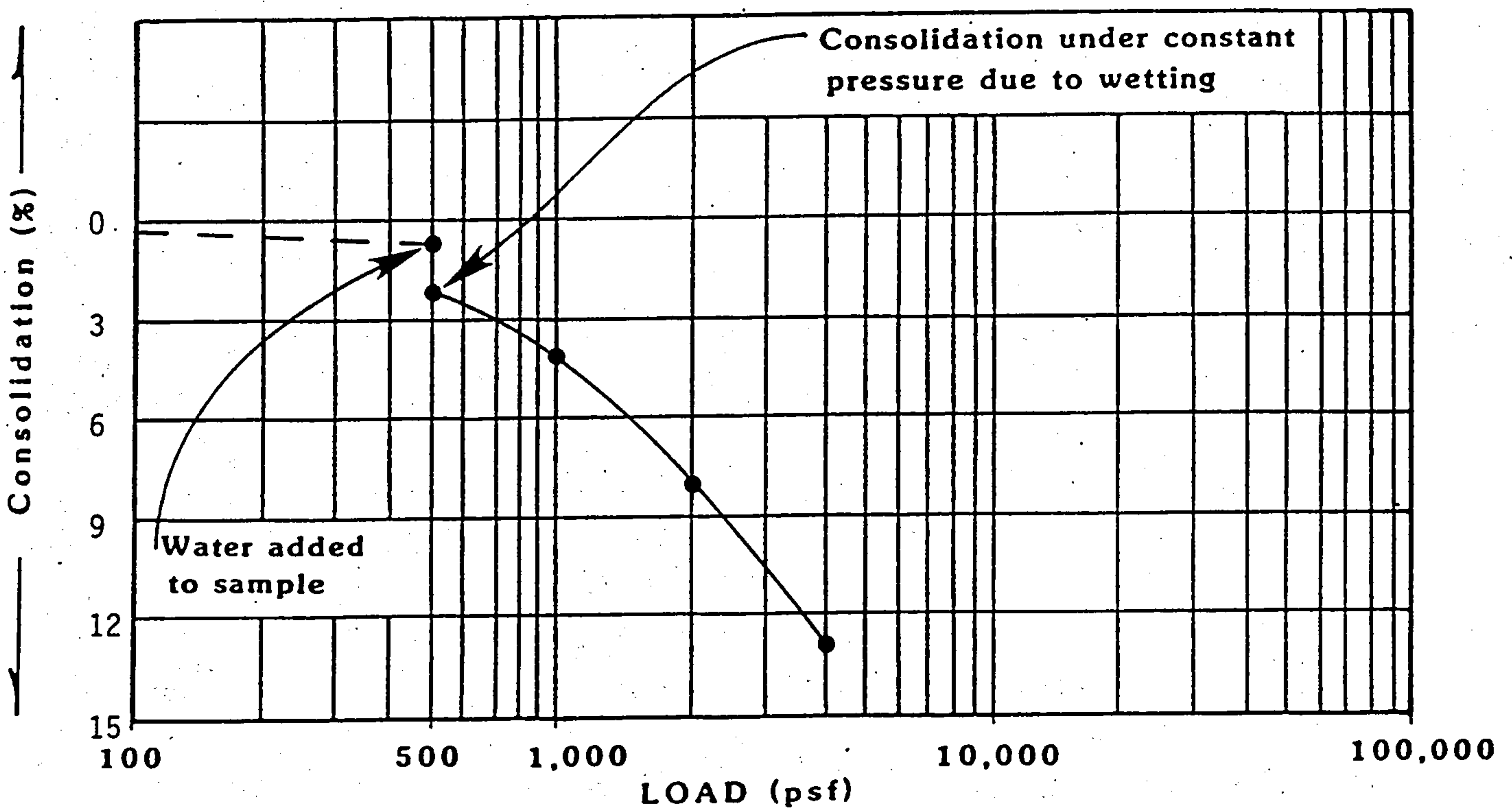
FOX

Consulting Engineers and Geologists



Sample of silty SAND from test hole 3 at depth 2 feet.

Natural Moisture Content 3.8 % Natural Dry Density 103 pcf.



Sample of very silty SAND from test hole 5 at depth 1 feet.

Natural Moisture Content 6.3 % Natural Dry Density 100 pcf.

SWELL - CONSOLIDATION TESTS

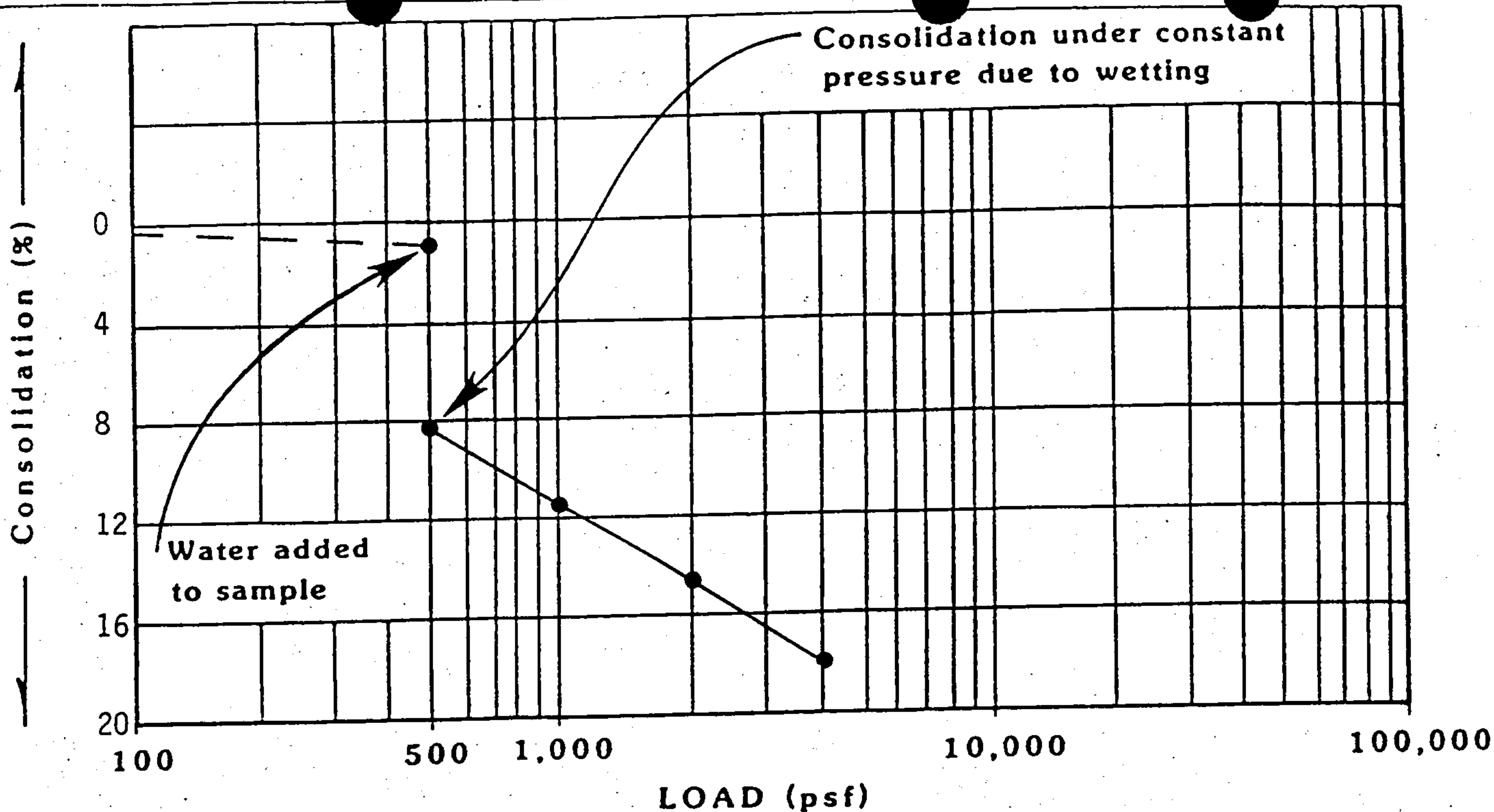
Job No: 0117410

FOX

Consulting Engineers and Geologists

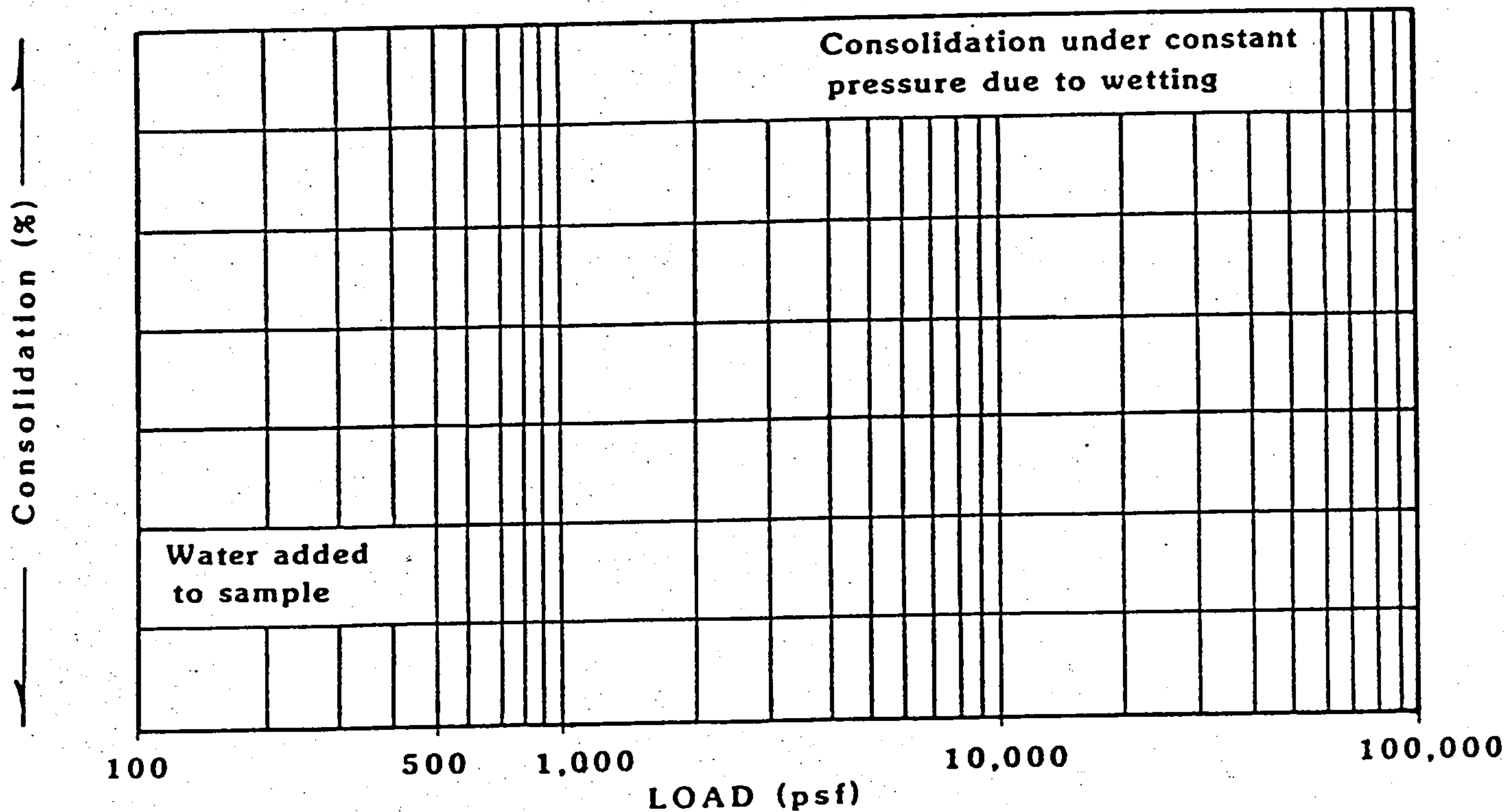
Date: 2/27/86

Figure 5



Sample of silty SAND from test hole 8 at depth 1 feet.

Natural Moisture Content 5.4 % Natural Dry Density 94 pcf.



Sample of _____ from test hole _____ at depth _____ feet.

Natural Moisture Content _____ % Natural Dry Density _____ pcf.

SWELL - CONSOLIDATION TESTS

Job No: 0117410

Date: 2/27/86

Figure 6

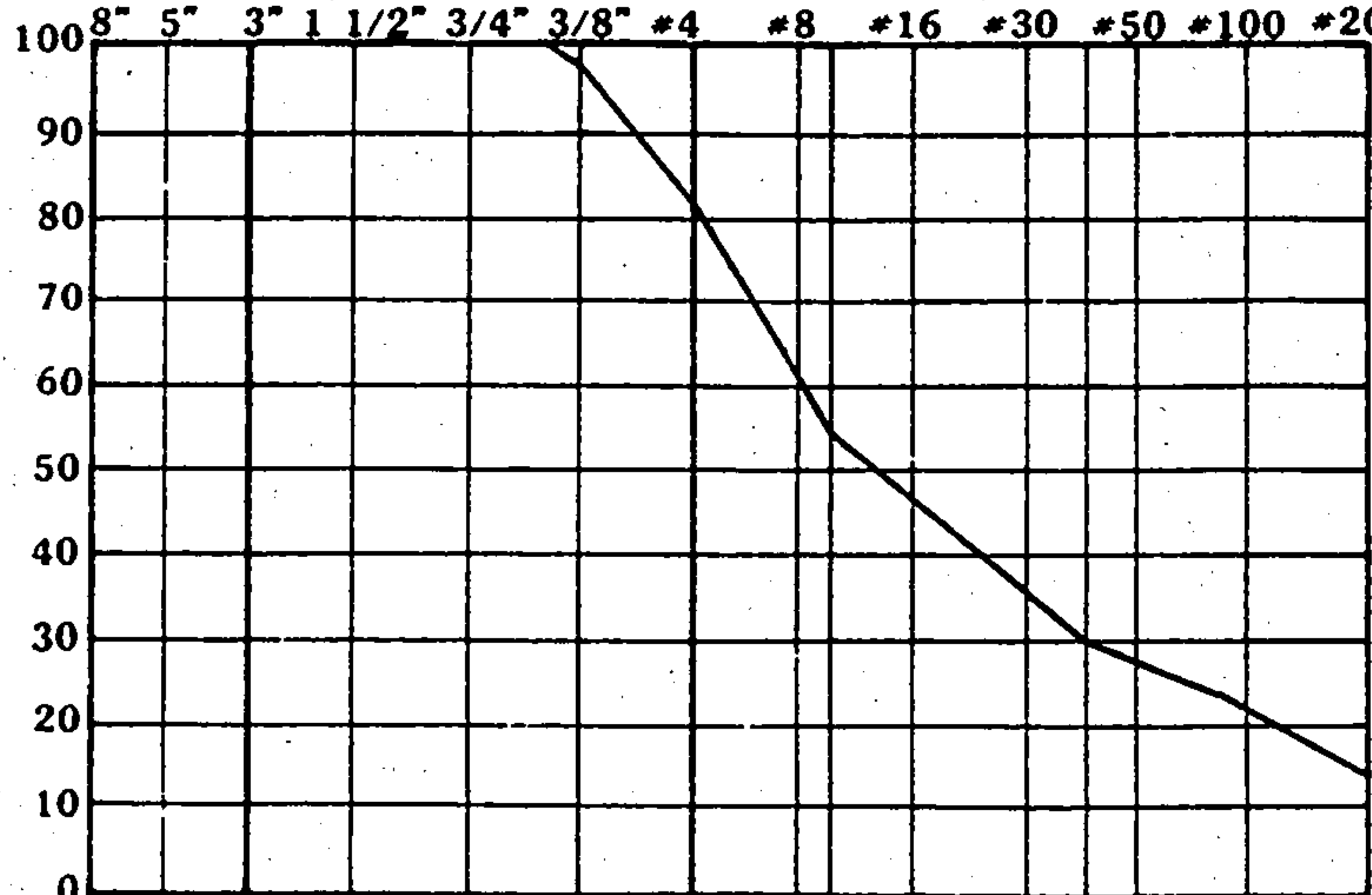
FOX

Consulting Engineers and Geologists

SIEVE ANALYSIS					
Cobbles	Gravel		Sand		
	coarse	fine	coarse	medium	fine
Clear Square Openings			U.S. Standard Series		

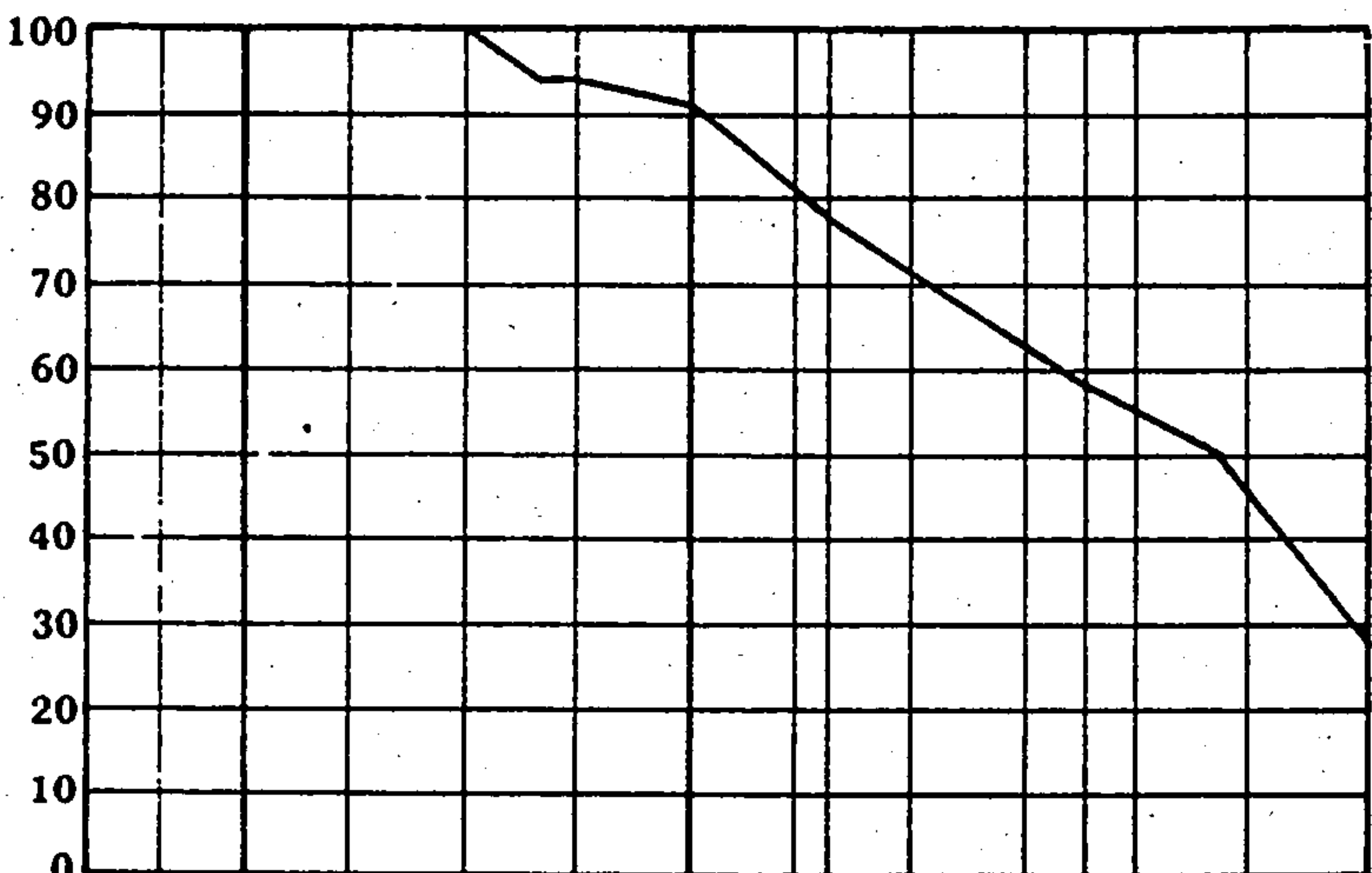
8" 5" 3" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200

PERCENT PASSING



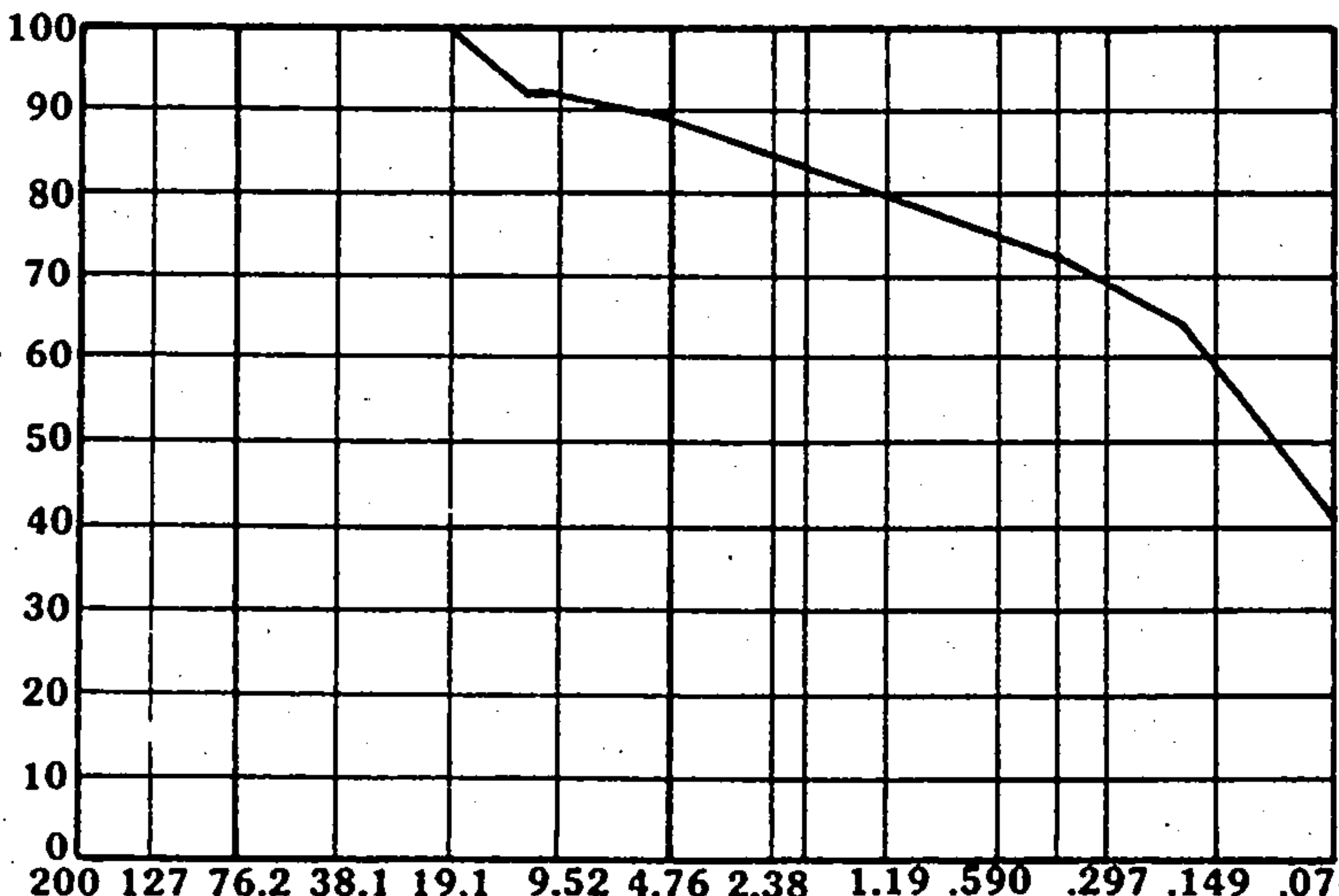
Sample of silty SAND
 from test hole 1
 at depth 1 feet.
 Atterberg limits:
 Liquid Limits 22
 Plasticity Index NP
 Classification: Unified SM
 AASHTO -
 Group Index -

PERCENT PASSING



Sample of silty SAND
 from test hole 3
 at depth 2 feet.
 Atterberg Limits:
 Liquid Limits -
 Plasticity Index -
 Classification: Unified SM
 AASHTO -
 Group Index -

PERCENT PASSING



Sample of clayey SAND
 from test hole 4
 at depth 2 feet.
 Atterberg Limits:
 Liquid Limits 26
 Plasticity Index 9
 Classification: Unified SC
 AASHTO -
 Group Index -

Grain Size in Millimeters

MECHANICAL ANALYSIS CHART



Consulting Engineers and Geologists

Job No: 0117410

Date: 2/27/86

Figure 7

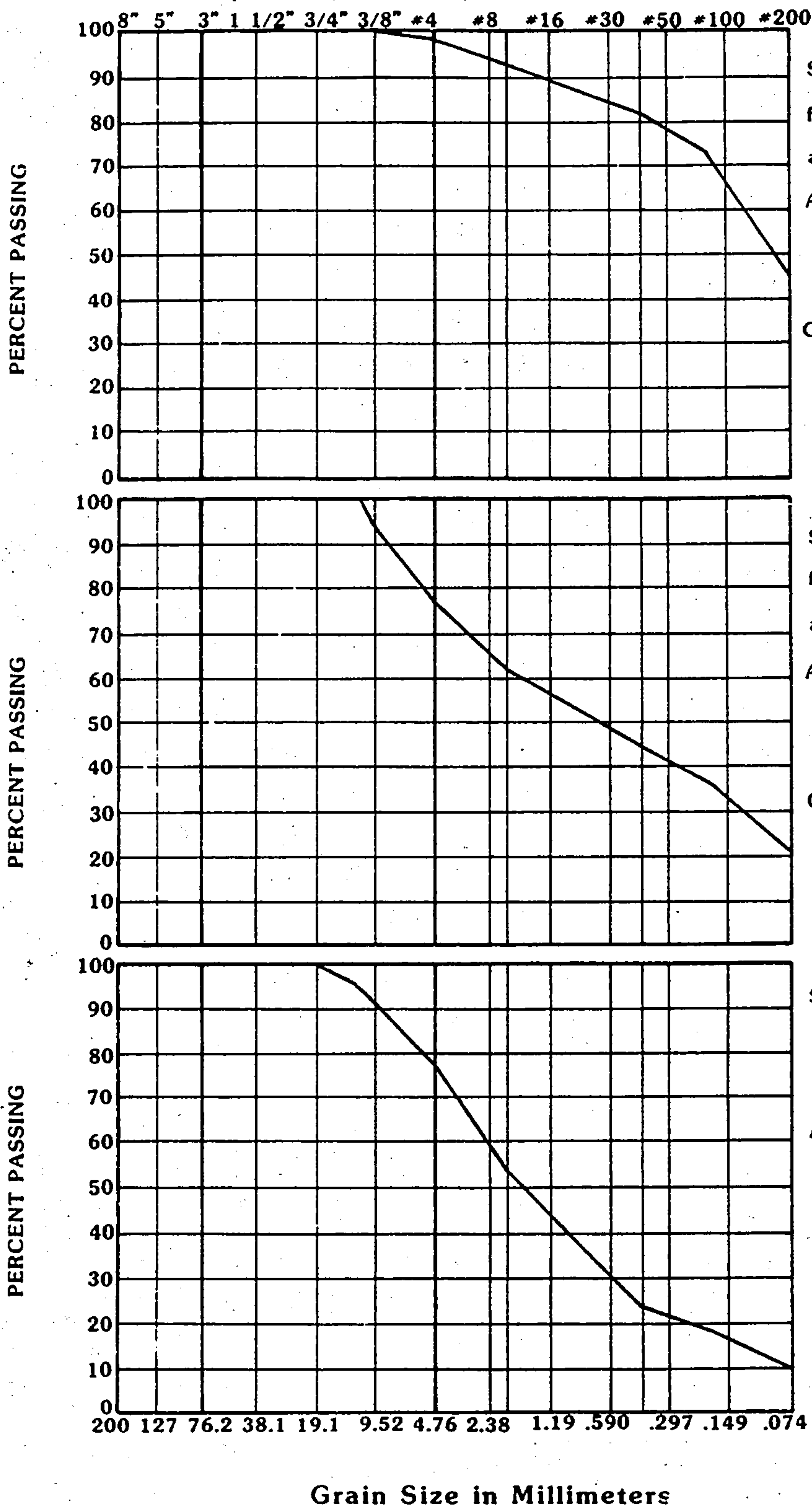
Hole _____ at depth _____

Hole _____ at depth _____

Hole _____ at depth _____

Form 1-11, Job _____

SIEVE ANALYSIS					
Cobbles	Gravel		Sand		
	coarse	fine	coarse	medium	fine
Clear Square Openings			U.S. Standard Series		



Sample of very silty SAND
 from test hole 5
 at depth 1 feet.
 Atterberg limits:
 Liquid Limits -
 Plasticity Index -
 Classification: Unified SM
 AASHTO -
 Group Index -

Sample of silty SAND
 from test hole 8
 at depth 1 feet.
 Atterberg Limits:
 Liquid Limits -
 Plasticity Index -
 Classification: Unified SM
 AASHTO -
 Group Index -

Sample of slightly silty SAND
 from test hole 11
 at depth 2 feet.
 Atterberg Limits:
 Liquid Limits -
 Plasticity Index -
 Classification: Unified SP-SM
 AASHTO -
 Group Index -

MECHANICAL ANALYSIS CHART

FOX

Consulting Engineers and Geologists

Job No: 0117410

Date: 2/27/86

Figure 8

Hole at depth

Hole depth

Hole at depth

Form 1-117 Job No

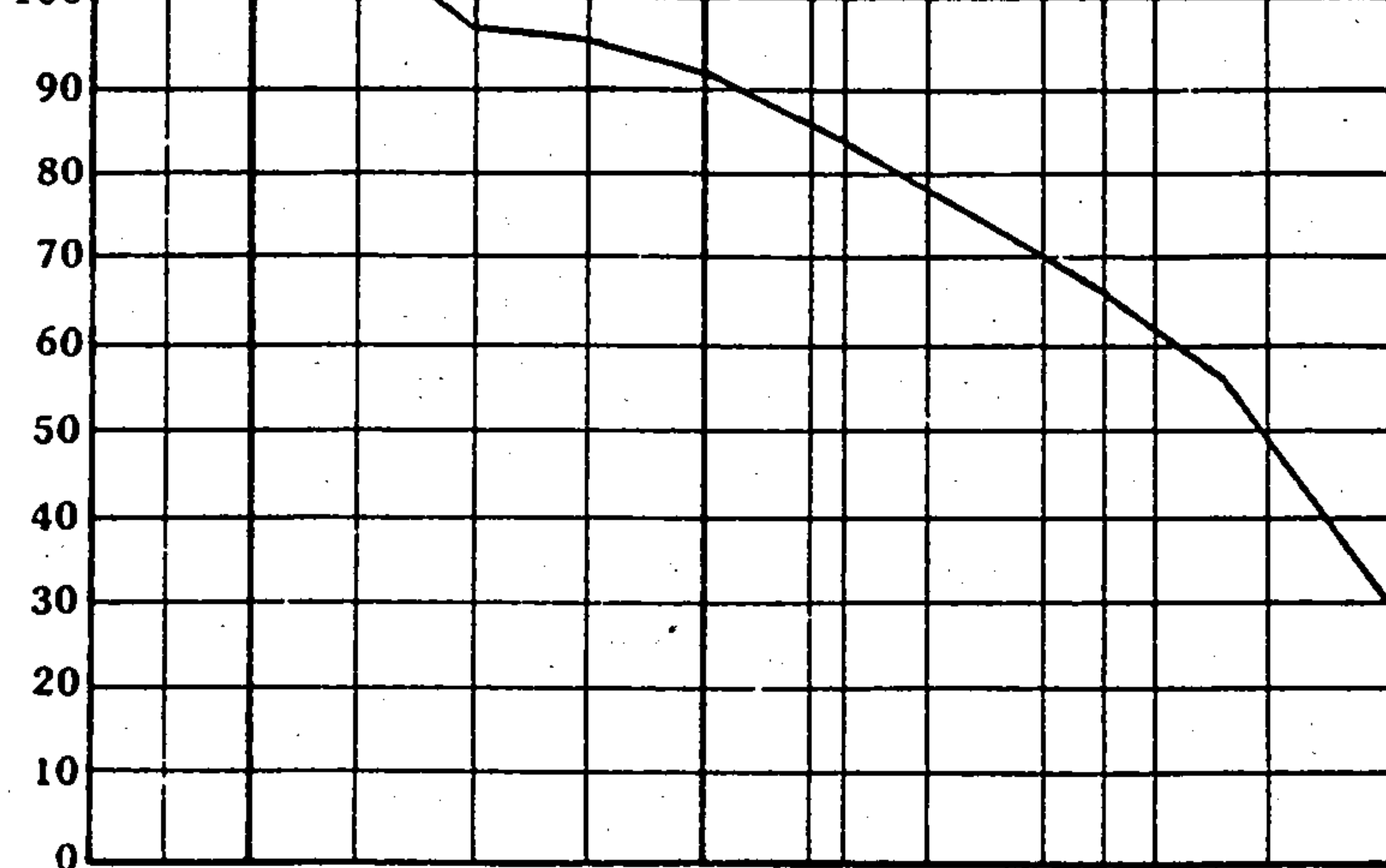
SIEVE ANALYSIS

Cobbles	Gravel		Sand		
	coarse	fine	coarse	medium	fine

Clear Square Openings U.S. Standard Series

8" 5" 3" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200

PERCENT PASSING



Sample of silty SAND

from test hole 12

at depth 2 feet.

Atterberg limits:

Liquid Limits -

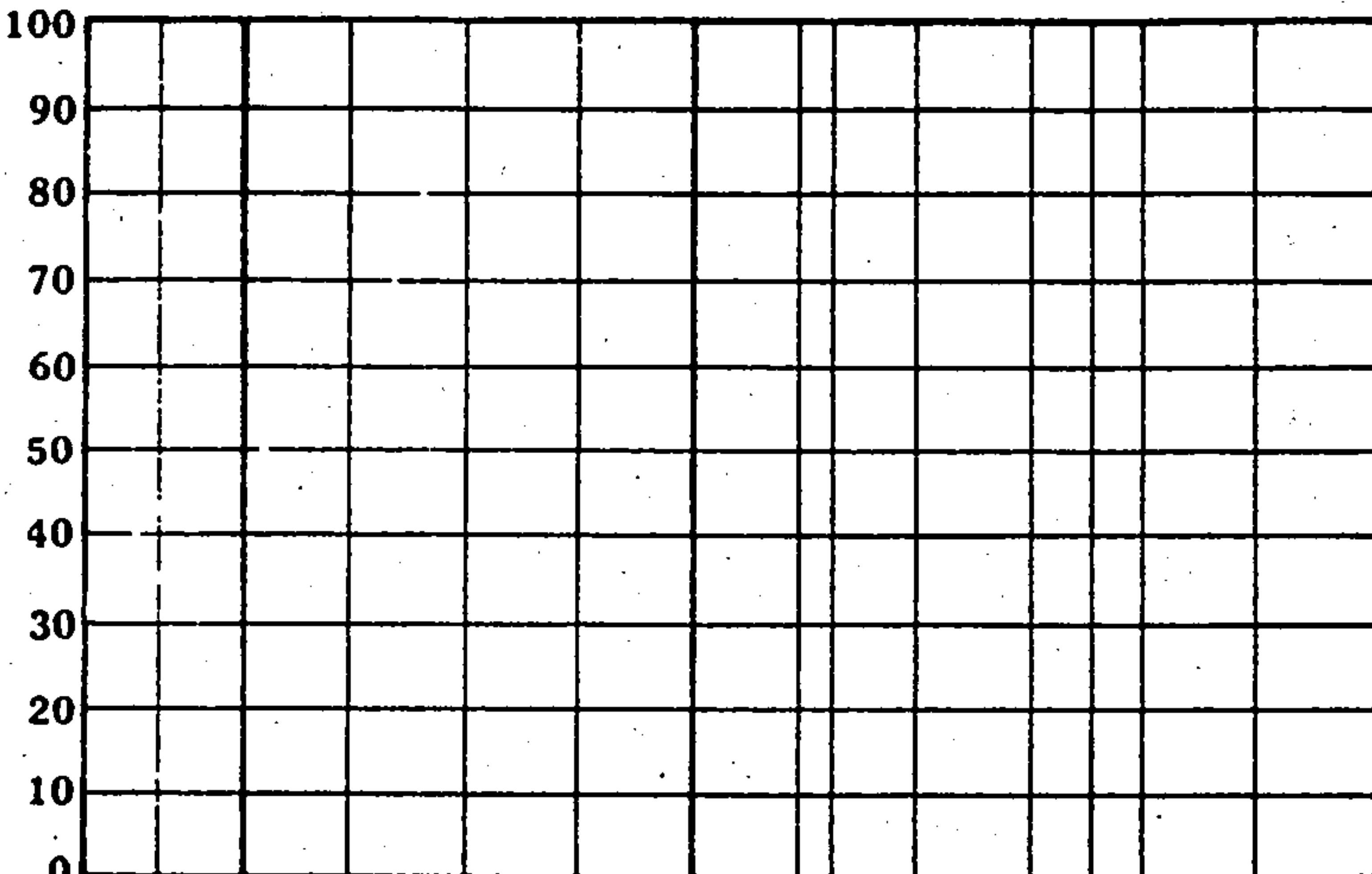
Plasticity Index -

Classification: Unified SM

AASHTO

Group Index

PERCENT PASSING



Sample of

from test hole

at depth feet.

Atterberg Limits:

Liquid Limits

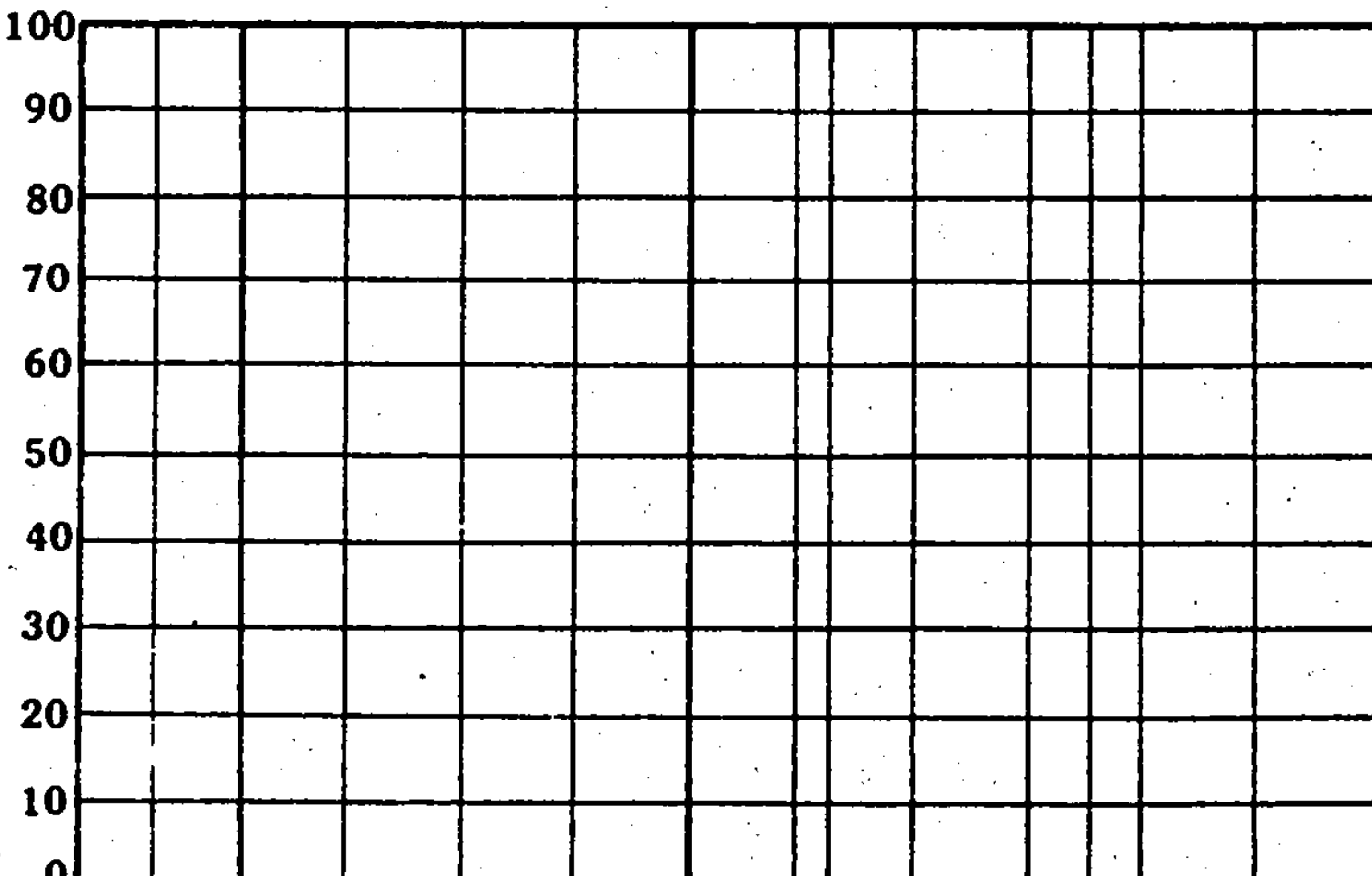
Plasticity Index

Classification: Unified

AASHTO

Group Index

PERCENT PASSING



Sample of

from test hole

at depth feet.

Atterberg Limits:

Liquid Limits

Plasticity Index

Classification: Unified

AASHTO

Group Index

200 127 76.2 38.1 19.1 9.52 4.76 2.38 1.19 .590 .297 .149 .074

Grain Size in Millimeters

MECHANICAL ANALYSIS CHART

FOX

Consulting Engineers and Geologists

Job No: 0117410

Date: 2/27/86

Figure 9

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth of Sample (ft)	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atter-berg Limits LL PI	Sieve Analysis % Passing						Soil Description
					1" 3/8"	No.4	No.10	No.40	No.80	No.200	
1	1			22 NP	100 97	81	54	30	24	14	silty SAND
3	2	103	3.8		100 93	91	78	59	50	28	silty SAND
4	2			26 9	100 92	89	83	72	64	41	clayey SAND
5	1	100	6.3		100	98	93	82	73	45	very silty SAND
8	1	94	5.4		100 94	78	62	45	36	21	silty SAND
11	2		2.4		100 91	77	54	24	18	10	slightly silty SAND
12	2				100 96	92	84	66	56	30	silty SAND

Job No: 0117410
Date: 2/27/86
Table: 1

APPENDIX A

GUIDE SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

GENERAL

The Soils Engineer shall be the Owner's representative to control the fill operations. The Soils Engineer shall approve the material, the method of placing and compaction, and shall give written approval of the completed fill after having taken sufficient tests to evaluate compliance with the specifications.

FILL MATERIAL UNDER FOUNDATIONS AND WITHIN THREE FEET OF SLABS

The fill materials shall be gravel, sand, silt, or clay mixtures which have a plasticity index not greater than ten (10) and a liquid limit not greater than twenty-five (25). Material larger than six (6) inches shall not be placed in the fill, and material larger than four (4) inches shall not be placed within one (1) foot of the bearing surfaces or foundations. Materials shall be approved by the soils engineer.

PREPARATION OF OVEREXCAVATED SURFACES

The over excavated surface under the areas to be filled shall be scarified, brought to optimum moisture content ($\pm 2\%$) for a minimum depth of eight (8) inches and compacted with a minimum of twenty (20) passes of a heavy roller to a minimum of 95% of maximum density as determined by ASTM D-1557.

PREPARATION OF BEARING SURFACES

Prior to footing placement, the proposed bearing surfaces shall be scarified, moistened to optimum moisture content ($\pm 2\%$) and compacted to a minimum of 95% of maximum density as determined by ASTM D-1557 using a heavy vibratory roller.

PREPARATION OF NATURAL GROUND BELOW SLABS

Prior to the placement of fill or floor slabs, the natural ground below slabs shall be scarified, moistened to optimum moisture content ($\pm 2\%$) for a depth of eight (8) inches and compacted with a minimum of twenty (20) passes of a heavy vibratory roller to a minimum of 95% of maximum density.

PREPARATION OF NATURAL GROUND

Prior to the placement of site fill, and subsequent to final grading in cut sections, the natural ground shall be scarified,

brought to optimum moisture content ($\pm 2\%$) for a minimum depth of eight (8) inches and compacted with a heavy roller to a minimum of 95% of maximum density as determined by ASTM D-1557. Vegetation and topsoil shall be removed before beginning preparation of natural ground.

PLACING FILL

No brush, sod, frozen material, or other perishable or unsuitable material shall be placed in the fill. Distribution of material shall be such as to avoid lenses differing substantially from the surrounding material. The materials shall be delivered to the fill in such a manner as to result in a well and uniformly compacted fill.

Before compacting, the fill material shall be spread in approximately horizontal layers not greater than eight (8) inches thick.

MOISTURE CONTROL

The material, while being compacted, shall contain the optimum moisture for compaction distributed uniformly throughout the layers. The Contractor shall be required to add moisture to the material in the excavation if, in the opinion of the Soils Engineer, it is not possible to obtain proper and uniform moisture by adding water to the fill surface.

COMPACTION

When the moisture content and condition of each individual layer is satisfactory, it shall be compacted by methods approved by the Soils Engineer. A Proctor test should be performed on each typical fill material and frequent density tests of the fill shall be taken.

When compacting cohesionless free-draining materials such as sands and gravels, the material shall be deposited in layers and compacted by treads of a crawler-type tractor, surface or internal vibrators, smooth or pneumatic rollers, hand or power tampers or by other means approved by the Soils Engineer. The thickness of the horizontal layers after compaction shall not exceed six (6) inches compacted thickness if compaction is performed by tractor treads, surface vibrators or similar equipment, or not more than the penetrating length of the vibrator head if compaction is performed by internal vibrators. The material may not be ponded or flooded to aid in the compaction.

Should the use of vibratory compaction techniques pose a threat to the structural integrity of surrounding structures, a heavy static roller should be used.

DENSITY REQUIREMENTS

Fill placed for foundation support shall be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

Fill placed for slab support and general site grading shall be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

Fill placed for pavement support shall be compacted to a minimum of 90% of maximum density as determined by ASTM D 1557 with the exception of the top eight (8) inches of pavement subgrade which shall be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

Cones



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

September 11, 1985

Federal Emergency Management Agency
Region VI, Federal Center
800 North Loop 288
Denton, Texas 76201-3698

Dear Mr. Burt Carr:

We have received a copy of Mr. John L. Matticks letter of August 30, 1985 addressed to Mayor Harry E. Kinney, City of Albuquerque, and regarding the effects of the proposed Fairgrounds Storm Water Relief system. The letter refers to a LOMR request for three properties in southeast Albuquerque; Tracts B-1 and B-2, Brown Place Addition; lots 9-13 and 19-22, Block 37, Tijeras Place Addition; and Tracts 2-4 and 5A of the Assessment Plat of the Tijeras Place Improvement Company.

Since we are not clear on the comments made in this letter we are asking for a clarification. As we understand the letter the technical data prepared by Isaacson & Arfman is acceptable and a conditional LOMR has been issued in your letter. We further interpret the letter to require a community endorsement of the revision request and "as-built" plans of the Fairgrounds System, certified by a registered engineer as being the only requirements necessary to allow you to issue a LOMR on the three properties identified. Apparently the other comments in your letter pertain to a total revision of the FIRM to show all revisions to the SFHA resulting from the construction of the Fairgrounds System. Please reply to us and indicate whether this interpretation is correct and if not correct specifically what actions are required to acquire a LOMR for the three properties studied.

Presently the City of Albuquerque is unable provide a study of the total changes affected by the Fairgrounds System. Additionally the City has several other storm water projects imminent or under construction which will further change the SFHA in this portion of the City.

Your attention and early response to this letter is requested.

Sincerely,

Carlos A. Montoya
City/County Flood Plain Admin.

CAM/cl

MUNICIPAL DEVELOPMENT DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

September 5, 1985

Ms. Elizabeth Crozier
Dewberry & Davis
8401 Arlington Blvd.
Fairfax, V.A. 22031

RE: REQUEST FOR LETTER OF MAP REVISION PANEL 30, ALBUQUERQUE, NM

Dear Ms. Crozier:

Attached to this letter is added information for a map revision. If you should have any questions, please feel free to call me at (505) 766-7644.

Sincerely,

Carlos A. Montoya
City/County Flood Plain Admin.

CAM/cl

MUNICIPAL DEVELOPMENT DEPARTMENT

C. Dwayne Sheppard, P.E., City Engineer

ENGINEERING DIVISION

Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER

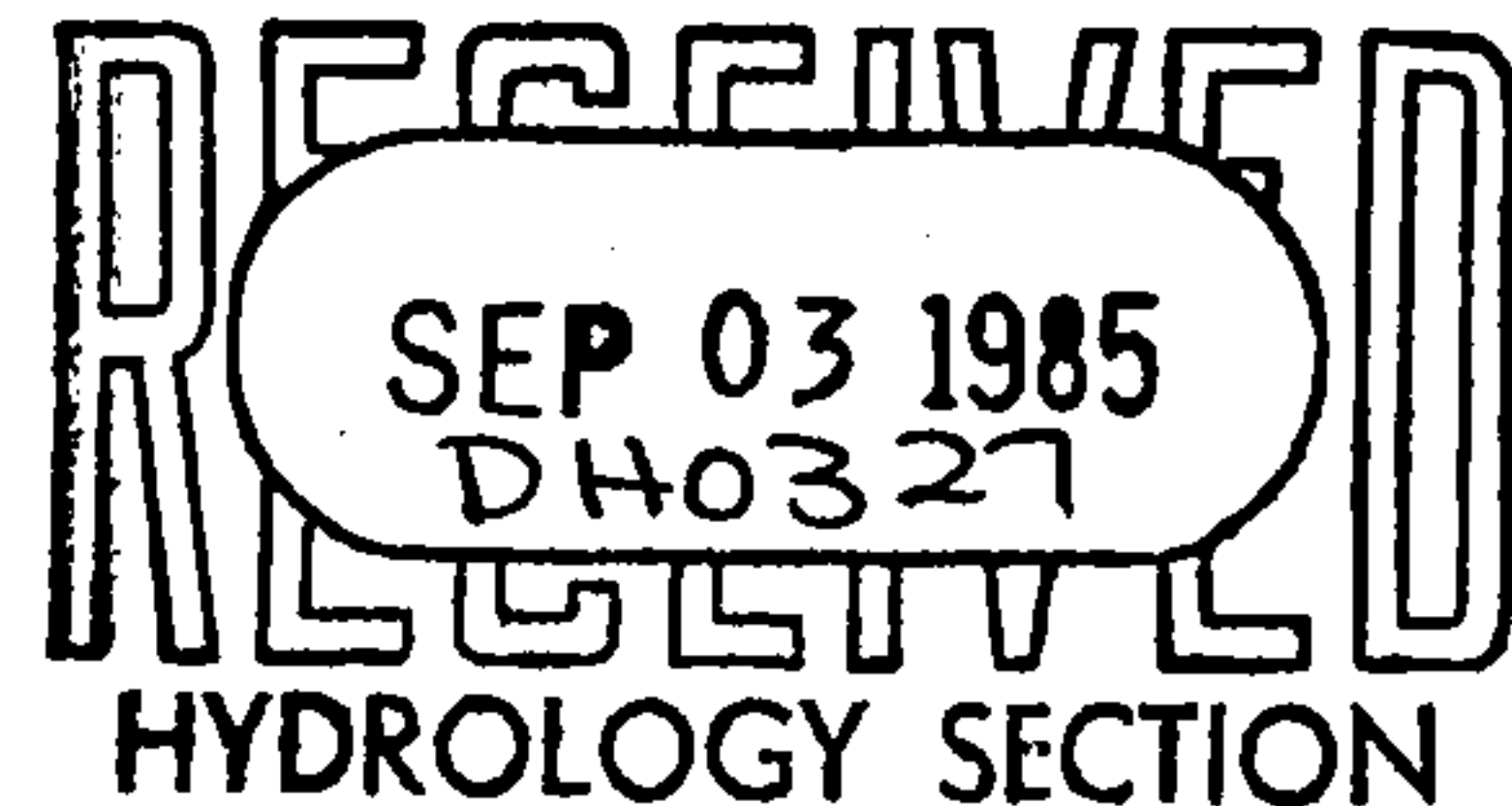


Federal Emergency Management Agency

Washington, D.C. 20472

August 30, 1985

CERTIFIED MAIL
RETURN RECEIPT REQUESTED



Honorable Harry E. Kinney
Mayor of the City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Dear Mayor Kinney:

This is in reference to a letter, dated April 8, 1985, submitted by Mr. Carlos A. Montoya, Flood Plain Administrator for the City of Albuquerque, forwarded to us by our Region VI office. With his letter, Mr. Montoya submitted technical data, prepared by Isaacson & Arfman, Consulting Engineering Associates, regarding the proposed Fairgrounds Storm Water Relief System. Mr. Montoya requested that the Federal Emergency Management Agency (FEMA) issue a Letter of Map Revision (LOMR) to reflect changes in flood hazards within the City of Albuquerque caused by the Fairgrounds System. The technical data, prepared by Isaacson & Arfman, includes a hydrologic analysis and normal depth calculations for three properties downstream of the Fairgrounds System. The three properties are identified as Tracts B-1 & B-2, Brown Place Addition; Lots 9-13 and 19-22, Block 37, Tijeras Place Addition; and Tracts 2-4 and 5A of the Assessment Plat of the Tijeras Place Improvement Company.

Since the aforementioned project is not complete, a LOMR cannot be issued at this time. FEMA will, however, review and critique proposed flood plain modification projects prior to their completion. If that review indicates that the design of the proposed project complies with applicable National Flood Insurance Program (NFIP) regulations, a conditional LOMR will be issued. The purpose of a conditional LOMR is to inform the community that FEMA will revise their effective Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM), contingent upon our receipt of community endorsement and upon satisfactory completion of the project.

Based on our review of the aforementioned technical data, we concur with the accuracy of the hydrologic and hydraulic analyses, and we believe the proposed Fairground Water Relief System will reduce the SFHA, designated Zone AO, as described in the technical data. The potential hydrologic impacts associated with the development of this area or areas upstream have not been considered in this determination. This conditional LOMR is issued with respect to minimum standards of the NFIP. Because your community may enforce more restrictive flood plain management criteria, final approval of this project rests with your community.

During the course of our review of the aforementioned technical data, we identified the following concern:

- o The submitted technical data only predict the effects of the Fairgrounds System on the aforementioned three properties. No attempt is made to examine the total effects of the Fairgrounds System outside the three properties. The proposed revised SFHA boundaries must tie-in to the effective SFHA boundaries, designated both as Zone AO and Zone B (100-year shallow flooding less than 1.0 foot in depth) on the effective FIRM.

This concern must be resolved prior to FEMA issuing a revision to the effective FIS and FIRM for the City of Albuquerque to reflect the effects of the completed Fairgrounds System.

Upon completion of the proposed Fairgrounds System, your community may request a revision to the effective FIS and FIRM. The revision request must include the data listed below:

1. Documentation which indicates community endorsement of the revision request and which demonstrates preparedness to accept responsibility for the maintenance of the Fairgrounds System. The submittal must indicate the entity having maintenance responsibility, and should specify both the activities to be performed and the frequency of their performance. If maintenance is to be performed by an agent other than the community, a legal provision for community monitoring and back-up maintenance is required.
2. "As-built" plans of the Fairgrounds System, certified by a registered engineer.
3. A written description of the methodology used to determine hydrologic and/or hydraulic parameters, if different from the effective FIS and FIRM.
4. Revised 100-year flood depth reflecting "as-built" conditions, including a determination of the appropriate shallow flooding zone.
 - a. The methodology and starting parameters for the revised discharges and 100-year flood depth determinations should be consistent with the present effective FIS, unless the parameters have been superseded by more current and technically superior data and analyses. (FEMA approval should be obtained before deviating from the effective FIS parameters.)
 - b. As mentioned in the concern above, the upstream and downstream portions of the SFHA should coincide with the effective FIS designation, i.e., normal depth calculations should be continued for a great enough distance upstream and downstream of the revised area until SFHA designation and water-surface depths coincide with those in the effective FIS.
5. Delineation of the revised 100-year flood boundary.

- a. This information should be shown on a map of suitable scale and topographic definition to provide reasonable accuracy.
 - b. All items should be labeled for easy cross-referencing to hydraulic model and summary data.
6. Source data and engineering documentation for the previously mentioned items, as well as a bibliographic list of other sources of information used.

Upon receipt and review by FEMA of items 1-6 above, satisfactory resolution of the aforementioned concern, and verification that the design of the Fairgrounds System conforms to sound engineering practice and meets all applicable NFIP standards, FEMA will take action to incorporate the effects of the completed Fairgrounds System into the effective FIS and FIRM for your community.

We have enclosed documents, entitled Conditions and Criteria for Map Revisions and Conditions and Criteria for Floodway Revisions, which further describe the nature and extent of the material needed to support a request to revise an effective FIS and FIRM. Compliance with the criteria outlined in these documents will expedite FEMA's review process, thus allowing the effective FIS and FIRM for your community to be revised as appropriate, in a timely manner.

Should you have any questions regarding this matter, please do not hesitate to contact the Chief, Natural and Technological Hazards Division of the Federal Emergency Management Agency in Denton, Texas, at (817) 387-5811 or members of our Headquarters staff in Washington, D.C., at (202) 646-2754.

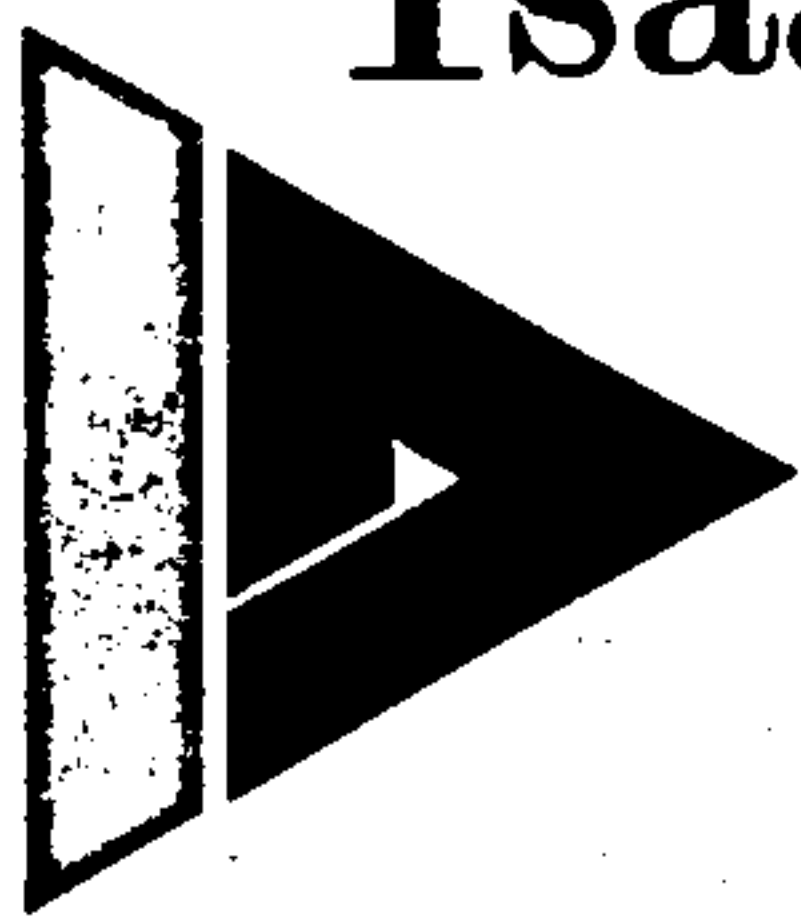
Sincerely,



John L. Matticks
Acting Chief, Risk Studies Division
Federal Insurance Administration

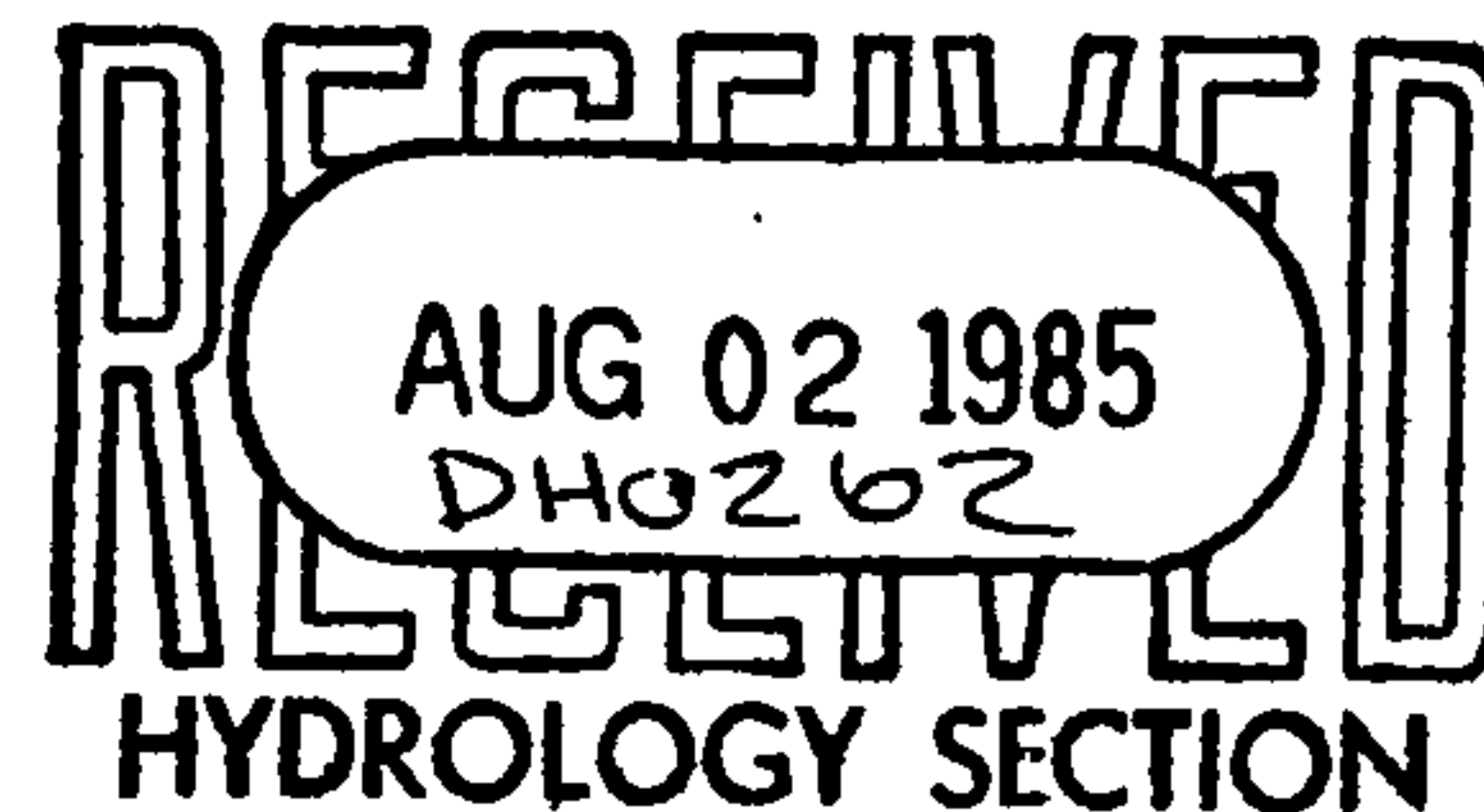
Enclosures

cc: Mr. Carlos A. Montoya, City/County Flood Plain Administrator, Design Hydrology Section, w/enclosures
Mr. Thomas O. Isaacson, Isaacson & Arfman, P.A., Consulting Engineers Assoc., w/enclosures



Isaacson & Arfman, P.A.

Consulting Engineering
Associates



August 1, 1985

Mr. Carlos Montoya
City/County Flood Plain Admin.
Design Hydrology Section
123 Central N.W.
Albuquerque, N.M. 87102

KA

RE: Request for Letter of Map Revision,
Panel 30, Albuquerque, N.M.

KP-D

Dear Carlos:

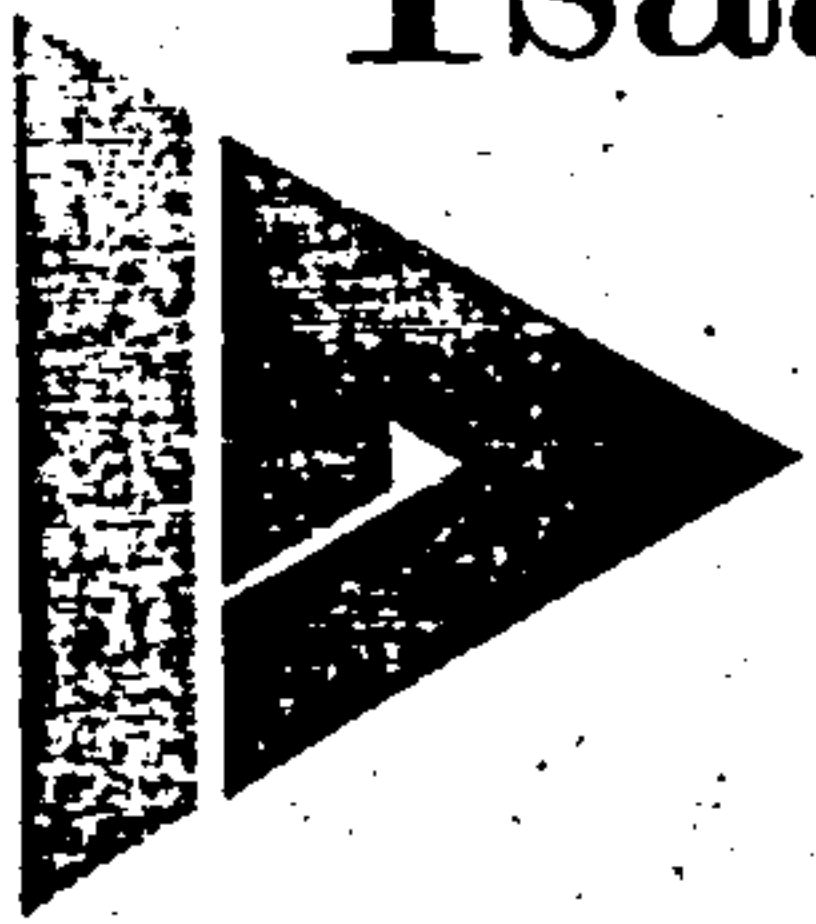
I'm sending a copy of Figure 1 which I have revised in order to correct the lot numbers in Block 37 of the Tijeras Place Addition. My original submittal had an error in the lots included in this request. This revision does not change the study area, but rather only corrects for an erroneous lot number noted in the original submittal.

Very truly yours,

Thomas O. Isaacson

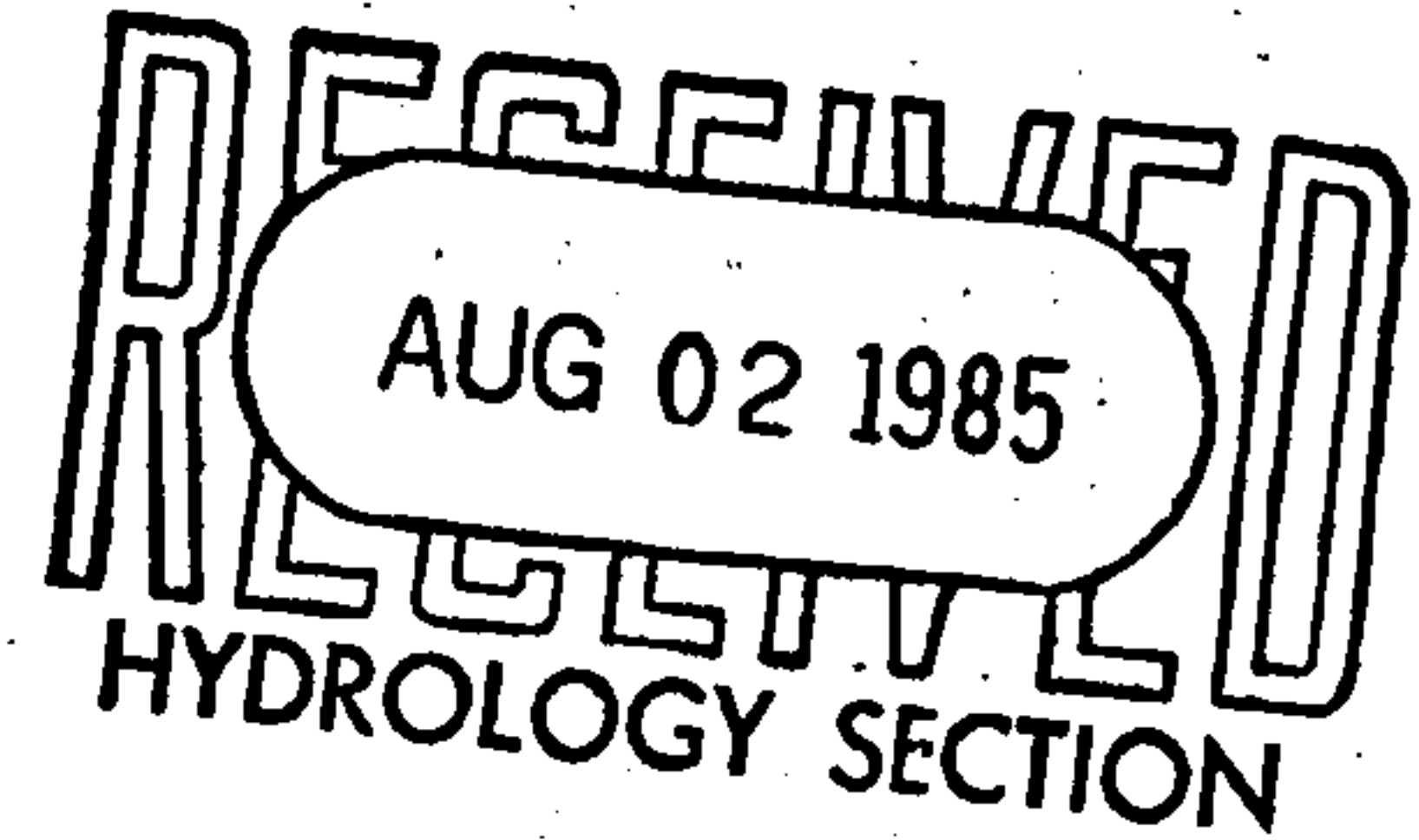
Enclosures

TOI/naf



Isaacson & Arfman, P.A.

Consulting Engineering
Associates



August 1, 1985

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City/County Flood Plain Admin.
Design Hydrology Section
123 Central N.W.
Albuquerque, N.M. 87102

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