C19/D011A

AGREEMENT
NORTH DOMINGO BACA ARROYO DRAINAGE FACILITY
WYOMING BLVD. TO BARSTOW ST.

This Agreement is entered into this 27 day of March, 1997 by and between the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) and Hoech Real Estate Corporation (HREC) a New Mexico Corporation.

RECITALS:

1. Whereas, AMAFCA's North and South Domingo Baca Arroyo and Paseo del Norte Corridor Drainage Management Plan (DMP), adopted in 1992, recommended a lined channel from the new Lower North Domingo Baca Arroyo Detention Dam at Louisiana, eastward to Ventura Street; and

2. Whereas, construction of a channel from Wyoming to Barstow will accomplish about 40 percent of the recommended channelization; and

3. Whereas, the Window G Sector Development Plan adopted May 6, 1996 by the City of Albuquerque (COA) Twelfth Council, and approved by the Mayor, Martin T. Chavez on June 7, l 996 sets forth a drainage management plan, the key element of which is the soil cement lining of the North Domingo Baca Arroyo from Wyoming Blvd. to Barstow St., (the "Project"); and

4. Whereas, AMAFCA Resolution 1982-4 Cost-Sharing with Land Owners, provides for the private sector to share in the cost of flood control facilities; and

5. Whereas, recognizing the value of such a PROJECT, AMAFCA programmed funds for a cost-shared PROJECT in its annual Project Schedule since 1995; and

6. Whereas, the PROJECT is appropriate for AMAFCA, in that it:

   a. Is consistent with AMAFCA's mission

b. Deals with a major arroyo which was addressed in AMAFCA's DMP

c. Channelizes the North Domingo Baca Arroyo for eventual delivery to the Lower Domingo Baca Dam.

d. Provides flood protection to existing development in Nor Este Manor and adjacent streets.

e. Provides a flood-control channel capable of accepting future fully developed flows.

f. Removes approximately 14.4 acres from the flood plain.

7. Whereas, AMAFCA has the operational capability and staffing to contract for the construction of the PROJECT, with construction anticipated to begin in the fall of 1997, and

8. Whereas, said PROJECT also offers opportunities for other purposes, such as open space, parks, trails, and other appropriate public uses, subject to the primacy of the drainage function; and

9. Whereas, HREC is proposing development of portions of the Window G Sector Development Plan comprising some 32 acres, to be built in the 1997-1999 time frame; and

10. Whereas, HREC proposes that it would be in the public interest for AMAFCA to construct the PROJECT on a cost-sharing basis as set forth in Exhibit A; and as set forth in paragraphs 1 and 2 below.

11. Whereas, the AMAFCA Board of Directors at its September 1995 and December 1996 Regular Meetings, considered the cost-sharing concept.

NOW THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. AMAFCA agrees to:

a. Construct a soil cement drainage channel in such a configuration as to serve as a drainage facility for the North Domingo Baca Arroyo from Barstow to 20 feet

west of Wyoming at an approximate cost of $1,059,000 (which includes construction, construction engineering, design, C/LOMR and contingency).

b. Commence construction in the fall of 1997 or after a CLOMR approval is received from the FEMA, whichever occurs later.

c. Operate and maintain the completed PROJECT.

d. Deed, to HREC, in exchange for property referenced in paragraph 2.a.(3) below, that portion of former Tract B- 1, Nor Este Manor, consisting of .6514 acres deeded to AMAFCA at no cost that falls south of the proposed channel right-of-way and identified as area 4 on Exhibit B.

e. Provide appropriate license to COA for recreation/open space use along the channel if acceptable to the COA.

f. Upon receipt by AMAFCA, of a sum equal to AMAFCA's purchase price for lots 19 through 25, exclusive Block 7, Tract 2, Unit 3 of North Albuquerque Acres, said purchase price multiplied by a factor equal to five percent interest, compounded annually, since June 1994. AMAFCA shall convey title to said lots directly to the City of Albuquerque to meet HREC Tract A, detached Open Space credit requirements. However such conveyance shall reserve to AMAFCA a blanket drainage easement, and shall also have a reversion clause such that the lots must be used for public purpose. It is understood that the number of lots to be conveyed may be adjusted based upon actual requirements which will be determined at the time of site plan approval.

2. HREC agrees to:

a. Provide to AMAFCA the following:

1) Channel designs for fully developed conditions approved by AMAFCA and the

COA and ready to bid, construction plans, contract documents and specifications, (estimated cost $85,500).

2) All engineering necessary for CLOMR and LOMR submissions approved by FEMA (estimated cost $24,500).

3) Deeds, in exchange for property referenced in paragraph I.d above, to the following land parcels for channel right-of-way (ROW) consisting of approximately 2.75 acres, with an approximate cost to HREC of $208,000:

a) That portion of land identified as Area 1, Exhibit B

b) That portion of land identified as Area 2, Exhibit B

c) That portion of land identified as Area 3, Exhibit B

4) The amount of $442,000 in bank guaranteed funds prior to award of a construction contract by AMAFCA. It is understood that $41,000 of this amount is contingency, and any, or all of the $41,000 not needed (as determined by AMAFCA) will be returned to HREC.

b. Prepare plat of areas between Wyoming and Barstow dedicating in fee the necessary ROW for the PROJECT, and upon approval of the COA, record said plat with the Bernalillo County Clerk prior to construction of the PROJECT.

c. Provide necessary easements for construction of the PROJECT.

d. Provide a phasing plan for development of Window "G" land parcels that will contribute flows to the proposed channel. Said plan will address timing issues and constraints on development tied to channel development and construction of the Wyoming Blvd. bridge, and shall be approved by AMAFCA and the COA before award of such a contract for the PROJECT.

e. Obtain vacation approval of all Portions of Carmel Avenue which may be needed for the

Project and convey or cause to be conveyed to AMAFCA said vacated portions of Carmel Avenue.

f. Obtain approval from the COA for outfall of channel on COA property west of Wyoming including approval from the COA for AMAFCA to operate and maintain this outfall in the interim until the COA park is developed.

g. Obtain approval of CLOMR and any required submittals to FEMA.

3. Both Parties agree as follows:

a. The facilities and ROW described herein have the primary purpose of conveying and managing storm water flows, and other interests granted by either party shall be subservient to that purpose.

b. This Agreement does not relieve HREC of the requirement to construct (or financially guarantee construction of) such facilities that the COA may deem necessary.

c. Disputes under this Agreement will be referred to binding arbitration under the provisions of the New Mexico Uniform Arbitration Act.

d. This Agreement may not be assigned by either party without the written consent of the other party, which consent shall not be unreasonably withheld.

e. Except as otherwise specifically provided herein, this Agreement shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico.

f. All notices with respect to this Agreement shall be in writing and shall be delivered personally, sent via confirmed telefax, or sent postage prepaid by United States mail certified mail return receipt requested, to the addresses set forth below or such other addresses as hereafter specified in writing by one party to the other:

Albuquerque Metropolitan Arroyo Flood Control Authority 2600 Prospect, NE Albuquerque, NM 87107

FAX: 884-0214

Hoech Real Estate Corporation
6729 Academy Rd, NE Ste. B
Albuquerque, NM 87109

FAX: 857-9774

g. This Agreement contains the entire Agreement between the parties hereto and all prior understandings, oral or in writing, by the parties hereto with respect to this Agreement. No variations, modifications, supplements, waivers or changes herein or hereof shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

h. If any provision of this Agreement of the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provisions to other persons or circumstance shall not be affected thereby and such provisions shall be enforced to the greatest extent permitted by law. In the event any action is instituted by any party for the purpose of enforcing or interpreting any provision of this Agreement, the prevailing party in such action shall be entitled to its reasonable attorney's fees and costs.

j. This Agreement shall inure to the benefit of and be binding upon the undersigned parties and their respective successors and assigns. Whenever in this Agreement a reference to HREC is made, such reference shall be deemed to include a reference to successor owners of the PROPERTY.

k. Each individual signing for each of the parties hereunder, warrants and represents that he/she is an authorized agent of such party, on whose behalf he/she is executing this Agreement, and is authorized to execute the same.

l. Each party agrees to execute such other and further instruments and documents as may be necessary or proper in order to complete the transactions contemplated by this Agreement.

m. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and said counterparts shall constitute but one and the same instrument which may sufficiently be evidenced by one counterpart.

n. Funds for this project will be addressed in the AMAFCA FY'98 budget, and may be contingent upon successful sale of General Obligation Bonds, anticipated to occur in mid-1997.

Executed the day and year first set out above.

ALBUQUERQUE METROPOLITAN
ARROYO FLOOD CONTROL
AUTHORITY, a political subdivision
of the State of New Mexico

ATTEST:

Linda Olmsted, Secretary-Treasurer
Board of Directors

Michael Murphy, Chair
Board of Directors

c:wpwin61/ndb wp5

HOECH REAL ESTATE
CORPORATION, A New
Mexico Corporation

Donald G. Hoech, President

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on March 27, 1997 by Michael Murphy, Chair of the Albuquerque Metropolitan Arroyo Flood Control Authority, a political subdivision of the State of New Mexico.

My commission expires: 3/29/99

OFFICIAL SEAL
Gwendolyn A. Vigil
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 3/29/99

Notary Public

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on March 27, 1997 by Donald G. Hoech, President of Hoech Real Estate Corporation, a New Mexico Corporation.

My commission expires:
July 8, 2000

Notary Public

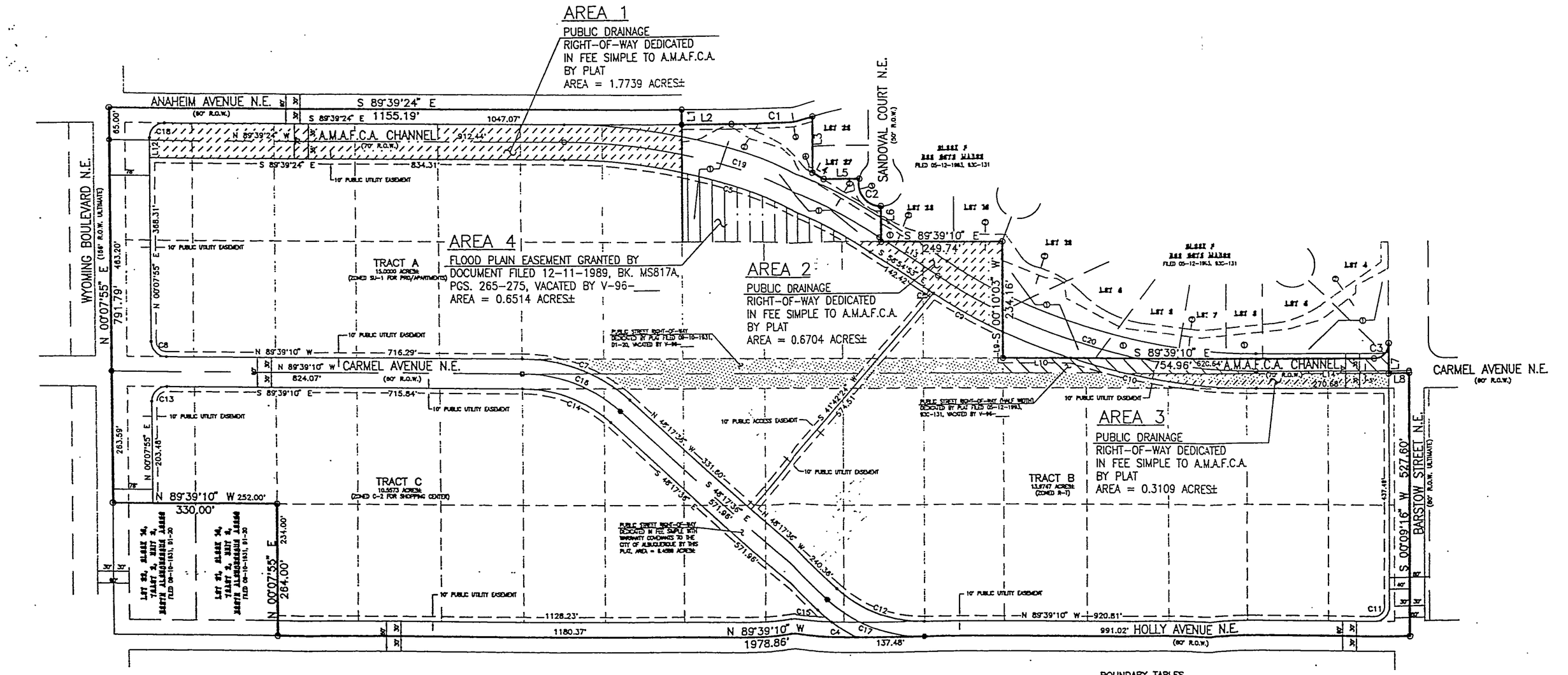
EXHIBIT A
COST SUMMARY

	AMAFCA	HREC	TOTAL
Design, C/LOMR	0	110,000	110,000
Construction + Tax	416,000	401,000	817,000
Contingency	41,000	41,000	82,000
Construction Engineering	50,000	0	50,000
Sub-Total	507,000	552,000	1,059,000
Cost of ROW (2.755 Ac. @ $1.73/sf)	0	208,000	208,000
Total	**507,000**	**760,000**	**1,267,000**
	(40%)	(60%)	(100%)

EXHIBIT B

2/2/97

SCALE: 1" = 200'



KEYED NOTES

① FLOOD PLAIN EASEMENT GRANTED BY DOCUMENT FILED 12-11-1989, BK. MS817A, PGS. 265-275

② A.M.A.F.C.A. DRAINAGE EASEMENT GRANTED BY THE PLAT FILED FILED 05-12-1993, 93C-131

③ 10' PUBLIC UTILITY EASEMENT GRANTED BY THE PLAT FILED FILED 05-12-1993, 93C-131

④ 7' PUBLIC UTILITY EASEMENT GRANTED BY THE PLAT FILED FILED 05-12-1993, 93C-131

BOUNDARY TABLES

LINE	BEARING	DISTANCE
L1	S 00°08'55" W	30.00'
L2	S 89°39'10" E	100.47'
L3	S 00°08'55" W	117.55'
L4	S 36°41'32" E	27.22'
L5	S 89°31'47" E	71.31'
L6	S 00°08'55" W	70.48'
L7	S 00°08'55" W	30.00'
L8	S 89°39'10" E	40.00'
L9	S 00°10'03" W	30.16'
L10	S 89°39'10" E	134.47'
L11	N 89°39'10" W	98.47'
L12	N 00°07'55" E	30.00'
L13	S 89°39'10" E	142.42'
L14	S 89°39'10" E	100.47'

CURVE	RADIUS	LENGTH	CHORD	BEARING	DELTA
C1	830.00'	188.39'	188.04'	S 83°07'22" E	13°00'32"
C2	45.00'	70.69'	63.64'	S 44°39'24" E	90°00'00"
C3	30.00'	47.12'	42.43'	S 45°20'36" W	90°00'00"
C4	1060.00'	80.15'	80.13'	N 88°42'42" W	4°20'00"
C5	1145.00'	865.74'	844.72'	S 73°17'08" E	43°19'32"
C6	1230.00'	11.28'	11.28'	S 51°11'26" E	00°33'56"
C7	1230.00'	274.21'	273.67'	S 88°39'24" E	12°46'12"
C8	30.00'	47.01'	42.36'	N 44°45'08" W	89°46'30"
C9	1230.00'	160.82'	160.70'	S 41°41'18" E	07°29'19"
C10	1230.00'	388.54'	386.97'	S 87°41'17" E	17°46'04"
C11	30.00'	47.12'	42.43'	N 45°20'36" E	90°00'00"
C12	830.00'	704.89'	683.73'	S 69°56'24" E	48°39'32"
C13	30.00'	47.12'	42.43'	N 45°20'36" E	90°00'00"
C14	970.00'	704.89'	689.34'	N 69°56'24" W	41°38'32"
C15	30.00'	47.12'	42.43'	S 44°39'24" W	90°00'00"
C16	830.00'	603.16'	589.96'	N 69°56'24" W	41°38'32"
C17	30.00'	47.12'	42.43'	S 45°20'36" W	90°00'00"
C18	1060.00'	80.15'	80.13'	N 87°17'18" W	4°20'00"
C19	1145.00'	865.74'	844.72'	S 73°17'08" E	43°19'32"
C20	1230.00'	11.28'	11.28'	S 51°11'26" E	00°33'56"

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

Window "G" channel
C19/D011A

VACANT LAND EXCHANGE AGREEMENT

This contract made this 27 day of March, 1997, between the Albuquerque Metropolitan Arroyo Flood Control Authority ("AMAFCA") and Hoech Real Estate Corporation, a New Mexico Corporation ("HREC"):

Witnesseth: The parties agree to exchange, upon terms and conditions hereinafter set out, the following real properties:

HREC agrees to convey, sell, and grant to AMAFCA the real estate shown on Exhibit A attached hereto designated as Area 1, Area 2 and Area 3, to wit: Approximately 2.755 +/- acres of vacant land zoned according to the Window "G" Sector Development Plan (the "EXCHANGE PROPERTY").

AMAFCA agrees to convey, sell, and grant to HREC the real estate shown on Exhibit A attached hereto designated as Area 4, to wit: Approximately 0.6514 +/- acres of vacant land zoned according to the Window "G" Sector Development Plan (the "PROPERTY").

I. PROPERTY VALUES

The value of the EXCHANGE PROPERTY, based on a per sq. ft. unit cost to HREC in contingency purchase agreements, is the sum of approximately TWO HUNDRED SEVEN THOUSAND SIX HUNDRED THIRTEEN DOLLARS ($207,613). The value of the PROPERTY, based on a per sq. ft. unit cost to HREC in contingency purchase agreements is the sum of approximately FORTY NINE THOUSAND AND EIGHTY NINE DOLLARS ($49,089).

The value of the EXCHANGE PROPERTY and the value of the PROPERTY both equate to $1.73 +/- per sq. ft. which is the average price per square foot which HREC has agreed to pay pursuant to contingency purchase agreements for property which comprise the EXCHANGE PROPERTY. This value is acceptable to both HREC and AMAFCA, and substantiating documentation is on file at the AMAFCA or HREC offices.

The difference between the value and cost of the EXCHANGE PROPERTY, and the value and cost of the PROPERTY, have been considered as a part of the overall agreement entitled AGREEMENT NORTH DOMINGO BACA ARROYO DRAINAGE FACILITY WYOMING BLVD. TO BARSTOW ST. between AMAFCA and HREC ("WINDOW G AGREEMENT").

It is acknowledged by the parties that AMAFCA Policy 1993-9 with regard to the Disposal of Real Estate normally requires AMAFCA to obtain an appraisal on the subject properties. As recommended by its staff for the WINDOW G AGREEMENT, AMAFCA agrees to waive the appraisal requirement in-as-much as the value of the EXCHANGE PROPERTY is significantly greater than the value of the PROPERTY.

Initials: AMAFCA _____ HREC _____

II. TITLE

A. EXCHANGE PROPERTY

As soon as practicable after the execution of this agreement HREC shall, at HREC's expense, cause First American Title Company (Attn. Kathy Carrillo), to issue a commitment to insure title to the EXCHANGE PROPERTY in AMAFCA's name through an Owners Policy of Title Insurance in the face amount of the value of the EXCHANGE PROPERTY. All requirements by said title commitment shall be met at closing. Failure by either party to meet such requirements shall constitute a breach of this Agreement. AMAFCA shall have ten (10) days from receipt of the title commitment to examine the title to the EXCHANGE PROPERTY and to report to HREC in writing any valid objections thereto. Any exceptions to title shall be deemed to have been accepted unless reported to HREC in writing during said examination period. If AMAFCA objects to any exceptions to the title, HREC shall use due diligence to remove such exceptions at their own expense before the closing date, upon failure of which all rights and obligations hereunder may, at the election of AMAFCA, terminate and end; provided that AMAFCA may elect to consummate this transaction and acquire the EXCHANGE PROPERTY subject to any such exceptions.

HREC shall escrow executed Warranty Deed(s) which will convey merchantable title to AMAFCA. Owner's title insurance insuring title in AMAFCA's name in fee simple shall be delivered to AMAFCA as soon as practicable after closing.

B. PROPERTY

As soon as practicable after the execution of this agreement AMAFCA shall, at AMAFCA's expense, cause Lawyer's Title Company (Attn. Sue Dunworth), to issue a commitment to insure title to the PROPERTY in HREC's name through an Owners Policy of Title Insurance in the face amount of the value of the PROPERTY. All requirements by said title commitment shall be met at closing. Failure by either party to meet such requirements shall constitute a breach of this Agreement. HREC shall have ten (10) days from receipt of the title commitment to examine the title to the property and to report to AMAFCA in writing any valid objections thereto. Any exceptions to title shall be deemed to have been accepted unless reported to AMAFCA in writing during said examination period. If HREC objects to any exceptions to the title, AMAFCA shall use due diligence to remove such exceptions at their own expense before the closing date, upon failure of which all rights and obligations hereunder may, at the election of HREC, terminate and end; provided that HREC may elect to consummate this transaction and acquire the PROPERTY subject to any such exceptions.

AMAFCA shall escrow an executed Quitclaim Deed which will convey merchantable title to HREC. Owner's title insurance insuring title in HREC's name in fee simple shall be delivered to HREC as soon as practicable after closing.

III. SURVEYS

A. EXCHANGE PROPERTY. As soon as practicable after execution of this Agreement, HREC, at HREC's expense, shall obtain and deliver to AMAFCA ALTA Survey(s) of the EXCHANGE PROPERTY. AMAFCA and HREC shall both have ten (10) days to examine the survey(s) together with the title commitment(s) and exception documents and to notify HREC in writing of any objections thereto. In the event that AMAFCA shall so notify HREC of objections to the survey, and HREC is unable to satisfy AMAFCA's objections before the closing date, then this Agreement and all rights and obligations hereunder, at the election of AMAFCA, may terminate and end; provided that AMAFCA may elect to consummate this transaction and acquire the EXCHANGE PROPERTY subject to any such exceptions and without satisfaction of their objections.

B. PROPERTY. As soon as practicable after execution of this Agreement, HREC, at HREC's expense, shall obtain an ALTA Survey of the PROPERTY. HREC shall have ten (10) days to examine the survey together with the title commitment and exception documents and to notify AMAFCA in writing of any objections thereto. In the event that HREC shall so notify AMAFCA of objections to the survey, and AMAFCA is unable to satisfy HREC's objections before the closing date, then this Agreement and all rights and obligations hereunder, at the election of the HREC, may terminate and end; provided that HREC may elect to consummate this transaction and acquire the PROPERTY subject to any such exceptions and without satisfaction of their objections.

IV. PLATS

HREC, at HREC's expense, shall obtain final subdivision approval and recordation of a subdivision plat, acceptable to AMAFCA, pursuant to the provisions in the WINDOW G AGREEMENT. The parties agree to cooperate with each other in obtaining said subdivision approvals. This Agreement and the closing contemplated hereby is subject to and conditioned upon the parties first obtaining final subdivision approvals for the above referenced plat upon terms and conditions acceptable to the parties. Recording of said subdivision plat shall be concurrent with close of escrow.

V. PRORATIONS and CLOSING COSTS

Paving, sidewalk, sewer, and water assessments, if any, to be paid by the respective property owner at closing. Rent, interest, hazard, flood, water, sewer, and garbage charges, if applicable, are to be prorated to closing date. Each party will pay all outstanding Real Estate Taxes, and will escrow with each respective Title Company the amount of estimated taxes for the current tax year, for their respective property. HREC shall pay the Title Commitment Fee, the Title Company Closing Fee, deed preparation costs, recording fees and the applicable title insurance premium, etc. for conveyance of the EXCHANGE PROPERTY. AMAFCA shall pay the Title Commitment

Fee, the Title Company Closing Fee, deed preparation costs, recording fees and the applicable title insurance premium, etc. for conveyance of the PROPERTY.

VI. CLOSING DATE, POSSESSION

Closing shall take place at a time and place mutually agreeable by the parties. The parties agree to give possession of the respective properties to the other on the date of closing at 5:00 pm, and certifies that the property will be in the same condition as of the date of this Agreement. All parties undersigned agree to complete closing within 72 hours after notification that required closing papers are ready.

VII. DEFAULT

Time is of the essence. If any payment or any other condition hereof is not made, tendered or performed by either AMAFCA or HREC as required, then this Agreement may be terminated at the option of the party who is not in default. In the event of such default by AMAFCA, and HREC elects to treat this Agreement as terminated it shall so notify AMAFCA of such election to terminate in writing whereupon HREC shall have no further rights under this Agreement. In the event of such default by HREC and AMAFCA elects to treat this Agreement as terminated, it shall so notify HREC of such election to terminate in writing whereupon AMAFCA shall have no further rights under this Agreement. In the event, however, the non-defaulting party elects to treat this Agreement as being in full force and effect, the non-defaulting party shall have the right to an action for specific performance and/or damages.

VIII. ENTIRE AGREEMENT

This Agreement is intended to be and constitute the entire agreement between the parties as of the date of execution and it may be amended only by an instrument in writing signed by the parties. This Agreement shall be binding upon and inure to the benefit of the parties, their heirs, executors, administrators, successors, and assigns.

IX. GOVERNMENTAL APPROVALS AND OTHER CONDITIONS

A. This Agreement and the closing contemplated hereby is subject to and conditioned upon the approval of the Board of Directors of the Albuquerque Metropolitan Arroyo Flood Control Authority ("Board") by no later than March 31, 1997. This Agreement shall not be binding upon AMAFCA until counter-signed by the chairman or other official of its Board. HREC acknowledges that Board approval of this transaction will be in accordance with the published policies governing AMAFCA real estate transactions, except for the waiver of appraisal as referenced in paragraph I.A. of this Agreement.

B. The parties acknowledge that HREC is acquiring the PROPERTY to combine it with adjacent properties for a mixed use development. This Agreement and the closing contemplated hereby is subject to and conditioned upon HREC first obtaining the appropriate governmental approvals of the development, including a drainage plan, contemplated by HREC upon terms and conditions acceptable to HREC. AMAFCA agrees to cooperate with HREC in its efforts to obtain the necessary governmental approvals for the development of the property in the manner envisioned by HREC, including, but not limited to, promptly executing any plats or any other documents which are required by the applicable governmental authorities.

C. HREC Represents:

1) That it is not the current fee owner of the EXCHANGE PROPERTY;

2) That it has entered into contingency purchase agreements for the purchase and sale of the EXCHANGE PROPERTY with the fee owners thereof for the purpose of this transaction, and;

3) That the Purchase Price of the EXCHANGE PROPERTY in the contingency purchase agreements by and between HREC and the fee owners thereof is the same as the value specified in Paragraph I of this Agreement. This Agreement and the closing contemplated hereby is subject to and conditioned upon the concurrent close of escrow of this transaction and the transactions by and between HREC and the fee owners of the EXCHANGE PROPERTY.

D. In the event that AMAFCA is unable to satisfy the condition specified in subparagraph IX A. hereinabove, it shall so notify HREC in writing, whereupon this Agreement and all the rights and obligations of the parties hereunder shall terminate and end. In the event that HREC is unable to satisfy the conditions specified in subparagraphs B and/or C hereinabove, it shall so notify AMAFCA in writing, whereupon this Agreement and all the rights and obligations of the parties hereunder shall terminate and end.

X. RIGHT OF ENTRY

AMAFCA and HREC hereby grant permission, each to the other, to enter onto the respective premises to conduct those studies, surveys, inspections, and any other due diligence investigations deemed necessary by each party. The parties further agree to provide the other with any and all documentation it has on their respective properties including but not limited to: surveys, geotechnical reports, environmental studies, and any engineering studies or reports.

XI. DISPUTES

If disputes arise regarding the terms of this Agreement, the parties agree to seek resolution through binding arbitration under AAA Arbitration Guidelines. If it becomes necessary for any party to take legal action to enforce any term of this agreement, the losing party shall be liable for all costs incurred in such legal action, including reasonable attorney's fees.

XII. NOTICES

Whenever, under the terms of this Agreement, a written notice is required, or whenever a written notice or communication is sent, the same shall be accomplished by hand delivery, or by certified or registered mail, return receipt requested, postage prepaid, or by telegram sent by Western Union Telegraph Company, addressed as follows:

AMAFCA: AMAFCA Attn: Larry Blair
2600 Prospect Ave. NE
Albuquerque, NM 87107

HREC: Hoech Real Estate Corporation
6729 Academy Rd. NE Suite B
Albuquerque, New Mexico, 87109

Notices served by mail shall be deemed given three (3) days after deposited with the United States Postal Service. Any change of address shall not be effective unless served upon the parties in the same manner as a notice referred to herein.

XIII. GOVERNING LAW

This Agreement shall be interpreted in accordance with the laws of the State of New Mexico.

XIV. BROKERAGE

The parties agree that the transaction hereby contemplated was brought about by the efforts of Donald G. Hoech and that the parties have dealt with no other brokers in connection with the transaction. It is further acknowledged by the parties that AMAFCA does not agree to pay any brokerage commission with regard to this transaction. HREC agrees to hold AMAFCA harmless from any claim for real estate brokerage commissions asserted by any other party as a result of this transaction.

Hoech Real Estate Corporation:

Donald G Hoech
By: Donald G. Hoech, its President

Date: 2-27-97

Albuquerque Metropolitan Arroyo Flood Control Authority:

Recommended By:

Larry A. Blair

By: Larry A. Blair, its Executive Engineer

Date: 3/27/97

AMAFCA BOARD OF DIRECTORS APPROVAL

Michael Murphy

By: Michael Murphy, Chair

Date: 3/27/97

Linda Olmsted

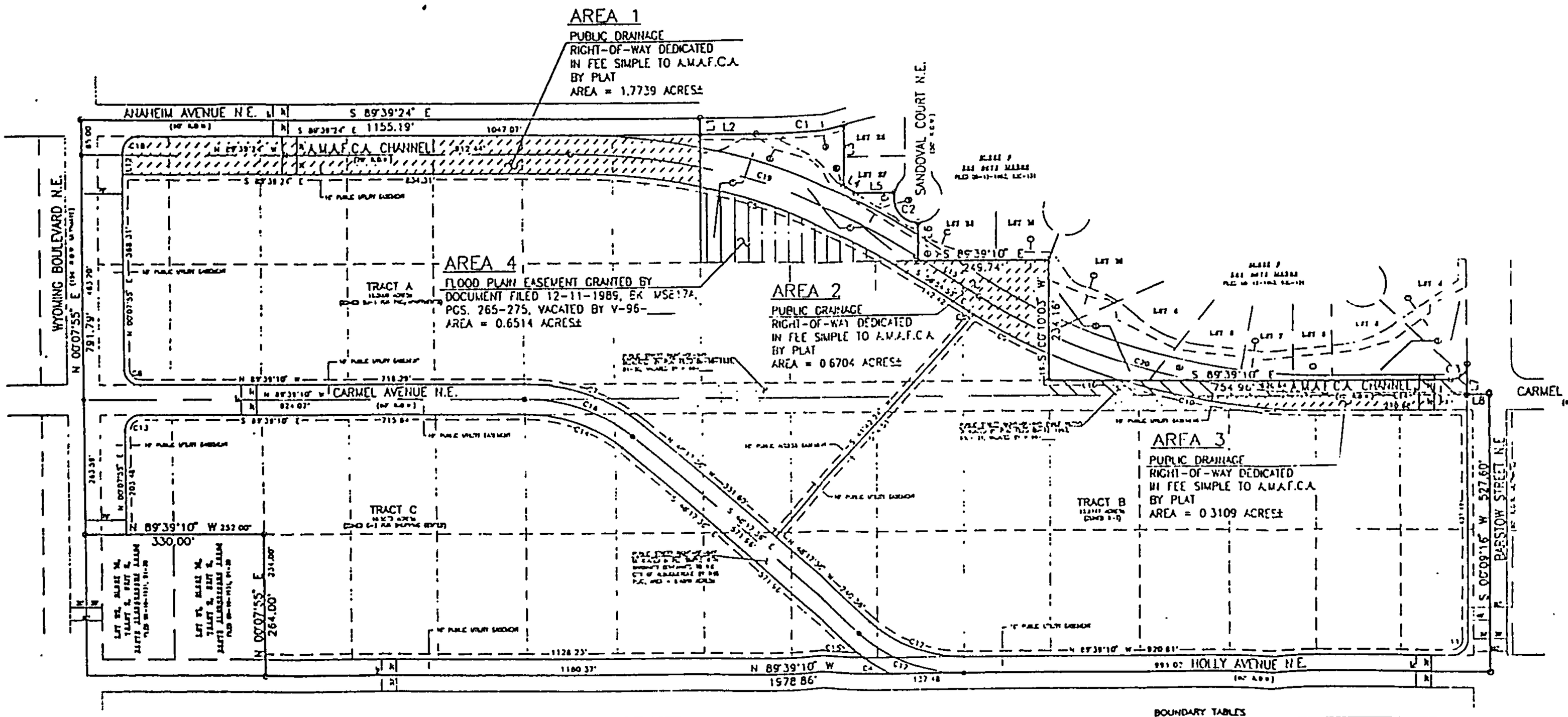
By: Linda Olmsted, Secretary-Treasurer

Date: 3/27/97

EXHIBIT

2/4/97

A



KEYED NOTES

① FLOOD PLAIN EASEMENT GRANTED BY DOCUMENT FILED 12-11-1989, BK M5817A, PGS 265-275

② A.M.A.F.C.A. DRAINAGE EASEMENT GRANTED BY THE PLAT FILED FILED 05-12-1993, 93C-131

③ 10' PUBLIC UTILITY EASEMENT GRANTED BY THE PLAT FILED FILED 05-12-1993, 93C-131

④ 7' PUBLIC UTILITY EASEMENT GRANTED BY THE PLAT FILED FILED 05-12-1993, 93C-131

BOUNDARY TABLES

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD NE.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

CITY OF
Albuquerque

June 10, 1997

Martin J. Chávez, Mayor

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, New Mexico 87109

RE: Phasing and Interim Grading Plan for Window G (C19/D11) Submitted for Preliminary Plat and Site Development for Building Permit Approval, Engineer's Stamp Dated 6/9/97.

Dear Mr. Mortensen:

Based on the information provided in the submittal of June 9, 1997 the above referenced plan is approved for Preliminary Plat and Site Development Plan for Building Permit approval.

Prior to release of Building Permit for Pinnacle Estates, a detailed grading and drainage plan must be submitted to and approved by this office. Prior to approval of Work Order plans for La Cueva Village, the easement and Agreement and Covenant for the temporary pond must be in place. Prior to release of financial guarantees for Pinnacle Estates and for La Cueva Village, the Letter of Map Revision must be received from FEMA.

If you should have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Don Hoech, Owner
File

DRAINAGE INFORMATION SHEET

970011/961307

PROJECT TITLE: WINDOW G PHASING PLAN AND INTERIM GRADING PLAN ZONE ATLAS/DRNG. FILE #: C19/D11

DRB #: 96-546 EPC #: 97-16 WORK ORDER #:

LEGAL DESCRIPTION: TRACT A and LOTS 1-59, UNIT1 and LOTS 1-17, unit2, LA CUEVA VILLAGE

CITY ADDRESS: CARMEL AVE N.E.

ENGINEERING FIRM: JMA CONTACT: GRAEME MEANS

ADDRESS: 6010-B MIDWAY PK BLVD NE 87109 PHONE: 345-4250

OWNER: NOECH REAL ESTATE CONTACT: DON NOECH

ADDRESS: 6729 ACADEMY NE SUITE B PHONE: 821-4440

ARCHITECT: — CONTACT:

ADDRESS: PHONE:

SURVEYOR: JMA CONTACT: CHUCK CALA

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

X OTHER Phasing and Interim Grading Revised Infrastructure List

PRE-DESIGN MEETING:

___ YES

X NO

___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

X PRELIMINARY PLAT APPROVAL

___ S. DEV. PLAN FOR SUB'D. APPROVAL

X S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ BUILDING PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

X DRAINAGE REQUIREMENTS

___ OTHER _____ (SPECIFY)

XC: DON HOECH, KEITH COLEMAN

DATE SUBMITTED: 06-09-97

BY: J. GRAEME MEANS

received 6-9-97
SMC

FAX TRANSMISSION

AMAFCA

2600 PROSPECT, NE
ALBUQUERQUE, NM 87107
(505) 884-2215
FAX: (505) 884-0214

To: SUSAN C. **Date:** 6-9-97

Fax #: One Stop **Pages:** 2, including this cover sheet.

From: KURT B.

Subject: Winters "G" Channel

COMMENTS:

Per the attached note from Deanna, I am sending this note. AMAFCA is OK w/ the temp. ponds; however, if they do not meet COA DPM criteria, the COA will need to to make comments. The lower ponds will spill to Wyoming, not the channel. The COA can have these ponds altered in size if the COA deems it necessary.

KB

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 970011
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

RE: TEMPORARY EROSION CONTROL AND SEDIMENT PONDS.

KURT,

FRED AND SUSAN WOULD LIKE SOME KIND OF NOTE FROM YOU CONCERNING THE SUBJECT PONDS. THE PONDS ARE INTENDED TO PROTECT RUNOFF FROM PINNACLE ESTATES AND LA CUEVA VILLAGE FROM IMPACTING THE CHANNEL DURING CONSTRUCTION. WHEN THE CHANNEL IS READY, THE PONDS WILL BE REMOVED AND THE TWO SITES WILL DISCHARGE TO THE CHANNEL VIA PENETRATION.

THE LA CUEVA VILLAGE POND IS SIZED TO RETAIN THE 10-YEAR VOLUME OF 36,200 c.f.

THE PINNACLE ESTATES PONDS TOTAL 20,700 cf AND ARE SIZED FOR THE 2-YEAR STORM. SHOULD THESE PONDS OVERFLOW, THE RUNOFF WILL FLOW TO WYOMING AND WEST FROM THERE. THE RUNOFF WILL NOT AFFECT THE CHANNEL.

PLEASE FAX A NOTE TO SUE AND FRED CONCERNING THE PONDS. BECAUSE THE PONDS SERVE TO PROTECT AMAFCA FROM CONSTRUCTION SEDIMENT AND RUNOFF, THEY REQUIRE YOUR COMMENT.

PLEASE CALL IF YOU HAVE ANY QUESTIONS OR COMMENTS

THANKS

GRAEME MEANS

FORMS BY CHRISTIAN SHOP, INC. ALBUQUERQUE, NEW MEXICO 87107 1-800-333-6780

****
*** RX REPORT ***
****

RECEPTION OK

TX/RX NO	5515
CONNECTION TEL	
SUBADDRESS	
CONNECTION ID	
ST. TIME	06/10 07:45
USAGE T	03'27
PGS.	2
RESULT	OK

6-5-97

Sept. 15th Construction begins
need final plat approval (SIA)
DRB- prelim plat, site plan
grading cannot occur til Channel Constru. begins

3. lots 45-59 paper easement until Channel done
dev. easement for temp. erosion setback (subd- ok on paper easement)
agreement & Covenant on pond

1. apts- protect for 1 100yr storm or (1yr erosion + 100-yr event)
May ask for waiver for 2'± good argument stability
Need soil Cement in place byor CO for any bldg. (ok on waiver)
SIA/Plat, Site Plan, BP

2. sequence of events

60% Channel bonded to AMAFCA if AMAFCA's 40% tied to rate-hold
need AMAFCA's assurance

4. 10 yr pond sizing - if ok w/ AMAFCA - ok - letter from Kurt
pond for developed area in apts · spills to parks property

Meeting w/ Fred, Susan, Jeff, Graeme

CITY OF
Albuquerque
Public Works Department

June 2, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, New Mexico 87109

RE: Phasing and Interim Grading Plan for Window G (C19/D11) Submitted for Preliminary Plat and Site Development for Building Permit Approval, Engineer's Stamp Dated 5/7/97.

Dear Mr. Mortensen:

Prior to approval for Preliminary Plat action, the following comments must be addressed:

1. The erosion setback limits must be based on the existing 100-year storm, not the 10-year event. The erosion setback limit should be measured from the bank of the channel. No development will be allowed within the erosion setback until the channel construction is complete. Therefore, in La Cueva Village, the area within the revised erosion setback limit should be shown as a separate Tract. This must be identified prior to Preliminary Plat approval.

2. All temporary retention ponds must be sized for the 100-year, 10-day storm.

3. The temporary CMP culverts under the Wyoming shoefly must be sized for the 100-year event. Please provide the size and capacity calculations prior to Preliminary Plat approval. The culvert size must be identified on the Infrastructure List.

If you should have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Don Hoech, Owner
Kurt Browning, AMAFCA
File

961307/970011

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Window & Phasing Plan and Interim Grading Plan ZONE ATLAS/DRNG. FILE #: C19/D11A, D11B

DRB #: 96-546 EPC #: Z97-16 WORK ORDER #: _____

LEGAL DESCRIPTION: Tract A and Lots 1-59, UNIT 1 AND LOTS 1-17, UNIT 2, LA CUEVA VILLAGE

CITY ADDRESS: Carmel Ave NE, Between Barstow & Wyoming

ENGINEERING FIRM: Jeff Mortensen & Assoc. CONTACT: Graeme Means

ADDRESS: 6010-B Midway Park Blvd NE PHONE: 345-4250

OWNER: HOECH REAL ESTATE CORP CONTACT: DON HOECH

ADDRESS: 6729 Academy NE Suite B PHONE: 821-4440

ARCHITECT: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: JMA CONTACT: Chuck Cala

ADDRESS: _____ PHONE: _____

CONTRACTOR: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
___ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
___ GRADING PLAN
___ EROSION CONTROL PLAN
___ ENGINEER'S CERTIFICATION
X OTHER Phasing and Interim Grading Plan

RECEIVED
MAY 08 1997
HYDROLOGY SECTION

PRE-DESIGN MEETING:

___ YES
X NO
___ COPY PROVIDED

XC: DON HOECH
AMAFCA
KEITH COLEMAN

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
X PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D. APPROVAL
X S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
___ SECTOR PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ FOUNDATION PERMIT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
X DRAINAGE REQUIREMENTS
___ OTHER _____ (SPECIFY)

DATE SUBMITTED: 05-07-97

BY: Graeme Means

FAX TRANSMISSION

AMAFCA

2600 PROSPECT, NE
ALBUQUERQUE, NM 87107
(505) 884-2215
FAX: (505) 884-0214

To: All Listed Below Date: May 2

Fax #: Pages: 5, including this cover sheet.

From: Kurt Browning by KB

Subject:

COMMENTS:

To: Susan Calongne
Lon Hoelck
Rick Rayball
Fred Aguirre
Dan Hogan
Jeff Mortensen
Ken McDaniel
Kevin Curran

Draft

April 30, 1997

Mr. Don Hoech
Hoech Real Estate
6729 Academy Road N.E., Suite B
Albuquerque, New Mexico 87109

RE: HREC-AMAFCA Agreement for Channel Construction and Requirements for Interim Excavation of Proposed Channel.

Dear Mr. Hoech:

As you know, the enclosed Agreement was approved and signed by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) Board of Directors at its March 27, 1997 meeting. (In order to satisfy certain AMAFCA Resolutions regarding land exchange, a subordinate agreement was necessary, and was also approved and signed by the Board on March 27, 1997.)

Our Agreement covers the financing, design, construction and maintenance of the North Domingo Baca Channel between Wyoming and Barstow. Construction by AMAFCA is planned to commence in the fall (October 1, 1997).

I am willing to permit interim excavation of the channel, subject to the following conditions:

a. Excavation must be completed by **September 1, 1997.** Interim wing dikes at the east end of the project must be in place for the interim earthen channel to operate satisfactorily. These dikes must be of engineered fill, and your engineer must certify these dikes including all test reports.

b. Interim channel slopes must be left with one foot (perpendicular to slope) of excess earth. The bottom will be excavated to finished sub-grade elevation.

c. A stockpile of satisfactory material for soil cement will be provided with the quantity being 120 percent of estimated need. AMAFCA, or its

MICHAEL MURPHY, CHAIR
TIM EICHENBERG, VICE-CHAIR
LINDA OLMSTED, SECRETARY-TREASURER
RONALD D BROWN, ASST SECRETARY-TREASURER
DANIEL W COOK, DIRECTOR

LARRY A BLAIR
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N E / ALBUQUERQUE, N M. 87107
TELEPHONE (505) 884-2215

April 29, 1997

Memorandum

TO: Don Hoech, Hoech Real Estate (ALL VIA FAX)
Rick Roybal, City Engineer
Fred Aguirre, City One-stop Development
Susan Calongne, City/County Floodplain Administrator
Dan Hogan, City Hydrology
Jeff Mortensen, Mortensen and Associates
Ken McDaniel, AMAFCA Legal
Kevin Curran, COA Legal

FR: Larry Blair, AMAFCA

RE: Interim excavation of Window "G" North Domingo Baca Channel

---

Attached is a proposed letter to HREC, outlining conditions to be met, to allow excavation of the North Domingo Baca Channel. The material will be stockpiled for soil cement production required for the new channel, and will also be used for adjacent site grading.

Your input and comments are welcome. Please provide comments to AMAFCA by Friday, May 9, 1997. Thank you.

Draft

approvals which may be imposed by the City of Albuquerque.

Prior to AMAFCA advertising for bids for the channel project, the following items must be in place, and certified by the City of Albuquerque and your engineer:

1. All utility work required at Wyoming (channel crossing).
2. The interim detour (shoefly) and stormwater outlet at Wyoming as approved by COA, and AMAFCA.
3. The bridge abutments/foundations at Wyoming, including all appurtenances, so that the channel can be constructed in the area with minimum maintenance.
4. Preliminary grading of the channel as outlined in item b above.
5. Traffic control plan approved by City Engineer.

I understand your engineer is coordinating these items with COA staff. As we proceed through coordination and review, additional items may surface.

Should you have any questions, please call me at (505) 884-2215.

Sincerely,

AMAFCA

CONCURRENCE, HREC

Larry Blair
Executive Engineer

cc: Fred Aguirre, COA One-Stop Development
Dan Hogan, COA Hydrology
Susan Calongne, City/County Floodplain Administrator
Rick Roybal, City Engineer

Draft

agent will make the determination on whether the material is satisfactory before, and as stockpiling occurs on the designated site. AMAFCA needs take priority. Your engineer will be responsible for providing AMAFCA with this quantity.

d. HREC will provide an area for stockpiling the soil cement material, plus an adjacent area for a soil cement production plant, both areas subject to AMAFCA approval. These areas will be located adjacent to the proposed channel, within the proposed La Cueva Village Tract. Approximately five acres will be required for both areas, plus access to public right-of-way. A temporary construction easement is suggested.

e. AMAFCA will assume no responsibility, liability or maintenance for any of the interim features discussed herein prior to the time AMAFCA awards its construction contract. HREC and your contractors will need to provide **certificates of insurance** naming AMAFCA as additional insured.

f. An interim outlet sufficient to pass existing condition flows (600 cfs) shall be provided at Wyoming Boulevard and must be approved by AMAFCA and City Hydrology.

g. Depending on timing of development adjacent to the channel, no temporary construction easement (TCE) along the south edge of the proposed channel, will be required by AMAFCA. However, should adjacent development abutting the channel to the south be delayed, HREC will provide an additional 30 feet of TCE for channel construction access along the southern edge of the proposed channel, for as long a period as is possible.

h. A revised phased grading and drainage plan is required. An item of considerable concern is how runoff will be directed to the interim earthen channel from the graded southern sites. Will the streets and rundowns be in place? This runoff must be addressed and cannot discharge to the temporary earthen channel during its construction. It appears that temporary diversion or temporary ponding may be required as part of your development. Moreover, a grading and drainage plan for the **interim situation** (earth channel in place with adjacent grading/streets in) is required by both the COA and AMAFCA.

The conditions outlined herein do not relieve HREC of any separate requirements or

MEMBER OF CONSULTING ENGINEERS COUNCIL OF NEW MEXICO

JEFF MORTENSEN & ASSOCIATES, INC. ☐ ENGINEERS & SURVEYORS ☐ (505) 345-4250
6010-B MIDWAY PARK BLVD. N.E. ☐ ALBUQUERQUE ☐ NEW MEXICO 87109 ☐ FAX (505) 345-4254

940957
February 6, 1997

Richard H. Dourte
Transportation Development Section
City of Albuquerque
Public Works Department
600 Second Street N.W.
Plaza Del Sol - Second Floor
Albuquerque, NM 87102

2-13-97
Drainage Section Looks OK — SMC

Mr. Fred J. Aguirre
Hydrology Section
City of Albuquerque
Public Works Department
600 Second Street N.W.
Plaza Del Sol - Second Floor
Albuquerque, NM 87102

Re: Final Sign-off of Window G Sector Plan (SD-95-2, AX-95-10, Z-95-82, DRB 96-572)

Gentlemen:

Transmitted herewith is a copy of the Addendum to Window G Sector Development Plan. I am transmitting the Master Sign-off Sheet to Richard for signature and forwarding to Fred for signature. We will then obtain sign-off from Kym Dicome and will insert a copy of the sign-off sheet and the Addendum into each of the previously printed Sector Plans. Upon completion of your review and signature on the sign-off sheet, please contact our office for pick-up.

Your assistance in this matter has been greatly appreciated. If you should have any questions or comments regarding this information, or if we can be of further assistance to you, please do not hesitate to call.

Sincerely,

JEFF MORTENSEN & ASSOCIATES, INC.

Charles G. Cala, Jr., P.S.
Vice-President

CGC:dsj
Enclosures

Jeffrey G. Mortensen, P.E. **Juan M. Cala** **Charles G. Cala, Jr., P.S.**

INTER OFFICE

MEMO

To: Board of Directors
From: Larry A. Blair, P.E.
Subject: North Domingo Baca / Window G
Date: December 6, 1996

1. Background

   a. In 1992, AMAFCA adopted the recommendations in the North and South Domingo Baca Arroyos and Paseo Del Norte Corridor Drainage Management Plan, one of which was construction of a "soil cement (partial or full lining) or concrete channel along Carmel and Anaheim Avenues from Ventura Street to Louisiana Boulevard -- Private Cost"

   b. In its adopting Resolution (1992-3), the board specifically stated:

> "b. Modifications to the adopted plan may be made as circumstances dictate, but shall be approved by the AMAFCA Board of Directors.
>
> c. final decisions regarding arroyo treatments shall be made in accord with existing and future plans such as the Facility Plan for Arroyos, the Bikeways Master Plan, and the Trails Facility plan.
>
> d. Financing and scheduling of improvements are subject to availability of funds by public agencies, and to initiatives by the private sector."

   c. Between 1990 and 1993, an Agreement was negotiated with Presley Homes whereby Presley would line a portion of the north bank of the arroyo between Wyoming and Barstow to protect the Nor Este Manor Subdivision, and AMAFCA would maintain the structure (which was completed in 1994). It was anticipated that the soil cement protection would be incorporated into future full channel treatment.

   d. In 1994, the Window G Sector Development Plan was started, which envisioned channelization of the arroyo between Wyoming and Barstow (see attached map).

   e. AMAFCA added this project to its project schedule in 1995 (project number 60 - North Domingo Baca Channel - Wyoming to Barstow; estimated cost $2,000,000; cost shared with landowners).

   f. In September 1995, Mr. Don Hoech briefed the Board on the Window G Sector plan, and requested AMAFCA participation in construction of the channel. No commitments were made.

g. On May 6, 1996, the Window G Sector Plan was approved by the City Council. Extracts of that plan related to the arroyo are attached.

h. In August, 1996, the board visited the site on tour.

2. Current Situation

a. Flow: 360 cfs existing
2,030 cfs developed from 2,000 acres offsite and 220 cfs from 35 acres onsite.

b. Proposed improvements:
Soil cement fully lined channel; 24 foot bottom width; 6 foot deep; 1:1 stepped side slopes; 27 foot access road/trail on south side. Total channel length 2,700 feet.

c. Estimated costs:

Channel Construction	$800,000
ROW	$240,000
Design and Surveys	$100,000
Construction Engineering	$64,000
	$1,204,000
Contingency (10%)	$120,000
	$1,324,000

3. Proposal:
a. 50/50 Cost Share with AMAFCA, with construction to commence early fall of 1997

b. AMAFCA is contracting agency, and maintains the completed channel.

4. Mr. Hoech and his engineer, Jeff Mortensen, will be present to brief the Board and answer questions.

ANAHEIM AVENUE

70' Right-of-Way

NORTH

DOMINGO

BACA

ARROYO

PROPOSED

DRAINAGE

CHANNEL

APARTMENT/MULTI FAMILY
(20 du/ac)
±17.0 ac
340 du

TOWNHOUSE SINGLE FAMILY
(12 du ac)
±16.2 ac
195 du

WYOMING BLVD

BARSTOW ST

CITY REBERVOIR
±3.5 ac

SU-1 OFFICE AND PLANT NURSERY
±4.0 ac Plant Nursery Only

PASEO DEL NORTE

LAND USE DATA

Land Use	Acres
Townhouse Single Family (12 du ac)	± 16.2
Apartment Multi Family (20 du/ac)	± 17.0
SU-1 Office and Plant Nursery	± 11.5
Shopping Center	± 28.0
City Reservoir	± 3.5
Roadways	3.3
Drainage Easement Area	2.5
TOTAL	± 82.0

SECTOR PLAN BOUNDARY

NORTH 50 0 100 200 400 FEET

WINDOW G SECTOR PLAN
CONCEPTUAL LAND USE PLAN

Prepared for
HOECH REALTY, INC
September 1995

Prepared by
CONSENSUS PLANNING, INC.
and
ZEPHYR DESIGN, INC

CITY OF
Albuquerque
Public Works Department

February 5, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

J. Graeme Means
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, New Mexico

RE: MASTER DRAINAGE PLAN FOR WINDOW "G", (C19/D11) SUBMITTED FOR PRELIMINARY PLAT AND SECTOR PLAN APPROVAL, ENGINEER'S STAMP DATE 1/9/97.

Dear Mr. Means:

The above referenced Master Drainage Plan for Window "G," submitted on January 13, 1997, is acceptable for Sector Plan Approval. The Addendum to the Sector Plan (DRB-96-572) that was submitted by Jeff Mortensen on January 22, 1997 is acceptable for sign-off by Hydrology.

It is my understanding that there is a phasing plan associated with the Window "G" development and the agreement with AMAFCA which must accompany this master plan. Please provide a copy of the phasing plan that was approved by AMAFCA to my office.

With respect to the Preliminary Plat (DRB- 96-546), the above referenced plan is acceptable for Preliminary Plat approval. Please provide a copy of the proposed Plat for my files. Attached is a copy of my mark up of the proposed Infrastructure List. It appears that interim improvements may be required on the east side of La Cueva Village, Units 1 and 2, to divert existing off-site flows. This must be addressed on the site specific grading and drainage plans which are required for each of these sites.

If you have any questions regarding this letter, please call me at 924-3982.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Kurt Browning, AMAFCA
Don Hoech, Hoech Real Estate
File

DRAINAGE INFORMATION SHEET

940956

PROJECT TITLE: WINDOW G ZONE ATLAS/DRNG. FILE #: C-19/D11

DRB #: 96-546/96-572 EPC #: AX-95-10. SD-95-2, Z-95-82 WORK ORDER #:

LEGAL DESCRIPTION: LOTS 1-7, 22-32, BLOCK 18; LOTS 1-32, BLOCKS 19 & 20, N.A.A., TRACT 2, UNIT 3

CITY ADDRESS: WYOMING, BARSTOW, CARMEL, HOLLY, PASEO DEL NORTE N.E.

ENGINEERING FIRM: JMA CONTACT: GRAEME MEANS

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

AGENT
~~OWNER~~: HOECH REAL ESTATE CONTACT: DON HOECH

ADDRESS: _____ PHONE: 821 4440

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: JMA CONTACT: CHUCK CALA

ADDRESS: _____ PHONE: 345-4250

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

__ __ DRAINAGE REPORT
____ DRAINAGE PLAN
____ CONCEPTUAL GRADING & DRAINAGE PLAN
____ GRADING PLAN
____ EROSION CONTROL PLAN
____ ENGINEER'S CERTIFICATION
__X__ OTHER MASTER DRAINAGE PLAN

PRE-DESIGN MEETING:

____ YES
__X__ NO
____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL for qua.
__X__ PRELIMINARY PLAT APPROVAL
____ S. DEV. PLAN FOR SUB'D. APPROVAL
____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
__X__ SECTOR PLAN APPROVAL
____ FINAL PLAT APPROVAL
____ FOUNDATION PERMIT APPROVAL
____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY APPROVAL
____ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ S.A.D. DRAINAGE REPORT
____ DRAINAGE REQUIREMENTS
__X__ OTHER G.O.M.P. (SPECIFY)

DATE SUBMITTED: 01/09/97

BY: J. GRAEME MEANS

XC: DON HOECH
AMAFCA

received
1-13-97

JEFF MORTENSEN & ASSOCIATES, INC.

☐ 6010-B MIDWAY PARK BLVD. N.E.
☐ ALBUQUERQUE ☐ NEW MEXICO 87109
☐ ENGINEERS ☐ SURVEYORS (505) 345-4250
FAX 345-4254

TRANSMITTAL

VIA: ☒ DELIVERY ☐ PICKUP ☐ FAX

TO: PUBLIC WORKS DEPT. ONE STOP	DATE: 01/22/97
	PROJECT: WINDOW G'
	JOB NO: 940957
ATTN: SUE CALONGNE & RICHARD DOURTE	
RE: SECTOR PLAN	ADDENDUM

WE ARE SENDING:

QTY.	DESCRIPTION	FOR
1	DRAFT COPY	REVIEW
1	COMMENTS	RICHARD

REMARKS: LET ME KNOW IF THIS IS OK.

XC: DON HOECH

BY:

RECEIVED: DATE:

ADDENDUM TO WINDOW G SECTOR DEVELOPMENT PLAN

JANUARY 20, 1997

1. **DELETE** the Section titled "Street Network" (page 15) in its entirety and **REPLACE** with the following:

Street Network

The Window G Plan area is well served by the surrounding street network. Window G is bordered to the south by Paseo del Norte which is designated by the Long Range Major Street Plan as a limited access arterial facility. Currently, Paseo del Norte is a two lane facility with a dirt shoulder. Its designation as a limited access facility has resulted in the preparation of plans to widen its right-of-way **to a width generally greater than 200 feet** and design a six-lane divided facility between Interstate 25 and Tramway. Access onto Paseo del Norte from Window G will be limited to the intersections of Wyoming Boulevard and Barstow Street. A service road between Barstow and the City reservoir site to the west may be included on the north side of Paseo del Norte to provide access to **those lots which front directly onto Paseo del Norte.**

To the east is Barstow Street, which has been designated a collector street to service the residential areas of North Albuquerque Acres. It has a right-of-way of **80** feet. Wyoming Boulevard is the western boundary of the Sector Plan area and is designated as a principal arterial with a 156 foot right-of-way.

A Traffic Impact Study (TIS) will be completed prior to submittal of any development within the Plan area, with the exception of the single family/townhome parcel under the condition that if the single family/townhome site develops with detached units at less than 150 units total, then the TIS may be deferred.

2. **DELETE** the Section titled "Transportation" (pages 30 and 31) and **REPLACE** with the following:

Transportation

The Window G Sector Development Plan is consistent with the Long Range Major Street Plan and the Trails and Bikeways Facility Plan.

Paseo del Norte east of Interstate 25 is **a** principal arterial facility intended to serve development in Window G. It is classified as a limited access arterial with a future **right-of-way of variable width which is generally greater than 200 feet wide;** plans are currently being prepared to widen this facility. Wyoming Boulevard is a principal arterial

with a required 156 foot right-of-way. Barstow Street is a collector requiring **80** feet of right-of-way and access will also be restricted once Paseo del Norte is reconstructed.

Paseo del Norte **is** located to the south of Window G. **That portion of Paseo del Norte from Interstate 25 to a point approximately 200 feet east of Wyoming Boulevard is programmed to be constructed by the City of Albuquerque. The remainder of Paseo del Norte east of that point is programmed to be constructed by the County of Bernalillo.** Wyoming Boulevard will be largely developed by private developers. As Window G develops, this roadway will be constructed with half-width paving. The half-width paving will consist of the northbound lanes of this principal arterial. The east curbline and the east side of the median curb will define the limits of the half-width paving. The paving section will be **designed in accordance with DPM standards**. Barstow Street will be **60'** face-to-face within an **80'** right-of-way.

Improvements to Paseo del Norte will make the area more accessible and confirm the suitability of the proposed land uses within the Plan area. The Window G Plan area will be divided roughly in half by Holly Avenue, a proposed **major local** street whose re-alignment will e curvilinear rather than straight. This realignment of the roadway is consistent with La Cueva Concept Three and other Comprehensive Plan policies.

The Carmel/Holly realignment will conform with current DPM standards. It is proposed to construct a 40' face-to-face collector street within a 60' width right-of-way. The construction of this roadway will be triggered by the actual development within this Window. Likewise, the design and construction of internal (residential) streets will be defined as a function of the specific plans for the major land use categories. Those layouts and configurations will be addressed at time of subdivision or site plan. The single family/townhome development will not be allowed direct driveway access onto Holly, although local residential street connection is allowed.

The Trails and Bikeways Facility Plan has identified two trail facilities along the boundaries of the Window G Sector Development Plan. The first is T 302 located along Wyoming Boulevard from Elena Drive to the north to Paseo del Norte to the south. The second trail proposal is identified as T 303 which would run along the North Domingo Baca Arroyo from the North Baca Dam to the east to Louisiana Boulevard to the west where a future park facility will be constructed.

Table 5 represents the Trip Generation Estimates for the proposed major land use categories. It is noted that a complete traffic analysis will be required if any part of this Window, or any of these major land use areas, proceeds to development. The development of the majority of the shopping center site and the other commercial site are dependent upon the widening of Paseo del Norte along the southern edge of the Window. Prior to the widening of Paseo del Norte, only the northern portion of the shopping center site (which lies to the north of the current Holly Avenue alignment) can reasonably develop. All parcels within Window G are required to submit site plans or subdivision plats for City approval prior to development due to their size or zoning.

Therefore, the City will have an additional opportunity for more detailed traffic analysis (if warranted) when an actual development is being proposed.

(Note: Table 5 remains intact and is not replaced or otherwise altered by this Addendum.)

3. **DELETE** the Section titled "Transportation Improvements" (pages 32 and 33) in its entirety and **REPLACE** with the following:

Transportation Improvements

The following transportation improvements will be necessary:

- A Traffic Impact Study (TIS) will be completed prior to submittal of any development within the Plan area, with the exception of the single family/townhome parcel under the following condition:

  If the single family/townhome site develops with detached units at less than 150 units total, then the TIS **may** be deferred.

- Implementation of required off-site mitigation improvements, as identified in a TIS and negotiated with the City, must be committed to and provided for prior to any subdivision or site plan approval by DRB or EPC, subject to procedural changes which may occur as a result of adoption of an impact fee ordinance, which may govern how traffic improvements are paid for in the future.

- Location and design of access points onto Wyoming and Barstow will be coordinated with the improved Paseo del Norte intersections with Wyoming and Barstow at the time of site planning.

- Replatting into bulk parcels or subdivisions within the new zone boundaries and dedication of required rights-of-way will occur prior to **platting and/or** development occurring within that portion of Window G. The only exception to this is for the plant nursery where a four acre parcel has already been created separate from the adjacent 7.5 acre office parcel.

- Construction of street improvements along adjacent streets will be required with the development of that portion of the site adjacent to and required to be serviced by the street in accordance with City ordinances governing street construction, or as identified and negotiated through a TIS.

- The proposed access to the adjacent major roadways must be configured to minimize direct impacts to the street system at the time of site planning.

4. **DELETE** the Section titled "Drainage Management" (pages 34, 35, 36 and 37) in its entirety and **REPLACE** with the following:

Drainage Management

Figure 6 shows the existing drainage conditions for Window G. As shown by this Figure, two (2) 100-year designated flood zones impact the plan area. The North Domingo Baca Arroyo enters at the northeast corner and is characterized by an AO (Depth 1) Zone. The existing offsite flow entering this flood zone from upstream is 360 cfs. The existing flow downstream at the Wyoming Boulevard N.E. crossing is 540 cfs. This hydrology was obtained from the North and South Domingo Baca Arroyos and Paseo del Norte Corridor Drainage Management Plan prepared for AMAFCA by Resource Technology, Inc, December 1991.

A tributary of the North Domingo Baca Arroyo lies along the south edge of Window G. This tributary enters with 266 cfs at Barstow Street and exists with 371 cfs at the intersection of Wyoming Boulevard and Paseo del Norte. The floodplain associated with these flows is also an AO (Depth 1) Zone. As determined from Panel 10 of 50 of the National Flood Insurance Programs, Flood Insurance Rate Map for the City of Albuquerque dated October 14, 1983. The hydrology for the existing condition was taken from the above referenced Resource Technology, Inc. report (RTI). The RTI report also identifies that the runoff from this south tributary shall be diverted to the Paseo del Norte Corridor. All runoff generated north of the existing Holly Avenue alignment shall drain to the North Domingo Baca Arroyo. All runoff generated to the south of Holly Avenue N.E. will be diverted to the Paseo del Norte Corridor.

Figure 7 shows the Proposed Drainage Improvements, in conceptual form, within Window G. Runoff associated with the North Domingo Baca Arroyo will be carried through the north portion of the planned area within a public drainage channel. A preliminary profile of this channel is shown on Figure 8. A typical channel section is shown on Figure 9. It is proposed that this channel will meet current City/AMAFCA Standards. Runoff contained within the existing 48" storm drain within Anaheim Avenue N.E. will be discharged directly into this channel. This will eliminate a portion of the runoff which currently enters an existing pond which lies outside of the window and north of the planned area. This small diversion will eliminate the presence of a public storm drain on private property. This will make the system more accessible to the City and/or AMAFCA.

It is also proposed to connect the discharge from the Vineyard Estates Detention Pond **(also known as the Northeast Heights Middle School)** into the channel just west of its connection at Barstow Street N.E. That storm drain currently discharges to the arroyo.

The City may participate in the costs of crossing structures at both Wyoming Boulevard N.E. and Barstow Street N.E. It is standard City policy to construct all arroyo crossing structures, **however, if the project(s) has not been programmed and**

funded, the construction cost will be borne by private development to the extents provided for and allowed by the Drainage Ordinance. The channel between those structures will be developer sponsored as indicated by the RTI report and as further indicated by AMAFCA during pre-application meetings.

Runoff generated by the two residential areas, Basin A and Basin B, will be discharged directly to the proposed drainage channel. At this time, it is anticipated that surface flows will be introduced via side inlets. Runoff generated by the northerly portion of the shopping center site, Basin C, will be discharged at its northwest corner. A public storm drain system is proposed within Wyoming Boulevard to accept this runoff and convey same to the improved arroyo. Runoff generated by Basins D, E, and F, which lie south of the Holly Avenue Divide, will discharge to the Paseo del Norte Corridor. In view of this, the development of those basins will be dependent upon the construction of the Paseo del Norte Improvements. The Basins A, B, and C are dependent upon the construction of the North Domingo Baca Channel Improvements.

As referenced above, crossing structures will be constructed **in conjunction with development as required at the Development Review Board (DRB).** Diverting the runoff carried by the arroyo to the AMAFCA/Louisiana Dam will require coordination with both AMAFCA and City parks. A City park site will lie immediately west of the site on the west side of Wyoming Boulevard N.E. Final plans for the development of the park site are not available, however, it is anticipated a park will be developed on that site at a later date. Because of this, the diversion should be temporary in nature so as to allow maximum flexibility in the design and construction of the City Park Improvements. Pre-application meetings indicate that this is an acceptable concept to follow. It should be stressed that this diversion will require close coordination with both AMAFCA and City parks.

A Trainer Facility, or an extension of the channel outside of the Window, is proposed upstream from Barstow Street N.E. **as a future project(s)**. In either case, coordination with the upstream property owners will be required. It is further proposed to place the channel within the Carmel Avenue alignment east of Barstow Street N.E. This is consistent with preliminary plans previously prepared and presented in conjunction with Vineyard Estates, Unit 4, which lies upstream of this site. This is also consistent with plans by the Albuquerque Public Schools for developing a middle school site at the northeast corner of Barstow Street N.E. and Carmel Avenue N.E. Once again, close coordination with the upstream property owners will be required for these future projects which are not part of this Sector Plan.

The design flow for the channel has been selected as 2,650 cfs as taken from the RTI Report. The Table from which Peak Discharges in the developed (future) conditions at critical locations has been reprinted as part of Figure 9. Figure 9 also includes Channel Hydraulics Calculations and an Analysis of Channel Freeboard. These calculations are presented in support of the typical channel section illustrated as part of Figure 9.

All figures appear in Chapter 4. Drainage Calculations for both the existing and developed conditions are found in Chapter 5. The Drainage Calculations have been prepared in accordance with the procedure for forty-acre and smaller basins set forth in the revision of Section 22.2, Hydrology, of the Development Process Manual, Volume 2, Design Criteria, date January 1993. As shown be these calculations, proposed improvements will result in an increase in runoff. The increases are within the limits identified by the RTI Peak Discharge Rates. In view of this, the free discharge of runoff from this site is appropriate. As stated above, Basins A, B, and C will discharge to the North Domingo Baca Arroyo. Basins D, E, and F will discharge to the Paseo del Norte Corridor.

5. **CLARIFICATION:**

FIGURES 8 and 9, which appear at the back of the Sector Plan, illustrates concepts for the design of a public drainage channel between Wyoming Boulevard N.E. and Barstow Street N.E. Final alignment, grade, cross-section and material are subject to adjustment and/or modification with concurrence/approval of the governmental agencies having jurisdiction.

CITY OF
Albuquerque

December 26, 1996

Martin J. Chávez, Mayor

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, New Mexico

RE: MASTER DRAINAGE PLAN FOR WINDOW "G", (C19/D11) SUBMITTED FOR PRELIMINARY PLAT AND SECTOR PLAN APPROVAL, ENGINEER'S STAMP DATE 12/13/96.

Dear Mr. Mortensen:

Prior to approval of the above referenced Master Drainage Plan for Window "G" the following comments must be addressed:

1. The report references the RTI plan for the North and South Domingo Baca Arroyo. Please provide a copy of the RTI basin map to show how your basin boundaries compare with those in the RTI study.

2. How many dwelling units per acre (du/acre) were assumed in the RTI study for the fully developed condition? How many du/acre is the Window "G" development proposing? The amount of discharge from Window "G" must be in compliance with the RTI plan.

3. The report states that the development of Tract A requires the construction of the bridge on Wyoming. Since the channel crosses Wyoming, the bridge must be constructed with the channel. Please revise this.

4. Side inlets to the channel should be provided for the drainage of Window "G" at the time of construction of the channel. These should be shown on the construction drawings. Will inlets be provided for any existing developments to the north of the channel?

5. With respect to the floodplain in the southern portion of Window "G", your plan indicates that seven Lots are to be platted in La Cueva Village Unit 1 within the FEMA floodplain. This floodplain will not be removed until the Paseo del Norte storm drain is complete, therefore, the limits of this floodplain must be shown on the Plat. The owners who purchase these lots should be made aware that flood insurance will be required until the map is revised.

6. In the Master plan, show the limits of the City's and County's portions of the Paseo Del Norte projects, if the boundary is adjacent to the site. Also, show the limits of the future right-of-way extensions. Will connections be provided in the storm drain for the development of Window "G"?

7. The Ultimate conditions plan shows a 42" storm drain stub on Wyoming. What is this stub designed to accept? It appears that this storm drain may be used to drain a portion of Tract C.

8. The high velocities of the runoff in the channel must be decreased downstream of Wyoming. The outlet structure must be designed at this time. AMAFCA and City Parks approval must be obtained for any proposed outlet structure from the channel.

9. It is difficult to tell from sheet 5 of the Master plan whether the water is contained within the cross-sections in the HEC-RAS run. Please provide more information. Also, extend the sections further upstream to demonstrate how the water crosses over Barstow.

10. On sheet 7 of the Master plan, the storm drain inlets shown in detail 1 must be designed for two times the 100-year flow. Capacity calculations will be required prior to approval of La Cueva Village Unit 1.

With respect to the Window "G" Sector Plan, City Hydrology will not sign-off on this document until the following revisions have been made:

11. The Sector plan states that the City will construct the crossing structures at Wyoming and Barstow. The statements on pages 35 and 36 must be revised. The ordinance states that the City may participate in the costs of these crossing structures provided that such construction is consistent with Capital Improvements Program priorities. Only after the project has been programmed and funded may the City may participate.

12. Page 35 references the Vineyard Estates Detention Pond. Where is this pond located? (Is this the one on the school site?)

13. The Trainer Facility referenced on page 36 should be identified as a future project since it is not located within Window "G" and, therefore, is not a part of this Sector plan.

If you should have any questions, please call me at 768-2666.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Kurt Browning, AMAFCA
=file

DRAINAGE INFORMATION SHEET

940956

PROJECT TITLE: WINDOW 6 ZONE ATLAS/DRNG. FILE #: C-19/D11

DRB #: 96-546 / 96-572 EPC #: SD-95-2, Z-95-82 AX-95-10. WORK ORDER #:

LEGAL DESCRIPTION: LOTS 1-7, 22-32, BLOCK 18; LOTS 1-32, BLOCKS 19 & 20, N.A.A. TRACT 2, UNIT 3

CITY ADDRESS: WYOMING, BARSTOW, CARMEL, HOLLY, PASEO DEL NORTE N.E.

ENGINEERING FIRM: JMA CONTACT: GRAEME MEANS

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

AGENT
~~OWNER~~: HOECH REAL ESTATE CONTACT: DON HOECH

ADDRESS: _____ PHONE: 821 4440

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: JMA CONTACT: CHUCK CALA

ADDRESS: _____ PHONE: 345-4250

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

__ DRAINAGE REPORT
____ DRAINAGE PLAN
____ CONCEPTUAL GRADING & DRAINAGE PLAN
____ GRADING PLAN
____ EROSION CONTROL PLAN
____ ENGINEER'S CERTIFICATION
X OTHER MASTER DRAINAGE PLAN

PRE-DESIGN MEETING:

____ YES
X NO
____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL
X PRELIMINARY PLAT APPROVAL
____ S. DEV. PLAN FOR SUB'D. APPROVAL
____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
X SECTOR PLAN APPROVAL
____ FINAL PLAT APPROVAL
____ FOUNDATION PERMIT APPROVAL
____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY APPROVAL
____ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ S.A.D. DRAINAGE REPORT
____ DRAINAGE REQUIREMENTS
[redacted] OTHER [redacted] (SPECIFY)

DEC 6

DATE SUBMITTED: 12/13/96

BY: J. GRAEME MEANS

XC: DON HOECH
AMAFCA

A MEMBER OF CONSULTING ENGINEERS COUNCIL OF NEW MEXICO

JEFF MORTENSEN & ASSOCIATES, INC. ☐ ENGINEERS & SURVEYORS ☐ (505) 345-4250
6010-B MIDWAY PARK BLVD. N.E. ☐ ALBUQUERQUE ☐ NEW MEXICO 87109 ☐ FAX (505) 345-4254

940956
December 9, 1996

Mr. Donald G. Hoech
Hoech Real Estate Corporation
6729 Academy N.E. Suite B
Albuquerque, NM 87109

Re: Window G

Dear Don:

On the afternoon of December 04, 1996, a coordination meeting was conducted for the above referenced project. In attendance were Mr. Fred Aguirre, City Hydrology Section, Ms. Susan Calongne, City/County Floodplain Administrator, Mr. Kurt Browning, AMAFCA, Mr. J. Graeme Means, Jeff Mortensen & Associates, Inc., Jeffrey G. Mortensen, Jeff Mortensen & Associates, Inc. The purpose for the meeting was to discuss the coordination efforts relative to Window G drainage issues. The topics of discussion are summarized below.

1. Master Drainage Plan

The Master Drainage Plan is currently being prepared by Jeff Mortensen & Associates, Inc. We anticipate submittal to the City on or about December 13, 1996. The Master Drainage Plan will accomplish the following:

a. Identify proposed drainage patterns
b. Reference the channel drainage study
c. Cross-reference the CLOMR submittal
d. Quantify existing and developed runoff for the site.
e. Identify required infrastructure for the development of the Window.
f. Identify timeframes and responsibilities for the construction of that infrastructure

Approval of the Master Drainage Plan will be required by Mr. Aguirre as a condition for Sector Plan sign-off at the DRB.

2. Timing

Mr. Browning was concerned as to the timing of three major construction activities were identified. The first is the channel. The second is the apartment project and the third is the proposed subdivision. Mr. Browning is concerned with having the apartments and/or the subdivision begin construction prior to substantial completion of the drainage channel. His main concern revolves around potential damage to the construction of the apartments

and/or subdivision if a significant rainfall event occurs during the construction of the channel and the flows associated with that event are not contained within the channel right-of-way. In response, a phasing report will be required. The phasing report will identify when the apartments can start and when the subdivision can start. Key ingredients to the Phasing Plan are:

a. Rough grading activities
b. Rainy season (June 15 - October 15)
c. Infrastructure construction
d. Foundation Permit
e. Building Permit

3. Timeline

Mr. Aguirre inquired as to the timing of the overall process. The overall process includes Bulk Land approval, Preliminary Plat approval, Grading Plan approval, Sector Plan approval, Infrastructure List approval, Master Drainage Plan approval, Subdivision Improvements Agreement approval, AMAFCA Agreement approval. I will prepare a timeline for Mr. Aguirre so that he may have a better feel for the overall schedule of the project.

4. Final Plat Requirements

Final Plat approval is conditioned upon completion of the following items:

a. AMAFCA Agreement
b. CLOMR
c. Subdivision Improvements Agreement
d. Financial Guarantees

Discussion was initiated regarding financial guarantees. Of the above items, most are self-explanatory. The financial guarantees, however, were a topic of brief discussion. The question was raised as to how the channel would be financially guaranteed. In particular, it was expressed that City Legal may not accept the "pending voter approval" clause in the AMAFCA Agreement. If this is the case, then Hoech Real Estate Corporation may need to financially guarantee the entire channel.

5. AMAFCA Briefing

The mailout for the next AMAFCA Board Meeting is Friday, December 06, 1996. It is not anticipated that the Agreement will be presented as AMAFCA staff is still reviewing the Agreement. The Board will be updated on the status of the project. Questions have been raised by AMAFCA staff relative to the Agreement which will require coordination between Hoech Real Estate Corporation and AMAFCA.

6. Bridge

It was discussed that the Wyoming Crossing Structure (bridge) should be constructed concurrent with the Channel. Coordination will be best if the bridge is included in the AMAFCA construction contract so that a single contractor may build both facilities. Mr. Browning was clear that AMAFCA would not participate in the cost of that facility, however, suggested that it be included with the channel as a practical matter. All parties agreed in concept.

7. Annexation

Ms. Calongne inquired as to whether or not Window G had been annexed. It was discussed that annexation becomes final upon approval of Council. Recognizing that those steps have been completed, I indicated to Ms. Calongne that we would provide her with copies of the final Council action for her files. Whether or not Window G lies within the City or the County jurisdictions is pertinent to the CLOMR review.

I believe that the above summarizes the discussions which occurred during the coordination meeting. Overall, the spirit of the meeting was highly cooperative and an information-sharing session. I believe that many of the questions will be answered by the Master Drainage Plan.

If you should have any questions or comments concerning this recap, or any other aspects of the project, please do not hesitate to call.

Sincerely,

JEFF MORTENSEN & ASSOCIATES, INC.

Jeffrey G. Mortensen, P.E.
President

JGM:dsj
xc: Fred Aguirre
Susan Calongne
Kurt Browning
J. Graeme Means

FAX TRANSMISSION

AMAFCA

2600 PROSPECT, NE
ALBUQUERQUE, NM 87107
(505) 884-2215
FAX: (505) 884-0214

To: SUE CALONGNE Date: 12-5-96

Fax #: HYD Pages: 2, including this cover sheet.

From: KB

Subject: WINDOW 'G'

COMMENTS:

See comments attached - Sorry they are "chicken scratch" but I knew they want a response - Your comments are good. Also - please include as a name @ top i.e. "Comments on CLOMR from FPA AMAFCA" - the comments @ the bottom refer to the const. plans but A would like to get them in the letter. Thanks.

P.S. n = .035 +/- what is their input?

Lee — please include our name @ bot of your letter

Window "G" CLOSURE

— Need Blockade log/fig. Six Chute Wildfire Rest

— add. transport analysis required; unlined area above Barstow, Hwy 58 use RT; - need analysis through transition and channel - no "endorsement" until add. analysis included.

— Removal of outlet structure by Parks will be required.

— How big are the side flows entering the channel and are they significant? Must be addressed.

— Plan set output HEC-RAS is done for 1130 cfs and 2250 cfs. (Plan error)

— Need to address Bridge (clear span, eng Rpt?)

— As to not confuse FEMA; there should be a short narrative explaining that Hoch Real Estate in any/all (closure, design, etc.) and ANFCA will own, operate and maintain upon completion

the ϕ is missing in the n' for the #'s address!!

** — Per guide - SC steps n=.035 ± SC plating =.022 ± ⟹ plans and submittal don't match!

Comments on const. plans forth coming — a few...

- utility / Bridge issues to be addressed.
- channel inlets / connections
- survey alignment for construction
- Rock/TCE's show on plans

etc.

— estimate for const. is being reviewed by ANFCA.

If they use!! + HEC-RAS I/P will show this

Window G - CLOMR

1. Status of the Annexation?
2. need check for $ 3100.00 * Compare to RTI's
3. Velocities are about 25 ft/sec - how does this compare w/ existing velocity? - what treatment will be used downstream?
4. Show upstream and downstream how channel ties into existing FEMA floodplain -
5. Sediment transport was not addressed - should reference RTI report on sed. provided in dam CLOMR submittal
6. Reference FEMA Case # for dam CLOMR - also reference PDN CLOMR
7. Bridge on Wyoming - must be designed as clear span or will have to be modeled / analyzed
8. n values .35 and .25 for Soil Cement?
9. Outlet structure proposed?

12-4-96

Sector Plan - DRB submittal

Master dev plan for window G

Bridge party Channel planset (2 lanes unless TIS requires more)

defers infrastructure & timing

Site specific g & d's for units 1 & 2, Tract A

Unit 2 - dev. easement for channel entrance

final plat after CLOMR - and AMAFCA agreement & SIA

then will build per AMAFCA agreement

Annexed into City - Jeff has documents

DRAINAGE INFORMATION SHEET

PROJECT TITLE: WINDOW "G" SOIL CEMENT ~~CHANNEL~~ ZONE ATLAS/DRNG. FILE #: C19/D11

DRB #: 96-546 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: TRACTS A-D ... "G"

CITY ADDRESS: _____

- Status of Annexation?

ENGINEERING _____ CONTACT: GRAEME MEANS

ADDRESS: - new fees - $ 3100.00 PHONE: 345-4250

AGENT OWNER: HOE - AHYMO user's manual?

CONTACT: DON HOECH

ADDRESS: - city DPM?

PHONE: 8214440

ARCHITECT: CON - Vel = 25 ft/sec - how do you slow it down?

CONTACT: _____

ADDRESS: _ - sediment transport

PHONE: _____

SURVEYOR: SU

CONTACT: CHUCK GALA

ADDRESS: _____

PHONE: 345 4250

CONTRACTOR: NOT SELECTED

CONTACT: _____

ADDRESS: _____

PHONE: _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPC

____ DRAINAGE PLAN

____ CONCEPTUAL GR

____ GRADING PLAN

____ EROSION CONTRC

____ ENGINEER'S CEF

X OTHER C.L.O

Velocities

- Reference FEMA Case #'s for NDB and Paseo LOMR's
- Bridge on Wyoming must be clear span or analyze
- n values .35 & .25?
- outlet structure proposed? how do you slow it down?

PRE-DESIGN MEETING:

X YES

____ NO

____ COPY PROVIDED

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

X OTHER GEOMET (SPECIFY)

RECEIVED
NOV 25 1996
HYDROLOGY SECT.

DATE SUBMITTED: 11/22/96

BY: T. GRAEME MEANS

XC: DON HOECH

A MEMBER OF CONSULTING
ENGINEERS COUNCIL OF NEW MEXICO

JEFF MORTENSEN & ASSOCIATES, INC. ☐ ENGINEERS & SURVEYORS ☐ (505) 345-4250
6010-B MIDWAY PARK BLVD. N.E. ☐ ALBUQUERQUE ☐ NEW MEXICO 87109 ☐ FAX (505) 345-4254

940951
November 22, 1996

Mr. Kurt Browning
AMAFCA
2600 Prospect Avenue NE
Albuquerque, NM 87107

Re: C.L.O.M.R. for Window "G"

Dear Kurt:

Transmitted herewith is one (1) copy of our C.L.O.M.R. submittal for the Window "G" Soil Cement Channel, and two (2) additional plan sets of the Soil Cement Channel Study. We request your review of the Plan Set and C.L.O.M.R. submittal for the purposes of: 1) obtaining an AMAFCA endorsement letter for F.E.M.A., 2) obtaining comments which may affect the channel construction drawings, and 3) obtaining AMAFCA approval of the construction estimate for use in the Cost-Sharing Agreement.

If you should have any questions or comments regarding this information, or if we can be of further assistance to you, please do not hesitate to call.

Sincerely,

JEFF MORTENSEN & ASSOCIATES, INC.

J. Graeme Means, E.I.T.

JGM:dsj
Enclosures
xc: Don Hoech
Susan Calongne

RECEIVED
NOV 25 1996
HYDROLOGY

Jeffrey G. Mortensen, P.E. **Juan M. Cala** **Charles G. Cala, Jr., P.S.**

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO
INTER-OFFICE CORRESPONDENCE

November 19, 1996

To: Fred Aguire, Hydrology, PWD
Loren Hines, Real Property, Legal Dept.

From: Sandy Zuschlag, Manager, Design and Development/CIP

Re: **North Domingo Baca Park**

Attached is a sketch I received from Jeff Mortenson and Don Hoeck about locating a rip rap drainage structure on City property. Please review the sketch and let me know what your thoughts are about the structure. Specifically, if you could advise me concerning the following:

Hydrology:

1. Who would maintain it?
2. This area of the park is encumbered by flood plains; is the improvement an asset or liability to the city?
3. Is the structure appropriate considering the drainage problem?
4. What, if any, compensation should the city receive for such a structure being placed on city property?

Real Property

1. What, if any, compensation should the city receive for such a structure being placed on city property?

Please get back to me as soon as possible, since I need to respond to Mr. Hoeck and Jeff Mortenson

cc: Don Hoeck, Hoeck Real Estate Corporation
Jeff Mortenson, JMA
Larry Blair/Kurt Browning, AMAFCA
Ed Stang/Colleen Frenz
Dan Hogan, Hydrology, PWD
Ted Pearson, Legal Dept.
d&d/project folder/parks/north Domingo/drainage structure

96'
24'
72'
8'
56'
8'
SOUTH ROW. ANAHEIM AVE N.E.
(60' R.O.W.)
Soil Cement Channel
79°
71°
75°
2:1
3
1
Q100=1130 c.f.s. (Interim)
D = 24'±
9'
56'
9'
20'
ULTIMATE WEST R.O.W.
WYOMING BLVD NE
(156' ULT. R.O.W.)
RIP RAP BASIN SIMILAR TO FIGURE XI-1, U.S. Department of Transportation Hydraulic Engineering Circular No. 14.
dia 6 PIPE?

RIP RAP BASIN DETAIL
Scale: 1" = 20'

..27+78
LD 1-30" RCP W/
) SECTIONS
E SHEET 26

1" = 100'

N

NEW 24' ROADWAY W/
4' SHOULDERS
FOR TYP. SECTION SEE SHT '26.

30+00

35+00

36

5370

5380

LIMIT OF
AMAFCA
PROPERTY

18'

5370

5380

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

FAX (505) 345-4254

FAX TRANSMITTAL

TO: Susan Calongne, Fred Aguirre, Kurt Browning

FIRM: C.O.A. Hydrology, C.O.A. Hydrology, AMAFCA

FACSIMILE NUMBER: 768-3629, 768-3629, 884-0214

FROM: GRAEME MEANS

SUBJECT: WINDOW "G"

MESSAGE: Here are Ptelim. meeting minutes. Please review and respond to any discrepancies/misunderstandings. I will wait a few days and circulate the minutes for signature.

NUMBER OF PAGES: 3 (Including this page)

If the transmission is incomplete or unclear, please notify us at once at (505) 345-4250.

RECEIVED
NOV 5
HYDROLOGY DIVISION

WINDOW "G"
PROJECT MEETING MINUTES

A meeting was held on November 01, 1996 at 2:00 p.m. to discuss the proposed development of Window "G" and of the North Domingo Baca Arroyo. In attendance were the following:

Fred Aguirre, City of Albuquerque, PWD, Hydrology Section
Susan Calongne, City/County Floodplain Administrator
Kurt Browning, AMAFCA
Don Hoech, Hoech Real Estate Corporation
Jeffrey G. Mortensen, Jeff Mortensen & Associates, Inc. (JMA)
J. Graeme Means, JMA

Discussion

1. The proposed construction consists of a soil cement channel from 20 feet west of Wyoming Boulevard N.E. to a point 330 feet west of the centerline of Barstow Street N.E. The construction of a permanent crossing structure at Wyoming Boulevard will be coordinated by Mr. Hoech with the City of Albuquerque.

2. All of the land between the Lower Domingo Baca Dam and Wyoming Boulevard is owned by either AMAFCA or City Parks Design and Development. The development of a City park in this area is several years in the future, at which time a permanent channel will be constructed to convey flows from the Wyoming crossing to the dam. Coordination with AMAFCA and City Parks will be required to determine the interim drainage requirements. AMAFCA has indicated they will maintain the interim channel.

3. A temporary wing dike structure will be constructed to accept the North Domingo Baca flows which cross Barstow Street. This structure will be located west of Barstow Street and will be designed for an interim design flow of 1130 cfs, which assumes upstream development at a density of one dwelling unit per acre.

4. A C.L.O.M.R. will be requested by JMA to relocate the North Domingo Baca floodplain to the proposed channel. Graeme Means will meet with Susan Calongne to discuss the requirement for the C.L.O.M.R. A tributary flow impacts a small portion of the proposed Tract B near Holly Avenue N.E. AMAFCA has submitted a C.L.O.M.R. to the City/County Floodplain Administrator which addressed the Paso Del Norte Corridor and removes the floodplain associated with that tributary flow. Because the AMAFCA C.L.O.M.R. addresses that floodplain, the Window "G" C.L.O.M.R. does not need to address it. The Master Drainage Plan for Window "G" will model the existing flows in that tributary. It is anticipated that those flows actually run to the south of Holly and do not impact Tract B.

5. The future alignment of the channel from Barstow Street to Ventura Street requires the concurrence of the affected property holders. This concurrence should be demonstrated via platting action.

6. The future development of Barstow Street may require a storm drain extension to the AMAFCA Channel. The potential storm drain requirements will be determined in conjunction with preliminary plat approval for the lots fronting Barstow Street. This will occur when Unit 2 of the Patio Home Lot Subdivision is developed.

If any of the discussion summaries presented above are inaccurate, or if any of the attendees have any revisions or additions to the meeting minutes, they are advised to contact J. Graeme Means at 345-4250.

Sincerely,

JEFF MORTENSEN & ASSOCIATES, INC.

J. Graeme Means, E.I.T.

JGM:dsj
xc: Attendees

Concurrence:

Fred Aguirre

Kurt Browning

Susan Calongne

Don Hoech

11-1-96

Window 6 Wyoming - Barstow 2000 Cfs

Soil Cement Channel - ANAFCA lead (fully developed flow)

bridge on Wyoming - cost share w/ City?

Clomr/Lomr

temp inlet structure for 1 du/ac ≈ 1100 cfs

* will submit Clomr soon

TIA - Terry Brown

Barstow to Ventura next phase

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 5, 1995

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, New Mexico

RE: CONCEPTUAL GRADING AND DRAINAGE PLAN FOR WINDOW 'G' (C19/D11) SUBMITTED FOR SECTOR PLAN APPROVAL, ENGINEER'S STAMP DATED 5/31/95.

Dear Mr. Mortensen:

The above referenced plan was reviewed under the assumption that this area will be annexed into the City. Prior to Sector Plan approval the following issues must be resolved:

1. The plan states that runoff from the south tributary (floodplain) will be diverted to the Paseo del Norte Corridor. What is the status of this project? Is the City or the County responsible for this project adjacent to the site? Does the annexation of Window G have any effect on this project?

2. Will a Letter of Map Revision (LOMR) be obtained to remove the south tributary floodplain? Who will request this LOMR? The development of Basins D, E, and F depend on the removal of this floodplain. Until the improvements are in place, FEMA will not issue the LOMR, therefore, the floodplain will remain until construction is complete and has been certified. What storm drain systems are required in Paseo del Norte in the interim condition until the widening project is constructed?

3. Please identify the ultimate right-of-way for Paseo del Norte on your plan. Your project is responsible for building the northern half of this street. Does the developer propose to dedicate the required right-of-way for the PDN widening project?

4. You must identify the ultimate storm drain system required in Paseo del Norte on your plan. What are the proposed street grades? How do these grades tie in to the proposed development in Window G?

5. How do you propose to handle the off-site flows entering your site from the east? What are the proposed street grades in Barstow? How will the 672 cfs in the tributary be intercepted in the interim condition? How will the minor flows cross Barstow?

6. Does the developer propose to make the connections from the existing storm drains on Barstow and Wyoming into the North Domingo Baca Arroyo? Easements may be required for the connection on Barstow.

7. The plan states that the City is responsible for the construction of the crossing structures at Wyoming and Barstow. This is true only if these crossing structures have been programmed and funded. If development is to occur before the crossing structures are funded, then the developer will be responsible for the construction of these structures.

8. The trainer facility proposed to intercept the North Domingo Baca Arroyo must be designed to intercept all of the flows in the arroyo, therefore it must be as wide as the floodplain on the upstream side. The developer will be responsible for the construction of this inlet structure. The developer must also obtain the easements required for this inlet structure. It appears that this structure is proposed in the existing Carmel right-of-way, therefore concurrence from City Transportation is required.

9. What is the proposed treatment for the North Domingo Baca channel downstream of Wyoming? If this portion of the arroyo is to remain unlined, then the developer must provide a transition structure to mitigate erosion. Has the right-of-way, or an easement, been identified for this portion of the arroyo? Coordination with City Parks and AMAFCA are required.

10. What are the requirements for Wyoming Boulevard? Will flows be allowed to go over the road from Window G? The plan proposes a public storm drain system in Wyoming. If this system is required for the development of Window G, then the developer is responsible for this system. Will the existing street grades change when development occurs? Please clarify.

11. The developer proposes to construct a concrete lined channel for the North Domingo Baca Arroyo through the site. A Letter of Map Revision will be required for this channel. Will this channel be maintained by the City or AMAFCA? This channel must be within either City or AMAFCA right-of-way. This must be identified before any platting can occur.

Also, the comments from AMAFCA which were provided for the EPC hearing are enclosed. Please make sure all of these comments have been addressed. If you should have any questions, please do not hesitate to call me.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Kurt Browning, AMAFCA
File

GENEIVA MEEKER,
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LARRY A. BLAIR
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N E. - ALBUQUERQUE, N M 87107
TELEPHONE (505) 884-2215

July 3, 1995

Ms. Susan Calongne, P.E.
City/County Floodplain Administrator
Hydrology Section
Public Works Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Conceptual Drainage Plan for Window "G", Map # C-19

Dear Susan:

Per your request, Jeff Mortensen has submitted a copy of the referenced plan to AMAFCA for our review. I commend the developer for looking at the overall drainage solutions in an area where the single lot development scenario can be a problem.

We understand this drainage plan is being submitted in support of the sector plan and we agree with the overall concept. It appears timing and interim improvements need to be addressed. Most of our concerns in this area have been previously transmitted via letter or memo and I am including those documents for your information and files. **Please note the second and last paragraphs in my memo to Susan Connors dated February 17, 1995.**

Major drainage issues as we see them are:

1. What are the County plans for Paseo del Norte in this area with regard to drainage? Can the proposed system accept free discharge from the southern portion of Window G? If so, is the proposed City system large enough to accept these flows downstream?

2. Will the concrete lined channel be turned over to the City?

3. As stated in previous comments, the upstream arroyo connection at Barstow has some constraining issues. The APS site is to the north where the existing arroyo presently traverses. The south side of Carmel (east of Barstow) contains typical North Albuquerque Acres single one acre lots. The proposed crossing as indicated, makes logical long term sense, however, in the interim, how will the arroyo be captured and conveyed? The arroyo

presently crosses north of the proposed bridge location. The developer may need to move the interim improvements (wing dikes?) onto Window G property west of Barstow or purchase upstream lots. Gathering of these flows will affect the APS site as well as the County single lots. Will the single County lot owners be negatively impacted? Has the County been consulted? What are the plans for the arroyo from Barstow to Ventura with respect to the bridge as proposed? An interim plan for this crossing is needed based on a long term alignment for the arroyo, that is agreed to by all affected parties. It appears that the single lots on the south side of Carmel (east of Barstow) may be directly affected by the alignment of the arroyo as indicated with the proposed bridge crossing. Extensive easements or ROW requirements need to be addressed. Coordination with the City and County is needed.

4. Has transportation agreed to vacate Carmel as indicated in the report? Is the Carmel ROW large enough for a lined channel with maintenance roads? These issues directly affect the location of the proposed crossing at Barstow as well as single lots to the south (east of Barstow). (Quickly changing the direction of large flows such as 2000 cfs is not easy.)

5. APS is planning on moving the existing pond. Coordination with City Hydrology and APS is needed regarding the 48 inch storm drain.

6. The Wyoming crossing is very similar to the Barstow crossing. Alignment is critical with regard to interim and long term plans for this area. A temporary outfall will be required for the large discharge. Coordination with AMAFCA and Parks will be needed.

7. Who will maintain any permanent or interim facilities?

8. What pond is referenced for the 48 inch storm drain on the northwest corner of the site? This needs to be better defined. How is this system affected downstream? How will this diversion affect the proposed Wyoming storm drain?

I did not review the on site hydrology. Our concerns are from the "big picture" standpoint and what will happen in the interim until the channel alignment between Barstow and Ventura is established. Seeing that the County is to the south and the City is to the north, coordination and planning between both entities appears to be crucial.

Sincerely,
AMAFCA

Kurt Browning, P.E.
Drainage Engineer

enc/
cc Dan Hogan, COA Hydrology
Don Hoech, Hoech Realty
Colleen Frenz, COA Parks
Steve Miller, Bern. County
Roger Paul, Molzen-Corbin, Bern. County
Pat Mcmurray, APS
Richard Dourte, COA Transportation

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LARRY A. BLAIR
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N.E. - ALBUQUERQUE N.M. 87107
TELEPHONE (505) 884-2215

1/2

February 17, 1995

MEMO

TO: Susan Connors, Senior Planner
FR: Kurt Browning, AMAFCA KB

RE: Comments for EPC Case SD 95-2, Hearing date 3-16-95
Window "G" Sector Development Plan

Our concerns and comments to be included in this EPC case are as follows:

A portion of the North Domingo Baca Arroyo is located in Window "G" as indicated in the EPC submittal. Please note that the La Cueva Land Use Guide (6-88), prepared for the City of Albuquerque includes several sections on drainage and a drainage study. It is our understanding that the drainage solutions mentioned in this document are no longer valid. Is this true, and if so, how was this determined? By whom? What plan regarding this arroyo should be followed?

Our drainage management plan (completed by Resource Technology in 1992) encompassed the North and South Domingo Baca Arroyos and Paseo del Norte Corridor. However, its purpose was for overall hydrology effects and new dam locations. It did not address the North Domingo Baca Arroyo in detail, from the new Lower Baca Dam (Louisiana and Anaheim) to the existing dam (Eubank and Anaheim). Our overall drainage management plan called for a hardlined channel from the new dam upstream to Ventura, to be constructed by others. An alignment, analysis, sizing, etc. for this channel were not a part of the DMP. The only detailed drainage document for this proposed channel appears to be the La Cueva Land Use Guide.

Coordination is definitely required regarding this area. Essentially, a comprehensive plan indicating the alignment for the proposed channel (in entirety) does not exist. The channel plans from Ventura to the new dam require some continuity, in order to properly layout the facility. (assuming the drainage solutions in the La Cueva Guide are not applicable anymore.) Some items to be addressed are:

1. Effects on existing Nor Este Manor Subdivision and how the existing floodwall will be incorporated.
2. Who will maintain the proposed channel? Who will take the lead? The alignment issue needs to be addressed as it affects channel (and

development) plans upstream and downstream.

3. Gathering flows at Barstow should be addressed as well as new crossing. Will the channel at Barstow be located north of Carmel? The APS mid-school site is affected and proper APS officials should be coordinated with. (From a long range plan, it appears that a future channel alignment along the south side of Carmel is the best solution, however this may affect some North Abq Acre lot owners.) If the arroyo alignment is moved to the south side of Carmel, the APS site will not require a channel.

ANNEXED BY CITY

4. Discharge of the flows downstream to the AMAFCA dam must be carefully analyzed and mitigated. Parks has concerns here regarding design, timing, funding, etc.
5. Crossing structure at Wyoming.
6. Sediment, erosion, and hydraulic issues are pertinent especially at Barstow and Wyoming. Detailed analysis will be required once an alignment is agreed upon for the entire channel.

AMAFCA is not developing additional policy for the arroyo at this time. Several areas near the arroyo are beginning to develop and an overall "plan" for this meandering arroyo is required, especially if the City's La Cueva Land Use Guide is no longer applicable from a drainage standpoint. The new dam downstream that intercepts the runoff from this arroyo is almost complete.

cc Dan Hogan, COA Hyd.
Fred Aguirre, COA Hyd.
Don Hoech, Hoech Realty
Pat Mcmurray, APS
Colleen Frenz, COA Parks
SUSAN CALONGNE, FLOODPLAIN ADMINISTRATOR
TYLER MASON, BPLW

DRAINAGE INFORMATION SHEET

94095

PROJECT TITLE: WINDOW 'G' ZONE ATLAS/DRNG. FILE #: C19/D39

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: LOTS 1-7, 22-32, BLK 18; LOTS 1-32, BLKS 19 & 20,

CITY ADDRESS: NORTH ALBUQ. ACRES, TRACT 2

ENGINEERING FIRM: JEFF MORTENSEN & ASSOC. CONTACT: JEFF MORTENSEN

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

AGENT OWNER: HOECH REAL ESTATE CONTACT: DON HOECHT

ADDRESS: _____ PHONE: 821-4440

PLANNER ARCHITECT: CONSENSUS PLANNING CONTACT: KAREN MARCOTTE

ADDRESS: _____ PHONE: 764-9801

SURVEYOR: JEFF MORTENSEN & ASSOC CONTACT: JEFF MORTENSEN

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

___ DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION (

___ ENGINEER'

___ OTHER

PRE-DESIGN MEE

___ YES

X NO

___ COPY PROVI

Water Code
N. Domingo Baca
beyond boundary
looking upstream
Don Hebcht.
APS, Jeff M

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

___ S. DEV. PLAN FOR SUB'D. APPROVAL

___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ BUILDING PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

OTHER _____ (SPECIFY)

JUN - 6 1995

DATE SUBMITTED: 06-01-95

BY: JEFFREY G. MORTENSEN

CONCEPTUAL DRAINAGE PLAN

FOR WINDOW 'G'

NORTH ALBUQUERQUE ACRES

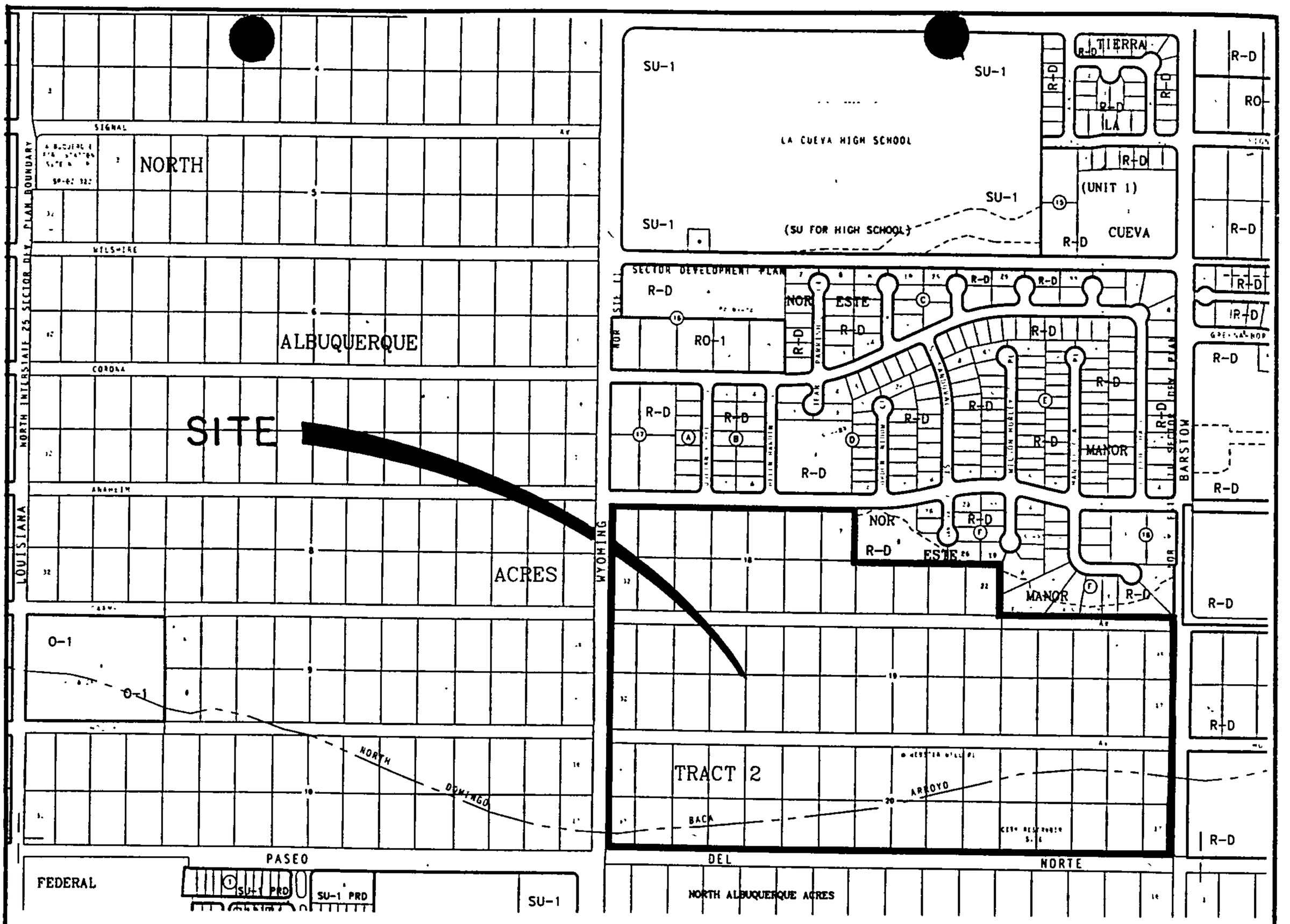
LA CUEVA LAND USE GUIDE

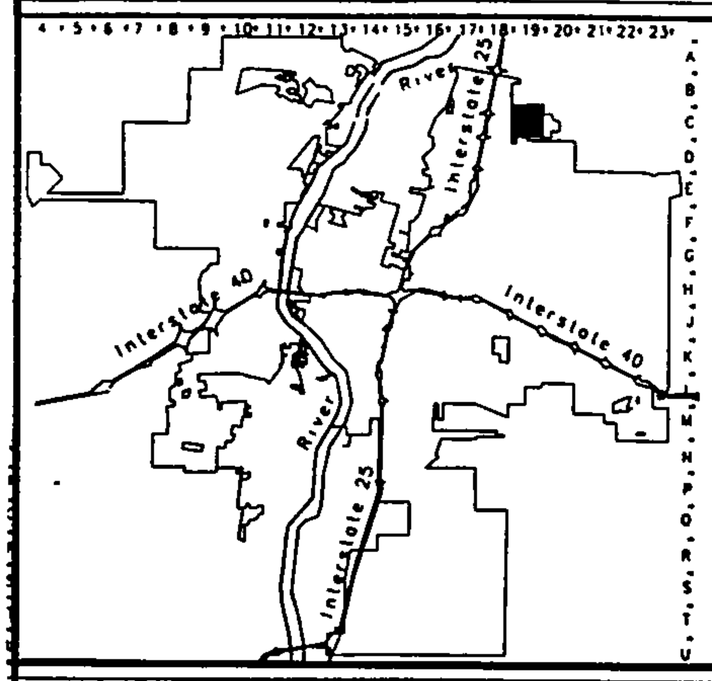
JUNE, 1995

RECEIVED
JUN - 6 1995

JEFF MORTENSEN & ASSOCIATES, INC.
☐ 6010-B MIDWAY PARK BLVD. N.E.
☐ ALBUQUERQUE ☐ NEW MEXICO 87109
☐ ENGINEERS ☐ SURVEYORS (505) 345-4250

940951





North

750 375 0 750

Scale 1" = 750'

Albuquerque Geographic Information System

City of Albuquerque

© Planning Department July 01, 1993

LEGAL DESCRIPTION

T11N

R4E

SEC 18

UNIFORM PROPERTY CODE

1-019-064

C-19-Z

LOCATION MAP

LEGAL DESCRIPTION

LOTS 1-7, 22-32, BLOCK 18;

LOTS 1-32, BLOCKS 19 AND 20;

NORTH ALBUQUERQUE ACRES, TRACT 2

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. NE
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

940951

LIST OF FIGURES

Figure	Title
1	Topographic and Floodplain Map
2-5	(Not Used)
6	Existing Drainage Conditions
7	Master Drainage Plan
8	Preliminary Channelization Profile
9	Drainage Channel Analysis

INTRODUCTION

The information which follows is intended to establish a drainage concept for the development of Window G. Window G lies within North Albuquerque Acres and is bounded on the north by Nor Este Manor, on the east by Barstow St. N.E., on the south by Paseo del Norte N.E., and on the west by Wyoming Blvd. N.E.. Development of the individual parcels and/or major land use groups will require subsequent submittal. Subsequent submittal will require a more indepth, detailed analysis and evaluation of the Drainage Criteria. This plan is intended to present drainage concepts only in support of Sector Plan Approval.

DRAINAGE MANAGEMENT

Figure 6 shows the existing drainage conditions for Window G. As shown by this Figure, two (2) 100-year designated flood zones impact the plan area. The North Domingo Baca Arroyo enters at the northeast corner and is characterized by an AO (Depth 1) Zone. The existing offsite flow entering this flood zone from upstream is 360 cfs. The existing flow downstream at the Wyoming Blvd. N.E. crossing is 540 cfs. This hydrology was obtained from the North and South Domingo Baca Arroyos and Paseo del Norte Corridor Drainage Management Plan prepared for AMAFCA by Resource Technology, Inc, December 1991.

A tributary of the North Domingo Baca Arroyo lies along the south edge of Window G. This tributary enters with 266 cfs at Barstow St. and exists with 371 cfs at the intersection of Wyoming Blvd. and Paseo del Norte. The floodplain associated with these flows is also an AO (Depth 1) Zone. As determined from Panel 10 of 50 of the National Flood Insurance Programs, Flood Insurance Rate Map for the City of Albuquerque dated October 14, 1983. The hydrology for the existing condition was taken from the above referenced Resource Technology, Inc. report (RTI). The RTI report also identifies that the runoff from this south tributary shall be diverted to the Paseo del Norte Corridor. All runoff generated north of the existing Holly Ave. alignment shall drain to the North Domingo Baca Arroyo. All runoff generated to the south of Holly Ave. N.E. will be diverted to the Paseo del Norte Corridor.

Figure 7 shows the Proposed Drainage Improvements, in conceptual form, within Window G. Runoff associated with the North Domingo Baca Arroyo will be carried through the north portion of the planned area within a concrete lined public drainage channel. A preliminary profile of this channel is shown on Figure 8. A typical channel section is shown on Figure 9. It is proposed that this channel will meet current City AMAFCA Standards. Runoff contained within the existing 48" storm drain within Anaheim Ave. N.E. will be discharged directly into this channel. This will eliminate a portion of the runoff which currently enters an existing pond which lies outside of the window and north of the planned area. This small diversion will eliminate the presence of a public storm drain on private property. This will make the system more accessible to the City and/or AMAFCA.

It is also proposed to connect the discharge from the Vineyard Estates Detention Pond into the channel just west of its connection at Barstow St. N.E. That storm drain currently discharges to the arroyo.

funded? programmed

Crossing structures at both Wyoming Blvd. N.E. and Barstow St. N.E. will be constructed by the City. It is standard City policy to construct all arroyo crossing structures. The channel between those structures will be developer sponsored as indicated by the RTI report and as further indicated by AMAFCA during pre-application meetings.

channel w/in City or AMAFCA ROW

Runoff generated by the two residential areas, Basin A and Basin B, will be discharged directly to the proposed drainage channel. At this time, it is anticipated that surface flows will be introduced via side inlets. Runoff generated by the northerly portion of the shopping center site, Basin C, will be discharged at its northwest corner. A public storm drain system is proposed within Wyoming Blvd. to accept this runoff and convey same to the improved arroyo. Runoff generated by Basins D, E, and F, which lie south of the Holly Ave. Divide, will discharge to the Paseo del Norte Corridor. In view of this, the development of those basins will be dependent upon the construction of the Paseo del Norte Improvements. The Basins A, B, and C are dependent upon the construction of the North Domingo Baca Channel Improvements.

As referenced above, crossing structures will be constructed by the City. Diverting the runoff carried by the arroyo to the AMAFCA/Louisiana Dam will require coordination with both AMAFCA and City parks. A City park site will lie immediately west of the site on the west side of Wyoming Blvd. N.E. Final plans for the development of the park site are not available, however, it is anticipated a park will be developed on that site at a later date. Because of this, the diversion should be temporary in nature so as to allow maximum flexibility in the design and construction of the City Park Improvements. Pre-application meetings indicate that this is an acceptable concept to follow. It should be stressed that this diversion will require close coordination with both AMAFCA and City parks.

A Trainer Facility, or an extension of the channel outside of the Window, is proposed upstream from Barstow Street N.E. In either case, coordination with the upstream property owners will be required. It is further proposed to place the channel within the Carmel Ave. alignment east of Barstow St. N.E. This is consistent with preliminary plans previously prepared and presented in conjunction with Vineyard Estates, Unit 4, which lies upstream of this site. This is also consistent with plans in process by the Albuquerque Public Schools for developing a middle school site at the northeast corner of Barstow St. N.E. and Carmel Ave. N.E. Once again, close coordination with the upstream property owners will be required.

The design flow for the channel has been selected as 2,650 cfs as taken from the RTI Report. The Table from which Peak Discharges in the developed (future) conditions at critical locations has been reprinted as part of Figure 9. Figure 9 also includes Channel Hydraulics Calculations and an Analysis of Channel Freeboard. These calculations are presented in support of the typical channel section illustrated as part of Figure 9.

All figures appear in Chapter 4. Drainage Calculations for both the existing and developed conditions are found in Chapter 5. The Drainage Calculations have been prepared in accordance with the procedure for forty-acre and smaller basins set forth in the revision of Section 22.2, Hydrology, of the Development Process Manual, Volume 2, Design Criteria, date January 1993. As shown be these calculations, proposed improvements will result in an increase in runoff. The increases are within the limits identified by the RTI Peak Discharge Rates. In view of this, the free discharge of runoff from this site is appropriate. As stated above, Basins A, B, and C will discharge to the North Domingo Baca Arroyo. Basins D, E, and F will discharge to the Paseo del Norte Corridor.

05-31-95

CALCULATIONS (BASIN A)

Site Characteristics

1. Precipitation Zone = 3
2. $P\sim s_{6,100}\sim S = P\sim s_{360}\sim S$ = 2.60 in.
3. Total Area ($A\sim s_T\sim S$) = 673,310 sf/15.46 ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	572,315/ 13.14	85.0
B	67,330/ 1.55	10.0
C	33,665/ 0.77	5.0

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
B	67,330/ 1.55	10.0
C	134,660/ 3.09	20.0
D	471,320/10.82	70.0

Existing Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.66)(13.14)+(0.92)(1.55)+(1.29)(0.77)]/(15.46) = 0.72$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (0.72in/12)(15.46) = 0.9243$ ac-ft; 40,260 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (1.87)(13.14)+(2.60)(1.55)+(3.45)(0.77) = 31.3$ cfs

Developed Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.92)(1.55)+(1.29)(3.09)+(2.36)(10.82)]/(15.46) = 2.00$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (2.00$ in/12)(15.46) = 2.5789 ac-ft; 112,340 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (2.60)(1.55)+(3.45)(3.09)+(5.02)(10.82) = 69.0$ cfs

Comparison

1. $*V\sim s_{100}\sim S$ = 112,340 - 40,260 = 72,080 cf (increase)
2. $*Q\sim s_{100}\sim S$ = 69.0 - 31.3 = 37.3 cfs (increase)

CALCULATIONS (BASIN B)

Site Characteristics

1. Precipitation Zone = 3
2. $P\sim s_{6,100}\sim S = P\sim s_{360}\sim S$ = 2.60 in.
3. Total Area ($A\sim s_T\sim S$) = 688180 sf/15.80 ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	584,960/ 13.43	85.0
B	68,815/ 1.58	10.0
C	34,410/ 0.79	5.0

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
B	137,635/ 3.16	20.0
C	137,635/ 3.16	20.0
D	412,910/ 9.48	60.0

Existing Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.66)(13.43)+(0.92)(1.58)+(1.29)(0.79)]/(15.80) = 0.72$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (0.72 \text{ in}/12)(15.80) = 0.9447$ ac-ft; 41,150 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (1.87)(13.43)+(2.60)(1.58)+(3.45)(0.79) = 39.3$ cfs

Developed Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.92)(3.16)+(1.29)(3.16)+(2.36)(9.48)]/(15.80) = 1.86$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (1.86 \text{ in}/12)(15.80) = 2.4464$ ac-ft; 106,560 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (2.60)(3.16)+(3.45)(3.16)+(5.02)(9.48) = 66.7$ cfs

Comparison

1. $*V\sim s_{100}\sim S$ = 106,560 - 41,150 = 65,410 cf (increase)
2. $*Q\sim s_{100}\sim S$ = 66.7 - 39.3 = 27.4 cfs (increase)

CALCULATIONS (BASIN C)

Site Characteristics

1. Precipitation Zone = 3
2. $P\sim s_{6,100}\sim S = P\sim s_{360}\sim S$ = 2.60 in.
3. Total Area ($A\sim s_T\sim S$) = 662,510 sf/15.21 ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	563,135/ 12.93	85.0
B	99,375/ 2.28	15.0

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
B	22,080/ 0.51	3.3
C	44,170/ 1.02	6.7
D	596,260/13.68	90.0

Existing Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.66)(12.93)+(0.92)(2.28)+(1.29)(0.0)]/(15.21) = 0.70$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (0.70 \text{ in}/12)(15.21) = 0.8859$ ac-ft; 38,590 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (1.87)(12.93)+(2.60)(2.28)+(3.45)(0.0) = 30.1$ cfs

Developed Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.92)(0.51)+(1.29)(1.02)+(2.36)(13.68)]/(15.21) = 2.24$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (2.24 \text{ in}/12)(15.21) = 2.8392$ ac-ft; 123,670 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (2.60)(0.51)+(3.45)(1.02)+(5.02)(13.68) = 73.5$ cfs

Comparison

1. $*V\sim s_{100}\sim S$ = 123,670 - 38,590 = 85,080 cf (increase)
2. $*Q\sim s_{100}\sim S$ = 73.5 - 30.1 = 43.4 cfs (increase)

CALCULATIONS (BASIN D)

Site Characteristics

1. Precipitation Zone = 3
2. $P\sim s_{6,100}\sim S = P\sim s_{360}\sim S =$ 2.60 in.
3. Total Area ($A\sim s_T\sim S$) = 557,990 sf/12.81 ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	474,295/ 10.89	85.0
B	83,695/ 1.92	15.0

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
B	18,600/ 0.43	3.3
C	37,200/ 0.86	6.7
D	502,190/11.52	90.0

Existing Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.66)(10.89)+(0.92)(1.92)+(1.29)(0.0)]/(12.81) = 0.70$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (0.70$ in$/12)(12.81) = 0.7462$ ac-ft; 32,500 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (1.87)(10.89)+(2.60)(1.92)+(3.45)(0.0) = 25.4$ cfs

Developed Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.92)(0.43)+(1.29)(0.86)+(2.36)(11.52)]/(12.81) = 2.24$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (2.24$ in$/12)(12.81) = 2.3910$ ac-ft; 104,150 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (2.60)(0.43)+(3.45)(0.86)+(5.02)(11.52) = 61.9$ cfs

Comparison

1. $*V\sim s_{100}\sim S$ = 104,150 - 32,500 = 71,650 cf (increase)
2. $*Q\sim s_{100}\sim S$ = 61.9 - 25.4 = 36.5 cfs (increase)

CALCULATIONS (BASIN E)

Site Characteristics

1. Precipitation Zone = 3
2. $P\sim s_{6,100}\sim S = P\sim s_{360}\sim S =$ 2.60 in.
3. Total Area ($A\sim s_T\sim S$) = 153,550 sf/3.53 ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	60,225/ 1.38	39.2
B	60,225/ 1.38	39.2
C	12,600/ 0.29	8.2
D	20,500/ 0.47	13.4

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
A	60,225/ 1.38	39.2
B	60,225/ 1.38	39.2
C	12,600/ 0.29	8.2
D	20,500/ 0.47	13.4

Existing Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = [(0.66)(1.38)+(0.92)(1.38)+(1.29)(0.29)+(2.36)(0.47)]/(3.53)$
$= 1.04$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (1.04 \text{ in}/12)(3.53) = 0.3053$ ac-ft; 13,300 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (1.87)(1.38)+(2.60)(1.38)+(3.45)(0.29)+(5.02)(0.47)$
$= 9.5$ cfs

Developed Condition

1. Volume

$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$

$E\sim s_W\sim S = 1.04$ in.

$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$

$V\sim s_{100}\sim S = (1.04 \text{ in}/12)(3.53) = 0.3053$ ac-ft; 13,300 cf

2. Peak Discharge

$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$

$Q\sim s_p\sim S = Q\sim s_{100}\sim S = 9.5$ cfs

Comparison

1. $*V\sim s_{100}\sim S$ = 13,300 cf (no change)
2. $*Q\sim s_{100}\sim S$ = 9.5 cfs (no change)

CALCULATIONS (BASIN F)

Site Characteristics

1. Precipitation Zone = 3
2. $P\sim s_{6,100}\sim S = P\sim s_{360}\sim S$ = 2.60 in.
3. Total Area ($A\sim s_T\sim S$) = 429,250 sf/9.85 ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	364,865/ 8.37	85.0
B	64,385/ 1.48	15.0

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
B	14,310/ 0.33	3.3
C	28,615/ 0.65	6.7
D	386,325/ 8.87	90.0

Existing Condition

1. Volume

$$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$$

$$E\sim s_W\sim S = [(0.66)(8.37)+(0.92)(1.48)+(1.29)(0.0)]/(9.85) = 0.70 \text{ in.}$$

$$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$$

$$V\sim s_{100}\sim S = (0.70 \text{ in}/12)(9.85) = 0.5738 \text{ ac-ft; } 25{,}000 \text{ cf}$$

2. Peak Discharge

$$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$$

$$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (1.87)(8.32)+(2.60)(1.48)+(3.45)(0.0) = 19.5 \text{ cfs}$$

Developed Condition

1. Volume

$$E\sim s_W\sim S = (E\sim s_A\sim SA\sim s_A\sim S+E\sim s_B\sim S+E\sim s_C\sim SA\sim s_C\sim S+E\sim s_D\sim SA\sim s_D\sim S)/A\sim s_T\sim S$$

$$E\sim s_W\sim S = [(0.92)(0.33)+(1.29)(0.65)+(2.36)(8.87)]/(9.85) = 2.24 \text{ in.}$$

$$V\sim s_{100}\sim S = (E\sim s_W\sim S/12)A\sim s_T\sim S$$

$$V\sim s_{100}\sim S = (2.24 \text{ in}/12)(9.85) = 1.8396 \text{ ac-ft; } 80{,}130 \text{ cf}$$

2. Peak Discharge

$$Q\sim s_p\sim S = Q\sim s_{PA}\sim S\ A\sim s_A\sim S + Q\sim s_{PB}\sim SA\sim s_B\sim S + Q\sim s_{PC}\sim SA\sim s_C\sim S + Q\sim s_{PD}\sim SA\sim s_D\sim S$$

$$Q\sim s_p\sim S = Q\sim s_{100}\sim S = (2.60)(0.33)+(3.45)(0.65)+(5.02)(8.87) = 47.6 \text{ cfs}$$

Comparison

1. $*V\sim s_{100}\sim S$ = 80,130 - 25,000 = 55,130 cf (increase)
2. $*Q\sim s_{100}\sim S$ = 47.6 - 19.5 = 28.5 cfs (increase)

GENEIVA MEEKER, CHAIR
DANIEL W. COOK, VICE-CHAIR
RONALD D. BROWN, SECRETARY-TREASURER
HAEL MURPHY, ASST. SECRETARY-TREASURER
TIM EICHENBERG, DIRECTOR

LARRY A. BLAIR
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N E - ALBUQUERQUE, N M 87107
TELEPHONE (505) 884-2215

1/2

February 17, 1995

MEMO

TO: Susan Connors, Senior Planner
FR: Kurt Browning, AMAFCA KB

RE: Comments for EPC Case SD 95-2, Hearing date 3-16-95
Window "G" Sector Development Plan

Our concerns and comments to be included in this EPC case are as follows:

A portion of the North Domingo Baca Arroyo is located in Window "G" as indicated in the EPC submittal. Please note that the La Cueva Land Use Guide (6-88), prepared for the City of Albuquerque includes several sections on drainage and a drainage study. It is our understanding that the drainage solutions mentioned in this document are no longer valid. Is this true, and if so, how was this determined? By whom? What plan regarding this arroyo should be followed?

Our drainage management plan (completed by Resource Technology in 1992) encompassed the North and South Domingo Baca Arroyos and Paseo del Norte Corridor. However, its purpose was for overall hydrology effects and new dam locations. It did not address the North Domingo Baca Arroyo in detail, from the new Lower Baca Dam (Louisiana and Anaheim) to the existing dam (Eubank and Anaheim). Our overall drainage management plan called for a hardlined channel from the new dam upstream to Ventura, to be constructed by others. An alignment, analysis, sizing, etc. for this channel were not a part of the DMP. The only detailed drainage document for this proposed channel appears to be the La Cueva Land Use Guide.

Coordination is definitely required regarding this area. Essentially, a comprehensive plan indicating the alignment for the proposed channel (in entirety) does not exist. The channel plans from Ventura to the new dam require some continuity, in order to properly layout the facility. (assuming the drainage solutions in the La Cueva Guide are not applicable anymore.) Some items to be addressed are:

1. Effects on existing Nor Este Manor Subdivision and how the existing floodwall will be incorporated.
2. Who will maintain the proposed channel? Who will take the lead? The alignment issue needs to be addressed as it affects channel (and

FEB 23

development) plans upstream and downstream.

3. Gathering flows at Barstow should be addressed as well as new crossing. Will the channel at Barstow be located north of Carmel? The APS mid-school site is affected and proper APS officials should be coordinated with. (From a long range plan, it appears that a future channel alignment along the south side of Carmel is the best solution, however this may affect some North Abq Acre lot owners.) If the arroyo alignment is moved to the south side of Carmel, the APS site will not require a channel. ANNEXED BY CITY
4. Discharge of the flows downstream to the AMAFCA dam must be carefully analyzed and mitigated. Parks has concerns here regarding design, timing, funding, etc.
5. Crossing structure at Wyoming.
6. Sediment, erosion, and hydraulic issues are pertinent especially at Barstow and Wyoming. Detailed analysis will be required once an alignment is agreed upon for the entire channel.

AMAFCA is not developing additional policy for the arroyo at this time. Several areas near the arroyo are beginning to develop and an overall "plan" for this meandering arroyo is required, especially if the City's La Cueva Land Use Guide is no longer applicable from a drainage standpoint. The new dam downstream that intercepts the runoff from this arroyo is almost complete.

cc Dan Hogan, COA Hyd.
Fred Aguirre, COA Hyd.
Don Hoech, Hoech Realty
Pat Mcmurray, APS
Colleen Frenz, COA Parks
SUSAN CALONGNE, FLOODPLAIN ADMINISTRATOR
TYLER MASON, BPLW

DRAINAGE INFORMATION SHEET

PROJECT TITLE: *LA CUEVA TOWN CENTER* **ZONE ATLAS/DRNG. FILE #:** C-19

DRB #: 98-402 **EPC #:** Z·98-98 **WORK ORDER #:**

LEGAL DESCRIPTION:

CITY ADDRESS: *Northeast corner of Wyoming Boulevard and Paseo del Norte*

ENGINEERING FIRM: TIERRA WEST, LLC **CONTACT:** RONALD R. BOHANNAN OR CHRISTINA E

ADDRESS: 4421 McLeod Rd. NE Suite D, 87109 **PHONE:** (505) 883-7592

OWNER: LA CUEVA TOWN CENTER , LTD., CO. **CONTACT:** BEN SPENSER

ADDRESS: 6400 UPTOWN BLVD. NE SUITE 200W **PHONE:** (505) 889-3061

ARCHITECT: *GEORGE RAINHART ARCHITECT* **CONTACT:** *GEORGE RAINHART*

ADDRESS: *2325 SAN PEDRO NE* **PHONE:** (505) 884-9110

SURVEYOR: ALDRIDGE LAND SURVEYING **CONTACT:** TIM ALDRIDGE

ADDRESS: 4109 MONTGOMERY BOULEVARD NE **PHONE:** (505) 884-1990

CONTRACTOR: **CONTACT:**

ADDRESS: **PHONE:**

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- X DRAINAGE PLAN
- _____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- _____ EROSION CONTROL PLAN
- _____ ENGINEER'S CERTIFICATION
- _____ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- _____ SKETCH PLAN APPROVAL
- X PRELIMINARY PLAT APPROVAL
- _____ S. DEV. PLAN FOR SUB'D. APPROVAL
- X S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- _____ SECTOR PLAN APPROVAL
- X FINAL PLAT APPROVAL
- _____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- _____ CERTIFICATE OF OCCUPANCY APPROVAL
- _____ GRADING PERMIT APPROVAL
- _____ PAVING PERMIT APPROVAL
- _____ S. A. D. DRAINAGE REPORT
- _____ DRAINAGE REQUIREMENTS
- _____ *APPROVAL ON THE REVISED BOUNDARY LINE*

PRE-DESIGN MEETING:

- _____ YES
- _____ NO
- _____ COPY PROVIDED

RECEIVED
APR 12 1999
HYDROLOGY SECTION

DATE SUBMITTED: *4/12/99*

BY: *CHRISTINA A. EHRSAM*

Tierra West, LLC

April 6, 1999

Ms. Susan M. Calongne, P.E.
City/County Flood Plain Administrator
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

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APR 12 1999
HYDROLOGY SECTION

RE: Drainage Report and Grading and Drainage Plan for La Cueva Town Center in Window "G" (C19/D11D) Submitted for Preliminary Plat and Site Development Plan for Subdivision Approval, Building Permit and Grading Permit Approval, Engineer's Stamp Dated 3/8/99.

Dear Ms. Calongne:

We have reviewed your comments from the letter dated March 23, 1999 and have addressed them in the following manner:

HYDROLOGY DEPARTMENT

1. FEMA cannot remove the existing flood plain until the As-built plans for the entire Paseo Del Norte (PDN) project are complete. According to the schedule included in your report, the County's construction will not be complete for at least another year. Therefore, please show the limits of the existing FEMA flood plain on the plans.

   We show the limits of the existing offical mapped FEMA flood plain on the grading plans.

2. Typically, no development is allowed within the limits of an active FEMA flood plain. Please provide more information on the status of this floodplain, including the potential avulsion that was identified by FEMA upstream of this project. Is the proposed County pond at Barstow sized to cut off this floodplain, or is the upper end of the storm drain system in PDN needed to capture the floodplain flows? Will interim improvements be required to intercept the floodplain?

   Jeffery Mortensen and Associates performed an HEC-RAS analysis of the avulsion, and we have enclosed a copy in our report. The analysis shows that during a 100-year storm, the storm water will stay within the North Domingo Baca Channel and will not enter the tributary arroyo that crosses our site.

   The County has designed the new storm water system, in Paseo del Norte (PDN), to carry the storm water that falls on the properties adjacent to PDN. The PDN system accepts the storm water upstream at Ventura Street and at Barstow Street. The PDN improvements include storm water improvements in Ventura Street north of Paseo del Norte and Barstow Street north of Paseo del Norte. The improvements in Ventura Street consist of a series of storm water inlets. These inlets capture the flows that enter Ventura from the east. These inlets are connected to the new storm drain in Paseo del Norte. The storm water between

4421 McLeod Rd. NE, Suite D • Albuquerque, NM 87109 • (505) 883-7592
fax (505) 883-7034 • e-mail: twdms@aol

Ventura Street and Barstow Street is channeled to a collection pond with a sediment trap. This pond is at the southeast corner of Barstow and Holly Avenue. The flows are then discharged into the new storm water system in Barstow, via a 60" pipe. The collection pond should be in place by August of 1999. (We are enclosing the proposed schedule provided by Bradbury and Stamm). We have also enclosed a copy of the County Collection pond for your use. During the interim we will accept the minor flows that enter our site. Carmel Avenue and the retaining wall along the west property line of the City Reservoir redirects or eliminates most of the flows from entering our site.

In the past the City's policy has been that if a flood control project is designed and funded and the construction contract awarded, the project will be allowed to move to construction.

3. Please identify which agency will be responsible for obtaining the Letter of Map Revision (LOMR) from FEMA to remove the floodplain from this site.

   Bernalillo County Public Works is doing the improvements in this area, and it is our opinion that they should obtain the LOMR.

4. The drainage basin maps for the existing and ultimate conditions were provided, however, the off-site drainage basin map for the interim condition was not provided. It appears that existing runoff from the east will impact your site. How do you propose to deal with these off-site flows?

We have performed an HEC-RAS analysis immediately upstream of our project showing the water surface elevation of the Tributary Arroyo that crosses the southeast corner of our site. According to the report by Resource Technology Inc., for a 100-year storm under undeveloped conditions the flow in the arroyo entering our site is 321 cfs. As noted in the Drainage Report for this project, there is a retaining wall on the west property line of the City Reservoir site. This retaining wall and construction of the City Reservoir eliminates surface flow from entering our site directly from the east. We have plotted the water surface elevations developed by the HEC-RAS analysis and the 100-year flows in the arroyo encroaches onto our site by 30-feet. We will let this flow cross our site and enter Paseo del Norte as shown historically. Enclosed in o8ur report is the HEC-RAS analysis and a plot of the water surface elevation for the Tributary Arroyo.

5. The HEC-RAS analysis for Window "G" determined where the runoff ran through the site, not the runoff rate. The 321 cfs in the arroyo was determined by the AHYMO run from the RTI study. The existing Window "G" channel is soil cement, not concrete. The public storm drain system being constructed in PDN is part of the City and County road projects, not a joint venture. When the PDN system is complete, the storm drain system will be available, however, until sites adjacent to the roadway develop and direct runoff to PDN, the runoff continues west as it does now. Please revise the Existing Conditions section of the report.

   We corrected our report to show that the 321 cfs is the flow in the Tributary Arroyo that enters the site during existing conditions. We have addressed the PDN improvements as City/County road projects and changed the text to soil cement

channel. Yes, the runoff continues west, but at the City water tank, there is a retaining wall along the west property line that will eliminate the flows from entering our site, except a small runoff portion. We have shown the retaining wall in more detail, including spot elevations. We have revised the report and clarify the diversion caused by the retaining wall.

6. The Proposed Conditions and On-Site Drainage Management Plan section of the report was confusing and hard to follow. On the basin map, please clearly show the phase boundaries and analysis points, and label the Lots mentioned in the report. Show the sub-basins used in the calculations.

   We have included a 11" x 17" basin map with the lots, phase boundaries and the sub-basins labeled.

7. Show the phase boundaries on the Grading Plan. Is the entire site to be graded at one time?

   We show the phase boundaries on the Grading Plan. The whole site will be mass graded, and Phase 1 will be fine graded for construction.

8. The plans must show the existing and/or proposed storm drain systems in Paseo Del Norte, Wyoming and Carmel. Basin A will connect to which storm drain system? Where is the "existing drainage channel" that connects to the 48" RCP in Wyoming? Where is the existing 36" stub in Wyoming? Please clarify these issues in the report.

   We show the existing and/or proposed storm drain systems in Paseo Del Norte, Wyoming and Carmel. Basin A will be connected to the existing 36" RCP shown on sheet 3 of 28 of City Project No. 4083.90. This 36" RCP is connected to the existing 48" RCP in Wyoming Boulevard. There is no existing drainage channel, and we have corrected our report. There is an existing 36" pipe from Wyoming Boulevard to our site at Carmel and Wyoming. We have shown the approximate location on our drawings.

9. The plan did not address street flows. Provide the proposed street grades and the analysis for both Carmel and Wyoming. Are inlets required in these streets adjacent to your site? Please show how the runoff from Basin E, discharging directly into Wyoming, will be intercepted by the storm drains.

   Carmel Avenue is an existing street and we have not change the design further our site is not contributing any flows to Carmel. Jeff Mortensen and Associates designed Carmel under City of Albuquerque Project No. 5729.83. The contours that we show are the existing grades. In the Appendix we have added the street capacity design for Carmel Avenue. Wilson and Company designed Wyoming Boulevard under Project No. 4083.90. We will add spot elevations to our plans. We are accessing the site from Wyoming Boulevard, but we are not changing the design. The runoff from the access at Wyoming (Basin E) will sheet flow from east to west within the paved entrance then enter the valley gutter at Wyoming and flow south in Wyoming to the double "A" inlet south of the entrance. The developed flow rate in Basin E is 1.266 cfs that is negligible compared with the total flow in Wyoming, so no improvements are necessary in Wyoming.

10. Provide the calculations used to determine the percentages for the developed land

treatments.

In the report under "Proposed Condition and On-Site Drainage Management Plan", the first paragraph addresses the percentages for the developed land. We propose land treatments of 15% "B" and 85% "D". We included the calculations for the developed land treatments in Appendix A.

11. The grading plan shows a detail for a retaining wall, however, no retaining walls are indicated in the legend. Where are these walls proposed?

    We show the locations of the retaining walls on the plans.

12. Provide a storm drain system layout for the on-site system, including the pipe sizes. This may help follow the description and calculations. Where is the proposed 18"CMP?

    We are not using a 18" CMP anywhere, this is an error in the report. We are using an 18" PVC storm water pipes with the on-site storm water system and have enclosed an On-Site Storm Water Layout with calculations. All connections to the City system, and within the public right of way, will be reinforced concrete pipe.

13. The pipe capacity calculations indicate that all on-site storm drains will have a 2% slope. Is this accurate? Some of the proposed pipes are not standard sizes. Only standard sized RCP may be constructed within the City's right-of-way. Also, the inlet calculations will be required prior to Building Permit approval.

    We recalculated the slopes on all the pipes and corrected all pipe sizes to standard sizes. We included the inlet calculations for your review.

14. Access to the City Reservoir site must be addressed. It was my understanding that access would be taken from this development. Please verify this with the County, since their project is removing access to PDN.

    The City Reservoir can be accessed from Carmel Avenue. It appears the City owns two lots that house the City Reservoir. The second lot fronts onto Holly Avenue, and access should be available. Please review the pictures taken at the site showing the existing conditions. We talked to Bob Fogelsong, the Project Manager for Bernalillo County, March 25, 1999, and he said they had extended the frontage road to access the City Reservoir.

If you have any questions, please do not hesitate to contact this office.

Sincerely,

Ronald R. Bohannan, PE

cc: Ben Spencer

JN 980012
RRB/ba

980012:9812sc040699

LETTER OF TRANSMITTAL

Tierra West, LLC

(505) 883-7592

4421 McLeod Road NE, Suite D, Albuquerque, NM 87109

DATE: 4·12·99	JOB NO: 9812
ATTENTION: FRED AGUIRRE	
RE: LA CUEVA TOWN CENTER	

TO City Hydrology
Attn: Fred Aguirre

WE ARE SENDING YOU ☐ Attached ☐ Under Separate cover via _____ the following items

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATED	NO.	DESCRIPTION
1	12·96	980012	Existing Drainage Conditions
1	12·96	980012	Figure 2 - Hec RAS - Tributary
1	12·96	980012	Utimate Drainage Conditions
1	3-29-99	980012	Grading and Drainage Pla
1	3-29-99	980012	Grading and Drainage Plan
1	3-99	980012	Hec - RAS Analysis - Avulsion
1	3-30-99	980012	DRAINAGE REPORT - LA CUEVA TOWN CENTER
1	4-6-99	980012	Letter to Susan Calongne

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ **FOR SIGNATURE(S)**

☑ For your use ☐ Approved as noted ☐ _____

☑ As requested ☐ Returned for corrections

☑ For review and comments ☐ _____

☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

RECEIVED
APR 12 1999
HYDROLOGY SECTION

COPY TO _____

RECEIVED BY _____ **SIGNED** _____

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

May 11, 1999

Ronald R. Bohannan, P.E.
Tierra West, LLC
4421 McLeod Road, Suite D
Albuquerque, New Mexico 87109

RE: Drainage Report and Grading and Drainage Plan for La Cueva Town Center in Window "G"(C19/D11D) Submitted for Preliminary and Final Plat and Site Development Plan for Building Permit Approval, and Building Permit Approval, Engineer's Stamp Dated 3/29/99.

Dear Mr. Bohannan:

Based on the information provided with the submittal of April 12, 1999, the above referenced plan is approved for Preliminary and Final Plat action and Site Development Plan for Building Permit approval.

It appears that the existing Type "A" inlet on Wyoming, just south of the Holly entrance, will have to be relocated with the construction of the right turn lane. This work, along with tying the storm drain into the existing pipe in Wyoming, may be accomplished with the Work Order plans.

The above referenced plan is also approved for Building Permit release. As you are aware, the engineer's certification will be required prior to release of the Certificate of Occupancy for the buildings.

Site specific Grading and Drainage Plans will be required prior to development of the future lots included on this site. These plans must be in compliance with this approved report.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Ben Spencer, La Cueva Town Center, Ltd.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE REPORT
FOR

La Cueva Town Center

Prepared by:

RECEIVED
APR 12 1999
HYDROLOGY SECTION

Tierra West, LLC
4421 McLeod Rd., NE, Suite D
Albuquerque, New Mexico 87109

April, 1999

I certify that this report was prepared under my supervision, and I am a registered professional engineer in the state of New Mexico in good standing.

RONALD RAY BOHANNAN
NEW MEXICO
7868
REGISTERED PROFESSIONAL ENGINEER

Ronald R. Bohannan
PE NO. 7868

Job No 980012

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Summary 10

Runoff Summary Table

Appendix A

Calculations

Appendix B

Infrastructure List

Appendix C

Roof Drain System

Storm Drain System

Appendix D

City and County Improvements

HEC-RAS for AP-1

Map Pocket

Master Drainage Plan, Existing Conditions, Window G . . . . . Figure 1

Master Drainage Plan - HEC-RAS Analysis, Window G . . . . . Figure 2

Master Drainage Plan, Ultimate Site Conditions, Window G . . . . . Figure 3

La Cueva Town Center, Grading and Drainage Plan . . . . . Figures 4 ,5

Avulsion - HEC-RAS Analysis, Window G . . . . . Figure 6

Location

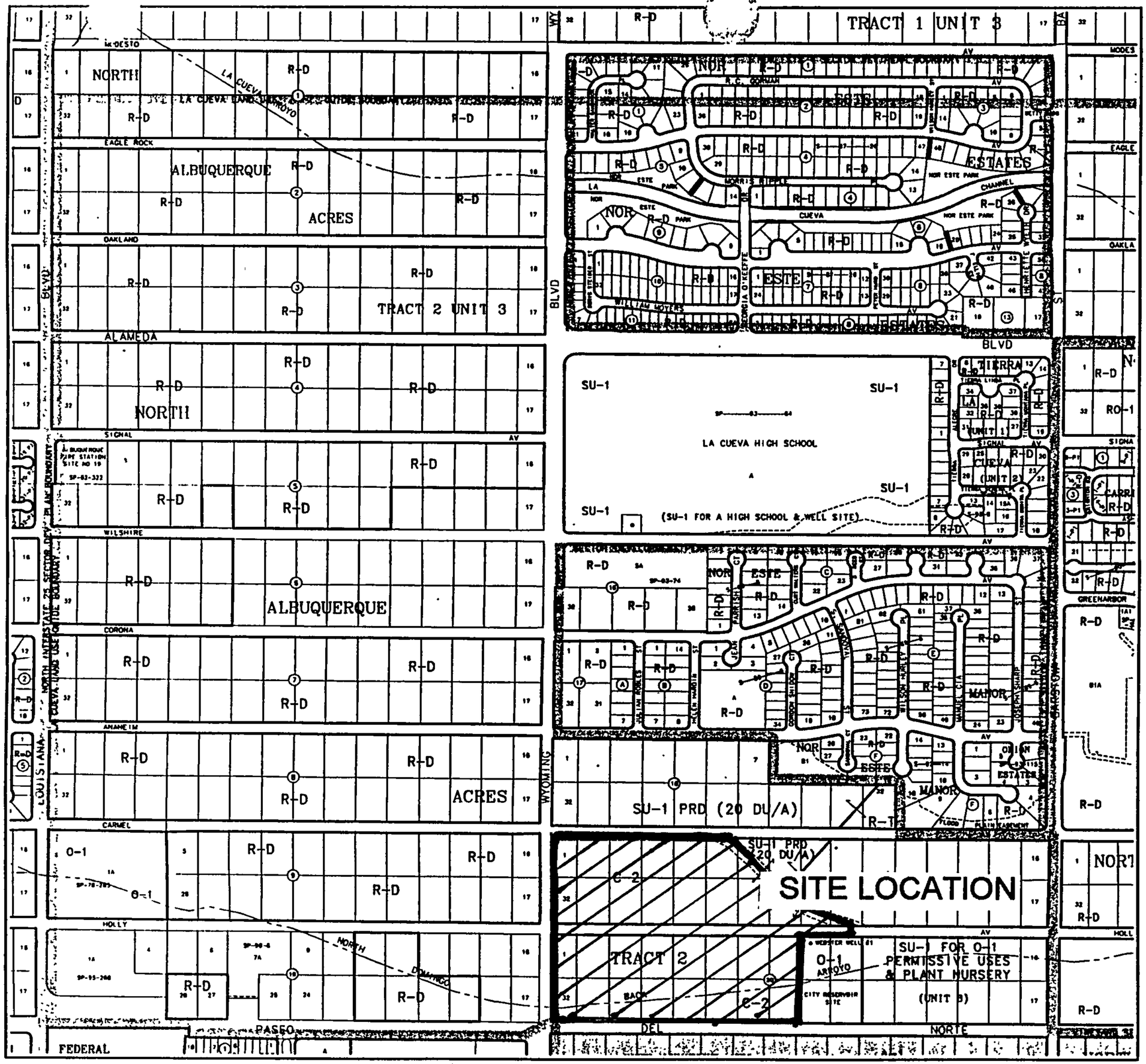
The site is located on the northeast corner of Wyoming Boulevard and Paseo del Norte, NE and it is within the Window G Sector Development Plan of North Albuquerque Acres. The site contains ± 20.8704 acres. La Cueva Town Center, LTD.,Co. proposes to develop a retail center that will include an in-line grocery store, four adjacent buildings and nine pad sites for future retail stores. The exact location is highlighted on the attached zone atlas map.

Legal Description

The legal description of the project is the remainder of Lots 1 and 26 through 32 and all of Lots 1 thru 8, and Lots 25 thru 32, Block 20 and lots 31 and 32, Block 19 of North Albuquerque Acres along with Tract 2, Unit 3; Tract C, La Cueva Village Unit 1; and that portion of the Holly easement from Wyoming Boulevard NE to the end of Lot 8, for a total of ± 20.8704 acres.

Zoning and Surrounding Development

The site is zoned C2 and includes all of the permissive and conditional uses under that designation. The City's Planning Department is preparing a new sector development plan (La Cueva Sector Plan) and they are currently planning the remaining areas that border the Window G Sector Plan. The site is surrounded by many different uses and zoning designations. The area to the north is developed with apartments, multi-family, townhouses, and single family homes. A City of Albuquerque water tank is on two lots directly east and the remaining area beyond this tank is zoned for offices, plant nursery, townhouses and single family housing. East of Barstow, the zoning is multi-family and church. Presently, the land just west of Wyoming Boulevard is zoned for multi-family, townhouses, single family units, and office and institutional uses. The land to the south is zoned for multi-family and townhouses.



GRAPHIC SCALE IN FEET

250 0 500 1000

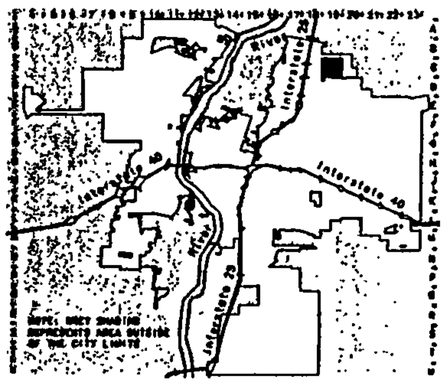
CITY OF Albuquerque

A Albuquerque Geographic Information System

PLANNING DEPARTMENT

©Copyright 1997

Map Amended through February 14, 1997



LEGAL DESCRIPTION

T11N

R4E

SEC 18

UNIFORM PROPERTY CODE

1-018-064

C-19-Z

Purpose

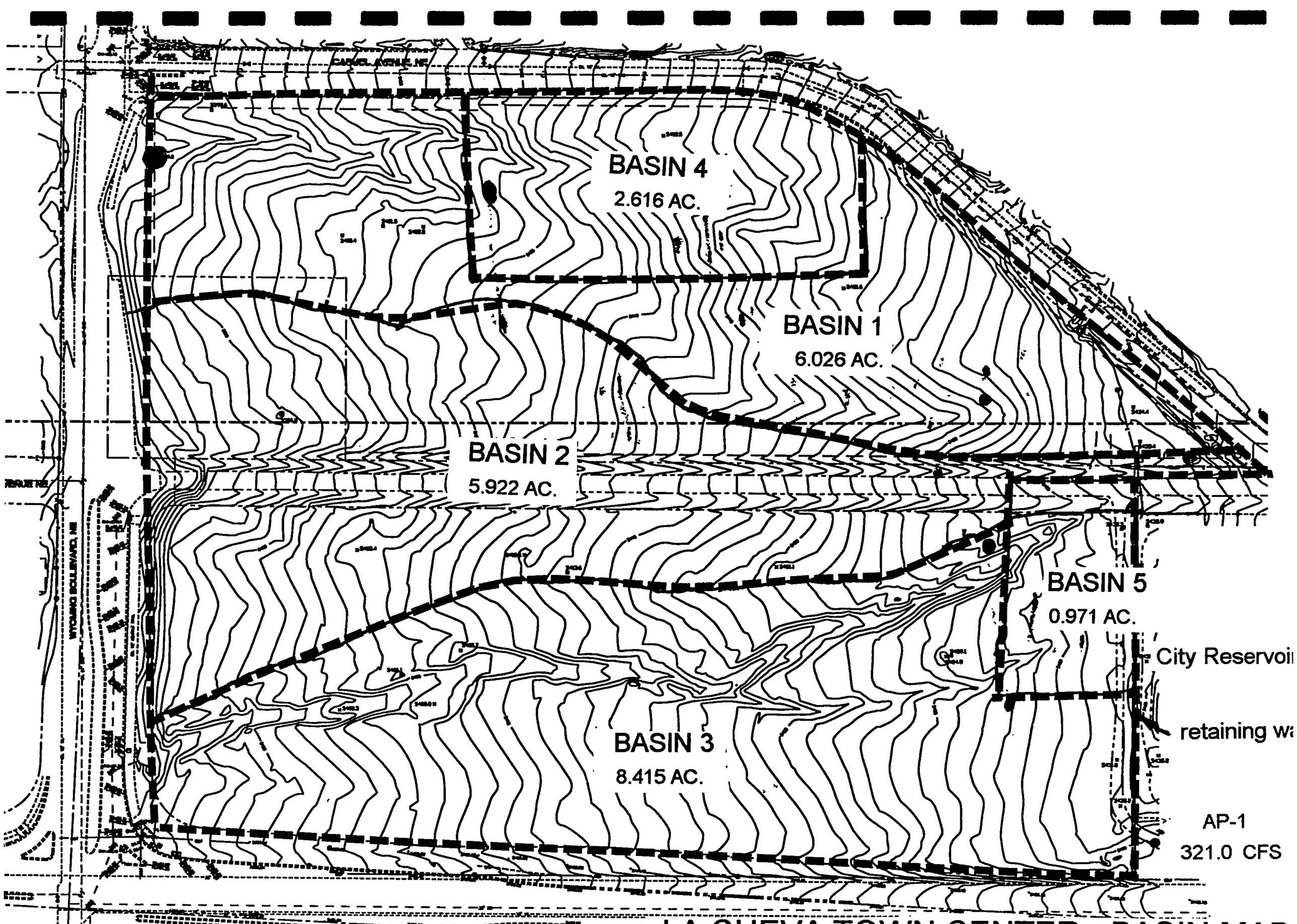
The purpose of this drainage report is to provide the drainage analysis and management plan for the proposed ± 20.8704 acre Retail Development. We are requesting approval for rough grading, Site Development Plan for Subdivision, Preliminary Plat and Building Permit.

Existing Drainage Conditions

The site lies within the approved Window G Sector Development Plan and the corresponding Master Drainage Plan prepared by Jeffrey G. Mortensen and Associates (C19/D11). The Master Plan area consists of the realigned Carmel Avenue, south to Paseo del Norte and from Wyoming Boulevard east to Barstow Street. The proposed site is undeveloped and the vegetation on site consists of weeds, grasses and occasional cacti. The site is divided into five basins and one analysis point. To the east is a City water tank site. Along the west property line of the City water tank site is a retaining wall which eliminates flows directly entering the La Cueva Town Center site (See grading and drainage plan.) We have divided the existing site into five basins and one Analysis Point. Basins 1 through 3 contain onsite flows and Basins 4 and 5 are properties owned by others that contribute flows. The Analysis Point (AP-1) represents flows entering the site from an arroyo and is located at the southeast corner of the property.

The existing basins discharge the following amounts of storm water: Basin 1: 11.269 cfs; Basin 2: 11.074 cfs; Basin 3: 15.736 cfs; Basin 4: 4.892 cfs; Basin 5: 1.816 cfs.

Directly to the east of the proposed La Cueva Town Center site is the City Reservoir site. Along the west property line of the reservoir site is a four foot high retaining wall that redirects the flows to the tributary arroyo and enters La Cueva Town Center at AP-1. A portion of the flows that enter the City Reservoir site are retained onsite. Storm water east of the City Reservoir site (that does not enter the City site) between the City Reservoir and Barstow flows



LA CUEVA TOWN CENTER - BASIN MAP

UNDEVELOPED CONDITIONS

to the tributary arroyo that crosses the southeast corner of the La Cueva Town Center (AP-1) and continues into the Paseo del Norte right-of-way. (See Figure 1 and appendix D.)

Analysis Point 1 (AP-1) is located at the southeast corner of the proposed La Cueva Town Center near Paseo del Norte and is the analysis point for an arroyo that enters the site. In the Master Drainage Plan for Window "G" an HEC-RAS analysis was performed on this arroyo and the resulting information is located on Figure 2, found in the map pocket. The HEC-RAS analysis shows the arroyo discharging 321 cfs onto the La Cueva Town Center site for undeveloped conditions. We have included a HEC-RAS analysis to show the limits of water surface elevation for 321.0 cfs (100 year undeveloped storm) as it crosses the La Cueva Town Center site. The analysis shows that the storm water encroaches the site by only 30 feet and continues into the Paseo del Norte right-of-way. (See Appendix D for the HEC-RAS analysis.)

The Master Drainage Plan and Ultimate Conditions for Window G (Figure 4) proposed several improvements, the construction of a soil cement channel and a public storm water system in Barstow Street, Ventura Street and Paseo del Norte. The construction of the soil cement channel is complete and in use. The public storm water system improvements in Paseo del Norte are a combination of two projects, a City road project and a County road project. The City of Albuquerque road project included the placement of a 78" RCP in Paseo del Norte from Wyoming Boulevard to 500 feet east and improvements to Wyoming Boulevard. The City has completed the placement of the 78" RCP in Paseo. The Bernalillo County road project includes the extension of the storm water system in Paseo del Norte to Tennyson Street and storm water improvements in Ventura Street and Barstow Street. We have included the storm sewer design for the Barstow Street and Ventura Street improvements in Appendix D. The Ventura system is a series of inlets that captures runoff that flows to Ventura Street from the east and channels the flows to Paseo del Norte. The Barstow system is design to collect the storm water that flows from Ventura Street to Barstow. The flows are channeled to a

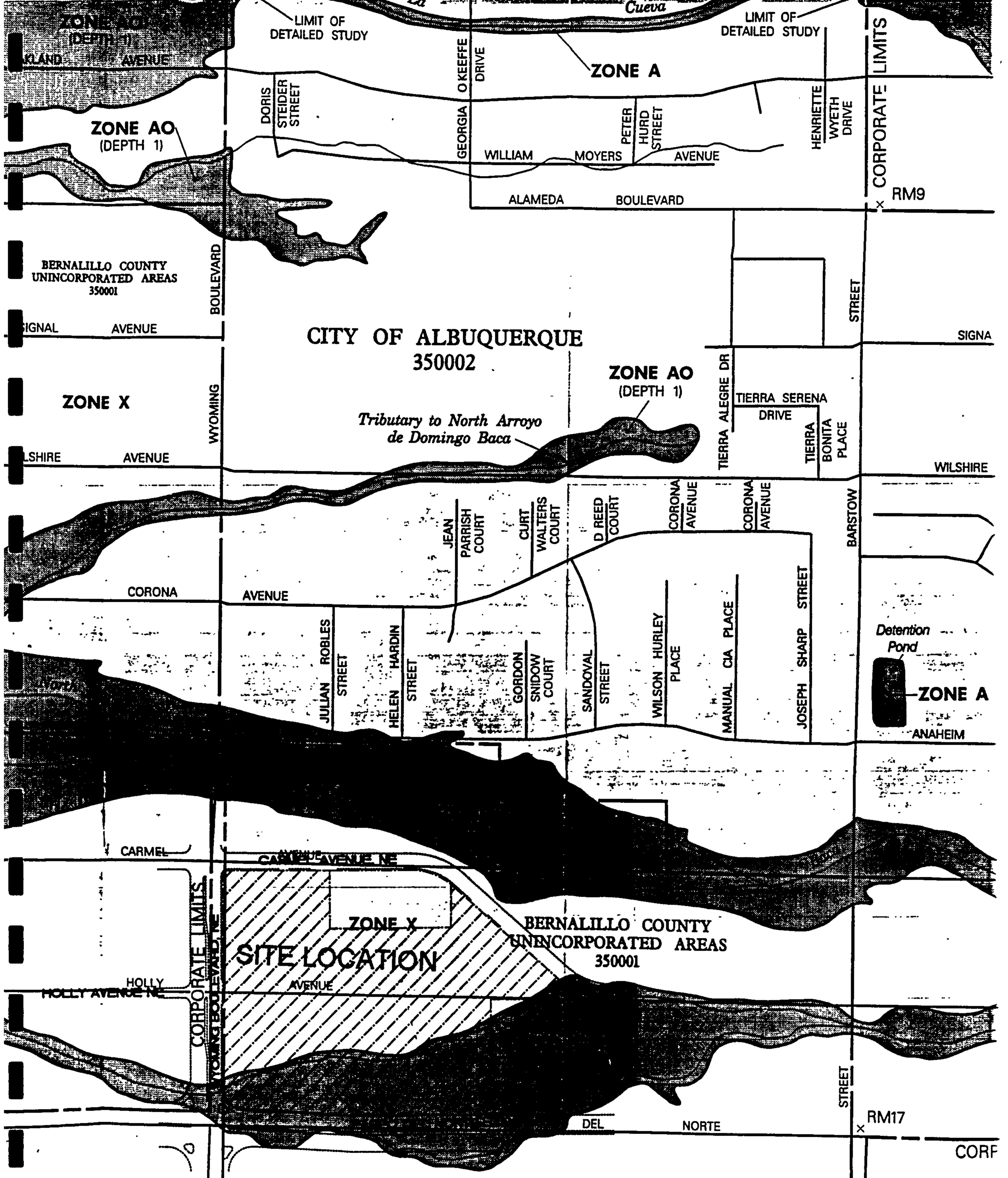
collection pond which discharges the runoff to a new storm water system in Barstow. This storm water system in Barstow flows south to the Paseo del Norte storm water system. The Barstow improvements should be completed by August 1999 and the improvements in Ventura by June 1999. The storm sewer improvements in Paseo del Norte (from the Wyoming extension to Tennyson Street) are scheduled for completion by September 1999. With the completion of these improvements this offsite flow (AP-1) will be reduced to 9.8 cfs according to the report and exhibits in the Window "G" Master Drainage Plan. (See figure 3.)

The Bernalillo County portion of the project has been awarded to Bradbury and Stamms. The will issue the notice to proceed April 15, 1999 and the improvements are scheduled for completion by February 2000. During the interim condition, the flows (321 cfs) at AP-1 will be allowed to follow the flows historical path across the corner of La Cueva Town Center into the Paseo del Norte right-of-way.

An avulsion is located upstream from our site at the south tributary of the North Domingo Baca Arroyo. Jeffery Mortensen performed a HEC-RAS analysis of the avulsion and it shows that the storm water will stay in the arroyo and not jump into the arroyo (AP-1) that enters our site. We have enclosed a copy of the analysis in the Map Pocket.

Flood Plain and Soil Conditions

As shown on Panel 141 of 825 of the National Flood Insurance Program Flood Insurance Rate Maps published by F.E.M.A. for the County of Bernalillo, New Mexico, and incorporated areas, dated September 20, 1996, one flood Hazard Zone designated AO with a depth of one-foot impacts the proposed site. (See Figure 1.) This flood hazard zone is associated with the arroyo that used to traverse the site. The existing flowrates reflect undeveloped conditions and are shown on the Basin Map are taken from the "North and South Domingo Baca Arroyo and Paseo del Norte Corridor Drainage Management Plan" prepared for


ZONE AO
(DEPTH 1)
LIMIT OF
DETAILED STUDY
Cueva
LIMIT OF
DETAILED STUDY
ZONE A
O KEEFFE
DRIVE
DORIS
STEIDER
STREET
GEORGIA
PETER
HURD
STREET
HENRIETTE
WYETH
DRIVE
CORPORATE LIMITS
WILLIAM
MOYERS
AVENUE
ALAMEDA
BOULEVARD
RM9
ZONE AO
(DEPTH 1)
BERNALILLO COUNTY
UNINCORPORATED AREAS
350001
BOULEVARD
IGNAL
AVENUE
STREET
SIGNA
CITY OF ALBUQUERQUE
350002
ZONE AO
(DEPTH 1)
ZONE X
WYOMING
Tributary to North Arroyo
de Domingo Baca
TIERRA ALEGRE DR
TIERRA SERENA
DRIVE
TIERRA
BONITA
PLACE
LSHIRE
AVENUE
WILSHIRE
BARSTOW
CORONA
AVENUE
CORONA
AVENUE
JEAN
PARRISH
COURT
CURT
WALTERS
COURT
D REED
COURT
CORONA
AVENUE
JULIAN ROBLES
STREET
HELEN HARDIN
STREET
GORDON
SNIDOW
COURT
SANDOVAL
STREET
WILSON HURLEY
PLACE
MANUAL CIA PLACE
JOSEPH SHARP
STREET
Detention
Pond
ZONE A
ANAHEIM
AO 2
CARMEL
AVENUE NE
ZONE X
SITE LOCATION
AVENUE
BERNALILLO COUNTY
UNINCORPORATED AREAS
350001
HOLLY
HOLLY AVENUE NE
CORPORATE LIMITS
WYOMING BOULEVARD NE
STREET
RM17
DEL
NORTE
CORF
BOULEVARD
PALOMAS
AVENUE
BERNALILLO COUNTY
CITY OF ALBUQUERQUE
BARSTOW
POTOMAC
COURT
PILGRIM
COURT
SAN

BERNALILLO COUNTY, AND PARTS OF SANDOVAL AND VALENCIA COUNTIES, NEW MEXICO — SHEET NUMBER 11

385 000 FEET

SANDOVAL COUNTY
BERNALILLO COUNTY

RIO GRANDE

ALAMEDA GRANT

SANDIA PUEBLO

ATRISCO GRANT

SITE LOCATION

Wyoming Blvd

Arroyo

Domingo Baca

Rancho Albuquerque School

Reservoir

T. 11 N.

(Joins sheet 10)

(Joins sheet 12)

(Joins sheet 21)

410 000 FEET

1 520 000 FEET

N

2 Miles

1 5000 4000 3000 2000 1000 0 0

AMAFCA by Resource Technology, Inc. dated December, 1991. (See figure 1). ~~Jeffery~~ AMAFCA Mortensen ~~and Associates~~ received approval on a CLOMR submitted to the Federal Emergency Management Agency for this site. When the improvements proposed by the City of Albuquerque and Bernalillo County are completed, a LOMR will be requested removing the flood plain. The City of Albuquerque has completed their portion of a new 78" RCP in Paseo del Norte and the County has award their portion of the road improvements.

The site contains two types of soil, Embudo-Tijeras complex (EtC) and Embudo gravelly fine sandy loam (EmB), as indicated on the Soil Map (Sheet 11) from the Soil Conservation Service Survey of Bernalillo County. Both The Embudo -Tijeras complex and Embudo gravelly fine sandy loam have runoff that is medium, the hazard of water erosion is moderate and control of moisture is required for proper compaction.

Proposed Conditions and On-Site Drainage Management Plan

This site lies within the Master Drainage Plan for Window "G", submitted by Jeffery Mortensen and Associates and approved by the City of Albuquerque. We propose the construction of a new retail shopping center known as La Cueva Town Center. This is the same area as shown as Tract C and Future Shopping Center from the approved Drainage Master Plan (shown on Figure 3 in Map Pocket) and in the Master Drainage Report, prepared by Jeffery Mortensen and Associates (C19/D11). The master drainage plan used the following percentage of land treatments: 3.3% land treatment "A", 6.7% land treatment 'B" and 90 % land treatment "D". We are proposing 15% land treatment "B" and 85% land treatment "D".

The proposed shopping center (La Cueva Town Center) will consist of an in-line grocery store, four adjacent buildings and nine pad sites for future retail stores. The site is divided into five onsite basins and two offsite basins. There are two onsite storm sewer systems. One system collects the storm water north of the vacated Holly Avenue and discharges to the

LA CUEVA TOWN CENTER - BASIN MAP
DEVELOPED CONDITIONS

CARMEL AVENUE NE
R.O.W. VARIES / PAVEMENT WIDTH: VARIES

FUTURE SIGNAL

WYOMING BOULEVARD NE
R.O.W. 156' / PAVEMENT WIDTH: VARIES

HOLLY AVENUE NE

PASEO DEL NORTE
R.O.W. 200' / PAVEMENT WIDTH: VARIES

EXISTING SIGNAL

NGS MONUMENT "HEAVEN"
Y=1518737.03
X=407051.31
G-O=0.99966243
Am—0010'45" E
CENTRAL ZONE
(NAD 1927 OR 1929)
ELEVATION=5,178.79

LOT 4
RETAIL PAD 1
MAX DENSITY = 25
PHASE IIB

BASIN G
2.616 AC.

BASIN C
3.403 AC.

BASIN B
3.302 AC.

LOT 2
PROPOSED MARKET

LOT 3
6,000 SF.

MAJOR 2
23,000 SF.

LOT 1
MAJOR 3
30,000 SF.

LOT 9
OFFICE PAD 7
MAX DENSITY = 25
PHASE IID

BASIN D
0.920 AC.

BASIN E
0.272 AC.

PHASE II

LOT 2A
RETAIL PAD 2

BASIN A
12.466 AC.
PHASE I

BASIN F
0.971 AC.

LOT 5
RETAIL PAD 3
MAX DENSITY = 25
PHASE IIA

LOT 6
RETAIL PAD 4
MAX DENSITY = 25
PHASE IIIA

LOT 7
RETAIL PAD 5
MAX DENSITY = 25
NOT TO EXCEED 4,500 SF.
PHASE IIIB

LOT 8
RETAIL PAD 6
MAX DENSITY = 25
NOT TO EXCEED 4,500 SF.
PHASE IIIC

LOT #	HEIGHT LIMITATION	F.A.R.	PROPOSED USE	AVERAGE
LOT 1	26 FEET	.30	C-2	0.8572
LOT 2	26 FEET	.30	C-2	0.4185
LOT 3A	26 FEET	.10	C-2	1.4659
LOT 3	26 FEET	.30	C-2	1.8979
LOT 4	26 FEET	.35	C-2	1.8552
LOT 5	26 FEET	.35	C-2	1.2287
LOT 6	26 FEET	.35	C-2	0.6891
LOT 7	26 FEET	.35	C-2	0.5432
LOT 8	26 FEET	.35	C-2	1.1395
LOT 9	26 FEET	.35	O-1	0.8974

BUILDING SETBACKS WILL BE TO THE CONDITIONS LISTED IN THE CITY ZONING CODE FOR C-2 USES.

LEGAL DESCRIPTION:

[illegible]

CURRENT ZONING: C2 INCLUDING ALL PERMISSIVE AND CONDITIONAL USES

TOTAL ACREAGE: 21.3983 AC.
ZONE ATLAS: C-10-Z

BUILDING AREA & PARKING CALCULATIONS:

BUILDING AREA		LESS TRAFFIC CREW (15%)
MAJOR 1	64,000 SF. / 200 = 384 SPACES	= 326 SPACES
MAJOR 2	23,000 SF. / 200 = 115 SPACES	= 103 SPACES
MAJOR 3	30,000 SF. / 200 = 150 SPACES	= 128 SPACES
SHOPS A	10,600 SF. / 200 = 54 SPACES	= 46 SPACES
TOTAL	126,881 SF.	= 646 SPACES = 646 SPACES

ALL RETAIL PADS ARE SELF-PARKING LOTS @ 5 PER 200

646 + .25 = 646 REQUIRED SPACES

TOTAL REQUIRED SPACES = 646 SPACES
TOTAL PROVIDED SPACES = 661 SPACES
(INCLUDES 15 HANDICAP SPACES & 5 MOTOR CYCLE SPACES)

PARKING NOTES:

TYPICAL STANDARD SPACES ARE ——— 8'-6" x 19'-6"
TYPICAL SMALL CAR (30) SPACES ARE ——— 7'-6" x 15'-6"
TYPICAL HANDICAP SPACES ARE ——— 8'-6" x 19'-6"
WITH A 8' WIDE ACCESS AISLE

* ALL SPACES ARE STANDARD SIZE UNLESS OTHERWISE NOTED *

BIKE RACKS:

3. REQUIRED NUMBER OF BIKE RACKS (1 PER 20 CARS)
660 PARKING SPACES PROVIDED / 20 = 33 BIKE RACKS
(8 SPACES PER RACK)
8 BIKE RACKS W/ARE SPACES EACH PROVIDED
SEE DETAIL SHEET A3

NOTES:
1. SEE LANDSCAPE PLAN FOR VALLEY GUTTERS
2. SEE LANDSCAPE - SITE SHEET A-2 FOR DETAILS.
3. REQUIRED NUMBER OF BIKE RACKS (1 PER 20 CARS)
660 PARKING SPACES PROVIDED / 20 = 33 BIKE RACKS
(8 SPACES PER RACK)
8 BIKE RACKS W/ARE SPACES EACH PROVIDED
SEE DETAIL SHEET A3
4. MINIMUM FLOOR AREA RATIO TO EXCEED .35 FOR RETAIL PADS.
5. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AND PROFESSIONAL ARCHEOLOGISTS ACROSS ALL LOTS & OWNERS OF THIS SITE PLAN AND SHALL BE RESPONSIBLE FOR THE REPAIR.
6. PRIOR TO DEVELOPMENT, CITY OF ALBUQUERQUE SHALL AND OWNERS SHALL ENSURE TO THESE PROVISIONS MAY BE VIOLATED FOR ENFORCEMENT BOTH THE PUBLIC WORKS DEPARTMENT, CITY OF ALBUQUERQUE, VIA A PERMIT FOR A WORK AND DRAINAGE WORK AVAILABILITY STATEMENT.

VICINITY MAP
NTS

1 SITE PLAN FOR SUBDIVISION
Scale: 1" = 60'-0"

N 60 0 30 60 120 240

SIGNATURE BLOCK

THIS PLAN IS CONSISTANT WITH THE SPECIFIC DEVELOPMENT PLAN APPROVED BY THE ENVIRONMETAL PLANNING COMMISSION ON _____
EPC CASE #_____ DRB CASE #_____

PLANNING DIRECTOR — DATE
APPROVED AS TO THE REQUIREMENTS

TRAFFIC ENGINEER — DATE

AMAFCA — DATE

CITY ENGINEER — DATE

WATER RESOURCES, UTILITIES DIVISION — DATE

PARKS / CIP — DATE

REV	DATE	BY	REVISION
1			-
2			-
3			-
4			-
5			-

GEORGE RAINHART, ARCHITECT & ASSOCIATES P.C.
2325 SAN PEDRO NE., SUITE 2-B
ALBUQUERQUE, NEW MEXICO 87110
PHONE (505) 884-9110 FAX (505) 837-9877

PROJECT TITLE: LA CUEVA TOWN CENTER
NEC OF WYOMING BOULEVARD & PASEO DEL NORTE
ALBUQUERQUE, NM

PROJECT MANAGER: GEORGE RAINHART, AIA
JOB NO. 97008
DRAWN BY: BDC

START DATE: 3-18-99
SCALE: 1" = 60'-0"

sht of

Wyoming system which flows north to Bear Canyon Channel. The other system collects the storm water south of the vacated Holly Avenue and discharges the storm water to the Wyoming storm drain system which flows south to the Paseo del Norte system. This follows the Master Drainage Plan for Window "G". (See attached Developed Conditions Basin Map.) Basins A through E represent onsite basin and E and F represent properties owned by others that contribute flows to La Cueva Town Center site (offsite). During the interim condition (before BCPW road improvements are complete) our site will accept the 321 cfs flows from the tributary arroyo (AP-1) that crosses a 30' wide tip at the southeast corner of the site to allow flows to continue to the Paseo del Norte right of way. When the BCPW road improvements are complete, the Ultimate Conditions the Master Drainage Plan will have been met and no offsite flows from the tributary arroyo will enter the La Cueva Town Center site.

The developed basins have flows rates of: Basin A: 58.054; Basin B: 15.378; Basin C: 15.849; Basin D: 4.284 cfs; Basin E: 1.266 cfs; Basin F: 4.521 cfs, and Basin G: 12.184 cfs.

BASIN	DEVELOPED Q100 (CFS)	DEVELOPED V100 (CF)
A	58.054	97019
B	15.378	25700
C	15.849	26487
D	4.284	7160
E	1.266	2116
BASIN	DEVELOPED Q100 (CFS)	DEVELOPED V100 (CF)
F	4.521	7555
G	12.184	20362

Basin A is composed of the southern portion of the grocery store site, lot 2, three adjacent retail sites, lots 1 and 2, future pad sites, Lots 2A, 5, 6, 7, 8 and the eastern entrance from Carmel Avenue. The roofs of the grocery store and adjacent buildings are pitched in the middle and have internal roof drain system that are connected to the proposed onsite storm

sewer system. (See appendix C for roof drain analysis.) The entrance from Carmel Avenue is sloped at 4 percent and the runoff is channeled to a type "D" inlet. The asphalt driveway along the Phase I retail stores is sloped east to west and the storm water runoff sheet flows to two inlets at the west end of the retail stores. These inlets are connected to the onsite storm water system which discharges to Wyoming. The asphalt parking lot is graded to sheet flow east to west at a two to three percent slope to the desilting pond in Lot 2A. The desilting pond and the onsite storm sewer system is then connected to the existing headwall and 36" RCP found at the corner of Paseo del Norte and Wyoming. (See figure 3.) The existing headwall will be replaced with a type E storm sewer manhole. The existing 36" RCP is connected to the 48 " RCP in Wyoming Boulevard as shown on figure 3. This system is connected to the new 78" storm sewer pipe found in Paseo del Norte. (See Grading and Drainage Plan and storm sewer system in Appendix C.) Lots 2A and 5 are to be developed in Phase II of the construction process. During Phase I these lots will be rough graded to drain to the desilting pond on Lot 2A, which discharges to the Wyoming storm sewer system. This desilting pond, and all desilting ponds within this development, will be constructed during Phase I. Lots 6, 7 and 8 are future pad sites and are within the Phase III construction process. These future pad sites are to be rough graded to slope east to west at a three percent slope and storm water runoff directed to the asphalt parking lot. The runoff in the parking lot is channeled to the desilting pond located in Lot 2A. The storm water in the desilting pond is connected to a manhole located in Lot 5, via a 36" PVC pipe. This manhole is connected to a new manhole that replaced the existing headwall. This existing storm water pipe is connected to a 48" RCP in Wyoming. The 48" RCP in Wyoming flows south to the 78" pipe in Paseo del Norte. The desilting pond will capture the silt from undeveloped Lots 5, 6,7,8, the parking lot. This basin contains ± 12.466 acres and discharges 58.054 cfs into the Wyoming Boulevard public storm water system which is connected to the 78" pipe in Paseo del Norte and flows west.

Basin B consists of ± 3.302 acres and flows from east to west to the west drive entrance from Carmel Avenue. This basin is comprised of one half of the building area of the grocery store, Lot 2 and adjacent buildings, Lots 1 and 3. The internal roof drains along the northern roof of the Smith's and adjacent building will be connected to the proposed onsite storm sewer system. (See storm sewer analysis in Appendix C.) This storm sewer system discharges to the public storm drain system in Wyoming which flows north and discharges to the North Domingo Baca. The proposed storm drain system consists of a series of drop inlets found within the paved parking and driveways. (See the grading and drainage plan.) This system will be connected to the existing 36" stub located at the southeast corner of Wyoming Boulevard and Carmel Avenue. This existing pipe is connected to the Wyoming storm water system. (See Figures 3 and 4.) This is in accordance with the Master Drainage Plan. Basin B, under developed conditions, discharges 15.378 cfs into the public storm water system.

Basin C is located at the northwest corner of the site, (Lot 4) and will be developed in Phase II. For this submittal, Phase I the site will be rough graded to sheet flow to a desilting pond. When the site is developed a drop inlet will be constructed and connected to the onsite storm water system. This basin contains 3.403 acres and under developed conditions this basin discharges 15.849 cfs into the public storm water system in Wyoming.

Basin D, (Lot 9) is located between the vacated Holly Avenue and the eastern entrance on Carmel Avenue. This basin is for a proposed office site and will be developed in Phase II. Until the site is developed the basin will be graded to a desilting pond. Within this desilting pond is a type "D" inlet which is connected to the onsite storm water system. When the basin is developed an inlet will be placed on site to carry the developed runoff to the storm water system. This basin contains 0.920 acres and under developed conditions discharges 4.284 cfs.

Basin E is the main entrance to the shopping center from Wyoming Boulevard. Due to the overall size of the site, the existing slopes and the reconstruction of Wyoming Boulevard

this basin, which is an entrance to the proposed shopping center, slopes from 4 to 7 percent and discharges directly into Wyoming Boulevard. This basin contains ± 0.272 acres and discharges 1.266 cfs.

Basin F is an offsite basin located near the eastern property line. La Cueva Town Center, LTD.,Co has acquired permission to grade this site from the owner. The basin will be graded so that the developed storm water will enter our site via overland flow. Under developed conditions this basin will discharge 4.521 cfs onto our site. This storm water will be accepted and will sheet flow across the south parking Lot to the desilting pond in Lot 2A.

Basin G is an offsite basin located along Carmel Ave and north of Basin B. Presently the basin slopes from east to west at a 5 to 6 percent. Under developed conditions this 2.616 acre site discharges 12.184 cfs. The storm water enters the proposed site at a swale located in the west entrance on Carmel Avenue and then into the onsite storm water system.

Several desilting ponds are located onsite. They are in areas of future development. The desilting ponds were designed to keep the sediment carried in the flows across the site on site and out of the public storm drain system. As the site is developed the desilting ponds will be removed and replaced with inlets.

Emergency Conditions

For emergency conditions the storm water will be carried in the service roads and parking lots to the desilting ponds. Under fully developed conditions, the storm water will flow through the parking lots to the service roads and into the streets.

Infrastructure List

See Appendix B

Summary

The grading and drainage plan and storm water management plan for this project meets the criteria developed in the Master Drainage Plan for Window G (C19/D11) as approved by the City of Albuquerque. The Master Drainage Plan shows the site being divided into two basins, The northern basin which discharges 63 cfs into the public storm drain system in Wyoming Boulevard and the southern basin which discharges 67 cfs of developed storm water into the public storm water system in Paseo del Norte when both storm drains are installed and functional. This plan has the developed storm water for this project entering the public storm water system as proposed in the Master Drainage Plan. We have 47.7 cfs entering the public storm water system near Wyoming and Carmel and 62.6 cfs entering the Paseo del Norte storm water system. A small flow of 1.266 cfs enters Wyoming directly and is an insignificant contribution to Wyoming Boulevard. This drainage plan discharges less storm water to the public system than the allowed in the Master Drainage Plan. All public infrastructure immediately adjacent to the site or upstream is under construction. All other drainage improvements are private.

RUNOFF SUMMARY TABLE -DEVELOPED CONDITIONS

ONSITE BASINS

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	42315	12.466	0.0015178
B	113944	3.302	0.0040872
C	602691	3.403	0.0216186
D	272485	0.920	0.0097740
E	11825	0.272	0.0004241

BASIN	DEVELOPED Q100 (CFS)	DEVELOPED V100 (CF)
A	58.054	97019
B	15.378	25700
C	15.849	26487
D	4.284	7160
E	1.266	2116

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
F	42297	0.971	0.0015172
G	113953	2.616	0.0040875

BASIN	DEVELOPED Q100 (CFS)	DEVELOPED V100 (CF)
F	4.521	7555
G	12.184	20362

APPENDIX A

TIERRA WEST LLC
4421 McLeod Road NE, Suite D, Albuquerque, NM 87109 Phone (505) 883-7592 - Fax (505) 883-7034

RUNOFF CALCULATIONS

Date: Jan. 29, 1999 Project: La Cueva Town Center Zone Atlas: C-19

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 3
Land treatment descriptions are in Table A-4.

1. RUNOFF RATE COMPUTATION

Use Equation A-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

EXISTING CONDITIONS (CFS)

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q_P
Basin 1	1.870	6.026	2.600	0.000	3.450	0.000	5.020	0.000	11.269
Basin 2	1.870	5.922	2.600	0.000	3.450	0.000	5.020	0.000	11.074
Basin 3	1.870	8.415	2.600	0.000	3.450	0.000	5.020	0.000	15.736
Total									**38.079**
OFFSITE FLOWS - EXISTING CONDITIONS (CFS)									
Basin 4	1.870	2.616	2.600	0.000	3.450	0.000	5.020	0.000	4.892
Basin 5	1.870	0.971	2.600	0.000	3.450	0.000	5.020	0.000	1.816
Total									**6.708**
DEVELOPED RATE OF RUNOFF (CFS)									
Basin A	1.870	0.000	2.600	1.870	3.450	0.000	5.020	10.596	58.054
Basin B	1.870	0.000	2.600	0.495	3.450	0.000	5.020	2.807	15.378
Basin C	1.870	0.000	2.600	0.510	3.450	0.000	5.020	2.893	15.849
Basin D	1.870	0.000	2.600	0.138	3.450	0.000	5.020	0.782	4.284
Basin E	1.870	0.000	2.600	0.041	3.450	0.000	5.020	0.231	1.266
									94.831
Basin F	1.870	0.000	2.600	0.146	3.450	0.000	5.020	0.825	4.521
Basin G	1.870	0.000	2.600	0.392	3.450	0.000	5.020	2.224	12.184
Total									**16.705**

2. RUNOFF VOLUME COMPUTATION

Use Equation A-5 to compute weighted excess precipitation:

Weighted E = "E" = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D)/(A_A + A_B + A_C + A_D)$

$(A_A + A_B + A_C + A_D) = \sum A_i$

Use Equation A-6 to compute the volume:

V_{360} = "E" x $(A_A + A_B + A_C + A_D)$ x 3630 feet^3/acre·inch

Values of E_i are from Table A-8, and are in inches. Area values are in acres.

BASIN	E_A	A_A	E_B	A_B	E_C	A_C	E_D	A_D	$\sum A_i$	"E"	V_{360}
ONSITE EXISTING VOLUME OF RUNOFF (CF)											
Basin 1	0.66	6.026	0.92	0.000	1.29	0.000	2.36	0.000	6.026	0.660	14437.0
Basin 2	0.66	5.922	0.92	0.000	1.29	0.000	2.36	0.000	5.922	0.660	14188.0
Basin 3	0.66	8.415	0.92	0.000	1.29	0.000	2.36	0.000	8.415	0.660	20161.0
Total											**48786.0**
OFFSITE BASINS EXISTING VOLUME OF RUNOFF (CF)											
Basin 4	0.66	2.616	0.92	0.000	1.29	0.000	2.36	0.000	2.616	0.660	6267.0
Basin 5	0.66	0.971	0.92	0.000	1.29	0.000	2.36	0.000	0.971	0.660	2326.0
Total											**8593.0**
DEVELOPED VOLUME OF RUNOFF (CUBIC FEET)											
ONSITE EXISTING VOLUME OF RUNOFF (CF)											
Basin A	0.66	0.000	0.92	1.870	1.29	0.000	2.36	10.596	12.466	2.144	97019.0
Basin B	0.66	0.000	0.92	0.495	1.29	0.000	2.36	2.807	3.302	2.144	25700.0
Basin C	0.66	0.000	0.92	0.510	1.29	0.000	2.36	2.893	3.403	2.144	26487.0
Basin D	0.66	0.000	0.92	0.138	1.29	0.000	2.36	0.782	0.920	2.144	7160.0
Basin E	0.66	0.000	0.92	0.041	1.29	0.000	2.36	0.231	0.272	2.144	2116.0
Total											**158482.0**
ONSITE BASINS DEVELOPED VOLUME OF RUNOFF (CF)											
Basin F	0.66	0.000	0.92	0.146	1.29	0.000	2.36	0.825	0.971	2.144	7555.0
Basin G	0.66	0.000	0.92	0.392	1.29	0.000	2.36	2.224	2.616	2.144	20362.0
Total											**27917.0**

APPENDIX B

DRB Case No: 98-402
Project Number:
Date Submitted:
Prelim. Plat Approved:
Prelim. Plat Expires:

"EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENTS
DEVELOPMENT REVIEW BOARD (DRB)REQUIRED INFRASTRUCTURE LISTING
FOR: **LA CUEVA TOWN CENTER**

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed for the above development. This summary is not necessarily a complete listing. During CPC, BCC, the design process and/or in the preparation of the construction drawings, if the City, County, and/or AMAFCA determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider's responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City, County, and/or AMAFCA.

Public Improvements

Size	Type Improvement	Location	From	To
24 F-F	Arterial Paving	Wyoming Boulevard	Paseo del Norte	Carmel Ave
	Curb & gutter, and sidewalks			
12'	275' Right Turn Lane	Wyoming Boulevard	Wyoming Boulevard	San Antonio
12'	Turn Lane and Transistion	Wyoming Boulevard	Wyoming Boulevard	San Francisco
1	Intersection Improvements	Wyoming Boulevard	Wyoming Boulevard	Carmel Ave
6'	Sidewalk	Wyoming Boulevard	Paseo del Norte	Carmel Ave
13'	Trail	Paseo del Norte	Wyoming Boulevard	East Property Line
6'	Sidewalk	Carmel Avenue	Wyoming Boulevard	West 680' along Carmel Ave
6'	Sidewalk	Carmel Avenue	East Property Line	West 570' to Service Road
8"	Water PVC Line	North Service Road	Wyoming Boulevard	Carmel Ave
8"	Water PVC Line	West Service Road	270' South Carmel Avenue	270" North of Paseo del Norte
8"	Water PVC Line	Wyoming Entrance	Wyoming Boulevard	385' East of Wyoming
8"	Water PVC Line	South Parking Lot	385' East of Wyoming	Carmel Ave
6"	Water PVC Line	South Parking Area	880" East of Wyoming	160' West of Eastern Property line
6"	Water PVC Line	South Parking Area	275' North of Paseo del Norte	490' North of Paseo del Norte
8"	SAS Gravity Line	Wyoming Entrance	Wyoming Boulevard	385' East of Wyoming
8"	SAS Gravity Line	South Parking Area	275' North of Paseo del Norte	490' North of Paseo del Norte
6"	SAS Gravity Line	Service Road	385' East of Wyoming	180' West of Carmel Ave
6"	SAS Gravity Line	South Parking Area	160' East of Wyoming	160' West of East Property Line
6'	Sidewalk	Wyoming Boulevard	Paseo del Norte	Carmel Ave
13'	Trail	Paseo del Norte	Wyoming Boulevard	East Property Line
	Water infrastructure to include valves, fittings, valve boxes, fire hydrants as requried			
	Sanitary Sewer to include manholes, service connections, as required			
	Certified Grading and Drainage Plan with Private retaining wall and provate drainage (none-work order item) required for SIA/Finacial Guarentee release.			

Prepared By: _____

Print Name: Ronald R. Bohannan, P.E.

Firm: Tierra West LLC

****

Development Review Board Member Approvals

Transportation Dev.	Date	Design & Development, CIP	Date
City Engineer/AMAFCA	Date	Utility Dev.	Date
DRB Chairman	Date		

APPENDIX C

APPENDIX C

PROPOSED ENTRY

LANDSCAPING BERM

UNIDIRECTIONAL RAMP PER C.O.A. STANDARDS

RAMP UP TO SIDEWALK

NEW

NEW F.H.

8' HIGH x 450' LONG CMU WALL W/LANDSCAPING BUFFER

GATED REFUSE ENCLOSURE PAINTED TO MATCH BLDG.

GATED REFUSE ENCLOSURE PAINTED TO MATCH BUILDING

TRASH COMPACTOR

DOCK

LANDSCAPING BUFFER

LOT 3

① SHOPS A 10,800 SF.

Q = 0.62
V = 1062

2 ~ 4"ϕ

② Smiths

MAJOR 1
PROPOSED MARKET
64,800 SF.

Q = 3.73
VOL = 6372

LOT 2

3 ~ 6"ϕ Pipes

Q = 1.35 CFS
V = 2311

③ MAJOR 2
23,500 SF.

LOT 1

2 - 4"ϕ

Q = 1.72 CFS
V = 2950

④ MAJOR 3
30,000 SF.

2 ~ 6"ϕ Pipes

LANDSCAPIN W/KEYSTON

6' S SIDE

PLANTER

ATM LOCATION

CONCRETE RAMP TYPICAL

CONCRETE RAMP TYPICAL

CONC. RAMP TYPICAL

BIKE RACKS TYP. PER C.O.A

RAISED CONC. TYPICAL

RAMP UP TO SIDEWALK

HC PARKING PER C.O.A STANDARDS

FLUSH W/ASPHALT TYP. @ HC PARKING

HC PARKING W/ SIGNS TYPICAL

PARKING BUMPER

SITE LIGHTING POLE SEE SHEET A3

TREE PLANTER TYPICAL

6' CONCRETE SIDEWALK PER C.O.A. STANDARDS

8' CONCRETE SIDEWALK (TYP.)

CONCRETE HC PER C.O.A. ST

RAISED PEDEST CROSSWALK (C

6' CONCRETE PER C.O.A. ST

PHASE I

Roof Drains

- Land = D
- AREA = Ac

$Q_{100} = 5.02 \times A_D$

$V_{100} = 2.36 \times A_D \times 3630 =$

Building 1

AREA = 10,800 SF / = 5400 ft² 2-4" pipes = 2 x .27 = 0.54

$Q_{100} = 5.02 \times 0.124^2$, $Q_{100} = 0.62$ CFS

$V_{100} = 2.36 \times 0.124 \times 3630 = 1062$ CF

Building 2

AREA = 64,800 SF/2 = 32,400

$Q_{100} = 5.02 \times 0.734 = Q_{100} = 3.73$ CFS 8"

$V_{100} = 2.36 \times 0.734 \times 3630 = 6372$ CF

Building 3

AREA = 23,500 SF/2 = 11,750 ft²

$Q_{100} = 5.02 \times 0.270 = Q_{100} = 1.35$ CFS

$V_{100} = 2.36 \times 0.270 \times 3630 = 2311$ CF

Building 4

AREA = 30,000 SF/2 = 15,000

$Q_{100} = 1.72$ CFS

$V_{100} = 2950$ CFS

100 yr, 6 hr storm

BUILDING No. 1

$Q_{100} = 0.62$ CFS
$V_{100} = 1062$ CF

Time for water to leave roof

$\frac{1062 \text{ CF}}{0.54 \text{ CFS}} = 1967 \text{ sec} = 33 \text{ min}$

2-4" ROOF DRAINS

$Q = 2 \times 0.27 = 0.54$ CFS

$t_c = 0.078 \left(\frac{L^{0.77}}{S^{0.385}} \right)$ => $S = .02$ $t_c = 11$ min
$L = 90$

BUILDING No 2.

$Q = 3.73$ CFS
$V = 6372$ CF

3 ~ 6" pipes = $3 * 0.80 = 2.40$ CFS

$t_c = 0.078 \left(\frac{100^{0.77}}{5^{.385}} \right) = 12.2$ min

Building No. 3

$Q = 1.35$ CFS
$V = 2311$

$V = \frac{2311}{Q = .54} \cdot t = t = 71$ min

2 ~ 4" ϕ pipes $= 2 * .27 = 0.54$ CFS

Building No. 4

Q = 1.72 cfs ... 2 ~ 6" ∅ pipes = 2x, 80 = 1.60 cfs

X = 2950

$$t = \frac{2950}{1.60} = 31 \text{ min}$$

MATCHLINE
SEE GRADING AND DRAINAGE
PLAN - A

INLET NO. 9

INLET NO. 8

MANHOLE NO. 9

MANHOLE NO. 8

MANHOLE NO. 7

INLET NO. 7

MANHOLE NO. 11

MANHOLE NO. 10

MANHOLE NO. 12

HOLLY AVENUE NE

WYOMING BOULEVARD, NE

PASEO DEL NORTE

PHASE I
LOT 2A

LOT 9
PHASE IID

LOT 8
PHASE IIC

LOT 7
PHASE IIB

LOT 6
PHASE IIA

LOT 5
PHASE IIA

LOT 2

LOT 1

EXISTING 4' RETAINING WALL

APPROXIMATE LOCATION
100 YEAR FLOOD PLAIN

WILSON & CO. DESIGNING
AND CITY CONSTRUCTING
SOUTH BOLINO LAKES
OF WYOMING

NGS MONUMENT
"HEAVEN"
X=1518737.03
Y=407051.31
C-C=0.99965353
Δpm=-00°10'46"
CENTRAL ZONE
(NAD 1927/SLDM 1929)
ELEVATION=5578.79

PAD=5409.00
FF=5410.60

PAD=5412.92
FF=5413.75

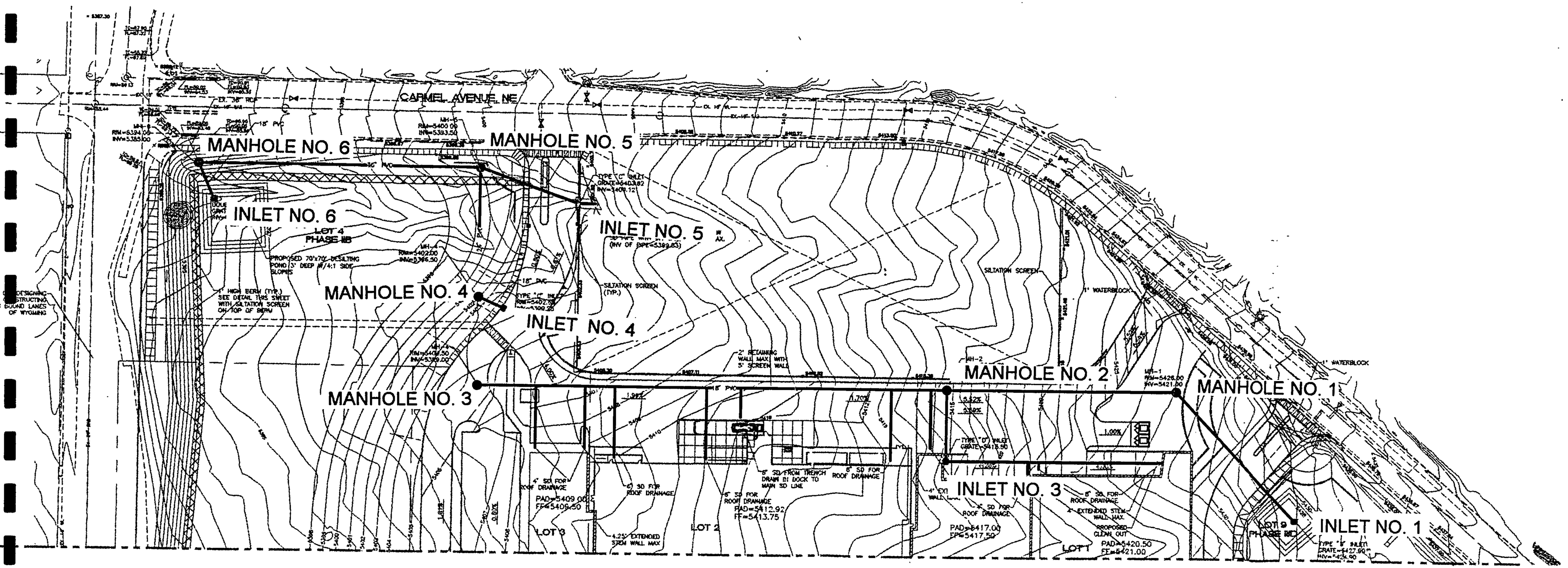
PAD=5417.00
FF=5417.50

PAD=5420.50
FF=5421.00

N

ROUGH GRADING APPROVAL — DATE

ENGINEER'S SEAL	LA CUEVA TOWN CENTER	DRAWN BY BDS
	STORM SEWER LAYOUT	DATE 3-29-99
		981SWER.DWG
	TIERRA WEST, LLC 4421 McLEOD ROAD, N.E., SUITE D ALBUQUERQUE, NEW MEXICO 87109 (505)883-7662	SHEET # C3
RONALD R. BOHANNAN P.E. #7868		JOB # 980012


CARMEL AVENUE NE
MANHOLE NO. 6
MANHOLE NO. 5
INLET NO. 6
INLET NO. 5
MANHOLE NO. 4
INLET NO. 4
MANHOLE NO. 3
MANHOLE NO. 2
MANHOLE NO. 1
INLET NO. 3
INLET NO. 1
LOT 4 PHASE IIB
PROPOSED 70'x70' DESILTING POND 3' DEEP W/4:1 SIDE SLOPES
1' HIGH BERM (TYP.) SEE DETAIL THIS SHEET WITH SILTATION SCREEN ON TOP OF BERM
SILTATION SCREEN (TYP.)
SILTATION SCREEN
1' WATERBLOCK
2' RETAINING WALL MAX. WITH 5' SCREEN WALL
4" SD FOR ROOF DRAINAGE
PAD=5409.00
FF=5409.50
6" SD FOR ROOF DRAINAGE
4.25' EXTENDED STEM WALL MAX
5" SD FOR ROOF DRAINAGE
PAD=5412.92
FF=5413.75
8" SD FROM TRENCH DRAIN BY DOCK TO MAIN SD LINE
8" SD FOR ROOF DRAINAGE
4" EXT WALL
4" SD FOR ROOF DRAINAGE
PAD=5417.00
FF=5417.50
6" SD FOR ROOF DRAINAGE
4" EXTENDED STEM WALL MAX
PROPOSED CLEAN OUT
PAD=5420.50
FF=5421.00
LOT 3
LOT 2
LOT 1
LOT 9 PHASE IIC
TYPE "C" INLET GRATE=5403.82
INV=5409.12
TYPE "D" INLET GRATE=5415.90
TYPE "S" INLET GRATE=5427.60
INV=5424.50
DESIGNING CONSTRUCTING SOUND LANES OF WYOMING

STORM DROP INLET-EFFECTIVE AREA

Single 'C'

Area at the grate:

L = 38.375" - 7(½" middle bars)
= 34.875"
= 2.906'

W = 25.5" - 13(½" middle bars)
= 19"
= 1.583'

Area = 1.583' x 2.906'
= 4.601 ft^2

Effective Area = 4.601- 4.601 (0.5 clogging factor)
= 2.30 ft^2 at the grate

Area at the throat:

L = 47.375"
= 3.95'

H = 10¾" - 4½"
= 6¼"
= 0.5208'

Area = 3.95' x 0.5208'
= 2.06 ft^2 at the throat

Total Area:

Area = $2.30_{grate} + 2.06_{throat}$
= 4.36 ft^2

STORM DRAIN INLET

EFFECTIVE AREA ASSUMING A 50% CLOGGING FACTOR

SINGLE 'D':

Area at the grate:

L = 38.375" - 7 (1/2" $_{\text{middle bars}}$)
= 34.875"
= 2.906'

W = 25.5" - 13 (1/2 $_{\text{middle bars}}$)
= 19"
= 1.583'

Area = 1.583' x 2.906'
= 4.601 ft^2

Effective Area = 4.601 - 0.5 (4.601)
= 2.30 ft^2

Effective Area = 2.30 ft^2

DROP INLET
HEAD CAPACITY

Orifice Equation:

$$Q = CA\sqrt{2gH}$$

Q = Flow (cfs)
C = 0.60
A = Area of drop inlet (ft^2)
g = 32.2
H = Height of water above drop inlet (ft)

$$H = \frac{\left(\frac{Q}{C*A}\right)^2}{2g}$$

$$H = \frac{\left(\frac{36.995}{0.6*11.24}\right)^2}{2*32.2}$$

H = 0.47 feet

Allowable depth = 0.847 feet
Required depth = 0.47 feet

0.47 feet < 0.847 feet

Inlet No. 1

Grate EL = 5427.90

AREA OF BASIN = 10,300 SF = .2364 AC.
Under developed Conditions
Land Treatment "D" = 5.02

$Q = 5.02 \times .2364$ Ac
$Q = 1.187$ CFS

FOR A USED 2.3

EFFECTIVE AREA OF TYPE "D" IS 2.30 FT²

Pipe Capacity=

$$Q = \frac{1.49}{n} * A * R^{2/3} \cdot S^{1/2}$$

12" PIPE
$n = 0.013$
$s = 13.90/180 = 2.167$
$Q_{cap} = 5.26$
$Q_R = 1.187$ CFS

12" pipe @ 2.167 CFS

HEAD CAPACITY

Orifice Eqn

$$Q = CA\sqrt{2gH}$$

$C = .6$
A = AREA OF inlet 2.30 FT
$g = 32.2$ FT²/s

H = height of Water above drop inlet

$$H = \frac{\left(\frac{Q}{CA}\right)^2}{2g} \quad H = \frac{\left(\frac{1.187}{.6 * 2.3}\right)^2}{64.4} = 0.0115 \text{ FT}$$

MANHOLE No. 1

Rim EL = 5426.0
Inv EL = 5421.0

CHECK H
ORIFICE eqn

$H = \frac{\left(\frac{Q}{C \cdot A}\right)^2}{2g}$ — Q = 1.187
C = 0.6
A = ~~AREA OF~~ 12" pipe
= 0.79

H = 0.0974

Inlet No 2 — why do we need this - slope away from inlet

Type "D"
GRATE EL = 5417.00
Inlet EL = 5414.00

DELETED

Inlet No. 3

Flows into inlet =
ROOFS = $Q' s = \frac{1.35}{2} + 1.72 = 2.395$ CFS

AREA OF BASIN = 10,307.81 SF = 0.23664 AC
Q = 5.02 x 0.24
Q = 1.188 = 1.2 CFS

Grate EL = 5413.50
Inv. = 5411.50
$S = \frac{14 - 11.5}{218} = \frac{2.5}{218} = 0.01146$
Q = 3.83
$Q_{REQ} = 3.595 = 3.60$

MANHOLE No. 2

~~AREA~~ = 0.79 = T^2
Q = 3.60

Rim EL = 5419.75
Inv. EL = 5409.50

CHECK H

$H = \frac{\left(\frac{Q}{CA}\right)^2}{2g} = 0.8957$

PIPE FROM INLET NO. 3 to MH No. 2

Q_R = 3.60

$S = \frac{10.5 - 9.5}{75} = 0.0133 = 1.33\%$

Q_{cap} = 4.12 > 3.60 ok

MANHOLE No. 3

Q = 8.32

Sub. basin

ROOFS = 0.62 + 3.73 + 1.35 + 1.72 + 1.2 = 8.62

A = 1.5

H = 1.4244

Pipe - Manhole No. 2 → Manhole No 3

$S = \frac{5409.50 - 5400.00}{480'} = 0.1979 = 1.98\%$

AREA 18" = 1.77

Q_{cap} = 14.82

Q_{REQ} = 8.62

Inlet No. 4 -

AREA OF BASIN = 87,747 = 2.0144 AC.

Q = 5.02 x 2.0144 = 10.11 CFS

TYPE "C" GRATE

GRATE ELEV = TOP. OF Grate = 5402.75

EFFECTIVE AREA = 2.30 FT²

TOTAL AREA = 4.36 FT²

HEAD CAPACITY - ORIFICE EQ'N

Inlet Capacity

$Q = CA\sqrt{2gH}$

Solve for H - $H = \frac{\left(\frac{Q}{CA}\right)^2}{2g} =$

Q = 10.11

A = 2.30

H = 0.8334 ok

Manhole No. 4

Rim = 5402
Inv = 5396.50

$$H = \frac{\left(\frac{Q}{CA}\right)^2}{2g}$$

A = 2
Q = 8.32 + 10.11 = 18.43
C = .6
g = 32.2

H = 3.66

Inlet No. 5

BASIN AREA = 123154.60
= 2.827 Ac
Q = 5.02 x 2.40 + 2.60 x 0.424
= 13.15

Type C.

$$H = \frac{\left(\frac{Q}{CA}\right)^2}{2g}$$

Q = 13.15
A = 2.30
H = 1.41

Rim = 5403.62
Inv = 5400.12
18" pipe

Manhole No. 5

Q = 8.32 + 10.11 + 13.15 = 31.58
2 pipes entering

$$H = \frac{\left(\frac{Q}{CA}\right)^2}{2g}$$

Q = 31.58
A = 24
C = .6
g = 32.2

H = 4.7796

Inlet No. 6

BASIN AREA = 110,036 SF
2.5260 AC

15% B =
85% D =

$Q = 5.02 \times 2.147 + 2.60 \times 0.379$
$Q = 11.76$

DOUBLE D

AREA = 4.60

H = 1.1276 OK

MANHOLE NO. 6

$Q_{18} = 11.763$
$Q_{36} = 31.6$

$Q = 43.36$
A = 41

H = 5.06

A = 3.5' – 42"

H = 6.6199

INLET NO. 7

BASIN AREA = 13020 SF D
+ 38600
51620 = 1.185 AC
A

Q = 5.02 x 1.185 = 5.94
1 - "D" INLET
H = 0.2887

Inlet No. 8

BASIN AREA = 19093 = 0.44 AC

Q = 5.02 x 0.44 = 2.20

TYPE C

H = 0.0395

Inlet No. 9

BASIN AREA = 2463 = .06 AC

Q = .28 CFS

H = .0006

MH No. 7

Rim = 5418.75
Inv = 5412.75

Q = 5.94 + 0.86 = 6.80
A = 1.5

H = 0.8864

MH No. 8

Q = 5.94 + 1.72 + 1.35 = 9.08
A = 18
H = 1.58

Rim = 5414.33
5408.33

MH No. 9

Inlets Roofs

Q = 5.94 + 2.20 + .28 + 6.50 = 14.92
A = 2'

H = 2.4

MH NO. 10

Q = 14.92
A = 2'
H = 2.4

MH No. 11

Q = 14.92 + 49.29 = 64.21
A = 2.5
H =

BASIN AREA = 10.58 ac.
Q = 9 x 5.02 + 1.58 x 2.60 = 49.29

DROP INLET CALCULATIONS

INLET	TYPE OF INLET	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
1	D	2.30	1.187	0.0115	1.5
2	D	2.30	0	0.0000	1.5
3	D	2.30	2.395	0.0468	1.5
4	C	2.30	10.11	0.8334	1.5
5	C	2.30	13.15	1.4100	1.5
6	D	2.30	11.76	1.1276	1.5
7	D	2.30	5.95	0.2887	1.5
8	C	2.30	2.2	0.0395	1.5
9	D	2.30	0.28	0.0006	1.5

ORIFICE EQUATION

Q = CA sqrt(2gH)

C = 0.6

g = 32.2

Pipe Capacity

Manning's Equation:

Q = 1.49/n * A * R^(2/3) * S^(1/2)

A = Area

R = D/4

S = Slope

n = 0.013

Pipe	D (in)	Slope (%)	Area (ft^2)	R	Q Provided (cfs)	Q Required (cfs)	Velocity provided	Velocity (ft/s)
LA CUEVA								
INLET 1 TO MH1	12	2.167	0.79	0.25	5.26	1.19	6.70	1.51
INLET 3 TO MH2	12	1.33	0.79	0.25	4.12	2.40	5.25	3.05
MH1 TO MH2	12	4.65	0.79	0.25	7.75	3.60	9.81	4.56
MH2 TO MH3	18	2.19	1.77	0.375	15.59	8.32	8.82	4.71
MH3 TO MH4	18	3.9	1.77	0.375	20.80	8.32	11.77	4.71
MH4 TO MH5	24	2.04	3.14	0.5	32.40	18.43	10.31	5.87
MH5 TO MH6	36	3	7.07	0.75	115.84	31.58	16.39	4.47
INLET 4 TO MH4	18	9.2	1.77	0.375	31.95	10.11	18.08	5.72
INLET 5 TO MH5	15	5.8	1.23	0.3125	15.60	13.15	12.71	10.72
INLET 6 TO MH6	18	12.5	1.77	0.375	37.24	11.76	21.07	6.65
INLET 7 TO MH7	18	4.4	1.77	0.375	22.09	5.94	12.50	3.36
MH7 TO MH8	18	2.4	1.77	0.375	16.32	6.80	9.23	3.85
MH8 TO MH9	18	1.8	1.77	0.375	14.13	9.08	8.00	5.14
MH9 TO MH10	24	1.2	3.14	0.5	24.85	14.92	7.91	4.75
MH10 TO MH11	24	4.4	3.14	0.5	47.58	14.92	15.15	4.75
DE-SILT TO MH11	48	6.2	12.57	1	358.63	49.29	28.54	3.92
INLET 8 TO MH9	12	6.5	0.79	0.25	9.11	2.20	11.60	2.80
INLET 9 TO MH9	12	2.6	0.79	0.25	5.76	0.28	7.33	0.36

MANHOLE CALCULATIONS

MANHOLE	TYPE OF MANHOLE	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
1	E	0.79	1.187	0.0974	4
2	E	0.79	3.6	0.8957	4
3	E	1.50	8.62	1.4244	4
4	E	2.00	18.43	3.6627	5
5	E	3.00	31.58	4.7796	4
6	E	3.50	43.36	6.6199	7
7	E	1.50	6.8	0.8864	4
8	E	1.50	9.08	1.5805	4
9	E	2.00	14.92	2.4004	4
10	E	2.00	14.92	2.4004	4
11	E	4.00	64.21	11.1147	4

ORIFICE EQUATION

Q = CA sqrt(2gH)

C = 0.6

g = 32.2

APPENDIX D

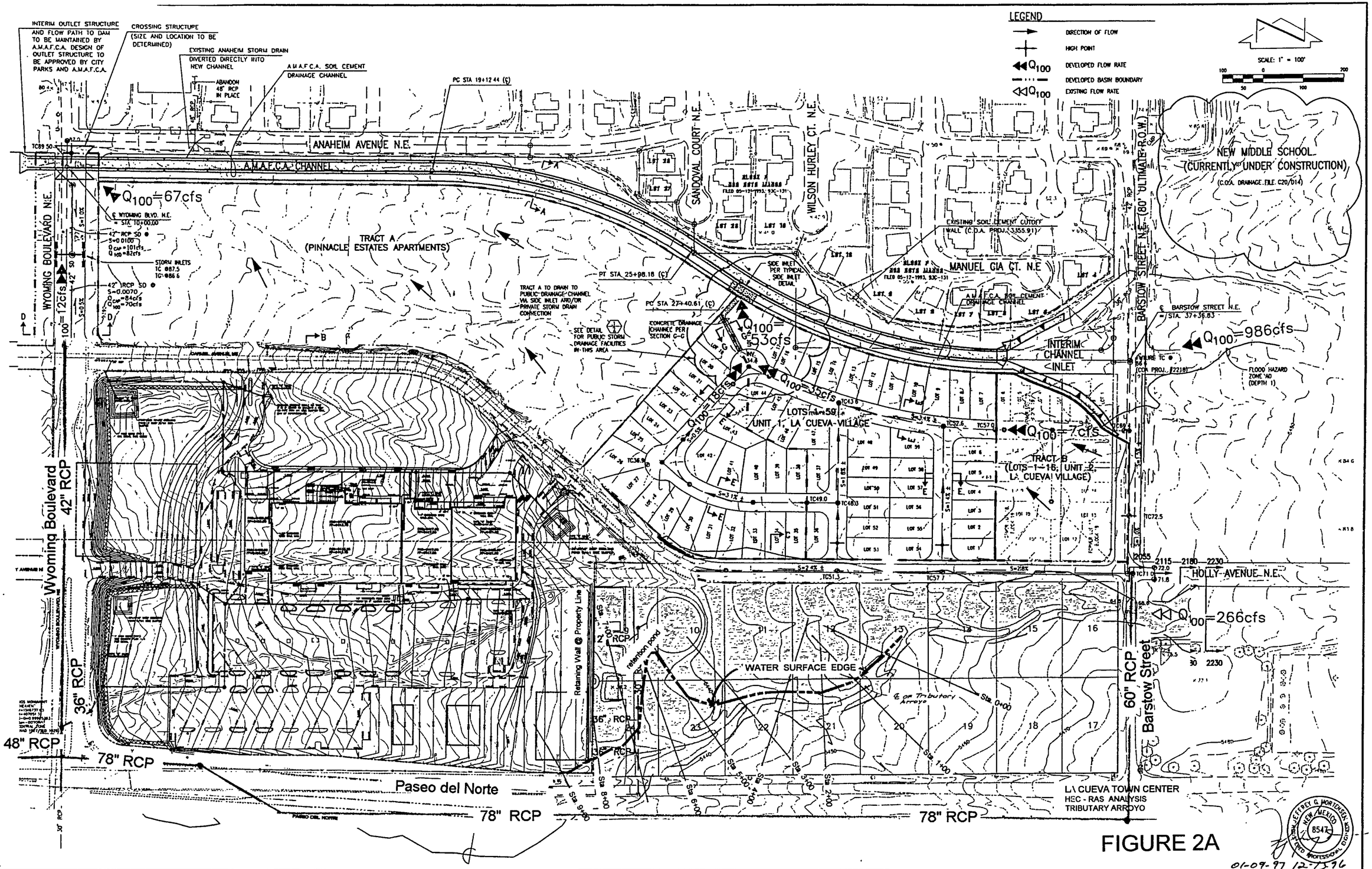


FIGURE 2A

JEFFREY G. HORTENSEN NEW MEXICO 8547 REGISTERED PROFESSIONAL ENGINEER

01-09-97 12:15:36

JEFF HORTENSEN & ASSOCIATES, INC.
6400-B HOLIDAY PARK BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87109
ENGINEERS (505) 345-4250 SURVEYORS (505) 345-4250

MASTER DRAINAGE PLAN
PROPOSED CONDITIONS
WINDOW - G

TOPOGRAPHIC DATA SHOWN HEREON IS FROM JHA SURVEY DATED 10/94

DESIGNED BY	G.H.
DRAWN BY	M.L.S.
APPROVED BY	J.G.H.

NO.	DATE	BY	REVISIONS
1	01/97	G.H.	ADD HEC-RAS @ BARSTOW

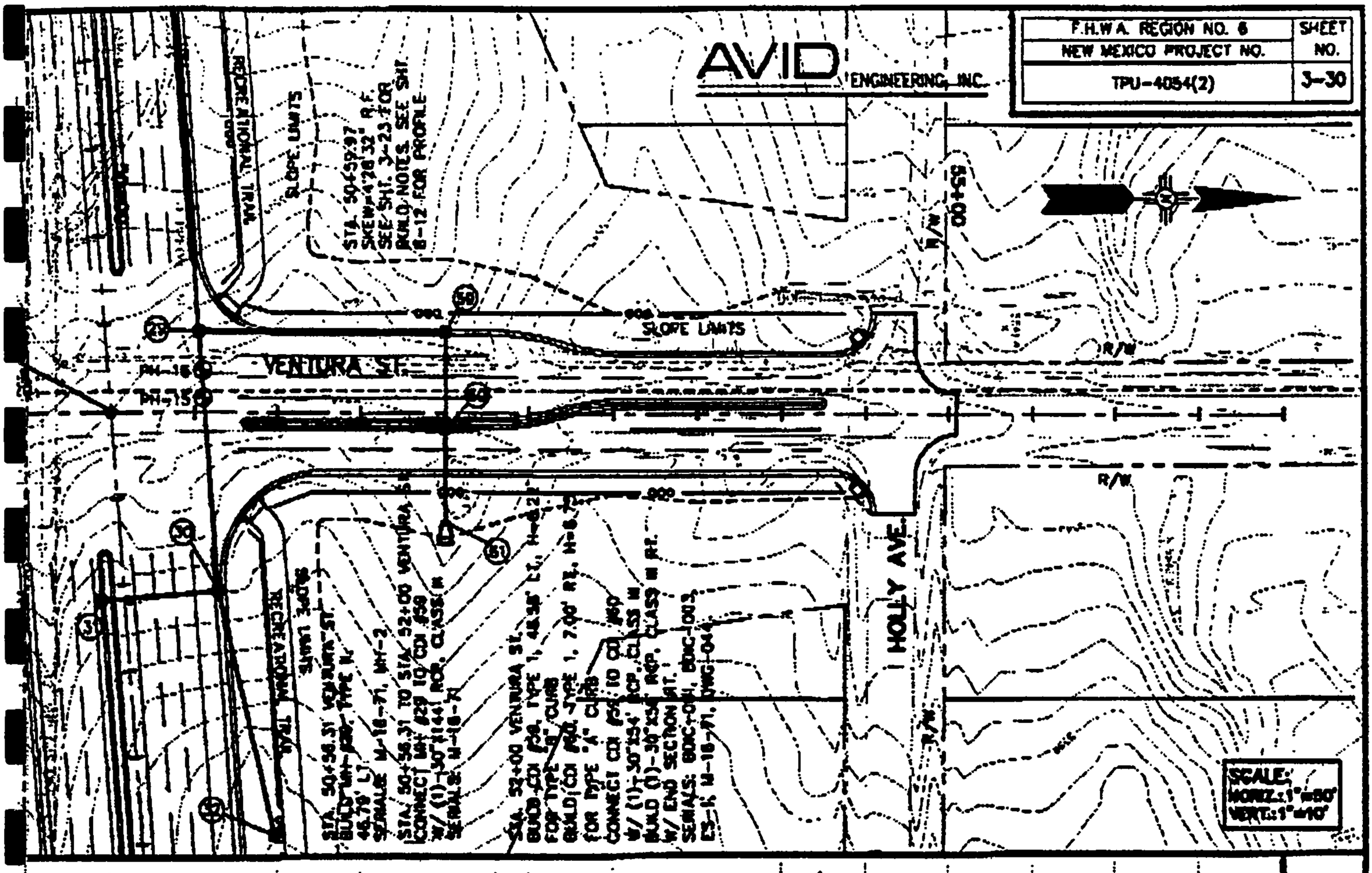
MASTER DRAINAGE PLAN
INTERIM DRAINAGE CONDITIONS

JOB NO. 940956
DATE 12-1996
SHEET 3 OF 7

APPENDIX D

AVID ENGINEERING, INC.

F.H.W.A. REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	
TPU-4054(2)	3-30



EXISTING UTILITY POTHOLE LOG
(DEPTHS SHOWN FROM EXISTING GROUND TO TOP OF UTILITY)

POTHOLE #15	12" PVC WATERLINE	DEPTH=96"
POTHOLE #16	3" COMM. CABLE	DEPTH=41"
POTHOLE #17	(2)-4" COMM. CABLE	DEPTH=36"
POTHOLE #18	2" PVC CATV	DEPTH=36"
POTHOLE #19	(3)-2" ELEC. LINES	DEPTH=100"
POTHOLE #20	12" AC WATERLINE	DEPTH=99"
POTHOLE #21	36" AC DRAIN LINE	DEPTH=57"

VENTURA STREET PLAN & PROFILE (Drainage)

NM PROJECT NO. TPU-4054(2) SHEET NO 3-30
CN 2662

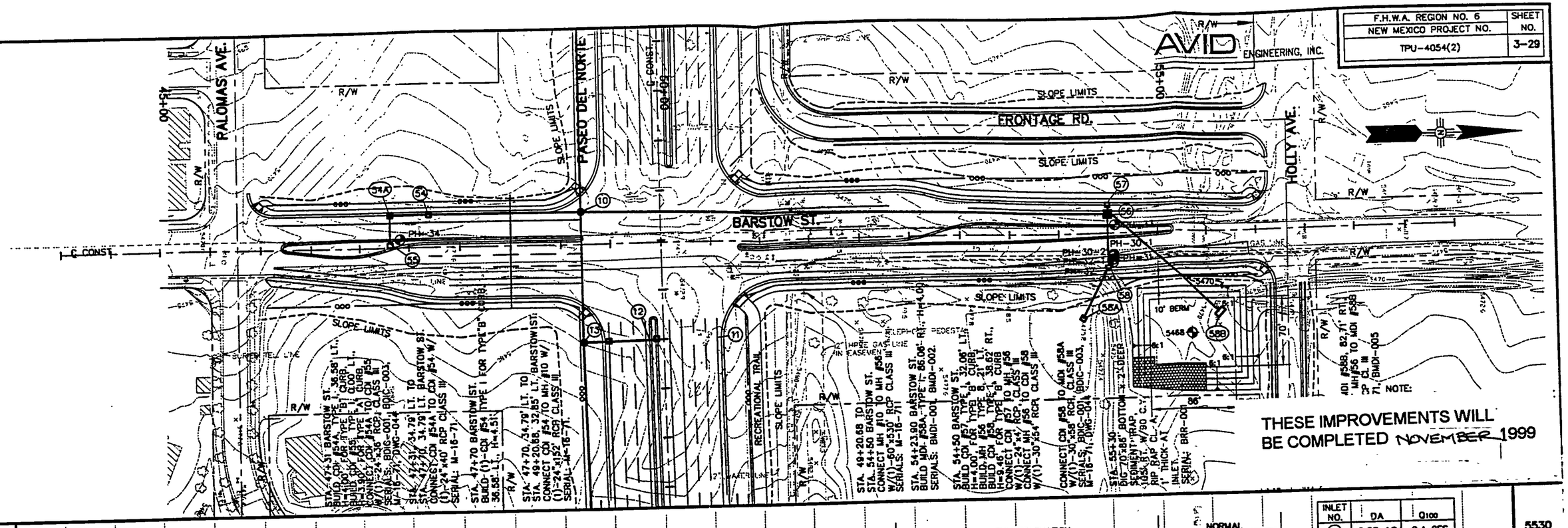
F.H.W.A. REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	
TPU-4054(2)	3-29

AVID ENGINEERING, INC.

DRAWN BY

CHECKED BY

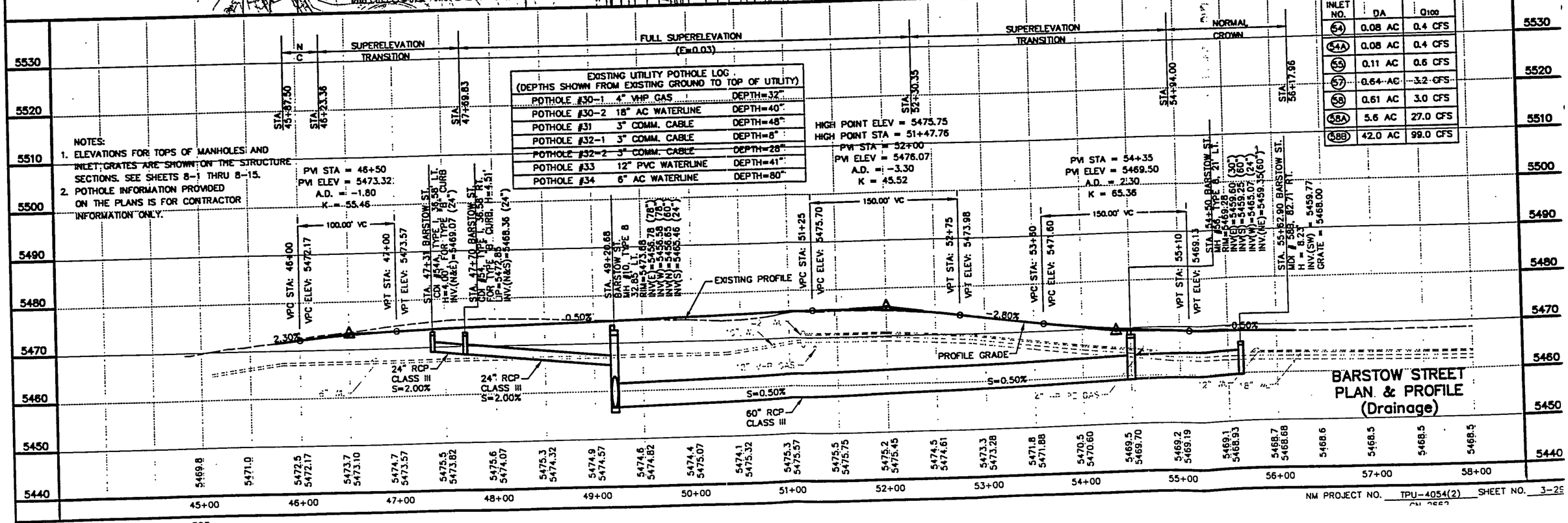
DESIGNED BY



INLET NO.	DA	Q100
54	0.08 AC	0.4 CFS
54A	0.08 AC	0.4 CFS
55	0.11 AC	0.6 CFS
57	0.64 AC	3.2 CFS
58	0.61 AC	3.0 CFS
58A	5.6 AC	27.0 CFS
58B	42.0 AC	99.0 CFS

NOTES:
1. ELEVATIONS FOR TOPS OF MANHOLES AND INLET GRATES ARE SHOWN ON THE STRUCTURE SECTIONS. SEE SHEETS 8-1 THRU 8-15.
2. POTHOLE INFORMATION PROVIDED ON THE PLANS IS FOR CONTRACTOR INFORMATION ONLY.

EXISTING UTILITY POTHOLE LOG (DEPTHS SHOWN FROM EXISTING GROUND TO TOP OF UTILITY)		
POTHOLE #30-1	4" VHP GAS	DEPTH=32"
POTHOLE #30-2	18" AC WATERLINE	DEPTH=40"
POTHOLE #31	3" COMM. CABLE	DEPTH=48"
POTHOLE #32-1	3" COMM. CABLE	DEPTH=8"
POTHOLE #32-2	3" COMM. CABLE	DEPTH=28"
POTHOLE #33	12" PVC WATERLINE	DEPTH=41"
POTHOLE #34	6" AC WATERLINE	DEPTH=80"



BARSTOW STREET PLAN & PROFILE (Drainage)

NM PROJECT NO. TPU-4054(2) SHEET NO. 3-29

5530

3b-24.dwg 12-22-98 10:17:16 am EST

JEFF MORTENSEN AND ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

FAX TRANSMITTAL:

To:	Don Hoech	From:	Graeme Means
Fax:	857-9774	Pages:	
Phone:	821-4440	Date:	02/16/99
Re:	Office Park HEC-RAS	CC:	File 980071

☐ Urgent ☐ For Review ☑ For Your Info. ☐ Please Reply ☑ As Requested

Don,

Pursuant to the suggestion of Don Dixon, I have completed a HEC-RAS computer model which demonstrates that existing 100-year flow rates will be contained in the main channel of the North Arroyo de Domingo Baca. Mr. Dixon had indicated that this analysis would demonstrate to AMAFCA and to the City that downstream developments are not endangered by the potential avulsion. The computer model is presently in a rough format (data only). In order to present this information to the City, I would add one additional sheet to the conceptual Grading and Drainage Plan for the Office Park. This sheet will show the topographic information with the section cuts and existing floodplain boundaries superimposed. The sheet will also contain a drainage narrative explaining the additional analysis, and a table which the hydraulic characteristics of the arroyo at each section.

I plan to prepare this sheet at the same time we resubmit the Conceptual Plan pending your final resolution of the access road issues. The estimated cost for preparing and submitting this additional sheet will not exceed $1,500.00. This fee includes all work I have done to date.

Please do not hesitate to call with any further questions or comments.

J. Graeme Means

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 94120

SHEET NO _____ OF _____

CALCULATED BY G.M. DATE 12/06/96

CHECKED BY _____ DATE _____

SCALE _____

STREET CAPACITY
HOLLY / CARMEL - 20' HALFWIDTH

Q_{100} = 19 cfs

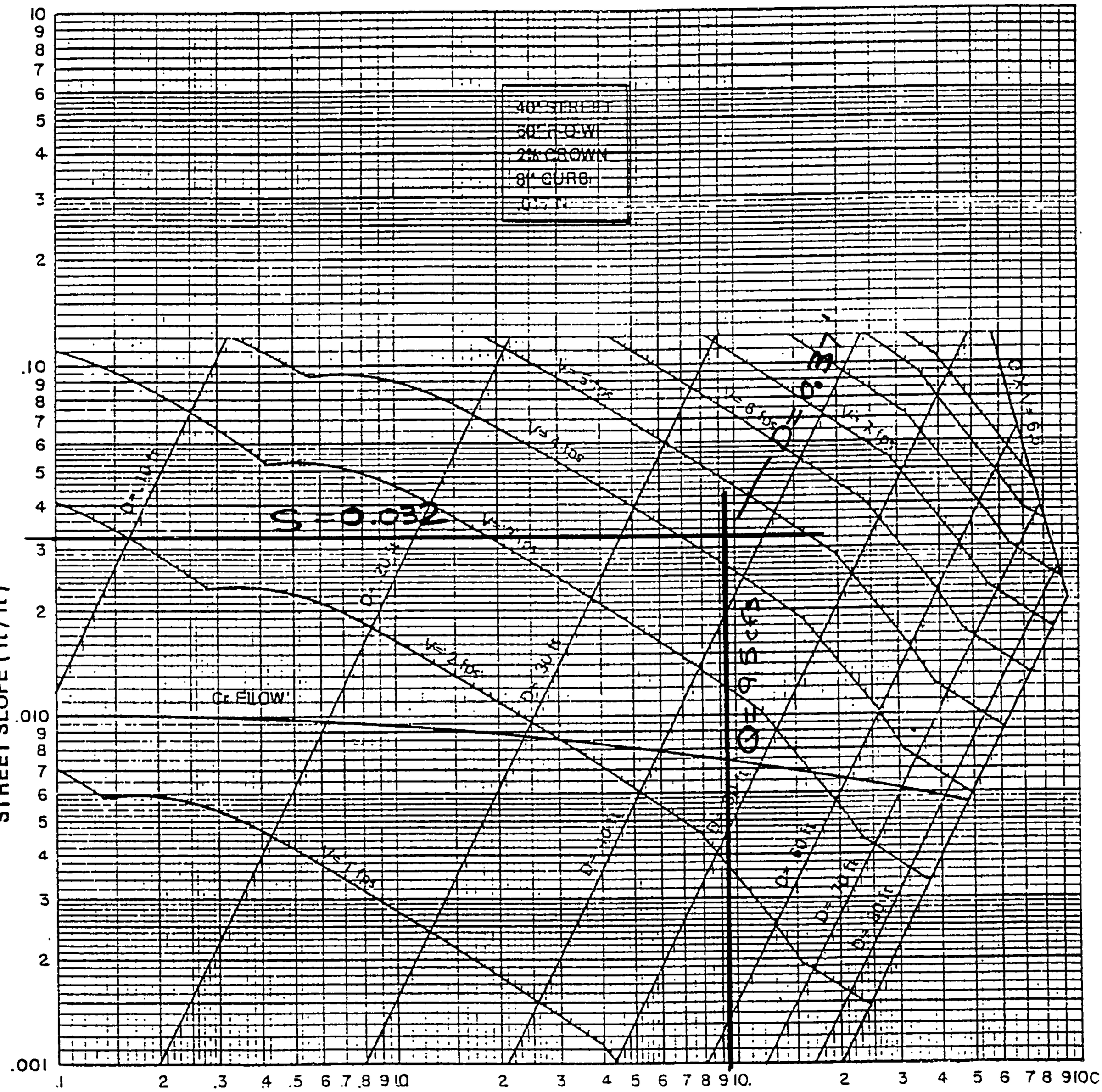
AT Q = 19 cfs (TOTAL), ASSUME Q_{half} = 9.5 cfs

AT Q = 9.5 cfs, S = 0.032 ; depth = 0.37'
(PLATE 22.3 D-2)

BECAUSE STREET SECTION CAN EASILY CONTAIN FLOWS, NO STORM DRAIN EXTENSION IS REQUIRED WITHIN HOLLY AND CARMEL.

STREET CAPACITY

HOLLY / CARMEL



HOLLY AVENUE

BARSTOW STREET

WATER SURFACE EDGE

℄ OF Tributary Arroyo

Retaining wall @ Property Line

Sta. 0+00

Sta. 1+00

Sta. 2+00

Sta. 3+00

Sta. 4+00

Sta. 5+00

Sta. 6+00

Sta. 7+00

Sta. 8+00

Sta. 9+00

12" RCP

30" RCP

36" RCP

36" RCP

30" RCP

5430

5440

5450

5460

5470

LA CUEVA TOWN CENTER

HEC - RAS ANALYSIS

HEC-RAS Plan: Plan 01 River: TRIBUTARY Reach: REACH 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
REACH 1	17	321.00	50.00	50.48	49.94	50.66	0.009126	1.80	94.81	85.79	0.65
REACH 1	16	321.00	48.00	48.62	48.62	48.91	0.024383	5.22	79.12	139.84	1.23
REACH 1	15	321.00	46.00	46.71	46.71	47.01	0.015931	4.36	73.63	126.38	1.01
REACH 1	14	321.00	42.27	43.91	43.91	44.32	0.014166	5.16	62.19	75.84	1.00
REACH 1	13	321.00	40.00	41.10	41.10	41.44	0.015695	4.94	73.83	111.89	1.03
REACH 1	12	321.00	38.00	38.66	38.66	38.95	0.027192	5.33	77.27	134.59	1.29
REACH 1	11	321.00	35.08	36.28	36.28	36.45	0.019752	3.32	96.81	294.14	1.02
REACH 1	10	321.00	31.20	32.66		33.02	0.010148	4.83	66.52	69.83	0.87
REACH 1	9	321.00	30.00	31.23	31.23	31.62	0.021802	5.29	64.53	84.19	1.19
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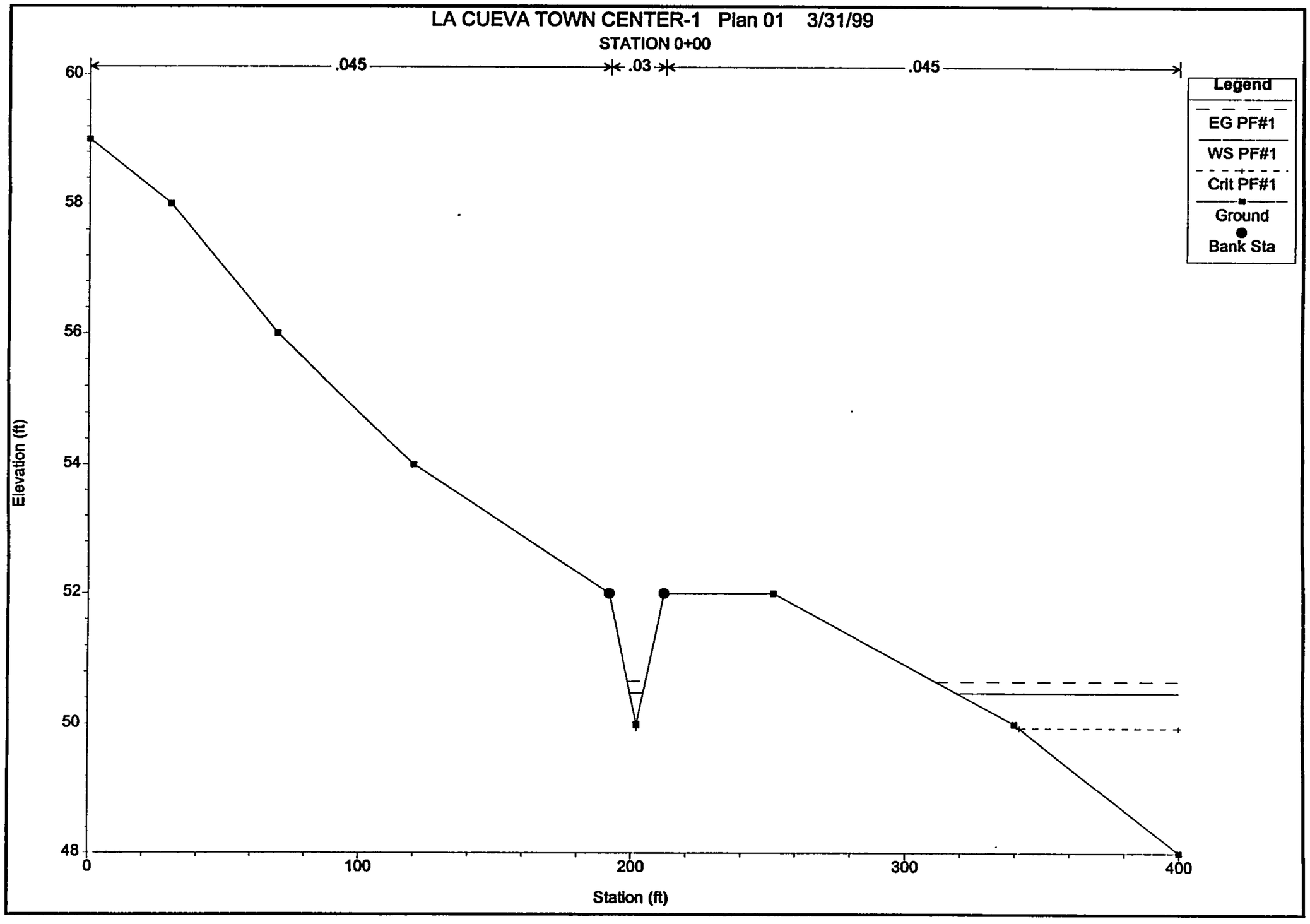
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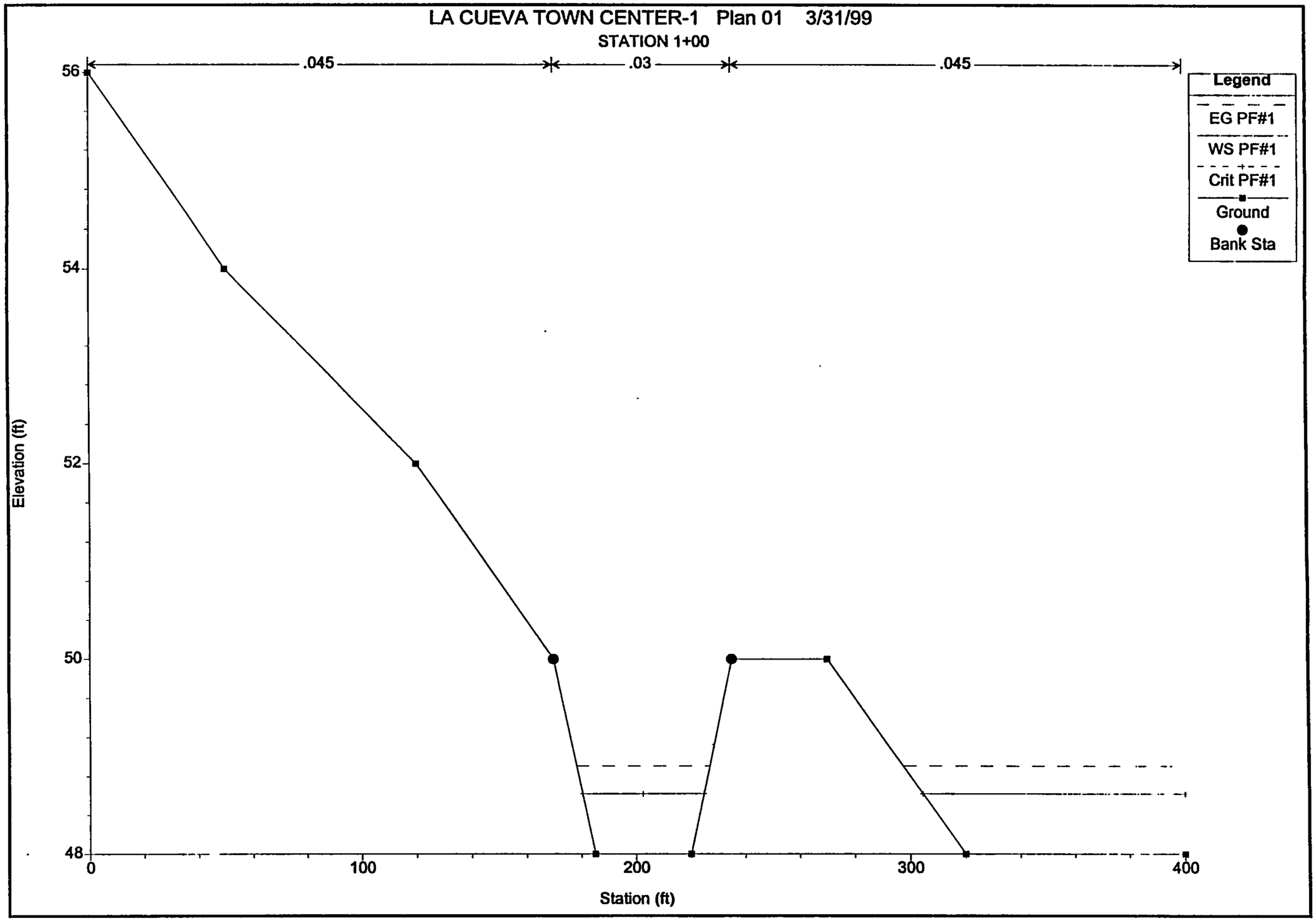
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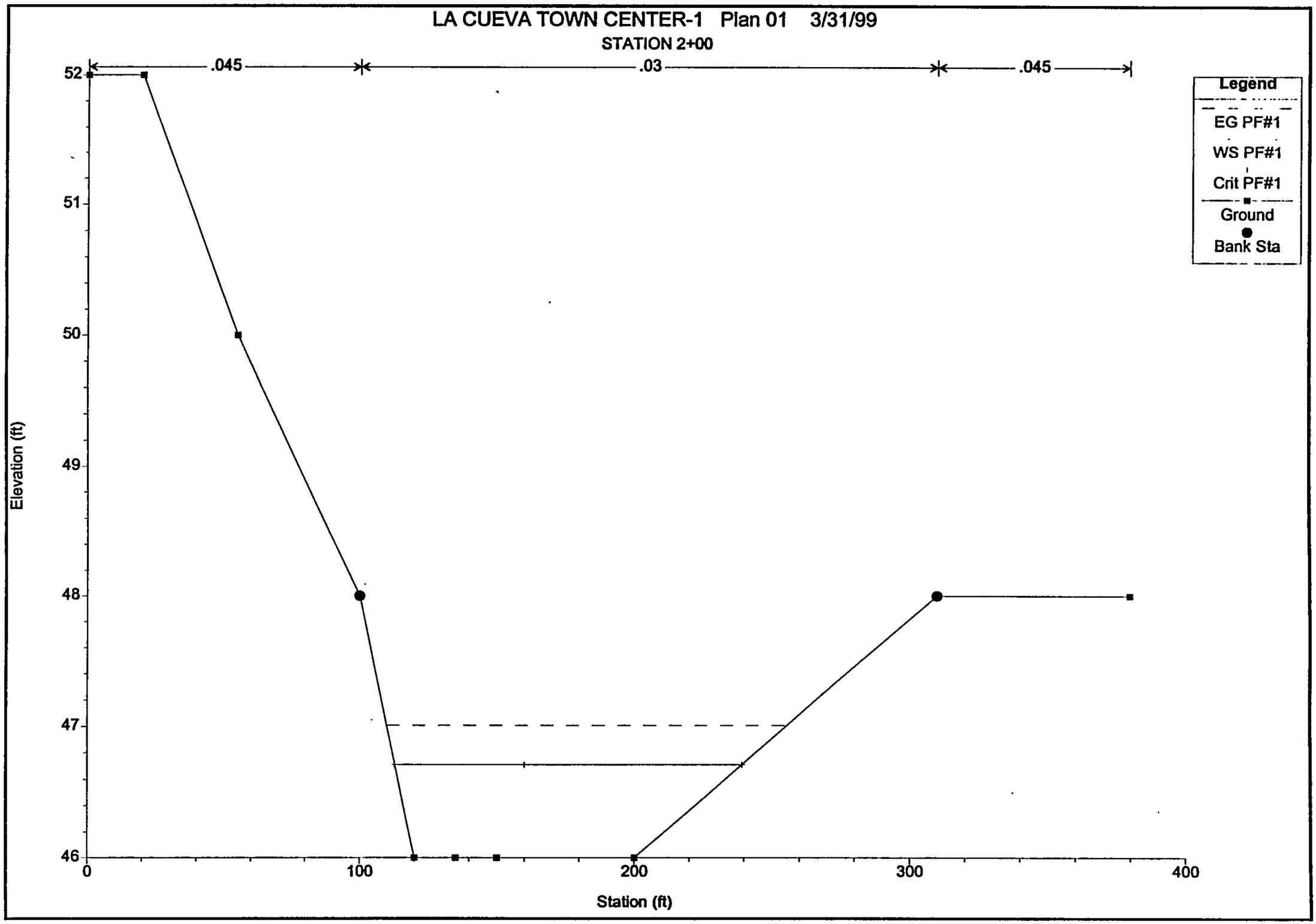
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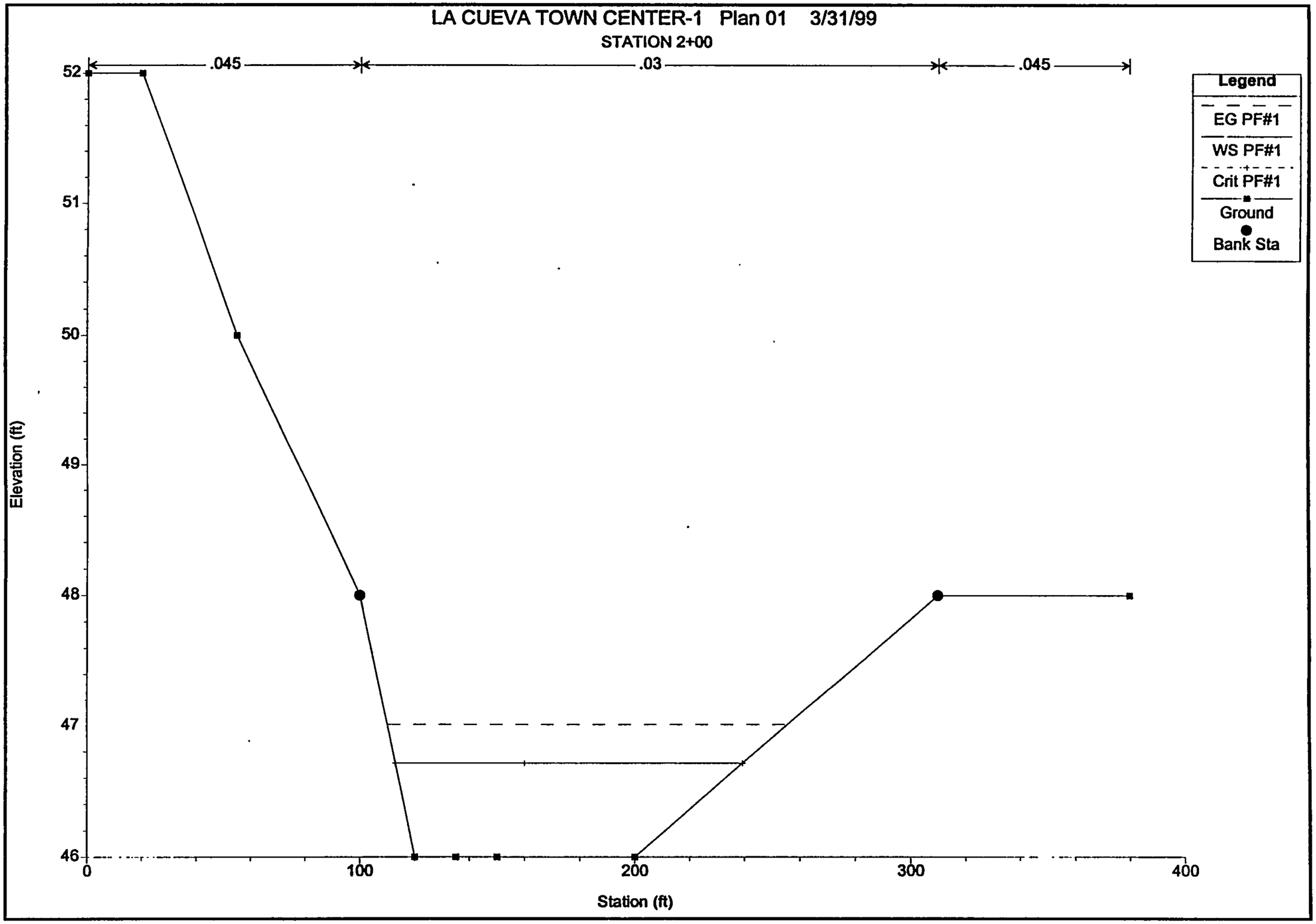
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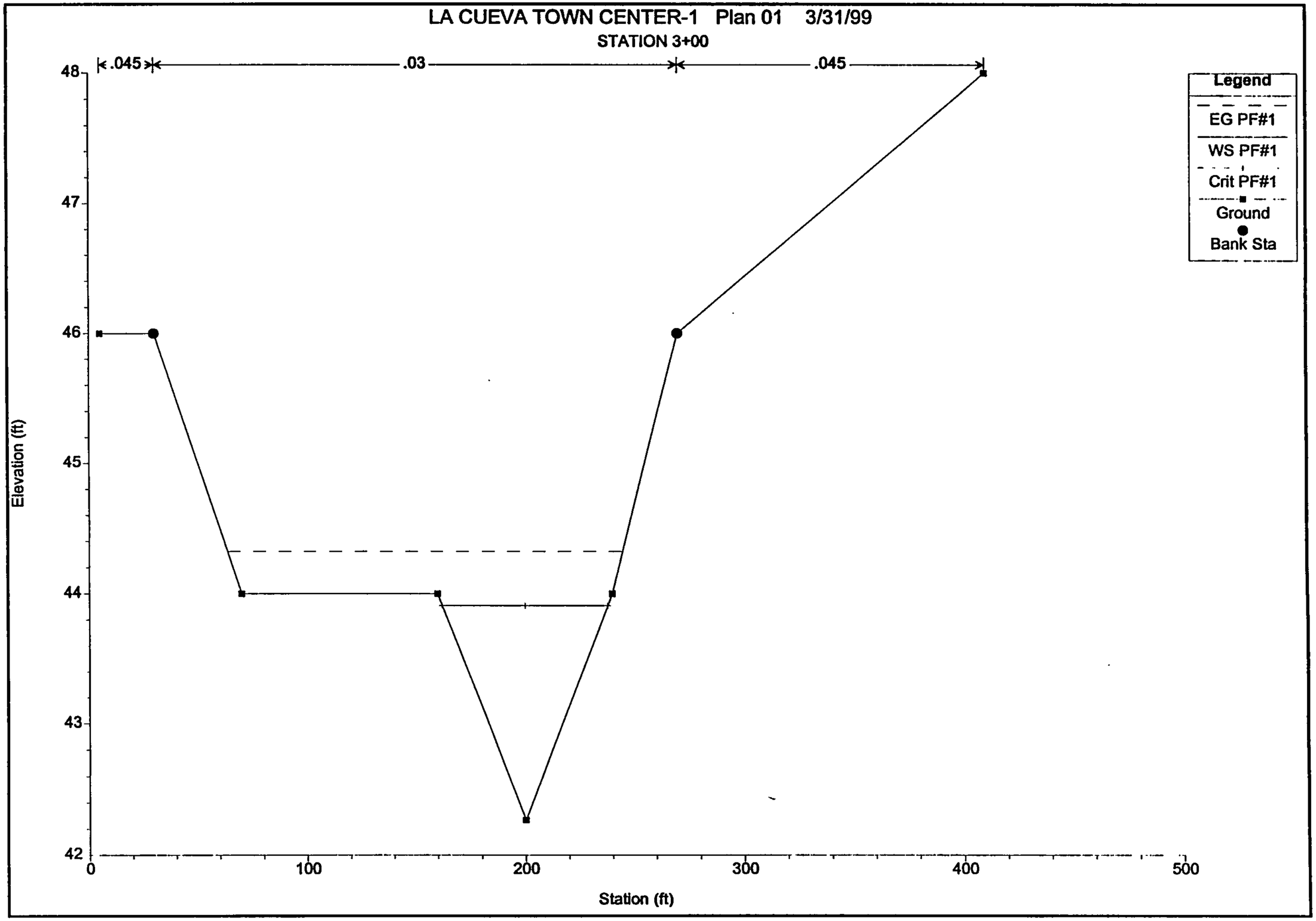
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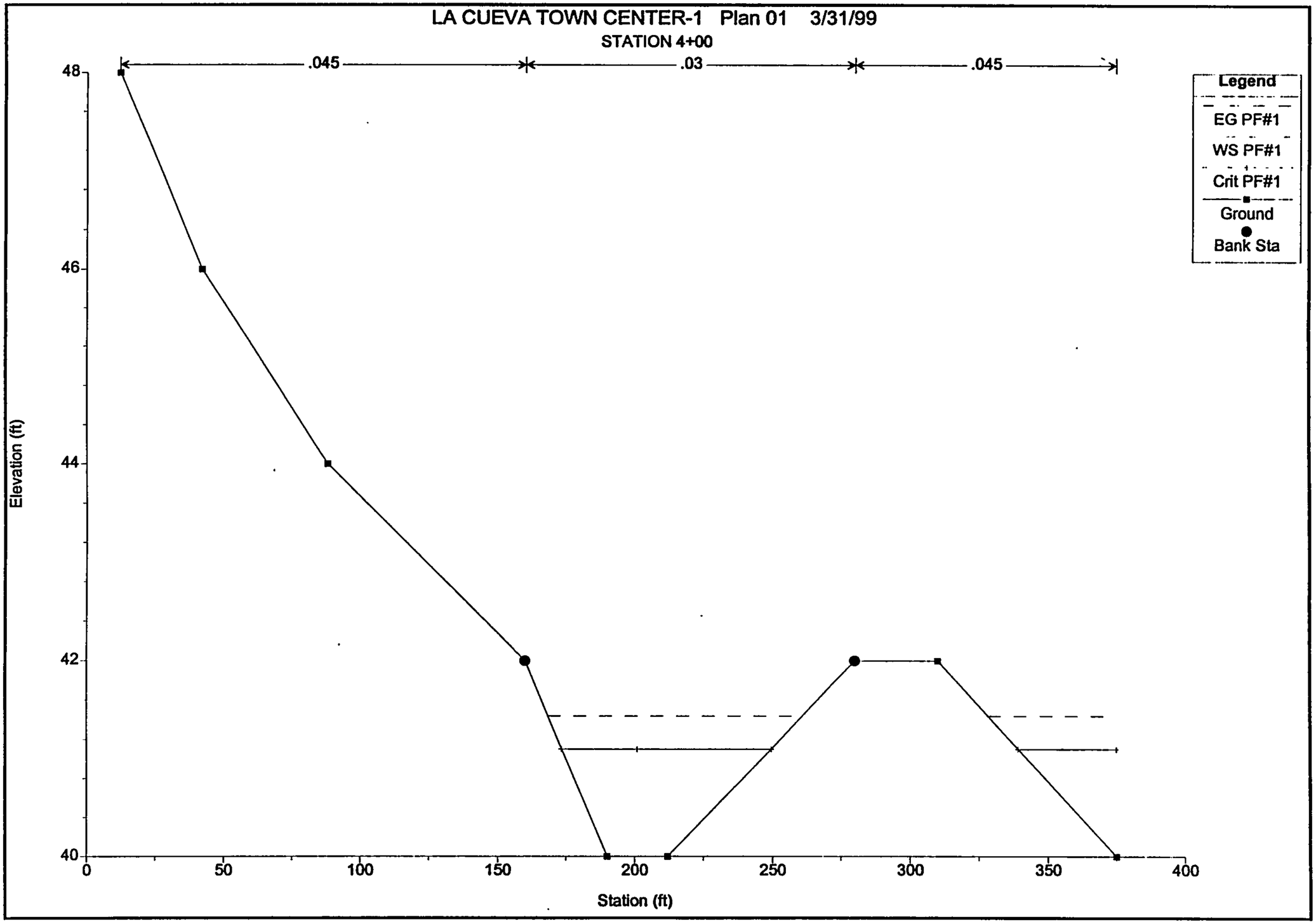
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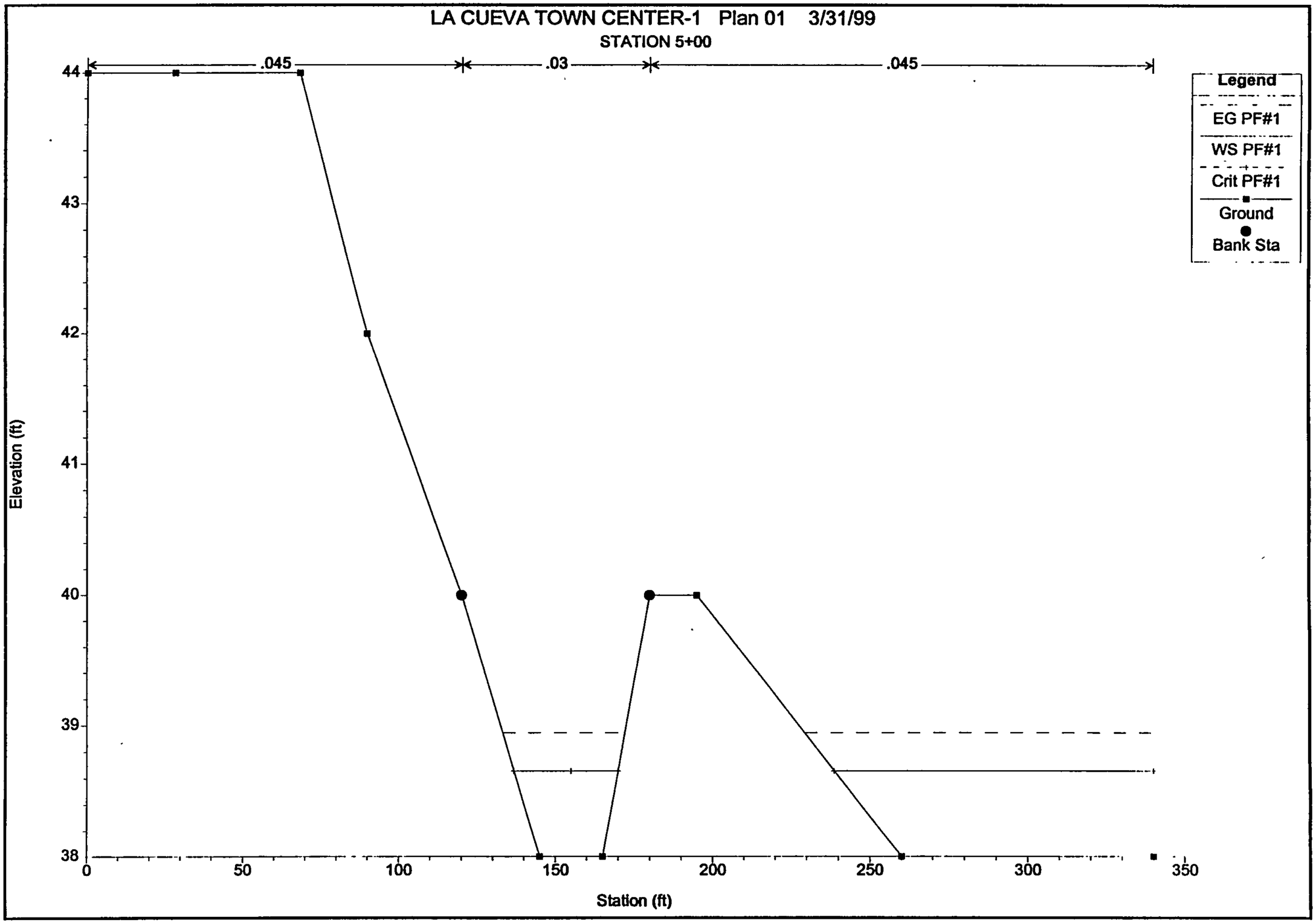
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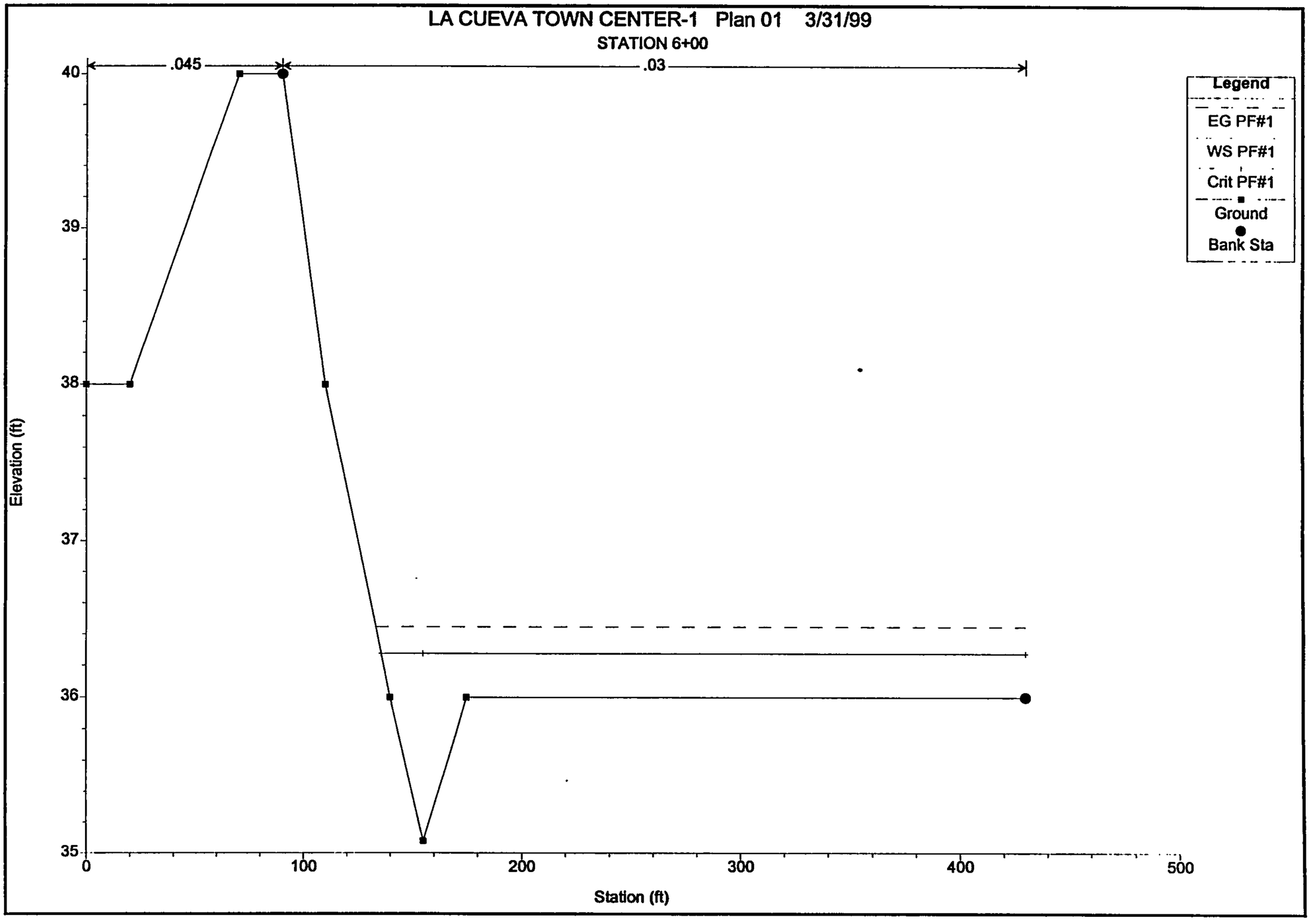
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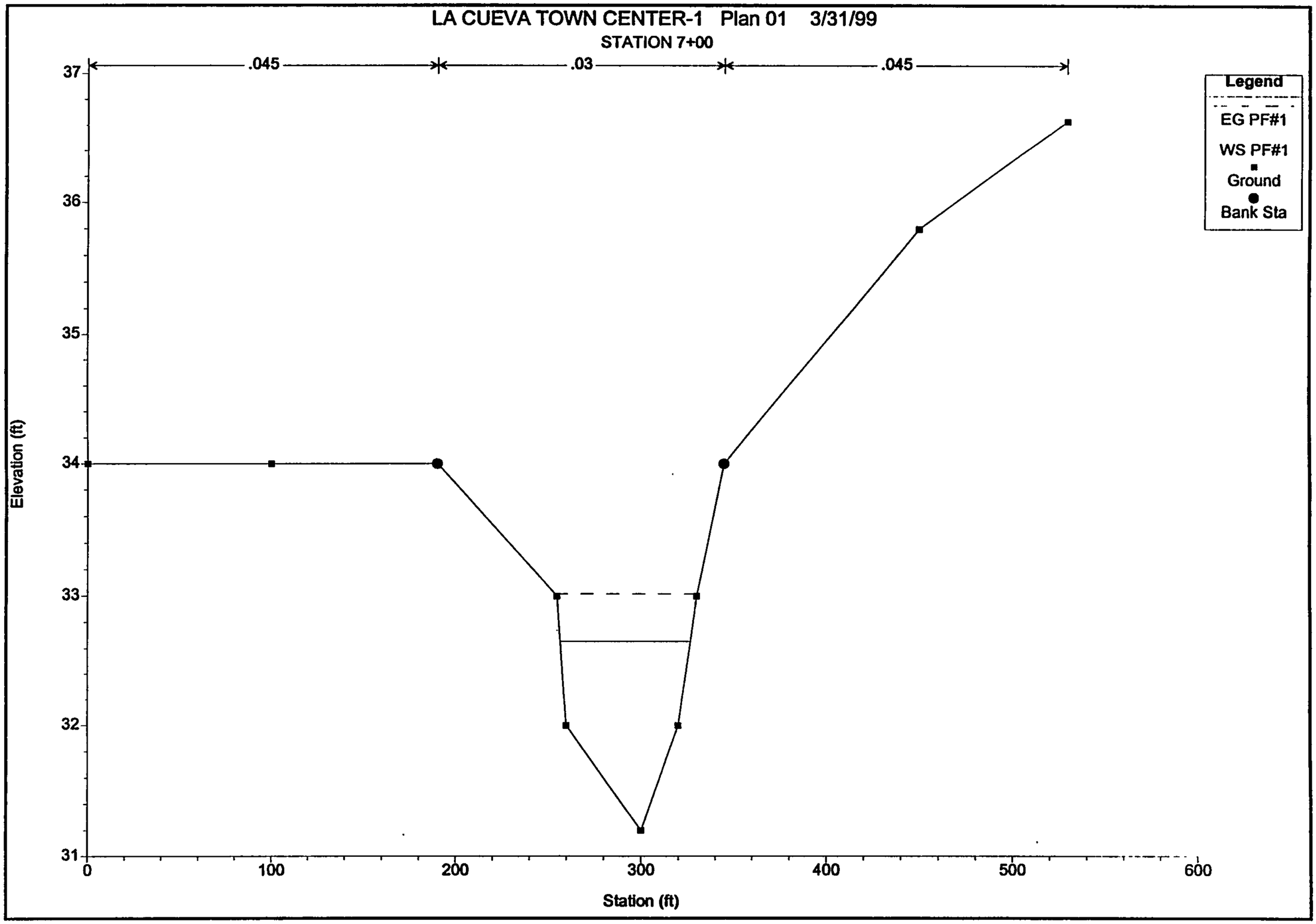
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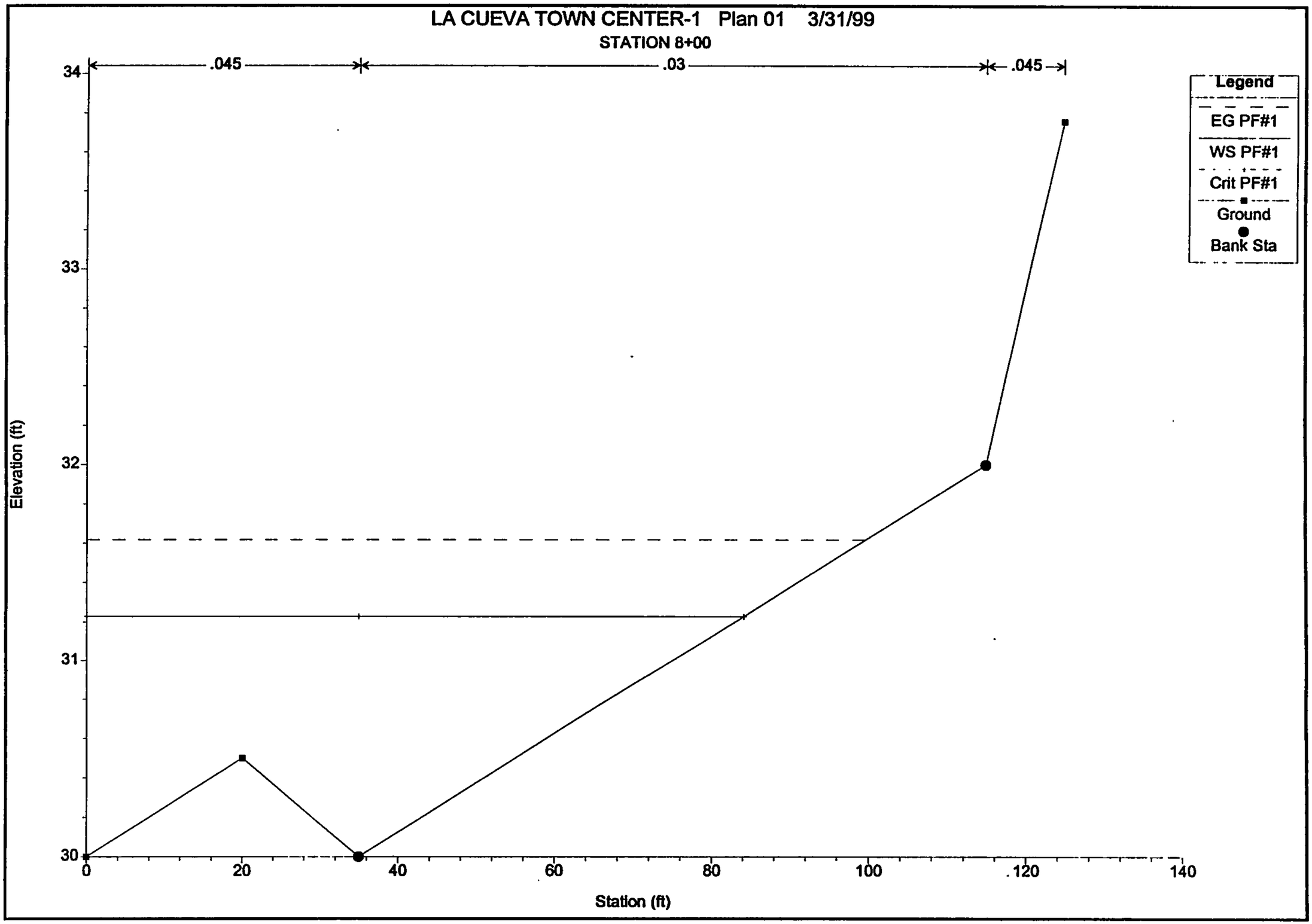
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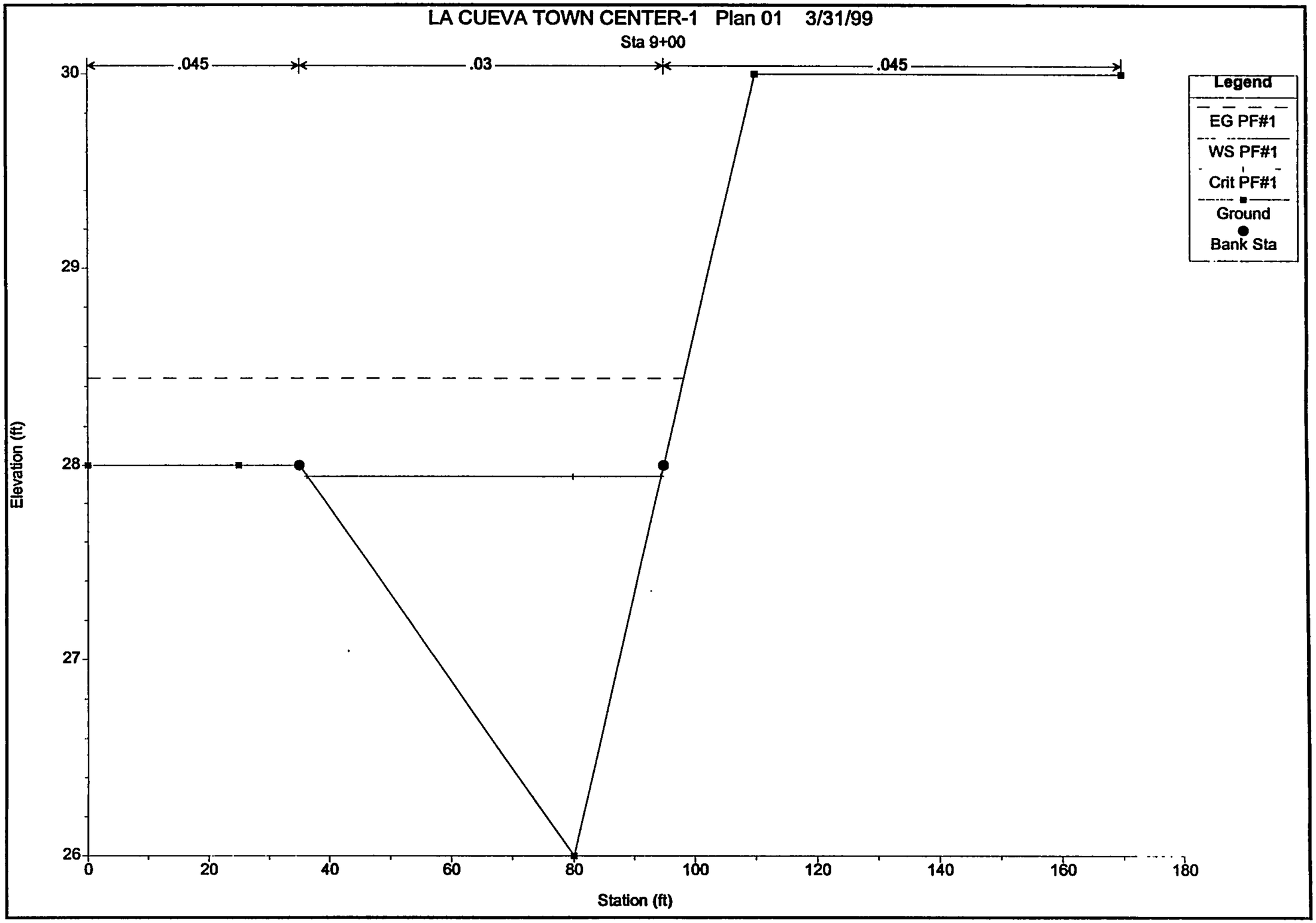
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Tierra West, LLC
4421 McLeod Rd. NE, Suite D
Albuquerque, NM 87109

Susan Cubanza

LETTER OF TRANSMITTAL

Tierra West, LLC

(505) 883-7592

4421 McLeod Road NE, Suite D, Albuquerque, NM 87109

DATE: 3-22-99	JOB NO: 980012
ATTENTION: Susan Calongne	
RE: La Cueva Town Centr	

TO Susan Calongne

WE ARE SENDING YOU ☐ Attached ☐ Under Separate cover via _____ the following items

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATED	NO.	DESCRIPTION
1 set (4)	3-22-99	980012	Photo's of City Water Tank -

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ **FOR SIGNATURE(S)**

☐ For your use ☐ Approved as noted ☐ _____

☐ As requested ☐ Returned for corrections

☐ For review and comments ☐ _____

☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

RECEIVED BY _____ SIGNED _____

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 9, 2000

Ronald R. Bohannan, P.E.
Tierra West, LLC
4421 McLeod Road, Suite D
Albuquerque, New Mexico 87109

RE: Engineer's Certification Plan for La Cueva Town Center in Window "G" (C19/D11D) Submitted for Temporary Certificate of Occupancy Approval, Engineer's Certification Stamp Dated 2/4/00.

Dear Mr. Bohannan:

The above referenced plan is acceptable for release of a 60-day Temporary Certificate of Occupancy for the LaCueva Town Center in Window "G" located at 8100 Wyoming NE.

Prior to release of the permanent Certificate of Occupancy, however, the plan must be revised to clearly indicate which portions of the site have been constructed. Please provide more As-Built spot elevations to the plan.

Please be sure to inform the property owner that flood insurance may be required for the buildings since the Letter of Map Revision has not been issued by FEMA to remove the existing floodplain.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Ben Spencer, La Cueva Town Center, Ltd.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

Tierra West, LLC

February 4, 2000

Mrs. Susan M. Calongne, P.E.
City/County Floodplain Administrator
Albuquerque Public Works Dept.
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: 60 Day Temporary Certification of Drainage for Certificate of Occupancy
La Cueva Town Center in Window "G", 8100 Wyoming NE, Suites A, B, and M
Lots 1-8 & 25-32, Block 20 @ Lots 31 & 32, Block 19 of N. Albuquerque Acres, Tract 2, Unit 3. Tract C, La Cueva Village Unit 1. C-19/D-11D

Dear Susan:

Enclosed please find one copy of the as-built Grading and Drainage Plan and information sheet for the La Cueva Town Center. Construction of the on-site utilities is complete. Paving for Phase One of the site is also complete. Landscaping for the site is underway as well as construction of the required sidewalks. As-built grading information was provided by Aldrich Land Surveying. All work is in substantial compliance with the approved grading and drainage plan. We are therefore requesting 60-day temporary Certification of Drainage for Certificate of Occupancy.

Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Ronald R. Bohannan, P. E.

Enclosure

cc: Ben Spencer
Harley Stoolman
Henry Chavez

JN: 980012
RRB/rw

RECEIVED
FEB 07 2000
HYDROLOGY SECTION

980012Temp H2o

4421 McLeod Rd. NE, Suite D • Albuquerque, NM 87109 • (505) 883-7592
fax (505) 883-7034 • e-mail: twdms@aol

G80071

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

FAX (505) 345-4254

FAX TRANSMITTAL

TO: Susan Calongne

FIRM: C.O.A. Hydrology

FACSIMILE NUMBER: 924-3864

FROM: Graeme Means

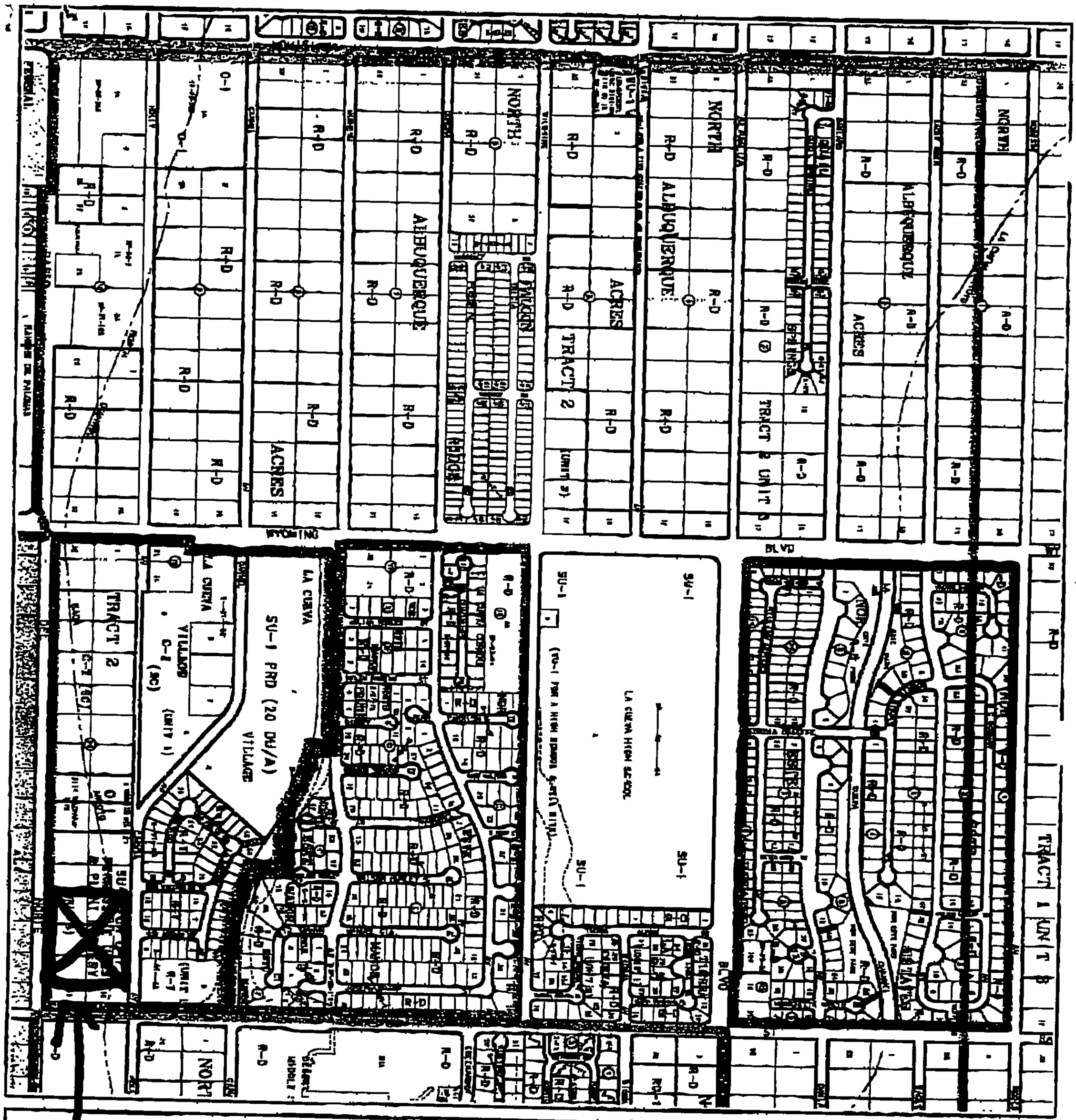
SUBJECT: La Cueva Office Park - Window 6

MESSAGE: Here is Quick sketch of our proposal. Our Sketch Plan was e DRB Tuesday (96-546) Real Plans are Shown on that Submittal. Please Comment on the Drp Section. Thanks!

—Graeme

NUMBER OF PAGES: 3 (Including this page)

If the transmission is incomplete or unclear, please notify us at once at (505) 345-4250.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JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

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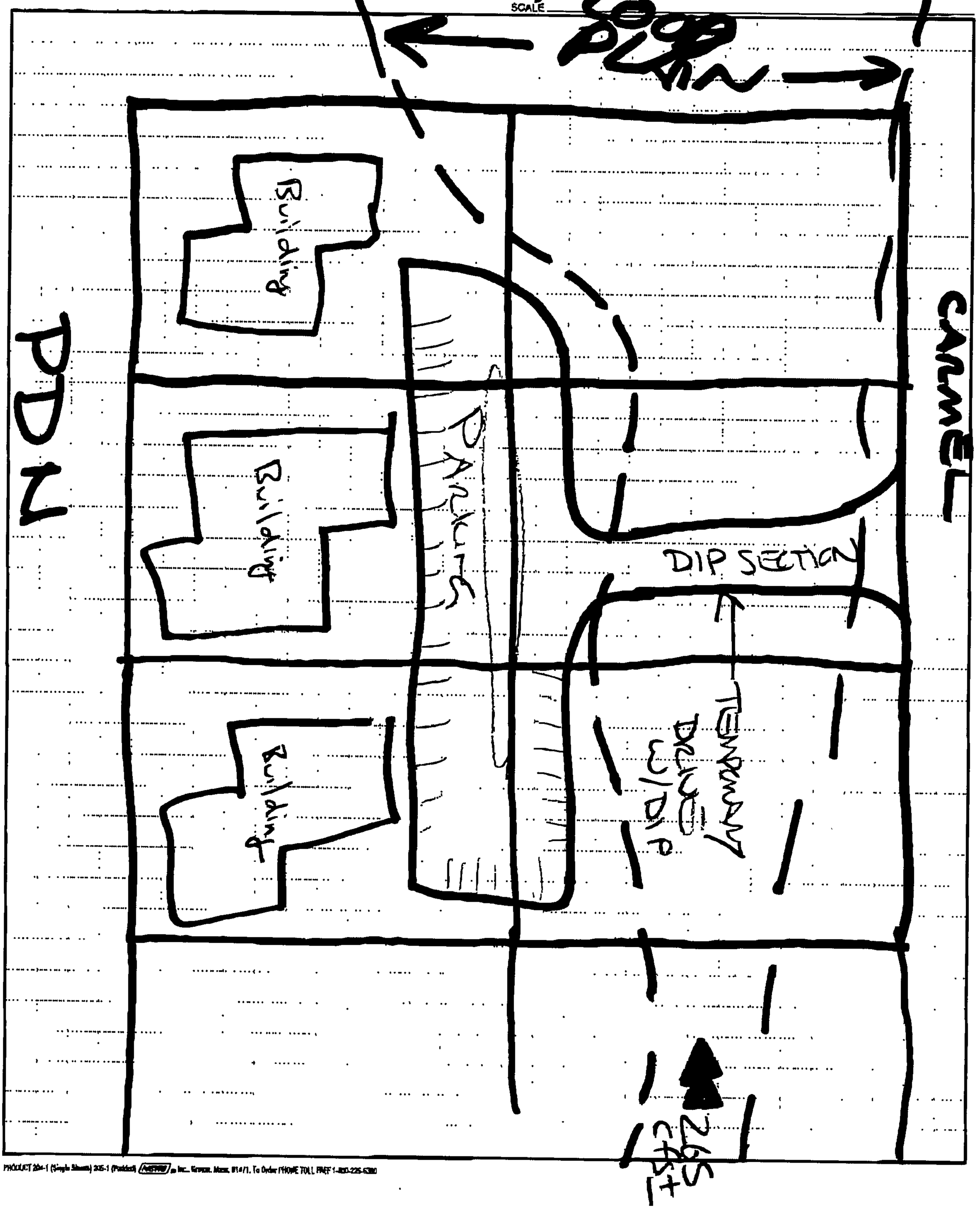

PRODUCT 20x-1 (Single Sheets) 20S-1 (Pads) ARCHIVE go Inc., Groton, Mass. 01471. To Order PHONE TOLL FREE 1-800-225-6380

CITY OF
Albuquerque

March 11, 1998

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304-6439

FEMA Case Number: 97-96-217R
Community: City of Albuquerque,
New Mexico
Community No.: 350002

Attention: Mr. Monther S. Madanat

Dear Mr. Madanat:

This submittal is in response to the letter from the Federal Emergency Management Agency (FEMA) to the City of Albuquerque dated March 6, 1997 requesting additional data in order for FEMA to prepare a Letter of Map Revision for the channelization of the North Domingo Baca Arroyo, Soil Cement Channel, within Window "G."

FEMA's letter requested the application and certification forms, the As-built plans certified by a registered professional engineer, an officially adopted operation and maintenance plan, certification of compaction of the fill material and additional data regarding Barstow Street. These have been enclosed with this submittal along with the initial review fee of $2300.00.

City Hydrology has reviewed and approved the construction of the project as well as the contents of this submittal. The City would greatly appreciate your prompt response and approval for this Letter of Map Revision. If you have any questions concerning this submittal, please call me at (505) 924-3982.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

Attachments

c: J. Graeme Means, P.E., Jeff Mortensen & Associates, Inc. (letter only)
Donald G. Hoech, Hoech Real Estate Corporation (letter only)
John Kelly, P.E., Albuquerque Metropolitan Arroyo Flood Control Authority (letter only)
File C19/D11, (letter only)

DRAINAGE INFORMATION SHEET

PROJECT TITLE: *LA CUEVA TOWN CENTER* ZONE ATLAS/DRNG. FILE #: *C-19/ D11D*

DRB #: *98-402* EPC #: *Z-98-98* WORK ORDER #: *611081*

LEGAL DESCRIPTION: *Lots 1-8 & 25-32, Block 20 @ Lots 31 &32, Block 19 of N. Albuquerque Acres. Tract 2. Unit 3. Tract C, La Cueva Town Village Unit 1*

CITY ADDRESS: *8100 Wyoming, Suites A, B, and M*

ENGINEERING FIRM:	*TIERRA WEST, LLC*	CONTACT:	*RONALD R. BOHANNAN*
ADDRESS:	*8509 Jefferson NE 87113*	PHONE:	*(505) 858-3100*
OWNER:	*La Cueva Town Center, Ltd., Co.*	CONTACT:	*Ben Spencer*
ADDRESS:	*4441 McLeod Rd. NE Suite G, 87109*	PHONE:	*(505) 889-3061*
ARCHITECT:	*George Rainhart Architect*	CONTACT:	*George Rainhart*
ADDRESS:	*2325 San Pedro NE*	PHONE:	*(505) 884-9110*
SURVEYOR:	*Aldrich Land Surveys*	CONTACT:	*Tim Aldrich*
ADDRESS:	*4109 Montgomery Blvd. NE*	PHONE:	*(505) 884-1990*
CONTRACTOR:	*Sundance Mechanical, Inc.*	CONTACT:	*Carlos Spiess*
ADDRESS:	*4400 Alameda Blvd., NE, Suite E*	PHONE:	*(505) 345-2694*

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
_X_ ENGINEER'S CERTIFICATION
_X_ OTHER, GRADING AND DRAINAGE PLAN, AS-BUILTS

PRE-DESIGN MEETING:

_____ YES
_X_ NO
_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAN APPROVAL
_____ PRELIMINARY PLAT APPROVAL
_____ S. DEV. PLAN FOR SUB'D. APPROVAL
_____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
_X_ CERTIFICATE OF OCCUPANCY APPROVAL
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ S. A. D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
_____ *OTHER ,*

DATE SUBMITTED: February 4, 2000

BY: *Ronald R. Bohannan, P.E.*

C-19/D11

CITY OF
Albuquerque

Martin J. Chávez, Mayor

December 5, 1996

Graeme Means
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, New Mexico

RE: CONDITIONAL LETTER OF MAP REVISION FOR WINDOW "G" CHANNEL, (C19/D11)
ENGINEER'S STAMP DATE 11/22/96.

Dear Mr. Means:

This letter is a compilation of comments from myself and AMAFCA. Before the above referenced submittal may be forwarded to FEMA with a request for the Conditional Letter of Map Revision (CLOMR), the following comments must be addressed:

1. A sediment transport analysis is required. You may reference the sediment transport analysis done by RTI which is included in the LOMR request for the Lower North Domingo Baca Dam. This should be used for the unlined arroyo above Barstow. The analysis through the transition, as well as through the channel, is required. Your submittal will not be forwarded to FEMA without this analysis.

2. The analysis must show how the proposed channel ties into the existing arroyo. Please provide cross-sections, upstream and downstream, to demonstrate how the channel ties into the existing mapped FEMA floodplain without adversely effecting other properties.

3. Please provide the analysis of the arroyo in its existing condition. The velocities in the proposed channel were found to be approximately 20 to 25 feet per second. How does this compare to the velocities in the existing condition? What treatment is proposed at the outlet of the channel to prevent scour downstream? Approval must be obtained from City Parks and AMAFCA for any proposed outlet structure.

4. The plans state that the "n" values used were 0.25 and 0.35. Were these values used?

5. Please provide a summary of the input and output data for the HEC-RAS analysis in the report if possible. It appears that the ultimate Q was used throughout the channel, although the Window "G" development will be adding developed flow at different locations. Show these. The model should reflect the proposed development.

6. The proposed bridge at Wyoming was not modeled in the analysis, therefore it is assumed that a clear span bridge is proposed. A preliminary bridge design must be provided to assure that the channel design is feasible.

7. In the plan set, the output for the HEC-RAS is the same for 1130 cfs as it is for 2250 cfs. Please revise this.

8. Please reference the FEMA case number for the LOMR request for the Lower North Domingo Baca Dam. Also identify the CLOMR request for the floodplain to be removed with the Paseo Del Norte storm drain. This will assist FEMA in their review.

9. Please provide a short narrative to explain that Hoech Real Estate is providing the design, CLOMR request, etc. and that AMAFCA will own and operate the facility upon completion. This will clarify the project for FEMA.

10. City Hydrology has not received a grading and drainage plan for the Sector Plan. How do the grades for the proposed channel serve the development? How and where do the flows from the site enter the channel?

11. Since the map revision is for the benefit of the developer, a review fee will be required. FEMA has recently increased their rates, therefore a check for $3100.00 must accompany this submittal when it is sent to FEMA.

12. Per our meeting of December 4, 1996, it is assumed that the annexation into the City is complete. Please provide me with supporting documentation.

AMAFCA has the following preliminary comments with respect to the plans:

- Utility and bridge issues must be addressed.
- Show all channel inlets/connections.
- Survey alignment for construction must be provided.
- Right-of-ways and Temporary Construction Easements must be on plans.

The estimate for construction is being reviewed by AMAFCA. Please be aware that additional comments with respect to the plans will be provided by AMAFCA.

If you should have any questions, please do not hesitate to call me.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Kurt Browning, AMAFCA
File

DEVELOPMENT & BUILDING SERVICE CENTER
ONE STOP
600 SECOND ST. N.W./2ND FLOOR
ATTENTION: _____
505-924-3900

Records Withdrawal Form HYDROLOGY

Project No. ~~B~~ C19/D11 Date: DEC. 1996 (REV. JAN 1997)

Project Title: WINDOW G MASTER DRAINAGE PLAN

a. File b. Mylars c. Redlines/Comments

d. Other COPY ENTIRE BOOK

Requested By: RESOURCE TECHNOLOGY **Phone No.:** 243-7300
Company

Anticipated Return Date: _____

Receipt Acknowledged

I here by accept full responsibility for the security of the above noted records/plans until return receipt acknowledgement is completed. Records/plans will be returned to the Development & Building Services Center on or before the indicated anticipated return date.

Delivery Picked Up By:

Name: FRANK ROMERO Organization: BBO BLVD
Print

Signed: Frank Romero Date: 7-28-97
Phone No. _____

Office Use Only

Return Acknowledged

Received by: S Ambrose **Date:** 7/30/97
Print

WINDOW G

MASTER DRAINAGE PLAN

DECEMBER, 1996

Prepared for:

HOECH REAL ESTATE CORPORATION
6729 Academy Road N.E., Suite B
Albuquerque, N.M., 87109

JEFF MORTENSEN & ASSOCIATES, INC.
☐ 6010-B MIDWAY PARK BLVD. N.E.
☐ ALBUQUERQUE ☐ NEW MEXICO 87109
☐ ENGINEERS ☐ SURVEYORS (505) 345-4250
940956

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Proposed Conditions	5
Ultimate Conditions	12

APPENDICES

Appendix A - Master Drainage Plan Drawings

Appendix B - Soil Cement Channel Preliminary Drawings

Appendix C - HEC-RAS Input and Output

Appendix D - AHYMO Input and Output

Appendix E - Miscellaneous Calculations

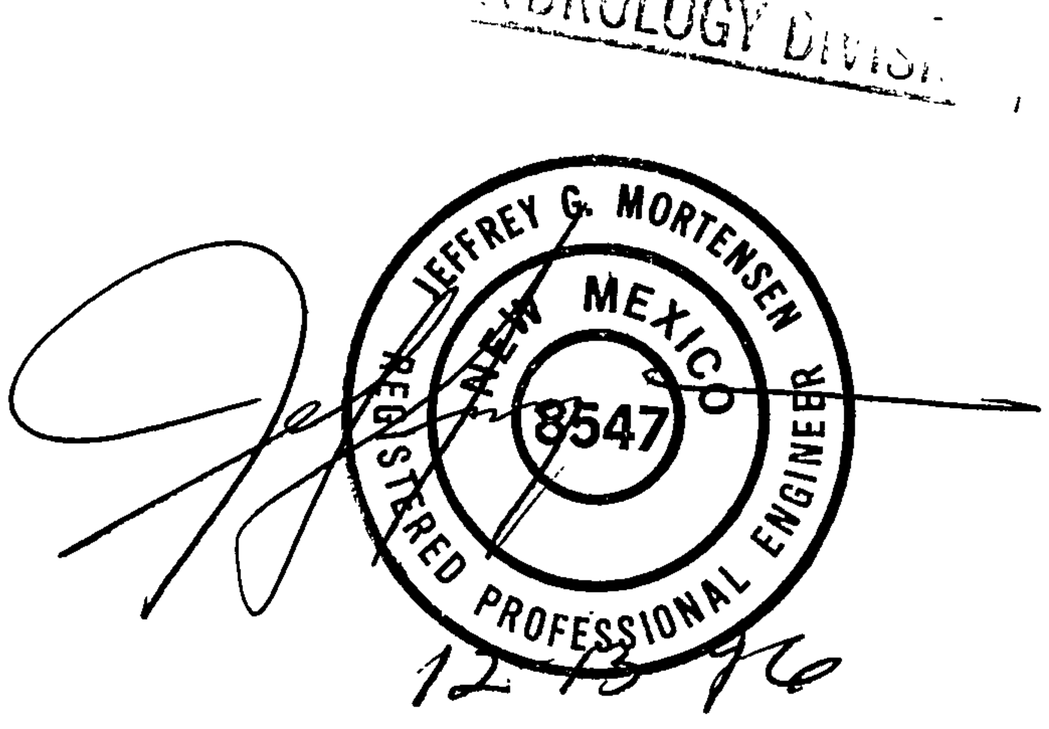
Appendix F - City Council Bills

Appendix G - Infrastructure List

Appendix H - AMAFCA Resolution 1992-3

DEC 16

HYDROLOGY DIVISION



INTRODUCTION:

The Window G Plan Area is bordered by Wyoming Blvd. NE to the west, Paseo del Norte to the south, Barstow Street NE to the east, and Anaheim Avenue NE and Nor Este Manor Subdivision to the north. The Window lies within the City of Albuquerque as annexed by City Council on May 06, 1996 (see attached bills, Appendix 'F').

This Master Drainage Plan will identify the existing, proposed, and ultimate drainage requirements for development within the Window. The text, calculations, and analysis presented herein support the Master Drainage Plan drawing set which is contained within Appendix 'A'. The main objective of this Plan is to identify required infrastructure associated with proposed Tract A (apartment site) and Tract B (La Cueva Village - Patio Homes). A Bulk Land Variance will be associated with Tract C (portion of Shopping Center site). Site specific plans will address grading issues. This Plan will focus upon drainage and drainage related requirements.

Window G lies within the North Domingo Baca and Paseo del Norte Watersheds as identified in "The North and South Domingo Baca Arroyo and Paseo del Norte Corridor Drainage Management Plan" prepared for AMAFCA by Resource Technology, Inc. (R.T.I.) dated December, 1991. The R.T.I. Plan has been adopted by AMAFCA as a guideline for drainage management within this area. AMAFCA Resolution 1992-3, dated January 30, 1992, appears in Appendix 'H'.

This Window G Master Drainage Plan often refers to the hydrology contained within the R.T.I. Report and a general acknowledgement to it is made here.

EXISTING CONDITIONS:

The existing conditions are shown on Sheet 2 of Appendix 'A'. With the exception of a City of Albuquerque Reservoir site located along Paseo del Norte, Window G is undeveloped. Carmel Avenue NE and Holly Avenue NE are unpaved dirt roads which are contained within the Window.

Window G drains to two distinct drainage basins. The northerly basin, which lies north of Holly Avenue NE, contributes to the main channel of the North Arroyo de Domingo Baca. This arroyo discharges to the AMAFCA Lower North Domingo Baca Arroyo Detention Dam. The south portion of the Window (south of Holly Avenue NE) drains to Paseo del Norte. This basin is characterized by a tributary of the NDB which crosses a dip section in Barstow Street NE, approximately 90 feet south of Holly Avenue NE. Two 24" corrugated metal pipes convey nuisance flows under Barstow Street at the tributary arroyo crossing.

does, found match plan referen

Both arroyos flow through the Window from east to west and exit the site by crossing Wyoming Boulevard NE. The Main NDB arroyo crosses Wyoming through two 43" x 27" corrugated metal arch pipes located approximately 60 feet south of Anaheim Avenue NE. The tributary crosses Wyoming at a dip section located approximately 130 feet north of Paseo del Norte.

As shown by Panel 141 of 825 of the National Flood Insurance Program Flood Insurance Rate Maps published by F.E.M.A. for the

County of Bernalillo, New Mexico, and incorporated areas, dated September 20, 1996, two flood Hazard Zones designated AO with a depth of one foot impact the Window. These two flood hazard zones are associated with the two arroyos which impact and traverse the site.

The existing flow rates shown on Sheet 2 are taken from "The North and South Domingo Baca Arroyo and Paseo del Norte Corridor Drainage Management Plan" prepared for AMAFCA by Resource Technology, Inc. (R.T.I.) dated December, 1991, and reflect the undeveloped condition.

PROPOSED CONDITIONS:

A. Drainage

The Proposed Conditions are as shown on Sheet 3 of Appendix 'A'. The currently proposed development within Window G lies north of the existing alignment of Holly Avenue NE in the North Basin. As shown on the existing conditions plan, much of this area lies within an existing floodplain. A C.L.O.M.R. Request has been prepared by this office to demonstrate that the existing floodplain can be confined to a proposed soil cement public drainage channel located at the north end of the Window. This channel will be sized to accept developed runoff from the upstream contributing basins, and the portion of Window G located north of Holly Avenue NE. The basin definition, channel alignment, and hydraulic capacity are consistent with the aforementioned R.T.I. Plan. The channel will be constructed by AMAFCA with both public and private funding. Upon completion of construction, the channel will be owned and maintained by AMAFCA. Construction of this channel is required to remove the existing floodplain designation and allow for development within this portion of the Window. Appendix 'B' contains the preliminary design drawings for the channel which support the C.L.O.M.R. Request.

The overall plan is to channelize the North Domingo Baca Arroyo from the Lower North Domingo Baca Arroyo Detention Dam to a point upstream of Ventura Street NE, midway between Ventura Street NE and Holbrook Street NE. Due to the impracticality of constructing this entire reach at once, it is necessary to phase the project. The Proposed Conditions Plan addresses the first phase, the

channelization between Wyoming Blvd. NE and Barstow Street NE. Because the downstream alignment of this channel will be influenced by the final design of a City park to be located west of Wyoming Blvd. NE, the interim outfall immediately west of Wyoming will be temporary to allow maximum flexibility in the design and construction of the City park improvements. In the meantime, AMAFCA will maintain the channel outlet and the flow path to the dam.

AMAFCA to maintain?

Channel improvements and development upstream of Barstow Street NE will follow Window G development, however, cannot occur until the upstream alignment is finalized and all property owners affected assembled to participate. In the proposed interim condition, all properties upstream of Barstow Street NE must continue to limit their discharge to the arroyo to either the undeveloped flow rate (City of Albuquerque Policy), or the equivalent discharge rate density of one dwelling unit (D.U.) per acre (Bernalillo County Policy). These limitations must be maintained until such time as an improved channel is constructed upstream of this project.

In view of the above, an interim channel structure must be constructed to collect and channelize flows from the natural arroyo, which originates upstream of Barstow Street NE. This relatively short interim section of the channel will be located within the east end of the Window, and will accept those flows which cross the existing dip section within Barstow Street NE. The permanent channel construction for Window G will end approximately 330 feet west of the centerline of Barstow Street NE. This

will allow for connection to the ultimate upstream channel alignment and a future Barstow Street Crossing Structure which will be addressed by the next phase of development.

The proposed channel construction will allow the development of Tract A (Pinnacle Estates Apartments) and Lots 1-59, La Cueva Village, Unit 1 (a single family residential subdivision). The apartment site will generate a peak 100 year flow rate of 67 cfs which will drain directly to the soil cement channel via side inlets and/or private storm drain connection. A Site Specific Grading and Drainage Report will be required for this site to address the interior grading and drainage details.

w/ pre-

La Cueva Village Unit 1 will drain to a public drainage channel and storm drain system located at the northwest corner of the Unit. This public system will discharge directly to the AMAFCA soil cement channel via side inlet and storm drain outlet. The internal storm drain and concrete channel has been sized to accept and convey the ultimate design flow of 59 cfs. Details of these improvements are shown on Sheet 6 of Appendix 'A'.

RTI used how many 4 du/ac for developed Condition - how does their Q100 Compare? ? cfs/ac?

The AHYMO Models which analyze the proposed and ultimate conditions are contained within Appendix 'D'. The street capacity and storm drain calculations are contained within Appendix 'E'. As with Tract A, a Site Specific Grading and Drainage Report will be required for this development.

La Cueva Village, Unit 2, can be constructed when the need for the interim channel entrance is removed. Until that time, La Cueva Village, Unit 1 must accept ~~undeveloped~~ existing flows from the future Unit 2. Unit 2 must be temporarily graded to satisfy this drainage requirement.

Tract C will ultimately be part of a shopping center site which will discharge to the north and south drainage basins. Tract C, which is north of Holly Avenue, will drain to the North Basin. More specifically, it's runoff will drain to its northwest corner and into a public storm drain proposed within Wyoming Blvd. NE. The proposed public storm drain within Wyoming Blvd. NE, which fronts Tract A, is sized to accept the runoff from Holly and Carmel Avenues, Tract C, and a portion of right-of-way associated with Wyoming Blvd. NE. As shown by the Calculations contained within Appendix 'E', the storm drain has sufficient capacity to accept and convey the design flows while maintaining one free driving lane and maximum depth of 0.50 ft. in the 10-year event. ?

The area south of the existing alignment of Holly Avenue NE lies within the South Basin and hence must drain to the Paseo del Norte Corridor (PDNC). Developed runoff from this portion of the Window must drain to the 78" storm drain proposed as part of the proposed Paseo del Norte improvements to be constructed by the City of Albuquerque (Project No. 4083.90) and the County of Bernalillo (no project number established yet). Until such time as the PDNC improvements are in place, the development of the parcels south of Holly Avenue NE will not have an outfall. In response, this report

recommends that development of these commercial tracts be deferred until such time as it can be coordinated with PDNC construction. Without PDNC improvements, the shopping center site and the upstream commercial tracts will be hampered by limited transportation and drainage facilities, hence deferral of development in the South Basin is prudent.

B. Infrastructure

The proposed development of Tract A and Lots 1-59, La Cueva Village, Unit 1, will require public infrastructure improvements. The AMAFCA Channel shall be constructed to provide a drainage outfall for the portion of Window G located north of the existing Holly Avenue alignment. The channel construction shall include temporary inlet and outlet structures. Tract A, La Cueva Village Subdivision, Units 1 and 2, and Tract C will ultimately drain to the channel. A Crossing Structure is required where Wyoming Blvd. NE crosses the proposed channel. The development of Tract A will require the construction of the bridge and of 24 feet of permanent paving improvements within Wyoming Blvd. NE fronting Tract A. The aforementioned public storm drain within Wyoming Blvd. NE must be constructed at this time in order to convey runoff from Carmel Avenue NE, Wyoming Blvd. NE, and future runoff from Tract C to the soil cement channel. The development of Tract A will also require the construction of 20 feet of permanent and 4 feet of temporary paving improvements within Carmel Avenue NE and the realigned Holly Avenue NE fronting Tract A. As demonstrated by the street hydraulic and hydrologic calculations, there are no storm drain

dev. of
A req
bridge

requirements for these streets. Proposed street sections are shown on Sheet 6 of Appendix 'A'.

The proposed development of Lots 1-59, La Cueva Village, Unit 1, will also require the AMAFCA channel construction and Carmel/Holly paving improvements. Because Holly Avenue NE is undeveloped, paved access to La Cueva Village, Unit 1, must be constructed within Holly to connect the proposed subdivision to Barstow Street NE. A public concrete drainage channel and storm drain system are required within Tract 1 to convey developed runoff from the subdivision to the AMAFCA channel. Preliminary details of this system are shown on Sheet 7 of Appendix 'A'. Hydraulic Calculations, which support this system, are contained within Appendix 'E'. As previously stated, a Site Specific Grading and Drainage Report will be required for development of La Cueva Village.

Development of Tract C is also dependent upon the AMAFCA channel construction, as well as public storm drain construction within Wyoming Blvd. NE. At this time, a bulk land variance is proposed for Tract C to defer development and infrastructure improvements until such time as the entire shopping center is proposed. At that time, Carmel Avenue paving improvements and Wyoming Blvd. paving improvements will be required.

As shown on the Existing Conditions Plan (Sheet 2 of Appendix 'A'), there is a small piece of mapped floodplain which impacts a southern portion of La Cueva Village Subdivision, and Holly Avenue

NE. The source of this flooding is identified as Subbasin 421 in the aforementioned R.T.I. Report. This potential flooding hazard will be eliminated upon construction of the Bernalillo County portion of the Paseo del Norte Corridor Storm Drain. A C.L.O.M.R. has been submitted to FEMA by AMAFCA to address this floodplain (related FEMA Case No. 95-06-417P). A HEC-RAS Analysis is presented herein to demonstrate that the proposed construction of La Cueva Village and Holly Avenue NE will not affect the existing flowpath and/or flooding limits of this arroyo. Sheet 5 of Appendix 'A' is a detail of this area which shows that the existing 100-year water surface level of the arroyo can be completely contained within the well defined natural arroyo, and it does not affect or cross Holly Avenue NE. Appendix 'C' contains the supporting HEC-RAS input and output. Because the arroyo does not impact Holly Avenue NE or any proposed development, no improvements are required to address this arroyo.

Platting 7
Lots w/in
fp. Show
fp on Plat.
> insurance

ULTIMATE CONDITIONS:

The Ultimate Conditions are shown on Sheet 4 of Appendix 'A'. There are two major improvements which must be in place prior t the ultimate development of Window G. The first improvement is th construction of the Paseo del Norte Corridor (PDNC) Storm Drain b the City of Albuquerque (Project No. 4083.90) and Bernalillo Count (no project number established yet). This storm drain will provide a drainage outfall for those properties along the Paseo del Norte Corridor. All of Window G located south of the existing alignment of Holly Avenue NE will drain to the new storm drain. Public storm drain extensions are proposed by the City and County within Wyoming Blvd. NE and Barstow Street NE, respectively, to accept runoff from the PDNC. PDNC improvements will allow the shopping center and commercial areas to develop.

city/County limits?

The second requirement for ultimate development is the upstream extension of the AMAFCA soil cement channel east of Barstow Street. This extension will allow for the development of La Cueva Village, Unit 2, and will necessitate permanent Barstow Street NE paving improvements and a crossing structure (bridge) over the channel extension. A Financial Guarantee exists for half of the bridge construction as part of the Subdivision Improvements Agreement between the City of Albuquerque and Albuquerque Public Schools executed for the Northeast Heights Middle School currently under construction (C.O.A. Project No. 5414.81). As shown by the Calculations in Appendix 'E', there will be no storm drain requirement within Barstow Street NE.

Unit 2 will bond for the other ½?

APPENDIX A

MASTER DRAINAGE PLAN DRAWINGS

FAX TRANSMISSION

AMAFCA

2600 Prospect, NE
Albuquerque, NM 87107
(505) 884-2215
Fax: (505) 884-0214

To: All Listed Below Date: May 2

Fax #: _____ Pages: 5, including this cover sheet.

From: Kurt Browning by KB

Subject: _____

COMMENTS:

Jo: Susan Calonge
Ron Koch
Rick Rayboal
Fred Aguirre
Dan Hogan
Jeff Mortensen
Ken McDaniel
Kevin Curran

MICHAEL MURPHY, CHAIR
TIM EICHENBERG, VICE-CHAIR
LINDA OLMSTED, SECRETARY-TREASURER
RONALD D BROWN, ASST. SECRETARY-TREASURER
DANIEL W COOK, DIRECTOR

LARRY A BLAIR
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N E · ALBUQUERQUE, N.M 87107
TELEPHONE (505) 884-2215

April 29, 1997

Memorandum

TO: Don Hoech, Hoech Real Estate (ALL VIA FAX)
Rick Roybal, City Engineer
Fred Aguirre, City One-stop Development
Susan Calongne, City/County Floodplain Administrator
Dan Hogan, City Hydrology
Jeff Mortensen, Mortensen and Associates
Ken McDaniel, AMAFCA Legal
Kevin Curran, COA Legal

FR: Larry Blair, AMAFCA

RE: Interim excavation of Window "G" North Domingo Baca Channel

---

Attached is a proposed letter to HREC, outlining conditions to be met, to allow excavation of the North Domingo Baca Channel. The material will be stockpiled for soil cement production required for the new channel, and will also be used for adjacent site grading.

Your input and comments are welcome. Please provide comments to AMAFCA by Friday, May 9, 1997. Thank you.

Draft

April 30, 1997

Mr. Don Hoech
Hoech Real Estate
6729 Academy Road N.E., Suite B
Albuquerque, New Mexico 87109

RE: HREC-AMAFCA Agreement for Channel Construction and Requirements for Interim Excavation of Proposed Channel.

Dear Mr. Hoech:

As you know, the enclosed Agreement was approved and signed by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) Board of Directors at its March 27, 1997 meeting. (In order to satisfy certain AMAFCA Resolutions regarding land exchange, a subordinate agreement was necessary, and was also approved and signed by the Board on March 27, 1997.)

Our Agreement covers the financing, design, construction and maintenance of the North Domingo Baca Channel between Wyoming and Barstow. Construction by AMAFCA is planned to commence in the fall (October 1, 1997).

I am willing to permit interim excavation of the channel, subject to the following conditions:

a. Excavation must be completed by **September 1, 1997**. Interim wing dikes at the east end of the project must be in place for the interim earthen channel to operate satisfactorily. These dikes must be of engineered fill, and your engineer must certify these dikes including all test reports.

b. Interim channel slopes must be left with one foot (perpendicular to slope) of excess earth. The bottom will be excavated to finished sub-grade elevation.

c. A stockpile of satisfactory material for soil cement will be provided with the quantity being 120 percent of estimated need. AMAFCA, or its

Draft

approvals which may be imposed by the City of Albuquerque.

Prior to AMAFCA advertising for bids for the channel project, the following items must be in place, and certified by the City of Albuquerque and your engineer:

1. All utility work required at Wyoming (channel crossing).
2. The interim detour (shoefly) and stormwater outlet at Wyoming as approved by COA, and AMAFCA.
3. The bridge abutments/foundations at Wyoming, including all appurtenances, so that the channel can be constructed in the area with minimum maintenance.
4. Preliminary grading of the channel as outlined in item b above.
5. Traffic control plan approved by City Engineer.

I understand your engineer is coordinating these items with COA staff. As we proceed through coordination and review, additional items may surface.

Should you have any questions, please call me at (505) 884-2215.

Sincerely,
AMAFCA

_____
CONCURRENCE, HREC

Larry Blair
Executive Engineer

cc: Fred Aguirre, COA One-Stop Development
Dan Hogan, COA Hydrology
Susan Calongne, City/County Floodplain Administrator
Rick Roybal, City Engineer

APPENDIX B

SOIL CEMENT CHANNEL PRELIMINARY DRAWINGS

C18/D11

CITY OF
Albuquerque
Public Works Department

RECEIVED
MAY 28 1997

May 21, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Larry Blair, Executive Engineer
AMAFCA
2600 Prospect Ave. N.E.
Albuquerque 87107

RECEIVED
JUL 10 1997
HYDROLOGY SECTION

RE. Window "G" Drainage Channel

Dear Mr Blair,

There has been much discussion and research on the design of the referenced channel. I, as City Engineer, grant a variance to the "Drainage Ordinance and the Subdivision Ordinance" by deferring the design approval of this facility to AMAFCA.

This design is new to the Albuquerque area and is a possible new direction for future channels. It is viewed as a test section and will be evaluated by this office for possible future use. The use of soil cement and the one to one stepped side slopes maybe the ticket to a more economical and durable channel. The natural "adobe" look is much more in line with current appeal than the previous "gray concrete look". Let's try it!

The variance is granted based on the following item:

1. The design falls outside of the normal criteria that the City has approved within the Development Process Manual.

2. The design has been worked out with the design engineer, developer, and AMAFCA.

3. The City has supported the hydrology of the channel by requesting and obtaining a CLOMAR from FEMA.

4. AMAFCA has committed to evaluate the performance of the constructed project and make changes if necessary.

Research by this office indicates that a pedestrian hand rail has been incorporated to similarly designed channels in other communities for the prevention of accidental human entrance into the channel. Additionally, staff from this office have visited similar structures in place to evaluate the comfort level of the one to one slopes. Therefore, this office recommends that the designer and AMAFCA re-evaluate the inclusion of a pedestrian hand rail along the top of the channel edge and the exit ramps.

Please feel free to discuss this with me if necessary. I am available at 924-3999.

Sincerely,

Ricardo B. Roybal P.E.
City Engineer
Public Works Dept.

cc: Don Hoech, Hoech Real Estate
Jeff Mortensen, Jeff Mortensen & Associates
John Castillo, Director, Ass't Director, PWD
Ron Short, Director, Planning Dept.
Fred Aguirre, Hydrology, PWD
Susan Calongne, Hydrology, PWD
Dan Hogan, Hydrology, PWD

CITY OF
Albuquerque

November 12, 1997

Martin J. Chávez, Mayor

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Donald G. Hoech
President
Hoech Real Estate Corporation
6729 Academy Road NE, Suite B
Albuquerque, NM 87109

RE: LA CUEVA VILLAGE UNIT 1 (Shoofly); CITY PROJECT NO. 572981; MAP NO. C-19

Dear Mr. Hoech:

This is to certify that the City of Albuquerque accepts the construction of the infrastructure provided in the Work Order Construction Plans, City Project No. 572981 in compliance with the completion of the required public infrastructure listed in the Subdivision Improvements Agreement (SIA) between Hoech Real Estate Corporation and the City of Albuquerque executed on August 27, 1997.

Having satisfied the requirements referenced above, the SIA and any associated Financial Guaranty, held by the City, can now be released. The Contractors one-year warranty period started at the date of acceptance by the Chief Construction Engineer, dated November 6, 1997.

Please be advised this Certificate of Completion and Acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

Should you have any questions or issues regarding this project, please contact me.

Sincerely,

Ricardo B. Roybal, P.E.
City Engineer
Dev. & Bld. Services Div.
Public Works Department

c. Graeme Means, Jeff Mortensen & Assoc., Inc.
Scott Browning, Vice President, Sunwest Bank of Albuq., N.A.
Teresa Martin, Project Administrator, Project Review
Theresa Lucero, Assistant Project Administrator , PWD
Fred Aguirre, Hydrology, PWD
Richard Dourte, Transportation Development, PWD
Roger Green, Utility Development, PWD
Ed Stang, Planning Section, CIP
f/Project file

APPENDIX C

HEC-RAS INPUT AND OUTPUT

TITLE	PAGE NO.
Input File	C-1
Output Tables	C-4
Section Plots	C-12
Profile Plot	C-20

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Rch Arrow X Y Up & X Y Dn=0,0,0,0
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      57     456
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      65      453
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      69      452
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Exp/Cntr=0.3,0.1

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      66      449       69      450       73    450.9
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```

HEC-RAS Plan: Imported Pla Reach: 1 11/25/96

River Sta.	Max Chl Dpth	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
2000	2.50	464.00	466.50	466.78	467.55	0.020751	8.23	39.00	31.00	1.29	2.50
1950	1.76	462.50	464.26	464.84	466.06	0.040538	10.78	29.78	26.09	1.78	1.76
1900	2.65	461.00	463.65	463.80	464.60	0.016041	7.81	41.10	28.92	1.15	2.65
1850	2.28	460.30	462.58	462.82	463.74	0.017567	8.64	37.15	23.91	1.22	2.28
1800	2.50	459.20	461.70	461.94	462.88	0.017438	8.72	36.80	23.18	1.22	2.50
1750	2.70	458.30	461.00	461.24	462.04	0.014913	8.21	39.11	23.98	1.13	2.70
1700	2.23	457.30	459.53	459.99	461.00	0.027615	9.72	33.04	25.29	1.50	2.23
1650	2.39	456.10	458.49	458.82	459.72	0.021784	8.92	36.00	26.24	1.34	2.39
1600	2.00	455.00	457.00	457.39	458.40	0.030534	9.50	33.77	28.95	1.55	2 00
1550	1.34	454.00	455.34	455.78	456 81	0.032555	9.72	33.03	28.71	1.60	1.34
1500	1.87	452.80	454.67	454.80	455.53	0.015999	7.42	43.25	33.13	1.14	1.87
1450	1.34	451.50	452.84	453.27	454.30	0.036675	9.69	33.11	31.73	1.67	1.34
1400	1.30	450.20	451.50	451.82	452.62	0.026849	8.49	37.79	35.02	1.44	1.30
1350	1.14	448.90	450.04	450.38	451.17	0.030531	8.50	37.74	38.49	1.51	1.14
1300	1.17	447.60	448.77	449.03	449.66	0.027394	7.54	42.58	48.16	1.41	1.17

4

Plan: Imported Pla Reach: 1 Riv Sta: 2000 Profile: 1 11/25/96

W.S. Elev (ft)	466.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
E.G. Elev (ft)	467.55	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.020751	Flow Area (sq ft)		39.00	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	31.00	Top Width (ft)		31.00	
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)		8.23	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		1.26	
Crit W.S. (ft)	466.78	Wetted Per. (ft)		31.48	
Conv. Total (cfs)	2228.3	Conv. (cfs)		2228.3	

Plan: Imported Pla Reach: 1 Riv Sta: 1950 Profile: 1 11/25/96

W.S. Elev (ft)	464.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.80	Wt. n-Val.		0.030	
E.G. Elev (ft)	466.06	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.040538	Flow Area (sq ft)		29.78	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	26.09	Top Width (ft)		26 09	
Vel Total (ft/s)	10.78	Avg. Vel. (ft/s)		10.78	
Max Chl Dpth (ft)	1.76	Hydr. Depth (ft)		1.14	
Crit W.S. (ft)	464.84	Wetted Per. (ft)		26.51	
Conv. Total (cfs)	1594.3	Conv. (cfs)		1594.3	

Plan: Imported Pla Reach: 1 Riv Sta: 1900 Profile: 1 11/25/96

W.S. Elev (ft)	463 65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.030	
E.G. Elev (ft)	464.60	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.016041	Flow Area (sq ft)		41.10	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	28.92	Top Width (ft)		28.92	
Vel Total (ft/s)	7.81	Avg. Vel. (ft/s)		7.81	
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)		1.42	
Crit W.S. (ft)	463.80	Wetted Per. (ft)		29.59	
Conv. Total (cfs)	2534.5	Conv. (cfs)		2534.5	

Plan: Imported Pla Reach: 1 Riv Sta: 1850 Profile: 1 11/25/96

W.S. Elev (ft)	462.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.030	
E.G. Elev (ft)	463.74	Reach Len. (ft)	50.00	50.00	50 00
E.G. Slope (ft/ft)	0.017567	Flow Area (sq ft)		37.15	
Q Total (cfs)	321.00	Flow (cfs)		321 00	
Top Width (ft)	23.91	Top Width (ft)		23.91	
Vel Total (ft/s)	8.64	Avg. Vel. (ft/s)		8.64	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		1.55	
Crit W.S. (ft)	462.82	Wetted Per. (ft)		24.60	
Conv. Total (cfs)	2421.9	Conv. (cfs)		2421.9	

Plan: Imported Pla Reach: 1 Riv Sta: 1800 Profile: 1 11/25/96

W.S. Elev (ft)	461.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.030	
E.G. Elev (ft)	462.88	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.017438	Flow Area (sq ft)		36.80	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	23.18	Top Width (ft)		23.18	
Vel Total (ft/s)	8.72	Avg. Vel. (ft/s)		8.72	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		1.59	
Crit W.S. (ft)	461.94	Wetted Per. (ft)		23.90	
Conv. Total (cfs)	2430.8	Conv. (cfs)		2430.8	

Plan: Imported Pla Reach: 1 Riv Sta: 1750 Profile: 1 11/25/96

W.S. Elev (ft)	461.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
E.G. Elev (ft)	462.04	Reach Len. (ft)	50 00	50.00	50.00
E.G. Slope (ft/ft)	0.014913	Flow Area (sq ft)		39.11	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	23.98	Top Width (ft)		23.98	
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)		8.21	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)		1.63	
Crit W.S. (ft)	461.24	Wetted Per. (ft)		24.75	
Conv. Total (cfs)	2628.6	Conv. (cfs)		2628.6	

Plan: Imported Pla Reach: 1 Riv Sta: 1700 Profile: 1 11/25/96

W.S. Elev (ft)	459.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0.030	
E.G. Elev (ft)	461.00	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.027615	Flow Area (sq ft)		33 04	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	25.29	Top Width (ft)		25.29	
Vel Total (ft/s)	9.72	Avg. Vel. (ft/s)		9.72	
Max Chl Dpth (ft)	2.23	Hydr. Depth (ft)		1.31	
Crit W.S. (ft)	459.99	Wetted Per. (ft)		25.76	
Conv. Total (cfs)	1931.7	Conv. (cfs)		1931.7	

Plan: Imported Pla Reach: 1 Riv Sta: 1650 Profile: 1 11/25/96

W.S. Elev (ft)	458.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.		0.030	
E.G. Elev (ft)	459.72	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.021784	Flow Area (sq ft)		36.00	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	26.24	Top Width (ft)		26.24	
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)		8.92	
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)		1.37	
Crit W.S. (ft)	458.82	Wetted Per. (ft)		26.73	
Conv. Total (cfs)	2174.9	Conv. (cfs)		2174.9	

Plan: Imported Pla Reach: 1 Riv Sta: 1600 Profile: 1 11/25/96

W.S. Elev (ft)	457.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.		0.030	
E.G. Elev (ft)	458.40	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.030534	Flow Area (sq ft)		33.77	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	28.95	Top Width (ft)		28 95	
Vel Total (ft/s)	9.50	Avg. Vel. (ft/s)		9.50	
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)		1.17	
Crit W.S. (ft)	457.39	Wetted Per. (ft)		29.35	
Conv. Total (cfs)	1837.0	Conv. (cfs)		1837.0	

Plan: Imported Pla Reach: 1 Riv Sta: 1550 Profile: 1 11/25/96

W.S. Elev (ft)	455.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0.030	
E.G. Elev (ft)	456.81	Reach Len. (ft)	50 00	50.00	50.00
E.G. Slope (ft/ft)	0.032555	Flow Area (sq ft)		33.03	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	28.71	Top Width (ft)		28.71	
Vel Total (ft/s)	9.72	Avg. Vel. (ft/s)		9.72	
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		1.15	
Crit W.S. (ft)	455.78	Wetted Per. (ft)		29.13	
Conv. Total (cfs)	1779.1	Conv. (cfs)		1779.1	

Plan: Imported Pla Reach: 1 Riv Sta: 1500 Profile: 1 11/25/96

W.S. Elev (ft)	454.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.030	
E.G. Elev (ft)	455.53	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.015999	Flow Area (sq ft)		43.25	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	33.13	Top Width (ft)		33.13	
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)		7.42	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.31	
Crit W.S. (ft)	454.80	Wetted Per. (ft)		33.53	
Conv. Total (cfs)	2537.8	Conv. (cfs)		2537.8	

Plan: Imported Pla Reach: 1 Riv Sta: 1450 Profile: 1 11/25/96

W.S. Elev (ft)	452 84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.030	
E.G. Elev (ft)	454.30	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.036675	Flow Area (sq ft)		33.11	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	31.73	Top Width (ft)		31.73	
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)		9.69	
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		1.04	
Crit W.S. (ft)	453.27	Wetted Per. (ft)		32.04	
Conv. Total (cfs)	1676.2	Conv. (cfs)		1676.2	

Plan: Imported Pla Reach: 1 Riv Sta: 1400 Profile: 1 11/25/96

W.S. Elev (ft)	451.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.030	
E.G. Elev (ft)	452.62	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.026849	Flow Area (sq ft)		37.79	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	35.02	Top Width (ft)		35.02	
Vel Total (ft/s)	8.49	Avg. Vel. (ft/s)		8.49	
Max Chl Dpth (ft)	1.30	Hydr. Depth (ft)		1.08	
Crit W.S. (ft)	451.82	Wetted Per. (ft)		35.29	
Conv. Total (cfs)	1959.0	Conv. (cfs)		1959.0	

Plan: Imported Pla Reach: 1 Riv Sta: 1350 Profile: 1 11/25/96

W.S. Elev (ft)	450.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.030	
E.G. Elev (ft)	451.17	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0 030531	Flow Area (sq ft)		37.74	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	38.49	Top Width (ft)		38.49	
Vel Total (ft/s)	8.50	Avg. Vel. (ft/s)		8.50	
Max Chl Dpth (ft)	1.14	Hydr. Depth (ft)		0.98	
Crit W.S. (ft)	450.38	Wetted Per. (ft)		38.75	
Conv. Total (cfs)	1837.1	Conv. (cfs)		1837.1	

Plan: Imported Pla Reach: 1 Riv Sta: 1300 Profile: 1 11/25/96

W.S. Elev (ft)	448.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0 88	Wt. n-Val.		0.030	
E.G. Elev (ft)	449.66	Reach Len. (ft)			
E.G. Slope (ft/ft)	0.027394	Flow Area (sq ft)		42.58	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	48.16	Top Width (ft)		48.16	
Vel Total (ft/s)	7.54	Avg. Vel. (ft/s)		7.54	
Max Chl Dpth (ft)	1.17	Hydr. Depth (ft)		0.88	
Crit W.S. (ft)	449.03	Wetted Per. (ft)		48.28	
Conv. Total (cfs)	1939.5	Conv. (cfs)		1939.5	

2

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
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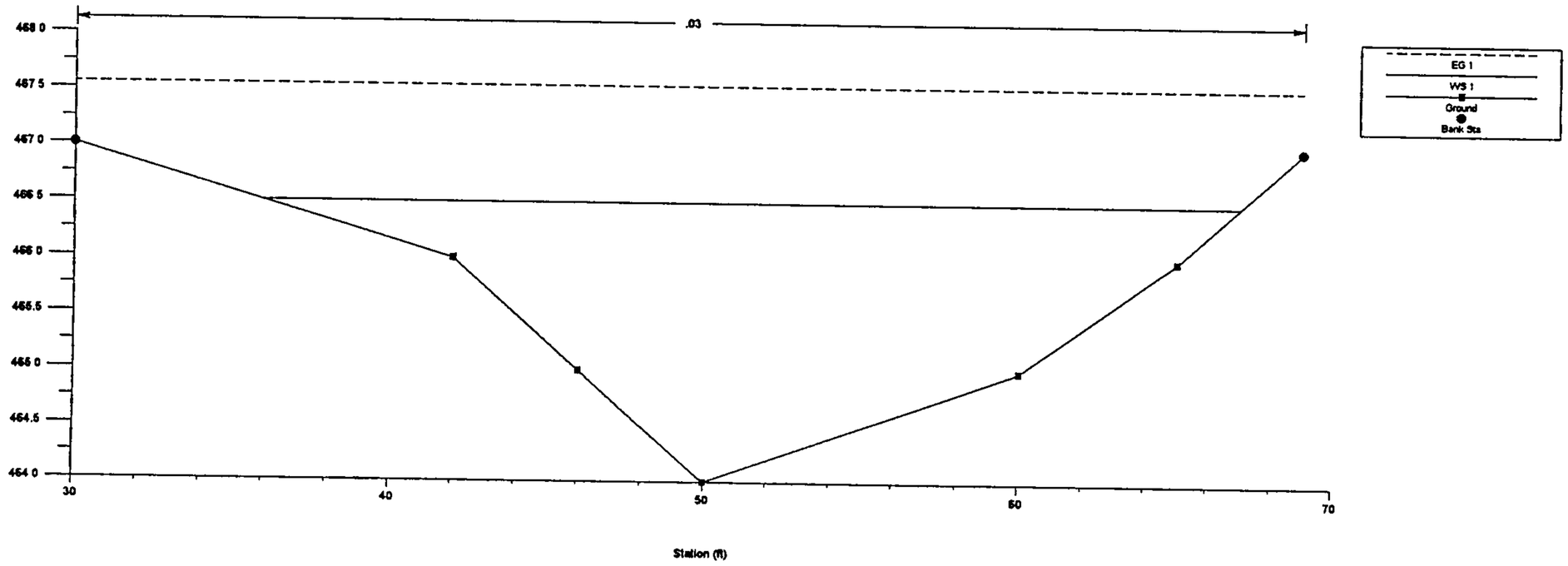

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
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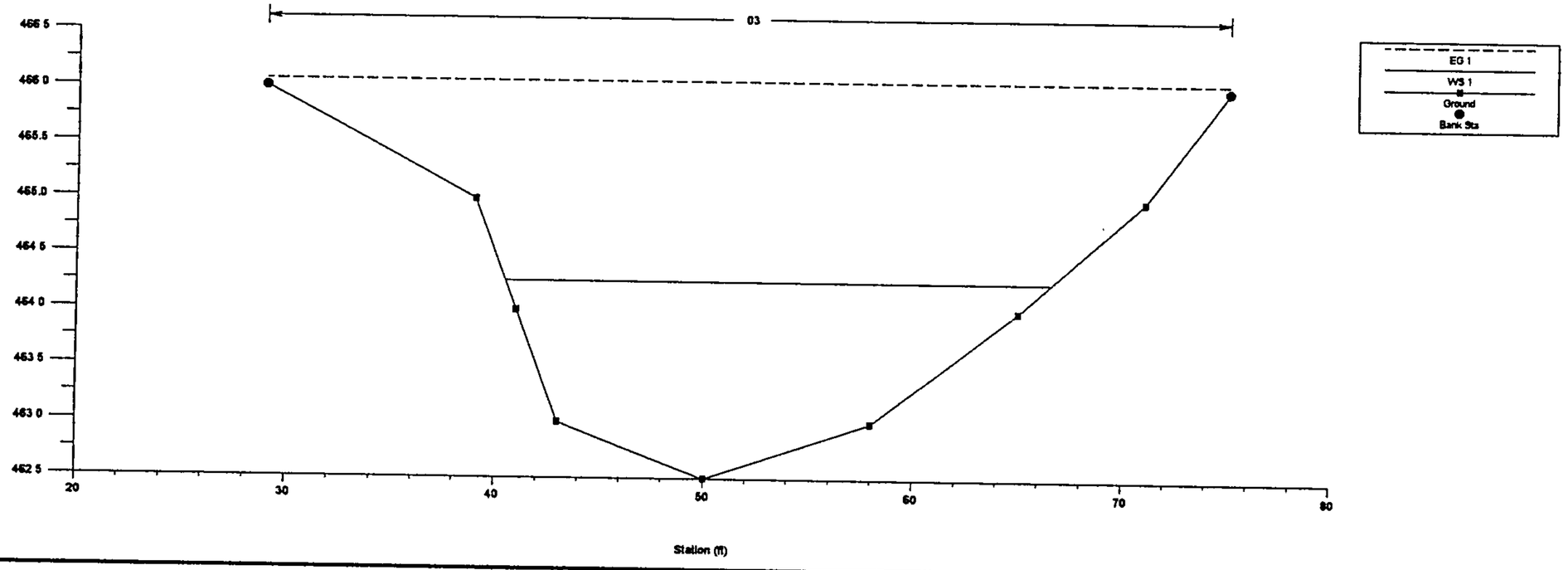

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WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
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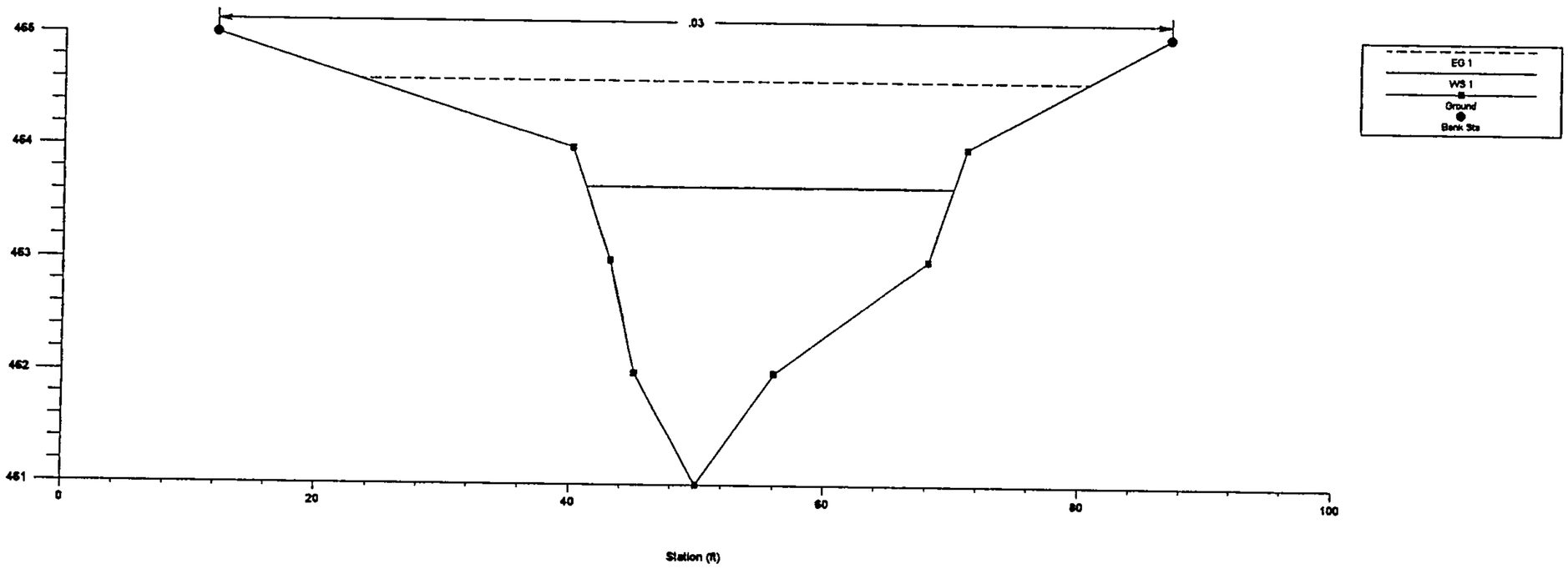

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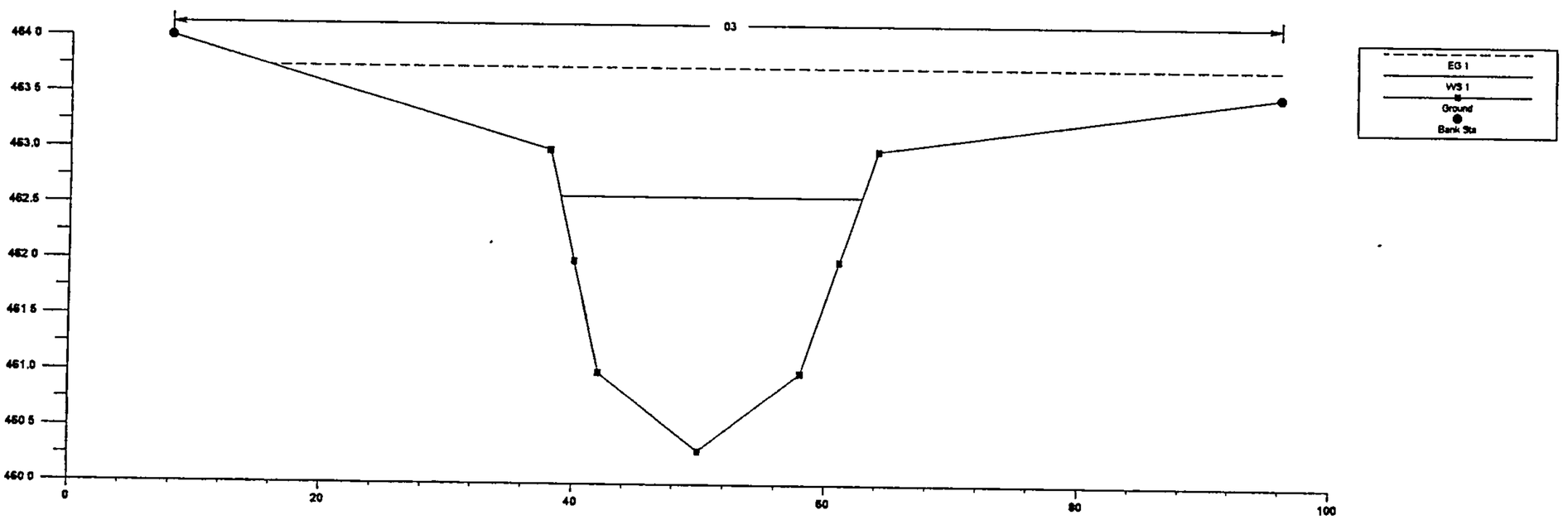
1850



WINDOW G MDP @ HOLLY Plan Imported Plan 01 11/25/96
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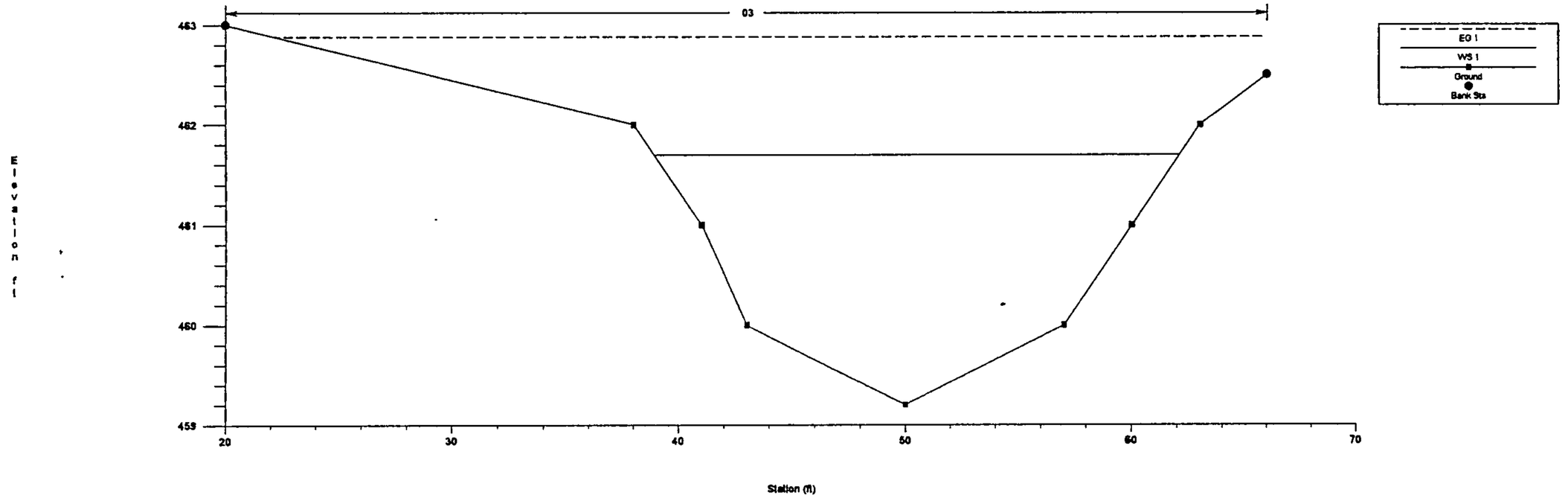

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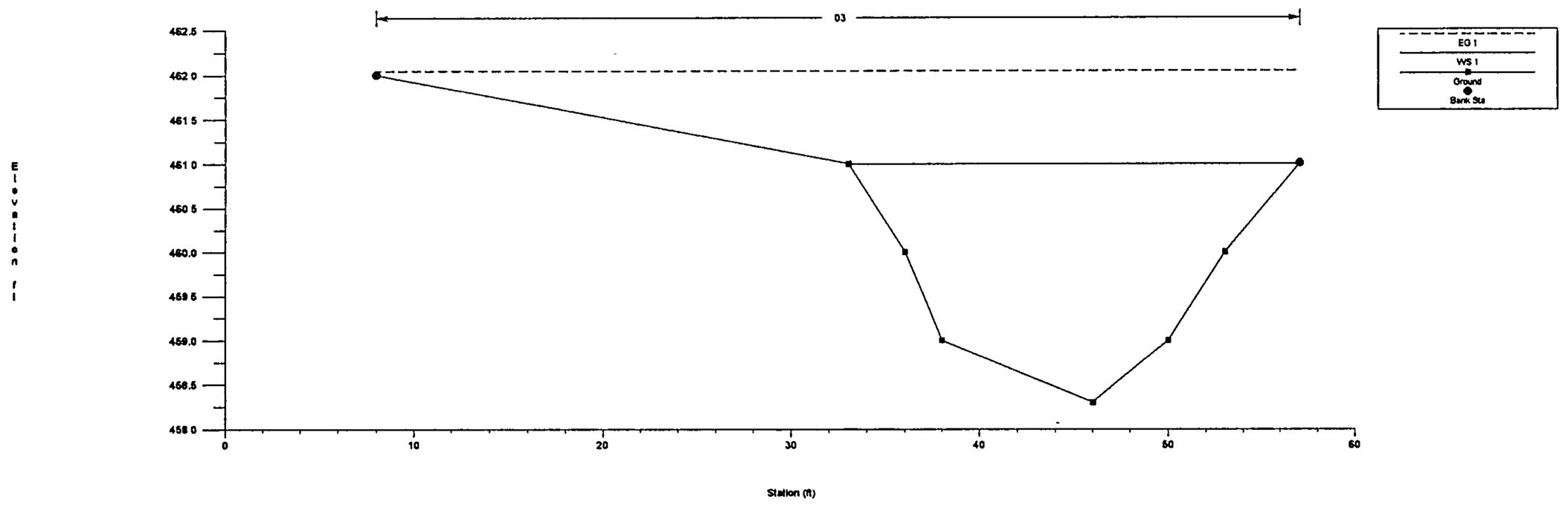

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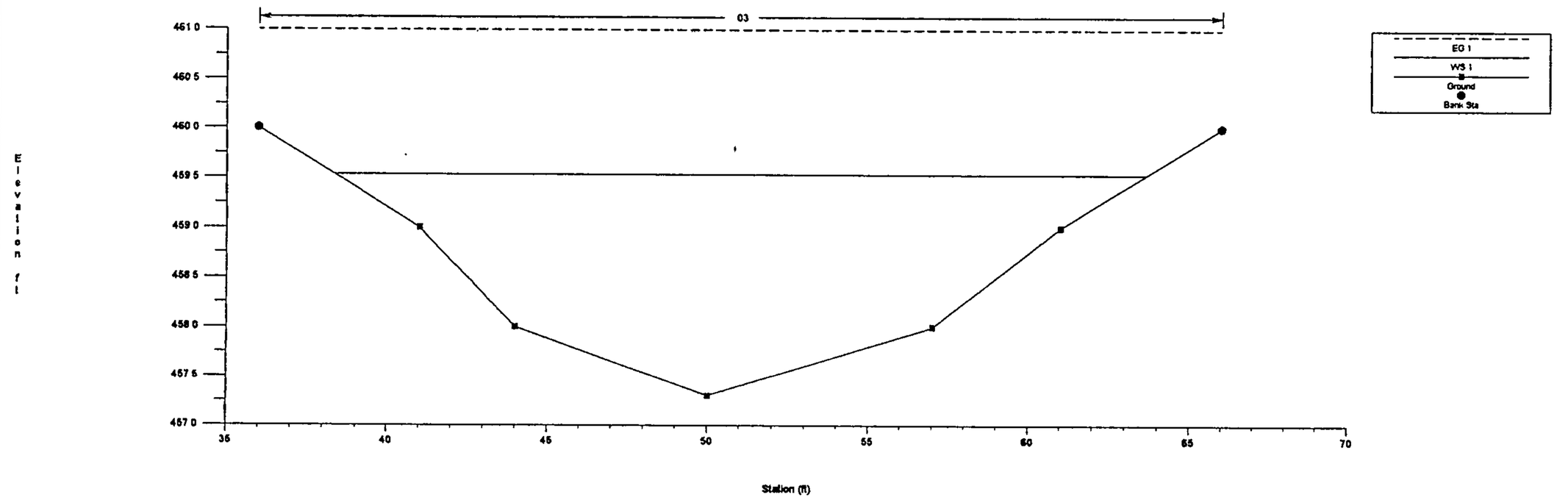
1700



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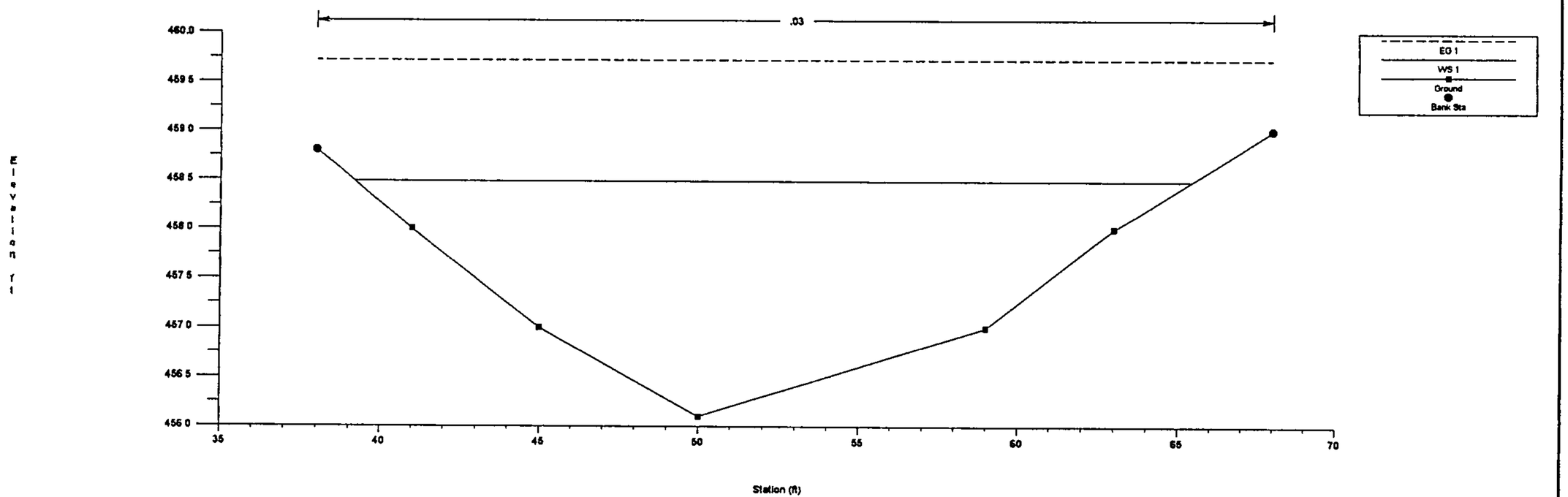
1650



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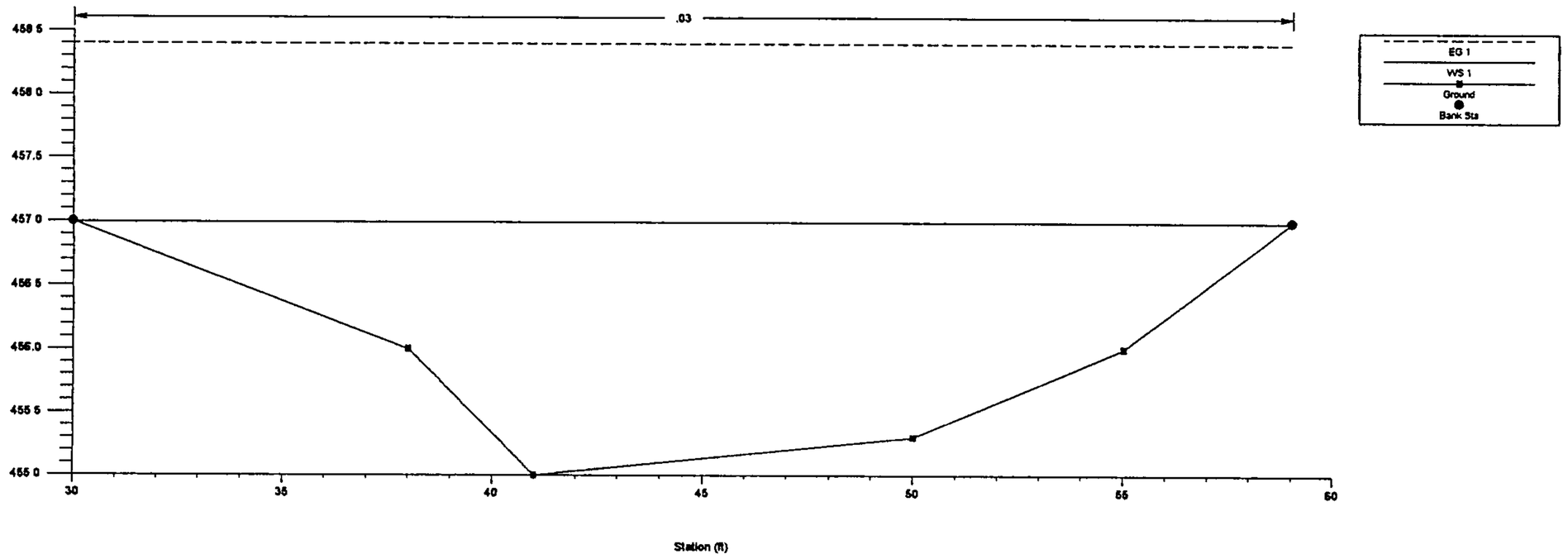
1600



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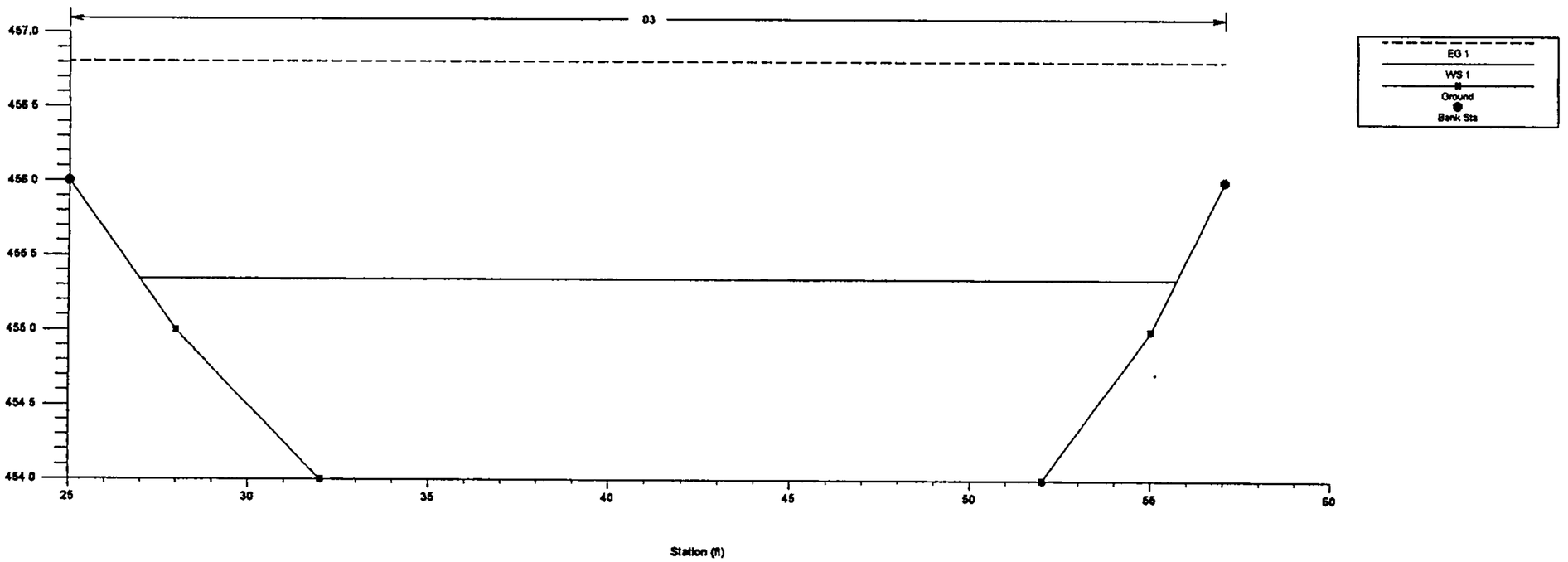
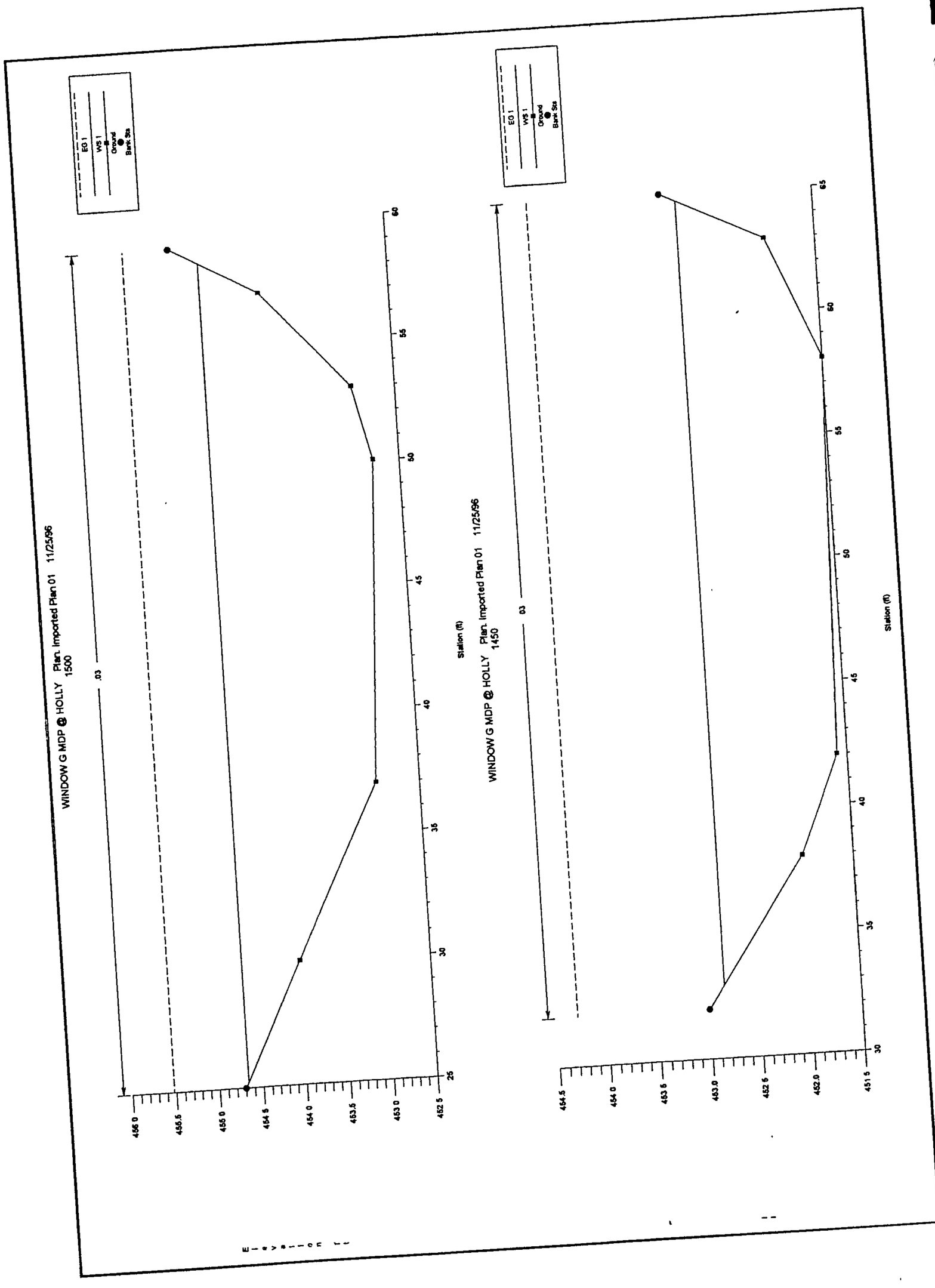
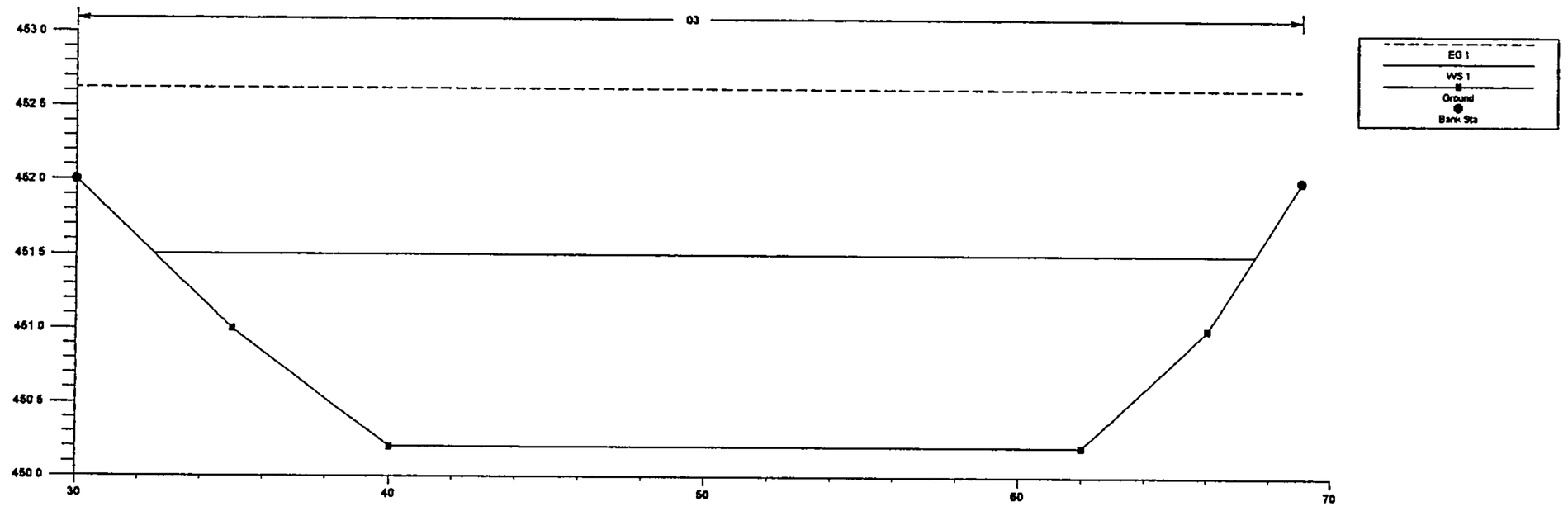


C-16

L1-1


WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1500
.03
EG 1
WS 1
Ground
Bank Sta
Station (ft)
WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1450
.03
EG 1
WS 1
Ground
Bank Sta
Station (ft)

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1400



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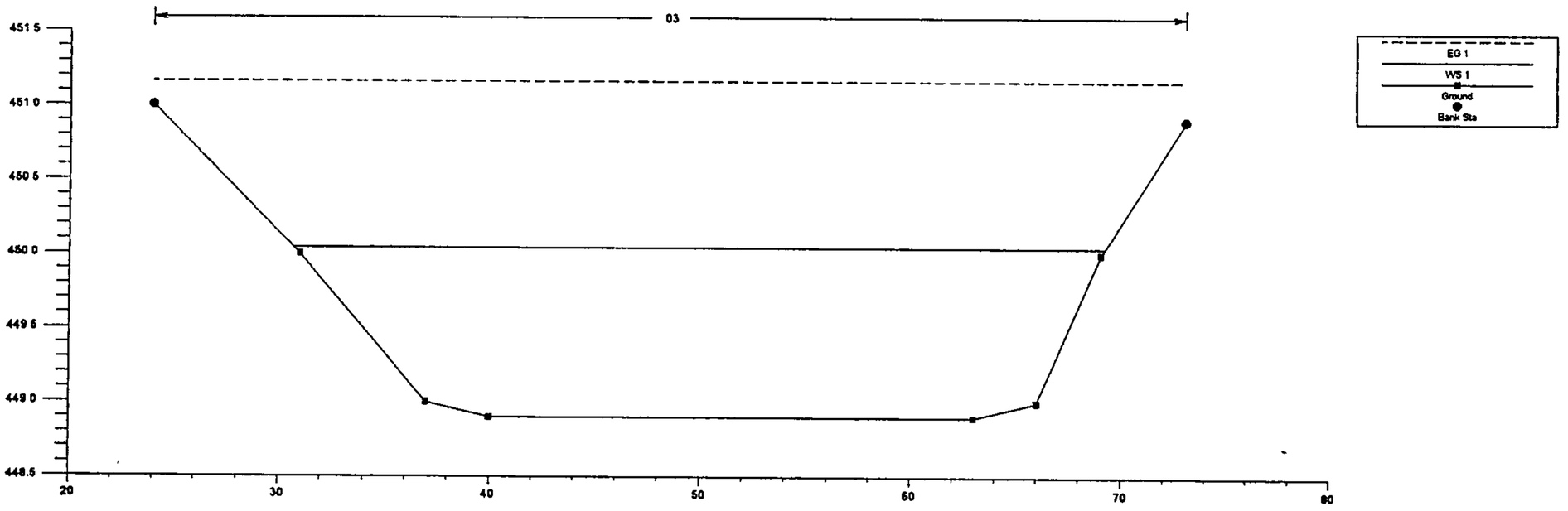

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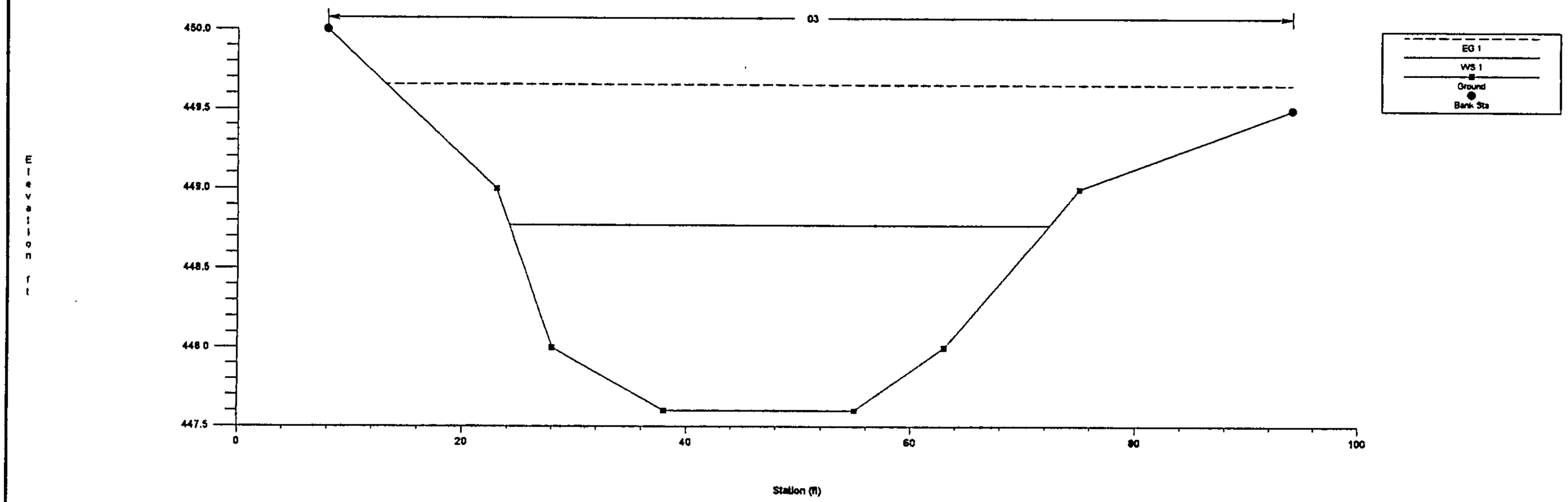

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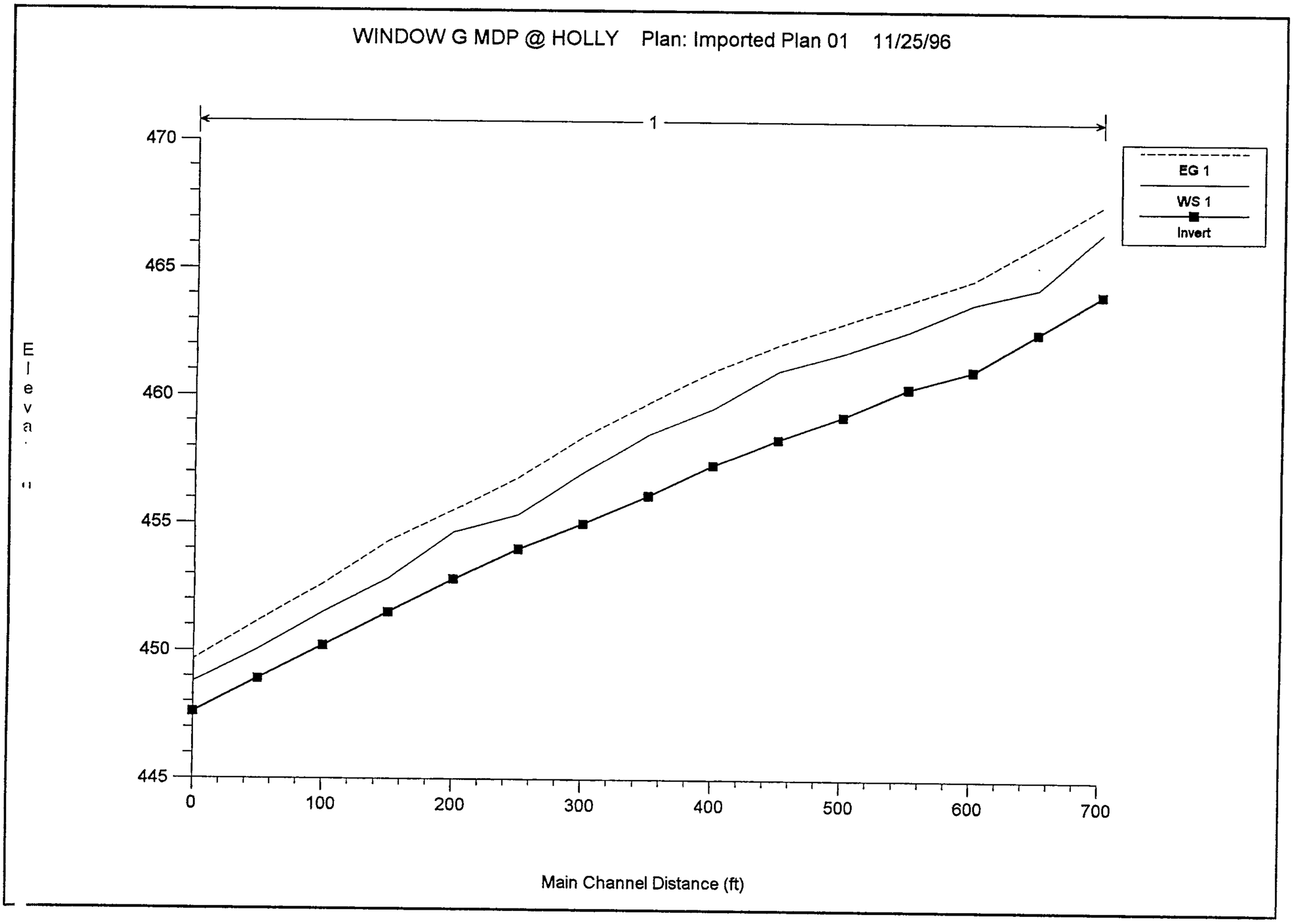
WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1
EG 1
WS 1
Invert
Elevation
470
465
460
455
450
445
0
100
200
300
400
500
600
700
Main Channel Distance (ft)

C-20

APPENDIX D

AHYMO INPUT AND OUTPUT

TITLE	PAGE NO.
Proposed Conditions Input & Output	D-1
Proposed Conditions Summary Table	D-10
Time of Concentration Calculations	D-11
Ultimate Conditions Input and Output	D-12
Ultimate Conditions Summary Table	D-22

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*234567890123456789O
*
*    Window "G" Proposed Conditions                    JMA # 940956
*                                                      December, 1996
*                                                      G.M. 486-5
*
*
*
*    100 - YEAR STORM
*
START                    TIME = 0.0   PUNCH CODE = 0   PRINT LINES = -1
RAINFALL                 TYPE = 2   RAIN QUARTER = 0.0
                         RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                         RAIN DAY = 3.10 IN DT = 0.02
*
* Offsite Baisn (East of Barstow)
COMPUTE NM HYD           ID = 1   HYD NO = 101.01   AREA = 0.913
                         PER A = 43   PER B = 20 PER C = 20   PER D = 17
                         TP = -0.314 HR   MASS RAIN =-1

PRINT HYD                ID = 1   CODE = 1

* Tract A (Pinnacle Estates Apartments)
COMPUTE NM HYD           ID = 2   HYD NO = 101.02   AREA = 0.0234375
                         PER A = 0   PER B = 10 PER C = 20   PER D = 70
                         TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD                ID = 2   CODE = 1

* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD           ID = 3   HYD NO = 101.03   AREA = 0.006525
                         PER A = 0   PER B = 20 PER C = 20   PER D = 60
                         TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD                ID = 3   CODE = 1

* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD           ID = 4   HYD NO = 101.04   AREA = 0.010454 SQ MI
                         PER A = 0   PER B = 20   PER C = 20   PER D = 60
                         TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD                ID = 4   CODE = 1

*   Add East and West La Cueva Village Basins

ADD HYD                  ID = 5   HYD NO = 101.05   ID I = 3   ID II = 4

PRINT HYD                ID = 5   CODE = 1

* Tract C (Shopping Center)

COMPUTE NM HYD           ID = 6 HYD NO = 101.06   AREA = 0.0165 SQ MI
                         PER A = 0   PER B =3.3   PER C = 6.7   PER D = 90
                         TP = -0.133333333 HR MASS RAIN = -1

PRINT HYD                ID = 6   CODE = 1

* Tract B (La Cueva Village Unit 2, Lots 1-16)
* UNDEVELOPED INTERIM CONDITION *
```

```
COMPUTE NM HYD      ID = 7 HYD NO = 101.07  AREA = 0.0055 SQ MI
                    PER A = 80  PER B = 10  PER C = 10 PER D = 0
                    TP = -0.1333333333 HR  MASS RAIN = -1

PRINT HYD           ID = 7 CODE = 1

*  Add to get total flow from La Cueva Village

ADD HYD             ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD           ID = 8 CODE = 1

* Carmel / Holly Right of Way

COMPUTE NM HYD      ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                    PER A = 0  PER B = 0  PER C = 11  PER D = 89
                    TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD           ID = 9 CODE = 1

* Wyoming Right of Way

COMPUTE NM HYD      ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                    PER A = 0   PER B = 0  PER C = 46  PER D = 54
                    TP = -0.13333333333 HR  MASS RAIN = -1

PRINT HYD           ID = 10  CODE = 1

FINISH
```

```
     AHYMO PROGRAM (AHYM0194) - AMAFCA Hydrologic Model - January, 1994
          RUN DATE (MON/DAY/YR) = 12/06/1996
          START TIME (HR:MIN:SEC) = 10:33:55     USER NO.= J_MORTEN.I01
          INPUT FILE = 940956.inp

*23456789012345678901
*
*   Window "G" Proposed Conditions                    JMA # 940956
*                                                     December, 1996
*                                                     G.M. 486-5
*
*
*   100 - YEAR STORM
*
START
RAINFALL          TIME = 0.0  PUNCH CODE = 0  PRINT LINES = -1
                  TYPE = 2  RAIN QUARTER = 0.0
                  RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                  RAIN DAY = 3.10 IN DT = 0.02

                  COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =    .020000 HOURS       END TIME =    11.980000 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0084   .0101
                     .0119   .0137   .0155   .0173   .0192   .0211   .0230
                     .0249   .0269   .0289   .0309   .0330   .0351   .0372
                     .0393   .0415   .0438   .0461   .0484   .0507   .0531
                     .0556   .0580   .0606   .0632   .0658   .0685   .0713
                     .0741   .0770   .0799   .0829   .0860   .0892   .0924
                     .0958   .0992   .1027   .1063   .1101   .1139   .1179
                     .1220   .1263   .1298   .1334   .1372   .1411   .1453
                     .1508   .1651   .1846   .2100   .2424   .2826   .3316
                     .3904   .4600   .5412   .6353   .7432   .8658  1.0044
                    1.1599  1.3335  1.4120  1.4697  1.5214  1.5691  1.6135
                    1.6554  1.6950  1.7326  1.7685  1.8029  1.8358  1.8675
                    1.8979  1.9272  1.9555  1.9827  2.0091  2.0345  2.0591
                    2.0830  2.1060  2.1283  2.1499  2.1709  2.1912  2.2108
                    2.2299  2.2484  2.2663  2.2708  2.2751  2.2794  2.2835
                    2.2875  2.2914  2.2952  2.2989  2.3025  2.3061  2.3095
                    2.3129  2.3162  2.3194  2.3226  2.3257  2.3288  2.3318
                    2.3348  2.3377  2.3405  2.3433  2.3461  2.3488  2.3515
                    2.3541  2.3567  2.3593  2.3618  2.3643  2.3667  2.3692
                    2.3716  2.3739  2.3763  2.3786  2.3809  2.3831  2.3853
                    2.3875  2.3897  2.3919  2.3940  2.3961  2.3982  2.4002
                    2.4023  2.4043  2.4063  2.4083  2.4103  2.4122  2.4141
                    2.4160  2.4179  2.4198  2.4217  2.4235  2.4253  2.4271
                    2.4289  2.4307  2.4325  2.4342  2.4360  2.4377  2.4394
                    2.4411  2.4428  2.4445  2.4461  2.4478  2.4494  2.4510
                    2.4526  2.4542  2.4558  2.4574  2.4590  2.4605  2.4621
                    2.4636  2.4651  2.4667  2.4682  2.4697  2.4711  2.4726
                    2.4741  2.4755  2.4770  2.4784  2.4799  2.4813  2.4827
                    2.4841  2.4855  2.4869  2.4883  2.4897  2.4910  2.4924
                    2.4938  2.4951  2.4964  2.4978  2.4991  2.5004  2.5017
                    2.5030  2.5043  2.5056  2.5069  2.5082  2.5094  2.5107
                    2.5120  2.5132  2.5145  2.5157  2.5169  2.5182  2.5194
                    2.5206  2.5218  2.5230  2.5242  2.5254  2.5266  2.5278
                    2.5290  2.5301  2.5313  2.5325  2.5336  2.5348  2.5359
                    2.5371  2.5382  2.5393  2.5405  2.5416  2.5427  2.5438
                    2.5449  2.5460  2.5471  2.5482  2.5493  2.5504  2.5515
                    2.5526  2.5536  2.5547  2.5558  2.5568  2.5579  2.5589
```

2.5600	2.5610	2.5621	2.5631	2.5641	2.5652	2.5662
2.5672	2.5682	2.5693	2.5703	2.5713	2.5723	2.5733
2.5743	2.5753	2.5763	2.5773	2.5782	2.5792	2.5802
2.5812	2.5821	2.5831	2.5841	2.5850	2.5860	2.5870
2.5879	2.5889	2.5898	2.5907	2.5917	2.5926	2.5935
2.5945	2.5954	2.5963	2.5973	2.5982	2.5991	2.6000
2.6009	2.6017	2.6026	2.6034	2.6043	2.6051	2.6060
2.6068	2.6077	2.6085	2.6094	2.6102	2.6110	2.6119
2.6127	2.6136	2.6144	2.6152	2.6161	2.6169	2.6177
2.6186	2.6194	2.6202	2.6211	2.6219	2.6227	2.6235
2.6244	2.6252	2.6260	2.6268	2.6276	2.6285	2.6293
2.6301	2.6309	2.6317	2.6325	2.6333	2.6342	2.6350
2.6358	2.6366	2.6374	2.6382	2.6390	2.6398	2.6406
2.6414	2.6422	2.6430	2.6438	2.6446	2.6454	2.6462
2.6470	2.6478	2.6486	2.6493	2.6501	2.6509	2.6517
2.6525	2.6533	2.6541	2.6548	2.6556	2.6564	2.6572
2.6580	2.6587	2.6595	2.6603	2.6611	2.6618	2.6626
2.6634	2.6642	2.6649	2.6657	2.6665	2.6672	2.6680
2.6688	2.6695	2.6703	2.6710	2.6718	2.6726	2.6733
2.6741	2.6748	2.6756	2.6763	2.6771	2.6778	2.6786
2.6794	2.6801	2.6809	2.6816	2.6823	2.6831	2.6838
2.6846	2.6853	2.6861	2.6868	2.6876	2.6883	2.6890
2.6898	2.6905	2.6912	2.6920	2.6927	2.6934	2.6942
2.6949	2.6956	2.6964	2.6971	2.6978	2.6986	2.6993
2.7000	2.7007	2.7015	2.7022	2.7029	2.7036	2.7043
2.7051	2.7058	2.7065	2.7072	2.7079	2.7087	2.7094
2.7101	2.7108	2.7115	2.7122	2.7129	2.7136	2.7143
2.7151	2.7158	2.7165	2.7172	2.7179	2.7186	2.7193
2.7200	2.7207	2.7214	2.7221	2.7228	2.7235	2.7242
2.7249	2.7256	2.7263	2.7270	2.7277	2.7283	2.7290
2.7297	2.7304	2.7311	2.7318	2.7325	2.7332	2.7339
2.7345	2.7352	2.7359	2.7366	2.7373	2.7380	2.7386
2.7393	2.7400	2.7407	2.7414	2.7420	2.7427	2.7434
2.7441	2.7447	2.7454	2.7461	2.7468	2.7474	2.7481
2.7488	2.7494	2.7501	2.7508	2.7514	2.7521	2.7528
2.7534	2.7541	2.7548	2.7554	2.7561	2.7567	2.7574
2.7581	2.7587	2.7594	2.7600	2.7607	2.7614	2.7620
2.7627	2.7633	2.7640	2.7646	2.7653	2.7659	2.7666
2.7672	2.7679	2.7685	2.7692	2.7698	2.7705	2.7711
2.7718	2.7724	2.7730	2.7737	2.7743	2.7750	2.7756
2.7762	2.7769	2.7775	2.7782	2.7788	2.7794	2.7801
2.7807	2.7813	2.7820	2.7826	2.7832	2.7839	2.7845
2.7851	2.7858	2.7864	2.7870	2.7877	2.7883	2.7889
2.7895	2.7902	2.7908	2.7914	2.7920	2.7927	2.7933
2.7939	2.7945	2.7952	2.7958	2.7964	2.7970	2.7976
2.7983	2.7989	2.7995	2.8001	2.8007	2.8013	2.8019
2.8026	2.8032	2.8038	2.8044	2.8050	2.8056	2.8062
2.8068	2.8074	2.8081	2.8087	2.8093	2.8099	2.8105
2.8111	2.8117	2.8123	2.8129	2.8135		

*

* Offsite Baisn (East of Barstow)

COMPUTE NM HYD ID = 1 HYD NO = 101.01 AREA = 0.913
PER A = 43 PER B = 20 PER C = 20 PER D = 17
TP = -0.314 HR MASS RAIN =-1

K = .175853HR TP = .314000HR K/TP RATIO = .560040 SHAPE CONSTANT, N = 6.863757
UNIT PEAK = 254.45 CFS UNIT VOLUME = 1.000 B = 514.76 P60 = 2.1400
AREA = .155210 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

```
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


K =   .276041HR    TP =   .314000HR    K/TP RATIO =   .879112     SHAPE CONSTANT, N =  4.037907
UNIT PEAK =   863.23    CFS   UNIT VOLUME =    1.000       B =   357.69      P60 = 2.1400
AREA =      .757790 SQ MI    IA =    .54157 INCHES    INF =  1.36639 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 1  CODE = 1

                              PARTIAL HYDROGRAPH   101.01

RUNOFF VOLUME =     1.13158 INCHES     =      55.1002 ACRE-FEET
PEAK DISCHARGE RATE =     986.10 CFS  AT   1.700 HOURS   BASIN AREA =   .9130 SQ. MI.


* Tract A (Pinnacle Estates Apartments)
COMPUTE NM HYD     ID = 2  HYD NO = 101.02  AREA = 0.0234375
                   PER A = 0  PER B = 10 PER C = 20  PER D = 70
                   TP = -0.133333333 HR  MASS RAIN =-1


K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   64.757    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
AREA =      .016406 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


K =   .117190HR    TP =   .133333HR    K/TP RATIO =   .878921     SHAPE CONSTANT, N =  4.038848
UNIT PEAK =   18.866    CFS   UNIT VOLUME =    .9993       B =   357.75      P60 = 2.1400
AREA =      .007031 SQ MI    IA =    .40000 INCHES    INF =    .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 2  CODE = 1

                              PARTIAL HYDROGRAPH   101.02


RUNOFF VOLUME =     2.14048 INCHES     =       2.6756 ACRE-FEET
PEAK DISCHARGE RATE =      66.95 CFS  AT   1.500 HOURS   BASIN AREA =   .0234 SQ. MI.


* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD     ID = 3  HYD NO = 101.03  AREA = 0.006525
                   PER A = 0  PER B = 20 PER C = 20  PER D = 60
                   TP = -0.133333333 HR  MASS RAIN =-1


K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   15.453    CFS   UNIT VOLUME =    .9993       B =   526.28      P60 = 2.1400
AREA =      .003915 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000
```

```
K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
UNIT PEAK =   6.8110    CFS   UNIT VOLUME =    .9980       B =   347.95      P60 = 2.1400
AREA =      .002610 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 3  CODE = 1

                                PARTIAL HYDROGRAPH   101.03

   RUNOFF VOLUME =     1.97426 INCHES      =         .6870 ACRE-FEET
   PEAK DISCHARGE RATE =      17.65 CFS  AT   1.520 HOURS   BASIN AREA =   .0065 SQ. MI.

* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD     ID = 4  HYD NO = 101.04  AREA = 0.010454 SQ MI
                   PER A = 0  PER B = 20  PER C = 20  PER D = 60
                   TP = -0.1333333333 HR  MASS RAIN = -1

   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   24.758    CFS   UNIT VOLUME =    .9996       B =   526.28      P60 = 2.1400
   AREA =      .006272 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
   UNIT PEAK =   10.912    CFS   UNIT VOLUME =    .9988       B =   347.95      P60 = 2.1400
   AREA =      .004182 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 4  CODE = 1

                                PARTIAL HYDROGRAPH   101.04

   RUNOFF VOLUME =     1.97426 INCHES      =        1.1007 ACRE-FEET
   PEAK DISCHARGE RATE =      28.26 CFS  AT   1.520 HOURS   BASIN AREA =   .0105 SQ. MI.

* Add East and West La Cueva Village Basins

ADD HYD            ID = 5  HYD NO = 101.05  ID I = 3  ID II = 4

PRINT HYD          ID = 5  CODE = 1

                                PARTIAL HYDROGRAPH   101.05

   RUNOFF VOLUME =     1.97426 INCHES      =        1.7878 ACRE-FEET
   PEAK DISCHARGE RATE =      45.91 CFS  AT   1.520 HOURS   BASIN AREA =   .0170 SQ. MI.
```

```
* Tract C (Shopping Center)

COMPUTE NM HYD       ID = 6 HYD NO = 101.06  AREA = 0.0165 SQ MI
                     PER A = 0  PER B =3.3  PER C = 6.7  PER D = 90
                     TP = -0.133333333 HR MASS RAIN = -1


    K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   58.614    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
    AREA =      .014850 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

    K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302     SHAPE CONSTANT, N =  4.041902
    UNIT PEAK =   4.4297    CFS   UNIT VOLUME =    .9969       B =   357.95      P60 = 2.1400
    AREA =      .001650 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD            ID = 6  CODE = 1

                                   PARTIAL HYDROGRAPH   101.06


    RUNOFF VOLUME =     2.42250 INCHES     =       2.1318 ACRE-FEET
    PEAK DISCHARGE RATE =      51.11 CFS  AT   1.500 HOURS   BASIN AREA =   .0165 SQ. MI.


* Tract B (La Cueva Village Unit 2, Lots 1-16)
* UNDEVELOPED INTERIM CONDITION *

COMPUTE NM HYD       ID = 7 HYD NO = 101.07  AREA = 0.0055 SQ MI
                     PER A = 80  PER B = 10  PER C = 10 PER D = 0
                     TP = -0.1333333333 HR  MASS RAIN = -1


    K =   .151014HR    TP =   .133333HR    K/TP RATIO =  1.132606     SHAPE CONSTANT, N =  3.125128
    UNIT PEAK =   12.040    CFS   UNIT VOLUME =    .9988       B =   291.87      P60 = 2.1400
    AREA =      .005500 SQ MI    IA =    .60500 INCHES    INF =   1.54400 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD            ID = 7 CODE = 1

                                   PARTIAL HYDROGRAPH   101.07


    RUNOFF VOLUME =      .72760 INCHES     =        .2134 ACRE-FEET
    PEAK DISCHARGE RATE =       7.40 CFS  AT   1.520 HOURS   BASIN AREA =   .0055 SQ. MI.


*  Add to get total flow from La Cueva Village

ADD HYD              ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD            ID = 8 CODE = 1

                                   PARTIAL HYDROGRAPH   101.08
```

```
RUNOFF VOLUME =     1.66923 INCHES      =        2.0012 ACRE-FEET
PEAK DISCHARGE RATE =      53.31 CFS  AT   1.520 HOURS   BASIN AREA =    .0225 SQ. MI.
```

* Carmel / Holly Right of Way

```
COMPUTE NM HYD      ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                    PER A = 0  PER B = 0  PER C = 11  PER D = 89
                    TP = -0.1333333333 HR   MASS RAIN = -1

   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   21.393    CFS   UNIT VOLUME =    .9995       B =   526.28      P60 = 2.1400
   AREA =      .005420 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .108940HR    TP =   .133333HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
   UNIT PEAK =   1.9061    CFS   UNIT VOLUME =    .9930       B =   379.38      P60 = 2.1400
   AREA =      .000670 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD           ID = 9 CODE = 1

                          PARTIAL HYDROGRAPH   101.09

   RUNOFF VOLUME =     2.42335 INCHES      =         .7871 ACRE-FEET
   PEAK DISCHARGE RATE =      18.93 CFS  AT   1.500 HOURS   BASIN AREA =    .0061 SQ. MI.
```

* Wyoming Right of Way

```
COMPUTE NM HYD      ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                    PER A = 0   PER B = 0  PER C = 46  PER D = 54
                    TP = -0.13333333333 HR  MASS RAIN = -1

   K =   .072667HR    TP =   .133334HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   9.4421    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 2.1400
   AREA =      .002392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .108940HR    TP =   .133334HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
   UNIT PEAK =   5.7982    CFS   UNIT VOLUME =    .9977       B =   379.38      P60 = 2.1400
   AREA =      .002038 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD           ID = 10  CODE = 1

                          PARTIAL HYDROGRAPH   101.10
```

```
 RUNOFF VOLUME =    1.97793 INCHES         =      .4673 ACRE-FEET
 PEAK DISCHARGE RATE =      12.22 CFS  AT   1.520 HOURS   BASIN AREA =   .0044 SQ. MI.


FINISH

   NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 10:34:02
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE = 940956.inp

RUN DATE (MON/DAY/YR) =12/06/1996
USER NO.= J_MORTEN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										
RAINFALL TYPE= 2										TIME= .(
COMPUTE NM HYD	101.01	-	1	.91300	986.10	55.101	1.13158	1.700	1.688	RAIN24= 3.1(
COMPUTE NM HYD	101.02	-	2	.02344	66.95	2.676	2.14048	1.500	4.464	PER IMP= 17.(
COMPUTE NM HYD	101.03	-	3	.00653	17.65	.687	1.97426	1.520	4.226	PER IMP= 70.(
COMPUTE NM HYD	101.04	-	4	.01045	28.26	1.101	1.97426	1.520	4.224	PER IMP= 60.0
ADD HYD	101.05	3& 4	5	.01698	45.91	1.788	1.97426	1.520	4.225	PER IMP= 60.0
COMPUTE NM HYD	101.06	-	6	.01650	51.11	2.132	2.42250	1.500	4.840	PER IMP= 90.0
COMPUTE NM HYD	101.07	-	7	.00550	7.40	.213	.72760	1.520	2.103	PER IMP= .0
ADD HYD	101.08	5& 7	8	.02248	53.31	2.001	1.66923	1.520	3.706	
COMPUTE NM HYD	101.09	-	9	.00609	18.93	.787	2.42335	1.500	4.857	PER IMP= 89.0
COMPUTE NM HYD	101.10	-	10	.00443	12.22	.467	1.97793	1.520	4.309	PER IMP= 54.0
FINISH										

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 740726
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

TIME OF CONCENTRATION CALCULATIONS (UPSTREAM OFFSITE BASIN)

L = 8,300 feet (Barstow to Hamilton Dam)

$t_c = ((12000 - L)/(72{,}000 * K * S^{0.5})) +$

$((L - 4000) * K_N * (L_{CA}/L)^{0.33}/(552.2 * S^{0.165}))$

$P_{60} = 2.14$

$K_N = 0.033$

$S = 0.03$

$L = 8{,}300$ ft

$L_{CA} = 4{,}500$ ft

$K = 3$

$t_c = 0.099 + 0.372 = 0.471$ hr

$t_p = (2/3)t_c = (2/3)(0.471) = 0.314$ hr

PRODUCT 204 1 (Single Sheets) 205-1 (Padded) NEBS Inc Groton Mass 01471 To Order PHONE TOLL FREE 1-800-225-6380

```
*23456789012345678901
*
*    Window "G" Ultimate Conditions                    JMA # 940956
*                                                      December, 1996
*                                                      G.M. 486-5
*
*
*    100 - YEAR STORM
*
START
RAINFALL                TIME = 0.0   PUNCH CODE = 0   PRINT LINES = -1
                        TYPE = 2   RAIN QUARTER = 0.0
                        RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                        RAIN DAY = 3.10 IN DT = 0.02

* Tract A (Apartments)
COMPUTE NM HYD          ID = 2   HYD NO = 101.02   AREA = 0.0234375
                        PER A = 0   PER B = 10 PER C = 20   PER D = 70
                        TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD               ID = 2   CODE = 1

* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD          ID = 3   HYD NO = 101.03   AREA = 0.006525
                        PER A = 0   PER B = 20 PER C = 20   PER D = 60
                        TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD               ID = 3   CODE = 1

* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD          ID = 4   HYD NO = 101.04   AREA = 0.010454 SQ MI
                        PER A = 0   PER B = 20   PER C = 20   PER D = 60
                        TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD               ID = 4   CODE = 1

*   Add East and West La Cueva Village Basins

ADD HYD                 ID = 5   HYD NO = 101.05   ID I = 3   ID II = 4

PRINT HYD               ID = 5   CODE = 1

* Tract C (Shopping Center)

COMPUTE NM HYD          ID = 6 HYD NO = 101.06   AREA = 0.0204 SQ MI
                        PER A = 0   PER B =3.3   PER C = 6.7   PER D = 90
                        TP = -0.133333333 HR MASS RAIN = -1

PRINT HYD               ID = 6   CODE = 1

* Tract B (La Cueva Village Unit 2, Lots 1-16)
* DEVELOPED ULTIMATE CONDITION *

COMPUTE NM HYD          ID = 7 HYD NO = 101.07   AREA = 0.00485719 SQ MI
                        PER A = 0   PER B = 20   PER C = 20 PER D = 60
                        TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD               ID = 7 CODE = 1
```

```
*  Add to get total flow from La Cueva Village
ADD HYD                 ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7
PRINT HYD               ID = 8 CODE = 1
* Carmel / Holly Right of Way
COMPUTE NM HYD          ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                        PER A = 0  PER B = 0  PER C = 11  PER D = 89
                        TP = -0.1333333333 HR   MASS RAIN = -1
PRINT HYD               ID = 9 CODE = 1
* Wyoming Right of Way
COMPUTE NM HYD          ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                        PER A = 0   PER B = 0  PER C = 46  PER D = 54
                        TP = -0.13333333333 HR  MASS RAIN = -1
PRINT HYD               ID = 10  CODE = 1
* Barstow Right of Way
COMPUTE NM HYD          ID = 11 HYD NO = 101.11  AREA = 0.00115 SQ MI
                        PER A = 0  PER B = 0  PER C = 10  PER D = 90
                        TP = -0.133333333 HR  MASS RAIN = -1
PRINT HYD               ID = 11  CODE = 1
*  FUTURE SHOPPING CENTER
COMPUTE NM HYD          ID = 12  HYD NO = 101.12  AREA = 0.0215625 SQ MI
                        PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                        TP = -0.133333333 HR  MASS RAIN = -1
PRINT HYD               ID = 12  CODE = 1
*  CITY RESERVOIR SITE
COMPUTE NM HYD          ID = 13  HYD NO = 101.13  AREA = 0.00553906 SQ MI
                        PER A = 40  PER B = 40  PER C = 8  PER D = 12
                        TP = -0.133333333 HR  MASS RAIN = -1
PRINT HYD               ID = 13  CODE = 1
*  FUTURE COMMERCIAL AREA
COMPUTE NM HYD          ID = 14  HYD NO = 101.14  AREA = 0.01604688
                        PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                        TP = -0.13333333. HR  MASS RAIN = -1
PRINT HYD               ID = 14  CODE = 1
FINISH
```

```
      AHYMO PROGRAM (AHYM0194) - AMAFCA Hydrologic Model - January, 1994
           RUN DATE (MON/DAY/YR) = 12/10/1996
           START TIME (HR:MIN:SEC) = 15:42:31     USER NO.= J_MORTEN.I01
           INPUT FILE = 940956F.INP

     *23456789012345678901
     *
     *   Window "G" Ultimate Conditions                    JMA # 940956
     *                                                     December, 1996
     *                                                     G.M. 486-5
     *
     *
     *   100 - YEAR STORM
     *
     START
     RAINFALL          TIME = 0.0  PUNCH CODE = 0  PRINT LINES = -1
                       TYPE = 2  RAIN QUARTER = 0.0
                       RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                       RAIN DAY = 3.10 IN DT = 0.02
                                    *

                  COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =     .020000 HOURS        END TIME =    11.980000 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0084   .0101
                     .0119   .0137   .0155   .0173   .0192   .0211   .0230
                     .0249   .0269   .0289   .0309   .0330   .0351   .0372
                     .0393   .0415   .0438   .0461   .0484   .0507   .0531
                     .0556   .0580   .0606   .0632   .0658   .0685   .0713
                     .0741   .0770   .0799   .0829   .0860   .0892   .0924
                     .0958   .0992   .1027   .1063   .1101   .1139   .1179
                     .1220   .1263   .1298   .1334   .1372   .1411   .1453
                     .1508   .1651   .1846   .2100   .2424   .2826   .3316
                     .3904   .4600   .5412   .6353   .7432   .8658  1.0044
                    1.1599  1.3335  1.4120  1.4697  1.5214  1.5691  1.6135
                    1.6554  1.6950  1.7326  1.7685  1.8029  1.8358  1.8675
                    1.8979  1.9272  1.9555  1.9827  2.0091  2.0345  2.0591
                    2.0830  2.1060  2.1283  2.1499  2.1709  2.1912  2.2108
                    2.2299  2.2484  2.2663  2.2708  2.2751  2.2794  2.2835
                    2.2875  2.2914  2.2952  2.2989  2.3025  2.3061  2.3095
                    2.3129  2.3162  2.3194  2.3226  2.3257  2.3288  2.3318
                    2.3348  2.3377  2.3405  2.3433  2.3461  2.3488  2.3515
                    2.3541  2.3567  2.3593  2.3618  2.3643  2.3667  2.3692
                    2.3716  2.3739  2.3763  2.3786  2.3809  2.3831  2.3853
                    2.3875  2.3897  2.3919  2.3940  2.3961  2.3982  2.4002
                    2.4023  2.4043  2.4063  2.4083  2.4103  2.4122  2.4141
                    2.4160  2.4179  2.4198  2.4217  2.4235  2.4253  2.4271
                    2.4289  2.4307  2.4325  2.4342  2.4360  2.4377  2.4394
                    2.4411  2.4428  2.4445  2.4461  2.4478  2.4494  2.4510
                    2.4526  2.4542  2.4558  2.4574  2.4590  2.4605  2.4621
                    2.4636  2.4651  2.4667  2.4682  2.4697  2.4711  2.4726
                    2.4741  2.4755  2.4770  2.4784  2.4799  2.4813  2.4827
                    2.4841  2.4855  2.4869  2.4883  2.4897  2.4910  2.4924
                    2.4938  2.4951  2.4964  2.4978  2.4991  2.5004  2.5017
                    2.5030  2.5043  2.5056  2.5069  2.5082  2.5094  2.5107
                    2.5120  2.5132  2.5145  2.5157  2.5169  2.5182  2.5194
                    2.5206  2.5218  2.5230  2.5242  2.5254  2.5266  2.5278
                    2.5290  2.5301  2.5313  2.5325  2.5336  2.5348  2.5359
                    2.5371  2.5382  2.5393  2.5405  2.5416  2.5427  2.5438
                    2.5449  2.5460  2.5471  2.5482  2.5493  2.5504  2.5515
```

2.5526	2.5536	2.5547	2.5558	2.5568	2.5579	2.5589
2.5600	2.5610	2.5621	2.5631	2.5641	2.5652	2.5662
2.5672	2.5682	2.5693	2.5703	2.5713	2.5723	2.5733
2.5743	2.5753	2.5763	2.5773	2.5782	2.5792	2.5802
2.5812	2.5821	2.5831	2.5841	2.5850	2.5860	2.5870
2.5879	2.5889	2.5898	2.5907	2.5917	2.5926	2.5935
2.5945	2.5954	2.5963	2.5973	2.5982	2.5991	2.6000
2.6009	2.6017	2.6026	2.6034	2.6043	2.6051	2.6060
2.6068	2.6077	2.6085	2.6094	2.6102	2.6110	2.6119
2.6127	2.6136	2.6144	2.6152	2.6161	2.6169	2.6177
2.6186	2.6194	2.6202	2.6211	2.6219	2.6227	2.6235
2.6244	2.6252	2.6260	2.6268	2.6276	2.6285	2.6293
2.6301	2.6309	2.6317	2.6325	2.6333	2.6342	2.6350
2.6358	2.6366	2.6374	2.6382	2.6390	2.6398	2.6406
2.6414	2.6422	2.6430	2.6438	2.6446	2.6454	2.6462
2.6470	2.6478	2.6486	2.6493	2.6501	2.6509	2.6517
2.6525	2.6533	2.6541	2.6548	2.6556	2.6564	2.6572
2.6580	2.6587	2.6595	2.6603	2.6611	2.6618	2.6626
2.6634	2.6642	2.6649	2.6657	2.6665	2.6672	2.6680
2.6688	2.6695	2.6703	2.6710	2.6718	2.6726	2.6733
2.6741	2.6748	2.6756	2.6763	2.6771	2.6778	2.6786
2.6794	2.6801	2.6809	2.6816	2.6823	2.6831	2.6838
2.6846	2.6853	2.6861	2.6868	2.6876	2.6883	2.6890
2.6898	2.6905	2.6912	2.6920	2.6927	2.6934	2.6942
2.6949	2.6956	2.6964	2.6971	2.6978	2.6986	2.6993
2.7000	2.7007	2.7015	2.7022	2.7029	2.7036	2.7043
2.7051	2.7058	2.7065	2.7072	2.7079	2.7087	2.7094
2.7101	2.7108	2.7115	2.7122	2.7129	2.7136	2.7143
2.7151	2.7158	2.7165	2.7172	2.7179	2.7186	2.7193
2.7200	2.7207	2.7214	2.7221	2.7228	2.7235	2.7242
2.7249	2.7256	2.7263	2.7270	2.7277	2.7283	2.7290
2.7297	2.7304	2.7311	2.7318	2.7325	2.7332	2.7339
2.7345	2.7352	2.7359	2.7366	2.7373	2.7380	2.7386
2.7393	2.7400	2.7407	2.7414	2.7420	2.7427	2.7434
2.7441	2.7447	2.7454	2.7461	2.7468	2.7474	2.7481
2.7488	2.7494	2.7501	2.7508	2.7514	2.7521	2.7528
2.7534	2.7541	2.7548	2.7554	2.7561	2.7567	2.7574
2.7581	2.7587	2.7594	2.7600	2.7607	2.7614	2.7620
2.7627	2.7633	2.7640	2.7646	2.7653	2.7659	2.7666
2.7672	2.7679	2.7685	2.7692	2.7698	2.7705	2.7711
2.7718	2.7724	2.7730	2.7737	2.7743	2.7750	2.7756
2.7762	2.7769	2.7775	2.7782	2.7788	2.7794	2.7801
2.7807	2.7813	2.7820	2.7826	2.7832	2.7839	2.7845
2.7851	2.7858	2.7864	2.7870	2.7877	2.7883	2.7889
2.7895	2.7902	2.7908	2.7914	2.7920	2.7927	2.7933
2.7939	2.7945	2.7952	2.7958	2.7964	2.7970	2.7976
2.7983	2.7989	2.7995	2.8001	2.8007	2.8013	2.8019
2.8026	2.8032	2.8038	2.8044	2.8050	2.8056	2.8062
2.8068	2.8074	2.8081	2.8087	2.8093	2.8099	2.8105
2.8111	2.8117	2.8123	2.8129	2.8135		

* Tract A (Apartments)

COMPUTE NM HYD ID = 2 HYD NO = 101.02 AREA = 0.0234375
PER A = 0 PER B = 10 PER C = 20 PER D = 70
TP = -0.133333333 HR MASS RAIN =-1

K = .072667HR TP = .133333HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 64.757 CFS UNIT VOLUME = .9999 B = 526.28 P60 = 2.1400
AREA = .016406 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

```
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


     K =   .117190HR    TP =   .133333HR    K/TP RATIO =   .878921     SHAPE CONSTANT, N =  4.038848
     UNIT PEAK =   18.866    CFS   UNIT VOLUME =    .9993       B =   357.75      P60 = 2.1400
     AREA =      .007031 SQ MI    IA =    .40000 INCHES    INF =    .97000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 2  CODE = 1

                                PARTIAL HYDROGRAPH   101.02

     RUNOFF VOLUME =     2.14048 INCHES     =       2.6756 ACRE-FEET
     PEAK DISCHARGE RATE =      66.95 CFS  AT   1.500 HOURS   BASIN AREA =   .0234 SQ. MI.



* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD     ID = 3  HYD NO = 101.03  AREA = 0.006525
                   PER A = 0  PER B = 20 PER C = 20  PER D = 60
                   TP = -0.133333333 HR  MASS RAIN =-1


     K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   15.453    CFS   UNIT VOLUME =    .9993       B =   526.28      P60 = 2.1400
     AREA =      .003915 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

     K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
     UNIT PEAK =   6.8110    CFS   UNIT VOLUME =    .9980       B =   347.95      P60 = 2.1400
     AREA =      .002610 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 3  CODE = 1

                                PARTIAL HYDROGRAPH   101.03

     RUNOFF VOLUME =     1.97426 INCHES     =        .6870 ACRE-FEET
     PEAK DISCHARGE RATE =      17.65 CFS  AT   1.520 HOURS   BASIN AREA =   .0065 SQ. MI.



* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD     ID = 4  HYD NO = 101.04  AREA = 0.010454 SQ MI
                   PER A = 0  PER B = 20  PER C = 20  PER D = 60
                   TP = -0.1333333333 HR  MASS RAIN = -1


     K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   24.758    CFS   UNIT VOLUME =    .9996       B =   526.28      P60 = 2.1400
     AREA =      .006272 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000
```

```
K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
UNIT PEAK =   10.912    CFS   UNIT VOLUME =    .9988       B =   347.95      P60 = 2.1400
AREA =      .004182 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 4  CODE = 1

                                PARTIAL HYDROGRAPH   101.04


RUNOFF VOLUME =     1.97426 INCHES     =       1.1007 ACRE-FEET
PEAK DISCHARGE RATE =      28.26 CFS  AT   1.520 HOURS   BASIN AREA =   .0105 SQ. MI.

* Add East and West La Cueva Village Basins

ADD HYD            ID = 5  HYD NO = 101.05  ID I = 3  ID II = 4

PRINT HYD          ID = 5  CODE = 1

                                PARTIAL HYDROGRAPH   101.05

RUNOFF VOLUME =     1.97426 INCHES     =       1.7878 ACRE-FEET
PEAK DISCHARGE RATE =      45.91 CFS  AT   1.520 HOURS   BASIN AREA =   .0170 SQ. MI.

* Tract C (Shopping Center)

COMPUTE NM HYD     ID = 6 HYD NO = 101.06  AREA = 0.0204 SQ MI
                   PER A = 0  PER B =3.3  PER C = 6.7  PER D = 90
                   TP = -0.133333333 HR MASS RAIN = -1

K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   72.468    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
AREA =      .018360 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302     SHAPE CONSTANT, N =  4.041902
UNIT PEAK =   5.4767    CFS   UNIT VOLUME =    .9975       B =   357.95      P60 = 2.1400
AREA =      .002040 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 6  CODE = 1

                                PARTIAL HYDROGRAPH   101.06

RUNOFF VOLUME =     2.42250 INCHES     =       2.6357 ACRE-FEET
PEAK DISCHARGE RATE =      63.19 CFS  AT   1.500 HOURS   BASIN AREA =   .0204 SQ. MI.
```

```
* Tract B (La Cueva Village Unit 2, Lots 1-16)
* DEVELOPED ULTIMATE CONDITION *

COMPUTE NM HYD       ID = 7 HYD NO = 101.07  AREA = 0.00485719 SQ MI
                     PER A = 0  PER B = 20  PER C = 20 PER D = 60
                     TP = -0.1333333333 HR  MASS RAIN = -1


   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   11.503    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 2.1400
   AREA =      .002914 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
   UNIT PEAK =   5.0701    CFS   UNIT VOLUME =    .9974       B =   347.95      P60 = 2.1400
   AREA =      .001943 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD            ID = 7 CODE = 1

                                PARTIAL HYDROGRAPH   101.07

   RUNOFF VOLUME =     1.97427 INCHES     =        .5114 ACRE-FEET
   PEAK DISCHARGE RATE =      13.14 CFS  AT   1.520 HOURS   BASIN AREA =   .0049 SQ. MI.

* Add to get total flow from La Cueva Village

ADD HYD              ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD            ID = 8 CODE = 1

                                PARTIAL HYDROGRAPH   101.08

   RUNOFF VOLUME =     1.97426 INCHES     =       2.2992 ACRE-FEET
   PEAK DISCHARGE RATE =      59.05 CFS  AT   1.520 HOURS   BASIN AREA =   .0218 SQ. MI.


* Carmel / Holly Right of Way

COMPUTE NM HYD       ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                     PER A = 0  PER B = 0  PER C = 11  PER D = 89
                     TP = -0.1333333333 HR   MASS RAIN = -1


   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   21.393    CFS   UNIT VOLUME =    .9995       B =   526.28      P60 = 2.1400
   AREA =      .005420 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .108940HR    TP =   .133333HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
```

```
UNIT PEAK =   1.9061    CFS   UNIT VOLUME =    .9930       B =   379.38      P60 = 2.1400
AREA =       .000670 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 9 CODE = 1

                                PARTIAL HYDROGRAPH   101.09

RUNOFF VOLUME =     2.42335 INCHES     =         .7871 ACRE-FEET
PEAK DISCHARGE RATE =      18.93 CFS  AT   1.500 HOURS   BASIN AREA =   .0061 SQ. MI.
```

```
* Wyoming Right of Way

COMPUTE NM HYD      ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                    PER A = 0   PER B = 0  PER C = 46  PER D = 54
                    TP = -0.13333333333 HR  MASS RAIN = -1

   K =   .072667HR    TP =   .133334HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   9.4421    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 2.1400
   AREA =       .002392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .108940HR    TP =   .133334HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
   UNIT PEAK =   5.7982    CFS   UNIT VOLUME =    .9977       B =   379.38      P60 = 2.1400
   AREA =       .002038 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 10  CODE = 1

                                PARTIAL HYDROGRAPH   101.10

   RUNOFF VOLUME =     1.97793 INCHES     =         .4673 ACRE-FEET
   PEAK DISCHARGE RATE =      12.22 CFS  AT   1.520 HOURS   BASIN AREA =   .0044 SQ. MI.
```

```
* Barstow Right of Way

COMPUTE NM HYD      ID = 11 HYD NO = 101.11  AREA = 0.00115 SQ MI
                    PER A = 0  PER B = 0  PER C = 10  PER D = 90
                    TP = -0.133333333 HR  MASS RAIN = -1

   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   4.0852    CFS   UNIT VOLUME =    .9972       B =   526.28      P60 = 2.1400
   AREA =       .001035 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .108940HR    TP =   .133333HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
   UNIT PEAK =   .32721    CFS   UNIT VOLUME =    .9587       B =   379.38      P60 = 2.1400
   AREA =       .000115 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
```

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

PRINT HYD ID = 11 CODE = 1

PARTIAL HYDROGRAPH 101.11

RUNOFF VOLUME = 2.43614 INCHES = .1494 ACRE-FEET
PEAK DISCHARGE RATE = 3.60 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

* FUTURE SHOPPING CENTER

COMPUTE NM HYD ID = 12 HYD NO = 101.12 AREA = 0.0215625 SQ MI
PER A = 0 PER B = 3.3 PER C = 6.7 PER D = 90
TP = -0.133333333 HR MASS RAIN = -1

K = .072667HR TP = .133333HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 76.598 CFS UNIT VOLUME = .9999 B = 526.28 P60 = 2.1400
AREA = .019406 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

K = .117107HR TP = .133333HR K/TP RATIO = .878302 SHAPE CONSTANT, N = 4.041902
UNIT PEAK = 5.7888 CFS UNIT VOLUME = .9977 B = 357.95 P60 = 2.1400
AREA = .002156 SQ MI IA = .39950 INCHES INF = .96860 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

PRINT HYD ID = 12 CODE = 1

PARTIAL HYDROGRAPH 101.12

RUNOFF VOLUME = 2.42250 INCHES = 2.7859 ACRE-FEET
PEAK DISCHARGE RATE = 66.78 CFS AT 1.500 HOURS BASIN AREA = .0216 SQ. MI.

* CITY RESERVOIR SITE

COMPUTE NM HYD ID = 13 HYD NO = 101.13 AREA = 0.00553906 SQ MI
PER A = 40 PER B = 40 PER C = 8 PER D = 12
TP = -0.133333333 HR MASS RAIN = -1

K = .072667HR TP = .133333HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.6236 CFS UNIT VOLUME = .9956 B = 526.28 P60 = 2.1400
AREA = .000665 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

K = .142689HR TP = .133333HR K/TP RATIO = 1.070169 SHAPE CONSTANT, N = 3.300277
UNIT PEAK = 11.167 CFS UNIT VOLUME = .9988 B = 305.45 P60 = 2.1400
AREA = .004874 SQ MI IA = .55455 INCHES INF = 1.40273 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

```
 PRINT HYD          ID = 13  CODE = 1

                                PARTIAL HYDROGRAPH   101.13

     RUNOFF VOLUME =     1.02551 INCHES     =         .3030 ACRE-FEET
     PEAK DISCHARGE RATE =       9.48 CFS  AT   1.520 HOURS   BASIN AREA =    .0055 SQ. MI.



*  FUTURE COMMERCIAL AREA

 COMPUTE NM HYD      ID = 14  HYD NO = 101.14  AREA = 0.01604688
                     PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                     TP = -0.13333333. HR  MASS RAIN = -1

      K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
      UNIT PEAK =   57.004    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
      AREA =      .014442 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


      K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302     SHAPE CONSTANT, N =  4.041902
      UNIT PEAK =   4.3080    CFS   UNIT VOLUME =    .9969       B =   357.95      P60 = 2.1400
      AREA =      .001605 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

 PRINT HYD          ID = 14  CODE = 1

                                PARTIAL HYDROGRAPH   101.14

     RUNOFF VOLUME =     2.42251 INCHES     =        2.0732 ACRE-FEET
     PEAK DISCHARGE RATE =      49.71 CFS  AT   1.500 HOURS   BASIN AREA =    .0160 SQ. MI.



 FINISH

          NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 15:42:39

 *23456789012345678901
 *
 *    Window "G" Ultimate Conditions                              JMA # 940956
 *                                                                December, 1996
 *                                                                G.M. 486-5
 *
 *
 *    100 - YEAR STORM
 *
 START
 RAINFALL                TIME = 0.0  PUNCH CODE = 0  PRINT LINES = -1
                         TYPE = 2  RAIN QUARTER = 0.0
                         RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                         RAIN DAY = 3.10 IN DT = 0.02

 * Tract A (Apartments)
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1996
INPUT FILE = 940956F.INP USER NO.= J_MORTEN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .0
RAINFALL TYPE= 2										RAIN24= 3.10
COMPUTE NM HYD	101.02	-	2	.02344	66.95	2.676	2.14048	1.500	4.464	PER IMP= 70.0
COMPUTE NM HYD	101.03	-	3	.00653	17.65	.687	1.97426	1.520	4.226	PER IMP= 60.0
COMPUTE NM HYD	101.04	-	4	.01045	28.26	1.101	1.97426	1.520	4.224	PER IMP= 60.0
ADD HYD	101.05	3& 4	5	.01698	45.91	1.788	1.97426	1.520	4.225	
COMPUTE NM HYD	101.06	-	6	.02040	63.19	2.636	2.42250	1.500	4.840	PER IMP= 90.0
COMPUTE NM HYD	101.07	-	7	.00486	13.14	.511	1.97427	1.520	4.228	PER IMP= 60.0
ADD HYD	101.08	5& 7	8	.02184	59.05	2.299	1.97426	1.520	4.225	
COMPUTE NM HYD	101.09	-	9	.00609	18.93	.787	2.42335	1.500	4.857	PER IMP= 89.0
COMPUTE NM HYD	101.10	-	10	.00443	12.22	.467	1.97793	1.520	4.309	PER IMP= 54.0
COMPUTE NM HYD	101.11	-	11	.00115	3.60	.149	2.43614	1.500	4.895	PER IMP= 90.0
COMPUTE NM HYD	101.12	-	12	.02156	66.78	2.786	2.42250	1.500	4.839	PER IMP= 90.0
COMPUTE NM HYD	101.13	-	13	.00554	9.48	.303	1.02551	1.520	2.673	PER IMP= 12.0
COMPUTE NM HYD	101.14	-	14	.01605	49.71	2.073	2.42251	1.500	4.840	PER IMP= 90.0
FINISH										

APPENDIX E

MISCELLANEOUS CALCULATIONS

TITLE	PAGE NO.
Street Capacity - Wyoming Boulevard	E-1
Street Capacity - Holly/Carmel Avenue	E-3
Street Capacities - La Cueva Village	E-5
Street Capacity - Barstow Street	E-7
Miscellaneous Storm Drain Calculations	E-8
La Cueva Village Concrete Channel Calculations	E-14

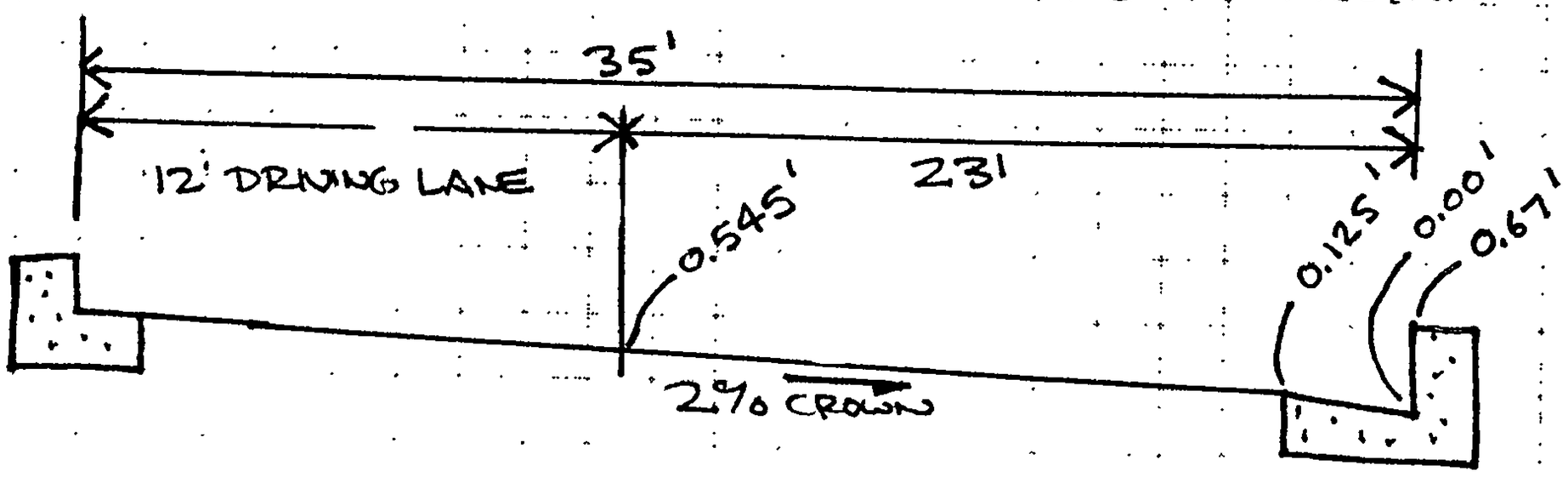
JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 940956
SHEET NO. ____ OF ____
CALCULATED BY G.M. DATE 12/06/96
CHECKED BY ____ DATE ____
SCALE N.T.S.

STREET CAPACITY

WYOMING BLVD N.E. – 35' Halfwidth

Major Arterial Classification – max street depth = 0.50' for 10-year Storm
– Must have one free driving lane in each direction



DRIVING LANE IS FREE OF WATER WHEN DEPTH = 0.545'

AT DEPTH = 0.50', ASSUMING MINIMUM SLOPE OF 0.005, THE 1/2 STREET CAPACITY OF WYOMING IS 9.5 CFS. (PLATE 22.3 D-4)

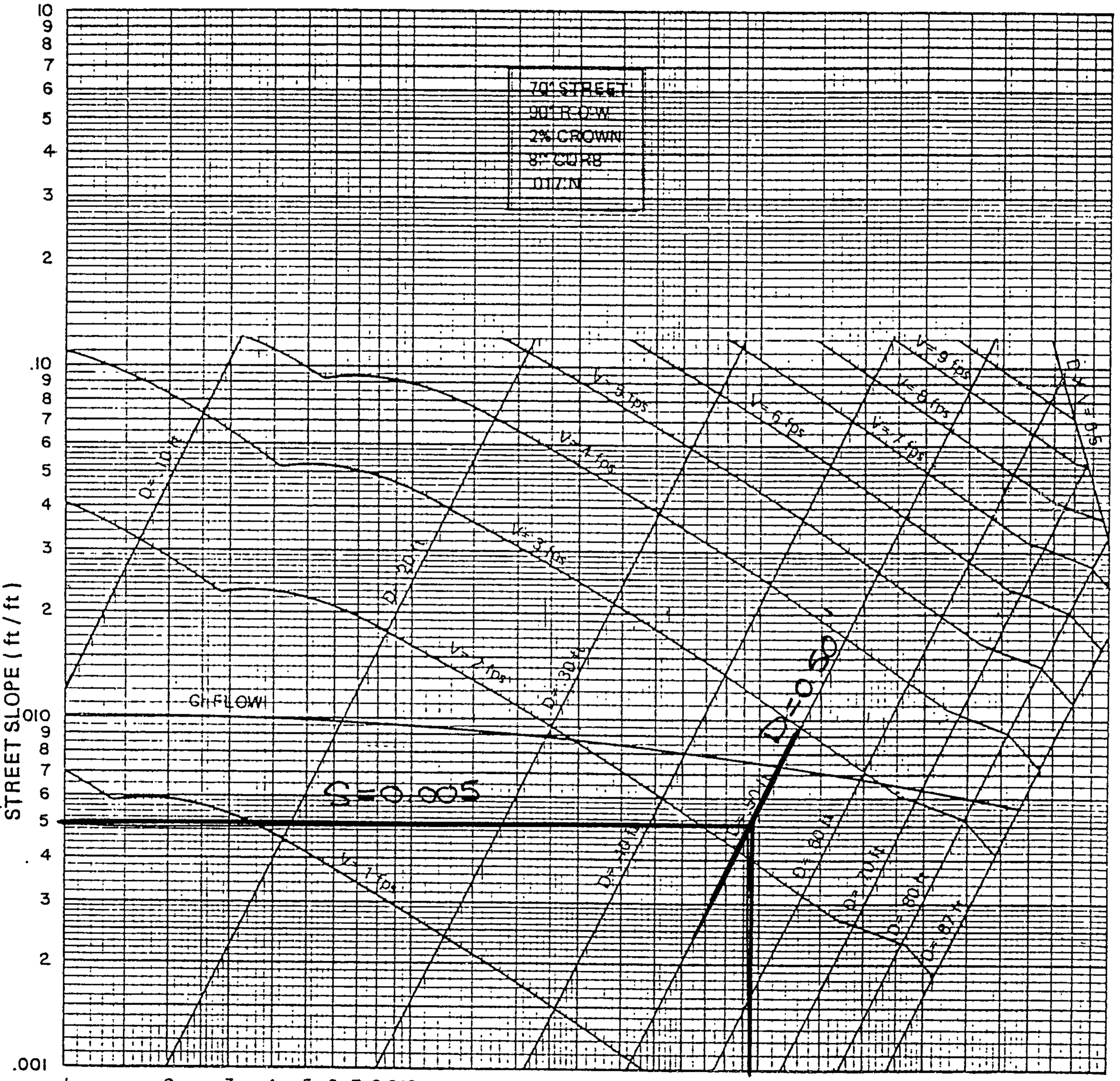
Q_{100} FOR WYOMING IS 12 CFS (TOTAL) AND 6 CFS (HALF)

THEREFORE, NO STORM INLETS ARE REQUIRED IN WYOMING TO REDUCE FLOW DEPTHS (OTHER THAN THOSE LOCATED AT THE SUMP LOCATION)

PRODUCT 204 1 (Single Sheets) 205 1 (Padded) NEBS Inc., Groton, Mass 01471 To Order PHONE TOLL FREE 1-800 225-6380

STREET CAPACITY

(WYOMING BLVD N.E.)



REV. 3-83

PLATE 22.3 D-4

E-2

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 96136

SHEET NO. _____ OF _____

CALCULATED BY G.M. DATE 12/06/96

CHECKED BY _____ DATE _____

SCALE _____

STREET CAPACITY
HOLLY / CARMEL - 20' HALFWIDTH

Q_{100} = 19 cfs

AT Q = 19 cfs (TOTAL), ASSUME Q_{half} = 9.5 cfs

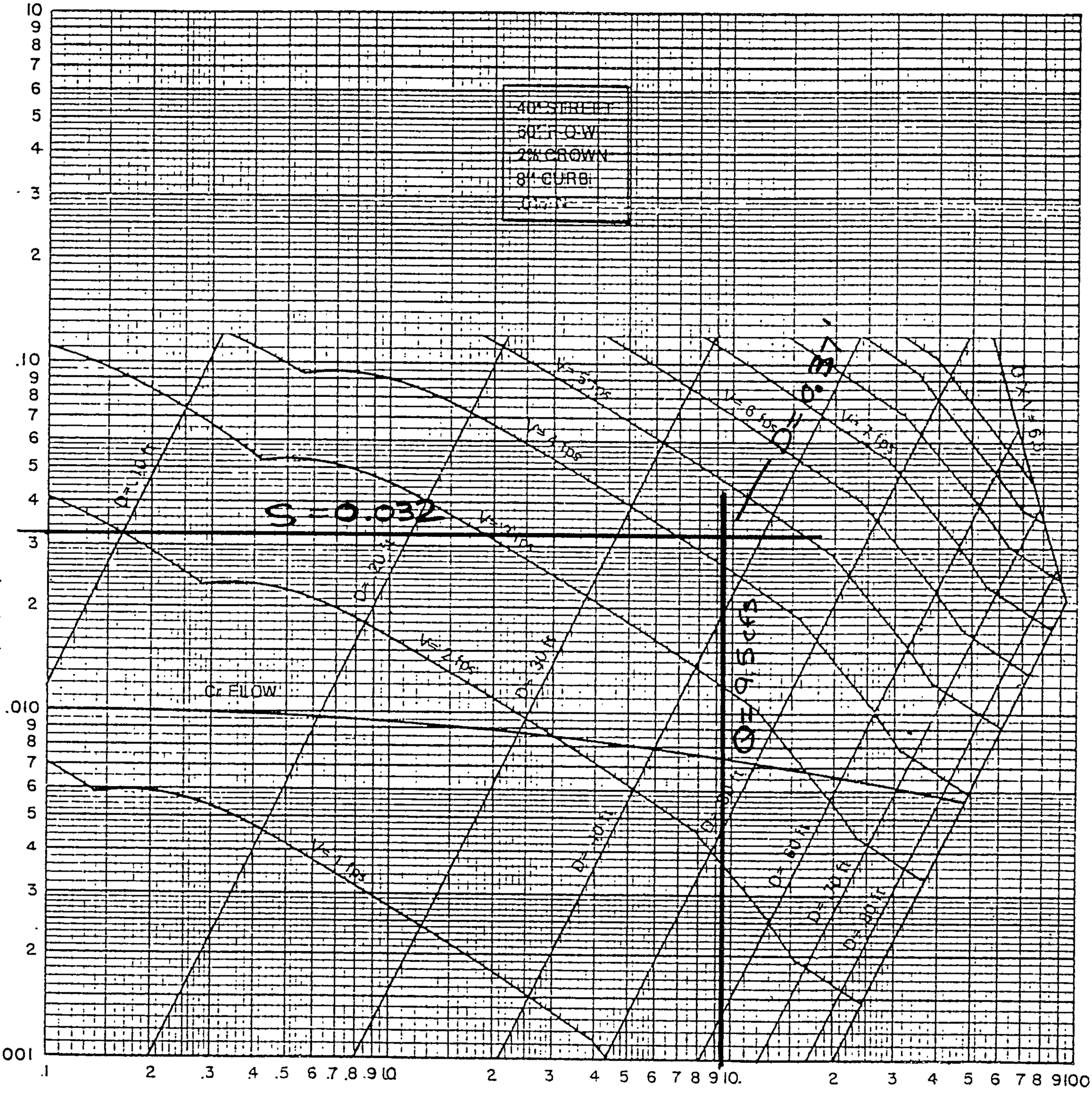
AT Q = 9.5 cfs, S = 0.032 ; depth = 0.37'
(PLATE 22.3 D-2)

BECAUSE STREET SECTION CAN EASILY CONTAIN FLOWS, NO STORM DRAIN EXTENSION IS REQUIRED WITHIN HOLLY AND CARMEL

PRODUCT 204-1 (Single Sheets) 205-1 (Padded) MEAD Inc., Groton, Mass. 01471 To Order PHONE TOLL FREE 1-800 225-6380

STREET CAPACITY

HOLLY / CARMEL



JEFF MORTENSEN & ASSOCIATES, INC.
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ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 940956
SHEET NO ____ OF ____
CALCULATED BY G.M. DATE 12/06/96
CHECKED BY ____ DATE ____
SCALE ____

STREET CAPACITY
LA CUEVA VILLAGE (46' R.O.W, 28' F-F)

Q_{100} (max) = 41 cfs at N.W. CORNER

USING Manning's Equation for normal depth, at depth = 0.47', S=0.03, A_1=7.03 sf, P=28.94',

Q_{CAP} = 41.5 cfs

MAX DEPTH = 0.47'

⇒ EXPLORE HYDRAULIC JUMP POTENTIAL DUE TO LARGE NUMBER OF DRIVECUTS IN RESIDENTIAL SUBDIVISION

$V = Q/A_1 = 41.5/7.03 = 5.9$ fps

SINCE SECTION IS NON-RECTANGULAR, USE HYDRAULIC DEPTH $D_1 = A_1/\text{Topwidth}$

$D_1 = 7.03/28 = 0.25'$

$F_1 = V/\sqrt{gD} = 5.9/\sqrt{(32.2)(0.25)} = 2.08$

USING D.P.M. PLATE 22.3 E-1, RATIO OF TAILWATER DEPTH TO INITIAL DEPTH = 2.4

$D_2 = 2.4 D_1 = 0.60$

CONVERTING HYDRAULIC DEPTH BACK TO NORMAL DEPTH: $A_2 = (D_2)(28) = 16.8$ sf

Y_2 @ A_2 = 0.85'

BECAUSE EQUIVALENT JUMP DEPTH CAN BE CONTAINED WITHIN R.O.W. AT A DEPTH OF LESS THAN 0.87', NO SPECIAL CONSIDERATIONS ARE REQUIRED.

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TAIL WATER DEPTH VS. D_1

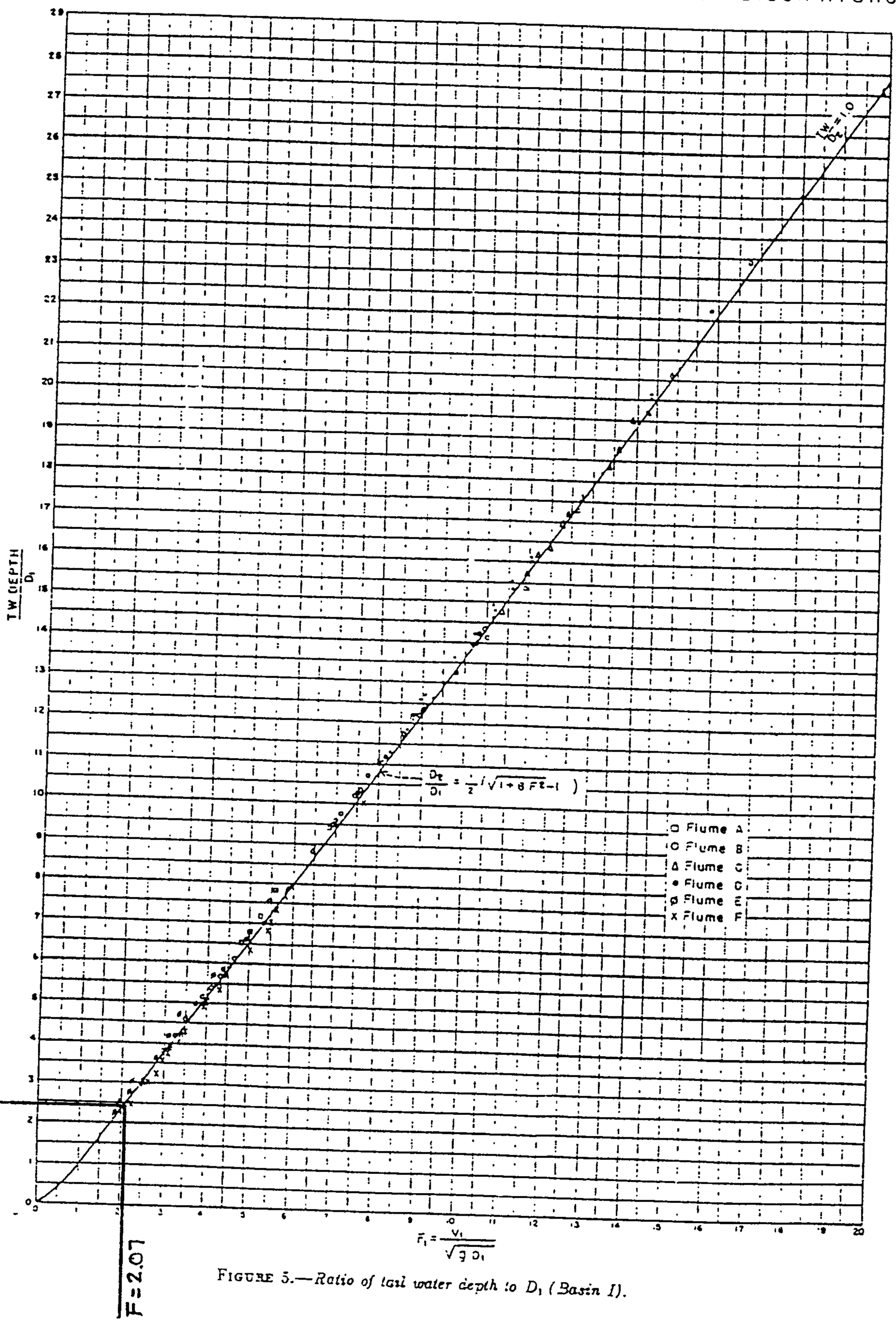

FIGURE 5.—*Ratio of tail water depth to D_1 (Basin I).*

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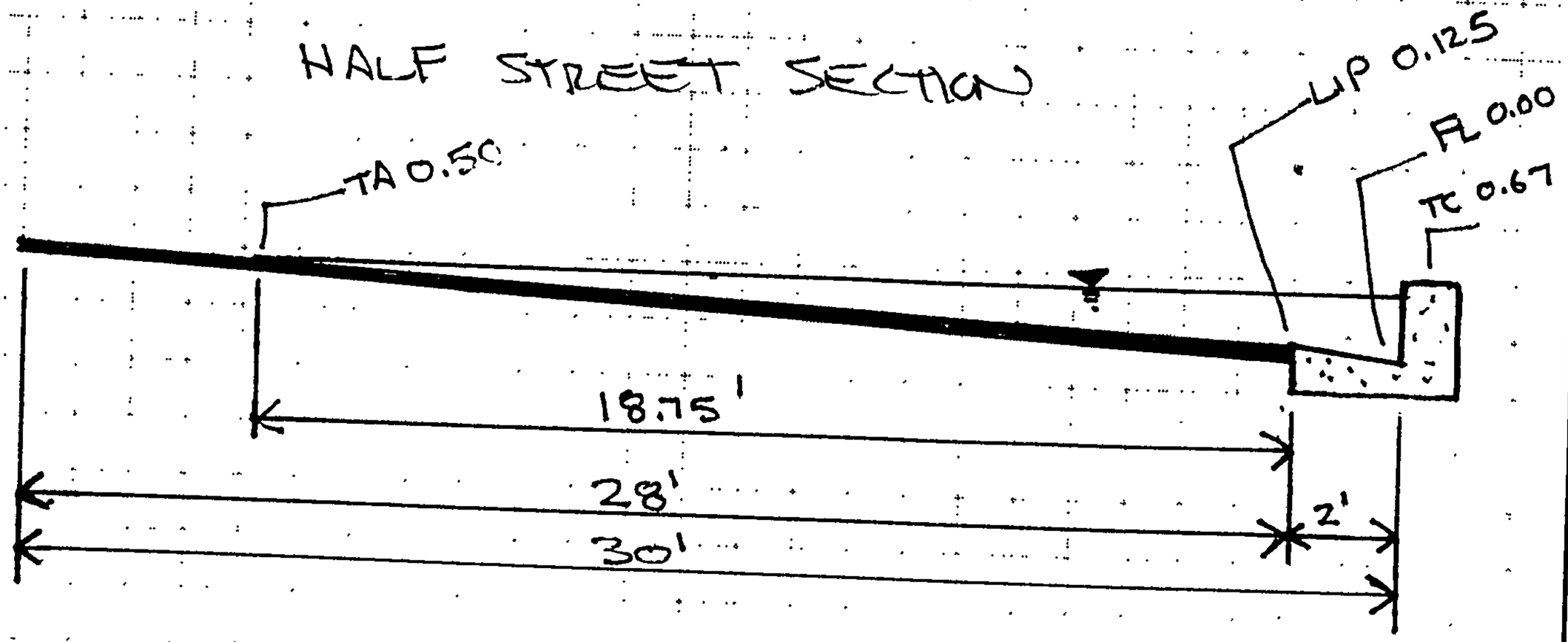
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 940936
SHEET NO. ____ OF ____
CALCULATED BY G.M. DATE 12/06/96
CHECKED BY ____ DATE ____
SCALE ____

STREET CAPACITY
BARSTOW STREET (60' F-F)

COLLECTOR STREET MAximum 10-YEAR DEPTH = 0.50 ft

HALF STREET SECTION



CAPACITY @ Depth = 0.50' (MANNINGS EQUATION)

AREA = 4.39 sf
P = 18.75 + 2.00 + 0.50 = 21.25 ft
R = A/P = 0.2066 $R^{2/3}$ = 0.3495
n = 0.017
S = 0.010 (minimum)

$Q_{CAP} = (1.49/n) A R^{2/3} S^{1/2}$ = 13.4 cfs (each half)
$Q_{BARSTOW} = (2)(13.4) = 26.8$ cfs

Q_{100} Barstow = 3.6 cfs
By DPM, 10-year flow rate can be up to 26.8 cfs

THEREFORE, NO STORM DRAIN IS REQUIRED IN BARSTOW TO DRAIN STREET TO FUTURE CHANNEL

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: WYOMING STORM DRAIN

Solve For Full Flow Capacity

WYOMING 36" RCP

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0130 ft/ft
Manning's n.....	0.013
Discharge.....	76.05 cfs

Computed Results:

Full Flow Capacity.....	76.05 cfs
Full Flow Depth.....	3.00 ft
Velocity.....	10.76 fps
Flow Area.....	7.07 sf
Critical Depth.....	2.73 ft
Critical Slope.....	0.0113 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	76.05 cfs
QMAX @.94D.....	81.81 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: WYOMING STORM DRAIN

WYOMING 42" RCP

Solve For Full Flow Capacity

Given Input Data:

Diameter.....	3.50 ft
Slope.....	0.0070 ft/ft
Manning's n.....	0.013
Discharge.....	84.18 cfs

Computed Results:

Full Flow Capacity.....	84.18 cfs
Full Flow Depth.....	3.50 ft
Velocity.....	8.75 fps
Flow Area.....	9.62 sf
Critical Depth.....	2.86 ft
Critical Slope.....	0.0070 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	84.18 cfs
QMAX @.94D.....	90.55 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: WYOMING STORM DRAIN

Solve For Full Flow Capacity

WYOMING 42" RCP

Given Input Data:

Diameter.....	3.50 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	100.61 cfs

Computed Results:

Full Flow Capacity.....	100.61 cfs
Full Flow Depth.....	3.50 ft
Velocity.....	10.46 fps
Flow Area.....	9.62 sf
Critical Depth.....	3.08 ft
Critical Slope.....	0.0090 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	100.61 cfs
QMAX @.94D.....	108.23 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Storm Drain

Solve For Full Flow Capacity

LA CUEVA 24" RCP
VILLAGE

Given Input Data:

Diameter.....	2.00 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	22.62 cfs

Computed Results:

Full Flow Capacity.....	22.62 cfs
Full Flow Depth.....	2.00 ft
Velocity.....	7.20 fps
Flow Area.....	3.14 sf
Critical Depth.....	1.70 ft
Critical Slope.....	0.0095 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	22.62 cfs
QMAX @.94D.....	24.34 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Storm Drain

LA CUEVA VILLAGE
30" RCP

Solve For Full Flow Capacity

Given Input Data:

Diameter.....	2.50 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	41.02 cfs

Computed Results:

Full Flow Capacity.....	41.02 cfs
Full Flow Depth.....	2.50 ft
Velocity.....	8.36 fps
Flow Area.....	4.91 sf
Critical Depth.....	2.15 ft
Critical Slope.....	0.0093 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	41.02 cfs
QMAX @.94D.....	44.12 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Storm Drain

Solve For Full Flow Capacity

LA CUEVA VILLAGE
36" RCP

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	66.70 cfs

Computed Results:

Full Flow Capacity.....	66.70 cfs
Full Flow Depth.....	3.00 ft
Velocity.....	9.44 fps
Flow Area.....	7.07 sf
Critical Depth....	2.61 ft
Critical Slope....	0.0091 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	66.70 cfs
QMAX @.94D.....	71.75 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Concrete Channel

Solve For Depth

Given Input Data:

Bottom Width.....	10.70 ft
Manning's n.....	0.013
Channel Slope....	0.0050 ft/ft
Discharge.....	59.00 cfs

Computed Results:

Depth.....	0.84 ft
Velocity.....	6.54 fps
Flow Area.....	9.02 sf
Flow Top Width...	10.70 ft
Wetted Perimeter.	12.39 ft
Critical Depth...	0.98 ft
Critical Slope...	0.0031 ft/ft
Froude Number....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

APPENDIX F

CITY COUNCIL BILLS

ITEM	PAGE NO.
Council Bill R-19	F-1
Council Bill 0-6	F-3

CITY of ALBUQUERQUE
TWELFTH COUNCIL

COUNCIL BILL NO. R-19 ENACTMENT NO. 58-1996

SPONSORED BY: by request

Underscored Material - New
[Bracketed Material] - Deletion

RESOLUTION

ADOPTING THE WINDOW G SECTOR DEVELOPMENT PLAN AND ITS PLAN BOUNDARIES AND ESTABLISHING R-T, O-1, C-2, SU-1 PRD (20 DU/AC), SU-1 FOR O-1 PERMISSIVE USES AND PLANT NURSERY ZONING .

WHEREAS, the City Council, the governing body of the City of Albuquerque, has the authority to adopt sector development plans and zoning; and

WHEREAS, the La Cueva Land Use Guide was adopted by the City Council in 1986 to guide the development in a larger area which contains this sector development plan; and

WHEREAS, the area contained in this plan was identified as Window G for which a se

and opportuni

WHERE

consis

La

PASSED AND ADOPTED THIS 6th DAY OF May, 1996

BY A VOTE OF: 7 FOR 1 AGAINST.

Yes: 7

No: Bregman

Excused: Griego

Steve D. Gallegos, President
City Council

APPROVED THIS 7th DAY OF June, 1996

Martin J. Chavez, Mayor
City of Albuquerque

ATTEST:

City Clerk

Underscored Material - New
[Bracketed Material] - Deletion

AM 11:08 -RK

96066546

CITY of ALBUQUERQUE
TWELFTH COUNCIL

7339

COUNCIL BILL NO. O-6 ENACTMENT NO. 19-1996

SPONSORED BY: Sam Bregman, by request

ORDINANCE

ANNEXING 82.0 ACRES MORE OR LESS, LOCATED GENERALLY BETWEEN PASEO DEL NORTE AND ANAHEIM AVENUE NE AND BETWEEN WYOMING BOULEVARD NE AND BARSTOW STREET NE TO THE CITY OF ALBUQUERQUE; AMENDING THE ZONE MAP TO ESTABLISH R-T, O-1, C-2, SU-1 PRD (20 DU/AC), SU-1 FOR O-1 PERMISSIVE USES AND PLANT NURSERY ZONING.

BE IT ORDAINED BY THE COUNCIL, THE GOVERNING BODY OF THE CITY OF ALBUQUERQUE:

Section 1. AREA PROPOSED FOR ANNEXATION. The owner of a majority of the area annexed hereby presented a properly signed petition to annex the following territory: 82.0 acres more or less, located generally between Paseo del Norte NE and Anaheim Avenue NE and between Wyoming Boulev-

described a-

Blo-

Bl-

Underscored Material - New
[Bracketed Material] - Deletion

Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

D. Lots 9-10 and 23-24, Block 20, Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

E. Lots 11-22, Block 20, Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

F. All of the public right-of-way on Paseo del Norte Drive NE adjoining the land described in subsection A of this section.

The above described territory is contiguous to the City of Albuquerque.

Section 2. ANNEXATION ACCEPTED. The petition and area specified in Section 1 above are accepted and the above territory is hereby annexed.

Section 3. ZONE MAP AMENDED. The zone map adopted by Article 7-14 R.O. 1974 is hereby amended as follows;

A. [illegible]

described [illegible]

subs[illegible]

[Bracketed Material] - Deletion

such decision shall not affect the validity of the remaining provisions of this ordinance. The Council hereby declares that it would have passed this ordinance and each section, paragraph, sentence, clause, word or phrase thereof irrespective of any provision being declared unconstitutional or otherwise invalid.

Section 5. EFFECTIVE DATE AND PUBLICATION. This ordinance shall become effective five or more days after publication in full when a copy of the ordinance and a plat of the territory hereby annexed is filed in the office of the County Clerk.

Underscored Material] - New
[Bracketed Material] - Deletion

PASSED AND ADOPTED THIS 6th DAY OF May, 1996

BY A VOTE OF: 8 FOR 1 AGAINST.

Yes: 8

No: Bregman

Steve D. Gallegos, President
City Council

APPROVED THIS 7th DAY OF June, 1996

Martin J. Chavez, Mayor
City of Albuquerque

ATTEST:

City Clerk

Underscored Material - New
[Bracketed Material] - Deletion

96 JUN 10 AM 11:10
RECEIVED
ALBUQUERQUE CITY CLERK

F-6

APPENDIX G

INFRASTRUCTURE LIST

JMA No. 940956
D.R.B. Case No. 96-546
D.R.C. Project No.
Date Submitted 12-13-96
Prelim. Plat Approved
Prelim. Plat Expires

PRELIMINARY EXHIBIT "A"
to Subdivision Improvements Agreement

DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LISTING
for Window G

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are Subdivider responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

A. Proposed Improvements (Unit 1 and Tract A)

Location	Size	Type Improvement	From	To
Wyoming Blvd NE	24'	Arterial Paving	Carmel Ave NE	Anaheim Ave NE
	6'	Sidewalk (East side)	Carmel Ave NE	Anaheim Ave NE
	TBD	Bridge across Channel	Carmel Ave NE	Anaheim Ave NE
	N/A	Std. Curb & Gutter (East Side)	Carmel Ave NE	Anaheim Ave NE
Carmel/Holly Ave	10"	Sanitary Sewer	Wyoming Blvd NE	Barstow St NE
	10"	Waterline	Wyoming Blvd NE	Barstow St NE
	20'	Residential Paving	Wyoming Blvd NE	Barstow St NE
	N/A	Std. Curb & Gutter	Wyoming Blvd NE	Barstow St NE
	4'	Temporary Pavement	Wyoming Blvd NE	Barstow St NE
	6'	Sidewalk (North side)	Wyoming Blvd NE	Barstow St NE
	4'	Sidewalk (North side)	SE Corner of Tract "A"	SE Corner Tract "A"
La Cueva Village	28' FF	Residential Paving	Internal	Streets
	N/A	Std. Curb & Gutter	Internal	Streets
	6"	Waterline	Internal	Streets
	8"	Sanitary Sewer	Internal	Streets
	varies	Storm Drainage Facilities Per Plan	Internal	Streets
AMAFCA R.O.W.	24' Bottom	Permanent Soil Cement Channel	20' West of Wyoming	NE Corner of La Cueva Village, Unit 1
AMAFCA R.O.W. & Drainage Easement	Varies	Interim Drainage Channel (wing dikes)	NE Corner of La Cueva Village, Unit 1	Barstow St NE

B. Proposed Improvements (Unit 2)

AMAFCA R.O.W.	24' Bottom	Permanent Soil Cement Channel	NE Corner La Cueva Village Unit 1	Barstow St NE
Barstow St NE	TBD	½ Bridge Across Channel (West half)		
	24'	Arterial Paving	Holly Ave NE	Carmel Ave NE
	6'	Sidewalk (west side)	Holly Ave NE	Carmel Ave NE

Location	Size	Type Improvement	From	To
Holly Ave NE	4'	Sidewalk	SW Corner La Cueva Village Unit 2	Barstow St NE
La Cueva Village	28' FF	Residential Paving	Internal	Streets
	N/A	Std. Curb & Gutter	Internal	Streets
	6"	Waterline	Internal	Streets
	8"	Sanitary Sewer	Internal	Streets
DEFERRED CONSTRUCTION:				
La Cueva Village (Units 1 & 2)	4'	Sidewalk	Internal	Streets

Prepared by: _____
Print Name: J. Graeme Means
Firm: Jeff Mortensen & Associates, Inc.

****

Development Review Board Member Approval

Transportation Dev. Date

Utility Dev. Date

Parks Design & Development, C.I.P. Date

City Engineer/AMAFCA Date

DRB Chairman Date

Rev. 10/85
ID3901D

APPENDIX H

AMAFCA RESOLUTION 1992-3

RESOLUTION 1992-3

MODIFICATION OF THE NORTHEAST HEIGHTS DRAINAGE MANAGEMENT PLAN AS IT PERTAINS TO THE NORTH AND SOUTH DOMINGO BACA ARROYOS

Whereas, the **Northeast Heights Drainage Management Plan,** adopted by AMAFCA in 1975, called for a dam on each of the North and South Domingo Baca Arroyos and called for the arroyos below (west of) the dam to be improved to wide earth channels stabilized with check dams and drop structures; and

Whereas, Resolution 1980-3 permitted alternative channel lining treatments; and

Whereas, the impending reconstruction of Paseo del Norte and other circumstances and conditions in the drainage areas of the North and South Domingo Baca Arroyos have necessitated the preparation of a more detailed plan specific to both arroyos; and

Whereas, such a plan has been prepared for AMAFCA by Resource Technology, Inc., entitled "North and South Domingo Baca Arroyos and Paseo del Norte Corridor Drainage Management Plan", dated December, 1991, and

Whereas, said Drainage Management Plan has been prepared with input and assistance from a task force and through appropriate public meetings;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY:

1. The improvements recommended by the North and South Domingo Baca Arroyos and Paseo del Norte Corridor Drainage Management Plan, by Resource Technology,.Inc., dated December, 1991 are hereby adopted, subject to the following:

   a. Final selection of the dam site will be made by the AMAFCA Board of Directors, following further engineering and cost analysis.

   b. Modifications to the adopted plan may be made as circumstances dictate, but shall be approved by the AMAFCA Board of Directors.

   c. Final decisions regarding arroyo treatments shall be made in accord with existing and future plans such as the Facility Plan for Arroyos, the Bikeways Master Plan, and the Trails Facility Plan.

   d. Financing and scheduling of improvements are subject to availability of funds by public agencies, and to initiatives by the private sector.

2. The adoption of the Resolution modifies the Northeast Heights Drainage Management Plan and any other previous Resolutions or actions by the AMAFCA Board of Directors regarding the North and South Domingo Baca Arroyos.

RESOLUTION 1992-3

MODIFICATION OF THE NORTHEAST HEIGHTS
DRAINAGE MANAGEMENT PLAN AS IT PERTAINS TO THE NORTH AND SOUTH
DOMINGO BACA ARROYOS
PAGE 2

PASSED, ADOPTED AND SIGNED THIS 30th DAY OF JANUARY, 1992.

THE ALBUQUERQUE METROPOLITAN
ARROYO FLOOD CONTROL AUTHORITY

Chairman, Board of Directors

(SEAL)

ATTEST:

Secretary, Board of Directors

A MEMBER OF CONSULTING
ENGINEERS COUNCIL OF NEW MEXICO

JEFF MORTENSEN & ASSOCIATES, INC. ☐ ENGINEERS & SURVEYORS ☐ (505) 345-4250
6010-B MIDWAY PARK BLVD. N.E. ☐ ALBUQUERQUE ☐ NEW MEXICO 87109 ☐ FAX (505) 345-4254

940956
December 9, 1996

Mr. Donald G. Hoech
Hoech Real Estate Corporation
6729 Academy N.E. Suite B
Albuquerque, NM 87109

Re: Window G

Dear Don:

On the afternoon of December 04, 1996, a coordination meeting was conducted for the above referenced project. In attendance were Mr. Fred Aguirre, City Hydrology Section, Ms. Susan Calongne, City/County Floodplain Administrator, Mr. Kurt Browning, AMAFCA, Mr. J. Graeme Means, Jeff Mortensen & Associates, Inc., Jeffrey G. Mortensen, Jeff Mortensen & Associates, Inc. The purpose for the meeting was to discuss the coordination efforts relative to Window G drainage issues. The topics of discussion are summarized below.

1. Master Drainage Plan

The Master Drainage Plan is currently being prepared by Jeff Mortensen & Associates, Inc. We anticipate submittal to the City on or about December 13, 1996. The Master Drainage Plan will accomplish the following:

a. Identify proposed drainage patterns
b. Reference the channel drainage study
c. Cross-reference the CLOMR submittal
d. Quantify existing and developed runoff for the site.
e. Identify required infrastructure for the development of the Window.
f. Identify timeframes and responsibilities for the construction of that infrastructure

Approval of the Master Drainage Plan will be required by Mr. Aguirre as a condition for Sector Plan sign-off at the DRB.

2. Timing

Mr. Browning was concerned as to the timing of three major construction activities were identified. The first is the channel. The second is the apartment project and the third is the proposed subdivision. Mr. Browning is concerned with having the apartments and/or the subdivision begin construction prior to substantial completion of the drainage channel. His main concern revolves around potential damage to the construction of the apartments

and/or subdivision if a significant rainfall event occurs during the construction of the channel and the flows associated with that event are not contained within the channel right-of-way. In response, a phasing report will be required. The phasing report will identify when the apartments can start and when the subdivision can start. Key ingredients to the Phasing Plan are:

a. Rough grading activities
b. Rainy season (June 15 - October 15)
c. Infrastructure construction
d. Foundation Permit
e. Building Permit

3. Timeline

Mr. Aguirre inquired as to the timing of the overall process. The overall process includes Bulk Land approval, Preliminary Plat approval, Grading Plan approval, Sector Plan approval, Infrastructure List approval, Master Drainage Plan approval, Subdivision Improvements Agreement approval, AMAFCA Agreement approval. I will prepare a timeline for Mr. Aguirre so that he may have a better feel for the overall schedule of the project.

4. Final Plat Requirements

Final Plat approval is conditioned upon completion of the following items:

a. AMAFCA Agreement
b. CLOMR
c. Subdivision Improvements Agreement
d. Financial Guarantees

Discussion was initiated regarding financial guarantees. Of the above items, most are self-explanatory. The financial guarantees, however, were a topic of brief discussion. The question was raised as to how the channel would be financially guaranteed. In particular, it was expressed that City Legal may not accept the "pending voter approval" clause in the AMAFCA Agreement. If this is the case, then Hoech Real Estate Corporation may need to financially guarantee the entire channel.

5. AMAFCA Briefing

The mailout for the next AMAFCA Board Meeting is Friday, December 06, 1996. It is not anticipated that the Agreement will be presented as AMAFCA staff is still reviewing the Agreement. The Board will be updated on the status of the project. Questions have been raised by AMAFCA staff relative to the Agreement which will require coordination between Hoech Real Estate Corporation and AMAFCA.

6. Bridge

It was discussed that the Wyoming Crossing Structure (bridge) should be constructed concurrent with the Channel. Coordination will be best if the bridge is included in the AMAFCA construction contract so that a single contractor may build both facilities. Mr. Browning was clear that AMAFCA would not participate in the cost of that facility, however, suggested that it be included with the channel as a practical matter. All parties agreed in concept.

7. Annexation

Ms. Calongne inquired as to whether or not Window G had been annexed. It was discussed that annexation becomes final upon approval of Council. Recognizing that those steps have been completed, I indicated to Ms. Calongne that we would provide her with copies of the final Council action for her files. Whether or not Window G lies within the City or the County jurisdictions is pertinent to the CLOMR review.

I believe that the above summarizes the discussions which occurred during the coordination meeting. Overall, the spirit of the meeting was highly cooperative and an information-sharing session. I believe that many of the questions will be answered by the Master Drainage Plan.

If you should have any questions or comments concerning this recap, or any other aspects of the project, please do not hesitate to call.

Sincerely,

JEFF MORTENSEN & ASSOCIATES, INC.

Jeffrey G. Mortensen, P.E.
President

JGM:dsj
xc: Fred Aguirre
Susan Calongne
Kurt Browning
J. Graeme Means

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO
INTER-OFFICE CORRESPONDENCE

96-546

November 19, 1996

To: Fred Aguire, Hydrology, PWD
Loren Hines, Real Property, Legal Dept.

From: Sandy Zuschlag, Manager, Design and Development/CIP SCZ

Re: **North Domingo Baca Park**

Attached is a sketch I received from Jeff Mortenson and Don Hoeck about locating a rip rap drainage structure on City property. Please review the sketch and let me know what your thoughts are about the structure. Specifically, if you could advise me concerning the following:

Hydrology:

1. Who would maintain it?
2. This area of the park is encumbered by flood plains; is the improvement an asset or liability to the city?
3. Is the structure appropriate considering the drainage problem?
4. What, if any, compensation should the city receive for such a structure being placed on city property?

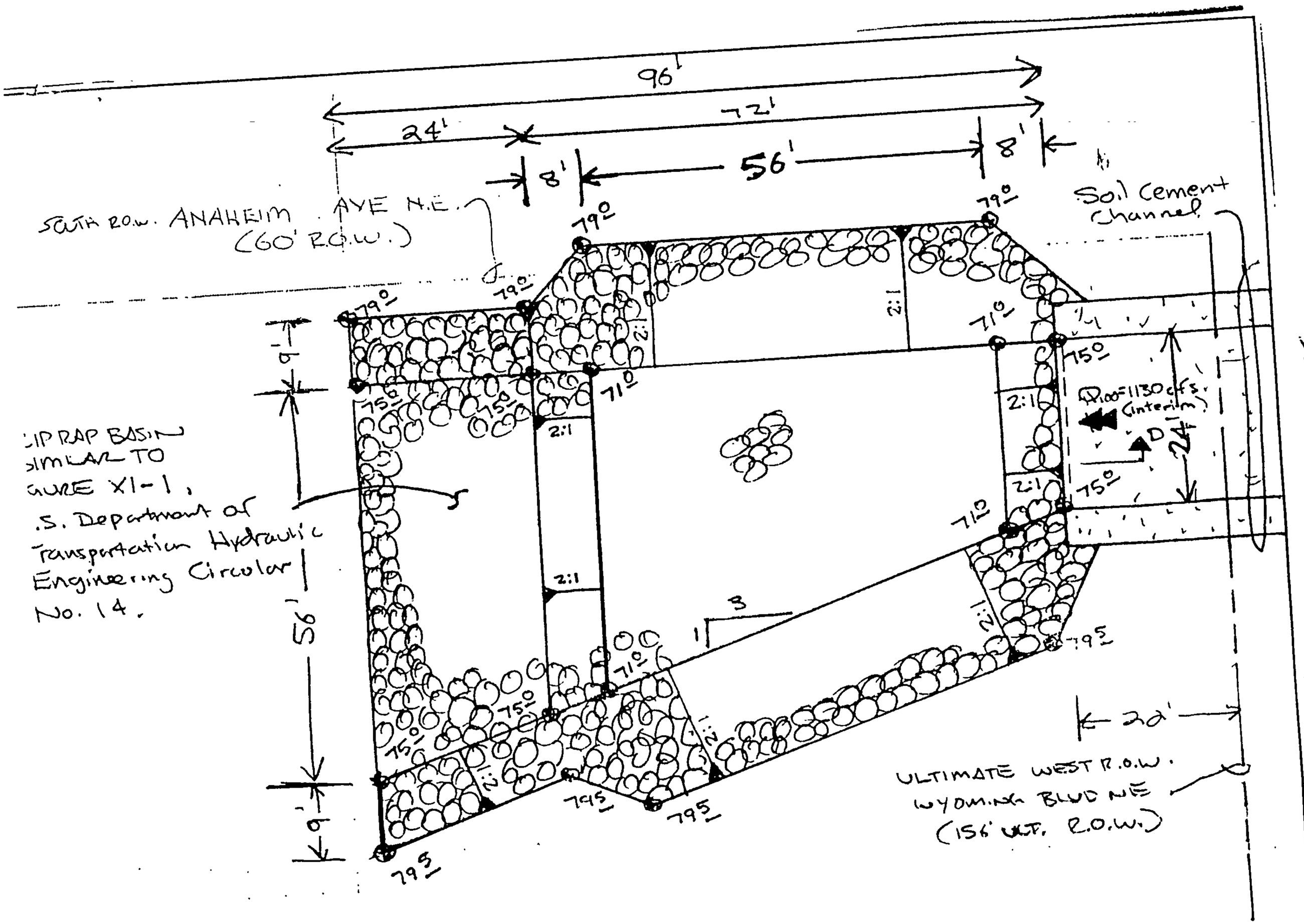
Real Property

1. What, if any, compensation should the city receive for such a structure being placed on city property?

Please get back to me as soon as possible, since I need to respond to Mr. Hoeck and Jeff Mortenson

cc: Don Hoeck, Hoeck Real Estate Corporation
Jeff Mortenson, JMA
Larry Blair/Kurt Browning, AMAFCA
Ed Stang/Colleen Frenz
Dan Hogan, Hydrology, PWD
Ted Pearson, Legal Dept.

d&d/project folder/parks/north Domingo/drainage structure



RIP RAP BASIN DETAIL
Scale: 1" = 20'

STA. 27+78
JUNCTION 1-30" RCP W/
JD SECTIONS
SEE SHEET 26

1" = 100'

N

NEW 24' ROADWAY W/
4' SHOULDERS
FOR TYP. SECTION SEE SHT '26.

30+00

35+00

5370

5380

LIMIT OF
AMAFCA
PROPERTY

18'

WINDOW G

MASTER DRAINAGE PLAN

DECEMBER, 1996

(REVISED JANUARY, 1997)

Prepared for:

HOECH REAL ESTATE CORPORATION
6729 Academy Road N.E., Suite B
Albuquerque, N.M., 87109

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

940956

A MEMBER OF CONSULTING
ENGINEERS COUNCIL OF NEW MEXICO

JEFF MORTENSEN & ASSOCIATES, INC. ☐ ENGINEERS & SURVEYORS ☐ (505) 345-4250
6010-B MIDWAY PARK BLVD. N.E. ☐ ALBUQUERQUE ☐ NEW MEXICO 87109 ☐ FAX (505) 345-4254

940956
January 09, 1997

Ms. Susan M. Calongne
City/County Floodplain Administrator
% The Hydrology Section
Public Works Department
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Window "G" Master Drainage Plan (C19/D11)
Response to Comments dated 12/26/96

Dear Susan:

Transmitted herewith is a revised Master Drainage Plan for Window G. Comments 1 - 10 of your letter dated 12/26/96 have been addressed as follows:

1. Appendix "H" has been expanded to include a copy of the R.T.I. Basin Map as presented by Jeff Mortensen & Associates, Inc. in the Master Drainage Plan for the North Arroyo de Domingo Baca which supports the Northeast Heights Middle School (C20/D14).

2. The R.T.I. Plan assumes 349 cfs enters the channel between Barstow Street N.E. and Wyoming Blvd. N.E. (AP 930.00). As shown on the Ultimate Conditions Plan, the total flow entering the channel is (12 + 19 + 63 + 67 + 59 + 4) = 224 cfs which is 125 cfs less than the allowed rate.

3. The text on Page 9 of The Text has been modified to state that "The channel construction will require a crossing structure where Wyoming Blvd. N.E. crosses the proposed channel."

4. Side inlets will be shown on the channel construction drawings. Side inlets will not be provided on the north side of the channel. The area north of the channel is developed and drains to an existing storm drain within Anaheim Avenue N.E. It is planned to divert this storm drain into the proposed channel.

5. The existing mapped floodplain, near Holly Avenue N.E., will be acknowledged on the Plat. The HEC-RAS analysis performed for this Master Drainage Plan demonstrates that the actual flood hazard does not impact the subdivision, therefore, no drainage improvements are proposed by this Plan.

6. The right-of-way and storm drain improvements for the City and County portions of the Paseo del Norte Corridor projects, including the Wyoming and Barstow Extensions, are shown on the Ultimate Conditions Plan (Sheet 4). The developments which must drain to the PDNC storm drain are responsible for connecting to the storm drain.

7. The 42" storm drain stub may be used to drain a portion of Tract "C" provided that the specific Grading and Drainage Plan for Tract "C" can justify the discharge. This Master Drainage Plan assumes that Tract "C" will drain entirely to the north.

8. The outlet structure will be designed as part of the DRC plans for the channel. The final designs will be dependent upon further coordination with City Parks and AMAFCA.

9. The dashed line on Sheet 5 of the Plan shows the water surface level is contained within the arroyo. The cross sections contained in Appendix "C" furthermore demonstrates the channel capacity. As requested, the HEC-RAS model has been extended upstream beyond Barstow.

10. The internal storm drain system within La Cueva Village will be designed as part of the Grading and Drainage Plan for La Cueva Village. The proposed storm drain is not intended to convey the 100-year flow rate, but to convey nuisance flows and a portion of the peak flow. All overflow will be conveyed to the soil cement channel by a concrete public drainage channel which will be designed for La Cueva Village.

If you should have any questions or comments regarding this information, or if we can be of further assistance to you, please do not hesitate to call.

Sincerely,

JEFF MORTENSEN & ASSOCIATES, INC.

J. Graeme Means, E.I.T.

JGM:dsj
xc: Kurt Browning
Don Hoech

TABLE OF CONTENTS

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Proposed Conditions	5
Ultimate Conditions	12

APPENDICES

Appendix A - Master Drainage Plan Drawings

Appendix B - Soil Cement Channel Preliminary Drawings

Appendix C - HEC-RAS Input and Output

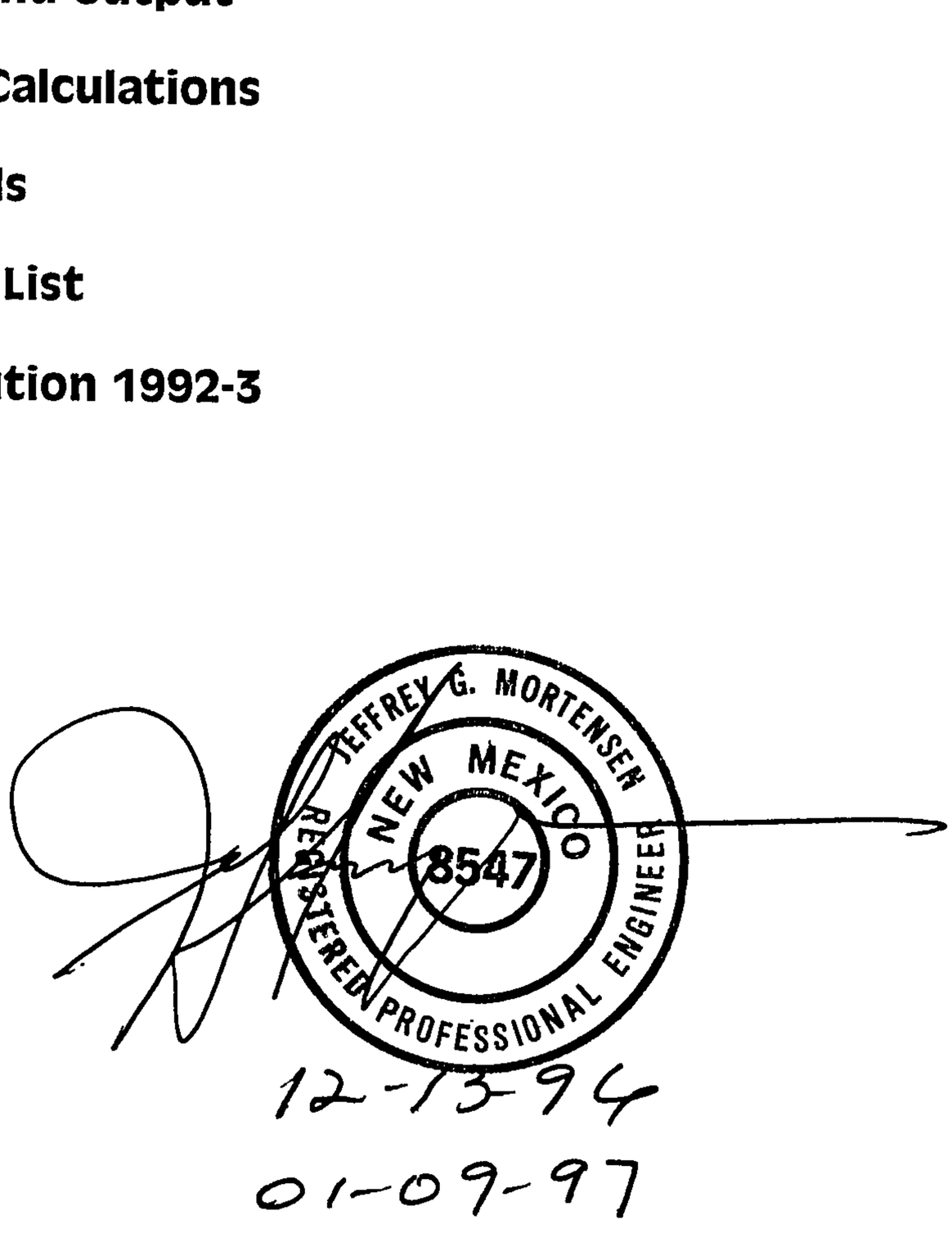
Appendix D - AHYMO Input and Output

Appendix E - Miscellaneous Calculations

Appendix F - City Council Bills

Appendix G - Infrastructure List

Appendix H - AMAFCA Resolution 1992-3



INTRODUCTION:

The Window G Plan Area is bordered by Wyoming Blvd. NE to the west, Paseo del Norte to the south, Barstow Street NE to the east, and Anaheim Avenue NE and Nor Este Manor Subdivision to the north. The Window lies within the City of Albuquerque as annexed by City Council on May 06, 1996 (see attached bills, Appendix 'F').

This Master Drainage Plan will identify the existing, proposed, and ultimate drainage requirements for development within the Window. The text, calculations, and analysis presented herein support the Master Drainage Plan drawing set which is contained within Appendix 'A'. The main objective of this Plan is to identify required infrastructure associated with proposed Tract A (apartment site) and Tract B (La Cueva Village - Patio Homes). A Bulk Land Variance will be associated with Tract C (portion of Shopping Center site). Site specific plans will address grading issues. This Plan will focus upon drainage and drainage related requirements.

Window G lies within the North Domingo Baca and Paseo del Norte Watersheds as identified in "The North and South Domingo Baca Arroyo and Paseo del Norte Corridor Drainage Management Plan" prepared for AMAFCA by Resource Technology, Inc. (R.T.I.) dated December, 1991. The R.T.I. Plan has been adopted by AMAFCA as a guideline for drainage management within this area. AMAFCA Resolution 1992-3, dated January 30, 1992, appears in Appendix 'H'.

This Window G Master Drainage Plan often refers to the hydrology contained within the R.T.I. Report and a general acknowledgement to it is made here. Appendix 'H' also contains a copy of the RTI Future Conditions Plan and Basin Map for the adopted option.

EXISTING CONDITIONS:

The existing conditions are shown on Sheet 2 of Appendix 'A'. With the exception of a City of Albuquerque Reservoir site located along Paseo del Norte, Window G is undeveloped. Carmel Avenue NE and Holly Avenue NE are unpaved dirt roads which are contained within the Window.

Window G drains to two distinct drainage basins. The northerly basin, which lies north of Holly Avenue NE, contributes to the main channel of the North Arroyo de Domingo Baca. This arroyo discharges to the AMAFCA Lower North Domingo Baca Arroyo Detention Dam. The south portion of the Window (south of Holly Avenue NE) drains to Paseo del Norte. This basin is characterized by a tributary of the NDB which crosses a dip section in Barstow Street NE, approximately 90 feet south of Holly Avenue NE. Two 24" corrugated metal pipes convey nuisance flows under Barstow Street at the tributary arroyo crossing.

Both arroyos flow through the Window from east to west and exit the site by crossing Wyoming Boulevard NE. The Main NDB arroyo crosses Wyoming through two 43" x 27" corrugated metal arch pipes located approximately 60 feet south of Anaheim Avenue NE. The tributary crosses Wyoming at a dip section located approximately 130 feet north of Paseo del Norte.

As shown by Panel 141 of 825 of the National Flood Insurance Program Flood Insurance Rate Maps published by F.E.M.A. for the

County of Bernalillo, New Mexico, and incorporated areas, dated September 20, 1996, two flood Hazard Zones designated AO with a depth of one foot impact the Window. These two flood hazard zones are associated with the two arroyos which impact and traverse the site.

The existing flow rates shown on Sheet 2 are taken from "The North and South Domingo Baca Arroyo and Paseo del Norte Corridor Drainage Management Plan" prepared for AMAFCA by Resource Technology, Inc. (R.T.I.) dated December, 1991, and reflect the undeveloped condition.

PROPOSED CONDITIONS:

A. Drainage

The Proposed Conditions are as shown on Sheet 3 of Appendix 'A'. The currently proposed development within Window G lies north of the existing alignment of Holly Avenue NE in the North Basin. As shown on the existing conditions plan, much of this area lies within an existing floodplain. A C.L.O.M.R. Request has been prepared by this office to demonstrate that the existing floodplain can be confined to a proposed soil cement public drainage channel located at the north end of the Window. This channel will be sized to accept developed runoff from the upstream contributing basins, and the portion of Window G located north of Holly Avenue NE. The basin definition, channel alignment, and hydraulic capacity are consistent with the aforementioned R.T.I. Plan. The channel will be constructed by AMAFCA with both public and private funding. Upon completion of construction, the channel will be owned and maintained by AMAFCA. Construction of this channel is required to remove the existing floodplain designation and allow for development within this portion of the Window. Appendix 'B' contains the preliminary design drawings for the channel which support the C.L.O.M.R. Request.

The overall plan is to channelize the North Domingo Baca Arroyo from the Lower North Domingo Baca Arroyo Detention Dam to a point upstream of Ventura Street NE, midway between Ventura Street NE and Holbrook Street NE. Due to the impracticality of constructing this entire reach at once, it is necessary to phase the project. The Proposed Conditions Plan addresses the first phase, the

channelization between Wyoming Blvd. NE and Barstow Street NE. Because the downstream alignment of this channel will be influenced by the final design of a City park to be located west of Wyoming Blvd. NE, the interim outfall immediately west of Wyoming will be temporary to allow maximum flexibility in the design and construction of the City park improvements. In the meantime, AMAFCA will maintain the channel outlet and the flow path to the dam.

Channel improvements and development upstream of Barstow Street NE will follow Window G development, however, cannot occur until the upstream alignment is finalized and all property owners affected assembled to participate. In the proposed interim condition, all properties upstream of Barstow Street NE must continue to limit their discharge to the arroyo to either the undeveloped flow rate (City of Albuquerque Policy), or the equivalent discharge rate density of one dwelling unit (D.U.) per acre (Bernalillo County Policy). These limitations must be maintained until such time as an improved channel is constructed upstream of this project.

In view of the above, an interim channel structure must be constructed to collect and channelize flows from the natural arroyo, which originates upstream of Barstow Street NE. This relatively short interim section of the channel will be located within the east end of the Window, and will accept those flows which cross the existing dip section within Barstow Street NE. The permanent channel construction for Window G will end approximately 330 feet west of the centerline of Barstow Street NE. This will

allow for connection to the ultimate upstream channel alignment and a future Barstow Street Crossing Structure which will be addressed by the next phase of development.

The proposed channel construction will allow the development of Tract A (Pinnacle Estates Apartments) and Lots 1-59, La Cueva Village, Unit 1 (a single family residential subdivision). The apartment site will generate a peak 100 year flow rate of 67 cfs which will drain directly to the soil cement channel via side inlets and/or private storm drain connection. A Site Specific Grading and Drainage Report will be required for this site to address the interior grading and drainage details.

La Cueva Village Unit 1 will drain to a public drainage channel and storm drain system located at the northwest corner of the Unit. This public system will discharge directly to the AMAFCA soil cement channel via side inlet and storm drain outlet. The internal storm drain and concrete channel has been sized to accept and convey the ultimate design flow of 59 cfs. Details of these improvements are shown on Sheet ~~6~~ 4 of Appendix 'A'.

The AHYMO Models which analyze the proposed and ultimate conditions are contained within Appendix 'D'. The street capacity and storm drain calculations are contained within Appendix 'E'. As with Tract A, a Site Specific Grading and Drainage Report will be required for La Cueva Village development.

La Cueva Village, Unit 2, can be constructed when the need for the interim channel entrance is removed. Until that time, La Cueva Village, Unit 1 must accept undeveloped flows from the future Unit 2. Unit 2 must be temporarily graded to satisfy this drainage requirement.

Tract C will ultimately be part of a shopping center site which will discharge to the north and south drainage basins. Tract C, which is north of Holly Avenue, will drain to the North Basin. More specifically, it's runoff will drain to its northwest corner and into a public storm drain proposed within Wyoming Blvd. NE. The proposed public storm drain within Wyoming Blvd. NE, which fronts Tract A, is sized to accept the runoff from Holly and Carmel Avenues, Tract C, and a portion of right-of-way associated with Wyoming Blvd. NE. As shown by the Calculations contained within Appendix 'E', the storm drain has sufficient capacity to accept and convey the design flows while maintaining one free driving lane and maximum depth of 0.50 ft. in the 10-year event.

The area south of the existing alignment of Holly Avenue NE lies within the South Basin and hence must drain to the Paseo del Norte Corridor (PDNC). Developed runoff from this portion of the Window must drain to the 78" storm drain proposed as part of the proposed Paseo del Norte improvements to be constructed by the City of Albuquerque (Project No. 4083.90) and the County of Bernalillo (no project number established yet). Until such time as the PDNC improvements are in place, the development of the parcels south of Holly Avenue NE will not have an outfall. In response, this report

recommends that development of these commercial tracts be deferred until such time as it can be coordinated with PDNC construction. Without PDNC improvements, the shopping center site and the upstream commercial tracts will be hampered by limited transportation and drainage facilities, hence deferral of development in the South Basin is prudent.

B. Infrastructure

The proposed development of Tract A and Lots 1-59, La Cueva Village, Unit 1, will require public infrastructure improvements. The AMAFCA Channel shall be constructed to provide a drainage outfall for the portion of Window G located north of the existing Holly Avenue alignment. The channel construction shall include temporary inlet and outlet structures. Tract A, La Cueva Village Subdivision, Units 1 and 2, and Tract C will ultimately drain to the channel. The Channel construction will require a Crossing Structure where Wyoming Blvd. NE crosses the proposed channel. The development of Tract A will require 24 feet of permanent paving improvements within Wyoming Blvd. NE fronting Tract A. The aforementioned public storm drain within Wyoming Blvd. NE must be constructed at this time in order to convey runoff from Carmel Avenue NE, Wyoming Blvd. NE, and future runoff from Tract C to the soil cement channel. The development of Tract A will also require the construction of 20 feet of permanent and 4 feet of temporary paving improvements within Carmel Avenue NE and the realigned Holly Avenue NE fronting Tract A. As demonstrated by the street hydraulic and hydrologic calculations, there are no storm drain

requirements for these streets. Proposed street sections are shown on Sheet 6 of Appendix 'A'.

The proposed development of Lots 1-59, La Cueva Village, Unit 1, will also require the AMAFCA channel construction and Carmel/Holly paving improvements. Because Holly Avenue NE is undeveloped, paved access to La Cueva Village, Unit 1, must be constructed within Holly to connect the proposed subdivision to Barstow Street NE. A public concrete drainage channel and storm drain system are required within Tract 1 to convey developed runoff from the subdivision to the AMAFCA channel. Preliminary details of this system are shown on Sheet 7 of Appendix 'A'. Hydraulic Calculations, which support this system, are contained within Appendix 'E'. As previously stated, a Site Specific Grading and Drainage Report will be required for development of La Cueva Village.

Development of Tract C is also dependent upon the AMAFCA channel construction, as well as public storm drain construction within Wyoming Blvd. NE. At this time, a bulk land variance is proposed for Tract C to defer development and infrastructure improvements until such time as the entire shopping center is proposed. At that time, Carmel Avenue paving improvements and Wyoming Blvd. paving improvements will be required.

As shown on the Existing Conditions Plan (Sheet 2 of Appendix 'A'), there is a small piece of mapped floodplain which impacts a southern portion of La Cueva Village Subdivision, and Holly Avenue

NE. The source of this flooding is identified as Subbasin 421 in the aforementioned R.T.I. Report. This potential flooding hazard will be eliminated upon construction of the Bernalillo County portion of the Paseo del Norte Corridor Storm Drain. A C.L.O.M.R. has been submitted to FEMA by AMAFCA to address this floodplain (related FEMA Case No. 95-06-417P). A HEC-RAS Analysis is presented herein to demonstrate that the proposed construction of La Cueva Village and Holly Avenue NE will not affect the existing flowpath and/or flooding limits of this arroyo. Sheet 5 of Appendix 'A' is a detail of this area which shows that the existing 100-year water surface level of the arroyo can be completely contained within the well defined natural arroyo, and it does not affect or cross Holly Avenue NE. Appendix 'C' contains the supporting HEC-RAS input and output. Because the arroyo does not impact Holly Avenue NE or any proposed development, no improvements are required to address this arroyo. at this time

ULTIMATE CONDITIONS:

The Ultimate Conditions are shown on Sheet 4 of Appendix 'A'. There are two major improvements which must be in place prior to the ultimate development of Window G. The first improvement is the construction of the Paseo del Norte Corridor (PDNC) Storm Drain by the City of Albuquerque (Project No. 4083.90) and Bernalillo County (no project number established yet). This storm drain will provide a drainage outfall for those properties along the Paseo del Norte Corridor. All of Window G located south of the existing alignment of Holly Avenue NE will drain to the new storm drain. Public storm drain extensions are proposed by the City and County within Wyoming Blvd. NE and Barstow Street NE, respectively, to accept runoff from the PDNC. PDNC improvements will allow the shopping center and commercial areas to develop. These areas will require site specific Grading and Drainage Plans which will address the interior drainage and external storm drain connections.

The second requirement for ultimate development is the upstream extension of the AMAFCA soil cement channel east of Barstow Street. This extension will allow for the development of La Cueva Village, Unit 2, and will necessitate permanent Barstow Street NE paving improvements and a crossing structure (bridge) over the channel extension. A Financial Guarantee exists for half of the bridge construction as part of the Subdivision Improvements Agreement between the City of Albuquerque and Albuquerque Public Schools executed for the Northeast Heights Middle School currently under construction (C.O.A. Project No. 5414.81). As shown by the

Calculations in Appendix 'E', there will be no storm drain requirement within Barstow Street NE.

APPENDIX A

MASTER DRAINAGE PLAN DRAWINGS

sites
southwest

PHYLLIS TAYLOR, AICP
MANAGING PARTNER

PLANNING
LANDSCAPE ARCHITECTURE
MARKET ANALYSIS

5150 A SAN FRANCISCO NE
ALBUQUERQUE, NM 87109
PHONE: 505-822-8200
FAX: 505-822-8282
E-MAIL: ptaylor@sites-sw.com
WEB: www.sites-sw.com

APPENDIX B

SOIL CEMENT CHANNEL PRELIMINARY DRAWINGS

APPENDIX C

HEC-RAS INPUT AND OUTPUT

TITLE	PAGE NO.
Input File	C-1
Output Tables	C-5
Section Plots	C-16
Profile Plot	C-26

```
Geom Title=Imported Geom 01

ViewRect= 0, 1, 1, 0

Reach=1
Junct Up Dn=
Rch X Y Up & X Y Dn=0.5,0.9,0.5,0.1
Rch Text X Y=0.52,0.7
Rch Arrow X Y Up & X Y Dn=0,0,0,0
Rch Type=0

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Exp/Cntr=0.3,0.1

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Bank Sta=80,225
Exp/Cntr=0.3,0.1

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Bank Sta=80,225
Exp/Cntr=0.3,0.1

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Node Desc=2055 (ROAD)
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       0      471       53      470        96   469.74       160   469.71       220      471
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       0      .03        0         0      .03        0       220      .03        0
Bank Sta=0,220
Exp/Cntr=0.3,0.1

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     165      466       169      467
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Bank Sta=130,169
Exp/Cntr=0.3,0.1

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Node Desc= 1950
#Sta/Elev=        9
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```
     129      466      139      465      141      464      143      463      150      462.5
     158      463      165      464      171      465      175      466
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Exp/Cntr=0.3,0.1

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Node Desc= 1900
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     112      465      140      464      143      463      145      462      150      461
     156      462      168      463      171      464      187      465
#Mann=3,0
     112      .03        0      112      .03        0      187      .03        0
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Exp/Cntr=0.3,0.1
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Type RM Length L Ch R =1,1850      ,50,50,50,0,0,0
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     158      461      161      462      164      463      196    463.5
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Bank Sta=108,196
Exp/Cntr=0.3,0.1

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Node Desc= 1800
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     120      463      138      462      141      461      143      460      150      459.2
     157      460      160      461      163      462      166    462.5
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Bank Sta=120,166
Exp/Cntr=0.3,0.1

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Node Desc= 1750
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     108      462      133      461      136      460      138      459      146      458.3
     150      459      153      460      157      461
#Mann=3,0
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Bank Sta=108,157
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1700      ,50,50,50,0,0,0
Node Desc= 1700
#Sta/Elev=         7
     136      460      141      459      144      458      150    457.3      157      458
     161      459      166      460
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     136      .03        0      136      .03        0      166      .03        0
Bank Sta=136,166
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1650      ,50,50,50,0,0,0
Node Desc= 1650
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     138    458.8      141      458      145      457      150    456.1      159      457
     163      458      168      459
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Bank Sta=138,168
Exp/Cntr=0.3,0.1

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Node Desc= 1600
#Sta/Elev=         6
     130      457      138      456      141      455      150    455.3      155      456
     159      457
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     130      .03        0      130      .03        0      159      .03        0
Bank Sta=130,159
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1550      ,50,50,50,0,0,0
Node Desc= 1550
#Sta/Elev=         6
     125      456      128      455      132      454      152      454      155      455
     157      456
#Mann=3,0
     125      .03        0      125      .03        0      157      .03        0
Bank Sta=125,157
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1500      ,50,50,50,0,0,0
Node Desc= 1500
#Sta/Elev=         7
     125    454.7      130      454      137      453      150    452.8      153      453
     157      454      159      455
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     125      .03        0      125      .03        0      159      .03        0
Bank Sta=125,159
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1450      ,50,50,50,0,0,0
Node Desc= 1450
#Sta/Elev=         6
     132      453      138      452      142    451.6      158    451.5      163      452
     165      453
#Mann=3,0
     132      .03        0      132      .03        0      165      .03        0
Bank Sta=132,165
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1400      ,50,50,50,0,0,0
Node Desc= 1400
#Sta/Elev=         6
     130      452      135      451      140    450.2      162    450.2      166      451
     169      452
#Mann=3,0
     130      .03        0      130      .03        0      169      .03        0
Bank Sta=130,169
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1350      ,50,50,50,0,0,0
Node Desc= 1350
#Sta/Elev=         8
```

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     124      451      131      450      137      449      140    448.9      163    448.9
     166      449      169      450      173    450.9
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Bank Sta=124,173
Exp/Cntr=0.3,0.1

Type RM Length L Ch R =1,1300     ,50,50,50,0,0,0
Node Desc= 1300
#Sta/Elev=        8
     108      450      123      449      128      448      138    447.6      155    447.6
     163      448      175      449      194    449.5
#Mann=3,0
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Bank Sta=108,194
Exp/Cntr=0.3,0.1
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HEC-RAS Plan: Imported Pla Reach: 1 1/7/97

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
2230	266.00	471.50	473.00	473.14	473.59	0.022608	6.14	43.31	57.75	1.25	1.50
2180	266.00	470.00	471.38	471.63	472.19	0.034749	7.22	36.86	53.28	1.53	1.38
2116	266.00	470.50	471.15	471.15	471.43	0.015989	4.29	61.99	109.23	1.19	0.65
2056	266.00	469.71	470.19	470.32	470 63	0 046050	5.35	49.73	139.32	1.58	0.48
2000	321.00	464.00	466 14	466 78	468.06	0 042897	11.10	28.91	25.26	1.83	2.14
1950	321.00	462.50	464.30	464 84	465 99	0.037141	10.45	30.71	26.37	1.71	1.80
1900	321.00	461.00	463 64	463 80	464.60	0 016466	7.88	40.74	28 84	1.17	2.64
1850	321.00	460.30	462 58	462.82	463.74	0 017464	8 62	37.22	23 92	1 22	2 28
1800	321 00	459.20	461.70	461 94	462 88	0 017431	8 72	36 81	23.18	1.22	2 50
1750	321.00	458.30	461.00	461 24	462.04	0 014912	8 21	39.12	23 98	1.13	2.70
1700	321.00	457.30	459 53	459.99	461.00	0.027613	9 72	33.04	25.29	1 50	2 23
1650	321.00	456.10	458.49	458.82	459.72	0 021786	8 92	36.00	26.24	1.34	2.39
1600	321.00	455.00	457.00	457.39	458.40	0 030467	9.50	33.80	28.96	1.55	2.00
1550	321.00	454.00	455.34	455.78	456.81	0.032563	9 72	33.03	28.71	1.60	1 34
1500	321.00	452.80	454 67	454.80	455.53	0 016022	7.43	43.22	33.12	1.15	1.87
1450	321.00	451.50	452.84	453.27	454.30	0.036666	9.69	33.11	31.73	1.67	1.34
1400	321.00	450.20	451 50	451.82	452.62	0.026852	8.49	37.79	35.02	1.44	1.30
1350	321.00	448.90	450.04	450.38	451.17	0.030534	8.50	37.74	38.49	1.51	1.14
1300	321.00	447.60	448.77	449.03	449.66	0 027388	7.54	42.58	48.16	1.41	1.17

Plan: Imported Pla Reach: 1 Riv Sta: 2230 Profile: 1 1/7/97

W.S. Elev (ft)	473.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0 030	
E.G. Elev (ft)	473.59	Reach Len. (ft)	50 00	50.00	50.00
E.G. Slope (ft/ft)	0.022608	Flow Area (sq ft)		43 31	
Q Total (cfs)	266.00	Flow (cfs)		266.00	
Top Width (ft)	57.75	Top Width (ft)		57.75	
Vel Total (ft/s)	6.14	Avg. Vel. (ft/s)		6.14	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		0 75	
Crit W.S. (ft)	473.14	Wetted Per. (ft)		57.84	
Conv. Total (cfs)	1769.1	Conv. (cfs)		1769.1	

Plan: Imported Pla Reach: 1 Riv Sta: 2180 Profile: 1 1/7/97

W.S. Elev (ft)	471.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0 030	
E.G. Elev (ft)	472.19	Reach Len. (ft)	65 00	65 00	65 00
E.G. Slope (ft/ft)	0 034749	Flow Area (sq ft)		36 86	
Q Total (cfs)	266.00	Flow (cfs)		266 00	
Top Width (ft)	53.28	Top Width (ft)		53 28	
Vel Total (ft/s)	7.22	Avg. Vel. (ft/s)		7.22	
Max Chl Dpth (ft)	1.38	Hydr. Depth (ft)		0.69	
Crit W.S. (ft)	471.63	Wetted Per. (ft)		53 36	
Conv. Total (cfs)	1427.0	Conv. (cfs)		1427.0	

C-9

Plan: Imported Pla Reach: 1 Riv Sta: 2115 Profile: 1 1/7/97

W.S. Elev (ft)	471.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0 030	
E.G. Elev (ft)	471.43	Reach Len. (ft)	60 00	60.00	60.00
E.G. Slope (ft/ft)	0.015989	Flow Area (sq ft)		61.99	
Q Total (cfs)	266.00	Flow (cfs)		266 00	
Top Width (ft)	109 23	Top Width (ft)		109 23	
Vel Total (ft/s)	4 29	Avg. Vel. (ft/s)		4 29	
Max Chl Dpth (ft)	0.65	Hydr. Depth (ft)		0 57	
Crit W.S. (ft)	471.15	Wetted Per. (ft)		109 29	
Conv. Total (cfs)	2103.7	Conv. (cfs)		2103 7	

Plan: Imported Pla Reach: 1 Riv Sta: 2055 Profile: 1 1/7/97

W.S. Elev (ft)	470.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0 030	
E.G. Elev (ft)	470.63	Reach Len. (ft)	55.00	55 00	55 00
E.G. Slope (ft/ft)	0 046050	Flow Area (sq ft)		49.73	
Q Total (cfs)	266.00	Flow (cfs)		266.00	
Top Width (ft)	139.32	Top Width (ft)		139.32	
Vel Total (ft/s)	5.35	Avg. Vel. (ft/s)		5 35	
Max Chl Dpth (ft)	0.48	Hydr. Depth (ft)		0 36	
Crit W.S. (ft)	470.32	Wetted Per. (ft)		139 33	
Conv. Total (cfs)	1239.6	Conv. (cfs)		1239.6	

Plan: Imported Pla Reach: 1 Riv Sta: 2000 Profile: 1 1/7/97

W.S. Elev (ft)	466.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.91	Wt. n-Val.		0 030	
E.G. Elev (ft)	468.06	Reach Len. (ft)	50 00	50 00	50 00
E.G. Slope (ft/ft)	0.042897	Flow Area (sq ft)		28.91	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	25.26	Top Width (ft)		25 26	
Vel Total (ft/s)	11.10	Avg. Vel. (ft/s)		11.10	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		1.14	
Crit W.S. (ft)	466.78	Wetted Per. (ft)		25.68	
Conv. Total (cfs)	1549.9	Conv. (cfs)		1549.9	

Plan: Imported Pla Reach: 1 Riv Sta: 1950 Profile: 1 1/7/97

W.S. Elev (ft)	464 30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1 70	Wt. n-Val.		0 030	
E.G. Elev (ft)	465 99	Reach Len. (ft)	50 00	50 00	50 00
E.G. Slope (ft/ft)	0 037141	Flow Area (sq ft)		30.71	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	26.37	Top Width (ft)		26 37	
Vel Total (ft/s)	10 45	Avg. Vel. (ft/s)		10.45	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.16	
Crit W.S. (ft)	464.84	Wetted Per. (ft)		26.81	
Conv. Total (cfs)	1665.6	Conv. (cfs)		1665.6	

Plan: Imported Pla Reach: 1 Riv Sta: 1900 Profile: 1 1/7/97

W.S. Elev (ft)	463 64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0 030	
E.G. Elev (ft)	464.60	Reach Len. (ft)	50.00	50 00	50.00
E.G. Slope (ft/ft)	0.016466	Flow Area (sq ft)		40.74	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	28.84	Top Width (ft)		28 84	
Vel Total (ft/s)	7.88	Avg. Vel. (ft/s)		7.88	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		1.41	
Crit W.S. (ft)	463.80	Wetted Per. (ft)		29.51	
Conv. Total (cfs)	2501.5	Conv. (cfs)		2501.5	

Plan: Imported Pla Reach: 1 Riv Sta: 1850 Profile: 1 1/7/97

W.S. Elev (ft)	462.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.		0 030	
E.G. Elev (ft)	463.74	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.017464	Flow Area (sq ft)		37.22	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	23.92	Top Width (ft)		23 92	
Vel Total (ft/s)	8.62	Avg. Vel. (ft/s)		8.62	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		1.56	
Crit W.S. (ft)	462.82	Wetted Per. (ft)		24.61	
Conv. Total (cfs)	2429.0	Conv. (cfs)		2429.0	

Plan: Imported Pla Reach: 1 Riv Sta: 1800 Profile: 1 11/25/96

W.S. Elev (ft)	461.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.030	
E.G. Elev (ft)	462.88	Reach Len. (ft)	50 00	50.00	50.00
E.G. Slope (ft/ft)	0.017438	Flow Area (sq ft)		36.80	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	23.18	Top Width (ft)		23.18	
Vel Total (ft/s)	8.72	Avg. Vel. (ft/s)		8.72	
Max Chl Dpth (ft)	2 50	Hydr. Depth (ft)		1.59	
Crit W.S. (ft)	461.94	Wetted Per. (ft)		23 90	
Conv. Total (cfs)	2430.8	Conv. (cfs)		2430 8	

Plan: Imported Pla Reach: 1 Riv Sta: 1750 Profile: 1 11/25/96

W.S. Elev (ft)	461.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
E.G. Elev (ft)	462.04	Reach Len. (ft)	50.00	50.00	50 00
E.G. Slope (ft/ft)	0.014913	Flow Area (sq ft)		39.11	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	23.98	Top Width (ft)		23.98	
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)		8 21	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)		1.63	
Crit W.S. (ft)	461.24	Wetted Per. (ft)		24.75	
Conv. Total (cfs)	2628.6	Conv. (cfs)		2628.6	

C-10

Plan: Imported Pla Reach: 1 Riv Sta: 1700 Profile: 1 11/25/96

W.S. Elev (ft)	459 53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0.030	
E.G. Elev (ft)	461.00	Reach Len. (ft)	50.00	50 00	50 00
E.G. Slope (ft/ft)	0 027615	Flow Area (sq ft)		33 04	
Q Total (cfs)	321.00	Flow (cfs)		321 00	
Top Width (ft)	25.29	Top Width (ft)		25.29	
Vel Total (ft/s)	9.72	Avg. Vel. (ft/s)		9.72	
Max Chl Dpth (ft)	2.23	Hydr. Depth (ft)		1.31	
Crit W.S. (ft)	459.99	Wetted Per. (ft)		25.76	
Conv. Total (cfs)	1931.7	Conv. (cfs)		1931.7	

Plan: Imported Pla Reach: 1 Riv Sta: 1650 Profile: 1 11/25/96

W.S. Elev (ft)	458 49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.		0 030	
E.G. Elev (ft)	459.72	Reach Len. (ft)	50 00	50 00	50.00
E.G. Slope (ft/ft)	0.021784	Flow Area (sq ft)		36.00	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	26.24	Top Width (ft)		26 24	
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)		8 92	
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)		1 37	
Crit W.S. (ft)	458.82	Wetted Per. (ft)		26.73	
Conv. Total (cfs)	2174.9	Conv. (cfs)		2174.9	

Plan: Imported Pla Reach: 1 Riv Sta: 1600 Profile: 1 11/25/96

W.S. Elev (ft)	457.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.		0 030	
E.G. Elev (ft)	458.40	Reach Len. (ft)	50 00	50.00	50.00
E.G. Slope (ft/ft)	0.030534	Flow Area (sq ft)		33.77	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	28.95	Top Width (ft)		28 95	
Vel Total (ft/s)	9.50	Avg. Vel. (ft/s)		9 50	
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)		1.17	
Crit W.S. (ft)	457.39	Wetted Per. (ft)		29.35	
Conv. Total (cfs)	1837.0	Conv. (cfs)		1837.0	

Plan: Imported Pla Reach: 1 Riv Sta: 1550 Profile: 1 11/25/96

W.S. Elev (ft)	455 34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0 030	
E.G. Elev (ft)	456 81	Reach Len. (ft)	50 00	50 00	50.00
E.G. Slope (ft/ft)	0.032555	Flow Area (sq ft)		33.03	
Q Total (cfs)	321.00	Flow (cfs)		321 00	
Top Width (ft)	28.71	Top Width (ft)		28.71	
Vel Total (ft/s)	9.72	Avg. Vel. (ft/s)		9.72	
Max Chl Dpth (ft)	1 34	Hydr. Depth (ft)		1.15	
Crit W.S. (ft)	455.78	Wetted Per. (ft)		29 13	
Conv. Total (cfs)	1779.1	Conv. (cfs)		1779.1	

Plan: Imported Pla Reach: 1 Riv Sta: 1500 Profile: 1 11/25/96

W.S. Elev (ft)	454 67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0 86	Wt. n-Val.		0 030	
E.G. Elev (ft)	455.53	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.015999	Flow Area (sq ft)		43 25	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	33.13	Top Width (ft)		33.13	
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)		7.42	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.31	
Crit W.S. (ft)	454.80	Wetted Per. (ft)		33.53	
Conv. Total (cfs)	2537.8	Conv. (cfs)		2537.8	

Plan: Imported Pla Reach: 1 Riv Sta: 1450 Profile: 1 11/25/96

W.S. Elev (ft)	452 84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.030	
E.G. Elev (ft)	454.30	Reach Len. (ft)	50.00	50.00	50 00
E.G. Slope (ft/ft)	0.036675	Flow Area (sq ft)		33.11	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	31.73	Top Width (ft)		31.73	
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)		9.69	
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		1.04	
Crit W.S. (ft)	453.27	Wetted Per. (ft)		32.04	
Conv. Total (cfs)	1676.2	Conv. (cfs)		1676.2	

* * * * *

Plan: Imported Pla Reach: 1 Riv Sta: 1500 Profile: 1 11/25/96

W.S. Elev (ft)	454 67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0 86	Wt. n-Val.		0.030	
E.G. Elev (ft)	455 53	Reach Len. (ft)	50.00	50.00	50 00
E.G. Slope (ft/ft)	0.015999	Flow Area (sq ft)		43 25	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	33.13	Top Width (ft)		33.13	
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)		7.42	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.31	
Crit W.S. (ft)	454.80	Wetted Per. (ft)		33.53	
Conv. Total (cfs)	2537.8	Conv. (cfs)		2537.8	

Plan: Imported Pla Reach: 1 Riv Sta: 1450 Profile: 1 11/25/96

W.S. Elev (ft)	452 84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.030	
E.G. Elev (ft)	454.30	Reach Len. (ft)	50.00	50.00	50 00
E.G. Slope (ft/ft)	0.036675	Flow Area (sq ft)		33.11	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	31.73	Top Width (ft)		31.73	
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)		9.69	
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		1.04	
Crit W.S. (ft)	453.27	Wetted Per. (ft)		32.04	
Conv. Total (cfs)	1676.2	Conv. (cfs)		1676.2	

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Plan: Imported Pla Reach: 1 Riv Sta: 1400 Profile: 1 11/25/96

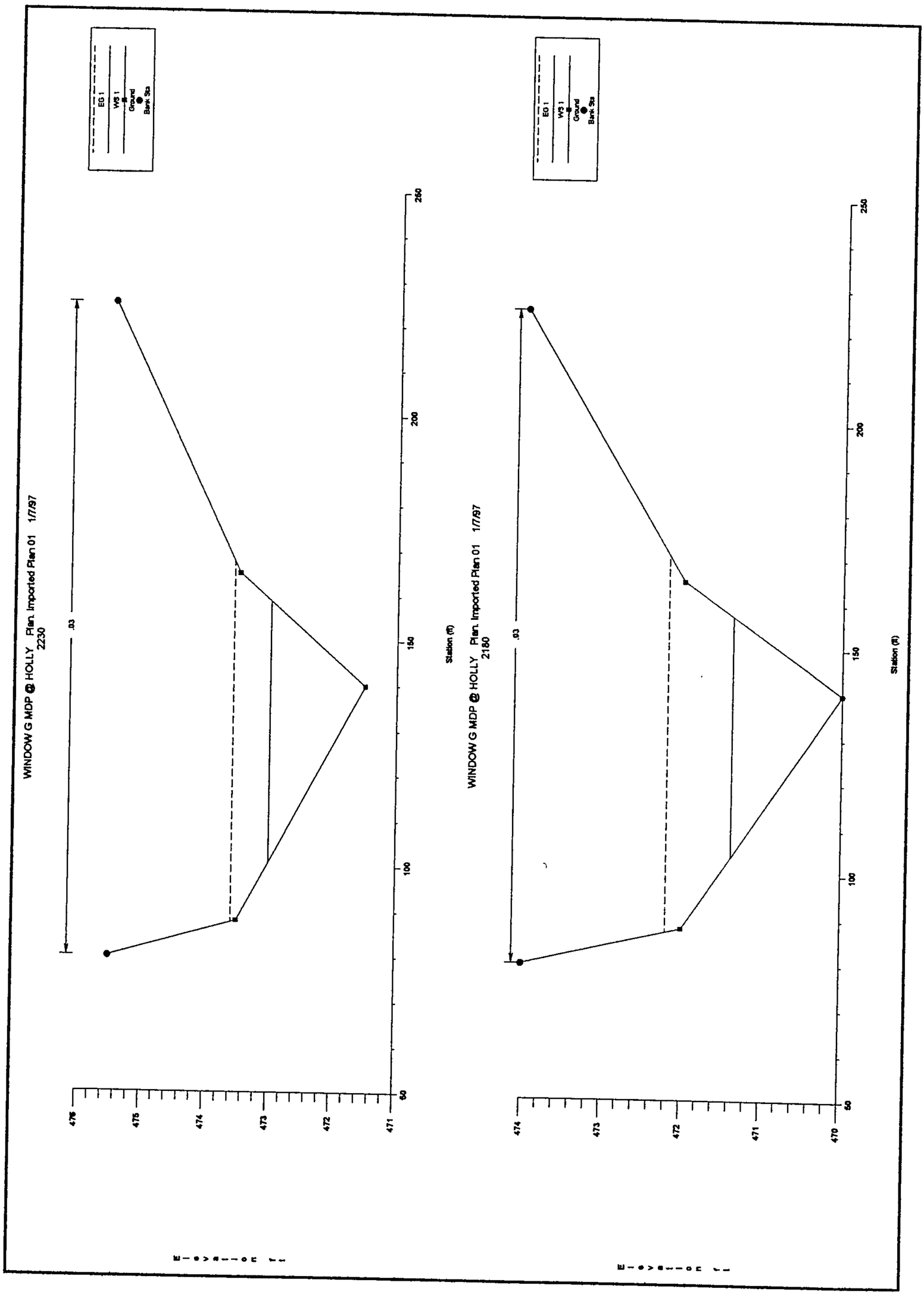
W.S. Elev (ft)	451.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.030	
E.G. Elev (ft)	452 62	Reach Len. (ft)	50 00	50.00	50 00
E.G. Slope (ft/ft)	0 026849	Flow Area (sq ft)		37.79	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	35 02	Top Width (ft)		35 02	
Vel Total (ft/s)	8.49	Avg. Vel. (ft/s)		8 49	
Max Chl Dpth (ft)	1 30	Hydr. Depth (ft)		1 08	
Crit W.S. (ft)	451.82	Wetted Per. (ft)		35 29	
Conv. Total (cfs)	1959.0	Conv. (cfs)		1959.0	

Plan: Imported Pla Reach: 1 Riv Sta: 1350 Profile: 1 11/25/96

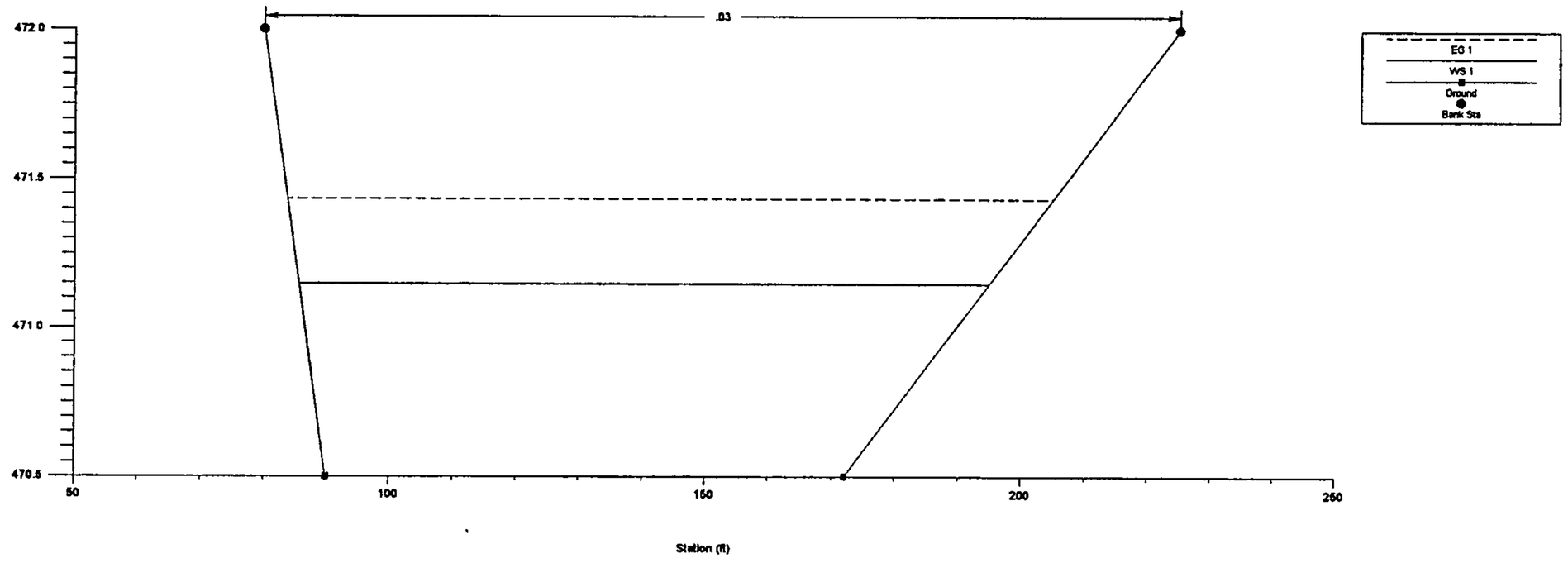
W.S. Elev (ft)	450 04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0 030	
E.G. Elev (ft)	451.17	Reach Len. (ft)	50 00	50 00	50 00
E.G. Slope (ft/ft)	0 030531	Flow Area (sq ft)		37.74	
Q Total (cfs)	321 00	Flow (cfs)		321.00	
Top Width (ft)	38 49	Top Width (ft)		38.49	
Vel Total (ft/s)	8.50	Avg. Vel. (ft/s)		8 50	
Max Chl Dpth (ft)	1.14	Hydr. Depth (ft)		0.98	
Crit W.S. (ft)	450.38	Wetted Per. (ft)		38.75	
Conv. Total (cfs)	1837.1	Conv. (cfs)		1837.1	

Plan: Imported Pla Reach: 1 Riv Sta: 1300 Profile: 1 11/25/96

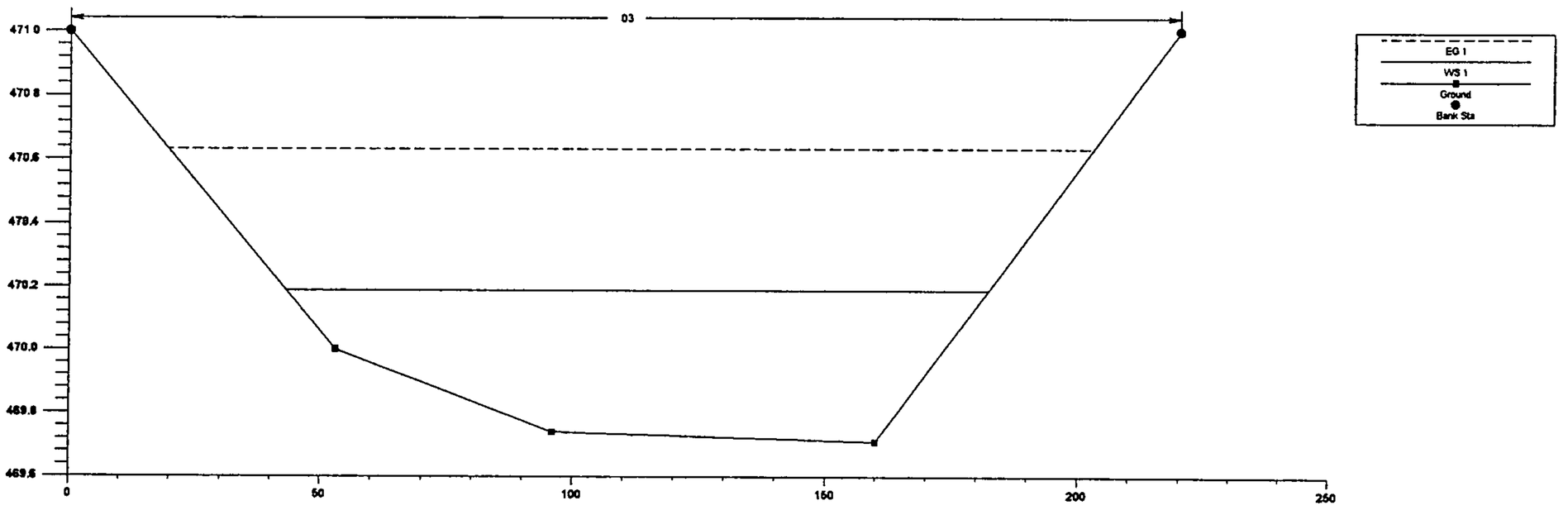
W.S. Elev (ft)	448.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0 030	
E.G. Elev (ft)	449.66	Reach Len. (ft)			
E.G. Slope (ft/ft)	0.027394	Flow Area (sq ft)		42.58	
Q Total (cfs)	321.00	Flow (cfs)		321.00	
Top Width (ft)	48.16	Top Width (ft)		48.16	
Vel Total (ft/s)	7.54	Avg. Vel. (ft/s)		7.54	
Max Chl Dpth (ft)	1.17	Hydr. Depth (ft)		0.88	
Crit W.S. (ft)	449.03	Wetted Per. (ft)		48.28	
Conv. Total (cfs)	1939.5	Conv. (cfs)		1939.5	


EG 1
WS 1
Ground
Bank Sta
WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
2230
.03
250
200
150
100
50
476
475
474
473
472
471
Station (ft)
EG 1
WS 1
Ground
Bank Sta
WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
2180
.03
250
200
150
100
50
474
473
472
471
470
Station (ft)

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
2115

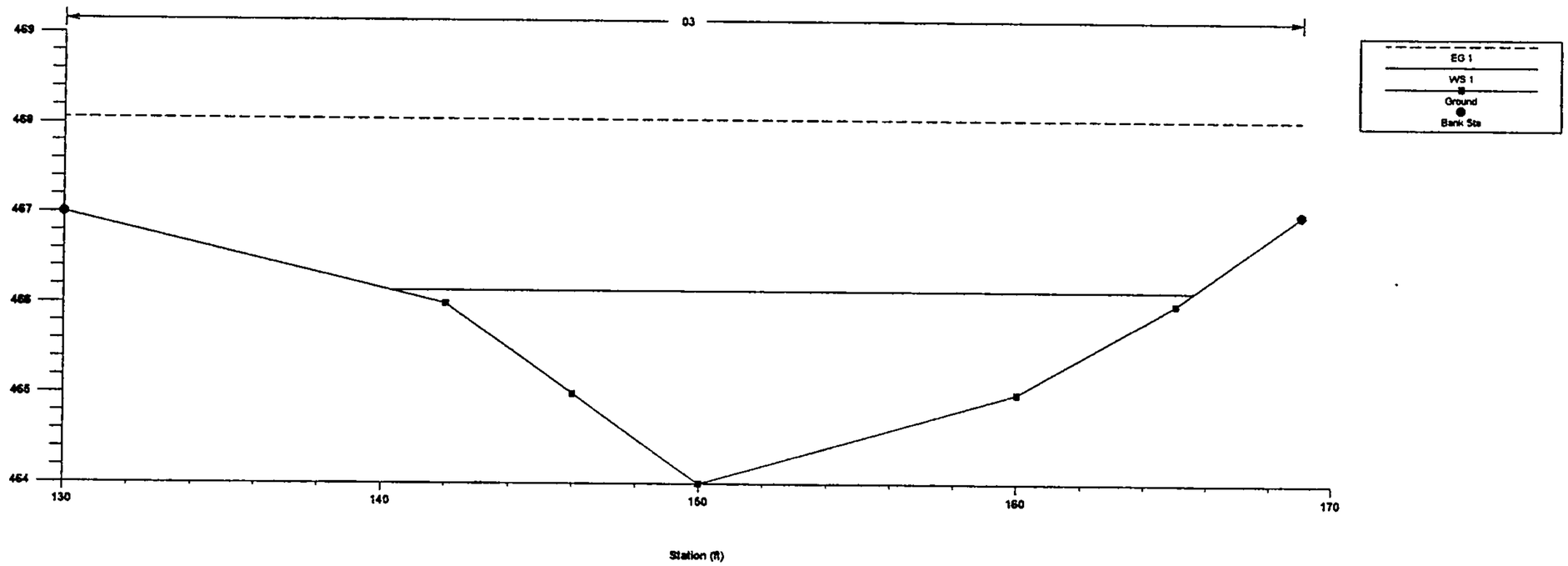


WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
2055 (ROAD)

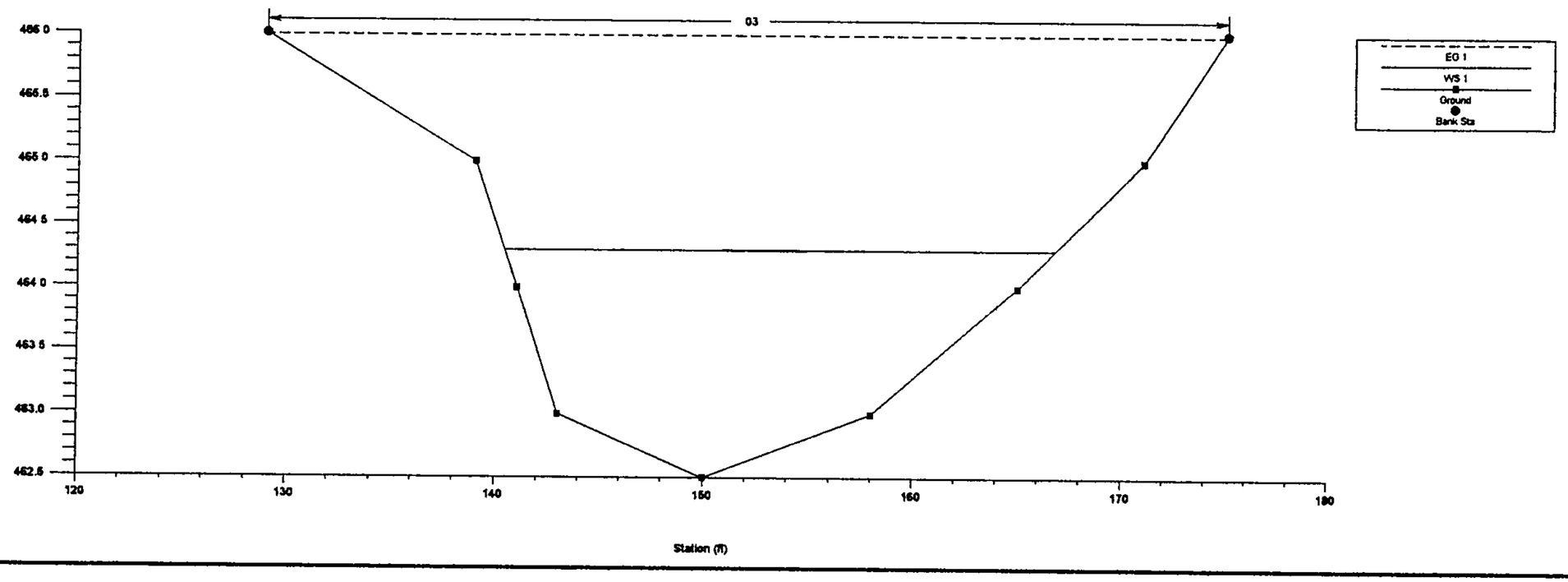


C-17

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
2000



WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
1950



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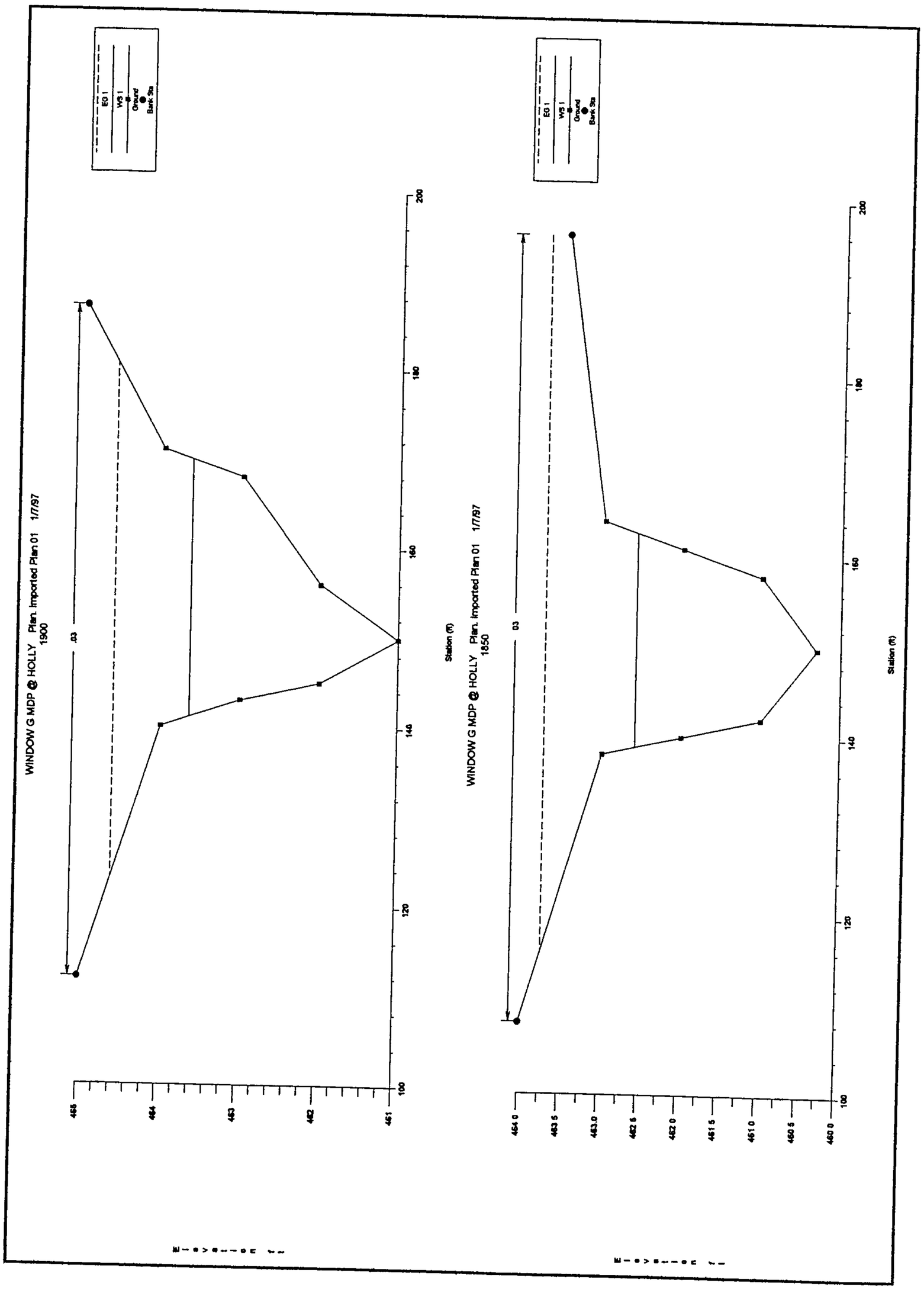
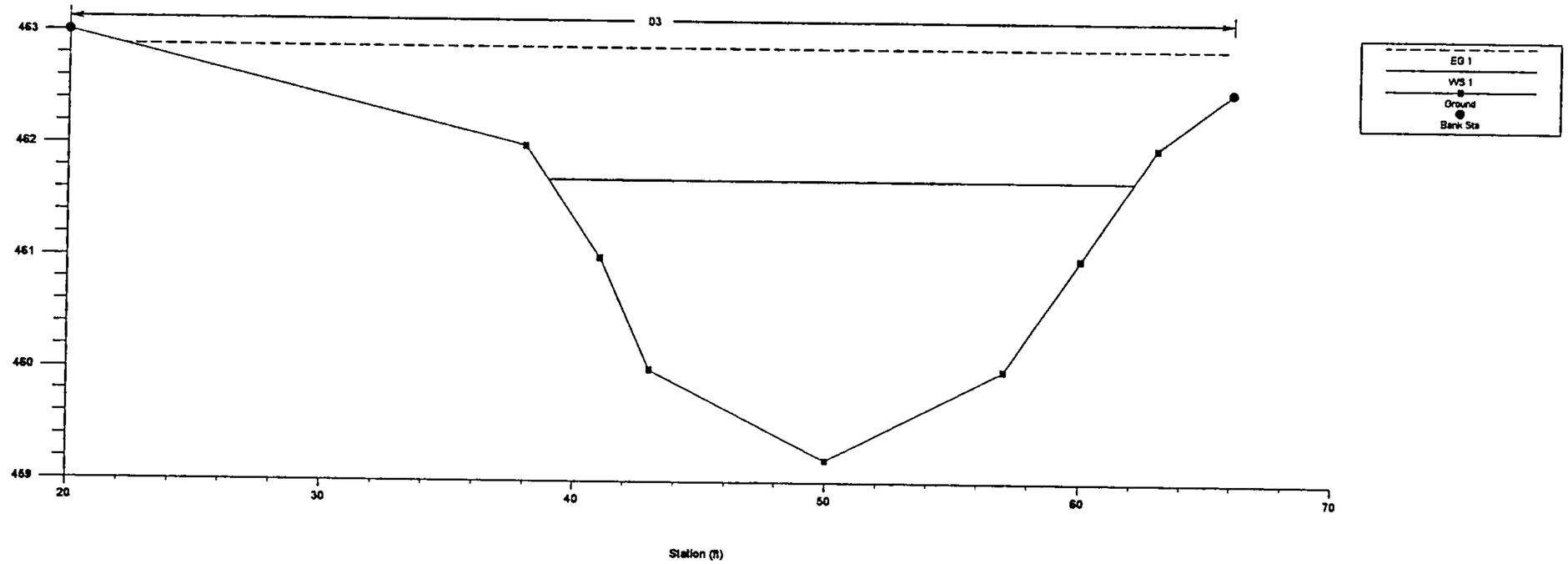
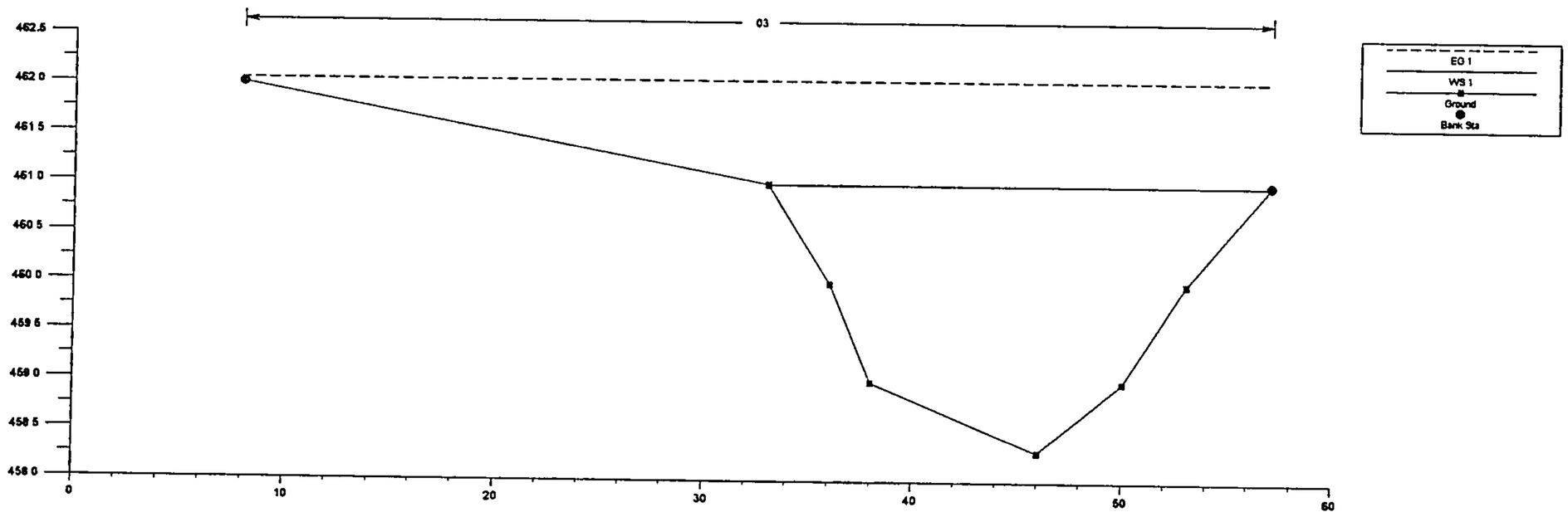

EG 1
WS 1
Ground
Bank Sta
WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
1900
03
Station (ft)
200
180
160
140
120
100
465
464
463
462
461
WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
1850
03
Station (ft)
200
180
160
140
120
100
464.0
463.5
463.0
462.5
462.0
461.5
461.0
460.5
460.0

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1800



WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1750



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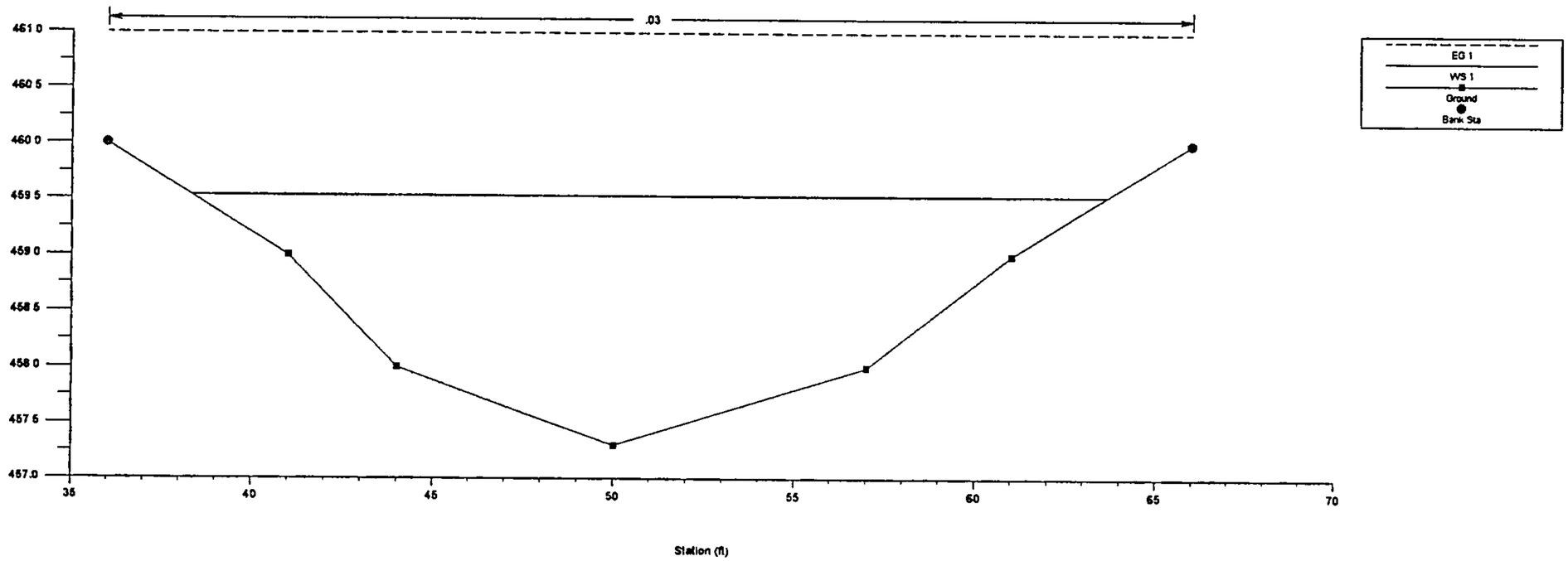
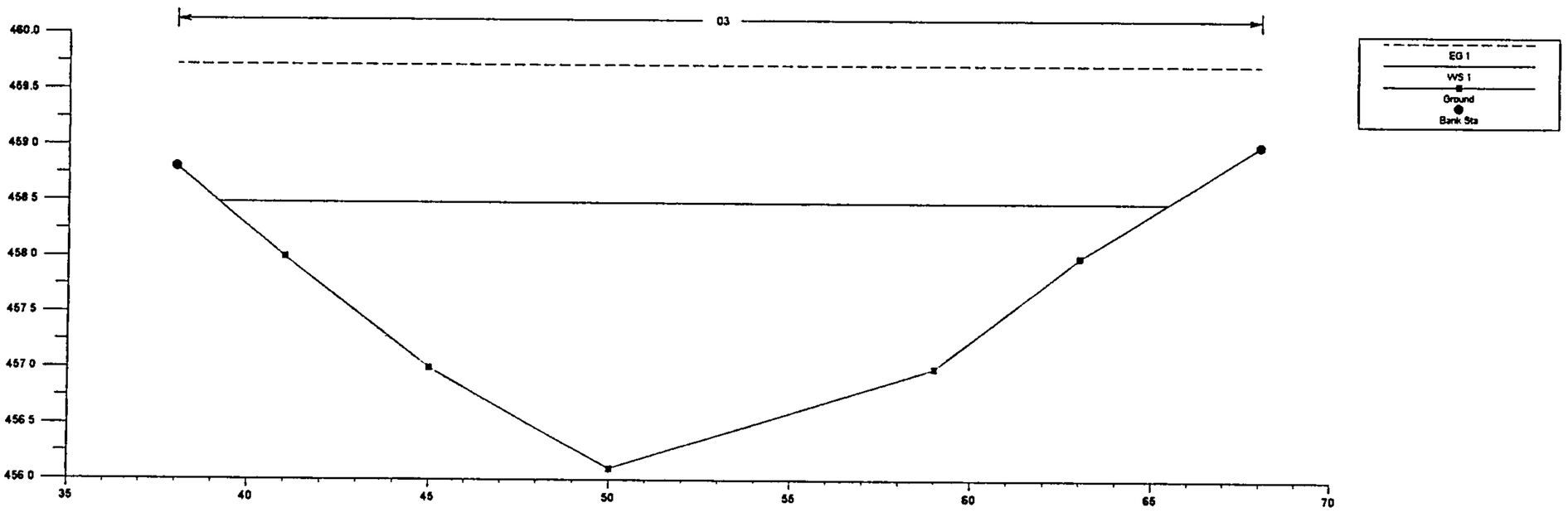
1700

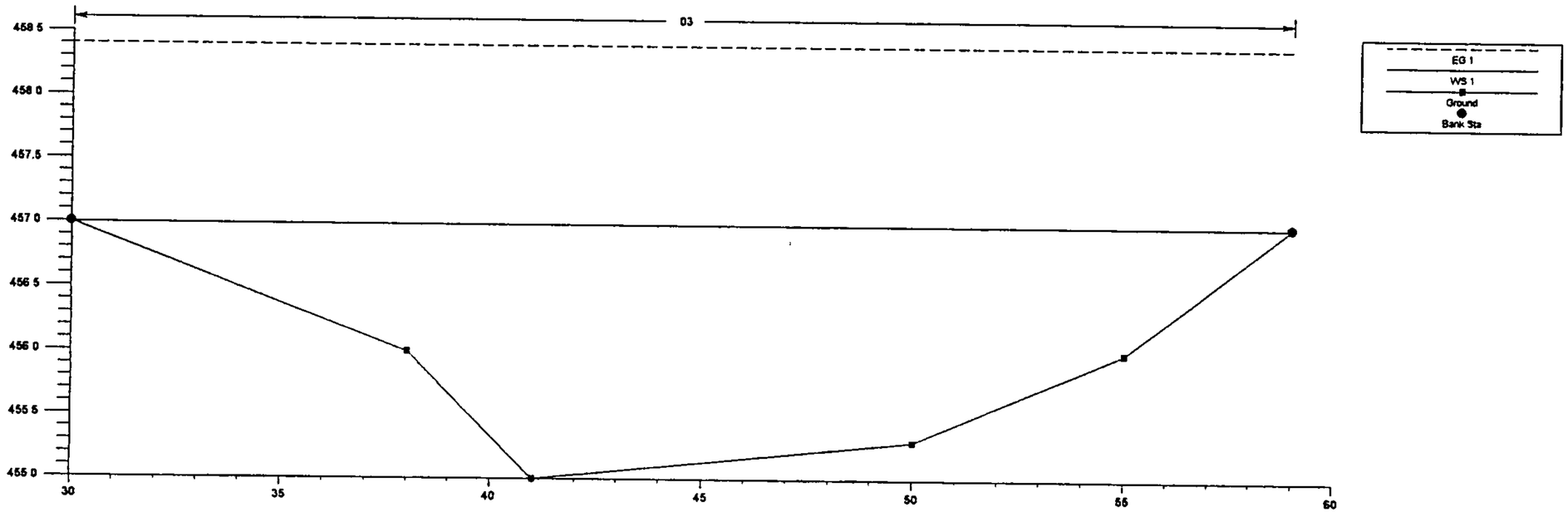


WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1650

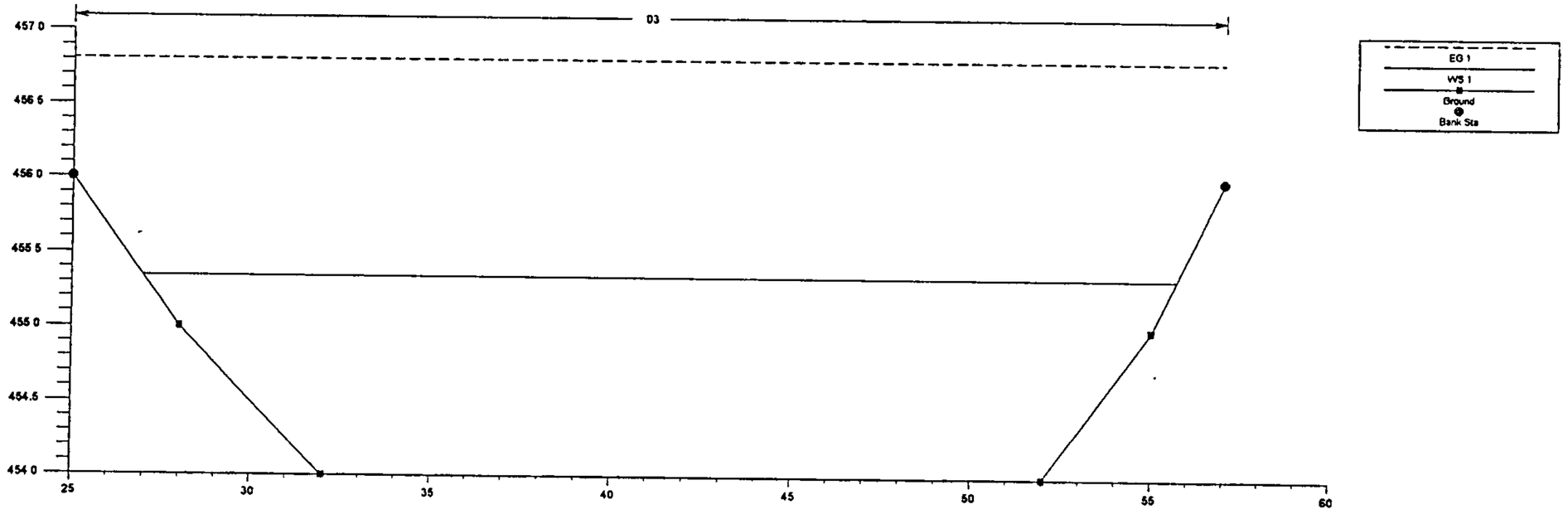


C-21

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1600

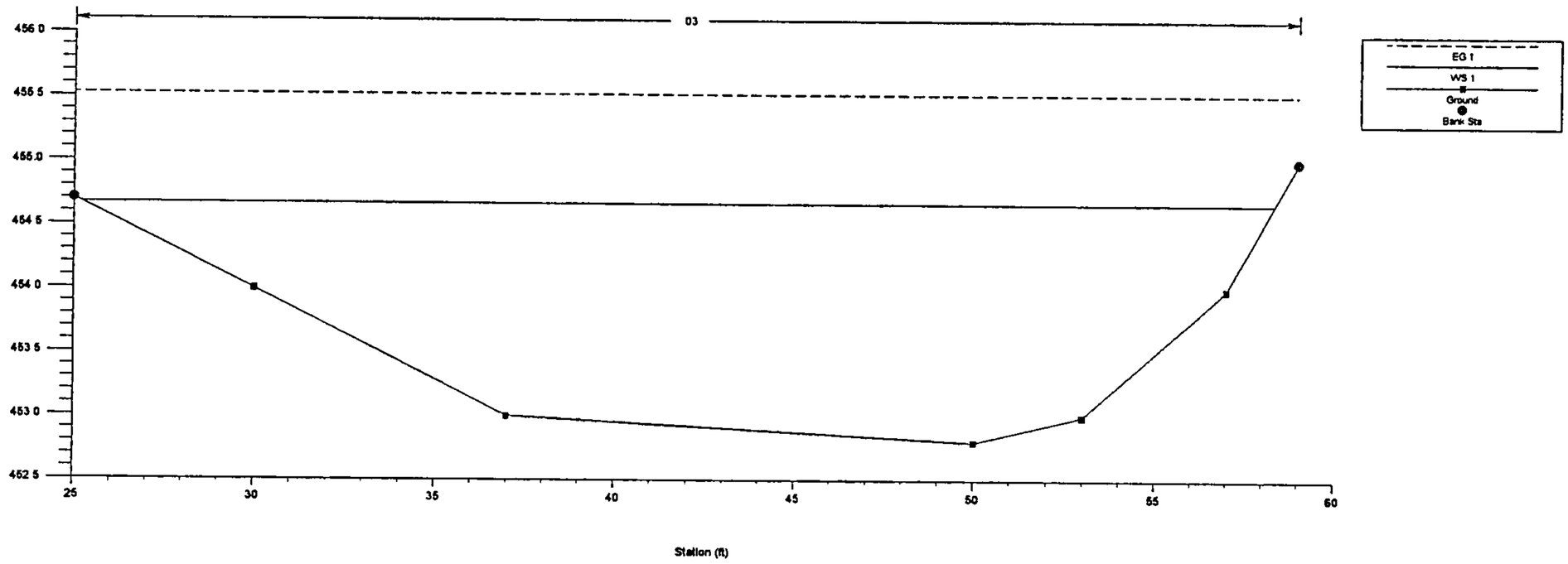


WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1550



C-82

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1500



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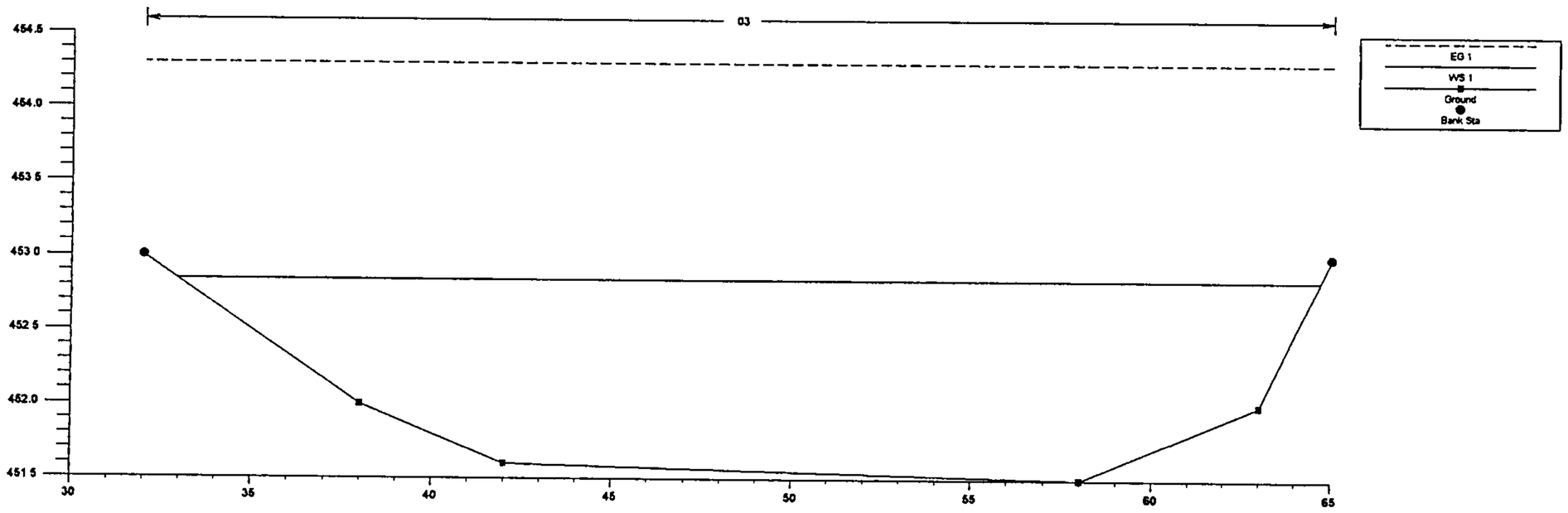
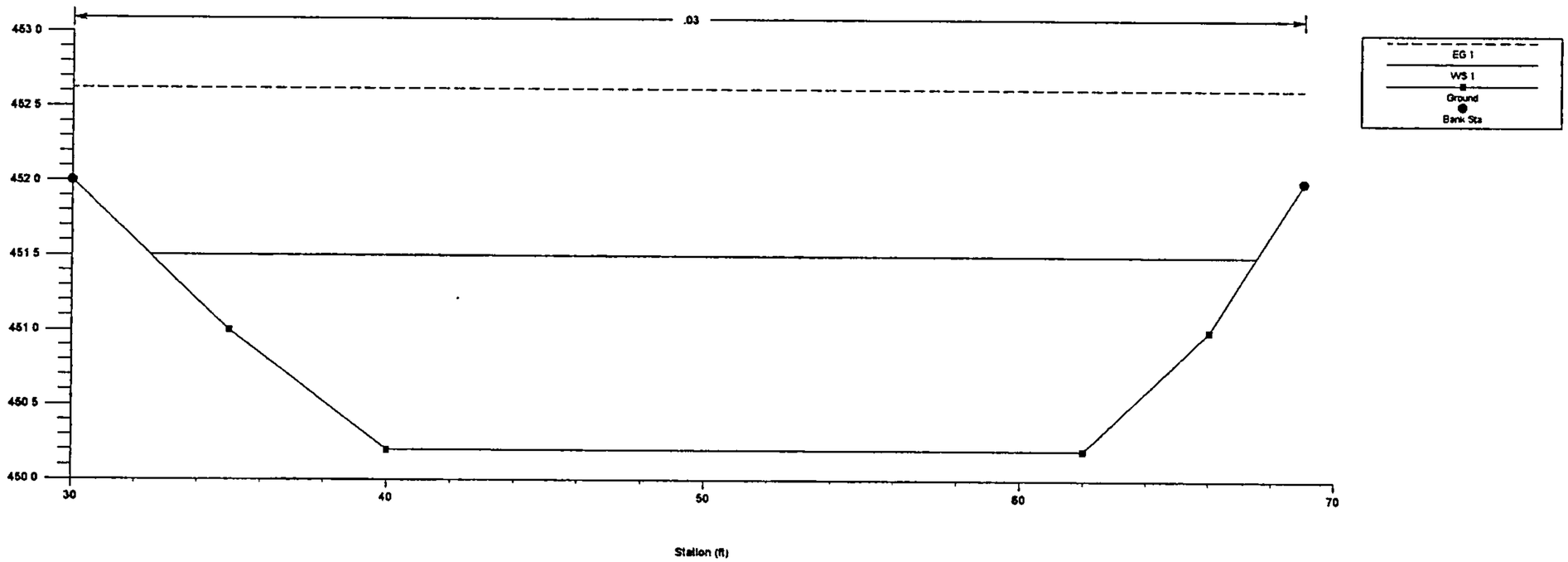
1450

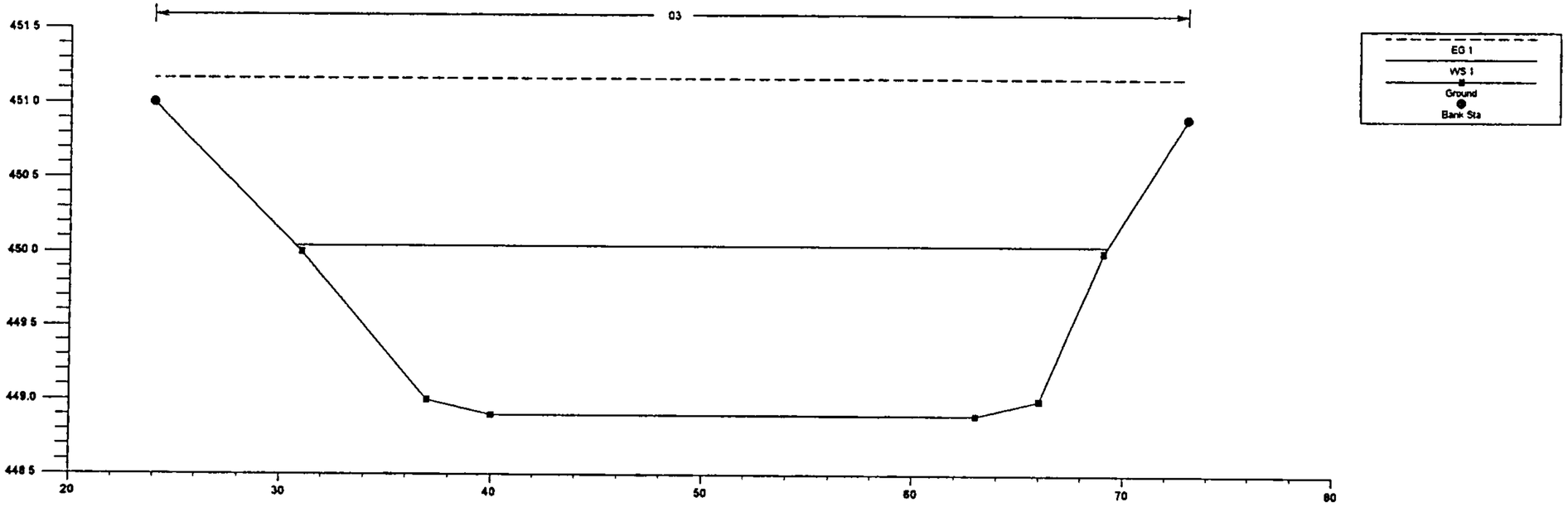


EC-3

WINDOW G MDP @ HOLLY Plan Imported Plan 01 11/25/96
1400



WINDOW G MDP @ HOLLY Plan Imported Plan 01 11/25/96
1350



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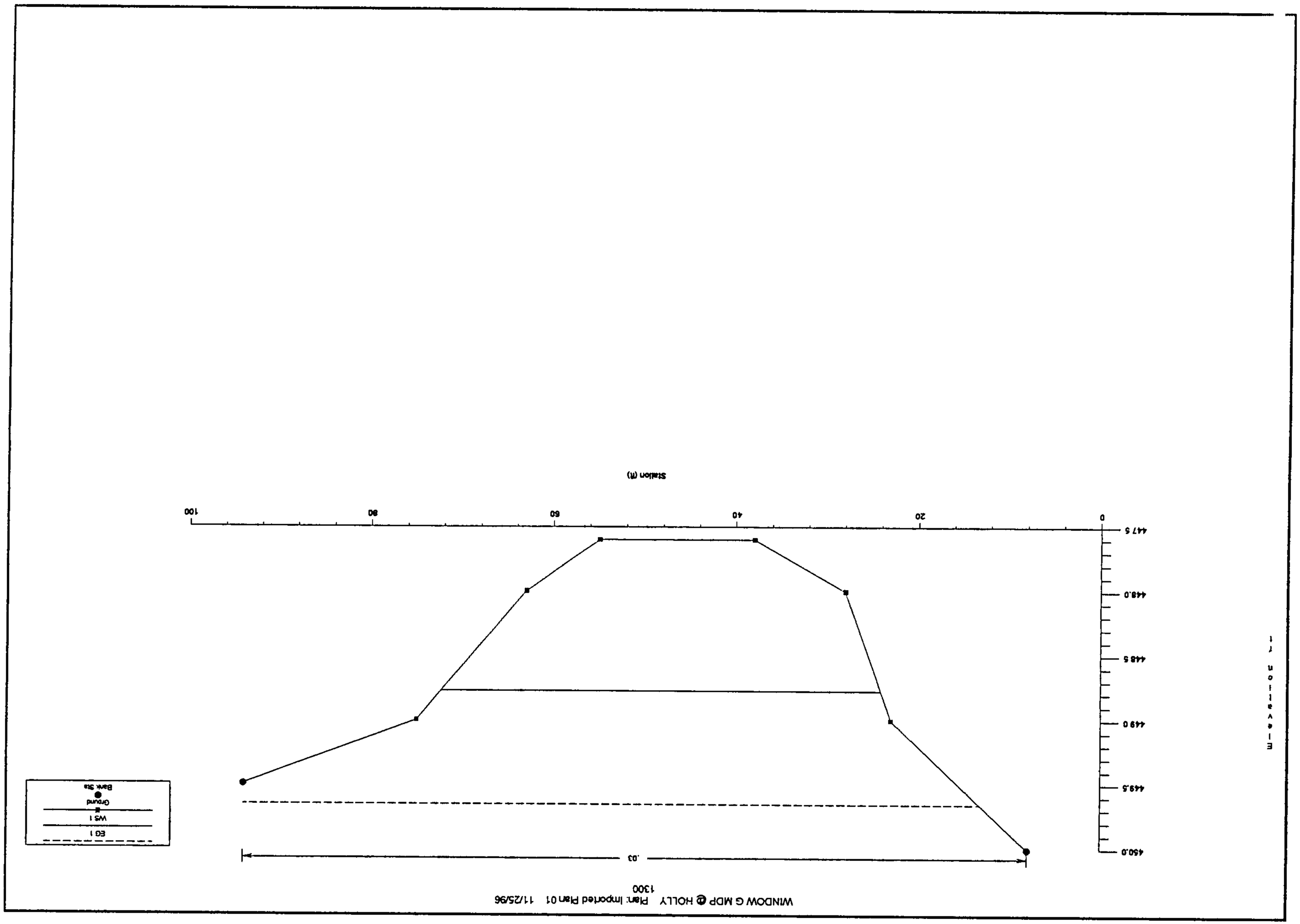
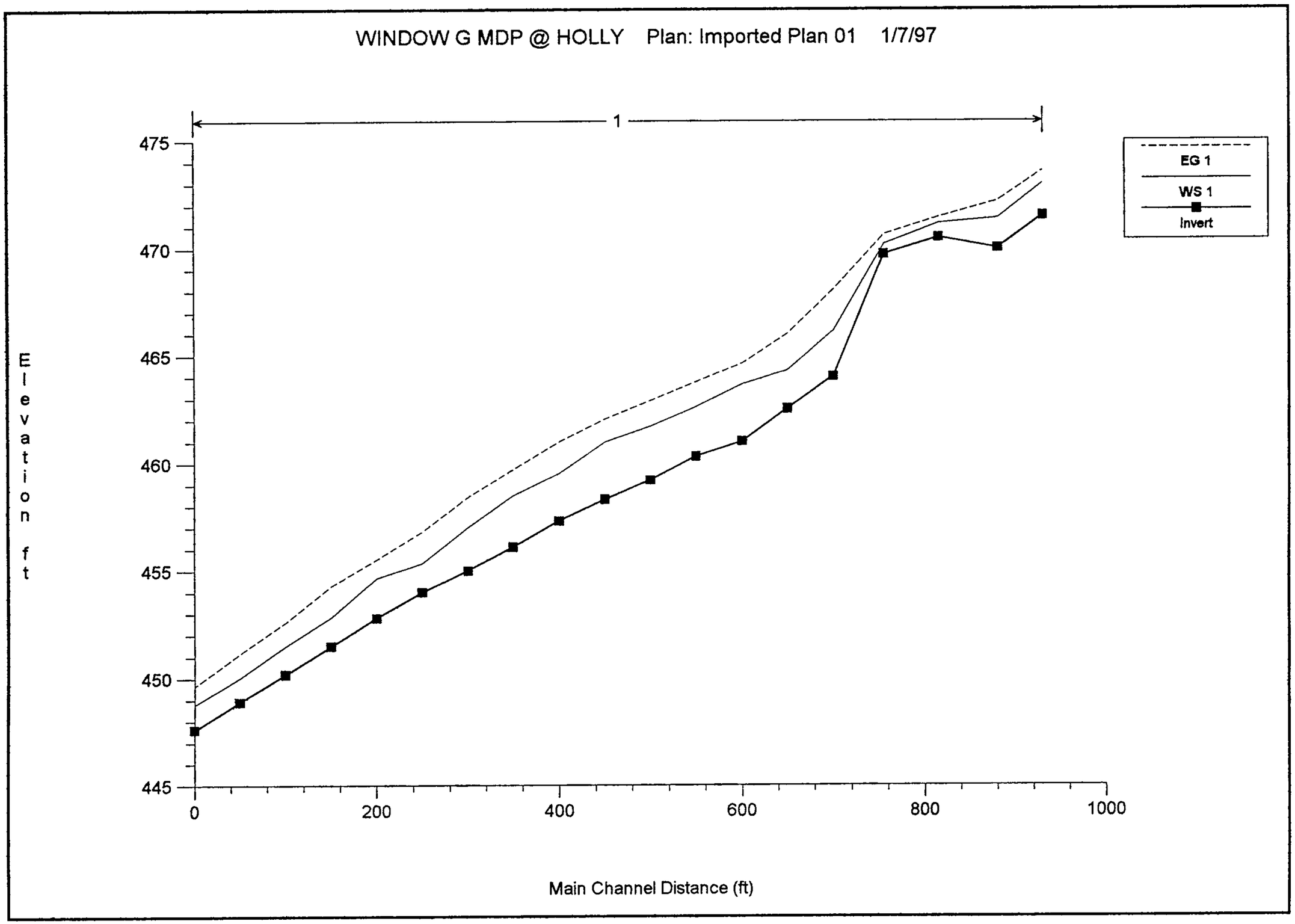

WINDOW G MDP @ HOLLY Plan: Imported Plan 01 11/25/96
1300
Station (m)
0
20
40
60
80
100
447.5
448.0
448.5
449.0
449.5
450.0
Elevation (m)
EG 1
WS 1
Ground
Bank Sta

C-25


WINDOW G MDP @ HOLLY Plan: Imported Plan 01 1/7/97
1
475
470
465
460
455
450
445
0
200
400
600
800
1000
Elevation ft
Main Channel Distance (ft)
EG 1
WS 1
Invert

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APPENDIX D

AHYMO INPUT AND OUTPUT

TITLE	PAGE NO.
Proposed Conditions Input & Output	D-1
Proposed Conditions Summary Table	D-10
Time of Concentration Calculations	D-11
Ultimate Conditions Input and Output	D-12
Ultimate Conditions Summary Table	D-22

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*2345678901234567890
*
*    Window "G" Proposed Conditions                    JMA # 940956
*                                                      December, 1996
*                                                      G.M. 486-5
*
*
*
*    100 - YEAR STORM
*
START                    TIME = 0.0   PUNCH CODE = 0   PRINT LINES = -1
RAINFALL                 TYPE = 2   RAIN QUARTER = 0.0
                         RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                         RAIN DAY = 3.10 IN DT = 0.02
*
* Offsite Baisn (East of Barstow)
COMPUTE NM HYD           ID = 1   HYD NO = 101.01   AREA = 0.913
                         PER A = 43   PER B = 20 PER C = 20   PER D = 17
                         TP = -0.314 HR   MASS RAIN =-1

PRINT HYD                ID = 1   CODE = 1

* Tract A (Pinnacle Estates Apartments)
COMPUTE NM HYD           ID = 2   HYD NO = 101.02   AREA = 0.0234375
                         PER A = 0   PER B = 10 PER C = 20   PER D = 70
                         TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD                ID = 2   CODE = 1

* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD           ID = 3   HYD NO = 101.03   AREA = 0.006525
                         PER A = 0   PER B = 20 PER C = 20   PER D = 60
                         TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD                ID = 3   CODE = 1

* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD           ID = 4   HYD NO = 101.04   AREA = 0.010454 SQ MI
                         PER A = 0   PER B = 20   PER C = 20   PER D = 60
                         TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD                ID = 4   CODE = 1

*   Add East and West La Cueva Village Basins

ADD HYD                  ID = 5   HYD NO = 101.05   ID I = 3   ID II = 4

PRINT HYD                ID = 5   CODE = 1

* Tract C (Shopping Center)

COMPUTE NM HYD           ID = 6 HYD NO = 101.06   AREA = 0.0165 SQ MI
                         PER A = 0   PER B =3.3   PER C = 6.7   PER D = 90
                         TP = -0.133333333 HR MASS RAIN = -1

PRINT HYD                ID = 6   CODE = 1

* Tract B (La Cueva Village Unit 2, Lots 1-16)
* UNDEVELOPED INTERIM CONDITION *
```

[redacted]

```
COMPUTE NM HYD      ID = 7 HYD NO = 101.07  AREA = 0.0055 SQ MI
                    PER A = 80  PER B = 10  PER C = 10 PER D = 0
                    TP = -0.1333333333 HR  MASS RAIN = -1

PRINT HYD           ID = 7 CODE = 1

*  Add to get total flow from La Cueva Village

ADD HYD             ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD           ID = 8 CODE = 1

* Carmel / Holly Right of Way

COMPUTE NM HYD      ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                    PER A = 0  PER B = 0  PER C = 11  PER D = 89
                    TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD           ID = 9 CODE = 1

* Wyoming Right of Way

COMPUTE NM HYD      ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                    PER A = 0   PER B = 0  PER C = 46  PER D = 54
                    TP = -0.13333333333 HR  MASS RAIN = -1

PRINT HYD           ID = 10  CODE = 1

FINISH
```

```
     AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
          RUN DATE (MON/DAY/YR) = 12/06/1996
          START TIME (HR:MIN:SEC) = 10:33:55     USER NO.= J_MORTEN.I01
          INPUT FILE = 940956.inp

*23456789012345678901
*
*   Window "G" Proposed Conditions                    JMA # 940956
*                                                     December, 1996
*                                                     G.M. 486-5
*
*
*   100 - YEAR STORM
*
START
RAINFALL          TIME = 0.0  PUNCH CODE = 0  PRINT LINES = -1
                  TYPE = 2  RAIN QUARTER = 0.0
                  RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                  RAIN DAY = 3.10 IN DT = 0.02

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
DT =     .020000 HOURS          END TIME =    11.980000 HOURS
   .0000   .0016   .0033   .0050   .0067   .0084   .0101
   .0119   .0137   .0155   .0173   .0192   .0211   .0230
   .0249   .0269   .0289   .0309   .0330   .0351   .0372
   .0393   .0415   .0438   .0461   .0484   .0507   .0531
   .0556   .0580   .0606   .0632   .0658   .0685   .0713
   .0741   .0770   .0799   .0829   .0860   .0892   .0924
   .0958   .0992   .1027   .1063   .1101   .1139   .1179
   .1220   .1263   .1298   .1334   .1372   .1411   .1453
   .1508   .1651   .1846   .2100   .2424   .2826   .3316
   .3904   .4600   .5412   .6353   .7432   .8658  1.0044
  1.1599  1.3335  1.4120  1.4697  1.5214  1.5691  1.6135
  1.6554  1.6950  1.7326  1.7685  1.8029  1.8358  1.8675
  1.8979  1.9272  1.9555  1.9827  2.0091  2.0345  2.0591
  2.0830  2.1060  2.1283  2.1499  2.1709  2.1912  2.2108
  2.2299  2.2484  2.2663  2.2708  2.2751  2.2794  2.2835
  2.2875  2.2914  2.2952  2.2989  2.3025  2.3061  2.3095
  2.3129  2.3162  2.3194  2.3226  2.3257  2.3288  2.3318
  2.3348  2.3377  2.3405  2.3433  2.3461  2.3488  2.3515
  2.3541  2.3567  2.3593  2.3618  2.3643  2.3667  2.3692
  2.3716  2.3739  2.3763  2.3786  2.3809  2.3831  2.3853
  2.3875  2.3897  2.3919  2.3940  2.3961  2.3982  2.4002
  2.4023  2.4043  2.4063  2.4083  2.4103  2.4122  2.4141
  2.4160  2.4179  2.4198  2.4217  2.4235  2.4253  2.4271
  2.4289  2.4307  2.4325  2.4342  2.4360  2.4377  2.4394
  2.4411  2.4428  2.4445  2.4461  2.4478  2.4494  2.4510
  2.4526  2.4542  2.4558  2.4574  2.4590  2.4605  2.4621
  2.4636  2.4651  2.4667  2.4682  2.4697  2.4711  2.4726
  2.4741  2.4755  2.4770  2.4784  2.4799  2.4813  2.4827
  2.4841  2.4855  2.4869  2.4883  2.4897  2.4910  2.4924
  2.4938  2.4951  2.4964  2.4978  2.4991  2.5004  2.5017
  2.5030  2.5043  2.5056  2.5069  2.5082  2.5094  2.5107
  2.5120  2.5132  2.5145  2.5157  2.5169  2.5182  2.5194
  2.5206  2.5218  2.5230  2.5242  2.5254  2.5266  2.5278
  2.5290  2.5301  2.5313  2.5325  2.5336  2.5348  2.5359
  2.5371  2.5382  2.5393  2.5405  2.5416  2.5427  2.5438
  2.5449  2.5460  2.5471  2.5482  2.5493  2.5504  2.5515
  2.5526  2.5536  2.5547  2.5558  2.5568  2.5579  2.5589
```

2.5600	2.5610	2.5621	2.5631	2.5641	2.5652	2.5662
2.5672	2.5682	2.5693	2.5703	2.5713	2.5723	2.5733
2.5743	2.5753	2.5763	2.5773	2.5782	2.5792	2.5802
2.5812	2.5821	2.5831	2.5841	2.5850	2.5860	2.5870
2.5879	2.5889	2.5898	2.5907	2.5917	2.5926	2.5935
2.5945	2.5954	2.5963	2.5973	2.5982	2.5991	2.6000
2.6009	2.6017	2.6026	2.6034	2.6043	2.6051	2.6060
2.6068	2.6077	2.6085	2.6094	2.6102	2.6110	2.6119
2.6127	2.6136	2.6144	2.6152	2.6161	2.6169	2.6177
2.6186	2.6194	2.6202	2.6211	2.6219	2.6227	2.6235
2.6244	2.6252	2.6260	2.6268	2.6276	2.6285	2.6293
2.6301	2.6309	2.6317	2.6325	2.6333	2.6342	2.6350
2.6358	2.6366	2.6374	2.6382	2.6390	2.6398	2.6406
2.6414	2.6422	2.6430	2.6438	2.6446	2.6454	2.6462
2.6470	2.6478	2.6486	2.6493	2.6501	2.6509	2.6517
2.6525	2.6533	2.6541	2.6548	2.6556	2.6564	2.6572
2.6580	2.6587	2.6595	2.6603	2.6611	2.6618	2.6626
2.6634	2.6642	2.6649	2.6657	2.6665	2.6672	2.6680
2.6688	2.6695	2.6703	2.6710	2.6718	2.6726	2.6733
2.6741	2.6748	2.6756	2.6763	2.6771	2.6778	2.6786
2.6794	2.6801	2.6809	2.6816	2.6823	2.6831	2.6838
2.6846	2.6853	2.6861	2.6868	2.6876	2.6883	2.6890
2.6898	2.6905	2.6912	2.6920	2.6927	2.6934	2.6942
2.6949	2.6956	2.6964	2.6971	2.6978	2.6986	2.6993
2.7000	2.7007	2.7015	2.7022	2.7029	2.7036	2.7043
2.7051	2.7058	2.7065	2.7072	2.7079	2.7087	2.7094
2.7101	2.7108	2.7115	2.7122	2.7129	2.7136	2.7143
2.7151	2.7158	2.7165	2.7172	2.7179	2.7186	2.7193
2.7200	2.7207	2.7214	2.7221	2.7228	2.7235	2.7242
2.7249	2.7256	2.7263	2.7270	2.7277	2.7283	2.7290
2.7297	2.7304	2.7311	2.7318	2.7325	2.7332	2.7339
2.7345	2.7352	2.7359	2.7366	2.7373	2.7380	2.7386
2.7393	2.7400	2.7407	2.7414	2.7420	2.7427	2.7434
2.7441	2.7447	2.7454	2.7461	2.7468	2.7474	2.7481
2.7488	2.7494	2.7501	2.7508	2.7514	2.7521	2.7528
2.7534	2.7541	2.7548	2.7554	2.7561	2.7567	2.7574
2.7581	2.7587	2.7594	2.7600	2.7607	2.7614	2.7620
2.7627	2.7633	2.7640	2.7646	2.7653	2.7659	2.7666
2.7672	2.7679	2.7685	2.7692	2.7698	2.7705	2.7711
2.7718	2.7724	2.7730	2.7737	2.7743	2.7750	2.7756
2.7762	2.7769	2.7775	2.7782	2.7788	2.7794	2.7801
2.7807	2.7813	2.7820	2.7826	2.7832	2.7839	2.7845
2.7851	2.7858	2.7864	2.7870	2.7877	2.7883	2.7889
2.7895	2.7902	2.7908	2.7914	2.7920	2.7927	2.7933
2.7939	2.7945	2.7952	2.7958	2.7964	2.7970	2.7976
2.7983	2.7989	2.7995	2.8001	2.8007	2.8013	2.8019
2.8026	2.8032	2.8038	2.8044	2.8050	2.8056	2.8062
2.8068	2.8074	2.8081	2.8087	2.8093	2.8099	2.8105
2.8111	2.8117	2.8123	2.8129	2.8135		

```
*
* Offsite Baisn (Bast of Barstow)
COMPUTE NM HYD       ID = 1  HYD NO = 101.01  AREA = 0.913
                     PER A = 43  PER B = 20 PER C = 20  PER D = 17
                     TP = -0.314 HR  MASS RAIN =-1


   K =   .175853HR    TP =   .314000HR    K/TP RATIO =   .560040     SHAPE CONSTANT, N =  6.863757
   UNIT PEAK =   254.45    CFS   UNIT VOLUME =    1.000       B =   514.76      P60 = 2.1400
   AREA =      .155210 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
```

```
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


     K =   .276041HR    TP =   .314000HR    K/TP RATIO =   .879112     SHAPE CONSTANT, N =  4.037907
     UNIT PEAK =   863.23    CFS   UNIT VOLUME =    1.000       B =   357.69      P60 = 2.1400
     AREA =      .757790 SQ MI    IA =    .54157 INCHES    INF =   1.36639 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 1  CODE = 1

                                   PARTIAL HYDROGRAPH   101.01

     RUNOFF VOLUME =     1.13158 INCHES     =      55.1002 ACRE-FEET
     PEAK DISCHARGE RATE =     986.10 CFS  AT   1.700 HOURS   BASIN AREA =   .9130 SQ. MI.



* Tract A (Pinnacle Estates Apartments)
COMPUTE NM HYD     ID = 2  HYD NO = 101.02  AREA = 0.0234375
                   PER A = 0  PER B = 10 PER C = 20  PER D = 70
                   TP = -0.133333333 HR  MASS RAIN =-1


     K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   64.757    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
     AREA =      .016406 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


     K =   .117190HR    TP =   .133333HR    K/TP RATIO =   .878921     SHAPE CONSTANT, N =  4.038848
     UNIT PEAK =   18.866    CFS   UNIT VOLUME =    .9993       B =   357.75      P60 = 2.1400
     AREA =      .007031 SQ MI    IA =    .40000 INCHES    INF =    .97000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 2  CODE = 1

                                   PARTIAL HYDROGRAPH   101.02


     RUNOFF VOLUME =     2.14048 INCHES     =       2.6756 ACRE-FEET
     PEAK DISCHARGE RATE =      66.95 CFS  AT   1.500 HOURS   BASIN AREA =   .0234 SQ. MI.



* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD     ID = 3  HYD NO = 101.03  AREA = 0.006525
                   PER A = 0  PER B = 20 PER C = 20  PER D = 60
                   TP = -0.133333333 HR  MASS RAIN =-1


     K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   15.453    CFS   UNIT VOLUME =    .9993       B =   526.28      P60 = 2.1400
     AREA =      .003915 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000
```

```
K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
UNIT PEAK =   6.8110    CFS   UNIT VOLUME =    .9980       B =   347.95      P60 = 2.1400
AREA =      .002610 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 3  CODE = 1

                                PARTIAL HYDROGRAPH   101.03

   RUNOFF VOLUME =     1.97426 INCHES      =         .6870 ACRE-FEET
   PEAK DISCHARGE RATE =      17.65 CFS  AT   1.520 HOURS   BASIN AREA =   .0065 SQ. MI.

* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD     ID = 4  HYD NO = 101.04  AREA = 0.010454 SQ MI
                   PER A = 0  PER B = 20  PER C = 20  PER D = 60
                   TP = -0.1333333333 HR  MASS RAIN = -1


   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   24.758    CFS   UNIT VOLUME =    .9996       B =   526.28      P60 = 2.1400
   AREA =      .006272 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


   K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
   UNIT PEAK =   10.912    CFS   UNIT VOLUME =    .9988       B =   347.95      P60 = 2.1400
   AREA =      .004182 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 4  CODE = 1

                                PARTIAL HYDROGRAPH   101.04

   RUNOFF VOLUME =     1.97426 INCHES      =        1.1007 ACRE-FEET
   PEAK DISCHARGE RATE =      28.26 CFS  AT   1.520 HOURS   BASIN AREA =   .0105 SQ. MI.

* Add East and West La Cueva Village Basins

ADD HYD            ID = 5  HYD NO = 101.05  ID I = 3  ID II = 4

PRINT HYD          ID = 5  CODE = 1

                                PARTIAL HYDROGRAPH   101.05

   RUNOFF VOLUME =     1.97426 INCHES      =        1.7878 ACRE-FEET
   PEAK DISCHARGE RATE =      45.91 CFS  AT   1.520 HOURS   BASIN AREA =   .0170 SQ. MI.
```

[redacted]

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* Tract C (Shopping Center)

COMPUTE NM HYD       ID = 6 HYD NO = 101.06  AREA = 0.0165 SQ MI
                     PER A = 0  PER B =3.3  PER C = 6.7  PER D = 90
                     TP = -0.133333333 HR MASS RAIN = -1


   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000    SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   58.614    CFS   UNIT VOLUME =    .9999      B =   526.28      P60 = 2.1400
   AREA =      .014850 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302    SHAPE CONSTANT, N =  4.041902
   UNIT PEAK =   4.4297    CFS   UNIT VOLUME =    .9969      B =   357.95      P60 = 2.1400
   AREA =      .001650 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD            ID = 6  CODE = 1

                                PARTIAL HYDROGRAPH   101.06

   RUNOFF VOLUME =     2.42250 INCHES     =       2.1318 ACRE-FEET
   PEAK DISCHARGE RATE =      51.11 CFS  AT   1.500 HOURS   BASIN AREA =   .0165 SQ. MI.



* Tract B (La Cueva Village Unit 2, Lots 1-16)
* UNDEVELOPED INTERIM CONDITION *

COMPUTE NM HYD       ID = 7 HYD NO = 101.07  AREA = 0.0055 SQ MI
                     PER A = 80  PER B = 10  PER C = 10 PER D = 0
                     TP = -0.1333333333 HR  MASS RAIN = -1


   K =   .151014HR    TP =   .133333HR    K/TP RATIO =  1.132606    SHAPE CONSTANT, N =  3.125128
   UNIT PEAK =   12.040    CFS   UNIT VOLUME =    .9988      B =   291.87      P60 = 2.1400
   AREA =      .005500 SQ MI    IA =    .60500 INCHES    INF =   1.54400 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD            ID = 7 CODE = 1

                                PARTIAL HYDROGRAPH   101.07

   RUNOFF VOLUME =      .72760 INCHES     =         .2134 ACRE-FEET
   PEAK DISCHARGE RATE =       7.40 CFS  AT   1.520 HOURS   BASIN AREA =   .0055 SQ. MI.


* Add to get total flow from La Cueva Village

ADD HYD              ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD            ID = 8 CODE = 1

                                PARTIAL HYDROGRAPH   101.08
```

RUNOFF VOLUME = 1.66923 INCHES = 2.0012 ACRE-FEET
PEAK DISCHARGE RATE = 53.31 CFS AT 1.520 HOURS BASIN AREA = .0225 SQ. MI.

* Carmel / Holly Right of Way

COMPUTE NM HYD ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
PER A = 0 PER B = 0 PER C = 11 PER D = 89
TP = -0.1333333333 HR MASS RAIN = -1

K = .072667HR TP = .133333HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 21.393 CFS UNIT VOLUME = .9995 B = 526.28 P60 = 2.1400
AREA = .005420 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

K = .108940HR TP = .133333HR K/TP RATIO = .817047 SHAPE CONSTANT, N = 4.373949
UNIT PEAK = 1.9061 CFS UNIT VOLUME = .9930 B = 379.38 P60 = 2.1400
AREA = .000670 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

PRINT HYD ID = 9 CODE = 1

PARTIAL HYDROGRAPH 101.09

RUNOFF VOLUME = 2.42335 INCHES = .7871 ACRE-FEET
PEAK DISCHARGE RATE = 18.93 CFS AT 1.500 HOURS BASIN AREA = .0061 SQ. MI.

* Wyoming Right of Way

COMPUTE NM HYD ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
PER A = 0 PER B = 0 PER C = 46 PER D = 54
TP = -0.13333333333 HR MASS RAIN = -1

K = .072667HR TP = .133334HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 9.4421 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 2.1400
AREA = .002392 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

K = .108940HR TP = .133334HR K/TP RATIO = .817047 SHAPE CONSTANT, N = 4.373949
UNIT PEAK = 5.7982 CFS UNIT VOLUME = .9977 B = 379.38 P60 = 2.1400
AREA = .002038 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .020000

PRINT HYD ID = 10 CODE = 1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = 1.97793 INCHES = .4673 ACRE-FEET
PEAK DISCHARGE RATE = 12.22 CFS AT 1.520 HOURS BASIN AREA = .0044 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 10:34:02

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/06/1996
INPUT FILE = 940956.inp USER NO.= J_MORTEN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .(
RAINFALL TYPE= 2										RAIN24= 3.1(
COMPUTE NM HYD	101.01	-	1	.91300	986.10	55.101	1.13158	1.700	1.688	PER IMP= 17.(
COMPUTE NM HYD	101.02	-	2	.02344	66.95	2.676	2.14048	1.500	4.464	PER IMP= 70.(
COMPUTE NM HYD	101.03	-	3	.00653	17.65	.687	1.97426	1.520	4.226	PER IMP= 60.(
COMPUTE NM HYD	101.04	-	4	.01045	28.26	1.101	1.97426	1.520	4.224	PER IMP= 60.(
ADD HYD	101.05	3& 4	5	.01698	45.91	1.788	1.97426	1.520	4.225	
COMPUTE NM HYD	101.06	-	6	.01650	51.11	2.132	2.42250	1.500	4.840	PER IMP= 90.0
COMPUTE NM HYD	101.07	-	7	.00550	7.40	.213	.72760	1.520	2.103	PER IMP= .0
ADD HYD	101.08	5& 7	8	.02248	53.31	2.001	1.66923	1.520	3.706	
COMPUTE NM HYD	101.09	-	9	.00609	18.93	.787	2.42335	1.500	4.857	PER IMP= 89.0
COMPUTE NM HYD	101.10	-	10	.00443	12.22	.467	1.97793	1.520	4.309	PER IMP= 54.0
FINISH										

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 1TU720
SHEET NO _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

TIME OF CONCENTRATION CALCULATIONS (UPSTREAM OFFSITE BASIN)

L = 8,300 feet (Barstow to Hamilton Dam)

$$t_c = ((12000 - L)/(72{,}000 * K * S^{0.5})) + ((L - 4000) * K_N * (L_{CA}/L)^{0.33}/(552.2 * S^{0.165}))$$

P_{60} = 2.14

K_N = 0.033

S = 0.03

l. = 8,300 ft

L_{CA} = 4,500 ft

K = 3

t_c = 0.099 + 0.372 = 0.471 hr

$t_p = (2/3)t_c = (2/3)(0.471) =$ 0.314 hr

PRODUCT 204 1 (Single Sheets) 205 1 (Padded) NEBS Inc Groton Mass 01471 To Order PHONE TOLL FREE 1-800 225-6380

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*23456789012345678901
*
*    Window "G" Ultimate Conditions                    JMA # 940956
*                                                      December, 1996
*                                                      G.M. 486-5
*
*
*
*    100 - YEAR STORM
*
START                    TIME = 0.0   PUNCH CODE = 0   PRINT LINES = -1
RAINFALL                 TYPE = 2   RAIN QUARTER = 0.0
                         RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                         RAIN DAY = 3.10 IN DT = 0.02

* Tract A (Apartments)
COMPUTE NM HYD           ID = 2   HYD NO = 101.02   AREA = 0.0234375
                         PER A = 0   PER B = 10 PER C = 20   PER D = 70
                         TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD                ID = 2   CODE = 1

* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD           ID = 3   HYD NO = 101.03   AREA = 0.006525
                         PER A = 0   PER B = 20 PER C = 20   PER D = 60
                         TP = -0.133333333 HR   MASS RAIN =-1

PRINT HYD                ID = 3   CODE = 1

* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD           ID = 4   HYD NO = 101.04   AREA = 0.010454 SQ MI
                         PER A = 0   PER B = 20   PER C = 20   PER D = 60
                         TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD                ID = 4   CODE = 1

*  Add East and West La Cueva Village Basins

ADD HYD                  ID = 5   HYD NO = 101.05   ID I = 3   ID II = 4

PRINT HYD                ID = 5   CODE = 1

* Tract C (Shopping Center)

COMPUTE NM HYD           ID = 6 HYD NO = 101.06   AREA = 0.0204 SQ MI
                         PER A = 0   PER B =3.3   PER C = 6.7   PER D = 90
                         TP = -0.133333333 HR MASS RAIN = -1

PRINT HYD                ID = 6   CODE = 1

* Tract B (La Cueva Village Unit 2, Lots 1-16)
* DEVELOPED ULTIMATE CONDITION *

COMPUTE NM HYD           ID = 7 HYD NO = 101.07   AREA = 0.00485719 SQ MI
                         PER A = 0   PER B = 20   PER C = 20 PER D = 60
                         TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD                ID = 7 CODE = 1
```

```
*  Add to get total flow from La Cueva Village

ADD HYD              ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD            ID = 8 CODE = 1

* Carmel / Holly Right of Way

COMPUTE NM HYD       ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                     PER A = 0  PER B = 0  PER C = 11  PER D = 89
                     TP = -0.1333333333 HR   MASS RAIN = -1

PRINT HYD            ID = 9 CODE = 1

* Wyoming Right of Way

COMPUTE NM HYD       ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                     PER A = 0   PER B = 0  PER C = 46  PER D = 54
                     TP = -0.13333333333 HR  MASS RAIN = -1

PRINT HYD            ID = 10  CODE = 1

* Barstow Right of Way

COMPUTE NM HYD       ID = 11 HYD NO = 101.11  AREA = 0.00115 SQ MI
                     PER A = 0  PER B = 0  PER C = 10  PER D = 90
                     TP = -0.133333333 HR  MASS RAIN = -1

PRINT HYD            ID = 11  CODE = 1

*  FUTURE SHOPPING CENTER

COMPUTE NM HYD       ID = 12  HYD NO = 101.12  AREA = 0.0215625 SQ MI
                     PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                     TP = -0.133333333 HR  MASS RAIN = -1

PRINT HYD            ID = 12  CODE = 1

*  CITY RESERVOIR SITE

COMPUTE NM HYD       ID = 13  HYD NO = 101.13  AREA = 0.00553906 SQ MI
                     PER A = 40  PER B = 40  PER C = 8  PER D = 12
                     TP = -0.133333333 HR  MASS RAIN = -1

PRINT HYD            ID = 13  CODE = 1

*  FUTURE COMMERCIAL AREA

COMPUTE NM HYD       ID = 14  HYD NO = 101.14  AREA = 0.01604688
                     PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                     TP = -0.13333333. HR  MASS RAIN = -1

PRINT HYD            ID = 14  CODE = 1

FINISH
```

```
     AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
          RUN DATE (MON/DAY/YR) = 12/10/1996
          START TIME (HR:MIN:SEC) = 15:42:31     USER NO.= J_MORTEN.I01
          INPUT FILE = 940956F.INP

*23456789012345678901
*
*   Window "G" Ultimate Conditions                    JMA # 940956
*                                                     December, 1996
*                                                     G.M. 486-5
*
*
*   100 - YEAR STORM
*
START                TIME = 0.0  PUNCH CODE = 0  PRINT LINES = -1
RAINFALL             TYPE = 2  RAIN QUARTER = 0.0
                     RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                     RAIN DAY = 3.10 IN DT = 0.02


                COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                DT =    .020000 HOURS       END TIME =    11.980000 HOURS
                   .0000   .0016   .0033   .0050   .0067   .0084   .0101
                   .0119   .0137   .0155   .0173   .0192   .0211   .0230
                   .0249   .0269   .0289   .0309   .0330   .0351   .0372
                   .0393   .0415   .0438   .0461   .0484   .0507   .0531
                   .0556   .0580   .0606   .0632   .0658   .0685   .0713
                   .0741   .0770   .0799   .0829   .0860   .0892   .0924
                   .0958   .0992   .1027   .1063   .1101   .1139   .1179
                   .1220   .1263   .1298   .1334   .1372   .1411   .1453
                   .1508   .1651   .1846   .2100   .2424   .2826   .3316
                   .3904   .4600   .5412   .6353   .7432   .8658  1.0044
                  1.1599  1.3335  1.4120  1.4697  1.5214  1.5691  1.6135
                  1.6554  1.6950  1.7326  1.7685  1.8029  1.8358  1.8675
                  1.8979  1.9272  1.9555  1.9827  2.0091  2.0345  2.0591
                  2.0830  2.1060  2.1283  2.1499  2.1709  2.1912  2.2108
                  2.2299  2.2484  2.2663  2.2708  2.2751  2.2794  2.2835
                  2.2875  2.2914  2.2952  2.2989  2.3025  2.3061  2.3095
                  2.3129  2.3162  2.3194  2.3226  2.3257  2.3288  2.3318
                  2.3348  2.3377  2.3405  2.3433  2.3461  2.3488  2.3515
                  2.3541  2.3567  2.3593  2.3618  2.3643  2.3667  2.3692
                  2.3716  2.3739  2.3763  2.3786  2.3809  2.3831  2.3853
                  2.3875  2.3897  2.3919  2.3940  2.3961  2.3982  2.4002
                  2.4023  2.4043  2.4063  2.4083  2.4103  2.4122  2.4141
                  2.4160  2.4179  2.4198  2.4217  2.4235  2.4253  2.4271
                  2.4289  2.4307  2.4325  2.4342  2.4360  2.4377  2.4394
                  2.4411  2.4428  2.4445  2.4461  2.4478  2.4494  2.4510
                  2.4526  2.4542  2.4558  2.4574  2.4590  2.4605  2.4621
                  2.4636  2.4651  2.4667  2.4682  2.4697  2.4711  2.4726
                  2.4741  2.4755  2.4770  2.4784  2.4799  2.4813  2.4827
                  2.4841  2.4855  2.4869  2.4883  2.4897  2.4910  2.4924
                  2.4938  2.4951  2.4964  2.4978  2.4991  2.5004  2.5017
                  2.5030  2.5043  2.5056  2.5069  2.5082  2.5094  2.5107
                  2.5120  2.5132  2.5145  2.5157  2.5169  2.5182  2.5194
                  2.5206  2.5218  2.5230  2.5242  2.5254  2.5266  2.5278
                  2.5290  2.5301  2.5313  2.5325  2.5336  2.5348  2.5359
                  2.5371  2.5382  2.5393  2.5405  2.5416  2.5427  2.5438
                  2.5449  2.5460  2.5471  2.5482  2.5493  2.5504  2.5515
```

2.5526	2.5536	2.5547	2.5558	2.5568	2.5579	2.5589
2.5600	2.5610	2.5621	2.5631	2.5641	2.5652	2.5662
2.5672	2.5682	2.5693	2.5703	2.5713	2.5723	2.5733
2.5743	2.5753	2.5763	2.5773	2.5782	2.5792	2.5802
2.5812	2.5821	2.5831	2.5841	2.5850	2.5860	2.5870
2.5879	2.5889	2.5898	2.5907	2.5917	2.5926	2.5935
2.5945	2.5954	2.5963	2.5973	2.5982	2.5991	2.6000
2.6009	2.6017	2.6026	2.6034	2.6043	2.6051	2.6060
2.6068	2.6077	2.6085	2.6094	2.6102	2.6110	2.6119
2.6127	2.6136	2.6144	2.6152	2.6161	2.6169	2.6177
2.6186	2.6194	2.6202	2.6211	2.6219	2.6227	2.6235
2.6244	2.6252	2.6260	2.6268	2.6276	2.6285	2.6293
2.6301	2.6309	2.6317	2.6325	2.6333	2.6342	2.6350
2.6358	2.6366	2.6374	2.6382	2.6390	2.6398	2.6406
2.6414	2.6422	2.6430	2.6438	2.6446	2.6454	2.6462
2.6470	2.6478	2.6486	2.6493	2.6501	2.6509	2.6517
2.6525	2.6533	2.6541	2.6548	2.6556	2.6564	2.6572
2.6580	2.6587	2.6595	2.6603	2.6611	2.6618	2.6626
2.6634	2.6642	2.6649	2.6657	2.6665	2.6672	2.6680
2.6688	2.6695	2.6703	2.6710	2.6718	2.6726	2.6733
2.6741	2.6748	2.6756	2.6763	2.6771	2.6778	2.6786
2.6794	2.6801	2.6809	2.6816	2.6823	2.6831	2.6838
2.6846	2.6853	2.6861	2.6868	2.6876	2.6883	2.6890
2.6898	2.6905	2.6912	2.6920	2.6927	2.6934	2.6942
2.6949	2.6956	2.6964	2.6971	2.6978	2.6986	2.6993
2.7000	2.7007	2.7015	2.7022	2.7029	2.7036	2.7043
2.7051	2.7058	2.7065	2.7072	2.7079	2.7087	2.7094
2.7101	2.7108	2.7115	2.7122	2.7129	2.7136	2.7143
2.7151	2.7158	2.7165	2.7172	2.7179	2.7186	2.7193
2.7200	2.7207	2.7214	2.7221	2.7228	2.7235	2.7242
2.7249	2.7256	2.7263	2.7270	2.7277	2.7283	2.7290
2.7297	2.7304	2.7311	2.7318	2.7325	2.7332	2.7339
2.7345	2.7352	2.7359	2.7366	2.7373	2.7380	2.7386
2.7393	2.7400	2.7407	2.7414	2.7420	2.7427	2.7434
2.7441	2.7447	2.7454	2.7461	2.7468	2.7474	2.7481
2.7488	2.7494	2.7501	2.7508	2.7514	2.7521	2.7528
2.7534	2.7541	2.7548	2.7554	2.7561	2.7567	2.7574
2.7581	2.7587	2.7594	2.7600	2.7607	2.7614	2.7620
2.7627	2.7633	2.7640	2.7646	2.7653	2.7659	2.7666
2.7672	2.7679	2.7685	2.7692	2.7698	2.7705	2.7711
2.7718	2.7724	2.7730	2.7737	2.7743	2.7750	2.7756
2.7762	2.7769	2.7775	2.7782	2.7788	2.7794	2.7801
2.7807	2.7813	2.7820	2.7826	2.7832	2.7839	2.7845
2.7851	2.7858	2.7864	2.7870	2.7877	2.7883	2.7889
2.7895	2.7902	2.7908	2.7914	2.7920	2.7927	2.7933
2.7939	2.7945	2.7952	2.7958	2.7964	2.7970	2.7976
2.7983	2.7989	2.7995	2.8001	2.8007	2.8013	2.8019
2.8026	2.8032	2.8038	2.8044	2.8050	2.8056	2.8062
2.8068	2.8074	2.8081	2.8087	2.8093	2.8099	2.8105
2.8111	2.8117	2.8123	2.8129	2.8135		

```
* Tract A (Apartments)
COMPUTE NM HYD      ID = 2  HYD NO = 101.02  AREA = 0.0234375
                    PER A = 0  PER B = 10 PER C = 20  PER D = 70
                    TP = -0.133333333 HR  MASS RAIN =-1


    K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   64.757    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
    AREA =      .016406 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
```

```
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


      K =   .117190HR    TP =   .133333HR    K/TP RATIO =   .878921     SHAPE CONSTANT, N =  4.038848
      UNIT PEAK =   18.866    CFS   UNIT VOLUME =    .9993       B =   357.75      P60 = 2.1400
      AREA =      .007031 SQ MI    IA =    .40000 INCHES    INF =    .97000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 2  CODE = 1

                                   PARTIAL HYDROGRAPH   101.02

      RUNOFF VOLUME =     2.14048 INCHES     =       2.6756 ACRE-FEET
      PEAK DISCHARGE RATE =      66.95 CFS  AT   1.500 HOURS   BASIN AREA =   .0234 SQ. MI.


* La Cueva Village Unit 1, Lots 19-35, 38-44 (WEST BASIN)

COMPUTE NM HYD     ID = 3  HYD NO = 101.03  AREA = 0.006525
                   PER A = 0  PER B = 20 PER C = 20  PER D = 60
                   TP = -0.133333333 HR  MASS RAIN =-1


    K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   15.453    CFS   UNIT VOLUME =    .9993       B =   526.28      P60 = 2.1400
    AREA =      .003915 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


    K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
    UNIT PEAK =   6.8110    CFS   UNIT VOLUME =    .9980       B =   347.95      P60 = 2.1400
    AREA =      .002610 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 3  CODE = 1

                                   PARTIAL HYDROGRAPH   101.03


    RUNOFF VOLUME =     1.97426 INCHES     =        .6870 ACRE-FEET
    PEAK DISCHARGE RATE =      17.65 CFS  AT   1.520 HOURS   BASIN AREA =   .0065 SQ. MI.


* La Cueva Village Unit 1, Lots 1-18, 36-37, 44-59 (East Basin)

COMPUTE NM HYD     ID = 4  HYD NO = 101.04  AREA = 0.010454 SQ MI
                   PER A = 0  PER B = 20  PER C = 20  PER D = 60
                   TP = -0.1333333333 HR  MASS RAIN = -1


    K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   24.758    CFS   UNIT VOLUME =    .9996       B =   526.28      P60 = 2.1400
    AREA =      .006272 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000
```

```
K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
UNIT PEAK =   10.912    CFS   UNIT VOLUME =    .9988       B =   347.95      P60 = 2.1400
AREA =      .004182 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 4  CODE = 1

                                PARTIAL HYDROGRAPH   101.04


    RUNOFF VOLUME =     1.97426 INCHES     =       1.1007 ACRE-FEET
    PEAK DISCHARGE RATE =      28.26 CFS  AT   1.520 HOURS   BASIN AREA =   .0105 SQ. MI.


* Add East and West La Cueva Village Basins

ADD HYD            ID = 5  HYD NO = 101.05  ID I = 3  ID II = 4

PRINT HYD          ID = 5  CODE = 1

                                PARTIAL HYDROGRAPH   101.05


    RUNOFF VOLUME =     1.97426 INCHES     =       1.7878 ACRE-FEET
    PEAK DISCHARGE RATE =      45.91 CFS  AT   1.520 HOURS   BASIN AREA =   .0170 SQ. MI.


* Tract C (Shopping Center)

COMPUTE NM HYD     ID = 6 HYD NO = 101.06  AREA = 0.0204 SQ MI
                   PER A = 0  PER B =3.3  PER C = 6.7  PER D = 90
                   TP = -0.133333333 HR MASS RAIN = -1


    K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   72.468    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
    AREA =      .018360 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

    K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302     SHAPE CONSTANT, N =  4.041902
    UNIT PEAK =   5.4767    CFS   UNIT VOLUME =    .9975       B =   357.95      P60 = 2.1400
    AREA =      .002040 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 6  CODE = 1

                                PARTIAL HYDROGRAPH   101.06


    RUNOFF VOLUME =     2.42250 INCHES     =       2.6357 ACRE-FEET
    PEAK DISCHARGE RATE =      63.19 CFS  AT   1.500 HOURS   BASIN AREA =   .0204 SQ. MI.
```

```
* Tract B (La Cueva Village Unit 2, Lots 1-16)
* DEVELOPED ULTIMATE CONDITION *

COMPUTE NM HYD       ID = 7 HYD NO = 101.07  AREA = 0.00485719 SQ MI
                     PER A = 0  PER B = 20  PER C = 20 PER D = 60
                     TP = -0.1333333333 HR  MASS RAIN = -1


   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   11.503    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 2.1400
   AREA =      .002914 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

   K =   .121314HR    TP =   .133333HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892621
   UNIT PEAK =   5.0701    CFS   UNIT VOLUME =    .9974       B =   347.95      P60 = 2.1400
   AREA =      .001943 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD            ID = 7 CODE = 1

                                   PARTIAL HYDROGRAPH   101.07


   RUNOFF VOLUME =     1.97427 INCHES      =        .5114 ACRE-FEET
   PEAK DISCHARGE RATE =      13.14 CFS  AT   1.520 HOURS   BASIN AREA =   .0049 SQ. MI.


* Add to get total flow from La Cueva Village

ADD HYD              ID = 8 HYD NO = 101.08  ID I = 5 ID II = 7

PRINT HYD            ID = 8 CODE = 1

                                   PARTIAL HYDROGRAPH   101.08


   RUNOFF VOLUME =     1.97426 INCHES      =       2.2992 ACRE-FEET
   PEAK DISCHARGE RATE =      59.05 CFS  AT   1.520 HOURS   BASIN AREA =   .0218 SQ. MI.


* Carmel / Holly Right of Way

COMPUTE NM HYD       ID = 9 HYD NO = 101.09 AREA = 0.00609 SQ MI
                     PER A = 0  PER B = 0  PER C = 11  PER D = 89
                     TP = -0.1333333333 HR   MASS RAIN = -1


   K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =   21.393    CFS   UNIT VOLUME =    .9995       B =   526.28      P60 = 2.1400
   AREA =      .005420 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


   K =   .108940HR    TP =   .133333HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
```

```
UNIT PEAK =   1.9061    CFS   UNIT VOLUME =    .9930       B =   379.38      P60 = 2.1400
AREA =      .000670 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 9 CODE = 1

                                PARTIAL HYDROGRAPH   101.09


RUNOFF VOLUME =     2.42335 INCHES     =        .7871 ACRE-FEET
PEAK DISCHARGE RATE =      18.93 CFS  AT   1.500 HOURS   BASIN AREA =   .0061 SQ. MI.
```

```
* Wyoming Right of Way

COMPUTE NM HYD      ID = 10 HYD NO = 101.10 AREA = 0.00443 SQ MI
                    PER A = 0   PER B = 0  PER C = 46  PER D = 54
                    TP = -0.13333333333 HR  MASS RAIN = -1


K =   .072667HR    TP =   .133334HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   9.4421    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 2.1400
AREA =      .002392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000
```

```
K =   .108940HR    TP =   .133334HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
UNIT PEAK =   5.7982    CFS   UNIT VOLUME =    .9977       B =   379.38      P60 = 2.1400
AREA =      .002038 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 10  CODE = 1

                                PARTIAL HYDROGRAPH   101.10


RUNOFF VOLUME =     1.97793 INCHES     =        .4673 ACRE-FEET
PEAK DISCHARGE RATE =      12.22 CFS  AT   1.520 HOURS   BASIN AREA =   .0044 SQ. MI.
```

```
* Barstow Right of Way

COMPUTE NM HYD      ID = 11 HYD NO = 101.11  AREA = 0.00115 SQ MI
                    PER A = 0  PER B = 0  PER C = 10  PER D = 90
                    TP = -0.133333333 HR  MASS RAIN = -1


K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   4.0852    CFS   UNIT VOLUME =    .9972       B =   526.28      P60 = 2.1400
AREA =      .001035 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


K =   .108940HR    TP =   .133333HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
UNIT PEAK =   .32721    CFS   UNIT VOLUME =    .9587       B =   379.38      P60 = 2.1400
AREA =      .000115 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
```

```
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD           ID = 11  CODE = 1

                                PARTIAL HYDROGRAPH   101.11


    RUNOFF VOLUME =     2.43614 INCHES     =        .1494 ACRE-FEET
    PEAK DISCHARGE RATE =      3.60 CFS  AT   1.500 HOURS   BASIN AREA =   .0012 SQ. MI.



*  FUTURE SHOPPING CENTER

COMPUTE NM HYD      ID = 12  HYD NO = 101.12  AREA = 0.0215625 SQ MI
                    PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                    TP = -0.133333333 HR  MASS RAIN = -1


    K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   76.598    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
    AREA =      .019406 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


    K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302     SHAPE CONSTANT, N =  4.041902
    UNIT PEAK =   5.7888    CFS   UNIT VOLUME =    .9977       B =   357.95      P60 = 2.1400
    AREA =      .002156 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD           ID = 12  CODE = 1

                                PARTIAL HYDROGRAPH   101.12


    RUNOFF VOLUME =     2.42250 INCHES     =       2.7859 ACRE-FEET
    PEAK DISCHARGE RATE =     66.78 CFS  AT   1.500 HOURS   BASIN AREA =   .0216 SQ. MI.



*  CITY RESERVOIR SITE

COMPUTE NM HYD      ID = 13  HYD NO = 101.13  AREA = 0.00553906 SQ MI
                    PER A = 40  PER B = 40  PER C = 8  PER D = 12
                    TP = -0.133333333 HR  MASS RAIN = -1


K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   2.6236    CFS   UNIT VOLUME =    .9956       B =   526.28      P60 = 2.1400
AREA =      .000665 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


K =   .142689HR    TP =   .133333HR    K/TP RATIO =  1.070169     SHAPE CONSTANT, N =  3.300277
UNIT PEAK =   11.167    CFS   UNIT VOLUME =    .9988       B =   305.45      P60 = 2.1400
AREA =      .004874 SQ MI    IA =    .55455 INCHES    INF =   1.40273 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000
```

```
PRINT HYD          ID = 13  CODE = 1

                              PARTIAL HYDROGRAPH   101.13

     RUNOFF VOLUME =     1.02551 INCHES     =         .3030 ACRE-FEET
     PEAK DISCHARGE RATE =       9.48 CFS  AT   1.520 HOURS   BASIN AREA =    .0055 SQ. MI.


*  FUTURE COMMERCIAL AREA

COMPUTE NM HYD     ID = 14  HYD NO = 101.14  AREA = 0.01604688
                   PER A = 0  PER B = 3.3  PER C = 6.7  PER D = 90
                   TP = -0.13333333. HR  MASS RAIN = -1

     K =   .072667HR    TP =   .133333HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   57.004    CFS   UNIT VOLUME =    .9999       B =   526.28      P60 = 2.1400
     AREA =      .014442 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000


     K =   .117107HR    TP =   .133333HR    K/TP RATIO =   .878302     SHAPE CONSTANT, N =  4.041902
     UNIT PEAK =   4.3080    CFS   UNIT VOLUME =    .9969       B =   357.95      P60 = 2.1400
     AREA =      .001605 SQ MI    IA =    .39950 INCHES    INF =    .96860 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .020000

PRINT HYD          ID = 14  CODE = 1

                              PARTIAL HYDROGRAPH   101.14

     RUNOFF VOLUME =     2.42251 INCHES     =        2.0732 ACRE-FEET
     PEAK DISCHARGE RATE =      49.71 CFS  AT   1.500 HOURS   BASIN AREA =    .0160 SQ. MI.


FINISH

     NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 15:42:39
```

```
*23456789012345678901
*
*    Window "G" Ultimate Conditions                    JMA # 940956
*                                                      December, 1996
*                                                      G.M. 486-5
*
*
*
*    100 - YEAR STORM
*
START                  TIME = 0.0   PUNCH CODE = 0   PRINT LINES = -1
RAINFALL               TYPE = 2   RAIN QUARTER = 0.0
                       RAIN ONE = 2.14 IN RAIN SIX = 2.60 IN
                       RAIN DAY = 3.10 IN DT = 0.02

* Tract A (Apartments)
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1996
INPUT FILE = 940956F.INP USER NO.= J_MORTEN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .0
RAINFALL TYPE= 2										RAIN24= 3.10
COMPUTE NM HYD	101.02	-	2	.02344	66.95	2.676	2.14048	1.500	4.464	PER IMP= 70.0
COMPUTE NM HYD	101.03	-	3	.00653	17.65	.687	1.97426	1.520	4.226	PER IMP= 60.0
COMPUTE NM HYD	101.04	-	4	.01045	28.26	1.101	1.97426	1.520	4.224	PER IMP= 60.0
ADD HYD	101.05	3& 4	5	.01698	45.91	1.788	1.97426	1.520	4.225	
COMPUTE NM HYD	101.06	-	6	.02040	63.19	2.636	2.42250	1.500	4.840	PER IMP= 90.0
COMPUTE NM HYD	101.07	-	7	.00486	13.14	.511	1.97427	1.520	4.228	PER IMP= 60.0
ADD HYD	101.08	5& 7	8	.02184	59.05	2.299	1.97426	1.520	4.225	
COMPUTE NM HYD	101.09	-	9	.00609	18.93	.787	2.42335	1.500	4.857	PER IMP= 89.0
COMPUTE NM HYD	101.10	-	10	.00443	12.22	.467	1.97793	1.520	4.309	PER IMP= 54.0
COMPUTE NM HYD	101.11	-	11	.00115	3.60	.149	2.43614	1.500	4.895	PER IMP= 90.0
COMPUTE NM HYD	101.12	-	12	.02156	66.78	2.786	2.42250	1.500	4.839	PER IMP= 90.0
COMPUTE NM HYD	101.13	-	13	.00554	9.48	.303	1.02551	1.520	2.673	PER IMP= 12.0
COMPUTE NM HYD	101.14	-	14	.01605	49.71	2.073	2.42251	1.500	4.840	PER IMP= 90.0
FINISH										

APPENDIX E

MISCELLANEOUS CALCULATIONS

TITLE	PAGE NO.
Street Capacity - Wyoming Boulevard	E-1
Street Capacity - Holly/Carmel Avenue	E-3
Street Capacities - La Cueva Village	E-5
Street Capacity - Barstow Street	E-7
Miscellaneous Storm Drain Calculations	E-8
La Cueva Village Concrete Channel Calculations	E-14

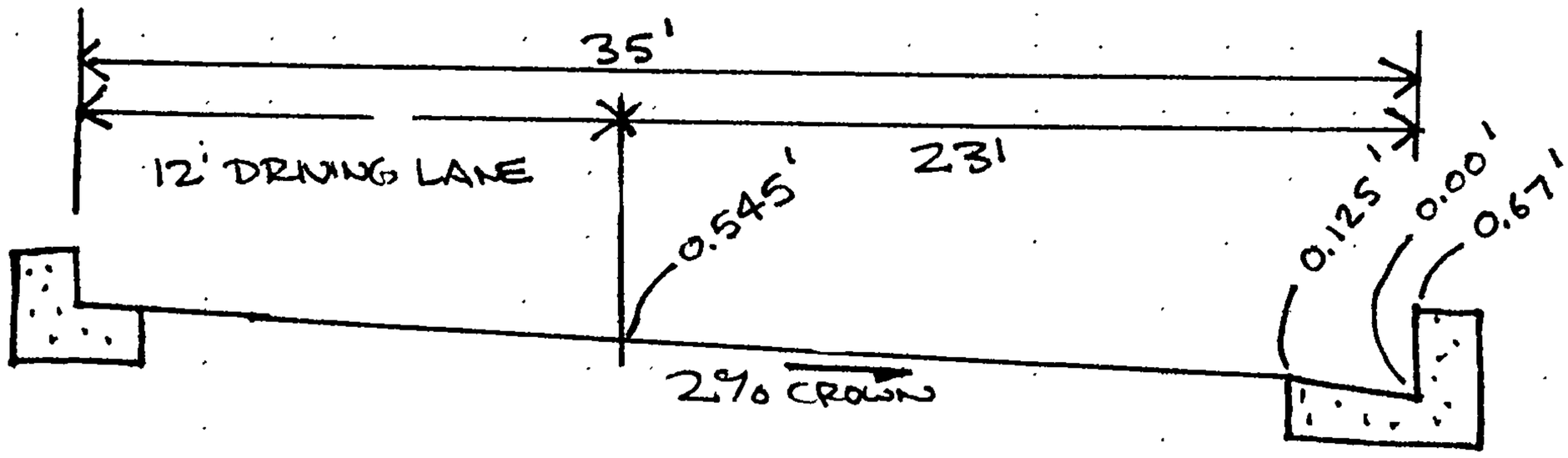
JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 940456
SHEET NO _____ OF _____
CALCULATED BY G.M. DATE 12/06/96
CHECKED BY _____ DATE _____
SCALE N.T.S.

STREET CAPACITY

WYOMING BLVD N.E. – 35' Halfwidth

Major Arterial Classification – max street depth = 0.50' for 10-year Storm
– Must have one free driving lane in each direction



DRIVING LANE IS FREE OF WATER WHEN DEPTH = 0.545'

AT DEPTH = 0.50', ASSUMING MINIMUM SLOPE OF 0.005, THE 1/2 STREET CAPACITY OF WYOMING IS 9.5 cfs. (PLATE 22.3 D-4)

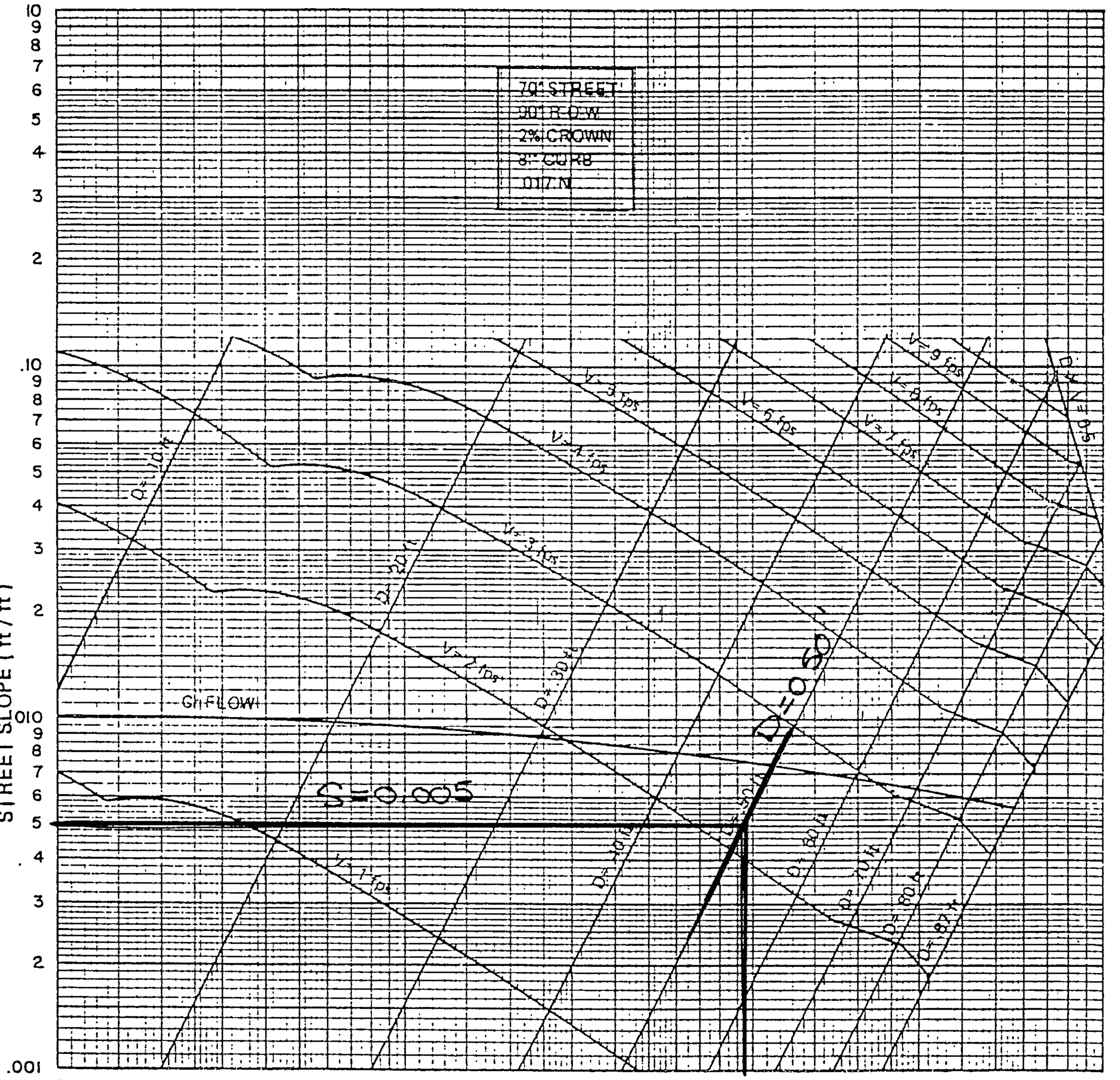
Q_{100} FOR WYOMING IS 12 cfs (TOTAL) AND 6 cfs (HALF)

THEREFORE, NO STORM INLETS ARE REQUIRED IN WYOMING TO REDUCE FLOW DEPTHS (OTHER THAN THOSE LOCATED AT THE SUMP LOCATION)

PRODUCT 204-1 (Single Sheets) 205-1 (Padded) MEAD Inc Groton Mass 01471 To Order PHONE TOLL FREE 1-800-225-6380

STREET CAPACITY

(WYOMING BLVD N.E.)



REV. 3-83

PLATE 22.3 D-4

E-2

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 94420

SHEET NO. _____ OF _____

CALCULATED BY G.M. DATE 12/06/96

CHECKED BY _____ DATE _____

SCALE _____

STREET CAPACITY
HOLLY / CARMEL - 20' HALFWIDTH

Q_{100} = 19 cfs

AT Q = 19 cfs (TOTAL), ASSUME Q_{half} = 9.5 cfs

AT Q = 9.5 cfs, S = 0.032 ; depth = 0.37'
(PLATE 22.3 D-2.)

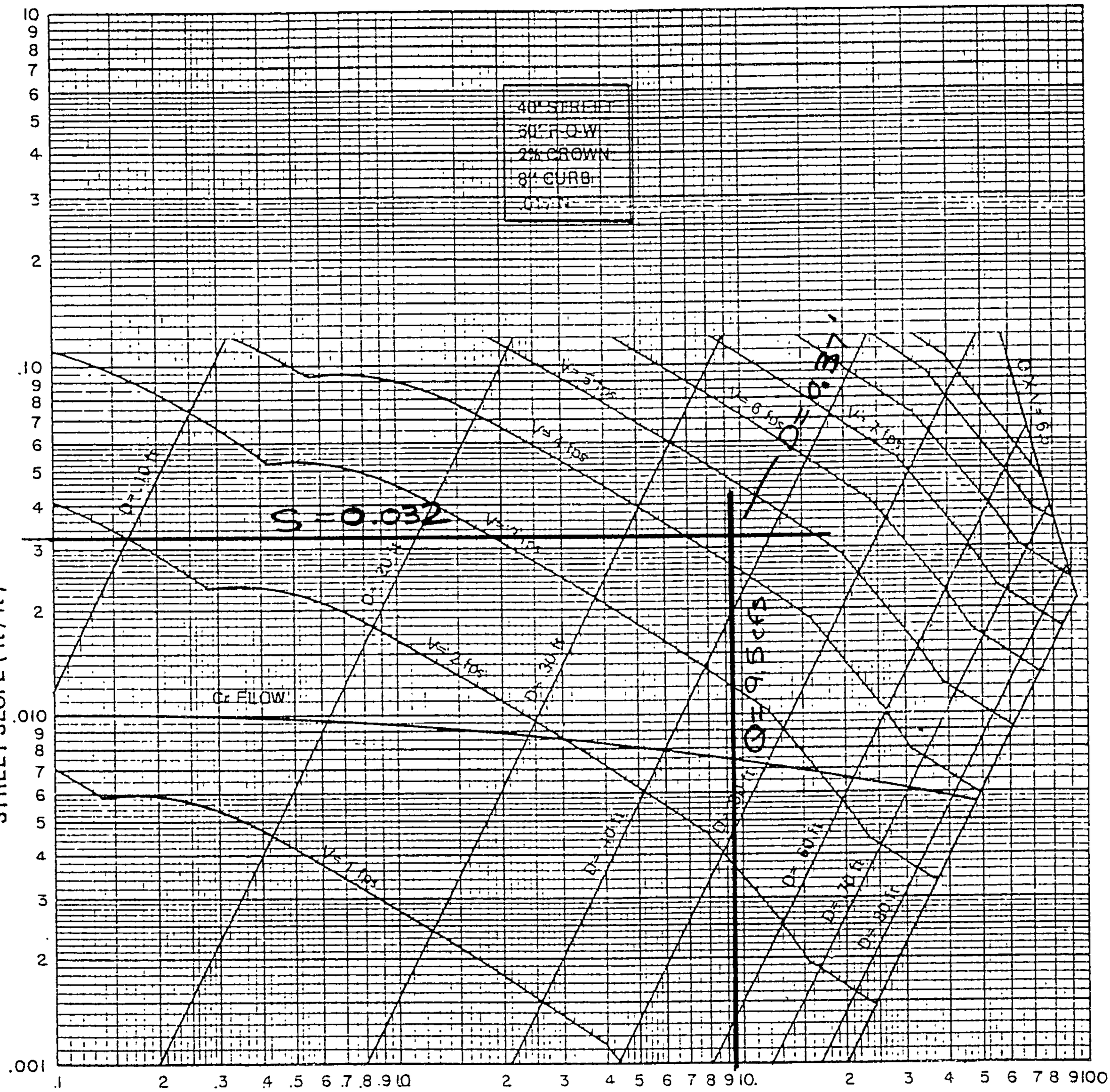
BECAUSE STREET SECTION CAN EASILY CONTAIN FLOWS, NO STORM DRAIN EXTENSION IS REQUIRED WITHIN HOLLY AND CARMEL

ODUCT 204 1 (Single Sheets) 205-1 (Padded) NEBS Inc., Groton Mass 01471 To Order PHONE TOLL FREE 1-800-225-6380

[redacted]

STREET CAPACITY

HOLLY / CARMEL



ONE HALF STREET FLOWS (cfs)

REV. 3-83

PLATE 22.3 D-2

E-4

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 940956
SHEET NO. _____ OF _____
CALCULATED BY G.M. DATE 12/06/96
CHECKED BY _____ DATE _____
SCALE _____

STREET CAPACITY
LA CUEVA VILLAGE (46' R.O.W, 28' F-F)

$Q_{100\ (max)} = 41$ cfs at N.W. CORNER

USING Manning's Equation for normal depth, at depth = 0.47', S=0.03, A_1=7.03 sf, P=28.94',
Q_{CAP} = 41.5 cfs

MAX DEPTH = 0.47'

⇒ EXPLORE HYDRAULIC JUMP POTENTIAL DUE TO LARGE NUMBER OF DRIVECUTS IN RESIDENTIAL SUBDIVISION

$V = Q/A_1 = 41.5/7.03 = 5.9$ fps
SINCE SECTION IS NON-RECTANGULAR, USE HYDRAULIC DEPTH $D_1 = A_1/\text{Topwidth}$
$D_1 = 7.03/28 = 0.25'$

$F_1 = V/\sqrt{gD} = 5.9/\sqrt{(32.2)(0.25)} = 2.08$

USING D.P.M. PLATE 22.3 E-1, RATIO OF TAILWATER DEPTH TO INITIAL DEPTH = 2.4

$D_2 = 2.4 D_1 = 0.60$

CONVERTING HYDRAULIC DEPTH BACK TO NORMAL DEPTH: $A_2 = (D_2)(28) = 16.8$ sf
Y_2 @ A_2 = 0.85'

BECAUSE EQUIVALENT JUMP DEPTH CAN BE CONTAINED WITHIN R.O.W. AT A DEPTH OF LESS THAN 0.87', NO SPECIAL CONSIDERATIONS ARE REQUIRED.

PRODUCT 204-1 (Single Sheets) 205-1 (Padded) MEEKS Inc Groton Mass 01471 To Order PHONE TOLL FREE 1-800-225-6380

TAIL WATER DEPTH VS. D_1

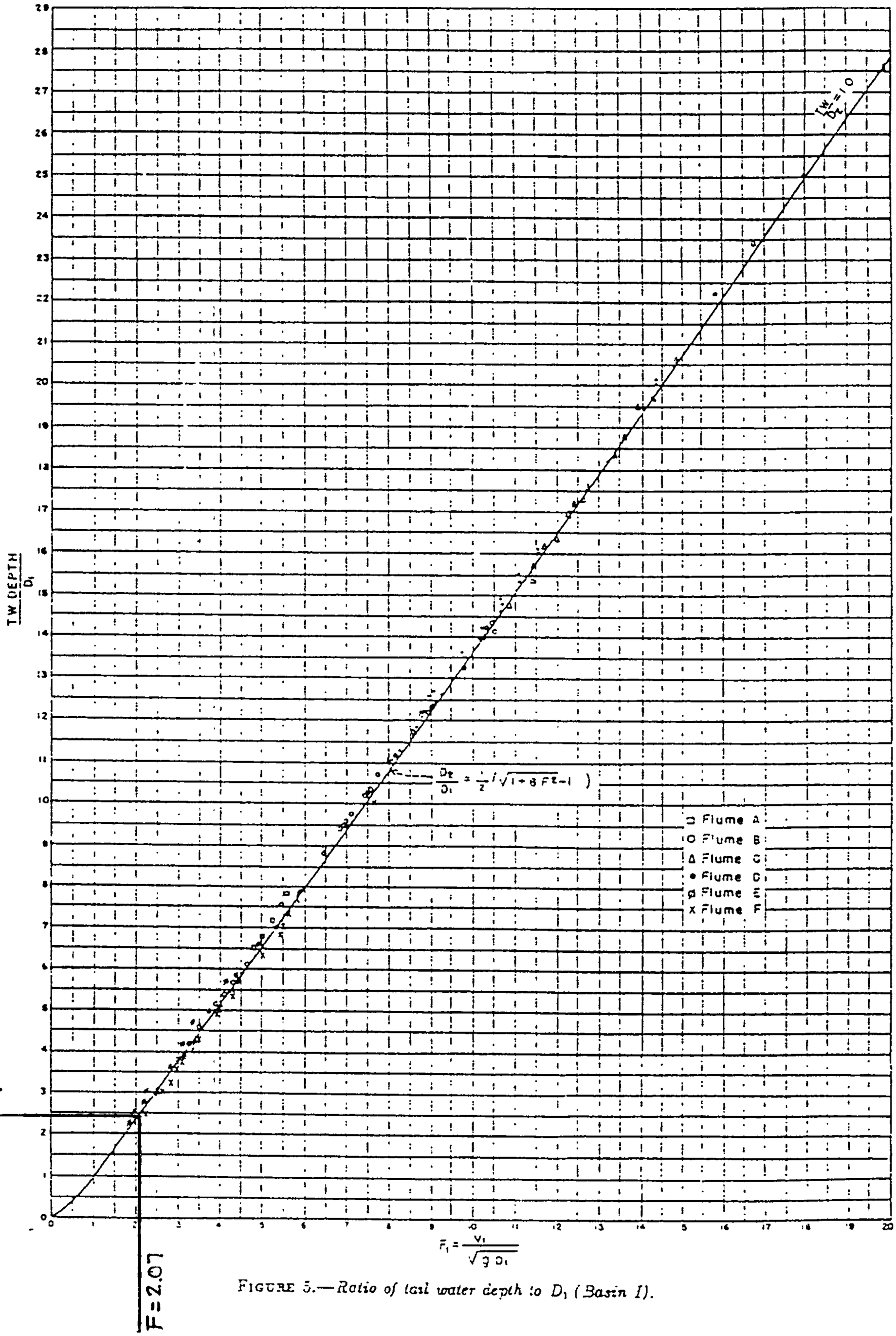


FIGURE 5.—*Ratio of tail water depth to D_1 (Basin I).*

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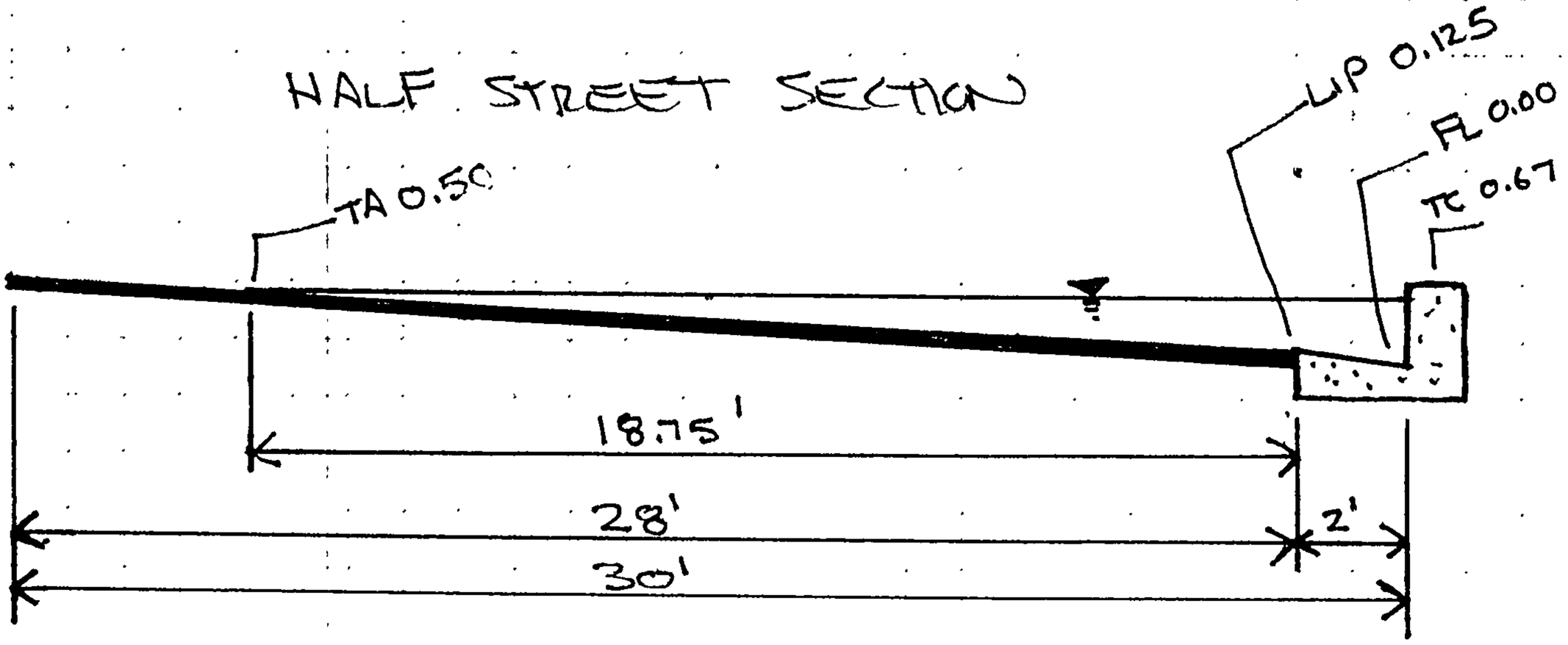
6010-B Midway Park Blvd. NE
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-4250 FAX (505) 345-4254

JOB 940926
SHEET NO _____ OF _____
CALCULATED BY G.M. DATE 12/06/96
CHECKED BY _____ DATE _____
SCALE _____

STREET CAPACITY
BARSTOW STREET (60' F-F)

COLLECTOR STREET MAXIMUM 10-YEAR DEPTH = 0.50 ft

HALF STREET SECTION



CAPACITY @ Depth = 0.50' (MANNINGS EQUATION)

AREA = 4.39 sf
P = 18.75 + 2.00 + 0.50 = 21.25 ft
R = A/P = 0.2066 $R^{2/3}$ = 0.3495
n = 0.017
S = 0.010 (minimum)

$Q_{CAP} = (1.49/n) A R^{2/3} S^{1/2}$ = 13.4 cfs (each half)
$Q_{BARSTOW} = (2)(13.4) = 26.8$ cfs

Q_{100} Barstow = 3.6 cfs
By DPM, 10-year flow rate can be up to 26.8 cfs

THEREFORE, NO STORM DRAIN IS REQUIRED IN BARSTOW TO DRAIN STREET TO FUTURE CHANNEL

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: WYOMING STORM DRAIN

WYOMING 36" RCP

Solve For Full Flow Capacity

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0130 ft/ft
Manning's n.....	0.013
Discharge.....	76.05 cfs

Computed Results:

Full Flow Capacity.....	76.05 cfs
Full Flow Depth.....	3.00 ft
Velocity.....	10.76 fps
Flow Area.....	7.07 sf
Critical Depth.....	2.73 ft
Critical Slope.....	0.0113 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	76.05 cfs
QMAX @.94D.....	81.81 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: WYOMING STORM DRAIN

WYOMING 42" RCP

Solve For Full Flow Capacity

Given Input Data:

Diameter.....	3.50 ft
Slope.....	0.0070 ft/ft
Manning's n.....	0.013
Discharge.....	84.18 cfs

Computed Results:

Full Flow Capacity.....	84.18 cfs
Full Flow Depth.....	3.50 ft
Velocity.....	8.75 fps
Flow Area.....	9.62 sf
Critical Depth....	2.86 ft
Critical Slope....	0.0070 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	84.18 cfs
QMAX @.94D.....	90.55 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: WYOMING STORM DRAIN

Solve For Full Flow Capacity

WYOMING 42" RCP

Given Input Data:

	Diameter.....	3.50 ft
	Slope.....	0.0100 ft/ft
	Manning's n.....	0.013
	Discharge.....	100.61 cfs

Computed Results:

Full	Flow Capacity.....	100.61 cfs
Full	Flow Depth.....	3.50 ft
	Velocity.....	10.46 fps
	Flow Area.....	9.62 sf
	Critical Depth....	3.08 ft
	Critical Slope....	0.0090 ft/ft
	Percent Full.....	100.00 %
	Full Capacity.....	100.61 cfs
	QMAX @.94D.....	108.23 cfs
	Froude Number.....	FULL

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Storm Drain

Solve For Full Flow Capacity

LA CUEVA 24" RCP
VILLAGE

Given Input Data:

Diameter.....	2.00 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	22.62 cfs

Computed Results:

Full Flow Capacity.....	22.62 cfs
Full Flow Depth.....	2.00 ft
Velocity.....	7.20 fps
Flow Area.....	3.14 sf
Critical Depth....	1.70 ft
Critical Slope....	0.0095 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	22.62 cfs
QMAX @.94D.....	24.34 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Storm Drain

LA CUEVA VILLAGE
30" RCP

Solve For Full Flow Capacity

Given Input Data:

	Diameter.....	2.50 ft
	Slope.....	0.0100 ft/ft
	Manning's n.....	0.013
	Discharge.....	41.02 cfs

Computed Results:

Full	Flow Capacity.....	41.02 cfs
Full	Flow Depth.....	2.50 ft
	Velocity.....	8.36 fps
	Flow Area.....	4.91 sf
	Critical Depth....	2.15 ft
	Critical Slope....	0.0093 ft/ft
	Percent Full.....	100.00 %
	Full Capacity.....	41.02 cfs
	QMAX @.94D.....	44.12 cfs
	Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Storm Drain

Solve For Full Flow Capacity

LA CUEVA VILLAGE
36" RCP

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	66.70 cfs

Computed Results:

Full Flow Capacity.....	66.70 cfs
Full Flow Depth.....	3.00 ft
Velocity.....	9.44 fps
Flow Area.....	7.07 sf
Critical Depth....	2.61 ft
Critical Slope....	0.0091 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	66.70 cfs
QMAX @.94D.....	71.75 cfs
Froude Number.....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name:

Comment: La Cueva Village Concrete Channel

Solve For Depth

Given Input Data:

Bottom Width.....	10.70 ft
Manning's n.....	0.013
Channel Slope....	0.0050 ft/ft
Discharge.....	59.00 cfs

Computed Results:

Depth.....	0.84 ft
Velocity.....	6.54 fps
Flow Area.....	9.02 sf
Flow Top Width...	10.70 ft
Wetted Perimeter.	12.39 ft
Critical Depth...	0.98 ft
Critical Slope...	0.0031 ft/ft
Froude Number....	FULL

Open Channel Flow Module, Version 3.42 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

APPENDIX F

CITY COUNCIL BILLS

ITEM	PAGE NO.
Council Bill R-19	F-1
Council Bill 0-6	F-3

CITY of ALBUQUERQUE
TWELFTH COUNCIL

COUNCIL BILL NO. R-19 ENACTMENT NO. 58-1996

SPONSORED BY: by request

RESOLUTION

ADOPTING THE WINDOW G SECTOR DEVELOPMENT PLAN AND ITS PLAN BOUNDARIES AND ESTABLISHING R-T, O-1, C-2, SU-1 PRD (20 DU/AC), SU-1 FOR O-1 PERMISSIVE USES AND PLANT NURSERY ZONING .

WHEREAS, the City Council, the governing body of the City of Albuquerque, has the authority to adopt sector development plans and zoning; and

WHEREAS, the La Cueva Land Use Guide was adopted by the City Council in 1986 to guide the development in a larger area which contains this sector development plan; and

WHEREAS, the area contained in this plan was identified as Window G for which a sector plan was recommended to address the difficulties and opportunities associated with the development of the land; and

WHEREA

consist

Lan

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PASSED AND ADOPTED THIS 6th DAY OF May, 1996

BY A VOTE OF: 7 FOR 1 AGAINST.

Yes: 7

No: Bregman

Excused: Griego

Steve D. Gallegos, President
City Council

APPROVED THIS 7th DAY OF June, 1996

Martin J. Chavez, Mayor
City of Albuquerque

ATTEST:

City Clerk

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CITY CLERK
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CITY of ALBUQUERQUE
TWELFTH COUNCIL

7339

COUNCIL BILL NO. O-6 _____ ENACTMENT NO. 19-1996

SPONSORED BY: Sam Bregman, by request

ORDINANCE

ANNEXING 82.0 ACRES MORE OR LESS, LOCATED GENERALLY BETWEEN PASEO DEL NORTE AND ANAHEIM AVENUE NE AND BETWEEN WYOMING BOULEVARD NE AND BARSTOW STREET NE TO THE CITY OF ALBUQUERQUE; AMENDING THE ZONE MAP TO ESTABLISH R-T, O-1, C-2, SU-1 PRD (20 DU/AC), SU-1 FOR O-1 PERMISSIVE USES AND PLANT NURSERY ZONING.

BE IT ORDAINED BY THE COUNCIL, THE GOVERNING BODY OF THE CITY OF ALBUQUERQUE:

Section 1. AREA PROPOSED FOR ANNEXATION. The owner of a majority of the area annexed hereby presented a properly signed petition to annex the following territory: 82.0 acres more or less, located generally between Paseo del Norte NE and Anaheim Avenue NE and between Wyoming Boulevard NE and Barstow Street NE and more particularly described as

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Block
N
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Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

D. Lots 9-10 and 23-24, Block 20, Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

E. Lots 11-22, Block 20, Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

F. All of the public right-of-way on Paseo del Norte Drive NE adjoining the land described in subsection A of this section.

The above described territory is contiguous to the City of Albuquerque.

Section 2. ANNEXATION ACCEPTED. The petition and area specified in Section 1 above are accepted and the above territory is hereby annexed.

Section 3. ZONE MAP AMENDED. The zone map adopted by Article 7-14 R.O. 1974 is hereby amended as follows;

A. establishing SU-1 PRD (20 DU/AC), zoning for the area described in

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CITY of ALBUQUERQUE
TWELFTH COUNCIL

7339

COUNCIL BILL NO. O-6 ENACTMENT NO. 19-1996

SPONSORED BY: Sam Bregman, by request

ORDINANCE

ANNEXING 82.0 ACRES MORE OR LESS, LOCATED GENERALLY BETWEEN PASEO DEL NORTE AND ANAHEIM AVENUE NE AND BETWEEN WYOMING BOULEVARD NE AND BARSTOW STREET NE TO THE CITY OF ALBUQUERQUE; AMENDING THE ZONE MAP TO ESTABLISH R-T, O-1, C-2, SU-1 PRD (20 DU/AC), SU-1 FOR O-1 PERMISSIVE USES AND PLANT NURSERY ZONING.

BE IT ORDAINED BY THE COUNCIL, THE GOVERNING BODY OF THE CITY OF ALBUQUERQUE:

Section 1. AREA PROPOSED FOR ANNEXATION. The owner of a majority of the area annexed hereby presented a properly signed petition to annex the following territory: 82.0 acres more or less, located generally between Paseo del Norte NE and Anaheim Avenue NE and between Wyoming Boulevard NE and Barstow Street NE and more particularly described as follows:

A. Lots 1-7 and 24-32 and portions of Lots 8, 9 and 23, Block 18; and portions of Lots 7, 9 and 9, Block 19; Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

B. Portions of Lots 23 and 24, Block 18; portions of Lots 8, 9 and 24 and Lots 10-23., Block 19; Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

C. Portions of Lots 7, 8, and 24 and Lots 1-6, and 25-32, Block 19; Lots 1-8 and 25-32, Block 20, Tract 2, Unit 3, North

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F-3

Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

D. Lots 9-10 and 23-24, Block 20, Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

E. Lots 11-22, Block 20, Tract 2, Unit 3, North Albuquerque Acres, as shown on said plat of subdivision filed in the office of the County Clerk of Bernalillo County, New Mexico, on September 10, 1931; and

F. All of the public right-of-way on Paseo del Norte Drive NE adjoining the land described in subsection A of this section.

The above described territory is contiguous to the City of Albuquerque.

Section 2. ANNEXATION ACCEPTED. The petition and area specified in Section 1 above are accepted and the above territory is hereby annexed.

Section 3. ZONE MAP AMENDED. The zone map adopted by Article 7-14 R.O. 1974 is hereby amended as follows;

A. establishing SU-1 PRD (20 DU/AC), zoning for the area described in subsection A. of Section 1 above.

B. establishing R-T zoning for the area described in subsection B. of Section 1 above.

C. establishing C-2, zoning for the area described in subsection C. of Section 1 above.

D. establishing O-1 zoning for the area described in subsection D. of Section 1 above.

E. establishing SU-1 FOR O-1 PERMISSIVE USES AND PLANT NURSERY zoning for the area described in subsection E of Section 1 above.

Section 4. SEVERABILITY CLAUSE. If any section, paragraph, sentence clause, word or phase of this ordinance is for any reason held to be invalid or unenforceable by any court of competent jurisdiction,

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such decision shall not affect the validity of the remaining provisions of this ordinance. The Council hereby declares that it would have passed this ordinance and each section, paragraph, sentence, clause, word or phrase thereof irrespective of any provision being declared unconstitutional or otherwise invalid.

Section 5. EFFECTIVE DATE AND PUBLICATION. This ordinance shall become effective five or more days after publication in full when a copy of the ordinance and a plat of the territory hereby annexed is filed in the office of the County Clerk.

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PASSED AND ADOPTED THIS 6th DAY OF May, 1996

BY A VOTE OF: 8 FOR 1 AGAINST.

Yes: 8

No: Bregman

Steve D. Gallegos, President
City Council

APPROVED THIS 7th DAY OF June, 1996

Martin J. Chavez, Mayor
City of Albuquerque

ATTEST:

City Clerk

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APPENDIX G

INFRASTRUCTURE LIST

JMA NO. 940956
D.R.B. Case No. 96-546
D.R.C. Project No.
Date Submitted 12-13-96
Prelim. Plat Approved
Prelim. Plat Expires

PRELIMINARY EXHIBIT "A"
to Subdivision Improvements Agreement

DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LISTING
for Window G

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City deter appurtenant items have not been included in the summary, those items will be listing and related financial guarantee, if the items normally are Subdivider In addition, any unforeseen items which arise during construction which are r complete the project and which normally are the Subdivider's responsibility a responsibility of the Subdivider and will be included in the financial guarar the City.

Plat? platting La Cueva Village now? or Bulk Land?

A. Proposed Improvements (Unit 1 and Tract A)

Location	Size	Type Improvement	From	To
Wyoming Blvd NE	24'	Arterial Paving	Carmel Ave NE	Ar
	6'	Sidewalk (East side)	Carmel Ave NE	Anaheim Ave NE
	TBD	Bridge across Channel ?	Carmel Ave NE	Anaheim Ave NE
	N/A	Std. Curb & Gutter (East Side)	Carmel Ave NE	Anaheim Ave NE
		42" Storm Drain	"	"
Carmel/Holly Ave	10"	Sanitary Sewer	Wyoming Blvd NE	Barstow St NE
	10"	Waterline	Wyoming Blvd NE	Barstow St NE
	20'	Residential Paving	Wyoming Blvd NE	Barstow St NE
	N/A	Std. Curb & Gutter	Wyoming Blvd NE	Barstow St NE
	4'	Temporary Pavement	Wyoming Blvd NE	Barstow St NE
	6'	Sidewalk (North side)	Wyoming Blvd NE	Barstow St NE
				SE Corner
	4'	Sidewalk (North side)	SE Corner of	Tract "A"
			Tract "A"	SE Corner La
				Cueva Village
La Cueva Village Unit 1	28' FF	Residential Paving	Internal	Unit 1 Streets
	N/A	Std. Curb & Gutter	Internal	Streets
	6"	Waterline	Internal	Streets
	8"	Sanitary Sewer	Internal	Streets
	varies 36"	Storm Drainage Facilities Per Plan	Internal Street	Streets + Channel
		east side - temp. diversion for off site flows		
AMAFCA R.O.W.	24' Bottom	Permanent Soil Cement Channel	20' West of Wyoming	NE Corner of La Cueva Village, Unit 1
AMAFCA R.O.W. & Drainage Easement	Varies	Interim Drainage Channel (wing dikes)	NE Corner of La Cueva Village, Unit 1	Barstow St NE

Street names ?

B. Proposed Improvements (Unit 2) La Cueva Village?

AMAFCA R.O.W.	24' Bottom	Permanent Soil Cement Channel	NE Corner La Cueva Village Unit 1	Barstow St NE
Barstow St NE	TBD	½ Bridge Across Channel (West half)		
	24'	Arterial Paving	Holly Ave NE	Carmel Ave NE
	6'	Sidewalk (west side)	Holly Ave NE	Carmel Ave NE

east side - temp. diversion for off-site flows ?

G1

Location	Size	Type Improvement	From	To
Holly Ave NE	4'	Sidewalk	SW Corner La Cueva Village Unit 2	Barstow St NE
La Cueva Village	28' FF	Residential Paving	Internal	Streets
	N/A	Std. Curb & Gutter	Internal	Streets
	6"	Waterline	Internal	Streets
	8"	Sanitary Sewer	Internal	Streets

DEFERRED CONSTRUCTION:

La Cueva Village (Units 1 & 2)	4'	Sidewalk	Internal	Streets

Prepared by: _____
Print Name: J. Graeme Means
Firm: Jeff Mortensen & Associates, Inc.

****

Development Review Board Member Approval

Transportation Dev. Date

Utility Dev. Date

Parks Design & Development, C.I.P. Date

City Engineer/AMAFCA Date

DRB Chairman Date

Rev. 10/85
ID3901D

APPENDIX H

AMAFCA RESOLUTION 1992-3

RESOLUTION 1992-3

MODIFICATION OF THE NORTHEAST HEIGHTS DRAINAGE MANAGEMENT PLAN AS IT PERTAINS TO THE NORTH AND SOUTH DOMINGO BACA ARROYOS

Whereas, the **Northeast Heights Drainage Management Plan**, adopted by AMAFCA in 1975, called for a dam on each of the North and South Domingo Baca Arroyos and called for the arroyos below (west of) the dam to be improved to wide earth channels stabilized with check dams and drop structures; and

Whereas, Resolution 1980-3 permitted alternative channel lining treatments; and

Whereas, the impending reconstruction of Paseo del Norte and other circumstances and conditions in the drainage areas of the North and South Domingo Baca Arroyos have necessitated the preparation of a more detailed plan specific to both arroyos; and

Whereas, such a plan has been prepared for AMAFCA by Resource Technology, Inc., entitled "North and South Domingo Baca Arroyos and Paseo del Norte Corridor Drainage Management Plan", dated December, 1991, and

Whereas, said Drainage Management Plan has been prepared with input and assistance from a task force and through appropriate public meetings;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE ALBUQUERQUE-METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY:

1. The improvements recommended by the North and South Domingo Baca Arroyos and Paseo del Norte Corridor Drainage Management Plan, by Resource Technology,.Inc., dated December, 1991 are hereby adopted, subject to the following:

   a. Final selection of the dam site will be made by the AMAFCA Board of Directors, following further engineering and cost analysis.

   b. Modifications to the adopted plan may be made as circumstances dictate, but shall be approved by the AMAFCA Board of Directors.

   c. Final decisions regarding arroyo treatments shall be made in accord with existing and future plans such as the Facility Plan for Arroyos, the Bikeways Master Plan, and the Trails Facility Plan.

   d. Financing and scheduling of improvements are subject to availability of funds by public agencies, and to initiatives by the private sector.

2. The adoption of the Resolution modifies the Northeast Heights Drainage Management Plan and any other previous Resolutions or actions by the AMAFCA Board of Directors regarding the North and South Domingo Baca Arroyos.

PASSED, ADOPTED AND SIGNED THIS 30th DAY OF JANUARY, 1992.

THE ALBUQUERQUE METROPOLITAN
ARROYO FLOOD CONTROL AUTHORITY

Chairman, Board of Directors

(SEAL)

ATTEST:

Secretary, Board of Directors