D20/D5

0000 0000 0944

D20/D5

25×10

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FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

April 15, 1987

Jackie McDowell
Chavez-Grieves Consulting Engineers, Inc.
4600-C Montgomery Boulevard, NE
Albuquerque, New Mexico 87109

RE: GRADING PLANS OF HERITAGE HILLS PARK RECEIVED MARCH 26 AND APRIL 2, 1987 FOR GRADING AND PAVING PERMIT APPROVAL (D-20/D5) (PROJECTS #2920, 3088)

Dear Jackie:

The above referenced submittal, dated March 26 and April 1, 1987 respectively, are approved for Grading and Paving Permit. Work Order construction drawings may be signed-off by Hydrology.

Contractor is responsible for obtaining a Topsoil Distrubance Permit prior to grading operations.

If you have any questions, call me at 768-2650.

Cordially,

Roger A. Green, PE

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Sandy Zuschlag, Parks & Rec.

RAG/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer ENGINEERING GROUP Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

25×10

0000 0000 0946

CHAVEZ—GRIEVES / CONSULTING ENGINEERS, INC.

4600 MONTGOMERY N.E., BUILDING C, #101
ALBUQUERQUE, NEW MEXICO 87109
(505) 881-7376

LETTER OF TRANSMITTAL

TO: City of Albuq. UDD
Hydrology Section
Attn: Barbara/Carlos

DATE: 4/2/87
JOB NO.
RE: Hearing Hills Park

GENTLEMEN:

We are sending you X ATTACHED ___ UNDER SEPARATE COVER the following items:

__ SHOP DRAWINGS __ CHANGE ORDER __ SPECIFICATIONS
__ COPY OF LETTER __ PLANS
__ PRINTS __ SAMPLES

RECEIVED
APR 2 1987
HYDROLOGY SECTION

COPIES	DATE	NO.	DESCRIPTION
6			sheets - C-10 thru C-15 Grading Plans - w/ Engr. Stamps & dated as requested
1			Info Sheet

THESE ARE TRANSMITTED as checked below:

X FOR APPROVAL
__ FOR YOUR USE
__ AS REQUESTED
__ FOR REVIEW AND COMMENT
__ APPROVED AS SUBMITTED
__ APPROVED AS NOTED
__ _____

__ RETURNED FOR CORRECTIONS
__ RESUBMIT ___ COPIES FOR APPROVAL
__ SUBMIT ___ COPIES FOR DISTRIBUTION
__ RETURN ___ CORRECTED PRINTS
__ PRINTS RETURNED AFTER LOAN TO US
__ FOR BIDS DUE _____ 19___

REMARKS:

COPY TO: File

SIGNED: Jackie S. McDonald

If enclosures are not as noted, kindly notify us at once.

25 × 10

0000 0000 0947

D20105

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Heritage Hills Park ZONE ATLAS/DRNG.FILE #: D,E-19,20

LEGAL DESCRIPTION: Heritage Hills Unit Two and Cherry Hills Subdivision

CITY ADDRESS: 7015 Ventura

ENGINEERING FIRM: Chavez-Grieves Engrs. CONTACT: Jackie McDowell

ADDRESS: 4600 C Montgomery Blvd. PHONE: (505) 881-7376

OWNER: City of Albuquerque CONTACT: Sandy Zuschlag

ADDRESS: P.O. Box 1293 PHONE: (505) 823-4012

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: Albuquerque Surveying CONTACT: Fred Sanchez

ADDRESS: 2119 Menaul PHONE: (505) 884-2036

CONTRACTOR: N/A CONTACT:

ADDRESS: PHONE:

RECEIVED APR 02 1987 HYDROLOGY SECTION

PRE-DESIGN MEETING:

____ YES

X NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. ____

EPC NO. ____

PROJ. NO. ____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAINAGE PLAN

X GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

X ROUGH GRADING PERMIT APPROVAL

X GRADING/PAVING PERMIT APPROVAL

X OTHER ~~Concept Approval~~ (SPECIFY)

DATE SUBMITTED: 4/2/87

BY: Jackie S. McDowell

25×10

0000 0000 0948

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 768-7644

December 5, 1986

Jackie McDowell
Chavez-Grieves Consulting Engineers
4600-C Montgomery Blvd., NE
Albuquerque, New Mexico 87109

RE: REVISED ROUGH GRADING PLAN FOR HERITAGE HILLS PARK (D-20/D5)
RECEIVED NOVEMBER 19, 1986

Dear Jackie:

I have reviewed the above referenced revised plan, dated November 10, 1986.

This plan is still in compliance with the rough grading approval. Consequently, please provide the contractor with this revised approved plan.

Please be advised that the conditions identified in Carlos Montoya's previous letter still apply for further approvals.

Should you have any questions or comments, or if I can be of further assistance, please call me at 768-2650.

Cordially,

Billy J. Goolsby

Billy J. Goolsby, P.E.
C.E./Hydrology Section

BJG/bsj

25×10

0000 0000 0949

DRAINAGE INFORMATION SHEET

D20/D5

PROJECT TITLE: Heritage Hills Park ZONE ATLAS/DRNG.FILE #: D,E-19,20

LEGAL DESCRIPTION: Heritage Hills Unit Two and Cherry Hills Subdivision

CITY ADDRESS: 7015 Ventura

ENGINEERING FIRM: Chavez-Grieves Engrs. CONTACT: Jackie McDowell

ADDRESS: 4600 C Montgomery Blvd. PHONE: (505) 881-7376

OWNER: City of Albuquerque CONTACT: Sandy Zuschlag

ADDRESS: P.O. Box 1293 PHONE: (505) 823-4012

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: Albuquerque Surveying CONTACT: Fred Sanchez

ADDRESS: 2119 Menaul PHONE: (505) 884-2036

CONTRACTOR: N/A CONTACT:

ADDRESS: PHONE:

RECEIVED NOV 19 1986 HYDROLOGY SECTION

PRE-DESIGN MEETING:

____ YES

X NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

X ROUGH GRADING PERMIT APPROVAL

~~X~~ GRADING/PAVING PERMIT APPROVAL

~~X~~ OTHER ~~Concept Approval~~ (SPECIFY)

DATE SUBMITTED: 11/19/86

BY: Jackie S. McDowell

25 x 10

0000 0000 0950

CHAVEZ—GRIEVES / CONSULTING ENGINEERS, INC.

4600 MONTGOMERY N.E., BUILDING C, #101
ALBUQUERQUE, NEW MEXICO 87109
(505) 881-7376

LETTER OF TRANSMITTAL

TO: Public Works Dept
Hydrology Section
Attn: Carlos

DATE: 11/19/86
JOB NO.
RE: Heritage Hills Park

RECEIVED NOV 19 1986 HYDROLOGY SECTION

GENTLEMEN:

We are sending you X ATTACHED ___ UNDER SEPARATE COVER the following items:

__ SHOP DRAWINGS __ CHANGE ORDER __ SPECIFICATIONS
__ COPY OF LETTER __ PLANS __
X PRINTS __ SAMPLES

COPIES	DATE	NO.	DESCRIPTION
1			Rough Grading Plan
1			Info Sheet

THESE ARE TRANSMITTED as checked below:

__ FOR APPROVAL
X FOR YOUR USE
__ AS REQUESTED
__ FOR REVIEW AND COMMENT
__ APPROVED AS SUBMITTED
__ APPROVED AS NOTED
__ RETURNED FOR CORRECTIONS
__ RESUBMIT ___ COPIES FOR APPROVAL
__ SUBMIT ___ COPIES FOR DISTRIBUTION
__ RETURN ___ CORRECTED PRINTS
__ PRINTS RETURNED AFTER LOAN TO US
__ FOR BIDS DUE _____ 19__

REMARKS:
Carlos - an additional berm has been added west of the first berm to dissipate flows.

COPY TO: file

SIGNED: Jackie S. McDowell

If enclosures are not as noted, kindly notify us at once.

25 × 10

0000 0000 0951

D20/D6

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Heritage Hills Park ZONE ATLAS/DRNG.FILE #: D,E-19,20

LEGAL DESCRIPTION: Heritage Hills Unit Two and Cherry Hills Subdivision

CITY ADDRESS: 7015 Ventura

ENGINEERING FIRM: Chavez-Grieves Engrs. CONTACT: Jackie McDowell

ADDRESS: 4600 C Montgomery Blvd. PHONE: (505) 881-7376

OWNER: City of Albuquerque CONTACT: Sandy Zuschlag

ADDRESS: P.O. Box 1293 PHONE: (505) 823-4012

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: Albuquerque Surveying CONTACT: Fred Sanchez

ADDRESS: 2119 Menaul PHONE: (505) 884-2036

CONTRACTOR: N/A CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

____ YES

X NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED NOV 1 0 1986 HYDROLOGY SECTION

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

X GRADING/PAVING PERMIT APPROVAL

~~X OTHER Concept Approval~~ (SPECIFY)

DATE SUBMITTED: 11/11/86

BY: Jackie S. McDowell

25 x 10

0000 0000 0952

CHAVEZ—GRIEVES / CONSULTING ENGINEERS, INC.

4600 MONTGOMERY N.E., BUILDING C, #101
ALBUQUERQUE, NEW MEXICO 87109
(505) 881-7376

LETTER OF TRANSMITTAL

TO: Public Works Dept
Hydrology Section
Attn: Carlos

DATE: 11/14/86
JOB NO.
RE: Heritage Park

RECEIVED NOV 17 1986 HYDROLOGY SECTION

GENTLEMEN:

We are sending you X ATTACHED ___ UNDER SEPARATE COVER the following items:

__ SHOP DRAWINGS __ CHANGE ORDER __ SPECIFICATIONS
__ COPY OF LETTER __ PLANS __ ____
X PRINTS __ SAMPLES

COPIES	DATE	NO.	DESCRIPTION
1			Grading (Rough) Plan - Permit.
1			Info Sheet

THESE ARE TRANSMITTED as checked below:

__ FOR APPROVAL
X FOR YOUR USE - file
X AS REQUESTED
__ FOR REVIEW AND COMMENT
__ APPROVED AS SUBMITTED
__ APPROVED AS NOTED
__ ____

__ RETURNED FOR CORRECTIONS
__ RESUBMIT ___ COPIES FOR APPROVAL
__ SUBMIT ___ COPIES FOR DISTRIBUTION
__ RETURN ___ CORRECTED PRINTS
__ PRINTS RETURNED AFTER LOAN TO US
__ FOR BIDS DUE ____ 19__

REMARKS:

COPY TO: file

SIGNED: Jackie S. McDonell

If enclosures are not as noted, kindly notify us at once.

25 × 10

0000 0000 0953

FILE COPY

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

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

November 10, 1986

Jackie McDowell
Chavez-Grieves Consulting Engineers
4600 Montgomery Blvd., NE Bldg. C
Albuquerque, New Mexico 87109

RE: CONCEPTUAL GRADING & DRAINAGE PLAN FOR HERITAGE HILLS PARK (D-20/D5) RECEIVED OCTOBER 27, 1986

Dear Jackie:

The referenced plan is approved for rough grading. The rough grading includes the east parking lot area only.

Prior to release of the paving permit for the east parking lot, the following items will be required:

1. Note on drawing indicating that "Topsoil Disturbance Permit" is required from the contractor.

2. Need proposed spot elevations or contours for the parking lot.

3. Need to address erosion downstream of the parking lot.

4. Please address the time table of when the future concrete swale is to be constructed and when the parking lot is to be constructed.

If you have any questions, please call me at 768-2650.

Cordially,

Carlos A. Montoya

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

CAM/bsj

25×10

0000 0000 0954

CHAVEZ—GRIEVES / CONSULTING ENGINEERS, INC.
4600 MONTGOMERY N.E., BUILDING C, #101
ALBUQUERQUE, NEW MEXICO 87109
(505) 881-7376

RECEIVED
OCT 27 1986
HYDROLOGY SECTION

October 24, 1986

Mr. Carlos A. Montoya, P.E.
City/County Floodplain Administrator
City of Albuquerque
P.O. Box 1293
Albuquerque, N.M. 87103

RE: GRADING AND DRAINAGE PLAN FOR HERITAGE HILLS PARK
(D-20/D5)

Dear Carlos:

In response to your letter dated September 15, 1986, I offer the following:

1. The conceptual plan submitted on September 9, 1986, has been modified to a grading and drainage plan.

2. Items below have been addressed:

   a. Proposed contours have been added.

   b. A detail of the typical rundown swale has been added to show how flows enter the existing concrete channel.

   c. The storm sewer system at the intersection of Barstow Street and Harper was designed to accept developed runoff from upstream properties. - See "Pino-San Antonio Corridor Project", #2151, designed by the City of Albuquerque.

   d. Off-site flows through the site have been shown on the plan and a detail of the typical rundown swale has been shown. The future concrete swale from Cherry Hills Subdivision will be designed and constructed with the design and construction of the parking lot next to Ventura Street. These construction drawings will go through the Work Order (DRC) Process.

25×10

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e. The DPM checklist has been reviewed and items have been added that are necessary.

Your timely assistance in this matter is appreciated.

Cordially yours,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Jackie S. McDowell

Jackie S. McDowell

JSM:mf

25×10

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DRAINAGE INFORMATION SHEET

D20/D5

PROJECT TITLE: Heritage Hills Park ZONE ATLAS/DRNG.FILE #: D,E-19,20

LEGAL DESCRIPTION: Heritage Hills Unit Two and Cherry Hills Subdivision

CITY ADDRESS: 7015 Ventura

ENGINEERING FIRM: Chavez-Grieves Engrs. CONTACT: Jackie McDowell

ADDRESS: 4600 C Montgomery Blvd. PHONE: (505) 881-7376

OWNER: City of Albuquerque CONTACT: Sandy Fuschlag

ADDRESS: P.O. Box 1293 PHONE: (505) 823-4012

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: Albuquerque Surveying CONTACT: Fred Sanchez

ADDRESS: 2119 Menaul PHONE: (505) 884-2036

CONTRACTOR: N/A CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

____YES

X NO

____COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED OCT 27 1986 HYDROLOGY SECTION

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

____DRAINAGE REPORT

____DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAINAGE PLAN

____GRADING PLAN

____EROSION CONTROL PLAN

____ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____SKETCH PLAT APPROVAL

____PRELIMINARY PLAT APPROVAL

____SITE DEVELOPMENT PLAN APPROVAL

____FINAL PLAT APPROVAL

____BUILDING PERMIT APPROVAL

____FOUNDATION PERMIT APPROVAL

____CERTIFICATE OF OCCUPANCY APPROVAL

____ROUGH GRADING PERMIT APPROVAL

____GRADING/PAVING PERMIT APPROVAL

X OTHER Concept Approval (SPECIFY)

DATE SUBMITTED:

BY: Jackie S. McDowell

25 x 10

0000 0000 0957

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

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

September 15, 1986

Jackie McDowell
Chavez-Grieves Engineers
4600 Montgomery Blvd., NE Suite C
Albuquerque, New Mexico 87109

RE: CONCEPTUAL DRAINAGE PLAN FOR HERITAGE HILLS PARK
(D-20/D5) RECEIVED SEPTEMBER 9, 1986

Dear Mrs. McDowell:

I have reviewed the referenced plan, dated September 9, 1986, and forward the following comments:

1. To obtain a grading/paving permit, we will need a drainage plan. A conceptual plan does not have sufficient detail for approval.

2. Items that need to be addressed are the following:

   A. Proposed contours.
   B. How do flows enter the existing concrete channel?
   C. Need downstream capacity for flows into Barstow.
   D. Need to quantify the off-site flows through the site. How will these flows be conveyed through the site?
   E. The DPM drainage plan check list has further requirements for approval.

If you have any questions regarding this project, call me at 766-7644.

Cordially,

Carlos A. Montoya

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

CAM/bsj

25 x 10

0000 0000 0958

DRAINAGE INFORMATION SHEET

D20/D5

PROJECT TITLE: Heritage Hills Park ZONE ATLAS/DRNG.FILE #: ~~D,E-19,20~~

LEGAL DESCRIPTION: Heritage Hills Unit Two and Cherry Hills Subdivision

CITY ADDRESS: 7015 Ventura

ENGINEERING FIRM: Chavez-Grieves Engrs. CONTACT: Jackie McDowell

ADDRESS: 4600 C Montgomery Blvd. PHONE: (505) 881-7376

OWNER: City of Albuquerque CONTACT: Sandy Zuschlag

ADDRESS: P.O. Box 1293 PHONE: (505) 823-4012

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: Albuquerque Surveying CONTACT: Fred Sanchez

ADDRESS: 2119 Menaul PHONE: (505) 884-2036

CONTRACTOR: N/A CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

____ YES

X NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED SEP 09 1986 HYDROLOGY SECTION

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

X GRADING/PAVING PERMIT APPROVAL

X OTHER Concept Approval (SPECIFY)

DATE SUBMITTED:

BY: Jackie S. McDowell

25×

0000 0000 0959

CHAVEZ—GRIEVES / CONSULTING ENGINEERS, INC.

4600 MONTGOMERY N.E., BUILDING C, #101
ALBUQUERQUE, NEW MEXICO 87109
(505) 881-7376

LETTER OF TRANSMITTAL

TO: Public Works Dept.
Hydrology Section
Attn: Barbara

DATE: 9/9/86
JOB NO.
RE: Heritage Hills Park

GENTLEMEN:

We are sending you X ATTACHED ___ UNDER SEPARATE COVER the following items:

__ SHOP DRAWINGS __ CHANGE ORDER __ SPECIFICATIONS
__ COPY OF LETTER __ PLANS
X PRINTS __ SAMPLES

RECEIVED SEP 09 1986 HYDROLOGY SECTION

COPIES	DATE	NO.	DESCRIPTION
2			Conceptual Drainage Plan
1			Info. Sheet
1			Drainage Report for North Pino Arroyo Channelization through Heritage Hills Park

THESE ARE TRANSMITTED as checked below:

X FOR APPROVAL
__ FOR YOUR USE
__ AS REQUESTED
__ FOR REVIEW AND COMMENT
__ APPROVED AS SUBMITTED
__ APPROVED AS NOTED
__ RETURNED FOR CORRECTIONS
__ RESUBMIT ___ COPIES FOR APPROVAL
__ SUBMIT ___ COPIES FOR DISTRIBUTION
__ RETURN ___ CORRECTED PRINTS
__ PRINTS RETURNED AFTER LOAN TO US
__ FOR BIDS DUE _____ 19__

REMARKS:

COPY TO: file

SIGNED: Jackie S. McDowell

If enclosures are not as noted, kindly notify us at once.

25 × 10

0000 0000 0960

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

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

April 15, 1987

Jackie McDowell
Chavez-Grieves Consulting Engineers, Inc.
4600-C Montgomery Boulevard, NE
Albuquerque, New Mexico 87109

RE: GRADING PLANS OF HERITAGE HILLS PARK RECEIVED MARCH 26 AND APRIL 2, 1987 FOR GRADING AND PAVING PERMIT APPROVAL (D-20/D5) (PROJECTS #2920, 3088)

Dear Jackie:

The above referenced submittal, dated March 26 and April 1, 1987 respectively, are approved for Grading and Paving Permit. Work Order construction drawings may be signed-off by Hydrology.

Contractor is responsible for obtaining a Topsoil Distrubance Permit prior to grading operations.

If you have any questions, call me at 768-2650.

Cordially,

Roger A Green, PE

Roger A. Green, P.E.
C.E./Hydrology Section

cc: Sandy Zuschlag, Parks & Rec.

RAG/bsj

PUBLIC WORKS DEPARTMENT
Walter Nickerson, P.E., City Engineer
ENGINEERING GROUP
Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

25×10

0000 0000 0961

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

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

December 5, 1986

Jackie McDowell
Chavez-Grieves Consulting Engineers
4600-C Montgomery Blvd., NE
Albuquerque, New Mexico 87109

RE: REVISED ROUGH GRADING PLAN FOR HERITAGE HILLS PARK (D-20/D5)
RECEIVED NOVEMBER 19, 1986

Dear Jackie:

I have reviewed the above referenced revised plan, dated November 10, 1986.

This plan is still in compliance with the rough grading approval. Consequently, please provide the contractor with this revised approved plan.

Please be advised that the conditions identified in Carlos Montoya's previous letter still apply for further approvals.

Should you have any questions or comments, or if I can be of further assistance, please call me at 768-2650.

Cordially,

Billy J. Goolsby

Billy J. Goolsby, P.E.
C.E./Hydrology Section

BJG/bsj

25×10

0000 0000 0962

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

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

November 10, 1986

Jackie McDowell
Chavez-Grieves Consulting Engineers
4600 Montgomery Blvd., NE Bldg. C
Albuquerque, New Mexico 87109

RE: CONCEPTUAL GRADING & DRAINAGE PLAN FOR HERITAGE HILLS PARK (D-20/D5) RECEIVED OCTOBER 27, 1986

Dear Jackie:

The referenced plan is approved for rough grading. The rough grading includes the east parking lot area only.

Prior to release of the paving permit for the east parking lot, the following items will be required:

1. Note on drawing indicating that "Topsoil Disturbance Permit" is required from the contractor.

2. Need proposed spot elevations or contours for the parking lot.

3. Need to address erosion downstream of the parking lot.

4. Please address the time table of when the future concrete swale is to be constructed and when the parking lot is to be constructed.

If you have any questions, please call me at 768-2650.

Cordially,

Carlos A. Montoya

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

CAM/bsj

25×10

0000 0000 0963

HERITAGE HILLS PARK

DRAINAGE REPORT

FOR

THE CITY OF ALBUQUERQUE
PARKS & RECREATION
DESIGN DEVELOPMENT

VICTOR J CHAVEZ
STATE OF NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER
3/25/87

MAR 6 1987
HYDROLOGY SECTION

LOCATION AND EXISTING CONDITION:

The site is the North Pino Arroyo (Heritage Hills Park) bounded by Barstow Street, Ventura Street, Heritage Hills Unit Two, and Cherry Hills Subdivision containing approximately 34.72 acres and sloping from east to west with an average slope of 2.9 percent.

The North Pino Arroyo is located on Albuquerque's northeast mesa and now drains from the diversion point at the Pino Arroyo, which lies to the south, to its outlet at the North Diversion Channel. Heritage Hills Park is approximately 3 miles upstream from the North Diversion Channel.

The site is undeveloped with the exception of a recently constructed concrete lined channel (M.D.D. Project No. 2079). The 100-year storm is confined to the channel.

A 150 foot Public Service Company of New Mexico easement with power poles runs parallel to the channel and adjacent to the Cherry Hills development on the southern part of the site.

The natural vegetation is a grass/shrub mixture covering approximately 15% of the area.

PROPOSED CONDITION:

Proposed development of the site includes: landscaping, a parking lot, two plazas, bike and jogging paths, and a pedestrian bridge.

There has been a drainage report written for this site by Resource Technology Incorporated along with construction documents for the North Pino Arroyo Channel titled "Drainage Report for North Pino Arroyo Channelization through Heritage Hills Park", September 21, 1984. This drainage plan complies with the above-referenced report.

25x10

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This development will drain directly to the North Pino Arroyo. Runoff due to development will be decreased, therefore ponding will not be required.

The parking lot construction will be done under a separate set of drawings (#3088). Riprap erosion control has been provided at the downstream end fo the parking lot.

HERITAGE HILLS PARK - SHEET 10 OF 33

CALCULATIONS:

Area = 2.36 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour, 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = (2.2)(2.45) = 5.39 in./hr.

EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	0.25	0.24	
Concrete Channel				
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	2.11	0.84	
TOTAL		2.36	1.08	0.46

Q(100) = (0.46)(5.39)(2.36) = 5.85 cfs
Q(10) = (0.657)(5.85) = 3.84 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(2.36)(43560)/12 = 3855 cu. ft.
V(10) = (0.657)(3855) = 2533 cu. ft.

PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	0.25		0.24
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	2.11	0.53	
Undeveloped	0.40	-0-	-0-	
TOTAL		2.36	0.77	0.33

Q(100) = (0.33)(5.39)(2.36) = 4.20 cfs
Q(10) = (0.657)(4.20) = 2.76 cfs
CN = 69 Plate 22.2 C-3
Direct Runoff = 0.40 in. Plate 22.2 C-4
V(100) = (0.40)(2.36)(43560)/12 = 3427 cu. ft.
V(10) = (0.657)(3427) = 2251 cu. ft.

25×10

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HERITAGE HILLS PARK - SHEET 11 OF 33

CALCULATIONS:

Area = 3.90 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour, 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = (2.2)(2.45) = 5.39 in./hr.

EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	-0-	-0-	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	3.90	1.56	
TOTAL		3.90	1.56	0.40

Q(100) = (0.40)(5.39)(3.90) = 8.41 cfs
Q(10) = (0.657)(8.41) = 5.52 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(3.90)(43560)/12 = 6371 cu. ft.
V(10) = (0.657)(6371) = 4186 cu. ft.

PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	1.32	1.25	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	2.07	0.52	
Undeveloped	0.40	0.51	0.20	
TOTAL		3.90	1.97	0.51

Q(100) = (0.51)(5.39)(3.90) = 10.72 cfs
Q(10) = (0.657)(10.72) = 7.04 cfs
CN = 74 Plate 22.2 C-3
Direct Runoff = 0.60 in. Plate 22.2 C-4
V(100) = (0.60)(3.90)(43560)/12 = 8494 cu. ft.
V(10) = (0.657)(8494) = 5581 cu. ft.

HERITAGE HILLS PARK - SHEET 12 OF 33

CALCULATIONS:

Area = 2.52 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour, 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = ()() = in./hr.

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EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks Concrete Channel	0.95	0.31	0.29	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	2.21	0.88	
TOTAL		2.52	1.17	0.46

Q(100) = (0.46)(5.39)(2.52) = **6.25 cfs**
Q(10) = (0.657)(6.25) = 4.10 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(2.52)(43560)/12 = 4116 cu. ft.
V(10) = (0.657)(4116) = 2704 cu. ft.

PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks Concrete Channel	0.95	0.31	0.29	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	2.21	0.55	
Undeveloped (Native)	0.40	-0-	-0-	
TOTAL		2.52	0.84	0.33

Q(100) = (0.33)(5.39)(2.52) = **4.48 cfs**
Q(10) = (0.657)(4.48) = 2.94 cfs
CN = 69 Plate 22.2 C-3
Direct Runoff = 0.40 in. Plate 22.2 C-4
V(100) = (0.40)(2.52)(43560)/12 = 3659 cu. ft.
V(10) = (0.657)(3659) = 2404 cu. ft.

HERITAGE HILLS PARK - SHEET 13 OF 33

CALCULATIONS:

Area = 3.96 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour, 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = (2.2)(2.45) = 5.39 in./hr.

EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	-0-	-0-	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	3.96	1.58	
TOTAL		3.96	1.58	0.40

25×10

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Q(100) = (0.40)(5.39)(3.96) = 8.54 cfs
Q(10) = (0.657)(8.54) = 5.61 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(3.96)(43560)/12 = 6469 cu. ft.
V(10) = (0.657)(6469) = 4250 cu. ft.

PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	0.07	0.07	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	2.21	0.55	
Undeveloped	0.40	1.68	0.67	
TOTAL		3.96	1.29	0.33

Q(100) = (0.33)(5.39)(3.96) = 7.04 cfs
Q(10) = (0.657)(7.04) = 4.63 cfs
CN = 69 Plate 22.2 C-3
Direct Runoff = 0.40 in. Plate 22.2 C-4
V(100) = (0.40)(3.96)(43560)/12 = 5750 cu. ft.
V(10) = (0.657)(5750) = 3778 cu. ft.

HERITAGE HILLS PARK - SHEET 14 OF 33

CALCULATIONS:

Area = 1.14 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour, 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = (2.2)(2.45) = 5.39 in./hr.

EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks Concrete Channel	0.95	0.15	0.14	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	0.99	0.40	
TOTAL		1.14	0.54	0.47

Q(100) = (0.47)(5.39)(1.14) = 2.89 cfs
Q(10) = (0.657)(2.89) = 1.90 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(1.14)(43560)/12 = 1862 cu. ft.
V(10) = (0.657)(1862) = 1223 cu. ft.

25×10

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PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	0.19	0.18	
Concrete Channel				
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	0.95	0.24	
Undeveloped	0.40	-0-	-0-	
TOTAL		1.14	0.42	0.37

Q(100) = (0.37)(5.39)(1.14) = 2.27 cfs
Q(10) = (0.657)(2.27) = 1.49 cfs
CN = 69 Plate 22.2 C-3
Direct Runoff = 0.40 in. Plate 22.2 C-4
V(100) = (0.40)(1.14)(43560)/12 = 1655 cu. ft.
V(10) = (0.657)(1655) = 1088 cu. ft.

HERITAGE HILLS PARK - SHEET 15 OF 33

CALCULATIONS:

Area = 3.73 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour, 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = (2.2)(2.45) = 5.39 in./hr.

EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	-0-	-0-	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	3.73	1.49	
TOTAL		3.73	1.49	0.40

Q(100) = (0.40)(5.39)(3.73) = 8.04 cfs
Q(10) = (0.657)(8.04) = 5.28 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(3.73)(43560)/12 = 6093 cu. ft.
V(10) = (0.657)(6093) = 4003 cu. ft.

PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	0.24	0.23	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	2.09	0.52	
Undeveloped (Native)	0.40	1.40	0.56	
TOTAL		3.73	1.31	0.35

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Q(100) = (0.35)(5.39)(3.73) = 7.04 cfs
Q(10) = (0.657)(7.04) = 4.62 cfs
CN = 69 Plate 22.2 C-3
Direct Runoff = 0.40 in. Plate 22.2 C-4
V(100) = (0.40)(3.73)(43560)/12 = 5416 cu. ft.
V(10) = (0.657)(5416) = 3558 cu. ft.

HERITAGE HILLS PARK - TOTALS FROM SHEETS 10-15

CALCULATIONS:

Area = 17.61 acres
I = 2.2 in./hr. Plate 22.2 D-2
6-hour. 100-year rainfall = 2.45 in. Plate 22.2 D-1
i = (2.2)(2.45) = 5.39 in./hr.

EXISTING ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	0.71	0.67	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	-0-	-0-	
Undeveloped	0.40	16.90	6.76	
TOTAL		17.61	7.43	0.42

Q(100) = (0.42)(5.39)(17.61) = 39.87 cfs
Q(10) = (0.657)(39.87) = 26.19 cfs
CN = 70 Plate 22.2 C-2
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(17.61)(43560)/12 = 28766 cu. ft.
V(10) = (0.657)(28766) = 18899 cu. ft.

PROPOSED ON-SITE CONDITIONS:

SURFACE TYPE	"C" VALUE	A (ACRES)	"C"X A	COMPOSITE "C"=CXA/A
Streets, Drives, Walks	0.95	2.38	2.26	
Roofs	0.90	-0-	-0-	
Lawns & Landscaping	0.25	11.64	2.91	
Undeveloped	0.40	3.59	1.44	
TOTAL		17.61	6.61	0.38

Q(100) = (0.38)(5.39)(17.61) = 36.07 cfs
Q(10) = (0.657)(36.07) = 23.70 cfs
CN = 70 Plate 22.2 C-3
Direct Runoff = 0.45 in. Plate 22.2 C-4
V(100) = (0.45)(17.61)(43560)/12 = 28766 cu. ft.
V(10) = (0.657)(28766) = 18899 cu. ft.

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

March 17, 1992

Fred Arfman, P.A.
Isaacson & Arfman, P.A.
128 Monroe Street, NE
Albuquerque, New Mexico 87108

RE: DRAINAGE PLAN FOR HERITAGE HILLS PARK, PHASE II
(D-20/D5) ENGINEER'S STAMP DATED FEBRUARY 20, 1992

Dear Mr. Arfman:

Based on the information provided on your submittal of February 20, 1992, listed are some concerns that will need to be addressed.

1. Encroachment Agreement from PNM for the encroachment within their easement.

2. Arroyo stabilization from the existing rundown from Cherry Hills, Unit 1 - D6-149 down towards the channel. Asphalt or concrete rundown or swale is appropriate.

3. Please include a legend so as determine what is existing and what is proposed .

4. What ACS datum was used?

5. Please provide typical details of structures when it is appropriate.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya

Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+3247)

PUBLIC WORKS DEPARTMENT

Walter H. Nickerson, Jr., P.E.
Assistant Director Public Works

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

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DRAINAGE INFORMATION SHEET

D20/D5

PROJECT TITLE: HERITAGE HILLS PL. - PH. II ZONE ATLAS/DRNG. FILE #: ~~D-E-19~~ D-8-28

LEGAL DESCRIPTION: TR. B, CHERRY HILLS UNIT 1, TR. A, HERITAGE HILL UNIT 2 AND

~~CITY ADDRESS~~: A PORTION OF THE NORTH ARROYO DEL PINO R.O.W.

ENGINEERING FIRM: ISAACSON & AREMAN, P.A. CONTACT: FRED C. AREMAN, P.E.

ADDRESS: 123 MONROE ST. N.E. PHONE: 268-3828

OWNER: CITY OF ALBUQUERQUE CONTACT: MARK DEAR

ADDRESS: P.O. BOX 1293, PINTO. BLD'G PHONE: 857-8647

ARCHITECT: DESIGN & DEVELOPMENT CONTACT:

ADDRESS: PARKS & REC. PHONE:

SURVEYOR: ALBUQUERQUE SURVEYING CONTACT: FRED SANCHEZ

ADDRESS: PHONE: 884-2036

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

___ YES

✓ NO

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. ___

EPC NO. ___

PROJ. NO. ___

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

✓ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

___ SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

✓ OTHER WORK ORDER (SPECIFY)

FEB 20 1992

DATE SUBMITTED: FEB 20, 1992

BY: FRED C. AREMAN, P.E.

FOR ISAACSON & AREMAN, P.A.

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HERITAGE HILLS PARK
PHASE II

RECREATIONAL TRAIL AND SPOT GRADING PLAN

SUPPLEMENTAL SITE INFORMATION AND HYDROLOGICAL CALCULATIONS

FEBRUARY 1992

FEB 20 1992

PREPARED BY:

ISAACSON & ARFMAN, P.A.
128 MONROE STREET, NE
ALBUQUERQUE, NEW MEXICO

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GENERAL NOTES

LEGAL DESCRIPTION: Heritage Hills Park, being comprised of Tract B, Cherry Hills Unit 1; portion of North Arroyo del Pino Right-of-Way; Tract A, Heritage Hills, Unit 2, filed August 10, 1977, in Book D-7, Page 196.

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108
Attn: Fred C. Arfman, P.E.

SURVEYOR: Albuquerque Surveying Company
Attn: Fred Sanchez
Date of Survey: May 1, 1991

BENCHMARK: The station mark is a standard City of Albuquerque Brass Cap, stamped "5-E19." Station is located approximately 0.5 miles east of the intersection of Wyoming Blvd. and San Antonio Drive. See City of Albuquerque Control Station Data, Page C-193.
ELEVATION = 5475.27

ZONING: City Park and Drainage R.O.W.

AREA: Phase II comprises approximately 11.0 acres.

FLOOD HAZARD: No portion of the park area is subject to a flood hazard area with the exception of those storm waters being contained within the constructed North Arroyo del Pino Channel as determined by Panel No. 350002-0010 of the October 14, 1983 edition of the FEMA maps and the subsequent revisions.

LOCATION & DESCRIPTION

Phase II of the Heritage Hills Park is situated east of Barstow Street between Cherry Hills Subdivision and Academy North Subdivision. It extends approximately 2,100 feet east to the existing improved west edge of Phase I. The North Arroyo del Pino Channel (fully lined concrete channel) is situated within the subject phase. The southerly 150 feet portion of the park is a Public Service Company of New Mexico transmission line easement.

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The proposed improvement of this phase of the park development shall only consist of a 10-foot-wide recreational trail linking the existing trail in the Phase I area with Barstow Street. In addition, minor grading of those previously disturbed areas south and adjacent to the North Arroyo del Pino Channel shall be performed and reseeded with native grasses. Those areas north of the improved channel and south of the proposed recreational trail shall not be disturbed with the exception of minor landscaping along Barstow Street to create a greenbelt buffer.

DRAINAGE CHARACTERISTICS

EXISTING: The study area is bordered on the north by the existing south concrete edge of the North Arroyo del Pino Channel, on the south by the rear yard property walls of the Cherry Hills Subdivision, Barstow Street on the west, and the existing concrete rundown connecting Cherry Hills Unit 2 with the said concrete channel. A commercial development off Barstow Street is excluded from the study area.

The entire area consists of undeveloped and mainly undisturbed lands consistent with the northeast heights. A gradual 3% grade of native grasses and shrubs exists through those undisturbed areas.

The study area consists of two drainage basins. A minor basin exists to the south of the La Petite Day Care (Tract B-B, Unit 6-A, Loma del Norte) from Barstow Street to an unimproved drainage way approximately 660 feet to the east. This basin is designated as Basin A and consists of 2.3 acres. Storm waters generated from this basin overland flow to the west and enter onto the paved surface of Barstow Street.

The remainder of the subject area has its storm water overland flow directly into the concrete channel or travel by a combination of overland and channelized flow to the existing concrete side inlet of the channel located approximately 260 feet east of Barstow Street.

HYDROLOGY

EXISTING: The subject area is within the boundaries of Precipitation Zone No. 3 (east of San Mateo Boulevard and west of Eubank Boulevard). As such, the P_{360} (6 hr.-100 yr. storm) has a depth of 2.60 inches.

The total drainage area (Basins A & B) consists of 11.0 acres of undeveloped earthen and grass lands having land treatment classifications of C and A, respectively.

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Peak Discharge (using a 10-minute time of concentration), cfs/Ac. 100 yr. Zone 3 (Table 9)

LAND TREATMENT	AREA (Ac.)	PEAK DISCHARGE (cfs./Ac.)
A	7.3	1.87
C	2.7	3.45

Total Q_P = (1.87)(7.3)+(3.45)(2.7)

= 23 cfs

Volume

Weighted E = $\frac{(7.3)(0.66)+(2.7)(1.29)}{7.3 + 2.7}$

= 0.75 inches

Volume = $\frac{0.75}{12}$ (11.0)(43560) = 30,133 cu.ft.

PROPOSED IMPROVEMENTS

The proposed Phase II improvements consist of a 10-foot-wide asphaltic recreational trail, minor grading on those previously disturbed areas adjacent to the concrete channel and north of the proposed trail, and landscaping along Barstow Street to create a greenbelt. All other parks improvements such as off-street parking, access road, grassed areas, playgrounds, tennis court, and major drainage improvements are scheduled for future Phase III of the park improvement program.

Peak Discharge (using a 10-minute time of concentration), cfs/Ac. 100 yr. Zone 3 (Table 9)

BASIN/LAND TREATMENT		AREA (Ac.)	PEAK DISCHARGE (cfs./Ac.)
A -	A	1.94	1.87
	C	0.20	3.45
	D	0.16	5.02
B -	A	6.77	1.87
	C	1.40	3.45
	D	0.53	5.02

BASIN A:

Total Q_P = (1.87)(1.94)+(3.45)(0.20)+(5.02)(0.16)

= 5.12 cfs

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Volume

Weighted E = $\frac{(0.66)(1.94)+(1.29)(0.20)+(2.36)(0.16)}{1.94 + 0.20 + 0.16}$

= 0.833 inches

Volume = $\frac{0.833}{12}(2.30)(43560) = 6{,}955$ cu.ft.

BASIN B:

Total Q_P = (1.87)(6.77)+(3.45)(1.40)+(5.02)(0.53)

= 20.2 cfs

Volume

Weighted E = $\frac{(0.66)(6.77)+(1.29)(1.40)+(2.36)(0.53)}{6.77 + 1.40 + 0.53}$

= 0.86 inches

Volume = $\frac{0.86}{12}(8.7)(43560) = 27{,}160$ cu.ft.

SUMMARY

The additional impervious paving of the asphaltic recreational trail and the minor grading result in an increase of 2.3 cfs (10%) and an increase in storm water runoff volume of 3,983 cu. ft.

The drainage patterns have not substantially changed due to the placement of the trail along the existing park high ridge line and for allowing the overland flow to traverse between the newly created knolls (low profile) between the trail and the existing channel.

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CITY ENGINEER

DRAINAGE REPORT FOR NORTH PINO ARROYO CHANNELIZATION THROUGH HERITAGE HILLS PARK

prepared for

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT

RECEIVED
SEP 09 1986
HYDROLOGY SECTION

September 21, 1984

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INTRODUCTION

This report presents an investigation of existing and expected drainage conditions for the proposed channelization of North Pino Arroyo through Heritage Hills Park from Ventura Street NE to Barstow Street NE.

At present, the North Pino Arroyo reach upstream from this study reach is being channelized into a trapezoidal concrete section, and the Ventura Street NE crossing will be accomplished with a box culvert structure. The present study reach will terminate just upstream from Barstow Street NE and this crossing is not planned to be changed under this project. At present it is a depressed street - an at - grade or dip crossing. Downstream from Barstow Street NE the North Pino Arroyo has an excavated but unlined channel.

Existing developed flows from adjoining subdivisions and upstream flows for the study reach are presented in this report. Design flow rates for the project channel reach are selected and alternative channels to carry the flows are then hydraulically sized and presented.

SITE DESCRIPTION

North Pino Arroyo is located on Albuquerque's northeast mesa, as shown in Figure 1. Between Browning and Lowell streets, the upper portion of the North Pino Arroyo is diverted to the Pino Arroyo which lies to the south. The North Pino Arroyo now drains from this diversion point to it's outlet at the North Diversion Channel. The portion of North Pino Arroyo to be channelized under this project lies between Ventura St. NE and Barstow St. NE, approximately three (3) miles upstream from its outlet. Heritage Hills Park will be located along the east-west oriented channel between Heritage Hills Unit 2 in the north and Cherry Hills Unit 2 in the south.

The project site is undeveloped except for the existing earthen arroyo channel which was constructed along with Heritage Hills Unit 2 on the north-eastern part of the site. A 150 ft. Public Service Company of New Mexico easement with power poles runs parallel to the channel and adjacent to the

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Cherry Hills development on the southern part of the site as shown in Figure 1. In the western part of the site, the existing channel has several wooden drop structures which are partially buried by aggradation and in a state of disrepair. The PNM easement and the channel converge 1,200 feet upstream from Barstow St. NE which crosses the arroyo in a concrete-lined dip crossing.

The eastern and upstream part of the site is bounded by Ventura St. NE where a bridge is under construction. Also, a new North Pino Arroyo concrete channel is being constructed upstream from Ventura St. NE by the developers of Heritage East Subdivision The site is crossed by several dirt roads including a road along the channel bank.

The soil in the arroyo channel is the Tijeras Series--gravelly fine sandy loam of the Soil Conservation Service Hydrologic Soil Group B. In areas of higher elevation, Embudo Series soils with properties similar to those of the Tijeras Series are found. The natural vegetation is a grass-shrub mixture covering about 15% of the area. All soils information was derived from the U.S. Department of Agriculture Soil Conservation Service report entitled, "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico."

The adjacent developments are mostly single family unit subdivisions. Adjacent off-site flows were divided into twelve (12) separate basins. The off-site basins west of Ventura St. NE are all developed, and those basins east of Ventura St. NE are only partially developed. At present, flows from these off-site basins cross the proposed Heritage Hills park site to the North Pino Arroyo channel. Off-site and on-site flows are discussed in further detail in the next section.

HYDROLOGY

Beginning in 1977 existing off-site flows for the developed basins were calculated by various engineering consultants. Most of their computations are based on use of the rational equation and are presented in the drainage report

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for each subdivision. Flows for the North Pino Arroyo channel reach were determined from the AMAFCA Volume 1 Report, Northeast Heights Drainage Management Plan, April 1975, which recommends future developed 100-yr flows in Table 2 of that report. Existing off-site flows and references to source reports are tabulated in Table 1 and the tributary basins, existing drainage and discharge points are shown on Plate 1. The following paragraphs describe the existing basins tributary to North Pino Arroyo along the study reach.

BASIN A - (18.60 AC, C = 0.68, Q100 = 66.8 cfs) Developed condition. This basin is all of Academy North subdivision which drains by street flow to storm sewers discharging to North Pino Arroyo channel just upstream of the Barstow St. NE dip crossing.

BASIN B - (12.1 AC, C = 0.51, Q100 = 32 cfs) Developed condition. This basin drains part of Heritage Hills Unit 2 where backyard ponding is used extensively on original plans but present effectiveness is unknown. Flow proceeds down Capitol St. NE and Ticonderoga Drive NE to a curb cut and rundown to North Pino Arroyo channel.

BASIN C - (3.3 AC, C = 0.56, Q100 = 9 cfs) Developed condition. Same as Basin B, except flow proceeds down Minutemen Drive NE. There appears to be an additional acre of development along the channel not shown in the drainage report for Heritage Hill unit 2. This would increase the 100-year flow to 11.4 cfs.

BASIN D - (onsite 7.9 AC, C = 0.55; offsite 50.5 AC, C = 0.35; total Q100 = 86 cfs) Developed condition. This basin drains Heritage Hills Unit 2 and Heritage Hills East. Flow proceeds across Ventura St. NE and down Gettysburg Rd. NE to a curb cut and rundown to North Pino Arroyo channel. The part of the basin in Heritage Hills Unit 2 uses backyard ponding extensively on original plans, but present effectivness of the ponds is unknown. When Heritage Hills Unit 2 was built, off-site flow across Ventura St. NE was calculated to be 78 cfs to produce a total routed flow discharging to North Pino Arroyo channel of 89 cfs. The actual flow discharging across Ventura St. NE by the presently

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developing Heritage Hills East, as shown by the drainage report, is reduced to 39 cfs. This is less than the allowable 78 cfs, but due to the questionable condition of the back yard ponding, and hydraulics of flow over Ventura St. NE, the more conservative total flow of 89 cfs is recommended.

BASIN E - (onsite 6.1 AC, C = 0.54; offsite 101.9 AC, C = 0.35; total Q100 = 139 cfs) Developed condition. This basin is similar to Basin D in drainage concept. Flow proceeds across Ventura St. NE and down Yorktown Ave. NE to a curb cut in the cul-de-sac and into North Pino Arroyo channel. The original more conservative total flow is recommended.

BASIN F - (onsite 8.1 AC, C = 0.51; offsite 17.0 AC, C = 0.35; total Q100 = 32 cfs) Developed condition. This basin is similar to Basin B, except flow proceeds down Valley Forge Rd. NE and Freedom Way NE.

BASIN G - (17.06 AC, C = 0.65, Q100 = 60 cfs) Developed condition. This basin drains the southeast corner of Heritage Hills East down Ventura St. NE to the North Pino Arroyo channel at the Ventura St. NE bridge now being constructed.

BASIN H - (561 AC, Q100 = 642 cfs) Partially developed condition. This basin drains the mostly undeveloped area of North Pino Arroyo east or upstream of Ventura St. NE. Flow rates are provided by the regional AMAFCA study.

BASIN I - (onsite 10.78 AC, CN = 85, Q100 = 16.4 cfs; offsite 13.76 AC, C = .685, Q100 = 62.6 cfs; offsite 11.0 AC, C = .40, Q100 = 25.0 cfs) Mostly developed condition. This basin consists of three separate sub-basins - Fairways North at Tanoan, Wimbledon West at Tanoan and some undeveloped land. Flow enters the site through 3 - 30 in. culverts under Ventura St. NE and proceeds to the west, parallel to North Pino Arroyo channel, in a small arroyo; then converges with the channel east of Barstow St. NE.

BASIN J - (15.60 AC, C = 0.69, Q100 = 43.6 cfs) Developed condition. This basin drains part of Cherry Hills Unit 2 by street flow to a channel run-down which drains into the small arroyo channel mentioned in Basin I.

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BASIN K - (7.48 AC., C = 0.73, Q100 = 11.4 cfs) Developed condition. Same as Basin J, except this area drains part of Unit 1 and Unit 2, Cherry Hills Subdivision.

DESIGN FLOWS

The larger tributary flows (Basins D, E, F, G, and I) all enter the study reach in the upstream third of the reach (Stations 23+00 to 35+00) Also, the total tributary contributing area is approximately 300 acres, resulting in a total drainage area of 861 acres for North Pino Arroyo at Barstow Street NE. However, the original drainage area at Barstow Street NE (actually Wyoming Blvd. NE) in the N.E. Heights Drainage Management Plan is given as 794 acres.

Because local tributary flows will peak and move downstream much faster than the main channel upstream flows, the difference in drainage areas of 67 acres or 8 percent may not be significant. Consequently, the Q100 of 885 cfs. given in the NE Heights Drainage Management Plan for the erroneously labeled Barstow Street NE (Wyoming Blvd. NE) was used as the design flow capacity for the entire channel reach for this project.

HYDRAULICS

The following recommendations for alternative channel treatments are based on grades determined from existing city ortho-topo maps, design drawings from Heritage Hills East Subdivision, Mannings Formula to compute flow depth and the City Development Process Manual to compute required freeboard:

OPTION A1 - MINIMAL IMPROVEMENT (NO ACTION)

This alternative would use the existing channel through the study reach with no channel improvements. All existing tributary channel rundowns would be regraded and widened as necessary. The temporary transition from the Ventura Street NE culvert to the existing channel would be enlarged to accomodate 100-year flows as shown in Figure 2. A 3-ft. deep silt basin would be constructed at the downstream end of the study reach and immediately upstream from Barstow Street

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NE. Preliminary details on this basin are shown on Table 2 and Figure 3. Inspection of the channel showed minimal erosion and some aggradation where the grade had been lowered with drop structures. Therefore, no severe erosion is expected except during major flows when velocities will exceed 7 fps. Hydraulic paramenters for the existing channel are shown in Table 3 and a typical cross section is shown in Figure 4. This alternative will require extensive use of existing channels across the proposed park site which would preclude the development of any graded athletic playing fields.

OPTION A2 - GRASS LINED CHANNEL

This alternative would also use the existing channel through the site but with a smooth graded channel and grass lining. Reinforcing fabric (such as Enkamat) would be used to withstand the high flow velocities during major flows. City freeboard requirements would make it necessary to deepen the channel about 1 ft. In the park, this channel would be wide and shallow (40 ft. bottom width, 10:1 side slopes) and transitioning to a deeper (50 ft. bottom width 3:1 side slopes) channel downstream from the park. Existing rundowns to the channel would be improved and protected from erosion with reinforcing fabric. An inlet transition and silt basin at the outlet would be required. The inlet transition will include a drop structure to reduce the changed slope as shown in Figure 5. The silt basin will be the same as for option A1 and as shown in Figure 3. An inlet basin would be constructed downstream and south of the 3 RCP culverts under Ventura St. NE and flow from Basin I would be carried in as downstream and south of the 3 RCP culverts under Ventura St. 4ft. - 6ft. diameter pipe to the North Pino Arroyo channel. Flow velocities for the North Pino Arroyo channel using the existing grade are slightly high (9.72 fps for Q100) for an earth channel; however, inspection of the channel showed that there is no appreciable erosion at present, and some aggradation has

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occured where the grade was lowered with drop structures. Hydraulic parameters for this channel are shown in Table 3 and a cross-section is shown in Figure 4.

OPTION B1 - CONCRETE LINED CHANNEL

This alternative would use a trapozoidal concrete channel (10ft. bottom width, 2:1 side slopes) begining at the downstream side of the Ventura St. NE culvert, to carry the full 100-yr. flow in North Pino Arroyo. The concrete channel would be constructed in the bottom of the existing earth channel and would follow the same alignment. The channel invert would follow a constant grade from the invert of the Ventura Street NE culvert to the present road surface elevation at the Barstow St. NE dip crossing. A second alternative would be to grade the channel at the existing slope and transition to the existing Barstow St. NE dip crossing. Hydraulic parameters are shown for both grades in Table 3 and a cross-section is shown in Figure 4.

OPTION B2 - CONCRETE LINED CHANNEL

This alternative channel is the same as B1 but with flatter (3:1) sideslopes which would decrease the hazard to people slipping into the water. Both channels B1 and B2 have very high (24 to 28fps) 100-yr. flow velocities as shown in Table 3 and a cross-section is shown in Figure 4. These channels will require fencing or a flood warning device because of the high velocities that are expected. However, these measures were not considered in the cost estimates for these channels.

OPTION C - COMPOSITE CONCRETE AND GRASS LINED CHANNEL

This alternative channel combines a low flow concrete channel with a grass lined overflow channel. The low flow concrete

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channel would carry the 10-yr. flow and the combination of both channels would carry the 100-yr. flow. A lower capacity concrete channel portion may be selected after more detailed analyses in the next phase of this project. The low flow channel would be constructed in the bottom of the present arroyo channel along the same alignment. In the non-concrete section, the existing channel would be seeded and fertilized, and grass lining with fabric (Enkamat) reinforcing would be developed as the overflow channel. The flow depth over the grass lined section would be less than one foot and velocities would be lower than the existing earthen channel for the 100-yr. flow. Hydraulic parameters for this channel are shown in Table 3 and a cross-section is shown in Figure 4.

OPTION D - GRASS LINED CHANNEL WITH LOW FLOW PIPE

This alternative channel and pipe consists of a low flow RCP pipe with an inlet (Figure 6) downstream from the Ventura St. NE Bridge, several manholes with inlets for tributary flow, and an outlet downstream of Barstow St. NE. The pipe would carry the 5-year flow (312 cfs) and would have 2 feet of cover. Above the pipe would be a grass lined swale with 10:1 sideslopes. Reinforcing fabric (such as Enkamat) would be used to withstand the high flow velocities during major flows. The swale would carry all flows in excess of the 5-year flow plus tributary flows to the manholes. The advantage of this alternative would be that the relatively dry grass lined swale would increase the recreation area in the park while being safer than the concrete channel in Option C. Hydraulic parameters for this alternative are shown in Table 3 and a cross-section is shown in Figure 4.

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COST ESTIMATES

OPTION A1

Inlet transition		
excavation	113 cy @ $5.00/cy =	565.
rip rap & filter cloth lining	3,952 sf @ $11.50/sf =	45,448.
Total Cost		$46,013.
Silt basin		
excavation	936 cy @ $5.00/cy =	4,680.
drain pipe	200 ft @ $22.00/ft. =	4,400.
Total cost		$9,080.
Total cost for Option A1		$55,093.

OPTION A2

Inlet transition - same as A1 -		$46,013.
Channel		
excavation	14,230 cy @ $5.00/cy =	71,150.
fill	1,008 cy @ $7.00/cy	$7,056.
lining	321,867 sf @ $1.25 sf =	402,334.
Total Cost		$480,540.
Silt basin - Same as A1 -		$9,080.
Total Cost for Option A2		$535,633.

OPTION B1

Channel		
excavation	10,301 cy @ $5.00/cy =	51,505.
fill	6,477 cy @ $7.00/cy =	45,339.
lining	75,573 sf @ $5.50/sf =	415,652.
Total Cost		$512,496.
Silt basin - same as A1 -		$9,080.
Total Cost for Option B1		$521,576.

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OPTION B2

Channel		
excavation	14,627 cy @ $5.00/cy. =	73,135.
fill	9,197 cy @ $7.00/cy =	64,379.
lining	107,314 sf @ $5.50/sf =	590,227.
Total Cost		$727,741.
Silt basin - same as Option A1 -		$9,080.
Total Cost of Option B2		$736,821.

OPTION C

Channel		
excavation	14,600 cy @ $5.00/cy =	73,000.
fill	1,964 cy @ $7.00/cy =	13,748.
concrete lining	53,649 sf @ $5.50/sf =	295,070.
grass lining	150,748 sf @ $1.25/sf =	188,435.
Total Cost		$570,253.
Silt basin - same as Option A1 -		$9,080.
Total cost of Option C		$579,333.

OPTION D

Channel		
excavation	13,400 cy @ $5.00/cy =	67,000.
fill	1,964 cy @ $7.00/cy =	13,748.
grass lining	325,479 sf @ $1.25/sf =	406,849. looks like 1 ea not 325
Pipe		
inlet		15,100.
pipe - 72" dia.	190 lf @ $130.00/lf =	24,700.
pipe - 54" dia.	3,440 lf @ $80.00/lf =	275,200.
manholes	6 @$3,000.00/ea =	18,000.
outlet		25,000.
Total Cost of Option D		$845,597.

NOTE: These costs do not include right-of-way, contingency, maintenance, or incidental costs. Therefore, they should be used only for comparison between options.

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CONCLUSION

Comparison of the cost estimates presented in the previous section, indicates that Option B1, a concrete channel with 2H:1V side slopes would have the lowest initial cost for an improved channel. However, the high channel velocities (24 to 28 fps) would require the use of security fences or a flood warning system, and bridges across the channel. Also, any kind of fence would detract from the proposed Heritage Hills Park along this channel.

The minimal action alternative is obviously the lowest cost option (A1), but the maintenance costs will be very high. Therefore this option is only considered for definition of a baseline for channel improvement costs.

The cost of the combined concrete/grass lined channel is approximately $44,000 greater than a fully grass lined channel, but maintenance costs on the grass lined channel would be quite excessive. Also, the combined lining channel is based on a 10-yr capacity concrete channel. This channel capacity could be reduced with substantial reduction in cost also; but this reduction should be based on a more detailed optimization analysis which will be conducted during the next phase of this project.

Because the channel will be located in the proposed Heritage Hills Park, it is our recommendation that the concrete/grass lined channel option be fully developed and the optimum concrete channel capacity be determined. Should this channel still prove more expensive than the grass lined channel, this decision should be reevaluated during the next project phase.

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TABLE 1 OFFSITE BASINS AND FLOWS

Existing Discharge Point	Channel Station	Basin	Area (ac)	Discharge Location	Existing Discharge Structure	C	Tc (min)	Q100 (cfs)	Q10 (cfs)	Reference Report
1	0+80 L	A	18.60	30 ft east of Barstow in Channel	30 in. RCP	0.68	10	66.8	43.8	Academy North
2	14+70 L	B	12.1	End of Capitol Drive	Rundown	0.51	11	32	--	Heritage Hills Unit 2
3	18+60 L	C	3.3	West end of Minute Man Loop	18 in. RCP	0.56	15	9	--	Heritage Hills Unit 2
4	23+30 L	D	7.9 +50.5	East end of Minute Man Loop	Rundown	0.55	18	89	--	Heritage Hills Unit 2
5	26+50 L	E	6.1 +101.9	Cul-de-sac end of Yorktown Avenue	Rundown	0.54	17	139	--	Heritage Hills Unit 2
6	28+40 L	F	8.1 15.0	Cul-de-sac end of Freedom Way	Rundown	0.51	13	51	--	Heritage Hills Unit 2
7	35+60 L	G	17.06	Ventura and Bridge		0.65	10	60	30	Heritage Hills East
8	36+00	H	561	Ventura Bridge	Bridge	--	--	642	322	AMAFCA Vol. 1, NE Heights Drainage Management Plan
9	36+00 R	I	35.54	South Ventura	3-30 in. RCP and eroded gully into channel	--	10	104	--	Wimbledon West at Tanoan, and Fairways North at Tanoan
10	18+30 R	J	15.60	West end of E. Cherry Hills Road	Rundown and eroded gully into channel	0.69	10	43.6	--	Cherry Hills Unit 2
11	2+60 R	K	7.48	West end of W. Cherry Hills Road	Rundown channel and 18 in. CMP into channel	0.73	10	11.4	--	Cherry Hills Unit 1
12	0+00 R		794.0	Barstow Ford	North Pino	--	--	885	433	AMAFCA Vol. 1, NE Heights Drainage Management Plan

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TABLE 2
SEDIMENT YIELD DETERMINATION

Runoff (inches) = 0.22 x Rainfall (inches) (Sabol, 1982)

100-yr Rainfall = 2.4 inches (DPM Plate 22.2 D-1)

Runoff = 0.22 x 2.4 = 0.528 inches

From North Diversion Channel data for EPA (Diniz, 1984)

Sediment load (lb/ac) = 4910. x $Q^{1.63}$ where Q = inches of runoff

Sediment load = 4910 x $0.528^{1.63}$ = 1734 lb/ac

Assume 95 lb/cu. ft

Sediment Volume = 1734/95 = 18 cu. ft./ac

Total area = 861 ac

Total Sediment Volume = 861 x 18 = 15,498 cu. ft.

For silt basin section
- Top width = 50 ft. (bottom width of channel)
- Avg. Depth = 3 ft.; side slopes = 3H:1V
- Cross sectional area = 123 sq. ft.
- Length of sediment basin = 15498/123 = 126 ft.
- Use 130 ft.

1. Diniz, E.V., 1984, Quality of Urban Runoff in Albuquerque, New Mexico -- Selected Papers on Water Quality and Pollution in New Mexico: New Mexico Institute of Mining & Technology, Hydrologic Report 7, pp.93-102.

2. Sabol V. George, Ward J. Timothy and Seiger D. Andrew, 1982, Rainfall Infiltration of Selected Soils in The Albuquerque Drainage Area -- Civil Engineering Department, New Mexico State University: Albuquerque Metropolitan Arroyo Flood Control Authority.

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TABLE 3 CHANNEL PARAMETERS

Channel	Material	Bottom Width (ft)	Bottom Slope (ft/ft)	Side Slope (H:V)	Channel Depth (ft)	100-YR Q (cfs)	100-YR Flow Depth (ft)	100-YR Average Velocity (fps)	100-YR F	10-YR Q (cfs)	10-YR Flow Depth (ft)	10-YR Average Velocity (fps)	10-YR F
A1	Earth n=.030	40	.0285	10:1	3.91	885	1.62	9.72	1.53	433	1.10	7.72	1.43
A1	Earth	50	.0285	3:1	3.84	885	1.54	10.52	1.56	433	1.01	8.08	1.46
A2	grass n=.025	40	.0269	10:1	3.41	885	1.50	10.72	1.65	433	1.10	7.72	1.30
A2	grass n=.025	50	.0269	3:1	3.84	885	1.50	10.83	1.56	433	1.00	8.17	1.44
B1	Concrete n=.013	10	.0285	2:1	5.15	885	2.28	26.66	3.56	433	1.54	21.50	3.39
	Concrete n=.013	10	.0268	2:1	5.29	885	2.32	26.06	3.46	433	1.56	21.16	3.32
B2	Concrete n=.013	10	.0285	3:1	4.95	885	2.14	25.18	3.58	433	1.48	20.26	3.36
	Concrete n=.013	10	.0268	3:1	5.10	885	2.18	24.54	3.46	433	1.50	19.91	3.28
C	Concrete Grass Combo n=.013 n=.025	40	.0268	10:1 2:1	5.46	885	2.95	14.18	2.12	433	1.56	21.16	3.32
D	Pipe Grass Combo n=.013 n=.025												
	Grass Channel	0	.0272	10:1	4.67	573	2.32	10.65	1.74	121	1.30	7.16	1.56
					Dia.Ft	5-YR							
	Pipe	--	.0272	--	4.5	312	3.55	23.15	2.31				

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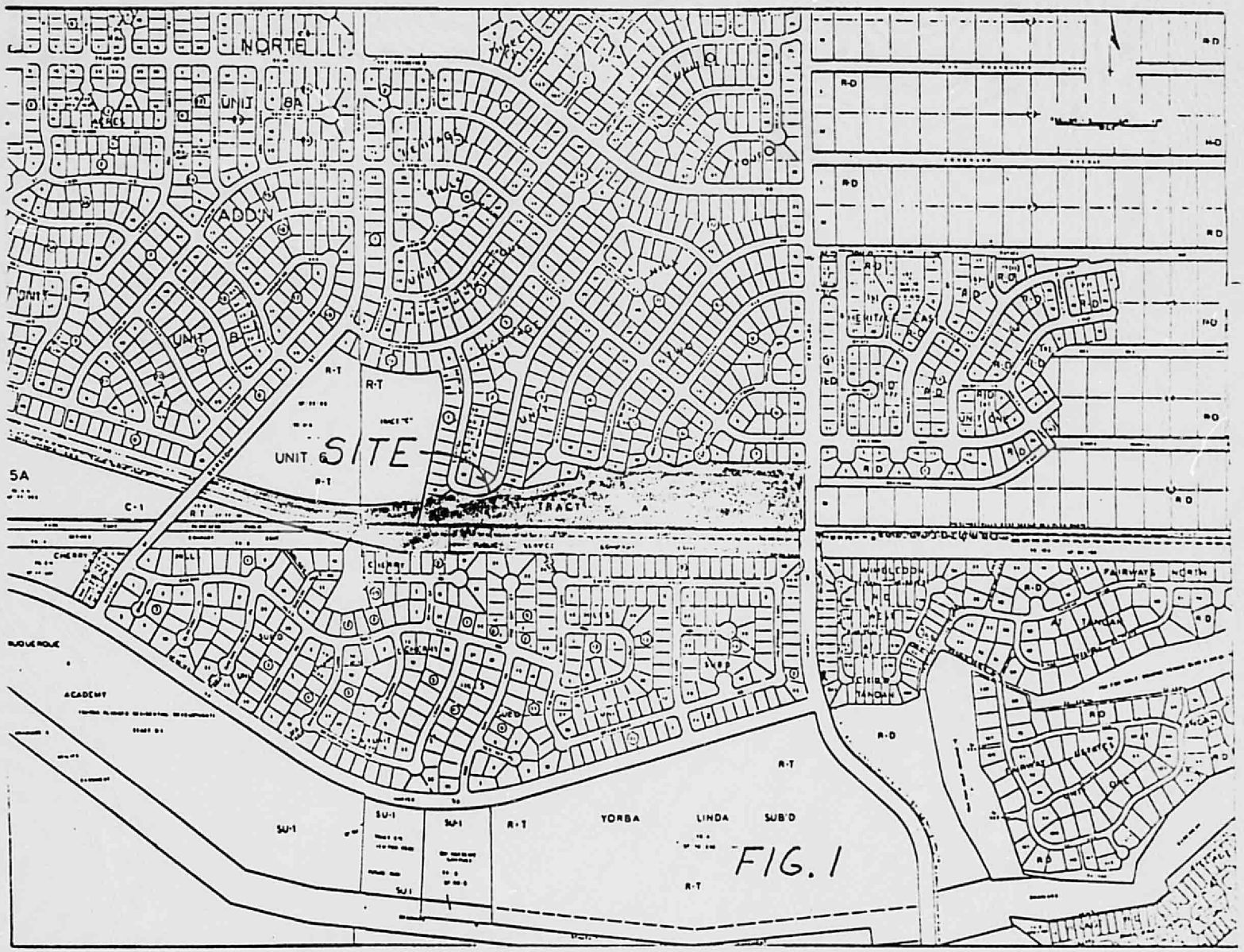

FIG. 1

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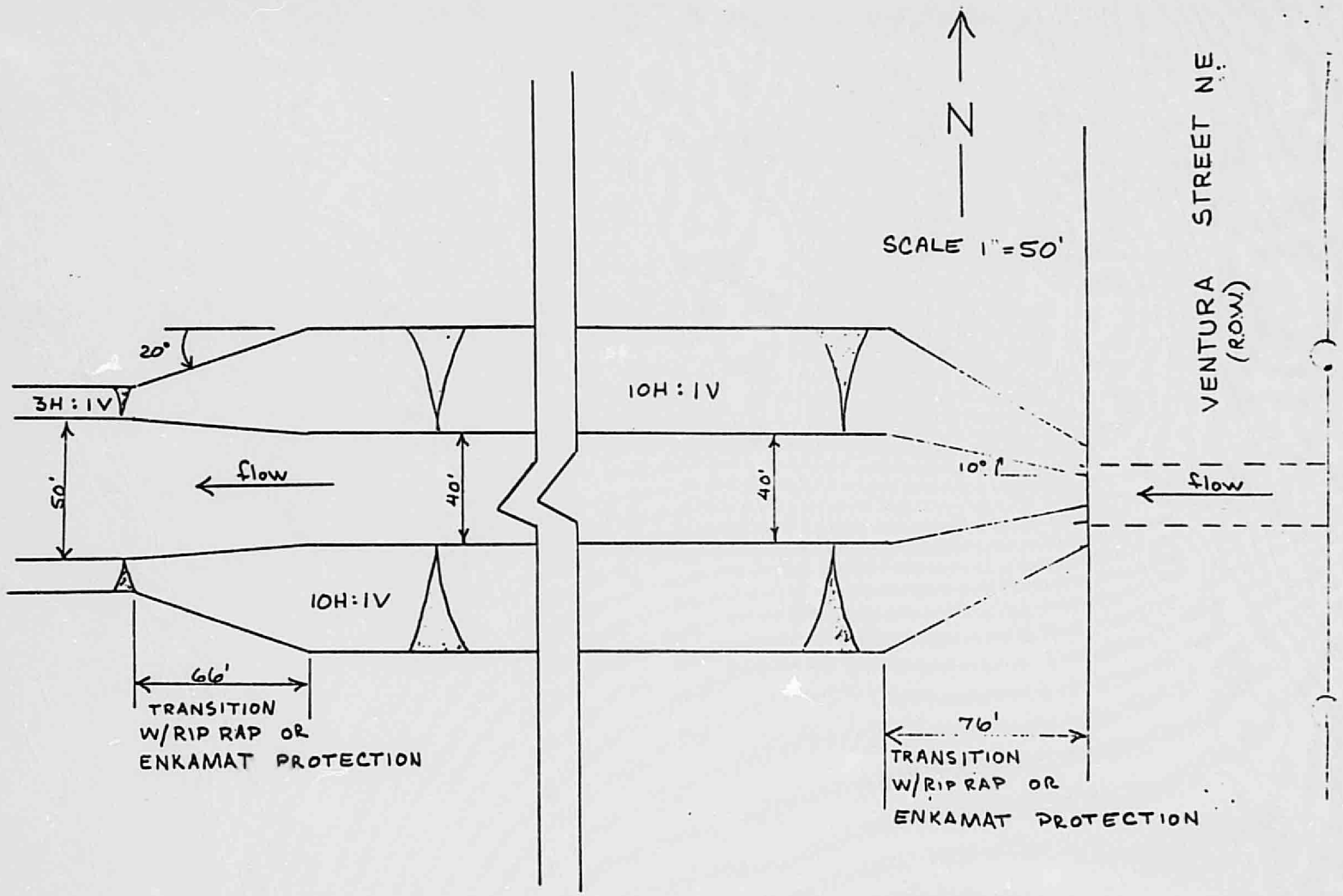

CHANNEL TRANSITIONS

FIGURE 2

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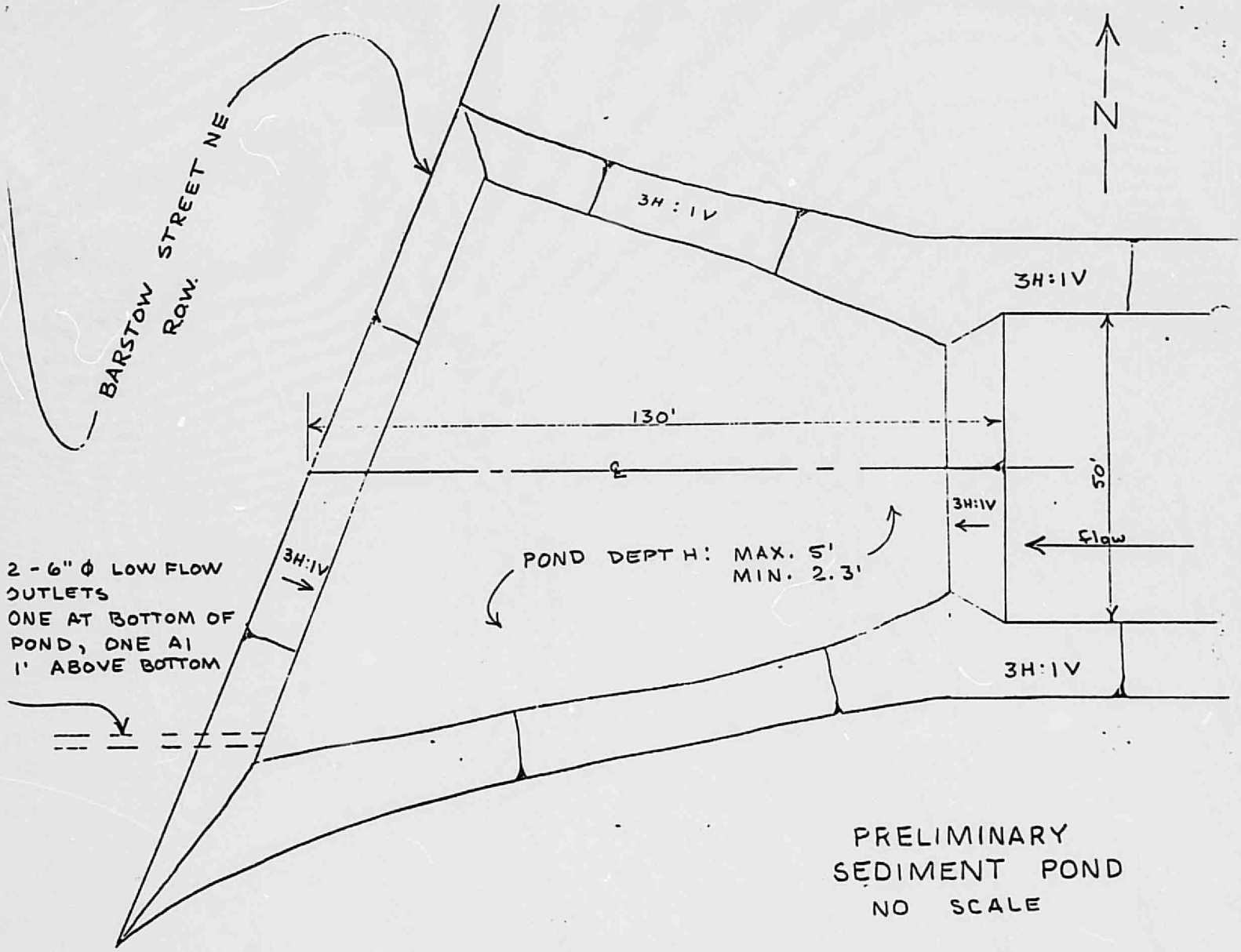

PRELIMINARY
SEDIMENT POND
NO SCALE

FIGURE 3

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FIGURE 4

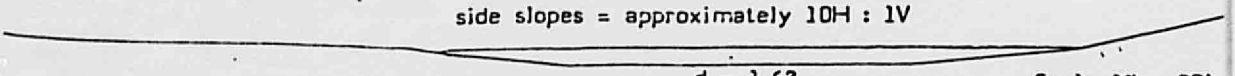
CHANNEL CROSS-SECTION ALTERNATIVES

CHANNEL A1 - existing channel in park area

bare ground

bottom width = 40ft.

side slopes = approximately 10H : 1V



d = 1.62

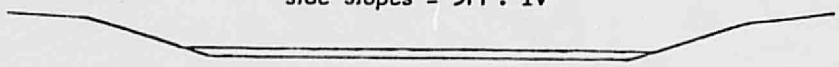
Scale 1" = 20'

CHANNEL A1 & A2 - existing channel downstream from park area

bare ground - A1
grass lined - A2

bottom width = 50'

side slopes = 3H : 1V



Scale 1" = 20'

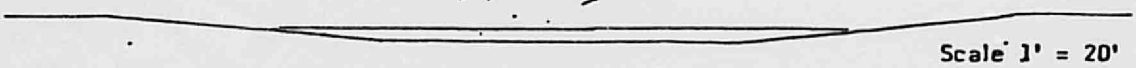
d = 1.54'

CHANNEL A2 - in park area

grass lined

bottom width = 40ft.

side slopes = 10H : 1V



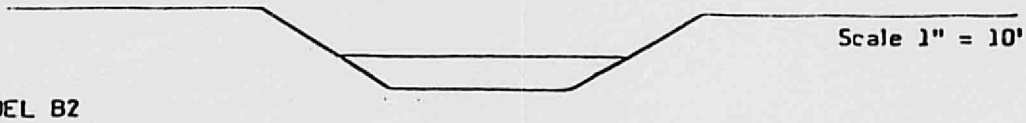
Scale 1' = 20'

CHANNEL B1

concrete

bottom width = 10ft.

side slopes = 2 H : 1V



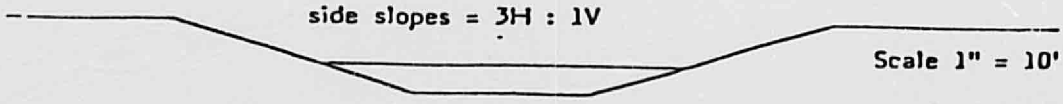
Scale 1" = 10'

CHANNEL B2

concrete

bottom width = 10ft.

side slopes = 3H : 1V



Scale 1" = 10'

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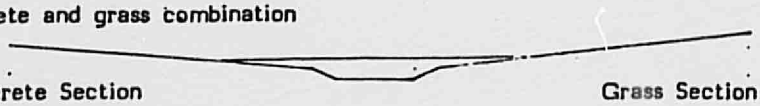
CHANNEL C

concrete and grass combination



Scale 1" = 20'

Concrete Section

bottom width = 10ft.

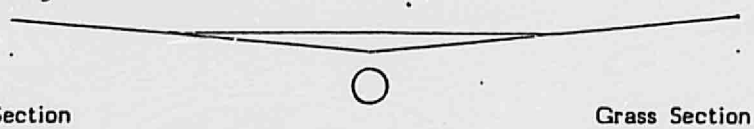
side slopes = 2H : 1V

Grass Section

side slopes = 10H : 1V

CHANNEL D

pipe and grass combination



Scale 1" = 20'

Pipe Section

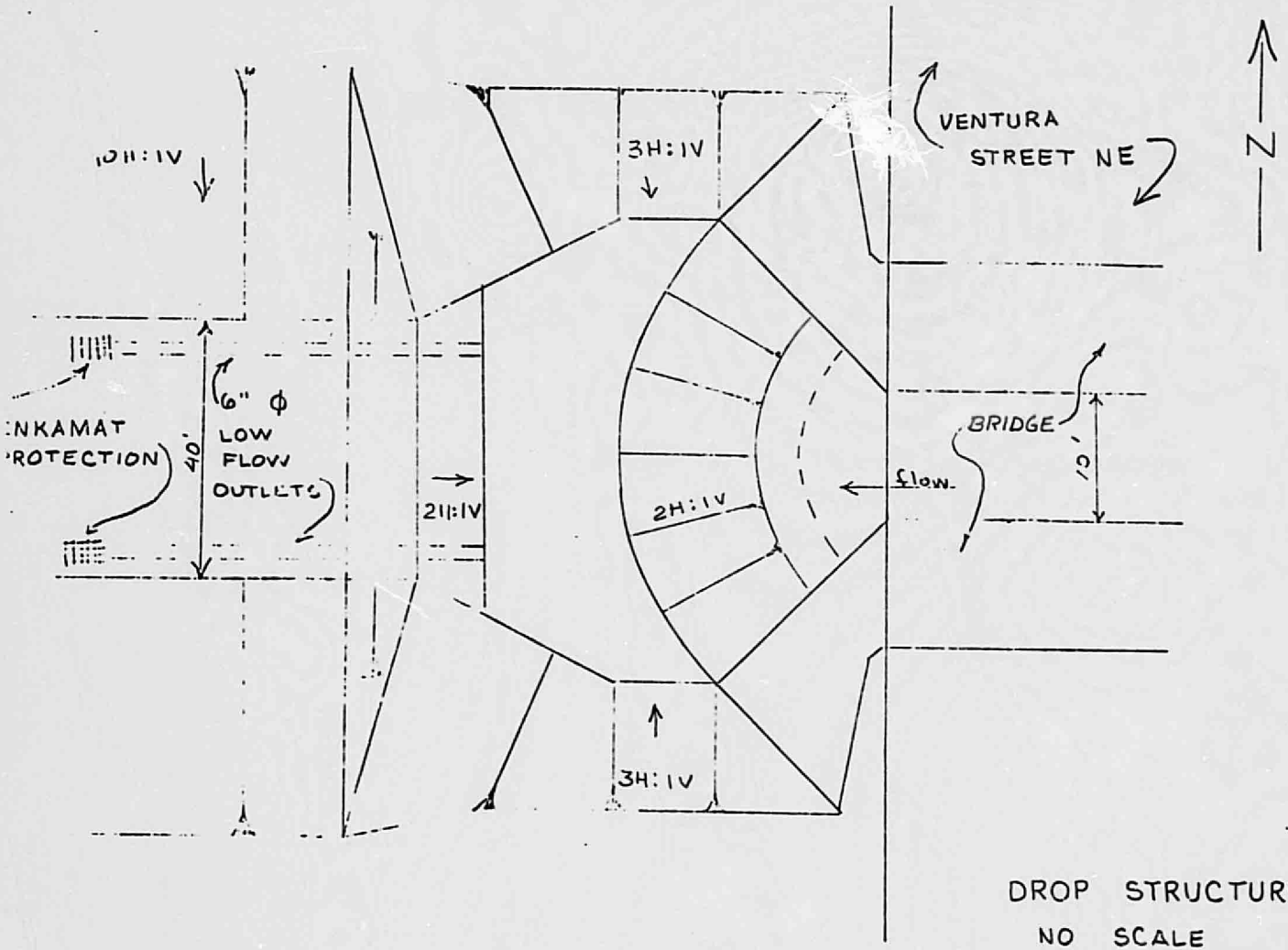
Dia. = 4.5'

Grass Section

side slopes = 10H : 1V

get flow into pipe

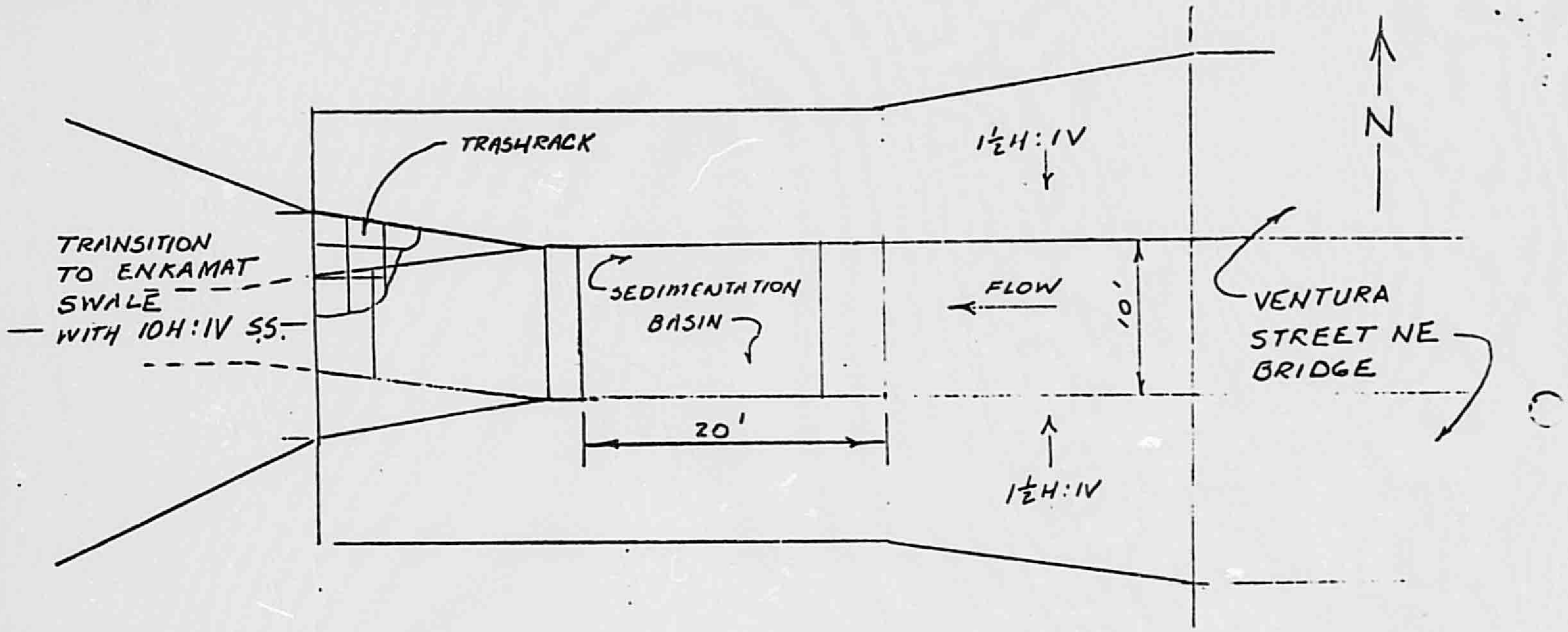
25×

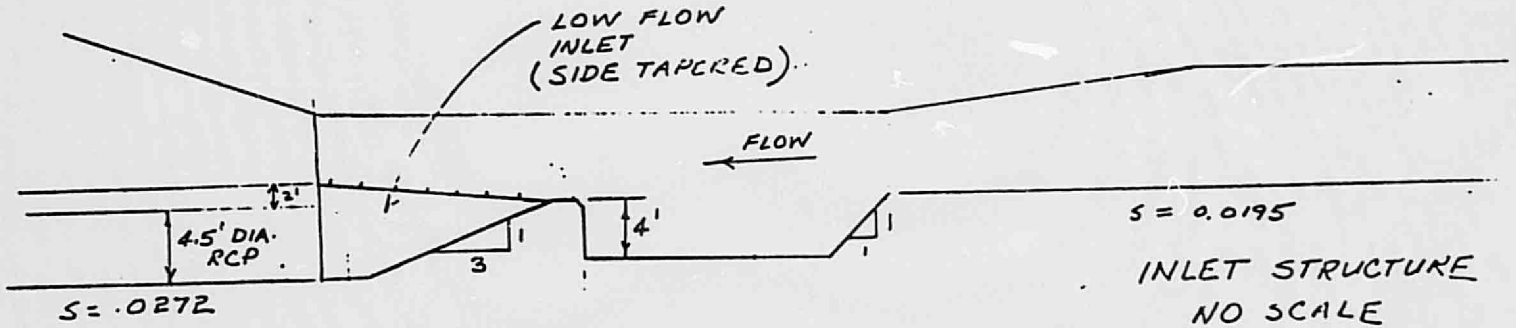


DROP STRUCTURE
NO SCALE

FIGURE 5

25X





INLET STRUCTURE
NO SCALE

FIGURE 6

25X10

0000 0000 0999

PLANS/PLATS ON FILE

FILE DESC: D20/D5

PLANS/PLATS 9

25 × 10

0000 0000 1000

25×10