DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/11/2002)

PROJECT TITLE: Uptown Site Grading Plan ZONE MAP/DRG. FILE # H-19-ZD072
DRB #: N/A EPC#: WORK ORDER#:

LEGAL DESCRIPTION: Off-Site Drainage Improvements
CITY ADDRESS:

ENGINEERING FIRM: Bohannan Huston, Inc. CONTACT: Scott Medina
ADDRESS: 7500 Jefferson NE – Courtyard I PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Hunt Building Corp. CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- ___ DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- ___ GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SIA / FINANCIAL GUARANTEE RELEASE
- ___ 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 (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- ___ GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- X OTHER (SPECIFY) Amended G/D Report

RECEIVED
JUN 02 2004
HYDROLOGY SECTION

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ___ YES
- ___ NO
- ___ COPY PROVIDED

DATE SUBMITTED: 06/02/2004 BY: Scott Medina

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

Bohannan ▲ Huston

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335
www.bhinc.com
voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

FACSIMILE TRANSMITTAL COVER SHEET

Date: June 14, 2004

To: Brad Bingham

Company: COA Hydrology

Fax No.: 924-3864

From: James Topmiller

Project No:

Project Name:

Number of Pages (including Cover): 10

Re:

Comments:

Brad:

Enclosed is the agreement executed between Hunt & City on drainage piping from Indian School to I-40.

Please also see e-mail I have sent you.

Thanks,

James

Original to Follow: ☐ **Yes** X **No**

If you do not receive all pages, please contact Anna at 823-1000.

ENGINEERING ▲
SPATIAL DATA ▲
ADVANCED TECHNOLOGIES ▲

MYERS, OLIVER & PRICE, P.C.
1401 Central Ave. NW
Albuquerque, New Mexico 87104
(505) 247-9080
e-mail: jmyers@moplaw.com

TELECOPY COVER SHEET

DATE SENT: June 9, 2004

TO: James Topmiller TELECOPIER NUMBER: 798-7988

TELECOPIER NUMBER

TELECOPIER NUMBER

FROM: John A. Myers, Esq.

TELECOPY NO: **(505) 247-9109** CLIENT/MATTER NO. 7133.0

ENCLOSURE:

TOTAL NUMBER OF PAGES SENT INCLUDING COVER SHEET: 9

COMMENTS:

Per your request please find attached the contract with the City relating to the storm sewer.

NOTICE OF CONFIDENTIALITY

This facsimile transmission and any documents or other instruments accompanying it may contain confidential information belonging to Myers, Oliver & Price, or any of its clients, all of which are protected by the attorney-client privilege. The information is intended only for the use of the individual or entity named above. If you have inadvertently received this transmission in error, or otherwise, and are not the intended recipient, please take notice that any disclosure, copying, distributing, communicating or other action on your part in reliance upon, or otherwise involving any party of this transmission, is strictly prohibited. If you have received this transmission in error, please immediately notify Myers, Oliver & Price by telephone to arrange for the return of all documents and other instruments accompanying this transmission.

AGREEMENT

THIS AGREEMENT ("Agreement") is entered into as of the 23rd day of October, 2002 by and between HUNT BUILDING CORPORATION, a Texas corporation, ("Hunt") and the CITY OF ALBUQUERQUE, a New Mexico municipal corporation (the "City").

RECITALS:

A. The City and the New Mexico State Highway and Transportation Department ("NMSHTD") are the parties to that certain Contract D10006/1 dated May 13, 2002, amended pursuant to the Amendment Number 1 Cooperative Funding and Maintenance Agreement dated Nov. 5, 2002 (the "City/NMSHTD Agreement") regarding the reconstruction of the Interstate 40/Louisana interchange and related roadways and utilities (the "Project");

B. An element of the Project is a storm sewer line extending from Americas Parkway, N.E. approximately 250 feet east of Louisiana Blvd., N.E., extending in a generally southerly direction to the Embudo Channel located within the Interstate 40 right-of-way (the "South Storm Sewer") as shown on plans being prepared by Gannett Flemming ("Gannett") (City Project 6601.93) ("Current Design").

C. Hunt's affiliated entities are the owner's of the properties commonly referred to as the St. Pius Site and the Monroe Junior High School Site located east of Louisiana Blvd. N.E. north and south of Indian School Blvd. N.E. (the "Hunt Properties").

D. The City and Hunt desire to have the scope of the Project revised to: (i) increase the size of the South Storm Sewer so as to have the capacity to accept the developed flows from lands upstream of and including the Hunt Properties for the 100 year 6-hour storm pursuant to the BHI Plan, as hereinafter defined, and convey them to the Embudo Channel (the "Revised South Reach Design") which South Reach Design shall be designed by Bohannan-Huston in accordance with City DPM Standards; and (ii) to add

Mary Herrera Bern. Co. AGRE R 23.00 2002165390 5772578 Page: 1 of 8 12/12/2002 08:18A Bk-A46 Pg-4953

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Mary Herrera Bern. Co. AGRE R 23.00 Bk-A46 Pg-4958

another reach of the storm sewer ("North Storm Sewer") extending from the South Storm Sewer to the south right-of-way line of Indian School Boulevard, NE within the Americas Parkway right-of-way as shown on the plans prepared by ASCG, Inc. ("ASCG") (City Project 6601.91) which new North Storm Sewer shall be designed by Bohannan-Huston, Inc. in accordance with City DPM Standards ("BHI") (the "North Reach Design"). The Revised South Reach Design and the North Reach Design are jointly referred to herein as the "Revised Design". The storm sewer to be constructed pursuant to the Revised Design is referred to herein as (the "Upsized Storm Sewer").

E. The City and NMSHTD agree to revise the Project to incorporate the Revised Design so long as the Project is not delayed and so long as Hunt bears the additional expense, including the construction cost, associated with the Revised Design, all in accordance with the terms of this Agreement.

NOW THEREFORE, in consideration of the mutual covenants and conditions contained herein, the parties agree as follows:

1. Revised Design. Hunt agrees to: (a) retain a licensed New Mexico engineer to prepare the Revised Design, and all necessary supporting and drainage analysis at Hunt's expense; (b) enter into an agreement with Gannett whereby Gannett will revise the Current Design prepared by Gannett to incorporate the Revised South Reach Design and Hunt will compensate Gannett for such work; (c) enter into an agreement with ASCG whereby ASCG will revise the Project plans prepared by ASCG to incorporate the North Reach Design and Hunt will compensate ASCG for such work, and (d) cause Gannett and ASCG to prepare the bid tabulation to itemize the Revised Design elements. The Revised Design shall be subject to the review and approval by the City. This Agreement and the obligations of the City to perform its duties under this Agreement, including the City's obligation to construct or cause to be constructed the Upsized Storm Sewer, shall be

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Mary Herrera Bern. Co. AGRE R 23.00 Bk-A46 Pg-4958

subject to and conditioned upon the condition precedent that the owners of property within which the Upsized Storm Sewer will be located execute, acknowledge and deliver to the City, as grantee, the necessary easements and rights of way, in form acceptable to the City, for the construction and operations of the Upsized Storm Sewer.

2. Upsized Storm Sewer. The City agrees to cause to be constructed the Upsized Storm Sewer pursuant to the Revised Design. The City agrees that, at a minimum, the additional capacity of the Upsized Storm Sewer and its related impact and effect on the local drainage system capacity shall be reserved for the free discharge of developed storm water flows from the Hunt Properties in accordance with the drainage plan prepared by Bohannan-Huston, Inc. entitled Drainage Study for the Albuquerque Uptown Area dated August 13, 2002, (the "BHI Plan").

3. Cost of Upsized Storm Sewer. Hunt agrees to pay (the "Hunt Contribution") the difference between the Estimated Cost of the Current Design (the "Estimated Storm Sewer Cost") and the actual cost of the Upsized Storm Sewer (the "Actual Upsized Storm Sewer Cost"). Hunt shall be responsible for any additional work required as a result of the Revised Design as may be identified in the field and the subject of change orders. The Estimated Storm Sewer Cost is $250,000.00 [$218,784.00 hard cost + $12,716.82 NMGRT + $17,502.72 (8% E&C) = $249,003.54 rounded to $250,000.00]. The Actual Upsized Storm Sewer Cost shall be calculated based upon the final construction cost of the Upsized Storm Sewer. It is anticipated that the Project construction contract will be a "unit price" contract, pursuant to which the final construction cost will be dependent upon the quantity of materials required to construct the Upsized Storm Sewer. To the extent that the cost of the Upsized Storm Sewer can be calculated by multiplying unit prices times quantities it shall be done so. The unit prices for elements of the Upsized Storm Sewer shall be the same as the unit prices for similar elements for the remainder of the Project. The

Actual Upsized Storm Sewer Cost shall be determined within thirty (30) days of acceptance of the constructed Upsized Storm Sewer by the City or the applicable accepting agency. The Actual Upsized Storm Sewer Cost shall be determined by Gannett and verified by Hunt and the City using the separate bid amount for elements of the Upsized Storm Sewer to the extent applicable, and/or the unit prices, to the extent applicable, plus applicable City Engineering and Testing Fees. Gannett shall consult with Hunt's engineers regarding its calculations of the Actual Upsized Storm Sewer Cost.

4. Financial Guarantee. The cost of the Upsized Storm Sewer has been estimated to be $700,000.00 [$612,257.19 hard costs + $35,587.45 NMGRT + $48,980.00 ((8% E&C) = $696,825.22 rounded to $700,000.00]. Therefore the Hunt Contribution is estimated to be $450,000.00 (the "Estimated Hunt Contribution"). For purposes of Hunt posting a financial guarantee, the Estimated Hunt Contribution shall be increased by 25%, resulting in a Hunt financial guarantee amount of $562,500.00 (the "Hunt Financial Guarantee Amount"). Contemporaneously with the execution of this Agreement, Hunt shall deposit with the City either cash, certified check, cashiers check, or wire transfer (the "Cash Payment") in the Hunt Financial Guarantee Amount (the "Hunt Financial Guarantee"). At acceptance of the Project, if the Hunt Financial Guarantee Amount exceeds the Hunt Contribution, then within 30 days of the determination of the Hunt Contribution; the City shall pay to Hunt the difference between the Cash Payment minus the Hunt Contribution; if the Hunt Contribution exceeds the Hunt Financial Guarantee, then within 30 days of the determination of the Hunt Contribution, Hunt shall pay to the City the difference between the Hunt Contribution minus the Cash Payment.

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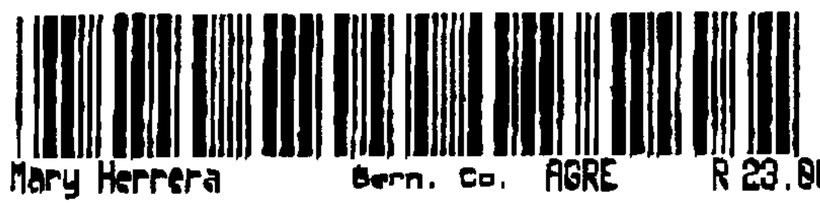
5. Governing Laws. Except as otherwise specifically provided herein, this Agreement shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico.

6. Notices. 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:

Hunt Building Corporation
Attn: Thomas Waggoner
4401 N. Mesa
El Paso, Texas 79902



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Mary Herrera Bern. Co. AGRE R 23.00 Bk-A48 Pg-4358

Public Works Department, Director
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

7. Entire Agreement. 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.

8. Severability. If any provision of this Agreement or 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.

9. Binding Agreement. This Agreement shall be a covenant running with the Hunt Properties and 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 any party is made, such reference shall be deemed to include a reference to the successors and permitted assigns of such party.

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

11. Further Assurances. 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.

12. Counterparts. 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.

Intentionally left blank.

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Page: 6 of 8
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SIGNATURE PAGE FOR STORM SEWER AGREEMENT

HUNT Building Corporation,
A Texas corporation

By: _____
THOMAS B. WAGGONER
Its: Vice President

Date Executed: October 10, 2002

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

The foregoing instrument was acknowledged before me on October 10, 2002, by Thomas B. Waggoner, its Vice President of Hunt Building Corporation, a Texas corporation.

_____
Notary Public

My Commission Expires: March 31, 2005

Mary Herrera Bern. Co. AGRE R 23.00
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CITY OF ALBUQUERQUE, a New Mexico
Municipal corporation

By: _____

Its: Jay Czar, Chief Administrative Officer

CTA 11/15/02

Date Executed: 11-27-2002

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

The foregoing instrument was acknowledged before me on ~~October~~ November 27, 2002, by Jay Czar, its Chief Administrative Officer for the City of Albuquerque, a New Mexico municipal corporation.

Notary Public

My Commission Expires: 1-27-06

H:\HUNTJAM\LEGALDOC\stormsewerclean.doc\October 22, 2002

Mary Herrera Bern. Co. AGRE R 23.00
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Bohannan ▲ Huston INC.

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335
www.bhinc.com
voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

CLIENT/COURIER TRANSMITTAL

To: Brad Bingham
City of Albuquerque
Plaza Del Sol
600 Second Street NW, 2nd Floor West

Requested by: Craig Hoover

Date: June 2, 2004

Time Due:
- ☐ **This A.M.**
- ☒ **This P.M.**
- ☐ **Rush** _____
- ☐ **By Tomorrow**

Phone: 924-3986

Job No.: 040358

Job Name: ABQ Uptown

DELIVERY VIA

- ☒ Courier
- ☐ Federal Express
- ☐ Mail
- ☐ UPS
- ☐ Other

PICK UP

Item: _____

ITEM NO.	QUANTITY	DESCRIPTION
1	1	Addendum No. ! for the Drainage Study for the ABQ Uptown Area
2	1	Drainage Information sheet

COMMENTS / INSTRUCTIONS

RECEIVED
JUN 02 2004
HYDROLOGY SECTION

*REC'D BY:*_____ *DATE:*_____ *TIME:*_____

ENGINEERING ▲
SPATIAL DATA ▲
ADVANCED TECHNOLOGIES ▲

ADDENDUM NO. 1
FOR THE DRAINAGE STUDY
FOR THE
ABQ UPTOWN AREA

JUNE 2, 2004

Prepared for:

Hunt Uptown LLC

500 Marquette NE, Suite 350

Albuquerque, NM 87102

RECEIVED
JUN 02 2004
HYDROLOGY SECTION

Bohannan Huston INC.

ENGINEERING
SPATIAL DATA
ADVANCED TECHNOLOGIES

ADDENDUM NO. 1
FOR THE
DRAINAGE STUDY FOR
THE ABQ UPTOWN AREA

JUNE 2, 2004

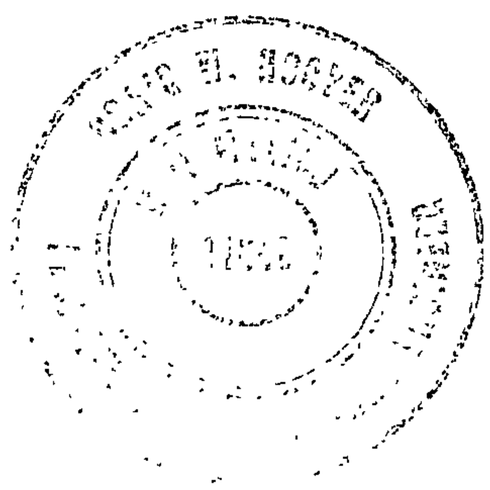
PREPARED BY:

BOHANNAN HUSTON INC.

COURTYARD ONE

7500 JEFFERSON NE

ALBUQUERQUE, NM 87109



Craig W. Hoover, P.E. — Date 6/15/04

A. Scott Medina, P.E. — Date 6/15/04

ADDENDUM NO. 1
FOR THE
DRAINAGE STUDY FOR
THE ABQ UPTOWN AREA

JUNE 2, 2004

RECEIVED
JUN 02 2004
HYDROLOGY SECTION

PREPARED BY:

BOHANNAN HUSTON INC.

COURTYARD ONE

7500 JEFFERSON NE

ALBUQUERQUE, NM 87109

Craig W. Hoover, P.E. Date

A. Scott Medina, P.E. Date

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I. INTRODUCTION 1
II. HYDROLOGY 1
III. PROPOSED IMPROVEMENTS 2
IV. HYDRAULIC ANALYSIS 3
V. DESIGN AND CONSTRUCTION CONSIDERATIONS 4
VI. CONCLUSIONS AND RECOMMENDATIONS 5

Appendices

Appendix A Figures
Appendix B AHYMO Model
Appendix C Hydraulic Analysis
Appendix D Plan and Profile Sheets

I. INTRODUCTION

This report constitutes Addendum No. 1 for the Drainage Study for the ABQ Uptown Area, Bohannan Huston, August 13, 2002 which was prepared for Hunt Uptown LLC. This report refines the proposed storm drain system for the Albuquerque Uptown Area that was presented in the 2002 Drainage Study. These refinements include minor revisions to the hydrologic model to refine the precipitation values and allow the determination of flow rates at additional analysis points and revisions to the storm drain alignments and pipe sizes including revised hydraulic calculations.

In accordance with the approved 2002 Drainage Study, the overall storm drain system will consist of two new storm drain networks as shown in Exhibit 1. The first in Uptown Loop Road will divert flow downstream of Espanola Road south toward Indian School Road. This diversion will protect the Uptown Site and allow for the removal of the existing 60" storm drain that runs diagonally across the property on the northeast corner of Indian School Road and Louisiana Boulevard. Just north of Indian School Road flows will be divided sending a portion of the flow south to the recently constructed 84" storm drain that discharges to the I-40 Channel and a portion of the flow west in a proposed 60" storm drain along the south side of Indian School Road. This 60" storm drain, which constitutes the second pipe network, will tie into the existing 72" storm drain at the intersection of Indian School Road and Louisiana Boulevard.

The additional capacity created with the recently constructed 84" storm drain discharging to the directly to the I-40 Channel is the cornerstone of the proposed drainage system. This additional capacity allows the diversion of flows from both Indian School Road and Espanola Road south to the I-40 Channel. This diversion of flows in turn allows for the development of the subject property without adversely impacting the existing storm drain system in Indian School downstream of the site.

II. HYDROLOGY

The storm water flows for the Uptown drainage area were established in the ASCG report in April 2002, "Uptown Area Drainage Report" and further refined by the "Drainage Study for the ABQ Uptown Area", Bohannan Huston, August 13, 2002. This addendum amended the storm water flows

with revisions to the AHYMO model to refine the precipitation values, add additional analysis points and to account for minor changes to the proposed storm drain locations. All modifications to the AHYMO model were in accordance with the Section 22.2, Hydrology, of the Development Process Manual (DPM) for the City of Albuquerque, dated January 1993. The modified flow results are illustrated in Appendix B.

The hydrologic model was also modified to reflect the final Uptown Site development plan. As shown in Figure 1 (Appendix A) the Uptown Site has been divided into three sub basins based on the proposed points of discharge. Basin A located between Espanola Road and Uptown Loop Road will discharge approximately 31 cfs to the proposed 72"/78" storm drain system along Uptown Loop Road. The other two basins, Basin 2A and Basin 2B, are located between Uptown Loop Road and Louisiana Boulevard. These basins will discharge approximately 72 cfs and 14 cfs respectively, into the existing 48" storm drain along Indian School Road.

III. PROPOSED IMPROVEMENTS

Currently the 100-year storm event would cause flooding of the ABQ Uptown area at several locations. Areas of potential flooding include Espanola Road (in between Leah Avenue and Arvada Avenue), and Indian School Road east of and at Louisiana Boulevard. To allow development of the Uptown Site without aggravating existing flooding conditions, as mentioned previously, the following improvements are proposed and shown in Exhibit 1.

At Espanola Road connections to the existing pipe culverts and extension of a storm drain to Uptown Loop Road will prevent flows that presently overtop Espanola Road from impacting the Uptown Site. The proposed storm drain network will capture and convey the 100-year runoff reaching this area with the combination of a storm drain manifold connecting to the existing 24" RCP culverts, existing drop inlets, and two new drop inlets. The proposed storm drain manifold will connect the 24" culverts and new inlets to the existing 60" storm drain which in turn will connect to a new 72"/78" storm drain system that continues west and south to Indian School Road. The storm drain network is designed to convey the 100-year flow rate of 506 cfs to a point just north of Indian School Road where the flow will be split between a connection to the recently constructed 84" storm drain and the proposed Indian School Storm Drain.

The proposed Indian School Storm Drain will begin at Uptown Loop road and continue west to Louisiana Boulevard where it will tie into the existing 72" storm drain. This new storm drain, that parallels the existing 48" storm drain along the south frontage of the Uptown site will essentially replace the 60" storm drain that crosses the Uptown Site. At the intersection of Uptown Loop Road and Indian School Road a flow split and a diversion of flow will occur. Just north of Indian School Road, in Uptown Loop Road the flow in the 78" storm drain (506 cfs) will be divided by the use of a hydraulic junction box. The flow will be divided such that 304 cfs will discharge to the new Indian School Storm Drain and 202 cfs will discharge to the 84" storm drain heading south to the I-40 channel. Within Indian School the entire pipe flow (164 cfs) in the existing 48" storm drain will be diverted to the south to the 84" storm drain. A 78" x 48" wye will be used to divert flows from the 48" storm drain while also combining with flows from the junction box. Additionally at this location, four existing inlets recently constructed with the Uptown Loop Road construction will be reconnected to the 84" storm drain, removing the flow they intercept (approximately 64 cfs) from the existing 48" Indian School Storm Drain. This diversion and reconnection of these inlets will divert a total of 228 cfs of pipe and surface flows from Indian School thereby allowing a portion of the existing 48" storm drain to be removed or abandoned. This in turn enables the proposed Uptown Loop Road storm drain to cross Indian School Road and provides capacity in the existing 48" storm drain further downstream to accommodate runoff from the Uptown Site.

At the intersection of Indian School Road and Louisiana Boulevard the storm water flows described above, and from adjacent sites, combine for a storm water flow total of 575 cfs. This total is less than the allowable flow rate of 605 cfs per the ABQ Uptown Drainage Report, April 2002, ASGC. These storm drain improvements and modeled flows are illustrated in Exhibit I, Appendix A.

IV. HYDRAULIC ANALYSIS

The hydraulic analyses for the proposed storm drain improvements were performed given the following constraints;

- the existing hydraulic grade line (HGL) at the intersection of Louisiana and Indian School starts at the existing curb elevation, per direction by the City of Albuquerque on March 15, 2004;

- the flows in Indian School are limited to 605 cfs combined capacity (500 cfs pressure pipe flow, 105 cfs street flow) west of Louisiana Boulevard as report in the ABQ Uptown Drainage Report, April 2002, ASCG.

The hydraulics for the proposed storm drain system were perform utilizing Inroads Storm and Sanitary's Drainage Structure Analyzer, City of Albuquerque DPM , orifice equations, velocity head equations, and Mannings equation to determine street water depth. These calculations are included in Appendix B.

The storm drain manifold capacity proposed downstream of Espanola Road was determined by analyzing the inlets, culverts, and storm drain components individually. The existing 24" culvert capacity was determined utilizing Inroads Storm and Sanitary's Drainage Structure Analyzer for culverts. The combined inlet capacity of the three 24" culverts' capacity is approximately 80 cfs. In order to collect the entire 140 cfs storm water flow for the channel and street, two additional inlets were added along Espanola Road. These inlets along with the existing inlets have sufficient capacity to collect the remaining 60 cfs, thereby protecting the Uptown Site. See Appendix B for calculations.

The HGL analysis for the proposed storm drain system was determined though an iterative process, involving AHYMO modeling, inlet flow calculations, street water depth calculations, and balancing of HGL's at each storm drain junction. The analysis determined the amount of street flow impacting the storm drain system and the appropriate splitting of flows between the 84" storm drain discharging to the I-40 channel and the Indian School storm drain system, thereby maximizing existing infrastructure and minimizing street flows. The storm drain system was designed to ensure that the HGL remains below top of pavement except where constrained by existing storm drain facilities. The hydraulic analysis results are illustrated in plan and profile sheets in Appendix D. Since the HGL starts at the curb elevation at Louisiana, the primary goal was to maintain the HGL below the existing grate elevations and road surface.

V. DESIGN AND CONSTRUCTION CONSIDERATIONS

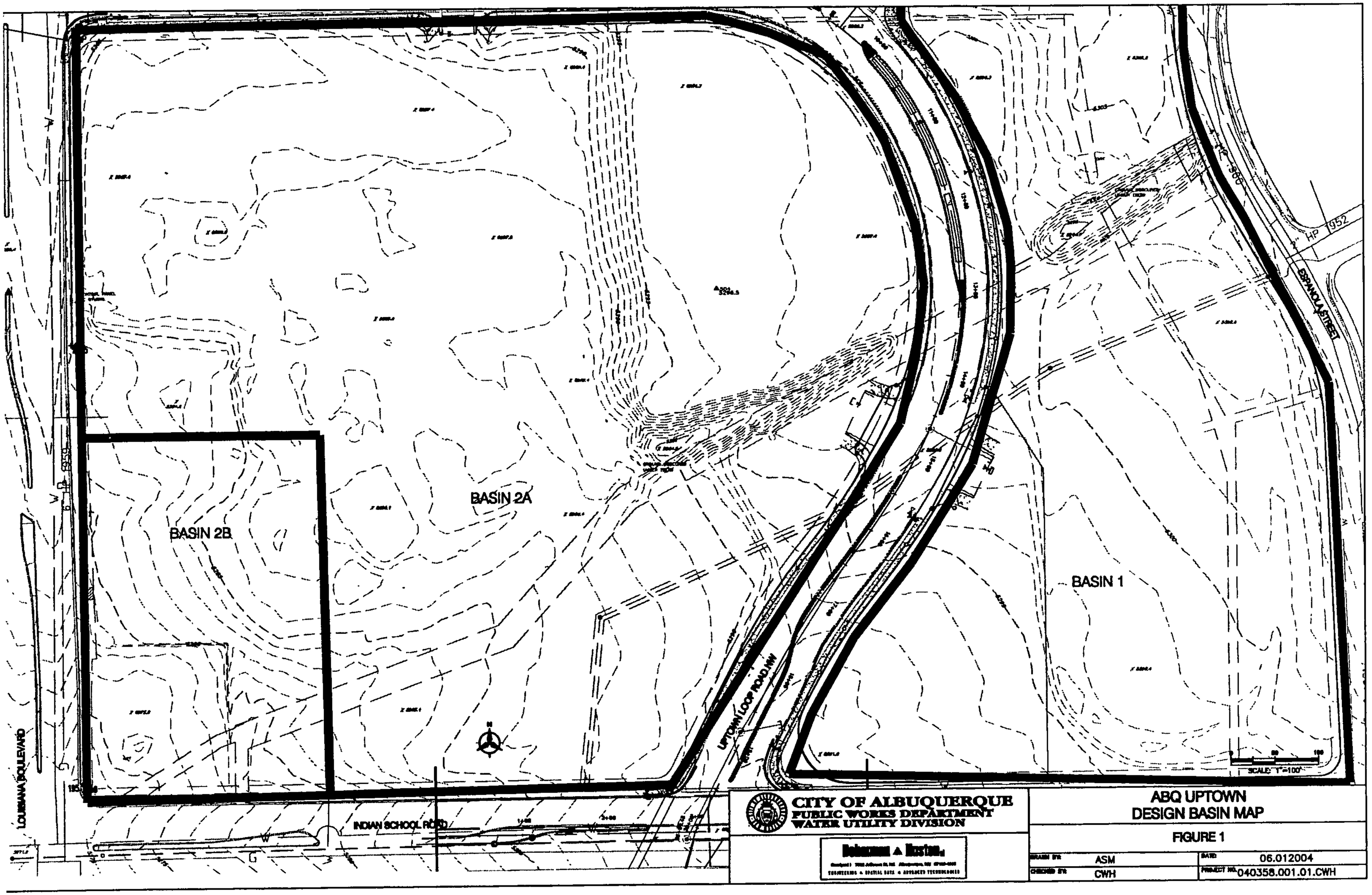
Design modifications were made to minimize the construction impacts along Indian School Road and Louisiana Boulevard. These design modifications include building the junction box, splitting flow between Indian School and the 84" storm drain, in Uptown Loop Road versus Indian School.

VI. CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses described herein, the proposed improvements shall adequately alleviate potential flooding problems cause by the increased flows for the developed conditions with the ABQ Uptown site. The improvements increase the existing capacity for the storm drain system surrounding the ABQ Uptown site, and partially rectified the currently flooding conditions on-going along Indian School Road.

APPENDIX A

FIGURES


BASIN 2B
BASIN 2A
BASIN 1
LOUISIANA BOULEVARD
INDIAN SCHOOL ROAD
UPTOWN LOOP ROAD NW
ESPANOLA STREET
HP 1952
SCALE: 1"=100'
CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
WATER UTILITY DIVISION
ABQ UPTOWN
DESIGN BASIN MAP
FIGURE 1
DRAWN BY: ASM
DATE: 06.012004
CHECKED BY: CWH
PROJECT NO. 040358.001.01.CWH

APPENDIX B

AHYMO MODEL

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

```
*S
*S
*S   TITLE 1 UPTOWN DRAINAGE MASTER PLAN
*S      100-yr / 6-hr
*S       FUTURE
*S
*S     THIS IS AN AHYMO_97 HYDROLOGIC MODEL FOR:
*S
*S         THE UPTOWN DRAINAGE MASTER PLAN
*S
*S             PREPARED FOR CITY OF ALBUQUERQUE
*S             PREPARED BY ASCG INC.
*S                         MODIFIED BY BOHANNAN HUSTON INC.
*S
*S        MODEL DESCRIPTION -
*S   1.  BASIN GROUPS 100'S AND 200'S-  WEST OF EUBANK FROM CANDELARIA SOUTH TO
*S       INDIAN SCHOOL ROAD TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S       THIS DRAINAGE SUB-BASIN 110 WILL BE IN THE FUTURE TAKEN DOWN WYOMING
*S       TO THE INTERSTATE AND THEREFORE WILL BE TAKEN OUT OF THE BASIN
*S
*S   2.  100-YEAR 6-HOUR RAINFALL EVENT
*S
*S   3.  THIS MODEL ASSUMES "FUTURE" FULL DEVELOPMENT CONDITIONS
*S
*S   5.  NO SEDIMENT BULKING APPLIED DUE TO
*S       MOST BASINS ARE DEVELOPED
*S
*S   6.  USE PROCEDURES FROM COA DPM SECTION 22
*S
*S   7.  BHI MODIFICATIONS: ADD WINROCK BASINS INTO INDIAN SCHOOL STORM DRAIN,
*S       (SEE UPDATE BELOW)
*S       DIVERT FLOW IN 60"PIPE ENTERING BASIN 290 TO INDIAN SCHOOL STORM DRAIN,
*S       DIVERT (PORTION) OF FLOW FROM THE INDIAN SCHOOL STORM DRAIN SOUTH INTO
*S       LOOP ROAD; BASIN 290 ONSITE FLOWS AND BASIN 280 STREET FLOWS TO NEW 54"
*S                  SIANA/INDIAN SCHOOL INTERSECTION (NO LONGER TRUE, SEE BELOW)
*S                   NO PARALLEL PIPE ON INDIAN SCHOOL RD WEST OF LOUISIANA
*s
*S       THE FOLLOWING CHANGES WERE MADE BY BHI(MAY,2004) FOR ABQ UPTWN PROJECT
*s
*S   8.  PREVIOUS MODEL INCORRECTLY DISCHARGES FLOW FROM BASIN 101.42 & 101.41
*s       (WINROCK PARKING LOT AND ROAD BASINS) TO SD IN INDIAN SCHOOL.
*S       FROM AVID REPORT AND FIELD VERIFIED, THESE BASINS ACTUALLY DISCHARGE
*S       TO STREET FLOW.
*S
*S   9.  DIVIDE BASEIN 290 FLOW INTO AREAS EAST AND WEST OF LOOP ROAD.  ADD
*S       EAST FLOWS INTO SD IN LOOP ROAD (BEFORE SPLIT).
*S
*S   10. NEED TO ADD IN FLOWS FROM 4 NEW INLETS U/S LOOP RD ON INDIAN SCHOOL
*S       INTO SD.  PER COA DPM CALC'S, 4 INLETS HAVE A COMB. CAPACITY=62 CFS.
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                                FROM   TO                    PEAK        RUNOFF                 TIME TO    CFS       PAGE =    2
                   HYDROGRAPH   ID    ID        AREA      DISCHARGE     VOLUME      RUNOFF       PEAK     PER
COMMAND          IDENTIFICATION NO.   NO.      (SQ MI)     (CFS)       (AC-FT)    (INCHES)    (HOURS)   ACRE      NOTATION

*S   11. NEED TO REMOVE SECOND SPLIT OF FLOWS IN INDIAN SCHOOL.  THERE WILL BE
*S        A SPLIT BUT IN A DIFFERENT LOCATION AND IS ADDRESSED IN #12 BELOW.
*S
*S   12. REVISED MODEL TO SPLIT FLOWS GOING WEST IN INDIAN SCHOOL INTO:
*S        A) EXISTING 48", & B) NEW 60?" SD.  MAKE NECESSRY REVISIONS TO JOIN
*S        ALL SD FLOWS AT INTERSECTION OF INDIAN SCHOOL AND LOUISIANA.
*S        IN ADDITION, THE OUTFLOW FOR BASINS 102.1 & 102.2 WAS MOVED TO THE NEW
*S        SD GOING TO THE I-40 CHANNEL AT LOUISIANA.  PREVOUIS AHYMO MODELS HAD
*S        THESE BASINS JOINING FLOW FROM THE PROPERTY AT THE SOUTHWEST CORNER OF
*S        I.S. AND LOUSIANA & FLOWING NORTH TO THE INTERSECTION VIA PROPOSED SD.
*S
*S  13.   REVISED UPSTREAM SPLIT NEAR LOOP ROAD / INDIAN SCHOOL
*S  14.   REVISED TO ACCOUNT FOR PROJECT LOCATION (ZONE 3VS.2 IN PREV. MDLS)
*S  15.   REVISED RAINFALL INPUTS TO MATCH COA DPM GUIDANCE THAT STATES "DO NOT
*S        USE TABLE A-2.  INSTEAD USE FIGURE C-1, C-2, AND C-3 IF USING AHYMO.
*S  16.   REVISED TIME TO PEAK CALCULATIONS FOR 3 SUBBASINS OF BASIN 290 PER
*S        6/5/03 ABQ UPTOWN GRADING AND DRAINAGE PLAN.
*S  17.   REVISED MODEL TO REMOVE SECOND SPLIT NEAR INDIAN SCHOOL AND LOOP ROAD
*S        DESCRIBED IN #12 ABOVE.  HYDRAULIC MODELING SHOWS THIS LINE CAN'T
*S        ACCEPT ANY MORE FLOWS. THEREFORE, ALL FLOWS FROM INITIAL SPLIT IN
*S        LOOP ROAD, JUST NORTH OF I.S. WILL GO INTO NEW SD ON SOUTH SIDE OF I.S.
*S  18.   REVISE % TREATMENTS FOR 3 ST. PIUS SITES (BASIN 290E.1, 290W.1, 290W.2)
*S        AND VILLAGE BASIN TO 95% D, 5% C PER BHI CDP 5/24/04.
START                                                                                  TIME=        .00
LOCATION                    ALBUQUERQUE
RAINFALL  TYPE= 1                                                                      RAIN6=     2.475
*S   ***    THE FOLLOWING SUB-BASINS 100'S ARE THOSE NORTH OF INDIAN SCHOOL ROAD
*S          WEST OF EUBANK, DRAINING EAST DOWN INDIAN SCHOOL
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S
*S
*S
*S
*S*** SUB-BASIN 110 **** BASIN 110, UNDER EXISTING CONDITIONS CONTRIBUTES FLOW T
*S********************** ANALYSIS POINTS HEREIN.  HOWEVER THE COA HAS A PROJECT
*S********************** BASIN 110 SOUTH ON WYOMING.  THERFORE, FOR THE PURPOSE
*S********************** ANALYSIS, THE ENGINEER AND THE CITY HAVE AGREED TO REMO
*S********************** BASIN 110 FROM THE WATERSHED HEREIN.
*S*** SUB-BASIN 130 **** (THIS IS COMBINATION OF 120 AND 130)
COMPUTE NM HYD        120.00   -     1        .16500       315.73      14.458      1.64293    1.600    2.990 PER IMP=  50.00
DIVIDE HYD          130_PIPE    1     2        .12186       135.00      10.678      1.64292    1.467    1.731
                      130_ST  and     3        .04314       180.73       3.780      1.64292    1.600    6.546
DIVIDE HYD        130_STREET    3     3        .02588       108.44       2.268      1.64292    1.600    6.546
                    130_PENN  and    13        .01726        72.29       1.512      1.64292    1.600    6.546
ROUTE                 140.10    2     9        .12186       135.00      10.678      1.64293    1.900    1.731
*S ROUTE THE REST OF FLOW DOWN INDIAN SCHOOL ROAD, 1000' FROM INTERSECTION******
*S LENGTH OF ROUTE MODIFIED BY BHI TO DIVERSION POINT INSTEAD OF INTERSECTION
ROUTE                 140.20    3     2        .02588        91.67       2.268      1.64312    1.667    5.534
*S*** SUB-BASIN 140 ****
COMPUTE NM HYD        140.00   -     3        .04900        88.40       4.478      1.71363    1.633    2.819 PER IMP=  55.00
ADD HYD               140.30  2& 3   8        .07488       178.86       6.746      1.68925    1.633    3.732
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*S FLOW IN THE STREET

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                                FROM  TO                    PEAK        RUNOFF                  TIME TO    CFS
                   HYDROGRAPH   ID    ID        AREA     DISCHARGE     VOLUME      RUNOFF       PEAK      PER
COMMAND          IDENTIFICATION NO.   NO.     (SQ MI)     (CFS)       (AC-FT)    (INCHES)    (HOURS)    ACRE      NOTATION

*S THIS IS THE FLOW FROM THE 48" STORM DRAIN
*S*** WINROCK SUB-BASINS ADDED BY BHI ****
COMPUTE NM HYD        101.10   -    20        .00436       13.59        .521     2.23711     1.500     4.868 PER IMP= 100.00
COMPUTE NM HYD        101.22   -    21        .00433       13.49        .517     2.23711     1.500     4.868 PER IMP= 100.00
COMPUTE NM HYD        101.21   -    22        .00265        8.26        .316     2.23711     1.500     4.870 PER IMP= 100.00
COMPUTE NM HYD        101.30   -    23        .01213       37.79       1.448     2.23711     1.500     4.866 PER IMP= 100.00
COMPUTE NM HYD        101.43   -    24        .00103        3.20        .122     2.23711     1.500     4.878 PER IMP= 100.00
COMPUTE NM HYD        101.42   -    25        .00656       20.42        .782     2.23711     1.500     4.867 PER IMP= 100.00
COMPUTE NM HYD        101.41   -    26        .00181        5.63        .215     2.23711     1.500     4.872 PER IMP= 100.00
*S SUM WINROCK BASINS ADDING TO INDIAN SCHOOL AT TOYS R US
ADD HYD                 TOYS 20&21  30        .00869       27.09       1.037     2.23705     1.500     4.868
ROUTE RESERVOIR       POND101   30  20        .00869       10.28       1.037     2.23705     1.767     1.847 AC-FT=     .346
ADD HYD                TOYS2 20&22  31        .01134       17.79       1.353     2.23702     1.500     2.450
ADD HYD                TOYS3 31&23  32        .02348       55.58       2.801     2.23706     1.500     3.699
ADD HYD                TOYS4 32&24  33        .02450       58.78       2.923     2.23705     1.500     3.748
ADD HYD                TOYS5 25&26  35        .00836       26.05        .998     2.23705     1.500     4.868
*S   ADD THESE SURFACE FLOWS TO STREET FLOWS FROM UPSTREAM ON INDIAN SCHOOL
*S
ADD HYD                TOYS6 35& 8  99        .08325      193.93       7.744     1.74428     1.633     3.640
*S ADD TOYS R US BASINS DISCHARGING TO ON-SITE SD, INTO STORM DRAIN ON INDIAN SC
*S    2-60" SD'S COLLECT FLOW FROM THE WINDROCK BASINS AND DISCHARGE VIA 12" LIN
*S    EXISTING INLET ON INDIAN SCHOOL.  ALSO, SOME FLOW ENTERS STREET UPSTREAM O
*S    ASSUME ALL THIS FLOW GETS IN INDIAN SCHOOL SD
ADD HYD                  SD 33& 9  60        .14636      190.07      13.601     1.74239     1.533     2.029
*s
*s DIVERT PORTION OF STREET FLOW IN INDIAN SCHOOL AT LOOP ROAD TO SD VIA 4 INLET
*s    PER SEPARATE CALC'S USING COA DPM PROCEDURES, COMBINED FLOW INTO 4 INLETS
*S
DIVIDE HYD            LOOPSD   99  96        .05230       62.00       4.866     1.74428     1.467     1.852
                      LOOPST  and  95        .03094      131.93       2.878     1.74428     1.633     6.662
*S STREET FLOW GETS ADDED IN W/ STREET FLOW FROM BASIN 130 &140 BELOW
*S ADD SD FLOW IN W/ SD FLOW FROM BASINS 130, 140 & WINDROCK
ADD HYD                 TOTSD 96&60  94        .19867      252.07      18.467     1.74289     1.533     1.982
*S   ***    THE FOLLOWING SUB-BASINS 200'S ARE THOSE FROM THE NORTH FROM CANDLER
*S          WEST FROM EUBANK, DRAINING WEST DOWN MENAUL, AND SOUTHWEST TO THE
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S*** SUB-BASIN 210 ****
COMPUTE NM HYD        210.00   -    1        .19600      354.42      17.717     1.69491     1.633     2.825 PER IMP=  55.00
DIVIDE HYD          210_PIPE    1    2        .08828       65.00       7.980     1.69491     1.400     1.150
                      210_ST  and    3        .10772      289.42       9.738     1.69491     1.633     4.198
ROUTE                 210.10    2    1        .08828       65.00       7.980     1.69492     1.967     1.150
ROUTE                 210.20    3    2        .10772      268.19       9.738     1.69496     1.767     3.890
*S*** SUB-BASIN 220 ****
COMPUTE NM HYD        220.00   -    3        .14300      265.20      12.530     1.64293     1.600     2.898 PER IMP=  50.00
DIVIDE HYD          220_PIPE    3    4        .10765      119.00       9.433     1.64292     1.467     1.727
                      220_ST  and    5        .03535      146.20       3.097     1.64292     1.600     6.462
ADD HYD               220.10  4& 1   6        .19593      184.00      17.413     1.66635     1.900     1.467
ADD HYD               220.20  5& 2   4        .14307      342.14      12.835     1.68209     1.667     3.737
ROUTE                 220.30    6    1        .19593      173.71      17.413     1.66635     1.933     1.385
ROUTE                 220.40    4    2        .14307      312.94      12.835     1.68209     1.800     3.418
*S*** SUB-BASIN 230 ****
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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
COMPUTE NM HYD	230.00	-	3	.18200	323.80	16.452	1.69491	1.633	2.780	PER IMP= 55.00
DIVIDE HYD	230_PIPE	3	4	.09781	80.00	8.841	1.69491	1.433	1.278	
	230_ST	and	5	.08419	243.80	7.611	1.69491	1.633	4.525	
ADD HYD	230.10	4& 1	6	.29374	253.71	26.254	1.67586	1.933	1.350	
ADD HYD	230.20	5& 2	4	.22726	508.32	20.446	1.68684	1.700	3.495	
*S*** SUB-BASIN 250 ****										
COMPUTE NM HYD	250.00	-	1	.04900	107.05	4.614	1.76549	1.567	3.414	PER IMP= 60.00
ROUTE	250.10	1	5	.04900	85.70	4.614	1.76550	1.633	2.733	
*S*** SUB-BASIN 260 ****										
COMPUTE NM HYD	260.00	-	2	.04700	112.06	4.426	1.76549	1.533	3.725	PER IMP= 60.00
ADD HYD	260.10	5& 2	1	.09600	179.64	9.039	1.76548	1.567	2.924	
ROUTE	260.20	1	3	.09600	151.10	9.039	1.76549	1.667	2.459	
ADD HYD	260.10	4& 3	5	.32326	658.64	29.485	1.71019	1.700	3.184	
*S DIVIDE STREET FLOW FROM BASIN's 210,220, and 230.....										
*S INTO FLOWS SOUTH ON PENN INTO BASIN 240 AND WEST DOWN MENAUL										
DIVIDE HYD	230_STAY	5	7	.16163	329.32	14.743	1.71019	1.700	3.184	
	230_MEN	and	12	.16163	329.32	14.743	1.71019	1.700	3.184	
ROUTE	230.30	6	1	.29374	253.86	26.254	1.67586	1.967	1.350	
ROUTE	230.40	7	2	.16163	299.05	14.743	1.71019	2.167	2.891	
*S*** SUB-BASIN 240 ****										
COMPUTE NM HYD	240.00	-	3	.03000	61.30	2.825	1.76549	1.600	3.193	PER IMP= 60.00
ADD HYD	240.10	3& 2	6	.19163	312.49	17.567	1.71884	2.167	2.548	
*S**********										
*S*** SUB-BASIN 260B ****										
COMPUTE NM HYD	260B	-	3	.03800	99.72	3.578	1.76549	1.500	4.100	PER IMP= 60.00
DIVIDE HYD	260B_PIPE	3	4	.03653	80.00	3.440	1.76549	1.467	3.422	
	260B_ST	and	2	.00147	19.72	.138	1.76549	1.500	20.969	
ROUTE	260B.3	4	3	.03653	80.46	3.440	1.76550	1.500	3.441	
ROUTE	260B.4	2	4	.00147	3.18	.139	1.76900	1.567	3.378	
*S*** SUB-BASIN 270 ****										
COMPUTE NM HYD	270.00	-	2	.05750	104.25	5.198	1.69491	1.633	2.833	PER IMP= 55.00
DIVIDE HYD	270_PIPE	2	5	.04460	50.00	4.032	1.69491	1.467	1.752	
	270_ST	and	7	.01290	54.25	1.166	1.69491	1.633	6.572	
ADD HYD	270.10	7& 4	2	.01437	55.88	1.304	1.70237	1.633	6.077	
ADD HYD	270.20	2& 6	4	.20600	313.29	18.872	1.71769	2.167	2.376	
DIVIDE HYD	270_STREET	4	4	.10300	156.65	9.436	1.71769	2.167	2.376	
	270_PENN	and	7	.10300	156.65	9.436	1.71769	2.167	2.376	
ADD HYD	270.20	5& 3	6	.08113	130.46	7.471	1.72669	1.500	2.512	
ADD HYD	270.20	6& 1	5	.37487	329.90	33.725	1.68686	1.900	1.375	
ROUTE	280.10	5	1	.37487	329.67	33.725	1.68686	1.900	1.374	
ROUTE	280.20	4	2	.10300	133.91	9.436	1.71769	2.200	2.031	
*S*** SUB-BASIN 280: BASIN JUST UPSTREAM FROM UPTOWN VILLAGE **********										
COMPUTE NM HYD	280.00	-	3	.03800	73.04	3.683	1.81746	1.633	3.003	PER IMP= 65.00
DIVIDE HYD	280_PIPE	3	5	.03154	60.62	3.057	1.81745	1.633	3.003	
	280_ST	and	7	.00646	12.42	.626	1.81745	1.633	3.003	
ADD HYD	280.30	7& 2	4	.10946	140.43	10.062	1.72356	1.867	2.005	
ADD HYD	280.30	5& 1	6	.40641	385.99	36.782	1.69699	1.667	1.484	
*S ADD STREET FLOW TO PIPE FLOW AT BASIN 290										
*S DIVERT COMBINED FLOW TOWARD INDIAN SCHOOL										
ADD HYD	280.30	4& 6	7	.51587	506.23	46.844	1.70263	1.800	1.533	
ROUTE	280.10	7	40	.51587	506.02	46.844	1.70263	1.833	1.533	

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*S  ADD IN SUBBASIN 290E (PORTION OF BASIN 290 EAST OF LOOP ROAD)
*S
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                                FROM  TO                    PEAK        RUNOFF                TIME TO    CFS
                   HYDROGRAPH   ID    ID        AREA     DISCHARGE     VOLUME      RUNOFF      PEAK     PER
COMMAND          IDENTIFICATION NO.  NO.      (SQ MI)     (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE     NOTATION

COMPUTE NM HYD          290E    -    98        .01000       30.62       1.166     2.18566     1.500    4.784 PER IMP=  95.00
*S*****************************************
ADD HYD                B4SPLT 40&98  97        .52587      516.65      48.010     1.71181     1.800    1.535
*S
*S*****************************************************************************
*S*****************************************************************************
*s*****************************************************************************
*S    DIVIDE FLOW IN THE PIPE.  PERCETNAGE BASED ON BALANCING HGL IN 2 SEPARATE
*S       LARGER PORTION TURNS WEST, SMALLER PORTION CONTINUES SOUTH TO I-40
DIVIDE HYD              SOUTH   97   41        .21035      206.66      19.204     1.71181     1.800    1.535
                         WEST  and    4        .31552      309.99      28.806     1.71181     1.800    1.535
*S PORTION OF PIPE FLOW GOING SOUTH ADDED TO INDIAN SCHOOL FLOW AT LOOP RD
ADD HYD               ISTOTAL 94&41  42        .40902      432.57      37.671     1.72690     1.733    1.652
*S*
*S ROUTE THE DIVERTED FLOW THROUGH NEW 72" PIPE TO S OF MACARONI GRILL
ROUTE                   MAIN1   42   45        .40902      432.30      37.671     1.72691     1.767    1.651
*S   THE OUTFALL FOR THE FOLLOWING BASINS WERE MOVED FROM PREVIOUS VERSIONS
*S    ADD BASINS 102.1 AND 102.2 & DIVERT TO NEW I-40 SD
COMPUTE NM HYD         102.10    -    52        .00550       17.13        .656     2.23711     1.500    4.867 PER IMP= 100.00
COMPUTE NM HYD         102.20    -    54        .00227        7.07        .270     2.23711     1.500    4.871 PER IMP= 100.00
*S  ADD 2 BASINS TOGETHER
ADD HYD                102TOT 52&54  87        .00777       24.20        .927     2.23704     1.500    4.868
*s  ADD THIS FLOW TO ROUTED FLOW FROM NORTH IN NEW I-40 SD
ADD HYD                 I40SD 87&45  86        .41678      441.97      38.598     1.73641     1.733    1.657
*S  THIS FLOW GETS ADDED TO SOUTHERN PORTION OF WINDROCK BASINS BELOW
*S*****************************************************************************
*S*****************************************************************************
*S CALCULATE THE FLOWS ENTERING THE INDIAN SCHOOL SD FLOWING WEST
*S
*S    BASIN 290W (WEST OF LOOP ROAD). PER PROPOSED SITE PLAN THERE WILL BE
*S         2 SD OUTFALLS FROM THIS PROPERTY.  WE WILL DIVIDE THE SITE INTO BASIN
*S         (EASTERN) AND 290W.2 (WESTERN PORTION).  AREAS PER PROPSED SITE PLAN.
*S*** SUB-BASIN 290W.1 (WEST OF LOOP ROAD, EASTERN ~2/3 OF SITE) ****
*S    DISCHARGES TO EXISTING 48" SD IN I.S.
COMPUTE NM HYD         290W.1    -    91        .02350       71.93       2.739     2.18566     1.500    4.782 PER IMP=  95.00
*S*** SUB-BASIN 290W.2 (WEST OF LOOP ROAD, WESTERN ~1/3 OF SITE) ****
COMPUTE NM HYD         290W.2    -    89        .00450       13.79        .525     2.18566     1.500    4.788 PER IMP=  95.00
*S   ADD TO FLOW IN EXISTING 48" SD (FROM BASIN 290W.1)
ADD HYD                  WEST 89&91  88        .02800       85.72       3.264     2.18564     1.500    4.783
*S   ADD THIS FLOW INTO NEW SD ON SOUTH PART OF INDIAN SCHOOL
ADD HYD                NEWTOT 88& 4  85        .34352      342.85      32.070     1.75043     1.733    1.559
*S
*S   THIS COMBINED SD FLOW WILL GET ADDED TO BASIN VILS (THE UNDEVELOPED SITE AT
*S   SOUTHEAST CORNER OF I.S. AND LOUISIANA), PLUS BASIN 310 FLOWS BELOW, AND TH
*S   ADDED TO STREET FLOW AT THE INTERSECTION OF INDIAN SCHOOL AND LOUSIANA TO
*S   DETERMINE THE TOTAL Q AT THAT LOCATION.
*s
*S*****************************************************************************
*S*****************************************************************************
COMPUTE NM HYD           VILS    -    50        .01840       56.38       2.145     2.18566     1.500    4.788 PER IMP=  95.00
*S  ADD THIS FLOW TO COMBINED SD FLOW AT INTERSECTION
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                                FROM   TO                    PEAK        RUNOFF                 TIME TO    CFS
                   HYDROGRAPH    ID    ID        AREA     DISCHARGE     VOLUME      RUNOFF       PEAK     PER
COMMAND          IDENTIFICATION  NO.   NO.      (SQ MI)     (CFS)      (AC-FT)    (INCHES)    (HOURS)   ACRE      NOTATION

ADD HYD                  VILS1 50&85   84       .36192      370.66      34.215     1.77256      1.633    1.600
*S  COMPUTE BASIN 310 AND ADD TO SD FLOW AT INTERSECTION
*S*** SUB-BASIN 310****
COMPUTE NM HYD          310.00   -     3        .03900       73.54       3.672     1.76549      1.633    2.947 PER IMP=  60.00
ADD HYD                 310.30  3&84   4        .40092      444.21      37.887     1.77187      1.633    1.731
*S
*S   SUM FLOWS AT INTERSECTION OF INDIAN SCHOOL AND LOUISIANA (SD AND STREET)
*S       TOTAL COMBINED STREET AND SD FLOWS AT INTERSECTION OF I.S. AND LOUISIAN
ADD HYD                 ISWEST  4&95   5        .43186      576.13      40.765     1.76989      1.633    2.084
*S*
*S*****************************************************************************
*S BOHANNAN HUSTON, INC. ADDITION OF AVID ENGR. WINROCK BASINS ALONG LOOP ROAD
COMPUTE NM HYD          103.10   -     10       .01356       42.23       1.618     2.23711      1.500    4.866 PER IMP= 100.00
COMPUTE NM HYD          103.20   -     11       .00330       10.28        .394     2.23711      1.500    4.869 PER IMP= 100.00
COMPUTE NM HYD          103.30   -     12       .00426       13.27        .508     2.23711      1.500    4.868 PER IMP= 100.00
COMPUTE NM HYD          103.42   -     13       .00166        5.18        .198     2.23711      1.500    4.873 PER IMP= 100.00
COMPUTE NM HYD          103.43   -     14       .00086        2.69        .103     2.23711      1.500    4.881 PER IMP= 100.00
COMPUTE NM HYD          105.10   -     15       .00694       21.62        .828     2.23711      1.500    4.867 PER IMP= 100.00
COMPUTE NM HYD          105.20   -     16       .00295        9.19        .352     2.23711      1.500    4.869 PER IMP= 100.00
COMPUTE NM HYD          106.10   -     17       .00182        5.68        .217     2.23711      1.500    4.872 PER IMP= 100.00
COMPUTE NM HYD          106.20   -     18       .00198        6.17        .236     2.23711      1.500    4.872 PER IMP= 100.00
COMPUTE NM HYD          106.30   -     19       .00107        3.34        .128     2.23711      1.500    4.878 PER IMP= 100.00
COMPUTE NM HYD          106.50   -     20       .00192        5.99        .229     2.23711      1.500    4.872 PER IMP= 100.00
COMPUTE NM HYD          106.60   -     21       .00167        5.21        .199     2.23711      1.500    4.873 PER IMP= 100.00
COMPUTE NM HYD          106.70   -     22       .00223        6.95        .266     2.23711      1.500    4.871 PER IMP= 100.00
COMPUTE NM HYD          107.30   -     23       .00046        1.44        .055     2.23711      1.500    4.894 PER IMP= 100.00
*S NEW PARKING LOT
COMPUTE NM HYD           PKLOT   -     24       .00130        4.06        .155     2.23711      1.500    4.875 PER IMP= 100.00
*S ADD WINROCK BASINS TOGETHER AND ADD TO DIVERSION PIPE
ADD HYD                 106.13 17&19   30       .00289        9.02        .345     2.23692      1.500    4.874
ADD HYD                 135.00 30&20   31       .00481       15.00        .574     2.23694      1.500    4.873
ADD HYD                1356.00 31&21   32       .00648       20.21        .773     2.23694      1.500    4.873
ADD HYD                 ALL106 32&22   33       .00871       27.16       1.039     2.23695      1.500    4.873
*S ADD 103'S
ADD HYD                  ROOF3 33&12   50       .01297       40.44       1.547     2.23699      1.500    4.871
ADD HYD                  31.00 50&10   51       .02653       82.66       3.165     2.23704      1.500    4.868
*S FLOW INTO EX. 24"/NEW 36" SD AT NEW PARKING-LOT INLET
ADD HYD                 312.00 51&11   52       .02983       92.94       3.559     2.23704      1.500    4.868
*S ADD STREET FLOWS
ADD HYD                    ST1 52&13   53       .03149       98.12       3.757     2.23703      1.500    4.869
*S TOTAL FLOW ADDED TO MAIN JUNCTION SOUTH OF MACARONI GRILL
ADD HYD                 312.00 53&14   54       .03235      100.81       3.860     2.23703      1.500    4.869
*S ADD FLOW TO MAIN LINE
ADD HYD                   MAIN 54&86   55       .44913      513.26      42.457     1.77247      1.533    1.786
*S ADD NEW PARKING LOT FLOW TO MAIN LINE
ADD HYD                  MAIN2 55&24   56       .45043      517.10      42.612     1.77381      1.533    1.794
*S ADD WINROCK BASINS 105'S
ROUTE                   107.30   23    57       .00046        1.24        .055     2.23760      1.567    4.199
ADD HYD                7352.00 57&16   60       .00341       10.30        .407     2.23697      1.500    4.718
ADD HYD                5262.00 60&18   61       .00539       16.47        .643     2.23697      1.500    4.775
*S NEXT INPUT AT 105.2
```

ADD HYD	105S 61&15	62	.01233	38.09	1.471	2.23702	1.500	4.827
*S ADD TO MAIN LINE								

APPENDIX C

HYDRAULIC ANALYSIS

Inlet Flow Calculations

Methodology:

1. Street flow modeled in Streams, to calculate normal depth of flow at the flow line, for Indian School Road and Uptown Loop Road utilizing 160 cfs and 7.5 cfs respectively.
2. Indian School street flow given in Uptown Area Drainage Report, by ASCG (See Attached).
3. Uptown Loop road street flow was determined utilizing ABQ DPM (See Attached).
4. COA DPM Nomographs used to determine inlet capacity (See Attached).

Indian School = 160 cfs

Uptown Loop Road = 2.26 ac (See Figure 1) x 5.02 cfs/ac (Table A-9) = 11.35 cfs

Stream Model Results:

Indian School Road = .83 ft of water @ 1% Slope
(See Attached "PC Program Stream" Model Results)

Uptown Loop Road = .27 ft. of water @ 2% Slope
(See Attached "PC Program Stream" Model Results)

Inlet Capacity (See Figure 2):

Single Type A inlet = 14 cfs – along Indian School Rd.
(See Plate 22.3 D-5 Attached)

Double Type C inlet = 18 cfs – along Indian School Rd.
(See Plate 22.3 D-6 Attached)

Single Type AC inlet = 2.5 cfs – along Uptown Loop Rd.
(See Plate 22.3 D-6 Attached)

A.6 PEAK DISCHARGE RATE FOR SMALL WATERSHEDS

Small watersheds are less than or equal to 40 acres.

Peak Discharge

Using a 0.2-hour (12-minute) time of concentration, peak discharge, Q_P, per acre is the volume of excess precipitation in the heaviest 12-minute portion of the storm, divided by the time increment 12 minutes, and multiplied by an attenuation factor. The attenuation factor (0.59 for treatment A, 0.67 for treatment B, 0.75 for treatment C and 0.93 for treatment D) describes the effect of routing. Determine the peak discharge using the values in TABLE A-9, which have been adjusted to consider the effects of initial abstraction.

TABLE A-9. PEAK DISCHARGE (CFS/ACRE)

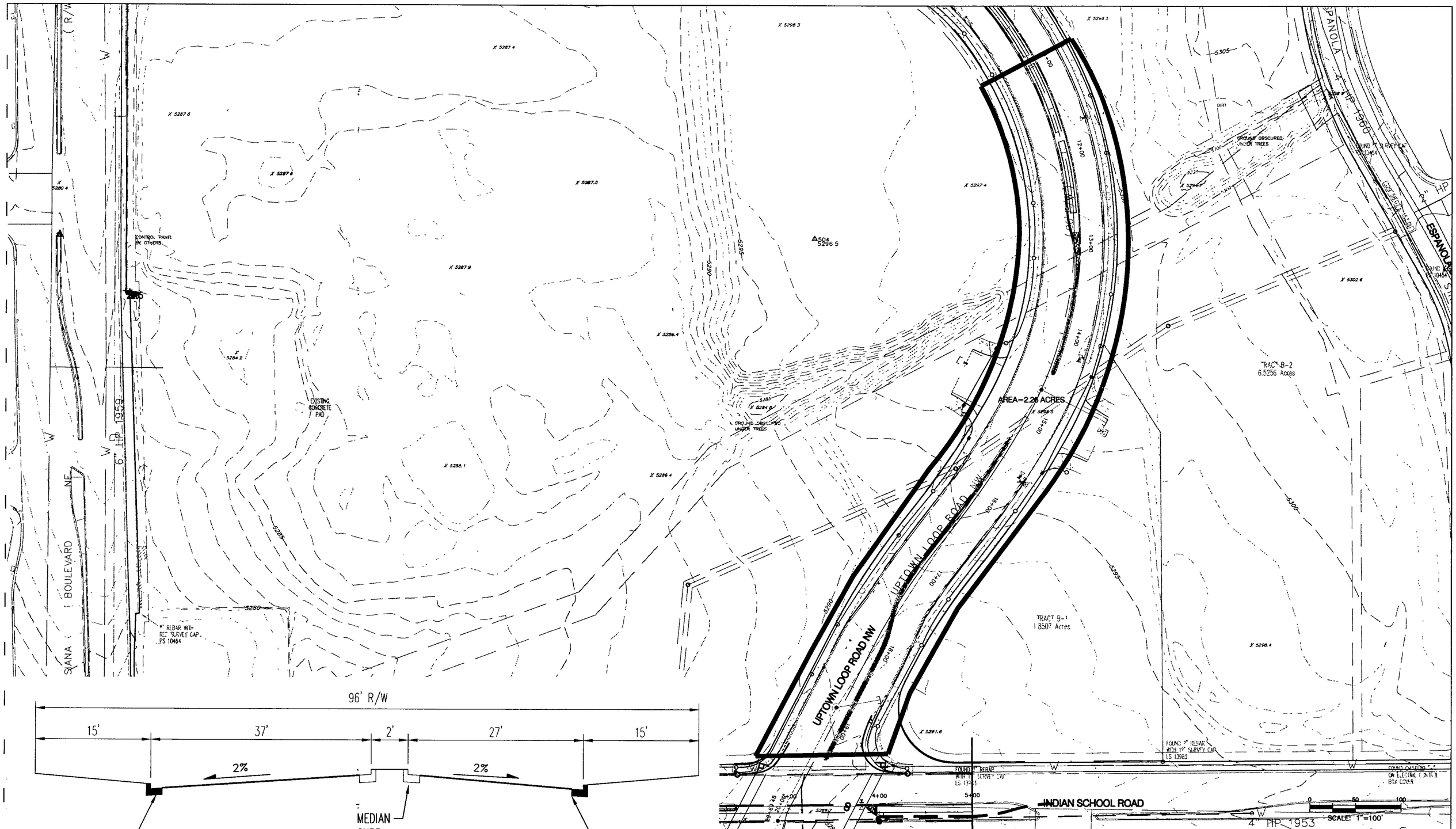
Zone	100-YR. Treatment [2-YR., 10-YR.]			
	A	B	C	D
1	1.29 [0.00, 0.24]	2.03 [0.03, 0.76]	2.87 [0.47, 1.49]	4.37 [1.69, 2.89]
2	1.56 [0.00, 0.38]	2.28 [0.08, 0.95]	3.14 [0.60, 1.71]	4.70 [1.86, 3.14]
3	1.87 [0.00, 0.58]	2.60 [0.21,1.19]	3.45 [0.78, 2.00]	5.02 [2.04, 3.39]
4	2.20 [0.05, 0.87]	2.92 [0.38, 1.45]	3.73 [1.00, 2.26]	5.25 [2.17, 3.57]

To determine the peak rate of discharge,

1) Determine the area in each treatment, A_A, A_B, A_C and A_D.

2) Multiply the peak rate for each treatment by the respective areas and sum to compute the total Q_P.

$$\text{Total } Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D \qquad \text{(a-10)}$$



UPTOWN LOOP RD SECTION

N.T.S.

Note: CROSS-SECTION FROM UPOWN LOOP ROAD PHASE II (JULY 2001) CONSTRUCTION PLANS.

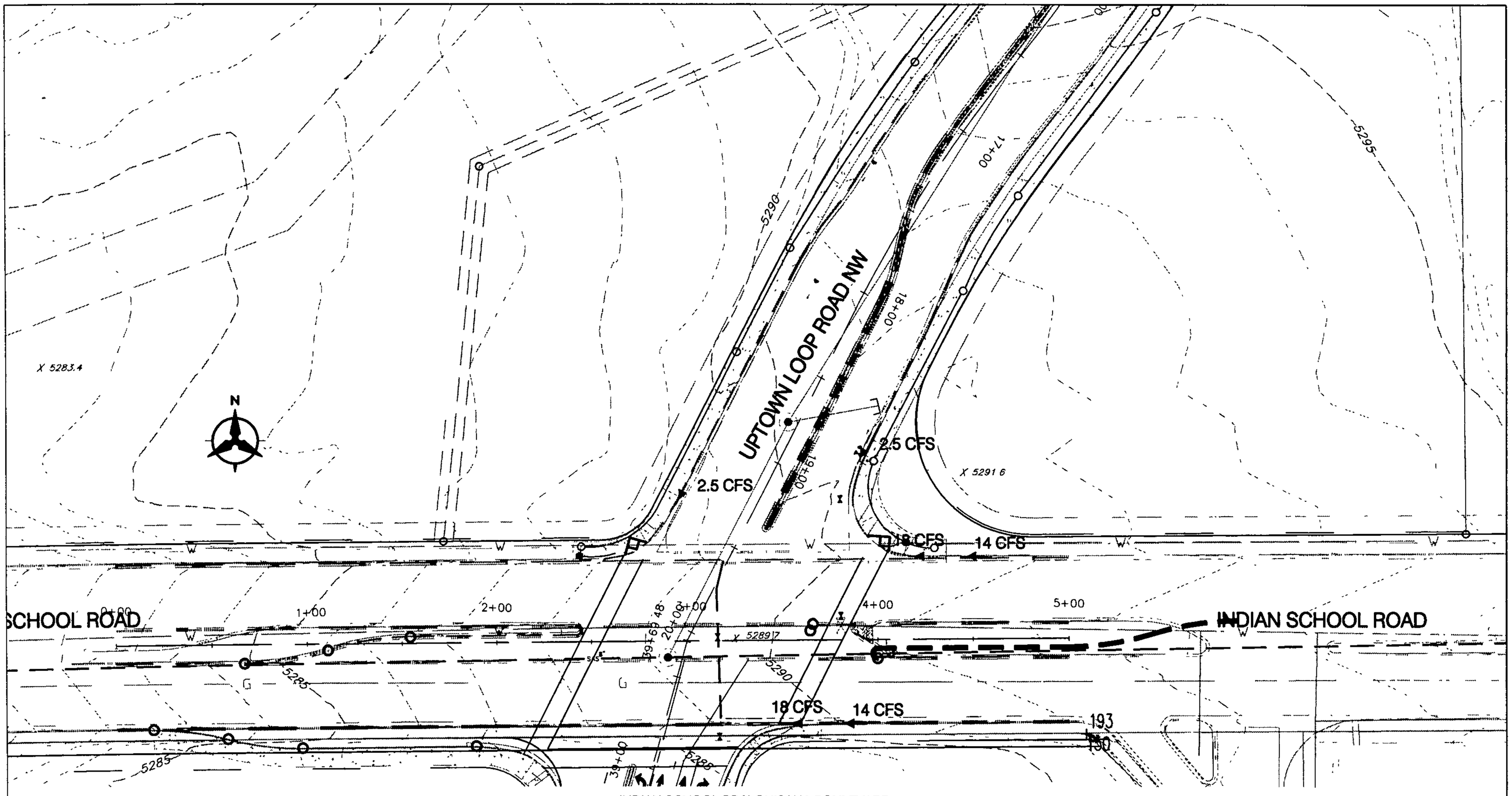
CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
WATER UTILITY DIVISION

Bohannan ▲ Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

ALBUQUERQUE UPTOWN PRELIMINARY DESIGN

FIGURE 2
UPTOWN LOOP RD. BASIN BOUNDARY

DRAWN BY:	S.M.	DATE:	03 16 04
CHECKED BY:	–	PROJECT NO.	040358.001.01.CWH



SCALE: 1"=50'

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
WATER UTILITY DIVISION

Bohannan ▲ Huston

ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

ALBUQUERQUE UPTOWN
PRELIMINARY DESIGN

FIGURE 3
POTHOLE LOCATION PLAN

DRAWN BY:	K.W.J	DATE:	03 16 04
CHECKED BY:	–	PROJECT NO.	040358.001.01.CWH

"Input Parameters"
"Calculated Values"

ORIFICE FLOW CALCULATIONS

Pipes

Orifice diameter (in.)	= 48								
Area (ft^2)	= 12.57								
C	= 0.6								
Water surface elevation (ft)	= 0	13	14	15	16	17	18	19	20
Headwater (ft)	= 0.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00
Q (ft^3/s)	= 0.0	200.7	209.6	218.2	226.4	234.3	242.0	249.5	256.7
Number of Barrells	1 0.0	200.7	209.6	218.2	226.4	234.3	242.0	249.5	256.7

Pipes

Orifice diameter (in.)	= 60								
Area (ft^2)	= 19.63								
C	= 0.6								
Water surface elevation (ft)	= 0	13	14	15	16	17	18	19	20
Headwater (ft)	= 0.00	10.50	11.50	12.50	13.50	14.50	15.50	16.50	17.50
Q (ft^3/s)	= 0.0	306.4	320.6	334.3	347.4	360.0	372.2	384.0	395.5
Number of Barrells	1 0.0	306.4	320.6	334.3	347.4	360.0	372.2	384.0	395.5

Analyzer Report

==========
Drainage Structure Analyzer

Culvert Hydraulic Analysis

Date: Wednesday, May 26, 2004 10:56:33 AM
==========

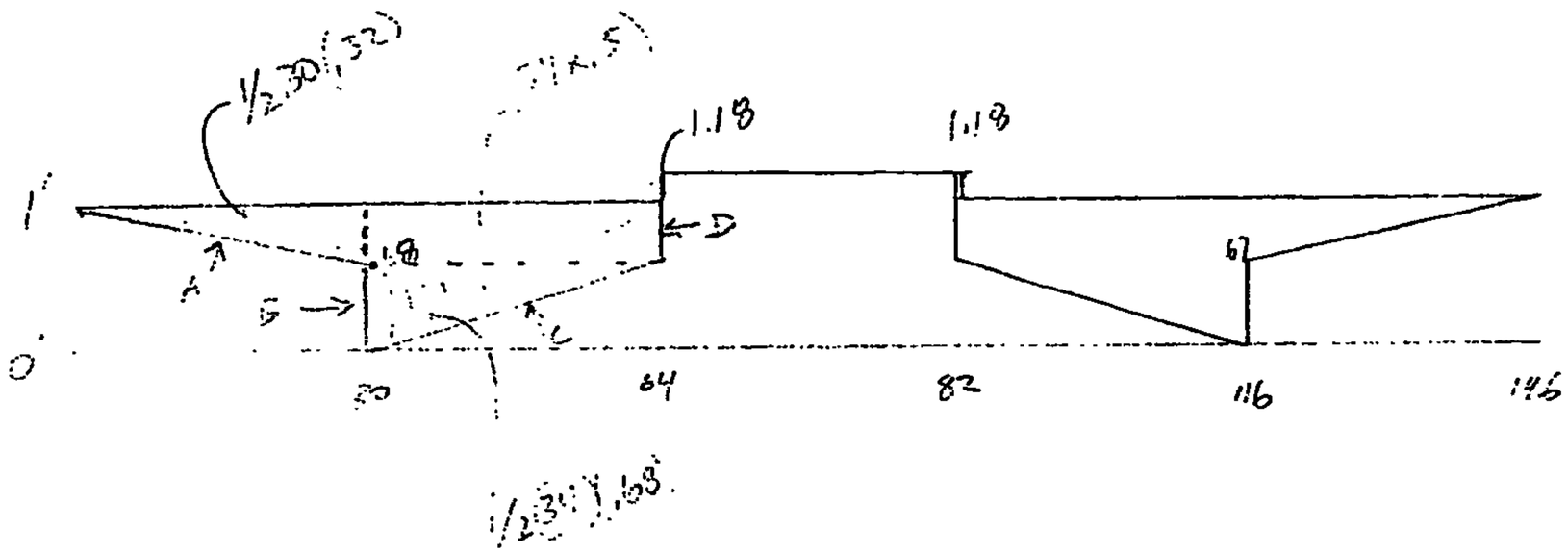
Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Entrance Edge	Square edge w/ headwall
Number of Barrels	3
Length	50.00 ft
Slope	2.000%
Tailwater	2.00 ft
Inlet Control Equation	Entrance Loss
Size (W x T):	24.00 x 2.5000
Headwater	4.25 ft

Output Results

Flow Rate	80.9 cfs
Control	Inlet
Capacity	96.0 cfs
Manning's Velocity	11.41 ft/s
Headwater	4.25 ft
Critical Depth	1.80 ft
Normal Depth	1.41 ft
Size (W x T):	24.00 x 2.5000

P:\ACAD\REV-SHT



$Q = \left(\frac{1.49}{n}\right) \cdot AR^{2/3} S^{1/2}$

A = AREA = 1/2 30(.32) + 1/2 34(.68) + (34 x .5) = 33.36 ft²

WP = 65.19

R = A/WP = 33.36/65.19 = .512

$r = \sqrt{30^2 + .32^2} = 30.002$

$S = .68$

$r = \sqrt{34^2 + .68^2} = 34.007$

$r = .5$

WP = (30.002 + .68 + 34.007 + .5)

$Q_{HAIL} = \frac{1.49}{0.017}(33.36)(.512)^{2/3} S^{1/2}$

$Q_{HAIL} = 581.19$

$Q_{TOTAL} = 2(581.19 \times S^{1/2})$

STREET CURB TYP. - TYPICAL SECTION

LEEDSHILL - HERKENHOFF, INC.
ENGINEERS ARCHITECTS
ALBUQUERQUE • SANTA FE
COMPUTATIONS

NAME OF PROJECT/CALCULATION

COMPUTED BY:

CHECKED BY:

JOB/TASK NO.

DATE:

SHEET NO. OF

1.0 SUBJECT | 2.0 PURPOSE | 3.0 REFERENCES | 4.0 ASSUMPTIONS | 5.0 CRITERIA / REQUIREMENTS

6.0 SKETCHES | 7.0 CALCULATIONS | 8.0 CONCLUSIONS | 9.0 ATTACHMENTS

IDENTIFY/ADDRESS THESE ELEMENTS

REVISION #

SUPERSEDES CALC TITLE

CHECKED BY:

DATED

Uptown Loop Road

MANNING'S N = 0.017 SLOPE = 0.02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0	1	5	52	1.2	9	81	0.7
2	15	0.7	6	54	1.2	10	96	1
3	15.1	0	7	54.1	0.7			
4	51.9	0.7	8	80.9	0			

WSEL INC FT.	DEPTH AREA SQ.FT.	FLOW RATE (CFS)	FLOW PER (FT)	WETTED VEL (FPS)	FLOW PLUS OBSTRUCTIONS	TOPWID ENERGY (FT)	TOTAL
0.01	0.01	0.004	0.002	0.88	0.357	2.862	0.012
0.02	0.02	0.017	0.01	1.76	0.566	3.724	0.025
0.03	0.03	0.039	0.029	2.64	0.742	4.586	0.039
0.04	0.04	0.069	0.062	3.52	0.899	5.449	0.053
0.05	0.05	0.108	0.112	4.399	1.043	6.311	0.067
0.06	0.06	0.155	0.183	5.279	1.177	7.173	0.082
0.07	0.07	0.211	0.276	6.159	1.305	8.035	0.096
0.08	0.08	0.276	0.394	7.039	1.426	8.897	0.112
0.09	0.09	0.349	0.539	7.919	1.543	9.759	0.127
0.1	0.1	0.431	0.714	8.799	1.655	10.622	0.143
0.11	0.11	0.522	0.92	9.679	1.764	11.484	0.158
0.12	0.12	0.621	1.16	10.559	1.869	12.346	0.174
0.13	0.13	0.729	1.436	11.438	1.972	13.208	0.19
0.14	0.14	0.845	1.75	12.318	2.071	14.07	0.207
0.15	0.15	0.97	2.104	13.198	2.169	14.932	0.223
0.16	0.16	1.104	2.499	14.078	2.264	15.795	0.24
0.17	0.17	1.246	2.937	14.958	2.358	16.657	0.256
0.18	0.18	1.397	3.421	15.838	2.449	17.519	0.273
0.19	0.19	1.556	3.951	16.718	2.539	18.381	0.29
0.2	0.2	1.724	4.531	17.598	2.627	19.243	0.307
0.21	0.21	1.901	5.16	18.477	2.714	20.105	0.325
0.22	0.22	2.086	5.842	19.357	2.8	20.968	0.342
0.23	0.23	2.28	6.577	20.237	2.884	21.83	0.359
0.24	0.24	2.483	7.367	21.117	2.967	22.692	0.377
0.25	0.25	2.694	8.214	21.997	3.049	23.554	0.395
0.26	0.26	2.914	9.12	22.877	3.13	24.416	0.412
0.27	0.27	3.143	10.086	23.757	3.209	25.278	0.43
0.28	0.28	3.38	11.113	24.637	3.288	26.141	0.448
0.29	0.29	3.625	12.203	25.517	3.366	27.003	0.466
0.3	0.3	3.88	13.357	26.396	3.443	27.865	0.484
0.31	0.31	4.143	14.578	27.276	3.519	28.727	0.503
0.32	0.32	4.414	15.866	28.156	3.594	29.589	0.521
0.33	0.33	4.694	17.223	29.036	3.669	30.451	0.539
0.34	0.34	4.983	18.65	29.916	3.742	31.314	0.558
0.35	0.35	5.281	20.149	30.796	3.816	32.176	0.576
0.36	0.36	5.587	21.721	31.676	3.888	33.038	0.595

Indian School Road

MANNING'S N = 0.017 SLOPE = 0.01

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0	1	5	64.1	1.2	9	116	0.7
2	30	0.7	6	81.9	1.2	10	146	1
3	30.1	0	7	82	0.7			
4	64	0.7	8	115.9	0			

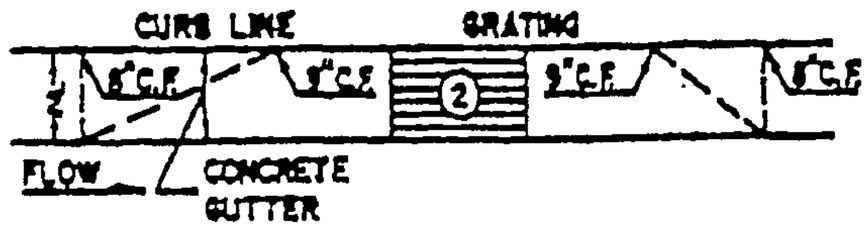
*Cross-section geometry from attached excerpt from ASCG report, 2002.

WSEL INC FT.	DEPTH AREA SQ.FT.	FLOW RATE (CFS)	FLOW PER (FT)	WETTED VEL (FPS)	FLOW PLUS OBSTRUCTIONS	TOPWID ENERGY (FT)	TOTAL
0.01	0.01	0.005	0.001	1.017	0.253	18.8	0.011
0.02	0.02	0.02	0.008	2.035	0.401	19.8	0.023
0.03	0.03	0.045	0.024	3.052	0.526	20.8	0.034
0.04	0.04	0.08	0.051	4.07	0.637	21.8	0.046
0.05	0.05	0.125	0.092	5.087	0.739	22.8	0.058
0.06	0.06	0.18	0.15	6.105	0.834	23.8	0.071
0.07	0.07	0.245	0.227	7.122	0.925	24.8	0.083
0.08	0.08	0.32	0.323	8.14	1.011	25.8	0.096
0.09	0.09	0.405	0.443	9.157	1.093	26.8	0.109
0.1	0.1	0.5	0.586	10.175	1.173	27.8	0.121
0.11	0.11	0.605	0.756	11.192	1.25	28.8	0.134
0.12	0.12	0.72	0.954	12.21	1.324	29.8	0.147
0.13	0.13	0.845	1.18	13.227	1.397	30.8	0.16
0.14	0.14	0.98	1.438	14.245	1.468	31.8	0.174
0.15	0.15	1.125	1.729	15.262	1.537	32.8	0.187
0.16	0.16	1.28	2.053	16.28	1.604	33.8	0.2
0.17	0.17	1.445	2.414	17.297	1.67	34.8	0.213
0.18	0.18	1.62	2.811	18.315	1.735	35.8	0.227
0.19	0.19	1.805	3.247	19.332	1.799	36.8	0.24
0.2	0.2	2	3.723	20.349	1.862	37.8	0.254
0.21	0.21	2.205	4.241	21.367	1.923	38.8	0.268
0.22	0.22	2.42	4.801	22.384	1.984	39.8	0.281
0.23	0.23	2.645	5.405	23.402	2.043	40.8	0.295
0.24	0.24	2.88	6.054	24.419	2.102	41.8	0.309
0.25	0.25	3.125	6.751	25.437	2.16	42.8	0.323
0.26	0.26	3.38	7.495	26.454	2.217	43.8	0.336
0.27	0.27	3.645	8.288	27.472	2.274	44.8	0.35
0.28	0.28	3.92	9.133	28.489	2.33	45.8	0.364
0.29	0.29	4.205	10.028	29.507	2.385	46.8	0.378
0.3	0.3	4.5	10.977	30.524	2.439	47.8	0.393
0.31	0.31	4.805	11.98	31.542	2.493	48.8	0.407
0.32	0.32	5.12	13.039	32.559	2.547	49.8	0.421
0.33	0.33	5.445	14.154	33.577	2.599	50.8	0.435
0.34	0.34	5.78	15.327	34.594	2.652	51.8	0.449
0.35	0.35	6.125	16.558	35.612	2.703	52.8	0.464
0.36	0.36	6.48	17.85	36.629	2.755	53.8	0.478

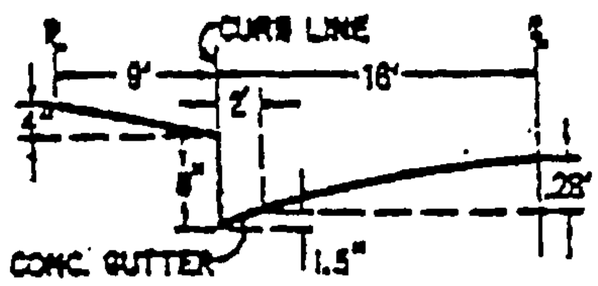
WSEL INC FT.	DEPTH AREA SQ.FT.	FLOW RATE (CFS)	FLOW PER (FT)	WETTED VEL (FPS)	FLOW PLUS OBSTRUCTIONS	TOPWID ENERGY (FT)	TOTAL
0.37	0.37	6.845	19.203	37.647	2.805	54.8	0.492
0.38	0.38	7.22	20.619	38.664	2.856	55.8	0.507
0.39	0.39	7.605	22.098	39.682	2.906	56.8	0.521
0.4	0.4	8	23.641	40.699	2.955	57.8	0.536
0.41	0.41	8.405	25.25	41.716	3.004	58.8	0.55
0.42	0.42	8.82	26.926	42.734	3.053	59.8	0.565
0.43	0.43	9.245	28.669	43.751	3.101	60.8	0.58
0.44	0.44	9.68	30.482	44.769	3.149	61.8	0.594
0.45	0.45	10.125	32.365	45.786	3.197	62.8	0.609
0.46	0.46	10.58	34.318	46.804	3.244	63.8	0.624
0.47	0.47	11.045	36.344	47.821	3.291	64.8	0.638
0.48	0.48	11.52	38.443	48.839	3.337	65.8	0.653
0.49	0.49	12.005	40.616	49.856	3.383	66.8	0.668
0.5	0.5	12.5	42.864	50.874	3.429	67.8	0.683
0.51	0.51	13.005	45.188	51.891	3.475	68.8	0.698
0.52	0.52	13.52	47.59	52.909	3.52	69.8	0.713
0.53	0.53	14.045	50.069	53.926	3.565	70.8	0.728
0.54	0.54	14.58	52.628	54.944	3.61	71.8	0.743
0.55	0.55	15.125	55.268	55.961	3.654	72.8	0.758
0.56	0.56	15.68	57.988	56.979	3.698	73.8	0.773
0.57	0.57	16.245	60.791	57.996	3.742	74.8	0.788
0.58	0.58	16.82	63.676	59.014	3.786	75.8	0.803
0.59	0.59	17.405	66.646	60.031	3.829	76.8	0.818
0.6	0.6	18	69.701	61.048	3.872	77.8	0.833
0.61	0.61	18.605	72.842	62.066	3.915	78.8	0.848
0.62	0.62	19.22	76.07	63.083	3.958	79.8	0.864
0.63	0.63	19.845	79.386	64.101	4	80.8	0.879
0.64	0.64	20.48	82.791	65.118	4.043	81.8	0.894
0.65	0.65	21.125	86.286	66.136	4.085	82.8	0.909
0.66	0.66	21.78	89.871	67.153	4.126	83.8	0.925
0.67	0.67	22.445	93.549	68.171	4.168	84.8	0.94
0.68	0.68	23.12	97.318	69.188	4.209	85.8	0.956
0.69	0.69	23.809	100.378	71.084	4.216	87.679	0.966
0.7	0.7	24.518	103.57	72.979	4.224	89.558	0.978
0.71	0.71	25.245	106.895	74.875	4.234	91.437	0.989
0.72	0.72	25.99	110.355	76.77	4.246	93.316	1
0.73	0.73	26.755	113.951	78.666	4.259	95.195	1.012
0.74	0.74	27.538	117.683	80.561	4.273	97.074	1.024
0.75	0.75	28.34	121.552	82.457	4.289	98.953	1.036
0.76	0.76	29.161	125.56	84.352	4.306	100.832	1.048
0.77	0.77	30.001	129.707	86.248	4.323	102.711	1.061
0.78	0.78	30.86	133.996	88.143	4.342	104.59	1.073
0.79	0.79	31.737	138.427	90.039	4.362	106.469	1.086
0.8	0.8	32.633	143.003	91.934	4.382	108.348	1.099
0.81	0.81	33.548	147.723	93.83	4.403	110.227	1.112
0.82	0.82	34.481	152.59	95.725	4.425	112.106	1.125
0.83	0.83	35.434	157.606	97.621	4.448	113.985	1.138
0.84	0.84	36.405	162.771	99.516	4.471	115.864	1.151
0.85	0.85	37.395	168.088	101.412	4.495	117.743	1.164

WSEL INC FT.	DEPTH AREA SQ.FT.	FLOW RATE (CFS)	FLOW PER (FT)	WETTED VEL (FPS)	FLOW PLUS OBSTRUCTIONS	TOPWID ENERGY (FT)	TOTAL
0.86	0.86	38.404	173.557	103.307	4.519	119.622	1.178
0.87	0.87	39.432	179.181	105.203	4.544	121.501	1.191
0.88	0.88	40.478	184.961	107.098	4.569	123.38	1.205
0.89	0.89	41.543	190.898	108.994	4.595	125.259	1.218
0.9	0.9	42.627	196.995	110.889	4.621	127.138	1.232
0.91	0.91	43.73	203.252	112.785	4.648	129.017	1.246
0.92	0.92	44.852	209.671	114.68	4.675	130.896	1.26
0.93	0.93	45.992	216.255	116.576	4.702	132.775	1.274
0.94	0.94	47.151	223.004	118.471	4.73	134.654	1.288
0.95	0.95	48.329	229.92	120.367	4.757	136.533	1.302
0.96	0.96	49.526	237.006	122.262	4.786	138.412	1.316
0.97	0.97	50.741	244.261	124.158	4.814	140.291	1.33
0.98	0.98	51.976	251.689	126.053	4.842	142.17	1.345
0.99	0.99	53.229	259.291	127.949	4.871	144.049	1.359

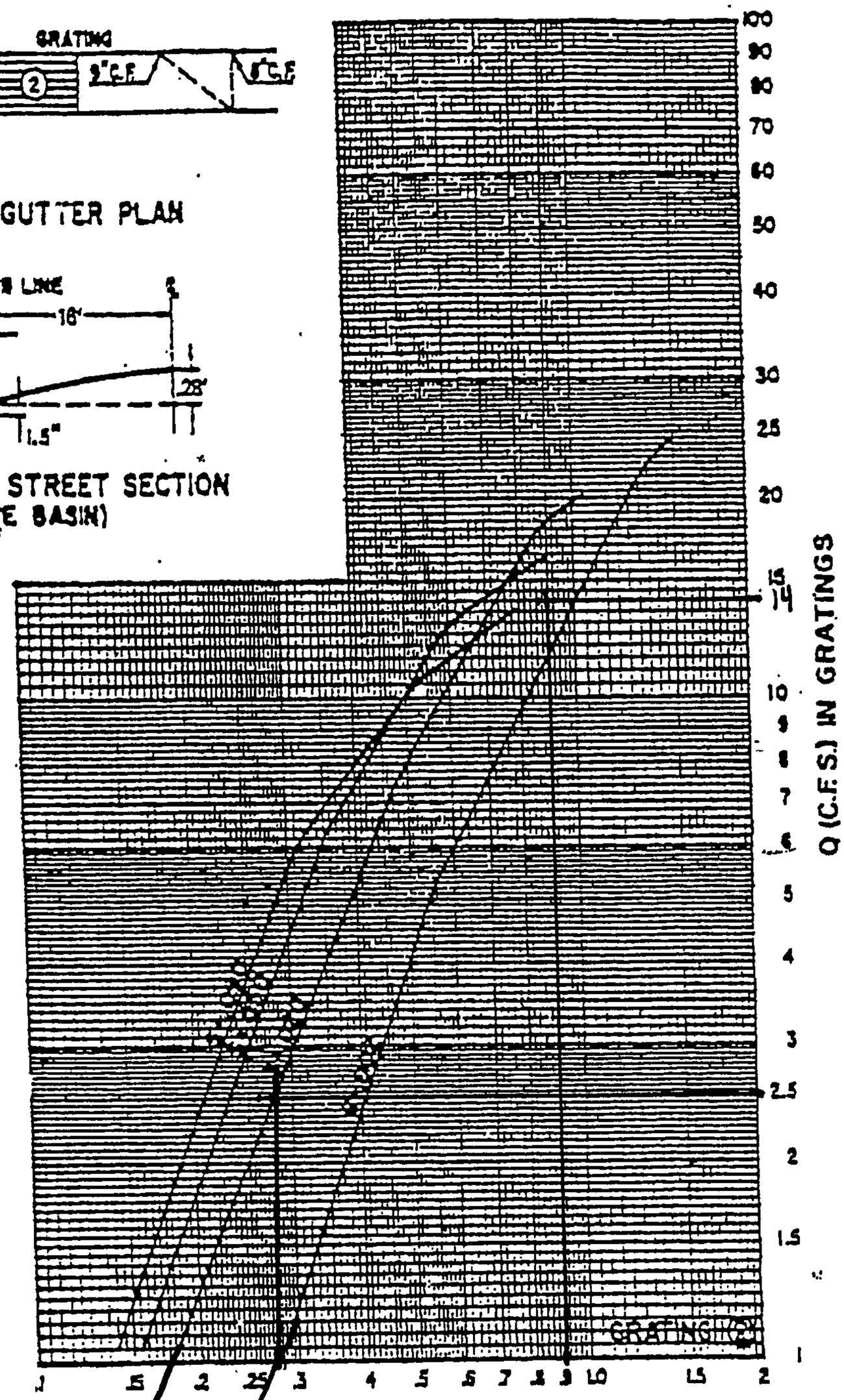
GRATING CAPACITIES FOR TYPE 'A', 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

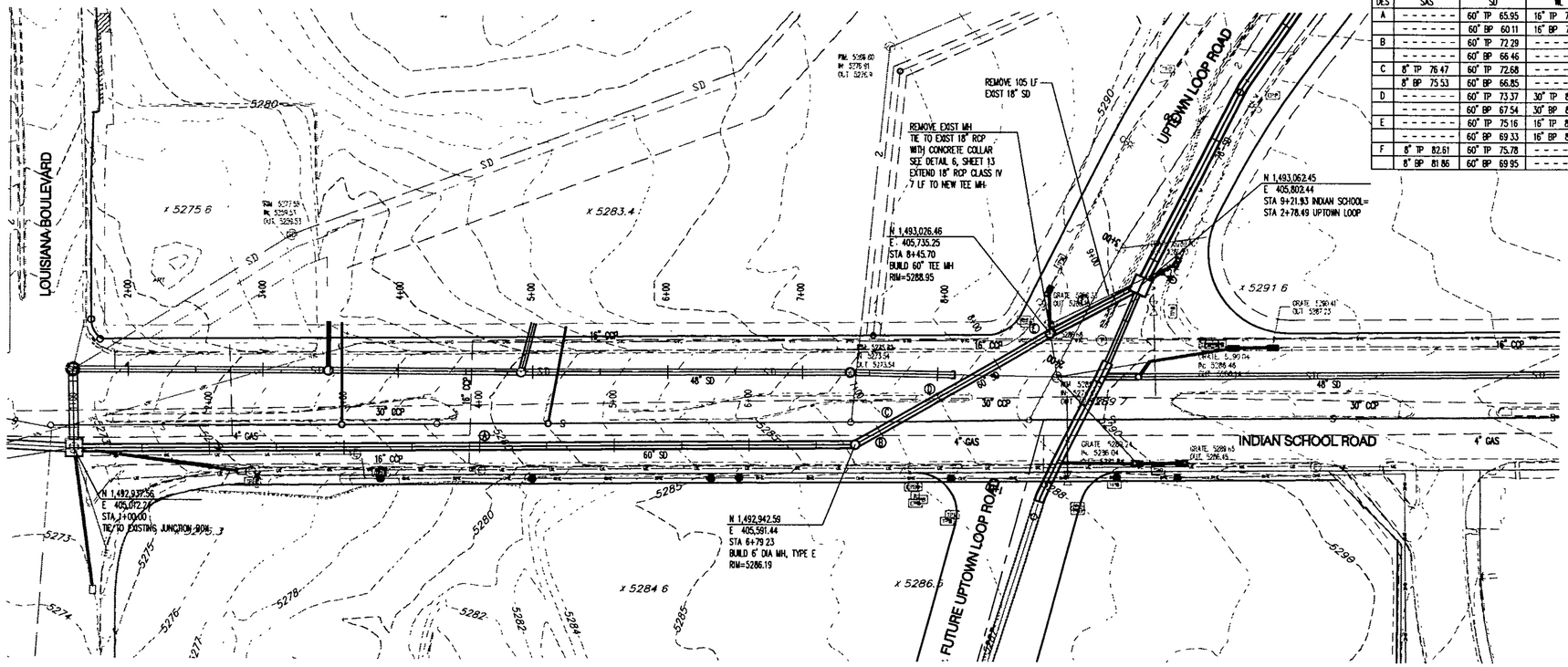


22 .22

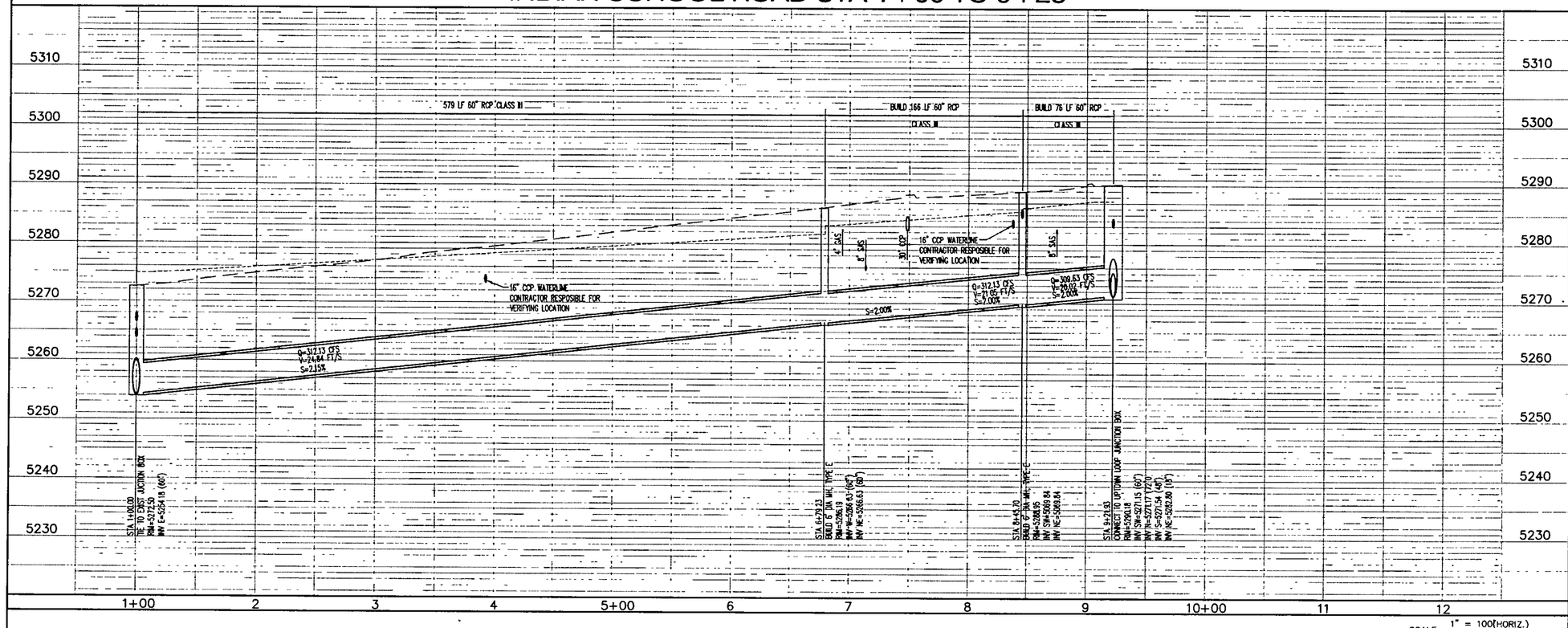
PLATE 22.3 D-5

APPENDIX D

PLAN AND PROFILE SHEETS



INDIAN SCHOOL ROAD STA 1+00 TO 9+28



SCALE 1" = 100(HORIZ.) 1" = 20'(VERT)

PIPE CROSSING TABLE						
DES	SAS	SD	WL	GAS		Clearance
A	- - - - - -	60" TP 65.95	16" TP 74.69	- - - - - -		7.24
	- - - - - -	60" BP 60.11	16" BP 73.19	- - - - - -		
B	- - - - - -	60" TP 72.29	- - - - - -	4" TP 82.54		9.86
	- - - - - -	60" BP 66.46	- - - - - -	4" BP 82.15		
C	8" TP 76.47	60" TP 72.68	- - - - - -	- - - - - -		2.85
	8" BP 75.53	60" BP 66.85	- - - - - -	- - - - - -		
D	- - - - - -	60" TP 73.37	30" TP 84.99	- - - - - -		8.66
	- - - - - -	60" BP 67.54	30" BP 82.04	- - - - - -		
E	- - - - - -	60" TP 75.16	16" TP 84.27	- - - - - -		7.60
	- - - - - -	60" BP 69.33	16" BP 82.76	- - - - - -		
F	8" TP 82.61	60" TP 75.78	- - - - - -	- - - - - -		6.07
	8" BP 81.86	60" BP 69.95	- - - - - -	- - - - - -		

NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
2. ALL CURB RETURN RADII SHALL BE 30' UNLESS OTHERWISE SPECIFIED.
3. ALL CURVE DATA AND DIMENSIONS REFER TO FACE OF CURB UNLESS OTHERWISE SPECIFIED
4. GRADE ELEVATIONS, WHERE NOTED, ARE FOR TOP OF STANDARD CURB UNLESS OTHERWISE SPECIFIED
5. CONTRACTOR IS TO INSTALL A 4"x 4"x 5' POST AND END AT THE END OF EACH SANITARY SEWER SERVICE.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ALL UTILITY CONDUITS AND EXISTING LINES.
7. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
8. CONTRACTOR SHALL PROVIDE THE INSPECTORS, (CITY AND PRIVATE) WITH THE PROPOSED HYDROSTATIC TESTING PLAN. THE PLAN MUST BE APPROVED BEFORE TESTING OPERATIONS BEGIN.
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11. REMOVAL OF THE EXISTING CURB & GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).
12. WHEELCHAIR RAMPS SHALL BE CONSTRUCTED PRIOR TO ACCEPTANCE OF CURB & GUTTER.
13. ALL TYPE "E" MANHOLES SHALL BE BUILT PE COA STD SWG 2102.
14. ALL TEE MANHOLES SHALL BE BUILT PER DETAIL 7, SHEET 13

LEGEND

- UNDERGROUND TELEPHONE
- EXISTING SD
- EXIST WATER
- EXIST SANITARY
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC
- ELECTRIC LIGHT POLE
- ELECTRICAL PULLBOX
- ELECTRICAL MANHOLE
- TELEPHONE PULLBOX
- SANITARY SEWER MANHOLE

KEYED NOTES

1. INSTALL CONCRETE VALLEY GUTTER AS PER STD. DWG. 2420
2. INSTALL WHEELCHAIR RAMP AS PER STD DWG 2441, CASE II WITH ALTERNATE SECTION AA
3. STD CURB & GUTTER AS PER STD DWG. 2415
4. MEDIAN CURB & GUTTER AS PER STD. DWG. 2415
5. FUTURE 4' SIDEWALK
6. BUILD 4' SIDEWALK

N

SCALE: 1"=50'

Bohannan ▲ Huston

Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335

ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

ABQ UPTOWN
INDIAN SCHOOL ROAD
STORM DRAIN PLAN AND PROFILE

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr	Mo./Day/Yr

City Project No	Zone Map No.	Sheet	Of
660181	H-19-Z	1	3

AS-BUILT INFORMATION

CONTRACTOR	DATE
STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

RECORDED BY DATE

NO

BENCH MARKS

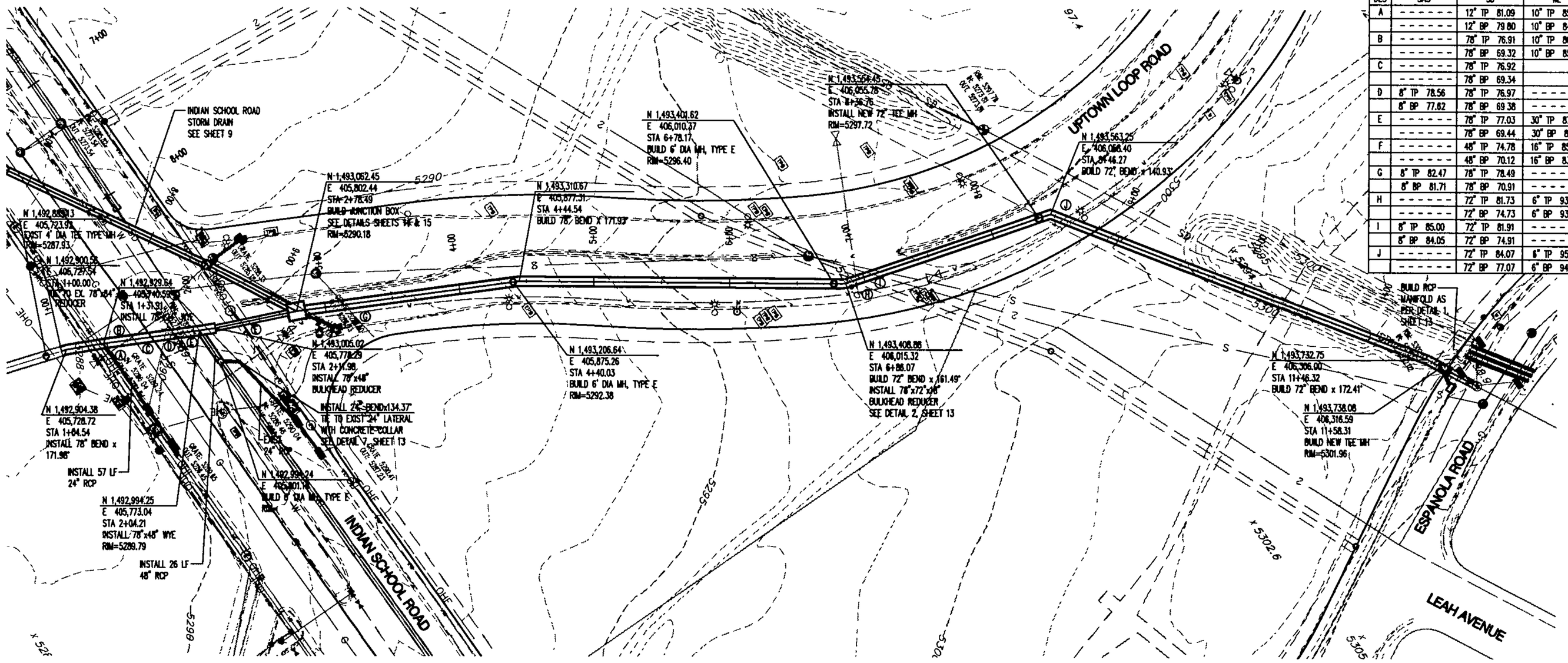
SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

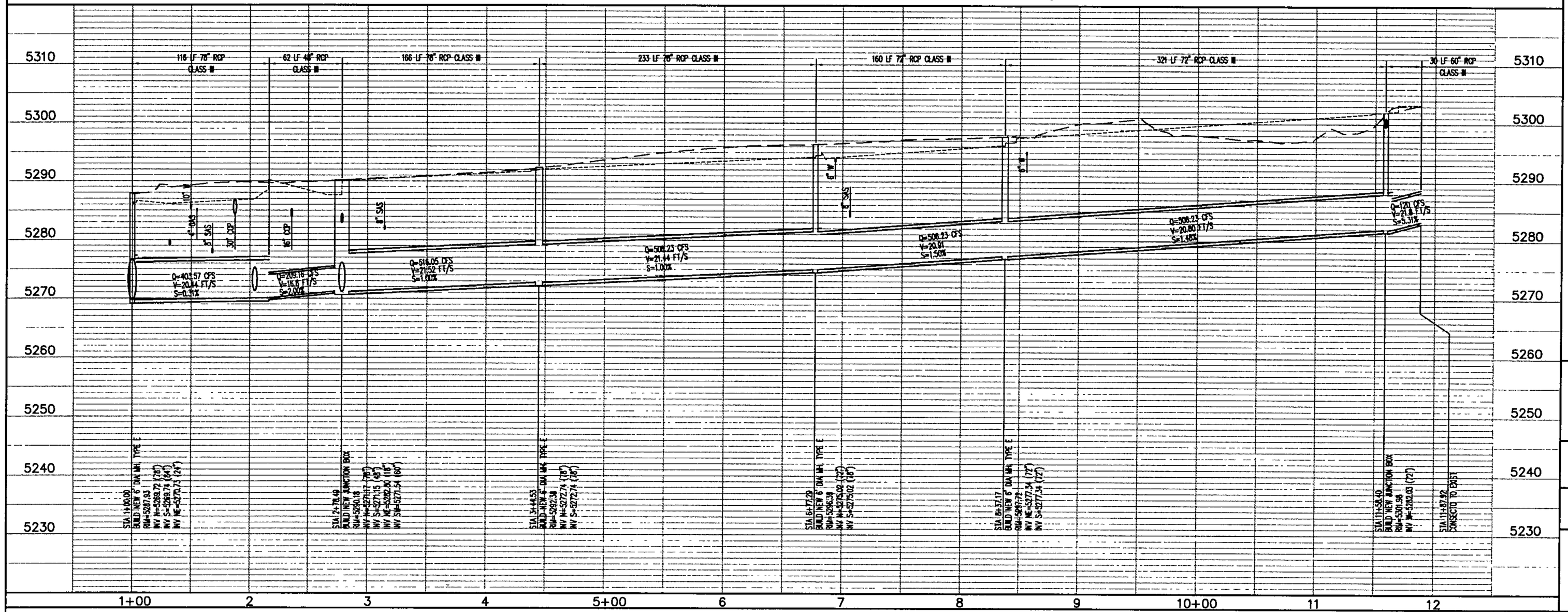
ENGINEER'S SEAL

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: S.M. DATE 5/18/04
Drawn By: M.T.D. DATE: 5/18/04
Checked By: C.W.H. DATE 5/18/04



UPTOWN LOOP ROAD STA 1+00 TO 11+49



SCALE: 1" = 100'(HORIZ.)
1" = 20' (VERT)

PIPE CROSSING TABLE

DES	SAS	SD	WL	GAS	CLEARANCE
A	- - - - - -	12" TP 81.09	10" TP 85.85		3.81
	- - - - - -	12" BP 79.80	10" BP 84.90		
B	- - - - - -	78" TP 76.91	10" TP 86.14		8.29
	- - - - - -	78" BP 69.32	10" BP 85.20		
C	- - - - - -	78" TP 76.92		4" TP 85.29	7.98
	- - - - - -	78" BP 69.34		4" BP 84.91	
D	8" TP 78.56	78" TP 76.97	- - - - - -	**0.65	
	8" BP 77.62	78" BP 69.38	- - - - - -		
E	- - - - - -	78" TP 77.03	30" TP 87.07		7.08
	- - - - - -	78" BP 69.44	30" BP 84.11		
F	- - - - - -	48" TP 74.78	16" TP 85.34		9.05
	- - - - - -	48" BP 70.12	16" BP 83.83		
G	8" TP 82.47	78" TP 78.49	- - - - - -		3.22
	8" BP 81.71	78" BP 70.91	- - - - - -		
H	- - - - - -	72" TP 81.73	6" TP 93.95		11.65
	- - - - - -	72" BP 74.73	6" BP 93.38		
I	8" TP 85.00	72" TP 81.91	- - - - - -		2.14
	8" BP 84.05	72" BP 74.91	- - - - - -		
J	- - - - - -	72" TP 84.07	8" TP 95.18		10.53
	- - - - - -	72" BP 77.07	6" BP 94.60		

NOTES

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13. ALL TYPE "E" MANHOLES SHALL BE BUILT PE COA STD SWG 2102.
14. ALL TEE MANHOLES SHALL BE BUILT PER DETAIL 7, SHEET 13.

LEGEND

UTC	UNDERGROUND TELEPHONE
SD	EXISTING SD
	EXIST WATER
S	EXIST SANITARY
UE	UNDERGROUND ELECTRIC
OHE	OVERHEAD ELECTRIC
	ELECTRIC LIGHT POLE
	ELECTRICAL PULLBOX
	ELECTRICAL MANHOLE
	TELEPHONE PULLBOX
	SANITARY SEWER MANHOLE

KEYED NOTES

1. INSTALL CONCRETE VALLEY GUTTER AS PER STD. DWG. 2420
2. INSTALL WHEELCHAIR RAMP AS PER STD. DWG. 2441, CASE II WITH ALTERNATE SECTION AA
3. STD. CURB & GUTTER AS PER STD. DWG. 2415
4. MEDIAN CURB & GUTTER AS PER STD. DWG. 2415
5. FUTURE 4' SIDEWALK
6. BUILD 4' SIDEWALK

N

SCALE: 1"=50'

Bohannan ▲ Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

ABQ UPTOWN
UPTOWN LOOP ROAD
STORM DRAIN PLAN AND PROFILE

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
660181	H-19-Z	2	3

ENGINEER'S SEAL

AS-BUILT INFORMATION

	DATE
CONTRACTOR	
WORK STAKED BY	
INSPECTOR ACCEPTANCE BY	
FIELD VERIFICATION BY	
DRAWINGS CORRECTED BY	

MICRO-FILM INFORMATION

	DATE
RECORDED BY	
NO	

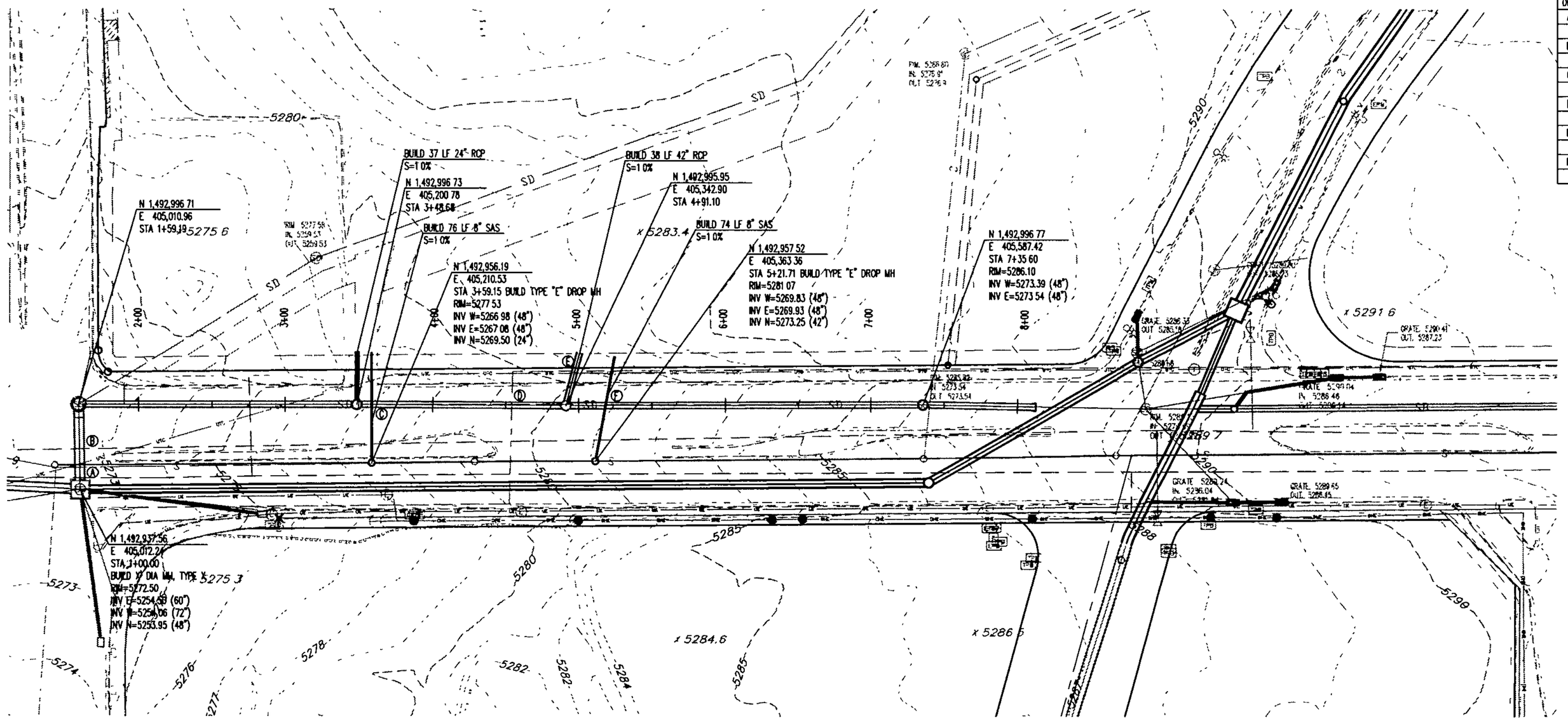
BENCH MARKS

SURVEY INFORMATION

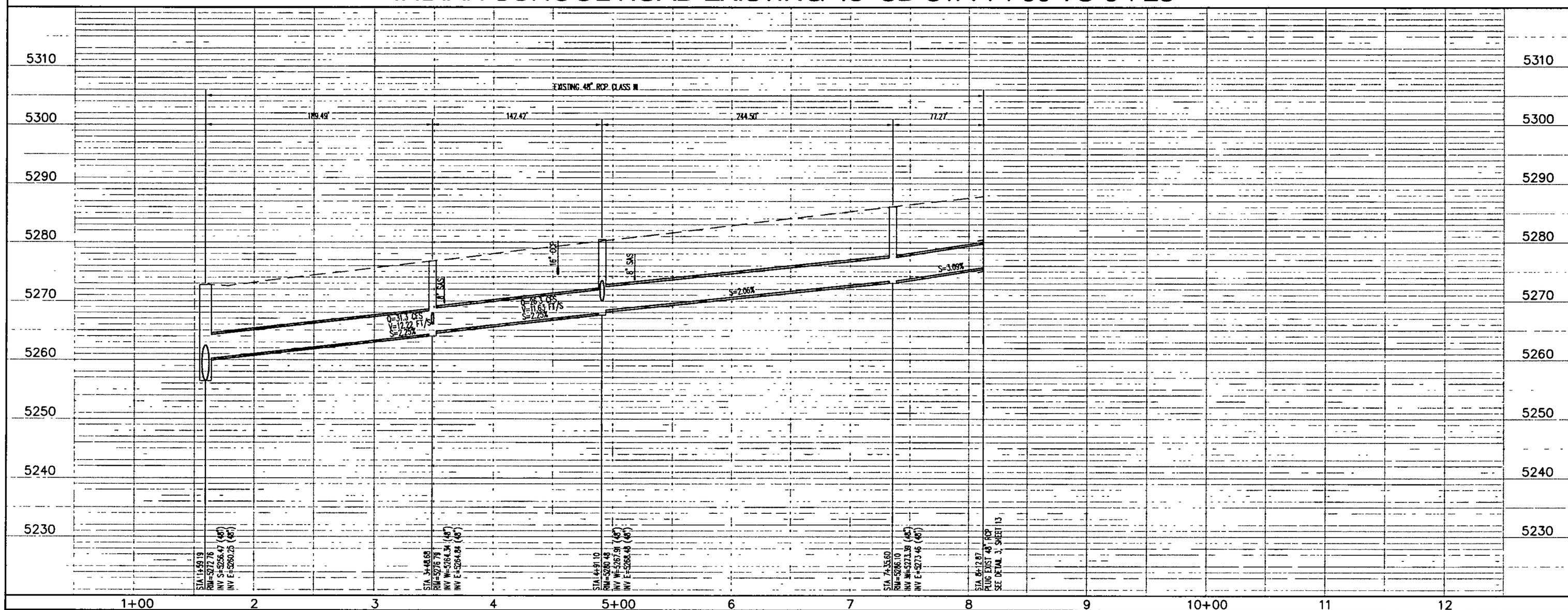
FIELD NOTES		
NO.	BY	DATE

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: S.M. DATE: 04/29/04
Drawn By: M.T.D. DATE: 04/29/04
Checked By: C.W.H. DATE: 04/29/04



INDIAN SCHOOL ROAD EXISTING 48" SD STA 1+00 TO 9+28



SCALE: 1" = 100'(HORIZ.)
1" = 20' (VERT.)

PIPE CROSSING TABLE				
DES	SAS	SD	WL	CLEARANCE
A	8" TP 63.95	72" TP 61 21	- - - - - -	1.80
	8" BP 63.01	72" BP 54 21	- - - - - -	
B	- - - - - -	72" TP 61.73	30" TP 66.85	2.16
	- - - - - -	72" BP 54.73	30" BP 63 90	
C	8" TP 70.30	48" TP 69 33	- - - - - -	0.31
	8" BP 69 64	48" BP 64 66	- - - - - -	
D	- - - - - -	48" TP 71 48	16" TP 75 91	2.92
	- - - - - -	48" BP 66 81	16" BP 74 40	
E	- - - - - -	24" TP 71 16	16" TP, 77.09	4 42
	- - - - - -	24" BP 68.75	16" BP 75.59	
F	8" TP 74.28	48" TP 73 32	- - - - - -	0.31
	8" BP 73 63	48" BP 68.65	- - - - - -	

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LEGEND

- UNDERGROUND TELEPHONE
- EXISTING SD
- EXIST WATER
- EXIST SANITARY
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC
- ELECTRIC LIGHT POLE
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KEYED NOTES

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N

50 25 0 50
SCALE: 1"=50'

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UTILITY CONNECTIONS PLAN AND PROFILE

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WORK STAKED BY — DATE
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BENCH MARKS

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NO.	BY	DATE

ENGINEER'S SEAL

No	Date	REMARKS	By
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		DESIGN	

Designed By: S.M. DATE: 04/29/04
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Checked By: C.W.H DATE: 04/29/04

Bohannan ▲ Huston INC.

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

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

August 30, 2002

Elizabeth Smith
Bohannan Huston, Inc.
7500 Jefferson Street NE
Courtyard I
Albuquerque New Mexico 87109

RE: Drainage Study For The Uptown Area (H19-D72) Dated August 13, 2002

Dear Ms. Smith:

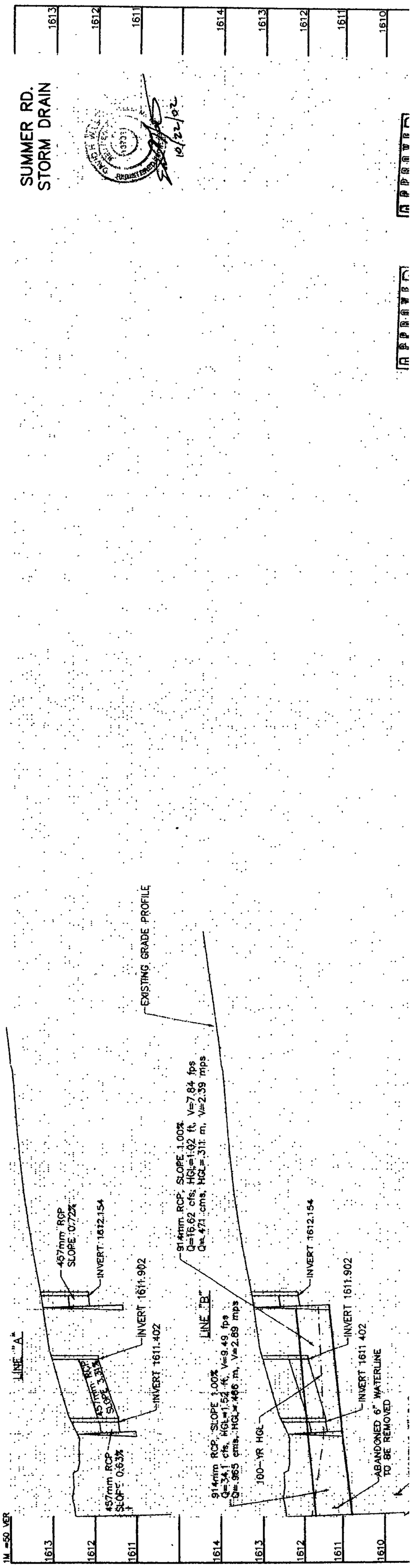
The above referenced master drainage report received August 13, 2002 is approved. We will use this report to determine the main storm drain line size and alignment. As the area develops a more detailed drainage plan will have to be submitted to Hydrology. If you have any questions please call me at 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

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

F.H.W.A. REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	60



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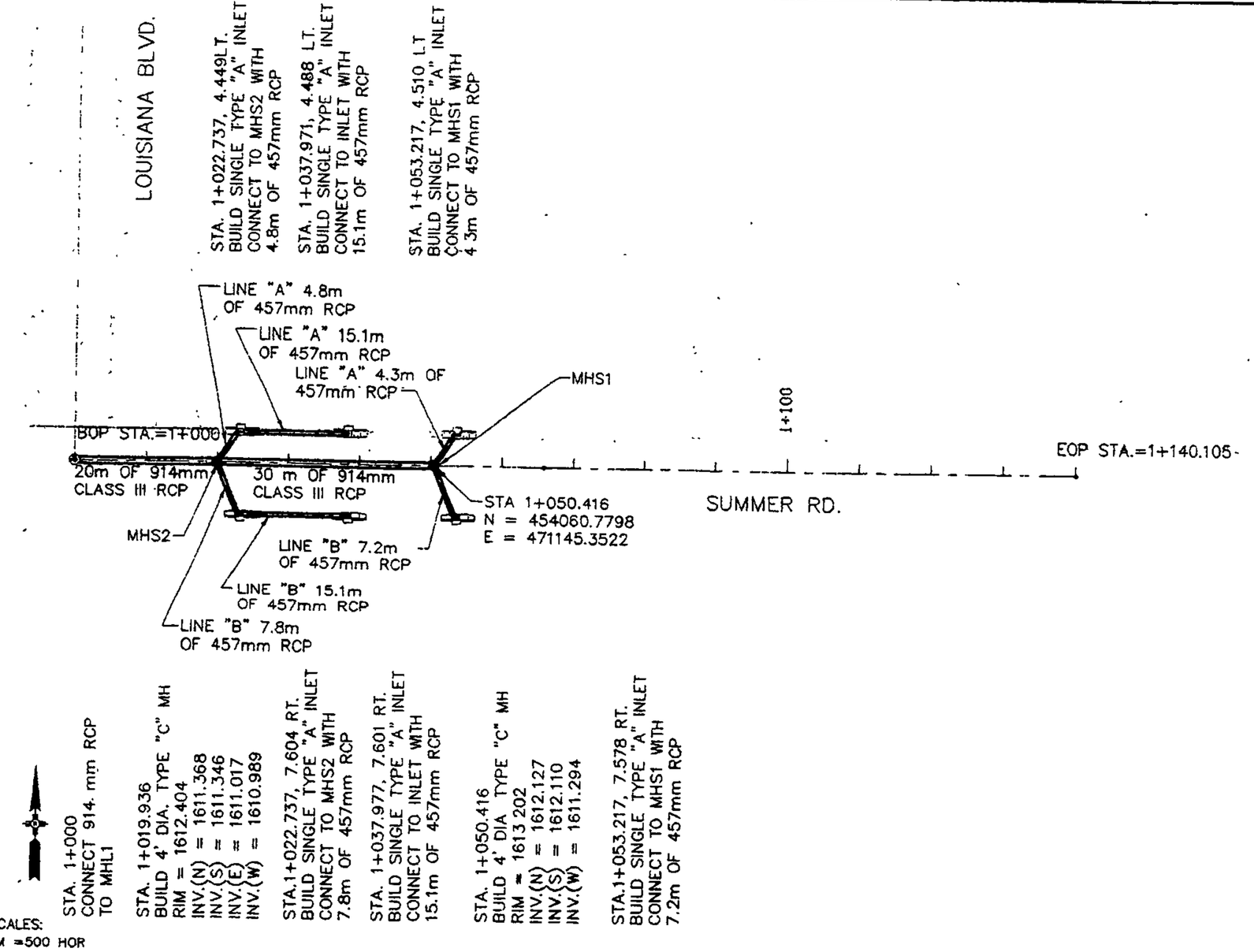
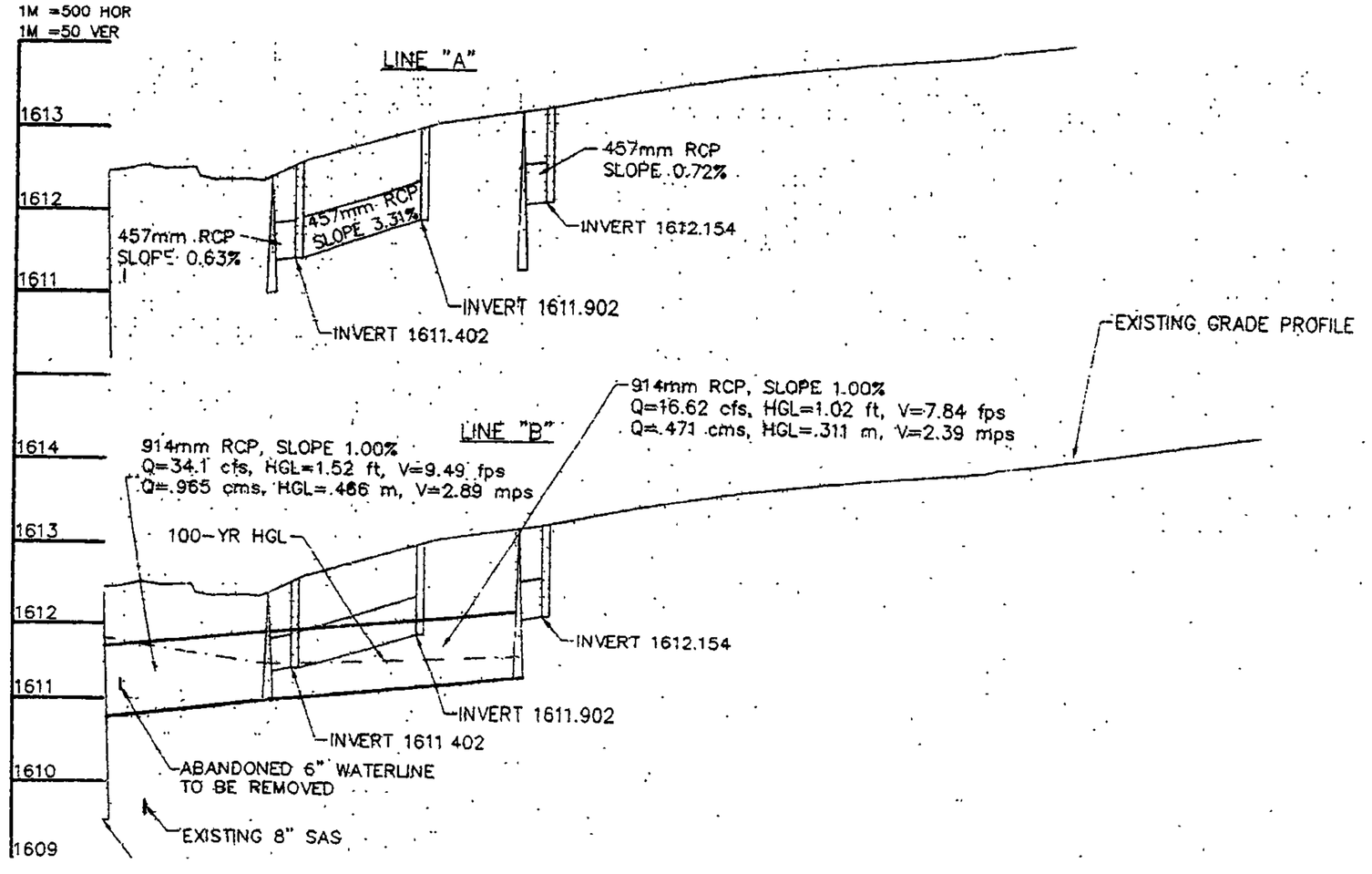
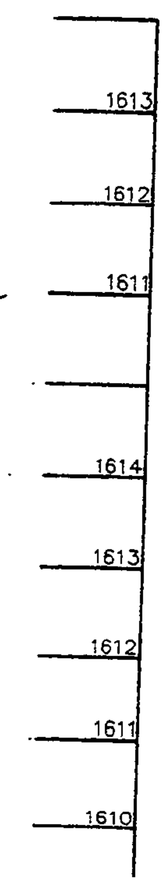
F.H.W.A. REGION NO. 6	SHEET NO
NEW MEXICO PROJECT NO	60

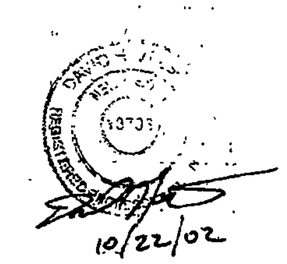


SCALES:
1M =500 HOR
1M =50 VER



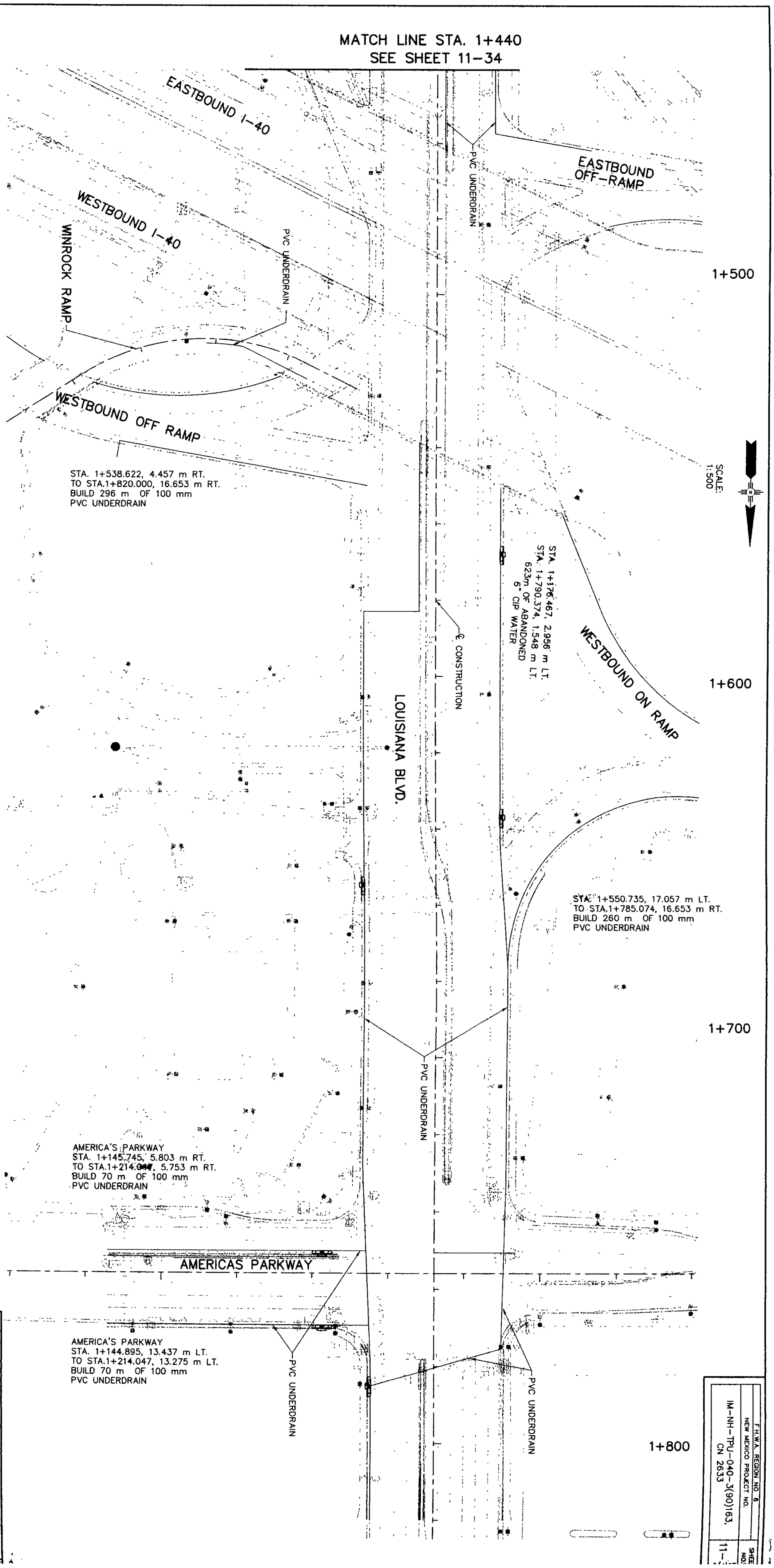
SUMMER RD.
STORM DRAIN





APPROVED

APPROVED



REGISTERED PROFESSIONAL ENGINEER
DAVID H. WILSON
NEW MEXICO
13703
10/06/03

F.H.W.A. REGION NO. 6	
NEW MEXICO PROJECT NO.	SHEET NO.
IM-NH-TPU-040-3(90)163, CN 2633	11-[illegible]

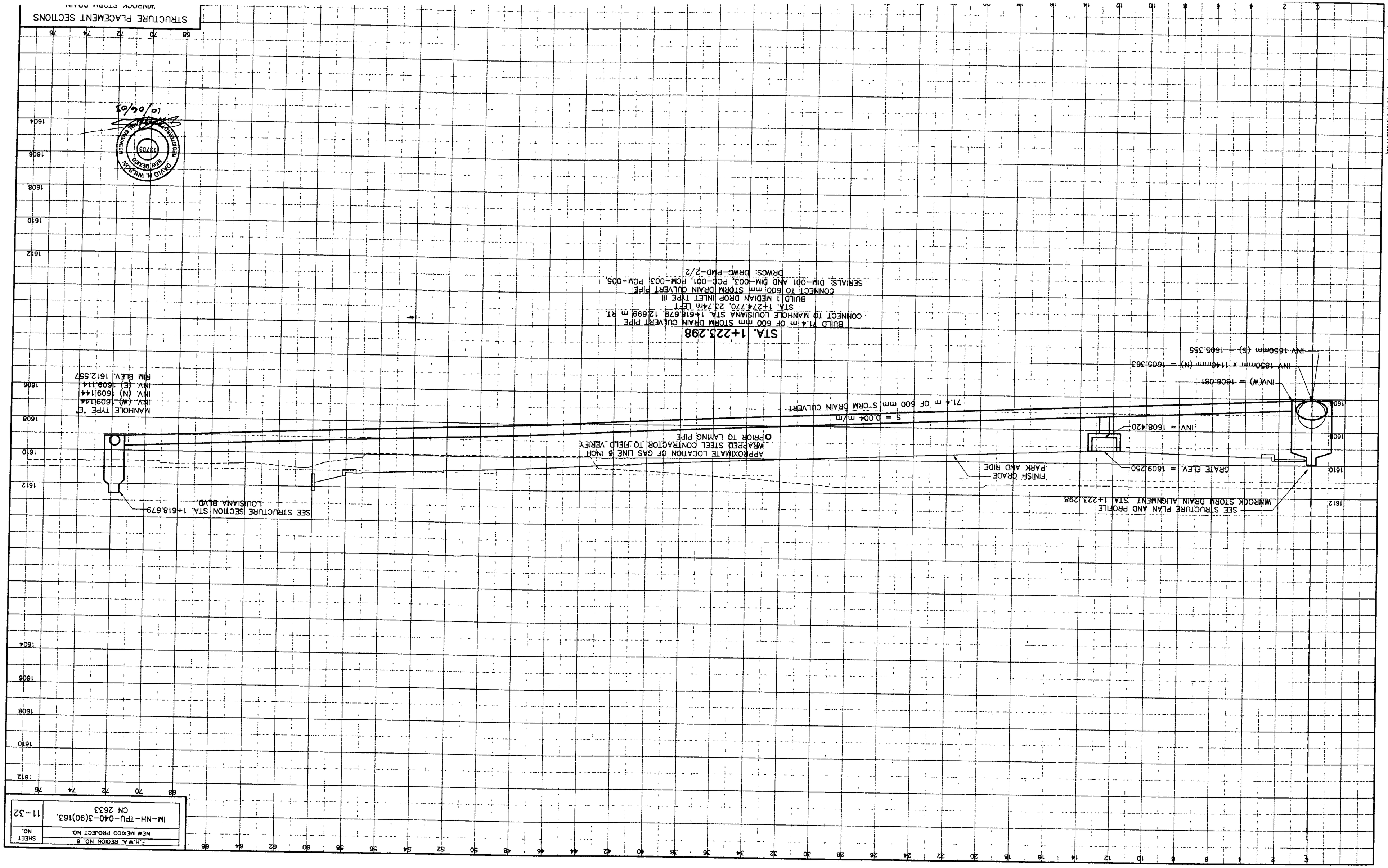
NEW MEXICO STATE
HIGHWAY AND TRANSPORTATION
DEPARTMENT

LOUISIANA BLVD / I-40
INTERCHANGE RECONSTRUCTION
BERNALILLO COUNTY

PAVEMENT UNDERDRAIN
LOUISIANA BOULAVARD &
AMERICA'S PARKWAY

NO.	DESCRIPTION	DATE
1		
2		
3		

REVISIONS (OR CHANGE NOTICES)



F.H.W.A. REGION NO. 6	
NEW MEXICO PROJECT NO.	IM-NH-TPU-040-3(90)163, CN 2633
SHEET NO.	11-32

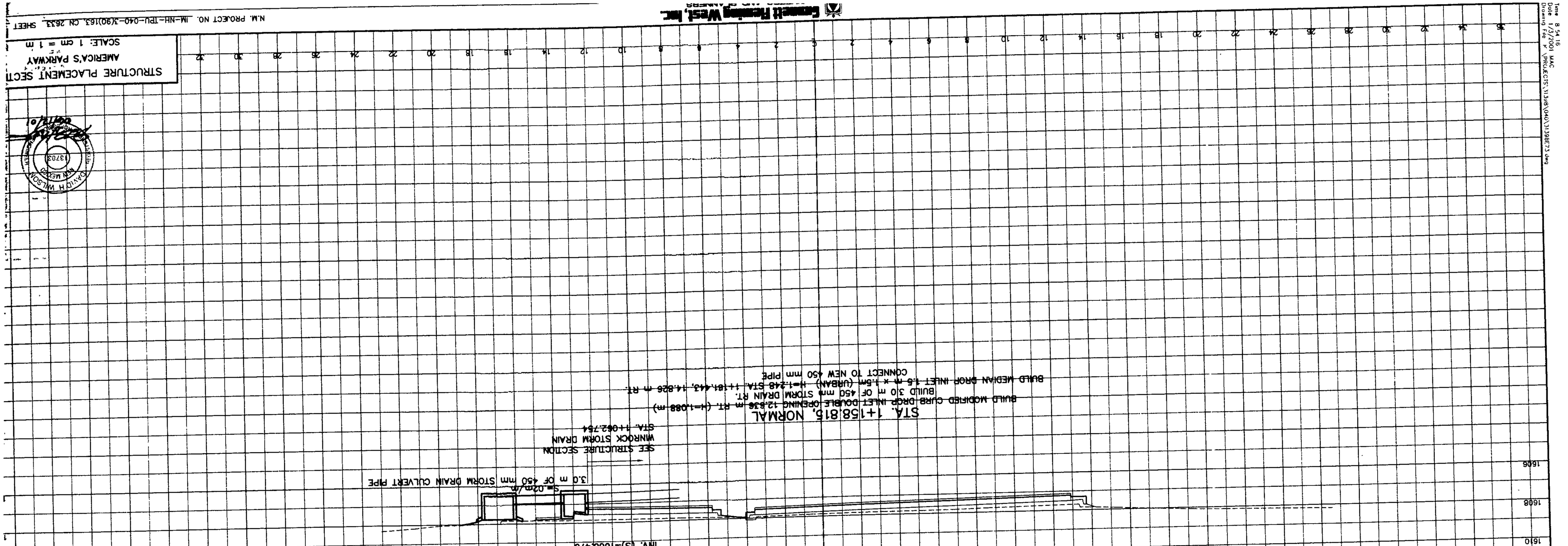
Date Oct 05, 2003 - 10:53am, bstecle Layout Model
Drawing Name k:\PROJECTS\11398\040\11398E71.dwg

Time 8:54:16
Date 7/3/2001 MAC
Drawing File P:\PROJECTS\11398(DHO)\11398E23.dwg

Connell Hensley West, Inc.
CONSULTING ENGINEERS

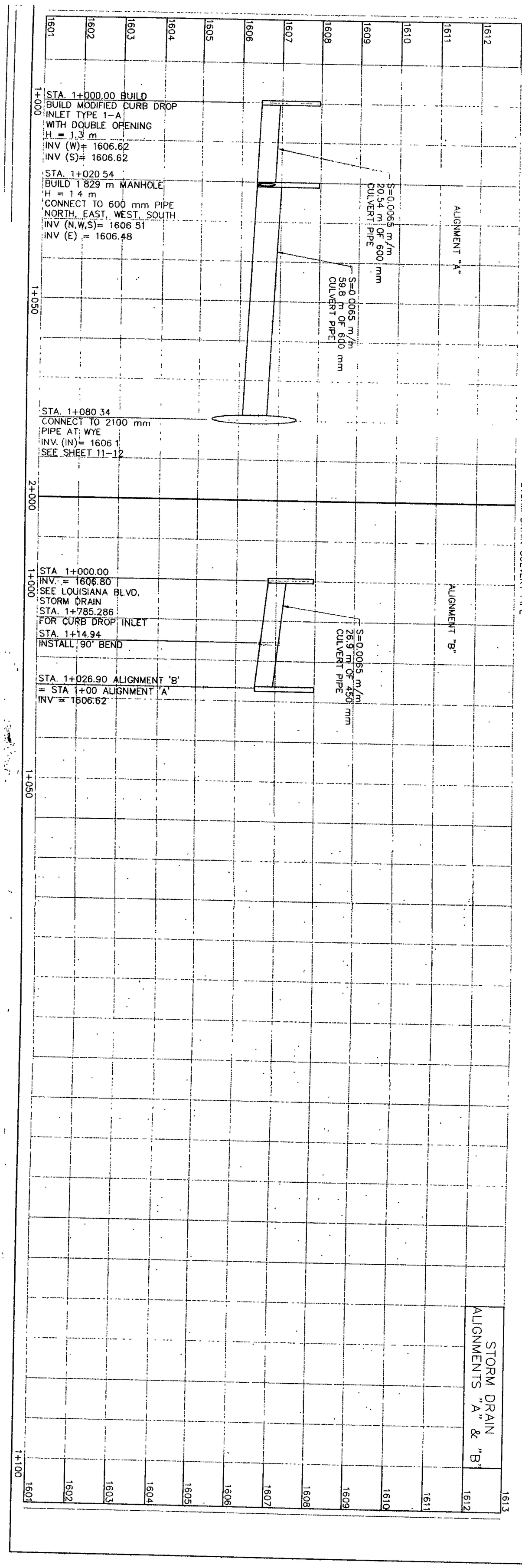
N.M. PROJECT NO. IM-NH-TPU-040-3(90)163, CN 2633, SHEET

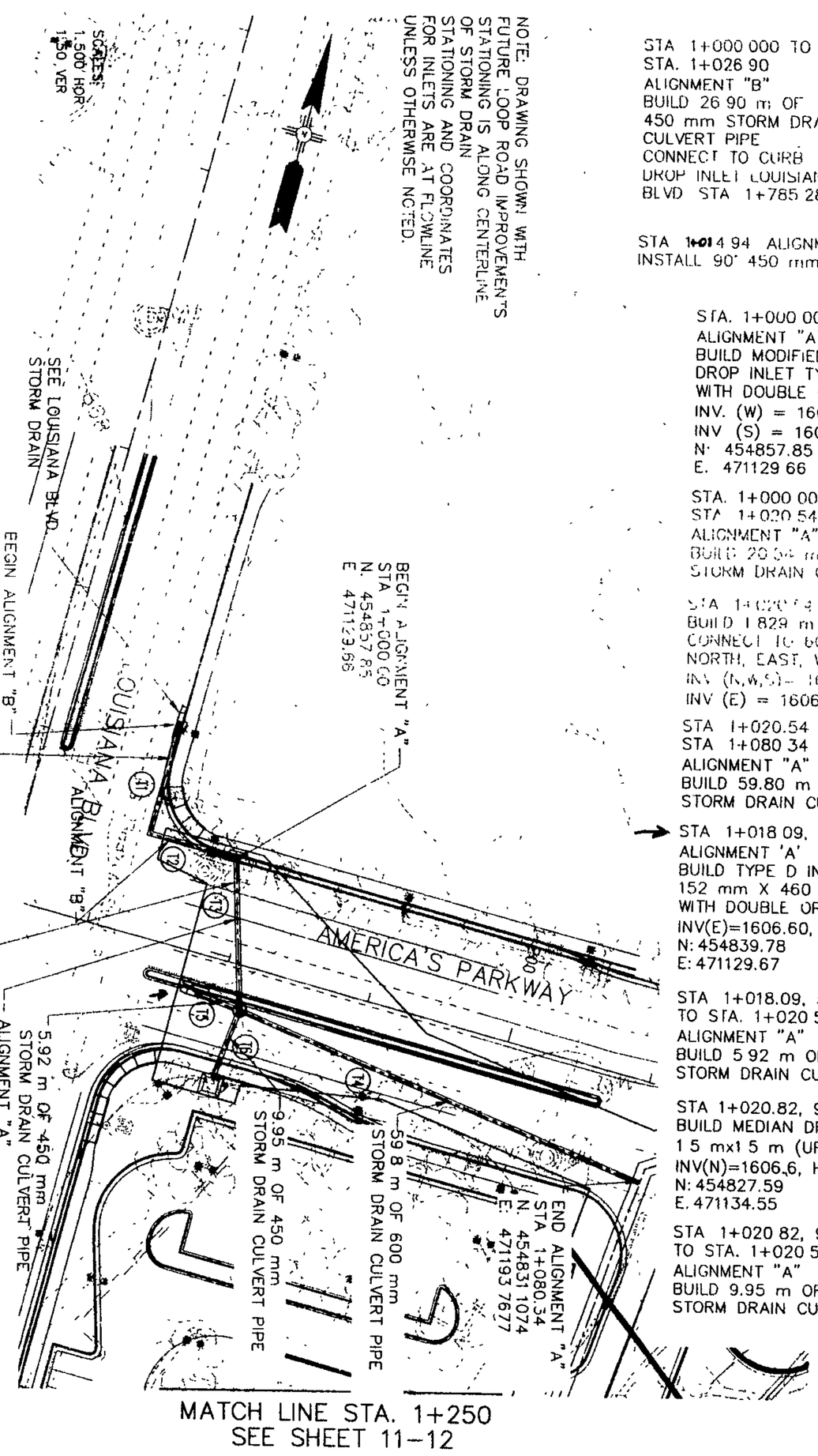
STRUCTURE PLACEMENT SECTION
AMERICA'S PARKWAY
SCALE: 1 cm = 1 m



DAVID H. WILSON
NEW MEXICO
13703
PROFESSIONAL ENGINEER
07/03/01

F.H.W.A. REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	
IM-NH-TPU-040-3(90)163, CN 2633	11-3





STA 1+000 000 TO
STA. 1+026 90
ALIGNMENT "B"
BUILD 26 90 m OF
450 mm STORM DRAIN
CULVERT PIPE
CONNECT TO CURB
DROP INLET LOUISIANA
BLVD STA 1+785 286

STA 1+014 94 ALIGNMENT 'B'
INSTALL 90° 450 mm BEND

STA. 1+000 00,
ALIGNMENT "A"
BUILD MODIFIED CURB
DROP INLET TYPE 1-A
WITH DOUBLE OPENING
INV. (W) = 1606.620
INV (S) = 1606.620
N: 454857.85
E. 471129 66

STA. 1+000 00 TO
STA 1+020 54
ALIGNMENT "A"
BUILD 20 54 m OF 600 mm
STORM DRAIN CULVERT PIPE

STA 1+020 54
BUILD 1 829 m MANHOLE
CONNECT TO 600 mm PIPE
NORTH, EAST, WEST, SOUTH
INV (N,W,S)= 1606 51
INV (E) = 1606 48

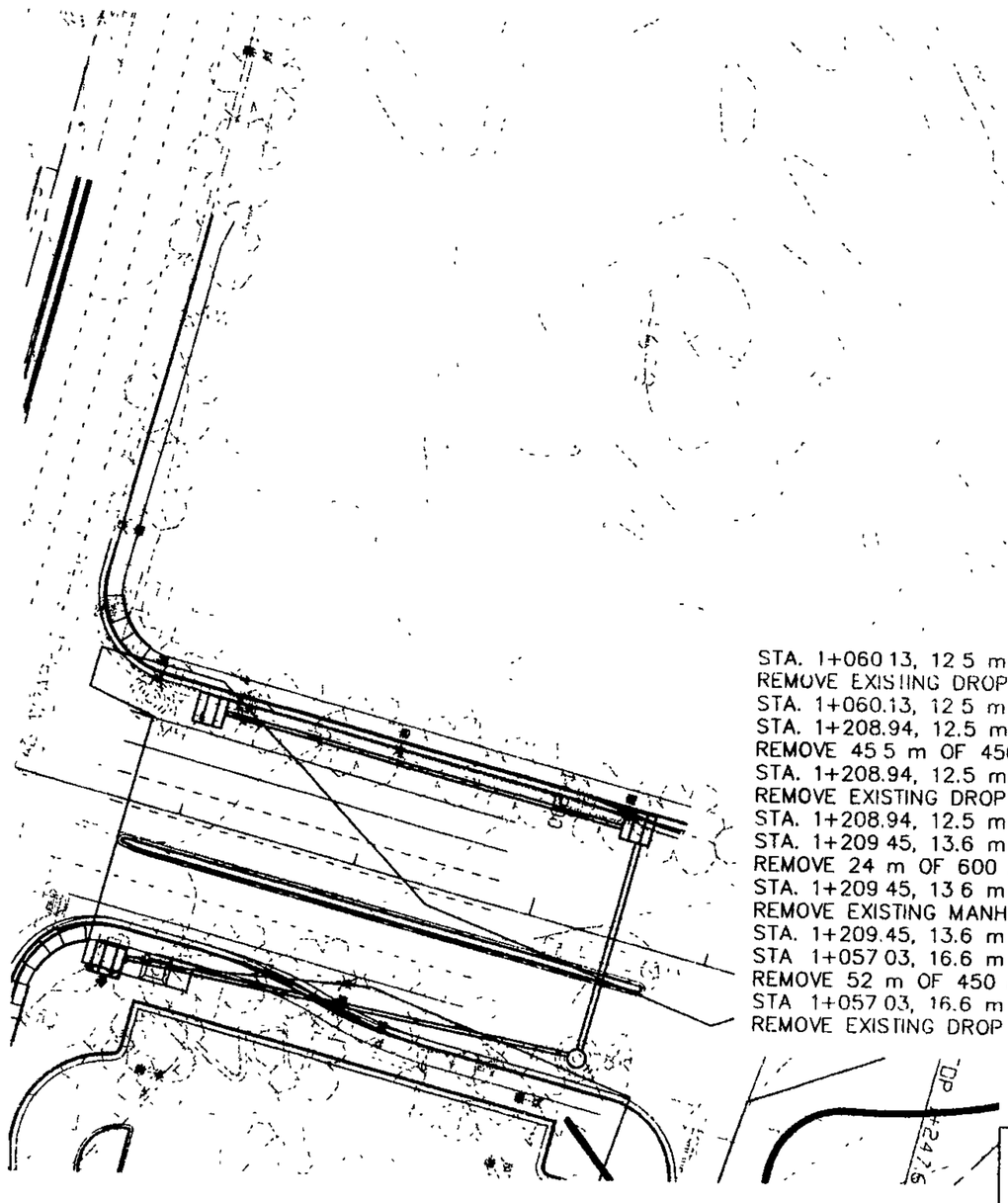
STA 1+020.54 TO
STA 1+080 34
ALIGNMENT "A"
BUILD 59.80 m OF 600 mm
STORM DRAIN CULVERT PIPE

STA 1+018 09, 5 387 m RT.
ALIGNMENT 'A'
BUILD TYPE D INLET
152 mm X 460 mm
WITH DOUBLE OPENING
INV(E)=1606.60, H = 1.4 m
N: 454839.78
E: 471129.67

STA 1+018.09, 5 387m RT
TO STA. 1+020 54
ALIGNMENT "A"
BUILD 5 92 m OF 450 mm
STORM DRAIN CULVERT PIPE

STA 1+020.82, 9 95 m RT
BUILD MEDIAN DROP INLET
1 5 mx1 5 m (URBAN)
INV(N)=1606.6, H = 1.4 m
N: 454827.59
E. 471134.55

STA 1+020 82, 9 95m RT
TO STA. 1+020 54
ALIGNMENT "A"
BUILD 9.95 m OF 450 mm
STORM DRAIN CULVERT PIPE



STA. 1+060 13, 12 5 m LT
REMOVE EXISTING DROP INLET,
STA. 1+060.13, 12 5 m LT TO
STA. 1+208.94, 12.5 m LT.
REMOVE 45 5 m OF 450 mm PIPE,
STA. 1+208.94, 12.5 m LT.
REMOVE EXISTING DROP INLET,
STA. 1+208.94, 12.5 m LT. TO
STA. 1+209 45, 13.6 m RT
REMOVE 24 m OF 600 mm PIPE;
STA. 1+209 45, 13 6 m RT.
REMOVE EXISTING MANHOLE;
STA. 1+209.45, 13.6 m RT. TO
STA 1+057 03, 16.6 m RT.
REMOVE 52 m OF 450 mm PIPE;
STA 1+057 03, 16.6 m RT
REMOVE EXISTING DROP INLET

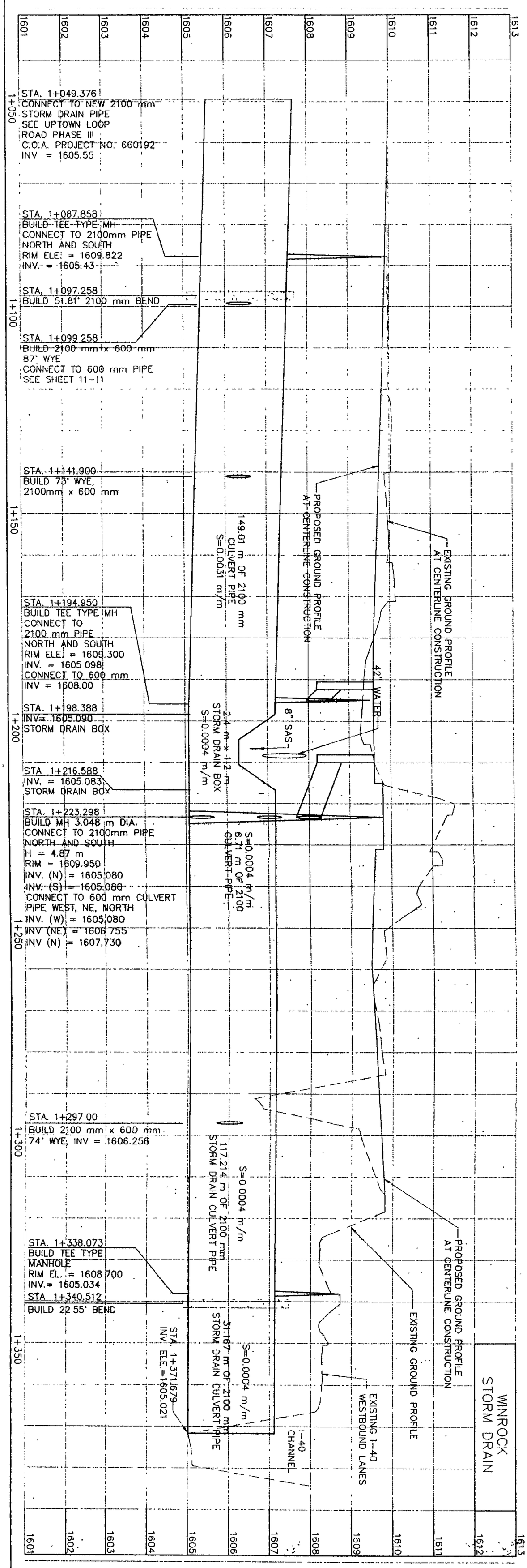
ALIGNMENT 'A' & 'B' TANGENT TABLE		
T1	S 00°00'00" W	14.94
T2	N 90°00'00" E	11.97
T3	S 16°46'11" E	20.54
T4	S 82°47'19" E	59.8
T5	S 84°16'18" E	5 92
T6	N 5°35'53" E	9.95

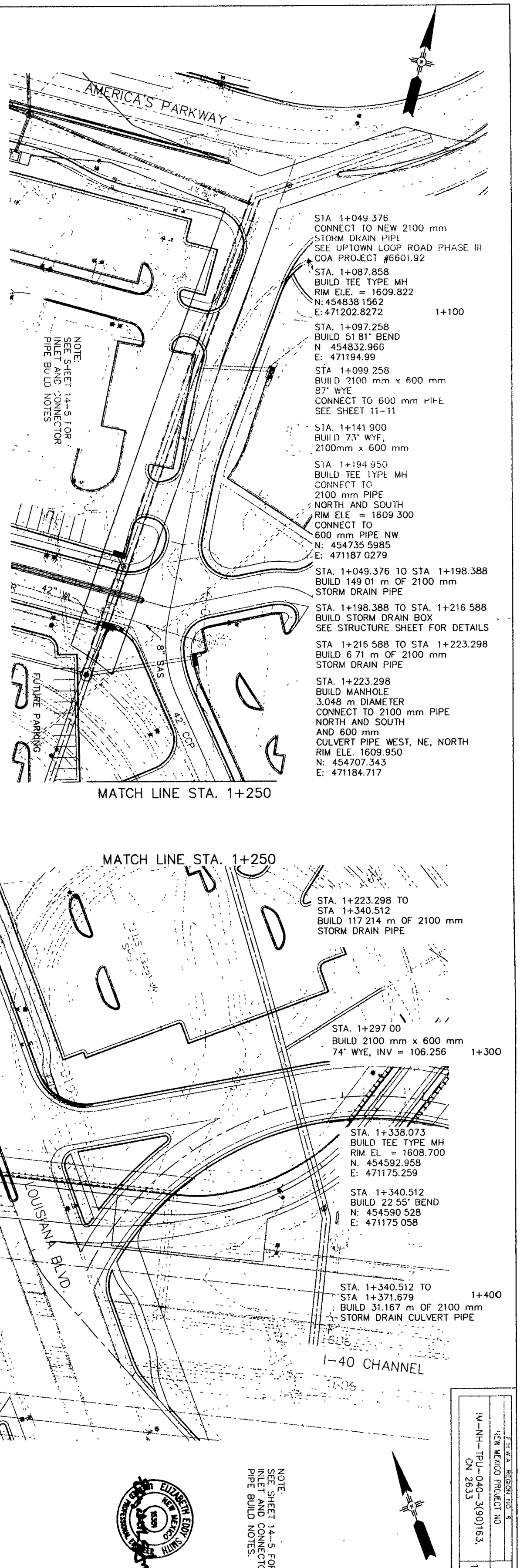
FHWA REGION NO 6
NEW MEXICO PROJECT NO
IM-NH-TPU-040-3(90)163,
CN 2633

SHEET NO
11-11

Date 10/3/03
Drawing File P 020110\hydro\design\GF\10-3-03\RCP01051_rev8 dwg

ENGR FILE





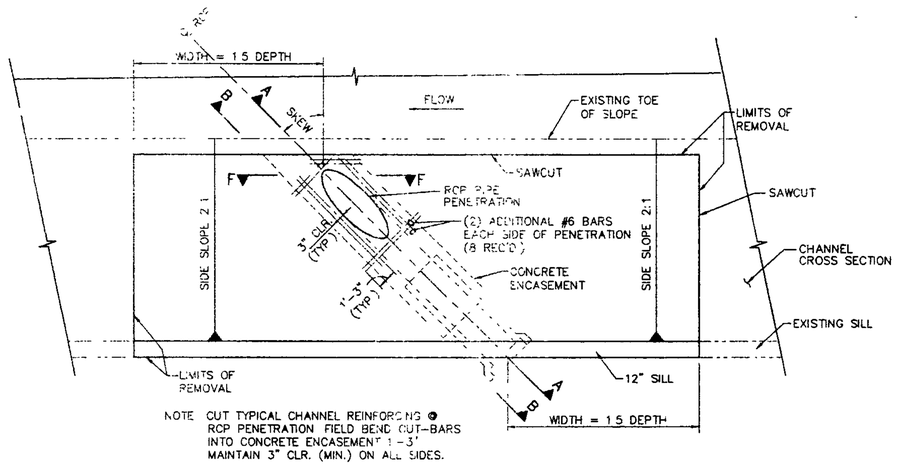
ELIZABETH EDDY SMITH
NEW MEXICO
10309
PROFESSIONAL ENGINEER

F.H.W.A. REGION NO. 6
NEW MEXICO PROJECT NO
IM-NH-TPU-040-3(90)163,
CN 2633

SHEET NO
11-12

NM PROJECT NO IM-NH-TPU-040-3(90)163, CN 2633 SHEET 11-12

F.H.W.A. REGION NO. 6	SHEET NO
NEW MEXICO PROJECT NO	
IM-NH-TPU-040-3(90)163, CN 2633	11-13

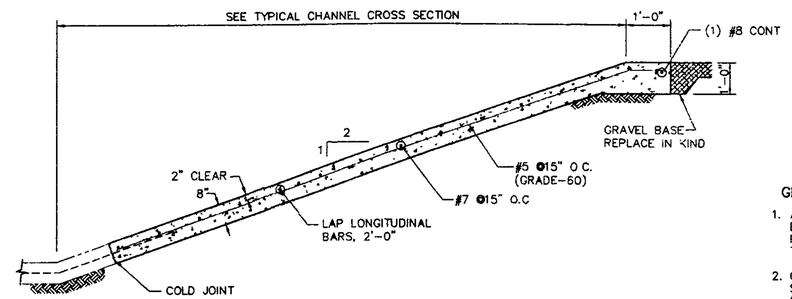


NOTE CUT TYPICAL CHANNEL REINFORCING @ RCP PENETRATION FIELD BEND CUT-BARS INTO CONCRETE ENCASEMENT 1'-3' MAINTAIN 3" CLR. (MIN.) ON ALL SIDES.

PIPE PENETRATION (PLAN VIEW)

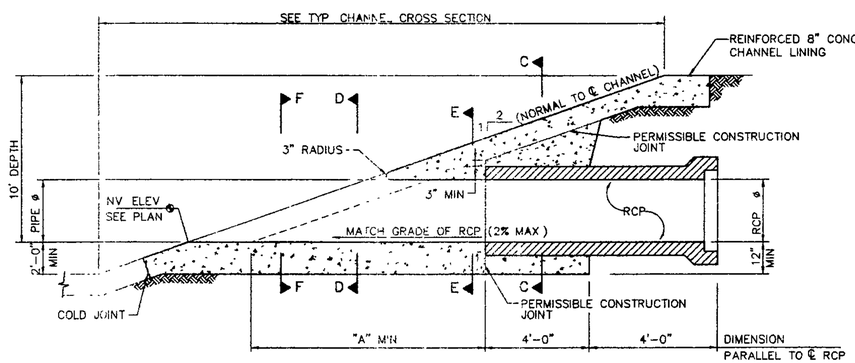
NO SCALE

DIMENSION "A" FOR 2:1 SIDE SLOPE									
SKEW ANGLE (DEGREES)	PIPE DIAMETER (INCHES)								
	24	30	36	42	48	54	60	72	84
0-10	5'-9"	6'-9"	7'-10"	8'-10"	9'-10"	10'-10"	11'-1"	13'-11"	15'-7"
>10-20	5'-11"	7'-0"	8'-1"	9'-2"	10'-3"	11'-3"	12'-4"	14'-6"	17'-5"
>20-30	6'-4"	7'-6"	8'-7"	9'-9"	10'-11"	12'-1"	13'-3"	15'-7"	18'-10"
>30-45	7'-4"	8'-9"	10'-2"	11'-7"	13'-0"	14'-5"	15'-10"	18'-9"	23'-1"



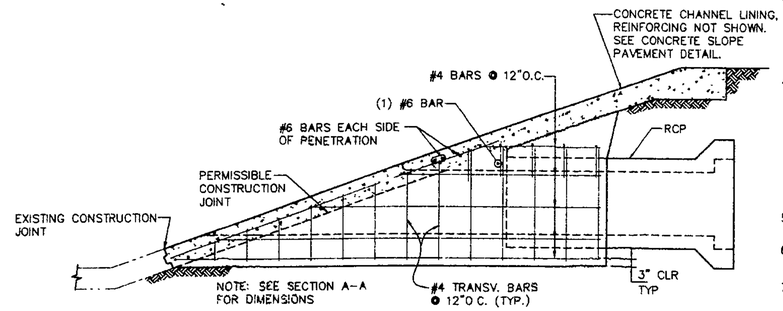
CONCRETE SLOPE PAVEMENT

SCALE: NONE



SECTION A-A

NO SCALE



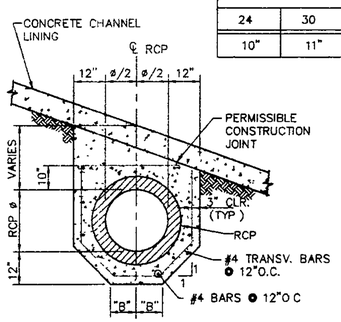
SECTION B-B

NO SCALE

GENERAL NOTES:

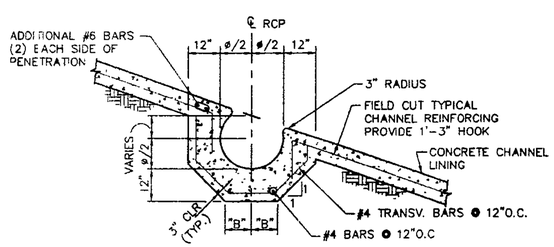
1. ALL WORK ON THE CHANNEL LINING SHALL BE COMPLETED BY MAY 15, WITH COMPLETE PROTECTION FROM INFILTRATION OF WATER TO THE SUBGRADE.
2. COMPLETE ARMORING OF THE CHANNEL SHALL BE IN PLACE BETWEEN MAY 15 AND OCTOBER 15, THE CONTRACTOR SHALL BE BE ALLOWED TO WORK WITHIN THE CHANNEL AT HIS OWN RISK, BUT SHALL NOT EXPOSE CHANNEL SUBGRADE DURING THIS TIME
3. ALL EXPOSED CHANNEL SUBGRADE SHALL BE PROTECTED WITH TEMPORARY BACKFILL AND PLASTIC TO PREVENT STANDING WATER AND INFILTRATION INTO THE EXPOSED SUBGRADE PRIOR TO REPLACEMENT OF CHANNEL LINING.
4. THE PIPE PENETRATION DETAILED HEREIN SHALL BE PAID FOR LUMP SUM AND SHALL BE COMPENSATION FOR THE PENETRATION COMPLETE AND IN-PLACE INCLUDED IN THIS WORK (BUT NOT LIMITED TO) IS GRADING, SUBGRADE PREPARATION, REINFORCED CONCRETE 8" CONCRETE SLOPE PAVEMENT, REINFORCING, CONSTRUCTION JOINTS, CONCRETE PLACEMENT AND FINISHING.
5. SEE NEW TO EXISTING CONSTRUCTION JOINT DETAILS ON SHEET 14.
6. PLACE ALL FILL @ 95% MODIFIED PROCTOR DENSITY.
7. WIDTH AS SHOWN IN PLAN SHALL BE 1.5 x CHANNEL DEPTH UNLESS SPECIAL PROVISIONS FOR A LESSER WIDTH ARE MADE.
8. ALL CULVERT PIPE PLACED UNDER THE CHANNEL LINING OR WITHIN AMAFCA RIGHT-OF-WAY SHALL BE RCP CLASS III.

DIMENSION "B"								
PIPE DIAMETER (INCHES)								
24	30	36	42	48	54	60	72	84
10"	11"	1'-1"	1'-2"	1'-3"	1'-4"	1'-6"	1'-8"	1'-10"



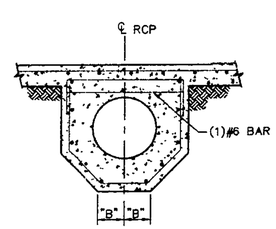
SECTION C-C

NO SCALE



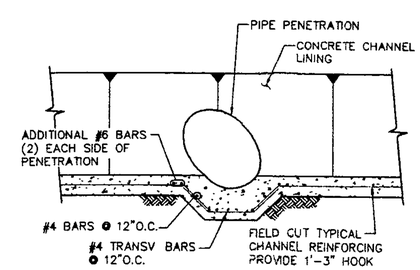
SECTION D-D

NO SCALE



SECTION E-E

NO SCALE



SECTION F-F

NO SCALE

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

January 19, 2004

James Topmiller, PE
Bohannan Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Uptown Site Grading Plan
Engineer's Stamp dated 1-8-04 (H19/D72)

Dear Mr. Topmiller,

Based upon the information provided in your submittal dated 1-12-04, the above referenced plan is approved for Grading Permit. This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso) or 768-3645 (Bryan Wolfe).

If I can be of further assistance, please contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: Chuck Caruso, MDD,
file

Bohannan Huston INC.

Courtyard I
7500 Jefferson NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
fax: 505.798.7988
toll free: 800.877.5332

January 9, 2004

Brad Bingham, P.E., Senior Engineer
Planning Dept / Hydrology Development Section
City of Albuquerque
P O Box 1293
Albuquerque, NM 87103

Re: Grading Plan Submittal for I40/Louisiana Interchange Borrow Site, Indian School and Louisiana

Dear Brad:

The purpose of this letter is to submit to you a copy of the proposed grading plan for the referenced project. As we discussed in a meeting with yourself, Richard Dourte, and me prior to the holidays, the New Mexico Department of Transportation interchange project at I40 and Louisiana proposes to re-grade the ABQ Uptown site to remove approximately 100,000 yards and use the borrow on the interchange project.

This is an acceptable grading of the ABQ Uptown site as, due to the several large parking structures proposed with underground basements, there will be sufficient dirt to export from the site to the interchange project.

Accordingly, please review the enclosed plan at your earliest possible convenience. We look forward to receiving your comments and/or approval. If you have any questions, please feel free to call me or Bruce Stidworthy at any time.

Sincerely,

James R. Topmiller, P.E.
Senior Vice President
Community Development and Planning

JRT/am
Enclosure

cc: Tom Waggoner, Hunt-Uptown, LLC
Bruce Stidworthy, BHI

RECEIVED
JAN 12 2004
HYDROLOGY SECTION

Bohannan ▲ Huston INC.

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335
www.bhinc.com
voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

CLIENT/COURIER TRANSMITTAL

To: Brad Bingham, P.E.
Drainage Section
Municipal Development Department
City of Albuquerque
600 Second Street NW - 2nd Floor West

Requested by: James Topmiller am

Date: ~~January 9, 2004~~ 1/12/04

Time Due:
- ☒ **This A.M.**
- ☐ **This P.M.**
- ☐ **Rush** _____
- ☐ **By Tomorrow**

Phone: 924-3986

Job No.: 02 0110 017

Job Name: I40/Louisiana Interchange Borrow Site

DELIVERY VIA

☒ **Courier** ☐ **Federal Express**
☐ **Mail** ☐ **UPS**
☐ **Other**

PICK UP

Item: _____

ITEM NO.	QUANTITY	DESCRIPTION
1	1	Letter dated 1/9/04 re: Grading Plan Submittal for I40/Louisiana Interchange Borrow Site, Indian School and Louisiana.
2	1	Drainage Info. Sheet.

RECEIVED
JAN 12 2004
HYDROLOGY SECTION

COMMENTS / INSTRUCTIONS

1/9 COA would not accept this delivery, saying a fee was due with this delivery.
1/12 Brad Bingham said no fees were due with this delivery. We are re-delivering.
BUB

ENGINEERING ▲
SPATIAL DATA ▲
ADVANCED TECHNOLOGIES ▲

REC'D BY: _____ ***DATE:*** _____ ***TIME:*** _____

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(REV. 1/28/2003rd)

PROJECT TITLE: Uptown Site Grading Plan ZONE MAP/DRG. FILE # H-19 / D72
DRB #: EPC#: WORK ORDER#:

LEGAL DESCRIPTION: Tract A-1, St. Pius X Subdivision
CITY ADDRESS: Northeast Corner of Indian School and Louisiana

ENGINEERING FIRM: Bohannan Huston, Inc. CONTACT: James Topmiller
ADDRESS: 7500 Jefferson NE – Courtyard I PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Hunt Uptown LLC CONTACT: Tom Waggoner
ADDRESS: PO Box 2001 PHONE: (505) 842-5645
CITY, STATE: Albuquerque, NM ZIP CODE: 87103

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:

____ DRAINAGE REPORT
____ DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal***
____ DRAINAGE PLAN RESUBMITTAL
____ CONCEPTUAL GRADING & DRAINAGE PLAN
__x__ GRADING PLAN
____ EROSION CONTROL PLAN
____ ENGINEER'S CERTIFICATION (HYDROLOGY)
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ ENGINEERS CERTIFICATION (TCL)
____ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
____ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

____ SIA / FINANCIAL GUARANTEE RELEASE
____ 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 (PERM.)
____ CERTIFICATE OF OCCUPANCY (TEMP.)
__x__ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ WORK ORDER APPROVAL
____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
____x YES
____ NO
____ COPY PROVIDED

RECEIVED
JAN 12 2004
HYDROLOGY SECTION

DATE SUBMITTED: 1/9/03 BY: James Topmiller

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. Conceptual Grading and Drainage Plan: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.

2. Drainage Plans: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.

3. Drainage Report: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

DEVELOPMENT & BUILDING SERVICE CENTER
ONE STOP SHOP
600 SECOND ST. N.W. Ste 201
ATTENTION: Hydrology
505-924-3900

Records Withdrawal Form

Project No. H191D72 **Date:** 2/24/05

Project Title: ALBQ. UPTOWN AREA

a. File b. Mylars c. Redlines/Comments
d. Other _____

Requested by: Scott Eddings Huitt-Zollars **Phone No.:** 892-5141
Name and Company

Comments:

_____

_____

_____

Anticipated Return Date: _____

I hereby 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 and Building Services Center on or before the indicted anticipated return date.

Delivery Picked Up By:

Name: Academy Repro **Organization:** _____
Print

Signed: [signature] **Date:** 2/24/05

Office Use Only

Return Acknowledged:

Received By: [signature] **Date:** 2-25-05
Print

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

June 11, 2004

Craig Hoover, PE
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: ABQ Uptown Drainage Report Addendum 1
Engineer's Stamp dated 6-11-04 (H19/D72)

Dear Mr. Hoover,

Based upon the information provided in your submittal dated 6-2-04, the above referenced plan is approved for Preliminary Plat action by the DRB. Any minor comments on the Work Order can be addressed at DRC.

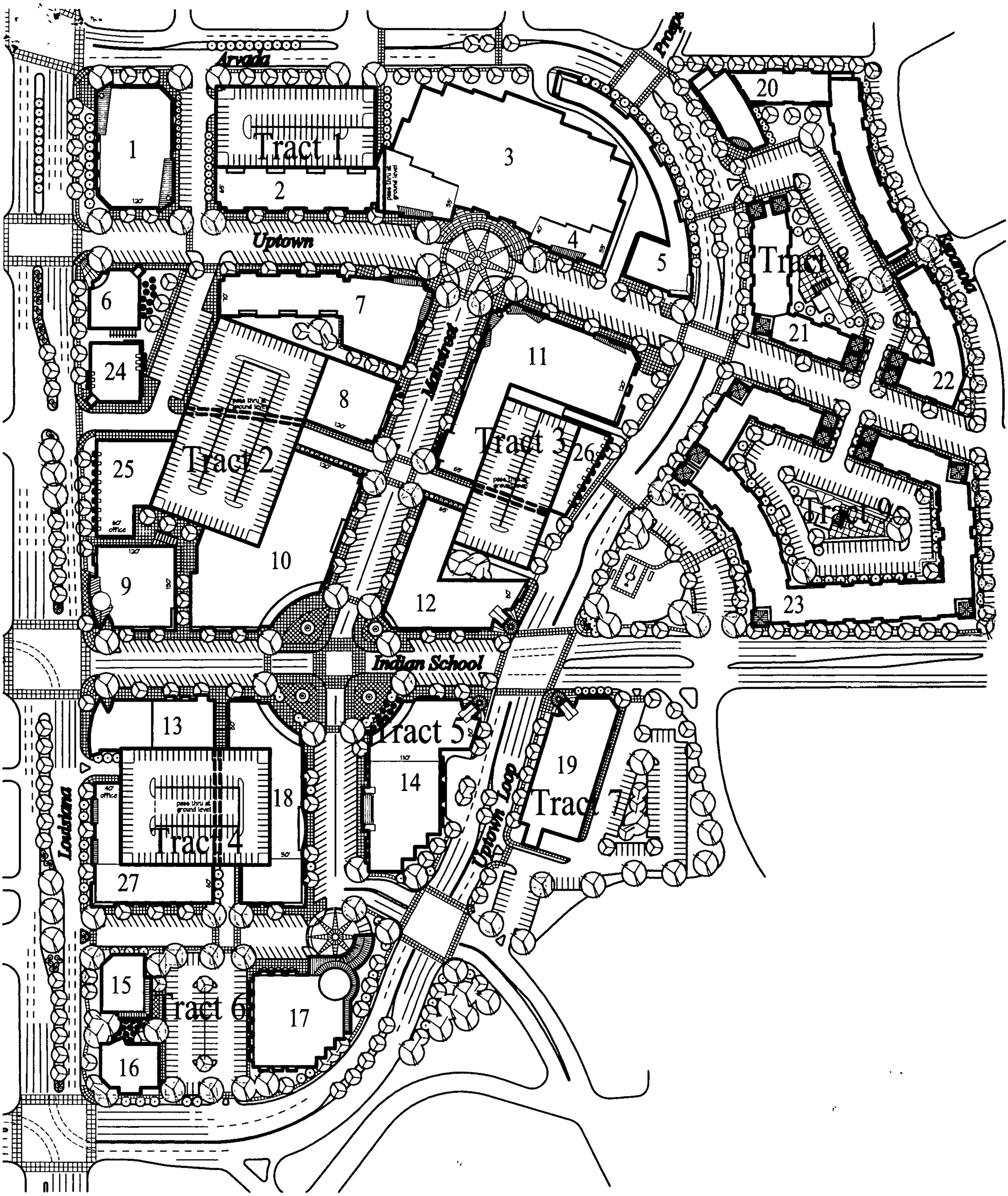
If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Development and Building Services

C: file

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



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Dekker/Perich/Sabatini

ABQ Uptown Hunt-Uptown.LLC

Dekker/Perich/Sabatini

Concept C

8/6/2002

Building	Retail (s.f.)	Office (s.f.)	Multi-Family Lofts (s.f.)	(# Units)	Restaurant (s.f.)	Multi-Family Garden (s.f.)	(# Units)	Theater (s.f)	(scrns)	Hotel (s.f.)	(keys)	Total	Ratio	Parking
Tract 1														
1A (ground)	22,000												1/200	110
1 Totals	**22,000**											**22,000**		**110**
2A	26,000												1/200	130
2B (2nd)		9,000	12,000	12									1/300,1.5/DU	48
2C (3rd)		9,000	12,000	12									1/300,1.5/DU	48
2D (4th)			12,000	12									1.5/DU	18
2 Totals	**26,000**	**18,000**	**36,000**	36								**80,000**		**244**
3A								56,000	14				1/4 seats	1000
3 Totals								**56,000**	14			**56,000**		**1000**
4A	6,000												1/200	30
4B		6,000											1/300	20
4C		6,000											1/300	20
4 Totals	**6,000**	**12,000**										**18,000**		**70**
5A			16,000	10									1.5/DU	15
5B			10,000	10									1.5/DU	15
5C			10,000	10									1.5/DU	15
5 Totals			**36,000**	30								**36,000**		**45**
												Total Parking Required		**1469**
													Structure	540
													Below Theater	900
													Street	76
												Total Parking Provided		**1516**
												Total Building Area	**212,000**	
												Total Site Area	**221,660**	
												FAR	**0.96**	

Building	Retail (s.f.)	Office (s.f.)	Multi-Family Lofts (s.f.)	(# Units)	Restaurant (s.f.)	Multi-Family Garden (s.f.)	(# Units)	Theater (s.f)	(scrns)	Hotel (s.f.)	(keys)	Total	Ratio	Parking
Tract 2														
6A					6,500								1/100	65
6 Totals					**6,500**							**6,500**		**65**
7A	27,000												1/200	135
7B			20,000	20									1.5/DU	30
7C			20,000	20									1.5/DU	30
7D			20,000	20									1.5/DU	30
7 Totals	**27,000**		**60,000**	60								**87,000**		**225**
8A	12,000												1/200	60
8B			7,000	7									1.5/DU	11
8C			7,000	7									1.5/DU	11
8D			7,000	7									1.5/DU	11
8 Totals	**12,000**		**21,000**	21								**33,000**		**92**
9A	12,000												1/200	120
9 Totals	**12,000**											**12,000**		**120**
10A	40,000												1/200	200
10B			30,000	30									1.5/DU	45
10C			30,000	30									1.5/DU	45
10D			30,000	30									1.5/DU	45
10 Totals	**40,000**		**90,000**	90								**130,000**		**335**
24A					6,500								1/100	65
24 Totals					**6,500**							**6,500**		**65**
25A		13,000											1/200	65
25B		11,000											1/300	37
25C		11,000											1/300	37
25D		11,000											1/300	37
25 Totals		**46,000**										**46,000**		**175**
												Total Parking Required		**1077**
													Structure	950
													Street	130
												Total Parking Provided		**1080**
												Total Building Area	**321,000**	
												Total Site Area	**258,450**	
												FAR	**1.24**	

Building	Retail (s.f.)	Office (s.f.)	Multi-Family Lofts (s.f.)	(# Units)	Restaurant (s.f.)	Multi-Family Garden (s.f.)	(# Units)	Theater (s.f)	(scrns)	Hotel (s.f.)	(keys)	Total	Ratio	Parking
Tract 3														
11A	40,000												1/200	200
11B			22,000	22									1.5/DU	33
11C			22,000	22									1.5/DU	33
11D			22,000	22									1.5/DU	33
11 Totals	**40,000**		**66,000**	66								**106,000**		**299**
12A	23,000												1/200	115
12B			12,000	12									1.5/DU	18
12C			12,000	12									1.5/DU	18
12D			12,000	12									1.5/DU	18
12 Totals	**23,000**		**36,000**	36								**59,000**		**169**
26A			6,000	6									1.5/DU	9
26B			6,000	6									1.5/DU	9
26B			6,000	6									1.5/DU	9
26D			6,000	6									1.5/DU	9
26 Totals			**24,000**	**24**								**24,000**		**36**
												Total Parking Required		**504**
													Structure	540
													Street	74
												Total Parking Provided		**614**
												Total Building Area	**189,000**	
												Total Site Area	**124,643**	
												FAR	**1.52**	

Building	Retail (s.f.)	Office (s.f.)	Multi-Family Lofts (s.f.)	(# Units)	Restaurant (s.f.)	Multi-Family Garden (s.f.)	(# Units)	Theater (s.f)	(scrns)	Hotel (s.f.)	(keys)	Total	Ratio	Parking
Tract 4														
13A	14,000												1/200	70
13B		7,500											1/300	25
13C		7,500											1/300	25
13D		7,500											1/300	25
13 Totals	**14,000**	**22,500**										**36,500**		**145**
18A	23,000												1/200	115
18B			18,000	18									1.5/DU	27
18C			18,000	18									1.5/DU	27
18D			18,000	18									1.5/DU	27
18 Totals	**23,000**		**54,000**	**54**								**77,000**		**196**
27A	10,000	6,000											1/200	50
27B		14,000											1/300	47
27C		14,000											1/300	47
27D		14,000											1/300	47
27 Totals	**10,000**	**48,000**										**58,000**		**190**
Tract 5														
14A	31,000												1/200	155
14B		26,000											1/300	87
14C		26,000											1/300	87
14D		26,000											1/300	87
14 Totals	**31,000**	**78,000**										**109,000**		**415**
Tract 6														
15A					6,500								1/100	65
15 Totals					**6,500**							**6,500**		**65**
16A					6,500								1/100	65
16 Totals					**6,500**							**6,500**		**65**
17A								22,000						
17B								18,000	30				1/key	30
17C								18,000	30				1/key	30
17D								18,000	30				1/key	30
17E								18,000	30				1/key	30
17F								18,000	30				1/key	30
17 Totals								**112,000**	150			**112,000**		**150**
								Total Parking Required						**1226**
													Structure	840
													Tract 4 Street	73
													Tract 5 Street	30
													Tract 6 Surface	88
								Total Parking Provided						**1031**

Building	Retail (s.f.)	Office (s.f.)	Multi-Family Lofts (s.f.)	(# Units)	Restaurant (s.f.)	Multi-Family Garden (s.f.)	(# Units)	Theater (s.f)	(scrns)	Hotel (s.f.)	(keys)	Total	Ratio	Parking
											Total Building Area	**405,500**		
											Total Site Area	**268,448**		
											Tracts 4, 5, & 6 combined, FAR	**1.51**		
Tract 7														
19A	22,000												1/200	110
19 Totals	**22,000**											**22,000**		**110**
											Total Parking Required			**110**
													Surface	90
											Total Parking Provided			**90**
											Total Building Area	**22,000**		
											Total Site Area	**95,369**		
											FAR	**0.23**		
Tract 8														
20A						25,000	25						1.5/DU	37.5
20B						25,000	25						1.5/DU	37.5
20C						10,500	10						1.5/DU	15
20 Totals						**60,500**	60					**60,500**		**90**
21A						14,000	14						1.5/DU	21
21B						14,000	14						1.5/DU	21
21C						14,000	14						1.5/DU	21
21 Totals						**42,000**	42					**42,000**		**63**
22A						11,000	11						1.5/DU	16.5
22B						11,000	11						1.5/DU	16.5
22 Totals						**22,000**	22					**22,000**		**33**
Tract 9														
23A						32,000	32						1.5/DU	48
23B						32,000	32						1.5/DU	48
23C						14,000	14						1.5/DU	21
23 Totals						**78,000**	78					**78,000**		**117**
											Total Parking Required			**303**
													Surface	189
													New Street	53
													Espanola	70
											Total Parking Provided			**312**
											Total Building Area	**202,500**		
											Total Site Area	**295,794**		
											FAR	**0.68**		

Building	Retail (s.f.)	Office (s.f.)	Multi-Family Lofts (s.f.)	(# Units)	Restaurant (s.f.)	Multi-Family Garden (s.f.)	(# Units)	Theater (s.f)	(scrns)	Hotel (s.f.)	(keys)	Total	Ratio	Parking
TOTALS	**308,000**	**224,500**	**423,000**	417	**26,000**	**202,500**	202	**56,000**	14	**112,000**	150	**1,352,000**	Required	**4689**
													Provided	**4643**
Percent	22.78%	16.61%	31.29%		1.92%	14.98%		4.14%		8.28%				

DRAINAGE STUDY FOR THE ABQ UPTOWN AREA

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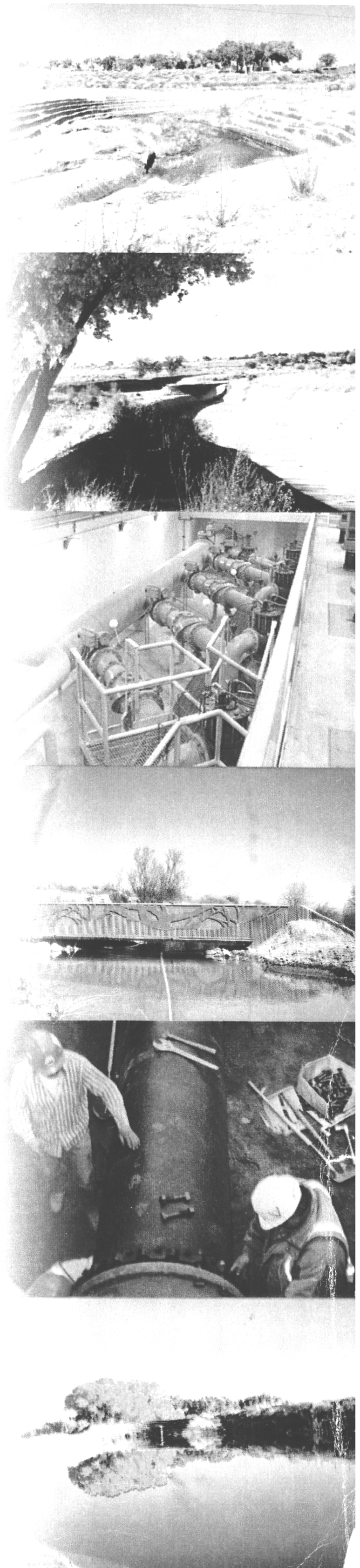

AUGUST 13, 2002

Prepared by:

Bohannan Huston Inc.

Bohannan Huston Inc.

ENGINEERING

ADVANCED TECHNOLOGIES

SPATIAL DATA

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PLATES

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DRAINAGE STUDY
FOR THE
UPTOWN AREA

AUGUST 13, 2002

PREPARED BY:

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PREPARED BY:

Elizabeth Smith, P.E. Date

I. INTRODUCTION

This Drainage Study addresses the developed storm runoff and the necessary facilities to adequately convey the flow from the Uptown Area to the I-40 Channel. The Uptown Area is located in northeast Albuquerque. It is bounded by the I-40 Channel to the south, San Pedro to the west, Eubank to the east, and Candelaria to the north. This study will focus on storm drain deficiencies near the intersection of Indian School and Louisiana and suggested improvements to mitigate the deficiencies both north and south of Indian School Road. This study is necessary to receive approval to construct the proposed storm drain system in the Loop Road and south to the I-40 Channel. See vicinity map for location. (Plate 1)

II. RESOURCES and HISTORY

The Uptown area has been the focus of many drainage studies. This goal of this study is not to reanalyze the area but to compile information from the other studies and present an alternative drainage solution.

The two main reports referenced in this report are *The Winrock Shopping Center Master Drainage Plan* prepared by AVID Engineering in July of 1993 and *The Uptown Area Drainage Report* prepared by ASCG in April of 2002.

The Uptown area experiences flooding along Indian School Road east of Louisiana Boulevard. The Albuquerque Master Drainage Study (AMDS), prepared in 1981, recommended that a new 54" storm drain be built parallel to the existing storm drain in Indian School Road and a 30" storm drain be built from the entrance to the Winrock Center to the I-40 Channel. As a result of this study, FEMA classified a portion of Indian School Road a flood hazard.

After the AMDS was completed, the Uptown Sector plan approved the alignment of a new Loop Road in the area. This Loop Road will be built to relieve traffic congestion in the Uptown Area. The new Loop Road right-of-way that connects Indian School to the south also provides a new alignment for the drainage solution. As a result, in 1983, Bohannan Huston Inc. prepared a study titled *Drainage Analysis For Uptown Street Improvements Phase I.* This report recommended the construction of a 60" storm drain in the Loop Road to divert flow from Indian School Road to the I-40 Channel.

In 1985, Leedshill-Herkenhoff, Inc., now ASCG, prepared a report titled *Uptown Phase II Indian School Storm Drain Diversion, Design Concept.* This report recommended the diversion of all of the flow in Indian School Road in a 48" storm drain in the Loop Road to the I-40 Channel. In 1988 and 1989, Leedshill-Herkenhoff revised this analysis to include developed conditions in the area and to analyze the storm drain under pressure. This analysis is documented in a letter report titled *Uptown Drainage Study.* After the study was approved, Leedshill-Herkenhoff prepared construction plans for the recommended improvements.

In April 2002, ASCG prepared a report called *Uptown Area Drainage Report.* The latest report analyzes the developed conditions in the area and proposes a solution for the property north of Indian School Road. This report recommends the construction of a parallel 54" pipe from Espanola Street to the intersection of Indian School and Louisiana Boulevard, construction of a new junction structure, and construction of a parallel 60" storm drain in Indian School from Louisiana to the I-40 Channel.

The City of Albuquerque has an upstream project underway to ease the flooding in Indian School Road. This project will divert the flows from Northeastern and convey them into the Embudo Channel at Wyoming. These improvements will reduce the flow in Indian School to 287 cfs at the Intersection with Louisiana and allow the flow to be contained within the street and storm drain system. The ASCG report, approved in April 2002, assumed that these improvements were in place. This report retains this assumption.

III. METHODOLOGY

Existing and proposed hydrologic conditions were analyzed for the 100-year, 6-hour storm in accordance with the revised Section 22.2, Hydrology, of the Development Process Manual (DPM) for the City of Albuquerque, dated January 1993. The AHYMO computer program was utilized to determine peak flow rates for design of the storm drainage improvements within the project. The 100-year, 6-hour storm is used as the design event. The AHYMO results are included in **Appendix A.** The storm sewer system is analyzed using current DPM methods and the Storm and Sanitary SelectCad computer program. Hydraulic grade line analysis and all other hydraulic computations are included in **Appendix B**.

IV. EXISTING CONDITIONS

The Uptown area is a combination of existing commercial and residential basins. These basins drain to the intersection of Indian School and Louisiana through two main paths. First, the residential basins within this drainage area north of Indian School Road and west of Pennsylvania drain through the vacant commercial tract on the northeast corner of Indian School Road and Louisiana Boulevard through a 60" storm drain and overland flow. Secondly, Indian School conveys flow from approximately 80 acres of adjacent property to the intersection through a 48" storm drain and street flow. These two storm drains combine just east of the intersection of Indian School Road and Louisiana Boulevard. Historically, this outfall has not had sufficient capacity for the flow applied. Excessive hydrostatic pressures generated by flows exceeding the system's capacity have removed the manhole covers in the area.

The flow enters the undeveloped tract on the northeast corner of Louisiana and Indian School through an existing 60" storm drain and through an earthen ditch. The storm drain line begins at the intersection of Phoenix and Moon, collects runoff from 250 acres, and conveys 367 cfs to the intersection of Indian School and Louisiana. The surface flow into this tract through an earthen ditch is 143 cfs. The developed runoff from this property adds 79 cfs to the surface flow at the intersection of Indian School and Louisiana, 30 cfs east of the Loop Road and 49 cfs west of the Loop Road. This surface flow will need to be managed for this property to develop.

Indian School Road conveys flow from adjacent commercial and residential basins, including a portion of Winrock Center, through a 48" storm drain and within the street. East of Louisiana, Indian School is a five-lane major arterial with curb and gutter and sidewalk. The road grade is approximately 1.4% toward Louisiana Boulevard. The storm drain capacity is approximately 135 cfs and the street can convey approximately 160 cfs. This storm drain system is undersized to convey the runoff produced by the area.

West of Louisiana, Indian School is a 6 lane major arterial with curb and gutter and sidewalk. This portion of Indian School is sloped approximately 1.2% to the I-40 Channel. The street has the capacity to convey approximately 105 cfs. There is also a 72" storm drain in Indian School with the capacity to convey approximately 500 cfs. The total capacity in Indian School west of Louisiana is 605 cfs.

South of Indian School, the remaining portions of Winrock Center drain through storm drain lines to the I-40 channel.

V. PROPOSED DEVELOPED CONDITIONS

The majority of the Uptown area is already developed. The largest remaining tract to be developed is the 37-acre property located east of Louisiana Boulevard and bisected by Indian School Road. This property is under design as a mixed-use center called ABQ Uptown that will include apartments, town-homes, retail shops, offices, a hotel, and a theater. This property currently has offsite surface and storm drain flows entering from the northeast corner as discussed in the previous section. In order for this property to develop, the on-site and off-site flows must be rerouted in a way that does not exasperate the flooding of Indian School Road. The following discussion will propose the construction of storm drains parallel to Indian School Road and in the Uptown Loop Road that will alleviate the flooding and solve the drainage problems for the ABQ Uptown property and the Louisiana/Indian School Intersection.

The proposed plan, as shown in **Plate 3**, recommends the construction of two new storm drain pipe networks: one in the Uptown Loop Road (Alignment A) and one parallel to Indian School Road (Alignment C). The offsite pipe and street flow northeast of ABQ Uptown will be combined in a storm drain and diverted south toward Indian School Road. This flow will be split just north of Indian School into a 42" storm drain parallel to Indian School and a 78" pipe that will continue south. The 78" pipe will connect to the 48" pipe in Indian School Road in a new junction box and divert a total of 399 cfs down the Loop Road. The remaining 135 cfs will continue in the Indian School pipe (Alignment B) to Louisiana. The diversion of this flow to the Loop Road storm drain allows the Indian School system to run within capacity from the Loop Road to Louisiana. The new Loop Road storm drain would continue from the Loop Road to the I-40 Channel east of the Louisiana Interchange. The flow in the I-40 Channel at the Winrock Center is 7,400 cfs. The flow added by this storm drain is 468 cfs. Since the added flow is less than ten percent of the main flow, a confluence analysis was not performed. The flow rate for the channel was obtained from the Corps of Engineer's *Interstate 40 Channel \ Embudo Arroyo Hydrologic Analysis.* An excerpt from this report is located in **Appendix E**. Profiles of the storm drain lines and hydraulic calculations are located in **Appendix B**. The Loop Road system is currently being designed by

ASCG, Inc. In addition, the Louisiana Interchange storm drain is currently being designed by Gannett Fleming West, Inc. If the three engineering firms can coordinate their efforts, the drainage problems for the entire area can be solved with one outfall and the cost can be shared among the participants.

Once the diversion has been made, the Indian School storm drain will have extra capacity west of Louisiana. Therefore, the ABQ Uptown properties can construct on-site storm drains and outfall fully developed flows into the Louisiana/Indian School Intersection. This plan proposes the construction of a 42" storm drain parallel to Indian School from the Loop Road to Louisiana. This pipe will convey the remainder of the offsite flow not diverted down the Loop Road across the ABQ Uptown property to the existing 60" storm drain just northeast of the Louisiana/Indian School Intersection. The unused portion of this 60" storm drain will be removed to make way for the ABQ Uptown development. The storm drain and street capacity in Indian School west of Louisiana is 605 cfs. This plan results in a total flow of 604 cfs in Indian School including the contribution of the property northwest of the intersection. The capacities of these streets were taken from the ASCG Uptown Drainage Report. Excerpts from this report are in **Appendix C**.

On the southeast corner of the Louisiana/Indian School intersection, ABQ Uptown will build a 36" storm drain to convey the on-site flow to the Louisiana intersection. In addition, this storm drain will be built across the site to the south, parallel to Louisiana Boulevard. This storm drain will convey the runoff from the low-point of America's Parkway, just east of Louisiana, to the Indian School storm drain. The addition of this storm drain changes the original drainage concept that contributed flow from these inlets to the Loop Road storm drain. This concept change is necessary because the Loop Road is uphill from the low-point of this entrance road and the proposed storm drain does not have the hydraulic capacity to accept this flow. In the interim condition before this 36" storm drain is built, a temporary pond will be constructed on the ABQ Uptown site to retain the 0.88 Ac-ft collected by the inlets on America's Parkway. This pond will be 165 feet square and pond water 18" deep. The pond invert is 5272.5 so that the water surface elevation in the pond is lower than the grate elevation on America's Parkway. The volume of the pond was obtained from the AHYMO output in **Appendix A** and the pond calculations are located in **Appendix B.**

VI. CONCLUSION

This report references the approved drainage analyses for the Uptown area and recommends an alternative solution to the drainage problems. While the original solutions are valid, the new solution is more cost effective because it combines the three current projects into one comprehensive plan. This report includes a detailed study of the proposed runoff and storm drain hydraulics. Attached are Basin Maps from previous reports, a proposed storm drain exhibit, AHYMO output and storm drain hydraulic calculations. This drainage plan allows for safe management of storm runoff from the new development of ABQ Uptown and alleviates existing flooding problems.

APPENDIX A

AHYMO INPUT AND SUMMARY FILES

APPENDICES

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INTERSTATE 40 CHANNEL / EMBUDO ARROYO HYDROLOGIC ANALYSIS, MAY 1994.

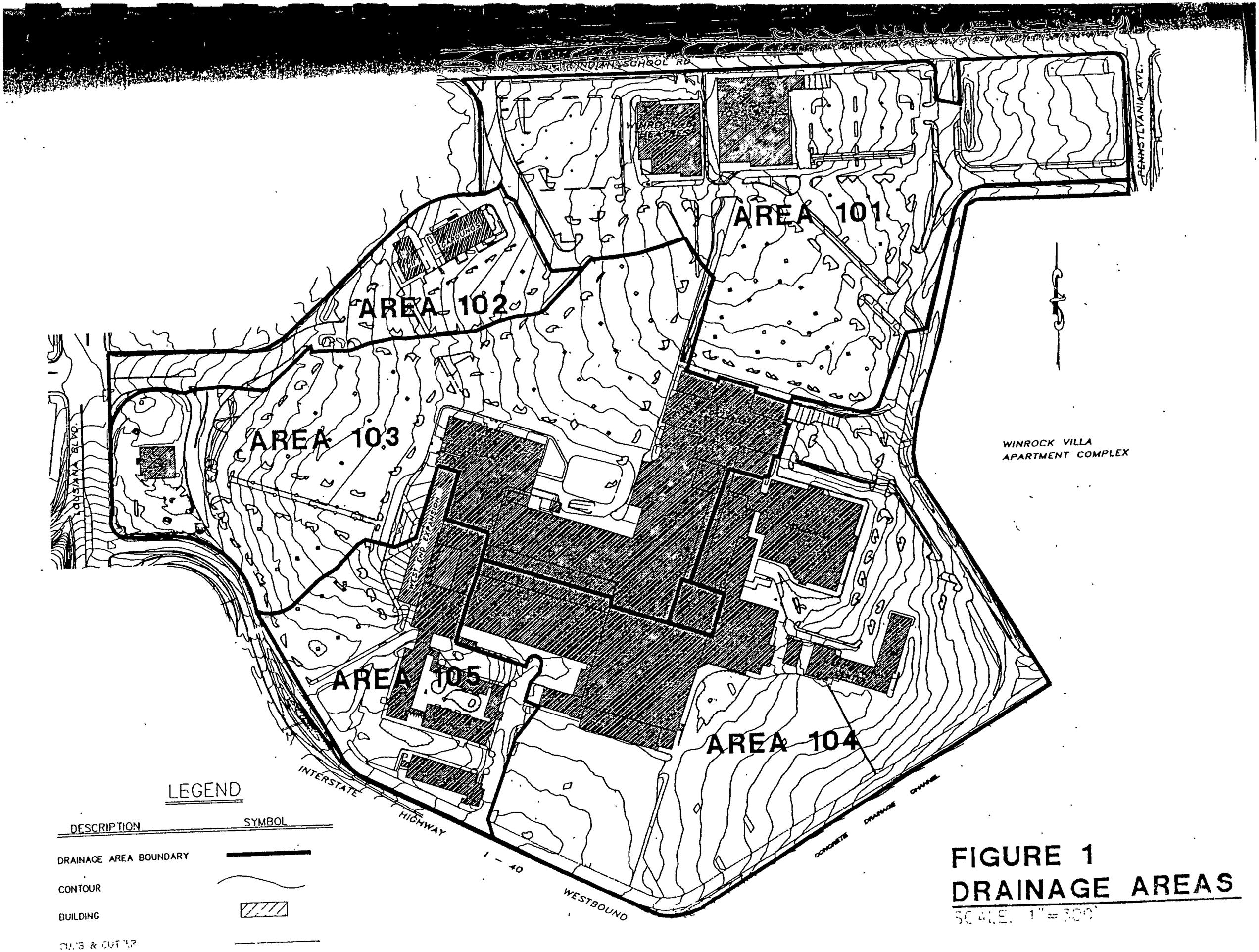

FIGURE 1
DRAINAGE AREAS
SCALE: 1" = 300'

TABLE 1: SUMMARY OF PEAK FLOWS

JULY, 1993, AVID "WINROCK SHOPPING CENTER MASTER DRAINAGE PLAN"

BASIN NUMBER	AREA (ACRES)	(SQ MI)	PEAK FLOW (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PERCENT IMPERV.
101.1	2.79	0.00436	13.49	0.53	2.26	1.500	4.83	100
101.21	1.70	0.00265	8.20	0.32	2.26	1.500	4.83	100
101.22	2.77	0.00433	13.39	0.52	2.26	1.500	4.83	100
101.3	7.76	0.01213	37.49	1.46	2.26	1.500	4.83	100
101.43	0.66	0.00103	3.18	0.12	2.26	1.500	4.84	100
101.41	1.16	0.00181	5.59	0.22	2.26	1.500	4.83	100
101.42	4.20	0.00656	20.27	0.79	2.26	1.500	4.83	100
102.1	3.52	0.00550	17.00	0.66	2.26	1.500	4.83	100
102.2	1.45	0.00227	7.01	0.27	2.26	1.500	4.83	100
→ 103.1	8.68	0.01356	41.90	1.63	2.26	1.500	4.83	100
→ 103.2	2.11	0.00330	10.20	0.40	2.26	1.500	4.83	100
→ 103.3	2.73	0.00426	13.17	0.51	2.26	1.500	4.83	100
103.41	0.88	0.00138	4.26	0.17	2.26	1.500	4.84	100
→ 103.42	1.06	0.00166	5.14	0.20	2.26	1.500	4.84	100
→ 103.43	0.55	0.00086	2.67	0.10	2.26	1.500	4.84	100
104.11*	8.35	0.01305	41.50	3.50	n/a	n/a	4.97	n/a
104.12*	12.60	0.01969	54.30	5.35	n/a	n/a	4.31	n/a
104.2	3.51	0.00549	16.97	0.66	2.26	1.500	4.83	100
104.3	2.44	0.00382	11.81	0.46	2.26	1.500	4.83	100
104.4	2.53	0.00395	12.21	0.48	2.26	1.500	4.83	100
104.5	3.39	0.00529	16.36	0.64	2.26	1.500	4.83	100
104.6	0.66	0.00103	3.20	0.12	2.26	1.500	4.84	100
★ 105.1	4.44	0.00694	21.44	0.84	2.26	1.500	4.83	100
★ 105.2	1.89	0.00295	9.12	0.36	2.26	1.500	4.83	100
→ 106.1	1.16	0.00182	5.63	0.22	2.26	1.500	4.83	100
★ 106.2	1.27	0.00198	6.14	0.24	2.26	1.500	4.83	100
→ 106.3	0.68	0.00107	3.33	0.13	2.26	1.500	4.84	100
106.4	1.40	0.00219	6.76	0.26	2.26	1.500	4.83	100
→ 106.5	1.23	0.00192	5.95	0.23	2.26	1.500	4.83	100
→ 106.6	1.07	0.00167	5.16	0.20	2.26	1.500	4.84	100
→ 106.7	1.43	0.00223	6.90	0.27	2.26	1.500	4.83	100
107.1	0.25	0.00039	1.22	0.05	2.26	1.500	4.86	100
107.2	0.31	0.00049	1.51	0.06	2.26	1.500	4.86	100
★ 107.3	0.29	0.00046	1.44	0.06	2.26	1.500	4.86	100
107.4	1.49	0.00233	7.21	0.28	2.26	1.500	4.83	100

*Note: Information for these basins is taken from "Hydrologic Analysis for East Side of Winrock Shopping Center," May 1985.

→ FLOW INJECTED JUST SOUTH OF MACARONI GRILL

★ FLOW INJECTED FURTHER SOUTH

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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                          - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =08/09/2002
INPUT FILE = P:\020110\cdp\hydro\Combine\UPTOWN.txt                                        USER NO.= AHYMO-S-9702c1BohanHu-AH

                                FROM  TO                    PEAK        RUNOFF                TIME TO    CFS      PAGE =   1
                   HYDROGRAPH    ID   ID        AREA     DISCHARGE     VOLUME      RUNOFF      PEAK     PER
COMMAND          IDENTIFICATION  NO.  NO.      (SQ MI)     (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE     NOTATION

*S
*S   FILE NAME  UPTOWN.TXT
*S   TITLE 1 UPTOWN DRAINAGE MASTER PLAN
*S      100-yr / 6-hr
*S       FUTURE
*S
*S     THIS IS AN AHYMO_97 HYDROLOGIC MODEL FOR:
*S
*S         THE UPTOWN DRAINAGE MASTER PLAN
*S
*S             PREPARED FOR CITY OF ALBUQUERQUE
*S             PREPARED BY ASCG INC.
*S                         MODIFIED BY BOHANNAN HUSTON INC.
*S        MODEL DESCRIPTION -
*S   1.  BASIN GROUPS 100'S AND 200'S-  WEST OF EUBANK FROM CANDELARIA SOUTH TO
*S                              TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S   THIS DRAINAGE SUB-BASIN 110 WILL BE IN THE FUTURE TAKEN DOWN WYOMING TO THE
*S   AND THEREFORE WILL BE TAKEN OUT OF THE BASIN
*S
*S   2.  100-YEAR 6-HOUR RAINFALL EVENT
*S
*S   3.  THIS MODEL ASSUMES "FUTURE" FULL DEVELOPMENT CONDITIONS
*S
*S   5.  NO SEDIMENT BULKING APPLIED DUE TO
*S       MOST BASINS ARE DEVELOPED
*S
*S   6.  USE PROCEDURES FROM COA DPM SECTION 22
*S
*S   7.  BHI MODIFICATIONS: ADD WINROCK BASINS INTO INDIAN SCHOOL STORM DRAIN,
*S       DIVERT FLOW IN 60" PIPE ENTERING BASIN 290 TO INDIAN SCHOOL STORM DRAIN
*S       DIVERT FLOW FROM THE INDIAN SCHOOL STORM DRAIN SOUTH INTO LOOP ROAD
*S                 BASIN 290 ONSITE FLOWS AND BASIN 280 STREET FLOWS TO NEW 54"
*S                  TO LOUISIANA/INDIAN SCHOOL INTERSECTION
*S                  NO PARALLEL PIPE ON INDIAN SCHOOL RD WEST OF LOUISIANA
START                                                                                                   TIME=       .00
LOCATION                        ALBUQUERQUE
RAINFALL  TYPE= 1                                                                                       RAIN6=    2.350
*S   ***    THE FOLLOWING SUB-BASINS 100'S ARE THOSE NORTH OF IDIAN SCHOOL ROAD
*S          WEST OF EUBANK, DRAINING EAST DOWN INDIAN SCHOOL
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA

*S*** SUB-BASIN 110 **** BASIN 110, UNDER EXISTING CONDITIONS CONTRIBUTES FLOW T
*S********************** ANALYSIS POINTS HEREIN.  HOWEVER THE COA HAS A PROJECT
*S********************** BASIN 110 SOUTH ON WYOMING.  THERFORE, FOR THE PURPOSE
*S********************** ANALYSIS, THE ENGINEER AND THE SITY HAVE AGREED TO REMO
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                  FROM  TO                    PEAK        RUNOFF                TIME TO    CFS
                 HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME     RUNOFF     PEAK      PER
COMMAND        IDENTIFICATION  NO.  NO.      (SQ MI)     (CFS)        (AC-FT)   (INCHES)  (HOURS)    ACRE      NOTATION

*S********************** BASIN 110 FROM THE WATERSHED HEREIN.
*S*** SUB-BASIN 130 **** (THIS IS COMBINATION OF 120 AND 130)
COMPUTE NM HYD        120.00   -     1        .16500       301.70      13.589      1.54423    1.600    2.857 PER IMP=  50.00
DIVIDE HYD          130_PIPE    1     2        .12402       135.00      10.214      1.54423    1.467    1.701
                      130_ST  and     3        .04098       166.70       3.375      1.54423    1.600    6.355
DIVIDE HYD        130_STREET    3     3        .02459       100.02       2.025      1.54423    1.600    6.355
                    130_PENN  and    13        .01639        66.68       1.350      1.54423    1.600    6.355
ROUTE                 140.10    2     9        .12402       135.00      10.214      1.54423    1.833    1.701
*S ROUTE THE REST OF FLOW DOWN INDIAN SCHOOL ROAD, 1000' FROM INTERSECTION******
*S LENGTH OF ROUTE MODIFIED BY BHI TO DIVERSION POINT INSTEAD OF INTERSECTION
ROUTE                 140.20    3     2        .02459        83.72       2.026      1.54444    1.667    5.319
*S*** SUB-BASIN 140 ****
COMPUTE NM HYD        140.00   -     3        .04900        84.72       4.214      1.61245    1.633    2.701 PER IMP=  55.00
ADD HYD               140.30  2& 3   8        .07359       166.83       6.239      1.58971    1.633    3.542
*S FLOW IN THE STREET
*S THIS IS THE FLOW FROM THE 48" STORM DRAIN
*S*** WINROCK SUB-BASINS ADDED BY BHI ****
COMPUTE NM HYD        101.10   -    20        .00436        13.15        .493      2.11668    1.500    4.708 PER IMP= 100.00
COMPUTE NM HYD        101.22   -    21        .00433        13.05        .489      2.11668    1.500    4.708 PER IMP= 100.00
COMPUTE NM HYD        101.21   -    22        .00265         7.99        .299      2.11668    1.500    4.710 PER IMP= 100.00
COMPUTE NM HYD        101.30   -    23        .01213        36.54       1.370      2.11668    1.500    4.705 PER IMP= 100.00
COMPUTE NM HYD        101.43   -    24        .00103         3.09        .116      2.11668    1.500    4.718 PER IMP= 100.00
COMPUTE NM HYD        101.42   -    25        .00656        19.75        .740      2.11668    1.500    4.706 PER IMP= 100.00
COMPUTE NM HYD        101.41   -    26        .00181         5.45        .204      2.11668    1.500    4.711 PER IMP= 100.00
*S SUM WINROCK BASINS ADDING TO INDIAN SCHOOL AT TOYS R US
ADD HYD                  TOYS 20&21  30        .00869        26.19        .981      2.11661    1.500    4.708
ROUTE RESERVOIR       POND101   30   20        .00869        10.18        .981      2.11661    1.767    1.829 AC-FT=     .325
ADD HYD                 TOYS2 20&22  31        .01134        17.47       1.281      2.11659    1.500    2.406
ADD HYD                 TOYS3 31&23  32        .02348        54.01       2.650      2.11662    1.500    3.595
ADD HYD                 TOYS4 32&24  33        .02450        57.11       2.766      2.11661    1.500    3.642
ADD HYD                 TOYS5 25&26  35        .00836        25.20        .944      2.11661    1.500    4.707
ADD HYD                 TOYS6 35&33  37        .03287        82.30       3.710      2.11661    1.500    3.913
*S ADD TOYS R US BASINS INTO STORM DRAIN
ADD HYD                    SD 37& 9  60        .15688       211.78      13.924      1.66414    1.533    2.109
*S   ***    THE FOLLOWING SUB-BASINS 200'S ARE THOSE FROM THE NORTH FROM CANDLER
*S          WEST FROM EUBANK, DRAINING EAST DOWN MENAUL, AND SOUTHEAST TO THE
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S*** SUB-BASIN 210 ****
COMPUTE NM HYD        210.00   -     1        .19600       338.63      16.667      1.59443    1.633    2.700 PER IMP=  55.00
DIVIDE HYD          210_PIPE    1     2        .08959        65.00       7.618      1.59443    1.400    1.134
                      210_ST  and     3        .10641       273.63       9.049      1.59443    1.633    4.018
ROUTE                 210.10    2     1        .08959        65.00       7.618      1.59443    1.967    1.134
ROUTE                 210.20    3     2        .10641       267.06       9.049      1.59447    1.767    3.921
*S*** SUB-BASIN 220 ****
COMPUTE NM HYD        220.00   -     3        .14300       253.37      11.777      1.54423    1.600    2.769 PER IMP=  50.00
DIVIDE HYD          220_PIPE    3     4        .10968       119.00       9.033      1.54423    1.467    1.695
                      220_ST  and     5        .03332       134.37       2.744      1.54423    1.600    6.302
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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
ADD HYD	220.10	4& 1	6	.19927	184.00	16.651	1.56680	1.867	1.443	
ADD HYD	220.20	5& 2	4	.13973	336.53	11.793	1.58249	1.733	3.763	
ROUTE	220.30	6	1	.19927	166.44	16.651	1.56680	1.967	1.305	
ROUTE	220.40	4	2	.13973	299.65	11.793	1.58249	1.767	3.351	
*S*** SUB-BASIN 230 ****										
COMPUTE NM HYD	230.00	-	3	.18200	309.35	15.477	1.59443	1.633	2.656	PER IMP= 55.00
DIVIDE HYD	230_PIPE	3	4	.09951	80.00	8.462	1.59443	1.433	1.256	
	230_ST	and	5	.08249	229.35	7.015	1.59443	1.633	4.344	
ADD HYD	230.10	4& 1	6	.29878	246.44	25.113	1.57600	1.967	1.289	
ADD HYD	230.20	5& 2	4	.22222	468.91	18.808	1.58692	1.733	3.297	
*S*** SUB-BASIN 250 ****										
COMPUTE NM HYD	250.00	-	1	.04900	102.79	4.344	1.66233	1.567	3.278	PER IMP= 60.00
ROUTE	250.10	1	5	.04900	81.73	4.344	1.66233	1.667	2.606	
*S*** SUB-BASIN 260 ****										
COMPUTE NM HYD	260.00	-	2	.04700	107.63	4.167	1.66233	1.533	3.578	PER IMP= 60.00
ADD HYD	260.10	5& 2	1	.09600	171.43	8.511	1.66232	1.567	2.790	
ROUTE	260.20	1	3	.09600	143.25	8.511	1.66233	1.667	2.331	
ADD HYD	260.10	4& 3	5	.31822	609.49	27.319	1.60966	1.700	2.993	
DIVIDE HYD	230_STAY	5	7	.15911	304.75	13.660	1.60966	1.700	2.993	
	230_MEN	and	12	.15911	304.75	13.660	1.60966	1.700	2.993	
ROUTE	230.30	6	1	.29878	246.52	25.113	1.57600	1.967	1.289	
ROUTE	230.40	7	2	.15911	239.94	13.660	1.60966	1.867	2.356	
*S*** SUB-BASIN 240 ****										
COMPUTE NM HYD	240.00	-	3	.03000	58.86	2.660	1.66233	1.600	3.066	PER IMP= 60.00
ADD HYD	240.10	3& 2	6	.18911	268.68	16.319	1.61801	1.833	2.220	
*S**********										
*S*** SUB-BASIN 260B ****										
COMPUTE NM HYD	260B	-	3	.03800	95.82	3.369	1.66233	1.500	3.940	PER IMP= 60.00
DIVIDE HYD	260B_PIPE	3	4	.03689	80.00	3.271	1.66232	1.467	3.388	
	260B_ST	and	2	.00111	15.82	.098	1.66232	1.500	22.321	
ROUTE	260B.3	4	3	.03689	80.40	3.271	1.66234	1.500	3.405	
ROUTE	260B.4	2	4	.00111	1.83	.098	1.66699	1.533	2.586	
*S*** SUB-BASIN 270 ****										
COMPUTE NM HYD	270.00	-	2	.05750	99.93	4.890	1.59443	1.633	2.715	PER IMP= 55.00
DIVIDE HYD	270_PIPE	2	5	.04540	50.00	3.861	1.59442	1.467	1.721	
	270_ST	and	7	.01210	49.93	1.029	1.59442	1.633	6.449	
ADD HYD	270.10	7& 4	2	.01320	51.08	1.127	1.60039	1.633	6.044	
ADD HYD	270.20	2& 6	4	.20232	283.88	17.446	1.61686	1.800	2.192	
DIVIDE HYD	270_STREET	4	4	.10116	141.94	8.723	1.61685	1.800	2.192	
	270_PENN	and	7	.10116	141.94	8.723	1.61685	1.800	2.192	
ADD HYD	270.20	5& 3	6	.08230	130.40	7.132	1.62486	1.500	2.476	
ADD HYD	270.20	6& 1	5	.38107	320.39	32.245	1.58655	1.900	1.314	
ROUTE	280.10	5	1	.38107	319.17	32.245	1.58655	1.900	1.309	
ROUTE	280.20	4	2	.10116	136.65	8.723	1.61685	1.867	2.111	
*S*** SUB-BASIN 280: BASIN JUST UPSTREAM FROM UPTOWN VILLAGE **********										
COMPUTE NM HYD	280.00	-	3	.03800	70.15	3.471	1.71244	1.633	2.885	PER IMP= 65.00
DIVIDE HYD	280_PIPE	3	5	.03154	58.23	2.881	1.71243	1.633	2.885	
	280_ST	and	7	.00646	11.93	.590	1.71243	1.633	2.885	

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
ADD HYD	280.30	7& 2	4	.10762	143.38	9.313	1.62257	1.867	2.082	
ADD HYD	280.30	5& 1	6	.41261	366.57	35.125	1.59617	1.667	1.388	
*S ADD STREET FLOW TO PIPE FLOW AT BASIN 290										
*S DIVERT COMBINED FLOW TOWARD INDIAN SCHOOL										
ADD HYD	280.30	4& 6	7	.52023	495.52	44.438	1.60163	1.833	1.488	
*S**********										
ROUTE	280.10	7	40	.52023	495.51	44.438	1.60163	1.833	1.488	
DIVIDE HYD	BYPASS	40	4	.14046	133.79	11.998	1.60163	1.833	1.488	
	LOOP	and	41	.37977	361.72	32.440	1.60163	1.833	1.488	
*S PIPE FLOW IN BASIN 290 DIVERTED AND ADDED TO INDIAN SCHOOL FLOW AT LOOP RD										
ADD HYD	ISTOTAL	60&41	42	.53665	532.28	46.364	1.61991	1.800	1.550	
*S**********										
*S SPLIT PIPE FLOW AT LOOP ROAD										
DIVIDE HYD	W_INTER	42	43	.13416	133.07	11.591	1.61991	1.800	1.550	
	S_DIVERT	and	44	.40249	399.21	34.773	1.61991	1.800	1.550	
*S ROUTE THE DIVERTED FLOW THROUGH NEW 72" PIPE TO S OF MACARONI GRILL										
ROUTE	MAIN1	44	45	.40249	398.98	34.773	1.61991	1.800	1.549	
*S**********										
ROUTE	280.20	4	2	.14046	133.57	11.998	1.60163	1.867	1.486	
*S*** SUB-BASIN 290 ****										
COMPUTE NM HYD	290.00	-	1	.03800	78.64	3.949	1.94860	1.633	3.234	PER IMP= 85.00
ADD HYD	290.30	1& 2	4	.17846	196.63	15.947	1.67550	1.667	1.722	
COMPUTE NM HYD	VILS	-	50	.01840	55.41	2.077	2.11668	1.500	4.705	PER IMP= 100.00
COMPUTE NM HYD	102.10	-	52	.00550	16.56	.621	2.11668	1.500	4.707	PER IMP= 100.00
COMPUTE NM HYD	102.20	-	54	.00227	6.83	.256	2.11668	1.500	4.710	PER IMP= 100.00
ADD HYD	VILS1	50& 4	51	.19686	224.85	18.025	1.71674	1.633	1.785	
ADD HYD	VILS2	51&52	53	.20236	234.42	18.645	1.72760	1.633	1.810	
ADD HYD	VILS3	53&54	55	.20463	238.37	18.901	1.73191	1.633	1.820	
S ADD FLOWS FROM BASIN 290 AND INDIAN SCHOOL TOGETHER TO GIVE										
*S THE TOTAL FLOW IN THE INTERSECTION										
ADD HYD	290.50	55&43	5	.33879	366.80	30.492	1.68755	1.633	1.692	
*S**********										
*S*** SUB-BASIN 310****										
COMPUTE NM HYD	310.00	-	3	.03900	70.58	3.458	1.66233	1.633	2.828	PER IMP= 60.00
ADD HYD	310.30	3& 5	4	.37779	437.39	33.950	1.68495	1.633	1.809	
ADD HYD	ISWEST	4& 8	5	.45138	604.22	40.189	1.66942	1.633	2.092	
*S BOHANNAN HUSTON, INC. ADDITION OF AVID ENGR. WINROCK BASINS ALONG LOOP ROAD										
COMPUTE NM HYD	103.10	-	10	.01356	40.83	1.531	2.11668	1.500	4.705	PER IMP= 100.00
COMPUTE NM HYD	103.20	-	11	.00330	9.94	.373	2.11668	1.500	4.708	PER IMP= 100.00
COMPUTE NM HYD	103.30	-	12	.00426	12.83	.481	2.11668	1.500	4.708	PER IMP= 100.00
COMPUTE NM HYD	103.42	-	13	.00166	5.01	.187	2.11668	1.500	4.713	PER IMP= 100.00
COMPUTE NM HYD	103.43	-	14	.00086	2.60	.097	2.11668	1.500	4.720	PER IMP= 100.00
COMPUTE NM HYD	105.10	-	15	.00694	20.90	.783	2.11668	1.500	4.706	PER IMP= 100.00
COMPUTE NM HYD	105.20	-	16	.00295	8.89	.333	2.11668	1.500	4.709	PER IMP= 100.00
COMPUTE NM HYD	106.10	-	17	.00182	5.49	.205	2.11668	1.500	4.711	PER IMP= 100.00
COMPUTE NM HYD	106.20	-	18	.00198	5.97	.224	2.11668	1.500	4.711	PER IMP= 100.00
COMPUTE NM HYD	106.30	-	19	.00107	3.23	.121	2.11668	1.500	4.718	PER IMP= 100.00

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COMPUTE NM HYD        106.50   -    20        .00192        5.79        .217      2.11668    1.500    4.711 PER IMP= 100.00
COMPUTE NM HYD        106.60   -    21        .00167        5.04        .189      2.11668    1.500    4.713 PER IMP= 100.00
COMPUTE NM HYD        106.70   -    22        .00223        6.72        .252      2.11668    1.500    4.710 PER IMP= 100.00
COMPUTE NM HYD        107.30   -    23        .00046        1.39        .052      2.11668    1.500    4.733 PER IMP= 100.00
*S NEW PARKING LOT
COMPUTE NM HYD         PKLOT   -    24        .00130        3.92        .147      2.11668    1.500    4.714 PER IMP= 100.00
*S ADD WINROCK BASINS TOGETHER AND ADD TO DIVERSION PIPE
ADD HYD               106.13 17&19  30        .00289        8.72        .326      2.11649    1.500    4.714
ADD HYD               135.00 30&20  31        .00481       14.51        .543      2.11651    1.500    4.713
ADD HYD              1356.00 31&21  32        .00648       19.54        .731      2.11651    1.500    4.713
ADD HYD               ALL106 32&22  33        .00871       26.27        .983      2.11652    1.500    4.712
*S ADD 103'S
ADD HYD                ROOF3 33&12  50        .01297       39.10       1.464      2.11655    1.500    4.711
ADD HYD                31.00 50&10  51        .02653       79.94       2.995      2.11661    1.500    4.708
*S FLOW INTO EX. 24"/NEW 36" SD AT NEW PARKING-LOT INLET
ADD HYD               312.00 51&11  52        .02983       89.88       3.367      2.11661    1.500    4.708
*S ADD STREET FLOWS
ADD HYD                  ST1 52&13  53        .03149       94.89       3.555      2.11660    1.500    4.708
*S TOTAL FLOW ADDED TO MAIN JUNCTION SOUTH OF MACARONI GRILL
ADD HYD               312.00 53&14  54        .03235       97.49       3.652      2.11660    1.500    4.709
*S ADD FLOW TO MAIN LINE
ADD HYD                 MAIN 54&45  55        .43484      437.17      38.425      1.65686    1.667    1.571
*S ADD NEW PARKING LOT FLOW TO MAIN LINE
ADD HYD                MAIN2 55&24  56        .43614      439.15      38.571      1.65823    1.633    1.573
*S ADD WINROCK BASINS 105'S
ROUTE                 107.30   23   57        .00046        1.19        .052      2.11715    1.567    4.047
ADD HYD              7352.00 57&16  60        .00341        9.95        .385      2.11653    1.500    4.558
ADD HYD              5262.00 60&18  61        .00539       15.92        .608      2.11653    1.500    4.615
*S NEXT INPUT AT 105.2
ADD HYD                 105S 61&15  62        .01233       36.82       1.392      2.11659    1.500    4.666
*S ADD TO MAIN LINE
ADD HYD                MAIN3 62&56  63        .44847      468.36      39.963      1.67083    1.567    1.632
FINISH
```

```
* FILE NAME uptown.TXT
* TITLE 1 UPTOWN DRAINAGE MASTER PLAN 100- YEAR 6 HOUR STORM
*RP 100-yr / 6-hr
*DC EXISTING
*S
*S   FILE NAME  UPTOWN.TXT
*S   TITLE 1 UPTOWN DRAINAGE MASTER PLAN
*S      100-yr / 6-hr
*S       FUTURE
*S
*S     THIS IS AN AHYMO 97 HYDROLOGIC MODEL FOR:
*S
*S         THE UPTOWN DRAINAGE MASTER PLAN
*S
*S             PREPARED FOR CITY OF ALBUQUERQUE
*S             PREPARED BY ASCG INC.
*S            MODIFIED BY BOHANNAN HUSTON INC.
*S
*S        MODEL DESCRIPTION -
*S
*S   1.  BASIN GROUPS 100'S AND 200'S-  WEST OF EUBANK FROM CANDELARIA SOUTH TO INDIAN SCHOOL ROAD
*S                          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S   THIS DRAINAGE SUB-BASIN 110 WILL BE IN THE FUTURE TAKEN DOWN WYOMING TO THE INTERSTATE
*S   AND THEREFORE WILL BE TAKEN OUT OF THE BASIN
*S
*S   2.  100-YEAR 6-HOUR RAINFALL EVENT
*S
*S   3.  THIS MODEL ASSUMES "FUTURE" FULL DEVELOPMENT CONDITIONS
*S
*S   5.  NO SEDIMENT BULKING APPLIED DUE TO
*S       MOST BASINS ARE DEVELOPED
*S
*S   6.  USE PROCEDURES FROM COA DPM SECTION 22
*S
*S   7.  BHI MODIFICATIONS: ADD WINROCK BASINS INTO INDIAN SCHOOL STORM DRAIN,
*S       DIVERT FLOW IN 60" PIPE ENTERING BASIN 290 TO INDIAN SCHOOL STORM DRAIN,
*S       DIVERT FLOW FROM THE INDIAN SCHOOL STORM DRAIN SOUTH INTO LOOP ROAD
*S      BASIN 290 ONSITE FLOWS AND BASIN 280 STREET FLOWS TO NEW 54"
*S      TO LOUISIANA/INDIAN SCHOOL INTERSECTION
*S      NO PARALLEL PIPE ON INDIAN SCHOOL RD WEST OF LOUISIANA
*
*******************************************************************************
START                TIME=0.0  PUNCH CODE=0 PRINT CODE=0
*
LOCATION             ALBUQUERQUE
* RAINFALL FROM NOAA ATLAS 2 6-HOUR RAINFALL DISTRIBUTION WITH PEAK AT 1.4 HOURS
*
RAINFALL             TYPE=1
                     QUARTER=0.0    ONE= 2.01 IN
                     SIX= 2.35IN    DAY= 2.71 IN   DT = 0.033333333 HR
*
*******************************************************************************
*S   ***    THE FOLLOWING SUB-BASINS 100'S ARE THOSE NORTH OF IDIAN SCHOOL ROAD
*S          WEST OF EUBANK, DRAINING EAST DOWN INDIAN SCHOOL
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S
*S
*S
*S
*S*** SUB-BASIN 110 **** BASIN 110, UNDER EXISTING CONDITIONS CONTRIBUTES FLOW TO THE
*S********************** ANALYSIS POINTS HEREIN.  HOWEVER THE COA HAS A PROJECT TO DIVERT
*S********************** BASIN 110 SOUTH ON WYOMING.  THERFORE, FOR THE PURPOSE OF THIS
*S********************** ANALYSIS, THE ENGINEER AND THE SITY HAVE AGREED TO REMOVE
*S********************** BASIN 110 FROM THE WATERSHED HEREIN.
*
```

```
*S*** SUB-BASIN 130 **** (THIS IS COMBINATION OF 120 AND 130)
*
COMPUTE LT TP          LCODE=1 NK=3 ISLOPE=0
                       LENGTH=100 FT SLOPE=.010 K=.7
                       LENGTH=2000 FT SLOPE=.018 K=2
                       LENGTH=1200 FT SLOPE=.018 K=3
COMPUTE NM HYD         ID=1   HYD NO=120   DA=0.165 SQ MI
                       PER A=0 PER B=20 PER C=30 PER D=50
                       TP=0.0 MASSRAIN=-1
PRINT HYD              ID=1   CODE=20
*
* ROUTE THIS FLOW FROM BASIN 130 AT THE INTERSECTION OF PENNSYLVAINIA AND INDIAN SCHOOL
* ROUTING THROUGH 48IN RCP DOWN INDIAN SCHOOL TO THE INTERSECTION OF LOUISIANA
* THIS FLOW WILL NEED TO BE DIVIDED IN STORM DRAIN AND IN THE STREET
* DIVIDE FLOW IN THE STREET INTO 48' STORM DRAIN 135CFS UNDER PRESSURE CONDITIONS
DIVIDE HYD             ID=1   Q=135  ID I=2   HYD NO=130_PIPE
                                     ID II=3  HYD NO=130_ST
PRINT HYD              ID=2  CODE=20
PRINT HYD              ID=3  CODE=20
* DIVIDE STREET FLOWS DOWN INDIAN SCHOOL AND PENNSYLVAINIA
* AT A 40 60 SPLIT
DIVIDE HYD             ID=3   PER=-60  ID I=3   HYD NO=130_STREET
                                       ID II=13  HYD NO=130_PENN
PRINT HYD              ID=2  CODE=20
PRINT HYD              ID=13  CODE=20
* ROUTING THROUGH 48IN RCP DOWN INDIAN SCHOOL TO THE LOOP RD THROUGH BASIN 140 (INDIAN SCHOOL)
COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                       SLOPE=0.02  FT/FT  DIA=4.0 FT    N=0.013
COMPUTE TRAVEL TIME  ID=9 REACH=1  NO VS=1
                      L= 2600  SLP= .02
ROUTE                  ID=9  HYD NO=140.1
                       INFLOW ID=2  DT=0.0
PRINT HYD              ID=9   CODE=20
*S ROUTE THE REST OF FLOW DOWN INDIAN SCHOOL ROAD, 1000' FROM INTERSECTION*************************
*S LENGTH OF ROUTE MODIFIED BY BHI TO DIVERSION POINT INSTEAD OF INTERSECTION
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=3  MIN ELEV=100  MAX ELEV=101.5
                       CH SLP=0.015    FP SLP=.0175
                       N=0.035 DIST=30.01  N=0.015 DIST=115.7  N=0.035 DIST=145.71
                       DIST    ELEV     DIST     ELEV    DIST     ELEV
                       0       101.5    0.1      101     30       100.67
                       30.01   100      63.9     100.68  63.91    101.18
                       81.8    101.18   81.81    100.68  115.7    100.0
                       115.71 100.67    145.7    101.0   145.71   101.5
COMPUTE TRAVEL TIME  ID=2 REACH=1  NO VS=1
                      L= 1600  SLP= .015
ROUTE                  ID=2  HYD NO=140.2
                       INFLOW ID=3  DT=0.0
PRINT HYD              ID=2   CODE=20
*
*****************************************************************************************************
*
*S*** SUB-BASIN 140 ****
*
COMPUTE LT TP          LCODE=1 NK=3 ISLOPE=0
                       LENGTH=100 FT SLOPE=.01 K=.7
                       LENGTH=2000 FT SLOPE=.015 K=2
                       LENGTH=1550 FT SLOPE=.015 K=3
COMPUTE NM HYD         ID=3   HYD NO=140   DA=0.049 SQ MI
                       PER A=0 PER B=15 PER C=30 PER D=55
                       TP=0.0 MASSRAIN=-1
PRINT HYD              ID=3   CODE=20
*  ADD BASIN 140 TO 130  STREET FLOW THAT HAVE BEEN ROUTED TO BASIN 140
ADD HYD                ID=8    HYD=140.3
                       ID=2   ID=3
*S FLOW IN THE STREET
```

```
PRINT HYD            ID=8  CODE=10
*S THIS IS THE FLOW FROM THE 48" STORM DRAIN
PRINT HYD            ID=9   CODE=10
*
*
*******************************************************************************************
*
*S*** WINROCK SUB-BASINS ADDED BY BHI ****
*
COMPUTE NM HYD       ID=20   HYD NO=101.1   DA=0.004363 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=20   CODE=20
*
COMPUTE NM HYD       ID=21   HYD NO=101.22   DA=0.0043308 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=21   CODE=20
*
COMPUTE NM HYD       ID=22   HYD NO=101.21   DA=0.00265 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=22   CODE=20
*
COMPUTE NM HYD       ID=23   HYD NO=101.3   DA=0.012134 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=23   CODE=20
*
COMPUTE NM HYD       ID=24   HYD NO=101.43   DA=0.001025 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=24   CODE=20
*
COMPUTE NM HYD       ID=25   HYD NO=101.42   DA=0.006557 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=25   CODE=20
*
COMPUTE NM HYD       ID=26   HYD NO=101.41   DA=0.001806 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
PRINT HYD            ID=26   CODE=20
*
*S SUM WINROCK BASINS ADDING TO INDIAN SCHOOL AT TOYS R US
ADD HYD              ID=30    HYD=TOYS   ID=20   ID=21
PRINT HYD            ID=30   CODE=20
*
ROUTE RESERVOIR             ID=20    HYD=POND101  INFLOW ID=30  CODE=20
                    OUTFLOW (CFS)  STORAGE(ACFT)     ELEV(FT)
                      0.00    0.000   5297.5
                      5.98    0.063   5300
                      8.46    0.126   5302.5
                      9.26    0.132   5303.5
                      10.36   0.364   5305
*
ADD HYD              ID=31    HYD=TOYS2 ID=20   ID=22
PRINT HYD            ID=31   CODE=20
*
ADD HYD              ID=32    HYD=TOYS3 ID=31   ID=23
PRINT HYD            ID=32   CODE=20
*
ADD HYD              ID=33    HYD=TOYS4 ID=32   ID=24
PRINT HYD            ID=33   CODE=20
*
```

```
*  ADD WINROCK BASINS THAT DISCHARGE OVERLAND AT LOOP ROAD
ADD HYD              ID=35    HYD=TOYS5 ID=25   ID=26
PRINT HYD            ID=35   CODE=20
*
ADD HYD              ID=37    HYD=TOYS6 ID=35   ID=33
PRINT HYD            ID=37   CODE=20
*
*S ADD TOYS R US BASINS INTO STORM DRAIN
ADD HYD             ID=60  HYD=SD  ID I=37  ID II=9
*
*****************************************************************************************
**
*
*S   ***    THE FOLLOWING SUB-BASINS 200'S ARE THOSE FROM THE NORTH FROM CANDLERIA AND EUBANK
*S          WEST FROM EUBANK, DRAINING EAST DOWN MENAUL, AND SOUTHEAST TO THE
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*
* THE NORTHERN HALF THIS DRAINS TO THE INTERSECTION OF MENAUL AND PENNSYLVAINIA
*
*****************************************************************************************
**
*
*S*** SUB-BASIN 210 ****
*
COMPUTE LT TP        LCODE=1 NK=3 ISLOPE=0
                     LENGTH=100 FT SLOPE=.01 K=.7
                     LENGTH=2000 FT SLOPE=.017 K=2
                     LENGTH=1750 FT SLOPE=.017 K=3
COMPUTE NM HYD       ID=1   HYD NO=210   DA=0.196 SQ MI
                     PER A=0 PER B=20 PER C=25 PER D=55
                     TP=0.0 MASSRAIN=-1
PRINT HYD            ID=1   CODE=20
*
*DIVIDE FLOW IN THE STREET INTO 36' STORM DRAIN 65 CFS UNDER PRESSURE
DIVIDE HYD           ID=1  Q=65  ID I=2   HYD NO=210_PIPE
                                 ID II=3  HYD NO=210_ST
PRINT HYD            ID=2  CODE=20
PRINT HYD            ID=3  CODE=20
* ROUTING THROUGH 36IN RCP DOWN PHOENIX TO THE INTERSECTION OF PHOENIX AND WYOMING THROUGH BASIN
220
COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                     SLOPE=0.02  FT/FT  DIA=3.5 FT    N=0.013
COMPUTE TRAVEL TIME  ID=1 REACH=1  NO VS=1
                    L= 2400  SLP= .02
ROUTE                ID=1  HYD NO=210.1
                     INFLOW ID=2  DT=0.0
PRINT HYD            ID=1   CODE=20
** ROUTE THE REST OF FLOW DOWN PHOENIX*************************
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=1 MIN ELEV=99.33 MAX ELEV=100
                     CH SLP=0.016    FP SLP=.016   N=0.017 DIST=60
                     DIST    ELEV     DIST     ELEV    DIST     ELEV
                     0       100.0    .1       99.33   30.0      99.5
                     47.9    99.33    60       100
COMPUTE TRAVEL TIME  ID=2 REACH=1  NO VS=1
                    L= 2400  SLP= .016
ROUTE                ID=2  HYD NO=210.2
                     INFLOW ID=3  DT=0.0
PRINT HYD            ID=2   CODE=20
*
*
*****************************************************************************************
**
*
*S*** SUB-BASIN 220 ****
*
```

```
COMPUTE LT TP          LCODE=1 NK=3 ISLOPE=0
                       LENGTH=100 FT SLOPE=.01 K=.7
                       LENGTH=2000 FT SLOPE=.016 K=2
                       LENGTH=1200 FT SLOPE=.016 K=3
COMPUTE NM HYD         ID=3   HYD NO=220   DA=0.143 SQ MI
                       PER A=0 PER B=20 PER C=30 PER D=50
                       TP=0.0 MASSRAIN=-1
PRINT HYD              ID=3   CODE=20
*DIVIDE FLOW IN THE STREET INTO 48' STORM DRAIN 119CFS
DIVIDE HYD             ID=3  Q=119   ID I=4   HYD NO=220_PIPE
                                    ID II=5  HYD NO=220_ST
PRINT HYD              ID=4  CODE=20
PRINT HYD              ID=5  CODE=20
*  ADD PIPE  FLOWS
ADD HYD                ID=6    HYD=220.1
                       ID=4   ID=1
PRINT HYD              ID=6    CODE=20
*  ADD BASINS 210 AND 220 STREET FLOWS AT THE INTERSECTION OF PHOENIX AND WYOMING***********
ADD HYD                ID=4    HYD=220.2
                       ID=5   ID=2
PRINT HYD              ID=4    CODE=20
* ROUTE PIPE FLOWS FROM HERE TO THE INTERSECTION
* OF MENAUL AND PENNSYLVAINIA
* ROUTING THROUGH 48IN RCP  ********************************
COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                       SLOPE=0.0015  FT/FT  DIA=4.0 FT    N=0.013
COMPUTE TRAVEL TIME  ID=1 REACH=1  NO VS=1
                      L= 2400  SLP= .02
ROUTE                  ID=1  HYD NO=220.3
                       INFLOW ID=6  DT=0.0
PRINT HYD              ID=1   CODE=20
** ROUTE THE REST OF FLOW DOWN STREETS*************************
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=3  MIN ELEV=100  MAX ELEV=101.5
                       CH SLP=0.014    FP SLP=.014
                       N=0.035 DIST=30.01  N=0.015 DIST=134  N=0.035 DIST=164
                       DIST    ELEV     DIST     ELEV    DIST     ELEV
                       0       101.5    0.01     101     30       100.67
                       30.01   100      74.99    100.68  75       101.18
                       89     101.18    89.01    100.68  133.99   100.0
                       134    100.67    163.99   101.0   164      101.5
COMPUTE TRAVEL TIME  ID=2 REACH=1  NO VS=1
                      L= 2400  SLP= .014
ROUTE                  ID=2  HYD NO=220.4
                       INFLOW ID=4  DT=0.0
PRINT HYD              ID=2   CODE=20
*
*
*******************************************************************************
*
*S*** SUB-BASIN 230 ****
*
COMPUTE LT TP          LCODE=1 NK=3 ISLOPE=0
                       LENGTH=100 FT SLOPE=.01 K=.7
                       LENGTH=2000 FT SLOPE=.014 K=2
                       LENGTH=3350 FT SLOPE=.014 K=3
                       KN=.021 CENTROID DISTANCE=1000
COMPUTE NM HYD         ID=3   HYD NO=230   DA=0.182 SQ MI
                       PER A=0 PER B=20 PER C=25 PER D=55
                       TP=0.0 MASSRAIN=-1
PRINT HYD              ID=3   CODE=20
*DIVIDE FLOW IN BASIN 230 INTO 54' STORM DRAIN 80 CFS
DIVIDE HYD             ID=3  Q=80  ID I=4   HYD NO=230_PIPE
                                    ID II=5  HYD NO=230_ST
PRINT HYD              ID=4  CODE=20
PRINT HYD              ID=5  CODE=20
```

```
*  ADD PIPE FLOWS TOGHTER THE INTERSECTION OF MENAUL AND PENN
ADD HYD                ID=6    HYD=230.1
                       ID=4   ID=1
PRINT HYD              ID=6    CODE=20
*  ADD STREET FLOWS
ADD HYD                ID=4    HYD=230.2
                       ID=5   ID=2
PRINT HYD              ID=4    CODE=20
*
* HOLD FLOWS AND ADD TO BASINS 250 AND 260
*
*
*******************************************************************************
*
*S*** SUB-BASIN 250 ****
*
COMPUTE LT TP          LCODE=1 NK=3 ISLOPE=0
                       LENGTH=100 FT SLOPE=.01 K=.7
                       LENGTH=2000 FT SLOPE=.019 K=2
                       LENGTH=700 FT SLOPE=.019 K=3
COMPUTE NM HYD         ID=1   HYD NO=250   DA=0.049 SQ MI
                       PER A=0 PER B=15 PER C=25 PER D=60
                       TP=0.0 MASSRAIN=-1
PRINT HYD              ID=1   CODE=20
*
* ROUTE INTO BASIN 260 DOWN MENAUL
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=3  MIN ELEV=100  MAX ELEV=101.5
                       CH SLP=0.02    FP SLP=.02
                       N=0.035 DIST=30.01  N=0.015 DIST=115.7  N=0.035 DIST=145.71
                       DIST    ELEV     DIST     ELEV    DIST     ELEV
                       0       101.5    0.1      101     30       100.67
                       30.01   100      63.9     100.68  63.91    101.18
                       81.8   101.18    81.81    100.68  115.7    100.0
                       115.71 100.67    145.7    101.0   145.71   101.5
COMPUTE TRAVEL TIME  ID=5 REACH=1  NO VS=1
                      L= 2600  SLP= .02
ROUTE                 ID=5  HYD NO=250.1
                      INFLOW ID=1  DT=0.0
PRINT HYD             ID=5  CODE=20
*
*
*******************************************************************************
*
*S*** SUB-BASIN 260 ****
*
COMPUTE LT TP         LCODE=1 NK=3 ISLOPE=0
                      LENGTH=100 FT SLOPE=.01 K=.7
                      LENGTH=2000 FT SLOPE=.02 K=2
                      LENGTH=150 FT SLOPE=.02 K=3
COMPUTE NM HYD        ID=2   HYD NO=260   DA=0.047 SQ MI
                      PER A=0 PER B=15 PER C=25 PER D=60
                      TP=0.0 MASSRAIN=-1
PRINT HYD             ID=2   CODE=20
*  ADD BASINS FLOWS FROM 250 AND 260
ADD HYD               ID=1    HYD=260.1
                      ID=5   ID=2
PRINT HYD             ID=1    CODE=20
* ROUTE THESE FLOWS 250 AND 260 INTO BASIN 230
** ROUTE THE FLOWS DOWN MENAUL*************************
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=3  MIN ELEV=100  MAX ELEV=101.5
                      CH SLP=0.014    FP SLP=.014
                      N=0.035 DIST=30.01  N=0.015 DIST=115.7  N=0.035 DIST=145.71
                      DIST    ELEV     DIST     ELEV    DIST     ELEV
                      0       101.5    0.1      101     30       100.67
                      30.01   100      63.9     100.68  63.91    101.18
```

```
                    81.8   101.18    81.81    100.68  115.7    100.0
                    115.71 100.67    145.7    101.0   145.71   101.5
COMPUTE TRAVEL TIME ID=3 REACH=1  NO VS=1
                   L= 2600  SLP= .014
ROUTE               ID=3  HYD NO=260.2
                    INFLOW ID=1  DT=0.0
PRINT HYD           ID=3   CODE=20
*
*  ADD BASINS STREET FLOWS FROM 250 AND 260 TO FLOWS FROM 210, 220 AND 230
ADD HYD             ID=5    HYD=260.1
                    ID=4   ID=3
PRINT HYD           ID=5    CODE=20
*
*DIVIDE STREET FLOW FROM BASIN's 210,220, and 230......INTO FLOWS SOUTH ON PENN INTO BASIN 240 AND
WEST DOWN MENAUL
DIVIDE HYD          ID=5  PER=-50   ID I=7   HYD NO=230_STAY
                                    ID II=12  HYD NO=230_MEN
PRINT HYD           ID=7  CODE=20
PRINT HYD           ID=12  CODE=20
* ROUTE THESE FLOWS 210,220,230, 250, AND 260 INTO BASIN 240
* ROUTING THROUGH 54IN RCP AND STREET DOWN PENN TO BASIN 240**********************************
* ROUTE THESE FLOWS IN A PIPE FROM BASIN 230 TO PENN AND CUTLER INTERSECTION
* ROUTING THROUGH 54IN RCP  ********************************
COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                    SLOPE=0.085  FT/FT  DIA=4.5 FT    N=0.013
COMPUTE TRAVEL TIME ID=1 REACH=1  NO VS=1
                   L= 1200  SLP= .085
ROUTE               ID=1  HYD NO=230.3
                    INFLOW ID=6  DT=0.0
PRINT HYD           ID=1   CODE=20
** ROUTE THE REST OF FLOW DOWN STREET*************************
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=1 MIN ELEV=99.33 MAX ELEV=100
                    CH SLP=0.014    FP SLP=.014
                    N=0.035 DIST=60
                    DIST    ELEV     DIST     ELEV    DIST     ELEV
                    0       100.0    .1       99.33   30.0      99.5
                    47.9    99.33    60       100
COMPUTE TRAVEL TIME ID=2 REACH=1  NO VS=1
                   L= 1200  SLP= .014
ROUTE               ID=2  HYD NO=230.4
                    INFLOW ID=7  DT=0.0
PRINT HYD           ID=2   CODE=20
*
*S*** SUB-BASIN 240 ****
*
COMPUTE LT TP       LCODE=1 NK=3 ISLOPE=0
                    LENGTH=100 FT SLOPE=.01 K=.7
                    LENGTH=2000 FT SLOPE=.014 K=2
                    LENGTH=600 FT SLOPE=.014 K=3
COMPUTE NM HYD      ID=3   HYD NO=240   DA=0.030 SQ MI
                    PER A=0 PER B=15 PER C=25 PER D=60
                    TP=0.0 MASSRAIN=-1
PRINT HYD           ID=3   CODE=20
*ADD STREET FLOW FROM 240 TO TOTAL STREET FLOW
ADD HYD             ID=6  HYD=240.1
                    ID=3  ID=2
PRINT HYD           ID=6  CODE=20
*S*****************************************************************
*******************************************************************
* THIS ARE THE SOUTHERN HALF FLOW FROM THE 200'S BASIN
*S*** SUB-BASIN 260B ****
*
COMPUTE LT TP       LCODE=1 NK=3 ISLOPE=0
                    LENGTH=100 FT SLOPE=.01 K=.7
                    LENGTH=1000 FT SLOPE=.019 K=2
```

```
                      LENGTH=200 FT SLOPE=.019 K=3
COMPUTE NM HYD        ID=3   HYD NO=260B   DA=0.038 SQ MI
                      PER A=0 PER B=15 PER C=25 PER D=60
                      TP=0.0 MASSRAIN=-1
PRINT HYD             ID=3   CODE=20
*
* ROUTE THESE FLOWS 260B INTO BASIN 270
*DIVIDE AND ROUTE FLOWS
*DIVIDE FLOW IN THE STREET INTO 48' STORM DRAIN 80 CFS
DIVIDE HYD            ID=3  Q=80   ID I=4   HYD NO=260B_PIPE
                                    ID II=2  HYD NO=260B_ST
PRINT HYD             ID=4  CODE=20
PRINT HYD             ID=2  CODE=20
* ROUTE THESE FLOWS IN A PIPE FROM BASIN 260B TO PENN AND CUTLER INTERSECTION
* ROUTING THROUGH 48IN RCP  AND THROUGH THE STREET*********************************
COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                      SLOPE=0.017  FT/FT  DIA=4.0 FT    N=0.013
COMPUTE TRAVEL TIME  ID=3 REACH=1  NO VS=1
                     L= 1200  SLP= .085
ROUTE                 ID=3  HYD NO=260B.3
                      INFLOW ID=4  DT=0.0
PRINT HYD             ID=3   CODE=20
** ROUTE THE REST OF FLOW DOWN STREET*************************
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=1 MIN ELEV=99.33 MAX ELEV=100
                      CH SLP=0.018    FP SLP=.018   N=0.017 DIST=60
                      DIST    ELEV     DIST     ELEV    DIST     ELEV
                      0       100.0    .1       99.33   30.0      99.5
                      47.9    99.33    60       100
COMPUTE TRAVEL TIME  ID=4 REACH=1  NO VS=1
                     L= 3000  SLP= .018
ROUTE                 ID=4  HYD NO=260B.4
                      INFLOW ID=2  DT=0.0
PRINT HYD             ID=4  CODE=20
*
*
*S*** SUB-BASIN 270 ****
*
COMPUTE LT TP         LCODE=1 NK=3 ISLOPE=0
                      LENGTH=100 FT SLOPE=.01 K=.7
                      LENGTH=2000 FT SLOPE=.018 K=2
                      LENGTH=1800 FT SLOPE=.018 K=3
COMPUTE NM HYD        ID=2   HYD NO=270   DA=0.0575 SQ MI
                      PER A=0 PER B=20 PER C=25 PER D=55
                      TP=0.0 MASSRAIN=-1
PRINT HYD             ID=2   CODE=20
*DIVIDE FLOW IN THE STREET INTO 48' STORM DRAIN 50 CFS
DIVIDE HYD            ID=2  Q=50    ID I=5   HYD NO=270_PIPE
                                    ID II=7  HYD NO=270_ST
PRINT HYD             ID=5  CODE=20
PRINT HYD             ID=7  CODE=20
*  ADD BASINS STREET FLOWS FROM 270 AND 260B
ADD HYD               ID=2    HYD=270.1
                      ID=7   ID=4
PRINT HYD             ID=2   CODE=20
* ADD PREVIOUS STREET FLOWS TO FLOWS FROM BASIN 270
ADD HYD               ID=4    HYD=270.2
                      ID=2   ID=6
* THIS IS THE STREET FLOW FROM THE 200'S BASINS
PRINT HYD             ID=4    CODE=10
* DIVIDE THIS FLOW T 50% SPILT DUE TO CROWN AND SLOPE OF STREET
* 50% OF FLOW WILL GO DOWN PENN AND INTO EMBUDO CHANNEL
* THE OTHER FLOW WILL MAKE IT'S WAY WEST MOST INTO CHANNEL ON SKY COURT
DIVIDE HYD            ID=4  PER=-50    ID I=4   HYD NO=270_STREET
                                    ID II=7  HYD NO=270_PENN
PRINT HYD             ID=4  CODE=20
```

```
PRINT HYD              ID=7  CODE=20
*
* ADD PREVIOUS PIPE FLOWS TO FLOWS FROM BASIN 270
ADD HYD                ID=6    HYD=270.2
                       ID=5   ID=3
PRINT HYD              ID=6   CODE=10
*
* ROUTING THROUGH 60IN RCP AND STREET INTO BASIN 280**********************************
* ADD TO PIPE FLOW FROM PREVIOUS BASINS
ADD HYD                ID=5    HYD=270.2
                       ID=6    ID=1
PRINT HYD              ID=5    CODE=10
* ROUTE THESE FLOWS IN A PIPE FROM BASIN 270 TO BASIN 280
* ROUTING THROUGH 60IN RCP  AND THROUGH THE STREET*********************************
COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                     SLOPE=0.01  FT/FT  DIA=5.0 FT    N=0.013
COMPUTE TRAVEL TIME  ID=1 REACH=1  NO VS=1
                    L= 2000  SLP= .01
ROUTE                ID=1  HYD NO=280.1
                     INFLOW ID=5  DT=0.0
PRINT HYD            ID=1   CODE=20
** ROUTE THE REST OF FLOW DOWN STREETS*************************
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=1 MIN ELEV=99.33 MAX ELEV=100
                     CH SLP=0.016    FP SLP=.016   N=0.017 DIST=60
                     DIST    ELEV     DIST     ELEV    DIST     ELEV
                     0       100.0    .1       99.33   30.0      99.5
                     47.9    99.33    60       100
COMPUTE TRAVEL TIME  ID=2 REACH=1  NO VS=1
                    L= 2000  SLP= .016
ROUTE                ID=2  HYD NO=280.2
                     INFLOW ID=4  DT=0.0
PRINT HYD            ID=2   CODE=20
*
*S*** SUB-BASIN 280: BASIN JUST UPSTREAM FROM UPTOWN VILLAGE ***********
*
COMPUTE LT TP        LCODE=1 NK=3 ISLOPE=0
                     LENGTH=100 FT SLOPE=.01 K=.7
                     LENGTH=2000 FT SLOPE=.016 K=2
                     LENGTH=1550 FT SLOPE=.016 K=3
COMPUTE NM HYD       ID=3   HYD NO=280   DA=0.038 SQ MI
                     PER A=0 PER B=15 PER C=20 PER D=65
                     TP=0.0 MASSRAIN=-1
PRINT HYD            ID=3   CODE=20
*DIVIDE FLOW IN THE STREET INTO 60' STORM DRAIN 25 CFS
DIVIDE HYD           ID=3  PER=-83   ID I=5   HYD NO=280_PIPE
                                   ID II=7  HYD NO=280_ST
PRINT HYD            ID=5  CODE=20
PRINT HYD            ID=7  CODE=20
*  ADD PREVIOUS BASINS STREET FLOWS FTO BASIN 280
ADD HYD              ID=4    HYD=280.3
                     ID=7   ID=2
PRINT HYD            ID=4   CODE=20
*  ADD PREVIOUS PIPE FLOWS TO BASIN 280 PIPE FLOWS
ADD HYD              ID=6    HYD=280.3
                     ID=5   ID=1
PRINT HYD            ID=6   CODE=20
*S  ADD STREET FLOW TO PIPE FLOW AT BASIN 290
*S DIVERT COMBINED FLOW TOWARD INDIAN SCHOOL
ADD HYD              ID=7    HYD=280.3   ID=4   ID=6
PRINT HYD            ID=7   CODE=20
*
*S*****************************************************************************
*****************************************************************************
*
* ROUTE FLOWS FROM BASIN 280 INTO BASIN 290 BY 60" PIPE AND ASSUMED STREET OR CHANNEL FLOW
```

```
* ROUTE THESE FLOWS IN A PIPE FROM BASIN 280 TO BASIN 290
* ROUTING THROUGH 60IN RCP  AND THROUGH THE ASSUMED STREET
* BOHANNAN HUSTON MODIFICATIONS:                                    *
* PIPE & STREET FLOW WILL BE REROUTED SOUTH TO THROUGH BASIN 290 TO SOUTH*
* FLOW WILL BE SPLIT, SOME TO LOOP ROAD SOME TO WEST END OF BASIN 290    *
*                                                                    *
**********************************************************************

COMPUTE RATING CURVE CID=1   VS NO=1   CODE=-1
                     SLOPE=0.01  FT/FT  DIA=6.5 FT    N=0.013
COMPUTE TRAVEL TIME  ID=40 REACH=1  NO VS=1
                    L= 300  SLP= .01
ROUTE                ID=40  HYD NO=280.1
                     INFLOW ID=7  DT=0.0
PRINT HYD            ID=40   CODE=20
*DIVIDE FLOW IN THE PIPE
DIVIDE HYD           ID=40  PER=-27     ID I=4   HYD NO=BYPASS
                                     ID II=41  HYD NO=LOOP
*S PIPE FLOW IN BASIN 290 DIVERTED AND ADDED TO INDIAN SCHOOL FLOW AT LOOP RD
ADD HYD              ID=42    HYD=ISTOTAL ID=60   ID=41
PRINT HYD            ID=42   CODE=20
*S*********************************************************************
*S  SPLIT PIPE FLOW AT LOOP ROAD
DIVIDE HYD           ID=42  PER=-25   ID I=43   HYD NO=W_INTER
                                      ID II=44  HYD NO=S_DIVERT
*
*S ROUTE THE DIVERTED FLOW THROUGH NEW 72" PIPE TO S OF MACARONI GRILL
COMPUTE RATING CURVE CID=1   VS NO=1  CODE=-1
                     SLOPE=0.01  FT/FT  DIA=6.0 FT    N=0.013
COMPUTE TRAVEL TIME  ID=45 REACH=1  NO VS=1
                    L= 1200  SLP= .01
ROUTE                ID=45  HYD NO=MAIN1
                     INFLOW ID=44  DT=0.0
PRINT HYD            ID=45   CODE=20
*S*********************************************************************
** ROUTE THE STREET FLOW THROUGH NEW 54" PIPE IN BASIN 290 TO INTERSECTION
************************
COMPUTE RATING CURVE CID=1   VS NO=1  CODE=-1
                     SLOPE=0.01  FT/FT  DIA=4.5 FT    N=0.013
COMPUTE TRAVEL TIME  ID=2 REACH=1  NO VS=1
                    L= 1650  SLP= .01
ROUTE                ID=2  HYD NO=280.2
                     INFLOW ID=4  DT=0.0
PRINT HYD            ID=2   CODE=20
*S*** SUB-BASIN 290 ****
*
COMPUTE LT TP        LCODE=1 NK=3 ISLOPE=0
                     LENGTH=100 FT SLOPE=.01 K=.7
                     LENGTH=2000 FT SLOPE=.016 K=2
                     LENGTH=1550 FT SLOPE=.016 K=3
COMPUTE NM HYD       ID=1   HYD NO=290   DA=0.038 SQ MI
                     PER A=0 PER B=05 PER C=10 PER D=85
                     TP=0.0 MASSRAIN=-1
*
PRINT HYD            ID=1   CODE=20
*  ADD BASIN 290 TO OFFSITE STREET FLOW IN NEW PIPE
ADD HYD              ID=4    HYD=290.3 ID=1   ID=2
PRINT HYD            ID=4   CODE=20
*
*  ADD BASIN AT SOUTHEAST CORNER OF INTERSECTION
COMPUTE NM HYD       ID=50   HYD NO=VILS   DA=0.0184 SQ MI
                     PER A=0 PER B=0 PER C=0 PER D=100
                     TP=0.133 MASSRAIN=-1
* BASINS 102.1 AND 102.2 DIVERT TO INDIAN SCHOOL & LOUISIANA
COMPUTE NM HYD       ID=52   HYD NO=102.1   DA=0.005499 SQ MI
```

```
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
*
COMPUTE NM HYD      ID=54   HYD NO=102.2   DA=0.002267 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
*
ADD HYD             ID=51    HYD=VILS1 ID=50   ID=4
PRINT HYD           ID=51   CODE=20
*
ADD HYD             ID=53    HYD=VILS2 ID=51   ID=52
PRINT HYD           ID=53   CODE=20
*
ADD HYD             ID=55    HYD=VILS3 ID=53   ID=54
PRINT HYD           ID=55   CODE=20
*
*S* ADD FLOWS FROM BASIN 290 AND INDIAN SCHOOL TOGETHER TO GIVE
*S   THE TOTAL FLOW IN THE INTERSECTION
ADD HYD             ID=5    HYD=290.5  ID=55   ID=43
PRINT HYD           ID=5    CODE=10
*
*S*****************************************************************************************
*****
*S*** SUB-BASIN 310****
*
COMPUTE LT TP       LCODE=1 NK=3 ISLOPE=0
                    LENGTH=100 FT SLOPE=.01 K=.7
                    LENGTH=2000 FT SLOPE=.012 K=2
                   LENGTH=900 FT SLOPE=.012 K=3
COMPUTE NM HYD      ID=3   HYD NO=310   DA=0.039 SQ MI
                    PER A=0 PER B=15 PER C=25 PER D=60
                    TP=0.0 MASSRAIN=-1
PRINT HYD           ID=3   CODE=20
*  ADD PREVIOUS BASINS STREET FLOWS TO BASIN 310
ADD HYD             ID=4    HYD=310.3  ID=3   ID=5
PRINT HYD           ID=4   CODE=20
*
ADD HYD             ID=5    HYD=ISWEST  ID=4   ID=8
PRINT HYD           ID=5   CODE=20
*****************************************************************************************
*****************************************************************************************
*S BOHANNAN HUSTON, INC. ADDITION OF AVID ENGR. WINROCK BASINS ALONG LOOP ROAD
*  DIVERT SOUTH ON LOOP ROAD TO I-40 CHANNEL
COMPUTE NM HYD      ID=10   HYD NO=103.1   DA=0.01356 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=10   CODE=20
*
COMPUTE NM HYD      ID=11   HYD NO=103.2   DA=0.0033 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=11   CODE=20
*
COMPUTE NM HYD      ID=12   HYD NO=103.3   DA=0.00426 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=12   CODE=20
*
COMPUTE NM HYD      ID=13   HYD NO=103.42   DA=0.00166 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=13   CODE=20
*
*
COMPUTE NM HYD      ID=14   HYD NO=103.43   DA=0.00086 SQ MI
```

```
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=14   CODE=20
*
COMPUTE NM HYD      ID=15   HYD NO=105.1   DA=0.00694 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=15   CODE=20
*
COMPUTE NM HYD      ID=16   HYD NO=105.2   DA=0.00295 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=16   CODE=20
*
COMPUTE NM HYD      ID=17   HYD NO=106.1   DA=0.00182 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=17   CODE=20
*
COMPUTE NM HYD      ID=18   HYD NO=106.2   DA=0.00198 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=18   CODE=20
*
COMPUTE NM HYD      ID=19   HYD NO=106.3   DA=0.00107 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=19   CODE=20
*
COMPUTE NM HYD      ID=20   HYD NO=106.5   DA=0.00192 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=20   CODE=20
*
COMPUTE NM HYD      ID=21   HYD NO=106.6   DA=0.00167 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=21   CODE=20
*
COMPUTE NM HYD      ID=22   HYD NO=106.7   DA=0.00223 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=22   CODE=20
*
COMPUTE NM HYD      ID=23   HYD NO=107.3   DA=0.00046 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=23   CODE=20
*
*S NEW PARKING LOT
COMPUTE NM HYD      ID=24   HYD NO=PKLOT   DA=0.0013 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=0.133 MASSRAIN=-1
PRINT HYD           ID=24   CODE=20
*
*S ADD WINROCK BASINS TOGETHER AND ADD TO DIVERSION PIPE
*  ADD 106'S - ROOF DRAIN BASINS
ADD HYD             ID=30    HYD=106.13  ID=17   ID=19
PRINT HYD           ID=30   CODE=20
*
ADD HYD             ID=31    HYD=135  ID=30   ID=20
PRINT HYD           ID=31   CODE=20
*
ADD HYD             ID=32    HYD=1356  ID=31   ID=21
PRINT HYD           ID=32   CODE=20
```

```
*
ADD HYD                ID=33    HYD=ALL106  ID=32   ID=22
PRINT HYD              ID=33   CODE=20
*
*S ADD 103'S
*
ADD HYD                ID=50    HYD=ROOF3  ID=33   ID=12
PRINT HYD              ID=50   CODE=20
*
ADD HYD                ID=51    HYD=31  ID=50   ID=10
PRINT HYD              ID=51   CODE=20
*
*S FLOW INTO EX. 24"/NEW 36" SD AT NEW PARKING-LOT INLET
*AFTER CULVERT UNDER EX. WL AND SAS
ADD HYD                ID=52    HYD=312  ID=51   ID=11
PRINT HYD              ID=52   CODE=20
*
*ANY SPILL-OVER WILL BE CAPTURED IN STREET INLETS AT SUMP
*S ADD STREET FLOWS
*
ADD HYD                ID=53    HYD=ST1  ID=52   ID=13
PRINT HYD              ID=53   CODE=20
*
*S TOTAL FLOW ADDED TO MAIN JUNCTION SOUTH OF MACARONI GRILL
ADD HYD                ID=54    HYD=312  ID=53   ID=14
PRINT HYD              ID=54   CODE=20
*
*S ADD FLOW TO MAIN LINE
ADD HYD                ID=55    HYD=MAIN  ID=54   ID=45
PRINT HYD              ID=55   CODE=20
*
*S ADD NEW PARKING LOT FLOW TO MAIN LINE
ADD HYD                ID=56    HYD=MAIN2  ID=55   ID=24
PRINT HYD              ID=56   CODE=20
*
*S ADD WINROCK BASINS 105'S
* ROUTE 107.3 OUT OF THE MALL
COMPUTE RATING CURVE CID=1   VS NO=1  CODE=-1
                       SLOPE=0.01  FT/FT  DIA=1.75 FT    N=0.013
COMPUTE TRAVEL TIME  ID=57 REACH=1  NO VS=1
                      L= 1100  SLP= .01
ROUTE                 ID=57  HYD NO=107.3
                      INFLOW ID=23  DT=0.0
PRINT HYD             ID=57   CODE=20
*
ADD HYD               ID=60    HYD=7352  ID=57   ID=16
PRINT HYD             ID=60   CODE=20
*
ADD HYD               ID=61    HYD=5262  ID=60   ID=18
PRINT HYD             ID=61   CODE=20
*S NEXT INPUT AT 105.2
ADD HYD               ID=62    HYD=105S  ID=61   ID=15
PRINT HYD             ID=62   CODE=20
*
*S ADD TO MAIN LINE
ADD HYD               ID=63    HYD=MAIN3  ID=62   ID=56
PRINT HYD             ID=63   CODE=20
*
FINISH
```

APPENDIX B

STORM DRAIN HYDRAULIC DESIGN CALCULATIONS

 ALIGNMENT A

Design Log

```
==================================================================
InRoads Storm & Sanitary Design Log

Drainage File:  P:\020110\Hydro\Design\Control\Workarea\A_George\Option1 TeeConnection\TeeContRev.sdb

Design File:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\ZFINGRND.DWG

Display Log:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\design.log

Date:  Monday, August 12, 2002 01:02:17 PM
==================================================================

Designing pipe P26

  Results:
        Total Flow:   362.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:    0.0006 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft              Flow Status:      Full
    Critical Depth:    5.0100 ft                 Capacity:  156.4813 cfs
          Velocity:    9.4064 ft/s
     Froude Number:    0.0000                 Flow Regime: Subcritical


Designing pipe P24
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   171.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:    0.0158 ft/ft
        Pipe Width:   48.0000 in              Pipe Height:   48.0000 in
     Depth of Flow:    3.1030 ft              Flow Status:    Partial
    Critical Depth:    3.7300 ft                 Capacity:  180.5568 cfs
          Velocity:   16.3427 ft/s
     Froude Number:    1.6273                 Flow Regime: SuperCritical


Designing manhole MH5

  Results:
        Total Flow:   533.0000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:   12.0000 ft          Chamber Length:   12.0000 ft


Designing pipe P23
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   133.9962 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:    0.0182 ft/ft
        Pipe Width:   48.0000 in              Pipe Height:   48.0000 in
     Depth of Flow:    2.4430 ft              Flow Status:    Partial
    Critical Depth:    3.4500 ft                 Capacity:  194.0463 cfs
          Velocity:   16.6569 ft/s
     Froude Number:    2.0453                 Flow Regime: SuperCritical


Designing pipe P21
```

```
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   399.0038 cfs                Flow From:   Upstream

            Status:      Fixed                        Slope:     0.1113 ft/ft
        Pipe Width:    78.0000 in               Pipe Height:    78.0000 in
     Depth of Flow:     2.1110 ft               Flow Status:    Partial
    Critical Depth:     5.3300 ft                  Capacity:  1748.6825 cfs
          Velocity:    42.6806 ft/s
      Froude Number:     6.0740                  Flow Regime: SuperCritical


Designing pipe P20
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   399.0038 cfs                Flow From:   Upstream

            Status:      Fixed                        Slope:     0.0050 ft/ft
        Pipe Width:    78.0000 in               Pipe Height:    78.0000 in
     Depth of Flow:     6.5000 ft               Flow Status:       Full
    Critical Depth:     5.3300 ft                  Capacity:   370.7200 cfs
          Velocity:    12.0243 ft/s
      Froude Number:     0.0000                  Flow Regime: Subcritical


Designing pipe P19
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   399.0038 cfs                Flow From:   Upstream

            Status:      Fixed                        Slope:     0.0050 ft/ft
        Pipe Width:    84.0000 in               Pipe Height:    84.0000 in
     Depth of Flow:     5.1090 ft               Flow Status:    Partial
    Critical Depth:     5.2600 ft                  Capacity:   451.9515 cfs
          Velocity:    13.2554 ft/s
      Froude Number:     1.0621                  Flow Regime: SuperCritical


Designing pipe P16
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   399.0038 cfs                Flow From:   Upstream

            Status:      Fixed                        Slope:     0.0050 ft/ft
        Pipe Width:    84.0000 in               Pipe Height:    84.0000 in
     Depth of Flow:     5.1010 ft               Flow Status:    Partial
    Critical Depth:     5.2600 ft                  Capacity:   452.8352 cfs
          Velocity:    13.2774 ft/s
      Froude Number:     1.0655                  Flow Regime: SuperCritical


Designing pipe P15
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   399.0038 cfs                Flow From:   Upstream

            Status:      Fixed                        Slope:     0.0054 ft/ft
        Pipe Width:    84.0000 in               Pipe Height:    84.0000 in
     Depth of Flow:     4.9510 ft               Flow Status:    Partial
    Critical Depth:     5.2600 ft                  Capacity:   470.0970 cfs
          Velocity:    13.7083 ft/s
```

```
      Froude Number:     1.1307                Flow Regime: SuperCritical

Designing pipe P14

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0004 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft              Flow Status:       Full
    Critical Depth:    5.2600 ft                 Capacity:  127.7664 cfs
          Velocity:   10.3679 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical

Designing pipe P13

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0005 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft              Flow Status:       Full
    Critical Depth:    5.2600 ft                 Capacity:  136.2594 cfs
          Velocity:   10.3679 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical

Designing pipe P12
   No flow in structure

Designing manhole MH4

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:   10.0000 ft          Chamber Length:   10.0000 ft

Designing pipe P11

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0004 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft              Flow Status:       Full
    Critical Depth:    5.2600 ft                 Capacity:  128.7235 cfs
          Velocity:   10.3679 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical

Designing manhole MH3

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:    8.0000 ft          Chamber Length:    8.0000 ft

Designing pipe P10

  Results:
```

```
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0004 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   48.0000 in
     Depth of Flow:    4.0000 ft              Flow Status:      Full
    Critical Depth:    4.6568 ft                 Capacity:   75.1774 cfs
          Velocity:   14.2501 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical


Designing manhole MH2

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:    8.0000 ft           Chamber Length:    8.0000 ft


Designing pipe P9

  Results:
        Total Flow:   399.0038 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0004 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft              Flow Status:      Full
    Critical Depth:    5.2600 ft                 Capacity:  127.7664 cfs
          Velocity:   10.3679 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical


Designing pipe P8
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:    40.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                      Slope:     0.0200 ft/ft
        Pipe Width:   36.0000 in              Pipe Height:   36.0000 in
     Depth of Flow:    1.3630 ft              Flow Status:   Partial
    Critical Depth:    2.0500 ft                 Capacity:   94.3258 cfs
          Velocity:   12.7924 ft/s
      Froude Number:    2.2055                Flow Regime: SuperCritical


Designing pipe P7
   No flow in structure

Designing manhole MH1

  Results:
        Total Flow:   439.0038 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:   10.0000 ft           Chamber Length:   10.0000 ft


Designing pipe P6

  Results:
        Total Flow:   439.0038 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0004 ft/ft
        Pipe Width:   84.0000 in              Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft              Flow Status:      Full
```

```
     Critical Depth:     5.5100 ft                Capacity:   127.7664 cfs
           Velocity:    11.4073 ft/s
      Froude Number:     0.0000                Flow Regime: Subcritical


Designing pipe P5
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:     3.0000 cfs               Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0200 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     0.4130 ft              Flow Status:    Partial
     Critical Depth:    0.6000 ft                 Capacity:    31.9929 cfs
           Velocity:    6.3851 ft/s
      Froude Number:    2.0933                Flow Regime: SuperCritical


Designing pipe P4

  Results:
        Total Flow:   442.0038 cfs               Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0004 ft/ft
        Pipe Width:    84.0000 in              Pipe Height:    84.0000 in
     Depth of Flow:     7.0000 ft              Flow Status:       Full
     Critical Depth:    5.5200 ft                 Capacity:   127.7664 cfs
           Velocity:   11.4852 ft/s
      Froude Number:     0.0000                Flow Regime: Subcritical


Designing pipe P3
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:    26.0000 cfs               Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0200 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     1.3680 ft              Flow Status:    Partial
     Critical Depth:    1.7800 ft                 Capacity:    31.9929 cfs
           Velocity:   11.3453 ft/s
      Froude Number:     1.8025                Flow Regime: SuperCritical


Designing pipe P2

  Results:
        Total Flow:   468.0038 cfs               Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0004 ft/ft
        Pipe Width:    84.0000 in              Pipe Height:    84.0000 in
     Depth of Flow:     7.0000 ft              Flow Status:       Full
     Critical Depth:    5.6700 ft                 Capacity:   127.7664 cfs
           Velocity:   12.1608 ft/s
      Froude Number:     0.0000                Flow Regime: Subcritical


Designing pipe P1

  Results:
        Total Flow:   468.0038 cfs               Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0004 ft/ft
        Pipe Width:    84.0000 in              Pipe Height:    84.0000 in
```

Depth of Flow:	7.0000 ft	Flow Status:	Full
Critical Depth:	5.6700 ft	Capacity:	127.3532 cfs
Velocity:	12.1608 ft/s		
Froude Number:	0.0000	Flow Regime:	Subcritical

HGL/EGL Computations:

No flow in structure: P12
No flow in structure: P7

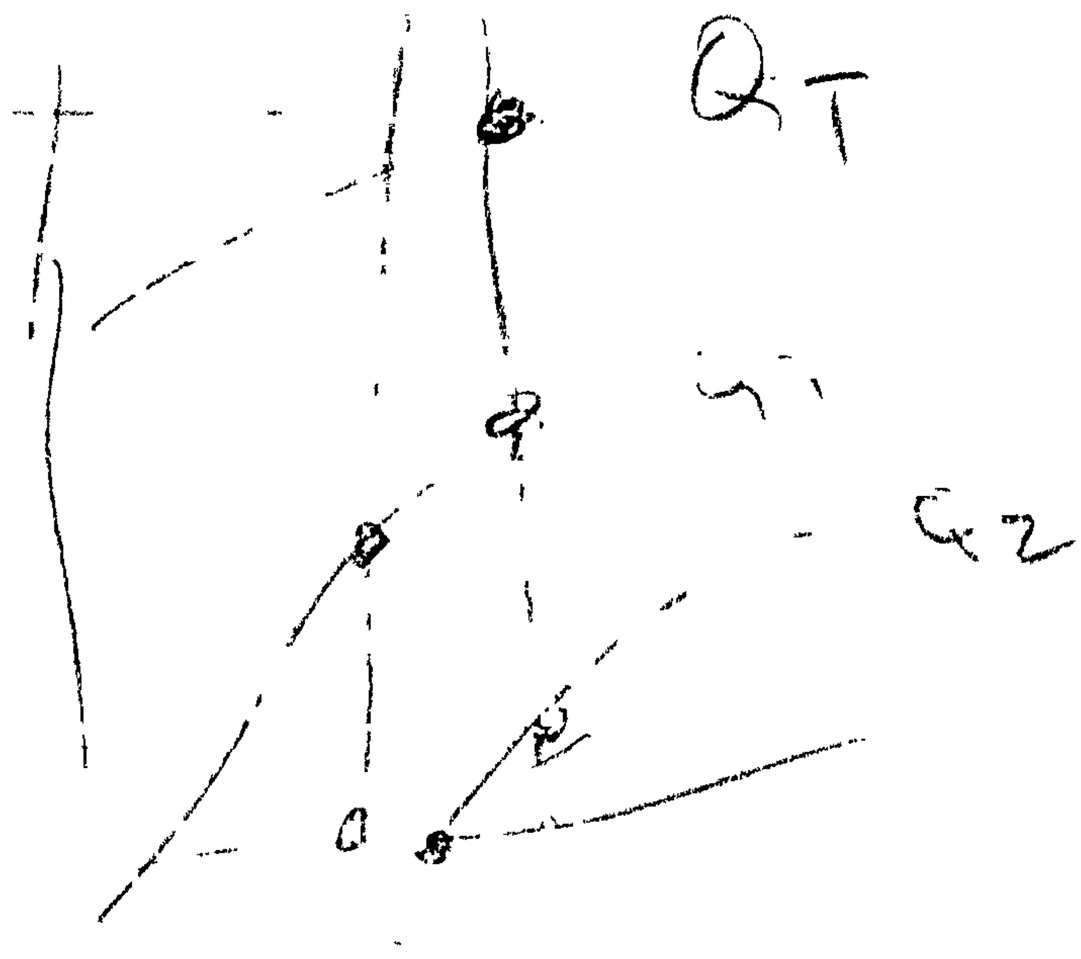
Table A:

Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	$V^2/2g$ (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5273.25	-
P1	84	468.00	100.65	12.16	-	-	2.30	0.0054	5272.82	5275.55	5273.25	0.54	5276.09	5273.79	-
Junction	-	-	-	-	-	-	-	-	-	5276.09	5273.79	0.17	5276.26	5273.96	-
P2	84	468.00	143.12	12.16	-	-	2.30	0.0054	5272.86	5276.26	5273.96	0.77	5277.03	5274.73	-
Junction	-	-	-	-	-	-	-	-	-	5277.03	5274.73	0.01	5277.04	5274.74	-
P4	84	442.00	127.39	11.49	-	-	2.05	0.0048	5272.92	5277.04	5274.74	0.61	5277.65	5275.60	-
Junction	-	-	-	-	-	-	-	-	-	5277.65	5275.60	0.01	5277.66	5275.61	-
P6	84	439.00	116.68	11.41	-	-	2.02	0.0047	5272.96	5277.66	5275.61	0.55	5278.21	5276.19	-
MH1	-	-	-	-	-	-	-	-	-	5278.21	5276.19	0.56	5278.78	5276.75	5281.98
P9	84	399.00	38.27	10.37	-	-	1.67	0.0039	5273.01	5278.78	5276.75	0.15	5278.92	5277.25	-
MH2	-	-	-	-	-	-	-	-	-	5278.92	5277.25	0.13	5279.05	5277.38	5281.98
P10	48	399.00	20.00	14.25	-	-	3.16	0.0113	5270.02	5279.05	5277.38	0.23	5279.28	5276.12	-
MH3	-	-	-	-	-	-	-	-	-	5279.28	5276.12	0.64	5279.92	5276.77	5281.06
P11	84	399.00	278.93	10.37	-	-	1.67	0.0039	5273.04	5279.92	5276.77	1.09	5281.01	5279.34	-
MH4	-	-	-	-	-	-	-	-	-	5281.01	5279.34	0.64	5281.65	5279.98	5281.56
P13	84	399.00	95.92	10.37	-	-	1.67	0.0039	5273.15	5281.65	5279.98	0.37	5282.03	5280.36	-
Junction	-	-	-	-	-	-	-	-	-	5282.03	5280.36	0.02	5282.05	5280.38	-
P14	84	399.00	168.89	10.37	-	-	1.67	0.0039	5273.19	5282.05	5280.38	0.66	5282.71	5281.04	-
Junction	-	-	-	-	-	-	-	-	-	5282.71	5281.04	0.07	5282.78	5281.11	-
P15	84	399.00	215.75	10.37	-	-	1.67	0.0039	5273.26	5282.78	5281.11	0.84	5283.62	5281.95	-
Junction	-	-	-	-	-	-	-	-	-	5283.62	5281.95	0.03	5283.65	5281.98	-
P16	84	399.00	191.32	10.37	-	-	1.67	0.0039	5274.42	5283.65	5281.98	0.75	5284.40	5282.73	-
Junction	-	-	-	-	-	-	-	-	-	5284.40	5282.73	0.06	5284.46	5282.79	-
P19	84	399.00	251.03	10.37	-	-	1.67	0.0039	5275.37	5284.46	5282.79	0.98	5285.44	5283.77	-
Junction	-	-	-	-	-	-	-	-	-	5285.44	5283.77	0.29	5285.73	5284.06	-
P20	78	399.00	63.14	12.02	-	-	2.25	0.0058	5276.13	5285.73	5284.06	0.37	5286.09	5283.85	-
Junction	-	-	-	-	-	-	-	-	-	5286.09	5283.85	0.00	5286.09	5283.85	-
P21	78	399.00	38.23	12.02	-	-	2.25	0.0058	5276.45	5286.09	5283.85	0.22	5286.31	5284.07	-
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5273.25	-
P23	48	134.00	44.37	-	-3.74	3.45	-	-	5280.99	-	5273.25	-	-	5273.95	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	5273.25	-
MH5	-	-	-	-	-	-	-	-	-	-	5273.25	2.50	-	5273.25	5289.45
(Alternate HGL and EGL Used)													5280.89	5279.52	
P26	84	362.00	60.24	9.41	-	-	1.38	0.0032	5280.51	5280.89	5279.52	0.19	5281.08	5279.71	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5277.03	5274.73	-
P3	24	26.00	64.70	8.28	-	-	1.06	0.0132	5270.42	5277.03	5274.73	0.85	5277.88	5276.82	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5277.65	5275.60	-
P5	24	3.00	25.25	0.95	-	-	0.01	0.0002	5270.46	5277.65	5275.60	0.00	5277.65	5277.64	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5278.21	5276.19	-
MH1	-	-	-	-	-	-	-	-	-	5278.21	5276.19	0.13	5278.35	5276.32	5281.98
P8	36	40.00	23.88	5.66	-	-	0.50	0.0036	5269.01	5278.35	5276.32	0.09	5278.43	5277.93	-

													-	5273.25	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	5273.25	5289.45
MH5	-	-	-	-	-	-	-	-	-	-	5273.25	2.50	5284.44	5281.56	
(Alternate HGL and EGL Used)															
P24	48	171.00	171.13	13.61	-	-	2.88	0.0142	5281.69	5284.44	5281.56	2.43	5286.86	5283.98	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1	0.54	-	-	-	-	-	0.54	-	-	-	-	-	-	-	-
Junction	-	0.17	-	-	-	-	0.17	-	-	-	-	-	-	-	-
P2	0.77	-	-	-	-	-	0.77	-	-	-	-	-	-	-	-
Junction	-	0.00	-	-	-	0.01	0.01	-	-	-	-	-	-	-	-
P4	0.61	-	-	-	-	-	0.61	-	-	-	-	-	-	-	-
Junction	-	0.00	-	-	-	0.01	0.01	-	-	-	-	-	-	-	-
P6	0.55	-	-	-	-	-	0.55	-	-	-	-	-	-	-	-
MH1	-	-	0.56	-	-	-	0.56	10.18	0.403	1.000	0.626	1.101	1.000	1.000	0.278
P9	0.15	-	-	-	-	-	0.15	-	-	-	-	-	-	-	-
MH2	-	-	0.13	-	-	-	0.13	11.23	0.114	1.000	0.664	1.000	1.000	1.000	0.076
P10	0.23	-	-	-	-	-	0.23	-	-	-	-	-	-	-	-
MH3	-	-	0.64	-	-	-	0.64	10.10	0.234	1.000	0.871	1.000	1.000	1.000	0.204
P11	1.09	-	-	-	-	-	1.09	-	-	-	-	-	-	-	-
MH4	-	-	0.64	-	-	-	0.64	13.19	0.527	1.000	0.731	1.000	1.000	1.000	0.385
P13	0.37	-	-	-	-	-	0.37	-	-	-	-	-	-	-	-
Junction	-	0.02	-	-	-	-	0.02	-	-	-	-	-	-	-	-
P14	0.66	-	-	-	-	-	0.66	-	-	-	-	-	-	-	-
Junction	-	0.07	-	-	-	-	0.07	-	-	-	-	-	-	-	-
P15	0.84	-	-	-	-	-	0.84	-	-	-	-	-	-	-	-
Junction	-	0.03	-	-	-	-	0.03	-	-	-	-	-	-	-	-
P16	0.75	-	-	-	-	-	0.75	-	-	-	-	-	-	-	-
Junction	-	0.06	-	-	-	-	0.06	-	-	-	-	-	-	-	-
P19	0.98	-	-	-	-	-	0.98	-	-	-	-	-	-	-	-
Junction	-	0.08	-	-	0.20	-	0.29	-	-	-	-	-	-	-	-
P20	0.37	-	-	-	-	-	0.37	-	-	-	-	-	-	-	-
Junction	-	0.00	-	-	-	-	0.00	-	-	-	-	-	-	-	-
P21	0.22	-	-	-	-	-	0.22	-	-	-	-	-	-	-	-
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P23	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH5	-	-	-	-	-	-	User	-	-	-	-	-	-	-	-
P26	0.19	-	-	-	-	-	0.19	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P3	0.85	-	-	-	-	-	0.85	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P5	0.00	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH1	-	-	0.13	-	-	-	0.13	10.18	1.476	1.000	0.626	0.071	1.000	1.000	0.066
P8	0.09	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH5	-	-	-	-	-	-	User	-4.44	-	-	-	-	-	-	-
P24	2.43	-	-	-	-	-	2.43	-	-	-	-	-	-	-	-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ıalyzer Report FLOW DIVISION NORTH OF INDIAN SCHOOL

==========

:ainage Structure Analyzer

ɔlvert Hydraulic Analysis

ıte: Monday, August 12, 2002 11:44:15 AM

==========

Input Data

ıape	Circular
Material	RC C76-A
ᴰoughness	0.013000
ıtrance Edge	Square edge w/ headwall
ımber of Barrels	1
Length	74.29 ft
ᵀlope	0.071%
ıilwater	13.37 ft
ılet Control Equation	Entrance Loss
Size (W x T):	84.00 x 7.0000
low Rate	362.00 cfs

ıtput Results

---

low Rate	362.00 cfs
ɔntrol	Outlet
ɔapacity	170.22 cfs
Outlet Velocity	9.41 ft/s
epth At Outlet	7.00 ft
eadwater	15.62 ft
Size (W x T):	84.00 x 7.0000

ıalyzer Report JUNCTION BOX IN INDIAN SCHOOL

==========

:ainage Structure Analyzer

ılvert Hydraulic Analysis

ıte: Monday, August 12, 2002 11:37:58 AM

==========

Input Data

ıape	Circular	
ıaterial	RC C76-A	
Roughness	0.013000	
ıtrance Edge	Square edge w/ headwall	
ımber of Barrels	1	
Length	38.00	ft
^lope	11.110%	
ailwater	14.00	ft
ılet Control Equation	Entrance Loss	
Size (W x T):	78.00 x 6.5000	
low Rate	399.00	cfs

ıtput Results

---

low Rate	399.00	cfs
ɔntrol	Outlet	
ɔapacity	1747.50	cfs
Outlet Velocity	12.02	ft/s
ɜpth At Outlet	6.50	ft
ɜadwater	13.37	ft
ɔize (W x T):	78.00 x 6.5000	

ALIGNMENT A
NORTH OF INDIAN SCHOOL

Design Log

```
=====================================================================
InRoads Storm & Sanitary Design Log

Drainage File:  P:\020110\Hydro\Design\Control\Workarea\A_George\Option1 TeeConnection\72in SD.sdb

Design File:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\ZFINGRND.DWG

Display Log:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\design.log

Date:  Monday, August 12, 2002 12:44:30 PM
=====================================================================

Designing pipe P38

  Results:
        Total Flow:   353.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:    0.0006 ft/ft
        Pipe Width:   78.0000 in              Pipe Height:   78.0000 in
     Depth of Flow:    6.5000 ft              Flow Status:      Full
    Critical Depth:    5.0300 ft                 Capacity:  128.4212 cfs
          Velocity:   10.6380 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical


Designing manhole MH13

  Results:
        Total Flow:   353.0000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:    8.0000 ft          Chamber Length:    8.0000 ft


Designing pipe P37
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   353.0000 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:    0.0070 ft/ft
        Pipe Width:   78.0000 in              Pipe Height:   78.0000 in
     Depth of Flow:    4.4140 ft              Flow Status:    Partial
    Critical Depth:    5.0300 ft                 Capacity:  438.9571 cfs
          Velocity:   14.7092 ft/s
      Froude Number:    1.3042                Flow Regime: SuperCritical


Designing pipe P36
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   143.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:    0.0100 ft/ft
        Pipe Width:   54.0000 in              Pipe Height:   54.0000 in
     Depth of Flow:    2.8460 ft              Flow Status:    Partial
    Critical Depth:    3.5100 ft                 Capacity:  196.6491 cfs
          Velocity:   13.4819 ft/s
      Froude Number:    1.5206                Flow Regime: SuperCritical


Designing manhole MH8
```

```
  Results:
        Total Flow:   496.0000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:   10.0000 ft           Chamber Length:   10.0000 ft


Designing pipe P35

  Results:
        Total Flow:   496.0000 cfs              Flow From:   Upstream

            Status:      Fixed                     Slope:    0.0022 ft/ft
        Pipe Width:   78.0000 in             Pipe Height:   78.0000 in
     Depth of Flow:    6.5000 ft             Flow Status:      Full
    Critical Depth:    5.8000 ft                Capacity:  243.5262 cfs
          Velocity:   14.9474 ft/s
      Froude Number:   0.0000               Flow Regime: Subcritical


Designing manhole MH7

  Results:
        Total Flow:   496.0000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:    8.0000 ft           Chamber Length:    8.0000 ft


Designing pipe P34

  Results:
        Total Flow:   496.0000 cfs              Flow From:   Upstream

            Status:      Fixed                     Slope:    0.0019 ft/ft
        Pipe Width:   84.0000 in             Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft             Flow Status:      Full
    Critical Depth:    5.8200 ft                Capacity:  277.8758 cfs
          Velocity:   12.8883 ft/s
      Froude Number:   0.0000               Flow Regime: Subcritical


Designing manhole MH6

  Results:
        Total Flow:   496.0000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:    8.0000 ft           Chamber Length:    8.0000 ft


Designing pipe P27

  Results:
        Total Flow:   496.0000 cfs              Flow From:   Upstream

            Status:      Fixed                     Slope:    0.0019 ft/ft
        Pipe Width:   84.0000 in             Pipe Height:   84.0000 in
     Depth of Flow:    7.0000 ft             Flow Status:      Full
    Critical Depth:    5.8200 ft                Capacity:  278.8309 cfs
          Velocity:   12.8883 ft/s
      Froude Number:   0.0000               Flow Regime: Subcritical
```

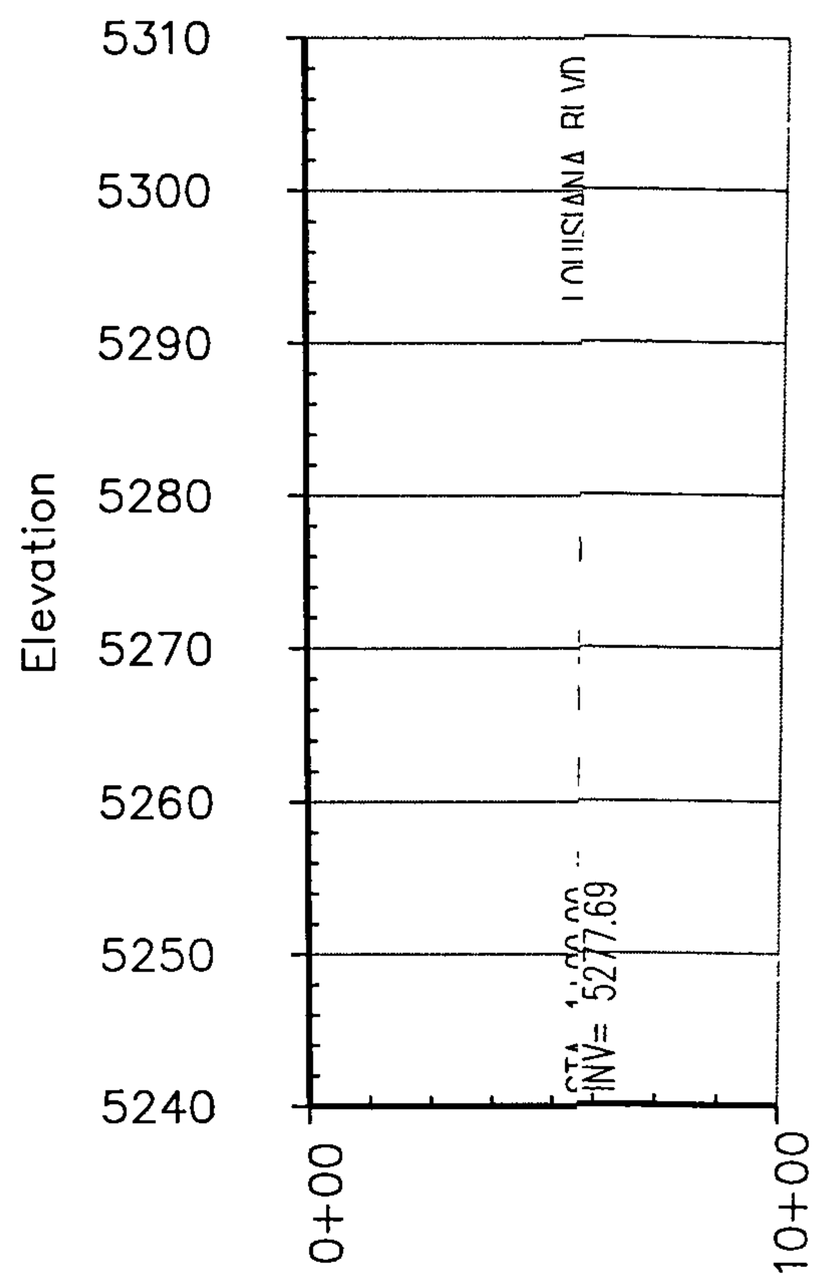
HGL/EGL Computations:

Table A:

Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	$V^2/2g$ (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5289.17	-
P27	84	496.00	108.98	12.89	-	-	2.58	0.0060	5280.55	5291.75	5289.17	0.66	5292.41	5289.83	-
MH6	-	-	-	-	-	-	-	-	-	5292.41	5289.83	0.86	5293.27	5290.69	5292.69
P34	84	496.00	362.12	12.89	-	-	2.58	0.0060	5280.77	5293.27	5290.69	2.18	5295.46	5292.87	-
MH7	-	-	-	-	-	-	-	-	-	5295.46	5292.87	0.88	5296.33	5293.75	5298.23
P35	78	496.00	175.85	14.95	-	-	3.47	0.0090	5280.96	5296.33	5293.75	1.57	5297.91	5294.43	-
MH8	-	-	-	-	-	-	-	-	-	5297.91	5294.43	0.72	5298.63	5295.16	5300.62
P37	78	353.00	25.95	10.64	-	-	1.76	0.0045	5281.34	5298.63	5295.16	0.12	5298.75	5296.99	-
MH13	-	-	-	-	-	-	-	-	-	5298.75	5296.99	1.85	5300.60	5298.84	5299.88
P38	78	353.00	23.87	10.64	-	-	1.76	0.0045	5281.46	5300.60	5298.84	0.11	5300.71	5298.95	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5297.91	5294.43	-
MH8	-	-	-	-	-	-	-	-	-	5297.91	5294.43	2.52	5300.42	5296.95	5300.62
P36	54	143.00	19.33	8.99	-	-	1.26	0.0053	5279.45	5300.42	5296.95	0.10	5300.53	5299.27	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P27	0.66	-	-	-	-	-	0.66	-	-	-	-	-	-	-	-
MH6	-	-	0.86	-	-	-	0.86	16.08	0.407	1.000	0.823	1.000	1.000	1.000	0.335
P34	2.18	-	-	-	-	-	2.18	-	-	-	-	-	-	-	-
MH7	-	-	0.88	-	-	-	0.88	18.43	0.380	1.000	0.894	1.000	1.000	1.000	0.340
P35	1.57	-	-	-	-	-	1.57	-	-	-	-	-	-	-	-
MH8	-	-	0.72	-	-	-	0.72	19.61	0.154	1.000	0.970	1.393	1.000	1.000	0.208
P37	0.12	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-
MH13	-	-	1.85	-	-	-	1.85	22.03	1.054	1.000	1.000	1.000	1.000	1.000	1.054
P38	0.11	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH8	-	-	2.52	-	-	-	2.52	19.61	1.101	1.000	0.970	0.679	1.000	1.000	0.725
P36	0.10	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-



0' (HORIZ.)
1' (VERT.)

Bohannan ▲ Huston INC.

Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335

ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

UPTOWN DRAINAGE STUDY

ALIGNMENT B
FIGURE 2

DRAWN BY.	S F.G.	DATE.	08.12.02
CHECKED BY.	E.S.	PROJECT NO.	020110.006.CWH

P:\020110\Hydro\Design\Plans\020110AlignB.dwg
Aug 12, 2002 – 5:05pm

ALIGNMENT B:
INDIAN SCHOOL SD

Design Log

```
==================================================================
InRoads Storm & Sanitary Design Log

Drainage File:  P:\020110\Hydro\Design\Control\Workarea\A_George\Option1 TeeConnection\48in SD.sdb

Design File:  C:\PROGRAM FILES\BENTLEY\CIVIL\DATA\DRAWING1.DWG

Display Log:  C:\PROGRAM FILES\BENTLEY\CIVIL\DATA\design.log

Date:  Sunday, August 11, 2002 03:35:31 PM
==================================================================

Designing pipe P2
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   134.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0145 ft/ft
        Pipe Width:   48.0000 in              Pipe Height:   48.0000 in
     Depth of Flow:    2.6410 ft              Flow Status:    Partial
    Critical Depth:    3.4500 ft                 Capacity:  173.1875 cfs
          Velocity:   15.2162 ft/s
      Froude Number:   1.7600                 Flow Regime: SuperCritical


Designing pipe P3
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   197.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0200 ft/ft
        Pipe Width:   60.0000 in              Pipe Height:   60.0000 in
     Depth of Flow:    2.6020 ft              Flow Status:    Partial
    Critical Depth:    4.0000 ft                 Capacity:  368.3215 cfs
          Velocity:   19.0664 ft/s
      Froude Number:   2.3379                 Flow Regime: SuperCritical


Designing manhole MH0

  Results:
        Total Flow:   331.0000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:   10.0000 ft          Chamber Length:   10.0000 ft


Designing pipe P0
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   331.0000 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0114 ft/ft
        Pipe Width:   60.0000 in              Pipe Height:   60.0000 in
     Depth of Flow:    5.0000 ft              Flow Status:       Full
    Critical Depth:    4.7600 ft                 Capacity:  278.6603 cfs
          Velocity:   16.8577 ft/s
      Froude Number:   0.0000                 Flow Regime: Subcritical
```

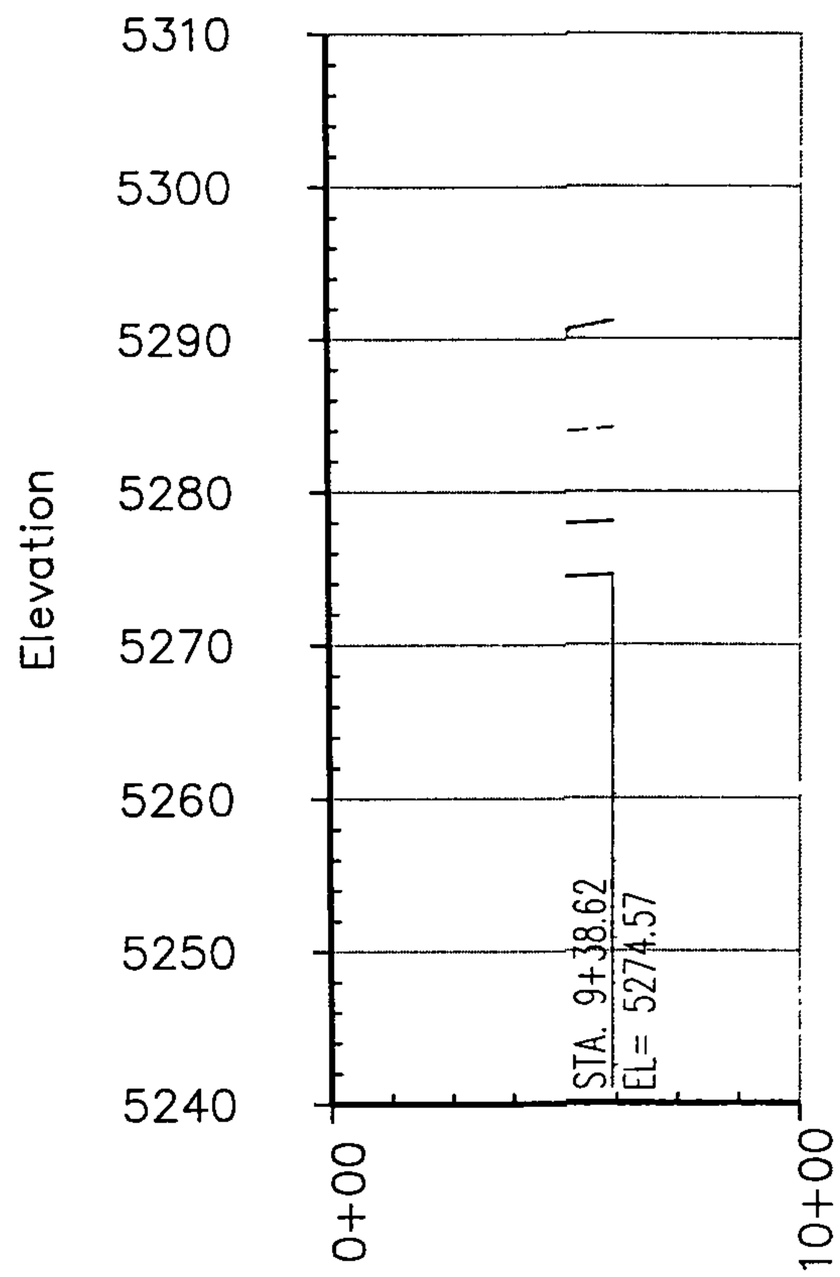
HGL/EGL Computations:

Table A:

Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	$V^2/2g$ (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5268.10	-
P0	60	331.00	59.16	37.32	2.31	4.76	21.65	-	5270.79	-	5268.10	-	-	5268.72	-
MH0	-	-	-	-	-	-	-	-	-	-	5268.72	-	-	5268.72	5272.75
P3	60	197.00	64.13	19.07	2.60	4.00	5.65	-	5271.51	-	5269.11	-	-	5270.29	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	5268.10	-
MH0	-	-	-	-	-	-	-	-	-	-	5268.10	-	-	5268.10	5272.75
P2	48	134.00	774.18	15.22	2.64	3.45	3.60	-	5270.51	-	5269.15	-	-	5280.33	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
MH0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P3	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P2	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-



)0' (HORIZ.)
)' (VERT.)

Bohannan ▲ Huston

Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335

ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

UPTOWN DRAINAGE STUDY

ALIGNMENT C
FIGURE 3

DRAWN BY:	S.F.G.	DATE:	08 12 02
CHECKED BY:	E S.	PROJECT NO	020110 006 CWH

P:\020110\Hydro\Design\Plans\020110AlignC.dwg
Aug 12, 2002 - 5:06pm

ALIGNMENT C
PARALLEL TO INDIAN SCHOOL

Design Log

```
==================================================================
InRoads Storm & Sanitary Design Log

Drainage File:  P:\020110\Hydro\Design\Control\Workarea\A_George\Option1 TeeConnection\60in SD.sdb

Design File:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\60INPROFILE.DWG

Display Log:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\design.log

Date:  Monday, August 12, 2002 07:11:15 AM
==================================================================

Designing pipe P2
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   134.0000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0100 ft/ft
        Pipe Width:    42.0000 in              Pipe Height:    42.0000 in
     Depth of Flow:     3.5000 ft              Flow Status:       Full
    Critical Depth:     3.3200 ft                 Capacity:   100.6098 cfs
          Velocity:    13.9277 ft/s
     Froude Number:     0.0000                 Flow Regime: Subcritical


Designing manhole MH1

  Results:
        Total Flow:   134.0000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:     8.0000 ft          Chamber Length:     8.0000 ft


Designing pipe P1
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   134.0000 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0100 ft/ft
        Pipe Width:    42.0000 in              Pipe Height:    42.0000 in
     Depth of Flow:     3.5000 ft              Flow Status:       Full
    Critical Depth:     3.3200 ft                 Capacity:   100.6098 cfs
          Velocity:    13.9277 ft/s
     Froude Number:     0.0000                 Flow Regime: Subcritical


Designing manhole MH0

  Results:
        Total Flow:   134.0000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:     8.0000 ft          Chamber Length:     8.0000 ft


Designing pipe P0
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   134.0000 cfs              Flow From:   Upstream
```

Status:	Fixed	Slope:	0.0062 ft/ft
Pipe Width:	60.0000 in	Pipe Height:	60.0000 in
Depth of Flow:	2.9530 ft	Flow Status:	Partial
Critical Depth:	3.3100 ft	Capacity:	204.3036 cfs
Velocity:	11.0974 ft/s		
Froude Number:	1.2487	Flow Regime:	SuperCritical

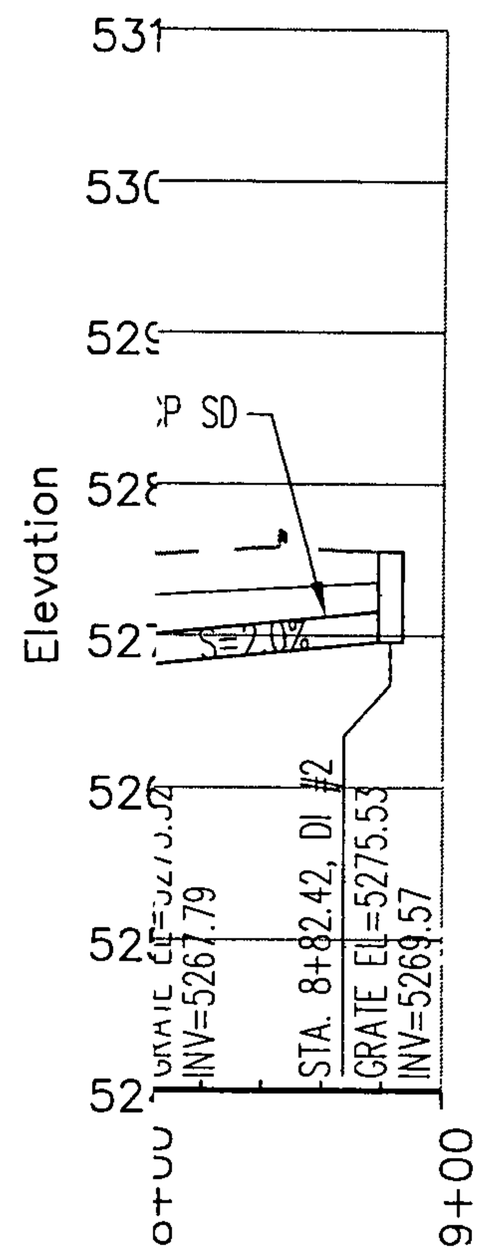
HGL/EGL Computations:

Table A:

Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	$V^2/2g$ (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5269.15	-
P0	60	134.00	99.88	12.74	2.64	3.31	2.52	-	5271.51	-	5269.15	-	-	5269.74	-
MH0	-	-	-	-	-	-	-	-	-	-	5269.74	0.75	-	5269.74	5275.06
(Alternate HGL and EGL Used)													5273.63	5270.61	
P1	42	134.00	288.75	13.93	-	-	3.01	0.0177	5270.70	5273.63	5270.61	5.12	5278.75	5275.73	-
MH1	-	-	-	-	-	-	-	-	-	5278.75	5275.73	0.46	5279.21	5276.20	5283.55
P2	42	134.00	450.02	13.93	-	-	3.01	0.0177	5273.61	5279.21	5276.20	7.98	5287.20	5284.18	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
MH0	-	-	0.75	-	-	-	0.75	2.64	0.870	1.000	0.341	1.000	1.000	1.000	0.297
P1	5.12	-	-	-	-	-	5.12	-	-	-	-	-	-	-	-
MH1	-	-	0.46	-	-	-	0.46	5.72	0.229	1.000	0.672	1.000	1.000	1.000	0.154
P2	7.98	-	-	-	-	-	7.98	-	-	-	-	-	-	-	-



)' (HORIZ.)
' (VERT.)

Bohannan ▲ Huston INC.

Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335

ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

UPTOWN DRAINAGE STUDY

ALIGNMENT D

DRAWN BY:	S.F.G.	DATE:	08.12.02
CHECKED BY:	E.S.	PROJECT NO.	020110.006.CWH

P:\020110\Hydro\Design\Plans\020110AlignD.dwg
Aug 13, 2002 - 1:47pm

ALIGNMENT D:
PARALLEL TO LOUISIANA BLVD.

Design Log

```
=====================================================================
InRoads Storm & Sanitary Design Log

Drainage File:  P:\020110\Hydro\Design\Control\Workarea\A_George\Option1 TeeConnection\Americas Prwy.sdb

Design File:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\AMERICAS PRWY.DWG

Display Log:  P:\020110\HYDRO\DESIGN\CONTROL\WORKAREA\design.log

Date:  Monday, August 12, 2002 03:13:46 PM
=====================================================================

Designing pipe P4
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:    23.4000 cfs              Flow From: Injected Storm

            Status:      Fixed                       Slope:    0.0200 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:   24.0000 in
     Depth of Flow:     1.2700 ft              Flow Status:   Partial
    Critical Depth:     1.7100 ft                 Capacity:   31.9929 cfs
          Velocity:    11.1107 ft/s
      Froude Number:    1.8739                 Flow Regime: SuperCritical


Designing manhole MH3

  Results:
        Total Flow:    23.4000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:    8.0000 ft           Chamber Length:    8.0000 ft


Designing pipe P3

  Results:
        Total Flow:    23.4000 cfs              Flow From:   Upstream

            Status:      Fixed                       Slope:    0.0050 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:   24.0000 in
     Depth of Flow:     2.0000 ft              Flow Status:      Full
    Critical Depth:     1.7100 ft                 Capacity:   15.9965 cfs
          Velocity:     7.4485 ft/s
      Froude Number:    0.0000                 Flow Regime: Subcritical


Designing pipe P5
   No flow in structure

Designing manhole MH2

  Results:
        Total Flow:    23.4000 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:    8.0000 ft           Chamber Length:    8.0000 ft


Designing pipe P2

  Results:
```

```
        Total Flow:    23.4000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0050 ft/ft
        Pipe Width:    30.0000 in             Pipe Height:    30.0000 in
     Depth of Flow:     1.7020 ft             Flow Status:    Partial
    Critical Depth:     1.6400 ft                Capacity:    29.0035 cfs
          Velocity:     6.5701 ft/s
      Froude Number:    0.9373                Flow Regime: Subcritical


Designing pipe P6
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:    55.4100 cfs              Flow From: Injected Storm

            Status:      Fixed                      Slope:     0.0200 ft/ft
        Pipe Width:    36.0000 in             Pipe Height:    36.0000 in
     Depth of Flow:     1.6520 ft             Flow Status:    Partial
    Critical Depth:     2.4100 ft                Capacity:    94.3258 cfs
          Velocity:    13.8785 ft/s
      Froude Number:    2.1163                Flow Regime: SuperCritical


Designing manhole MH1

  Results:
        Total Flow:    78.8100 cfs              Flow From:   Upstream

            Status:      Fixed
      Chamber Width:    8.0000 ft          Chamber Length:     8.0000 ft


Designing pipe P1

  Results:
        Total Flow:    78.8100 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0050 ft/ft
        Pipe Width:    42.0000 in             Pipe Height:    42.0000 in
     Depth of Flow:     3.5000 ft             Flow Status:       Full
    Critical Depth:     2.7700 ft                Capacity:    71.1418 cfs
          Velocity:     8.1913 ft/s
      Froude Number:    0.0000                Flow Regime: Subcritical


HGL/EGL Computations:

   No flow in structure:  P5

  Table A:
```

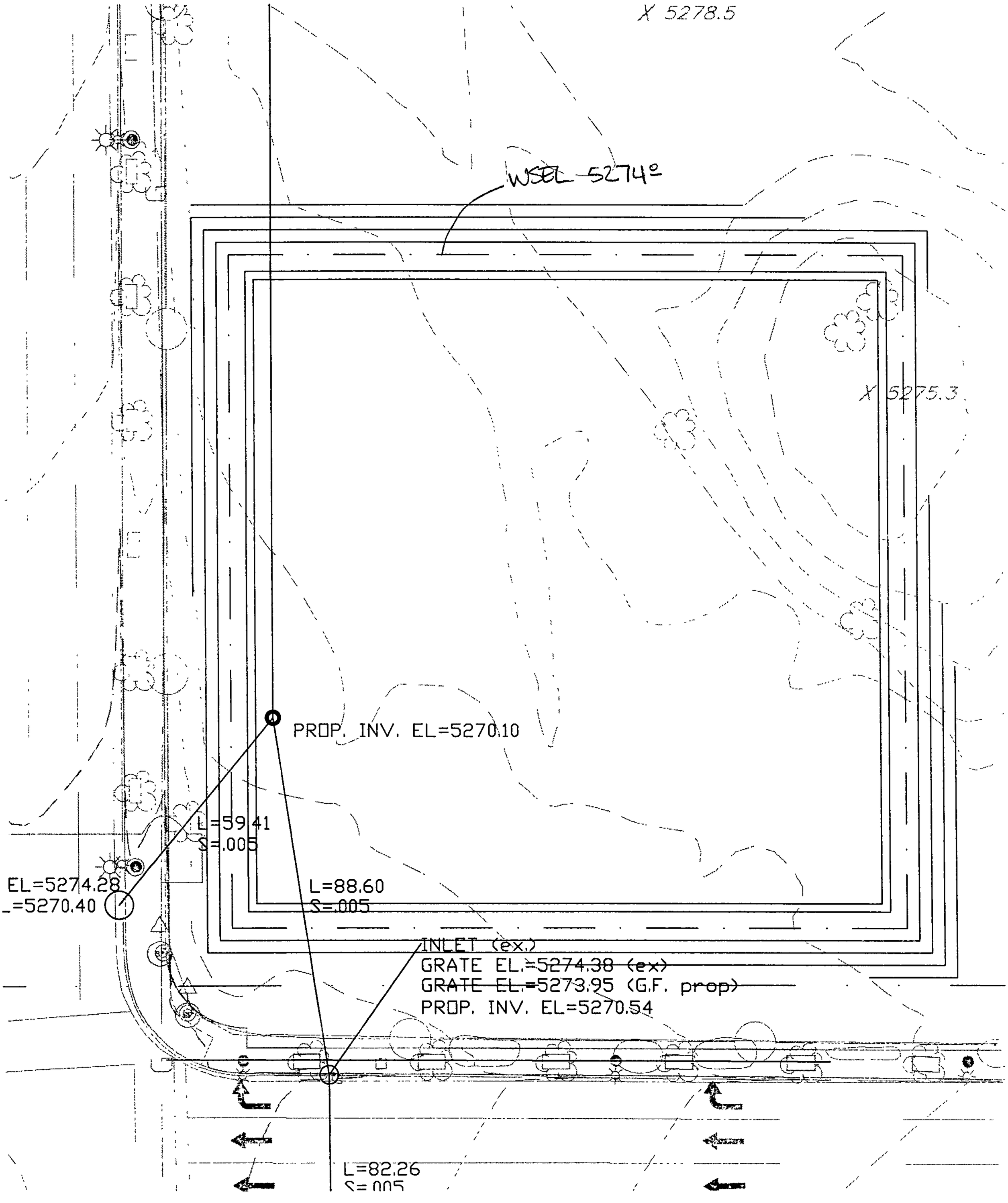
Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	$V^2/2g$ (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5268.10	-
P1	42	78.81	148.95	8.19	-	-	1.04	0.0061	5268.31	5269.14	5268.10	0.91	5270.06	5269.01	-
MH1	-	-	-	-	-	-	-	-	-	5270.06	5269.01	0.51	5270.57	5269.53	5275.54
P6	36	55.41	22.37	7.84	-	-	0.95	0.0069	5268.53	5270.57	5269.53	0.15	5270.73	5269.77	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5270.06	5269.01	-
MH1	-	-	-	-	-	-	-	-	-	5270.06	5269.01	0.43	5270.49	5269.45	5275.54

P2	30	23.40	458.62	4.77	-	-	0.35	0.0033	5267.85	5270.49	5269.45	1.49	5271.98	5271.63	-
MH2	-	-	-	-	-	-	-	-	-	5271.98	5271.63	0.12	5272.10	5271.75	5277.70
P3	24	23.40	88.61	7.45	-	-	0.86	0.0107	5269.60	5272.10	5271.75	0.95	5273.05	5272.19	-
MH3	-	-	-	-	-	-	-	-	-	5273.05	5272.19	0.40	5273.45	5272.59	5274.90
P4	24	23.40	82.27	7.45	-	-	0.86	0.0107	5270.00	5273.45	5272.59	0.88	5274.34	5273.47	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1	0.91	-	-	-	-	-	0.91	-	-	-	-	-	-	-	-
MH1	-	-	0.51	-	-	-	0.51	3.48	1.188	1.000	0.499	0.833	1.000	1.000	0.493
P6	0.15	-	-	-	-	-	0.15	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH1	-	-	0.43	-	-	-	0.43	3.48	0.639	1.000	0.499	1.303	1.000	1.000	0.415
P2	1.49	-	-	-	-	-	1.49	-	-	-	-	-	-	-	-
MH2	-	-	0.12	-	-	-	0.12	4.03	0.520	1.000	0.666	1.000	1.000	1.000	0.346
P3	0.95	-	-	-	-	-	0.95	-	-	-	-	-	-	-	-
MH3	-	-	0.40	-	-	-	0.40	4.19	0.599	1.000	0.779	1.000	1.000	1.000	0.467
P4	0.88	-	-	-	-	-	0.88	-	-	-	-	-	-	-	-

TEMPORARY POND



UPTOWN TEMPORARY POND
12-Aug-02

Elevation	Area ft^2	Avg Area ft^2	increment Vol ft^3	Cum Vol ft^3	Cum Vol ac-ft	H ft
5272.4	0		0	0	0	0
5272.5	23104	11552	1155.2	1155.2	0.02652	0.1
5273	24336	23720	11860	13015.2	0.298787	0.6
5274	26896	25616	25616	38631.2	**0.886847**	1.6

APPENDIX C

EXCERPTS FROM ASCG, APRIL 2002.

CITY OF
ALBUQUERQUE, NEW MEXICO

UPTOWN AREA
DRAINAGE REPORT

APRIL 2002

ASCG
INCORPORATED
ENGINEERS · ARCHITECTS · SURVEYORS · INSPECTION SERVICES
6501 AMERICAS PARKWAY NE
Suite 400
Albuquerque, NM 87110-5372 (505) 247-0294 Fax (505) 242-4845

TOTAL CAPACITY
OF PIPE AND STREET
INDIAN SCHOOL Rd. FROM I-40 CHANNEL TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
MANNINGS COEFFICIENT - STREE n= 0.017
MANNINGS COEFFICIENT - PIPE n= 0.013

TABLE #1

STRUCTURE	OUTLET ELEV	INLET ELEV	GROUND ELEV	GROUND ELEV-1 0'	LENGTH FT	DIAMETER LINE	SLOPE PIPE FT/FT	SLOPE STREET FT/FT	CAPACITY Q	Q-FROM PRESSURIZED SYSTEM	CAL S	BEND ANGLE	^Hf LOSSES FRICTION	^Hl STRUCTURE LOSSES	HGL	AREA STREET HALF	WP STREET HALF	CAPACITY STREET Q	TOTAL CAPACITY
I-40	5212	5212.87	5225	5224		6	0 0066	0.0066	344.08	555	0.0172	0.0	0	5.1506	5224.02	75	31.66	450 07	1005 07
					232														
941	5213	5215 99	5230	5229		6	0.0066	0.0066	344.08	590	0.0194	0.0	4.5022	2.5719	5229.06	75	31.66	450 07	1040 07
					400														
956	5218.63	5220.13	5236	5235		6	0.0066	0.0066	344.08	545	0.0166	0.0	6.6234	2.1946	5234.95	75	31.66	450.07	995 07
					400														
970	5222.77	5224.27	5238	5237		6	0.0061	0.0061	330.79	477	0.0127	0.0	5.0737	1.6811	5237.02	75	31.66	432.69	909.69
					140														
969	5225.12	5226.63	5240	5239		6	0.0061	0 0083	330.79	640	0.0228	0.0	3.1968	3.0263	5238.85	33 36	65.19	105 88	745.88
					340														
977	5228.69	5232.19	5249	5248		6	0.0061	0 0120	330.79	610	0.0207	0.0	7 0529	2.7492	5247.99	33.36	65 19	127 31	737 31
					400														
985	5240.19	5241.69	5253 5	5252.5		6	0 0061	0 0070	330.79	400	0.0089	0.0	3.5679	1.1822	5252.44	33.36	65.19	97.24	497.24
					400														
988	5244.13	5245.63	5259	5258		6	0.0061	0.0070	330.79	463	0.0120	0.0	4.7802	1.5839	5257.99	33 36	65.19	97.24	560.24
					400														
995	5248.07	5249.57	5265 5	5264.5		6	0.0061	0.0070	330 79	545	0.0166	0.0	6.6234	2.1946	5264.39	33.36	65.19	97.24	642.24
					343														
994	5249.82	5250.22	5268	5267		6	0.0061	0 0070	330.79	630	0.0221	0.0	7.5893	2.9325	5266.74	33.36	65.19	97 24	727.24
					37														
992	5252.32	5252.72	5268	5267		6	0.0061	0.0080	330.79	900	0.0452	0.0	1.6708	5.9846	5266.38	33.36	65.19	103.95	1003.95
					63														
993	5253.11	5253.51	5269	5268		6	0.0061	0.0080	330.79	870	0.0422	0.0	2.6583	5.5923	5267.76	33.36	65.19	103 95	973.95
					64														
901	5253.89	5254.95	5270	5269		6	0.0061	0 0080	330.79	740	0.0305	90.0	1.9538	6.1753	5269.08	33.36	65 19	103 95	843.95
					50														
902	5256.35	5257.7	5272	5271		6	0 0061	0.0080	330.79	740	0.0305	60.0	1.5264	5.7846	5271.01	33 36	65 19	103.95	843.95

IV. ANALYSIS

The area of analysis is broken up into three different systems; (1) Indian School from the I-40 Channel at San Pedro to the intersection of Indian School and Louisiana, (2) from the Intersection of Indian School and Louisiana to Moon and Phoenix, and (3) Indian School from Louisiana to Pennsylvania. All three of these Systems tie in at one point the Indian School – Louisiana Intersection.

A. SYSTEM 1 - INDIAN SCHOOL ROAD – FROM THE I-40 CHANNEL AT SAN PEDRO TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA.

1. Existing conditions

a. Hydrology

Areas throughout this subbasin " 310" are considered fully developed with the majority of the area being commercial development. The watershed boundaries are Louisiana Blvd. on the east, Indian School on the south, the commercial area to the north of Indian School Rd. to the north, and San Pedro to the east. Indian School Rd. is the principle overland conveyor of flow in this basin, within the 100 feet of the right of way of Indian School Rd.; there is a 6 lane major arterial, curbs, sidewalks and paved commercial parking lots. The roadway consist of three 12 foot paved driving lanes in each direction (east and West), the remaining area within the right of way is a sidewalk and landscaped area. The roadway slope is approximately .012 ft/ft from the I-40 channel to Louisiana Blvd. Overland offsite runoff for this system is conveyed though Indian School Rd. with an approximate peak discharge of 265 cfs and a volume of 20.1 ac-ft. Adding to this peak discharge, a flow of 79 cfs from basin 310 gives a total discharge of 309 cfs that has to be conveyed down Indian School road into the I-40 channel. The peak discharge can be seen in the AHYMO output, or summary files in Appendix B. The stormwater runoff is also conveyed to the I-40 channel via one 72" diameter RCP, which runs down Indian School Rd. Runoff from approximately 320 acres of off-site area enters this system, with a peak discharge of 500 cfs and a volume of 54 ac-ft for the 100-year 24-hour event.

b. Hydraulics Analysis

Several assumptions regarding stormdrains are used for the analysis of the 72" system. It was assumed that the existing stormdrains are clean and in good repair (this was assured by a memo from the city maintenance department seen in appendix D). Another assumption is that the number of inlets is sufficient to allow the storm drains to flow full and that the inlets are properly located and clean. A Manning's "n" of .013 was used for all reinforced concrete pipe per DPM. It is also assumed that the system can flow pressurized, and therefore carry increased flows. A Manning's "n" of .017 was used for all street flows in the system.

c. Capacity of the system

The pipe capacity of the 72" diameter pipe under a pressurized flow is approximately 500cfs this can be seen in Table #1. This spreadsheet shows the flow in this system at a regular flow and with a pressurized flow.

The street capacity of this 6-lane road is also shown in Table #1 it is approximately 105 cfs, the capacity fluctuates due to the slope in the street. The total street and pipe capacity for the system is approximately 605 cfs.

2. Conclusions

This system has a combined street and pipe capacity of approximately 605 cfs; this can be seen in the 100-yr, 6-hr AHYMO model shown in appendix B. The capacities in Table #1 show that the combined flow in the street and pipe for this developed system is approximately 800 cfs. This difference of 200 cfs must be contained in order to alleviating the flooding, reevaluate and remove this area from the FEMA flood plain map. There are a two of suggestions, which would acquire the increase in capacity.

a. Junction Loses: In pass reports a evaluation of junction loses in this system has been done, these junction boxes are large 8'X 8' boxes with 6' pipes entering from opposite ends, with no grouted or smooth bottoms, which accounted for a substantial amount of friction losses in the pipe. This could be alleviated by either grouting the bottoms smooth or better still the replacement of these boxes with inverted "Tee's", there by eliminating the junctions losses.

b. Parallel Pipes: With 200 cfs needing to be conveyed into the I-40 channel a parallel 60" diameter pipe could be used to convey these flows, a series of pipes and manholes from the intersection of Indian School and Louisiana to the I-40 channel could be installed, and all fully developed flows could be accounted for within the system shown in Figure 6. Table #4 shows the capacity of a parallel pipe system from the I-40 Channel to Louisiana.

3. Recommendations

It is recommended that since there is a difference of 200cfs in the capacity of the system, that a parallel pipe, and manholes be added in Indian School Road from the intersection of Louisiana and Indian School Rd. to the outfall into the I-40 channel. The approximate cost for this construction is 1 million dollars (cost estimate in Appendix C) this cost could be shared between the City and Developers. A storm sewer assessment could be implemented, and all future development could be assessed a cost per cfs added to the system. This would allow the City to recover some of the cost for these improvements and allow the developer full release into the system.

B. SYSTEM 2 - FROM MOON AND PHOENIX TO THE INTERSECTION OF INDIAN SCHOOL, AND LOUISIANA

1. Existing conditions

a. Hydrology

This basin is the largest with a total area of 533 acres; this basin is fully developed with both residential and commercial developments. The watershed boundaries are Candelaria Rd. to the north, Eubank Blvd. to the East, Louisiana Blvd. to the west, and an area just south of Menaul, including the undeveloped area (old Saint Pius property) to the south the boundaries can be seen in Plate #1 Appendix D. The overland flow from this basin is conveyed with 2-lane connector streets, major aerials such as Menaul and Pennsylvania, and a small lined ditch. These streets have a right of way from 65 to 100 feet, within the right of way there are 2 to 6 –12 foot paved lanes, paved shoulders, curbs, sidewalks and paved commercial parking lots. The roadway slope is varies from .008 to .015 ft/ft. The peak discharges for the subbasins within this area can be seen in the output or summary files for the AHYMO model in Appendix B. There are two analysis points of interest for this system one being on Espanola Rd just north of Leah Dr., where the small ditch empties into the three 24" culverts under Espanola Rd. The overland flow at this analysis point (822) is approximately 138 cfs and a volume of 9.8 ac-ft; this flows through an earthen ditch through the undeveloped property. The addition of 79 cfs from subbasin 290 added to the overland flow gives us a total overland flow of 178 cfs at the intersection of Indian School and Louisiana analysis point (902). The piped flow is conveyed through a series of pipes from Phoenix and Moon to the manhole in the intersection of Indian School road and Louisiana analysis point (902), this can be seen in Plate #1. The storm drain system that crosses the undeveloped property at the northeast corner of Indian School and Louisiana is contained in one 60" diameter RCP. The offsite piped runoff from approximately 250 acres is contained in the 60" pipe, with a peak discharge of 375 cfs and a volume of 42.0 ac-ft for the 100-year 24-hour storm event as seen in the AHYMO summary, Appendix B.

b. Hydraulic Analysis

Several assumptions regarding stormdrains were used for the analysis of system #2. It was assumed that the existing stormdrains are clean and in good repair, it is assumed that the number of inlets is sufficient to allow the storm drains to flow full and that the inlets are properly located and clean. A manning's "n" of .013 was used for all reinforced concrete pipe per DPM. It is also assumed that the system can flow pressurized, and therefore carry increased flows. A manning "n" of .017 was used for all street flows in the system.

c. Capacity of the system

The pipe capacity of the 60" diameter pipe under a pressurized flow is approximately 365cfs this can be seen in Table #2. Table #2 shows the flow in the 60" pipe from analysis point 822 to 902 at an average of 365 cfs, this flow is pressurized flow, the spreadsheet also shows that a flow of 273 cfs when the pipe is flowing full.

The street capacity of this area can be seen in Table #2, the streets change in size due to the large area involved in this system. At the main analysis point where the ditch and street flows cross Espanola Rd. we have an overland flow of 138 cfs this flow must be rerouted around the proposed development, or piped into the system at the intersection of Indian School and Louisiana. The approximate 79 cfs in flow from Basin 290 as seen on the Basin Map Plate 1, also needs to be routed into the system.

2. Conclusions

This system has a capacity of approximately 365 cfs neglecting any street or overland flow capacity, since basin 290 is not yet developed, and we can see by the AHYMO model shown in appendix B, and the capacities in Table #2 that the flow in the pipe and the overland flow for a fully developed system is approximately 530 cfs. The difference of 165 cfs must be contained in order to develop this area. There are two ways of doing this:

a. Ponding on Site: This can be accomplished by ponding the existing flows of 138 cfs from the off site flows, which is what is done now by a small earthen dam, and a small channel cut through the undeveloped property. Subbasin 290 the presently undeveloped property will have a developed flow of 79 cfs, this will also have to be contained on site since the current down stream system is at capacity. This can be done with a pond of an approximate volume of 13 ac-ft.

b. Parallel Pipes: With 165 cfs needing to be conveyed into system #1 a parallel 54" diameter pipe could be used to convey these flows, a series of pipes and manholes from Espanola Rd. at analysis point 822 to the system proposed in system #1 (shown in figure 6). Table #4 shows the total pipe capacity for the 54" parallel pipe from the intersection of Louisiana and Indian School to Espanola

3. Recommendations

It is recommended that the volume of 13 ac-ft is to large to pond on site, alternative b the installation of a parallel 54" pipe to the existing 60" pipe will be the most feasible and therefore allowing the developers free discharge into the system. The cost for this alternative is approximately $550,000 dollars; the cost of the upgrade in system #1 will have to be considered since the present system is at capacity, which gives a total of approximately 1.5 million dollars (cost estimate is given in Appendix C). This may be accomplished by cost sharing with the city and developers through assessment per cfs generated.

C. SYSTEM 3 – INDIAN SCHOOL RD. FROM LOUISIANA TO PENNSYLVAIAIA

1. Existing conditions

a. Hydrology

The area within this system is fully developed with both residential and commercial developments. The watershed boundaries are Wyoming to the east, Indian School to the south, Louisiana to the west and the residential area north of Indian School Rd. this can be seen on Plate #1 in Appendix D. Indian School Rd. is the principle conveyor of flow into system #1. Within 100 feet of the right of way of Indian School Rd., there is a 5 lane major arterial, curbs, sidewalks and paved commercial parking lots. The roadway consists of two 12 foot paved driving lanes in each direction (east and West), with a 12 turning lane. The remaining roadway in the right of way is used as sidewalk and landscaped area. The roadway slope is approximately .014 ft/ft from Louisiana to Pennsylvania, overland offsite runoff for this system is conveyed though Indian School Rd. with an approximate peak discharge of 150 cfs and a volume of 6.6 ac-ft. The storm water runoff is conveyed to the manhole in the intersection of Indian School road and Louisiana via one 48" diameter RCP that ties into a series of different sized pipes from 24' to 48". Runoff from approximately 80 acres of off-site area enters this system, with a peak discharge of 135 cfs and a volume of 11.5 ac-ft for the 100-year 24-hour storm event, this can be seen in Appendix B; AHYMO summary.

b. Hydraulic Analysis

Several assumptions regarding stormdrains were used for the analysis of the 48" system. It was assumed that the existing stormdrains are clean and in good repair, it is assumed that the number of inlets is sufficient to allow the storm drains to flow full and that the inlets are properly located and clean. A manning's "n" of .013 was used for all reinforced concrete pipe per DPM. It is also assumed that the system can flow pressurized, and therefore carry increased flows. A manning "n" of .017 was used for all street flows in the system. Table #3 shows the Hydraulic analysis for the system from each manhole in the system.

c. Capacity of the system

The pipe capacity of the 48" diameter pipe under a pressurized flow is approximately 135 cfs this can be seen in Table #3. This spreadsheet shows the capacity in the pipe from analysis point 949 to 902, the pipe size range from 24" to 48".

The street capacity of this area can be seen in Table #3; Indian school Rd. has a capacity of approximately 160-cfs

2. Conclusions

The AMDS recognized flooding problems associated with this section of road, from the entrance to Winrock, west approximately 1000 ft. west of Louisiana. The proposed City of Albuquerque project in the Wyoming and Indian School intersection, plans to take the flows from Northeastern (BASIN 110), south into the channel, and there by alleviating the surface flows down Indian School Rd. With this project in place the deficiencies in this area will be alleviated, and we will have a combined street and pipe capacity of approximately 370-cfs at the intersection as seen in Table #3. From the AHYMO model we see that the flow generated at this point is approximately 300 cfs.

3. Recommendations

It is recommended to wait until the Northeastern project is in place, once this is done the capacity in the street and pipes will be sufficient to carry all developed flows to the intersection of Indian School and Louisiana.

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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                    - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =04/08/2002
INPUT FILE = J:\COA\20108\UPTOWN~1\ahymo\UT100D1A.txt                                USER NO.= AHYMO-I-9702a01000D07-AH

                              FROM  TO                  PEAK        RUNOFF              TIME TO    CFS      PAGE =    1
                HYDROGRAPH    ID    ID        AREA    DISCHARGE     VOLUME     RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION  NO.   NO.     (SQ MI)    (CFS)       (AC-FT)   (INCHES)   (HOURS)   ACRE     NOTATION

*S
*S   FILE NAME  UT100D1A.TXT
*S   TITLE 1 UPTOWN DRAINAGE MASTER PLAN
*S      100-yr / 6-hr
*S       FUTURE
*S
*S     THIS IS AN AHYMO_97 HYDROLOGIC MODEL FOR:
*S
*S         THE UPTOWN DRAINAGE MASTER PLAN
*S
*S             PREPARED FOR CITY OF ALBUQUERQUE
*S             PREPARED BY ASCG INC.
*S
*S        MODEL DESCRIPTION -
*S
*S   1.  BASIN GROUPS 100'S AND 200'S-  WEST OF EUBANK FROM CANDELARIA SOUTH TO
*S                            TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S   THIS DRAINAGE SUB-BASIN 110 WILL BE IN THE FUTURE TAKEN DOWN WYOMING TO THE
*S   AND THEREFORE WILL BE TAKEN OUT OF THE BASIN
*S
*S   2.  100-YEAR 6-HOUR RAINFALL EVENT
*S
*S   3.  THIS MODEL ASSUMES "FUTURE" FULL DEVELOPMENT CONDITIONS
*S
*S   5.  NO SEDIMENT BULKING APPLIED DUE TO
*S       MOST BASINS ARE DEVELOPED
*S   6.  USE PROCEDURES FROM COA DPM SECTION 22
*S
START                                                                                                   TIME=       .00
LOCATION                        ALBUQUERQUE
RAINFALL  TYPE= 1                                                                                       RAIN6=    2.350
*S   ***    THE FOLLOWING SUB-BASINS 100'S ARE THOSE NORTH OF IDIAN SCHOOL ROAD
*S          WEST OF EUBANK, DRAINING EAST DOWN INDIAN SCHOOL
*S          TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA
*S
*S
*S
*S
*S*** SUB-BASIN 110 **** BASIN 110, UNDER EXISTING CONDITIONS CONTRIBUTES FLOW T
*S********************** ANALYSIS POINTS HEREIN.  HOWEVER THE COA HAS A PROJECT
*S********************** BASIN 110 SOUTH ON WYOMING.  THERFORE, FOR THE PURPOSE
*S********************** ANALYSIS, THE ENGINEER AND THE SITY HAVE AGREED TO REMO
*S********************** BASIN 110 FROM THE WATERSHED HEREIN.
*S*** SUB-BASIN 130 **** (THIS IS COMBINATION OF 120 AND 130)
COMPUTE NM HYD        120.00   -     1        .16500       301.70      13.589      1.54423    1.600    2.857 PER IMP=  50.00
DIVIDE HYD          130_PIPE    1     2        .12402       135.00      10.214      1.54423    1.467    1.701
                      130_ST  and     3        .04098       166.70       3.375      1.54423    1.600    6.355
DIVIDE HYD        130_STREET    3     3        .02459       100.02       2.025      1.54423    1.600    6.355
                    130_PENN  and    13        .01639        66.68       1.350      1.54423    1.600    6.355
```

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
ROUTE	140.10	2	9	.12402	135.00	10.214	1.54423	1.833	1.701	
ROUTE	140.20	3	2	.02459	69.43	2.026	1.54444	1.667	4.412	
*S*** SUB-BASIN 140 ****										
COMPUTE NM HYD	140.00	-	3	.04900	84.72	4.214	1.61245	1.633	2.701	PER IMP= 55.00
ADD HYD	140.30	2& 3	8	.07359	152.13	6.239	1.58971	1.667	3.230	
*S FLOW IN THE STREET										
*S THIS IS THE FLOW FROM THE 48" STORM DRAIN										
*S *** THE FOLLOWING SUB-BASINS 200'S ARE THOSE FROM THE NORTH FROM CANDLER										
*S WEST FROM EUBANK, DRAINING EAST DOWN MENAUL, AND SOUTHEAST TO THE										
*S TO THE INTERSECTION OF INDIAN SCHOOL AND LOUISIANA										
*S*** SUB-BASIN 210 ****										
COMPUTE NM HYD	210.00	-	1	.19600	338.63	16.667	1.59443	1.633	2.700	PER IMP= 55.00
DIVIDE HYD	210_PIPE	1	2	.08959	65.00	7.618	1.59443	1.400	1.134	
	210_ST	and	3	.10641	273.63	9.049	1.59443	1.633	4.018	
ROUTE	210.10	2	1	.08959	65.00	7.618	1.59443	1.967	1.134	
ROUTE	210.20	3	2	.10641	267.06	9.049	1.59447	1.767	3.921	
*S*** SUB-BASIN 220 ****										
COMPUTE NM HYD	220.00	-	3	.14300	253.37	11.777	1.54423	1.600	2.769	PER IMP= 50.00
DIVIDE HYD	220_PIPE	3	4	.10968	119.00	9.033	1.54423	1.467	1.695	
	220_ST	and	5	.03332	134.37	2.744	1.54423	1.600	6.302	
ADD HYD	220.10	4& 1	6	.19927	184.00	16.651	1.56680	1.867	1.443	
ADD HYD	220.20	5& 2	4	.13973	336.53	11.793	1.58249	1.733	3.763	
ROUTE	220.30	6	1	.19927	166.44	16.651	1.56680	1.967	1.305	
ROUTE	220.40	4	2	.13973	299.65	11.793	1.58249	1.767	3.351	
*S*** SUB-BASIN 230 ****										
COMPUTE NM HYD	230.00	-	3	.18200	309.35	15.477	1.59443	1.633	2.656	PER IMP= 55.00
DIVIDE HYD	230_PIPE	3	4	.09951	80.00	8.462	1.59443	1.433	1.256	
	230_ST	and	5	.08249	229.35	7.015	1.59443	1.633	4.344	
ADD HYD	230.10	4& 1	6	.29878	246.44	25.113	1.57600	1.967	1.289	
ADD HYD	230.20	5& 2	4	.22222	468.91	18.808	1.58692	1.733	3.297	
*S**********										
*S*** SUB-BASIN 250 ****										
COMPUTE NM HYD	250.00	-	1	.04900	102.79	4.344	1.66233	1.567	3.278	PER IMP= 60.00
ROUTE	250.10	1	5	.04900	81.73	4.344	1.66233	1.667	2.606	
*S*** SUB-BASIN 260 ****										
COMPUTE NM HYD	260.00	-	2	.04700	107.63	4.167	1.66233	1.533	3.578	PER IMP= 60.00
ADD HYD	260.10	5& 2	1	.09600	171.43	8.511	1.66232	1.567	2.790	
ROUTE	260.20	1	3	.09600	143.25	8.511	1.66233	1.667	2.331	
ADD HYD	260.10	4& 3	5	.31822	609.49	27.319	1.60966	1.700	2.993	
DIVIDE HYD	230_STAY	5	7	.15911	304.75	13.660	1.60966	1.700	2.993	
	230_MEN	and	12	.15911	304.75	13.660	1.60966	1.700	2.993	
ROUTE	230.30	6	1	.29878	246.52	25.113	1.57600	1.967	1.289	
ROUTE	230.40	7	2	.15911	239.94	13.660	1.60966	1.867	2.356	
*S*** SUB-BASIN 240 ****										
COMPUTE NM HYD	240.00	-	3	.03000	58.86	2.660	1.66233	1.600	3.066	PER IMP= 60.00
ADD HYD	240.10	3& 2	6	.18911	268.68	16.319	1.61801	1.833	2.220	
*S**********										
*S*** SUB-BASIN 260B ****										
COMPUTE NM HYD	260B	-	3	.03800	95.82	3.369	1.66233	1.500	3.940	PER IMP= 60.00
DIVIDE HYD	260B_PIPE	3	4	.03689	80.00	3.271	1.66232	1.467	3.388	
	260B_ST	and	2	.00111	15.82	.098	1.66232	1.500	22.321	

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
ROUTE	260B.3	4	3	.03689	80.40	3.271	1.66234	1.500	3.405	
ROUTE	260B.4	2	4	.00111	1.83	.098	1.66699	1.533	2.586	
*S*** SUB-BASIN 270 ****										
COMPUTE NM HYD	270.00	-	2	.05750	99.93	4.890	1.59443	1.633	2.715	PER IMP= 55.00
DIVIDE HYD	270_PIPE	2	5	.04540	50.00	3.861	1.59442	1.467	1.721	
	270_ST	and	7	.01210	49.93	1.029	1.59442	1.633	6.449	
ADD HYD	270.10	7& 4	2	.01320	51.08	1.127	1.60039	1.633	6.044	
ADD HYD	270.20	2& 6	4	.20232	283.88	17.446	1.61686	1.800	2.192	
DIVIDE HYD	270_STREET	4	4	.10116	141.94	8.723	1.61685	1.800	2.192	
	270_PENN	and	7	.10116	141.94	8.723	1.61685	1.800	2.192	
ADD HYD	270.20	5& 3	6	.08230	130.40	7.132	1.62486	1.500	2.476	
ADD HYD	270.20	6& 1	5	.38107	320.39	32.245	1.58655	1.900	1.314	
ROUTE	280.10	5	1	.38107	319.17	32.245	1.58655	1.900	1.309	
ROUTE	280.20	4	2	.10116	136.65	8.723	1.61685	1.867	2.111	
*S*** SUB-BASIN 280 ****										
COMPUTE NM HYD	280.00	-	3	.03800	70.15	3.471	1.71244	1.633	2.885	PER IMP= 65.00
DIVIDE HYD	280_PIPE	3	5	.03154	58.23	2.881	1.71243	1.633	2.885	
	280_ST	and	7	.00646	11.93	.590	1.71243	1.633	2.885	
ADD HYD	280.30	7& 2	4	.10762	143.38	9.313	1.62257	1.867	2.082	
ADD HYD	280.30	5& 1	6	.41261	366.57	35.125	1.59617	1.667	1.388	
*S**********										
ROUTE	280.10	6	3	.41261	364.62	35.125	1.59617	1.700	1.381	
ROUTE	280.20	4	2	.10762	137.82	9.313	1.62258	1.933	2.001	
*S*** SUB-BASIN 290 ****										
COMPUTE NM HYD	290.00	-	1	.03800	79.52	3.989	1.96835	1.633	3.270	PER IMP= 85.00
ADD HYD	290.30	1& 2	4	.14562	178.52	13.302	1.71280	1.867	1.915	
S ADD FLOWS FROM THE BASINS 100'S AND 200'S TOGETHER TO GIVE THE TOTAL FLOW IN										
*S STREET FLOWS										
ADD HYD	290.50	4& 8	5	.21921	293.41	19.542	1.67148	1.733	2.091	
*S PIPE FLOWS										
ADD HYD	290.60	3& 9	7	.53663	499.61	45.339	1.58417	1.700	1.455	
*S**********										
ROUTE	290.70	7	1	.53663	490.35	45.339	1.58417	1.833	1.428	
ROUTE	290.80	5	2	.21921	264.93	19.542	1.67148	1.833	1.888	
*S*** SUB-BASIN 310****										
COMPUTE NM HYD	310.00	-	3	.03900	70.58	3.458	1.66233	1.633	2.828	PER IMP= 60.00
ADD HYD	310.30	3& 2	4	.25821	308.98	22.999	1.67009	1.800	1.870	
ADD HYD	310.40	4& 1	2	.79484	798.99	68.338	1.61208	1.800	1.571	
FINISH										

APPENDIX D

EXCERPTS FROM AVID ENGINEERING, INC.

WINROCK SHOPPING CENTER MASTER DRAINAGE PLAN, JULY 1993.

WINROCK SHOPPING CENTER
MASTER DRAINAGE PLAN

J19-D58

Prepared For:

THE PRUDENTIAL INSURANCE COMPANY OF AMERICA

Prepared By:

AVID ENGINEERING, INC.
6100 SEAGULL LANE NE
SUITE 102
ALBUQUERQUE, NM 87109

July, 1993

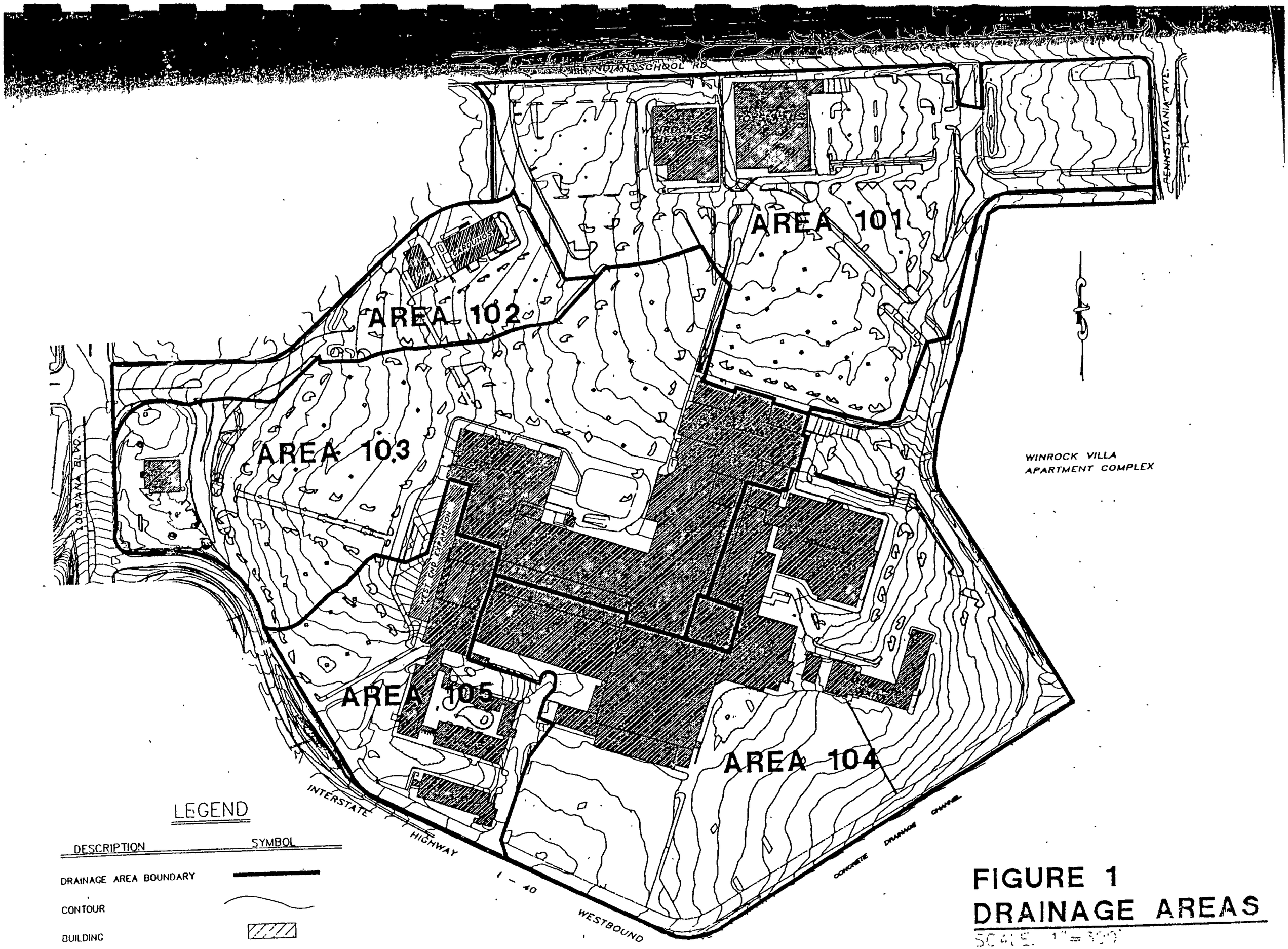

FIGURE 1
DRAINAGE AREAS
SCALE 1" = 300'

DEVELOPMENT & BUILDING SERVICE CENTER
ONE STOP
600 SECOND ST. N.W./2ND FLOOR
ATTENTION: _____

505-924-3900

Records Withdrawal Form

Project No. H-19/072 J-19/071 Date: 9/10/02

Project Title: Winrock & Uptown Drainage Reports

a. File b. Mylars c. Redlines/Comments
(d.) Other Drainage Report

Requested By: Huitt-Zollars, Inc **Phone No.:** 892-5141
Company

Comments: Copies of two drainage reports from City Records
1) J19-071 - Winrock Shopping Center Master Drainage Plan, by AVID Engineering
2) H19-072 - Drainage Study for the ABQ Uptown Area, by BHI

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: Robert Clun **Organization:** Academy Reprographics
Print

Signed: Robert Clun **Date:** 9-11-02
Phone No. 821-6666

Office Use Only

Return Acknowledged

Received by: [signature] **Date:** 6/20/05
Print

Doug

AR

Academy Reprographics
Located in the New Mexico Design Center
Corner of Jefferson & Alameda Blvds. NE
Phone: (505) 821-6666 Fax: (505) 857-0634

Date In: __/__/__	Time: ____:____
Date Needed__/__/__	Time: ____:____
Normal ___	Rush ___
Pick Up	Deliver

Services Order Form

Customer Information

Name: Janet Shaw/Russ Grayson	Phone number: 892-5141	Extension:	Email: @huitt-zollars.com

Bill to: Huitt-Zollars - Rio Rancho 333 Rio Rancho Blvd. Rio Rancho , NM 87124	Deliver to (if different than Bill to):
[X] Non Taxable [ ] Taxable	Job Name Winrock Job Number 14-0209-01

Large Format Prints

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Special Instructions : Pick up 2 Drainage Studies at the City of Albuquerque One Stop, Study #'s H19-D72 and J19-D71. Please make one copy of each for us, return the originals to the CoA and deliver a copy to us.

CoA One Stop → Plaza Del Sol Bldg. 1st Floor

TABLE 1: SUMMARY OF PEAK FLOWS

JULY, 1993, AVID "WINROCK SHOPPING CENTER MASTER DRAINAGE PLAN"

BASIN NUMBER	AREA (ACRES)	(SQ MI)	PEAK FLOW (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PERCENT IMPERV.
101.1	2.79	0.00436	13.49	0.53	2.26	1.500	4.83	100
101.21	1.70	0.00265	8.20	0.32	2.26	1.500	4.83	100
101.22	2.77	0.00433	13.39	0.52	2.26	1.500	4.83	100
101.3	7.76	0.01213	37.49	1.46	2.26	1.500	4.83	100
101.43	0.66	0.00103	3.18	0.12	2.26	1.500	4.84	100
101.41	1.16	0.00181	5.59	0.22	2.26	1.500	4.83	100
101.42	4.20	0.00656	20.27	0.79	2.26	1.500	4.83	100
102.1	3.52	0.00550	17.00	0.66	2.26	1.500	4.83	100
102.2	1.45	0.00227	7.01	0.27	2.26	1.500	4.83	100
→ 103.1	8.68	0.01356	41.90	1.63	2.26	1.500	4.83	100
→ 103.2	2.11	0.00330	10.20	0.40	2.26	1.500	4.83	100
→ 103.3	2.73	0.00426	13.17	0.51	2.26	1.500	4.83	100
103.41	0.88	0.00138	4.26	0.17	2.26	1.500	4.84	100
→ 103.42	1.06	0.00166	5.14	0.20	2.26	1.500	4.84	100
→ 103.43	0.55	0.00086	2.67	0.10	2.26	1.500	4.84	100
104.11*	8.35	0.01305	41.50	3.50	n/a	n/a	4.97	n/a
104.12*	12.60	0.01969	54.30	5.35	n/a	n/a	4.31	n/a
104.2	3.51	0.00549	16.97	0.66	2.26	1.500	4.83	100
104.3	2.44	0.00382	11.81	0.46	2.26	1.500	4.83	100
104.4	2.53	0.00395	12.21	0.48	2.26	1.500	4.83	100
104.5	3.39	0.00529	16.36	0.64	2.26	1.500	4.83	100
104.6	0.66	0.00103	3.20	0.12	2.26	1.500	4.84	100
★ 105.1	4.44	0.00694	21.44	0.84	2.26	1.500	4.83	100
★ 105.2	1.89	0.00295	9.12	0.36	2.26	1.500	4.83	100
→ 106.1	1.16	0.00182	5.63	0.22	2.26	1.500	4.83	100
★ 106.2	1.27	0.00198	6.14	0.24	2.26	1.500	4.83	100
→ 106.3	0.68	0.00107	3.33	0.13	2.26	1.500	4.84	100
106.4	1.40	0.00219	6.76	0.26	2.26	1.500	4.83	100
→ 106.5	1.23	0.00192	5.95	0.23	2.26	1.500	4.83	100
→ 106.6	1.07	0.00167	5.16	0.20	2.26	1.500	4.84	100
→ 106.7	1.43	0.00223	6.90	0.27	2.26	1.500	4.83	100
107.1	0.25	0.00039	1.22	0.05	2.26	1.500	4.86	100
107.2	0.31	0.00049	1.51	0.06	2.26	1.500	4.86	100
★ 107.3	0.29	0.00046	1.44	0.06	2.26	1.500	4.86	100
107.4	1.49	0.00233	7.21	0.28	2.26	1.500	4.83	100

*Note: Information for these basins is taken from "Hydrologic Analysis for East Side of Winrock Shopping Center," May 1985.

→ FLOW INJECTED JUST SOUTH OF MACARONI GRILL

★ FLOW INJECTED FURTHER SOUTH

The site was divided into several major drainage Areas by discharge location. The areas are shown in Figure 1. The runoff from the Areas discharges to the following locations:

Area 101: drains by surface and storm drain flow to Indian School Road.

Area 102: drains by surface flow to inlets near Louisiana Boulevard.

Area 103: drains through a storm drain system to a channel inside the I-40 westbound on and off ramps then to the I-40 Channel.

Area 104: discharges through a storm drain system into the I-40 Channel.

Area 105: drains through a storm drain system to a channel inside the I-40 westbound on and off ramps then to the I-40 Channel.

Basins 106 &107: rooftop basins which discharge to various points.

Major drainage Areas were analyzed by dividing them into Basins. Hydrologic analysis was performed to provide discharges from individual Basins. Hydrologic information is listed in Table 1. Existing hydrologic and hydraulic characteristics of Basins are explained in this section.

Full flow storm drain capacities were calculated using Manning's equation and are shown in Table 2. This indicates capacity restrictions qualitatively, but note that many pipes may flow under pressure. Storm drain capacity, rather than inlet capacity, was assumed to control the capacity of the storm drain systems, because typically the inlet capacities are greater than the pipe capacities.

Please note that the analysis is conservative because it neglects some of the existing detention ponding that could reduce peak flows.

AREA 101

Off-site

This Area is bounded by Pennsylvania Avenue on the east and Indian School Road on the north. On the east side, curb and gutter along Pennsylvania and water blocks prevent off-site flows from reaching this Area. On the north side, off-site flows are confined to the curb and gutter and storm drain system in Indian School Road. No off-site flows from the Winrock Villa Apartments are expected to reach this Area.

On-site

Runoff from Area 101 discharges to Indian School Road via surface or storm drain flow. Conditions in individual Basins are summarized below.

Basin 101.1 is currently undeveloped. Runoff ponds in a depressed area on the west side of the Basin. Any overflow runs into sub-Basin 101.22 and onto Indian School Road.

Runoff from Basins 101.21 and 101.22 is collected by inlets and a storm drain system which discharges to an underground detention system comprised of two parallel 120' lengths of 60" diameter corrugated metal pipe. The 60" pipes discharge via a 12" PVC line to a drop inlet in Indian School Road.

Basin 101.3 drains to Indian School road through a 4' wide asphalt lined rundown between Basins 101.43 and 101.21. The existing 100-year runoff from Basin 101.3 is 37.5 cfs. Winrock maintenance personnel indicated that the entrance to the asphalt rundown between Basins 101.43 and 101.21 has insufficient capacity. Water overflows from this area into Basin 101.42 and washes out landscaping near the entrance to the rundown. The sidewalk culvert at the end of the rundown also may overflow, forcing water over the sidewalk and out to Indian School through a driveway just to the west of the culvert. Possible actions are discussed in the Recommendations section.

Basin 101.42 discharges by surface flow through rundowns which drain to Indian School Road. If the rundowns overflow, water will cross the sidewalk to Indian School Road. Basin 104.41 drains by surface flow to Indian School Road.

AREA 102

Off-site

Area 102 is protected from off-site flows from the east by median islands which divert flow north to Indian School Road.

On-site

Area 102 runoff flows along the Winrock entrance road and across Louisiana Boulevard to inlets by surface flow. The peak flow from this Area is 28.3 cfs during the 100-year storm, from Basins 102.1, 102.2 and 103.41. Basin 103.41 drains to the Winrock entrance road through a rundown and (2)-2' wide sidewalk culverts. The Winrock entrance road forms part of the planned Uptown Loop Road (City of Albuquerque project number 3308). There are inlets in place on the entrance road to intercept flow before it reaches Louisiana, but the inlets are temporarily plugged pending a future outfall.

AREA 103

Off-site: No off-site flows reach Area 103.

On-site

Now, runoff from the Basins in Area 103 is collected by a storm drain system which discharges to a ditch inside the I-40 westbound ramps that discharges to the I-40 Channel through (2)-36" RCP culverts.

Basin 103.3 drains to a depressed area between the mall buildings, which will be drained by a C.O.A. type double "D" drop inlet at the completion of the current construction. Roofs in this area discharge to the parking lot in Basin 103.3 or directly into the storm drain system. The existing peak flow from Basins 103.3, 106.1, 106.3, 106.5, 106.6, and 106.7 for the 100-year storm is 14.3 cfs, considering rooftop detention.

In the event of a 100-year frequency storm, the AHYMO model shows that water will pond in this area to an elevation of 5294.1, which is 1.4' below the mall floor elevation of 5295.5. An overflow will be graded with the current project to allow excess flow to spill into Basin 103.1 if the drop inlet is clogged. The overflow is 0.5' below the mall floor elevation.

Flow from Basins 103.1, 103.2, 103.42, 103.43, 103.3, 106.1, 106.3, 106.5, 106.6, and 106.7 reaches a 24" RCP outfall at the southwest corner of Winrock Center. The estimated capacity of this existing outfall is 16.0 cfs. The total flow to the outfall is 85.7 cfs, including 16.3 cfs overflow from Basins 105.1, 105.2, 106.2, and 107.3. The excess flow of 69.9 cfs spills into Basin 103.43, then 103.41, then over the sidewalk to Louisiana Boulevard. Water then flows west across Louisiana to other inlets.

From the contours shown on the "Romano's Macaroni Grill Grading & Drainage Plan," water can overflow from basins 103.42 and 103.43 into Basin 103.41 through a driveway when it reaches elevation 5279.0. This driveway has capacity to carry at least 77.8 cfs before water reaches the Macaroni Grill pad elevation of 5280.0. This capacity is greater than the existing 100-year peak flow. Water also can overflow into Basin 102.2 when it reaches elevation 5279.3.

AREA 104

Off-site

Off-site flows from the Winrock Villa Apartments discharge onto the existing perimeter road, via a rundown and a driveway. The "Hydrologic Analysis for East Side of Winrock Shopping Center," May 1985, quantifies off-site flows. The rational method and the SCS curve number method were used to compute peak flows and volumes. Since these Basins do not appear to have changed significantly since 1985, the results from this report are incorporated into the Master Drainage Plan. The 100-year peak flow was computed as 54.3 cfs total from the apartments.

A maintenance problem was indicated with the drainage inlets near the apartment complex. During some storms, water flows over the curbs near inlet G0, the northernmost inlet near the apartment complex, carrying sediment from behind the curb of the perimeter road onto the perimeter road and the parking lot. Proposed actions are listed in the Recommendations section.

On-site

The "Hydrologic Analysis for East Side of Winrock Shopping Center" gives the 100-year peak flow for Basin 104.11 as 41.5 cfs. Combined with the off-site flow from the apartments (routed), the total flow is 92.0 cfs, with a t_c of 20 minutes. This is incorporated into the AHYMO model. Basin 104.11 contains a ponding area. The "Hydrologic Analysis for East Side of Winrock Shopping Center" report states that the capacity of this system is limited to 29 cfs by the 32" RCP. The report indicates that the remainder of the flow above 29 cfs will spill over into Basin 104.3 during the 100-year storm and into the mall itself. Please see that report for details.

While the exact discharge points of some of the roof Basins are not known, a field investigation indicated the following: rooftop Basins 107.1 and 107.2 discharge to the parking lot through pipes under the sidewalks; Basin 106.4 discharges directly into storm drain lines through two 6" diameter pipes; Basin 107.4 is expected to discharge to the parking lot in Basin 104.3.

Basin 104.3 also contains a ponding area, drained by an inlet. The possibility of flooding during a 100-year rainstorm exists in this area. According to the topography, the mall floor is at approximately the same elevation as the overflow from the ponding area. At elevation 5295.5, water can overflow from the ponding area into Basin 104.5. The elevation of the mall floor is also at 5295.5. However, the hydraulics of this system need to be analyzed further before any conclusions are drawn. Possible actions to prevent flooding are examined in the Recommendations section.

Overflow from upstream basins reaches an inlet at a relative low point in basin 104.5. The outfall for the storm drain is a 42" RCP, which discharges directly to the I-40 Channel. The full flow capacity of the outfall is estimated as 26.0 cfs. The peak flow for this area is approximately 89.6 cfs during the 100-year storm, neglecting upstream detention. During a 100-year storm, water would overtop the curb along the south side of the perimeter road into a earth-lined swale north of I-40. This swale is approximately 4' deep and 30' wide and is vegetated. A median drop inlet and an earth berm capture the flow and drain it to the I-40 Channel through a 30" pipe. There is the potential for erosion along the side of the swale in this area. In an apparent attempt to limit erosion on the Winrock property in this area, a 20' to 30' length of the 1' wide strip between the curb and the property fence has been lined with hand-poured concrete. Some water also could flow northwest along the perimeter road into Basin 105.1.

AREA 105

Off-site

For the purposes of the Winrock Master Drainage Plan, basin 105.1 is treated as an off-site flow. Without considering the effects of routing, the peak flow from Basin 105.1 was calculated to be 21.4 cfs during the 100-year storm. This flow is conservative, because much of the drainage from this Basin is likely to be detained in rooftops, depressions, and in the Winrock Inn courtyard. A system of drop inlets and pipes collects flow into a 15" RCP which connects to the storm drain system in Basin 105.2. The full-flow capacity is 7.0 cfs. Whatever runoff is not captured in this 15" RCP would flow over the curb on the northwest boundary of Basin 105.1, into Basin 105.2.

On-site

A drop inlet in Basin 105.2 collects runoff into the storm drain system. Roof Basin 107.3 also drains into this system by means of a 21" RCP which runs west under the mall floor. The outfall for this system is a 24" RCP under the I-40 westbound ramps, which discharges to a ditch then into (2)-36" RCP's to the I-40 Channel. The approximate capacity of the 24" outfall is 16.0 cfs. The total flow to this outfall is approximately 32.3 cfs. Excess flow is carried northeast to Basin 103.2, eventually reaching inlet D1.

APPENDIX E

EXCERPTS FROM U.S. ARMY CORPS OF ENGINEERS *INTERSTATE 40 CHANNEL / EMBUDO ARROYO HYDROLOGIC ANALYSIS*, MAY 1994.

373.0.1
INTERSTATE 40 CHANNEL/EMBUDO ARRO
ARMY CORPS ENGINEERS
1994
73
INDEX

INTERSTATE 40 CHANNEL \ EMBUDO ARROYO

ALBUQUERQUE, NEW MEXICO

HYDROLOGIC ANALYSIS

PREPARED BY:
U.S. ARMY CORPS OF ENGINEERS
ALBUQUERQUE DISTRICT

MAY 1994

TABLE 6

INTERSTATE 40 CHANNEL
1.0%-CHANCE FLOOD

LOCATION		1%-CHANCE-FLOOD DISCHARGE (CFS)
Subarea EA5 @ Embudo Dam	Inflow	860
	Outflow	260
Subarea PL @ Piedra Lisa Dam	Inflow	320
	Outflow	60
Subarea EA6		100
Subarea EA7		80
Subarea EA4		2800
Embudo Arroyo @ Eubank Blvd		3100
Routed to Interstate 40		3000
Subarea EA3		800
Total @ Embudo Arroyo @ Interstate 40		3100
Subarea EA10		1000
Diversion to Tijeras Arroyo		1000
Remaining flow routed to Los Altos		0
Subarea EA17		1400
Route to Los Altos		1300
Subarea EA15		2900
Subarea EA16		820
Combine @ Los Altos		5200
Route to Winrock		5000
Subarea 14		1800
→ Total Interstate 40 Channel @ Winrock		7400
Route to San Pedro Blvd		7400
Subarea 13		3200
Total Interstate 40 Channel @ San Pedro Blvd		11000
Route to San Mateo Blvd		11000
Subarea EA2		1500
Combine @ San Mateo Blvd		12000
Total @ End of New Mexico State Highway Dept Interstate 40 Channel		12000

PLATES

PLATE 1 - AVID ENGINEERING, INC BASIN MAP

PLATE 2 - ASCG INC. BASIN MAP

PLATE 3 - BHI PROPOSED CONDITIONS BASIN MAP

PLATE 1

AVID ENGINEERING, INC. BASIN MAP

PLATE 2

ASCG INC. BASIN MAP

PLATE 3

BHI PROPOSED STORM DRAIN EXHIBIT

BHAN JAN HUSTON, INC

Courtyard One

5 JEFFERSON

Albuquerque

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