ALBUQUERQUE METROPOLITAN
ARROYO FLOOD CONTROL AUTHORITY

NORTH VALLEY
DRAINAGE MANAGEMENT PLAN
PHASE 1

APPENDICES

DRAFT REPORT: NOVEMBER 16, 1998

Prepared by

SMITH ENGINEERING COMPANY
6400 UPTOWN BOULEVARD NE SUITE 500E
ALBUQUERQUE, NM 87110
SEC No. 198637

NORTH VALLEY
DRAINAGE MANAGEMENT PLAN
PHASE 1

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APPENDIX A
ENVIRONMENTAL HAZARD INVESTIGATION

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

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September 10, 1998

Mr. Steve Kemna
Smith Engineering Company
6400 Uptown Blvd. NE
Suite 500 E
Albuquerque, NM 87110

Dear Mr. Kemna:

In response to your authorization of August 6, 1998, I am submitting as a letter report the results of the identification of known areas of environmental contamination in the North Valley Drainage Management Plan Area. This work was conducted in accordance with our proposal to you of March 12, 1998.

Our research focused on review of agency secondary file data and reports and on obtaining information through conferrals with knowledgeable agency technical staff. Agencies contacted for information were as follows:

- City of Albuquerque Environmental Health Department
- Bernalillo County Environmental Health Department
- New Mexico Environment Department, Albuquerque District Office
  - Underground Storage Tank (UST) Office
  - Groundwater Quality Office
  - Environmental Engineer Office

- New Mexico Environment Department, State Office, Santa Fe
  - UST Bureau
  - Solid Waste Bureau
  - Groundwater Quality Bureau
  - Hazardous and Radioactive Waste Bureau
- Village of Los Ranchos de Albuquerque Planning and Zoning Office
- New Mexico State Highway and Transportation Department, Environmental Section
- US Geological Survey, Water Resources Branch
- Bureau of Reclamation, Albuquerque Area Office
- Middle Rio Grande Conservancy District
- US Corps of Engineers, Albuquerque District Office
- AMAFCA Office
- All Indian Pueblo Council, Pueblo Office of Environmental Protection

Major References and key technical agency personnel which we interviewed are outlined on the attached list of REFERENCES AND CONFERRALS.

The product of our findings is delineated on the attached project area map, as known sites of contamination. The twenty eight (28) sites indicated have resulted from leaky underground storage tanks. Two additional sites were identified as CERCLIS sites. A summary of the site names, addresses, and New Mexico Environment Department (NMED), Underground Storage Tank Bureau (USTB) determination are provided as TABLE 1.

TABLE 1
SITES OF KNOWN SOIL AND/OR GROUNDWATER CONTAMINATION IN THE NORTH VALLEY PROJECT AREA

Map Key	Facility Name	Facility Address	NMED Determination
1.	ATEX #363	1125 Alameda	Soil and groundwater contamination extending off site into Alameda Blvd. right-of-way. Still under investigation.
2.	Circle K # 1428	6130 Edith	Soil contamination on site. 7 day report provided. Still under investigation
3.	West. Fleet Maint.	6700 Edith	Soil contamination detected on site. No further action required.
4.	Groendyke Trans.	100 El Pueblo	Soil contamination detected on site. No further action required.
5.	Montano Shell	5605 4th	Soil and groundwater contamination detected on site. No further action required.
6.	M & S Chevron	5640 4th	Soil and groundwater contamination on site. Cleanup phase underway.
7.	Zip Lube	5701 4th	Soil contamination detected on site. No further action required.
8.	Peerless Tire	5801 4th	Soil and groundwater contamination detected on site. No further action required.
9.	Bob Killough Auto Serv.	6001 4th	Soil and groundwater contamination detected on site. Still under investigation.
10.	ATEX #1307	6502 4th	Soil and groundwater contamination detected on site. Still under investigation.
11.	ATEX #54	7324 4th	Soil contamination detected on site. Still under investigation.
12.	ATEX #211	7702 4th	Some soil contamination detected. Possible overfill. Still under investigation.
13.	Circle K #377	7900 4th	Soil contamination detected on site. Still under investigation.
14.	Sandia Chevron	10634 4th	Soil and groundwater contamination detected. Still under investigation.
15.	Rainbow Baking Co.	111 Montano	Soil contamination detected on site. No further action required.
16.	Chevron #75906	4500 Rio Grande	Soil contamination detected on site. No further action required.
17.	Western Grocers	5600 2nd	Soil and groundwater contamination detected on site. No further action required.
18.	Vickers #2492	6724 2nd	Soil and groundwater contamination detected on site. No further action required.
19.	CalMat Yard	6001 Chapel	Soil and groundwater contamination unconfirmed on site. No further action required.
20.	Econ #157	9311 4th	Soil and groundwater contamination extending off site. Still under investigation.
21.	Big Chief Truck Ter.	9700 2nd	Soil and groundwater contamination extending off site. Still under investigation.
22.	Circle K	397 Alameda	Soil contamination detected on site. No further action required.
23.	NW Automotive	6897 4th	Soil and groundwater contamination detected on site. No further action required.
24.	Old Gas Station	10463 4th	Soil contamination detected on site. No further action required.
25.	Sullivan Stables	9521 Rio Grande	Soil and groundwater contamination detected on site. Still under investigation.
26.	Chevron/Alameda	1101 Corrales	Soil contamination detected on site. Still under investigation.
27.	Abandoned site	6002 Edith	Soil contamination detected on site. Still under investigation.
28.	Helen Jones Property	7201 4th	Soil contamination detected on site. No further action required.
29.	Hugo Schulte & Co.	6666 4th	Assessment of May 1995 did not identify any potential source of hazardous substances associated with H. Schulte or current operator. No further action required.
30.	Brothers Plating Co.	6811 4th	Soil contamination detected on site. No further remedial action required.

Other types of potential contamination sites were not determined to be present or of concern. No RCRA or Superfund sites were identified. Although some illegal dump sites are present immediately outside the west boundary of the project area south of Alameda Boulevard, according to the NMED Solid Waste Bureau and the Middle Rio Grande Conservancy District, most of the sites have been cleaned up and others are planned for cleanup.

No nitrate contamination of concern was identified by the NMED, Ground Water Quality Bureau (McQuillan 1998). However, a 1979 study by the University of New Mexico Bureau of Engineering Research documented a large area in the North Valley with relatively high concentrations of sulfides, manganese, and kjeldahl nitrogen in the groundwater. The North Valley area is not unique in its groundwater quality condition. This character of the groundwater is common throughout the valley area in Bernalillo County as a naturally occurring anerobic condition worsened by local septic tank effluent (McQuillan 1998).

I hope this information is clear to you and sufficient for your needs in proceeding on the North Valley Drainage Management Plan for AMAFCA.

Sincerely,

METRIC Corporation

Peter H. Metzner

Peter H. Metzner
President

PHM/rkh

REFERENCES AND CONFERRALS

Bean, Kevin. Contractor, Albuquerque Public Works Department. Personal communications of September 9 and 10, 1998.

Beardsley, Don. Water Resource Engineering Specialist I, Permit Section, Solid Waste Bureau, New Mexico Environment Department. Personal communication of August 25, 1998.

Billings and Associates. December 1994. Hydrologic Investigation Report. Allsups #4, 1125 Alameda Boulevard NW, Albuquerque, New Mexico. Consultant report prepared for the New Mexico Environment Department, Underground Storage Tank Bureau and Allsups Petroleum, Inc.

Bio Tech Remediation, Inc. September 26, 1995. On-site Investigation, Thriftway Station #296, 7324 4th Street NW, Los Ranchos de Albuquerque, New Mexico. Consultant report prepared for the New Mexico Environment Department.

Brawley, Joseph. Acting Planning and Zoning Administrator, Village of Los Ranchos de Albuquerque. Personal communication of August 20, 1998.

Browning, Curt. Drainage Engineer, Albuquerque Metropolitan Flood Control Authority. Personal communication of September 10, 1998.

City of Albuquerque, Environmental Health Department, Geographic Information System Section. November 1997. Landfill Sites in Bernalillo County, New Mexico.

City of Albuquerque, Environmental Health Department, Geographic Information System Section. August 11, 1998. Site Environmental Audit System record search.

City of Albuquerque/Bernalillo County. January 1995. Ground-Water Protection Policy and Action Plan.

City of Albuquerque/Bernalillo County. March 24, 1993. Ground-Water Contamination in Bernalillo County. Consultant report prepared by CH2M Hill as a supporting document to the Ground-Water Protection Policy and Action Plan.

Ferris, Bart. Water Resource Specialist, Groundwater Protection and Remediation Bureau, New Mexico Environment Department, Albuquerque District Office. Personal communication of August 24, 1998.

Grogan, Sterling. Biologist/Planner, Middle Rio Grande Conservancy District. Personal communication of August 27, 1998.

Hanning, Maura. Health Program Manager, Groundwater Quality Bureau, New Mexico Environment Department. Personal communication of August 25, 1998.

Harding Lawson Associates. July 5, 1996. Groundwater Monitoring, Fourth Quarter Report, Killough's Auto Service LUST Site, Facility #562001, Albuquerque, New Mexico. Letter report to Rita Alexander, Project Manager, UST Bureau, New Mexico Environment Department, Albuquerque, New Mexico.

Harding Lawson Associates. December 10, 1993. Results of On-site Investigation, Killough's Auto Service Property, Albuquerque, New Mexico. Consultant report prepared for UST Bureau, New Mexico Environment Department, Albuquerque, New Mexico.

Hartman, John. Engineer, Transportation Division, Albuquerque Public Works Department. Personal communication of September 9, 1998.

Jetter, Steve. Water Resource Specialist, Underground Storage Tank Bureau, Remedial Action Section, New Mexico Environment Department, Albuquerque District Office. Personal communication of August 24, 1998.

Kelly, John. Chief Engineer, Albuquerque Metropolitan Arroyo Flood Control Authority. Personal communication of September 9, 1998.

Komogorova, Tanya. Bernalillo County Environmental Health Department, Geographic Information System Office. Personal communication of August 21, 1998.

Kretts, Kathryn. Environmental Geologist, New Mexico State Highway and Transportation Department, Environmental Section. Personal communication of September 9, 1998.

Krishkern, Jonathan. Water Resource Specialist, Groundwater Pollution Prevention Section, New Mexico Environment Department. Personal communication of August 25, 1998.

LeScouarnec, Michael. Supervisor of Enforcement and Inspection Program, Hazardous and Radioactive Waste Bureau, New Mexico Environment Department. Personal communication of September 10, 1998.

Linderoth, Andrea. Wildlife Biologist, Open Space Division, Albuquerque Parks and General Services Department. Personal communication of September 9, 1998.

McAda, Doug. Hydrologist, Water Resources Branch, US Geological Survey. Personal communication of August 24, 1998.

McKinney, Carol. Chief of Hazardous, Toxic and Radioactive Waste Section, US Corps of Engineers, Albuquerque District. Personal communication of August 20, 1998.

McQuillan, Dennis. Health Program Manager, Groundwater Pollution Prevention Section, Groundwater Quality Bureau, New Mexico Environment Department. Personal communications of August 25 and September 10, 1998.

Meinz, Loren. Drainage Engineer, Hydrology Division, Albuquerque Public Works Department. Personal communication of September 9, 1998.

Montman, Curt. Manager of Environmental Services Division, Albuquerque Environmental health Department. Personal communication of September 9, 1998.

Moreno, Norman. Program Manager, Underground Storage Tank Program, Pueblo Office of Environmental Protection, All Indian Pueblo Council.

Robertson, Lori. Environmental Scientist, US Bureau of Reclamation, Albuquerque Area Office. Personal communication of August 25, 1998.

Rosenberger, Lee. District One Engineer, New Mexico Environment Department, Albuquerque District Office. Personal communication of August 21, 1998.

Tymkowych, John. Program Manager, Enforcement and Inspection Program, Hazardous and Radioactive Waste Bureau, New Mexico Environment Department. Personal communication of September 11, 1993.

US Bureau of Reclamation, Albuquerque Area Office. 1997. Middle Rio Grande Water Assessment, Final Report.

Utter, Leonard. Engineer, Middle Rio Grande Conservancy District. Personal communication of August 31, 1998.

Weston, Roy F. May 1995. Preliminary Assessment Report, Hugo Schulte and Company, Albuquerque, Bernalillo County, New Mexico. consultant report prepared for US Environmental Protection Agency, Dallas, Texas.

APPENDIX B
LITERATURE REVIEW

LITERATURE REVIEW

A total of 28 drainage reports and grading plans were reviewed as part of the North Valley Drainage Management Plan. The reports most pertinent to this study are summarized in the following paragraphs. The remaining reports are included in a subsequent list. All of the reports and grading plans that were reviewed are summarized on reporting forms that are included in this appendix.

EXECUTIVE SUMMARIES

1a) Alameda and Riverside Drains Engineering Analysis - Vol. I
Prepared By: Leedshill-Herkenhoff
Date: May 1991

The City of Albuquerque contracted with Leedshill-Herkenhoff to perform a hydraulic analysis of the Alameda Drain. The study analyzed the Drain's capacity to convey storm water and investigated water quality issues related to the Drain. Recommendations were made for improving the Drain to increase its storage and conveyance properties. The hydrographs from the Albuquerque Master Drainage Study (AMDS) were input into the dynamic routing model, SWMM EXTRAN. The modeling included AMDS hydrographs for all of the major storm drain systems as well as all of the permitted storm outfalls discharging to the Alameda Drain. There are 35 inflows to the Alameda Drain with the NVDMP study area. These inflows range from 12 to 48 inch storm drains and irrigation wasteways that convey from 2 to 40 cfs. The AMDS hydrology modeled the 100-year 24-hour event. The modeling assumed that the existing sluice gate at Paseo del Norte restricted flows south of Paseo del Norte to only base flows. Irrigation base flows range from 5 to 40 cfs within the NVDMP study area and they occupy from 20 to 50% of the Drain's capacity. Excess runoff from the Alameda Drain flowed into the Paseo del Norte detention ponds. The existing Alameda Drain can convey the AMDS 100-year 24-hour peak flow throughout the study area, except at the reach between Roehl Road and Green Valley Drive. The Alameda Drain operates as a series of detention ponds due to the limited capacity of many of the roadway crossings. Proposed improvements include widening the Alameda Drain between Paseo del Norte and Mildred Avenue. This will ensure that the Alameda Drain can convey the 100-year event with 1.5 feet of freeboard. Based on AMDS hydrology it has been determined that the Montano storm drain must be limited to 25 cfs (existing flow restriction plate) until the Alameda Drain is widened, and then the Montano storm drain can discharge at its ultimate design flow of 139 cfs. The Bureau of Reclamation has stated that agricultural drains should be designed to accommodate the 100-year event. The City of Albuquerque presently provides funding to MRGCD to maintain the Alameda Drain.

1b) Draft Environmental Assessment for Alameda and Riverside Drains Engineering Analysis - Vol. 3
Prepared By: Leedshill-Herkenhoff and Metric Corporation
Date: November 1993

The City of Albuquerque adopted Option #2 of the "Alameda and Riverside Drains Engineering Analysis - Volume 1". This option proposes to divert some storm flow from the Alameda Drain to the Paseo Del Norte detention basins. Also the Alameda Drain will be widened from Paseo Del Norte to Mildred Avenue (other improvements are also proposed outside of the NVDMP study area). At the request of the Bureau of Reclamation, Volume 3 of this study provides an environmental assessment for the construction of Option #2. The environmental assessment examined impacts to water quality, insects, mammals, birds, plants, geology, and other environmental factors. The study concluded that the water quality in the Alameda Drain is good and it will not significantly suffer from additional storm water inflows. Option 2 will generally reduce peak flow rates and flow depths in the Alameda Drain.

2) Edith Boulevard Drainage Analysis Report
Prepared By: Boyle Engineering
Date: November 1990

This report describes the analysis used to design the Edith Boulevard storm drain system. This system consists of storm drain, a pump station and four detention basins. North of Osuna Road the drainage east of Edith from remnants of the Bear Arroyo is conveyed to Detention Basin #6. The discharge from this detention basin is conveyed west to the Alameda Drain where the MRGDC has limited the outfall to 7.5 cfs. Between Osuna Road and Montano Road the storm drain conveys runoff in Edith through storm drains that range in size from 24 to 60 inches. Three detention basins (#3S, #3N, and #7) reduce the 100-year peak flow to 15 cfs that ultimately drains into the Montano storm drain system just east of the ATSF railroad tracks. The Edith storm drain system is designed to convey the 100-year 24-hour event for a 1.95 square mile basin located predominantly east of Edith Boulevard.

3) North Valley Drainage in the Proximity of Paseo Del Norte
Prepared By: Bohannan-Huston
Date: September 1985

Both this report and an earlier report titled, "Paseo Del Norte Section B - Revised Preliminary Drainage Report" dated May 1985 are inaccurate in their description of the existing Paseo del Norte drainage system. Howard Stone of Bohannan-Huston provided a schematic (attached) that accurately describes this system. The system includes six detention basins, seven retention basins, storm drain that ranges in size from 18 to 48 inches, and a pump station. The storm drain system conveys drainage from the roadway corridor west to the pump station located at Paseo del Norte and Rio Grade Boulevard. The pump station discharges through a force main to the Rio Grande. The storm drain and pump station system are designed for the 100-year, 1 hour event. The detention basins are designed to store the 10-year 1 hour event from a 1.3 square mile area that reaches up to Alameda Boulevard on the north and down to El Pueblo Road on the south. Detention Basins located on the west side of the Alameda Drain are designed to accept overflow from the Drain.

4) Second Street North Transportation Corridor Study
Prepared By: Marron Knight et. al.
Date: April and December 1992

The existing cross section of Second Street presently drains through catch basins directly to the Alameda Drain. The Alameda Drain study of 1991 determined that there will be no adverse water quality impact to the Alameda Drain that will occur due to addition of more runoff from an improved Second Street. It is likely that future improvements to Second Street will continue to discharge to the Alameda Drain. It is likely that when Second Street was improved in the late 1980's that existing inlets were simply replaced by newer ones.

5) Alameda Boulevard - Second Street to Coors Boulevard
Prepared By: Wilson and Company
Date: February 1991

Improvements to Alameda Boulevard include a 48 to 60 inch storm drain system that flows west from the Chamisal Lateral to a detention basin and pump station at Rio Grande Boulevard. The pump station then discharges through two force mains to the Rio Grande. A letter report titled, "Amended Drainage Report for Alameda Boulevard from Second Street to Coors Boulevard" is dated January 1995 and describes the storm drain system that begins east of the Chamisal Lateral in a 36 to 48 inch storm drain system and conveys runoff to a detention basin at Second Street. This detention basin then drains to the Alameda Drain at a permitted rate of 10 cfs. The Alameda storm drain

systems are designed for the 100-year 6-hour event for a drainage area that is a total of about 500 feet wide along the roadway corridor.

6) Phase 1 of the Montano Corridor from Rio Grande Boulevard to Edith
Prepared By: Wilson and Company
Date: March 1986

The Montano storm drain system includes a 60 to 66 inch storm drain that flows west from near the Alameda Drain to a pump station at Rio Grande Boulevard. The pump station discharges to the Rio Grande through a force main. The Montano system is designed to convey the 100-year 6-hour runoff from a drainage area that includes a strip about 400 feet wide along the roadway corridor. A letter report titled, "Submittal of Drainage Flow/Basin Map for Montano Corridor" was submitted to the City of Albuquerque in March 1997. This letter report states that the properties along the Montano Roadway corridor must be limited to about 0.5 cfs/acre to ensure that the pump station capacity is not exceeded. The Montano system east of the Alameda Drain includes 30 to 60 inch storm drain that collects flow from the Renaissance and AGP detention ponds. The Montano storm drain has a flow restriction plate at the ATSF railroad tracks limiting its discharge to 15 cfs. MRGCD has limited the discharge from the Montano storm drain to the Alameda Drain to a peak flow of 25 cfs.

7) Ranchitos Road Localized Ponding Relief Project
Prepared By: James Boardman
Date: 1995

In order to remove nuisance ponding along Ranchitos Road just east of 2nd Street, the Bernalillo County Public Works Department constructed a small diameter storm drain that conveys runoff from 600 feet west of the ATSF railroad tracks to a pump station located about 700 feet east of 2nd Street. The pump station discharges through a 6 inch force main to an existing catch basin along 2nd Street. This catch basin then discharges to the Alameda Drain. This storm drainage system is designed to slowly drain the street ponding that occurs in Ranchitos Road.

8) Final Storm Water Pump Stations Report
Prepared By: Gannett Fleming West
Date: August 1997

This report provides data summaries for several of the storm water pump stations located in the study area including: the Paseo del Norte pump station, the Edith Boulevard pump station, and the Ortega Road pump station. The Paseo del Norte pump station and the Edith Boulevard pump stations are designed for the 100-year storm event, while the Ortega Road pump station is designed to convey only nuisance flooding. The Paseo del Norte and Edith pump stations are discussed further in the executive summary of other reports. The Ortega Road pump station uses a 24 inch storm drain from 9th Street to 4th Street to convey flow to one 300 gpm pump. This pump discharges south through a 6 inch force main located in 4th Street. This force main connects to the 36 inch Paseo Del Norte storm drain (that ultimately flows west to the Riverside Drain). This pump station replaced a plugged french drain.

9) Drainage Master Plan for Vista Del Norte Subdivision
Prepared By: Avid Engineering
Date: March 1998

The Master Plan for the Vista Del Norte Subdivision covers a 0.64 square mile area between Edith Boulevard on the west, the North Diversion Channel on the east, Osuna Road on the south, and Paseo del Norte on the north. The 100-year 24-hour event is to be detained in three detention ponds. The north pond will discharge through a pump station to the North Diversion Channel. The middle and south ponds will discharge to Edith Pond #6 (to be enlarged as part of this project).

10) Renaissance Center Drainage Report
Prepared By: Andrews, Asbury, and Robert
Date: February 1985

This 0.49 square mile area requires onsite detention ponding to limit each commercial site to 0.1 cfs/acre of runoff. The runoff is conveyed through streets and storm drain to the Renaissance Detention Basin located east of the Alameda Lateral and north of Montano Road. The outflow from the Renaissance Detention Basin flows into the Montano Storm Drain.

11) Taylor Middle School Storm Water Pump Station
Prepared By: Albuquerque Public Schools
Date: Unknown

School officials in the facilities department described an existing small storm water pump station that pumps from the southwest corner of Taylor Middle School property. This pump station pumps east through a force main to the Chamisal Lateral that borders the east edge of the school's property. The pump station was probably built by the school's operation and maintenance staff, and there are not likely any plans available.

12) Plans for Renovation/Addition to Taft Middle School
Prepared By: Chavez-Grieves
Date: April 1996

Plans show that much of the south campus drains to a small storm water pump station located on the south central side of the school. The pump station discharges through a 12 inch force main to a retention pond on the east side of the property.

DRAINAGE REPORTS/PLANS

13) Conceptual Master Drainage Plan - Tract B-1-A-1 Springer Building Lands
14) Bona Terra Farms
15) Grading and Drainage Plan - Mini Storage Facilities
16) Derramadera Subdivision Terrain Management and Conceptual Grading Plan
17) Las Haciendas de Gregoria Candelaria Grading and Drainage Plan
18) Holbrook Subdivision - Grading and Drainage Plan
19) Sandia Preparatory School Master Grading and Drainage Plan
20) Drainage Report for Arboleda Del Sol Subdivision
21) North Valley Drainage Systems Final Design Analysis Report
22) Final Drainage Report - Paseo Del Norte and Second Street Interchange
23) Calmat Business Park Phase 1
24) Analysis of the AHYMO Program for Flat Valley Areas

PLANNING DOCUMENTS

25) Bernalillo County Parks and Recreation Master Plan
26) City of Albuquerque Major Public Open Space Facility Plan
27) North Valley Area Plan
28) Albuquerque-Bernalillo County Comprehensive Plan

ALBUQUERQUE METROPOLITAN ARROYO
FLOOD CONTROL AUTHORITY
(AMAFCA)

SMITH ENGINEERING COMPANY
(SEC)

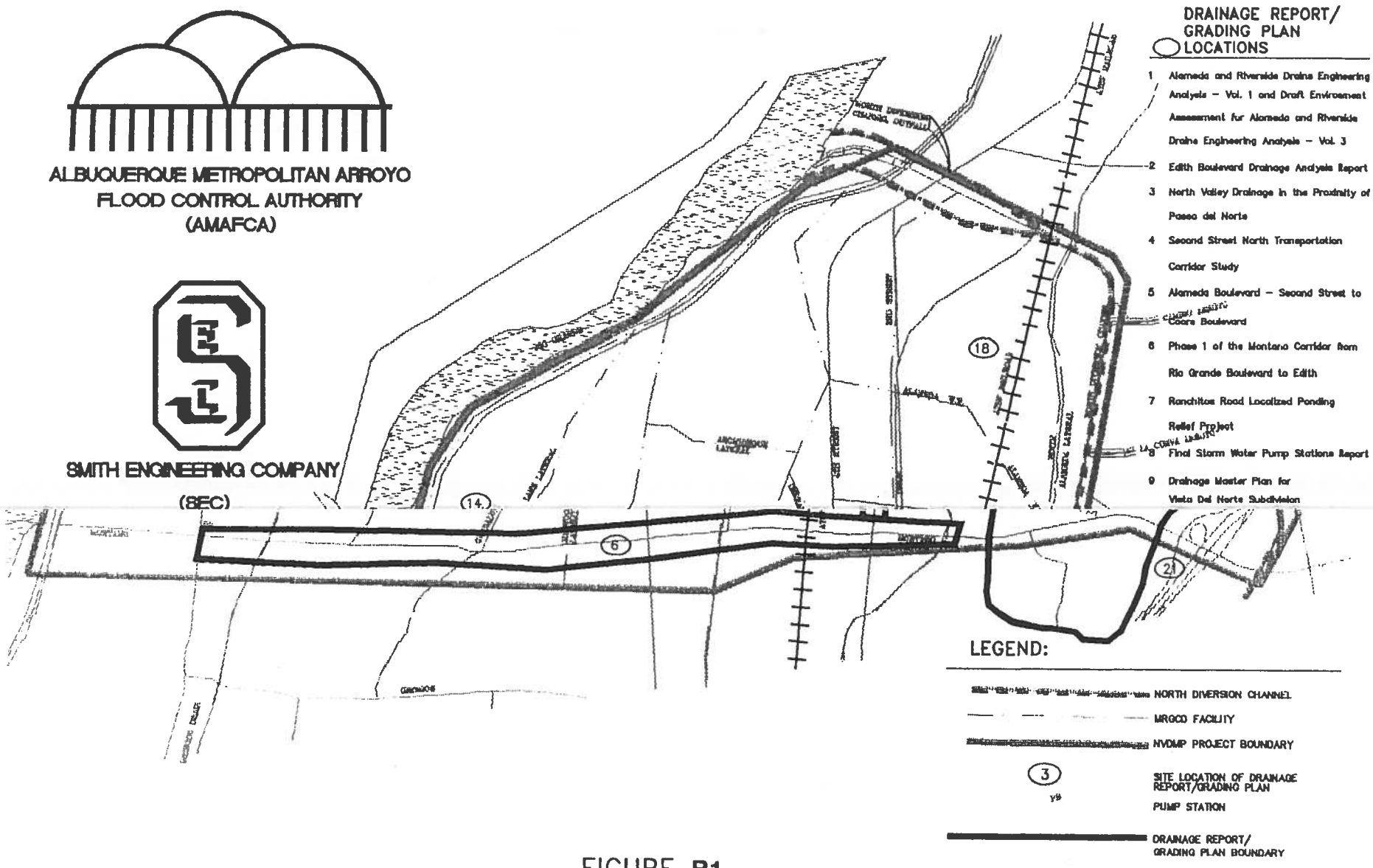


FIGURE **B1**

LITERATURE REVIEW MAP

North Valley Drainage Management Plan
Literature Review

Title of Report: Alameda and Riverside Drains Engineering Analysis - Vol 1
Author: Leedshill Herkenhoff, Inc.
Date: May 1991
Owner/Authorizing Agency: COA
Study Area: Alameda & Riverside Drains
Location (COA/Bcty/LosRanchos): COA/Bcty
Purpose of Report: Analysis of drains to convey stormwater
- Evaluated capacity and water quality
- Developed conceptual design of improvements to convey 100-yr. Event
Drainage Area Size (sq.miles): Unknown
Drainage Area Boundary: AMDS Area Contributing to Alameda Drain
Design Event Return Period (years): 100 yr.
Design Event Duration (hrs): 24 Hr.
Other Events Analyzed: None
Soils: N/A
Numerical Models Used (specify version): Used SWMM EXTRAN for dynamic routing in drains(V.4.04), used AMDS HYMO Runs as input for SWMM EXTRAN
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): CN
Rainfall-runoff Transformation Method: HYMO
Time of Concentration Method: DPM (1988)
Mapping Used to Delineate Watershed (Type of map): AMDS
Date: N/A
Scale: N/A
Contour Interval: N/A
Peak Inflow (cfs)/Location: N/A
Peak Outflow (cfs)/Location: N/A
Peak Volume (ac-ft)/Location: N/A
Peak Water Surface Elevation (ft)/Location: N/A
Describe Offsite Flows: N/A
Describe Existing Floodplains: N/A
Summary of Existing Drainage Structures: - Modeling included flows from Osuna SD, Candelaria SD, Menual H.S. Det. Basin, Existing permitted storm drains, 2nd Street inlets, Montano SD (East of Alameda Drain), Griegos Road SD (East), Greigos Road (West).
Modeled 56 Inflow Hydrographs.

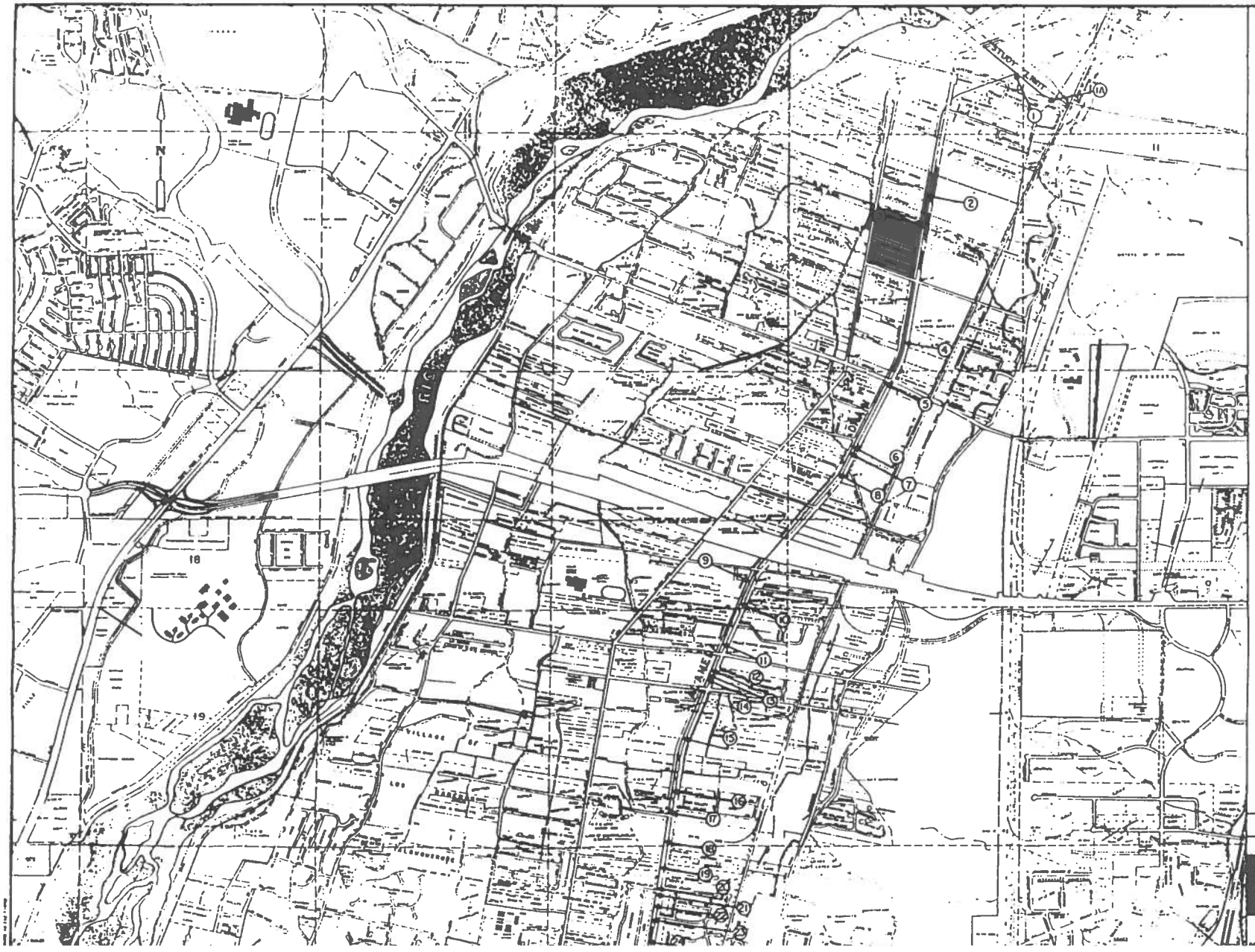
Summary of Proposed Drainage Structures: ①Edit Blvd. Det. Basins, full unrestricted flow from Montaro Storm drain (east), and widening of 4th Street. ②Improve Alameda Drain so 1.5' freeboard. ③ Due to future 2nd Street widening there is only 60 feet of ROW available for Alameda drain widening. ④ Flow restriction at Paseo so only baseline flows head south in Alameda Drain excess flow to PDN Det. Basins. ⑤ Option #2 will widen Alameda Drain from PDN to Mildred Ave..⑤ Other improvements are proposed for south of Montano.

Comments: Baseline irrigation flows occupy 20 to 50% of channel capacity. Alameda Drain can handle Q100 (old COA Hydrology) except only one reach in study area can not convey Q100 + baseflow (from Roehl Rd. to Green Valley Drive - just North of Osuna).

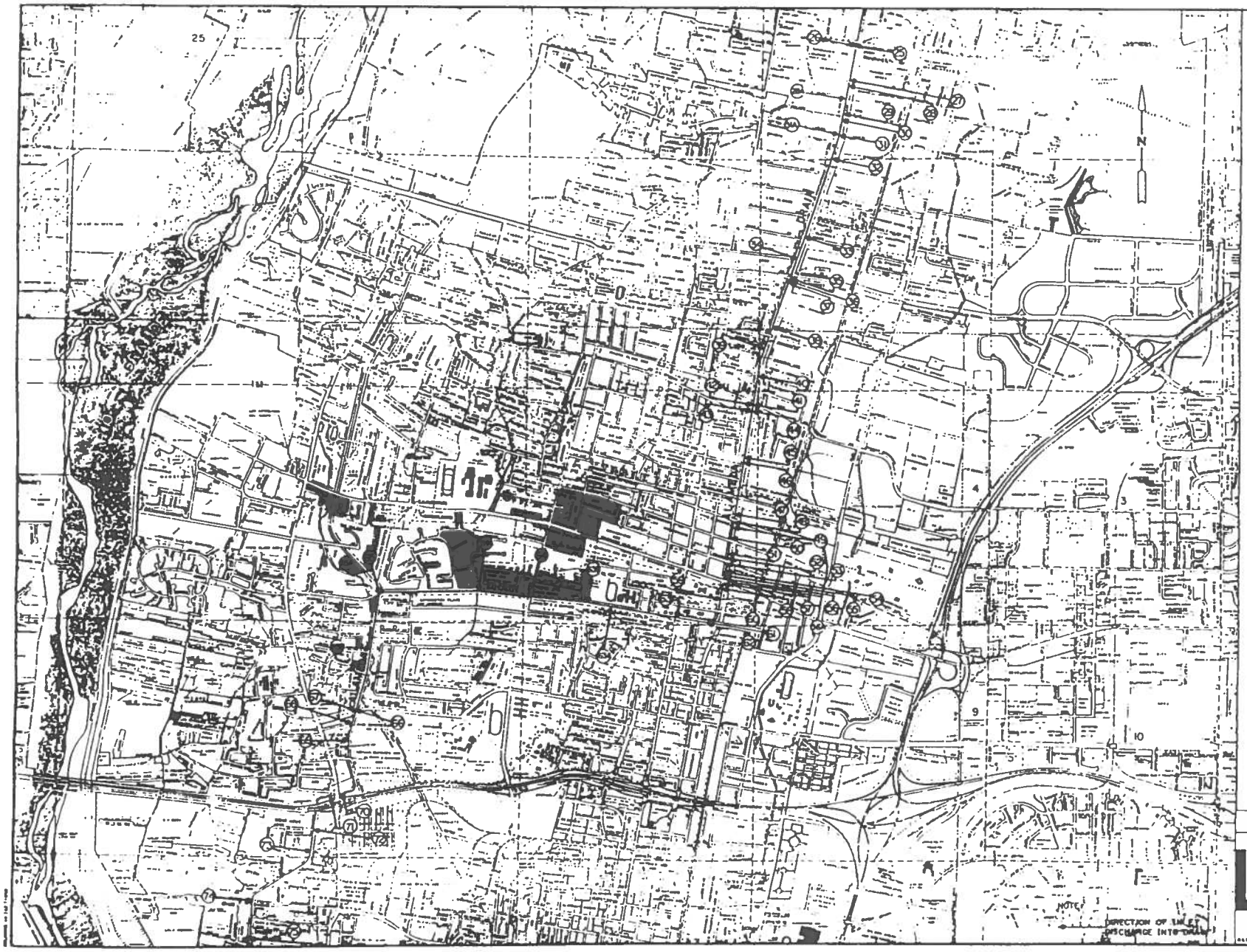
⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

Unk = unknown information
N/A = not applicable

Reviewed by: SPK Date: 6-26-98



INLET ID NO.	PIPE SIZE & TYP.	100 YR. PEAK FLOW (CFS)	REFERENCE
1	24" RCP	10	PERMIT
1A	—	N/A	AMAFCA - NO DIV CHANNEL
2	18" CMP	27	PERMIT
3	24" CMP	5	ALAMEDA WASTEWAY (PPRIG.)
4	24" CMP	5	PERMIT
5	24" CMP	6	PERMIT
6	24" CMP	7	PERMIT
7	36" CMP	15	BC-4035(200)
8	24" CMP	5	BC-4035(200)
9	18" CMP	5	LA DERAMEDERA WASTEWAY (IRRIGATION)
10	18" RCP	24	BC-65-3
11	18" RCP	6	BC-65-3
12	24" CMP	15	BC-65-3
13	18" RCP	3	BC-65-3
14	18" RCP	3	BC-65-3
15	18" RCP	21	BC-65-3
16	18" CMP	23	BC-65-3
17	18" RCP	2	BC-65-3
18	18" RCP	17	BC-65-3
19	18" RCP	15	BC-65-3
20	18" RCP	10	BC-65-3
21	18" RCP	21	BC-65-3
22	18" CMP	5	BC-65-3
23	24" RCP	3	FAC. MAPS
24	18" RCP	38	BC-65-3



INLET ID NO.	PIPE SIZE/TYP	100 YR PEAK FLOW (CFS)	REFERENCE
24	48" RCP	40	BC-85-3
26	24" RCP	20	BC-85-3
27	18" RCP	17	BC-85-3
28	18" RCP	20	BC-85-3
28A	—	15	CHAMISA LATERAL (1988)
29	18" RCP	6	BC-85-3
30	18" RCP	21	BC-85-3
31	24" RCP	5	STOTTS LATERAL
31A	—	5	GALLEGOS ACEQUIA (1988)
32	18" CMP	5	PERMIT
33	18" CMP	5	FAC. MAPS
34	36" RCP	14	FAC. MAPS
35	12" RCP	2	FAC. MAPS
36	60" RCP	23	PROJ. 2461
37	18" CMP	5	FAC. MAPS
38	12" CMP	2	FAC. MAPS
39	12" CMP	2	FAC. MAPS
40	18" CMP	5	FAC. MAPS
41	18" CMP	5	FAC. MAPS
42	12" CMP	3	FAC. MAPS
43	42" RCP	35	PROJ. 2461
44	60" RCP	6	PROJ. 2461
45	24" RCP	3	FAC. MAPS
46	24" RCP	4	FAC. MAPS
47	18" RCP	3	FAC. MAPS
48	18" RCP	4	FAC. MAPS
49	18" RCP	2	FAC. MAPS
50	18" RCP	6	FAC. MAPS
51	24" RCP	4	FAC. MAPS
52	18" RCP	2	FAC. MAPS
53	18" RCP	2	FAC. MAPS
54	24" RCP	2	FAC. MAPS
55	24" RCP	2	FAC. MAPS
56	24" RCP	2	FAC. MAPS
56A	—	5	ALAMEDA LATERAL (1988)
57	18" RCP	3	FAC. MAPS
58	48" RCP	84	FAC. MAPS
59	18" RCP	3	FAC. MAPS
60	48" RCP	13	FAC. MAPS
61	48" RCP	13	FAC. MAPS
62	48" RCP	13	FAC. MAPS
63	36" RCP	28	FAC. MAPS
63A	—	10	HARWOOD LATERAL (1988)
63B	—	10	GRIEGOS ACEQUIA (1988)
64	60" RCP	63	FAC. MAPS
64A	—	5	MENAUL ACEQUIA (1988)
65	36" RCP	7	FAC. MAPS
65A	—	25	GRIEGOS DRAIN (1988)
65B	—	10	ALBUQ. ACEQUIA (1988)
66	36" RCP	52	FAC. MAPS
67	30" RCP	69	FAC. MAPS
68	18" RCP	3	FAC. MAPS
69	24" RCP	5	FAC. MAPS
70	18" RCP	4	FAC. MAPS
71	18" RCP	5	FAC. MAPS
72	24" RCP	3	FAC. MAPS
73	15" RCP	2	FAC. MAPS
73A	—	5	ZEARING LATERAL (1988)
74	24" RCP	3	FAC. MAPS
75	15" RCP	3	FAC. MAPS

GRAPHIC SCALES

0 500 1000 2000 3000

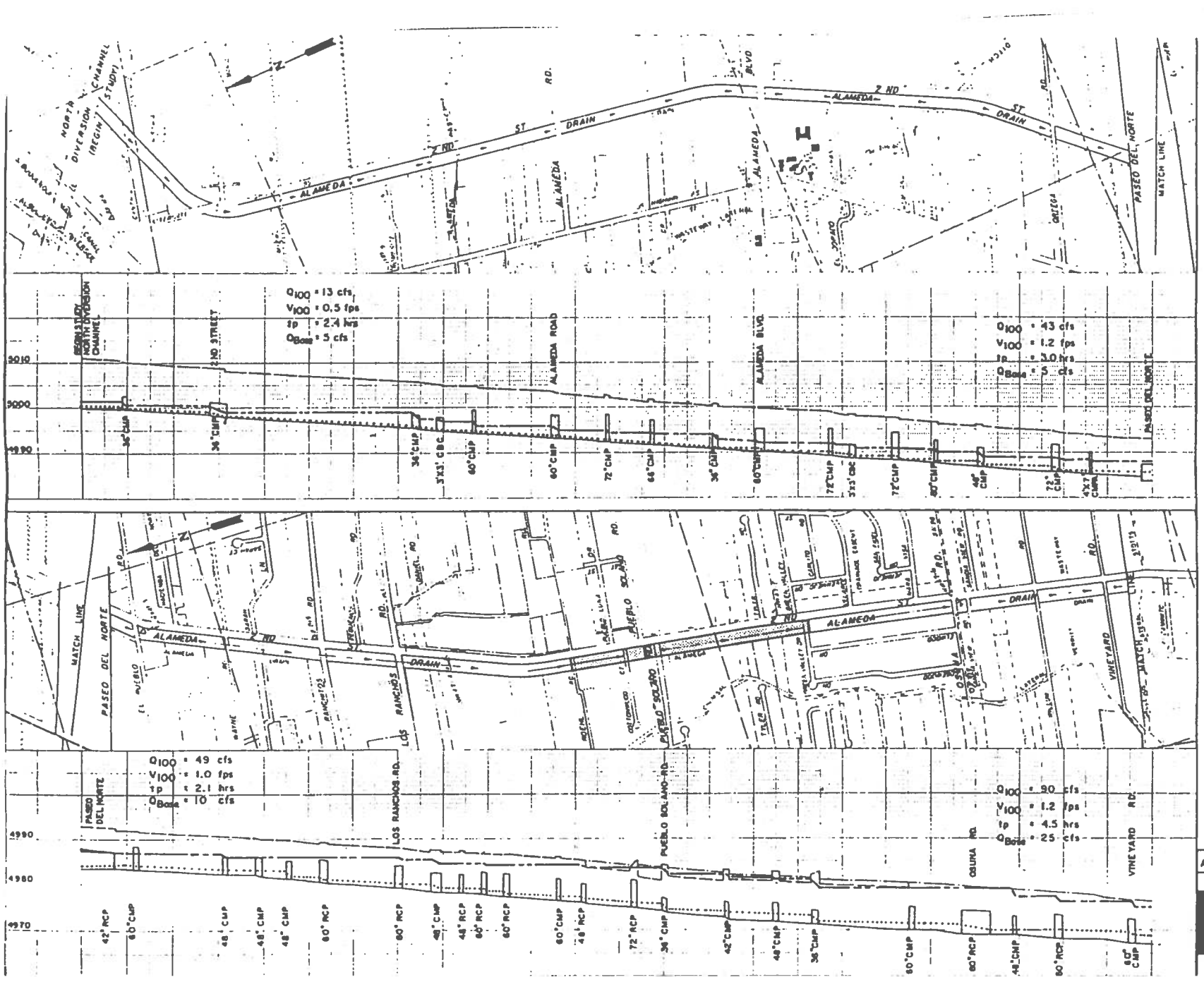
ALBUQUERQUE, NEW MEXICO

ALAMEDA/RIVERSIDE DRAIN ANALYSIS

FIGURE 3.2
EXISTING STORMWATER AND IRRIGATION INFLOWS TO DRAINS

DRAWN BY: M.L.
DATE: JAN. 1989
SCALE: AS SHOWN

LEEDSHILL-HERKENHOFF, INC.
ENGINEERS ARCHITECTS



ALAMEDA/RIVERSIDE DRAINS ENGINEERING ANALYSIS

CITY OF ALBUQUERQUE

EXISTING CONDITIONS 100 YEAR WATER SURFACE PROFILE

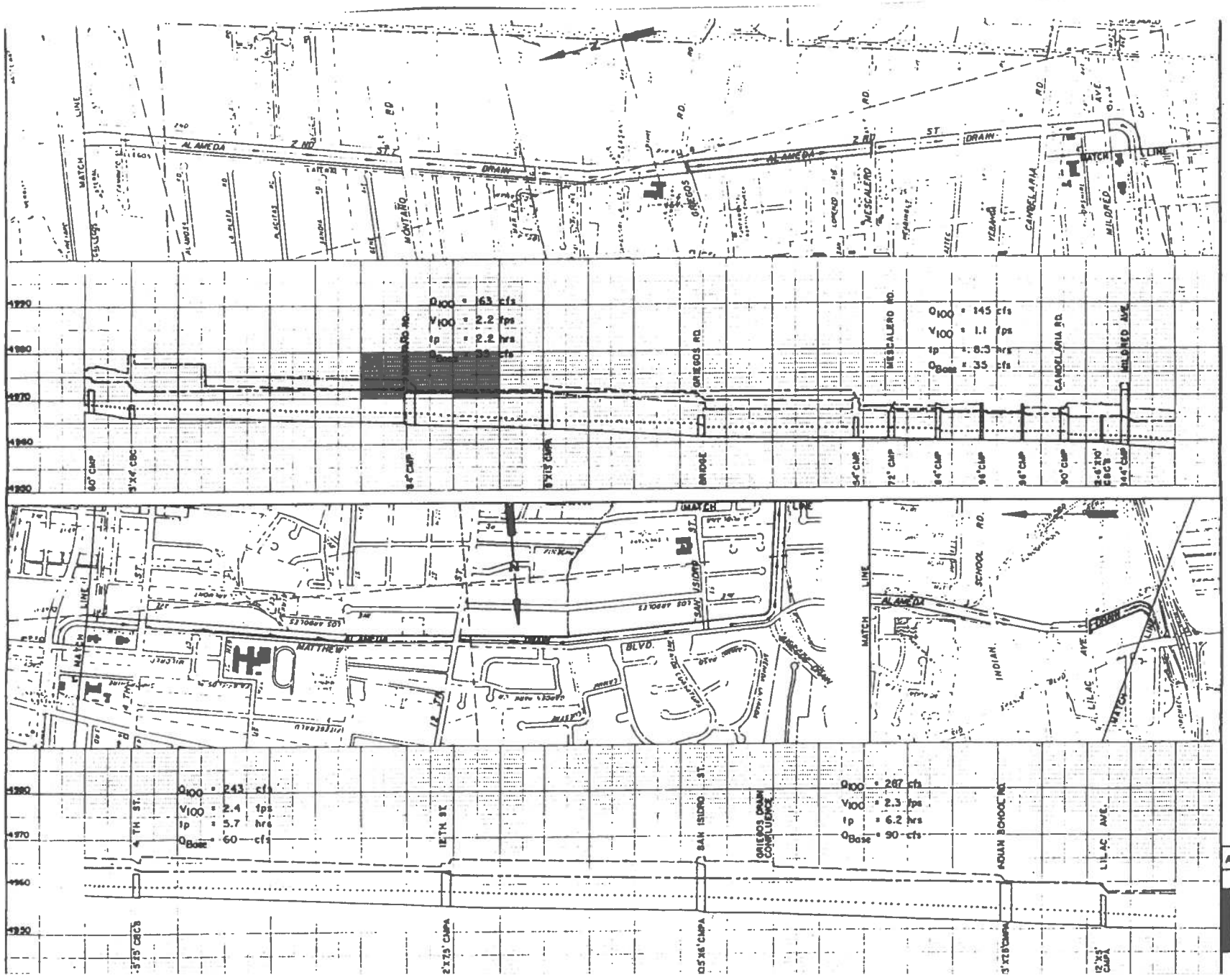
DRAWN BY

DATE

SCALE AS SHOWN

LEEDSHILL-HERKENHOFF, INC.

ENGINEERS ARCHITECTS



ALAMEDA/RIVERSIDE DRAINS ENGINEERING ANALYSIS

CITY OF ALBUQUERQUE

EXISTING CONDITIONS 100 YEAR WATER SURFACE PROFILE

LEEDSHILL-HERKENHOFF, INC.
ENGINEERS ARCHITECTS

North Valley Drainage Management Plan
Literature Review

Title of Report: Draft Environmental Assessment for Alameda and Riverside Drains Engineering Analysis (Vol. 3)
Author: Leedshill - Herkenhoff, Inc. and Metric Corp.
Date: November 1993
Owner/Authorizing Agency: COA .
Study Area: Alameda and Riverside Drains
Location: City of Albuquerque/ Bernalillo County

Purpose of Report Bureau of Reclamation required that an environmental assessment be performed for proposed improvements to Alameda Drain.
Drainage Area Size (sq.miles): Unknown

Drainage Area Boundary: AMDS Area contributing to Alameda Drain.
Design Event Return Period (years): 100 year
Design Event Duration (hrs): 24 hour
Other Events Analyzed: None
Soils: N/A

Numerical Models Used (specify version): SWMM Extran for hydraulic anaylsis AMDS hydrographs for hydrology (HYMO or RADS)

Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): CN

Rainfall-runoff Transformation Method: HYMO or RADS
Time of Concentration Method: DPM
Mapping Used to Delineate Watershed (Type of map N/A
Date: N/A
Scale: N/A
Contour Interval: N/A
Peak Inflow (cfs)/Location: N/A
Peak Outflow (cfs)/Location: N/A
Peak Volume (ac-ft)/Location: N/A

Peak Water Surface Elevation (ft)/Location: Unknown
Describe Offsite Flows: N/A

Describe Existing Floodplains: N/A .

Summary of Existing Drainage Structures: See "Literature Review" data form for Volume 1.

Summary of Proposed Drainage Structures: Option #2 (see attached paragraphs)

Comments Study concludes that the addition of more storm water to Alameda Drain will not substantially impair water quality.

⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

Unk = unknown information
N/A = not applicable

Reviewed by: SPK Date: 8-26-98

Environmental Analysis

- 2nd Street inlets incorporate "traps" to reduce scum and debris from entering Alameda Drain.

- Option #2 will generally reduce peak flow rates and flow depths.

- Storm water quality results attached.

* Water quality in Alameda Drain is good and will "not suffer substantial impairment of water quality" with more discharge of storm water.

Seven alternate improvement scenarios were developed for evaluating the effectiveness of the drains to convey stormwater runoff under future development conditions. Certain drain improvements have been constructed or are planned for construction since publication of the May, 1991 report. These include:

1. Alameda Drain Improvements:

   Menaul/Mildred Drainage Improvements, report dated March 1991, designed to satisfy the May, 1991 report recommendations of a separate storm drain to parallel Alameda Drain between Delamar Road and Mildred Avenue; obtained environmental compliance through a categorical exclusion from the Bureau of Reclamation (BuRec); presently under construction.

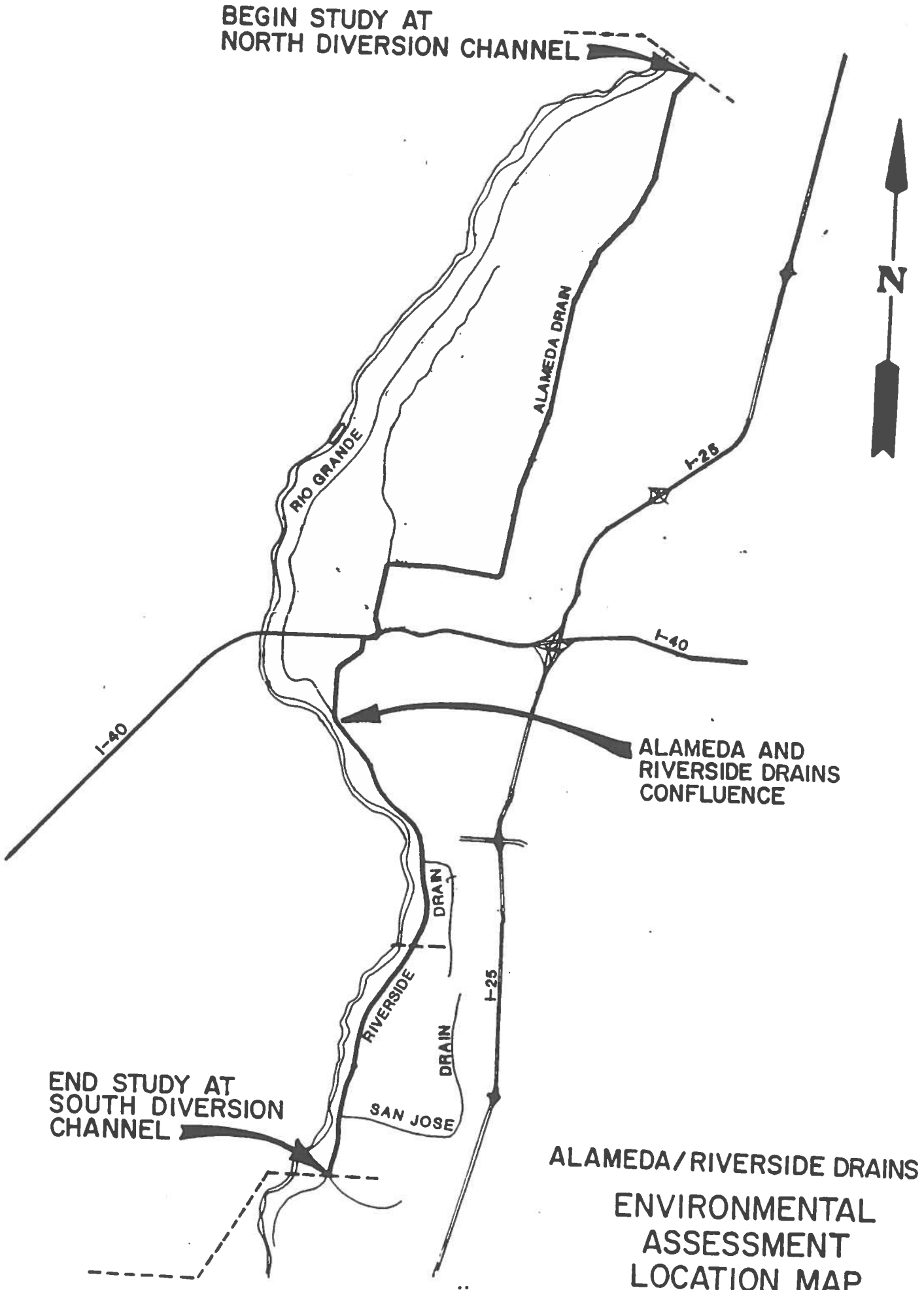
2. Riverside Drain Improvements:

   San Jose Drain Outfall to the Rio Grande, report dated May, 1992, designed in accordance with improvements recommended in the May, 1991 report; obtained environmental compliance with a finding of no significant impact (FONSI) on May 22, 1992 (UC-FONSI-92-02) from the BuRec following the Environmental Assessment report, dated April, 1992; construction completed April 1993.

A description follows of the drain improvements remaining for each alternate improvement scenario which was evaluated.

Alternative Improvement Scenario No. 1: Improvements include diverting storm flows at Paseo del Norte, widening Alameda Drain and replacing selected culverts from Paseo del Norte south to Mildred Avenue and from I-40 south to Mountain Road, a 16 ac-ft off-line detention basin near Mountain Road and concrete lining Alameda Drain between Mountain Road, and the confluence of the Riverside Drain; widening Riverside Drain from the confluence to the Barr Diversion along with replacing selected culverts and extending the overflow weir at the Barr Canal Diversion structure.

Alternative Improvement Scenario No. 2: Improvements include diverting storm flows at Paseo del Norte, widening Alameda Drain and replacing selected culverts from Paseo del Norte to Mildred Avenue and from I-40 south to Mountain Road, and concrete lining Alameda Drain from Mountain Road to the Riverside Drain confluence. Riverside Drain improvements would be limited to constructing a diversion structure at Alcalde Pump Station, extending the overflow weir at the Barr Diversion structure, and replacing culverts at Rio Bravo Boulevard. Alternate Improvement Scenario No. 2 is the proposed action.



ALAMEDA/RIVERSIDE DRAINS

ENVIRONMENTAL ASSESSMENT LOCATION MAP

FIGURE S-1

On the Riverside Drain, widening is required from the confluence to the Barr Diversion. Culvert replacement in these reaches will also be necessary. The Rio Bravo Blvd. culverts will be replaced.

The total project cost for this alternative, excluding property acquisition, is estimated at $10,400,000 excluding Menaul/Mildred improvements.

Alternate Improvement Scenario No. 2: In this Scenario, storm flows are diverted to the existing detention basin facilities paralleling Paseo del Norte, the Alameda Drain is widened from Paseo del Norte to Mildred Avenue, and from Interstate 40 to Mountain Road. Construction improvements resulting from the Menaul/Mildred Drainage Improvements report, dated March, 1991, supersede previous recommendations for drainage improvements along 2nd Street. Some culvert replacements are required between I-40 and Mountain Road, and sideslopes of the Alameda Drain are concrete lined from Mountain Road to the Riverside Drain confluence.

On the Riverside Drain, channel widening is not required. Instead, a diversion structure is installed just south of Alcalde Place. This structure will allow baseline irrigation flows to pass, but diverts the stormwater peak flows into the existing Alcalde Pump Station, to be discharged into the Rio Grande. As a result, less stormwater remains within the Riverside Drain, thereby reducing the Barr diversion overflow weir length and eliminating the need to replace the Rio Bravo Blvd. culverts. The siphon culvert size under the San Jose Drain outfall is also reduced by the diversion.

The total project cost for this alternate, excluding property acquisition, is estimated at $8,600,000 excluding Menaul/Mildred improvements.

Alternate Improvement Scenario No. 3: In Scenario No. 3, storm flows are diverted to the existing detention basin facilities paralleling Paseo del Norte, the Alameda Drain is widened from Paseo del Norte to Mildred Avenue, and from Interstate 40 to Mountain Road. Construction improvements resulting from the Menaul/Mildred Drainage Improvements report, dated March, 1991, supersede previous recommendations for drainage improvements along 2nd Street. A diversion structure is placed just upstream of Montano Road, in the Alameda Drain. This diversion structure will divert a portion of the peak drain flows into the proposed Montano Pump Station storm sewer system. This improvement will eliminate the diversion from the Montano Storm Sewer into the Alameda Drain, originally proposed with the pump station. The total improvement package will reduce the amount of stormwater flows entering the Alameda Drain. Only a single culvert replacement is required between Paseo and Mildred. Culvert replacements are necessary between I-40 and Mountain, as well as concrete lining of the drain sideslopes between Mountain Road and the Riverside Drain confluence.

On the Riverside Drain, widening is required from the confluence to the Barr Diversion. Culvert crossings are also replaced within this section of the drain. The Rio Bravo Boulevard culverts are replaced.

3.5.1.2 Basin-Specific Standards

The basin-specific standards for water quality within this area are as follows:

1. In any single sample dissolved oxygen shall be greater than 4.0 mg/l, pH shall be within the range of 6.0 to 9.0, and temperature shall be less than 32.2 degrees celsius (90 degrees Fahrenheit).

2. The monthly logarithmic mean of fecal coliform bacterial shall not exceed 1000/100 ml; no single sample shall exceed 2000/100 ml.

3. At mean monthly flows about 100 cubic feet per second, the monthly average concentration for dissolved solids shall be less than 1500 mg/l, sulfate shall be less than 500 mg/l, and chlorine shall be less than 250 mg/l.

3.5.1.3 Water Quality Study

A water quality study was conducted on the Alameda/Riverside Drain system during 1989. A summary of the water quality study project is contained in Appendix I, and the study is included as a referenced document.

Description of existing water quality in the drain system is based on data derived from site specific field collection and laboratory testing between September and November 1989. For the drain system and area storm drains, the average quality of existing stormwater flows is summarized in Table 3.2. These existing flows include groundwater contributions, irrigation water, and stormwater. Comparison is provided with established guidelines, based on New Mexico Interstate and Intrastate Stream Standards, New Mexico Water Quality Control Commission Regulations, and a series of Environmental Protection Agency reports on water quality criteria. Where guidelines are available, parameters are at or below established guideline concentrations, with the exception of copper, lead, and total chlorine which slightly exceed the concentrations. Fecal coliform is much greater than established guidelines for both existing drain conditions and stormwater flow conditions, which is consistent with findings for overland runoff from undeveloped properties.

Table 3.2
Water Quality Comparisons

4th & 12th St.

Parameters	Guideline (mg/l)	Existing Storm Flows in Drains (mg/l)	Alameda Drain Flows (mg/l)
Ammonia	1.09	0.25	0.37
BOD-5	30	4.84	14.23
Cadmium	0.05	0.004	<0.02
Chloride	250	10.7	5.6
Chromium	1.0	0.03	0.02
COD	125	34	150
Conductivity	750 umohs/cm	408 umohs/cm	174 umohs/cm
Copper	0.024	0.03	0.02
Cyanide	0.022	0.006	0.006
DO	>4.0	7.2	8.46
Fecal Coliform	2000/100ml	>2000/100ml	>2000/100ml
Fecal Strep.	-	-	-
TKN	-	1.13	2.18
Lead	0.1	0.22	0.22
Detergent (MBAs)	-	0.096	0.060
Nickel	0.2	<0.2	<0.2
Nitrate	100	0.73	1.09
Oil & Grease	-	20.7	31.8
pH	6.0-9.0 units	8.01 units	7.83 units
Phenols	3.5	0.038	0.032
Ortho-Phosphate	-	0.98	0.56
Silver	0.05	0.05	0.03
Temperature	32.0°C	18.7°C	-
Total Chlorine	0.011	0.06	0.03
TDS	1000	264	149
TSS	-	1085	576
TOC	-	10.35	12.40
VOC	-	0.046	0.525
Zinc	2.0	0.10	0.23

3.5.2.1 "Build" Option

The following Table 3.5 lists the general anticipated impacts associated with the Build alternative:

Table 3.5

General Impacts of "Build" Option

1.	Minimize effects of intense stormwater runoff to Alameda Drain through use of detention basins and controlled release drainage systems.
2.	Reduced sediment load from stormwater that presently impacts the Drain.
3.	Improve collection of solid waste and floatable material from stormwater.
4.	Detention basins will provide time delays to take advantage of naturally occurring water treatment, i.e. many of the pollutants will settle out of the stream.
5.	Improves control of accidental spills that may impact storm-water.
6.	Adds stormwater flow volume to Alameda/Riverside systems.
7.	Temporary disturbance of Drain due to construction activities.
8.	Reduce areas of flooding and ponding in Alameda Drain Basin.

3.5.2.2 "No-Build" Option

The no-build option will allow the storm drain system to remain in the existing configuration. Capacities available in the existing Alameda/Riverside Drain system would not be efficiently utilized to carry additional stormwater runoff. This results in possible additional pumping requirements for storm-water, rather than utilizing the existing gravity flow drain system.

The following Table 3.6 lists the general impacts.

Elevated values for metals were noted during some storm flow samples in the drains. These higher values did not appear to represent continuous discharges, rather possibly isolated indiscreet or accidental discharges. Presently, stormwater discharges are not regulated. Upon issuance of the City of Albuquerque's General Permit for Stormwater Discharge, it will be necessary to mitigate these factors which contribute to negative water quality impacts in an effort to meet these new standards.

A qualitative summary of Water Quality Impacts is presented in Table 3.4.

Table 3.4
Water Quality Impacts

No Apparent Change
Cadmium - Existing and future less than guideline Cyanide - Existing and future less than guideline Fecal Coliform - Existing and future greater than guideline Fecal Strep. - No guideline Lead - Existing and future greater than guideline Nickel - Existing and future less than guideline pH - Existing and future within guideline Temperature - Existing and future less than guideline
Apparent Positive Impact
Chloride - Existing and future less than guideline Chromium - Existing and future less than guideline Conductivity - Existing and future less than guideline Copper - Existing greater than guideline, future less than guideline Dissolved Oxygen - Existing and future greater than guideline Detergents - No guideline Phenols - Existing and future less than guideline Ortho-Phosphate - No guideline Silver - Existing at guideline, future less than guideline Total Chlorine - Existing and future greater than guideline TDS - Existing and future less than guideline TSS - No guideline
Apparent Negative Impact
Ammonia - Existing and future less than guideline BOD-5 - Existing and future less than guideline COD - Existing less than guideline, future greater than guideline TKN - No guideline Nitrate - Existing and future less than guideline Oil and Grease - No guideline TOC - No guideline VOC - No guideline Zinc - Existing and future less than guideline

Table 3.3
Summary Pollutant Removal
for Dry Detention Basins

Parameter	Removal Efficiency
Suspended Sediment	80 - 100%
Total Phosphorus	40 - 60%
Total Nitrogen	20 - 40%
Oxygen Demand	20 - 40%
Trace Metals	40 - 60%
(Source, Metro. Washington Council of Governments)	

3.5.2 Impacts

Water quality data describing existing storm drains at 4th and 12th Streets in the North Valley are considered to be representative of the quality of additional stormwater proposed to be discharged to the Alameda/Riverside Drain system. Table 3.2, earlier presented, compares the average water quality of the storm drains with existing stormwater flow in the drain system and also with a guideline for each parameter. An evaluation of the comparison is summarized in Table 3.4.

Considering specific chemical characteristics analyzed in the water quality study, of the 29 parameters analyzed, no apparent change is indicated for eight parameters. Apparent positive impacts are indicated for twelve parameters, and apparent negative impacts are indicated for nine parameters. Of the nine parameters for which apparent negative impacts are indicated, only chemical oxygen demand (COD) exceeds a selected guideline for future conditions. TKN, oil and grease, total organic carbon (TOC) indicate a slightly increased results. Volatile organic carbon (VOC) concentrations which indicate the presence of solvents, gasoline, or other organic compounds, is greater in the storm drain flows than in the stormwater in the Alameda and Riverside Drain by one order of magnitude. This finding based on the project sampling and analysis could warrant further investigation.

Total suspended solids for average stormwater in the Alameda and Riverside Drain is higher than in average storm drain samples. Additional storm drain discharge to the Alameda and Riverside Drains would tend to dilute the total suspended solids scenarios which incorporate off-line detention and reduced sediment in the drain. Stormwater pumping facilities will remove a minor portion of additional sediment from the system.

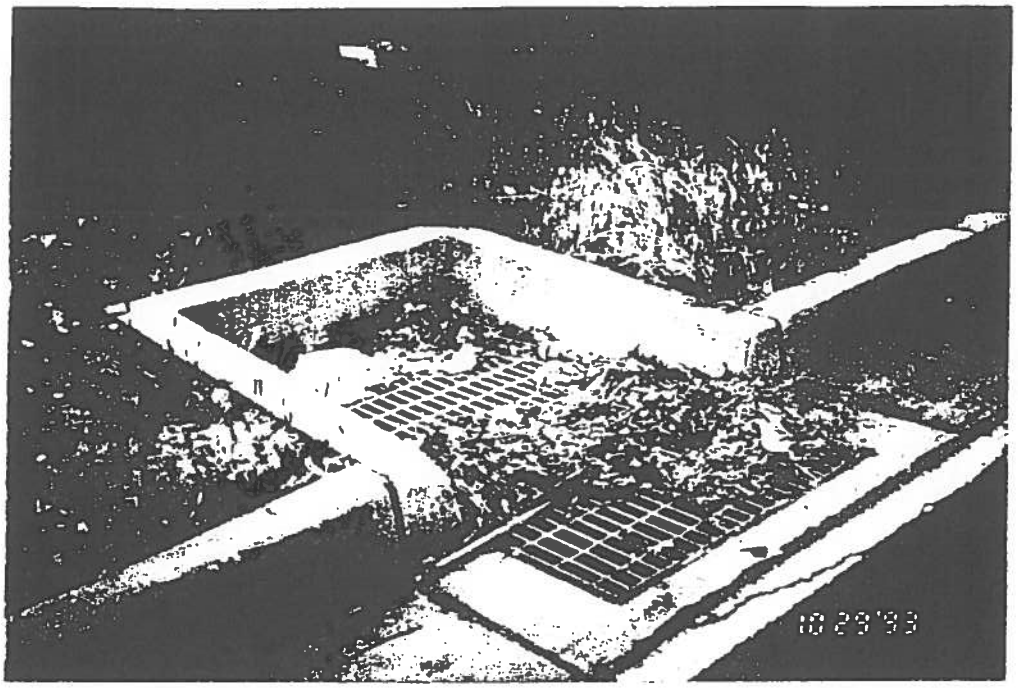
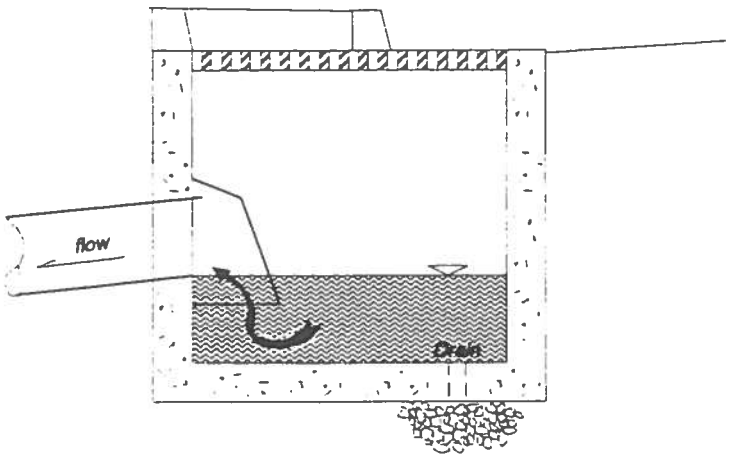


Photo 3.7 Typical Bernalillo county trapped type inlet along 2nd Street. Grate is oversided to trap debris.



TRAPPED INLET

Figure 3.1 Typical Cross-section of a trapped-type inlet used on 2nd Street.

North Valley Drainage Management Plan
Literature Review

Title of Report: Edit Blvd. Drainage Analysis Report
Author: Boyle Engineering
Date: November 1990
Owner/Authorizing Agency: Bernalillo County
Study Area: Bernalillo County - Edith from Osuna to Candelaria
Location: Bernalillo County
Purpose of Report: Provide Storm Drain System for Edith Blvd. Improvements from Candelaria Road to Osuna.

Drainage Area Size (sq.miles): 1.95 Square Miles
Drainage Area Boundary: Watershed Contributing to Edith Blvd. Bordered by Bear Canyon Arroyo on the North, Candelaria Road on the South, NDC on the East, and Edith on the West.
Design Event Return Period (years): 100 year
Design Event Duration (hrs): 6 hour for SD, 24 hours for ponds.
Other Events Analyzed: 10 year
Soils: Blue Point (BKD), Cut & Fill Land (CU), Embudo (EMB), Gila (GF, GB), Vinton VA, VBA (B), Wink (WEB)
Numerical Models Used (specify version): Used Rational Method for Subbasins Draining Directly to Edith Storm Drain. HYMO used for Subbasins Draining to Detention Basins.
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): "CN" for HYMO, "C" for Rational Method
Rainfall-runoff Transformation Method: HYMO
Time of Concentration Method: Upland Method SCS
Mapping Used to Delineate Watershed (Type of map): 67 Subbasins on Ortho Photo Maps
Date: 1980
Scale: 1" = 500'
Contour Interval: Unknown (AMDS Mapping)
Peak Inflow (cfs)/Location: See HYMO Runs in Report
Peak Outflow (cfs)/Location: Detention Basin #3 = 5 cfs, Detention Basin #6 = 7.5 cfs, Detention Basin #7 = 15 cfs.
Peak Volume (ac-ft)/Location: Detention Basin #3 = 42.2 AF (total), Detention Basin #6 = 3.5 AF, Detention Basin #7 = 13 AF
Peak Water Surface Elevation (ft)/Location: N/A
Describe Offsite Flows: N/A
Describe Existing Floodplains: Between Edith and ATSF Railroad
Summary of Existing Drainage Structures: MRGCD has limited discharge from Montano SD System to 15 cfs. MRGCD will allow another 10 cfs when Alameda drain improved (25 cfs total). Edith system can therefore discharge a maximum of 19 cfs into Montano system. Osuna SD designed for 10-year 6 hour Q. Excess between 100 yr. And 10 yr. goes into "New" Edith system. Vineyard development will discharge to Edith SD. Montano SD has flow restriction plate at ATSF Railway limiting Q = 15 cfs.

Summary of Proposed Drainage Structures: Detention Basin #7 to accept flow from System 10 (Muscatel Avenue to Montano). Basin #7 is limited to 15 cfs by a flow restriction plate of (discharges to Montano Road SD upstream of ATSF Railroad flow restriction plate). Detention Basin #7 also picks up 5 cfs from Detention Pond #3 force main. Detention Basin #3 (north and South) with 5 cfs P.S. System 13 drains to Detention Basin #6.

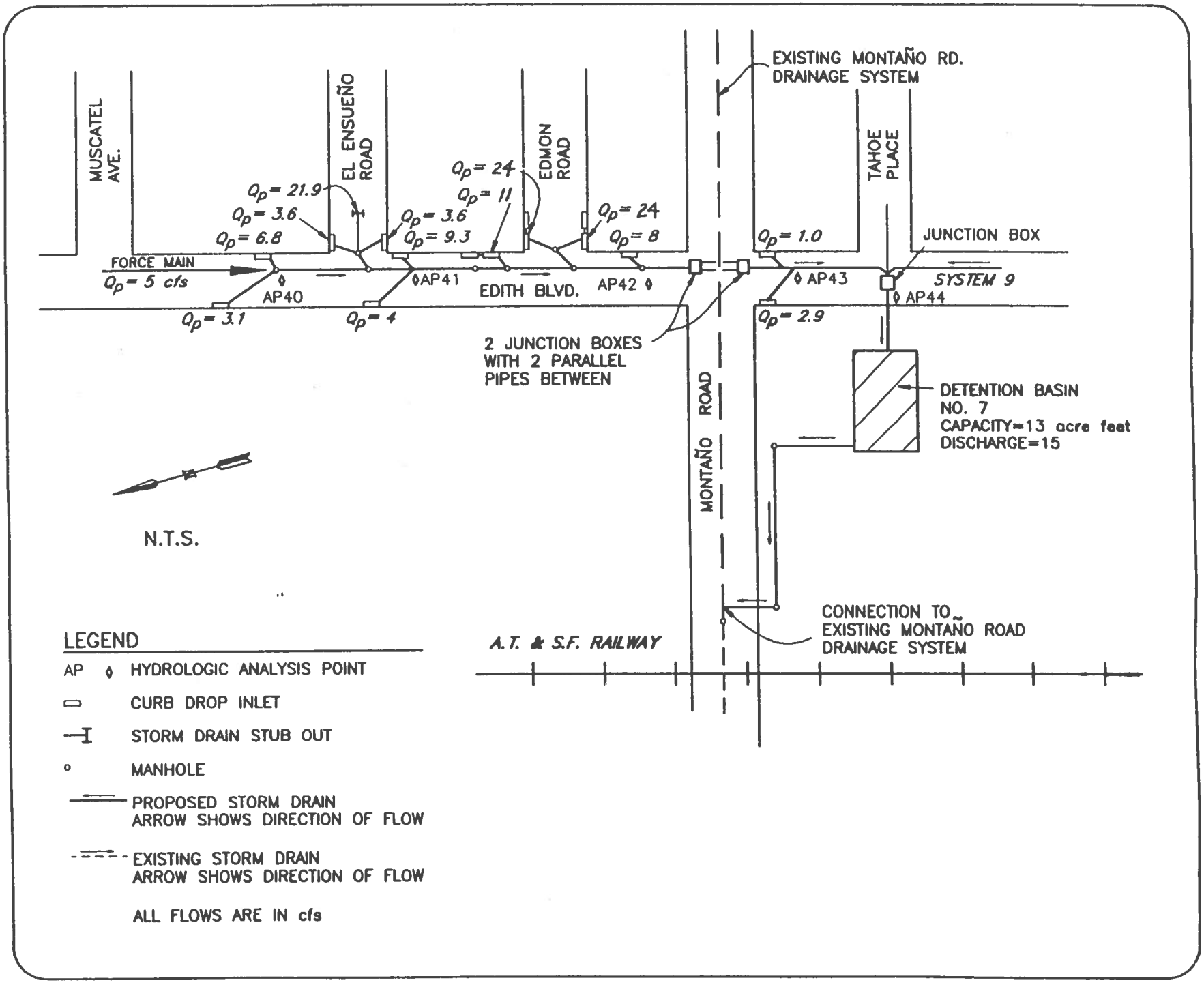
Comments:

⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

Unk = unknown information
N/A = not applicable

Reviewed by: SPK Date: 6-25-98

BOYLE ENGINEERING CORPORATION



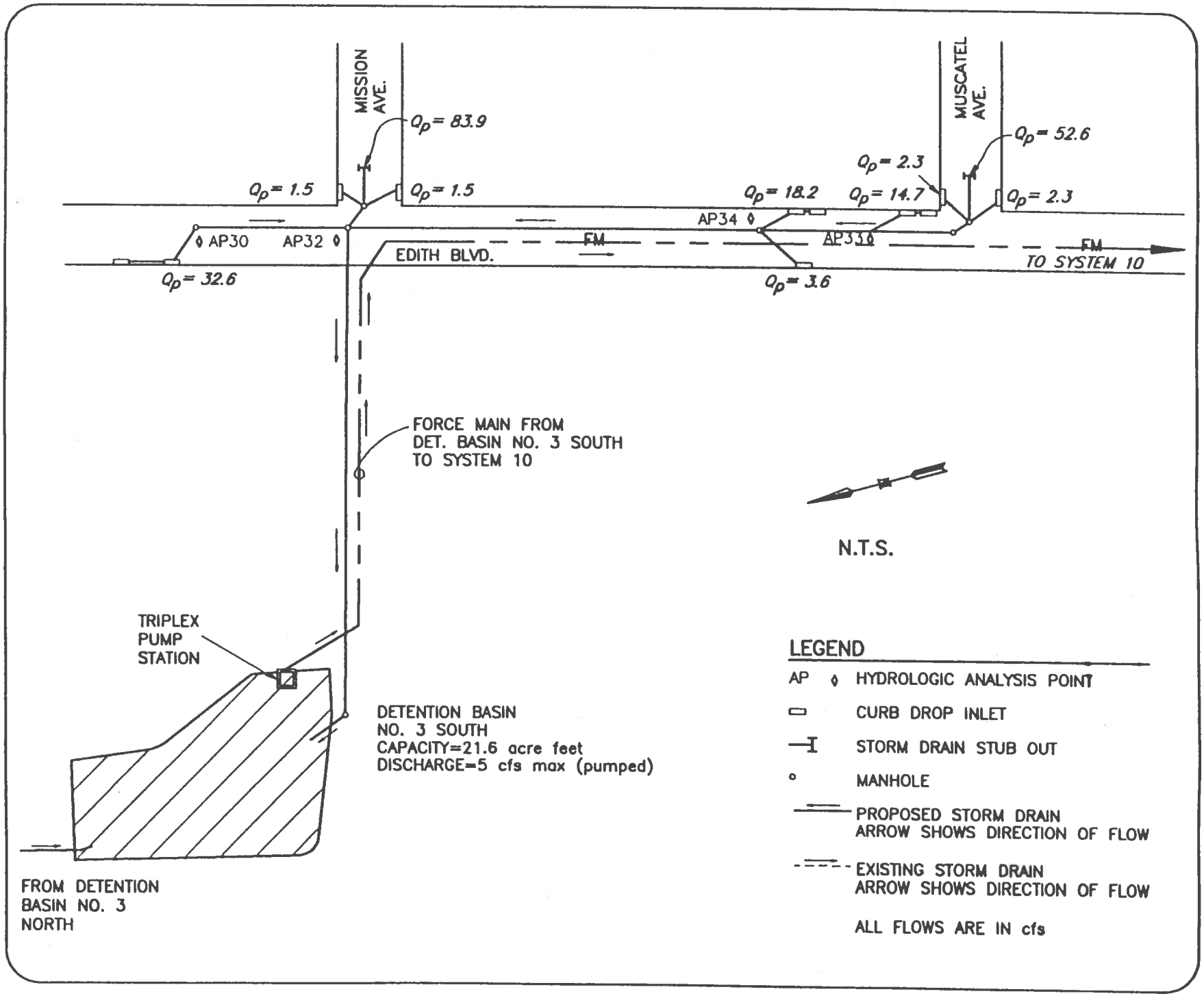
SYSTEM 10

Figure 10

BOYLE ENGINEERING CORPORATION

SYSTEM 11

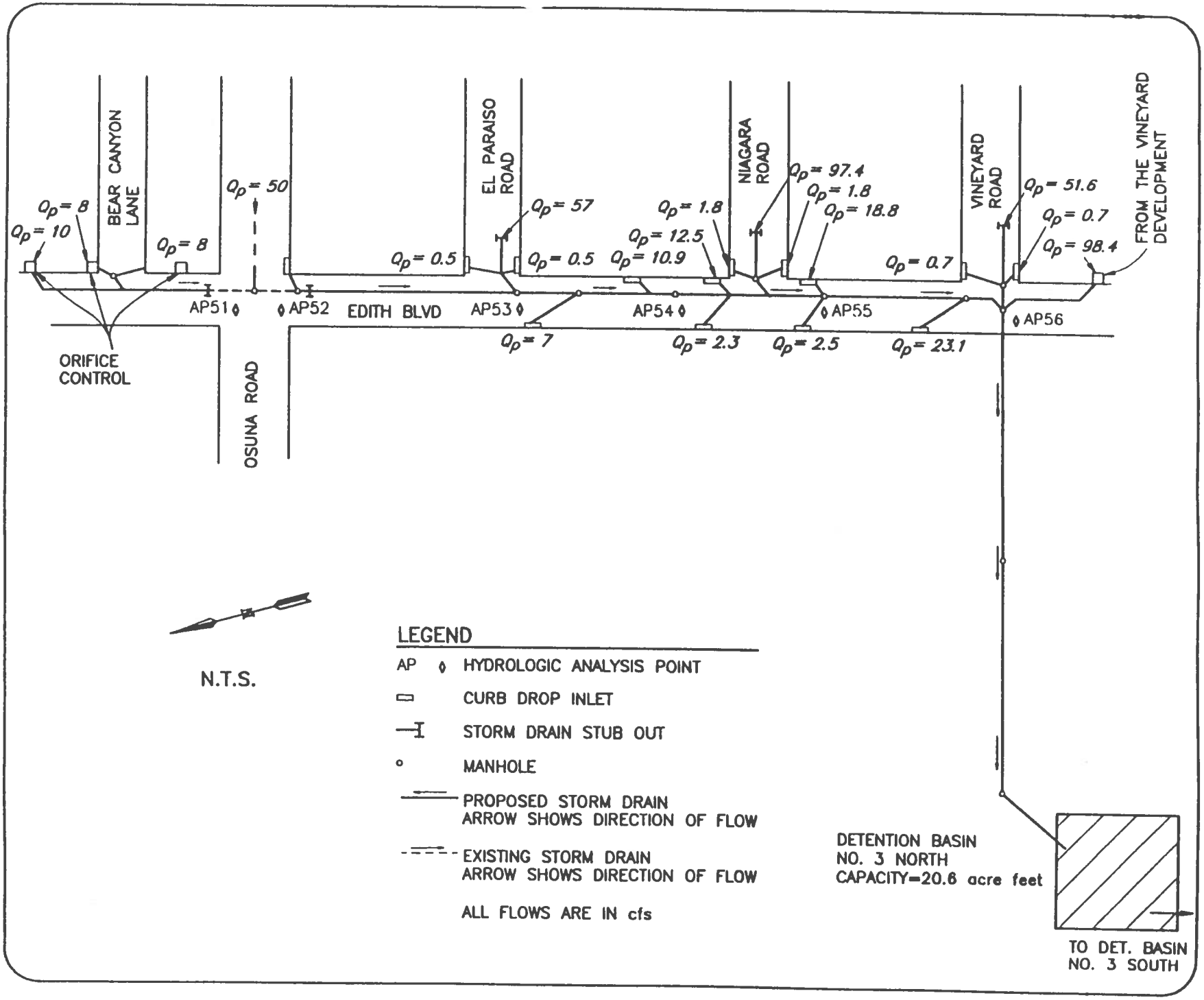
Figure 11



BOYLE ENGINEERING CORPORATION

SYSTEM 12

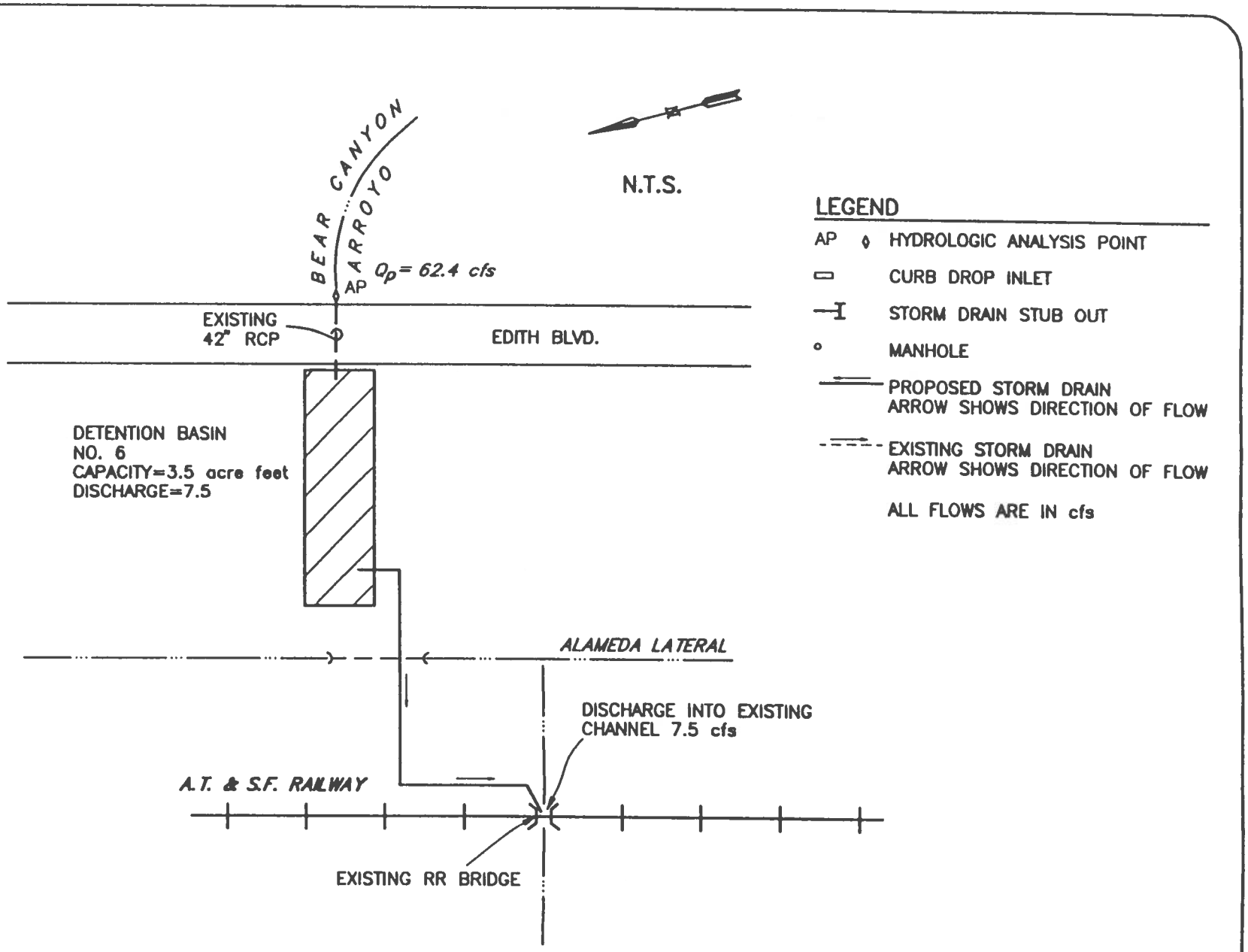
Figure 12



BOYLE ENGINEERING CORPORATION

SYSTEM 13

Figure 13



North Valley Drainage Management Plan
Literature Review

Title of Report: *North Valley Drainage in the Proximity of Paseo Del Norte
Author: Bohannan - Huston, Inc.
Date: September 1985
Owner/Authorizing Agency: City of Albuquerque
Study Area: North Valley along PDN
Location: City of Albuquerque/Bernalillo County/Los Rancho de Albuquerque
Purpose of Report: Try to alleviate flooding near PDN by using PDN system.

Drainage Area Size (sq.miles): 1.3 Square Miles to PDN Ponds
Drainage Area Boundary: Alameda on North, Riverside Drain on West, Alameda Drain on East, El Pueblo on South
Design Event Return Period (years): 100 year (for PDN system) 10 year (for surrounding offsite areas)
Design Event Duration (hrs): 1 hour.
Other Events Analyzed: N/A
Soils: Blue Point N/A
Numerical Models Used (specify version): HYMO
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): CN
Rainfall-runoff Transformation Method: N/A
Time of Concentration Method: N/A
Mapping Used to Delineate Watershed (Type of map): Unknown
Date: Unknown
Scale: Unknown
Contour Interval: Unknown
Peak Inflow (cfs)/Location: Unknown
Peak Outflow (cfs)/Location: Unknown
Peak Volume (ac-ft)/Location: Unknown
Peak Water Surface Elevation (ft)/Location: Unknown
Describe Offsite Flows: Unknown
Describe Existing Floodplains: Unknown
Summary of Existing Drainage Structures: Unknown

*Howard Stone of BHI says both reports (9/85 and 5/85) are incorrect. Ultimate System shown on attached schematic. Complimentary report "Paseo del Norte - Section B - Revised Preliminary Drainage Report" - May 1985

Summary of Proposed Drainage Structures: Various systems proposed to alleviate flooding in Alameda Drain and areas along PDN. Systems described in two reports are not accurate. Attached schematic shows existing system.

Comments:

⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

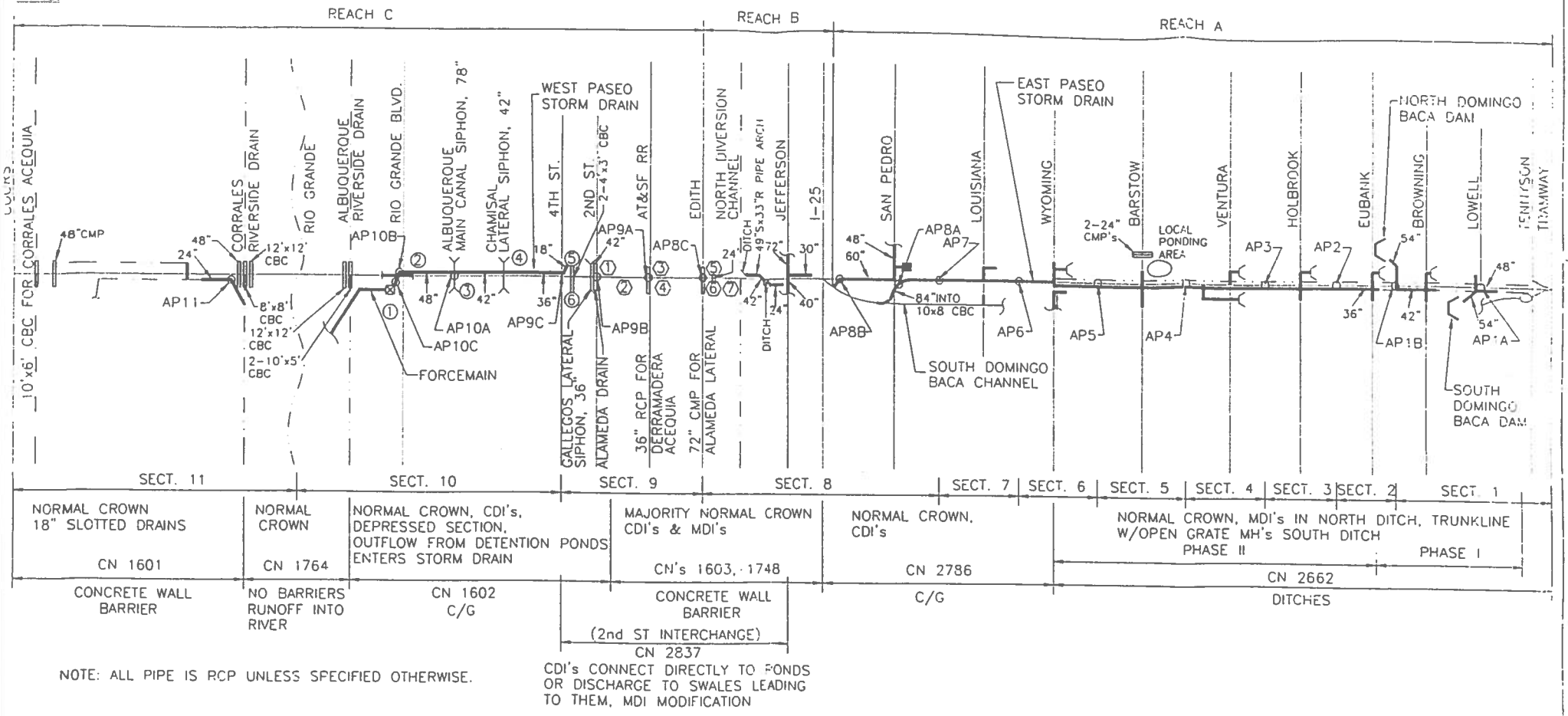
Unk = unknown information
N/A = not applicable

Reviewed by: SPK Date: 6-25-98

EXISTING DRAINAGE IMPROVEMENTS ALONG PASEO DEL NORTE FROM COORS TO TRAMWAY

AS DESIGNED, CONSTRUCTED, OR RECOMMENDED IN PREVIOUS STUDIES – REFERRED TO AS EXISTING CONDITIONS IN THIS STUDY

N.T.S.



NOTE: ALL PIPE IS RCP UNLESS SPECIFIED OTHERWISE.

LEGEND

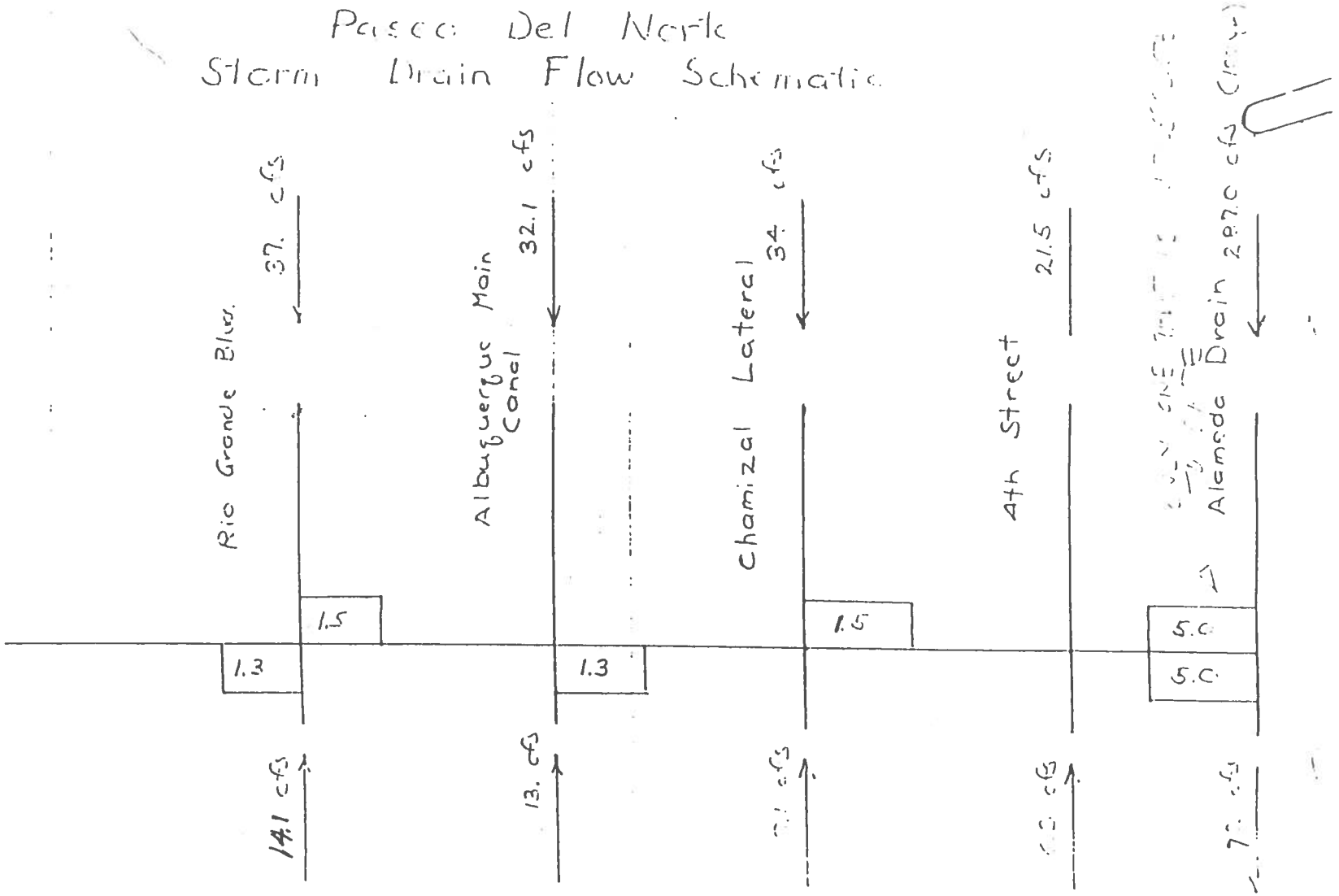
- STORM SEWER AS DESIGNED
- DOUBLE D INLET
- END SECTION
- DAM
- LIFT STATION
- AP1A ANALYSIS POINTS
- CROSSING STRUCTURE
- SIPHON
- ① DETENTION POND
- ① RETENTION POND
- ROADSIDE DITCH
- FLOW DIRECTION

PASEO DEL NORTE
EXISTING DRAINAGE
COORS TO TRAMWAY

FIGURE 1

Bohannan ▲ Huston
Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109

Paseo Del Norte
Storm Drain Flow Schematic



100 Yr Storm - ROW

10 Yr Storm - Surrounding Basins

KEY

- Pond Outflow

REVISED FLOW SCHEMATIC - GIVEN BY HOWARD STONE 11/14/88

North Valley Drainage Management Plan
Literature Review

Title of Report: Second Street North - Transportation Corridor Study
Author: Marron Knight et. al
Date: December 1992
Owner/Authorizing Agency: City of Albuquerque
Study Area: 2nd Street - Menaul to Roy Avenue
Location: Bernalillo County/City of Albuquerque

Purpose of Report: Corridor Analysis Report

Drainage Area Size (sq.miles): N/A
Drainage Area Boundary: N/A
Design Event Return Period (years): N/A
Design Event Duration (hrs): N/A
Other Events Analyzed: N/A
Soils: N/A
Numerical Models Used (specify version): N/A
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): N/A
Rainfall-runoff Transformation Method: N/A
Time of Concentration Method: N/A
Mapping Used to Delineate Watershed (Type of map): N/A
Date: N/A
Scale: N/A
Contour Interval: N/A
Peak Inflow (cfs)/Location: N/A
Peak Outflow (cfs)/Location: N/A
Peak Volume (ac-ft)/Location: N/A
Peak Water Surface Elevation (ft)/Location: N/A
Describe Offsite Flows: N/A
Describe Existing Floodplains: N/A
Summary of Existing Drainage Structures: N/A
- Bernalillo County improved 2nd Street from City Limits to Alameda Drain in 1986 to 1989.

Summary of Proposed Drainage Structures: N/A

Comments: N/A

⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

Unk = unknown information
N/A = not applicable

Reviewed by: SPK Date: 6-24-98

7/28/98 Personal communication with Rae Van Hoven, NMSHTD, says likely that when 2nd street was improved the existing catch basins were replaced with new ones. That's how NMSHTD was able to convey 2nd street runoff to Alameda Drain.

North Valley Drainage Management Plan
Literature Review

Title of Report: Second Street North - Transportation Corridor Study
Author: Marron Knight et. al
Date: April 1992
Owner/Authorizing Agency: City of Albuquerque
Study Area: 2nd Street - Menaul to Roy Avenue
Location: Bernalillo County/City of Albuquerque

Purpose of Report: Preliminary Evaluation of Non-Vehicular Travel

Drainage Area Size (sq.miles): N/A
Drainage Area Boundary: N/A
Design Event Return Period (years): N/A
Design Event Duration (hrs): N/A
Other Events Analyzed: N/A
Soils: N/A
Numerical Models Used (specify version): N/A
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): N/A
Rainfall-runoff Transformation Method: N/A
Time of Concentration Method: N/A
Mapping Used to Delineate Watershed (Type of map): N/A
Date: N/A
Scale: N/A
Contour Interval: N/A
Peak Inflow (cfs)/Location: N/A
Peak Outflow (cfs)/Location: N/A
Peak Volume (ac-ft)/Location: N/A
Peak Water Surface Elevation (ft)/Location: N/A
Describe Offsite Flows: N/A
Describe Existing Floodplains: N/A
Summary of Existing Drainage Structures: N/A

- Alameda Drain has 80 Storm water Inlets within Study Area
- Alameda Drain has 100' Row
- Excess flow in Alameda Drain diverted to PDN System
- Existing and Proposed 2nd Street Improvements Discharge to Alameda Drain.
- Alameda Drain Study 1991 said No Adverse Water Quality Products Due to Enlarging Alameda Drain or Adding More 2nd Street Flow
- MRGCD Alameda Drain Contained within Easements From 1930's for Irrigation and Drainage Purposes

Land under Drain Owned by Private Individuals, MRGCD, Bernalillo County and the State

Summary of Proposed Drainage Structures: N/A

Comments: N/A

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Unk = unknown information
N/A = not applicable

Reviewed by: SPK Date: 6-24-98

North Valley Drainage Management Plan
Literature Review

Title of Report: Alameda Blvd. - 2nd Street to Coors Blvd.
Author: Wilson & Company
Date: February 15, 1991
Owner/Authorizing Agency: NMSHTD
Study Area: Alameda - 2nd Street to Coors Blvd.
Location: Bernalillo County

Purpose of Report: Hydrologic and hydraulic analysis for Alameda Blvd. project.

Drainage Area Size (sq.miles): See attached
Drainage Area Boundary:
Design Event Return Period (years): 100 years
Design Event Duration (hrs): 6 hour
Other Events Analyzed: 10 year - 6 hour for spacing of inlets
Soils: Fairly level, well drained soils which generally drain from the North to South

Numerical Models Used (specify version): Q's with HYMO were compared with rational method - Hydraflow Volume III - WSEL Profiles
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): IA/ IF Method
Rainfall-runoff Transformation Method:
Time of Concentration Method: PPM 22.2 Part A
Mapping Used to Delineate Watershed (Type of map ACAD DTM
Date: 2/5/1991
Scale: 1" = 200'
Contour Interval:
Peak Inflow (cfs)/Location:
Peak Outflow (cfs)/Location:
Peak Volume (ac-ft)/Location:
Peak Water Surface Elevation (ft)/Location:
Describe Offsite Flows:
Describe Existing Floodplains:
Summary of Existing Drainage Structures: System 1 - 60" pipe from STA 21 + 67 to Sta 31 + 50 (See Plate 1) 30" pipe from Sta 24 + 40 to Sta 31 + 50 (See Plate 1) System 2 - Series of pipes (60", 54", 48", 36") collect water from roadway and adjacent sub-basins that discharge into detention pond. Runoff in pond will then be conveyed under the Rio Grande into the wet well of a proposed lift station. System 3 - Series of pipes (48", 42") will convey flow from roadway and adjacent sub-basins to an ultimate discharge point at the Alameda Drain.

Summary of Proposed Drainage Structures: See Above

Comments All of the drainage within this watershed is handled on site and is taken out by means of draining to the river or to area drains..

⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

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N/A = not applicable

Reviewed by: CJR Date: 5-14-98

Drainage Area Size

System 1 Coors Boulevard to the River Bridge
Drainage Area = 50.3 acres

System 2 Chamisal Drain to the River Bridge
Drainage Area = 50.1 acres

System 3 Chamisal Drain to the Alameda Drain
Drainage Area = 23.6 acres

North Valley Drainage Management Plan
Literature Review

Title of Report: Phase I of the Montano Corridor from Rio Grande Blvd. to Edith
Author: Wilson & Company
Date: March 1986
Owner/Authorizing Agency: COA
Study Area: Montano Road Corridor between Rio Grande Blvd & 2nd Street (or Edith)
Location: City of Albuquerque

Purpose of Report To prevent roadway flooding as development west of Guadalupe occurs.

Drainage Area Size (sq.miles):0.220 (+ flows also from Alameda Drain)
Drainage Area Boundary: A strip along Montano Rd. approx. 400 ft. in width, plus a triangular portion on the No. side of Montano Rd. from the Griegos lateral almost to Guadalupe Trail.

Design Event Return Period (years): 100 years
Design Event Duration (hrs): 6 hour
Other Events Analyzed: Unk
Soils: Unk - but surface is mostly roadway

Numerical Models Used (specify version): City of Albuquerque modified SCS Method or similar method (from COA DPM Edition at time of report)
Infiltration Loss Method (if AHYMO used then specify if land treatments A, B, C, D used or curve numbers): Unk
Rainfall-runoff Transformation Method: Unk
Time of Concentration Method:
Mapping Used to Delineate Watershed (Type of map COA Transportation Dept.
Date: Unk
Scale: 1" = 200'
Contour Interval: Unk
Peak Inflow (cfs)/Location: N/A
Peak Outflow (cfs)/Location: N/A
Peak Volume (ac-ft)/Location: N/A
Peak Water Surface Elevation (ft)/Location: N/A
Describe Offsite Flows: 130 cfs from the Alameda Drain during peak flows

Describe Existing Floodplains: None
Summary of Existing Drainage Structures: Major drainage outlets are the Alameda Drain, the Rio Grande River, and to a limited extent, the Riverside Drains. Storm drains at the 4th Street and 2nd Street intersections are 18 inch. Storm drain from a low area South of the Guadalupe Trail to the Griegos Drain.

Summary of Proposed Drainage Structures: 60" - 66" storm drain from the Alameda Drain to a pumping station at Rio Grande Blvd. which will be discharged to the Rio Grande. A tee will be provided at the Guadalupe Trail to Receive a sewer draining the low area south of Montano.

Comments

⇒ Attach a copy of map showing the existing drainage facilities and any proposed drainage facilities described in this report that have been built since the report was completed. Include: location, size, name, design peak flow, and for detention basins include design volume and water surface elevation. Make sure that the map has enough detail so that the information can be transposed to our projects overall base map later on.

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N/A = not applicable

Reviewed by: SKM Date: 5-21-98

"Submittal of Drainage Flow/Basin Map for Montano Corridor" supplemental letter dated 10 March 1997 by Wilson & Company to City of Albuquerque.

Total existing Q to Montano SD System (East of Alameda Drain) is 54 cfs. Total flow at Alameda Drain (less 30 cfs outfall to drain) is 80 cfs. This leaves 30 cfs for drainage area 200' North and South of Montano center line. Total Q at P.S. is 110 cfs (capacity is 95 cfs). Report concludes 110 cfs ok due to routing and storage effects.

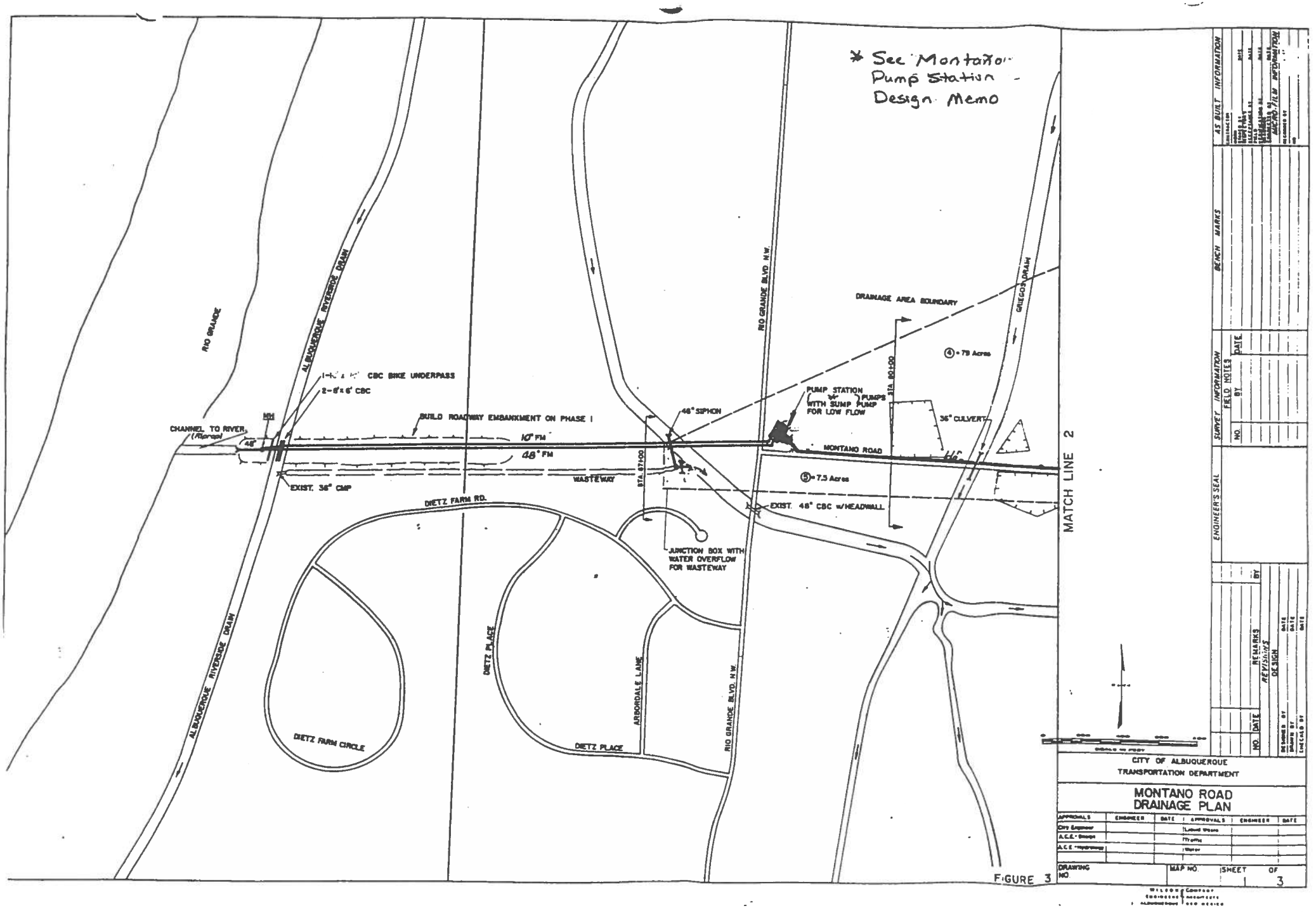
* See Montano Pump Station Design Memo
RIO GRANDE
ALBUQUERQUE RIVERSIDE DRAIN
CBC BIKE UNDERPASS
2-8'x6' CBC
CHANNEL TO RIVER (Riprap)
BUILD ROADWAY EMBANKMENT ON PHASE I
10" FM
48" FM
WASTEWAY
EXIST. 36" CMP
DIETZ FARM RD.
DIETZ FARM CIRCLE
DIETZ PLACE
ARBORDALE LANE
RIO GRANDE BLVD. N.W.
46" SIPHON
PUMP STATION
3 PUMPS WITH SUMP PUMP FOR LOW FLOW
JUNCTION BOX WITH WATER OVERFLOW FOR WASTEWAY
DRAINAGE AREA BOUNDARY
④ = 7.9 Acres
⑤ = 7.5 Acres
36" CULVERT
MONTANO ROAD
EXIST. 48" CBC w/HEADWALL
GRIEGOS DRAIN
MATCH LINE 2
AS BUILT INFORMATION
BENCH MARKS
SURVEY INFORMATION
FIELD NOTES
ENGINEER'S SEAL
REMARKS
REVISIONS
DESIGN
CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT
MONTANO ROAD
DRAINAGE PLAN
APPROVALS
ENGINEER
DATE
City Engineer
A.C.E. - Design
A.C.E. - Hydrology
DRAWING NO.
MAP NO.
SHEET 1 OF 3
WILSON & Company
ENGINEERS
ALBUQUERQUE NEW MEXICO

FIGURE 3