

**MASTER DEVELOPMENT DRAINAGE PLAN
FOR
NORTHGATE CORPORATE VILLAGE NORTH
(Monument Branch Basin)**

RETURN WITHIN 2 WEEKS TO:
CITY OF COLORADO SPRINGS
STORM WATER & SUBDIVISION
101 W. COSTILLA, SUITE 113
COLORADO SPRINGS, CO 80903
(719) 385-5979



J-R ENGINEERING
A Subsidiary of Westrian



**MASTER DEVELOPMENT DRAINAGE PLAN
FOR
NORTHGATE CORPORATE VILLAGE NORTH
(Monument Branch Basin)**

November 1999
Revised February 2000
Revised August 2000

Prepared For:

PICOLAN, INC.
90 South Cascade, Suite 1300
Colorado Springs, CO 80903
(719) 381-8441

Prepared By:

JR ENGINEERING
4310 ArrowsWest Drive
Colorado Springs, CO 80907
(719) 593-2593

Job No. 8896.55

MASTER DEVELOPMENT DRAINAGE PLAN
FOR
NORTHGATE CORPORATE VILLAGE NORTH
DRAINAGE REPORT STATEMENT



ENGINEER'S STATEMENT:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

L. D. Rubey
Luanne D. Rubey, Colorado P.E. #32339
For and On Behalf of JR Engineering

8.16.00
Date

DEVELOPER'S STATEMENT:

I, the developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name: Picolan, Inc.
By: [Signature]
Title: Vice Pres
Address: 90 South Cascade, Suite 1300
Colorado Springs, CO 80903

CITY OF COLORADO SPRINGS ONLY:

Filed in accordance with Section 15-3-906 of the Code of the City of Colorado Springs, 1980, as amended.

[Signature]
City Engineer

Sept 10, 2000
Date

Conditions:

**MASTER DEVELOPMENT DRAINAGE PLAN
FOR
NORTHGATE CORPORATE VILLAGE NORTH**

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MASTER DEVELOPMENT DRAINAGE PLAN FOR NORTHGATE CORPORATE VILLAGE NORTH

PURPOSE

This document is the Master Development Drainage Plan for Northgate Corporate Village North. The purpose of this report is to identify major drainageways, culvert, storm sewer, and inlet locations, and areas tributary to this site. This report will analyze overall routing for developed flows based upon the previously approved drainage studies and recommend outfall locations to transfer these flows to their respective discharge points. In addition, the general location of private and regional detention facilities will be discussed. This report does not attempt to size or locate the minor storm facility system due to the unknown nature of the ultimate land use and street configuration. This report is only intended to modify the Monument Branch portion of the Northgate Master Development Drainage Plan by URS Consultants, Inc. dated June 27, 1988.

GENERAL DESCRIPTION

The Northgate Corporate Village North is located in a portion of Sections 5, 6, 7 and 8, Township 12 South, Range 66 West of the Sixth Principal Meridian in the City of Colorado Springs. County of El Paso. The site is bounded to the north by the proposed Northgate Highlands site, Northgate Road, the Mining Museum, and unzoned county land; to the west by the USAFA land, to the south by Middle Creek Manor (zoned R1-6000) and unzoned county property. The Northgate Software Campus (zoned PIP-1), (referred to as the Stout Parcel); and to the east by unzoned county property.

The entire site is located within the Monument Branch Basin. This area has been previously studied in the following reports: "Monument Branch Drainage Basin Planning Study (D.B.P.S.)," by URS Consultants, Inc., dated August 6, 1987; "Northgate Master Development Drainage Plan," by URS Consultants, Inc., dated June 27, 1988; "Master Development Drainage Plan for Northgate Software Campus (Monument Branch and Middle Tributary Basins)," by JR Engineering, dated January 28, 1999; and the "Preliminary / Final Drainage Report for Northgate Filing No. 7 Voyager Parkway Phase 2 (2000 feet North of Middle Creek Parkway to Northgate Road)," by JR Engineering, dated

February, 1999.

The entire site currently has an approved Master Plan entitled “Northgate Master Plan,” by NES, Inc., dated February 9, 1999. (See appendix for map). Most of the site is to be developed as PIP – I with high-rise overlay with commercial/office buildings with a small portion of multi-family, single-family, community commercial and a middle school/high school, fire station and open space per the approved master plan.

The average soil condition reflects Hydrologic Group “B” (Tomah-Peyton-Pring Loamy Sands/Sandy Loams), and “D” (Kettle-Rock Outcrop Complex), as determined by the “Soil Survey of El Paso County Area,” prepared by S.C.S. (see map in appendix). The majority of the site (approx. 95%) is classified as the Tomah/Peyton/Pring. Therefore, Hydrologic Group “B” was assumed for the calculations in this report.

Currently, Voyager Parkway has been graded up to Northgate Road. Storm sewer, water main sanitary sewer, fiber optics, and curb and gutter have been installed within the right-of-way as of the writing of this report. This roadway divides the site into an easterly and westerly portion. Also, the temporary detention basins “A” and “B” are currently under construction along the westerly right-of-way of Voyager Parkway. An existing right-of-way of overhead utility lines currently exists on the site.

EXISTING ENVIRONMENTAL SITE RESTRICTIONS

Certain environmental constraints exist on the site due to the location of existing wetlands and identified Prebles Meadow Jumping Mouse (PMJM) habitat. The Northgate owner, Picolan Inc., is currently in the process of obtaining permits from the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service based upon field investigations and work done in the area by Janetta Shepard of Aquatics and Wetlands Company and Trent Miller of SWCA. Once obtained, these permits will allow for development to take place in the identified areas as long as mitigation to replace habitat/wetlands is also completed. As on Smith Creek, these environmental concerns bring into question the D.B.P.S.’s recommendation for channel lining and drop structures and any

improvements within these environmentally sensitive areas. Since the D.B.P.S. was written without the knowledge of these constraints, it is now necessary to establish which improvements will be required. In addition, Powers Boulevard is now potentially located within this study area. This alignment was not considered in the original drainage studies.

For the Monument Branch D.B.P.S.'s proposed partially lined channels upstream of the two box culverts at Voyager Parkway (Reach 4 and 7-within Northgate), we propose that a modified prudent line approach along with check structures be implemented to minimize impacts to the existing wetlands and vegetation, maintain the natural channel, and protect future development from bank migration. These existing channels have not exhibited significant erosion due to historic flows and have established vegetative cover.

For the Monument Branch D.B.P.S.'s partially lined channel downstream of the northerly box culvert under Voyager Parkway (Reach 5-within Northgate) no channel improvements are proposed due to the existing PMJM habitat.

ON-SITE VS. REGIONAL DETENTION

Due to many factors, including the restrictions placed upon the site by the environmental concerns, Picolan, Inc. has decided to require each site within Northgate to restrict developed flows to the 5 and 100-year historic rates from each site as it is developed. These on-site detention facilities will be privately owned and maintained. Regional detention facilities to collect and restrict flows from the proposed public roads will be constructed by Picolan, Inc. and then conveyed to the city for the city to own and maintain. These facilities will be located at the primary discharge points adjacent to common property lines at the Stout Parcel and the Air Force Academy. Further, the ponds are proposed to be designed using the water quality capture technique to further protect the downstream properties (See Figure II).

EXISTING/PROPOSED DRAINAGE CHARACTERISTICS

The Northgate Corporate Village North is located within the Monument Branch Drainage Basin. The "Monument Branch Drainage Basin Planning Study (D.B.P.S.)," by URS, Inc., 1987, and the "Northgate Master Development Drainage Plan (M.D.D.P.)," by URS, Inc., 1988, have previously studied this area. In addition, the "M.D.D.P. for Northgate Software Campus (Monument Branch and Middle Tributary Basins)," by JR Engineering, dated January 28, 1999, and the "Preliminary/Final Drainage Report for Northgate Filing No. 7 Voyager Parkway Phase 2," by JR Engineering, dated February 17, 1999, also studied portions of this area.

The existing stormwater runoff within the Monument Branch Basin currently flows overland in a southwesterly direction from the north and northwesterly direction from the south into the Monument Branch Basin. The existing slopes vary from 3% to 25%, with most of the site at approximately 4%. Figure I, the Existing Conditions Drainage Map identifies sub-basins which are tributary to the Monument Branch Basin and which are within the subject site. The Future Conditions Drainage Map, Figure II, identifies five (5) public regional detention facilities and seventeen (17) private detention facilities. The public regional detention facilities are to be owned and maintained by the City of Colorado Springs. The private detention facilities are to be privately owned and maintained. A schematic lay out of the storm sewer facilities is also shown on the Future Conditions Drainage Map.

The following detailed explanation of the existing drainage sub-basins begins at the northwesterly property line and continues by design point to the south and then to the east.

Design Point 12-A is the point at which flows from Sub-basin P2 (Tract KK and a portion of Northgate Campus Filing No. 1) exits the site and flows overland in a westerly direction onto the U.S.A.F.A. property. These flows were identified as $Q_{10} = 55$ cfs, $Q_{100} = 103$ cfs for the 48-acre tributary area in the D.B.P.S. and M.D.D.P. The D.B.P.S. and M.D.D.P. both show that flows in excess of $Q_{100} = 80$ cfs being diverted to other basins to the south due to a capacity limitation of the culvert at I-25. However, this report proposes that a regional detention basin be constructed at this location. The allowable outfall in the 100-year condition will be limited to 80 cfs.

Design Point 11-A is the point at which flows from Tracts LL, GG, HH, MM, Sub-basins M, N, L, K, E, D, F, O, and G, (Basins Q2, M, and L in the D.B.P.S. and M.D.D.P.) combine in a channelized flow and exit the site onto the U.S.A.F.A. The D.B.P.S. and M.D.D.P. identified the historic flows at this point to be $Q_{10} = 261$ cfs, $Q_{100} = 730$ cfs. The existing culvert at DP-11B is undersized per the D.B.P.S. and thus, the historic flows to this point do not reflect the anticipated upstream diversion of flows to alleviate the capacity problem at Design Point 11B. It is anticipated that the proposed release at this point will be $Q_5 = 169$ cfs, $Q_{100} = 351$ cfs. A portion of the historic flow to this point will be diverted into the north branch of the Monument Branch Tributary at Design Point 10-A.

From the south, historic flows from the existing steep slopes will continue to flow overland in a northwesterly direction to the South Branch of the Monument Branch Tributary. A regional detention facility, as recommended in the D.B.P.S. and the M.D.D.P. is proposed at Design Point 21. The anticipated release at this point is $Q_5 = 25$ cfs, $Q_{100} = 46$ cfs.

Design Point 10-A is the point at which the diverted flows from upstream Basins G, O, F, D, E, M, N, L, and K will enter the north branch of the Monument Branch Tributary. These flows are diverted to this point in keeping with the recommendation of the D.B.P.S. and the M.D.D.P. in order to reduce the total flow to Design Point 11-B. The allowable release at this location is $Q_5 = 141$ cfs, $Q_{100} = 152$ cfs. These flows are based upon calculated values in the D.B.P.S. and original M.D.D.P.

Design Point 10-B is located just east of the existing 10'X12' concrete box culvert in Voyager Parkway. Historic flows from upstream basin C will be released at this point at the historic rate of $Q_5 = 18.6$ cfs, $Q_{100} = 45.6$ cfs.

Design Point 8-C is located on the easterly property line, south of Northgate Road. At this point, historic flows of $Q_5 = 16.9$ cfs, $Q_{100} = 41.3$ cfs will be released at the existing shallow channel.

Design Point 19 is the point at which flows from the South Fork of Monument Branch enter the Stout parcel. These flows are detained in Regional Pond SS1 and released at historic rates.

MONUMENT BRANCH CHANNEL IMPROVEMENTS

The D.B.P.S. and M.D.D.P. prepared by URS in the 1980's recommended partially lined channels be constructed on both forks of Monument Branch from upstream of Northgate to the Air Force Academy boundary. These studies were performed prior to the change in environmental constraints that exist today. Further, these channels were expected to carry developed flows through long reaches to downstream regional detention ponds.

This report attempts to address the environmental constraints and provide a reasonable drainage solution. The basis of the proposal is to limit the channels requirements to convey developed flows and use a modified prudent line technique to determine safe building setbacks.

The southern fork of Monument Branch is proposed to have the following improvements:

- A. Regional detention pond just upstream of Northgate's east property line (DP#3).
- B. The reach upstream of Voyager Parkway is proposed to be stabilized by installation of check structures. These structures will be set to allow the channel to erode to a 0.5% bottom slope.
- C. Development along this reach will be setback to allow channel degradation based upon the creek structures.
- D. A regional detention pond (SS1) will be placed at the Stout parcel to further control flows.
- E. No improvements are proposed downstream to the confluence with the north branch; however, this reach will require further study as the Stout property develops.

The North Fork is proposed to have the following improvements:

- A. Regional detention pond upstream of Northgate property (DP22).
- B. The reach upstream of Voyager Parkway is proposed to be stabilized by installation of check structures. These structures will be set to allow the channel to erode to a 0.5% bottom slope.
- C. Development along this reach will be setback to allow channel degradation based upon the creek structures.
- D. A private detention pond will be located just upstream of Voyager Parkway. This detention pond will receive flows from Tract B-1 and control the release of these flows to historic levels.
- E. A regional detention pond (JJ2) will be placed at a major tributary to the North Fork. This

pond will control flows to historic levels.

- F. No improvements are proposed downstream to the confluence with the south branch; however, this reach will require further study as the Stout property develops.

REGIONAL DETENTION POND PHASING

Because of the use of private on-site detention ponds on the majority of developments in this area, the requirement for the public detention facilities at the major property boundaries is not immediate.

The following events are suggested to be the “trigger” for construction of the public facilities:

Pond KK (Northwest drainage onto U.S.A.F.A.)

This pond collects runoff from Tract KK and potentially a portion of the improved Northgate Road. The impetus for constructing this pond would either be the development of Parcel KK or the decision to drain a portion of Northgate Road improvements to this location.

Pond MM2 (Central drainage onto U.S.A.F.A.)

This pond collects runoff from the proposed loop road, Northgate Campus Filing No. 1, Tracts GG, HH, JJ, MM, and LL.

The south half of Northgate Road will follow historic drainage patterns to the southwest. Where necessary, inlets and a pipe system will be installed to convey flows to Pond KK.

Currently there are plans to develop Northgate Campus Filing No. 1 into an office park over three phases, which also include phased construction of the loop road.

It is proposed that the first two phases shown on the concept plan can develop without requiring the need of the public pond. Private on-site detention will be utilized with each phase to release at historic rates of flow. As the loop road is constructed, a temporary pond will be constructed at each terminus. This would allow approximately 45-acres of upstream development to occur prior to triggering the need for the public facility at the U.S.A.F.A.

It is assumed that Powers Boulevard will be constructed as an elevated road in this area. Detention for Powers may be provided within the right-of-way, beneath the road.

Pond No. 21 (Southern drainage onto U.S.A.F.A.)

This pond will be required with any development of the Software Park adjacent to the Oracle Development that is within the Monument Branch Basin.

Pond JJ2 (At tributary to North Fork at Monument Branch)

This pond construction becomes necessary with the development of Parcel JJ or the southern segment of the loop road.

Pond SS1 (Stout Parcel boundary)

This pond becomes necessary with the proposed development of either Parcel B1 or L.

HYDROLOGIC CALCULATIONS

Due to the large size of the Tributary area, Monument Branch D.B.P.S. was done using the TR-20 computer model for determining the hydrographs and hydrologic routing of the given storm events for the main channel. Per the D.B.P.S., "flows for sub-basins should be calculated using the Rational Method." In the proposed condition, all sub-basins within the Northgate Corporate Village North's M.D.D.P. area are to be less than 100-acres. Therefore, the modified Rational Method was used to estimate storm water runoff anticipated from design storms with 5-year and 100-year recurrence interval. All facilities calculated in this report are designed to accept both 5-year and 100-year flows. Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994.

FLOODPLAIN STATEMENT

No portion of this site is within a designated F.E.M.A. floodplain as determined by Flood Insurance Rate Map Community Panel Number 080060-0040B, effective December 18, 1986. See the Appendix for a Floodplain Information Map, which shows the location of the site. This area has not

incorporated this basin into their flood hazard study.

DRAINAGE FEES

Drainage fees shall be calculated at the time of final drainage reports.

SUMMARY

The overall plan for the Northgate Corporate Village North is to restrict the developed flows from the site to the historic rates in the 5-year and 100-year storm events. This will be accomplished by constructing both private and public detention facilities within the development. Originally, the M.D.D.P. and D.B.P.S. recommended regional detention facilities for this development. Due to environmental issues, this M.D.D.P. now recommends private onsite detention facilities with regional detention facilities for the public roads. In addition, it is also recommended that a modified prudent line method along with the construction of check structures (in areas which are not classified as Prebles Meadow Jumping Mouse habitat) be used to stabilize the Monument Branch channel in place of the previously recommended partially lined channels.

PREPARED BY:

JR Engineering

Luanne D. Rubey, P.E.
Project Manager

ew-889655/MDDP-RPT.nov99.doc

REFERENCES

1. "Monument Branch Drainage Basin Planning Study," URS, Inc., April 1987, revised August 6, 1987.
2. "Northgate Master Development Drainage Plan (Monument Branch and Middle Tributary Basins)," URS, Inc., December 1987, revised June 27, 1988.
3. "Northgate Phase 1 Drainage Plan," URS, Inc., October 6, 1987 (addendum date).
4. "Preliminary/Final Drainage Report for Northgate Filing No. 7 –Voyager Parkway Phase 2," JR Engineering, February 1999.
5. City of Colorado Springs/County of El Paso Drainage Criteria Manual, dated November 1991.
6. Soils Survey of El Paso County Area, Colorado Soil Conservation Service.
7. "Northgate Master Plan Amendment," NES, Inc., February 9, 1999.
8. "Master Development Drainage Plan for Northgate Software Campus (Monument Branch and Middle Tributary Basins)," JR Engineering, January 1999.
9. "Master Development Drainage Plan for Northgate Highlands," JR Engineering, August 1999.

APPENDICES

**LANDOWNER NOTIFICATION FOR
DETENTION POND CONSTRUCTION**

THE FOLLOWING LETTER IS FROM THE NORTHGATE MASTER DEVELOPMENT DRAINAGE PLAN FOR MONUMENT BRANCH AND MIDDLE TRIBUTARY BASINS DATED DECEMBER 1987. IT IS INCLUDED IN THIS REPORT AND IS STILL A VALID CONDITION TO THIS REPORT.



THE OLIVE COMPANY

RECEIVED
PUBLIC WORKS DEPARTMENT
CITY OF COLORADO SPRINGS

OCT 28 1988

CITY OF COLORADO SPRINGS

October 26, 1988

Mr. Chris Smith, Subdivision Administrator
Public Works Department
City Engineering Division
City of Colorado Springs
P.O. Box 1575
Colorado Springs, CO 80901

RE: Landowner Notification for Detention Pond Construction
on Existing or Future Development within the City of
Colorado Springs Middle Tributary and Monument Branch
Drainage Basins

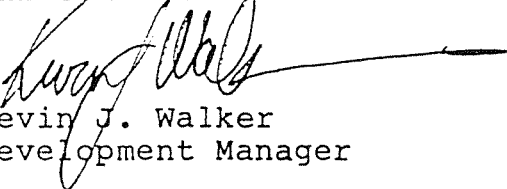
Dear Chris:

Please find attached a copy of the executed letter setting forth our agreement regarding the above notification of property owners within NORTHGATE. I appreciate your efforts in this regard and feel that we have reached an equitable solution so that we may proceed ahead with orderly development of drainage facilities within our NORTHGATE development.

Please contact me (or Tom Berg) if you should have any questions or further comments regarding this item.

Sincerely,

THE OLIVE COMPANY


Kevin J. Walker
Development Manager

KJW/jb
Enclosure

cc: Tom Berg

CITY OF COLORADO SPRINGS

The "America the Beautiful" City

DEPARTMENT OF PUBLIC WORKS

CITY ENGINEERING DIVISION (719) 578-6606

30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

October 11, 1988

The Olive Company
3550 North Academy Blvd.
Colorado Springs, CO 80907
Attn: Kevin Walker

RE: Landowner notification for detention pond construction on existing or future development within the City of Colorado Springs Middle Tributary and Monument Branch drainage basins.

Dear Mr. Walker:

Per our previous discussions, it is the understanding of the City of Colorado Springs Engineering Division that at the Development Plan-Preliminary Plat Stage of the platting process for all proposed development which occurs within the boundaries of the Monument Branch and Middle Tributary drainage basins, that a preliminary drainage report will be prepared which definitively states the necessity for and construction of detention ponds as called for in the Monument Branch and Middle Tributary Master drainage basin studies. The preliminary drainage report for each parcel will state whether or not a pond is to be constructed on the property, or as an alternative, whether the property being platted must construct a pond upstream to insure that the over detention referred to in portions of the master drainage basin reports is accomplished. The preliminary drainage report will be submitted to the City Engineering Division concurrently with the plat submittals or developmental plan submittals to the City Planning department. Furthermore is this Divisions understanding that no parcels within Northgate are exempt from this requirement.

Prior to final plat approval of any parcel within the Northgate ownership, a final drainage report will be submitted to the City Engineering for review and approval. The final drainage report will indicate any detention ponds located on the property and define easements required for those ponds. If ponds are constructed upstream of the property which is being platted the pond will be located accordingly and the appropriate easements will be granted prior to final plat approval of that subdivision.

If this letter correctly sets for our agreement, would you please sign the enclosed copy of this letter and return it to us while keeping a copy for your own files.

Landowner Notification
October 11, 1988
Page Two

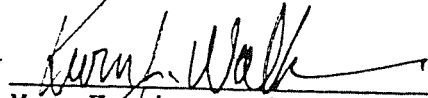
Sincerely,



Chris Smith
Subdivision Administrator

This letter correctly sets for the agreement we have reached between the City of Colorado Springs and the Northgate property owners.

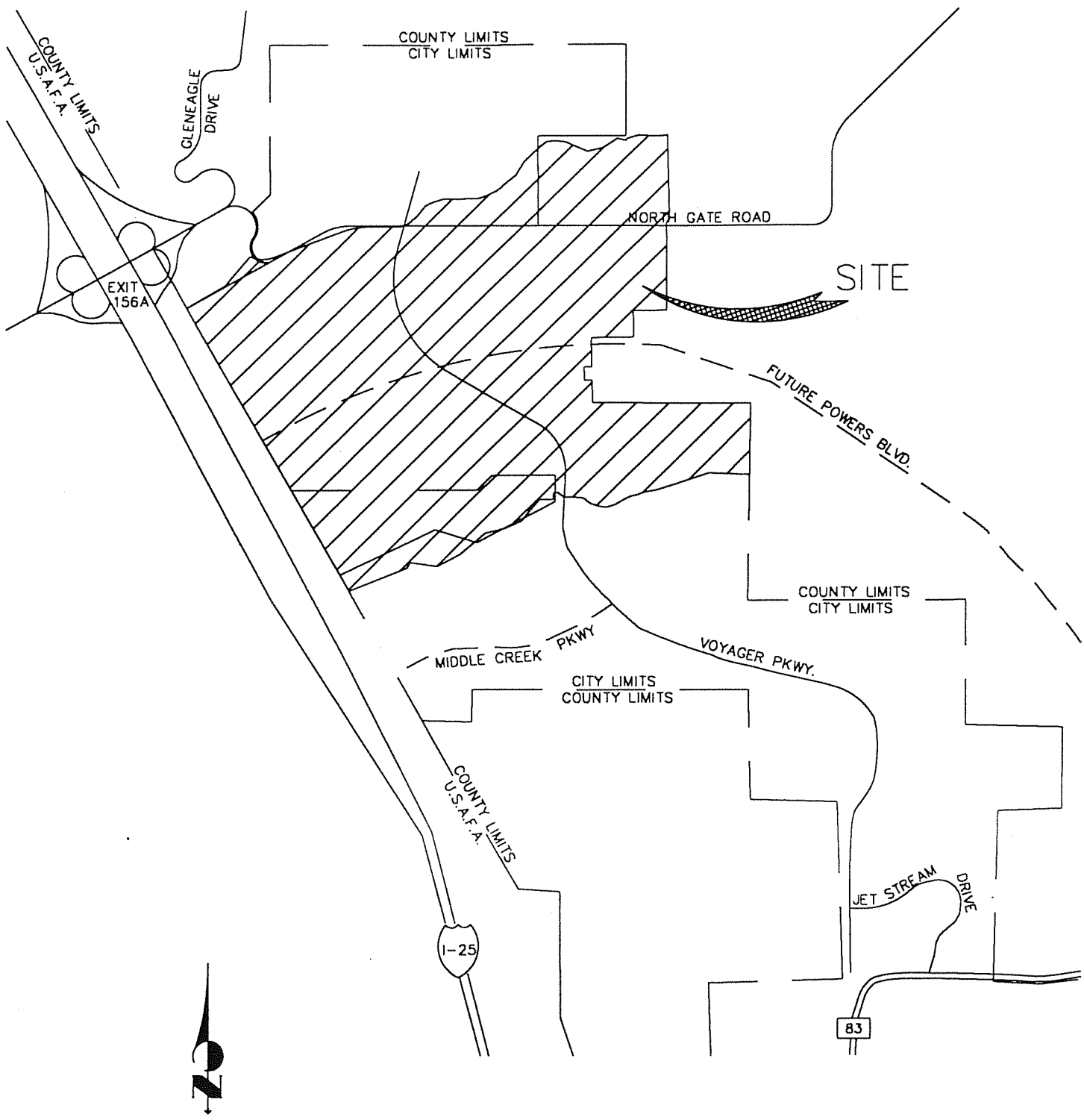
Dated this day of 1988



Mr. Kevin Walker
Olive Company

CS/rm

VICINITY MAP



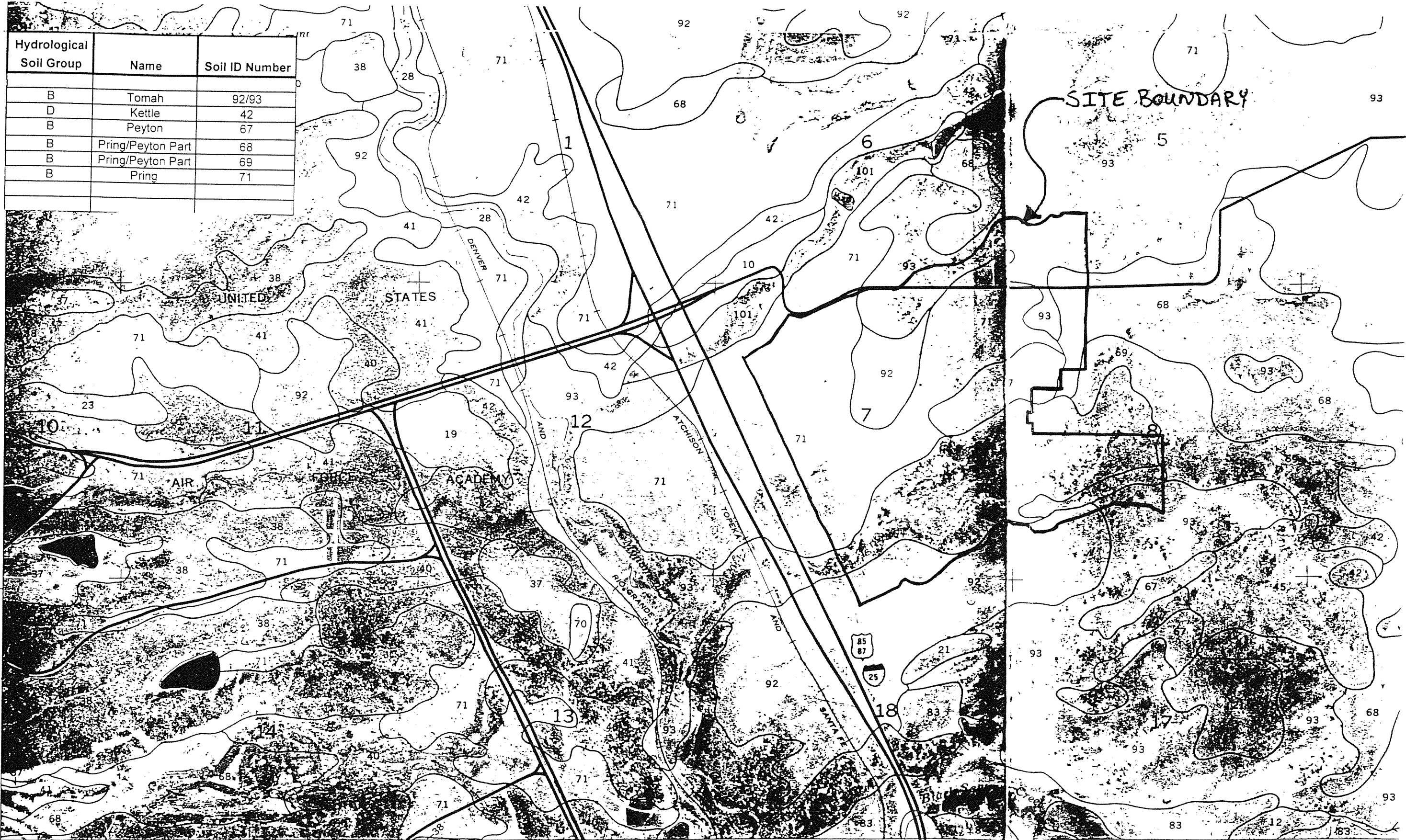
NOT TO SCALE

VICINITY MAP

JR Engineering, Ltd.
 4310 ArrowsWest Drive
 Colorado Springs, CO 80907-3449
 (719) 593-2593 • FAX (719) 528-6613

SOIL MAP (S.C.S. SURVEY)

Hydrological Soil Group	Name	Soil ID Number
B	Tomah	92/93
D	Kettle	42
B	Peyton	67
B	Pring/Peyton Part	68
B	Pring/Peyton Part	69
B	Pring	71

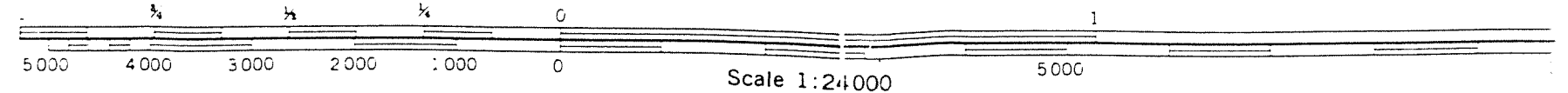


39° 00' 00"
104° 52' 30"

R. 67 W. | R. 66 W.

(Joins sheet 8)

USCS SOILS Map 1" = 2000'



This soil survey map was compiled by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Base maps are orthorectified aerial photographs prepared by the U.S. Department of the Interior, Geological Survey, from 1974 and 1978 aerial photography. Contribution by [unclear]

F.E.M.A. MAP

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
COLORADO SPRINGS,
COLORADO
EL PASO COUNTY

PANEL 40 OF 625
(SEE MAP INDEX FOR PANELS NOT PRINTED)

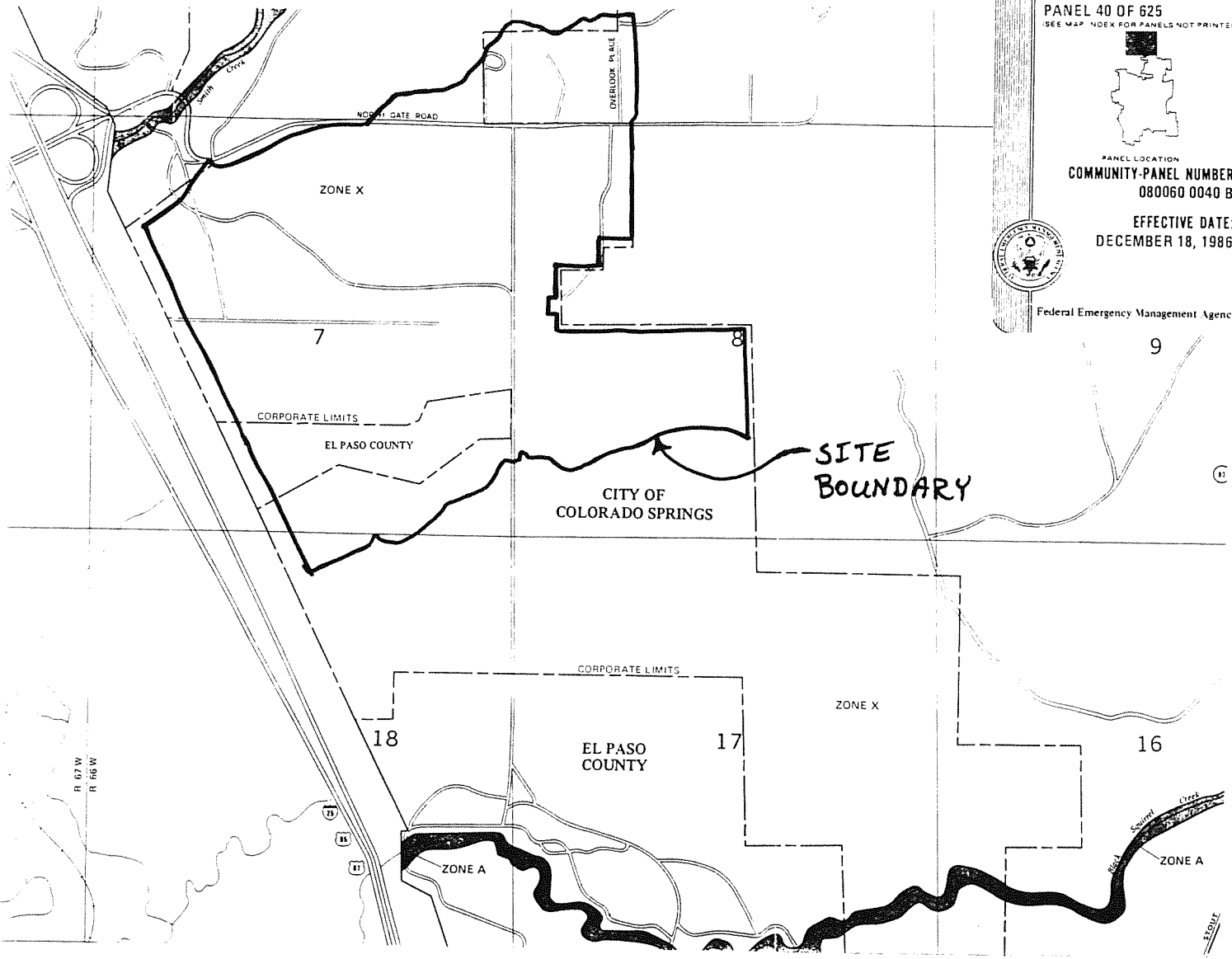


PANEL LOCATION
COMMUNITY-PANEL NUMBER
080060 0040 B

EFFECTIVE DATE:
DECEMBER 18, 1986



Federal Emergency Management Agency



FEMA FIRM

JR Engineering, Ltd.

4310 ArrowsWest Drive
Colorado Springs, CO 80907-3449
(719) 593-2593 • FAX (719) 528-6613

HYDROLOGIC CALCULATIONS

HISTORIC FLOW = PROPOSED ALLOWABLE
Release

DP 12A

From DBPS - historic flow calculation

Area Tributary = P2 = 48 AC

$T_c = 13 \text{ min}$

$C_s = 0.28$ (C from DBPS)

$I_s = 3.7$

$Q_5 = 0.28 \times 3.7 \times 48 = 49.7 \text{ cfs}$ use 50 cfs

$Q_{100} = 103 \text{ cfs}$ from DBPS

DP 11A

From DBPS - proposed flow

$Q_{100} = 384 \text{ cfs}$ from DBPS

Area Tributary = P2 = 172 AC

$T_c = 14 \text{ min}$

$C_s = 0.28$ (C from DBPS)

$I_s = 3.5$

$Q_5 = 0.28 \times 3.5 \times 172 = 168.6 \text{ cfs}$

DP-10A

$A = 133 \text{ AC}$

$I_s = 3.1$ $I_{100} = 5.4$ $T_c = 18 \text{ min}$

$Q_5 = 0.28 \times 3.1 \times 133 = 115 \text{ cfs}$ - 20 cfs unrestricted = 95 cfs

$Q_{100} = 0.35 \times 5.4 \times 133 = 252 \text{ cfs}$

DP-21

$A = 22 \text{ AC}$

$I_s = 4$ $I_{100} = 6.8$ $T_c = 11 \text{ min}$

$Q_5 = 0.28 \times 4 \times 22 = 25 \text{ cfs}$

$Q_{100} = 0.35 \times 6.8 \times 22 = 52 \text{ cfs}$ - 6 cfs

unrestricted
= 46 cfs

DRAINAGE MAPS

SMITH CREEK
(misc. - unstudied)

GLENEAGLE DR

NORTH GATE RD

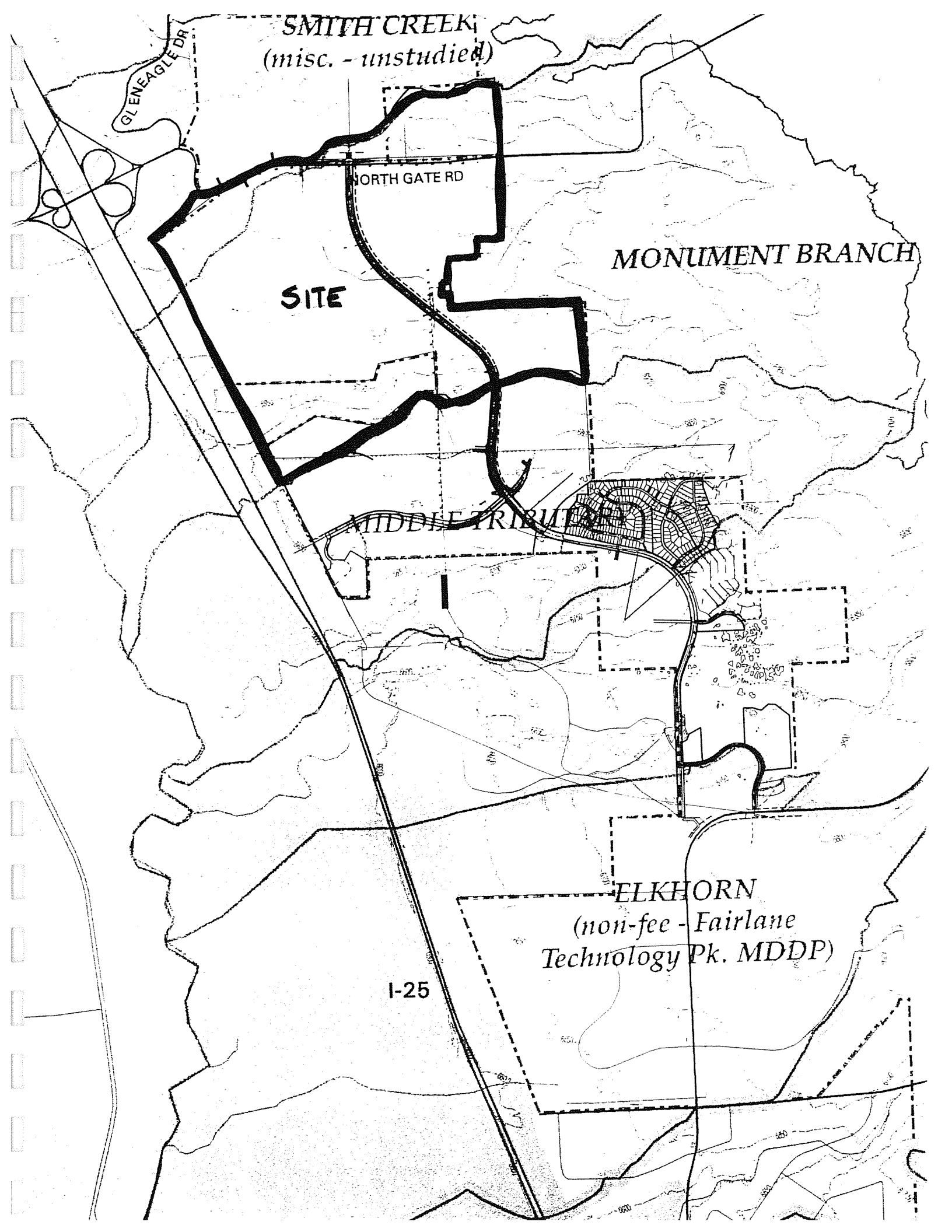
SITE

MONUMENT BRANCH

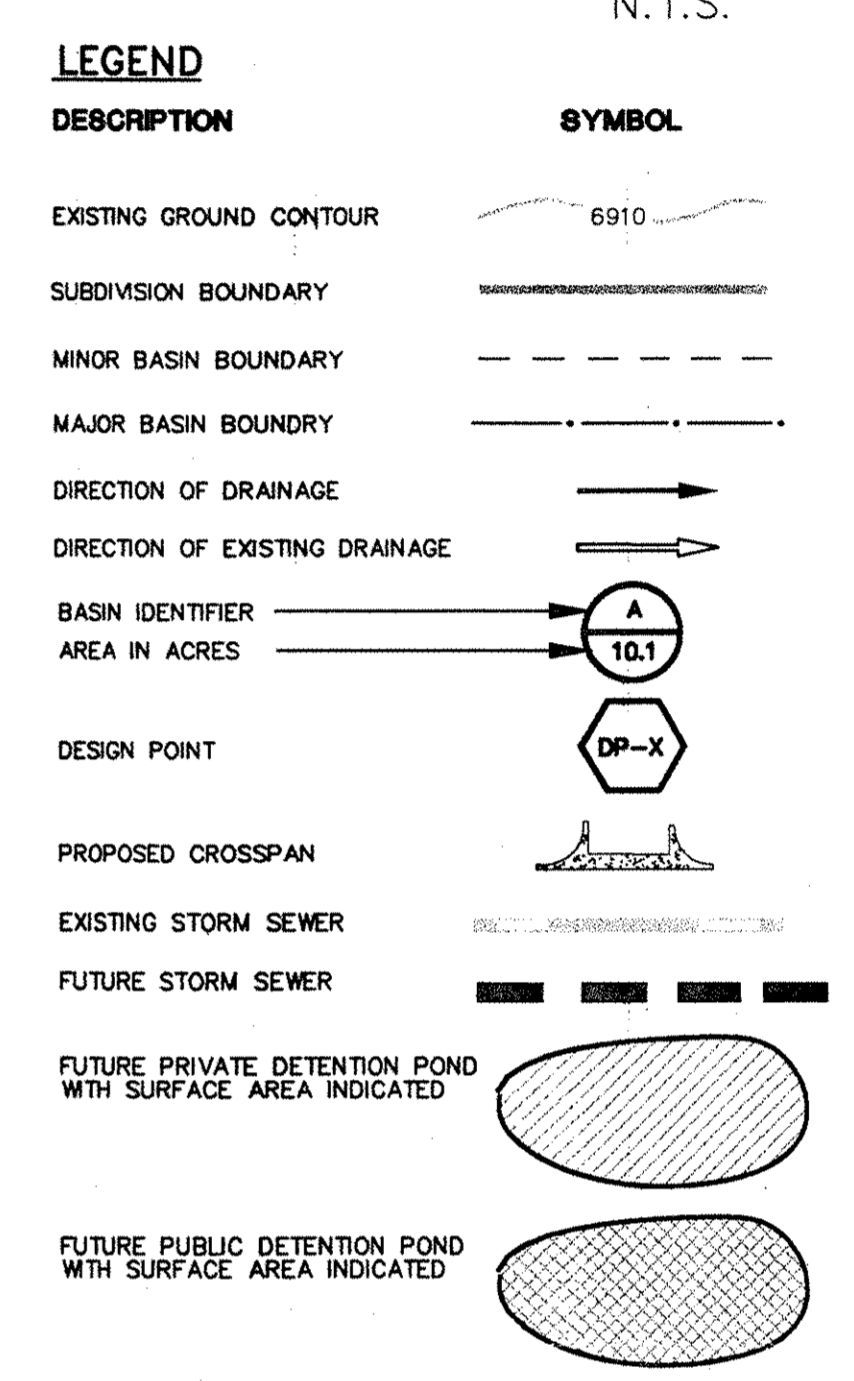
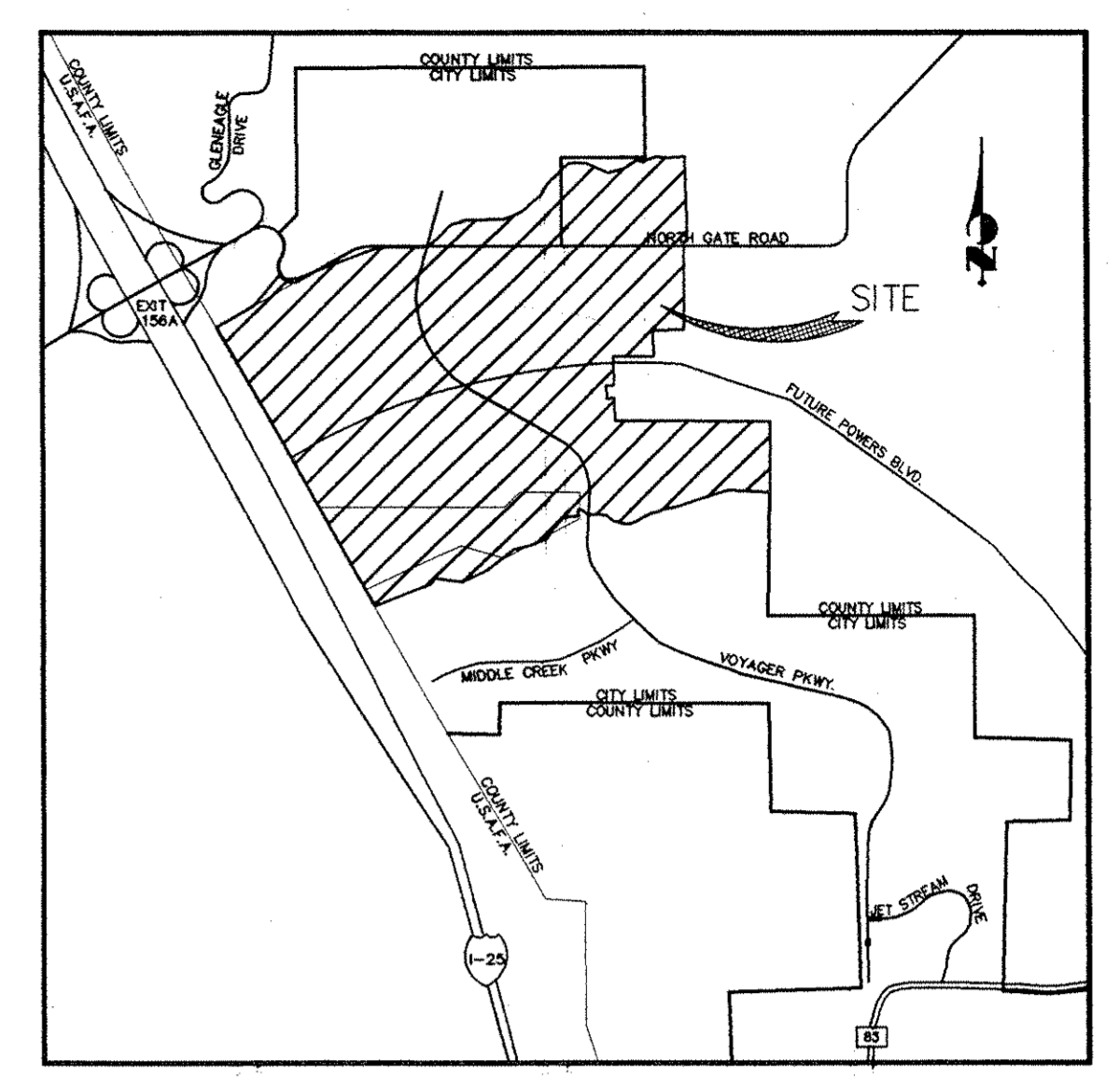
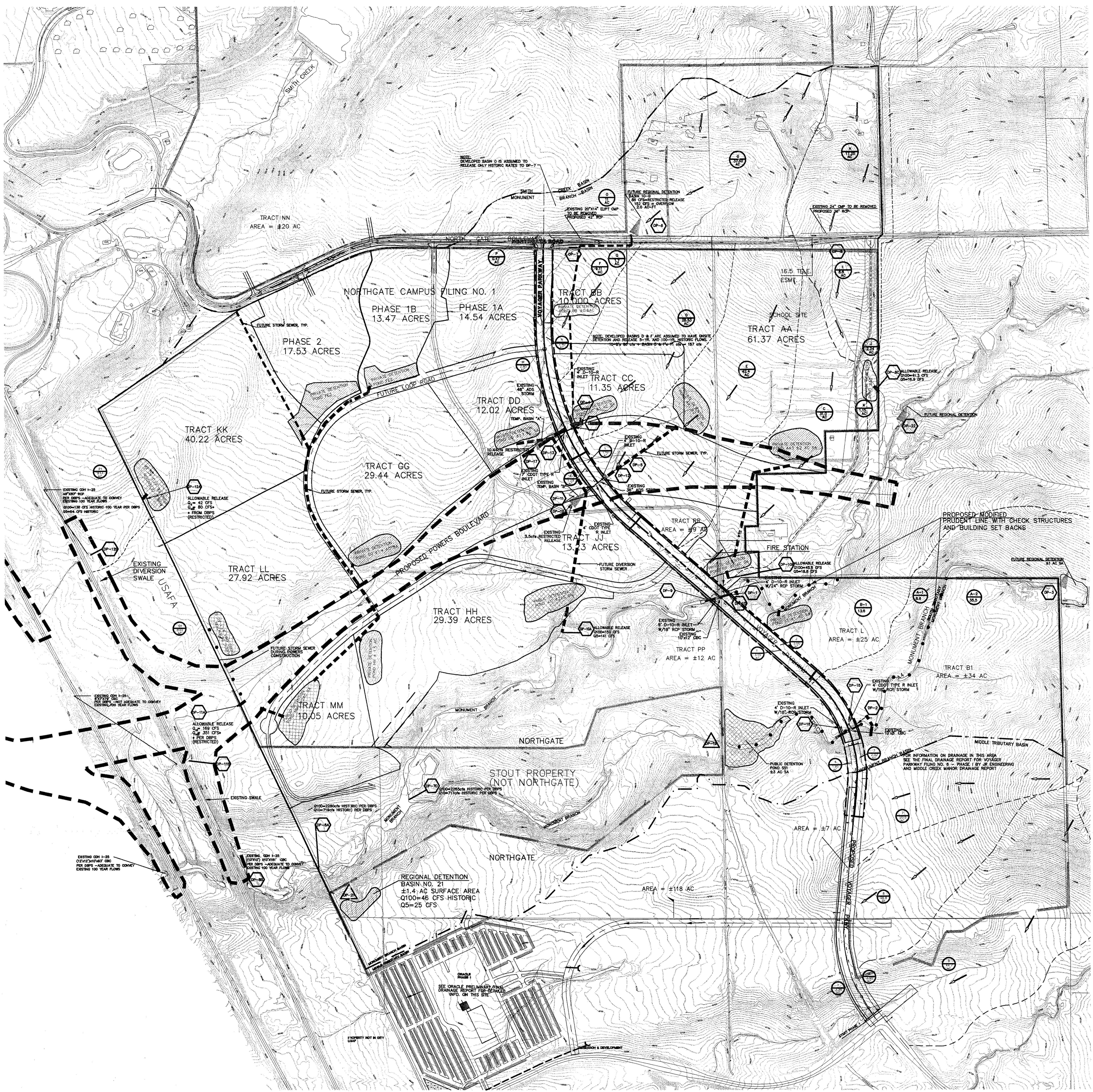
MIDDLE TRIBUTARY

ELKHORN
(non-fee - Fairlane
Technology Pk. MDDP)

I-25

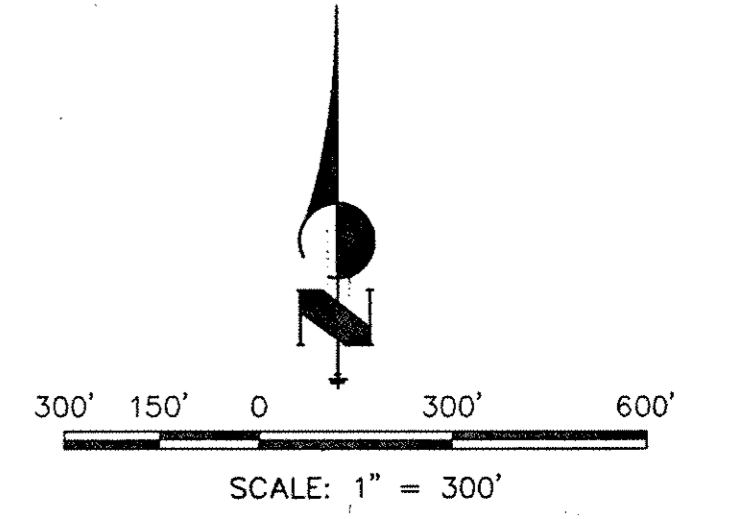


REVENUE 8885556/000 DATE: 12/25/99 PROJECT: 8885556/000



DESIGN POINT SUMMARY

DP	HISTORIC		PROPOSED		COMMENT
	(CFS)	(CFS)	(CFS)	(CFS)	
1	469	1448	469	1312	PER MDDP BY URS
2	254	797	265	777	PER MDDP BY URS
3	252	755	252	757	PER MDDP BY URS
4	-	-	-	166	PER VOYAGER PKWY FILING NO.7 FDR
5	-	-	31.3	74.6	PER VOYAGER PKWY FILING NO.7 FDR
6	43	106	43	86	PER MDDP BY URS
7	-	-	43	86	OUTLET FOR DP-6
8	33	85	35.9	66	CULVERT UNDER NORTHGATE ROAD
9	-	-	10.8	19.8	INLET PER VOYAGER PKWY FILING NO. 7 FDR
10	-	-	10.3	18.3	INLET PER VOYAGER PKWY FILING NO. 7 FDR
11	-	-	4.1	7.5	INLET PER VOYAGER PKWY FILING NO. 7 FDR
12	-	-	3.8	6.9	INLET PER VOYAGER PKWY FILING NO. 7 FDR
13	-	-	9.8	17.9	INLET PER VOYAGER PKWY FILING NO. 7 FDR
14	-	-	9.8	17.9	INLET PER VOYAGER PKWY FILING NO. 7 FDR
15	-	-	7.3	13.1	INLET PER VOYAGER PKWY FILING NO. 7 FDR
16	-	-	7.0	12.6	INLET PER VOYAGER PKWY FILING NO. 7 FDR
17	-	-	-	10.44	PER VOYAGER PKWY FILING NO.7 FDR
18	-	-	-	3.5	PER VOYAGER PKWY FILING NO.7 FDR
19	254	797	265	777	PER THIS REPORT
21	-	-	25	45	PER SOFTWARE PARK MDDP
22	-	-	1290	1290	PER MDDP BY URS
7D	717 (Q ₁₀)	2265	717 (Q ₁₀)	2265	PER DBPS
8A	719 (Q ₁₀)	2280	719 (Q ₁₀)	2280	PER DBPS
8B	722 (Q ₁₀)	2289	722 (Q ₁₀)	2289	PER DBPS
8C	16.9	41.3	16.9	41.3	PER THIS REPORT
10A	-	-	141	152	PER MDDP BY URS
10B	18.6	45.6	18.6	45.6	PER THIS REPORT
11A	261	730	261	384	PER MDDP BY URS
11B	-	-	169	351	PER THIS REPORT
12A	42	115	42	80	PER MDDP BY URS
12B	45	136	102	135	PER MDDP BY URS



UNTIL SUCH TIME AS THESE PLANS ARE APPROVED BY THE APPROPRIATE AGENCIES, OR ENGINEERING, ARCHITECTURAL, OR ENVIRONMENTAL AGENCIES, OR OTHERWISE REVISED FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
1-800-922-1987
 CITY OF COLORADO SPRINGS DEPT. OF UTILITIES
 GAS, ELECTRIC, WATER AND WASTEWATER

JR Engineering, Ltd.
 4835 North 30th Street
 Colorado Springs, Colorado 80909
 (719) 598-2688 • FAX (719) 528-8813

NO.	DATE	BY	REVISION
1	12/20/99	LDR	Public Detention Revised

SCALE: 1" = 300'
 DATE: 11/9/99
 DES. BY: LDR
 CHK. BY: []
 DWN. BY: ACS

NORTHGATE CORPORATE VILLAGE NORTH MDDP
 PROPOSED CONDITIONS DRAINAGE MAP

SHEET 2 OF 2
 JOB NO. 8896.55

FIGURE II