Project Name: Pinery Filing 30A, Tract F
Project File #: LE2024-027
Date Sent: 11/12/2024 **Date Due:** 11/26/2024

Agency	Date Received	Agency Response	Response Resolution
Addressing Analyst	11/18/2024	No Comment	No action necessary
Assessor	11/19/2024	No Comment	No action necessary
AT&T Long Distance - ROW	11/13/2024	Received: This is in response to your eReferral with a utility map showing any buried AT&T Long Line Fiber Optics near Democrat Road Franktown, Colorado. The Earth map shows the project area in red. Based on the address and/or map you provided, there should be NO conflicts with the AT&T Long Lines, as we do not have facilities in that area. Ann Barnowski Clearwater Consulting Group Inc 120 9th Avenue South Suite 140, Nampa, ID 83651 Annb@cwc64.com	No action necessary
Black Hills Energy		No Response Received	No action necessary
Building Services	11/22/2024	Received: Permit is required, please visit Douglas County's web site for requirements and contact 303-660-7497 if you have any questions.	Comments forwarded to applicant to address.
CenturyLink	11/20/2024	Received: We have received your request for an Encroachment and have set up a Lumen project accordingly. Your project number is P864060 and it should be referenced in all emails sent in for review. Your project owner is Richard Hollis and they can be reached by email at Richard.Hollis@lumen.com with any questions that you may have regarding this project. Eryn Ogden, Project Coordinator Faulk & Foster 214 Expo Circle, Suite 7 West Monroe, LA 71291 Eryn.Ogden@lumen.com	No action necessary

Project Name: Pinery Filing 30A, Tract F
Project File #: LE2024-027
Date Sent: 11/12/2024 **Date Due:** 11/26/2024

Agency	Date Received	Agency Response	Response Resolution
Comcast		No Response Received	No action necessary
CORE Electric Cooperative	11/20/2024	No Comment	No action necessary
Engineering Services	11/26/2024	Received: General Comments Summary: Please submit construction drawings and plans (including GESC Plans). These are not required for the approval of the L&E but will be required prior to construction. Please submit them to Carol LeMaire (clemaire@douglas.co.us) Drainage Comments Summary: It appears that an older Phase III Drainage Report was used than the most recent which included a detention pond around the building to the northeast. Please reassess and amend the letter per the most recent Phase III Drainage Report (see attached). With this, please either show that the detention and/or water quality for this proposed site is being accounted for in the detention pond around the building to the northeast, or that a grass buffer or swale is being provided per the Mile High Flood District criteria. Please provide all calculations for either case as part of the report. Traffic Comments Summary: Please discuss in the narrative the number of trips that the site currently receives and the anticipated number of trips that the site will receive and discuss the frequency. With the next submittal, please enclose a written response to these comments. Jacob Gabel, Development Review Engineer	Comments forwarded to applicant to address.

Project Name: Pinery Filing 30A, Tract F
Project File #: LE2024-027
Date Sent: 11/12/2024 **Date Due:** 11/26/2024

Agency	Date Received	Agency Response	Response Resolution
High Prairie Farms HOA		No Response Received	No action necessary
High Prairie Farms Metro District		No Response Received	No action necessary
Mile High Flood District		No Response Received	No action necessary
Misty Pines HOA	11/21/2024	No Comment	No action necessary
Office of Emergency Management		No Response Received	No action necessary
Pinery Water and Wastewater District		No Response Received	No action necessary
Sheriff's Office	11/26/2024	Received: This was reviewed by Deputy Jeff Pelle with the Douglas County Sheriff's Office. I have no comments or concerns at this time for the project.	No action necessary
Sheriff's Office E911		No Response Received	No action necessary
South Metro Fire Rescue	11/14/2024	Received: South Metro Fire Rescue (SMFR) has reviewed the provided documents and has no objection to the proposed Location and Extent. Applicants and Contractors are encouraged to contact SMFR regarding the applicable permit requirements for the proposed project.	No action necessary
The Pinery HOA	11/26/2024	Received: The Pinery HOA appreciates the attention to blend the buildings colors in with the surrounding environment and thoughtful placement to reduce the removal of trees.	No action necessary
Timbers At The Pinery Filing 23A HOA		No Response Received	No action necessary
Timbers At The Pinery Filing 23B HOA		No Response Received	No action necessary

Project Name: Pinery Filing 30A, Tract F
Project File #: LE2024-027
Date Sent: 11/12/2024 **Date Due:** 11/26/2024

Agency	Date Received	Agency Response	Response Resolution
Timbers HOA	11/26/2024	Received: The Timbers T30A HOA does not object to the construction of the building per the particulars they provided to the county in their submission. We do however have one request. If at all possible, if some additional native trees could be planted between the HPFMD buildings and the detention swale, it would provide a layer of additional screening for our residents. Thank you, Ed Likman T30A HOA President 201-715-8658 edlikman@gmail.com	Comments forwarded to applicant to address.
Xcel Energy-Right of Way & Permits	11/18/2024	Received: Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the documents for the above-mentioned project and currently has no apparent conflict. As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction. Violeta Ciocanu (Chokanu) Right of Way and Permits Public Service Company of Colorado dba Xcel Energy Office: 303-285-6612 – Email: violeta.ciocanu@xcelenergy.com	No action necessary

REFERRAL RESPONSE REQUEST – LOCATION AND EXTENT

Date sent: **November 12, 2024** Comments due by: **November 26, 2024**

Project Name:	*High Prairie Farms Metro District - Location and Extent*
Project File #:	**LE2024-027**
Project Summary:	High Prairie Farms Metro District requests approval of a Location and Extent for the construction of a new maintenance building located near the northeast corner of S. Pinery Pkwy and Democrat Road SPN: 2347-182-05-001.

Information on the identified development proposal located in Douglas County is enclosed. Please review and comment in the space provided.

☐ No Comment	
☐ Please be advised of the following concerns:	
☒ See letter attached for detail.	
Agency: PW - Engineering	**Phone #:** (303) 660-7490
Your Name: Jacob Gabel	**Your Signature:**
(please print)	**Date:** 11/26/2024

A public hearing on this request will be held before the Douglas County Planning Commission on Monday, **December 2, 2024, at 6:00 pm; located at 100 Third Street, Castle Rock, CO 80104 in the Commissioner's Hearing Room.**

Sincerely,

Carolyn Washee-Freeland

Carolyn Washee-Freeland, AICP
Senior Planner
303-660-7460
cfreeland@douglas.co.us
Enclosure

MEMORANDUM

To: Carolyn Washee-Freeland, Senior Planner

CC: Matt Miller, High Prairie Farms Metro District

From: Jacob Gabel, Development Review Engineer

Date: 11/26/2024

RE: Pinery Filing 30A, Tract F Maintenance Building: LE2024-027: DV2024-481

Initial Submittal:	11-13-2024
1st Engineering response letter:	11-26-2024

The Douglas County Department of Public Works Engineering has reviewed the Pinery Filing 30A, Tract F Maintenance Building Project and has the following comments:

General

1. Please submit any construction drawings and plans (including GESC Plans). These are not required for the approval of the L&E but will be required prior to construction.
    a. Please note that the general process for approval of plans and permits is that once any plans are completed for this project, please submit them to Carol LeMaire (clemaire@douglas.co.us) with the DV# as part of the subject line. Once received, we will review them (usually 14 days, though this could be shorter or longer dependent on the project or our current workload), and send comments if there are any outstanding items or request final plans if there are no changes to be made. Once the plans are approved and fees are paid for, we will send the plans back to you. From there, please submit the GESC Permit to Carol LeMaire along with the approved plan and send any ROW Use and/or Construction Permits, Temporary Access Permits, etc., to Engineering Permits and Inspections (engpermits@douglas.co.us). Once the GESC Permit is approved you will receive an email to schedule a preconstruction meeting. Once this meeting has been completed with our inspectors, they will sign off on the permit and construction can commence when you have the approved permit in hand.

Drainage Letter

2. It appears that an older Phase III Drainage Report was used than the most recent which included a detention pond around the building to the northeast. Please reassess and amend the letter per the most recent Phase III Drainage Report (see attached). With this, please either show that the detention and/or water quality for this proposed site is being accounted for in the detention pond around the building to the northeast, or that a grass buffer or swale is being provided per the Mile High Flood District criteria. Please provide all calculations for either case as part of the report.

Traffic Letter

3. Please discuss in the narrative the number of trips that the site currently receives and the anticipated number of trips that the site will receive and discuss the frequency.

With the next submittal, please enclose a written response to these comments. Please let me know if you have any questions.

[redacted] DV07-353 [redacted]

APR 03 2008

THE PINERY
HIGH PRAIRIE FARMS MAINTENANCE FACILITY
PHASE III DRAINAGE REPORT

for

High Prairie Metro District
c/o Clifton Gunderson

Contact: Kenneth Black
Manager
6399 So. Fiddler's Green Circle, Suite 100
Greenwood Village, CO 80111
303-472-8120

by

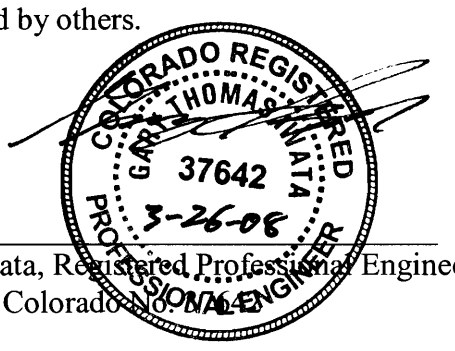
Nolte Associates, Inc.
8000 South Chester Street, Suite 200
Centennial, Colorado 80112
(303) 220-6400

August 2007
Revised February 2008
Revised March 2008

[redacted]

CERTIFICATION

I hereby certify that this report for the final drainage design of the High Prairie Farms Maintenance Facility was prepared by me (or under my direct supervision) in accordance with the provisions of Douglas County Drainage Design and Technical Criteria for the owners thereof. I understand that Douglas County does not and will not assume liability for drainage facilities designed by others.

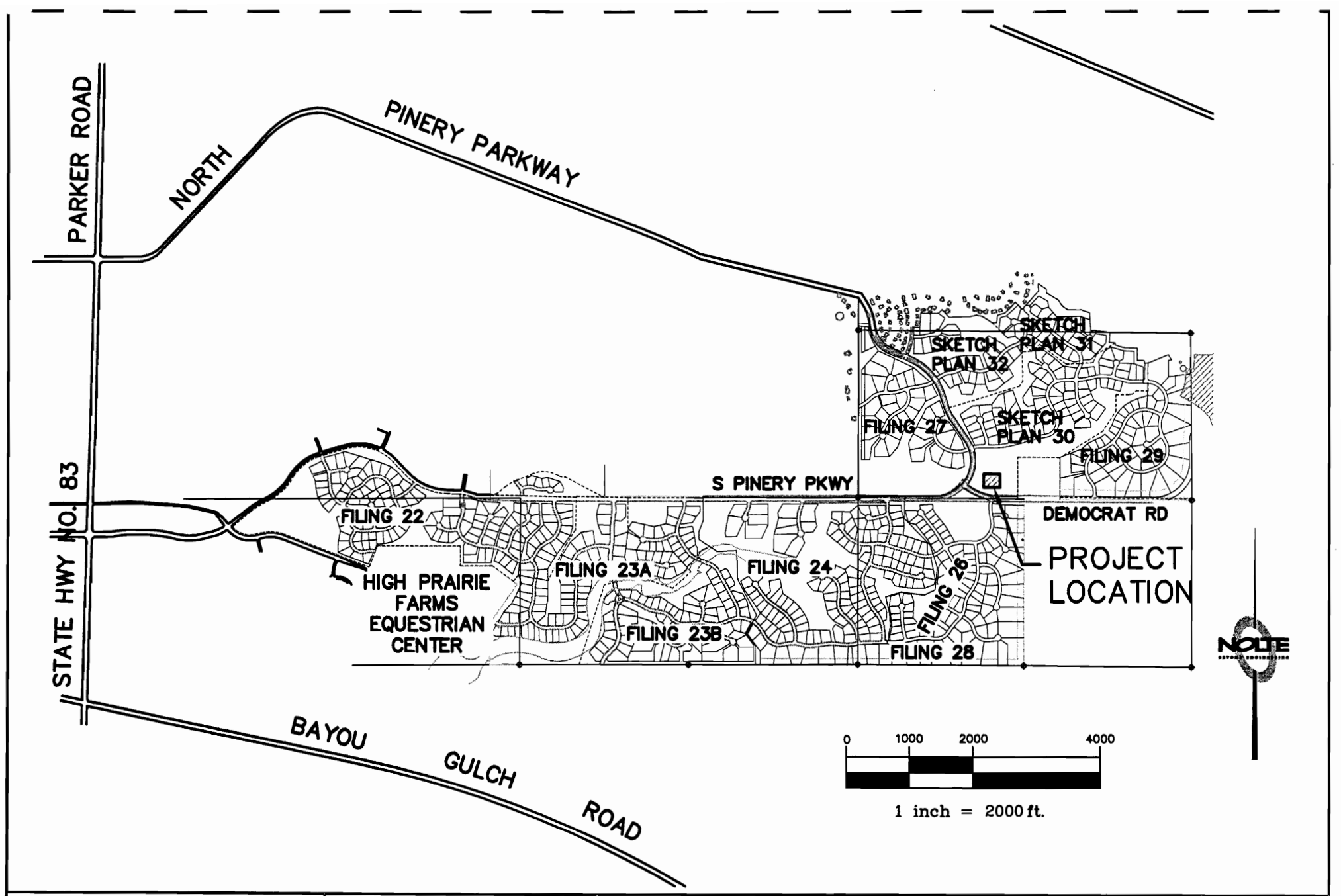


Gary Iwata, Registered Professional Engineer
State of Colorado No. 37642

The High Prairie Metro District hereby certifies that the drainage facilities for the High Prairie Farms Maintenance Facility shall be constructed according to the design presented in this report. I understand that Douglas County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that Douglas County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of the High Prairie Farms Maintenance Facility, guarantee that final drainage design review will absolve High Prairie Metro District and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the Final Plat does not imply approval of my engineer's drainage design.

Kenneth Black
High Prairie Metro District
c/o Clifton Gunderson

TABLE OF CONTENTS



NUETZEL XREFS: VICMAP

NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.8400 TEL 303.220.9001 FAX WWW.NOLTE.COM

DATE: 8/27/07 TIME: 3:42:16 PM
NETWORK: DVS1
PATH: N:\DV1310\CADD\CIVIL\HIGH PRAIRIE FARMS
DWG NAME: ET01-VICINITYMAP.DWG
LAYOUT: Layout1
DESIGNER: HTL MGR: RJM

HIGH PRAIRIE FARMS MAINT. FACILITY
VICINITY MAP

PREPARED FOR: HIGH PRAIRIE FARMS METRO. DISTRICT DATE SUBMITTED: AUG 2007

SHEET NUMBER ET1 OF 1 SHEETS
JOB NUMBER DV1310

1 GENERAL LOCATION AND DESCRIPTION

A. Location

The proposed High Prairie Farms Maintenance Facility is located in the **northeast quarter of Section 18**, Township 7 South, Range 65 West of the Sixth Principal Meridian, Douglas County, Colorado. The project will be located on existing Democrat Road, at the northeast corner of the intersection with North Pinery Parkway. (See vicinity map).

B. Description of Property

The proposed High Prairie Farms Maintenance Facility is a 2,500 square foot building on a 0.13 acre lot. The existing vegetation consists of numerous pine trees, native grasses and brush. Onsite soils are in the Stapleton-Bresser Association, with slopes ranging from two to thirty percent.

The existing site drains to the north into an existing drainage way. The existing drainage way drains to the west into an existing culvert underneath North Pinery Parkway and is conveyed in Timbers Creek until it reaches Bayou Gulch. Bayou Gulch ultimately drains into Cherry Creek.

2 DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

Historically, the site drains to the north. The proposed development will not change the historic flow patterns. A detention pond will be constructed on the back of the building (north side), that will capture all the developed flow from the building and release it at historic rates.

The property is not located in a FEMA dedicated floodplain REF Flood Insurance Rate Map Douglas County Colorado Panels 204 number 080049 suffix F.

B. Sub-basin Description (Historic)

Basin H1 is an offsite basin that drains to the north into the existing drainage way. This basin contains brush, native grasses, and select areas of pine trees.

C. Sub-basin Description (Developed)

Basin A1 is the main basin created by this project. It includes the proposed building, driveway and detention pond. Flows will be collected in the swales on either side of the building and then run north to a pair of forebays and into the detention pond.

Basin B1 is on the north side of the detention pond. It includes the slope down from the proposed detention pond to the existing grade. This area will be replanted with

native vegetation and not permanently irrigated. This area is expected to generate flows similar to the existing conditions and will not be captured in the detention pond.

3 DRAINAGE DESIGN CRITERIA

A. Regulations

The Phase III Drainage Report for High Prairie Farms Maintenance Facility complies with procedures outlined in the *Douglas County Storm Drainage Design and Technical Criteria* and the *Urban Storm Drainage Criteria Manual*. The High Prairie Farms Maintenance Facility is within the Pinery Development, which is a part of the Timbers Creek Basin.

B. Development Criteria References and Constraints

The Phase III Drainage Report for High Prairie Farms Maintenance Facility complies with proposed Pinery Regional Drainage Study.

C. Hydrologic Criteria

The one-hour design point rainfall values for the High Prairie Farms Maintenance Facility development are:
10-yr recurrence interval storm = 1.66 in/hr
100-yr recurrence interval storm = 2.60 in/hr
The proposed development falls within Zone 1, so the appropriate *Time Intensity Frequency Curve Formulas* from the *Douglas County Storm Drainage Design and Technical Criteria* were used (see Appendix A). Runoff calculations were done utilizing the Rational Method for all storm events. Hydrologic calculations can be found in Appendix A. Runoff coefficients used were based on composite impervious values defined in the *Urban Storm Drainage Criteria Manual* (see Appendix A). Composite percent imperviousness was determined by way of the land uses on each basin and the related percent imperviousness found in the *Urban Storm Drainage Criteria Manual.* The resultant percent imperviousness was applied to equations from the *Urban Storm Drainage Criteria Manual.*

D. Hydraulic Criteria

A channel rundown was designed utilizing FlowMaster by *Haestad Methods*, which conforms to normal open channel calculation procedures with Manning's formula. Storm pipe capacities and Hydraulic Grade Lines were determined using StormCad by *Haestad Methods*, which utilizes common calculating procedures outlined in the *Criteria*. Hydraulic calculations can be found in Appendix B.

4 DRAINAGE FACILITY DESIGN

A. General Concept

The general drainage concept for High Prairie Farms Maintenance Facility is to capture the runoff from the building in the pond behind the building.

Water quality enhancement measures will be incorporated into the detention pond. The Excess Urban Runoff Volume (EURV) for the detention pond is calculated based on the Excess Urban Runoff Volume design in *the Urban Storm Drainage Criteria Manual, Volume 2 – Storage*. The development of the High Prairie Farms Maintenance Facility will detain drainage and release it at allowable rate into the channel to the north. The detention pond will provide several features to help with water quality. First, the forebay will allow for larger particles to settle out into the bottom and still allow water to pass at a controlled rate into the rest of the pond. The release structure has two different releases. The first is the Excess Urban Runoff Volume (EURV). There will be a plate attached to the front of the outlet structure to allow this EURV to be released over a 72-hour period. In addition, there will be a trash rack in front of the EURV plate to help prevent clogging, but will not interfere with the hydraulic capacity of the outlet. The top of the plate will have a notch to release the 100-year event not exceed the historic rate for the major storm.

5 CONCLUSIONS / SUMMARY

All drainage calculations and drainage solutions were done in compliance with *Douglas County Storm Drainage Design and Technical Criteria*, the drainage studies for surrounding developments and the *Urban Storm Drainage Criteria Manual*. The storm sewers will release into channels or to the detention ponds. The proposed detention pond has been designed to meet current standards set fourth by the *Criteria* and do not exceed calculated historic flow rates. The drainage system has been designed to control discharge of storm water and safely convey it from the site in compliance with local regulations.

6 REFERENCES

A. *Douglas County Storm Drainage Design and Technical Criteria*, January 1986.

B. *Urban Storm Drainage Criteria Manual, Volume 1*, June 2001, Urban Storm Drainage and Flood Control District.

C. *Urban Storm Drainage Criteria Manual, Volume 2*, June 2001, Urban Storm Drainage and Flood Control District.

D. *Urban Storm Drainage Criteria Manual, Volume 3*, September 1999, Urban Storm Drainage and Flood Control District.

APPENDIX A

MAPS

(FIRM, SCS)

JOINS PANEL 0203

90000 FT

CULVERT

ZONE X

ZONE A

LIMIT OF STUDY

DAM

CULVERT

PINERY PKWY

PROJECT SITE

ENTIRE PROJECT WITHIN ZONE X

ZONE X

PINERY PKWY

DEMOCRAT RD

13

18

MAP SCALE 1" = 500'

250 0 500 1000 FEET

PANEL 0204F

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 204 OF 495

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0204	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08035C0204F

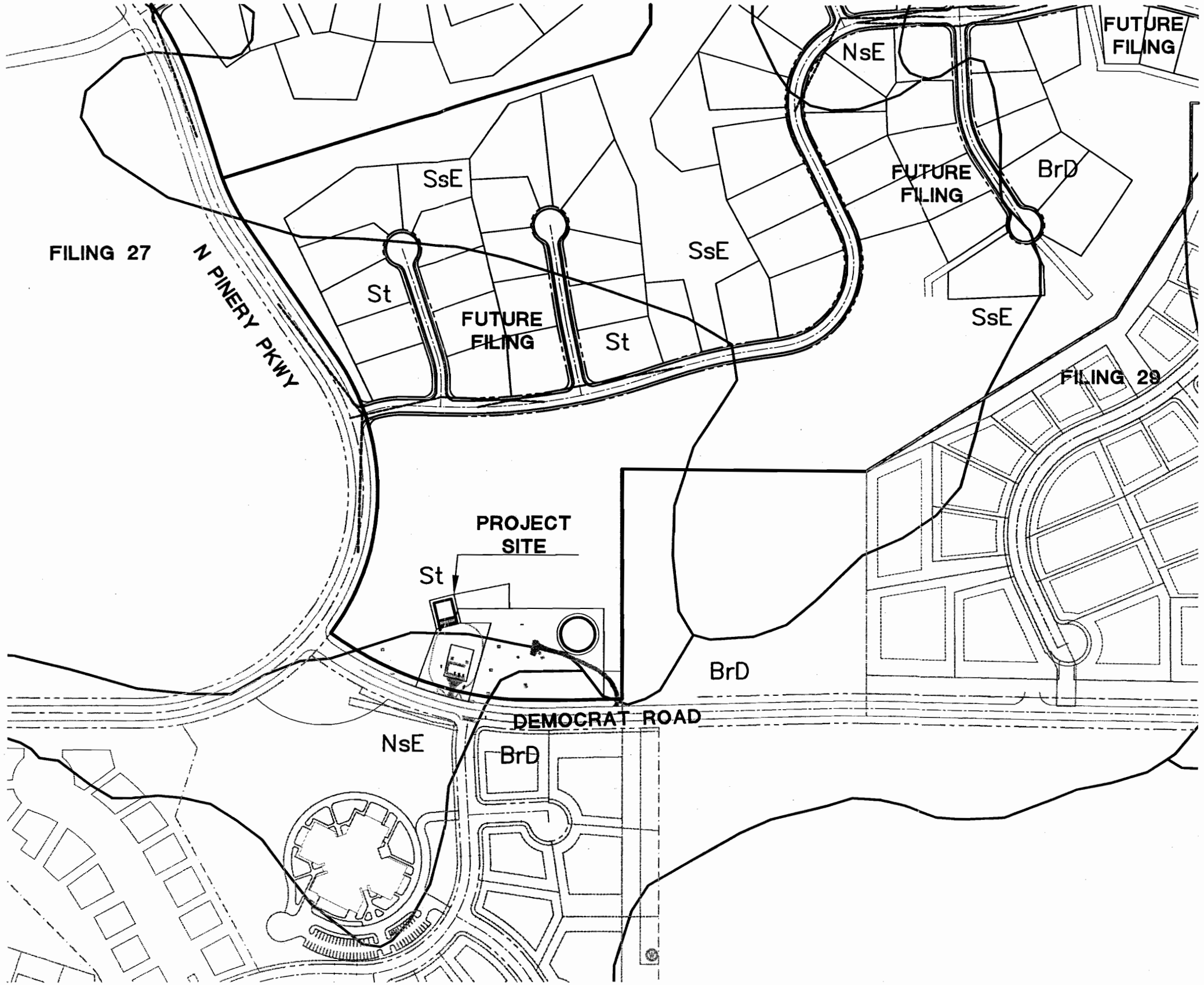
EFFECTIVE DATE:
SEPTEMBER 30, 2005

Federal Emergency Management Agency

NOLTE BEYOND ENGINEERING

DWG NAME: ET03-FIRM.DWG		
PATH: N:\DV1310\CADD\CIVIL\HIGH PRAIRIE FARMS		
DATE: 03/02/06	TIME:	SCALE:
XREFS:		
DESIGNER: TAN	PROJ. MGR: GTI	JOB NO. 131070-80
SHEET 1 OF 1 SHEETS		
PLOTTED BY: NUETZEL		

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



0 150 300 600

1 inch = 300 ft.

SYMBOL	HYDROLOGIC SOILS GROUP	NAME
St	B	STAPLETON–BRESSER ASSOCIATION
BrD	B	BRESSER SANDY LOAM
NsE	B	NEWLIN–SATANTA COMPLEX
SsE	B	STAPLETON LOAMY SAND
PrE2	B	PEYTON–PRING–CROWFOOT COMPLEX

HIGH PRAIRIE FARMS MAINT. FACILITY
SCS SOILS MAP

PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT DATE SUBMITTED: AUG 2007

NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.8400 TEL 303.220.8401 FAX WWW.NOLTE.COM

DATE: 8/27/07 TIME: 3:46:15 PM
NETWORK: DVS1
DWG NAME: N:\DM1310\CADD\CIVIL\HIGH PRAIRIE FARMS ET02-SOILSMAP.DWG
LAYOUT: Layout1
DESIGNER: TAN MGR: GTI

SHEET NUMBER
ET2
OF 1 SHEETS

JOB NUMBER
DV1310

NUETZEL
XREFS: EXMA, EXPN, skprma, skprsd, srd-prma, SKPRPN

APPENDIX B

HYDROLOGY CALCULATIONS

DEVELOPED COMPOSITE % IMPERVIOUS

DEVELOPED COMPOSITE WEIGHTED "C"

DEVELOPED COMPOSITE SLOPE

DEVELOPED RATIONAL METHOD CALCULATIONS

RELATED CHARTS, FIGURES & GRAPHS

High Prairie Farms Maintenance Facility
Phase III Drainage Report

DEVELOPED COMPOSITE BASIN -WEIGHTED "% IMPERVIOUS" CALCULATIONS

-REFERENCE TABLE RO-3 DRAINAGE CRITERIA MANUAL (V.1)

	Lawns Type A or C	Lawns Type B or D	O.S./ Greenbelt	Single Family	Multi Unit Attached	Street	Det. Pond	Roof	Comm-ercial	Well Site		
% Imperv.	2.00%	2.00%	2.00%	23.00%	75.00%	100.00%	100.00%	100.00%	95.00%	12.00%	**Total Area**	**Weighted % Imperv.**
Basin ID	**Area**	**Area**	**Area**	**Area**	**Area**	**Area**	**Area**	**Area**	**Area**	**Area**		
A1	0.20						0.05	0.08			0.34	41.04%
B1	0.13								.		0.13	2.00%
	0.33	0.00	0.00	0.00	0.00	0.00	0.05	0.08	0.00	0.00	0.47	30.03%

Total On-Site Area (Ac) = **0.47**

Total Off-Site Area (Ac) =

Total Area (Ac) = **0.47**

HISTORIC COMPOSITE BASIN -WEIGHTED "% IMPERVIOUS" CALCULATIONS

H1	0.47										0.47	2.00%

Total Area (Ac) = **0.47**

COMPOSITE DEVELOPED BASIN -WEIGHTED "C" CALCULATIONS (10-YEAR & 100-YEAR)

$C_A = K_A + (1.31i^3 - 1.44i^2 + 1.135i - 0.12)$ for $C_A >$ or + 0, otherwise $C_A = 0$ (RO-6)

$C_B = (C_A + C_{CD})/2$

$C_{CD} = K_{CD} + (0.858i^3 - 0.786i^2 + 0.774i + 0.04)$ (RO-7)

i = % imperviousness/100 expressed as a decimal

K_A = Correction factor for Type A soils

K_{CD} = Correction factor for Type C and Type D soils

Correction Factors, K_A & K_{CD}

Soil Type	Storm Return Period			
	2-Year	**5-Year**	**10-Year**	**100-Year**
A	0	-0.08i + 0.09	-0.14i + 0.17	-0.25i + 0.32
C or D	0	-0.10i + 0.11	-0.18i + 0.21	-0.39i + 0.46

Basin ID	% Imperv.	*i*	Soil Type	Correction Factors, K_A & K_{CD}				Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	**5-Year**	**10-Year**	**100-Year**	**2-Year**	**5-Year**	**10-Year**	**100-Year**			**2-Year**	**5-Year**	**10-Year**	**100-Year**
A1	41.04%	0.41	A	0.00	0.06	0.11	0.22	0.19	0.25	0.31	0.41	0.34	0.34	0.24	0.30	0.36	0.50
			B	-	-	-	-	0.24	0.30	0.36	0.50						
			C or D	0.00	0.07	0.14	0.30	0.28	0.35	0.42	0.58						
B1	2.00%	0.02	A	0.00	0.09	0.17	0.32	0.00	0.00	0.07	0.22	0.13	0.13	0.03	0.08	0.17	0.36
			B	-	-	-	-	0.03	0.08	0.17	0.36						
			C or D	0.00	0.11	0.21	0.45	0.06	0.16	0.26	0.51						

COMPOSITE HISTORIC BASIN -WEIGHTED "C" CALCULATIONS (10-YEAR & 100-YEAR)

H1	2.00%	0.02	A	0.00	0.09	0.17	0.32	0.00	0.00	0.07	0.22	0.47	0.47	0.03	0.08	0.17	0.36
			B	-	-	-	-	0.03	0.08	0.17	0.36						
			C or D	0.00	0.11	0.21	0.45	0.06	0.16	0.26	0.51						

High Prairie Farms Maintenance Facility
Phase III Drainage Report

High Prairie Farms Maintenance Facility
Historic Runoff Calculations
Time of Concentration

Watercourse Coefficient

Forest & Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Tillage/ Field	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

	SUB-BASIN DATA			INITIAL / OVERLAND TIME			TRAVEL TIME T(t)					T(c) CHECK (URBANIZED BASINS)			FINAL T(c)
DESIGN POINT	DRAIN BASIN	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	min.
H1	H1	0.47	0.08	130	2.0%	16.9	95	13.00	7.00	25.2	0.1	17.0	225	11.3	11.3

High Prairie Farms Maintenance Facility
Historic Runoff Calculations

(Rational Method Procedure)

Design Storm 5 Year Historic

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
H1	H1	0.47	0.08	11.3	0.04	3.69	0.1					

High Prairie Farms Maintenance Facility
Historic Runoff Calculations

(Rational Method Procedure)

Design Storm 10 Year Historic

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
H1	H1	0.47	0.17	11.3	0.08	6.74	0.5					

High Prairie Farms Maintenance Facility
Historic Runoff Calculations

(Rational Method Procedure)

Design Storm 100 Year Historic

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
H1	H1	0.47	0.36	11.3	0.17	6.74	1.14					

High Prairie Farms Maintenance Facility
Phase III Drainage Report

High Prairie Farms Maintenance Facility
Developed Runoff Calculations
Time of Concentration

Watercourse Coefficient

Forest & Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Tillage/ Field	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

	SUB-BASIN DATA			INITIAL / OVERLAND TIME			TRAVEL TIME T(t)					T(c) CHECK (URBANIZED BASINS)			FINAL T(c)
DESIGN POINT	DRAIN BASIN	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	min.
A1	A1	0.34	0.30	40	2.0%	7.3	80	2.00	7.00	9.9	0.1	7.4	120	10.7	7.4
B1	B1	0.13	0.08	50	25.0%	4.5	0	2.00	0.00	0.0	0.0	5.0	50	10.3	5.0

High Prairie Farms Maintenance Facility
Developed Runoff Calculations

(Rational Method Procedure)

Design Storm 5 Year Developed

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
A1	A1	0.34	0.30	7.4	0.10	4.40	0.45					
B1	B1	0.13	0.08	5.0	0.01	4.92	0.05					

High Prairie Farms Maintenance Facility
Developed Runoff Calculations

(Rational Method Procedure)

Design Storm 10 Year Developed

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
A1	A1	0.34	0.36	7.4	0.12	5.16	0.63					
B1	B1	0.13	0.17	5.0	0.02	5.76	0.13					

High Prairie Farms Maintenance Facility
Developed Runoff Calculations

(Rational Method Procedure)

Design Storm 100 Year Developed

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
A1	A1	0.34	0.50	7.4	0.17	8.08	1.35					
B1	B1	0.13	0.36	5.0	0.05	9.05	0.43					

FIGURE 6-1
DOUGLAS COUNTY RAINFALL ZONES

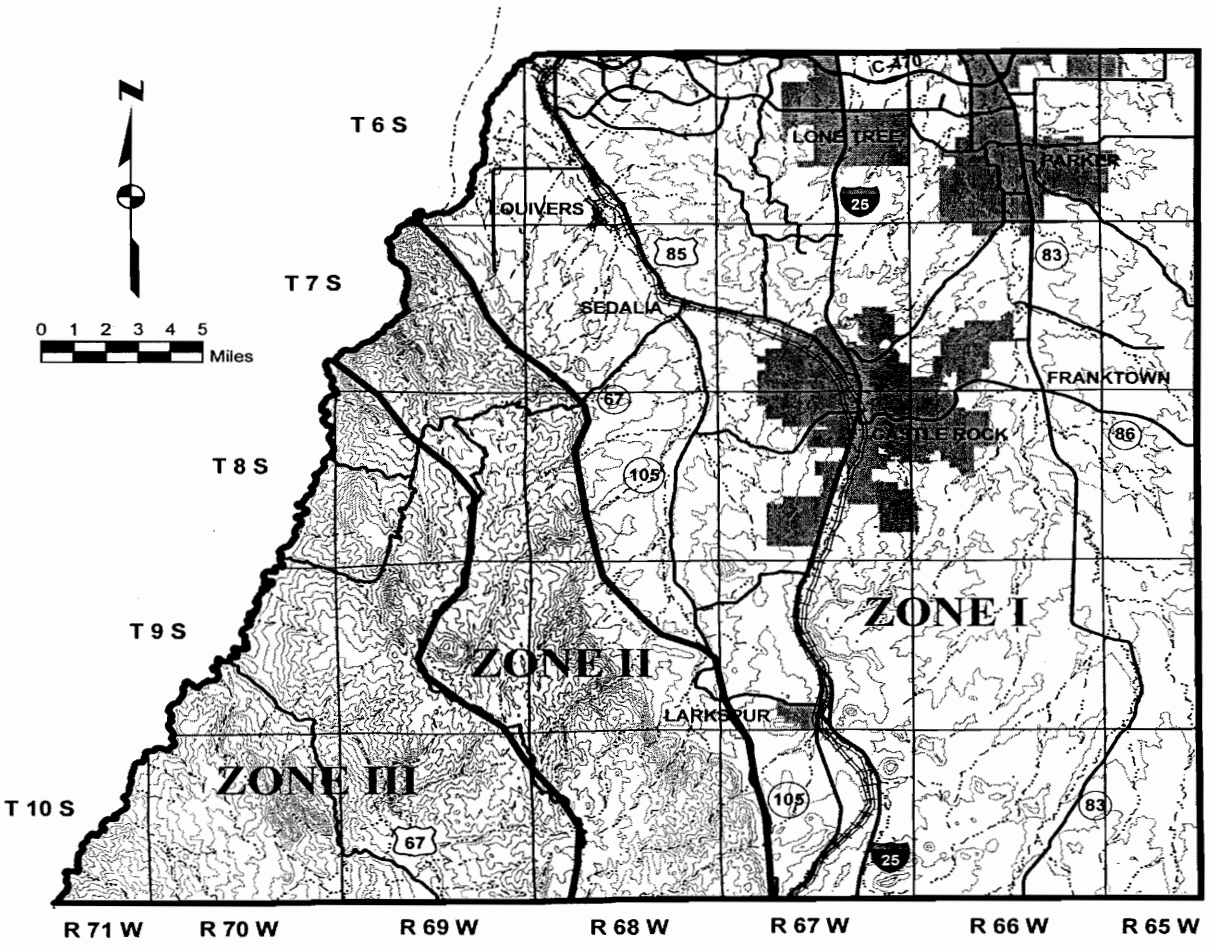


FIGURE 6-2
RAINFALL INTENSITY-DURATION CURVE
DOUGLAS COUNTY *ZONE I*

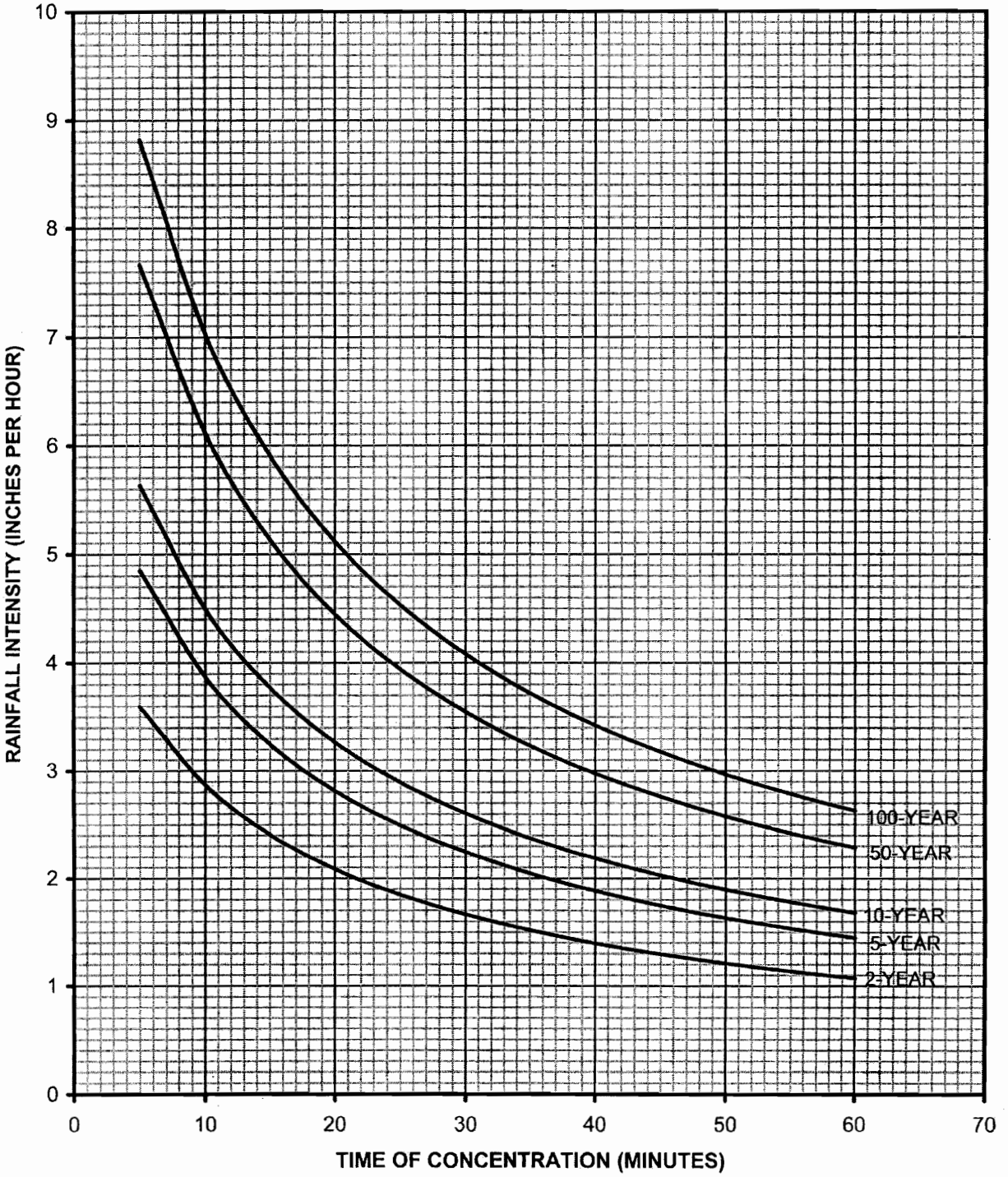


Table RO-3—Recommended Percentage Imperviousness Values

Land Use or Surface Characteristics	Percentage Imperviousness
Business:	
Commercial areas	95
Neighborhood areas	85
Residential:	
Single-family	*
Multi-unit (detached)	60
Multi-unit (attached)	75
Half-acre lot or larger	*
Apartments	80
Industrial:	
Light areas	80
Heavy areas	90
Parks, cemeteries	5
Playgrounds	10
Schools	50
Railroad yard areas	15
Undeveloped Areas:	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	0
Lawns, clayey soil	0

* See Figures RO-3 through RO-5 for percentage imperviousness.

$$C_A = K_A + \left(1.31i^3 - 1.44i^2 + 1.135i - 0.12\right) \text{ for } C_A \geq 0, \text{ otherwise } C_A = 0 \qquad \text{(RO-6)}$$

$$C_{CD} = K_{CD} + \left(0.858i^3 - 0.786i^2 + 0.774i + 0.04\right) \qquad \text{(RO-7)}$$

$$C_B = \left(C_A + C_{CD}\right)/2$$

in which:

i = % imperviousness/100 expressed as a decimal (see Table RO-3)

C_A = Runoff coefficient for Natural Resources Conservation Service (NRCS) Type A soils

C_B = Runoff coefficient for NRCS Type B soils

C_{CD} = Runoff coefficient for NRCS Type C and D soils

K_A = Correction factor for Type A soils defined in Table RO-4

K_{CD} = Correction factor for Type C and D soils defined in Table RO-4

Table RO-4—Correction Factors K_A and K_{CD} for Use with Equations RO-6 and RO-7

NRCS Soil Type	Storm Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
C and D	0	-0.10i + 0.11	-0.18i + 0.21	-0.28i + 0.33	-0.33i + 0.40	-0.39i + 0.46
A	0	-0.08i + 0.09	-0.14i + 0.17	-0.19i + 0.24	-0.22i + 0.28	-0.25i + 0.32

The values for various catchment imperviousnesses and storm return periods are presented graphically in Figures RO-6 through RO-8, and are tabulated in Table RO-5. These coefficients were developed for the Denver region to work in conjunction with the time of concentration recommendations in Section 2.4. Use of these coefficients and this procedure outside of the semi-arid climate found in the Denver region may not be valid. The *UD-Rational* spreadsheet performs all the needed calculations to find the runoff coefficient given the soil type and imperviousness and the reader may want to take advantage of this macro-enabled Excel workbook that is available for download from the District's web site www.udfcd.org under "Download" – "Technical Downloads."

See Examples 7.1 and 7.2 that illustrate the Rational method. The use of the Rational method in storm sewer design is illustrated in Example 6.13 of the STREETS/INLETS/STORM SEWERS chapter.

Table RO-5— Runoff Coefficients, C

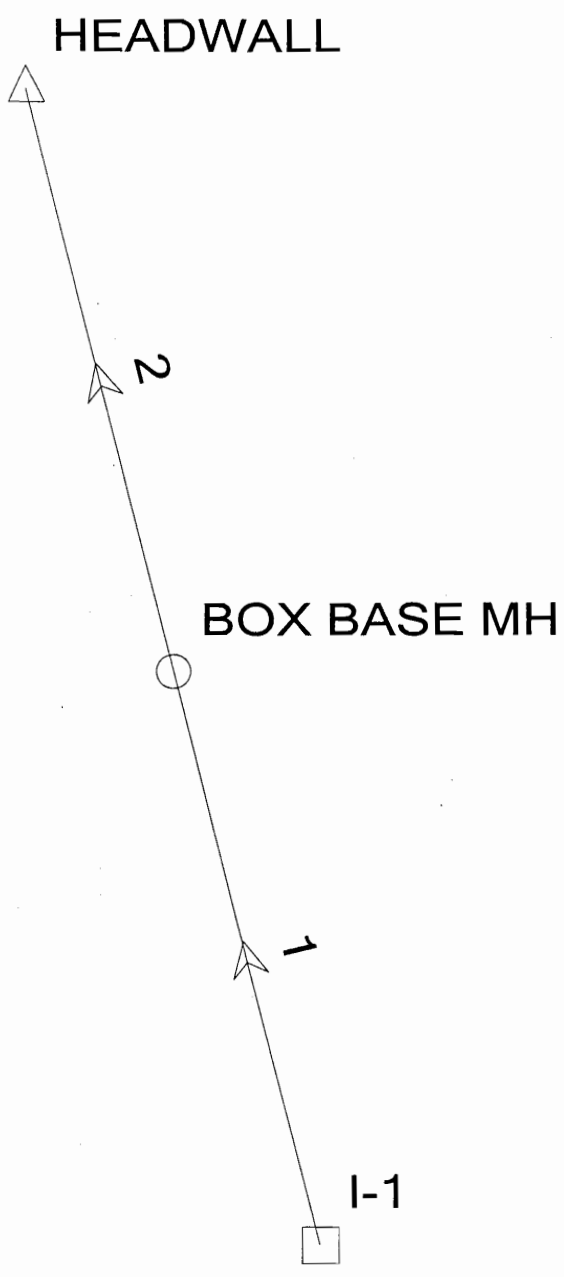
Percentage Imperviousness	Type C and D NRCS Hydrologic Soil Groups					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0%	0.04	0.15	0.25	0.37	0.44	0.50
5%	0.08	0.18	0.28	0.39	0.46	0.52
10%	0.11	0.21	0.30	0.41	0.47	0.53
15%	0.14	0.24	0.32	0.43	0.49	0.54
20%	0.17	0.26	0.34	0.44	0.50	0.55
25%	0.20	0.28	0.36	0.46	0.51	0.56
30%	0.22	0.30	0.38	0.47	0.52	0.57
35%	0.25	0.33	0.40	0.48	0.53	0.57
40%	0.28	0.35	0.42	0.50	0.54	0.58
45%	0.31	0.37	0.44	0.51	0.55	0.59
50%	0.34	0.40	0.46	0.53	0.57	0.60
55%	0.37	0.43	0.48	0.55	0.58	0.62
60%	0.41	0.46	0.51	0.57	0.60	0.63
65%	0.45	0.49	0.54	0.59	0.62	0.65
70%	0.49	0.53	0.57	0.62	0.65	0.68
75%	0.54	0.58	0.62	0.66	0.68	0.71
80%	0.60	0.63	0.66	0.70	0.72	0.74
85%	0.66	0.68	0.71	0.75	0.77	0.79
90%	0.73	0.75	0.77	0.80	0.82	0.83
95%	0.80	0.82	0.84	0.87	0.88	0.89
100%	0.89	0.90	0.92	0.94	0.95	0.96
	TYPE B NRCS HYDROLOGIC SOILS GROUP					
0%	0.02	0.08	0.15	0.25	0.30	0.35
5%	0.04	0.10	0.19	0.28	0.33	0.38
10%	0.06	0.14	0.22	0.31	0.36	0.40
15%	0.08	0.17	0.25	0.33	0.38	0.42
20%	0.12	0.20	0.27	0.35	0.40	0.44
25%	0.15	0.22	0.30	0.37	0.41	0.46
30%	0.18	0.25	0.32	0.39	0.43	0.47
35%	0.20	0.27	0.34	0.41	0.44	0.48
40%	0.23	0.30	0.36	0.42	0.46	0.50
45%	0.26	0.32	0.38	0.44	0.48	0.51
50%	0.29	0.35	0.40	0.46	0.49	0.52
55%	0.33	0.38	0.43	0.48	0.51	0.54
60%	0.37	0.41	0.46	0.51	0.54	0.56
65%	0.41	0.45	0.49	0.54	0.57	0.59
70%	0.45	0.49	0.53	0.58	0.60	0.62
75%	0.51	0.54	0.58	0.62	0.64	0.66
80%	0.57	0.59	0.63	0.66	0.68	0.70
85%	0.63	0.66	0.69	0.72	0.73	0.75
90%	0.71	0.73	0.75	0.78	0.80	0.81
95%	0.79	0.81	0.83	0.85	0.87	0.88
100%	0.89	0.90	0.92	0.94	0.95	0.96

APPENDIX C

HYDRAULIC CALCULATIONS

STORMCAD ANALYSIS

Scenario: 100yr



© Bentley Systems, Inc.

Scenario: EURV

Combined Pipe\Node Report

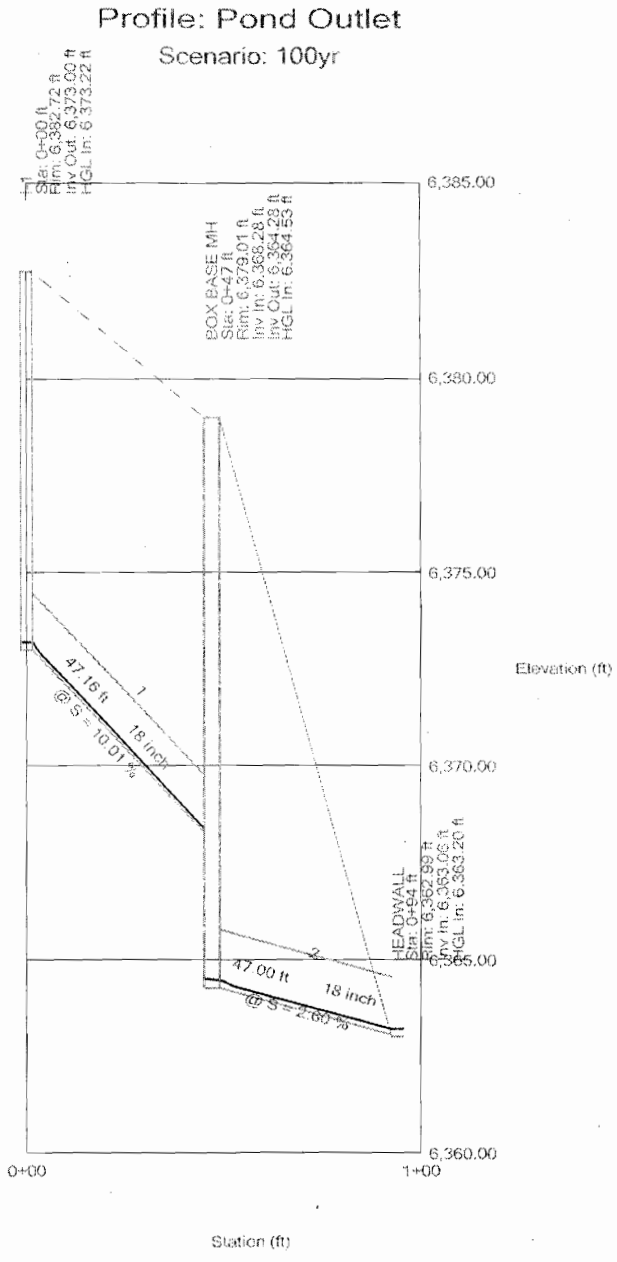
Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Total System Flow (cfs)	Full Capacity (cfs)	Flow / Full Capacity (%)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (%)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
1	I-1	BOX BASE M	47.16	18 inch	0.02	33.23	0.06	2.55	6,373.00	6,368.28	10.01	6,373.05	6,368.31
2	BOX BASE M	HEADWALL	47.00	18 inch	0.02	16.92	0.12	1.59	6,364.28	6,363.06	2.60	6,364.33	6,363.20

Scenario: 100yr

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Total System Flow (cfs)	Full Capacity (cfs)	Flow / Full Capacity (%)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (%)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
1	I-1	BOX BASE M	47.16	18 inch	0.34	33.23	1.02	6.08	6,373.00	6,368.28	10.01	6,373.22	6,368.39
2	BOX BASE M	HEADWALL	47.00	18 inch	0.34	16.92	2.01	3.80	6,364.28	6,363.06	2.60	6,364.50	6,363.21

Profile
Scenario: 100yr



© Bentley Systems, Inc.

APPENDIX D

DETENTION AND WATER QUALITY

EXCESS URBAN RUNOFF CONTROL (FULL-SPECTRUM) DETENTION SIZING

Project: High Prairie Farms Maintenance Facility

Basin ID:

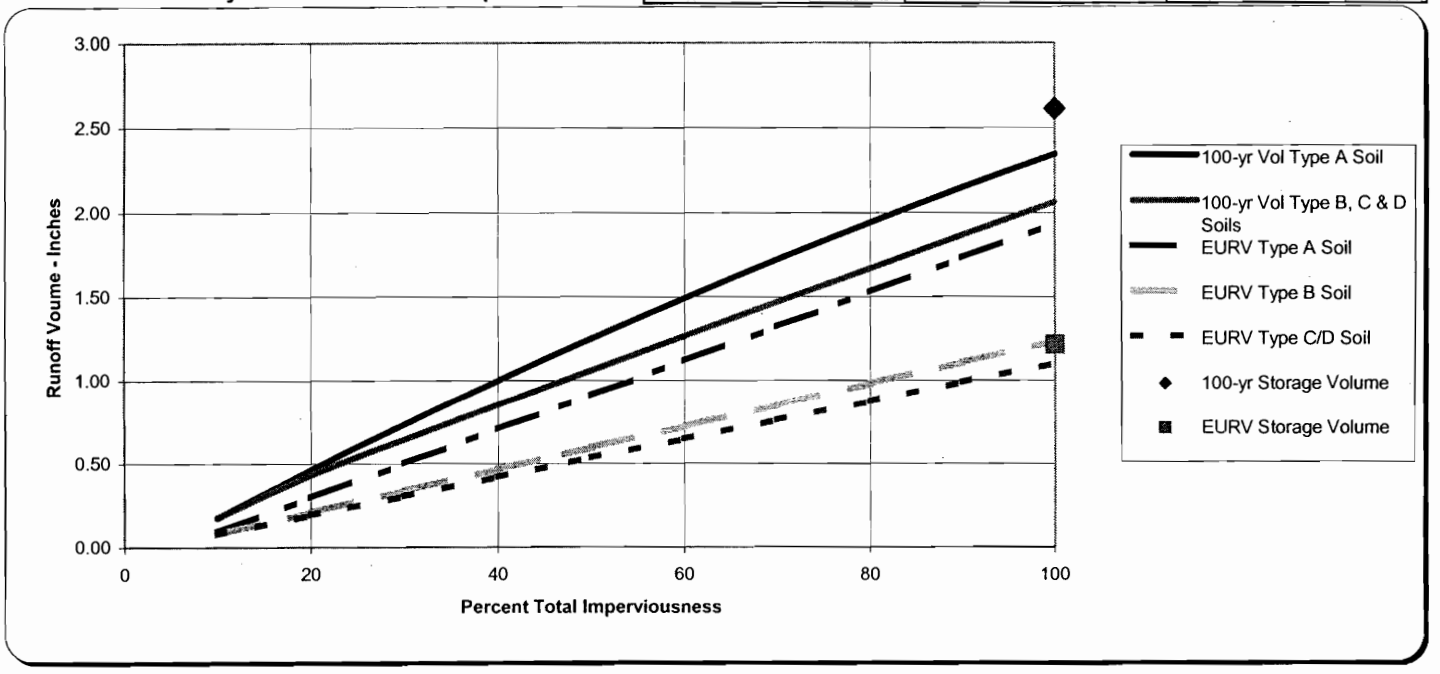
* User input data shown in blue.

Area of Watershed (acres)	0.336
Subwatershed Imperviousness	100.0%
Level of Minimizing Directly Connected Impervious Area (MDCIA)	0
Effective Imperviousness[1]	100.0%

Hydrologic Soil Type	Percentage of Area	Area (acres)
Type A		0.0
Type B		0.0
Type C or D	100.0%	0.3

Recommended Horton's Equation Parameters for CUHP		
Infiltration (inches per hour)		Decay Coefficient--α
Initial--f_i	Final--fo	
3	0.5	0.0018

	Detention Volumes [2,5]		Maximum Allowable Release Rate, cfs[3]
	(watershed inches)	(acre-feet)	
Excess Urban Runoff Volume[4]	1.21	0.0340	Design Oulet to Empty EURV in 72 Hours
100-year Detention Volume plus WQCV [5]	2.61	0.0731	0.34



Notes:

1) Effective imperviousness is based on Figure ND-1 of the Urban Storm Drainage Criteria Manual (USDCM).

2) Results shown reflect runoff reduction from Level 1 or 2 MDCIA and are plotted at the watershed's total imperviousness value; the impact of MDCIA is reflected by the results being below the curves.

3) Maximum allowable release rates for 100-year event are based on Table SO-1. Outlet for the Excess Urban Runoff Volume (EURV) to be designed to empty out the EURV in 72 hours. Outlet design is similar to one for the WQCV outlet of an extended detention basin (i.e., perforated plate with a micro-pool) and extends to top of EURV water surface elevation.

4) EURV approximates the difference between developed and pre-developed runoff volume.

5) User has opted to add the WQCV to the 100-year detention volume to satisfy local regulations. This is not required per the USDCM.

EMPIRICAL 10-YEAR AND 100-YEAR DETENTION VOLUME CALCULATIONS

-REFERENCE UDFCD DRAINAGE CRITERIA MANUAL (V.2)

$V_{10,100}=KA$

$K_{10}=(0.95I-1.90)/1000$ (EQUATION SO-2)

$K_{100}=(1.78I-0.002I^2-3.56)/900$ (EQUATION SO-3)

A=Tributary Area (acres)

I=Imperviousness of Tributary Area (%)

A= 0.336

I= 100.00

Required V_{10}(Ac-ft)= 0.031

Required V_{100}(Ac-ft)= 0.058

WATER QUALITY CAPTURE VOLUME CALCULATIONS

-REFERENCE UDFCD DRAINAGE CRITERIA MANUAL VOL. 3 FIGURE EDB-2

Water Quality Capture Volume = WQCV = $a*(0.91i^3-1.19i^2+0.78i)$ (watershed inches)

i = Total Imperviousness Ratio = $I_{WQ}/100$

a = 40-hr Drain Time = 1.0

Required Storage = [WQCV/12]*A*1.2 (acre-ft)

A = Tributary Catchments Area (acres)

1.2 Factor = Multiplier to account for 20% sediment accumulation

i = 1.00

Required WQCV (watershed in) = 0.500

Required WQCV (Ac-ft) = 0.017

Forebay (3%) = 0.0005

Forebay (5%) = 0.0008

Micropool (0.5%) = 0.0001

DETENTION POND - STAGE/DISCHARGE

	PRISMOIDAL METHOD				
	POND VOLUME = 1/3(A1+A2+(A1*A2)^0.5)*D				
	DETENTION POND		INCREM	CUMM.	CUMM.
	ELEV	AREA SQ FT	VOLUME CU FT	VOLUME CU FT	VOLUME ACRE-FT
	6379.08	0	0	0	0.0000
	6379.50	0	0	0	0.0000
	6380.00	238	40	40	0.0009
	6380.50	537	189	229	0.0052
	6381.00	840	341	570	0.0131
WQCV WSE	***6381.16***				***0.017***
	6381.50	1,207	509	1,079	0.0248
EURV WSE	***6381.78***				***0.034***
	6382.00	1,634	708	1,786	0.0410
	6382.50	2,125	937	2,724	0.0625
100-yr WSE	***6382.72***				***0.074***
	6383.00	2,699	1,203	*3,927*	0.0901

Worksheet for 100-Yr - Rectangular Orifice

Project Description

Solve For	Opening Width

Input Data

Discharge	0.320	ft³/s
Headwater Elevation	6382.72	ft
Centroid Elevation	6382.13	ft
Tailwater Elevation	6373.00	ft
Discharge Coefficient	0.65	
Opening Height	0.69	ft

Results

Opening Width	0.12	ft
Headwater Height Above Centroid	0.60	ft
Tailwater Height Above Centroid	-9.13	ft
Flow Area	11.46	in²
Velocity	4.02	ft/s

OUTLET DESIGN

TOP OF MICROPOOL ELEV.= 6379.50 ft

EURV = 0.034 ac-ft
ELEVATION = 6381.78 ft
H (EURV) = 2.28 ft

100 YEAR VOLUME = 0.074 ac-ft
ELEVATION = 6382.72 ft
100_{year} Release = 0.34 cfs

EXCESS URBAN RUNOFF VOLUME ORIFICE CALCULATIONS

-REFERENCE UDFCD DRAINAGE CRITERIA MANUAL VOL. 2 EQUATION SO-13a

$b=0.0166H^2+0.2055H+0.1543$ b = 0.710
$c = -0.0018H^2-0.0068H+1.0015$ c = 0.977
$A = [(EURV)/b]^{(1/c)}$ A = 0.04 in^2
D = 0.24 in
D = 2/8 in

100-YR WEIR DESIGN

Q = CA*(2gh)^.5 cfs
c = 0.65
g = 32.17 ft/s^2
A = 0.00034 ft^2

	Elev. =	h =	Q =	Q total =
EURV ELEV.	6381.78			
	6381.50	0.28	0.00094	0.01349
	6381.17	0.61	0.00139	0.01255
	6380.83	0.95	0.00173	0.01116
	6380.50	1.28	0.00201	0.00943
	6380.17	1.61	0.00226	0.00742
	6379.83	1.95	0.00248	0.00516
TOP OF MICROPOOL ELEV.	6379.50	2.28	0.00268	0.00268

$Q_{100\ weir} = Q_{100} - Q_{total\ eurv}$ = 0.32 cfs

$Q_{100\ weir}$ = cbh^(3/2)
c = 3.33
h = 0.93 ft
b = Q/(ch^(3/2)) = 0.11 ft
= **1.3 in**

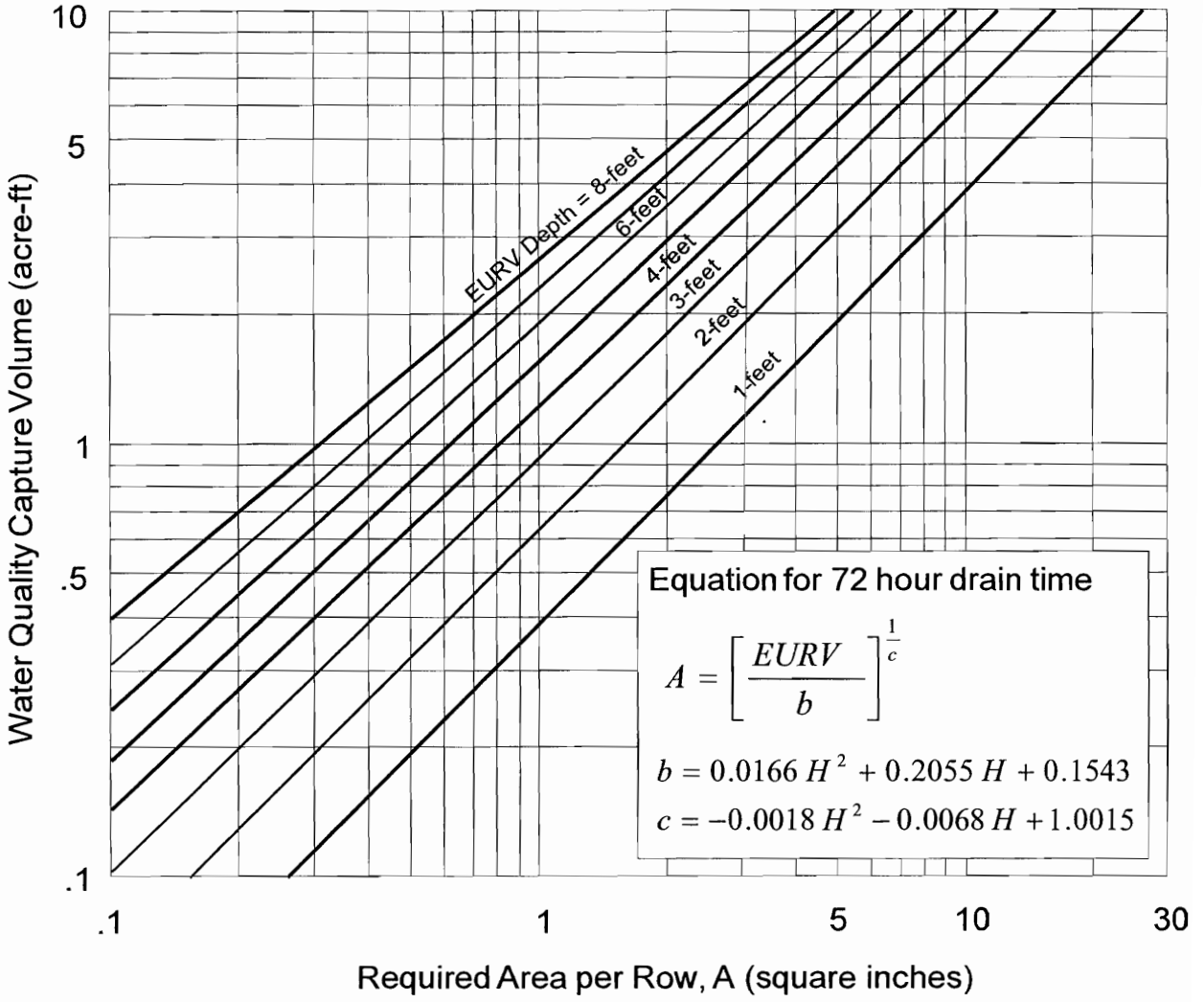


Figure SO-8—Outlet Sizing for EURV Control with 72-hour Drain Time for On-Site Detention

Orifice Plate Perforation Sizing

Circular Perforation Sizing

This table may be used to size perforation in a vertical plate of riser pipe.

Hole Dia. (in.) *	Hole Dia. (in.)	Min. S_c (in.)	Area per Row (sq. in.)		
			n = 1	n = 2	n = 3
1/4	0.250	1	0.05	0.10	0.15
5/16	0.313	2	0.08	0.16	0.24
3/8	0.375	2	0.11	0.22	0.33
7/16	0.438	2	0.15	0.30	0.45
1/2	0.500	2	0.20	0.40	0.60
9/16	0.563	3	0.25	0.50	0.75
5/8	0.625	3	0.31	0.62	0.93
11/16	0.688	3	0.37	0.74	1.11
3/4	0.750	3	0.44	0.88	1.32
13/16	0.813	3	0.52	1.04	1.56
7/8	0.875	3	0.60	1.20	1.80
15/16	0.938	3	0.69	1.38	2.07
1	1.000	4	0.79	1.58	2.37
1 1/16	1.063	4	0.89	1.78	2.67
1 1/8	1.125	4	0.99	1.98	2.97
1 3/16	1.188	4	1.11	2.22	3.33
1 1/4	1.250	4	1.23	2.46	3.69
1 5/16	1.313	4	1.35	2.70	4.05
1 3/8	1.375	4	1.48	2.96	4.44
1 7/16	1.438	4	1.62	3.24	4.86
1 1/2	1.500	4	1.77	3.54	5.31
1 9/16	1.563	4	1.92	3.84	5.76
1 5/8	1.625	4	2.07	4.14	6.21
1 11/16	1.688	4	2.24	4.48	6.72
1 3/4	1.750	4	2.41	4.82	7.23
1 13/16	1.813	4	2.58	5.16	7.74
1 7/8	1.875	4	2.76	5.52	8.28
1 15/16	1.938	4	2.95	5.90	8.85
2	2.000	4	3.14	6.28	9.42
n = Number of columns of perforations					
Minimum steel plate thickness			1/4"	5/16"	3/8"
* Designer may interfere to the nearest 32nd inch to better match the needed area if desired.					

Rectangular Perforation sizing

Use only one rectangular column whenever two 2;inch diameter circular perforations cannot provide needed outlet area.

Rectangular Height = 2-inches

Rectangular Width = Required Area per Row / 2"

Rectangular hole Width	Min. Steel Thickness
5"	1/4 "
6"	1/4 "
7"	5/32 "
8"	5/16 "
9"	11/32 "
10"	3/8 "
> 10"	1/2 "

Figure 5—WQCV Outlets Orifice Perforation Sizing.

FOREBAY/MICRO-POOL VOLUME CALCULATIONS

POND DESIGN	ELEV	AREA (ft^2)	VOLUME (ft^3)	$VOLUME_{sum}$ (ft^3)	$VOLUME_{sum}$ (Ac-ft)	METHOD
Pond Presedimentation Forebay - West	6382.37	0.00	0.00	0.00	0.0000	prismoidal
	6382.40	4.68	0.05	0.05	0.0000	
	6382.60	35.33	3.52	3.57	0.0001	
	6382.80	66.78	10.05	13.62	0.0003	
	6382.90	76.27	7.15	20.76	0.0005	

WQCV(Ac-ft)= 0.0168 **$V_{forebay}$(Ac-ft)= 0.0004**
Elev (ft) = 6382.87

50% of total flow enters south forebay. .Therefore only 50% of the required forebay volume is being provided at this location.

POND DESIGN	ELEV	AREA (ft^2)	VOLUME (ft^3)	$VOLUME_{sum}$ (ft^3)	$VOLUME_{sum}$ (Ac-ft)	METHOD
Pond Presedimentation Forebay - East	6383.44	0.00	0	0	0.0000	prismoidal
	6383.60	24.04	1.31	1.31	0.0000	
	6383.80	55.18	7.71	9.02	0.0002	
	6384.00	82.84	13.71	22.72	0.0005	

WQCV(Ac-ft)= 0.0168 **$V_{forebay}$(Ac-ft)= 0.0004**
Elev (ft) = 6383.94

50% of total flow enters north forebay. Therefore only 50% of the required forebay volume is being provided at this location.

POND DESIGN	ELEV	AREA (ft^2)	VOLUME (ft^3)	$VOLUME_{sum}$ (ft^3)	$VOLUME_{sum}$ (Ac-ft)	METHOD
Pond Sedimentation Micro-Pool	6376.80	16.00	0	0	0	prismoidal
	6377.00	16.00	3.20	3.20	0.0001	
	6377.50	16.00	8.00	11.20	0.0003	
	6378.00	16.00	8.00	19.20	0.0004	
	6378.50	16.00	8.00	27.20	0.0006	
Bottom Stage	6379.00	16.00	8.00	35.20	0.0008	
Storage VBS	6379.50	16.00	8.00	43.20	0.0010	

WQCV(Ac-ft)= 0.0168 **$V_{Bottom\ Stage}$(Ac-ft)= 0.0001**
Elev (ft) = 6377.03

Note: Micro-pool to be 1/2 depth of the top stage depth, or 2.5', whichever is greater.
Top stage depth = 3.3' , therefore micro-pool is 2.50' deep.

SUBJECT: High Prairie Farms Maint. Facility - Pond Forebay Outlets

JOB NO.: DV1310

DESIGNED BY: TAN

DATE: 8/28/07

CHECKED BY:

NOLTE

Forebays should drain in 3-5 minutes

$V_{Forebay} = 0.0004 \text{ ac-ft} = 18.3 \text{ cf}$

$Q_{3min} = \frac{18.3 \text{ cf}}{3 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 0.102 \text{ cfs}$

$Q_{5min} = \frac{18.3 \text{ cf}}{3 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 0.061 \text{ cfs}$

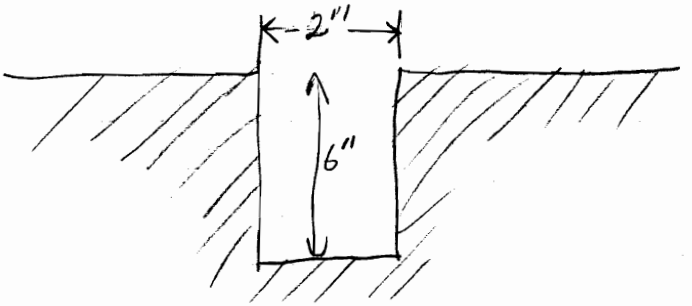
$Q_{weir} = c\, b\, h^{3/2} \qquad c = 3.33 \qquad h = 0.5'$

$b = \frac{Q}{c\, h^{3/2}}$

$b_{3min} = 0.086' = 1.0''$

$b_{5min} = 0.052' = 0.6''$

* Use 2" wide curb cut due to clogging concerns



Worksheet for Pond Emergency Overflow

Project Description

Solve For	Headwater Elevation

Input Data

Discharge		1.350	ft^3/s
Crest Elevation		6383.25	ft
Tailwater Elevation		6382.40	ft
Crest Surface Type	Gravel		
Crest Breadth		5.00	ft
Crest Length		10.00	ft

Results

Headwater Elevation	6383.39	ft
Headwater Height Above Crest	0.14	ft
Tailwater Height Above Crest	-0.85	ft
Weir Coefficient	2.56	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.56	US
Flow Area	202.39	in^2
Velocity	0.96	ft/s
Wetted Perimeter	10.28	ft
Top Width	10.00	ft

Cross Section for Pond Emergency Overflow

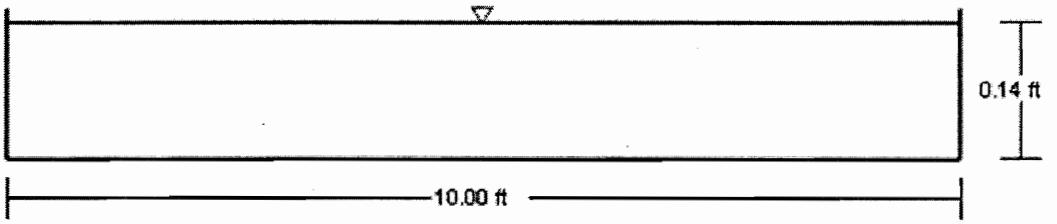
Project Description

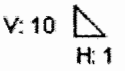
Solve For	Headwater Elevation

Input Data

Discharge		1.350	ft³/s
Headwater Elevation		6383.39	ft
Crest Elevation		6383.25	ft
Tailwater Elevation		6382.40	ft
Crest Surface Type	Gravel		
Crest Breadth		5.00	ft
Crest Length		10.00	ft

Cross Section Image





APPENDIX E
MAPS/PLANS

1697 Cole Boulevard, Suite 200
Golden, CO 80401
Tel: (303) 239-5400
Fax: (303) 239-5454

BROWN AND CALDWELL

January 11, 2008

Ms. Kati Carter
Douglas County Community Development Department
Planning Division
100 Third Street
Castle Rock, CO 80104

Subject: 9455 Democrat Road (High Prairie Farms Maintenance Facility), SP07-104

Dear Ms. Carter:

Brown and Caldwell reviewed the subject project on behalf of the Cherry Creek Basin Water Quality Authority (Authority). As the watershed consultant for the Authority, Brown and Caldwell's review focuses on point and non-point source pollutant impacts and water quality considerations related to the proposed project.

Considerations

The proposed project warrants review by the Authority because of its location within the Cherry Creek basin and the change in land use that can impact runoff quantity and quality.

Review Comments

The Authority takes no exception to the proposed project as long as the applicant provides water quality control facilities (i.e., baseline BMPs) either on-site or by a regional facility. Facilities must be designed in accordance with the Authority's *Requirements*[1], Authority approved development master plans, and the Urban Drainage and Flood Control District's Major Drainageway and Outfall System Planning studies. Additional water-quality facilities are required if the project disturbs a stream preservation area or if industrial type uses are proposed that may impact quality of stormwater runoff or if the project may have a direct impact on Cherry Creek State Park. Applicant shall provide documentation in the drainage report that a regional stormwater facility was designed to accept developed-conditions runoff from the proposed project. The Authority reserves the right to comment further on the project after receiving the drainage plan. Please provide a copy of the drainage and stormwater quality plan with subsequent submittals.

If you have any questions, please call us at (303) 239-5400.

Very truly yours,

BROWN AND CALDWELL

Michelle M. Wind, P.E.
Project Manager

William P. Ruzzo, P.E.
Project Engineer

cc: Chuck Reid, Manager, Authority

[1] Cherry Creek Basin Water Quality Authority. February 2000. *Cherry Creek Reservoir Watershed Stormwater Quality Requirements.*

January 30, 2008

NOLTE
BEYOND ENGINEERING

Michelle M. Wind, P.E.
Project Manager
1697 Cole Blvd., Suite 200
Golden, CO 80401

RE: 9455 Democrat Road (High Prairie Farms Maintenance Facility), SP07-104

Dear Mrs. Wind:

This letter is in reference to the comments received from the Cherry Creek Basin Water Quality Authority (Authority) on the first submittal of the 9455 Democrat Road plans and reports, dated January 11, 2008.

Review Comments

1. The Authority takes no exception to the proposed project as ling as the applicant provides water quality control facilities (i.e., baseline BMPs) either on-site or by a regional facility. Facilities must be designed in accordance with the Authority's *Requirements*, Authority approved development master plans, and the Urban Drainage and Flood Control District's Major Drainageway and Outfall System Planning Studies.
   Response: Water quality facilities will be provided on-site and have been designed in accordance with current UDFCD standards. These include a water quality volume in the on- site detention basin, forebays and a micropool. The project will be constructed following current Douglas County Grading, Erosion and Sediment Control procedures to ensure water quality during construction.

2. Additional water-quality facilities are required if the project disturbs a stream preservation area or if industrial type uses are proposed that may impact quality of stormwater runoff or if the project may have a direct impact on Cherry Creek State Park.
   Response: The project does not meet the above listed criteria for additional water-quality facilities.

3. Applicant shall provide documentation in the drainage report that a regional stormwater facility was designed to accept developed-conditions runoff from the proposed project.
   Response: Stormwater detention will be provided on site to accept developed-conditions runoff. This has been documented in the drainage report.

4. The Authority reserves the right to comment further on the project after receiving the drainage plan. Please provide a copy of the drainage and stormwater quality plan with subsequent submittals.
   Response: The Phase III Drainage Report is attached.

Please contact us if you have any questions or concerns regarding this matter. Sincerely,

NOLTE ASSOCIATES, INC.

Gary Iwata, P.E.
Engineering Manager

CC: Kati Carter, Project Planner, Douglas County Planning Division
David Foster, Plan West, Inc.

N:\dv1310\Documents\High Prairie Farms\CommentResponses.doc

NOLTE ASSOCIATES, INC.
8000 SOUTH CHESTER STREET, SUITE 200
CENTENNIAL, CO 80112-3520
303.220.6400 TEL 303.220.9001 FAX
WWW.NOLTE.COM

Printed on paper made with 100% post consumer fiber

CONSTRUCTION PLANS

THE PINERY HIGH PRAIRIE FARMS MAINTENANCE FACILITY

PROPOSED GRADING AND STORM DRAINAGE IMPROVEMENTS

County of Douglas, State of Colorado

GENERAL NOTES

1. THE DOUGLAS COUNTY ENGINEER'S SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE ENGINEERING DIVISION HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL CONFORMANCE WITH THE DOUGLAS COUNTY SUBDIVISION RESOLUTION OR APPROVED VARIANCES TO THOSE REGULATIONS. THE DOUGLAS COUNTY ENGINEER, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY, OTHER THAN STATED ABOVE, FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS. THE OWNER AND ENGINEER UNDERSTAND THAT THE RESPONSIBILITY FOR THE ENGINEERING ADEQUACY OF THE FACILITIES DEPICTED IN THE DOCUMENT LIES SOLELY WITH THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE IS AFFIXED TO THE DOCUMENT.

2. ALL MATERIAL AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY ENGINEERING DIVISION. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS STANDARDS AND SPECIFICATIONS.

3. THE CONTRACTOR SHALL NOTIFY THE DOUGLAS COUNTY ENGINEERING DIVISION INSPECTION SECTION, 303-660-7487, A MINIMUM OF 48 HOURS AND A MAXIMUM OF 96 HOURS PRIOR TO STARTING CONSTRUCTION.

4. CAUTION: LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. FOR INFORMATION CONTACT: DENVER INTER-UTILITY GROUP 1-800-922-1987.

5. THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE PLANS (ACCEPTED BY THE DOUGLAS COUNTY ENGINEER) AND ONE (1) COPY OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS AT THE JOB SITE AT ALL TIMES.

6. A PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION SHALL BE SUBMITTED TO DOUGLAS COUNTY FOR ACCEPTANCE WITH THE PERMIT APPLICATION. AN EXCAVATION OR PUBLIC IMPROVEMENTS CONSTRUCTION PERMIT WILL NOT BE ISSUED WITHOUT AN APPROVED TRAFFIC CONTROL PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION.

7. THE CONSTRUCTION PLANS SHALL BE CONSIDERED VALID FOR TWO (2) YEARS FROM THE DATE OF COUNTY ACCEPTANCE AFTER WHICH TIME THESE PLANS SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY DOUGLAS COUNTY.

8. CONTRACTOR SHALL NOTIFY DOUGLAS COUNTY ENGINEERING INSPECTION WHEN WORKING OUTSIDE OF THE PUBLIC RIGHT-OF-WAY ON ANY FACILITY WHICH WILL BE CONVEYED TO THE COUNTY, URBAN DRAINAGE AND FLOOD CONTROL DISTRICT, OR OTHER SPECIAL DISTRICT FOR MAINTENANCE (STORM SEWER, ENERGY DISSIPATER, DETENTION OUTLET STRUCTURE, OR OTHER DRAINAGE INFRASTRUCTURE BY THE COUNTY AND/OR URBAN DRAINAGE). FAILURE TO NOTIFY ENGINEERING INSPECTION TO ALLOW THEM TO INSPECT THE CONSTRUCTION MAY RESULT IN NON-ACCEPTANCE OF THE FACILITY/INFRASTRUCTURE BY THE COUNTY AND/OR URBAN DRAINAGE.

9. INSPECTION: CONSTRUCTION SHALL NOT BEGIN UNTIL A PERMIT HAS BEEN ISSUED. IF A DOUGLAS COUNTY ENGINEERING INSPECTOR IS NOT AVAILABLE AFTER PROPER NOTICE OF CONSTRUCTION ACTIVITY HAS BEEN PROVIDED, THE PERMITEE MAY COMMENCE WORK IN THE INSPECTORS ABSENCE. HOWEVER, DOUGLAS COUNTY RESERVES THE RIGHT NOT TO ACCEPT THE IMPROVEMENT IF SUBSEQUENT TESTING REVEALS AN IMPROPER INSTALLATION.

10. ALL ELEVATIONS ARE ON USGS DATUM NAVD 88. RANGE POINT OR MONUMENT SHALL BE SHOWN ON CONSTRUCTION PLANS.

STORM DRAIN NOTES

1. PUBLIC STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (RCP), MINIMUM CLASS III EXCEPT WHERE NOTED OTHERWISE.

2. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING STORM SEWER POINTS OF CONNECTIONS PRIOR TO THE CONSTRUCTION OF ANY PROPOSED STORM SEWER AND NOTIFY THE COUNTY AND ENGINEER WITH ANY DISCREPANCIES.

3. ALL STORM SEWER SHALL HAVE PIPE BEDDING AS SHOWN ON FIGURE 9.1a AND 9.1b PER DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS MANUAL.

4. MANHOLE BARRELS AND CONES SHALL BE CONSTRUCTED OF PRECAST CONCRETE. CAST-IN-PLACE MANHOLE BASES AND INLETS ARE REQUIRED.

5. PRECAST MANHOLES AND RISERS SHALL BE MANUFACTURED IN CONFORMITY WITH ASTM DESIGNATION C-478. ALL CONES SHALL BE ECCENTRIC.

6. CONTRACTOR SHALL ATTACH FLARED-END SECTIONS PER DOUGLAS COUNTY CRITERIA WITH JOINT FASTENERS ON FES AND THE LAST TWO SECTIONS OF RCP PIPE.

7. NO BACKFILL MATERIAL SHALL BE PLACED ABOVE THE SPRINGLINE OF THE PIPE UNTIL A DOUGLAS COUNTY REPRESENTATIVE HAS AUTHORIZED BACKFILLING. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY DOUGLAS COUNTY 48 HOURS IN ADVANCE OF THE PROPOSED BACKFILL OPERATIONS SO THAT A DOUGLAS COUNTY REPRESENTATIVE MAY INSPECT THE PIPE AND THE BEDDING PRIOR TO BACKFILLING.

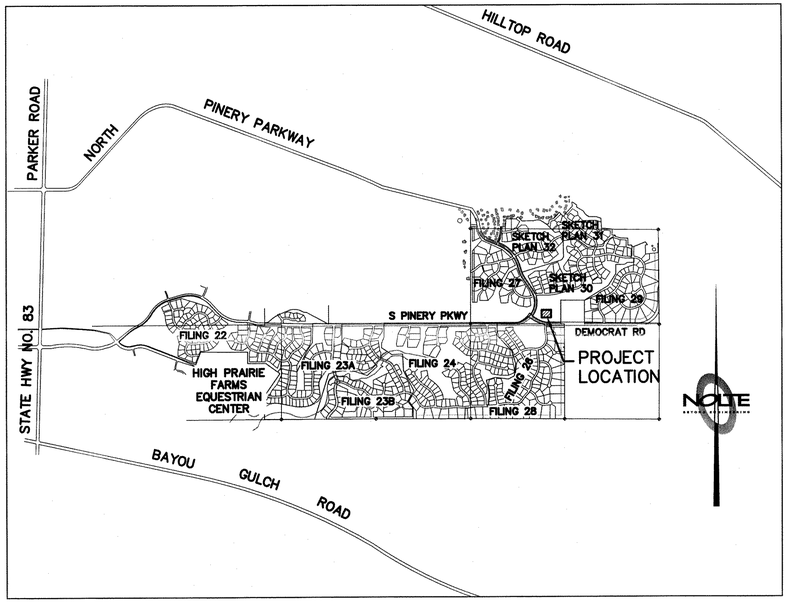
8. STORM DRAINAGE MANHOLES SHALL BE IMPRINTED WITH "STORM" ON THE COVER.

9. ALL RCP STORM SEWER MUST USE WATERTIGHT O-RING GASKETS.

10. EPOXY COATED REBAR SHALL BE USED IN THE CONSTRUCTION OF ALL INLETS PER CDOT M & S STANDARDS M-604-10, 11, 12, AND 13.

11. CLASS D CONCRETE SHALL BE USED FOR THE CONSTRUCTION OF ALL DRAINAGE STRUCTURES.

12. TWO (2) MANHOLE ACCESS POINTS ARE REQUIRED ON ALL TYPE 'R' INLETS GREATER THAN OR EQUAL TO TEN (10) FEET IN LENGTH, PER CDOT M & S STANDARD M-604-12.



VICINITY MAP

SCALE 1"=2000'

BASIS OF BEARINGS

THE BEARINGS ARE BASED ON THE SOUTHERLY LINE OF THE SOUTHEAST QUARTER OF SECTION 13, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN. SAID LINE IS MONUMENTED ON THE WEST BY A 3 1/2" ALUMINUM CAPPED MONUMENT STAMPED "T7S R66W 13/24 1999 PLS 28656" AND ON THE EAST BY A 3 1/2" ALUMINUM CAPPED MONUMENT STAMPED "T7S R66W R65W 13/18/24/19 1999 PLS 28656" AS SHOWN HEREON. THE BEARING OF SAID LINE IS SOUTH 89°51'18" WEST, WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO.

BENCHMARK

THE BENCHMARK IS A 2 1/2" BRASS CAP STAMPED "CP #13, WSSI" LOCATED NEAR THE NORTH RIGHT-OF-WAY LINE OF SOUTH PINERY PARKWAY APPROXIMATELY 925 FEET EAST OF THE NORTH-SOUTH CENTERLINE OF SECTION 13, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN. ELEVATION = 6301.82, DOUGLAS COUNTY GPS NETWORK DATUM.

KEY CONTACTS

GARY IWATA
NOLTE AND ASSOCIATES, INC. _____ (303) 220-6400

DAVE PERKINS
HIGH PRAIRIE FARMS METRO DISTRICT _____ (303) 472-8120

BILL MORGAN
PINERY WATER & WASTE WATER DISTRICT _____ (303) 841-2797

UTILITY NOTIFICATION
INTER-UTILITY GROUP _____ 1-800-922-1987

SHEET INDEX

I HEREBY AFFIRM THAT THESE CONSTRUCTION PLANS FOR THE PINERY HIGH PRAIRIE FARMS MAINTENANCE FACILITY WERE PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) IN ACCORDANCE WITH THE REQUIREMENTS OF THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS. THE DOUGLAS COUNTY STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA.

COLORADO REGISTERED GARY T. IWATA 37642 3-24-08 PROFESSIONAL ENGINEER

GARY IWATA
REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO NO. 37642
NOLTE ASSOCIATES, INC.
8000 S. CHESTER ST., SUITE 200,
CENTENNIAL, CO. 80112
(303) 220-6400

RECORD COPY

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

RECORD COPY

DV07-363
DOUGLAS COUNTY
APR 03 2008
DEPARTMENT OF PUBLIC WORKS

COUNTY ENGINEER _____
DATE 4/7/08

RECORD COPY

THESE CONSTRUCTION PLANS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR DRAINAGE IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

NO.	BY	DATE	REVISIONS
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION
The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to, or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

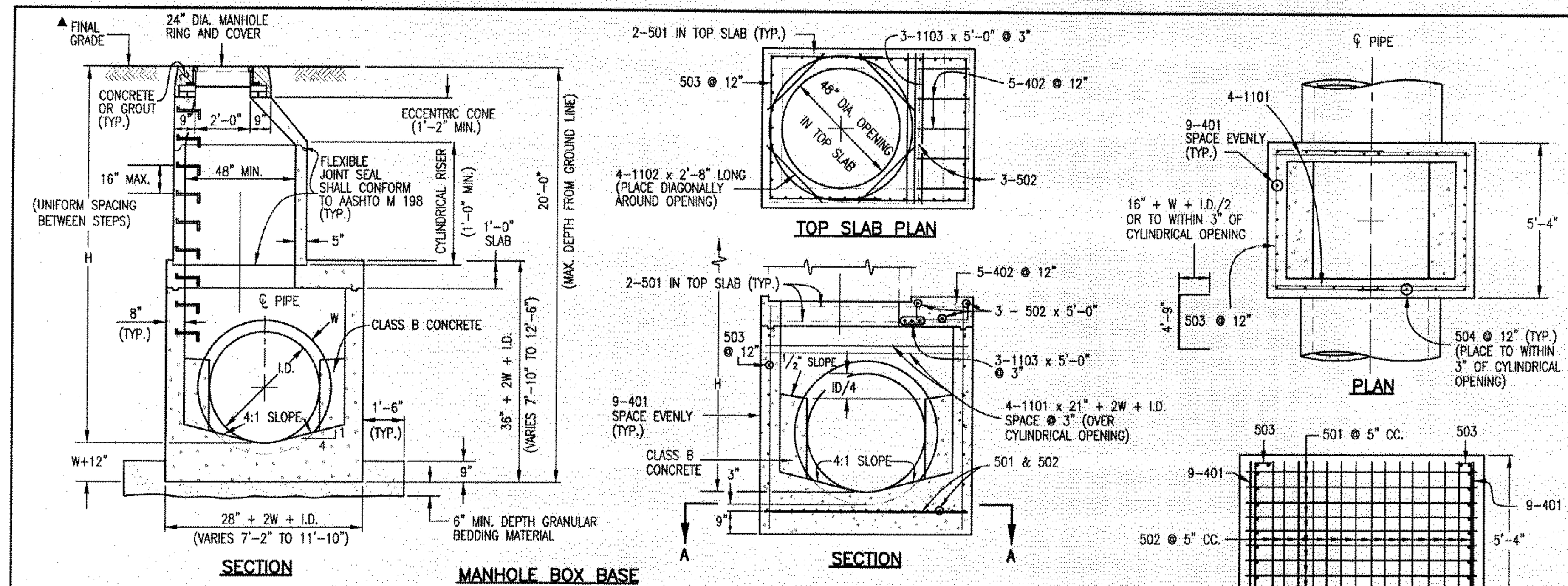
HIGH PRAIRIE FARMS MAINT. FACILITY
CONSTRUCTION DOCUMENTS
TITLE SHEET

PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT
DATE SUBMITTED: FEB. 2008

NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.0400 TEL 303.220.9001 FAX WWW.NOLTE.COM

SHEET NUMBER
TS
1 OF 7 SHEETS
JOB NUMBER
DV131005

DATE: 3/21/08 TIME: 10:43:11 AM DRAWING NAME: 01-CD-TS.DWG
SERVER: DVS1 DESIGNER: ### PROJ. MGR: ### PLOTTED BY: HOUSEK
PATH: N:\DV\131\CADD\CIVIL\HIGH PRAIRIE FARMS
XREFS: 24x36x_VCMAP



MARK	SIZE	TYPE	WT. #/FT.	BARS	I.D. 54"	60"	66"	72"	84"	96"	FORMULAS
401	4	I	0.668	NO. REQ'D. / LENGTH / WEIGHT #	18 / 8'-1" / 97.2	18 / 8'-8" / 104.2	18 / 9'-3" / 111.2	18 / 9'-10" / 118.2	18 / 11'-0" / 132.3	18 / 12'-2" / 146.3	401 BAR LENGTH = 32"+2W+I.D.
402	4	III	0.668	NO. REQ'D. / LENGTH / WEIGHT #	5 / 5'-5" / 18.1	5 / 6'-0" / 20.0	5 / 6'-7" / 22.0	5 / 7'-2" / 23.9	5 / 8'-4" / 27.8	5 / 9'-6" / 31.7	402 BAR LENGTH = I.D. + 2W
501	5	I	1.043	NO. REQ'D. / LENGTH / WEIGHT #	17 / 7'-5" / 131.5	17 / 8'-0" / 141.8	17 / 8'-7" / 152.2	17 / 9'-2" / 162.5	17 / 10'-4" / 183.2	17 / 11'-6" / 203.9	501 BAR LENGTH = 24" + I.D. + 2W
502	5	I	1.043	NO. REQ'D. / LENGTH / WEIGHT #	22 / 5'-0" / 114.7	23 / 5'-0" / 119.9	25 / 5'-0" / 130.4	26 / 5'-0" / 135.6	29 / 5'-0" / 151.2	32 / 5'-0" / 166.9	502 NUMBER BARS REQ'D. = $3 + \left(\frac{24+I.D.+2W}{@\ 5"} + 1\right)$
503	5	II	1.043	NO. REQ'D. / LENGTH / WEIGHT #	16 / 12'-10" / 214.2	16 / 13'-5" / 223.9	18 / 14'-0" / 262.8	18 / 14'-7" / 273.8	20 / 15'-9" / 328.5	24 / 16'-11" / 423.5	503 NUMBER BARS REQ'D. = $2\left(\frac{13+I.D.+2W}{@\ 12"} + 1\right)$ BAR LENGTH = 4'-9"+2(16+W+I.D./2)
504	5	I	1.043	NO. REQ'D. / LENGTH / WEIGHT #	12 / 8'-1" / 101.2	14 / 8'-8" / 126.6	14 / 9'-3" / 135.1	16 / 9'-10" / 164.1	18 / 11'-0" / 206.5	20 / 12'-2" / 253.8	504 NUMBER BARS REQ'D. = $2\left(\frac{2W+I.D.-4}{@\ 12"} + 1\right)$ BAR LENGTH = 32"+2W+I.D.
1101	11	I	5.313	NO. REQ'D. / LENGTH / WEIGHT #	4 / 7'-2" / 152.3	4 / 7'-9" / 164.7	4 / 8'-4" / 177.1	4 / 8'-11" / 189.5	4 / 10'-1" / 214.3	4 / 11'-3" / 239.1	1101 BAR LENGTH = 21" + I.D. + 2W
1102	11	I	5.313	NO. REQ'D. / LENGTH / WEIGHT #	4 / 2'-8" / 56.7	4 / 2'-8" / 56.7	4 / 2'-8" / 56.7	4 / 2'-8" / 56.7	4 / 2'-8" / 56.7	4 / 56.7 / 2'-8"	BENDING: TYPE I STRAIGHT
1103	11	I	5.313	NO. REQ'D. / LENGTH / WEIGHT #	3 / 5'-0" / 79.7	3 / 5'-0" / 79.7	3 / 5'-0" / 79.7	3 / 5'-0" / 79.7	3 / 5'-0" / 79.7	3 / 5'-0" / 79.7	TYPE II 4'-9", 16"+W+I.D./2
REINFORCING STEEL TOTAL #					965.6	1,037.5	1,127.2	1,204.0	1,380.2	1,601.6	TYPE III 12", 12", 7", I.D.+2W–38"
CONCRETE – CUBIC YARDS – TOTAL					6.0	6.6	7.3	8.0	9.5	11.1	

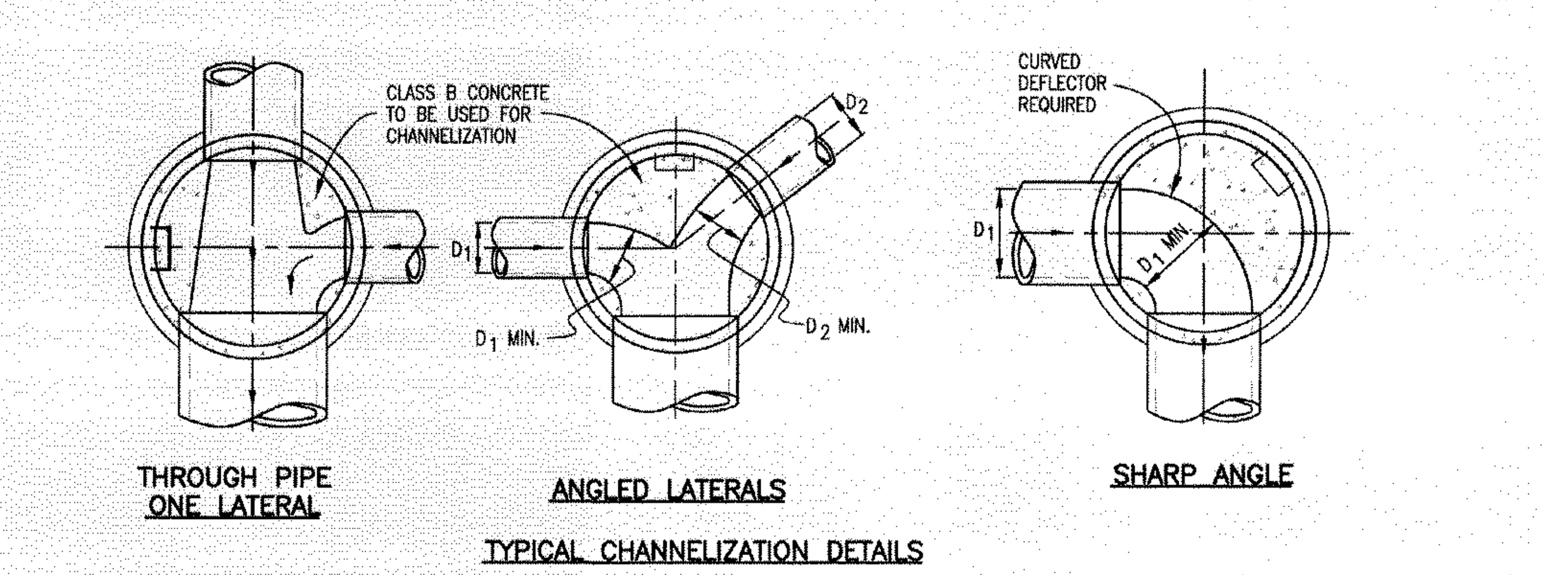
NOTE: QUANTITIES ARE BASED ON SAME SIZE PIPE ENTRANCE TO AND EXIT FROM, BASE AND A 4 FT. MANHOLE ENTRANCE INTO TOP SLAB OF BASE.

QUANTITIES FOR CONCRETE MANHOLE BOX BASE

GENERAL NOTES

1. SINCE ALL PIPE ENTRIES INTO THE BASE ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK.
2. THE PRECAST FLAT TOP MAY BE USED ON ANY MANHOLE. THE ECCENTRIC CONE MAY BE USED WHEN THE MANHOLE "H" HEIGHT IS AT LEAST 8 FT.
3. THE MANHOLE RING FRAME SHALL BE SET IN A BED OF GROUT. THE FRAME SHALL BE SURROUNDED WITH A CEMENT GROUT IN UNPAVED AREA, OR A CONCRETE COLLAR IN PAVED AREA. SEE DETAILS ON SHEETS 2 AND 3.
4. DESIGN OF BOX BASE IS BASED ON STRAIGHT RUNS OF PIPE OR CHANGE IN DIRECTION OF LESS THAN 45°. SPECIAL DESIGN IS REQUIRED FOR 45° OR GREATER.
5. PRECAST MANHOLES AND REINFORCEMENT SHALL CONFORM TO AASHTO M 199 (ASTM C 478).
6. CAST-IN-PLACE MANHOLES SHALL BE CLASS D CONCRETE.
7. STEPS ARE REQUIRED WHEN THE MANHOLE DEPTH EXCEEDS 3 FT.-6 IN. AND SHALL CONFORM TO AASHTO M 199.
8. ALL REINFORCING STEEL SHALL BE GRADE 60 AND EPOXY COATED. VERTICAL STEEL SHALL BE PLACED AT CENTERLINE OF WALL. ALL BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.
9. ALL PIPE ENTRIES INTO THE BASE OF MANHOLE SHALL BE CONNECTED BY OPEN CHANNELIZATION ADJUSTED FOR PIPE SIZE, SHAPE, SLOPE, AND DIRECTION OF FLOW. DETAILS SHOWN ARE TYPICAL FOR INSTALLATIONS WITH ALL INVERTS OF SAME RELATIVE ELEVATION. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, SPECIAL BASE/CHANNEL DETAILS WILL BE SHOWN ON THE PLANS.
10. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH CLASS D CONCRETE OR APPROVED GROUT.
11. STUB-OUTS SHALL EXTEND 2 FT. MINIMUM BEYOND OUTSIDE WALL SURFACE OF MANHOLE AND BE SATISFACTORILY PLUGGED.
12. THE SLOPE OF THE MANHOLE COVER SHALL MATCH THE ROADWAY PROFILE AND CROSS SLOPE.

▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.



Computer File Information	
Creation Date: 07/04/06	Initials: SJR
Last Modification Date: 07/04/06	Initials: LTA
Full Path: www.dot.state.co.us/DesignSupport/	
Drawing File Name: 6040200103.dwg	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

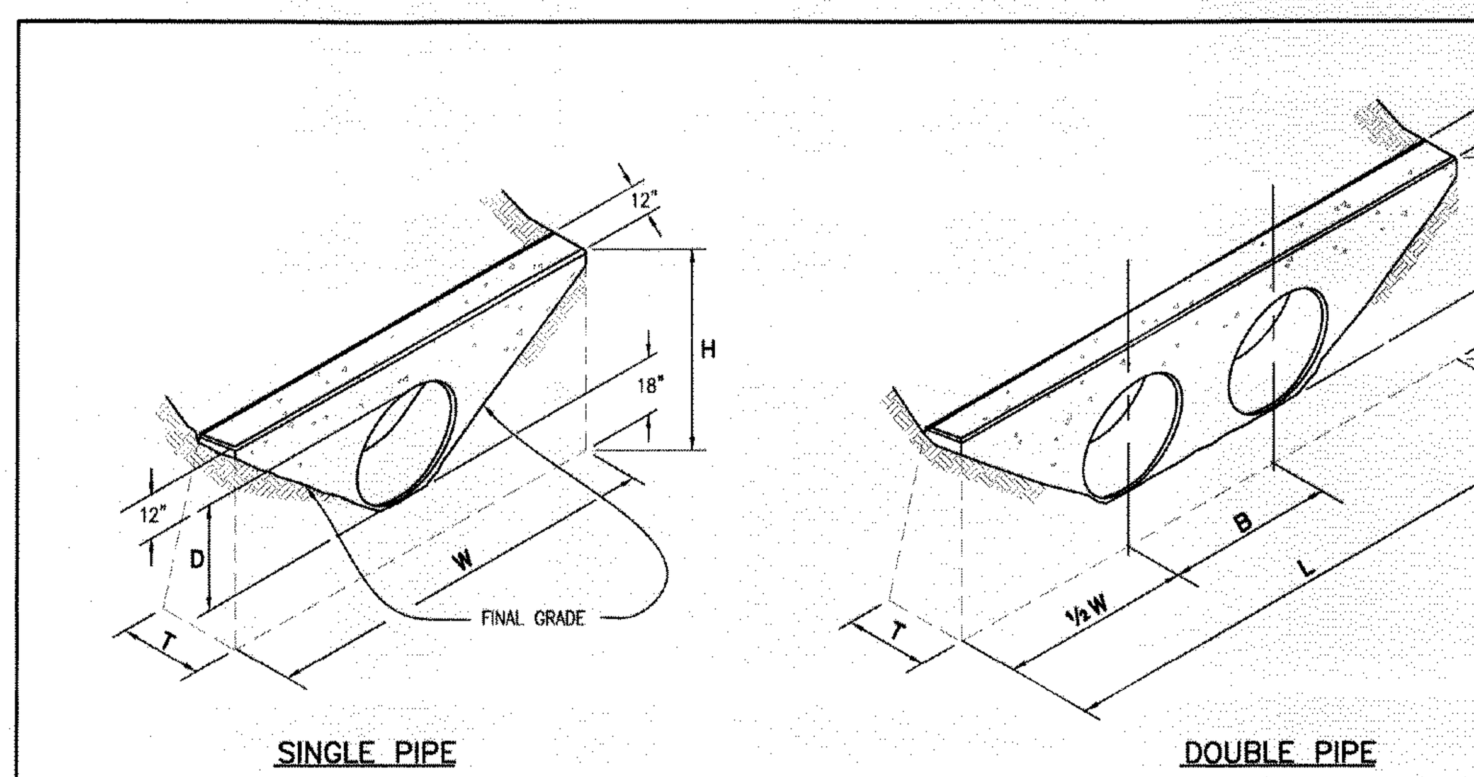
Sheet Revisions — Date: / Comments:

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch SRJ/LTA

MANHOLES

Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO. M-604-20 — Sheet No. 1 of 3



CONCRETE HEADWALL INSTALLATIONS

SEE STANDARD PLAN M-601-10 FOR REINFORCING DETAILS.

PIPE TYPE	MATERIAL	18 SINGLE	18 DOUBLE	24 SINGLE	24 DOUBLE	30 SINGLE	30 DOUBLE	36 SINGLE	36 DOUBLE	42 SINGLE	42 DOUBLE	48 SINGLE	48 DOUBLE
CIRCULAR	RIGID	1.0	1.3	1.5	2.0	2.0	2.7	2.8	3.6	3.6	4.6	4.6	6.0
CIRCULAR	FLEXIBLE	1.1	1.4	1.6	2.1	2.2	3.0	3.0	4.0	3.9	5.3	5.0	6.8
ELLIPTICAL	RIGID	23 x 14		30 x 19		38 x 24		45 x 29		53 x 34		60 x 38	
		0.9	1.2	1.3	1.6	1.7	2.2	2.3	2.9	2.9	3.7	3.5	4.4
ARCH	METAL	22 x 13		29 x 18		36 x 22		43 x 27		50 x 31		58 x 36	
		0.9	1.3	1.4	1.9	1.8	2.4	2.4	3.4	3.2	4.4	3.4	5.0

CONCRETE QUANTITIES FOR ONE CONCRETE HEADWALL (CUBIC YARDS)

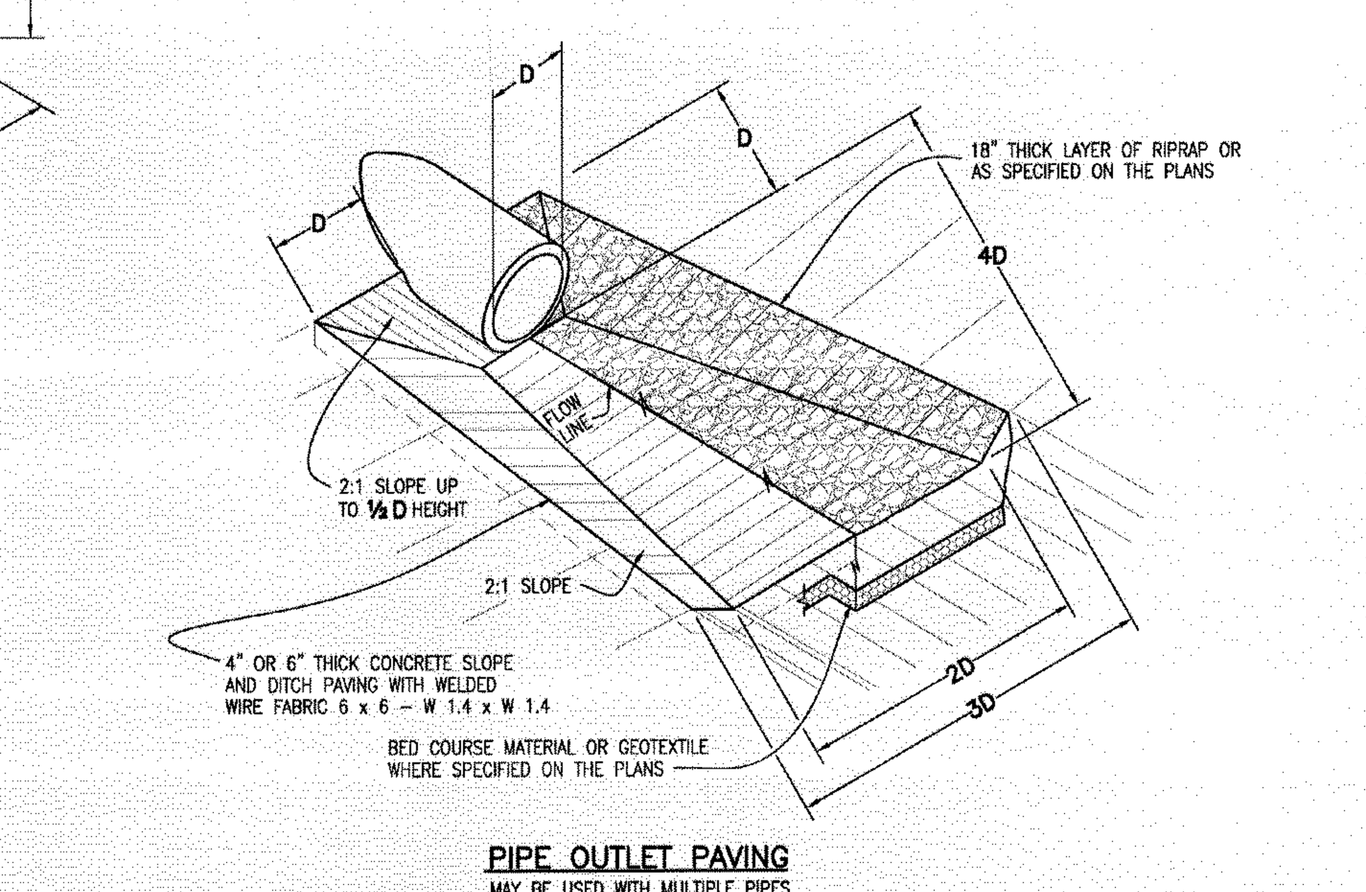
THICKNESS	MATERIAL	18	24	30	36	42	48
4"	CONCRETE	0.4	0.8	1.2			
6"	CONCRETE				2.6	3.6	4.7
18"	RIPRAP	2.0	3.5	5.4	7.8	10.7	13.9

PIPE OUTLET PAVING (CUBIC YARDS)

NOTE: VOLUME OCCUPIED BY PIPE HAS BEEN DEDUCTED.

GENERAL NOTES

1. FOR SIZE AND LOCATION OF PIPES, SEE THE PLANS.
2. ALL CONCRETE SHALL BE CLASS D.
3. FOOTINGS IN ROCK SHALL BE POURED OUT TO ROCK AND NOT FORMED IN ACCORDANCE WITH SUBSECTION 601.09(b).
4. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 IN.



PIPE OUTLET PAVING

MAY BE USED WITH MULTIPLE PIPES.

TYPE OF PIPE: CIRCULAR — HEADWALL DIMENSIONS:
D = PIPE DIAMETER (INSIDE)
H = D + 30"
W = 3D + 18"
T = 0.4 H (NEAREST IN.)
B = 1.5 D (30" MINIMUM)
L = W + B

TYPE OF PIPE: ARCH OR ELLIPTICAL — HEADWALL DIMENSIONS:
D = EQUIVALENT CIRCULAR DIAMETER (INSIDE)
H = RISE + 30"
W = 3D + 18"
T = 0.4 H (NEAREST IN.)
B = 1.5 D (30" MINIMUM)
L = W + B

Computer File Information	
Creation Date: 07/04/06	Initials: SJR
Last Modification Date: 07/04/06	Initials: LTA
Full Path: www.dot.state.co.us/DesignSupport/	
Drawing File Name: 6010120101.dwg	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

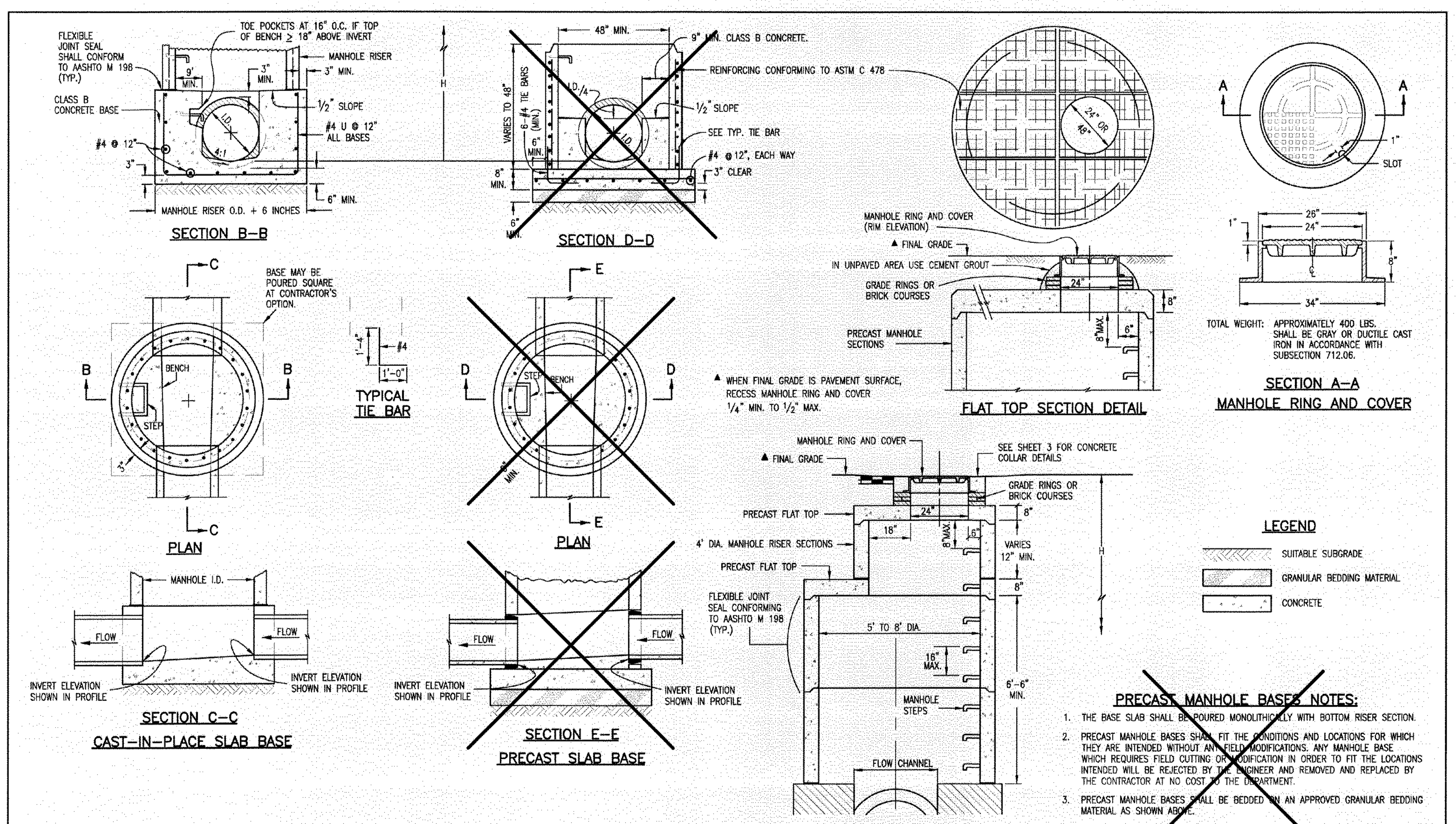
Sheet Revisions — Date: / Comments:

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch SRJ/LTA

HEADWALLS AND PIPE OUTLET PAVING

Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO. M-601-12 — Sheet No. 1 of 1



~~PRECAST MANHOLE BASES NOTES:~~

1. ~~THE BASE SLAB SHALL BE POURED MONOLITHICALLY WITH BOTTOM RISER SECTION.~~
2. ~~PRECAST MANHOLE BASES SHALL FIT THE CONDITIONS AND LOCATIONS FOR WHICH THEY ARE INTENDED WITHOUT ANY FIELD MODIFICATIONS. ANY MANHOLE BASE WHICH REQUIRES FIELD CUTTING OR MODIFICATION IN ORDER TO FIT THE LOCATIONS INTENDED WILL BE REJECTED BY THE ENGINEER AND REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO THE DEPARTMENT.~~
3. ~~PRECAST MANHOLE BASES SHALL BE BEDDED ON AN APPROVED GRANULAR BEDDING MATERIAL AS SHOWN ABOVE.~~

Computer File Information	
Creation Date: 07/04/06	Initials: SJR
Last Modification Date: 07/04/06	Initials: LTA
Full Path: www.dot.state.co.us/DesignSupport/	
Drawing File Name: 6040200203.dwg	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions — Date: / Comments:

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch SRJ/LTA

MANHOLES

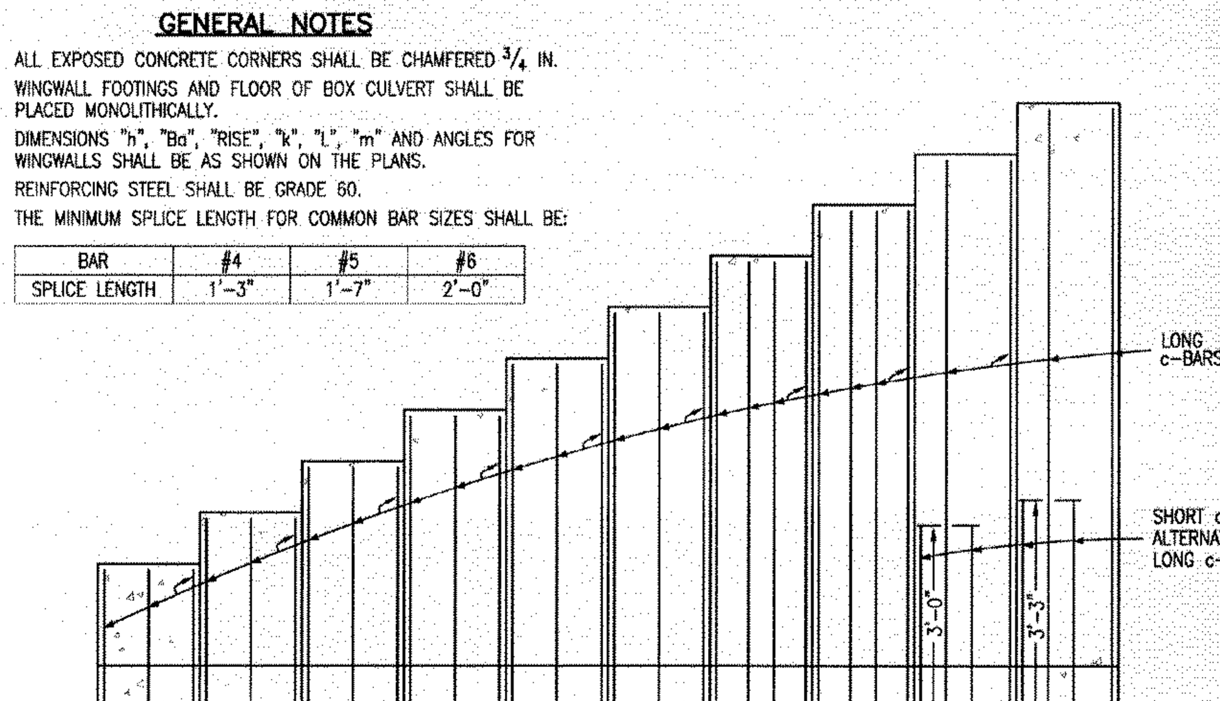
Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO. M-604-20 — Sheet No. 2 of 3

GENERAL NOTES

1. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 IN.
2. WINGWALL FOOTINGS AND FLOOR OF BOX CULVERT SHALL BE PLACED MONOLITHICALLY.
3. DIMENSIONS "h", "Ba", "RISE", "k", "L", "m" AND ANGLES FOR WINGWALLS SHALL BE AS SHOWN ON THE PLANS.
4. REINFORCING STEEL SHALL BE GRADE 60.
5. THE MINIMUM SPLICE LENGTH FOR COMMON BAR SIZES SHALL BE:

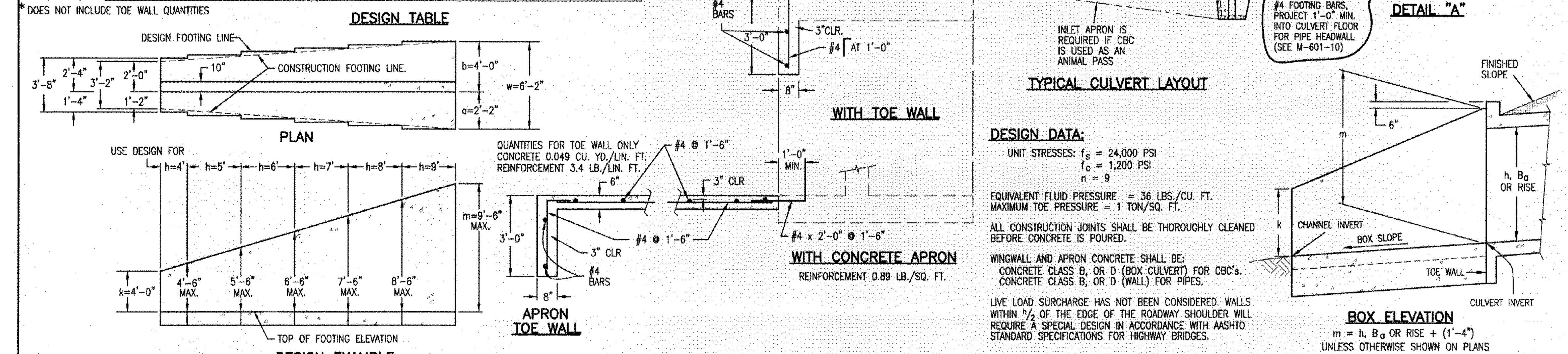
BAR	#4	#5	#6
SPLICE LENGTH	1'-3"	1'-7"	2'-0"



e =	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-4"	1'-3"	11'	9"	7"	CTRS.
h =	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	
a =	1'-0"	1'-2'	1'-4"	1'-6'	1'-8"	1'-10"	2'-0"	2'-2"	2'-4"	2'-6"	
b =	1'-8"	2'-0"	2'-4'	2'-8'	3'-0"	3'-4"	3'-8"	4'-0"	4'-4"	4'-8"	
w =	2'-8"	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"	5'-8"	6'-2"	6'-8"	7'-2"	
c & d BARS	#4@1'-6"	#4@1'-6"	#4@1'-6"	#4@1'-6"	#4@1'-6"	#4@1'-4"	#5@1'-3"	#5@11"	#6@9"	#6@7"	CTRS.
* CONC.CU.YD./L.F.	0.161	0.210	0.259	0.308	0.358	0.407	0.457	0.506	0.556	0.604	
* REINF. LB./L.F.	8.0	9.3	10.7	12.1	14.3	16.4	23.0	28.6	41.8	54.6	

* DOES NOT INCLUDE TOE WALL QUANTITIES

DESIGN TABLE



DESIGN DATA:

UNIT STRESSES: f_s = 24,000 PSI
f_c = 1,200 PSI
n = 9

EQUIVALENT FLUID PRESSURE = 36 LBS./CU. FT.
MAXIMUM TOE PRESSURE = 1 TON/SQ. FT.

ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE CONCRETE IS POURED.

WINGWALL AND APRON CONCRETE SHALL BE:
CONCRETE CLASS B, OR D (BOX CULVERT) FOR CBC's.
CONCRETE CLASS B, OR D (WALL) FOR PIPES.

LIVE LOAD SURCHARGE HAS NOT BEEN CONSIDERED. WALLS WITHIN h/2 OF THE EDGE OF THE ROADWAY SHOULDER WILL REQUIRE A SPECIAL DESIGN IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.

m = h, B_a OR RISE + (1'-4")
UNLESS OTHERWISE SHOWN ON PLANS

Computer File Information	
Creation Date: 07/04/05	Initials: SJR
Last Modification Date: 07/04/06	Initials: LTA
Full Path: www.dot.state.co.us/DesignSupport/	
Drawing File Name: 6010200101.dwg	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions — Date: / Comments:

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch SRJ/LTA

WINGWALLS FOR PIPE OR BOX CULVERTS

Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO. M-601-20 — Sheet No. 1 of 1

NO.	BY	DATE	REVISIONS:
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

HIGH PRAIRIE FARMS MAINT. FACILITY
CONSTRUCTION DOCUMENTS
DETAILS

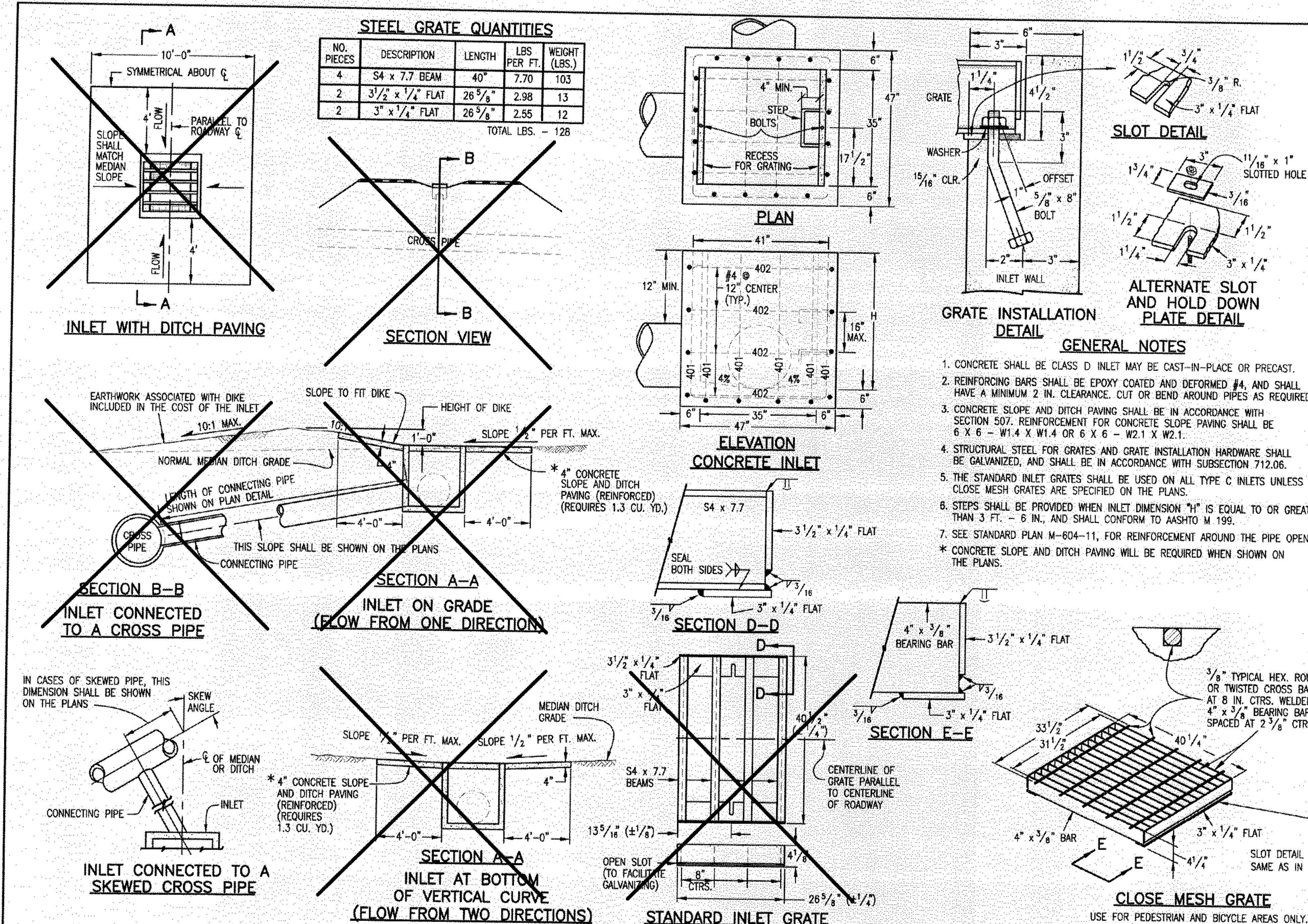
PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT — DATE SUBMITTED: FEB. 2008

NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.6400 TEL 303.220.9001 FAX WWW.NOLTE.COM

COLORADO REGISTERED PROFESSIONAL ENGINEER 37642 3-26-08

SHEET NUMBER DT1
2 OF 7 SHEETS
JOB NUMBER DV131005

DATE: 3/21/08 TIME: 10:43:15 AM DRAWING NAME: 02-CD-DT.DWG
SERVER: DVS1 DESIGNER: JRR PROJ. MGR: GTI PLOTTED BY: HOUSEK
PATH: N:\DV131\CADD\CIVIL\HIGH PRAIRIE FARMS
XREFS: 24x36, IMAGES: M-604-20_Manholes1.jpg, M-604-20_Manholes2.jpg, M-601-20_WingwallsforPipeorBoxCulverts.jpg, M-601-12_HeadwallsandPipeOutletPaving.jpg, M-604-10_InletTypeC.jpg, Fig 9-1B trench detail notes.jpg, Fig 9-1A-trench detail.jpg



STEEL GRATE QUANTITIES

NO. PIECES	DESCRIPTION	LENGTH	LBS PER FT.	WEIGHT (LBS.)
4	S4 x 7.7 BEAM	40"	7.70	103
2	3 1/2" x 1/4" FLAT	26 5/8"	2.98	13
2	3" x 1/4" FLAT	26 5/8"	2.55	12

TOTAL LBS. – 128

GENERAL NOTES

1. CONCRETE SHALL BE CLASS D INLET MAY BE CAST-IN-PLACE OR PRECAST.
2. REINFORCING BARS SHALL BE EPOXY COATED AND DEFORMED #4, AND SHALL HAVE A MINIMUM 2 IN. CLEARANCE. CUT OR BEND AROUND PIPES AS REQUIRED.
3. CONCRETE SLOPE AND DITCH PAVING SHALL BE IN ACCORDANCE WITH SECTION 507. REINFORCEMENT FOR CONCRETE SLOPE PAVING SHALL BE 6 X 6 – W1.4 X W1.4 OR 6 X 6 – W2.1 X W2.1.
4. STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED, AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
5. THE STANDARD INLET GRATES SHALL BE USED ON ALL TYPE C INLETS UNLESS CLOSE MESH GRATES ARE SPECIFIED ON THE PLANS.
6. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FT. – 6 IN., AND SHALL CONFORM TO AASHTO M 199.
7. SEE STANDARD PLAN M-604-11, FOR REINFORCEMENT AROUND THE PIPE OPENING.

* CONCRETE SLOPE AND DITCH PAVING WILL BE REQUIRED WHEN SHOWN ON THE PLANS.

QUANTITIES FOR ONE INLET

H	CONCRETE (CU. YDS.) ▼	STEEL (LBS.) ▼	NO. STEPS REQ'D.
2'–6"	0.9	75	0
3'–0"	1.0	80	0
3'–6"	1.2	96	0
4'–0"	1.3	101	1
4'–6"	1.4	116	2
5'–0"	1.5	122	2
5'–6"	1.7	137	2
6'–0"	1.8	142	3
6'–6"	1.9	158	3
7'–0"	2.0	163	3
7'–6"	2.2	179	4
8'–0"	2.3	184	4
8'–6"	2.4	199	4
9'–0"	2.5	205	5
9'–6"	2.7	220	5
10'–0"	3.0	235	6
11'–6"	3.4	251	6

▼ PIPE INSIDE DIAMETER SHALL BE 30 IN. OR LESS. CONCRETE AND STEEL QUANTITIES ARE FOR ONE ENTIRE INLET BEFORE DEDUCTION FOR VOLUME OCCUPIED BY PIPE. WEIGHT OF STEEL INCLUDES A RING FOR THE MAXIMUM PIPE DIAMETER.

BAR LIST FOR H=2 FT–6 IN. AND BENDING DIAGRAM

MARK	NO. REQ'D.	HEIGHT	LENGTH
401	2	2'–3"	7'–11"
401	6	2'–7"	8'–7"
402	3	"U"	15'–0"

"U" INCREASE DIMENSION 6 IN. FOR EACH 6 IN. INCREASE OF "H" ABOVE 2 FT.–6 IN.

ADD ONE BAR FOR EACH FT. INCREASE OF "H" ABOVE 2 FT. – 6 IN.

402 BARS SHALL BE EQUALLY SPACED FROM EACH OTHER.

Computer File Information	
Creation Date: 07/04/06	Initials: SJR
Last Modification Date: 07/04/06	Initials: LTA
Full Path: www.dot.state.co.us/DesignSupport/	
Drawing File Name: 6040100101.dwg	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions — Date: | Comments

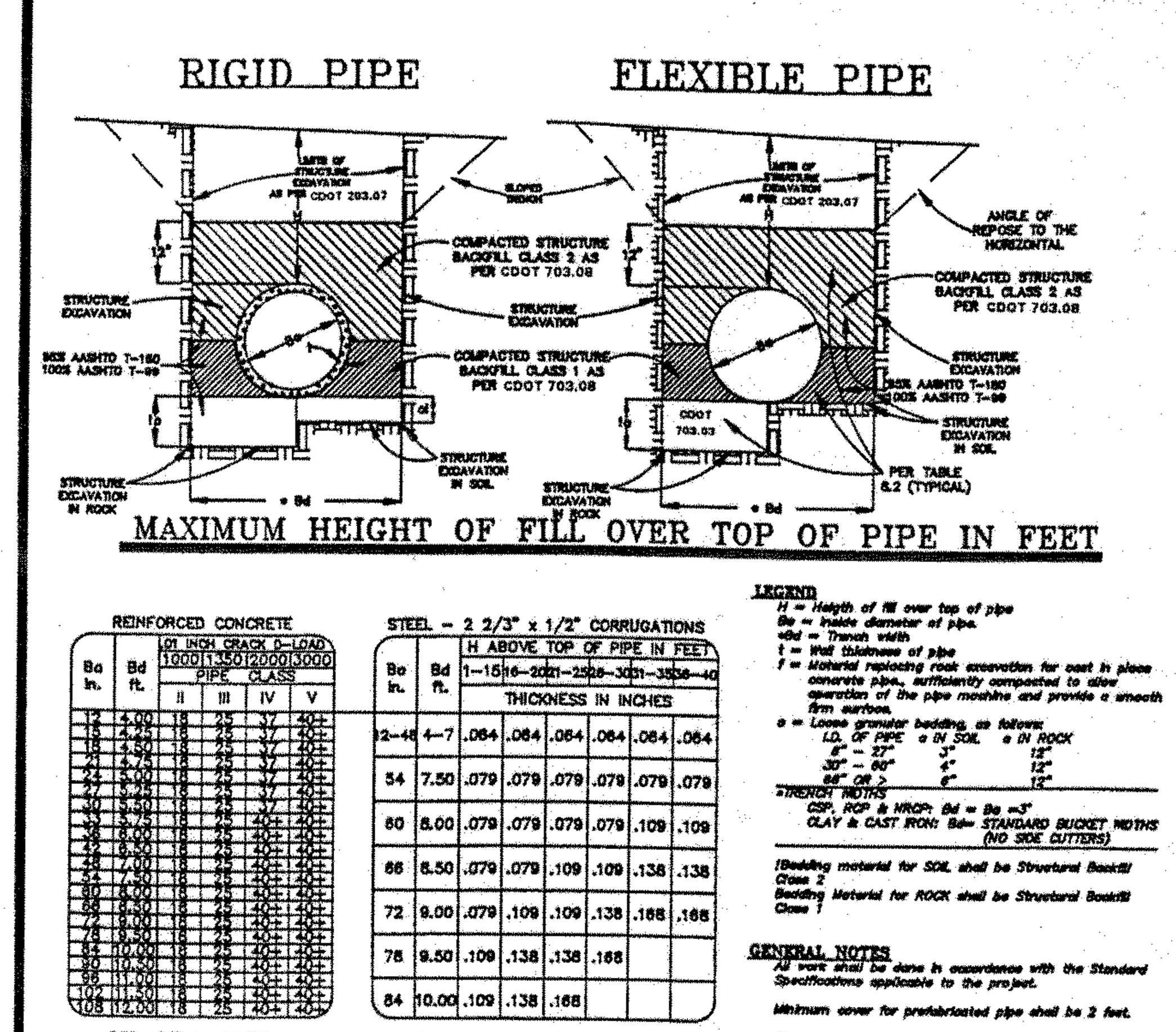
Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch SRJ/LTA

INLET, TYPE C

Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO. M-604-10

Sheet No. 1 of 1



Safety Factor = 1.33 on Ult.
Soil Weight = 120 lb. per cu. ft.
Load Factor = 1.9
Bedding = Class B (modified)

Note: Where trench widths cause transition to embankment condition, fill heights for projected pipe (Standard M–603–RC) are shown.

Soil Weight = 120 lb. per cu. ft.
Safety Factor for Seam Strength = 2.00
Bucking Stress Level = 1/2 Yield Strength
Load Factor (Backfill) = 95% Standard Density, AASHTO–T 99 (K=0.86)

ALL UTILITY REPAIRS MUST BE BACKFILLED WITH CLSM.

Spacing for multiple pipe sewer installations shall conform to the details shown on M Standard Excavation and Backfill for Structures.

TRENCH INSTALLATION:
All trench installations shall be in accordance with OSHA and Colorado Department of Transportation Regulations.

NON–REINFORCED CONCRETE PIPE:
The use of Non–Reinforced Concrete Pipe will not be allowed in Douglas County Right–Of–Way.

NOTE: All trenching shall comply with all State, Federal and O.S.H.A. safety requirements. It will be the responsibility of the Contractor to meet all safety requirements.

TRENCHING DETAIL

DOUGLAS COUNTY 9.4

Issued:

Revised: JANUARY 1992

Drawing No. FIGURE 9.1a

NOTES:

1. This trench patching detail specifies requirements in addition to those specified in the latest edition of the Colorado Department of Transportation's Standard Specifications for Road and Bridge Construction.
2. A construction traffic control plan shall be submitted to and approved by Douglas County prior to issuance of construction permits in the County right-of-way.
3. Trench shall be braced or sheeted as necessary for the safety of the workers and protection of other utilities or structures in accordance with applicable local, state and federal safety regulations.
4. The trench width shall be confined to those minimum dimensions, which will permit proper installation and acceptable pipe loading, as established by current local, state and federal safety regulations.
5. At the discretion of the Douglas County Inspector, the pavement may be required to be saw-cut back to maintain a straight edge.
6. Backfill compaction requirements: Minimum density will be determined in accordance with AASHTO T 99 or T 180 as defined by CDOT Standard Specifications Section 203.11 and CDOT 703.03. Except for CLSM.
7. Full depth asphalt can be used as an alternative to base course. A ratio of 3 inches base course to 1 inch of asphalt shall be used in the substitution.
8. A temporary cold-mix asphalt patch, 4" minimum depth (see Section 9.6) will be required for all street cuts if a permanent hot-mix asphalt patch cannot be applied for any reason, after construction is completed.
9. Pavement edges shall be saw-cut straight to within 5 degrees of vertical. Edges shall be tack coated prior to patching.
10. If existing street is paved with fabric, a "TEE" trench shall be required. The Contractor shall carefully saw-cut and remove the layer of asphalt above the fabric a minimum of 12" back from the edge of the trench.
11. Minimum cover for prefabricated pipe shall be 2 feet.
12. Changes in design criteria will require compensating change in pipe design.
13. When pipe sewer is to be extended or replaced with pipe of different material, the connections shall conform to the detail shown on plans or be approved.
14. Spacing for multiple pipe sewer installations shall be 1/2" inside diameter or span, or 3" maximum.
15. TRENCH INSTALLATION:
    a. Trenches over 5 feet in depth shall be either shared or the trench walls shall be sloped to the angle of repose. If sloped, the bottom of the slope shall be a minimum of 1 foot above the top of the pipe.
    b. Shoring will be required when the bottom of the slope is more than 3 feet above the bottom of the trench. Shoring shall extend a minimum of 1 foot above the bottom of the slope.
    c. Timber sheeting or shoring may be cut off 1 foot above the top of the pipe after backfilling is complete.

REFERENCE: Douglas County Drainage Manual and Colorado Department of Transportation "M" Standards

TRENCHING DETAIL NOTES

DOUGLAS COUNTY 9.5

Issued:

Revised: 7–95

Drawing No. FIGURE 9.1b

NO.	BY	DATE	REVISIONS:
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

HIGH PRAIRIE FARMS MAINT. FACILITY

CONSTRUCTION DOCUMENTS DETAILS

PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT

DATE SUBMITTED: FEB. 2008

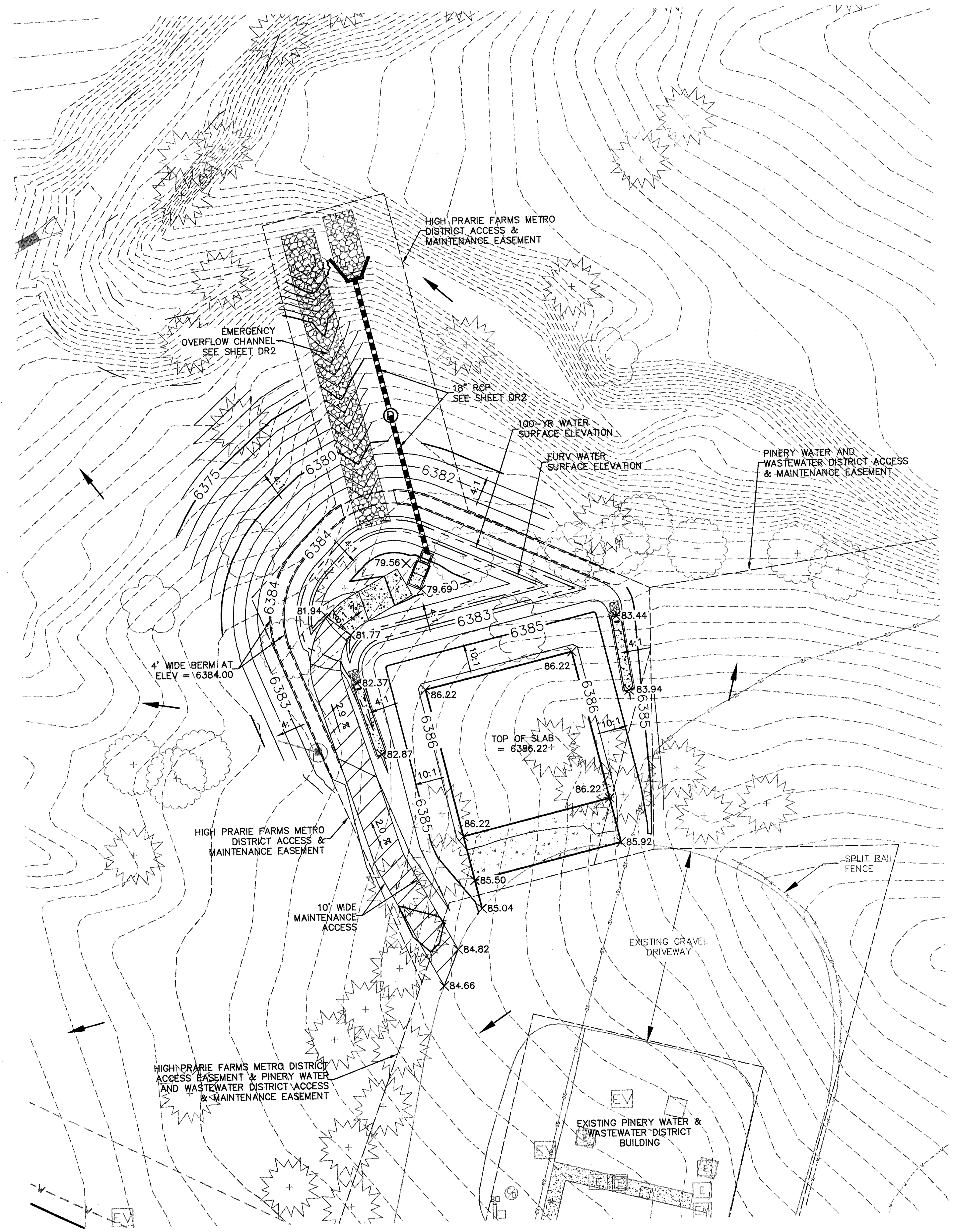
NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.6400 TEL 303.220.9001 FAX WWW.NOLTE.COM

COLORADO REGISTERED PROFESSIONAL ENGINEER 37642 3-26-08

SHEET NUMBER DT2

3 OF 7 SHEETS

JOB NUMBER DV131005



LEGEND

6380	EXISTING CONTOURS
6380	PROPOSED CONTOURS
	EXISTING TREES
SD	EXISTING STORM DRAIN
	EXISTING STORM DRAIN
	PROPOSED STORM DRAIN
W	EXISTING WATERLINE
	EXISTING SANITARY SEWER
E	EXISTING ELECTRIC TRANSFORMER
	EXISTING WATER VALVE
	LIMITS OF GRADING
	PROPOSED CONCRETE PAVEMENT
	WATER SURFACE ELEVATION
	RIP-RAP
	10' MAINTENANCE ACCESS
	PROPOSED HEADWALL
X 83.54	PROPOSED ELEV @ FL UNLESS OTHERWISE NOTED

1 inch = 20 ft.

CALL UTILITY NOTIFICATION CENTER OF COLORADO

1-800-922-1987

CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

COUNTY ENGINEER

DATE 4/17/08

THESE CONSTRUCTION PLANS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR DRAINAGE IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

HIGH PRAIRIE FARMS MAINT. FACILITY

CONSTRUCTION DOCUMENTS OVERALL GRADING PLAN

DATE SUBMITTED: FEB. 2008

PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT

NOLTE BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.6400 TEL 303.220.9001 FAX WWW.NOLTE.COM

NO.	BY	DATE	REVISIONS:
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

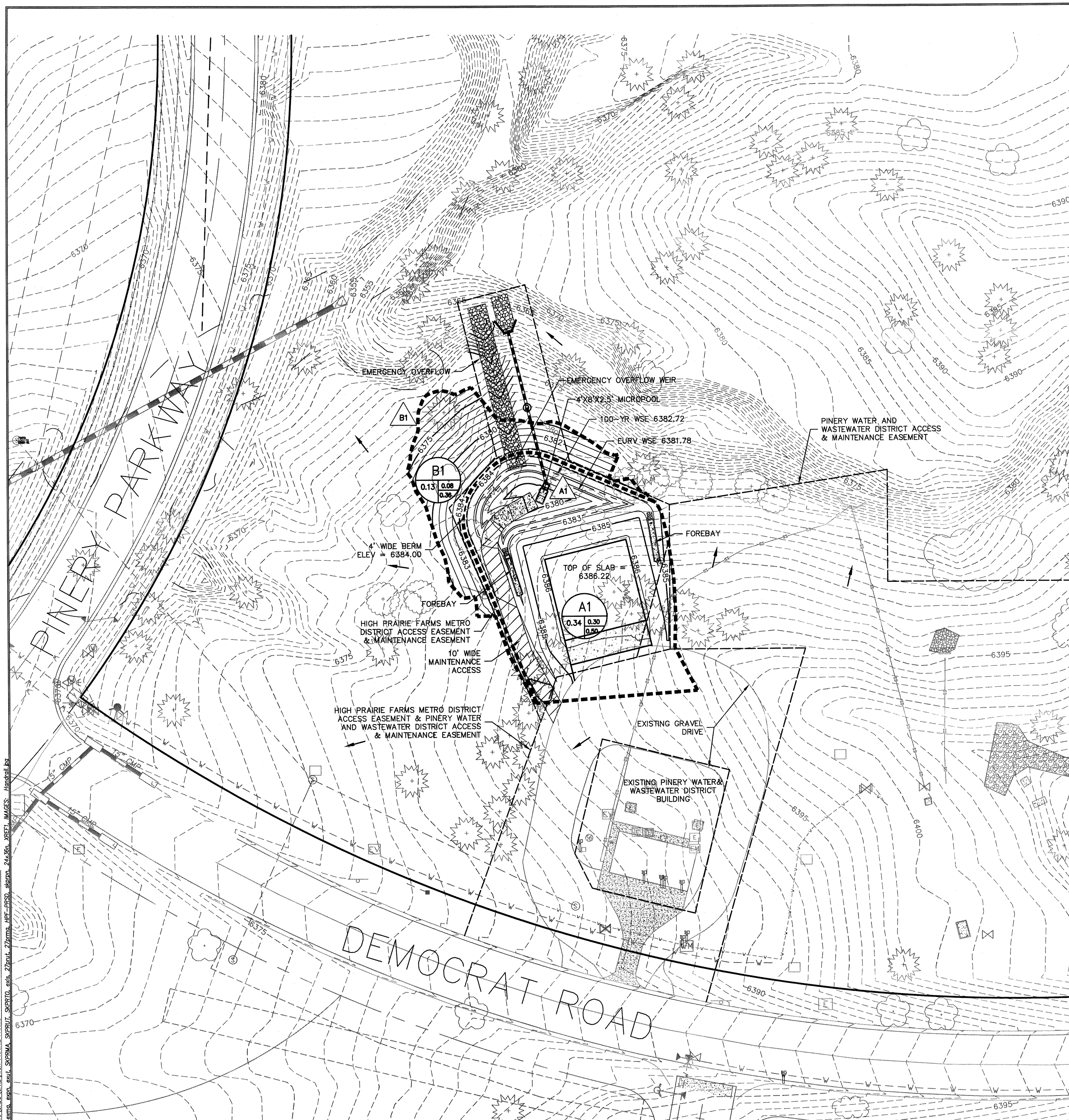
COLORADO REGISTERED PROFESSIONAL ENGINEER 37642 3-26-08

SHEET NUMBER GR1

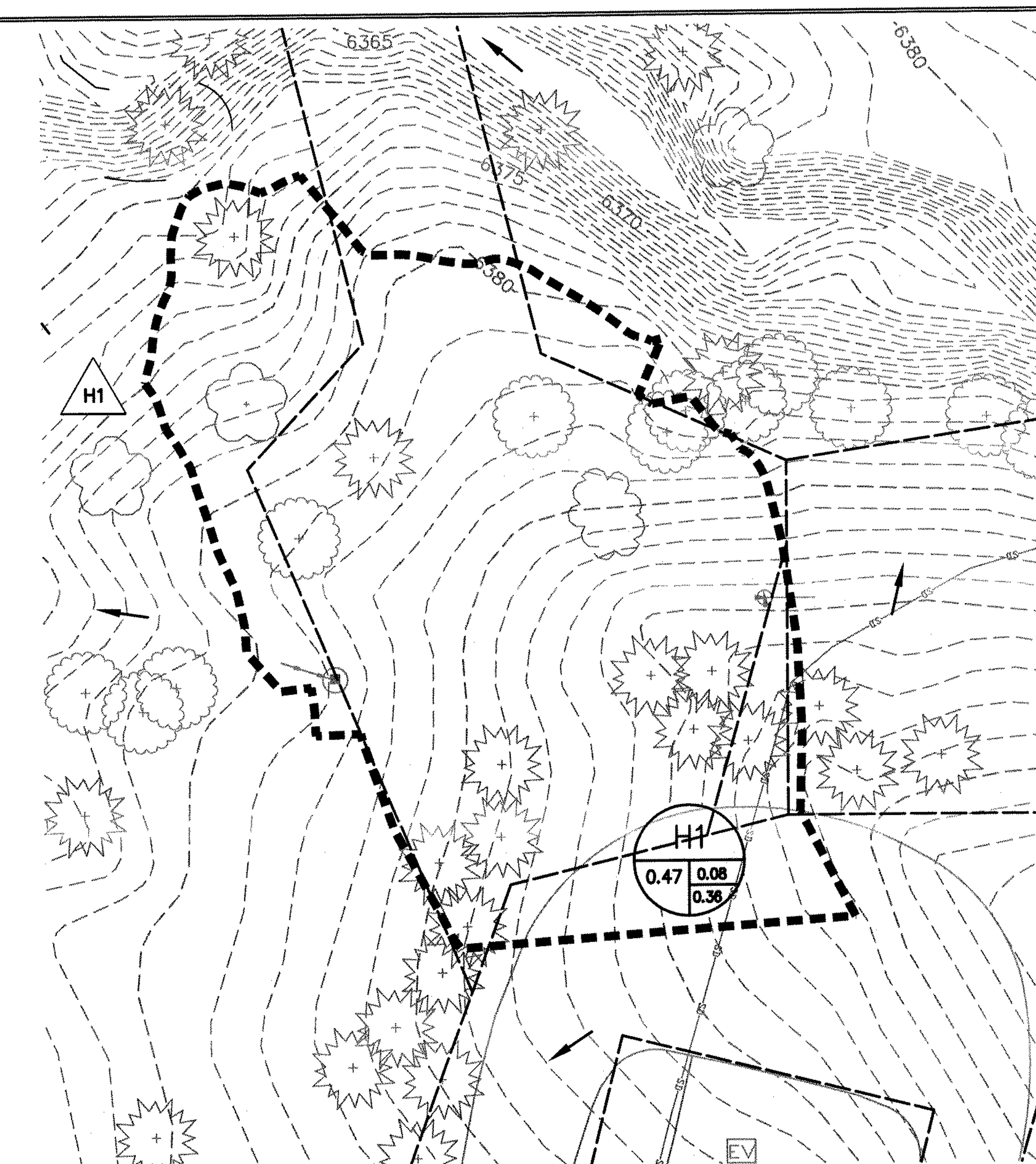
4 OF 7 SHEETS

JOB NUMBER DV131005

DATE: 3/21/08 TIME: 10:45:16 AM DRAWING NAME: 03-CD-GD.DWG
SERVER: DVS1 DESIGNER: #### PROJ MGR: #### PLOTTED BY: HOUSEK
PATH: N:\DV1310\CADD\CIVIL\HIGH PRAIRIE FARMS



PROPOSED DRAINAGE MAP



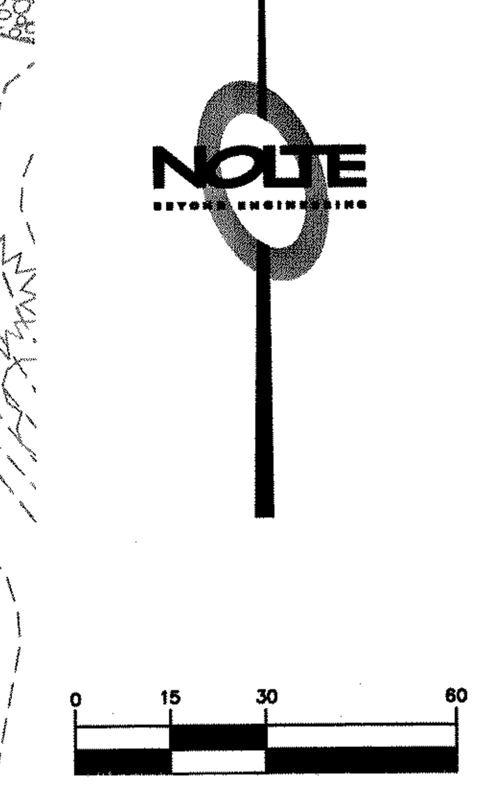
HISTORIC DRAINAGE MAP

Historic Discharge Rate Summary			
Basin ID	5 Year Flow (cfs)	10 Year Flow (cfs)	100 Year Flow (cfs)
H1	0.14	0.52	1.14

Developed Discharge Rate Summary			
Basin ID	5 Year Flow (cfs)	10 Year Flow (cfs)	100 Year Flow (cfs)
A1	0.45	0.63	1.35
B1	0.05	0.13	0.43

LEGEND

- DESIGN POINT
- BASIN LABEL / BASIN AREA (ACRES) / 5 YR. COEFFICIENT / 100 YR. COEFFICIENT
- BASIN BOUNDARY
- EXISTING CONTOURS
- PROPOSED CONTOURS
- EXISTING TREES
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- EXISTING WATERLINE
- EXISTING SANITARY SEWER
- EXISTING ELECTRIC TRANSFORMER
- EXISTING WATER VALVE



NO.	BY	DATE	REVISIONS:
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

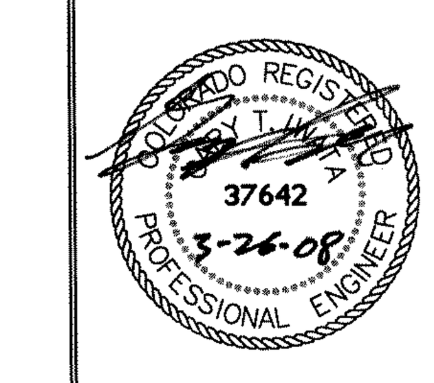
HIGH PRAIRIE FARMS MAINT. FACILITY

CONSTRUCTION DOCUMENTS
HISTORIC & PROPOSED DRAINAGE MAP

PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT

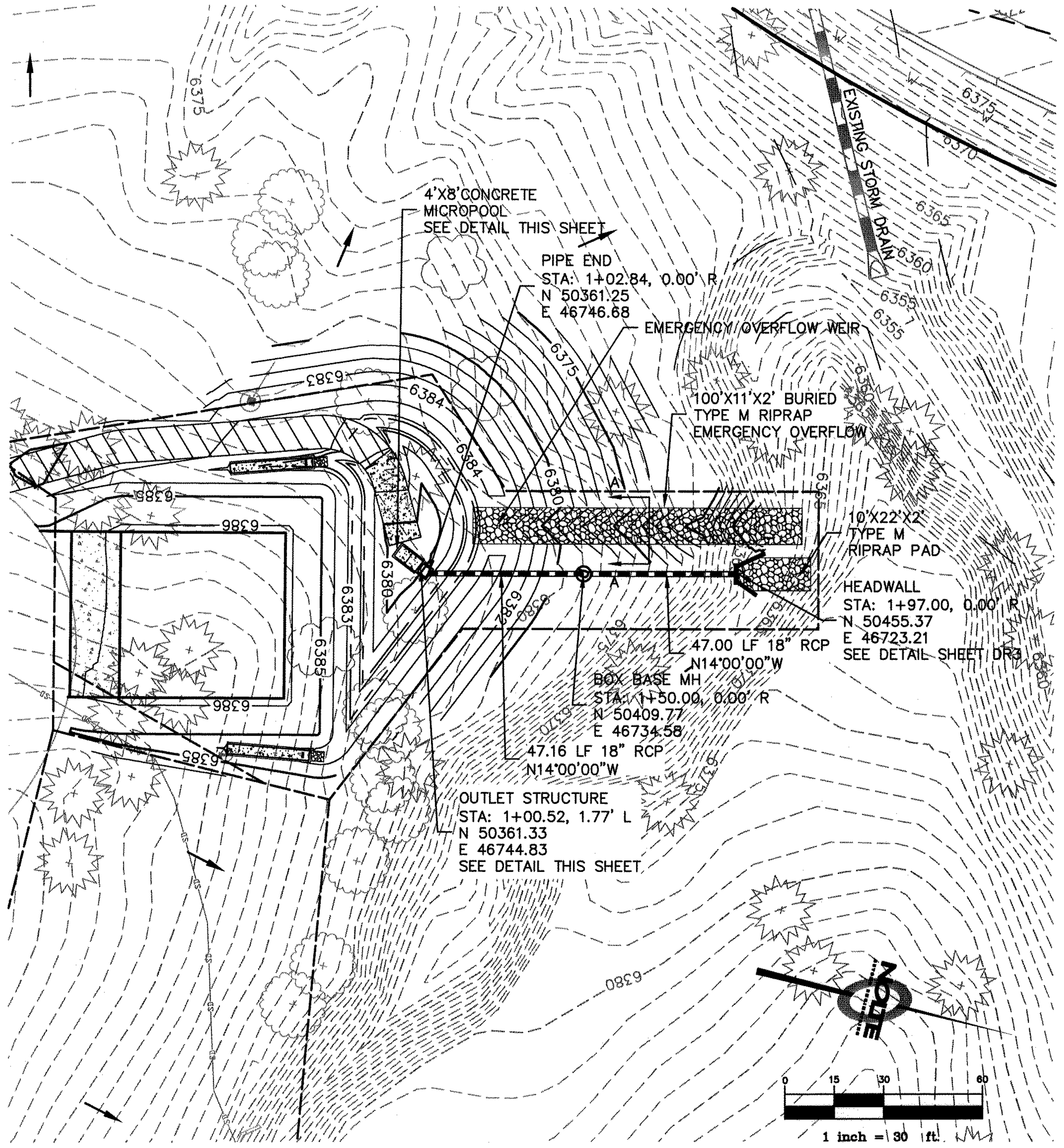
DATE SUBMITTED: FEB. 2008

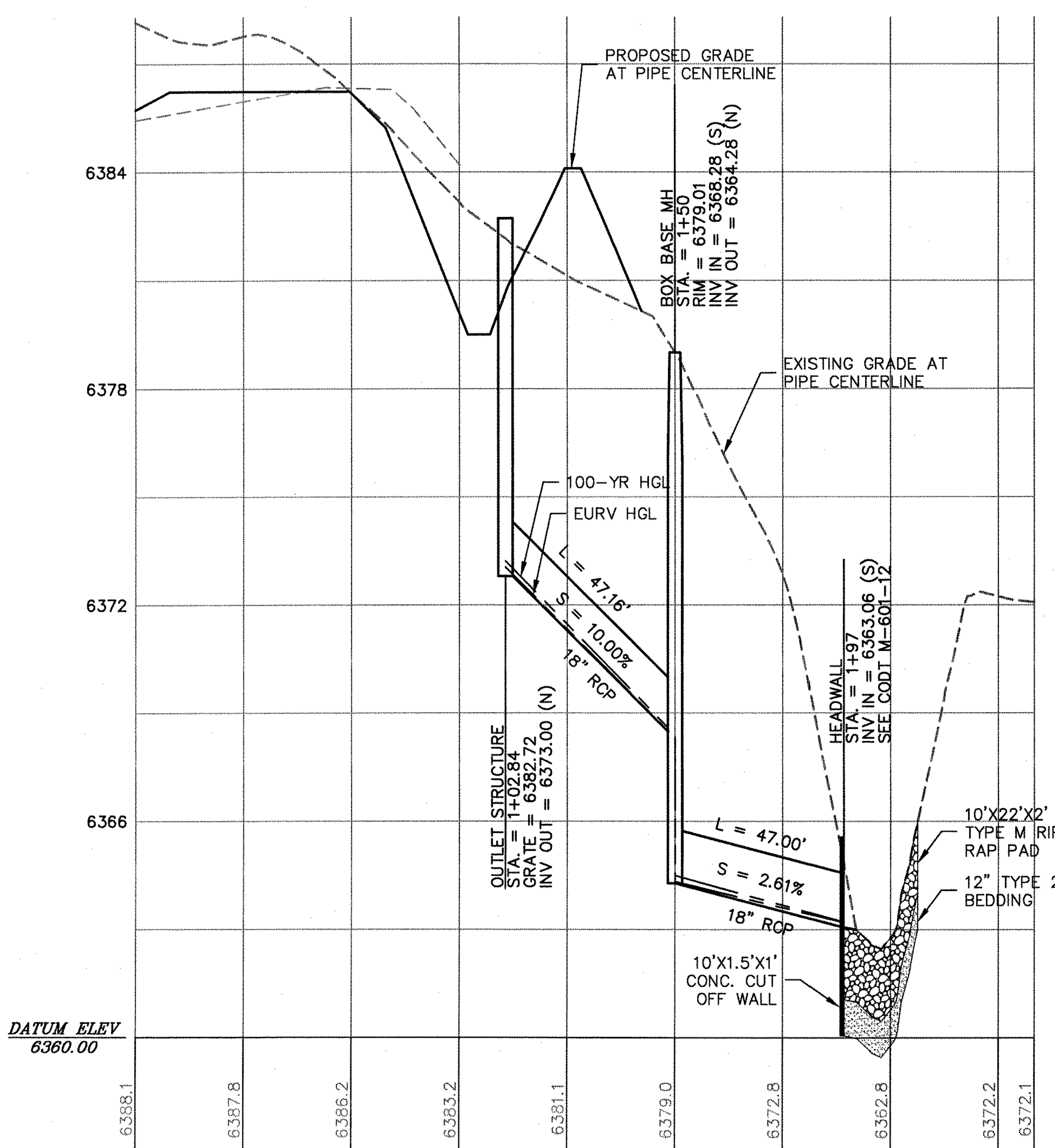
NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.6400 TEL 303.220.9001 FAX WWW.NOLTE.COM

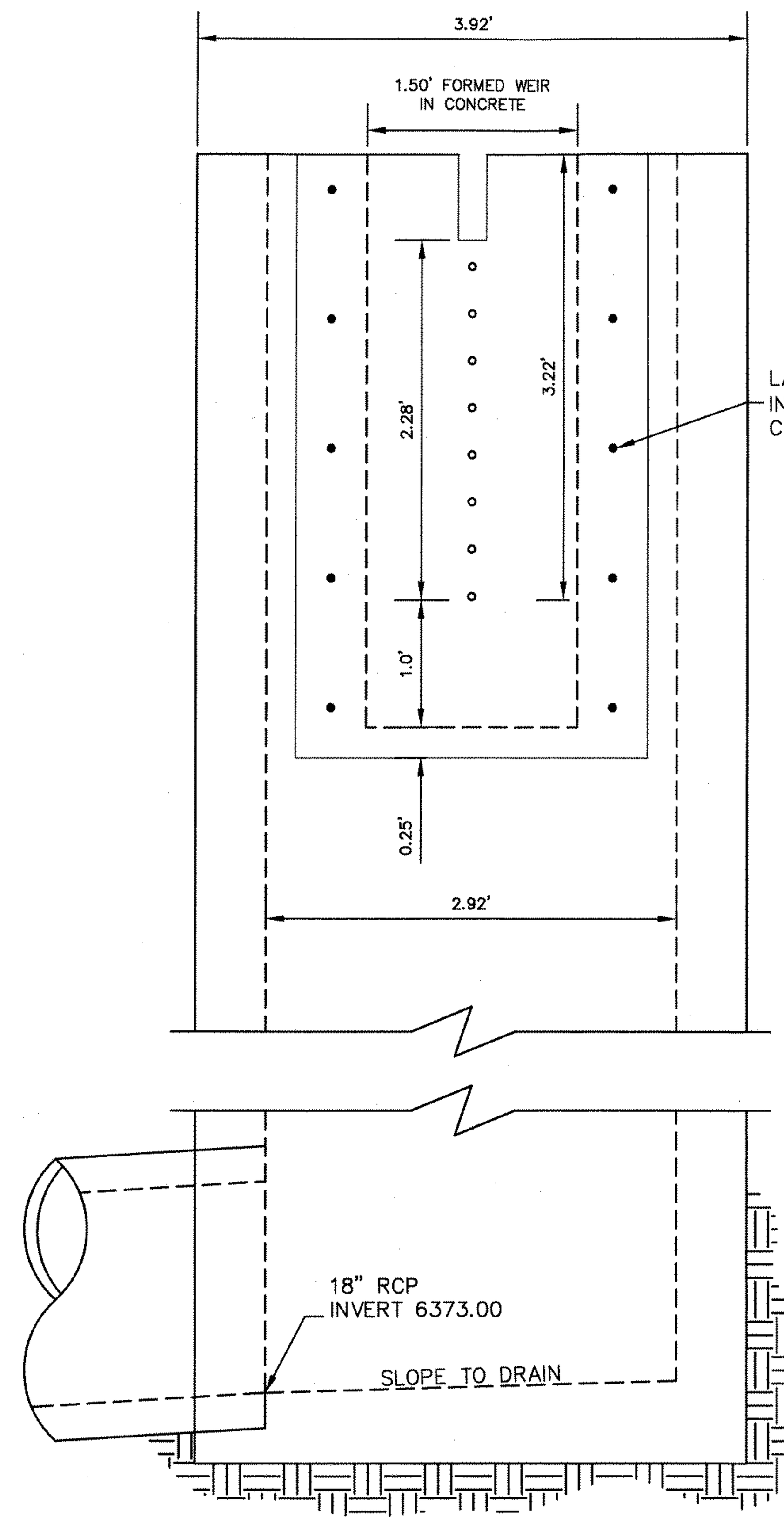


SHEET NUMBER
DR1
5 OF 7 SHEETS
JOB NUMBER
DV131005

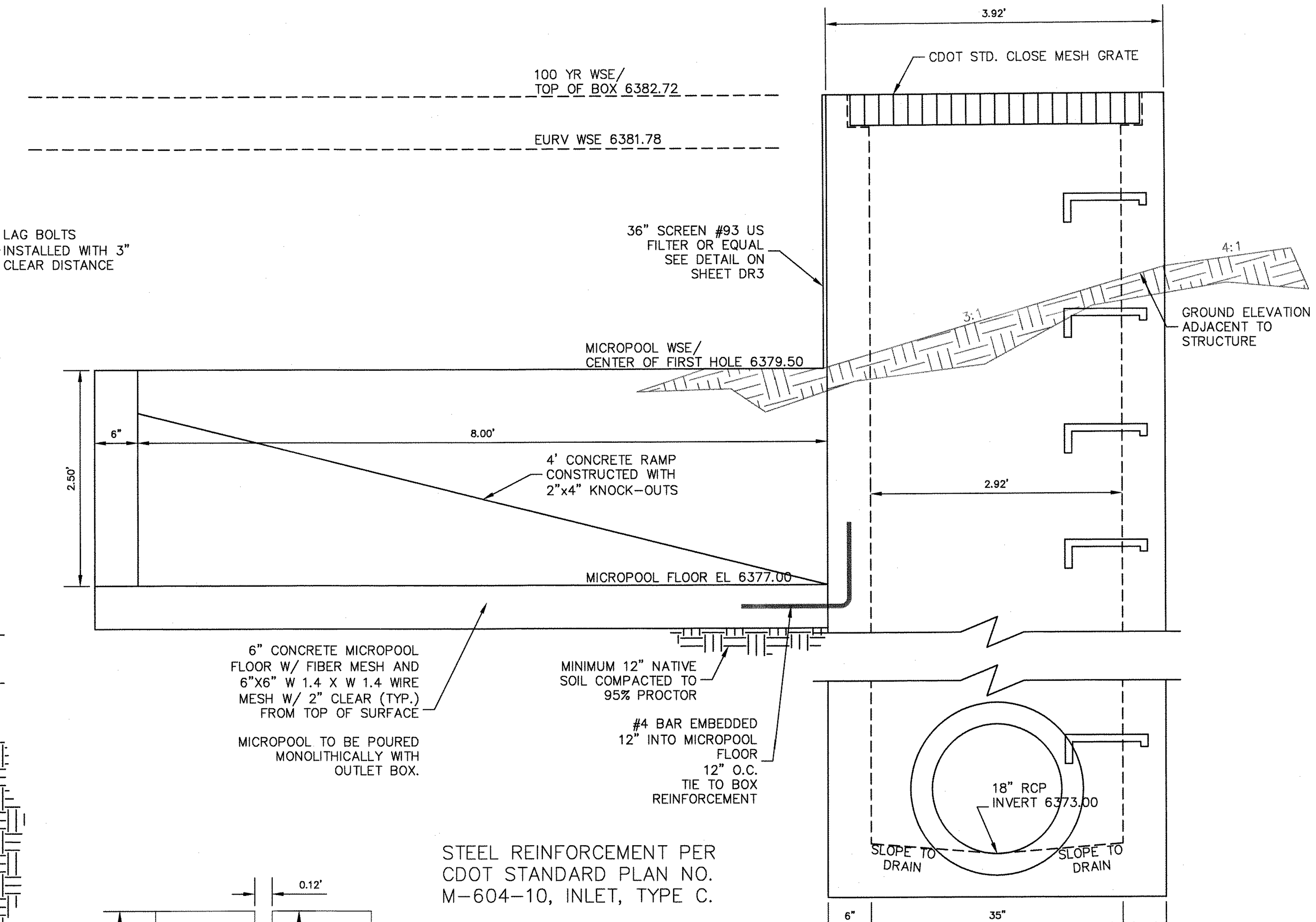
DATE: 3/21/08 TIME: 10:46:14 AM DRAWING NAME: 04-CD-DR.DWG
SERVER: DVS1 DESIGNER: TAN PROJ. MGR: GTI PLOTTED BY: HOUSEK
PATH: N:\DV1310\CADD\CIVIL\HIGH PRAIRIE FARMS
XREFS: skexto, exma, expn, exut, SKPRMA, SKPRUT, SKPRTO, exls, 27prut, 27prma, HPF-PRSD, skprpn, 24x36n, XREF1, IMAGES:





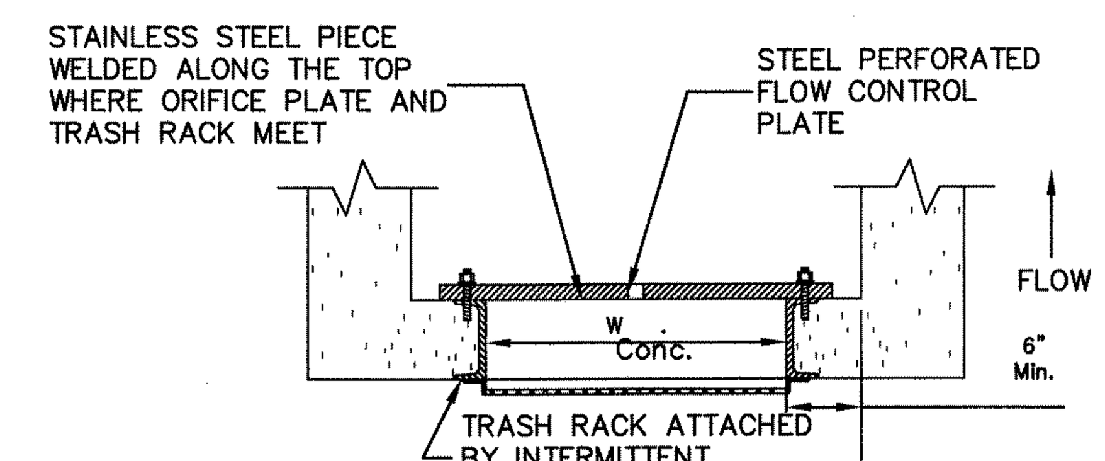


FRONT VIEW
1"=1'

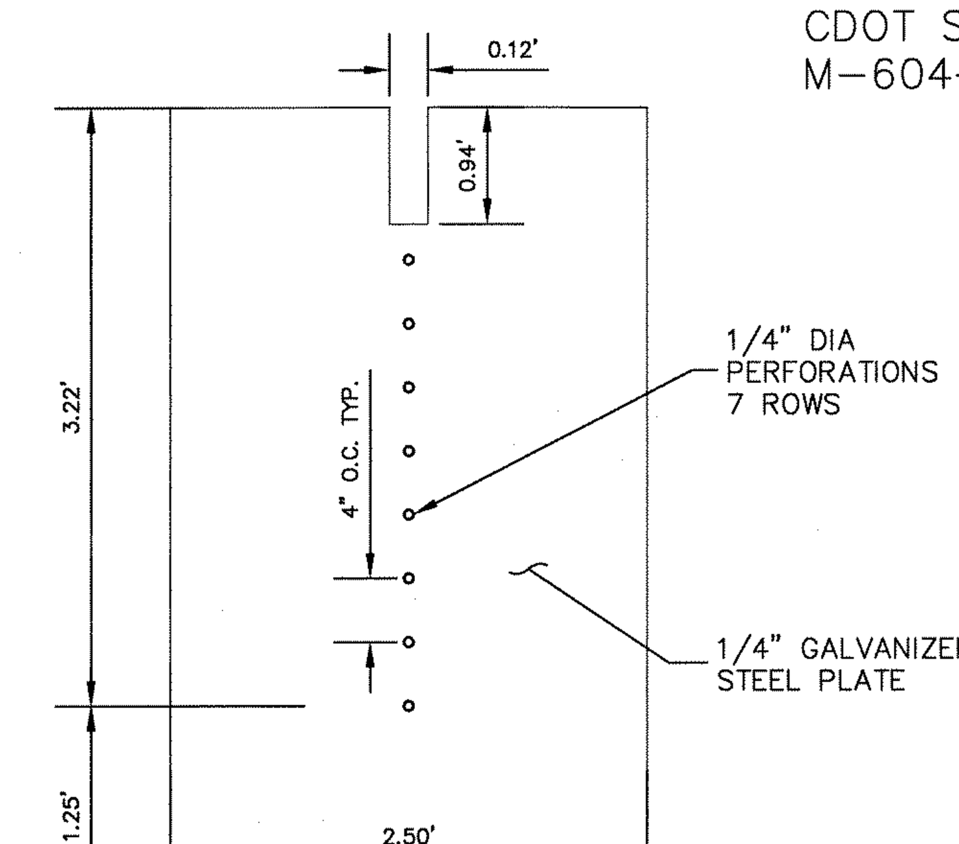


STEEL REINFORCEMENT PER CDOT STANDARD PLAN NO. M-604-10, INLET, TYPE C.

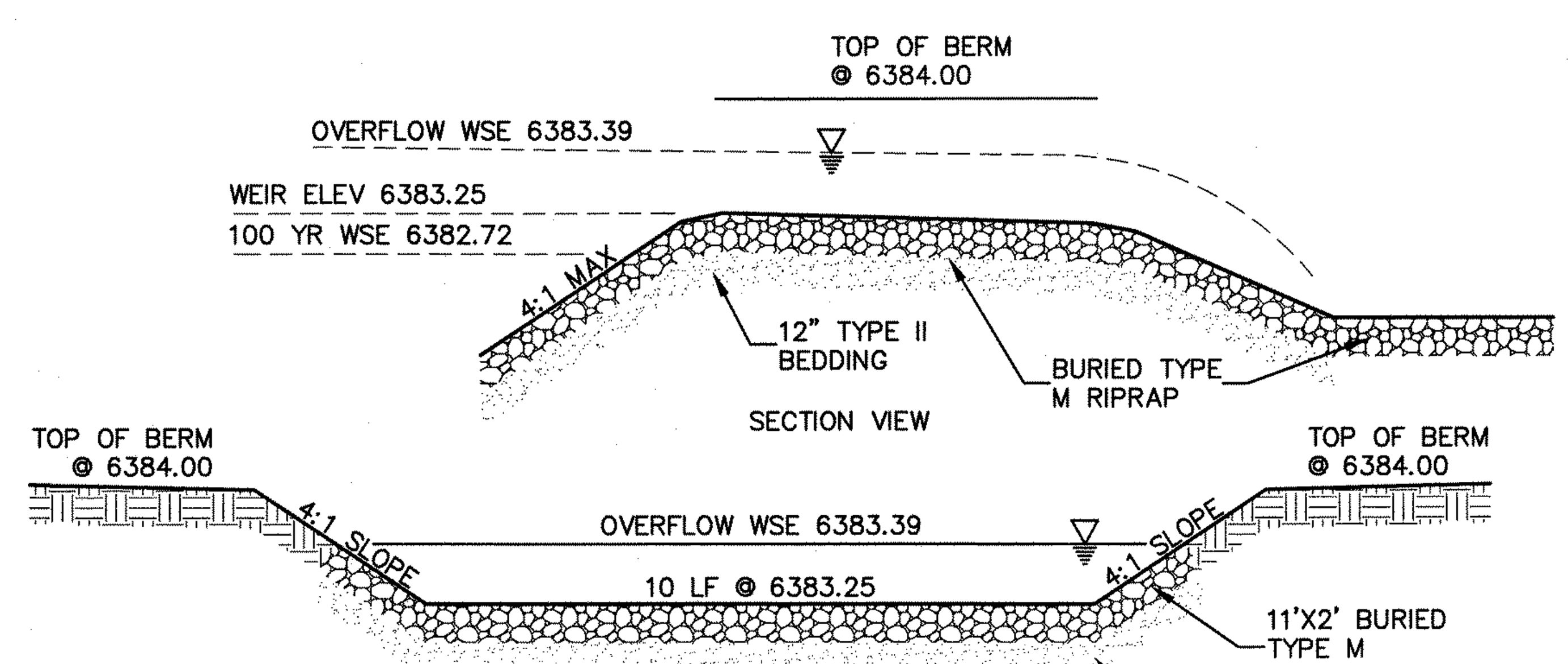
SIDE VIEW
1"=1'



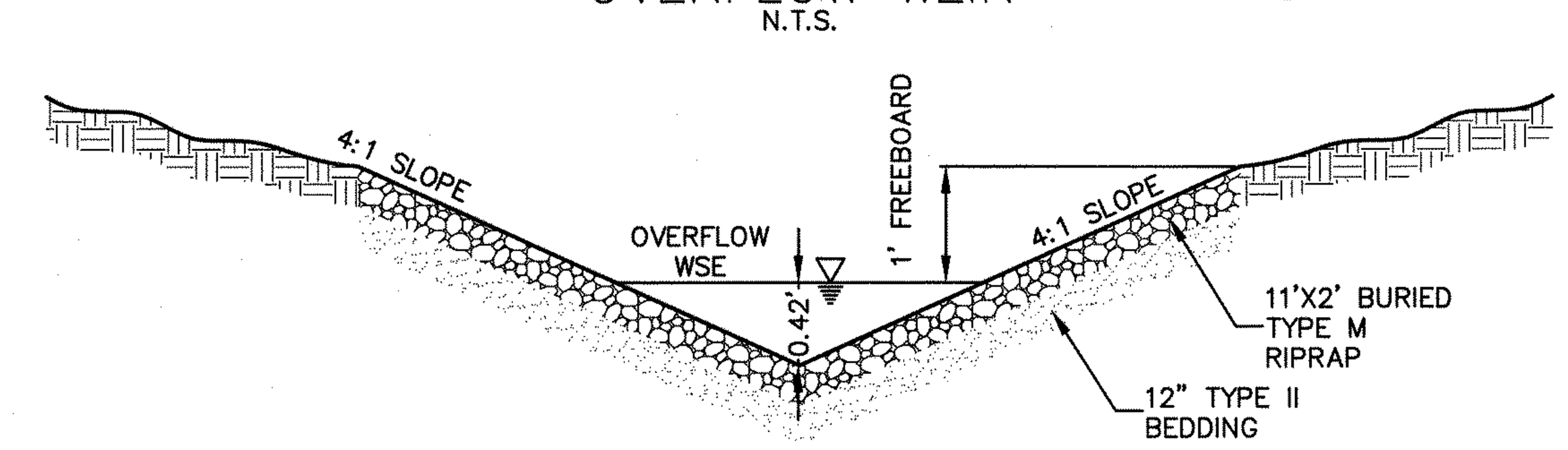
STEEL PLATE PLAN VIEW



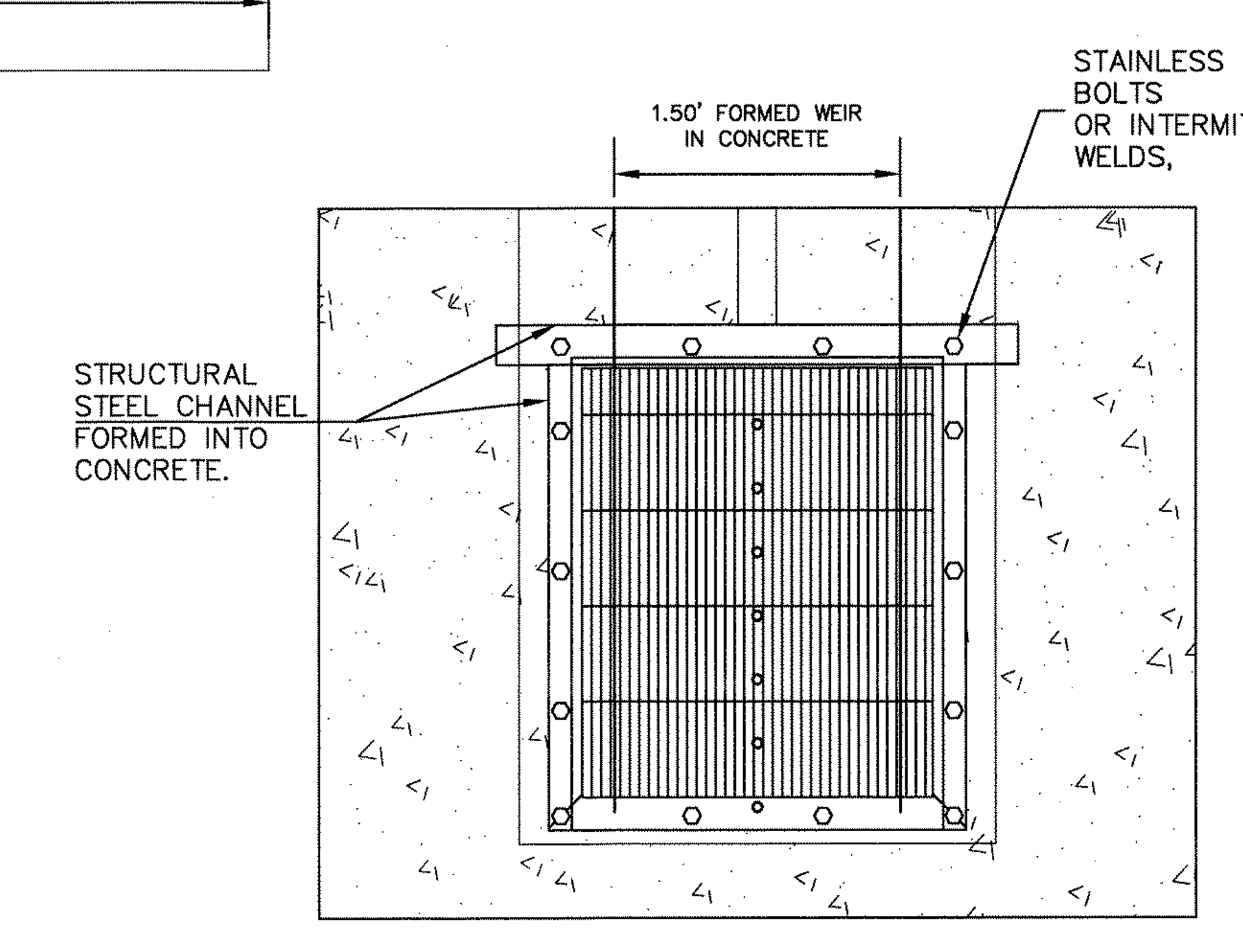
TRASH RACK



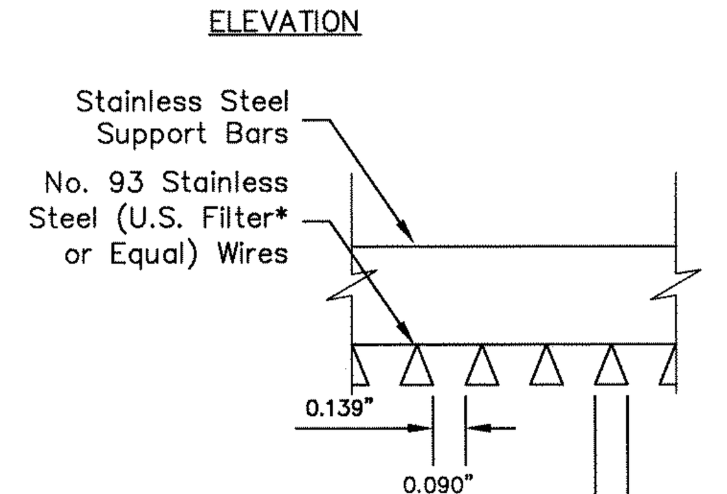
OVERFLOW WEIR
N.T.S.



SECTION A-A OVERFLOW CHANNEL
N.T.S.



TRASH RACK
ELEVATION



R Value = (net open area)/(gross rack area) = 0.60

WQCV TRASH RACK NOTES:

1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.

2. BAR GRATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.

3. TRASH RACK WIDTHS ARE FOR SPECIFIED TRASH RACK MATERIAL. FINER WELL-SCREEN OR MESH SIZE THAN SPECIFIED IS ACCEPTABLE, HOWEVER, TRASH RACK DIMENSIONS NEED TO BE ADJUSTED FOR MATERIALS HAVING A DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE)

4. US FILTER STAINLESS STEEL WELL-SCREEN (OR EQUAL) TRASH RACK DESIGN SPECIFICATIONS

MAX. WIDTH OF OPENING	SCREEN #93 VEE WIRE SLOT OPENING	SUPPORT ROD TYPE	SUPPORT ROD ON-CENTER SPACING
9"	0.139	#156 VEE	3/4"

TOTAL SCREEN THICKNESS	CARBON STEEL FRAME TYPE
0.31'	3/8" X 1.0" FLAT BAR

CALL UTILITY NOTIFICATION CENTER OF COLORADO

1-800-922-1987

CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

NO.	BY	DATE	REVISIONS:
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

HIGH PRAIRIE FARMS MAINT. FACILITY

CONSTRUCTION DOCUMENTS

STORM DRAIN & OUTLET STRUCTURE DETAILS

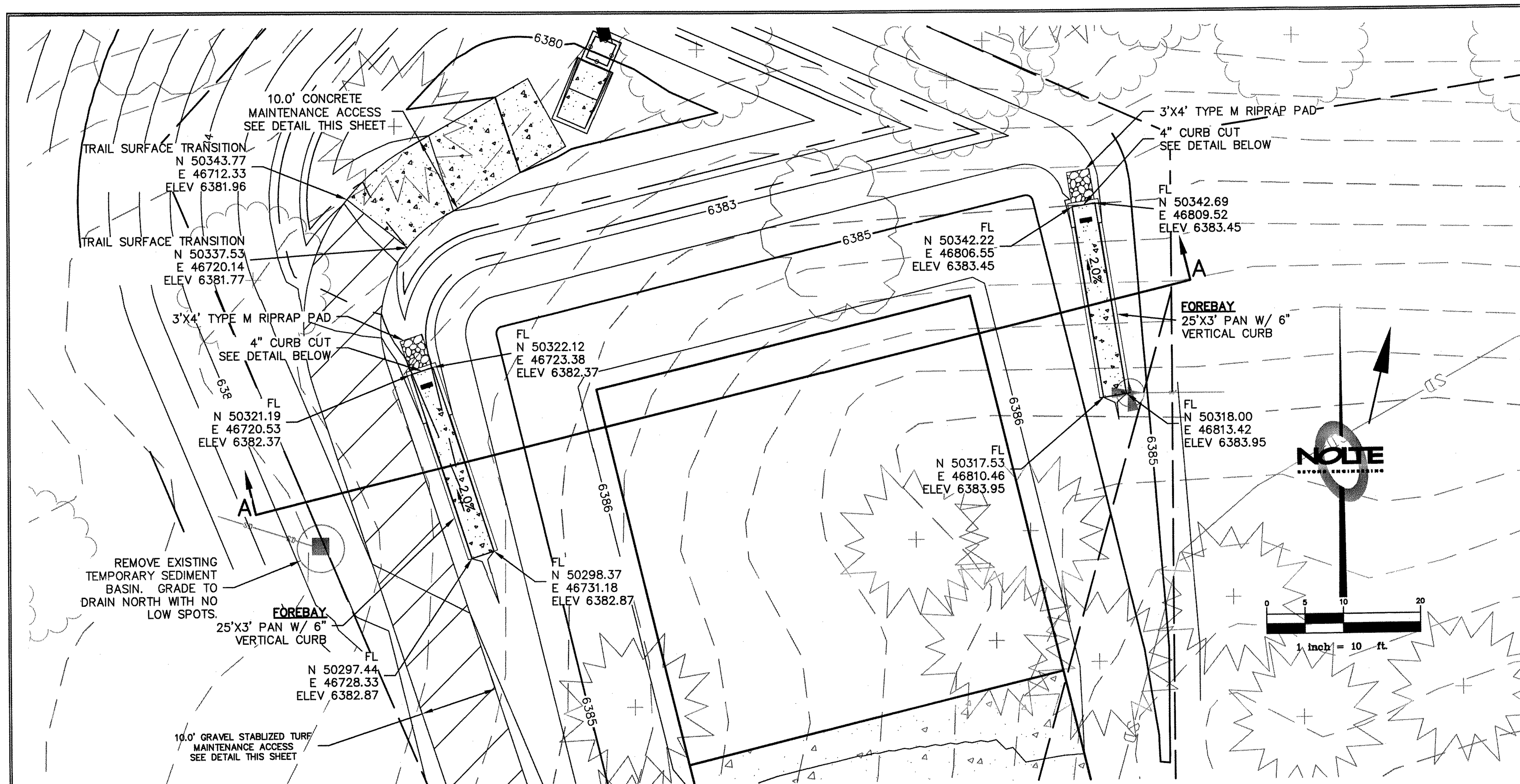
PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT

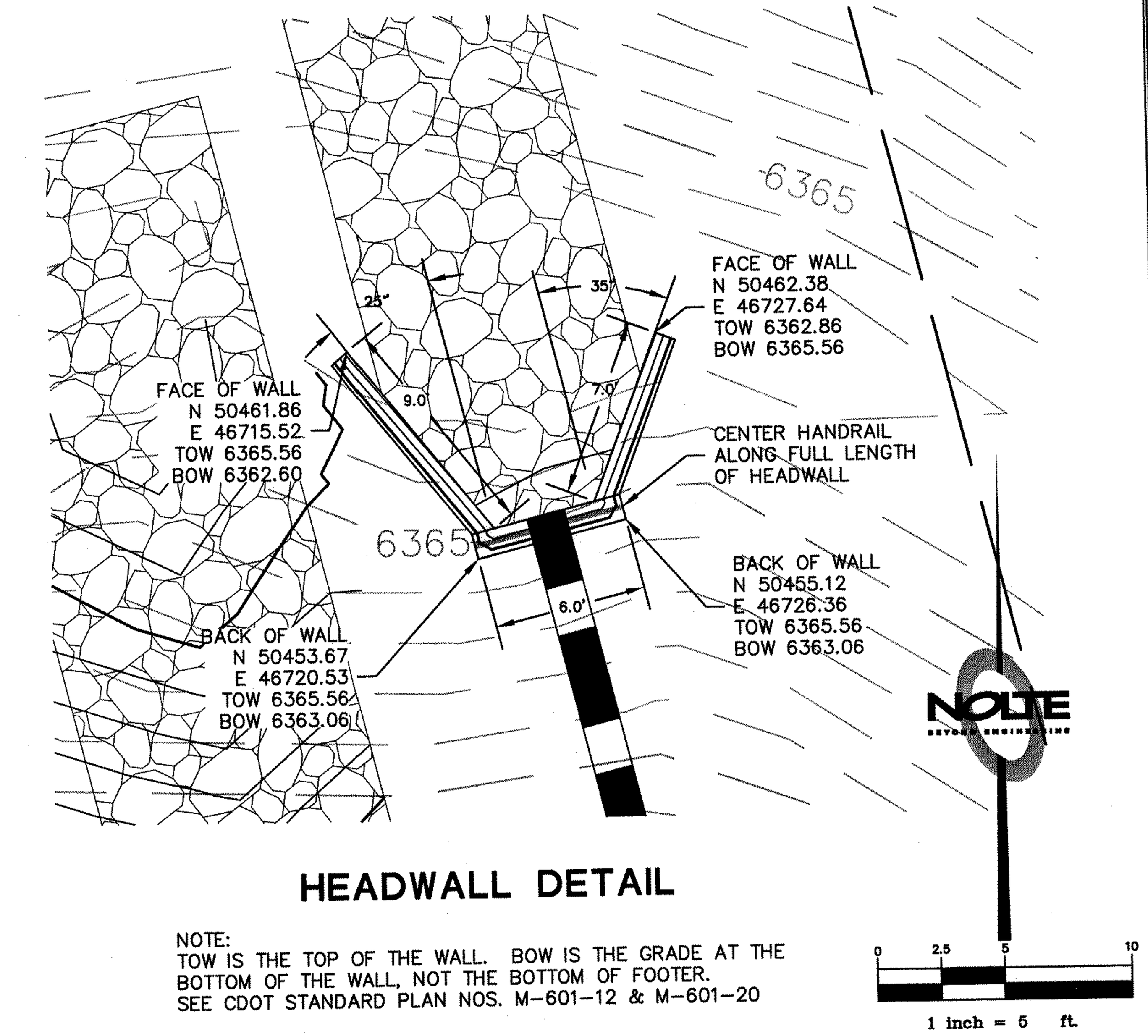
DATE SUBMITTED: FEB. 2008

NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.6400 TEL 303.220.9001 FAX WWW.NOLTE.COM

SHEET NUMBER
DR2
6 OF 7 SHEETS
JOB NUMBER
DV131005

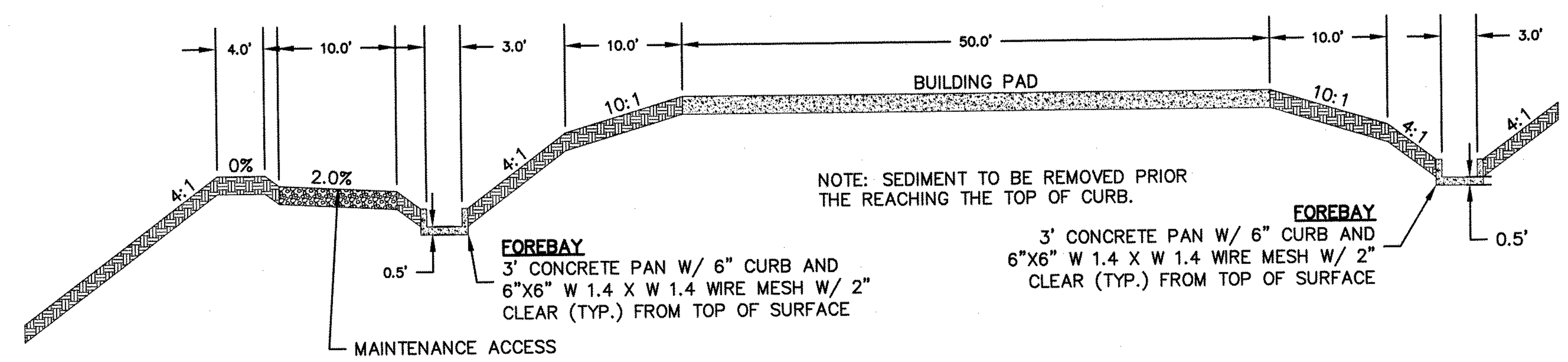
DATE: 3/21/08 TIME: 10:46:39 AM DRAWING NAME: 04-CD-DR.DWG
SERVER: DVS1 DESIGNER: TAN PROJ. MGR: GTI PLOTTED BY: HOUSEK
PATH: N:\DV131\CADD\CIVIL\HIGH PRAIRIE FARMS



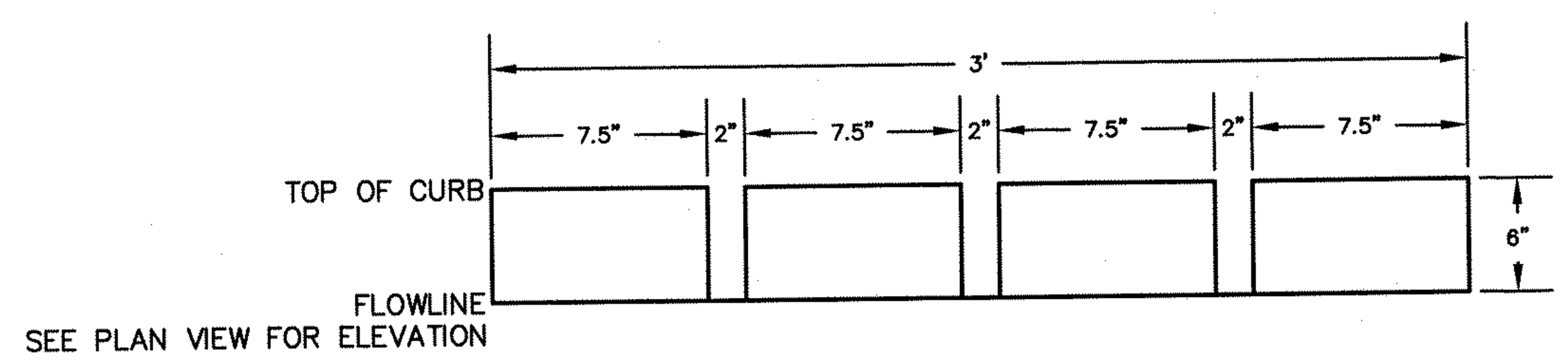


HEADWALL DETAIL

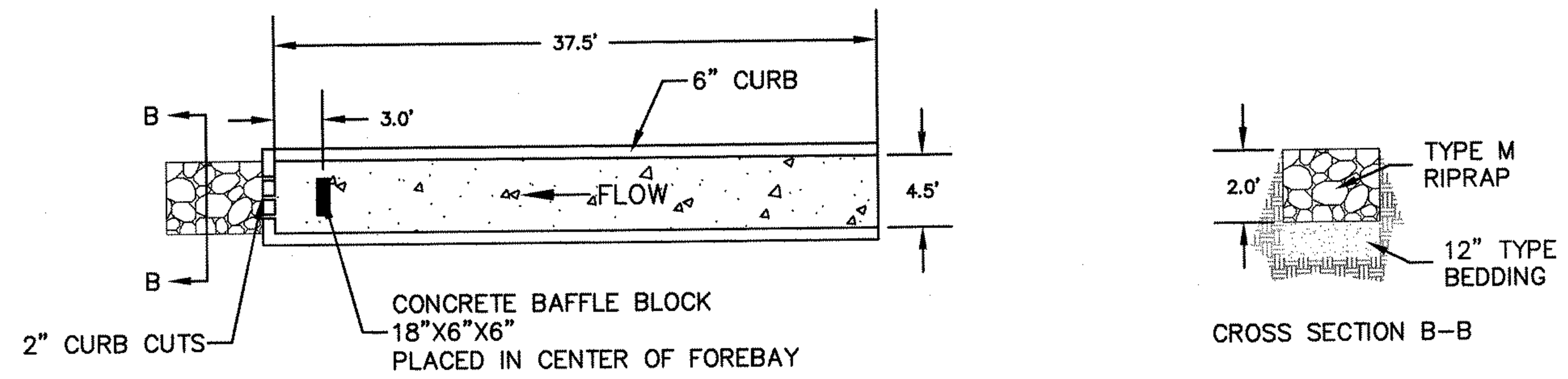
NOTE:
TOW IS THE TOP OF THE WALL. BOW IS THE GRADE AT THE BOTTOM OF THE WALL, NOT THE BOTTOM OF FOOTER.
SEE CDOT STANDARD PLAN NOS. M-601-12 & M-601-20



CROSS SECTION A-A

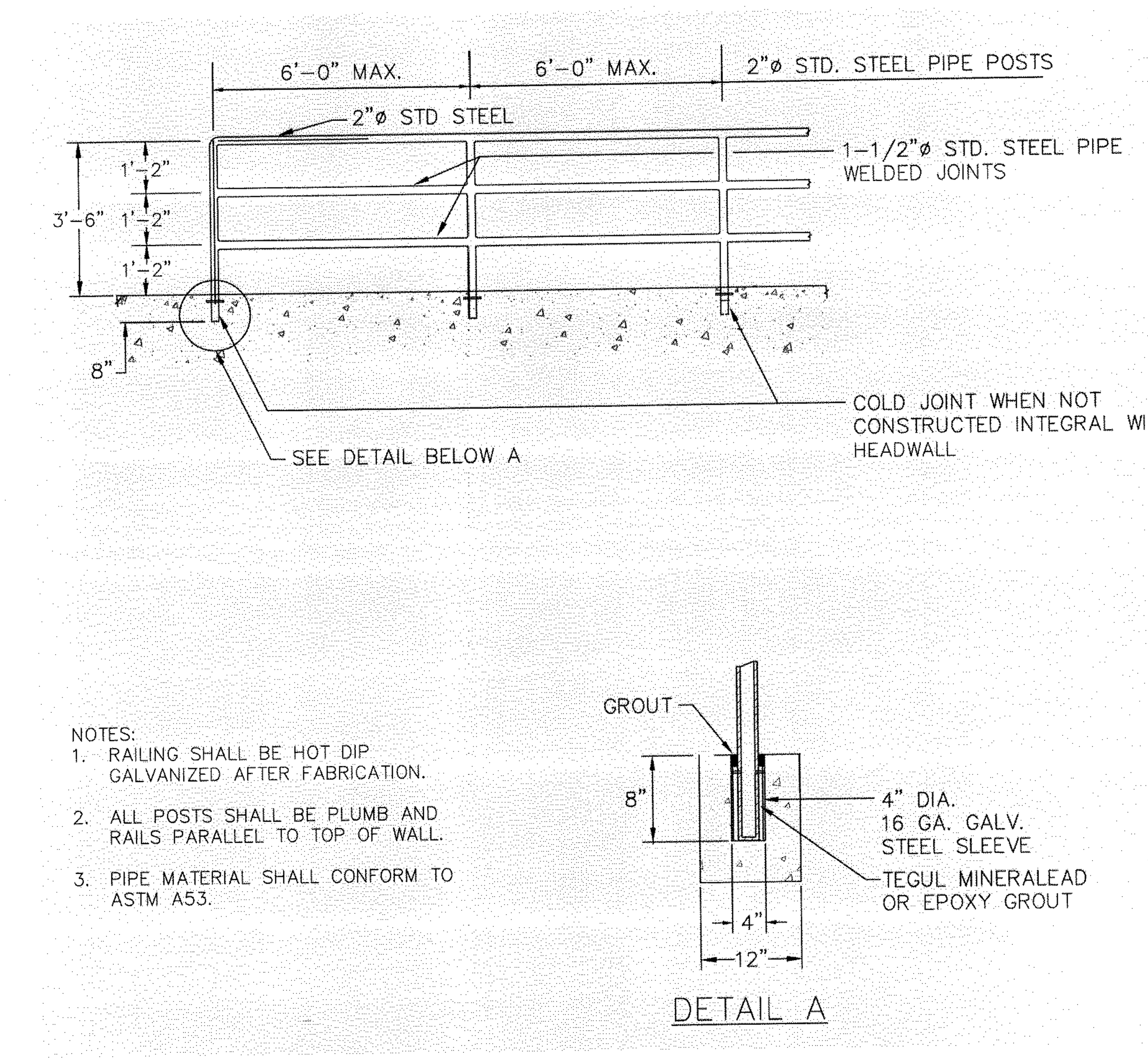


CURB CUT DETAIL



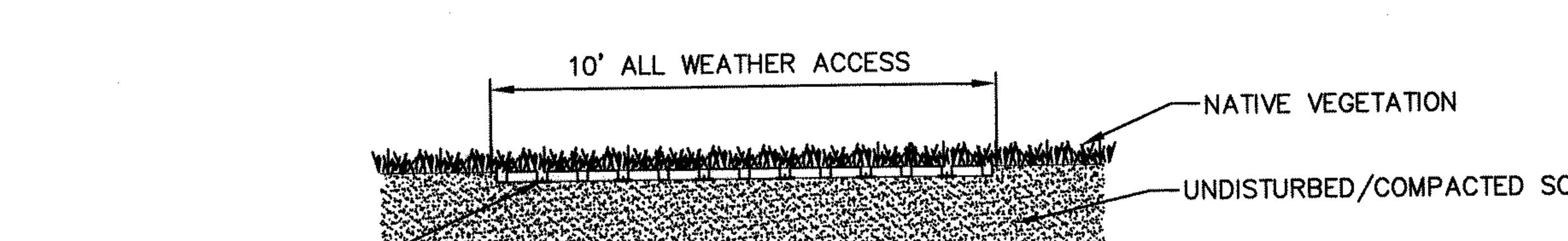
CONNECT BAFFLE BLOCK TO FOREBAY WITH 2-6" LONG #4 REBARS EMBEDDED 3" INTO BOTH FOREBAY AND BLOCK, SPACED 6" O.C.

FOREBAY DETAIL

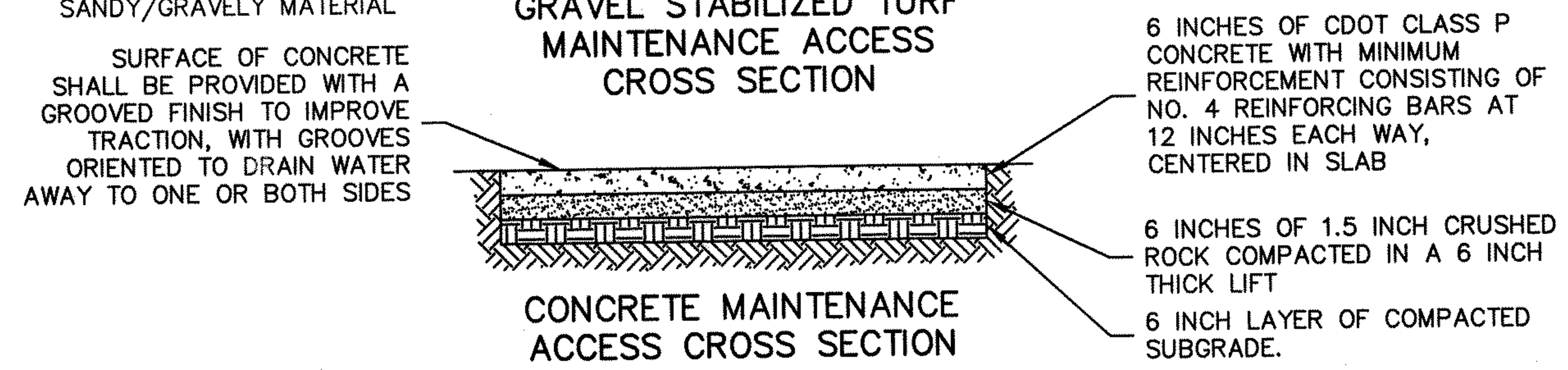


NOTES:
1. RAILING SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
2. ALL POSTS SHALL BE PLUMB AND RAILS PARALLEL TO TOP OF WALL.
3. PIPE MATERIAL SHALL CONFORM TO ASTM A53.

HANDRAIL DETAIL



GRAVEL STABILIZED TURF MAINTENANCE ACCESS CROSS SECTION



CONCRETE MAINTENANCE ACCESS CROSS SECTION

HIGH PRAIRIE FARMS MAINT. FACILITY

CONSTRUCTION DOCUMENTS
DETENTION POND - DETAILS

PREPARED FOR: HIGH PRAIRIE FARMS METRO DISTRICT

DATE SUBMITTED: FEB. 2008

NO.	BY	DATE	REVISIONS
1	KH	03/2008	REVISED PER DC ENG COMMENTS

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

NOLTE
BEYOND ENGINEERING
8000 S. Chester Street, Suite 200 Centennial, CO 80112
303.220.6400 TEL 303.220.9001 FAX WWW.NOLTE.COM

COLORADO REGISTERED PROFESSIONAL ENGINEER 37642 3-26-08

SHEET NUMBER
DR3
7 OF 7 SHEETS
JOB NUMBER
DV131005

DATE: 3/21/08 TIME: 10:47:23 AM DRAWING NAME: 04-CD-DR.DWG
SERVER: DVS1 DESIGNER: TAN PROJ. MGR: GTI PLOTTED BY: HOUSEK
PATH: N:\DV1310\CADD\CIVIL\HIGH PRAIRIE FARMS

SOUTH METRO FIRE RESCUE
FIRE MARSHAL'S OFFICE

Carolyn Washee-Freeland, AICP, Senior Planner
Douglas County Department of Community Development, Planning Services
100 Third St
Castle Rock Co 80104
303.660.7460
303.660.9550 Fax

Project Name:	High Prairie Farms Metro District – Location and Extent
Project File #:	**LE2024-027**
S Metro Review #	REFSP24-00195
Review date:	November 14, 2024
Plan reviewer:	Aaron Miller 720.989.2246 aaron.miller@southmetro.org
Project Summary:	High Prairie Farms Metro District requests approval of a Location and Extent for the construction of a new maintenance building located near the northeast corner of S. Pinery Pkwy and Democrat Road SPN: 2347-182-05-001.
Code Reference:	Douglas County Fire Code, 2018 International Fire Code, and 2021 International Building Code with amendments as adopted by Douglas County.

South Metro Fire Rescue (SMFR) has reviewed the provided documents and has no objection to the proposed Location and Extent. Applicants and Contractors are encouraged to contact SMFR regarding the applicable permit requirements for the proposed project.

Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: 303.285.6612
violeta.ciocanu@xcelenergy.com

November 18, 2024

Douglas County Planning Services
100 Third Street
Castle Rock, CO 80104

Attn: Carolyn Washee-Freeland

Re: Pinery Filing 30A, Tract F, High Prairie Farms MetroDistrict - New Maintenance Building Location and Extent Request
Case # LE2024-027

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the documents for **the above-mentioned project** and currently has **no apparent conflict**.

As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction.

Violeta Ciocanu (Chokanu)
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-285-6612 – Email: violeta.ciocanu@xcelenergy.com

Carolyn Freeland

From: annb cwc64.com <annb@cwc64.com>
Sent: Wednesday, November 13, 2024 2:31 PM
To: Carolyn Freeland
Cc: Pam Choy (pc2914@att.com); duanew cwc64.com; jt cwc64.com
Subject: Democrat Road Franktown, Colorado Douglas County eReferral #LE2024-027
Attachments: Democrat Road Franktown, Colorado.jpg

Hi Carolyn,

This is in response to your eReferral with a utility map showing any buried AT&T Long Line Fiber Optics near Democrat Road Franktown, Colorado. The Earth map shows the project area in red. Based on the address and/or map you provided, there should be NO conflicts with the AT&T Long Lines, as we do not have facilities in that area.

Please feel free to contact us with any questions or concerns.

Ann Barnowski
Clearwater Consulting Group Inc
120 9th Avenue South
Suite 140
Nampa, ID 83651
Annb@cwc64.com

The attached google earth maps are intended to show approximate locations of the buried AT&T long line fiber optic cable. The maps are provided for informational purposes only. In no way should the maps be used for anything other than general guidelines as to where the fiber is or is not and any other use of these maps is strictly prohibited.

-----Original Message-----
From: cfreeland@douglas.co.us <cfreeland@douglas.co.us>
Sent: Tuesday, November 12, 2024 2:39 PM
To: annb cwc64.com <annb@cwc64.com>
Subject: Douglas County eReferral (LE2024-027) Is Ready For Review

There is an eReferral for your review. Please use the following link to log on to your account:
https://apps.douglas.co.us/planning/projects/Login.aspx

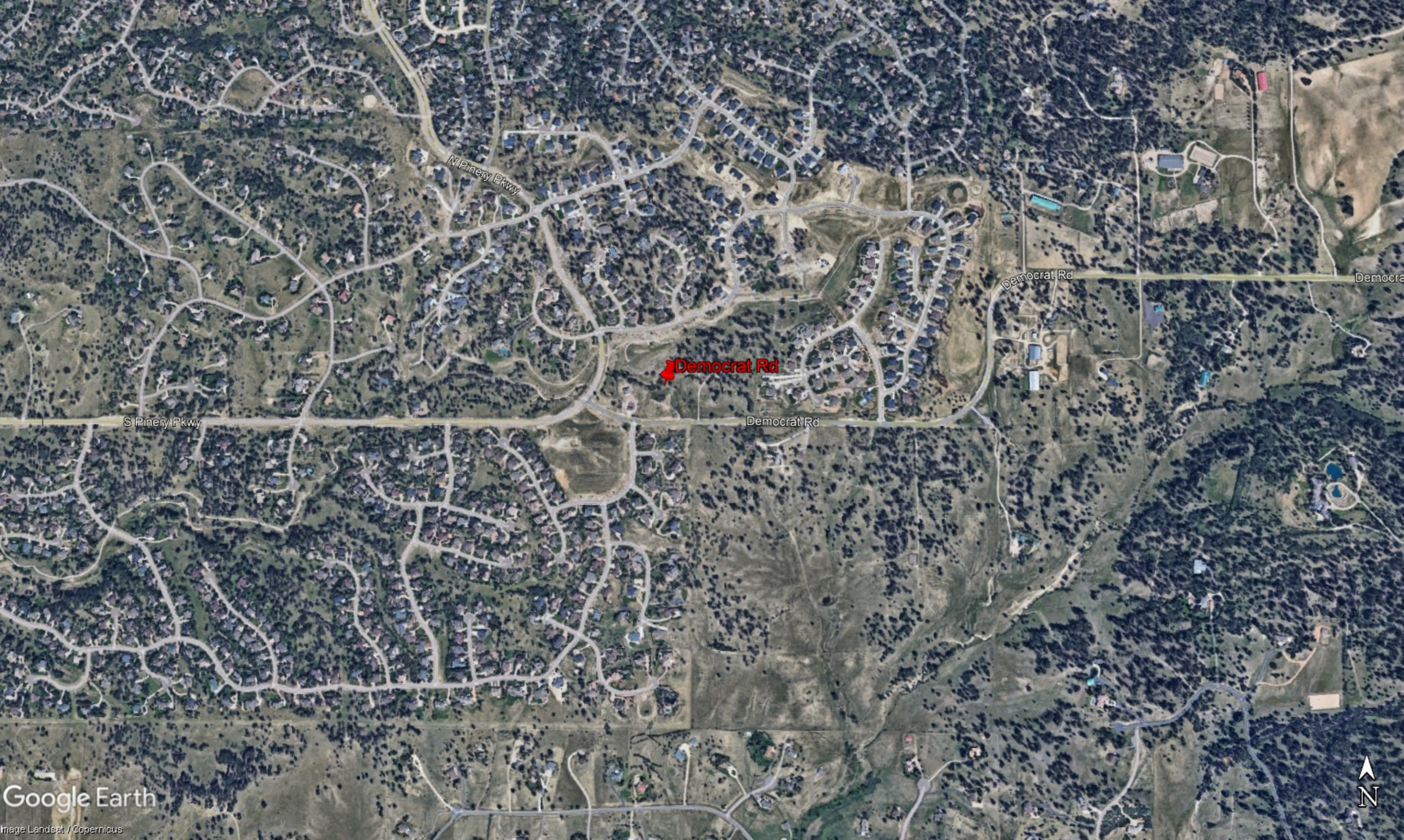
LE2024-027, Pinery Filing 30A, Tract F, High Prairie Farms MetroDistrict - New Maintenance Building Location and Extent Request

High Prairie Farms Metro District requests approval of a Location and Extent for the construction of a new maintenance building located near the northeast corner of S. Pinery Pkwy and Democrat Road SPN: 2347-182-05-001.

This referral will close on November 26, 2024.

If you have any questions, please contact me.

Sincerely,


N Pinery Pkwy
Democrat Rd
Democrat Rd
Democrat Rd
S Pinery Pkwy
Democrat Rd
Google Earth
Image Landsat / Copernicus
N