

STATE OF
COLORADO

Gagnon - DNR, Nikie <nikie.gagnon@state.co.us>

Re: Adequacy Review Letter TR7 Cooley Reservoir & Fulton Wildlife Area

1 message

Wyatt WEBSTER <wyatt.webster@holcim.com>

Wed, Sep 4, 2024 at 8:03 AM

To: "Gagnon - DNR, Nikie" <nikie.gagnon@state.co.us>, "Charles, Fred" <Fred.Charles@tetrattech.com>

Nikie,

Please see attached our response. Please let me know if you have any questions.

Thank you,

Wyatt Webster | Environmental and Land Manager

Holcim Group | Holcim - WCR, Inc.

Address: [1687 Cole Blvd., Suite 300](#)[Golden, CO 80401](#)

Office & Mobile: (702) 379-4623

Email: Wyatt.Webster@holcim.com

On Mon, Apr 29, 2024 at 11:38 AM Gagnon - DNR, Nikie <nikie.gagnon@state.co.us> wrote:

Hi Wyatt.

Please see the attached extension approval notice for TR7. The decision date has been extended to July 2, 2024.

Kind regards,

Nikie Gagnon

On Mon, Apr 29, 2024 at 11:19 AM Wyatt WEBSTER <wyatt.webster@holcim.com> wrote:

Nikie,

Extension Request below.

Thanks again,

Wyatt Webster | Environmental and Land Manager

Holcim Group | Holcim - WCR, Inc.

Address: [1687 Cole Blvd., Suite 300](#)[Golden, CO 80401](#)

Office & Mobile: (702) 379-4623

Email: Wyatt.Webster@holcim.com

On Mon, Apr 29, 2024 at 10:22 AM Gagnon - DNR, Nikie <nikie.gagnon@state.co.us> wrote:

Hi Wyatt.

Please see the attached adequacy letter for TR-7 for the Cooley Reservoir & Fulton Wildlife Area, permit no. M-1999-034. Although, as a follow-up to our phone conversation, you emailed the 2021 as-built drawings and the floodplain development permit application to me, this needs to be submitted as a formal revision to the approved reclamation plan. Please submit all the required information with a narrative describing the purpose for TR-7 and cover pages for each component, along with a revised reclamation plan map that meets the Division rules. We cannot accept the older version of the reclamation plan map with overlays of the changes. It's too outdated. You might need to survey the site to define the permit areas and acres because the map you submitted says the "boundary is approximate". The boundary on a reclamation plan cannot be approximate, it should match the permitted acres.

Once you read through the letter, feel free to call me to discuss this further. You don't need to submit the adequacy items through epermitting, you can email the whole package to me when it is complete. I assume you will need an extension on this. The decision date is Friday May 3, 2024. Please email an extension request to me by Friday so we can continue to work through the updates to this permit.

Kind regards,

Nikie Gagnon
Environmental Protection Specialist



COLORADO
Division of Reclamation,
Mining and Safety
Department of Natural Resources

P 303.866.3567 x8126 | C 720.527.1640 | F 303.832.8106
Physical: [1313 Sherman Street, Room 215, Denver, CO 80203](#)
Mailing: DRMS Room 215, [1001 E 62nd Ave, Denver, CO 80216](#)
nikie.gagnon@state.co.us | <https://www.drms.colorado.gov>

4 attachments



CooleyExhE_FloodMitigation_Memo.pdf
156K



CooleyExhF-1_FloodControlMitigPlan1.pdf
1147K



CooleyExhF-2_ReclamPlan1.pdf
3346K



CooleyExhF_AttachA_RJHdwgs_2021.pdf
19341K

To: Wyatt Webster – Holcim – WCR, Inc.

From: Fred Charles, PE

Date: August 30, 2024

Subject: Cooley Reservoir Flood Control Mitigation Plan – Summary Memorandum, **Exhibit E**

This technical memorandum documents the design basis for the Flood Control Mitigation Plan for the Cooley Reservoir site which was reclaimed by Holcim and the City of Thornton under DRMS Permit No. 1999-034. Drawing F-1 and the 2021 as-built drawings (Attachment A) provide the documentation of the work completed for flood control mitigation. Other reclamation for the site was also completed as shown in Drawing F-2 (Reclamation Plan Map). This memo was prepared using the best available information from the sources identified below.

1.0 SUPPORTING INFORMATION

The Flood Control Mitigation Plan measures were designed by RJH Consultants under contract with the City of Thornton. Drawing F-1 presents the locations of flood mitigation with further detail provided in the as-built drawings (Attachment A) to show spillways, overflow channels, riprap, inlet/outlet structures, and permanent operating features (pumps/control valves). The as-built drawings present details on the construction that was completed for flood mitigation including the following:

- Locations of shoreline stabilization features around the reservoirs
 - Riprap identified in Drawings B-01, B-02, and C
 - Concrete cutoff wall shown in Drawings B-02, B-08, and C
 - Cofferdam shown in Drawing B-06
- Locations of inlet/outlet structures for flood control – shown throughout the as-builts on numerous drawings
- Permanent operating features (pumps/control valves) inside the permit boundary
 - Pump station shown in Drawings B-01, B-02, and B-08
 - Blow off valve shown in Drawing B-01
 - Gaging station shown in Drawing E-02

The design basis for the work performed to address flood control mitigation is based on information presented in the RJH Consultants Draft Pre-Design Report (July 2016); the design basis applies to work done before and after 2016 as included in the 2021 as-builts (Attachment A).

2.0 DESIGN BASIS

The Flood Control Mitigation Plan covers the entire reservoir complex under DRMS Permit No. 1999-034. One specific part of the work included installation of flood mitigation measures to address the flood damage problem cited in 2015. Note that all features installed will remain after release of the DRMS permit. The bulk of the following discussion of the design basis is developed/copied from the RJH Consultants Draft Pre-Design Report (July 2016). The following data were utilized in the design:

- Relevant drawings, data, and reports from the City of Thornton for previous work at the site
- Geotechnical data obtained through test pit excavations and testing
- Base mapping prepared from topographic surveying
- Results from a survey of potential natural resources concerns including a wetland delineation, identifying potential habitat for federally listed threatened and endangered species, and other concerns such as migratory birds and their nests

General design criteria were applied per the following national and local codes and standards:

- American Concrete Institute – various guidelines
- American National Standards Institute – various guidelines
- American Public Works Association – various guidelines
- American Society for Testing and Materials – various guidelines
- American Water Works Association – various guidelines
- City of Thornton Special and General Conditions
- City of Thornton Standards and Specifications
- Colorado Department of Transportation – Standard Specifications for Road and Bridge Construction
- International Building Code – 2015
- National Electric Code – 2014
- Urban Drainage and Flood Control District (UDFCD), now Mile High Flood District (MHFD) – *Technical Review Guidelines for Gravel Mining Activities Within or Adjacent to the 100-year Floodplain* – 2013 (prepared in cooperation with Adams County) (UDFCD Guidelines)

Design of bank stabilization was completed using the above design criteria, with an emphasis on utilizing the UDFCD Guidelines for design of erosion protection (i.e., riprap) for bank repairs among other design aspects. Note that the UDFCD Guidelines are the basis upon which the MHFD regulates construction activities at gravel pit reservoirs in the floodplain. The general intent of the UDFCD Guidelines is to protect the South Platte River (River) and related properties and infrastructure from adverse impacts resulting from routine and catastrophic failure of gravel pit reservoir facilities.

Design of spillways (i.e., overflow channels) was based on RJH's understanding of the Project goals and objectives, understanding of the sites, and previous experience on similar projects with the City of Thornton. Applicable UDFCD Guidelines were also utilized for the design. RJH performed a planning-level spillway evaluation in 2014 that included real-time stream gage data to characterize flood conditions using the FEMA Effective HEC-RAS model. Through this process, RJH evaluated routing of the flood flows through potential spillways at the site, specifically for multiple spillway widths, at several flow rates at which River water levels rise with increased flows, and for numerous spillway combinations (for effectiveness in reducing flood damage). Results from these analyses were used as a basis for design of the spillways which was based on UDFCD Guidelines for sizing and erosion protection. Because of its success at other nearby sites, RJH developed the pre-design spillway concepts using grouted riprap. However, RJH also presented an option for earth spillways to be used at some lateral internal berms (to a limited extent) based on the design flows.

The UDFCD Guidelines were generally applied to the design of spillways as follows:

- Number of spillways – Two riverside spillways are required when the length of the riverside berm exceeds 1,300 linear feet or the head differential between the upstream and downstream end of the pit is greater than 2 feet. The general intent of this criterion is to limit the differential head over the length of the riverside berm to ensure the reservoir is filled prior to berm overtopping. Only one spillway is required for each lateral berm.
- Spillway invert elevation – UDFCD Guidelines require that the invert of riverside spillways be set at 1 foot above the 2-year water surface elevation in the river. Requirements for the invert elevation of the lateral spillways are not specified.
- Spillway length – UDFCD Guidelines present formulas for calculating the required spillway lengths. The length of riverside spillways is based on the surface area of the reservoir. The length of lateral spillways is based on the height between the top of berm and spillway invert.
- Spillway materials and configuration – Riverside spillways are required to include the following components:
 - Streambank protection along the bank of the River. The streambank protection typically consists of buried riprap and must extend a minimum of 5 feet below the River thalweg.
 - Concrete cutoff walls along the crest of the River and reservoir.
 - Hardened lining along the pitside slope of the reservoir. Acceptable hard lining materials include concrete, soil-cement, and grouted riprap. The hardened lining is required to extend a minimum of 5 feet below the River thalweg.
- Note that UDFCD Guidelines do not provide requirements for the materials and configurations of lateral spillways. On previous projects, the City of Thornton applied the design criteria for riverside spillways to design lateral spillways.

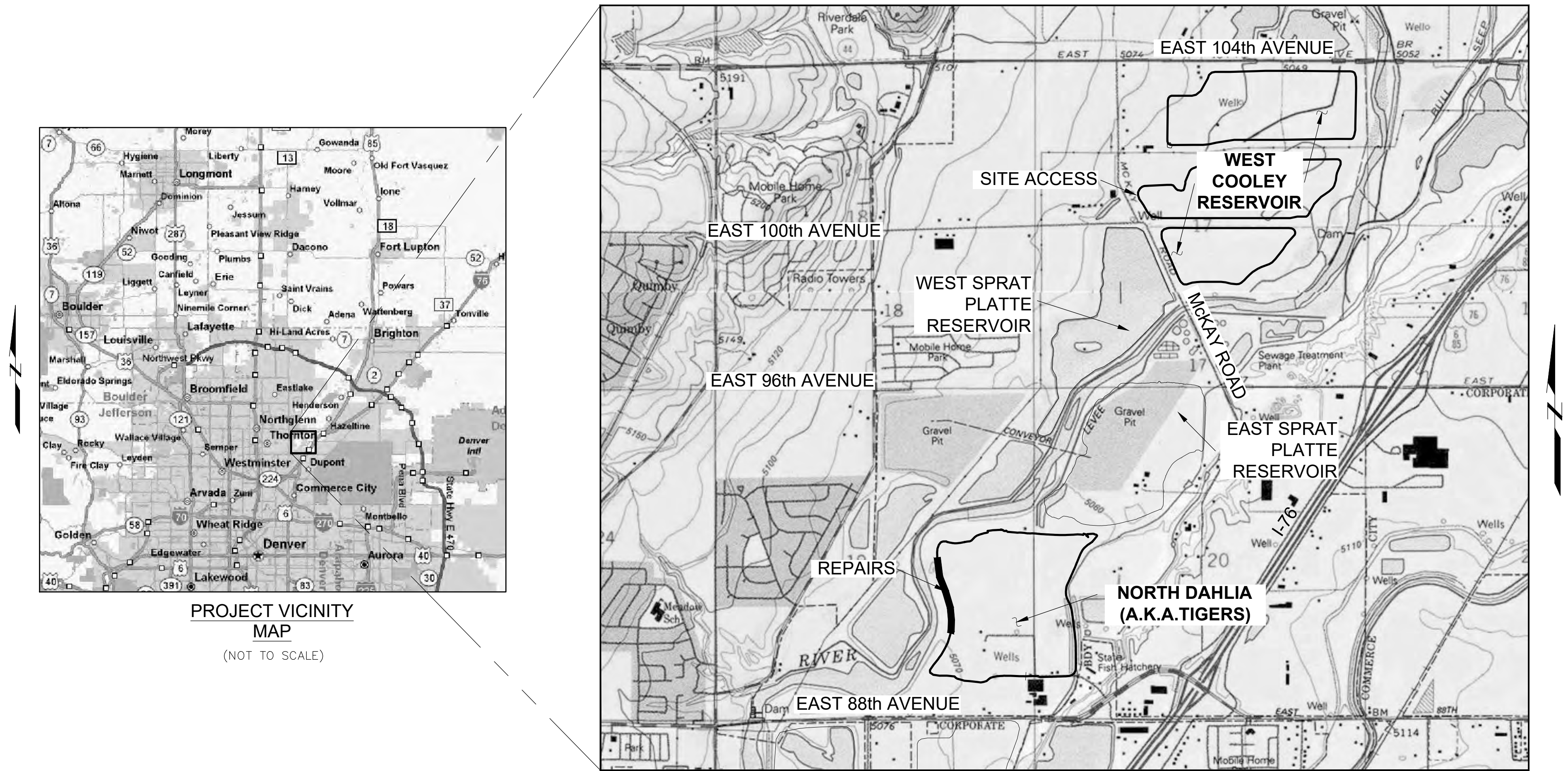
CITY OF THORNTON

WEST COOLEY RESERVOIR

2015 FEMA FLOOD REPAIRS PROJECT

CIP NO. 16-351C

RECORD DRAWINGS



GENERAL PROJECT INFORMATION

AS OWNERS THEREOF WE HEREBY ACCEPT AND APPROVE THESE PLANS FOR CONSTRUCTION OF THE WEST COOLEY RESERVOIR – 2015 FLOOD REPAIRS PROJECT.

CITY OF THORNTON, COLORADO

OWNER

AMERICAN WEST CONSTRUCTION, LLC

CONTRACTOR

RJH CONSULTANTS, INC., ENGLEWOOD, COLORADO

ENGINEER

APRIL 25, 2019

CONSTRUCTION STARTED

AUGUST 29, 2020

CONSTRUCTION COMPLETED

CITY OF THORNTON APPROVALS

PROJECT MANAGER – EDUARDO MORENO

DATE

WATER RESOURCES SENIOR MANAGER – EDWARD LANYON

DATE

WATER RESOURCES MANAGER – EMILY HUNT

DATE

SENIOR CIVIL ENGINEER – DAN SHILTZ, P.E.

DATE

SENIOR CIVIL ENGINEER – JAMES KAISER, P.E., C.F.M.

DATE

EMERGENCY AND SAFETY ADMINISTRATOR – RYAN DOYLE

DATE

SITE LOCATION MAP

(NOT TO SCALE)

PREPARED FOR:

City of Thornton

PREPARED BY:



RJH CONSULTANTS, INC.

ENGLEWOOD • COLORADO

www.rjh-consultants.com

I HEREBY CERTIFY THAT THESE PLANS FOR THE WEST COOLEY RESERVOIR – 2015 FLOOD REPAIRS PROJECT WERE PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) FOR THE OWNERS THEREOF.

ROBERT J. HUZJAK, P.E. COLORADO P.E. NO.25734

REGISTERED ENGINEER

RJH CONSULTANTS, INC.

THESE PLANS REPRESENT THE AS-CONSTRUCTED CONDITIONS OF THE WEST COOLEY RESERVOIR – 2015 FLOOD REPAIRS PROJECT TO THE BEST OF MY KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY OTHERS, AS OF THE 25 DAY OF JUNE 2021

ROBERT J HUZJAK 06/25/21

(ENGINEER'S PRINTED NAME) (SIGNATURE)

DWG. NO.

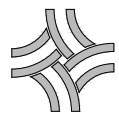
A-01

SHEET NO.

1 of 77

SHEET INDEX	
DWG. NO.	SHEET TITLE
C-07	SITE 2 – OVERFLOW CHANNEL SECTIONS (1 OF 2)
C-08	SITE 2 – OVERFLOW CHANNEL SECTIONS (2 OF 2)
C-09	SITE 2 – CATHODIC DETAILS (1 OF 2)
C-10	SITE 2 – CATHODIC DETAILS (2 OF 2)
PACKAGE D	– SITE 3 W COOLEY CENTRAL CELL
D-01	SITE 3 – PLAN OF EXISTING CONDITIONS
D-02	SITE 3 – PLAN OF MODIFICATIONS
D-03	SITE 3 – PHASE I CONSTRUCTION
D-04	SITE 3 – PHASE II CONSTRUCTION
D-05	SITE 3 – PLAN OF EXCAVATION
D-06	SITE 3 – REPAIR SECTIONS
D-07	SITE 3 – NORTH OVERFLOW CHANNEL SECTIONS (1 OF 3)
D-08	SITE 3 – NORTH OVERFLOW CHANNEL SECTIONS (2 OF 3)
D-09	SITE 3 – NORTH OVERFLOW CHANNEL SECTIONS (3 OF 3)
D-10	SITE 3 – NORTH OVERFLOW CHANNEL DETAILS
D-11	SITE 3 – SOUTH OVERFLOW CHANNEL SECTIONS (1 OF 3)
D-12	SITE 3 – SOUTH OVERFLOW CHANNEL SECTIONS (2 OF 3)
D-13	SITE 3 – SOUTH OVERFLOW CHANNEL SECTIONS (3 OF 3)
D-14	SITE 3 – SOUTH OVERFLOW CHANNEL DETAILS
D-15	SITE 3 – PLAN OF MULTI-USE TRAIL, ACCESS ROAD, AND FENCES
D-16	SITE 3 – MULTI-USE TRAIL PROFILE, SECTION, AND DETAILS
D-17	SITE 3 – MULTI-USE TRAIL DETAILS
D-18	SITE 3 – CONTROL POINTS
PACKAGE E	– WEST COOLEY NORTH CELL
E-01	SITE 4 – PLAN OF EXISTING CONDITIONS
E-02	SITE 4 – MODIFICATIONS PLAN AND SECTIONS
E-03	SITE 4 – INTERCONNECT GATE CONTROL VAULT MODIFICATIONS
E-04	SITE 4 – CATHODIC DETAILS (1 OF 2)
E-05	SITE 4 – CATHODIC DETAILS (2 OF 2)
PACKAGE F	– ALLUVIAL WELL NO. 5
F-01	COOLEY WELL 5 REPLACEMENT SITE PLAN
F-02	COOLEY WELL 5 DISCHARGE PIPELINE CONSTRUCTION PLAN AND PROFILE A
F-03	COOLEY WELL 5 REPLACEMENT PLAN, PROFILE B AND DETAILS
F-04	COOLEY WELL 5 PIPELINE RECONSTRUCTION DETAILS
F-05	COOLEY WELL 5 REPLACEMENT SITE ELECTRICAL PLAN
F-06	
PACKAGE G	– NORTH DAHLIA – SLOPE PROTECTION IMPROVEMENTS
G-01	NORTH DAHLIA EXISTING SITE PLAN AND SURVEY CONTROL
G-02	NORTH DAHLIA GENERAL PLAN OF MODIFICATIONS
G-03	
PACKAGE H	
H-01	WETLAND MITIGATION

—	05/2021	RECORD DRAWINGS	—	KLH	AJY	RJH
NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SHEET INDEX

DWG. NO.
A-02

SHEET NO.
2 of 77

GENERAL NOTES

1. BASIS OF TOPOGRAPHIC MAPPING IS A COMPOSITE OF THE FOLLOWING SOURCES:
- A. PROJECT TOPOGRAPHIC MAPPING (2016 SURVEY DATA) WAS DEVELOPED BY HCL ENGINEERING AND SURVEYING IN OCTOBER 2016 AND JANUARY 2017. THE SURVEY WAS AMENDED WITH ADDITIONAL INFORMATION DEVELOPED BY J.R. ENGINEERING (FEBRUARY, 2016).
- B. TOPOGRAPHIC SURVEY AT WEST COOLEY NORTH CELL FROM "2012 SLOPE PROTECTION PROJECTS WEST COOLEY – NORTH CELL" RECORD DRAWINGS (THORNTON CIP NO. 09–793B) (RJH CONSULTANTS, 2013).
- C. TOPOGRAPHIC SURVEY WITHIN WEST COOLEY SOUTH CELL FROM "CONSTRUCTION PLANS FOR CITY OF ARVADA SOUTH PLATTE RESERVOIR PROJECT" RECORD DRAWINGS (APPLEGATE, 2003).
- D. TOPOGRAPHIC SURVEY AT OTHER LOCATIONS FROM 2–FOOT TOPOGRAPHIC MAPPING PROVIDED BY CITY OF THORNTON (2008).
2. ACTUAL SITE CONDITION MAY DEVIATE FROM TOPOGRAPHY SHOWN. CONTRACTOR TO CONFIRM SITE TOPOGRAPHY PRIOR TO STARTING EARTHWORK.
3. RIGHTS–OF–WAY AND EASEMENTS ARE APPROXIMATE. BASIS OF RIGHTS–OF–WAY AND EASEMENTS IS FROM "2012 SLOPE PROTECTION PROJECTS WEST COOLEY – NORTH CELL" RECORD DRAWINGS (THORNTON CIP NO. 09–793B) (RJH CONSULTANTS, 2013) AND FROM OCTOBER 27, 2006 ALTA/ACSM LAND TITLE SURVEY PREPARED BY J.R. ENGINEERING.
4. BASIS OF PROPERTY BOUNDARIES IS FROM HARRIS KOCHER SMITH (HKS) SURVEY (SEPTEMBER 2014).
5. LOCATION AND NATURE OF EXISTING UTILITIES AND EXISTING FACILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE. FIELD LOCATE ALL UTILITIES AND FACILITIES, WHETHER SHOWN ON THE DRAWINGS OR NOT, PRIOR TO EXCAVATION AND DEMOLITION. PROTECT ALL UTILITIES AND FACILITIES IN PLACE UNLESS DESIGNATED FOR REMOVAL, DEMOLITION, OR REPLACEMENT.
6. UNLESS SHOWN OR SPECIFIED OTHERWISE, PAYLINES FOR UNIT PRICE PAY ITEMS ARE BASED ON THE DESIGN LINES (NEAT LINES) SHOWN ON THE PLANS.

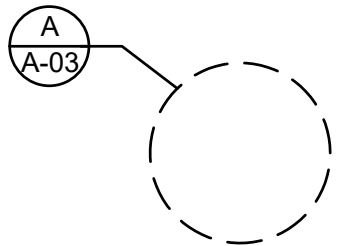
LEGEND

DETAIL

A
A-03

SECTION
STA 0+00

1
A-03



APPROXIMATE TREE AND SHRUB LIMITS



INDIVIDUAL SHRUB OR TREE



EARTH SLOPE



CUT SLOPE



HORIZONTAL COORDINATE GRID MARK



SURVEY CONTROL POINT



CONSTRUCTION CONTROL POINT



EXISTING MONITORING WELL OR
PIEZOMETER



EXISTING PRODUCTION WELL



EXISTING ALLUVIAL WELL



EXISTING VALVE



BLOW–OFF VALVE



ELECTRICAL TRANSMISSION
TOWER



EXISTING INDEX TOPOGRAPHIC
CONTOUR WITH ELEVATION IN FEET



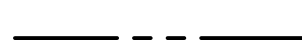
EXISTING INTERMEDIATE
TOPOGRAPHIC CONTOUR



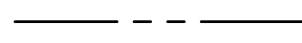
PAVED ROAD



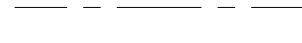
GRAVEL OR UNIMPROVED ROAD



PROPERTY LINE



LIMIT OF SITE DISTURBANCE (PROJECT LIMITS)



CENTERLINE



LIMIT OF CONTRACTOR STAGING AND STOCKPILING



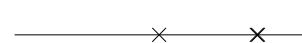
SURFACE WATERWAY



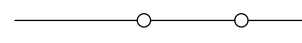
RIGHT–OF–WAY



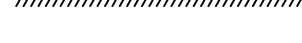
EASEMENT



APPROXIMATE WATER LEVEL



FENCE



TRAIL SAFETY FENCE



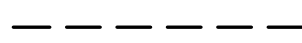
FLOODPLAIN LIMITS



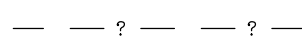
FLOODWAY LIMITS



WATERLINE



SILT FENCE



SOIL–BENTONITE BARRIER WALL



GEOTEXTILE



APPROXIMATE GEOLOGIC CONTACT



OVERHEAD ELECTRIC



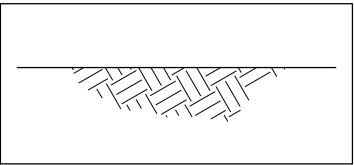
UNDERGROUND ELECTRIC



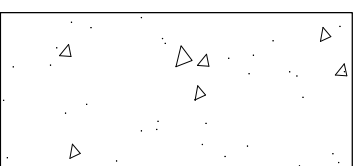
UNDERGROUND COMMUNICATION

ABBREVIATIONS:

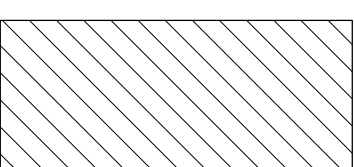
AB	= ANCHOR BOLT	INV	= INVERT
ABT	= ABOUT	JT	= JOINT
ADAS	= AUTOMATIC DATA ACQUISITION SYSTEM	LG	= LONG
ADDL	= ADDITIONAL	LP	= LOW POINT
ALUM	= ALUMINUM	LPBO	= LOW POINT BLOW–OFF
ALT	= ALTERNATE	MAX	= MAXIMUM
APPROX	= APPROXIMATE	MIN	= MINIMUM
AS	= AUXILIARY SPILLWAY	MH	= MANHOLE
ASCP	= AUXILIARY SPILLWAY CONTROL POINT	MFR	= MANUFACTURER
BF	= BOTTOM FACE	MSE	= MECHANICALLY STABILIZED EARTH
BLDG	= BUILDING	NAD	= NORTH AMERICAN DATUM
BM	= BENCHMARK	NAVD	= NORTH AMERICAN VERTICAL DATUM
BOC	= BOTTOM OF CONCRETE	N	= NORTH OR NORTHING
BOH	= BOTTOM OF HOLE	NF	= NEAR FACE
BOT	= BOTTOM	NGS	= NATIONAL GEODETIC SURVEY
BR	= BOTTOM ROW	NGVD	= NATIONAL GEODETIC VERTICAL DATUM
BRG	= BEARING	NO.	= NUMBER
BTWN	= BETWEEN	NR	= NEAR ROW
CCM	= CELLULAR CONCRETE MAT	NTS	= NOT TO SCALE
CDOT	= COLORADO DEPT OF TRANSPORTATION	NWL	= NORMAL WATER LEVEL
CFS	= CUBIC FEET PER SECOND	OC	= ON CENTER
CJ	= CONSTRUCTION JOINT	OD	= OUTSIDE DIAMETER
CL, C	= CENTERLINE	O.F.	= OUTSIDE FACE
CLR	= CLEAR	OH	= OVERHEAD
CMP	= CORRUGATED METAL PIPE	OPNG	= OPENING
CMU	= CONCRETE MASONRY UNIT	OPP	= OPPOSITE
COL	= COLUMN	O.R.	= OUTSIDE ROW
CONC	= CONCRETE	OW	= OUTLET WORKS
CONN	= CONNECTION	OWC	= OUTLET WORKS CONDUIT
CONT	= CONTINUOUS	OWCP	= OUTLET WORKS CONTROL POINT
CP	= CONTROL POINT	PC	= POINT OF CURVATURE
CTJ	= CONTRACTION JOINT	PD	= PLAIN DOWELS
CTR	= CENTER	PE	= POLYETHYLENE
DIA	= DIAMETER	PEN.	= PENETRATION
DIAG	= DIAGONAL	PI	= POINT OF INTERSECTION
DWG, DWGS	= DRAWING OR DRAWINGS	PJF	= PREFORMED JOINT FILER
DWL	= DOWEL	PL, P	= PLATE
DWLS	= DOWELS	PMF	= PROBABLE MAXIMUM FLOOD
E	= EAST OR EASTING	PT	= POINT OF TANGENCY
EA	= EACH	PVC	= POLYVINYL CHLORIDE
EC	= EACH CORNER	RB	= ROOF BEAM
ECP	= EMBANKMENT CONTROL POINT	RCP	= REINFORCED CONCRETE PIPE
EF	= EACH FACE	REINF	= REINFORCEMENT
EJ	= EXPANSION JOINT	REQ'D	= REQUIRED
EL, ELEV	= ELEVATION	ROW	= RIGHT OF WAY
EQ	= EQUAL	S	= SLOPE
ER	= EACH ROW	SC	= SOIL–CEMENT
ES	= EACH SIDE	SCH	= SCHEDULE
EW	= EACH WAY	SEO	= STATE ENGINEER'S OFFICE
EXST	= EXISTING	SIM	= SIMILAR
EXT	= EXTENSION	SPC, SPCS	= SPACE OR SPACES
EXP	= EXPANSION	SPY	= SPILLWAY
F	= FAHRENHEIT	SS	= STAINLESS STEEL
FB	= FLAT BAR	STA	= STATION
FD	= FLOOR DRAIN	STL	= STEEL
FDN	= FOUNDATION	SQ	= SQUARE
FF	= FAR FACE, FINISHED FLOOR	SYM	= SYMMETRICAL
FIN	= FINISH	T&B	= TOP & BOTTOM
FLG	= FLANGE	TF	= TOP FACE
FO	= FACE OF	THK	= THICK
FR	= FAR ROW	TL	= TOP LAYER
FS	= FAR SIDE	T.O.	= TOP OF
FT	= FEET OR FOOT	TOC	= TOP OF CONCRETE
FES	= FLARED END SECTION	TOW	= TOP OF WALL
FTG	= FOOTING	TR	= TOP ROW
GALV	= GALVANIZED	TW	= TAILWATER
GR	= GRADE	TYP	= TYPICAL
H	= HORIZONTAL	UCP	= UTILITY CARRIER PIPE
H.A.S.	= HEADED ANCHOR STUD	UDP	= UNDERDRAIN PIPE
HDPE	= HIGH DENSITY POLYETHYLENE	UNC	= UNIFIED NATIONAL COARSE THREAD
HGT	= HEIGHT	UNO	= UNLESS NOTED OTHERWISE
HK	= HOOK	USGS	= UNITED STATES GEOLOGICAL SURVEY
HORZ	= HORIZONTAL	V	= VERTICAL
HR	= HANDRAIL	VERT	= VERTICAL
HS	= HIGH STRENGTH	WS	= WATER SURFACE
HSS	= HOLLOW STRUCTURAL SECTION	WSA	= WATERSTOP
HYD	= HYDRAULIC	WWF	= WELDED WIRE FABRIC
ID	= INSIDE DIAMETER		
IE	= INVERT ELEVATION		
I.F.	= INSIDE FACE		



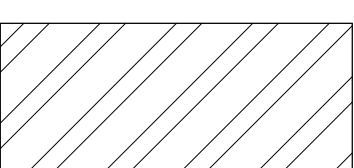
EARTH



CONCRETE



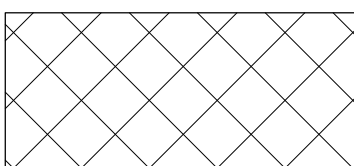
EROSION REPAIRS



STOCKPILE
AREA



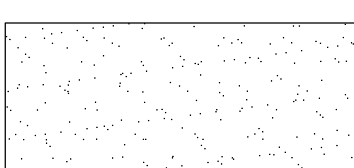
LOW–PERMEABLE
FILL



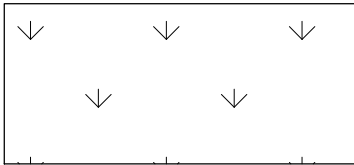
SOIL–BENTONITE
BACKFILL



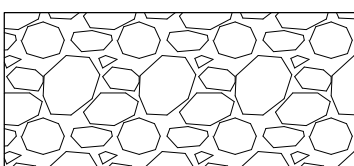
EXISTING
SOIL–BENTONITE
BARRIER WALL



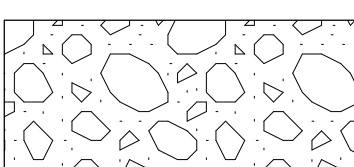
DRAIN
MATERIAL



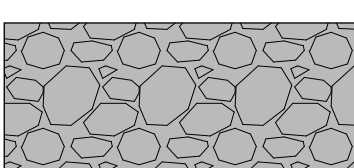
WETLANDS



RIPRAP



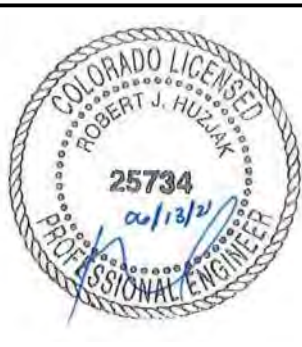
AGGREGATE SURFACING
AND RIPRAP BEDDING



GROUTED RIPRAP

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RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

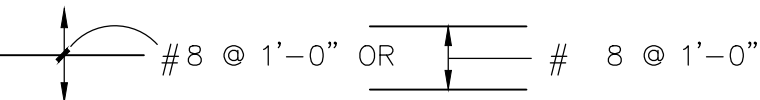
GENERAL NOTES,
ABBREVIATIONS, AND
LEGEND

DWG. NO.
A-03

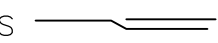
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STRUCTURAL NOTES:

1) REINFORCEMENT SYMBOLS

BARS SHOWN THUS  INDICATE A GROUP OF IDENTICAL #8 BARS SPACED AT 1'-0" (12") CENTERS.

- AN OPEN CIRCLE AT THE END OF A BAR INDICATES A BEND WITH THE BAR TURNED AWAY FROM THE OBSERVER.
- A CLOSED CIRCLE AT THE END OF A BAR INDICATES A BEND WITH THE BAR TURNED TOWARDS THE OBSERVER.
- INDICATES A DOWEL

SPLICES SHOWN THUS  INDICATES A LAPPED SPlice, NOT A BEND IN THE BAR.

2) DIMENSIONS

DIMENSIONS ARE TO THE CENTERLINES OF THE BARS UNLESS OTHERWISE SHOWN. CLEAR COVER DIMENSIONS ARE MARKED "CLR." ALL DIMENSIONS TO A JOINT ARE TO THE CENTERLINE OF THE JOINT. BEAMS, COLUMNS, AND WALLS ARE CENTERED ON REFERENCED LINES.

THICKNESS SHOWN FOR WALLS AND SLABS ADJACENT TO UNDISTURBED SOIL OR ROCK ARE MINIMUM DIMENSIONS.

3) COVER

UNLESS OTHERWISE INDICATED ON THE DRAWING, PLACE THE REINFORCEMENT SO THAT THE CLEAR DISTANCE BETWEEN THE FACE OF CONCRETE AND NEAREST REINFORCEMENT IS 3 INCHES FOR #5 BARS OR LARGER. FOR CONCRETE PLACED DIRECTLY AGAINST EARTH OR ROCK, MINIMUM CLEAR CONCRETE COVER OVER REINFORCEMENT SHALL BE 3 INCHES.

4) REINFORCEMENT DOWELS

DOWELS INDICATED ON THE DRAWING SUCH AS #8(DWL), SHALL HAVE A MINIMUM STRAIGHT EMBEDMENT AND PROJECTION EQUAL TO THAT REQUIRED FOR LAP SPLICING A BAR OF THE SAME DIAMETER.

5) PLAIN DOWELS

PLAIN DOWELS, INDICATED ON THE DRAWINGS SUCH AS 3/4" (PD), ACROSS CONTRACTION JOINTS SHALL BE PLAIN REINFORCING BARS OF THE BAR DIAMETER INDICATED. PLAIN DOWELS SHALL BE A MINIMUM OF 36 INCHES LONG, WITH EQUAL LENGTH EXTENDING ON EITHER SIDE OF THE CONTRACTION JOINT. IMMEDIATELY BEFORE THE SECOND CONCRETE PLACEMENT, THE PROJECTING HALF LENGTH OF DOWEL SHALL BE GREASED TO PREVENT BOND TO THE CONCRETE.

6) STANDARD HOOKS AND BENDS

HOOKS AND BENDS SHALL CONFORM TO ACI 318, SECTIONS 7.1, 7.2, AND 7.3.

7) PLACING REINFORCEMENT

PLACE REINFORCEMENT IN ACCORDANCE WITH APPROVED REINFORCEMENT SHOP DRAWINGS. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND THE APPROVED SHOP DRAWINGS, THE APPROVED SHOP DRAWINGS SHALL GOVERN.

SEE ACI 318, SECTION 7.5 AND ACI 301, SECTION 5.3 FOR PLACING TOLERANCES.

REINFORCEMENT MAY BE ADJUSTED IN THE FIELD TO CLEAR FORM TIES AND ANCHOR BARS. IN SUCH CASES, RELOCATION OF THE EMBEDDED MATERIALS MUST BE CONSIDERED. IN NO CASE SHALL BARS BE BENT IN THE FIELD.

REINFORCEMENT SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1 INCH BETWEEN OTHER REINFORCEMENT, ANCHOR BOLTS, FORM TIES, OR OTHER EMBEDDED METALWORK.

REINFORCEMENT PARALLEL TO ANCHOR BOLTS OR OTHER EMBEDDED METALWORK SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1-1/3 TIMES THE MAXIMUM SIZE AGGREGATE TO BE USED.

8) SPACING

THE FIRST AND LAST BARS IN SLABS AND WALLS, STIRRUPS IN BEAMS, AND TIES IN COLUMNS ARE TO START AND END AT A MAXIMUM OF ONE HALF OF THE ADJACENT BAR SPACING. ALL REINFORCING TO BE EQUALLY SPACED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

9) ACCESSORIES

BAR SUPPORTS, SPACERS, AND OTHER ACCESSORIES ARE NOT SHOWN ON THE DRAWINGS. THE RECOMMENDATIONS OF ACI 315 (DETAILING MANUAL) SHALL BE USED IN SELECTING ACCESSORIES.

10) DETAILING

UNLESS OTHERWISE SHOWN, FOLLOW THE RECOMMENDATIONS OF ACI 315. NO CHANGES SHALL BE MADE WITHOUT PRIOR APPROVAL.

11) CONCRETE PLACEMENT

BEFORE PLACING CONCRETE, CHECK ALL APPLICABLE DRAWINGS RELEASED AS SUITABLE FOR CONSTRUCTION INCLUDING MANUFACTURER'S DRAWINGS TO VERIFY THE PRESENCE OF ALL EMBEDDED MATERIAL REQUIRED IN THE PLACEMENT.

12) EMBEDMENT AND LAP SPlice LENGTH REQUIREMENTS

EMBEDMENT LENGTHS AND LAP SPlice LENGTHS ARE SHOWN IN THE TABLE BELOW.

BASIC EMBEDMENT LENGTHS ARE BASED ON ACI 318, SECTION 12.2. AND THE REQUIRED f_c' .

ALL LAP SPlice LENGTHS SHOWN ARE CLASS B SPLICES BASED ON ACI 318, SECTION 12.15.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS, THE MINIMUM LENGTHS FOR EMBEDMENT AND LAP SPLICES FOR PARALLEL BARS SHALL BE AS GIVEN IN THE TABLE BELOW.

WHEN REINFORCING BARS OF DIFFERENT SIZE ARE TO BE SPLICED, THE LENGTH OF THE LAP SHALL BE GOVERNED BY THE SMALLER DIAMETER BAR.

SPLICES ARE TO BE MADE SO THAT THE GIVEN CLEAR DISTANCES TO THE FACE OF CONCRETE WILL BE MAINTAINED.

TABLE OF BASIC EMBEDMENT AND LAP SPlice LENGTHS ACCORDING TO ACI 318
 $f_c' = 4000 \text{ PSI}$

BAR SIZE NO.	EMBEDMENT (INCHES)		LAP SPlice (INCHES)	
	ALL BARS EXCEPT TOP BARS	TOP BARS *	ALL BARS EXCEPT TOP BARS	TOP BARS *
3	1'-3"	1'-7"	1'-7"	2'-1"
4	1'-7"	2'-1"	2'-1"	2'-9"
5	2'-0"	2'-7"	2'-7"	3'-5"
6	2'-5"	3'-1"	3'-1"	4'-1"
7	3'-6"	4'-6"	4'-6"	5'-10"
8	4'-0"	5'-2"	5'-2"	6'-10"
9	4'-6"	5'-10"	5'-10"	7'-7"
10	5'-1"	6'-7"	6'-7"	8'-6"
11	5'-7"	7'-3"	7'-3"	9'-6"

* TOP BARS ARE HORIZONTAL BARS IN BEAMS AND SLABS PLACED SO THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.

TABLE OF BASIC EMBEDMENT AND LAP SPlice LENGTHS ACCORDING TO ACI 318
 $f_c' = 5000 \text{ PSI}$

BAR SIZE NO.	EMBEDMENT (INCHES)		LAP SPlice (INCHES)	
	ALL BARS EXCEPT TOP BARS	TOP BARS *	ALL BARS EXCEPT TOP BARS	TOP BARS *
3	1'-1"	1'-5"	1'-5"	1'-10"
4	1'-5"	1'-11"	1'-11"	2'-5"
5	1'-10"	2'-4"	2'-4"	3'-0"
6	2'-2"	2'-10"	2'-10"	3'-8"
7	3'-1"	4'-1"	4'-1"	5'-3"
8	3'-7"	4'-8"	4'-8"	6'-0"
9	4'-0"	5'-3"	5'-3"	6'-9"
10	4'-6"	5'-11"	5'-11"	7'-8"
11	5'-0"	6'-6"	6'-6"	8'-6"

* TOP BARS ARE HORIZONTAL BARS IN BEAMS AND SLABS PLACED SO THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.

13) EMBEDDED ITEMS AND OPENINGS

BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEDDED ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE. ADD ADDITIONAL REINFORCING AROUND OPENINGS AS SHOWN ON DRAWINGS.

14) FINISHING SYMBOLS AND CONCRETE TOLERANCES

THE FOLLOWING FINISHING SYMBOLS HAVE BEEN USED ON THESE DRAWINGS. REFER TO THE CONSTRUCTION SPECIFICATIONS FOR DETAILED REQUIREMENTS AND CONSTRUCTION TOLERANCES FOR HYDRAULIC STRUCTURES.

  SPECIAL FINISH WITH SPECIAL TOLERANCES FOR HIGH VELOCITY WATER FLOW.

FINISH SURFACES FOR ALL CONSTRUCTION AND CONTRACTION JOINTS SHALL BE PROVIDED IN ACCORDANCE WITH THE SPECIFICATIONS. ALL SURFACES REQUIRING AN  OR  FINISH ARE SHOWN ON THE DRAWINGS.

15) CHAMFER

UNLESS OTHERWISE INDICATED, CHAMFER EDGES OF ALL PERMANENTLY EXPOSED CONCRETE SURFACES WITH A 45 DEGREE BEVEL, 3/4 INCH X 3/4 INCH. CHAMFER STRIP MAY NOT BE SHOWN ON THE DESIGN DRAWINGS.

16) JOINTS

ALL CONSTRUCTION JOINTS, CONTRACTION JOINTS AND EXPANSION JOINTS SHALL BE PROVIDED WHERE SHOWN ON THE APPROVED SHOP DRAWINGS. NO OTHER JOINTS SHALL BE INTRODUCED UNLESS APPROVED BY THE ENGINEER.

17) STRUCTURAL STEEL

17a) GENERAL

FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO CURRENT AISC MANUAL OF STEEL CONSTRUCTION.

17b) BOLTED CONNECTIONS

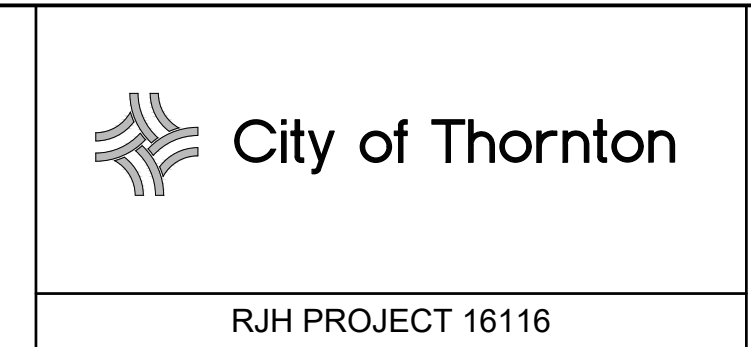
ANCHOR BOLTS, BOLTS AND NUTS SHALL BE ASTM A276 TYPE 316 STAINLESS STEEL. ALL STRUCTURAL BOLTED CONNECTIONS SHALL BE BEARING-TYPE CONNECTIONS.

17c) WELDING

CONFORM TO AWS D1.1. WELDING ELECTRODES FOR PLAIN STRUCTURAL STEEL SHALL BE AWS SERIES E-70. WELDING ELECTRODES FOR GALVANIZED STEEL SHALL BE AWS SERIES E6010 OR E6011.

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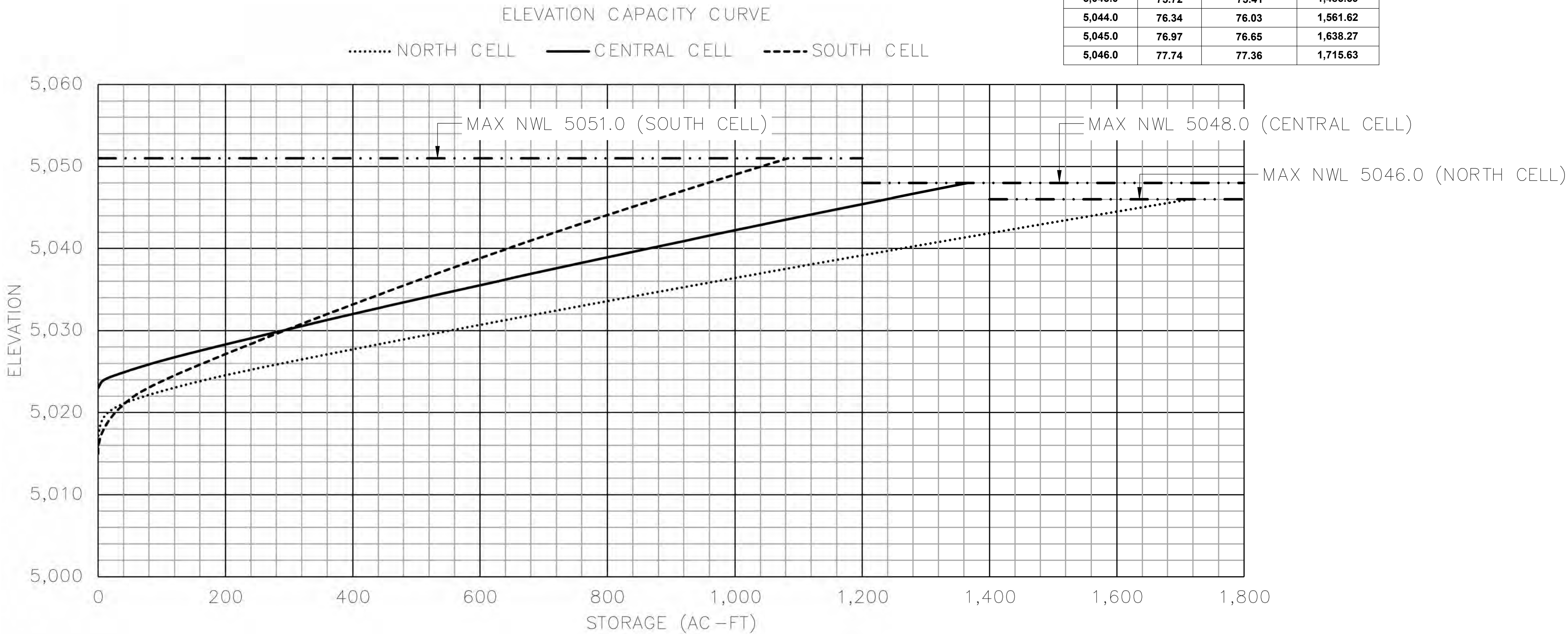
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

STRUCTURAL NOTES

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\GENERAL NOTES AND LEGENDING.DWG 6/14/2021



NORTH CELL			
ELEVATION	AREA (AC)	INCR. VOLUME (AC-FT)	STORAGE (AC-FT)
5,016.0	0.01	0.01	0.01
5,017.0	0.72	0.37	0.38
5,018.0	2.53	1.62	2.00
5,019.0	5.07	3.80	5.80
5,020.0	13.54	9.31	15.11
5,021.0	30.44	21.99	37.10
5,022.0	41.93	36.18	73.28
5,023.0	47.65	44.79	118.07
5,024.0	53.70	50.68	168.75
5,025.0	61.49	57.59	226.34
5,026.0	63.83	62.66	289.00
5,027.0	65.08	64.46	353.46
5,028.0	66.07	65.57	419.03
5,029.0	66.93	66.50	485.53
5,030.0	67.66	67.29	552.82
5,031.0	68.36	68.02	620.84
5,032.0	69.03	68.69	689.53
5,033.0	69.66	69.34	758.87
5,034.0	70.26	69.96	828.83
5,035.0	70.86	70.57	899.40
5,036.0	71.46	71.16	970.56
5,037.0	72.06	71.75	1,042.31
5,038.0	72.66	72.36	1,114.67
5,039.0	73.26	72.96	1,187.63
5,040.0	73.88	73.57	1,261.20
5,041.0	74.49	74.18	1,335.38
5,042.0	75.10	74.80	1,410.18
5,043.0	75.72	75.41	1,485.59
5,044.0	76.34	76.03	1,561.62
5,045.0	76.97	76.65	1,638.27
5,046.0	77.74	77.36	1,715.63

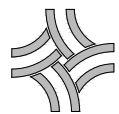
CENTRAL CELL			
ELEVATION	AREA (AC)	INCR. VOLUME (AC-FT)	STORAGE (AC-FT)
5,023.0	0.00	0.00	0.00
5,024.0	28.61	9.54	9.54
5,025.0	39.44	33.88	43.42
5,026.0	45.52	42.45	85.86
5,027.0	49.26	47.38	133.24
5,028.0	52.17	50.71	183.94
5,029.0	53.11	52.64	236.58
5,030.0	54.00	53.56	290.14
5,031.0	54.67	54.34	344.48
5,032.0	55.44	55.06	399.53
5,033.0	56.28	55.86	455.39
5,034.0	56.98	56.63	512.02
5,035.0	57.57	57.28	569.29
5,036.0	58.15	57.86	627.15
5,037.0	58.72	58.43	685.58
5,038.0	59.28	59.00	744.58
5,039.0	59.85	59.57	804.15
5,040.0	60.42	60.13	864.29
5,041.0	61.00	60.71	924.99
5,042.0	61.58	61.29	986.28
5,043.0	62.17	61.88	1,048.16
5,044.0	62.77	62.47	1,110.63
5,045.0	63.38	63.07	1,173.70
5,046.0	64.00	63.69	1,237.39
5,047.0	64.65	64.32	1,301.71
5,048.0	65.30	64.97	1,366.69

SOUTH CELL			
ELEVATION	AREA (AC)	INCR. VOLUME (AC-FT)	STORAGE (AC-FT)
5,015.0	0.00	0.00	0.00
5,016.0	1.98	0.66	0.66
5,017.0	4.23	3.04	3.70
5,018.0	6.36	5.26	8.95
5,019.0	8.85	7.57	16.52
5,020.0	11.54	10.17	26.69
5,021.0	14.80	13.14	39.83
5,022.0	18.77	16.75	56.58
5,023.0	25.42	22.01	78.59
5,024.0	27.67	26.54	105.13
5,025.0	30.08	28.87	134.00
5,026.0	31.01	30.54	164.54
5,027.0	31.59	31.30	195.84
5,028.0	32.17	31.88	227.72
5,029.0	32.58	32.38	260.10
5,030.0	32.98	32.78	292.88
5,031.0	33.38	33.18	326.06
5,032.0	33.85	33.62	359.68
5,033.0	34.25	34.05	393.73
5,034.0	34.65	34.45	428.18
5,035.0	35.06	34.86	463.04
5,036.0	35.48	35.27	498.30
5,037.0	35.90	35.69	533.99
5,038.0	36.36	36.13	570.12
5,039.0	36.83	36.59	606.71
5,040.0	37.30	37.07	643.78
5,041.0	37.78	37.54	681.32
5,042.0	38.26	38.02	719.34
5,043.0	38.75	38.51	757.85
5,044.0	39.24	38.99	796.84
5,045.0	39.74	39.49	836.33
5,046.0	40.25	39.99	876.32
5,047.0	40.75	40.50	916.82
5,048.0	41.27	41.01	957.83
5,049.0	41.79	41.53	999.36
5,050.0	42.34	42.06	1,041.43
5,051.0	42.90	42.62	1,084.05

- NOTES:
- ELEVATION CAPACITY FOR NORTH DAHLIA RESERVOIR IS NOT INCLUDED BECAUSE THE WORK DID NOT MODIFY THE INTERNAL SLOPES AND NO NEW TOPOGRAPHY WAS COLLECTED.
 - NORTH CELL ELEVATION CAPACITY DEVELOPED BY FANSWORTH GROUP BASED ON AERIAL SURVEY.

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City of Thornton

RJH PROJECT 16116

WEST COOLEY RESERVOIR -
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THORNTON, COLORADO

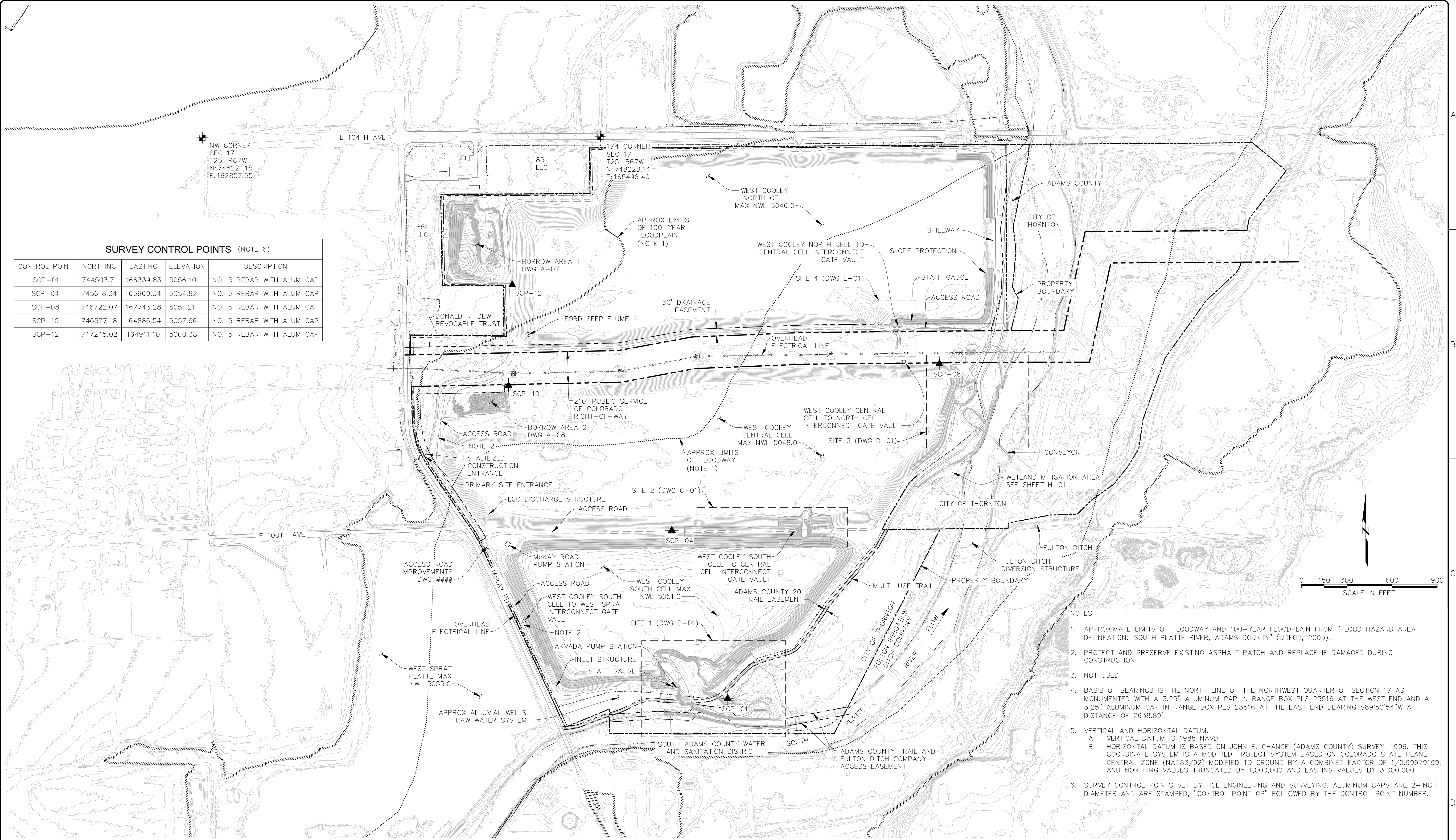
ELEVATION CAPACITY
CURVE

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SURVEY CONTROL POINTS (NOTE 6)				
CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
SCP-01	744503.71	166339.83	5056.10	NO. 5 REBAR WITH ALUM CAP
SCP-04	745618.34	165969.34	5054.82	NO. 5 REBAR WITH ALUM CAP
SCP-08	746722.07	167743.28	5051.21	NO. 5 REBAR WITH ALUM CAP
SCP-10	746577.18	164886.54	5057.96	NO. 5 REBAR WITH ALUM CAP
SCP-12	747245.02	164911.10	5060.38	NO. 5 REBAR WITH ALUM CAP



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					RJH
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WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

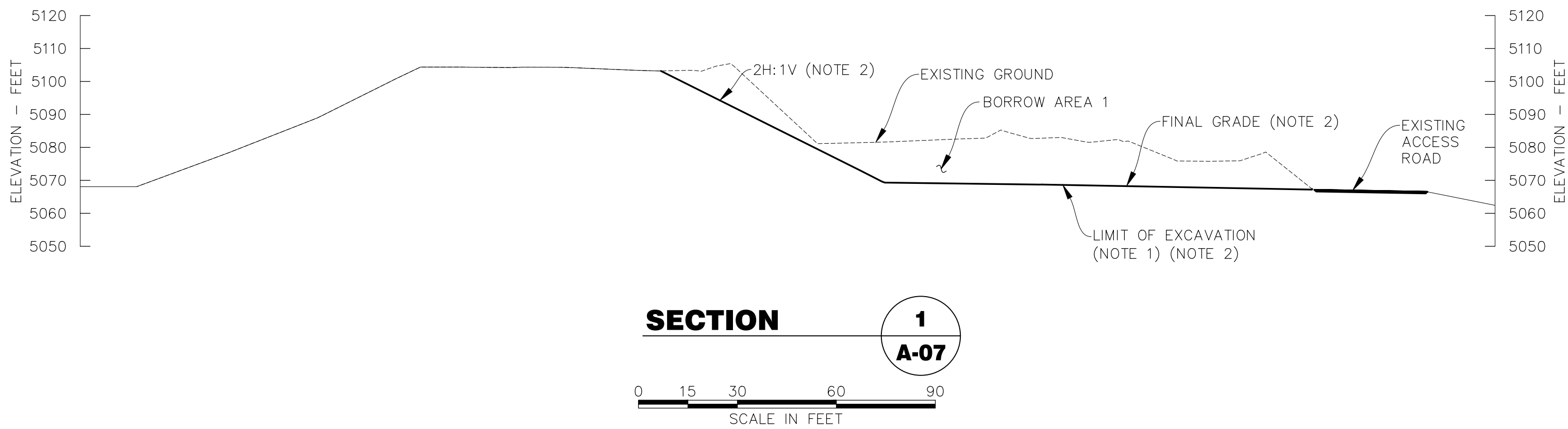
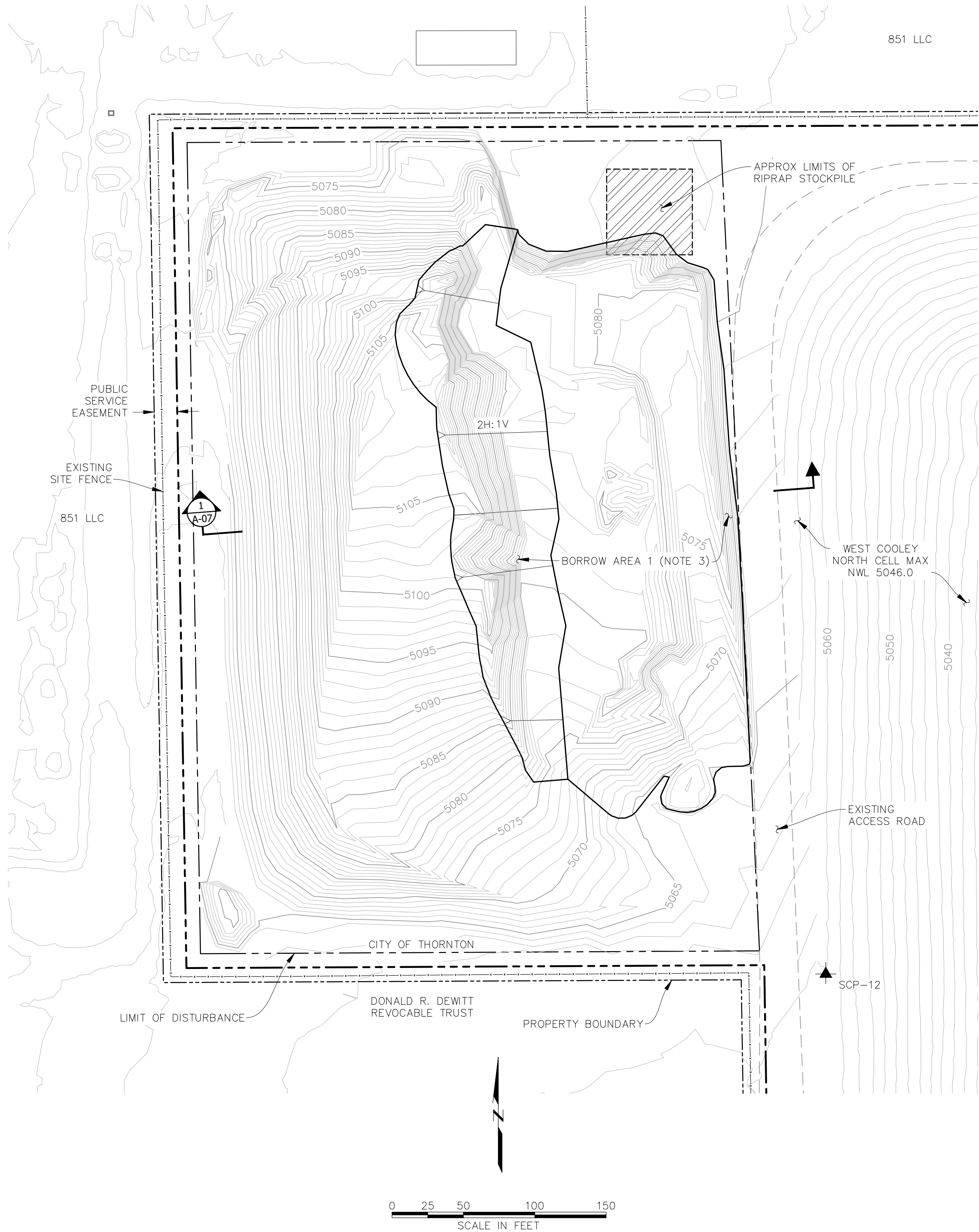
GENERAL PLAN OF
EXISTING CONDITIONS AND
SURVEY CONTROL

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\BORROW AREAS.DWG 6/14/2021

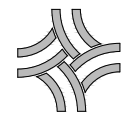


NOTES:

1. GRADE UNIFORMLY TO MATCH EXISTING GRADE AT TOE OF STOCKPILE.
2. LIMIT OF EXCAVATION SHOWN ILLUSTRATES INTENTION OF BORROW AREA FINAL GRADE AND IS EXPECTED TO PRODUCE MATERIAL IN EXCESS OF REQUIRED BORROW. WHERE POSSIBLE AND IN ACCORDANCE WITH SPECIFICATIONS, UTILIZE MATERIAL FROM REQUIRED EXCAVATIONS FOR FILL AND BACKFILL PRIOR TO USING MATERIAL FROM BORROW AREA.
3. MATERIAL FROM BORROW AREA 1 IS BEING ACQUIRED FOR USE ON OTHER THORNTON PROJECTS. CONFIRM TOPOGRAPHY DURING BIDDING AND AT START OF CONSTRUCTION.

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City of Thornton

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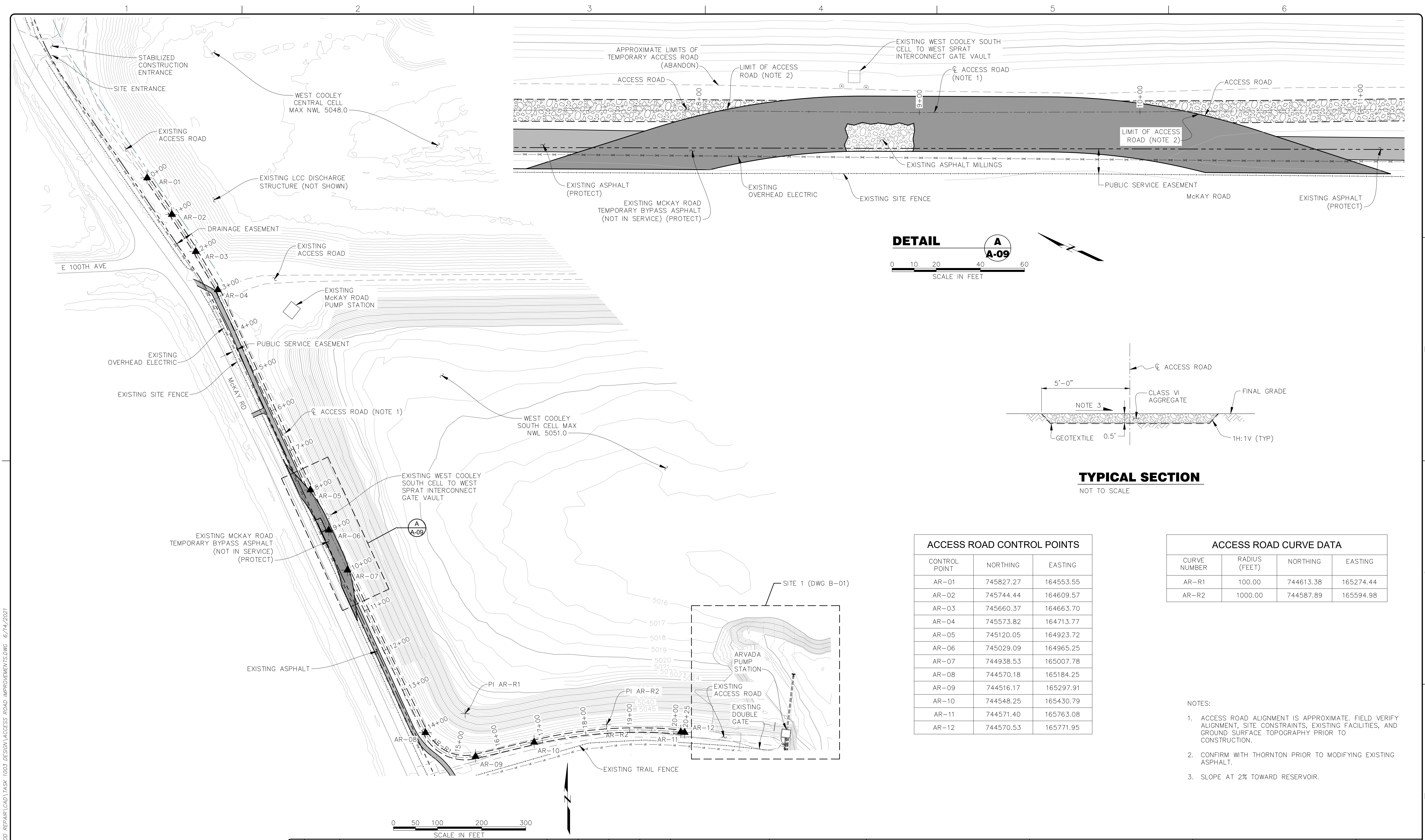
BORROW AREA 1 -
PLAN OF EXISTING
CONDITIONS

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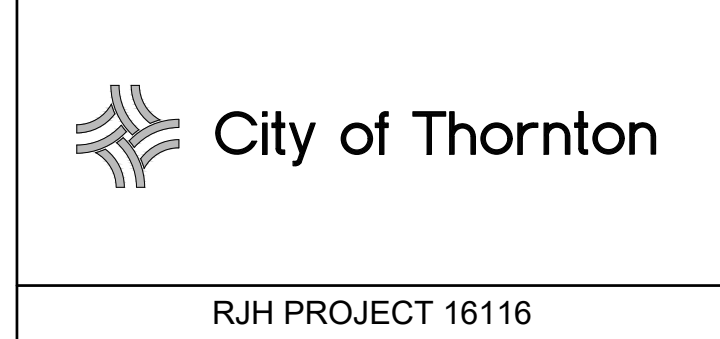
RJH PROJECT 16116

P:\16116 - W COOLEY FLOOD REPAIR\ROAD\TASK 1003 DESIGN\ACCESS ROAD IMPROVEMENTS.DWG 6/14/2021



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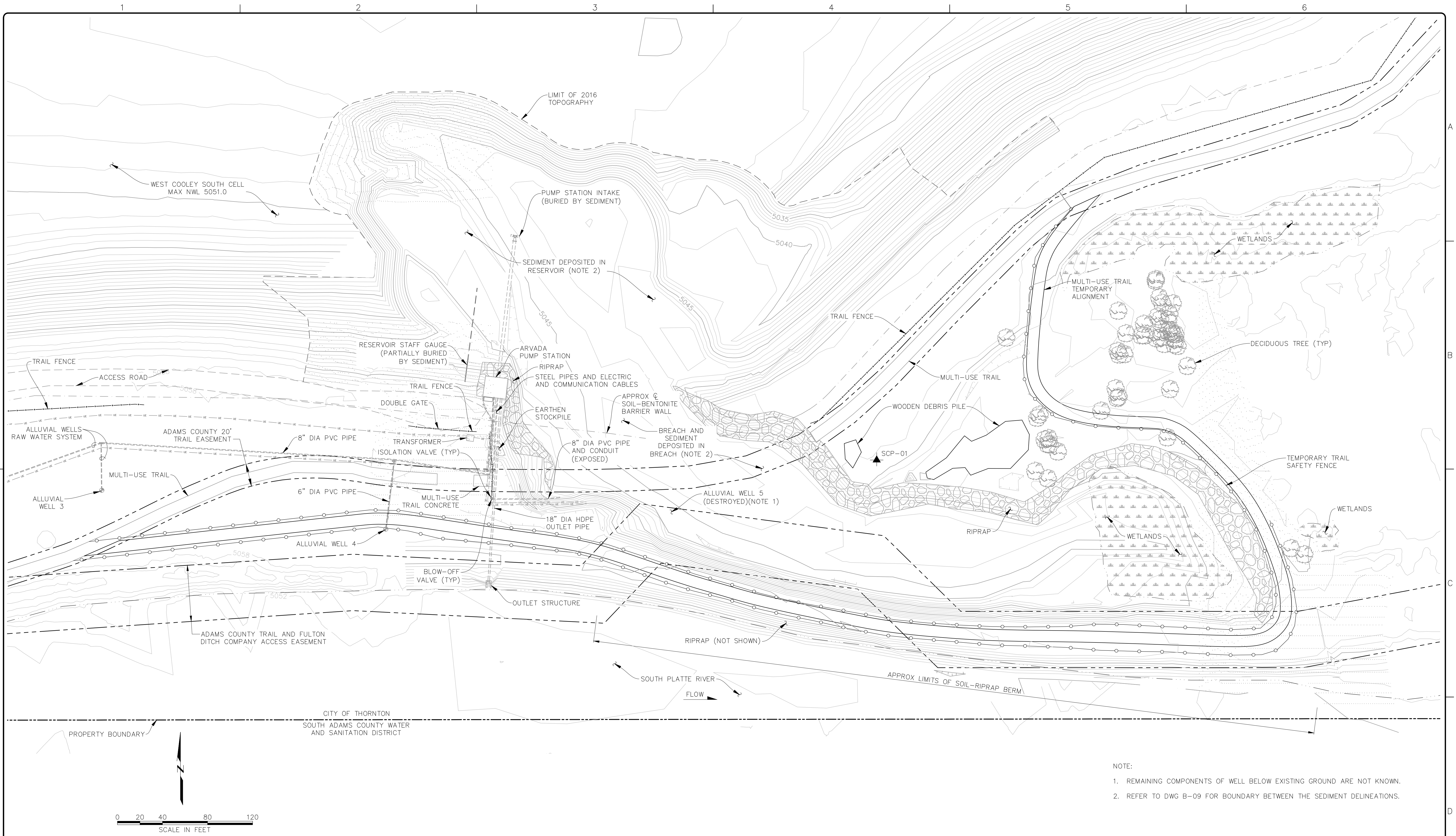
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

ACCESS ROAD
IMPROVEMENTS

DWG. NO.
A-09
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RJH PROJECT 16116

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 1 - PLAN OF EXISTING CONDITIONS.DWG 6/14/2021



- NOTE:
1. REMAINING COMPONENTS OF WELL BELOW EXISTING GROUND ARE NOT KNOWN.
 2. REFER TO DWG B-09 FOR BOUNDARY BETWEEN THE SEDIMENT DELINEATIONS.

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City of Thornton

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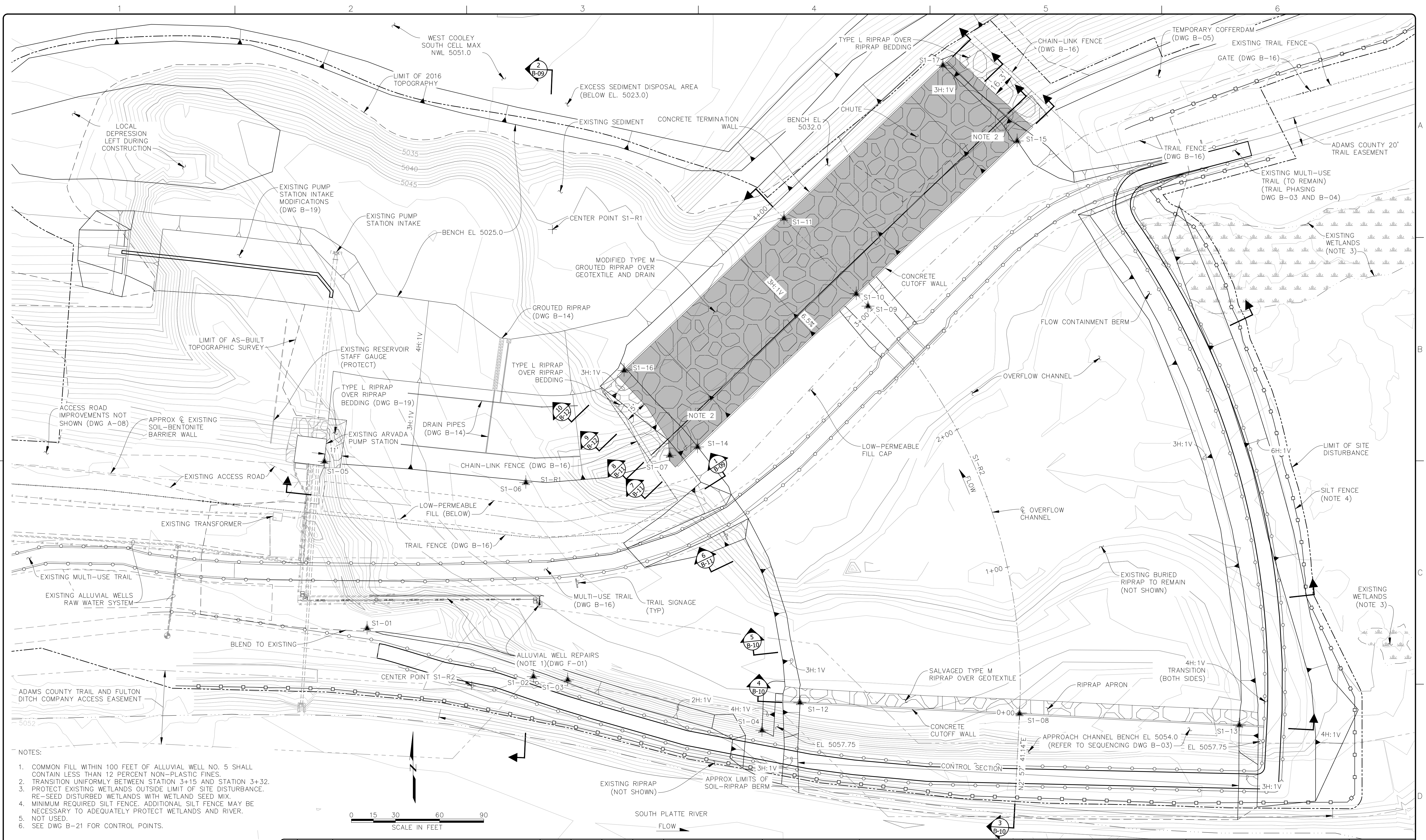
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - PLAN OF EXISTING
CONDITIONS

DWG. NO.
B-01

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 1 - PLAN OF MODS.DWG 6/14/2021



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2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

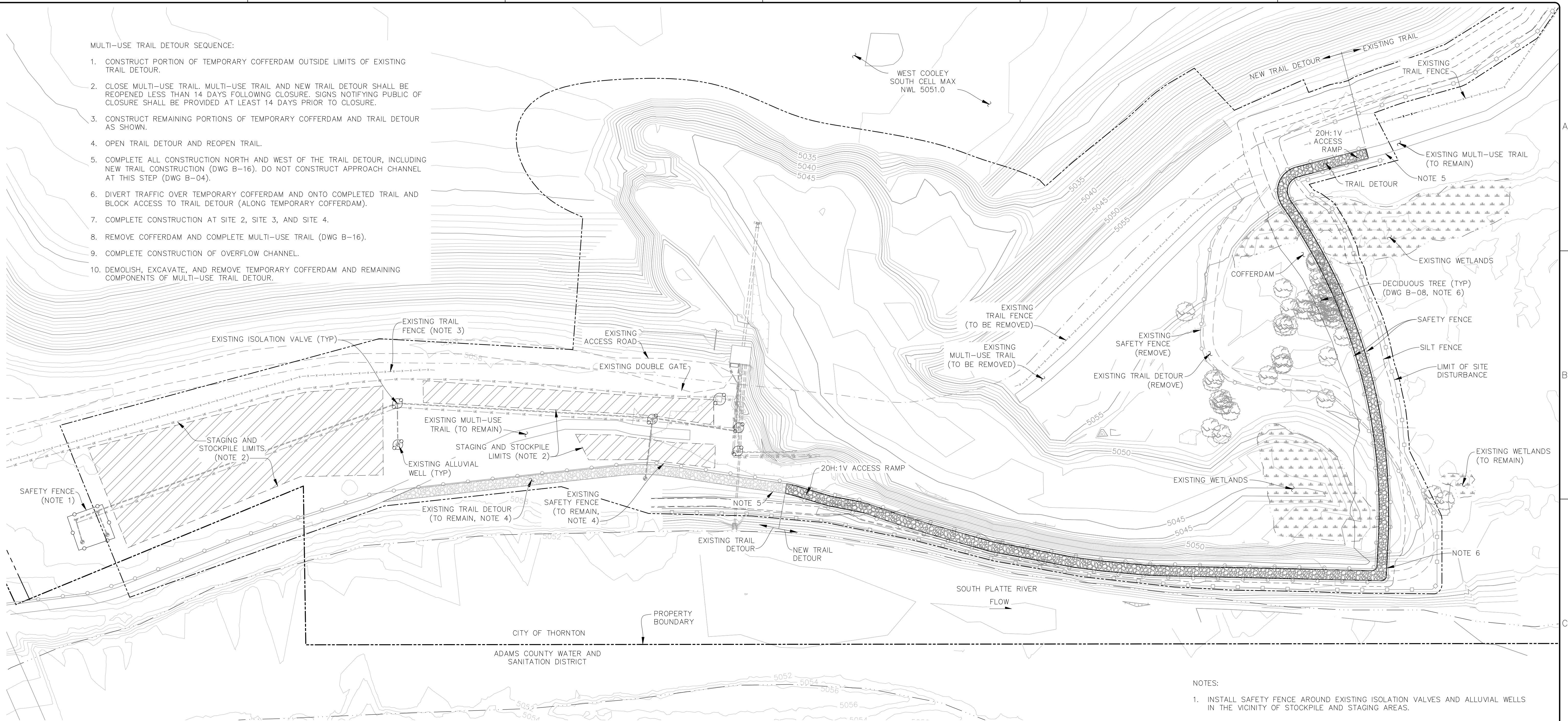
SITE 1 - PLAN OF
MODIFICATIONS

DWG. NO.
B-02
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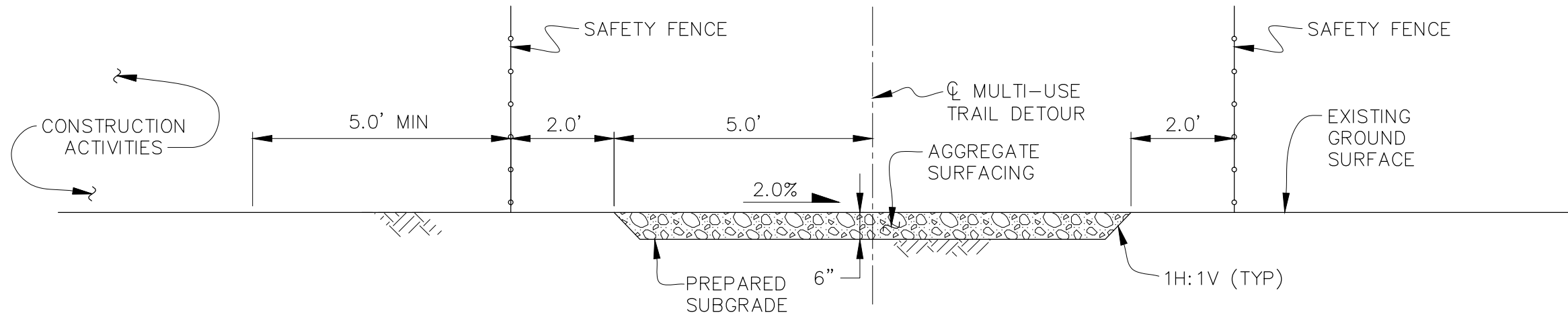
P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 1 - PHASING LDWG 6/14/2021

MULTI-USE TRAIL DETOUR SEQUENCE:

1. CONSTRUCT PORTION OF TEMPORARY COFFERDAM OUTSIDE LIMITS OF EXISTING TRAIL DETOUR.
2. CLOSE MULTI-USE TRAIL. MULTI-USE TRAIL AND NEW TRAIL DETOUR SHALL BE REOPENED LESS THAN 14 DAYS FOLLOWING CLOSURE. SIGNS NOTIFYING PUBLIC OF CLOSURE SHALL BE PROVIDED AT LEAST 14 DAYS PRIOR TO CLOSURE.
3. CONSTRUCT REMAINING PORTIONS OF TEMPORARY COFFERDAM AND TRAIL DETOUR AS SHOWN.
4. OPEN TRAIL DETOUR AND REOPEN TRAIL.
5. COMPLETE ALL CONSTRUCTION NORTH AND WEST OF THE TRAIL DETOUR, INCLUDING NEW TRAIL CONSTRUCTION (DWG B-16). DO NOT CONSTRUCT APPROACH CHANNEL AT THIS STEP (DWG B-04).
6. DIVERT TRAFFIC OVER TEMPORARY COFFERDAM AND ONTO COMPLETED TRAIL AND BLOCK ACCESS TO TRAIL DETOUR (ALONG TEMPORARY COFFERDAM).
7. COMPLETE CONSTRUCTION AT SITE 2, SITE 3, AND SITE 4.
8. REMOVE COFFERDAM AND COMPLETE MULTI-USE TRAIL (DWG B-16).
9. COMPLETE CONSTRUCTION OF OVERFLOW CHANNEL.
10. DEMOLISH, EXCAVATE, AND REMOVE TEMPORARY COFFERDAM AND REMAINING COMPONENTS OF MULTI-USE TRAIL DETOUR.



- NOTES:
1. INSTALL SAFETY FENCE AROUND EXISTING ISOLATION VALVES AND ALLUVIAL WELLS IN THE VICINITY OF STOCKPILE AND STAGING AREAS.
 2. STOCKPILES SHALL BE SETBACK 10 FEET FROM PROPERTY LINES AND SITE FENCE AND 15 FEET FROM EXISTING ISOLATION VALVES AND ALLUVIAL WELLS.
 3. REMOVE EXISTING TRAIL FENCE ALONG NORTH EDGE OF STOCKPILE AREA TO ALLOW ACCESS DURING CONSTRUCTION. REPLACE IN-KIND AT THE END OF CONSTRUCTION.
 4. MAINTAIN MULTI-USE TRAIL DETOUR AND SAFETY FENCE THROUGHOUT CONSTRUCTION UNTIL REMOVAL. SEE SEQUENCE THIS SHEET.
 5. TRAFFIC CONTROL PLAN SHALL INCLUDE DISMOUNT ZONE SIGNS AT ACCESS RAMP TO COFFERDAM.
 6. COORDINATE LOCATION OF COFFERDAM AND TRAIL TO PERMIT CONSTRUCTION OF OVERFLOW CHANNEL CONCRETE CUTOFF WALL (DWG B-10).



TYPICAL SECTION
MULTI-USE TRAIL DETOUR
NOT TO SCALE



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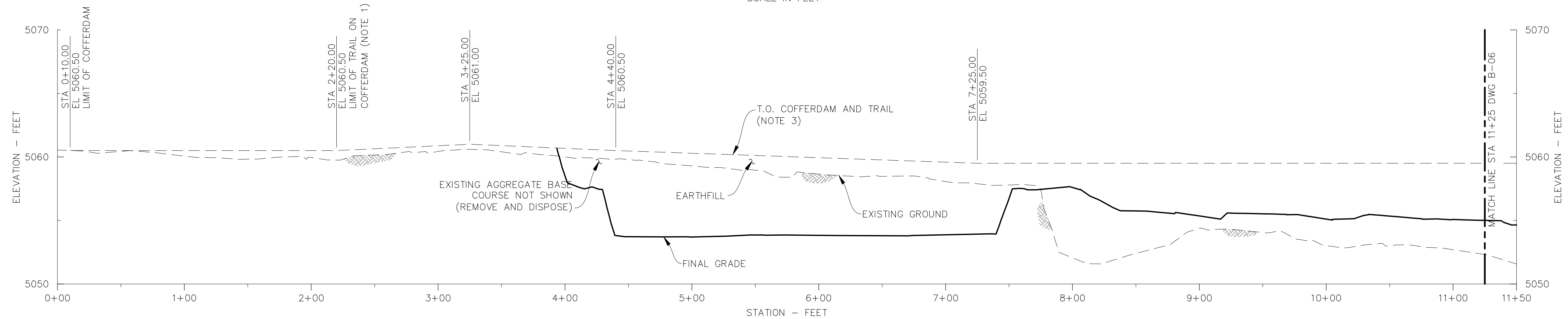
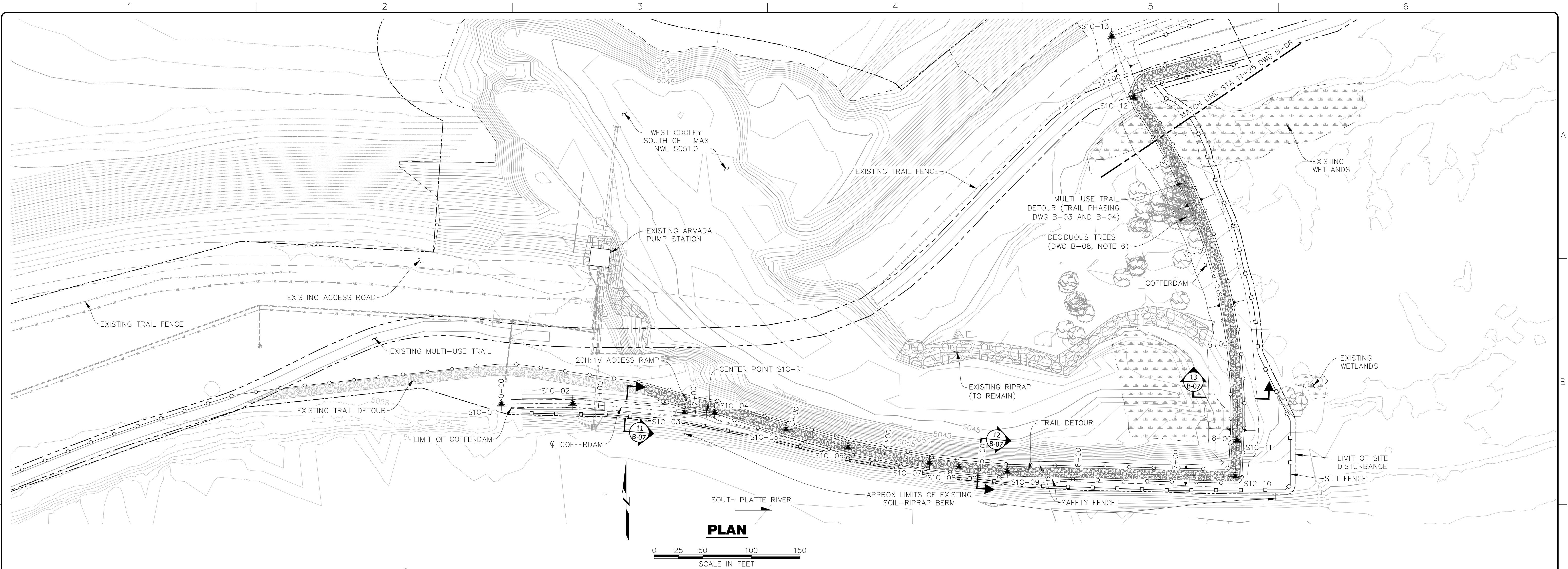
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - PHASE I TRAIL
DETOUR, STAGING AND
STOCKPILING

DWG. NO.
B-03

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1005\SITE 1 - COFFERDAM PLAN AND PROFILE.DWG 6/14/2021



NOTES:

1. TRANSITION CREST WIDTH AND SIDE SLOPES BETWEEN STATION 2+10 AND 2+20.
2. DO NOT DISTURB TREES OUTSIDE LIMIT OF COFFERDAM.
3. TEMPORARY COFFERDAM REMOVED AT PROJECT COMPLETION.

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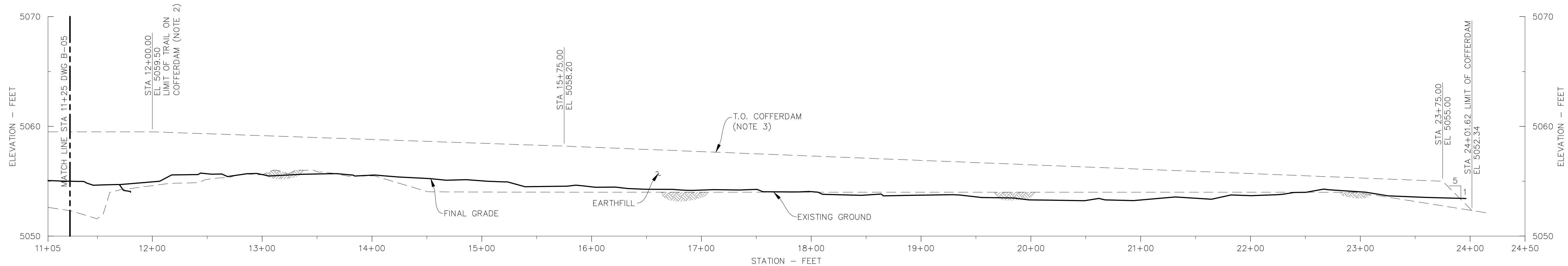
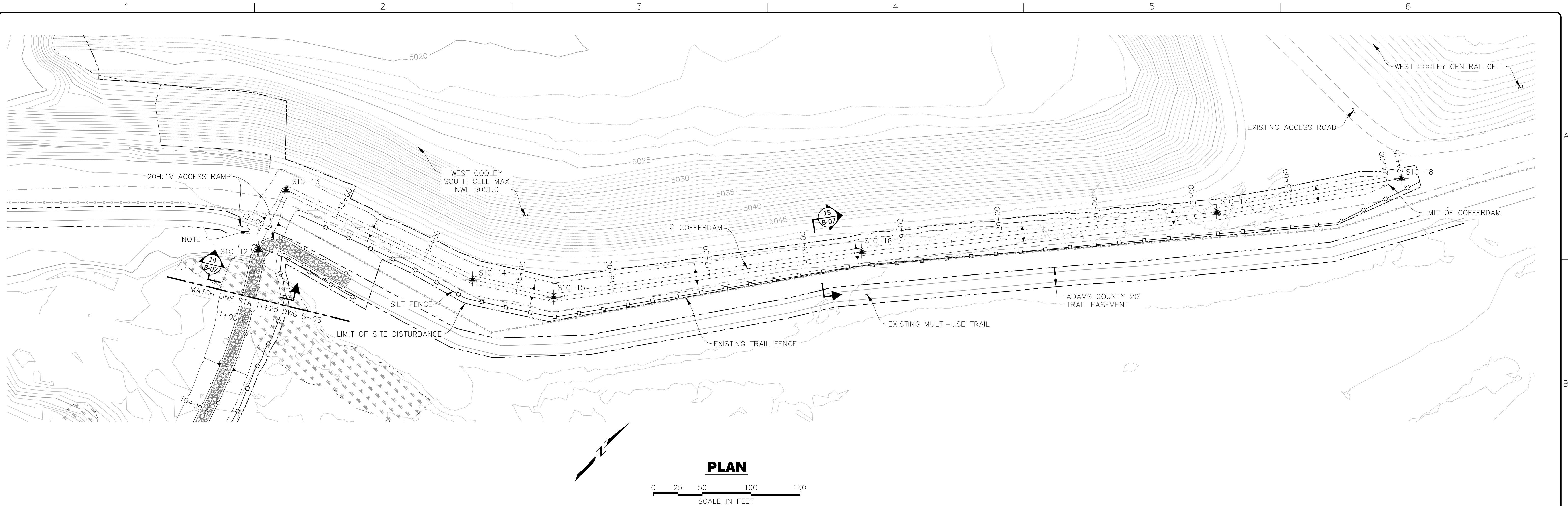
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - COFFERDAM
PLAN AND PROFILE
(1 OF 2)

DWG. NO.
B-05

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1005\SITE 1 - COFFERDAM PLAN AND PROFILE.DWG 6/14/2021



- NOTES:
- SAWCUT, DEMOLISH, AND DISPOSE OF EXISTING MULTI-USE TRAIL AND FENCE BELOW COFFERDAM.
 - TRANSITION CREST WIDTH BETWEEN STATION 12+10 AND 12+20.
 - TEMPORARY COFFERDAM REMOVED AT PROJECT COMPLETION.

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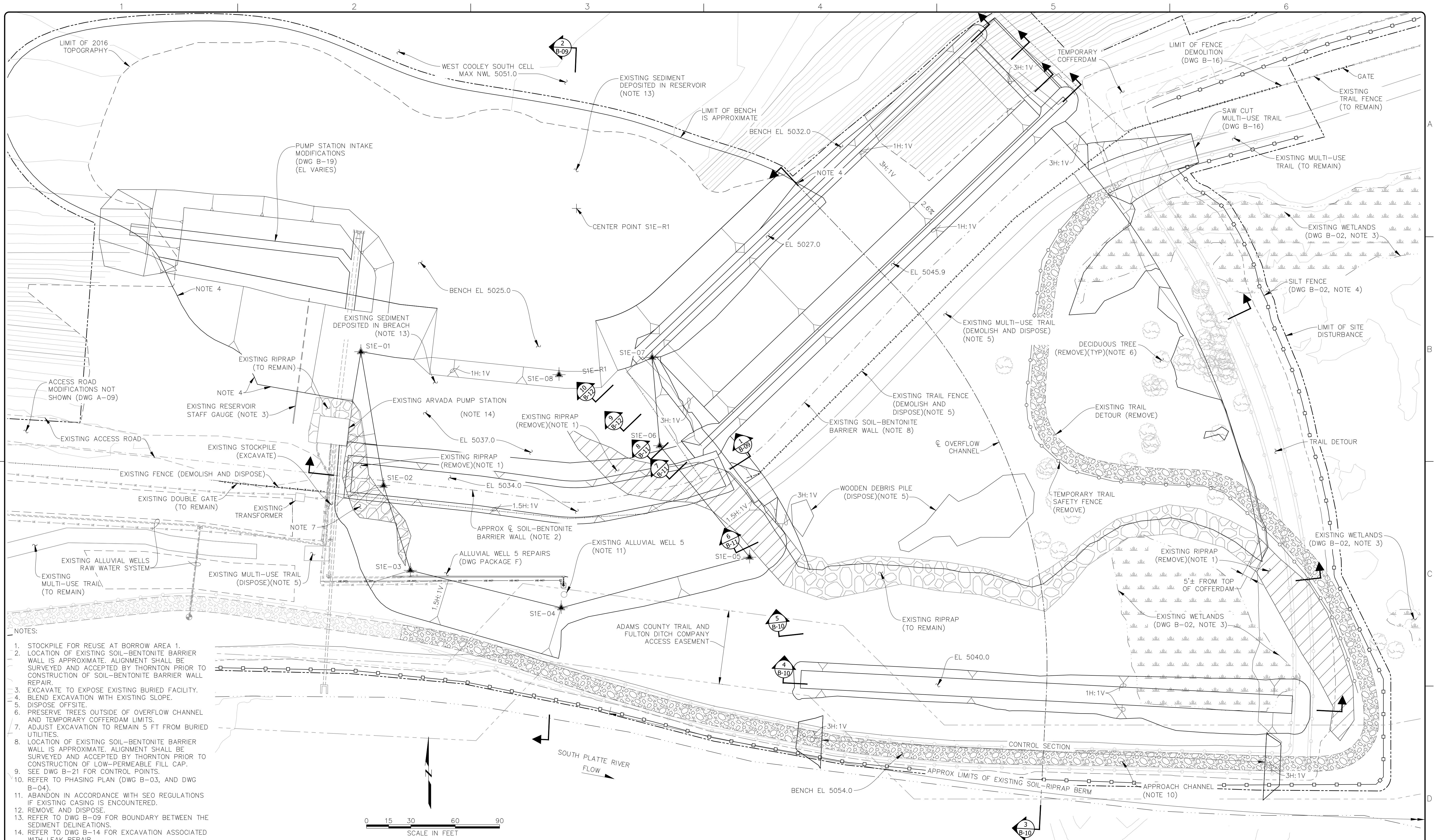
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - COFFERDAM
PLAN AND PROFILE
(2 OF 2)

DWG. NO.
B-06

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 1 - EXCAVATION PLAN.DWG 6/14/2021



- NOTES:
1. STOCKPILE FOR REUSE AT BORROW AREA 1.
 2. LOCATION OF EXISTING SOIL-BENTONITE BARRIER WALL IS APPROXIMATE. ALIGNMENT SHALL BE SURVEYED AND ACCEPTED BY THORNTON PRIOR TO CONSTRUCTION OF SOIL-BENTONITE BARRIER WALL REPAIR.
 3. EXCAVATE TO EXPOSE EXISTING BURIED FACILITY.
 4. BLEND EXCAVATION WITH EXISTING SLOPE.
 5. DISPOSE OFFSITE.
 6. PRESERVE TREES OUTSIDE OF OVERFLOW CHANNEL AND TEMPORARY COFFERDAM LIMITS.
 7. ADJUST EXCAVATION TO REMAIN 5 FT FROM BURIED UTILITIES.
 8. LOCATION OF EXISTING SOIL-BENTONITE BARRIER WALL IS APPROXIMATE. ALIGNMENT SHALL BE SURVEYED AND ACCEPTED BY THORNTON PRIOR TO CONSTRUCTION OF LOW-PERMEABLE FILL CAP.
 9. SEE DWG B-21 FOR CONTROL POINTS.
 10. REFER TO PHASING PLAN (DWG B-03, AND DWG B-04).
 11. ABANDON IN ACCORDANCE WITH SEO REGULATIONS IF EXISTING CASING IS ENCOUNTERED.
 12. REMOVE AND DISPOSE.
 13. REFER TO DWG B-09 FOR BOUNDARY BETWEEN THE SEDIMENT DELINEATIONS.
 14. REFER TO DWG B-14 FOR EXCAVATION ASSOCIATED WITH LEAK REPAIR.

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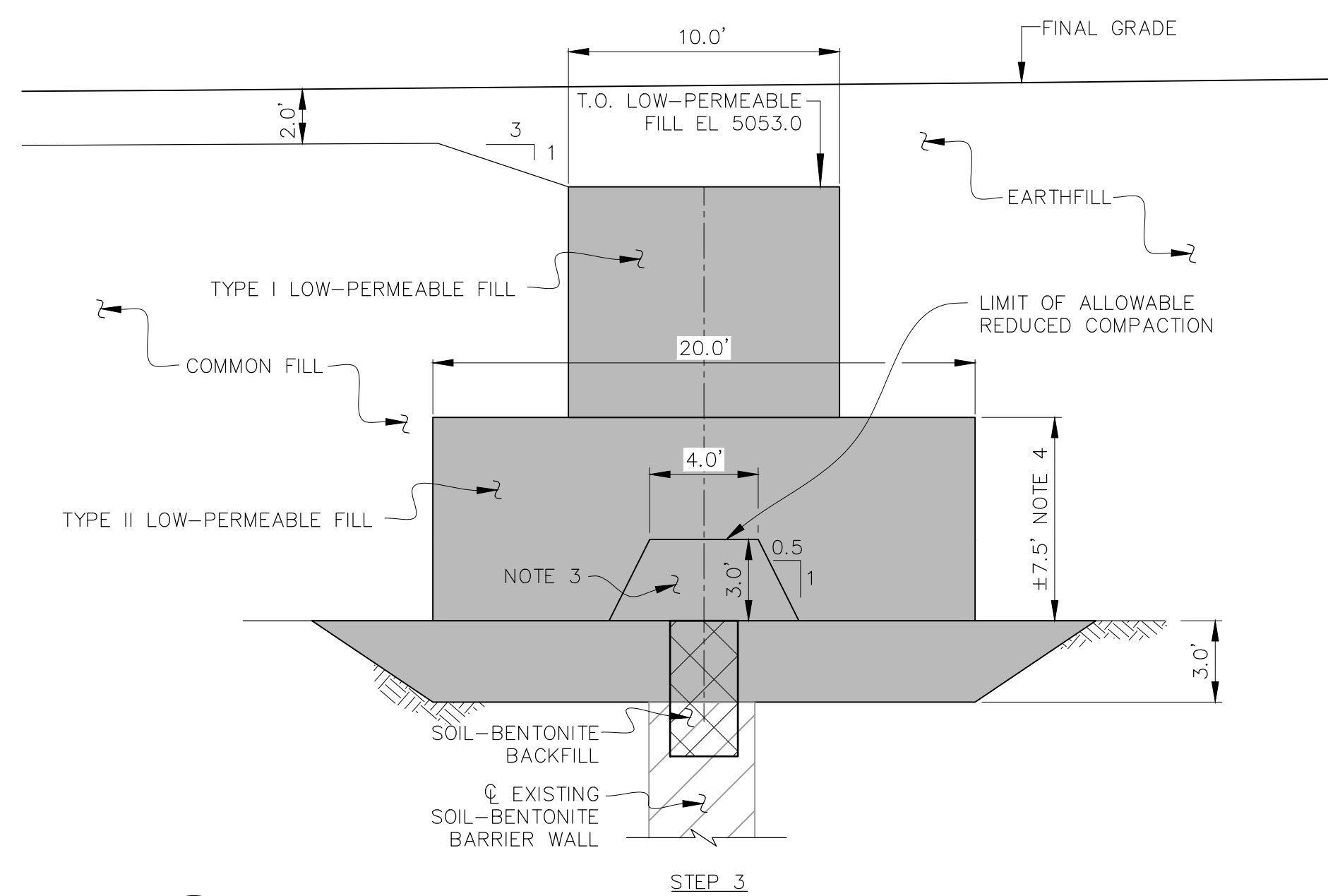
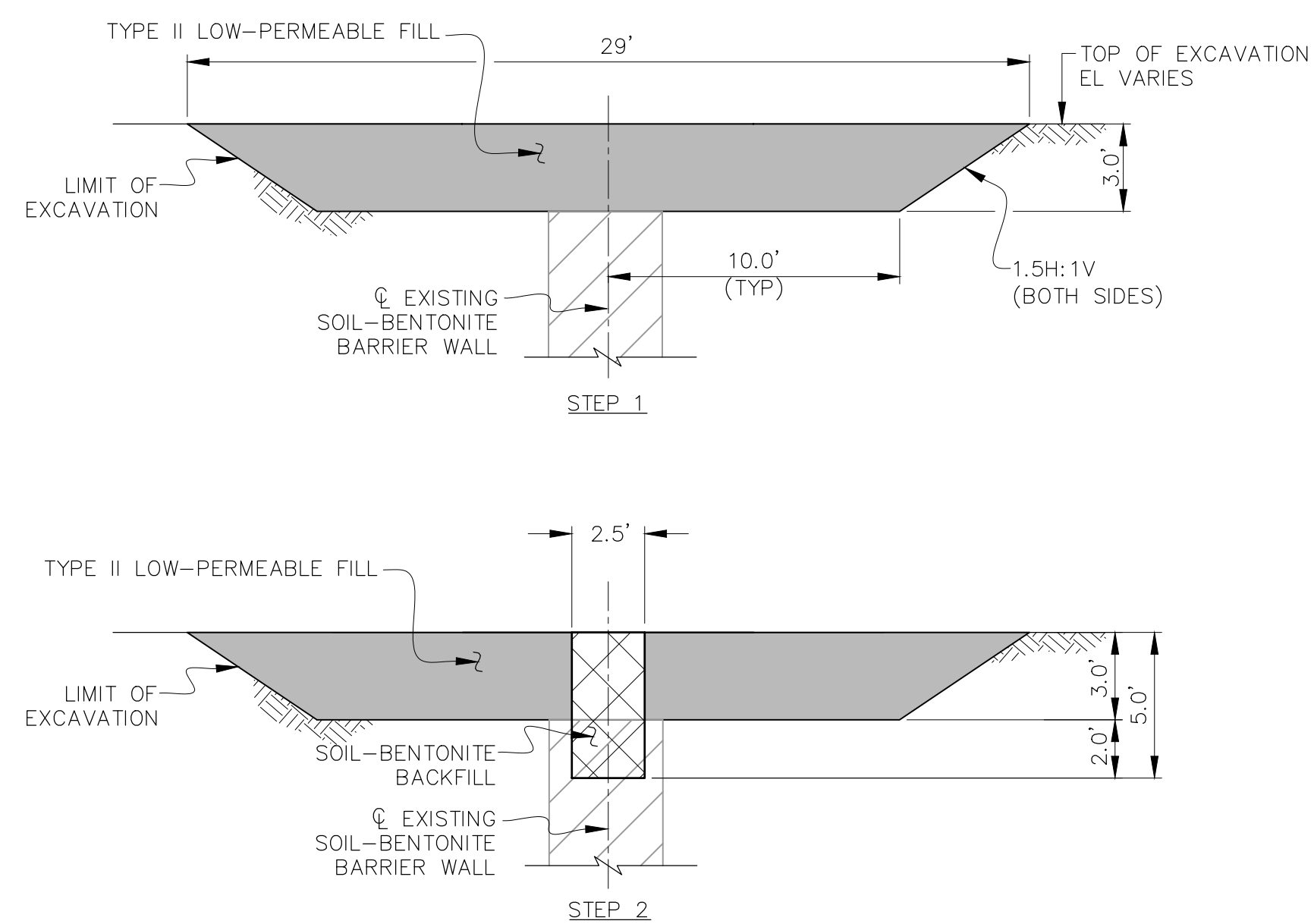
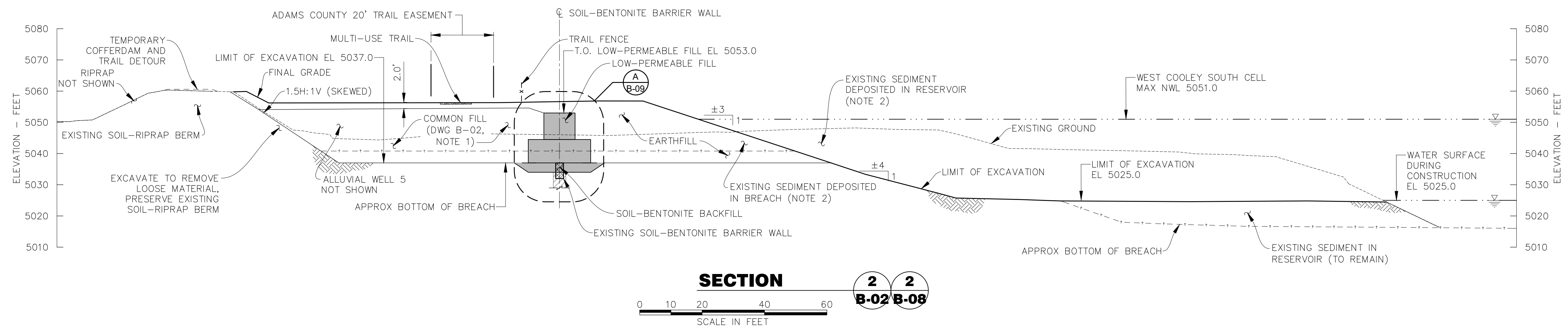
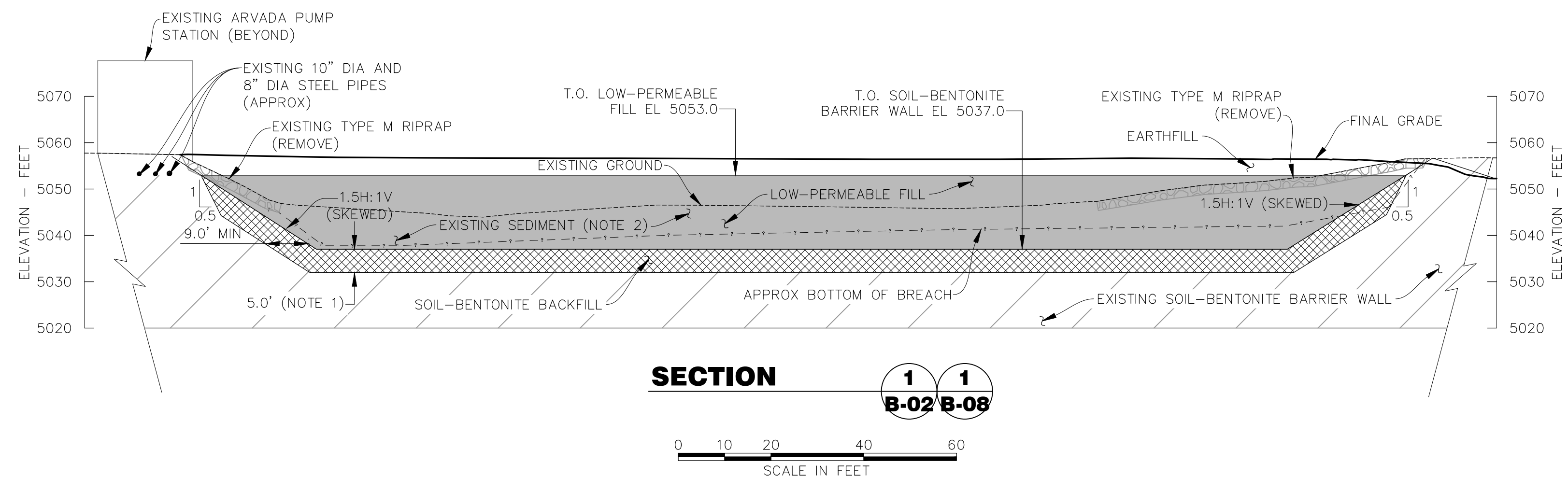
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WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - EXCAVATION PLAN

DWG. NO.
B-08

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SOIL-BENTONITE BARRIER WALL REPAIR INSTALLATION SEQUENCE:

1. EXCAVATE SEDIMENT AS SHOWN ON THE SITE 1 EXCAVATION PLAN. PLACE LOW-PERMEABLE FILL AS SHOWN.
2. EXCAVATE THROUGH LOW-PERMEABLE FILL AND INTO EXISTING SOIL-BENTONITE BARRIER WALL. EXCAVATION MUST OVERLAP EXISTING BARRIER WALL BY MINIMUM OF 2 VERTICAL FEET. BACKFILL TRENCH WITH SOIL-BENTONITE BACKFILL.
3. PLACE LOW-PERMEABILITY FILL TO ELEVATION 5053.0.

NOTES:

1. EXCAVATE TOP 5.0 FEET OF EXISTING SOIL-BENTONITE BARRIER WALL.
2. SEDIMENT DEPOSITED DURING FLOOD EVENT, CONCRETE AND MISCELLANEOUS DEBRIS COULD BE LOCATED WITHIN SEDIMENT, EXCAVATE AND STOCKPILE SEDIMENT FOR USE AS COMMON FILL AND DISPOSE OF CONCRETE AND MISCELLANEOUS DEBRIS. LIMITS OF EXISTING SEDIMENT MAY VARY FROM THOSE SHOWN.
3. COMPACT LOW-PERMEABLE FILL DIRECTLY ABOVE AND ALONG SOIL-BENTONITE BARRIER WALL NOT LESS THAN 92-PERCENT RELATIVE COMPACTION.
4. UTILIZE ALL ACCEPTABLE TYPE II LOW-PERMEABLE FILL BEFORE PLACING TYPE I LOW-PERMEABLE FILL.

DETAIL

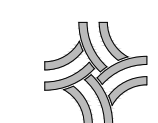
A
B-09

0 2.5 5 10 15

SCALE IN FEET

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City of Thornton

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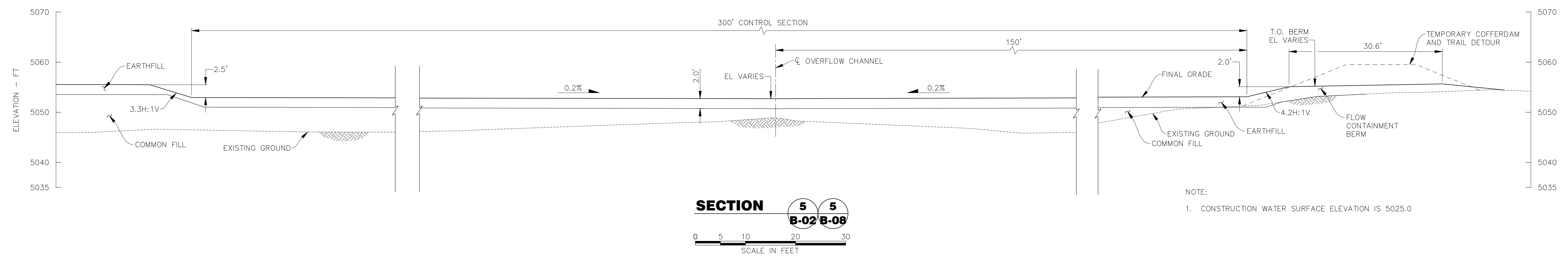
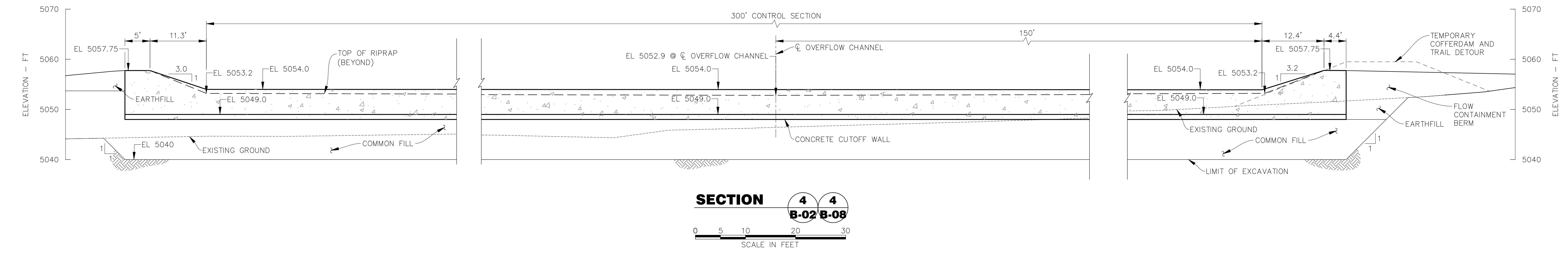
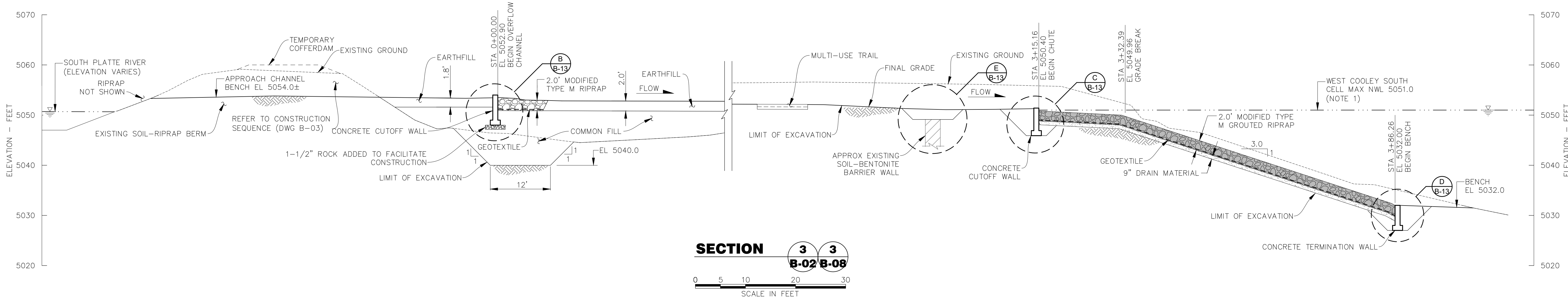
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - REPAIR SECTIONS AND DETAILS

DWG. NO.
B-09

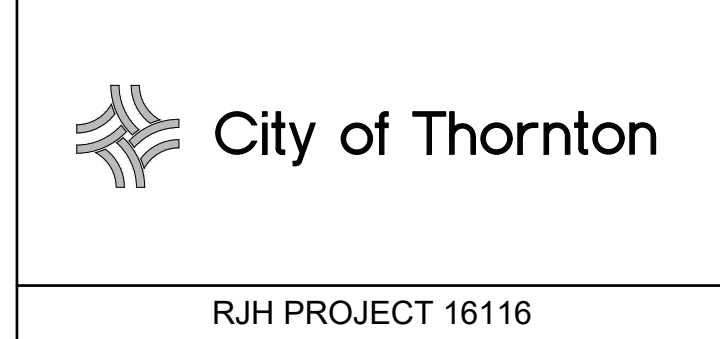
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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK
					RJH
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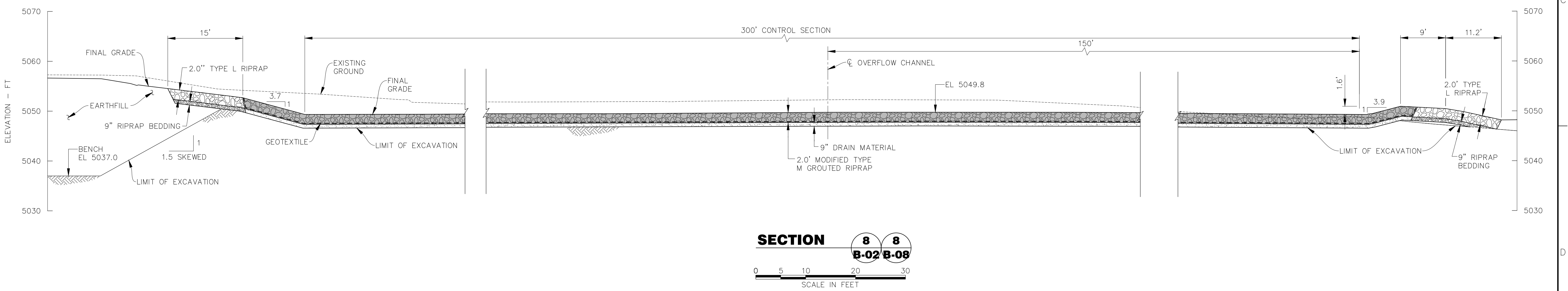
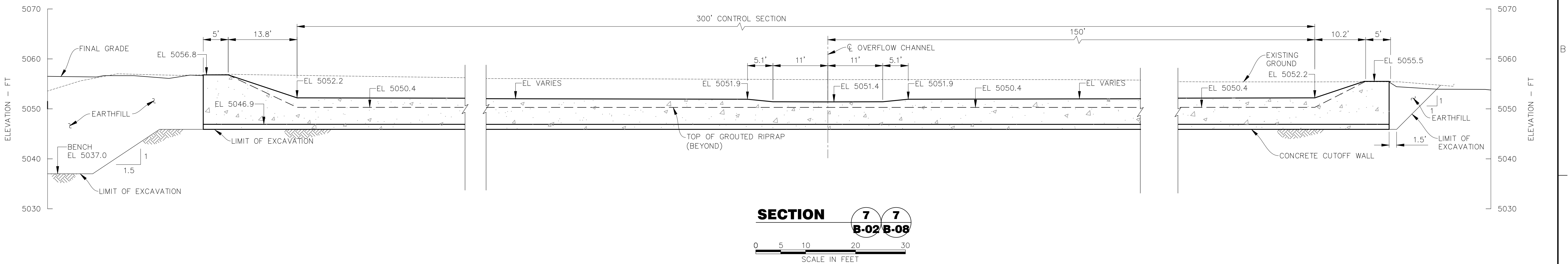
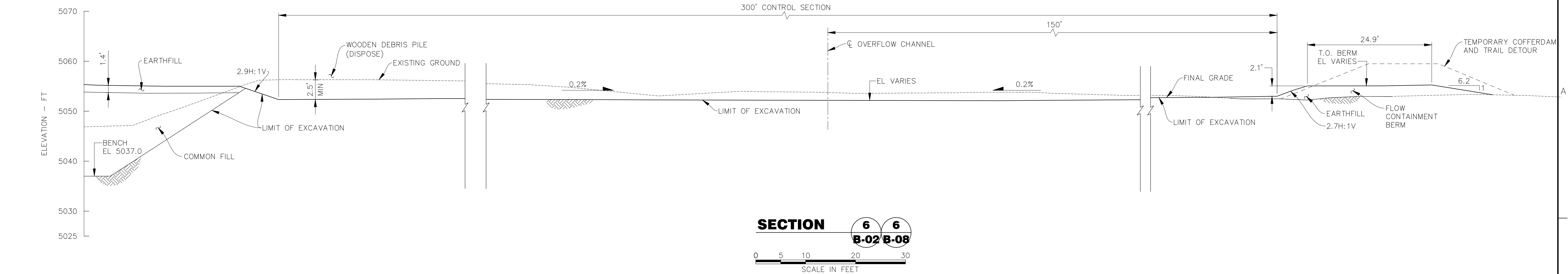


WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - OVERFLOW
CHANNEL SECTIONS
(1 OF 3)

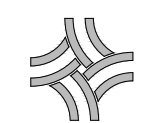
DWG. NO.
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2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

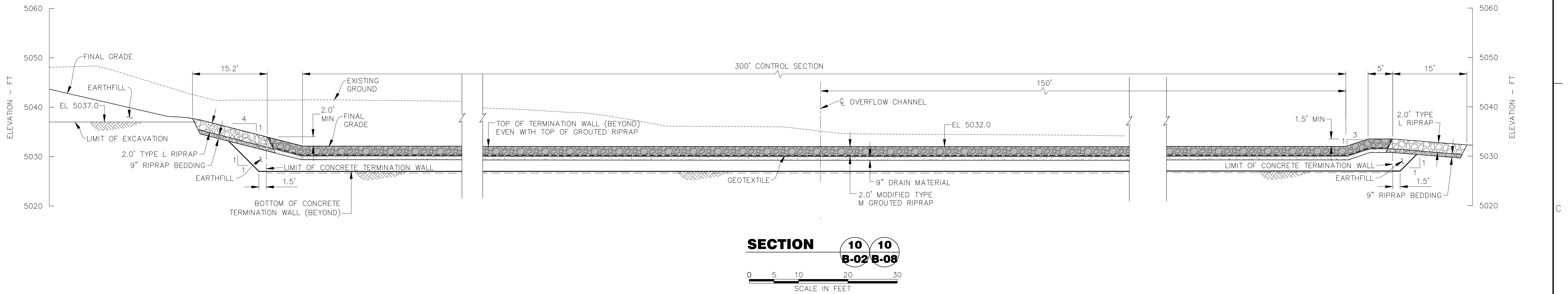
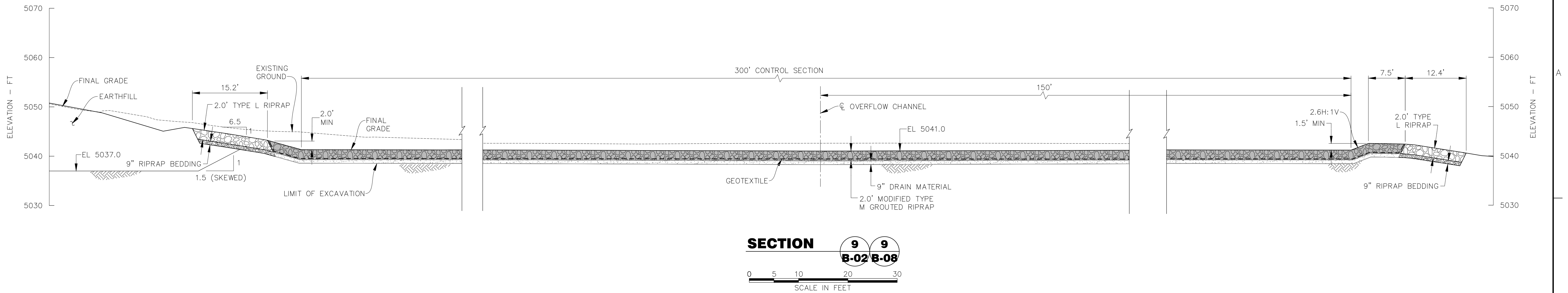
SITE 1 - OVERFLOW
CHANNEL SECTIONS
(2 OF 3)

DWG. NO.
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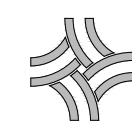
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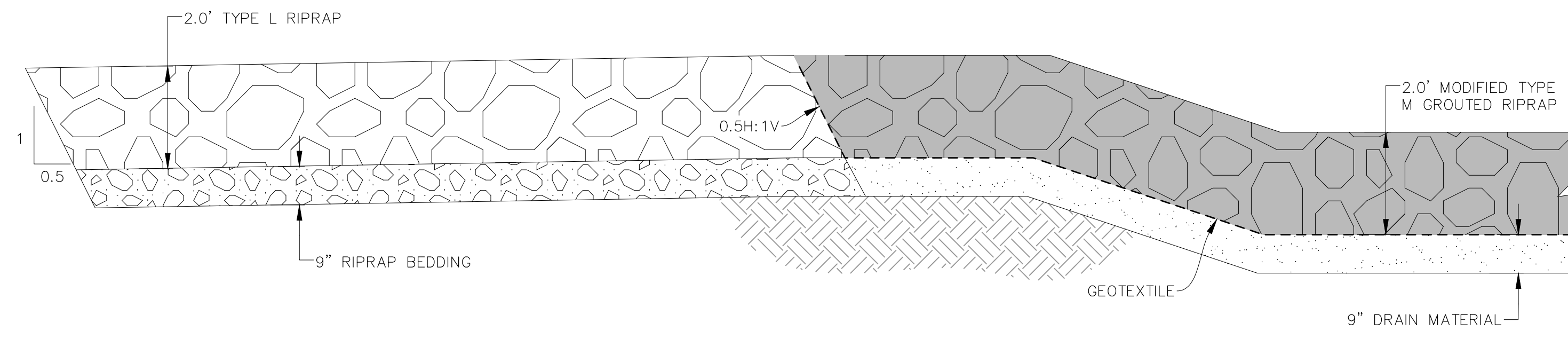
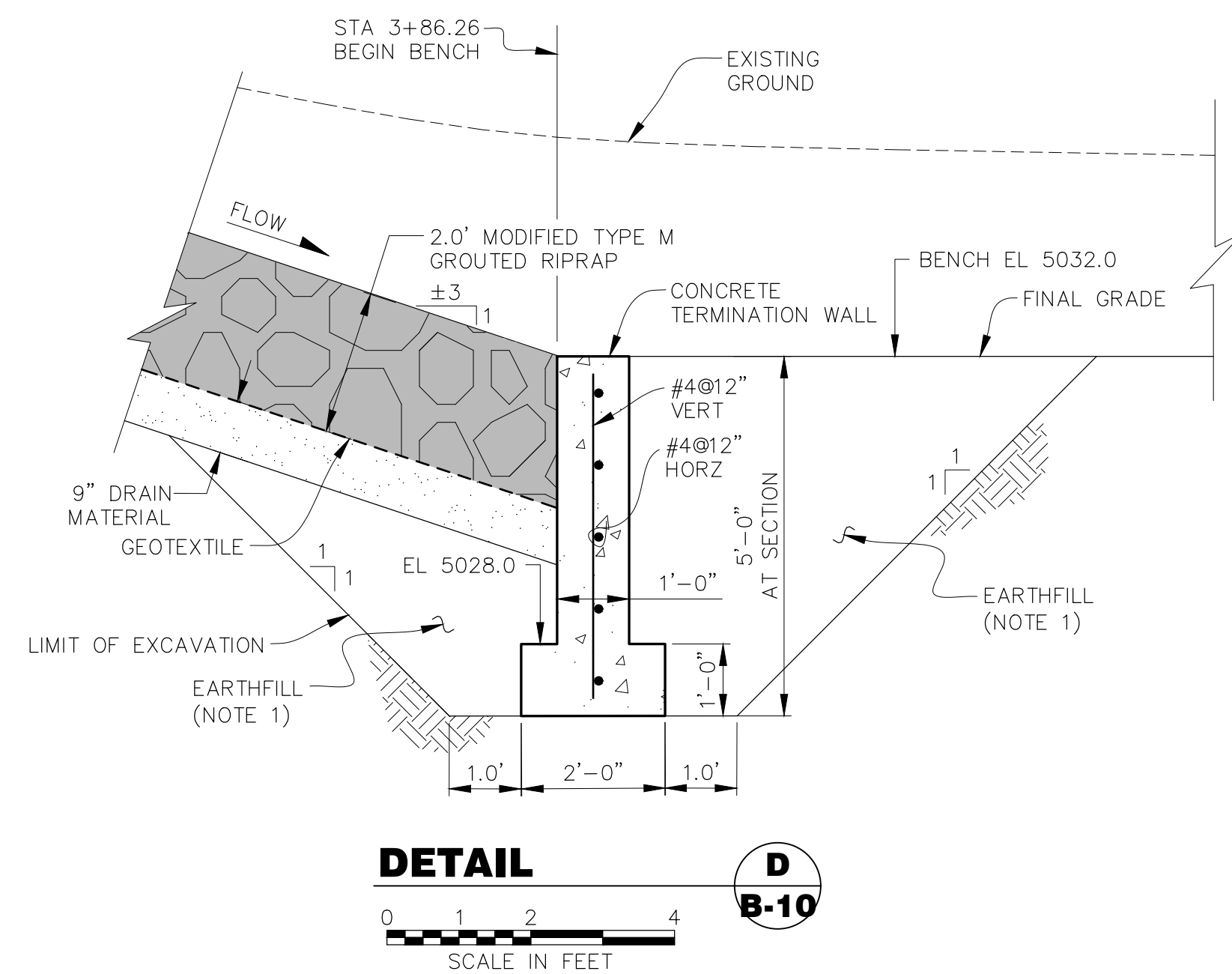
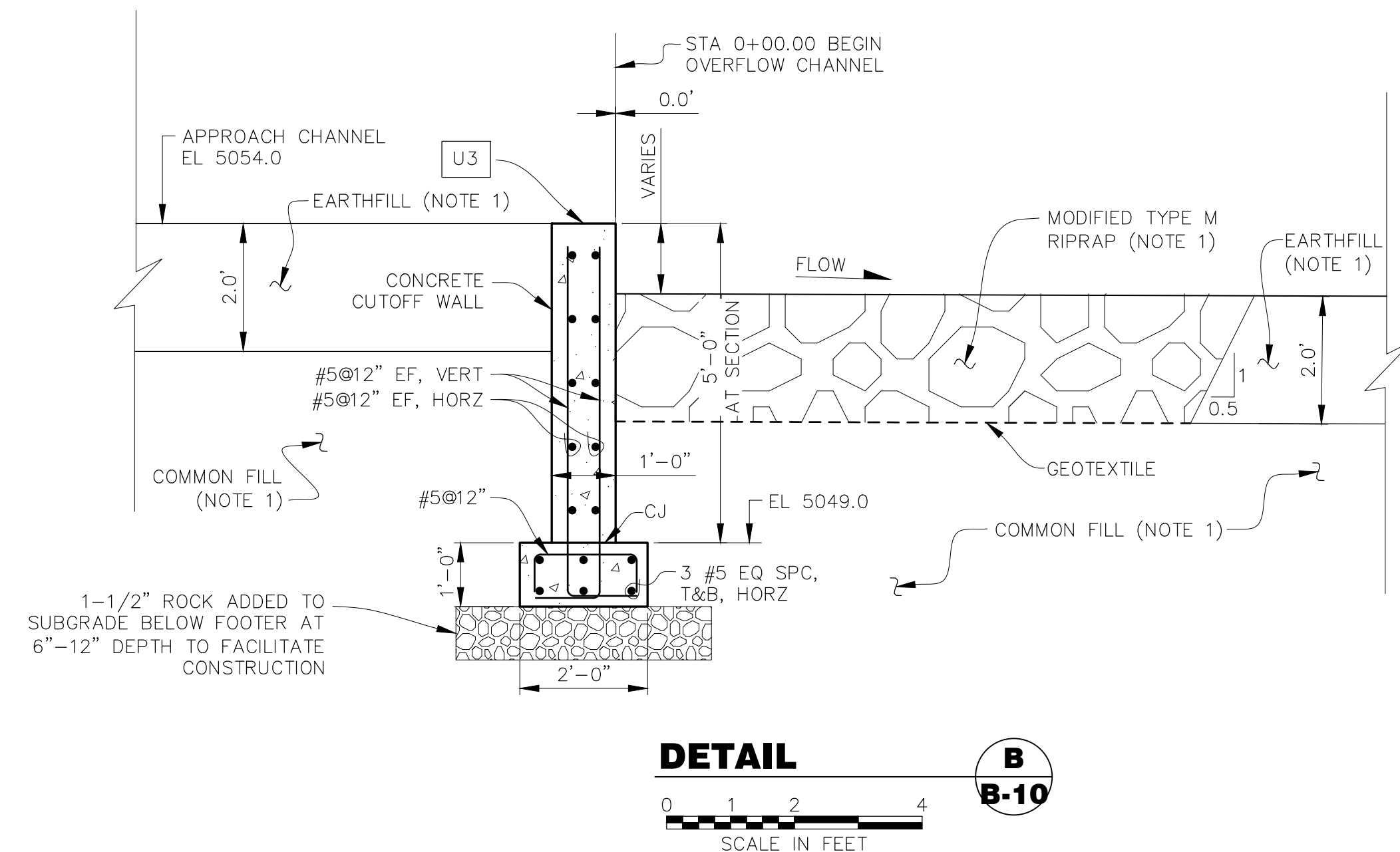
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THORNTON, COLORADO

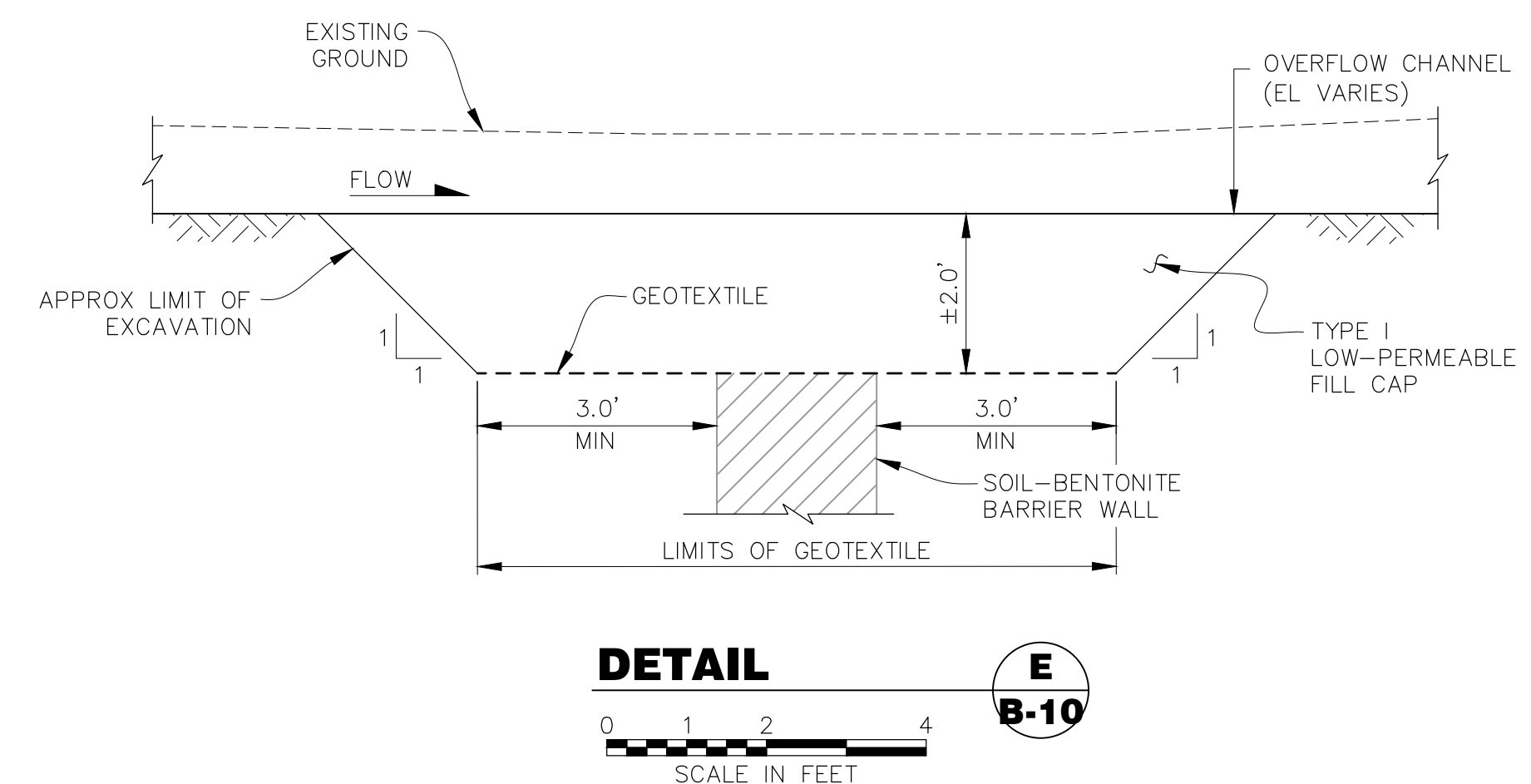
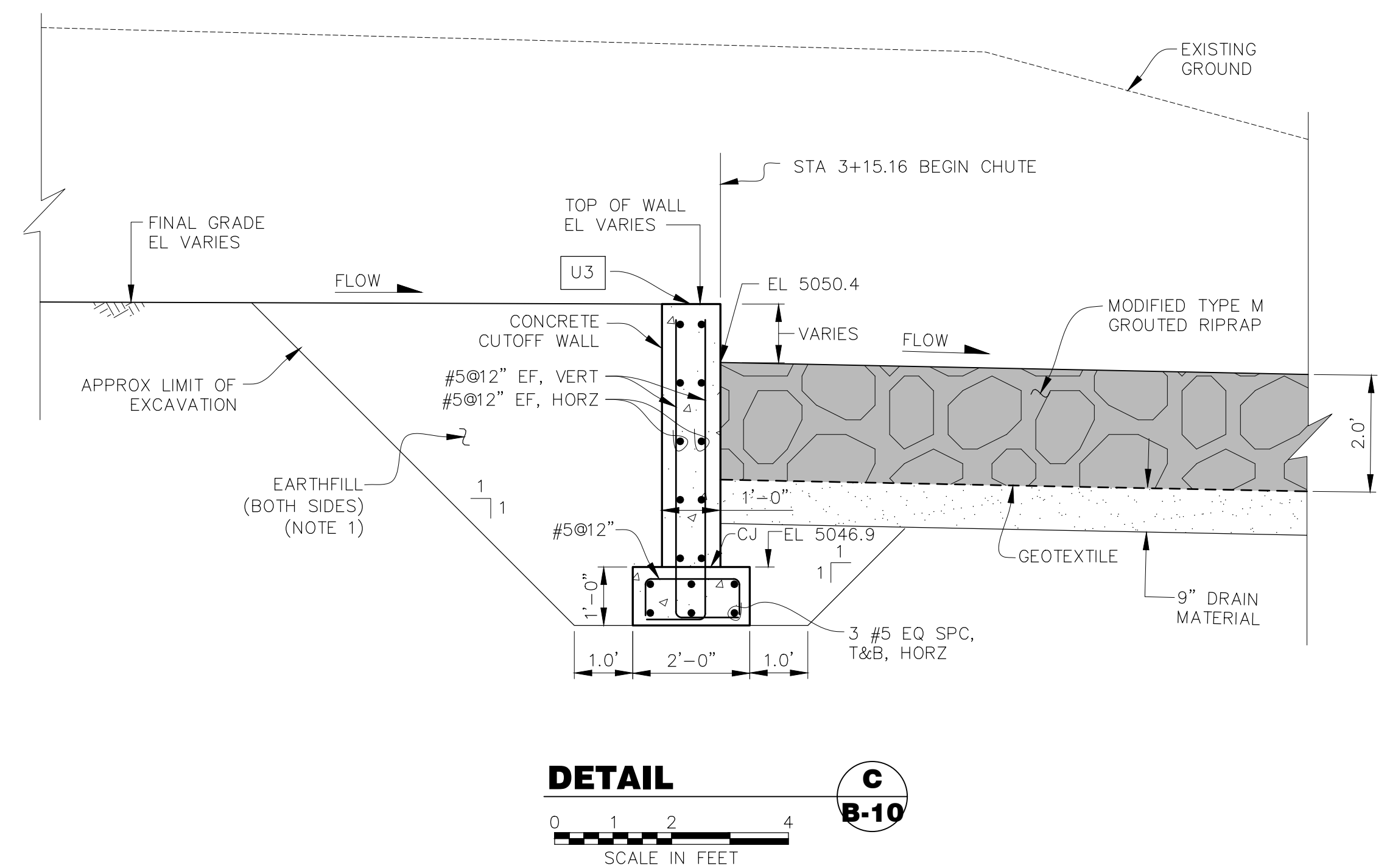
SITE 1 - OVERFLOW
CHANNEL SECTIONS
(3 OF 3)

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TYP DETAIL
NOT TO SCALE



NOTE:

1. MAINTAIN FILL LEVEL WITHIN 2 FT ON ALL SIDES OF STRUCTURE.

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2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - OVERFLOW CHANNEL DETAILS

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\16116 - SUBSURFACE_SITE 1 - LEAK-REPAIRS.DWG 6/14/2021

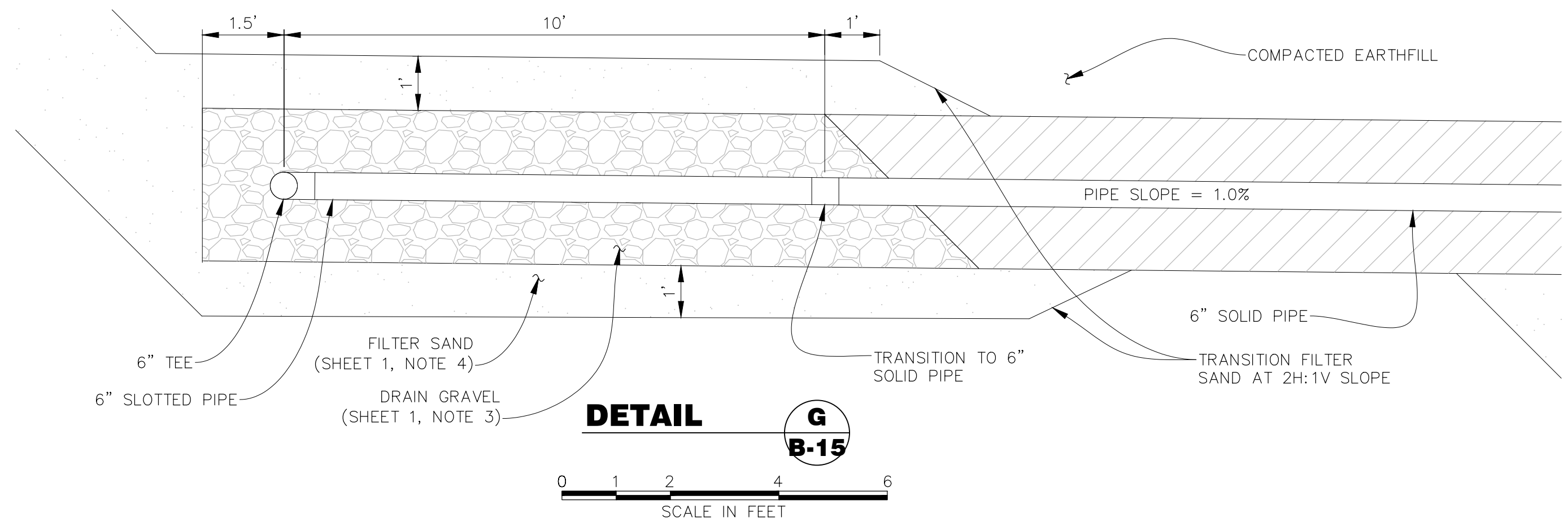
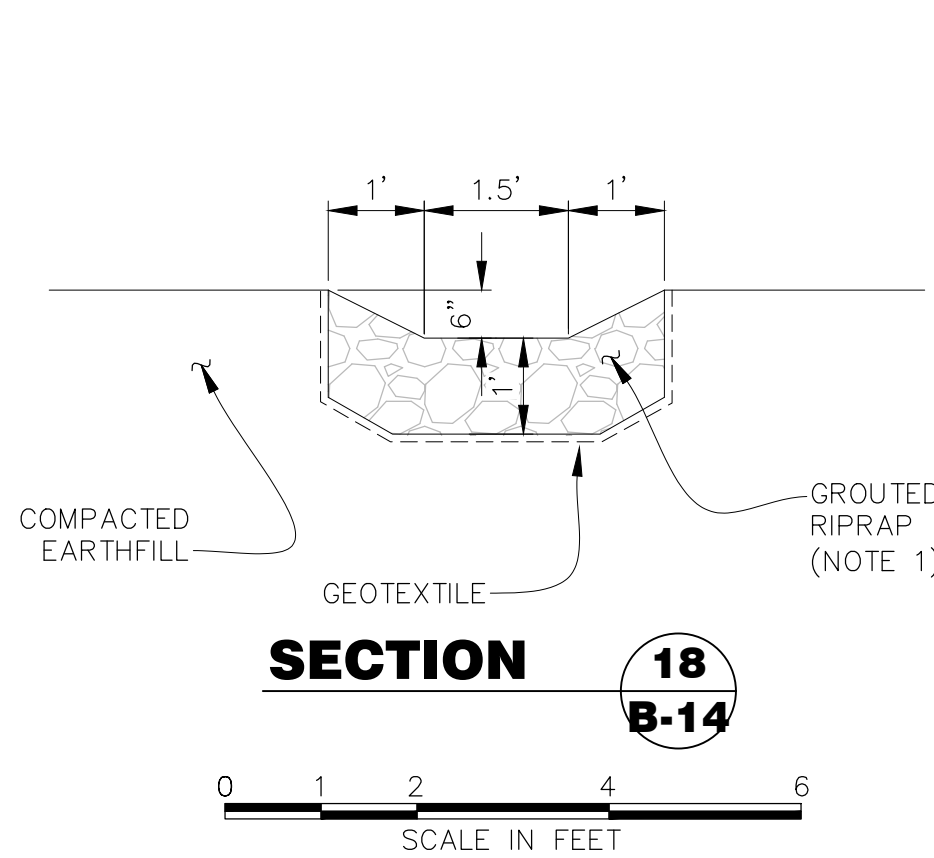


TABLE 1 - FILTER SAND GRADATION

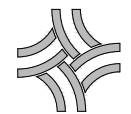
SIEVE NAME	PERCENT PASSING
2"	95-100
3/4"	80-100
3/8"	70-90
No. 4	60-80
No. 16	35-60
No. 40	0-25
No. 200	0-5

NOTES:

- RIPRAP SHALL MEET THE FOLLOWING CRITERIA:
 - $D_{50} = 4$ IN
 - MAXIMUM ROCK SIZE = 9 IN
 - MINIMUM ROCK SIZE = 2 IN

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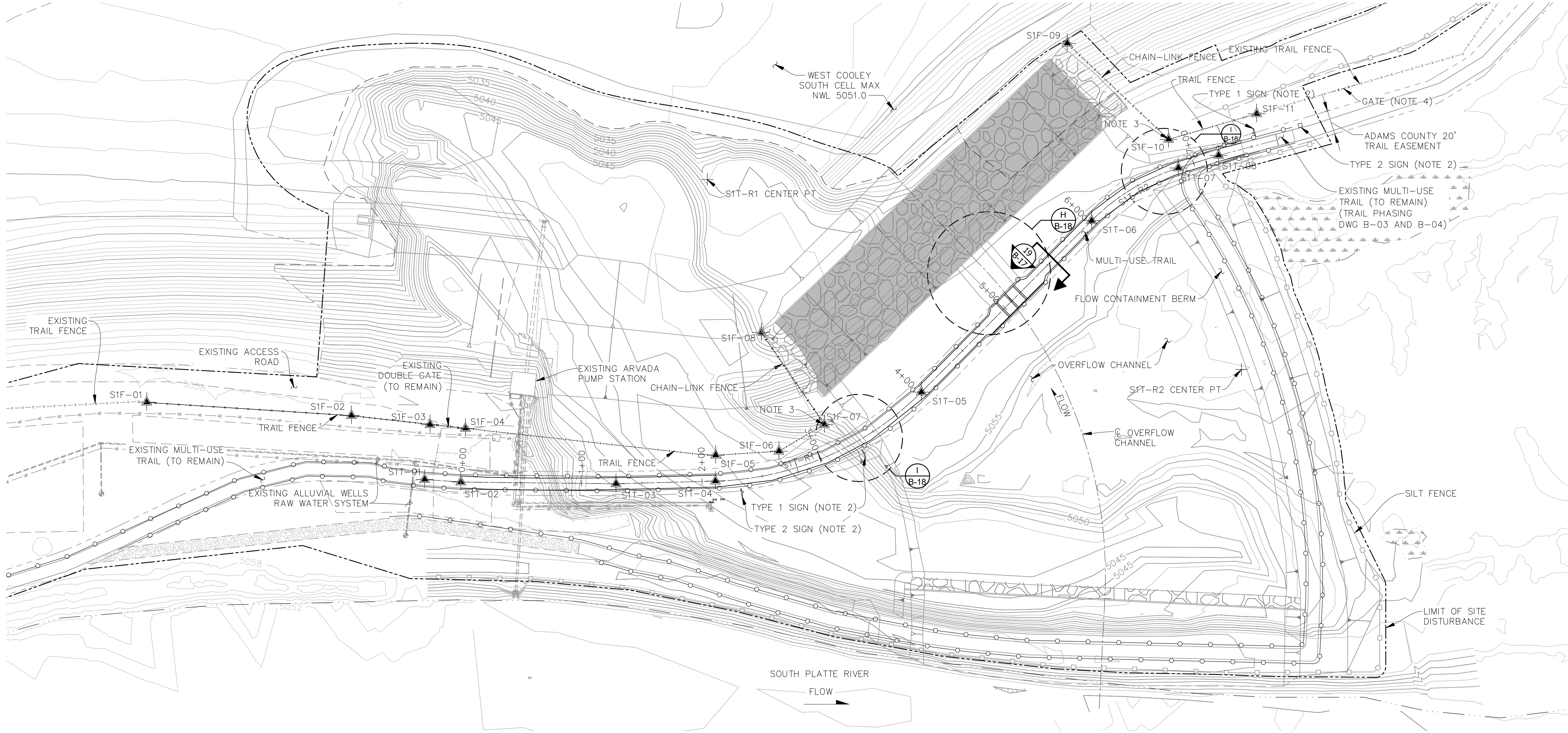
RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - LEAK REPAIR
SECTIONS AND DETAILS

DWG. NO.
B-15

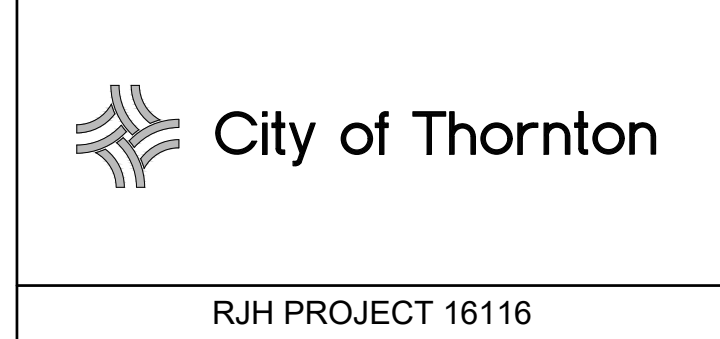
SHEET NO.
24 of 77



- NOTES:
- SEE DWG B-21 FOR CONTROL POINTS.
 - LOCATE SIGNS ON RIGHT SIDE OF TRAIL AT EACH SIDE APPROACHING THE OVERFLOW CHANNEL AT 10 FT AND 100 FT FROM THE TOP OF THE OVERFLOW CHANNEL SLOPE. TOTAL OF 4 SIGNS.
 - TRANSITION TRAIL FENCE TO CHAIN-LINK FENCE.
 - PROVIDE 20 FOOT DOUBLE SWING GATE. COORDINATE LOCATION WITH THORNTON PRIOR TO INSTALLATION.

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	05/2021	RECORD DRAWINGS		KLH	AJY	RJH
NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



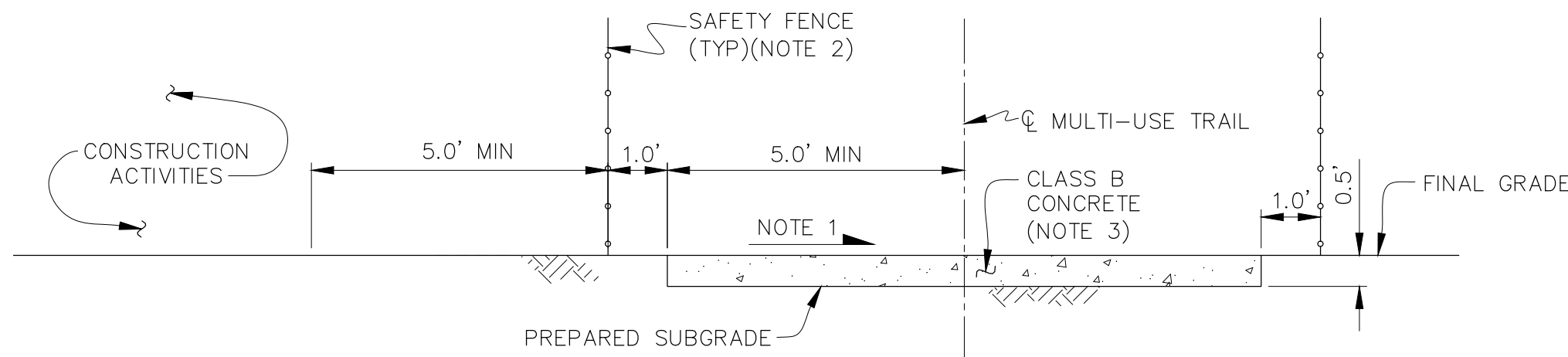
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - PLAN OF
MULTI-USE TRAIL AND
FENCES

DWG. NO.
B-16
SHEET NO.
25 of 77

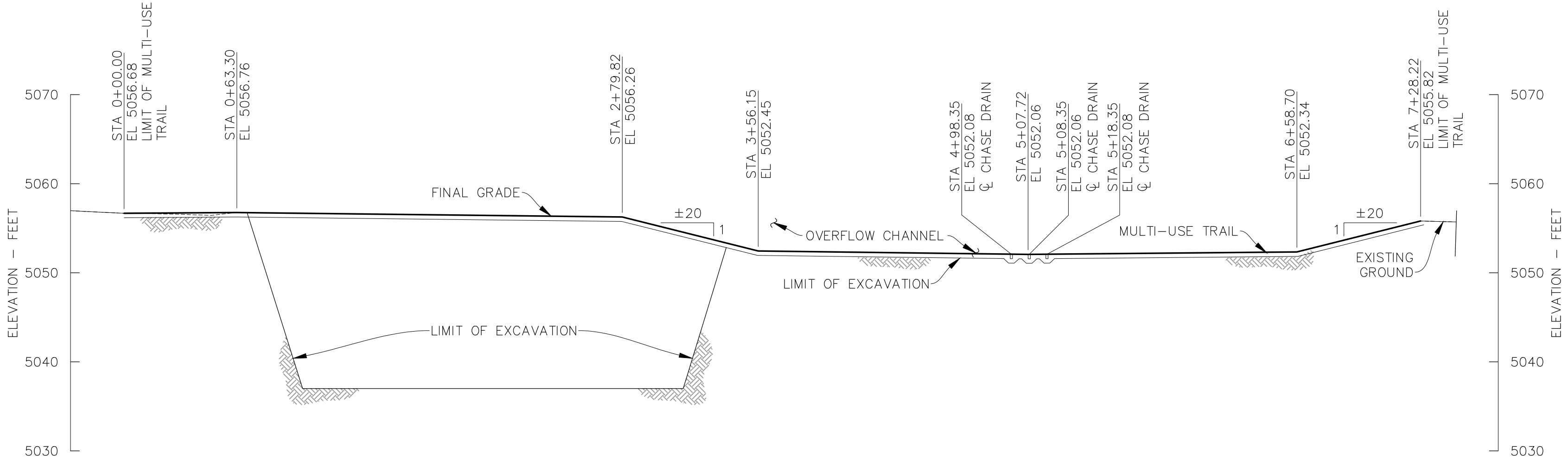
P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 1 - TRAIL AND FENCING.DWG 6/14/2021

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 1 - TRAIL AND FENCING.DWG 6/14/2021

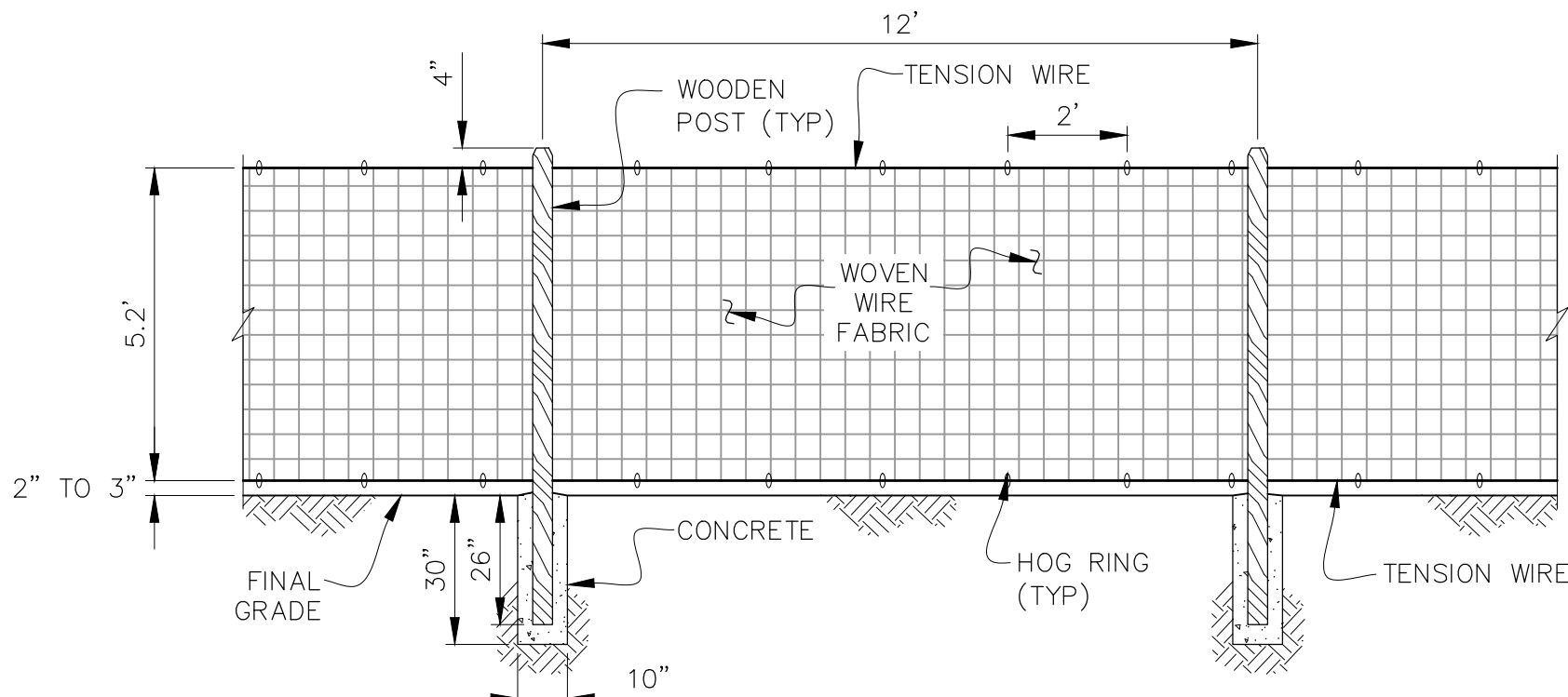
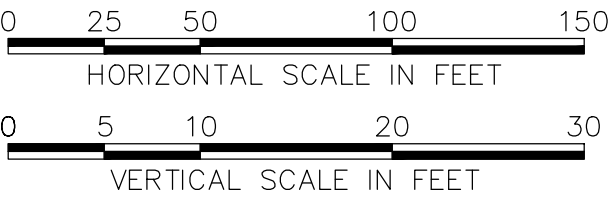


SECTION
MULTI-USE TRAIL
NOT TO SCALE

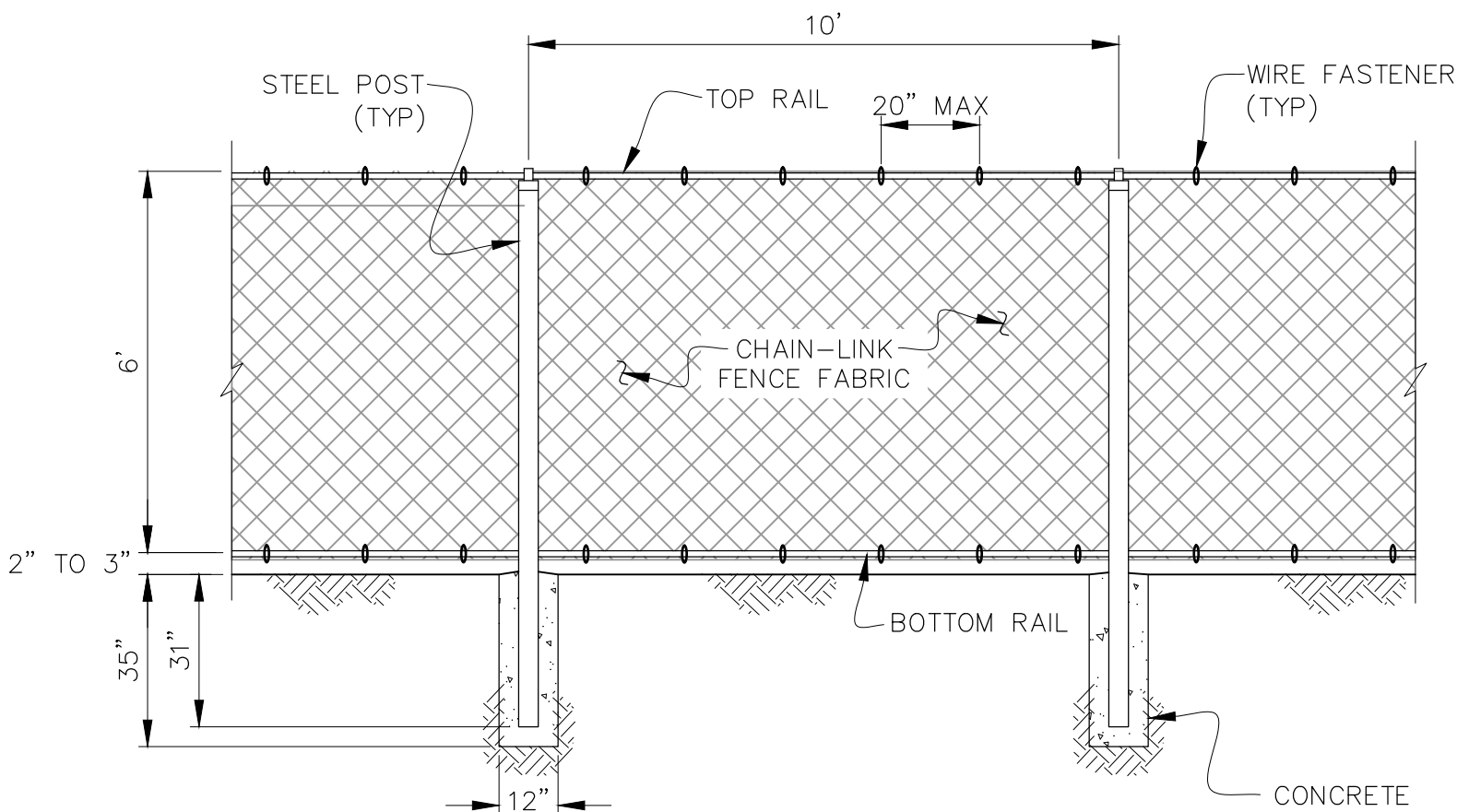
19
B-16



PROFILE
MULTI-USE TRAIL



TYPICAL DETAIL
TRAIL FENCE
NOT TO SCALE



TYPICAL DETAIL
CHAIN-LINK FENCE
NOT TO SCALE

NOTES:

1. SLOPE AT GRADE OF OVERFLOW CHANNEL WITHIN OVERFLOW CHANNEL AND 2 PERCENT OUTSIDE OVERFLOW CHANNEL IN DIRECTION OF PREVAILING SLOPE.
2. REMOVE FOLLOWING CONSTRUCTION.
3. EXCAVATE AND PREPARE SUBGRADE FOR MULTI-USE TRAIL. CLASS B CONCRETE TO BE CONSTRUCTED BY OTHERS.

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



City of Thornton

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2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

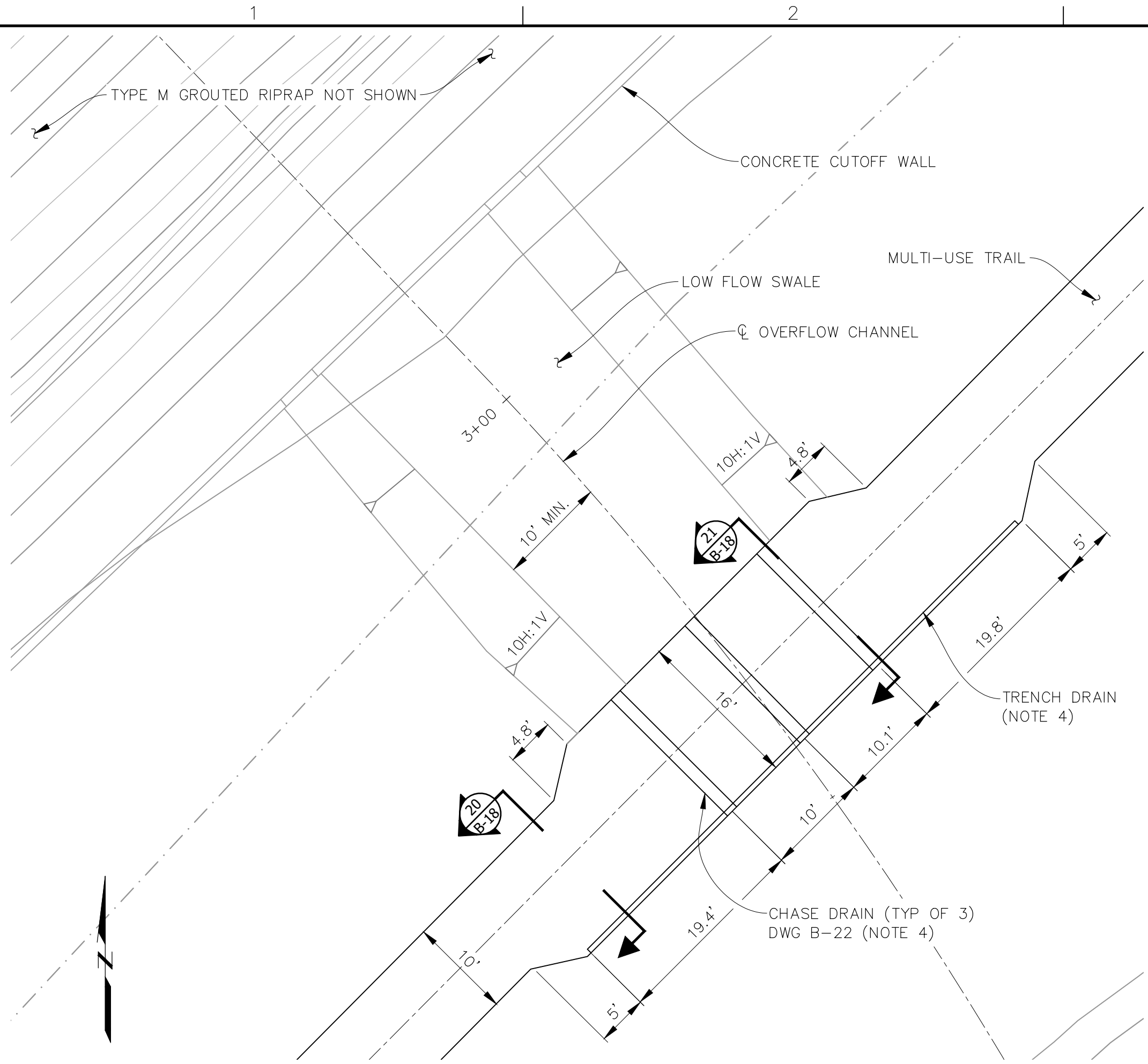
SITE 1 - MULTI-USE TRAIL
PROFILE, SECTION AND
DETAILS

DWG. NO.
B-17

SHEET NO.
26 of 77

RJH PROJECT 16116

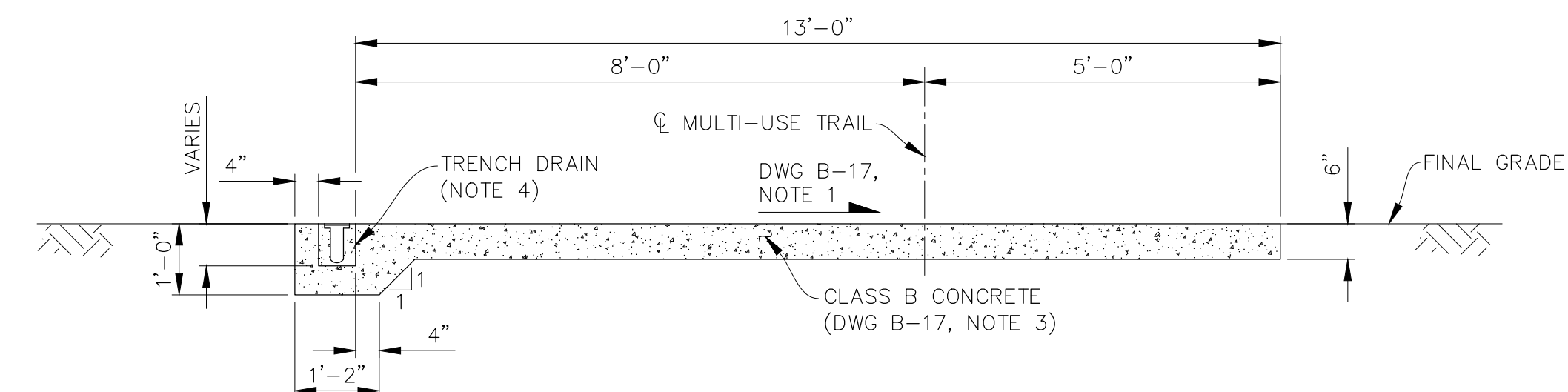
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DETAIL

H
B-16

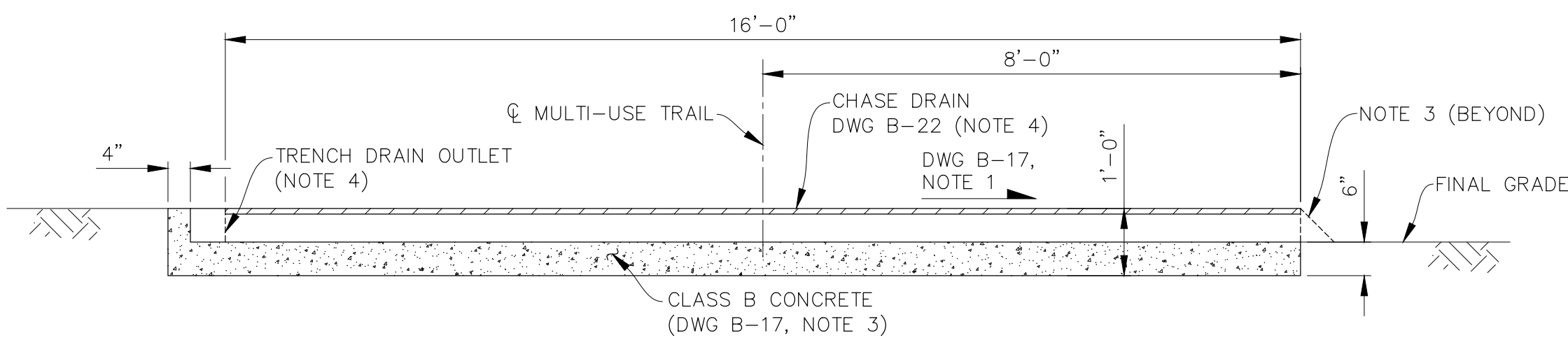
0 5 10 20 30
SCALE IN FEET



SECTION

20
B-18

0 1 2 4 6
SCALE IN FEET



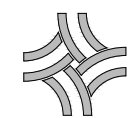
SECTION

21
B-18

0 1 2 4 6
SCALE IN FEET

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



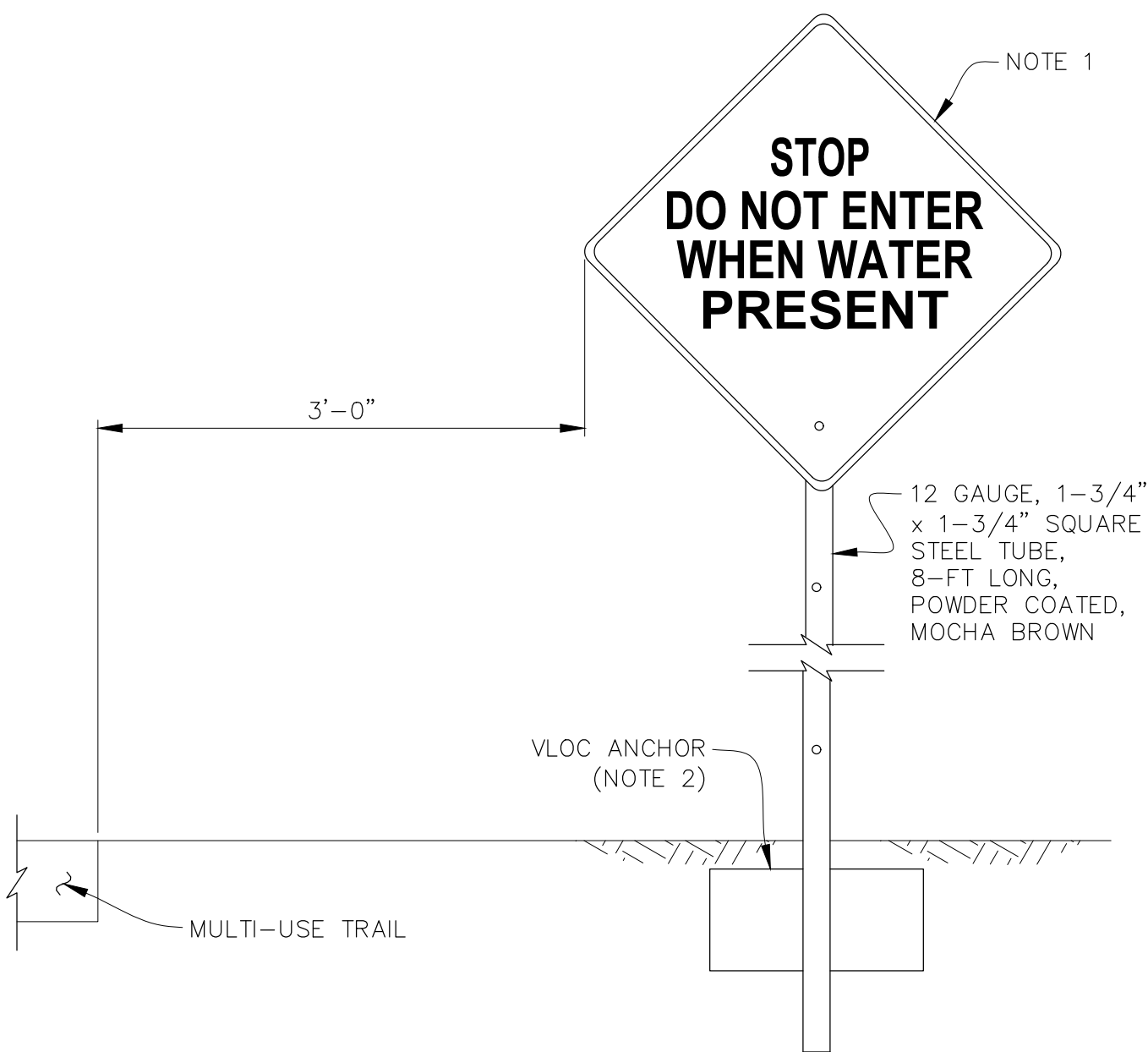
City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - MULTI-USE TRAIL
DETAILS

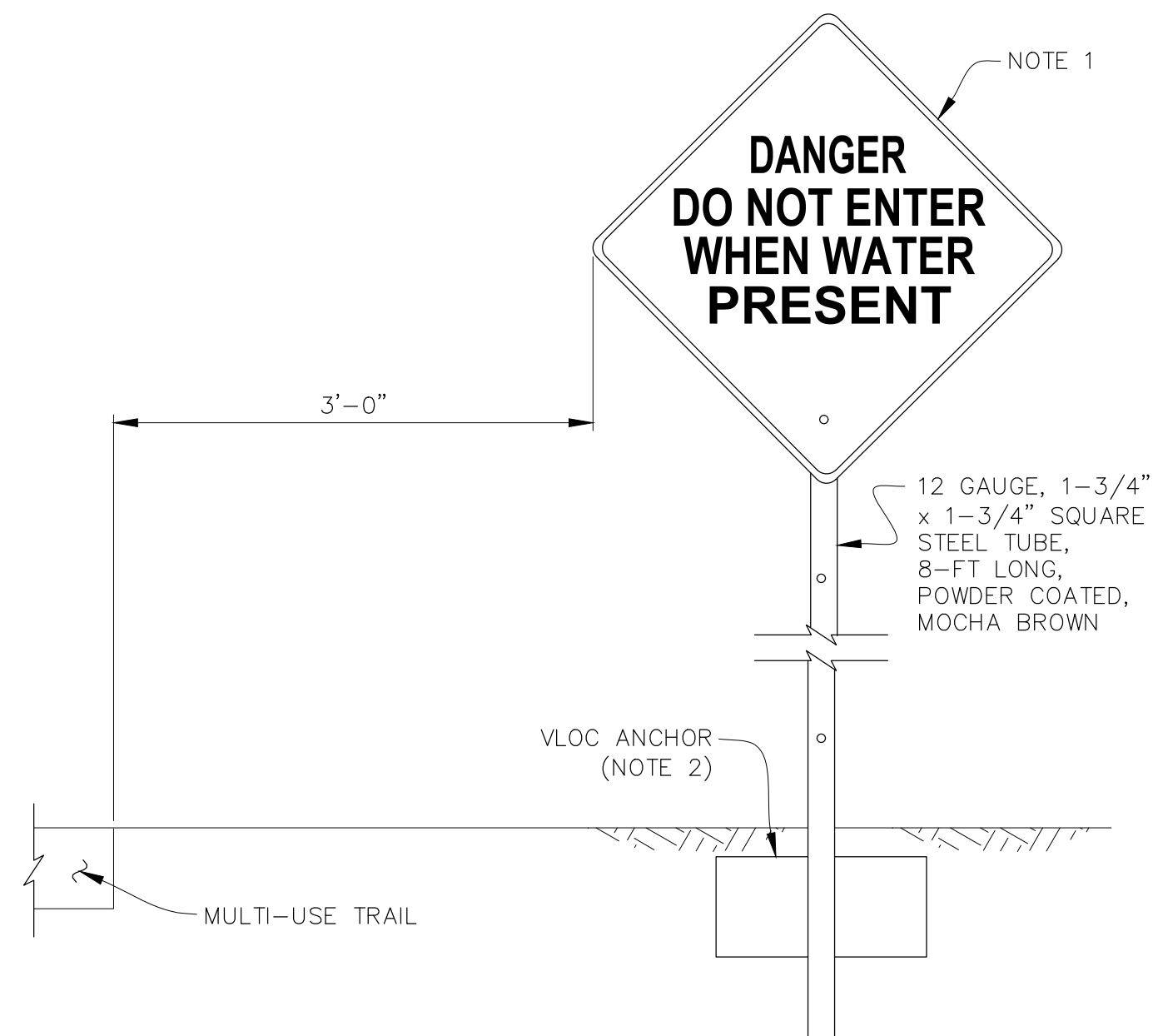
DWG. NO.
B-18

SHEET NO.
27 of 77



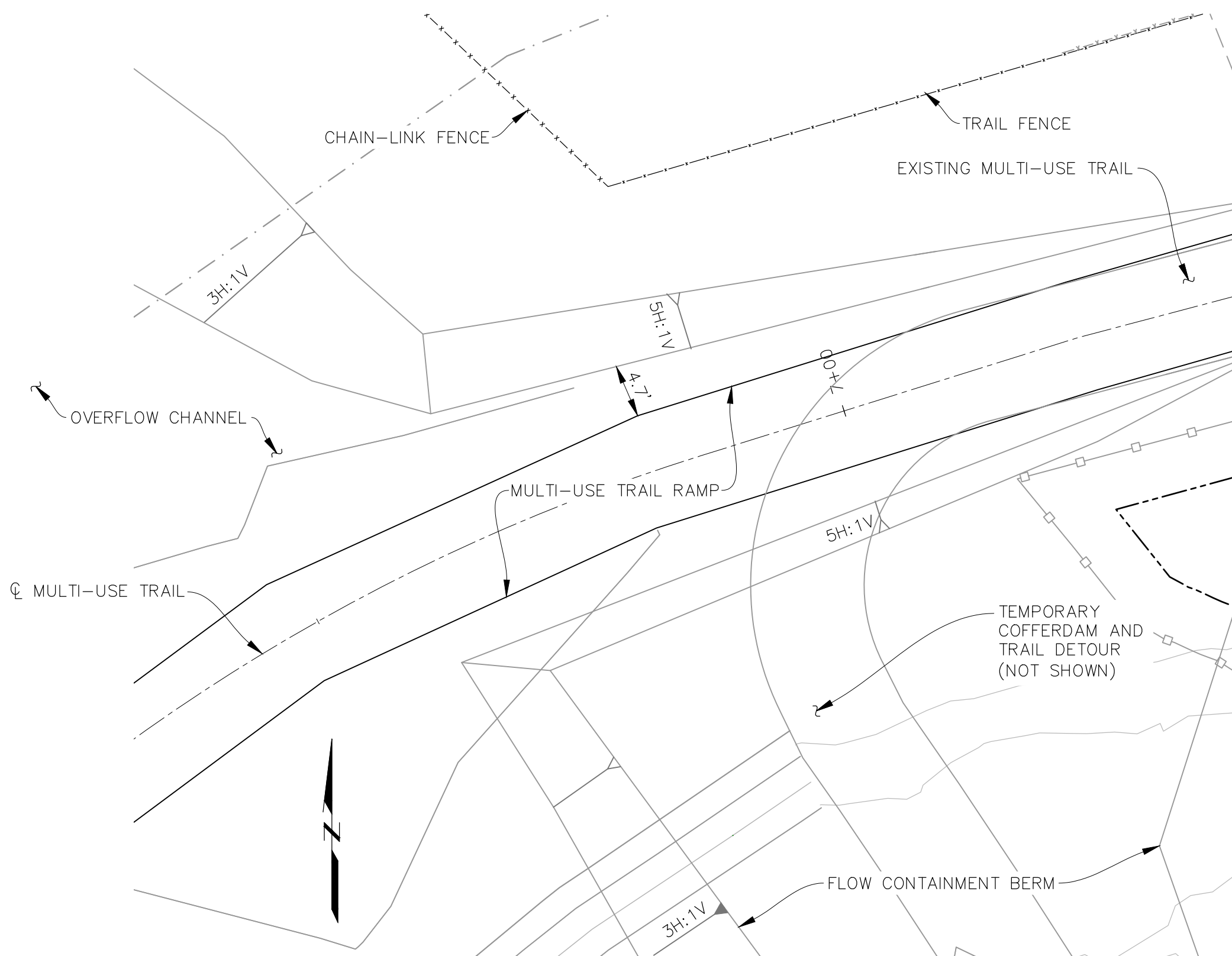
TYPICAL DETAIL
TYPE 1 SIGN

N.T.S.



TYPICAL DETAIL
TYPE 2 SIGN

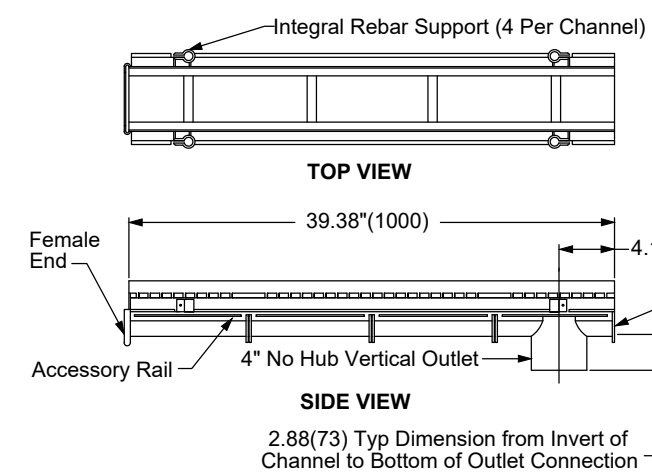
N.T.S.



DETAIL

I
B-16

0 5 10 20 30
SCALE IN FEET



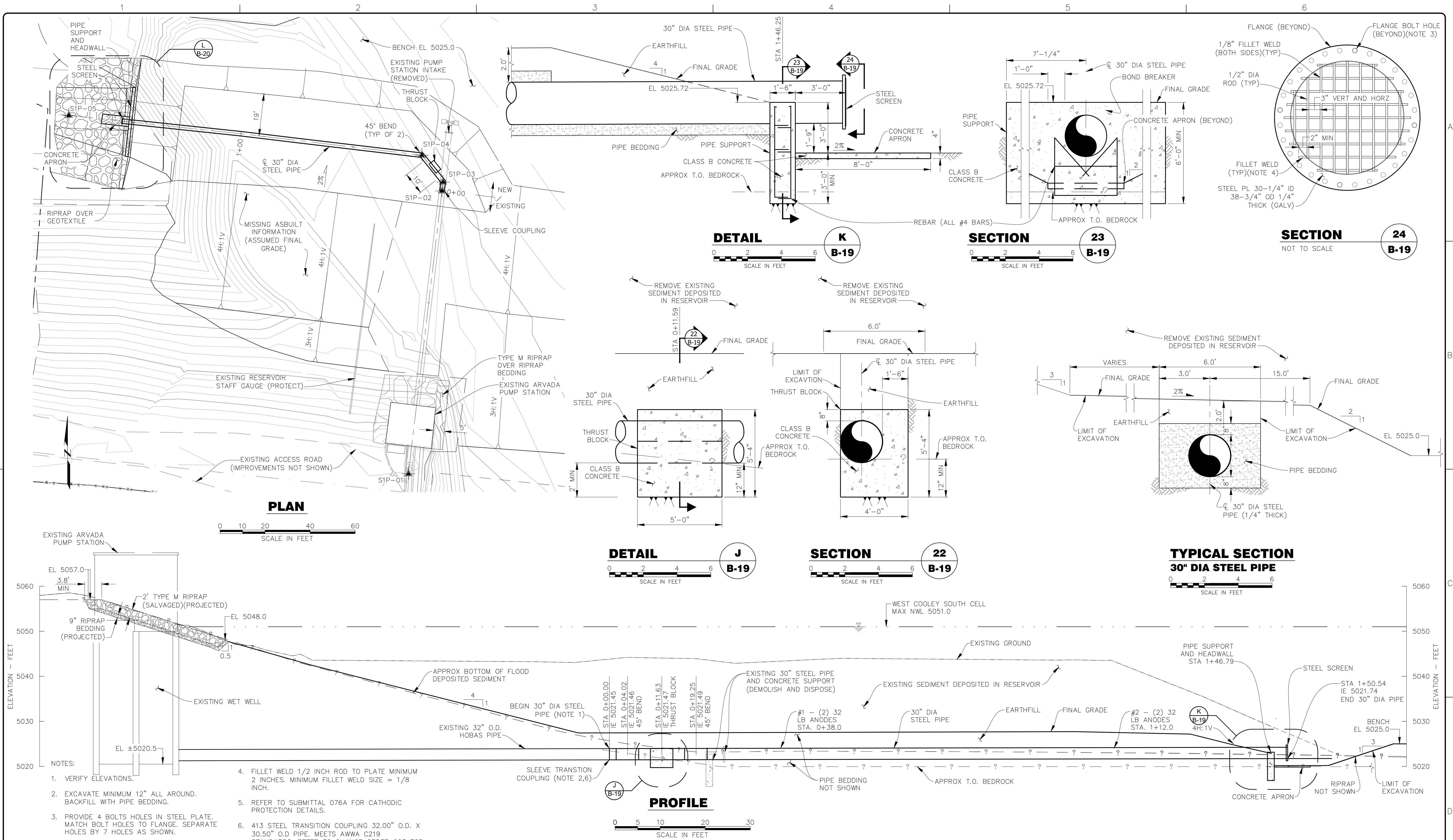
ENLARGED END VIEW

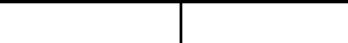
TRENCH DRAIN DETAIL

NOTE:

- SIGNS SHALL BE IN ACCORDANCE WITH MUTCD, TYPE W4, AND SHALL BE YELLOW BACKGROUND WITH BLACK LETTERS.
- VLOC SIGN POST ANCHOR DETAIL IN ACCORDANCE WITH CITY OF THORNTON STANDARDS AND SPECIFICATIONS, DRAWING NO. 700-11.
- SLOPE CONCRETE TO LOW FLOW SWALE AT 1H:1V.
- TRENCH DRAIN - PER 6 IN ENVIROFLOW II - MANUFACTURED BY JAY R. SMITH MFG. CO. 800.46764.84 WWW.JRSMITH.COM

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\2020-11-23_RFT025_SITE 1 - RESERVOIR INTAKE.DWG 6/14/2021



										 City of Thornton	WEST COOLEY RESERVOIR - 2015 FLOOD REPAIRS PROJECT THORNTON, COLORADO	SITE 1 - PUMP STATION RESERVOIR INTAKE (1 OF 2)	DWG. NO. B-19		
-	02/2020	RECORD DRAWINGS		MSS	WHA	RJH	RJH								SHEET NO. 28 of 77
NO.	DATE	ISSUE/REVISION		DES	DRN	CHK	APP			RJH PROJECT 16116					

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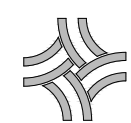
DETAIL

L
B-19



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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



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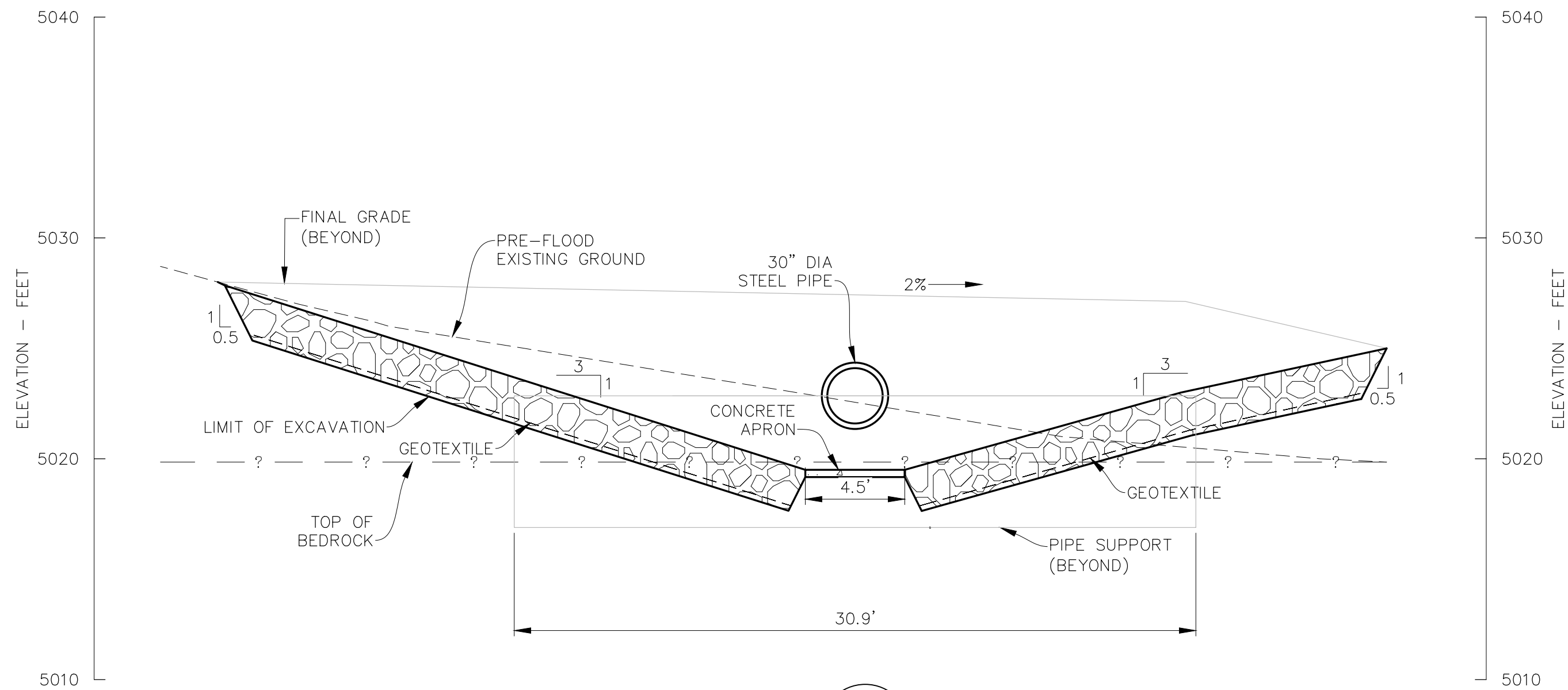
RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - PUMP
STATION RESERVOIR
INTAKE (2 OF 2)

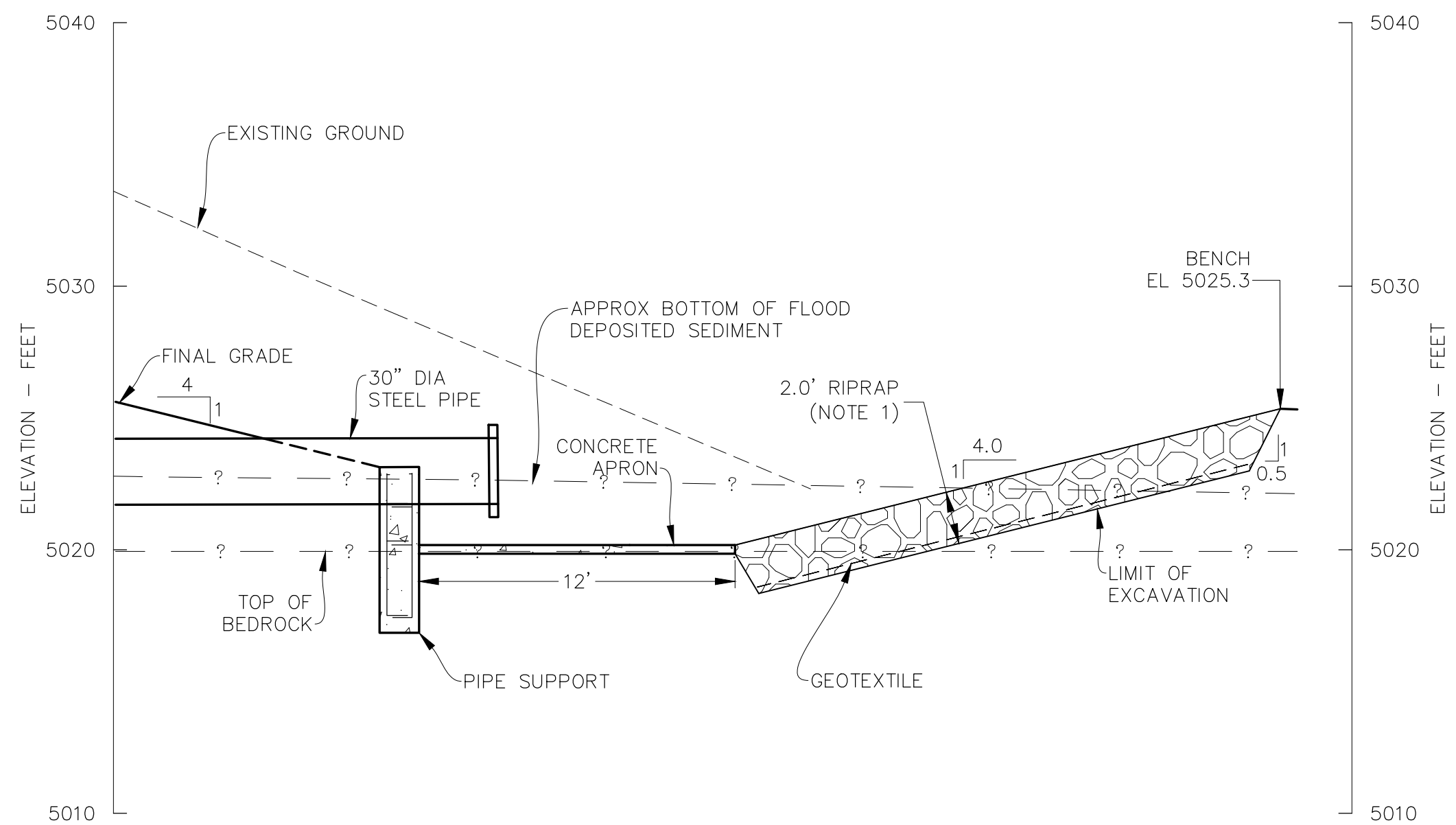
DWG. NO.
B-20

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SECTION

25
B-20



SECTION

26
B-20



NOTES:
1. USE EXISTING ON SITE SALVAGED RIP-RAP.

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\CONTROL POINTS.DWG 6/14/2021

DWG B-02 CONSTRUCTION CONTROL POINTS				
DESCRIPTION	CONTROL POINT	NORTHING	EASTING	ELEVATION
EARTHFILL	S1-01	744447.38	166039.92	5056.90
EARTHFILL	S1-02	744414.53	166152.98	5056.00
EARTHFILL	S1-03	744412.30	166176.27	5056.00
EARTHFILL	S1-04	744378.02	166308.38	5055.70
EARTHFILL	S1-05	744560.86	166010.87	5057.00
EARTHFILL	S1-06	744546.48	166147.82	5057.00
EARTHFILL	S1-07	744565.04	166245.70	5057.00
☒ OVERFLOW CHANNEL	S1-08	744389.32	166483.45	NOTE 2
☒ OVERFLOW CHANNEL	S1-09	744666.43	166380.42	NOTE 2
☒ OVERFLOW CHANNEL	S1-10	744674.73	166372.48	NOTE 2
☒ OVERFLOW CHANNEL	S1-11	744726.09	166323.31	NOTE 2
CUTOFF WALL	S1-12	744396.91	166334.14	NOTE 2
CUTOFF WALL	S1-13	744381.60	166632.80	NOTE 2
CUTOFF WALL	S1-14	744570.71	166264.55	NOTE 2
CUTOFF WALL	S1-15	744778.72	166481.83	NOTE 2
TERMINATION WALL	S1-16	744622.72	166214.61	NOTE 2
TERMINATION WALL	S1-17	744830.18	166431.32	NOTE 2

DWG B-08 EXCAVATION CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S1E-01	744621.66	166020.17
S1E-02	744531.28	166035.51
S1E-03	744473.88	166053.62
S1E-04	744448.57	166155.58
S1E-05	744482.76	166282.92
S1E-06	744558.13	166222.19
S1E-07	744617.78	166217.04
S1E-08	744606.15	166154.09

DWG B-05 AND B-06 COFFERDAM CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
SC1-01	744417.61	165900.23
SC1-02	744418.23	165973.62
SC1-03	744408.81	166088.15
SC1-04	744409.10	166119.51
SC1-05	744391.05	166192.87
SC1-06	744372.91	166256.57
SC1-07	744356.95	166340.46
SC1-08	744352.89	166370.79
SC1-09	744348.36	166420.45
SC1-10	744343.05	166654.57
SC1-11	744380.36	166656.50
SC1-12	744732.92	166550.49
SC1-13	744795.84	166527.62
SC1-14	744865.85	166727.60
SC1-15	744911.41	166799.22
SC1-16	745167.66	166989.12
SC1-17	745453.48	167217.38
SC1-18	745611.44	167326.54

DWG B-16 MULTI-USE TRAIL CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S1T-01	744488.70	165919.69
S1T-02	744486.59	165949.71
S1T-03	744485.18	166078.32
S1T-04	744487.39	166160.72
S1T-05	744561.14	166331.40
S1T-06	744703.21	166472.49
S1T-07	744746.90	166544.35
S1T-08	744757.34	166577.70

DWG B-16 FENCE CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S1F-01	744552.79	165689.39
S1F-02	744541.65	165859.06
S1F-03	744534.13	165924.20
S1F-04	744531.04	165953.58
S1F-05	744508.83	166160.94
S1F-06	744512.17	166213.37
S1F-07	744534.30	166251.10
S1F-08	744610.50	166198.83
S1F-09	744850.25	166452.25
S1F-10	744770.62	166536.25
S1F-11	744791.81	166609.29

DWG B-16 FENCE CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S1F-01	744552.79	165689.39
S1F-02	744541.65	165859.06
S1F-03	744534.13	165924.20
S1F-04	744531.04	165953.58
S1F-05	744508.83	166160.94
S1F-06	744512.17	166213.37
S1F-07	744534.30	166251.10
S1F-08	744610.50	166198.83
S1F-09	744850.25	166452.25
S1F-10	744770.62	166536.25
S1F-11	744791.81	166609.29

DWG B-19 INTAKE MODIFICATION CONSTRUCTION CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S1P-01	744546.67	166000.40
S1P-02	744672.23	166015.31
S1P-03	744676.20	166015.78
S1P-04	744688.12	166006.39
S1P-05	744705.77	165849.68

DWG B-02 CURVE DATA			
CURVE NUMBER	RADIUS (FEET)	NORTHING	EASTING
S1-R1	173.00	744718.53	166165.88
S1-R2	372.88	744408.58	166111.06

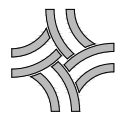
DWG B-08 CURVE DATA			
CURVE NUMBER	RADIUS (FEET)	NORTHING	EASTING
S1E-R1	113.00	744718.53	166165.88

DWG B-16 MULTI-USE TRAIL CURVE DATA			
CURVE NUMBER	RADIUS (FEET)	NORTHING	EASTING
S1T-R1	250.00	744737.30	166154.01
S1T-R2	175.00	744579.90	166596.66

- NOTES:
- CONTROL POINTS FOR CONCRETE TERMINATION WALL AND CONCRETE CUTOFF WALL CORRESPOND TO THE CENTER OF THE PLAN WALL THICKNESS.
 - ELEVATIONS PROVIDED ON CROSS SECTIONS.

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-	05/2021	RECORD DRAWINGS	-	KLH	AJY	RJH
NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



City of Thornton

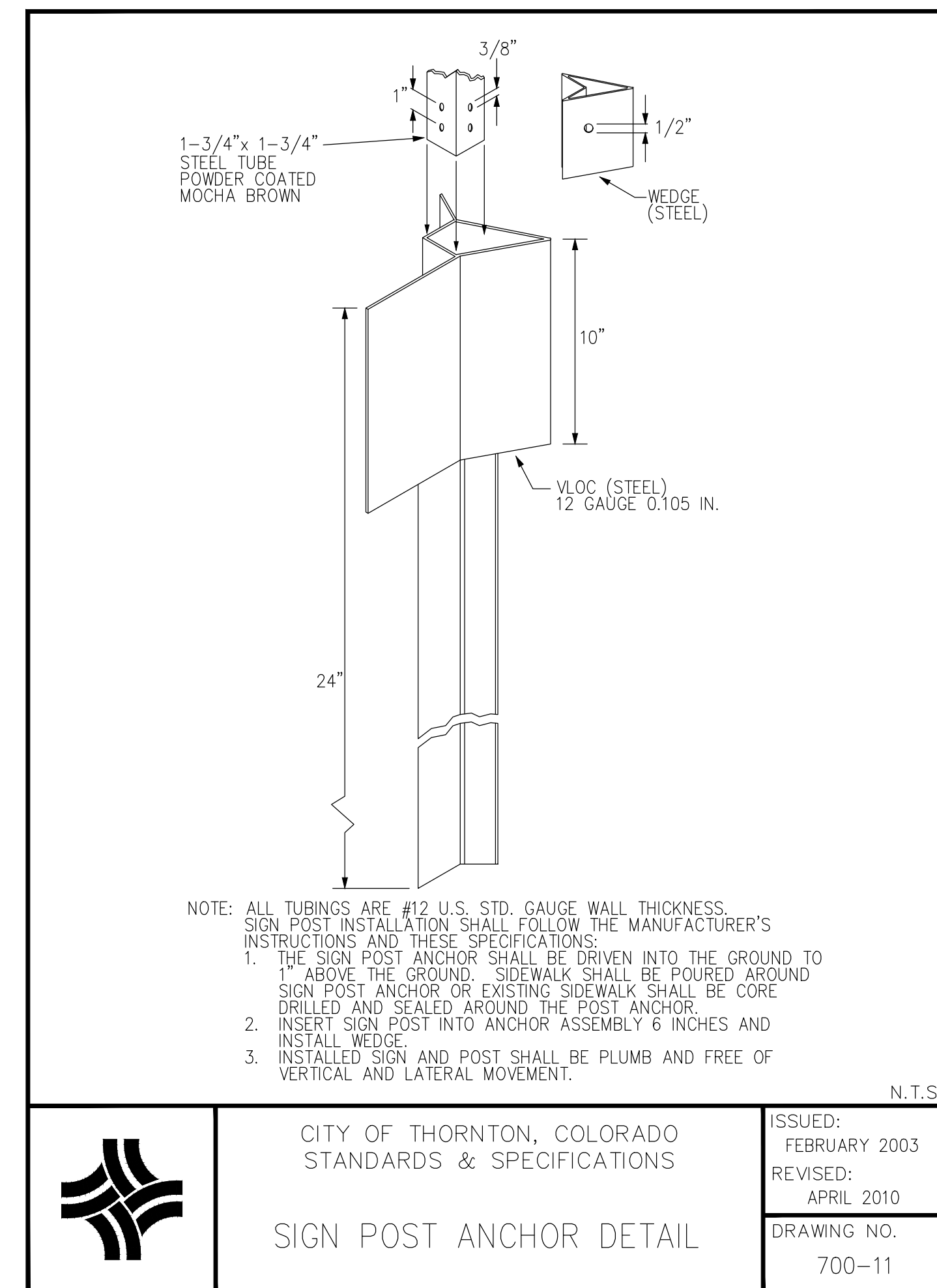
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - CONTROL POINTS

DWG. NO.
B-21

SHEET NO.
30 of 77

RJH PROJECT 16116



—	05/2021	RECORD DRAWINGS	—	KLH	AJY	RJH
NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP

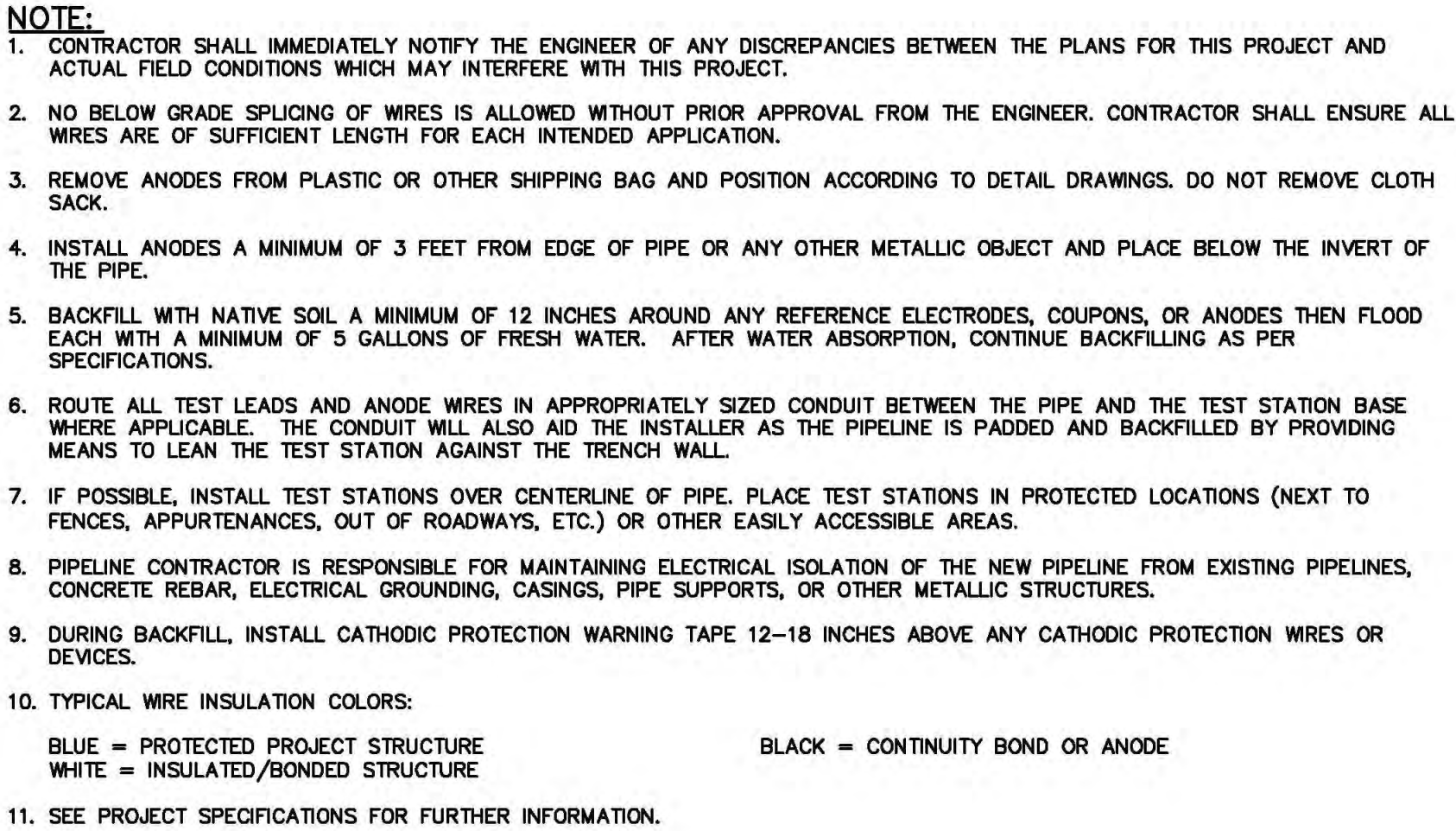


WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - THORNTON STANDARD DETAILS

DWG. NO.
B-22

SHEET NO.
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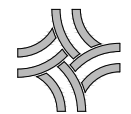
NOTES:

1. INFORMATION FROM SUBMITTAL.

[illegible]

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



City of Thornton

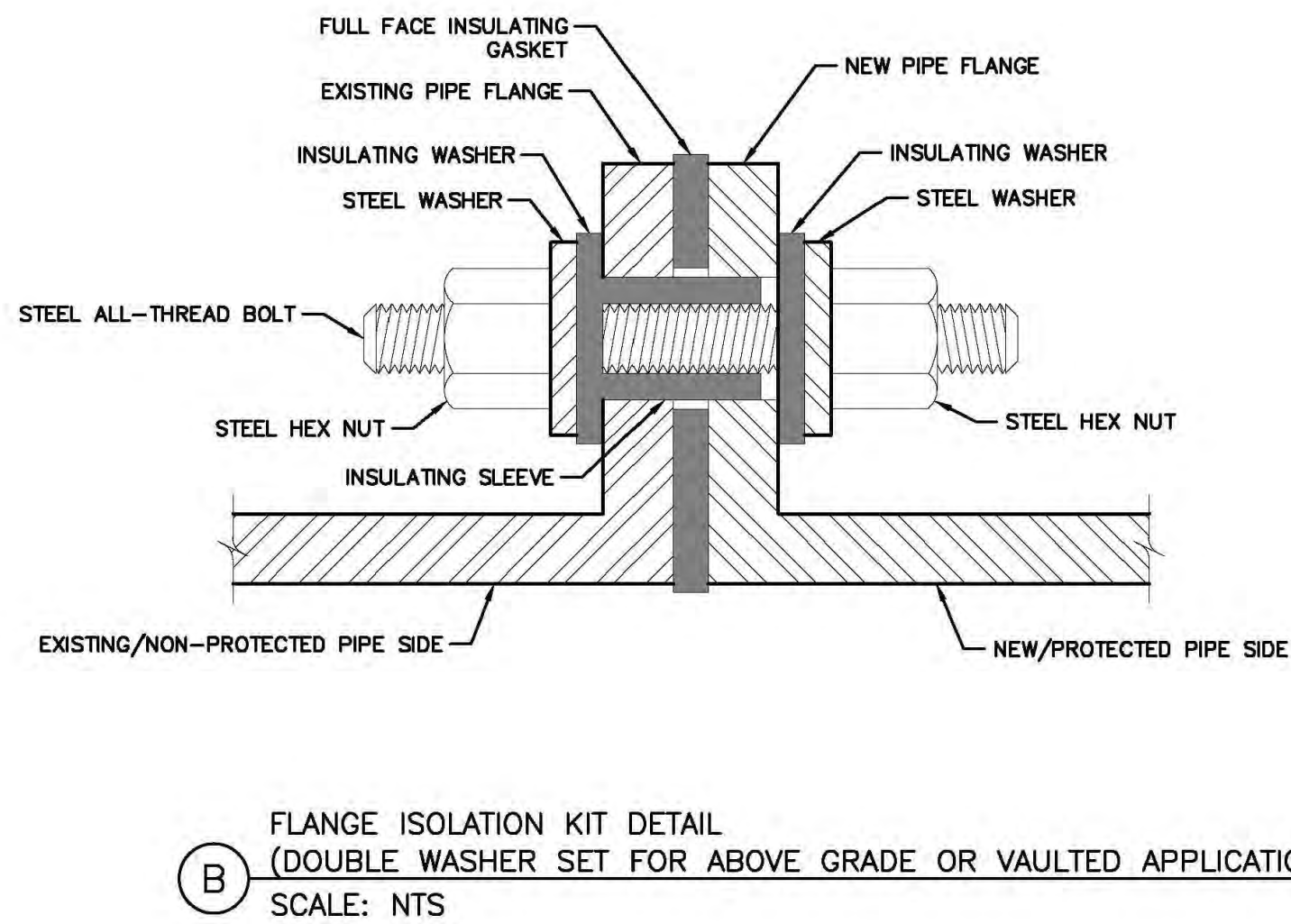
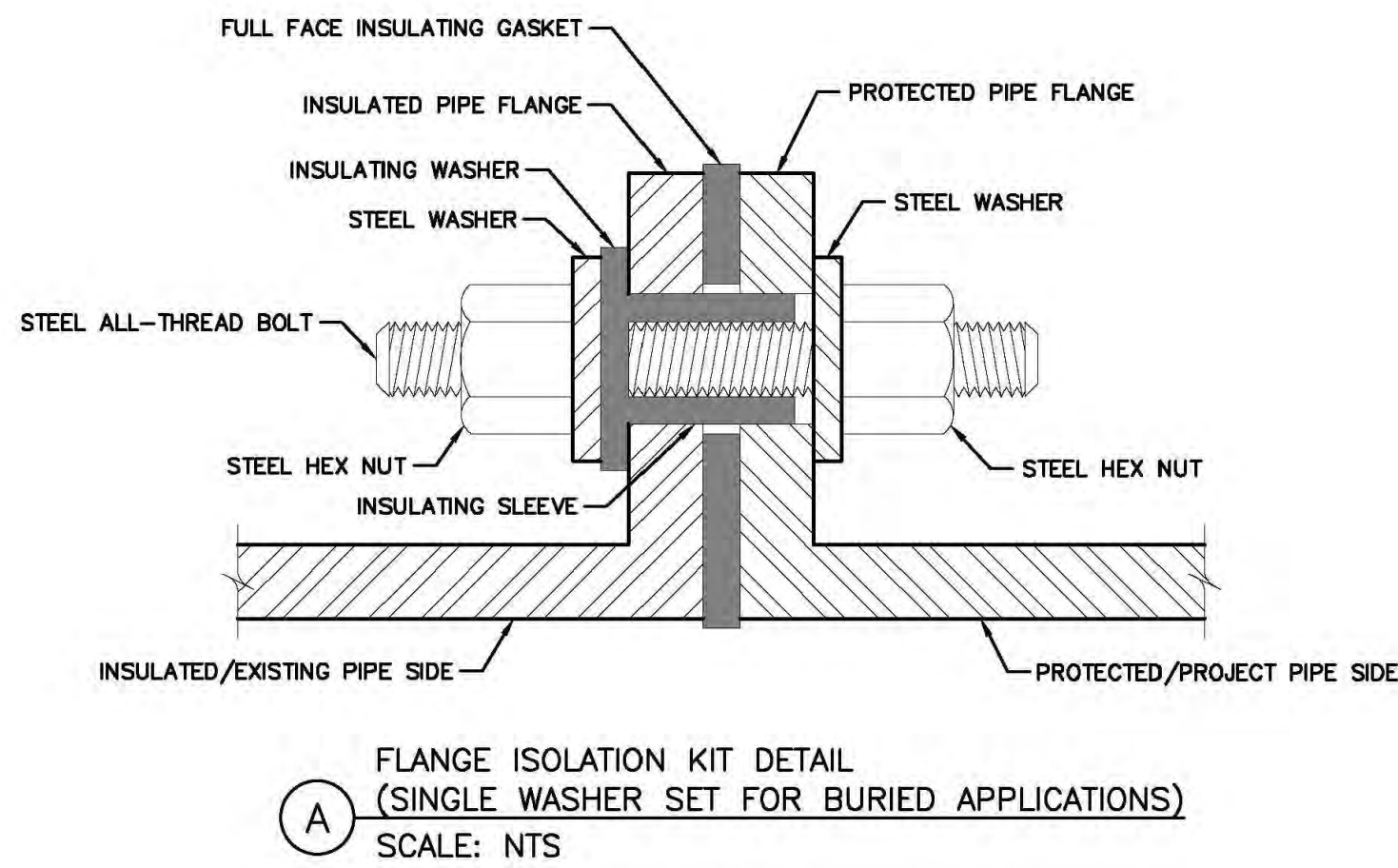
RJH PROJECT 16116

WEST COOLEY RESERVOIR - 2015 FLOOD REPAIRS PROJECT THORNTON, COLORADO

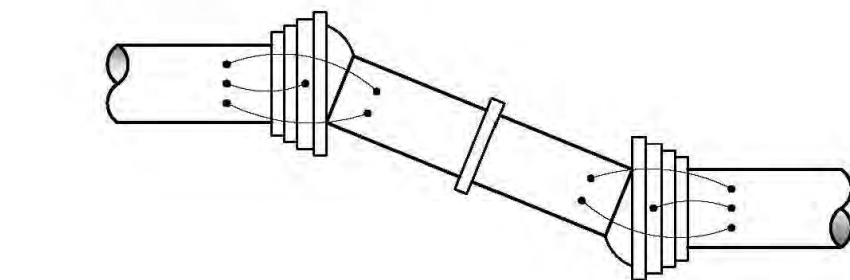
SITE 1 - CATHODIC DETAILS (1 OF 3)

DWG. NO.
B-23

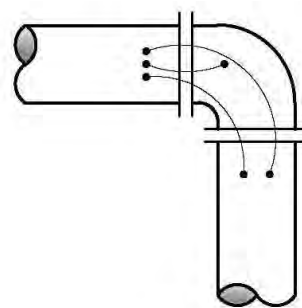
SHEET NO
32 of 77



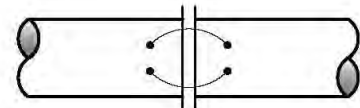
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1. INFORMATION FROM SUBMITTAL.



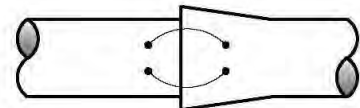
FLEXIBLE JOINT



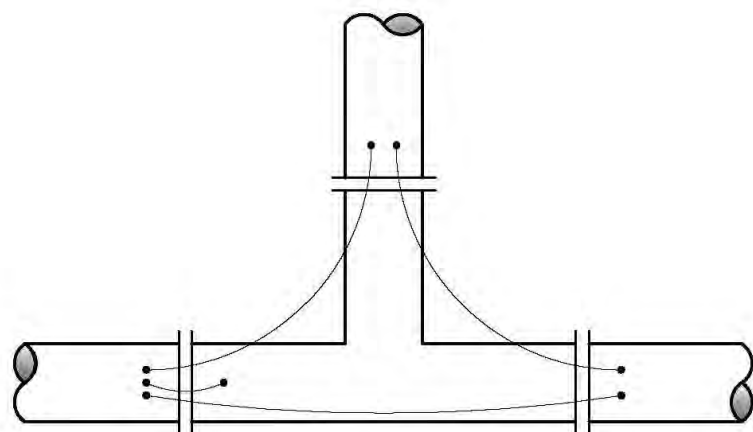
BEND



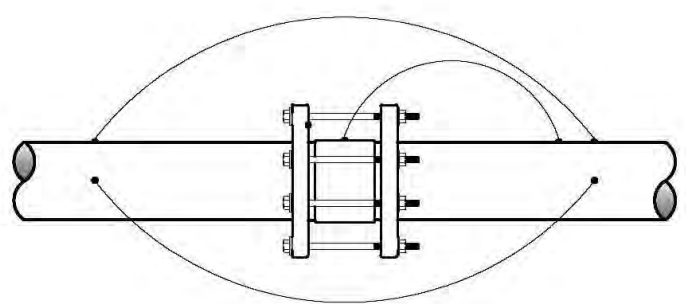
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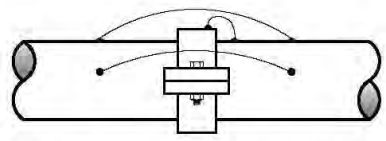
BELL AND SPIGOT



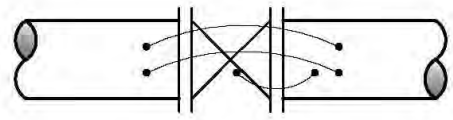
TEE



NON-INSULATING COUPLING



VICTAULIC COUPLING



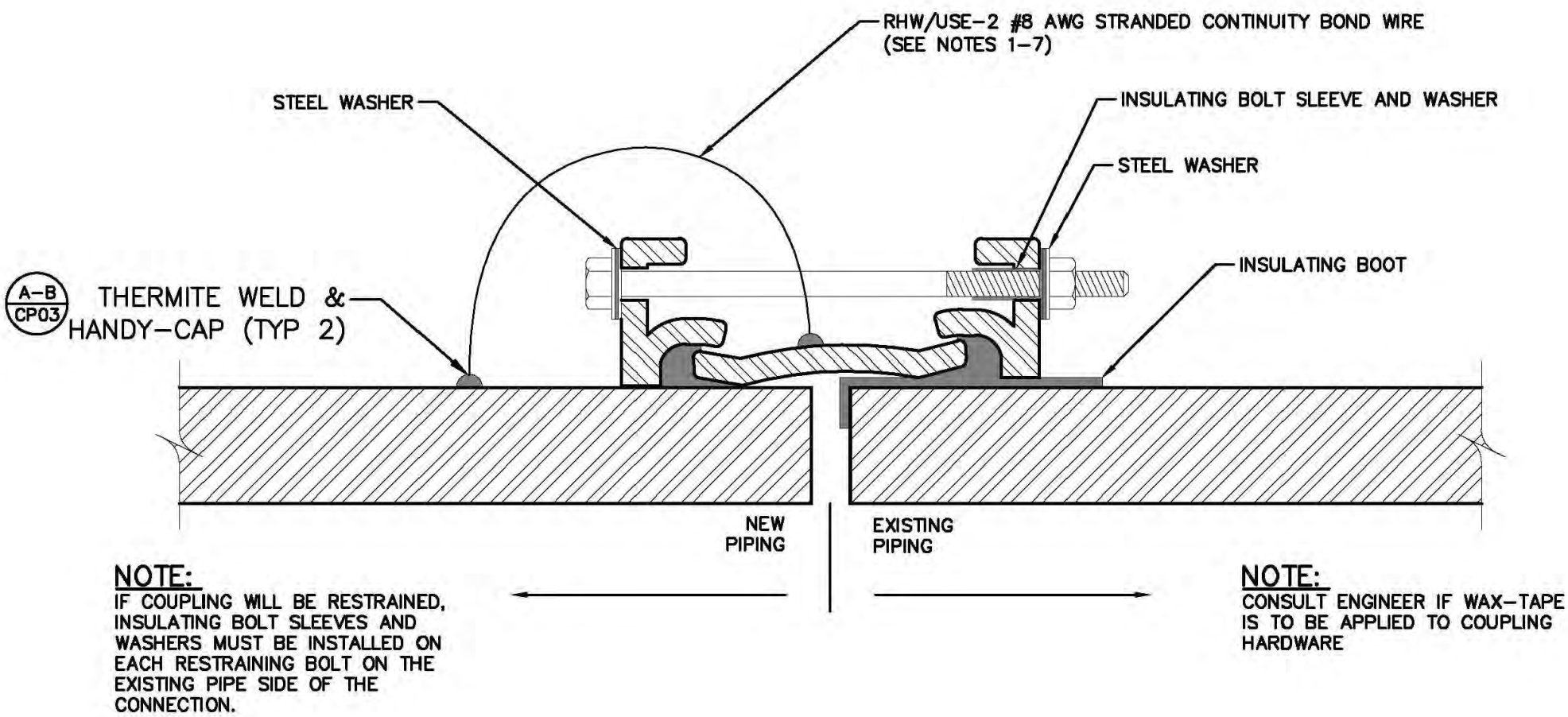
VALVE

NOTE:
DO NOT INSTALL CONTINUITY BONDS OVER INSULATING COUPLINGS, ISOLATING FLANGES, NON-METALLIC PIPING, AND ISOLATING FITTINGS

C FITTING CONTINUITY BONDING DETAILS
SCALE: NTS

- CONTINUITY BONDING NOTES:**
1. TYPICAL FOR NON-WELDED PIPING OR WELDED PIPING WITH MECHANICAL COUPLINGS.
 2. RHW/USE-2 BLACK INSULATED STRANDED COPPER BOND WIRES SHALL BE SIZED ACCORDING TO THE FOLLOWING TABLE UNLESS OTHERWISE NOTED.
 3. CLEAN PIPE PRIOR TO THERMITE WELDING.
 4. UTILIZE COPPER SLEEVES FOR THERMITE WELDING OF #8 AWG OR SMALLER WIRES.
 5. ENSURE ALL BLOW-OFF AND HYDRANT PIPING ARE BONDED AND ELECTRICALLY CONTINUOUS WITH ADJACENT WATER MAIN (IF METALLIC).
 6. ALL FOLLOWER BONDS TO METALLIC FITTINGS SHALL HAVE A SINGLE #8 AWG JOINT BOND WIRE ATTACHED.
 7. DO NOT BOND ACROSS ANY INSULATING FLANGE, COUPLING, UNION, OR NON-METALLIC PIECE OF PIPE.

NOMINAL PIPE Ø	WIRE SIZE	# OF WIRES
12" OR LESS	#8	2
13" - 36"	#4	2
>36"	#2	3



NOTE:
IF COUPLING WILL BE RESTRAINED, INSULATING BOLT SLEEVES AND WASHERS MUST BE INSTALLED ON EACH RESTRAINING BOLT ON THE EXISTING PIPE SIDE OF THE CONNECTION.

NOTE:
CONSULT ENGINEER IF WAX-TAPE IS TO BE APPLIED TO COUPLING HARDWARE

D INSULATED COUPLING BONDING
SCALE: NTS

REVISION DESCRIPTION

NO.	DATE	ISSUED FOR REVIEW
1	12/06/19	ISSUED FOR 95% REVIEW
2	01/14/20	ISSUED FOR 95% REVIEW



CATHODIC PROTECTION
CONTINUITY BOND AND FIK DETAILS
WEST COOLEY 2015 FLOOD REPAIRS

TITLE / LOCATION

QUANTIFIED BY	QUALICORR
PROJECT NO.	19-272
DESIGNED BY	MAV
DRAWN BY	CAS
CHECKED BY	VMI
DATE	12/02/19

SHEET CP02

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP
—	05/2021	RECORD DRAWINGS	—	KLH	AJY	RJH



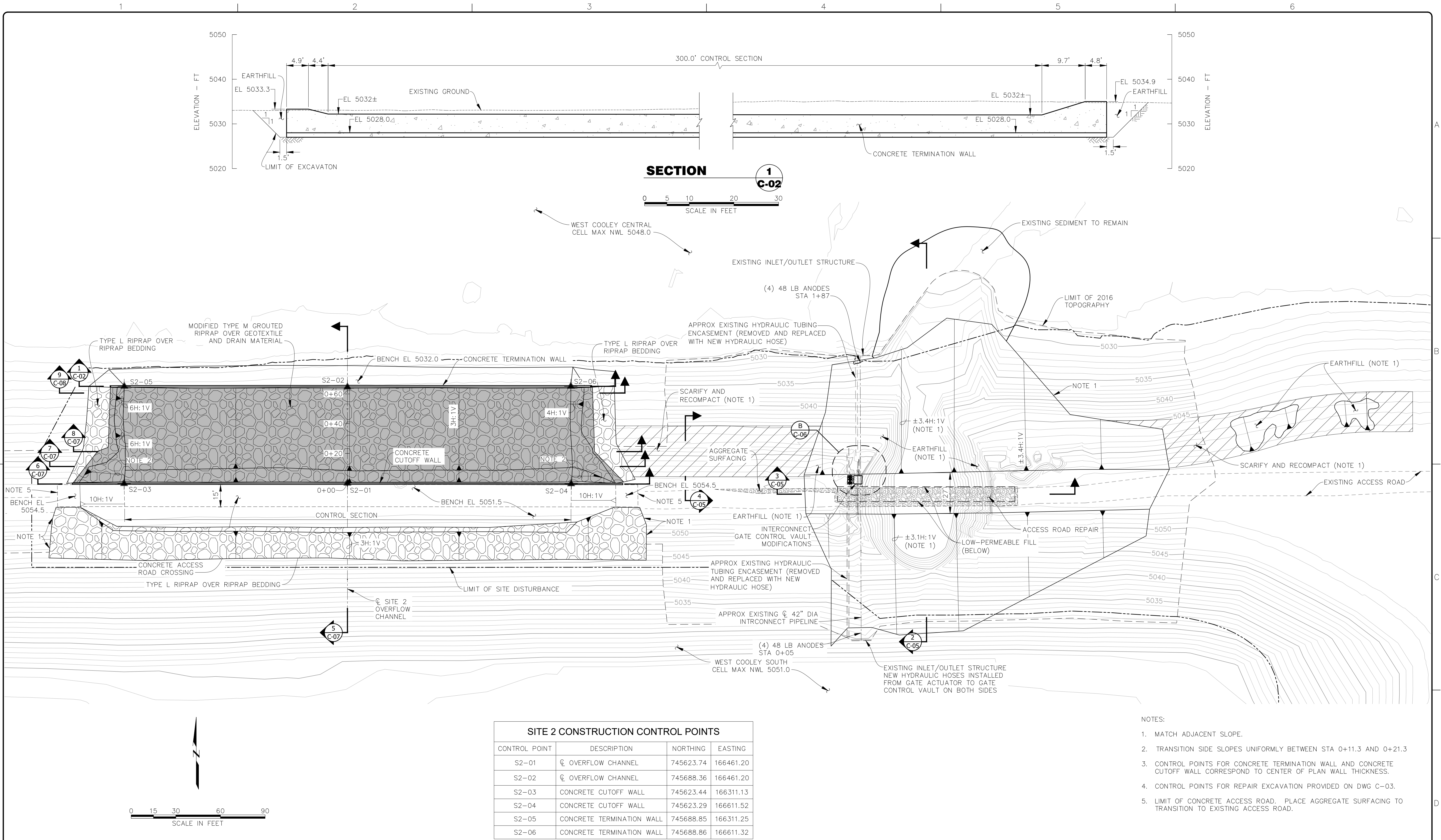
RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 1 - CATHODIC DETAILS
(2 OF 3)

DWG. NO.
B-24
SHEET NO.
33 of 77

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 2 - PLAN OF MODS.DWG 6/14/2021



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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK
					RJH
					APP



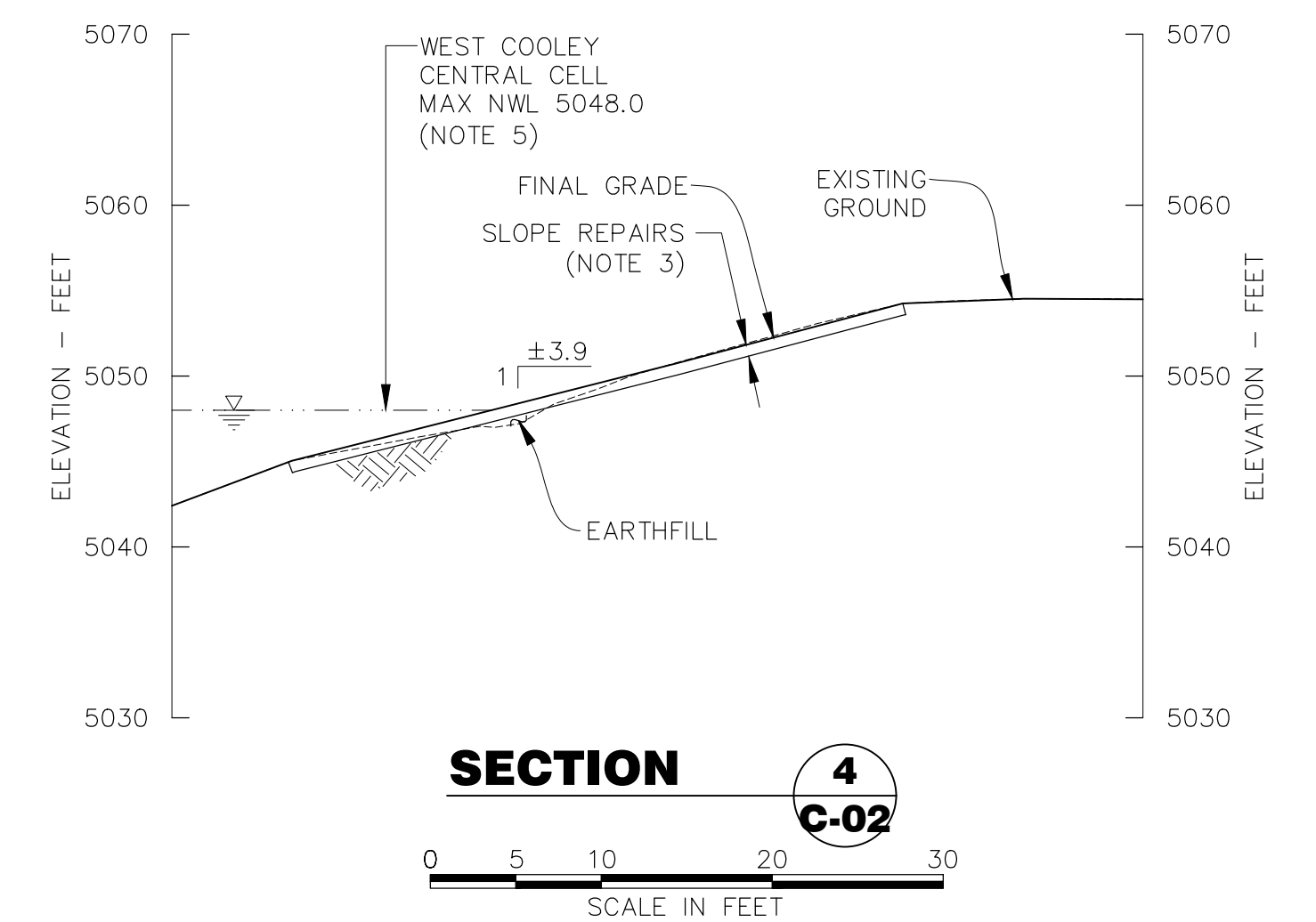
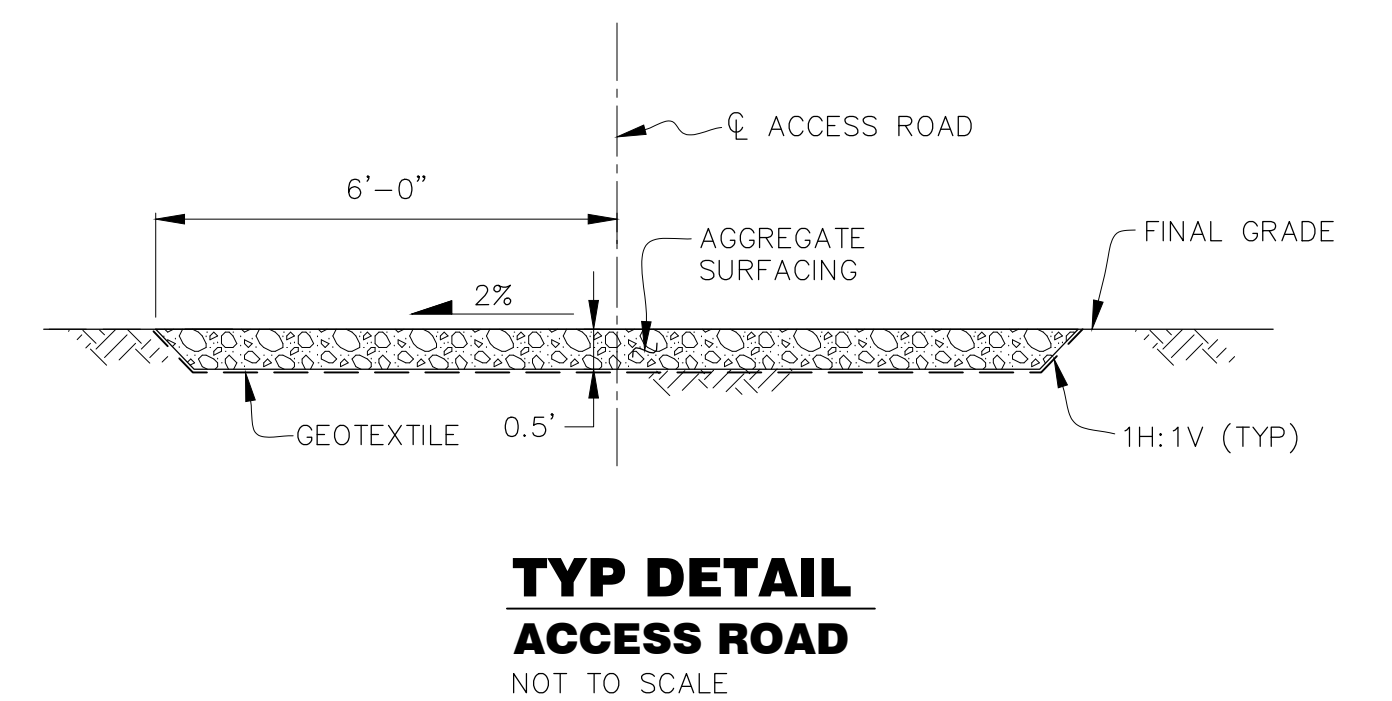
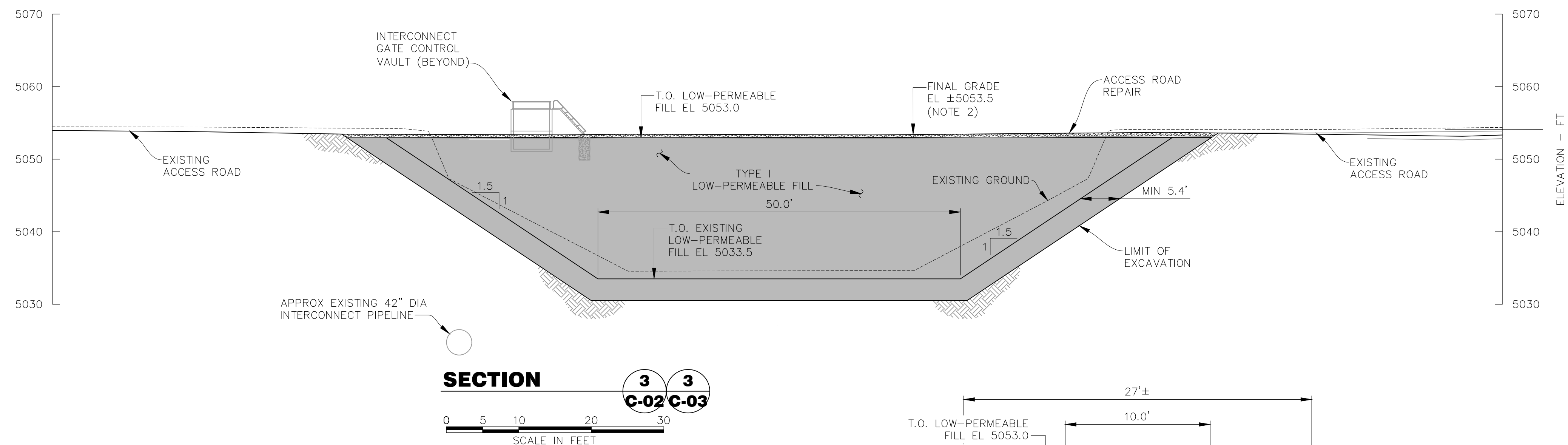
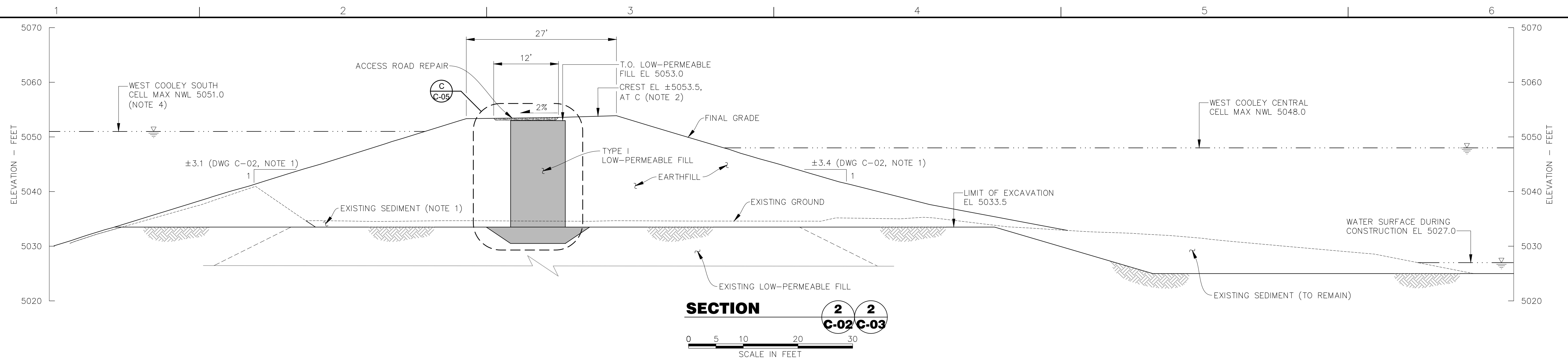
RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 2 - GENERAL PLAN
OF MODIFICATIONS

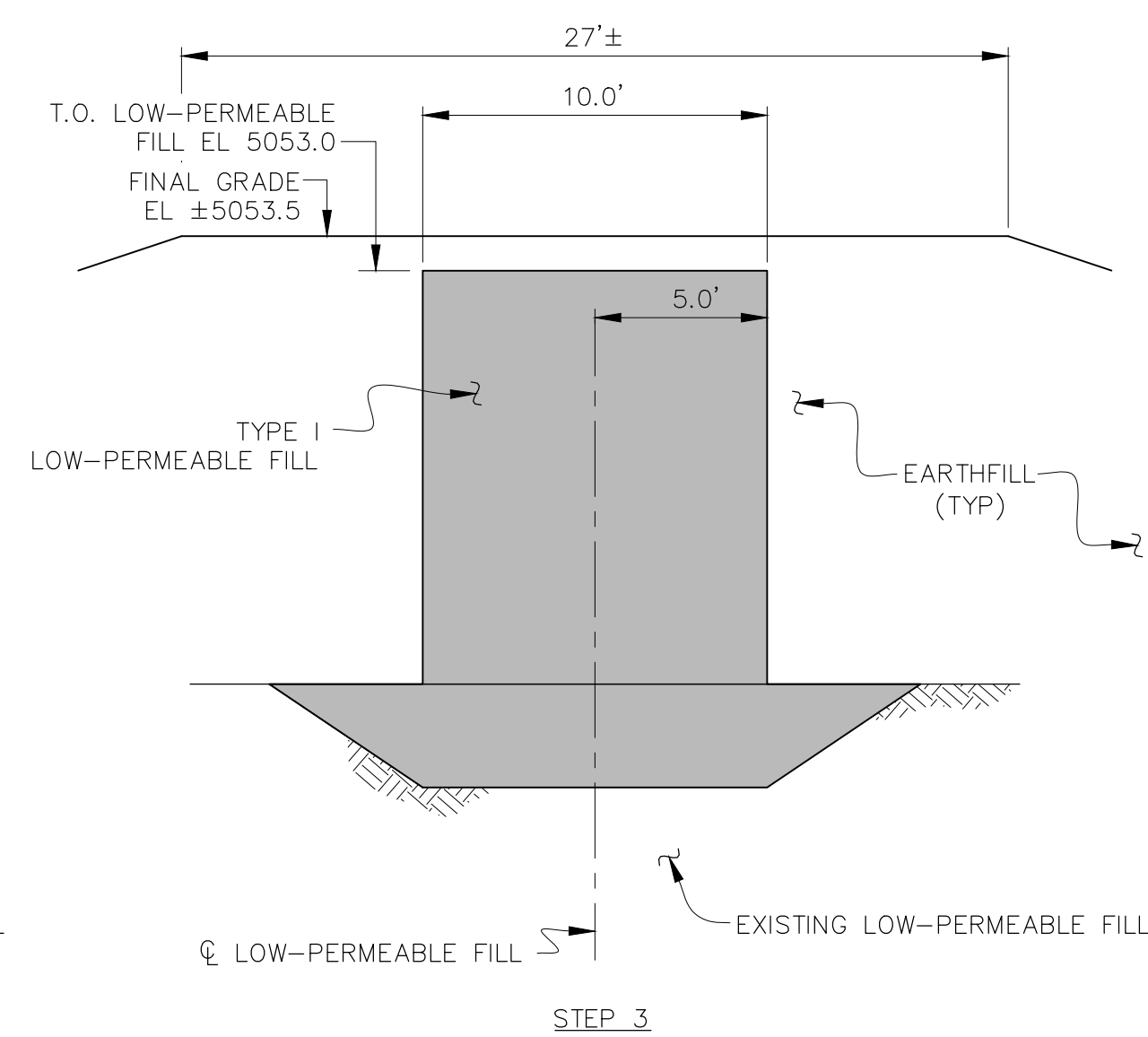
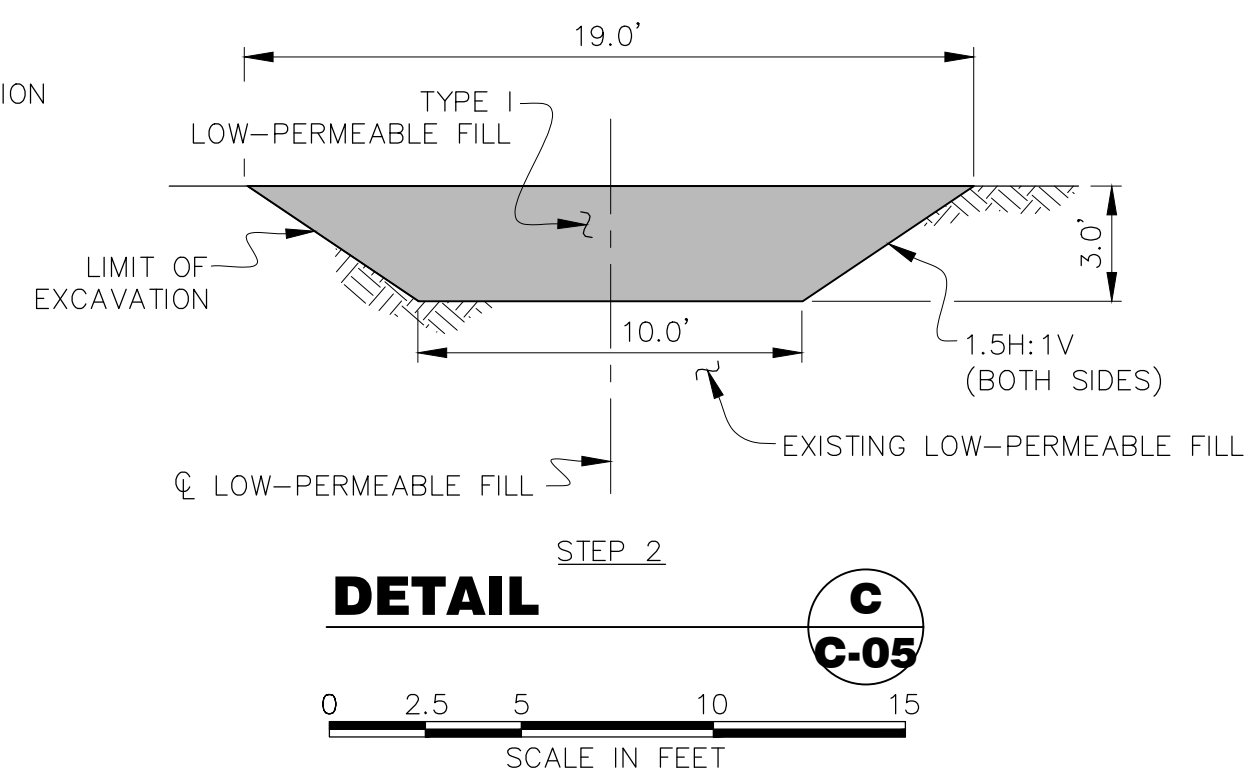
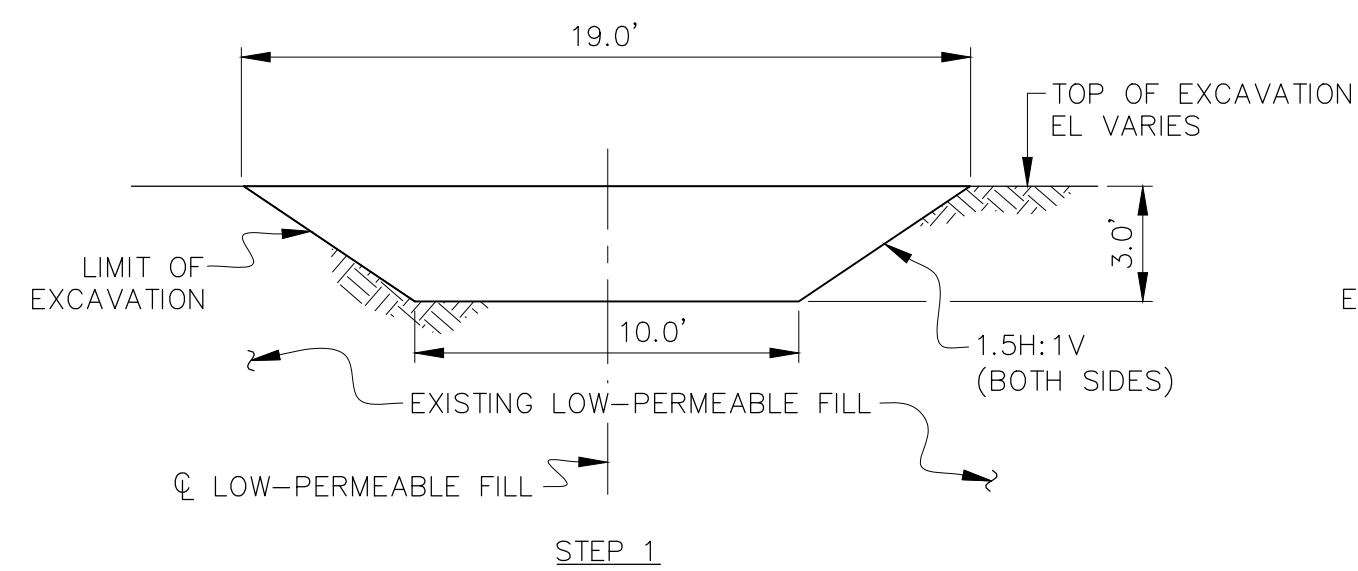
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- LOW-PERMEABLE FILL INSTALLATION SEQUENCE:

1. EXCAVATE AS SHOWN ON DRAWINGS. EXCAVATE ADDITIONAL 3 FEET DEEP TO THE DIMENSIONS PROVIDED.
2. PLACE TYPE I LOW-PERMEABILITY FILL AS SHOWN IN STEP 2.
3. PLACE TYPE I LOW-PERMEABILITY FILL TO ELEVATION 5053.0 AND ADJACENT EARTHFILL AS SHOWN IN STEP 3.



- NOTES:

1. LIMITS OF SEDIMENT MAY VARY FROM THOSE SHOWN.
2. MATCH ADJACENT SLOPE AT BOTH ENDS OF EXCAVATION.
3. REMOVE EXISTING VEGETATION AND DEBRIS. SCARIFY, GRADE, AND RE-COMPACT TOP 8 INCHES.
4. CONSTRUCTION WATER LEVEL IS EL. 5025.0.
5. CONSTRUCTION WATER LEVEL IS EL. 5027.0.

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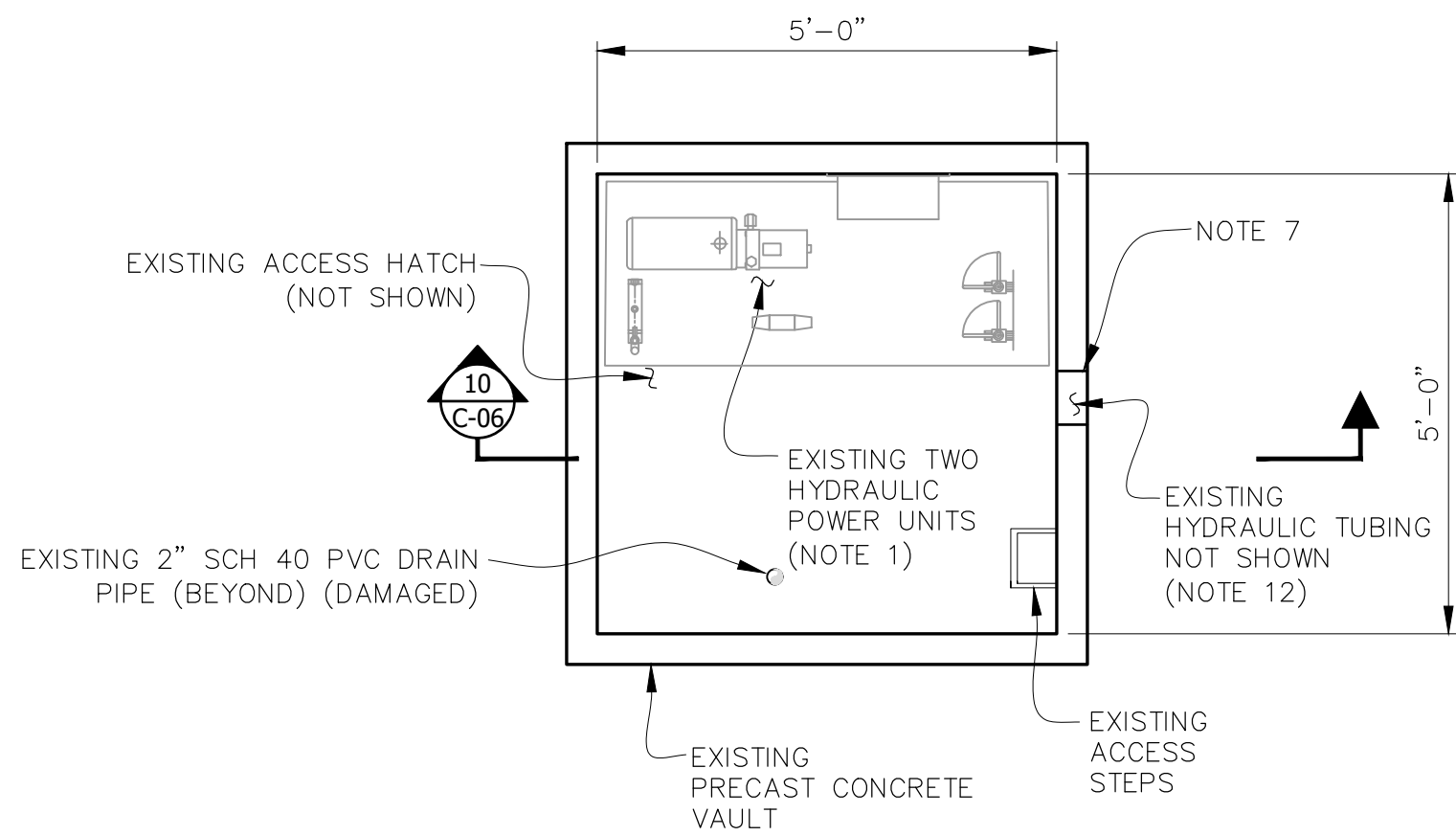
City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 2 - REPAIR SECTIONS

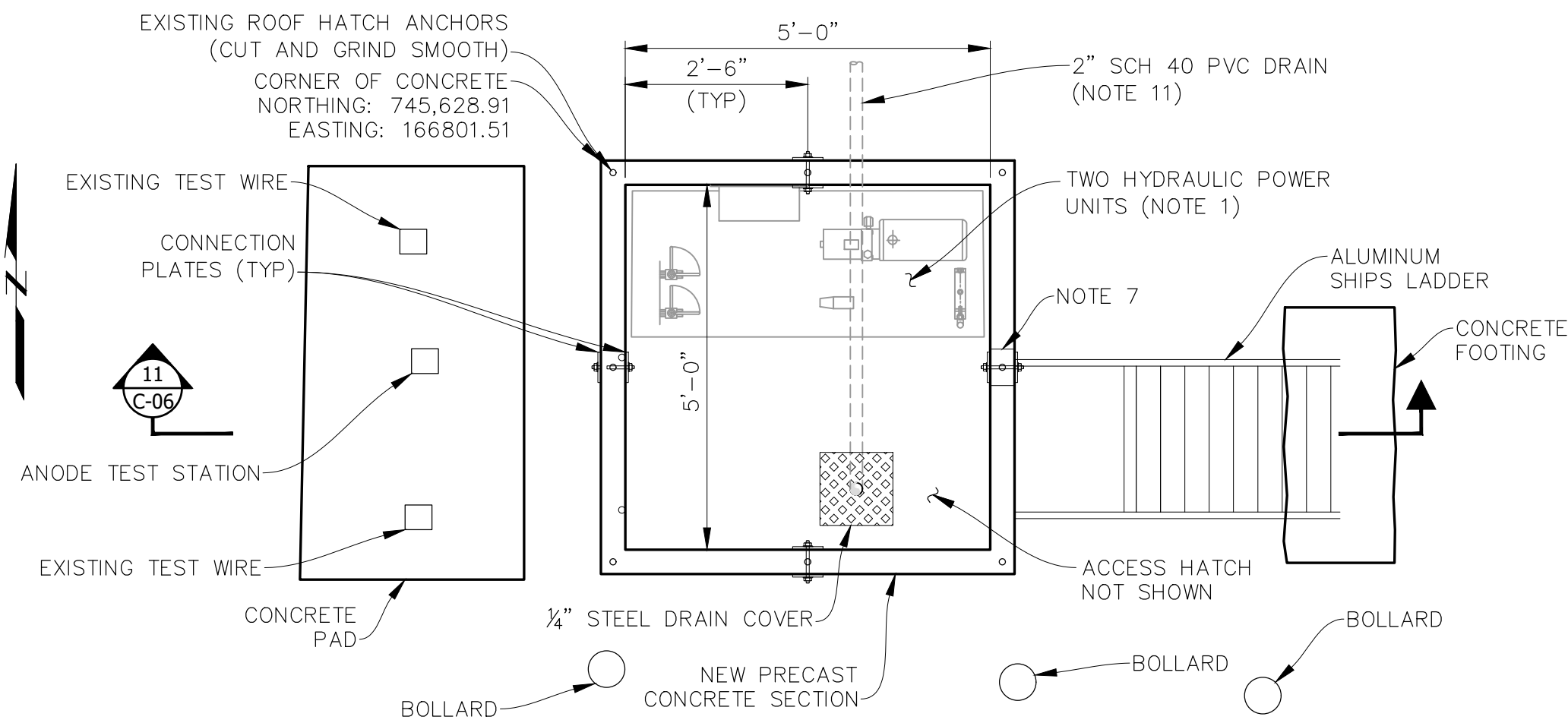
WG. NO.
C-05

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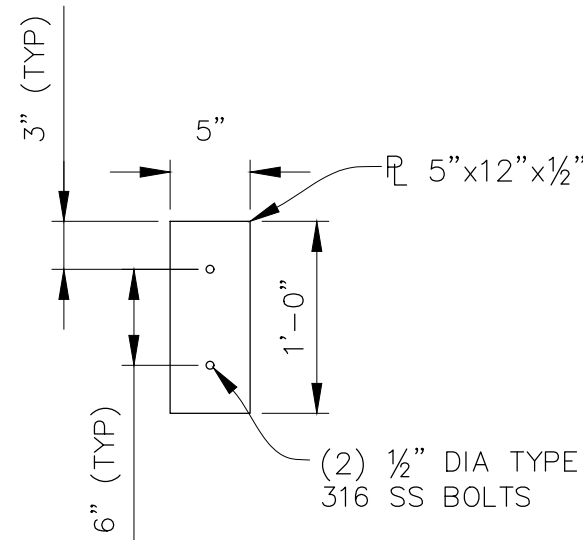
**DETAIL
EXISTING VAULT**

A
C-01

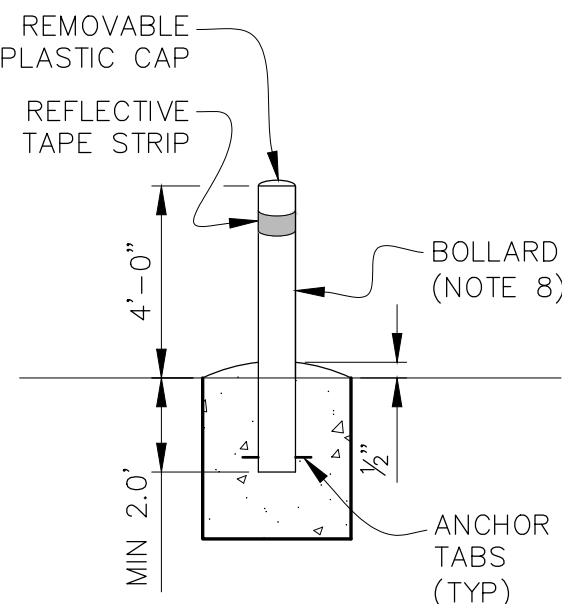


**DETAIL
MODIFIED VAULT**

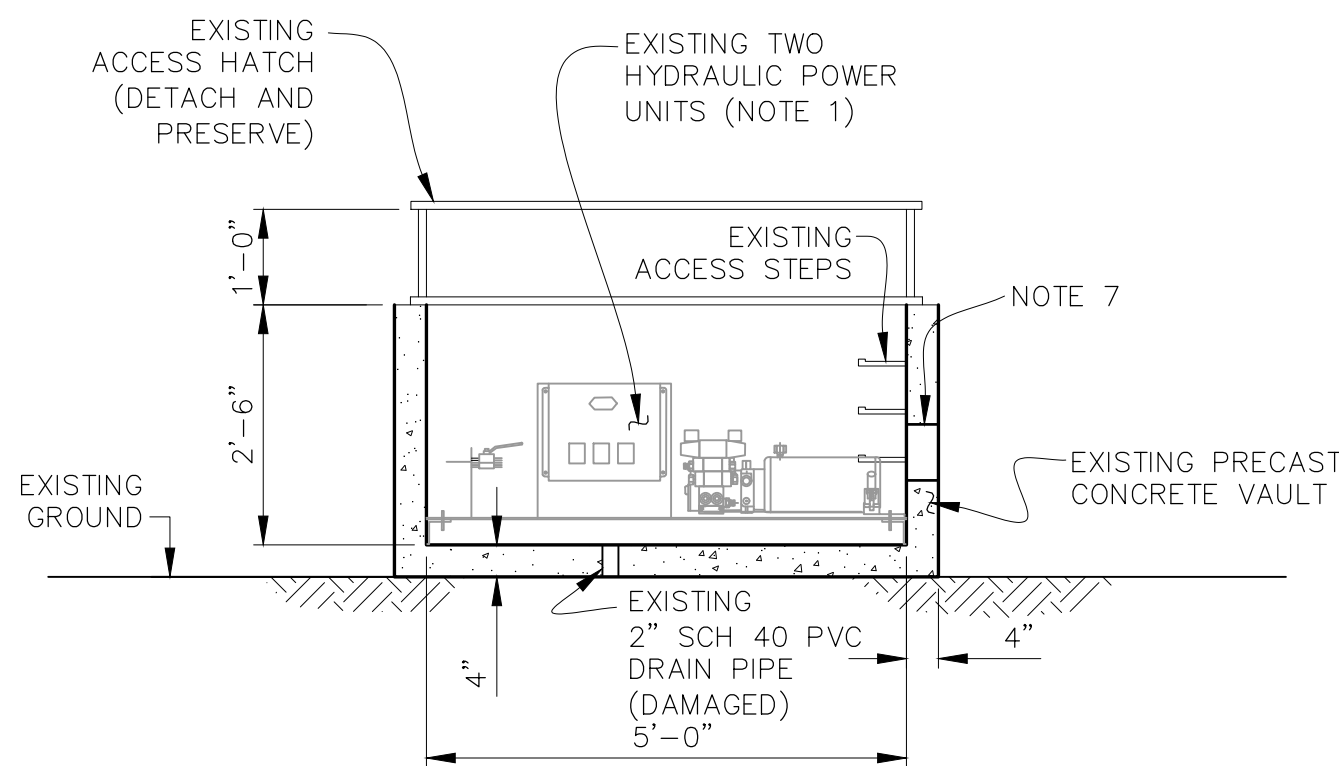
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C-02



**TYP DETAIL
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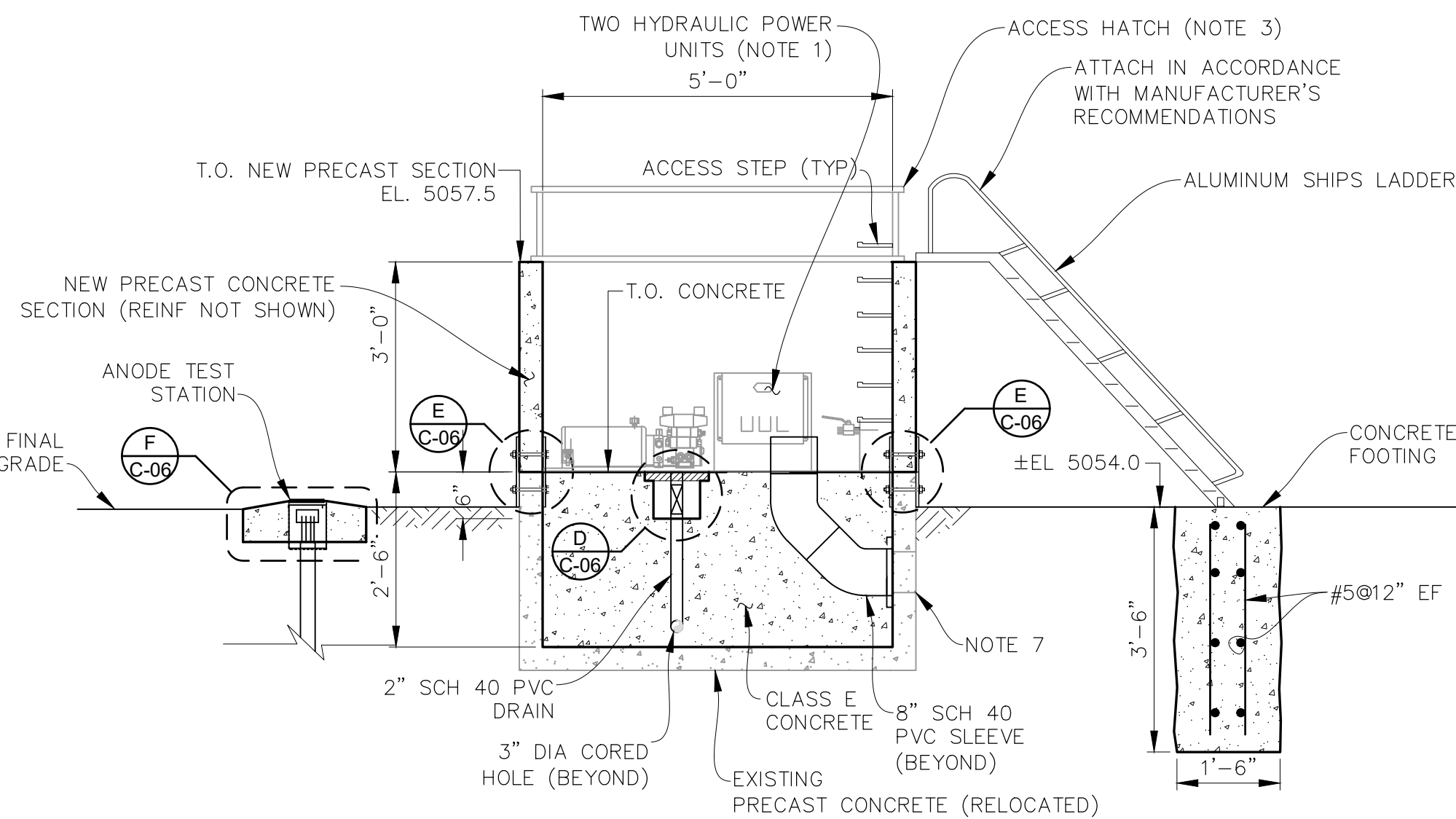


**TYP DETAIL
BOLLARD**
NOT TO SCALE



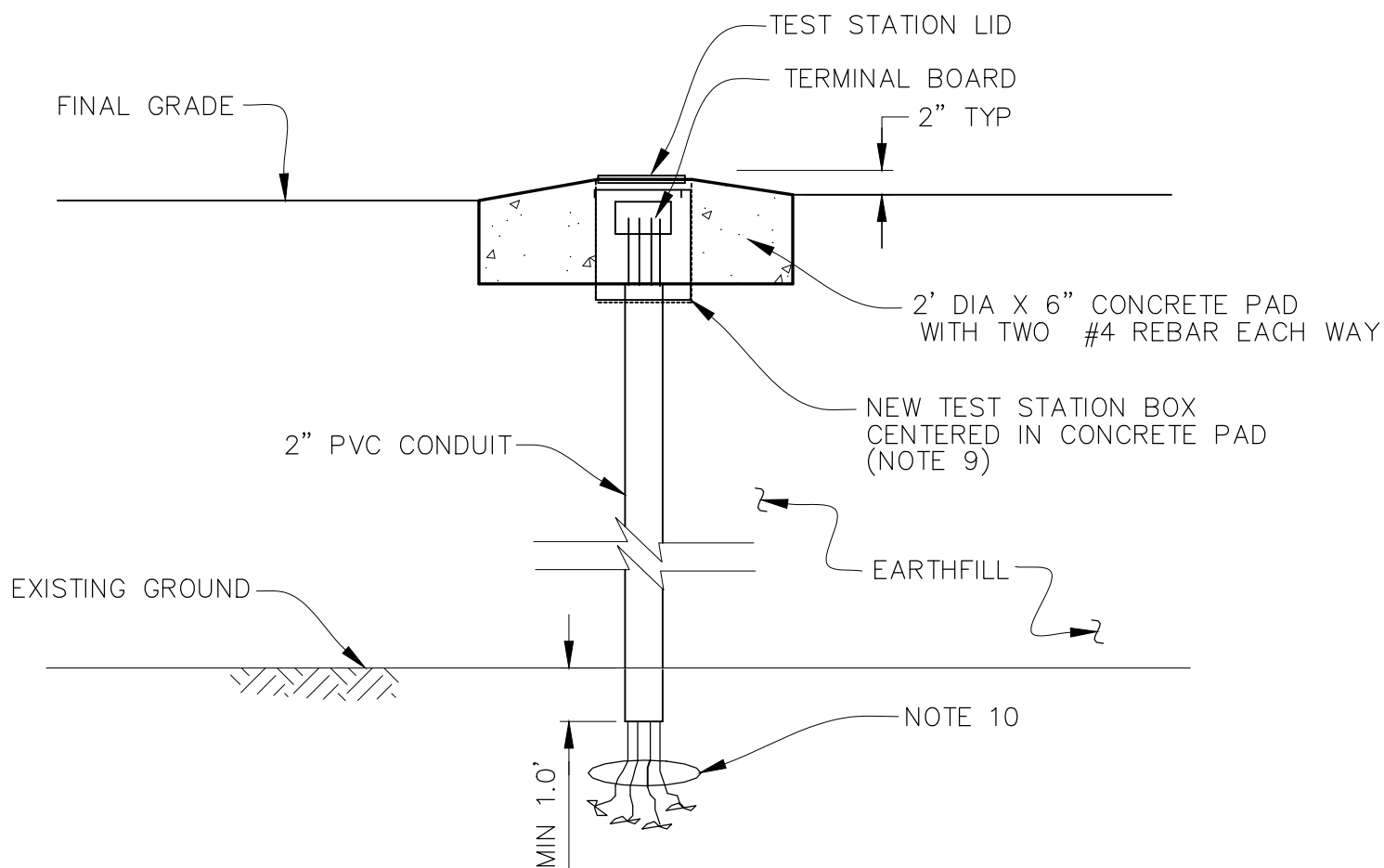
**SECTION
EXISTING VAULT**

10
C-06



**SECTION
MODIFIED VAULT**

11
C-06



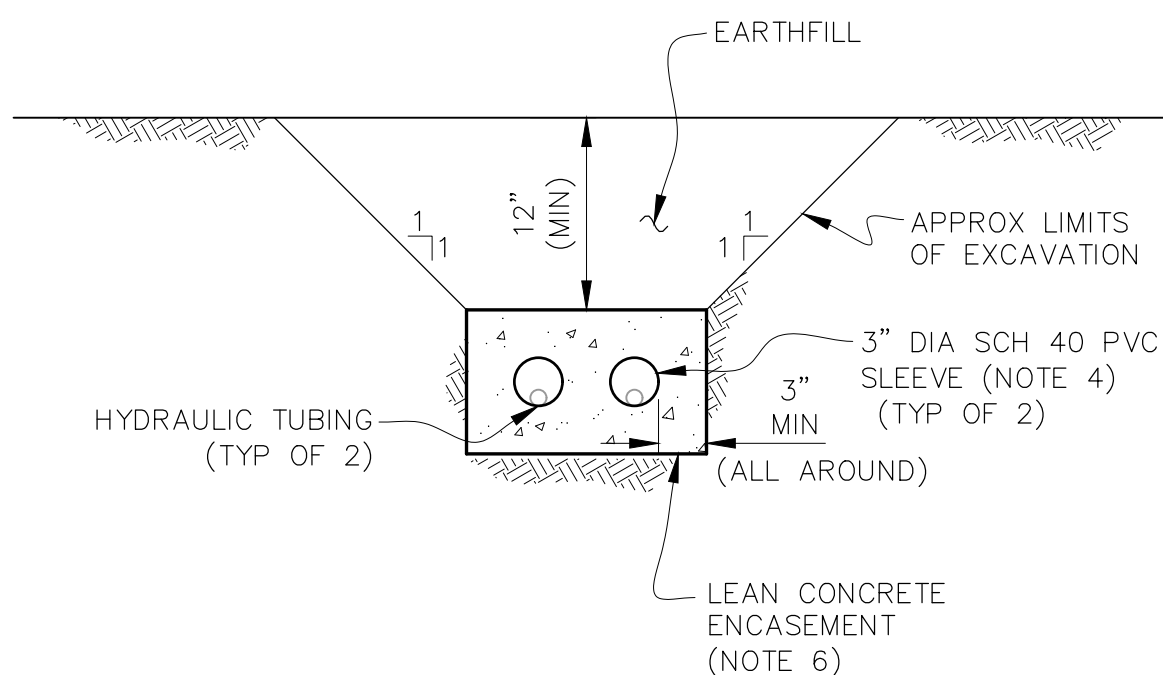
**DETAIL
ANODE TEST
STATION**

F
C-06

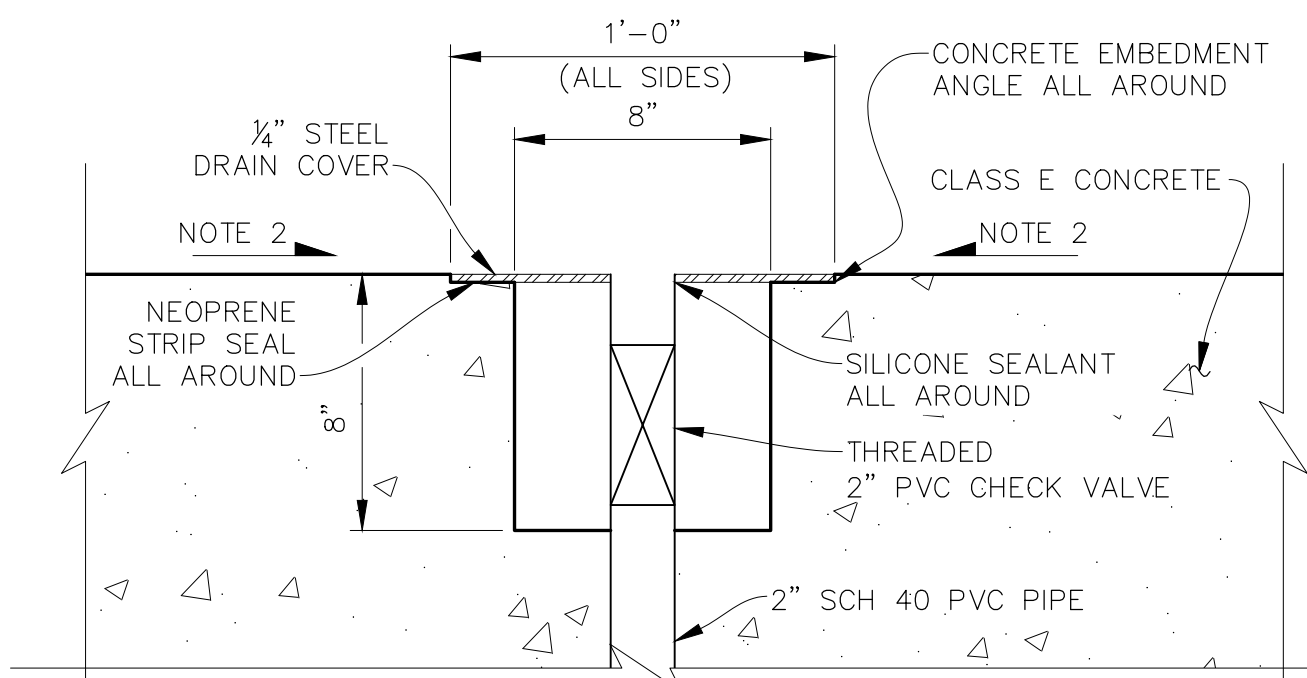
NOT TO SCALE

NOTES:

- PRESERVE AND REINSTALL EXISTING HYDRAULIC POWER UNITS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- SLOPE BACKFILL CONCRETE AT 1-PERCENT SLOPE TOWARDS DRAIN PIPE.
- REINSTALL EXISTING ACCESS HATCH.
- INSTALL PVC PIPE AROUND EXISTING HYDRAULIC TUBING. DO NOT DETACH HYDRAULIC TUBING. CUT PVC PIPE LONGITUDINALLY TO ACCOMMODATE ENCASEMENT OF HYDRAULIC TUBING. INSTALL AND TIGHTEN STAINLESS STEEL BANDS AROUND PVC CONDUITS PRIOR TO ENCASEMENT AT MINIMUM 10 FOOT SPACING.
- NOT USED.
- EXTEND CONCRETE ENCASEMENT TO EXISTING GATE CONTROL VAULT.
- EXISTING 6 INCH TO 7 INCH DIA BLOCKOUT FOR HYDRAULIC TUBING. ANNULAR SPACE FILLED WITH GROUT.
- 5/8 INCH DIAMETER CONCRETE FILLED BEACON TRAFFIC BOLLARD, TYPE BBOLPP-48-5.5. SET BOLLARD IN CONCRETE PER MANUFACTURERS SPECIFICATIONS. MINIMUM DEPTH 3.0 FEET. POWDER COATED SAFETY YELLOW FINISH.
- A MINIMUM OF 2 FEET OF SLACKWIRE SHALL BE PROVIDED FOR ALL WIRES INSIDE THE TEST STATION BOX. THE 2" PVC CONDUIT SHALL EXTEND APPROXIMATELY 3 INCHES INTO THE BOTTOM OF THE TEST STATION BOX.
- LOCATE EXISTING WIRES. CUT WIRES BACK TO REMOVE FRAYED ENDS. SPLICE NEW WIRES ON TO EXISTING WIRES WITH WATERPROOF SPLICE. LOCATE THE SPLICES WITHIN THE PVC CONDUIT.
- SLOPE AT 2-PERCENT TO DAYLIGHT IN RESERVOIR WITH 2" STAINLESS STEEL FLAPGATE
- FIELD VERIFY LOCATION OF EXISTING HYDRAULIC TUBING.

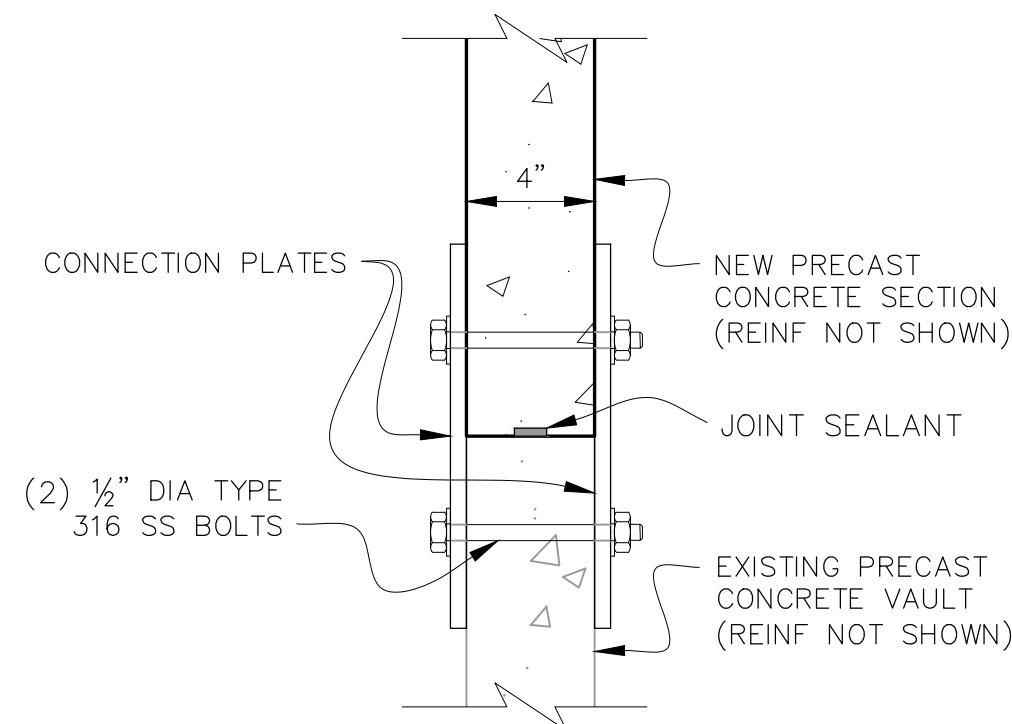
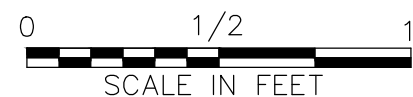


**TYPICAL SECTION
HYDRAULIC TUBING ENCASEMENT**



DETAIL

D
C-06



DETAIL

E
C-06



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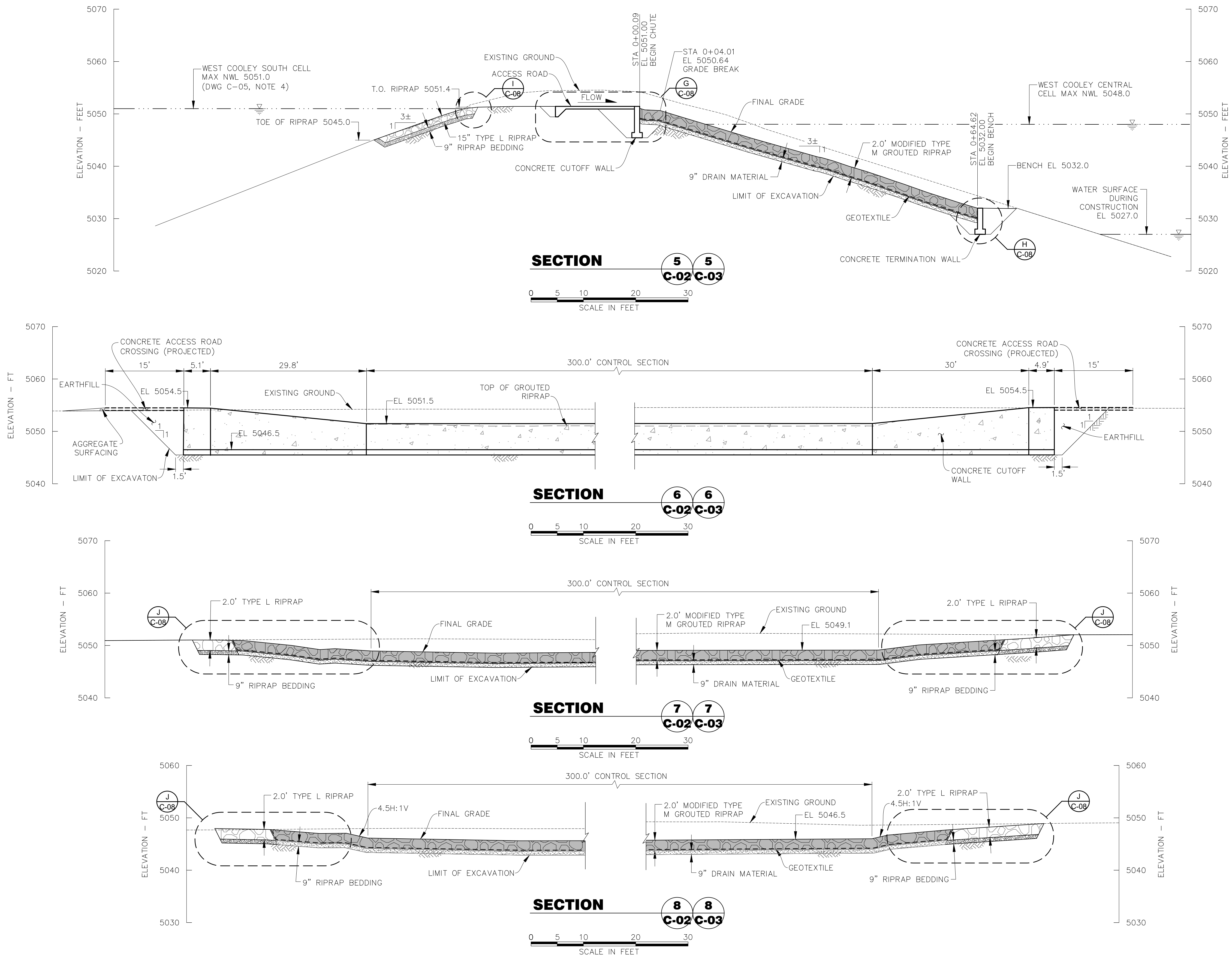
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 2 - INTERCONNECT
GATE CONTROL VAULT
MODIFICATIONS

DWG. NO.
C-06

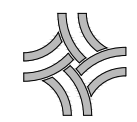
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City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

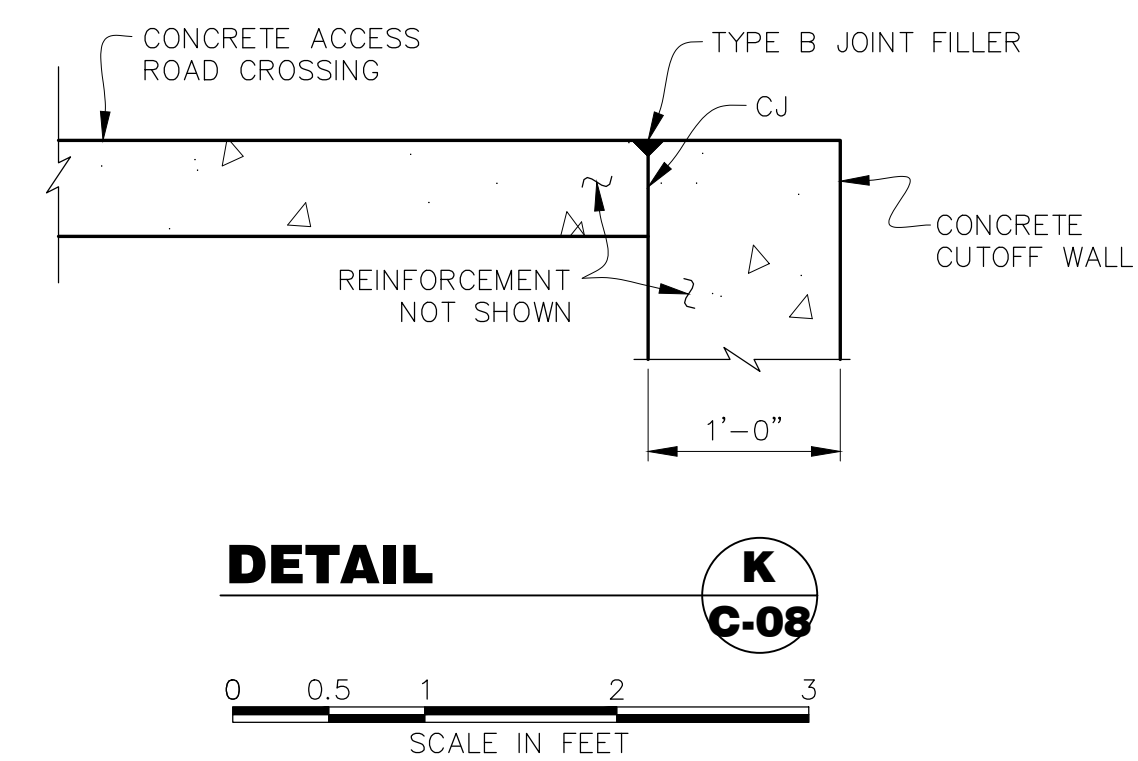
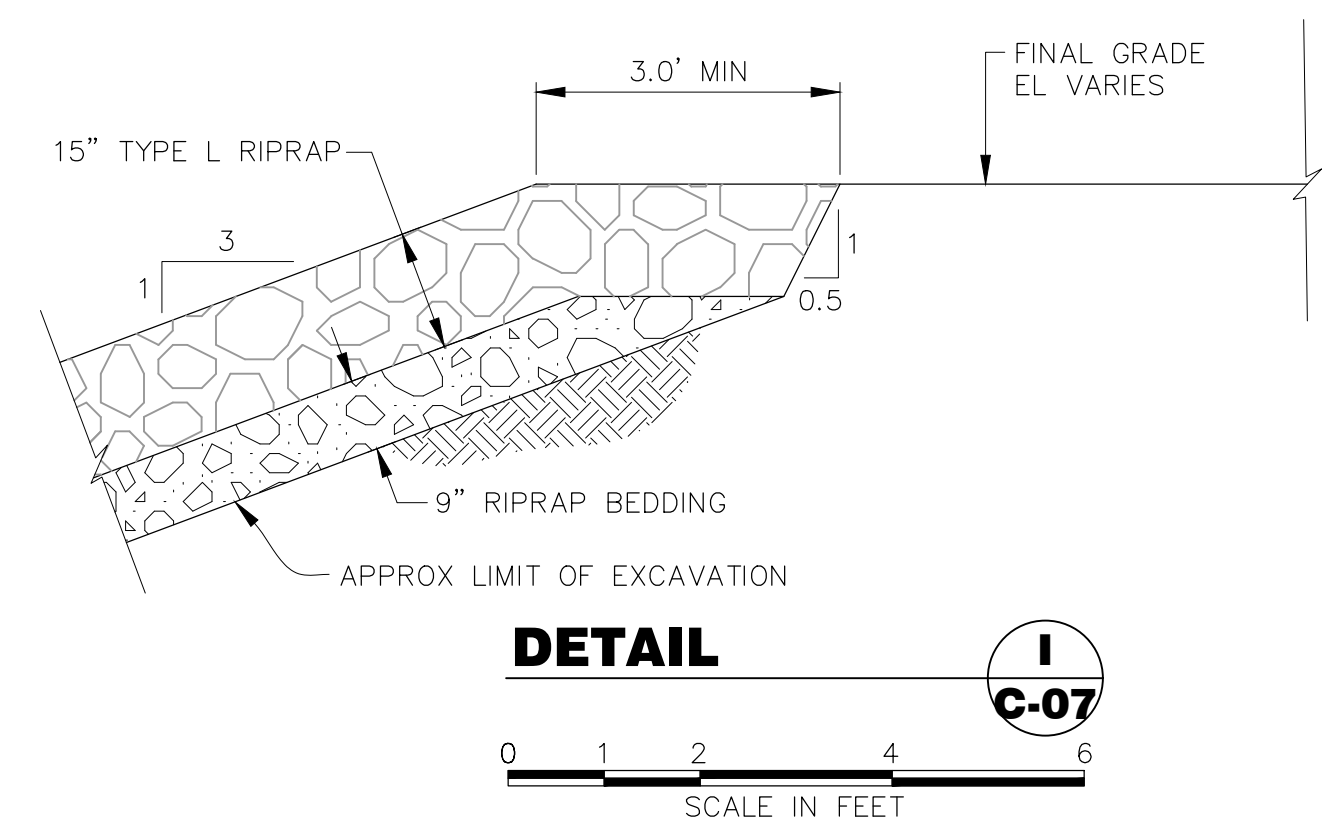
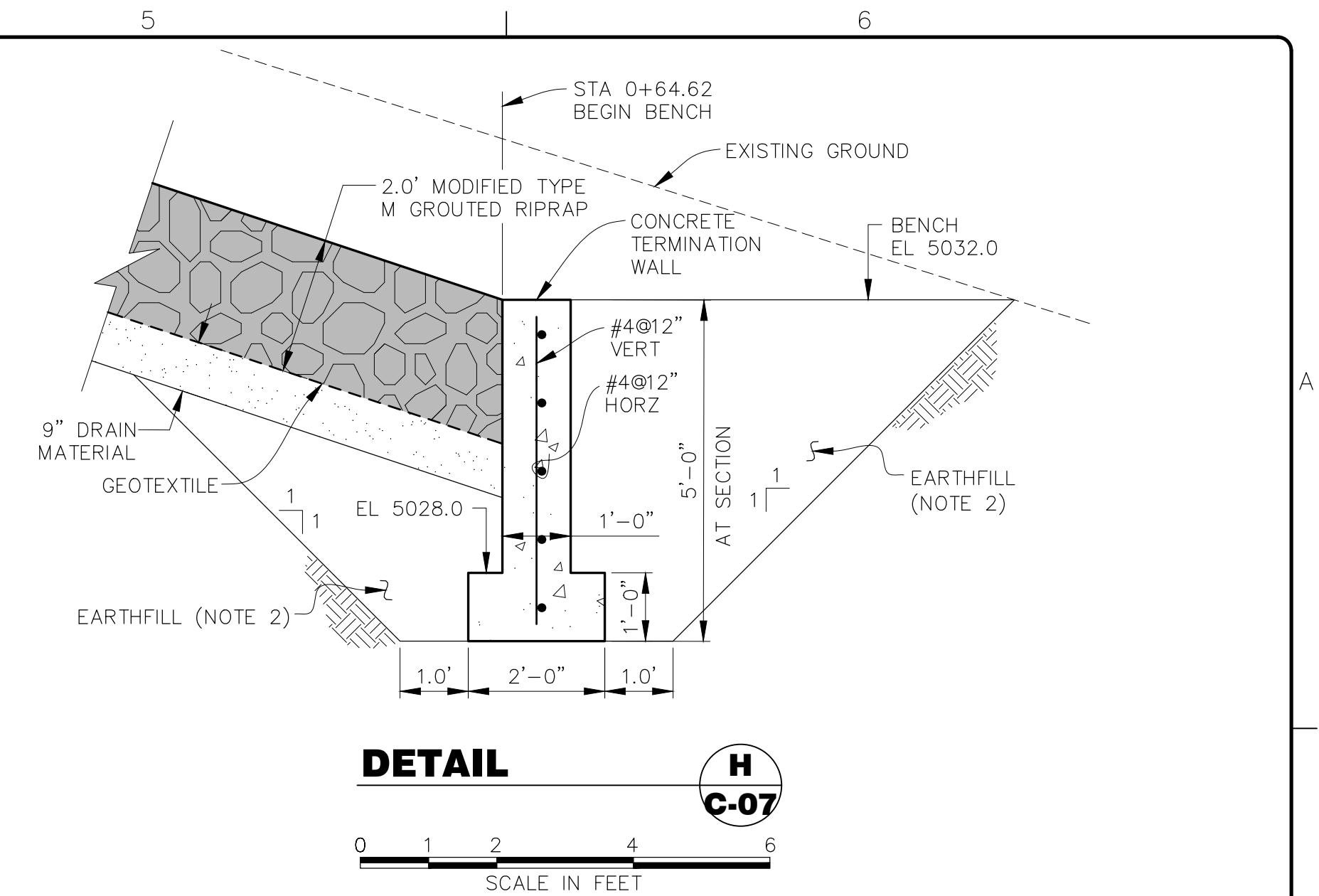
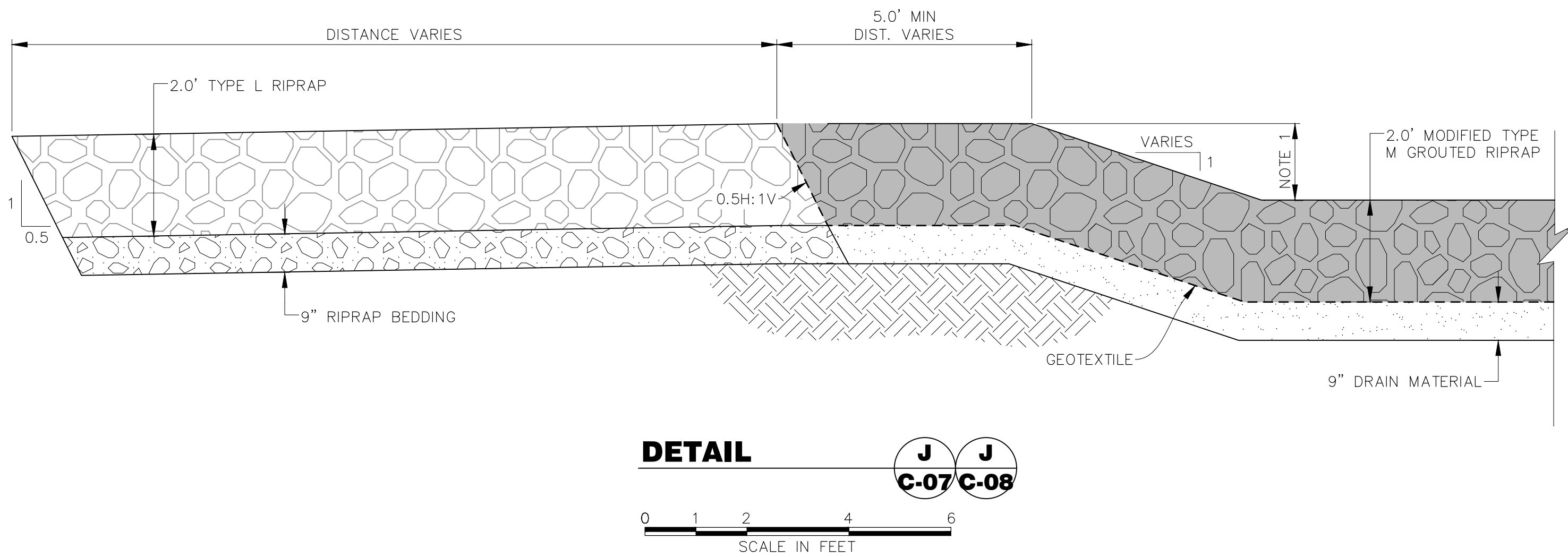
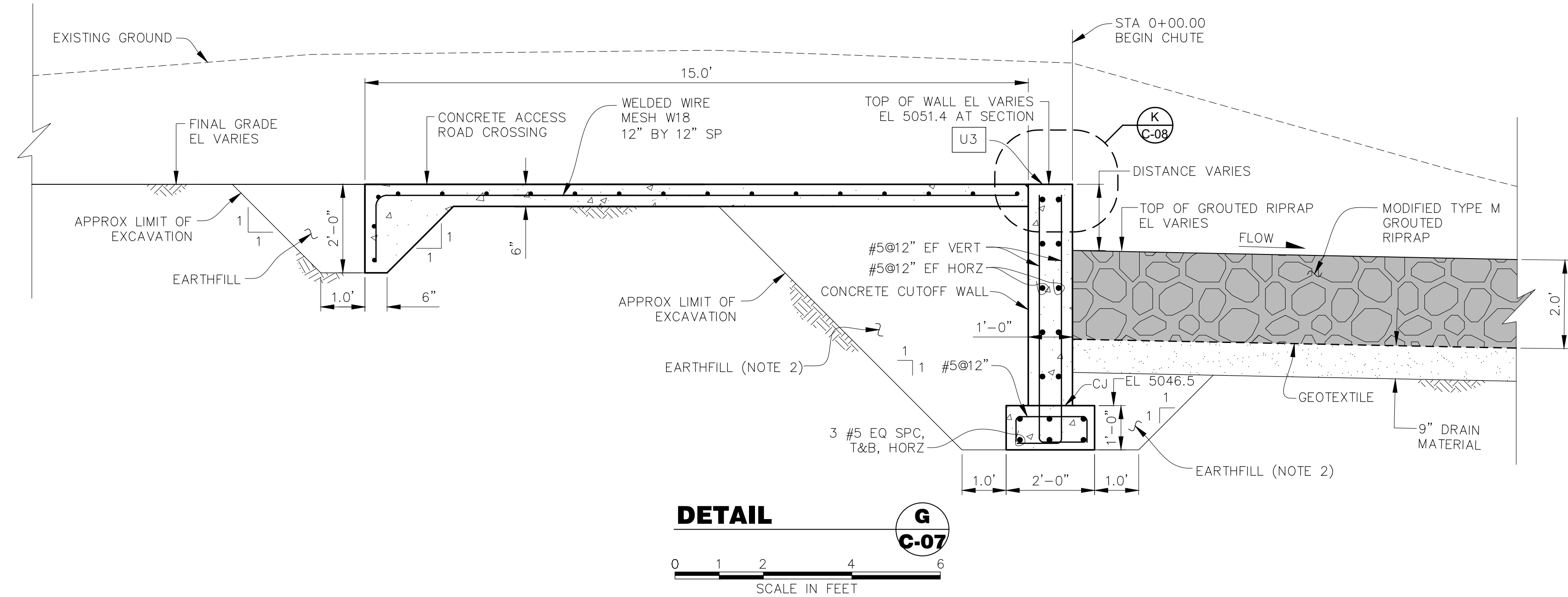
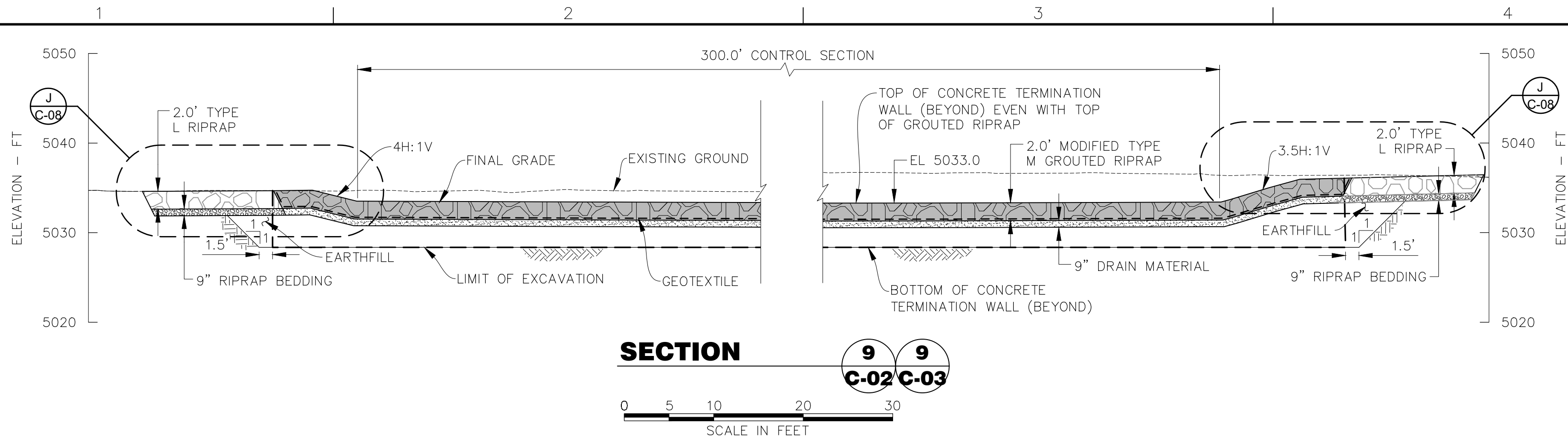
SITE 2 - OVERFLOW
CHANNEL SECTIONS
(1 OF 2)

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C-07

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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 2 - PLAN OF MODS.DWG 6/14/2021



- NOTES:
1. PROVIDE 2-FOOT MINIMUM BETWEEN STA 0+00 AND 0+11.3 AND 1.5-FOOT MINIMUM BETWEEN STA 0+11.3 AND 0+64.6.
 2. MAINTAIN FILL LEVEL WITHIN 2 FT ON ALL SIDES OF STRUCTURE.

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RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 2 - OVERFLOW
CHANNEL SECTIONS
(2 OF 2)

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C-08
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Diagram A: THERMITE WELD DETAIL. Shows a cross-section of a pipe with a thermite weld connecting a lead wire to the inside pipe wall. Labels include: THERMITE WELD, PATCH COATING, LEAD WIRE, COPPER SLEEVE (IF REQ'D), STRUCTURE COATING, and INSIDE PIPE WALL.

A THERMITE WELD DETAIL
SCALE: NTS

THERMITE WELDING INSTRUCTIONS:

1. REMOVE APPROXIMATELY 4" DIAMETER CIRCLE OF PIPELINE COATING AT STRUCTURE CONNECTION LOCATION.
2. CLEAN AREA APPROXIMATELY 2" DIAMETER TO BRIGHT METAL.
3. REMOVE 2" OF INSULATION FROM END OF WIRE.
4. WELD CONDUCTOR TO PIPE. USE APPROPRIATE GRAPHITE MOLD AND CARTRIDGE CHARGE SIZE. COPPER SLEEVES ARE REQUIRED FOR #8 AWG OR SMALLER WIRES.
5. TEST THE THERMITE WELD CONNECTION BY STRIKING THE COMMON SEVERAL BLOWS ON THE SIDE USING A ONE POUND HAMMER. TOP OF WELD MAY BE HAMMERED FLAT IF REQUIRED.
6. APPLY HANDY-CAP. SEE DETAIL B.

Diagram B: HANDY-CAP APPLICATION. Shows a cross-section of a pipe with a handy-cap installed over a thermite weld. Labels include: HANDY-CAP, PIPELINE, and PIPE LEADS TO TEST STATION.

B HANDY-CAP APPLICATION
SCALE: NTS

HANDY-CAP APPLICATION PROCEDURES:

1. CLEAN ALL MUD, DIRT, GREASE, OIL, AND OTHER CONTAINMENTS FROM THE METAL SURFACE AND ANY PART OF THE MILL APPLIED COATING WHICH IS TO BE COVERED.
2. APPLY A COAT OF ROYSTON 747 PRIMER (if required) AND ALLOW TO DRY TO A NON-GLOSSY APPEARANCE, WHICH WILL TAKE APPROXIMATELY 5 MINUTES DEPENDING ON HUMIDITY AND TEMPERATURE.
3. REMOVE THE RELEASE PAPER FROM THE BOTTOM OF THE ROYSTON HANDY CAP. BEND THE PLASTIC SHEET INWARD AT THE SERRATIONS WHEN APPLYING TO A SMALL DIAMETER PIPE. POSITION AND PLACE THE HANDY CAP ON THE WELDED AREA WITH THE TUNNEL OVER THE LEAD WIRE.
4. PUSH THE DOME OF THE CAP FIRMLY IN THE WELD AREA. NOW LIFT THE WIRE AWAY FROM THE PIPE AND SQUEEZE THE BLACK RUBBER COMPOUND COMPLETELY AROUND AND UNDERNEATH THE WIRE. THEN PUSH THE LEAD WIRE BACK DOWN ON THE PIPE AND PRESS THE ELASTOMERIC COMPOUND INTO FIRM CONTACT WITH THE PIPE OVER THE ENTIRE AREA.

NO FURTHER PROTECTION IS NECESSARY IF THE ROYSTON HANDY CAP COVERS THE ENTIRE EXPOSED METAL AREA. UNCOVERED AREAS SHOULD BE PROTECTED BY APPLYING TAPE OR MASTIC SUCH AS TRENTON PIPELINE TAPE CP OR ROYSTON ROSKOTE MASTIC.

WHEN COATING OR WRAPPING THE ROYSTON HANDY CAP, REMOVE THE NARROW STRIPS OF PLASTIC RELEASE FILM ON THE TOP OF THE CAP. THIS WILL ASSURE MAXIMUM PROTECTION BY EFFECTING A POSITIVE WATERPROOF SEAL.

Diagram C: WIRE SPLICING PROCEDURE. Shows a cross-section of a cable with a splice enclosure. Labels include: CABLE, CONDUCTOR, BURNDY CRIMP FITTING (SIZED TO MATCH APPLICATION), and SPLICE ENCASEMENT. Dimension: 6-18 IN. TYP.

C WIRE SPLICING PROCEDURE
SCALE: NTS

NOTE:
ALL SPLICES MUST BE APPROVED BY ENGINEER PRIOR TO USE. PROVIDE WIRING OF SUFFICIENT LENGTH SO THAT ADDITIONAL SPLICES ARE NOT REQUIRED.

TYPICAL PROCEDURE TO SPLICE ANODE OR CABLE:

1. CUT BACK INSULATION FROM END OF ANODES OR CABLES APPROX. 1 INCH. BE SURE ALL CABLE ENDS AND CONNECTIONS ARE CLEAN OF DIRT AND FOREIGN MATTER AND THAT ALL CONNECTIONS ARE BARE METAL.
2. PUT CABLES IN APPROPRIATE SIZED CRIMP FITTING AND CRIMP.
3. APPLY ELECTRICAL PUTTY TO FILL IN ANY VOIDS AND IRREGULAR SHAPES.
4. APPLY ELECTRICAL RUBBER TAPE AROUND THE PUTTY AND CABLE WHERE INSULATION WAS REMOVED.
5. APPLY ELECTRICAL TAPE ALONG THE ENTIRE SPLICE AND A MINIMUM OF 2 INCHES ON EACH ANODE OR CABLE END.
6. APPLY ELECTRICAL COATING ALONG THE ENTIRE SPLICE.
7. EPOXY SPLICE KIT MAY BE USED IN LIEU OF RUBBER AND PLASTIC TAPE.

NOTES:

1. INFORMATION FROM SUBMITTAL.

DATE	1/10/20	ISSUED FOR BOX REVIEW
NO.	1	

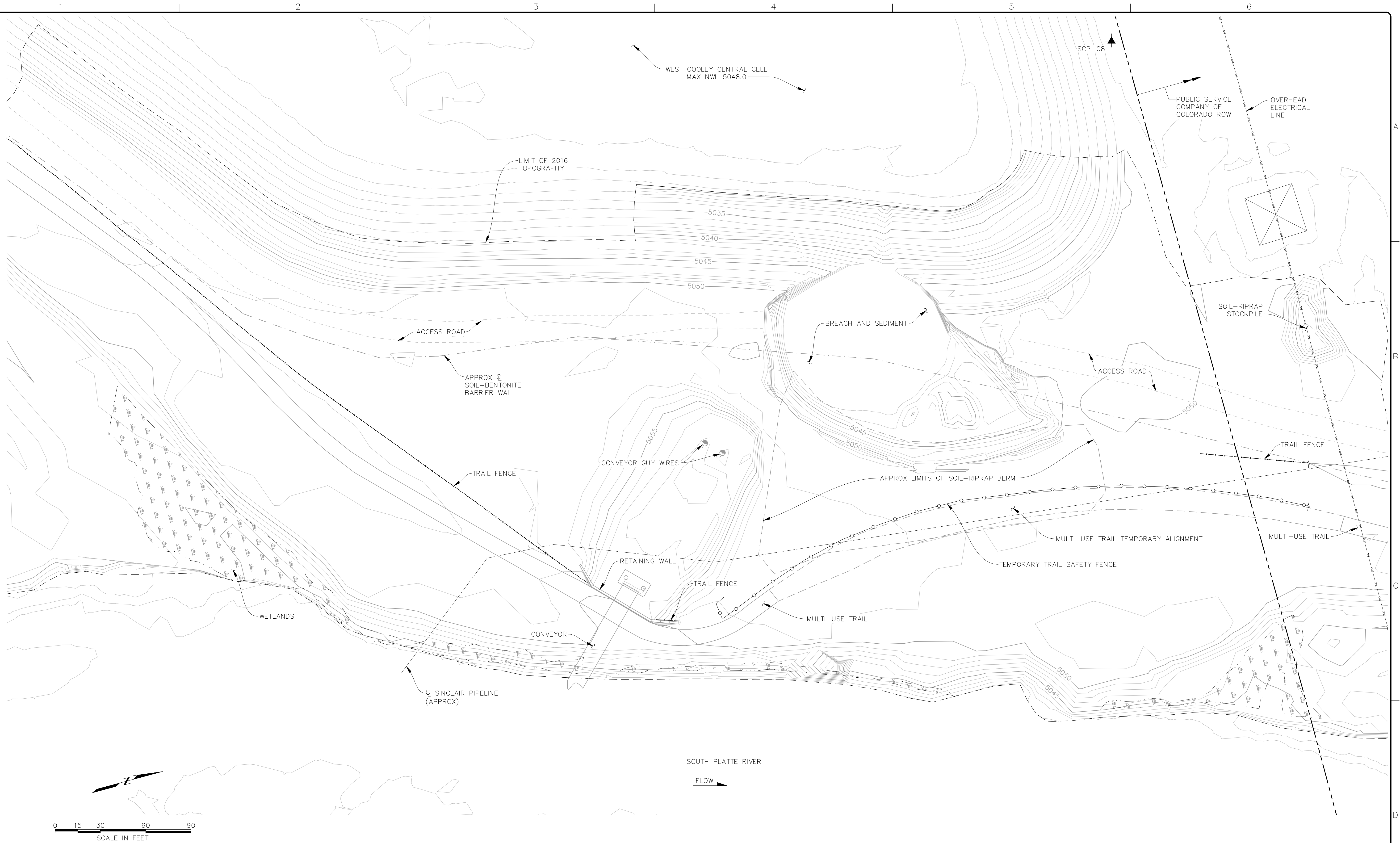
CATHODIC PROTECTION
STANDARD DETAILS
WEST COOLEY 2015 FLOOD REPAIRS

QUALICORR	19-PT2	MMV	CAS	MMV	12/02/19
PROJECT NO.	19-PT2	DESIGNED BY	MMV	CHECKED BY	MMV
DRAWN BY	CAS	DATE	12/02/19		

CP02

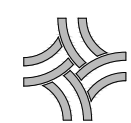
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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - PLAN OF EXISTING CONDITIONS.DWG 6/14/2021



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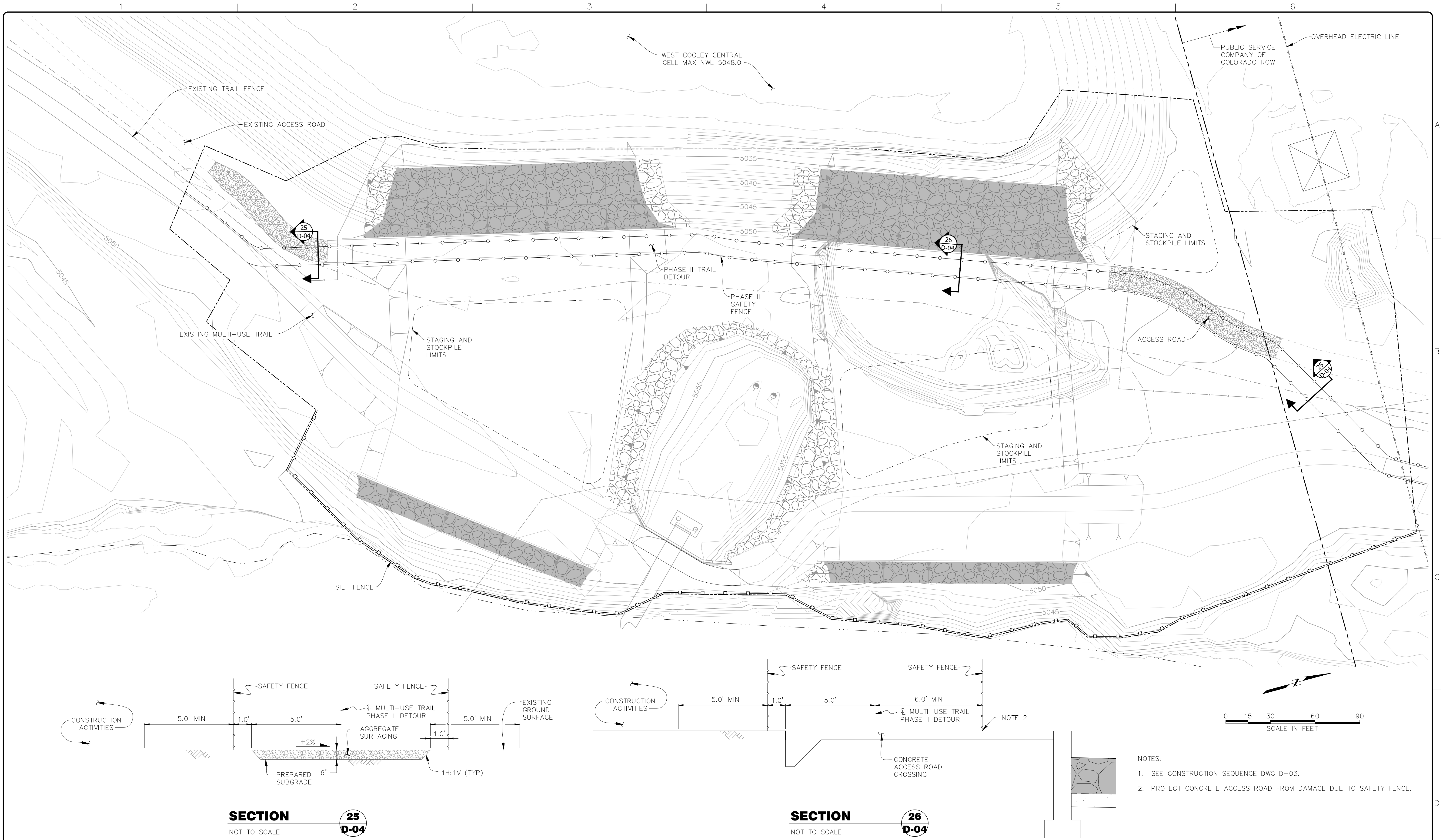
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - PLAN OF EXISTING
CONDITIONS

DWG. NO.
D-01

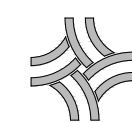
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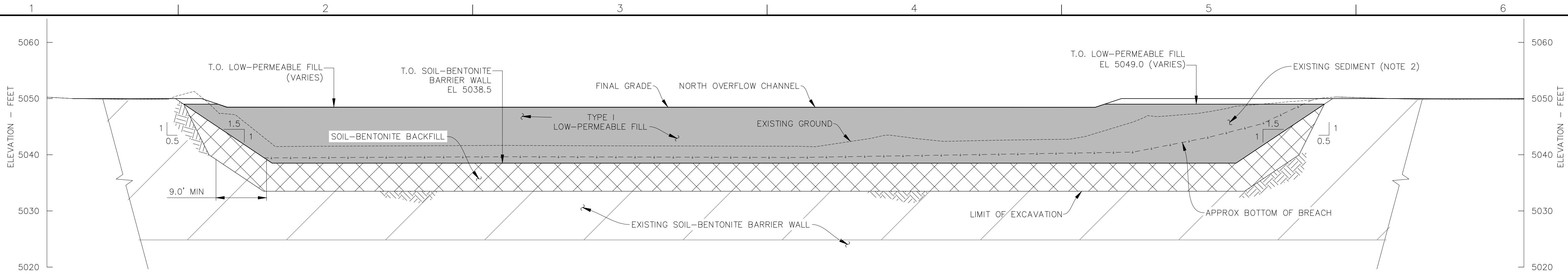
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - PHASE II
CONSTRUCTION

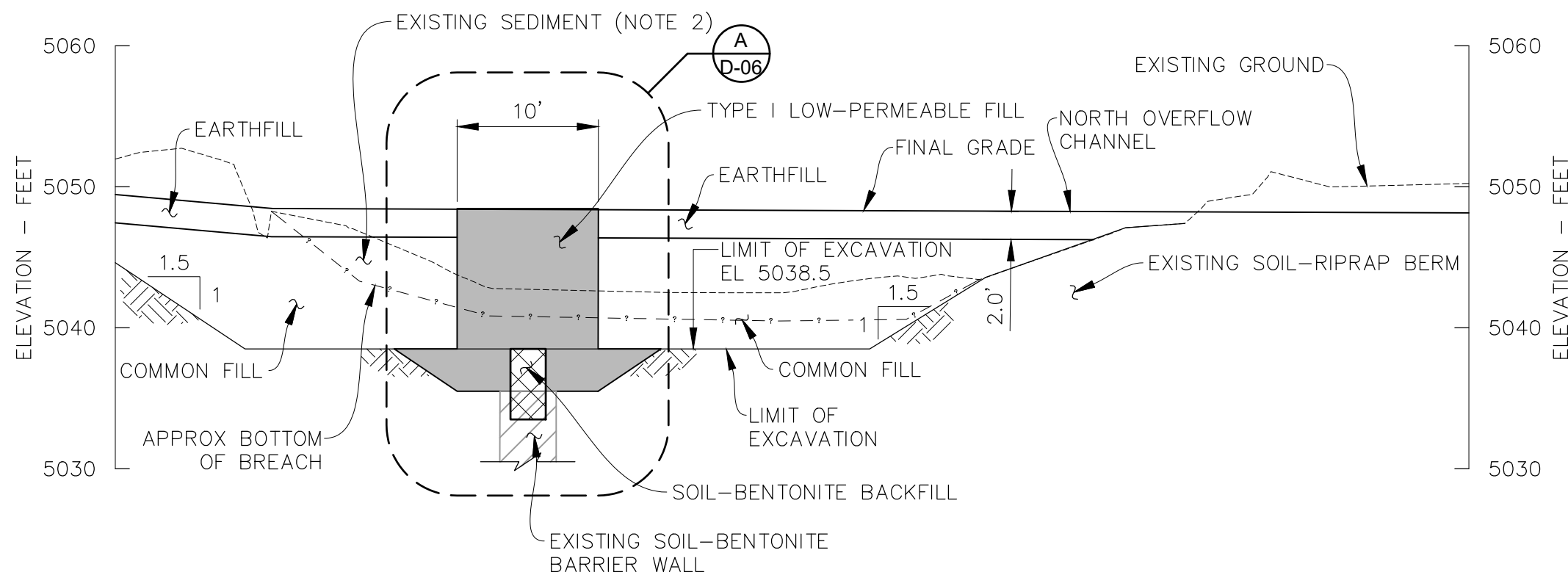
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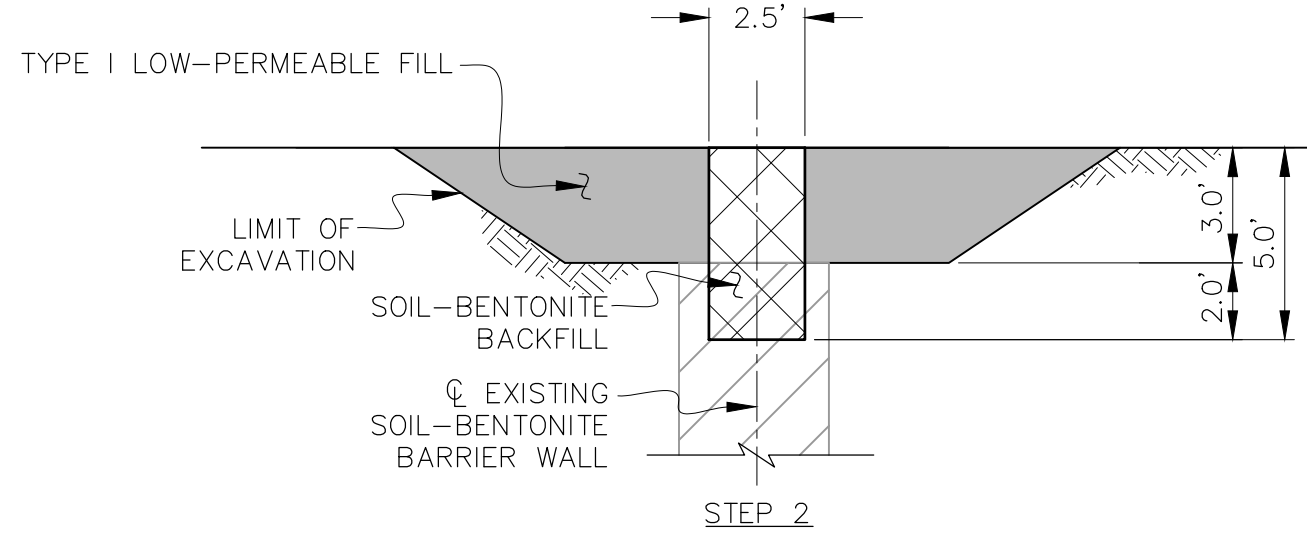
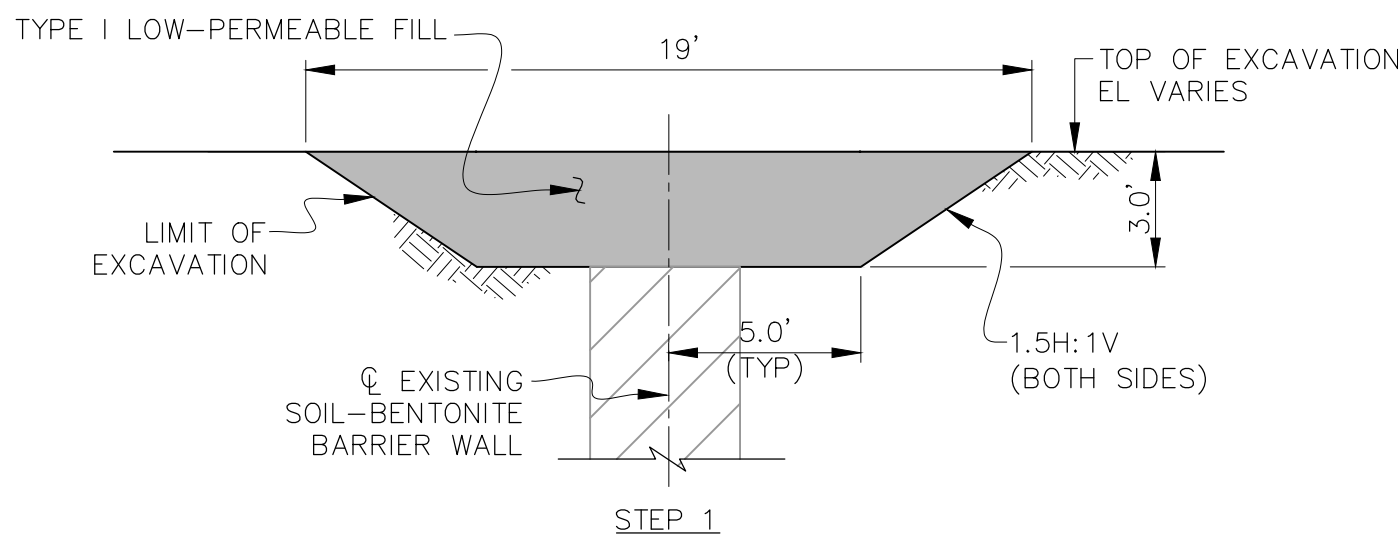
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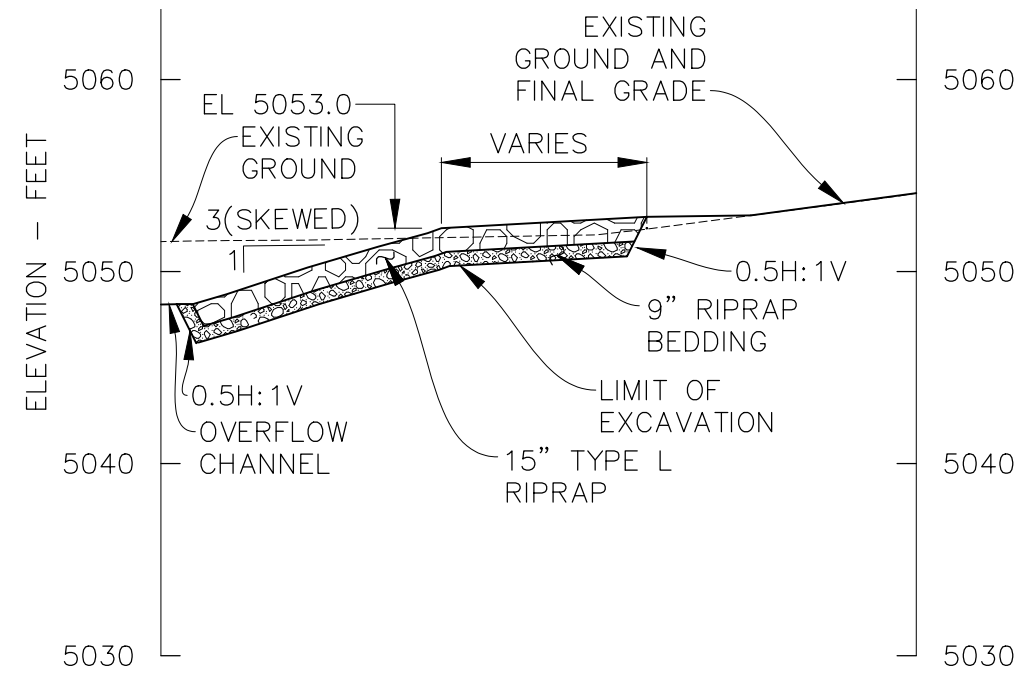
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D-02 D-05
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SCALE IN FEET



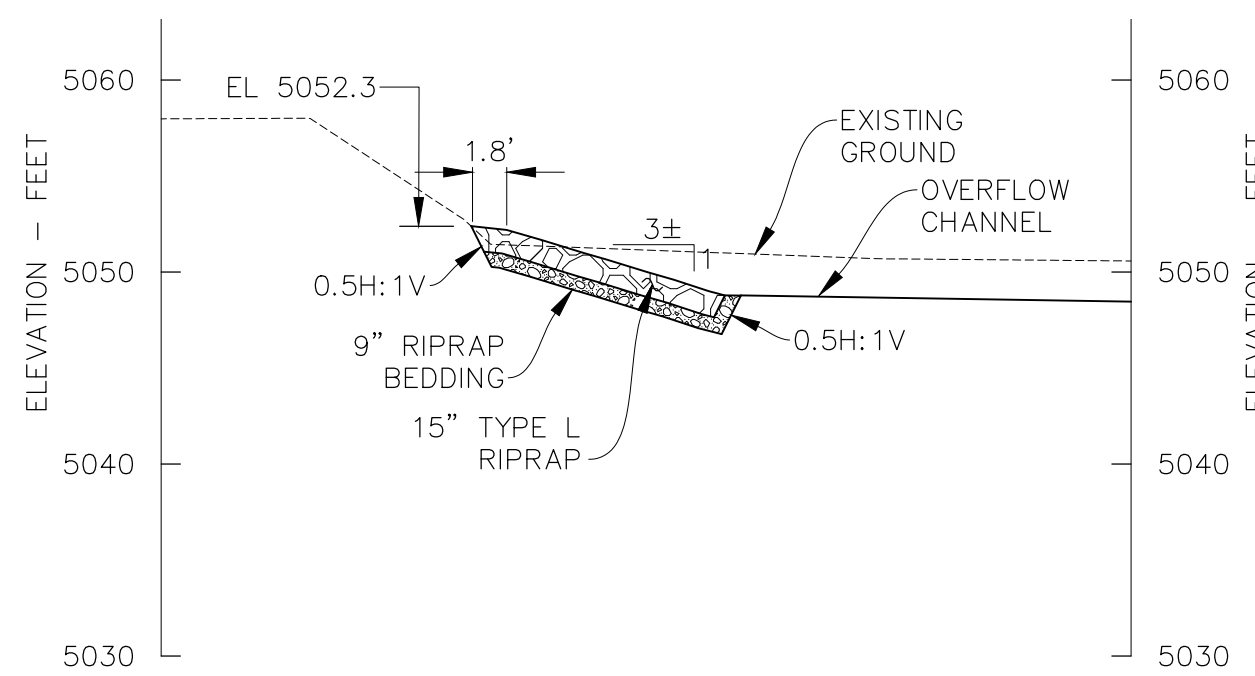
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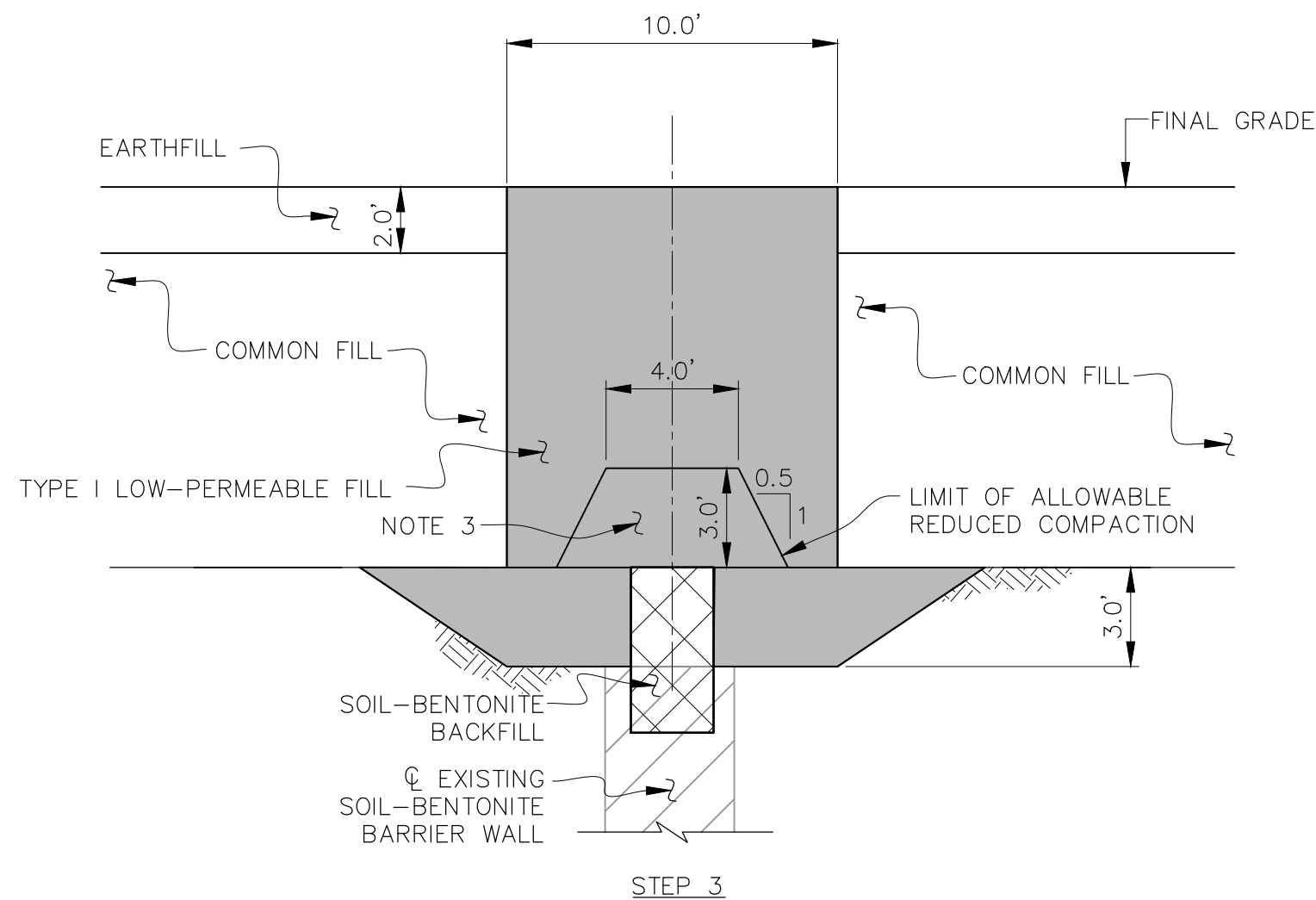
DETAIL
A A
D-06 D-07
0 2.5 5 10 15
SCALE IN FEET



SECTION
21
D-02
0 5 10 20 30
SCALE IN FEET



SECTION
22
D-02
0 5 10 20 30
SCALE IN FEET



SOIL-BENTONITE BARRIER WALL REPAIR INSTALLATION SEQUENCE:

1. EXCAVATE SEDIMENT AS SHOWN ON THE SITE 3 EXCAVATION PLAN. PLACE TYPE I LOW-PERMEABLE FILL AS SHOWN.
2. EXCAVATE THROUGH TYPE I LOW-PERMEABLE FILL AND INTO EXISTING SOIL-BENTONITE BARRIER WALL. EXCAVATION MUST OVERLAP EXISTING BARRIER WALL BY MINIMUM OF 2 FEET. BACKFILL TRENCH WITH SOIL-BENTONITE BACKFILL.
3. PLACE TYPE I LOW-PERMEABILITY FILL TO ELEVATIONS SHOWN.

NOTES:

1. NOT USED.
2. SEDIMENT DEPOSITED DURING FLOOD EVENT. CONCRETE AND MISCELLANEOUS DEBRIS COULD BE LOCATED WITHIN SEDIMENT. EXCAVATE AND STOCKPILE SEDIMENT FOR USE AS COMMON FILL AND DISPOSE OF CONCRETE AND MISCELLANEOUS DEBRIS. LIMITS OF EXISTING SEDIMENT MAY VARY FROM THOSE SHOWN.
3. COMPACT TYPE I LOW-PERMEABLE FILL DIRECTLY ABOVE AND ALONG SOIL-BENTONITE BARRIER WALL NOT LESS THAN 92-PERCENT RELATIVE COMPACTION.

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WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

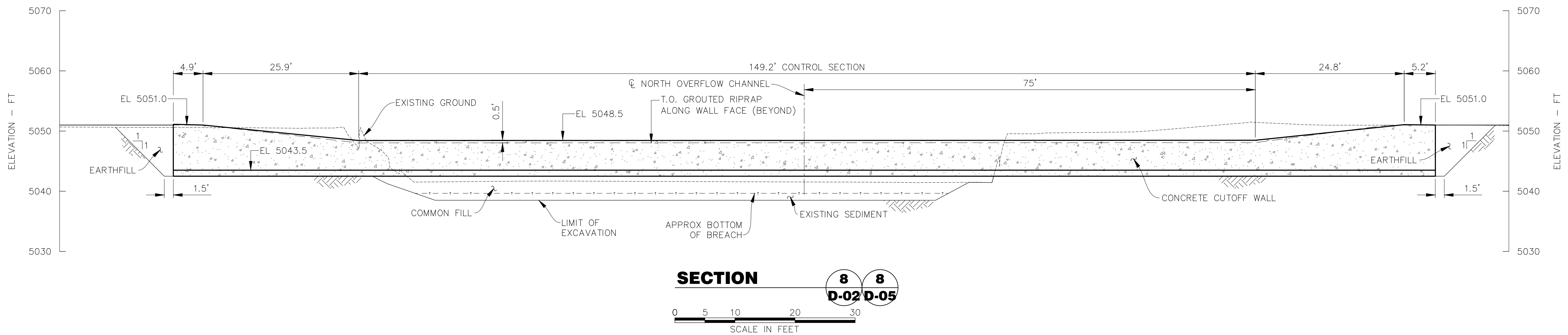
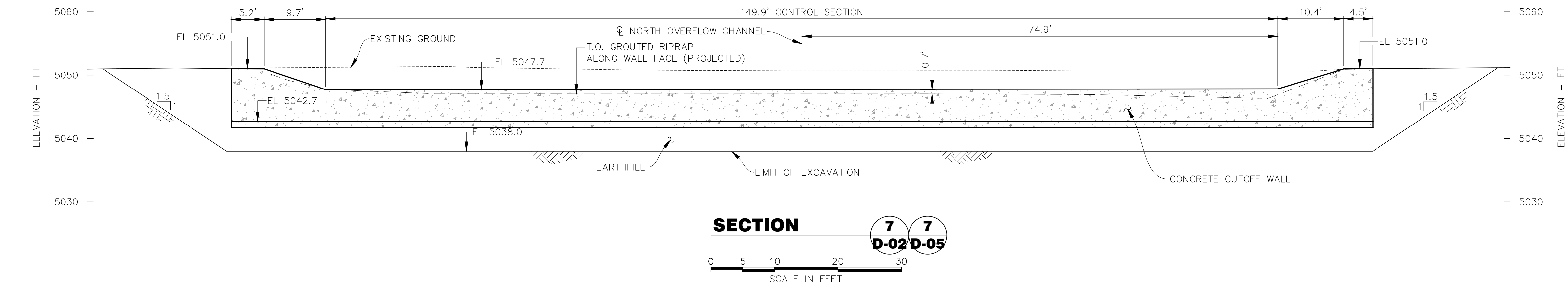
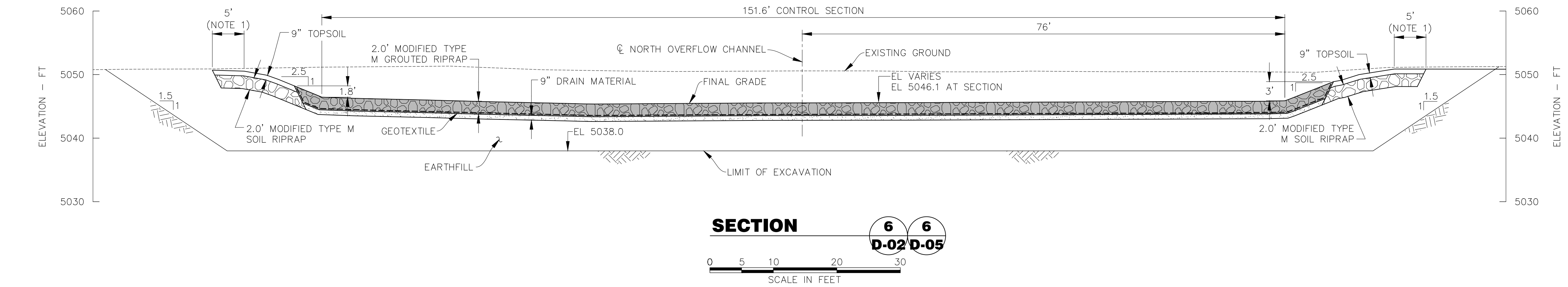
SITE 3 - REPAIR SECTIONS

DWG. NO.
D-06

SHEET NO.
50 of 77

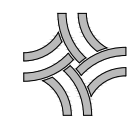
RJH PROJECT 16116

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - PLAN OF MODIFICATIONS.DWG 6/14/2021



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					APP



City of Thornton

RJH PROJECT 16116

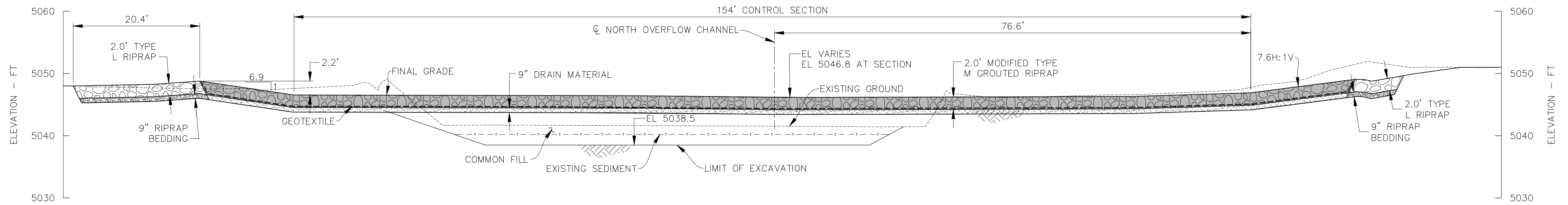
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - NORTH
OVERFLOW CHANNEL
SECTIONS (2 OF 3)

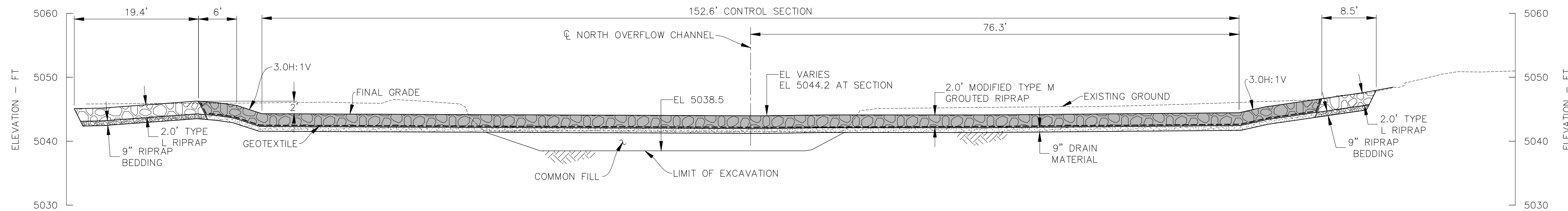
DWG. NO.
D-08

SHEET NO.
52 of 77

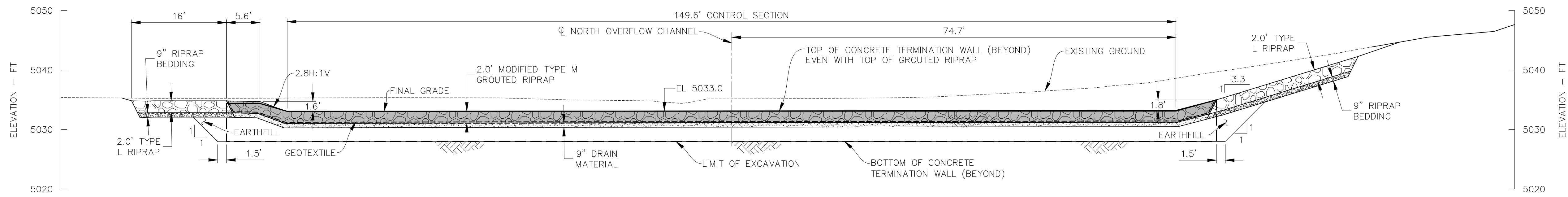
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SECTION **9** **9**
D-02 D-05
0 5 10 20 30
SCALE IN FEET



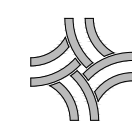
SECTION **10** **10**
D-02 D-05
0 5 10 20 30
SCALE IN FEET



SECTION **11** **11**
D-02 D-05
0 5 10 20 30
SCALE IN FEET

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City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

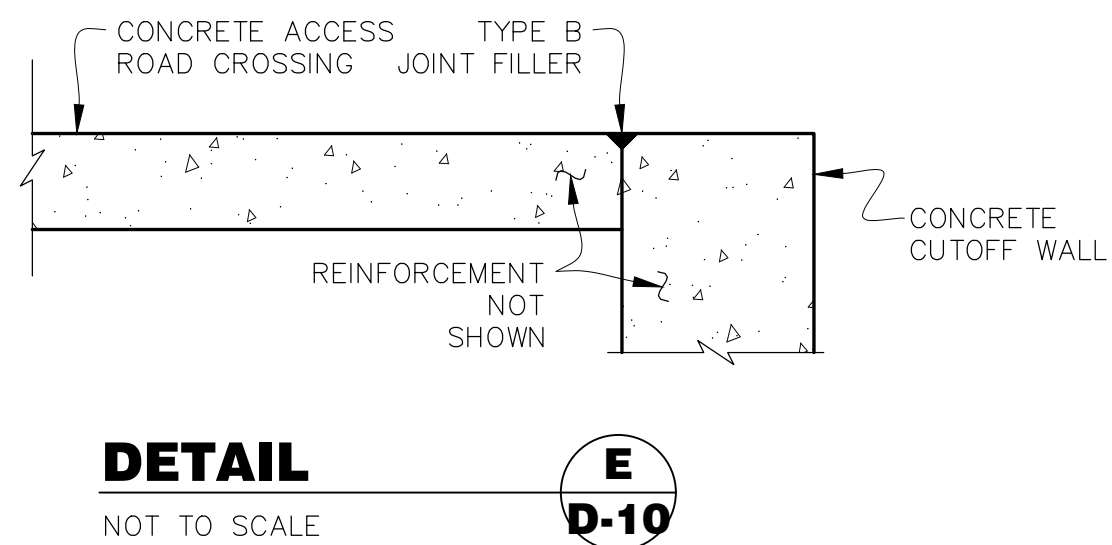
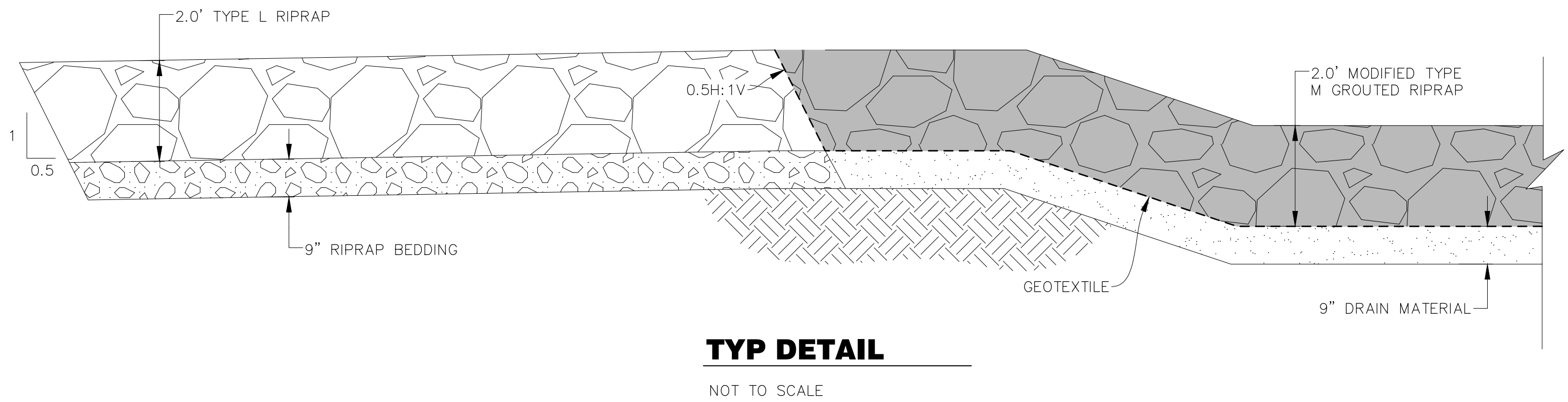
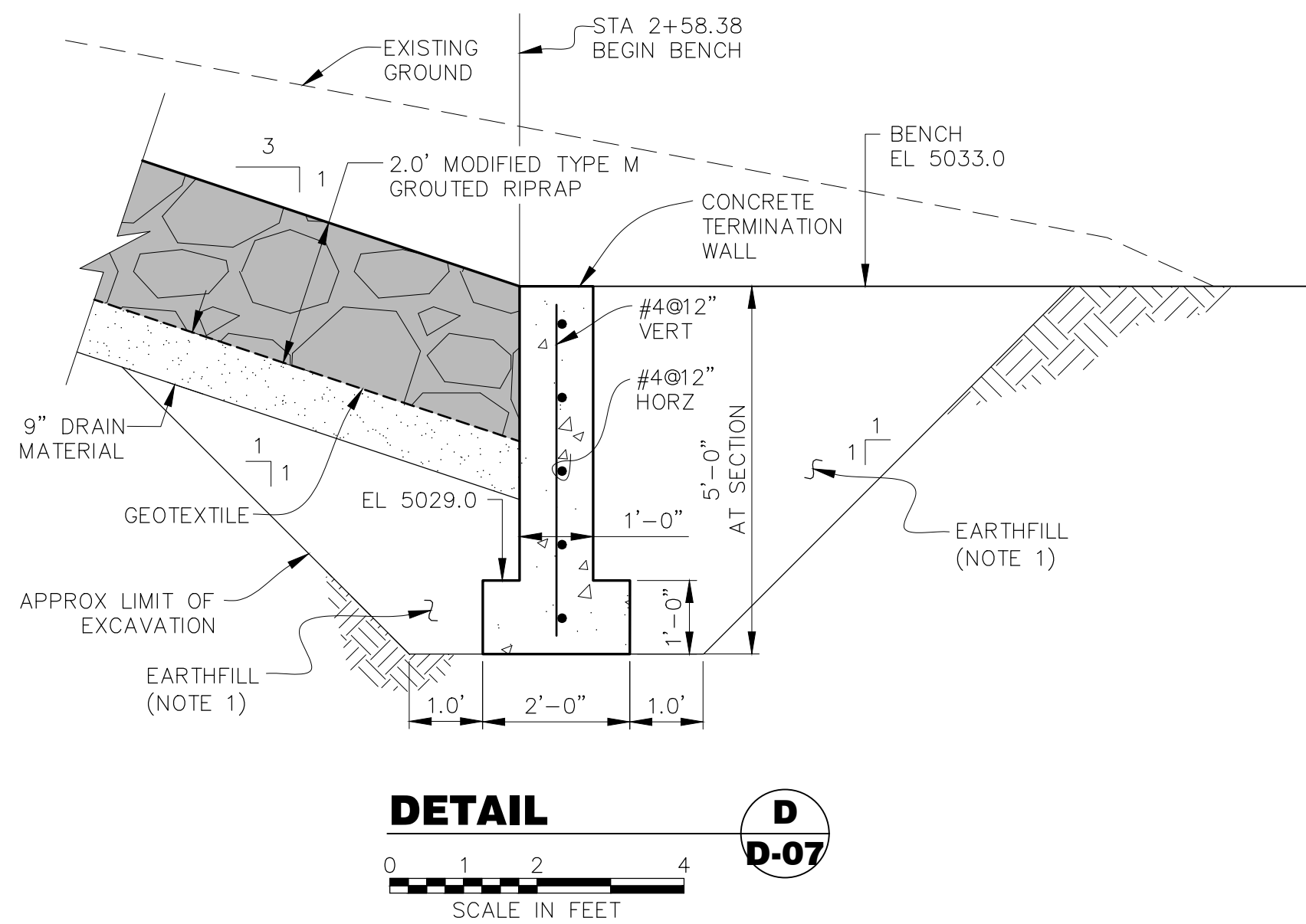
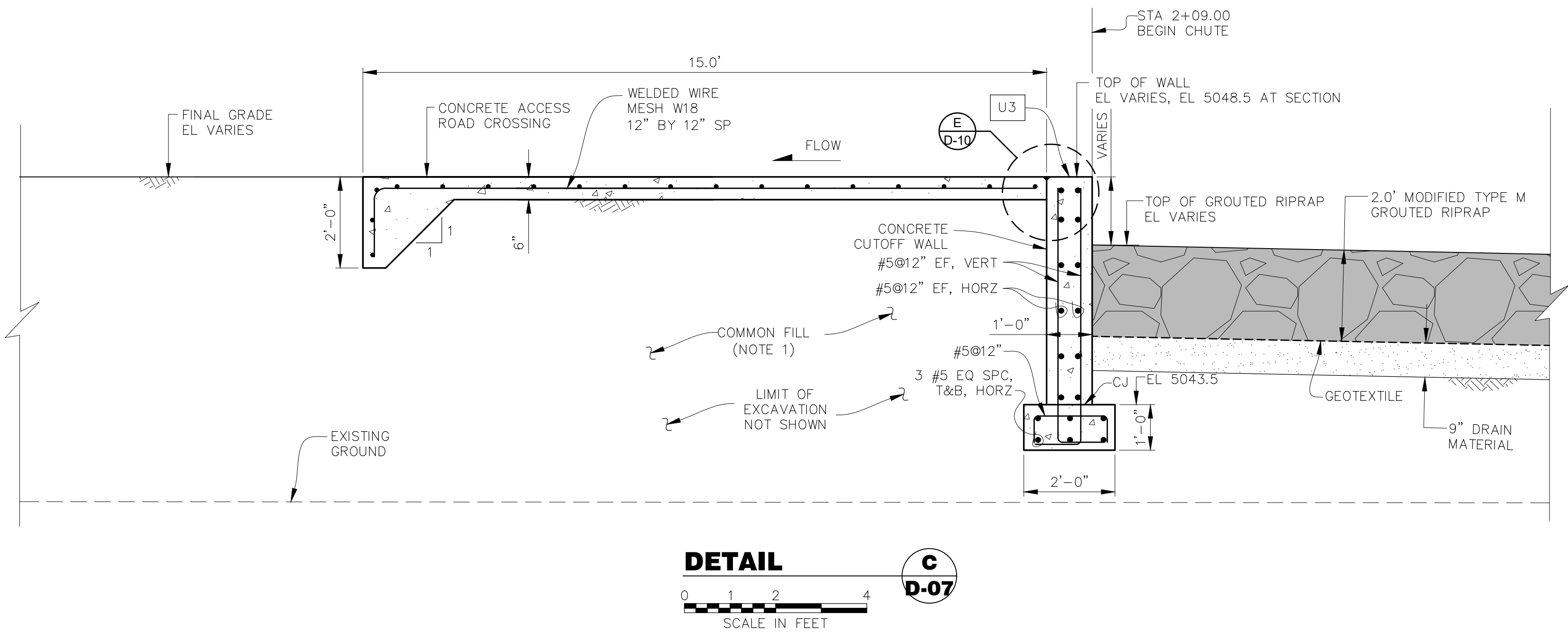
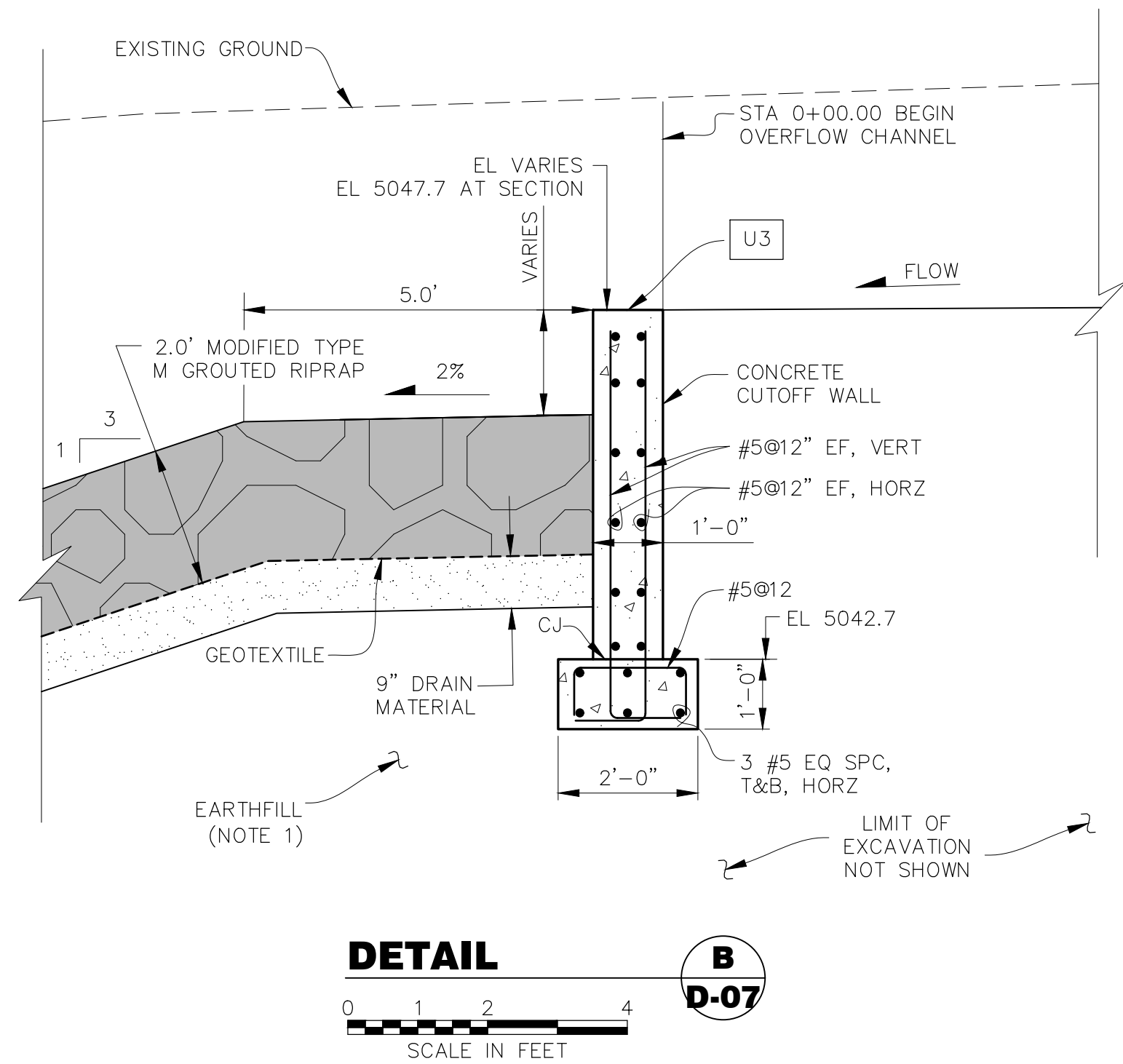
SITE 3 - NORTH
OVERFLOW CHANNEL
SECTIONS (3 OF 3)

DWG. NO.
D-09

SHEET NO.
53 of 77

RJH PROJECT 16116

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - PLAN OF MODIFICATIONS.DWG 6/14/2021



- NOTES:
1. MAINTAIN FILL LEVEL WITHIN 2 FT ON ALL SIDES OF STRUCTURE.

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



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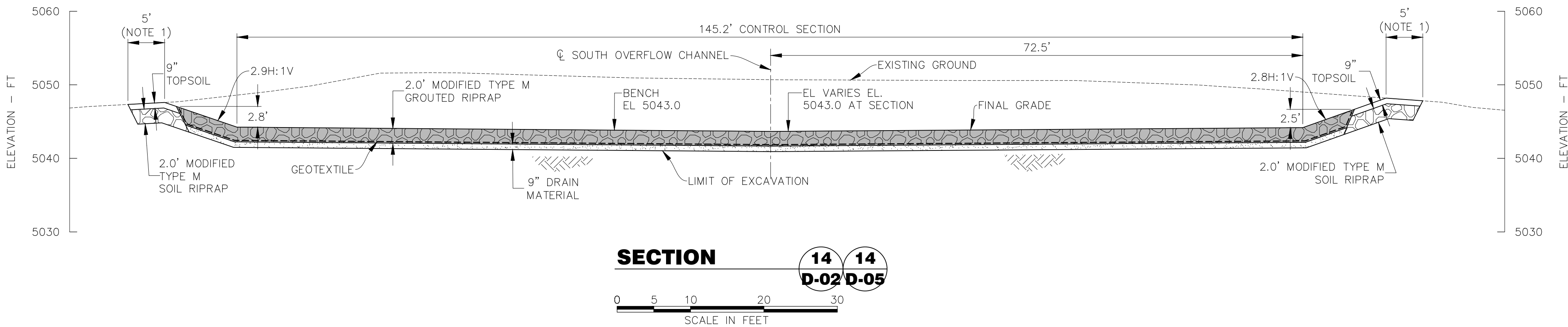
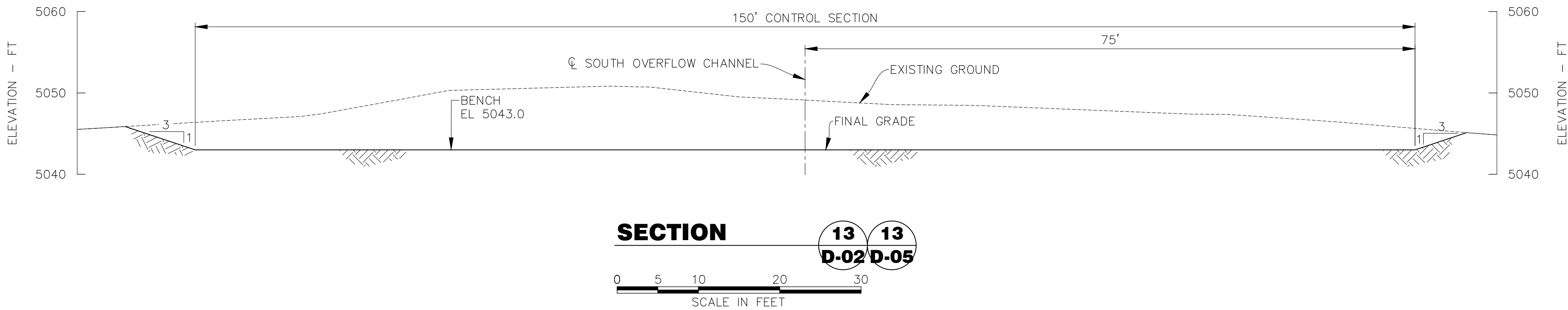
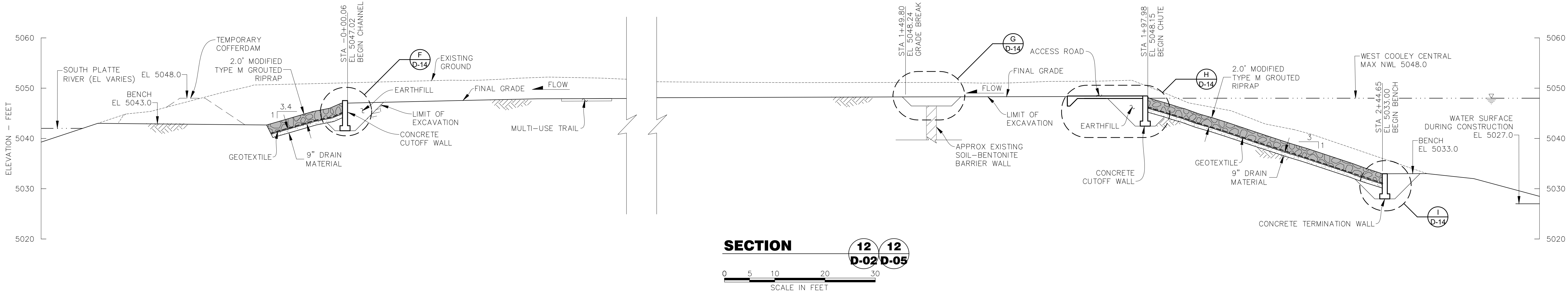
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - NORTH
OVERFLOW CHANNEL
DETAILS

DWG. NO.
D-10

SHEET NO.
54 of 77

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - PLAN OF MODIFICATIONS.DWG 6/14/2021

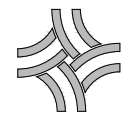


NOTES:

1. AS-BUILT SURVEY DID NOT INCLUDED TOPSOIL COVERED TYPE M SOIL RIPRAP AREAS. EXTENTS SHOWN ARE DESIGN DIMENSIONS.

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK
					RJH
					APP



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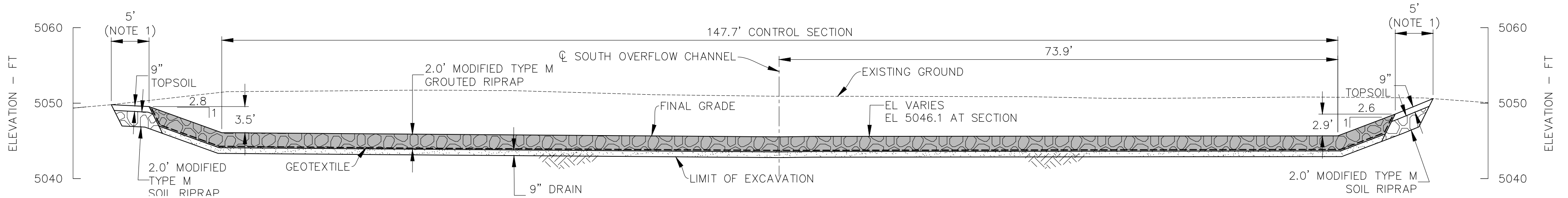
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - SOUTH
OVERFLOW CHANNEL
SECTIONS (1 OF 3)

DWG. NO.
D-11

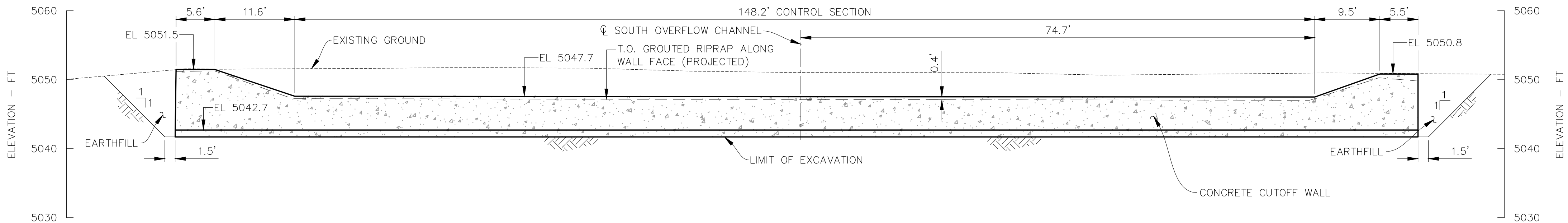
SHEET NO.
55 of 77

RJH PROJECT 16116



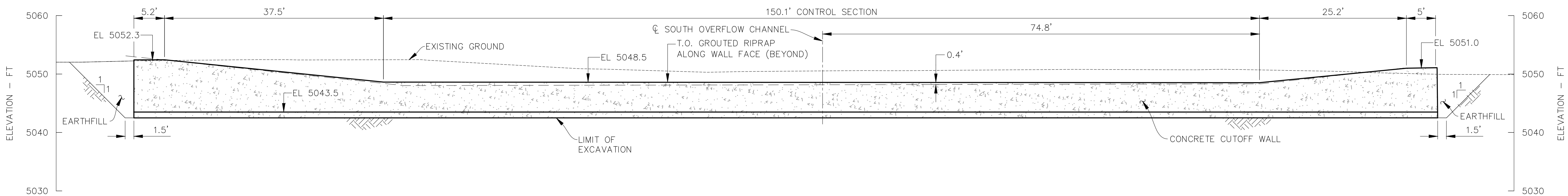
SECTION 15 15
D-02 D-05

0 5 10 20 30
SCALE IN FEET



SECTION 16 16
D-02 D-05

0 5 10 20 30
SCALE IN FEET



SECTION 17 17
D-02 D-05

0 5 10 20 30
SCALE IN FEET

- NOTES:
1. AS-BUILT SURVEY DID NOT INCLUDED TOPSOIL COVERED TYPE M SOIL RIPRAP AREAS. EXTENTS SHOWN ARE DESIGN DIMENSIONS.

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

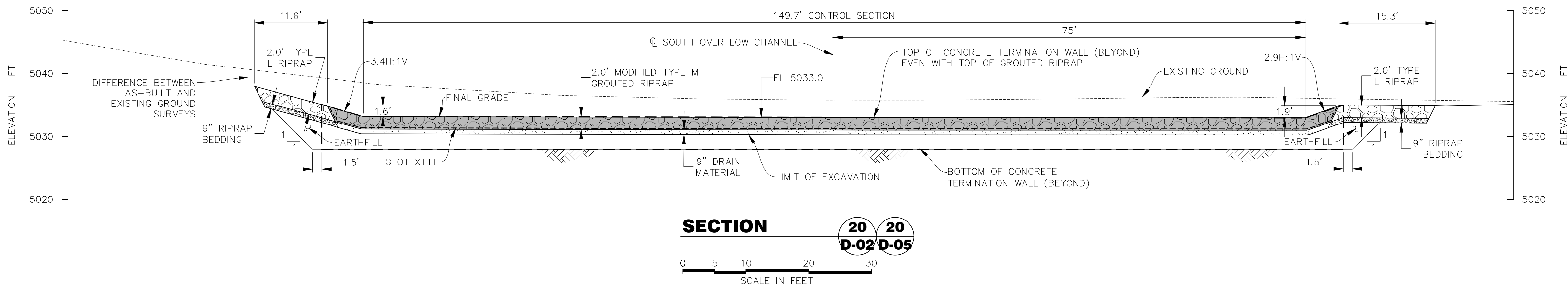
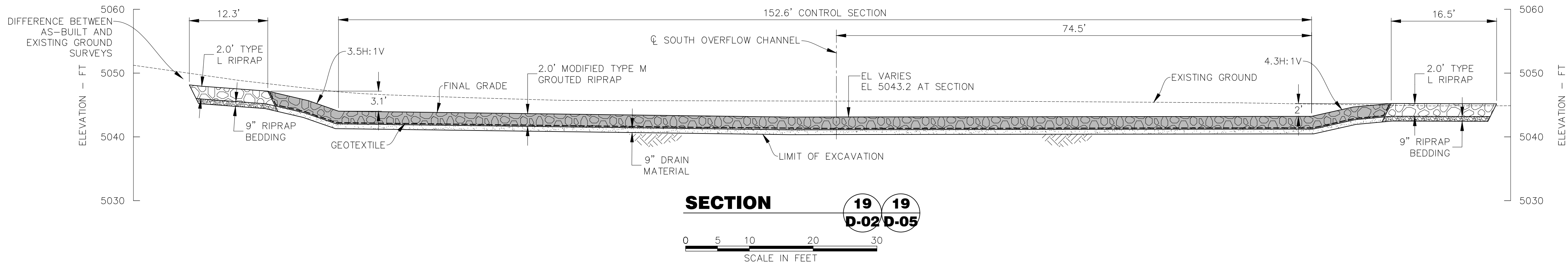
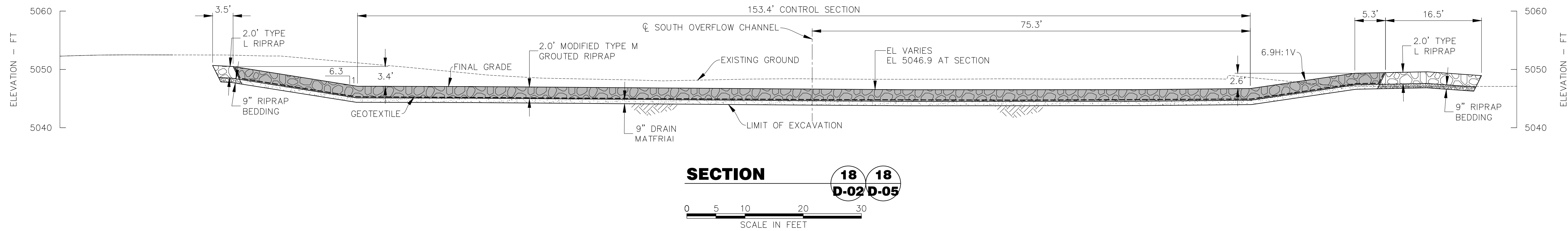
SITE 3 - SOUTH
OVERFLOW CHANNEL
SECTIONS (2 OF 3)

DWG. NO.
D-12

SHEET NO.
56 of 77

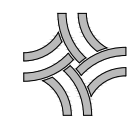
RJH PROJECT 16116

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - PLAN OF MODIFICATIONS.DWG 6/14/2021



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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP



City of Thornton

RJH PROJECT 16116

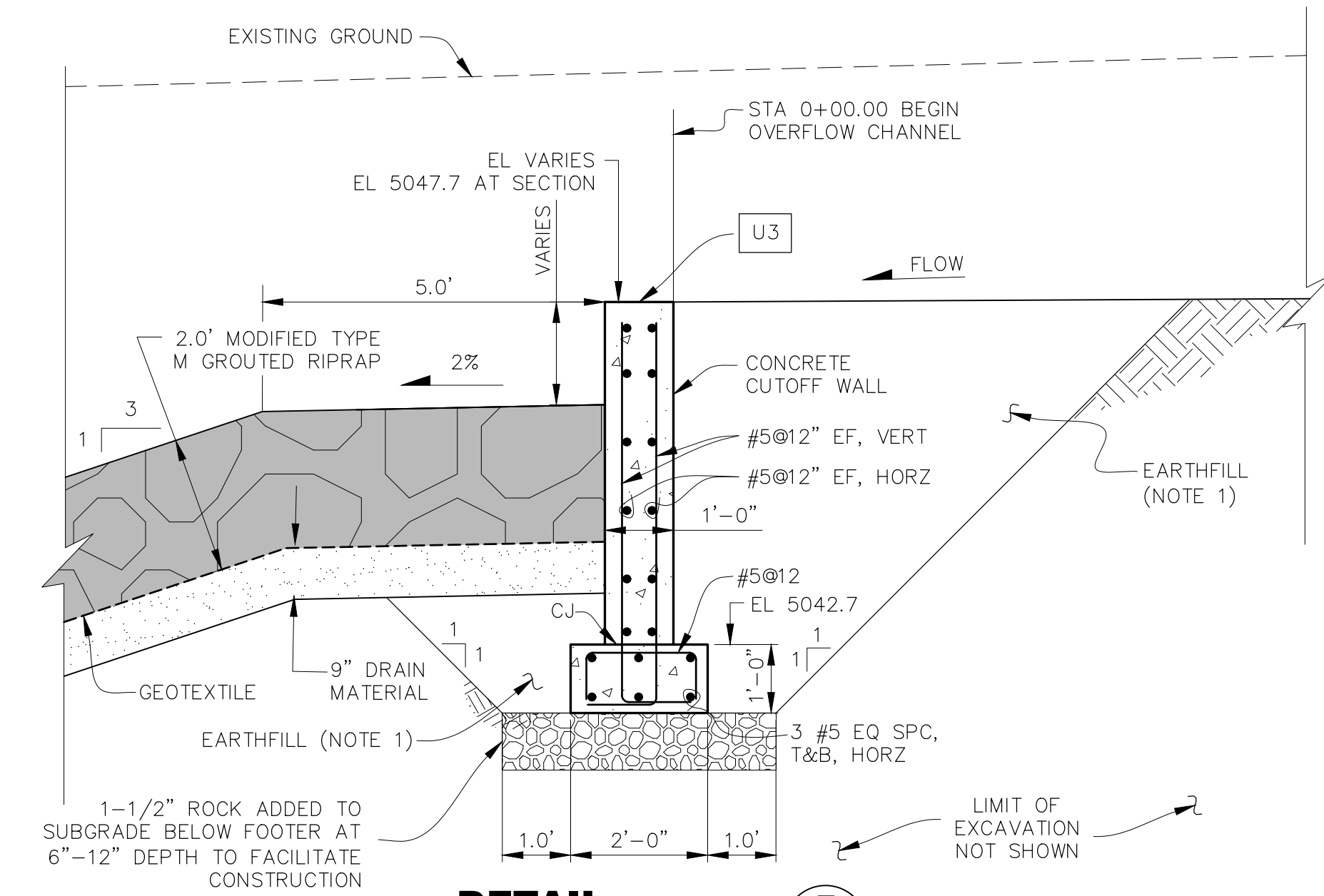
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - SOUTH
OVERFLOW CHANNEL
SECTIONS (3 OF 3)

DWG. NO.
D-13

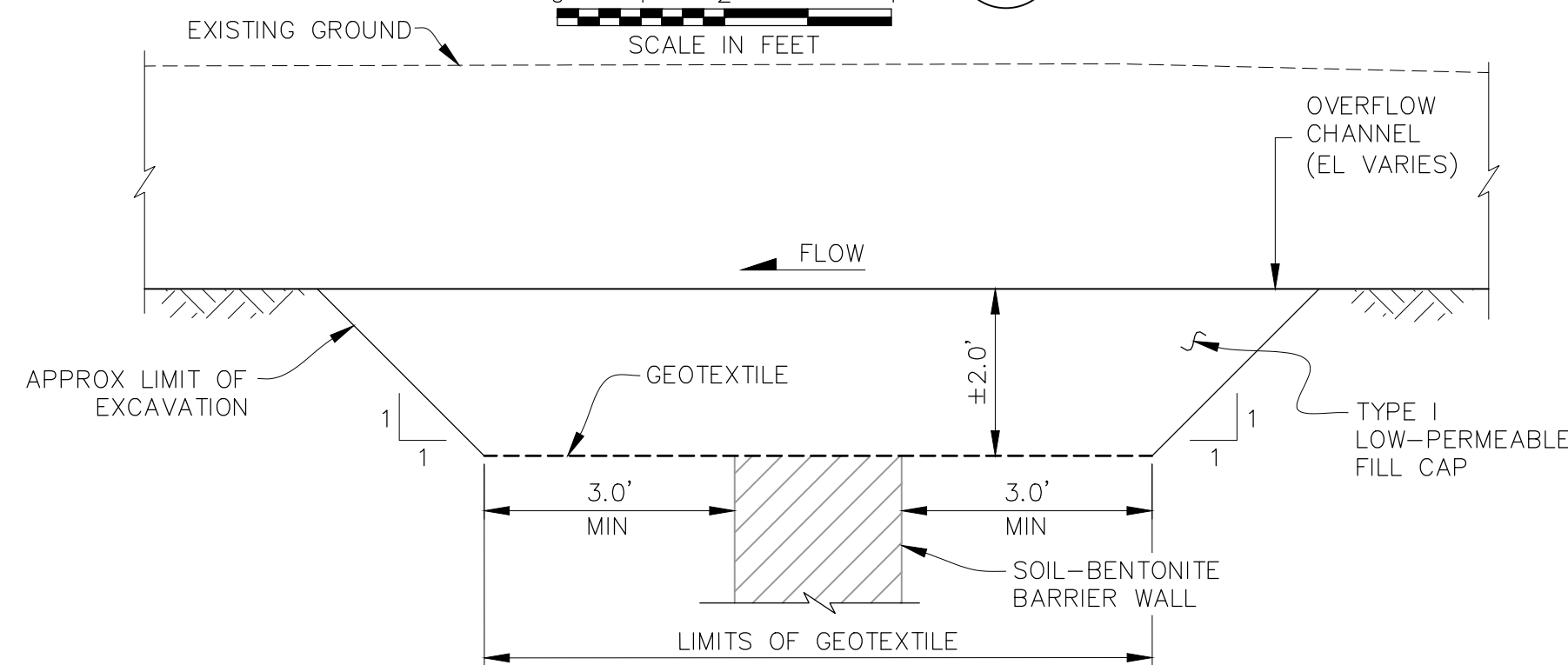
SHEET NO.
57 of 77

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - PLAN OF MODIFICATIONS.DWG 6/14/2021



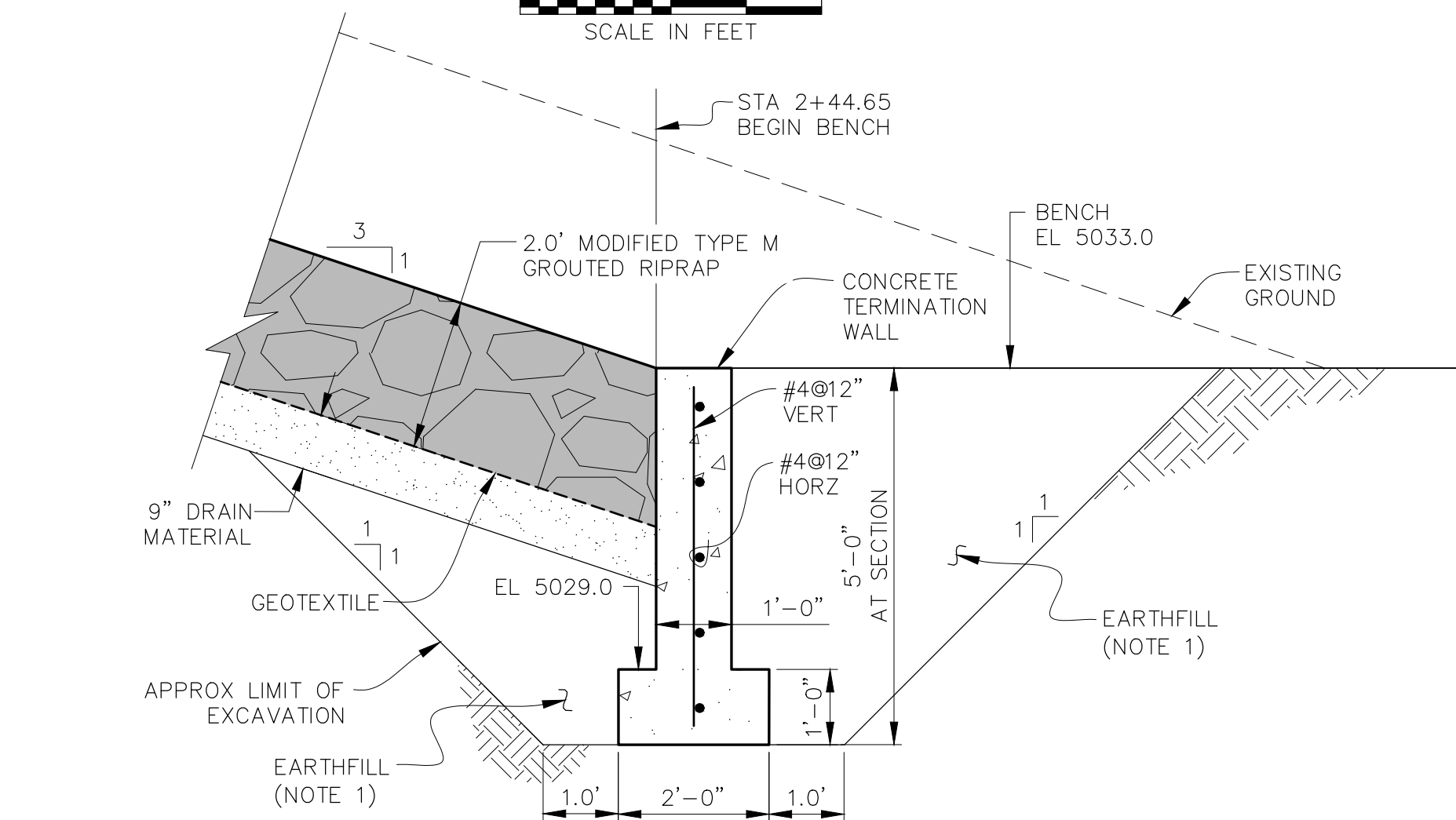
DETAIL

F
D-11



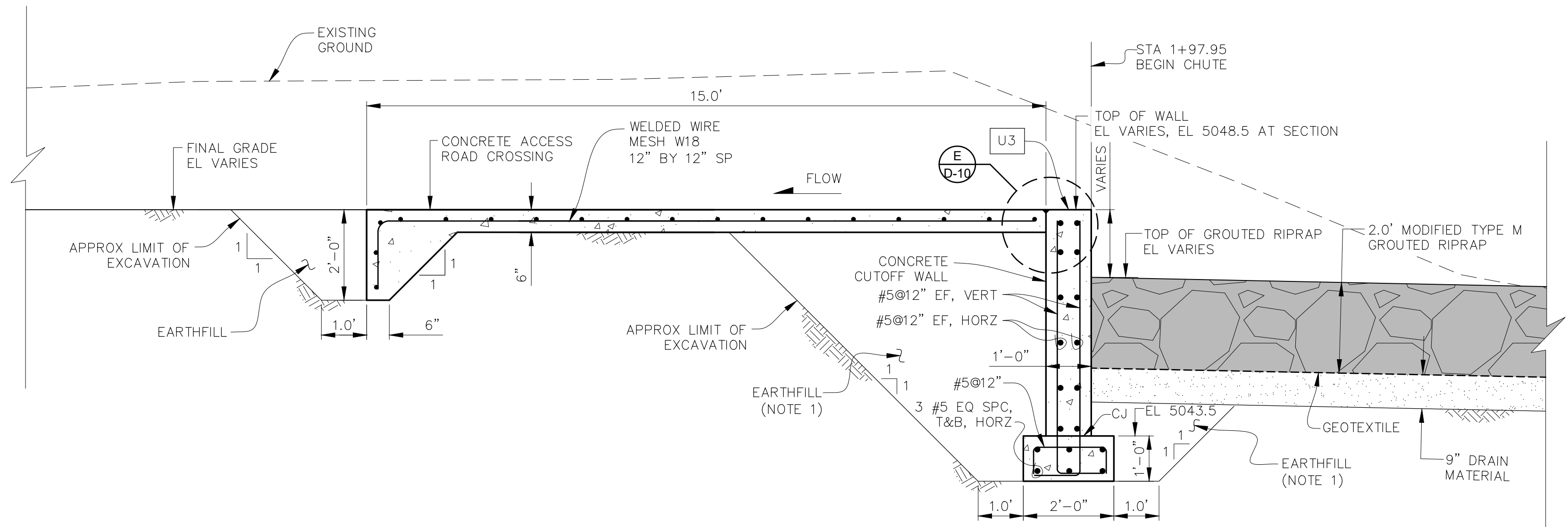
DETAIL

G
D-11



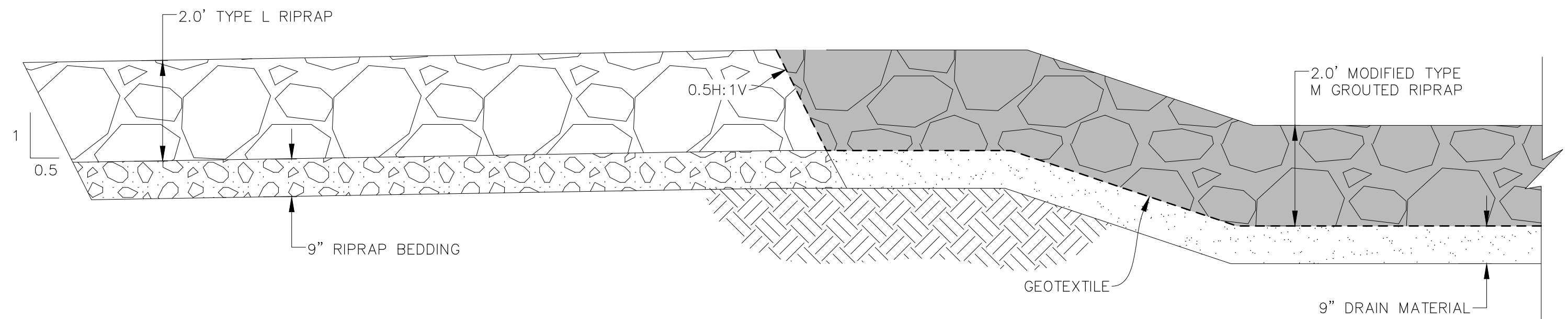
DETAIL

I
D-11



DETAIL

H
D-11



TYP DETAIL

NOT TO SCALE

- NOTE:
1. MAINTAIN FILL LEVEL WITHIN 2 FT. OF ON SIDES OF STRUCTURE.

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RJH PROJECT 16116

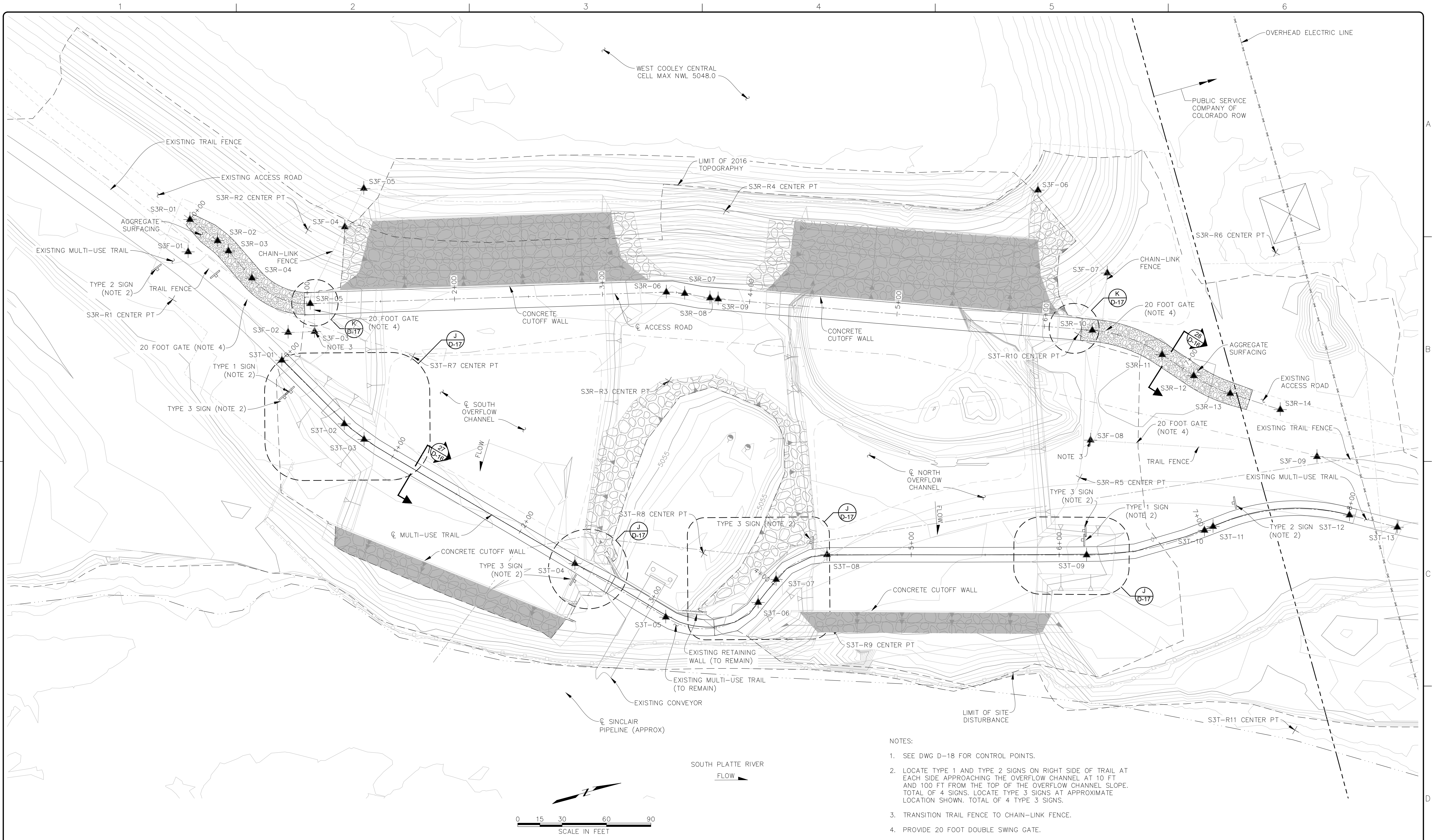
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - SOUTH
OVERFLOW CHANNEL
DETAILS

DWG. NO.
D-14

SHEET NO.
58 of 77

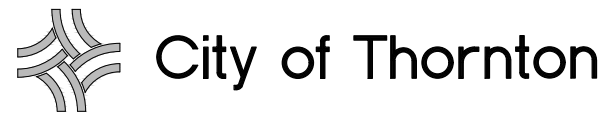
P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - TRAIL AND FENCE.DWG 6/14/2021



- NOTES:
- SEE DWG D-18 FOR CONTROL POINTS.
 - LOCATE TYPE 1 AND TYPE 2 SIGNS ON RIGHT SIDE OF TRAIL AT EACH SIDE APPROACHING THE OVERFLOW CHANNEL AT 10 FT AND 100 FT FROM THE TOP OF THE OVERFLOW CHANNEL SLOPE. TOTAL OF 4 SIGNS. LOCATE TYPE 3 SIGNS AT APPROXIMATE LOCATION SHOWN. TOTAL OF 4 TYPE 3 SIGNS.
 - TRANSITION TRAIL FENCE TO CHAIN-LINK FENCE.
 - PROVIDE 20 FOOT DOUBLE SWING GATE.

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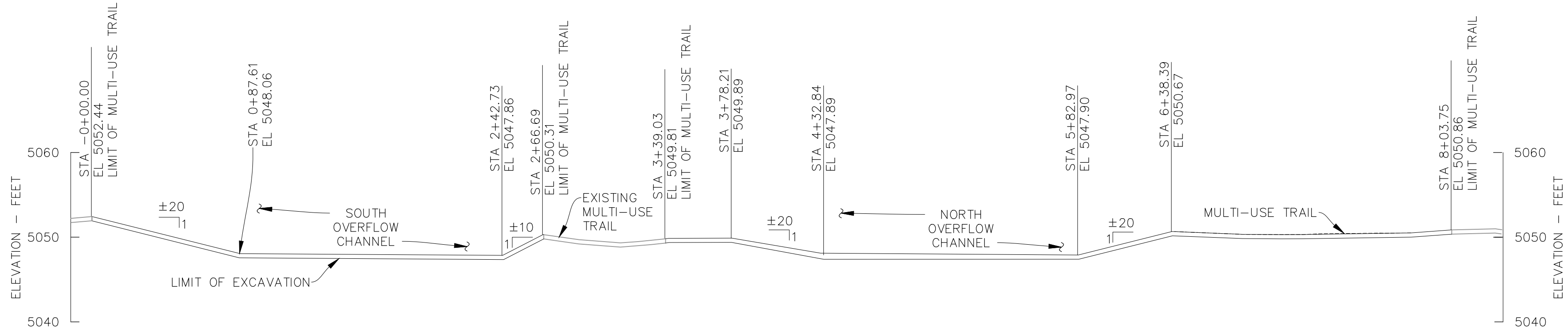
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - PLAN OF
MULTI-USE TRAIL, ACCESS
ROAD, AND FENCES

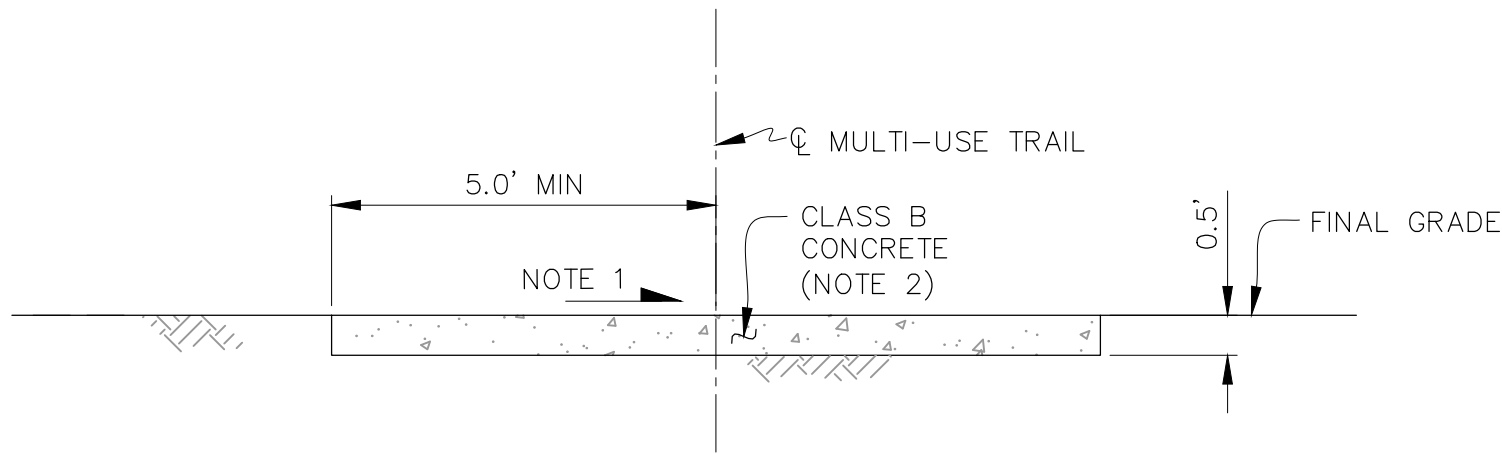
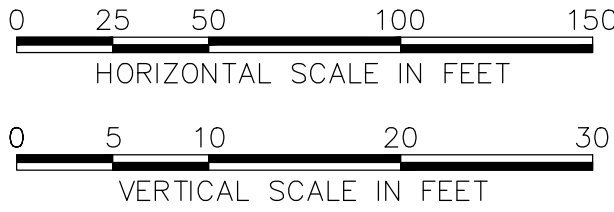
DWG. NO.
D-15

SHEET NO.
59 of 77

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - TRAIL AND FENCE.DWG 6/14/2021

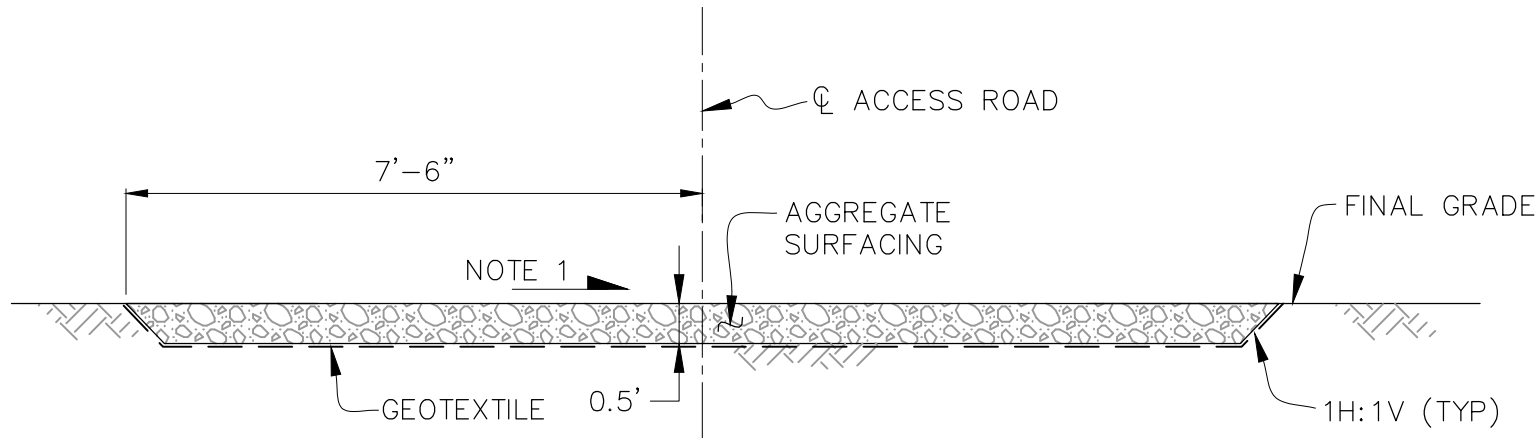


**PROFILE
MULTI-USE TRAIL**



**SECTION
NOT TO SCALE**

**27
D-15**

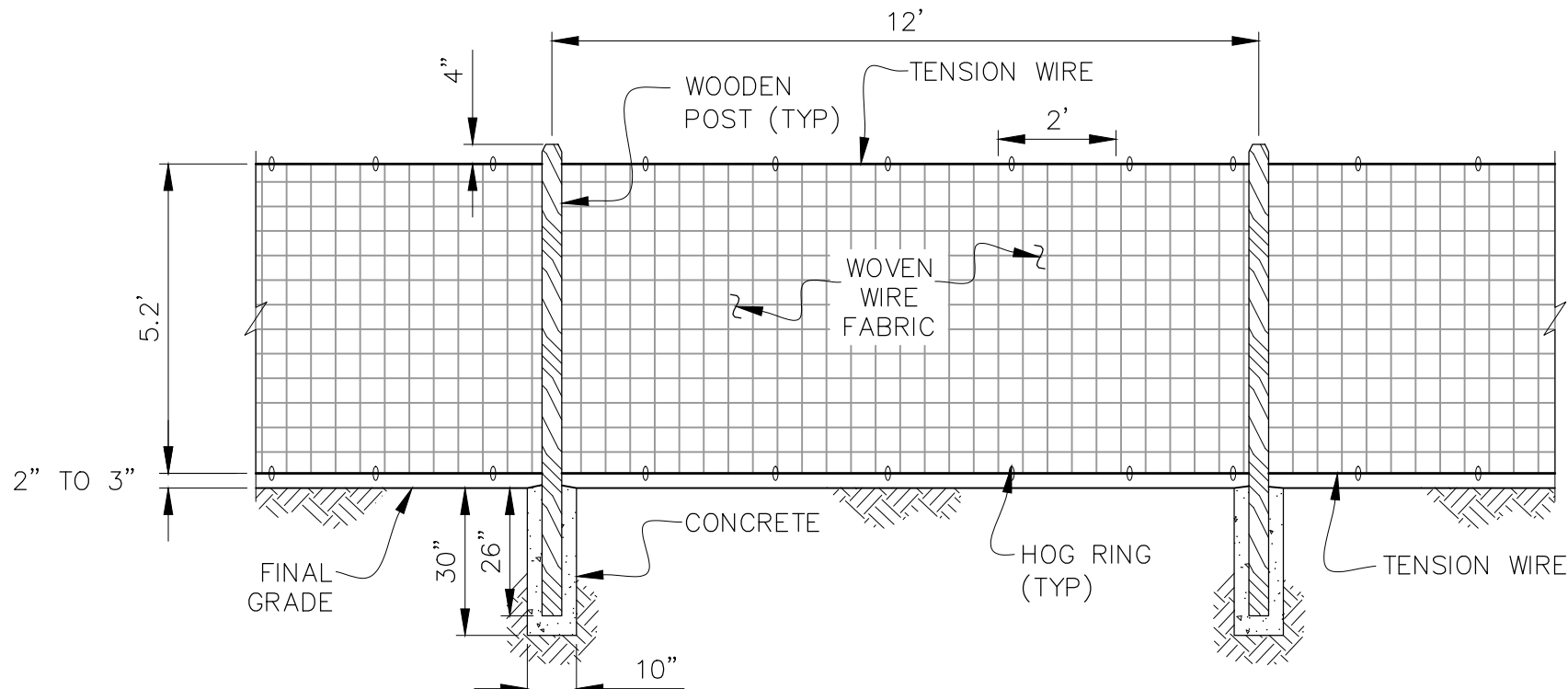


**SECTION
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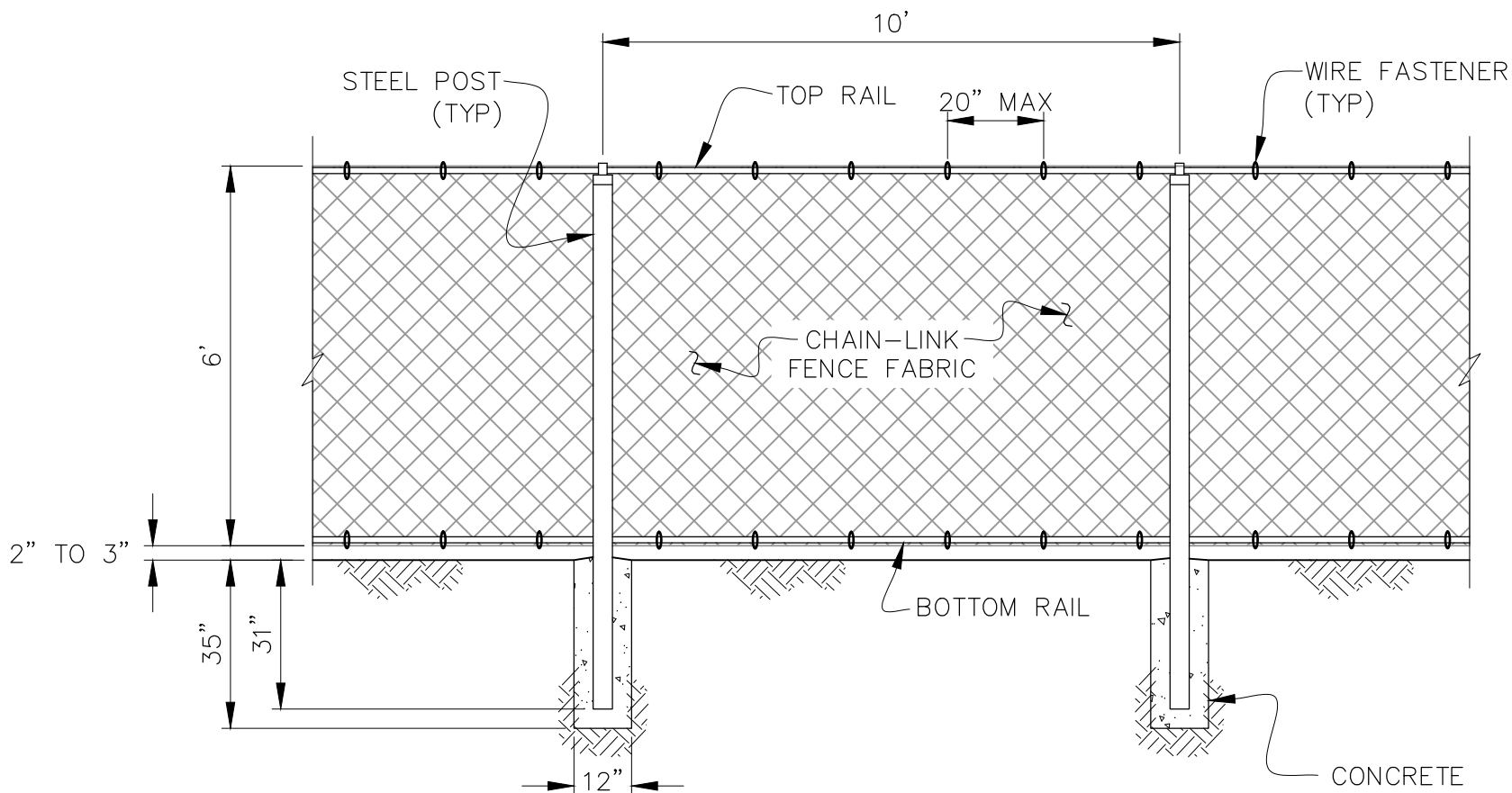
**28
D-15**

NOTES:

1. SLOPE AT GRADE OF OVERFLOW CHANNEL WITHIN OVERFLOW CHANNEL AND 2 PERCENT IN THE DIRECTION OF PREVAILING SLOPE AT LOCATIONS OUTSIDE OF OVERFLOW CHANNEL.
2. EXCAVATE AND PREPARE SUBGRADE FOR MULTI-USE TRAIL. CLASS B CONCRETE TO BE CONSTRUCTED BY OTHERS.



**TYPICAL DETAIL
TRAIL FENCE
NOT TO SCALE**



**TYPICAL DETAIL
CHAIN-LINK FENCE
NOT TO SCALE**

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RJH PROJECT 16116

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - MULTI-USE TRAIL
PROFILE, SECTION, AND
DETAILS

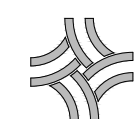
DWG. NO.
D-16

SHEET NO.
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1. SIGNS SHALL BE IN ACCORDANCE WITH MUTCD, TYPE W4, AND SHALL BE YELLOW BACKGROUND WITH BLACK LETTERS.
2. VLOC SIGN POST ANCHOR DETAIL IN ACCORDANCE WITH CITY OF THORNTON STANDARDS AND SPECIFICATIONS, DRAWING NO. 700-11.

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City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - MULTI-USE TRAIL DETAILS

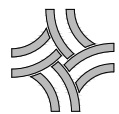
WG. NO.
D-17

SHEET NO.
1 of 77

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 3 - TRAIL AND FENCE.DWG 6/14/2021

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City of Thornton

WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 3 - CONTROL POINTS

DWG. NO.
D-18

SHEET NO.
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DWG D-02 CONSTRUCTION CONTROL POINTS			
CONTROL POINT	DESCRIPTION	NORTHING	EASTING
S3N-01	☒ OVERFLOW CHANNEL	746489.26	168077.85
S3N-02	☒ OVERFLOW CHANNEL	746504.84	168021.06
S3N-03	☒ OVERFLOW CHANNEL	746507.67	168008.06
S3N-04	☒ OVERFLOW CHANNEL	746522.53	167916.80
S3N-05	☒ OVERFLOW CHANNEL	746528.28	167894.59
S3N-06	☒ OVERFLOW CHANNEL	746535.51	167874.48
S3N-07	☒ OVERFLOW CHANNEL	746552.21	167828.01
S3N-08	CONCRETE CUTOFF WALL	746416.78	168058.54
S3N-09	CONCRETE CUTOFF WALL	746561.47	168098.12
S3N-10	CONCRETE CUTOFF WALL	746464.76	167849.57
S3N-11	CONCRETE CUTOFF WALL	746605.91	167900.32
S3N-12	CONCRETE TERMINATION WALL	746481.80	167802.17
S3N-13	CONCRETE TERMINATION WALL	746622.96	167852.92
S3S-01	☒ OVERFLOW CHANNEL	746188.34	167969.88
S3S-02	☒ OVERFLOW CHANNEL	746197.47	167957.71
S3S-03	☒ OVERFLOW CHANNEL	746253.99	167836.62
S3S-04	☒ OVERFLOW CHANNEL	746264.94	167789.74
S3S-05	☒ OVERFLOW CHANNEL	746275.56	167744.26
S3S-06	CONCRETE CUTOFF WALL	746128.05	167925.26
S3S-07	CONCRETE CUTOFF WALL	746248.03	168015.29
S3S-08	CONCRETE CUTOFF WALL	746191.80	167773.15
S3S-09	CONCRETE CUTOFF WALL	746337.86	167807.29
S3S-10	CONCRETE TERMINATION WALL	746202.65	167726.71
S3S-11	CONCRETE TERMINATION WALL	746348.72	167760.84

DWG D-15 MULTI-USE TRAIL CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S3T-01	746113.70	167801.77
S3T-02	746143.30	167854.23
S3T-03	746153.54	167867.83
S3T-04	746269.45	167985.83
S3T-05	746319.41	168036.68
S3T-06	746382.31	168043.23
S3T-07	746398.04	168031.38
S3T-08	746435.61	168024.11
S3T-09	746605.06	168069.72
S3T-10	746686.33	168074.24
S3T-11	746692.62	168073.28
S3T-12	746783.72	168089.62
S3T-13	746812.80	168105.92

DWG D-05 EXCAVATION CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S3E-01	746471.30	167855.84
S3E-02	746452.55	167909.75
S3E-03	746481.52	167921.28
S3E-04	746525.64	167956.54
S3E-05	746586.99	167967.19
S3E-06	746606.03	167977.51
S3E-07	746625.00	167942.29
S3E-08	746563.61	167909.04
S3E-09	746549.65	167862.55
S3E-10	746510.00	167848.31

DWG D-15 ACCESS ROAD CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
S3R-01	746078.30	167693.79
S3R-02	746092.64	167712.50
S3R-03	746097.94	167721.09
S3R-04	746108.52	167742.90
S3R-05	746142.13	167769.76
S3R-06	746376.64	167824.57
S3R-07	746388.41	167828.65
S3R-08	746404.14	167836.01
S3R-09	746409.26	167838.12
S3R-10	746648.09	167923.99
S3R-11	746689.40	167952.12
S3R-12	746706.36	167971.44
S3R-13	746727.11	167989.37
S3R-14	746756.94	168008.71

DWG D-15 FENCE CONTROL POINT		
CONTROL POINT	NORTHING	EASTING
S3F-01	746071.45	167714.58
S3F-02	746122.67	167784.65
S3F-03	746140.08	167788.72
S3F-04	746178.14	167725.69
S3F-05	746197.26	167703.92
S3F-06	746637.13	167822.96
S3F-07	746667.90	167889.26
S3F-08	746627.77	167995.43
S3F-09	746772.71	168045.78

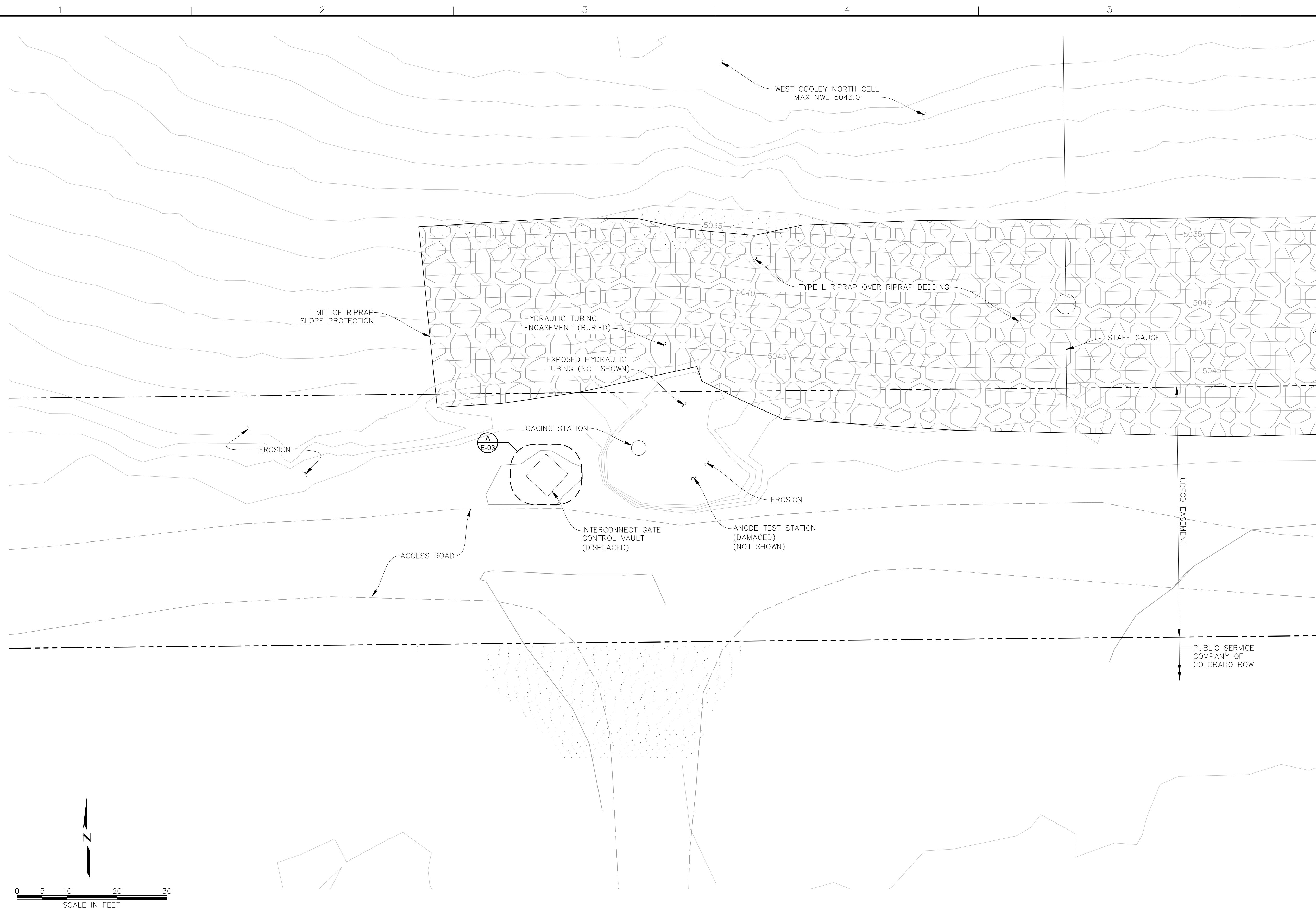
DWG D-02 SPILLWAYS CURVE DATA			
CURVE NUMBER	RADIUS (FEET)	NORTHING	EASTING
S3N-R1	125.00	746384.30	167987.98
S3N-R2	125.00	746645.90	167936.88
S3S-R3	325.00	745937.51	167762.65

DWG D-15 ACCESS ROAD CURVE DATA			
CURVE NUMBER	RADIUS (FEET)	NORTHING	EASTING
S3R-R1	50.00	746052.96	167742.92
S3R-R2	50.00	746153.51	167721.07
S3R-R3	60.00	746362.98	167882.99
S3R-R4	60.00	746429.56	167781.66
S3R-R5	100.00	746614.26	168018.09
S3R-R6	100.00	746781.51	167905.46

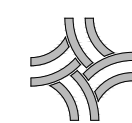
DWG D-15 MULTI-USE TRAIL CURVE DATA			
CURVE NUMBER	RADIUS (FEET)	NORTHING	EASTING
S3T-R7	65.00	746199.91	167822.28
S3T-R8	49.27	746355.08	168001.64
S3T-R9	50.00	746425.65	168072.74
S3T-R10	150.00	746638.31	167924.19
S3T-R11	150.00	746710.40	168220.48

NOTES:

1. CONTROL POINTS FOR CONCRETE TERMINATION WALL AND CONCRETE CUTOFF WALL CORRESPOND TO THE CENTER OF THE PLAN WALL THICKNESS.



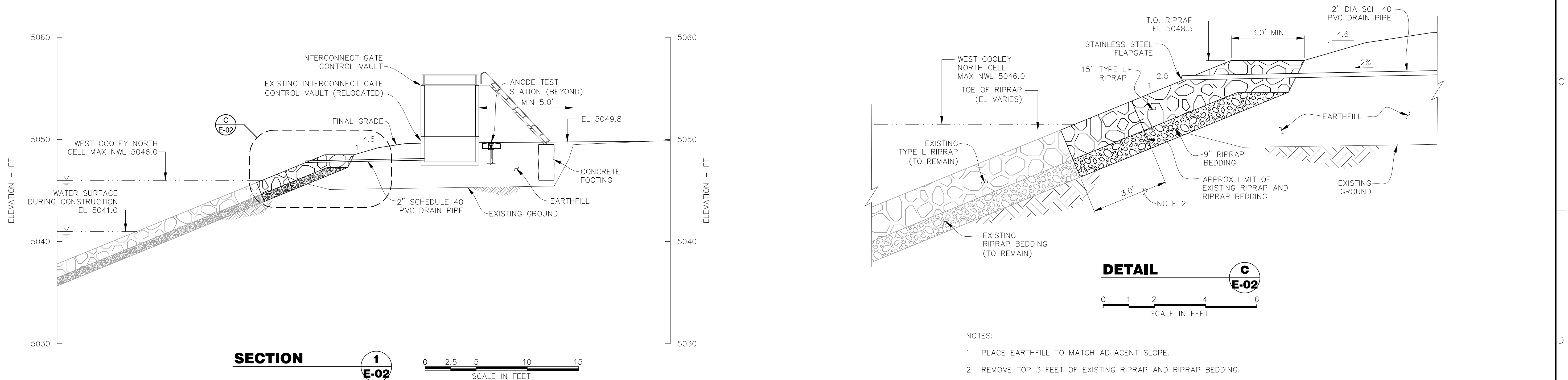
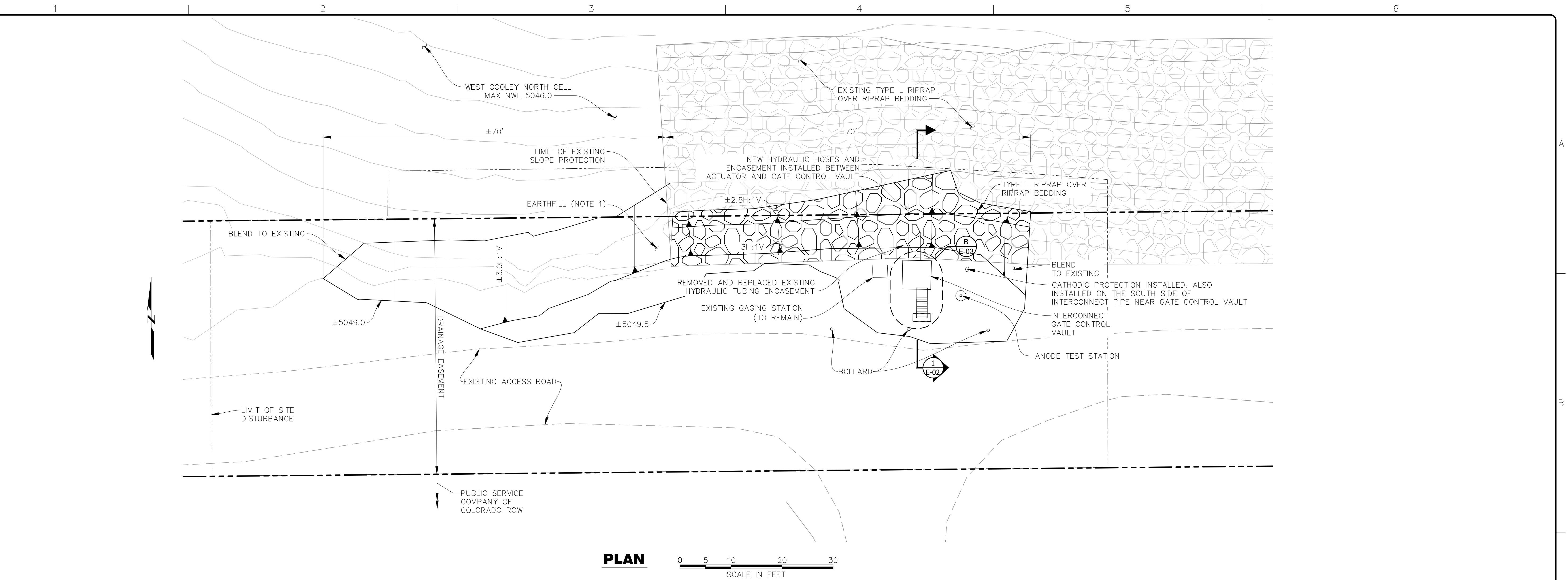
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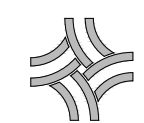
SITE 4 - PLAN OF EXISTING
CONDITIONS

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 4 - PLAN OF MODIFICATIONS.DWG 6/14/2021



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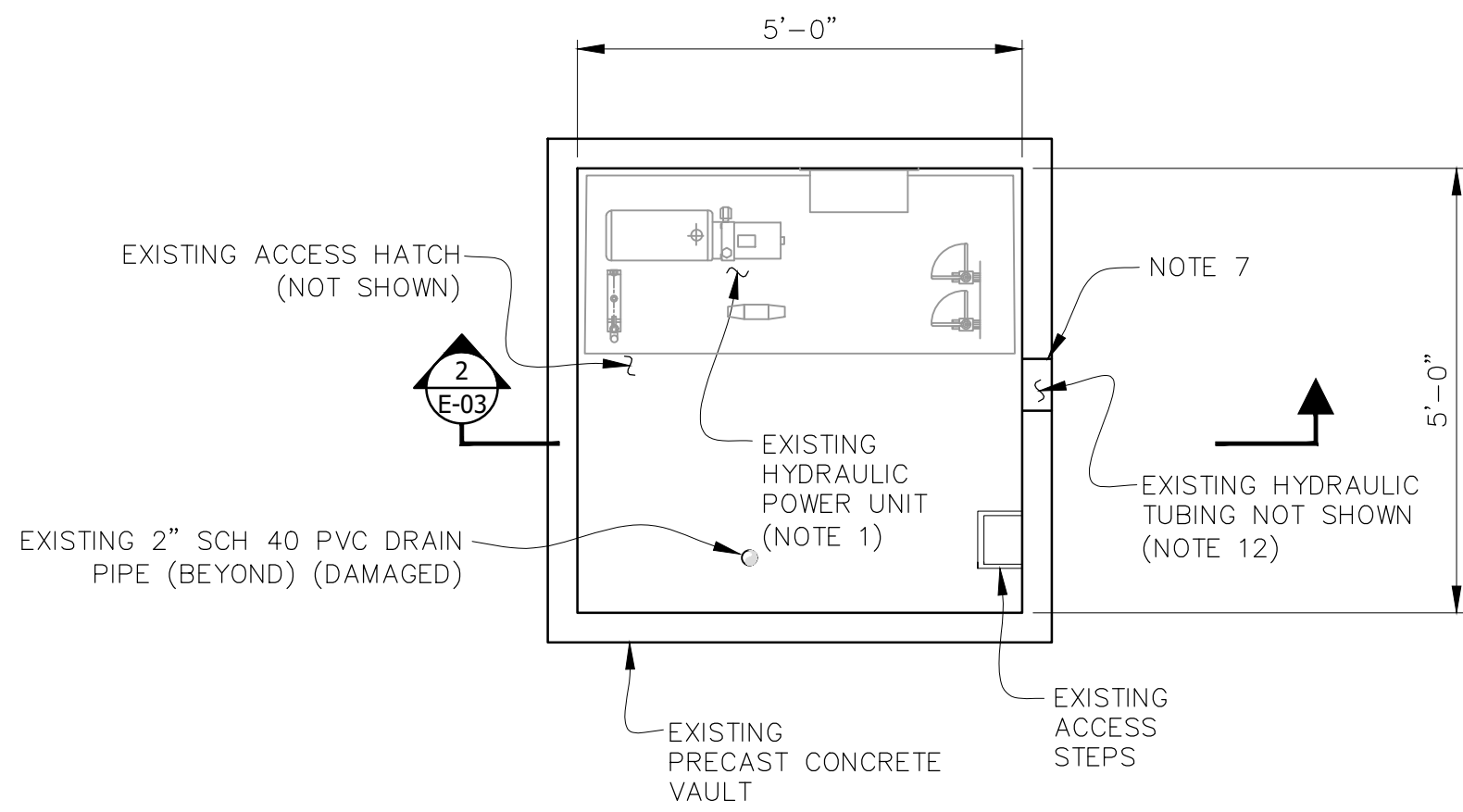
SITE 4 - MODIFICATIONS
PLAN AND SECTIONS

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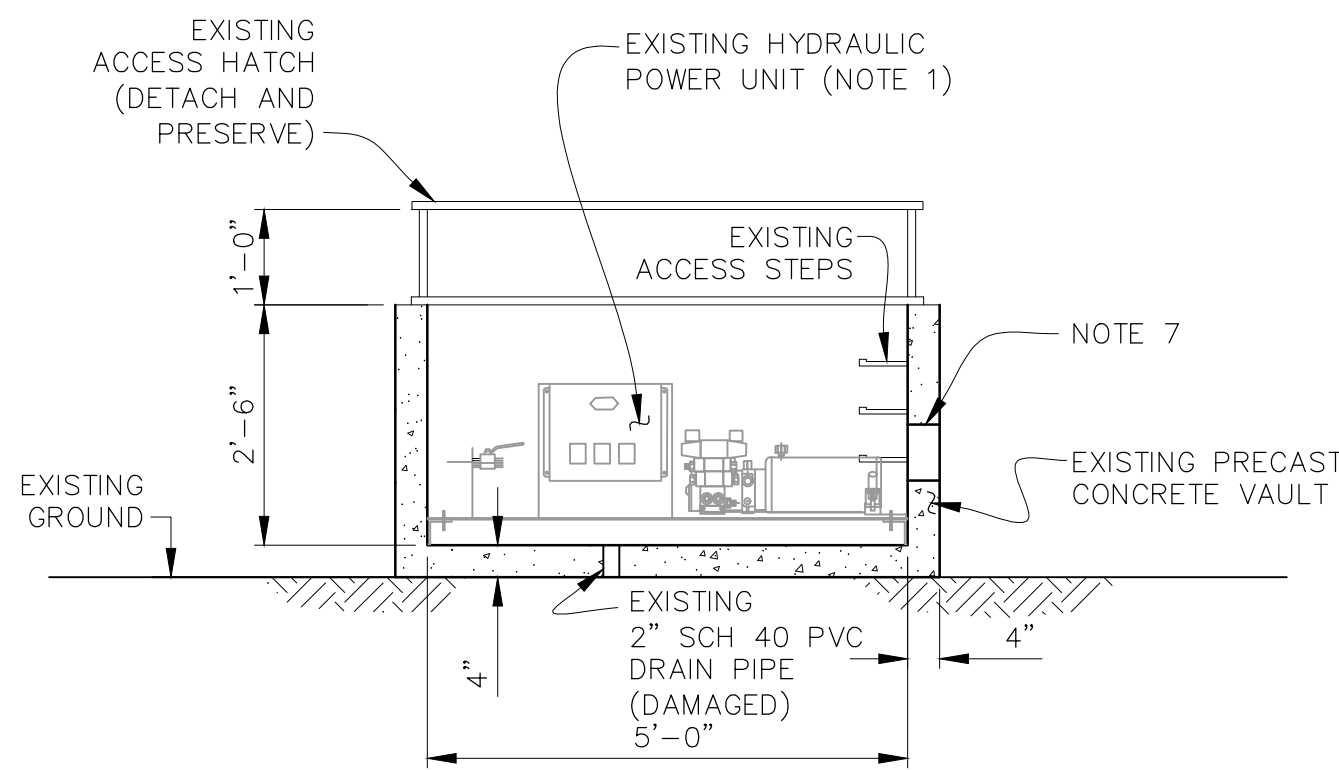
RJH PROJECT 16116

P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\SITE 4 - PLAN OF INTERCONNECT MODS.DWG 6/14/2021



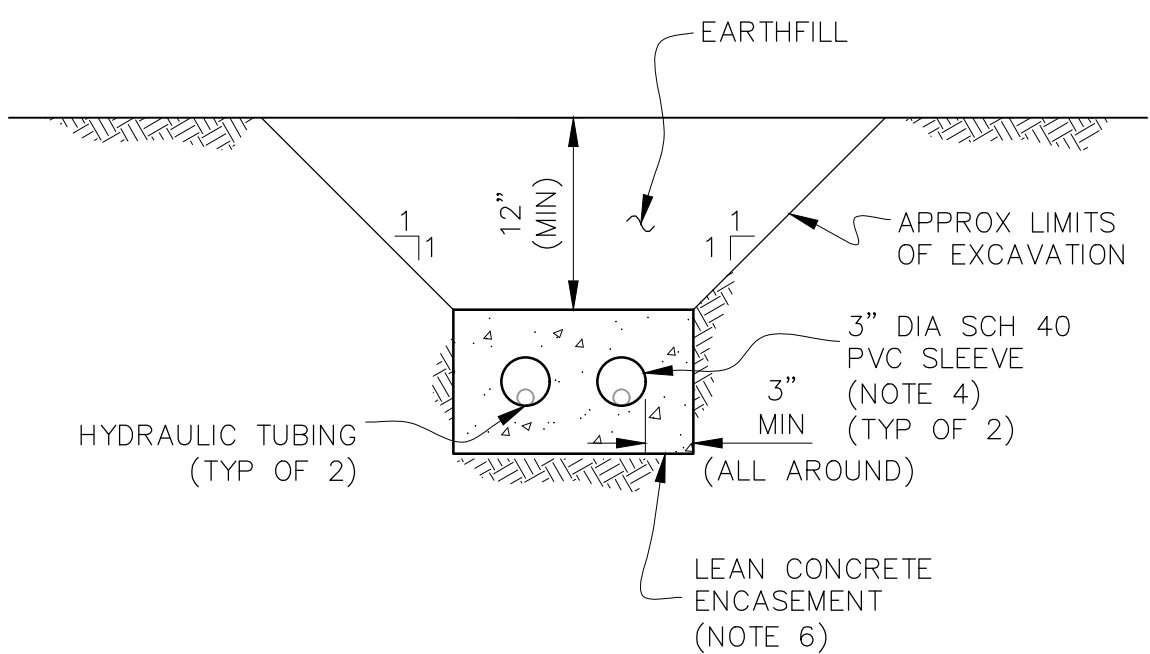
**DETAIL
EXISTING VAULT**

**A
E-01**

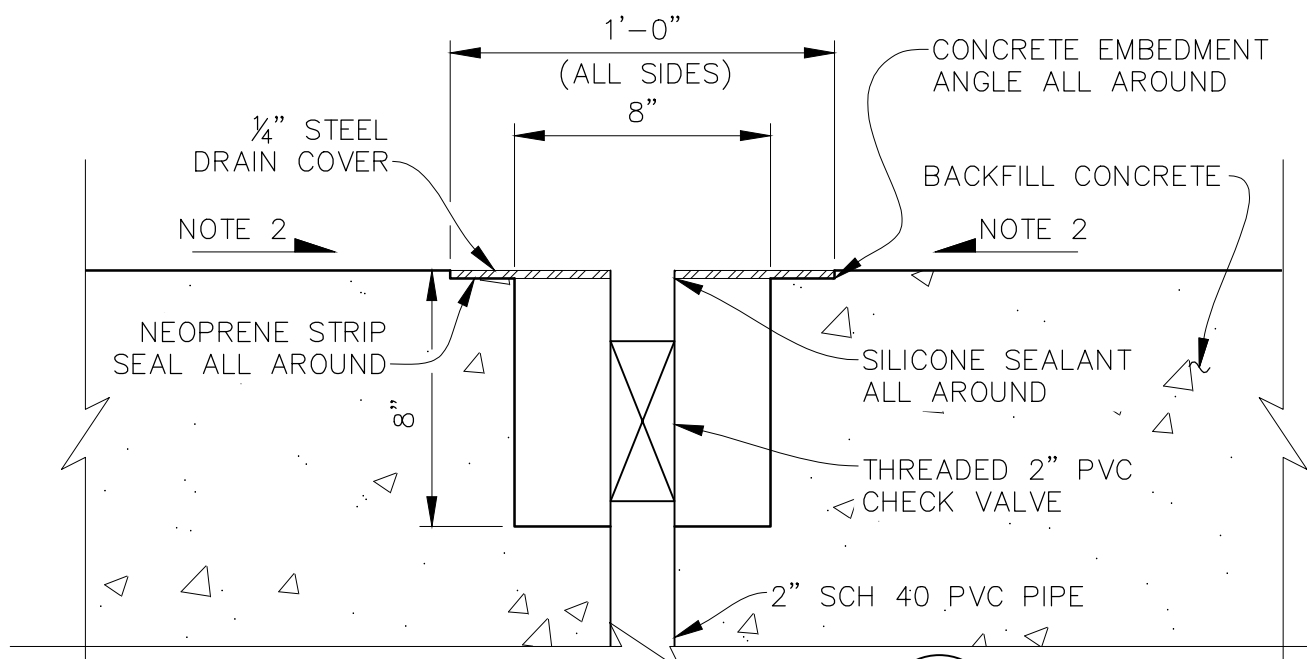


**SECTION
EXISTING VAULT**

**2
E-03**

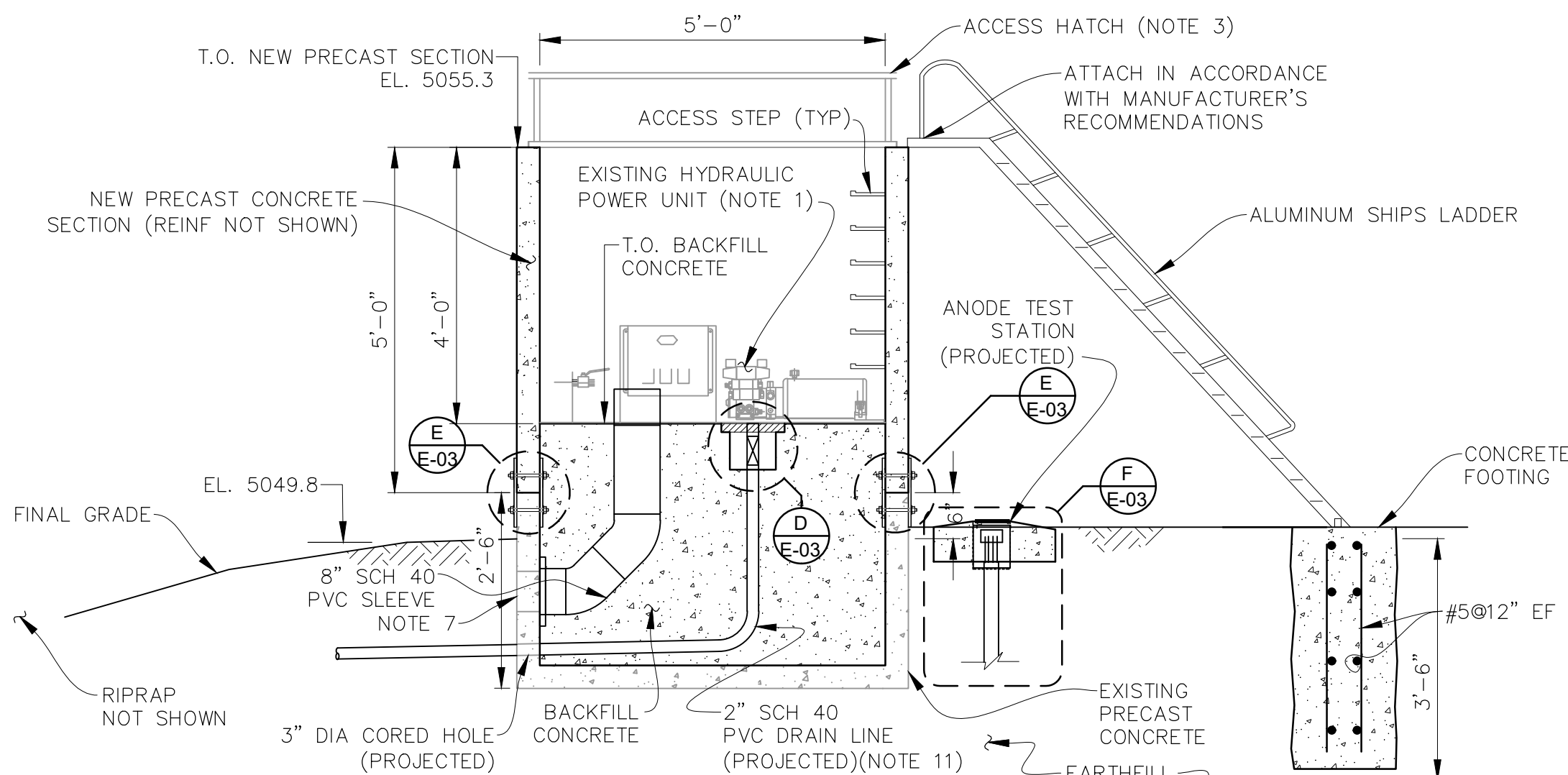


TYPICAL SECTION



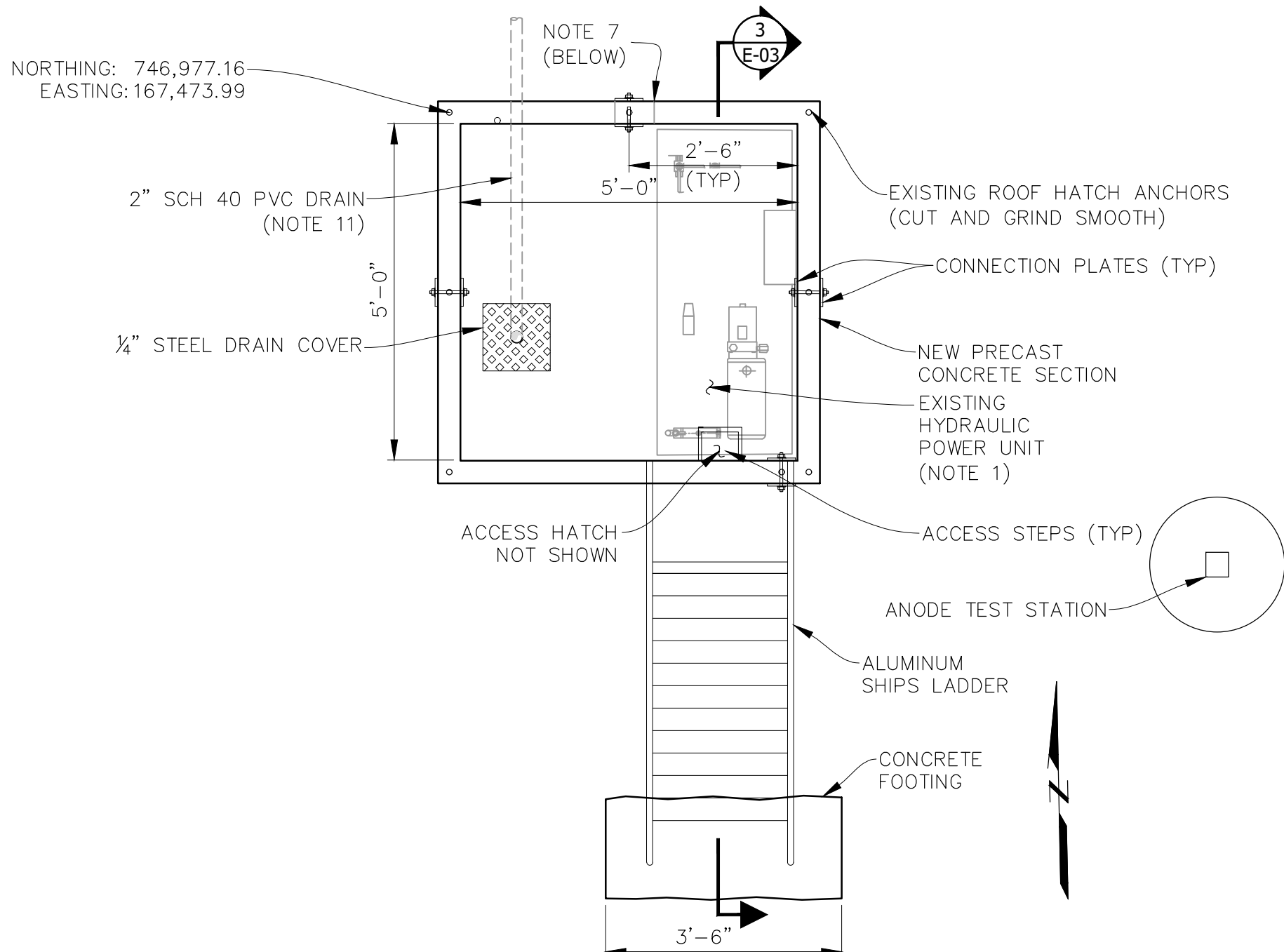
DETAIL

**D
E-03**



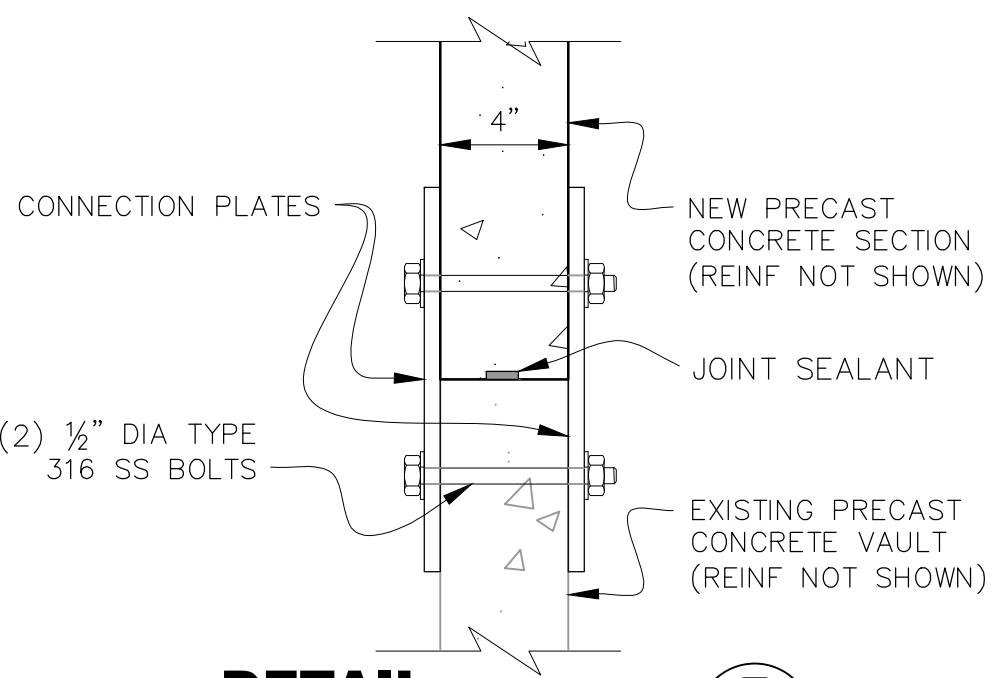
**SECTION
MODIFIED VAULT**

**3
E-03**



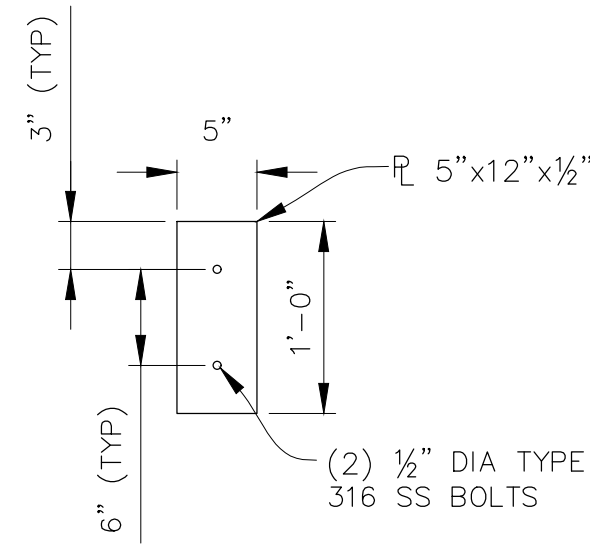
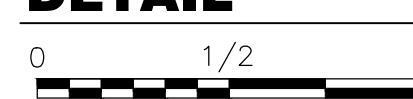
**DETAIL
MODIFIED VAULT**

**B
E-02**

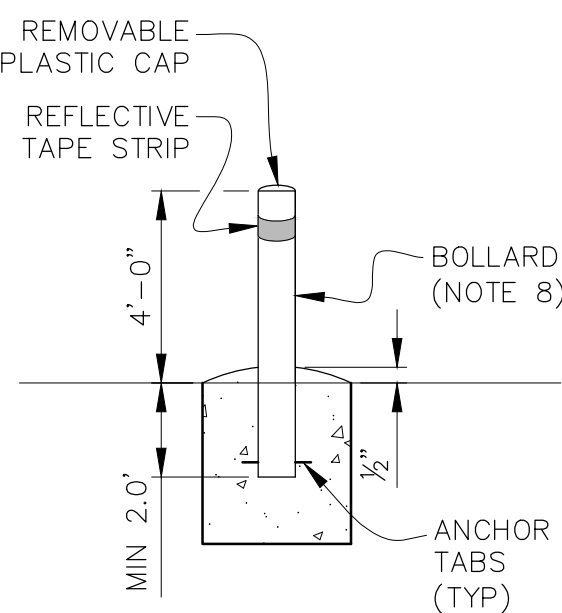


DETAIL

**E
E-03**

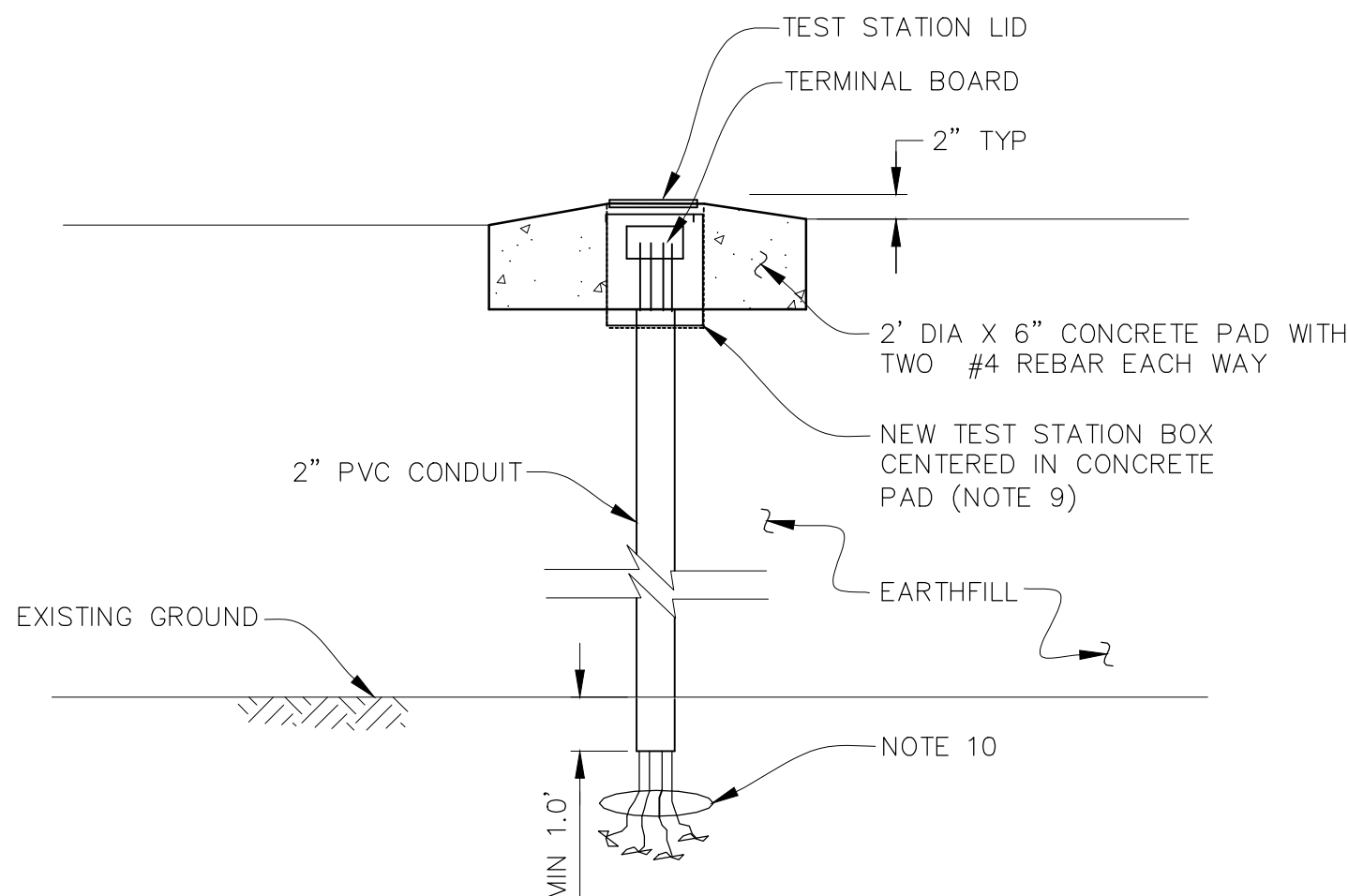


**TYP DETAIL
CONNECTION PLATE**



**TYP DETAIL
BOLLARD**

NOT TO SCALE



**DETAIL
ANODE TEST STATION**

**F
E-03**

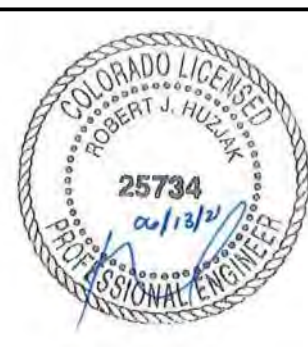
NOT TO SCALE

NOTES:

- PRESERVE AND REINSTALL EXISTING HYDRAULIC POWER UNIT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- SLOPE BACKFILL CONCRETE AT 1-PERCENT SLOPE TOWARDS DRAIN PIPE.
- REINSTALL EXISTING ACCESS HATCH.
- INSTALL PVC PIPE AROUND EXISTING HYDRAULIC TUBING. DO NOT DETACH HYDRAULIC TUBING. CUT PVC PIPE LONGITUDINALLY TO ACCOMMODATE ENCASEMENT OF HYDRAULIC TUBING. INSTALL AND TIGHTEN STAINLESS STEEL BAND CLAMPS AROUND PVC CONDUITS PRIOR TO ENCASEMENT AT MINIMUM 10 FOOT SPACING.
- NOT USED.
- EXTEND CONCRETE ENCASEMENT TO EXISTING GATE CONTROL VAULT.
- EXISTING 6 INCH TO 7 INCH DIA BLOCKOUT FOR HYDRAULIC LINES. ANNULAR SPACE FILLED WITH GROUT.
- 5 1/2 INCH DIAMETER CONCRETE FILLED BEACON TRAFFIC BOLLARD, TYPE BBOLPP-48-5.5. SET BOLLARD IN CONCRETE PER MANUFACTURER'S SPECIFICATIONS. MINIMUM DEPTH 3.0 FEET. POWDER COATED SAFETY YELLOW FINISH.
- A MINIMUM OF 2 FEET OF SLACKWIRE SHALL BE PROVIDED FOR ALL WIRES INSIDE THE TEST STATION BOX. THE 2" PVC CONDUIT SHALL EXTEND APPROXIMATELY 3 INCHES INTO THE BOTTOM OF THE TEST STATION BOX.
- LOCATE EXISTING WIRES. CUT WIRES BACK TO REMOVE FRAYED ENDS. SPLICE NEW WIRES ON TO EXISTING WIRES WITH WATERPROOF SPLICE. LOCATE THE SPLICES WITHIN THE PVC CONDUIT.
- SLOPE AT 2 PERCENT TO DAYLIGHT IN RESERVOIR WITH 2 INCH STAINLESS STEEL FLAP GATE.
- FIELD VERIFY LOCATION OF EXISTING HYDRAULIC TUBING.

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—	05/2021	RECORD DRAWINGS	—	KLH	AJY	RJH



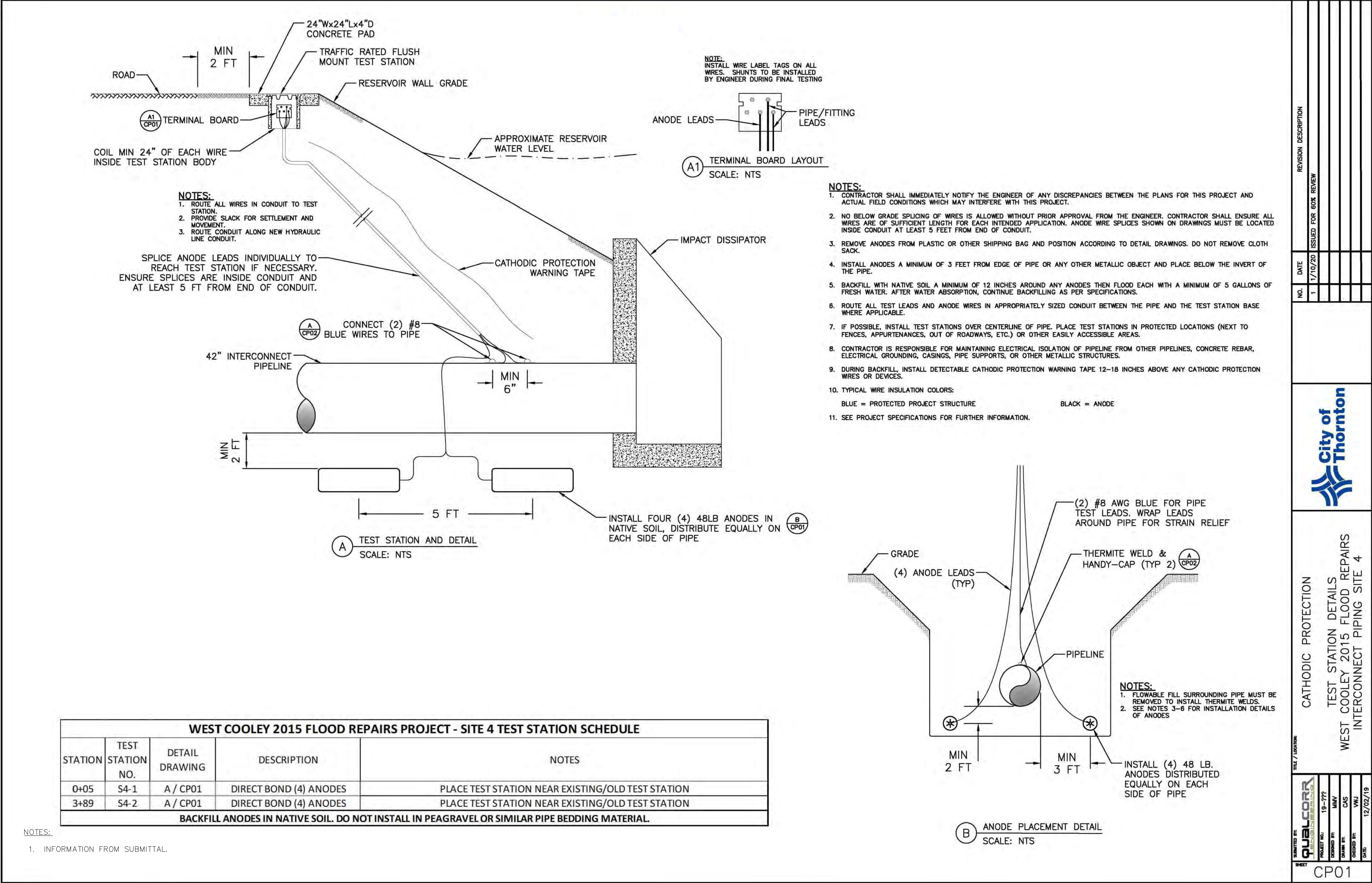
RJH PROJECT 16116

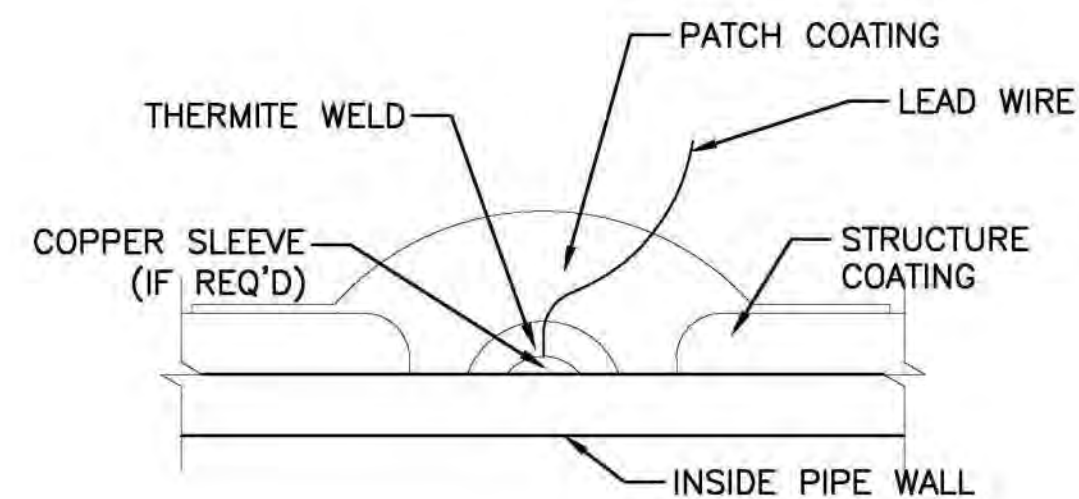
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

SITE 4 - INTERCONNECT
GATE CONTROL VAULT
MODIFICATIONS

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E-03

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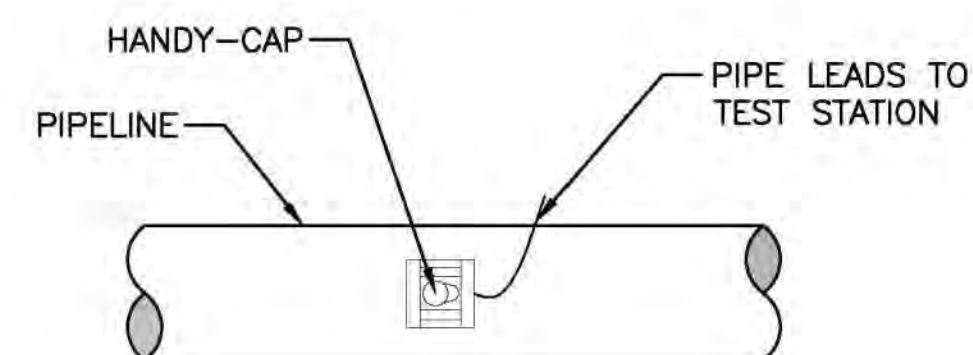




(A) THERMITE WELD DETAIL
SCALE: NTS

- THERMITE WELDING INSTRUCTIONS:

1. REMOVE APPROXIMATELY 4" DIAMETER CIRCLE OF PIPELINE COATING AT STRUCTURE CONNECTION LOCATION.
2. CLEAN AREA APPROXIMATELY 2" DIAMETER TO BRIGHT METAL.
3. REMOVE 2" OF INSULATION FROM END OF WIRE.
4. WELD CONDUCTOR TO PIPE. USE APPROPRIATE GRAPHITE MOLD AND CARTRIDGE CHARGE SIZE. COPPER SLEEVES ARE REQUIRED FOR #8 AWG OR SMALLER WIRES.
5. TIGHTEN THERMITE WELD CONNECTION BY STRIKING THE COMMON SEVERAL BLOWS ON THE SIDE USING A ONE POUND HAMMER. TOP OF WELD MAY BE HAMMERED FLAT IF REQUIRED.
6. APPLY HANDY-CAP. SEE DETAIL B.



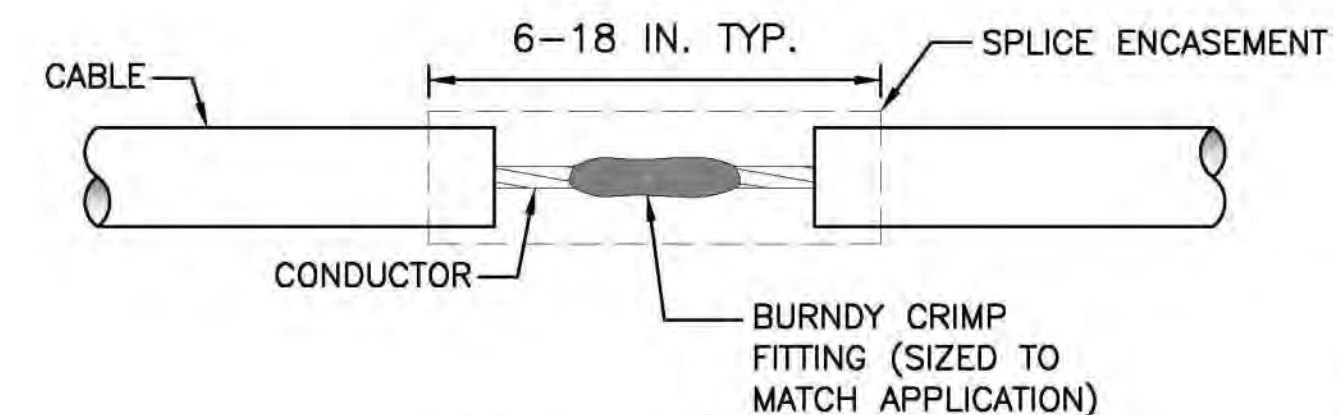
(B) HANDY-CAP APPLICATION
SCALE: NTS

- #### HANDY-CAP APPLICATION PROCEDURES:

1. CLEAN ALL MUD, DIRT, GREASE, OIL, AND OTHER CONTAMINANTS FROM THE METAL SURFACE AND ANY PART OF THE MILL APPLIED COATING WHICH IS TO BE COVERED.
2. APPLY A COAT OF ROYSTON 747 PRIMER (if required) AND ALLOW TO DRY TO A NON-GLOSSY APPEARANCE, WHICH WILL TAKE APPROXIMATELY 5 MINUTES DEPENDING ON HUMIDITY AND TEMPERATURE.
3. REMOVE THE RELEASE PAPER FROM THE BOTTOM OF THE ROYSTON HANDY CAP. BEND THE PLASTIC SHEET INWARD AT THE SERRATIONS WHEN APPLYING TO A SMALL DIAMETER PIPE. POSITION AND PLACE THE HANDY CAP ON THE WELDED AREA WITH THE TUNNEL OVER THE LEAD WIRE.
4. PUSH THE DOME OF THE CAP FIRMLY IN THE WELD AREA. NOW LIFT THE WIRE AWAY FROM THE PIPE AND SQUEEZE THE BLACK RUBBER COMPOUND COMPLETELY AROUND AND UNDERNEATH THE WIRE. THEN PUSH THE LEAD WIRE BACK DOWN ON THE PIPE AND PRESS THE ELASTOMERIC COMPOUND INTO FIRM CONTACT WITH THE PIPE OVER THE ENTIRE AREA.

NO FURTHER PROTECTION IS NECESSARY IF THE ROYSTON HANDY CAP
COVERS THE ENTIRE EXPOSED METAL AREA. UNCOVERED AREAS SHOULD
BE PROTECTED BY APPLYING TAPE OR MASTIC SUCH AS TRENTON
PIPELINE TAPE CP OR ROYSTON ROSKOTE MASTIC.

WHEN COATING OR WRAPPING THE ROYSTON HANDY CAP, REMOVE THE NARROW STRIPS OF PLASTIC RELEASE FILM ON THE TOP OF THE CAP. THIS WILL ASSURE MAXIMUM PROTECTION BY EFFECTING A POSITIVE WATERPROOF SEAL.



③ WIRE SPLICING PROCEDURE
SCALE: NTS

- TYPICAL PROCEDURE TO SPLICE
ANODE OR CABLE:

1. CUT BACK INSULATION FROM END OF ANODES OR CABLES APPROX. 1 INCH. BE SURE ALL CABLE ENDS AND CONNECTIONS ARE CLEAN OF DIRT AND FOREIGN MATTER AND THAT ALL CONNECTIONS ARE BARE.
2. PUT CABLES IN APPROPRIATE SIZED CRIMP FITTING AND CRIMP.
3. APPLY ELECTRICAL PUTTY TO FILL IN ANY VOIDS AND ANY CRACKS. SHAPES.
4. APPLY ELECTRICAL RUBBER TAPE AROUND THE PUTTY AND CABLE WHERE INSULATION WAS REMOVED.
5. REMOVE ELECTRICAL TAPE ALONG THE ENTIRE SPLICED AND A MINIMUM OF 2 INCHES ON EACH ANODE OR CABLE END.
6. APPLY ELECTRICAL COATING ALONG THE ENTIRE SPLICED.
7. EPOXY SPLICING KIT MAY BE USED IN LIEU OF RUBBER AND PLASTIC TAPE.

NOTES:

1. INFORMATION FROM SUBMITTAL.

—	05/2021	RECORD DRAWINGS	—	KLH	AJY	RJH
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2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

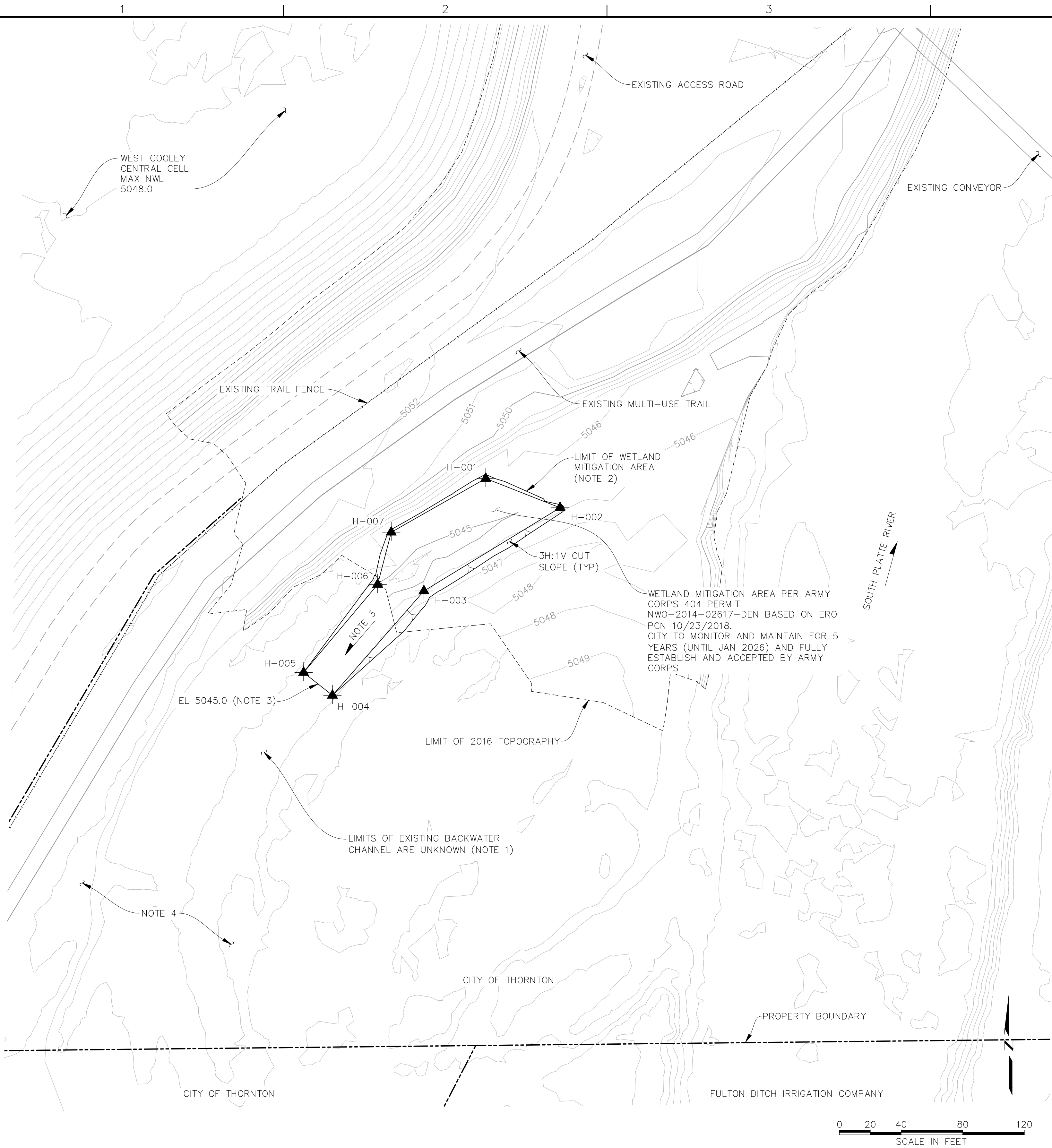
SITE 4 - CATHODIC DETAILS
(2 OF 2)

DWG. NO.
E-05

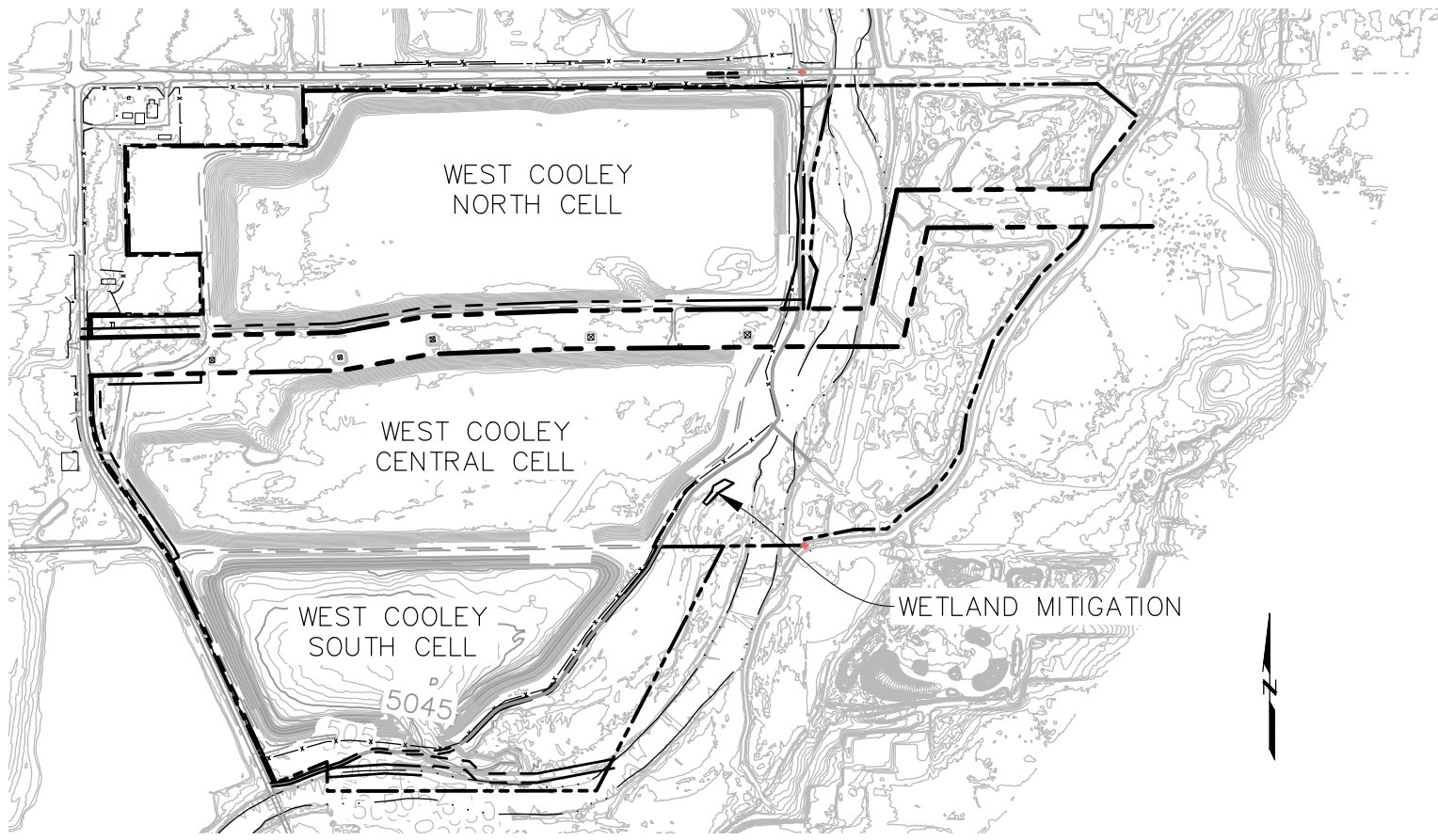
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P:\16116 - W COOLEY FLOOD REPAIR\CAD\TASK 1006\WETLAND MITIGATION.DWG 6/14/2021



WETLAND MITIGATION CONTROL POINTS		
CONTROL POINT	NORTHING	EASTING
H-001	745996.41	167756.17
H-002	745977.41	167804.38
H-003	745923.39	167716.03
H-004	745855.60	167656.65
H-005	745870.43	167637.92
H-006	745927.62	167685.99
H-007	745961.52	167694.82



VICINITY MAP
SCALE: 1"=1000'

Table 1. Wetland seed mix - loamy to sandy loam soils.

Common Name	Scientific Name	Growth Season	Growth Form	Wetland Indicator ¹	Lb/ac (PLS) ²
Grasses and Herbaceous Species					
American sloughgrass	<i>Beckmannia syzigachne</i>	Cool	Sod	OBL	0.84
Baltic rush	<i>Luncus balticus</i>	Cool	Sod	OBL	0.10
Creeping spikerush	<i>Eleocharis palustris</i>			OBL	1.00
Fowl mannagrass	<i>Glyceria striata</i>	Cool	Sod	OBL	3.33
Fowl bluegrass	<i>Poa palustris</i>			FACW	0.15
Prairie cordgrass	<i>Spartina pectinata</i>	Warm	Sod	FACW	2.00
Switchgrass	<i>Panicum virgatum</i>	Warm	Sod/Bunch	FAC	1.20
Western wheatgrass	<i>Pascopyrum smithii</i>	Cool	Sod	FACJ	2.00

Wildflowers					
Blue vervain	<i>Verbena hastata</i>			FACW	0.10
Nuttall's sunflower	<i>Helianthus nuttallii</i>			FAC	0.10
TOTAL PLS POUNDS/ACRE					12.47

¹Wetland Indicator OBL = Obligate, FACW = Facultative Wetland, FAC = Facultative, FACU = Facultative Upland.

²Drill seed; double rate if broadcast; PLS = pure live seed; LB/ac = pounds per acre.

Table 3. Upland area mix

Common Name	Scientific Name	Growth Season	Growth Form	Lb/ac (PLS) ¹
Grasses				
Blue grama	<i>Bouteloua gracilis</i>	Warm	Sod	0.60
Green needlegrass	<i>stipa viridula</i>	Cool	Bunch	2.00
Indian ricegrass	<i>Acantherum hymenoides</i>	Cool	Bunch	3.00
Junegrass	<i>Koeleria macranthera</i>	Cool	Bunch	0.20
Little bluestem	<i>Schizachyrium scoparium</i>	Warm	Bunch	2.30
Prairie sandreed	<i>Calamovilfa longifolia</i>	Warm	Sod	1.00
Sand dropseed	<i>Sporobolus cryptandrus</i>	Warm	Bunch	0.10
Sideoats grama	<i>Bouteloua curtipedula</i>	Warm	Sod	3.00
Thickspike wheatgrass	<i>Elymus lanceolatus</i>	Cool	Sod	2.00
Western wheatgrass	<i>Pascopyrum Smithii</i>	Cool	Sod	4.00
				18.20

Herbaceous/Wildflowers				
Blanket flower	<i>Gaillardia aristata</i>			0.80
Fringed sagebrush	<i>Artemisia frigida</i>			0.08
Tansy aster	<i>Machaeranthera tanacetifolia</i>			1.00
TOTAL PLS POUNDS/ACRE				21.18

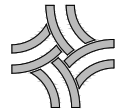
¹Drill seed, if broadcast seeding, doubling the rate; LB/ac = pounds per acre. PLS = pure live seed.

NOTES:

- ELEVATION OF BACKWATER CHANNEL ASSUMED TO BE AT ELEVATION 5044 FOR DESIGN. FIELD VERIFY AND PROVIDE TO THORNTON.
- VERIFY PROPOSED GRADING WITH THORNTON PRIOR TO CONSTRUCTING WETLAND MITIGATION AREA. CONSTRUCTION OF WETLAND MITIGATION AREA TO BE FIELD FIT UNDER THE DIRECTION OF THORNTON.
- SLOPE WETLAND MITIGATION AREA TOWARD EXISTING BACKWATER CHANNEL AT 0.5%. MINIMUM ELEVATION SHALL BE EL 5045.0. WETLAND MITIGATION AREA SHALL BE AT LEAST 6230 SQUARE FEET.
- 2 FOOT TOPOGRAPHY PROVIDED BY CITY OF THORNTON (2008).

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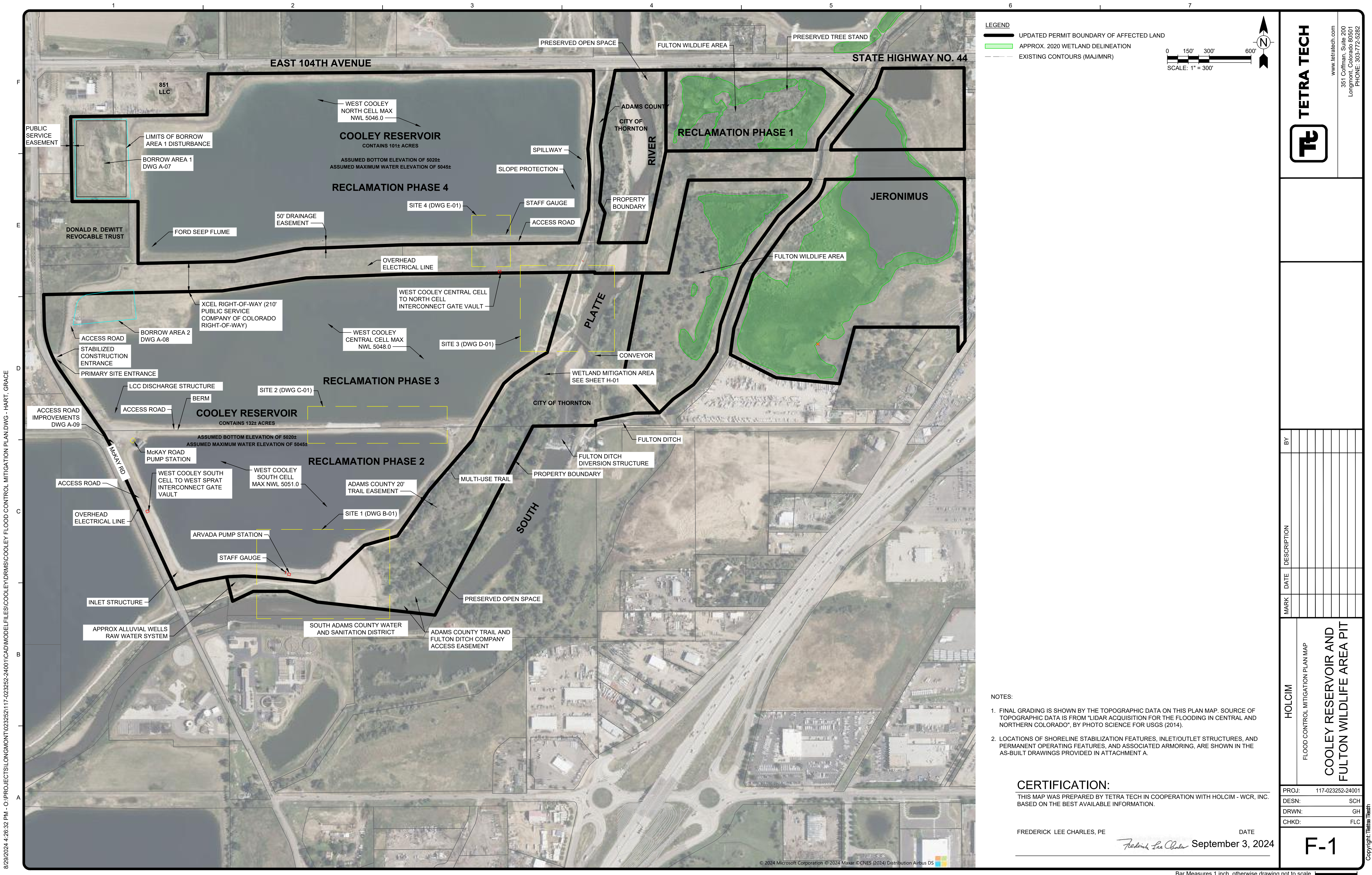
WEST COOLEY RESERVOIR -
2015 FLOOD REPAIRS PROJECT
THORNTON, COLORADO

WETLAND MITIGATION

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RJH PROJECT 16116



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LEGEND

UPDATED PERMIT BOUNDARY OF AFFECTED LAND

APPROX. 2020 WETLAND DELINEATION

EXISTING CONTOURS (MAJ/MNR)

0150'300'600'

SCALE: 1" = 300'

N

- RECLAMATION PLAN NOTES
- ANY HARDPACKED AREAS SHALL BE SCARIFIED PRIOR TO REPLACEMENT OF TOPSOIL AND SEEDING. AFTER BACKFILLING, GRADING OF ANY AREA TO FINAL SLOPES AND PLACEMENT OF TOPSOIL, SEEDING WILL BE INITIATED AS SOON AS POSSIBLE.
 - EXCEPT FOR WETLAND ESTABLISHMENT AREAS, THE BELOW GRASS DRILL SEED MIX BELOW SHALL BE USED FOR RE-SEEDING OF SLOPES AND DISTURBED AREAS. FOR BROADCAST SEEDING, THE RATE SHALL BE DOUBLED. MULCH SHALL CONSIST OF 4,000 LBS./ACRE WEED FREE NATIVE GRASS CRIMPED INTO THE SOIL SURFACES. PLANTING SHALL OCCUR BETWEEN NOVEMBER 1 AND APRIL 30 WHEN THE GROUND IS FROZEN AND BE PLANTED ¼ TO ¾ INCHES DEEP IN 7" TO 12" ROWS. NON-IRRIGATED GRASS PLANTING OF THE NON-WETLAND AREAS SHALL CONSIST OF THE FOLLOWING:

SPECIES	VARIETY	PLS#	%	PLS#/AC
WESTERN WHEATGRASS	"ARRIBA OR BARTON"	8.0	30	2.4
PUBESCENT WHEATGRASS	"LUNA"	9.0	20	1.8
SIDEOATS GRAMA	"VAUGHN OR BUTTE"	4.5	30	1.4
BLUE GRAMA	"HACHITA OR LOVINGTON"	1.5	10	0.2

- FOR WETLANDS CREATION, PARTIAL RECLAMATION WILL BEGIN WITH THE BACKFILLING OF SEDIMENTS CREATED DURING THE PROCESSING OF THE MINED SAND AND GRAVEL. AT THE TERMINATION OF MINING, AT LEAST 50% OF THE PRESENTLY EXPOSED LAKE AREA IS EXPECTED TO BEEN BACKFILLED TO A LEVEL TO SUPPORT WETLAND VEGETATION AT THE CONCLUSION OF ALL MINING. INTERIM PLANTING OF WETLANDS VEGETATION SHALL BE UNDERTAKEN, WHENEVER A MINIMUM OF 5 ACRES HAS BEEN FILLED TO 6" ABOVE THE ORIGINAL LAKE SURFACE. WETLAND PLANTING SHALL FIRST CONSIST OF BROADCAST SEEDING OF THE BELOW OR SIMILAR GRASS SEED MIX AT AN APPLICATION RATE OF 20 LBS./ACRE DURING THE GROWING SEASON (MAY THROUGH AUGUST):

%	SPECIES	COMMON NAME	% PURE	% VIABLE
12.00	BECKMANNIA SYZGACHNE	AMERICAN SLOUGHGRASS	89.28	82.00
4.00	CARAX NEBRASCENCIA	NEBRASKA SEDGE	98.69	84.00
1.00	CARAX LANUGINOSA	WOOLY SEDGE	97.54	46.00
10.00	ELEOCHARIS PALUSTRIS	CREEPING SPIKERUSH	99.51	88.00
15.00	ELYMUS CANDENSIS	CANADA WILDRYE	99.33	99.00
1.00	JUNOUS BALTICUS	BALTIC RUSH	93.21	96.00
1.00	JUNOUS TORREYL	TORREY'S RUSH	66.02	97.00
12.00	PANICUM VIRGATUM	SWITCHGRASS	99.47	70.00
10.00	SCIRPUS ACUTUS	HARDSTEM BULRUSH	97.77	64.00
1.00	SCIRPUS PALLIDUS	PALE BULRUSH	95.01	92.00
10.00	SCIRPUS PALUDOSUS	ALKALAI BULRUSH	99.04	97.00
4.00	SCIRPUS PUNGENS	THREE SQUARE BULRUSH	87.20	77.00
10.00	SCIRPUS VALIDUS	SOFT STEM BULRUSH	99.26	91.00
4.00	SPARGANIUM EURYCARPUM	GIANT BUR REED	98.73	90.00
5.00	SPARTINA PACTINATA	PRAIRIE CORDGRASS	77.82	92.00

- PER THE NOXIOUS WEED CONTROL PLAN IN EXHIBIT D -MINING PLAN, NOXIOUS WEEDS WILL BE CONTROLLED, PARTICULARLY DIFFUSE KNAPWEED, SCOTCH THISTLE, AND CANADA THISTLE, WHICH HAVE BEEN OBSERVED WITHIN THE PERMIT AREA AND ON ADJACENT PROPERTY. ALL AREAS ADJACENT TO ROADWAYS AND WATERWAYS WILL BE ASSESSED EVERY SPRING TO DETERMINE THE BEST MANAGEMENT PRACTICE FOR WEED CONTROL. AT A MINIMUM, ALL NOXIOUS WEED AREAS WILL BE MOWED AS NEEDED. IN HEAVILY INVESTED AREAS, APPROVED HERBICIDES WILL BE APPLIED AS NEEDED TO INCLUDE, BUT NOT LIMITED TO, TORDON 22K APPLIED AT 1PT/AC AT 20 GPA OR 2-4-D 4# AMINE AT 1 QT/AC AT 20 GPA. CONSULTATION WITH QUALIFIED VEGETATION MANAGERS AND/OR COUNTY WEED CONTROL COORDINATORS WILL BE ON-GOING TO ASSIST IN THE MANAGEMENT OF NOXIOUS WEEDS.
- COTTONWOOD TREES (IN CLUSTERS OF 3 TO 5) AND WILLOW SHRUBS (IN CLUSTERS OF 5 TO 10) PLANTED IN SEVERAL LOCATIONS WHERE CREATED WETLANDS ADJUT UPLAND NON-IRRIGATED REPLANTING AREAS.

AREAS BY FINAL USE - ORIGINAL PERMIT

LAKE (WATER SURFACE AREA)	231± ACRES
OPEN SPACE/WILDLIFE	60± ACRES
CREATED WETLANDS	11 TO 31± ACRES
CREATED LAKE	20 TO 0± ACRES
INDUSTRIAL	27± ACRES
TOTAL	349± ACRES

AREAS BY FINAL USE - AMENDMENT NO. 1

PRESERVED WETLANDS	10± ACRES
DRYLAND/OPEN SPACE (UNDISTURBED)	10± ACRES
DRYLAND/OPENS SPACE (DISTURBED)	10± ACRES
CREATED WETLANDS	15± ACRES
LAKE	5± ACRES
TOTAL	50± ACRES

FULTON WILDLIFE REVEGETATION PHASES

- PHASE 1A - WETLANDS REVEGETATION 6± ACRES
- PHASE 1B - WETLANDS TOPSOIL REPLACEMENT 5 TO 25± ACRES REVEGETATION 5 TO 25± ACRES
- PHASE 5 - CONVEYOR AND PLANT SITE EQUIPMENT REMOVAL

COOLEY RESERVOIR REVEGETATION PHASES

- REVEGETATION
PHASE 2 - 6472± LINEAL FEET x 50' / 43560 SQ.FT. = 7.5± ACRES TO BE REVEGETATED
PHASE 3 - 8730± LINEAL FEET x 50' / 43560 SQ.FT. = 10.0± ACRES TO BE REVEGETATED
PHASE 4 - 9652± LINEAL FEET x 50' / 43560 SQ.FT. = 11.0± ACRES TO BE REVEGETATED

* - 35' SETBACK + 15' TO WATER LINE x 1 = 50

JERONIMUS (AMENDMENT NO. 1) PROPERTY, PHASE 6

PHASE 6A - GRASSLAND TOPSOIL REPLACEMENT & REVEGETATION	10± ACRES
PHASE 6B - CREATED WETLANDS REVEGETATION	15± ACRES

NOTES:

- ALL REVEGETATION AREAS HAVE MIN. 6" TOPSOIL REPLACEMENT, FINAL GRADING, SEEDING, FERTILIZING, AND MULCHING EXCEPT FOR WETLAND REVEGETATION WHICH DOES NOT INCLUDE TOPSOIL REPLACEMENT.
- FINAL GRADING IS SHOWN BY THE TOPOGRAPHIC DATA ON THIS PLAN MAP. SOURCE OF TOPOGRAPHIC DATA IS FROM "LIDAR ACQUISITION FOR THE FLOODING IN CENTRAL AND NORTHERN COLORADO", BY PHOTO SCIENCE FOR USGS (2014).

CERTIFICATION:

THIS MAP WAS PREPARED BY TETRA TECH IN COOPERATION WITH HOLCIM - WCR, INC. BASED ON THE BEST AVAILABLE INFORMATION.

FREDERICK LEE CHARLES, PE *Frederick Lee Charles* DATE September 3, 2024

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BY

DESCRIPTION

DATE

MARK

HOLCIM

RECLAMATION PLAN MAP

COOLEY RESERVOIR AND
FULTON WILDLIFE AREA PIT

PROJ:	117-023252-24001
DESIN:	SCH
DRWN:	GH
CHKD:	FLC

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