Oversight / NHS	
FHWA REGION VIII OVERSIGHT?	■ NO □YES
NATIONAL HIGHWAY SYSTEM?	■ NO □YES

PUBLIC WORKS, ENGINEERING DIVISION
CITY OF GRAND JUNCTION

BIKE PATH CONSTRUCTION BID PLANS OF PROPOSED
FEDERAL AID PROJECT NO. MTF M555-035
24 ROAD BIKE PATH
MESA COUNTY
CONSTRUCTION PROJECT CODE NO. 24077
SEC. 4, TOWNSHIP 1 SOUTH, RANGE 1 WEST, UTE PRINCIPAL MERIDIAN

Related Projects:	
P. E. UNDER PROJECT:	
Project Number	MTF M555-035
Project Code:	24077
R.O.W. Projects:	
R.O.W. Project Description	MTF M555-035

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

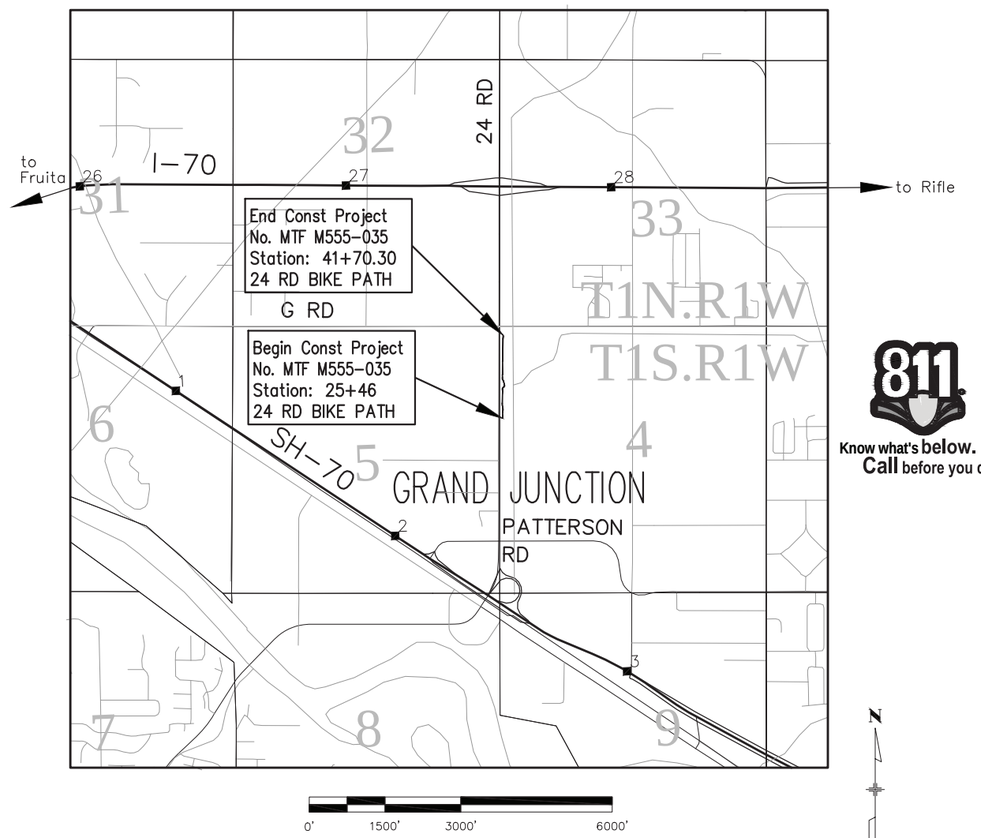
DESCRIPTION OF PROJECT

CONSTRUCT A BIKE PATH FROM THE END OF THE EXISTING PATH AT 659 MARKET ST TO THE END OF THE EXISTING PATH SOUTH OF G ROAD. THIS IS A BIKE PATH FUNDED PROJECT WHICH INCLUDES UNCLASSIFIED EXCAVATION, AGGREGATE BASE COURSE, CONCRETE PAVEMENT, PEDESTRIAN LIGHTING, AND PREFABRICATED STRUCTURAL STEEL BRIDGE INSTALLATION.

A MANDATORY PRE-BID CONFERENCE WILL BE HELD ON MONTH DAY, YEAR AT TIME XM AT THE MESA CONFERENCE ROOM LOCATED AT 606 SOUTH 9TH STREET (CDOT MAINTENANCE BUILDING), GRAND JUNCTION, COLORADO TO PRESENT A BRIEF OVERVIEW OF THE PROJECT AND TO ANSWER QUESTIONS FROM PROSPECTIVE BIDDERS.

TABULATION OF LENGTH

STATION	BIKE PATH	BRIDGE
24 ROAD BIKE PATH STA 25+46 TO STA 41+70.30	1624.30	
24 ROAD BIKE PATH STA 32+42.50 TO STA 32+92.50		50
TOTAL FEET	1624.30	50
TOTAL MILES	0.307	



PROJECT LOCATION MAP

Know what's below. Call before you dig.

SHEET No. INDEX OF SHEETS

SHEET No. BRIDGE PLANS

SHEET No. LIGHTING PLANS

Print Date: as shown	Sheet Revisions	Colorado Department of Transportation	As Constructed
File Name: as shown	Date: / Comments / Init.	606 South 9th Street	No Revisions:
Horiz. Scale: As Noted Vert. Scale: As Noted		Grand Junction, CO, 81501	Revised:
Unit Information: City of GJ Unit Leader Initials: KA		Phone: 970-683-6351 FAX: 970-683-6369	Void:
City of Grand Junction Colorado — 333 West Avenue, Bldg C, Grand Junction, CO, 81501, Phone: 970-244-1554		Region 3 KCC	

Contract Information	Project No./Code
Contractor:	MTF M555-035
Resident Engineer:	24077
Project Engineer:	Sheet Number 1
PROJECT STARTED: __/__/__ ACCEPTED: __/__/__	
Comments:	

N:\Landproj\(24 Road Bike Path)\dwg\Title Sheet.dwg, 6/29/2022 12:07:55 PM

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☐ M-100-2	ACRONYMS AND ABBREVIATIONS (4 SHEETS)	4-7
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☐ M-203-2	DITCH TYPES	9
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☐ M-203-12	SUPERELEVATION STREETS (2 SHEETS)	13-14
☐ M-206-1	EXCAVATION AND BACKFILL FOR STRUCTURES (2 SHEETS)	15-16
■ M-206-2	EXCAVATION AND BACKFILL FOR BRIDGES (2 SHEETS)	17-18
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COLORADO
DEPARTMENT OF TRANSPORTATION

M&S STANDARDS PLANS LIST

July 31, 2019

Revised on September 6, 2022

ALL OF THE M&S STANDARD PLANS, AS SUPPLEMENTED AND REVISED, APPLY TO THIS PROJECT WHEN USED BY DESIGNATED PAY ITEM OR SUBSIDIARY ITEM.

THE M&S STANDARD PLANS USED TO DESIGN THIS PROJECT ARE INDICATED BY A MARKED BOX ■, AND WILL BE ATTACHED TO THE PLANS. ALL THE OTHER M&S STANDARD PLANS ARE STILL ELIGIBLE FOR CONSTRUCTION IF APPROVED BY AN APPROPRIATE CDOT ENGINEER.

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☐ S-614-1	GROUND SIGN PLACEMENT (2 SHEETS)	187-188
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☐ S-614-22	TYPICAL MULTI-SIGN INSTALLATIONS	218
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DESCRIPTION	DATE
REVISION ⚠ REV 1	DATE
REVISION ⚠ REV 2	DATE
REVISION ⚠ REV 3	DATE
REVISION ⚠ REV 4	DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE OCTOBER 2022
APPROVED BY KH DATE OCTOBER 2022

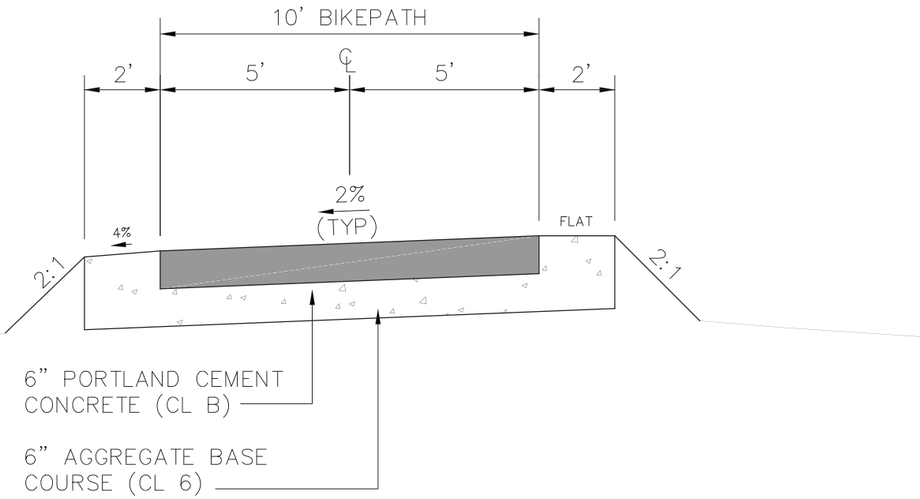
NO SCALE

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
CDOT STANDARD PLAN LIST
October 13, 2022

2



24 ROAD BIKEPATH
STA 25+46 TO STA 41+70.30

N.T.S.

NOTES

1. GRADE PATHSIDE SWALE AS SHOWN HERON. SEE PLANS FOR HORIZONTAL LOCATION OF SWALE..
2. TOP 6" OF SUBGRADE TO BE COMPACED TO STANDARD DENSITY OF 95% AS DETERMINED BY AASHTO T-99.

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

DESCRIPTION	DATE
REVISION ⚠ REV 1	– DATE
REVISION ⚠ REV 2	– DATE
REVISION ⚠ REV 3	– DATE
REVISION ⚠ REV 4	– DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

SCALE 0 1 2 4

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
TYPICAL CROSS SECTION – 1
June 29, 2022

3

N:\Landproj\(24 Road Bike Path)\dwg\TYPICAL CROSS SECTION.dwg, 6/29/2022 12:08:04 PM

ABBREVIATIONS

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
ABC	AGGREGATE BASE COURSE
AC	ASBESTOS CEMENT
AP	ANGLE POINT
ASB	ANCHORED STRAW BALES
ASP	ALUMINIZED STEEL PIPE
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BACK OF CURB
BF	BUTTERFLY VALVE
BOW	BACK OF WALK
BCR	BEGIN CURB RETURN
BOT	BOTTOM
BSWMP	BETTER STORM WATER MANAGEMENT PRACTICES
CH	CHORD
CAP	CORRUGATED ALUMINUM PIPE
CDOT	COLORADO DEPARTMENT OF TRANSPORTATION
CI	CAST IRON
C,G,& SW	CURB, GUTTER & SIDEWALK
℄	CENTER LINE
CL	CLEAR
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
COMB	COMBINATION (AS IN STORM SEWER AND SANITARY SEWER)
CONC	CONCRETE
CSM	CITY SURVEY MONUMENT
CSP	CORRUGATED STEEL PIPE
CU	COPPER
DI	DUCTILE IRON
DWY	DRIVEWAY
E	ELECTRIC
ECR	END CURB RETURN
EG	EDGE OF GUTTER
EL	ELEVATION
EP	EDGE OF PAVEMENT
EX	EXISTING
FB	FULL BODY
FC	FACE OF CURB
FG	FINISHED GRADE
℄	FLOW LINE
FL	FLANGE
FM	FORCE MAIN
FO	FIBER OPTICS
FS	FAR SIDE
FTG	FOOTING
G	GAS
GB	GRADE BREAK
GM	GAS METER
GV	GATE VALVE
HBP	HOT BITUMINOUS PAVEMENT
HDPE	HIGH DENSITY POLYETHYLENE
INV	INVERT
IRR	IRRIGATION
L	LENGTH OF ARC
LC	LONG CHORD
LF	LINEAR FEET
LL	LONG ARC
LS	SHORT ARC
LT	LEFT
MB	MAILBOX
MCSM	MESA COUNTY SURVEY MONUMENT
MH	MANHOLE
MJ	MECHANICAL JOINT
MW	MILL WRAP
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NOP	NO ONE PERSON
NRCP	NON-REINFORCED CONCRETE PIPE
NS	NEAR SIDE
NTS	NOT TO SCALE
OHP	OVERHEAD POWER
OHT	OVERHEAD TELEPHONE
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PE	POLYETHYLENE
PERF	PERFORATED
PI	POINT OF INTERSECTION
PIP	PLASTIC IRRIGATION PIPE
POC	POINT ON CURVE
POT	POINT ON TANGENT
PR	PROPOSED
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
REQ'D	REQUIRED
RG	RESTRAINED GLANDS
RL	LONG RADIUS
ROW	RIGHT OF WAY
RP	RADIUS POINT
RR	RAIL ROAD
RS	SHORT RADIUS
RT	RIGHT
S	SLOPE
SAN	SANITARY
SC	SHORT CHORD
SCD	STANDARD CONTRACT DOCUMENTS
SCH	SCHEDULE
SF	SILT FENCE
SL	SECTION LINE
SSRB	STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION
SSUU	STANDARD SPECIFICATIONS FOR CONSTRUCTION OF UNDERGROUND UTILITIES
STA	STATION
STL	STEEL
STM	STORM
T	TELEPHONE
TAN	LENGTH OF TANGENT
TC	TOP OF CURB
TH	TEST HOLE
TV	TELEVISION
(TYP)	TYPICAL
UU	UNDERGROUND UTILITIES
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VPC	VERTICAL POINT OF CURVATURE
VPCC	VERTICAL POINT OF COMPOUND CURVATURE
VPRC	VERTICAL POINT OF REVERSE CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
W	WATER
△	DELTA ANGLE

LEGEND

BSWMP
DRAINAGE BASIN BOUNDARY

BSWMP
ANCHORED STRAW BALES — ASB ASB ASB ASB ASB ASB ASB

BSWMP
SILT FENCE — SF SF SF SF SF SF SF

BUILDING

CONCRETE CURB AND GUTTER — 2" CURB AND GUTTER

CONCRETE CURB,GUTTER, & SIDEWALK — 7" C, G, & SW

CONCRETE DITCH — CONCRETE

CONCRETE SIDEWALK — 4" SW

CULVERT — 18" RCP

EARTH DITCH — EARTH EARTH EARTH

EDGE OF GRAVEL

EDGE OF PAVEMENT

FENCE (HT & MATL NOTED) — 6' CHAINLINK

GUARD RAIL

HATCHING:
INDICATES ASPHALT REMOVAL

HATCHING:
INDICATES CONCRETE REMOVAL

HATCHING:
INDICATES STAGING AREA — ~STAGING AREA~

LINE (CENTER OF IMPROVEMENTS) — CENTERLINE

LINE (CITY LIMITS) — CITY LIMITS

LINE (CONTROL) — CONTROL LINE

LINE (EASEMENT)

LINE (MONUMENT/SECTION) — MONUMENT/SECTION LINE

LINE (PROPERTY)

LINE (RIGHT OF WAY)

MATCH LINE — MATCH LINE

PIPE (IRRIGATION) — 4" IRR

PIPE (SIPHON) — 4" SIPHON

PROPOSED CONCRETE CURB AND GUTTER

PROPOSED CONCRETE CURB,GUTTER,& SIDEWALK

PROPOSED CONCRETE SIDEWALK

PROPOSED "WET" UTILITIES (CONSTRUCTION NOTE WILL INDICATE TYPE, SIZE, AND MATERIAL OF NEW MAIN) — 8" PVC SANITARY SEWER

ALL PROPOSED FEATURES NOT SHOWN IN LEGEND WILL BE SHOWN THE SAME AS THEIR EXISTING COUNTERPART, BUT INDICATED BY BOLDER LINETYPE

RAIL ROAD

RETAINING WALL — 1' RETAINING WALL

STRIPING (CONTINUOUS WHITE) — WHITE

STRIPING (DASHED WHITE) — WHITE

STRIPING (CONTINUOUS YELLOW) — YELLOW

STRIPING (DASHED YELLOW) — YELLOW

TOP OF SLOPE — 4580

CONTOUR LINES
(SHOWN BETWEEN TOP & TOE)

TOE OF SLOPE — 4570

TRAFFIC DETECTOR LOOP

UTILITY LINE (ABANDON)
(THIS CASE A WATER LINE) — W (ABANDONED) 8" W

UTILITY LINE (CABLE TV) — TV TV

UTILITY LINE (ELECTRIC) — E E

UTILITY LINE (FIBER OPTIC) — FO QWEST FO

UTILITY LINE (GAS) — G 1 1/4" MPE G

UTILITY LINE (HIGH VOLTAGE OVERHEAD POWER) — HVOHP

UTILITY LINE
(OVERHEAD POWER) — OHP

UTILITY LINE
(OVERHEAD TELEPHONE) — OHT

UTILITY LINE
(SANITARY SEWER) — 8" SAN

UTILITY LINE
(SANITARY SEWER FORCE MAIN) — 8" FM

UTILITY LINE
(SANITARY SEWER SERVICE) — SS

UTILITY LINE
(STORM SEWER) — 8" STM

UTILITY LINE
(STORM SEWER, PERFORATED) — 6" PERF

UTILITY LINE
(STORM/SANITARY SEWER SEWER COMBINATION) — 18" COMB

UTILITY LINE (TELEPHONE) — T T

UTILITY LINE (WATER) — W 8" W

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER

06/30/2022

SYMBOLS

BENCH MARK — A
CATCH BASIN
CLEAN OUT — SSCO
CURB STOP
FIRE HYDRANT
GUY WIRE ANCHOR
HEADGATE
IRRIGATION PUMP — IP
MAILBOX — MB
MANHOLE (ELECTRIC) — E
MANHOLE (GAS) — G
MANHOLE (SANITARY/STORM)
MANHOLE (TELEPHONE) — T
MANHOLE (TV) — TV
MANHOLE (WATER) — W
METER (GAS) — GM
METER (WATER)
PEDESTAL (TELEPHONE)
PEDESTAL (TV) — TV
PROPERTY PIN — PIN
PULL BOX
REDUCER FITTING
SIGN OR POST (SIGN TYPE NOTED) — STOP
SPRINKLER HEAD
STREET LIGHT
SURVEY MONUMENT (CITY) — CSM
SURVEY MONUMENT (TYPE NOTED) — MCSM
TEST HOLE — TH #1
TRAFFIC PAINT MARKING
TRAFFIC SIGNAL POLE AND MAST ARM
UTILITY POLE
VALVE (GAS)
VALVE (IRRIGATION) — IRR
VALVE (WATER)
VEGETATION (HEDGE OR BUSH)
VEGETATION (TREE STUMP)
VEGETATION (TREE) (CALIPER SIZE NOTED) — 6"
WATER HYDRANT — WH
WEIR — M
YARD LIGHT

NORTH ARROW:

N
W E
S

BAR SCALE:

GRAPHIC SCALE

10 0 20 60

(IN FEET)
1 inch = 20 ft.

DESCRIPTION	DATE
REVISION △ REV 1	DATE
REVISION △ REV 2	DATE
REVISION △ REV 3	DATE
REVISION △ REV 4	DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

SEE PLAN FOR SCALE INFO

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
STANDARD ABREVIATIONS LEGENDS & SYMBOLS
June 29, 2022

4

N:\Landproj\(24 Road Bike Path)\dwg\STANDARD LEGEND AND SYMBOLS.dwg, 6/29/2022 12:08:09 PM

GENERAL NOTES

1. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, CITY OF GRAND JUNCTION STANDARD CONTRACT DOCUMENTS FOR CAPITAL IMPROVEMENT CONSTRUCTION, AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE SPECIFICATIONS, OR ANY APPLICABLE STANDARDS, THE MOST RESTRICTIVE STANDARD SHALL APPLY. ALL WORK SHALL BE INSPECTED BY CITY OF GRAND JUNCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY. REFER TO OSHA PUBLICATION 2226, EXCAVATING AND TRENCHING.
3. IF, DURING THE CONSTRUCTION PROCESS, CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT CITY OF GRAND JUNCTION IMMEDIATELY.
4. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD, UNLESS SPECIFICALLY STATED OTHERWISE.
5. MUD AND DEBRIS MUST BE REMOVED FROM THE PAVED STREET AT THE CONSTRUCTION ACCESS BY THE END OF EACH WORKING DAY BY AN APPROPRIATE MECHANICAL METHOD (I.E. STREET SWEEPER, LIGHT DUTY FRONT-END LOADER, ETC.) OR AS APPROVED BY CITY OF GRAND JUNCTION. POWER BROOMS WILL NOT BE ACCEPTABLE-MUST USE STREET SWEEPER. THIS WORK SHALL BE INCIDENTAL TO OTHER ITEMS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING AS-BUILT INFORMATION ON A SET OF RECORD DRAWINGS KEPT ON THE CONSTRUCTION SITE, AND AVAILABLE TO CITY OF GRAND JUNCTION INSPECTOR AT ALL TIMES. THESE UPDATES SHALL BE DONE AS WORK PROGRESSES. PREPARATION OF AS-BUILT PLANS WILL NOT BE PAID FOR SEPARATELY.
7. UPON COMPLETION OF CONSTRUCTION, THE SITE SHALL BE CLEANED AND RESTORED TO A CONDITION EQUAL TO, OR BETTER THAN, THAT WHICH EXISTED BEFORE CONSTRUCTION, OR TO THE GRADES AND CONDITION AS REQUIRED BY THESE PLANS.
8. THE CONTRACTOR SHALL PROCEED WITH ALL PERMIT ACQUISITION AS SOON AS HE DEEMS NECESSARY FOLLOWING THE NOTICE OF AWARD. NO CONTRACT DELAYS OR EXTENSIONS WILL BE GRANTED TO THE CONTRACTOR FOR FAILURE TO DEVELOP THE REQUIRED PLANS AND OBTAIN THE REQUIRED STATE, COUNTY, OR CITY PERMITS IN A TIMEFRAME NECESSARY TO BEGIN THE WORK AS SPECIFIED IN THE CONTRACT.
9. ALL STATIONING IS BASED ON CENTERLINE OF 24 ROAD BIKE PATH UNLESS OTHERWISE NOTED.
10. CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITIES TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE AND/OR TOES OF SLOPE AS SHOWN ON THE PLANS AND CROSS SECTIONS. ANY DISTURBANCES BEYOND THESE LIMITS SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. CONSTRUCTION ACTIVITIES IN ADDITION TO NORMAL CONSTRUCTION PROCEDURE SHALL INCLUDE THE PARKING OF VEHICLES OR EQUIPMENT. DISPOSAL OF LITTER, AND ANY OTHER ACTION WHICH WOULD ALTER EXISTING CONDITIONS. ANY OFF ROAD STAGING AREAS MUST BE PRE-APPROVED BY THE PROJECT ENGINEER.
11. DISPOSAL OF EXCESS MATERIAL OFF-SITE OR THE IMPORTING OF MATERIALS ON-SITE, REGARDLESS OF PROPERTY OWNERSHIP, MUST BE DONE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS AND MUST ABIDE BY THE CDOT PRAIRIE DOG POLICY.
12. THE CONTRACTOR SHALL PROVIDE A CERTIFIED SCALE AND CERTIFIED WEIGHER AT THE POINT OF LOADING FOR ALL AGGREGATES, CEMENT, FLY ASH, AND WATER DELIVERED TO THE PROJECT. A CERTIFIED TICKET SHALL BE PROVIDED FOR EACH LOAD OF MATERIAL DELIVERED TO THE PROJECT. THE TICKET SHALL SHOW GROSS, TARE, AND NET WEIGHTS. THE CONTRACTOR SHALL NOT DELIVER ANY LOAD EXCEEDING THE LEGAL WEIGHT LIMIT. DELIVERY OF ANY OVERWEIGHT LOADS MAY RESULT IN WITHHOLDING OF MONTHLY PAYMENT FOR THE RELATED ITEM.
13. ALL EXCESS MATERIAL GENERATED WITHIN THE PROJECT LIMITS SHALL BE REMOVED FROM THE PROJECT SITE AT NO COST TO THE PROJECT UNLESS SPECIFIED BY THE PLANS.
14. CONCRETE SULFATE EXPOSURE FOR THIS PROJECT IS CLASS 2.

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL PROTECT ALL WORK AREAS AND FACILITIES FROM WATER AT ALL TIMES. AREA AND FACILITIES SUBJECTED TO FLOODING, REGARDLESS OF THE SOURCE OF WATER SHALL BE PROMPTLY DEWATERED AND RESTORED AT NO COST TO THE OWNER. THIS SHALL INCLUDE REMOVAL OF ANY DEBRIS CAUSED BY FLOODING.
2. LIMITS OF CONSTRUCTION SHALL BE CONFINED TO PUBLIC RIGHTS-OF-WAY, EASEMENTS, CONSTRUCTION LIMIT AREAS, OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
3. REPAIR OF ANY DAMAGE TO EXISTING IMPROVEMENTS, IRRIGATION, OR LANDSCAPING IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL ASSOCIATED COSTS FOR IMPROVEMENTS REPAIR SHALL BE PAID FOR BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER.
4. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED BEFORE CONSTRUCTION AND GRADING OPERATIONS BEGIN. ALL EROSION CONTROL MEASURES SHALL BE PLACED CONTINUALLY AS DRAINAGE FEATURES ARE BEING CONSTRUCTED. MEASURES SHALL REMAIN IN PLACE UNTIL ALL CONSTRUCTION IS COMPLETE AND SUBSTANTIALLY STABILIZED.

EARTHWORK NOTES

1. WATER SHALL BE USED AS A DUST PALLIATIVE, WHERE REQUIRED. LOCATIONS SHALL BE AS ORDERED. WATER USED FOR DUST PALLIATIVE AND TO OBTAIN MOISTURE DENSITY WILL NOT BE PAID FOR SEPARATELY. DEPTH OF MOISTURE – DENSITY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
   FULL DEPTH OF ALL EMBANKMENTS
   BASES OF CUTS AND FILLS 6 INCHES
2. EXCAVATION REQUIRED FOR COMPACTION OF BASES OF CUTS AND FILLS WILL BE CONSIDERED AS SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY.
3. THE TYPE OF COMPACTION FOR EARTHWORK ON THIS PROJECT SHALL BE AASHTO T99, (STANDARD PROCTOR), PROOF ROLLING OF ALL SUBGRADE WILL BE REQUIRED PRIOR TO PAVING AND IS PATH PLACEMENT AND SHALL BE INCLUDED IN COST OF THE WORK. THE EQUIPMENT USED FOR PROOF ROLLING SHALL BE A PNEUMATIC-TIRED VEHICLE WITH TIRE PRESSURE OF AT LEAST 100 PSI CAPABLE OF APPLYING GROUND LOADS OF NOT LESS THAN 18,000 POUNDS PER AXLE. EQUIPMENT SHALL BE SUPPLIED BY CONTRACTOR. PROOF ROLLING WILL NOT BE PAID SEPARATELY.
4. DEPTH OF TOPSOIL REMOVAL SHALL BE 6 INCHES. FINAL GRADES SHOWN REFLECT A MINIMUM OF 6 INCHES OF TOPSOIL PLACED ON ALL DISTURBED AREAS NOT SURFACED. TOPSOIL TO BE USED IS SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.
5. SEE DRAWING 7 FOR DETAILED EARTHWORK NOTES AND TABULATIONS.

EROSION CONTROL NOTES

1. SEE STORMWATER MANAGEMENT PLAN (26 THRU 29).
2. THE COLORADO DISCHARGE PERMIT SYSTEM STORMWATER CONSTRUCTION PERMIT (CDPS-SCP) SHALL BE OBTAINED BY THE CITY AND THEN TRANSFERRED TO THE CONTRACTOR. A MINIMUM 2 WORKING DAYS PRIOR TO ANY EARTHMOVING ACTIFITIES, THE CONTRACTOR MUST NOTIFY THE CITY FOR AN INSPECTION OF EROSION CONTROL ITEMS.
3. THE CONTRACTOR SHALL HAVE, ONSITE AT ALL TIMES, AN UP TO DATE STORMWATER EROSION CONTROL PLAN, A ECM MAINTENANCE FOLDER, ONE (1) SIGNED COPY OF THE APPROVED PLANS, ONE (1) COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB.
4. THE CONTRACTOR SHALL COMPLY WITH ALL TERMS AND CONDITIONS OF THE COLORADO PERMIT FOR STORM WATER DISCHARGE, THE STORM WATER MANAGEMENT PLAN, AND THE EROSION CONTROL PLAN.
5. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED, AT THE LIMITS OF CONSTRUCTION AND AT AREAS WITH DISTURBED SOIL, ON- OR OFF-SITE, PRIOR TO ANY OTHER GROUND-DISTURBING ACTIVITY. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR, UNTIL SUCH TIME AS THE ENTIRE DISTURBED AREA IS STABILIZED WITH HARD SURFACE OR LANDSCAPING. TO MITIGATE EROSION, THE CONTRACTOR SHALL USE STANDARD EROSION CONTROL TECHNIQUES PER THE CDOT M & S STANDARD PLAN M-208-1.

TRAFFIC CONTROL NOTES

1. THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION TRAFFIC CONTROL PLAN FOR THE CLOSURE OF THE EXISTING TRAIL, IN ACCORDANCE WITH THE MUTCD, CITY OF GRAND JUNCTION AND COLORADO DEPARTMENT OF TRANSPORTATION FOR APPROVAL, PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN, OR AFFECTING, THE RIGHT-OF-WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL TRAFFIC CONTROL DEVICES AS MAY BE REQUIRED BY THE CONSTRUCTION ACTIVITIES.

DRAINAGE / STORM SEWER NOTES

1. THERE ARE SEVERAL STORM DRAINS THAT OUTLET TO LEACH CREEK IN THE AREA OF THE PROPOSED BIKE PATH. THE CONTRACTOR IS REQUIRED TO KEEP ALL DRAINAGE FACILITIES FUNCTIONAL AND MAINTAIN DRAINAGE TO THOSE FACILITIES AT ALL TIMES DURING CONSTRUCTION.
2. THIS PROJECT IS SHOWN ON FEMA MAP NUMBER 08077C0801G (MESA COUNTY) CURRENT EFFECTIVE MAP DATE 10/16/2012). THE PROJECT IS IN THE FLOODPLAIN.
3. THE CONTRACTOR SHALL OBTAIN AND COMPLY WITH A FLOODPLAIN DEVELOPMENT PERMIT FROM MESA COUNTY TRANSPORTATION DEPARTMENT.

PAVEMENT NOTES

1. FOR PLAN QUANTITIES OF PAVEMENT MATERIAL, THE FOLLOWING RATES OF APPLICATION WERE USED:

   AGGREGATE BASE COURSE @136 LBS. PER CU. FT.
2. WHERE IT IS REQUIRED TO CUT EXISTING CONCRETE PAVEMENT, THE CUTTING SHALL BE DONE TO A NEAT WORK LINE WITH A SAW OR OTHER METHOD AS APPROVED BY ENGINEER.

SEEDING AND MULCHING NOTES

1. SEE STORMWATER MANAGEMENT PLAN (26 THRU 29).

STRUCTURAL NOTES

1. SEE DRAWING B-01 FOR STRUCTURAL NOTES.

ENVIRONMENTAL NOTES

1. DURING ALL SUBSURFACE ACTIVITIES, WORKERS SHALL BE ALERT FOR VISUAL AND OLFACTORY SIGNS OF CONTAMINATION. IF CONTAMINATION IS ENCOUNTERED, WORK SHALL STOP AND PROCEDURES ESTABLISHED IN THE CDOT 250 SPEC SHALL BE FOLLOWED. ANY CONTAMINATED SOILS OR LANDFILL MATERIAL SHALL BE PROPERLY HANDLED AND SAMPLED PRIOR TO DISPOSAL.

UTILITY NOTES

1. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH CITY OF GRAND JUNCTION, AND ALL UTILITY COMPANIES INVOLVED, WITH REGARD TO RELOCATIONS, ADJUSTMENTS, EXTENSIONS AND REARRANGEMENTS OF EXISTING UTILITIES DURING CONSTRUCTION, AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING, IN ADVANCE, ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE AS WELL AS THE UTILITY COMPANIES.
2. THE CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING AND VERIFYING ELEVATIONS OF ALL EXISTING PAVEMENT AND UTILITIES AT THE POINTS OF CONNECTION SHOWN ON THE PLANS, AND AT ANY UTILITY CROSSINGS PRIOR TO INSTALLING ANY OF THE NEW IMPROVEMENTS. IF A CONFLICT EXISTS AND/OR A DESIGN MODIFICATION IS REQUIRED, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO MODIFY THE DESIGN. DESIGN MODIFICATION(S) MUST BE APPROVED BY CITY OF GRAND JUNCTION PRIOR TO BEGINNING CONSTRUCTION.
3. THE LOCATIONS OF UTILITY FACILITIES AS SHOWN ON THE PLAN SHEETS AND/OR HEREIN DESCRIBED AS QUALITY LEVEL D AND QUALITY LEVEL C.

   THE CONTRACTOR'S ATTENTION IS DIRECTED TO SUBSECTION 105.11 OF THE STANDARD SPECIFICATIONS AND THE UTILITY PROJECT SPECIAL PROVISIONS CONCERNING UTILITIES. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH UTILITY OWNERS IN THEIR REMOVAL, ADJUSTMENT AND/OR RELOCATION OPERATIONS SO THAT THE UTILITY WORK CAN BE ACCOMPLISHED WITHOUT IMPACTING THE CONSTRUCTION SCHEDULE.

   THE CONTRACTOR SHALL COMPLY WITH ARTICLE 1.5 OF TITLE 9, CRS ("EXCAVATION REQUIREMENTS") WHEN EXCAVATING OR GRADING IS PLANNED IN THE AREA OF UNDERGROUND UTILITY FACILITIES. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITIES AT LEAST TWO (2) BUSINESS DAYS, NOT INCLUDING THE ACTUAL DAY OF NOTICE, PRIOR TO COMMENCING SUCH OPERATIONS. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811 OR 1-800-922-1987, TO HAVE LOCATIONS OF UNCC REGISTERED LINES MARKED BY MEMBER COMPANIES. ALL OTHER UNDERGROUND FACILITIES SHALL BE LOCATED BY CONTACTING THE RESPECTIVE OWNER. UTILITY SERVICE LATERALS SHALL ALSO BE LOCATED PRIOR TO BEGINNING EXCAVATION OR GRADING.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES DURING CONSTRUCTION AND FOR COORDINATING WITH THE APPROPRIATE UTILITY COMPANY FOR ANY UTILITY CROSSINGS REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF ALL MEANS REQUIRED TO PROTECT EXISTING UTILITIES AND/OR TO WORK AROUND SUCH UTILITIES. THIS INCLUDES BUT IS NOT LIMITED TO SUPPORTING EXISTING UTILITIES, SHORING AROUND EXISTING UTILITIES AND PHASING/TRAFFIC CONTROL. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR ANY IRRIGATION LINE, HEAD OR BOX THAT IS DAMAGED DURING CONSTRUCTION.
5. UTILITY CONTACT LIST:
   THE FOLLOWING IS A LIST OF KNOWN UTILITIES WITH SERVICE WITHIN THE PROJECT AREA AND THE CONTACT INDIVIDUALS:

AGENCY {UTILITY} CONTACT [PHONE]
- UTE WATER {WATER} JUSTIN BATES [970-242-7491]
- XCEL ENERGY {ELECTRIC} BRENDA BOES [970-244-2664]
- XCEL ENERGY {GAS} SARAH DARRICAU [970-244-2656]
- GRAND VALLEY POWER {ELECTRIC} MIKE GARDNER [970-242-0040]
- SPECTRUM {CABLE TV} MARK KOSTELECKY [970-245-8750]
- CENTURYLINK {COMMUNICATIONS} CHRIS JOHNSON [970-244-4311]
- CITY OF GRAND JUNCTION {SANITARY SEWER} LEE COOPER [970-256-4155]
- GRAND VALLEY IRRIGATION CO. {IRRIGATION} PHIL BERTRAND [970-242-2762]

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

DESCRIPTION	DATE
REVISION ⚠ REV 1	– DATE
REVISION ⚠ REV 2	– DATE
REVISION ⚠ REV 3	– DATE
REVISION ⚠ REV 4	– DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

NO SCALE

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
GENERAL NOTES – 1
June 29, 2022

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INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	TRAIL			BRIDGE			PROJECT TOTAL	
BOOK	PAGE	SHEET				PLAN	AS CONST.		PLAN	AS CONST.		PLAN	AS CONST.
			201-00000	Clearing and Grubbing	LS	1			0			1	
			202-00035	Removal of Pipe	LF	16			0			16	
			202-01000	Removal of Fence	LF	1100			0			1100	
			203-00060	Embankment Material (Complete in Place)	CY	423			0			423	
			206-00000	Structural Excavation	CY	0			30			30	
			206-00100	Structure Backfill (Class 1)	CY	0			40			40	
			206-00200	Structure Backfill (Class 2)	CY	0			10			10	
			207-00206	Topsoil (Including Stockpile)	CY	40			0			40	
			208-00012	Erosion Log Type 1 (9 Inch)	LF	3300			0			3300	
			208-00045	Concrete Washout Structure	EA	2			0			2	
			208-00070	Vehicle Tracking Pad	EA	2			0			2	
			208-00400	Water Control	LS	1			0			1	
			212-00007	Seeding (Native) (Hydroseed)	ACRE	0.51			0			0.51	
			240-00015	Wildlife Biologist	HOUR	40			0			40	
			304-03000	Aggregate Base Course (Class 3)	TONS	810			0			810	
			304-06000	Aggregate Base Course (Class 6)	TONS	970			0			970	
			306-01000	Reconditioning (12" Deep)	SY	2630			0			2630	
			420-00132	Geotextile (Separator)(Class 1)	SY	2630			0			2630	
			502-00460	Pile Tip	EA	0			4			4	
			502-00500	Complete Joint Penetration (CJP) Splice	EA	0			4			4	
			502-11253	Steel Piling (HP 12x53)	LF	0			200			200	
			506-00206	Riprap (6 Inch)	CY	0			50			50	
			514-00042	Pedestrian Railing (Steel) (Special)	LF	0			20			20	
			601-03040	Concrete Class D (Bridge)	CY	0			16			16	
			601-40300	Structural Concrete Coating	SY	0			20			20	
			602-00000	Reinforcing Steel (Epoxy Coated)	LB	0			2200			2200	
			603-01185	18 Inch Reinforced Concrete Pipe (Complete In Place)	LF	72			0			72	
			603-50008	8" PVC Pipe (SDR-35) (Complete in Place)	LF	35			0			35	
			604-30010	Manhole Slab Base (10 Foot)	EA	1			0			1	
			607-01055	Fence Wire with Treated Wooden Posts	LF	1060			0			1060	
			608-00026	Concrete Bikeway (6 Inch)	SY	1760			0			1760	
			613-01200	2 Inch Electrical Conduit (Plastic)	LF	1868			0			1868	
			613-07001	Type One Pull Box	EA	22			0			22	
			613-10000	Wiring	LS	1			0			1	
			613-30005	Light Standard and Luminaire (Pedestrian)	EA	19			0			19	
			613-40012	Light Standard Foundation (Special)	EA	19			0			19	
			613-30006	Light Standard and Luminaire (Pedestrian BRIDGE)	EA	0			18			18	
			620-00020	Sanitary Facility	LS	1			0			1	
			625-00000	Construction Surveying	LS	1			0			1	
			626-00000	Mobilization	LS	1			0			1	
			628-00045	Bridge Girder and Deck Unit (45 Feet to 50 Feet)	EA	0			1			1	
			630	Traffic Control (Complete In Place)	LS	1			0			1	
			630	Traffic Control Plan	LS	1			0			1	

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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REVISION 4 REV 4	DATE

DRAWN BY JCS DATE 2021
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APPROVED BY KH DATE MARCH 2022

NO SCALE

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
SUMMARY OF APPROXIMATE QUANTITIES
June 29, 2022

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SUMMARY OF EARTHWORK QUANTITIES

INDEX Book	INDEX Page	INDEX Sheet		PROJECT TOTAL CU. YD.	PROJECT TOTAL As Const.
			203-00060 EMBANKMENT MATERIAL (CIP)		
			QUANTITY CALCULATED FROM CIVIL3D - TIN SUBTRACTION	1250	
			MINUS CONCRETE BIKE PATH AND ASSOCIATED CL. 6 PRISM	-827	
			TOTAL FOR PAY QUANTITIES	**423**	
			UNCLASSIFIED EXCAVATION (CIP) (FOR INFORMATION ONLY)	**CU. YD.**	
			(QUANTITY CALCULATED FROM CIVIL3D - TIN SUBTRACTION)		
			UNCLASSIFIED EXCAVATION (INCLUDES TAILWATER DITCH)	42	
			TOTAL	**42**	

INDEX Book	INDEX Page	INDEX Sheet	EARTHWORK QUANTITIES BALANCE (FOR INFORMATION ONLY)	PROJECT TOTAL CU. YD.	PROJECT TOTAL As Const.
			EMBANKMENT MATERIAL EXPANDED		
			EMBANKMENT TIMES FACTOR 1.15	486	
			BALANCE		
			Import Material Required	444	

NOTES

1. HAULING WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
2. THERE IS NO DESIGNATED BORROW SITE. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE EMBANKMENT BORROW SOURCE.
3. ONSITE TOPSOIL SHALL BE STRIPPED, STOCKPILED AND PLACED ON FINISHED SLOPES. ALL EXCESS TOPSOIL SHALL BE PLACED AS EMBANKMENT OUTSIDE OF THE TRAIL PRISM.

TABULATION OF SURFACING

STATION	LENGTH (FEET)	AVERAGE WIDTH (FEET)	CONCRETE BIKEWAY (6 INCH)		AGGREGATE BASE COURSE (CLASS 6)		AGGREGATE BASE COURSE (CLASS 3)		RECONDITIONING (12" DEEP)	GEOTEXTILE (SEPARATOR) (CLASS 1)	TOPSOIL (INCLUDING STOCKPILE)		REMARKS
			DEPTH (IN)	SY	DEPTH (IN)	TON	DEPTH (IN)	TON	SY	SY	DEPTH (IN)	CY	
25+46 - 32+41.50	695.5	10	6	780	6	240	9	360					Trail
25+46 - 32+41.50	695.5	4			12	190					2	18	Shoulders
25+46 - 32+41.50	695.5	15							1160	1160			Subgrade
32+93.50 - 41+70.30	876.8	10	6	980	6	300	9	450					Trail
32+93.50 - 41+70.30	876.8	4			12	240					2	22	Shoulders
32+93.50 - 41+70.30	876.8	15							1470	1470			Subgrade
TOTAL				1760		970		810	2630	2630		40	

TABULATION OF FENCING & PIPE STRUCTURES

STATION	SIDE	REMOVAL OF FENCE	FENCE WIRE WITH TREATED WOODEN POSTS	REMOVAL OF PIPE	18 INCH REINFORCED CONCRETE PIPE	8 INCH PVC PIPE (SDR-35)	MANHOLE SLAB BASE (10 FOOT)
		LF	LF	LF	LF	LF	EA
26+00					40		
30+55 - 32+41.50	RT	1100	192				
32+93.50 - 41+70.30	RT		868				
30+63.50				16	32		
30+55						35	
30+53.77	RT						1
TOTAL		1100	1060	16	72	35	1

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06/30/2022

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SEE PLAN FOR SCALE INFO

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
TABULATION OF QUANTITIES
June 29, 2022

7

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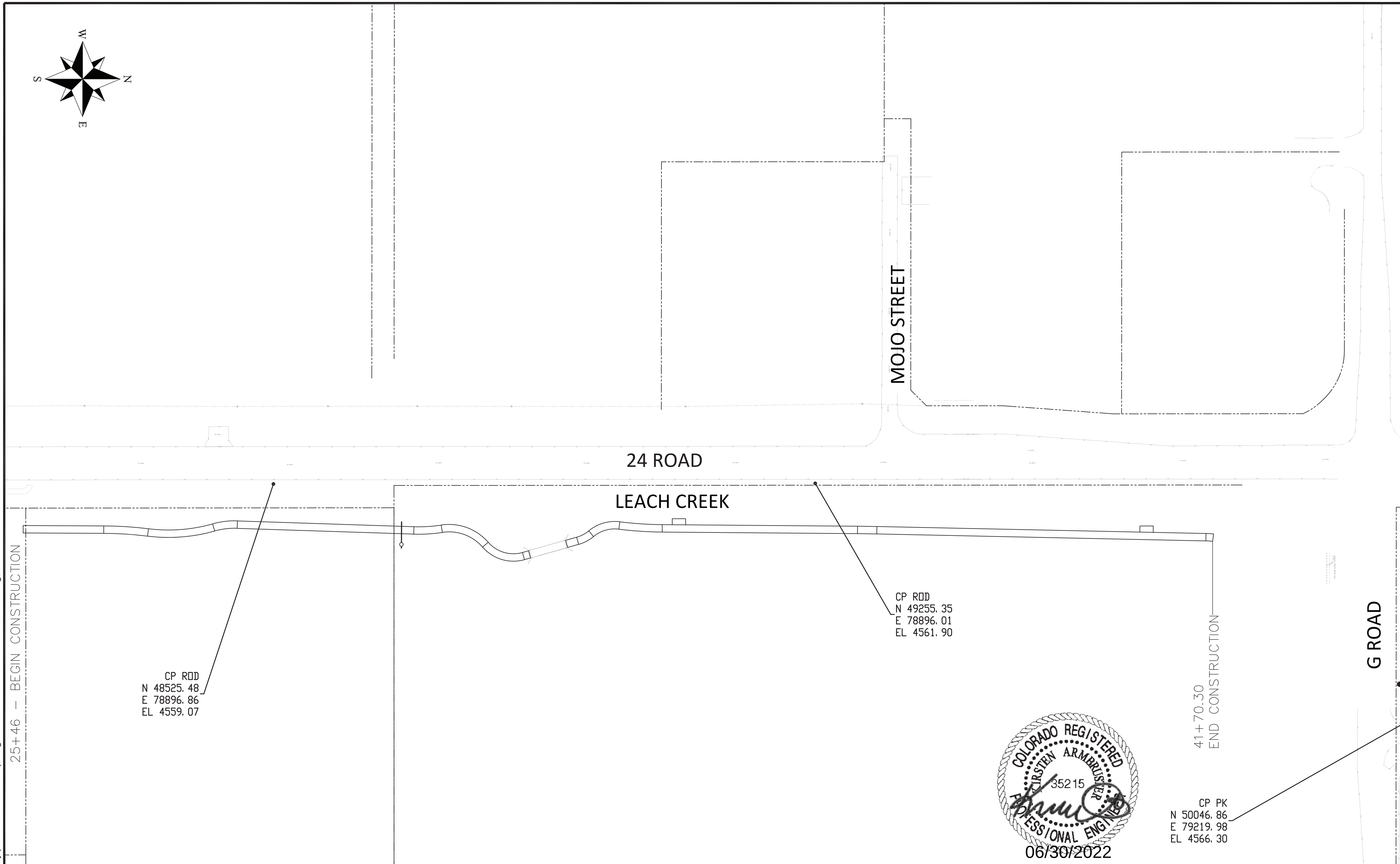

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APPROVED BY	KH	DATE	MARCH 2022

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CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
PROJECT SURVEY CONTROL
June 29, 2022

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TO ESTABLISH GEOMETRIC CONTROL FOR THE CONSTRUCTION OF THIS PROJECT, THE DEPARTMENT HAS PROVIDED THE FOLLOWING INFORMATION:

Format *

- ■ 3D Design Modeling Electronic Files _____
- ■ Horizontal Control _____
- ■ Vertical Control _____
- □ Roadway Alignment _____
- ■ Original Terrain Data _____
- □ Other: _____

* Specify the information format, ie., plan sheet, computer disk, computer printout, or other. The information marked is either contained on the plans or is available from the Engineer.

TYPE OF PROJECT

- □ Landscaping
- □ Signalization
- □ Safety Improvement
- □ Asphalt Overlay
- □ Concrete Overlay
- □ Minor Widening
- □ Major Reconstruction
- □ New Roadway Construction
- □ Bridge Replacement
- □ Bridge Widening
- ■ New Bridge
- ■ Other: MULTI-USE TRAIL

SURVEY WORK TO BE PERFORMED BY OTHERS: _____

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER SECTION 625:

- ___ □ A complete passing Base Line report (completed within 6 months prior to the start of the project)
- ___ □ An instrument calibration Certification (completed within 6 months prior to the start of the project)
- ___ ■ Establish and Maintain Project Centerline or Engineer Approved Offset Line(s)
- ___ ■ Verification and Maintenance of Horizontal and Vertical Control
- ___ □ Verify or Determine existing grades and alignments
- ___ □ Verify or Determine existing topography
- ___ ■ Clearing and Grubbing Limits (Section 201)
- ___ ■ Removal Limits (Section 202)
- ___ □ Reset Items (Section 210)
- ___ ■ Excavation and Embankment (Section 203)
  - ___ ■ Excavation
    - ___ ■ Unclassified
    - ___ □ Stripping
    - ___ □ Muck
    - ___ □ Rock
    - ___ □ Borrow
    - ___ □ Other: _____
    - ___ □ Potholing
  - ___ ■ Embankment
  - ___ ■ Site Grading
  - ___ □ Erosion Control (Perm)
  - ___ □ Other: _____
  - ___ □ As Staked Earthwork Quantities (See General Notes)

Excavation	Slope Staking (Y/N)	Grid (Y/N)	Grade (Y/N)	Special Interval
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-

Embankment				
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-

- ___ ■ Landscaping
  - ___ □ Top Soil (Section 207)
  - ___ ■ Seeding (Section 212)
  - ___ □ Mulching (Section 213)
  - ___ □ Planting (Section 214)
  - ___ □ Herbicide (Section 217)
  - ___ □ Other: _____
- ___ □ Erosion Control (Section 208)
  - ___ □ Seeding (Temp)
  - ___ □ Silt Fence
  - ___ □ Erosion Bales
  - ___ □ Erosion Logs
  - ___ □ Riprap (Temp)
  - ___ □ Other: _____
- ___ ■ Roadway Bases
  - ___ □ Untreated Subgrade
  - ___ □ Treated Subgrade
  - ___ ■ Aggregate Base Course (Section 304)
  - ___ □ Reconditioning
  - ___ □ PMBB - Plant Mix Bituminous Base
  - ___ □ Other: _____

06/30/2022

Roadway Bases	Grid (Y/N)	Grade (Y/N)	Special Interval	Special Offset
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-

- ___ □ Pavements
  - ___ □ HMA - Hot Mix Asphalt (Section 403)
  - ___ □ Concrete (Section 412)
  - ___ □ Heating & Scarifying Treatment
  - ___ □ Prime Coat, Tack Coat & Rejuvenating Agent (Section 407)
  - ___ □ Seal Coat or Chip Seal (Section 409)
  - ___ □ Other: _____

Pavements	Grid (Y/N)	Special Interval	Special Offset
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

Curb & Gutter	Tangent Interval	Curve Interval	Special Offset
	-	-	-

Stationing	Left Interval	Center Interval	Right Interval
	-	-	-

- ___ ■ Roadway Elements
  - ___ □ Curb and Gutter (Section 609)
  - ___ □ Drop inlets - alignment and grades (Section 604)
  - ___ □ Retaining Walls
  - ___ □ Guard Rail (Section 606)
  - ___ ■ Sidewalk (Section 608)
  - ___ □ Overlay Stationing
  - ___ □ Other: _____
- ___ □ Riprap (Perm) (Section 506)
- ___ □ Slope and Ditch Paving (Section 507)
- ___ ■ Minor Structures
  - ___ □ Structure Excavation limits (Section 206)
  - ___ □ Culverts (Section 603)
  - ___ □ Culverts w/ Headwalls and Wingwalls (Section 601)
  - ___ □ Concrete Box Culverts w/ Headwalls and Wingwalls
  - ___ ■ Pipes (Section 603)
    - ___ □ Sanitary Sewer
    - ___ □ Storm Sewer
    - ___ □ Water
    - ___ ■ Irrigation
    - ___ □ Miscellaneous
  - ___ □ Manholes (Section 604)
  - ___ □ Inlets (Section 604)
  - ___ □ Permanent Water Quality BMP (Section 208)
  - ___ □ Other: _____
- ___ ■ Major Structures - Overhead Signs (Section 614), Concrete Box Culverts, Bridges - and all other structures assigned a structure number
  - ___ ■ Structure Excavation limits (Section 206)
  - ___ □ Concrete Box Culverts (Section 603) w/ Headwalls and Wingwalls (Section 601)
  - ___ ■ Piling locations and cut off elevations (Section 502)
  - ___ □ Caisson locations and elevations (Section 503)
  - ___ □ Footing locations, alignment, and elevations
  - ___ ■ Abutment/Pier locations, alignment, and elevations
  - ___ ■ Wingwall skew angles/offsets
  - ___ □ Structural concrete form locations
  - ___ ■ Substructure As-constructed survey required for Bridges (Subsection 601 .12) and Overhead signs (S-614-50)
  - ___ □ Bridge expansion joint(s) alignment and grade (longitudinal and transverse)
  - ___ □ Deck grades at Girder 10th or "n" th point locations and elevations
  - ___ □ Slope and Ditch Paving (Section 507)
  - ___ □ Other: _____
- ___ ■ Fencing (Section 607)
  - ___ □ Temporary
  - ___ ■ Permanent
  - ___ □ Sound Barrier
  - ___ □ Other: _____
- ___ □ Delineators (Section 612)
  - ___ □ Temporary
  - ___ □ Permanent
- ___ ■ Lighting (Section 613) and Traffic Control Devices (Permanent) (Section 614)
  - ___ □ Signal pole locations and elevations
  - ___ ■ Light pole locations and elevations
  - ___ □ Sign locations
  - ___ □ Field verify sign post locations, elevations, and lengths before fabrication.
  - ___ □ Other: _____
- ___ □ Pavement Marking (Section 627)
  - ___ □ Striping (Temp)
  - ___ □ Striping (Perm)
  - ___ □ Symbols
  - ___ □ Other: _____
- ___ □ Temporary Lighting and Construction Traffic Control Devices (Section 630)
  - ___ □ Signal pole locations and elevations (Temp)
  - ___ □ Light pole locations and elevations (Temp)
  - ___ □ Sign Locations (Temp)
  - ___ □ Other: _____
- ___ ■ All Easements (Temp Staking by P.L.S. Only)
- ___ ■ Right of Way (Temp Staking by P.L.S. Only)

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER SECTION 629:

- ___ ■ Monumentation (Section 629)
  - ___ □ Control
  - ___ □ Right of Way
  - ___ □ Land corners, Aliquot corners
  - ___ ■ Easements
  - ___ □ Reference the specified existing monuments:** _____
  - ___ □ Replace the specified existing monuments: ** _____
  - ___ □ Locate monuments. It is estimated ___ hours are required.

NOTE: All 629 items shall include adequate research, calculations, and evaluations of evidence for monuments to be set.

** A Tabulation of Survey Monuments may be provided on the plans.

GENERAL NOTES:

1. Unless indicated otherwise on this Survey Tabulation Sheet, all survey work and staking intervals shall be done in accordance with the latest edition of the CDOT Survey Manual.
2. Adequate information for establishing lines, grades, and locations for all work items have been specified on the plans. Any additional information required to stake the item or element shall be generated by the Contractor's surveyor.
3. The Contractor's surveyor shall provide an estimate of the man-hours necessary to complete the work items indicated on this sheet. A copy of this sheet, with the estimated man-hours written on the blank line to the left of the specified items, shall be submitted with the Survey Schedule to the Engineer _____ days prior to the Presurvey Conference - Construction Survey.
4. Stakes and Monuments which are damaged or destroyed by the progress of construction shall be replaced by the Contractor at no additional cost to the Department.
5. The Contractor shall furnish an As Staked (or 3D Design Modeling Electronic Files) Earthwork Quantity report to the Engineer prior to completion of twenty percent (20%) of the planned earthwork in any phase as per the CDOT Survey Manual. A printed copy of the As Staked (or 3D Design Modeling Electronic Files) Earthwork data report and a computer disk with that information on it, in the specified format shall be submitted to the Engineer. The Contractor shall field verify original ground cross sections at a maximum 500 feet intervals.
6. Prior to beginning work on any subsequent operation, such as placing base course or paving, the Contractor shall certify in writing to the Engineer that the final grade is within specified tolerance.
7. The Contractor's surveyor shall perform all field surveying and calculations necessary to tie plan grades into field grades.
8. The Contractor shall coordinate construction staking on the project with any utility work.
9. Fieldbooks shall contain daily records of points set and or measurements observed. The information recorded shall contain: date, crew members' names, point no., description, staking information, and sketches. If the survey information is collected electronically, information recorded shall be provided to the Project Engineer in a hard copy format that is intuitive, clear and related to the supplemental information recorded in the field books. All linear surveys, such as slope stakes and blue tops, shall have the station and offset information related to the measured information. Non-linear surveys such as structures staking shall have sketches relating electronic information, such as point numbers, to the sketch.
10. The Contractor's surveyor shall submit the following fieldbooks to the Engineer:
    - ■ Horizontal Control (Primary & Secondary)
    - ■ Vertical Control (i.e. Benchmarks)
    - □ Property Pin Ties
    - □ Horizontal Alignment
    - □ Grading
    - □ Slope Staking
    - □ Minor Structures
    - ■ Major Structures
    - ■ One fieldbook for each work category shown on this sheet
    - □ Other Fieldbook(s): _____
11. The Contractor's surveyor shall submit the following (prior to surveying on the project) to the Engineer:
    - □ All required Instrument Calibrations

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DESCRIPTION	DATE
REVISION ⚠ REV 1	DATE
REVISION ⚠ REV 2	DATE
REVISION ⚠ REV 3	DATE
REVISION ⚠ REV 4	DATE

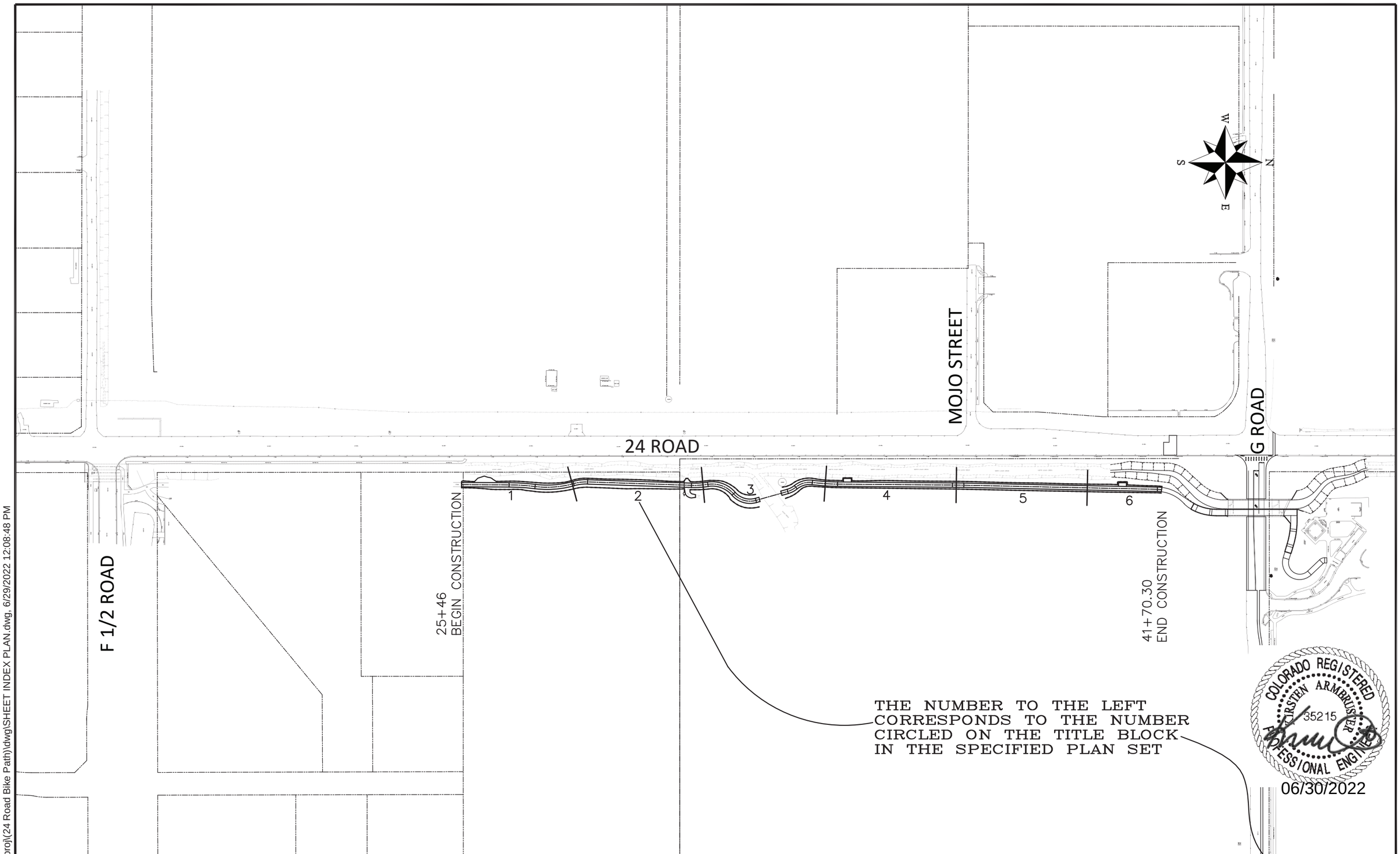
DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

NO SCALE

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
SURVEY TABULATION
June 29, 2022



THE NUMBER TO THE LEFT CORRESPONDS TO THE NUMBER CIRCLED ON THE TITLE BLOCK IN THE SPECIFIED PLAN SET

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

DESCRIPTION	DATE
REVISION 1 REV_1	DATE
REVISION 2 REV_2	DATE
REVISION 3 REV_3	DATE
REVISION 4 REV_4	DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

SCALE 0 50 100 200

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
SHEET INDEX PLAN – 1
June 29, 2022

10

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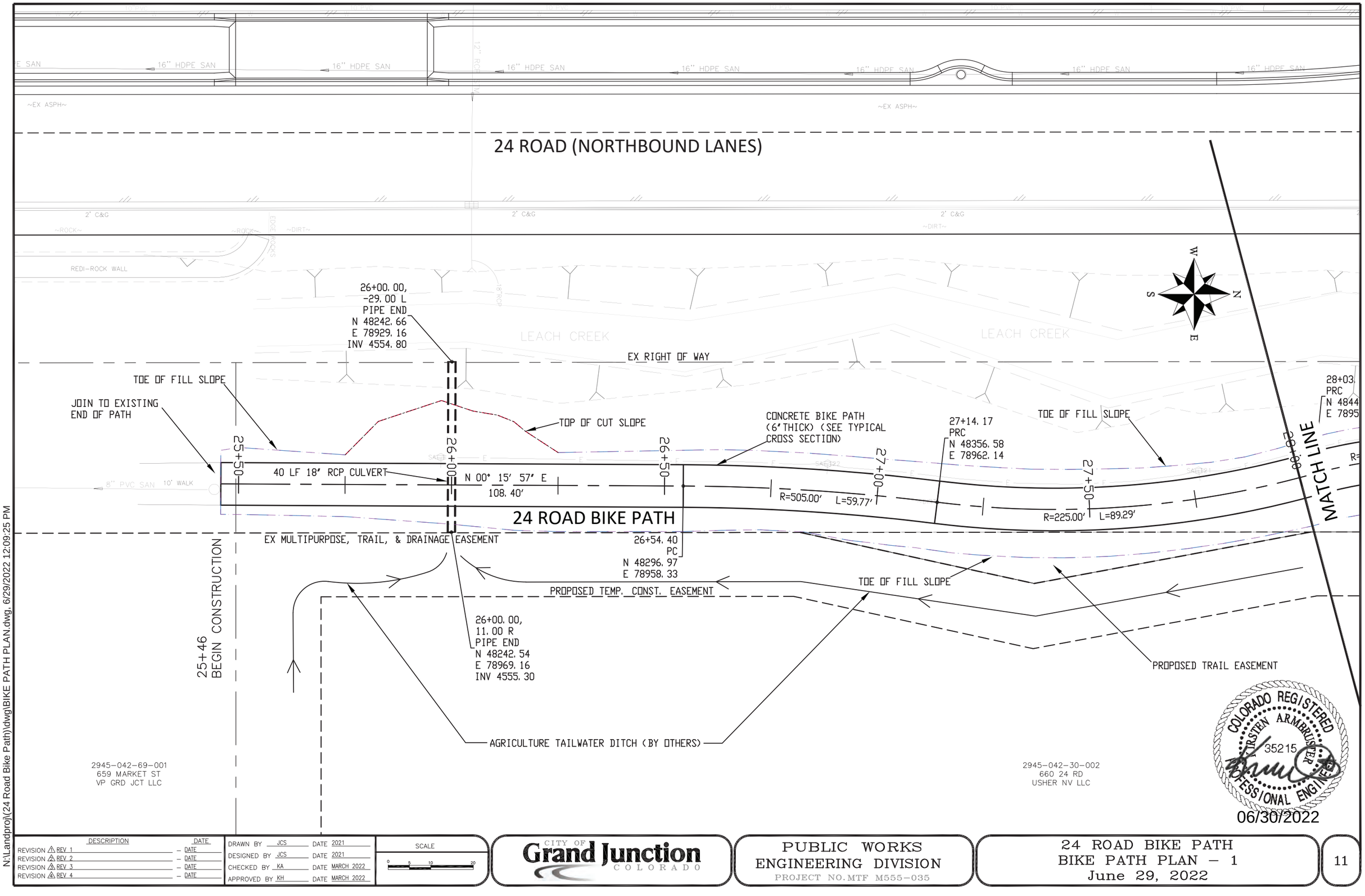

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DESCRIPTION	DATE
REVISION ⚠ REV 1	– DATE
REVISION ⚠ REV 2	– DATE
REVISION ⚠ REV 3	– DATE
REVISION ⚠ REV 4	– DATE

DRAWN BY	JCS	DATE	2021
DESIGNED BY	JCS	DATE	2021
CHECKED BY	KA	DATE	MARCH 2022
APPROVED BY	KH	DATE	MARCH 2022

SCALE 0 5 10 20

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PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PLAN – 1
June 29, 2022

11

16" HDPE SAN | 16" HDPE SAN | 16" HDPE SAN | 16" HDPE SAN | 16" HDPE SAN | 16" HDPE SAN | 12" HDPE SAN

~EX ASPH~

24 ROAD (NORTHBOUND LANES)

2' C&G | 2' C&G | 2' C&G | BH 24-3 | ~DIRT~

8" PVC SAN | 8" PVC SAN | 8" PVC SAN | 8" PVC SAN

MANHOLE REMAINS IN PLACE. CONTRACTOR TO CORE AND CONNECT NEW PIPE TO EXISTING MANHOLE (NEW INV IN EAST EL 4549.90) AND VERIFY THAT INVERT IN FROM SOUTH IS CAPPED. IF PIPE FROM SOUTH IS NOT CAPPED CONTRACTOR SHALL CAP. ALL WORK SHALL BE INCLUDED IN THE COST OF THE SEWER LINE. NO SEPARATE PAY

EX RIGHT OF WAY

30+63.10,
-15.69 L
PIPE END
N 48704.72
E 78943.37
INV 4555.68

EX. 14' GVIC EASEMENT

LEACH CREEK

CP /ROD DWY FLD/
N 48525.4800
E 78896.86
EL 4555.07

28+35.65
PT
N 48476.87
E 78951.60

EX RIGHT OF WAY

28+03.45
PRC
N 48445.04
E 78955.46

CONCRETE BIKE PATH
(6" THICK) (SEE TYPICAL
CROSS SECTION)

TOE OF FILL SLOPE

EX SEW MH F4-241.00
RIM 4559.70
INV IN S 4549.70
INV OUT N 4549.70

30+73.55
PC
N 48714.65
E 78959.39

MATCH LINE

28+00 | 28+50 | 29+00 | 29+50 | 30+00 | 30+50 | 31+00

R=105.00' L=32.20'

N 01° 52' 38" E
237.90'

R=205.00' L=37.75'

REMOVE 16 LF EX. CULVERT

32 LF 18" RCP CULVERT

TOE OF FILL SLOPE

24 ROAD BIKE PATH

EX MULTIPURPOSE, TRAIL, & DRAINAGE EASEMENT

30 LF 8" PVC (SDR-35) SEWER PIPE

PROPOSED TRAIL EASEMENT

TOP OF CUT SLOPE

PROPOSED TEMP. CONST. EASEMENT

PROPOSED TEMP. CONST. EASEMENT

30+57.46,
19.48 R
MANHOLE SLAB BASE*
(10 FOOT)
N 48697.93
E 78978.34
RIM 4560.05
INV IN E 4550.15
INV OUT W 4550.05

5 LF 8" PVC (SDR-35) SEWER PIPE

TIE EXISTING TAILWATER
DITCH TO END OF NEW
CULVERT AS SHOWN

30+64.18,
16.71 R
PIPE END
N 48704.73
E 78975.79
INV 4556.80

30+57.65,
24.45 R
PIPE END
N 48697.95
E 78983.31
INV 4550.18

2945-042-00-018
Southeast Corner of 24 & G Rd
USHER NV LLC

2945-042-30-002
660 24 RD
USHER NV LLC

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

NOTE:
* REFER TO CDOT M-STANDARD PLAN
M-604-1 FOR MANHOLE SLAB DETAILS

DESCRIPTION	DATE
REVISION ⚠ REV_1	DATE
REVISION ⚠ REV_2	DATE
REVISION ⚠ REV_3	DATE
REVISION ⚠ REV_4	DATE

DRAWN BY	JCS	DATE	2021
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CITY OF Grand Junction COLORADO

PUBLIC WORKS
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PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PLAN – 2
June 29, 2022

12

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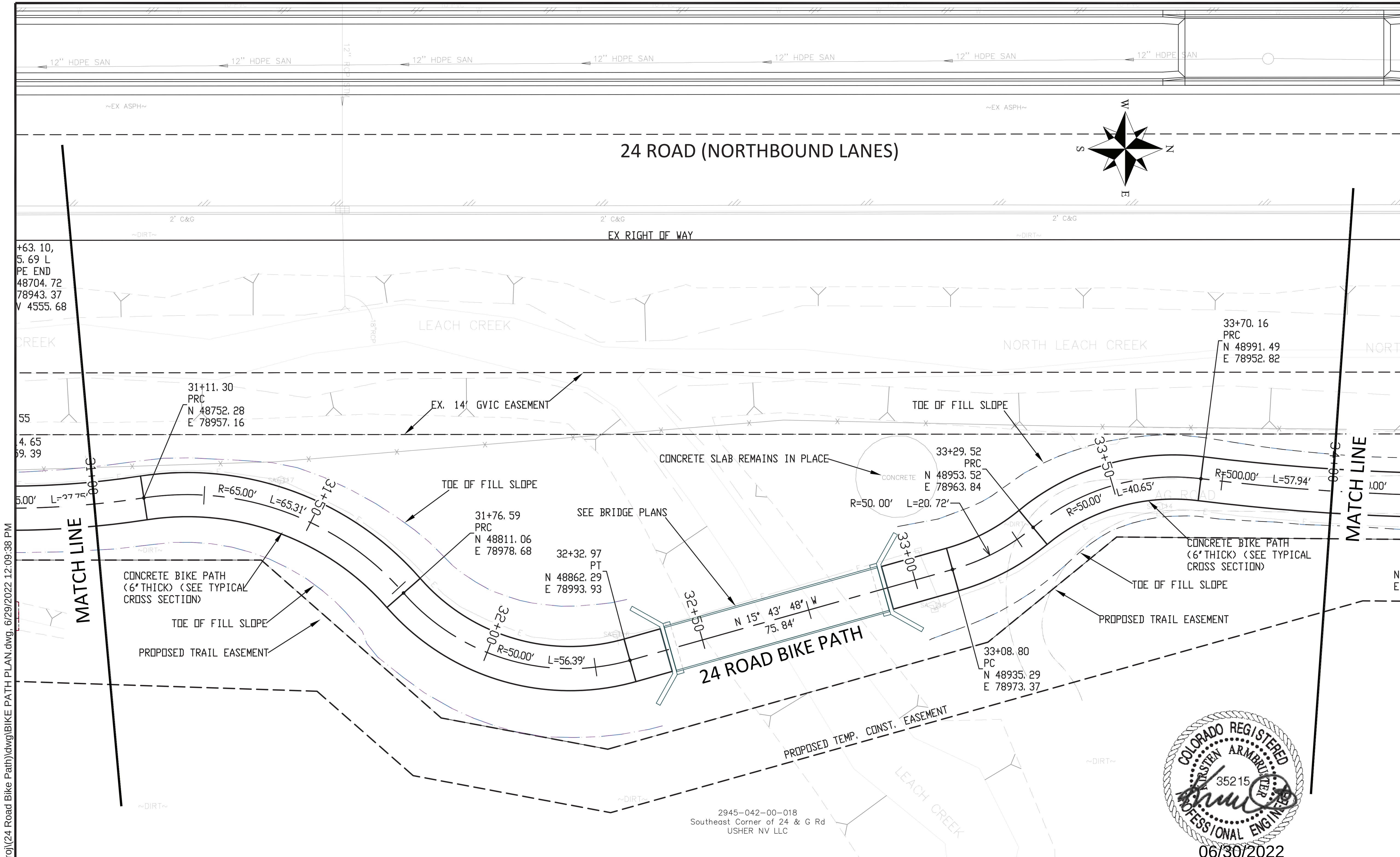
12" HDPE SAN
~EX ASPH~
24 ROAD (NORTHBOUND LANES)
W
S
N
E
2' C&G
EX RIGHT OF WAY
~DIRT~
+63. 10,
5. 69 L
PE END
48704. 72
78943. 37
V 4555. 68
LEACH CREEK
NORTH LEACH CREEK
33+70. 16
PRC
N 48991. 49
E 78952. 82
31+11. 30
PRC
N 48752. 28
E 78957. 16
EX. 14' GVIC EASEMENT
TOE OF FILL SLOPE
CONCRETE SLAB REMAINS IN PLACE
CONCRETE
33+29. 52
PRC
N 48953. 52
E 78963. 84
R=50. 00' L=20. 72'
R=500.00' L=57.94'
L=40.65'
R=50.00'
R=65.00' L=65.31'
31+50
31+00
34+00
33+50
33+00
32+50
32+00
MATCH LINE
31+76. 59
PRC
N 48811. 06
E 78978. 68
SEE BRIDGE PLANS
32+32. 97
PT
N 48862. 29
E 78993. 93
CONCRETE BIKE PATH
(6" THICK) (SEE TYPICAL
CROSS SECTION)
PROPOSED TRAIL EASEMENT
N 15° 43' 48" W
75. 84'
24 ROAD BIKE PATH
R=50.00' L=56.39'
33+08. 80
PC
N 48935. 29
E 78973. 37
PROPOSED TEMP. CONST. EASEMENT
2945-042-00-018
Southeast Corner of 24 & G Rd
USHER NV LLC
LEACH CREEK
COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022
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DESCRIPTION	DATE
REVISION 1 REV 1	DATE
REVISION 2 REV 2	DATE
REVISION 3 REV 3	DATE
REVISION 4 REV 4	DATE

DRAWN BY	JCS	DATE	2021
DESIGNED BY	JCS	DATE	2021
CHECKED BY	KA	DATE	MARCH 2022
APPROVED BY	KH	DATE	MARCH 2022

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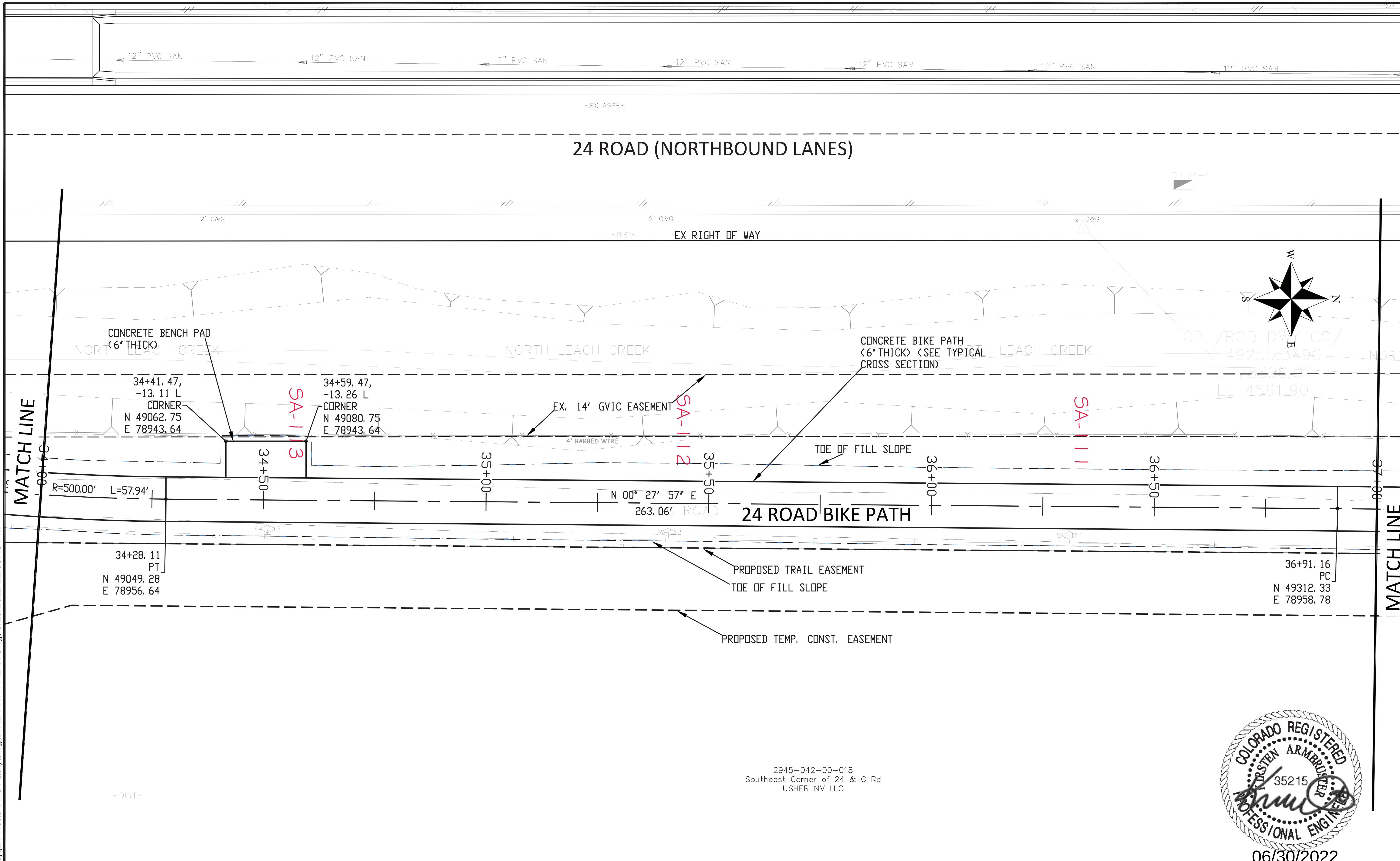
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PLAN – 3
June 29, 2022

13


12" PVC SAN
~EX ASPH~
24 ROAD (NORTHBOUND LANES)
2' C&G
EX RIGHT OF WAY
NORTH LEACH CREEK
CONCRETE BENCH PAD
(6' THICK)
34+41.47,
-13.11 L
CORNER
N 49062.75
E 78943.64
34+59.47,
-13.26 L
CORNER
N 49080.75
E 78943.64
EX. 14' GVIC EASEMENT
CONCRETE BIKE PATH
(6' THICK) (SEE TYPICAL
CROSS SECTION)
SA-113
SA-112
SA-111
TOE OF FILL SLOPE
4' BARBED WIRE
MATCH LINE
34+00
34+50
35+00
35+50
36+00
36+50
37+00
R=500.00'
L=57.94'
N 00° 27' 57" E
263.06'
24 ROAD BIKE PATH
34+28.11
PT
N 49049.28
E 78956.64
PROPOSED TRAIL EASEMENT
TOE OF FILL SLOPE
36+91.16
PC
N 49312.33
E 78958.78
MATCH LINE
PROPOSED TEMP. CONST. EASEMENT
2945-042-00-018
Southeast Corner of 24 & G Rd
USHER NV LLC
~DIRT~
W
N
E
S
COLORADO REGISTERED PROFESSIONAL ENGINEER
KRISTEN ARMBRUSTER
35215
06/30/2022

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DESCRIPTION	DATE
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REVISION REV 2	DATE
REVISION REV 3	DATE
REVISION REV 4	DATE

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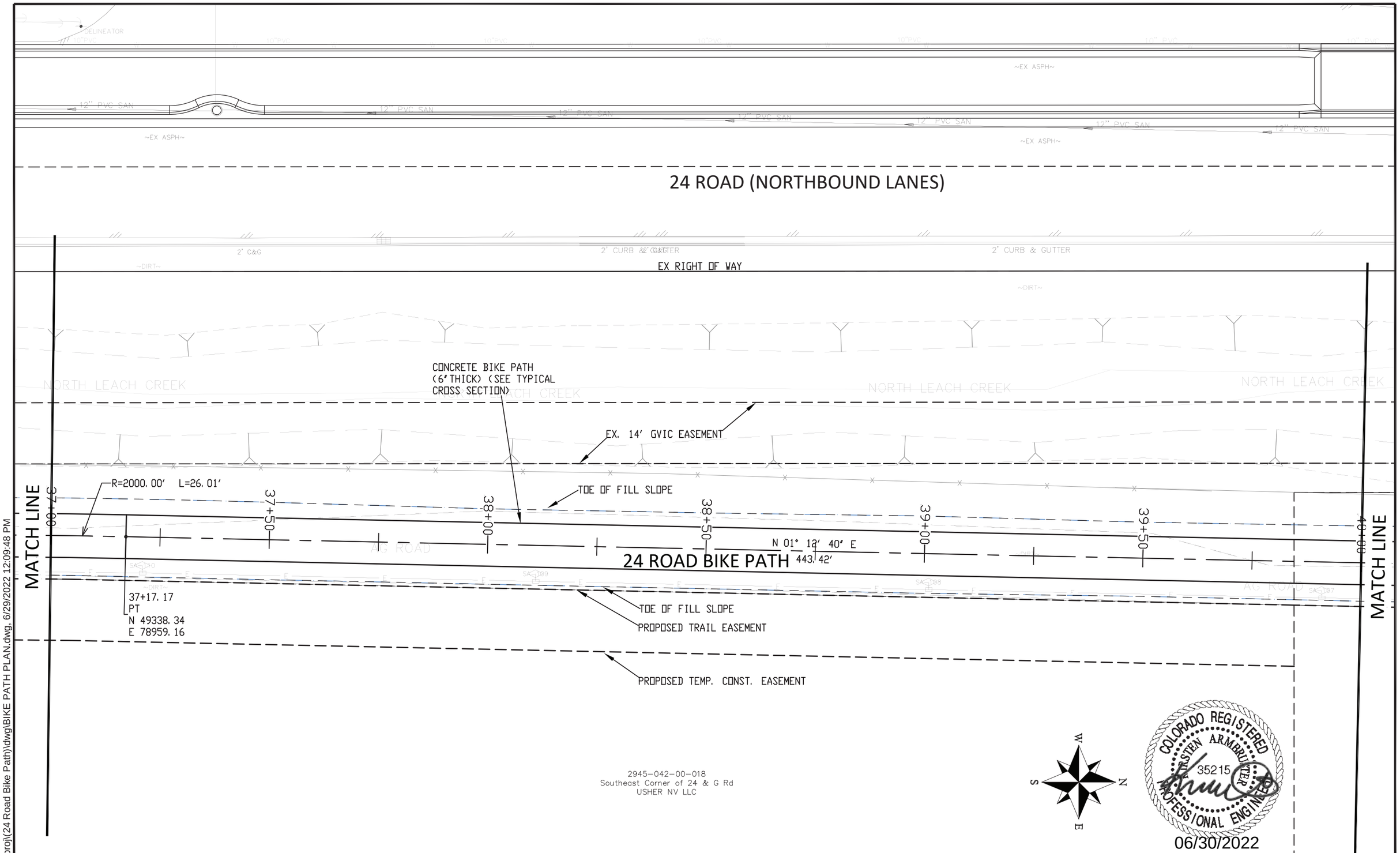
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PLAN – 4
June 29, 2022

14



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DESCRIPTION	DATE
REVISION ⚠ REV 1	– DATE
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REVISION ⚠ REV 4	– DATE

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SCALE
0 5 10 20

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PLAN – 5
June 29, 2022

15

24 ROAD (NORTHBOUND LANES)

ROUNDABOUT AND ROAD IMPROVEMENTS BY OTHERS

EX RIGHT OF WAY

CONCRETE BENCH PAD (6' THICK)

EX. 14' GVIC EASEMENT

TOE OF FILL SLOPE

40+71.26, -13.22 L
CORNER
N 49692.62
E 78953.43

40+89.26, -13.60 L
CORNER
N 49710.62
E 78953.43

40+00

40+50

41+00

41+50

N 01° 12' 40" E
443.42'

24 ROAD BIKE PATH

TOE OF FILL SLOPE

PROPOSED TRAIL EASEMENT

41+60.59
PC
N 49781.65
E 78968.53

41+70.30
END CONSTRUCTION
N 49791.33
E 78969.26

42+00

R=90.00' L=9.71'

CONCRETE BIKE PATH (6' THICK) (SEE TYPICAL CROSS SECTION)

MATCH LINE

LEACH CREEK TO BE RELOCATED BY OTHERS

BIKE PATH BY OTHERS

RIGHT OF WAY

MULTI PURPOSE EASEMENT

2945-042-00-018
Southeast Corner of 24 & G Rd
USHER NV LLC

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

DESCRIPTION	DATE
REVISION 1 REV. 1	DATE
REVISION 2 REV. 2	DATE
REVISION 3 REV. 3	DATE
REVISION 4 REV. 4	DATE

DRAWN BY	JCS	DATE	2021
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SCALE 0 5 10 20

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PLAN – 6
June 29, 2022

16

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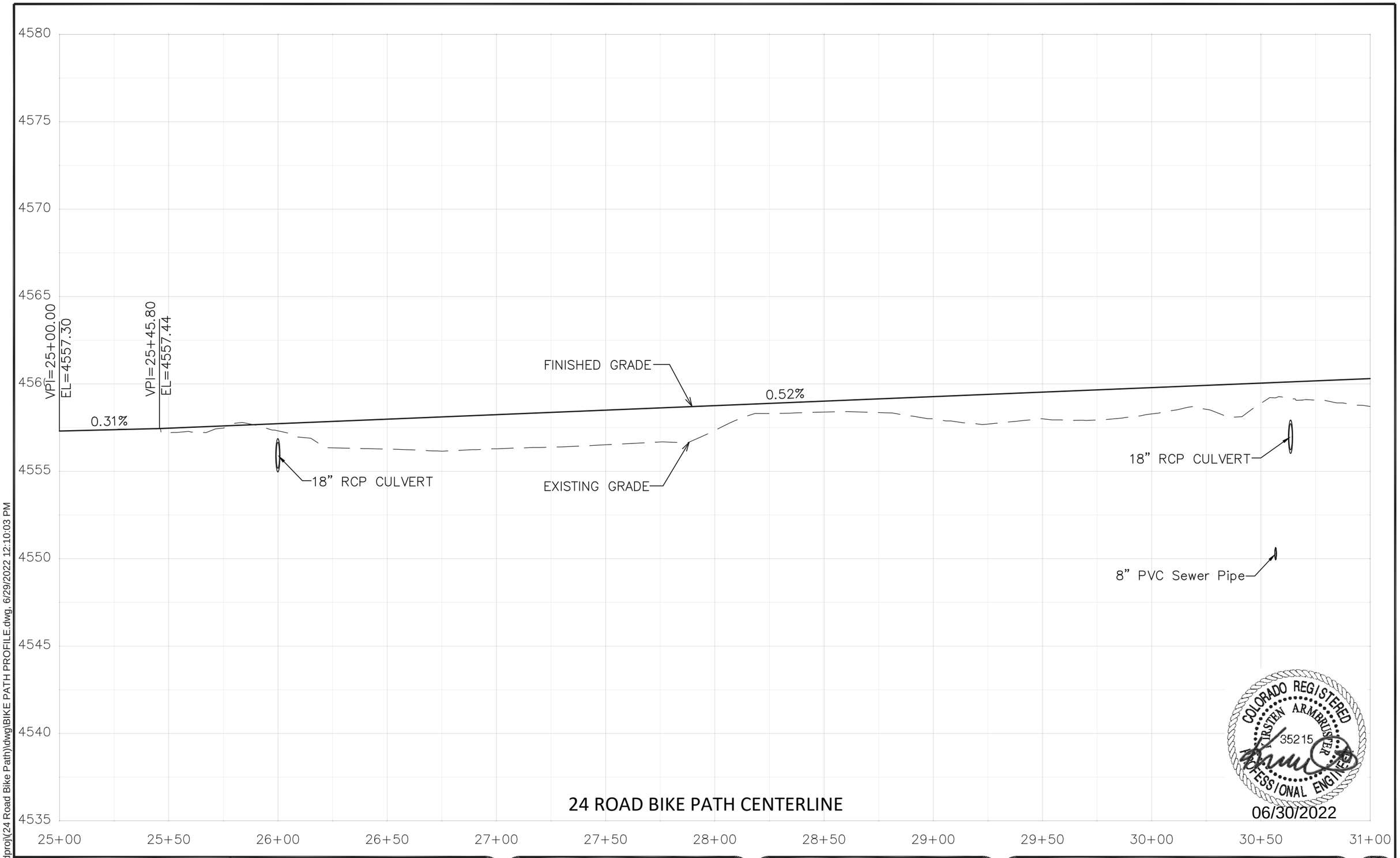

COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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DESCRIPTION	DATE
REVISION ⚠ REV 1	– DATE
REVISION ⚠ REV 2	– DATE
REVISION ⚠ REV 3	– DATE
REVISION ⚠ REV 4	– DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 2.5 5

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PROFILE – 1
June 29, 2022

17

VPI=31+48.95
VPI EL=4560.55
LP=31+18.95
LP EI=4560.40
AD=3.09%
K=19.44
VC=60.00

VPC=
31+18.95
EL=4560.40

VPT=
31+78.95
EL=4561.63

VPI=32+67.50
VPI EL=4564.82
AD=−7.20%
K=6.94
SSD=117.29
VC=50.00

VPC=
32+42.50
EL=4563.92

VPT=
32+92.50
EL=4563.92

VPI=33+81.84
VPI EL=4560.71
LP=34+09.85
LP EI=4560.83
AD=4.00%
K=17.51
VC=70.00

VPC=
33+46.84
EL=4561.97

VPT=
34+16.84
EL=4560.85

32+67.50
EL=4564.41

32+41.50
EL=4563.89

32+93.50
EL=4563.89

3.60%

−3.60%

FINISHED GRADE

EXISTING GRADE

SEE BRIDGE PLANS

4595
4590
4585
4580
4575
4570
4565
4560
4555
4550

31+00 31+50 32+00 32+50 33+00 33+50 34+00 34+50 35+00 35+50 36+00 36+50 37+00

24 ROAD BIKE PATH CENTERLINE

COLORADO REGISTERED
KRISTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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DESCRIPTION	DATE
REVISION 1 REV 1	– DATE
REVISION 2 REV 2	– DATE
REVISION 3 REV 3	– DATE
REVISION 4 REV 4	– DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

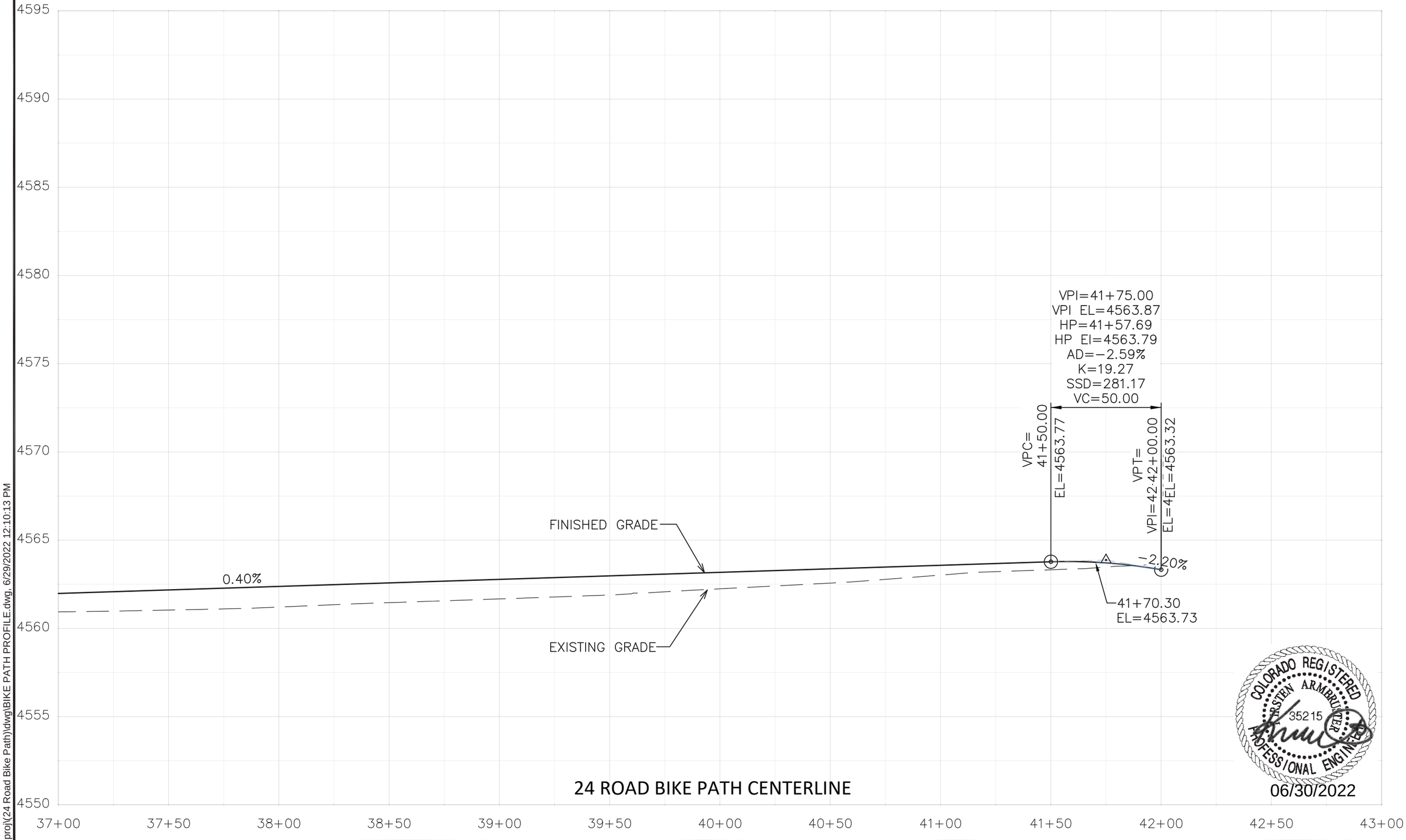
SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 2.5 5

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PROFILE – 2
June 29, 2022

18



24 ROAD BIKE PATH CENTERLINE

COLORADO REGISTERED
KRISTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

DESCRIPTION	DATE
REVISION 1 REV 1	DATE
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REVISION 4 REV 4	DATE

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SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 2.5 5

CITY OF Grand Junction COLORADO

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PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH PROFILE – 3
June 29, 2022

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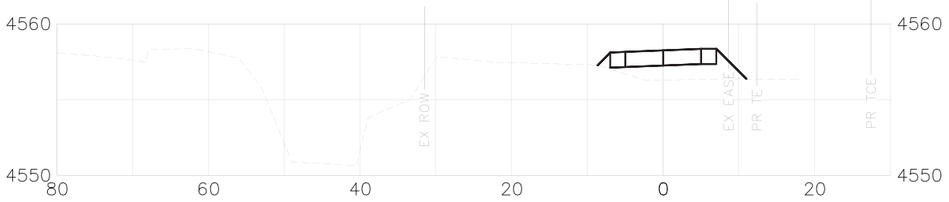

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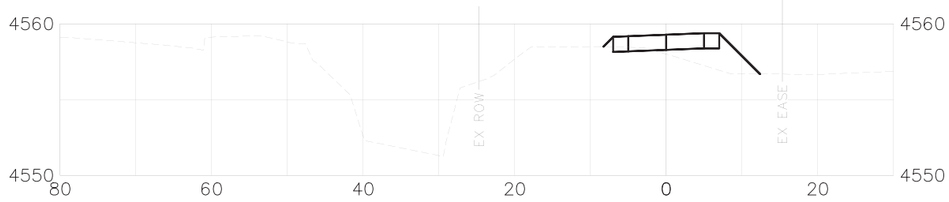

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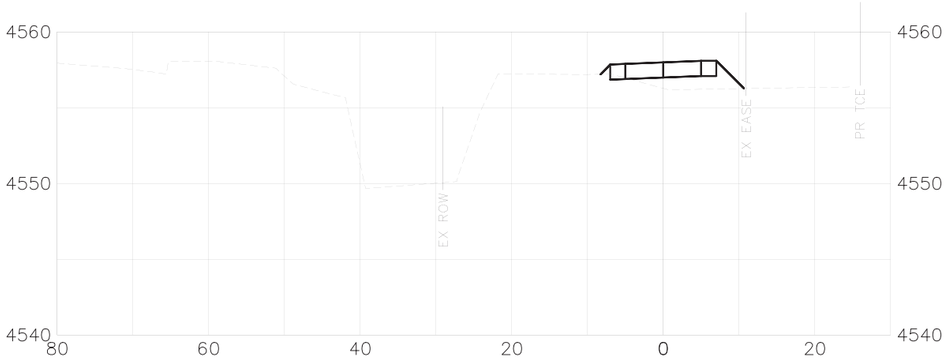

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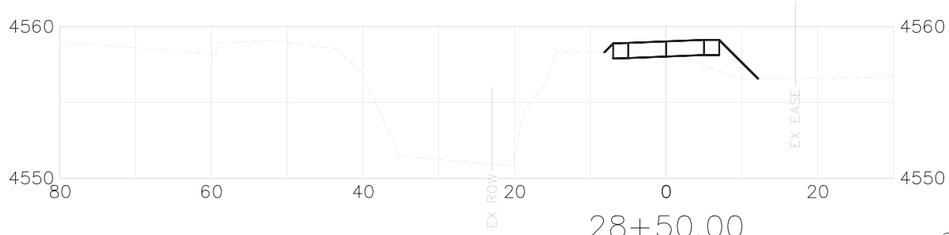

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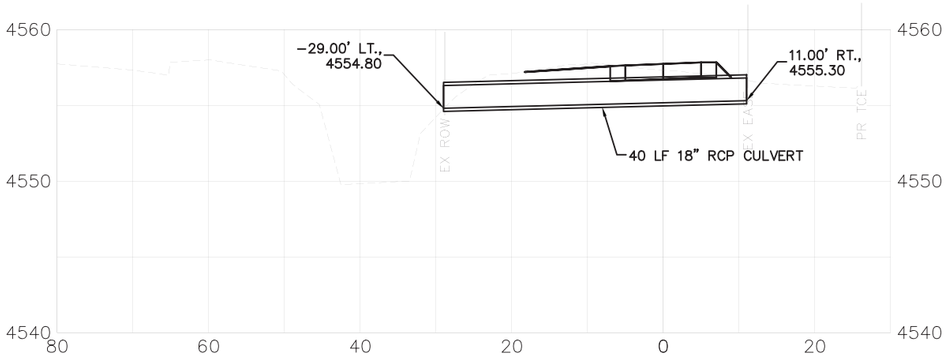

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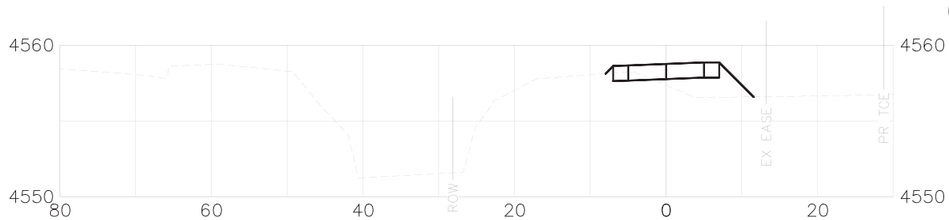

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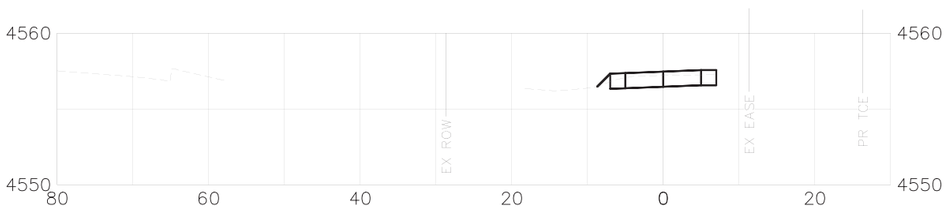

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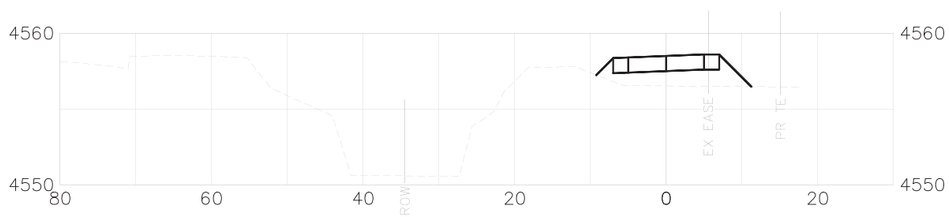

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COLORADO REGISTERED
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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HORIZONTAL 0 5 10 20
VERTICAL 0 5 10

CITY OF Grand Junction COLORADO

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PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH CROSS SECTIONS – 1
June 29, 2022

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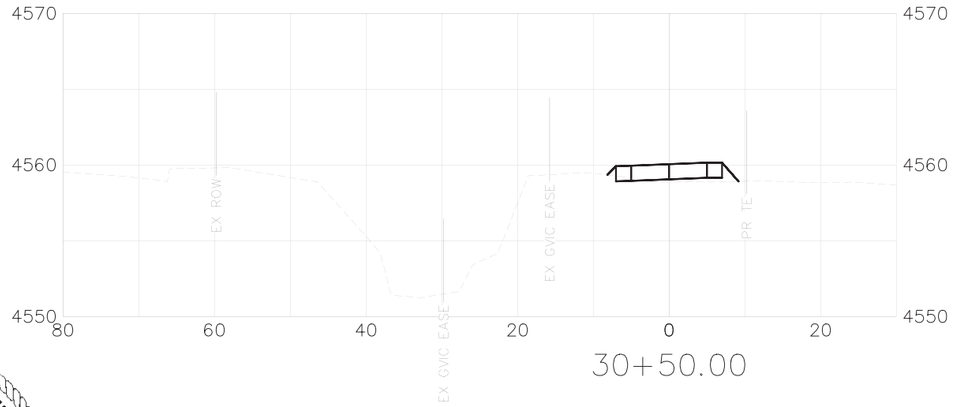

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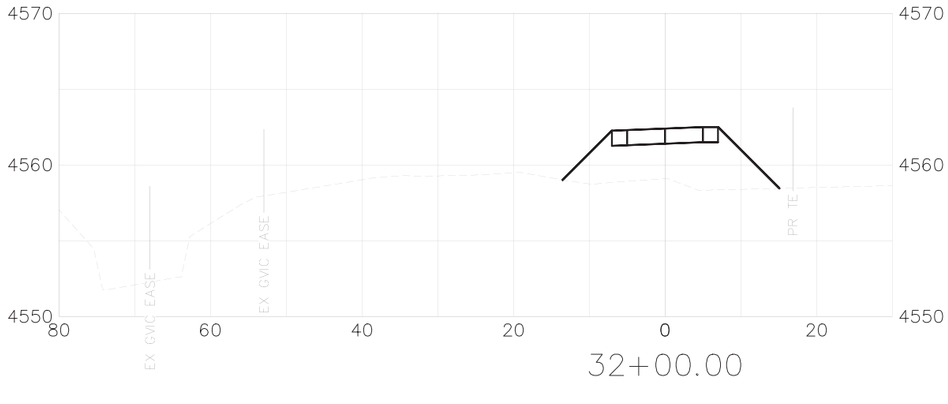

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PROFESSIONAL ENGINEER
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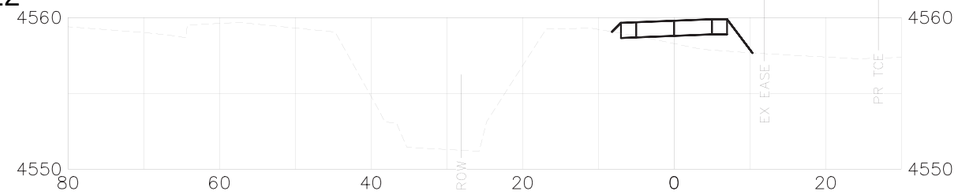

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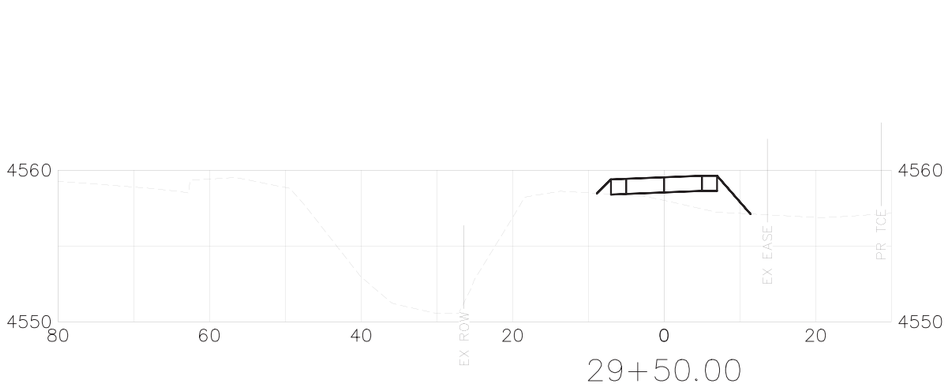

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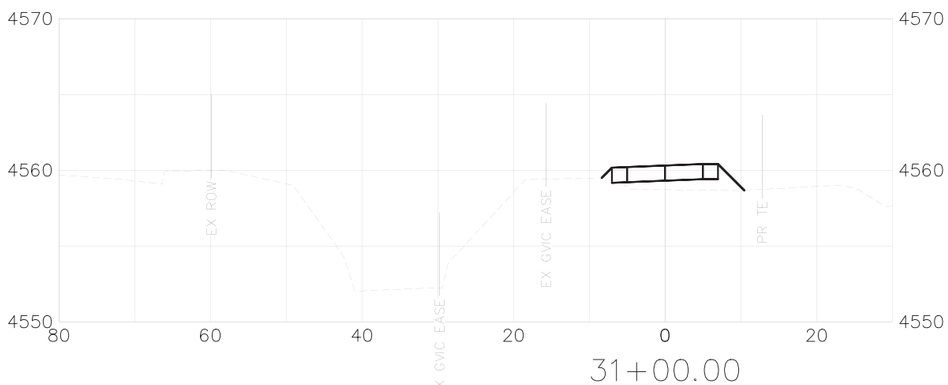

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REVISION ⚠ REV_3	– DATE
REVISION ⚠ REV_4	– DATE

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APPROVED BY	KH	DATE	MARCH 2022

SCALES:
PLAN & PROFILE
HORIZONTAL 0 5 10 20
VERTICAL 0 5 10

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH CROSS SECTIONS – 2
June 29, 2022

21

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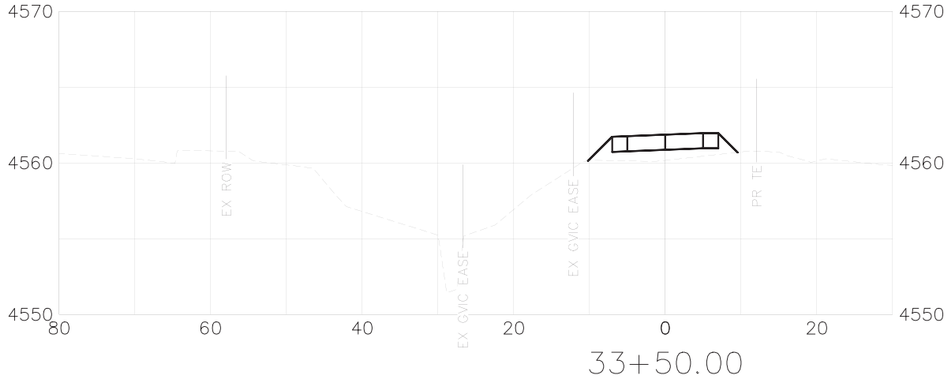

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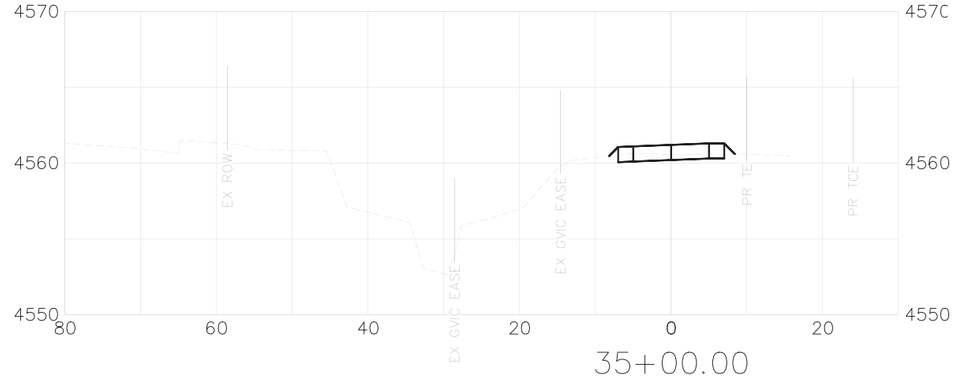

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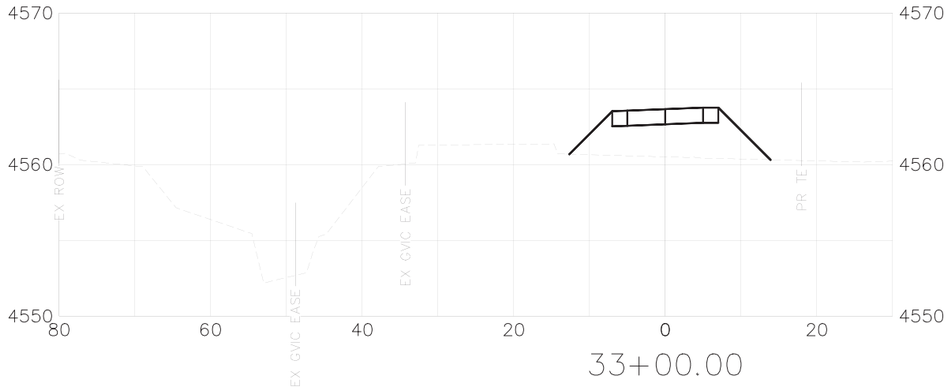

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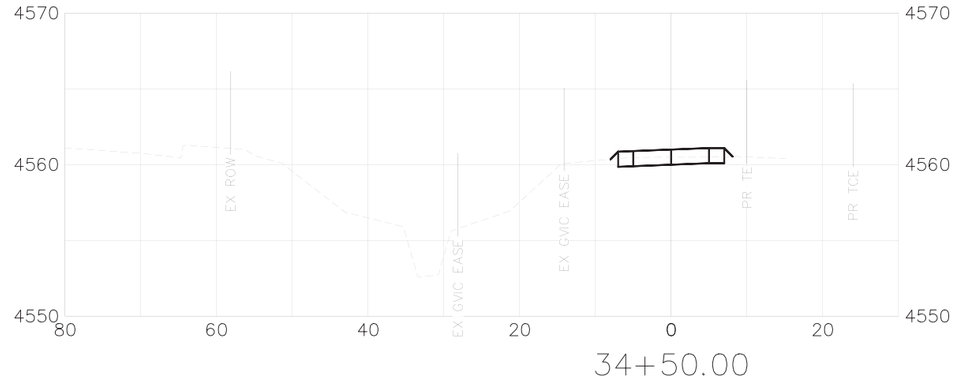

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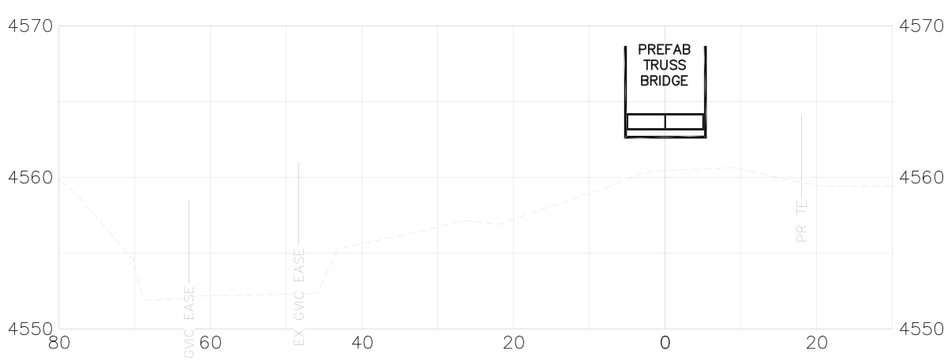

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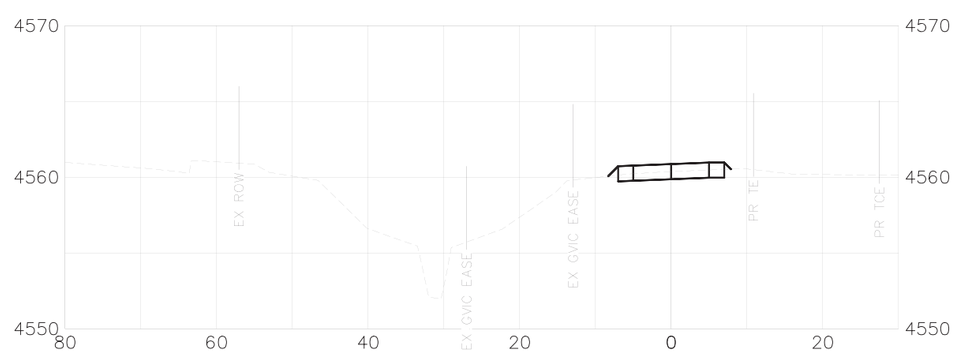

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KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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REVISION ⚠ REV 3	– DATE
REVISION ⚠ REV 4	– DATE

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APPROVED BY	KH	DATE	MARCH 2022

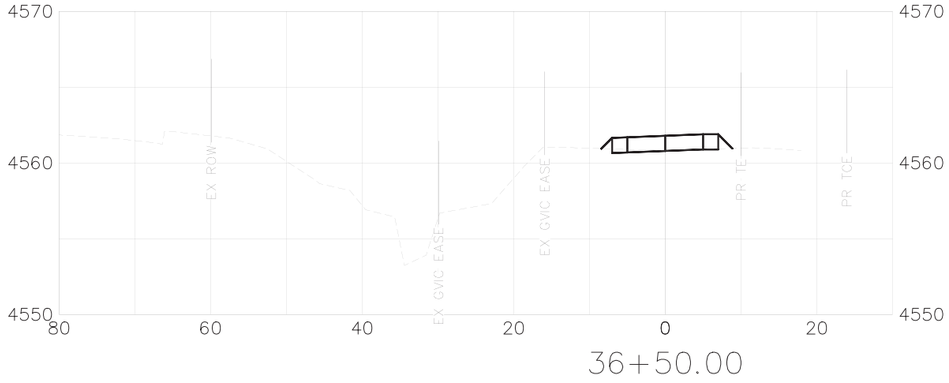
SCALES:
PLAN & PROFILE
HORIZONTAL 0 5 10 20
VERTICAL 0 5 10

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH CROSS SECTIONS – 3
June 29, 2022

22



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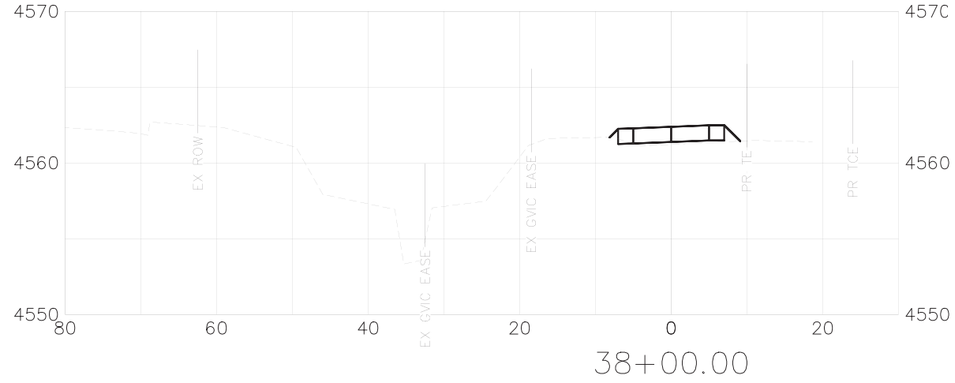

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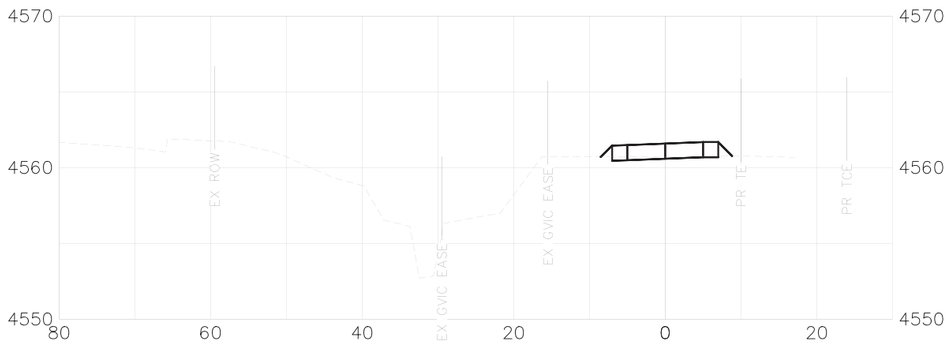

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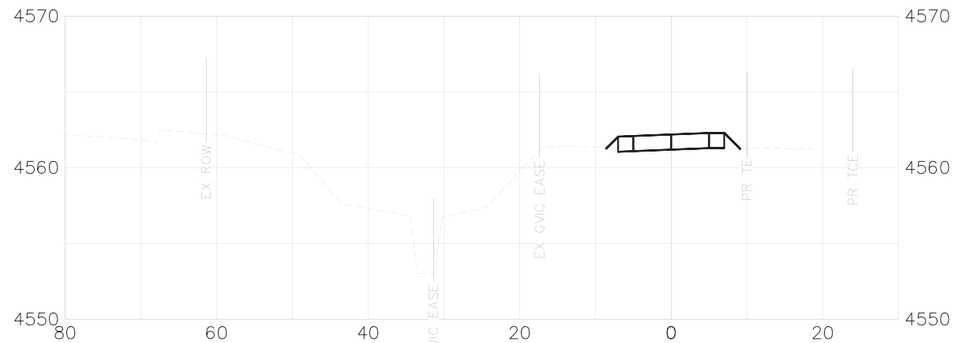

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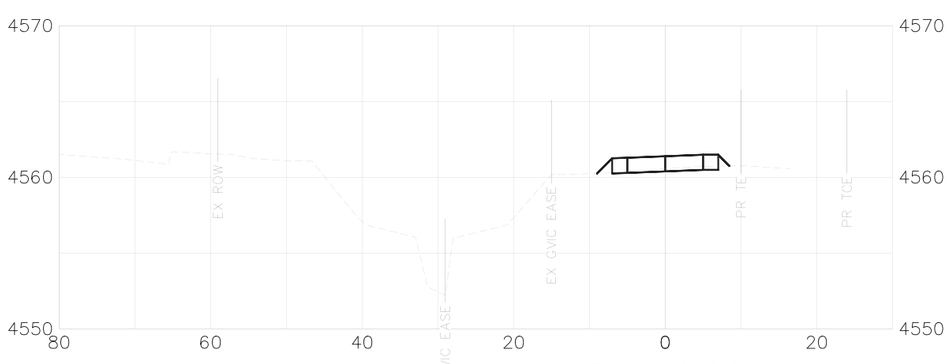

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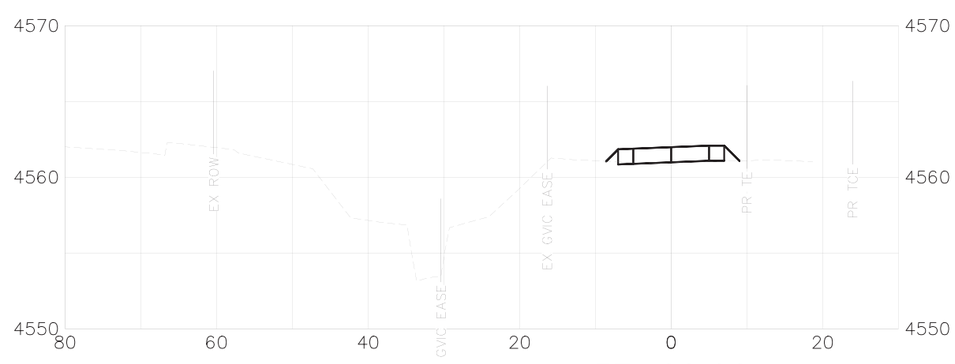

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KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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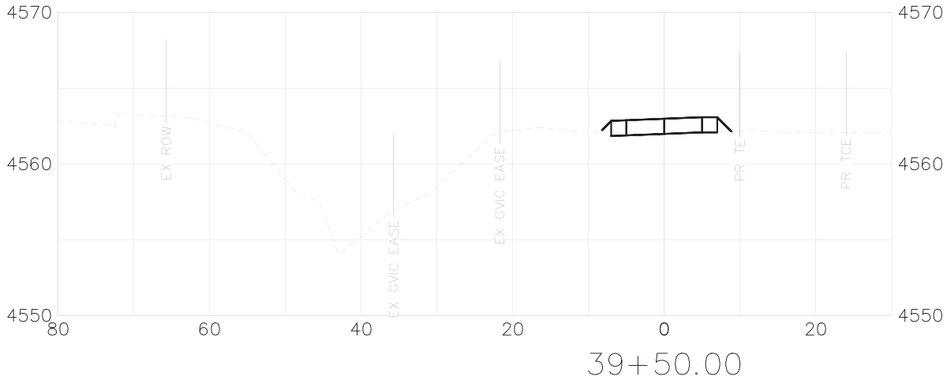
SCALES:
PLAN & PROFILE
HORIZONTAL 0 5 10 20
VERTICAL 0 5 10

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH CROSS SECTIONS – 4
June 29, 2022

23



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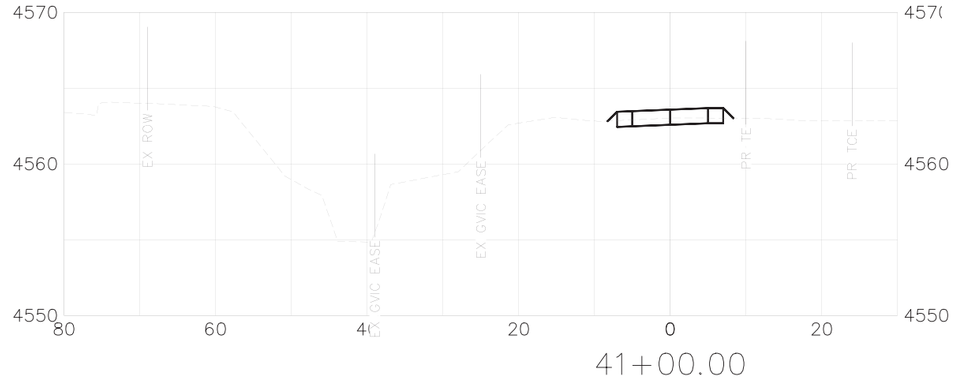

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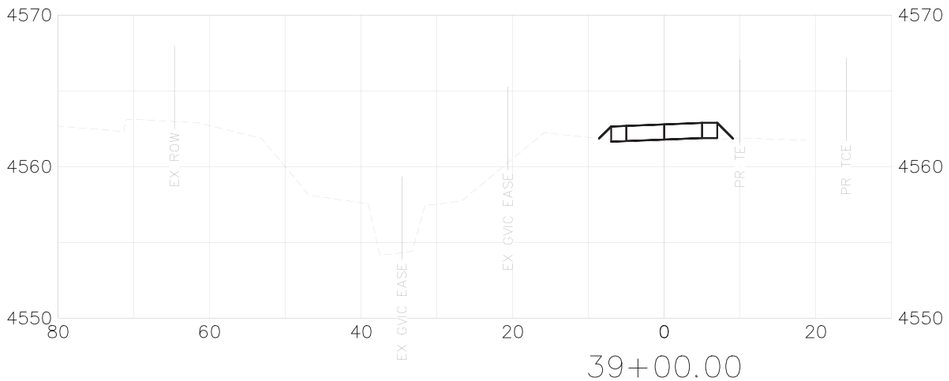

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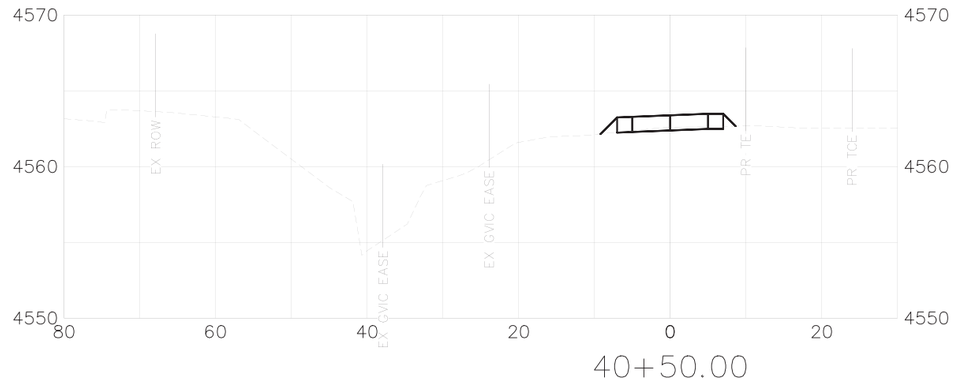

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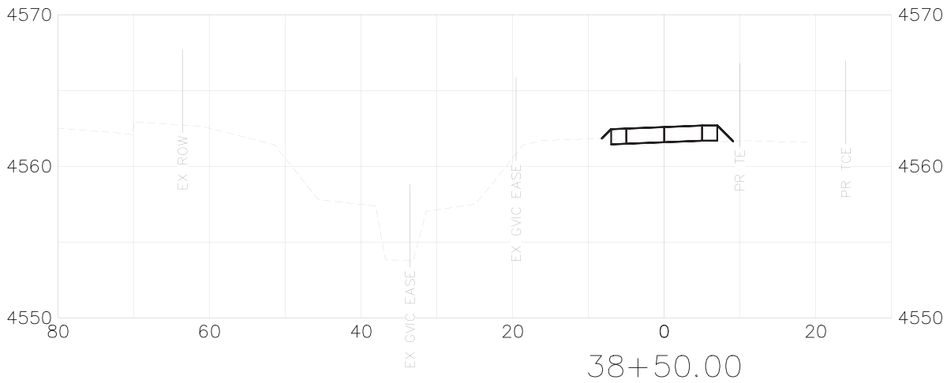

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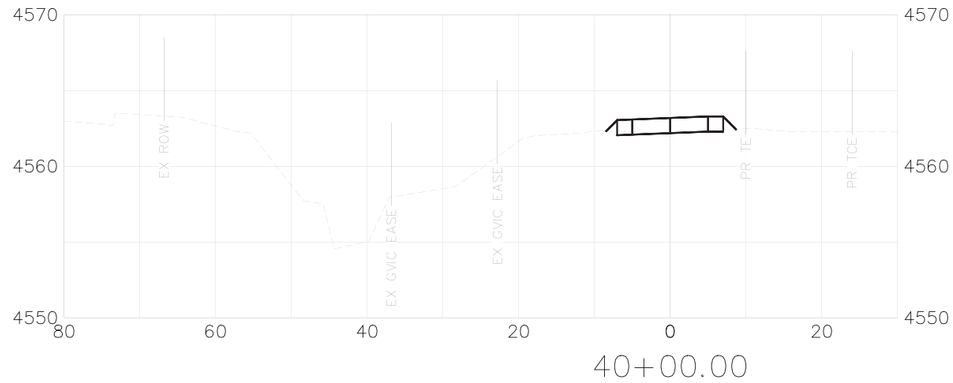

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COLORADO REGISTERED
TRISTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

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SCALES:
PLAN & PROFILE
HORIZONTAL 0 5 10 20
VERTICAL 0 5 10

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH CROSS SECTIONS – 5
June 29, 2022

24

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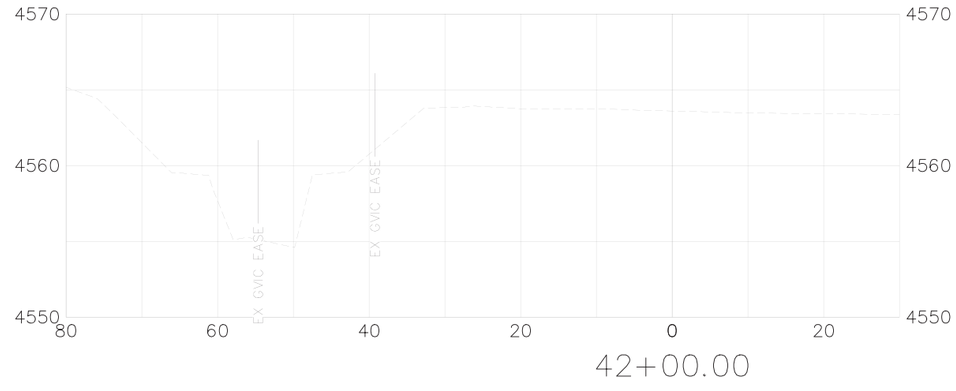
KIRSTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022



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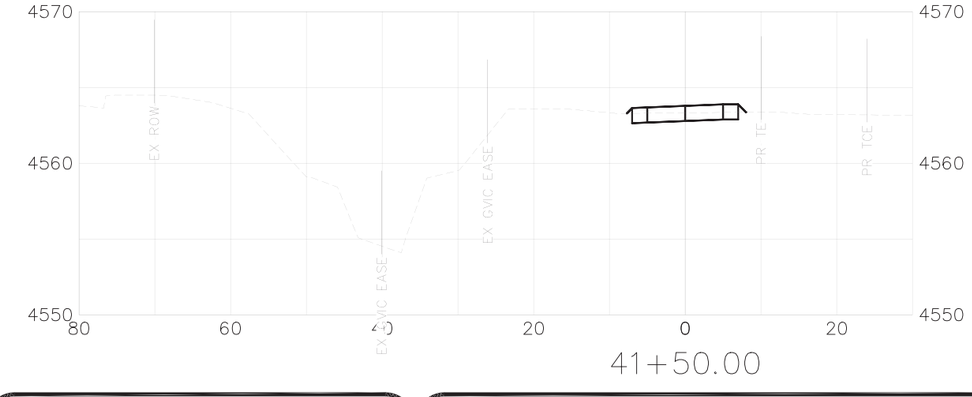

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CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
BIKE PATH CROSS SECTIONS – 6
June 29, 2022

25

1. SITE DESCRIPTION

The Contractor shall comply with all City contractual requirements and all requirements associated with the SWMP on this project. The SWMP Administrator for Construction shall update to reflect current project site conditions.

A. PROJECT SITE LOCATION: Along and adjacent to 24 Road, south of G Road
Location or address of construction office: 660 24 Road, Grand Junction, CO 81505

B. PROJECT SITE DESCRIPTION: The 24 Road Bike Path Project is to construct a bike path from the end of the existing path at 659 Market St to the end of the existing path south of G Road. This is a bike path funded project which includes unclassified excavation, aggregate base course, concrete pavement, pedestrian lighting, and prefabricated structural steel bridge installation. The path, west path shoulder, and west fill slope drains to Leach Creek which directly discharges to the Colorado River; The east path shoulder and fill slope drain to agriculture furrow that in turn drains to Leach Creek; erosion log toe of slope protection is proposed at all toe of slopes upstream of Leach Creek on the west side of the path and at all toe of slopes upstream of agriculture furrows that drain to Leach Creek on the east side of the path; final landscaping will include hydroseeding with a native seed mix for all areas disturbed during construction.

C. PROPOSED SEQUENCING FOR MAJOR CONSTRUCTION ACTIVITIES: The project will begin with installation of tracking pad, concrete washout structure, and perimeter sediment controls, clearing and grubbing, grading of the bike path area, installation of a culvert with excavation, construction of bike path subgrade and concrete and prefabricated structural steel bridge installation. Disturbed areas will receive hydroseeding.

D. ACRES OF DISTURBANCE:
1. Total area of construction site (LOC (PERMITTED AREA)): 2.0 acres
2. Total area of proposed disturbance (LDA): 1.1 acres
3. Total area of seeding: 0.51 acres
4. Total area of pre-project impervious surface: 0 sq. ft.
5. Total area of final impervious surface: 16,250 sq. ft.

E. EXISTING SOIL DATA: The project site area is mapped as being colluvium, undivided, (Holocene and late Pleistocene) (Qac), as well as at the immediate surrounding areas. Alluvium generally consists of silt, sand and gravels and the colluvium generally consists of sandy silt, silty to clayey sand, and sandy clay.

F. EXISTING VEGETATION, INCLUDING PERCENT COVER:

Pre-Construction Date of survey: x/xx/xxxx %Density: xx%
Description of existing vegetation: xxxxxx

Post-Construction Date of survey: _____ %Density: _____
Description of existing vegetation: **Date of Permit Closure:** _____

G. POTENTIAL POLLUTANTS SOURCES: Sediment from ground disturbance and stockpiled soils, vehicle tracking of sediments, construction worker trash, both liquid and solid construction wastes, paints, solvents, adhesives, concrete washout water, asphalt waste, or any other material that could conceivably be dissolved in or carried by stormwater.

H. RECEIVING WATER:
1. Outfall locations: See site map
2. Names of immediate receiving water(s) on site: Leach Creek
3. Ultimate receiving water(s): Colorado River
4. Horizontal distance to nearest ultimate receiving water from project: 1.2 miles
5. Description of all stream crossings located within the Construction Site Boundary: There are no stream crossings located within the Construction Site Boundary

Location	Stream Name	Description Of Any Disturbed Upland Areas

I. NON-STORMWATER DISCHARGES:

Discharge Description	Location (Site Map #)	Method Statement (Location)
Dewatering*		
Concrete Wash Water (in-ground washout structure)	See site map	A Concrete Washout Structure shall be provided by the contractor
Landscape Irrigation Return Flows		
Emergency Fire Fighting		
Concrete Saw Water		

ALLOWABLE: Refer to CDPHE Low Risk Discharge Guidance Document of Uncontaminated Groundwater to Land.
https://www.colorado.gov/pacific/sites/default/files/WQ%20LOW%20RISK%20GW.pdf

*If ground water does not meet water quality standards for receiving water a separate CDPS Dewatering Permit shall be obtained by the Contractor from CDPHE.

2. SITE MAP COMPONENTS:

Pre-construction

A. PROJECT CONSTRUCTION POTENTIAL SITE BOUNDARIES See SWMP Site Map

B. ALL AREAS OF GROUND SURFACE DISTURBANCE See SWMP Site Map

C. AREAS OF CUT AND FILL See SWMP Site Map

D. LOCATION OF ALL STRUCTURAL CONTROL MEASURES IDENTIFIED IN THE SWMP See SWMP Site Map

E. LOCATION OF NON-STRUCTURAL CONTROL MEASURES AS APPLICABLE IN THE SWMP See SWMP Site Map

F. STREAMS, SPRINGS, WETLANDS AND OTHER STATE WATERS, INCLUDING AREAS THAT REQUIRE PRE-EXISTING VEGETATION BE MAINTAINED WITHIN 50 FEET OF A RECEIVING WATER N/A

G. PROTECTION OF TREES, SHRUBS AND CULTURAL RESOURCES N/A

H. Flow arrows that depict stormwater flow directions on-site and runoff direction See SWMP Site Map

I. AREAS USED FOR STORING AND STOCKPILING OF MATERIALS, STAGING AREAS (field trailer, fueling, etc.) WASTE ACCUMULATION and BATCH PLANTS INCLUDING MASONARY MIXING STATIONS N/A

J. LOCATIONS OF ALL STREAM CROSSINGS LOCATED WITHIN THE CONSTRUCTION SITE BOUNDARY N/A

3. QUALIFIED STORMWATER MANAGERS:

A. SWMP ADMINISTRATOR FOR DESIGN:

Name/Title	Contact Information [phone & email]	Certification #
Kirsten Armbruster, Project Manager	970-244-1421 kirstena@gjcity.org	

C. SWMP Administrator for Construction: The Contractor shall designate a SWMP Administrator for Construction upon co-permittee of the permit. The SWMP Administrator for Construction shall become the operator for the SWMP and assume responsibility for all design changes to the SWMP implementation and maintenance. The SWMP Administrator for Construction shall be responsible for implementing, maintaining and revising SWMP, including the title and contact information. The activities and responsibilities of the SWMP Administrator for Construction shall address all aspects of the project's SWMP. (Update the information below for each new SWMP Administrator for Construction)

Name/Title	Contact Information (phone & email)	Certification #	Start Date	Engineer Approval

C. EROSION CONTROL INSPECTOR: The Contractor may designate an Erosion Control Inspector. The Erosion Control Inspector shall complete duties in accordance with CDPHE and Mesa County MS4. An inspection of the site shall be performed every 7 calendar days.

Name/Title	Contact Information (phone & email)	Certification #	Start Date	Engineer Approval

4. STORMWATER MANAGEMENT CONTROLS FIRST CONSTRUCTION ACTIVITIES

THE CONTRACTOR SHALL PERFORM THE FOLLOWING:

A. POTENTIAL POLLUTANT SOURCES

Evaluate, identify, locate and describe all potential sources of pollutants at the site in accordance with and place in the SWMP. All control measures related to potential pollutants shall be shown on the SWMP Site Map by the Contractor's SWMP Administrator for Construction.

B. OFFSITE DRAINAGE (RUN ON WATER)

1. Describe and record control measures on the SWMP Site Map that have been implemented to address off site run-on water.

C. VEHICLE TRACKING PAD/VEHICLE TRACKING CONTROL

1. Control measures shall be implemented.

D. PERIMETER CONTROL

1. Perimeter control shall be established as the first item on the SWMP to prevent the potential for pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state waters.
2. Perimeter control may consist of berms, silt fence, erosion logs, existing landforms, or other control measures as approved.

5. DURING CONSTRUCTION

RESPONSIBILITIES OF THE SWMP Administrator for Construction

The SWMP is a living document "living document" that is continuously reviewed and modified throughout the construction phasing. During construction, the following items shall be added, updated, or amended as needed by the SWMP Administrator for Construction.

During construction, indicate how items that have not been addressed during design are being handled in construction. If items are covered in the template or other sections of the SWMP, indicate below what section the discussion takes place.

A. SPILL PREVENTION AND RESPONSE PLAN (SPCC): Prior to project startup, the awarded contractor's personnel have been trained in the following spill control procedures:

- Spill control;
- Containment, vessel, tank, and piping inspection and maintenance;
- Spill response, containment, and clean-up;
- Company policies on reporting and responding to spills.

Environmentally Sensitive Areas:

All spillways, channels, and storm drainage that lead directly or indirectly to the receiving waters and/or pose a threat to ground water are identified as being environmentally sensitive. Extra care and preventative measures will be taken to minimize the risk of contamination to these areas.

Identification of Spill Cleanup Coordinators:

Responsibility	Name/Title	Contact Information (phone)
Primary SPCC		
Secondary SPCC		
On-site Spill Responder		
City Inspector		
City Project Engineer	Lisa Froshaug, Project Engineer	970-244-1592

Location of Clean-up Kits:

Type of Spill Kit	Location(s)
Large Spill Kit	
Vehicle Kit	

Notification Procedures to be used in the event of an accident:

The Qualified Stormwater Manager shall be notified immediately after a spill on the project site. For **non-hazardous** materials which may endanger health or the environment, and for spills or discharge of hazardous substance or oil (which may cause pollution of the waters of the State), the following measures shall be implemented:

- Contact the CDPHE Environmental Emergency Spill Reporting Line (1-877-518-5608) within 24 hours of the spill event. A written notification to the CDPHE-EMP is necessary within 5 days.
- Report spill to the City Inspector and the City Project Engineer.

For spills involving **hazardous** materials the following measures shall be implemented:

- Contact the local emergency response team by dialing 911.
- Contact the CDPHE Environmental Emergency Spill Reporting Line (1-877-518-5608) within 24 hours of the spill event. A written notification to the CDPHE-EMP is necessary within 5 days.
- Report spill to the City Inspector and the City Project Engineer.

B. MATERIALS HANDLING:

Quantities of Chemicals and Locations Stored on Site Chemical storage shall be at least 50 horizontal feet from the ordinary high-water line of any State water.

Material	Quantity	Staging/Storage Location(s)

Any products/chemicals that are located or stored onsite shall be properly labeled as to the contents of the material. The Material Safety Datasheets (MSDS) for all products/chemicals utilized onsite can be found in a notebook at the project trailer.

All chemicals and stockpiled materials stored on site shall be stored within berms or other secondary containment devices to prevent leaks and spills from contacting stormwater runoff.

C. STOCKPILE MANAGEMENT: Shall be done in accordance with subsection 107.25 and 208.07

D. CONCRETE WASHOUT: Concrete wash out water or waste from field laboratories and paving equipment shall be contained in accordance with subsection 208.05.

E. SAW CUTTING: Shall be done in accordance with subsection 107.25, 208.04, 208.05

F. STREET SWEEPING: Shall be done in accordance with subsection 208.04

6. INSPECTIONS

A. Inspections shall be performed every 7 calendar days in accordance with subsection 208.03(c).

7. CONTROL MEASURE MAINTENANCE

A. Maintenance shall be in accordance with subsection 208.04(f).

8. RECORD KEEPING

A. Records shall be kept in accordance with subsection 208.03(d).

9. INTERIM, PERMANENT STABILIZATON and LONG TERM STORMWATER MANAGEMENT

The Contractor shall comply with all interim stabilization and permanent stabilization requirements in accordance with subsection 208.04(e).

A. SEEDING PLAN

Seeding will be required for an estimated 0.51 acres of disturbed area within the right-of-way limits which are not surfaced. The following types and rates shall be used:

COMMON NAME	BOTANICAL NAME	LBS. PLS PER ACRE
Western wheatgrass		7.5
Bluebunch wheatgrass		2.3
Indian ricegrass		1.0
Thickspike wheatgrass		2.3
Slender wheatgrass		9.5
Red Mexican Hat		0.5
Blanket flower		1.5
Western yarrow		0.5
TOTAL		25.00

B. SEEDING APPLICATION: Hydroseed all disturbed areas at the construction site per subsection 212. Soil compaction shall be minimized for areas where permanent stabilization will be achieved through vegetative cover.

D. LONG TERM STORMWATER MANAGEMENT

In addition to the seeding plan noted in item 9.A, a detention pond will be constructed control pollutants in stormwater discharges that will occur after construction operations are completed.

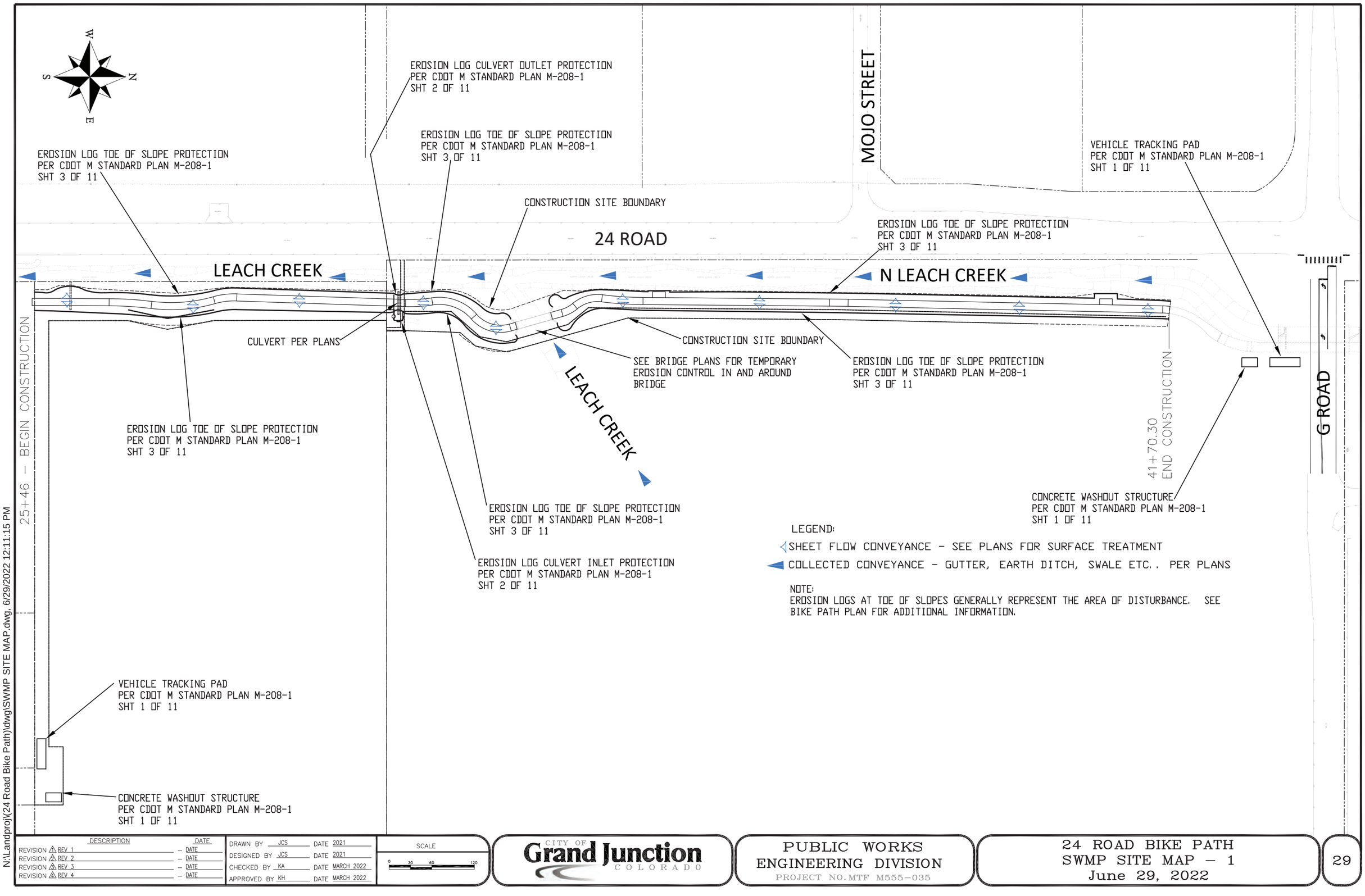
10. PRIOR TO PROJECT FINAL ACCEPTANCE

A. Partial Acceptance shall be in accordance with subsection 107.25 (d), 208.10 and 214.04. At the Partial Acceptance of the project, it shall be determined by the SWMP Administrator for Construction and the Engineer which temporary control measures shall remain until 70% revegetation is established or which shall be removed.

B. At the end of the project, all ditch checks shall either consist of temporary erosion logs (or equivalent) or permanent riprap.

C. All storm drains shall be cleaned prior to the Final Acceptance of the project.

SUMMARY OF SWMP QUANTITIES			
CONTRACT ITEM NO.	DESCRIPTION	UNIT	QTY.
208-00012	Erosion Log Type 1 (9 inch)	LF	3300
208-00045	Concrete Washout Structure	EA	2
208-00070	Vehicle Tracking Pad	EA	2



LEGEND:

SHEET FLOW CONVEYANCE - SEE PLANS FOR SURFACE TREATMENT

COLLECTED CONVEYANCE - GUTTER, EARTH DITCH, SWALE ETC.. PER PLANS

NOTE:
EROSION LOGS AT TOE OF SLOPES GENERALLY REPRESENT THE AREA OF DISTURBANCE. SEE BIKE PATH PLAN FOR ADDITIONAL INFORMATION.

DESCRIPTION	DATE
REVISION ⚠ REV 1	– DATE
REVISION ⚠ REV 2	– DATE
REVISION ⚠ REV 3	– DATE
REVISION ⚠ REV 4	– DATE

DRAWN BY JCS DATE 2021
DESIGNED BY JCS DATE 2021
CHECKED BY KA DATE MARCH 2022
APPROVED BY KH DATE MARCH 2022

SCALE 0 30 60 120

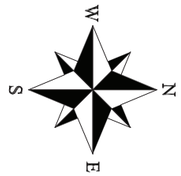
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
SWMP SITE MAP – 1
June 29, 2022

29

N:\Landproj\(24 Road Bike Path)\dwg\SWMP SITE MAP.dwg, 6/29/2022 12:11:15 PM



MOJO STREET

COLORADO REGISTERED
KRISTEN ARMBRUSTER
35215
PROFESSIONAL ENGINEER
06/30/2022

REMOVE 1100 LF EXISTING
BARBED WIRE FENCE

24 ROAD

LEACH CREEK

25+46 – BEGIN CONSTRUCTION

JOIN EX. FENCE
N 48698.44
E 78970.65

ANGLE POINT
N 48774.28
E 78972.95

ANGLE POINT
N 48825.47
E 79014.46

ANGLE POINT
N 48862.81
E 79013.57

ANGLE POINT
N 48939.32
E 78992.49

ANGLE POINT
N 48975.65
E 78966.03

ANGLE POINT
N 49325.19
E 78968.88

JOIN EX. FENCE
N 49785.73
E 78978.62

41+70.30
END CONSTRUCTION

TIE TO NEW STRUCTURE
WING WALL WITH EYEBOLTS
PER CDOT M STANDARD PLAN M-607-1
SHT 2 OF 3

FENCE WIRE WITH TREATED WOODEN
POSTS (190 LF) PER CDOT M STANDARD
PLAN M-607-1 SHT 1 THRU 3

FENCE WIRE WITH TREATED WOODEN
POSTS (870 LF) PER CDOT M STANDARD
PLAN M-607-1 SHT 1 THRU 3

EXISTING FENCE WILL BE RESET BY
OTHERS PRIOR TO THIS CONTRACT

G ROAD

DESCRIPTION	DATE
REVISION 1 REV 1	– DATE
REVISION 2 REV 2	– DATE
REVISION 3 REV 3	– DATE
REVISION 4 REV 4	– DATE

DRAWN BY	JCS	DATE	2021
DESIGNED BY	JCS	DATE	2021
CHECKED BY	KA	DATE	MARCH 2022
APPROVED BY	KH	DATE	MARCH 2022

SCALE
0 30 60 120

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555-035

24 ROAD BIKE PATH
FENCING PLAN – 1
June 29, 2022

30

N:\Landproj\(24 Road Bike Path)\dwg\FENCING PLAN.dwg, 6/29/2022 12:11:24 PM

GENERAL NOTES

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE COLORADO DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, DATED 2021; AND AND AS SUBSEQUENTLY REVISED; THE STANDARD PLANS (M&S STANDARDS) DATED JULY 2019; AND AS SUBSEQUENTLY REVISED; AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS INCLUDED HEREIN.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

A COLORED STRUCTURAL CONCRETE COATING FINISH WILL BE REQUIRED, AS SHOWN ON THE PLANS, ON EXPOSED CONCRETE SURFACES. THE COLOR SHALL BE TAN, AND IS TO BE SELECTED BY THE CITY FROM TEST PANELS PROVIDED BY THE CONTRACTOR.

THE FOLLOWING STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 (ASTM A–572): PILING.

AASHTO M–222 (ASTM A–588) MAY BE SUBSTITUTED FOR M270 GRADE 50 (ASTM A–572) AT NO ADDITIONAL COST TO THE PROJECT.

ANCHOR BOLTS SHALL BE AASHTO M314 (ASTM F1554) AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153. EACH ANCHOR BOLT SHALL BE PROVIDED WITH TWO NUTS FOR JAMMING. NUTS FOR ANCHOR BOLTS SHALL BE AASHTO M291 (ASTM563, GRADE A) HEAVY HEX.

FIELD WELDING OF ANY KIND SHALL NOT BE PERMITTED ON THE STEEL TRUSSES UNLESS SPECIFICALLY CALLED FOR IN THE PLANS.

LEVELING PADS ARE UNLAMINATED BEARINGS. THEY SHALL BE CUT OR MOLDED FROM AASHTO ELASTOMER GRADE 3, 4, OR 5 AS DESCRIBED IN TABLES 705–1 AND 705–2 WITH A DUROMETER (SHORE "A") HARDNESS OF 60.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED.

(N) DENOTES NON COATED (BLACK) REINFORCING STEEL.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'–11"	2'–5"	2'–11"	3'–5"	3'–10"	4'–9"	5'–11"	7'–1"

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	2'–4"	2'–11"	4'–11"	5'–9"	6'–6"	8'–1"	10'–0"	12'–0"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE ABOVE SPLICE LENGTHS SHALL BE INCREASED BY 20 PERCENT FOR 3 BAR BUNDLES AND 33 PERCENT FOR 4 BAR BUNDLES.

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

ALL LONGITUDINAL AND TRANSVERSE DIMENSIONS ARE MEASURED HORIZONTALLY AND INCLUDE NO CORRECTION FOR GRADE.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 (1–800–922–1987) AT LEAST 3 DAYS (2 DAYS NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

DESIGN DATA

AASHTO, 9TH EDITION LRFD WITH CURRENT INTERIMS

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN

LIVE LOAD: 90 PSF PEDESTRIAN LIVE LOAD
5 TON SERVICE VEHICLE (H–5 TRUCK)

REINFORCED CONCRETE:
CLASS D CONCRETE: f'c = 4,500 psi
REINFORCING STEEL: fy = 60,000 psi

STRUCTURAL STEEL:
AASHTO M222 (ASTM A588) GRADE 50 fy = 50,000 psi

SEISMIC DESIGN CRITERIA

LATITUDE = 39.1038° N
LONGITUDE = 108.6048° W

AASHTO SPECTRUM FOR 7% PE IN 75 YEARS

PERIOD (sec)	Sa (g)
0.0	0.080 PGA – SITE CLASS E
0.2	0.160 Ss – SITE CLASS E
1.0	0.045 S1 – SITE CLASS E

SPECTRAL RESPONSE ACCELERATIONS:
As = Fpga*PGA, SDs = Fa*Ss, AND SD1 = Fv*S1
Fpga = 2.50, Fa = 2.50, Fv = 3.50

PERIOD (sec)	Sa (g)
0.0	0.157 As – SITE CLASS E
0.2	0.400 SDs – SITE CLASS E
1.0	0.157 SD1 – SITE CLASS E

SEISMIC DESIGN CATEGORY (SDC) = A

SUMMARY OF BRIDGE QUANTITIES

ITEM NO.	DESCRIPTION	UNITS	QUANTITY
206–00000	STRUCTURAL EXCAVATION	CY	30
206–00100	STRUCTURE BACKFILL (CLASS 1)	CY	40
206–00200	STRUCTURE BACKFILL (CLASS 2)	CY	10
502–00460	PILE TIP	EA	4
502–00500	COMPLETE JOINT PENETRATION (CJP) SPLICE	EA	4
502–11253	STEEL PILING (HP 12X53)	LF	200
506–00206	RIPRAP (6 INCH)	CY	50
514–00201	PEDESTRIAN RAILING (STEEL)(SPECIAL)	LF	20
601–03040	CONCRETE CLASS D (BRIDGE)	CY	20
601–40301	STRUCTURAL CONCRETE COATING	SY	30
602–00020	REINFORCING STEEL (EPOXY COATED)	LB	2200
628–00045	BRIDGE GIRDER AND DECK UNIT (45 FT TO 50 FT)	EA	1

NOTES: ABOVE VALUES DO NOT INCLUDE CONCRETE CLASS D AND REINFORCING STEEL (EPOXY COATED) QUANTITIES REQUIRED BY BRIDGE DECK. CONTRACTOR SHALL COORDINATE WITH BRIDGE SUPPLIER TO DETERMINE BRIDGE DECK QUANTITIES. THESE WILL NOT BE PAID SEPARATELY BUT WILL BE INCIDENTAL TO PAY ITEM 628–00045.

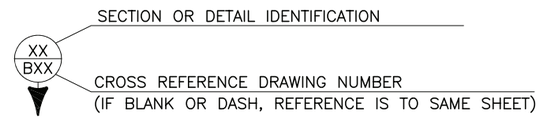
INDEX OF DRAWINGS

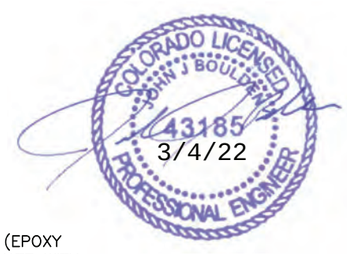
ABBREVIATIONS:

BF = BACK FACE
EL = ELEVATION
EX = EXISTING
FG = FINISHED GRADE
HCL = HORIZONTAL CONTROL LINE
PGL = PROFILE GRADE LINE
WSEL = WATER SURFACE ELEVATION
SEE M–100–2 FOR OTHER ABBREVIATIONS

BRIDGE DESCRIPTION

1–SIMPLE SPAN (50'–0") MANUFACTURED STEEL TRUSS BRIDGE, CONCRETE DECK SLAB, 24 ROAD BIKE PATH OVER LEACH CREEK, 10'–0" PATH HANDRAIL TO HANDRAIL, 90°0'0" SKEW





811 Know what's below. Call before you dig.

CNCC 1–800–922–1987

BRIDGE NO. GRJP 24.02–F.80

DESCRIPTION	DATE
REVISION 1 REV 1	DATE
REVISION 2 REV 2	DATE
REVISION 3 REV 3	DATE
REVISION 4 REV 4	DATE

DRAWN BY FJB DATE 2020
DESIGNED BY JJB DATE 2020
CHECKED BY ELK DATE 2020
APPROVED BY JJB DATE 2020

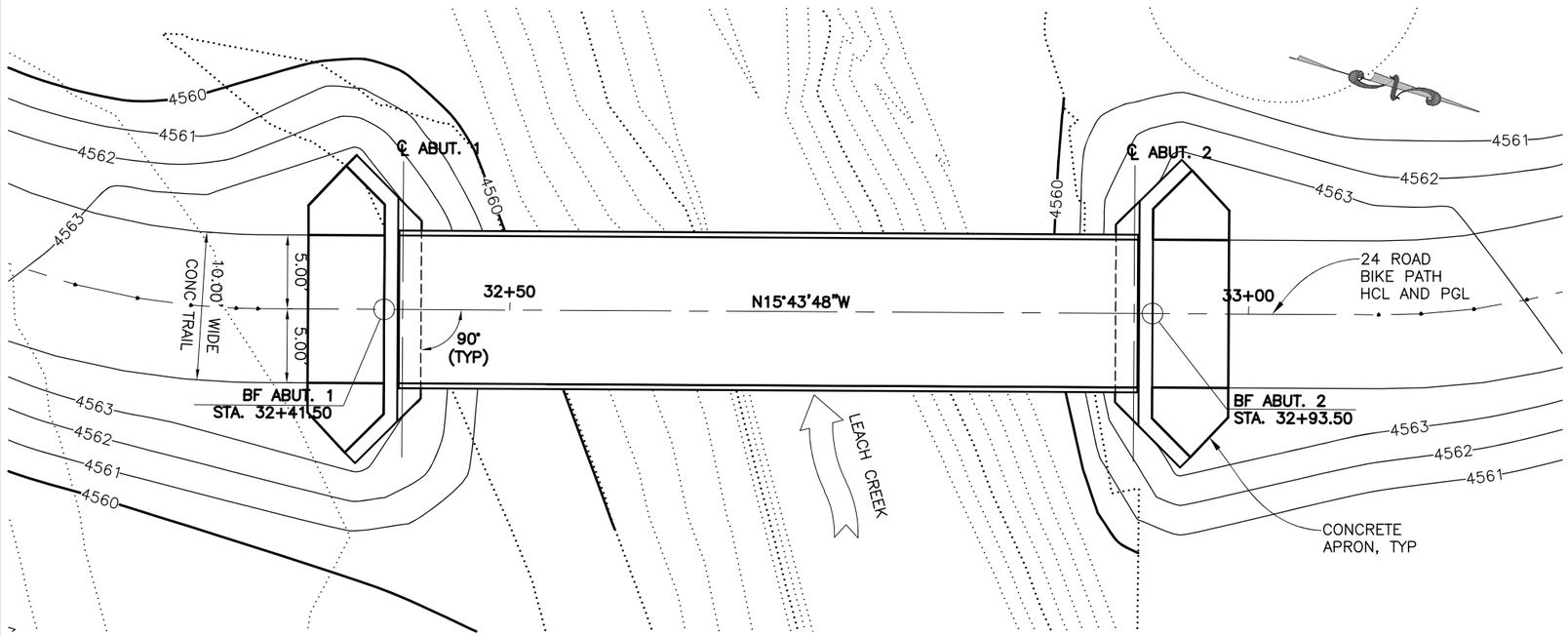
SCALES: PLAN 0 2.5 5 10

CITY OF Grand Junction COLORADO
SGM 259 Grand Avenue, Suite 200 Grand Junction, CO 81501 970.245.2571 www.sgm-inc.com

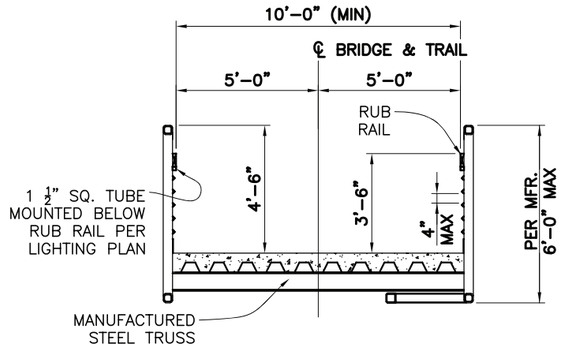
PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555–035

24 ROAD BIKE PATH – PED BRIDGE
BRIDGE GENERAL INFORMATION
MARCH 4, 2022

B01



PLAN



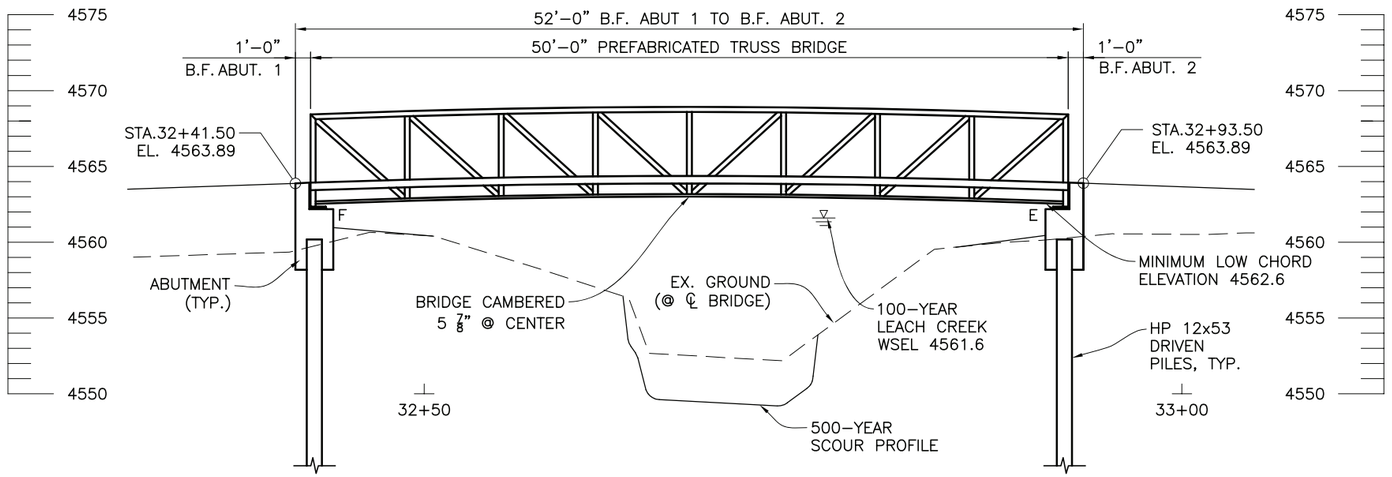
TYPICAL SECTION

(LOOKING AHEAD STATION)

NOTE: CONTRACTOR SHALL COORDINATE WITH BRIDGE SUPPLIER TO DETERMINE BRIDGE DECK QUANTITIES.

OPENINGS IN RAILS SHALL BE SMALL ENOUGH THAT A 4 INCH DIAMETER SPHERE CANNOT PASS THROUGH.

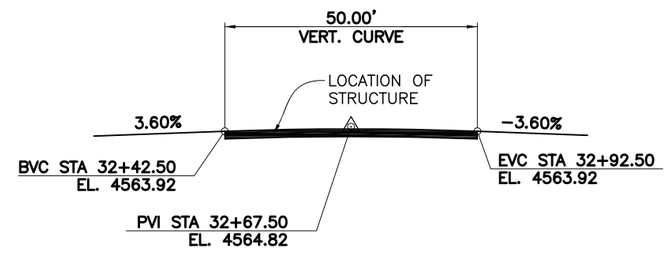
COLORADO LICENSED
JOHN J BOULDEN
43185
3/4/22
PROFESSIONAL ENGINEER



ELEVATION

(LOOKING WEST)

(RAILINGS NOT SHOWN FOR CLARITY)



24 ROAD TRAIL PROFILE GRADE

N.T.S.

BRIDGE NO. GRJP 24.02–F.80

DESCRIPTION	DATE
REVISION ⚠1 REV 1	– DATE
REVISION ⚠2 REV 2	– DATE
REVISION ⚠3 REV 3	– DATE
REVISION ⚠4 REV 4	– DATE

DRAWN BY	FJB	DATE 2020
DESIGNED BY	JJB	DATE 2020
CHECKED BY	ELK	DATE 2020
APPROVED BY	JJB	DATE 2020

SCALES: PLAN 0 5 10 20

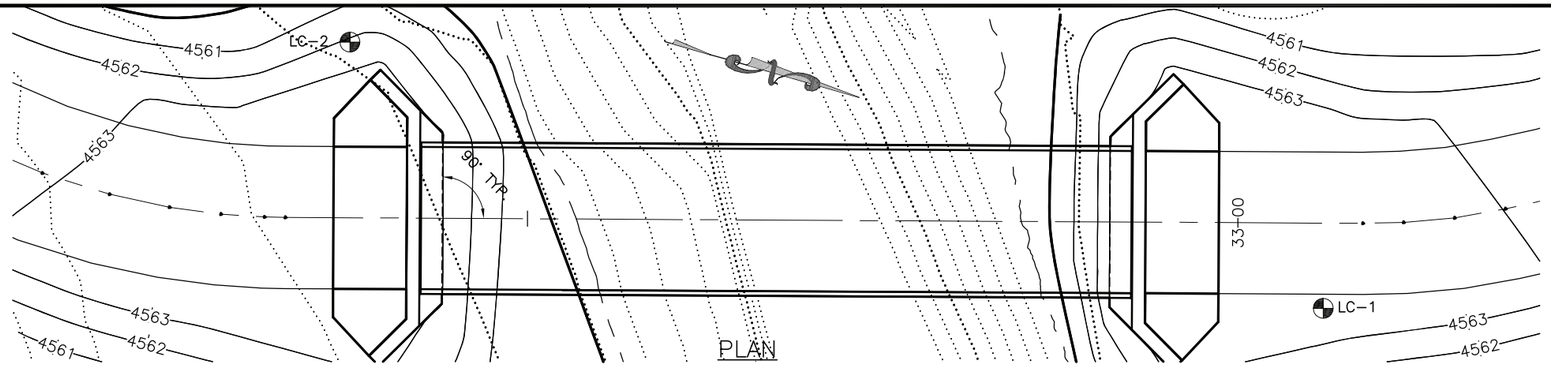
CITY OF Grand Junction COLORADO

SGM 259 Grand Avenue, Suite 200 Grand Junction, CO 81501 970.245.2571 www.sgminc.com

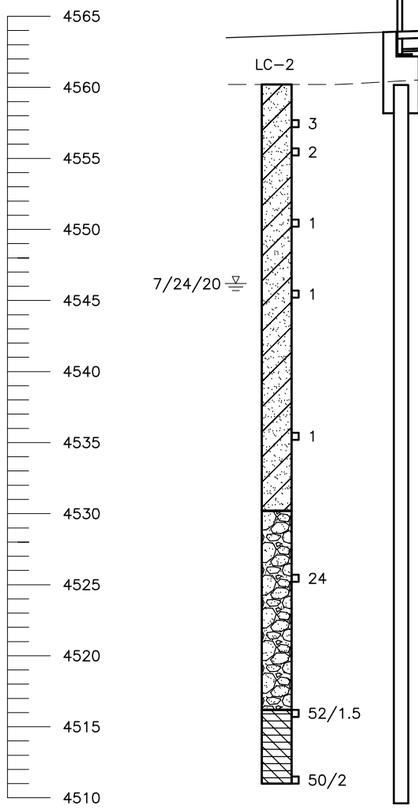
PUBLIC WORKS
ENGINEERING DIVISION
PROJECT NO. MTF M555–035

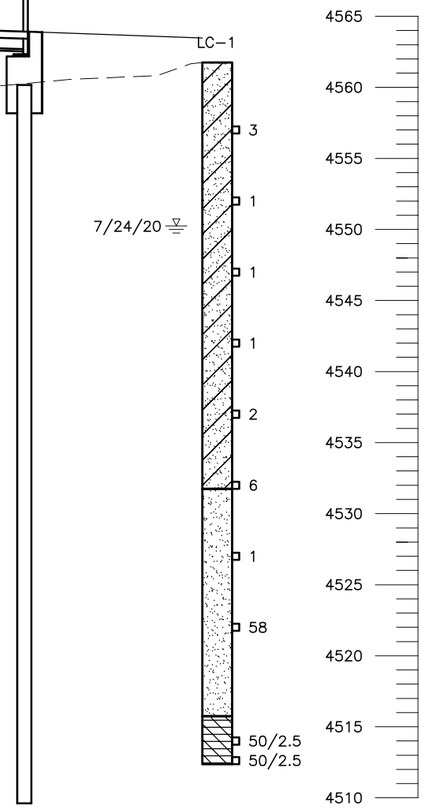
24 ROAD BIKE PATH – PED BRIDGE
GENERAL LAYOUT
MARCH 4, 2022

B02



PLAN





ELEVATION
(LOOKING WEST)

NOTES:

1. BOREHOLES WERE DRILLED ON JULY 24, 2020. BOREHOLES WERE DRILLED WITH A CONTINUOUS FLIGHT HOLLOW STEM AUGER.
2. TEST HOLE DESCRIPTIONS ARE SUBJECT TO EXPLANATIONS CONTAINED IN THE REPORT, ROCKSOL PROJECT NO. 599.07.
3. THE BORINGS WERE LOCATED IN THE FIELD RELATIVE TO EXISTING SITE FEATURES AS SHOWN IN THE SITE PLAN CONTAINED IN THE GEOTECH REPORT. THESE LOCATIONS HAVE NOT BEEN SURVEYED OR MEASURED OTHERWISE. ACTUAL LOCATIONS MAY VARY FROM THOSE SHOWN IN THE PLANS.
4. THE LINES BETWEEN THE MATERIALS SHOWN IN THE TEST HOLE LOGS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES AND THE ACTUAL TRANSITIONS MAY BE GRADUAL.
5. GROUND WATER LEVELS SHOWN ON THE LOGS WERE MEASURED AT THE TIMES AND UNDER CONDITIONS INDICATED. FLUCTUATIONS IN THE WATER LEVEL MAY OCCUR WITH TIME.

TYPE OF MATERIAL

- SILTY, SANDY CLAY
- SAND w/ COBBLES
- SAND w/ GRAVEL
- CLAYSTONE BEDROCK

LEGEND

- Location of Exploratory Boring (Test Hole)
- 2 — Standard Sampler. The symbol 3 indicates 3 blows from a 140 pound hammer falling 30 inches was used to drive the sampler 12 inches.
- Bulk Sample obtained from auger cuttings at depths indicated.

BRIDGE NO. GRJP 24.02-F.80

COLORADO LICENSED
JOHN J BOULDEN
43185
3/4/22
PROFESSIONAL ENGINEER

SUMMARY OF TEST RESULTS

SAMPLE LOCATION			CLASSIFICATION		GRADING ANALYSIS (%)			ATTERBERG LIMITS			WATER CONTENT (%)	UNIT WEIGHT (PCF)
BORE HOLE	DEPTH (FT)	SAMPLE TYPE	SOIL OR BEDROCK TYPE	AASHTO	GRAVEL	SAND	SILT & CLAY	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX		
LC-1	4	MC	CLAY, SILTY TO SANDY	–	–	–	82.0	–	–	–	19.9	107.1
LC-1	14	MC	CLAY, SILTY TO SANDY	–	–	–	91.8	25	20	5	27.9	97.8
LC-1	24	MC	CLAY, SILTY TO SANDY	–	–	–	99.7	25	16	9	26.4	100.9
LC-1	34	MC	SAND w/ GRAVEL	A-2-4	–	–	12.3	NP	NP	NP	23.8	101.0
LC-1	39	SS	POORLY GRADED SAND w/ GRAVEL (SP)	A-3	15.3	71.4	4.7	NP	NP	NP	15.7	–
LC-1	48	SS	CLAYSTONE/SHALE	–	–	–	80.6	–	–	–	10.4	–
LC-2	2	MC	CLAY, SANDY TO SILTY	–	–	–	93.1	24	18	6	20.1	105.5
LC-2	10	MC	CLAY, SANDY TO SILTY	–	–	–	91.6	20	19	1	–	–
LC-2	34	SS	SAND w/ COBBLES	–	–	–	28.9	–	–	–	16.2	–
LC-2	44	SS	CLAYSTONE/SHALE	–	–	–	11.5	–	–	–	23.5	–
LC-2	49	SS	CLAYSTONE/SHALE	–	–	–	76.2	–	–	–	7.5	–

DESCRIPTION	DATE
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REVISION 2 REV 2	– DATE
REVISION 3 REV 3	– DATE
REVISION 4 REV 4	– DATE

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PROJECT NO. MTF M555-035

24 ROAD BIKE PATH – PED BRIDGE
ENGINEERING GEOLOGY
MARCH 4, 2022

B03

HYDRAULIC DATA

Drainage Area = 2.93 Square Miles
Q100 = 721 CFS
V100 = 4.37 FPS (US of bridge, in channel)
Q500 = 730 CFS
V500 = 4.07 FPS (US of bridge, in channel)

CHANNEL DESCRIPTION

Bottom Material: Cohesive ☐ Non–Cohesive ■
Bottom Material Size: Clay ■ Silt ■ Sand ■ Gravel ☐
Cobbles ■ Other ☐
Stream Form: Straight ☐ Meandering ■ Braided ☐
Mannings "n" for Design: Channel = 0.035 Overbank = 0.05
Debris: Brush ■ Trees/Logs ☐ Ice ☐ Other ☐

COMPARISON OF HYDRAULICS

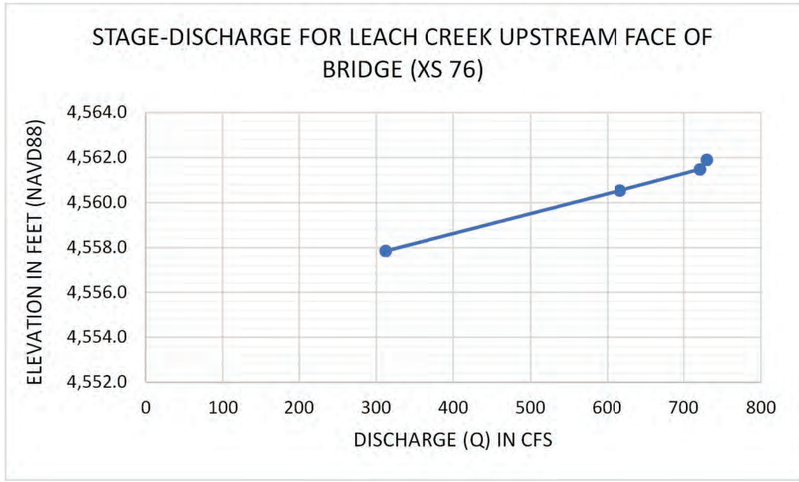
At proposed bridge entrance (HEC–RAS model STA 76) during design discharge (100 yr)

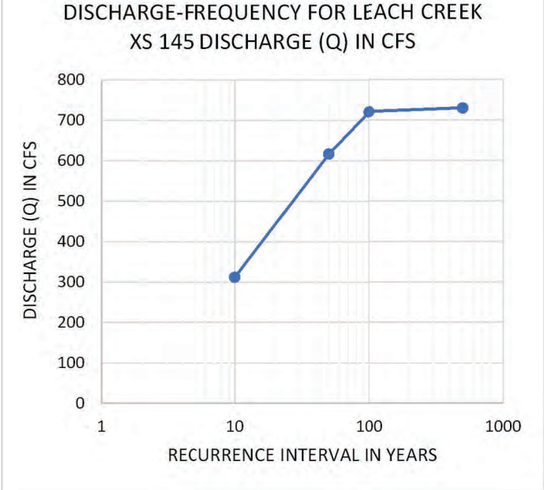
100 YR	TOTAL AVERAGE VELOCITY (fps)	VELOCITY IN MAIN CHANNEL (fps)	100 YR WSEL (FT)	FROUDE NO. (100 YR)	LOW CHORD ELEVATION (FT)	FREEBOARD (FT)
EXISTING CONDITIONS	2.74	4.07	4561.48	0.25	---	---
PROPOSED CONDITIONS	3.3	4.37	4561.47	0.27	4562.6	1.13

SCOUR DATA

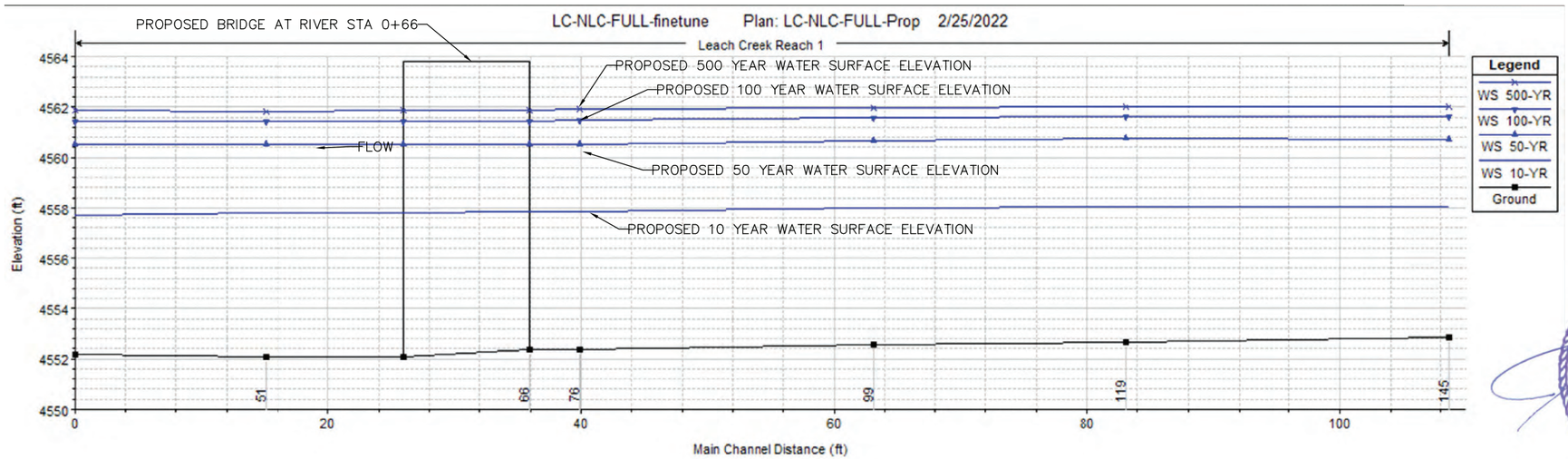
Maximum scour at HEC–RAS model station 119, 47 FT upstream of proposed bridge

	100 YR WSEL (FT)	500 YR MAX SCOUR IN CHANNEL (FT)	500 YR MAX SCOUR ON BANKS (FT)
PROPOSED CONDITIONS	4561.63	2.62	0.91-0.84





LEACH CREEK HYDRAULIC PROFILE



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43185
3/4/22
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BRIDGE NO. GRJP 24.02–F.80

DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY KJS DATE DEC 2020
DESIGNED BY KJS DATE DEC 2020
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APPROVED BY RB DATE DEC 2020

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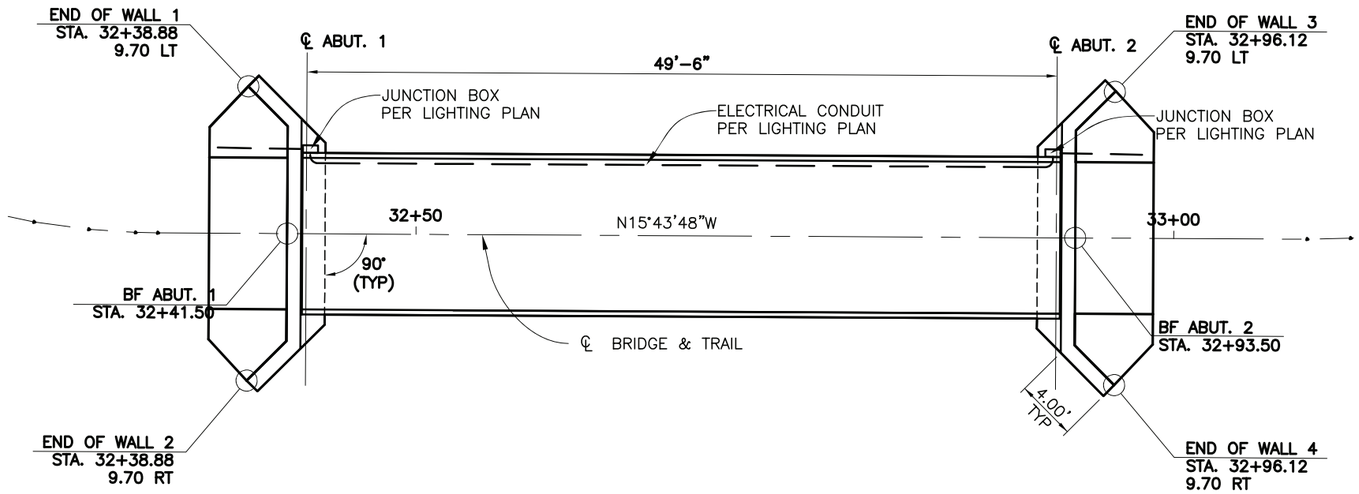
24 ROAD BIKE PATH – PED BRIDGE
HYDRAULIC INFORMATION
MARCH 4, 2022

B04



PLAN

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BRIDGE NO. GRJP 24.02–F.80

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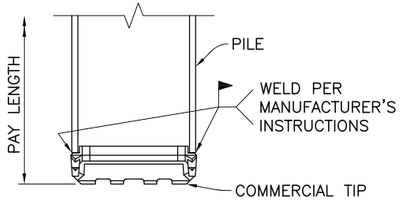
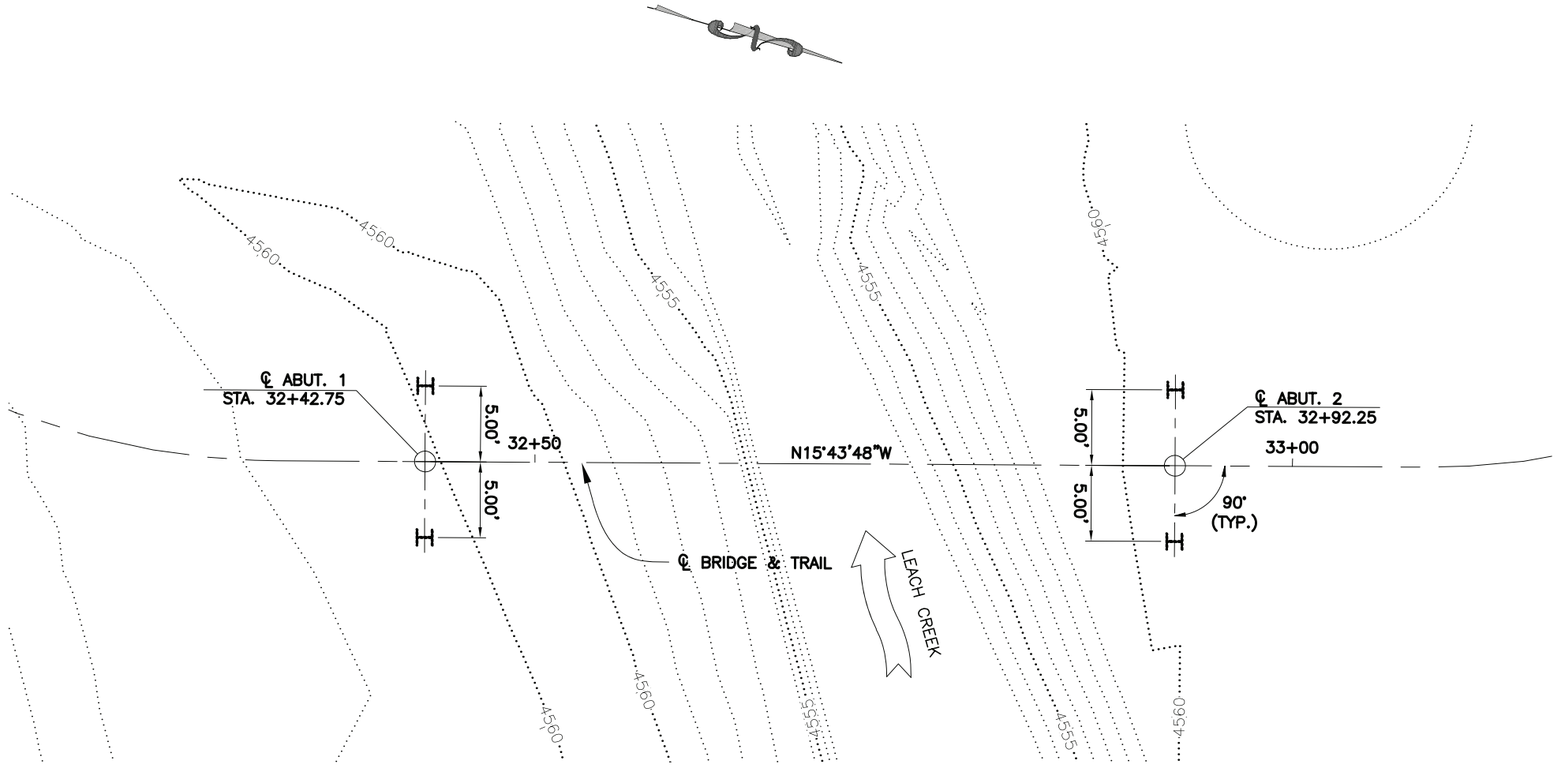
24 ROAD BIKE PATH – PED BRIDGE
CONSTRUCTION LAYOUT
MARCH 4, 2022

B05



REINFORCING TIP DETAIL

USE COMMERCIAL TIP APF HARD BITE 77600, 77750, DFP H–776, VERSA–STEEL VS–300, CONSTRUCTION SUPPLY HT–3300 OR APPROVED ALTERNATE.



PLAN

FOUNDATION NOTES:

1. REFER TO SOILS REPORT PREPARED BY ROCKSOL, PROJECT NO. 599.07, DATED NOVEMBER 12, 2020 FOR ADDITIONAL INFORMATION REGARDING SUBSURFACE CONDITIONS.
2. PILES SHALL BE DRIVEN INTO THE UNDERLYING SEDIMENTARY BEDROCK TO A DEPTH SUFFICIENT TO RESIST THE MAXIMUM FACTORED LOAD INDICATED ON THE PLANS.
3. PDA SHALL BE PERFORMED ON ONE PRODUCTION PILE PER ABUTMENT TO DETERMINE THE PILE DRIVING CRITERIA TO ACHIEVE THE MAXIMUM FACTORED LOAD INDICATED IN THE SCHEDULE.
4. COMPLETE JOINT PENETRATION WELDS SHALL BE REQUIRED FOR THE FLANGES OF ALL SPLICES REGARDLESS OF DEPTH.
5. A REPRESENTATIVE OF THE CONTRACTOR'S ENGINEER SHALL OBSERVE ALL PILE INSTALLATION.
6. HORIZONTAL DIMENSIONS SHOWN ARE AT THE BOTTOM OF THE ABUTMENT OR FOOTING CONCRETE.
7. REFER TO TRAIL PLANS FOR ADDITIONAL UTILITY INFORMATION.
8. ALL SPLICES MADE ABOVE THE MINIMUM CJP ELEVATION SHALL BE CJP SPLICES

LEGEND:

I VERTICAL PILE

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LOCATION	FOUNDATION SIZE	EXPECTED TIP ELEVATION	MINIMUM CJP ELEVATION	MAXIMUM FACTORED LOAD	MAXIMUM SERVICE LOAD
ALL	HP12x53	4510	4525	30 TONS	21 TONS

811 Know what's below. Call before you dig.

CNCC 1–800–922–1987

BRIDGE NO. GRJP 24.02–F.80

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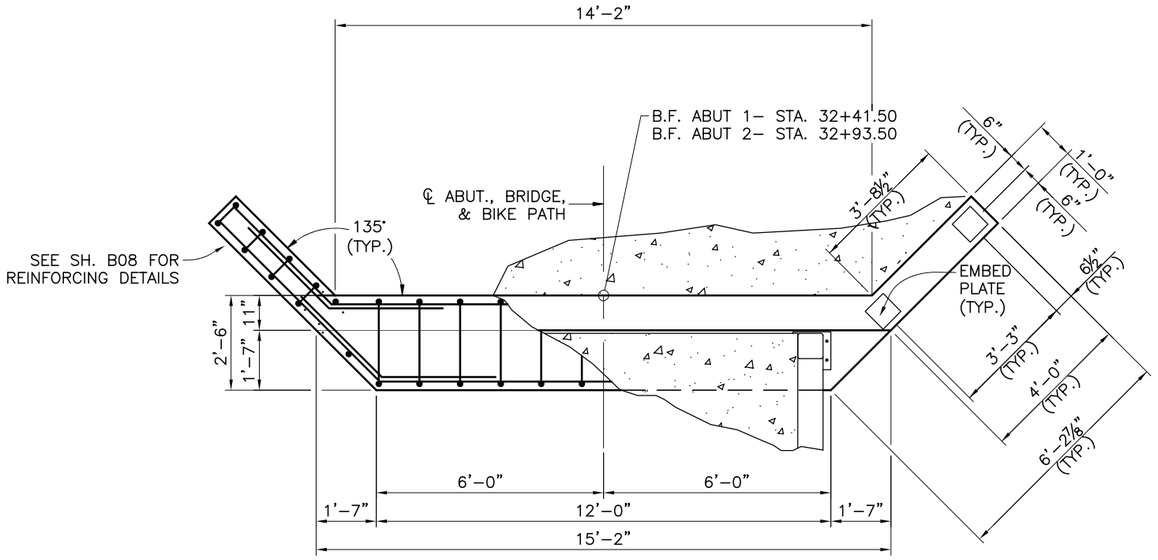
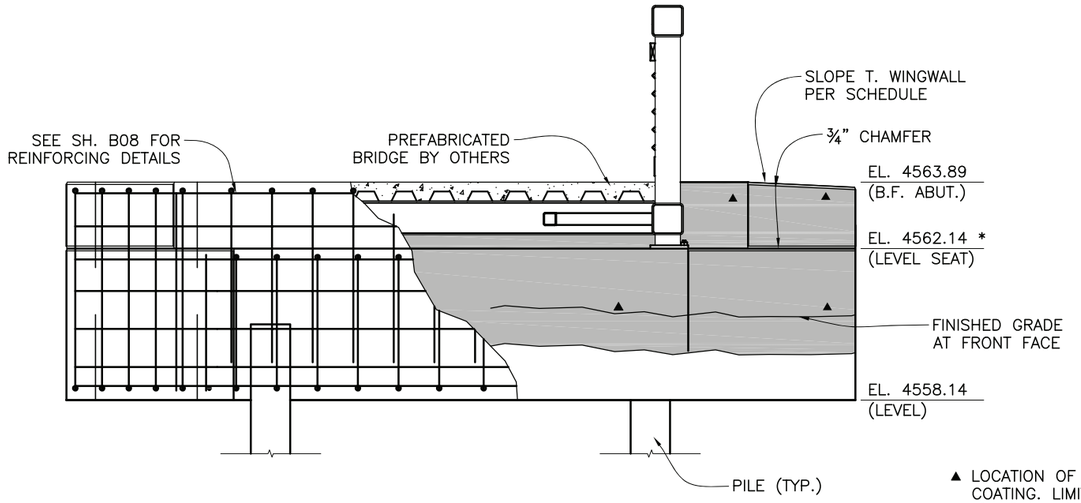
24 ROAD BIKE PATH – PED BRIDGE
FOUNDATION LAYOUT
MARCH 4, 2022

B06



ABUTMENT PLAN



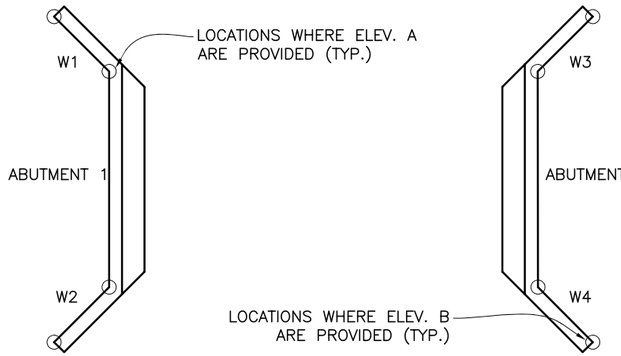
ABUTMENT ELEVATION

▲ LOCATION OF STRUCTURAL CONCRETE COATING. LIMITS SHALL EXTEND TO 1'–0" (MIN.) BELOW FINISHED GRADE.

NOTE: RAILING NOT SHOWN FOR CLARITY

ABUTMENT NOTES:

1. ALL CONCRETE SHALL BE CLASS D.
2. ALL REINFORCING STEEL SHALL BE EPOXY COATED, UNLESS OTHERWISE NOTED.
3. THE ENGINEER WILL PROVIDE ANCHOR BOLT DETAILS AFTER REVIEW OF THE PREFABRICATED BRIDGE SHOP DRAWINGS.
4. DIMENSIONS AND ELEVATIONS NOTED WITH AN * INDICATE THAT THESE ARE TO BE VERIFIED WITH THE PREFABRICATED BRIDGE SHOP DRAWINGS AND ADJUSTED ACCORDINGLY.
5. REINFORCING MAY BE ADJUSTED TO ACCOMMODATE PILES.
6. APPLY STRUCTURAL CONCRETE COATING AT EXTERIOR FACE OF ABUTMENT. LIMITS SHALL EXTEND TO 1'–0" (MIN.) BELOW FINISHED GRADE PER GRADING PLAN.
7. SEE SHEET B08 FOR ABUTMENT AND WINGWALL SECTIONS AND REINFORCING DETAILS.



WINGWALL LOCATION PLAN AND ELEVATIONS

LOCATION	ELEV. A	ELEV. B
W1	4563.89	4563.60
W2	4563.89	4563.60
W3	4563.89	4563.60
W4	4563.89	4563.60

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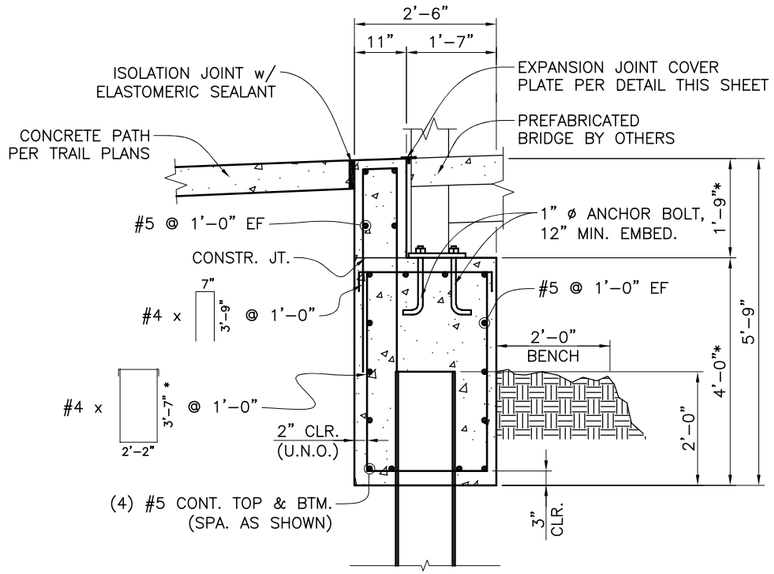
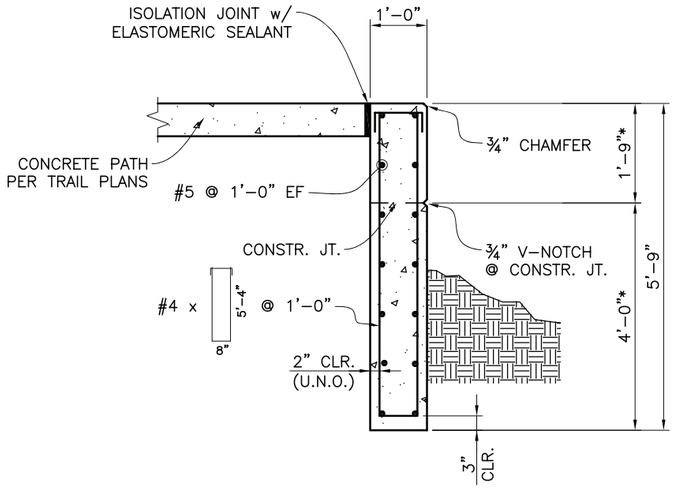
24 ROAD BIKE PATH – PED BRIDGE
ABUTMENT LAYOUT
MARCH 4, 2022

B07



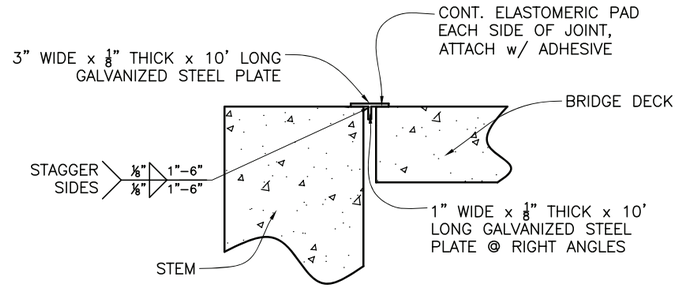
ABUTMENT SECTION



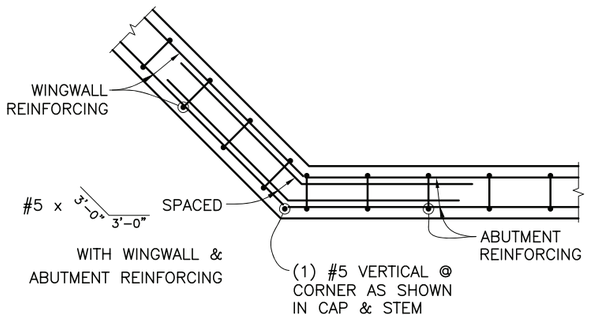
WINGWALL SECTION

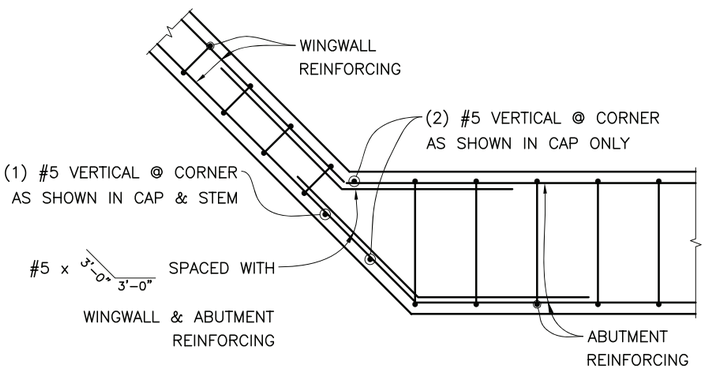
NOTES:

1. SEE SHEET B07 FOR NOTES.
2. DIMENSIONS AND ELEVATIONS NOTED WITH AN * INDICATE THAT THESE ARE TO BE VERIFIED WITH THE PREFABRICATED BRIDGE SHOP DRAWINGS AND ADJUSTED ACCORDINGLY.



EXP JOINT COVER





CORNER DETAILS

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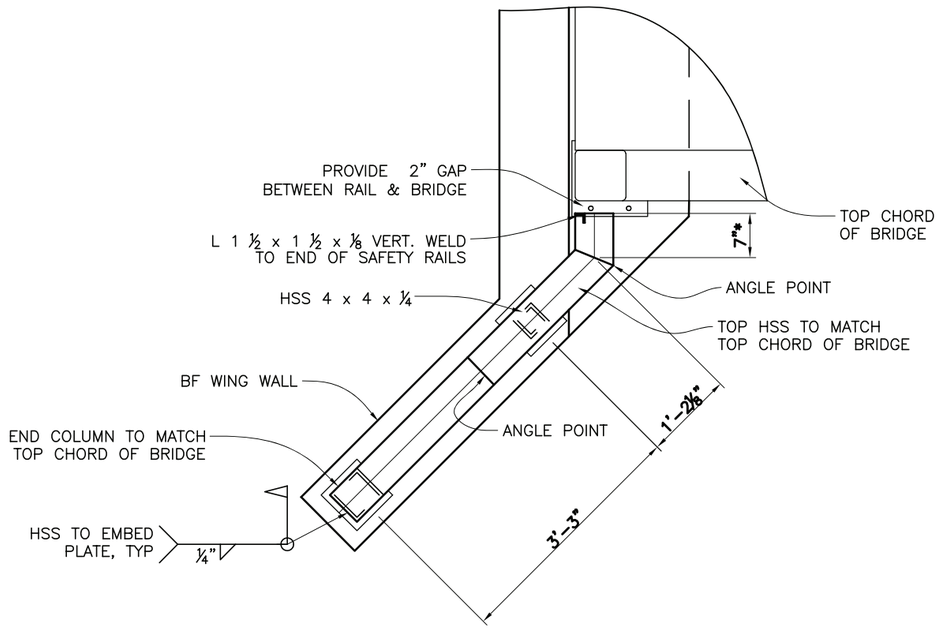
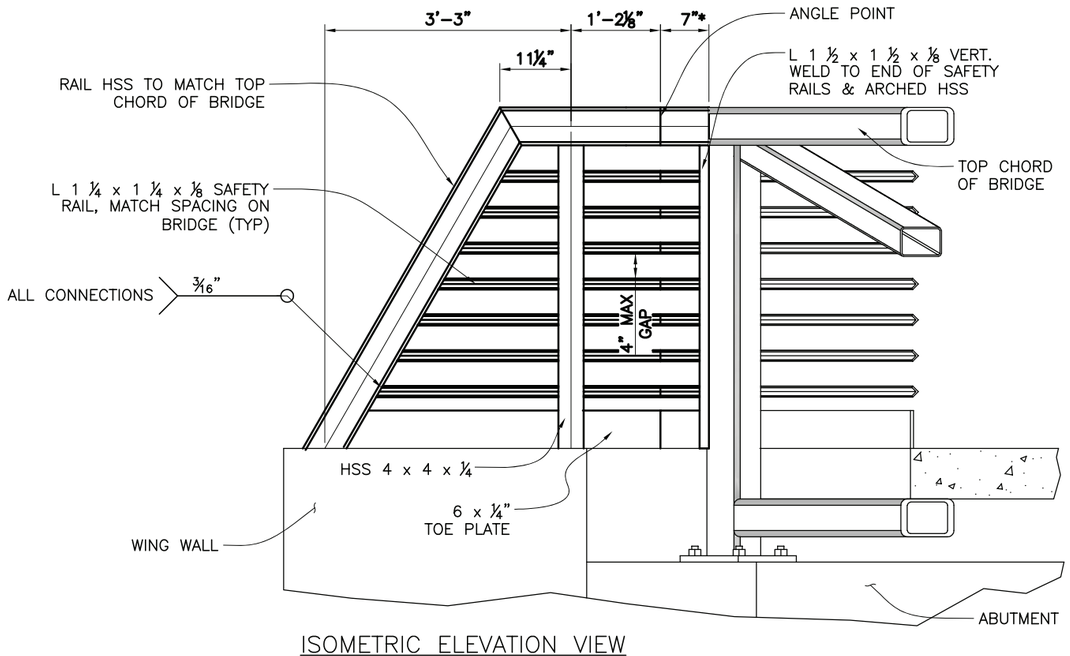
24 ROAD BIKE PATH – PED BRIDGE
ABUTMENT DETAILS
MARCH 4, 2022

B08



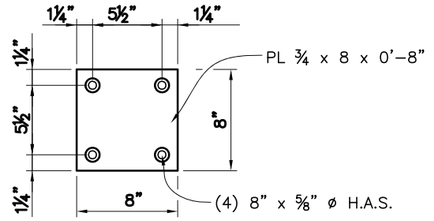
ELEVATION VIEW



ISOMETRIC ELEVATION VIEW

NOTES:

1. SEE SHEET B07 FOR NOTES.
2. DIMENSIONS AND ELEVATIONS NOTED WITH AN * INDICATE THAT THESE ARE TO BE VERIFIED WITH THE PREFABRICATED BRIDGE SHOP DRAWINGS AND ADJUSTED ACCORDINGLY.
3. ALL RAILING STEEL SHALL BE AASHTO M222 (ASTM A588) WEATHERING STEEL.
4. CONTRACTOR TO PROVIDE SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
5. OPENINGS IN RAILS SHALL BE SMALL ENOUGH THAT A 4 INCH DIAMETER SPHERE CANNOT PASS THROUGH.



EMBED PLATE DETAIL

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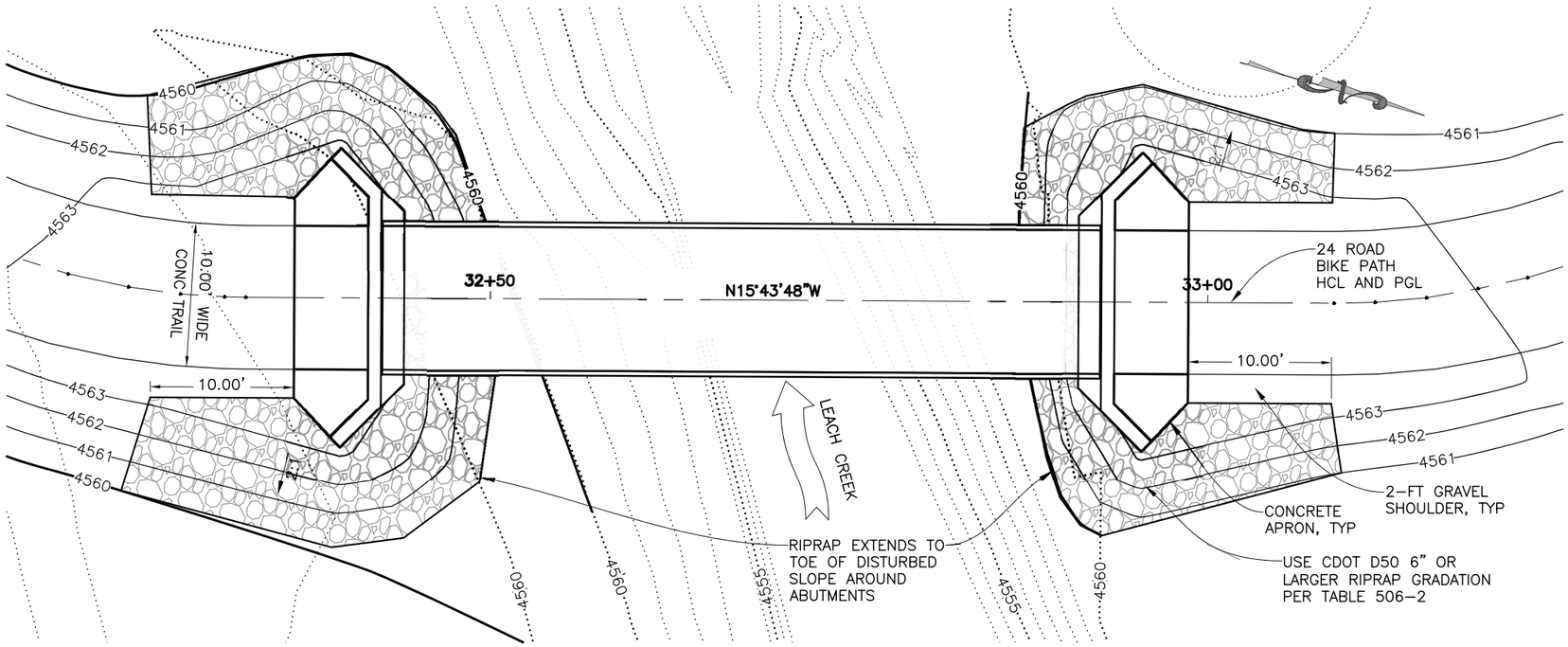
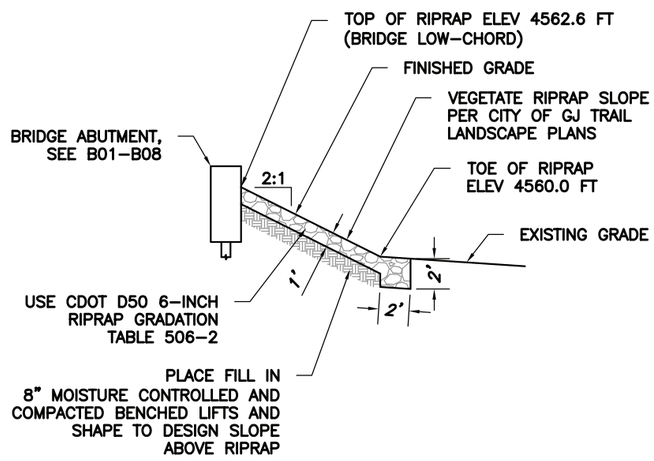
RAIL DETAILS
MARCH 4, 2022

B09



PLAN



RIPRAP ABUTMENT PROTECTION
NTS

PART 1 GENERAL

1.01 SUMMARY

A. THIS SPECIFICATION COVERS THE QUALITY OF ROCK AND GENERAL PLACEMENT METHODS TO BE USED IN THE CONSTRUCTION OF ROCK RIPRAP.

1.02 REFERENCES

A. COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION – SECTION 506. RIPRAP GRADATION AND PLACEMENT IS BASED ON THIS REFERENCE.

1.03 SUBMITTALS

A. PRODUCT DATA: PROVIDE SUPPLIER'S SIZE OF RIPRAP STONES: MEAN SPHERICAL DIAMETER, ANGULAR SHAPE, WEIGHT, LENGTH, AND WIDTH.

PART 2 PRODUCTS

2.01 MATERIALS

A. SIZES OF RIP RAP FOR THIS PROJECT SHALL MEET THE REQUIREMENT PRESENTED IN THE TABLE ON THIS SHEET.

B. QUALITY – SHALL BE SUITABLE ONSITE ROCK CRUSHED AND SCREENED WITH SPECIFIC GRAVITY OF AT LEAST 2.55. IF AN ALTERNATIVE SOURCE IS PROPOSED, THE CONTRACTOR SHALL FURNISH TEST RESULTS TO THE ENGINEER DEMONSTRATING THE FOLLOWING MATERIAL PROPERTIES ARE MET.
   1. SG ≥ 2.55
   2. LA ABRASION (ASTM C535) = 50% LOSS (MAX) OR APPROVED EQUAL TESTING METHOD

PART 3 EXECUTION

3.01 PREPARATION AND PLACEMENT

A. RIPRAP MAY BE DUMPED FROM A HEIGHT NO GREATER THAN 3' WITH HAND SORTING TO ACHIEVE A STABLE AND WELL GRADED SURFACE FINISH.

B. PLACEMENT OF THE RIPRAP SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE GEOTEXTILE FABRIC AND CLASS B FILTER MATERIAL WITH NO MORE THAN ONE WEEK BETWEEN PLACEMENT OF THE FABRIC AND FULL COVERAGE BY RIPRAP. PLACE RIPRAP SO THAT IT FORMS A DENSE MASS OF STONE WITH MINIMUM VOIDS.

C. ROCKS SHOULD BE PLACED IN UNIFORM LIFTS.

Table 506-2

Pay Item		Percent of Material Smaller Than Typical Stone[2]	Typical Stone Dimensions[3] (Inches)	Typical Stone Weight[4] (Pounds)
	Stone Size d50[1] (Inches)			
Riprap	6	70-100 50-70 35-50 2-10	12 9 6 2	85 35 10 0.4
Riprap	9	70-100 50-70 35-50 2-10	15 12 9 3	160 85 35 1.3
Riprap	12	70-100 50-70 35-50 2-10	21 18 12 4	440 275 85 3
Riprap	18	100 50-70 35-50 2-10	30 24 18 6	1280 650 275 10
Riprap	24	100 50-70 35-50 2-10	42 33 24 9	3500 1700 650 35

[1]d50 = nominal stone size
[2]based on typical rock mass
[3]equivalent spherical diameter
[4]based on a specific gravity = 2.5

RIP RAP NOTES:

1. PARTICLE SIZE D CORRESPONDS TO THE INTERMEDIATE "B" AXIS OF THE PARTICLE.
2. WEIGHT LIMITS FOR EACH CLASS ARE ESTIMATED FROM PARTICLE SIZE BY: $W=0.85(\gamma SD3)$ WHERE D CORRESPONDS TO THE INTERMEDIATE ("B") AXIS OF THE PARTICLE AND PARTICLE SPECIFIC GRAVITY IS TAKEN AS 2.65.

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24 ROAD BIKE PATH – PED BRIDGE
RIPRAP LAYOUT AND DETAILS
MARCH 4, 2022

B10

PEDESTRIAN LIGHTING GENERAL NOTES:

1. THIS PROJECT WILL BE BID FOR THE INSTALLATION OF PEDESTRIAN LIGHTING. BASE PROJECT: COMPLETE THE PEDESTRIAN LIGHTING SOUTH OF G ROAD AND EAST OF 24 ROAD AND AS SHOWN IN DRAWINGS.

2. THIS PROJECT CONSISTS OF WORK TO INSTALL ALL WIRING, CONDUIT, PULL BOXES, AND CONNECTION TO EXISTING POWER PANELS. REFERENCE SCHEDULE OF LIGHTING DEVICES AND SUMMARY OF QUANTITIES.

3. TYPES "SA" LIGHT STANDARD & LUMINARIES (PEDESTRIAN LIGHT), PAY ITEM 613-30005, SHALL INCLUDE THE FOLLOWING ITEMS FROM ILLUMINATION SYSTEMS LIGHTING LOCATED AT 5 SOUTH KALAMATH STREET, DENVER, CO 80223, 303.295.2900. THE ITEMS NUMBERS ARE AS FOLLOWS: TYPE "SA" 1A-1527LED-R-12L-40-T2-MDL018-SV1-EZ-HSS-OAPT/450P414-.125/BK.

4. PROVIDE COLLISION BREAK AWAY CONNECTORS FOR TYPE "SA" FIXTURES. FIXTURE TO BE 12 FOOT ABOVE FINISHED TRAIL GRADE TO BOTTOM OF LIGHT.

5. TYPES "SD" LIGHT STANDARD & LUMINARIES (BRIDGE RAIL LIGHT, PAY ITEM 613-30006, SHALL INCLUDE THE FOLLOWING ITEMS FROM M&H LIGHTING LOCATED AT 1044 SPEER BLVD, DENVER COLORADO, 303-573-0222. THE ITEMS NUMBERS ARE AS FOLLOWS:
   5.1. TYPE "SD" KLIK USA #LP-SQ40K-A-12.
   5.2. PROVIDE AND INSTALL 2 TOTAL - KLICK #LPNEMA4ENCLJR NEMA 3R LOCKABLE ENCLOSURES.
   5.3. PROVIDE AND INSTALL 2 TOTAL -24 VOLT POWER SUPPLIES KLICK #HLG-100H

6. CONNECT NEW LIGHTING TO EXISTING MILBANK PANEL (PP1), 240V, 1ϕ, 3W 100A , LOCATED AS SHOWN IN DRAWINGS.

7. ALL PEDESTRIAN LIGHTING FIXTURES(TYPE "SA") INSTALLED ON THE PROJECT WILL BE CONTROLLED WITH AN EXISTING PHOTOCELL LOCATED IN EXISTING MILBANK POWER PEDESTAL IN SWITCHED SECTION OF PANEL PP1.

8. PROVIDE 2" PVC SCHEDULE 80 CONDUIT BETWEEN EACH JUNCTION BOX LABELED "UB".

9. PROVIDE #10 THWN TRACER WIRE IN NEW CONDUIT TO FACILITATE LOCATION OF CONDUIT IN THE FUTURE.

10. ELEVATIONS SHOWN IN THE SCHEDULE OF LIGHTING DEVICES ON THE PLANS SHEETS REPRESENT THE DESIGN FINISHED GRADE OR THE EXISTING GROUND FINISHED GRADE. THESE ELEVATIONS DO NOT INDICATE THE TOP ELEVATION OF THE LUMINARIES (PEDESTRIAN) FOUNDATION. PEDESTRIAN LIGHTING FOUNDATIONS SHALL BE CONSTRUCTED PER THE MANUFACTURERS RECOMMENDATIONS, AND COLORADO DEPARTMENT OF TRANSPORTATION(CDOT) STANDARD S-613-1, SHEET 3 OF 8.

11. PROVIDE AND INSTALL KLICK #LPNEMA4ENCLJR NEMA 3R LOCKABLE ENCLOSURES TO 1.5" SQUARE TUBE AS SHOWN IN DWG E10. PROVIDE 2 POWER SUPPLIES 1 IN EACH ENCLOSURE FOR 24 VOLT POWER TO TYPE "SD" LIGHTING KLICK #HLG-100H. TYPE "SD" LIGHTING

12. PULL BOXES FOR LIGHT STANDARD (PEDESTRIAN AND STREET) WILL BE TYPE 1 CDOT PULL BOXES 11"X18"X12".

13. PULL BOXES WILL BE INSTALLED IN GRADES WITHOUT CONCRETE WHERE POSSIBLE AND ACCORDANCE WITH CDOT S-613-1.

14. ALL ELECTRICAL CONDUIT SHALL BE SCHEDULE 80 PVC UNLESS NOTED OTHERWISE, TYPICAL.

15. UNLESS OTHERWISE NOTED, THE WORK DESCRIBED ON THE PLANS SHALL INCLUDE PROVIDING ALL LABOR AND MATERIALS NECESSARY FOR A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM. FURNISH ALL REQUIRED ITEMS WHETHER SUCH ARE SPECIFICALLY SHOWN OR NOT.

16. INFORMATION SHOWN ON DRAWINGS IS DIAGRAMMATIC ONLY AND SHALL NOT BE SCALED. OBTAIN VERIFY EXACT LOCATIONS, MEASUREMENTS, LEVELS, SPACE REQUIREMENTS, POTENTIAL CONFLICTS AMONG TRADES AND FOR ADJUSTING THE WORK REQUIRED BY THE ACTUAL CONDITIONS OF THE PROJECT. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDER GROUND OBSTRUCTIONS AND MAKING ALLOWANCES FOR FIELD ADJUSTMENT OF LOCATION OF LUMINARIES TO AVOID SHUT DOWN OF ANY SERVICES OR SYSTEMS THAT ARE TO REMAIN.

17. BEFORE SUBMITTING THE BID ELECTRICAL CONTRACTOR SHALL VISIT AND EXAMINE THE PREMISES AND/OR JOB SITE SO AS TO ASCERTAIN THE EXISTING CONDITIONS IN WHICH THE CONTRACTOR WILL BE OBLIGED TO OPERATE IN PERFORMING HIS PART OF THE CONTRACT TO ANTICIPATE ANY POSSIBLE SPACE RESTRICTIONS OR CONSTRAINTS THAT COULD AFFECT THE TIMELY COMPLETION OF THE ELECTRICAL WORK IN ACCORDANCE WITH THE INTENT OF THE SPECIFICATIONS AND DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL REPORT TO THE THE PROJECT ENGINEER OR GENERAL CONTRACTOR ANY CONDITIONS THAT MIGHT PREVENT THE SPECIFIED ELECTRICAL WORK FROM BEING PERFORMED IN THE MANNER INTENDED. NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED TO THE ELECTRICAL CONTRACTOR FOR FAILURE TO VISIT THE PROJECT SITE, OR FOR ANY ALLEGED MISUNDERSTANDING OF THE MATERIALS TO BE FURNISHED OR WORK TO BE DONE.

18. THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE DRAWINGS OF ALL TRADES WHOSE WORK RELATES TO OR IS DEPENDENT ON ELECTRICAL WORK TO BECOME FULLY INFORMED OF THE EXTENT AND CHARACTER OF THEIR SPECIFIED WORK AND BE ABLE TO COORDINATE WITH OTHER TRADES WHILE AVOIDING POSSIBLE INTERFERENCE WITH THE ELECTRICAL WORK.

19. THE CONTRACTOR SHALL USE CONDUIT PLUGS AND SEALING PLUGS FOR SEALING ALL EMPTY CONDUITS AND CONDUITS OCCUPIED WITH CABLING, RESPECTIVELY, INSTALLED UNDER THIS CONTRACT. CONDUIT PLUGS SHALL BE MANUFACTURED FROM HIGH-IMPACT PLASTIC COMPONENTS, COMBINED WITH DURABLE ELASTIC GASKETS. THEY SHALL BE CORROSION PROOF AND APPROPRIATE FOR USE AS EITHER A LONG-TERM OR TEMPORARY SEAL. CONDUIT PLUGS SHALL BE REMOVABLE AND REUSABLE. THEY SHALL BE BOTH WATERTIGHT AND AIRTIGHT TO PREVENT THE FLOW OF WATER AND BUILDUP OF SEDIMENTATION WITHIN THE CONDUIT. EACH CONDUIT PLUG SHALL BE EQUIPPED WITH A ROPE TIE DEVICE TO ALLOW THE SECURING OF PULL ROPE TO THE PLUG'S BACK COMPRESSION PLATE. THE CONTRACTOR SHALL ATTACH THE PULL ROPE TO THE BACK COMPRESSION PLATE OF THE PLUG AND STORE EXCESS SLACK PULL ROPE BEHIND THE PLUG WITHIN THE CONDUIT FOR FUTURE USE.

PP1-X ELECTRICAL CIRCUIT NUMBER (REFER TO PANEL SCHEDULES)

UB □ NEW HEAVY DUTY, TRAFFIC RATED, FLUSH-TO-GRADE POLYMER CONCRETE SPLICE BOX WITH HEAVY DUTY, TRAFFIC RATED, BOLTED COVER. 11"X18"X12" TYPE 1. NUMBER ASSOCIATED IS NOT THE QUANTITY BUT THE IDENTIFIER ONLY.

UBE □ EXISTING HEAVY DUTY, TRAFFIC RATED, FLUSH-TO-GRADE POLYMER CONCRETE SPLICE BOX WITH HEAVY DUTY, TRAFFIC RATED, BOLTED COVER. 11"X18"X12" TYPE 1. NUMBER ASSOCIATED IS NOT THE QUANTITY BUT THE IDENTIFIER ONLY.

UNDER GROUND BURIED RACEWAY (2#6 THWN CU AND 1#8 GND) IN 2" PVC CONDUIT (UNLESS NOTED OTHERWISE ON PLANS) IN 24" DEEP TRENCH, BURY AND COMPACTED BACKFILL TO CITY STANDARDS.

INSTALL SINGLE ARM PEDESTRIAN STANDARD OR STREET STANDARD AS SPECIFIED. NUMBER ASSOCIATED IS NOT THE QUANTITY BUT THE IDENTIFIER ONLY.

COLORADO REGISTERED JOEL MARTINEZ 37580 3-7-22 PROFESSIONAL ENGINEER

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ACM CONSULTING
ELECTRICAL DESIGN, CONSULTING ENGINEERS; PH: 970-245-7292
PO 3211 GRAND JCT., CO 81502
EMAIL: joelm@ACMengrs.com

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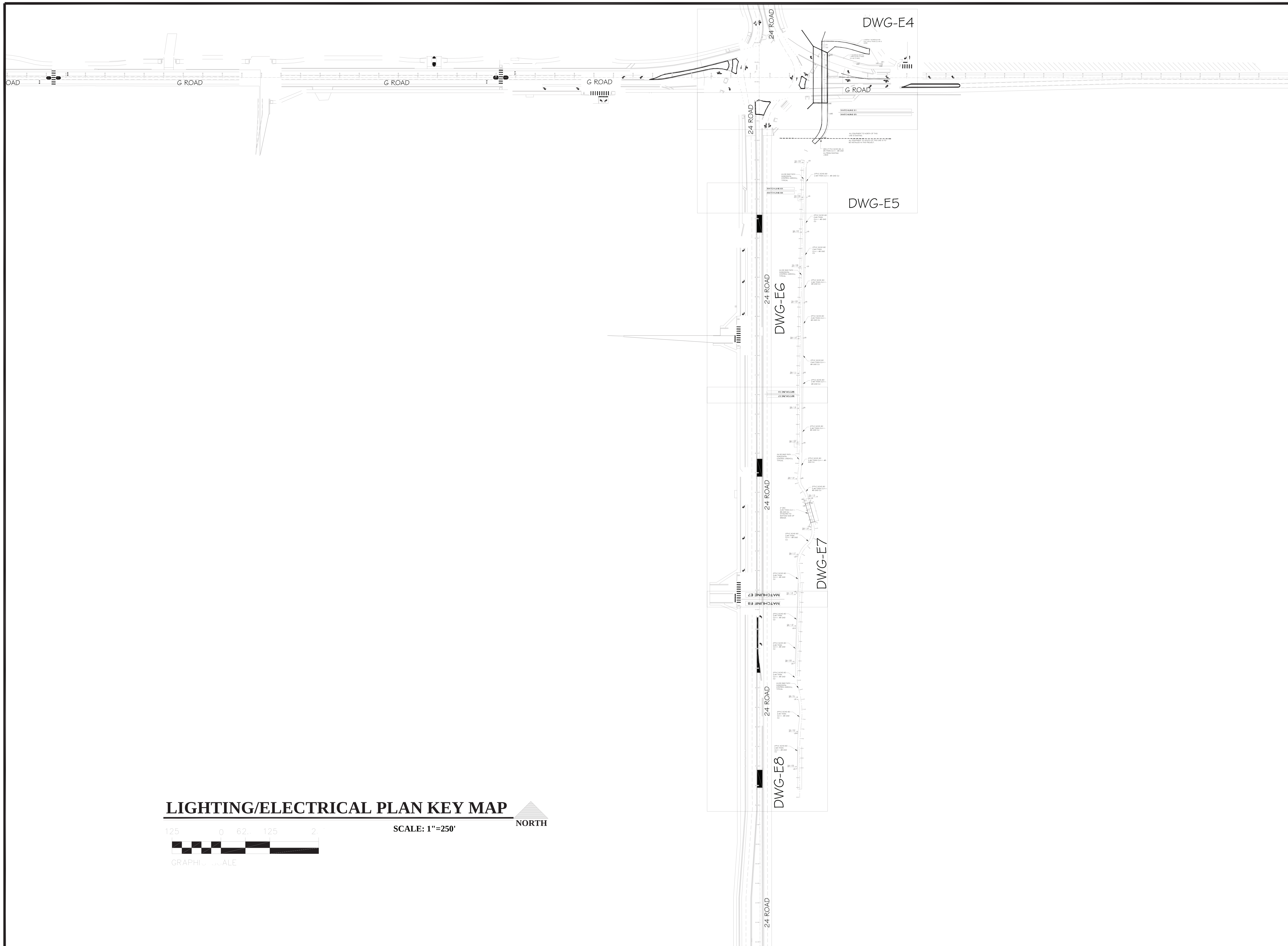
24 ROAD BIKE PATH
LIGHTING COVER SHEET PLAN

E1
of 12



LIGHTING/ELECTRICAL PLAN KEY MAP

NORTH

SCALE: 1"=250'

GRAPHIC SCALE

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24 ROAD BIKE PATH
SITE LIGHTING PLAN

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Schedule of Lighting Devices

ITEM No.				613-30005	613-40012	613-30006	
DESCRIPTION				LIGHT STANDARD LUMINAIRE LED (PEDESTRIAN TYPE "SA")	LIGHT STANDARD FOUNDATION SPECIAL	LUMINAIRE LED ("SD")	NOTES
				EACH	EACH	EACH	
SHEET NO.	ID NO.	STATION	OFFSET	PLAN	PLAN	PLAN	
E5	SA-105	41+71.8621	R=8	1	1		1,2
E5	SA-106	40+81.0514	R=8	1	1		1,2
E6	SA-107	39+91.0938	R=8	1	1		1,2
E6	SA-108	39+1.0391	R=8	1	1		1,2
E6	SA-109	38+11.0514	R=8	1	1		1,2
E6	SA-110	37+21.0514	R=8	1	1		1,2
E6	SA-111	36+30.966	R=8	1	1		1,2
E7	SA-112	35+40.966	R=8	1	1		1,2
E7	SA-113	34+50.966	R=8	1	1		1,2
E7	SA-114	33+60.3739	R=8	1	1		1,2
E7	SA-115	33+2.4304	R=8	1	1		1,2
E7	SA-116	32+31.415	L=8	1	1		1,2
E7	SA-117	31+40.7539	L=8	1	1		1,2
E7	SA-118	30+48.5765	L=8	1	1		1,2
E8	SA-119	29+58.5765	L=8	1	1		1,2
E8	SA-120	28+68.5765	L=8	1	1		1,2
E8	SA-121	27+76.7512	L=8	1	1		1,2
E8	SA-122	26+87.8964	L=8	1	1		1,2
E8	SA-123	25+97.4481	L=8	1	1		1,2
E9						18	3
TABLE TOTALS				19	19	18	

SCHEDULE OF LIGHTING DEVICES NOTES:

1. FOUNDATION TOP HEIGHT EQUAL TO ADJACENT SIDEWALK, REFERENCE FOUNDATION DETAIL.
2. LUMINIARE LED(66 WATT) IS TO BE INCLUDED IN THE COST OF PAY ITEM 613-30005 LIGHT STANDARD AND LUMINIARE (PEDESTRIAN)
3. EIGHTEEN TOTAL LIGHTS, WIRE, CONDUIT, CONNECTIONS, DRIVERS ARE INCLUDED IN COST OF PAY ITEM, REFERENCE BRIDGE LIGHT DETAIL.

Tabulation of Approximate Quantities

Item No.	Ref. No.	Construction Note Description	Quantity	Unit	NOTES
	613-01200	2 Inch Electrical Conduit (Plastic)	1868	LF	
	613-07001	Type One Pull Box	22	EA	
	613-10000	Wiring	1	LS	
	613-30005	Light Standard and Luminaire (Pedestrian TYPE "SA")	19	EA	
	613-40012	Light Standard Foundation (Special)	19	EA	
	613-30006	Light Standard Luminaire (Pedestrian BRIDGE TYPE "SD")	18	EA	
SUMMARY NOTES:					

PEDESTRIAN LIGHTING GENERAL NOTES:

1. EACH NEW LIGHT TYPE "SA" TO HAVE A NEW PULL BOX "UB", REFERENCE ELECTRICAL SHEETS.

COLORADO REGISTERED JOEL M. MARSH 37580 3-7-22 PROFESSIONAL ENGINEER

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ENGINEERING DIVISION

24 ROAD BIKE PATH
LIGHTING SCHEDULES

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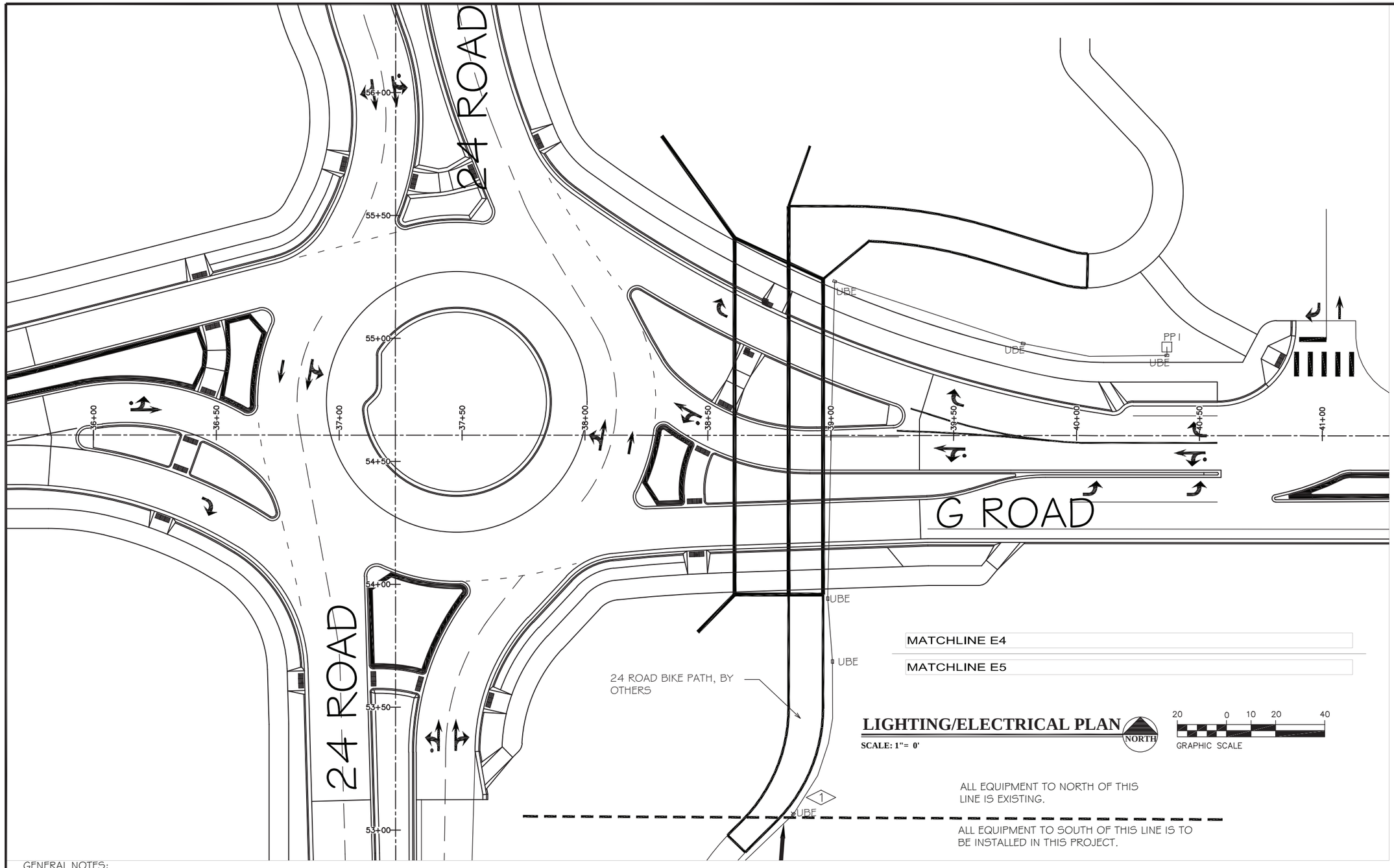

LIGHTING/ELECTRICAL PLAN

SCALE: 1"= 0'

NORTH

20 0 10 20 40

GRAPHIC SCALE

GENERAL NOTES:

1. POWER CIRCUIT AS SHOWN ON DRAWING, TYPICAL.
2. LIGHT TO BE ORIENTED PERPENDICULAR TO TRAIL AND SHINE ON TRAIL, TYPICAL.
3. PROVIDE 2-#4 THWN + #8GND IN 2" PVC SCHEDULE 80 CONDUIT BETWEEN PULL BOXES UNLESS SHOWN OTHERWISE, TYPICAL. WIRE LIGHTS IN PARALLEL NOT SERIES TO REDUCE VOLTAGE DROP.

FLAG NOTES:

<1> UTILITY BOX AND WIRING IS EXISTING, CONNECT AND CONTINUE NEW (2- #4THWN CU + 1- #8GND CU) AND 2" SCHEDULE 80 PVC FROM EXISTING UTILITY BOX AND CONTINUE FEED TO SOUTH PATHWAY LIGHTING.

COLORADO REGISTERED JOEL MARKEWICH 37580 3-7-22 PROFESSIONAL ENGINEER

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ENGINEERING DIVISION

24 ROAD BIKE PATH
SITE LIGHTING PLAN

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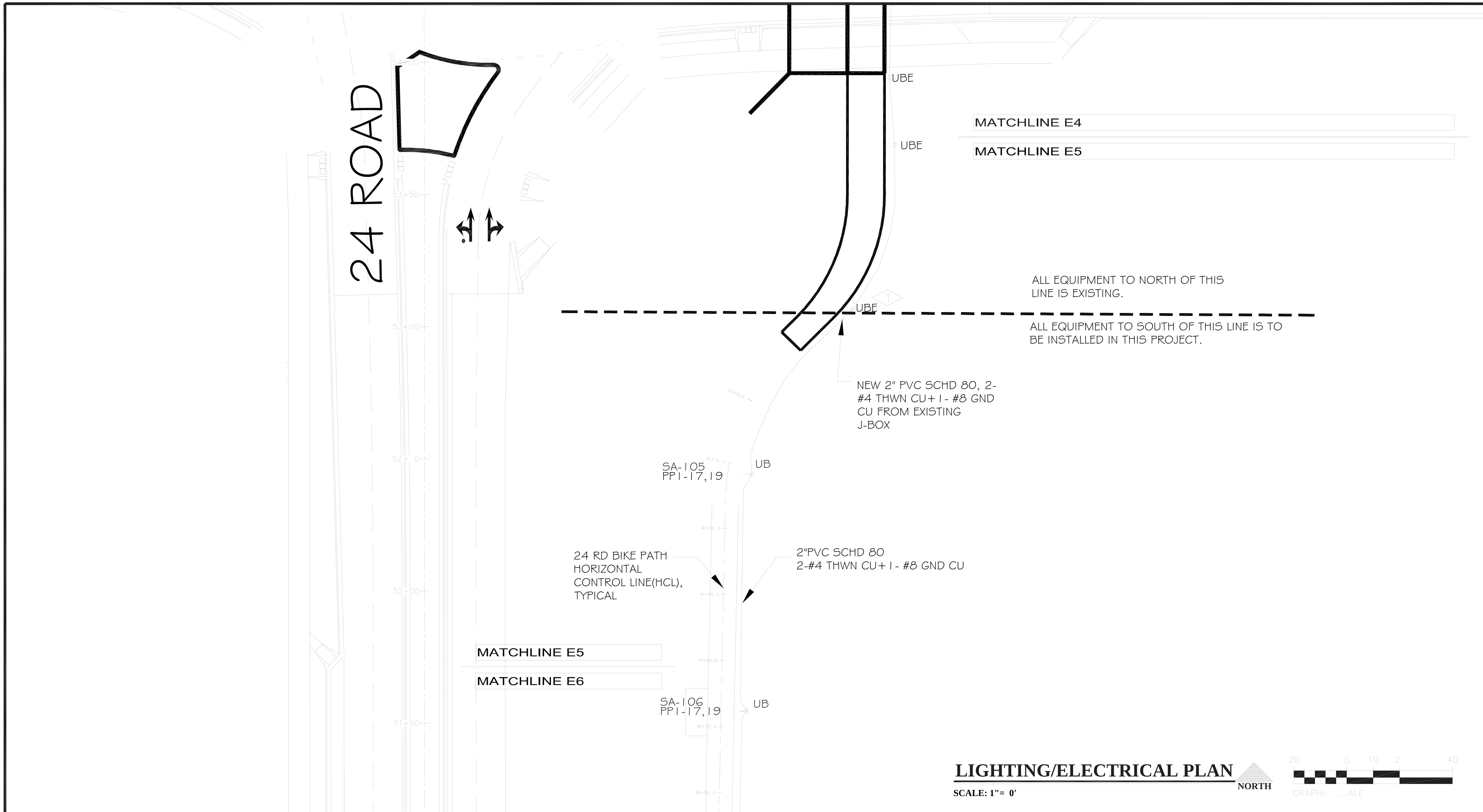

FLAG NOTES:

1 PROVIDE (2- #4THWN CU + 1- #8GND CU) AND 2" SCHEDULE 80 PCV FROM EXISTING UTILITY BOX TO NEW PATHWAY LIGHTING.

GENERAL NOTES:

1. POWER CIRCUIT AS SHOWN ON DRAWING, TYPICAL.
2. LIGHT TO BE ORIENTED PERPENDICULAR TO TRAIL AND SHINE ON TRAIL, TYPICAL.
3. PROVIDE 2-#4 THWN + #8GND IN 2" PVC SCHEDULE 80 CONDUIT BETWEEN PULL BOXES UNLESS SHOWN OTHERWISE, TYPICAL. WIRE LIGHTS IN PARALLEL NOT SERIES TO REDUCE VOLTAGE DROP.

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24 ROAD BIKE PATH
SITE LIGHTING PLAN

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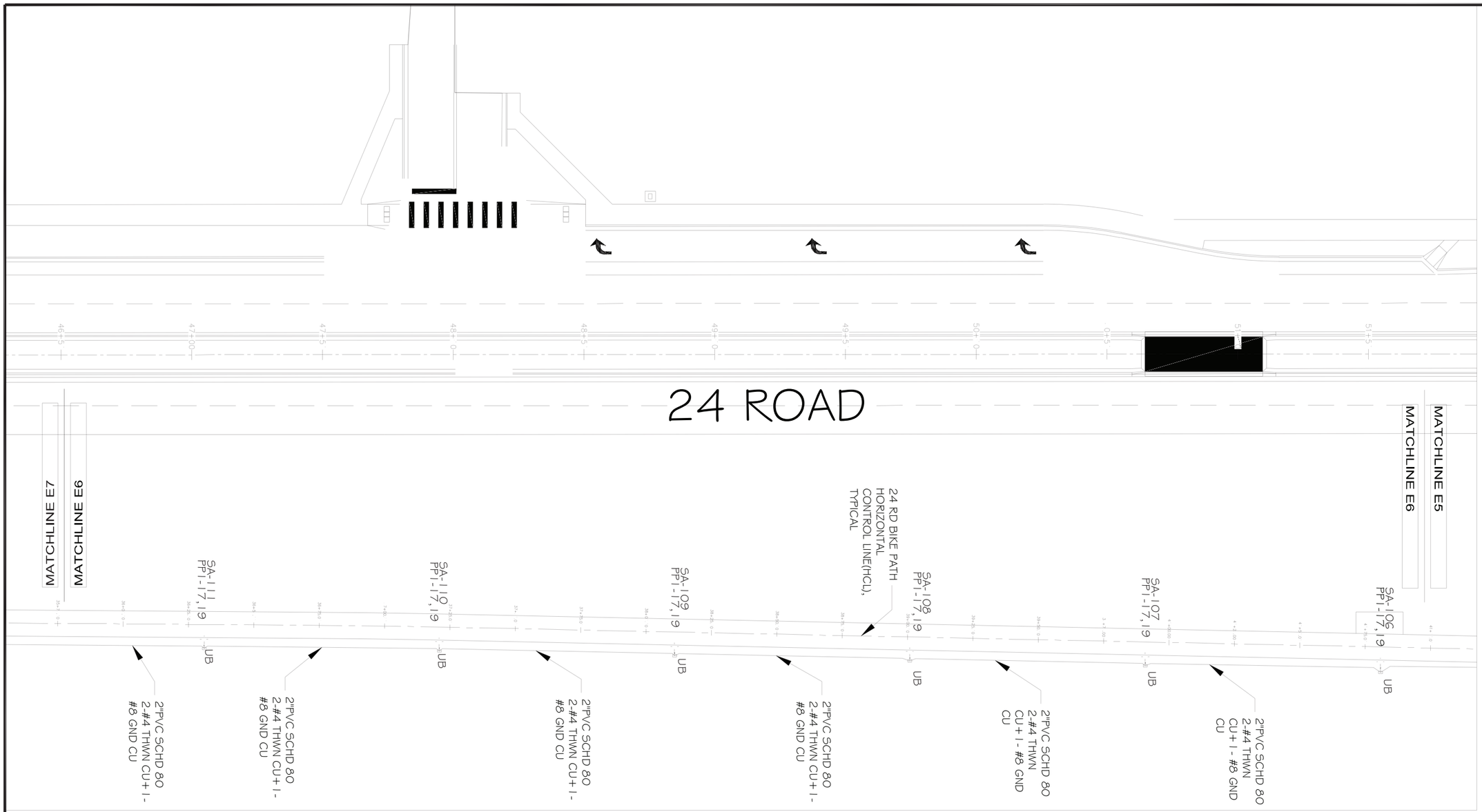

LIGHTING/ELECTRICAL PLAN

SCALE: 1"= 0'

NORTH

GRAPHIC SCALE

GENERAL NOTES:

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COLORADO REGISTERED JOEL M. MARTINEZ 37580 3-7-22 PROFESSIONAL ENGINEER

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24 ROAD BIKE PATH
SITE LIGHTING PLAN

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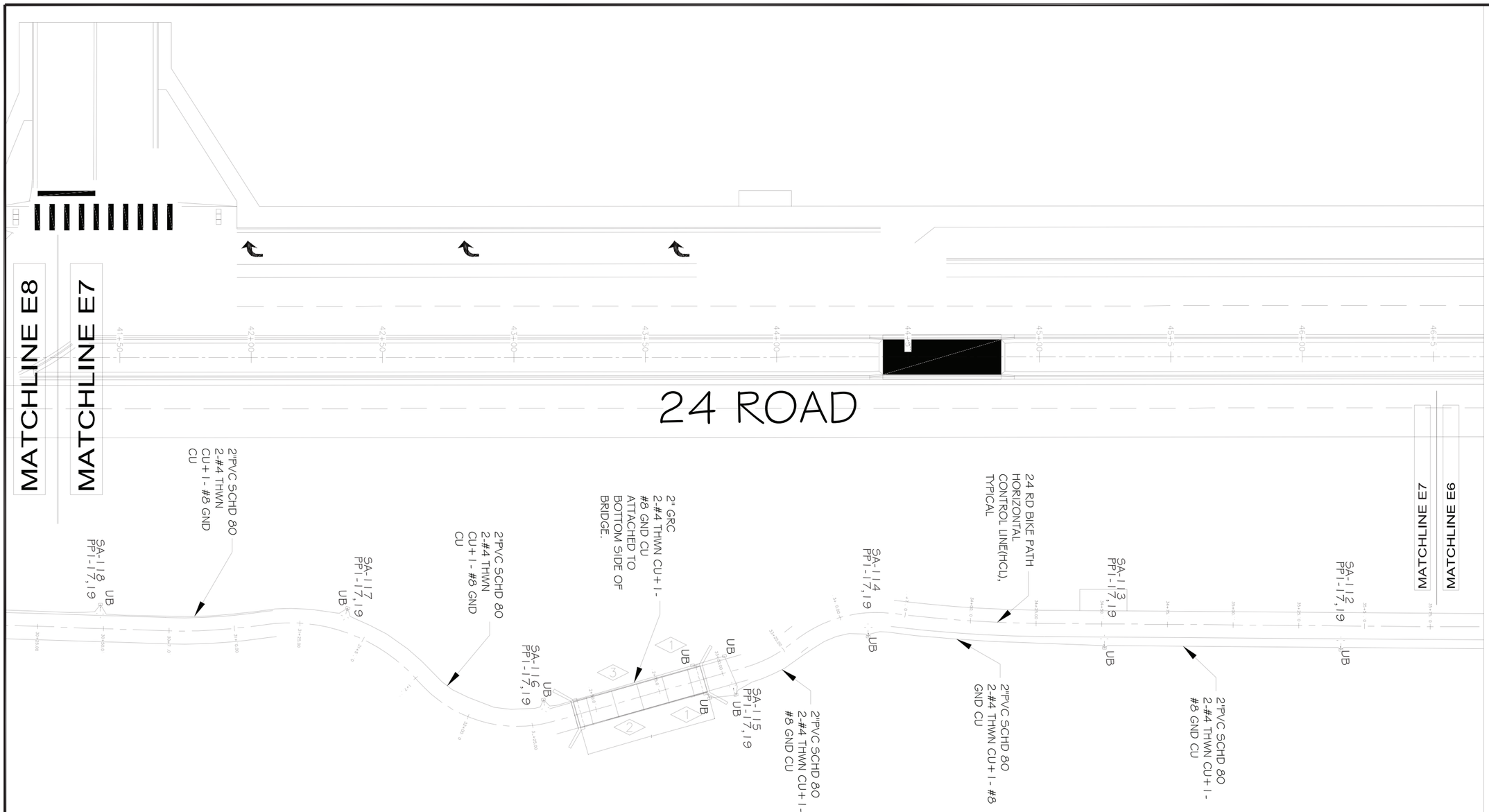

LIGHTING/ELECTRICAL PLAN

SCALE: 1"= 0'

NORTH

2 0 10 2 40

GRAPHIC SCALE

GENERAL NOTES:

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FLAG NOTES:

1. PROVIDE 2-#10 THWN CU + #12 GND FROM UTILITY BOX TO NEMA 3R J-BOX MOUNTED ON BRIDGE, REFERENCE DRAWING E9. PROVIDE 3/4" PVC SCHEDULE 80 TO FROM UTILITY BOX TO NEW J-BOX.
2. REFERENCE DRAWING E9 DETAILS FOR TYPE "SD" BRIDGE LIGHTING.
3. PROVIDE 2" GALVANIZED RIGID METAL CONDUIT ATTACHED TO BOTTOM OF BRIDGE FOR BRIDGE SPAN THAT IS ABOVE GROUND, TRANSITION TO 2" PVC SCHEDULE 80 UNDERGROUND.

COLORADO REGISTERED 37580 PROFESSIONAL ENGINEER 3-7-22

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ENGINEERING DIVISION

24 ROAD BIKE PATH
SITE LIGHTING PLAN

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of 12

LIGHTING/ELECTRICAL PLAN

SCALE: 1"= 0'

NORTH

GRAPHIC SCALE

GENERAL NOTES:

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24 ROAD BIKE PATH
SITE LIGHTING PLAN

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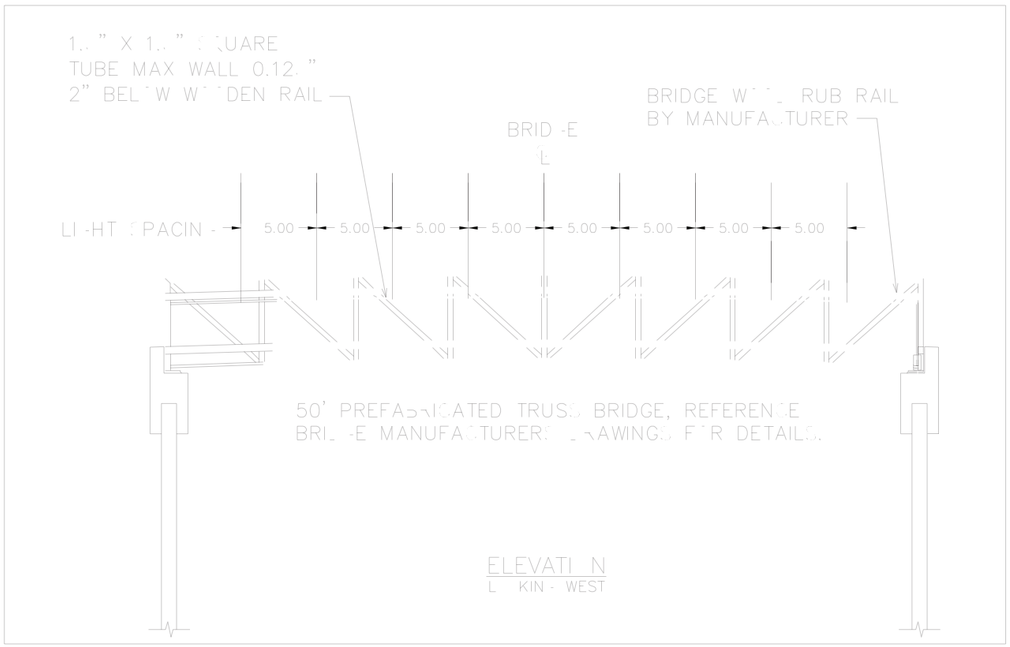

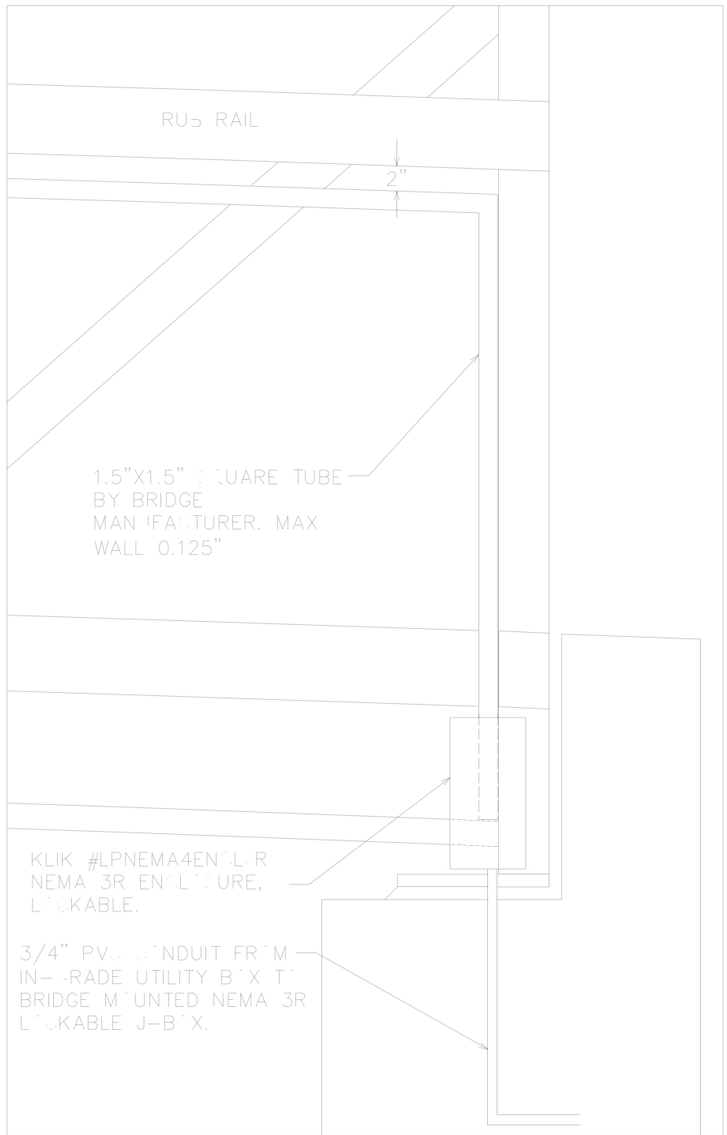

NORTH END OF BRIDGE DETAIL
LOOKING AT EXTERIOR OF BRIDGE)

NOTES:

1. BRIDGE FABRICATOR TO PROVIDE AND INSTALL ON EAST AND WEST SIDES OF BRIDGE 1.5"X 1.5" SQUARE STEEL TUBE WITH A MAXIMUM WALL THICKNESS OF 0.125". TUBE WILL BE 2" BELOW RUB RAIL AND WILL HOUSE TYPE "D" LIGHT.
2. MANUFACTURER TO DRILL 25mm DIAMETER HOLES IN BOTTOM OF 1.5" SQUARE STEEL TUBE AT 5 FOOT INTERVALS FOR A TOTAL OF 9 LIGHTS PER SIDE.
3. ROUTE TUBE DOWN TO ALLOW DRILLING AND CONNECTION WITH 3/4" GRC CONDUIT FROM BOTTOM SIDE OF BRIDGE.
4. WEST AND EAST SIDE OF BRIDGE TO MIRROR EACH OTHER.
5. BRIDGE MANUFACTURER TO PROVIDE SHOP DRAWINGS TO CITY FOR REVIEW PRIOR TO FABRICATION.
6. TUBE TO MATCH BRIDGE MATERIAL SPECIFICATIONS, REPAIR ANY DAMAGE.
7. ELECTRICIAN TO MOUNT KLIK #LPNEMA4ENCLR NEMA 3R ENCLOSURE TO 1.5" SQUARE TUBE. TWO ENCLOSURES REQUIRED ONE ON NORTH EAST AND ONE ON NORTH WEST SIDES OF BRIDGE.
8. ELECTRICIAN TO PROVIDE 2" GRC ATTACHED TO BOTTOM OF BRIDGE FOR CONDUIT RUN ABOVE GROUND FOR FEEDS TO PATHWAY LIGHTING. TRANSITION ON SOUTH AND NORTH END OF BRIDGE TO 2" SCHEDULE 80 PVC UNDER GROUND. FIELD VERIFY EXACT LOCATION OF ATTACHMENT TO BRIDGE WITH OWNER PRIOR TO ATTACHMENT TO BRIDGE.

COLORADO REGISTERED JESSE D. MARTINEZ 37580 3-7-22 PROFESSIONAL ENGINEER

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24 ROAD BIKE PATH
BRIDGE LIGHTING DETAILS

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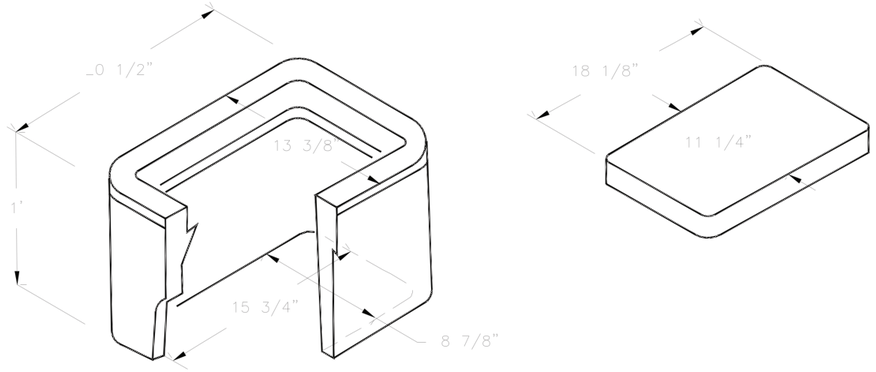


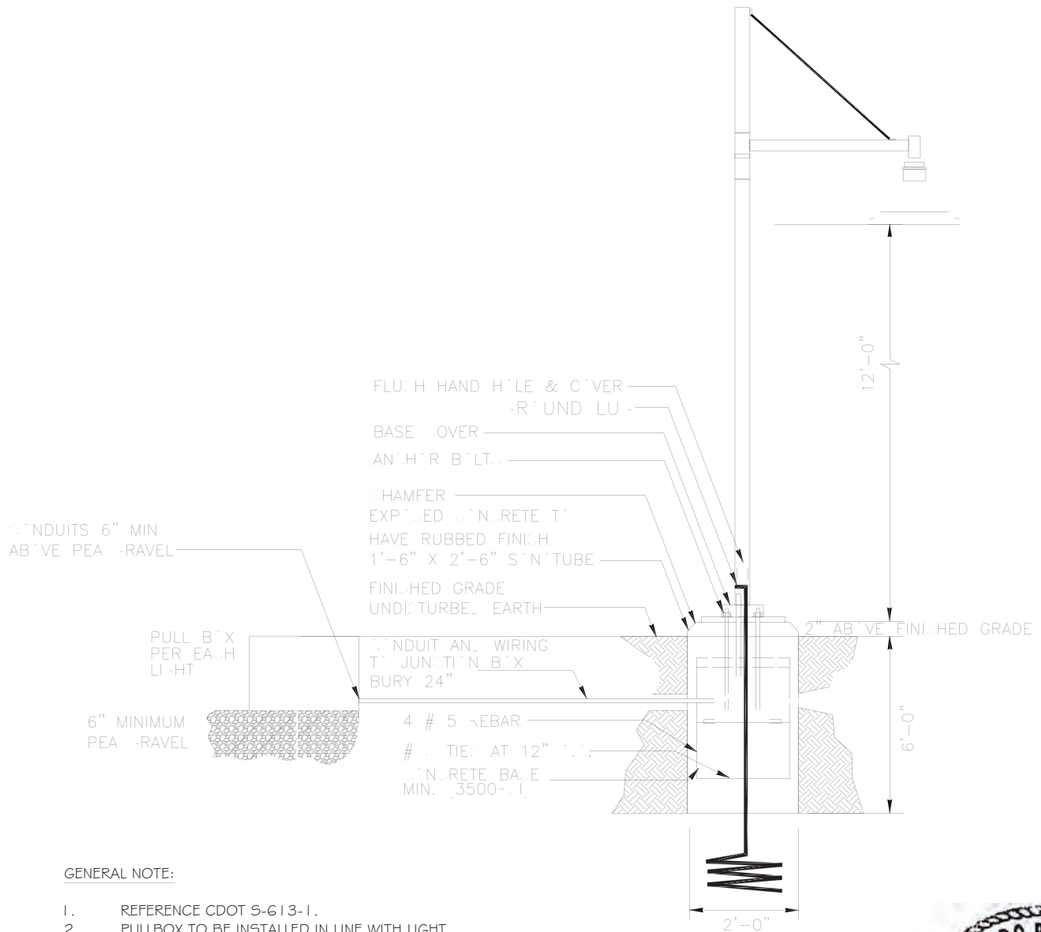
STREET LIGHT AND PEDESTRIAN LIGHT PULL BOX

DIMENSIONS SHOWN HERE FOR LAYOUT AND PLANNING PURPOSES. CONTRACTOR SHALL RELY ON MANUFACTURER DETAILS

1. PULL BOXES, PULL BOX COVERS AND EXTENSIONS SHALL BE MADE OF FIBERGLASS REINFORCED POLYMER CONCRETE. PULL BOXES SHALL BE VERIFIED BY A 3RD PARTY NATIONALLY RECOGNIZED INDEPENDENT TESTING LABORATORY AS MEETING ALL TEST PROVISIONS OF THE LATEST ANSI/SCTE 77 SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY, TIER 22 RATING. CERTIFICATION DOCUMENTS SHALL BE SUBMITTED WITH MATERIALS SUBMITTALS. THE PULL BOX SHALL HAVE A DETACHABLE COVER WITH A SKID RESISTANT SURFACE AND HAVE THE WORDS ELECTRICAL CAST INTO THE SURFACE. PAINTING THE WORDS SHALL NOT BE ACCEPTED. MARKINGS SHOWING THE TIER 22 RATING MUST BE LABELED OR STENCILED ON THE INSIDE AND OUTSIDE OF THE BOX AND ON THE UNDER SIDE OF THE COVER. THE COVER SHALL BE ATTACHED TO THE PULL BOX BODY BY MEANS OF A MINIMUM 3/8 - 7 UNIFIED NATIONAL COURSE (UNC) STAINLESS STEEL PENTA HEAD BOLTS AND SHALL HAVE TWO LIFT SLOTS TO AID IN THE REMOVAL OF THE LID.
2. PULL SLOTS SHALL BE RATED FOR A MINIMUM PULL OUT OF 3,000 POUNDS. MAGNESIUM CHLORIDE TESTS SHOULD BE PERFORMED IN ACCORDANCE WITH THE LATEST ANSI/SCTE 77 SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY, TIER 22 RATING.
3. PROVIDE AT LEAST 6 INCHES OF PEA GRAVEL MEASURED FROM BOTTOM OF PULL BOX FOR DRAINAGE. PEA GRAVEL IS INCLUDED IN PULL BOX PAY ITEM.

UTILITY BOX DETAIL

1 NOT TO SCALE

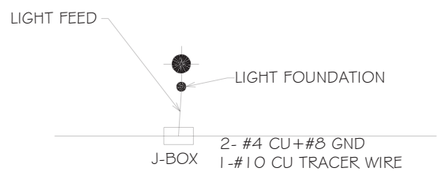


GENERAL NOTE:

1. REFERENCE CDOT S-613-1.
2. PULLBOX TO BE INSTALLED IN LINE WITH LIGHT. REFERENCE UTILTY BOX DETAIL C2.

TYPICAL TYPE SA LIGHT DETAIL

3 NOT TO SCALE



UTILITY BOX CONNECTION DETAIL

2 NOT TO SCALE

NOTES:

1. ALL WIRING TO LIGHTS WILL BE WIRED IN PARALLEL NOT IN SERIES WITH #4 WIRE FEED TO REDUCE VOLTAGE DROP.
2. PROVIDE #10 TRACER WIRE IN ALL NEW CONDUIT.

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER / MODEL NUMBER	APPROVAL	VOLTAGE / MOUNTING / # OF LAMPS	BALLAST / LAMPE TYPE / LAMP CAT. #	DESCRIPTION
SA	STERNBERG LIGHTING 1A-1527LED-R-12L-40-T2-MDL018-SV1-EZ-HSS-OAPT/450P414-.125/BK	OWNER REQUESTED	240 POLE 1	ELECTRONIC LED 66 W	PEDESTRIAN LUMINAIRE, ARM MOUNTED, LED, CUTOFF, ORDER POLE SO THAT LAMP HEIGHT IS 12' AFG MEASURED AT BOTTOM OF LUMINAIRE. ORDER WITH BRD ARM COLOR OF POLE AND ARM TO MATCH POLE.
SD	KLIK LIGHTING LP-SQ40K-A-12	OWNER REQUESTED	24 V RECESSED BRIDGE RAIL 1	ELECTRONIC LED 2 W	LIGHT TO BE INSTALLED PER MANUFACTURER INSTALLATION INSTRUCITONS IN BRIDGE RAIL. 18 TOTAL LIGHTS 9 EACH ON BOTH RAILS. PROVIDE 24 VOLT POWER SUPPLIES IN NEMA 3R ENCLOSURES.

COLORADO REGISTERED PROFESSIONAL ENGINEER 37580 3-7-22

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ELECTRICAL DESIGN, CONSULTING ENGINEERS; PH: 970-245-7292
PO 3211 GRAND JCT., CO 81502
EMAIL: joelm@ACMengrs.com

DESCRIPTION	DATE
REVISION	
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REVISION	

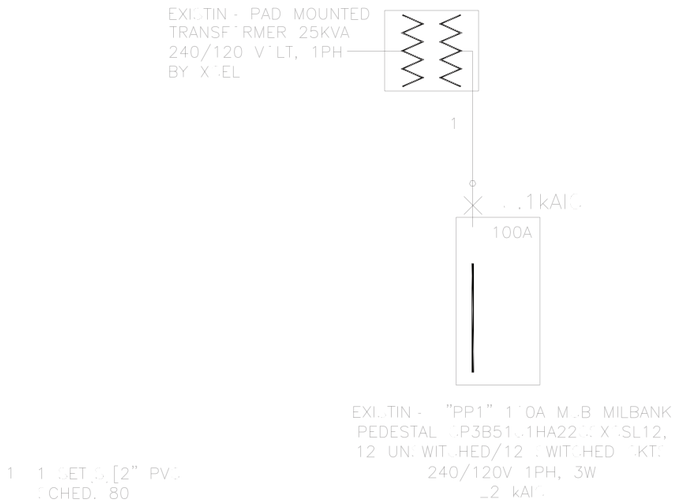
DRAWN BY AJM DATE 3/7/22
DESIGNED BY AJM DATE 3/7/2022
CHECKED BY AJM DATE 3/7/22
APPROVED BY KA DATE 3/7/2022

CITY OF Grand Junction COLORADO

PUBLIC WORKS ENGINEERING DIVISION

24 ROAD BIKE PATH LIGHTING DETAILS

E10 of 12



1 1 '.ET .. [2" PV'.
'.CHED. 80
.3#3'..U,THWN, +1#8, ..U, GND]

2 1 '.ET .. [1" PV'.
'.CHED. 80
.2-#10 '.U,THWN, +1#12, '.U, GND]

3 1 '.ET .. [0.75" PV'.
'.CHED. 80
.2-#12 '.U,THWN, +1#12, '.U, GND]

A 1 EXISTING ONE-LINE DIAGRAM

NOT TO SCALE

GENERAL NOTES:

1. IN AS MUCH AS DESIGN REQUIRES THAT CERTAIN ASSUMPTIONS BE MADE REGARDING EXISTING CONDITIONS, AND BECAUSE SOME OF THESE ASSUMPTIONS CANNOT BE VERIFIED. FIELD COORDINATION DURING CONSTRUCTION SERVICES IS IMPERATIVE. CONTRACTORS BIDDING THIS WORK MUST MAKE REASONABLE ALLOWANCES FOR UNFORESEEN CONTINGENCIES.
2. THE SERVING ELECTRICAL ASSOCIATION SHALL ADVISE THE OWNER/ENGINEER PRIOR TO SERVICE MODIFICATION REQUIRING COST TO THE OWNER.
3. REFERENCE CIVIL, LANDSCAPE AND IRRIGATION DRAWING PLANS FOR COORDINATION AND LOCATION OF ALL UNDER GROUND SYSTEMS.
4. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES AS REQUIRED: REFERENCE CIVIL LANDSCAPE AND IRRIGATION DRAWINGS.
5. ALL WIRING IS SHOWN DIAGRAMMATICALLY ON DRAWINGS, FIELD VERIFY ALL CONDITIONS PRIOR TO ROUGH-IN.
6. ALL ELECTRICAL WORK SHALL COMPLY WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE AND ALL APPLICABLE LOCAL CODES.
7. ALL WIRE TO LIGHTING TO BE #4 UNLESS NOTED OTHERWISE.
8. CONDUCTOR COUNT IS SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL ENSURE THAT ANY AND ALL DEVICES AND EQUIPMENT ARE CIRCUITED PROPERLY. CONTRACTOR SHALL ENSURE THAT NO EQUIPMENT OR DEVICES ARE COMBINED OTHER THAN WHAT IS DEPICTED.

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D.AWN BY AJM DATE 3/7/2 22
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.HE.KED BY AJM DATE 3/7/2 22
APPR'VED BY JC DATE 3/7/2022

CITY OF Grand Junction COLORADO

PUBLI.. WORKS
EN.INEERIN. DIVISION

24 ROAD BIKE PATH
LI.HTIN. ONE-LINE DIA.RAMS

E11
.f 12

PANEL: PP1 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 3R | MAINS(A): BKR | CONTINUOUS(A): 100
LOCATION: | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: Single-Phase 3-Wire | BUS SC RATING(A) 22000
FED FROM: BUS-XFMR | VOLTAGE: 240/120 | FAULT CURRENT(A): 3079
INCIDENT ENERGY: 16.93 Cal/cm2 @18.00(in) | BOUNDARY: 90.55(in)

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES <1>	OC AMPS	P
100	2		MAIN	GENERAL	0	1	180			2	180	GENERAL	CONTROL POWER		15	1
"			"		0	3		600		4	600	GENERAL	IRR CNTRL		20	1
20	2		SUMP-1	NONE	438	5	876			6	438	NONE	SUMP-2		20	2
"			"		438	7		876		8	438		"		"	
20	1		RCPT FUTURE	RECEPTA	1500	9	2125			10	625	NONE	LTS TUNNEL		20	2
20	1		RCPT FUTURE	RECEPTA	1500	11		2125		12	625		"		"	
						13				14						
						15				16						
20	2		LTS 24 RD SE <2>	NONE	816	17	1116			18	300	NONE	LTS NE PATH		20	2
"			"		816	19		1116		20	300		"		"	
						21				22						
						23				24						
						25				26						
						27				28						
						29				30						
						31				32						

ALL CONNECTED	KVA	3P AVE AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	8.70	20.9	* A-N	4143.1	34.5	CONNECTED	8.70
TOTAL DEMAND	8.70	20.9	* B-N	4555.1	38.0	DEMAND	8.70
TOTAL DESIGN	8.92	21.5	* C-N	0.0	0.0	DESIGN	8.92

FLAG NOTES:

<1> CIRCUITS 1-16 ARE UNSWITCHED, CIRCUITS 17 TO 32 ARE SWITCHED AND CONTROLLED WITH THE EXISTING PHOTOCELL, TYPICAL.

<2> NEW PATH WAY LIGHTS AND BRIDGE LIGHTING WILL BE CONTROLLED WITH EXISTING CIRCUIT PP1-17,19.

COLORADO REGISTERED JOEL JIMENEZ 37580 3-7-22 PROFESSIONAL ENGINEER

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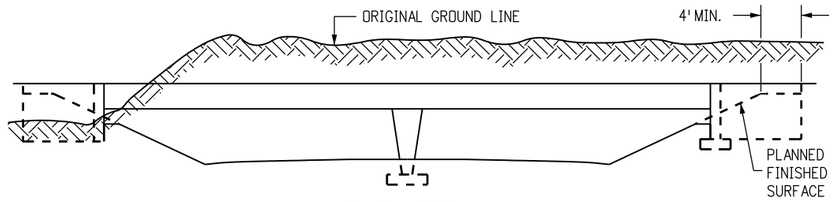
APPROVED BY JC DATE 3/7/2022

CITY OF Grand Junction COLORADO

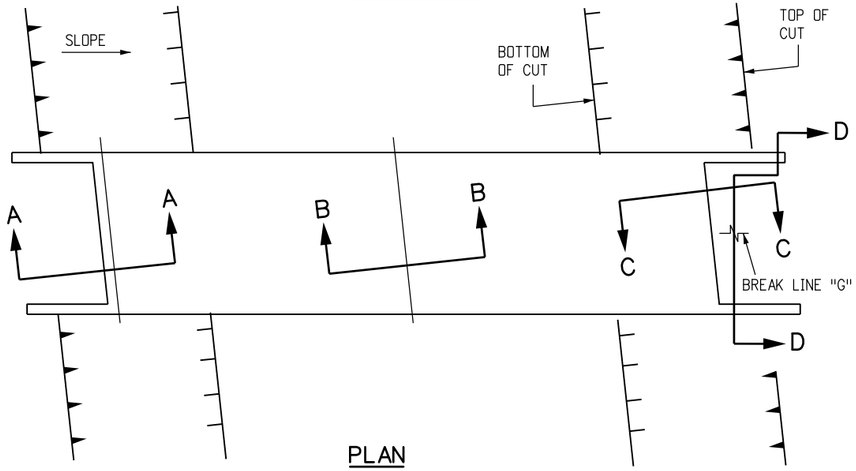
PUBLIC WORKS
ENGINEERING DIVISION

24 ROAD BIKE PATH
LIGHTING PANEL SCHEDULES

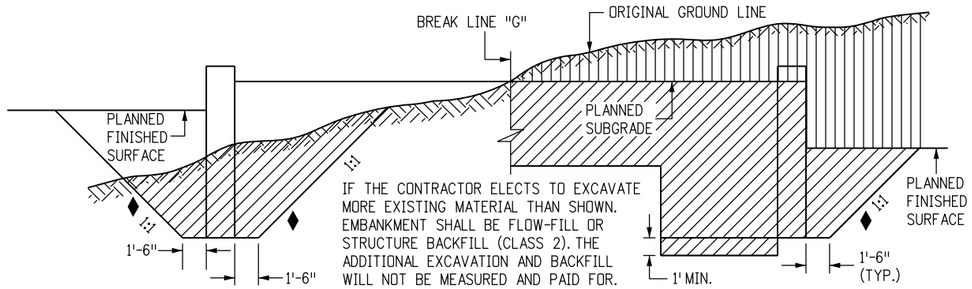
E12
of 12



ELEVATION

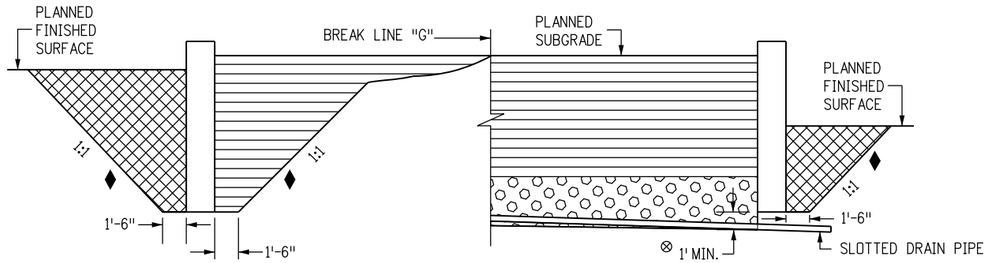


PLAN



▲ NEAR END OF WINGWALL — NEAR BACKFILL OF ABUTMENT

SECTION D-D (EXCAVATION)



▲ NEAR END OF WINGWALL — NEAR BACKFILL OF ABUTMENT

SECTION D-D (BACKFILL)

GENERAL NOTES

1. EXCAVATION AND BACKFILL PATTERNS DIFFERENT FROM THOSE INDICATED ON THIS SHEET WILL BE SHOWN ON THE PLANS.
2. STRUCTURE FOOTINGS WHICH ARE LOCATED IN ROCK SHALL BE POURED OUT TO UNDISTURBED ROCK WITHOUT FORMING, IN CONFORMANCE WITH SUBSECTION 601.09(b).
3. STRUCTURE EXCAVATION FOR SLOPE PAVING NOT SHOWN.

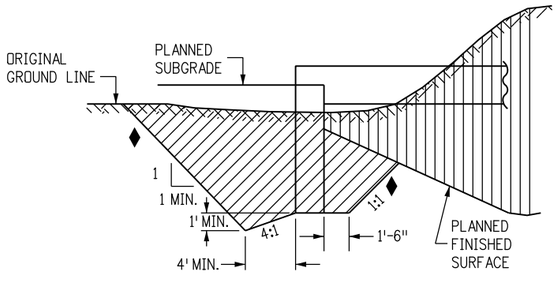
LEGEND

- UNCLASSIFIED EXCAVATION
- STRUCTURE EXCAVATION
- STRUCTURE BACKFILL (FLOW-FILL), OR STRUCTURE BACKFILL (CLASS 1) WITH MECHANICAL REINFORCEMENT AS SHOWN ON THE PLANS
- STRUCTURE BACKFILL CLASS 1
- FILTER MATERIAL

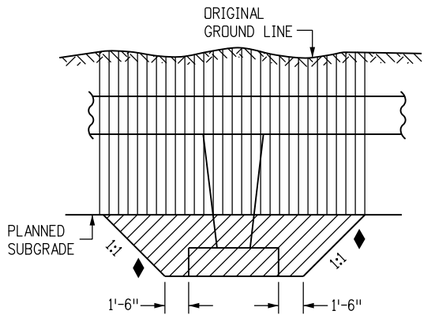
▲ FOR PURPOSES OF QUANTITY CALCULATIONS THIS TEMPLATE APPLIES TO END OF WINGWALL.

⊗ SLOPE TO DRAIN.

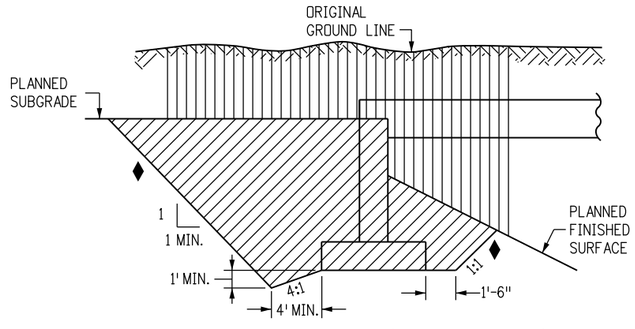
♦ SLOPE FOR PAY LIMITS OF EXCAVATION AND BACKFILL.



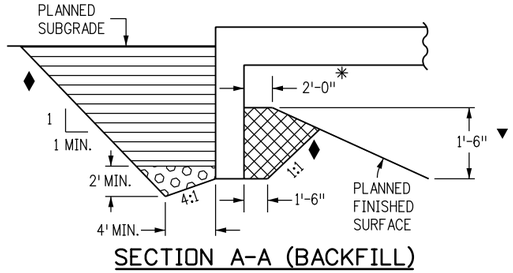
SECTION A-A (EXCAVATION)



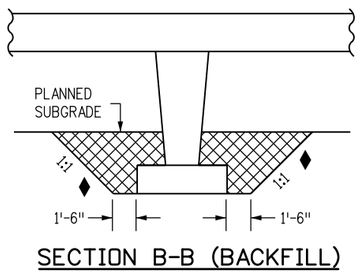
SECTION B-B (EXCAVATION)



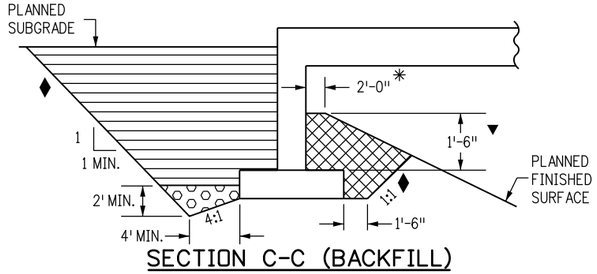
SECTION C-C (EXCAVATION)



SECTION A-A (BACKFILL)



SECTION B-B (BACKFILL)



SECTION C-C (BACKFILL)

* MINIMUM BERM DIMENSION

▼ MINIMUM EMBEDMENT OF ABUTMENT, IN STRUCTURE BACKFILL

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
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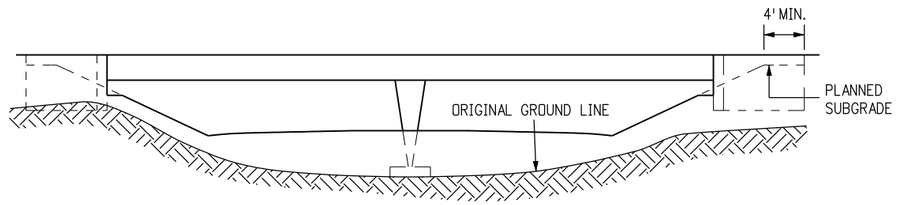
Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

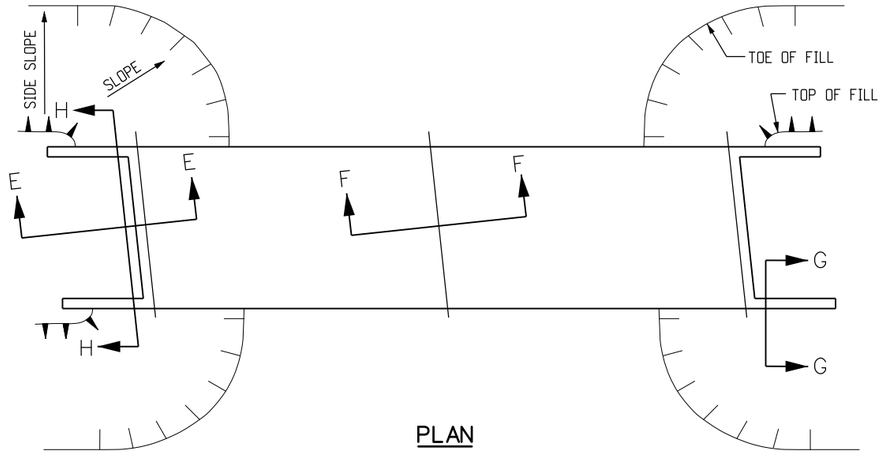
EXCAVATION AND BACKFILL FOR BRIDGES

Issued by the Project Development Branch: July 31, 2019

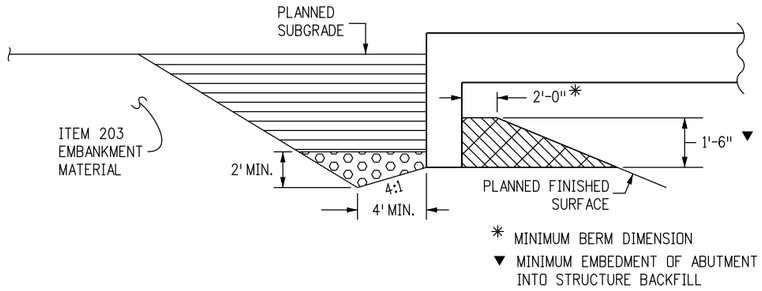
STANDARD PLAN NO.
M-206-2
Standard Sheet No. 1 of 2
Project Sheet Number:



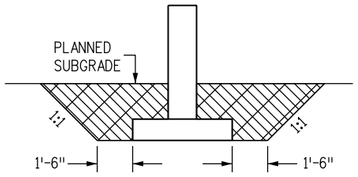
ELEVATION



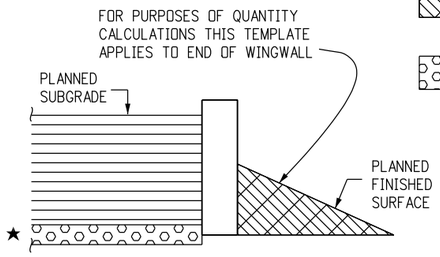
PLAN



SECTION E-E (BACKFILL)



SECTION F-F (BACKFILL)



SECTION G-G (BACKFILL)

★ FILTER MATERIAL IS ONLY USED IN AREA NEAR THE ABUTMENT AND NOT AT THE END OF THE WINGWALL

GENERAL NOTES

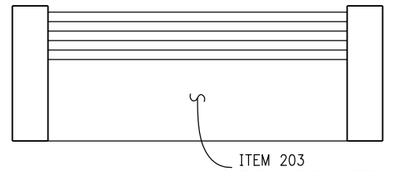
1. EXCAVATION AND BACKFILL PATTERNS DIFFERENT FROM THOSE INDICATED ON THIS SHEET WILL BE SHOWN ELSEWHERE ON THE PLANS.
2. STRUCTURE FOOTINGS WHICH ARE LOCATED IN ROCK SHALL BE POURED OUT TO UNDISTURBED ROCK WITHOUT FORMING IN CONFORMANCE WITH SUBSECTION 601.09.
3. STRUCTURE EXCAVATION FOR SLOPE PAVING NOT SHOWN.

LEGEND

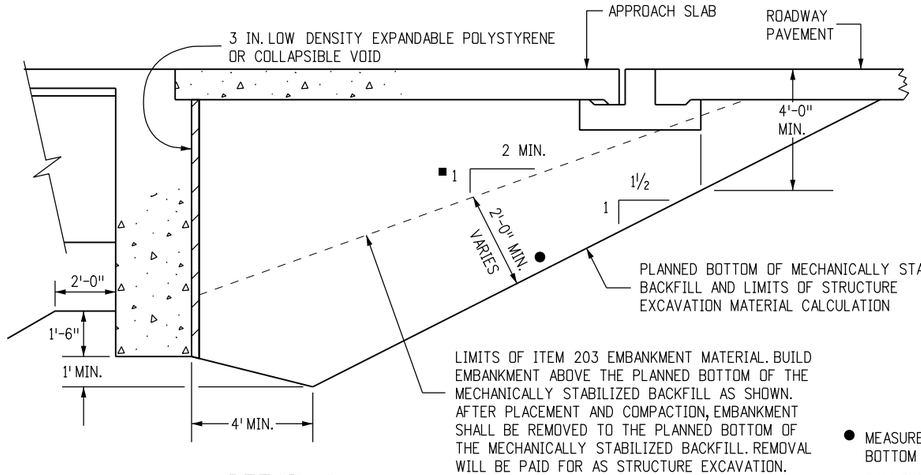
STRUCTURE BACKFILL (FLOW-FILL), OR STRUCTURE BACKFILL (CLASS 1) WITH MECHANICAL REINFORCEMENT AS SHOWN ON THE PLANS

STRUCTURE BACKFILL CLASS 2 (ON-SITE CLASS 2 MATERIALS MUST MEET CLASS 1 REQUIREMENTS)

FILTER MATERIAL



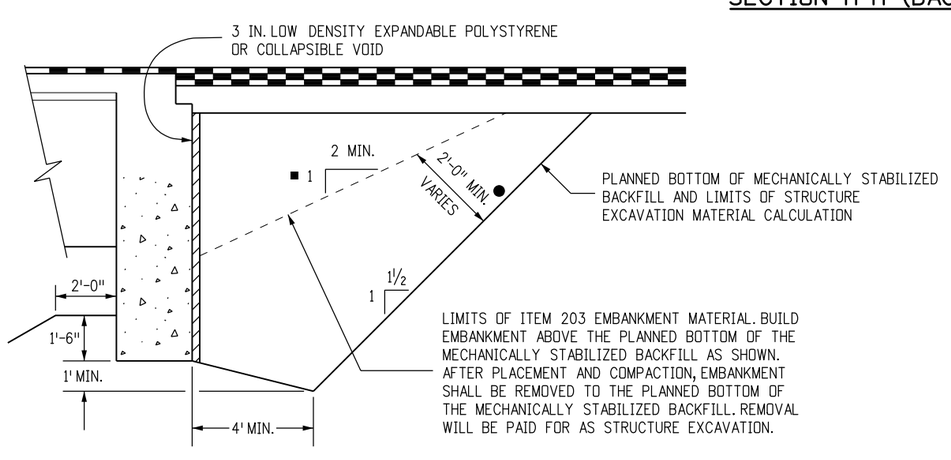
SECTION H-H (BACKFILL)



DETAIL 1
(WITH APPROACH SLAB)

● MEASURED PERPENDICULAR TO PLANNED BOTTOM OF MECHANICALLY STABILIZED BACKFILL.

■ PAYMENT BASED ON 2:1 SLOPE. ADDITIONAL QUANTITIES SHALL BE INCLUDED IN THE WORK.



DETAIL 2
(WITHOUT APPROACH SLAB)

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Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
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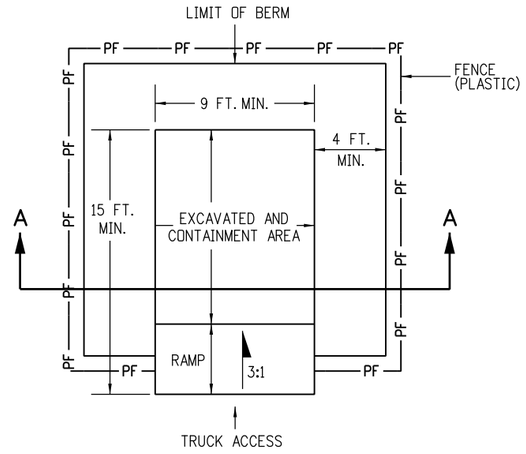
Project Development Branch JBK

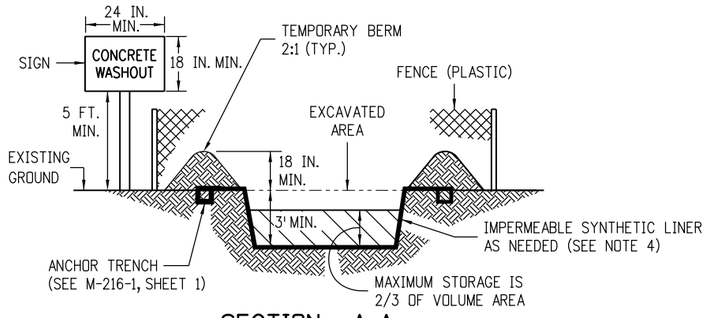
EXCAVATION AND BACKFILL FOR BRIDGES

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-206-2
Standard Sheet No. 2 of 2
Project Sheet Number:



PLAN VIEW

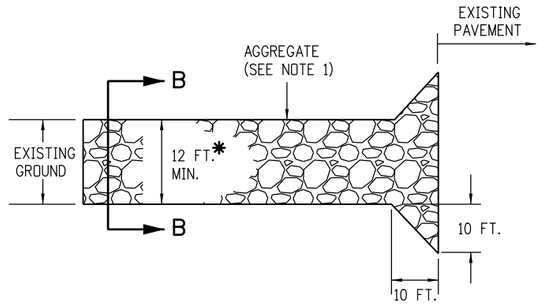


SECTION A-A

NOTES:

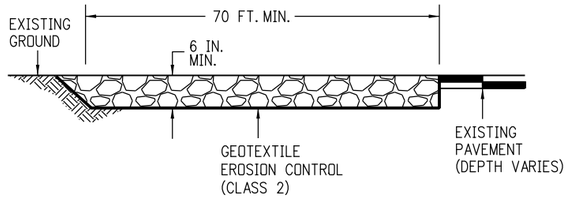
1. A FENCE (PLASTIC) CONFORMING TO SECTION 607 SHALL BE INSTALLED AROUND THE CONCRETE WASHOUT AREA, EXCEPT AT THE OPENING.
2. THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH AND CONFORM TO SUBSECTION 630.02.
3. ALL MATERIALS AND LABOR TO COMPLETE THE CONCRETE WASHOUT STRUCTURE SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
4. THE BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF FIVE FEET ABOVE GROUND WATER. IF NOT, THE BOTTOM OF EXCAVATION SHALL BE IN ACCORDANCE WITH 208.02 (j).
5. THE PAY ITEM NUMBER FOR CONCRETE WASHOUT STRUCTURE (EACH) IS 208-00045.

CONCRETE WASHOUT STRUCTURE

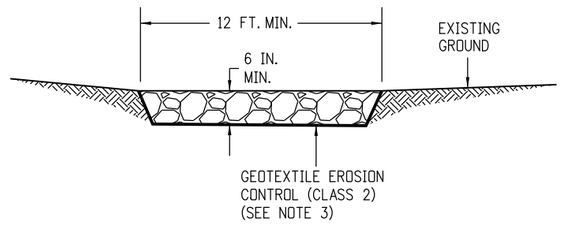


PLAN VIEW

* SHALL EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION.



ELEVATION SECTION



SECTION B-B

NOTES:

1. AGGREGATE SHALL CONFORM TO SUBSECTION 208.02 (I).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE, WHILE NOT BLOCKING FLOW OF WATER THRU STRUCTURE. PROTECTION OF THE CURB AND GUTTER SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
3. GEOTEXTILE SHALL CONFORM TO SUBSECTION 712.08.
4. ALL MATERIALS AND LABOR TO COMPLETE THE VEHICLE TRACKING PAD SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
5. THE PAY ITEM NUMBER FOR VEHICLE TRACKING PAD (EACH) IS 208-00070.

VEHICLE TRACKING PAD

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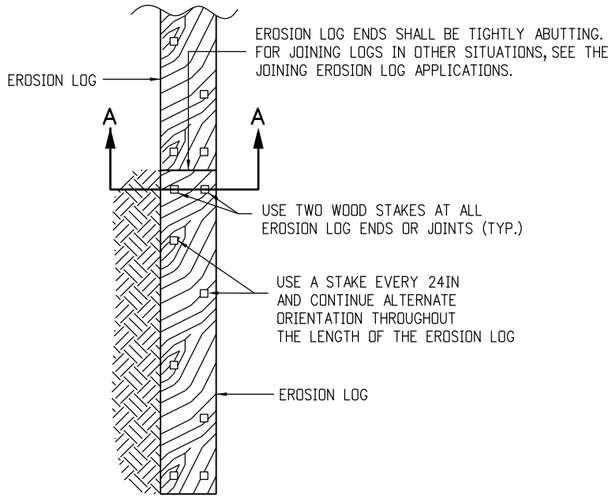
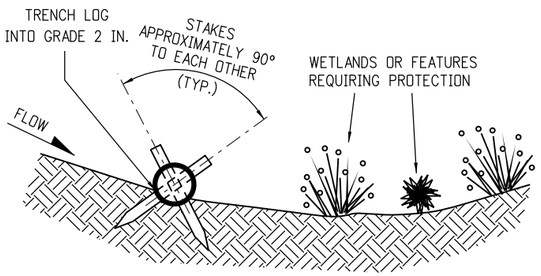
TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 1 of 11
Project Sheet Number:



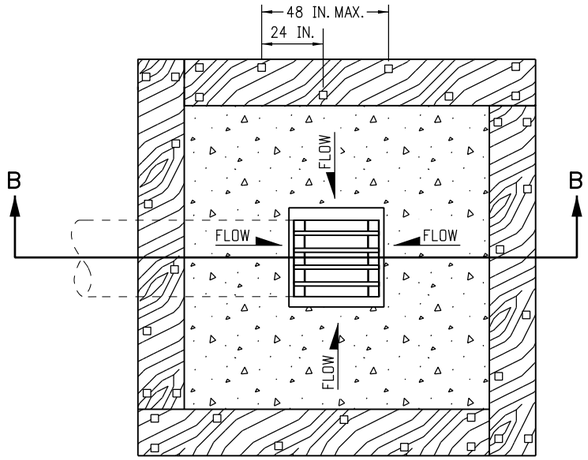
PLAN VIEW



SECTION A-A

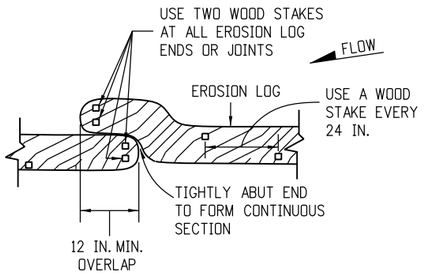
TYPICAL STAKE INSTALLATION

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

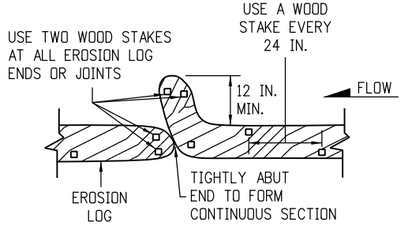


PLAN VIEW

NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.

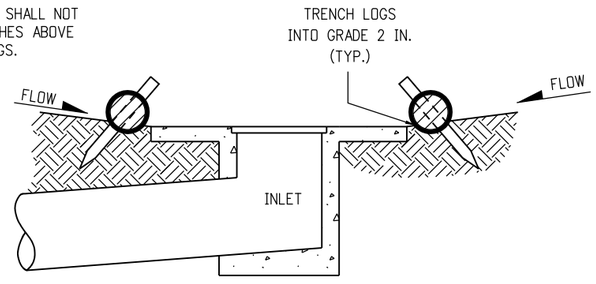


OVERLAP JOINING DETAIL



J-HOOK JOINING DETAIL

JOINING EROSION LOG APPLICATIONS



SECTION B-B

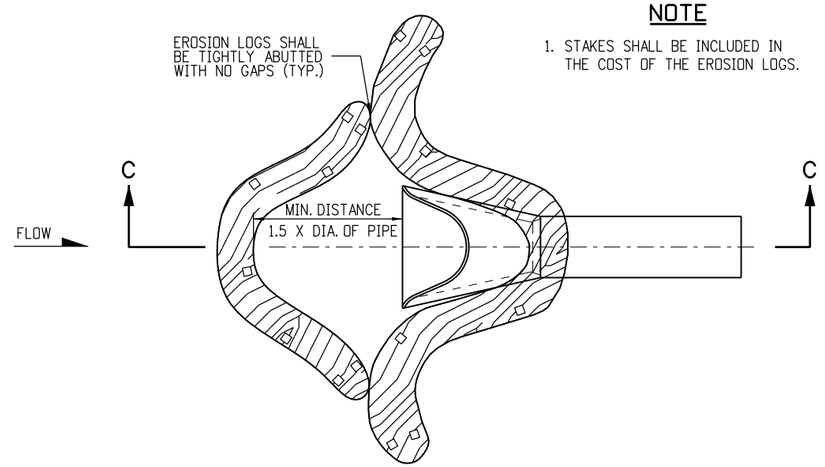
NOTE: LOCATE EROSION LOGS AT THE OUTSIDE EDGE OF THE CONCRETE APRON.

EROSION LOG FILTER AT DROP INLET

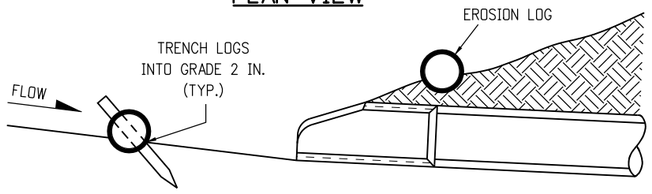
EROSION LOG APPLICATIONS

NOTE

1. STAKES SHALL BE INCLUDED IN THE COST OF THE EROSION LOGS.



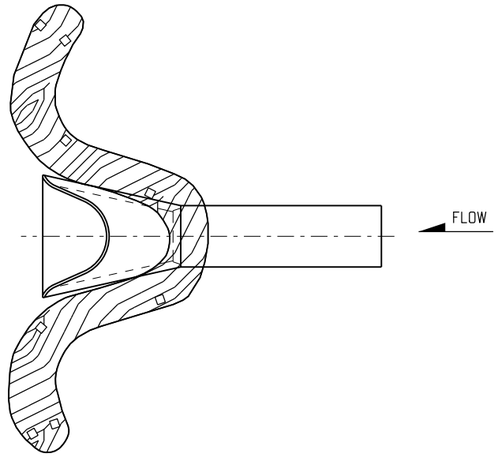
PLAN VIEW



SECTION C-C
(NOT ALL LOGS SHOWN)

NOTE: TOP OF STAKE SHALL NOT EXTEND PAST TOP OF EROSION LOG MORE THAN 2 IN.

EROSION LOG CULVERT INLET PROTECTION



EROSION LOG CULVERT OUTLET PROTECTION

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Denver, CO 80204
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TEMPORARY EROSION CONTROL

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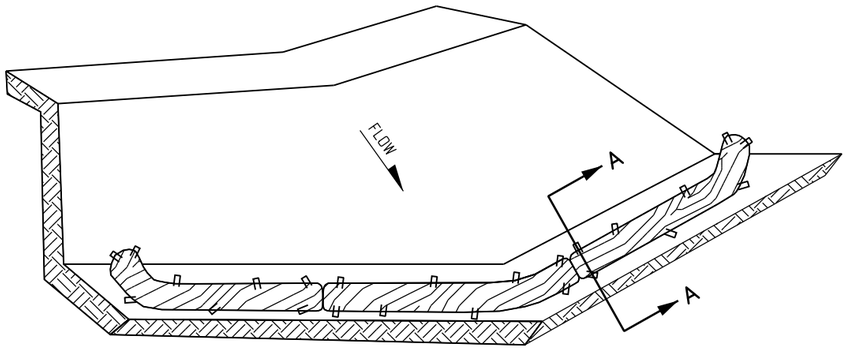
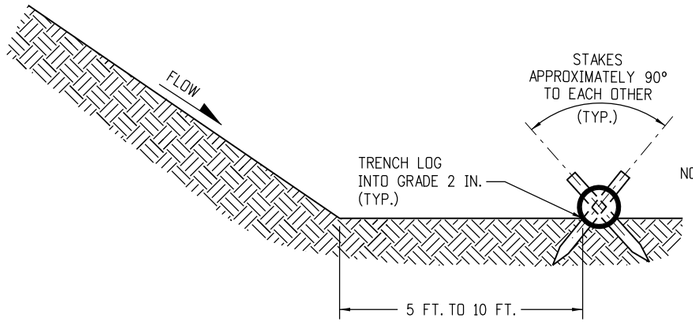
STANDARD PLAN NO.
M-208-1
Standard Sheet No. 2 of 11
Project Sheet Number:



ISOMETRIC VIEW



NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.

SECTION A-A

NOTES:

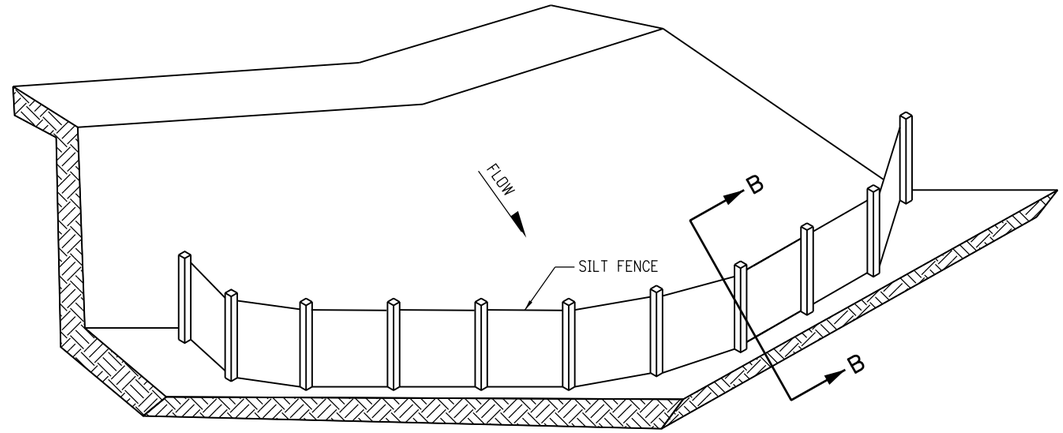
1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

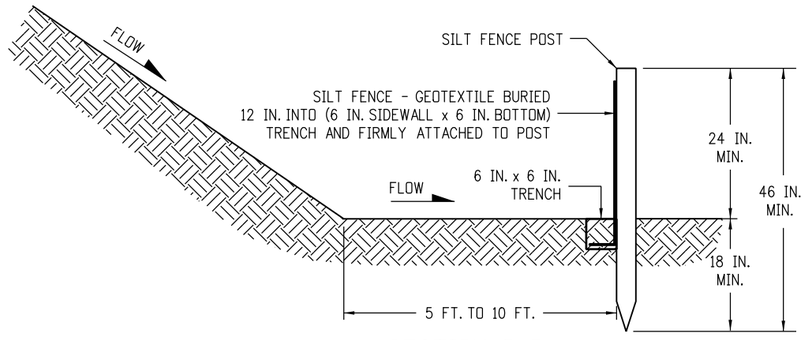
EROSION LOG TOE OF SLOPE PROTECTION

NOTES

1. SILT FENCE SHALL HAVE A MAXIMUM DRAINAGE AREA OF ONE-QUARTER ACRE PER 100 FEET OF SILT FENCE LENGTH; MAXIMUM SLOPE LENGTH BEHIND BARRIER IS 100 FEET.
2. SILT FENCE USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
3. SILT FENCE SHALL BE PLACED PARALLEL TO THE CONTOUR WITH ENDS FLARED UP SLOPE.
4. THE MAXIMUM LENGTH OF EROSION LOGS OR SILT FENCES WITHOUT A FLARED END TURNING UPSLOPE IS 150 FEET.



ISOMETRIC VIEW



SECTION B-B

SILT FENCE TOE OF SLOPE PROTECTION

NOTE: THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.

TOE OF SLOPE PROTECTION APPLICATIONS

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TEMPORARY EROSION CONTROL

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STANDARD PLAN NO.
M-208-1
Standard Sheet No. 3 of 11
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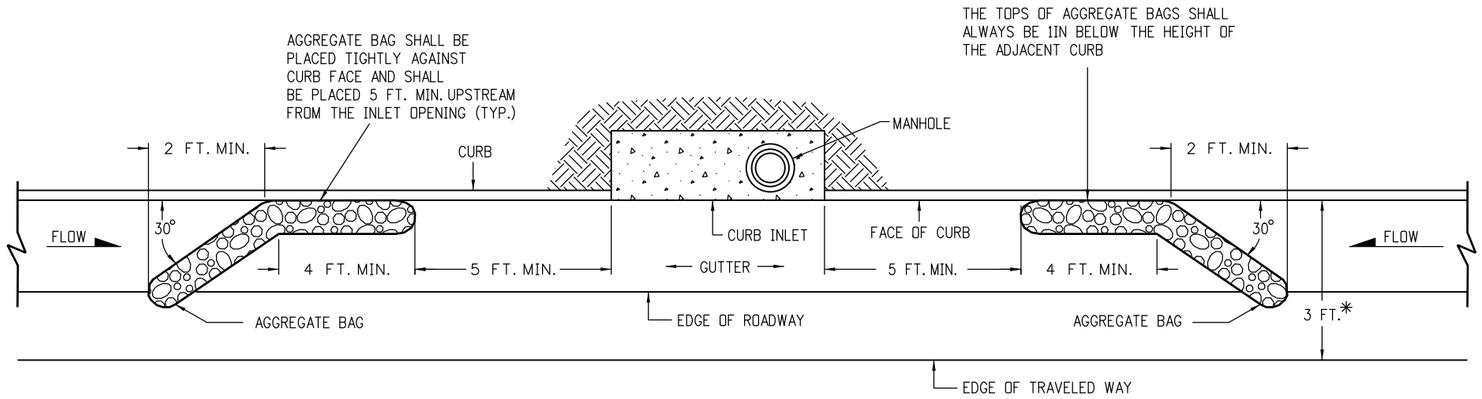
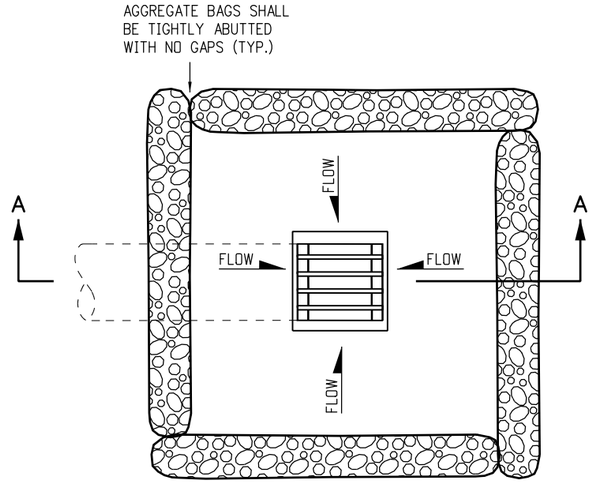


PLAN VIEW

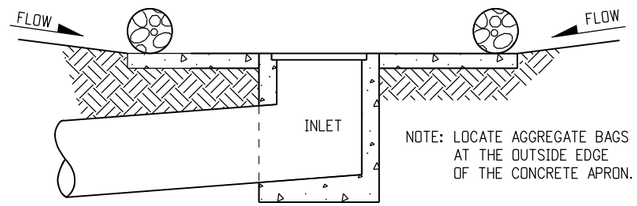
* NOTE: USE AGGREGATE BAGS ONLY WHEN THERE IS A MINIMUM CLEARANCE OF 3 FEET FROM THE EDGE OF THE TRAVELED WAY (INCLUDING CONDITIONS DURING DETOURS) TO THE FACE OF CURB.

LENGTH (L) OF INLET FT.	NUMBER OF AGGREGATE BAGS UPSTREAM OF INLET
0 - 5	1
6 - 10	2
L > 10	3

AGGREGATE BAGS AT STORM DRAIN INLET (TYPE I)



PLAN VIEW



SECTION A-A

AGGREGATE BAGS AT DROP INLET

AGGREGATE BAG APPLICATIONS

NOTE: THE PAY ITEM NUMBER FOR AGGREGATE BAG (LF) IS 208-00035

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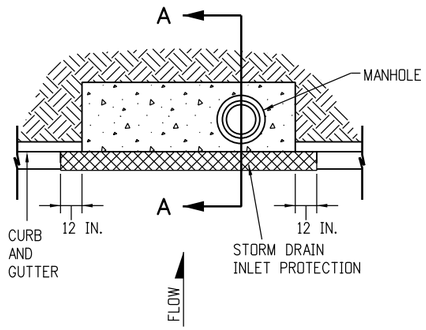
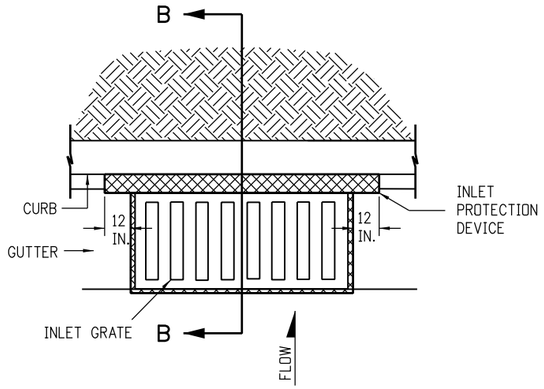
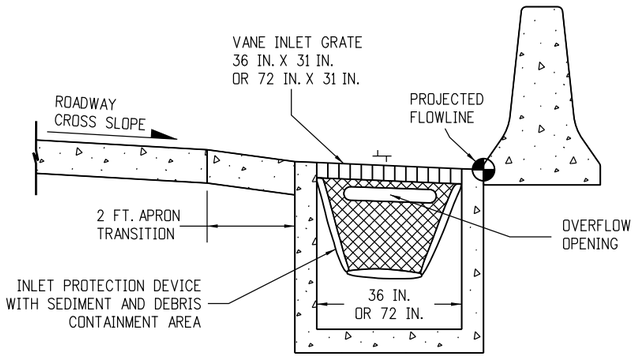
STANDARD PLAN NO.
M-208-1
Standard Sheet No. 4 of 11
Project Sheet Number:



PLAN VIEW

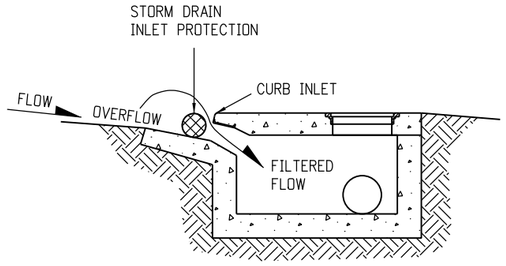


PLAN VIEW



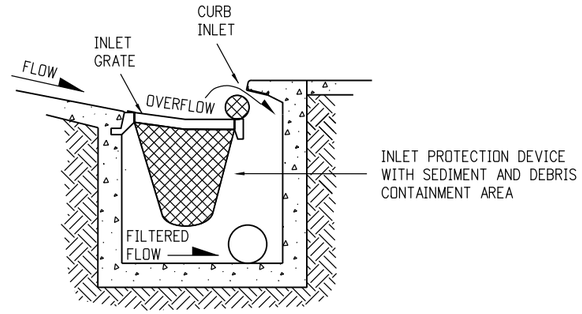
OPTION A

STORM DRAIN INLET PROTECTION (TYPE III)



SECTION A-A

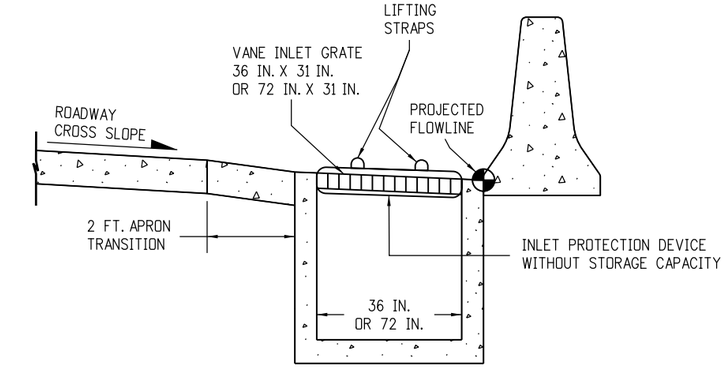
STORM DRAIN INLET PROTECTION (TYPE I)



SECTION B-B

OPTION A

STORM DRAIN INLET PROTECTION (TYPE II)



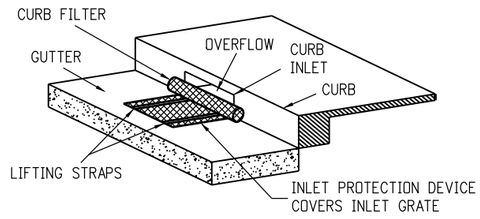
OPTION B

STORM DRAIN INLET PROTECTION (TYPE III)

NOTE: THE PAY ITEM NUMBER FOR STORM DRAIN INLET PROTECTION (TYPE III) (EACH) IS 208-00056.

NOTES:

1. INLET PROTECTION DEVICE SHALL EXTEND 12 INCHES PAST EACH END OF THE INLET.
2. THE PAY ITEM NUMBERS FOR STORM DRAIN INLET PROTECTION (TYPE I) ARE 208-00051 (LF), 208-00053 84 INCHES (EACH), 208-00057 144 INCHES (EACH), AND 208-00058 204 INCHES (EACH).
3. FOR STORM DRAIN INLET TYPES I AND II, IF THERE IS A MINIMUM CLEARANCE OF 3 FEET FROM THE EDGE OF THE TRAVELED WAY TO THE FACE OF CURB, USE THE AGGREGATE BAGS AT STORM DRAIN INLET (TYPE I) DETAIL ON SHEET 4 INSTEAD.



ISOMETRIC VIEW

OPTION B

STORM DRAIN INLET PROTECTION (TYPE II)

NOTE: THE PAY ITEM NUMBERS FOR STORM DRAIN INLET PROTECTION (TYPE II) ARE 208-00054 (EACH).

STORM DRAIN INLET PROTECTION TYPES

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TEMPORARY EROSION CONTROL

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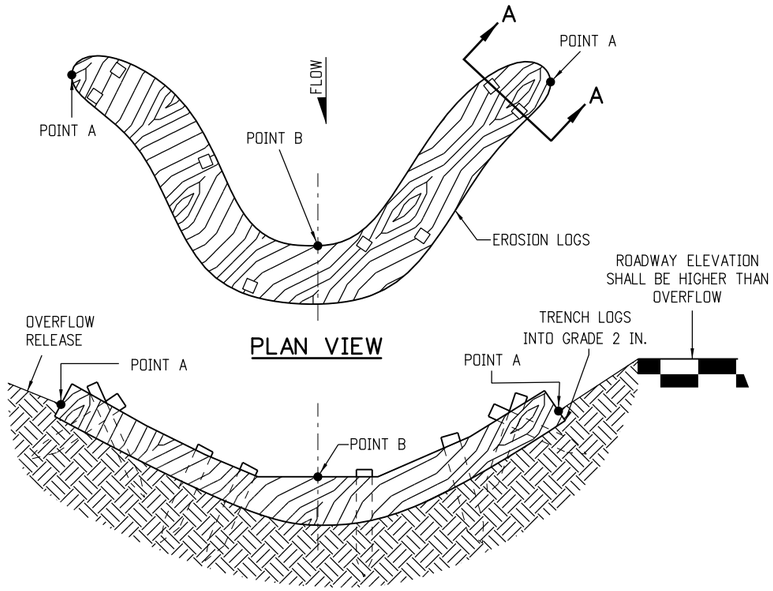
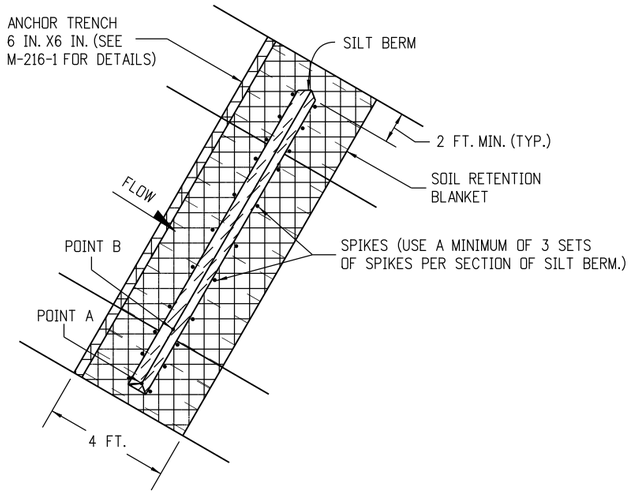
STANDARD PLAN NO.
M-208-1
Standard Sheet No. 5 of 11
Project Sheet Number:



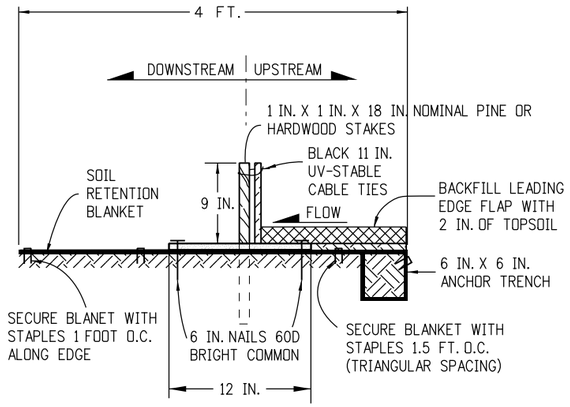
PLAN VIEW

NOTE: POINTS "A" SHALL BE A MINIMUM 4 IN. HIGHER THAN POINT "B".

ELEVATION



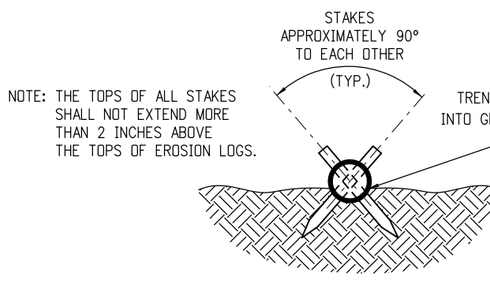
PLAN VIEW



NOTES:

1. MINIMUM 4 NAILS PER SEGMENT (UPSTREAM).
2. MINIMUM 2 NAILS PER SEGMENT (DOWNSTREAM).
3. MINIMUM 2 WOOD STAKES PER SEGMENT.

SILT BERM (2) SECTION VIEW

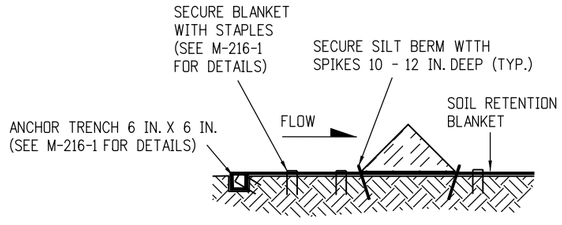


SECTION A-A

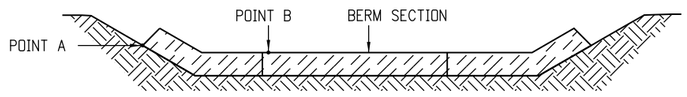
NOTES:

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.
3. V-SHAPED TEMPORARY DITCHES SHALL NOT BE USED. DITCHES SHAL BE GRADED IN A PARABOLIC OR TRAPEZOIDAL SHAPE.

EROSION LOG INSTALLATION



SILT BERM (1) SECTION VIEW



POINT "A" SHALL BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE BERM AND NOT AROUND THE ENDS.

FRONT VIEW

NOTES

1. ANCHOR SOIL RETENTION BLANKET INTO TRENCH WITH 8 INCHES MIN. STAPLES PLACED AT 1 FOOT INTERVALS ALONG EDGE.
2. FILL AND COMPACT TRENCH.
3. SECTIONS OF THE SILT BERM SHALL BE OVERLAPPED WITH NO GAPS.
4. FOR SLOPE AND CHANNEL SPACING SEE THE "SECTION VIEW ALONG DITCH FLOWLINE" DETAIL ON SHEET 11 OF 11.
5. SOIL RETENTION BLANKET SHALL ALWAYS BE REQUIRED.
6. THE PAY ITEM NUMBER FOR SILT BERM (LF) IS 208-00004.

SILT BERM INSTALLATION

DRAINAGE DITCH APPLICATIONS

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TEMPORARY EROSION CONTROL

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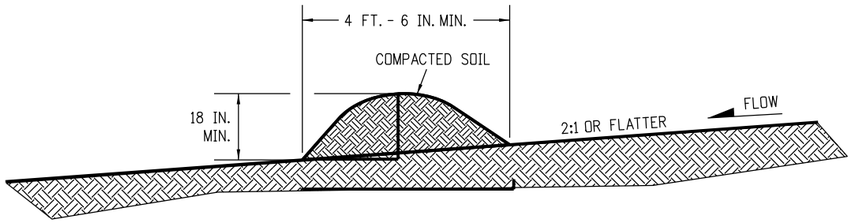
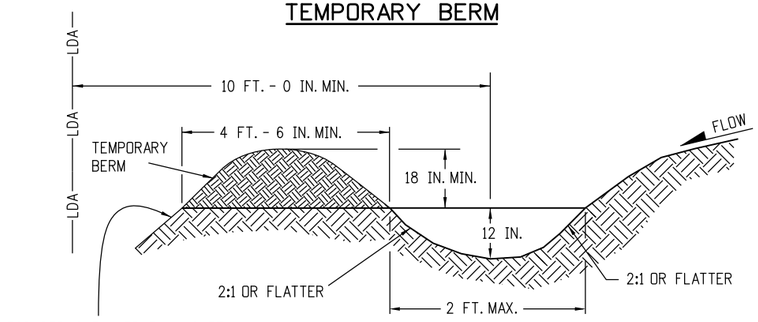


NOTES:

1. BERMS SHALL HAVE A HEIGHT OF 18 INCHES, SIDE SLOPES OF 2:1 OR FLATTER AND A MINIMUM BASE WIDTH OF 4 FT. -6 IN.
2. BERMS SHALL BE USED TO INTERCEPT AND DIVERT DRAINAGE TO A DESIGNATED OUTLET.
3. BERMS SHALL NOT BE USED WHERE DRAINAGE AREA EXCEEDS 10 ACRES.
4. BERMS SHALL BE CONSTRUCTED OUT OF ACCEPTABLE MATERIAL THAT CAN BE COMPACTED AND RECEIVE AT A MINIMUM HEAVY EQUIPMENT WHEEL ROLLED COMPACTION.
5. TEMPORARY BERMS SHALL BE CONSTRUCTED OUT OF EMBANKMENT (SUBSOIL) AND IN NO CIRCUMSTANCE CONSTRUCTED OUT OF SALVAGED TOPSOIL.
6. THE PAY ITEM NUMBER FOR TEMPORARY BERM (LF) IS 208-00300.

TEMPORARY BERM

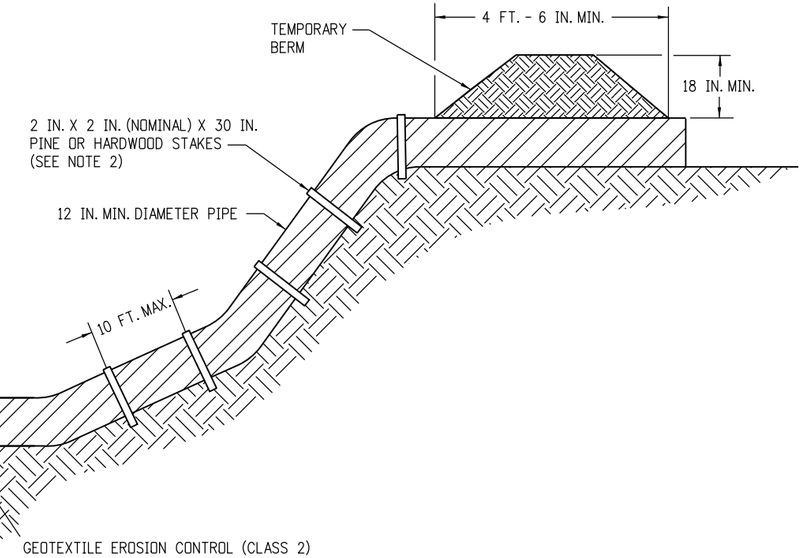


FOR BERMS TALLER THAN 2 FT.,
INSTALL TOE OF SLOPE CONTOL MEASURES.
SEE SHEET 3 OF 11 FOR DETAILS.

NOTES:

1. TEMPORARY DIVERSION DITCHES SHALL BE CONSTRUCTED ACROSS THE SLOPE TO INTERCEPT RUNOFF AND DIRECT IT TO A STABLE OUTLET OR SEDIMENT TRAP.
2. USE THE TEMPORARY DIVERSION DITCH IMMEDIATELY ABOVE A NEW CUT, FILL SLOPE, OR AROUND THE PERIMETER OF A DISTURBED AREA.
3. THE GRADIENT ALONG THE FLOW PATH SHALL HAVE A POSITIVE GRADE TO ASSURE DRAINAGE, BUT SHALL NOT BE SO STEEP AS TO RESULT IN EROSION DUE TO HIGH VELOCITY.
4. THE DIVERSION FLOWLINE SHALL ALWAYS BE LOCATED A MINIMUM 10 FEET FROM THE OUTSIDE LIMITS OF DISTURBED AREA BOUNDARY.
6. DIVERSION BERMS SHALL BE CONSTRUCTED OUT OF EMBANKMENT (SUBSOIL) AND IN NO CIRCUMSTANCE CONSTRUCTED OUT OF SALVAGED TOPSOIL.
5. THE PAY ITEM NUMBER FOR TEMPORARY DIVERSION (LF) IS 208-00301.

TEMPORARY DIVERSION



NOTES:

1. ANCHOR SIZE VARIES ACCORDING TO PIPE SIZE
2. TO SECURE THE PIPE, DRIVE STAKES INTO GROUND, THEN TIE A 12 GUAGE WIRE BETWEEN THEM ABOVE AND ACROSS THE PIPE'S WIDTH.
3. THE OUTLET SHALL BE ALIGNED WITH THE FLOW DIRECTION OF THE EXISTING GRADE. PERPENDICULAR DISCHARGE TO A CHANNEL SHALL NOT BE ACCEPTABLE.
4. THE GRADE AROUND THE INLET TO THE PIPE SHALL BE COMPACTED.
5. THE PAY ITEM NUMBER FOR TEMPORARY SLOPE DRAINS (LF) IS 208-00060.

TEMPORARY SLOPE DRAINS

GRADING APPLICATIONS

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CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
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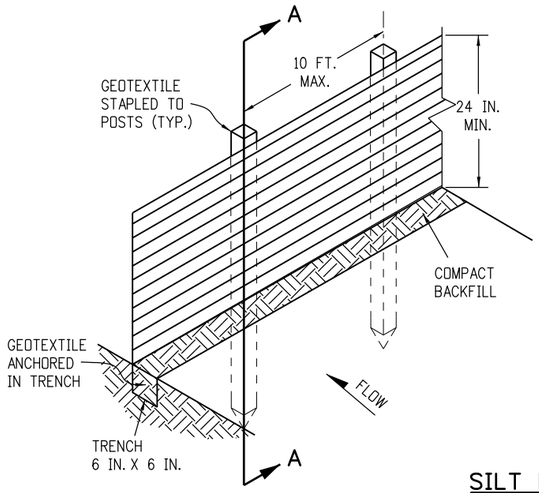
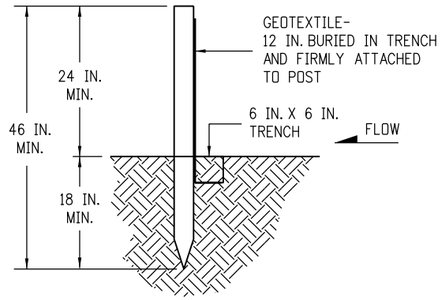
TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 7 of 11
Project Sheet Number:



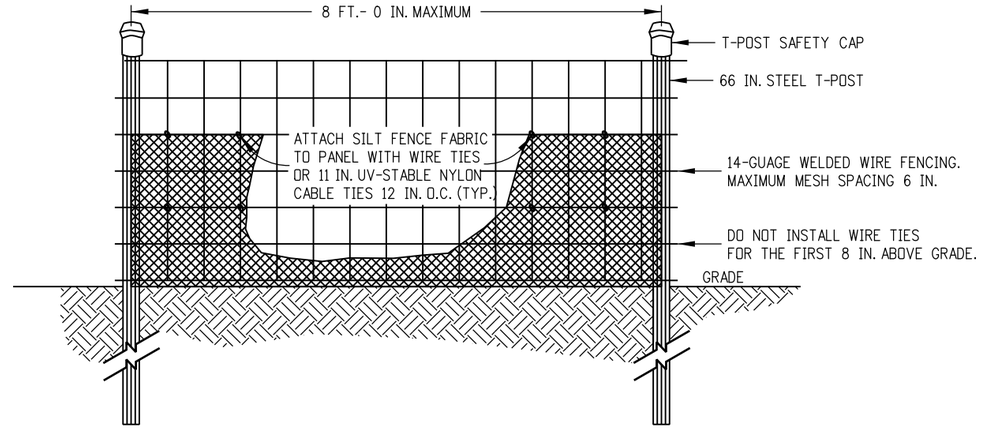


SECTION A-A

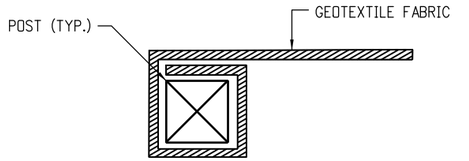
SILT FENCE

NOTES:

1. GEOTEXTILE SHALL BE ATTACHED TO WOOD POSTS WITH THREE OR MORE STAPLES PER POST. STAPLES SHALL BE HEAVY DUTY WIRE AND AT LEAST 1 INCH LONG.
2. WOOD POST SHALL BE 1 IN. X 1 IN. NOMINAL.
3. THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.
4. THE SILT FENCE SHALL BE PLACED ON THE CONTOUR (AT THE SAME ELEVATION ±6 IN.). THE ENDS SHALL BE FLARED UP SLOPE (MINIMUM ELEVATION GAIN OF 18 IN.).



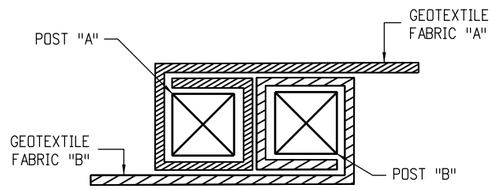
ELEVATION VIEW



END SECTION DETAIL (PLAN VIEW)

NOTE:

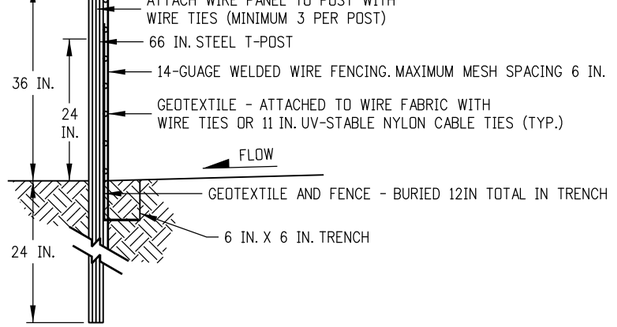
1. THE END OF THE SILT FENCE FABRIC SHALL BE WRAPPED APPROX. 6 INCHES AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.



JOINING SECTION DETAIL (PLAN VIEW)

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.



SIDE VIEW

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A STEEL T-POST, THEN SECURED ALONG THE POST WITH WIRE TIES (MINIMUM 3 PER POST).
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.
3. SILT FENCES SHALL NOT BE USED FOR CHECK DAMS.
4. THE PAY ITEM NUMBER FOR SILT FENCE (REINFORCED) (LF) IS 208-00021.

SILT FENCE (REINFORCED)

SILT FENCE APPLICATIONS

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2829 West Howard Place
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Denver, CO 80204
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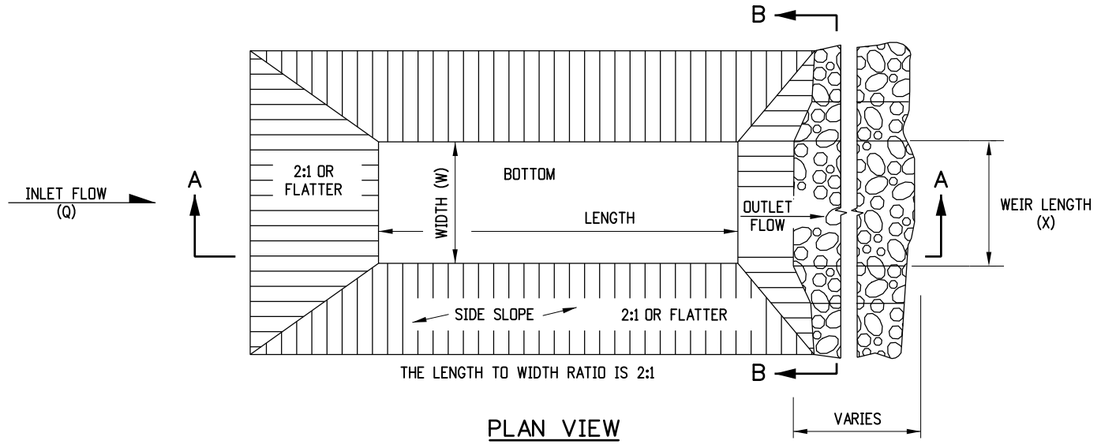
TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

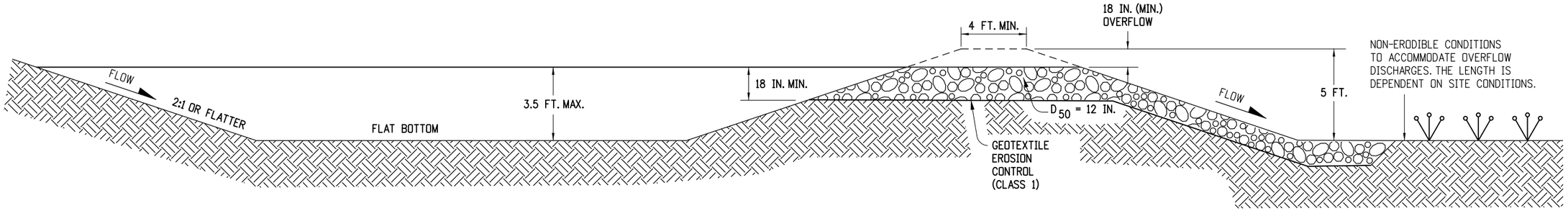
STANDARD PLAN NO.
M-208-1
Standard Sheet No. 8 of 11
Project Sheet Number:



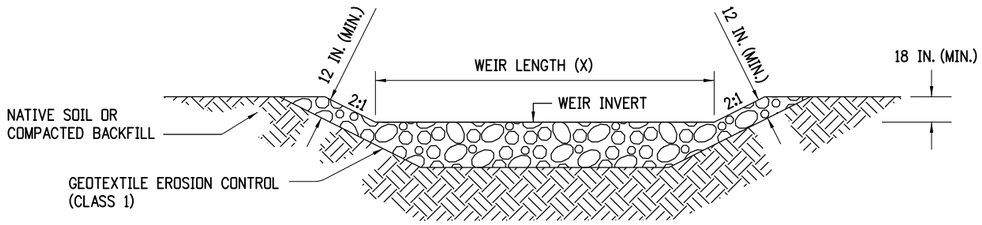
PLAN VIEW

NOTES

1. THE MAXIMUM DRAINAGE AREA IS 5 ACRES.
2. THE MAXIMUM STRUCTURE LIFE IS 2 YEARS.
3. THE STORAGE AREA IS 1800 CUBIC FEET PER ACRE.
4. THE MAXIMUM EMBANKMENT HEIGHT SHALL BE 5 FT. MEASURED ON THE DOWNSTREAM SIDE.
5. THE LENGTH/WIDTH RATIO MAY BE ADJUSTED TO MEET SITE CONDITIONS WHEN APPROVED BY THE ENGINEER.
6. WIDTH (W) OF SEDIMENT TRAP IS APPROXIMATELY EQUAL TO THE WEIR LENGTH (X).
7. SEDIMENT TRAP DESIGN SHALL BE APPROVED BY THE ENGINEER.
8. THE DOWN GRADE FROM WEIR SHALL BE STABLE AND NON-ERODIABLE.
9. THE PAY ITEM NUMBER FOR SEDIMENT TRAP (LF) IS 208-00033.



SECTION A-A



SECTION B-B

DRAINAGE AREA (ACRES)	WEIR LENGTH (FEET)
1	4
2	6
3	8
4	10
5	12

WEIR LENGTH TABLE

SEDIMENT TRAP

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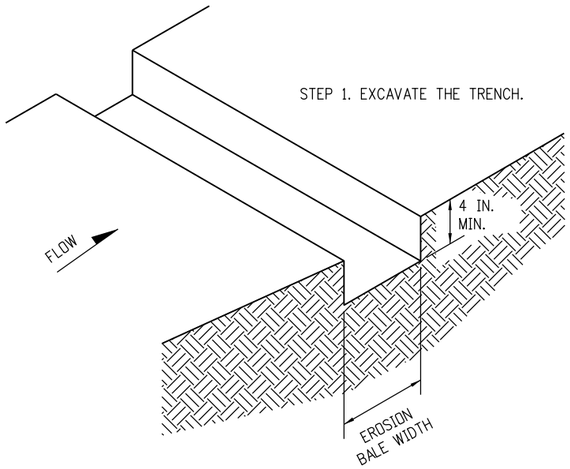
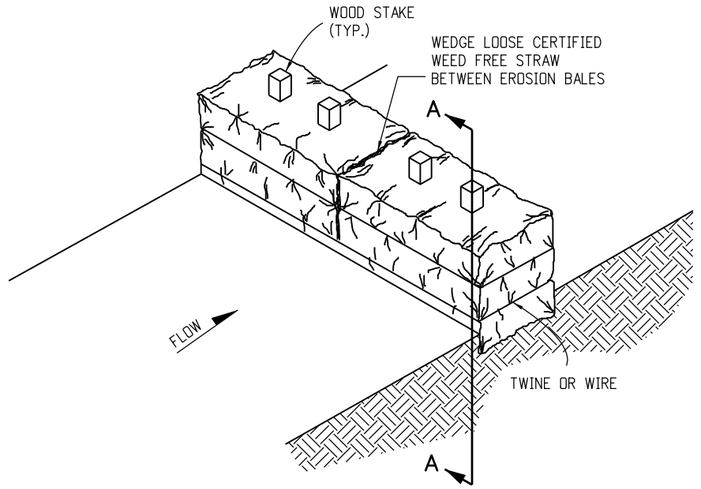
STANDARD PLAN NO.
M-208-1
Standard Sheet No. 9 of 11
Project Sheet Number:

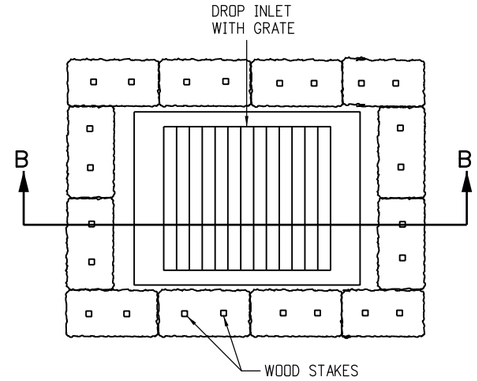
NOTES

1. STAKES SHALL BE WOOD AND SHALL BE 2 IN. X 2 IN. X 30 IN. NOMINAL.
2. EROSION BALES SHALL BE 18 IN. X 18 IN. X 36 IN.
3. EROSION BALES SHALL BE ENTRENCHED 4 IN. MINIMUM INTO THE SOIL, THIGHTLY ABUTTED WITH NO GAPS, STAKED, AND BACKFILLED AROUND THE ENTIRE OUTSIDE PERIMETER.
4. EROSION BALES CANNOT BE USED FOR CHECK DAMS.
5. EROSION BALE FILTER SHALL BE LOWER THAN BERM ELEVATION OR USED IN A SUMP CONDITION.
6. THE PAY ITEM NUMBER FOR EROSION BALES (WEED FREE) (EA) IS 208-00011.

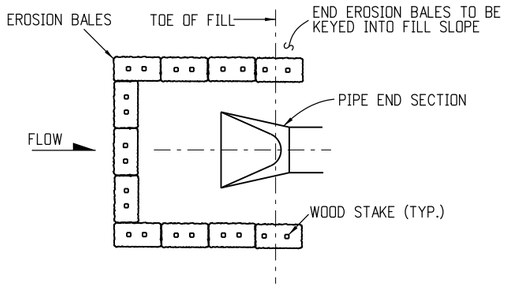




WOOD STAKE (TYP.)

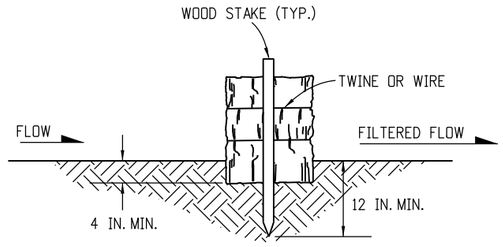


PLAN VIEW



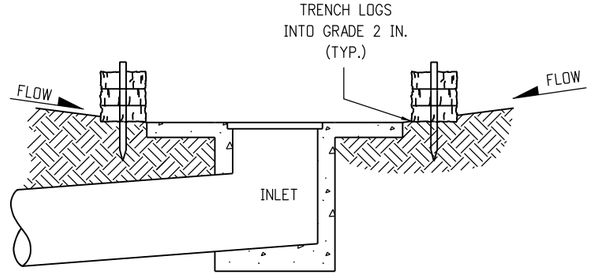
PLAN VIEW

EROSION BALE CULVERT INLET PROTECTION



SECTION A-A

EROSION BALE TRENCHING AND STAKING



SECTION B-B

NOTE: LOCATE EROSION BALES AT THE OUTSIDE EDGE OF THE CONCRETE APRON.

EROSION LOG FILTER AT DROP INLET

EROSION BALE APPLICATIONS

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STANDARD PLAN NO.
M-208-1
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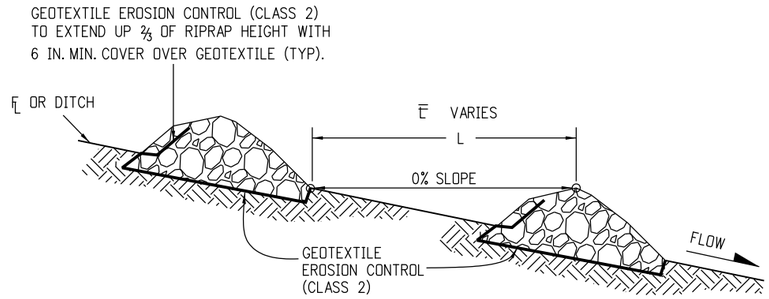
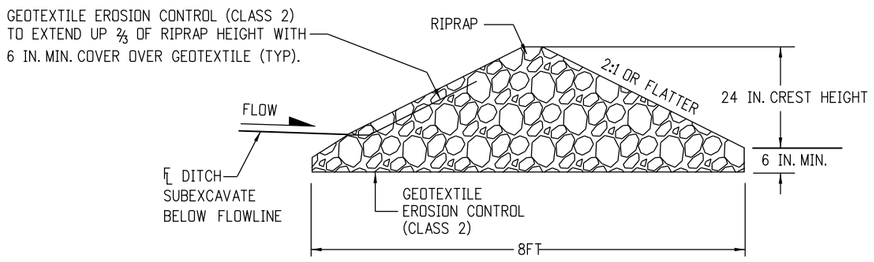


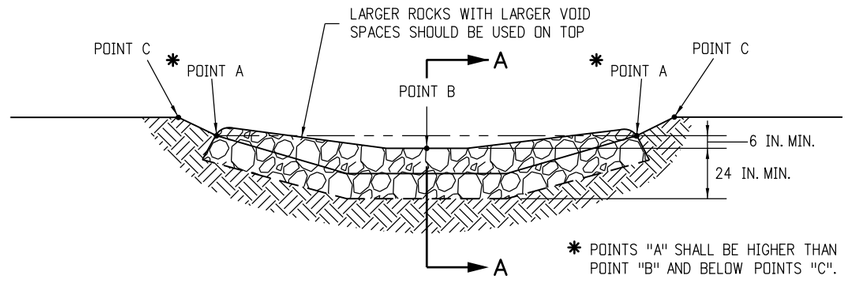
SECTION VIEW ALONG DITCH FLOWLINE



SECTION A-A

NOTES:

1. RIPRAP SIZE D_{50} = 6IN OR AS SHOWN ON THE PLANS.
2. THE GEOTEXTILE EROSION CONTROL SHALL BE CLASS 2 AND CONFORM TO THE REQUIREMENTS OF SUBSECTION 712.08.
3. THE ENDS OF RIPRAP CHECK DAM SHALL BE A MINIMUM OF 6 IN. HIGHER THAN CENTER OF CHECK DAM.
4. FOR USE AS TEMPORARY CHECK DAMS ONLY AND NOT FOR PERMANENT INSTALLATIONS.
5. THE PAY ITEM NUMBER FOR ROCK CHECK DAM (EA) IS 208-00041.



TYPICAL SECTION VIEW

NOTE: ALL MATERIALS AND LABOR TO COMPLETE THE ROCK CHECK DAM SHALL BE INCLUDED IN THE COST OF WORK.

ROCK CHECK DAM

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Creation Date: 07/31/19		Date:	Comments
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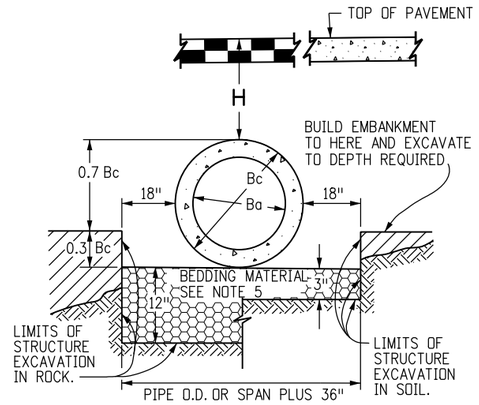


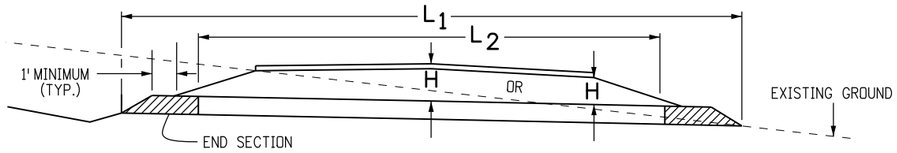
NOTE: Bc IS THE OUTSIDE DIMENSION FOR DIAMETER, SPAN OR RISE.

PIPE INSTALLATION
(WITH 0.7 PROJECTION RATIO)

CIRCULAR (CIR)			VERTICAL ELLIPTICAL (VE)				HORIZONTAL ELLIPTICAL (HE)			
△ PIPE SIZE= *Ba* (INSIDE DIA)	WALL THICKNESS	0.3 *Bc* (OUTSIDE DIA)	SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE	SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE
IN.		FT.	IN.			FT.	IN.			FT.
12	2	0.40								
15	2-1/4	0.49								
18	2-1/2	0.58					23	14	2-3/4	0.49
21	2-3/4	0.66								
24	3	0.75					30	19	3-1/4	0.66
27	3-1/4	0.84					34	22	3-1/2	0.73
30	3-1/2	0.92					38	24	3-3/4	0.79
33	3-3/4	1.01								
36	4	1.10	29	45	4-1/2	1.35	45	29	4-1/2	0.95
42	4-1/2	1.28	34	53	5	1.58	53	34	5	1.10
48	5	1.45	38	60	5-1/2	1.78	60	38	5-1/2	1.23
54	5-1/2	1.62	43	68	6	2.00	68	43	6	1.38
60	6	1.80	48	76	6-1/2	2.23	76	48	6-1/2	1.53
66	6-1/2	1.97	53	83	7	2.43	83	53	7	1.68
72	7	2.15	58	91	7-1/2	2.65	91	58	7-1/2	1.83
78	7-1/2	2.32	63	98	8	2.85	98	63	8	1.98
84	8	2.50	68	106	8-1/2	3.08	106	68	8-1/2	2.13
90	8-1/2	2.68	72	113	9	3.28	113	72	9	2.25
96	9	2.85	77	121	9-1/2	3.50	121	77	9-1/2	2.40
102	9-1/2	3.02	82	128	9-3/4	3.69	128	82	9-3/4	2.54
108	10	3.20	87	136	10	3.90	136	87	10	2.68

△ ALSO EQUIVALENT ROUND DIMENSION FOR ELLIPTICAL PIPE.

DIMENSIONS FOR REINFORCED CONCRETE PIPE
(FOR INFORMATION ONLY)

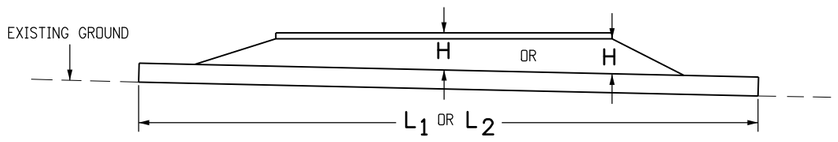


CONCRETE PIPE WITH END SECTIONS
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

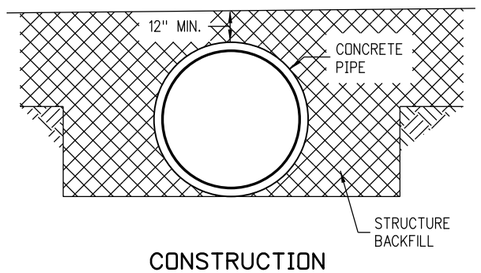
H = HEIGHT OF FILL OVER TOP OF PIPE, INCLUDING PAVEMENT THICKNESS.

L_1 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 624.

L_2 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.



CONCRETE PIPE WITHOUT END SECTIONS
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.



CONSTRUCTION MINIMUM COVER FOR RIGID PIPE

GENERAL NOTES

REINFORCED CONCRETE PIPE

1. FILL HEIGHTS GREATER THAN MAXIMUM ALLOWED IN THE HEIGHTS OF FILL TABLE ON THIS SHEET REQUIRE SPECIAL DESIGN OF STRUCTURE.
2. PIPE DESIGN IS BASED ON SAFETY FACTOR OF 1.33 ON ULTIMATE STRENGTH.
3. THE HEIGHTS OF FILL OVER TOP OF PIPE ARE BASED ON UNIT WEIGHT OF SOIL AT 135 LBS. PER CUBIC FT.
4. PIPE CLASS IS DETERMINED FROM 0.01 IN. CRACK D-LOAD.
5. BEDDING IS CLASS B (MODIFIED) (FROM CONCRETE PIPE DESIGN MANUAL-AMERICAN CONCRETE PIPE ASSOCIATION) WITH SETTLEMENT RATIO R = 0.0 $_{sd}$ (YIELDING BED). BEDDING MATERIAL FOR RIGID PIPE IN SOIL SHALL BE 3 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 2. BEDDING MATERIAL FOR RIGID PIPE IN ROCK SHALL BE 12 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 1.
6. CHANGES IN DESIGN FACTORS REQUIRE COMPENSATING CHANGES IN PIPE DESIGN.
7. MINIMUM WALL THICKNESS DIMENSIONS ARE BASED ON AASHTO M 170 (WALL B) FOR CIRCULAR PIPE, AND AASHTO M 207 FOR ELLIPTICAL PIPE.
8. SPACING FOR MULTIPLE PIPE INSTALLATIONS SHALL CONFORM TO THE DETAILS SHOWN ON STANDARD PLAN M-206-1.
9. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL PIPE INSTALLATION SHALL BE USED.

NONREINFORCED CONCRETE PIPE

1. AT THE OPTION OF THE CONTRACTOR, NONREINFORCED CONCRETE PIPE CONFORMING TO AASHTO M 86 MAY BE USED IN LIEU OF REINFORCED CONCRETE PIPE FOR ALL SIZES 36 INCHES IN DIAMETER AND SMALLER. THE NONREINFORCED CONCRETE PIPE SHALL MEET THE SAME D-LOAD TO PRODUCE THE ULTIMATE LOAD UNDER THE THREE-EDGE BEARING METHOD AS SPECIFIED FOR REINFORCED CONCRETE PIPE IN CONFORMANCE WITH AASHTO M 170. THE CONTRACTOR SHALL PROVIDE WRITTEN CERTIFICATION OF CONFORMACE. THE WALL THICKNESS OF THE NONREINFORCED PIPE MAY BE INCREASED AS REQUIRED TO MEET D-LOAD REQUIREMENT.
2. ALL REQUIREMENTS FOR REINFORCED CONCRETE PIPE, EXCEPT THOSE REFERRING TO REINFORCEMENT, SHALL APPLY TO NONREINFORCED CONCRETE PIPE.

TYPE OF PIPE	HEIGHT OF FILL OVER TOP OF PIPE, H (FEET)				
	CLASS OF PIPE (0.01 IN. CRACK D-LOAD)				
	CLASS CIR II CLASS VE II CLASS HE II 1000 D	CLASS CIR III CLASS VE III CLASS HE III 1350 D	CLASS CIR IV CLASS VE IV CLASS HE IV 2000 D	CLASS CIR V CLASS VE V 3000 D	CLASS VE VI 4000 D
CIRCULAR (CIR)	1 TO 18	1 TO 25	± 25 TO 37	± 37 TO 45	
VERTICAL ELLIPTICAL (VE)	1 TO 18	1 TO 25	± 25 TO 37	± 37 TO 45	± 45 TO 62
HORIZONTAL ELLIPTICAL (HE)	1 TO 18	1 TO 25	± 25 TO 37		

ALLOWABLE RANGE OF HEIGHTS FOR FILL OVER REINFORCED CONCRETE PIPE
(ALL SIZES)

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Colorado Department of Transportation
2829 West Howard Place
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Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
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REINFORCED CONCRETE PIPE

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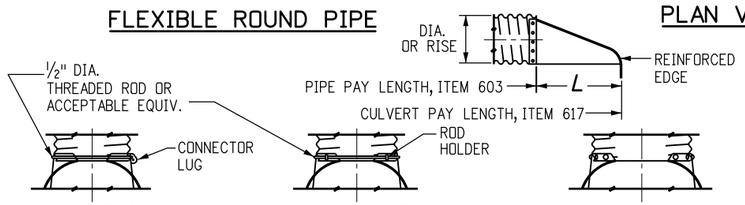
STANDARD PLAN NO.
M-603-2
Standard Sheet No. 1 of 1
Project Sheet Number:

PIPE DIA.	THICKNESS	DIMENSIONS					
		A	B	H	L	W	T
		IN.					
12	0.064	6	6	6	21	24	34
18	0.064	8	10	6	31	36	46
21	0.064	9	12	6	36	42	52
24	0.064	10	13	6	41	48	58
30	0.079	12	16	8	51	60	70
36	0.079	14	19	9	60	72	94
42	0.109	16	22	11	69	84	106
48	0.109	18	27	12	78	90	112
54	0.109	18	30	12	84	102	124
60	0.109	18	33	12	87	114	136
66	0.109	18	36	12	87	120	142
72	0.109	18	39	12	87	126	148
78	0.109	18	42	12	87	132	154
84	0.109	18	45	12	87	138	160

FLEXIBLE ROUND PIPE



TYPE 1

FOR 18 IN. THRU 24 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

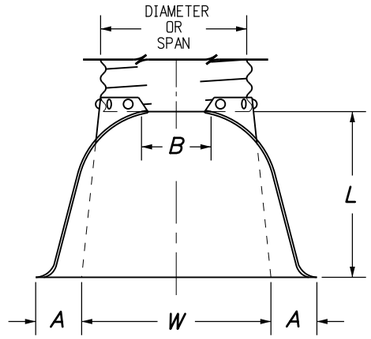
TYPE 2

FOR 30 IN. THRU 36 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

TYPE 3

FOR 42 IN. THRU 84 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS AND ALL SIZES WITH HELICAL CORRUGATIONS AND FOR ALL METAL PIPE ARCH CULVERTS. SHOP ATTACH A 24 IN. MIN. LENGTH OF ANNULAR PIPE WITH GALV. RIVETS OR BOLTS, SPOT WELDS, OR 2 IN. LONG SKIP WELDS ON 8 IN. CTRS. REPAIR BURNT GALVANIZING IN ACCORDANCE WITH SUBSECTION 707.09.

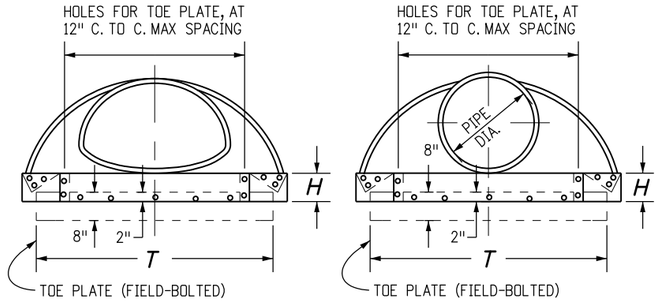
TYPICAL CONNECTIONS



PLAN VIEW

PIPE ARCH SPAN x RISE	THICK-NESS	DIMENSIONS					
		A (±1")	B (MAX.)	H (±1")	L (±1.5")	W (±2")	T
		IN.					
21 x 15	0.064	7	10	6	23	36	46
24 x 18	0.064	8	12	6	28	42	52
28 x 20	0.064	9	14	6	32	48	58
35 x 24	0.079	10	16	6	39	60	70
42 x 29	0.079	12	18	8	46	75	85
49 x 33	0.109	13	21	9	53	85	103
57 x 38	0.109	18	26	12	63	90	108
64 x 43	0.109	18	30	12	70	102	120
71 x 47	0.109	18	33	12	77	114	132

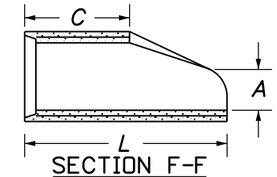
FLEXIBLE PIPE ARCH



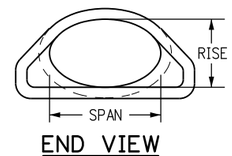
ELEVATIONS

GENERAL NOTES

1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL PIPE REQUIRED TO PROVIDE THE DESIGN LENGTH SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. THE INSIDE CONFIGURATION AND THE JOINT OF CONCRETE END SECTION AND PIPE SHALL MATCH.
5. END SECTIONS FOR CMP ARCH PIPE SHALL MATCH THE DIMENSIONS OF THE PIPE SHOWN ON THE PLANS.
6. GALVANIZED TOE PLATE AS SHOWN IS REQUIRED ON END SECTIONS FOR CORRUGATED STEEL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH ⅜ IN. GALVANIZED BOLTS, NUTS AND WASHERS.
7. GALVANIZED STEEL SHALL CONFORM TO AASHTO M 111, M 218 OR M 232.
8. CONCRETE PIPE JOINT FASTENERS, WHERE SHOWN ON PLANS, SHALL BE INSTALLED SO THAT A MINIMUM OF 15 LINEAR FEET OF THE OUTLET END OF THE PIPE ARE MECHANICALLY LOCKED TOGETHER. END SECTION LENGTHS WHEN USED, SHALL BE INCLUDED IN THE 15 LF REQUIREMENT.
9. CONNECTIONS OF METAL END SECTIONS TO PLASTIC PIPE SHALL BE APPROVED BY THE ENGINEER. PLASTIC END SECTIONS SHALL NOT BE USED.
10. THE END SECTION STYLE, EITHER REGULAR OR SAFETY, SHALL BE AS SHOWN ON THE PLANS.
11. AT THE OPTION OF THE CONTRACTOR AND APPROVAL OF THE CDOT PROJECT ENGINNER, REINFORCED CONCRETE END SECTIONS MAY BE MADE WITH SYNTHETIC FIBERS INSTEAD OF STEEL FOR PIPES 36 INCHES IN DIAMETER AND SMALLER, AND CONFORM TO AASHTO M 86 AND SUBSECTION 601.03.

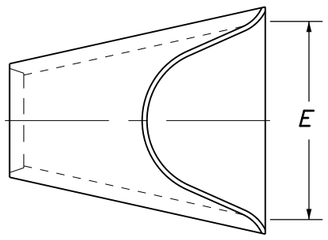


SECTION F-F



END VIEW

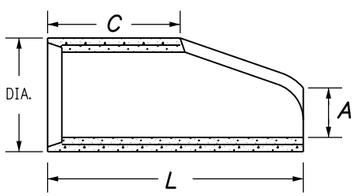
END SECTION AND CONNECTION DETAILS FOR ROUND AND ARCH METAL PIPES



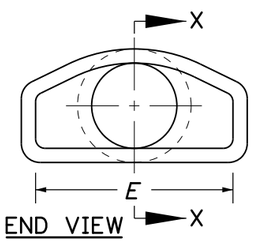
PLAN

PIPE I.D.	DIMENSIONS			
	A	C	L	E
	IN.			
18	10	48	78	36
24	10	48	78	48
30	14	36	96	60
36	18	36	96	72
42	24	36	96	78
48	28	24	96	84
54	30	36	96	90
60	36	36	96	96
72	34	20	96	108

REINFORCED CONCRETE CIRCULAR PIPE

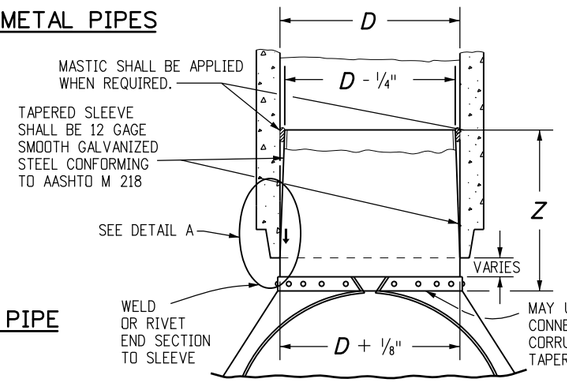


SECTION X-X



END VIEW

END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE

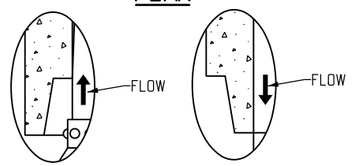


D	Z (MIN.)
IN.	
18 - 24	12
30 AND 36	16
42 AND LARGER	24

NOTE: METAL END SECTION SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING.

STEEL END SECTION FOR CONCRETE CIRCULAR PIPE

(ALTERNATIVE FOR CONCRETE END SECTION)



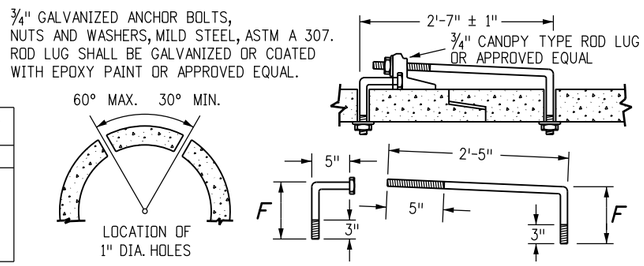
PLAN

DETAIL A

PIPE DIAMETER	F
IN.	
18 - 30	5
36 - 42	6
48 - 60	7
72 - 84	9

EQUIVALENT CIRCULAR DIA.	DIMENSIONS					
	NOMINAL SPAN x RISE	A	C	L	E	
	IN.					
24	30 x 19	9	33	72	48	
30	38 x 24	10	18	72	60	
36	45 x 29	12	24	84	72	
42	53 x 34	16	36	96	78	
48	60 x 38	21	36	96	84	
54	68 x 43	26	36	96	90	
60	76 x 48	30	36	96	96	

END SECTION FOR REINFORCED CONCRETE ELLIPTICAL PIPE



CONCRETE JOINT FASTENER (TWO PER JOINT)

Computer File Information		Sheet Revisions	
		Date:	Comments
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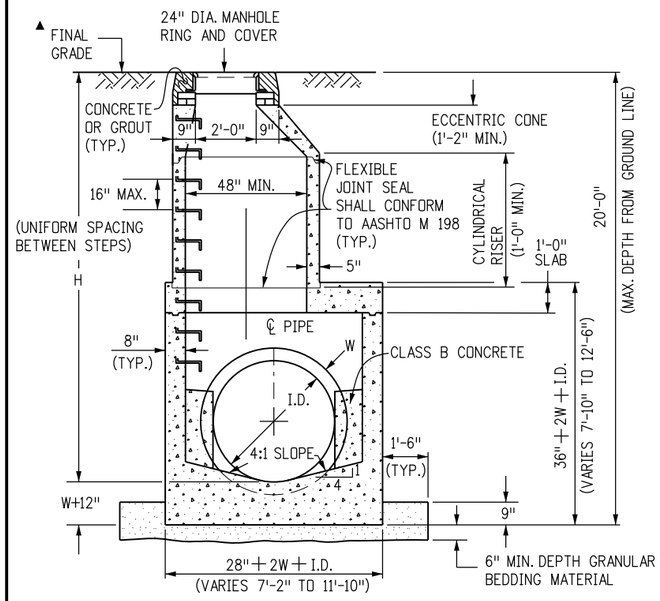
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

CONCRETE AND METAL END SECTIONS

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-603-10
Standard Sheet No. 1 of 1
Project Sheet Number:



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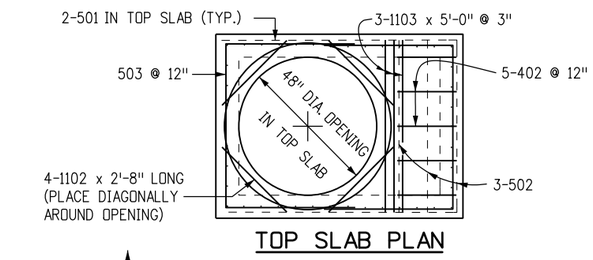
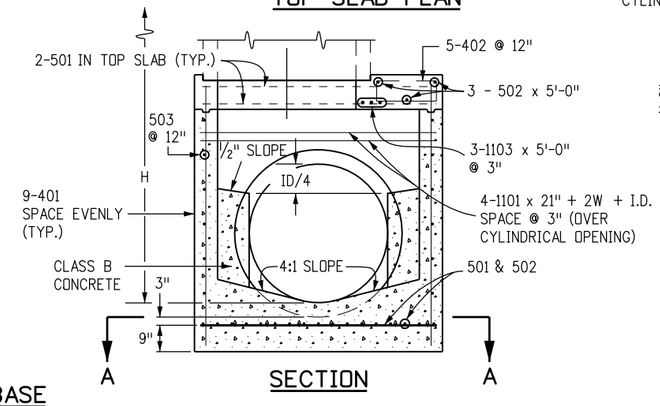


TOP SLAB PLAN



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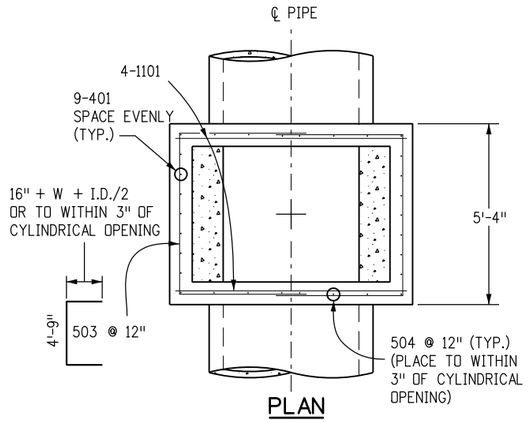
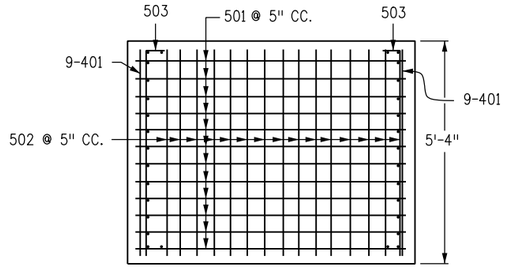


PLAN



SECTION A-A
(STEEL IN BOTTOM OF BASE)

GENERAL NOTES

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

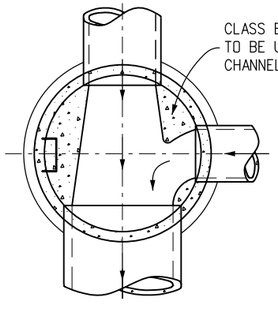
▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.

MAHHOLE BOX BASE

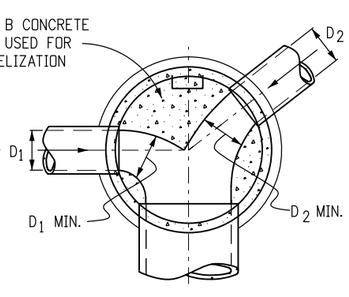
MARK	SIZE	TYPE	WT. #/FT.	BARS	I.D. 54"	60"	66"	72"	84"	96"	FORMULAS
401	4	I	0.668	NO. REQ'D.	18	18	18	18	18	18	401
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-0"	12'-2"	BAR LENGTH = 32" + 2W + I.D.
				WEIGHT *	97.2	104.2	111.2	118.2	132.3	146.3	
402	4	III	0.668	NO. REQ'D.	5	5	5	5	5	5	402
				LENGTH	5'-5"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

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

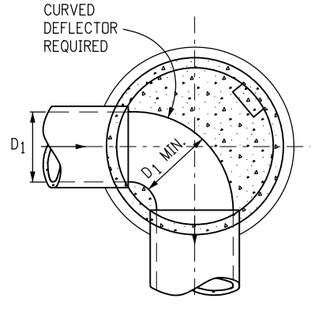
QUANTITIES FOR CONCRETE MANHOLE BOX BASE



THROUGH PIPE ONE LATERAL



ANGLED LATERALS



SHARP ANGLE

TYPICAL CHANNELIZATION DETAILS

Computer File Information		Sheet Revisions	
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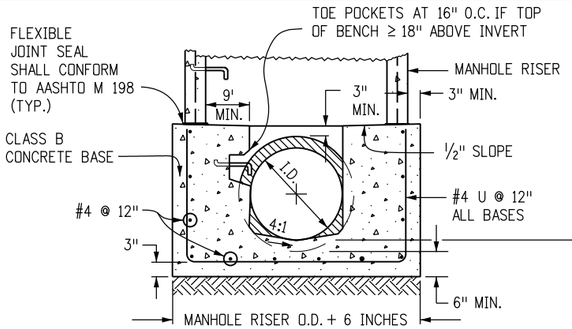
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

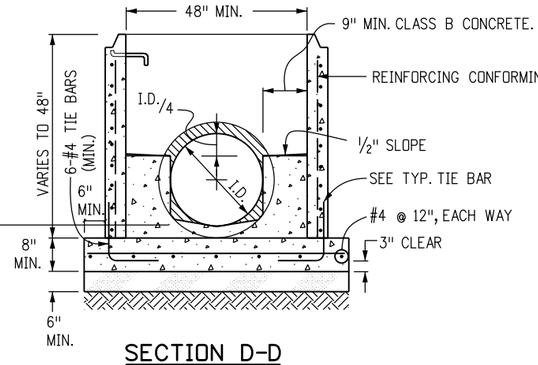
MANHOLES

Issued by the Project Development Branch: July 31, 2019

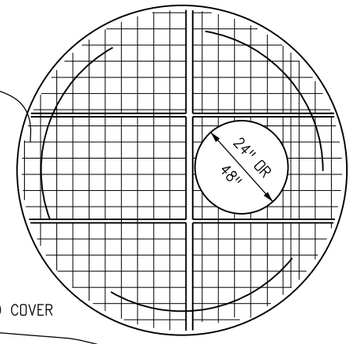
STANDARD PLAN NO.
M-604-20
Standard Sheet No. 1 of 3
Project Sheet Number:

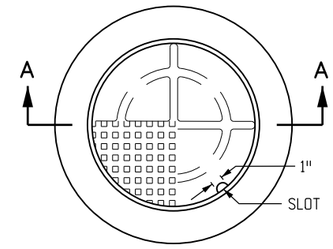


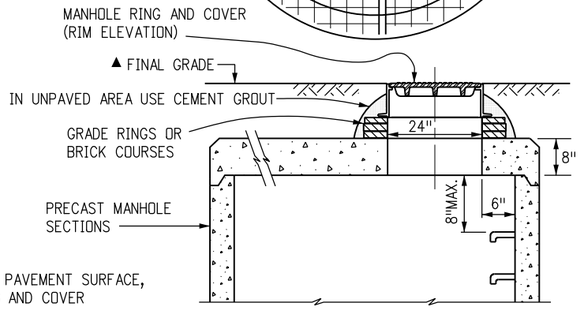
SECTION B-B



SECTION D-D

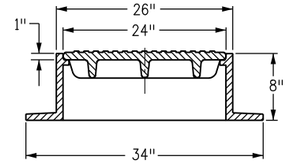






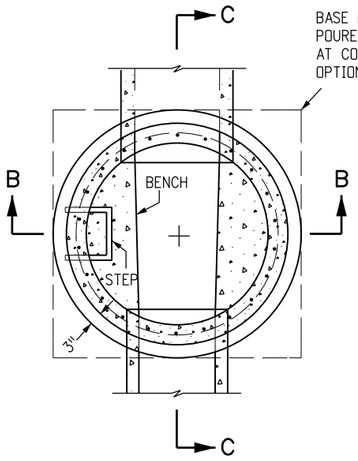
▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER ¼" MIN. TO ½" MAX.

FLAT TOP SECTION DETAIL

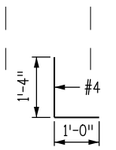


TOTAL WEIGHT: APPROXIMATELY 400 LBS. SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06.

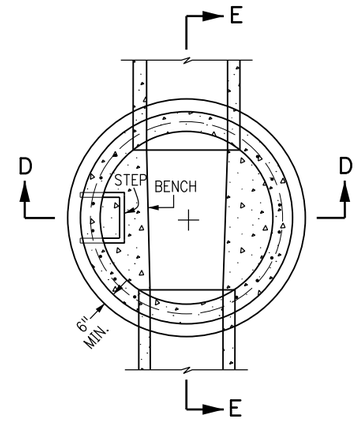
SECTION A-A
MANHOLE RING AND COVER



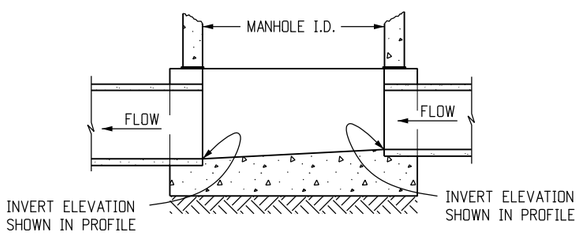
PLAN



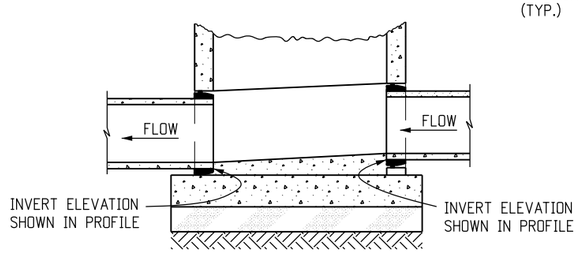
TYPICAL TIE BAR



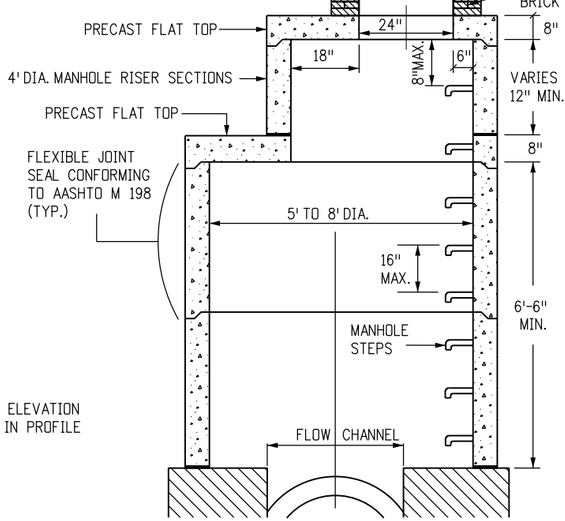
PLAN



SECTION C-C
CAST-IN-PLACE SLAB BASE



SECTION E-E
PRECAST SLAB BASE



MANHOLE RISER DETAIL

LEGEND

- SUITABLE SUBGRADE
- GRANULAR BEDDING MATERIAL
- CONCRETE

PRECAST MANHOLE BASES NOTES:

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

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2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
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MANHOLES

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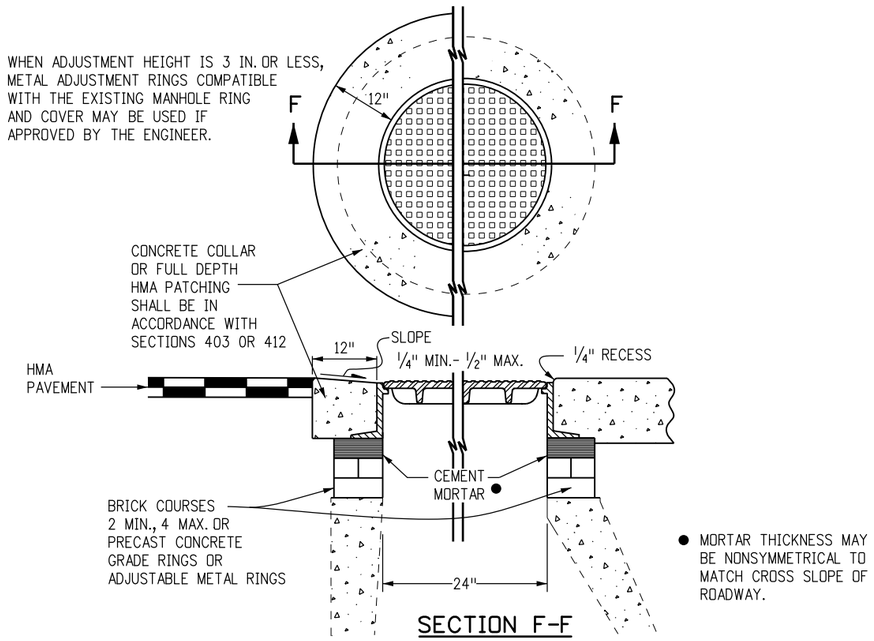
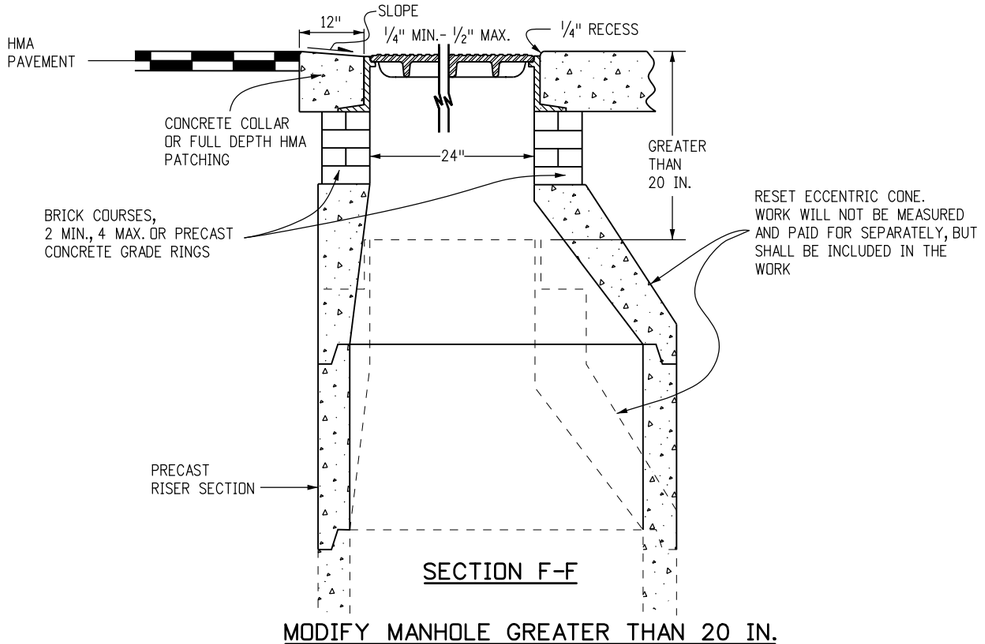
WHEN ADJUSTMENT HEIGHT IS 3 IN. OR LESS, METAL ADJUSTMENT RINGS COMPATIBLE WITH THE EXISTING MANHOLE RING AND COVER MAY BE USED IF APPROVED BY THE ENGINEER.



● MORTAR THICKNESS MAY BE NONSYMMETRICAL TO MATCH CROSS SLOPE OF ROADWAY.

SECTION F-F

ADJUST MANHOLE 20 IN. OR LESS



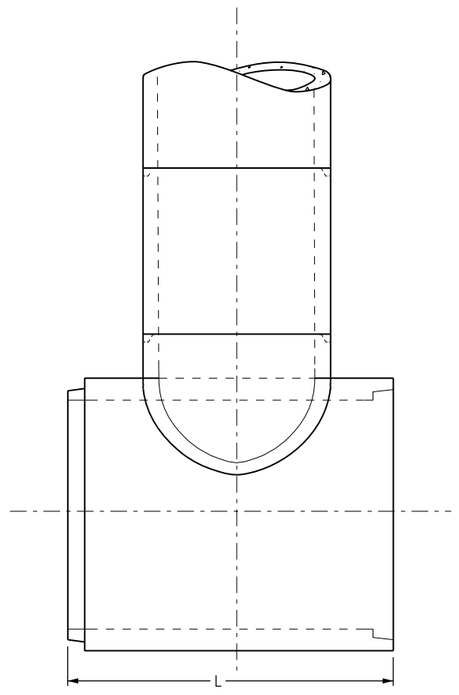
SECTION F-F

MODIFY MANHOLE GREATER THAN 20 IN.

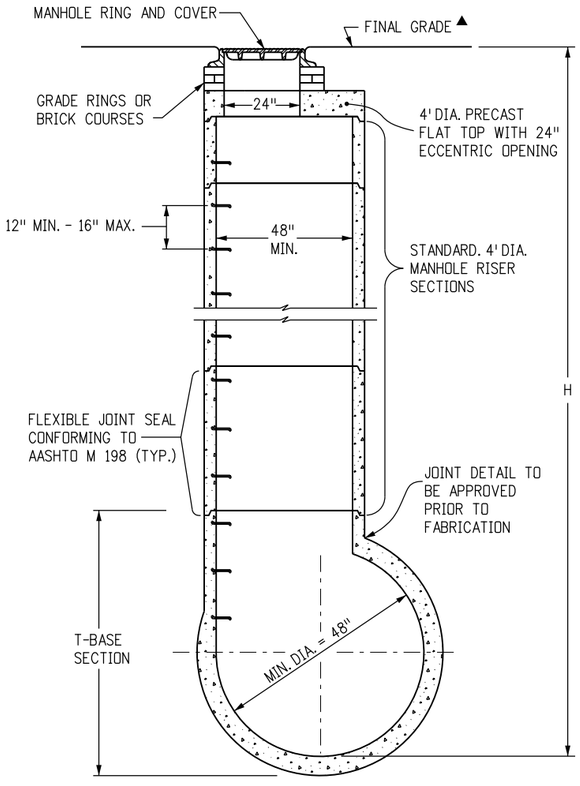
T-BASE MANHOLES NOTES

1. THE T-BASE SECTION SHALL BE SHOP-FABRICATED FOR DELIVERY TO THE CONSTRUCTION SITE AS A COMPLETE UNIT.
2. THESE DETAILS SHOW ONLY THE CONCEPTUAL AND STANDARD DIMENSIONAL REQUIREMENTS FOR TYPE T-BASE MANHOLES. THE CONTRACTOR SHALL FURNISH DETAILED SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION. THE DETAILS SHOWN HEREIN APPLY ONLY TO 48 IN. AND GREATER DIAMETER PIPES.
3. EXCEPT FOR CLASS OF PIPE, SPECIFICATIONS FOR THE MANHOLE SHALL BE THE SAME AS THOSE REQUIRED FOR THE ADJOINING PIPE.
4. THE T-BASE SECTION SHALL MAINTAIN ITS INTERNAL SHAPE AND FLOW AREA. GROUTING OR FILLING SHALL BE APPLIED SO AS TO NOT DISTURB THE NORMAL FLOW OR REDUCE THE AREA.

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



CIRCULAR RIGID PIPE (LONGITUDINAL SECTION)



CIRCULAR RIGID PIPE (TRANSVERSE SECTION)

MANHOLE T-BASE

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MANHOLES

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GENERAL NOTES

1. ALL MATERIAL DIMENSIONS AND WEIGHTS ON THIS STANDARD ARE NOMINAL UNLESS OTHERWISE INDICATED.

2. AT EACH LOCATION WHERE AN ELECTRIC TRANSMISSION, DISTRIBUTION OR SECONDARY LINE CROSSES A WOOD POST FENCE, THE CONTRACTOR SHALL FURNISH AND INSTALL A GROUND CONFORMING TO ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. THE GROUND ROD SHALL BE A MINIMUM DIAMETER OF 1/2 IN. AND 8 FT. IN LENGTH, AND DRIVEN AT LEAST 7 1/2 FT. INTO THE GROUND. THE ROD SHALL BE CONNECTED TO EACH WIRE WITH A MINIMUM AWG NO. 8 STRANDED COPPER WIRE. GROUNDING WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

   A METAL LINE POST SHALL BE INSTALLED A MAXIMUM OF EVERY 500 FT. ALONG A WOOD POST FENCE. THE METAL POST SHALL BE WITHIN 1 FT. OF THE NEAREST WOOD POST, AND SHALL BE TIED TO EACH STRAND WITH A WIRE CLAMP.

3. DIMENSIONS SHOWN FOR "STANDARD" AND "ALTERNATIVE" APPLY FOR BOTH WOOD AND METAL POST FENCE.

4. FENCE WIRE SHALL BE ENDED, DOUBLE WRAPPED AND TIED OFF AT END POSTS, ANGLE POSTS AND LINE BRACE POSTS. FENCE TO BE CONTINUED SHALL THEN BE RESTARTED IN THE SAME MANNER.

5. FENCE WIRE SHALL BE PLACED ON EITHER ROAD OR FIELD SIDE OF POSTS, DEPENDING ON LOCAL CONDITIONS, i.e. ON CURVES, THE WIRE SHALL BE PLACED ON THE SIDE OF THE POST WHICH WILL RESULT IN THE LEAST TENSION ON FENCE TIES. THIS WILL ALSO APPLY WHERE WIND DRIFT, TUMBLE WEEDS OR OTHER CONDITIONS WOULD EXERT UNUSUAL PRESSURE AGAINST THE WIRE. WHERE POSSIBLE, WIRE SHOULD BE PLACED ON THE LIVESTOCK SIDE OF THE POSTS.

6. WHERE STEEL POSTS ARE SPECIFIED, EVERY FIFTH POST SHALL BE WOOD, WHEN SPECIFIED ON THE PLANS.

7. RIGHT OF WAY FENCES SHALL BE CONSTRUCTED APPROXIMATELY 6 IN. INSIDE THE BOUNDARY OF THE RIGHT OF WAY AS SHOWN ON THE PLANS, OR AS STAKED.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING DISTURBED OR DESTROYED SURVEY MONUMENTS TO THE APPROPRIATE ACCURACY IN ACCORDANCE WITH SUBSECTION 625.08 OF THE STANDARD SPECIFICATIONS.

WOOD POSTS:

ALL LINE POSTS SHALL HAVE A MINIMUM DIAMETER OF 4 IN. AND BE A MINIMUM OF 6 FT.-0 IN. LONG.

ALL END, CORNER, INTERSECTION AND BRACE POSTS SHALL HAVE A MINIMUM DIAMETER OF 5 IN. AND BE 7 FT. IN LENGTH.

WOOD POSTS HAVING NONUNIFORM CROSS SECTION SHALL BE SET WITH THE LARGER DIAMETER END IN THE GROUND.

FENCE WIRE SHALL BE STAPLED TO WOOD POSTS OR TIED TO METAL POSTS AS SHOWN MARKED ✚ ON BARBED WIRE OR COMBINATION WIRE FENCE DETAILS. STAPLES SHALL BE NO. 9 WIRE MINIMUM, AND AT LEAST 1 1/2 IN. LONG.

METAL POSTS:

ALL POSTS AND BRACES SHALL BE THE TYPES AND WEIGHTS SHOWN OR ACCEPTABLE EQUIVALENTS, AND SHALL BE IN ACCORDANCE WITH AASHTO M 281. HOLES SHALL BE PROVIDED IN END, CORNER, AND GATE POSTS AS DETAILED.

CORNER AND LINE BRACE POSTS:

TYPE: 2 1/2 IN. x 2 1/2 IN. x 1/4 IN. STRUCTURAL STEEL ANGLES
WEIGHT: 4.10 LBS./LIN. FT.
LENGTH: 6 FT.-6 IN. MIN.
NUMBER OF BRACES: TWO

LINE POSTS:

TYPE: "STUDDED TEE" OR "U"
WEIGHT: 1.33 LBS./LIN. FT. (WITHOUT ANCHOR)
LENGTH: 6 FT.-0 IN. MINIMUM
ANCHOR: SECURELY FASTENED, WITH BEARING SURFACE SUFFICIENT TO RESIST MOVEMENT OF POST. WEIGHT: 0.67 LB.

METAL END POSTS AND GATE POSTS:

TYPE: 2 1/2 IN. x 2 1/2 IN. x 1/4 IN. STRUCTURAL STEEL ANGLES
WEIGHT: 4.10 LBS./LIN. FT.
NUMBER OF BRACES: ONE
LENGTH: END, 6 FT.-6 IN. MINIMUM. PANEL GATE, 7 FT.-0 IN. MINIMUM.

BRACES: (FOR CORNER, END OR LINE BRACE POSTS)

TYPE: 2 IN. x 2 IN. x 1/4 IN. STRUCTURAL STEEL ANGLES
WEIGHT: 3.19 LBS./LIN. FT.
LENGTH: SAME AS CORNER AND END POSTS USED.

FOOTINGS OR BASES:

CONCRETE SHALL BE CLASS B.
CONCRETE WITH LIGHTWEIGHT AGGREGATES CONFORMING TO AASHTO M 195 (ASTM C 330) WILL BE PERMITTED.

ALTERNATIVES: (CONTRACTOR'S OPTION)

END, CORNER AND LINE BRACE POSTS

TYPE	I.D.	O.D.	WEIGHT	WALL THICKNESS
	INCHES	INCHES	LB/FT.	INCHES
1. STD. GALV. PIPE	2 1/2	2 7/8	5.79 ± 5%	0.203
2. H.S. COLD ROLLED PIPE	2 1/2	2 7/8 ± 0.16	4.64 ± 5%	0.160 ± 5%

LENGTHS SHALL BE 6 FT.-6 IN. MINIMUM

BRACES:

TYPE: 1 3/8 IN. O.D. TUBULAR STEEL WITH 2 1/2 IN. BRACE BAND, HINGE BOLT AND 1 3/8 IN. I.D. RAIL END; ALL GALVANIZED.
WEIGHT: 16 LBS/LIN. FT. ± 5%
LENGTH: 6 FT.-6 IN. MINIMUM.

BARBED WIRE:

ZINC-COATED STEEL BARBED WIRE SHALL CONFORM TO AASHTO M 280, (ASTM A 121), 12-1/2 GAGE WITH CLASS 1 COATING, OR ALUMINUM-COATED STEEL BARBED WIRE CONFORMING TO ASTM A 585 TYPE 1.

WOVEN WIRE MESH:

WOVEN WIRE USED IN COMBINATION WIRE FENCE SHALL BE GALVANIZED AND CONFORM TO AASHTO M 279, (ASTM A 116) COATING CLASS 1, AND THE FOLLOWING:

STANDARD WOVEN WIRE FIELD FENCE, STYLE OR DESIGN NO.	ALTERNATIVE 4 IN. X 4 IN. WIRE "V" MESH
832-6-11* 32 IN. WIDTH 0.65 LBS/LIN.FT.	34 IN. WIDTH - 0.75 LBS/LIN.FT.
726-6-11* 26 IN. WIDTH 0.55 LBS/LIN.FT.	26 IN. WIDTH - 0.54 LBS/LIN.FT.
	CROSS WIRES-1 STRAND-14-1/2 GAGE MIN. HORIZONTAL-2 STRAND-12-1/2 GAGE

* 12-1/2 GAGE WOVEN WIRE FENCE FABRIC (832-6-12-1/2 OR 726-6-12-1/2) MAY BE USED WHEN SPECIFIED IN THE CONTRACT.

ALL FENCE WIRE TIES, CLIPS, CLAMPS, STAPLES AND OTHER WIRE APPURTENANCES SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232.

DRIVEWAY GATES (SINGLE):

HEIGHT: 42 IN.
WEIGHT: NOT LESS THAN 90 LBS. COMPLETE WITH LATCH AND HINGES.
WIDTH OF GATE OPENING: 16 FT.-0 IN. MINIMUM TO 20 FT.-0 IN. MAXIMUM.
GATE FRAME: 1 IN. I.D. STANDARD GALVANIZED PIPE OR ACCEPTABLE EQUIVALENT AND SHALL BE OF ALL WELDED CONSTRUCTION.

WOVEN WIRE SHALL ENCLOSE THE GATE FRAME AS SHOWN AND SHALL BE THE SAME WOVEN WIRE DESIGN AS THE FENCE, OR AS APPROVED BY THE ENGINEER.

ALTERNATIVE DRIVEWAY GATES (SINGLE PANEL):

WEIGHT: GALVANIZED STEEL, 75 LBS.
HEIGHT: APPROXIMATELY 42 IN. (5 PANELS),
WIDTH OF GATE OPENING: 16 FT.-0 IN. MINIMUM TO 20 FT.-0 IN. MAXIMUM.

GATES SHALL BE OF RIVETED CONSTRUCTION AS FOLLOWS:
MINIMUM FOUR NO. 10 RIVETS AT EACH RIGHT ANGLE CONNECTION AND WHERE DIAGONAL BRACES CONNECT TO HORIZONTAL PANELS.

MINIMUM THREE NO. 10 RIVETS WHERE DIAGONAL BRACES CONNECT TO TOP AND BOTTOM PANELS.

WALK GATES:

HEIGHT: APPROXIMATELY 42 IN. (5 PANELS)
WEIGHT: GALVANIZED STEEL, 16 LBS.; TEMPERED ALUMINUM, 10 LBS.
WIDTH OF GATE OPENING: 3 FT.-0 IN. MINIMUM.

ALTERNATIVE WALK GATES:

HEIGHT: 42 IN.
WEIGHT: NOT LESS THAN 18 LBS. COMPLETE WITH LATCH AND HINGES.
WIDTH OF GATE OPENING: 3 FT.-0 IN. MINIMUM.
GATE FRAME: 3/4 IN. I.D. STANDARD GALVANIZED PIPE OR ACCEPTABLE EQUIVALENT AND SHALL BE OF ALL-WELDED CONSTRUCTION.

WOVEN WIRE SHALL BE OF THE SAME CONSTRUCTION DESIGNATED FOR DRIVEWAY GATE.

ALTERNATIVE EQUIVALENT STANDARD METAL GATES OTHER THAN SHOWN WILL BE ACCEPTABLE SUBJECT TO THE ENGINEER'S APPROVAL.

IN LIEU OF GALVANIZED FINISH ON GATE FRAMES, CADMIUM-PLATED PIPE OR ALUMINUM PAINTING WILL BE ACCEPTED.

LATCHES AND HINGES:

GALVANIZED STEEL OR ALUMINUM OF STANDARD MANUFACTURE. HINGES SHALL BE PLACED AS SHOWN TO PREVENT THEFT.

IN LIEU OF STANDARD MAKE LATCHES, THE CONTRACTOR MAY USE AN ELECTRO-GALVANIZED CHAIN, EYEBOLT AND SNAPHOOK TYPE LATCH.

EYEBOLT, CHAIN AND SNAPHOOK ASSEMBLY SHALL BE SECURED TO LATCH SIDE OF GATE. GATE CLOSURE MAY BE ACCOMPLISHED BY WRAPPING CHAIN AROUND END POST AND SNAPPING HOOK INTO CHAIN.

WOOD STAYS:

WOOD STAYS SHALL BE UNTREATED NATIVE TIMBER. STAY DIMENSIONS SHALL BE 2 IN. x 2 IN. NOMINAL MINIMUM (1 1/2 IN. x 1 1/2 IN.).
WOOD STAYS MAY BE STAPLED, OR DRILLED AND TIED WITH WIRE.
METAL STAYS MAY BE TIED TO THE BOTTOM WIRE.

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Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
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WIRE FENCES AND GATES

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M-607-1

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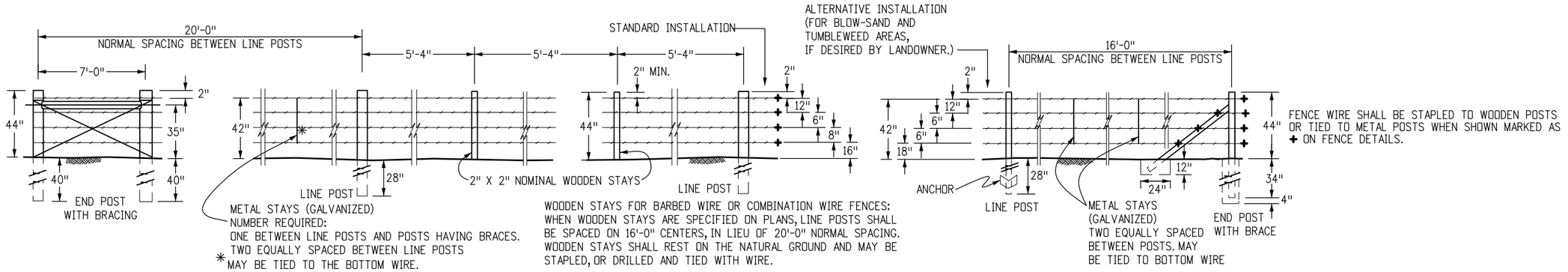
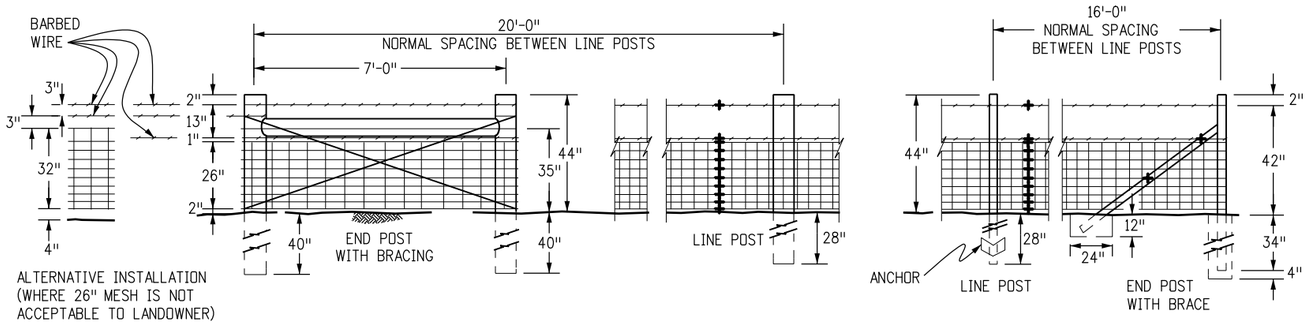


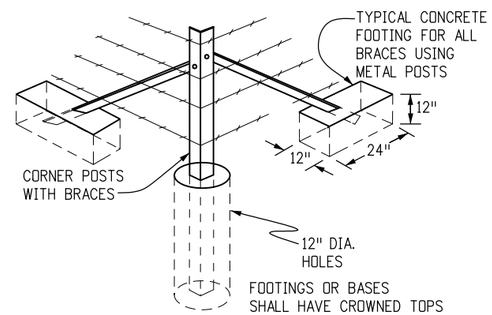
BARBED WIRE FENCE WITH WOODEN POSTS

BARBED WIRE FENCE WITH METAL POSTS

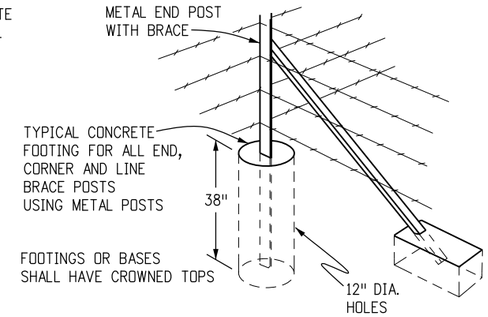


COMBINATION WIRE FENCE WITH WOODEN POSTS

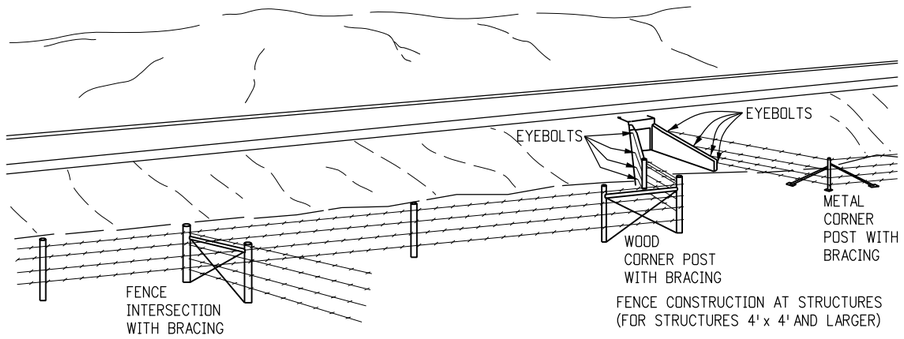
COMBINATION WIRE FENCE WITH METAL POSTS



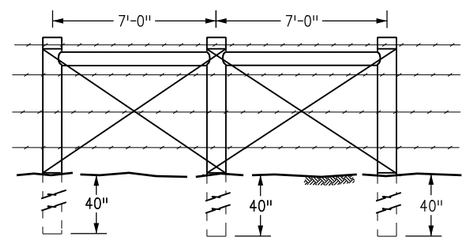
TYPICAL CORNER POST INSTALLATION

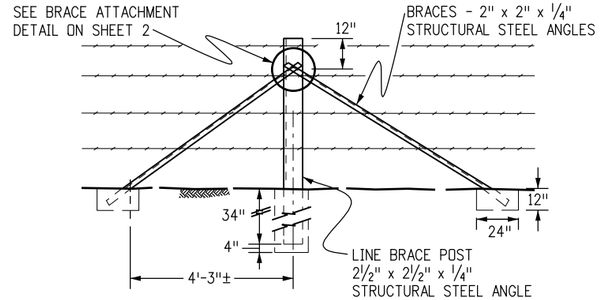


TYPICAL INSTALLATION AT FENCE INTERSECTIONS



FENCE CONSTRUCTION AT STRUCTURES
(FOR STRUCTURES 4' x 4' AND LARGER)





NOTES

1. AT ALL STRUCTURES OF 4 FT. x 4 FT. AND LARGER, THE FENCE SHALL END AT THE EYEBOLTS IN THE WINGS OF THE STRUCTURE. WHERE THE TYPE OF STRUCTURE PROHIBITS THE USE OF EYEBOLTS, AN END POST WITH BRACE SHALL BE USED.
2. EYEBOLTS SHALL BE MADE OF ½ IN. ROUND BARS WITH A MINIMUM OF 6 IN. OF BODY LENGTH EMBEDDED (HOOKED OR BENT) IN FRESH CONCRETE.
3. FOR EYEBOLTS IN EXISTING CONCRETE, THE ½ IN. ROUND BARS SHALL BE DEFORMED AND GROUTED INTO DRILLED HOLES.
4. EYEBOLTS SHALL HAVE A MINIMUM OF 1 IN. INSIDE EYE DIAMETER.
5. EYEBOLTS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. EYEBOLTS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

LINE BRACES

WHEN GATES, ANGLES, CORNERS OR INTERSECTING FENCES ARE NOT REQUIRED, LINE BRACES SHALL BE SPACED AS FOLLOWS:
METAL POSTS - 800 FT. INTERVALS
WOOD POSTS - 1,400 FT. INTERVALS

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WIRE FENCES AND GATES

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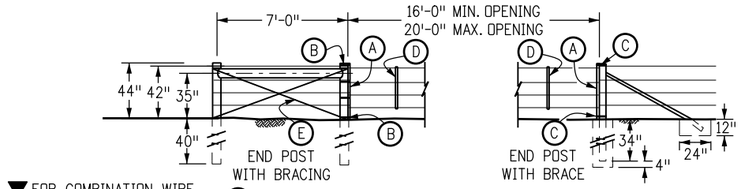
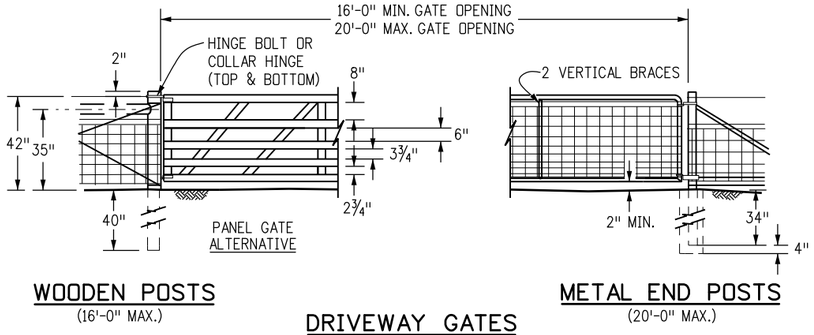


▼ FOR COMBINATION WIRE GATE, USE 34" MESH AND ONE STRAND OF BARBED WIRE. EXTEND WOODEN STAYS TO GROUND.

(A) 2 IN. x 4 IN. x 4 FT. WOODEN STAYS
(B) FOUR NO. 12-1/2 GA. WIRE LOOPS TO ACT AS HINGES
(C) NO. 12-1/2 GA. WIRE LOOPS
(D) TWO 2 IN. x 2 IN. NOMINAL WOODEN STAYS EQUALLY SPACED
(E) NO. 12-1/2 GA. BRACE WIRE, DOUBLE STRAND

WOODEN POSTS — METAL END POSTS

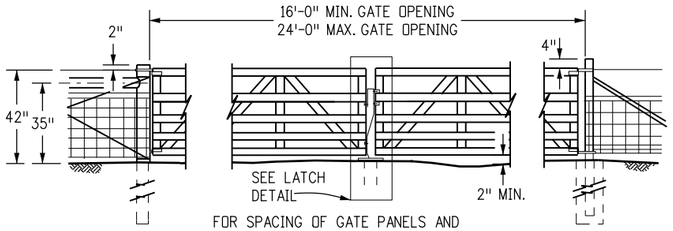
▼ BARBED WIRE GATE



WOODEN POSTS (16'-0" MAX.) — METAL END POSTS (20'-0" MAX.)

DRIVEWAY GATES

(METAL AND WOOD END POSTS SHALL BE BRACED SAME AS FOR BARBED WIRE GATES)

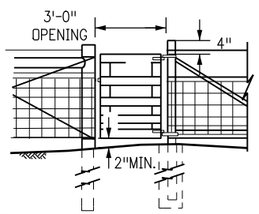


WOODEN POSTS — PANEL GATE POSTS

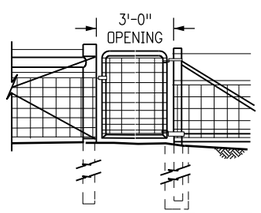
TWIN DRIVEWAY GATES

(METAL AND WOOD END POSTS SHALL BE BRACED SAME AS FOR BARBED WIRE GATES)

FOR SPACING OF GATE PANELS AND LENGTH OF POSTS, SEE DETAIL ABOVE.



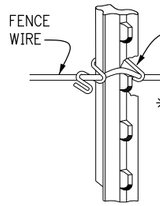
FOR LENGTH OF POSTS AND SPACING OF WIRE AND GATE PANELS, SEE DRIVEWAY GATE DETAIL ABOVE.



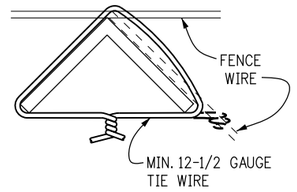
WOODEN POSTS PANEL GATE POSTS
WALK GATE

WOODEN POSTS METAL END POSTS
ALTERNATIVE WALK GATE

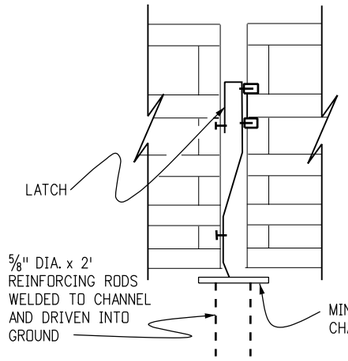
(METAL AND WOOD END POSTS SHALL BE BRACED SAME AS FOR BARBED WIRE GATES)



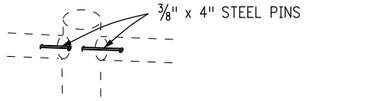
TIES FOR "STUDDED TEE" OR "U" POSTS



TIES FOR ANGLE POSTS FENCE WIRE TIES

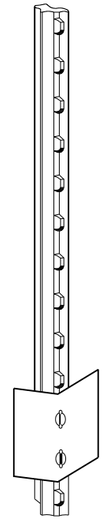


LATCH DETAIL

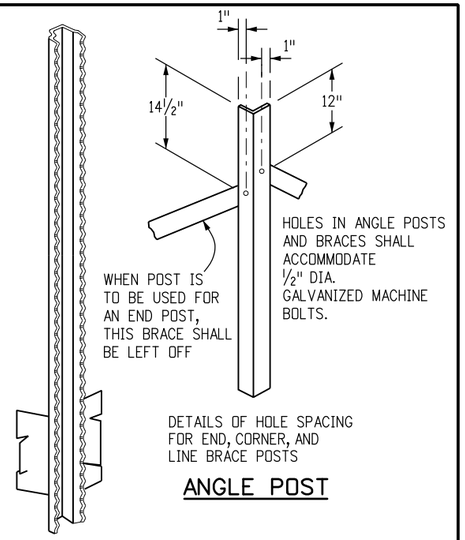


BORE A ⅜" x 2" HOLE IN EACH POST AND BRACE TO RECEIVE THE PINS. WRAP THE ENDS OF THE BRACES TIGHTLY WITH SEVERAL TURNS OF 12-½ GA. SMOOTH GALV. WIRE TO PREVENT SPLITTING OR NOTCH POST AND NAIL WITH 40d COMMON NAILS.

CROSS BRACE DOWELING DETAIL

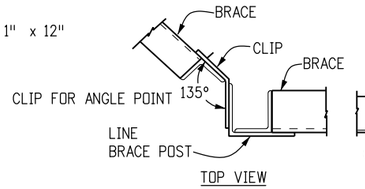


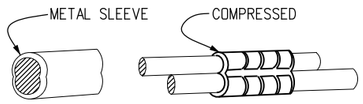
STUDDED "TEE" LINE POST



"U" LINE POST
ANGLE POST

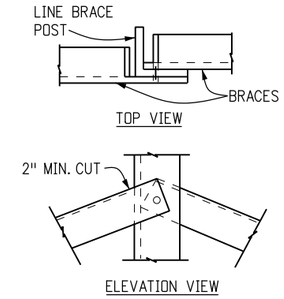
TYPICAL METAL POSTS



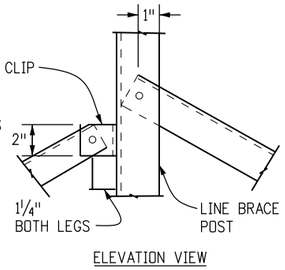


SPLICING SLEEVE SHALL BE APPROVED BY THE ENGINEER

WIRE SPLICE



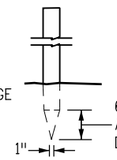
⌀ BRACE ATTACHMENT DETAIL



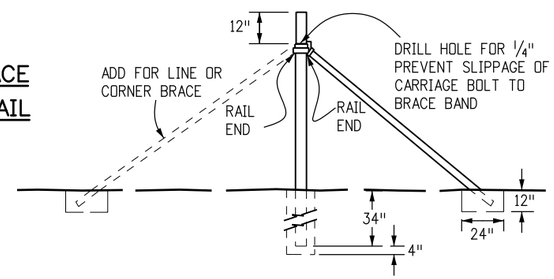
⌀ ALTERNATIVE BRACE ATTACHMENT DETAIL

⌀ ALTERNATIVE ATTACHMENT METHODS, ACCEPTABLE TO THE ENGINEER, MAY BE USED.

WOODEN POSTS MAY BE DRIVEN IN LIEU OF SETTING AND TAMPING, AT THE OPTION OF THE CONTRACTOR. DRIVING METHODS SHALL NOT DAMAGE POST.



POST POINTING



ALTERNATIVE POST

(FOR END, CORNER OR LINE BRACE POSTS)

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Designer Initials: JBK	(R-X)		
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Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
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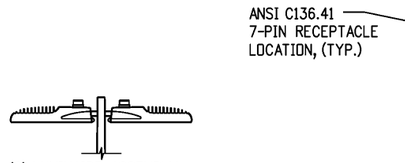
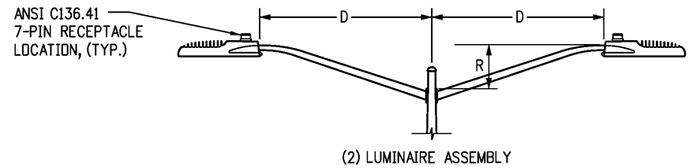
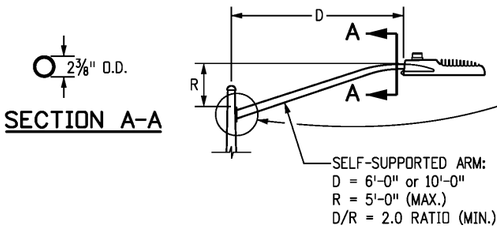
WIRE FENCES AND GATES

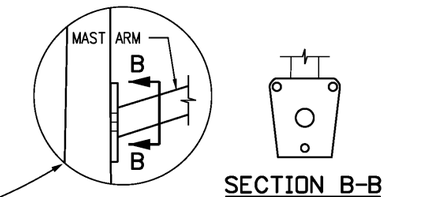
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-607-1
Standard Sheet No. 3 of 3
Project Sheet Number:









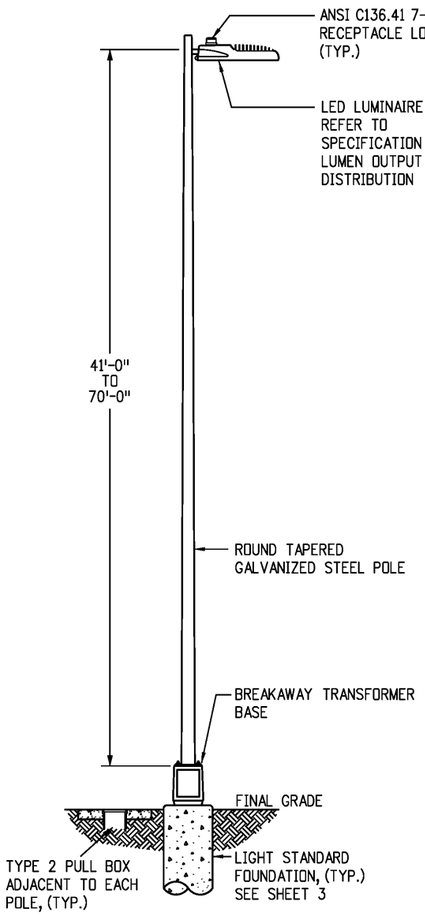
LUMINAIRE AND LIGHT STANDARD NOTES:

1. LUMINAIRES WITH LIGHT SOURCES RATED MORE THAN 3200 LUMENS SHALL HAVE NO UPLIGHT (U0 RATING) PER IES TM-15-11 AND MOUNTED LEVEL AND PLUMB.
2. ALL LUMINAIRES SHALL BE EQUIPPED WITH AN ANSI C136.41 7-PIN RECEPTACLE AND SHORTING CAP FOR WIRELESS CONTROL NODE.
3. ALL LED LUMINAIRES SHALL BE 3000K NOMINAL OR LESS, PER ANSI C78.377-2011 STANDARD AND EQUIPPED WITH A SURGE SUPPRESSION DEVICE WITH AN IMMUNITY LEVEL OF 10kV (MINIMUM). ALL LED LUMINAIRES SHALL BE EQUIPPED WITH A 0-10V OR DALI DIMMING DRIVER.
4. LIGHT STANDARDS SHALL NOT BE PLACED IN DITCHES OR OTHER LOW AREAS UNLESS AN ALTERNATIVE LOCATION IS NOT POSSIBLE.
5. BACKFILL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 203.
6. POLE CAPS AND BASE PLATE COVERS ARE REQUIRED.
7. ALL ELECTRICAL COMPONENTS SHALL BE UL LISTED PER THE APPROPRIATE UL REQUIREMENTS. INCLUDING BUT NOT LIMITED TO 508A INDUSTRIAL CONTROL PANELS.
8. ELECTRICAL SPLICES MAY BE MADE WITHIN THE POLE BASE OR TRANSFORMER BASE AT EACH REGIONS DISCRETION. THE CDOT PROJECT MANAGER SHALL CONFIRM WHETHER SPLICE BOXES SHALL BE INSTALLED FOR THE PROJECT OR WHETHER SPLICES SHALL BE MADE IN THE POLE.

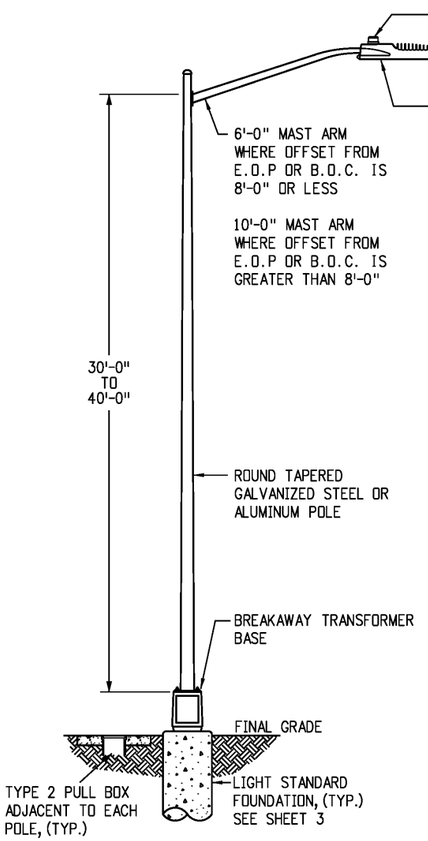
◒ POLE ASSEMBLY SHALL BE SUPPLIED IN SUFFICIENT LENGTH TO ACCOMMODATE LUMINAIRE MOUNTING HEIGHT.

✳ FINAL LOCATION OF THE LUMINAIRES SHALL BE APPROVED BY THE ENGINEER.

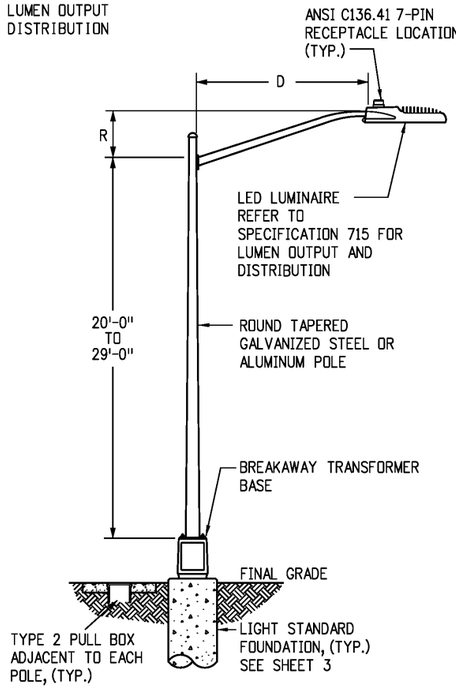
♦ WHERE FOUNDATION IS LOCATED IN SIDEWALK, PAVERS OR OTHER HARDSCAPE, THE TOP OF FOUNDATION SHALL BE FLUSH WITH THE TOP OF THE SIDEWALK CONFORMING TO ADA REQUIREMENTS.



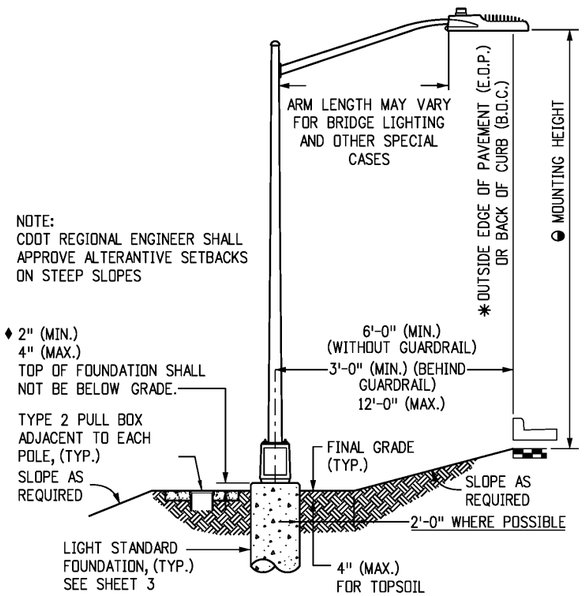
41 FT. TO 70 FT. STANDARD



30 FT. TO 40 FT. STANDARD



20 FT. TO 29 FT. STANDARD



LIGHT STANDARD LOCATION

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Creation Date: 07/31/19		Date:	Comments
Created By: Clanton	R-1	11/22/2019	3-BOLT MAST ARM
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Colorado Department of Transportation
2829 W. Howard Pl.
Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219
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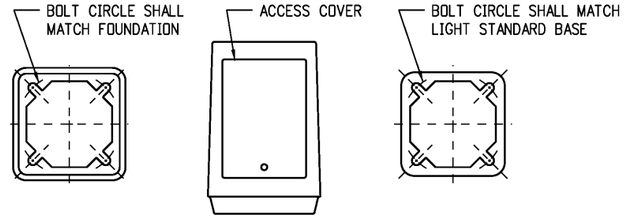
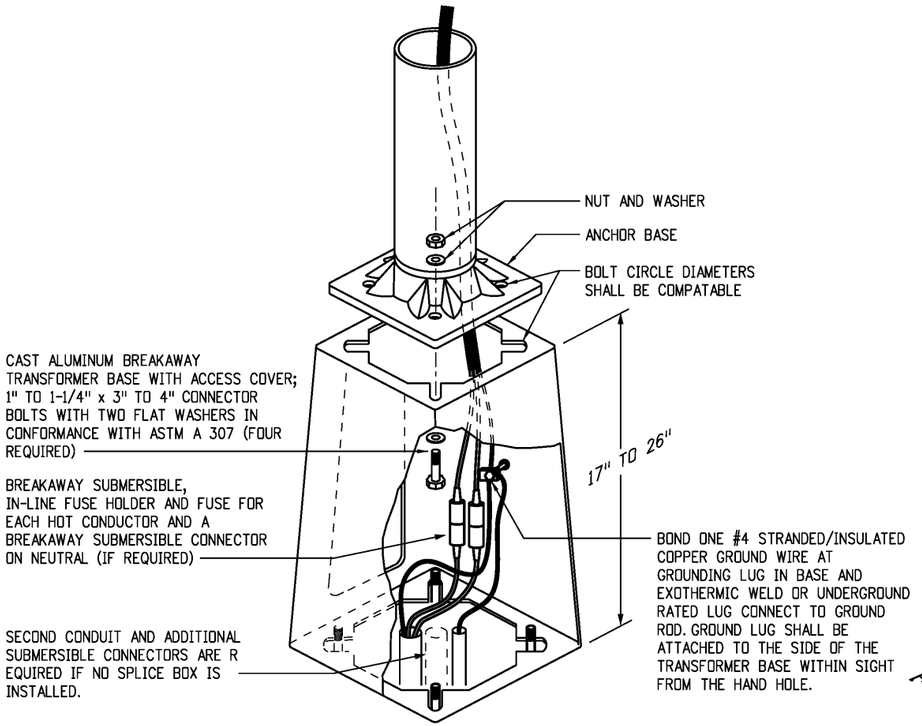
ROADWAY LIGHTING

Issued By: Traffic & Safety Engineering Branch July 31, 2019

STANDARD PLAN NO.
S-613-1
Sheet No. 1 of 6
Project Sheet Number:



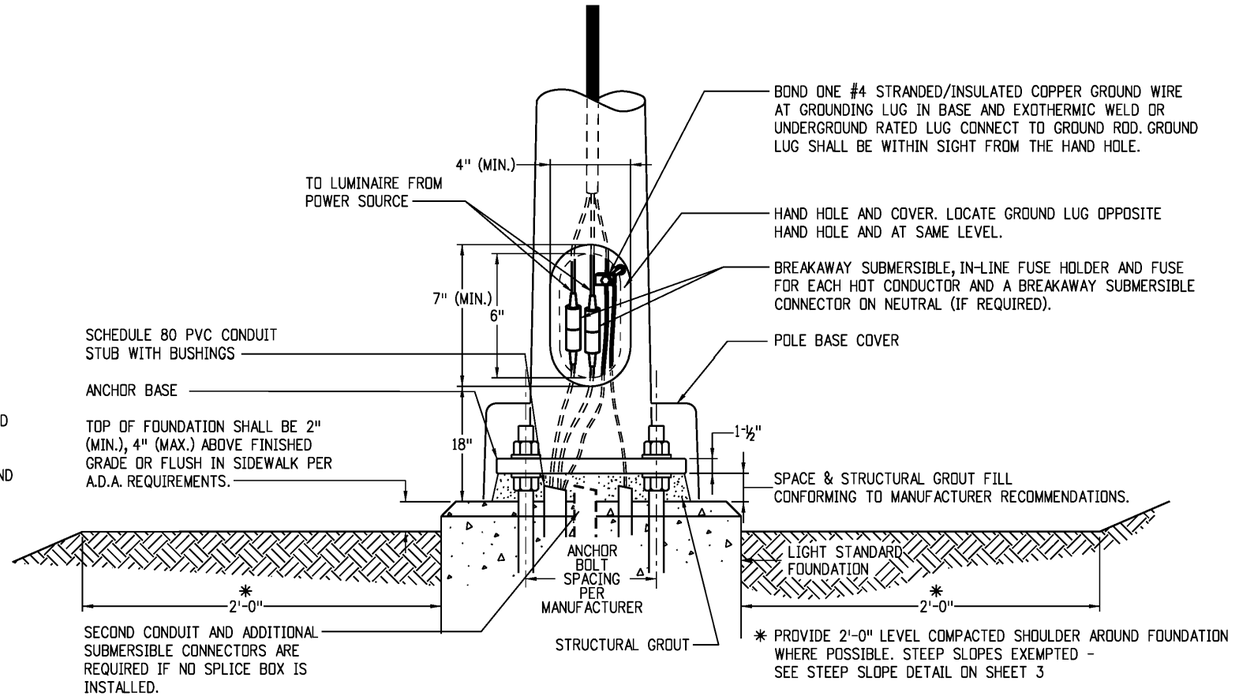
NOTE: MATCH EXISTING BREAKAWAY TRANSFORMER BASE AS CLOSELY AS POSSIBLE.



TYPICAL BREAKAWAY TYPE TRANSFORMER BASE DETAIL

DETAIL NOTES:

1. ALL BREAKAWAY TRANSFORMER BASES SHALL CONFORM TO AASHTO "LRFD SPECIFICATIONA FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS".
2. ANCHOR BOLT SPACING, HARDWARE AND TORQUE CONFORMING TO MANUFACTURER RECOMMENDATIONS.
3. BREAKAWAY BASES OF ANY TYPE ARE FOR USE INSIDE CLEAR ZONES. BREAKAWAY BASES SHOULD NOT BE USED WHEN THE LIGHT STANDARD IS LOCATED AT LEAST ONE AND A HALF TIMES (1.5X) MOUNTING HEIGHT AWAY FROM PEDESTRIAN OCCUPIED AREAS. REFER TO CURRENT UTILITY ACCOMMODATION CODE SECTION 3.3.3 FOR CLEAR ZONE REQUIREMENTS.
4. BREAKAWAY TRANSFORMER BASES MAY BE OMITTED AND THE POLES MOUNTED DIRECTLY ON THE LIGHT STANDARD FOUNDATION AS APPROVED BY THE ENGINEER OR AS SHOWN ON THE PLAN. POLES WITHOUT BREAKAWAY TRANSFORMER BASES MUST HAVE HAND HOLE.
5. ALL CONDUCTORS SHALL BE SIZED IN CONFORMANCE WITH N.E.C. REQUIREMENTS S.O.O.W. 12/3 STRANDED COPPER CONDUCTOR OR #12 AWG MINIMUM COLOR CODE BLACK, WHITE, GREEN.
6. LIGHT STANDARDS SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C. ARTICLE 250 "GROUNDING AND BONDING".



TYPICAL NON-BREAKAWAY BASE DETAIL

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2829 W. Howard Pl.
Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219
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ROADWAY LIGHTING

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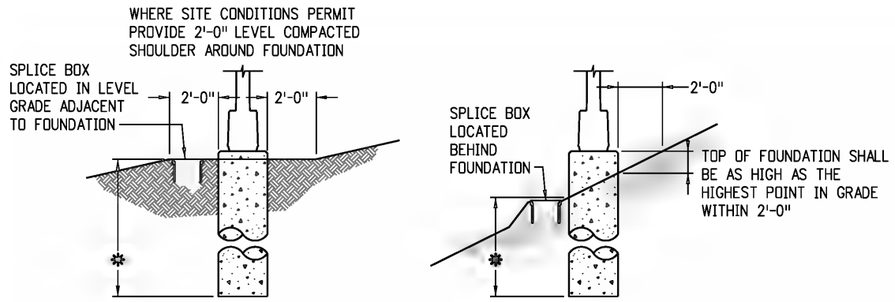
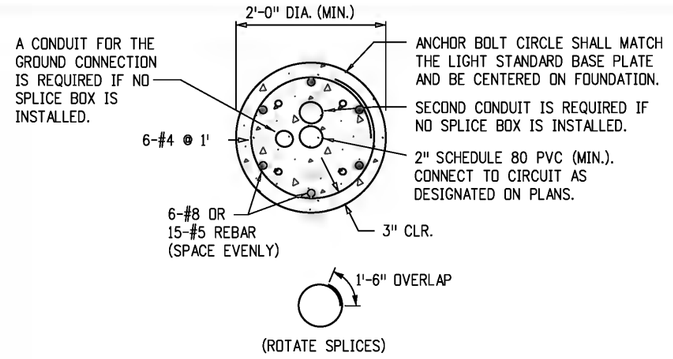
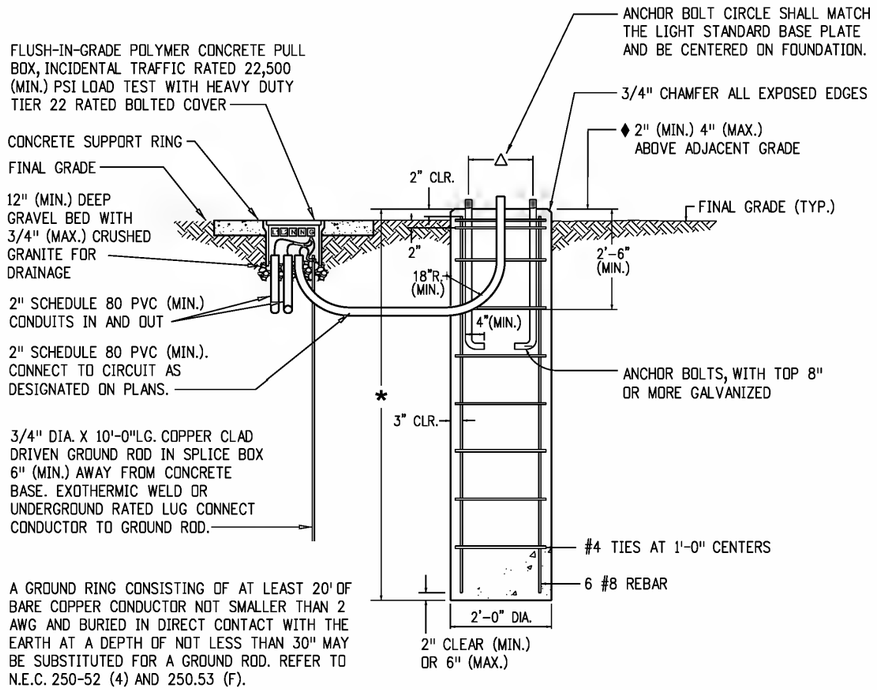
STANDARD PLAN NO.
S-613-1
Sheet No. 2 of 6
Project Sheet Number:



FOUNDATION REQUIREMENTS FOR STEEP SLOPES



TYPICAL FOUNDATION SECTION



TYPICAL CONCRETE LIGHT STANDARD FOUNDATION

LIGHT STANDARD FOUNDATION SHALL BE CAST-IN-PLACE CONCRETE. A COMPLETE FOUNDATION INCLUDES THE CLASS BZ CONCRETE, REINFORCING STEEL, PVC STUB OUT(S), GROUNDING ELECTRODE(S), ANCHOR BOLTS AND CONNECTOR BOLTS (FOR BREAKAWAY TYPE TRANSFORMER BASES).

NOTES:

1. DIMENSIONS FOR THE TRANSFORMER BASE, ANCHOR BASE AND ANCHOR BOLTS ARE VARIABLE FOR THE HEIGHT OF THE LIGHT STANDARD AND THE MAST ARM CONFIGURATION. ALL COMPONENTS SHALL FIT AND ACCOMMODATE THE REQUIREMENTS OF THE LIGHT STANDARD SUPPLIED.

♦ 2. CONCRETE SHALL BE AIR ENTRAINED CLASS BZ AND SHALL CONFORM TO SECTION 601 FOR CONCRETE AND SECTION 602 FOR REINFORCING STEEL.

* 3. WHERE LIGHT STANDARD FOUNDATION OCCUR IN HARDSCAPE AREAS, WHERE AN EXPOSED FOUNDATION COULD CREATE A TRIPPING HAZARD, THE TOP OF FOUNDATION SHALL BE FLUSH TO THE FINISHED SURFACE TO MEET A.D.A. REQUIREMENTS. WHERE EXPOSED LIGHT STANDARD FOUNDATION COMPLIES WITH A.D.A. REQUIREMENTS, FOUNDATION SHALL BE INSTALLED 2 INCHES ABOVE HARDSCAPE WITH CDOT APPROVAL.

4. BOND (1) #4 STRANDED/INSULATED COPPER TO GROUND ROD IN PULL BOX / SPLICE BOX AND GROUNDING LUG IN POLE BASE HAND HOLE.

5. PROVIDE 4-TERMINAL SUBMERSIBLE UNDERGROUND RATED LUG CONNECTIONS TO FIT #12 AWG - #350 AWG COPPER WIRE. ELECTRICAL SPLICES MAY BE MADE WITHIN THE POLE BASE OR TRANSFORMER BASE AT EACH REGIONS DISCRETION. SUBMERSIBLE UNDERBROUND RATED LUG CONNECTIONS ARE NOT REQUIRED WHEN SPLICES ARE MADE IN THE POLE.

6. ALL PVC CONDUIT ENDS SHALL HAVE END BELLS OR MALE ADAPTOR, THREADED TERMINAL ENDS WITH SCREW ON BUSHING.

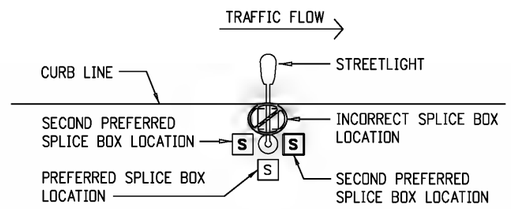
7. FOUNDATION DIMENSIONS PER FOUNDATION SCHEDULE BELOW AND AS NOTED. LIGHT STANDARDS HIGHER THAN 50 FEET OR WITH BANNERS, PRECAST FOUNDATION, VARYING SOIL, OR WIND CONDITIONS SHALL BE DESIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF COLORADO. FOR DESIGN WIND SPEEDS GREATER THAN V=155MPH ADD AN ADDITIONAL 1'-0" TO THE FOUNDATION DEPTH SHOWN IN THE FOUNDATION SCHEDULE BELOW.

FOUNDATION SCHEDULE

POLE HEIGHT	FOUNDATION DEPTH	FOUNDATION DIAMETER
< 20'	8'-0"	24"
20' - < 30'	9'-0"	24"
30' - 50'	12'-0"	24"
> 50'	P.S.E.	P.S.E.

P.S.E. (PER STRUCTURAL ENGINEER)
FOUNDATION DESIGN DATA:
BROMS' METHOD USING AASHTO LRFD LTS 1ST, 2015 WITH 2018 INTERIMS.

THE DESIGN ASSUMES FOLLOWING SOIL PARAMETERS:
SOIL DENSITY = 110 LB/CF
SOIL COHESION = 750 LB/SQFT FOR MEDIUM STIFF COHESIVE SOIL
SOIL ANGLE = 30° FOR MEDIUM DENSE COHESIONLESS SOIL
RESITANCE FACTOR = 0.4 FOR FLEXURE.



TYPICAL STREET LIGHT SPLICE BOX PLACEMENT

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Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219
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ROADWAY LIGHTING

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STANDARD PLAN NO.
S-613-1
Sheet No. 3 of 6
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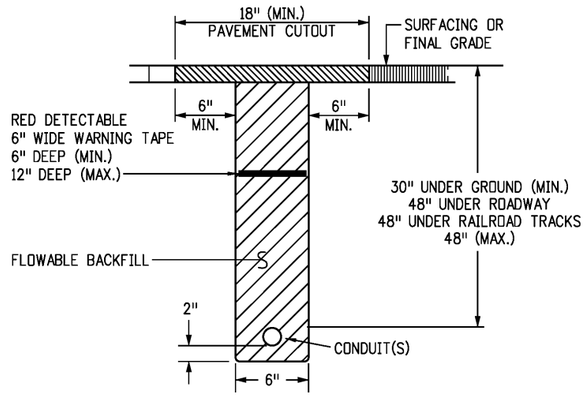
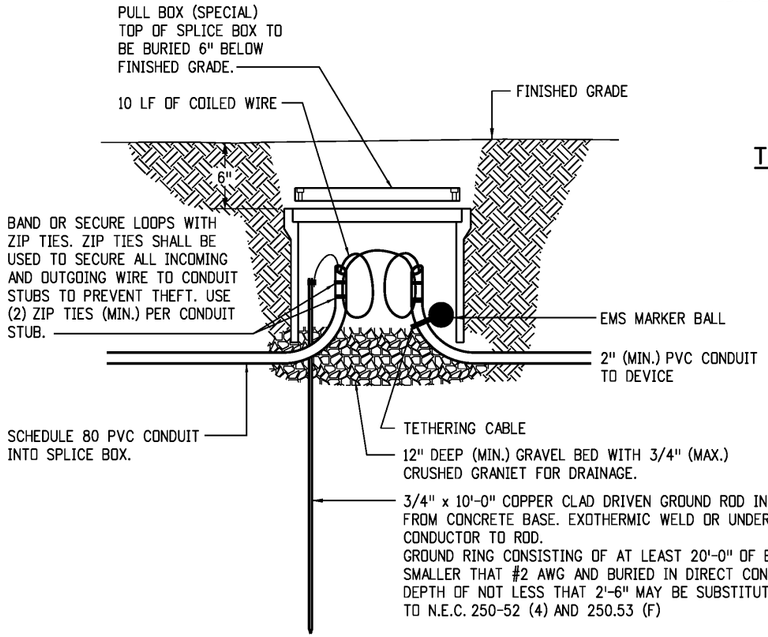


TYPICAL CONDUIT BURIAL - SECTION

CONDUIT BURIAL NOTES

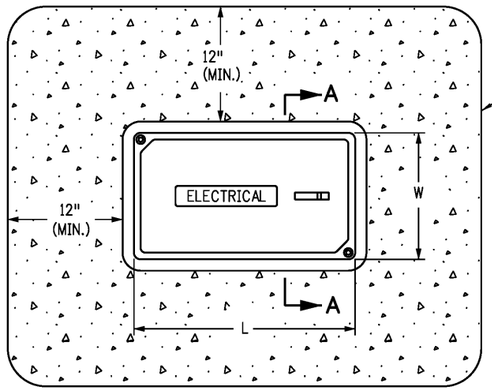
1. CONTRACTOR SHALL COORDINATE TRENCHING WITH OTHER UNDERGROUND UTILITIES, RAMP METERING AND IRRIGATION. CONTRACTOR SHALL USE COMMON TRENCHES AT ALL ROAD CROSSINGS WHERE POSSIBLE.
2. ONE CONDUIT PER BUNDLE SHALL HAVE ONE #12 AWG LOCATE WIRE AND A NYLON OR POLYESTER PULL TAPE WITH 1,250 LBS TEST STRENGTH AND FOOTAGE MARKINGS IN ALL EMPTY CONDUITS. LOCATE WIRES SHALL NOT BE INSTALLED IN FIBER OPTIC CONDUITS.
3. ELECTRICAL CONDUIT (BORED) SHALL BE UL LISTED HDPE AND INSTALLED USING TRENCHLESS TECHNOLOGY OR EITHER JACKED CONDUIT OR DIRECTIONAL BORING. IF TRENCHED CONDUIT IS SPECIFIED ON PLANS, BORED CONDUIT OF EQUAL OR GREATER SIZE MAY BE SUBSTITUTED FOR TRENCHED CONDUIT IF PAID FOR UNDER THE ORIGINALLY DESIGNED TRENCHED CONDUIT PAY ITEM AND AT NO ADDITIONAL COST TO THE PROJECT. ELECTRICAL CONDUIT (BORED) SHALL CONFORM TO THE SAME MINIMUM DEPTH REQUIREMENTS.
4. INSTALLING CONDUIT IN ANY METHOD OTHER THAN TRENCHING OR DIRECTIONAL BORE, THAT MAY CAUSE DAMAGE TO THE EMBANKMENT OR HIGHWAY AREA, OR BE HAZARDOUS TO THE TRAVELING PUBLIC WILL NOT BE PERMITTED. WHEN JACKING IS SPECIFIED, DISRUPTION OF HIGHWAY TRAFFIC WILL NOT BE PERMITTED.
5. FOR ALL SCHEDULE 80 PVC CONDUIT, PROVIDE SLIP FIT EXPANSION FITTINGS AT 100 FOOT INTERVALS AND 6 FEET (MAXIMUM) FROM EACH ELBOW. EXPANSION FITTINGS WILL BE INSTALLED PER N.E.C. REQUIREMENTS FOR 65 DEGREE FAHRENHEIT TEMPERATURE CHANGE.
6. FOR ALL TRENCHED CONDUIT, ELBOWS SHALL BE WIDE SWEEPS (36-INCHES MINIMUM) WITH PVC COATED GRC ON THE OUTSIDE AND THREADED COUPLINGS.
7. ALL PVC CONDUIT ENDS IN PULL BOXES SHALL HAVE END BELLS OR MALE ADAPTOR, THREADED TERMINAL ENDS WITH SCREW ON BUSHING.



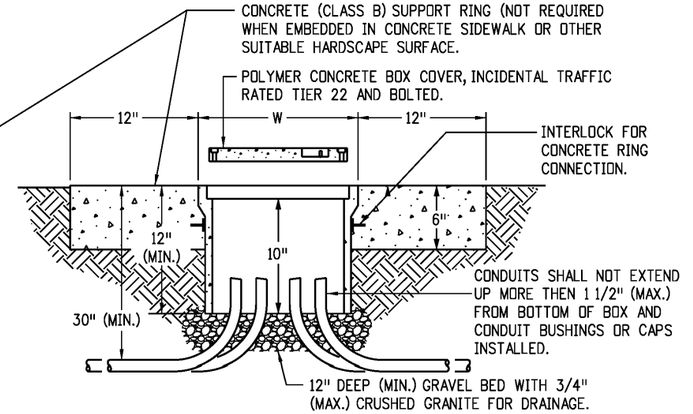
BURIED SPLICE BOX WITH EMS MARKER BALL

BURIED SPLICE BOX NOTES

1. ALL PULL BOXES SHALL BE INCIDENTAL TRAFFIC RATED 22,500 PSI LOAD TEST (MINIMUM) WITH HEAVY DUTY TIER 22 RATED COVERS.
2. ALL PULL BOXES SHALL BE TYPE 2. 13 INCHES x 24 INCHES x 12 INCHES DEEP (MINIMUM) UNLESS NOTED OTHERWISE ON PLANS. REFER TO N.E.C. SECTION 314.28A FOR BOX SIZE REQUIREMENTS. REFER TO CDOT STANDARD PLAN NO. S-613-3 FOR TYPICAL PULL BOX SIZES.
3. ALL PULL BOXES SHALL BE BURIED 6 INCHES BELOW FINAL GRADE AND COVERED WITH EMBANKMENT AND TOPSOIL. BURIED PULL BOXES SHALL NOT BE COVERED WITH CONCRETE, ASPHALT, ROCK OR ANY OTHER HARDSCAPING. CONCRETE SUPPORT RING IS NOT REQUIRED FOR THESE SPECIAL BURIED ANTI-THEFT PULL BOXES.
4. CONNECT COPPER GROUND WIRE TO HELICAL FOUNDATION.
5. BURIED SPLICE BOXES SHALL ONLY BE USED WHERE APPROVED BY CDOT ENGINEER.
6. THE WIRE TERMINATIONS IN PULL BOXES SHALL BE MADE USING URG, SUBMERSIBLE INSULATED PEDESTAL LUG CONNECTIONS. PROVIDE ONE MULTI-LUG CONNECTOR FOR EACH PHASE, NEUTRAL AND GROUND CONDUCTOR TO BE SPLICED IN THE IN-GRADE PULL BOX.



PLAN VIEW



SECTION A-A

TYPICAL PULL OR SPLICE BOX

SPLICE BOX NOTES

1. BOX COVERS MUST BE POLYMER CONCRETE WITH FIBERGLASS REINFORCEMENT, INCIDENTAL TRAFFIC RATED TO TIER 22 AND BOLTED WITH AN HS LOAD RATING OF 22,500 PSI (MINIMUM).
2. BOX COVERS SHALL BE LABELED AS FOLLOWS:
   "ELECTRIC" OR "STREET LIGHTING" ON ALL PULL BOXES CONTAINING CDOT OWNED ELECTRICAL SERVICE.
   "UTILITY ELECTRIC" ON ALL PULL BOXES CONTAINING UTILITY OWNED ELECTRICAL SERVICE.
   LABELING MUST BE CAST INTO THE COVER AND NOT AS A SEPARATE INDEPENDENT TAG.
3. REFER TO CDOT STANDARD PLAN No. S-613-3 FOR TYPICAL PULL BOX SIZES.
4. REFER TO N.E.C. ARTICLE 314 "PULL AND JUNCTION BOXES AND CONDUIT BODIES MINIMUM SIZE" FOR BOX SIZE REQUIREMENTS. REFER TO CDOT SPECIFICATION 601 FOR CAST-IN-PLACE CONCRETE SPECIFICATION.
5. THE WIRE TERMINATIONS IN PULL BOXES SHALL BE MADE USING URG, SUBMERSIBLE INSULATED PEDESTAL LUG CONNECTIONS. PROVIDE ONE MULTI-LUG CONNECTOR FOR EACH PHASE, NEUTRAL AND GROUND CONDUCTOR TO BE SPLICED IN THE IN-GRADE PULL BOX.

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Colorado Department of Transportation
2829 W. Howard Pl.
Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219
Traffic & Safety Engineering MKB

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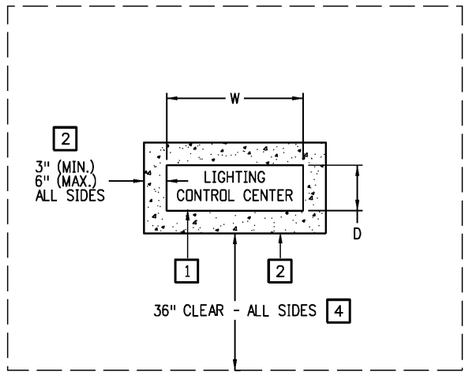
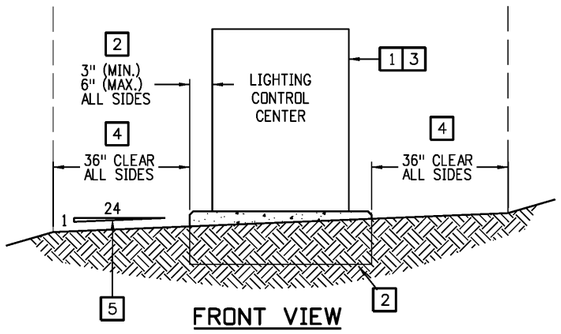


PLAN VIEW

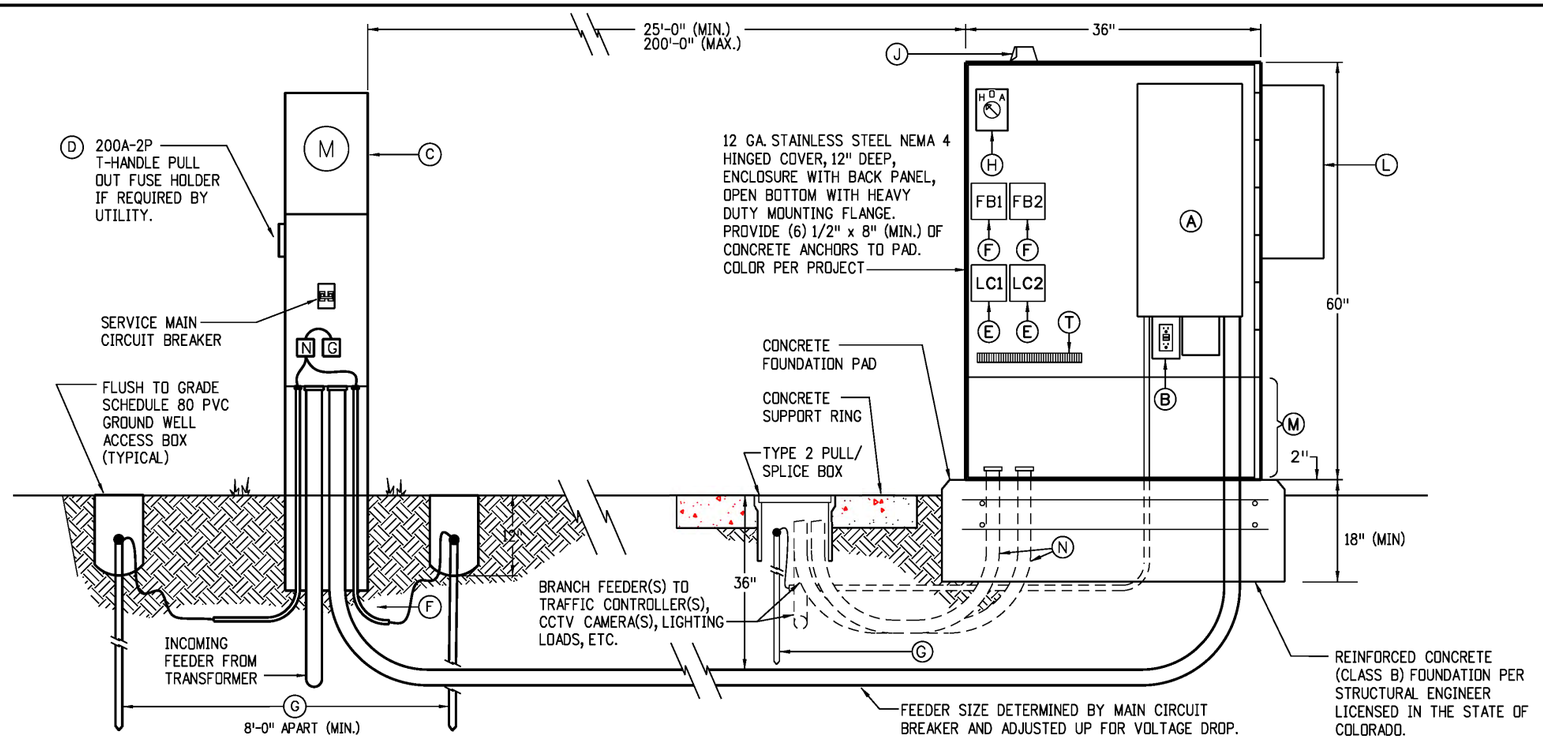


FRONT VIEW

LIGHTING CONTROL CENTER PLACEMENT

DETAIL NOTES

1. PREBUILT NEMA 3R LIGHTING CONTROL CENTER CABINET (LCC). REFER TO LIGHTING CONTROL CENTER DETAILS FOR MORE INFORMATION.
2. REINFORCED CONCRETE (CLASS B) FOUNDATION PAD, PER STRUCTURAL ENGINEER LICENSED IN THE STATE OF COLORADO, WITH 1 INCH CHAMFER ON ALL EXPOSED EDGES. EDGE OF CONCRETE TO EXTEND 3 INCHES (MINIMUM) OR 6 INCHES (MAXIMUM) BEYOND EDGE OF CABINET.
3. THE LCC SHALL NOT BE LOCATED IN ANY INTERSECTION SIGHT TRIANGLES. PLACEMENT SHALL CONFORM TO ALLOWABLE ENCROACHMENTS IN THE PUBLIC ROW.
4. 36 INCH CLEAR ZONE (MINIMUM) ON ALL SIDES OF CONCRETE PAD WHEN LOCATED IN SOFTSCAPE. 48 INCHES OF CLEAR ZONE (MINIMUM) ON ALL SIDES OF CONCRETE PAD WHEN LOCATED WITHIN THE SIDEWALK.
5. 1:24 SLOPE (MAXIMUM) IN CLEAR ZONE AREA.



COMPONENT LIST

- (A) NEMA 1, SERVICE ENTRANCE RATED, SINGLE PHASE LOAD CENTERS. (SEE PANEL SCHEDULE FOR QUANTITY AND SIZE OF MAIN AND BRANCH BREAKERS). MOUNTED INSIDE NEMA 4 ENCLOSURE.
- (B) GFCI MAINTENANCE RECEPTACLE IN A 1-GANG BACK BOX WITH COVER.
- (C) 200A, 1 PH., NEMA 3R, DIRECT BURY METER PEDESTAL SERVICE ENTRANCE RATED WITH LEVER BYPASS TO UTILITY COMPANY SPECIFICATIONS. PROVIDE SERVICE MCB SIZE AS INDICATED ON ONE-LINE DIAGRAM WITH NEUTRAL & GROUND BARS.
- (D) 200A, 2 POLE, 250V, HEAVY DUTY, NEMA 3R, T-HANDLE PULL-OUT METER DISCONNECT, UL LISTED FOR SERVICE EQUIPMENT AND TYPE AND SIZE FUSES AS SHOWN ON ONE-LINE DIAGRAM. MAY BE OMITTED BY UTILITY COMPANY SPECIFICATIONS HOT SEQUENCE REQUIREMENTS.
- ✱(E) 4 POLE, 30A, 250V ELECTRICALLY HELD LIGHTING CONTACTORS WITH 120V COILS. TWO (2) REQUIRED.
- ✱(F) 4 POLE, 30A, FUSE BLOCKS WITH 30A, FRNR FUSES TO THE LIGHTING CONTACTORS AS REQUIRED BY UL 508A (2001 STANDARD FOR INDUSTRIAL CONTROL PANELS). TWO (2) REQUIRED.
- (G) 3/4 INCH x 10 FEET LONG, COPPER-CLAD DRIVEN GROUND ROD WITH GROUND CONDUCTOR EXOTHERMIC WELD OR UNDERGROUND RATED LUG CONNECT GROUND CONDUCTOR TO GROUND ROD. PROVIDE SCHEDULE 80 PVC GROUND WELLS.
- ✱(H) H.O.A. SWITCH - HAND-OFF-AUTO WITH 15A 120V CONTACTS, BACK BOX, COVER, KNOB & LEGEND AND THE PHOTOCELL CONTROL WIRED IN THE AUTO POSITION.
- ✱(J) NEMA 3R 120V PHOTOELECTRIC CONTROL WITH 3-PRONG TWIST-LOCK RECEPTACLE BASE WIRED THROUGH THE H.O.A. SWITCH. THE PHOTOELECTRIC CONTROL SHALL BE MOUNTED ON THE NORTH SIDE ON ENCLOSURE OR WINDOW FACING NORTH OR DOWN TO MINIMIZE THE SUN'S INTERFERENCE.
- (L) OPTIONAL CABINET HVAC PER ENGINEERING REQUEST. PAINT TO MATCH NEMA 4 ENCLOSURE.
- (M) OPTIONAL 18 INCH HIGH SKIRT PER ENGINEER REQUEST.
- (N) BRANCH RACEWAYS - PROVIDE BRANCH CIRCUIT RACEWAY TO ALL LIGHTING FED FROM THIS LCC. SEE PLAN AND FEEDER SCHEDULE FOR SIZE AND QUANTITY.
- (T) TERMINAL STRIP - 600V RATED, LUGS TO ACCEPT #1 - 10 AWG COPPER WITH ALL MARKING STRIP, END CAPS AND MOUNTING HARDWARE. PROVIDE THE NUMBER OF TERMINAL POINTS AS REQUIRED, MINIMUM OF 36 POINTS.

NOTE: ALL COMPONENTS LISTED SHALL BE INCLUDED IN THE LIGHTING CONTROL CENTER PAY ITEM. ALL ELECTRICAL COMPONENTS SHALL BE UL LISTED PER THE APPROPRIATE UL REQUIREMENTS. INCLUDING BUT NOT LIMITED TO 508A INDUSTRIAL CONTROL PANELS.

✱ ONLY REQUIRED FOR LOADS NOT CONTROLLED BY LOCAL NODES.

RECOMMENDED CABINET TYPE LIGHTING CONTROL CENTER DETAIL

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Colorado Department of Transportation
2829 W. Howard Pl.
Denver, CO 80204
Phone: 303-757-9654
FAX: 303-757-9219
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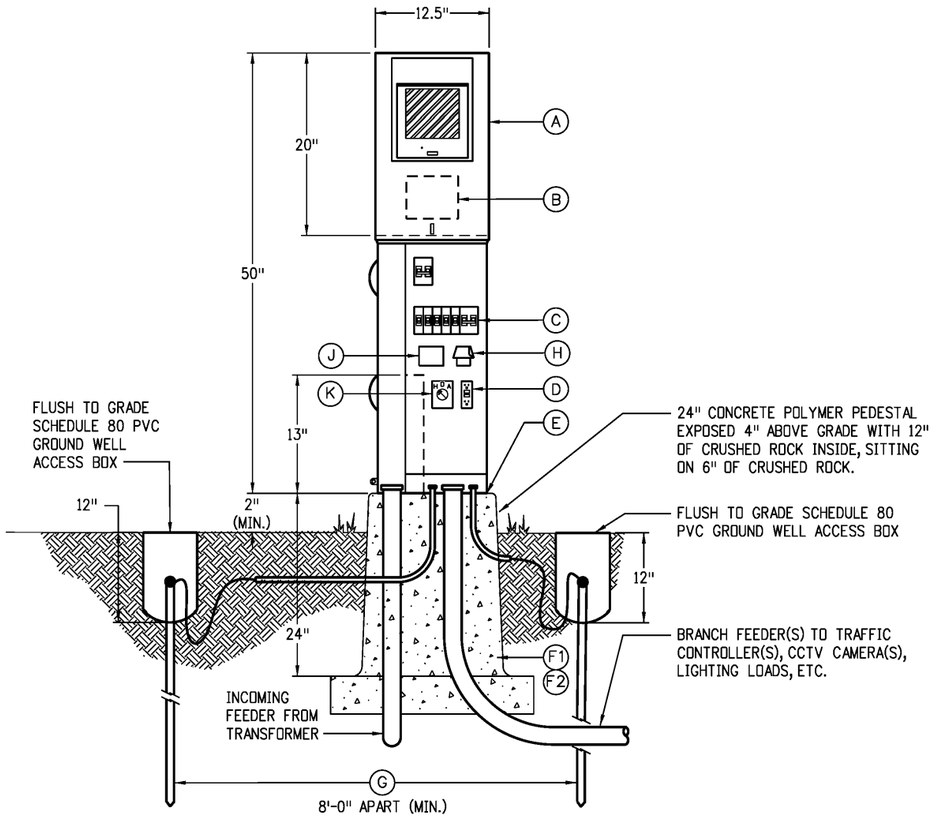

LIGHTING CONTROL CENTER (PEDESTAL ONLY) DETAIL

COMPONENT LIST

(A) STAINLESS STEEL, 200A, 120/240V, NEMA 3R COMBINATION, SERVICE ENTRANCE RATED, COLD SEQUENCE, METER/POWER PEDESTAL WITH LEVER BYPASS, LOAD CENTER, MCB AND FUSED TEE-HANDLE PULL OUT DISCONNECT AHEAD OF METER TO LOCAL UTILITY SPECIFICATIONS. SEE PANEL SCHEDULE FOR SIZE OF MAIN AND NUMBER AND SIZE OF BRANCH BREAKERS REQUIRED. SET ENCLOSURE ON CONCRETE PAD PLUMB AND LEVEL.

(B) T-HANDLE, PULL-OUT FUSE TYPE METER, DISCONNECT FLUSH MOUNTED INTO THE BACK SIDE OF THE ENCLOSURE FOR METER PROTECTION PER UTILITY SPECIFICATION, COLD SEQUENCE METER WITH WEATHERPROOF COVER AND TAB FOR SEAL. THIS ITEM MAY BE OMITTED BY UTILITY COMPANY SPECIFICATIONS HOT SEQUENCE REQUIREMENTS.

(C) SERVICE ENTRANCE PANEL BREAKER SECTION, FOR CUSTOMER LOADS. SEE PANEL SCHEDULES FOR SIZE OF BREAKERS AND NUMBER OF POLES REQUIRED.

(D) OPTIONAL BUILT-IN GFCI NEMA 5-20R, DUPLEX, GFCI MAINTENANCE RECEPTACLE FLUSH MOUNTED IN PANEL DEAD-FRONT.

(E) PROVIDE RECESSED CONCRETE PAD MOUNTING PLATE WITH L-BOLTS TO MATCH THE ENCLOSURE BASE BOLT PATTERN.

(F1) OPTION 1: POLYMER CONCRETE PEDESTAL FOUNDATION WITH FIBERGLASS REINFORCEMENT. THE PAD SHALL BE CONTINUOUS CLOTH REINFORCEMENT ON THE INSIDE AND OUTSIDE PERIMETER. WEIGHT OF THE FOUNDATIONS SHALL BE STENCILED ON THE SIDEWALL OF THE FOUNDATION.

(F2) OPTION 2: PROVIDE 4500 PSI, RE-BAR REINFORCED, CONCRETE WITH A DIRECT EARTH BURY DEPTH OF 18 INCHES (MINIMUM), 2 INCHES OVERLAP OF THE ENCLOSURE ON ALL SIDES FRONT AND BACK AND 2 INCHES EXPOSURE ABOVE GRADE. PROVIDE 3/4 INCH CHAMFERED EDGES. PROVIDE STRUCTURAL ENGINEERING STAMPED DRAWING FOR PAD.

(G) 3/4 INCH x 10 FEET LONG, COPPER-CLAD DRIVEN GROUND RODS. EXOTHERMIC WELD OR UNDERGROUND LUG CONNECT CONDUCTOR TO ROD. TWO (2) GROUND RODS REQUIRED. GROUND ROD TO BE LOCATED IN SCHEDULE 80 PVC GROUND WELL ACCESS WITH BOLT DOWN COVER AND "GROUND" CAST INTO LID.

(H) OPTIONAL PHOTOCELL - NEMA 3R 120V PHOTOELECTRIC CONTROL WITH 3-PRONG TWIST-LOCK RECEPTACLE BASE. THE PHOTOCELL SHALL BE MOUNTED INSIDE THE ENCLOSURE WITH A GLASS LENS COVERED HOLE IN THE EXTERIOR OF THE ENCLOSURE TO ALLOW THE PHOTOCELL TO RECEIVE DAYLIGHT.

(J) OPTIONAL LIGHTING CONTACTOR - CONTROLLED BY OPTIONAL PHOTOCELL ITEM 'H' ABOVE WHEN MORE THAN ONE CIRCUIT IS TO BE CONTROLLED BY THE PHOTOCELL.

(K) OPTIONAL HAND-OFF-AUTO SWITCH WHEN ITEMS 'H' AND 'J' ABOVE ARE USED. PROVIDE THIS HOA SWITCH WITH THE PHOTOCELL CONTROL WIRED IN THE AUTO POSITION.

NOTE: ALL COMPONENTS LISTED SHALL BE INCLUDED IN THE LIGHTING CONTROL CENTER PAY ITEM. ALL ELECTRICAL COMPONENTS SHALL BE UL LISTED PER THE APPROPRIATE UL REQUIREMENTS. INCLUDING BUT NOT LIMITED TO 508A INDUSTRIAL CONTROL CENTER.

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Denver, CO 80204
Phone: 303-757-9654
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