Redland
WHERE GREAT PLACES BEGIN
720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

December 15, 2023

Ms. Ashlyn Mathy
El Paso County
2880 International Circle, Suite 110,
Colorado Springs, CO 80910

Re: PCD File No. PPR2329
The Rock Commerce Center, 2nd Review
Response to Comments

Dear Ms. Mathy,

Please accept this letter on behalf of Central Development, LLC, the applicant for The Rock Commerce Center. We received your comment letter dated December 8, 2023, regarding the application and we offer the following responses:

Site Plan

Engineering and Planning Comments

Sheet 5-6, Grading Plan – Responses were prepared by Redland

1. *Wall will need drainage pan to direct flows around and not over wall. Refer to County detail SD_3-44. Provide calculation for sizing of ditch section in drainage report.*

   Response: A drainage pan was added to direct flows around the walls and the County detail was added to the SDP set. An SF table and flow calculations were added to the Drainage Report for sizing of the drainage pan.

Public Improvement Plan Construction Documents

Engineering Comments
Sheet C3.0, Horizontal Control Plan – Responses were prepared by Redland

2. *Riprap depth should be minimum of 12" (2xD50 of riprap size).*

   Response: The riprap was all updated to be 12" deep on all plans.

Sheet C4.0, Plan and Profile - Responses were prepared by Redland

3. *Riprap depth should be minimum of 12" (2xD50 of riprap size.*

   Response: The riprap was all updated to be 12" deep on all plans.

4. *Per DCM Section 8.3 include HGL.*

   Response: The 10-YR and 100-YR HGLs were added to this storm sewer profile and labeled.

Sheet C6.0, Erosion Control Plan - Responses were prepared by Redland

5. *Riprap depth should be minimum of 12" (2xD50 of riprap size.*

   Response: The riprap was all updated to be 12" deep on all plans.

Grading and Erosion Control Plans

Engineering and EPC Stormwater Comments

Sheet 4, Grading Plan – Responses were prepared by Redland

6. *Riprap depth should be minimum of 12" (2xD50 of riprap size.*

   Response: The riprap was all updated to be 12" deep on all plans.

Sheet 8, Interim Erosion Control Plan – Responses were prepared by Redland

7. *Assign a name/number to all PBMPs and then update all submitted text and drawings accordingly with consistent labeling throughout (example Pond A or Pond 1).*

   Response: The full spectrum detention pond was named Pond A and it was updated in all plans and reports.

8. *Riprap depth should be minimum of 12" (2xD50 of riprap size.*

   Response: The riprap was all updated to be 12" deep on all plans.

Sheet 9, Final Erosion Control Plan – Reponses were prepared by Redland

9. *Call out type of riprap and size of pad. Provide a detail showing how the riprap will tie into the trickle channel without causing erosion or undermining at interface.*

   Response: The trickle channel was extended up to the flared end section and a splash wall was added where this trickle channel branch meets up with the main trickle channel to act as a energy dissipator as the flow is directed 90 degrees towards the outlet structure.

Sheet 10, Pond Details – Reponses were prepared by Redland

10. *Please submit a State Non-Jurisdictional Water Impoundment Structure Application for this pond.*

    Response: This application will be submitted as requested.

11. *Provide a bolt at top and bottom of orifice plate to ensure a water tight seal.*

    Response: A bolt was added to the top and bottom of the orifice plate as requested.

12. *Change rectangular to circular in the orifice opening note.*

    Response: This note was updated as requested.

13. *Provide details for Outlet structure, Forebay, and Trickle Channel.*

    Response: These details were added as requested.

14. *Verify all highlighted elevation. Heights and depths should be from micropool elevation which is 7134.00 per MHFD Detention spreadsheet in FDR.*

    Response: The MHFD spreadsheet was updated so that the micropool is at the correct elevation of 7134.23.

15. *First orifice is set at micropool elevation, which per MHFD spreadsheet in Drainage report is 7134.00.*

    Response: The MHFD spreadsheet was updated so that the micropool is at the correct elevation of 7134.23.

16. *Please revise the minimum access road width is 15'.*

    Response: These details were updated to reflect the 15' wide access road.

17. *Provide a cross section detail of spillway.*

    Response: A cross section detail of the emergency spillway was added as requested.

18. *Please label detail.*

    Response: The emergency spillway detail was labeled as requested.

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Final Drainage Report – Responses were prepared by Redland

Engineering and EPC Stormwater Comments

19. *Change the Orifice area from 1.30 to 1.35.*

    Response: This was updated on the MHFD spreadsheet.

20. Updated the debris clogging % from 0% to 50%.

    Response: This was updated on the MHFD spreadsheet and the resulting changes were updated throughout the Report.

21. Riprap is not seen on the Plans at DP-C, please confirm location.

    Response: The riprap at DP-C was covered by the major basin line, this was shifted so that the riprap is now visible.

Traffic Impact Study – Responses were prepared by Fox Tuttle Transportation Group

Engineering Comments

1. *State what the spacing is that is described in ECM Table 2-35.*

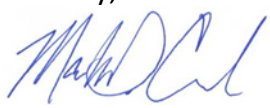
   Response: Required spacing from ECM Table 2-35 has been listed specifically in the report text.

2. *Indicate if the applicant intends to pay the full-fee amount or use one the two PID options. Refer to Resolution 19-471(Copy attached in EDarp For Reference)*

   Response: Clarification has been added that the owner intends to pay the full fee amount and does not plan to use either PID option.

If you have any questions regarding the above response to comments, please contact me at 720-283-6783 ext. 136 or at mcevaal@redland.com.

Sincerely,



Mark D. Cevaal, P.E.
Sr. Project Manager

THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN

LOCATED IN THE SOUTHWEST QUARTER OF THE
NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
EL PASO COUNTY, STATE OF COLORADO.

PROJECT TEAM

OWNER / DEVELOPER

CENTRAL DEVELOPMENT, LLC
1600 S. ALBON ST., #200
DENVER, CO 80222
303.628.0200 voice
CONTACT: JEREMY RECORDS

CIVIL ENGINEER

REDLAND
1500 W. CANAL CT.
LITTLETON, CO 80120
720.283.6783 voice
CONTACT: MARK CEVAAL, P.E.
EMAIL: mcevaal@redland.com

ARCHITECT

INTERGROUP ARCHITECTS
2000 W. LITTLETON BLVD.
LITTLETON, CO 80120
303.407.1157 voice
CONTACT: BILL SMITH, AIA

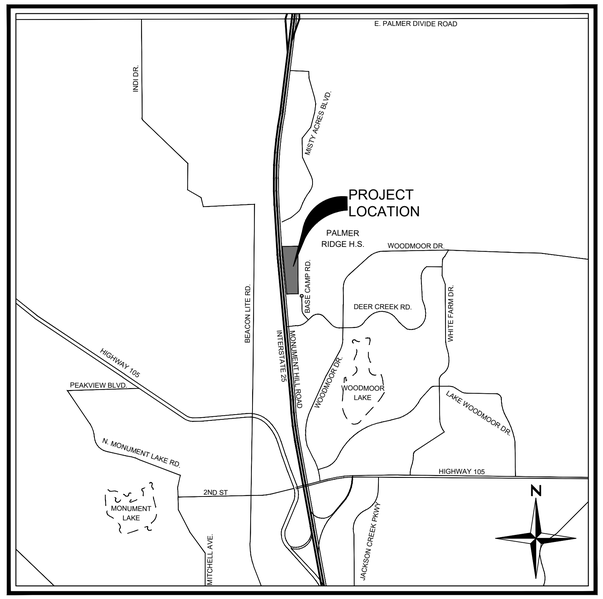
LANDSCAPE ARCHITECT

STACKLOT
5369 S. CURTICE ST.
LITTLETON, CO 80120
303.808.4523 voice
CONTACT: STEVE WIENS
EMAIL: steve@stacklot.com

LEGAL DESCRIPTION:

PARCEL B:

THAT PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE 6TH P.M. LYING EAST OF THE EAST LINE OF THAT TRACT CONVEYED TO THE STATE HIGHWAY DEPARTMENT BY QUITCLAIM DEED RECORDED SEPTEMBER 8, 1948 IN BOOK 1185, PAGE 458, ALSO DESCRIBED AS: THAT PART OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE P.M., COUNTY OF EL PASO, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER; THENCE EASTERLY ALONG THE SOUTHERLY LINE OF SAID NORTHWEST QUARTER A DISTANCE OF 996.04 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF INTERSTATE HIGHWAY 25 DESCRIBED IN THAT DEED TO THE STATE HIGHWAY DEPARTMENT RECORDED SEPTEMBER 8, 1948 IN BOOK 1185 AT PAGE 458, WHICH POINT IS THE TRUE POINT OF THE BEGINNING OF THE PARCEL TO BE DESCRIBED; THENCE ON A DEFLECTION ANGLE TO THE LEFT 95°08'20" AND ALONG SAID EASTERLY RIGHT OF WAY LINE A DISTANCE OF 1334.24 FEET TO A POINT ON THE NORTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 95°00'36" AND ALONG SAID NORTHERLY LINE 441.95 FEET TO THE NORTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 90°16'15" AND ALONG THE EASTERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 1329.88 FEET TO THE SOUTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 89°51'29" AND ALONG THE SOUTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 319.15 FEET TO THE POINT OF BEGINNING.



VICINITY MAP
SCALE: 1" = 2000'

BENCHMARK

NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF I-25.

NAVD88. ELEV = 7111.32'

BASIS OF BEARINGS

BEARINGS SHOWN HEREON ARE REFERENCED TO THE SOUTHERLY BOUNDARY OF LOT 1, GREATER EUROPE MISSION SUBDIVISION FILING NO. 1, BEING MONUMENTED AS SHOWN HEREON, ASSUMED TO BEAR SOUTH 80°00'37" WEST, A DISTANCE OF 358.79 FEET.

Sheet List Table	
Sheet Number	Sheet Title
1 OF 20	COVER SHEET
2 OF 20	OVERALL SITE PLAN
3 OF 20	SITE PLAN
4 OF 20	SITE PLAN
5 OF 20	GRADING PLAN
6 OF 20	GRADING PLAN
7 OF 20	UTILITY PLAN
8 OF 20	UTILITY PLAN
9 OF 20	LANDSCAPE PLAN 'A'
10 OF 20	LANDSCAPE PLAN 'B'
11 OF 20	LANDSCAPE PLAN 'C'
12 OF 20	LANDSCAPE NOTES
13 OF 20	LANDSCAPE DETAILS
14 OF 20	EXTERIOR ELEVATIONS
15 OF 20	EXTERIOR ELEVATIONS
16 OF 20	EXTERIOR ELEVATIONS
17 OF 20	EXTERIOR PERSPECTIVES
18 OF 20	SITE DETAILS
19 OF 20	PHOTOMETRIC SITE PLAN
20 OF 20	PHOTOMETRIC DETAILS

PCD FILE NO. PPR2329

15 YEARS Redland
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▪ Civil Engineering ▪ Construction Management

NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

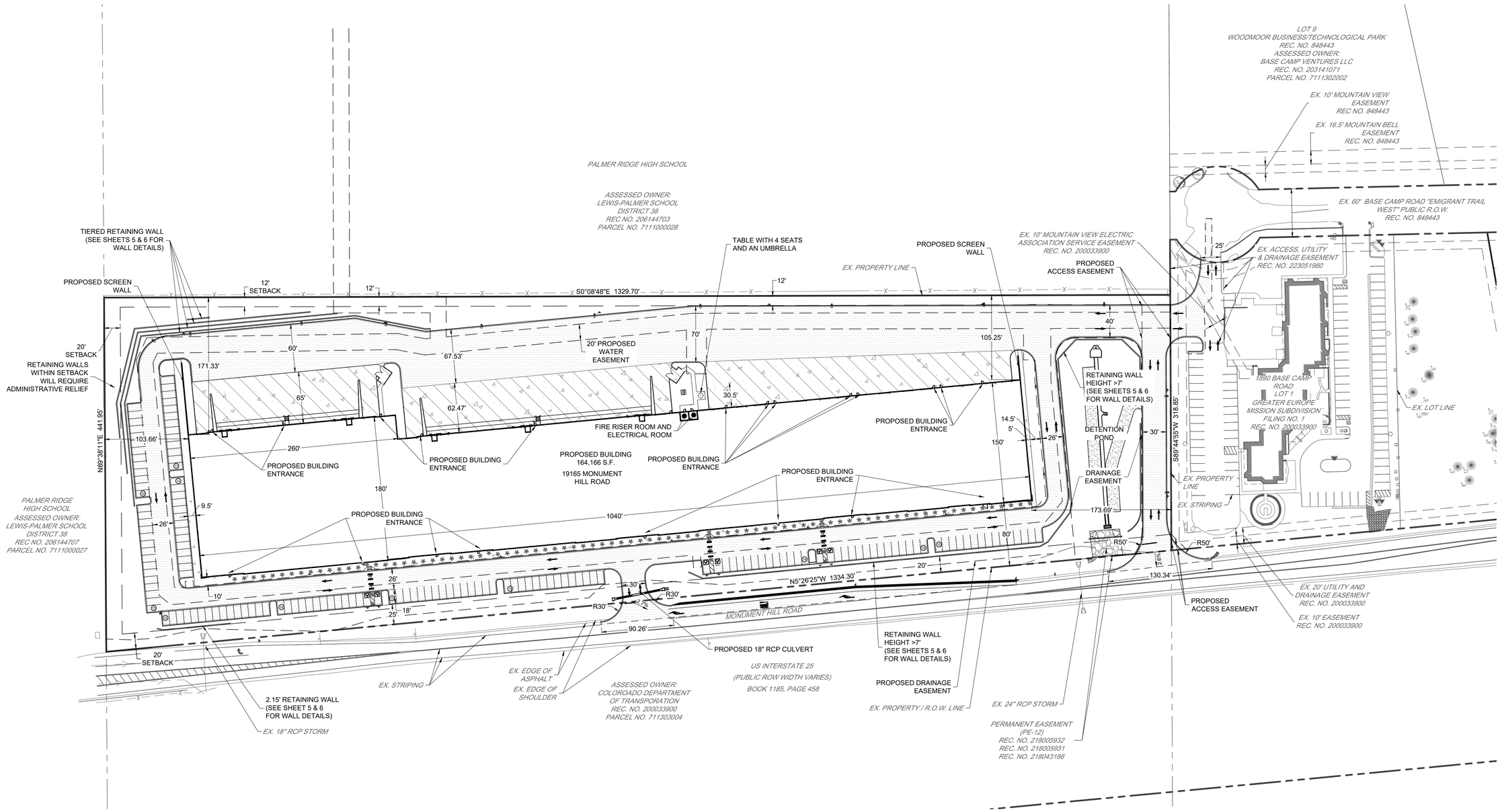
NO.	DATE	NOTES
1	08/08/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN
COVER SHEET

SHEET
1 OF 20

I:\2023\23009 - The Rock Commerce Center\CADD\Sheet Sets\Site Plan\The Rock\23009_Cover Sheet.dwg tab: 1 OF 24 COVER SHEET Nov 20, 2023 - 7:23pm csatz



NOTE:
1. ANY WORK WITHIN EL PASO COUNTY RIGHT-OF-WAY REQUIRES A WORK IN RIGHT-OF-WAY PERMIT FROM EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS.
2. A BUILDING PERMIT FORM PIKES PEAK REGIONAL BUILDING DEPARTMENT IS REQUIRED FOR RETAINING WALLS GREAT THAN 4 FEET IN HEIGHT.

PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- SIDEWALK
- CONCRETE PAVEMENT
- ASPHALT PAVEMET
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- RETAINING WALL

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SECTION LINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- SETBACK

SITE DATA TABLE		
LOT 1, THE ROCK COMMERCE CENTER SUBDIVISION FILING NO.1	REQUIRED	PROPOSED
ZONING	CS	CS
PARCEL AREA	11.61 AC. (505,680 S.F.)	11.61 AC. (505,680 S.F.)
BUILDING AREA	-	163,800 S.F.
BUILDING HEIGHT	40' MAX.	36'
STANDARD SPACES	*RETAIL = 28 SPACES *WAREHOUSE = 123 SPACES TOTAL = 151 SPACES	PROPOSED PARKING = 151 SPACES
ACCESSIBLE SPACES	6 ACCESSIBLE SPACES	6 ACCESSIBLE SPACES
VAN ACCESSIBLE	1 VAN ACCESSIBLE SPACE	1 VAN ACCESSIBLE SPACES
LANDSCAPE AREA	-	2.4 AC. (105,409.5 S.F. / 20.8%)
HARDSCAPE AREA	-	9.2 AC. (400,270.5 S.F. / 79.2%)

* RETAIL = 10% OF BLDG S.F. @ 1/600 S.F.
* WAREHOUSE = 90% OF BLDG S.F. @ 1/1200 S.F.
* AN ALTERNATIVE PARKING RATIO WILL BE REQUESTED TO CHANGE THE WAREHOUSE PARKING TO 1 SPACE PER 1,200 S.F. FROM 1 SPACE PER 1,000 S.F.
* THE TOTAL AMOUNT OF ACCESSIBLE SPACES WILL STILL FOLLOW THE ORIGINAL CODE.

SITE DATA TABLE
LOT 1, GREATER EUROPE MISSION FILING NO. 1
CS
3.59 AC. (156,422 S.F.)
+-11,784 S.F.
45' MAX.
REQUIRED = 59 SPACES EXISTING = 96 SPACES PROPOSED = 88 SPACES
3 ACCESSIBLE SPACES
1 VAN ACCESSIBLE
(87,973.7 S.F. / 56.2%)
(68,448.3 S.F. / 43.8%)

NOTE:
THE PARTIES RESPONSIBLE FOR THIS PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATION AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF THIS PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OF GUIDELINES ENACTED OF PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.

PCD FILE NO. PPR2329

SCALE: 1" = 60'

15 Redland YEARS
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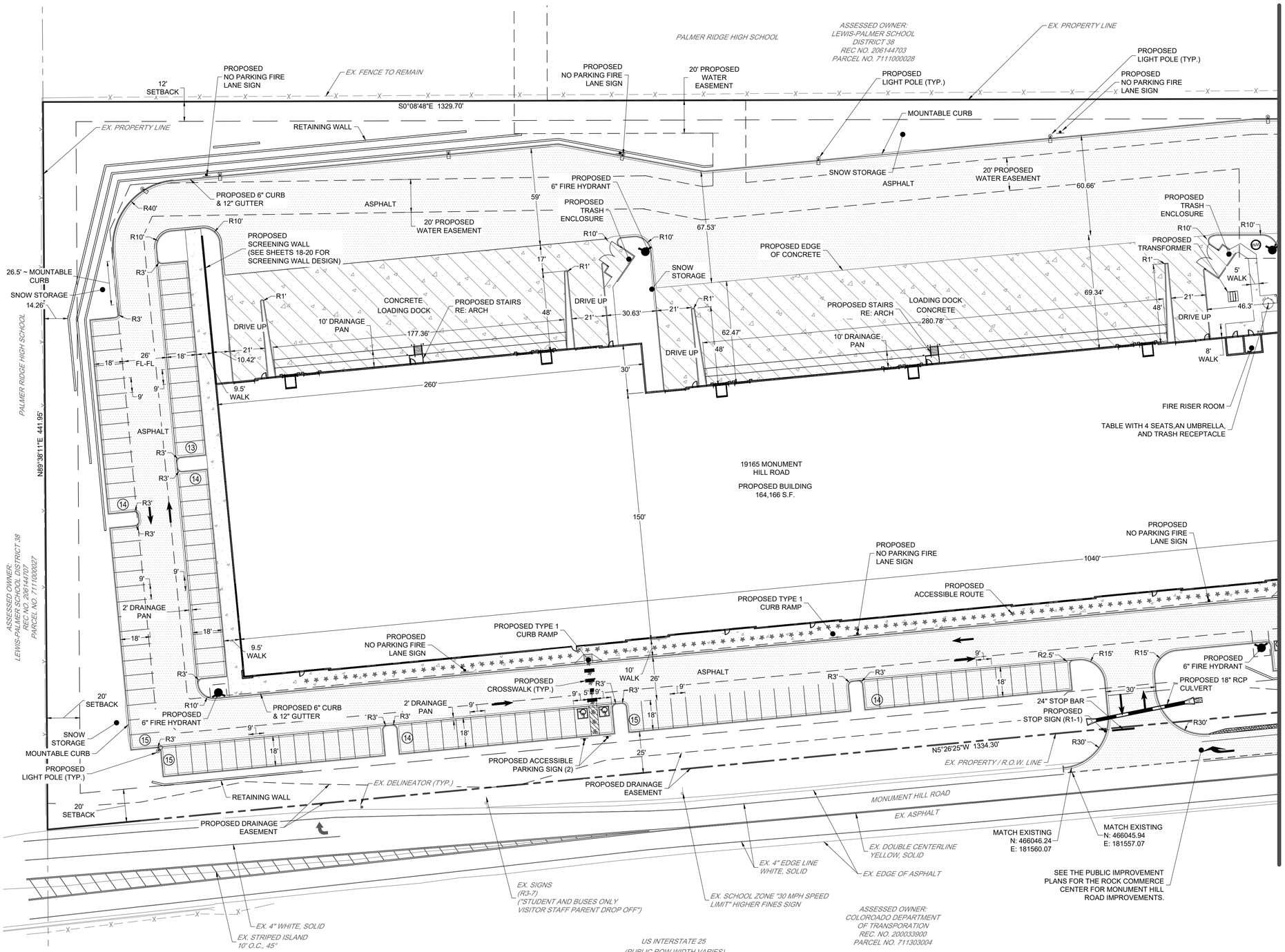
THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN
OVERALL SITE PLAN

SHEET 2 OF 20



PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- SIDEWALK
- CONCRETE PAVEMENT
- ASPHALT PAVEMET
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- RETAINING WALL
- FIRE HYDRANT

EXISTING LEGEND

- PROPERTY LINE
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PCD FILE NO. PPR2329

N

0 15 30 60
SCALE: 1" = 30'

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THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN

SITE PLAN

SHEET
3 OF 20

MATCHLINE - SEE SHEET NO. 3 OF 20

PROPOSED NO PARKING FIRE LANE SIGN
PROPOSED LIGHT POLE (TYP.)
EX. PROPERTY LINE
PROPOSED NO PARKING FIRE LANE SIGN
12' SETBACK
S0°08'48"E 1329.70'
PROPOSED 6" CURB & 12" GUTTER
ASPHALT
20' PROPOSED WATER EASEMENT
PROPOSED 6" FIRE HYDRANT
PROPOSED EDGE OF CONCRETE
LOADING DOCK CONCRETE
379.5'
780'
105.25'
R10'
37'
12'
SNOW STORAGE
MOUNTABLE CURB
12'
40' FL-FL
R20'
PROPOSED 6" FIRE HYDRANT
R25'
PROPOSED ACCESS EASEMENT
PROPOSED SCREENING WALL (SEE SHEETS 18-20 FOR SCREENING WALL DESIGN)
PROPOSED NO PARKING FIRE LANE SIGN
MOUNTABLE CURB
187.25'
4' CONCRETE PAN
FULL SPECTRUM DETENTION POND
R20'
R5'
15' MAINTENANCE ACCESS ROAD
26' FL-FL
5' WALK
15'
150'
19165 MONUMENT HILL ROAD
PROPOSED BUILDING
164,166 S.F.
PROPOSED NO PARKING FIRE LANE SIGN
PROPOSED TYPE 1 CURB RAMP
1040'
PROPOSED NO PARKING FIRE LANE SIGN
PROPOSED ACCESSIBLE ROUTE
10' WALK
R15'
R41'
RETAINING WALL
DRAINAGE EASEMENT
173.69'
PROPOSED TYPE 1 CURB RAMP
PROPOSED NO PARKING FIRE LANE SIGN
PROPOSED 6" CURB & 12" GUTTER
ASPHALT
26' FL-FL
9'
R3'
80'
18'
PROPOSED CROSSWALK (TYP.)
PROPOSED VAN PARKING ACCESSIBLE SIGN (R7-8a)
PROPOSED ACCESSIBLE PARKING SIGN (R7-8)(2)
RIGHT LANE MUST TURN RIGHT (R3-7R)
N5°26'25"W 1334.30'
PROPOSED EDGE OF ASPHALT
RIGHT LANE MUST TURN RIGHT (R3-7R)
EX. PROPERTY / R.O.W. LINE
MATCH EXISTING N: 465533.39 E: 181609.72
20' SETBACK
24" STOP BAR
PROPOSED STOP SIGN (R1-1)
PROPOSED ACCESS EASEMENT
R50'
200'
235'
MONUMENT HILL ROAD
EX. ASPHALT
PROPOSED 4" EDGE LINE WHITE, SOLID
PROPOSED ACCESSIBLE PARKING SIGN (R7-8)
EX. 4" EDGE LINE WHITE, SOLID
EX. EDGE OF ASPHALT
PROPOSED DRAINAGE EASEMENT
SEE THE PUBLIC IMPROVEMENT PLANS FOR THE ROCK COMMERCE CENTER FOR MONUMENT HILL ROAD IMPROVEMENTS.
EX. DOUBLE CENTERLINE YELLOW, SOLID
MATCH EXISTING N: 465533.02 E: 181605.92
RELOCATED SCHOOL ZONE (S1-1) AHEAD (W16-9P) SIGN
EX. SIGN 45 MPH SPEED LIMIT AND END SCHOOL ZONE
PERMANENT EASEMENT (PE-12) REC. NO. 218005932 REC. NO. 218005931 REC. NO. 218043186
ASSESSED OWNER: COLORADO DEPARTMENT OF TRANSPORTATION REC. NO. 200033900 PARCEL NO. 711303004
MATCH EXISTING N: 465418.86 E: 181622.95
MATCH EXISTING N: 465418.73 E: 181620.95
PROPOSED SAWCUT LINE
MATCH EXISTING N: 465289.84 E: 181638.43
MATCH EXISTING N: 465289.69 E: 181636.43
US INTERSTATE 25 (PUBLIC ROW WIDTH VARIES) BOOK 1185, PAGE 458

LOT 9 WOODMOOR BUSINESS/TECHNOLOGICAL PARK REC. NO. 848443 ASSESSED OWNER: BASE CAMP VENTURES LLC REC. NO. 203141071 PARCEL NO. 7111302002
EX. 10' MOUNTAIN VIEW EASEMENT REC NO. 848443
EX. 16.5' MOUNTAIN BELL EASEMENT REC. NO. 848443
ASSESSED OWNER: LEWIS-PALMER SCHOOL DISTRICT 38 REC NO. 206144703 PARCEL NO. 7111000028
PALMER RIDGE HIGH SCHOOL
BASE CAMP ROAD "EMIGRANT TRAIL WEST" (60' WIDE PUBLIC R.O.W. WIDTH) REC. NO. 848443
MATCH EXISTING N: 465297.22 E: 182062.80
MATCH EXISTING N: 465289.22 E: 182062.80
PROPOSED SAWCUT LINE
EX. 60'
EX. ASPHALT
MATCH EXISTING N: 465297.22 E: 182010.71
EX. FIRE HYDRANT
MATCH EXISTING N: 465303.22 E: 182010.72
PROPOSED STOP SIGN (R1-1)
24" STOP BAR
25'
R95'
R35.5'
MATCH EXISTING N: 465289.22 E: 181963.77
MATCH EXISTING N: 465298.71 E: 181954.27
EX. 10' MOUNTAIN VIEW ELECTRIC ASSOCIATION SERVICE EASEMENT REC. NO. 200033900
EX. ACCESS, UTILITY, AND DRAINAGE EASEMENT REC. NO. 223051980
R25'
R10'
R3'
MATCH EXISTING N: 465297.42 E: 181900.09
MATCH EXISTING N: 465303.39 E: 181894.07
MATCH EXISTING N: 465318.31 E: 181897.00
2-STORY STUCCO BUILDING LOT 1 GREATER EUROPE MISSION SUBDIVISION FILING NO. 1 REC. NO. 200033900
EX. CURB & GUTTER
EX. ASPHALT
PROPOSED NO PARKING FIRE LANE SIGN
S89°44'55"W 318.85'
30' FL-FL
5'
EX. STRIPING
EX. PROPERTY LINE
PROPOSED NO PARKING FIRE LANE SIGN
EX. 20' UTILITY AND DRAINAGE EASEMENT REC. NO. 200033900
EX. 10' EASEMENT REC. NO. 200033900
PROPOSED ACCESS EASEMENT
R50'

PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- SIDEWALK
- CONCRETE PAVEMENT
- ASPHALT PAVEMET
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- RETAINING WALL
- FIRE HYDRANT

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SECTION LINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- SETBACK

NOTE:
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N

0 15 30 60
SCALE: 1" = 30'

PCD FILE NO. PPR2329

15 Redland YEARS
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THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN

SITE PLAN

SHEET
4 OF 20

PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- FIRE HYDRANT
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- STORM SEWER
- TRENCH DRAIN
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- RETAINING WALL
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR
- 81.73 SPOT ELEVATION
- SLOPE ARROW (4:1 MAX UNLESS NOTED OTHERWISE)

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SETBACK
- SECTION LINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- STORM SEWER
- GAS LINE
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR

NOTE:

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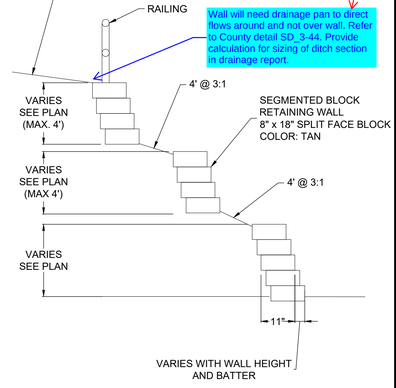
2. REGIONAL BUILDING DEPARTMENT PERMIT REQUIRED FOR ALL RETAINING WALLS GREATER THAN OR EQUAL TO 4 FT IN HEIGHT.
3. SEE SHEETS 18-21 FOR SCREENING WALL DETAILS BY ARCH.
4. NO BATCH PLANTS WILL BE UTILIZED ONSITE.

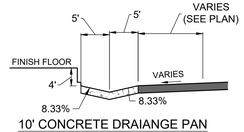
A drainage pan was added to direct flows around the walls and the County details were added to this set. The ditch sizing was added to the Drainage Report

Wall will need drainage pan to direct flows around and not over wall. Refer to County detail SD_3-44. Provide calculation for sizing of ditch section in drainage report.

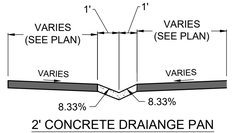


TYPICAL MODULAR BLOCK WALL DETAIL
NOT TO SCALE

NOTE: RETAINING WALL WILL REQUIRE A SEPARATE BUILDING PERMIT

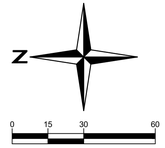


10' CONCRETE DRAIANGE PAN
N.T.S.



2' CONCRETE DRAIANGE PAN
N.T.S.

PCD FILE NO. PPR2329



SCALE: 1" = 30'

MATCHLINE - SEE SHEET NO. 6 OF 20

15 YEARS Redland WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO.	23009	NOTES
NO	DATE	
1	08/08/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

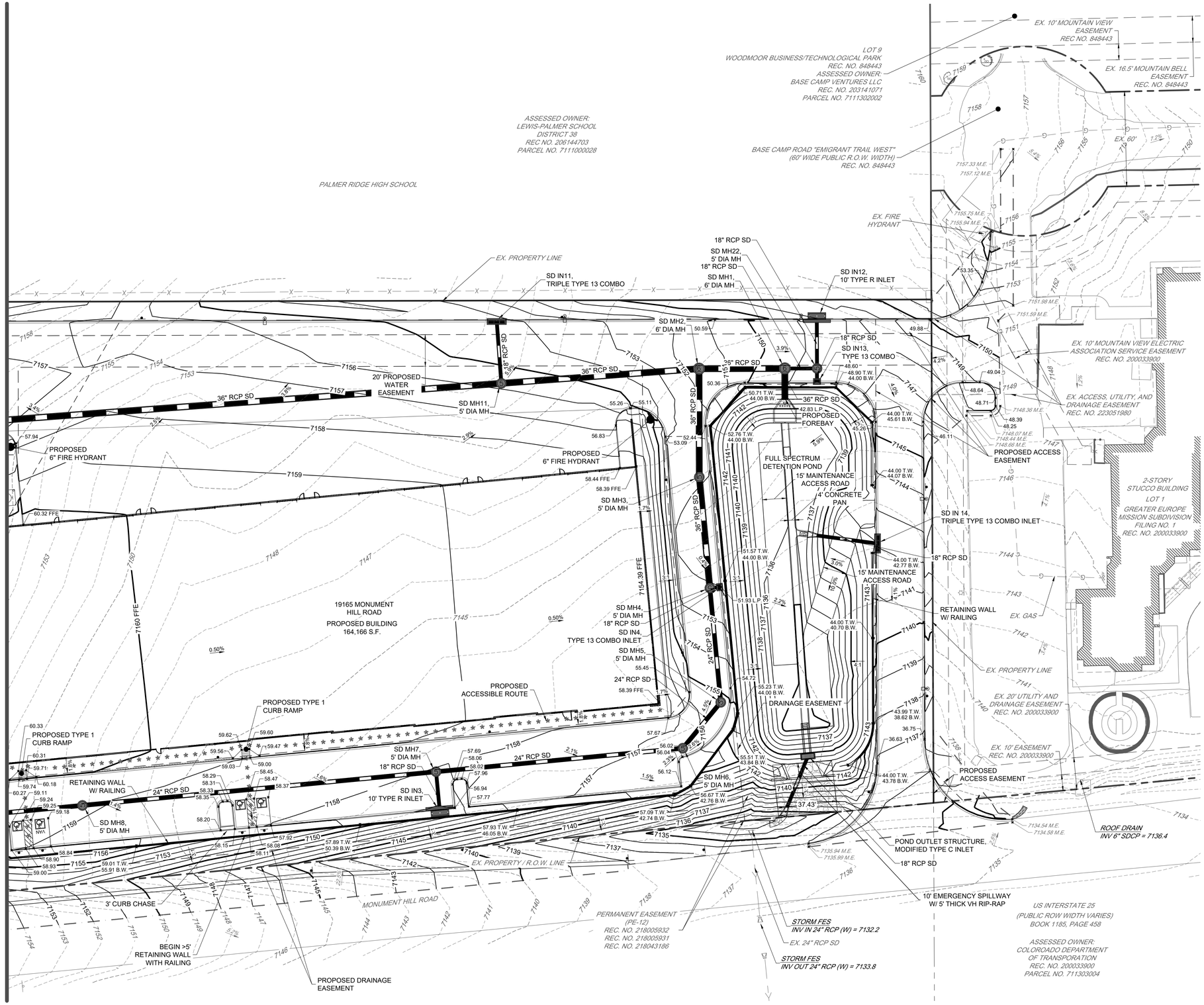
THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN
GRADING PLAN

SHEET
5 OF 20

I:\2023\23009 — The Rock Commerce Center\CADD\Sheet Sets\Site Plan\The Rock\23009_Grading Plan.dwg tab: 5 OF 23 GRADING PLAN Nov 20, 2023 - 7:24pm csaiz

MATCHLINE - SEE SHEET NO. 5 OF 20



PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- FIRE HYDRANT
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- STORM SEWER
- TRENCH DRAIN
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- RETAINING WALL
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR
- 81.73 SPOT ELEVATION
- SLOPE ARROW (4:1 MAX UNLESS NOTED OTHERWISE)

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SETBACK
- SECTION LINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- STORM SEWER
- GAS LINE
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR

NOTE:

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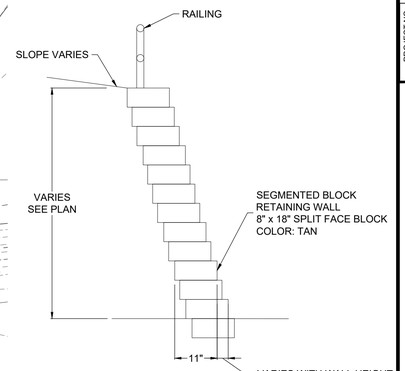

TYPICAL MODULAR BLOCK WALL DETAIL
NOT TO SCALE

NOTE: RETAINING WALL WILL REQUIRE A SEPARATE BUILDING PERMIT

N

0 15 30 60
SCALE: 1" = 30'

PCD FILE NO. PPR2329

NOT FOR CONSTRUCTION

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THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN
GRADING PLAN

SHEET
6 OF 20

MATCHLINE - SEE BELOW RIGHT SIDE

PALMER RIDGE HIGH SCHOOL

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

EX. FIBER OPTIC
EX. ELECTRIC
EX. TELEPHONE / FIBER OPTIC
EX. PROPERTY LINE

8" 90° BEND
8" 90° BEND
120.5'~8" PVC
15.0'~8" PVC
2" WATER TAP
57.1'~2" SERVICE LINE
8"x8" TEE W/ 8" G.V.
111.7'~8" PVC
EX. PROPERTY LINE
RETAINING WALL
SD MH18, 5' DIA MH
RIM = 7165.27
20.9 LF ~ 18" RCP
8" 45° BEND
20.9'~8" PVC
8" 45° BEND
7.3'~8" PVC
8" 11.25° BEND
57.3'~8" PVC
8"X8" TEE W/ 3 ~ 8" G.V.
20' PROPOSED WATER EASEMENT
8"x6" TEE W/ 8" G.V. & 6" G.V.
16.5'~8" PVC
315.9'~8" PVC
SD MH12, 5' DIA MH
RIM = 7156.49
6.1 LF ~ 18" RCP
SD IN10, 5' TYPE R INLET
RIM = 7156.38
301.5'~8" PVC
82.9 LF ~ 24" RCP
SD MH14, 5' DIA MH
RIM = 7158.16
48.4 LF ~ 24" RCP
142.2 LF ~ 24" RCP
SD MH13, 5' DIA MH
RIM = 7157.06
156.9 LF ~ 18" RCP
SD MH16, 5' DIA MH
RIM = 7161.09
144.5 LF ~ 24" RCP
SD MH19, 5' DIA MH
RIM = 7165.50
SD MH17, 5' DIA MH
RIM = 7163.31
66.6 LF ~ 18" RCP
8" 11.25° BEND
SD MH15, 5' DIA MH
RIM = 7160.44
36.1'~6" DIP
66.3 LF ~ 18" RCP
6" HYDRANT
79.5 LF ~ 18" RCP
2" WATER METER
54.3'~2" SERVICE LINE
64.6 LF ~ 18" RCP
SD IN9, TRIPLE TYPE 13 INLET
RIM = 7156.37
SD IN7, DOUBLE TYPE 13 INLET
RIM = 7160.10
96.5 LF ~ 18" RCP
SD IN8, TYPE 13 INLET
RIM = 7157.09
PROPOSED TRANSFORMER
8" FIRE SERVICE
2" WATER SERVICE LINE
FIRE RISER ROOM
PROPOSED FDC
SD IN6, TYPE 13 INLET
RIM = 7164.43
6.0 LF ~ 18" RCP
SD MH20, 5' DIA MH
RIM = 7164.69
259.1'~8" PVC
110.8 LF ~ 18" RCP
10'
20' PROPOSED WATER EASEMENT
SD IN5, TYPE 13 INLET
RIM = 7164.08
6.0 LF ~ 18" RCP
SD MH21, 5' DIA MH
RIM = 7164.43
2' DRAINAGE PAN
6" HYDRANT
12.2'~6" DIP
8"x6" TEE W/ 8" G.V. & 6" G.V.
ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000027
PALMER RIDGE HIGH SCHOOL

19165 MONUMENT HILL ROAD
PROPOSED BUILDING
164,166 S.F.

SANITARY CAP, 6" CAP
RIM = 7155.19
42.4'~6" PVC
SD MH9, 5' DIA MH
RIM = 7160.32
6.0 LF ~ 18" RCP
SD IN2, TRIPLE TYPE 13 INLET
RIM = 7160.40
SANMH 1-1, 4' SAMPLING MH
RIM = 7161.09
8"x6" TEE W/ 8" G.V. & 6" G.V.
20.8'~6" DIP
SD MH10, 5' DIA MH
RIM = 7163.41
6.0 LF ~ 18" RCP
SD IN1, TRIPLE TYPE 13 INLET
RIM = 7162.93
10.29'
632.9'~8" PVC
239.3 LF ~ 24" RCP
6" HYDRANT
66.3 LF ~ 18" RCP
38.3'~6" PVC
SDFES 1-1, 18" FES
SDFES 1-2, 18" FES
20' PROPOSED WATER EASEMENT
264.0 LF ~ 18" RCP
2' DRAINAGE PAN
8" 45° BEND
10.4'~8" PVC
8" 45° BEND
21.6'~8" PVC
RETAINING WALL
EX. 8" SS
EX. 8" SS
EX. PROPERTY / R.O.W. LINE
EX. TELEPHONE
CONNECT TO EX. 8" SS W/ 6" SADDLE TEE CONNECTION
2.0'~6" PVC
45° VERTICAL BEND
RIM = 7153.48

EX. STORM FES
INV OUT 18" RCP (W) = 7166.6
PROPOSED DRAINAGE EASEMENT WIDTH VARIES
MONUMENT HILL ROAD
EX. SANITARY MANHOLE
RIM = 7166.3
INV OUT 8" PVC (S) = 7157.5
INV IN 8" PVC (N) = 7157.7
PROPOSED 10' DRAINAGE EASEMENT
EX. STORM MANHOLE
RIM = 7169.7
INV OUT 30" RCP (W) = 7165.1
INV IN 24" RCP (N) = 7165.2
INV IN 18" RCP (E) = 7165.3
EX. STORM INLET
RIM = 7169.0
INV OUT 42" RCP (W) = 7163.0
INV IN 30" RCP (E) = 7163.3
INV IN 18" RCP (NE) = 7163.4
EX. STORM MANHOLE
RIM = 7171.3
INV OUT 18" RCP (S) = 7165.8
INV IN 18" RCP (N) = 7165.9
EX. STORM MANHOLE
RIM = 7171.2
INV OUT 24" RCP (S) = 7165.9
INV IN 24" RCP (E) = 7165.9
EX. SANITARY MANHOLE
RIM = 7169.7
INV OUT 8" PVC (S) = 7159.9
INV IN 8" PVC (N) = 7160.0
EX. STORM MANHOLE
RIM = 7169.8
INV OUT 18" RCP (SW) = 7164.2
INV IN 18" RCP (N) = 7164.3

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 71130304

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

PCD FILE NO. PPR2329

N
0 15 30 60
SCALE: 1" = 30'

MATCHLINE - SEE ABOVE EAST SIDE OF SITE

MATCHLINE - SEE SHEET NO. 8 OF 20

PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- LIMITS OF CONSTRUCTION / SAWCUT
- FIRE HYDRANT
- STORM SEWER
- SANITARY SEWER
- TRENCH DRAIN
- W — WATER LINE
- IRR — IRRIGATION LINE
- NP — NONPOTABLE WATER LINE
- RW — RAW WATER LINE
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- WATER BEND
- WATER CROSS
- WATER TEE
- WATER REDUCER
- WATER VALVE
- PLUG/CAP
- RETAINING WALL

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SECTION LINE
- SETBACK
- EDGE OF PAVEMENT
- CURB AND GUTTER
- X — X — FENCE
- RETAINING WALL
- W — WATER LINE
- RW — RAW WATER LINE
- NP — NON-POTABLE WATER LINE
- IRR — IRRIGATION LINE
- S — SANITARY SEWER
- D — STORM SEWER
- E — ELECTRIC LINE
- G — GAS LINE
- T — TELEPHONE LINE
- FO — FIBER OPTICS LINE
- OH — OVERHEAD ELECTRIC LINE

NOTE:
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15 YEARS
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▪ Civil Engineering ▪ Construction Management

NOT FOR CONSTRUCTION

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THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN
UTILITY PLAN

SHEET
7 OF 20

I:\2023\23009 - The Rock Commerce Center\CADD\Sheet Sets\Site Plan\The Rock\23009_Utility Plan.dwg tdb: 11 OF 24 UTILITY PLAN Nov 20, 2023 - 7:24pm csaiz

MATCHLINE - SEE SHEET NO. 7 OF 20

EX. FIBER OPTIC
EX. ELECTRIC
EX. TELEPHONE / FIBER OPTIC
EX. PROPERTY LINE
SD IN11, TRIPLE TYPE 13 COMBO RIM = 7154.24
SD IN12, 10' TYPE R INLET RIM = 7148.51
20.4 LF ~ 18" RCP
SD MH1, 6' DIA MH RIM = 7149.28
18" RCP SD
18.9'~8" PVC
8"x6" TEE W/ 8" G.V. & 6" G.V.
8"x8" TEE W/ 2 ~ 8" G.V.
405.4'~8" PVC
40.0 LF ~ 18" RCP
54.3 LF ~ 36" RCP
177.7'~8" PVC
125.5 LF ~ 36" RCP
8"x6" TEE W/ 8" G.V. & 6" G.V.
60.4'~6" DIP
44.1'~6" DIP
SD MH11, 5' DIA MH RIM = 7155.78
SD MH22, 5' DIA MH
SD MH2, 6' DIA MH RIM = 7151.67
18" RCP SD
SD IN13, TYPE 13 COMBO RIM = 7148.26
19.2 LF ~ 36" RCP
PROPOSED FOREBAY
337.0 LF ~ 36" RCP
20' PROPOSED WATER EASEMENT
6" HYDRANT
74.4'~8" PVC
68.6 LF ~ 36" RCP
FULL SPECTRUM DETENTION POND
4' CONCRETE PAN
8" 11.25° BEND
SD MH3, 5' DIA MH RIM = 7152.12
15' MAINTENANCE ACCESS ROAD
70.6 LF ~ 36" RCP
43.8 LF ~ 18" RCP
SD IN4, TYPE 13 COMBO INLET RIM = 7151.93
7.0 LF ~ 18" RCP
SD MH4, 5' DIA MH RIM = 7152.14
15' MAINTENANCE ACCESS ROAD
148.7'~8" PVC
8" 45° BEND
24.4'~8" PVC
8" 45° BEND
72.7 LF ~ 24" RCP
SD MH5, 5' DIA MH RIM = 7155.19
DRAINAGE EASEMENT
37.8 LF ~ 24" RCP
433.5'~8" PVC
SD MH7, 5' DIA MH RIM = 7157.90
24.0 LF ~ 18" RCP
157.0 LF ~ 24" RCP
RETAINING WALL
SD MH6, 5' DIA MH RIM = 7156.44
225.0 LF ~ 24" RCP
SD MH8, 5' DIA MH RIM = 7159.12
SD IN3, 10' TYPE R INLET RIM = 7156.84
EX. PROPERTY / R.O.W. LINE
EX. 8" SS
EX. SANITARY MANHOLE
RIM = 7147.4
INV OUT 8" PVC (S) = 7138.9
INV IN 8" PVC (N) = 7139.0
PROPOSED 10' DRAINAGE EASEMENT
MONUMENT HILL ROAD
EX. SANITARY MANHOLE
RIM = 7137.5
INV OUT 8" PVC (S) = 7129.9
INV IN 8" PVC (N) = 7130.2
EX. PERMANENT EASEMENT (PE-12)
REC. NO. 218005932
REC. NO. 218005931
REC. NO. 218043186
STORM FES
INV IN 24" RCP (W) = 7132.2
STORM FES
INV OUT 24" RCP (W) = 7133.8
POND OUTLET STRUCTURE, MODIFIED TYPE C INLET RIM = 7140.00
41.1 LF ~ 18" RCP
SDFES 1-4, 18" FES RIM = 7135.83
EX. TELEPHONE
PROPOSED SAWCUT LINE
EX. TELEPHONE PEDESTALS TO BE RELOCATED
EX. 8" SS
EX. 20' UTILITY AND DRAINAGE EASEMENT REC. NO. 200033900
EX. 10' EASEMENT REC. NO. 200033900
PROPOSED ACCESS EASEMENT
EX. GAS LINE
EX. ELECTRIC
EX. TELEPHONE
EX. PROPERTY LINE
2-STORY STUCCO BUILDING
LOT 1
GREATER EUROPE 'ISSION SUBDIVISION FILING NO. 1
REC. NO. 200033900
SD IN 14, TRIPLE TYPE 13 COMBO INLET RIM = 7142.03
ASSESSED OWNER: COLOROADO DEPARTMENT OF TRANSPORATION REC. NO. 200033900 PARCEL NO. 7113003004
US INTERSTATE 25 (PUBLIC ROW WIDTH VARIES) BOOK 1185, PAGE 458
19165 MONUMENT HILL ROAD
PROPOSED BUILDING 164,166 S.F.
PALMER RIDGE HIGH SCHOOL
ASSESSED OWNER: LEWIS-PALMER SCHOOL DISTRICT 38 REC NO. 206144703 PARCEL NO. 7111000028
LOT 9 WOODMOOR BUSINESS/TECHNOLOGICAL PARK REC. NO. 848443 ASSESSED OWNER: BASE CAMP VENTURES LLC REC. NO. 203141071 PARCEL NO. 7111302002
BASE CAMP ROAD "EMIGRANT TRAIL WEST" (60' WIDE PUBLIC R.O.W. WIDTH) REC. NO. 848443
EX. 10' MOUNTAIN VIEW EASEMENT REC NO. 848443
EX. 16.5' MOUNTAIN BELL EASEMENT REC. NO. 848443
CONNECT TO EX. WATER W/ 8" G.V.
PROPOSED SAWCUT LINE
93.4'~8" PVC
EX. WATER
EX. FIRE HYDRANT
8" 45° BEND
41.4'~8" PVC
EX. 10' MOUNTAIN VIEW ELECTRIC ASSOCIATION SERVICE EASEMENT REC. NO. 200033900
8" 45° BEND
EX. ACCESS, UTILITY, AND DRAINAGE EASEMENT REC. NO. 223051980
EX. TELEPHONE PEDESTALS TO BE RELOCATED
PROPOSED ACCESS EASEMENT

PROPOSED LEGEND

- EASEMENT
- CURB AND GUTTER
- LIMITS OF CONSTRUCTION / SAWCUT
- FIRE HYDRANT
- STORM SEWER
- SANITARY SEWER
- TRENCH DRAIN
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- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- WATER BEND
- WATER CROSS
- WATER TEE
- WATER REDUCER
- WATER VALVE
- PLUG/CAP
- RETAINING WALL

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SECTION LINE
- SETBACK
- EDGE OF PAVEMENT
- CURB AND GUTTER
- X — X — FENCE
- RETAINING WALL
- W — WATER LINE
- RW — RAW WATER LINE
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N

0 15 30 60
SCALE: 1" = 30'

PCD FILE NO. PPR2329

15 Redland YEARS
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THE ROCK COMMERCE CENTER

SITE DEVELOPMENT PLAN
UTILITY PLAN

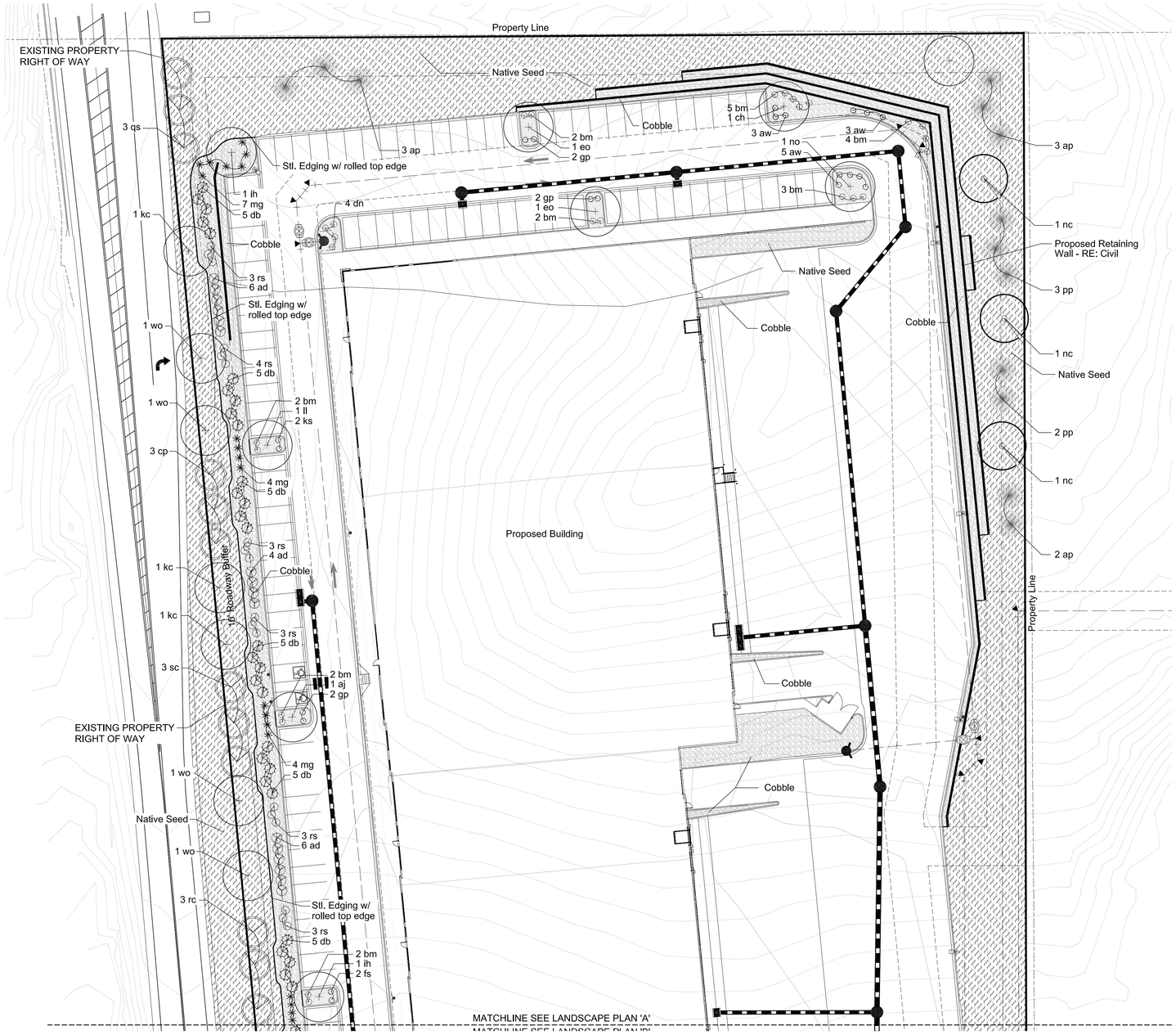
SHEET
8 OF 20

I:\2023\23009 — The Rock Commerce Center\CADD\Sheet Sets\Site Plan\The Rock\23009_Utility Plan.dwg tdb: 12 OF 24 UTILITY PLAN Nov 20, 2023 - 7:24am csatz

SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
COUNTY OF EL PASO, STATE OF COLORADO



LANDSCAPE LEGEND:

DECIDUOUS TREE

ORNAMENTAL TREE

EVERGREEN TREE

SHRUB

ORNAMENTAL GRASS / PERENNIAL

NATIVE SEED MIX NON-IRRIGATED

COMMON NAME	SCIENTIFIC NAME	% OF TOTAL	PLS PER ACRE
BLUE GRAMA	BOUTELOUA GRACILIS	25%	1.8 LBS.
SAND DROPSEED	SPOROBOLUS CRYPTANDRUS	20%	0.20 LBS.
SIDEOATS GRAMA	BOUTELOUA CURTIPENDULA	20%	6.3 LBS.
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	15%	8.2 LBS.
BUFFALO GRASS	BOUTELOUA DACTYLOIDES	10%	10.7 LBS.
INLAND SALTGRASS	DISTICHLIS SPICATA	1%	0.60 LBS.
PASTURE SAGE	ARTEMISIA FRIGIDA	1%	0.01 LBS.
BLANKET FLOWER	GAILLARDIA ARTISTATA	1%	0.5 LBS.
PRAIRIE CONEFLOWER	RATIBIDA COLUMNIFERA	1%	0.1 LBS.
PURPLE PRAIRIECLOVER	DALEA PURPUREA	1%	0.3 LBS.
BLUE FLAX	LINUM LEWISII	1%	0.4 LBS.

DETENTION SEED MIX

COMMON NAME	SCIENTIFIC NAME	% OF TOTAL	PLS PER ACRE
BLUE GRAMA	BOUTELOUA GRACILIS	20%	1.5 LBS.
SAND DROPSEED	SPOROBOLUS CYRPTANDRUS	20%	0.20 LBL.
SWITCHGRASS	PANICUM VIRGATUM	20%	3.2 LBS.
SIDEOATS GRAMA	BOUTELOUA CURIPENDULA	15%	4.7 LBS.
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	10%	5.5 LBS.
GREEN NEEDLEGRASS	NASELLA VIRIDULA	10%	3.3 LBS.

4"-8" ROUND COBBLE OVER FILTER FABRIC

SHREDDED CEDAR MULCH

STEEL EDGING w/ ROLLED TOP EDGE

RETAINING WALL - RE: CIVIL

LANDSCAPE PLAN 'A'

NORTH

0' 15' 30' 60' 90'
SCALE 1" = 30' - 0"

STACK Lot
5639 SOUTH CURTICE STREET
LITTLETON, COLORADO 80120
phone. 303.808.4523

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
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	11/16/23	RESUBMITTAL

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DESIGNED sdw
FILENAME

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

LANDSCAPE PLAN 'A'

INTERGROUP ARCHITECTS
architecture
planning
interiors
2000 West Littleton Blvd
Littleton, Colorado 80120
P. 303.738.8877 F. 303.738.2294
www.igarch.com

JOB NO.
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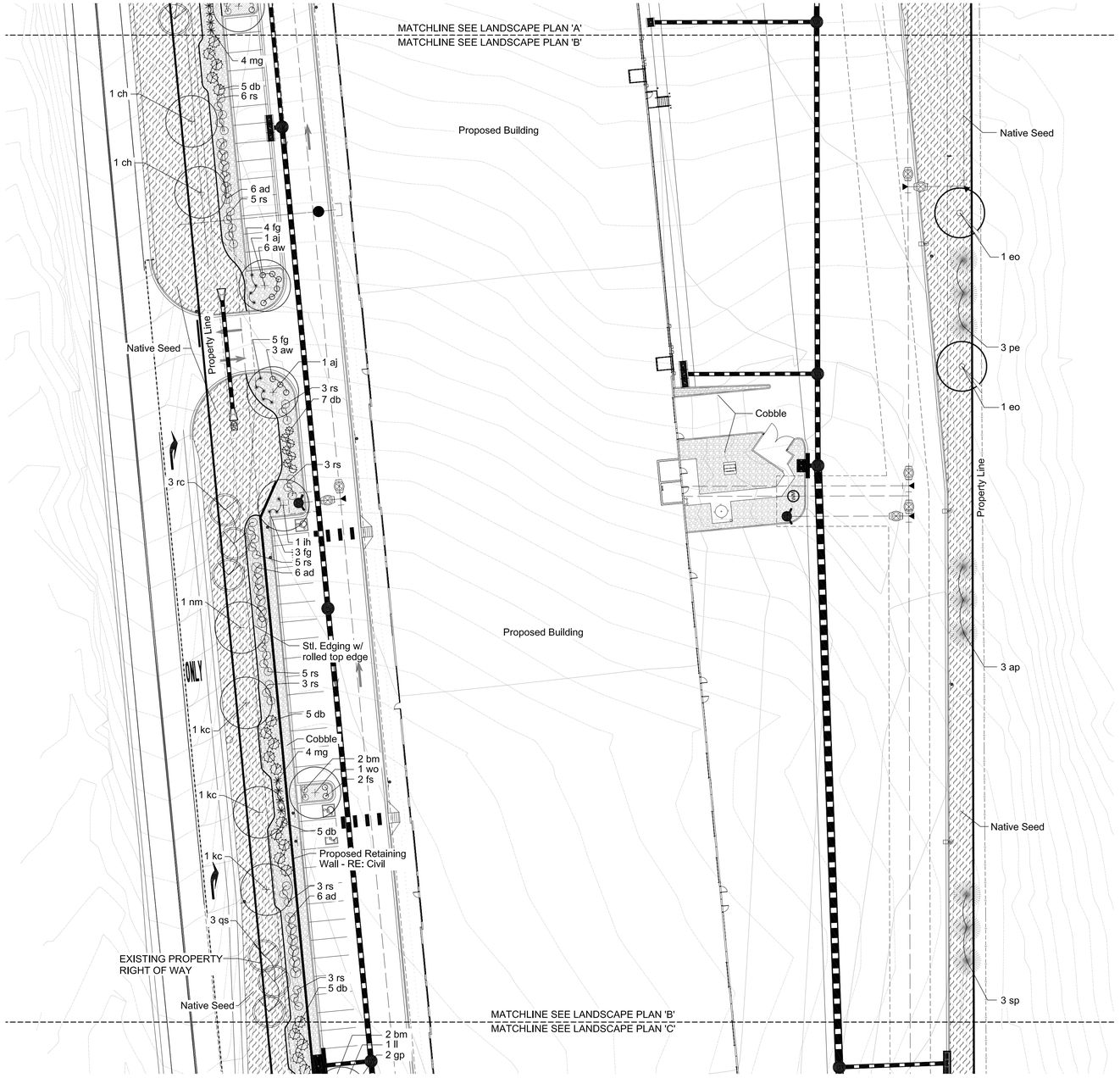
SHEETS 20
SHEET 9

SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
COUNTY OF EL PASO, STATE OF COLORADO



LANDSCAPE LEGEND:

DECIDUOUS TREE

ORNAMENTAL TREE

EVERGREEN TREE

SHRUB

ORNAMENTAL GRASS / PERENNIAL

NATIVE SEED MIX NON-IRRIGATED

COMMON NAME	SCIENTIFIC NAME	% OF TOTAL	PLS PER ACRE
BLUE GRAMA	BOUTELOUA GRACILIS	25%	1.8 LBS.
SAND DROPSEED	SPOROBOLUS CRYPTANDRUS	20%	0.20 LBS.
SIDEOATS GRAMA	BOUTELOUA CURTIPENDULA	20%	6.3 LBS.
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	15%	8.2 LBS.
BUFFALO GRASS	BOUTELOUA DACTYLOIDES	10%	10.7 LBS.
INLAND SALTGRASS	DISTICHLIS SPICATA	1%	0.60 LBS.
PASTURE SAGE	ARTEMISIA FRIGIDA	1%	0.01 LBS.
BLANKET FLOWER	GAILLARDIA ARTISTATA	1%	0.5 LBS.
PRAIRIE CONEFLOWER	RATIBIDA COLUMNIFERA	1%	0.1 LBS.
PURPLE PRAIRIECLOVER	DALEA PURPUREA	1%	0.3 LBS.
BLUE FLAX	LINUM LEWISII	1%	0.4 LBS.

DETENTION SEED MIX

COMMON NAME	SCIENTIFIC NAME	% OF TOTAL	PLS PER ACRE
BLUE GRAMA	BOUTELOUA GRACILIS	20%	1.5 LBS.
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4"-8" ROUND COBBLE OVER FILTER FABRIC

SHREDDED CEDAR MULCH

STEEL EDGING w/ ROLLED TOP EDGE

RETAINING WALL - RE: CIVIL

LANDSCAPE PLAN 'A'

NORTH

0' 15' 30' 60' 90'
SCALE 1" = 30' - 0"

STACKLot
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SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

LANDSCAPE PLAN 'B'

INTERGROUP ARCHITECTS
■ architecture
■ planning
■ interiors
2000 West Littleton Blvd
Littleton, Colorado 80120
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SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

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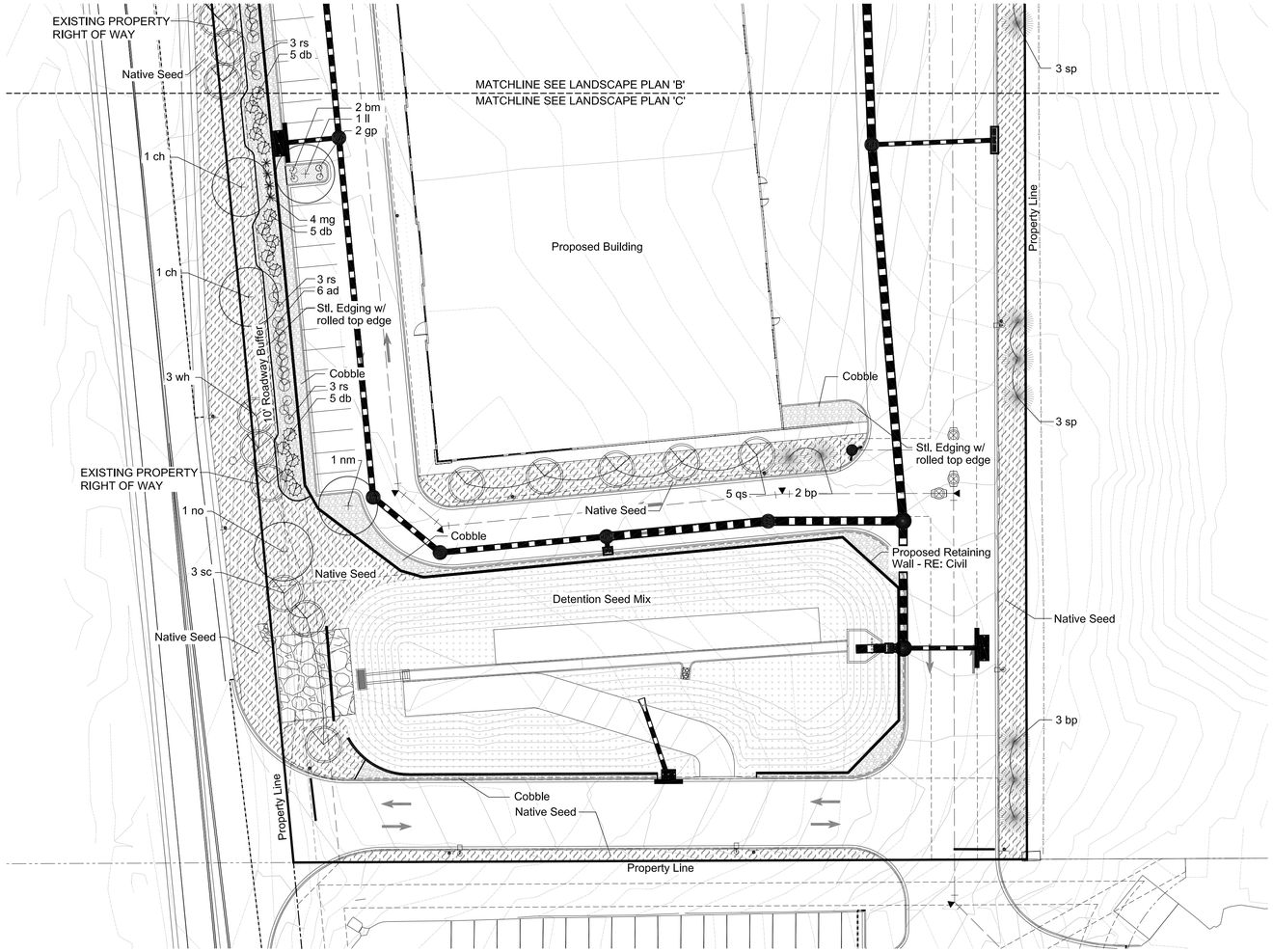

LANDSCAPE PLAN 'A'

NORTH

0' 15' 30' 60' 90'

SCALE 1" = 30' - 0"

LANDSCAPE LEGEND:

DECIDUOUS TREE

ORNAMENTAL TREE

EVERGREEN TREE

SHRUB

ORNAMENTAL GRASS / PERENNIAL

NATIVE SEED MIX NON-IRRIGATED

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4"-8" ROUND COBBLE OVER FILTER FABRIC

SHREDDED CEDAR MULCH

STEEL EDGING w/ ROLLED TOP EDGE

RETAINING WALL - RE: CIVIL

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SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

LANDSCAPE PLAN 'C'

INTERGROUP ARCHITECTS
■ architecture
■ planning
■ interiors
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Littleton, Colorado 80120
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SHEET 11

SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
COUNTY OF EL PASO, STATE OF COLORADO

GENERAL PLANTING NOTES:

1. PRIOR TO BEGINNING ANY WORK ON THE SITE THE LANDSCAPE CONTRACTOR SHALL CONTACT THE OFFICE OF THE GENERAL CONTRACTOR AND LANDSCAPE ARCHITECT FOR SPECIFIC INSTRUCTIONS RELEVANT TO THE SEQUENCING OF WORK.
2. LANDSCAPE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS AND SERVICE NECESSARY TO FURNISH AND INSTALL PLANTINGS AND MATERIALS AS SPECIFIED HEREIN AND AS SHOWN ON PLANS.
3. NO MATERIAL SUBSTITUTIONS SHALL BE MADE WITHOUT THE LANDSCAPE ARCHITECTS APPROVAL IN WRITING. ALTERNATE MATERIALS OF SIMILAR SIZE AND CHARACTER MAY BE CONSIDERED IF SPECIFIED PLANT MATERIALS CANNOT BE OBTAINED.
4. LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REVISE PLANT MATERIAL LIST AS DEEMED NECESSARY.
5. ALL PLANT LOCATIONS ARE APPROXIMATE. ADJUST AS NECESSARY TO AVOID CONFLICTS.
6. QUANTITIES OF MATERIALS SHOWN ON THE PLANTING PLAN TAKE PRECEDENCE OVER QUANTITIES SHOWN ON THE PLANT MATERIAL SCHEDULE. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFY ALL QUANTITIES ON THE PLANTING PLAN(S).
7. LANDSCAPE CONTRACTOR SHALL LOCATE ALL UTILITIES BEFORE COMMENCEMENT OF WORK. VERIFY EXACT LOCATION OF ALL UTILITIES BY CONTACTING APPROPRIATE UTILITY COMPANIES. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR THE REPAIR / REPLACEMENT FOR ANY DAMAGE CAUSED TO UTILITIES.
8. FINISH GRADE SHALL BE ADJUSTED FOR TURF THICKNESS.
9. ALL PLANT MATERIALS SHALL HAVE BACKFILL, CAREFULLY PLACED AROUND BASE AND IDES OF BALL TO TWO-THIRDS (⅔) DEPTH OF BALL THEN THOROUGHLY SOAKED WITH WATER TO ALLOW SETTLEMENT. ALL WIRE, BURLAP FASTENERS, TOP ONE-THIRD (⅓) OF BURLAP AND LOOSE BURLAP SHALL BE REMOVED AT THIS TIME THE REMAINDER OF HE PIT SHALL THEN BE BACKFILLED, ALLOWING FOR THE DEPTH OF THE MULCH SAUCER AND SETTLEMENT OF BACKFILL. BACKFILL SHALL THEN BE THOROUGHLY WATERED ONCE AGAIN.
10. AFTER PLANTING IS COMPLETED REPAIR INJURIES TO ALL PLANTS AS REQUIRED. LIMIT AMOUNT OF PRUNING TO A MINIMUM NECESSARY TO REMOVE DEAD OR INJURED TWIGS AND BRANCHES. PRUNE IN SUCH A MANNER AS NOT TO CHANGE THE NATURAL GROWING HABIT OR SHAPE OF THE PLANT. MAKE ALL CUTS FLUSH, LEAVING NO STUBS. CENTRAL LEADERS SHALL NOT BE REMOVED. IF THE CENTRAL LEADER OF A PLANT IS DEAD THE PLANT SHALL BE REPLACED.
11. PLANT SPECIFIED GROUND COVERS WITHIN ONE FOOT OF TRUCK OF TREES AND SHRUBS PLANTED WITHIN THE AREA. PLANTING ARRANGEMENTS SHALL BE TRIANGULAR WITH PROPER SPACING BETWEEN PLANTS.
12. COMMERCIAL GRADE 3/16 INCH BY 4" POWDER COATED STEEL EDGING SHALL BE USED TO SEPARATE ALL TURF AREAS FROM PLANTING BEDS. PLACE EDGING FLUSH WITH GRADE AND STAKE TO GROUND PER MANUFACTURES RECOMMENDATIONS.
13. LANDSCAPE CONTRACTOR TO PROVIDE THE LANDSCAPE CONTRACTOR A SAMPLE OF PROPOSED STEEL EDGING FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
14. USE SHREDDED CEDAR MULCH IN ALL PLANTING BEDS AND TREE SAUCERS. LANDSCAPE CONTRACTOR SHALL PROVIDE A 1 CUBIC FOOT SAMPLE OF PROPOSED MULCH TO LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL.
15. PLACE FOUR INCHES OF MULCH IN ALL SHRUB BEDS, PLACE FOUR INCHES OF MULCH IN ALL GROUND COVER, PERENNIAL BEDS AND PLACE 4 INCHES OF MULCH AT ALL TREE SAUCERS.
16. PLANTING BEDS RECEIVING MULCH MULCH ARE TO BE FREE OF WEEDS AND GRASS. TREAT BEDS WITH A PRE-EMMERGENT HERBICIDE PRIOR TO PLANTING AND MULCH PLACEMENT. DO NOT APPLY HERBICIDE IN PERENNIAL OR ANNUAL BEDS.
17. LANDSCAPE CONTRACTOR TO REMOVE TREE STAKES AND ALL DEAD WOOD ON TREES AND SHRUBS ONE YEAR AFTER SUBSTANTIAL COMPLETION IS GRANTED ON THE COMPLETE PROJECT.
18. REPORT ANY DISCREPANCIES IN THE PLANTING PLAN TO THE LANDSCAPE ARCHITECT PRIOR TO STARTING CONSTRUCTION.
19. ALL LANDSCAPE AREAS SHALL BE IRRIGATED BY AN UNDERGROUND AUTOMATIC UNDERGROUD IRRIGATION SYSTEM. WITH SEPARATE ZONES FOR TURF AND SHRUBS / TREES / GROUNDCOVER.
20. IF TRANSFORMERS, GROUND MOUNTED HVAC EQUIPMENT, UTILITY PEDESTALS, ETC. ARE NOT SHOWN ON THE SITE IMPROVEMENT PLAN, ADDITIONAL LANDSCAPE/SCREENING MAY BE REQUIRED BASED UPON FIELD CONDITIONS DISCOVERED VIA THE SITE INSPECTION BY STAFF, MADE PRIOR TO THE ISSUANCE OF CERTIFICATE OF OCCUPANCY, OR FINAL INSPECTION AS APPLICABLE.

SOIL ANALYSIS CONTRACTOR REQUIREMENT

"THE REQUIRED SOIL ANALYSIS REPORT IS REQUIRED TO BE SUBMITTED AND APPROVED WITH THE IRRIGATION PLAN SUBMITTAL AND BEFORE ANY LANDSCAPE CONSTRUCTION. THIS WOULD INCLUDE COMPLETING THE SOIL SAMPLING AND SUBMITTING THE SAMPLES TO A SOILS LAB FOR TESTING. A SEPARATE LAB TEST REPORT AND SOIL PREPARATION RECOMMENDATIONS (AMENDMENT/FERTILIZER AMOUNTS AND APPLICATION RATES) FOR EACH TYPE OF PROPOSED LANDSCAPING (SHRUB BEDS/SOD/NATIVE SEED) WILL NEED TO BE PROVIDED TO CITY STAFF FOR REVIEW AND APPROVAL."

SOIL AMENDMENTS

PRIOR TO PLANTING, ALL SITES FOR PLANTINGS SHALL INCORPORATE SOIL AMENDMENTS AT A RATE OF 3 CUBIC YARDS PER 1000 SQUARE FEET TO A MINIMUM DEPTH OF 6". A LESSER AMOUNT SHALL BE ALLOWED IF A SOIL TEST SHOWS THAT 3 CUBIC YARDS PER 1000 SQUARE FEET IS NOT NECESSARY FOR WATER RETENTION AND DEEP ROOTING OF PLANT MATERIALS. IF THE SPECIFIED PLANT MATERIAL REQUIRES LESS FERTILE SOIL, THOSE AREAS MAY HAVE LESS SOIL AMENDMENTS INSTALLED IF APPROVED BY THE COMMUNITY DEVELOPMENT DIRECTOR. THESE AREAS SHALL BE IDENTIFIED ON THE LANDSCAPE PLAN. EXISTING TOPSOIL SHALL BE SALVAGED AND STOCKPILED FOR USE AS SOIL AMENDMENTS OR TOPSOIL. NO TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS THE CITY APPROVES THE TRANSFER OF TOPSOIL TO A CITY-OWNED PARK OR OPEN SPACE AREA. A NOTE SHALL BE PLACED ON THE LANDSCAPE PLAN REFLECTING THE ABOVE REQUIREMENTS REGARDING SOIL AMENDMENTS AND TOPSOIL. EXAMPLES OF ACCEPTABLE SOIL AMENDMENTS INCLUDE COMPOST AND AGED MANURE. MOUNTAIN PEAT AND INORGANIC MATERIALS SUCH AS SAND, GYPSUM AND LIME ARE PROHIBITED SOIL AMENDMENTS. ALL SITES ARE SUBJECT TO INSPECTION BY THE CITY FOR COMPLIANCE WITH SOIL AMENDMENT REQUIREMENTS.

PLANT MATERIAL SCHEDULE:

SYMBOL	QTY.	I.D.	COMMON NAME	BOTANICAL NAME	SIZE	COND.
SHADE TREES						
	2	nm	NORWAY MAPLE	ACER PLATANOIDES	1 1/2" CAL.	B & B
	3	aj	AUTUMN BLAZE MAPLE	ACER X FREEMANII 'JEFFERSRED'	1 1/2" CAL.	B & B
	5	ch	COMMON HACKBERRY	CELTIS OCCIDENTALIS	1 1/2" CAL.	B & B
	3	ih	IMPERIAL HONEY LOCUST	GLEDITSIA TRIACANTHOS INERMIS 'IMPERIAL'	1 1/2" CAL.	B & B
	6	kc	KENTUCKY COFFEE TREE	GYMNOCLADUS DIOICUS	1 1/2" CAL.	B & B
	3	nc	NARROWLEAF COTTONWOOD	NARROWLEAF COTTONWOOD	1 1/2" CAL.	B & B
	5	wo	SWAMP WHITE OAK	QUERCUS BICOLOR	1 1/2" CAL.	B & B
	2	no	NORTHERN RED OAK	QUERCUS RUBRA	1 1/2" CAL.	B & B
	2	ll	LITTLELEAF LINDEN	TILIA CORDATA	1 1/2" CAL.	B & B
	4	eo	ENGLISH OAK	QUERCUS ROBUR	1 1/2" CAL.	B & B
ORNAMENTAL TREES						
	3	wh	WASHINGTON HAWTHORN	CRATAEGUS PHAENOPYRUM	1" CAL.	B & B
	6	rc	RADIANT CRABAPPLE	MALAU 'RADIANT'	1" CAL.	B & B
	6	sc	SPRING SNOW CRABAPPLE	MALUS 'SPRING SNOW' '	1" CAL.	B & B
	3	cp	CHANTICLEER PEAR	PYRUS CALLERYANA	1" CAL.	B & B
	11	qs	CRIMSON SPIRE OAK	QUERCUS X BIMUNDORUM 'CRIMSCHMIDT'	1" CAL.	B & B
EVERGREEN TREES						
	3	pe	PINON PINE	PINUS EDULIS	6' HT.	B & B
	11	ap	AUSTRIAN PINE	PINUS NIGRA	6' HT.	B & B
	5	pp	PONDEROSA PINE	PINUS PONDEROSA	6' HT.	B & B,
	6	sp	SOUTHWESTERN WHITE PINE	PINUS STROBIFORMIS	6' HT.	B & B
	5	bp	BOSNIA PINE	PINUS HELDREICHII	6' HT.	B & B
SHRUBS						
	2	ks	DARK KNIGHT SPIREA	CARYOPTERIS X CLANDONENSIS 'DARK KNIGHT'	5 GAL.	CONT.
	20	aw	ANOTHONY WATERER SPIREA	SPIREA JAPONICA 'ANTHONY WATER'	5 GAL.	CONT.
	4	fs	GOLD FLAME SPIREA	SPIREA JAPONICA 'GOLDFLAME'	5 GAL.	CONT.
	8	gp	GOLD DROP POTENTILLA	POTENTILLA FRUITICOSA 'GOLD DROP'	5 GAL.	CONT.
	26	bm	BLUE MIST SPIREA	CARYOPTERIS X CLANDONENSIS	5 GAL.	CONT.
	67	db	DWARF BURNING BUSH	EOUNYMUS ALATA 'DWARF NANA'	5 GAL.	CONT.
	61	rs	RUSSIAN SAGE	PEROVSKIA ATRIPLICIFOLIA	5 GAL.	CONT.
	40	ad	ARCTIC FIRE DOGWOOD	CORNUS STOLONIFERA 'FARROW'	5 GAL.	CONT.
	4	dn	DWARF NINEBARK	PHYSOCARPUS OPULIFOLIUS 'NANUS'	5 GAL.	CONT.
ORNAMENTAL GRASSES						
	27	mg	MAIDEN GRASS	MISCANTHUS SINENSIS 'GRACILLIMUS'	1 GAL.	CONT.
	12	fg	MEXICAN FEATHER GRASS	NESSELLA TENUISSIMA	1 GAL.	CONT.

Roadway Buffer

MONUMENT HILL ROAD NON-ARTERIAL	REQUIRED ROADWAY BUFFER	PROVIDED ROADWAY BUFFER	REQUIRED TREES 1 TREE / 30 LN.FT.	PROVIDED TREES
1,175 LN.FT.	10 FEET	10 FEET	40	40

Internal Landscaping

SITE AREA	INTERNAL LANDSCAPE AREA REQUIRED - (5%)	INTERNAL LANDSCAPE AREA PROVIDED	REQUIRED TREES 1 TREE / 500 SF	PROVIDED TREES
505,679 SF.	25,284 SF.	115,434 SF.	51	54

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SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

LANDSCAPE NOTES

INTERGROUP ARCHITECTS
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SITE DEVELOPMENT PLAN

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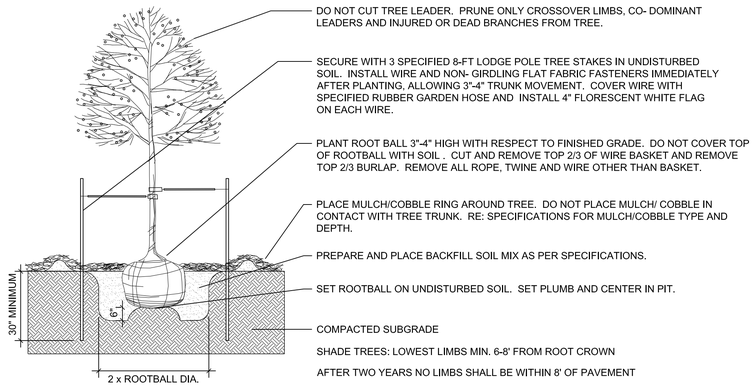
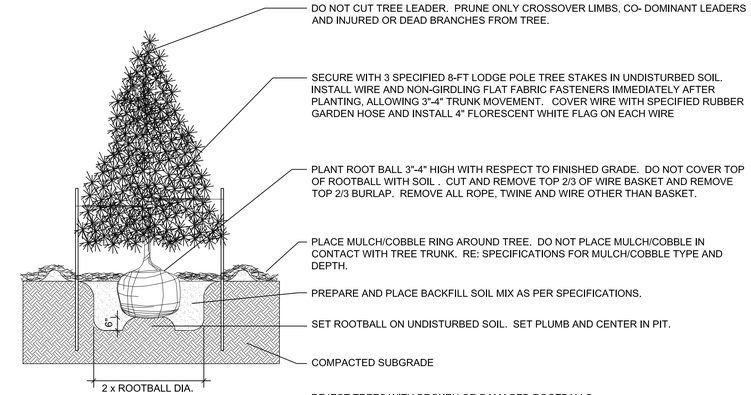


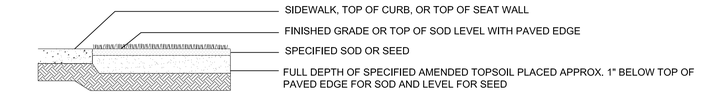
1 DECIDUOUS TREE

NOT TO SCALE

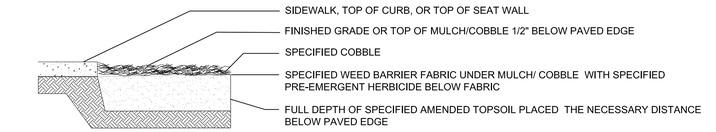


2 EVERGREEN TREE PLANTING

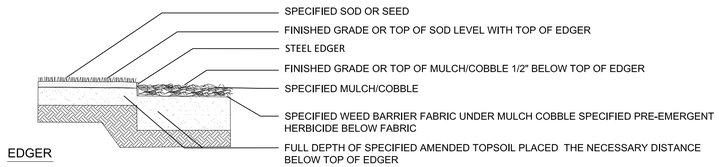
NOT TO SCALE



SOD ADJACENT TO WALKS AND CURBS



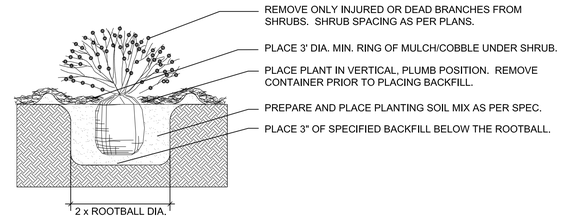
MULCH ADJACENT TO WALKS AND CURBS



EDGER

3 EDGE TREATMENT

NOT TO SCALE



4 SHRUB PLANTING

NOT TO SCALE

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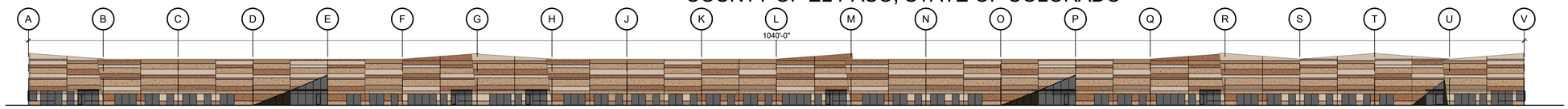
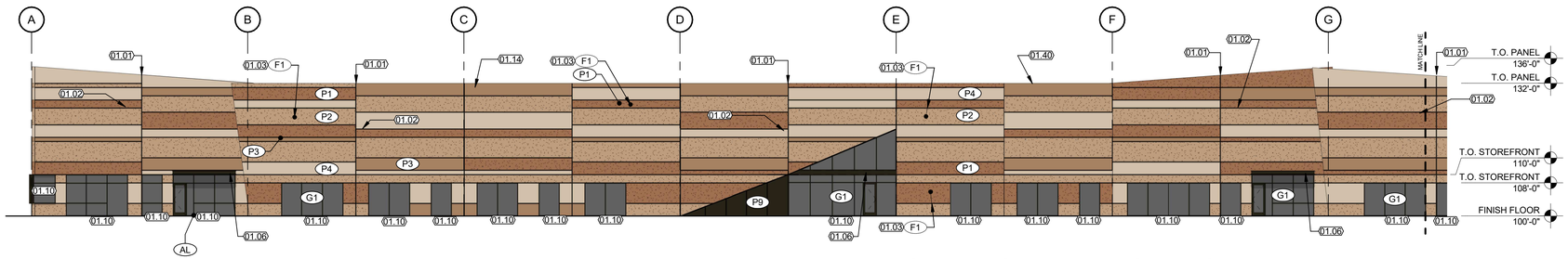
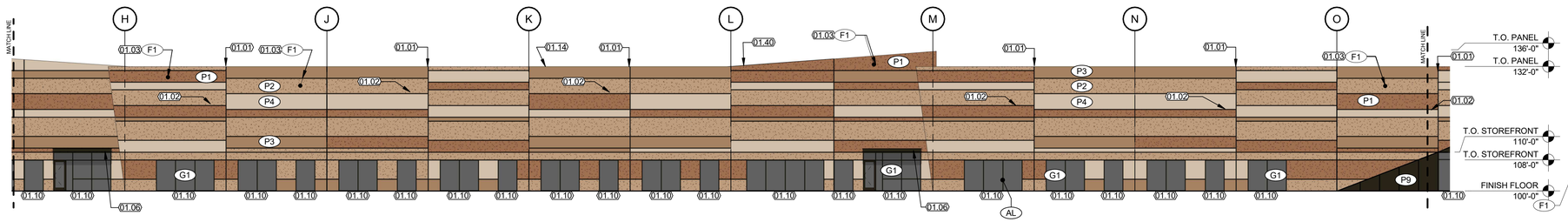


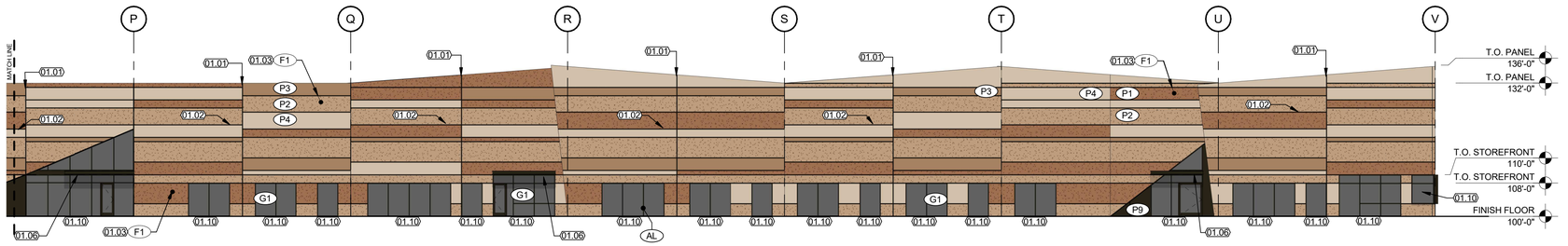
1 OVERALL WEST ELEVATION
SCALE: 1" = 40'-0"



2 ENLARGED WEST ELEVATION - NORTH
SCALE: 1/16" = 1'-0"



3 ENLARGED WEST ELEVATION - MID
SCALE: 1/16" = 1'-0"



4 ENLARGED WEST ELEVATION - SOUTH
SCALE: 1/16" = 1'-0"

KEYNOTES:

01.01	CONCRETE PANEL JOINT WITH 3/4" CHAMFERED EDGES, BACKER ROD & SEALANT FULL LENGTH.
01.02	3/4" x 2 1/4" REVEAL, PAINTED.
01.03	US FORMLINER 2/156 STEINWALD.
01.06	STEEL CHANNEL ENTRY CANOPY TO ATTACH TO CONC. TILT-UP WALL WITH T.S. SUPPORTS, PAINTED.
01.10	INSULATED TINTED GLAZING IN ANODIZED ALUMINUM STOREFRONT SYSTEM, SEE FINISH LEGEND.
01.14	SITE CAST TILT-UP CONCRETE PANEL, PAINTED WITH MEDIUM TEXTURED PAINT. SEE EXTERIOR FINISH LEGEND FOR SPECIFIC COLORS.
01.40	PREFINISHED METAL CAP FLASHING, TYP @ ALL CONCRETE PANELS.

EXTERIOR FINISH LEGEND

KEY	DESCRIPTION	IMAGE	MANUFACTURER	REMARKS / COMMENTS
P1	EXTERIOR PAINT		GLIDDEN #50YR 18/223 "SOFT COPPER"	MEDIUM TEXTURE @ CONC. PANEL
F1	CONCRETE TILT UP ACCENT		US FORMLINER	2/156 STEINWALD ROCK PATTERN
P2	EXTERIOR PAINT		GLIDDEN #10YY 41/175 "HIGHLAND PLAINS"	MEDIUM TEXTURE @ CONC. PANEL
P3	EXTERIOR PAINT		GLIDDEN #20YY 33/145 "DEACON'S BENCH"	MEDIUM TEXTURE @ CONC. PANEL
P4	EXTERIOR PAINT		GLIDDEN #20YY 51/098 "LEGEND TAN"	MEDIUM TEXTURE @ CONC. PANEL
P5	EXTERIOR PAINT		GLIDDEN #30YY 46/036 "ZEPPELIN"	MEDIUM TEXTURE @ CONC. PANEL
F2	CONCRETE TILT UP ACCENT		US FORMLINER	2/75 KOCHER - HORIZONTAL
P6	EXTERIOR PAINT		GLIDDEN #30YY 33/047 "OLD MONTEREY"	MEDIUM TEXTURE @ CONC. PANEL
P7	EXTERIOR PAINT		GLIDDEN #30YY 20/029 "MANSARD STONE"	MEDIUM TEXTURE @ CONC. PANEL
P8	EXTERIOR PAINT		GLIDDEN #30YY 10/038 "FOREST BLACK"	MEDIUM TEXTURE @ CONC. PANEL
P9	EXTERIOR PAINT		GLIDDEN #30YY 05/044 "THE DARK SIDE"	MEDIUM TEXTURE @ CONC. PANEL
G1	GLAZING		VITRO GLASS - SOLARGRAY	
AL	STOREFRONT FRAME		DARK BRONZE	

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
	10/20/2023	RESUBMITTAL
	11/16/2023	RESUBMITTAL

DRAWN: CBW
CHECKED: BS
DESIGNED: KS
FILENAME: BS11530

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

EXTERIOR ELEVATIONS

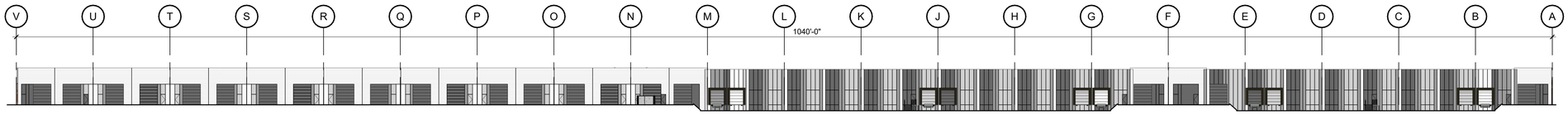
INTERGROUP ARCHITECTS
■ architecture
■ planning
■ interiors
2000 West Litteton Blvd
Littleton, Colorado 80120
p 303.730.8800 f 303.738.2294
www.igarch.com

JOB NO. BS11530
SCALE: AS SHOWN
DATE: 07/28/2023
SHEETS: 20
SHEET: 14

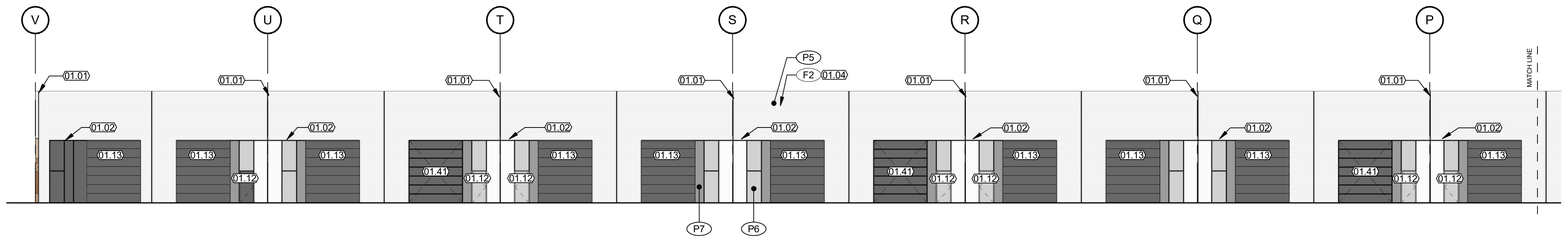
SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

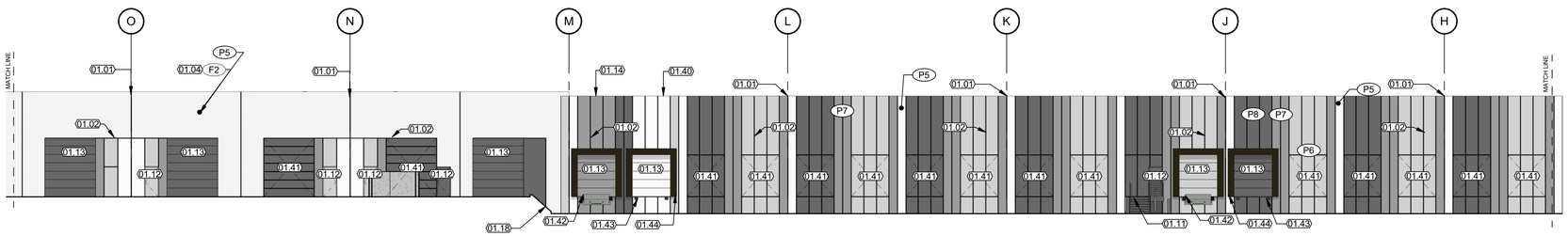
A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
COUNTY OF EL PASO, STATE OF COLORADO



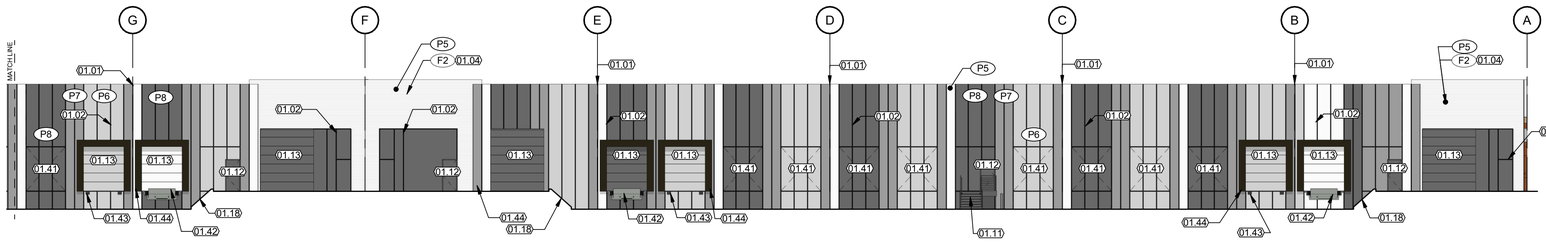
1 OVERALL EAST ELEVATION
SCALE: 1" = 40'-0"



2 ENLARGED EAST ELEVATION - SOUTH
SCALE: 1/16" = 1'-0"



3 ENLARGED EAST ELEVATION - MID
SCALE: 1/16" = 1'-0"



4 ENLARGED EAST ELEVATION - NORTH
SCALE: 1/16" = 1'-0"

KEYNOTES:

01.01	CONCRETE PANEL JOINT WITH 3/4" CHAMFERED EDGES, BACKER ROD & SEALANT FULL LENGTH.
01.02	3/4" x 2 1/4" REVEAL, PAINTED.
01.04	US FORMLINER 2/75 KOCHER - ORIENTATION HORIZONTAL.
01.11	EXTERIOR STEEL STAIRS, LANDING, GUARDRAIL & HANDRAILS. TREAD & LANDING TO BE 1" DEEP OPEN GRATING WITH LONG DIM. PERP. TO PATH OF TRAVEL. GUARDRAIL TO BE 1 1/2"Ø x 42"H. WITH 1 1/2"Ø x 34"H. HARDRAIL, PAINTED.
01.12	INSULATED H.M. MAN DOOR, PAINT TO MATCH ADJACENT WALL SURFACE COLOR, U.N.O.
01.13	INSULATED STEEL O.H. DOOR, PAINTED - SEE FINISH LEGEND.
01.14	SITE CAST TILT-UP CONCRETE PANEL, PAINTED WITH MEDIUM TEXTURED PAINT. SEE EXTERIOR FINISH LEGEND FOR SPECIFIC COLORS.
01.18	SLOPING CONCRETE RETAINING WALL.
01.40	PREFINISHED METAL CAP FLASHING, TYP @ ALL CONCRETE PANELS.
01.41	AREA TO BE KNOCK-OUT FOR FUTURE DOCK DOOR, PROVIDE 1 1/2" DEEP RECESS. TYPICAL 3/4" x 2 1/4" REVEALS WITHIN RECESS TO PROVIDE THE O.H. DOOR APPEARANCE.
01.42	6' x 8' DOCK LEVELER
01.43	DOCK BUMPER, TYP. @ DOCK LEVELER
01.44	DOCK SEAL, TYP @ DOCK HEIGHT O.H. DOORS

EXTERIOR FINISH LEGEND

KEY	DESCRIPTION	IMAGE	MANUFACTURER	REMARKS / COMMENTS
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F1	CONCRETE TILT UP ACCENT		US FORMLINER	2/156 STEINWALD ROCK PATTERN
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P3	EXTERIOR PAINT		GLIDDEN #20YY 33/145 "DEACON'S BENCH"	MEDIUM TEXTURE @ CONC. PANEL
P4	EXTERIOR PAINT		GLIDDEN #20YY 51/098 "LEGEND TAN"	MEDIUM TEXTURE @ CONC. PANEL
P5	EXTERIOR PAINT		GLIDDEN #30YY 46/036 "ZEPPELIN"	MEDIUM TEXTURE @ CONC. PANEL
F2	CONCRETE TILT UP ACCENT		US FORMLINER	2/75 KOCHER - HORIZONTAL
P6	EXTERIOR PAINT		GLIDDEN #30YY 33/047 "OLD MONTEREY"	MEDIUM TEXTURE @ CONC. PANEL
P7	EXTERIOR PAINT		GLIDDEN #30YY 20/029 "MANSARD STONE"	MEDIUM TEXTURE @ CONC. PANEL
P8	EXTERIOR PAINT		GLIDDEN #30YY 10/038 "FOREST BLACK"	MEDIUM TEXTURE @ CONC. PANEL
P9	EXTERIOR PAINT		GLIDDEN #30YY 05/044 "THE DARK SIDE"	MEDIUM TEXTURE @ CONC. PANEL
G1	GLAZING		VITRO GLASS - SOLARGRAY	
AL	STOREFRONT FRAME		DARK BRONZE	

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
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	11/16/2023	RESUBMITTAL

DRAWN: CBW
CHECKED: BS
DESIGNED: KS
FILENAME: BS11530

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

EXTERIOR ELEVATIONS

INTERGROUP ARCHITECTS
architecture
planning
interiors
2000 West Littleton Blvd
Littleton, Colorado 80120
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www.igarch.com

JOB NO. BS11530
SCALE: AS SHOWN
DATE: 07/28/2023
SHEETS: 20
SHEET: 15

SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
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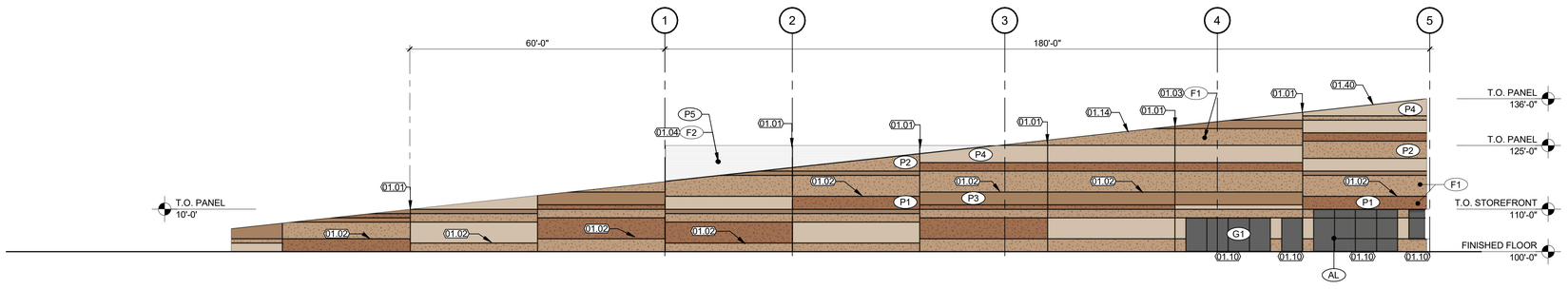
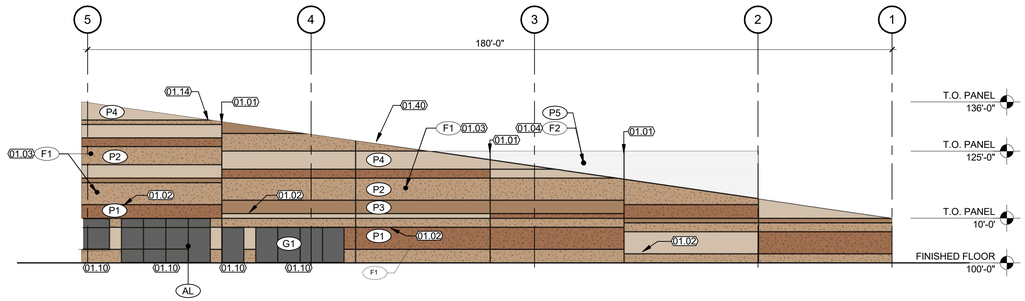


1 NORTH ELEVATION
SCALE: 1/16" = 1'-0"



2 SOUTH ELEVATION
SCALE: 1/16" = 1'-0"

KEYNOTES:

01.01 CONCRETE PANEL JOINT WITH 3/4" CHAMFERED EDGES, BACKER ROD & SEALANT FULL LENGTH.
01.02 3/4" x 2 1/4" REVEAL, PAINTED.
01.03 US FORMLINER 2/155 STEINWALD.
01.04 US FORMLINER 2/75 KOCHER - ORIENTATION HORIZONTAL.
01.10 INSULATED TINTED GLAZING IN ANODIZED ALUMINUM STOREFRONT SYSTEM, SEE FINISH LEGEND.
01.14 SITE CAST TILT-UP CONCRETE PANEL, PAINTED WITH MEDIUM TEXTURED PAINT. SEE EXTERIOR FINISH LEGEND FOR SPECIFIC COLORS.
01.40 PREFINISHED METAL CAP FLASHING, TYP @ ALL CONCRETE PANELS.

EXTERIOR FINISH LEGEND

KEY	DESCRIPTION	IMAGE	MANUFACTURER	REMARKS / COMMENTS
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P6	EXTERIOR PAINT		GLIDDEN #30YY 33/047 "OLD MONTEREY"	MEDIUM TEXTURE @ CONC. PANEL
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P8	EXTERIOR PAINT		GLIDDEN #30YY 10/038 "FOREST BLACK"	MEDIUM TEXTURE @ CONC. PANEL
P9	EXTERIOR PAINT		GLIDDEN #30YY 05/044 "THE DARK SIDE"	MEDIUM TEXTURE @ CONC. PANEL
G1	GLAZING		VITRO GLASS - SOLARGRAY	
AL	STOREFRONT FRAME		DARK BRONZE	

PCD FILE NO: PPR2329

REVISIONS

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	11/16/2023	RESUBMITTAL

DRAWN CBW
CHECKED BS
DESIGNED KS
FILENAME BS11530

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

EXTERIOR ELEVATIONS

INTERGROUP ARCHITECTS
■ architecture
■ planning
■ interiors
2000 West Littleton Blvd
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www.igarch.com

JOB NO. BS11530
SCALE AS SHOWN
DATE 07/28/2023
SHEETS 20
SHEET 16

SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
COUNTY OF EL PASO, STATE OF COLORADO

1 NORTH END CAP PERSPECTIVE
SCALE: 12" = 1'-0"

2 SOUTH TENANT PERSPECTIVE
SCALE: 12" = 1'-0"

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
	10/20/2023	RESUBMITTAL
	11/16/2023	RESUBMITTAL

DRAWN CBW
CHECKED BS
DESIGNED KS
FILENAME BS11530

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

EXTERIOR PERSPECTIVES

INTERGROUP ARCHITECTS
■ architecture
■ planning
■ interiors
2000 West Littleton Blvd
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p. 303.730.8077 f. 503.758.2294
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SCALE AS SHOWN
DATE 07/28/2023
SHEETS 20
SHEET 17

SITE DEVELOPMENT PLAN

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A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11,
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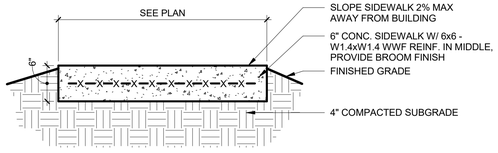
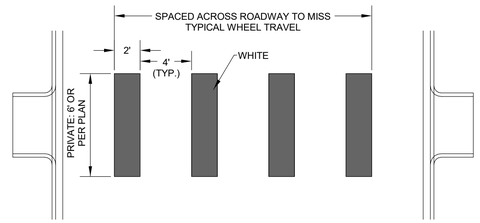
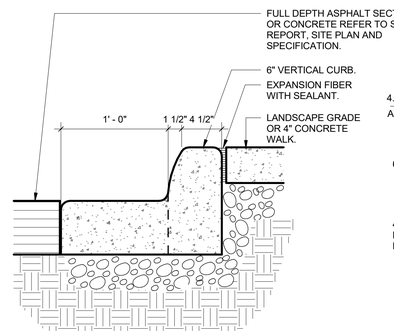
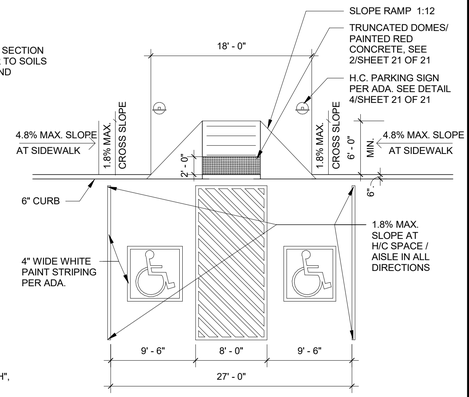


NOTE: PROVIDE HAND TOOLED TRANSVERSE & LONGITUDINAL CONTRACTION JOINTS @ 5'-0" O.C. MAX., 3/8" EXPANSION JOINTS @ 25'-0" O.C. MAX

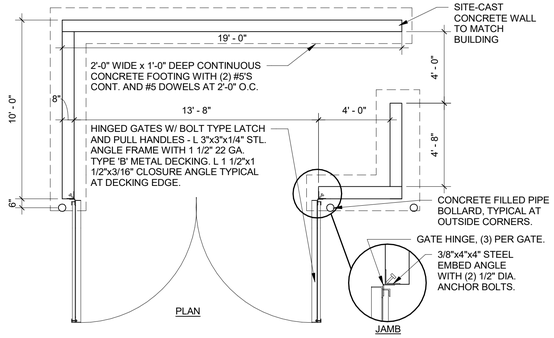






12 EXTERIOR CONC. SIDEWALK

SCALE: 1" = 1'-0"

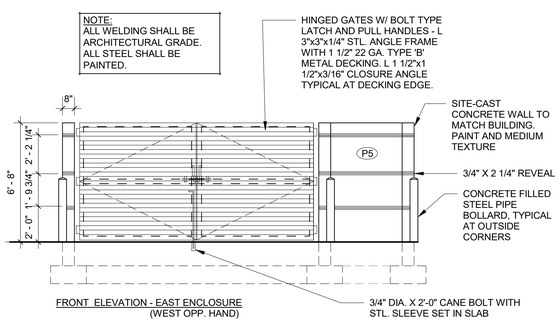


11 TRASH ENCLOSURE DETAIL

SCALE: 1/4" = 1'-0"

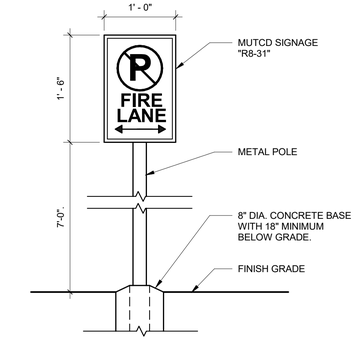
9 CROSS WALK STRIPING DETAIL

SCALE: 12" = 1'-0"



6 CURB DETAIL

SCALE: 1 1/2" = 1'-0"

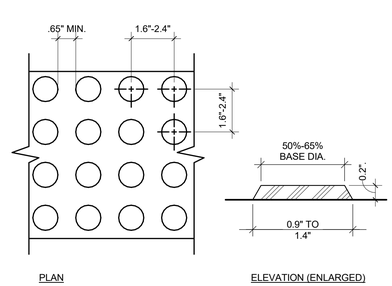


5 FIRE LANE SIGN DETAIL

SCALE: 1" = 1'-0"

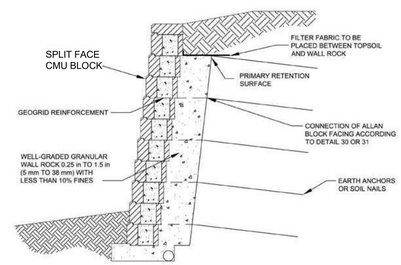
3 ACCESSIBLE PARKING ENLARGED PLAN

SCALE: 1/8" = 1'-0"



TRUNCATED DOME SIZING & SPACING

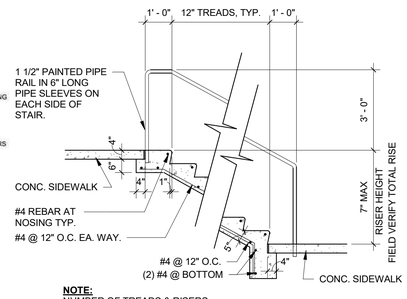
SCALE: 3" = 1'-0"



NOTE:
RETAINING WALL TO BE DESIGN-BUILD AND WILL REQUIRE A BUILDING PERMIT.

SEGMENTED BLOCK RETAINING WALL

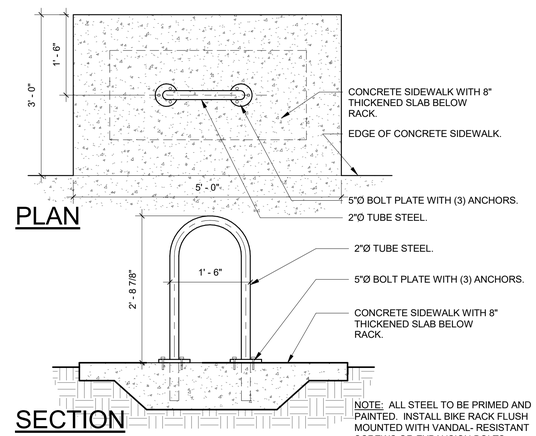
SCALE: 3/4" = 1'-0"



NOTE:
NUMBER OF TREADS & RISERS WILL VARY. RISE & RUN / STEP IS TYP - SEE GRADING PLAN.

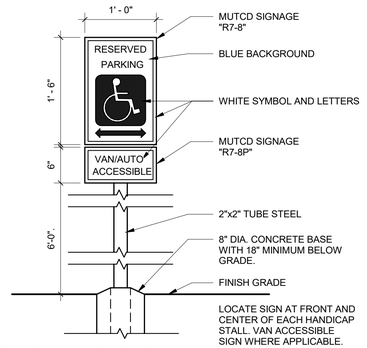
LANDSCAPE STAIR DETAIL

SCALE: 3/8" = 1'-0"



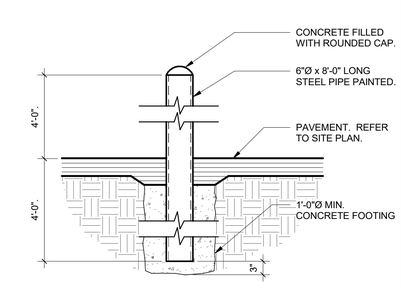
BIKE RACK DETAIL

SCALE: 3/4" = 1'-0"



HC PARKING SIGN

SCALE: 1" = 1'-0"



NOTE:
VERIFY FOUNDATION SIZE AND DEPTH FOR 8'-0" H. BOLLARDS.

BOLLARD DETAIL

SCALE: 3/4" = 1'-0"

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
	10/20/2023	RESUBMITTAL
	11/16/2023	RESUBMITTAL

DRAWN: CBW
CHECKED: BS
DESIGNED: KS
FILENAME: BS11530

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

SITE DETAILS

INTERGROUP ARCHITECTS
■ architecture
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SCALE: AS SHOWN
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SHEET: 18

SITE DEVELOPMENT PLAN

THE ROCK COMMERCE CENTER

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TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
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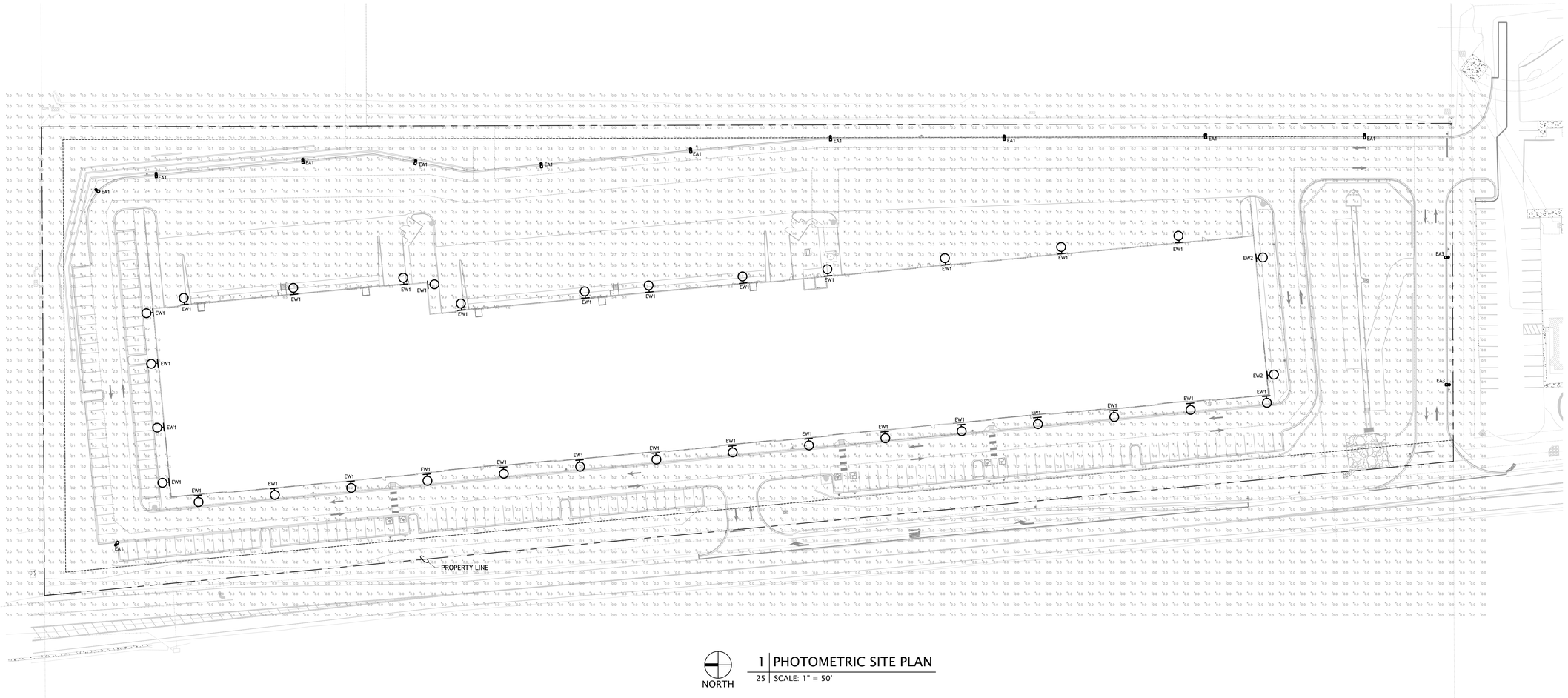

NORTH

1 | PHOTOMETRIC SITE PLAN
25 | SCALE: 1" = 50'

AE DESIGN
Integrated Lighting, Technology, and Electrical Solutions
1900 Wazee Street #205 | Denver, CO 80202 | 303.296.3034
aedesign-inc.com
Project #: 6411.00

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
	10/20/23	2ND SUBMITTAL
	11/17/23	3RD SUBMITTAL

DRAWN: HJ, HK
CHECKED: EDR
DESIGNED: HJ, HK
FILENAME: PPR2329

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

PHOTOMETRIC SITE PLAN

INTERGROUP ARCHITECTS
■ architecture
■ planning
■ interiors
2000 West Littleton Blvd
Littleton, Colorado 80120
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JOB NO. 6411.00
SCALE: AS SHOWN
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SHEETS: 20
SHEET: 19

SITE DEVELOPMENT PLAN

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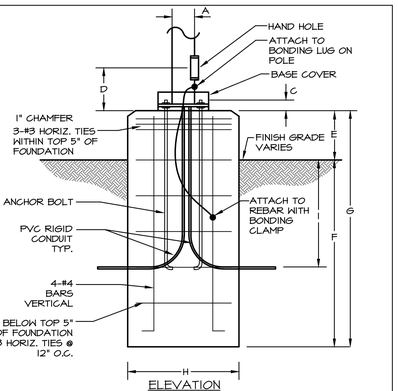
Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
EAST LOADING	X	2.5 fc	11.3 fc	0.1 fc	113.0:1	25.0:1
NORTH PARKING LOT	X	2.4 fc	8.8 fc	0.2 fc	44.0:1	12.0:1
PROPERTY LINE	+	0.1 fc	1.5 fc	0.0 fc	N/A	N/A
PROPERTY LINE + 20'	+	0.0 fc	0.1 fc	0.0 fc	N/A	N/A
SITE	+	1.1 fc	15.6 fc	0.0 fc	N/A	N/A
SOUTH PARKING LOT	X	3.0 fc	7.9 fc	0.9 fc	8.8:1	3.3:1
SOUTHEAST PARKING LOT	X	2.6 fc	8.2 fc	0.5 fc	16.4:1	5.2:1
WEST PARKING LOT	X	3.7 fc	15.6 fc	0.4 fc	39.0:1	9.3:1



POLE KEY	OVERALL HEIGHT	A	ANCHOR BOLT DATA B	SIZE	C	D	E	F	G	H	I
EA1	20'0"	4"	PER MANUFACTURER				2'6"	6'0"	8'6"	24"	36"
EA2	20'0"	4"	PER MANUFACTURER				2'6"	6'0"	8'6"	24"	36"

3 | POLE BASE DETAIL
SCALE: N.T.S.

D-Series Size 1
LED Area Luminaire

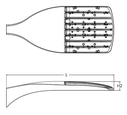
d-series

Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

EPA:	0.69 ft² (0.06 m²)
Length:	32.71" (83.1 cm)
Width:	14.26" (36.2 cm)
Height H1:	7.88" (20.0 cm)
Height H2:	2.73" (6.9 cm)
Weight:	34 lbs (15.4 kg)



Introduction
The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information
EXAMPLE: DSX1 LED P7 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX1 LED

Series	LEDs	Color temperature[1]	Color Rendering Index	Distribution	Voltage	Mounting
DSX1 LED	**Forward optics** P1 P6 P2 P7 P3 P8 P4 P9 P5 **Rotated optics** P10[1] P12[1] P11[1] P13[1]	(this section 70CRI only) 30K 3000K 40K 4000K 50K 5000K (this section 80CRI only, extended lead times apply) 27K 2700K 30K 3000K 35K 3500K 40K 4000K 50K 5000K	70CRI 70CRI 70CRI 80CRI 80CRI 80CRI 80CRI 80CRI	AFB Automotive front row T1S Type I short T2M Type II medium T3M Type III medium T3LG Type III low glare[2] T4M Type IV medium T4LG Type IV low glare[2] TFTM Forward throw medium T5M Type V medium T5LG Type V low glare T5W Type V wide BLC3 Type III backlight control[3] BLC4 Type IV backlight control[3] LCCO Left corner cutoff[3] RCCO Right corner cutoff[3]	MVOLT (120V-277V)[4] HVOLT (347V-480V)[5,6] XVOLT (277V - 480V)[5,6]	**Shipped included** SPA Square pole mounting (#8 drilling) RPA Round pole mounting (#8 drilling) SPA5 Square pole mounting #5 drilling[7] RPA5 Round pole mounting #5 drilling[7] SPABK Square narrow pole mounting #8 drilling WBA Wall bracket[8] MA Mast arm adapter (mounts on 2 3/8" OD horizontal tenon)

Control options		Other options		Finish (required)	
Shipped installed NLTAIR2 PIRHN	nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 8-40' mounting height, ambient sensor enabled at 2fc.[9,10,11,12]	PER7	Seven-pin receptacle only (controls ordered separately)[9,10]	**Shipped installed** SPD20KV	20kV surge protection
PIR	High/low, motion/ambient sensor, 8-40' mounting height, ambient sensor enabled at 2fc.[9,10,11]	FAO	Field adjustable output[9,13]	HS	Houseside shield (black finish standard)[13]
PIRH	NEMA twist-lock receptacle only (controls ordered separately)[9]	BL30	Bi-level switched dimming, 30%[9,13]	L90	Left rotated optics[1]
PER	Five-pin receptacle only (controls ordered separately)[9,13]	BL50	Bi-level switched dimming, 50%[9,13]	R90	Right rotated optics[1]
PER5		DMG	0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)[13]	CCE	Coastal Construction[13]
		DS	Dual switching[9,14,15]	HA	50°C ambient operation[13]
				Shipped separately	
				EGSR	External Glare Shield (reversible, field install required, matches housing finish)
				BSDB	Bird Spikes (field install required)

Finish (required)	
DDBXD	Dark bronze
DBLXD	Black
DNAXD	Natural Aluminum
DWHXD	White
DSSXD	Sandstone
DDBTXD	Textured dark bronze
DBLBXD	Textured black
DNATXD	Textured natural aluminum
DWHGXD	Textured white
DSSTXD	Textured sandstone

1 | FIXTURE TYPE 'EA1', 'EA2', 'EA3'
SCALE: N.T.S.

WDGE4 LED
Architectural Wall Sconce

Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

Depth (D1):	10"
Depth (D2):	2"
Height:	9"
Width:	25"
Weight: (without options)	30.5 lbs

Introduction
The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE4 has been designed to deliver up to 25,000 lumens through a precision refractive lens with wide distribution, perfect for augmenting the lighting from pole mounted luminaires.

WDGE LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C	Sensor	Lumens (4000K) P1	P2	P3	P4	P5	P6
WDGE1 LED	4W	--	--	1,200	2,000	--	--	--	--
WDGE2 LED	10W	18W	Standalone / nLight	1,200	2,000	3,000	4,500	6,000	--
WDGE3 LED	15W	18W	Standalone / nLight	7,500	8,500	10,000	12,000	--	--
WDGE4 LED	--	--	Standalone / nLight	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information
EXAMPLE: WDGE4 LED P3 40K 70CRI R3 MVOLT SRM DDBXD

Series	Package	Color Temperature	CRI	Distribution	Voltage	Mounting
WDGE4 LED	P1 P4 P2 P5 P3 P6	30K 3000K 40K 4000K 50K 5000K	70CRI 80CRI	R2 Type 2 R3 Type 3 R4 Type 4 RFT Forward Throw	MVOLT 347[1] 480[1]	**Shipped included** SRM Surface mounting bracket ICW Indirect Canopy/Ceiling Washer bracket (dry/damp locations only)[2] **Shipped separately** AWS 3/8inch Architectural wall spacer PBBW Surface-mounted back box (top, left, right conduit entry). Use when there is no junction box available.

Options		Finish
PE[1] Photocell, Button Type DS[1] Dual switching (comes with 2 drivers and 2 light engines) DMG[1] 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately) BCE Bottom conduit entry for back box (PBBW). Total of 4 entry points. SPD10KV 10kV Surge pack. BAA Buy American Act Compliant	**Standalone Sensors/Controls** PIR Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching. PIRH Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching. PIR1FC3V Bi-level (100/35%) motion sensor for 8-15 mounting heights with photocell pre-programmed for dusk to dawn operation. PIRH1FC3V Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation. **Networked Sensors/Controls** NLTAIR2 PIR nLight AIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights. NLTAIR2 PIRH nLight AIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights. See page 3 for out of box functionality	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DSSXD Sandstone DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white DSSTXD Textured sandstone

Accessories
Ordered and shipped separately.
WDGEAWS DDBXD — WDGE 3/8inch Architectural Wall Spacer (specify finish)
WDGEPBBW DDBXD U — WDGE surface-mounted back box (specify finish)

NOTES
1 347V and 480V not available with DS.
2 PE not available in 480V and with sensors/controls.
3 DS and DMG not available with sensors/controls.
4 Not qualified for DLC. Not available with emergency battery backup.

2 | FIXTURE TYPE 'EW1' & 'EW2'
SCALE: N.T.S.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	VOLTAGE	SOURCE QTY	WATT	TYPE	CCT/CRI	MAX WATTS	LUMEN OUTPUT	DIMMING	FIXTURE FINISH	MOUNTING LOCATION	INFORMATION BOF/RFD/OFH
EA1	LED AREA LIGHT, POLE TOP, TYPE IV DISTRIBUTION, HOUSE SIDE SHIELD	LITHONIA	DSXI-P2-40K-70CRI-T4M-MVOLT-RPA-HS-DBLXD	277	1	68	LED	4000K 70+ CRI	68	9,909 LM	SWITCHING	BLACK	POLE TOP	20' - 0" BOF
EA2	LED AREA LIGHT, POLE TOP, TYPE III DISTRIBUTION, HOUSE SIDE SHIELD	LITHONIA	DSXI-P2-40K-70CRI-T3M-MVOLT-RPA-HS-DBLXD	277	1	68	LED	4000K 70+ CRI	68	9,763 LM	SWITCHING	BLACK	POLE TOP	20' - 0" BOF
EA3	LED AREA LIGHT, POLE TOP, TYPE IV DISTRIBUTION, LOWER OUTPUT, HOUSE SIDE SHIELD	LITHONIA	DSXI-P1-40K-70CRI-T4M-MVOLT-RPA-HS-DBLXD	277	1	51	LED	4000K 70+ CRI	51	7,107 LM	SWITCHING	BLACK	POLE TOP	20' - 0" BOF
EW1	SURFACE MOUNTED LED WALL PACK, TYPE IV DISTRIBUTION	LITHONIA	WDGE4-LED-P3-40K-70CRI-R4-MVOLT-SRM-DBLXD	277	1	123	LED	4000K 70+ CRI	123	18,524 LM	SWITCHING	BLACK	WALL SURFACE	20' - 0" BOF
EW2	SURFACE MOUNTED LED WALL PACK, TYPE III DISTRIBUTION	LITHONIA	WDGE4-LED-P3-40K-70CRI-R3-MVOLT-SRM-DBLXD	277	1	123	LED	4000K 70+ CRI	123	18,074 LM	SWITCHING	BLACK	WALL SURFACE	20' - 0" BOF

ABBREVIATIONS: BOF - BOTTOM OF FIXTURE, RFD - RECESSED FIXTURE DEPTH, OFH - OVERALL FIXTURE HEIGHT, AFF(AFG) - ABOVE FINISHED FLOOR (GRADE), WFD - WALL FIXTURE DEPTH

GENERAL NOTES:
A. ALL REFLECTOR LAMPS SHALL BE PROVIDED AS WIDE FLOOD DISTRIBUTION, UON.
B. LUMENS LISTED ARE DELIVERED LUMENS, NOT INITIAL.
C. FOR ALL SPECIFIED LUMINAIRES, THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MOUNTING HARDWARE, ACCESSORIES, COMPONENTS, LEADER/JUMPER CABLES, WIRE FEED, CONNECTORS, END CAPS, REMOTE POWER SUPPLIES, AND ANY OTHER NECESSARY COMPONENT AS REQUIRED FOR INSTALLING A SECURE AND FULLY FUNCTIONAL SYSTEM.
D. ALL FINISH SELECTIONS SHALL BE VERIFIED BY ARCHITECT/INTERIOR DESIGNER/OWNER AS PART OF THE SUBMITTAL PROCESS. UNLESS OTHERWISE NOTED, EC SHALL ASSUME STANDARD LUMINAIRE FINISH OPTION FOR PRICING.
E. EC SHALL VERIFY ALL FIXTURE MOUNTING HEIGHTS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ANY ROUGH-IN.
F. EXTERIOR LUMINAIRES SHALL BE COLD WEATHER RATED FOR 0 DEG. F / -18 DEG. C., AND RATED FOR OUTDOOR USE.

AE DESIGN
Integrated Lighting, Technology, and Electrical Solutions
1900 Wazee Street #205 | Denver, CO 80202 | 303.296.3034
aedesign-inc.com Project #: 6411.00

PCD FILE NO: PPR2329

REVISIONS

BY	DATE	DESCRIPTION
	10/20/23	2ND SUBMITTAL
	11/17/23	3RD SUBMITTAL

DRAWN HJ, HK
CHECKED EDR
DESIGNED HJ, HK
FILENAME PPR2329

SITE DEVELOPMENT PLAN
THE ROCK COMMERCE CENTER

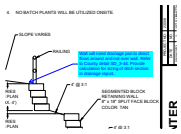
PHOTOMETRIC DETAILS

INTERGROUP ARCHITECTS
■ architecture ■ planning ■ interiors
2000 West Littleton Blvd
Littleton, Colorado 80120
P. 303.738.8877 F. 303.738.2294
www.igparch.com

JOB NO. 6411.00
SCALE AS SHOWN
DATE 07/28/2023
SHEETS 20 | SHEET 20

V3_Site Development Plan Comments.pdf Markup Summary

CDurham (1)



Subject: Callout
Page Label: [5] 5 OF 20 GRADING PLAN
Author: CDurham
Date: 12/5/2023 7:54:47 AM
Color:

Wall will need drainage pan to direct flows around and not over wall. Refer to County detail SD_3-44. Provide calculation for sizing of ditch section in drainage report.

THE ROCK COMMERCE CENTER

PUBLIC IMPROVEMENT PLAN CONSTRUCTION DOCUMENTS

LOCATED IN THE SOUTHWEST QUARTER OF THE
NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
EL PASO COUNTY, STATE OF COLORADO.

PROJECT TEAM

OWNER / DEVELOPER

CENTRAL DEVELOPMENT, LLC
1600 S. ALBON ST., #200
DENVER, CO 80222
303.628.0200 voice
CONTACT: JEREMY RECORDS

CIVIL ENGINEER

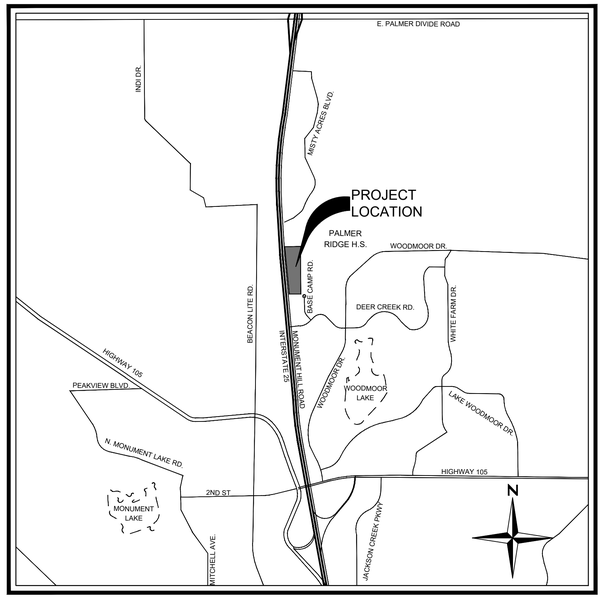
REDLAND
1500 W. CANAL CT.
LITTLETON, CO 80120
720.283.6783 voice
CONTACT: MARK CEVAAL, P.E.
EMAIL: mcevaal@redland.com

ARCHITECT

INTERGROUP ARCHITECTS
2000 W. LITTLETON BLVD.
LITTLETON, CO 80120
303.407.1157 voice
CONTACT: BILL SMITH, AIA

LANDSCAPE ARCHITECT

STACKLOT
5369 S. CURTICE ST.
LITTLETON, CO 80120
303.808.4523 voice
CONTACT: STEVE WIENS
EMAIL: steve@stacklot.com



VICINITY MAP
SCALE: 1" = 2000'

Sheet List Table	
Sheet Number	Sheet Title
C1.0	COVER SHEET
C1.1	REDLAND GENERAL NOTES
C2.0	DEMOLITION PLAN
C3.0	HORIZONTAL CONTROL PLAN
C4.0	PLAN AND PROFLIE
C5.0	GRADING PLAN
C6.0	EROSION CONTROL PLAN
C7.1	ROAD CROSS SECTIONS
C7.2	ROAD CROSS SECTIONS
C8.0	SIGNAGE AND STRIPING PLAN
C9.1	SITE DETAILS
C9.2	EROSION CONTROL DETAILS
C9.3	EROSION CONTROL DETAILS

LEGAL DESCRIPTION:

PARCEL B:

THAT PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE 6TH P.M. LYING EAST OF THE EAST LINE OF THAT TRACT CONVEYED TO THE STATE HIGHWAY DEPARTMENT BY QUITCLAIM DEED RECORDED SEPTEMBER 8, 1948 IN BOOK 1185, PAGE 458, ALSO DESCRIBED AS: THAT PART OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE P.M., COUNTY OF EL PASO, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER; THENCE EASTERLY ALONG THE SOUTHERLY LINE OF SAID NORTHWEST QUARTER A DISTANCE OF 996.04 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF INTERSTATE HIGHWAY 25 DESCRIBED IN THAT DEED TO THE STATE HIGHWAY DEPARTMENT RECORDED SEPTEMBER 8, 1948 IN BOOK 1185 AT PAGE 458, WHICH POINT IS THE TRUE POINT OF THE BEGINNING OF THE PARCEL TO BE DESCRIBED; THENCE ON A DEFLECTION ANGLE TO THE LEFT 95°08'20" AND ALONG SAID EASTERLY RIGHT OF WAY LINE A DISTANCE OF 1334.24 FEET TO A POINT ON THE NORTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 95°00'36" AND ALONG SAID NORTHERLY LINE 441.95 FEET TO THE NORTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 90°16'15" AND ALONG THE EASTERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 1329.88 FEET TO THE SOUTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 89°51'29" AND ALONG THE SOUTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 319.15 FEET TO THE POINT OF BEGINNING.

SIGNING AND STRIPING NOTES:

1. ALL SIGNS AND PAVEMENT MARKINGS SHALL BE IN COMPLIANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. REMOVAL OF EXISTING PAVEMENT MARKINGS SHALL BE ACCOMPLISHED BY A METHOD THAT DOES NOT MATERIALLY DAMAGE THE PAVEMENT. THE PAVEMENT MARKINGS SHALL BE REMOVED TO THE EXTENT THAT THEY WILL NOT BE VISIBLE UNDER DAY OR NIGHT CONDITIONS. AT NO TIME WILL IT BE ACCEPTABLE TO PAINT OVER EXISTING PAVEMENT MARKINGS.
3. ANY DEVIATION FROM THE STRIPING AND SIGNING PLAN SHALL BE APPROVED BY EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT.
4. ALL SIGNS SHOWN ON THE SIGNING AND STRIPING PLAN SHALL BE NEW SIGNS. EXISTING SIGNS MAY REMAIN OR BE REUSED IF THEY MEET CURRENT EL PASO COUNTY AND MUTCD STANDARDS.
5. STREET NAME AND REGULATORY STOP SIGNS SHALL BE ON THE SAME POST AT INTERSECTIONS.
6. ALL REMOVED SIGNS SHALL BE DISPOSED OF IN A PROPER MANNER BY THE CONTRACTOR.
7. ALL STREET NAME SIGNS SHALL HAVE "D" SERIES LETTERS, WITH LOCAL ROADWAY SIGNS BEING 4" UPPER-LOWER CASE LETTERING ON 8" BLANK AND NON-LOCAL ROADWAY SIGNS BEING 6" LETTERING, UPPER-LOWER CASE ON 12" BLANK, WITH A WHITE BORDER THAT IS NOT RECESSED. MULTI-LANE ROADWAYS WITH SPEED LIMITS OF 35 MPH OR HIGHER SHALL HAVE 8" UPPER-LOWER CASE LETTERING ON 12" BLANK WITH A WHITE BORDER THAT IS NOT RECESSED. THE WIDTH OF THE NON-RECESSED WHITE BORDERS SHALL MATCH PAGE 255 OF THE 2012 MUTCD "STANDARD HIGHWAY SIGNS". SIGNAL POLE MOUNTED AND OVERHEAD STREET NAME SIGNS SHALL BE PER MUTCD SIZE STANDARDS.
8. ALL TRAFFIC SIGNS SHALL HAVE A MINIMUM HIGH INTENSITY PRISMATIC GRADE SHEETING.
9. ALL LOCAL RESIDENTIAL STREET SIGNS SHALL BE MOUNTED ON A 1.75" X 1.75" SQUARE TUBE SIGN POST AND STUB POST BASE. FOR OTHER APPLICATIONS, REFER TO THE CDOT STANDARD S-614-8 REGARDING USE OF THE P2 TUBULAR STEEL POST SLIPBASE DESIGN.
10. ALL SIGNS SHALL BE SINGLE SHEET ALUMINUM WITH 0.100" MINIMUM THICKNESS.
11. ALL LIMIT LINES/STOP LINES, CROSSWALK LINES, PAVEMENT LEGENDS, AND ARROWS SHALL BE A MINIMUM 125 MIL THICKNESS PREFORMED THERMOPLASTIC PAVEMENT MARKINGS WITH TAPERED LEADING EDGES PER CDOT STANDARD S-627-1. STOP BARS SHALL BE 24" IN WIDTH. CROSSWALKS LINES SHALL BE 24" WIDE AND A MINIMUM OF 9' LONG.
12. WORD AND SYMBOL MARKINGS SHALL BE THE NARROW TYPE.
13. ALL LONGITUDINAL LINES SHALL BE A MINIMUM 15MIL THICKNESS EPOXY PAINT. ALL NON-LOCAL RESIDENTIAL ROADWAYS SHALL INCLUDE BOTH RIGHT AND LEFT EDGE LINE STRIPING AND ANY ADDITIONAL STRIPING AS REQUIRED BY CDOT S-627-1.
14. THE CONTRACTOR SHALL NOTIFY EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (719) 520-6819 PRIOR TO AND UPON COMPLETION OF SIGNING AND STRIPING.
15. THE CONTRACTOR SHALL OBTAIN A WORK IN THE RIGHT OF WAY PERMIT FROM THE EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS (DPW) PRIOR TO ANY SIGNAGE OR STRIPING WORK WITHIN AN EXISTING EL PASO COUNTY ROADWAY.

BENCHMARK

NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF I-25.

NAVD88. ELEV = 7111.32'

BASIS OF BEARINGS

BEARINGS SHOWN HEREON ARE REFERENCED TO THE SOUTHERLY BOUNDARY OF LOT 1, GREATER EUROPE MISSION SUBDIVISION FILING NO. 1, BEING MONUMENTED AS SHOWN HEREON, ASSUMED TO BEAR SOUTH 80°00'37" WEST, A DISTANCE OF 358.79 FEET.

DESIGN ENGINEER'S STATEMENT

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, GRADING, AND EROSION CONTROL PLANS AND SPECIFICATIONS, AND SAID PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS

MARK D. CEVAAL, P.E. #33123 DATE

OWNER/DEVELOPER'S STATEMENT

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN.

JEREMY RECORDS DATE
CENTRAL DEVELOPMENT, LLC
1600 S. ALBION ST #200,
DENVER, CO 80222

STANDARD NOTES FOR EL PASO COUNTY CONSTRUCTION PLANS:

1. ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD NOTIFICATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
3. CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOILS AND GEOTECHNICAL REPORT, AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES, INCLUDING THE FOLLOWING:
   A. EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
   B. CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
   C. COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
   D. CDOT M & S STANDARDS
4. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING. ANY MODIFICATIONS NECESSARY TO MEET CRITERIA AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
5. IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH ONSITE AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
6. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (PCD) – INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.
7. 7.IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-ISSUED 401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.
8. CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCD. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.
9. ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PCD.
10. CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER ECM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCD PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT.
11. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
12. SIGHT VISIBILITY TRIANGLES AS IDENTIFIED IN THE PLANS SHALL BE PROVIDED AT ALL INTERSECTIONS. OBSTRUCTIONS GREATER THAN 18 INCHES ABOVE FLOWLINE ARE NOT ALLOWED WITHIN SIGHT TRIANGLES.
13. SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DOT AND MUTCD CRITERIA. [IF APPLICABLE, ADDITIONAL SIGNING AND STRIPING NOTES WILL BE PROVIDED.
14. CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DOT, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
15. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION

EL PASO COUNTY

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WITH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.
FIELD IN ACCORDANCE WITH REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL AS AMENDED.
IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTORS DISCRETION.

JOSH PALMER, P.E. DATE
COUNTY ENGINEER/ECM ADMINISTRATOR

PCD FILE NO. PPR2329

NOT FOR CONSTRUCTION

NO.	DATE	NOTES
1	07/26/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

PROJECT NO. 23009

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
COVER SHEET

SHEET
C1.0

ENGINEER'S NOTES

1. PROJECT CONTROL/BENCHMARK:

   PRIMARY PROJECT BENCHMARK:

   NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF I-25.

   NAVD88. ELEV = 7111.32'

   ALL ELEVATIONS SHOWN ON THESE PLANS ARE REFERENCED TO THE PROJECT BENCHMARK. HORIZONTAL CONTROL, INCLUDING THE BASIS OF BEARING, SHALL BE IN ACCORDANCE WITH THE FINAL SUBDIVISION PLAT FOR THIS PROJECT.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING THE PROJECT BENCHMARK AND OTHER SURVEY MONUMENTS AND SHALL HAVE A REGISTERED LAND SURVEYOR TIE OUT AND RESET ANY PROPERTY CORNERS OR SECTION CORNERS PLANNED TO BE DISTURBED BY CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ANY INADVERTENTLY DISTURBED OR DAMAGED MONUMENTS AND SHALL HAVE THEM REESTABLISHED AND REPLACED BY A REGISTERED LAND SURVEYOR.
3. THE CONTRACTOR SHALL COMPLY, AND PERFORM WORK IN ACCORDANCE, WITH THE REQUIREMENTS OF THE GEOTECHNICAL (SOILS) REPORT(S) PREPARED FOR THIS PROJECT. GEOTECHNICAL INFORMATION FOR THIS PROJECT IS BASED ON THE REPORT (PRELIMINARY GEOTECHNICAL EVALUATION, MARCH 29, 2023, BY GROUND ENGINEERING). IN THE EVENT OF A DISCREPANCY BETWEEN THE GEOTECHNICAL REQUIREMENTS AND JURISDICTIONAL REQUIREMENTS, THE MORE STRINGENT REQUIREMENT SHALL BE FOLLOWED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND GEOTECHNICAL ENGINEER IN THE EVENT THAT A DISCREPANCY OCCURS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE SERVICES OF A QUALIFIED TESTING LABORATORY TO PERFORM ALL COMPACTION TESTING, ASPHALT TESTING, CONCRETE TESTING, AND ANY OTHER TESTING AS MAY BE REQUIRED TO COMPLETE THE WORK. TESTING RESULTS MUST BE SUBMITTED FOR ALL PHASES OF THIS PROJECT PER THE APPLICABLE GOVERNING AGENCIES REQUIREMENTS.
5. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE (1) SET OF "REDLINED" PRINTS OF THE CONSTRUCTION PLANS. THE "REDLINED" PRINTS SHALL BE KEPT CURRENT TO ACCURATELY REPRESENT THE DIMENSIONS AND LOCATIONS OF ALL WORK PERFORMED BY THE CONTRACTOR. THE CONTRACTOR MUST PRESENT THE "REDLINED" PRINTS TO THE ENGINEER (REDLAND) TIMELY UPON COMPLETION OF EACH PHASE OF THE WORK.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF ANY PROBLEMS OR POTENTIAL PROBLEMS IN CONFORMING TO THE DESIGN LINE AND GRADE FOR ANY ELEMENT OF THE CONSTRUCTION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF SITE CONDITIONS THAT DIFFER FROM THOSE SHOWN ON THE APPROVED PLANS.
7. IN THE EVENT THE CONTRACTOR ALLOWS, AUTHORIZES, APPROVES OR CONSTRUCTS ITEMS THAT DIFFER FROM THE APPROVED PLANS, SPECIFICATIONS OR OTHER CONTRACT DOCUMENTS, WITHOUT WRITTEN APPROVAL BY THE ENGINEER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LIABILITY ARISING FROM SUCH CHANGES.
8. THE CONTRACTOR SHALL PERFORM ALL WORK ACCORDING TO ALL CITY, COUNTY, STATE AND FEDERAL SAFETY AND HEALTH REGULATIONS. IN PARTICULAR, THE TRENCHING AND OPEN EXCAVATION OPERATIONS SHALL COMPLY WITH ALL CURRENT O.S.H.A. REGULATORY REQUIREMENTS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, AND ANY OTHER NEEDED ACTION TO PROTECT THE LIFE, HEALTH AND SAFETY OF THE PUBLIC AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE JOB SITE CONDITIONS THROUGHOUT THE DURATION OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROTECTION OF PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED ONLY TO WORKING HOURS. THE CONTRACTOR SHALL DEFEND INDEMNIFY AND HOLD THE OWNER, THE ENGINEER AND THE GOVERNING JURISDICTION HARMLESS FOR ANY AND ALL LIABILITY, IN CONNECTION WITH THE PERFORMANCE OF WORK, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER OR THE GOVERNING JURISDICTION.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE, PASSABLE ACCESS TO PRIVATE PROPERTIES ADJACENT TO THE WORK THROUGHOUT THE PERIOD OF CONSTRUCTION.
12. THE TYPE, SIZE, LOCATION, AND NUMBER OF UNDERGROUND UTILITIES ARE APPROXIMATE WHERE SHOWN ON THE PLANS AND WERE TAKEN FROM RECORDS OF THE CONTROLLING AGENCIES AND/OR FROM MARKINGS IN THE FIELD BY AN AGENCY AND/OR UTILITY LOCATING CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR COMPLETENESS OR ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK AND PARTICIPATE IN THE RESOLUTION OF ANY CONFLICTS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
13. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO FOR THE LOCATION OF UNDERGROUND GAS, ELECTRIC AND COMMUNICATION UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION (CALL 811 OR 1-800-922-1987). THE CONTRACTOR SHALL ALSO NOTIFY OTHER APPLICABLE UTILITY COMPANIES TO OBTAIN FIELD LOCATES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

ENGINEER'S NOTES (CONTD)

14. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES TO COORDINATE SCHEDULES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY RELOCATIONS WITH THE APPROPRIATE UTILITY COMPANY.
15. TEMPORARY EROSION CONTROL MEASURES SHALL BE PROVIDED BY THE CONTRACTOR DURING CONSTRUCTION AS IDENTIFIED IN THE EROSION CONTROL AND/OR STORMWATER MANAGEMENT PLANS. MAINTENANCE OF ONSITE DRAINAGE AND EROSION CONTROL FACILITIES DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE REMOVAL OF TEMPORARY EROSION CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. HOWEVER, REMOVALS SHALL NOT OCCUR UNTIL THE GOVERNING JURISDICTION HAS GIVEN APPROVAL TO REMOVE ANY OF THE MEASURES.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING NEARBY PUBLIC OR PRIVATE STREETS OF MUD AND DEBRIS, DUE TO CONSTRUCTION ACTIVITIES, ON A DAILY BASIS OR AS DIRECTED BY GOVERNING JURISDICTION PERSONNEL.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED EXISTING IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO, PAVEMENT, CURB AND GUTTER, SIDEWALK, LANDSCAPING, IRRIGATION, SIGNAGE, STRIPING, AND UTILITIES.
18. ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH THE STATE OF COLORADO PERMITTING PROCESS FOR "STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY." FOR INFORMATION, CONTACT THE COLORADO DEPARTMENT OF HEALTH, WATER QUALITY CONTROL DIVISION, WQCD-PE-B2, 4300 CHERRY DRIVE SOUTH, DENVER, COLORADO, 80246-1530, ATTENTION: PERMITS AND ENFORCEMENT SECTION. PHONE (303) 692-3590.
19. IF DEWATERING IS TO BE USED TO INSTALL UTILITIES OR CONSTRUCT IMPROVEMENTS, A STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT IS REQUIRED IF DISCHARGE IS INTO A STORM SEWER, CHANNEL, IRRIGATION DITCH, OR ANY WATERS OF THE UNITED STATES.
20. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION AT ALL TIMES THE APPROPRIATE EDITION OF THE GOVERNING JURISDICTION DESIGN AND CONSTRUCTION STANDARDS, ONE SET OF APPROVED CONSTRUCTION PLANS, THE STORMWATER MANAGEMENT PLAN, AND ALL REQUIRED PERMITS.
21. ALL STREET, SANITARY SEWER, STORM SEWER AND WATERLINE CONSTRUCTION SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE APPLICABLE GOVERNING LOCAL AGENCY CURRENT AT THE DATE OF CONSTRUCTION PLAN APPROVAL. FOR ELEMENTS OF WORK NOT COVERED BY LOCAL AGENCY STANDARDS AND SPECIFICATIONS, ALL CONSTRUCTION SHALL CONFORM TO THE APPROPRIATE EDITION OF THE STANDARDS AND SPECIFICATIONS OF THE COLORADO DEPARTMENT OF TRANSPORTATION, THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT, AND INDUSTRY STANDARDS AS APPLICABLE. REQUIREMENTS OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, THE ENVIRONMENTAL PROTECTION AGENCY AND THE U.S. ARMY CORPS OF ENGINEERS, SHALL ALSO BE FOLLOWED AS THEY RELATE TO THE WORK.
22. THE CONTRACTOR SHALL PROVIDE AND IMPLEMENT A "TRAFFIC CONTROL PLAN" RELATED TO ALL CONSTRUCTION ACTIVITIES FOR THIS PROJECT. ALL TRAFFIC CONTROL DEVICES, STRIPING, AND SIGNING SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
23. ALL STATIONING IS ON CENTERLINE UNLESS OTHERWISE NOTED. CENTERLINE, RIGHTS-OF-WAY (R.O.W.), PROPERTY LINE, AND EASEMENT DIMENSIONS ARE FOR REFERENCE ONLY. REFER TO THE FINAL SUBDIVISION PLAT FOR PROJECT HORIZONTAL CONTROL.
24. ALL ELEVATIONS IN PLAN VIEW ARE ALONG FLOWLINE UNLESS OTHERWISE NOTED. WHERE SHOWN, 'TC' REPRESENTS TOP-OF-CURB ELEVATION ALONG CURB AND GUTTER OR BACK-OF-WALK ELEVATION ALONG COMBINATION CURB, GUTTER AND WALK.
25. CROSS PANS ARE 8-FEET IN WIDTH UNLESS OTHERWISE NOTED.
26. WATER MAIN LENGTHS ARE FROM CENTER OF FITTING (EXCLUDING GATE VALVES) TO CENTER OF FITTING UNLESS OTHERWISE NOTED.
27. STORM AND SANITARY SEWER MAIN LENGTHS ARE FROM CENTER OF STRUCTURE/MANHOLE TO CENTER OF STRUCTURE/MANHOLE. SANITARY SEWER AND STORM SEWER MANHOLES ARE 4-FOOT DIAMETER UNLESS OTHERWISE NOTED.
28. STORM INLET STATIONING/OFFSET REFERENCE IS AT THE INTERSECTION OF FLOWLINE AND THE CENTER OF STRUCTURE.
29. STORM INLETS LOCATED ALONG CURB SHALL BE CONSTRUCTED WITH TOP OF BOX AT SAME GRADE AS EXTENDED TOP-OF-CURB GRADE, UNLESS OTHERWISE NOTED.
30. THE CLIENT, CONTRACTOR AND SUBCONTRACTOR SHOULD IMMEDIATELY NOTIFY THE CONSULTANT OF ANY CONDITIONS OF THE PROJECT THAT THEY BELIEVE DO NOT COMPLY WITH THE CURRENT STATE OF THE ADA AND/OR FHAA.

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SECTION LINE
- ROAD CENTERLINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- WATER LINE
- RAW WATER LINE
- NON-POTABLE WATER LINE
- IRRIGATION LINE
- SANITARY SEWER
- STORM SEWER
- ELECTRIC LINE
- GAS LINE
- TELEPHONE LINE
- FIBER OPTICS LINE
- OVERHEAD ELECTRIC LINE
- CABLE TELEVISION
- CONTOUR MAJOR
- CONTOUR MINOR
- 100YR FLOOD PLAIN
- FEMA FLOOD PLAIN
- FLOOD HAZARD AREA DELINEATION
- WATERS OF THE U.S.

PROPOSED LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- SETBACK
- EASEMENT
- ROAD CENTERLINE
- CURB AND GUTTER (CATCH)
- CURB AND GUTTER (SPILL)
- SIDEWALK
- STORM SEWER
- SANITARY SEWER
- TRENCH DRAIN
- WATER LINE
- IRRIGATION LINE
- NONPOTABLE WATER LINE
- RAW WATER LINE
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- WATER BEND
- WATER CROSS
- WATER TEE
- WATER REDUCER
- WATER VALVE
- FIRE HYDRANT
- PLUG/CAP
- SANITARY SEWER SERVICE (* INDICATES NON-TYPICAL LOCATION)
- WATER SERVICE (* INDICATES NON-TYPICAL LOCATION)
- UTILITY CROSSING
- UNDERDRAIN w/ SIZE (IN.)
- RETAINING WALL
- CONTOUR MAJOR
- CONTOUR MINOR
- SPOT ELEVATION
- SLOPE ARROW (4:1 MAX UNLESS NOTED OTHERWISE)
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- LOT TYPE
- LINE OF SIGHT
- OVER FLOW ARROW
- DEMOLITION

ABBREVIATIONS

ABC	AGGREGATE BASE COARSE
ARV	AIR RELEASE VALVE
BB MH	BOX BASE MANHOLE
BC	BUILDING CORNER
BFE	BASEMENT FLOOR ELEVATION
B.O.P.	BOTTOM OF PIPE (ELEVATION)
BW	BOTTOM OF WALL
CATV	CABLE TELEVISION
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
D.E.	DRAINAGE EASEMENT
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	DOMESTIC WATER
E	EAST
EC	END CURVE RETURN
EG	EXISTING GRADE/GROUND
ELEC	ELECTRIC OR ELECTRICAL
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX.	EXISTING
FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FL	FLOWLINE
FM	FORCE MAIN
FO	FIBER OPTIC
G.E.	GAS EASEMENT
GB	GRADE BREAK
GFE	GARAGE FINISH FLOOR
GM	GAS METER
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HP	HIGH POINT
IBV	INLINE BUTTERFLY VALVE
INV	INVERT (ELEVATION)
IRR	IRRIGATION
L	LEFT
LF	LINEAR FEET/FOOT
LP	LOW POINT
MAX	MAXIMUM
ME	MATCH EXISTING
MH	MANHOLE
MIN	MINIMUM
N	NORTH
PC	POINT ON CURVE
PCC	POINT OF COMPOUND CURVE
PCR	POINT OF CURVE RETURN
PL	PROPERTY LINE
PRC	POINT OF REVERSE CURVE
PROP.	PROPOSED
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE PIPE
R	RADIUS OR RIGHT
R.O.W.	RIGHT OF WAY
RCP	REINFORCED CONCRETE PIPE
S	SOUTH
S.D.M.E.	SIDEWALK, DRAINAGE, AND MAINTENANCE EASEMENT
S.M.E.	SIDEWALK AND MAINTENANCE EASEMENT
S.W.E.	SIDEWALK EASEMENT
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STM	STORMWATER
STM MH	STORMWATER MANHOLE
TBC	TOP BACK OF CURB
TBW	TOP BACK OF WALK
TC	TOP OF CURB
TOF	TOP OF FOUNDATION
T.O.P.	TOP OF PIPE (ELEVATION)
TW	TOP OF WALL
TYP	TYPICAL
U.E.	UTILITY EASEMENT
VC	VERTICAL CURVE
W	WEST
WL	WATERLINE
WM	WATER METER
WV	WATER VALVE

MASTER REVISION / TRACKING TABULATION

NUMBER	DATE	DESCRIPTION	SHEETS REVISED
1	7/28/2023	1ST SUBMITTAL	ALL
2	10/20/2023	2ND SUBMITTAL	ALL
3	11/17/2023	3RD SUBMITTAL	ALL

15 YEARS Redland WHERE GREAT PLACES BEGIN
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▪ Civil Engineering ▪ Construction Management

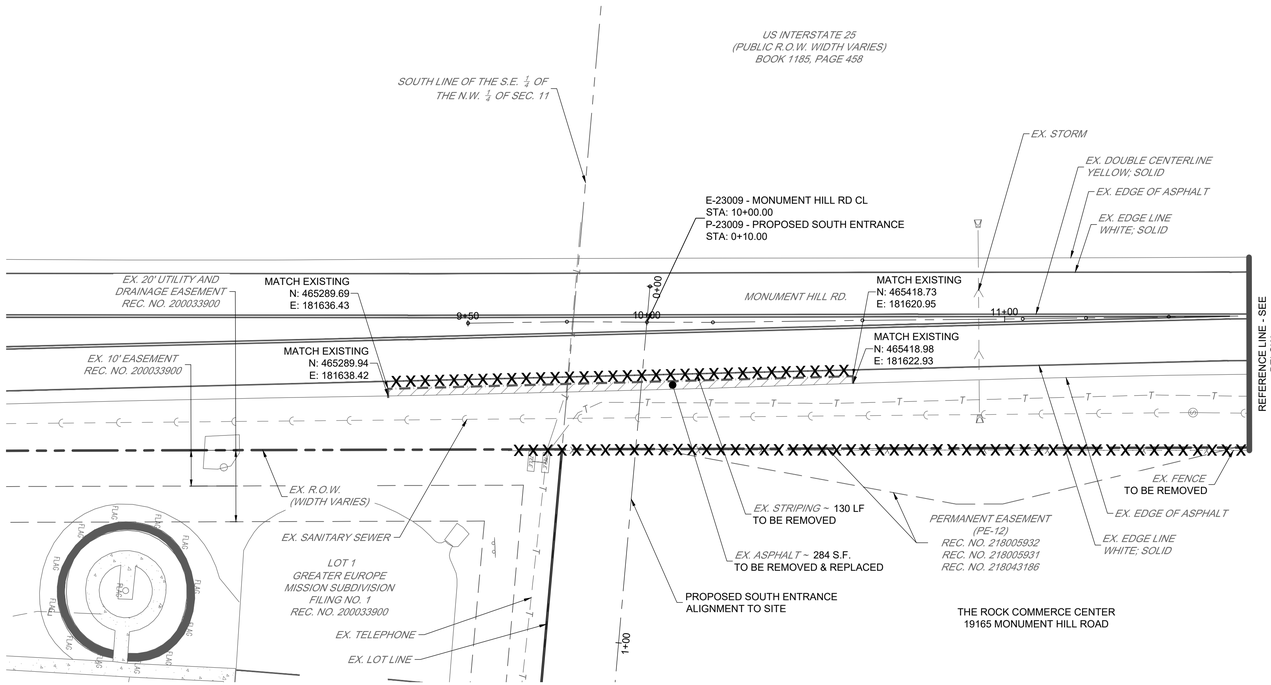
NOT FOR CONSTRUCTION

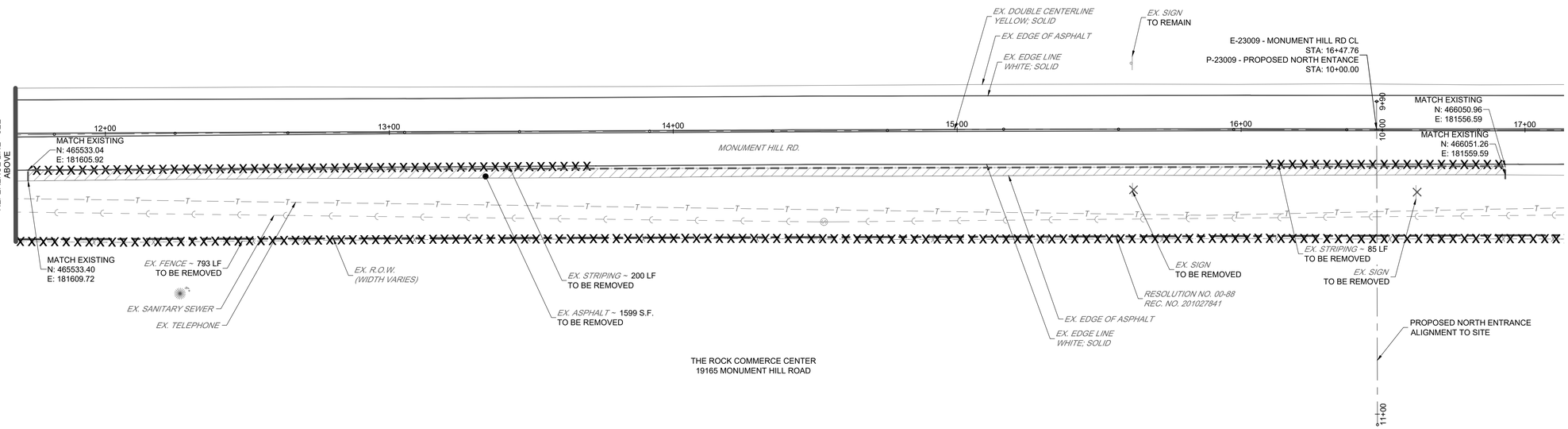
NOTES	NO.	DATE

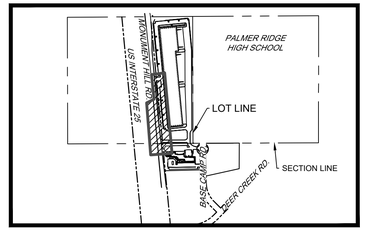
PROJECT NO.	23009	NOTES
DATE	NO.	
07/28/2023	1	1ST SUBMITTAL
10/20/2023	2	2ND SUBMITTAL
11/17/2023	3	3RD SUBMITTAL

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
REDLAND GENERAL NOTES

SHEET
C1.1







KEYMAP
SCALE = 1" = 750'

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

N

0 10 20 40

SCALE: 1" = 20'

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NOT FOR CONSTRUCTION

NOTES	NO.	DATE

PROJECT NO.	23009	
DATE	NO.	NOTES
07/28/2023	1	1ST SUBMITTAL
10/20/2023	2	2ND SUBMITTAL
11/17/2023	3	3RD SUBMITTAL

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
DEMOLITION PLAN

SHEET
C2.0

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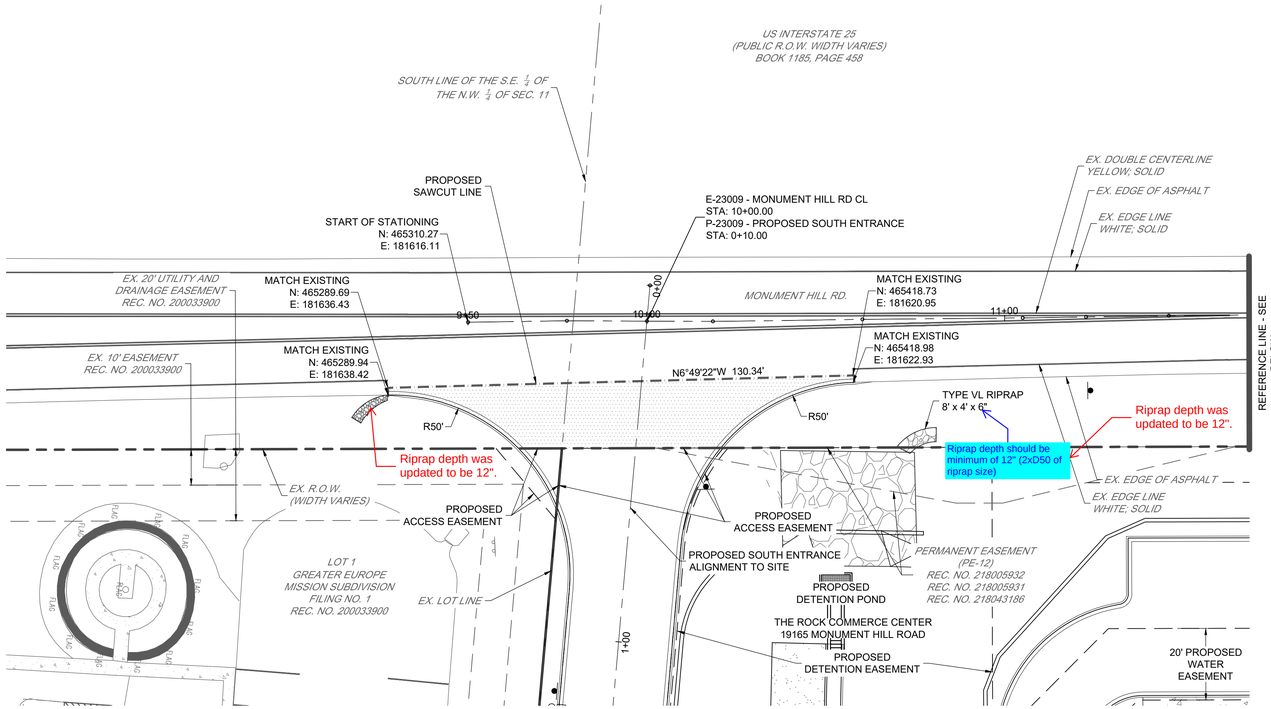
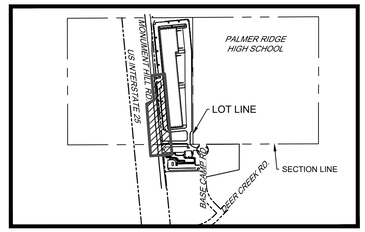




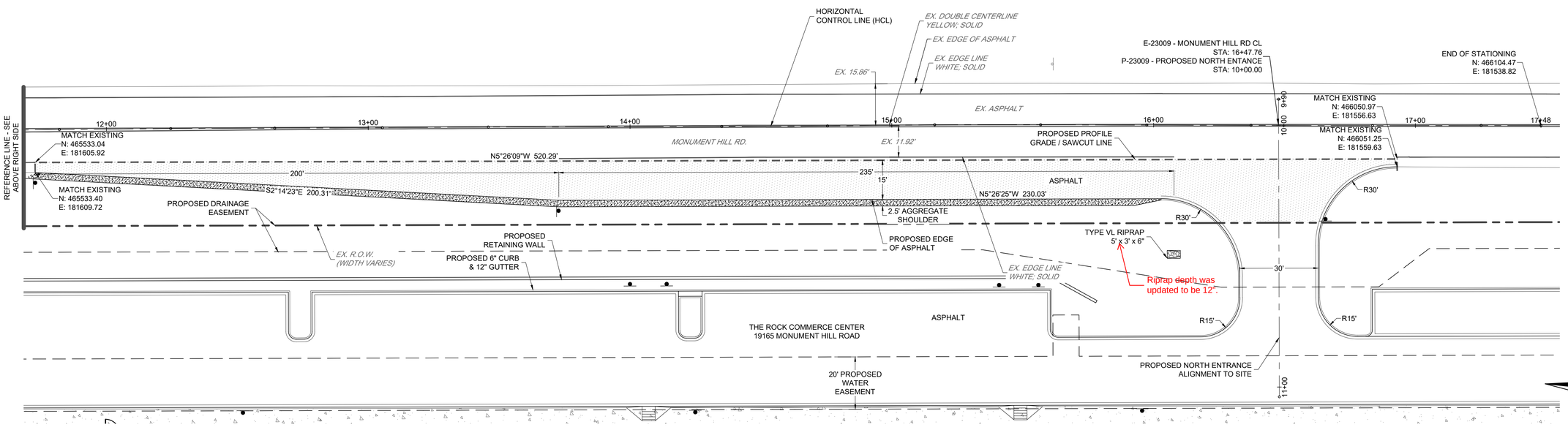
KEYMAP
SCALE = 1" = 750'

Know what's below. Call before you dig.

PAVING LEGEND

PROPOSED ASPHALT PAVEMENT
7.5-INCHES ASPHALT OVER 10-INCHES COMPACTED CLASS 6 AGGREGATE BASE COURSE.

PROPOSED SHOULDER
MATCH EXISTING



15 YEARS Redland
WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

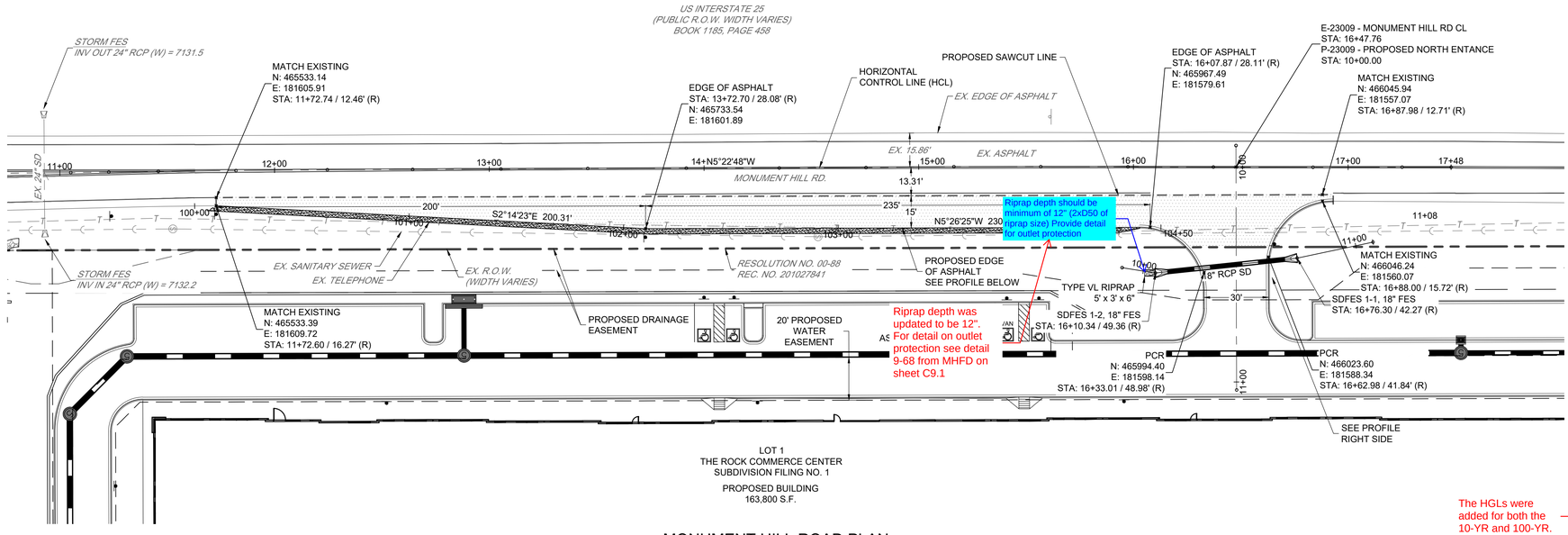
NO.	DATE	NOTES

PROJECT NO: 23009

NO.	DATE	NOTES
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

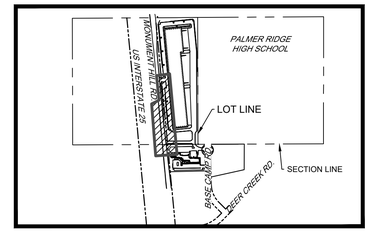
THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
HORIZONTAL CONTROL PLAN

SHEET
C3.0



MONUMENT HILL ROAD PLAN

SCALE: 1" = 30'

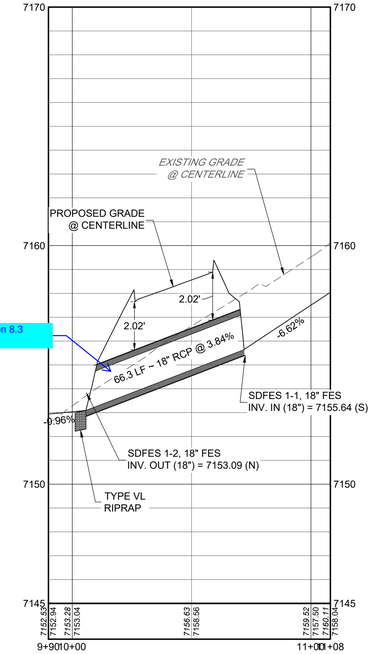


KEYMAP

SCALE = 1" = 750'

NORTH ENTRANCE CULVERT PROFILE

H: 1" = 30'
V: 1" = 3

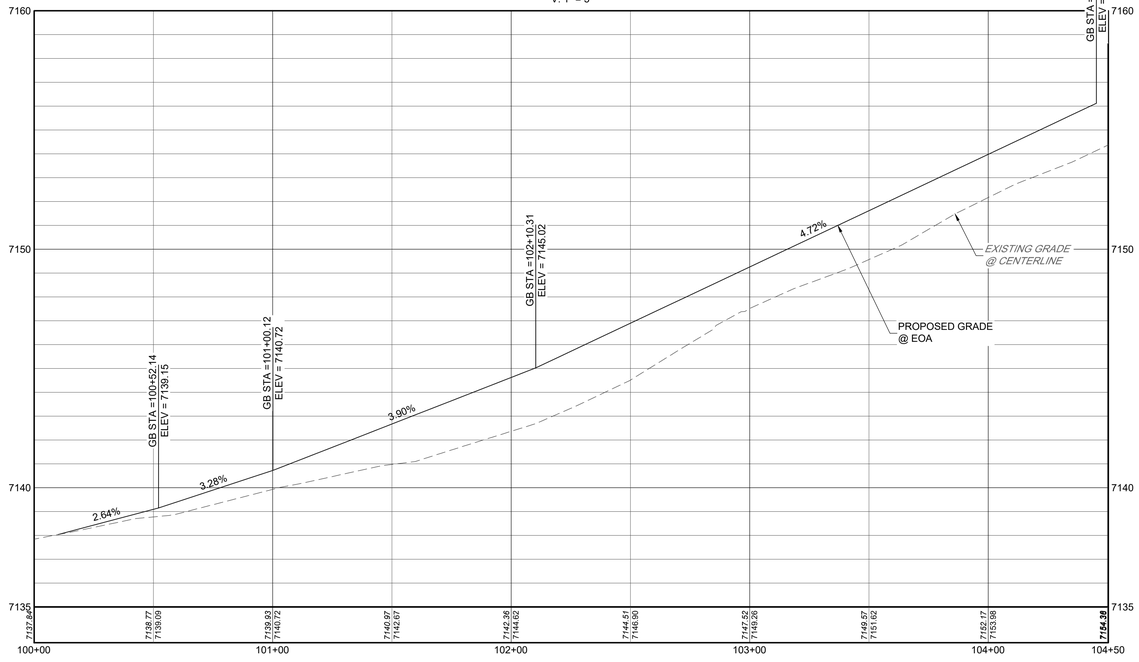


The HGLs were added for both the 10-YR and 100-YR.

Per DCM Section 8.3 include HGL

MONUMENT HILL ROAD PROFILE

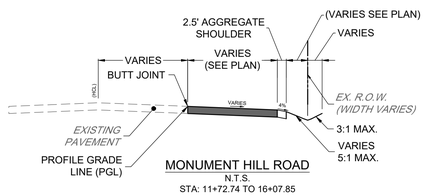
H: 1" = 30'
V: 1" = 3'



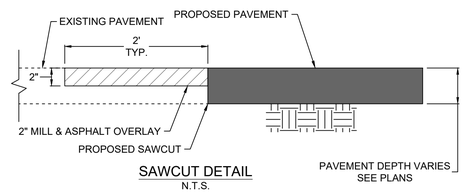
PAVING LEGEND

PROPOSED ASPHALT PAVEMENT
7.5-INCHES ASPHALT OVER 10-INCHES COMPACTED CLASS 6 AGGREGATE BASE COURSE.
*THIS MAY BE USED FOR BIDDING PURPOSES ONLY. HOWEVER, THE ACTUAL PAVEMENT DESIGN IS SUBJECT TO CHANGE PENDING PAVEMENT DESIGN REPORT SUBMITTAL.

PROPOSED SHOULDER
MATCH EXISTING



MONUMENT HILL ROAD
N.T.S.
STA: 11+72.74 TO 16+07.85



SAWCUT DETAIL
N.T.S.

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

N

0 15 30 60

SCALE: 1" = 30'

PROJECT NO.	23009	NOTES
DATE	NO.	
07/28/2023	1	1ST SUBMITTAL
10/20/2023	2	2ND SUBMITTAL
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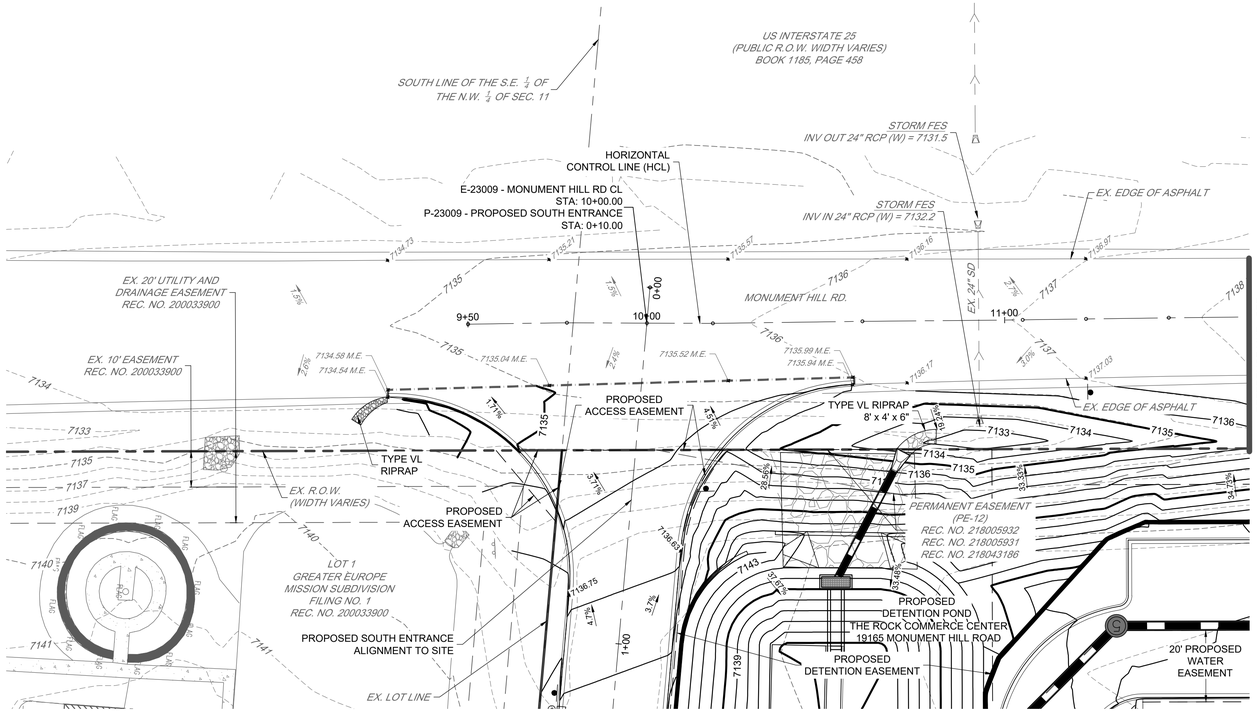
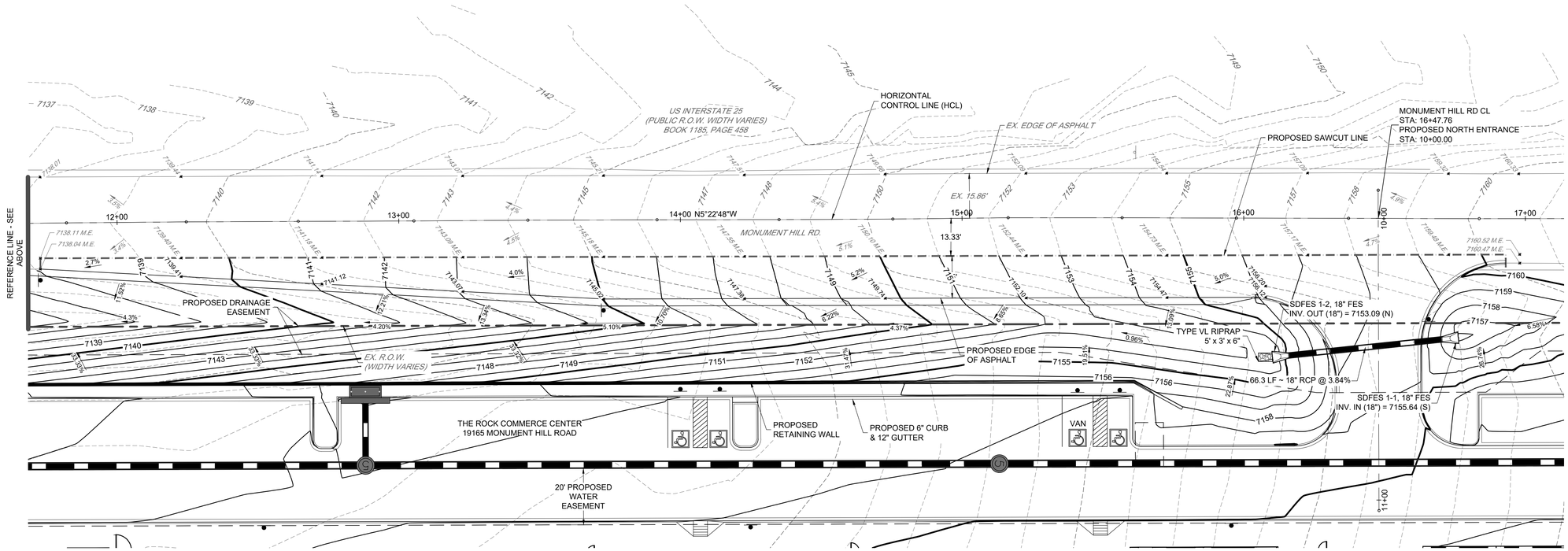
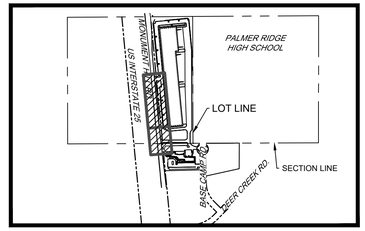
THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
PLAN AND PROFLIE

SHEET
C4.0







KEYMAP
SCALE = 1" = 750'

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

N

0 10 20 40
SCALE: 1" = 20'

15 YEARS **Redland** WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

NO.	DATE	NOTES
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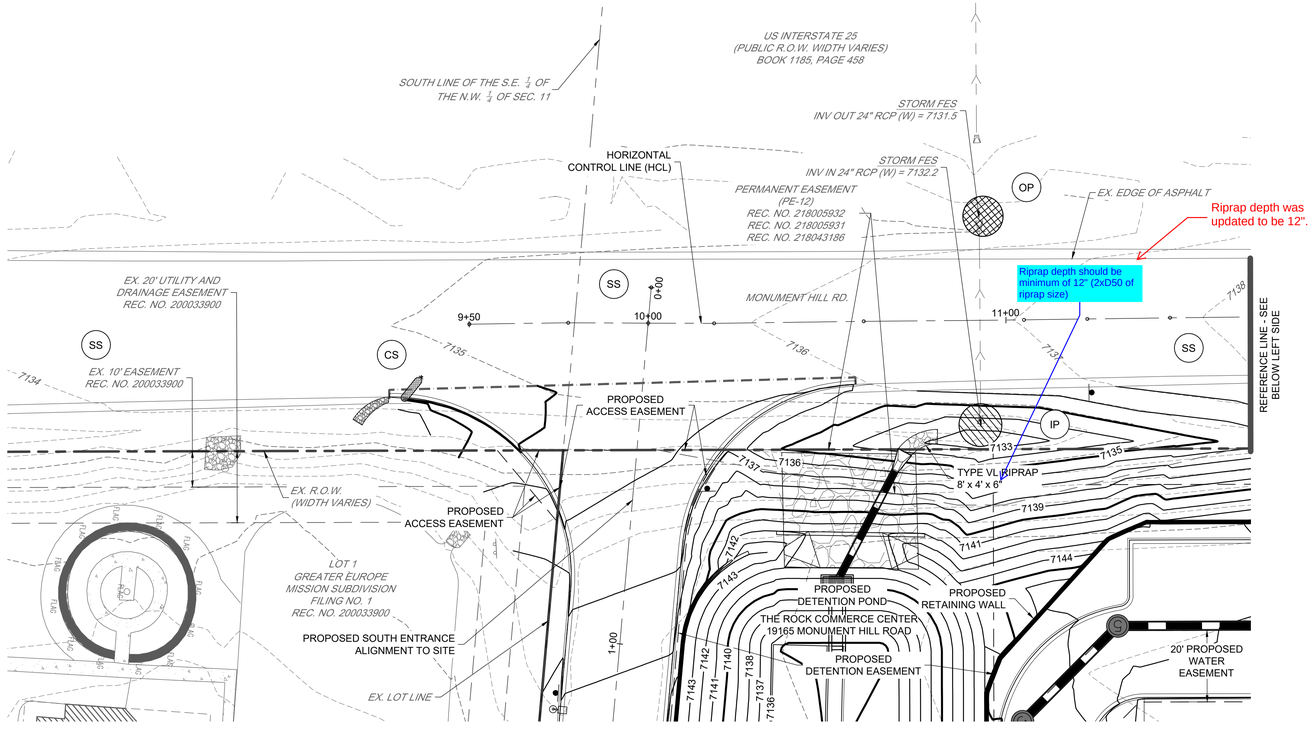
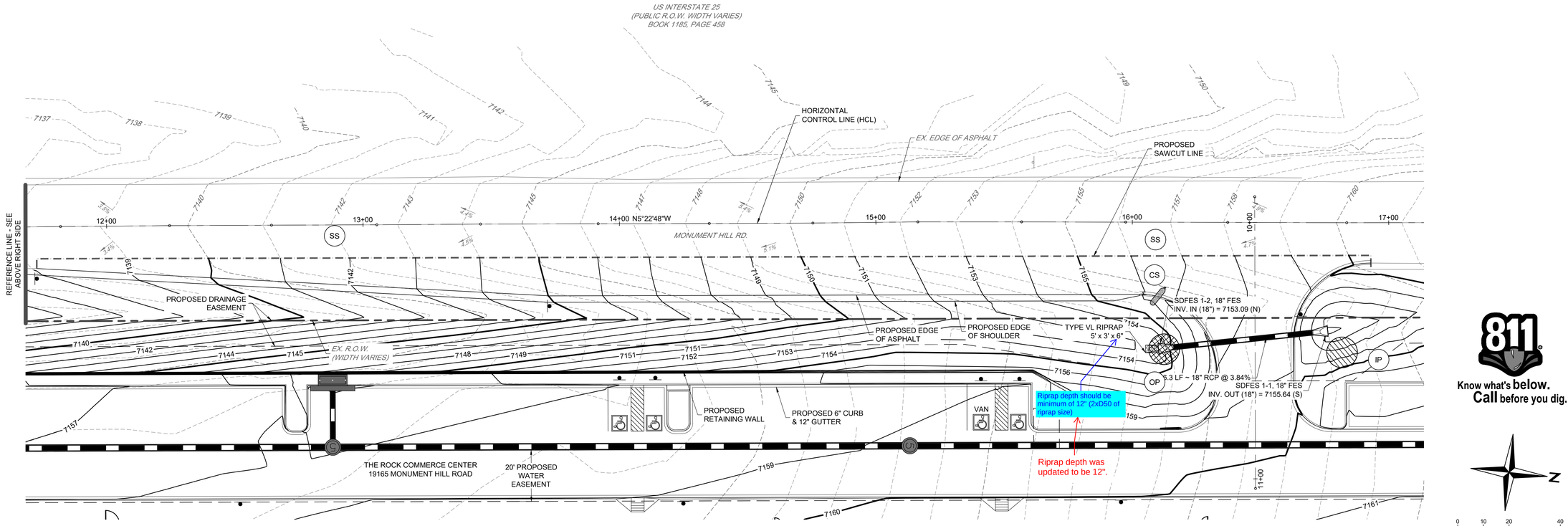
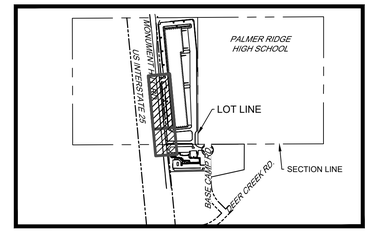
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
GRADING PLAN

SHEET
C5.0







KEYMAP
SCALE = 1" = 750'

LEGEND

CF	CONSTRUCTION FENCE	VTC	VEHICLE TRACKING CONTROL
DD	DIVERSION DITCH	ECB	EROSION CONTROL BLANKET
IP	INLET PROTECTION	LOC	LIMITS OF CONSTRUCTION
OP	OUTLET PROTECTION	ST	SEDIMENT TRAP
SB	SEDIMENT BASIN		FLOW ARROW
SF	SILT FENCE	CS	CURB SOCK
SCL	SEDIMENT CONTROL LOG	SS	STREET SWEEPING

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

N

0 10 20 40
SCALE: 1" = 20'

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NO.	DATE	NOTES

PROJECT NO. 23009

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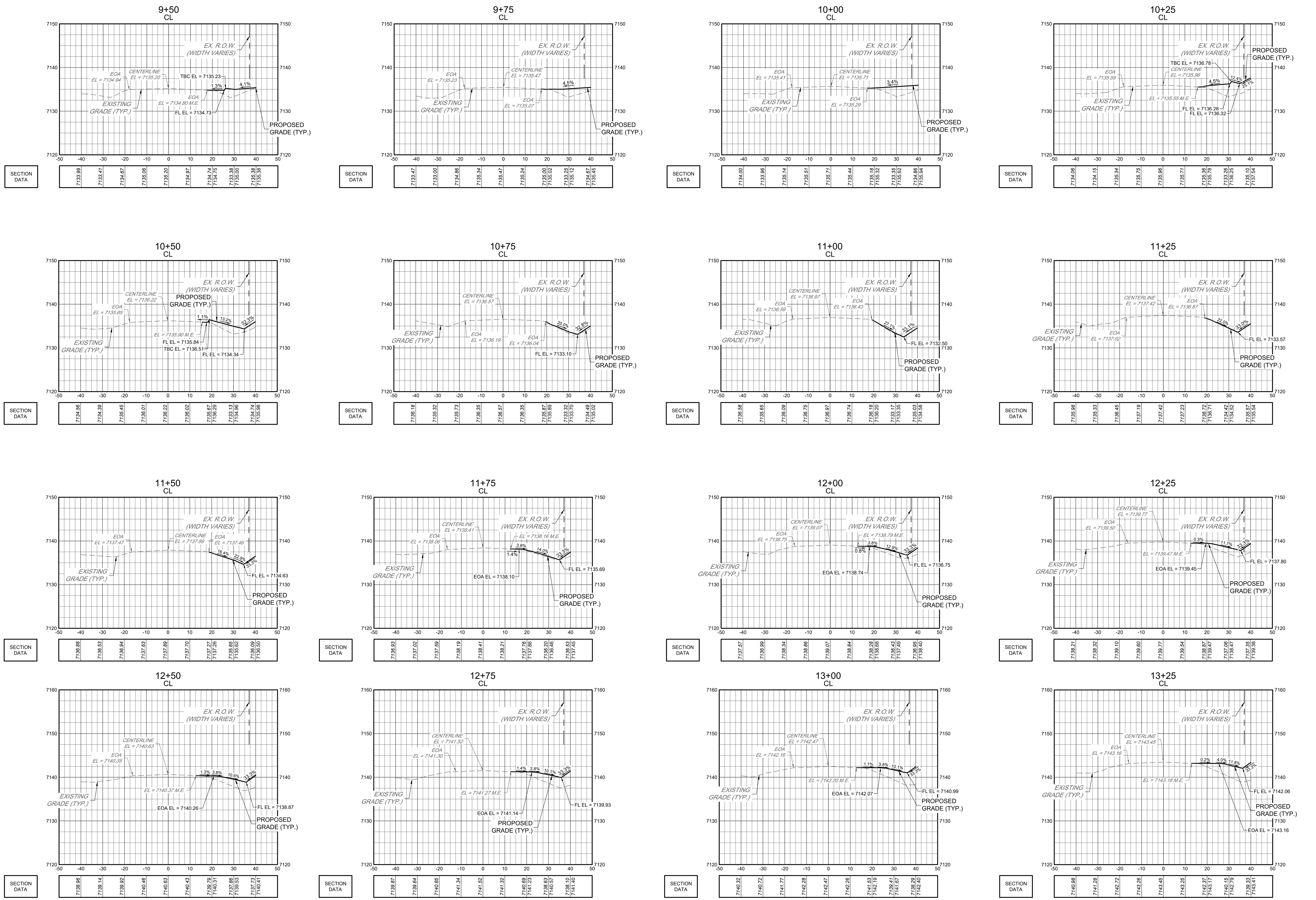
THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
EROSION CONTROL PLAN

SHEET
C6.0



SECTION VIEWS
H: 1" = 20'
V: 1" = 10'

SCALE: 1" = 20'

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NOTES

PROJECT NO.	23009	
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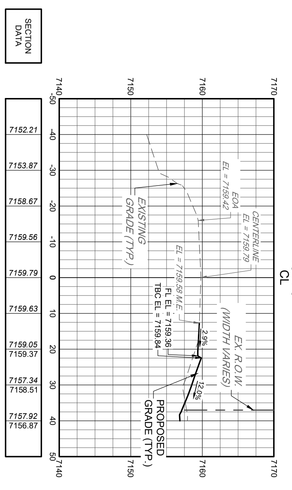
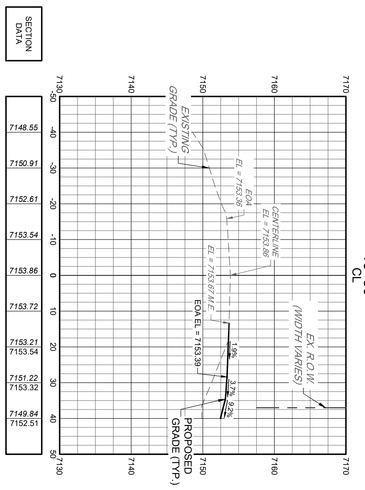
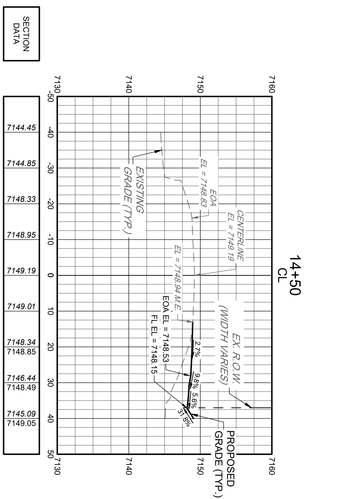
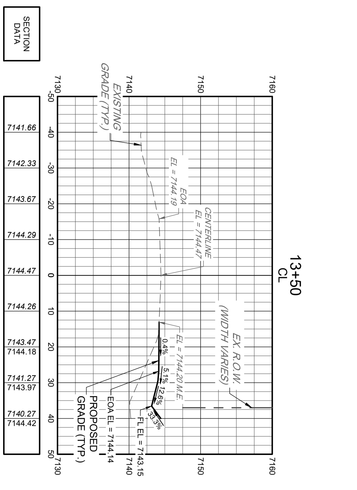
THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
ROAD CROSS SECTIONS

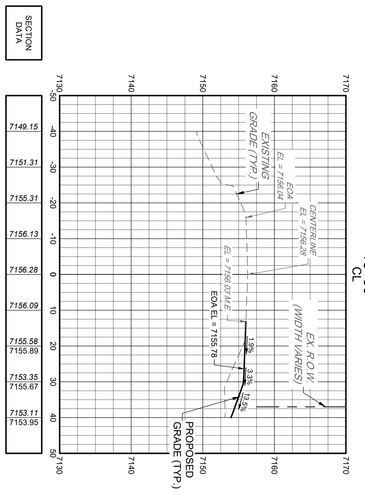
SHEET
C7.1

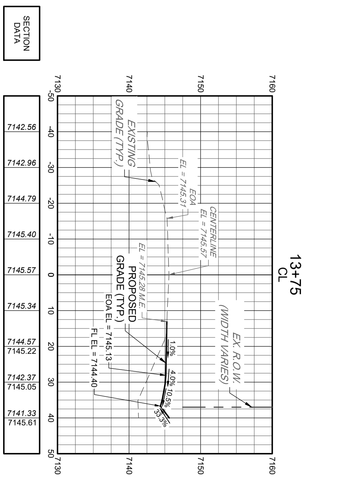


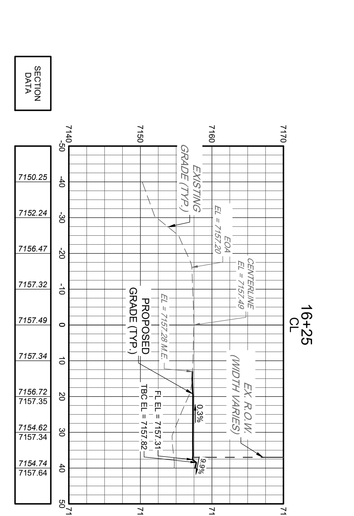


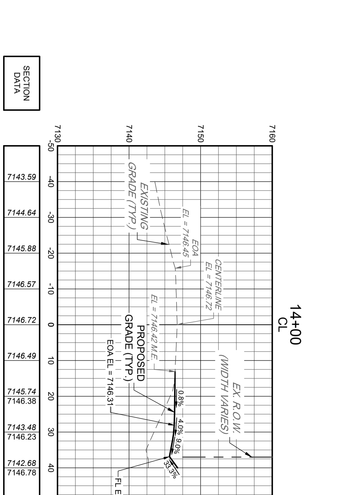


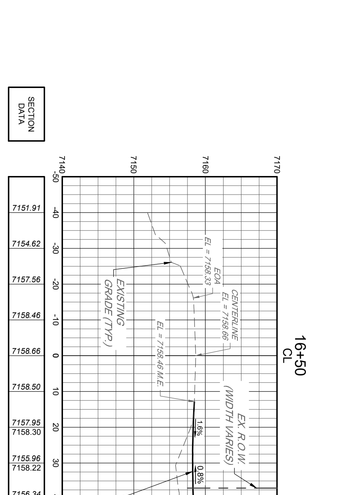


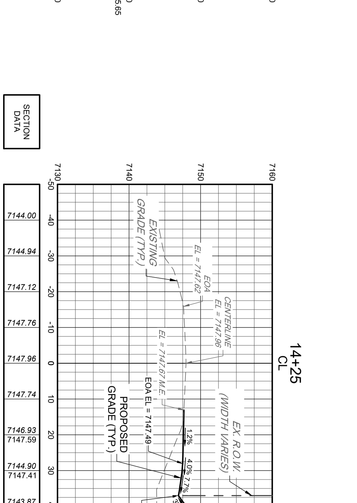












SECTION VIEWS
H: 1" = 20'
V: 1" = 10'

SCALE: 1" = 20'

SHEET
C7.2

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN

CONSTRUCTION DODUMENTS
ROAD CROSS SECTIONS

PROJECT NO:		23009
DATE	NO.	NOTES
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11/17/2023	3	3RD SUBMITTAL

DATE	NO.	NOTES

NOT FOR CONSTRUCTION

15 YEARS Redland
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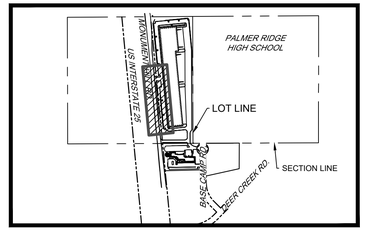
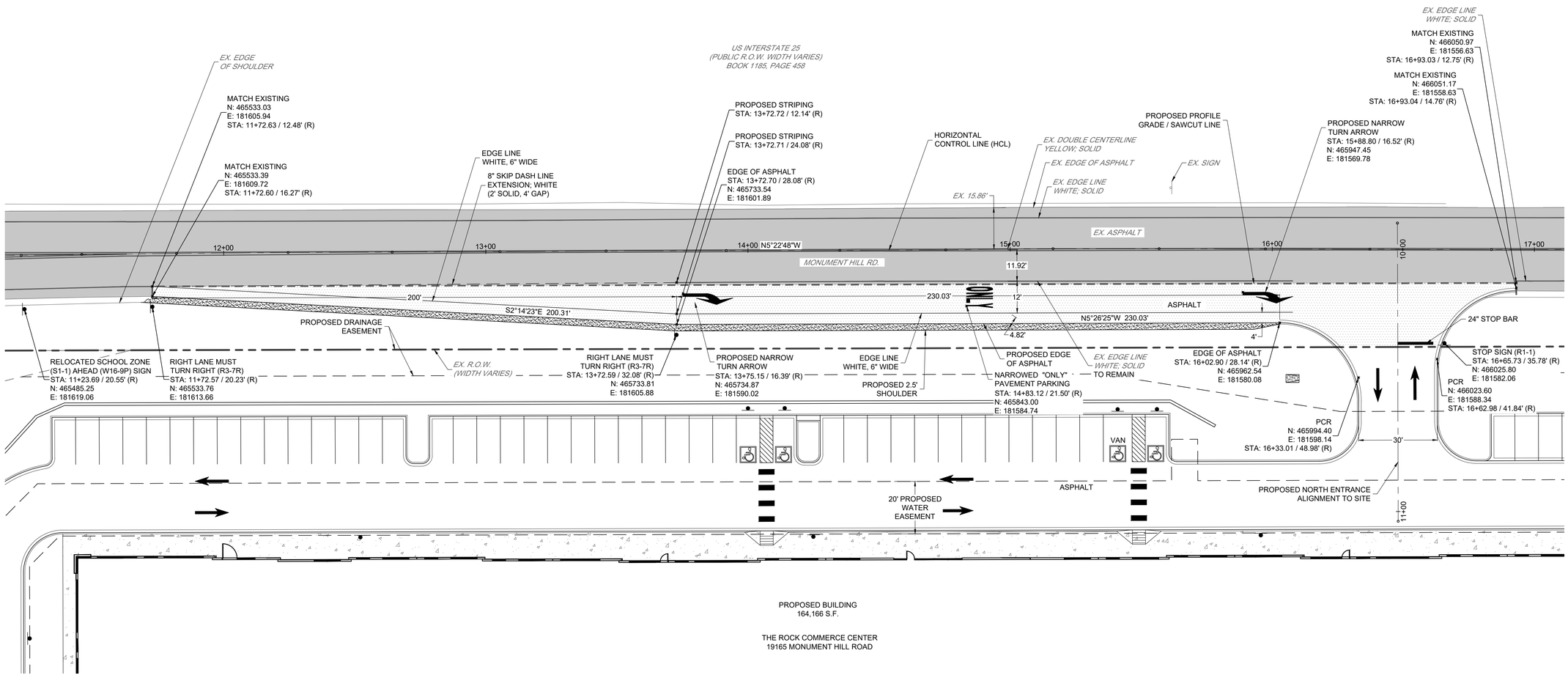


KEYMAP
SCALE = 1" = 750'



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

N

0 10 20 40
SCALE: 1" = 20'

15 YEARS Redland
WHERE GREAT PLACES BEGIN
▪ Land Planning ▪ Civil Engineering ▪ Landscape Architecture ▪ Construction Management
720.283.6783
REDLAND.COM

NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

NO.	DATE	NOTES
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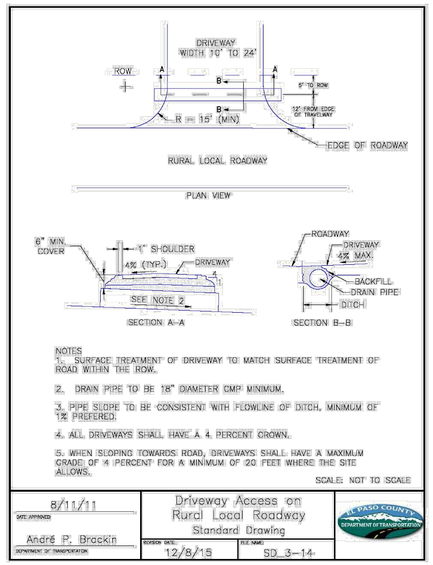
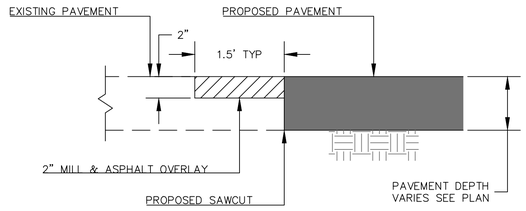
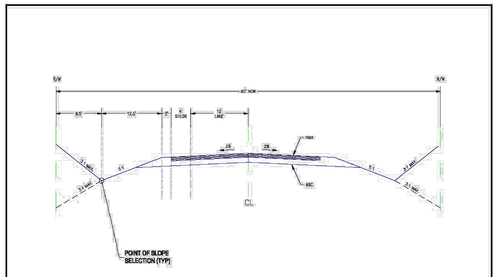
THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
SIGNAGE AND STRIPING PLAN

SHEET
C8.0





SAWCUT DETAIL
N.T.S.



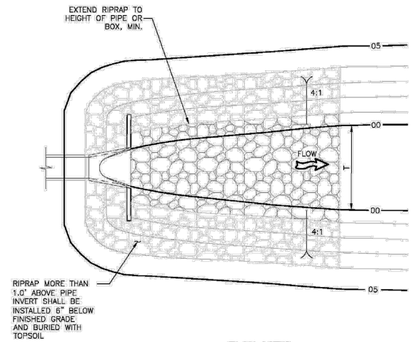
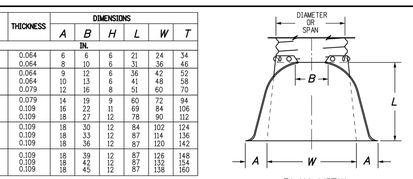


Figure 9-34. Riprap apron detail for culverts in-line with the channel

PIPE DIA.	THICKNESS	DIMENSIONS					
		A	B	H	L	W	T
		IN.					
12	0.064	6	8	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



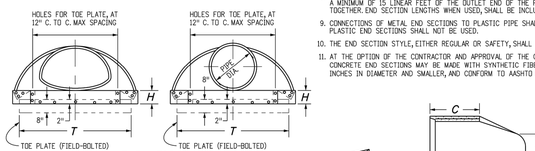
PLAN VIEW

PIPE ARCH SPAN x RISE	THICKNESS	DIMENSIONS					
		A	B	H	L	W	T
		(±1°)	(MAX.)	(±1°)	(±1.5°)	(±2°)	
		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

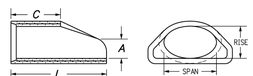
FLEXIBLE PIPE ARCH

GENERAL NOTES

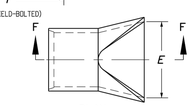
1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL 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.



ELEVATIONS



SECTION F-F END VIEW

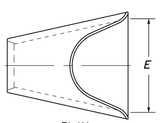


PLAN

EQUIVALENT CIRCULAR DIA.	NOMINAL SPAN x RISE	DIMENSIONS			
		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

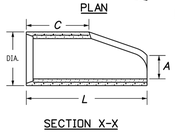
END SECTION AND CONNECTION DETAILS FOR ROUND AND ARCH METAL PIPES



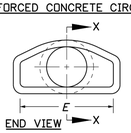
PLAN

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

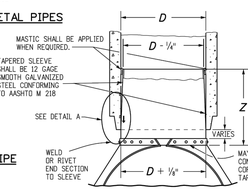


SECTION X-X



END VIEW

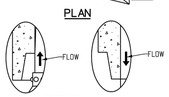
END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE



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

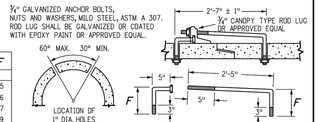
NOTE: METAL END SECTION SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING.

STEEL END SECTION FOR CONCRETE CIRCULAR PIPE
(ALTERNATIVE FOR CONCRETE END SECTION)



DETAIL A

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



CONCRETE JOINT FASTENER (TWO PER JOINT)

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)		
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:

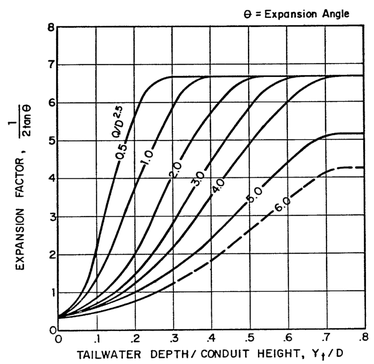


Figure 9-35. Expansion factor for circular conduits

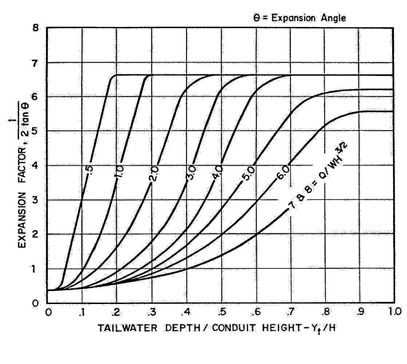


Figure 9-36. Expansion factor for rectangular conduits

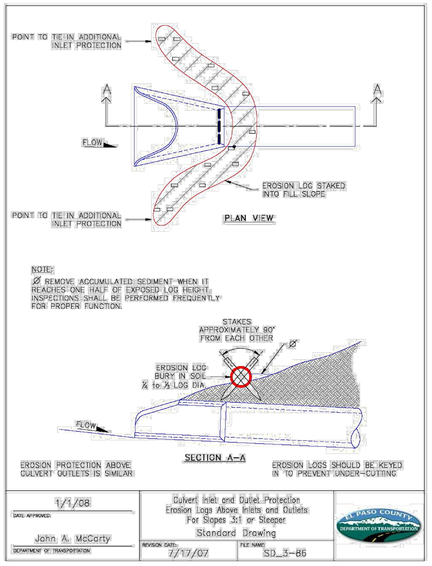
NOTES	NO.	DATE

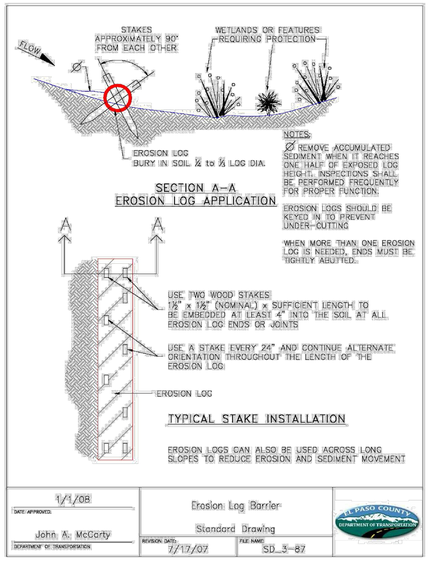
PROJECT NO. 23009

DATE	NO.	NOTES
07/28/2023	1	1ST SUBMITTAL
10/20/2023	2	2ND SUBMITTAL
11/17/2023	3	3RD SUBMITTAL

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
SITE DETAILS

SHEET C9.1





1/1/08 DATE APPROVED: John A. McCarty DEPARTMENT OF TRANSPORTATION	Culvert Inlet and Outlet Protection Erosion Logs Above Inlets and Outlets For Slopes 3:1 or Steeper Standard Drawing	EL PASO COUNTY COLORADO DEPARTMENT OF TRANSPORTATION
	REVISION DATE: 7/17/07 FILE NAME: SD_3-86	

1/1/08 DATE APPROVED: John A. McCarty DEPARTMENT OF TRANSPORTATION	Erosion Log Barrier Standard Drawing	EL PASO COUNTY COLORADO DEPARTMENT OF TRANSPORTATION
	REVISION DATE: 7/17/07 FILE NAME: SD_3-87	

Description

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet. Inlet protection can be constructed from rock socks, sediment control logs, silt fence, block and rock socks, or other materials approved by the local jurisdiction. Area inlets can also be protected by over-excavating around the inlet to form a sediment trap.

Photograph IP-1. Inlet protection for a curb opening inlet.

Appropriate Uses

Install protection at storm sewer inlets that are operable during construction. Consider the potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and should be used in conjunction with other upgradient BMPs.

Design and Installation

To function effectively, inlet protection measures must be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs must also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding. When selecting the type of inlet protection, consider factors such as type of inlet (e.g., curb or area, sump or on-grade conditions), traffic, anticipated flows, ability to secure the BMP properly, safety and other site-specific conditions. For example, block and rock socks will be better suited to a curb and gutter along a roadway, as opposed to silt fence or sediment control logs, which cannot be properly secured in a curb and gutter setting, but are effective area inlet protection measures.

Several inlet protection designs are provided in the Design Details. Additionally, a variety of proprietary products are available for inlet protection that may be approved for use by local governments. If proprietary products are used, design details and installation procedures from the manufacturer must be followed. Regardless of the type of inlet protection selected, inlet protection is most effective when combined with other BMPs such as curb socks and check dams. Inlet protection is often the last barrier before runoff enters the storm sewer or receiving water.

Design details with notes are provided for these forms of inlet protection:

IP-1. Block and Rock Sock Inlet Protection for Sump or On-grade Inlets

IP-2. Curb (Rock) Socks Upstream of Inlet Protection, On-grade Inlets

Inlet Protection (various forms)	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

IP-3. Rock Sock Inlet Protection for Sump/Area Inlet

IP-4. Silt Fence Inlet Protection for Sump/Area Inlet

IP-5. Over-excavation Inlet Protection

IP-6. Straw Bale Inlet Protection for Sump/Area Inlet

CIP-1. Culvert Inlet Protection

Propriety inlet protection devices should be installed in accordance with manufacturer specifications.

More information is provided below on selecting inlet protection for sump and on-grade locations.

Inlets Located in a Sump

When applying inlet protection in sump conditions, it is important that the inlet continue to function during larger runoff events. For curb inlets, the maximum height of the protective barrier should be lower than the top of the curb opening to allow overflow into the inlet during larger storms without excessive localized flooding. If the inlet protection height is greater than the curb elevation, particularly if the filter becomes clogged with sediment, runoff will not enter the inlet and may bypass it, possibly causing localized flooding, public safety issues, and downstream erosion and damage from bypassed flows.

Area inlets located in a sump setting can be protected through the use of silt fence, concrete block and rock socks (on paved surfaces), sediment control logs/straw wattles embedded in the adjacent soil and stacked around the area inlet (on pervious surfaces), over-excavation around the inlet, and proprietary products providing equivalent functions.

Inlets Located on a Slope

For curb and gutter inlets on paved sloping streets, block and rock sock inlet protection is recommended in conjunction with curb socks in the gutter leading to the inlet. For inlets located along unpaved roads, also see the Check Dam Fact Sheet.

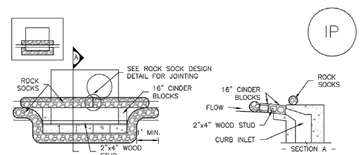
Maintenance and Removal

Inspect inlet protection frequently. Inspection and maintenance guidance includes:

- Inspect for tears that can result in sediment directly entering the inlet, as well as result in the contents of the BMP (e.g., gravel) washing into the inlet.
- Check for improper installation resulting in untreated flows bypassing the BMP and directly entering the inlet or bypassing to an unprotected downstream inlet. For example, silt fence that has not been properly trenched around the inlet can result in flows under the silt fence and directly into the inlet.
- Look for displaced BMPs that are no longer protecting the inlet. Displacement may occur following larger storm events that wash away or reposition the inlet protection. Traffic or equipment may also crush or displace the BMP.
- Monitor sediment accumulation upgradient of the inlet protection.

- Remove sediment accumulation from the area upstream of the inlet protection, as needed to maintain BMP effectiveness, typically when it reaches no more than half the storage capacity of the inlet protection. For silt fence, remove sediment when it accumulates to a depth of no more than 6 inches. Remove sediment accumulation from the area upstream of the inlet protection as needed to maintain the functionality of the BMP.
- Propriety inlet protection devices should be inspected and maintained in accordance with manufacturer specifications. If proprietary inlet insert devices are used, sediment should be removed in a timely manner to prevent devices from breaking and spilling sediment into the storm drain.

Inlet protection must be removed and properly disposed of when the drainage area for the inlet has reached final stabilization.



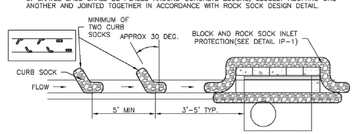
IP–1. BLOCK AND ROCK SOCK SUMP OR ON GRADE INLET PROTECTION

BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES

1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

2. CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW, ABUTTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.

3. GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINTED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.



IP–2. CURB ROCK SOCKS UPSTREAM OF INLET PROTECTION

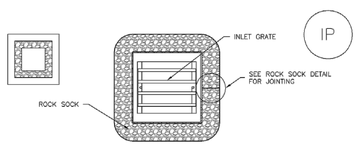
CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES

1. SEE ROCK SOCK DESIGN DETAIL INSTALLATION REQUIREMENTS.

2. PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.

3. SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.

4. AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON–GRADE INLETS.

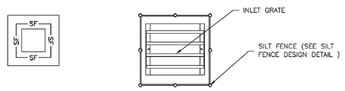


IP–3. ROCK SOCK SUMP/AREA INLET PROTECTION

ROCK SOCK SUMP/AREA INLET PROTECTION INSTALLATION NOTES

1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

2. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.



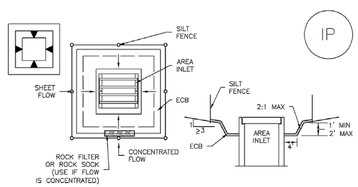
IP–4. SILT FENCE FOR SUMP INLET PROTECTION

SILT FENCE INLET PROTECTION INSTALLATION NOTES

1. SEE SILT FENCE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

2. POSTS SHALL BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET.

3. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF SILT FENCE FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.



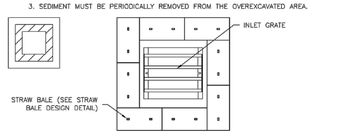
IP–5. OVEREXCAVATION INLET PROTECTION

OVEREXCAVATION INLET PROTECTION INSTALLATION NOTES

1. THIS FORM OF INLET PROTECTION IS PRIMARILY APPLICABLE FOR SITES THAT HAVE NOT YET REACHED FINAL GRADE AND SHOULD BE USED ONLY FOR INLETS WITH A RELATIVELY SMALL CONTRIBUTING DRAINAGE AREA.

2. WHEN USING FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.

3. SEDIMENT MUST BE PERIODICALLY REMOVED FROM THE OVEREXCAVATED AREA.



IP–6. STRAW BALE FOR SUMP INLET PROTECTION

STRAW BALE BARRIER INLET PROTECTION INSTALLATION NOTES

1. SEE STRAW BALE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

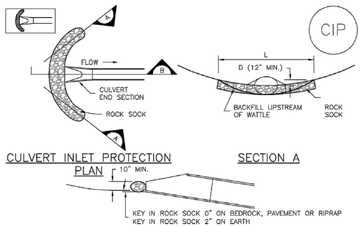
2. BALES SHALL BE PLACED IN A SINGLE ROW AROUND THE INLET WITH ENDS OF BALES TIGHTLY ABUTTING ONE ANOTHER.

NO.	DATE	NOTES

PROJECT NO.	23009	
NO.	DATE	NOTES
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER
PUBLIC IMPROVEMENTS PLAN
CONSTRUCTION DODUMENTS
EROSION CONTROL DETAILS

SHEET
C9.2



CIP–1, CULVERT INLET PROTECTION

CULVERT INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF CULVERT INLET PROTECTION.

2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL.

CULVERT INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.

5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

GENERAL INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   –LOCATION OF INLET PROTECTION.
   –TYPE OF INLET PROTECTION (IP.1, IP.2, IP.3, IP.4, IP.5, IP.6)

2. INLET PROTECTION SHALL BE INSTALLED PROMPTLY AFTER INLET CONSTRUCTION OR PAVING IS COMPLETE (TYPICALLY WITHIN 48 HOURS). IF A RAINFALL/RUNOFF EVENT IS FORECAST, INSTALL INLET PROTECTION PRIOR TO ONSET OF EVENT.

3. MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED AS NECESSARY TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN STORAGE VOLUME REACHES 50% OF CAPACITY, A DEPTH OF 6" WHEN SILT FENCE IS USED, OR ¼ OF THE HEIGHT FOR STRAW BALES.

5. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.

6. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED, OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF INLET PROTECTION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY PROPRIETARY INLET PROTECTION METHODS ON THE MARKET. UDFCD NEITHER ENDORSES NOR DISCOURAGES USE OF PROPRIETARY INLET PROTECTION; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

NOTE: SOME MUNICIPALITIES DISCOURAGE OR PROHIBIT THE USE OF STRAW BALES FOR INLET PROTECTION. CHECK WITH LOCAL JURISDICTION TO DETERMINE IF STRAW BALE INLET PROTECTION IS ACCEPTABLE.

Description

Outlet protection helps to reduce erosion immediately downstream of a pipe, culvert, slope drain, rundown or other conveyance with concentrated, high-velocity flows. Typical outlet protection consists of riprap or rock aprons at the conveyance outlet.

Photograph TOP-1. Riprap outlet protection.

Appropriate Uses

Outlet protection should be used when a conveyance discharges onto a disturbed area where there is potential for accelerated erosion due to concentrated flow. Outlet protection should be provided where the velocity at the culvert outlet exceeds the maximum permissible velocity of the material in the receiving channel.

Note: This Fact Sheet and detail are for temporary outlet protection, outlets that are intended to be used for less than 2 years. For permanent, long-term outlet protection, see the *Major Drainage* chapter of Volume 1.

Design and Installation

Design outlet protection to handle runoff from the largest drainage area that may be contributing runoff during construction (the drainage area may change as a result of grading). Key in rock, around the entire perimeter of the apron, to a minimum depth of 6 inches for stability. Extend riprap to the height of the culvert or the normal flow depth of the downstream channel, whichever is less. Additional erosion control measures such as vegetative lining, turf reinforcement mat and/or other channel lining methods may be required downstream of the outlet protection if the channel is susceptible to erosion. See Design Detail OP-1 for additional information.

Maintenance and Removal

Inspect apron for damage and displaced rocks. If rocks are missing or significantly displaced, repair or replace as necessary. If rocks are continuously missing or displaced, consider increasing the size of the riprap or deeper keying of the perimeter.

Remove sediment accumulated at the outlet before the outlet protection becomes buried and ineffective. When sediment accumulation is noted, check that upgradient BMPs, including inlet protection, are in effective operating condition.

Outlet protection may be removed once the pipe is no longer draining an upstream area, or once the downstream area has been sufficiently stabilized. If the drainage pipe is permanent, outlet protection can be left in place; however, permanent outlet protection should be designed and constructed in accordance with the requirements of the *Major Drainage* chapter of Volume 2.

Outlet Protection	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

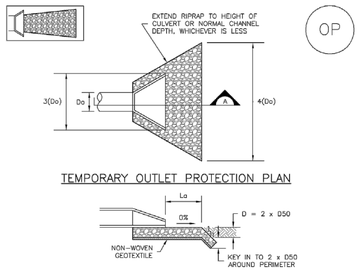


TABLE OP–1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

OP–1, TEMPORARY OUTLET PROTECTION

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF OUTLET PROTECTION.
   –DIMENSIONS OF OUTLET PROTECTION.

2. DETAIL IS INTENDED FOR PIPES WITH SLOPE ≤ 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.

3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

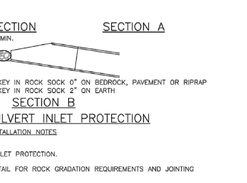
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

Description

A rock sock is constructed of gravel that has been wrapped by wire mesh or a geotextile to form an elongated cylindrical filter. Rock socks are typically used either as a perimeter control or as part of inlet protection. When placed at angles in the curb line, rock socks are typically referred to as curb socks. Rock socks are intended to trap sediment from stormwater runoff that flows onto roadways as a result of construction activities.



Photograph RS-1. Rock socks placed at regular intervals in a curb line can help reduce sediment loading to storm sewer inlets. Rock socks can also be used as perimeter controls.

Appropriate Uses

Rock socks can be used at the perimeter of a disturbed area to control localized sediment loading. A benefit of rock socks as opposed to other perimeter controls is that they do not have to be trenched or staked into the ground; therefore, they are often used on roadway construction projects where paved surfaces are present.

Use rock socks in inlet protection applications when the construction of a roadway is substantially complete and the roadway has been directly connected to a receiving storm system.

Design and Installation

When rock socks are used as perimeter controls, the maximum recommended tributary drainage area per 100 lineal feet of rock socks is approximately 0.25 acres with disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. A rock sock design detail and notes are provided in Detail RS-1. Also see the Inlet Protection Fact Sheet for design and installation guidance when rock socks are used for inlet protection and in the curb line.

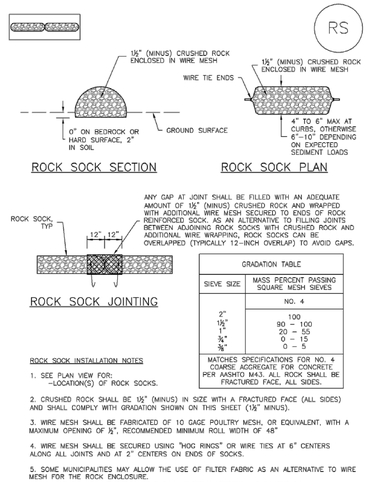
When placed in the gutter adjacent to a curb, rock socks should protrude no more than two feet from the curb in order for traffic to pass safely. If located in a high traffic area, place construction markers to alert drivers and street maintenance workers of their presence.

Maintenance and Removal

Rock socks are susceptible to displacement and breaking due to vehicle traffic. Inspect rock socks for damage and repair or replace as necessary. Remove sediment by sweeping or vacuuming as needed to maintain the functionality of the BMP, typically when sediment has accumulated behind the rock sock to one-half of the sock's height.

Once upstream stabilization is complete, rock socks and accumulated sediment should be removed and properly disposed.

Rock Sock	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No



GRADATION TABLE	
SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	NO. 4
2"	100
1½"	90 – 100
1"	20 – 55
¾"	0 – 15
⅜"	0 – 5
MATCHES SPECIFICATIONS FOR NO. 4 COARSE AGGREGATE FOR CONCRETE PER AASHTO M43. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.	

ROCK SOCK INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   –LOCATION(S) OF ROCK SOCKS.

2. CRUSHED ROCK SHALL BE ½" (MINUS) IN SIZE WITH A FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON THIS SHEET (½" MINUS).

3. WIRE MESH SHALL BE FABRICATED OF 10 GAGE POULTRY MESH, OR EQUIVALENT, WITH A MAXIMUM OPENING OF ½", RECOMMENDED MINIMUM ROLL WIDTH OF 48"

4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6" CENTERS ALONG ALL JOINTS AND AT 2" CENTERS ON ENDS OF SOCKS.

5. SOME MUNICIPALITIES MAY ALLOW THE USE OF FILTER FABRIC AS AN ALTERNATIVE TO WIRE MESH FOR THE ROCK ENCLOSURE.

RS–1, ROCK SOCK PERIMETER CONTROL

ROCK SOCK MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SOCKS SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, OR DAMAGED BEYOND REPAIR.

5. SEDIMENT ACCUMULATED UPSTREAM OF ROCK SOCKS SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY ½ OF THE HEIGHT OF THE ROCK SOCK.

6. ROCK SOCKS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

7. WHEN ROCK SOCKS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

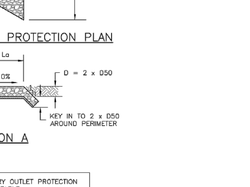
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF ROCK SOCK INSTALLATION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY OTHER SIMILAR PROPRIETARY PRODUCTS ON THE MARKET. UDFCD NEITHER NDORSES NOR DISCOURAGES USE OF PROPRIETARY PROTECTION PRODUCTS; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

Description

Street sweeping uses mechanical pavement cleaning practices to reduce sediment, litter and other debris washed into storm sewers by runoff. This can reduce pollutant loading to receiving waters and in some cases reduce clogging of storm sewers and prolong the life of infiltration oriented BMPs and reduce clogging of outlet structures in detention BMPs.

Different designs are available with typical sweepers categorized as a broom and conveyor belt sweeper, wet or dry vacuum-assisted sweepers, and regenerative-air sweepers. The effectiveness of street sweeping is dependent upon particle loadings in the area being swept, street texture, moisture conditions, parked car management, equipment operating conditions and frequency of cleaning (Pitt et al. 2004).



Photograph SSC-1. Monthly street sweeping from April through November removed nearly 40,690 cubic yards of sediment/debris from Denver streets in 2009. Photo courtesy of Denver Public Works.

Appropriate Uses

Street sweeping is an appropriate technique in urban areas where sediment and litter accumulation on streets is of concern for aesthetic, sanitary, water quality, and air quality reasons. From a pollutant loading perspective, street cleaning equipment can be most effective in areas where the surface to be cleaned is the major source of contaminants. These areas include freeways, large commercial parking lots, and paved storage areas (Pitt et al. 2004). Where significant sediment accumulation occurs on pervious surfaces tributary to infiltration BMPs, street sweeping may help to reduce clogging of infiltration media. In areas where construction activity is occurring, street sweeping should occur as part of construction site stormwater management plans. Vacuuming of permeable pavement systems is also considered a basic routine maintenance practice to maintain the BMP in effective operating condition. See the maintenance chapter for more information on permeable pavement systems. Not all sweepers are appropriate for this application.

Practice Guidelines[1]

1. Post street sweeping schedules with signs and on local government websites so that cars are not parked on the street during designated sweeping days.

2. Sweeping frequency is dependent on local government budget, staffing, and equipment availability, but monthly sweeping during non-winter months is a common approach in the metro Denver urban area. Consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to watercourses, etc. For example:
   - Increase the sweeping frequency for streets with high pollutant loadings, especially in high traffic and industrial areas.
   - Conduct street sweeping prior to wetter seasons to remove accumulated sediments.
   - Increase the sweeping frequency for streets in special problem areas such as special events, high litter or erosion zones.

3. Perform street cleaning during dry weather if possible.

4. Avoid wet cleaning the street; instead, utilize dry methods where possible.

5. Maintain cleaning equipment in good working condition and purchase replacement equipment as needed. Old sweepers should be replaced with more technologically advanced sweepers (preferably regenerative air sweepers) that maximize pollutant removal.

6. Operate sweepers at manufacturer recommended optimal speed levels to increase effectiveness.

7. Regularly inspect vehicles and equipment for leaks and repair promptly.

8. Keep accurate logs of the number of curb-miles swept and the amount of waste collected.

9. Dispose of street sweeping debris and dirt at a landfill.

10. Do not store swept material along the side of the street or near a storm drain inlet.

[1] Practice guidelines adapted from CASQA (2003) *California Stormwater BMP Handbook*, Practice SC-70 Road and Street Maintenance.

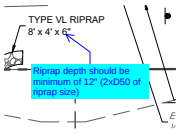
Changes in Street Sweeper Technology (Source: Center for Watershed Protection 2002)

At one time, street sweepers were thought to have great potential to remove stormwater pollutants from urban street surfaces and were widely touted as a stormwater treatment practice in many communities. Street sweeping gradually fell out of favor, largely as a result of performance monitoring conducted as part of the National Urban Runoff Program (NURP). These studies generally concluded that street sweepers were not very effective in reducing pollutant loads (USEPA, 1983). The primary reason for the mediocre performance was that mechanical sweepers of that era were unable to pick up fine-grained sediment particles that carry a substantial portion of the stormwater pollutant load. In addition, the performance of sweepers is constrained by that portion of a street's stormwater pollutant load delivered from outside street pavements (e.g., pollutants that wash onto the street from adjacent areas or are directly deposited on the street by rainfall). Street sweeping technology, however, has evolved considerably since the days of the NURP testing. Today, communities have a choice in three basic sweeping technologies to clean their urban streets: traditional mechanical sweepers that utilize a broom and conveyor belt, vacuum-assisted sweepers, and regenerative-air sweepers (those that blast air onto the pavement to loosen sediment particles and vacuum them into a hopper).

For more information, see
http://www.cwp.org/Resource_Library/Center_Docs/PWP/ELC_PWP121.pdf

V3_Public Improvement Plan Comments.pdf Markup Summary

CDurham (5)



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Date: 12/5/2023 9:26:17 AM
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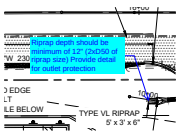
Riprap depth should be minimum of 12" (2xD50 of riprap size)



Subject: Callout
Page Label: [5] C4.0 PLAN AND PROFLIE
Author: CDurham
Date: 12/5/2023 4:20:55 PM
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Riprap depth should be minimum of 12" (2xD50 of riprap size) Provide detail for outlet protection

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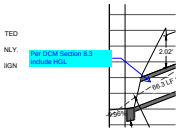

Subject: Callout
Page Label: [5] C4.0 PLAN AND PROFLIE
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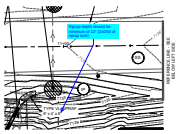
Per DCM Section 8.3 include HGL



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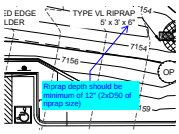

Subject: Callout
Page Label: [7] C6.0 EROSION CONTROL PLAN
Author: CDurham
Date: 12/5/2023 10:54:35 AM
Color:

Riprap depth should be minimum of 12" (2xD50 of riprap size)

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS

LOCATED IN THE SOUTHWEST QUARTER OF THE
NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
EL PASO COUNTY, STATE OF COLORADO.

EPC STORMWATER REVIEW COMMENTS IN ORANGE BOXES WITH BLACK TEXT

PROJECT TEAM

OWNER / DEVELOPER

CENTRAL DEVELOPMENT, LLC
1600 S. ALBON ST., #200
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303.628.0200 voice
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CIVIL ENGINEER

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ARCHITECT

INTERGROUP ARCHITECTS
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LANDSCAPE ARCHITECT

STACKLOT
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303.808.4523 voice
CONTACT: STEVE WIENS
EMAIL: steve@stacklot.com

LEGAL DESCRIPTION:

PARCEL B:

THAT PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE 6TH P.M. LYING EAST OF THE EAST LINE OF THAT TRACT CONVEYED TO THE STATE HIGHWAY DEPARTMENT BY QUITCLAIM DEED RECORDED SEPTEMBER 8, 1948 IN BOOK 1185, PAGE 458, ALSO DESCRIBED AS: THAT PART OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE P.M., COUNTY OF EL PASO, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER; THENCE EASTERLY ALONG THE SOUTHERLY LINE OF SAID NORTHWEST QUARTER A DISTANCE OF 996.04 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF INTERSTATE HIGHWAY 25 DESCRIBED IN THAT DEED TO THE STATE HIGHWAY DEPARTMENT RECORDED SEPTEMBER 8, 1948 IN BOOK 1185 AT PAGE 458, WHICH POINT IS THE TRUE POINT OF THE BEGINNING OF THE PARCEL TO BE DESCRIBED; THENCE ON A DEFLECTION ANGLE TO THE LEFT 95°08'20" AND ALONG SAID EASTERLY RIGHT OF WAY LINE A DISTANCE OF 1334.24 FEET TO A POINT ON THE NORTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 95°00'36" AND ALONG SAID NORTHERLY LINE 441.95 FEET TO THE NORTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 90°16'15" AND ALONG THE EASTERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 1329.88 FEET TO THE SOUTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 89°51'29" AND ALONG THE SOUTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 319.15 FEET TO THE POINT OF BEGINNING.

DESIGN ENGINEER'S STATEMENT

THIS GRADING AND EROSION CONTROL PLAN WAS PREPARED UNDER MY DIRECTION AND SUPERVISION AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. SAID PLAN HAS BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR GRADING AND EROSION CONTROL PLANS. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS

MARK D. CEVAAL, P.E. #33123 DATE

OWNER/DEVELOPER'S STATEMENT

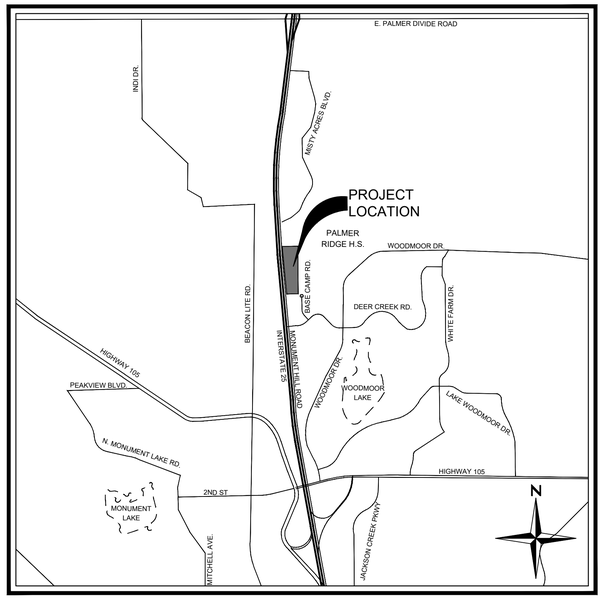
I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN.

JEREMY RECORDS DATE
CENTRAL DEVELOPMENT, LLC
1600 S. ALBION ST #200,
DENVER, CO 80222

EL PASO COUNTY

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WITH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.
FIELD IN ACCORDANCE WITH REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL AS AMENDED.
IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTORS DISCRETION.

JOSH PALMER, P.E. DATE
COUNTY ENGINEER/ECM ADMINISTRATOR



VICINITY MAP
SCALE: 1" = 2000'

BENCHMARK

NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF I-25.

NAVD88. ELEV = 7111.32'

BASIS OF BEARINGS

BEARINGS SHOWN HEREON ARE REFERENCED TO THE SOUTHERLY BOUNDARY OF LOT 1, GREATER EUROPE MISSION SUBDIVISION FILING NO. 1, BEING MONUMENTED AS SHOWN HEREON, ASSUMED TO BEAR SOUTH 80°00'37" WEST, A DISTANCE OF 358.79 FEET.

Sheet List Table

Sheet Number	Sheet Title
EC1.0	COVER SHEET
EC1.1	REDLAND GENERAL NOTES
EC2.1	GRADING PLAN
EC2.2	GRADING PLAN
EC3.1	INITIAL EROSION CONTROL PLAN
EC3.2	INITIAL EROSION CONTROL PLAN
EC3.3	INTERIM EROSION CONTROL PLAN
EC3.4	INTERIM EROSION CONTROL PLAN
EC3.5	FINAL EROSION CONTROL PLAN
EC3.6	FINAL EROSION CONTROL PLAN
EC4.1	GEC DETAILS
EC4.2	GEC DETAILS
EC4.3	POND DETAILS

EL PASO COUTNY GRADING AND EROSION CONTROL PLAN NOTES:

1. STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF-SITE WATERS, INCLUDING WETLANDS.
2. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
3. A SEPARATE STORMWATER MANAGEMENT PLAN (SMWP) FOR THIS PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. MANAGEMENT OF THE SWMP DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE DESIGNATED QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR. THE SWMP SHALL BE LOCATED ON-SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
4. ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
5. CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT COULD CONTRIBUTE POLLUTANTS TO STORMWATER. CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, AND DISTURBED LAND AREAS SHALL BE INSTALLED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
6. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES ARE NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN.
7. TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS.
8. FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLANT DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
9. ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DESIGNED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT EFFECT THE DESIGN OR FUNCTION OF PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
10. EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE UNLESS SHOWN TO BE INFEASIBLE AND SPECIFICALLY REQUESTED AND APPROVED.
11. COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED. IF COMPACTION PREVENTION IS NOT FEASIBLE DUE TO SITE CONSTRAINTS, ALL AREAS DESIGNATED FOR INFILTRATION AND VEGETATION CONTROL MEASURES MUST BE LOOSENED PRIOR TO INSTALLATION OF THE CONTROL MEASURE(S).
12. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF-SITE.
13. CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO ENTER STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUTS SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY, CREEK OR STREAM.
14. DURING DEWATERING OPERATIONS, UNCONTAMINATED GROUNDWATER MAY BE DISCHARGED ON-SITE, BUT SHALL NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF UNLESS AN APPROVED STATE DEWATERING PERMIT IS IN PLACE.
15. EROSION CONTROL BLANKETING OR OTHER PROTECTIVE COVERING SHALL BE USED ON SLOPES STEEPER THAN 3:1.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
17. WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. CONTROL MEASURES MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
18. TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF-SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
19. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, SOIL, AND SAND THAT MAY ACCUMULATE IN ROADS, STORM DRAINS AND OTHER DRAINAGE CONVEYANCE SYSTEMS AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
20. THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.
21. NO CHEMICAL(S) HAVING THE POTENTIAL TO BE RELEASED IN STORMWATER ARE TO BE STORED OR USED ON-SITE UNLESS PERMISSION FOR THE USE OF SUCH CHEMICAL(S) IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING APPROVAL FOR THE USE OF SUCH CHEMICAL(S), SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
22. BULK STORAGE OF ALLOWED PETROLEUM PRODUCTS OR OTHER ALLOWED LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL REQUIRE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS ON-SITE AND TO PREVENT ANY SPILLED MATERIALS FROM ENTERING STATE WATERS, ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR OTHER FACILITIES.
23. NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE CURB AND GUTTER OR DITCH EXCEPT WITH APPROVED SEDIMENT CONTROL MEASURES.
24. OWNER/DEVELOPER AND THEIR AGENTS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS), AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS OF THE LAND DEVELOPMENT CODE, DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (1041, NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND OTHER LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, LOCAL, OR COUNTY AGENCIES, THE MOST RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
25. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE ONLY AT APPROVED CONSTRUCTION ACCESS POINTS.
26. PRIOR TO CONSTRUCTION THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
27. A WATER SOURCE SHALL BE AVAILABLE ON-SITE DURING EARTHWORK OPERATIONS AND SHALL BE UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
28. THE SOILS REPORT FOR THIS SITE HAS BEEN PREPARED BY [GROUND ENGINEERING, 03-29-2023] AND SHALL BE CONSIDERED A PART OF THESE PLANS.
29. AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB ONE (1) ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THIS GRADING AND EROSION CONTROL PLAN MAY BE A PART. FOR INFORMATION OR APPLICATION MATERIALS CONTACT:
    COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
    WATER QUALITY CONTROL DIVISION
    WQCD – PERMITS
    4300 CHERRY CREEK DRIVE SOUTH
    DENVER, CO 80246-1530
    ATTN: PERMITS UNIT

PCD FILE NO. PPR2329

NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

NO.	DATE	NOTES
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
COVER SHEET

SHEET
EC1.0

I:\2023\23009 - The Rock Commerce Center\CADD\Sheet Sets\GEC\The Rock\23009_Cover Sheet.dwg tabs: 1 OF 24 COVER SHEET Nov 20, 2023 - 7:34pm csatz

ENGINEER'S NOTES

1. PROJECT CONTROL/BENCHMARK:

   PRIMARY PROJECT BENCHMARK:

   NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF I-25.

   NAVD88. ELEV = 7111.32'

   ALL ELEVATIONS SHOWN ON THESE PLANS ARE REFERENCED TO THE PROJECT BENCHMARK. HORIZONTAL CONTROL, INCLUDING THE BASIS OF BEARING, SHALL BE IN ACCORDANCE WITH THE FINAL SUBDIVISION PLAT FOR THIS PROJECT.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING THE PROJECT BENCHMARK AND OTHER SURVEY MONUMENTS AND SHALL HAVE A REGISTERED LAND SURVEYOR TIE OUT AND RESET ANY PROPERTY CORNERS OR SECTION CORNERS PLANNED TO BE DISTURBED BY CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ANY INADVERTENTLY DISTURBED OR DAMAGED MONUMENTS AND SHALL HAVE THEM REESTABLISHED AND REPLACED BY A REGISTERED LAND SURVEYOR.
3. THE CONTRACTOR SHALL COMPLY, AND PERFORM WORK IN ACCORDANCE, WITH THE REQUIREMENTS OF THE GEOTECHNICAL (SOILS) REPORT(S) PREPARED FOR THIS PROJECT. GEOTECHNICAL INFORMATION FOR THIS PROJECT IS BASED ON THE REPORT (PRELIMINARY GEOTECHNICAL EVALUATION, MARCH 29, 2023, BY GROUND ENGINEERING). IN THE EVENT OF A DISCREPANCY BETWEEN THE GEOTECHNICAL REQUIREMENTS AND JURISDICTIONAL REQUIREMENTS, THE MORE STRINGENT REQUIREMENT SHALL BE FOLLOWED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND GEOTECHNICAL ENGINEER IN THE EVENT THAT A DISCREPANCY OCCURS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE SERVICES OF A QUALIFIED TESTING LABORATORY TO PERFORM ALL COMPACTION TESTING, ASPHALT TESTING, CONCRETE TESTING, AND ANY OTHER TESTING AS MAY BE REQUIRED TO COMPLETE THE WORK. TESTING RESULTS MUST BE SUBMITTED FOR ALL PHASES OF THIS PROJECT PER THE APPLICABLE GOVERNING AGENCIES REQUIREMENTS.
5. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE (1) SET OF "REDLINED" PRINTS OF THE CONSTRUCTION PLANS. THE "REDLINED" PRINTS SHALL BE KEPT CURRENT TO ACCURATELY REPRESENT THE DIMENSIONS AND LOCATIONS OF ALL WORK PERFORMED BY THE CONTRACTOR. THE CONTRACTOR MUST PRESENT THE "REDLINED" PRINTS TO THE ENGINEER (REDLAND) TIMELY UPON COMPLETION OF EACH PHASE OF THE WORK.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF ANY PROBLEMS OR POTENTIAL PROBLEMS IN CONFORMING TO THE DESIGN LINE AND GRADE FOR ANY ELEMENT OF THE CONSTRUCTION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF SITE CONDITIONS THAT DIFFER FROM THOSE SHOWN ON THE APPROVED PLANS.
7. IN THE EVENT THE CONTRACTOR ALLOWS, AUTHORIZES, APPROVES OR CONSTRUCTS ITEMS THAT DIFFER FROM THE APPROVED PLANS, SPECIFICATIONS OR OTHER CONTRACT DOCUMENTS, WITHOUT WRITTEN APPROVAL BY THE ENGINEER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LIABILITY ARISING FROM SUCH CHANGES.
8. THE CONTRACTOR SHALL PERFORM ALL WORK ACCORDING TO ALL CITY, COUNTY, STATE AND FEDERAL SAFETY AND HEALTH REGULATIONS. IN PARTICULAR, THE TRENCHING AND OPEN EXCAVATION OPERATIONS SHALL COMPLY WITH ALL CURRENT O.S.H.A. REGULATORY REQUIREMENTS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, AND ANY OTHER NEEDED ACTION TO PROTECT THE LIFE, HEALTH AND SAFETY OF THE PUBLIC AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE JOB SITE CONDITIONS THROUGHOUT THE DURATION OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROTECTION OF PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED ONLY TO WORKING HOURS. THE CONTRACTOR SHALL DEFEND INDEMNIFY AND HOLD THE OWNER, THE ENGINEER AND THE GOVERNING JURISDICTION HARMLESS FOR ANY AND ALL LIABILITY, IN CONNECTION WITH THE PERFORMANCE OF WORK, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER OR THE GOVERNING JURISDICTION.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE, PASSABLE ACCESS TO PRIVATE PROPERTIES ADJACENT TO THE WORK THROUGHOUT THE PERIOD OF CONSTRUCTION.
12. THE TYPE, SIZE, LOCATION, AND NUMBER OF UNDERGROUND UTILITIES ARE APPROXIMATE WHERE SHOWN ON THE PLANS AND WERE TAKEN FROM RECORDS OF THE CONTROLLING AGENCIES AND/OR FROM MARKINGS IN THE FIELD BY AN AGENCY AND/OR UTILITY LOCATING CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR COMPLETENESS OR ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK AND PARTICIPATE IN THE RESOLUTION OF ANY CONFLICTS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
13. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO FOR THE LOCATION OF UNDERGROUND GAS, ELECTRIC AND COMMUNICATION UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION (CALL 811 OR 1-800-922-1987). THE CONTRACTOR SHALL ALSO NOTIFY OTHER APPLICABLE UTILITY COMPANIES TO OBTAIN FIELD LOCATES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

ENGINEER'S NOTES (CONTD)

14. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES TO COORDINATE SCHEDULES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY RELOCATIONS WITH THE APPROPRIATE UTILITY COMPANY.
15. TEMPORARY EROSION CONTROL MEASURES SHALL BE PROVIDED BY THE CONTRACTOR DURING CONSTRUCTION AS IDENTIFIED IN THE EROSION CONTROL AND/OR STORMWATER MANAGEMENT PLANS. MAINTENANCE OF ONSITE DRAINAGE AND EROSION CONTROL FACILITIES DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE REMOVAL OF TEMPORARY EROSION CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. HOWEVER, REMOVALS SHALL NOT OCCUR UNTIL THE GOVERNING JURISDICTION HAS GIVEN APPROVAL TO REMOVE ANY OF THE MEASURES.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING NEARBY PUBLIC OR PRIVATE STREETS OF MUD AND DEBRIS, DUE TO CONSTRUCTION ACTIVITIES, ON A DAILY BASIS OR AS DIRECTED BY GOVERNING JURISDICTION PERSONNEL.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED EXISTING IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO, PAVEMENT, CURB AND GUTTER, SIDEWALK, LANDSCAPING, IRRIGATION, SIGNAGE, STRIPING, AND UTILITIES.
18. ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH THE STATE OF COLORADO PERMITTING PROCESS FOR "STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY." FOR INFORMATION, CONTACT THE COLORADO DEPARTMENT OF HEALTH, WATER QUALITY CONTROL DIVISION, WQCD-PE-B2, 4300 CHERRY DRIVE SOUTH, DENVER, COLORADO, 80246-1530, ATTENTION: PERMITS AND ENFORCEMENT SECTION. PHONE (303) 692-3590.
19. IF DEWATERING IS TO BE USED TO INSTALL UTILITIES OR CONSTRUCT IMPROVEMENTS, A STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT IS REQUIRED IF DISCHARGE IS INTO A STORM SEWER, CHANNEL, IRRIGATION DITCH, OR ANY WATERS OF THE UNITED STATES.
20. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION AT ALL TIMES THE APPROPRIATE EDITION OF THE GOVERNING JURISDICTION DESIGN AND CONSTRUCTION STANDARDS, ONE SET OF APPROVED CONSTRUCTION PLANS, THE STORMWATER MANAGEMENT PLAN, AND ALL REQUIRED PERMITS.
21. ALL STREET, SANITARY SEWER, STORM SEWER AND WATERLINE CONSTRUCTION SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE APPLICABLE GOVERNING LOCAL AGENCY CURRENT AT THE DATE OF CONSTRUCTION PLAN APPROVAL. FOR ELEMENTS OF WORK NOT COVERED BY LOCAL AGENCY STANDARDS AND SPECIFICATIONS, ALL CONSTRUCTION SHALL CONFORM TO THE APPROPRIATE EDITION OF THE STANDARDS AND SPECIFICATIONS OF THE COLORADO DEPARTMENT OF TRANSPORTATION, THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT, AND INDUSTRY STANDARDS AS APPLICABLE. REQUIREMENTS OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, THE ENVIRONMENTAL PROTECTION AGENCY AND THE U.S. ARMY CORPS OF ENGINEERS, SHALL ALSO BE FOLLOWED AS THEY RELATE TO THE WORK.
22. THE CONTRACTOR SHALL PROVIDE AND IMPLEMENT A "TRAFFIC CONTROL PLAN" RELATED TO ALL CONSTRUCTION ACTIVITIES FOR THIS PROJECT. ALL TRAFFIC CONTROL DEVICES, STRIPING, AND SIGNING SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
23. ALL STATIONING IS ON CENTERLINE UNLESS OTHERWISE NOTED. CENTERLINE, RIGHTS-OF-WAY (R.O.W.), PROPERTY LINE, AND EASEMENT DIMENSIONS ARE FOR REFERENCE ONLY. REFER TO THE FINAL SUBDIVISION PLAT FOR PROJECT HORIZONTAL CONTROL.
24. ALL ELEVATIONS IN PLAN VIEW ARE ALONG FLOWLINE UNLESS OTHERWISE NOTED. WHERE SHOWN, 'TC' REPRESENTS TOP-OF-CURB ELEVATION ALONG CURB AND GUTTER OR BACK-OF-WALK ELEVATION ALONG COMBINATION CURB, GUTTER AND WALK.
25. CROSS PANS ARE 8-FEET IN WIDTH UNLESS OTHERWISE NOTED.
26. WATER MAIN LENGTHS ARE FROM CENTER OF FITTING (EXCLUDING GATE VALVES) TO CENTER OF FITTING UNLESS OTHERWISE NOTED.
27. STORM AND SANITARY SEWER MAIN LENGTHS ARE FROM CENTER OF STRUCTURE/MANHOLE TO CENTER OF STRUCTURE/MANHOLE. SANITARY SEWER AND STORM SEWER MANHOLES ARE 4-FOOT DIAMETER UNLESS OTHERWISE NOTED.
28. STORM INLET STATIONING/OFFSET REFERENCE IS AT THE INTERSECTION OF FLOWLINE AND THE CENTER OF STRUCTURE.
29. STORM INLETS LOCATED ALONG CURB SHALL BE CONSTRUCTED WITH TOP OF BOX AT SAME GRADE AS EXTENDED TOP-OF-CURB GRADE, UNLESS OTHERWISE NOTED.
30. THE CLIENT, CONTRACTOR AND SUBCONTRACTOR SHOULD IMMEDIATELY NOTIFY THE CONSULTANT OF ANY CONDITIONS OF THE PROJECT THAT THEY BELIEVE DO NOT COMPLY WITH THE CURRENT STATE OF THE ADA AND/OR FHAA.

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SECTION LINE
- ROAD CENTERLINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- WATER LINE
- RAW WATER LINE
- NON-POTABLE WATER LINE
- IRRIGATION LINE
- SANITARY SEWER
- STORM SEWER
- ELECTRIC LINE
- GAS LINE
- TELEPHONE LINE
- FIBER OPTICS LINE
- OVERHEAD ELECTRIC LINE
- CABLE TELEVISION
- CONTOUR MAJOR
- CONTOUR MINOR
- 100YR FLOOD PLAIN
- FEMA FLOOD PLAIN
- FLOOD HAZARD AREA DELINEATION
- WATERS OF THE U.S.

PROPOSED LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- SETBACK
- EASEMENT
- ROAD CENTERLINE
- CURB AND GUTTER (CATCH)
- CURB AND GUTTER (SPILL)
- SIDEWALK
- STORM SEWER
- SANITARY SEWER
- TRENCH DRAIN
- WATER LINE
- IRRIGATION LINE
- NONPOTABLE WATER LINE
- RAW WATER LINE
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- WATER BEND
- WATER CROSS
- WATER TEE
- WATER REDUCER
- WATER VALVE
- FIRE HYDRANT
- PLUG/CAP
- SANITARY SEWER SERVICE (* INDICATES NON-TYPICAL LOCATION)
- WATER SERVICE (* INDICATES NON-TYPICAL LOCATION)
- UTILITY CROSSING
- UNDERDRAIN w/ SIZE (IN.)
- RETAINING WALL
- CONTOUR MAJOR
- CONTOUR MINOR
- SPOT ELEVATION
- SLOPE ARROW (4:1 MAX UNLESS NOTED OTHERWISE)
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- LOT TYPE
- LINE OF SIGHT
- OVER FLOW ARROW
- DEMOLITION

ABBREVIATIONS

ABC	AGGREGATE BASE COARSE
ARV	AIR RELEASE VALVE
BB MH	BOX BASE MANHOLE
BC	BUILDING CORNER
BFE	BASEMENT FLOOR ELEVATION
B.O.P.	BOTTOM OF PIPE (ELEVATION)
BW	BOTTOM OF WALL
CATV	CABLE TELEVISION
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
D.E.	DRAINAGE EASEMENT
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	DOMESTIC WATER
E	EAST
EC	END CURVE RETURN
EG	EXISTING GRADE/GROUND
ELEC	ELECTRIC OR ELECTRICAL
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX.	EXISTING
FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FL	FLOWLINE
FM	FORCE MAIN
FO	FIBER OPTIC
G.E.	GAS EASEMENT
GB	GRADE BREAK
GFE	GARAGE FINISH FLOOR
GM	GAS METER
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HP	HIGH POINT
IBV	INLINE BUTTERFLY VALVE
INV	INVERT (ELEVATION)
IRR	IRRIGATION
L	LEFT
LF	LINEAR FEET/FOOT
LP	LOW POINT
MAX	MAXIMUM
ME	MATCH EXISTING
MH	MANHOLE
MIN	MINIMUM
N	NORTH
PC	POINT ON CURVE
PCC	POINT OF COMPOUND CURVE
PCR	POINT OF CURVE RETURN
PL	PROPERTY LINE
PRC	POINT OF REVERSE CURVE
PROP.	PROPOSED
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE PIPE
R	RADIUS OR RIGHT
R.O.W.	RIGHT OF WAY
RCP	REINFORCED CONCRETE PIPE
S	SOUTH
S.D.M.E.	SIDEWALK, DRAINAGE, AND MAINTENANCE EASEMENT
S.M.E.	SIDEWALK AND MAINTENANCE EASEMENT
S.W.E.	SIDEWALK EASEMENT
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STM	STORMWATER
STM MH	STORMWATER MANHOLE
TBC	TOP BACK OF CURB
TBW	TOP BACK OF WALK
TC	TOP OF CURB
TOF	TOP OF FOUNDATION
T.O.P.	TOP OF PIPE (ELEVATION)
TW	TOP OF WALL
TYP	TYPICAL
U.E.	UTILITY EASEMENT
VC	VERTICAL CURVE
W	WEST
WL	WATERLINE
WM	WATER METER
WV	WATER VALVE

MASTER REVISION / TRACKING TABULATION

NUMBER	DATE	DESCRIPTION	SHEETS REVISED
1	7/28/2023	1ST SUBMITTAL	ALL
2	10/20/2023	2ND SUBMITTAL	ALL
3	11/17/2023	3RD SUBMITTAL	ALL

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▪ Civil Engineering ▪ Construction Management

NOT FOR CONSTRUCTION

NOTES	NO.	DATE

PROJECT NO.	23009	NOTES
DATE	NO.	
07/28/2023	1	1ST SUBMITTAL
10/20/2023	2	2ND SUBMITTAL
11/17/2023	3	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS

REDLAND GENERAL NOTES

SHEET

EC1.1

PALMER RIDGE HIGH SCHOOL

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

EX. PROPERTY LINE

TIERED RETAINING WALL

20' PROPOSED WATER EASEMENT

SD MH18, 5' DIA MH
18" RCP SD

SD MH17, 5' DIA MH
18" RCP SD

SD MH16, 5' DIA MH
18" RCP SD

SD MH15, 5' DIA MH
24" RCP SD

SD MH14, 5' DIA MH
24" RCP SD

SD MH13, 5' DIA MH
24" RCP SD

SD MH12, 5' DIA MH
18" RCP SD

SD IN10, 5' TYPE R INLET

SD MH19, 5' DIA MH
18" RCP SD

SD MH20, 5' DIA MH
18" RCP SD

SD IN6, TYPE 13 INLET

SD MH21, 5' DIA MH
18" RCP SD

SD IN5, TYPE 13 INLET

SD IN7, DOUBLE TYPE 13 INLET

SD IN8, TYPE 13 INLET

SD IN9, TRIPLE TYPE 13 INLET

SD IN1, TRIPLE TYPE 13 INLET

SD IN2, TRIPLE TYPE 13 INLET

SD MH10, 5' DIA MH
18" RCP SD

SD MH9, 5' DIA MH
18" RCP SD

PROPOSED 6" FIRE HYDRANT

10' DRAINAGE PAN

2' DRAINAGE PAN

PROPOSED TYPE 1 CURB RAMP

PROPOSED ACCESSIBLE ROUTE

PROPOSED 2' CONCRETE DRAINAGE PAN

RETAINING WALL

TYPE VL RIPRAP
5' x 3' x 6"

SDFES 1-1
18" FES

SDFES 1-2
18" FES

19165 MONUMENT HILL ROAD

PROPOSED BUILDING
164,166 S.F.

MONUMENT HILL ROAD

EX. PROPERTY / R.O.W. LINE

PROPOSED DRAINAGE EASEMENT

MATCHLINE - SEE SHEET NO. EC2.2

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000027

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 7113030004

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

STORM FES
INV OUT 18" RCP (W) = 7166.6

STORM MANHOLE
RIM = 7169.7
INV OUT 30" RCP (W) = 7165.1
INV IN 24" RCP (N) = 7165.2
INV IN 18" RCP (E) = 7165.3

STORM INLET
RIM = 7169.0
INV OUT 42" RCP (W) = 7163.0
INV IN 30" RCP (E) = 7163.3
INV IN 18" RCP (NE) = 7163.4

STORM MANHOLE
RIM = 7169.8
INV OUT 18" RCP (SW) = 7164.2
INV IN 18" RCP (N) = 7164.3

STORM MANHOLE
RIM = 7171.3
INV OUT 18" RCP (S) = 7165.8
INV IN 18" RCP (N) = 7165.9

STORM MANHOLE
RIM = 7171.2
INV OUT 24" RCP (S) = 7165.9
INV IN 24" RCP (E) = 7165.9

EX. 18" RCP SD

PROPOSED LEGEND

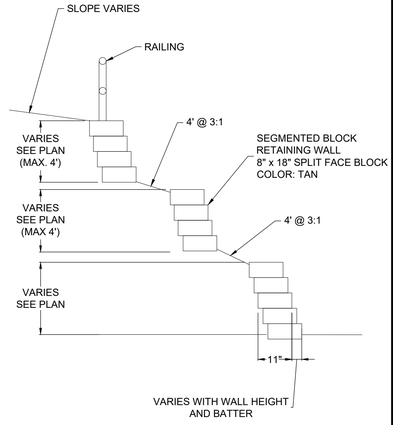
- EASEMENT
- CURB AND GUTTER
- FIRE HYDRANT
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- STORM SEWER
- TRENCH DRAIN
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- RETAINING WALL
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR
- 81.73 SPOT ELEVATION
- SLOPE ARROW (4:1 MAX UNLESS NOTED OTHERWISE)

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SETBACK
- SECTION LINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- STORM SEWER
- GAS LINE
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR

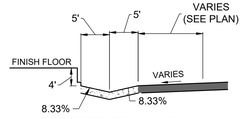
NOTE:

1. THE PARTIES RESPONSIBLE FOR THIS PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATION AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF THIS PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OF GUIDELINES ENACTED OF PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.
2. REGIONAL BUILDING DEPARTMENT PERMIT REQUIRED FOR ALL RETAINING WALLS GREATER THAN OR EQUAL TO 4 FT IN HEIGHT.
3. SEE SITE DEVELOPMENT PLAN FOR SCREENING WALL DETAILS BY ARCH.
4. NO BATCH PLANTS WILL BE UTILIZED ONSITE.

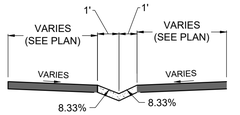


TYPICAL MODULAR BLOCK WALL DETAIL
NOT TO SCALE

NOTE: RETAINING WALL WILL REQUIRE A SEPARATE BUILDING PERMIT



10' CONCRETE DRAIANGE PAN
N.T.S.



2' CONCRETE DRAIANGE PAN
N.T.S.

PCD FILE NO. PPR2329

N

0 15 30 60
SCALE: 1" = 30'

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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

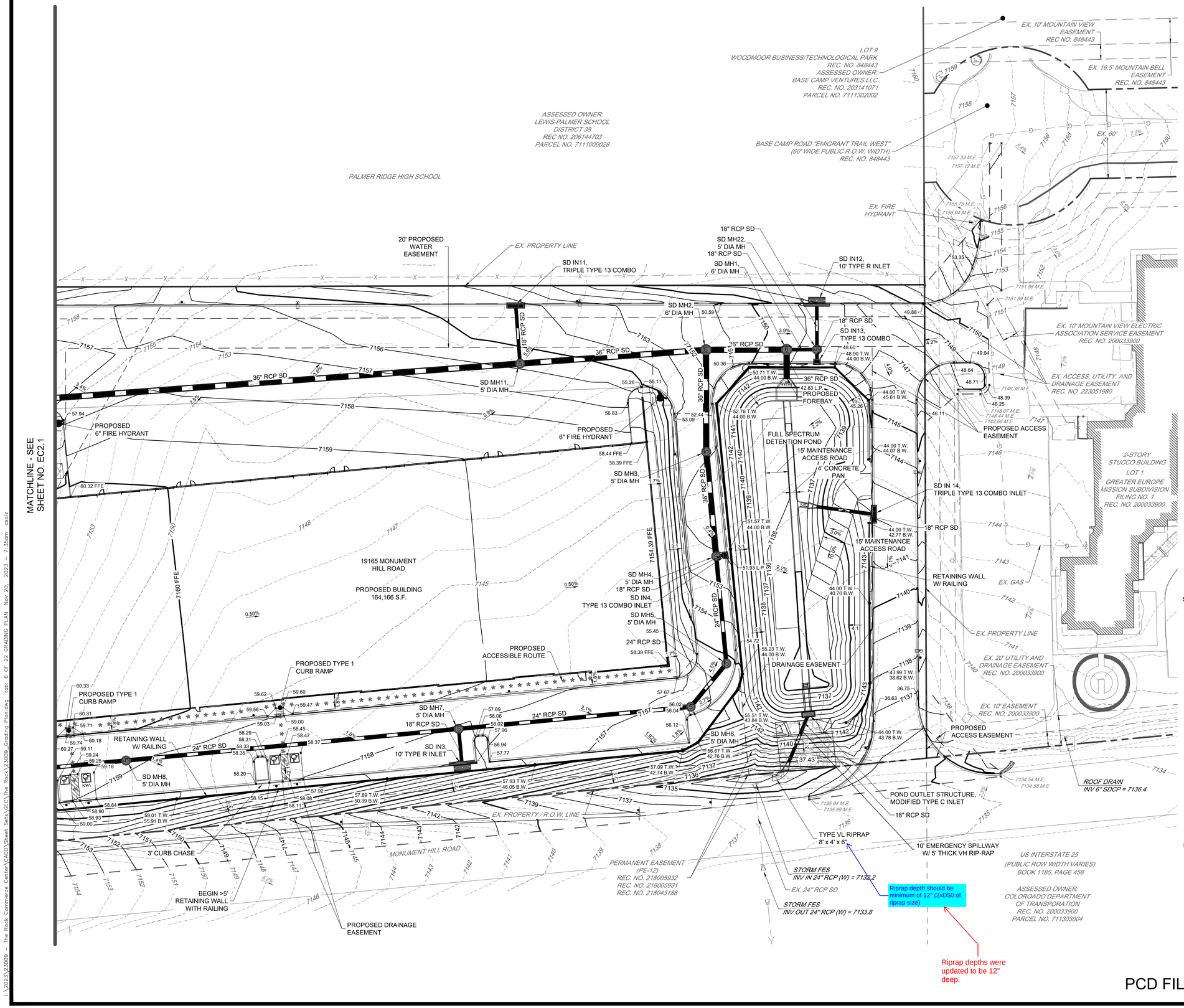
NO	DATE	NOTES
1	07/26/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
GRADING PLAN

SHEET
EC2.1

I:\2023\23009 – The Rock Commerce Center\CADD\Sheet Sets\GEC\The Rock\23009_Grading Plan.dwg tdb: 5 OF 23 GRADING PLAN Nov 20, 2023 - 7:34am cssiz



PROPOSED LEGEND

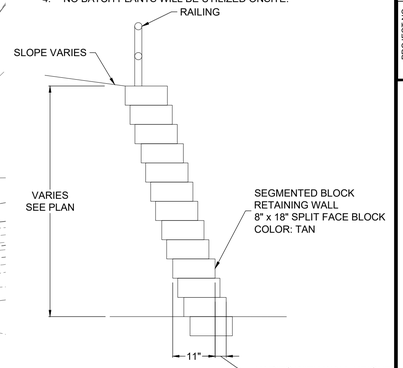
- EASEMENT
- CURB AND GUTTER
- FIRE HYDRANT
- LIMITS OF CONSTRUCTION / SAWCUT
- PEDESTRIAN ACCESSIBLE ROUTE
- STORM SEWER
- TRENCH DRAIN
- MANHOLE w/ DIA. (FT.)
- INLET
- FLARED END SECTION
- RETAINING WALL
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR
- 81.73 SPOT ELEVATION
- SLOPE ARROW (4:1 MAX UNLESS NOTED OTHERWISE)

EXISTING LEGEND

- PROPERTY LINE
- R.O.W.
- LOT LINE
- EASEMENT LINE
- SETBACK
- SECTION LINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- STORM SEWER
- GAS LINE
- 5280 CONTOUR MAJOR
- 5281 CONTOUR MINOR

NOTE:

1. THE PARTIES RESPONSIBLE FOR THIS PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATION AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF THIS PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OF GUIDELINES ENACTED OF PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.
2. REGIONAL BUILDING DEPARTMENT PERMIT REQUIRED FOR ALL RETAINING WALLS GREATER THAN OR EQUAL TO 4 FT IN HEIGHT.
3. SEE SITE DEVELOPMENT PLAN FOR SCREENING WALL DETAILS BY ARCH.
4. NO BATCH PLANTS WILL BE UTILIZED ONSITE.



TYPICAL MODULAR BLOCK WALL DETAIL

NOT TO SCALE

NOTE: RETAINING WALL WILL REQUIRE A SEPARATE BUILDING PERMIT

PCD FILE NO. PPR2329

SCALE: 1" = 30'

15 YEARS Redland
WHERE GREAT PLACES BEGIN
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▪ Civil Engineering ▪ Construction Management
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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO.	23009	NOTES
NO.	DATE	
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS

GRADING PLAN

SHEET

EC2.2

MATCHLINE - SEE BELOW RIGHT SIDE

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

PALMER RIDGE HIGH SCHOOL

EX. PROPERTY LINE

CF INITIAL 3125 LF

LOC

SF INITIAL 365 LF

CF INITIAL

LOC

DD INITIAL 400 LF

TRIBUTARY AREA: 2.15 ACRES
VOLUME: 0.09 ACRE-FT
RISER DIA: 8"
2 COLUMNS OF 1/16" HOLES
1/16" STEEL PLATE

DD INITIAL 220 LF

IP INITIAL

LOC CF INITIAL SF INITIAL

19165 MONUMENT HILL ROAD

MONUMENT HILL ROAD

CWA

VTC INITIAL 2696 SF

SSA

TEMPORARY 8" CMP UNDER VTC

OFFSITE GRADING, TO BE APPROVED BY EL PASO COUNTY

EX. PROPERTY / R.O.W. LINE

STORM FES
INV OUT 18" RCP (W) = 7166.6

EX. 18" RCP SD

STORM MANHOLE
RIM = 7169.7
INV OUT 30" RCP (W) = 7165.1
INV IN 24" RCP (N) = 7165.2
INV IN 18" RCP (E) = 7165.3

STORM MANHOLE
RIM = 7169.8
INV OUT 18" RCP (SW) = 7164.2
INV IN 18" RCP (N) = 7164.3

STORM MANHOLE
RIM = 7171.3
INV OUT 18" RCP (S) = 7165.8
INV IN 18" RCP (N) = 7165.9

STORM MANHOLE
RIM = 7171.2
INV OUT 24" RCP (S) = 7165.9
INV IN 24" RCP (E) = 7165.9

STORM INLET
RIM = 7169.0
INV OUT 42" RCP (W) = 7163.0
INV IN 30" RCP (E) = 7163.3
INV IN 18" RCP (NE) = 7163.4

EX. 42" RCP SD

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 711303004

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000027

PALMER RIDGE HIGH SCHOOL

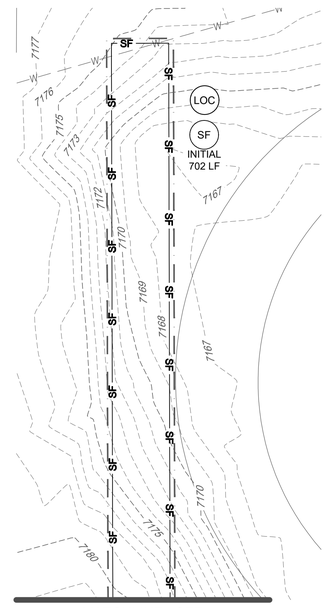
EX. PROPERTY LINE

LEGEND

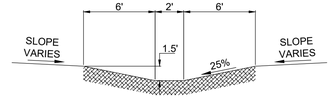
- CWA — CONCRETE WASHOUT AREA
- CF — CONSTRUCTION FENCE
- DD — DIVERSION DITCH
- IP — INLET PROTECTION
- OP — OUTLET PROTECTION
- SB — SEDIMENT BASIN
- SF — SILT FENCE
- SCL — SEDIMENT CONTROL LOG
- SSA — STABILIZED STAGING AREA
- VTC — VEHICLE TRACKING CONTROL
- ECB — EROSION CONTROL BLANKET
- LOC — LIMITS OF CONSTRUCTION
- ST — SEDIMENT TRAP
- FLOW ARROW
- CS — CURB SOCK
- SM — SEEDING AND MULCHING
- REMOVE INDICATED BMP
- AREA OF CUT
- AREA OF FILL

12.3 ACRES DISTURBED

MATCHLINE - SEE SHEET NO. EC3.2



MATCHLINE - SEE ABOVE EAST SIDE OF SITE



TYP. DIVERSION DITCH CROSS SECTIN
N.T.S.

PCD FILE NO. PPR2329

N

0 15 30 60
SCALE: 1" = 30'

15 YEARS Redland
WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO	23009	
NO	DATE	
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
INITIAL EROSION CONTROL PLAN

SHEET
EC3.1

D:\2023\23009 - The Rock Commerce Center\CADD\Sheet Sets\GEC\The Rock\23009_Initial Erosion Control Plan.dwg, tobi 7 OF 24 INITIAL EROSION CONTROL PLAN Nov 20, 2023 - 7:35pm csatz

MATCHLINE - SEE SHEET NO. EC3.1

PALMER RIDGE HIGH SCHOOL
ASSESSED OWNER: LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

LOT 9
WOODMOOR BUSINESS/TECHNOLOGICAL PARK
REC. NO. 848443
ASSESSED OWNER: BASE CAMP VENTURES LLC
REC. NO. 203141071
PARCEL NO. 7111302002

BASE CAMP ROAD "EMIGRANT TRAIL WEST" (60' WIDE PUBLIC R.O.W. WIDTH)
REC. NO. 848443

EX. 10' MOUNTAIN VIEW EASEMENT
REC NO. 848443

EX. 16.5' MOUNTAIN BELL EASEMENT
REC. NO. 848443

EX. 60'

EX. FIRE HYDRANT

EX. ACCESS, UTILITY & DRAINAGE EASEMENT
REC. NO. 223051980

EX. PROPERTY LINE

EX. 10' MOUNTAIN VIEW ELECTRIC ASSOCIATION SERVICE EASEMENT
REC. NO. 200033900

CF
INITIAL
3,125 LF

LOC

OFFSITE GRADING, TO BE APPROVED BY PROPERTY OWNER

19165 MONUMENT HILL ROAD

STANDARD
TRIBUTARY AREA: 9.3ACRES
VOLUME: 0.38 ACRE-FT
RISER DIA: 8"
3 COLUMNS OF ½" HOLES
⅜" STEEL PLATE

DD
INITIAL
170 LF

DD
INITIAL
235 LF

PERMANENT EASEMENT (PE-12)
REC. NO. 218005932
REC. NO. 218005931
REC. NO. 218043186

OFFSITE GRADING, TO BE APPROVED BY EL PASO COUNTY

IP
INITIAL

STORM FES
INV IN 24" RCP (W) = 7132.2

EX. 24" RCP SD

OP
INITIAL

STORM FES
INV OUT 24" RCP (W) = 7133.8

EX. PROPERTY / R.O.W. LINE

MONUMENT HILL ROAD

2-STORY STUCCO BUILDING
LOT 1
GREATER EUROPE MISSION SUBDIVISION FILING NO. 1
REC. NO. 200033900

EX. GAS

EX. PROPERTY LINE

EX. 20' UTILITY AND DRAINAGE EASEMENT
REC. NO. 200033900

EX. 10' EASEMENT
REC. NO. 200033900

ROOF DRAIN
INV 6" SDCP = 7136.4

OFFSITE GRADING, TO BE APPROVED BY PROPERTY OWNER

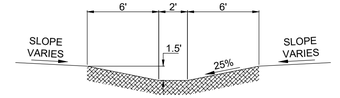
US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

ASSESSED OWNER: COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 711303004

LEGEND

CWA	CONCRETE WASHOUT AREA
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
IP	INLET PROTECTION
OP	OUTLET PROTECTION
SB	SEDIMENT BASIN
SF	SILT FENCE
SCL	SEDIMENT CONTROL LOG
SSA	STABILIZED STAGING AREA
VTC	VEHICLE TRACKING CONTROL
ECB	EROSION CONTROL BLANKET
LOC	LIMITS OF CONSTRUCTION
ST	SEDIMENT TRAP
	FLOW ARROW
CS	CURB SOCK
SM	SEEDING AND MULCHING
	REMOVE INDICATED BMP
	AREA OF CUT
	AREA OF FILL

12.3 ACRES DISTURBED



TYP. DIVERSION DITCH CROSS SECTIN
N.T.S.

PCD FILE NO. PPR2329

N

0 15 30 60
SCALE: 1" = 30'

15 Redland YEARS
WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO.	23009	
NO.	DATE	NOTES
1	07/26/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS

INITIAL EROSION CONTROL PLAN

SHEET
EC3.2

MATCHLINE - SEE BELOW RIGHT SIDE

MATCHLINE - SEE SHEET NO. EC3.4

MATCHLINE - SEE ABOVE EAST SIDE OF SITE

EX. PROPERTY LINE

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

PALMER RIDGE HIGH SCHOOL

RETAINING WALL
(SEE SHEETS EC2.1 & EC2.2
FOR WALL DETAILS)

ECB INTERIM

SCL INTERIM 2548 LF

SCL INTERIM 697 LF

SCL INTERIM 178 LF

SCL INTERIM 133 LF

SCL INTERIM 155 LF

SCL INITIAL 3125 LF

SCL INTERIM 261 LF

SF INITIAL 365 LF

SF INITIAL 1400 LF

SF INITIAL 702 LF

CF INITIAL

LOC

LOC INITIAL 2696 SF

ECB INTERIM 965 SF

ECB INTERIM 1726 SF

ECB INTERIM 50,000 SF

CWA INTERIM

OP INTERIM

IP INTERIM

SD MH9, 5' DIA MH

SD MH10, 5' DIA MH

SD MH12, 5' DIA MH

SD MH13, 5' DIA MH

SD MH14, 5' DIA MH

SD MH15, 5' DIA MH

SD MH16, 5' DIA MH

SD MH17, 5' DIA MH

SD MH18, 5' DIA MH

SD MH19, 5' DIA MH

SD MH20, 5' DIA MH

SD MH21, 5' DIA MH

18" RCP SD

24" RCP SD

SD IN1, TRIPLE TYPE 13 INLET

SD IN2, TRIPLE TYPE 13 INLET

SD IN5, TYPE 13 INLET

SD IN6, TYPE 13 INLET

SD IN7, DOUBLE TYPE 13 INLET

SD IN8, TYPE 13 INLET

SD IN9, TRIPLE TYPE 13 INLET

SD IN10, 5' TYPE R INLET

SDFES 1-1, 18" FES

SDFES 1-2, 18" FES

TYPE VL RIPRAP 5' x 3' x 6"

20' PROPOSED WATER EASEMENT

PROPOSED DRAINAGE EASEMENT

10' DRAINAGE PAN

2' DRAINAGE PAN

0.50%

2.03%

0.93%

1.00%

19165 MONUMENT HILL ROAD
PROPOSED BUILDING
164,166 S.F.

7164 FFE

7165 FFE

7162 FFE

7161 FFE

TRIBUTARY AREA: 2.15 ACRES
VOLUME: 0.09 ACRE-FT
RISER DIA: 8"
2 COLUMNS OF 1/8" HOLES
1/8" STEEL PLATE

RETAINING WALL

STORM FES
INV OUT 18" RCP (W) = 7166.6

STORM MANHOLE
RIM = 7169.8
INV OUT 18" RCP (SW) = 7164.2
INV IN 18" RCP (N) = 7164.3

STORM MANHOLE
RIM = 7171.3
INV OUT 18" RCP (S) = 7165.8
INV IN 18" RCP (N) = 7165.9

STORM MANHOLE
RIM = 7171.2
INV OUT 24" RCP (S) = 7165.9
INV IN 24" RCP (E) = 7165.9

STORM MANHOLE
RIM = 7169.7
INV OUT 30" RCP (W) = 7165.1
INV IN 24" RCP (N) = 7165.2
INV IN 18" RCP (E) = 7165.3

STORM INLET
RIM = 7169.0
INV OUT 42" RCP (W) = 7163.0
INV IN 30" RCP (E) = 7163.3
INV IN 18" RCP (NE) = 7163.4

EX. 18" RCP SD

EX. 42" RCP SD

EX. PROPERTY / R.O.W. LINE

MONUMENT HILL ROAD

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 711303004

TEMPORARY CMP TO BE REMOVED

10' CONCRETE DRAINAGE PAN
N.T.S.

2' CONCRETE DRAINAGE PAN
N.T.S.

LEGEND

- CWA — CONCRETE WASHOUT AREA
- CF — CONSTRUCTION FENCE
- DD — DIVERSION DITCH
- IP — INLET PROTECTION
- OP — OUTLET PROTECTION
- SB — SEDIMENT BASIN
- SF — SILT FENCE
- SCL — SEDIMENT CONTROL LOG
- SSA — STABILIZED STAGING AREA
- VTC — VEHICLE TRACKING CONTROL
- ECB — EROSION CONTROL BLANKET
- LOC — LIMITS OF CONSTRUCTION
- ST — SEDIMENT TRAP
- FLOW ARROW
- CS — CURB SOCK
- SM — SEEDING AND MULCHING
- REMOVE INDICATED BMP
- AREA OF CUT
- AREA OF FILL

PCD FILE NO. PPR2329

SCALE: 1" = 30'

15 Redland
YEARS
WHERE GREAT PLACES BEGIN
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PROJECT NO.	23009	NOTES
DATE	NO.	
07/28/2023	1	1ST SUBMITTAL
10/20/2023	2	2ND SUBMITTAL
11/17/2023	3	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
INTERIM EROSION CONTROL PLAN

SHEET
EC3.3

L:\2023\23009 – The Rock Commerce Center\CADD\Sheet Sets\CEC\The Rock\23009_Interim Erosion Control Plan.dwg, Lab: 9 OF 24 INTERIM EROSION CONTROL PLAN, Nov 20, 2023 – 7:35pm, cssz

This pond was assigned the name Pond A and it was updated on all plans and the report.

Assign a name/number to all PBMPs and then update all submitted text and drawings accordingly with consistent labeling throughout (example: "Pond A" or "Pond 1").

Riprap depth should be minimum of 12" (2xD50 of riprap size)

Riprap depths were upaded to be 12" deep.

MATCHLINE - SEE SHEET NO. EC3.3

PALMER RIDGE HIGH SCHOOL

ASSESSED OWNER: LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

LOT 9
WOODMOOR BUSINESS/TECHNOLOGICAL PARK
REC. NO. 848443
ASSESSED OWNER:
BASE CAMP VENTURES LLC
REC. NO. 203141071
PARCEL NO. 7111302002

BASE CAMP ROAD "EMIGRANT TRAIL WEST"
(60' WIDE PUBLIC R.O.W. WIDTH)
REC. NO. 848443

EX. 10' MOUNTAIN VIEW EASEMENT
REC NO. 848443

EX. 16.5' MOUNTAIN BELL EASEMENT
REC. NO. 848443

EX. 60'

EX. FIRE HYDRANT

EX. PROPERTY LINE

SD IN11,
TRIPLE TYPE 13 COMBO

CF
INITIAL
3,125 LF

LOC

SD IN13,
TYPE 13 COMBO
18" RCP SD

SD IN12,
10' TYPE R INLET
18" RCP SD

SCL
INTERIM
2615 LF

IP
INTERIM

18" RCP SD

SD MH1,
6' DIA MH

SD MH2,
6' DIA MH

36" RCP SD

20' PROPOSED WATER EASEMENT

SD MH11,
5' DIA MH

PROPOSED FOREBAY

FULL SPECTRUM DETENTION POND

SCL
INTERIM
1313 LF

RETAINING WALL
(SEE SHEETS EC2.1 & EC2.2
FOR WALL DETAILS)

4' CONCRETE PAN

SCL
INTERIM
515 LF

SD MH3,
5' DIA MH

36" RCP SD

OP
INTERIM

IP
INTERIM

SD IN 14,
TRIPLE TYPE 13 COMBO INLET

18" RCP SD

DD
INITIAL
170 LF
15' MAINTENANCE ACCESS ROAD

15' MAINTENANCE ACCESS ROAD

PROPOSED ACCESS EASEMENT

SCL
INTERIM
330 LF

2-STORY STUCCO BUILDING
LOT 1
GREATER EUROPE MISSION SUBDIVISION FILING NO. 1
REC. NO. 200033900

EX. 10' MOUNTAIN VIEW ELECTRIC ASSOCIATION SERVICE EASEMENT
REC. NO. 200033900

EX. ACCESS, UTILITY & DRAINAGE EASEMENT
REC. NO. 223051980

EX. GAS

EX. 20' UTILITY AND DRAINAGE EASEMENT
REC. NO. 200033900

EX. 10' EASEMENT
REC. NO. 200033900

PROPOSED ACCESS EASEMENT

ROOF DRAIN
INV 6" SDCP = 7136.4

STANDARD TRIBUTARY AREA:
9.3ACRES
VOLUME: 0.38 ACRE-FT
RISER DIA: 8"
3 COLUMNS OF 1" HOLES
3/8" STEEL PLATE

SD MH4,
5' DIA MH
18" RCP SD

SD IN4,
TYPE 13 COMBO INLET

ECB
INTERIM
2723 SF

SD MH5,
5' DIA MH
24" RCP SD

24" RCP SD

SD MH7,
5' DIA MH
18" RCP SD

SD MH6,
5' DIA MH

SD IN3,
10' TYPE R INLET

RETAINING WALL

ECB
INTERIM
619 SF

SCL
INTERIM
127 LF

SD MH8,
5' DIA MH

ECB
INTERIM
31932 SF

DRAINAGE EASEMENT

PROPOSED ACCESS EASEMENT

TYPE VL RIPRAP
8' x 4' x 6"

STORM FES
INV IN 24" RCP (W) = 7132.2

OP
INITIAL

EX. 24" RCP SD

STORM FES
INV OUT 24" RCP (W) = 7133.8

19165 MONUMENT HILL ROAD

PROPOSED BUILDING
164,166 S.F.

7160 FFE

7159 FFE

EX. PROPERTY / R.O.W. LINE

MONUMENT HILL ROAD

PROPOSED DRAINAGE EASEMENT

PERMANENT EASEMENT (PE-12)
REC. NO. 218005932
REC. NO. 218005931
REC. NO. 218043186

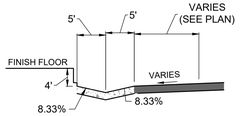
US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 7113003004

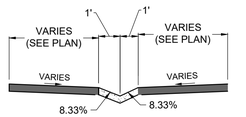
LEGEND

CWA	CONCRETE WASHOUT AREA
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
IP	INLET PROTECTION
OP	OUTLET PROTECTION
SB	SEDIMENT BASIN
SF	SILT FENCE
SCL	SEDIMENT CONTROL LOG
SSA	STABILIZED STAGING AREA
VTC	VEHICLE TRACKING CONTROL
ECB	EROSION CONTROL BLANKET
LOC	LIMITS OF CONSTRUCTION
ST	SEDIMENT TRAP
	FLOW ARROW
CS	CURB SOCK
SM	SEEDING AND MULCHING
	REMOVE INDICATED BMP
	AREA OF CUT
	AREA OF FILL

FULL SPECTRUM POND SUMMARY		
ZONE	VOLUME (AC-FT)	WATER ELEV.
WQCV	0.294	7137.55
EURV	0.675	7140.11
100-YEAR	0.518	7141.64



10' CONCRETE DRAINAGE PAN
N.T.S.



2' CONCRETE DRAINAGE PAN
N.T.S.

PCD FILE NO. PPR2329

SCALE: 1" = 30'

15 YEARS Redland
WHERE GREAT PLACES BEGIN
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▪ Civil Engineering ▪ Construction Management

NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO 23009

NO	DATE	NOTES
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS

INTERIM EROSION CONTROL PLAN

SHEET
EC3.4

MATCHLINE - SEE BELOW RIGHT SIDE

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

EX. PROPERTY LINE

PALMER RIDGE HIGH SCHOOL

RETAINING WALL
(SEE SHEETS EC2.1 & EC2.2
FOR WALL DETAILS)

18" RCP SD
SD MH18,
5' DIA MH

SD MH19,
5' DIA MH

SD MH17,
5' DIA MH

SD MH15,
5' DIA MH

SD MH16,
5' DIA MH

SD MH14,
5' DIA MH

SD MH13,
5' DIA MH

SD MH12,
5' DIA MH
18" RCP SD
SD IN10,
5' TYPE R INLET

24" RCP SD

20' PROPOSED
WATER
EASEMENT

10' DRAINAGE
PAN

SD IN7,
DOUBLE TYPE 13 INLET

SD IN8,
TYPE 13 INLET

SD IN9,
TRIPLE TYPE 13 INLET

SD MH20,
5' DIA MH
18" RCP SD
SD IN6,
TYPE 13 INLET

SD IN5,
TYPE 13 INLET
18" RCP SD
SD MH21,
5' DIA MH

2' DRAINAGE
PAN

19165 MONUMENT
HILL ROAD
PROPOSED BUILDING
164,166 S.F.

7165 FFE
7164 FFE
7162 FFE
7161 FFE

SD MH10,
5' DIA MH

SD MH9,
5' DIA MH

SD IN1,
TRIPLE TYPE 13 INLET

SD IN2,
TRIPLE TYPE 13 INLET

2' DRAINAGE
PAN

RETAINING WALL

FINAL
82191 SF

ECB
FINAL
2923 SF

TYPE VL RIPRAP
5' x 3' x 6"

INITIAL
702 LF

PROPOSED DRAINAGE
EASEMENT

MONUMENT HILL ROAD

SDFES 1-1,
18" FES

SDFES 1-2,
18" FES

2*D50 = 12"

RETAINING WALL
(SEE SHEETS EC2.1 & EC2.2
FOR WALL DETAILS)

EX. 18" RCP SD

EX. PROPERTY / R.O.W. LINE

STORM FES
INV OUT 18" RCP (W) = 7166.6

STORM MANHOLE
RIM = 7169.8
INV OUT 18" RCP (SW) = 7164.2
INV IN 18" RCP (N) = 7164.3

STORM MANHOLE
RIM = 7171.3
INV OUT 18" RCP (S) = 7165.8
INV IN 18" RCP (N) = 7165.9

STORM MANHOLE
RIM = 7171.2
INV OUT 24" RCP (S) = 7165.9
INV IN 24" RCP (E) = 7165.9

STORM MANHOLE
RIM = 7169.7
INV OUT 30" RCP (W) = 7165.1
INV IN 24" RCP (N) = 7165.2
INV IN 18" RCP (E) = 7165.3

STORM INLET
RIM = 7169.0
INV OUT 42" RCP (W) = 7163.0
INV IN 30" RCP (E) = 7163.3
INV IN 18" RCP (NE) = 7163.4

EX. 42" RCP SD

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144707
PARCEL NO. 7111000027

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

ASSESSED OWNER:
COLORADO DEPARTMENT
OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 711303004

10' CONCRETE DRAINAGE PAN
N.T.S.

2' CONCRETE DRAINAGE PAN
N.T.S.

MATCHLINE - SEE
SHEET NO. EC3.6

MATCHLINE - SEE
ABOVE EAST SIDE OF SITE

LEGEND

CWA	CONCRETE WASHOUT AREA
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
IP	INLET PROTECTION
OP	OUTLET PROTECTION
SB	SEDIMENT BASIN
SF	SILT FENCE
SCL	SEDIMENT CONTROL LOG
SSA	STABILIZED STAGING AREA
VTC	VEHICLE TRACKING CONTROL
ECB	EROSION CONTROL BLANKET
LOC	LIMITS OF CONSTRUCTION
ST	SEDIMENT TRAP
	FLOW ARROW
CS	CURB SOCK
SM	SEEDING AND MULCHING
	REMOVE INDICATED BMP

SEEDING AND MULCHING = 124,089 SF
PERMANENT EROSION CONTROL BLANKET = 16,058 SF

PCD FILE NO. PPR2329

SCALE: 1" = 30'

15 Redland YEARS
WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

NO.	DATE	NOTES
1	07/26/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
FINAL EROSION CONTROL PLAN

SHEET
EC3.5

MATCHLINE - SEE SHEET NO. EC3.5

Riprap type and pad size were removed and a 12" splashwall was added to the trickle channel across form O-2. This will serve to dissipate the energy of the flows from O-2 while not allow low flows to undermine the concrete channel.

call out type of riprap and size of pad. provide a detail showing how the riprap pad will tie into the trickle channel without causing erosion or undermining at the interface.

PALMER RIDGE HIGH SCHOOL
ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

LOT 9
WOODMOOR BUSINESS/TECHNOLOGICAL PARK
REC. NO. 848443
ASSESSED OWNER:
BASE CAMP VENTURES LLC
REC. NO. 203141071
PARCEL NO. 7111302002

BASE CAMP ROAD "EMIGRANT TRAIL WEST"
(60' WIDE PUBLIC R.O.W. WIDTH)
REC. NO. 848443

EX. 10' MOUNTAIN VIEW EASEMENT
REC NO. 848443

EX. 16.5' MOUNTAIN BELL EASEMENT
REC. NO. 848443

EX. 60'

EX. FIRE HYDRANT

EX. PROPERTY LINE

EX. 10' MOUNTAIN VIEW ELECTRIC ASSOCIATION SERVICE EASEMENT
REC. NO. 200033900

EX. ACCESS, UTILITY & DRAINAGE EASEMENT
REC. NO. 223051980

PROPOSED ACCESS EASEMENT

2-STORY STUCCO BUILDING
LOT 1
GREATER EUROPE MISSION SUBDIVISION FILING NO. 1
REC. NO. 200033900

EX. GAS

EX. 20' UTILITY AND DRAINAGE EASEMENT
REC. NO. 200033900

EX. 10' EASEMENT
REC. NO. 200033900

PROPOSED ACCESS EASEMENT

ROOF DRAIN
INV 6" SDCP = 7136.4

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 7113003004

EX. PROPERTY / R.O.W. LINE

MONUMENT HILL ROAD

19165 MONUMENT HILL ROAD

PROPOSED BUILDING
164,166 S.F.

7160 FFE

PROPOSED DRAINAGE EASEMENT

PERMANENT EASEMENT (PE-12)
REC. NO. 218005932
REC. NO. 218005931
REC. NO. 218043186

20' PROPOSED WATER EASEMENT

DRAINAGE EASEMENT

SD IN11, TRIPLE TYPE 13 COMBO
SD IN12, 10' TYPE R INLET
SD IN13, TYPE 13 COMBO
SD IN14, TRIPLE TYPE 13 COMBO INLET
SD IN3, 10' TYPE R INLET
SD IN4, TYPE 13 COMBO INLET

SD MH1, 6' DIA MH
SD MH2, 6' DIA MH
SD MH3, 5' DIA MH
SD MH4, 5' DIA MH
SD MH5, 5' DIA MH
SD MH6, 5' DIA MH
SD MH7, 5' DIA MH
SD MH8, 5' DIA MH
SD MH11, 5' DIA MH

18" RCP SD
24" RCP SD
36" RCP SD

INITIAL 3,125 LF
INTERIM 2615 LF
INTERIM 515 LF
INTERIM 330 LF
INITIAL 170 LF
INITIAL 235 LF
INTERIM 2723 SF
INTERIM 619 SF
INTERIM 41622 SF
INITIAL 41607 SF
FINAL 41607 SF
INTERIM 13136 SF
FINAL 13136 SF

PROPOSED FOREBAY
FULL SPECTRUM DETENTION POND
RETAINING WALL (SEE SHEETS EC2.1 & EC2.2 FOR WALL DETAILS)
4' CONCRETE PAN
15' MAINTENANCE ACCESS ROAD

TYPE VL RIPRAP
8' x 4' x 6"

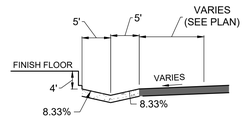
STORM FES
INV IN 24" RCP (W) = 7132.2

STORM FES
INV OUT 24" RCP (W) = 7133.8
EX. 24" RCP SD

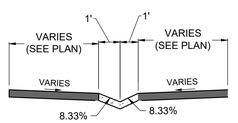
LEGEND

CWA	CONCRETE WASHOUT AREA
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
IP	INLET PROTECTION
OP	OUTLET PROTECTION
SB	SEDIMENT BASIN
SF	SILT FENCE
SCL	SEDIMENT CONTROL LOG
SSA	STABILIZED STAGING AREA
VTC	VEHICLE TRACKING CONTROL
ECB	EROSION CONTROL BLANKET
LOC	LIMITS OF CONSTRUCTION
ST	SEDIMENT TRAP
	FLOW ARROW
CS	CURB SOCK
SM	SEEDING AND MULCHING
	REMOVE INDICATED BMP

FULL SPECTRUM POND SUMMARY		
ZONE	VOLUME (AC-FT)	WATER ELEV.
WQCV	0.294	7137.55
EURV	0.675	7140.11
100-YEAR	0.518	7141.64



10' CONCRETE DRAINAGE PAN
N.T.S.



2' CONCRETE DRAINAGE PAN
N.T.S.

N

0 15 30 60
SCALE: 1" = 30'

PCD FILE NO. PPR2329

15 Redland YEARS WHERE GREAT PLACES BEGIN
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PROJECT NO	23009	
NO	DATE	NOTES
1	07/28/2023	1ST SUBMITTAL
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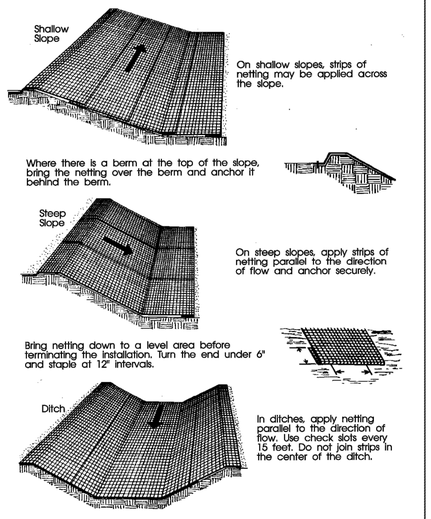
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
FINAL EROSION CONTROL PLAN

SHEET
EC3.6

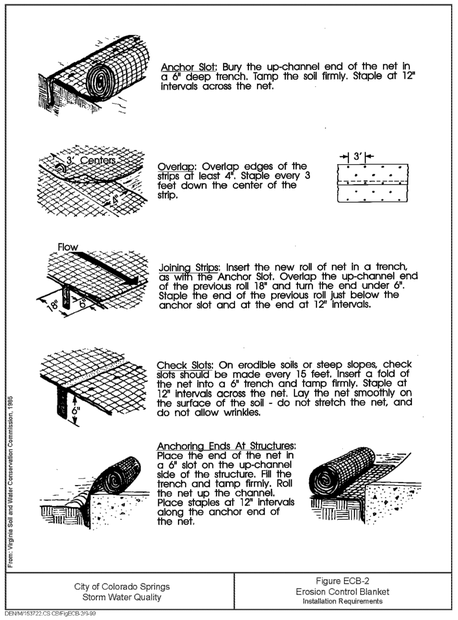
I:\2023\23009 - The Rock Commerce Center\CADD\Sheet Sets\GEC\The Rock\23009_Final Erosion Control Plan.dwg tab: 1O OF 24 FINAL EROSION CONTROL PLAN Nov 20, 2023 – 7:36am cspiz



City of Colorado Springs
Storm Water Quality

Figure ECB-1
Erosion Control Blanket
Application Examples

DENVM153722.CS.CBFigECB-1/9-99



City of Colorado Springs
Storm Water Quality

Figure ECB-2
Erosion Control Blanket
Installation Requirements

DENVM153722.CS.CBFigECB-3/5-99

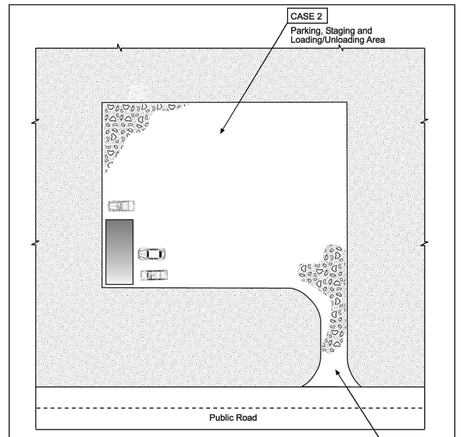


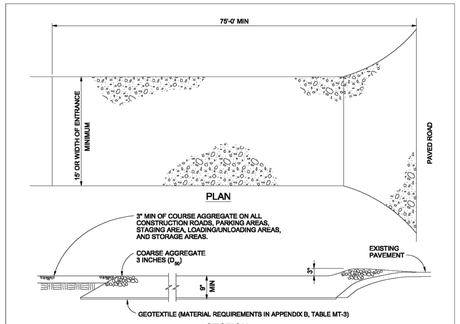
Table VT-1

	Case 1	Case 2
Gravel Thickness	9"	3"
Filter Fabric	YES	NO

City of Colorado Springs
Storm Water Quality

Figure VT-1
Vehicle Tracking
Application Examples

DENVM153722.CS.CBFigVT-1/9-99



SECTION

VEHICLE TRACKING
NTS

VEHICLE TRACKING NOTES

INSTALLATION REQUIREMENTS

1. ALL ENTRANCES TO THE CONSTRUCTION SITE ARE TO BE STABILIZED PRIOR TO CONSTRUCTION BEGINNING.

2. CONSTRUCTION ENTRANCES ARE TO BE BUILT WITH AN APRON TO ALLOW FOR TURNING TRAFFIC, BUT SHOULD NOT BE BUILT OVER EXISTING PAVEMENT EXCEPT FOR A SLIGHT OVERLAP.

3. AREAS TO BE STABILIZED ARE TO BE PROPERLY GRADED AND COMPACTED PRIOR TO LAYING DOWN GEOTEXTILE AND STONE.

4. CONSTRUCTION ROADS, PARKING AREAS, LOADING/UNLOADING ZONES, STORAGE AREAS, AND STAGING AREAS ARE TO BE STABILIZED.

5. CONSTRUCTION ROADS ARE TO BE BUILT TO CONFORM TO SITE GRADES, BUT SHOULD NOT HAVE SIDE SLOPES OR ROAD GRADES THAT ARE EXCESSIVELY STEEP.

MAINTENANCE REQUIREMENTS

1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL STABILIZED AREAS, ESPECIALLY AFTER STORM EVENTS.

2. STONES ARE TO BE REAPPLIED PERIODICALLY AND WHEN REPAIR IS NECESSARY.

3. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED DAILY BY SHOVELING OR SWEEPING. SEDIMENT IS NOT TO BE WASHED DOWN STORM SEWER DRAINS.

4. STORM SEWER INLET PROTECTION IS TO BE IN PLACE, INSPECTED, AND CLEANED IF NECESSARY.

5. OTHER ASSOCIATED SEDIMENT CONTROL MEASURES ARE TO BE INSPECTED TO ENSURE GOOD WORKING CONDITION.

City of Colorado Springs
Stormwater Quality

Figure VT-2
Vehicle Tracking
Application Examples

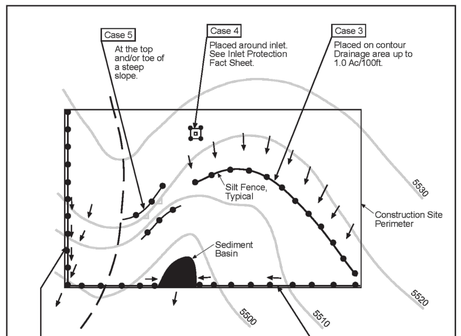


Table SF-1

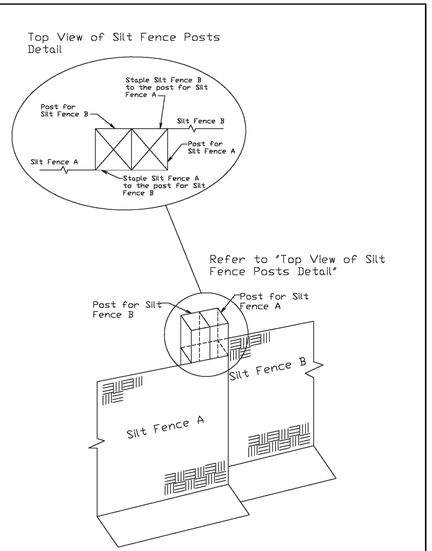
Silt Fence Used as Perimeter Control	Case 1		Case 2
	DA < 0.25 AC	0.25 < DA < 1 AC	DA > 1.0 AC
Continuous Grade	OK (1)	OK (1)	OK (1)
Area of Concentrated Flow	OK	NO (2)	NO (3)

(1) Temporary Swale or Straw Bale Barrier may be used as alternative to a Silt Fence.
(2) Check Dam may also be used as alternative to Silt Fence at low point.
(3) Sediment Basin is required for concentrated flow from drainage areas > 1.0 AC.

City of Colorado Springs
Storm Water Quality

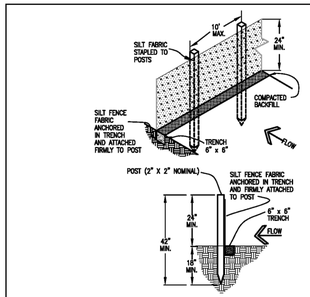
Figure SF-1
Silt Fence
Application Examples

DENVM153722.CS.CBFigSF-1/9-99



City of Colorado Springs
Stormwater Quality

Figure SF-3
Silt Fence Joint Tying
Construction Detail and Maintenance Requirements



SILT FENCE

SILT FENCE NOTES

INSTALLATION REQUIREMENTS

1. SILT FENCES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

2. WHEN JOINTS ARE NECESSARY, SILT FENCE GEOTEXTILE SHALL BE SPLICED TOGETHER ONLY AT SUPPORT POST AND SECURELY SEALED.

3. METAL POSTS SHALL BE "STUDDED TEE" OR "U" TYPE WITH MINIMUM WEIGHT OF 1.33 POUNDS PER LINEAR FOOT. WOOD POSTS SHALL HAVE A MINIMUM DIAMETER OR CROSS SECTION DIMENSION OF 2 INCHES.

4. THE FILTER MATERIAL SHALL BE FASTENED SECURELY TO METAL OR WOOD POSTS USING WIRE TIES, OR TO WOOD POSTS WITH 1¼" LONG #9 HEAVY-DUTY STAPLES. THE SILT FENCE GEOTEXTILE SHALL NOT BE STAPLED TO EXISTING TREES.

5. WHILE NOT REQUIRED, WIRE MESH FENCE MAY BE USED TO SUPPORT THE GEOTEXTILE. WIRE FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST 3¼" LONG, TIE WIRES OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 8" AND SHALL NOT EXTEND MORE THAN 3' ABOVE THE ORIGINAL GROUND SURFACE.

6. ALONG THE TOE OF FILLS, INSTALL THE SILT FENCE ALONG A LEVEL CONTOUR AND PROVIDE AN AREA BEHIND THE FENCE FOR RUNOFF TO POND AND SEDIMENT TO SETTLE. A MINIMUM DISTANCE OF 5 FEET FROM THE TOE OF THE FILL IS RECOMMENDED.

7. THE HEIGHT OF THE SILT FENCE FROM THE GROUND SURFACE SHALL BE MINIMUM OF 24 INCHES AND SHALL NOT EXCEED 36 INCHES; HIGHER FENCES MAY IMPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE.

MAINTENANCE REQUIREMENTS

1. CONTRACTOR SHALL INSPECT SILT FENCES IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS OF NO RAINFALL. DAMAGED, COLLAPSED, UNENTRENCHED OR INEFFECTIVE SILT FENCES SHALL BE PROMPTLY REPAIRED OR REPLACED.

2. SEDIMENT SHALL BE REMOVED FROM BEHIND SILT FENCE WHEN IT ACCUMULATES TO HALF THE EXPOSED GEOTEXTILE HEIGHT.

3. SILT FENCES SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED AS APPROVED BY THE CITY.

City of Colorado Springs
Stormwater Quality

Figure SF-2
Silt Fence
Construction Detail and Maintenance Requirements

MULCHING NOTES

INSTALLATION REQUIREMENTS

1. ALL DISTURBED AREAS MUST BE MULCHED WITHIN 21 DAYS AFTER FINAL GRADE AND SEEDED AREAS ARE TO BE MULCHED WITHIN 24 HOURS AFTER SEEDING.

2. MATERIAL USED FOR MULCH CAN BE CERTIFIED CLEAN, WEED- AND SEED-FREE LONG STEMMED FIELD OR MARSH HAY, OR STRAW OF OATS, BARLEY, WHEAT, RYE, OR TRITICALE CERTIFIED BY THE COLORADO DEPARTMENT OF AGRICULTURE WEED FREE FORAGE CERTIFICATION PROGRAM.

3. HYDRAULIC MULCHING MATERIAL SHALL CONSIST OF VIRGIN WOOD FIBER MANUFACTURED FROM CLEAN WHOLE WOOD CHIPS. WOOD CHIPS CANNOT CONTAIN ANY GROWTH OR GERMINATION INHIBITORS OR BE PRODUCED FROM RECYCLED MATERIAL. GRAVEL CAN ALSO BE USED.

4. MULCH IS TO BE APPLIED EVENLY AT A RATE OF 2 TONS PER ACRE.

5. MULCH IS TO BE ANCHORED EITHER BY CRIMPING (TUCKING MULCH FIBERS 4 INCHES INTO THE SOIL), USING NETTING (USED ON SMALL AREAS WITH STEEP SLOPES), OR WITH A TACKIFIER.

6. HYDRAULIC MULCHING AND TACKIFIERS ARE NOT TO BE USED IN THE PRESENCE OF FREE SURFACE WATER.

MAINTENANCE REQUIREMENTS

1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL MULCHED AREAS.

2. MULCH IS TO BE REPLACED IMMEDIATELY IN THOSE AREAS IT HAS BEEN REMOVED, AND IF NECESSARY THE AREA SHOULD BE RESEEDED.

City of Colorado Springs
Stormwater Quality

Figure MU-1
Mulching
Construction Detail and Maintenance Requirements

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PROJECT NO.	23009	NOTES
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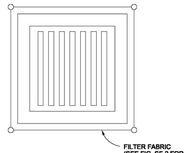
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER

GRADING AND EROSION CONTROL PLANS
GEC DETAILS

SHEET
EC4.1

PCD FILE NO. PPR2329



FILTER FABRIC INLET PROTECTION
NTS

FILTER FABRIC INLET PROTECTION NOTES

INSTALLATION REQUIREMENTS

1. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY AFTER CONSTRUCTION OF INLET.

2. SEE SILT FENCE FIGURE SF-2 FOR INSTALLATION REQUIREMENTS.

3. POSTS ARE TO BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET.

MAINTENANCE REQUIREMENTS

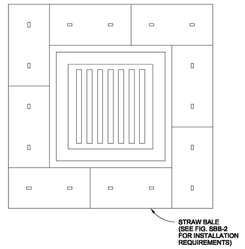
1. CONTRACTOR SHALL INSPECT INLET PROTECTION IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS NO RAINFALL.

2. DAMAGED, COLLAPSED, UNENTRENCHED OR INEFFECTIVE INLET PROTECTION SHALL BE PROMPTLY REPAIRED OR REPLACED.

3. SEDIMENT SHALL BE REMOVED FROM BEHIND FILTER FABRIC WHEN IT ACCUMULATES TO HALF THE EXPOSED GEOTEXTILE HEIGHT.

4. FILTER FABRIC PROTECTION SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED IN THE DRAINAGE AREA AS APPROVED BY THE CITY.

City of Colorado Springs Stormwater Quality	Figure IP-1 Filter Fabric Inlet Protection Construction Detail and Maintenance Requirements



STRAW BALE INLET PROTECTION
NTS

STRAW BALE INLET PROTECTION NOTES

INSTALLATION REQUIREMENTS

1. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY AFTER CONSTRUCTION OF INLET.

2. BALES ARE TO BE PLACED IN A SINGLE ROW AROUND THE INLET WITH THE END OF THE BALES TIGHTLY ABUTTING ONE ANOTHER.

3. SEE STRAW BALE BARRIER FIGURE SBB-2 FOR INSTALLATION REQUIREMENTS.

MAINTENANCE REQUIREMENTS

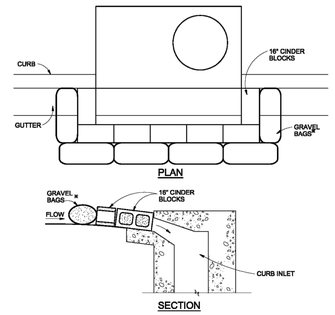
1. CONTRACTOR SHALL INSPECT STRAW BALE INLET PROTECTION IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS NO RAINFALL.

2. DAMAGED OR INEFFECTIVE INLET PROTECTION SHALL PROMPTLY BE REPAIRED, REPLACING BALES IF NECESSARY, AND UNENTRENCHED BALES NEED TO BE REPAIRED WITH COMPACTED BACKFILL MATERIAL.

3. SEDIMENT SHALL BE REMOVED FROM BEHIND STRAW BALES WHEN IT ACCUMULATES TO APPROXIMATELY 1/3 THE HEIGHT OF THE BARRIER.

4. INLET PROTECTION SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED WITHIN THE DRAINAGE AREA AS APPROVED BY THE CITY.

City of Colorado Springs Stormwater Quality	Figure IP-2 Straw Bale Inlet Protection Construction Detail and Maintenance Requirements



BLOCK AND GRAVEL BAG*CURB INLET PROTECTION
NTS

BLOCK AND GRAVEL BAG*CURB INLET PROTECTION NOTES

INSTALLATION REQUIREMENTS

1. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY AFTER CONSTRUCTION OF INLET.

2. CONCRETE BLOCKS ARE TO BE LAID AROUND THE INLET IN A SINGLE ROW ON THEIR SIDES, ABUTTING ONE ANOTHER WITH THE OPEN ENDS OF THE BLOCK FACING OUTWARD.

3. GRAVEL BAGS ARE TO BE PLACED AROUND THE CONCRETE BLOCKS CLOSELY ABUTTING ONE ANOTHER SO THERE ARE NO GAPS.

4. GRAVEL BAGS ARE TO CONTAIN WASHED SAND OR GRAVEL APPROXIMATELY 3/4 INCH IN DIAMETER.

5. BAGS ARE TO BE MADE OF 1/4" INCH WIRE MESH (USED WITH GRAVEL ONLY) OR GEOTEXTILE.

MAINTENANCE REQUIREMENTS

1. CONTRACTOR SHALL INSPECT INLET PROTECTION IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS NO RAINFALL.

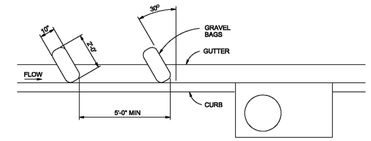
2. DAMAGED OR INEFFECTIVE INLET PROTECTION SHALL PROMPTLY BE REPAIRED OR REPLACED.

3. SEDIMENT SHALL BE REMOVED WHEN SEDIMENT HAS ACCUMULATED TO APPROXIMATELY 1/2 THE DESIGN DEPTH OF THE TRAP.

4. INLET PROTECTION SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED WITHIN THE DRAINAGE AREA AS APPROVED BY THE CITY.

* AN ALTERNATE 3/4" TO 1" GRAVEL FILTER OVER A WIRE SCREEN MAY BE USED IN PLACE OF GRAVEL BAGS. THE WIRE MESH SHALL EXTEND ABOVE THE TOP OF THE CONCRETE BLOCKS AND THE GRAVEL PLACED OVER THE WIRE SCREEN TO THE TOP OF THE CONCRETE BLOCKS.

City of Colorado Springs Stormwater Quality	Figure IP-3 Block & Gravel Bag Curb Inlet Protection Construction Detail and Maintenance Requirements



CURB SOCK INLET PROTECTION
NTS

CURB SOCK INLET PROTECTION NOTES

INSTALLATION REQUIREMENTS

1. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY AFTER CONSTRUCTION OF INLET.

2. SOCK IS TO BE MADE OF 1/4 INCH WIRE MESH (USED WITH GRAVEL ONLY) OR GEOTEXTILE.

3. WASHED SAND OR GRAVEL 3/4 INCH TO 4 INCHES IN DIAMETER IS PLACED INSIDE THE SOCK.

4. PLACEMENT OF THE SOCK IS TO BE 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.

5. SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED AT A MINIMUM 5 FEET APART.

6. AT LEAST 2 CURB SOCKS IN SERIES IS REQUIRED.

MAINTENANCE REQUIREMENTS

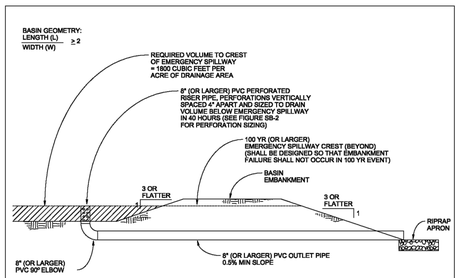
1. CONTRACTOR SHALL INSPECT INLET PROTECTION IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL AND WEEKLY DURING PERIODS NO RAINFALL.

2. DAMAGED OR INEFFECTIVE INLET PROTECTION SHALL PROMPTLY BE REPAIRED OR REPLACED.

3. SEDIMENT SHALL BE REMOVED FROM BEHIND THE SOCK WHEN GUTTER WIDTH IS FILLED.

4. INLET PROTECTION SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED WITHIN THE DRAINAGE AREA AS APPROVED BY THE CITY.

City of Colorado Springs Stormwater Quality	Figure IP-4 Curb Sock Inlet Protection Construction Detail and Maintenance Requirements



SEDIMENT BASIN
NTS

SEDMENT BASIN NOTES

INSTALLATION REQUIREMENTS

1. SEDIMENT BASINS SHALL BE INSTALLED BEFORE ANY CLEARING AND/OR GRADING IS UNDERTAKEN.

2. THE AREA UNDER WHICH THE EMBANKMENT IS TO BE INSTALLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ALL VEGETATION AND ROOT MAT.

3. THE OUTLET OF THE BASIN SHALL BE DESIGNED TO DRAIN ITS VOLUME IN 40 HOURS.

4. THE OUTLET IS TO BE LOCATED AT THE FURTHEST DISTANCE FROM THE INLET OF THE BASIN. BAFFLES MAY BE NEEDED TO INCREASE THE FLOW LENGTH AND SETTLING TIME.

5. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL WITH A MINIMUM OF 15% PASSING A #200 SIEVE. EXCAVATED SOIL CAN BE USED IF IT MEETS THIS REQUIREMENT.

6. EMBANKMENT IS TO BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT ACCORDING TO ASTM D 698.

7. WHEN A BASIN IS INSTALLED NEAR A RESIDENTIAL AREA, FOR SAFETY REASONS, A SIGN SHALL BE POSTED AND THE AREA SECURED WITH A FENCE.

MAINTENANCE REQUIREMENTS

1. CONTRACTOR SHALL INSPECT SEDIMENT BASINS AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS NO RAINFALL.

2. SEDIMENT BASINS SHALL BE CLEANED OUT BEFORE SEDIMENT HAS FILLED HALF THE VOLUME OF THE BASIN.

3. SEDIMENT BASINS SHALL REMAIN OPERATIONAL AND PROPERLY MAINTAINED UNTIL THE SITE AREA IS PERMANENTLY STABILIZED WITH ADEQUATE VEGETATIVE COVER AND/OR OTHER PERMANENT STRUCTURE AS APPROVED BY THE CITY.

City of Colorado Springs Stormwater Quality	Figure SB-1 Sediment Basin Construction Detail and Maintenance Requirements

Required Area per Row (in^2)

		Depth at Outlet (ft)							
		1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
Design Volume (acre-ft)	2	15.04	7.71	5.10	3.76	2.95	2.41	2.02	1.73
	1	7.52	3.86	2.55	1.88	1.48	1.21	1.01	0.87
	0.6	4.51	2.31	1.53	1.13	0.89	0.72	0.61	0.52
	0.4	3.01	1.54	1.02	0.75	0.59	0.48	0.40	0.35
	0.2	1.50	0.77	0.51	0.38	0.30	0.24	0.20	0.17
	0.1	0.75	0.39	0.26	0.19	0.15	0.12	0.10	0.09
	0.06	0.45	0.23	0.15	0.11	0.09	0.07	0.06	0.05
	0.04	0.30	0.15	0.10	0.08	0.06	0.05	0.04	0.03
	0.02	0.15	0.08	0.05	0.04	0.03	0.02	0.02	0.02
	0.01	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.01

TABLE SB-1

Circular Perforation Sizing

Hole Diameter	Hole Diameter	Area per Row (in^2)		
(in)	(in)	n = 1	n = 2	n = 3
1/4	0.250	0.05	0.10	0.15
5/16	0.313	0.08	0.15	0.23
3/8	0.375	0.11	0.22	0.33
7/16	0.438	0.15	0.30	0.45
1/2	0.500	0.20	0.39	0.59
9/16	0.563	0.25	0.50	0.75
5/8	0.625	0.31	0.61	0.92
11/16	0.688	0.37	0.74	1.11
3/4	0.750	0.44	0.88	1.33
7/8	0.875	0.60	1.20	1.80
1	1.000	0.79	1.57	2.36
1 1/8	1.125	0.99	1.99	2.98
1 1/4	1.250	1.23	2.45	3.68
1 3/8	1.375	1.48	2.97	4.45
1 1/2	1.500	1.77	3.53	5.30
1 5/8	1.625	2.07	4.15	6.22
1 3/4	1.750	2.41	4.81	7.22
1 7/8	1.875	2.76	5.52	8.28
2	2.000	3.14	6.28	9.42
	n = Number of columns of perforations			
Minimum steel plate thickness		1/4"	5/16"	3/8"

TABLE SB-2

City of Colorado Springs Stormwater Quality	Figure SB-2 Outlet Sizing Application Techniques and Maintenance Requirements

RECOMMENDED ANNUAL GRASSES

SPECIES (COMMON NAME)	GROWTH SEASON	SEEDING DATE	POUNDS OF PURE LIVE SEED (PLS) (PLS/ACRE)	PLANTING DEPTH (INCHES)
1. OATS	COOL	MARCH 16 - APRIL 30	35-50	1-2
2. SPRING WHEAT	COOL	MARCH 16 - APRIL 30	25-35	1-2
3. SPRING BARLEY	COOL	MARCH 16 - APRIL 30	25-35	1-2
4. ANNUAL RYEGRASS	COOL	MARCH 16 - JUNE 30	10-15	1/2
5. MILLET	WARM	MAY 16 - JULY 15	3-15	1/2-3/4
6. SUDANGRASS	WARM	MAY 16 - JULY 15	5-10	1/2-3/4
7. SORGHUM	WARM	MAY 16 - JULY 15	5-10	1/2-3/4
8. WINTER WHEAT	COOL	SEPTEMBER 1 - 30	20-35	1-2
9. WINTER BARLEY	COOL	SEPTEMBER 1 - 30	20-35	1-2
10. WINTER RYE	COOL	SEPTEMBER 1 - 30	20-35	1-2
11. TRITICALE	COOL	SEPTEMBER 1 - 30	25-40	1-2

THIS TABLE WAS TAKEN FROM UDFCD FOR RECOMMENDED ANNUAL GRASSES FOR THE DENVER METROPOLITAN AREA. THIS TABLE MAY BE USED UNLESS A SITE-SPECIFIC SEED MIX IS REQUESTED AND APPROVED.

TABLE TS-1

TEMPORARY SEEDING NOTES

INSTALLATION REQUIREMENTS

1. DISTURBED AREAS ARE TO BE SEEDED WITHIN 21 DAYS AFTER CONSTRUCTION ACTIVITY OR GRADING ENDS IF SEASON ALLOWS.

2. IF NECESSARY, SOIL IS TO BE CONDITIONED FOR PLANT GROWTH BY APPLYING TOPSOIL, FERTILIZER, OR LIME.

3. SOIL IS TO BE TILLED IMMEDIATELY PRIOR TO APPLYING SEEDS. COMPACT SOILS ESPECIALLY NEED TO BE LOOSENED.

4. SEEDBED DEPTH IS TO BE 4 INCHES FOR SLOPES FLATTER THAN 2:1, AND 1 INCH FOR SLOPES STEEPER THAN 2:1.

5. ANNUAL GRASSES LISTED IN TABLE TS-1 ARE TO BE USED FOR TEMPORARY SEEDING. SEED MIXES ARE NOT TO CONTAIN ANY NOXIOUS WEED SEEDS INCLUDING RUSSIAN OR CANADIAN THISTLE, KNAPWEED, PURPLE LOOSESTRIFE, EUROPEAN BINDWEED, JOHNSON GRASS, AND LEAFY SPURGE.

6. TABLE TS-1 ALSO PROVIDES REQUIREMENTS FOR SEEDING RATES, SEEDING DATES, AND PLANTING DEPTHS FOR THE APPROVED TYPES OF ANNUAL GRASSES.

7. SEEDING IS TO BE APPLIED USING MECHANICAL TYPE DRILLS EXCEPT WHERE SLOPES ARE STEEP OR ACCESS IS LIMITED THEN HYDRAULIC SEEDING MAY BE USED.

8. ALL SEEDED AREAS ARE TO BE MULCHED (SEE FACTSHEET ON MULCHING).

9. IF HYDRAULIC SEEDING IS USED THEN HYDRAULIC MULCHING SHALL BE DONE SEPARATELY TO AVOID SEEDS BECOMING ENCAPSULATED IN THE MULCH.

MAINTENANCE REQUIREMENTS

1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL SEEDED AREAS TO ENSURE GROWTH.

2. AREAS WHERE GROWTH IS NOT OCCURRING QUICKLY OR THE MULCH HAS BEEN REMOVED SHALL BE RE-SEEDED AS SOON AS POSSIBLE AND RE-MULCHED IF NEEDED.

3. SEEDED AREAS ARE NOT TO BE DRIVEN OVER WITH CONSTRUCTION EQUIPMENT OR VEHICLES.

City of Colorado Springs Stormwater Quality	Figure TS-1 Temporary Seeding Construction Detail and Maintenance Requirements

PCD FILE NO. PPR2329

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NO.	DATE	NOTES

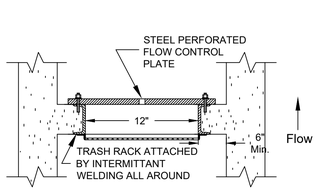
PROJECT NO.	23009	
NO.	DATE	NOTES
1	07/28/2023	1ST SUBMITTAL
2	10/20/2023	2ND SUBMITTAL
3	11/17/2023	3RD SUBMITTAL

THE ROCK COMMERCE CENTER
GRADING AND EROSION CONTROL PLANS
GEC DETAILS

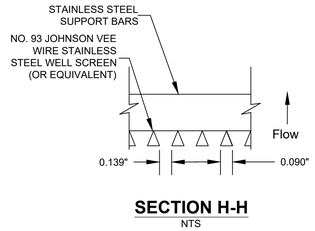
SHEET
EC4.2

Please submit a State Non-Jurisdictional Water Impoundment Structure Application for this pond

This application will be submitted as requested.

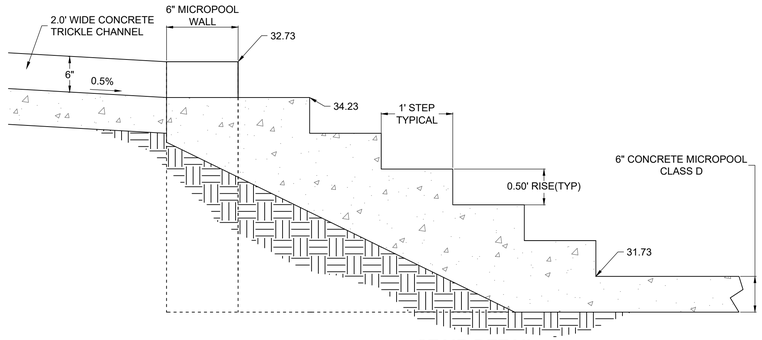


SECTION G-G PLAN VIEW
NTS



SECTION H-H
NTS

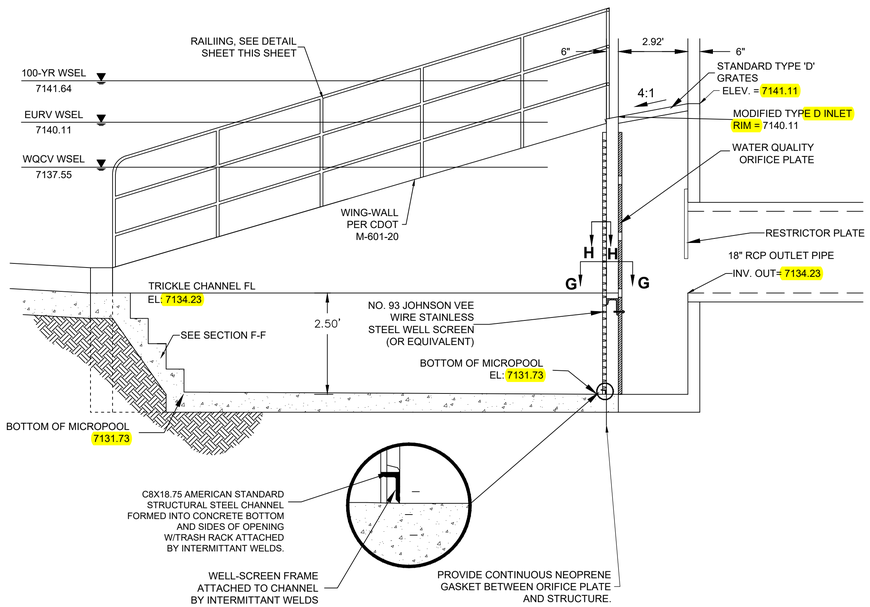
NOTES:
1) ALL STRUCTURES SHALL CONSIST OF CDOT CLASS D CONCRETE.
2) CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR ALL STRUCTURES PRIOR TO CONSTRUCTION.



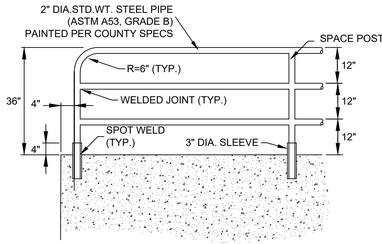
STAIR DETAIL
SECTION F-F
NTS

Provide details for:
- Outlet Structure
- Forebay
- Trickle Channel

These details have been added as requested.



OUTLET STRUCTURE
SECTION E-E
NTS

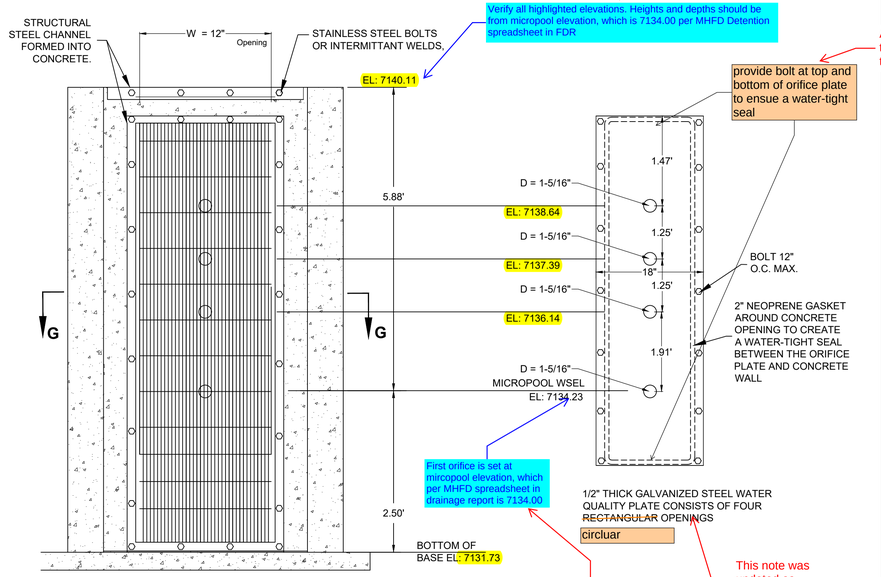


HANDRAIL DETAIL

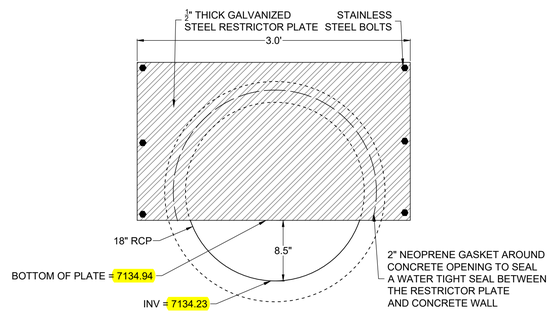
The MHFD Detention Spread sheet was updated so that the micropool elevation is now 7134.23.

Verify all highlighted elevations. Heights and depths should be from micropool elevation, which is 7134.00 per MHFD Detention spreadsheet in FDR

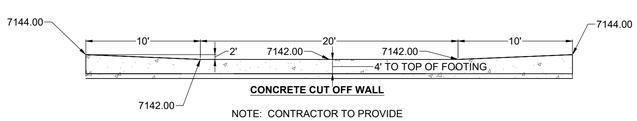
A bolt was added to the top and bottom of the orifice plate.



WATER QUALITY ORFICE PLATE DETAIL
NTS

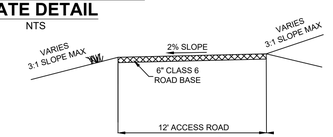


100-YR STEEL RESTRICTOR PLATE DETAIL
NTS



CONCRETE CUT OFF WALL

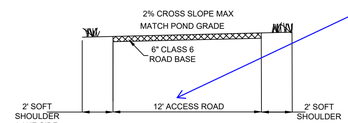
NOTE: CONTRACTOR TO PROVIDE STRUCTURAL SHOP DRAWINGS FOR CUT-OFF WALL



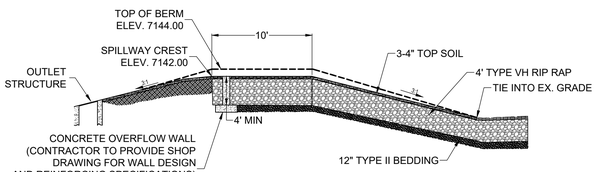
ACCESS ROAD SECTION
(TO BOTTOM OF POND)
N.T.S

Please revise the minimum access road width is 15'.

These details were updated to reflect the 15' access road.



ACCESS ROAD SECTION
(AT BOTTOM OF POND)
N.T.S



Provide cross section detail of spillway

A cross section detail was added for the emergency spillway.

Please label detail

This detail is now labeled as requested.

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

PCD FILE NO. PPR2329

15 YEARS Redland WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

PROJECT NO.	23009	NOTES
NO.	1	1ST SUBMITTAL
DATE	07/28/2023	
NO.	2	2ND SUBMITTAL
DATE	10/20/2023	
NO.	3	3RD SUBMITTAL
DATE	11/17/2023	

THE ROCK COMMERCE CENTER

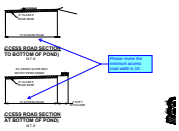
GRADING AND EROSION CONTROL PLANS
POND DETAILS

SHEET
EC4.3

I:\2023\23009 - The Rock Commerce Center\CADD\Sheet Sets\GEC\The Rock\23009_POND Details.dwg tab: POND DETAILS Nov 20, 2023 - 7:36pm cstolz

V3_Grading and Erosion Control Plan.pdf Markup Summary

Carlos (2)



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Please revise the minimum access road width is 15'.

Please label detail

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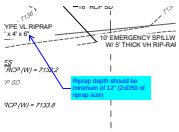
Please label detail

CDurham (20)



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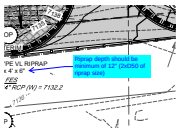
Riprap depth should be minimum of 12" (2xD50 of riprap size)



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Riprap depth should be minimum of 12" (2xD50 of riprap size)

PE VL RIF
4' x 6"
FES

Subject: Highlight
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Author: CDurham
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x 6"

Provide details for:
- Outlet Structure
- Forebay
- Trickle Channel

Subject: Text Box
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Author: CDurham
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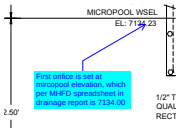
Provide details for:
- Outlet Structure
- Forebay
- Trickle Channel



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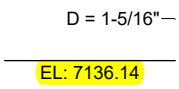
First orifice is set at mircopool elevation, which per MHFD spreadsheet in drainage report is 7134.00



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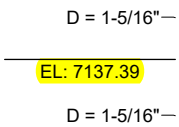

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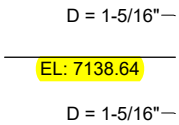

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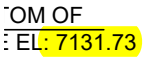

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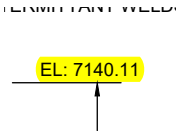

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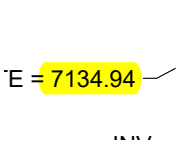

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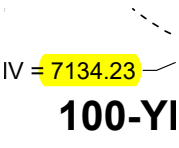

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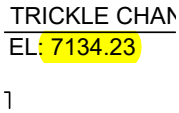

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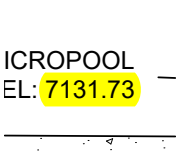

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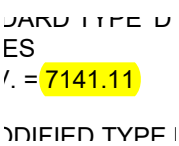

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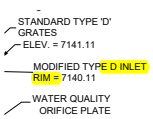

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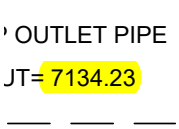

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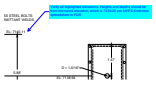

Subject: Callout
Page Label: [13] EC4.3 POND DETAILS
Author: CDurham
Date: 12/5/2023 4:27:14 PM
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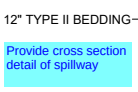
Verify all highlighted elevations. Heights and depths should be from micropool elevation, which is 7134.00 per MHFD Detention spreadsheet in FDR



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Page Label: [13] EC4.3 POND DETAILS
Author: CDurham
Date: 12/5/2023 4:27:48 PM
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Provide cross section detail of spillway

Christina Prete (8)

Subject: Stormwater Comments Color
Page Label: [1] EC1.0 COVER SHEET
Author: Christina Prete
Date: 12/6/2023 5:24:45 PM
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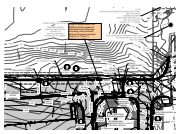

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Page Label: [8] EC3.4 INTERIM EROSION CONTROL PLAN
Author: Christina Prete
Date: 12/6/2023 4:24:13 PM
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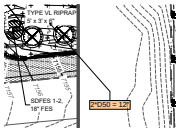
Assign a name/number to all PBMPs and then update all submitted text and drawings accordingly with consistent labeling throughout (example: “Pond A” or “Pond 1”).



Subject: Contractor
Page Label: [9] EC3.5 FINAL EROSION CONTROL PLAN
Author: Christina Prete
Date: 12/6/2023 5:06:49 PM
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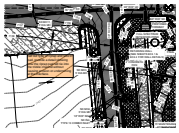
2*D50 = 12"



Subject: Contractor
Page Label: [10] EC3.6 FINAL EROSION CONTROL PLAN
Author: Christina Prete
Date: 12/6/2023 5:03:41 PM
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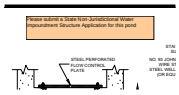
call out type of riprap and size of pad. provide a detail showing how the riprap pad will tie into the trickle channel without causing erosion or undermining at the interface.



Subject: Contractor
Page Label: [13] EC4.3 POND DETAILS
Author: Christina Prete
Date: 12/6/2023 4:26:03 PM
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Please submit a State Non-Jurisdictional Water Impoundment Structure Application for this pond

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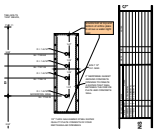

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Page Label: [13] EC4.3 POND DETAILS
Author: Christina Prete
Date: 12/6/2023 4:31:35 PM
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provide bolt at top and bottom of orifice plate to ensue a water-tight seal

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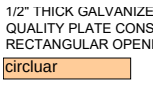

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Page Label: [13] EC4.3 POND DETAILS
Author: Christina Prete
Date: 12/6/2023 4:32:12 PM
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Redland
WHERE GREAT PLACES BEGIN
720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

EPC STORMWATER REVIEW COMMENTS
IN ORANGE BOXES WITH BLACK TEXT

Final Drainage Report
The Rock Commerce Center

Prepared for:

Central Development LLC
1660 S Albion St, Suite 200
Denver, CO 80222
(303) 628-0200 voice

Prepared by:

Redland
1500 W Canal Court
Littleton, Colorado 80120
(720) 283-6783 voice
Mark D. Cevaal, P.E.

PCD File No. PPR2329

July 28, 2023
October 20, 2023
November 17, 2023
Project No. 23009.001

Signature Page

The Rock Commerce Center

Design Engineer's Statement

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

SIGNATURE (Affix Seal) : _____ 10/20/23
Colorado P.E. No. 33123 Date

Developer's Statement

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

_____ _____
[Jeremy Records, Principal] Date
[Central Development LLC]
[1660 S Albion St, Suite 200
Denver, CO 80222]

El Paso County

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

_____ _____
Joshua Palmer, P.E. Date
County Engineer / ECM Administrator

Conditions:

Table of Contents

General Location and Description

Introduction

The purpose of this Final Drainage Report is to identify on-site and off-site drainage patterns, storm sewer, inlet locations, areas tributary to the site, and to safely route the developed flows to the proposed full spectrum pond. Analyses for the proposed drainage patterns and requirements for the proposed The Rock Commerce Center development, hereafter referred to as the Site, are presented in the appendices of this Report.

Site Location

The Site is located on unplatted land in the Northwest Quarter of Section 11, Township 11 South, Range 67 West of the 6th Principal Meridian, El Paso County, Colorado. The site is bordered on the west side by Monument Hill Road and I-25, Palmer Ridge High School to the north and west, and 18950 Base Camp Road to the south, see Appendix A. The site will have two connections onto Monument Hill Road and one connection to the southeast to Base Camp Road.

Description of Property

The Site encompasses approximately 11.61 acres and is currently undeveloped. The project area was determined by an ALTA/NSPS Land Title Survey conducted by Aztec Consultants Inc. dated 02/23/2023. This survey can be seen in Appendix A of this report. Native grasses and weeds currently cover the site with a few small trees. The site generally falls north to south but has a ridge running diagonally from the northwest corner toward Monument Hill Road splitting the site north and south. The northern section of site slopes at about 12% from west to east. The middle of the site slopes at about 4% from the northeast to the southwest. The southern section of site slopes at about 4% from the west to east.

The property is proposed to include a 164,166 SF commercial warehouse/showroom with associated parking, sidewalks, drive aisles, and landscaping. The building will be located in the middle of the site running north to south parallel to Monument Hill Road. The total disturbed area is 12.30 acres. The disturbed area is greater than the project area due to offsite improvements and grading required for Monument Hill Road. There will also be some offsite improvements required to create an access to Base Camp Road.

The Site is located within the Crystal Creek Drainage Basin which outfalls to Monument Lake per the *El Paso County Drainage Basin Map (DBMP), prepared by the Board of Commissioners, El Paso County, dated 2005*.

There are no existing irrigation facilities on the Site.

There is an existing 18" RCP storm sewer located near the northwest corner of the Site located in a roadside swale next to Monument Hill Road This storm sewer crosses Monument Hill Road and ties into a 42" storm sewer which flows under I-25 to outfall west of I-25. An existing

and outfalls into the I-25 right of way where it then enters another storm sewer that outfalls to the west of I-25.

The property lies within the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel 08041C0276G dated December 18, 2018. Based on a review of the FIRM panel, the Site is located within Flood Zone X which is designated as an area determined to be outside the 0.2% (500-year) annual chance floodplain (see Appendix A).

The NRCS soil survey indicates that the soil on site is primarily Tomah-Crowfoot loamy sands and Tomah-Crowfoot complex, whose hydrologic soil group is Type B. A soil map has been included in the appendix for reference.

Drainage Basins and Subbasins

Existing Major Basin Description

The Site is located within the Crystal Creek Drainage Basin. The Crystal Creek Basin outfalls to Monument Lake. The Site is included in the *Dirty Woman Creek and Crystal Creek Drainage Basin Planning Study, prepared by Kiowa Engineering Corporation, dated September 1993*. *The Final Drainage Report for Palmer Ridge High School*, *prepared by Tetra Tech, dated July 3, 2007* (PRHS Report) also includes a small portion of the site. Both of these previous drainage reports focus primarily on the flows entering and flowing through Crystal Creek. The flows from the site flow west crossing under I-25 before flowing southwest in an undefined channel towards Crystal Creek and eventually Monument Lake.

Existing Subbasin Description

The Site currently is made up of three existing basins that are all part of the Crystal Creek Drainage Basin. Basin A is the north basin that is 2.35 acres and drains east to west to an existing 18" storm sewer at Design Point A that eventually outfalls west of I-25. Basin A has a total surface runoff of 1.5 cfs in the 10-year event and 4.6 cfs in the 100-year event at Design Point A. These flows are the total basin flows from Basin A, not the routed flows at Design Point A. Basin B is the largest existing basin with 7.40 acres flowing northeast to southwest into an existing 24" storm sewer at Design Point B. This existing storm sewer outfalls on the west side of Monument Hill Road where the flow enters another storm sewer to eventually outfall west of I-25. Basin B has a total surface runoff of 3.7 cfs in the 10 -year event and 11.4 cfs in the 100-year event at Design Point B. These flows are the total basin flows from Basin B, not the routed flows at Design Point B. Both Basin A and B flow in an undefined channel on the west side of I-25 to the southwest until eventually making it to Monument Lake. Basin C is the south basin on the site with 1.86 acres flowing east to southwest. Basin C has a total surface runoff of 1.1 cfs in the 10-year event and 3.4 cfs in the 100-year event at Design Point C. These flows are the total basin flows from Basin C, not the routed flows at Design Point C. The runoff from this basin currently enters a roadside ditch on the east side of Monument Hill Road where it flows south away from the site to eventually enter Crystal Creek. An Existing Conditions Map is included in Appendix E.

There are four existing off-site basins that currently flow onto the site or into the Monument Hill Road swale adjacent to the Site. Basin OSA1 is a west portion of the Palmer Ridge High School that includes the school's west entrance and a detention pond. Basin OSA1 is 0.75 acres and flows northeast to southwest where it enters the existing 24" storm sewer at Design Point A. The flow from Basin OSA1 at Design Point A is 2.0 cfs in the 10-year event and 3.4 cfs in the 100-year event. These flows are the total basin flows from Basin OSA1, not the routed flows at Design Point A. Basin EP1 represents Detention Pond B from the PRHS Report. According to the PRHS Report the 100-year release rate from the existing pond is 35.33 cfs at Design Point A. Basin OSB1 is a southwest portion of the Palmer Ridge High School that includes field, lawn, and parts of the school's track. Basin OSB1 is 1.14 acres and flows east to west on to the Site. The runoff then flows through Basin B until it reaches the existing 24" storm sewer at Design Point B. The flow generated from Basin OSB1 at Design Point B is 0.8 cfs in the 10-year event and 2.5 cfs in the 100-year event. These flows are the total basin flows from Basin OSB1, not the routed flows at Design Point B. Basin OSB2 is the east half section of Monument Hill Road and its road side ditch. Basin OSB2 is 0.76 acres and flows east to west into the road side ditch then south towards Design Point B. The runoff then flows through the existing 24" storm sewer at Design Point B. The flow generated from Basin OSB2 at Design Point B is 1.5 cfs in the 10-year event and 2.6 cfs in the 100-year event. These flows are the total basin flows from Basin OSB2, not the routed flows at Design Point B. The largest existing offsite basin is Basin OSC1 at 1.91 acres. Basin OSC1 is the southwest corner of the Palmer Ridge High School and includes field, lawn, and parts of the school's track. Basin OSC1 flows northeast to southwest flowing through Basin C until it reaches the roadside ditch next to Monument Hill Road at Design Point C. The flow generated from Basin OSC1 is 1.0 cfs in the 10-year event and 3.0 cfs in the 100-year event. These flows are the total basin flows from Basin OSC1, not the routed flows at Design Point C.

After routing flows from off-site and on-site basins through the Standard SF form for the 10-year and 100-year storm events the existing drainage values were found:

Design Point A has a combined 3.07 cfs for the 10-year event from Basins A1 and Basin OSA1. Design Point A has a combined 7.27 cfs for the 100-year event from Basins A1 and Basin OSA1. The Existing Pond B from the Lewis Palmer Ridge High School Drainage Report has an emergency overflow that is tributary to Design Point A. Assuming the outlet structure is completely clogged Design Point A would receive an extra 35.33 cfs.

Design Point B has a combined 5.53 cfs for the 10-year event from Basins B1 and Basin OSB1. Design Point B has a combined 15.26 cfs for the 100-year event from Basins B1 and Basin OSB1.

Design Point C has a combined 1.97 cfs for the 10-year event from Basins C1 and Basin OSC1. Design Point C has a combined 6.02 cfs for the 100-year event from Basins C1 and Basin OSC1.

Drainage Design Criteria

This Report has been prepared in accordance with the *El Paso County Drainage Criteria Manual Volume 1 & 2 October 2018*. Supplemental information is taken from the *Mile High Flood District Urban Storm Drainage Criteria Manual Volumes 1, 2 and 3*.

Water Quality is required to be provided on the site and the developed 100-year release rate is 90% of the predeveloped flow from the Site. Existing storm sewers are located in the northwest and southwest corners of the site within drainage easements. The pond sizing and outlet design was done through the Mile High Flood District Detention v4-06 spreadsheet. A tributary area table is provided in Appendix B. The table shows that the area on-site the is tributary to the pond is 10.98 acres at 77% imperviousness. The Full Spectrum Pond will also accept water from 5 off-site basins for a total of 3.2 acres. The Full Spectrum Pond was sized for the full site of 11.38 acres. The Full Spectrum Pond is over detaining runoff to offset the runoff not detained on-site. The pond is not sized to detain the additional runoff from the off-site basins but the emergency overflow is sized to be able to pass the developed 100-year runoff plus the additional off-site runoff. The outlet of the proposed full spectrum pond is planned to discharge into the existing roadside ditch and enter the existing 24" storm sewer near the southwest of the Site. The full spectrum pond will be designed so the release of the 100-year runoff will be restricted to a release rate equal to or less than 90% of the predeveloped runoff. It was estimated that the predeveloped 10-year runoff to be 4.0 cfs and the 100-year runoff to be 11.7 cfs. For the purpose of this Report, the 100-year storm event will be released from the pond at a rate of 10.4 cfs. The release rate of 10.4 cfs was chosen since it is 88.9% of the predeveloped runoff.

The hydrologic design was computed using the Rational Method as defined by El Paso County Drainage Criteria Manual. The 10-year storm was used as the minor storm event, while the 100-year storm was used as the major event. The one-hour point rainfall depth used for the 10-year storm was 1.75 inches and 2.52 inches for the 100-year event. The Rational Method was used to analyze fully developed conditions. Hydraulic grade lines were calculated using Haestead's StormCadd and are attached in the appendices. On-site detention includes a full spectrum detention pond with water quality control volume, excess urban runoff volume, and the 100-year flood volume. The 100-year release is required to be less than 10.4 cfs. Inlets were sized using the UD-Inlet_V4.06 spreadsheet. The full spectrum pond was sized using the MHFD-Detention _v4.06 spreadsheet.

Runoff/Proposed Basin Description

Major Basins

The Site in its development condition includes 3 primary Basins described as Basins A, B, and C. The Proposed Drainage Map in included in Appendix E. Basin B is the largest basin with 10.58 acres on-site plus an additional 3.88 acres of an off-site basin tributary to it. Basin B consists of 30 on-site basins and 8 off-site basins. The on-site basins are numbered B1 through B30 and the off-site basins are numbered OSB1 through OSB8. Basin A has 0.12

acres on-site plus an additional 0.71 acres of an off-site tributary to it. Basin C has 0.11 acres on-site and no off-site basins.

Sub-Basins

Basin A1 (0.09 Acres):

Basin A1 represents the northwest edge of the Site and includes the portion of the roadside ditch along Monument Hill Road that is located on the site. Basin A1 is tributary to the existing 18" storm sewer located in the northwest of the Site and discharges under Monument Hill Road and to the west side of I-25. This Basin has an overall imperviousness of 0%. This Basin it not tributary to the proposed full spectrum pond. Water quality is not required for this basin because under exclusion I.7.1.B.7 the land is undeveloped and will remain undeveloped.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 0.1$ CFS $Q_{100} = 0.2$ CFS

Basin OSA1 (0.71 Acres)

Basin OSA1 consists of a portion of the Palmer Ridge High School site and the east half section of Monument Hill Road. This basin all flows to the road side ditch and is tributary to the northwest existing storm sewer. This Basin has an overall imperviousness of 63%.

$C_{10} = 0.64$ $C_{100} = 0.74$

$Q_{10} = 2.4$ CFS $Q_{100} = 4.0$ CFS

The combined Basin A 100-year overland routed runoff of 3.51 CFS discharges to the existing 18" storm sewer at Design Point A and will not be routed through the proposed full spectrum pond.

Basin B1 (0.53 Acres)

Basin B1 consists of parking lot, sidewalk, and landscape islands located to the west of proposed Building. It will also receive the water from a portion of the roof in basin B16. The grades of this Basin generally slope at 3% and 4%. Runoff will sheet flow to a 2-foot concrete drainage pan where the concentrated flow will be collected in a Triple Type 13 Inlet at Design Point 1 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 64%. Emergency overflow from this Basin will route to the next downstream Sub-basin, B2.

C_{10} = 0.64 C_{100} = 0.74

Q_{10} = 2.0 CFS Q_{100} = 3.4 CFS

Basin B2 (0.48 Acres)

Basin B2 consists of parking lot, sidewalk, and landscape islands located to the west of proposed Building B. It will also receive the water from a portion of the roof in basins B17 and B18. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a 2-foot concrete drainage pan where the concentrated flow will be collected in a Triple Type 13 Inlet at Design Point 2 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 73%.

C_{10} = 0.71 C_{100} = 0.80

Q_{10} = 2.0 CFS Q_{100} = 3.2 CFS

Basin B3 (0.30 Acres)

Basin B3 consists of parking lot, sidewalk, and landscape islands located to the west of the proposed building. This basin also includes the north entrance into the site. It will also receive the water from a portion of the roof in basin B19 and the off-site basin OSB7. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow away from the proposed building to the curb and gutter on the west side. The concentrated flow will be then be conveyed through a curb chase at Design Point 3 and conveyed to the next downstream basin, B4. This Basin has an overall imperviousness of 95%.

C_{10} = 0.88 C_{100} = 0.93

Q_{10} = 1.6 CFS Q_{100} = 2.4 CFS

Basin B4 (0.19 Acres)

Basin B4 consists of parking lot, sidewalk, and landscape islands located to the west of the proposed building. It will also receive the water from a portion of the roof in basin B20. The grades of this Basin generally slope at 3%. Runoff will sheet flow away from the proposed building to the curb and gutter on the west side. The concentrated flow will be then be conveyed to a 10' Type R Inlet at Design Point 4 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 100%.

C_{10} = 0.92 C_{100} = 0.96

Q_{10} = 1.0 CFS Q_{100} = 1.5 CFS

Basin B5 (0.40 Acres)

Basin B5 consists of parking lot, sidewalk, and landscape islands located to the west and south of the proposed building. It will also receive the water from a portion of the roof in basin B21. The grades of this Basin generally slope at 3% and 7%. Runoff will sheet flow away from the proposed building to the curb and gutter on the west side. The concentrated flow will be then be conveyed to a Single Type 13 Combo Inlet at Design Point 5 and conveyed to the proposed Full spectrum pond via storm sewer. This Basin has an overall imperviousness of 82%. Emergency overflow from this Basin will overtop of curb and enter the proposed full spectrum pond.

C_{10} = 0.78 C_{100} = 0.85

Q_{10} = 1.8 CFS Q_{100} = 2.9 CFS

Basin B6 (0.31 Acres)

Basin B6 consists of parking lot, sidewalk, landscape islands, and landscape buffer located to the north of proposed Building. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a 2-foot concrete drainage pan where the concentrated flow will be collected in a Single Type 13 Inlet at Design Point 6 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 68%.

C_{10} = 0.68 C_{100} = 0.77

Q_{10} = 1.2 CFS Q_{100} = 2.0 CFS

Basin B7 (0.40 Acres)

Basin B7 consists of parking lot, sidewalk, landscape islands, and landscape buffer located to the north of proposed Building. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a 2-foot concrete drainage pan where the concentrated flow will be collected in a Single Type 13 Inlet at Design Point 7 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 58%. Emergency overflow from this Basin will route to the next downstream Basin, B6.

C_{10} = 0.60 C_{100} = 0.70

Q_{10} = 1.4 CFS Q_{100} = 2.4 CFS

Basin B8 (0.98 Acres)

Basin B8 consists of loading dock and landscape islands located to the east of proposed Building. It will also receive the water from a portion of the roof in basin B22. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a 10-foot concrete drainage pan where the concentrated flow will be collected in a Double Type 13 Inlet at Design Point 8 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 68%.

C_{10} = 0.68 C_{100} = 0.77

Q_{10} = 3.9 CFS Q_{100} = 6.4 CFS

Basin B9 (0.59 Acres)

Basin B9 consists of loading dock and landscape islands located to the east of proposed Building. It will also receive the water from a portion of the roof in basin B23. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a 10-foot concrete drainage pan where the concentrated flow will be collected in a on grade Single Type 13 Inlet at Design Point 9 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 71%. Emergency overflow from this Basin will route to the next downstream Basin, B10.

C_{10} = 0.70 C_{100} = 0.78

Q_{10} = 2.4 CFS Q_{100} = 3.9 CFS

Basin B10 (0.67 Acres)

Basin B10 consists of loading dock located to the east of proposed Building. It will also receive the water from the offsite basin OSB1 and a portion of the roof in basin B24. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a 10-foot concrete drainage pan where the concentrated flow will be collected in a Triple Type 13 Inlet at Design Point 10 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 83%.

C_{10} = 0.79 C_{100} = 0.85

Q_{10}= 3.1 CFS Q_{100} = 4.9 CFS

Basin B11 (0.37 Acres)

Basin B11 consists of loading dock and landscape islands located to the east of proposed Building. It will also receive the water from the off-site basin OSB2 and a portion of the roof in basin B25. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a curb and gutter on the west side of the drive aisle where the concentrated flow will be collected in a 5' Type R Inlet at Design Point 11 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 74%.

C_{10} = 0.72 C_{100} = 0.80

Q_{10} = 1.6 CFS Q_{100} = 2.5 CFS

Basin B12 (0.75 Acres)

Basin B12 consists of loading dock located to the east of proposed Building. It will also receive the water from the off-site basin OSB3 and a portion of the roof in basin B26. The grades of this Basin generally slope between 3% to 5%. Runoff will sheet flow to a curb and gutter on the east side of the drive aisle where the concentrated flow will be collected in an on-grade Triple Type 13 Combo Inlet at Design Point 12 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 89%. Emergency overflow from this Basin will route to the next downstream Basin, B13.

C_{10} = 0.83 C_{100} = 0.89

Q_{10} = 3.6 CFS Q_{100} = 5.6 CFS

Basin B13 (0.43 Acres)

Basin B13 consists of loading dock and landscaping located to the east and south of proposed Building. It will also receive the water from the off-site basin OSB4 and a portion of the roof in basin B27. The grades of this Basin generally slope between 3% to 7%. Runoff will sheet flow to a curb and gutter on the west side of the drive aisle where the concentrated flow will be collected in a 10' Type R Inlet at Design Point 13 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 81%. Emergency overflow from this Basin will route to the next downstream Basin, B14.

C_{10} = 0.77 C_{100} = 0.84

Q_{10} = 2.0 CFS Q_{100} = 3.1 CFS

Basin B14 (0.08 Acres)

Basin B14 consists of drive aisle and landscape islands located to the south of proposed Building. The grades of this Basin generally slope between 3% to 7%. Runoff will sheet flow to a curb and gutter where the concentrated flow will be collected in a Single Type 13 Combo Inlet at Design Point 14 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 87%.

C_{10} = 0.82 C_{100} = 0.88

Q_{10} = 0.4 CFS Q_{100} = 0.6 CFS

Basin B15 (0.11 Acres)

Basin B15 consists of a loading dock area and landscape islands located to the east of proposed Building. It will also receive the water from the off-site basin OSB5. The grades of this Basin generally slope between 4% to 8%. Runoff will sheet flow to a curb and gutter on the north side of the entrance drive where the concentrated flow will be collected in a on grade Triple Type 13 Combo Inlet at Design Point 15 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 97%.

C_{10} = 0.90 C_{100} = 0.94

Q_{10} = 0.6 CFS Q_{100} = 0.9 CFS

Basin B16 (0.30 Acres)

Basin B16 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to grade through a drainage chase located on the west side of proposed Building into Basin B1. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.3$ CFS $Q_{100} = 2.1$ CFS

Basin B17 (0.30 Acres)

Basin B17 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to grade through a drainage chase located on the west side of proposed Building into Basin B2. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.3$ CFS $Q_{100} = 2.1$ CFS

Basin B18 (0.30 Acres)

Basin B18 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to grade through a drainage chase located on the west side of proposed Building into Basin B2. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.3$ CFS $Q_{100} = 2.1$ CFS

Basin B19 (0.30 Acres)

Basin B19 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to grade through a drainage chase located on the west side of proposed Building into Basin B3. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.3$ CFS $Q_{100} = 2.1$ CFS

Basin B20 (0.30 Acres)

Basin B20 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to grade through a drainage chase located on the west side of proposed Building into Basin B4. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.3$ CFS $Q_{100} = 2.1$ CFS

Basin B21 (0.30 Acres)

Basin B21 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to grade through a drainage chase located on the west side of proposed Building into Basin B5. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.3$ CFS $Q_{100} = 2.1$ CFS

Basin B22 (0.42 Acres)

Basin B22 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to the east side of proposed Building into Basin B8. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.8$CFS $Q_{100} = 2.9$ CFS

Basin B23 (0.36 Acres)

Basin B23 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to the east side of proposed Building into Basin B9. This Basin has an overall imperviousness of 90%.

$C_{10} = 0.75$ $C_{100} = 0.81$

$Q_{10} = 1.6$ CFS $Q_{100} = 2.5$ CFS

Basin B24 (0.30 Acres)

Basin B24 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to the east side of proposed Building into Basin B10. This Basin has an overall imperviousness of 90%.

C_{10} = 0.75 C_{100} = 0.81

Q_{10} = 1.3 CFS Q_{100} = 2.0 CFS

Basin B25 (0.30 Acres)

Basin B25 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to the east side of proposed Building into Basin B11. This Basin has an overall imperviousness of 90%.

C_{10} = 0.75 C_{100} = 0.84

Q_{10} = 1.3 CFS Q_{100} = 2.1 CFS

Basin B26 (0.30 Acres)

Basin B26 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to the east side of proposed Building into Basin B12. This Basin has an overall imperviousness of 90%.

C_{10} = 0.75 C_{100} = 0.81

Q_{10} = 1.3 CFS Q_{100} = 2.1 CFS

Basin B27 (0.30 Acres)

Basin B27 consists of a portion of the proposed roof. The slope of the rooftop is 2.5% and runoff will sheet flow to a roof drain. Runoff will then discharge to the east side of proposed Building into Basin B13. This Basin has an overall imperviousness of 90%.

C_{10} = 0.75 C_{100} = 0.81

Q_{10} = 1.3 CFS Q_{100} = 2.1 CFS

Basin B28 (0.06 Acres)

Basin B28 consists of a portion of the roadside ditch next to Monument Hill Road that is on site. The grades of this Basin generally slope between 4% to 15%. Runoff will sheet flow to roadside ditch where the concentrated flow will be conveyed under the north entrance to the south half of the roadside ditch via an 18" culvert at design point RC1. This Basin has an overall imperviousness of 0%. This Basin it not tributary to the proposed full spectrum pond. Water quality is not required for this basin because under exclusion I.7.1.B.7 the land is undeveloped and will remain undeveloped.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 0.0$ CFS $Q_{100} = 0.1$ CFS

Basin B29 (0.38 Acres)

Basin B29 consists of a portion of the roadside ditch next to Monument Hill Road and landscaping. The grades of this Basin generally slope between 4% to 33%. Runoff will sheet flow to the Monument Hill Road roadside ditch where the concentrated flow will be collected by the existing southwest 24" storm sewer at design point B. It will then be conveyed to the west side of I-25 via the existing storm sewer. This Basin has an overall imperviousness of 0%. This Basin it not tributary to the proposed full spectrum pond. Water quality is not required for this basin because under exclusion I.7.1.B.7 the land is undeveloped and will remain undeveloped.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 0.2$ CFS $Q_{100} = 0.8$ CFS

Basin B30 (0.61 Acres)

Basin B30 consists of the proposed full spectrum pond that include lawn and the gravel access road. The sides of the full spectrum pond will be 33% except for the access road that is a max of 10%. The runoff will sheet flow down to the trickle channel where the concentrated flow will then flow west to the outlet structure. This basin has an overall imperviousness of 3%.

$C_{10} = 0.08$ $C_{100} = 0.44$

$Q_{10} = 0.3$ CFS $Q_{100} = 1.9$ CFS

Basin B31 (0.02 Acres)

Basin B31 consists of road at the central entrance of the site along Monument Hill Road. The basin will drain northeast to southwest into the curb at the south side of the entrance. The concentrated gutter flow will then discharge into the road side ditch and flow to Design Point B. This basin has an overall imperviousness of 100%. This Basin it not tributary to the proposed full spectrum pond. Water quality is not required for this basin because under exclusion I.7.1.C.1 that allows for 20%, not to exceed 1 acre, of the development to not be captured for water quality.

$C_{10} = 0.87$ $C_{100} = 0.90$

$Q_{10} = 0.1$ CFS $Q_{100} = 0.1$ CFS

Basin OSB1 (0.08 Acres)

Basin OSB1 consists of lawn and field on the west edge of the Palmer Ridge School Site. The grades of this Basin generally slope between 6% to 8%. Runoff will sheet flow to the southwest onto the site and enter the curb and gutter in basin B10. Where the concentrated flow will be collected in a Triple Type 13 Inlet at Design Point 10 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 0%.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 0.1$ CFS $Q_{100} = 0.2$ CFS

Basin OSB2 (0.34 Acres)

Basin OSB2 consists of lawn, field, and a portion of the school's track on the west edge of the Palmer Ridge School Site. The grades of this Basin generally slope between 1% to 12%. Runoff will sheet flow to the west onto the site and enter the curb and gutter in basin B11. Where the concentrated flow will be collected in a 5' Type R Inlet at Design Point 11 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 0%.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 0.2$ CFS $Q_{100} = 0.8$ CFS

Basin OSB3 (0.78 Acres)

Basin OSB3 consists of lawn, field, and a portion of the school's track on the west edge of the Palmer Ridge School Site. The grades of this Basin generally slope between 1% to 25%. Runoff will sheet flow to the west onto the site and enter the curb and gutter in basin B12. Where the concentrated flow will be collected in a Triple Type 13 Combo Inlet at Design Point 12 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 0%.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 0.6$ CFS $Q_{100} = 1.9$ CFS

Basin OSB4 (1.88 Acres)

Basin OSB4 consists of lawn, field, and a portion of the school's track on the west edge of the Palmer Ridge School Site. The grades of this Basin generally slope between 1% to 25%. Runoff will sheet flow to the west onto the site and enter the curb and gutter in basin B13. Where the concentrated flow will be collected in a 10' Type R Inlet at Design Point 13 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 0%.

$C_{10} = 0.15$ $C_{100} = 0.35$

$Q_{10} = 1.1$ CFS $Q_{100} = 3.7$ CFS

Basin OSB5 (0.06 Acres)

Basin OSB5 consists of landscaping, parking lot, and drive aisle between the site and Case Camp Road to the southeast. The grades of this Basin generally slope between 3% to 7%. Runoff will sheet flow to the northwest onto the site and enter the curb and gutter in basin B15. Where the concentrated flow will be collected in a 5' Type R Inlet at Design Point 15 and conveyed to the proposed full spectrum pond via storm sewer. This Basin has an overall imperviousness of 71%.

$C_{10} = 0.70$ $C_{100} = 0.78$

$Q_{10} = 0.2$ CFS $Q_{100} = 0.4$ CFS

Basin OSB6 (0.21 Acres)

Basin OSB6 consists of a half section of Monument Hill Road and a portion of the roadside ditch to the west of the site. The grades of this Basin generally slope between 2% to 20%. Runoff will sheet flow to the southeast and enter the roadside ditch. Where the concentrated flow will be conveyed under the north entrance of the site to the south half of the roadside ditch, via an 18" culvert at Design Point RC1. This Basin has an overall imperviousness of 49%. This basin it not tributary to the proposed full spectrum pond.

$C_{10} = 0.53$ $C_{100} = 0.65$

$Q_{10} = 0.6$ CFS $Q_{100} = 1.0$ CFS

Basin OSB7 (0.05 Acres)

Basin OSB7 consists of a half section of Monument Hill Road and the north connection to the site. The grades of this Basin generally slope between 2% to 4%. Runoff will sheet flow to the southeast enter the site through the north entrance. The sheet flow will be collected in the curb and gutter in Basin B3. This Basin has an overall imperviousness of 100%.

$C_{10} = 0.92$ $C_{100} = 0.96$

$Q_{10} = 0.3$ CFS $Q_{100} = 0.4$ CFS

Basin OSB8 (0.47 Acres)

Basin OSB8 consists of a half section of Monument Hill Road and a portion of the roadside ditch to the west of the site. The grades of this Basin generally slope between 2% to 33%. Runoff will sheet flow to the southeast and enter the roadside ditch. Where the concentrated flow will be collected by the existing southwest 24" storm sewer at design point B. It will then be conveyed to the west side of I-25 via the existing storm sewer. This Basin has an overall imperviousness of 65%. This Basin it not tributary to the proposed full spectrum pond.

$C_{10} = 0.65$ $C_{100} = 0.75$

$Q_{10} = 1.6$ CFS $Q_{100} = 2.7$ CFS

The combined Basin B 100-year runoff of 54.14 cfs that discharges to the proposed full spectrum pond at Design Point O-1 and 1.31 cfs at Design Point O-2. Basins B28 and B29 combine with Basins OSB6 and OSB8 in the roadside ditch adjacent to Monument Hill Road to discharge into the existing 24" storm sewer at Design Point B. The previously mentioned basins have a combined 100-year runoff of 4.29 cfs that enters the roadside ditch without being routed through the full spectrum pond. This flow of 4.29 cfs then combines with the

100-year release from the full spectrum pond of 10.4 cfs and enters the 24" existing storm sewer at Design Point B. Since, the full spectrum pond delays the release on the 100-year event, the peak flow at Design Point B is 10.4 cfs.

Basin C1 (0.22 Acres):

Basin C1 represents the southwest edge of the site and includes the south entrance road. Basin C1 will sheet flow south to enter the Monument Hill Road roadside ditch that runs south from the site. This Basin has an overall imperviousness of 80%. Water quality is not required for this basin because under exclusion I.7.1.C.1 that allows for 20%, not to exceed 1 acres, of the development to not be captured for water quality.

$C_{10} = 0.76$ $C_{100} = 0.84$

$Q_{10} = 1.0$ CFS $Q_{100} = 1.6$ CFS

Basin C has a total 100-year runoff of 1.6 cfs that discharges to the existing roadside ditch next to Monument Hill Road without being routed through the proposed full spectrum pond.

Under exclusion I.7.1.B.7 the project is allowed to have 20%, not to exceed 1 acre of development to not be captured and treated for water quality. There are 5 on-site basin that are not captured and treated that sum to 0.77 acres. These basins are Basins A1, B28, B29, B31, and C1.

The proposed drainage design will decrease 100-year flows going to the existing storm sewer at Design Point A from 7.27 cfs to 3.51 cfs. With the restriction of the outflows from the proposed full spectrum pond, the 100-year flows at Design Point B will decrease from 15.26 cfs to 10.4 cfs. It will decrease the 100-year flows entering the roadside ditch next to Monument Hill Road at Design Point C from 6.02 cfs to 1.6 cfs. These values and calculations can be found in Appendix B in the Existing and Developed SF Form Tables. The proposed Site will not have an adverse impact on existing downstream conveyance systems.

Stormwater Detention and Water Quality Design

Runoff from the Site will surface flow and be piped to a full spectrum pond located near the southwest corner of the Site. The full spectrum pond has been sized using the MHFD-Detention_v4.06 spreadsheet to meet the El Paso County Drainage Criteria Manual Standards. The full spectrum pond has been sized to provide Water Quality Control Volume (WQCV), Excess Urban Runoff Volume (EURV) and 100-year flood protection for the developed Site. The full spectrum pond has been sized for 11.4 acres with a watershed imperviousness of 77%. The area that is tributary to the pond is 10.98 acres however, 11.4 acres was used to size the pond to over detain stormwater on the site. This was done offset the stormwater that is not being detained on-site. The full spectrum pond is approximately 80 feet by 230 feet in size. Runoff enters the full spectrum pond via a forebay at the east end of the pond, Forebay O-1, and an 18" FES at about the midpoint of the south side of the pond, Design Point O-2. Forebay O-1 notch was calculated at 5.7 inches wide to release at 1.08 cfs. The calculation

for Forebay O-1 were made using the UD-BMP v3.07 from Mile High Flood District. The required WQCV is 0.294 ac-ft. The micropool water surface elevation and outlet pipe are at a water surface elevation of 7134.23. The WQCV provided is 0.294 ac-ft at an elevation of 7137.55. The WQCV is drained through an orifice plate that has four 1-1/4" diameter with 23" between the bottom two holes and 15" spacing for the top two holes. The 99% drain time for the WQCV is 40 hours. The EURV storage provided by the full spectrum pond is 0.675 ac-ft at an elevation of 7140.11. The EURV will be drained from the full spectrum pond through the same orifice plate as the WQCV. In the 100-year storm event, runoff overtops the overflow weir and is released through an 18" storm sewer with a restrictor plate. The restrictor plate will be 8.5 inches above the invert of the 18" pipe. An additional 0.518 ac-ft volume is provided in the full spectrum pond for the release of the 100-year runoff. The 100-year runoff will pond to an elevation of 7141.64 and will discharge at a maximum of 10.4 cfs into the roadside ditch next to Monument Hill Road The 99% drain time of the 100-year volume is 76 hours. A concrete emergency spillway is provided on the west side of the full spectrum pond. The spillway crest length is 20 feet with an invert elevation of 7142.00. The spillway end slopes are 5H:1V. The emergency spillway discharges into the roadside ditch next to Monument Hill Road The spillway was over sized to allow the flows from offsite to be bypassed over the spillway in the 100-year event. The full spectrum pond calculations are included in Appendix C.

A 15' wide maintenance access road is provided to the outlet structure of the proposed full spectrum pond.

The County of El Paso requires the UDFCD Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the WQCV, stabilizing drainageways, and implementing long-term source controls. The four steps and how they are implemented into the proposed design is below:

1) Step one is Employ Runoff Reduction Practices.
   - The existing roadside ditch on the west side of the site are being conserved and landscaping islands are being used. With the grades on site, there are no more opportunities to implement Runoff Reduction Practices.

2) Step two is Stabilize Drainage Ways.
   - No stream is located within the vicinity of this project so step three does not apply. Stormwater runoff from the Site is being provided water quality treatment and discharged into a storm sewer system rather than flowing directly into the Monument Hill Road roadside ditch. The Monument Hill Road roadside ditch is located on the west property line. This project will benefit the Monument Hill Road roadside ditch by reducing the amount of sediment tributary to the ditch from the Site and by improving the embankment and running slope of the ditch.

3) Step three is Provide a Water Quality Capture Volume.
   - Water Quality Capture Volume is provided in the full spectrum pond and is released over a period of 40 hours. Which lowers the peak flow at the existing storm sewer in the Monument Hill Road roadside ditch.

4) Step four is Identify Best Management Practices to be used to control industrial and commercial pollutants.
   - All parking, driving aisle, and loading docks drain to the proposed storm sewer system and are discharged into the full spectrum pond. This will remove pollutants from the commercial runoff.

Drainage Fees

The Site will require $23,078 per Impervious Acre for the 2023 Drainage Fee and an additional $1,262 per Impervious Acre for the 2023 Bridge Fee. With 9.04 acres of impervious area, the Site will require a Drainage Fee of $208,625.12. With 9.04 acres of impervious area, the Site will require a Bridge Fee of $11,408.48. The impervious area was determined by add all on-site areas on the SF form that include roof, drive/walk, and gravel road. This calculation can be seen in the table called Impervious Area Table in Appendix B.

$23,078 per Impervious Acre = $23,078*9.04 = $208,625.12
$1,262 per Impervious Acre = $1,262*9.04 = $11,408.48

Erosion Control Plan

A Grading and Erosion Control Plan will be submitted to the County for review and approval prior to construction.

Construction Cost Estimate

Storm sewer and water quality are required for the Site. All drainage and detention facilities are private and non-reimbursable. The storm infrastructure includes RCP storm sewer, inlets and manholes. The full spectrum pond includes an outlet structure and spillway. Below is a cost estimate for the private storm facilities and the full spectrum pond.

				UNIT	TOTAL
Strom Sewer		QUANTITY	UNIT	PRICE	COST
	18" RCP (0-8' depth)	1,150	LF	$50.00	$57,500
	24" RCP (0-8' depth)	1,150	LF	$65.00	$74,750
	36" RCP (0-8' depth)	654	LF	$100.00	$65,400
	5' Dia. Manhole	20	EA	$4,500.00	$90,000
	5' Type 'R' Inlet	2	EA	$4,750.00	$9,500
	6' Dia. Manhole	2	EA	$6,000.00	$12,000
	10' Type 'R' Inlet	1	EA	$6,500.00	$6,500
	18" Flared End Section	4	EA	$1,350.00	$5,400
	Type '13' Inlet	22	EA	$3,500.00	$77,000
	Type 'VL' Rip Rap	1,270	CY	$110.00	$139,700
	Type 'VH' Rip Rap - Spillway	2,400	CY	$100.00	$240,000
	Concrete Drainage Pan	1,255	LF	$5.00	$6,275
	Cutoff Wall - Spillway	10	CY	$1,250.00	$12,500
	Pond Gravel Access Road	4,385	SY	$10.00	$43,850
	Forebay (36"-42" Inlet)	1	EA	$15,000.00	$15,000
	Pond Outlet Structure	1	EA	$15,000.00	$15,000
	Trickle Channel	200	LF	$90.00	$18,000
				Subtotal	**$888,375**
				15% Contingency	**$133,256**
				TOTAL COST	**$1,021,631**

Other Government Agency Requirements

The proposed drainage improvements on The Rock Commerce Center will not require any other agency approval. It is not with the FEMA floodplain so will not require further review or floodplain map revisions. The full spectrum pond's spillway will not need review by the State Engineer's office since it is less than 10' in height at the centerline of the spillway

Conclusion

The proposed drainage improvements on The Rock Commerce Center will have no adverse effects to the surrounding properties, downstream storm conveyance system, or regional drainage facilities. The Site was designed in compliance with the El Paso County Stormwater Criteria. The Site development proposed is in conformance with the approved land use and zoning. This Report and its findings are in conformance with all pertinent studies related to this site. The existing roadside ditches along Monument Hill Road are in stable condition currently. The existing ditch will require new erosion control measures during and post construction. This project will require the regrading of the road side ditches so their current state will be improved. The culvert within the road side ditch running under the proposed access drive will require type VL riprap at its outlet. There will be erosion control blanket placed in the road side ditch north of the culvert but no riprap is required for protection. In the 100-year event the velocity is 1.15 fps within the road side ditch. This velocity is less than the velocities stated in table 10-4. The subcritical flow value is also less than the riprap requirements listed in table 10-6. The two culverts under I-25 currently have permanent inlet protection and new permanent inlet protection is being installed with the public improvement plans submitted with this project. The existing culverts will also be receiving less flow than in the current conditions and the flow capacity calculations are included in Appendix B of this Report.

References

REFERENCES

1. Drainage Criteria Manual Volumes 1 & 2, El Paso County. October 2018.

2. Mile High and Flood District, Denver, Colorado, Urban Storm Drainage Criteria Manual, Volume 1-3, latest online addition.

3. The El Paso County Drainage Basin Map (DBMP), El Paso County Board of Commissioners, 2005

4. Final Drainage Report for Palmer Ridge High School, Monument, Colorado, Tetra Tech, July 3, 2007

Redland
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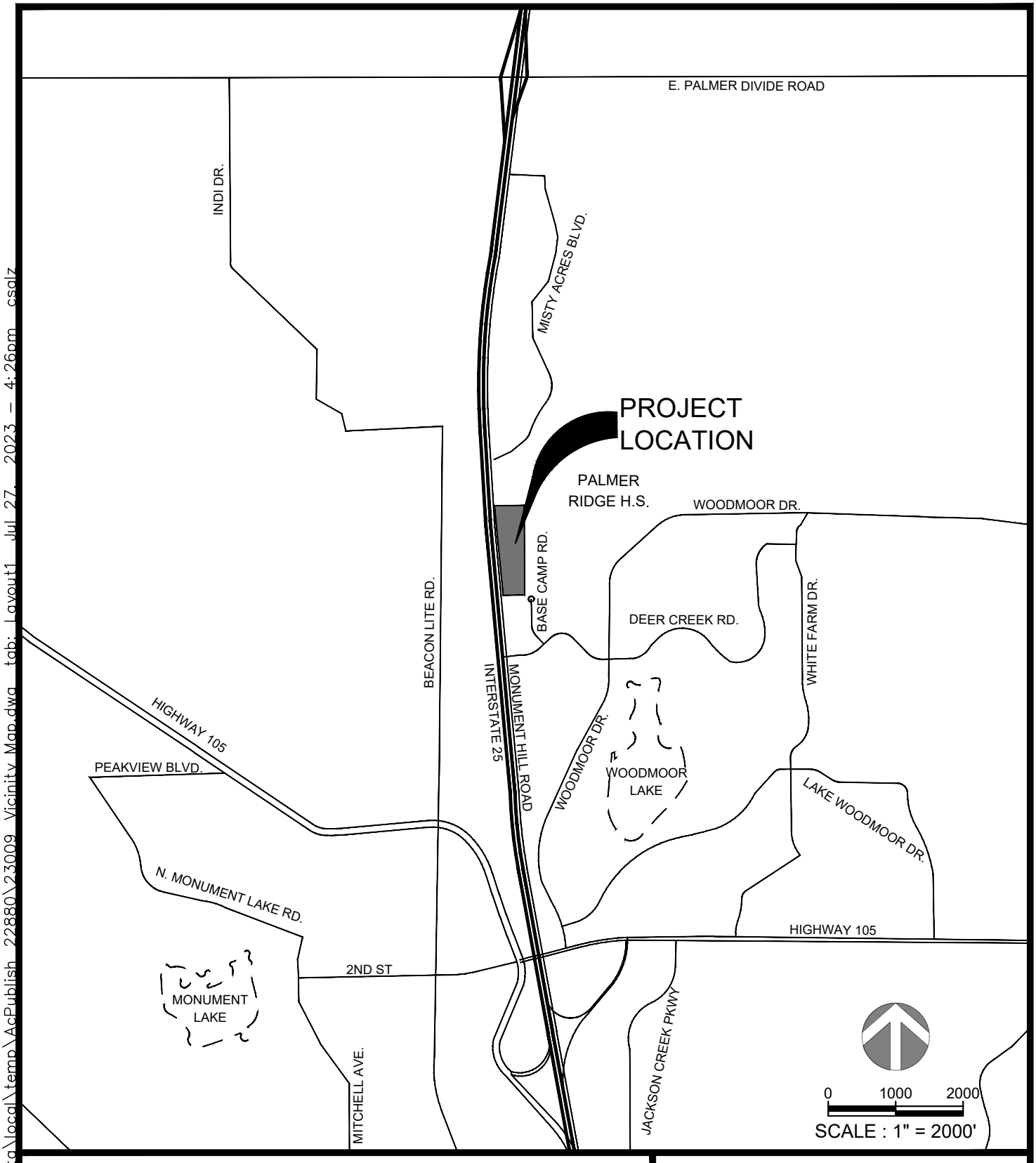
Appendix A - Vicinity Map, FIRM Map, Soils Map



THE ROCK LOT 1 FILING NO. 1

VICINTY MAP

EXHIBIT

15 YEARS Redland
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▪ Land Planning ▪ Civil Engineering ▪ Landscape Architecture ▪ Construction Management

PROJECT NO: 23009.001

DATE: 07/28/2023

DRAWING NO: 1 OF 1

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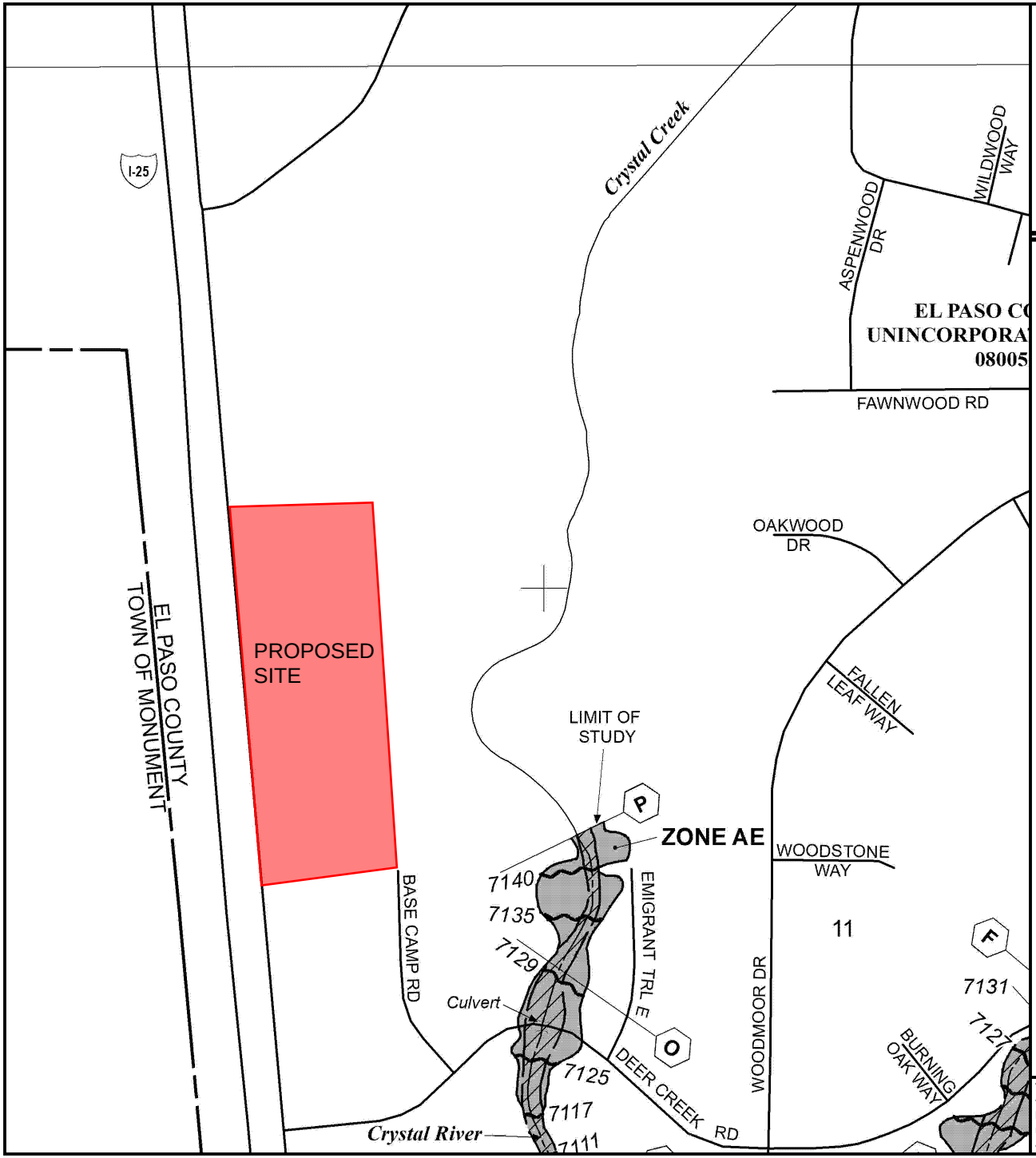

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 M

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0276G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 276 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0276	G
MONUMENT, TOWN OF	080064	0276	G
PALMER LAKE, TOWN OF	080065	0276	G

Notice: This map was reissued on 05/15/2020 to make a correction.This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

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

MAP NUMBER
08041C0276G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

Map Scale: 1:2,660 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
92	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	B	13.6	93.8%
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	0.9	6.2%
Totals for Area of Interest			**14.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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WHERE GREAT PLACES BEGIN
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Appendix B - Hydrologic Calculation

TOTAL IMPERVIOUS AREA TABLE			
BASIN	DRIVE/WALK (AC)	ROOF (AC)	GRAVEL (AC)
B16	0.00	0.30	0.00
B1	0.34	0.00	0.00
B17	0.00	0.30	0.00
B18	0.00	0.30	0.00
B2	0.35	0.00	0.00
B19	0.00	0.30	0.00
B3	0.29	0.00	0.00
B20	0.00	0.30	0.00
B4	0.19	0.00	0.00
B21	0.00	0.30	0.00
B5	0.33	0.00	0.00
B27	0.00	0.30	0.00
B7	0.23	0.00	0.00
B6	0.21	0.00	0.00
B8	0.67	0.00	0.00
B22	0.00	0.42	0.00
B9	0.42	0.00	0.00
B23	0.00	0.36	0.00
B24	0.00	0.30	0.00
B10	0.56	0.00	0.00
B25	0.00	0.30	0.00
B26	0.00	0.30	0.00
B11	0.27	0.00	0.00
B12	0.66	0.00	0.00
B13	0.35	0.00	0.00
B14	0.07	0.00	0.00
B15	0.11	0.00	0.00
C1	0.18	0.00	0.00
A1	0.00	0.00	0.00
B28	0.00	0.00	0.00
B29	0.00	0.00	0.00
B30	0.00	0.00	0.05
B31	0.02	0.00	0.00
TOTAL	5.23	3.76	0.05
TOTAL IMPERVIOUS AREA:		9.04	

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STANDARD FORM SF-1 - UNDEVELOPED RUNOFF COEFFICIENTS

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/19/2023
JURISDICTION: El Paso

LAND USE:	Drive/Walk	Roof	Lawn	Undeveloped Land	Gravel Road
IMPERVIOUSNESS	100%	90%	0%	2%	40%
C10 VALUES	0.92	0.75	0.15	0.17	0.63
C100 VALUES	0.96	0.81	0.35	0.36	0.7

NRCS SOIL TYPE: TYPE B

OVERALL SITE STUDY AREA

DESIGN BASIN	DESIGN POINT	Drive/Walk (AC)	Roof (AC)	Lawn (AC)	Undeveloped Land (AC)	Gravel Road (AC)	TOTAL AREA (AC)	$C_d(10)$	$C_d(100)$	Imp (%)
A1	A	0.00	0.00	0.00	2.35	0.00	**2.35**	0.17	0.36	2%
OSA1	A	0.40	0.00	0.00	0.35	0.00	**0.75**	0.57	0.68	54%
BASIN A		**0.40**			**2.71**		**3.10**			**14%**
		12.7%			**87.3%**		**100.0%**			
B1	B	0.00	0.00	0.00	7.40	0.00	**7.40**	0.17	0.36	2%
OSB1	B	0.00	0.00	0.00	1.14	0.00	**1.14**	0.17	0.36	2%
OSB2	B	0.38	0.00	0.00	0.38	0.00	**0.76**	0.55	0.66	51%
BASIN B		**0.38**			**8.92**		**9.29**			**6%**
		4.1%			**95.9%**		**100.0%**			
C1	C	0.00	0.00	0.00	1.86	0.00	**1.86**	0.17	0.36	2%
OSC1	C	0.00	0.00	0.00	1.91	0.00	**1.91**	0.17	0.36	2%
BASIN C					**3.77**		**3.77**			**2%**
					100.0%		**100.0%**			

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STANDARD FORM SF-2 - UNDEVELOPED TIME OF CONCENTRATION

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/16/2023
JURISDICTION: El Paso

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL Tc	RUNOFF COEFFICIENT	
DESIGN BASIN (1)	AREA (AC) (2)	C_{10} (3)	LENGTH* (FT) (4)	SLOPE (%) (5)	T_i (MINUTES) (6)	LENGTH (FT) (7)	SLOPE (%) (8)	C_v (9)	Land Surface (10)	VEL (FPS) (11)	T_t (MINUTES) (12)	COMP. t_c (13)	TOTAL LENGTH (14)	REGIONAL tc (15)	Min. t_c	C_{10}	C_{100}
A1	2.35	0.17	110	5.0%	10	445	5.0%	5.0	Tillage/Field	1.1	6.6	17.1	555	25.9	17.1	0.17	0.36
OSA1	0.75	0.57	128	3.5%	7.3	192	4.3%	5.0	Tillage/Field	1.0	3.1	10.4	320	17.0	10.4	0.57	0.68
B1	7.40	0.17	197	4.0%	15.1	962	4.4%	5.0	Tillage/Field	1.0	15.3	30.4	1159	26.3	26.3	0.17	0.36
OSB1	1.14	0.17	85	2.0%	12.5	104	16.0%	5.0	Tillage/Field	2.0	0.9	13.3	189	25.7	13.3	0.17	0.36
OSB2	0.76	0.55	100	2.0%	8.1	750	4.1%	5.0	Tillage/Field	1.0	12.3	20.4	850	17.8	17.8	0.55	0.66
C1	1.86	0.17	155	5.0%	12.4	385	3.3%	5.0	Tillage/Field	0.9	7.1	19.5	540	25.9	19.5	0.17	0.36
OSC1	1.91	0.17	165	1.0%	21.9	210	7.0%	5.0	Tillage/Field	1.3	2.6	24.5	375	25.8	24.5	0.17	0.36

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STANDARD FORM SF-3 - UNDEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 10 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 1.75

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME		
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{10}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	A	A1	2.4	0.17	17.1	0.4	3.73	1.5	17.09	0.82	3.73	3.07								
	A	OSA1	0.7	0.57	10.4	0.4	4.66	2.0	17.09	0.82	3.73	3.07								
	B	B1	7.4	0.17	26.3	1.3	2.97	3.7	26.27	1.86	2.97	5.53								
	B	OSB1	1.1	0.17	13.3	0.2	4.19	0.8	26.27	1.86	2.97	5.53								
	B	OSB2	0.8	0.55	17.8	0.4	3.66	1.5	26.27	1.86	2.97	5.53								
	C	C1	1.9	0.17	19.5	0.3	3.49	1.1	24.55	0.64	3.08	1.97								
	C	OSC1	1.9	0.17	24.5	0.3	3.08	1.0	24.55	0.64	3.08	1.97								

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STANDARD FORM SF-3 - UNDEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 2.52

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{100}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A	A1	2.4	0.36	17.1	0.8	5.37	4.6	17.09	1.35	5.37	7.27									
	A	OSA1	0.7	0.68	10.4	0.5	6.71	3.4	17.09	1.35	5.37	7.27									
	B	B1	7.4	0.36	26.3	2.7	4.27	11.4	26.27	3.57	4.27	15.26									
	B	OSB1	1.1	0.36	13.3	0.4	6.04	2.5	26.27	3.57	4.27	15.26									
	B	OSB2	0.8	0.66	17.8	0.5	5.27	2.6	26.27	3.57	4.27	15.26									
	C	C1	1.9	0.36	19.5	0.7	5.03	3.4	24.55	1.36	4.44	6.02									
	C	OSC1	1.9	0.36	24.5	0.7	4.44	3.0	24.55	1.36	4.44	6.02									

BASIN SUMMARY - UNDEVELOPED

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PROJECT NAME:	The Rock Commerce Center	DATE:	10/16/2023
PROJECT NUMBER:	23009.000	JURISDICTION:	El Paso
CALCULATED BY:	CJS		
CHECKED BY:	MC		

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C_{10}	C_{100}		Q_{10}	Q_{100}
A1	2.35	0.17	0.36	2%	1.5	4.6
OSA1	0.75	0.57	0.68	54%	2.0	3.4
B1	7.40	0.17	0.36	2%	3.7	11.4
OSB1	1.14	0.17	0.36	2%	0.8	2.5
OSB2	0.76	0.41	0.66	51%	1.5	2.6
C1	1.86	0.17	0.36	2%	1.1	3.4
OSC1	1.91	0.17	0.36	2%	1.0	3.0

STANDARD FORM SF-1 - DEVELOPED RUNOFF COEFFICIENTS

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/19/2023
JURISDICTION: El Paso

LAND USE:	Drive/Walk	Roof	Lawn	Undeveloped Land	Gravel Road
IMPERVIOUSNESS	100%	90%	0%	2%	40%
C10 VALUES	0.92	0.75	0.15	0.17	0.63
C100 VALUES	0.96	0.81	0.35	0.36	0.7

NRCS SOIL TYPE: TYPE B

OVERALL SITE STUDY AREA

DESIGN BASIN	DESIGN POINT	Drive/Walk (AC)	Roof (AC)	Lawn (AC)	Undeveloped Land (AC)	Gravel Road (AC)	TOTAL AREA (AC)	$C_d(10)$	$C_d(100)$	Imp (%)
B16	1	0.00	0.30	0.00			0.30	0.75	0.81	90%
B1	1	0.34	0.00	0.19			0.53	0.64	0.74	64%
B17	2	0.00	0.30	0.00			0.30	0.75	0.81	90%
B18	2	0.00	0.30	0.00			0.30	0.75	0.81	90%
B2	2	0.35	0.00	0.13			0.48	0.71	0.80	73%
B19	3	0.00	0.30	0.00			0.30	0.75	0.81	90%
B3	3	0.29	0.00	0.02			0.30	0.88	0.93	95%
B20	4	0.00	0.30	0.00			0.30	0.75	0.81	90%
B4	4	0.19	0.00	0.00			0.19	0.92	0.96	100%
B21	5	0.00	0.30	0.00			0.30	0.75	0.81	90%
B5	5	0.33	0.00	0.07			0.40	0.78	0.85	82%
B27	13	0.00	0.30	0.00			0.30	0.75	0.81	90%
B7	7	0.23	0.00	0.17			0.40	0.60	0.70	58%
B6	6	0.21	0.00	0.10			0.31	0.68	0.77	68%
B8	8	0.67	0.00	0.31			0.98	0.68	0.77	68%
B22	8	0.00	0.42	0.00			0.42	0.75	0.81	90%
B9	9	0.42	0.00	0.17			0.59	0.70	0.78	71%
B23	9	0.00	0.36	0.00			0.36	0.75	0.81	90%
B24	10	0.00	0.30	0.00			0.30	0.75	0.81	90%
B10	10	0.56	0.00	0.12			0.67	0.79	0.85	83%
B25	11	0.00	0.30	0.00			0.30	0.75	0.81	90%
B26	12	0.00	0.30	0.00			0.30	0.75	0.81	90%
B11	11	0.27	0.00	0.09			0.37	0.72	0.80	74%
B12	12	0.66	0.00	0.08			0.75	0.83	0.89	89%
B13	13	0.35	0.00	0.08			0.43	0.77	0.84	81%
B14	14	0.07	0.00	0.01			0.08	0.82	0.88	87%
B15	15	0.11	0.00	0.00			0.11	0.90	0.94	97%
C1	C	0.18	0.00	0.05			0.22	0.76	0.84	80%
A1	A	0.00	0.00	0.09			0.09	0.15	0.35	0%

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STANDARD FORM SF-1 - DEVELOPED RUNOFF COEFFICIENTS

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/19/2023
JURISDICTION: El Paso

B28	RC1	0.00	0.00	0.06			**0.06**	0.15	0.35	0%
B29	B	0.00	0.00	0.36			**0.36**	0.15	0.35	0%
OSB1	10	0.00	0.00	0.08			**0.08**	0.15	0.35	0%
OSB2	11	0.00	0.00	0.34			**0.34**	0.15	0.35	0%
OSB3	12	0.00	0.00	0.78			**0.78**	0.15	0.35	0%
OSB4	13	0.00	0.00	1.88			**1.88**	0.15	0.35	0%
OSA1	A	0.45	0.00	0.26			**0.71**	0.64	0.74	63%
OSB6	RC1	0.10	0.00	0.11			**0.21**	0.53	0.65	49%
OSB7	4	0.05	0.00	0.00			**0.05**	0.92	0.96	100%
OSB8	B	0.31	0.00	0.16			**0.47**	0.65	0.75	65%
OSB5	15	0.04	0.00	0.02			**0.06**	0.70	0.78	71%
B30	16	0.00	0.00	0.56		0.05	**0.61**	0.08	0.44	3%
B31	B	0.02					**0.02**	0.87	0.90	100%

Redland

STANDARD FORM SF-2 - DEVELOPED TIME OF CONCENTRATION

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/16/2023
JURISDICTION: El Paso

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL Tc	RUNOFF COEFFICIENT	
DESIGN BASIN (1)	AREA (AC) (2)	C_{10} (3)	LENGTH* (FT) (4)	SLOPE (%) (5)	T_i (MINUTES) (6)	LENGTH (FT) (7)	SLOPE (%) (8)	C_v (9)	Land Surface (10)	VEL (FPS) (11)	T_t (MINUTES) (12)	COMP. t_c (13)	TOTAL LENGTH (14)	REGIONAL tc (15)	Min. t_c	C_{10}	C_{100}
B16	0.30	0.75	50	2.5%	3	210	2.5%	20.0	Paved Areas	3.2	1.1	4.5	260	10.9	5.0	0.75	0.81
B1	0.53	0.64	77	30.0%	2.4	228	0.8%	20.0	Paved Areas	1.7	2.2	4.6	305	15.4	5.0	0.64	0.74
B17	0.30	0.75	100	2.5%	4.7	200	2.0%	20.0	Paved Areas	2.8	1.2	5.9	300	10.9	5.9	0.75	0.81
B18	0.30	0.75	50	2.5%	3.3	210	2.5%	20.0	Paved Areas	3.2	1.1	4.5	260	10.9	5.0	0.75	0.81
B2	0.48	0.71	70	5.0%	3.5	189	75.0%	20.0	Paved Areas	17.3	0.2	3.6	259	13.6	5.0	0.71	0.80
B19	0.30	0.75	50	2.5%	3.3	375	1.5%	20.0	Paved Areas	2.4	2.6	5.9	425	11.1	5.9	0.75	0.81
B3	0.30	0.88	40	2.5%	1.9	230	1.0%	20.0	Paved Areas	2.0	1.9	3.8	270	10.2	5.0	0.88	0.93
B20	0.30	0.75	50	2.5%	3.3	210	2.5%	20.0	Paved Areas	3.2	1.1	4.5	260	10.9	5.0	0.75	0.81
B4	0.19	0.92	65	3.0%	1.8	115	1.0%	20.0	Paved Areas	2.0	1.0	2.8	180	9.1	5.0	0.92	0.96
B21	0.30	0.75	50	2.5%	3.3	265	2.5%	20.0	Paved Areas	3.2	1.4	4.7	315	10.9	5.0	0.75	0.81
B5	0.40	0.78	60	3.0%	3.1	275	3.5%	20.0	Paved Areas	3.7	1.2	4.4	335	12.2	5.0	0.78	0.85
B27	0.30	0.75	50	2.5%	3.3	300	2.5%	20.0	Paved Areas	3.2	1.6	4.9	350	10.9	5.0	0.75	0.81
B7	0.40	0.60	90	30.0%	2.8	45	1.0%	20.0	Paved Areas	2.0	0.4	3.2	135	16.2	5.0	0.60	0.70
B6	0.31	0.68	90	25.0%	2.5	66	1.0%	20.0	Paved Areas	2.0	0.6	3.1	156	14.5	5.0	0.68	0.77
B8	0.98	0.68	65	33.0%	2.0	324	2.5%	20.0	Paved Areas	3.2	1.7	3.7	389	14.6	5.0	0.68	0.77
B22	0.42	0.75	75	2.0%	4.4	120	2.0%	20.0	Paved Areas	2.8	0.7	5.1	195	10.8	5.1	0.75	0.81
B9	0.59	0.70	100	18.0%	2.8	175	1.2%	20.0	Paved Areas	2.2	1.3	4.2	275	14.1	5.0	0.70	0.78
B23	0.36	0.75	50	2.5%	3.3	250	2.0%	20.0	Paved Areas	2.8	1.5	4.8	300	10.9	5.0	0.75	0.81
B24	0.30	0.75	50	2.5%	3.3	200	0.5%	20.0	Paved Areas	1.4	2.4	5.7	250	11.0	5.7	0.75	0.81
B10	0.67	0.79	100	18.0%	2.2	250	0.5%	20.0	Paved Areas	1.4	2.9	5.1	350	12.4	5.1	0.79	0.85

Redland

STANDARD FORM SF-2 - DEVELOPED TIME OF CONCENTRATION

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/16/2023
JURISDICTION: El Paso

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL Tc	RUNOFF COEFFICIENT	
DESIGN BASIN (1)	AREA (AC) (2)	C_{10} (3)	LENGTH* (FT) (4)	SLOPE (%) (5)	T_i (MINUTES) (6)	LENGTH (FT) (7)	SLOPE (%) (8)	C_v (9)	Land Surface (10)	VEL (FPS) (11)	T_t (MINUTES) (12)	COMP. t_c (13)	TOTAL LENGTH (14)	REGIONAL tc (15)	Min. t_c	C_{10}	C_{100}
B25	0.30	0.75	50	2.5%	3.3	120	2.5%	20.0	Paved Areas	3.2	0.6	4.0	170	10.8	5.0	0.75	0.81
B26	0.30	0.75	50	2.5%	3.3	280	2.5%	20.0	Paved Areas	3.2	1.5	4.8	330	10.9	5.0	0.75	0.81
B11	0.37	0.72	100	6.5%	3.7	10	1.0%	20.0	Paved Areas	2.0	0.1	3.8	110	13.4	5.0	0.72	0.80
B12	0.75	0.83	100	3.0%	3.4	290	1.7%	20.0	Paved Areas	2.6	1.9	5.2	390	11.2	5.2	0.83	0.89
B13	0.43	0.77	100	3.0%	4.2	175	4.0%	20.0	Paved Areas	4.0	0.7	4.9	275	12.4	5.0	0.77	0.84
B14	0.08	0.82	85	7.0%	2.5	47	4.2%	20.0	Paved Areas	4.1	0.2	2.6	132	11.2	5.0	0.82	0.88
B15	0.11	0.90	70	3.0%	2.2	70	4.0%	20.0	Paved Areas	4.0	0.3	2.5	140	9.6	5.0	0.90	0.94
C1	0.22	0.76	50	2.5%	3.2	125	2.0%	20.0	Paved Areas	2.8	0.7	4.0	175	12.6	5.0	0.76	0.84
A1	0.09	0.15	60	3.3%	9.0	215	3.0%	7.0	Short Pasture/Lawn	1.2	3.0	12.0	275	26.2	12.0	0.15	0.35
B28	0.06	0.15	40	5.0%	6.4	200	7.5%	7.0	Short Pasture/Lawn	1.9	1.7	8.2	240	26.1	8.2	0.15	0.35
B29	0.36	0.15	40	5.0%	6.4	470	4.0%	7.0	Short Pasture/Lawn	1.4	5.6	12.0	510	26.3	12.0	0.15	0.35
OSB1	0.08	0.15	75	7.4%	7.7	180	4.0%	20.0	Paved Areas	4.0	0.8	8.5	255	26.1	8.5	0.15	0.35
OSB2	0.34	0.15	100	3.9%	11.1	165	3.5%	20.0	Paved Areas	3.7	0.7	11.8	265	26.1	11.8	0.15	0.35
OSB3	0.78	0.15	100	7.2%	9.0	230	10.9%	20.0	Paved Areas	6.6	0.6	9.6	330	26.1	9.6	0.15	0.35
OSB4	1.88	0.15	100	2.3%	13.2	350	14.3%	7.0	Short Pasture/Lawn	2.6	2.2	15.4	450	26.1	15.4	0.15	0.35
OSA1	0.71	0.64	100	2.5%	6.2	250	3.5%	20.0	Paved Areas	3.7	1.1	7.3	350	15.4	7.3	0.64	0.74
OSB6	0.21	0.53	75	2.5%	6.7	200	7.5%	20.0	Paved Areas	5.5	0.6	7.3	275	17.7	7.3	0.53	0.65
OSB7	0.05	0.92	84	4.0%	1.9	0	1.0%	20.0	Paved Areas	2.0	0.0	1.9	84	9.0	5.0	0.92	0.96
OSB8	0.47	0.65	90	2.5%	5.7	470	4.0%	20.0	Paved Areas	4.0	2.0	7.7	560	15.2	7.7	0.65	0.75
OSB5	0.06	0.70	60	7.0%	3.0	120	1.0%	20.0	Paved Areas	2.0	1.0	4.0	180	14.0	5.0	0.70	0.78

Redland

STANDARD FORM SF-2 - DEVELOPED TIME OF CONCENTRATION

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

DATE: 10/16/2023
JURISDICTION: El Paso

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL Tc	RUNOFF COEFFICIENT	
DESIGN BASIN (1)	AREA (AC) (2)	C_{10} (3)	LENGTH* (FT) (4)	SLOPE (%) (5)	T_i (MINUTES) (6)	LENGTH (FT) (7)	SLOPE (%) (8)	C_v (9)	Land Surface (10)	VEL (FPS) (11)	T_t (MINUTES) (12)	COMP. t_c (13)	TOTAL LENGTH (14)	REGIONAL tc (15)	Min. t_c	C_{10}	C_{100}
B30	0.61	0.08	50	33.0%	4.1	200	1.0%	7.0	Short Pasture/Lawn	0.7	4.8	8.9	250	25.7	8.9	0.08	0.44
B31	0.02	0.87	100	7.0%	2.2	475	4.6%	7.0	Short Pasture/Lawn	1.5	5.3	7.5	575	9.3	7.5	0.87	0.90

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 10 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 1.75

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{10}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	1	B16	0.3	0.75	5.0	0.2	5.94	1.3	5.00	0.56	5.94	3.35									
	1	B1	0.5	0.64	5.0	0.3	5.94	2.0	5.00	0.56	5.94	3.35									
	2	B17	0.3	0.75	5.9	0.2	5.67	1.3	5.91	0.79	5.67	4.46									
	2	B18	0.3	0.75	5.0	0.2	5.94	1.3	5.91	0.79	5.67	4.46									
	2	B2	0.5	0.71	5.0	0.3	5.94	2.0	5.91	0.79	5.67	4.46									
	3	B19	0.3	0.75	5.9	0.2	5.67	1.3	5.89	0.49	5.67	2.78									
	3	B3	0.3	0.88	5.0	0.3	5.94	1.6	5.89	0.49	5.67	2.78									
	4	B20	0.3	0.75	5.0	0.2	5.94	1.3	5.00	0.44	5.94	2.63									
	4	B4	0.2	0.92	5.0	0.2	5.94	1.0	5.00	0.44	5.94	2.63									
	5	B21	0.3	0.75	5.0	0.2	5.94	1.3	5.00	0.54	5.94	3.19									
	5	B5	0.4	0.78	5.0	0.3	5.94	1.8	5.00	0.54	5.94	3.19									
	13	B27	0.3	0.75	5.0	0.2	5.94	1.3	15.40	0.84	3.92	3.30									
	7	B7	0.4	0.60	5.0	0.2	5.94	1.4	5.00	0.24	5.94	1.40									
	6	B6	0.3	0.68	5.0	0.2	5.94	1.2	5.00	0.21	5.94	1.24									
	8	B8	1.0	0.68	5.0	0.7	5.94	3.9	5.12	0.98	5.90	5.76									
	8	B22	0.4	0.75	5.1	0.3	5.90	1.8	5.12	0.98	5.90	5.76									
	9	B9	0.6	0.70	5.0	0.4	5.94	2.4	5.00	0.68	5.94	4.03									
	9	B23	0.4	0.75	5.0	0.3	5.94	1.6	5.00	0.68	5.94	4.03									
	10	B24	0.3	0.75	5.7	0.2	5.73	1.3	8.49	0.76	5.04	3.85									
	10	B10	0.7	0.79	5.1	0.5	5.89	3.1	8.49	0.76	5.04	3.85									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 10 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 1.75

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{10}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	11	B25	0.3	0.75	5.0	0.2	5.94	1.3	11.80	0.54	4.42	2.39									
	12	B26	0.3	0.75	5.0	0.2	5.94	1.3	9.60	0.96	4.81	4.63									
	11	B11	0.4	0.72	5.0	0.3	5.94	1.6	11.80	0.54	4.42	2.39									
	12	B12	0.7	0.83	5.2	0.6	5.86	3.6	9.60	0.96	4.81	4.63									
	13	B13	0.4	0.77	5.0	0.3	5.94	2.0	15.40	0.84	3.92	3.30									
	14	B14	0.1	0.82	5.0	0.1	5.94	0.4	5.00	0.06	5.94	0.38									
	15	B15	0.1	0.90	5.0	0.1	5.94	0.6	5.00	0.14	5.94	0.85									
	C	C1	0.2	0.76	5.0	0.2	5.94	1.0	5.00	0.17	5.94	1.01									
	A	A1	0.1	0.15	12.0	0.0	4.39	0.1	11.99	0.47	4.39	2.05									
	RC1	B28	0.1	0.15	8.2	0.0	5.10	0.0	8.18	0.12	5.10	0.61									
	B	B29	0.4	0.15	12.0	0.1	4.39	0.2	12.04	0.38	4.39	1.66									
	10	OSB1	0.1	0.15	8.5	0.0	5.04	0.1	8.49	0.76	5.04	3.85									
	11	OSB2	0.3	0.15	11.8	0.1	4.42	0.2	11.80	0.54	4.42	2.39									
	12	OSB3	0.8	0.15	9.6	0.1	4.81	0.6	9.60	0.96	4.81	4.63									
	13	OSB4	1.9	0.15	15.4	0.3	3.92	1.1	15.40	0.84	3.92	3.30									
	A	OSA1	0.7	0.64	7.3	0.5	5.29	2.4	11.99	0.47	4.39	2.05									
	RC1	OSB6	0.2	0.53	7.3	0.1	5.31	0.6	8.18	0.12	5.10	0.61									
	4	OSB7	0.1	0.92	5.0	0.0	5.94	0.3	5.00	0.44	5.94	2.63									
	B	OSB8	0.5	0.65	7.7	0.3	5.21	1.6	12.04	0.38	4.39	1.66									
	15	OSB5	0.1	0.70	5.0	0.0	5.94	0.2	5.00	0.14	5.94	0.85									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 10 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 1.75

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{10}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	16	B30	0.6	0.08	8.9	0.1	4.96	0.3	8.87	0.05	4.96	0.26									
	B	B31	0.0	0.87	7.5	0.0	5.26	0.1	12.04	0.38	4.39	1.66									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 2.52

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{100}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	1	B16	0.3	0.81	5.0	0.2	8.55	2.1	5.00	0.63	8.55	5.42									
	1	B1	0.5	0.74	5.0	0.4	8.55	3.4	5.00	0.63	8.55	5.42									
	2	B17	0.3	0.81	5.9	0.2	8.16	2.0	5.91	0.86	8.16	7.04									
	2	B18	0.3	0.81	5.0	0.2	8.55	2.1	5.91	0.86	8.16	7.04									
	2	B2	0.5	0.80	5.0	0.4	8.55	3.2	5.91	0.86	8.16	7.04									
	3	B19	0.3	0.81	5.9	0.2	8.17	2.0	5.89	0.52	8.17	4.28									
	3	B3	0.3	0.93	5.0	0.3	8.55	2.4	5.89	0.52	8.17	4.28									
	4	B20	0.3	0.81	5.0	0.2	8.55	2.1	5.00	0.47	8.55	4.03									
	4	B4	0.2	0.96	5.0	0.2	8.55	1.5	5.00	0.47	8.55	4.03									
	5	B21	0.3	0.81	5.0	0.2	8.55	2.1	5.00	0.58	8.55	4.98									
	5	B5	0.4	0.85	5.0	0.3	8.55	2.9	5.00	0.58	8.55	4.98									
	13	B27	0.3	0.81	5.0	0.2	8.55	2.1	15.40	1.27	5.65	7.16									
	7	B7	0.4	0.70	5.0	0.3	8.55	2.4	5.00	0.28	8.55	2.39									
	6	B6	0.3	0.77	5.0	0.2	8.55	2.0	5.00	0.24	8.55	2.02									
	8	B8	1.0	0.77	5.0	0.8	8.55	6.4	5.12	1.09	8.50	9.26									
	8	B22	0.4	0.81	5.1	0.3	8.50	2.9	5.12	1.09	8.50	9.26									
	9	B9	0.6	0.78	5.0	0.5	8.55	3.9	5.00	0.75	8.55	6.42									
	9	B23	0.4	0.81	5.0	0.3	8.55	2.5	5.00	0.75	8.55	6.42									
	10	B24	0.3	0.81	5.7	0.2	8.25	2.0	8.49	0.84	7.25	6.13									
	10	B10	0.7	0.85	5.1	0.6	8.49	4.9	8.49	0.84	7.25	6.13									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 2.52

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{100}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	11	B25	0.3	0.81	5.0	0.2	8.55	2.1	11.80	0.66	6.37	4.18									
	12	B26	0.3	0.81	5.0	0.2	8.55	2.1	9.60	1.18	6.93	8.16									
	11	B11	0.4	0.80	5.0	0.3	8.55	2.5	11.80	0.66	6.37	4.18									
	12	B12	0.7	0.89	5.2	0.7	8.44	5.6	9.60	1.18	6.93	8.16									
	13	B13	0.4	0.84	5.0	0.4	8.55	3.1	15.40	1.27	5.65	7.16									
	14	B14	0.1	0.88	5.0	0.1	8.55	0.6	5.00	0.07	8.55	0.58									
	15	B15	0.1	0.94	5.0	0.1	8.55	0.9	5.00	0.15	8.55	1.31									
	C	C1	0.2	0.84	5.0	0.2	8.55	1.6	5.00	0.19	8.55	1.60									
	A	A1	0.1	0.35	12.0	0.0	6.33	0.2	11.99	0.55	6.33	3.51									
	RC1	B28	0.1	0.35	8.2	0.0	7.35	0.1	8.18	0.16	7.35	1.15									
	B	B29	0.4	0.35	12.0	0.1	6.32	0.8	12.04	0.50	6.32	3.14									
	10	OSB1	0.1	0.35	8.5	0.0	7.25	0.2	8.49	0.84	7.25	6.13									
	11	OSB2	0.3	0.35	11.8	0.1	6.37	0.8	11.80	0.66	6.37	4.18									
	12	OSB3	0.8	0.35	9.6	0.3	6.93	1.9	9.60	1.18	6.93	8.16									
	13	OSB4	1.9	0.35	15.4	0.7	5.65	3.7	15.40	1.27	5.65	7.16									
	A	OSA1	0.7	0.74	7.3	0.5	7.62	4.0	11.99	0.55	6.33	3.51									
	RC1	OSB6	0.2	0.65	7.3	0.1	7.64	1.0	8.18	0.16	7.35	1.15									
	4	OSB7	0.1	0.96	5.0	0.1	8.55	0.4	5.00	0.47	8.55	4.03									
	B	OSB8	0.5	0.75	7.7	0.4	7.51	2.7	12.04	0.50	6.32	3.14									
	15	OSB5	0.1	0.78	5.0	0.0	8.55	0.4	5.00	0.15	8.55	1.31									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: The Rock Commerce Center
PROJECT NUMBER: 23009
CALCULATED BY: CJS
CHECKED BY: MC

P_1 (1-Hour Rainfall) = 2.52

DATE: 10/16/2023
JURISDICTION: El Paso

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{100}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	16	B30	0.6	0.44	8.9	0.3	7.14	1.9	8.87	0.27	7.14	1.92									
	B	B31	0.0	0.90	7.5	0.0	7.57	0.1	12.04	0.50	6.32	3.14									

BASIN SUMMARY - DEVELOPED

Redland

PROJECT NAME:	The Rock Commerce Center	DATE:	10/16/2023
PROJECT NUMBER:	23009.000	JURISDICTION:	El Paso
CALCULATED BY:	CJS		
CHECKED BY:	0		

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C10	C_{100}		Q10	Q_{100}
B16	0.30	0.75	0.81	90%	1.3	2.1
B1	0.53	0.64	0.74	64%	2.0	3.4
B17	0.30	0.75	0.81	90%	1.3	2.0
B18	0.30	0.75	0.81	90%	1.3	2.1
B2	0.48	0.71	0.80	73%	2.0	3.2
B19	0.30	0.75	0.81	90%	1.3	2.0
B3	0.30	0.88	0.93	95%	1.6	2.4
B20	0.30	0.75	0.81	90%	1.3	2.1
B4	0.19	0.92	0.96	100%	1.0	1.5
B21	0.30	0.75	0.81	90%	1.3	2.1
B5	0.40	0.78	0.85	82%	1.8	2.9
B27	0.30	0.75	0.81	90%	1.3	2.1
B7	0.40	0.60	0.70	58%	1.4	2.4
B6	0.31	0.68	0.77	68%	1.2	2.0
B8	0.98	0.68	0.77	68%	3.9	6.4
B22	0.42	0.75	0.81	90%	1.8	2.9
B9	0.59	0.70	0.78	71%	2.4	3.9
B23	0.36	0.75	0.81	90%	1.6	2.5
B24	0.30	0.75	0.81	90%	1.3	2.0
B10	0.67	0.79	0.85	83%	3.1	4.9
B25	0.30	0.75	0.81	90%	1.3	2.1
B26	0.30	0.75	0.81	90%	1.3	2.1
B11	0.37	0.72	0.80	74%	1.6	2.5
B12	0.75	0.83	0.89	89%	3.6	5.6
B13	0.43	0.77	0.84	81%	2.0	3.1
B14	0.08	0.82	0.88	87%	0.4	0.6
B15	0.11	0.90	0.94	97%	0.6	0.9
C1	0.22	0.76	0.84	80%	1.0	1.6
A1	0.09	0.15	0.35	0%	0.1	0.2
B28	0.06	0.15	0.35	0%	0.0	0.1
B29	0.36	0.15	0.35	0%	0.2	0.8
OSB1	0.08	0.15	0.35	0%	0.1	0.2
OSB2	0.34	0.15	0.35	0%	0.2	0.8
OSB3	0.78	0.15	0.35	0%	0.6	1.9
OSB4	1.88	0.15	0.35	0%	1.1	3.7
OSA1	0.71	0.64	0.74	63%	2.4	4.0
OSB6	0.21	0.53	0.65	49%	0.6	1.0
OSB7	0.05	0.92	0.96	100%	0.3	0.4
OSB8	0.47	0.65	0.75	65%	1.6	2.7
OSB5	0.06	0.70	0.78	71%	0.2	0.4
B30	0.61	0.08	0.44	3%	0.3	1.9
B31	0.02	0.87	0.90	100%	0.1	0.1

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WHERE GREAT PLACES BEGIN
720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

Appendix C - Hydraulic Calculations

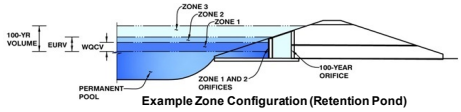
BASINS TRIBUTARY TO POND		
BASIN	AREA	% IMPERVIOUS
B1	0.53	64%
B2	0.48	73%
B3	0.3	95%
B4	0.19	100%
B5	0.4	82%
B6	0.31	68%
B7	0.4	58%
B8	0.98	68%
B9	0.59	71%
B10	0.67	83%
B11	0.37	74%
B12	0.75	89%
B13	0.43	81%
B14	0.08	87%
B15	0.11	97%
B16	0.3	90%
B17	0.3	90%
B18	0.3	90%
B19	0.3	90%
B20	0.3	90%
B21	0.3	90%
B22	0.42	90%
B23	0.36	90%
B24	0.3	90%
B25	0.3	90%
B26	0.3	90%
B27	0.3	90%
B30	0.61	3%
TOTAL:	10.98	77%

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: 23009 - The Rock Lot 1 Filing No. 1

Basin ID: Basin B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	11.38	acres
Watershed Length =	1,550	ft
Watershed Length to Centroid =	775	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	77.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.294	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.969	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.867	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.153	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.392	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	1.660	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	1.907	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.192	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.39 in.) =	3.067	acre-feet	3.39	inches
Approximate 2-yr Detention Volume =	0.765	acre-feet		
Approximate 5-yr Detention Volume =	1.011	acre-feet		
Approximate 10-yr Detention Volume =	1.261	acre-feet		
Approximate 25-yr Detention Volume =	1.352	acre-feet		
Approximate 50-yr Detention Volume =	1.405	acre-feet		
Approximate 100-yr Detention Volume =	1.488	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.294	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.675	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.518	acre-feet
Total Detention Basin Volume =	1.488	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = 1.00 ft

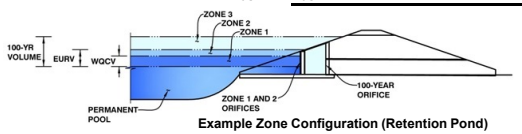
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
7135	--	1.00	--	--	--	747	0.017	374	0.009
7136	--	2.00	--	--	--	4,659	0.107	3,077	0.071
7137	--	3.00	--	--	--	9,002	0.207	9,907	0.227
7138	--	4.00	--	--	--	10,517	0.241	19,667	0.451
7139	--	5.00	--	--	--	12,089	0.278	30,970	0.711
7140	--	6.00	--	--	--	13,719	0.315	43,875	1.007
7141	--	7.00	--	--	--	15,407	0.354	58,438	1.342
7142	--	8.00	--	--	--	17,156	0.394	74,720	1.715
	--	9.00	--	--	--	18,969	0.435	92,782	2.130
	--	10.00	--	--	--	20,803	0.478	112,668	2.586

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: 23009 - The Rock Lot 1 Filing No. 1

Basin ID: Basin B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.32	0.294	Orifice Plate
Zone 2 (EURV)	5.88	0.675	Orifice Plate
Zone 3 (100-year)	7.41	0.518	Weir&Pipe (Restrict)
Total (all zones)		1.488	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft²
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	9.028E-03	ft²
Depth at top of Zone using Orifice Plate =	5.88	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	1.30	sq. inches (diameter = 1-1/4 inches)	Elliptical Slot Area =	N/A	ft²

Calculated Parameters for Plate

This was updated to be 1.35 on final calculations.

change to 1.35

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.91	3.16	4.41				
Orifice Area (sq. inches)	1.30	1.30	1.30	1.30				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft²
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.88	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.88	N/A	feet
Overflow Weir Front Edge Length =	3.00	N/A	feet	Overflow Weir Slope Length =	4.12	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	10.48	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	8.61	N/A	ft²
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	8.61	N/A	ft²
Debris Clogging % =	0%	N/A	%				

Calculated Parameters for Overflow Weir

This was updated to be 50% on final calculations.

assume 50%

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.82	N/A	ft²
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.41	N/A	feet
Restrictor Plate Height Above Pipe Invert =	8.50		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.52	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.62	feet
Spillway Crest Length =	20.00	feet	Stage at Top of Freeboard =	9.62	feet
Spillway End Slopes =	5.00	H:V	Basin Area at Top of Freeboard =	0.46	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	2.41	acre-ft

Calculated Parameters for Spillway

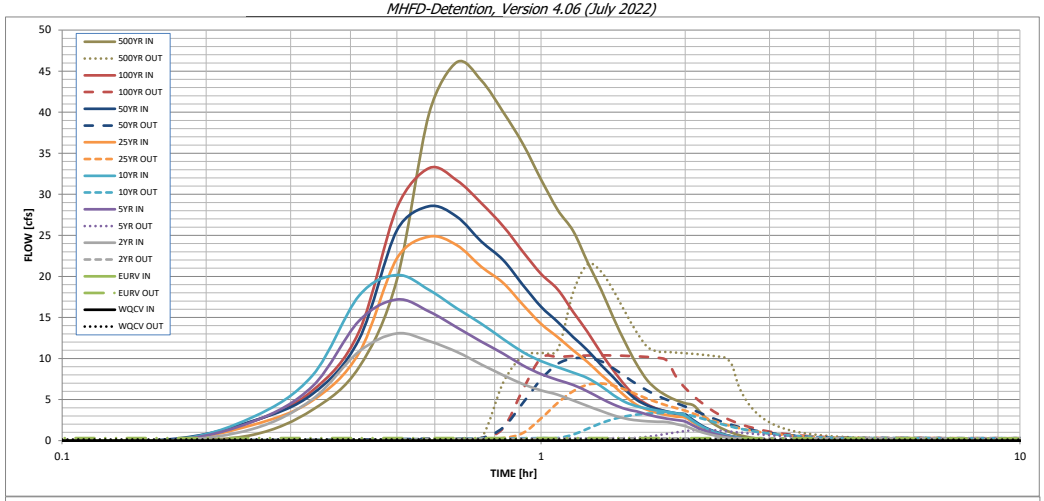
Routed Hydrograph Results

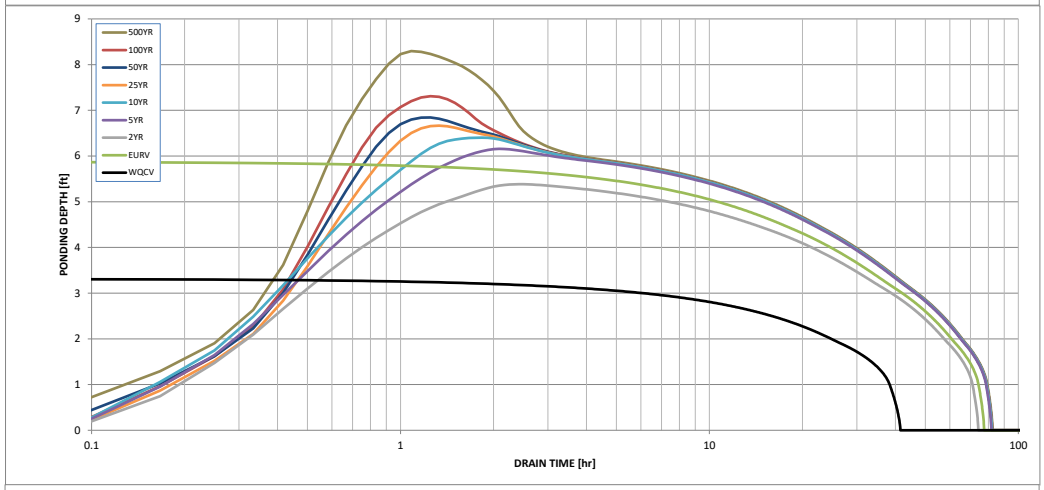
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

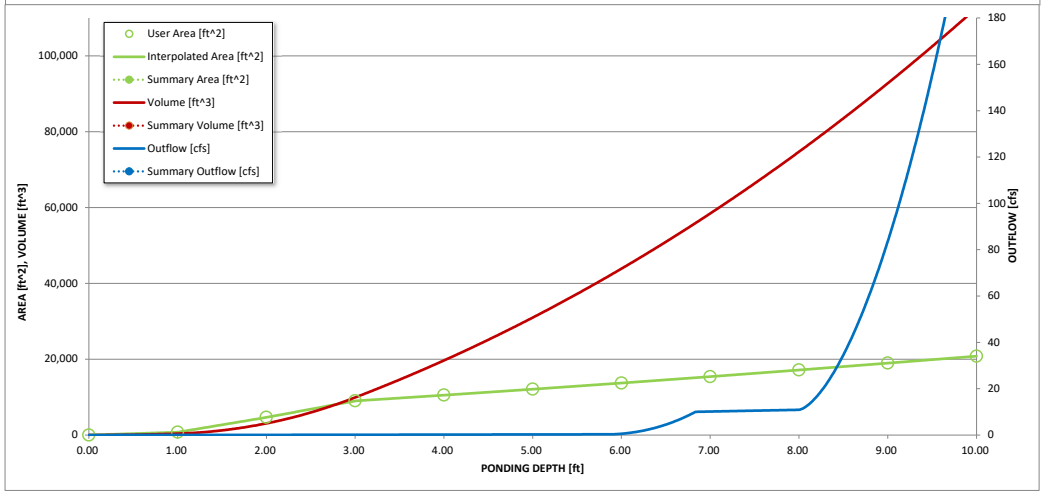
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.39
CUHP Runoff Volume (acre-ft) =	0.294	0.969	0.867	1.153	1.392	1.660	1.907	2.192	3.067
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.867	1.153	1.392	1.660	1.907	2.192	3.067
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.9	2.6	4.0	7.3	9.2	11.7	18.4
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.08	0.23	0.35	0.64	0.80	1.03	1.61
Peak Inflow Q (cfs) =	N/A	N/A	13.1	17.2	20.2	24.9	28.6	33.2	46.1
Peak Outflow Q (cfs) =	0.1	0.3	0.3	1.3	3.4	7.0	10.0	10.4	21.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	0.8	1.0	1.1	0.9	1.2
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.3	0.8	1.1	1.2	1.2
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	69	67	72	71	69	68	66	63
Time to Drain 99% of Inflow Volume (hours) =	**40**	74	71	78	78	77	76	76	74
Maximum Ponding Depth (ft) =	3.32	5.88	5.39	6.16	6.40	6.67	6.84	7.31	8.30
Area at Maximum Ponding Depth (acres) =	0.22	0.31	0.29	0.32	0.33	0.34	0.35	0.37	0.41
Maximum Volume Stored (acre-ft) =	0.295	0.970	0.819	1.055	1.136	1.224	1.285	1.453	1.831

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	SD IN1	SD IN2	SD IN3
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump
Inlet Type	CDOT/Denver 13 Valley Grate	CDOT/Denver 13 Valley Grate	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.4	4.5	5.4
Major Q_{Known} (cfs)	5.4	7.0	8.3

Bypass (Carry-Over) Flow from Upstream

Inlets must be organized from upstream (left) to downstream (right) in order for bypass flows to be linked.

Receive Bypass Flow from:	No Bypass Flow Received	User-Defined	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.4**	**4.5**	**5.4**
Major Total Design Peak Flow, Q (cfs)	**5.4**	**7.0**	**8.3**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	SD IN4	SD IN5	SD IN6
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump
Inlet Type	CDOT/Denver 13 Combination	CDOT/Denver 13 Valley Grate	CDOT/Denver 13 Valley Grate

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.2	1.2	1.4
Major Q_{Known} (cfs)	5.0	2.0	2.4

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.2**	**1.2**	**1.4**
Major Total Design Peak Flow, Q (cfs)	**5.0**	**2.0**	**2.4**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	SD IN7	SD IN8	SD IN9
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	On Grade	In Sump
Inlet Type	CDOT/Denver 13 Valley Grate	CDOT/Denver 13 Valley Grate	CDOT/Denver 13 Valley Grate

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	5.8	4.0	3.9
Major Q_{Known} (cfs)	9.3	6.4	6.1

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	User-Defined
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	2.1
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	3.7

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**5.8**	**4.0**	**6.0**
Major Total Design Peak Flow, Q (cfs)	**9.3**	**6.4**	**9.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	2.1	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	3.7	N/A

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	SD IN10	SD IN11	SD IN12
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	On Grade	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT/Denver 13 Combination	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	2.4	4.6	3.3
Major Q_{Known} (cfs)	4.2	8.2	7.2

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	User-Defined
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.2
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	1.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**2.4**	**4.6**	**3.5**
Major Total Design Peak Flow, Q (cfs)	**4.2**	**8.2**	**8.2**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	0.2	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	1.0	N/A

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	SD IN13	SD IN14
Site Type (Urban or Rural)	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	On Grade	On Grade
Inlet Type	CDOT/Denver 13 Combination	CDOT/Denver 13 Combination

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	0.4	0.9
Major Q_{Known} (cfs)	0.6	1.3

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	User-Defined	User-Defined
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.1

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

Overland Slope (ft/ft)		
Overland Length (ft)		
Channel Slope (ft/ft)		
Channel Length (ft)		

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**0.4**	**0.9**
Major Total Design Peak Flow, Q (cfs)	**0.6**	**1.4**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.1	0.0

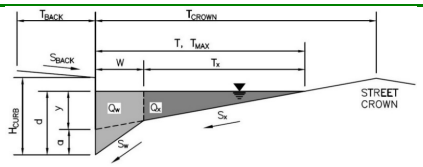
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN1**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.050	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	14.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.035	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	14.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

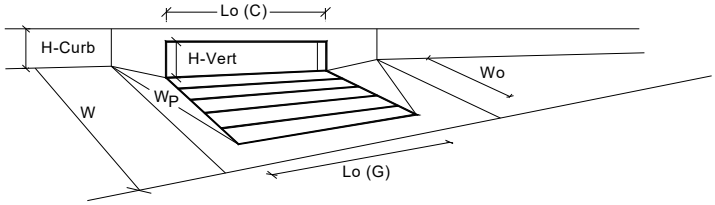
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



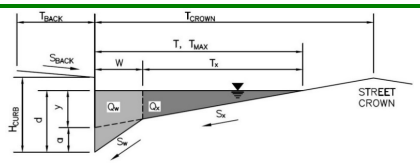
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.8	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.52	0.59	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.57	0.64	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.4**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	3.4	5.4	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN2**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	14.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.030	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

Maximum Capacity for 1/2 Street based On Allowable Spread

		Minor Storm	Major Storm	
Water Depth without Gutter Depression (T * S_x * 12)	y =	6.48	6.48	inches
Vertical Depth between Gutter Lip and Gutter Flowline (W * S_w * 12)	d_C =	2.0	2.0	inches
Gutter Depression (d_C - (W * S_x * 12))	a =	1.27	1.27	inches
Water Depth at Gutter Flowline (y + a)	d =	7.75	7.75	inches
Allowable Spread for Discharge outside the Gutter Section (T - W)	T_X =	16.0	16.0	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. 7-7)	E_O =	0.304	0.304	
Discharge outside the Gutter Section, carried in Section T_X	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section (Q_T - Q_X - Q_{BACK})	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	0.0	cfs
Maximum Flow Based On Allowable Spread	**Q_T =**	**SUMP**	**SUMP**	**cfs**
Flow Velocity within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity times Gutter Flowline Depth	V*d =	0.0	0.0	

Maximum Capacity for 1/2 Street based on Allowable Depth

		Minor Storm	Major Storm	
Theoretical Water Spread	T_{TH} =	13.1	29.8	ft
Theoretical Spread for Discharge outside the Gutter Section (T - W)	$T_{X\,TH}$ =	11.1	27.8	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. 7-7)	E_O =	0.411	0.184	
Theoretical Discharge outside the Gutter Section, carried in Section $T_{X\,TH}$	$Q_{X\,TH}$ =	0.0	0.0	cfs
Actual Discharge outside the Gutter Section, (limited by distance T_{CROWN})	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section (Q_d - Q_X)	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	0.0	cfs
Total Discharge for Major & Minor Storm (Pre-Safety Factor)	Q =	SUMP	SUMP	cfs
Average Flow Velocity Within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity Times Gutter Flowline Depth	V*d =	0.0	0.0	
Slope-Based Safety Factor for Minor/Major Storm depth reduction, d ≥ 6"	R =	SUMP	SUMP	
Max Flow based on Allowable Depth (Safety Factor Applied)	**Q_d =**	**SUMP**	**SUMP**	**cfs**
Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)	d =			inches
Resultant Flow Depth at Street Crown (Safety Factor Applied)	d_{CROWN} =			inches

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

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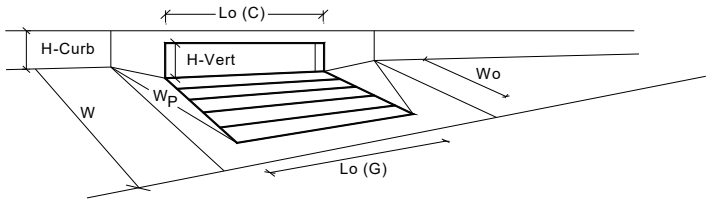


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.5	8.2	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.56	0.70	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.61	0.77	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.3**	**9.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	4.5	7.0	cfs

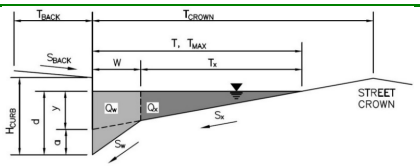
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	4.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.010	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.3	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

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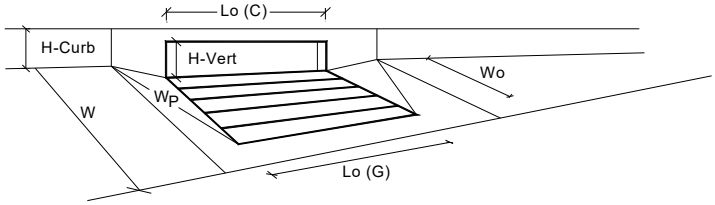


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.3	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.35	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	0.95	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.3**	**9.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	5.4	8.3	cfs

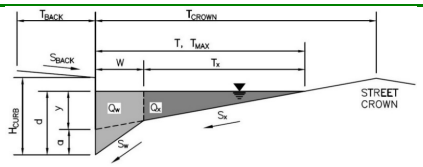
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: SD IN4



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.030	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

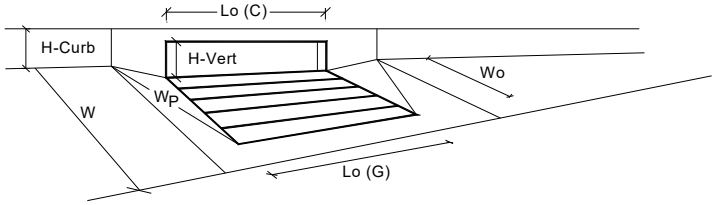
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.52	0.52	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.33	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.94	0.94	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.94	0.94	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.1**	**5.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	3.2	5.0	cfs

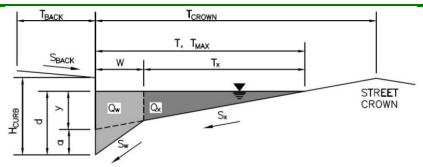
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN5**



Gutter Geometry:

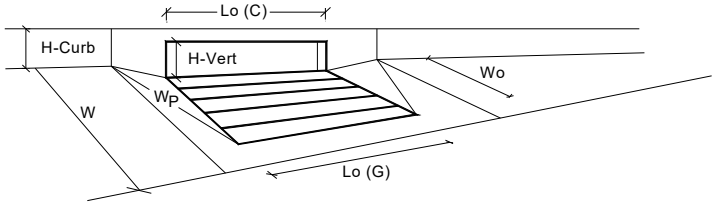
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	12.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	7.9	7.9	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	7.9	7.9	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.68	0.68	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	1.00	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.0**	**4.0**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.2	2.0	cfs

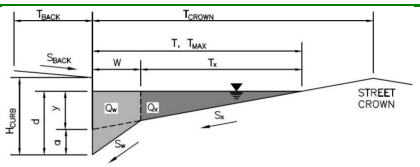
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN6**



Gutter Geometry:

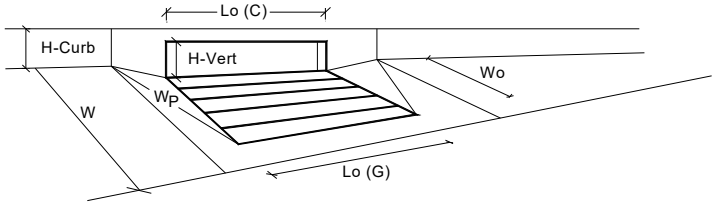
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	12.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.52	0.52	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.94	0.94	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.6**	**2.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.4	2.4	cfs

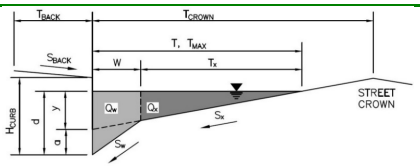
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN7**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	11.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	25.0	ft
Gutter Width	W =	5.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.5	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	8.8	8.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

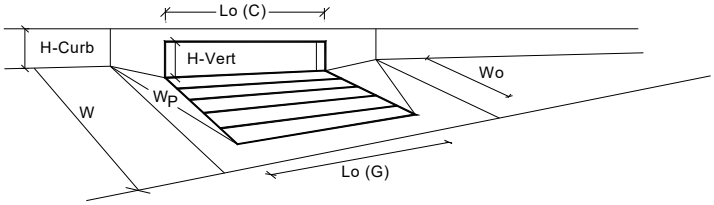
Maximum Capacity for 1/2 Street based On Allowable Spread		Minor Storm	Major Storm	
Water Depth without Gutter Depression (T * S_x * 12)	y =	6.00	8.64	inches
Vertical Depth between Gutter Lip and Gutter Flowline (W * S_w * 12)	d_C =	5.0	5.0	inches
Gutter Depression (d_C - (W * S_x * 12))	a =	2.58	2.58	inches
Water Depth at Gutter Flowline (y + a)	d =	8.58	11.22	inches
Allowable Spread for Discharge outside the Gutter Section (T - W)	T_X =	7.5	13.0	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. 7-7)	E_O =	0.815	0.646	
Discharge outside the Gutter Section, carried in Section T_X	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section (Q_T - Q_X - Q_{BACK})	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	#DIV/0!	cfs
Maximum Flow Based On Allowable Spread	**Q_T =**	**SUMP**	**SUMP**	**cfs**
Flow Velocity within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity times Gutter Flowline Depth	V*d =	0.0	0.0	

Maximum Capacity for 1/2 Street based on Allowable Depth		Minor Storm	Major Storm	
Theoretical Water Spread	T_{TH} =	12.9	12.9	ft
Theoretical Spread for Discharge outside the Gutter Section (T - W)	$T_{X\,TH}$ =	7.9	7.9	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. 7-7)	E_O =	0.803	0.803	
Theoretical Discharge outside the Gutter Section, carried in Section $T_{X\,TH}$	$Q_{X\,TH}$ =	0.0	0.0	cfs
Actual Discharge outside the Gutter Section, (limited by distance T_{CROWN})	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section (Q_d - Q_X)	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	0.0	cfs
Total Discharge for Major & Minor Storm (Pre-Safety Factor)	Q =	SUMP	SUMP	cfs
Average Flow Velocity Within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity Times Gutter Flowline Depth	V*d =	0.0	0.0	
Slope-Based Safety Factor for Minor/Major Storm depth reduction, d ≥ 6"	R =	SUMP	SUMP	
Max Flow based on Allowable Depth (Safety Factor Applied)	**Q_d =**	**SUMP**	**SUMP**	**cfs**
Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)	d =			inches
Resultant Flow Depth at Street Crown (Safety Factor Applied)	d_{CROWN} =			inches

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	8.6	8.8	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.78	0.80	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	1.00	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**9.4**	**9.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	5.8	9.3	cfs

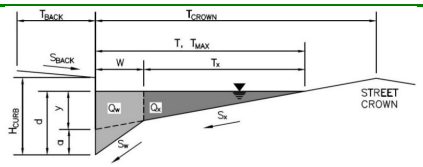
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN8**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	11.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	5.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.005	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.5	12.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	8.0	8.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

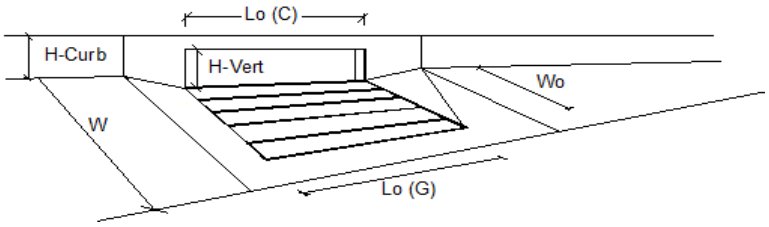
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**8.7**	**8.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.03 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.42 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT/Denver 13 Valley Grate		MINOR	MAJOR	
Type of Inlet		Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.0**	**2.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**2.1**	**3.7**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**49**	**43**	**%**

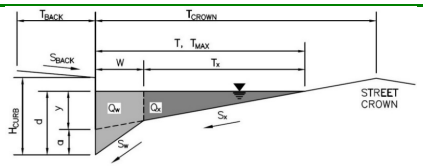
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN9**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	11.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	5.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.5	12.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	10.0	10.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

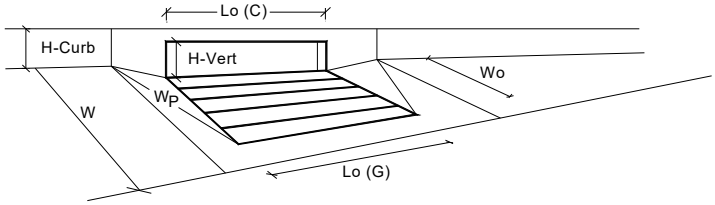
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	8.6	8.6	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.78	0.78	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.81	0.81	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**11.4**	**11.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	6.0	9.8	cfs

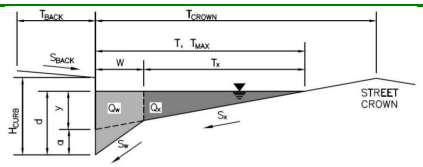
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN10**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	2.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.070	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	30.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

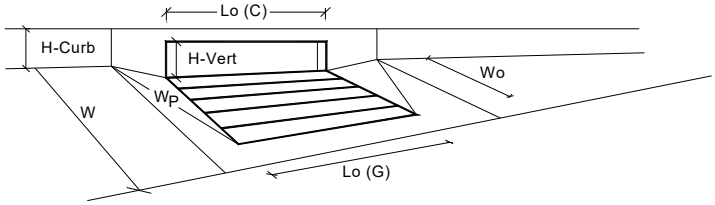
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.33	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**5.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	2.4	4.2	cfs

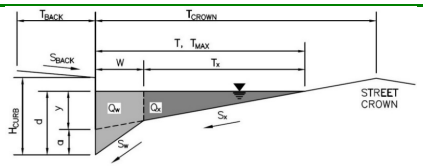
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN11**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.1	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.100	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	54.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.014	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	15.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

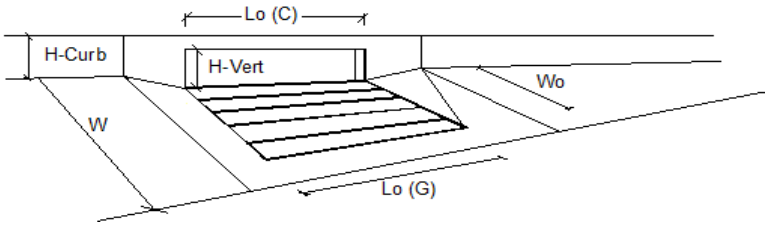
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**8.5**	**8.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.63 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 8.16 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT/Denver 13 Combination		MINOR	MAJOR	
Type of Inlet		Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**4.4**	**7.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.2**	**1.0**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**96**	**88**	**%**

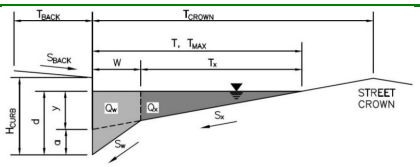
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN12**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	2.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	20.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

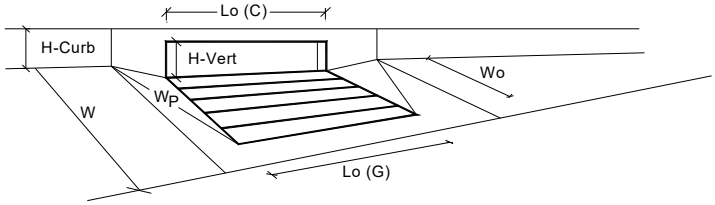
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.3	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.36	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	0.95	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.3**	**9.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	3.5	8.2	cfs

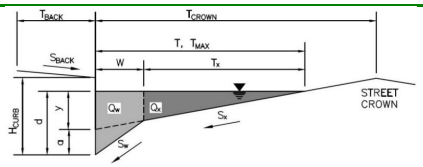
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN13**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.1	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.100	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	20.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

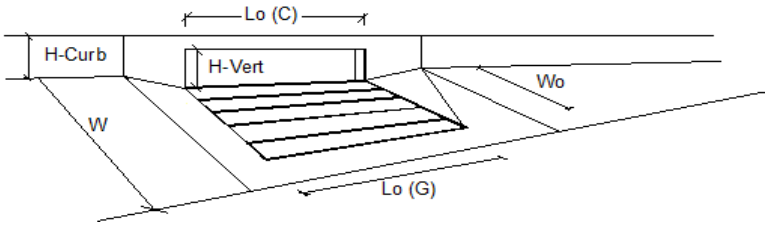
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**13.0**	**13.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.38 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.58 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT/Denver 13 Combination		MINOR	MAJOR	
Type of Inlet		Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**0.4**	**0.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**94**	**90**	**%**

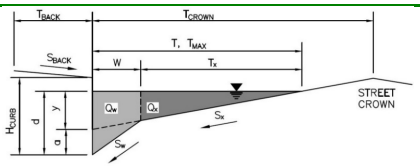
MHFD-Inlet, Version 5.02 (August 2022)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **SD IN14**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.1	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.100	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

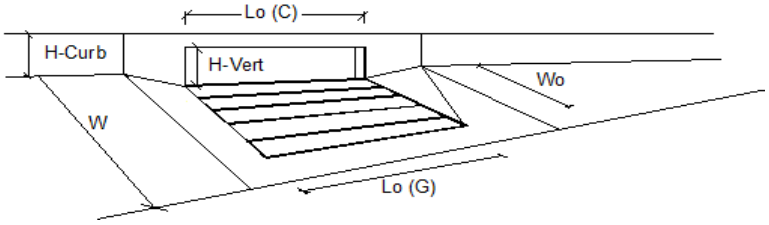
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**13.0**	**13.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.85 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.41 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.9**	**1.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**104**	**97**	**%**

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 1 - 10yr

User-defined

Invert Elev (ft)	= 7163.15
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

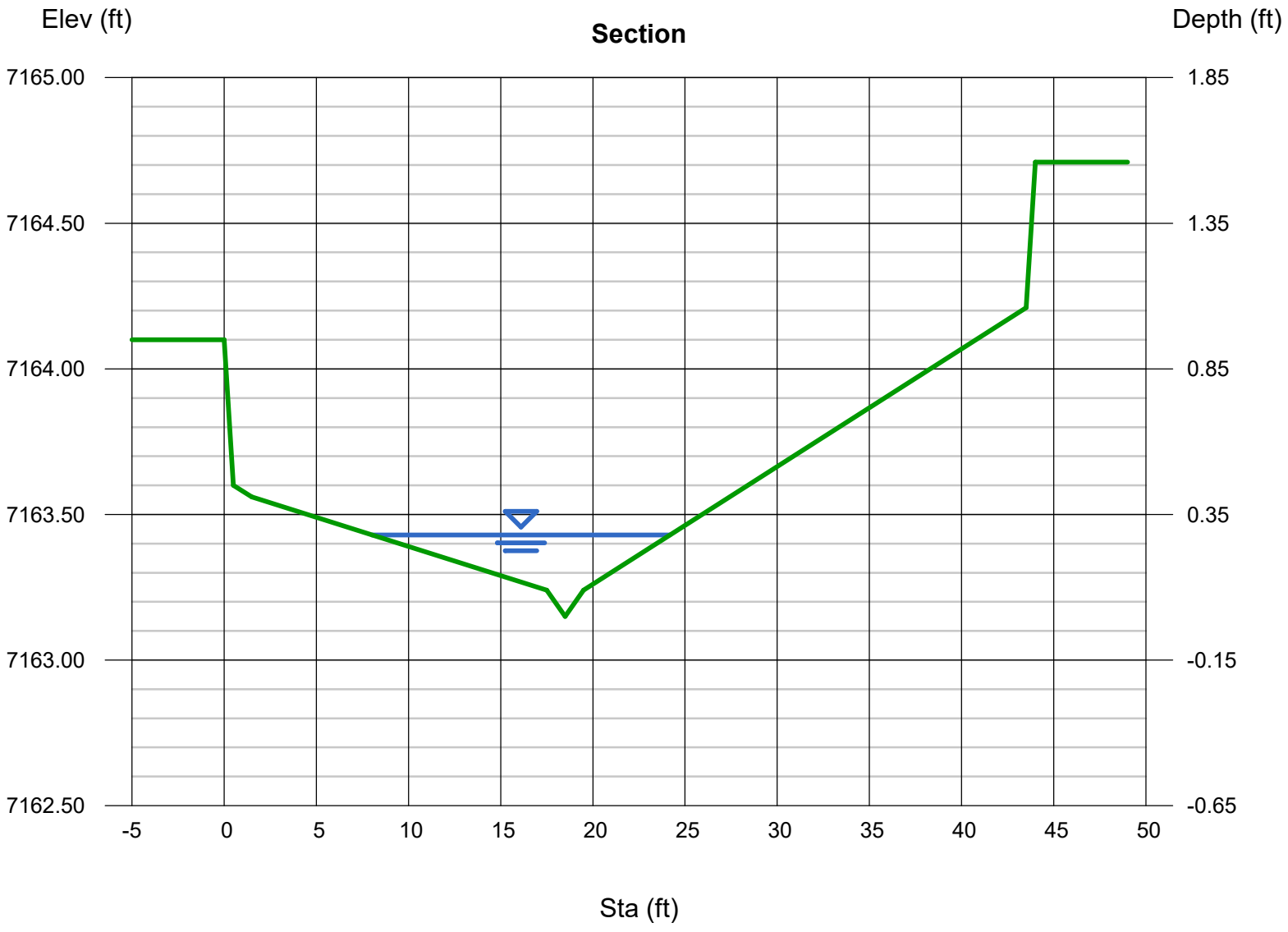
Compute by:	Known Q
Known Q (cfs)	= 3.40

Highlighted

Depth (ft)	= 0.28
Q (cfs)	= 3.400
Area (sqft)	= 1.81
Velocity (ft/s)	= 1.88
Wetted Perim (ft)	= 16.18
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 16.17
EGL (ft)	= 0.33

(Sta, El, n)-(Sta, El, n)...

(0.00, 7164.10)-(0.50, 7163.60, 0.013)-(1.50, 7163.56, 0.013)-(17.50, 7163.24, 0.013)-(18.50, 7163.15, 0.013)-(19.50, 7163.24, 0.013)-(43.50, 7164.21, 0.013)-(44.00, 7164.71, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 1 - 100yr

User-defined

Invert Elev (ft)	= 7163.15
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.40

Highlighted

Depth (ft)	= 0.32
Q (cfs)	= 5.400
Area (sqft)	= 2.52
Velocity (ft/s)	= 2.14
Wetted Perim (ft)	= 19.18
Crit Depth, Yc (ft)	= 0.33
Top Width (ft)	= 19.16
EGL (ft)	= 0.39

(Sta, El, n)-(Sta, El, n)...

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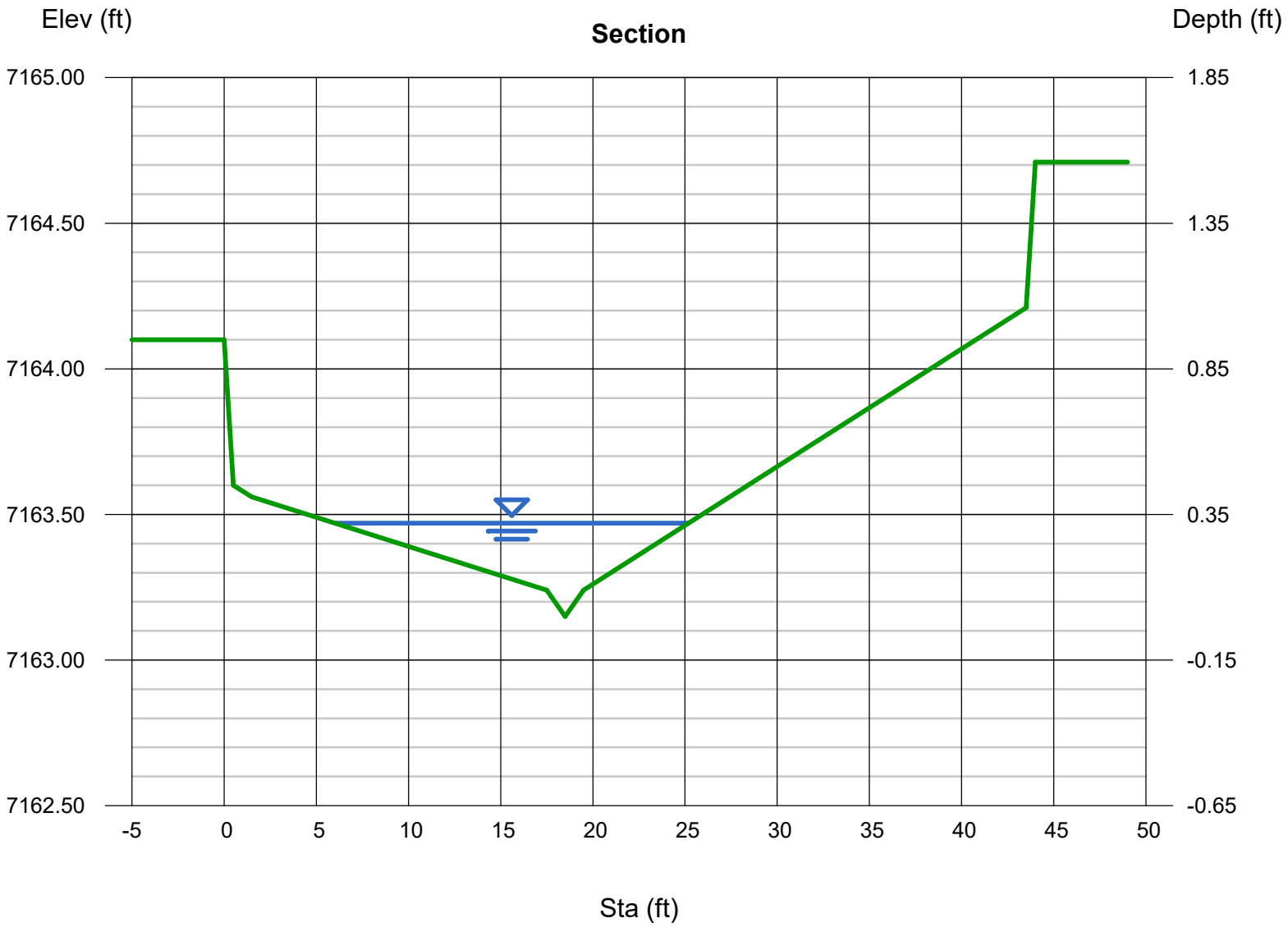


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 2 - 10yr

User-defined

Invert Elev (ft)	= 7160.59
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

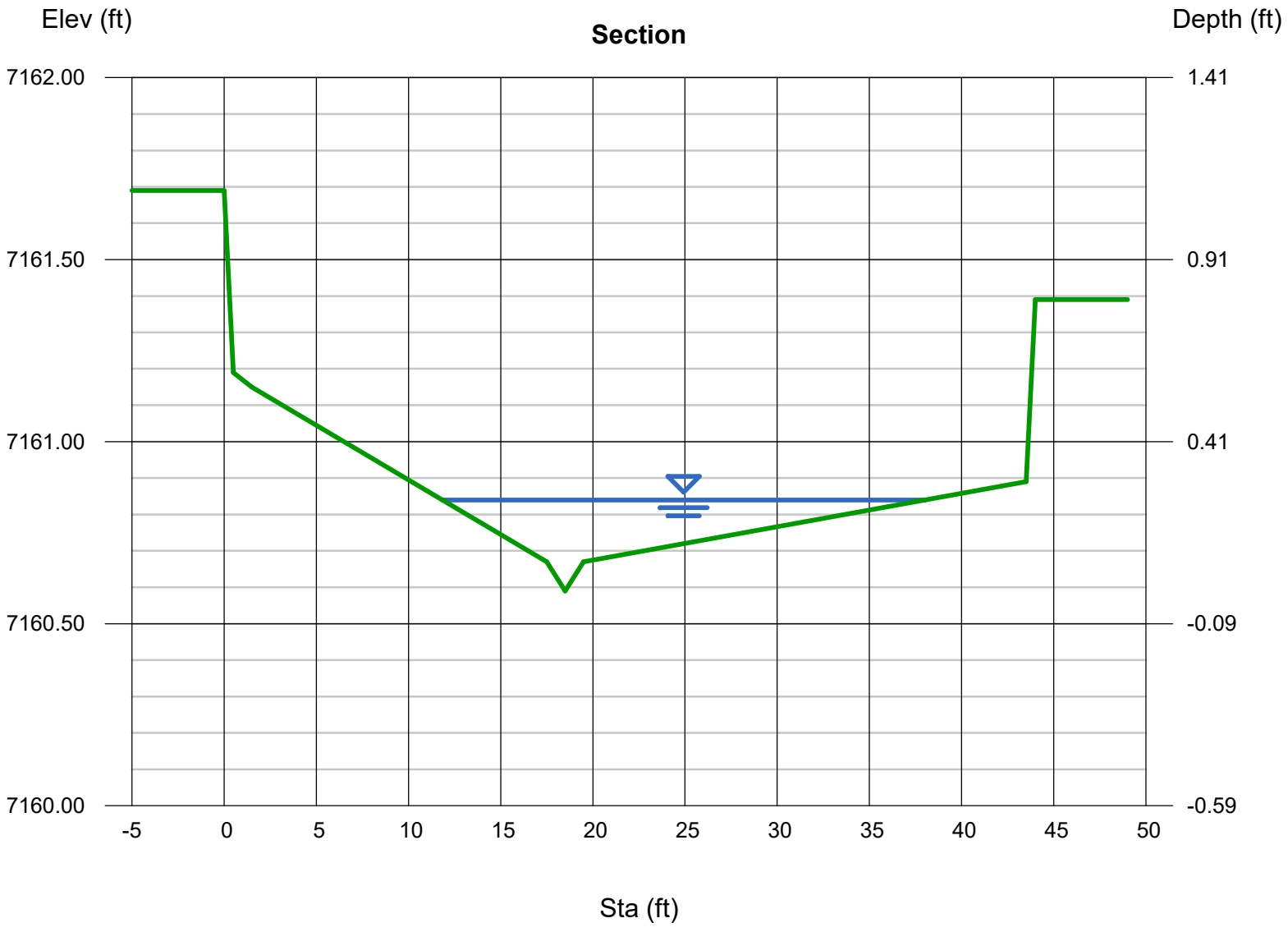
Compute by:	Known Q
Known Q (cfs)	= 4.50

Highlighted

Depth (ft)	= 0.25
Q (cfs)	= 4.500
Area (sqft)	= 2.47
Velocity (ft/s)	= 1.82
Wetted Perim (ft)	= 26.19
Crit Depth, Yc (ft)	= 0.26
Top Width (ft)	= 26.18
EGL (ft)	= 0.30

(Sta, El, n)-(Sta, El, n)...

(0.00, 7161.69)-(0.50, 7161.19, 0.013)-(1.50, 7161.15, 0.013)-(17.50, 7160.67, 0.013)-(18.50, 7160.59, 0.013)-(19.50, 7160.67, 0.013)-(43.50, 7160.89, 0.013)-(44.00, 7161.39, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 2 - 100yr

User-defined

Invert Elev (ft)	= 7160.59
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

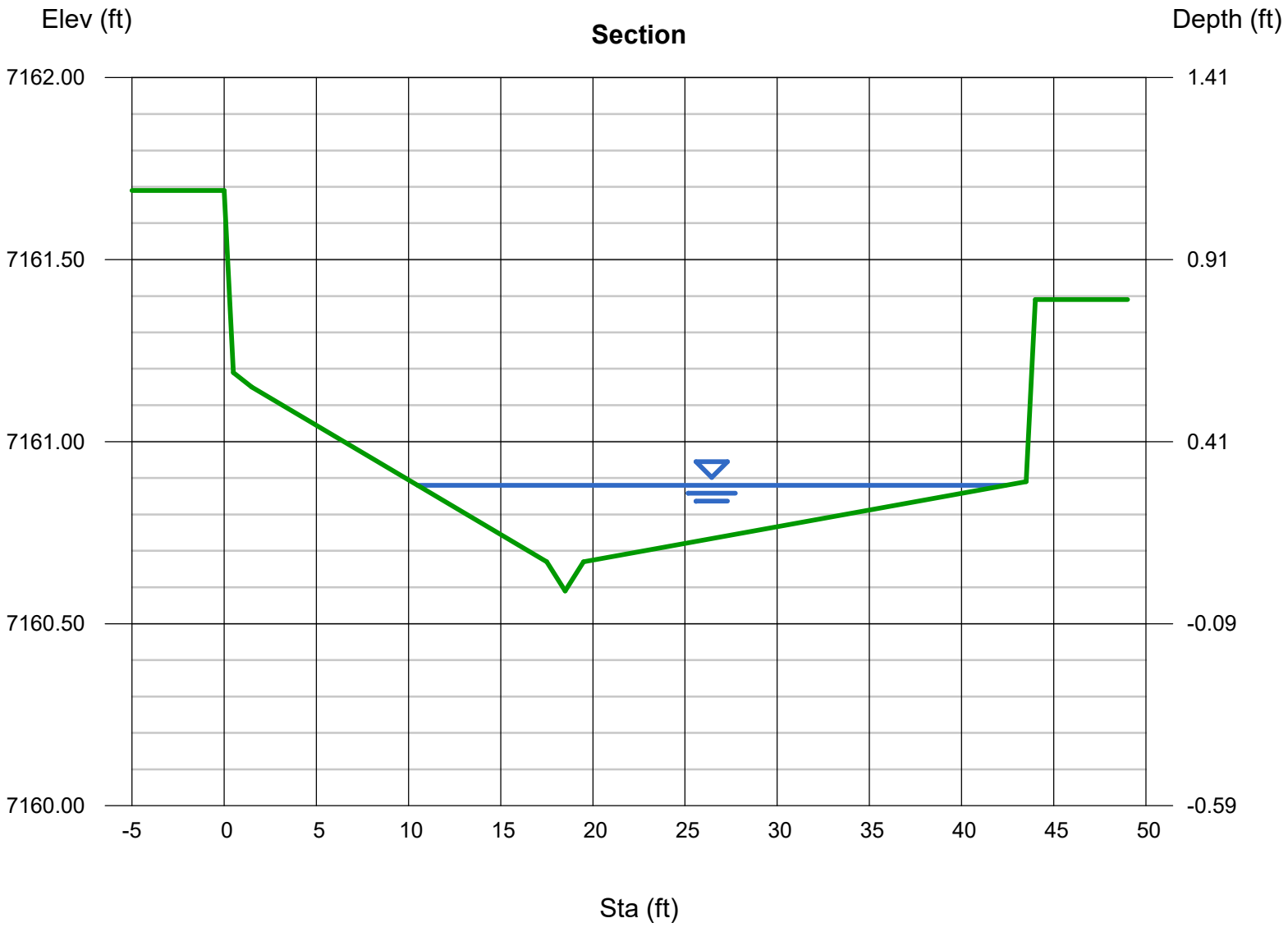
Compute by:	Known Q
Known Q (cfs)	= 7.00

Highlighted

Depth (ft)	= 0.29
Q (cfs)	= 7.000
Area (sqft)	= 3.64
Velocity (ft/s)	= 1.92
Wetted Perim (ft)	= 31.89
Crit Depth, Yc (ft)	= 0.30
Top Width (ft)	= 31.88
EGL (ft)	= 0.35

(Sta, El, n)-(Sta, El, n)...

(0.00, 7161.69)-(0.50, 7161.19, 0.013)-(1.50, 7161.15, 0.013)-(17.50, 7160.67, 0.013)-(18.50, 7160.59, 0.013)-(19.50, 7160.67, 0.013)-(43.50, 7160.89, 0.013)-(44.00, 7161.39, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 6 - 10yr

User-defined

Invert Elev (ft)	= 7164.30
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

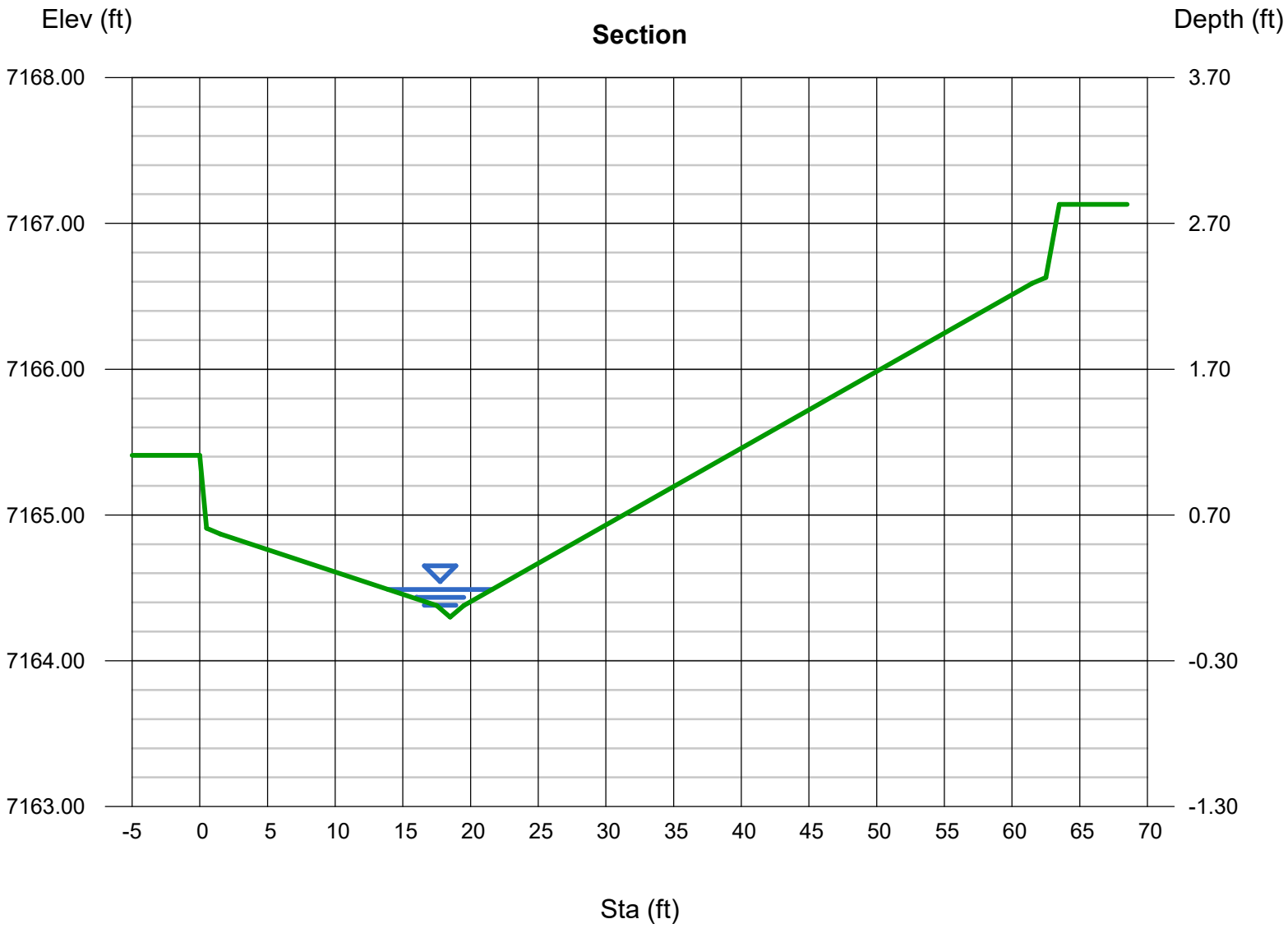
Compute by:	Known Q
Known Q (cfs)	= 1.20

Highlighted

Depth (ft)	= 0.19
Q (cfs)	= 1.200
Area (sqft)	= 0.61
Velocity (ft/s)	= 1.96
Wetted Perim (ft)	= 7.68
Crit Depth, Yc (ft)	= 0.21
Top Width (ft)	= 7.67
EGL (ft)	= 0.25

(Sta, El, n)-(Sta, El, n)...

(0.00, 7165.41)-(0.50, 7164.91, 0.013)-(1.50, 7164.87, 0.013)-(17.50, 7164.38, 0.013)-(18.50, 7164.30, 0.013)-(19.50, 7164.38, 0.013)-(61.50, 7166.59, 0.013)-(62.50, 7166.63, 0.013)-(63.50, 7167.13, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 6 - 100yr

User-defined

Invert Elev (ft)	= 7164.30
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

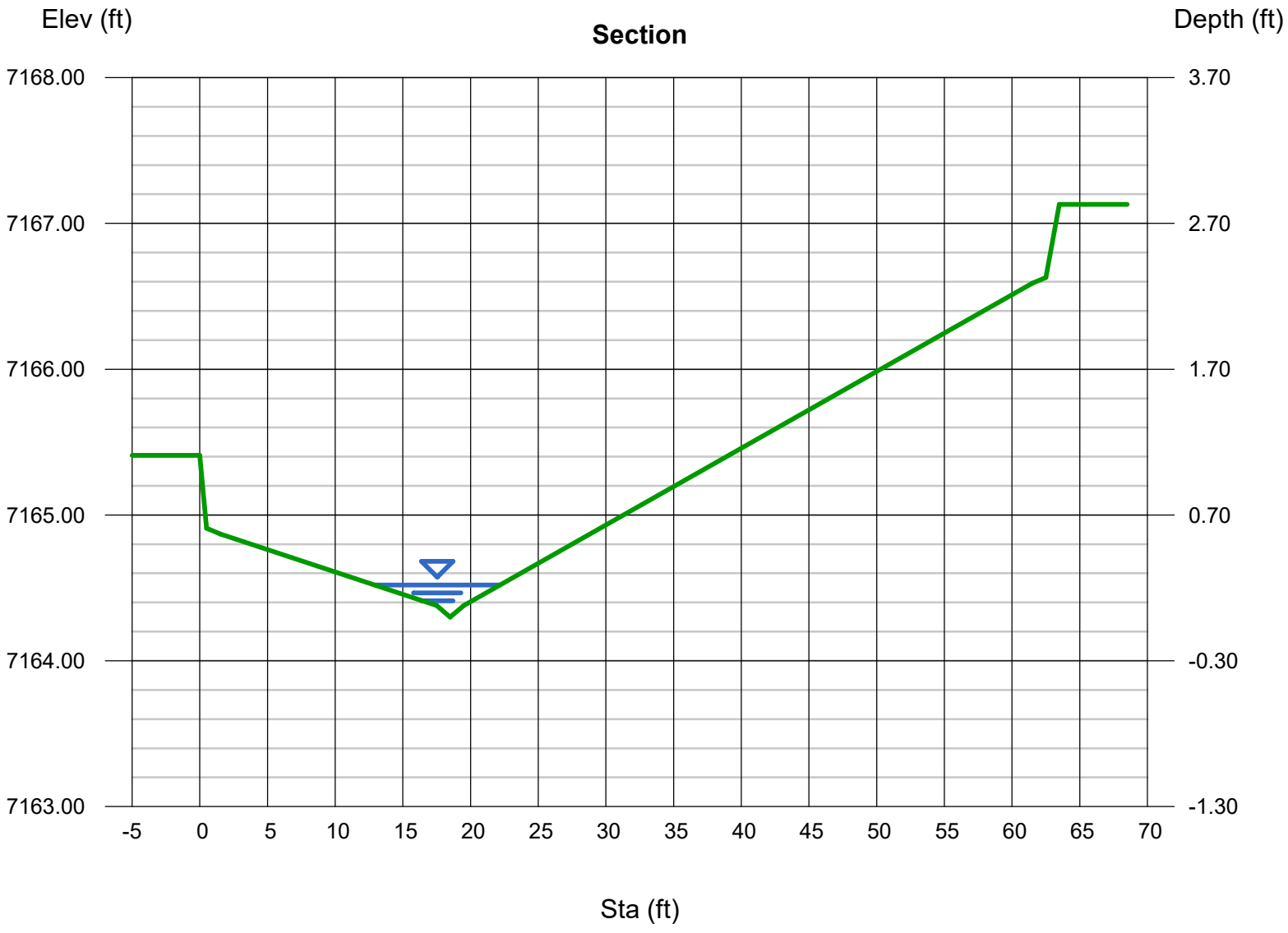
Compute by:	Known Q
Known Q (cfs)	= 2.00

Highlighted

Depth (ft)	= 0.22
Q (cfs)	= 2.000
Area (sqft)	= 0.87
Velocity (ft/s)	= 2.31
Wetted Perim (ft)	= 9.25
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 9.24
EGL (ft)	= 0.30

(Sta, El, n)-(Sta, El, n)...

(0.00, 7165.41)-(0.50, 7164.91, 0.013)-(1.50, 7164.87, 0.013)-(17.50, 7164.38, 0.013)-(18.50, 7164.30, 0.013)-(19.50, 7164.38, 0.013)-(61.50, 7166.59, 0.013)-(62.50, 7166.63, 0.013)-(63.50, 7167.13, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 7 - 10yr

User-defined

Invert Elev (ft)	= 7164.50
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

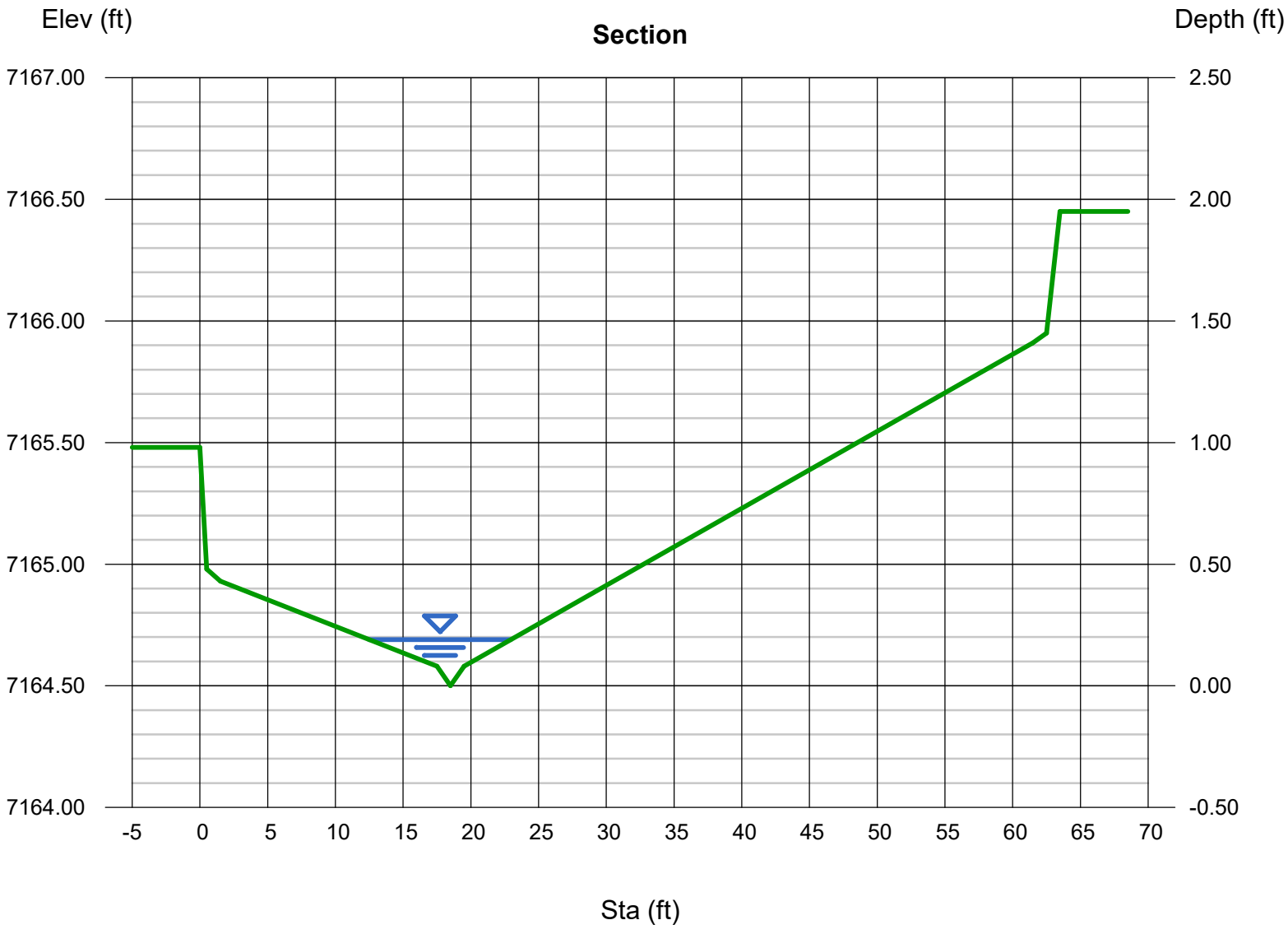
Compute by:	Known Q
Known Q (cfs)	= 1.40

Highlighted

Depth (ft)	= 0.19
Q (cfs)	= 1.400
Area (sqft)	= 0.77
Velocity (ft/s)	= 1.83
Wetted Perim (ft)	= 10.50
Crit Depth, Yc (ft)	= 0.21
Top Width (ft)	= 10.49
EGL (ft)	= 0.24

(Sta, El, n)-(Sta, El, n)...

(0.00, 7165.48)-(0.50, 7164.98, 0.013)-(1.50, 7164.93, 0.013)-(17.50, 7164.58, 0.013)-(18.50, 7164.50, 0.013)-(19.50, 7164.58, 0.013)-(61.50, 7165.91, 0.013)-(62.50, 7165.95, 0.013)-(63.50, 7166.45, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 7 - 100yr

User-defined

Invert Elev (ft)	= 7164.50
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.40

Highlighted

Depth (ft)	= 0.22
Q (cfs)	= 2.400
Area (sqft)	= 1.12
Velocity (ft/s)	= 2.14
Wetted Perim (ft)	= 12.84
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 12.83
EGL (ft)	= 0.29

(Sta, El, n)-(Sta, El, n)...

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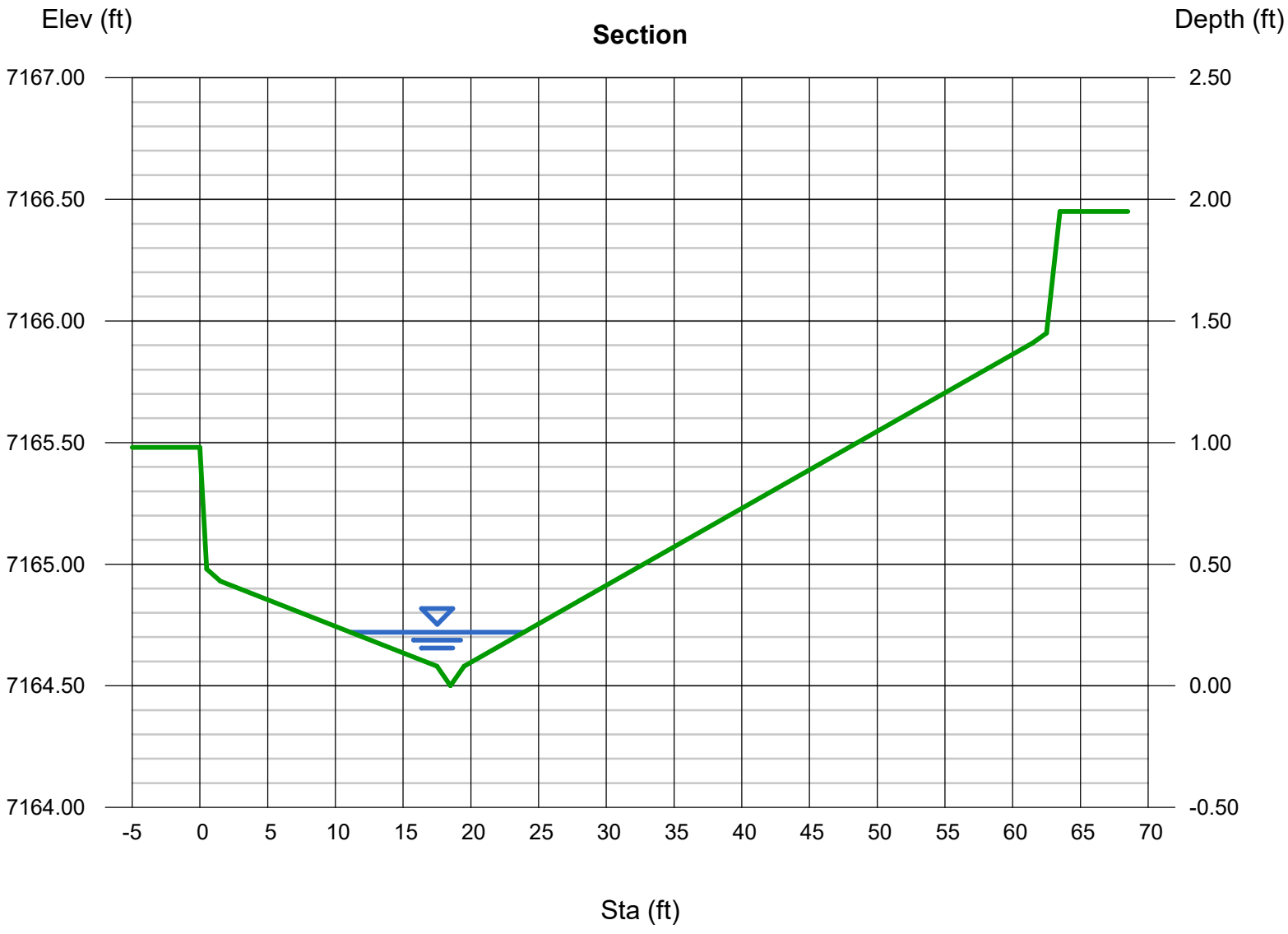


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 8 - 10yr

User-defined

Invert Elev (ft)	= 7160.15
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

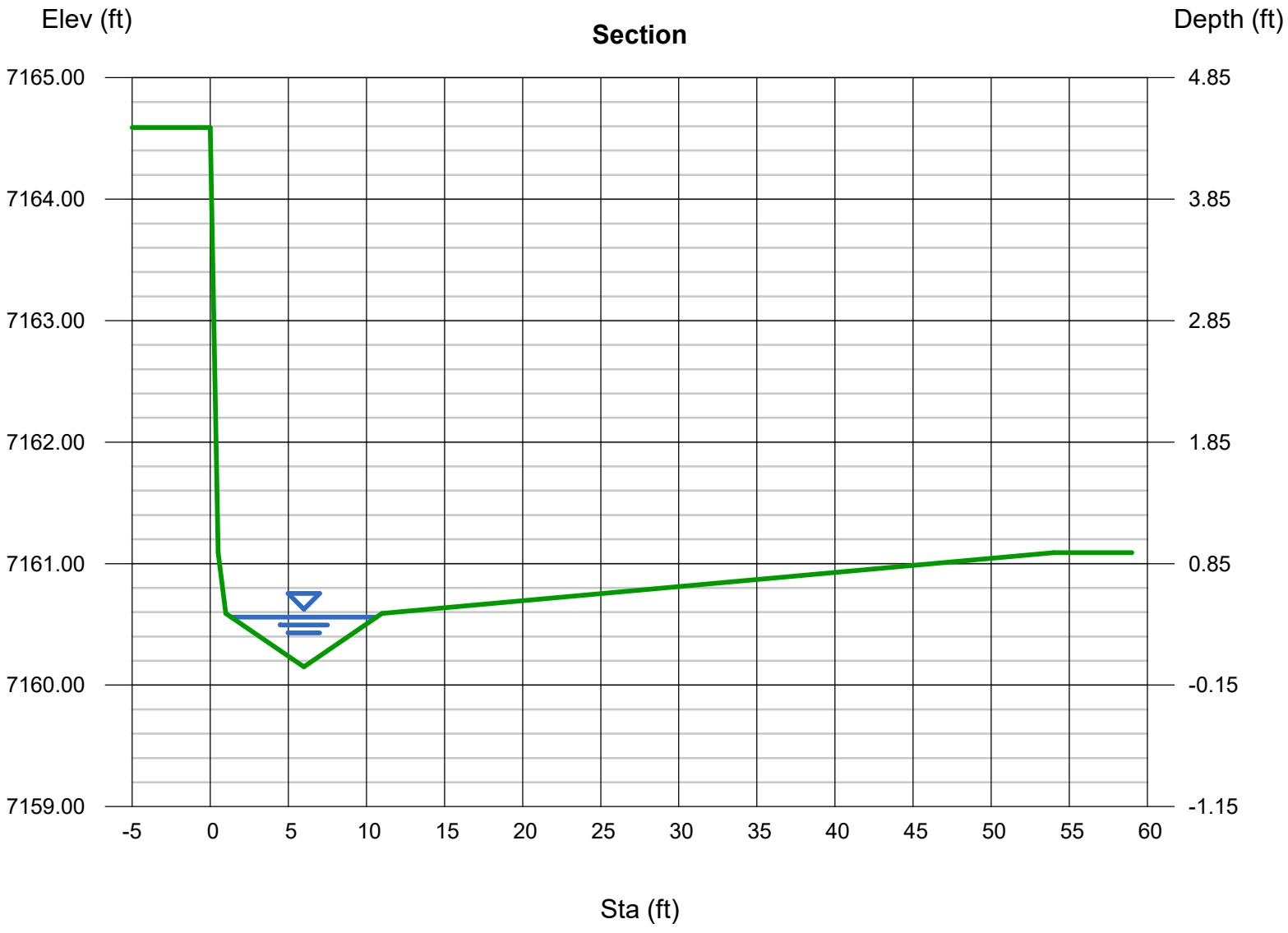
Compute by:	Known Q
Known Q (cfs)	= 5.80

Highlighted

Depth (ft)	= 0.41
Q (cfs)	= 5.800
Area (sqft)	= 1.91
Velocity (ft/s)	= 3.03
Wetted Perim (ft)	= 9.36
Crit Depth, Yc (ft)	= 0.44
Top Width (ft)	= 9.32
EGL (ft)	= 0.55

(Sta, El, n)-(Sta, El, n)...

(0.00, 7164.59)-(0.50, 7161.09, 0.013)-(1.00, 7160.59, 0.013)-(6.00, 7160.15, 0.013)-(11.00, 7160.59, 0.013)-(54.00, 7161.09, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 8 - 100yr

User-defined

Invert Elev (ft)	= 7160.15
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 9.30

Highlighted

Depth (ft)	= 0.52
Q (cfs)	= 9.300
Area (sqft)	= 3.28
Velocity (ft/s)	= 2.84
Wetted Perim (ft)	= 17.04
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 16.97
EGL (ft)	= 0.65

(Sta, El, n)-(Sta, El, n)...

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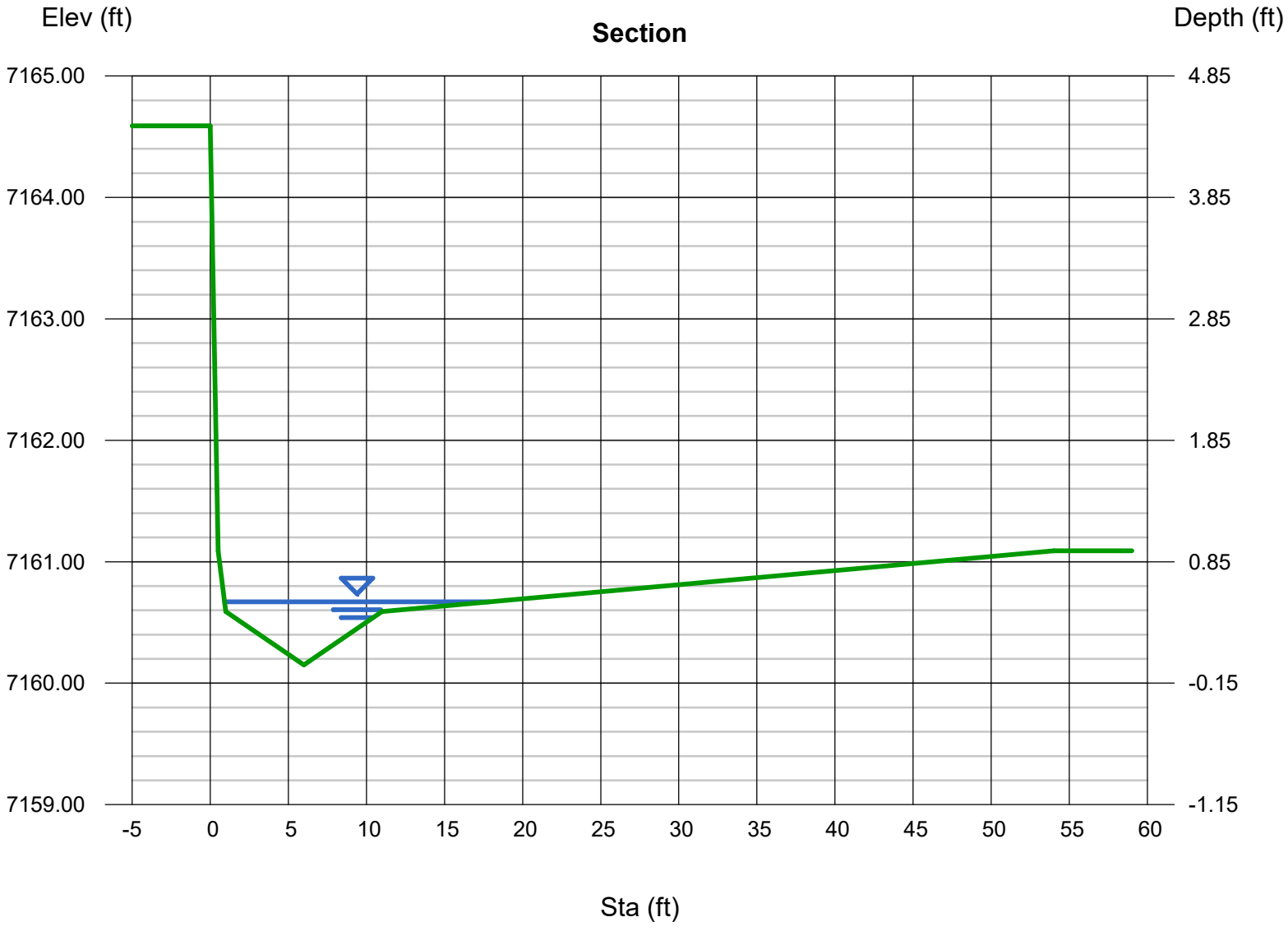


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 10 - 10yr

User-defined

Invert Elev (ft)	= 7156.46
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

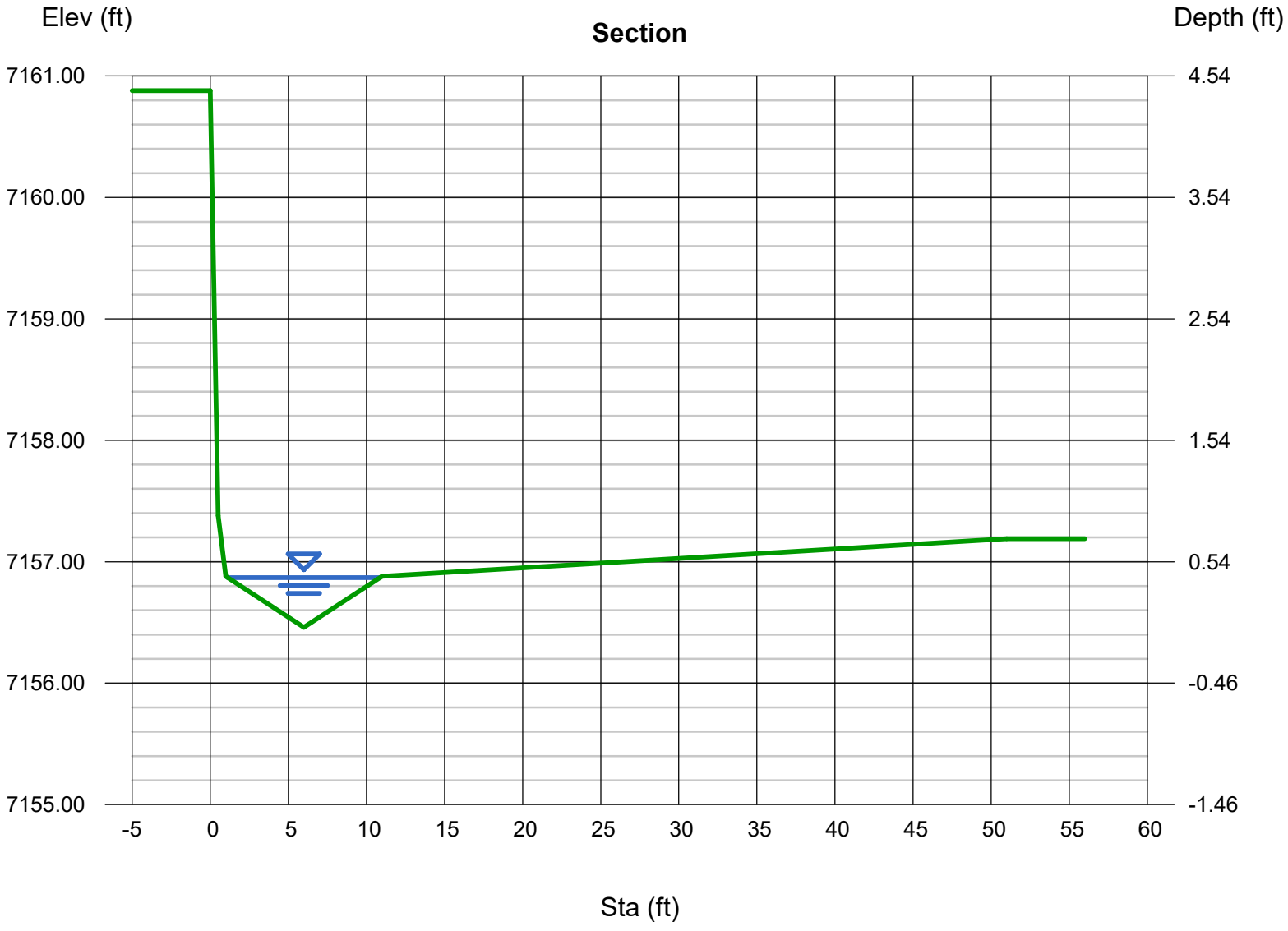
Compute by:	Known Q
Known Q (cfs)	= 6.00

Highlighted

Depth (ft)	= 0.41
Q (cfs)	= 6.000
Area (sqft)	= 2.00
Velocity (ft/s)	= 3.00
Wetted Perim (ft)	= 9.80
Crit Depth, Yc (ft)	= 0.46
Top Width (ft)	= 9.77
EGL (ft)	= 0.55

(Sta, El, n)-(Sta, El, n)...

(0.00, 7160.88)-(0.50, 7157.38, 0.013)-(1.00, 7156.88, 0.013)-(6.00, 7156.46, 0.013)-(11.00, 7156.88, 0.013)-(51.00, 7157.19, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Oct 15 2023

Drainage Pan @ Design Point 10 - 100yr

User-defined

Invert Elev (ft)	= 7156.46
Slope (%)	= 0.60
N-Value	= 0.013

Calculations

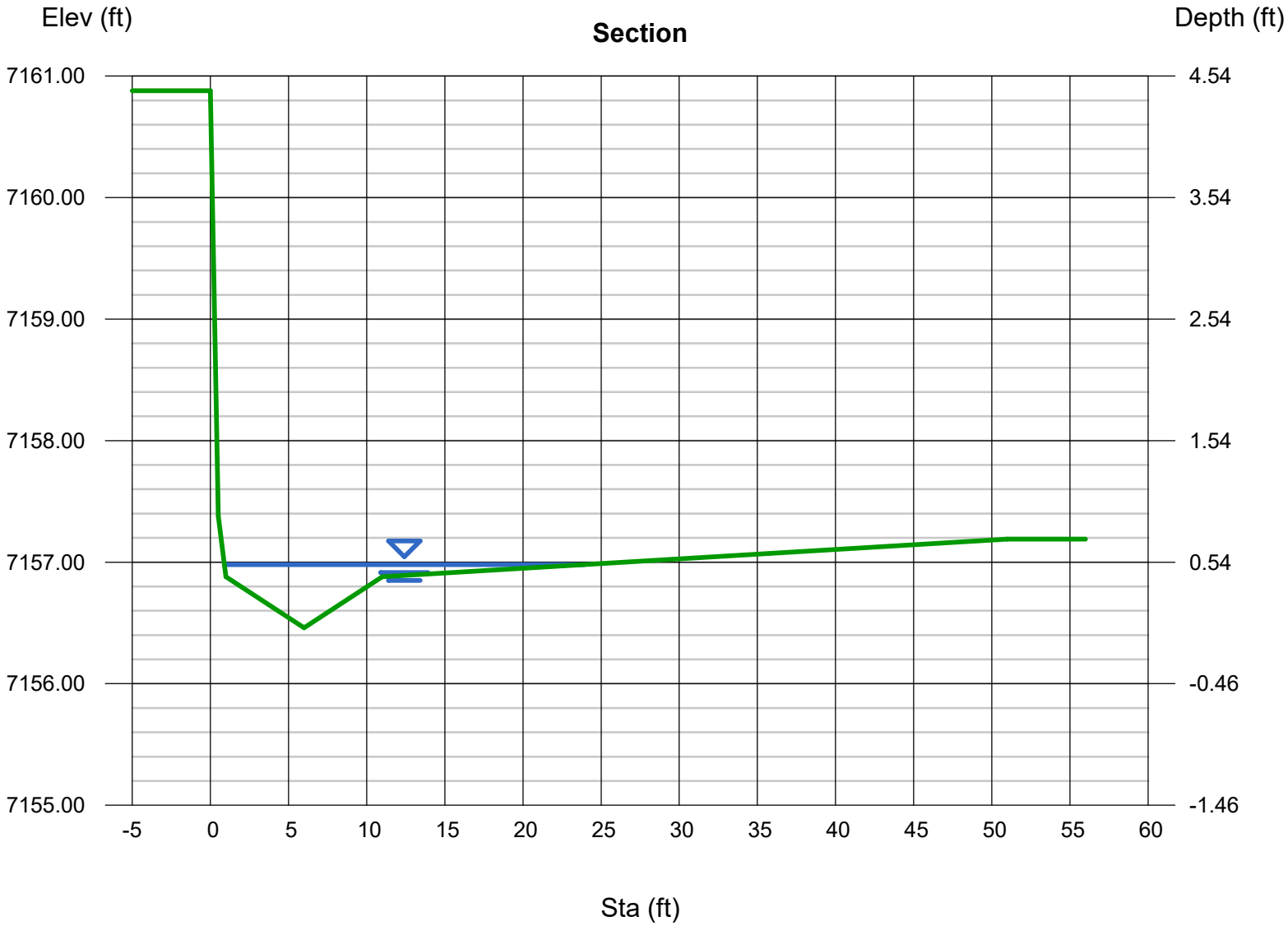
Compute by:	Known Q
Known Q (cfs)	= 9.80

Highlighted

Depth (ft)	= 0.52
Q (cfs)	= 9.800
Area (sqft)	= 3.75
Velocity (ft/s)	= 2.61
Wetted Perim (ft)	= 23.09
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 23.01
EGL (ft)	= 0.63

(Sta, El, n)-(Sta, El, n)...

(0.00, 7160.88)-(0.50, 7157.38, 0.013)-(1.00, 7156.88, 0.013)-(6.00, 7156.46, 0.013)-(11.00, 7156.88, 0.013)-(51.00, 7157.19, 0.013)



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 16 2023

Drainage Chase @ Design Point 3

Invert Elev Dn (ft)	=	7157.72
Pipe Length (ft)	=	9.00
Slope (%)	=	3.33
Invert Elev Up (ft)	=	7158.02
Rise (in)	=	6.0
Shape	=	Box
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Tapered inlet throat
Coeff. K,M,c,Y,k	=	0.475, 0.667, 0.0179, 0.97, 0.2

Embankment

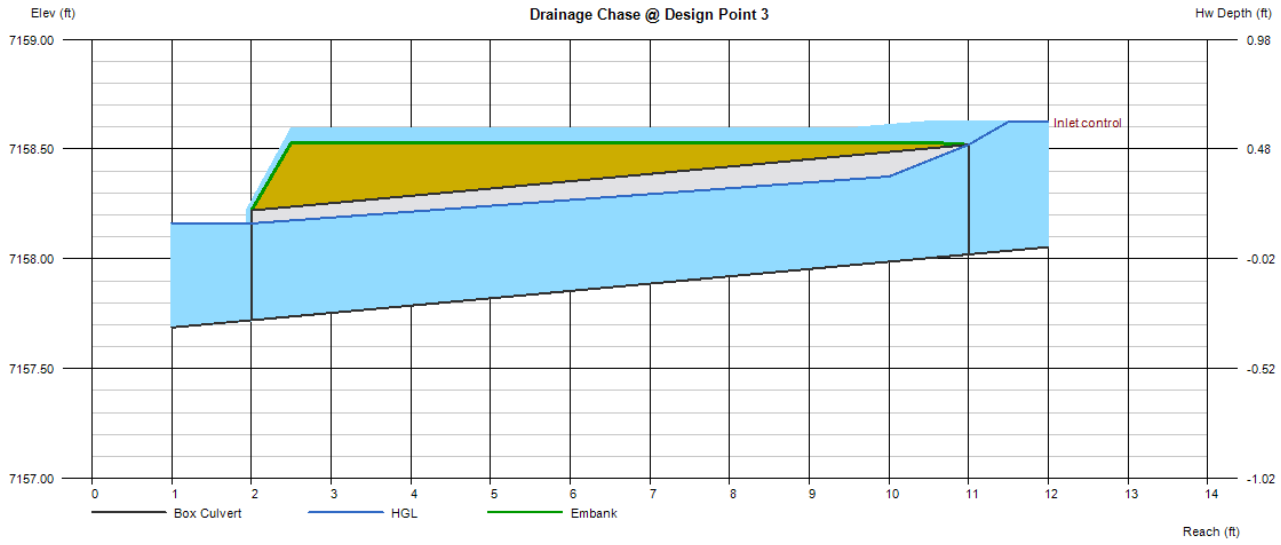
Top Elevation (ft)	=	7158.53
Top Width (ft)	=	8.00
Crest Width (ft)	=	3.00

Calculations

Qmin (cfs)	=	2.78
Qmax (cfs)	=	4.28
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	4.24
Qpipe (cfs)	=	4.01
Qovertop (cfs)	=	0.23
Veloc Dn (ft/s)	=	3.03
Veloc Up (ft/s)	=	3.50
HGL Dn (ft)	=	7158.16
HGL Up (ft)	=	7158.40
Hw Elev (ft)	=	7158.63
Hw/D (ft)	=	1.21
Flow Regime	=	Inlet Control



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Oct 10 2023

Detention Pond Trickle Channel

Rectangular

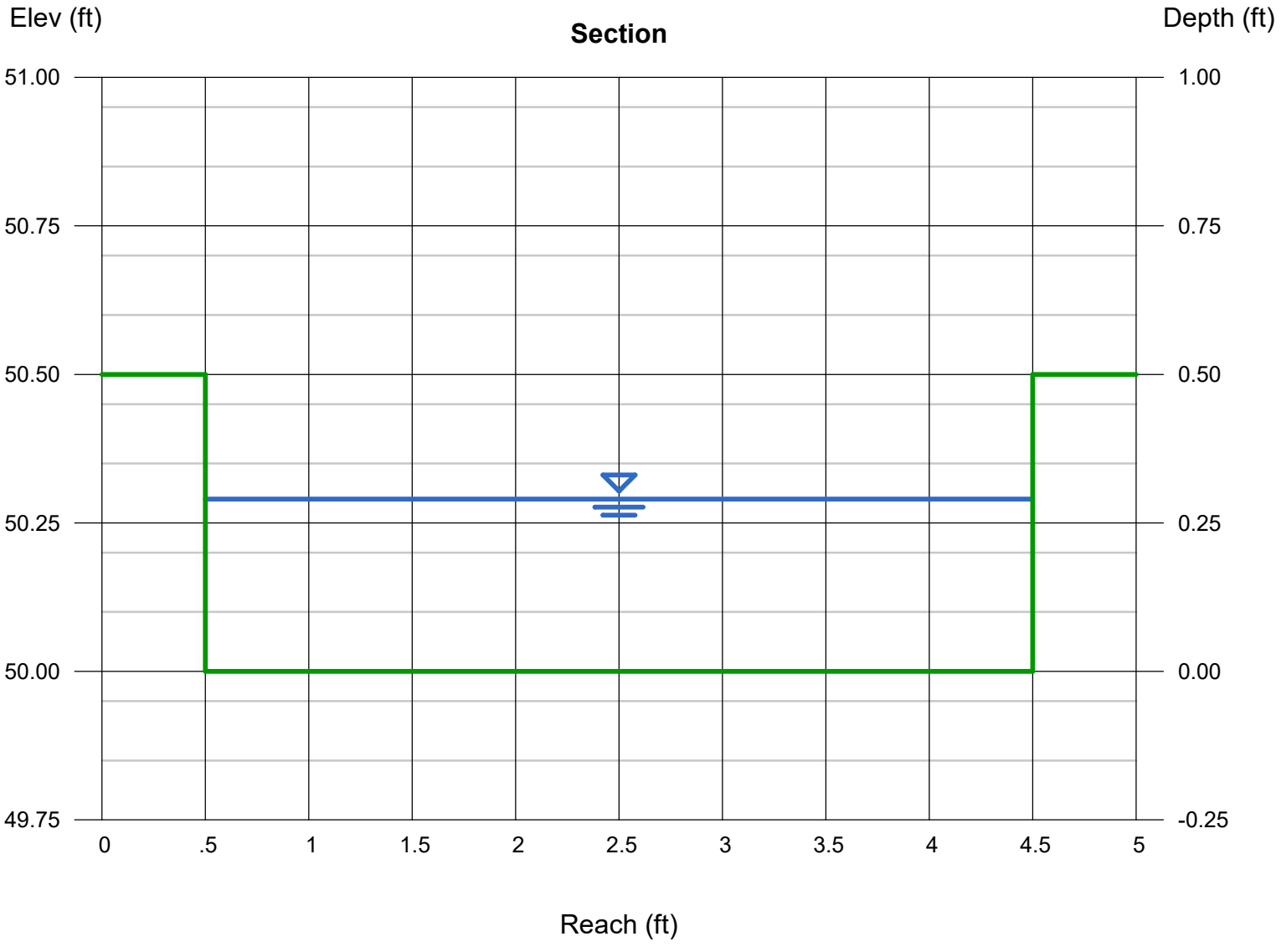
Bottom Width (ft)	= 4.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 50.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.20

Highlighted

Depth (ft)	= 0.29
Q (cfs)	= 5.200
Area (sqft)	= 1.16
Velocity (ft/s)	= 4.48
Wetted Perim (ft)	= 4.58
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 4.00
EGL (ft)	= 0.60



Design Procedure Form: Grass Swale (GS)

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

Designer: Cameron Salz
Company: Redland Consultants
Date: November 15, 2023
Project: The Rock Commerce Center
Location: Monument Hill Road - Road Side Ditch

1. Design Discharge for 2-Year Return Period	Q_2 = 0.20 cfs
2. Hydraulic Residence Time	
A) : Length of Grass Swale	L_S = 100.0 ft
B) Calculated Residence Time (based on design velocity below)	T_{HR} = 2.5 minutes
3. Longitudinal Slope (vertical distance per unit horizontal)	
A) Available Slope (based on site constraints)	S_{avail} = 0.070 ft / ft
B) Design Slope	S_D = 0.070 ft / ft
4. Swale Geometry	
A) Channel Side Slopes (Z = 4 min., horiz. distance per unit vertical)	Z = 25.00 ft / ft
B) Bottom Width of Swale (enter 0 for triangular section)	W_B = 0.00 ft
5. Vegetation A) Type of Planting (seed vs. sod, affects vegetal retardance factor)	Choose One: (●) Grass From Seed ( ) Grass From Sod
6. Design Velocity (0.333 ft / s maximum for desirable 5-minute residence time)	V_2 = 0.66 ft / s
7. Design Flow Depth (1 foot maximum)	D_2 = 0.11 ft
A) Flow Area	A_2 = 0.3 sq ft
B) Top Width of Swale	W_T = 5.5 ft
C) Froude Number (0.50 maximum)	F = 0.50
D) Hydraulic Radius	R_H = 0.05
E) Velocity-Hydraulic Radius Product for Vegetal Retardance	VR = 0.04
F) Manning's n (based on SCS vegetal retardance curve E for seeded grass)	n = 0.080
G) Cumulative Height of Grade Control Structures Required	H_D = 0.00 ft
8. Underdrain (Is an underdrain necessary?)	Choose One: ( ) YES (●) NO
9. Soil Preparation (Describe soil amendment)	
10. Irrigation	Choose One: (●) Temporary ( ) Permanent

Notes:

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 9 2023

DRAINAGE CHASE FOR ROOF DRAIN (TYP.)

Invert Elev Dn (ft)	=	7157.72
Pipe Length (ft)	=	9.00
Slope (%)	=	2.00
Invert Elev Up (ft)	=	7157.90
Rise (in)	=	6.0
Shape	=	Box
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	90D Headwall, Chamfered or Beveled Inlet Edges
Culvert Entrance	=	90D headwall w/3/4-in chamfers
Coeff. K,M,c,Y,k	=	0.515, 0.667, 0.0375, 0.79, 0.2

Embankment

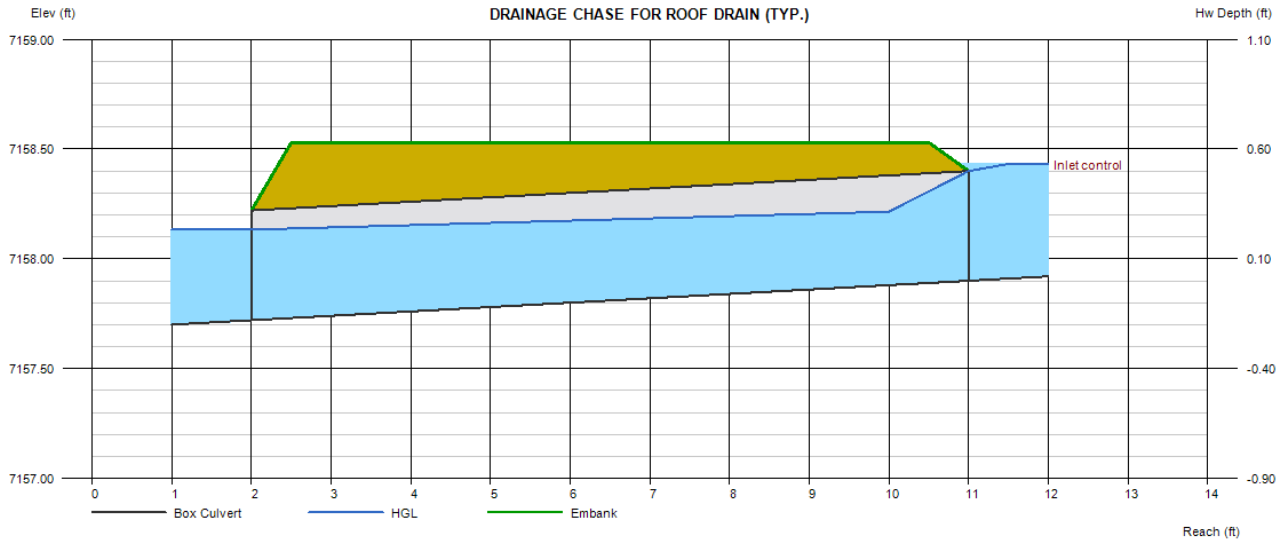
Top Elevation (ft)	=	7158.53
Top Width (ft)	=	8.00
Crest Width (ft)	=	2.00

Calculations

Qmin (cfs)	=	1.30
Qmax (cfs)	=	2.10
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.10
Qpipe (cfs)	=	2.10
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.54
Veloc Up (ft/s)	=	3.23
HGL Dn (ft)	=	7158.13
HGL Up (ft)	=	7158.23
Hw Elev (ft)	=	7158.43
Hw/D (ft)	=	1.06
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 16 2023

Existing Culvert @ Design Point A

Invert Elev Dn (ft)	=	7165.30
Pipe Length (ft)	=	30.00
Slope (%)	=	4.67
Invert Elev Up (ft)	=	7166.70
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

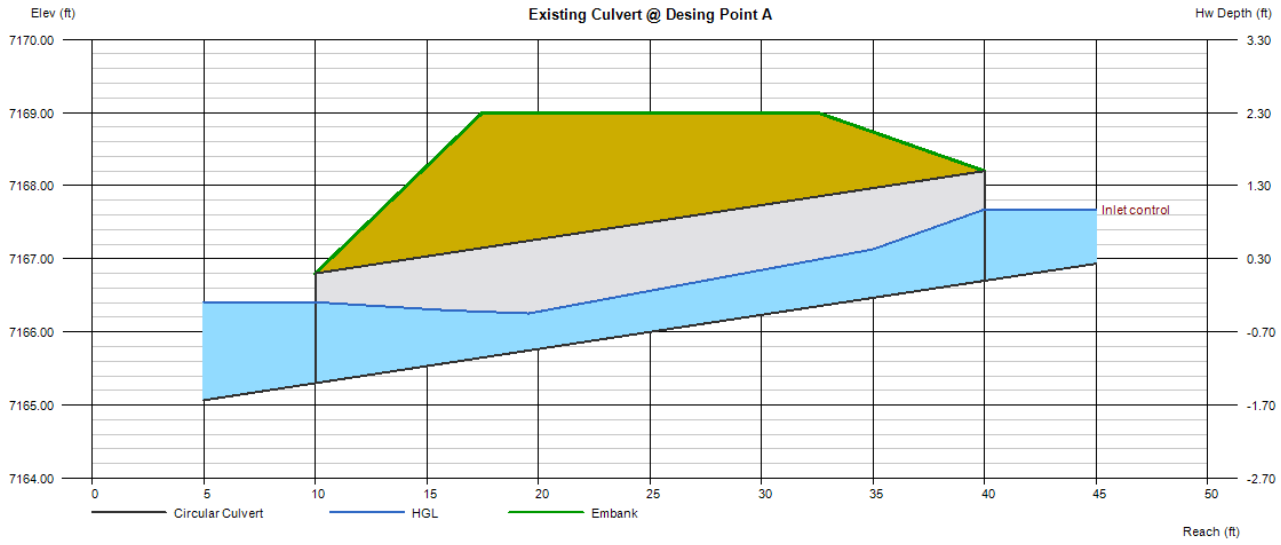
Top Elevation (ft)	=	7169.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	15.00

Calculations

Qmin (cfs)	=	2.05
Qmax (cfs)	=	3.51
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	3.51
Qpipe (cfs)	=	3.51
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.51
Veloc Up (ft/s)	=	4.23
HGL Dn (ft)	=	7166.41
HGL Up (ft)	=	7167.42
Hw Elev (ft)	=	7167.68
Hw/D (ft)	=	0.65
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 16 2023

Existing Culvert @ Design Point B

Invert Elev Dn (ft)	=	7131.50
Pipe Length (ft)	=	65.00
Slope (%)	=	1.08
Invert Elev Up (ft)	=	7132.20
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

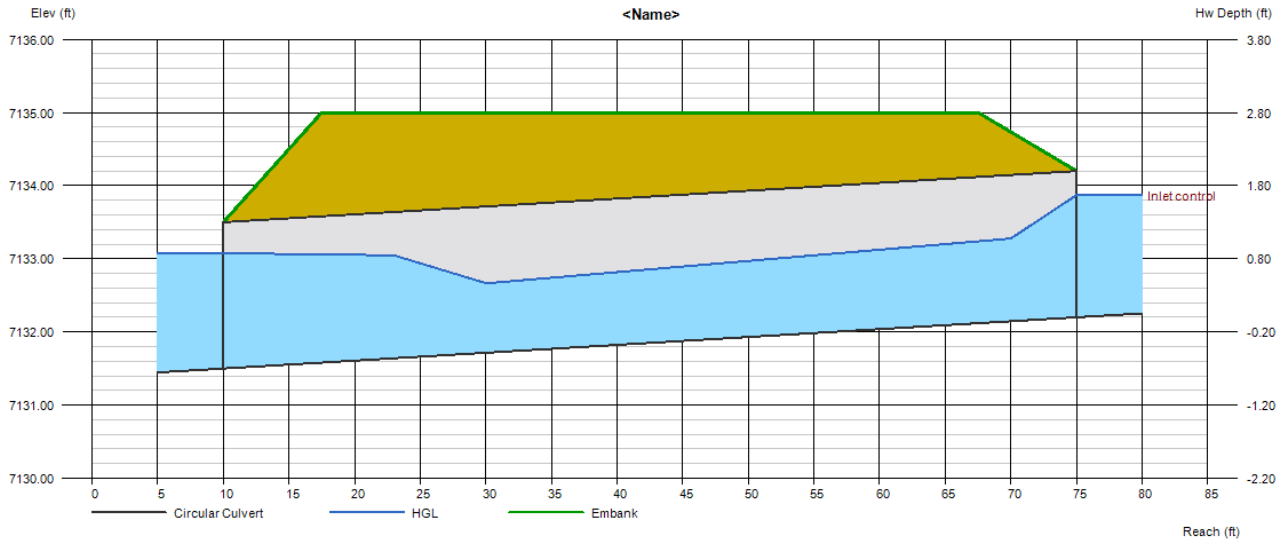
Top Elevation (ft)	=	7135.00
Top Width (ft)	=	50.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	3.40
Qmax (cfs)	=	10.40
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	10.40
Qpipe (cfs)	=	10.40
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.91
Veloc Up (ft/s)	=	5.54
HGL Dn (ft)	=	7133.08
HGL Up (ft)	=	7133.35
Hw Elev (ft)	=	7133.87
Hw/D (ft)	=	0.83
Flow Regime	=	Inlet Control

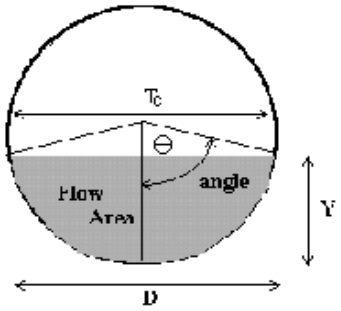


CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

MHFD-Culvert, Version 4.00 (May 2020)

Project: P-23009 The Rock Commerce Center

Pipe ID: Pipe at Design Point O-2



Design Information (Input)			
Pipe Invert Slope	So =	0.0059	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	18.00	inches
Design discharge	Q =	1.31	cfs

Full-Flow Capacity (Calculated)			
Full-flow area	Af =	1.77	sq ft
Full-flow wetted perimeter	Pf =	4.71	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	8.09	cfs

Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	1.10	radians
Flow area	An =	0.39	sq ft
Top width	Tn =	1.34	ft
Wetted perimeter	Pn =	1.65	ft
Flow depth	Yn =	0.41	ft
Flow velocity	Vn =	3.37	fps
Discharge	Qn =	1.31	cfs
Percent of Full Flow	Flow =	16.2%	of full flow
Normal Depth Froude Number	Fr_n =	1.10	supercritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	1.13	radians
Critical flow area	Ac =	0.42	sq ft
Critical top width	Tc =	1.36	ft
Critical flow depth	Yc =	0.43	ft
Critical flow velocity	Vc =	3.15	fps
Critical Depth Froude Number	Fr_c =	1.00	

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer: Cameron Salz
Company: Redland
Date: October 16, 2023
Project: The Rock Commerce Center
Location: El Paso County

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 77.0 %

B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$) — i = 0.770

C) Contributing Watershed Area — Area = 11.380 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- ○ Water Quality Capture Volume (WQCV)
- ◉ Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time
($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area$)
V_{DESIGN} = 0.294 ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER} = (d_6 * (V_{DESIGN}/0.43))$)
$V_{DESIGN\ OTHER}$ = ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)
$V_{DESIGN\ USER}$ = ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
i) Percentage of Watershed consisting of Type A Soils — HSG_A = 0 %
ii) Percentage of Watershed consisting of Type B Soils — HSG_B = 100 %
iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = 0 %

J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURV_A = 1.68 * i^{1.28}$
For HSG B: $EURV_B = 1.36 * i^{1.08}$
For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$
$EURV_{DESIGN}$ = 0.973 ac-f t

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired)
$EURV_{DESIGN\ USER}$ = ac-f t

2. Basin Shape: Length to Width Ratio
(A basin length to width ratio of at least 2:1 will improve TSS reduction.)
L : W = 2.0 : 1

3. Basin Side Slopes

A) Basin Maximum Side Slopes
(Horizontal distance per unit vertical, 4:1 or flatter preferred)
Z = 3.00 ft / ft
DIFFICULT TO MAINTAIN, INCREASE WHERE POSSIBLE

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations:

5. Forebay

A) Minimum Forebay Volume
(V_{FMIN} = 3% of the WQCV)
V_{FMIN} = 0.009 ac-ft

B) Actual Forebay Volume
V_F = 0.020 ac-ft

C) Forebay Depth
(D_F = 18 inch maximum)
D_F = 18.0 in

D) Forebay Discharge

i) Undetained 100-year Peak Discharge
Q_{100} = 54.14 cfs

ii) Forebay Discharge Design Flow
($Q_F = 0.02 * Q_{100}$)
Q_F = 1.08 cfs

E) Forebay Discharge Design

Choose One
- ○ Berm With Pipe
- ◉ Wall with Rect. Notch
- ○ Wall with V-Notch Weir

Flow too small for berm w/ pipe

F) Discharge Pipe Size (minimum 8-inches)
Calculated D_P = in

G) Rectangular Notch Width
Calculated W_N = 5.7 in

Design Procedure Form: Extended Detention Basin (EDB)

Designer: Cameron Salz
Company: Redland
Date: October 16, 2023
Project: The Rock Commerce Center
Location: El Paso County

6. Trickle Channel

A) Type of Trickle Channel — Choose One: (●) Concrete ( ) Soft Bottom

F) Slope of Trickle Channel — S = 0.0100 ft / ft

7. Micropool and Outlet Structure

A) Depth of Micropool (2.5-feet minimum) — D_M = 2.5 ft

B) Surface Area of Micropool (10 ft^2 minimum) — A_M = 10 sq ft

C) Outlet Type — Choose One: (●) Orifice Plate ( ) Other (Describe):

D) Smallest Dimension of Orifice Opening Based on Hydrograph Routing (Use UD-Detention) — $D_{orifice}$ = 1.36 inches

E) Total Outlet Area — A_{ot} = 0.85 square inches

8. Initial Surcharge Volume

A) Depth of Initial Surcharge Volume (Minimum recommended depth is 4 inches) — D_{IS} = 4 in

B) Minimum Initial Surcharge Volume (Minimum volume of 0.3% of the WQCV) — V_{IS} = 38 cu ft

C) Initial Surcharge Provided Above Micropool — V_s = 3.3 cu ft

9. Trash Rack

A) Water Quality Screen Open Area: $A_t = A_{ot} * 38.5*(e^{-0.095D})$ — A_t = 29 square inches

B) Type of Screen (If specifying an alternative to the materials recommended in the USDCM, indicate "other" and enter the ratio of the total open are to the total screen are for the material specified.) — *Aluminum Amico-Klemp SR Series with Cross Rods 2" O.C.*

Other (Y/N): N

C) Ratio of Total Open Area to Total Area (only for type 'Other') — User Ratio =

D) Total Water Quality Screen Area (based on screen type) — A_{total} = 41 sq. in.

E) Depth of Design Volume (EURV or WQCV) (Based on design concept chosen under 1E) — H= 6.06 feet

F) Height of Water Quality Screen (H_{TR}) — H_{TR}= 100.72 inches

G) Width of Water Quality Screen Opening ($W_{opening}$) (Minimum of 12 inches is recommended) — $W_{opening}$ = 12.0 inches **VALUE LESS THAN RECOMMENDED MIN. WIDTH. WIDTH HAS BEEN SET TO 12 INCHES.**

Design Procedure Form: Extended Detention Basin (EDB)

Designer: Cameron Salz
Company: Redland
Date: October 16, 2023
Project: The Rock Commerce Center
Location: El Paso County

10. Overflow Embankment

A) Describe embankment protection for 100-year and greater overtopping:

B) Slope of Overflow Embankment
(Horizontal distance per unit vertical, 4:1 or flatter preferred)

Ze = 4.00 ft / ft

11. Vegetation

Choose One
- ○ Irrigated
- ◉ Not Irrigated

12. Access

A) Describe Sediment Removal Procedures

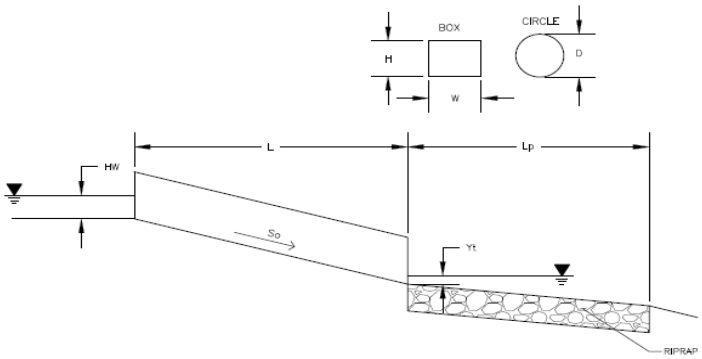
Notes:

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.00 (May 2020)

Project: **P-23009 The Rock Commerce Center**

ID: **Pond Invert O-2**



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

Supercritical Flow! Using Adjusted Diameter to calculate protection type.

Design Information:

Design Discharge	Q =	1.31	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	18	inches
Inlet Edge Type (Choose from pull-down list)		Grooved Edge Projecting	
OR:			
Box Culvert:		**OR**	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	7137.26	ft
Outlet Elevation **OR** Slope	Elev OUT =	7137	ft
Culvert Length	L =	32	ft
Manning's Roughness	n =	0.012	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =	7137.61	ft
Max Allowable Channel Velocity	V =	7	ft/s

Calculated Results:

Culvert Cross Sectional Area Available	A =	1.77	ft^2
Culvert Normal Depth	Y_n =	0.36	ft
Culvert Critical Depth	Y_c =	0.43	ft
Froude Number	Fr =	1.39	**Supercritical!**
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	0.49	
Sum of All Loss Coefficients	k_s =	1.69	ft
Headwater:			
Inlet Control Headwater	HW_I =	0.58	ft
Outlet Control Headwater	HW_O =	N/A	ft
Design Headwater Elevation	**HW =**	**N/A**	**ft**
Headwater/Diameter OR Headwater/Rise Ratio	**HW/D =**	**N/A**	

Outlet Control Headwater Approximation Method Inaccurate for Low Flow - Backwater Calculations Required

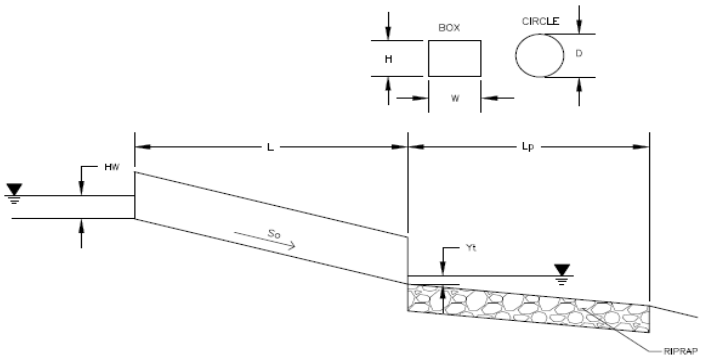
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	0.48	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	0.61	ft
Tailwater/Diameter	Yt/D =	0.41	
Expansion Factor	1/(2*tan(Θ)) =	6.70	
Flow Area at Max Channel Velocity	A_t =	0.19	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	**L_p =**	**5**	**ft**
Width of Riprap Protection at Downstream End	**T =**	**3**	**ft**
Adjusted Diameter for Supercritical Flow	Da =	0.93	ft
Minimum Theoretical Riprap Size	d_{50} min=	1	in
Nominal Riprap Size	d_{50} nominal=	6	in
MHFD Riprap Type	**Type =**	**VL**	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.00 (May 2020)

Project: **P-23009 The Rock Commerce Center**

ID: **Culvert at Design Point O-3**



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

Supercritical Flow! Using Adjusted Diameter to calculate protection type.

Design Information:

Design Discharge	Q =	1.15	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	18	inches
Inlet Edge Type (Choose from pull-down list)		Beveled Edge (1:1)	
OR:			
Box Culvert:		**OR**	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	7156.62	ft
Outlet Elevation **OR** Slope	Elev OUT =	7153.87	ft
Culvert Length	L =	65.4	ft
Manning's Roughness	n =	0.012	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	7	ft/s

Calculated Results:

Culvert Cross Sectional Area Available	A =	1.77	ft^2
Culvert Normal Depth	Y_n =	0.23	ft
Culvert Critical Depth	Y_c =	0.40	ft
Froude Number	Fr =	3.06	**Supercritical!**
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	1.01	
Sum of All Loss Coefficients	k_s =	2.21	ft
Headwater:			
Inlet Control Headwater	HW_I =	0.53	ft
Outlet Control Headwater	HW_O =	N/A	ft
Design Headwater Elevation	**HW =**	**N/A**	**ft**
Headwater/Diameter OR Headwater/Rise Ratio	**HW/D =**	**N/A**	

Outlet Control Headwater Approximation Method Inaccurate for Low Flow - Backwater Calculations Required

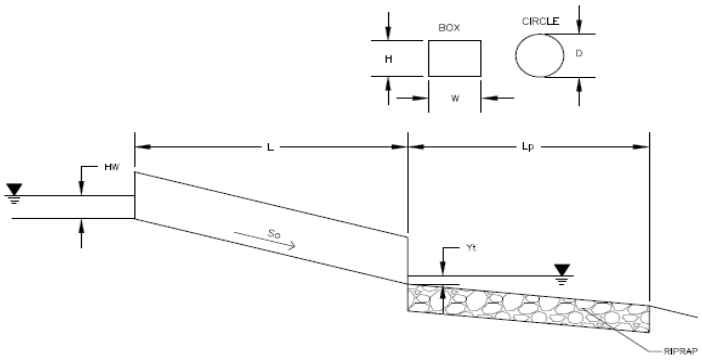
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	0.42	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	0.60	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	6.70	
Flow Area at Max Channel Velocity	A_t =	0.16	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	**L_p =**	**5**	**ft**
Width of Riprap Protection at Downstream End	**T =**	**3**	**ft**
Adjusted Diameter for Supercritical Flow	Da =	0.86	ft
Minimum Theoretical Riprap Size	d_{50} min=	1	in
Nominal Riprap Size	d_{50} nominal=	6	in
MHFD Riprap Type	**Type =**	**VL**	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.00 (May 2020)

Project: **P-23009 The Rock Commerce Center**

ID: **Pond Outlet @ Design Point O-4**



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

Design Information:

Design Discharge	Q =	10.4	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	18	inches
Inlet Edge Type (Choose from pull-down list)		Grooved Edge Projecting	
OR:			
Box Culvert:		**OR**	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	7134.29	ft
Outlet Elevation **OR** Slope	Elev OUT =	7134	ft
Culvert Length	L =	41.25	ft
Manning's Roughness	n =	0.013	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	5	ft/s

Calculated Results:

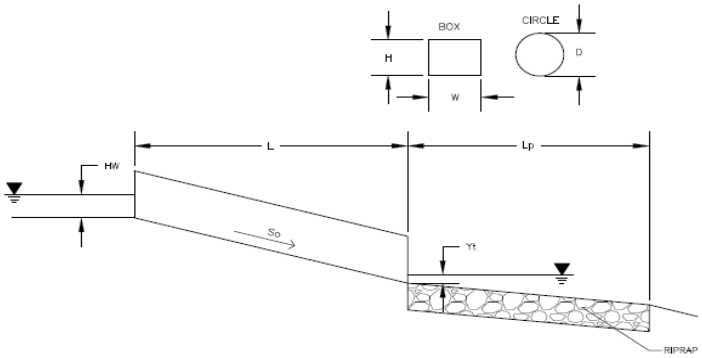
Culvert Cross Sectional Area Available	A =	1.77	ft^2
Culvert Normal Depth	Y_n =	1.50	ft
Culvert Critical Depth	Y_c =	1.24	ft
Froude Number	Fr =	-	**Pressure flow!**
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	0.75	
Sum of All Loss Coefficients	k_s =	1.95	ft
Headwater:			
Inlet Control Headwater	HW_I =	2.12	ft
Outlet Control Headwater	HW_O =	2.13	ft
Design Headwater Elevation	**HW =**	**7136.42**	**ft**
Headwater/Diameter OR Headwater/Rise Ratio	**HW/D =**	**1.42**	
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	3.77	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	0.60	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	3.70	
Flow Area at Max Channel Velocity	A_t =	2.08	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	**L_p =**	**8**	**ft**
Width of Riprap Protection at Downstream End	**T =**	**4**	**ft**
Adjusted Diameter for Supercritical Flow	Da =	-	ft
Minimum Theoretical Riprap Size	d_{50} min=	5	in
Nominal Riprap Size	d_{50} nominal=	6	in
MHFD Riprap Type	**Type =**	**VL**	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.00 (May 2020)

Project: **P-23009 The Rock Commerce Center**

ID: **Design Point C Run Down**



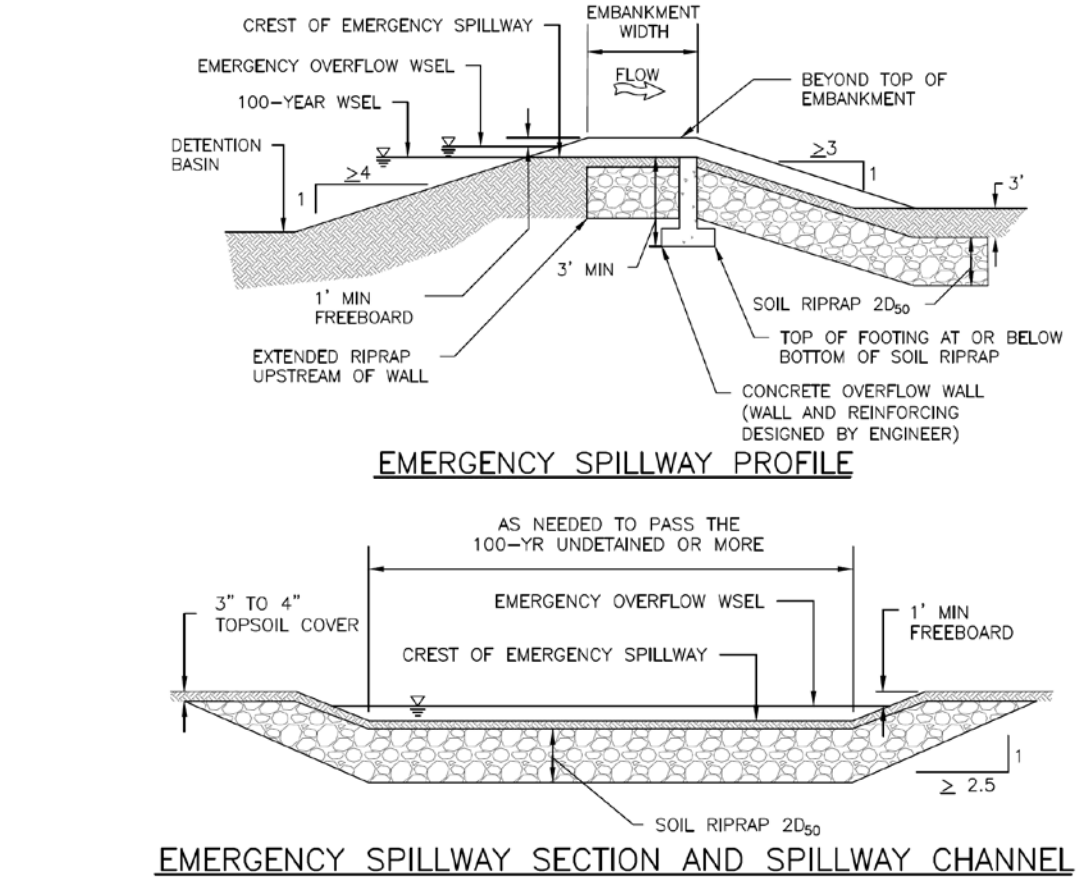
i dont see riprap at DP-C on the Plans. Please confirm location

The riprap was covered by the basin boundary line, it has been adjusted so it can now be seen.

Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

Supercritical Flow! Using Adjusted Diameter to calculate protection type.

Design Information:				
	Design Discharge	Q =	1.6	cfs
Circular Culvert:				
	Barrel Diameter in Inches	D =	18	inches
	Inlet Edge Type (Choose from pull-down list)		Grooved Edge Projecting	
OR:				
Box Culvert:			**OR**	
	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation	Elev IN =	7134.54	ft
	Outlet Elevation **OR** Slope	Elev OUT =	7133.19	ft
	Culvert Length	L =	15	ft
	Manning's Roughness	n =	0.012	
	Bend Loss Coefficient	k_b =	0	
	Exit Loss Coefficient	k_x =	1	
	Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
	Max Allowable Channel Velocity	V =	7	ft/s
Calculated Results:				
	Culvert Cross Sectional Area Available	A =	1.77	ft^2
	Culvert Normal Depth	Y_n =	0.40	ft
	Culvert Critical Depth	Y_c =	0.48	ft
	Froude Number	Fr =	1.40	**Supercritical!**
	Entrance Loss Coefficient	k_e =	0.20	
	Friction Loss Coefficient	k_f =	0.23	
	Sum of All Loss Coefficients	k_s =	1.43	ft
Headwater:				
	Inlet Control Headwater	HW_I =	0.65	ft
	Outlet Control Headwater	HW_O =	N/A	ft
	Design Headwater Elevation	**HW =**	**N/A**	**ft**
	Headwater/Diameter OR Headwater/Rise Ratio	**HW/D =**	**N/A**	
	Outlet Control Headwater Approximation Method Inaccurate for Low Flow - Backwater Calculations Required			
Outlet Protection:				
	Flow/(Diameter^2.5)	Q/D^2.5 =	0.58	$ft^{0.5}/s$
	Tailwater Surface Height	Y_t =	0.60	ft
	Tailwater/Diameter	Yt/D =	0.40	
	Expansion Factor	1/(2*tan(Θ)) =	6.70	
	Flow Area at Max Channel Velocity	A_t =	0.23	ft^2
	Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
	Length of Riprap Protection	**L_p =**	**5**	**ft**
	Width of Riprap Protection at Downstream End	**T =**	**3**	**ft**
	Adjusted Diameter for Supercritical Flow	Da =	0.95	ft
	Minimum Theoretical Riprap Size	d_{50} min=	1	in
	Nominal Riprap Size	d_{50} nominal=	6	in
	MHFD Riprap Type	**Type =**	**VL**	



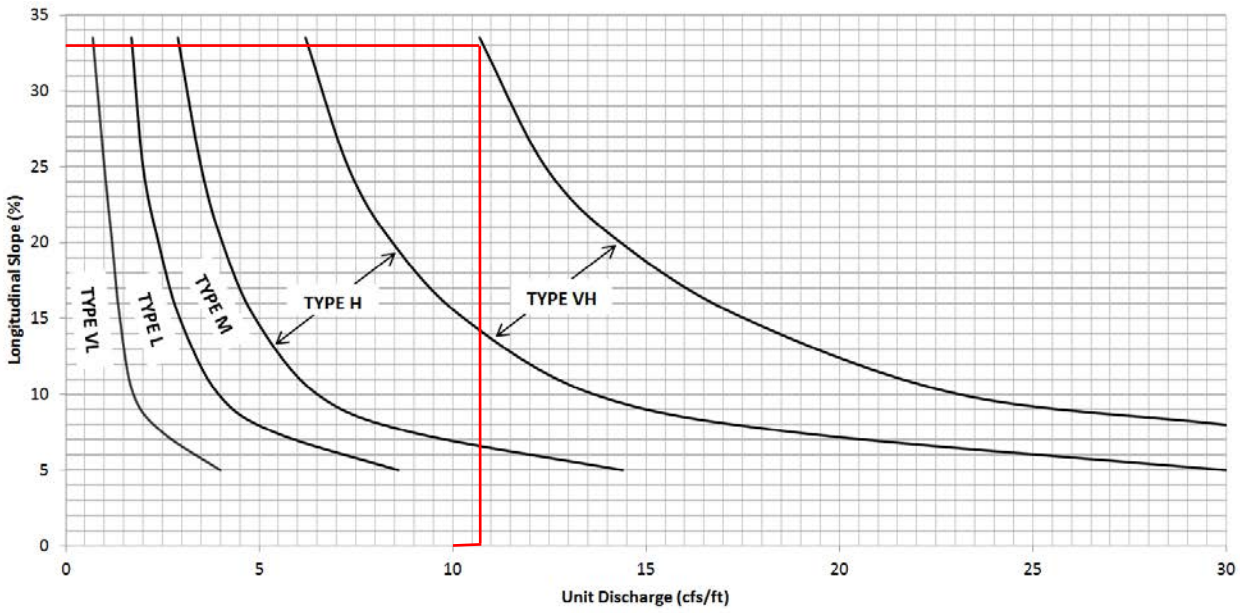
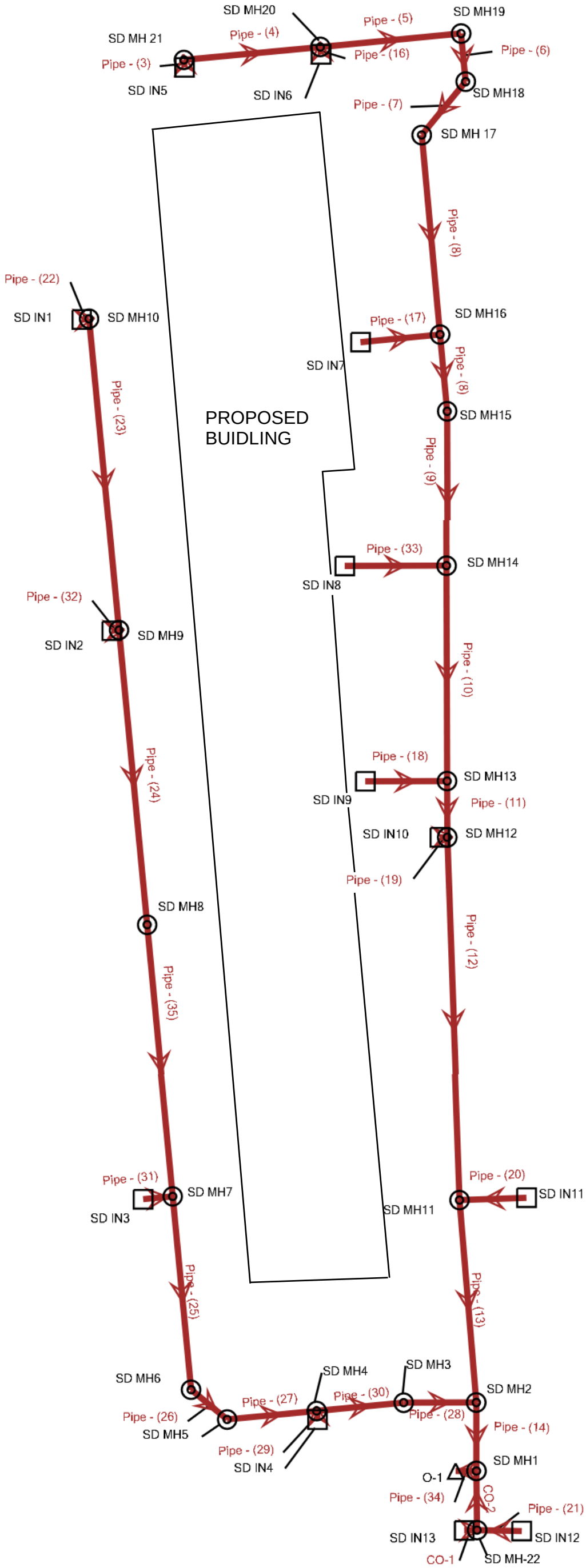


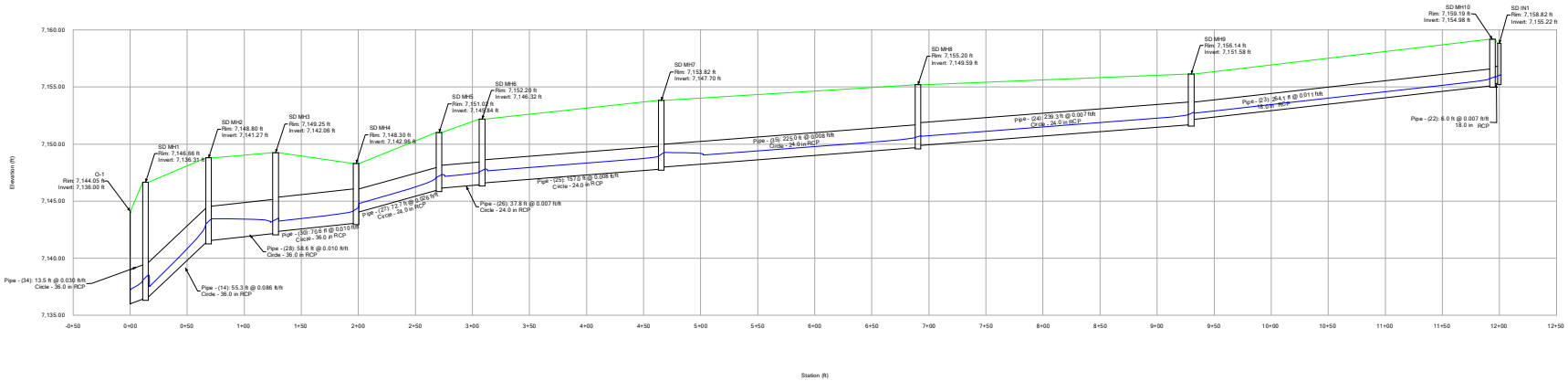
Figure 12-21. Embankment protection details and rock sizing chart (adapted from Arapahoe County)

STORMCAD NETWORK PREVEIW FOR THE ROCK COMMERCE CENTER



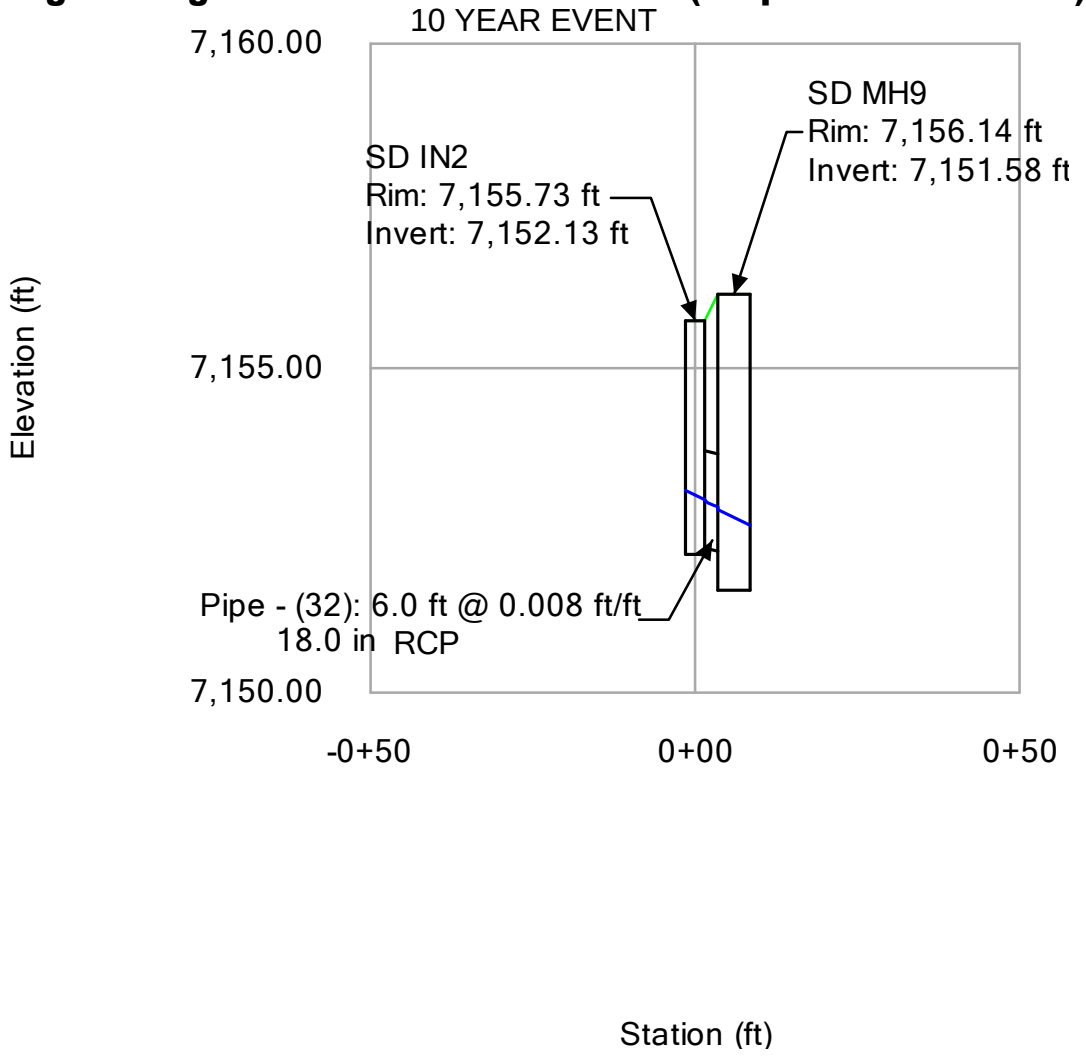
Profile Report
Engineering Profile - O-1 to SD IN1 (Proposed Strom.stsw)

10 YEAR EVENT



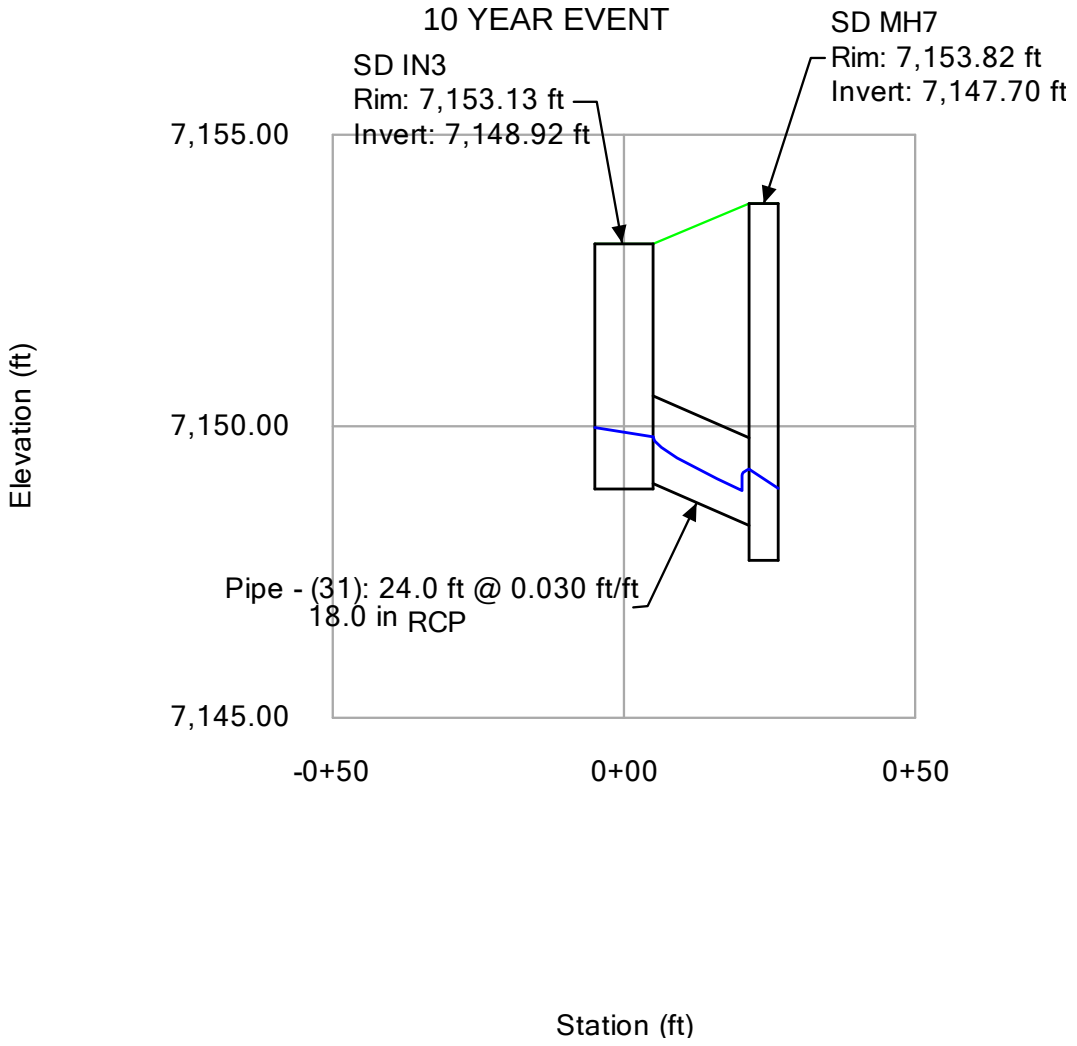
Profile Report

Engineering Profile - SD IN2 to SD MH9 (Proposed Strom.stsw)

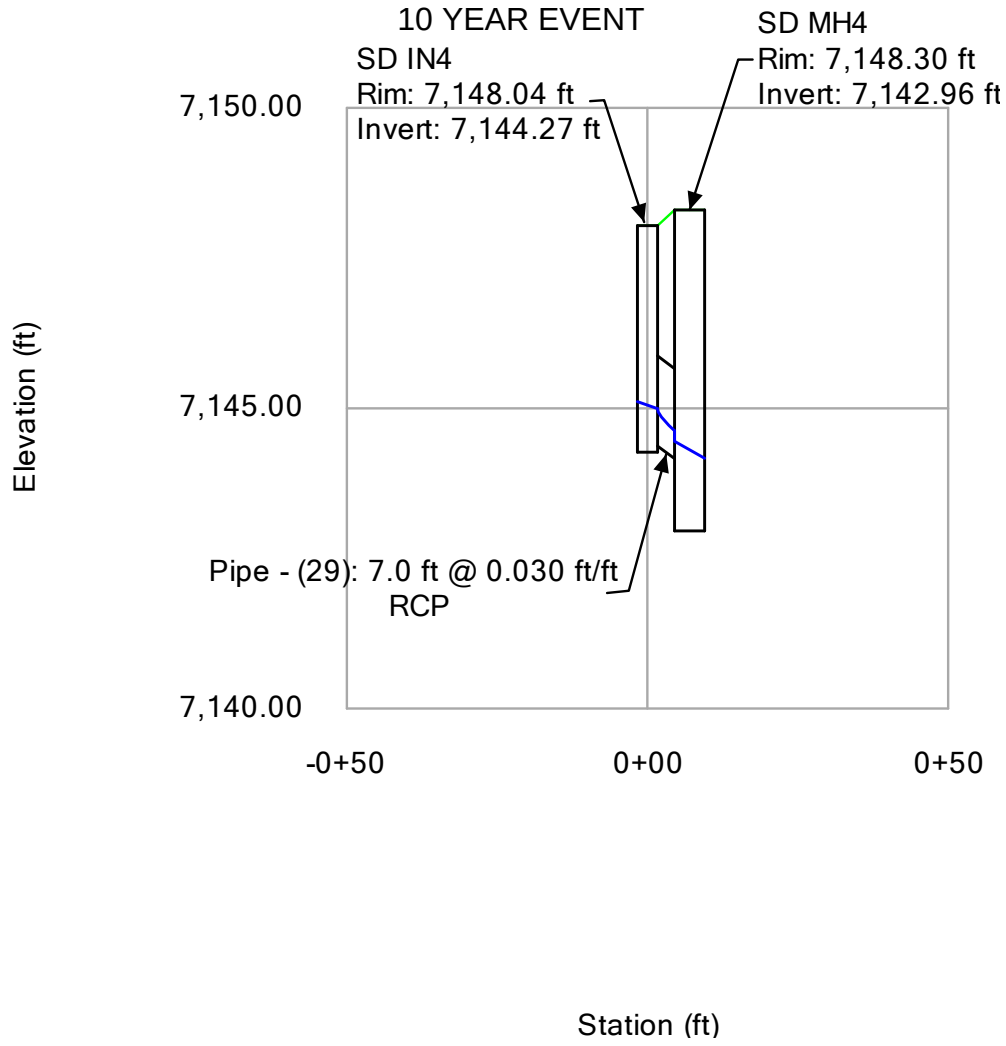


Profile Report

Engineering Profile - SDIN3 to SD MH7 (Proposed Strom.stsw)

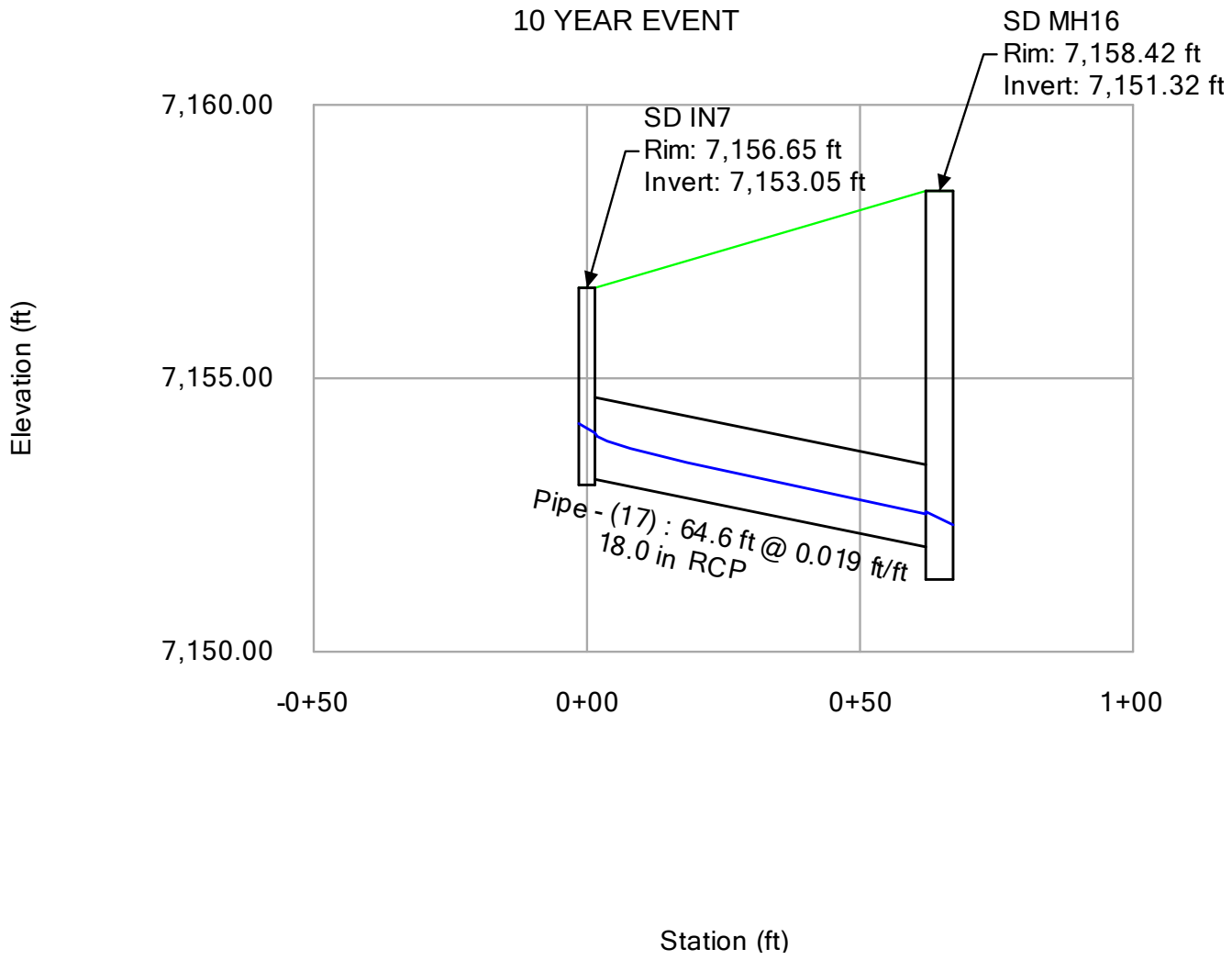


Profile Report
Engineering Profile - SD IN4 to SD MH4 (Proposed Strom.stsw)



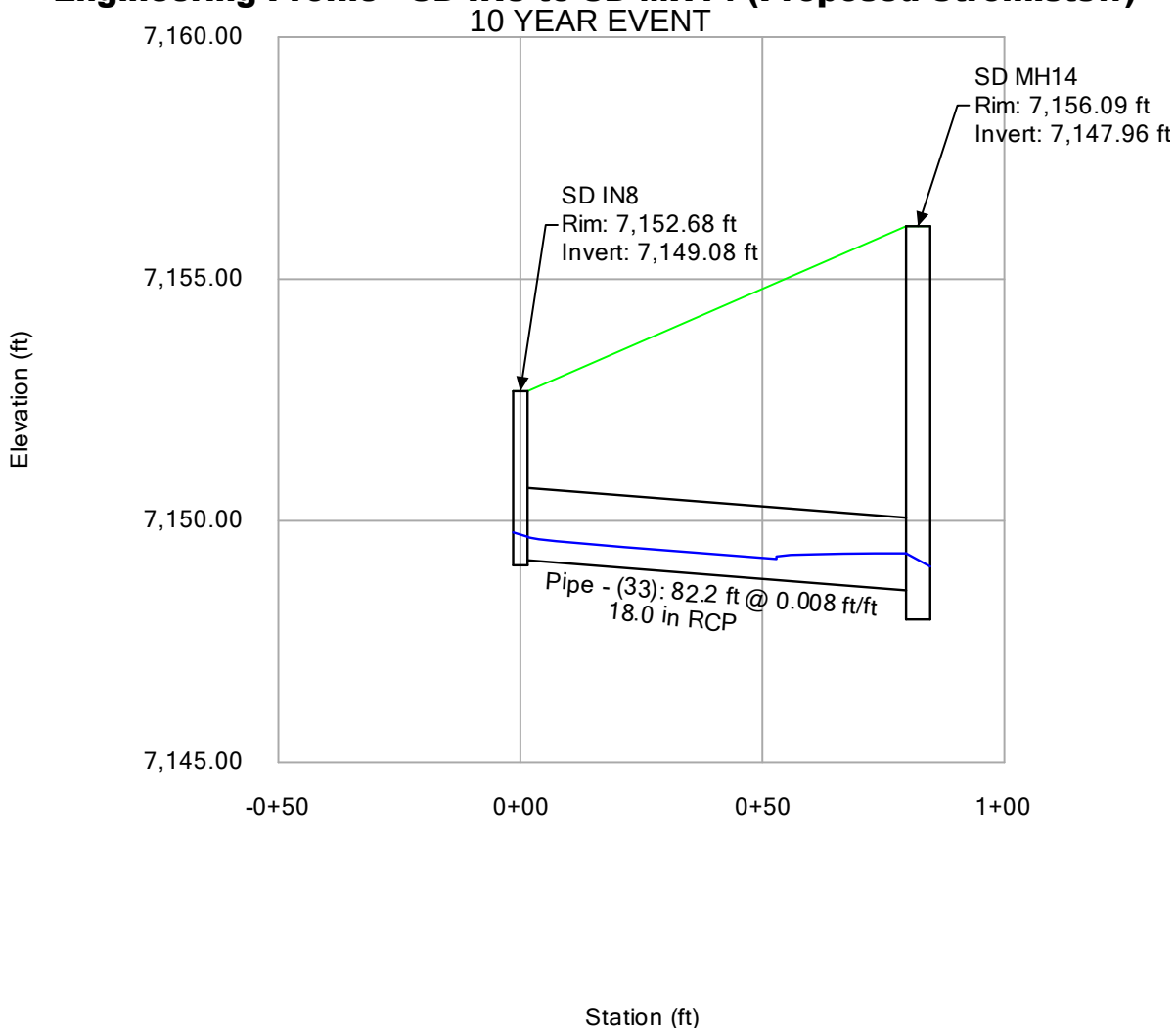
Profile Report

Engineering Profile - SD IN7 to SD MH16 (Proposed Strom.stsw)

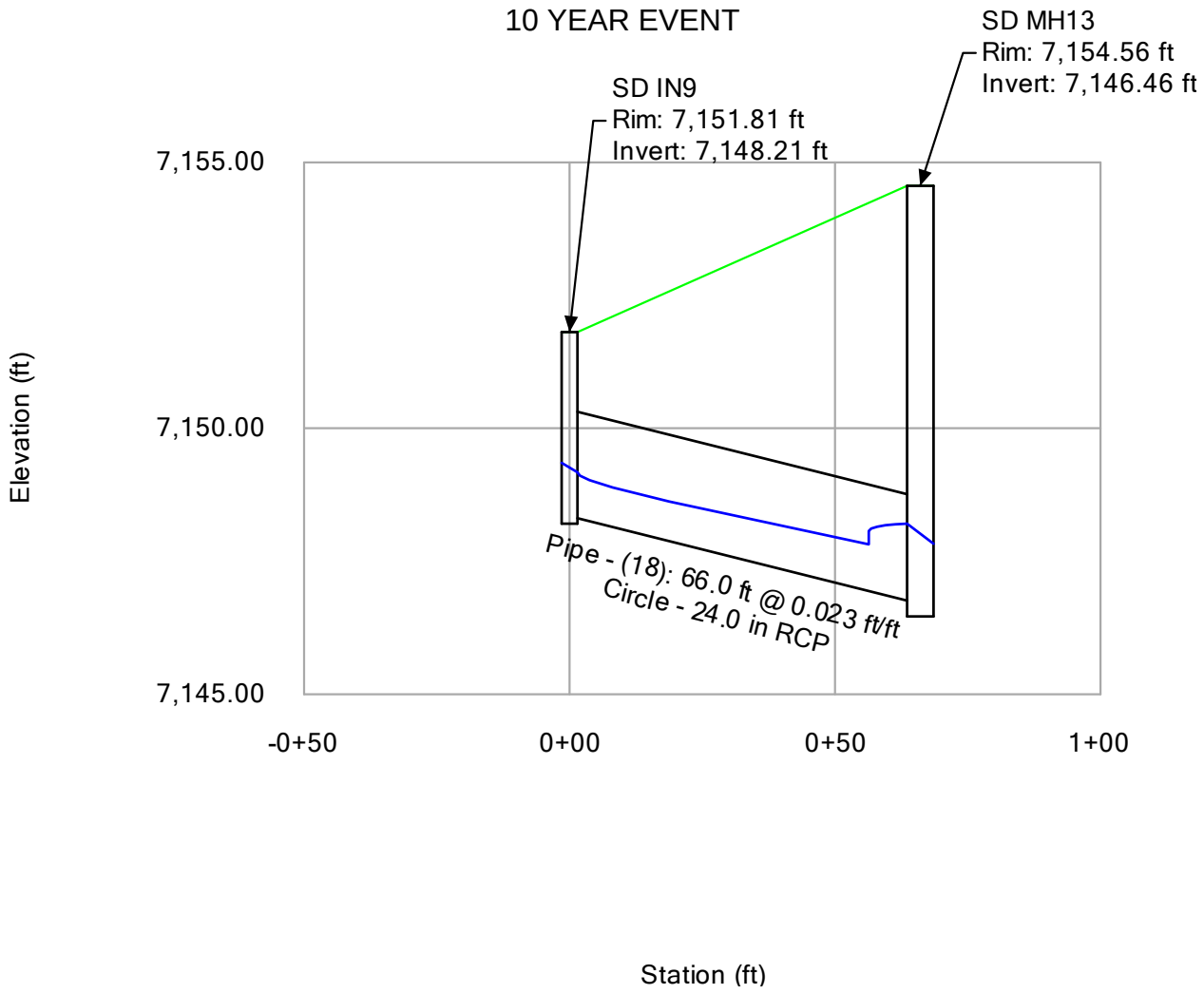


Profile Report

Engineering Profile - SD IN8 to SD MH14 (Proposed Strom.stsw)

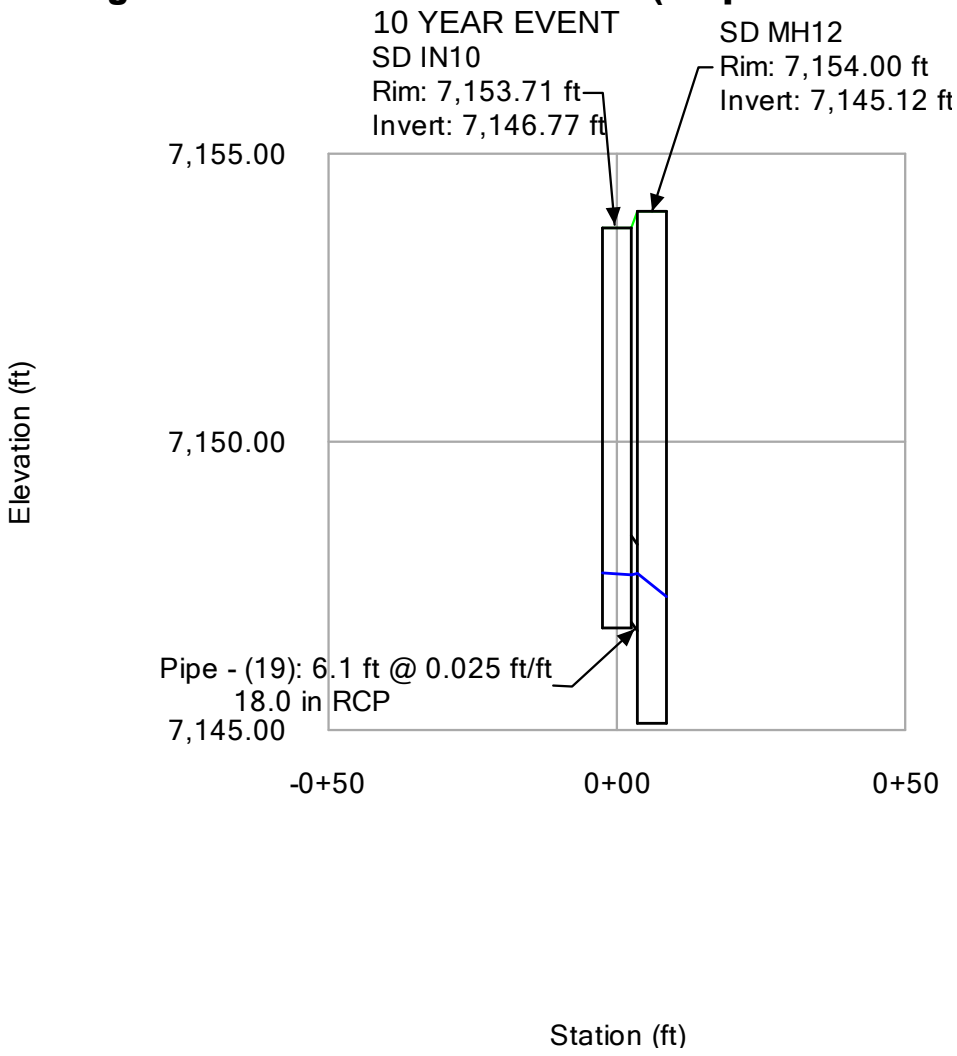


Profile Report
Engineering Profile - SD IN9 to SD MH13 (Proposed Strom.stsw)



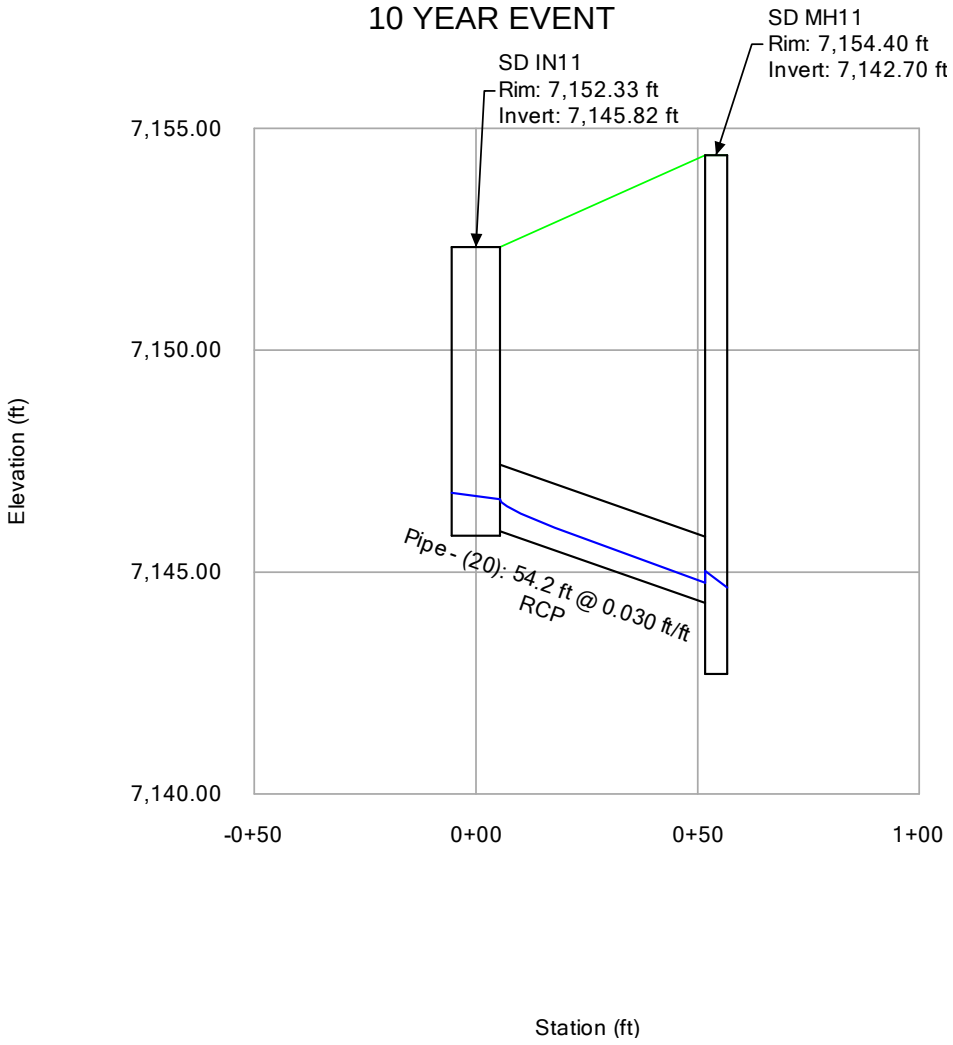
Profile Report

Engineering Profile - SD IN10 to SD MH12 (Proposed Strom.stsw)



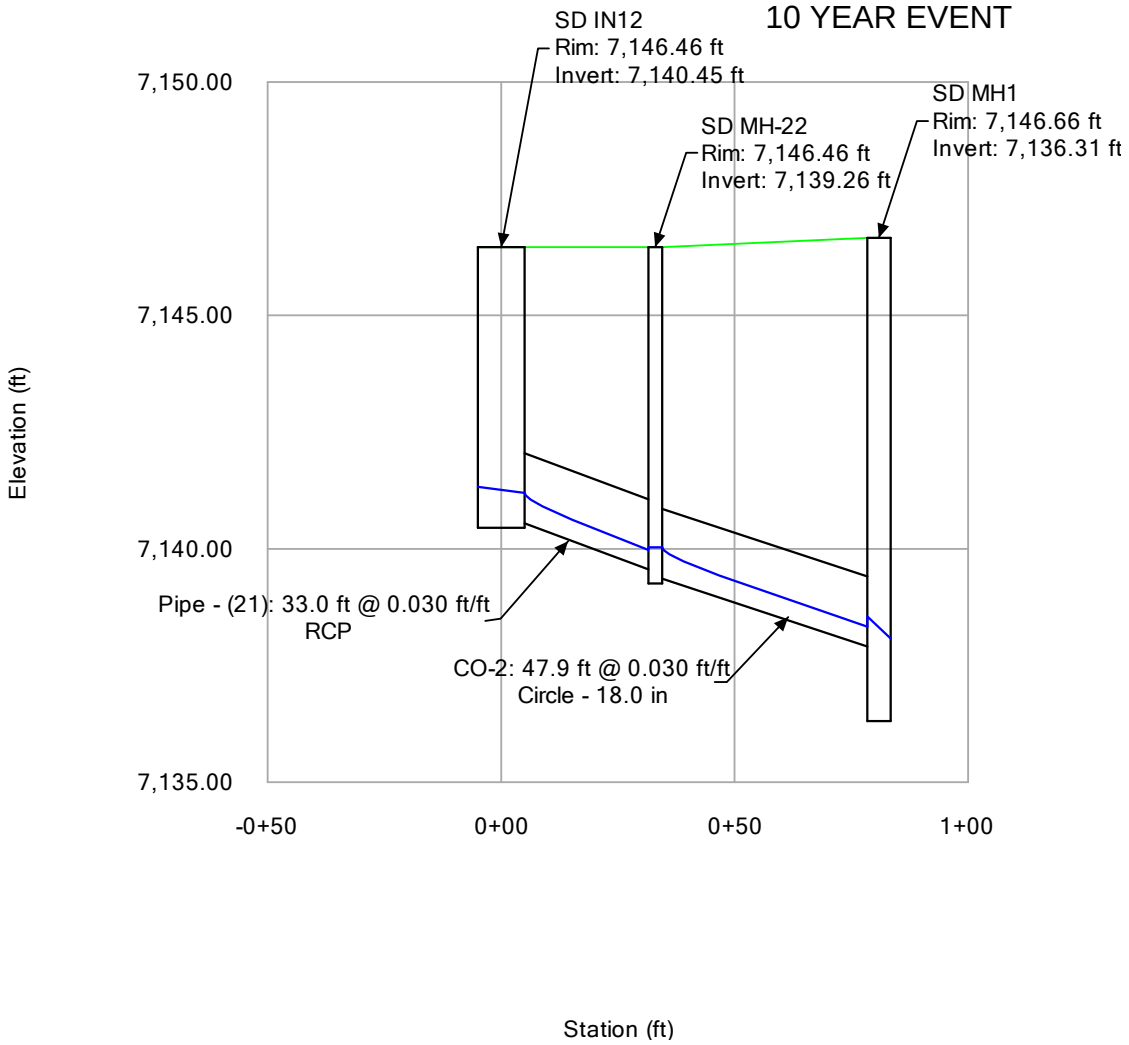
Profile Report

Engineering Profile - SD IN11 to SD MH11 (Proposed Strom.stsw)



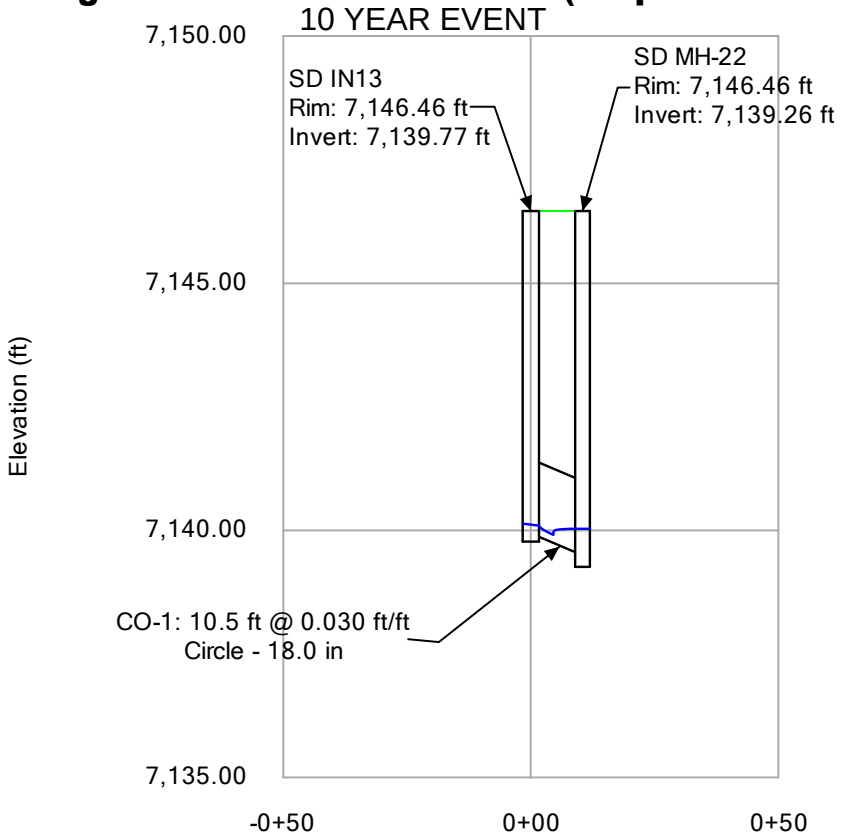
Profile Report

Engineering Profile - SD IN12 to SD MH1 (Proposed Strom.stsw)

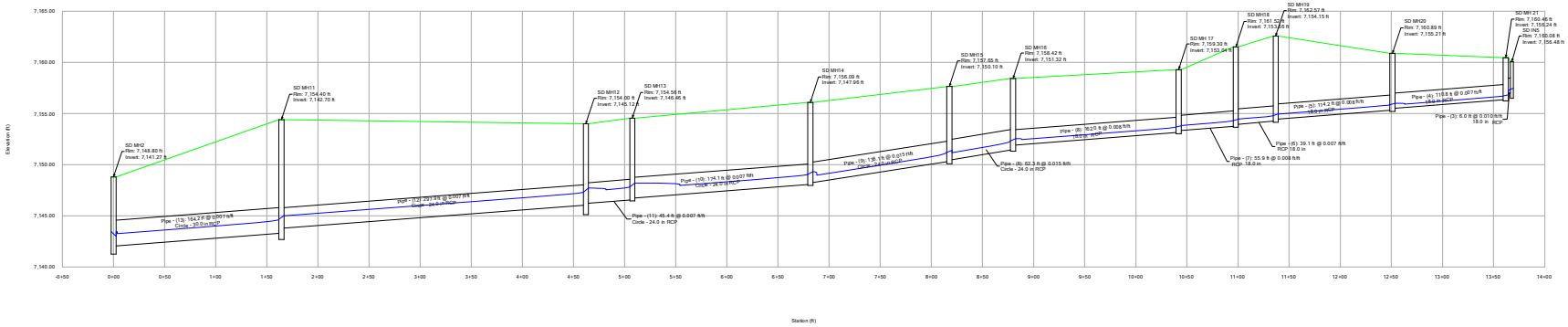


Profile Report

Engineering Profile - SDIN 13 to MH22 (Proposed Strom.stsw)



Profile Report
Engineering Profile - SD MH2 to SD IN5 (Proposed Strom.stsw)
10 YEAR EVENT



FlexTable: Catch Basin Table - 10 YEAR EVENT

Label	Notes	Elevation (Ground) (ft)	Headloss Method	Headloss Coefficient (Standard)	Headloss (ft)
SD IN11	CDOT Type 13 Combo	7,152.33	Standard	0.500	0.14
SD IN13	CDOT Type 13 Combo	7,146.46	Standard	0.500	0.01
SD IN12	CDOT Type R	7,146.46	Standard	0.500	0.12
SD IN4	CDOT Type 13 Combo	7,148.04	Standard	0.500	0.12
SD IN3	CDOT Type R	7,153.13	Standard	0.500	0.16
SD IN10	CDOT Type R	7,153.71	Standard	0.500	0.03
SD IN9	CDOT Type 13	7,151.81	Standard	0.500	0.15
SD IN8	CDOT Type 13	7,152.68	Standard	0.500	0.09
SD IN7	CDOT Type 13	7,156.65	Standard	0.500	0.17
SD IN6	CDOT Type 13	7,160.43	Standard	0.500	0.07
SD IN5	CDOT Type 13	7,160.08	Standard	0.500	0.07
SD IN1	CDOT Type 13	7,158.82	Standard	0.500	0.12
SD IN2	CDOT Type 13	7,155.73	Standard	0.500	0.15

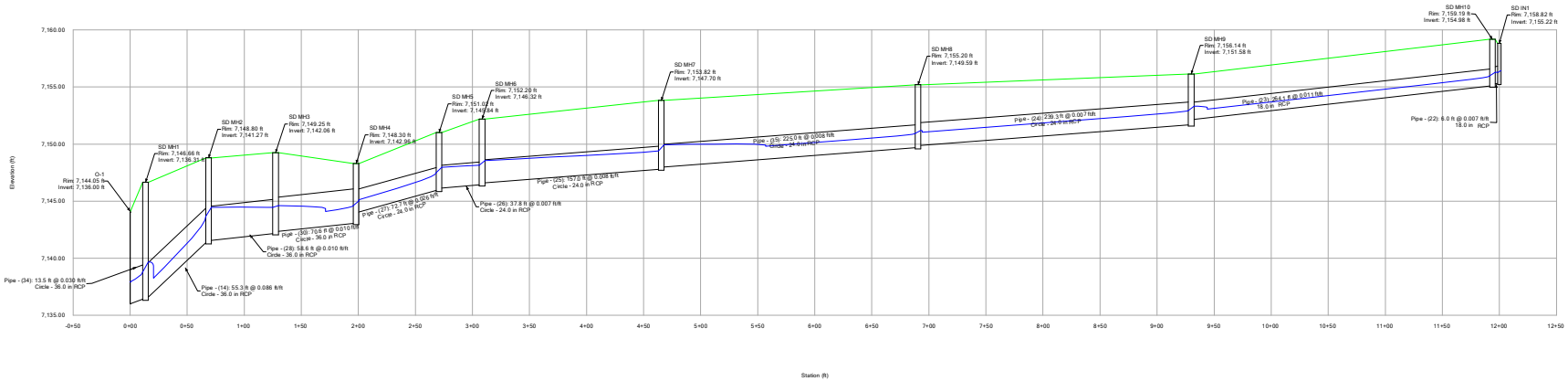
FlexTable: Manhole Table - 10 YEAR EVENT

Label	Notes	Elevation (Rim) (ft)	Headloss Method	Headloss Coefficient (Standard)	Headloss (ft)
SD MH19	5' DIA MH	7,162.57	Standard	0.800	0.16
SD MH18	5' DIA MH	7,161.52	Standard	0.600	0.12
SD MH20	5' DIA MH	7,160.89	Standard	0.700	0.14
SD MH 21	5' DIA MH	7,160.46	Standard	0.800	0.11
SD MH 17	5' DIA MH	7,159.30	Standard	0.600	0.12
SD MH10	5' DIA MH	7,159.19	Standard	0.800	0.19
SD MH16	5' DIA MH	7,158.42	Standard	0.700	0.24
SD MH15	5' DIA MH	7,157.65	Standard	0.600	0.21
SD MH9	5' DIA MH	7,156.14	Standard	0.700	0.24
SD MH14	5' DIA MH	7,156.09	Standard	0.700	0.27
SD MH8	5' DIA MH	7,155.20	Standard	0.500	0.17
SD MH13	5' DIA MH	7,154.56	Standard	0.700	0.38
SD MH11	5' DIA MH	7,154.40	Standard	0.700	0.38
SD MH12	5' DIA MH	7,154.00	Standard	0.700	0.40
SD MH7	5' DIA MH	7,153.82	Standard	0.700	0.33
SD MH6	5' DIA MH	7,152.20	Standard	0.600	0.28
SD MH5	5' DIA MH	7,151.02	Standard	0.600	0.27
SD MH3	5' DIA MH	7,149.25	Standard	0.600	0.24
SD MH2	6' DIA MH	7,148.80	Standard	0.700	0.46
SD MH4	5' DIA MH	7,148.30	Standard	0.700	0.29
SD MH1	6' DIA MH	7,146.66	Standard	0.700	0.47
SD MH-22	5' DIA MH	7,146.46	Standard	0.700	0.18

FlexTable: Conduit Table - 10 YEAR EVENT

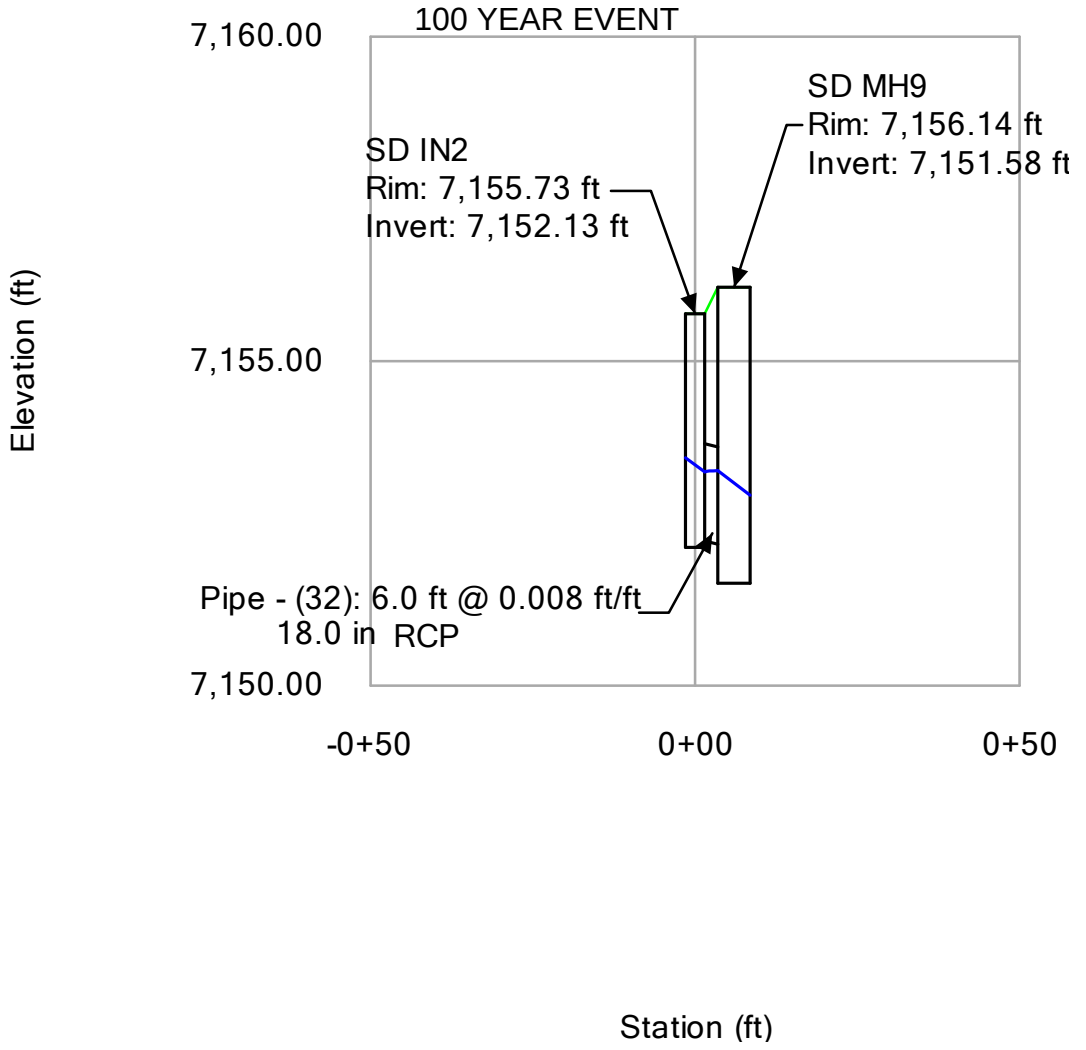
Label	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Manning's n	Flow (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Froude Number (Normal)
Pipe - (5)	18.0	0.008	4.23	7,155.31	7,154.45	0.013	2.18	7,155.87	7,154.95	7,156.07	7,155.23	1.236
Pipe - (6)	18.0	0.007	4.19	7,154.25	7,153.96	0.013	2.13	7,154.80	7,154.46	7,155.01	7,154.73	1.229
Pipe - (7)	18.0	0.008	4.20	7,153.76	7,153.34	0.013	2.12	7,154.31	7,153.83	7,154.51	7,154.11	1.237
Pipe - (4)	18.0	0.007	3.43	7,156.34	7,155.51	0.013	1.05	7,156.72	7,156.01	7,156.86	7,156.08	1.228
Pipe - (16)	18.0	0.010	3.95	7,155.80	7,155.74	0.013	1.20	7,156.21	7,156.10	7,156.36	7,156.31	1.418
Pipe - (3)	18.0	0.010	3.80	7,157.00	7,156.94	0.013	1.05	7,157.38	7,157.27	7,157.52	7,157.47	1.414
Pipe - (8)	18.0	0.008	4.19	7,153.14	7,151.92	0.013	2.09	7,153.69	7,152.56	7,153.89	7,152.69	1.239
Pipe - (22)	18.0	0.007	4.34	7,155.32	7,155.28	0.013	2.80	7,155.95	7,155.88	7,156.19	7,156.16	1.154
Pipe - (23)	18.0	0.011	5.20	7,155.08	7,152.18	0.013	2.79	7,155.71	7,152.82	7,155.95	7,153.05	1.493
Pipe - (8)	24.0	0.015	7.15	7,151.42	7,150.50	0.013	6.46	7,152.32	7,151.40	7,152.67	7,151.74	1.819
Pipe - (17)	18.0	0.019	7.39	7,153.15	7,151.92	0.013	4.86	7,154.00	7,152.52	7,154.34	7,153.37	1.948
Pipe - (9)	24.0	0.015	7.18	7,150.30	7,148.26	0.013	6.42	7,151.20	7,149.33	7,151.54	7,149.55	1.833
Pipe - (24)	24.0	0.007	5.58	7,151.68	7,149.89	0.013	6.43	7,152.58	7,150.68	7,152.92	7,151.16	1.282
Pipe - (32)	18.0	0.008	5.10	7,152.23	7,152.18	0.013	3.77	7,152.97	7,152.86	7,153.26	7,153.22	1.275
Pipe - (10)	24.0	0.007	5.87	7,148.06	7,146.76	0.013	7.81	7,149.05	7,148.21	7,149.44	7,148.37	1.265
Pipe - (33)	18.0	0.008	3.94	7,149.18	7,148.56	0.013	1.68	7,149.67	7,149.33	7,149.84	7,149.38	1.240
Pipe - (35)	24.0	0.008	5.54	7,149.69	7,148.00	0.013	6.21	7,150.57	7,149.26	7,150.91	7,149.40	1.286
Pipe - (11)	24.0	0.007	6.60	7,146.56	7,146.22	0.013	12.45	7,147.83	7,147.71	7,148.37	7,148.09	1.190
Pipe - (18)	24.0	0.023	7.86	7,148.31	7,146.76	0.013	5.04	7,149.10	7,148.21	7,149.40	7,148.28	2.290
Pipe - (12)	24.0	0.007	6.65	7,146.02	7,143.80	0.013	13.00	7,147.32	7,144.99	7,147.88	7,145.68	1.175
Pipe - (13)	30.0	0.007	7.03	7,143.30	7,142.07	0.013	15.90	7,144.65	7,143.47	7,145.19	7,143.96	1.303
Pipe - (20)	18.0	0.030	8.01	7,145.92	7,144.30	0.013	3.61	7,146.65	7,144.75	7,146.93	7,145.75	2.469
Pipe - (19)	18.0	0.025	6.33	7,146.87	7,146.72	0.013	2.01	7,147.70	7,147.71	7,147.76	7,147.75	2.234
Pipe - (25)	24.0	0.008	6.29	7,147.80	7,146.62	0.013	10.07	7,148.94	7,147.82	7,149.40	7,148.23	1.238
Pipe - (31)	18.0	0.030	8.44	7,149.02	7,148.30	0.013	4.33	7,149.82	7,149.26	7,150.14	7,149.47	2.467
Pipe - (26)	24.0	0.007	6.23	7,146.42	7,146.14	0.013	9.88	7,147.54	7,147.34	7,148.00	7,147.73	1.232
Pipe - (27)	24.0	0.026	9.84	7,145.94	7,144.06	0.013	9.84	7,147.06	7,144.78	7,147.52	7,146.22	2.400
Pipe - (30)	36.0	0.010	7.15	7,143.06	7,142.36	0.013	12.13	7,144.17	7,143.51	7,144.57	7,143.88	1.596
Pipe - (28)	36.0	0.010	7.17	7,142.16	7,141.57	0.013	12.04	7,143.26	7,143.47	7,143.67	7,143.57	1.608
Pipe - (14)	36.0	0.086	19.16	7,141.37	7,136.61	0.013	25.69	7,143.01	7,138.56	7,143.67	7,138.99	4.684
Pipe - (29)	18.0	0.030	7.38	7,144.37	7,144.16	0.013	2.70	7,144.99	7,144.62	7,145.23	7,145.15	2.470
Pipe - (21)	18.0	0.030	7.57	7,140.55	7,139.56	0.013	2.95	7,141.20	7,140.21	7,141.45	7,140.46	2.472
Pipe - (34)	36.0	0.030	13.35	7,136.41	7,136.00	0.013	26.72	7,138.08	7,137.27	7,138.76	7,138.64	2.790
CO-1	18.0	0.030	3.83	7,139.87	7,139.56	0.013	0.30	7,140.20	7,140.21	7,140.22	7,140.22	2.236
CO-2	18.0	0.030	7.74	7,139.36	7,137.91	0.013	3.14	7,140.03	7,138.33	7,140.29	7,139.25	2.486

Profile Report
Engineering Profile - O-1 to SD IN1 (Proposed Strom.stsw)
100 YEAR EVENT



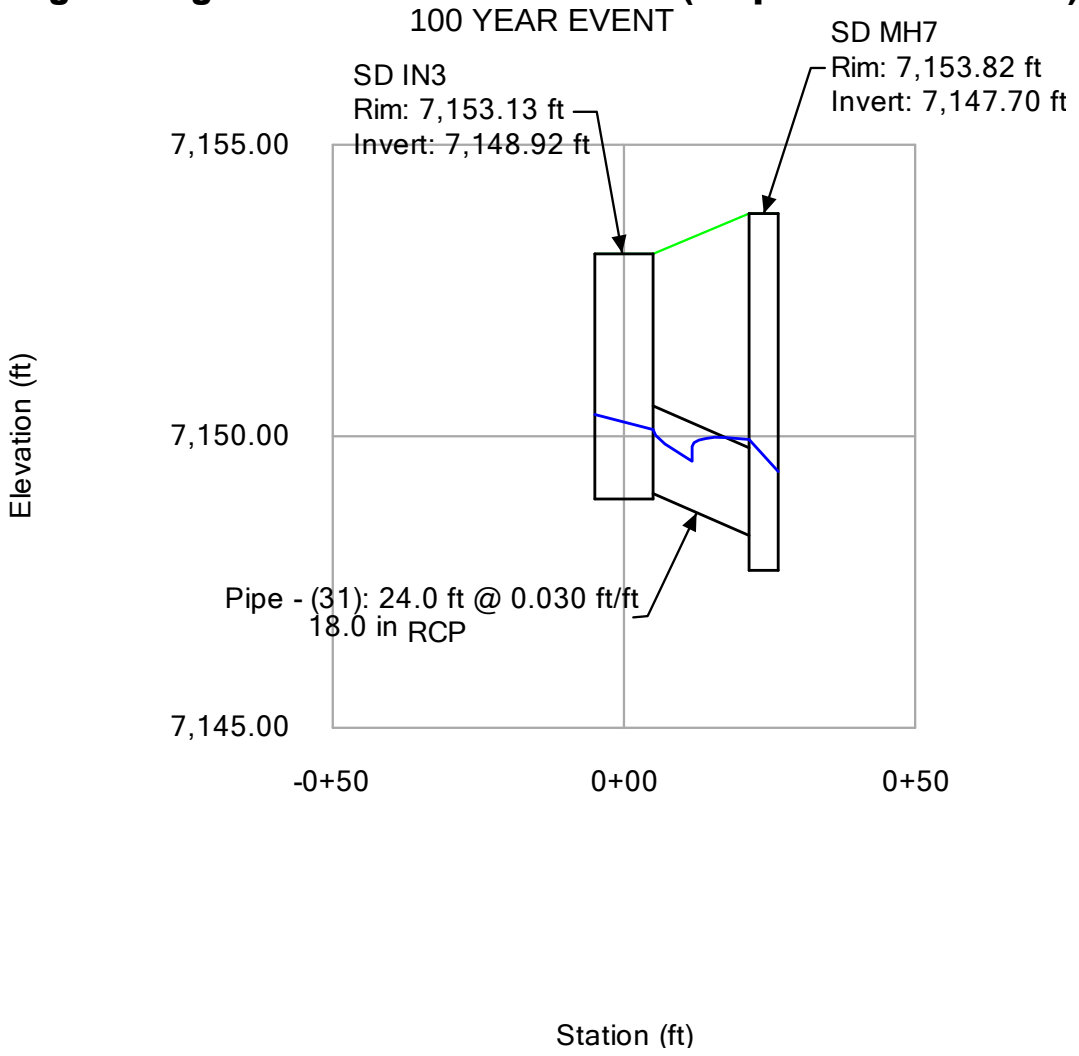
Profile Report

Engineering Profile - SD IN2 to SD MH9 (Proposed Strom.stsw)



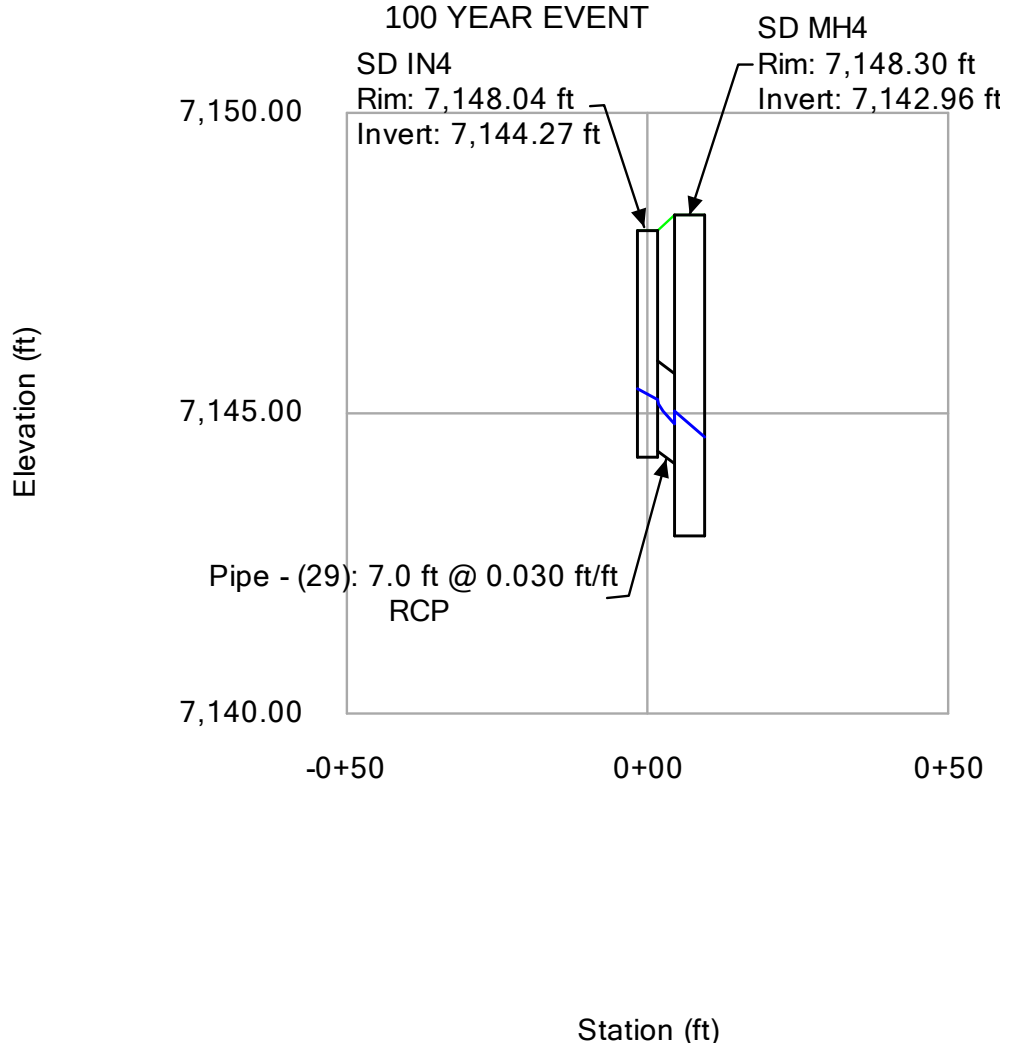
Profile Report

Engineering Profile - SDIN3 to SD MH7 (Proposed Strom.stsw)



Profile Report

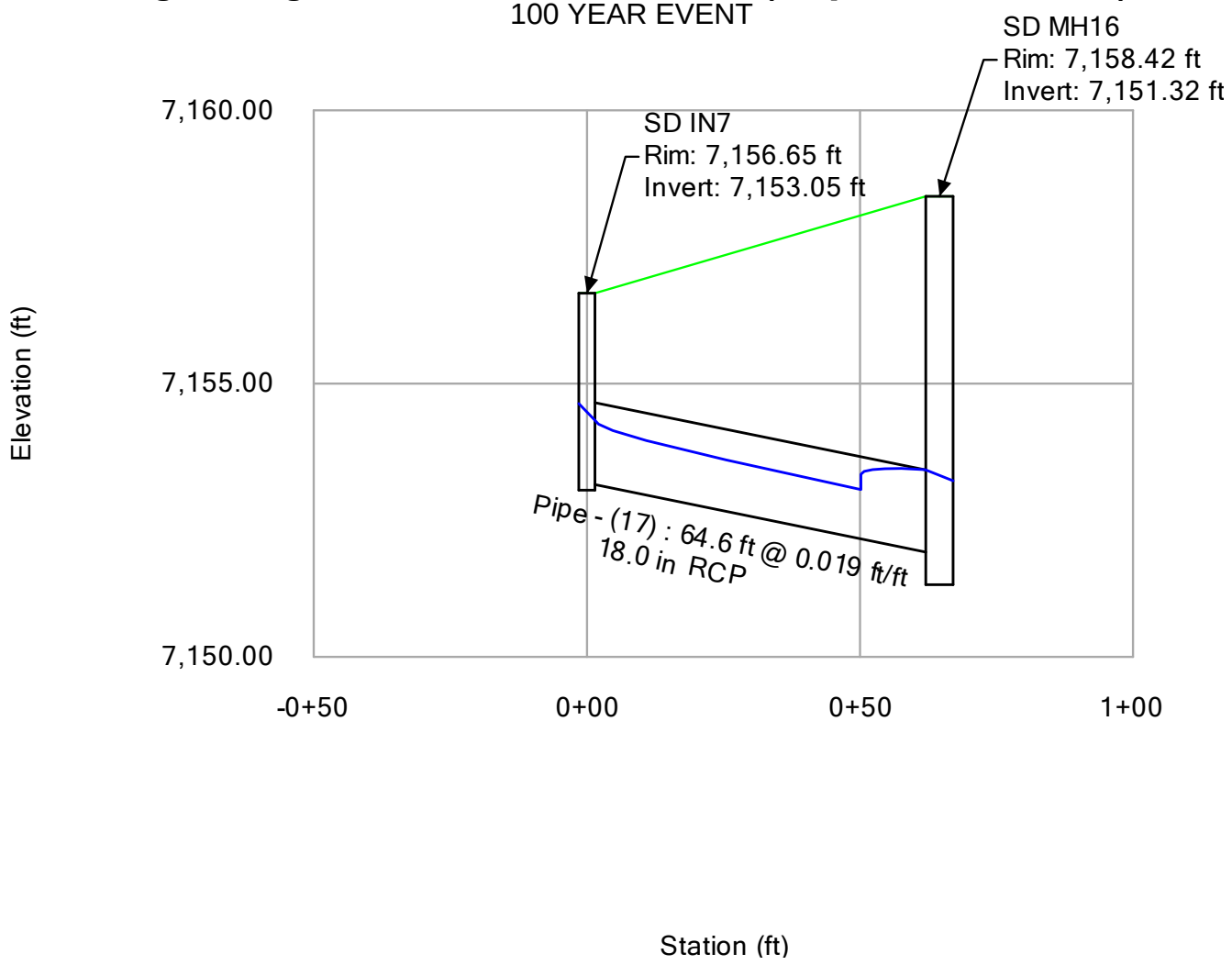
Engineering Profile - SD IN4 to SD MH4 (Proposed Strom.stsw)



Profile Report

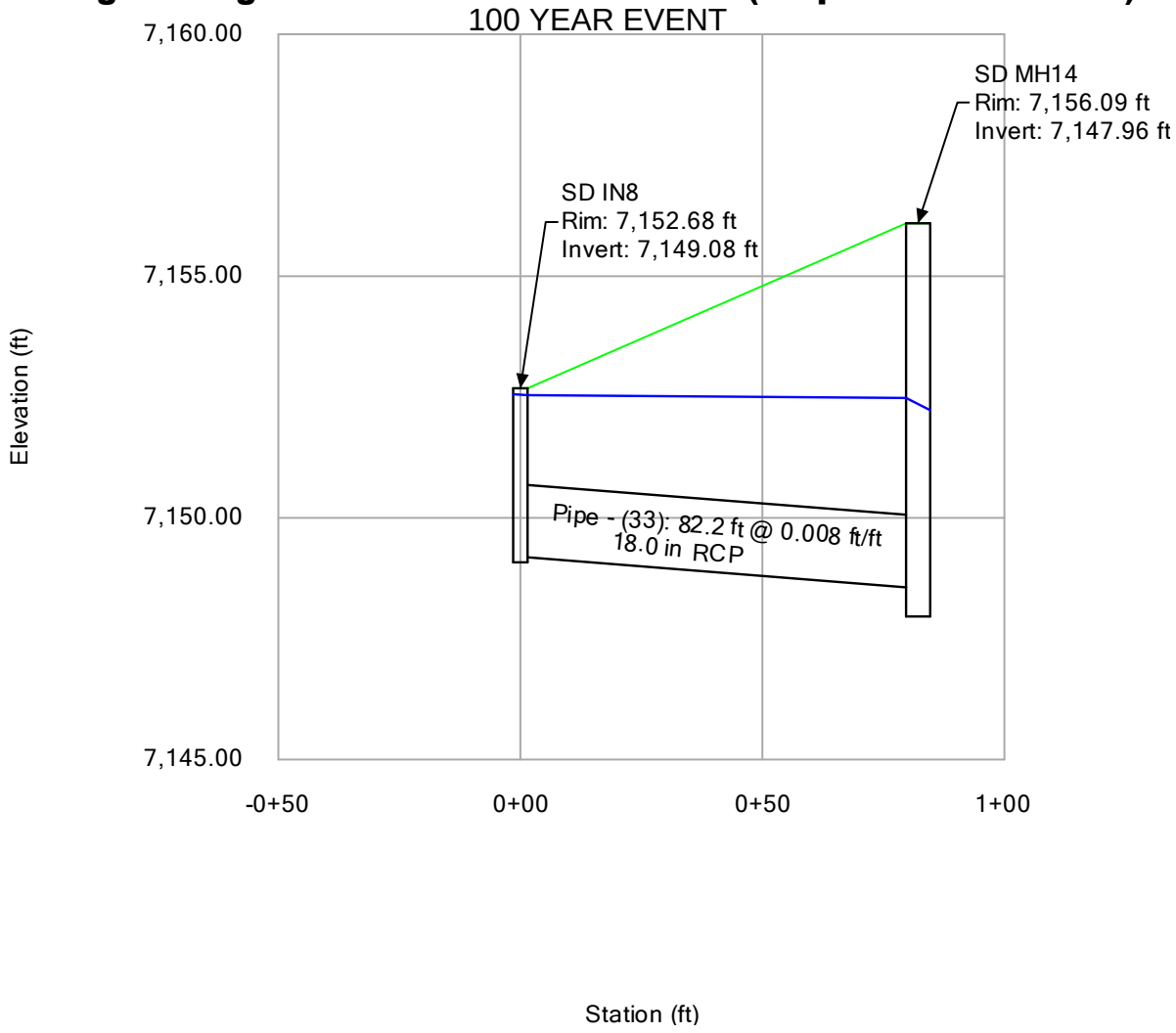
Engineering Profile - SD IN7 to SD MH16 (Proposed Strom.stsw)

100 YEAR EVENT



Profile Report

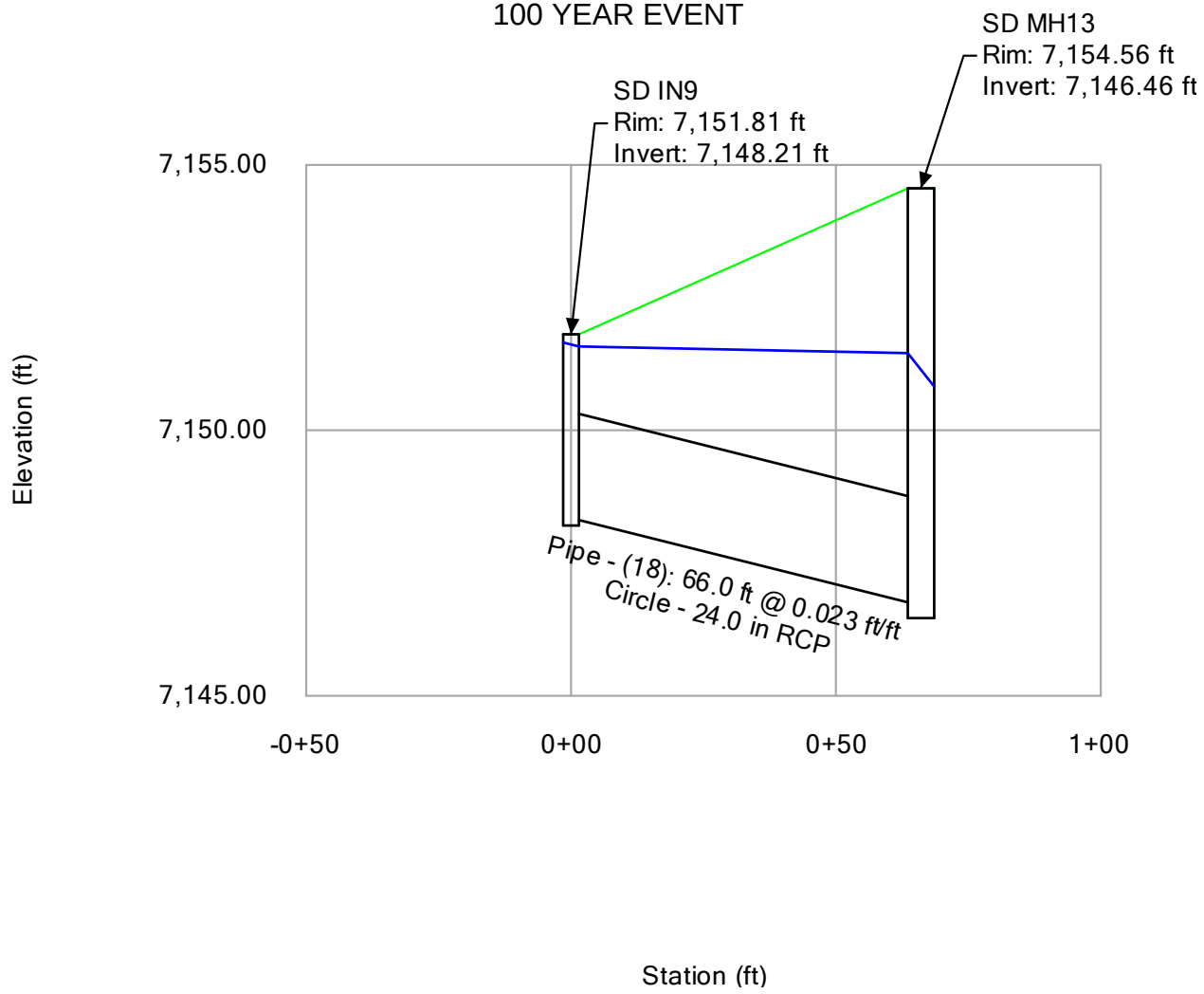
Engineering Profile - SD IN8 to SD MH14 (Proposed Strom.stsw)



Profile Report

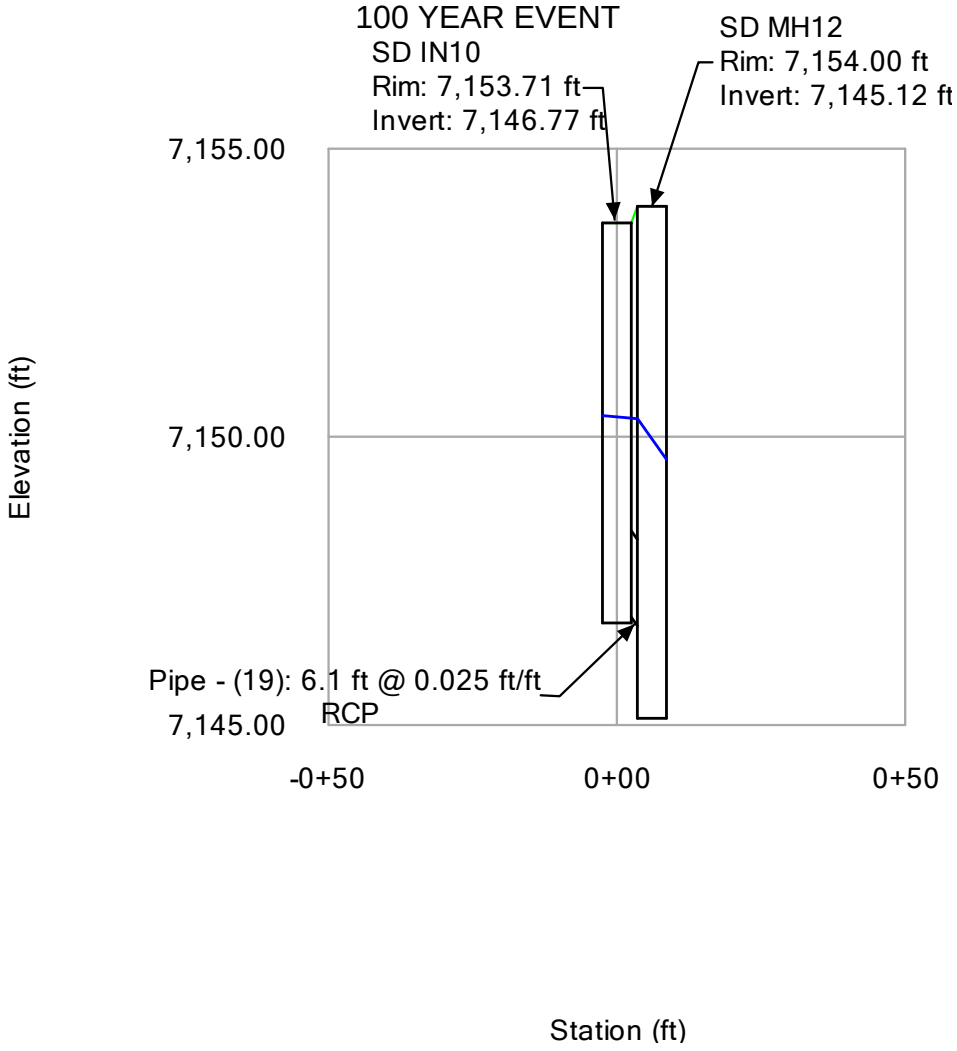
Engineering Profile - SD IN9 to SD MH13 (Proposed Strom.stsw)

100 YEAR EVENT

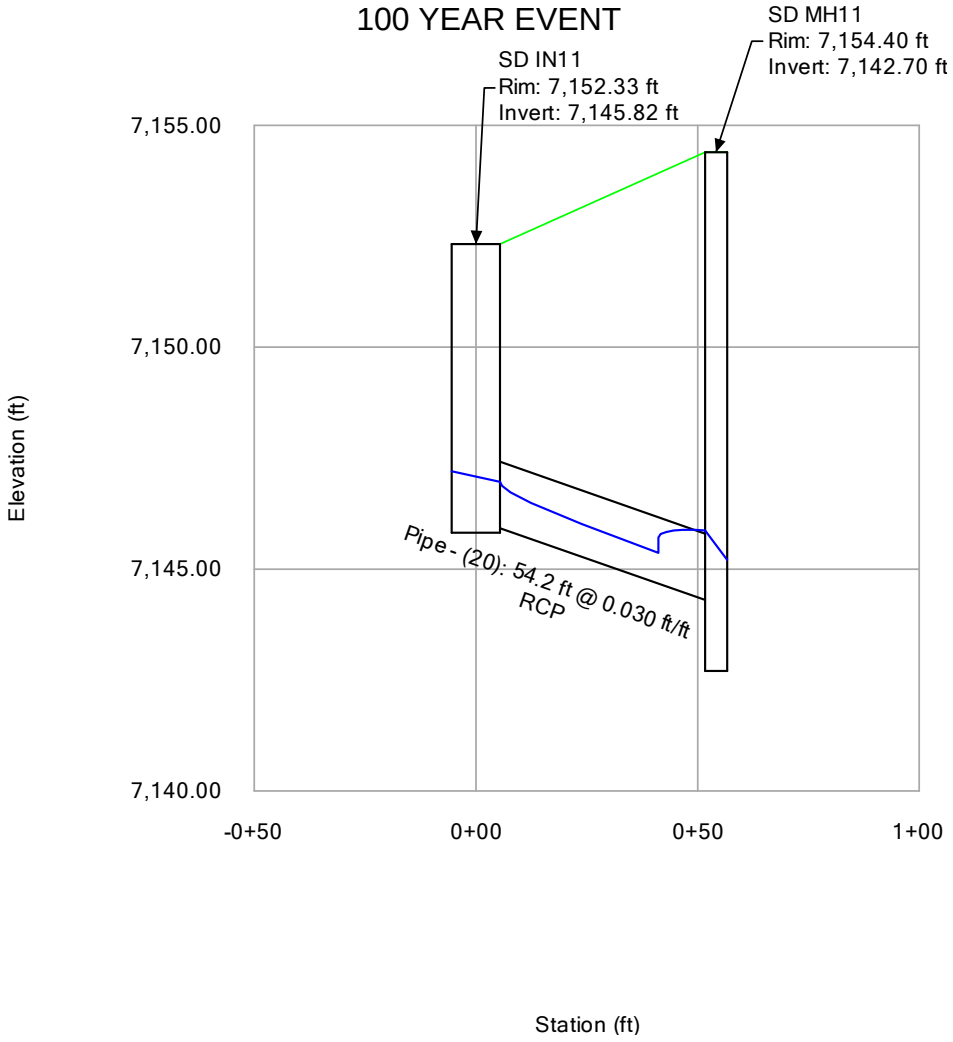


Profile Report

Engineering Profile - SD IN10 to SD MH12 (Proposed Strom.stsw)

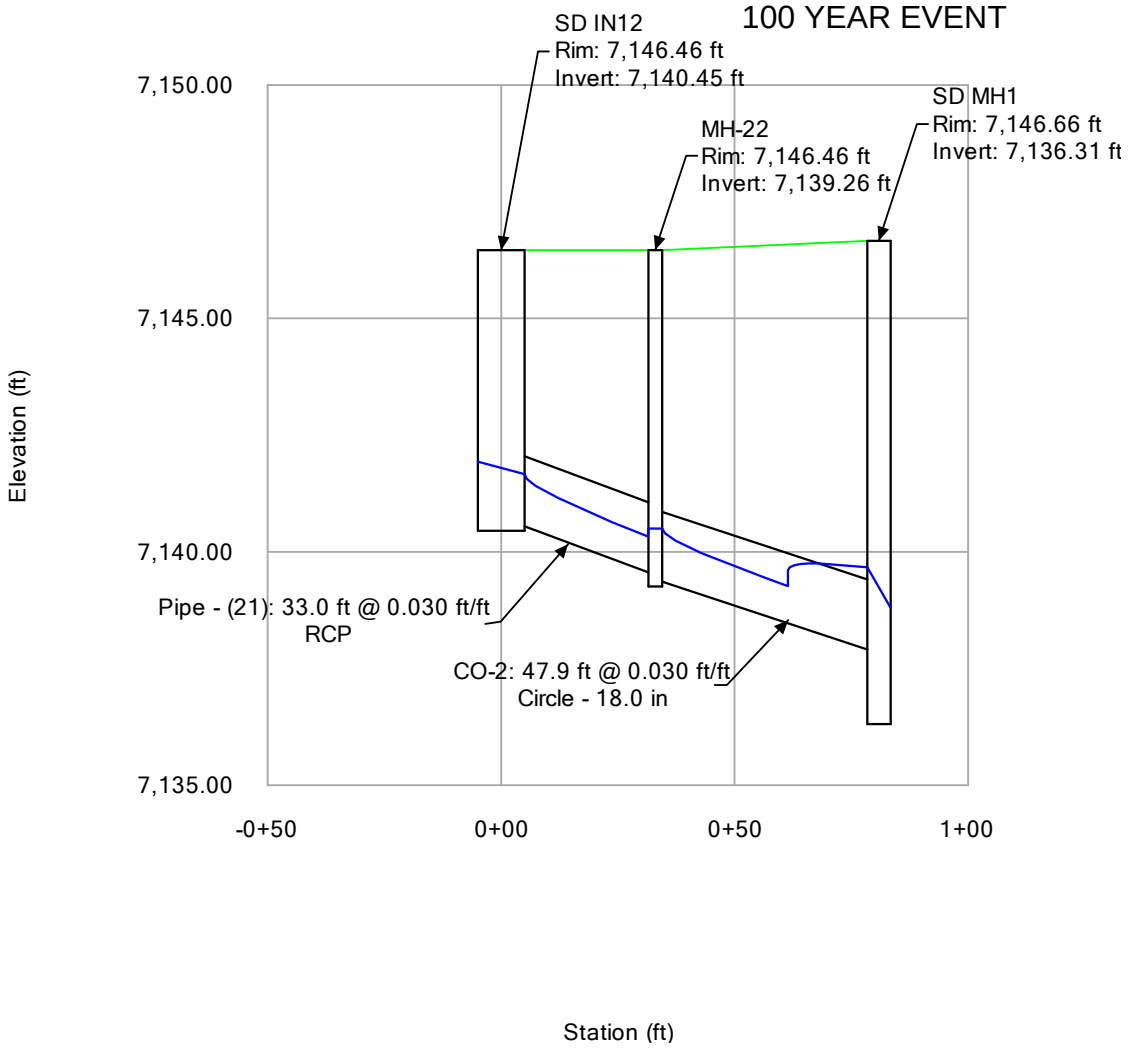


Profile Report
Engineering Profile - SD IN11 to SD MH11 (Proposed Strom.stsw)



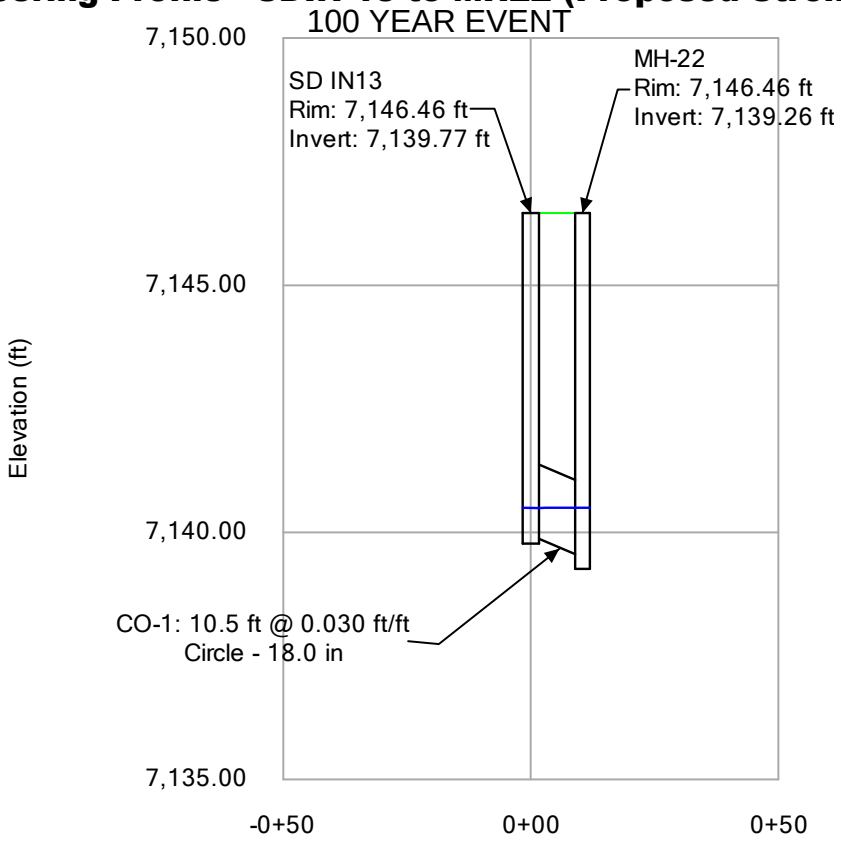
Profile Report

Engineering Profile - SD IN12 to SD MH1 (Proposed Strom.stsw)

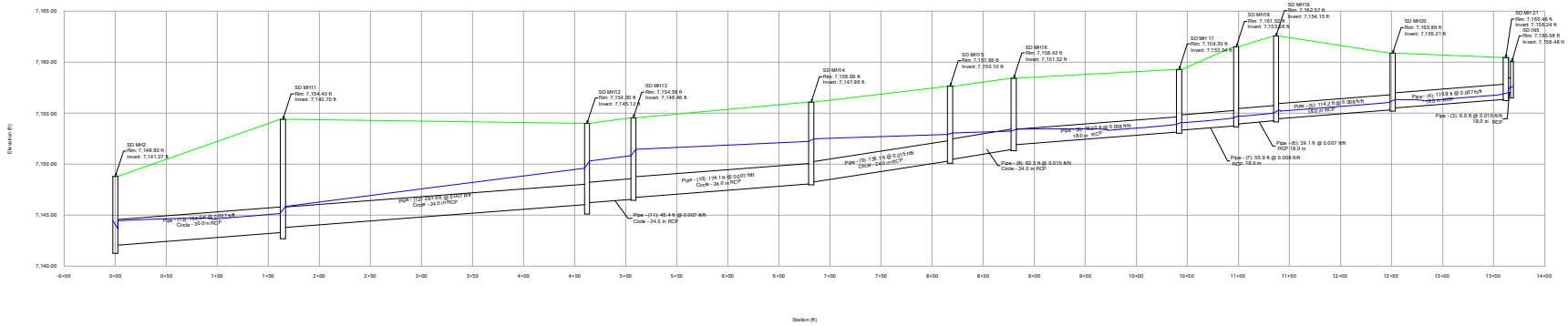


Profile Report

Engineering Profile - SDIN 13 to MH22 (Proposed Strom.stsw)



Profile Report
Engineering Profile - SD MH2 to SD IN5 (Proposed Strom.stsw)
100 YEAR EVENT



FlexTable: Catch Basin Table - 100 YEAR EVENT

Label	Notes	Elevation (Ground) (ft)	Headloss Method	Headloss Coefficient (Standard)	Headloss (ft)
SD IN11	CDOT Type 13 Combo	7,152.33	Standard	0.500	0.24
SD IN13	CDOT Type 13 Combo	7,146.46	Standard	0.500	0.01
SD IN12	CDOT Type R	7,146.46	Standard	0.500	0.27
SD IN4	CDOT Type 13 Combo	7,148.04	Standard	0.500	0.18
SD IN3	CDOT Type R	7,153.13	Standard	0.500	0.26
SD IN10	CDOT Type R	7,153.71	Standard	0.500	0.04
SD IN9	CDOT Type 13	7,151.81	Standard	0.500	0.08
SD IN8	CDOT Type 13	7,152.68	Standard	0.500	0.02
SD IN7	CDOT Type 13	7,156.65	Standard	0.500	0.30
SD IN6	CDOT Type 13	7,160.43	Standard	0.500	0.11
SD IN5	CDOT Type 13	7,160.08	Standard	0.500	0.10
SD IN1	CDOT Type 13	7,158.82	Standard	0.500	0.16
SD IN2	CDOT Type 13	7,155.73	Standard	0.500	0.22

FlexTable: Manhole Table - 100 YEAR EVENT

Label	Notes	Elevation (Rim) (ft)	Headloss Method	Headloss Coefficient (Standard)	Headloss (ft)
SD MH19	5' DIA MH	7,162.57	Standard	0.800	0.25
SD MH18	5' DIA MH	7,161.52	Standard	0.600	0.19
SD MH20	5' DIA MH	7,160.89	Standard	0.700	0.22
SD MH 21	5' DIA MH	7,160.46	Standard	0.800	0.16
SD MH 17	5' DIA MH	7,159.30	Standard	0.600	0.19
SD MH10	5' DIA MH	7,159.19	Standard	0.800	0.30
SD MH16	5' DIA MH	7,158.42	Standard	0.700	0.20
SD MH15	5' DIA MH	7,157.65	Standard	0.600	0.15
SD MH9	5' DIA MH	7,156.14	Standard	0.700	0.38
SD MH14	5' DIA MH	7,156.09	Standard	0.700	0.25
SD MH8	5' DIA MH	7,155.20	Standard	0.500	0.26
SD MH13	5' DIA MH	7,154.56	Standard	0.700	0.63
SD MH11	5' DIA MH	7,154.40	Standard	0.700	0.66
SD MH12	5' DIA MH	7,154.00	Standard	0.700	0.71
SD MH7	5' DIA MH	7,153.82	Standard	0.700	0.55
SD MH6	5' DIA MH	7,152.20	Standard	0.600	0.40
SD MH5	5' DIA MH	7,151.02	Standard	0.600	0.47
SD MH3	5' DIA MH	7,149.25	Standard	0.600	0.14
SD MH2	6' DIA MH	7,148.80	Standard	0.700	0.80
SD MH4	5' DIA MH	7,148.30	Standard	0.700	0.43
SD MH1	6' DIA MH	7,146.66	Standard	0.700	0.88
SD MH-22	5' DIA MH	7,146.46	Standard	0.700	0.39

FlexTable: Conduit Table - 100 YEAR EVENT

Label	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Manning's n	Flow (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Froude Number (Normal)
Pipe - (5)	18.0	0.008	5.11	7,155.31	7,154.45	0.013	4.37	7,156.11	7,155.30	7,156.43	7,155.58	1.191
Pipe - (6)	18.0	0.007	5.06	7,154.25	7,153.96	0.013	4.29	7,155.04	7,154.69	7,155.36	7,155.08	1.184
Pipe - (7)	18.0	0.008	5.07	7,153.76	7,153.34	0.013	4.27	7,154.55	7,154.06	7,154.87	7,154.46	1.193
Pipe - (4)	18.0	0.007	4.16	7,156.34	7,155.51	0.013	2.07	7,156.88	7,156.34	7,157.08	7,156.40	1.234
Pipe - (16)	18.0	0.010	4.83	7,155.80	7,155.74	0.013	2.41	7,156.39	7,156.34	7,156.61	7,156.55	1.428
Pipe - (3)	18.0	0.010	4.62	7,157.00	7,156.94	0.013	2.07	7,157.54	7,157.42	7,157.74	7,157.70	1.428
Pipe - (8)	18.0	0.008	5.06	7,153.14	7,151.92	0.013	4.23	7,153.93	7,153.42	7,154.24	7,153.51	1.196
Pipe - (22)	18.0	0.007	5.14	7,155.32	7,155.28	0.013	5.43	7,156.27	7,156.28	7,156.60	7,156.57	1.072
Pipe - (23)	18.0	0.011	6.21	7,155.08	7,152.18	0.013	5.42	7,155.98	7,153.31	7,156.35	7,153.54	1.434
Pipe - (8)	24.0	0.015	8.59	7,151.42	7,150.50	0.013	12.76	7,153.23	7,153.06	7,153.51	7,153.32	1.757
Pipe - (17)	18.0	0.019	8.71	7,153.15	7,151.92	0.013	9.33	7,154.33	7,153.42	7,154.94	7,153.86	1.805
Pipe - (9)	24.0	0.015	8.62	7,150.30	7,148.26	0.013	12.69	7,152.91	7,152.48	7,153.16	7,152.73	1.772
Pipe - (24)	24.0	0.007	6.57	7,151.68	7,149.89	0.013	12.23	7,152.94	7,151.19	7,153.47	7,151.69	1.194
Pipe - (32)	18.0	0.008	5.93	7,152.23	7,152.18	0.013	7.06	7,153.29	7,153.31	7,153.73	7,153.69	1.152
Pipe - (10)	24.0	0.007	6.87	7,148.06	7,146.76	0.013	15.08	7,152.23	7,151.46	7,152.59	7,151.81	1.125
Pipe - (33)	18.0	0.008	4.55	7,149.18	7,148.56	0.013	2.82	7,152.54	7,152.48	7,152.58	7,152.52	1.229
Pipe - (35)	24.0	0.008	6.54	7,149.69	7,148.00	0.013	11.87	7,150.93	7,149.94	7,151.45	7,150.17	1.205
Pipe - (11)	24.0	0.007	7.61	7,146.56	7,146.22	0.013	23.92	7,150.82	7,150.32	7,151.73	7,151.22	0.949
Pipe - (18)	24.0	0.023	9.51	7,148.31	7,146.76	0.013	9.88	7,151.58	7,151.46	7,151.73	7,151.61	2.283
Pipe - (12)	24.0	0.007	8.07	7,146.02	7,143.80	0.013	25.35	7,149.61	7,145.87	7,150.62	7,146.88	1.006
Pipe - (13)	30.0	0.007	8.16	7,143.30	7,142.07	0.013	31.32	7,145.21	7,144.47	7,146.15	7,145.12	1.095
Pipe - (20)	18.0	0.030	9.70	7,145.92	7,144.30	0.013	7.25	7,146.96	7,145.87	7,147.44	7,146.13	2.413
Pipe - (19)	18.0	0.025	7.82	7,146.87	7,146.72	0.013	4.24	7,150.33	7,150.32	7,150.42	7,150.41	2.238
Pipe - (25)	24.0	0.008	7.11	7,147.80	7,146.62	0.013	19.09	7,149.39	7,148.54	7,150.18	7,149.13	0.971
Pipe - (31)	18.0	0.030	9.96	7,149.02	7,148.30	0.013	7.99	7,150.12	7,149.94	7,150.63	7,150.26	2.399
Pipe - (26)	24.0	0.007	7.06	7,146.42	7,146.14	0.013	18.78	7,148.15	7,147.97	7,148.81	7,148.57	0.976
Pipe - (27)	24.0	0.026	11.66	7,145.94	7,144.06	0.013	18.70	7,147.50	7,145.12	7,148.29	7,147.02	2.296
Pipe - (30)	36.0	0.010	8.54	7,143.06	7,142.36	0.013	23.00	7,144.60	7,144.60	7,145.22	7,144.86	1.575
Pipe - (28)	36.0	0.010	8.57	7,142.16	7,141.57	0.013	22.86	7,144.46	7,144.47	7,144.70	7,144.63	1.587
Pipe - (14)	36.0	0.086	23.13	7,141.37	7,136.61	0.013	49.84	7,143.67	7,139.68	7,144.81	7,140.45	4.689
Pipe - (29)	18.0	0.030	8.78	7,144.37	7,144.16	0.013	5.00	7,145.23	7,145.03	7,145.58	7,145.37	2.462
Pipe - (21)	18.0	0.030	10.05	7,140.55	7,139.56	0.013	8.27	7,141.66	7,140.32	7,142.20	7,141.62	2.391
Pipe - (34)	36.0	0.030	16.15	7,136.41	7,136.00	0.013	54.16	7,138.80	7,137.92	7,140.05	7,139.92	2.692
CO-1	18.0	0.030	4.73	7,139.87	7,139.56	0.013	0.60	7,140.49	7,140.50	7,140.50	7,140.50	2.329
CO-2	18.0	0.030	10.20	7,139.36	7,137.91	0.013	8.65	7,140.50	7,139.68	7,141.06	7,140.05	2.393

Appendix D - Reference Documents

2.1. - Rainfall Depths

Rainfall depths must be determined based on the duration and return period of the design storm and the size of the drainage basin being evaluated. Depths can be derived by the methods described in the NOAA Atlas. The depths reported in the NOAA Atlas represent probable total depths for each duration and return period at a point on the ground. An extensive evaluation of available rain gage data was completed with the Carlton Study. While some increase in recorded depths was noted from the airport gage data, the other long-term gage locations showed that depths consistent with the NOAA Atlas can be expected. Since the NOAA Atlas is in the process of being updated, it was determined that the published atlas should continue to be used as the source of rainfall depths until this publication is revised or replaced.

The methods described in this Manual require only that the 1-hour, 6-hour and 24-hours depths be used as input. The storm return periods required for the application of methods in this Manual are the 2-, 5-, 10-, 25-, 50- and 100-year events. The 6-hour and 24-hour depths for these return periods can be read directly from Figures 6-6 through 6-17 at the end of this chapter. The1-hour depth for return periods can be calculated for all design return periods following this procedure:

Step 1: Calculate 2-year, 1-hour rainfall based on 2-year, 6-hour and 24-hour values.

$$Y_2 = 0.218 + 0.709 \cdot (X_1 \cdot X_1 / X_2) \qquad \text{(Eq. 6-1)}$$

Where:

Y_2 = 2-year, 1-hour rainfall (in)

X_1 = 2-year, 6-hour rainfall (in) from Figure 6-6

X_2 = 2-year, 24-hour rainfall (in) from Figure 6-12

Step 2: Calculate 100-year, 1-hour rainfall based on 2-year 6-hour and 24-hour values

$$Y_{100} = 1.897 + 0.439 \cdot (X_3 \cdot X_3 / X_4) - 0.008Z \qquad \text{(Eq. 6-2)}$$

Where:

Y_{100} = 100-year, 1-hour rainfall (in)

X_3 = 100-year, 6-hour rainfall (in) from Figure 6-11

X_4 = 100-year, 24-hour rainfall (in) from Figure 6-17

Z = Elevation in hundreds of feet above sea level

3.0. - RATIONAL METHOD

The Rational Method is used to determine runoff peak discharges for drainage basins up to and including 130 acres in size and when hydrologic routing is relatively simple. However, the drainage area should be divided into sub-basins that represent homogeneous land uses, soil types or land cover. The Rational Method is most typically applied for inlet and storm drain sizing.

The Rational Method is based on the direct relationship between rainfall and runoff, and is expressed by the following equation:

$$Q = C \cdot I \cdot A \qquad \text{(Eq. 6-5)}$$

In which:

Q = the maximum rate of runoff (cubic feet per second [cfs])

C = the runoff coefficient that is the ratio between the runoff volume from an area and the average rainfall depth over a given duration for that area

I = the average intensity of rainfall for a duration equal to the time of concentration (in/hr)

A = drainage basin area (acres)

The assumptions and limitations of the Rational Method are described in the UDFCD Manual, Volume 1, Runoff chapter. Standard Form 1 (SF-1) and Standard Form 2 (SF-2) are provided at the end of this chapter as Figure 6-23 and Figure 6-24, respectively to provide a standard format for Rational Method calculations. The SF-1 Form is used for calculating the time of concentration, and the SF-2 form is used to estimate accumulated peak discharges from multiple basins as storm runoff flows downstream in a channel or pipe. Results from the Rational Method calculations shall be included with the drainage report submittal. As an alternative to SF-1 and SF-2, the UD-Rational spreadsheet can be used to document basin parameters and calculations or other spreadsheets or programs can be used as long as the information and format is the similar to that shown in these standard forms.

3.1. - Rational Method Runoff Coefficient (C)

The runoff coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception, all of which affect the time distribution and peak rate of runoff. Runoff coefficients are based on the imperviousness of a particular land use and the hydrologic soil type of the area and are to be selected in accordance with Table 6-6.

The procedure for determining the runoff coefficient includes these steps:

1. Categorize the site area into one or more similar land uses, each with a representative imperviousness, according to the information in Table 6-6.
2. Based on the dominant hydrologic soil type in the area, use Table 6-6 to estimate the runoff coefficient for the particular land use category for the design storms of interest.
3. Calculate an area-weighted average runoff coefficient for the site based on the runoff coefficients from individual land use areas of the site.

When analyzing an area for design purposes, urbanization of the full watershed, including both on-site and off-site areas, shall be assumed.

Gravel parking areas, storage areas, and access drives proposed on Site Improvement Plans shall be analyzed based on an imperviousness of 80%. This is due to the potential for gravel areas being paved over time by property owners and the resulting adverse impacts on the stormwater management facilities and adjacent properties.

There are some circumstances where the selection of impervious percentage values may require additional investigation due to unique land characteristics (e.g., recent burn areas). When these circumstances arise, it is the designer's responsibility to verify that the correct land use assumptions are made.

When multiple sub-basins are delineated, the composite C value calculation is:

$$C_c = (C_1 A_1 + C_2 A_2 + C_3 A_3 + \ldots C_i A_i)/A_t \qquad \text{(Eq. 6-6)}$$

Where:

C_c = composite runoff coefficient for total area

C_i = runoff coefficient for subarea corresponding to surface type or land use

A_i = area of surface type corresponding to Ci (units must be the same as those used for total area)

A_t = total area of all subareas for which composite runoff coefficient applies

i = number of surface types in the drainage area

Table 6-6. Runoff Coefficients for Rational Method

(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
⅛ Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
¼ Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
⅓ Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57

½ Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis—Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96

Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

3.2. - Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration (t_c) consists of an initial time or overland flow time (t_i) plus the travel time (t_t) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time (t_i) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion (t_t) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

$t_c = t_i + t_t$ (Eq. 6-7)

Where:

t_c = time of concentration (min)

t_i = overland (initial) flow time (min)

t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min) ;0h5; 3.2.1.\Overland (Initial) Flow Time

The overland flow time, t_i, may be calculated using Equation 6-8.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \quad \text{(Eq. 6-8)}$$

Where:

t_i = overland (initial) flow time (min)

C_5 = runoff coefficient for 5-year frequency (see Table 6-6)

L = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)

S = average basin slope (ft/ft)

Note that in some urban watersheds, the overland flow time may be very small because flows quickly concentrate and channelize. ;0h5; 3.2.2.\Travel Time

For catchments with overland and channelized flow, the time of concentration needs to be considered in combination with the travel time, t_t, which is calculated using the hydraulic properties of the swale, ditch, or channel. For preliminary work, the overland travel time, t_t, can be estimated with the help of Figure 6-25 or Equation 6-9 (Guo 1999).

$$V = C_v S_w^{0.5} \quad \text{(Eq. 6-9)}$$

Where:

V = velocity (ft/s)

C_v = conveyance coefficient (from Table 6-7)

S_w = watercourse slope (ft/ft)

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried) *	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20
* For buried riprap, select C_v value based on type of vegetative cover.	

The travel time is calculated by dividing the flow distance (in feet) by the velocity calculated using Equation 6-9 and converting units to minutes.

The time of concentration (t_c) is then the sum of the overland flow time (t_i) and the travel time (t_t) per Equation 6-7. ;0h5; 3.2.3.\First Design Point Time of Concentration in Urban Catchments

Using this procedure, the time of concentration at the first design point (typically the first inlet in the system) in an urbanized catchment should not exceed the time of concentration calculated using Equation 6-10. The first design point is defined as the point where runoff first enters the storm sewer system.

$$t_c = L / 180 + 10 \quad \text{(Eq. 6-10)}$$

2.1. - DESIGN STORM WATER RUNOFF DETERMINATION

The City/County drainage policy permits the Rational Method and the Soil Conservation Service (SCS) Hydrograph Method as models to be used by designers in estimating storm water runoff for project purposes. The Rational Method is required for drainage basins of 100 acres or less. The SCS Hydrograph Method is required for drainage basins greater than 100 acres. For large complex Drainage Basin Planning Studies, computer models may be utilized following approval by City/County. Necessary data requirements, assumptions and detailed procedures for using models are discussed Section II. All drainage systems must be planned, designed and constructed to handle runoff from both the initial and major design storms. The initial design storm shall be the 10 year event. The major design storm shall be the 100-year event.

Normally in a roadway section, the initial drainage system should convey a substantial portion of the minor storm flows with the more intense or major storm flows conveyed by the available street capacity. Out of roadway sections, storm drain systems combined with overflow swales or drainageway or channel sections must be of adequate capacity to convey both design storms and protect adjacent properties.

NOAA Atlas 14, Volume 8, Version 2
Location name: Monument, Colorado, USA*
Latitude: 39.1092°, Longitude: -104.864°
Elevation: 7156 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.244** (0.200-0.297)	**0.312** (0.256-0.379)	**0.426** (0.348-0.518)	**0.523** (0.424-0.638)	**0.659** (0.517-0.830)	**0.768** (0.587-0.974)	**0.878** (0.648-1.14)	**0.993** (0.702-1.31)	**1.15** (0.780-1.55)	**1.27** (0.839-1.73)
10-min	**0.358** (0.293-0.434)	**0.457** (0.375-0.555)	**0.624** (0.509-0.759)	**0.765** (0.621-0.934)	**0.966** (0.757-1.22)	**1.12** (0.859-1.43)	**1.29** (0.949-1.66)	**1.45** (1.03-1.92)	**1.68** (1.14-2.27)	**1.86** (1.23-2.53)
15-min	**0.436** (0.358-0.530)	**0.558** (0.457-0.677)	**0.761** (0.621-0.926)	**0.933** (0.757-1.14)	**1.18** (0.923-1.48)	**1.37** (1.05-1.74)	**1.57** (1.16-2.03)	**1.77** (1.25-2.34)	**2.05** (1.39-2.76)	**2.27** (1.50-3.09)
30-min	**0.575** (0.471-0.698)	**0.736** (0.603-0.894)	**1.00** (0.820-1.22)	**1.23** (1.00-1.51)	**1.56** (1.22-1.96)	**1.81** (1.38-2.30)	**2.07** (1.53-2.68)	**2.34** (1.65-3.09)	**2.70** (1.84-3.64)	**2.99** (1.97-4.06)
60-min	**0.727** (0.596-0.882)	**0.897** (0.735-1.09)	**1.20** (0.975-1.45)	**1.46** (1.18-1.78)	**1.85** (1.46-2.35)	**2.17** (1.67-2.78)	**2.52** (1.86-3.27)	**2.88** (2.04-3.82)	**3.39** (2.31-4.59)	**3.80** (2.51-5.17)
2-hr	**0.878** (0.725-1.06)	**1.06** (0.872-1.27)	**1.38** (1.14-1.67)	**1.69** (1.38-2.04)	**2.15** (1.71-2.72)	**2.54** (1.97-3.23)	**2.96** (2.21-3.84)	**3.42** (2.45-4.52)	**4.08** (2.80-5.50)	**4.61** (3.07-6.24)
3-hr	**0.987** (0.818-1.18)	**1.16** (0.958-1.39)	**1.48** (1.22-1.78)	**1.80** (1.48-2.17)	**2.30** (1.85-2.92)	**2.74** (2.14-3.49)	**3.22** (2.42-4.18)	**3.76** (2.71-4.97)	**4.54** (3.14-6.12)	**5.19** (3.46-6.99)
6-hr	**1.20** (1.00-1.42)	**1.39** (1.16-1.65)	**1.76** (1.46-2.09)	**2.13** (1.75-2.54)	**2.72** (2.21-3.43)	**3.24** (2.55-4.10)	**3.83** (2.90-4.93)	**4.48** (3.25-5.89)	**5.44** (3.78-7.29)	**6.24** (4.19-8.35)
12-hr	**1.46** (1.22-1.71)	**1.72** (1.44-2.02)	**2.20** (1.84-2.60)	**2.66** (2.21-3.15)	**3.37** (2.74-4.19)	**3.98** (3.14-4.98)	**4.65** (3.54-5.92)	**5.39** (3.92-7.00)	**6.44** (4.50-8.55)	**7.31** (4.94-9.72)
24-hr	**1.76** (1.48-2.05)	**2.09** (1.76-2.44)	**2.68** (2.25-3.13)	**3.22** (2.69-3.77)	**4.02** (3.28-4.93)	**4.70** (3.73-5.80)	**5.43** (4.15-6.83)	**6.22** (4.55-8.00)	**7.33** (5.15-9.64)	**8.23** (5.61-10.9)
2-day	**2.09** (1.77-2.41)	**2.44** (2.07-2.82)	**3.08** (2.60-3.56)	**3.65** (3.07-4.24)	**4.51** (3.69-5.47)	**5.23** (4.17-6.39)	**6.00** (4.61-7.48)	**6.82** (5.02-8.70)	**8.00** (5.65-10.4)	**8.94** (6.13-11.7)
3-day	**2.26** (1.92-2.59)	**2.65** (2.26-3.05)	**3.34** (2.83-3.85)	**3.95** (3.33-4.57)	**4.86** (3.99-5.85)	**5.61** (4.49-6.82)	**6.41** (4.94-7.95)	**7.26** (5.36-9.21)	**8.46** (6.00-11.0)	**9.42** (6.48-12.3)
4-day	**2.39** (2.05-2.74)	**2.81** (2.40-3.22)	**3.54** (3.01-4.06)	**4.18** (3.54-4.82)	**5.13** (4.22-6.14)	**5.91** (4.74-7.15)	**6.73** (5.20-8.31)	**7.61** (5.63-9.61)	**8.83** (6.28-11.4)	**9.81** (6.77-12.8)
7-day	**2.79** (2.40-3.17)	**3.23** (2.77-3.67)	**4.00** (3.42-4.56)	**4.68** (3.98-5.36)	**5.70** (4.71-6.77)	**6.53** (5.26-7.84)	**7.42** (5.76-9.10)	**8.36** (6.22-10.5)	**9.68** (6.92-12.5)	**10.7** (7.45-13.9)
10-day	**3.15** (2.72-3.56)	**3.62** (3.11-4.09)	**4.43** (3.80-5.02)	**5.15** (4.40-5.87)	**6.23** (5.17-7.37)	**7.11** (5.75-8.50)	**8.05** (6.28-9.83)	**9.05** (6.76-11.3)	**10.5** (7.50-13.4)	**11.6** (8.06-15.0)
20-day	**4.17** (3.62-4.67)	**4.77** (4.14-5.35)	**5.80** (5.01-6.52)	**6.69** (5.74-7.55)	**7.97** (6.63-9.30)	**8.99** (7.30-10.6)	**10.1** (7.88-12.1)	**11.2** (8.39-13.8)	**12.7** (9.17-16.1)	**13.9** (9.76-17.9)
30-day	**5.00** (4.35-5.57)	**5.73** (4.99-6.39)	**6.95** (6.03-7.77)	**7.98** (6.88-8.96)	**9.42** (7.85-10.9)	**10.5** (8.58-12.3)	**11.7** (9.18-14.0)	**12.9** (9.68-15.8)	**14.4** (10.4-18.2)	**15.7** (11.0-20.0)
45-day	**6.03** (5.28-6.68)	**6.92** (6.05-7.68)	**8.36** (7.28-9.30)	**9.55** (8.27-10.7)	**11.2** (9.31-12.8)	**12.4** (10.1-14.4)	**13.6** (10.7-16.2)	**14.8** (11.2-18.0)	**16.4** (11.9-20.5)	**17.6** (12.4-22.4)
60-day	**6.90** (6.06-7.62)	**7.92** (6.94-8.75)	**9.54** (8.33-10.6)	**10.8** (9.41-12.1)	**12.6** (10.5-14.3)	**13.9** (11.3-16.0)	**15.1** (11.9-17.8)	**16.3** (12.3-19.8)	**17.9** (13.0-22.2)	**19.0** (13.5-24.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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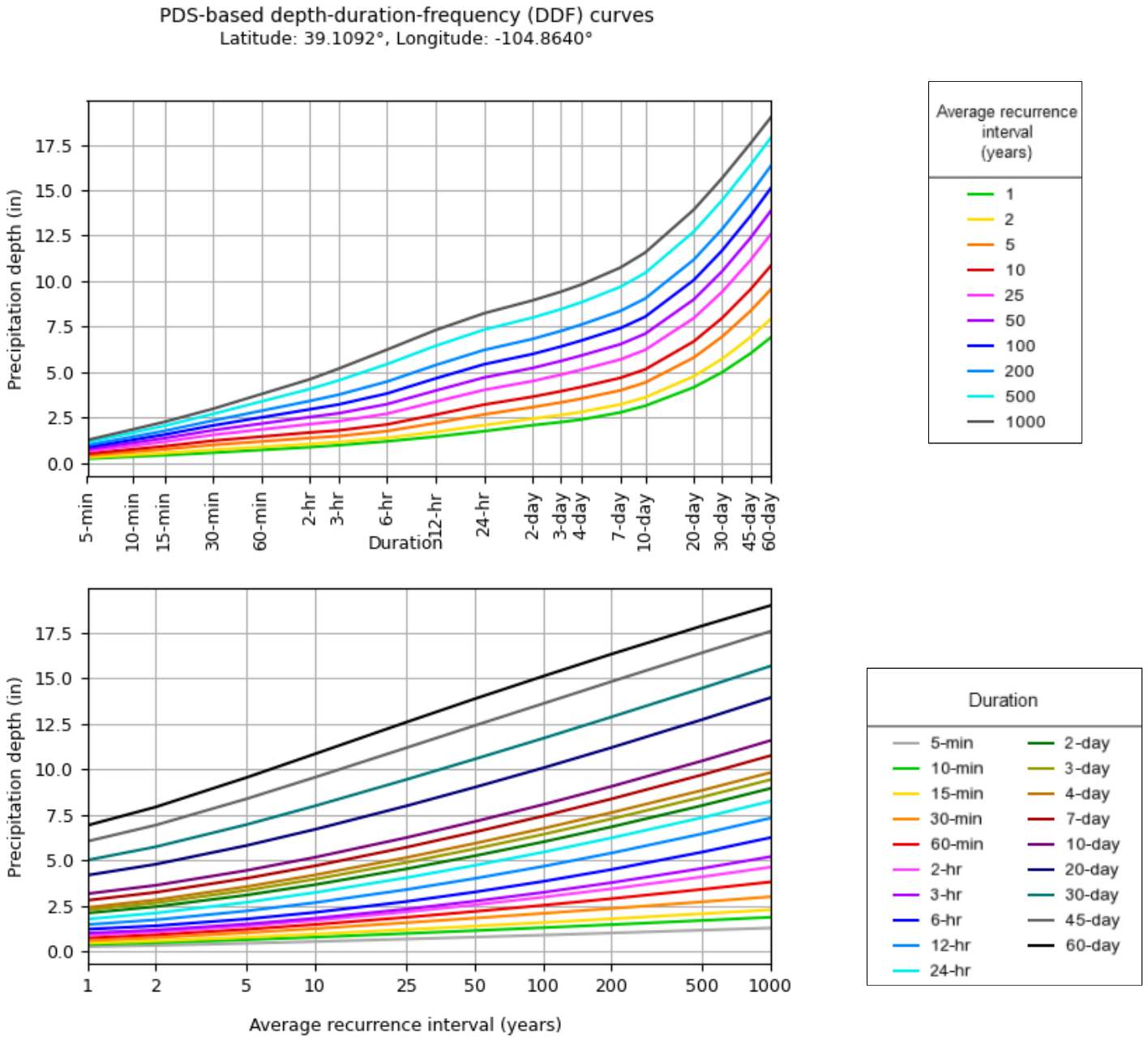
PF graphical



NOAA Atlas 14, Volume 8, Version 2 Created (GMT): Thu Jun 8 22:07:23 2023

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Maps & aerials

Small scale terrain

$VS^{0.17}/(S_s-1)^{0.66}$ * ($ft^{1}/2/sec$)	Rock Type***
1.4 to 3.2	VL
3.3 to 3.9	L
4.0 to 4.5	M
4.6 to 5.5	H
5.6 to 6.4	VH
*where:	
V = mean channel flow velocity, in fps;	
S = longitudinal channel slope, in feet per foot (ft/ft); and	
S_s = specific gravity of stone (minimum S_s = 2.50)	
** Table valid only for Froude number of 0.8 or less and side slopes no steeper than 2h:1v.	
*** Type VL and L riprap may be buried after placement to reduce vandalism.	

Channel Slope	Lining	Permissible Mean Channel Velocity* (ft/sec)
0 - 5%	Sodded grass	7
	Bermudagrass	6
	Reed canarygrass	5
	Tall fescue	5
	Kentucky bluegrass	5
	Grass-legume mixture	4
	Red fescue	2.5
	Redtop	2.5
	Sericea lespedeza	2.5
	Annual lespedeza	2.5
	Small grains (temporary)	2.5
5 - 10%	Sodded grass	6
	Bermudagrass	5
	Reed canarygrass	4
	Tall fescue	4
	Kentucky bluegrass	4
	Grass-legume mixture	3
Greater than 10%	Sodded grass	5
	Bermudagrass	4
	Reed canarygrass	3
	Tall fescue	3
	Kentucky bluegrass	3
*For highly erodible soils, decrease permissible velocities by 25%.		
*Grass lined channels are dependent upon assurances of continuous growth and maintenance of grass.		

Appendix E - Drainage Maps

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144703
PARCEL NO. 7111000028

LOT 9
WOODMOOR BUSINESS/TECHNOLOGICAL PARK
REC. NO. 848443
ASSESSED OWNER:
BASE CAMP VENTURES LLC
REC. NO. 203141071
PARCEL NO. 7111302002

EX. 16.5' MOUNTAIN BELL EASEMENT
REC. NO. 848443

EX. 10' MOUNTAIN VIEW EASEMENT
REC NO. 848443

OSC1 | 1.91 | 0.17 | 0.36

OSB1 | 1.14 | 0.17 | 0.36

EX. PROPERTY LINE

BASE CAMP ROAD "EMIGRANT TRAIL WEST"
(60' WIDE PUBLIC R.O.W. WIDTH)
REC. NO. 848443

EX. 10' MOUNTAIN VIEW ELECTRIC ASSOCIATION SERVICE EASEMENT
REC. NO. 200033900

C1 | 1.86 | 0.17 | 0.36

2-STORY STUCCO BUILDING
LOT 1
GREATER EUROPE MISSION SUBDIVISION
FILING NO. 1
REC. NO. 200033900

EX. PROPERTY LINE

LOT 1 OF THE ROCK COMMERCIAL CENTER FILING NO.1
11.609 AC

B1 | 7.4 | 0.17 | 0.36

A1 | 2.35 | 0.17 | 0.36

STORM MANHOLE
RIM = 7171.2
INV OUT 24" RCP (S) = 7165.9
INV IN 24" RCP (E) = 7165.9

STORM FES
INV OUT 18" RCP (W) = 7166.7

STORM FES
INV IN 24" RCP (W) = 7132.2

EX. PROPERTY / R.O.W. LINE

ROOF DRAIN
INV 6" SDCP = 7136.4

EX. 20' UTILITY AND DRAINAGE EASEMENT
REC. NO. 200033900

EX. 10' EASEMENT
REC. NO. 200033900

OSB2 | 0.76 | 0.41 | 0.66

MONUMENT HILL ROAD

OSA1 | 0.75 | 0.57 | 0.68

STORM FES
INV OUT 24" RCP (W) = 7131.5

EX. EDGE OF ASPHALT

STORM MANHOLE
RIM = 7169.7
INV OUT 30" RCP (W) = 7165.1
INV IN 24" RCP (N) = 7165.2
INV IN 18" RCP (E) = 7165.3

PERMANENT EASEMENT (PE-12)
REC. NO. 218005932
REC. NO. 218005931
REC. NO. 218043186

US INTERSTATE 25
(PUBLIC ROW WIDTH VARIES)
BOOK 1185, PAGE 458

EX. CULVERT UNDER I-25

EX. SECTION LINE

STORM MANHOLE
RIM = 7171.3
INV OUT 18" RCP (S) = 7165.8
INV IN 18" RCP (N) = 7165.9

STORM INLET
RIM = 7169.0
INV OUT 42" RCP (W) = 7163.0
INV IN 30" RCP (E) = 7163.3
INV IN 18" RCP (NE) = 7163.4

STORM MANHOLE
RIM = 7169.8
INV OUT 18" RCP (SW) = 7164.2
INV IN 18" RCP (N) = 7164.3

EX. 42" STORM DRAIN

ASSESSED OWNER:
COLORADO DEPARTMENT OF TRANSPORATION
REC. NO. 200033900
PARCEL NO. 711303004

ASSESSED OWNER:
LEWIS-PALMER SCHOOL DISTRICT 38
REC NO. 206144707
PARCEL NO. 7111000027

DRAINAGE LEGEND

- 5281 — EXISTING MINOR CONTOUR
- 5280 — EXISTING MAJOR CONTOUR
- EXISTING STORM SEWER LINE
- FEMA — FEMA 100-YEAR FLOOD PLAIN
- FEMA ZONE X
- SUB-BASIN BOUNDARY
- MAJOR BASIN BOUNDARY
- PROPERTY LINE
- A1 / 0.00 / 0.00 / 0.00 — EXISTING BASIN ID; EXISTING 10 YEAR RUNOFF COEFFICIENT; EXISTING 100 YEAR RUNOFF COEFFICIENT; BASIN AREA (ACRES)
- EXISTING GRADE FLOW ARROW
- 00 — EXISTING DESIGN POINT

BASIN PEAK FLOW SUMMARY		
BASIN	Q10	Q100
A1	1.5	4.6
OSA1	2.0	3.4
B1	3.7	11.4
OSB1	0.8	2.5
OSB2	1.5	2.6
C1	1.1	3.4
OSC1	1.0	3.0

DESIGN POINT FLOW SUMMARY		
DESIGN POINT	Q10	Q100
A	3.07	7.27
B	5.53	15.26
C	1.97	6.02

PCD FILE NO. PPR2329

N

0 30 60 120

SCALE: 1" = 60'

15 YEARS Redland
WHERE GREAT PLACES BEGIN
720.283.6783 REDLAND.COM
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▪ Civil Engineering ▪ Construction Management

NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO. 23009

NO.	DATE	NOTES
1	07/28/23	1ST SUBMITTAL
2	10/20/23	2ND SUBMITTAL
3	11/17/23	3RD SUBMITTAL

LOT 1 OF THE ROCK COMMERCE CENTER FILING NO. 1

DRAINAGE MAPS
EXISTING DRAINAGE MAP

SHEET
DNG-1

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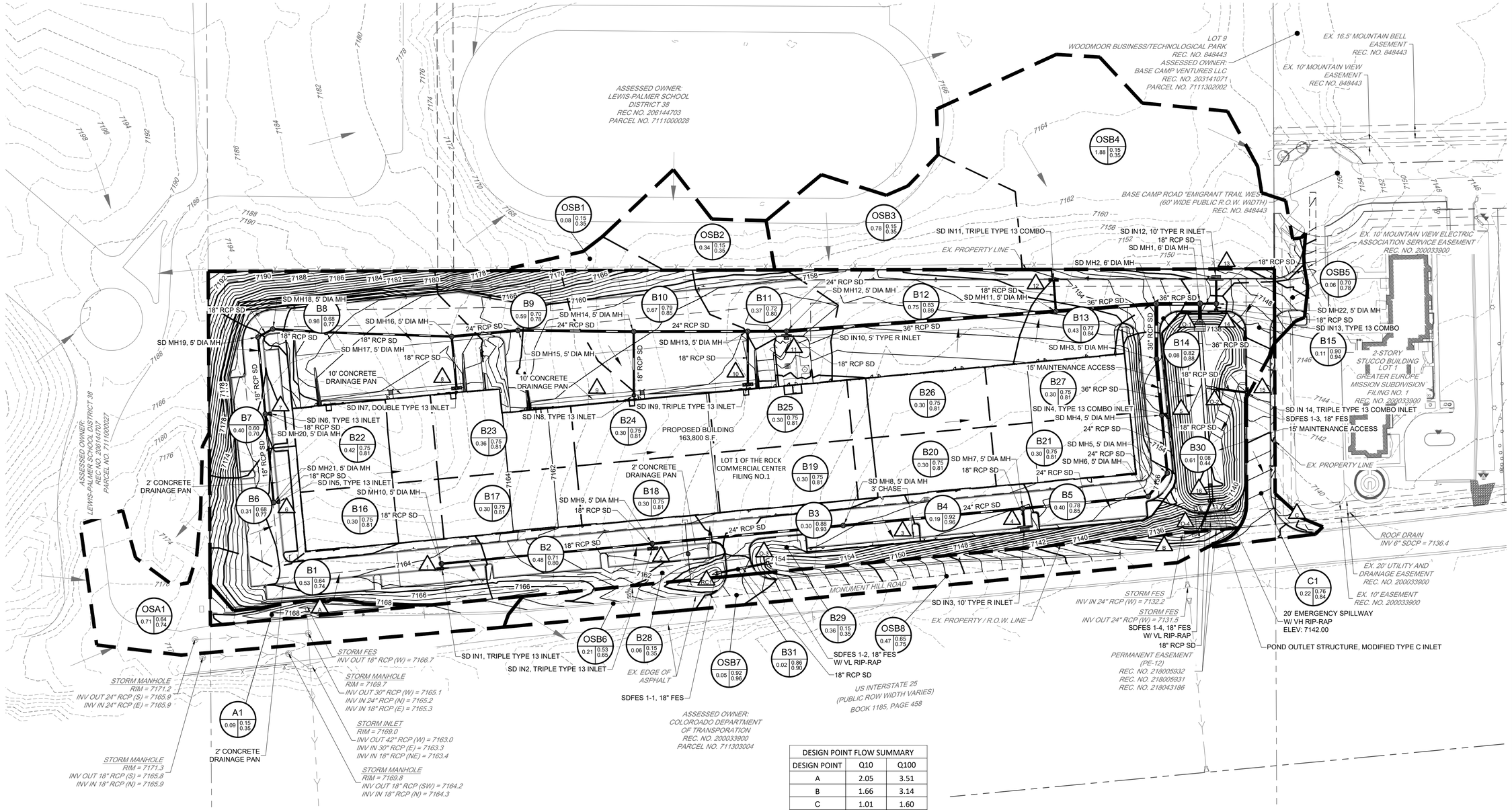

DRAINAGE LEGEND

- EXISTING MINOR CONTOUR (5282)
- EXISTING MAJOR CONTOUR (5280)
- PROPOSED MINOR CONTOUR (5281)
- PROPOSED MAJOR CONTOUR (5280)
- PHASE 2 CONSTRUCTION BOUNDARY
- EXISTING STORM SEWER LINE
- PROPOSED STORM SEWER LINE
- PROPOSED MANHOLE
- EXISTING INLET
- PROPOSED INLET
- PROPOSED FLARED END SECTION
- SUB-BASIN BOUNDARY
- MAJOR BASIN BOUNDARY
- PROPERTY LINE

A1 — 0.000 — 0.00 / 0.00
- BASIN ID
- 10 YEAR RUNOFF COEFFICIENT
- 100 YEAR RUNOFF COEFFICIENT
- BASIN AREA (ACRES)
- PROPOSED DESIGN POINT

EX-1 — 0.00 — 0.00 / 0.00
- EXISTING BASIN ID
- EXISTING 10 YEAR RUNOFF COEFFICIENT
- EXISTING 100 YEAR RUNOFF COEFFICIENT
- BASIN AREA (ACRES)
- EXISTING DESIGN POINT
- EXISTING GRADE FLOW ARROW
- PROPOSED GRADE FLOW ARROW

BASIN PEAK FLOW SUMMARY		
BASIN	Q10	Q100
B1	2.0	3.4
B2	2.0	3.2
B3	1.6	2.4
B4	1.0	1.5
B5	1.8	2.9
B6	1.2	2.0
B7	1.4	2.4
B8	3.9	6.4
B9	2.4	3.9
B10	3.1	4.9
B11	1.6	2.5
B12	3.6	5.6
B13	2.0	3.1
B14	0.4	0.6
B15	0.6	0.9
B16	1.3	2.1
B17	1.3	2.0
B18	1.3	2.1
B19	1.3	2.0
B20	1.3	2.1
B21	1.3	2.1

BASIN PEAK FLOW SUMMARY		
BASIN	Q10	Q100
B22	1.8	2.9
B23	1.6	2.5
B24	1.3	2.0
B25	1.3	2.1
B26	1.3	2.1
B27	1..3	2.1
B28	0.0	0.1
B29	0.2	0.8
B30	0.3	1.9
B31	0.1	0.1
OSB1	0.1	0.2
OSB2	0.2	0.8
OSB3	0.6	1.9
OSB4	1.1	3.7
OSB5	0.2	0.4
OSB6	0.6	1.0
OSB7	0.3	0.4
OSB8	1.6	2.7
A1	0.1	0.2
OSA1	2.4	4.0
C1	1.0	1.6

DESIGN POINT FLOW SUMMARY		
DESIGN POINT	Q10	Q100
A	2.05	3.51
B	1.66	3.14
C	1.01	1.60
O-1	26.71	54.14
O-2	0.85	1.31
O-3	0.61	1.15
O-4	3.4	10.4
RC1	0.61	1.15
1	3.35	5.42
2	4.46	7.04
3	2.78	4.28
4	2.63	4.03
5	3.19	4.98
6	1.24	2.02
7	1.40	2.39
8	5.76	9.26
9	4.03	6.42
10	3.85	6.13
11	2.39	4.18
12	4.63	8.16
13	3.30	7.16
14	0.38	0.58
15	0.85	1.31
16	0.26	1.92

FULL SPECTRUM POND SUMMARY		
ZONE	VOLUME (AC-FT)	WATER ELEV.
WQCV	0.294	7137.55
EURV	0.675	7140.11
100-YEAR	0.518	7141.64

PCD FILE NO. PPR2329

N

0 30 60 120

SCALE: 1" = 60'

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15 YEARS WHERE GREAT PLACES BEGIN
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NOT FOR CONSTRUCTION

NOTES	NO.	DATE

PROJECT NO.	23009	NOTES
DATE	NO	
07/28/23	1	1ST SUBMITTAL
10/20/23	2	2ND SUBMITTAL
11/17/23	3	3RD SUBMITTAL

LOT 1 OF THE ROCK COMMERCE CENTER FILING NO. 1

DRAINAGE MAPS
PROPOSED DRAINAGE MAP

SHEET
DNG-2

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V3_Drainage Report - Final.pdf Markup Summary

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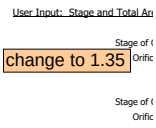

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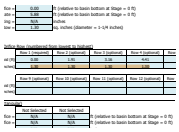

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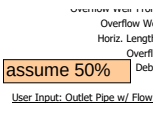

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Date: 12/6/2023 4:45:15 PM
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Color:
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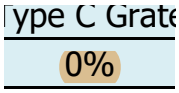
assume 50%



Subject: Highlight
Page Label: 55
Author: Christina Prete
Date: 12/6/2023 4:45:11 PM
Status:
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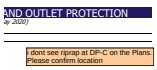

Subject: Contractor
Page Label: 115
Author: Christina Prete
Date: 12/6/2023 5:15:24 PM
Status:
Color:
Layer:
Space:

i dont see riprap at DP-C on the Plans. Please confirm location