McNett Flats Subdivision

Major Subdivision Application

Section 20: Preliminary Construction Plans

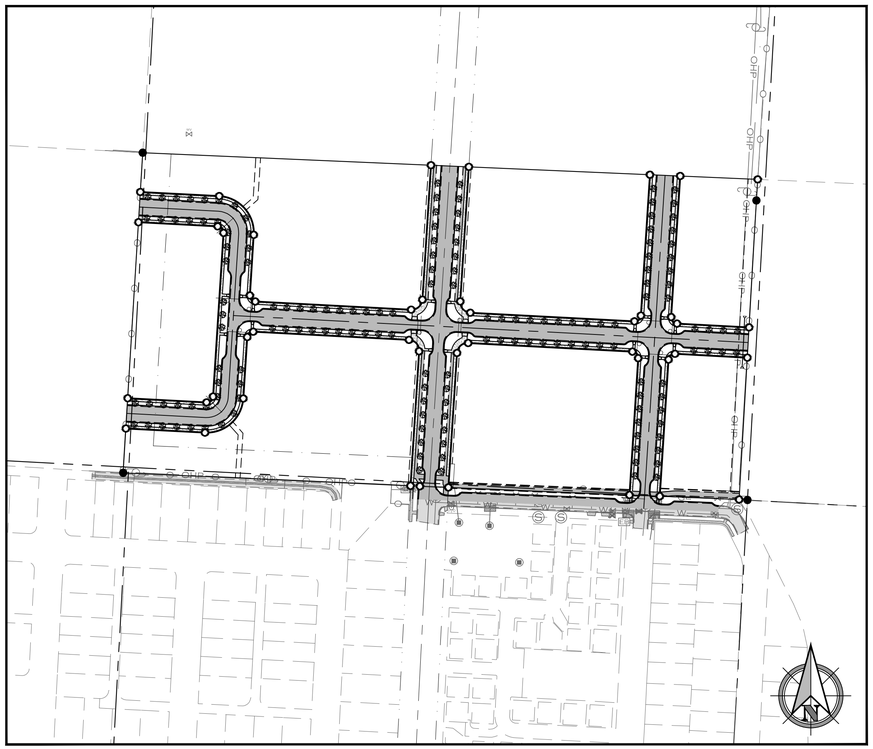
Revision	*Date*
1st Element Review Copy	August 25, 2020
1st Sufficiency Review Copy	September 1, 2020
2nd Sufficiency Review Copy	October 16, 2020
3rd Sufficiency Review Copy	November 11, 2020
Governing Body Review	December 4, 2020

405 Third Street NW, Suite 206
Great Falls, MT 59404
(406) 761-1955

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS

3860 O'Leary Street, Suite A
Missoula, MT 59808
(406) 203-0869

VICINITY MAP
NOT TO SCALE



PROJECT MAP
NOT TO SCALE

Know what's below.
Call before you dig.

PRELIMINARY CONSTRUCTION PLANS FOR

MCNETT FLATS SUBDIVISION

MISSOULA, MONTANA

NOVEMBER 2020

APPROVED BY: _____
KODY SWARTZ, PE

INDEX OF CIVIL SHEETS

PRELIMINARY - THIRD SUFFICIENCY REVIEW

COLOR VERIFICATION
ELEMENTS ON THIS SHEET ARE INTENDED TO BE IN COLOR. IF PROPERLY REPRODUCED, RED, GREEN AND BLUE WILL BE VISIBLE.

JOB #: 1931
DRAWN: CRH
DESIGN: MH/AH
QA: KTS
DATE: 11/11/2020

MONTANA
KODY THOMAS SWARTZ
No. 30035 PE
REGISTERED PROFESSIONAL ENGINEER

DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
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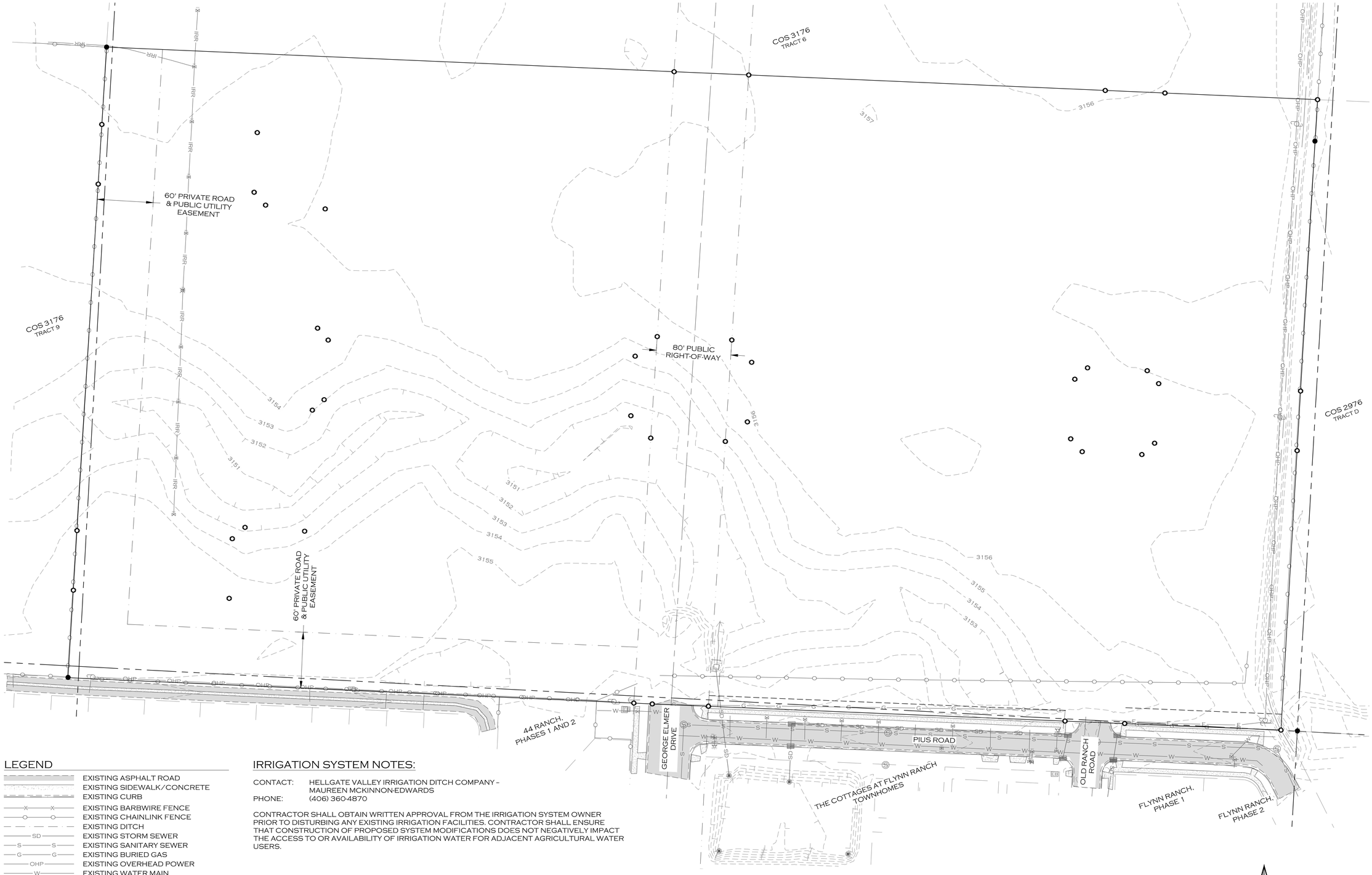
MCNETT FLATS
MISSOULA MONTANA

COVER SHEET

C0.0

COVER SHEET.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020



LEGEND

- EXISTING ASPHALT ROAD
- EXISTING SIDEWALK/CONCRETE
- EXISTING CURB
- EXISTING BARBWIRE FENCE
- EXISTING CHAINLINK FENCE
- EXISTING DITCH
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING BURIED GAS
- EXISTING OVERHEAD POWER
- EXISTING WATER MAIN
- EXISTING JUNCTION BOX
- EXISTING FIRE HYDRANT
- EXISTING GUY ANCHOR
- EXISTING MANHOLE - SANITARY SEWER
- EXISTING POWER POLE
- EXISTING STORM DRAIN INLET
- EXISTING SIGN POST
- EXISTING WATER VALVE

IRRIGATION SYSTEM NOTES:

CONTACT: HELLGATE VALLEY IRRIGATION DITCH COMPANY - MAUREEN MCKINNON-EDWARDS

PHONE: (406) 360-4870

CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM THE IRRIGATION SYSTEM OWNER PRIOR TO DISTURBING ANY EXISTING IRRIGATION FACILITIES. CONTRACTOR SHALL ENSURE THAT CONSTRUCTION OF PROPOSED SYSTEM MODIFICATIONS DOES NOT NEGATIVELY IMPACT THE ACCESS TO OR AVAILABILITY OF IRRIGATION WATER FOR ADJACENT AGRICULTURAL WATER USERS.

PRELIMINARY - THIRD SUFFICIENCY REVIEW

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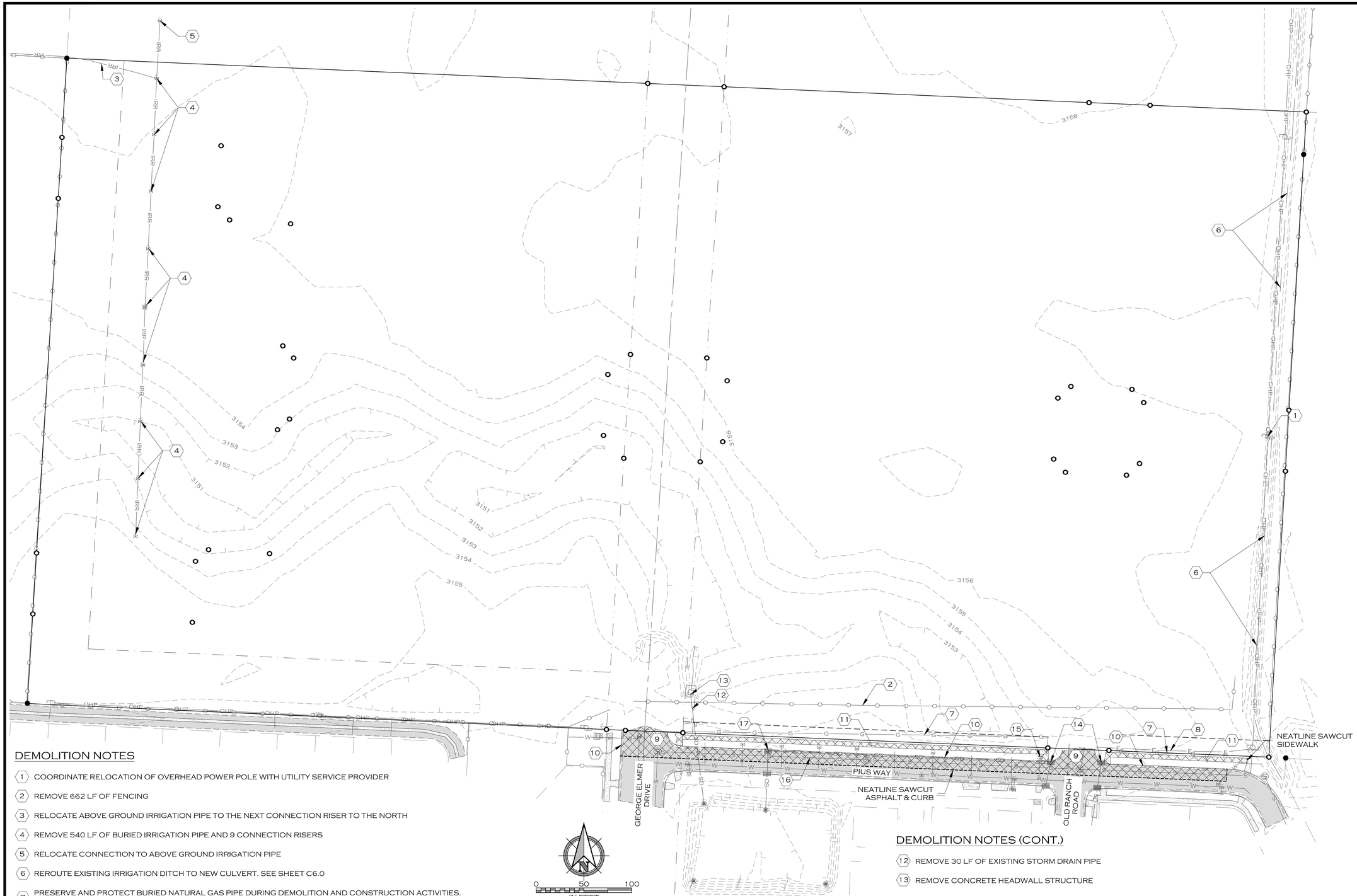
MCNETT FLATS
MISSOULA MONTANA

EXISTING SITE CONDITIONS

C1.0

EXISTING CONDITIONS.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020



DEMOLITION NOTES

1. COORDINATE RELOCATION OF OVERHEAD POWER POLE WITH UTILITY SERVICE PROVIDER
2. REMOVE 662 LF OF FENCING
3. RELOCATE ABOVE GROUND IRRIGATION PIPE TO THE NEXT CONNECTION RISER TO THE NORTH
4. REMOVE 540 LF OF BURIED IRRIGATION PIPE AND 9 CONNECTION RISERS
5. RELOCATE CONNECTION TO ABOVE GROUND IRRIGATION PIPE
6. REROUTE EXISTING IRRIGATION DITCH TO NEW CULVERT. SEE SHEET C6.0
7. PRESERVE AND PROTECT BURIED NATURAL GAS PIPE DURING DEMOLITION AND CONSTRUCTION ACTIVITIES. COORDINATE RELOCATION WITH UTILITY SERVICE PROVIDER IF NECESSARY
8. PRESERVE AND PROTECT BURIED ELECTRICAL CABLE DURING DEMOLITION AND CONSTRUCTION ACTIVITIES. COORDINATE RELOCATION WITH UTILITY SERVICE PROVIDER IF NECESSARY
9. REMOVE & REPLACE 942 SY ASPHALT.
10. REMOVE & REPLACE 605 LF CURB.
11. REMOVE & REPLACE 2683 SF CONCRETE SIDEWALK

DEMOLITION NOTES (CONT.)

12. REMOVE 30 LF OF EXISTING STORM DRAIN PIPE
13. REMOVE CONCRETE HEADWALL STRUCTURE
14. PRESERVE AND PROTECT STORM DRAINAGE INLET GRATE, MANHOLE, AND CURB HOOD DURING DEMOLITION AND CONSTRUCTION ACTIVITIES
15. FIRE HYDRANT TO BE RELOCATED. COORDINATE WITH UTILITY DURING DEMOLITION AND CONSTRUCTION ACTIVITIES.
16. PRESERVE AND PROTECT SEWER MAIN AND MANHOLES DURING DEMOLITION AND CONSTRUCTION ACTIVITIES
17. REPLACE CURB INLET WITH SOLID STORM DRAIN COVER. PRESERVE AND PROTECT MANHOLE IN PLACE DURING DEMOLITION AND CONSTRUCTION ACTIVITIES.

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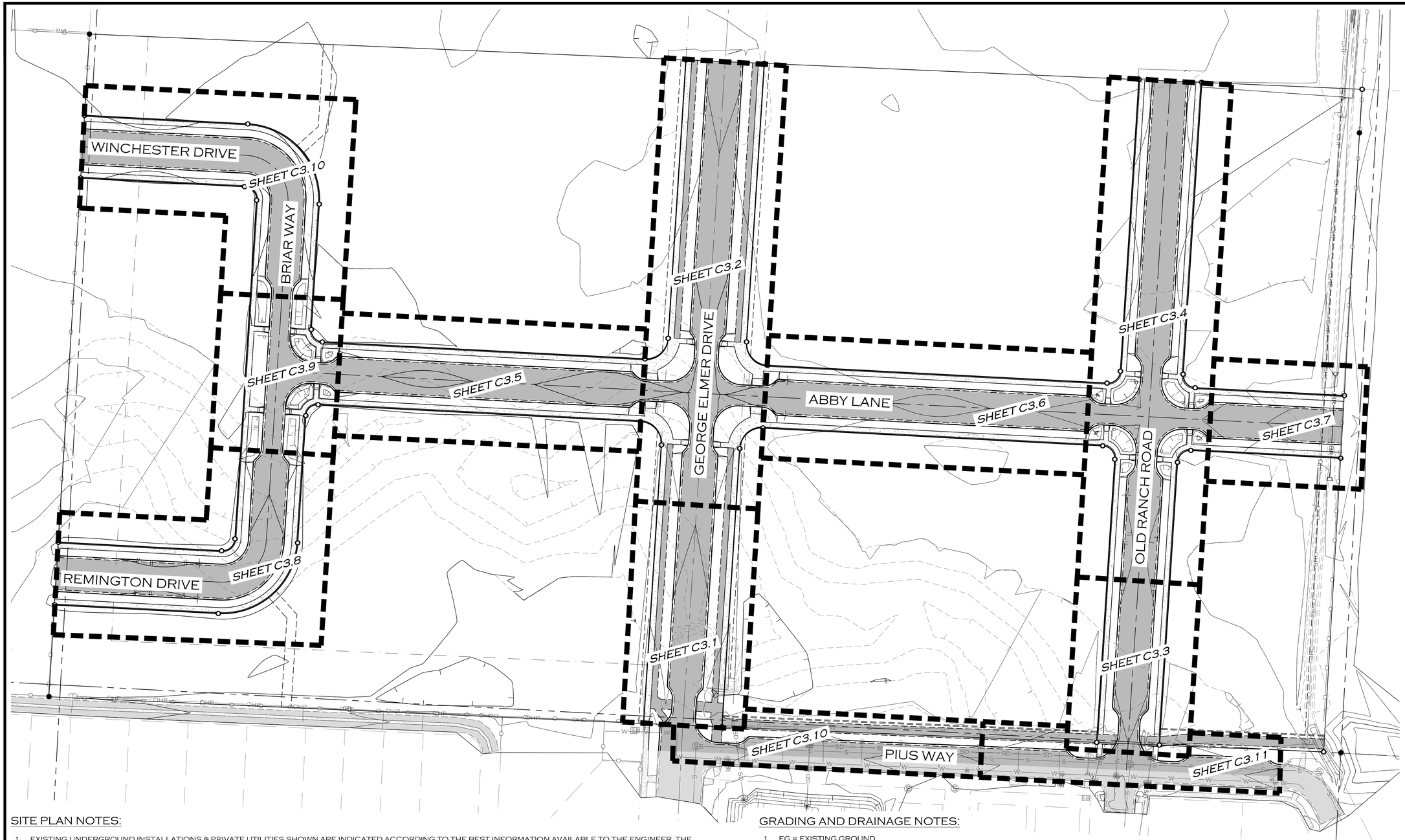
PRELIMINARY - THIRD SUFFICIENCY REVIEW

MCNETT FLATS
MONTANA
MISSOULA

DEMOLITION PLAN

C1.1

DEMOLITION PLAN.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020



SITE PLAN NOTES:

1. EXISTING UNDERGROUND INSTALLATIONS & PRIVATE UTILITIES SHOWN ARE INDICATED ACCORDING TO THE BEST INFORMATION AVAILABLE TO THE ENGINEER. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF SUCH INFORMATION. SERVICE LINES (WATER, POWER, GAS, SEWER, TELEPHONE, TELEVISION) MAY NOT BE STRAIGHT LINES OR AS INDICATED ON THE PLANS. STATE LAW REQUIRES CONTRACTOR TO CALL ALL UTILITY COMPANIES BEFORE EXCAVATION FOR EXACT LOCATIONS.
2. ALL ONSITE UTILITY IMPROVEMENTS SHALL CONFORM TO THE PLUMBING CODE (UPC) AND ALL ADMINISTRATIVE RULES OF MONTANA AND MODIFICATIONS TO THE UPC.
3. PLEASE REFER TO THE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR PLUMBING FEATURES WITHIN 5' OF BUILDING ENVELOPE.
4. ALL IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS 6TH EDITION, APRIL, 2010, INCLUDING ALL ADDENDUMS, AND ANY APPLICABLE STANDARDS FROM THE CITY OF MISSOULA.
5. ALL PROPOSED WORK WITHIN THE RIGHT-OF-WAY IS SUBJECT TO THE APPROVAL OF THE CITY OF MISSOULA ENGINEERING DEPARTMENT.
6. UNLESS OTHERWISE SPECIFIED, ALL CONSTRUCTION LAYOUT AND STAKING SHALL BE PERFORMED UNDER THE RESPONSIBLE CHARGE OF A LAND SURVEYOR LICENSED IN THE STATE OF MONTANA AND BY A PARTY CHIEF OR ENGINEERING TECHNICIAN EXPERIENCED IN CONSTRUCTION LAYOUT AND STAKING TECHNIQUES AS ARE REQUIRED BY THE SPECIFIC TYPE OF WORK BEING PERFORMED.
7. ALL EARTHWORK, TRENCHING, GRADING, FILLING, ETC., SHALL BE PERFORMED IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT RECOMMENDATIONS PREPARED FOR THIS PROJECT BY LORENZEN SOIL MECHANICS.
8. UNLESS OTHERWISE NOTED, RADIUS CALLOUTS ARE TO TOP BACK OF CURB, EDGE OF SIDEWALK, EDGE OF ASPHALT, OR EDGE OF GRAVEL.

GRADING AND DRAINAGE NOTES:

1. EG = EXISTING GROUND
   FG = FINISH GROUND
   EP = EDGE OF PAVEMENT AT LOCATION OF TBC
   TBC = TOP BACK OF CURB
2. ALL TIE-INS TO EXISTING ASPHALT, CONCRETE CURBS, AND SIDEWALKS SHALL BE SAW CUT OR NEAT CUT BY METHOD APPROVED BY THE ENGINEER. PROVIDE SMOOTH TRANSITIONS TO EXISTING SURFACES.
3. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
4. GRADING AND DRAINAGE INFRASTRUCTURE SHALL CONFORM TO ADA REQUIREMENTS.
5. LANDSCAPE PLAN PROVIDED BY OTHERS.
6. ALL CURB DIMENSIONS DEPICTED HEREON REFERENCE TOP BACK OF CURB UNLESS OTHERWISE NOTED.
7. ALONG THE DESIGNATED ACCESSIBLE ROUTE, ALL WALKWAYS SHALL NOT EXCEED 2% MAXIMUM CROSS SLOPE.

0 50 100
IN FEET

PRELIMINARY - SECOND SUFFICIENCY REVIEW

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ENGINEERS & SURVEYORS
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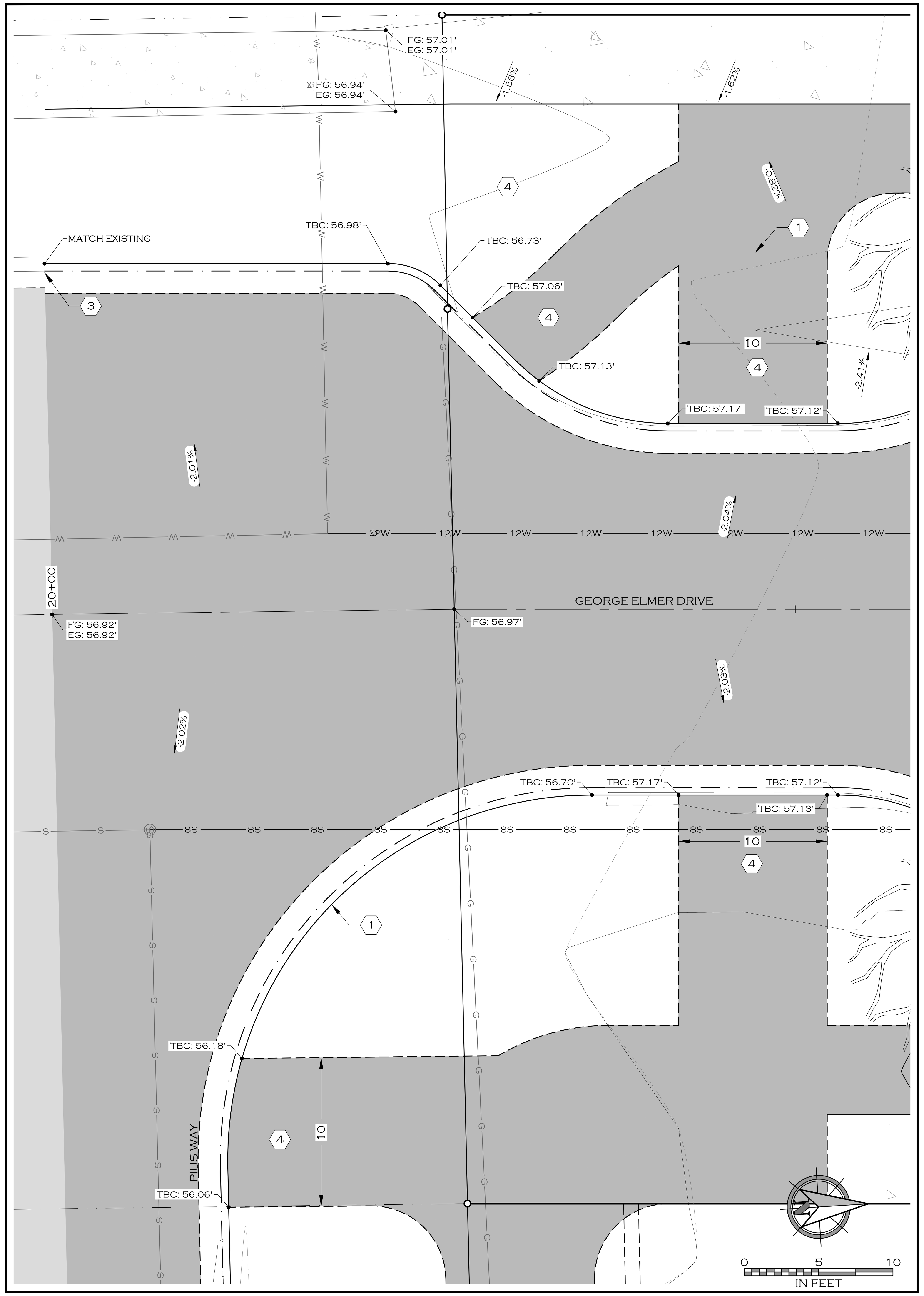
MCNETT FLATS
MISSOULA MONTANA

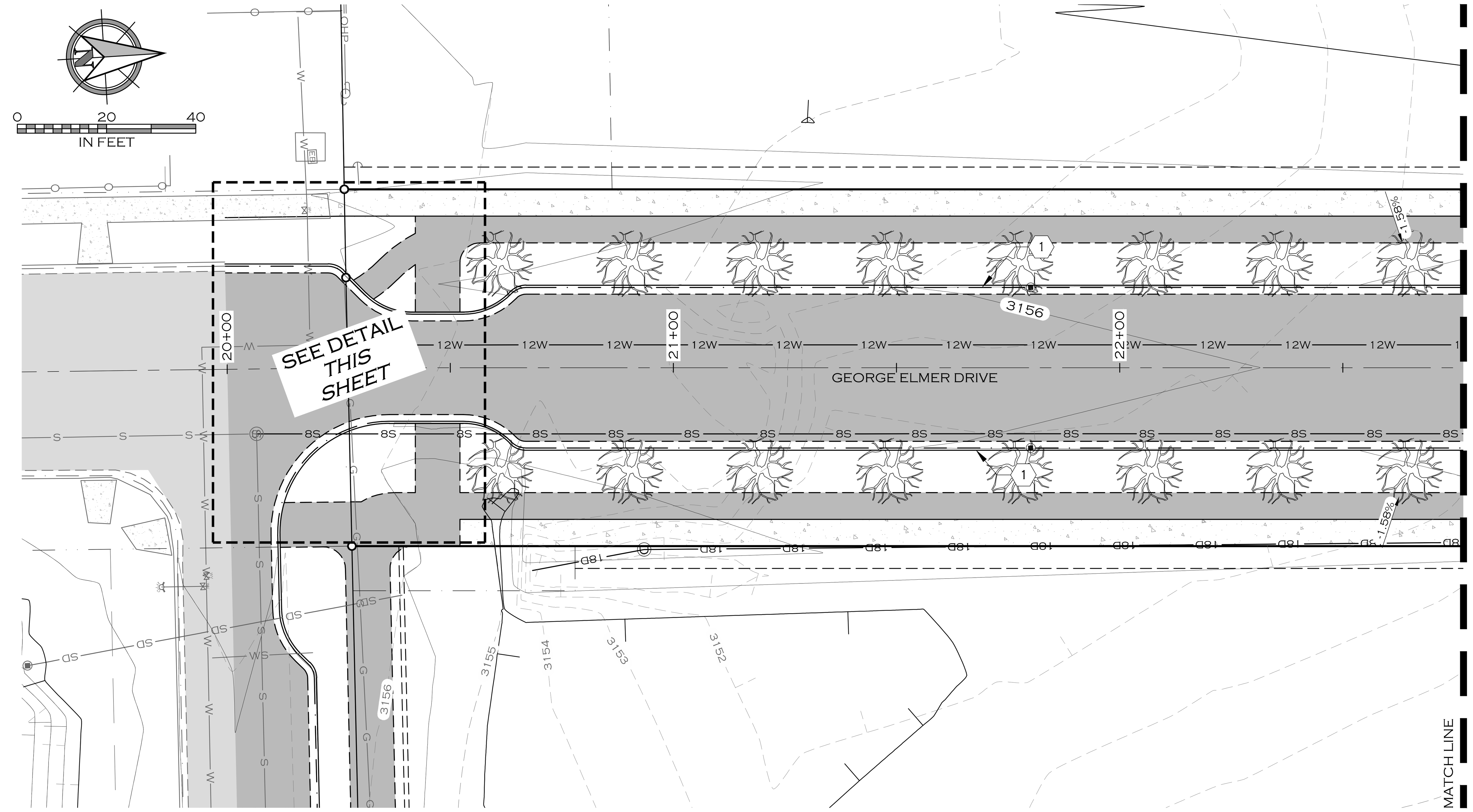
OVERALL SITE & GRADING PLAN

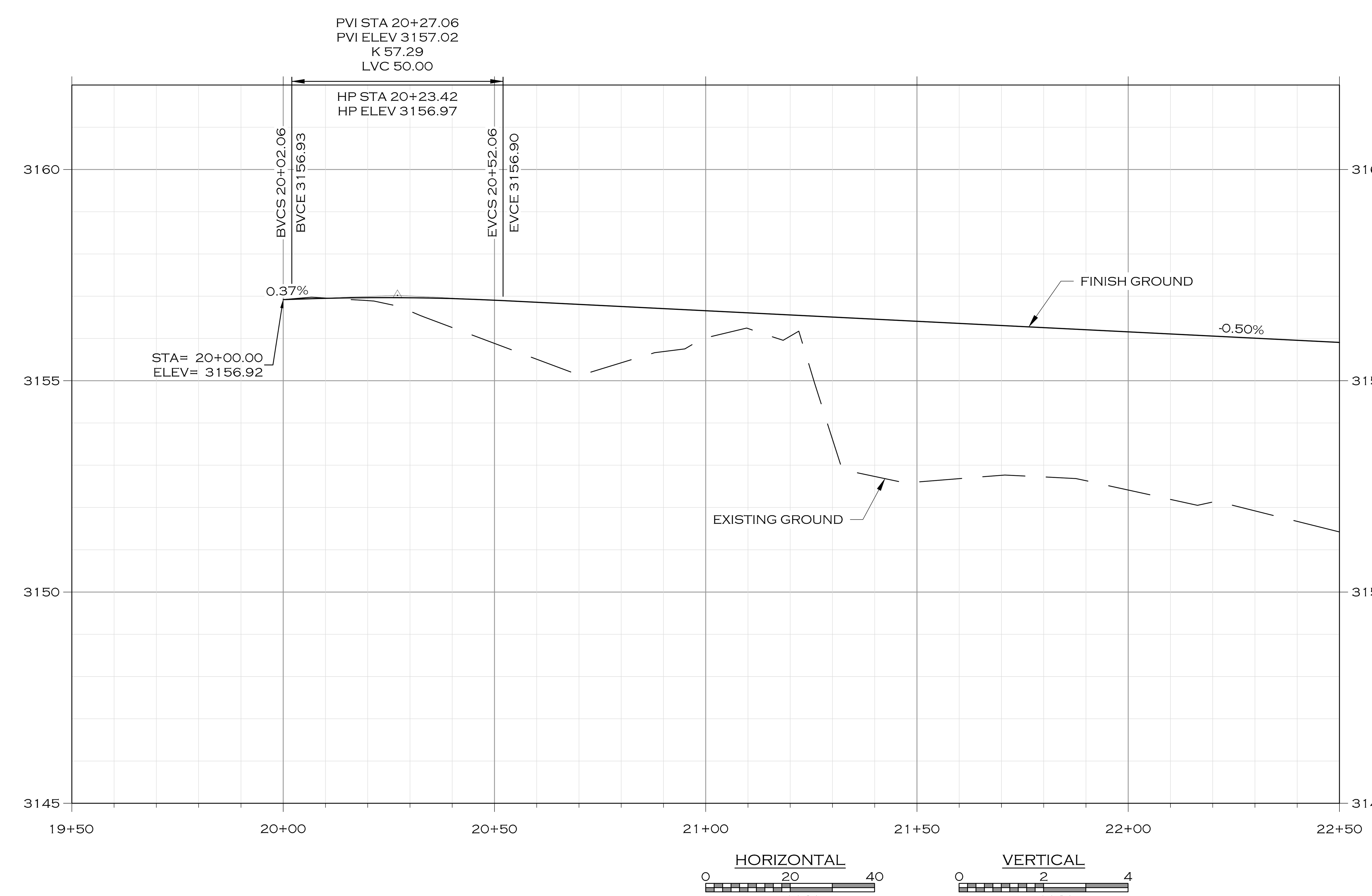
C3.0

OVERALL SITE & GRADING PLAN DWG PLOTTED BY: WEIMSLA2 ON Nov/11/2020



PIUS WAY INTERSECTION DETAIL





PRELIMINARY - THIRD SUFFICIENCY REVIEW

KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. GRADE BREAK
3. SAWCUT AND MATCH EXISTING CURB AND GUTTER SECTION.
4. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
5. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).

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MONTANA KODY THOMAS SWARTZ No. 39085 PE LICENSED PROFESSIONAL ENGINEER

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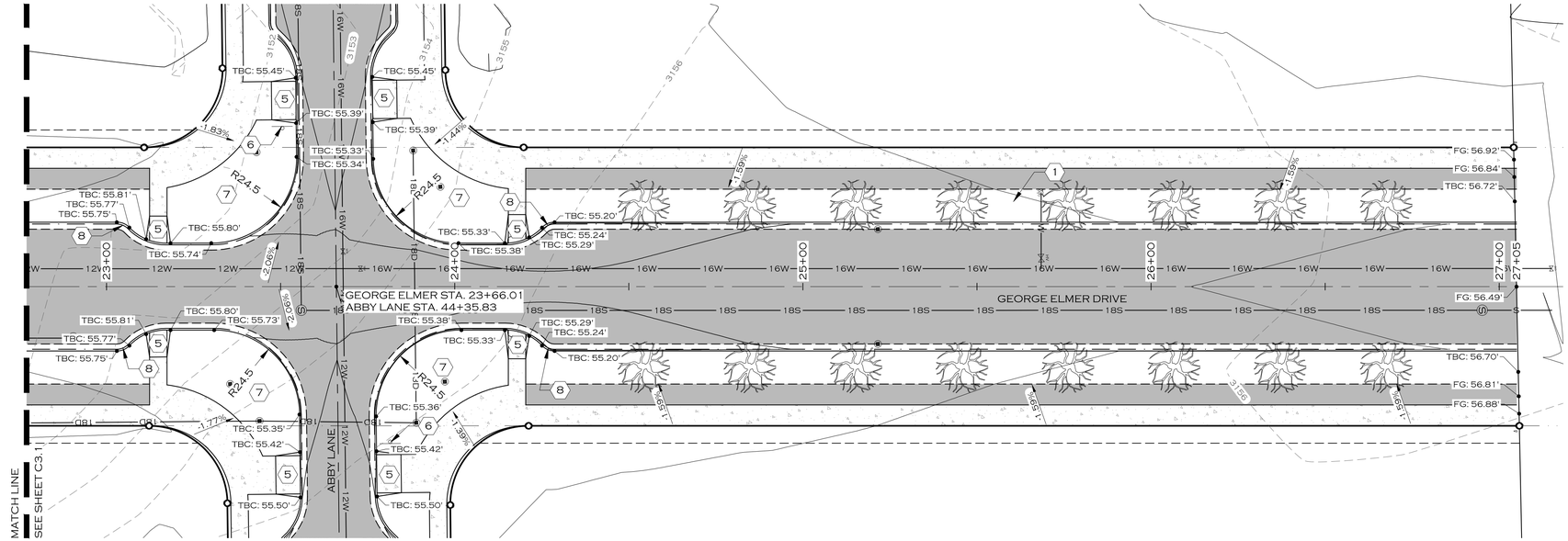
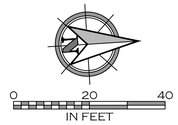
MCNETT FLATS
MISSOULA MONTANA

GEORGE ELMER DRIVE PLAN & PROFILE STA. 20+00 TO 22+50

C3.1





KEY NOTES:

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2. INSTALL 3' CONCRETE COVE GUTTER PER CITY OF MISSOULA STD-128/STD-167 (SEE SHEET C7.1)
3. GRADE BREAK
4. INSTALL 8' SUMP PER CITY OF MISSOULA STD-302 (SEE SHEET 7.2). PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.
5. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
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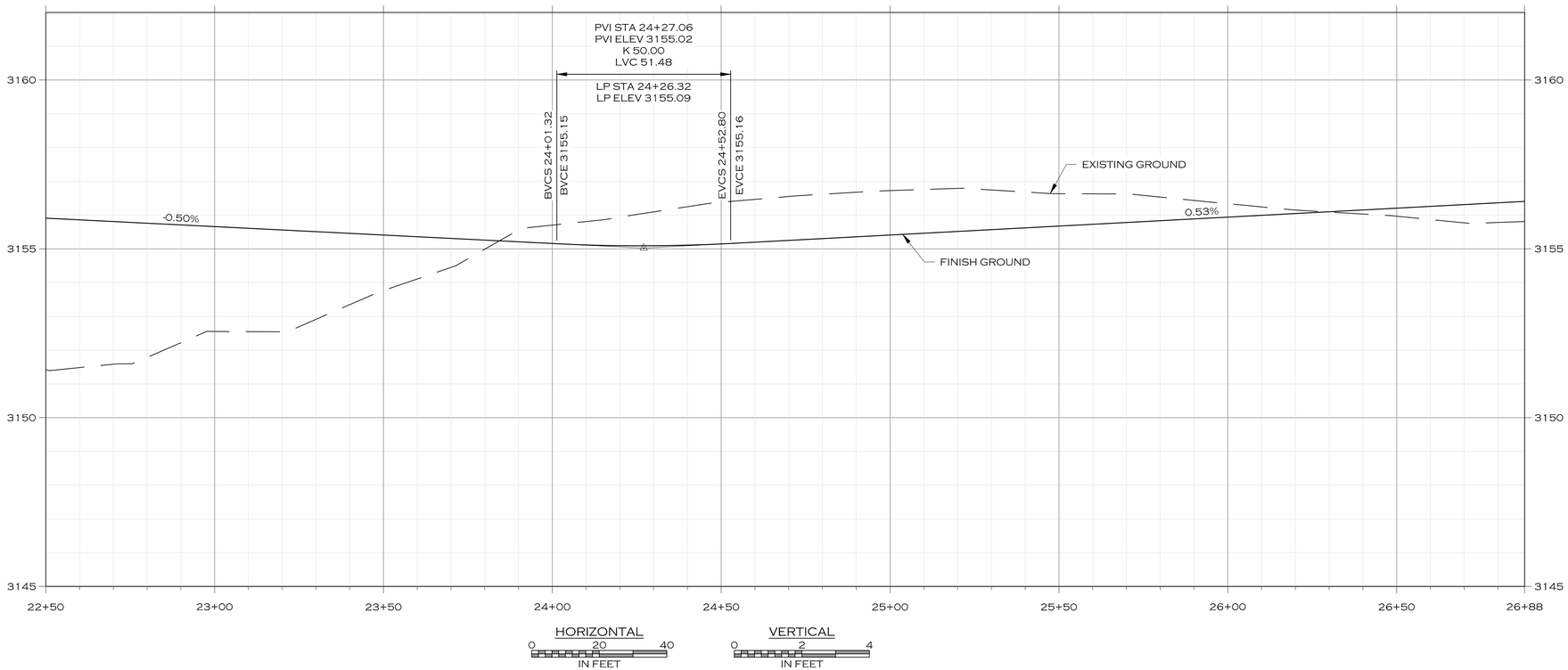
7. BIORETENTION BASIN BULB-OUT PER MULLAN AREA MASTER PLAN DETAIL.
8. INSTALL 2.5' WIDE CURB CUT INLET INTO BIORETENTION BASIN.



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MONTANA
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PRELIMINARY - THIRD SUFFICIENCY REVIEW

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405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
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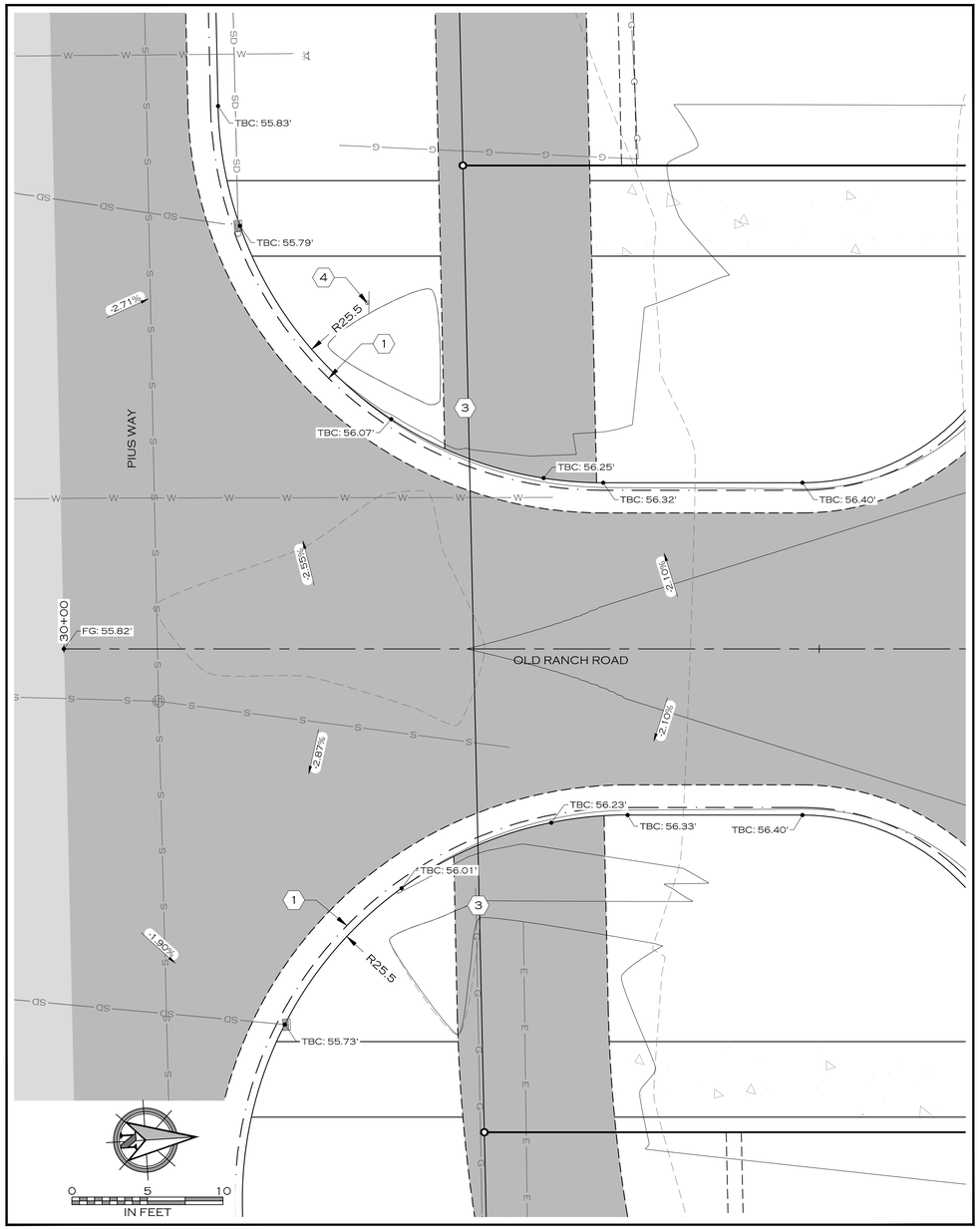
MCNETT FLATS
MISSOULA
MONTANA

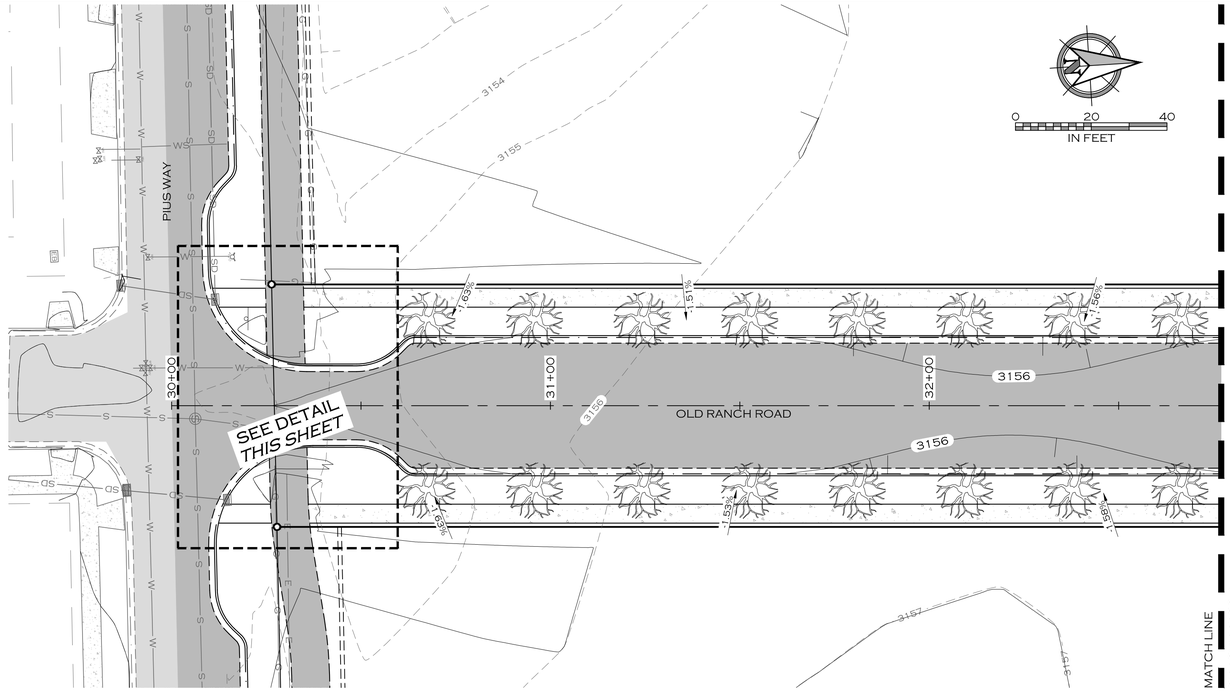
GEORGE ELMER DRIVE PLAN & PROFILE STA. 22+50 TO 26+78

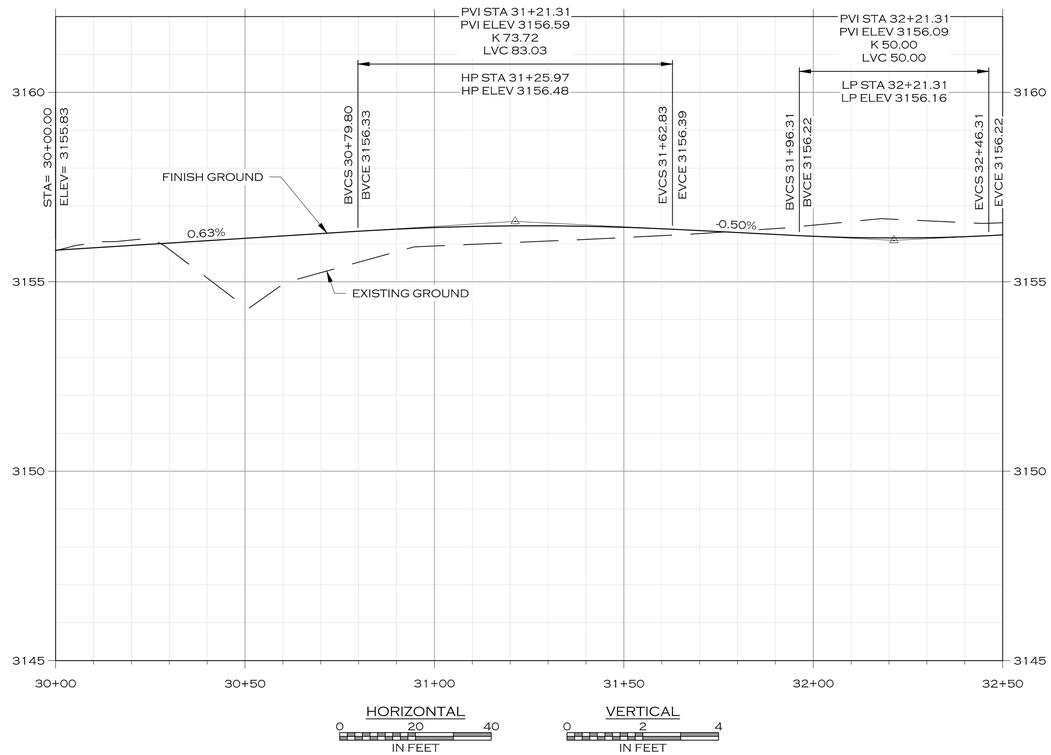
C3.2

GEORGE ELMER DRIVE PLAN & PROFILE STA. 22+50 TO 26+78.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020



PIUS WAY INTERSECTION DETAIL





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4. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).

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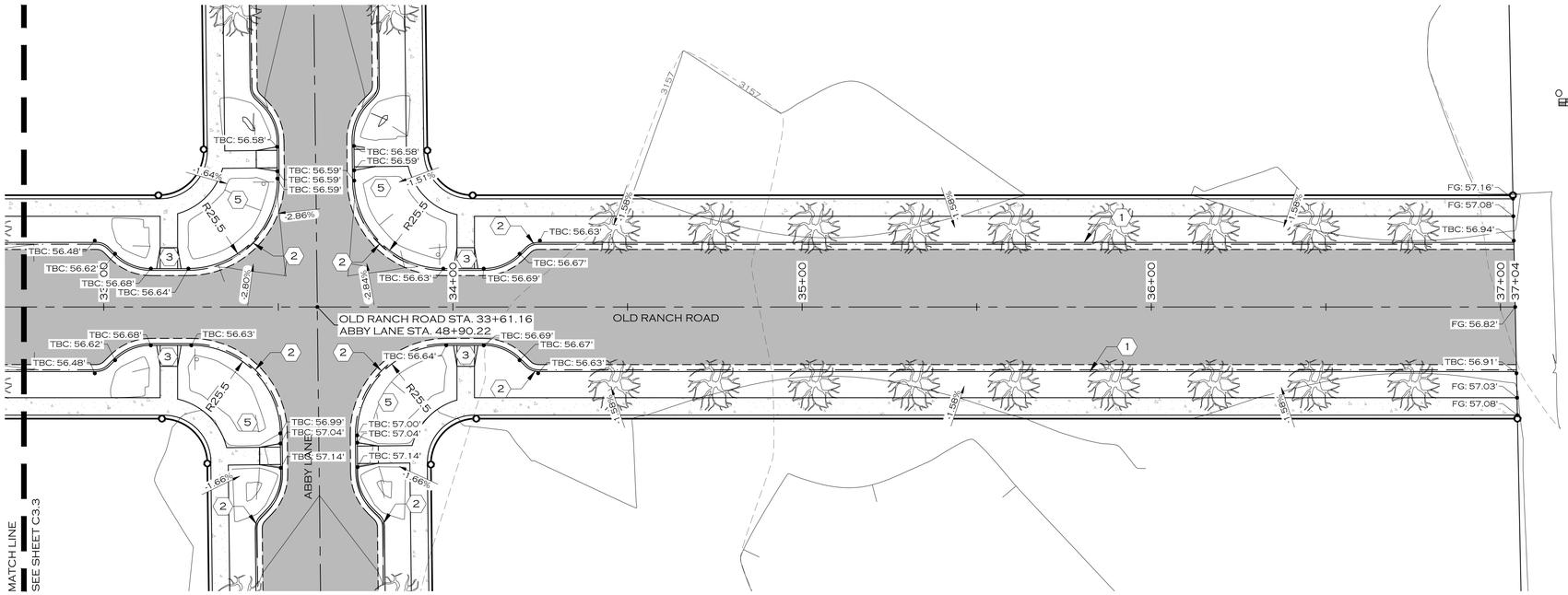
PRELIMINARY - SECOND SUFFICIENCY REVIEW

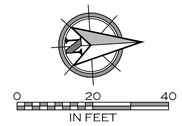
MCNETT FLATS
MISSOULA MONTANA

OLD RANCH ROAD PLAN & PROFILE STA. 30+00 TO 32+50

C3.3

OLD RANCH ROAD STA. 32+50 TO 36+87.DWG PLOTTED BY:WEIMSLA2 ON Nov 7 17 2020





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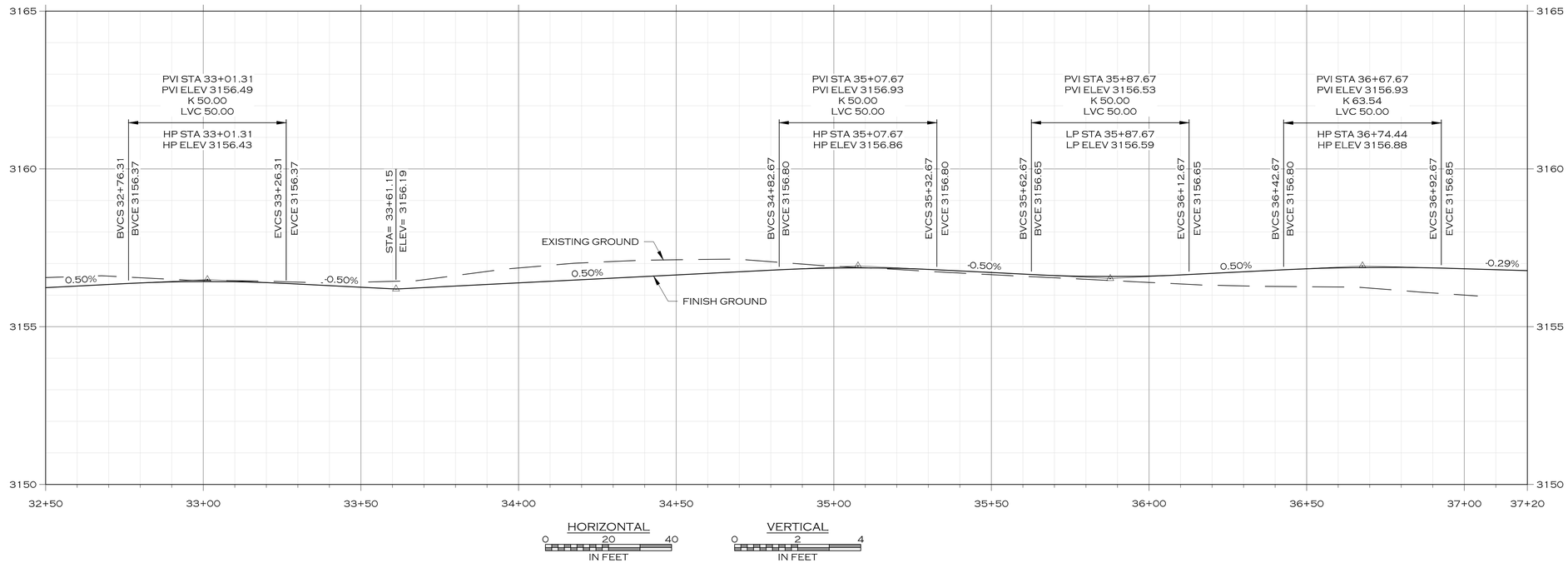

HORIZONTAL
0 20 40
IN FEET

VERTICAL
0 2 4
IN FEET

PRELIMINARY - SECOND SUFFICIENCY REVIEW

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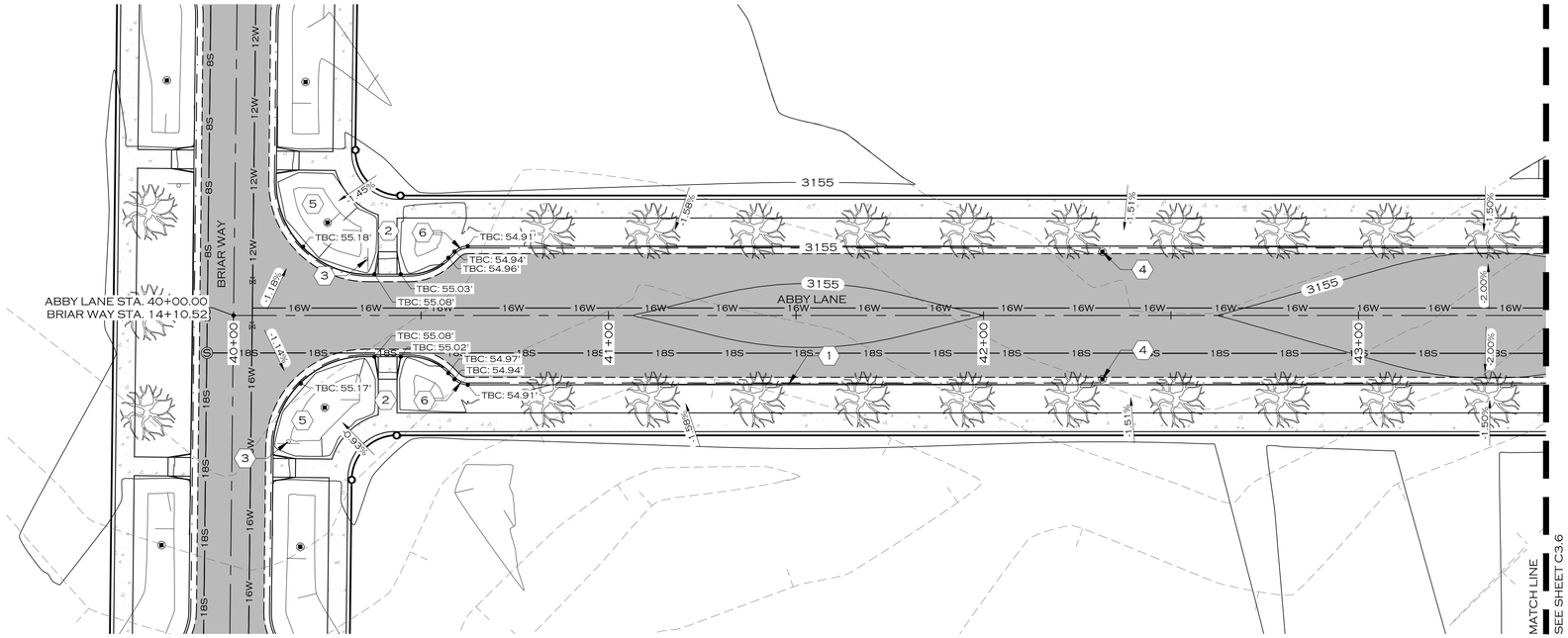
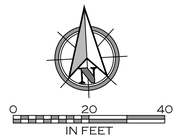
MCNETT FLATS
MISSOULA MONTANA

OLD RANCH ROAD STA. 32+50 TO 36+87

C3.4

OLD RANCH ROAD STA. 32+50 TO 36+87.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020





KEY NOTES:

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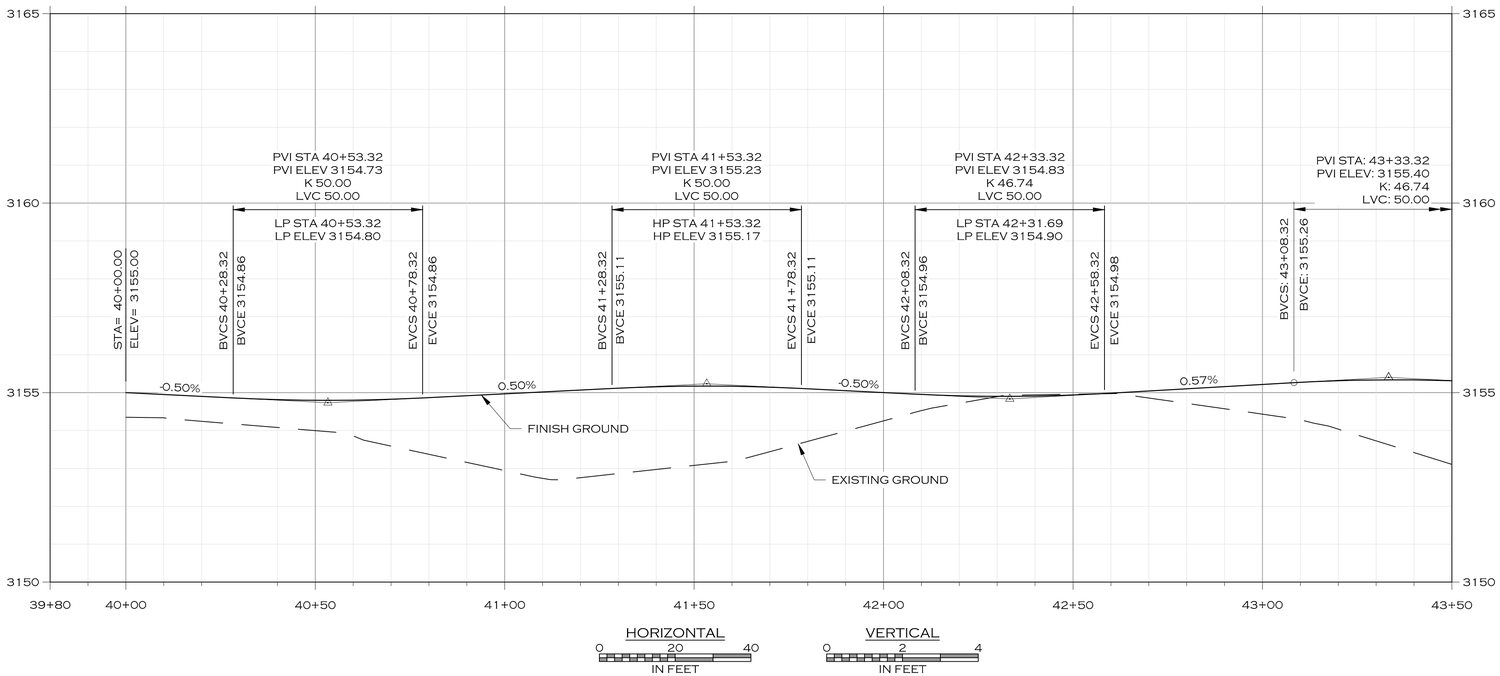

HORIZONTAL
0 20 40
IN FEET

VERTICAL
0 2 4
IN FEET

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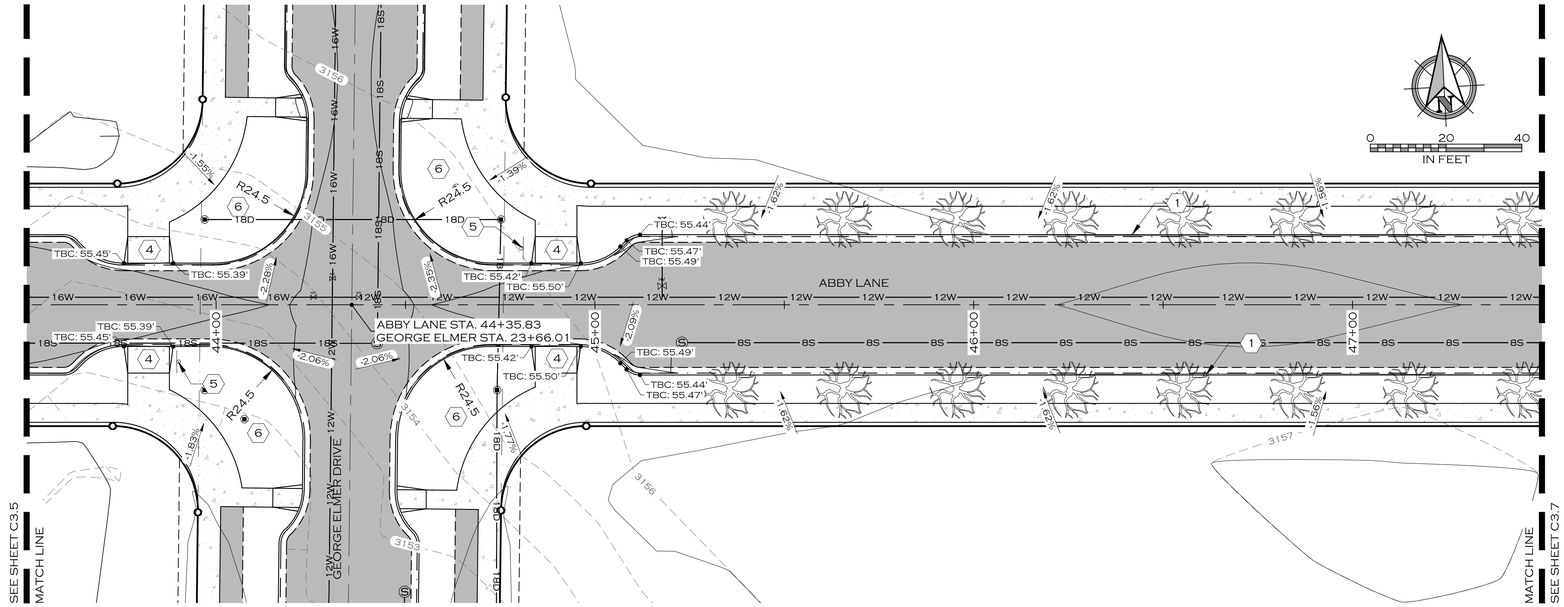
MCNETT FLATS
MISSOULA MONTANA

ABBY LANE PLAN & PROFILE STA. 40+00 TO 43+50

C3.5

ABBY LANE PLAN & PROFILE STA. 47+50 TO 51+00.DWG PLOTTED BY:WEIMSLA2 ON Nov 11, 2020



KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. INSTALL 3' CONCRETE COVE GUTTER PER CITY OF MISSOULA STD-128/STD-167 (SEE SHEET C7.1)
3. INSTALL 8' SUMP PER CITY OF MISSOULA STD-302 (SEE SHEET C7.2). PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.
4. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
5. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).
6. BIORETENTION BASIN BULB-OUT PER MULLAN AREA MASTER PLAN DETAIL.
7. INSTALL 2.5' WIDE CURB CUT INLET INTO BIORETENTION BASIN.

PRELIMINARY - SECOND SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	10/16/2020

#	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MCNETT FLATS
MISSOULA MONTANA

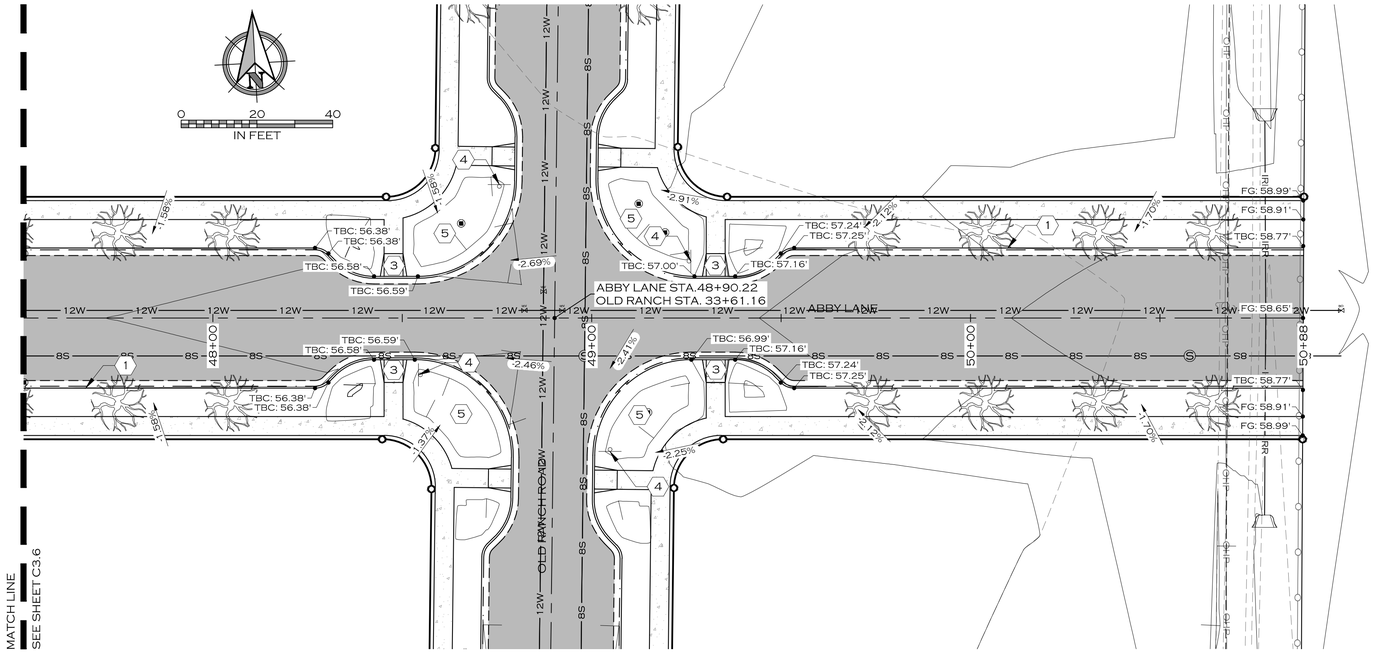
ABBY LANE PLAN & PROFILE STA. 43+50 TO 47+50

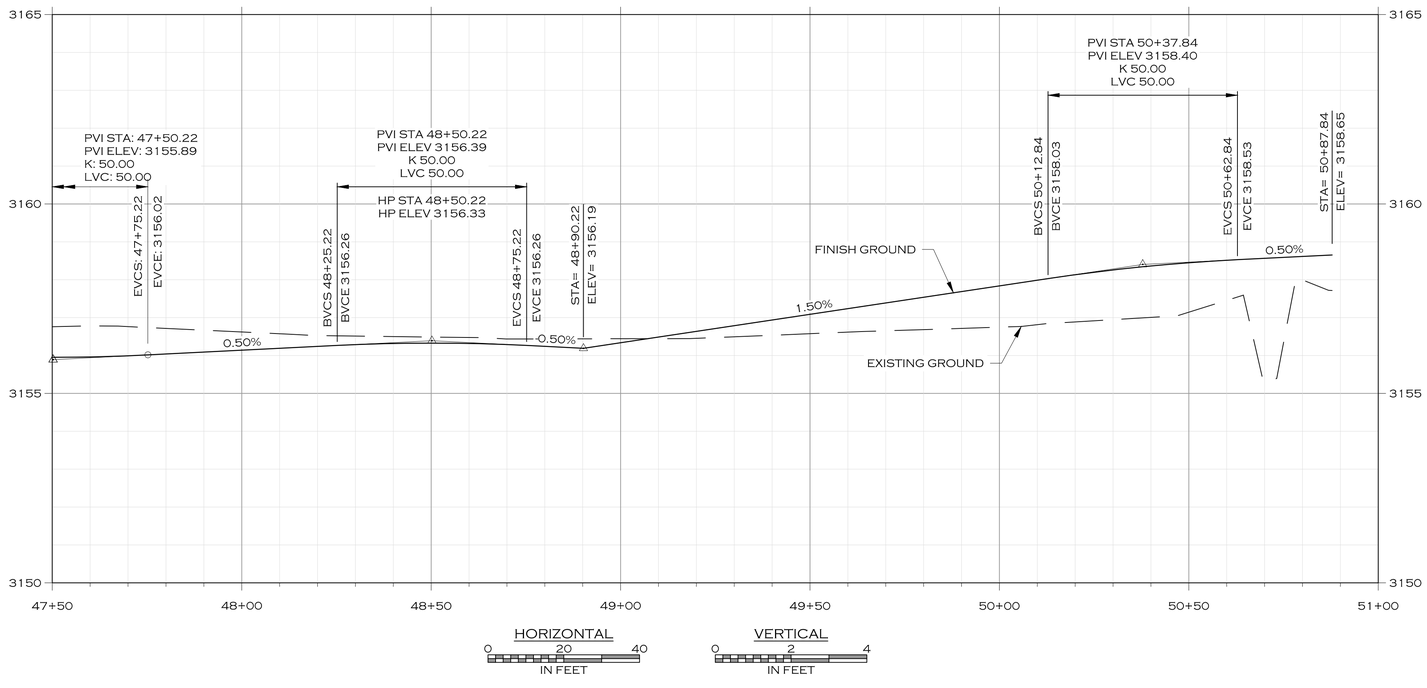
C3.6

ABBY LANE PLAN & PROFILE STA. 47+50 TO 51+00.DWG PLOTTED BY:WEIMSLA2 ON Nov 11, 2020

KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. INSTALL 8' SUMP PER CITY OF MISSOULA STD-302 (SEE SHEET C7.2). PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.
3. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
4. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).
5. BIORETENTION BASIN BULB-OUT PER MULLAN AREA MASTER PLAN DETAIL.
6. INSTALL 2.5' WIDE CURB CUT INLET INTO BIORETENTION BASIN.





PRELIMINARY - SECOND SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	10/16/2020

#	DESCRIPTION	DATE

MONTANA
KODY THOMAS SWARTZ
No. 30035 PE
REGISTERED PROFESSIONAL ENGINEER

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
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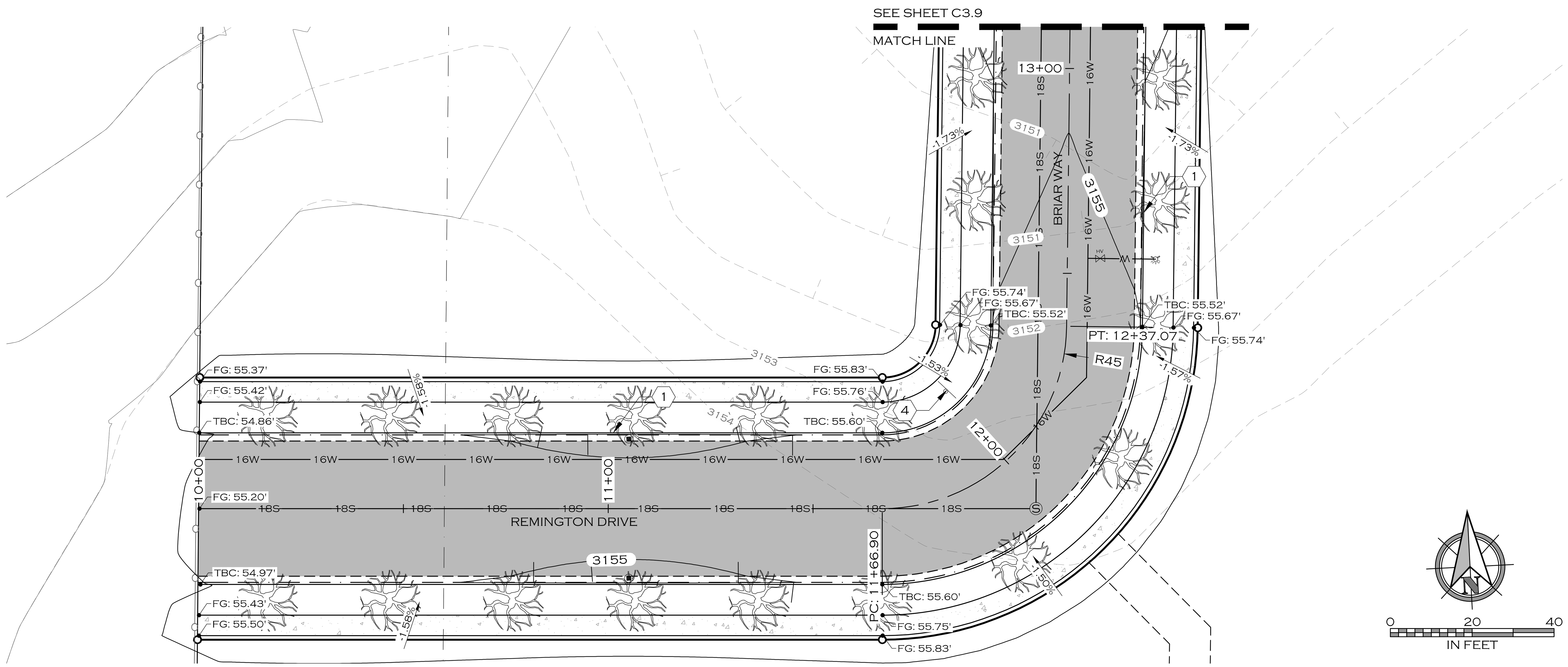
MCNETT FLATS
MISSOULA MONTANA

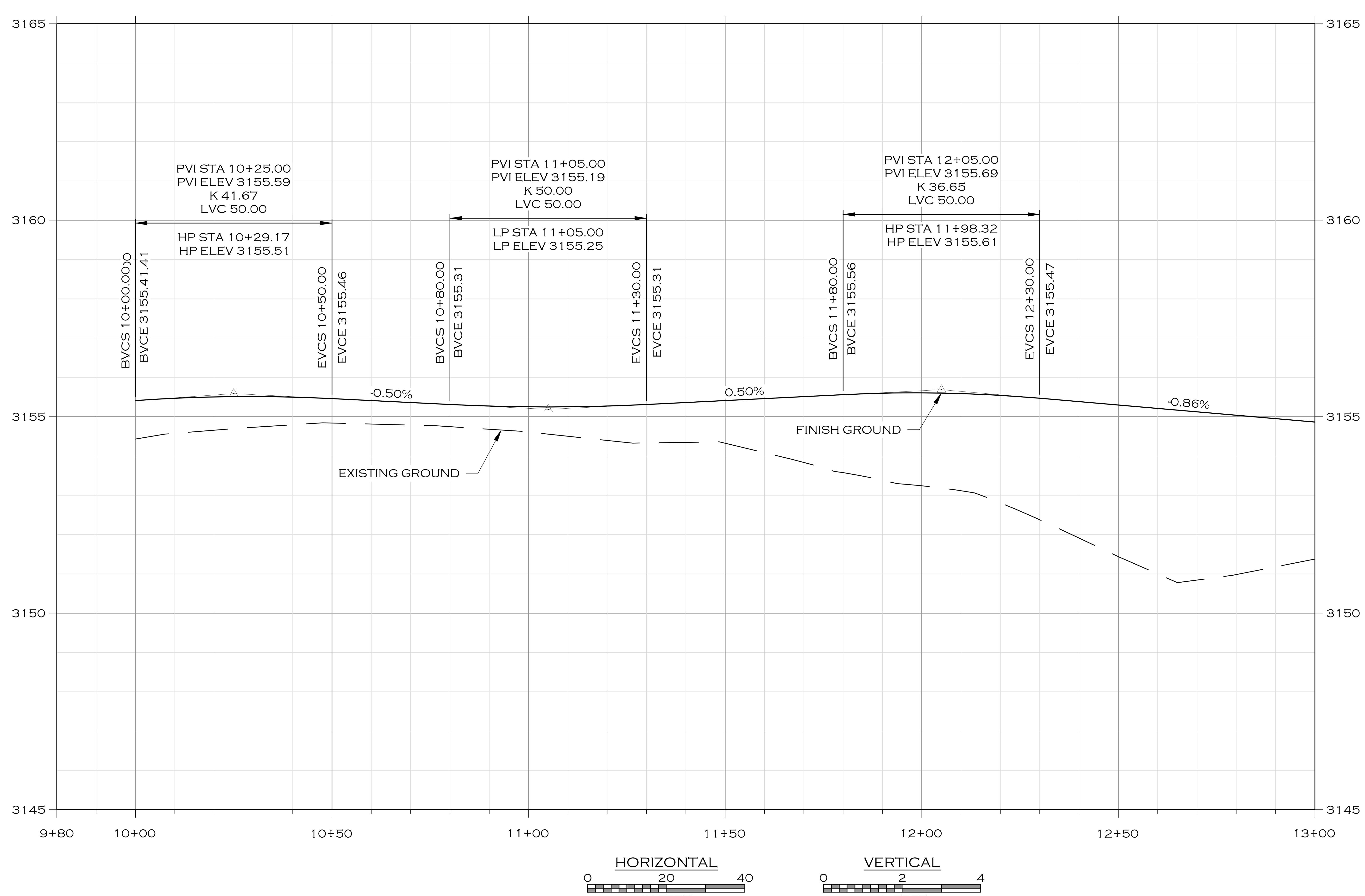
ABBY LANE PLAN & PROFILE STA. 47+50 TO 51+00

C3.7



KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. INSTALL 8' SUMP PER CITY OF MISSOULA STD-302 (SEE SHEET C7.2). PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.
3. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
4. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).



PRELIMINARY - SECOND SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	10/16/2020

MONTANA KODY THOMAS SWARTZ No. 39035 PE LICENSED PROFESSIONAL ENGINEER

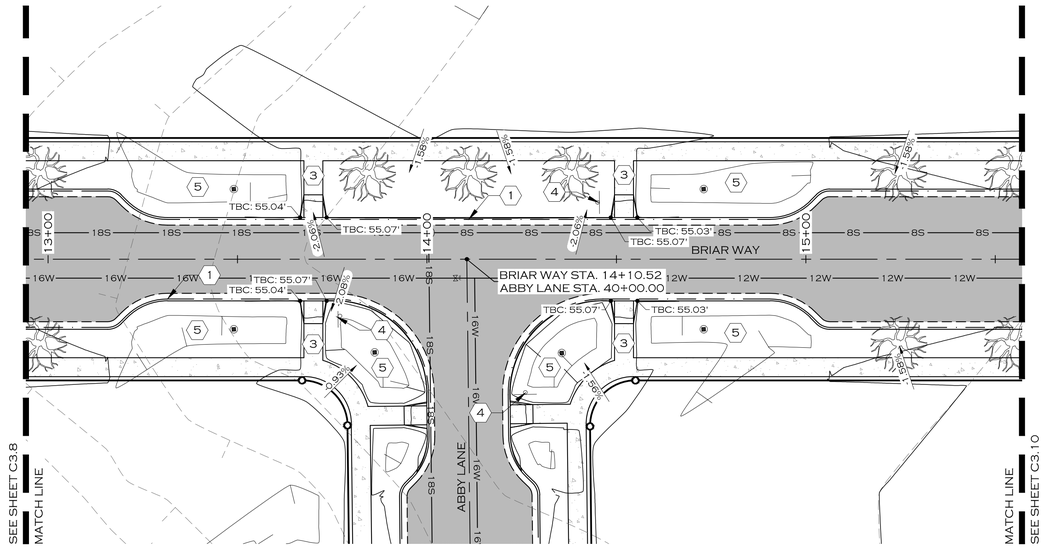
#	DESCRIPTION	DATE

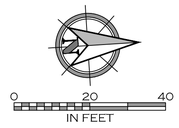
WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

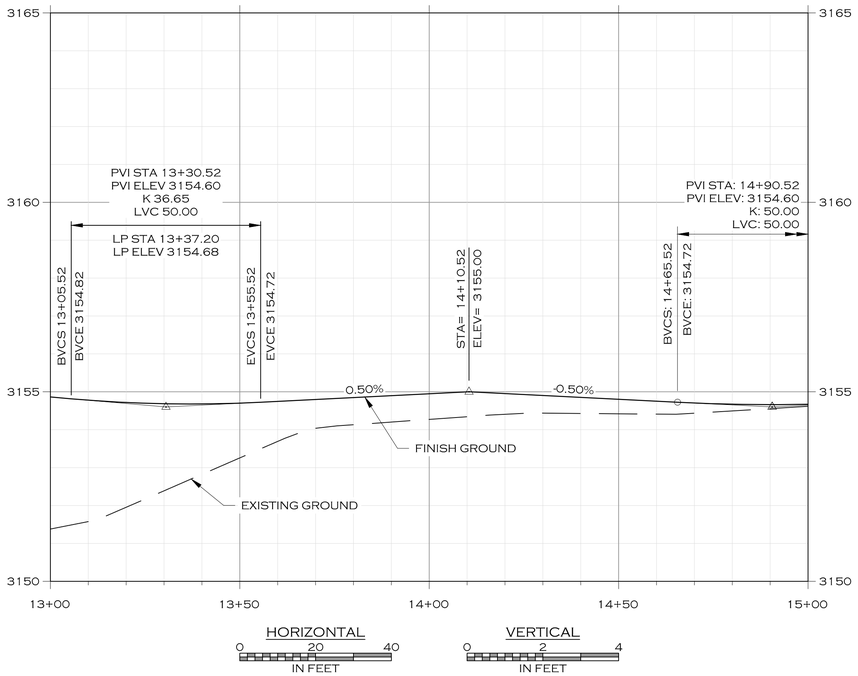
MCNETT FLATS
MISSOULA MONTANA

REMINGTON DRIVE PLAN & PROFILE

C3.8







KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. INSTALL 8' SUMP PER CITY OF MISSOULA STD-302 (SEE SHEET C7.2). PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.
3. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
4. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).
5. BIORETENTION BASIN BULB-OUT PER MULLAN AREA MASTER PLAN DETAIL.
6. INSTALL 2.5' WIDE CURB CUT INLET INTO BIORETENTION BASIN.

PRELIMINARY - SECOND SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	10/16/2020

MONTANA KODY THOMAS SWARTZ No. 30035 PE REGISTERED PROFESSIONAL ENGINEER

	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
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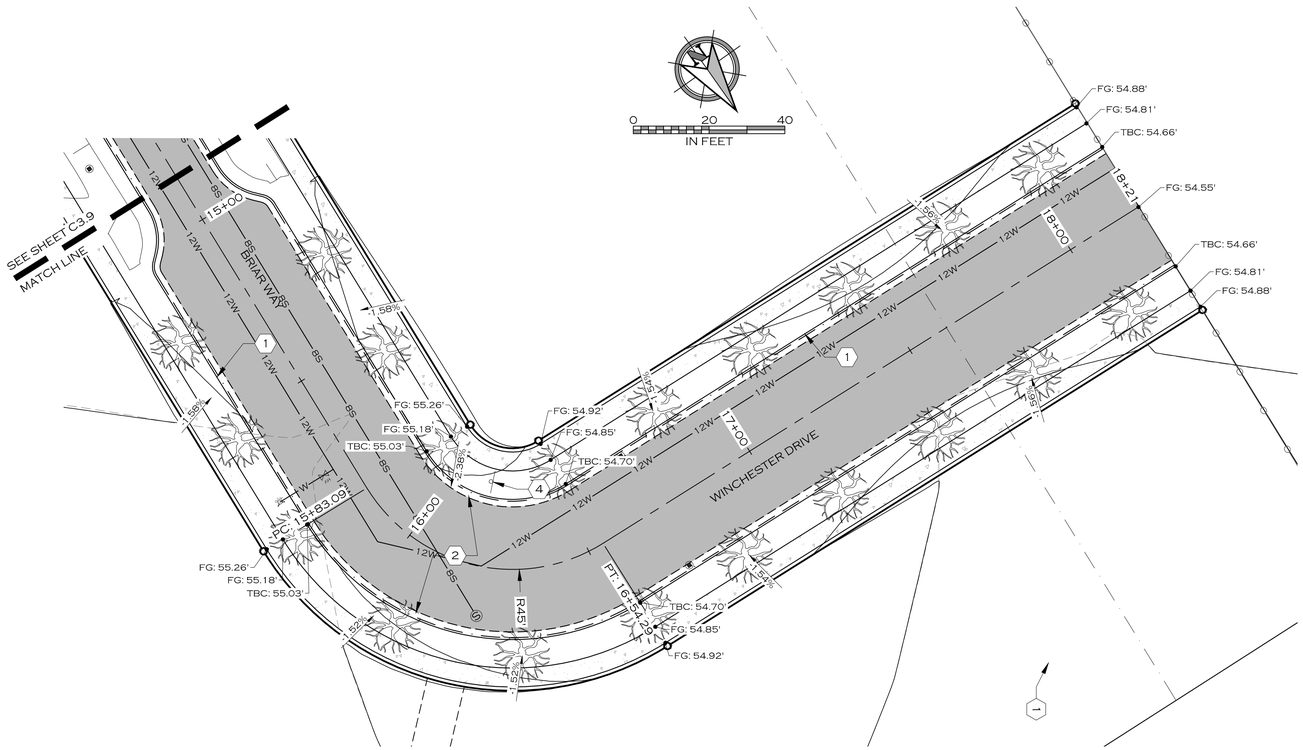
MCNETT FLATS
MISSOULA MONTANA

BRIAR WAY PLAN & PROFILE

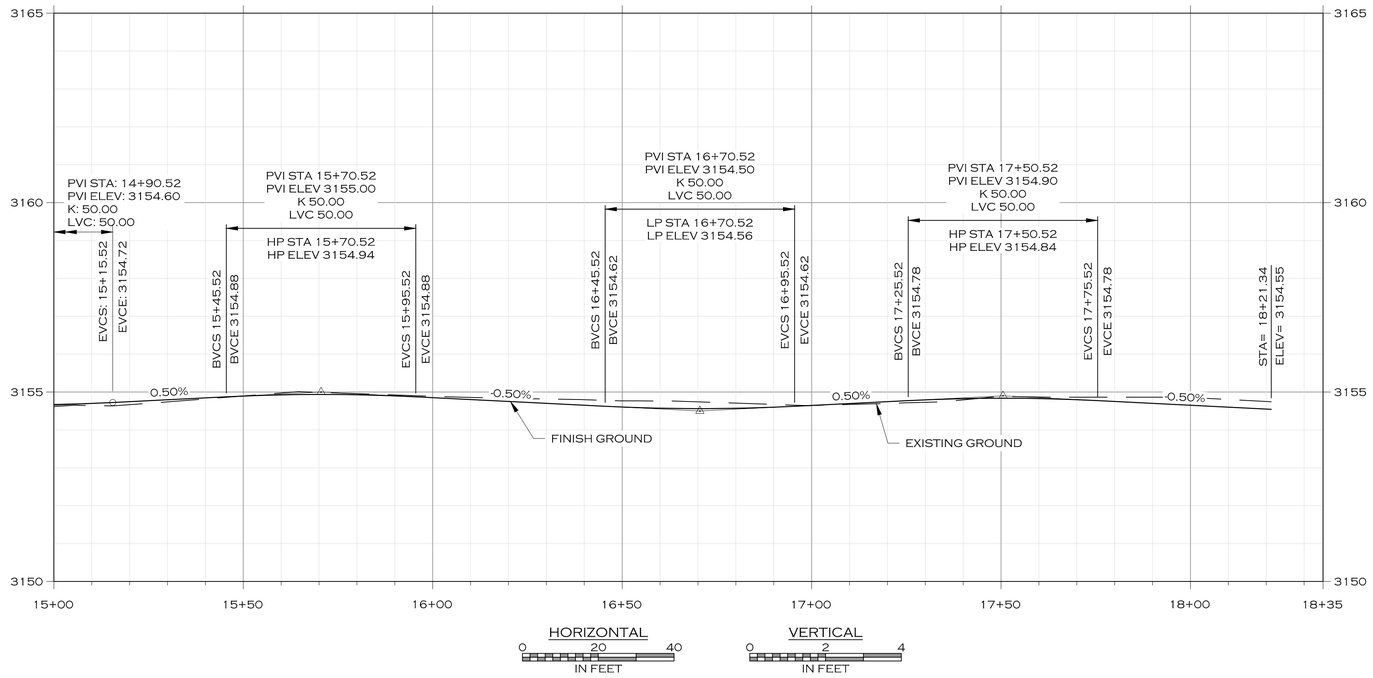
C3.9

WINCHESTER DRIVE PLAN & PROFILE.DWG PLOTTED BY:WEIMSLA2 ON Nov 7 11 7:2020



KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. INSTALL 8' SUMP PER CITY OF MISSOULA STD-302 (SEE SHEET C7.2). PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.
3. INSTALL CURB RAMP FOR BOULEVARD SIDEWALK PER CITY OF MISSOULA STD-111 (SEE SHEET C7.1).
4. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).



PRELIMINARY - SECOND SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	10/16/2020

MONTANA
KODY THOMAS SWARTZ
No. 30035 PE
LICENSED PROFESSIONAL ENGINEER

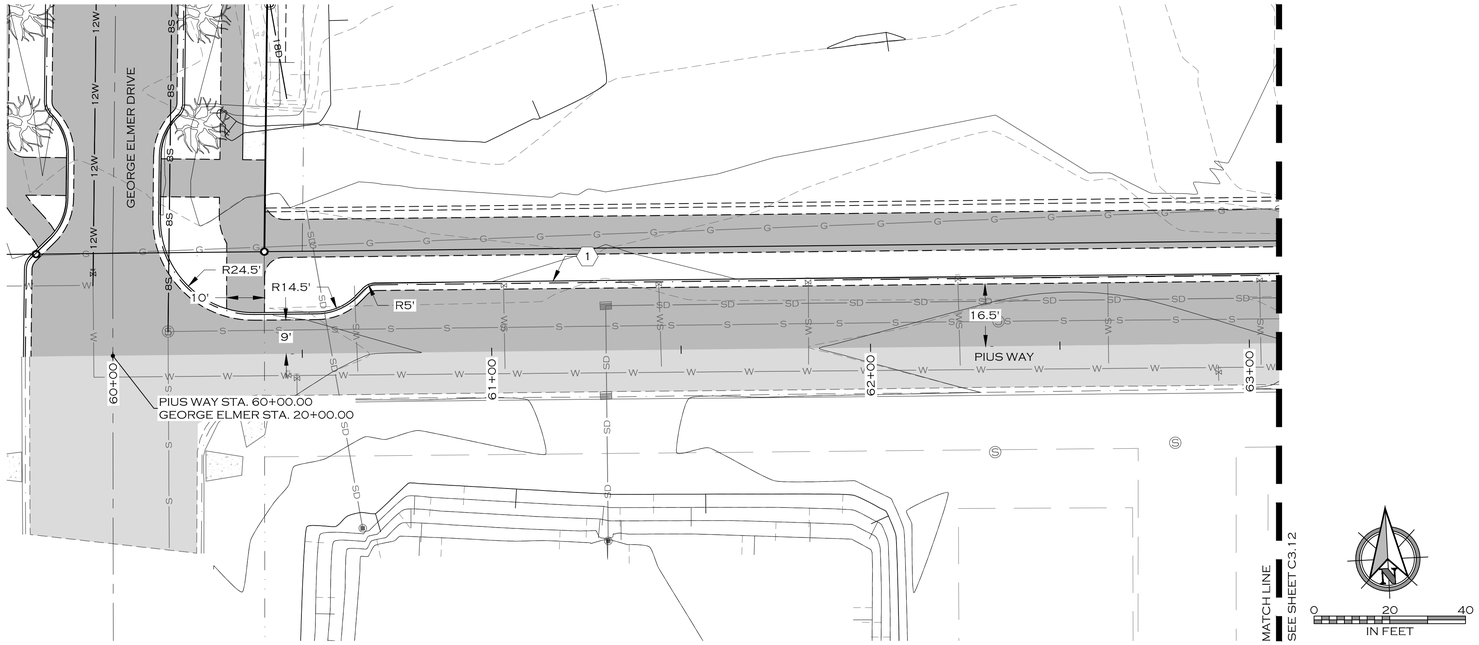
	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MONTANA
MCNETT FLATS
MISSOULA

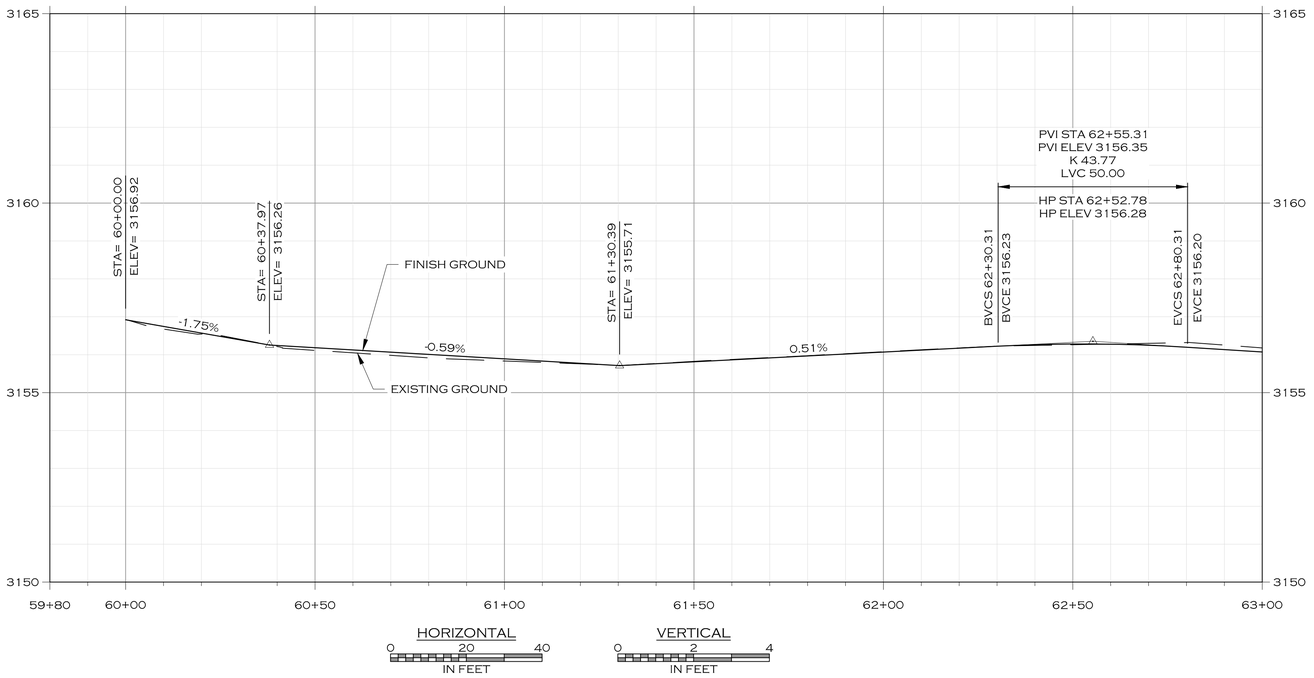
WINCHESTER DRIVE PLAN & PROFILE

C3.10



KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.



PRELIMINARY - THIRD SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	11/11/2020

MONTANA
KODY THOMAS SWARTZ
No. 30085 PE
REGISTERED PROFESSIONAL ENGINEER

	DESCRIPTION	DATE
4		

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
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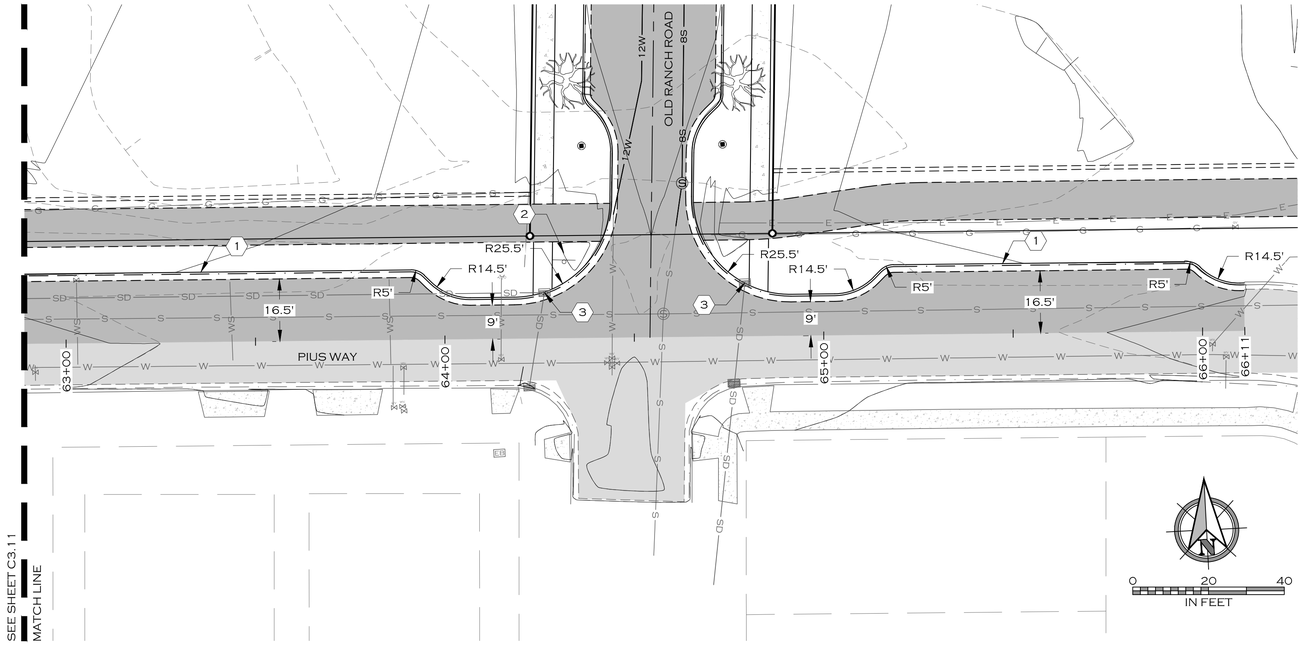
MCNETT FLATS
MISSOULA MONTANA

PIUS WAY PLAN & PROFILE STA. 60+00 TO 63+00

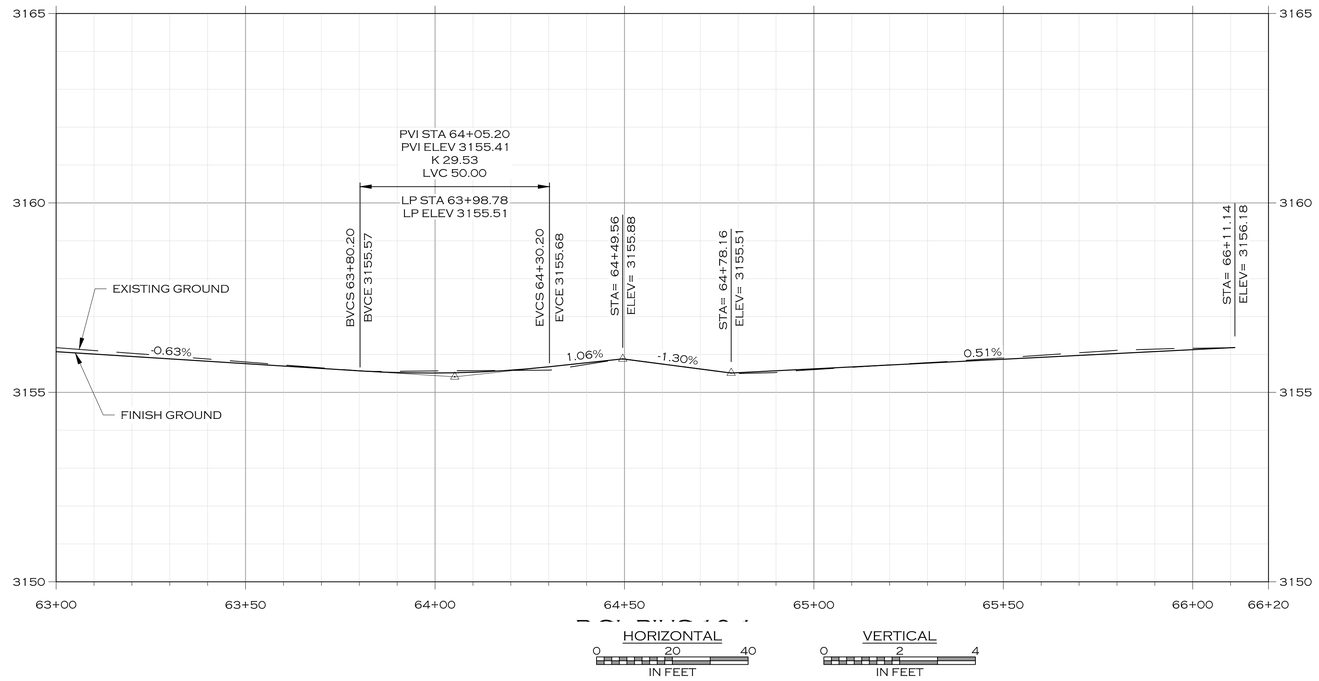
C3.11

PIUS WAY PLAN & PROFILE.DWG PLOTTED BY: WEIMSLA2 ON Nov/11/2020



KEY NOTES:

1. INSTALL TYPE 'L' CURB AND GUTTER PER CITY OF MISSOULA STD-121 (SEE SHEET C7.1). CURB SHALL BE INSTALLED AS CATCH CURB.
2. STREET SIGN PER CITY OF MISSOULA STD-270, -274, AND -276 (SEE SHEET C7.0).
3. PRESERVE AND PROTECT SUMP IN PLACE. PROVIDE NEENAH R-3067 COMBINATION INLET GRATE AND ENVIRO-CURB BOX OR APPROVED EQUAL. TYPE R DIAGONAL GRATE SHALL BE USED AT SAG LOCATIONS AND TYPE L VANED GRATE SHALL BE USED ON GRADE.



PRELIMINARY - THIRD SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	11/11/2020

MONTANA
KODY THOMAS SWARTOS
No. 30035 PE
REGISTERED PROFESSIONAL ENGINEER

#	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MCNETT FLATS
MISSOULA MONTANA

PIUS WAY PLAN & PROFILE STA. 63+00 TO 66+11

C3.12

PIUS WAY PLAN & PROFILE.DWG PLOTTED BY: WEIMSLA2 ON Nov/11/2020

COS 3176 TRACT 7

COS 3176 TRACT 6

COS 3176 TRACT 9

COS 2976 TRACT D

CONNECT TO REMINGTON FLATS PROPOSED WATER

WINCHESTER DRIVE

ABBY LANE

GEORGE ELMER DRIVE

OLD RANCH ROAD

PIUS WAY

CONNECT TO REMINGTON FLATS PROPOSED WATER & SEWER MAINS

REMINGTON DRIVE

CONNECT TO EXISTING 8" DIP MAIN AT VALVE

CONNECT TO EXISTING MANHOLE

EXISTING FIRE HYDRANT

EXISTING 18" OUTFALL PIPE

CONNECT TO EXISTING 8" DIP MAIN

EXISTING FIRE HYDRANT

CONNECT TO EXISTING MANHOLE

EXISTING FLYNN RANCH DETENTION POND

THE COTTAGES AT FLYNN RANCH TOWNHOMES

FLYNN RANCH, PHASE 1

LOT 8A

LOT 8B

FLYNN RANCH, PHASE 2

LOT 9

44 RANCH, PHASES 1 AND 2

LOT 48 LOT 47 LOT 46 LOT 45 LOT 44 LOT 43 LOT 42 LOT 41 LOT 40 LOT 39 LOT 38

LOT 9

KEY NOTES

1. STUB ONTO ADJACENT PROPERTY TO FACILITATE FUTURE EXTENSION

LEGEND

- PROPOSED ASPHALT ROAD
- PROPOSED SIDEWALK/CONCRETE
- PROPOSED LANDSCAPING
- PROPOSED CURB
- 18S — PROPOSED 18" SANITARY SEWER MAIN
- 8S — PROPOSED 8" SANITARY SEWER MAIN
- 16W — PROPOSED 16" WATER MAIN
- 12W — PROPOSED 12" WATER MAIN
- SD — PROPOSED STORM SEWER
- PROPOSED MANHOLE - SANITARY SEWER
- PROPOSED STORM DRAIN SUMP
- PROPOSED BLOWOFF
- PROPOSED FIRE HYDRANT
- PROPOSED HYDRANT VALVE
- PROPOSED WATER VALVE

0 50 100
IN FEET

PRELIMINARY - SECOND SUFFICIENCY REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	10/16/2020

#	DESCRIPTION	DATE

MONTANA
KODY THOMAS SWARTZ
No. 30035 PE
REGISTERED PROFESSIONAL ENGINEER

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
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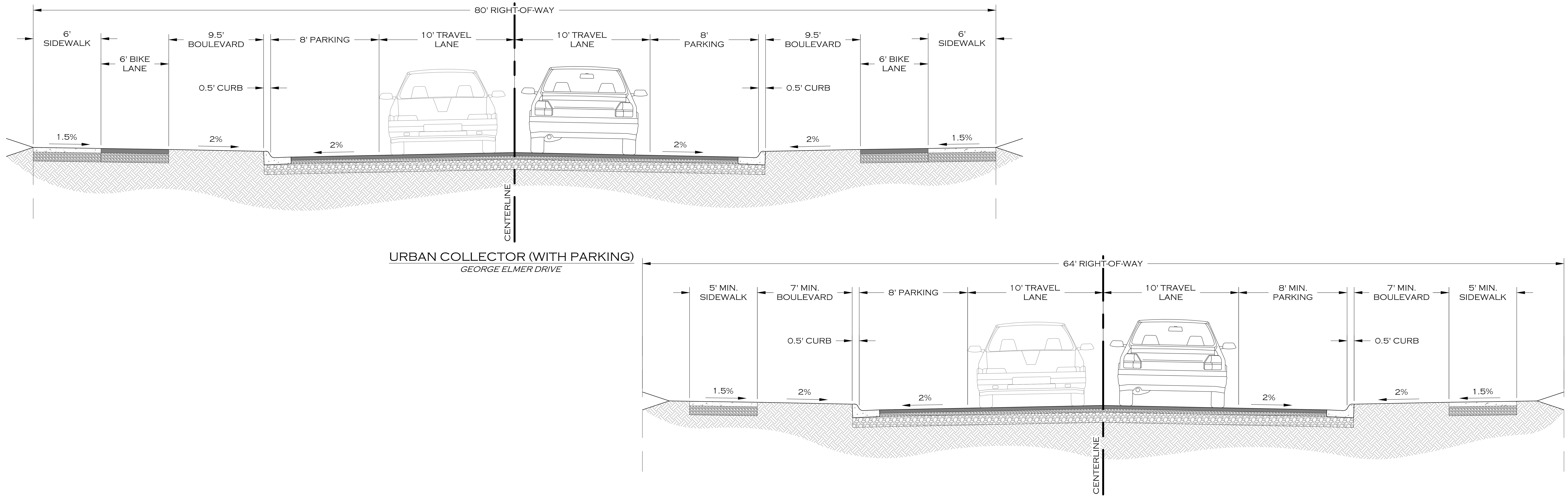
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MCNETT FLATS
MISSOULA MONTANA

UTILITY PLAN

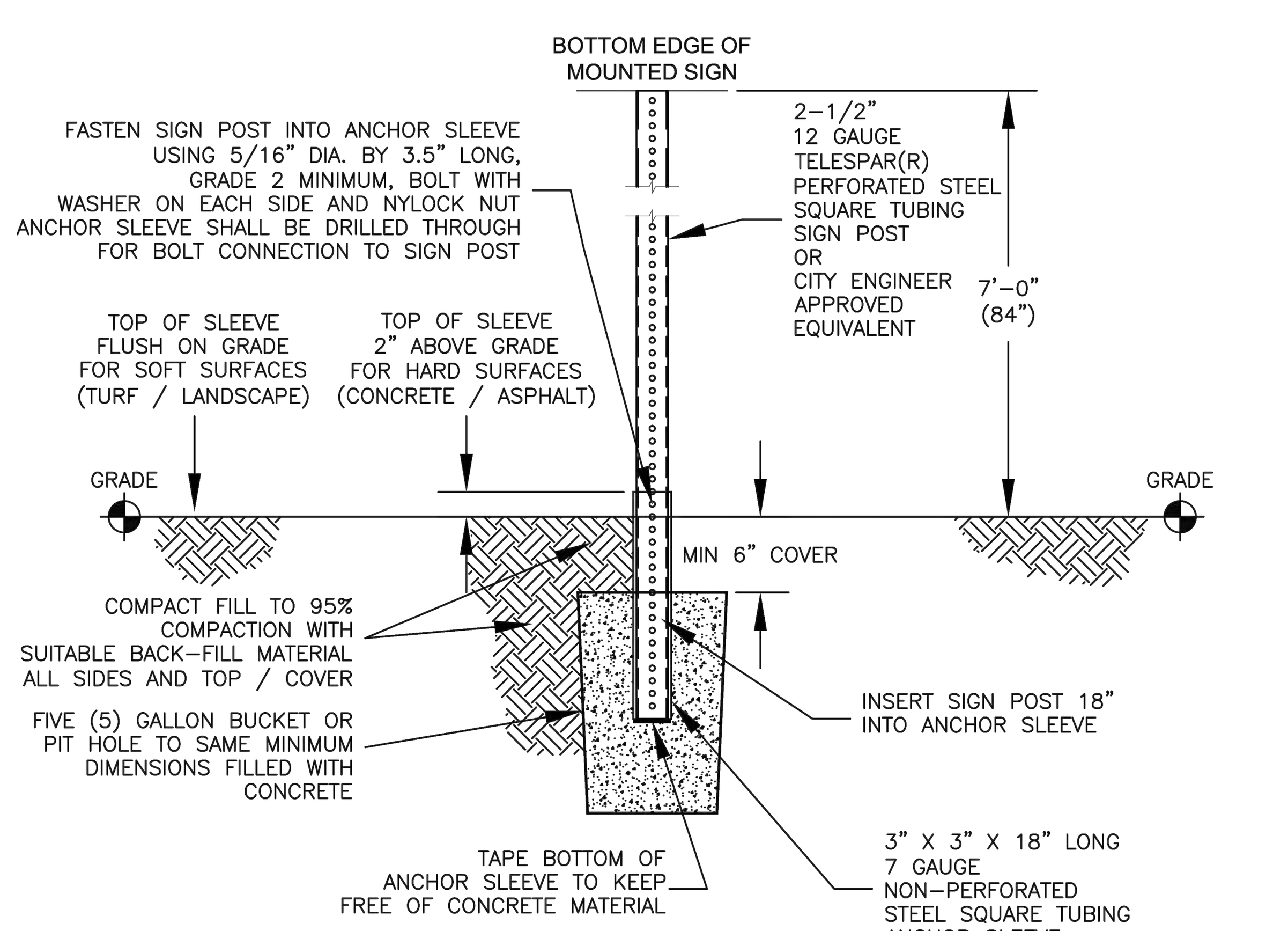
C4.0

UTILITY PLAN.DWG PLOTTED BY:WEIMSLA2 ON Nov 11 2020



ROAD CORRIDOR SECTIONS (1)
SCALE:N.T.S.

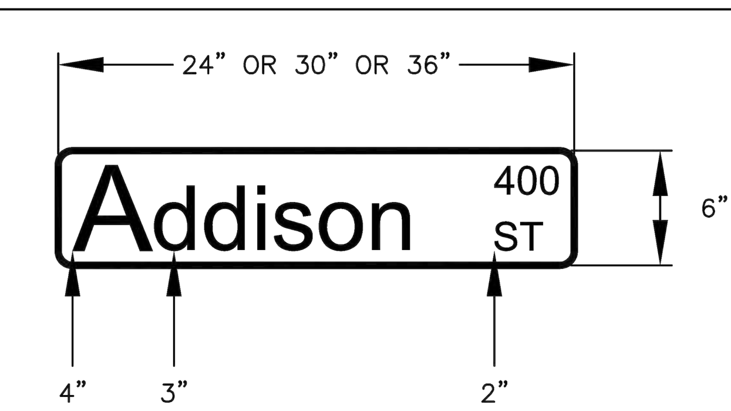
TYPICAL SIGN BASE STANDARD
FOR USE ON PUBLIC RIGHT–OF–WAY
(SEE STD–274 FOR TYPICAL SIGN MOUNTING)
(SEE STD–276 FOR TYPICAL SIGN LOCATION)



1. ALL SIGNS SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), MOST CURRENT VERSION, REVISION AND / OR SUPPLEMENT, FOR SIGN MATERIAL(S), SIZE, THICKNESS, SHAPE, COLOR(S), MESSAGE, SYMBOLOGY AND RETROREFLECTIVITY.
2. ANY / ALL SIGNS LOCATED UPON / WITHIN THE PUBLIC RIGHT–OF–WAY SHALL BE SLEEVE–MOUNTED FOR BREAKAWAY AND REPLACEABILITY.
3. FINAL SIGN LOCATION AND / OR PLACEMENT SHALL BE IN ACCORDANCE WITH THE MUTCD AND AS DETERMINED AND APPROVED BY THE CITY ENGINEER OR SIGN SHOP SUPERVISOR.
4. 2–1/2" 10 GAUGE TELESPAR(R) PERFORATED STEEL SQUARE TUBING SIGN POST, OR CITY ENGINEER APPROVED EQUIVALENT, SHALL BE USED FOR ANY / ALL SIGN INSTALLATIONS UPON / WITHIN THE PUBLIC RIGHT–OF–WAY. TELESPAR(R) OR EQUAL MATERIAL SPECIFICATIONS: STEEL CONFORMING TO ASTM A–1011 GRADE 50 AND GALVANIZING CONFORMING TO ASTM A–653.

MISSOULA Engineering Division | Typical Sign Base Standard Public Right-of-Way Boulevard Use | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/27/1999 Revised: 01/10/2017 | STD - 270

TYPICAL SIGN MOUNTING STANDARD
(SEE STD–270 FOR TYPICAL SIGN BASE)
(SEE STD–276 FOR TYPICAL SIGN LOCATION)



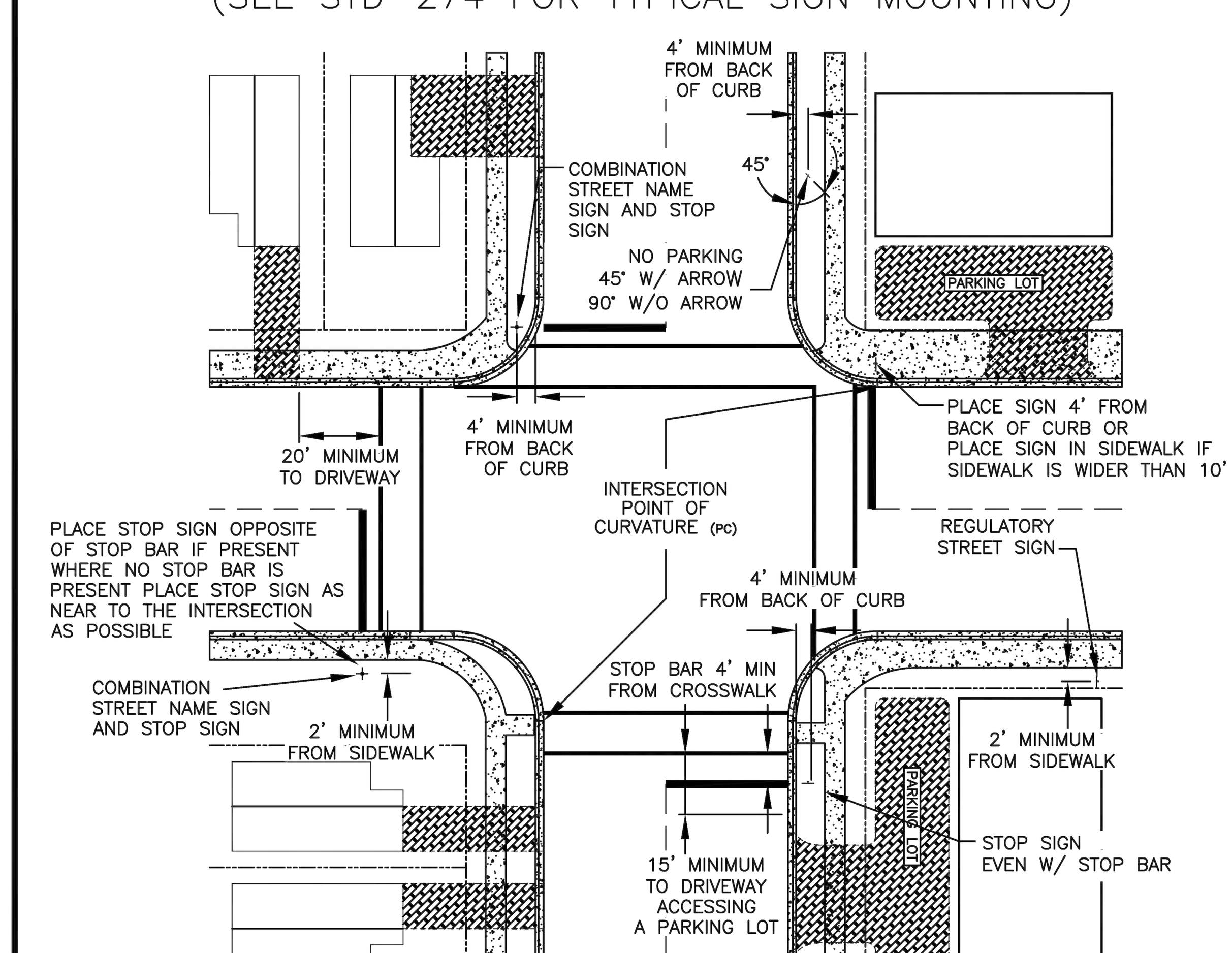
STREET NAME SIGN MATERIAL SPECIFICATIONS:
1. ALUMINUM BLANKS
   6" X 24", 30", 36" X .08"
2. MARKINGS SHALL BE PLACED ON ONE SIDE OF SIGN ONLY
3. TEXT SIZE SPECIFICATION:
   3.1. 4" INITIAL UPPERCASE
   3.2. 3" LOWER CASE
   3.3. 2" BLOCK NUMBER
   3.4. 2" ROUTE DESIGNATION
4. TWO SIGNS SHALL BE MOUNTED BACK TO BACK ON EITHER SIDE OF THE SIGN POST
5. GREEN BACKGROUND / WHITE TEXT FOR PUBLIC STREETS
6. WHITE BACKGROUND / GREEN TEXT FOR PRIVATE STREETS

SIGN FASTENING SPECIFICATIONS:
ALL TRAFFIC MANAGEMENT SIGNAGE SHALL BE ATTACHED TO PERFORATED STEEL (TELESPAR(R) OR CITY ENGINEER APPROVED EQUIVALENT, SEE STD–270) SIGN POSTS WITH TWO (2) EACH, 5/16" DIA. BY 3–1/2" LONG GRADE 2 BOLTS WITH WASHER ON EACH SIDE OF SIGN POST AND SECURED WITH NYLOCK NUTS

1. ALL SIGNS SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), MOST CURRENT VERSION, REVISION AND / OR SUPPLEMENT, FOR SIGN MATERIAL(S), SIZE, THICKNESS, SHAPE, COLOR(S), MESSAGE, SYMBOLOGY AND RETROREFLECTIVITY.
2. ANY / ALL SIGNS LOCATED UPON / WITHIN THE PUBLIC RIGHT–OF–WAY SHALL BE SLEEVE–MOUNTED FOR BREAKAWAY AND REPLACEABILITY.
3. FINAL SIGN LOCATION AND / OR PLACEMENT SHALL BE IN ACCORDANCE WITH THE MUTCD AND AS DETERMINED AND APPROVED BY THE CITY ENGINEER OR SIGN SHOP SUPERVISOR.
4. ALL "NO PARKING" SIGNS – WITH ARROWS SHALL BE SET AT 45° TO STREET IN THE DIRECTION OF TRAVEL
   WITHOUT ARROWS SHALL BE SET AT 90° TO STREET

MISSOULA Engineering Division | Typical Sign Mounting Standard | Approved By City Engineer Kevin J. Slovarp | Adopted: 03/15/2006 Revised: 01/13/2017 | STD - 274

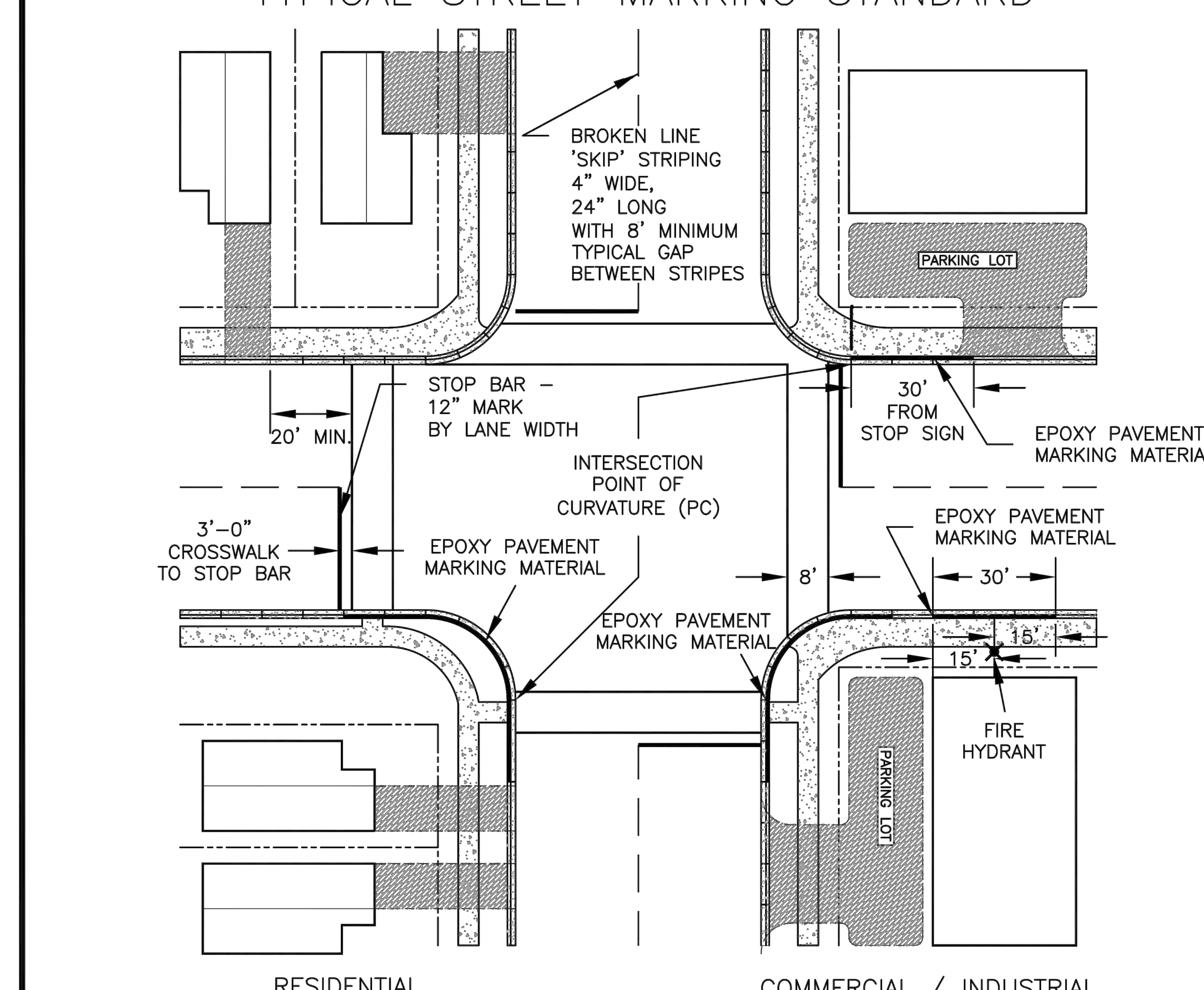
TYPICAL SIGN LOCATION STANDARD
(SEE STD–270 FOR TYPICAL SIGN BASE)
(SEE STD–274 FOR TYPICAL SIGN MOUNTING)



1. ALL SIGNS SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), MOST CURRENT VERSION, REVISION AND / OR SUPPLEMENT, FOR SIGN MATERIAL(S), SIZE, THICKNESS, SHAPE, COLOR(S), MESSAGE, SYMBOLOGY AND RETROREFLECTIVITY.
2. ANY / ALL SIGNS LOCATED UPON / WITHIN THE PUBLIC RIGHT–OF–WAY SHALL BE SLEEVE–MOUNTED FOR BREAKAWAY AND REPLACEABILITY.
3. FINAL SIGN LOCATION AND / OR PLACEMENT SHALL BE IN ACCORDANCE WITH THE MUTCD AND AS DETERMINED AND APPROVED BY THE CITY ENGINEER OR SIGN SHOP SUPERVISOR. (THIS DRAWING IS A GUIDELINE AND DOES NOT ADDRESS ALL SITUATIONS)
4. ALL "NO PARKING" SIGNS – WITH ARROWS SHALL BE SET AT 45° TO STREET IN THE DIRECTION OF TRAVEL
   WITHOUT ARROWS SHALL BE SET AT 90° TO STREET

MISSOULA Engineering Division | Typical Sign Location Standard | Approved By City Engineer Kevin J. Slovarp | Adopted: 03/15/2006 Revised: 01/10/2017 | STD - 276

TYPICAL STREET MARKING STANDARD



1. ALL MATERIALS, SAMPLING AND TESTING, AND APPLICATION PROCEDURES SHALL CONFORM WITH THE MOST CURRENT REVISION / VERSION;
   1.1. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR DIMENSION (SIZE), PLACEMENT, COLOR, MESSAGE, SYMBOLOGY AND RETROREFLECTIVITY COMPLIANCE
   1.2. MONTANA DEPARTMENT OF TRANSPORTATION; STANDARD SPECIFICATIONS AND APPLICABLE SUPPLEMENTS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 620 – PAVEMENT MARKING APPLICATION
   1.3. MONTANA DEPARTMENT OF TRANSPORTATION; STANDARD SPECIFICATIONS AND APPLICABLE SUPPLEMENTS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 714 – PAVEMENT MARKING MATERIALS
   1.4. MONTANA DEPARTMENT OF TRANSPORTATION; TRAFFIC ENGINEERING MANUAL, CHAPTER 19 – PAVEMENT MARKINGS
   1.5. MONTANA DEPARTMENT OF TRANSPORTATION; METHODS OF SAMPLING AND TESTING, MT 410–04 – INSPECTION, SAMPLING, TESTING AND ACCEPTANCE OF PAINT
2. EPOXY PAVEMENT MARKING MATERIAL CAN INCLUDE, BUT SHALL NOT BE LIMITED TO; EPOXY PAINT, GLASS BEADS, HOT AND / OR COLD APPLIED THERMOPLASTIC TAPE(S), ETCETERA – AS REQUIRED AND APPROVED BY THE CITY ENGINEER.
3. TYPICAL STREET MARKING STANDARD DRAWING SHALL BE USED AS GUIDANCE – ALL FINAL STREET MARKINGS SHALL BE DETERMINED, REQUIRED AND APPROVED BY THE CITY ENGINEER.

MISSOULA Engineering Division | Typical Street Marking Standard | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/10/2007 Revised: 01/10/2017 | STD - 280

PRELIMINARY - THIRD SUFFICIENCY REVIEW

JOB #: 1931
DRAWN: CRH
DESIGN: MH/AH
QA: KTS
DATE: 11/11/2020

MONTANA KODY THOMAS SWARTZ No. 39085 PE LICENSED PROFESSIONAL ENGINEER

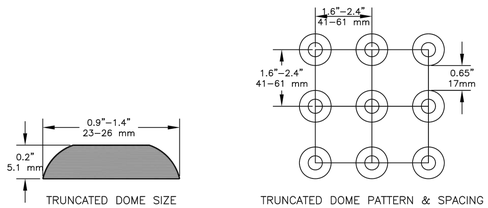
#	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MISSOULA | MONTANA
MCNETT FLATS
ROAD CORRIDOR DETAILS

C7.0

DETECTABLE WARNING PANEL



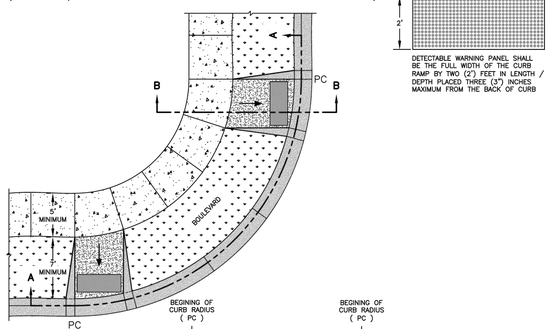
1. DETECTABLE WARNING PANEL SHALL FULLY COMPLY WITH ALL CURRENT CITY OF MISSOULA AND ADA REQUIREMENTS AND SPECIFICATIONS
2. DETECTABLE WARNING PANEL MATERIAL SHALL BE APPROVED BY CITY ENGINEER
3. CURRENT ACCEPTABLE DETECTABLE WARNING PANEL MATERIALS;
   - 3.1. PRECAST CONCRETE
   - 3.2. CAST IRON
4. DETECTABLE WARNING PANEL SHALL BE PLACED ON GRADE TO MATCH SIDEWALK / RAMP;
   - 4.1. NOT TO EXCEED EIGHT (8%) PERCENT MAXIMUM GRADE
   - 4.2. NOT TO EXCEED TWO (2%) PERCENT MAXIMUM CROSS–SLOPE
5. DETECTABLE WARNING PANEL SHALL BE PLACED PERPENDICULAR WITH DIRECTION OF PEDESTRIAN TRAVEL
6. DETECTABLE WARNING PANEL SHALL BE PLACED THREE (3") INCHES MAXIMUM FROM BACK EDGE OF CURB ON A MINIMUM OF ONE (1) EDGE.
7. DETECTABLE WARNING PANEL COLOR SHALL CONTRAST VISUALLY WITH THE ADJOINING SIDEWALK / RAMP SURFACE
8. DETECTABLE WARNING PANEL SHALL BE CAST–IN–PLACE AND FLUSH WITH SIDEWALK / RAMP SURFACE
9. SURFACE APPLIED DETECTABLE WARNING PANEL SHALL NOT BE PLACED IN NEW CONSTRUCTION; SURFACE APPLIED DETECTABLE WARNING PANEL MAY BE USED ON EXISTING SURFACES, ONLY WITH PRIOR APPROVAL OF CITY ENGINEER

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Detectable Warning Panel | Approved By City Engineer Kevin J. Slovarp | Adopted: 03/12/2004 | Revised: 02/15/2011 | STD - 100

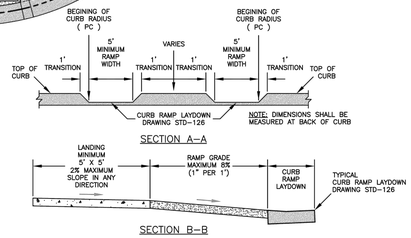
CURB RAMP BOULEVARD SIDEWALK

(STANDARD / WIDE BOULEVARD – CURB RADIUS 20 FEET OR GREATER)



DETECTABLE WARNING PANEL (DRAWING STD–100)

DETECTABLE WARNING PANEL SHALL BE THE FULL WIDTH OF THE CURB RAMP BY TWO (2') FEET IN LENGTH / DEPTH PLACED THREE (3") INCHES MAXIMUM FROM THE BACK OF CURB



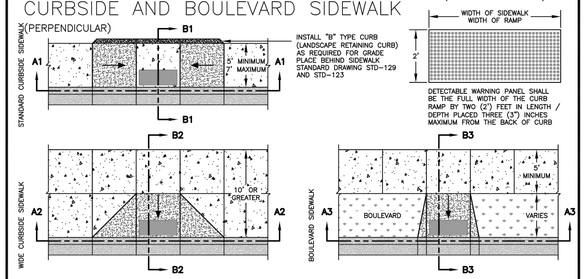
1. CURB RAMP LANDINGS SHALL BE MINIMUM FIVE (5') FEET BY FIVE (5') FEET, NOT TO EXCEED TWO (2%) PERCENT MAXIMUM GRADE IN ANY DIRECTION.
2. DETECTABLE WARNING PANELS SHALL BE FULL WIDTH OF THE CURB RAMP BY TWO (2') FEET IN LENGTH, MEASURED FROM THE BACK OF THE CURB.
3. CURB LAYOUT AS SHOWN SHALL BE USED WITH ALL SECTION TEMPLATES; TYPE "A" STD–122, TYPE "B" STD–123, TYPE "L" STD–121 & 126 (SHOWN).
4. SIDEWALK LAYOUT AS SHOWN SHALL CONFORM, AT MINIMUM, WITH ALL SECTION TEMPLATES; STD–141, STD–142, STD–144, STD–162 AND STD–163.
5. WHERE EXISTING SITE DEVELOPMENT CONDITIONS PROHIBIT THE STRICT AND FULL COMPLIANCE OF ALL ADA CRITERIA, ACCESSIBILITY MUST BE PROVIDED TO THE MAXIMUM EXTENT FEASIBLE, AS DETERMINED BY THE CITY ENGINEER.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Curb Ramp - Boulevard Sidewalk Standard/Wide Boulevard - Curb Radius 20' or Greater | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/07/1998 | Revised: 02/15/2011 | STD - 110

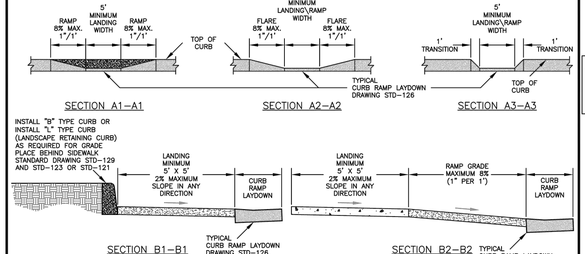
CURB RAMP CURBSIDE AND BOULEVARD SIDEWALK

(PERPENDICULAR)



DETECTABLE WARNING PANEL (DRAWING STD–100)

DETECTABLE WARNING PANEL SHALL BE THE FULL WIDTH OF THE CURB RAMP BY TWO (2') FEET IN LENGTH / DEPTH PLACED THREE (3") INCHES MAXIMUM FROM THE BACK OF CURB

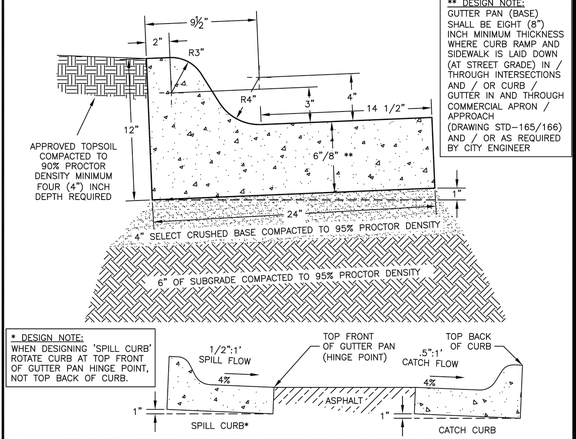


1. CURB RAMP LANDINGS SHALL BE MINIMUM FIVE (5') FEET BY FIVE (5') FEET, NOT TO EXCEED TWO (2%) PERCENT MAXIMUM GRADE IN ANY DIRECTION.
2. DETECTABLE WARNING PANELS SHALL BE FULL WIDTH OF THE CURB RAMP BY TWO (2') FEET IN LENGTH, MEASURED FROM THE BACK OF THE CURB.
3. CURB LAYOUT AS SHOWN SHALL BE USED WITH ALL SECTION TEMPLATES; TYPE "A" STD–122, TYPE "B" STD–123, TYPE "L" STD–121 & 126 (SHOWN).
4. SIDEWALK LAYOUT AS SHOWN SHALL CONFORM, AT MINIMUM, WITH ALL SECTION TEMPLATES; STD–141, STD–142, STD–144, STD–162 AND STD–163.
5. WHERE EXISTING SITE DEVELOPMENT CONDITIONS PROHIBIT THE STRICT AND FULL COMPLIANCE OF ALL ADA CRITERIA, ACCESSIBILITY MUST BE PROVIDED TO THE MAXIMUM EXTENT FEASIBLE, AS DETERMINED BY THE CITY ENGINEER.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Curb Ramp - Curbside and Boulevard Sidewalk Perpendicular | Approved By City Engineer Kevin J. Slovarp | Adopted: 02/28/1996 | Revised: 02/15/2011 | STD - 111

TYPICAL "L" TYPE CURB/GUTTER SECTION



** DESIGN NOTE:
GUTTER PAN (BASE) SHALL BE EIGHT (8") INCH MINIMUM THICKNESS WHERE CURB RAMP AND SIDEWALK IS LAID DOWN (AT STREET GRADE) IN / THROUGH INTERSECTIONS AND / OR CURB / GUTTER IN AND THROUGH COMMERCIAL APRON / APPROACH (DRAWING STD–165/166) AND / OR AS REQUIRED BY CITY ENGINEER

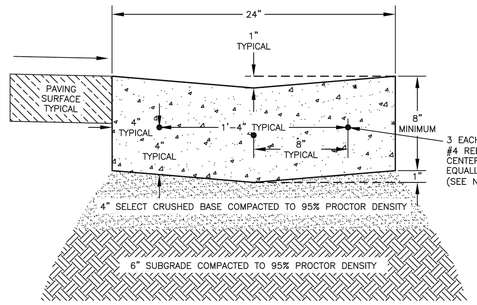
* DESIGN NOTE:
WHEN DESIGNING "SPILL CURB" ROTATE CURB AT TOP FRONT OF GUTTER PAN HINGE POINT, NOT TOP BACK OF CURB.

1. MINIMUM OF SIX (6") INCHES OF SUBGRADE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
2. MINIMUM OF FOUR (4") INCHES OF SELECT CRUSHED BASE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
3. CITY ENGINEER MAY REQUIRE ADDITIONAL SELECT CRUSHED BASE, DEPENDING ON SUBGRADE MATERIAL.
4. CONTRACTION JOINTS SHALL BE PLACED EVERY TEN (10') FEET AND SHALL BE ONE–FOURTH (1/4) THE CONCRETE THICKNESS OR A MINIMUM OF ONE (1") INCH DEEP.
5. EXPANSION JOINTS OF ONE–HALF (1/2") INCH MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS:
   - 5.1. P.C.s AND P.T.s OF CURVES.
   - 5.2. GRADE BREAKS.
   - 5.3. FOUR (4') FEET ON EITHER SIDE OF A DRAINAGE STRUCTURE.
   - 5.4. AT OTHER LOCATIONS AS SPECIFIED BY CITY ENGINEER.
   - 5.5. EXPANSION JOINTS MAY BE ELIMINATED FOR EXTRUDED CURB WITH APPROVAL OF CITY ENGINEER.
6. MINIMUM GUTTER FLOW LINE SHALL BE FOUR–TENTHS (0.4%) PERCENT SLOPE.
7. NO CURB SHALL BE PLACED WITHOUT A FINAL FORM INSPECTION BY CITY ENGINEER.
8. CONSTRUCTION MATERIALS AND PROCEDURES SHALL CONFORM TO EXISTING CITY AND STATE STANDARD SPECIFICATIONS FOR M–4000 CONCRETE AND MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS SECTIONS 02528 AND 03310.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Typical "L" Type Curb/Gutter Section | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/30/1980 | Revised: 02/15/2011 | STD - 121

TYPICAL 2' COVE GUTTER SECTION

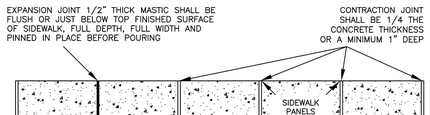


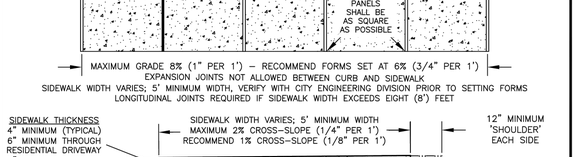
1. TYPICAL 2' COVE GUTTER SECTION SHALL BE MINIMUM OF EIGHT (8") INCHES DEPTH (THROUGHOUT COVE GUTTER SECTION) PORTLAND CEMENT CONCRETE POURED TWO (2') FEET WIDE WITH A ONE (1") INCH DEPRESSION (COVE) THROUGH THE CENTER AS SHOWN ABOVE.
2. MINIMUM OF SIX (6") INCHES DEPTH OF SUBGRADE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
3. MINIMUM OF FOUR (4") INCHES DEPTH (THROUGHOUT SELECT CRUSHED BASE SECTION) OF SELECT CRUSHED BASE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
4. CITY ENGINEER MAY REQUIRE ADDITIONAL SELECT CRUSHED BASE, DEPENDING ON SUBGRADE MATERIAL.
5. CONTRACTION JOINTS SHALL BE PLACED EVERY TEN (10') FEET AND SHALL BE ONE–FOURTH (1/4) THE CONCRETE THICKNESS OR A MINIMUM OF ONE (1") INCH DEEP.
6. EXPANSION JOINTS OF ONE–HALF (1/2") INCH MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS:
   - 6.1. P.C.s AND P.T.s OF CURVES.
   - 6.2. GRADE BREAKS.
   - 6.3. FOUR (4') FEET ON EITHER SIDE OF A DRAINAGE STRUCTURE.
   - 6.4. AT OTHER LOCATIONS AS SPECIFIED BY CITY ENGINEER.
   - 6.5. EXPANSION JOINTS MAY BE ELIMINATED FOR EXTRUDED CURB WITH APPROVAL OF CITY ENGINEER.
7. REINFORCING BAR (REBAR) SHALL BE #4 (1/2"), THREE (3) EACH, EQUALLY SPACED (EIGHT (8") INCHES TYPICAL) WITH #4 SPREADERS TIED EVERY FIVE (5') FEET, EQUALLY SPACED AND TYPICALLY FOUR (4") INCHES (MINIMUM THREE (3") INCHES) OF PORTLAND CEMENT CONCRETE COVERING REBAR IN ALL LOCATIONS.
8. REINFORCING BAR (REBAR) SHALL BE PLACED AND SUPPORTED UTILIZING 'CHAIRS' FOR SUCH PURPOSE.
9. NO CURB SHALL BE PLACED WITHOUT A FINAL FORM INSPECTION BY CITY ENGINEER.
10. CONSTRUCTION MATERIALS AND PROCEDURES SHALL CONFORM TO EXISTING CITY AND STATE STANDARD SPECIFICATIONS FOR M–4000 CONCRETE AND MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS SECTIONS 2528 AND 3310.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Typical 2' Cove Gutter Section | Approved By City Engineer Kevin J. Slovarp | Adopted: 08/01/1986 | Revised: 02/15/2011 | STD - 128

TYPICAL SIDEWALK SECTION AND TYPICAL DRIVEWAY SIDEWALK SECTION



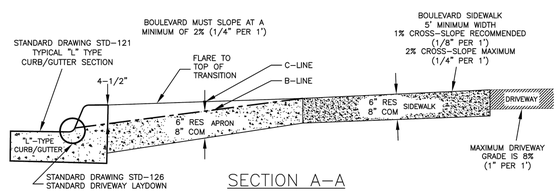


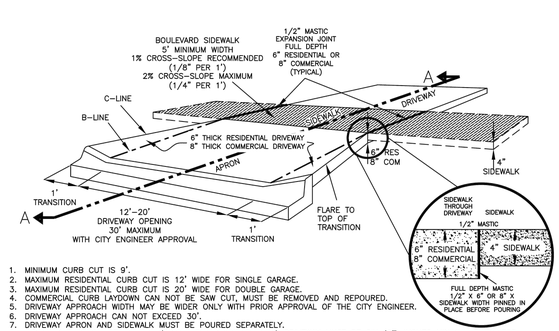
1. MINIMUM OF SIX (6") INCHES OF SUBGRADE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
2. MINIMUM OF FOUR (4") INCHES OF SELECT CRUSHED BASE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
3. MINIMUM OF FOUR (4") INCHES OF CONCRETE SIDEWALK (TYPICAL), MINIMUM SIX (6") INCHES CONCRETE SIDEWALK THROUGH RESIDENTIAL DRIVEWAY OR MINIMUM EIGHT (8") INCHES CONCRETE SIDEWALK THROUGH COMMERCIAL DRIVEWAY.
4. CITY ENGINEER MAY REQUIRE ADDITIONAL SELECT CRUSHED BASE, DEPENDING ON SUBGRADE MATERIAL.
5. CONTRACTION JOINTS SHALL BE SPACED SO AS TO FORM AS NEAR A SQUARE PANEL AS POSSIBLE, NO SINGLE PANEL SHALL EXCEED EIGHT (8') FEET ON ANY SIDE.
6. CONTRACTION JOINTS SHALL BE ONE–FOURTH (1/4) THE CONCRETE THICKNESS OR A MINIMUM OF ONE (1") INCH DEEP.
7. EXPANSION JOINTS OF ONE–HALF (1/2") INCH THICK MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS:
   - 7.1. EVERY FIFTY (50') FEET OF UNINTERRUPTED SIDEWALK.
   - 7.2. P.C.s AND P.T.s OF CURVES.
   - 7.3. GRADE BREAKS.
   - 7.4. RESIDENTIAL DRIVEWAYS SIX (6") INCH DEEP MASTIC SHALL BE INSTALLED AT THE TOP OF THE TRANSITION ON BOTH SIDES AND SHALL BE PINNED IN PLACE BEFORE POURING.
   - 7.5. COMMERCIAL DRIVEWAYS EIGHT (8") INCH DEEP MASTIC SHALL BE INSTALLED AT THE TOP OF THE TRANSITION ON BOTH SIDES AND SHALL BE PINNED IN PLACE BEFORE POURING.
   - 7.6. AT OTHER LOCATIONS AS SPECIFIED BY CITY ENGINEERING DIVISION.
   - 7.7. ALL EXPANSION JOINTS SHALL BE PLACED FLUSH OR JUST BELOW TOP FINISHED SURFACE OF SIDEWALK.
   - 7.8. ALL EXPANSION JOINTS SHALL BE FULL DEPTH, FULL WIDTH AND PINNED IN PLACE BEFORE THE FORMS WILL BE APPROVED.
8. FINISHED SIDEWALK SURFACE SHALL HAVE MEDIUM–TO–HEAVY BROOM TEXTURE.
9. NO SIDEWALK SHALL BE POURED WITHOUT AN INSPECTION AND APPROVAL OF FORM AND MATERIAL PREPARATION AND PLACEMENT BY CITY ENGINEERING DIVISION.
10. CONSTRUCTION MATERIALS AND PROCEDURES SHALL CONFORM TO EXISTING CITY AND STATE STANDARD SPECIFICATIONS FOR M–4000 CONCRETE AND MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS SECTIONS 02528 AND 03310.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Typical Sidewalk Section and Typical Driveway Sidewalk Section | Approved By City Engineer Kevin J. Slovarp | Adopted: 02/29/1996 | Revised: 02/15/2011 | STD - 141

STANDARD DRIVEWAY OPENING FOR BOULEVARD SIDEWALK





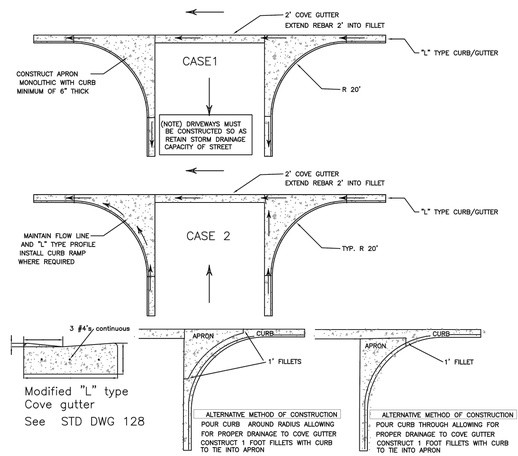
1. MINIMUM CURB CUT IS 9'.
2. MAXIMUM RESIDENTIAL CURB CUT IS 12' WIDE FOR SINGLE GARAGE.
3. MAXIMUM RESIDENTIAL CURB CUT IS 20' WIDE FOR DOUBLE GARAGE.
4. COMMERCIAL CURB LAYDOWN CAN NOT BE CUT, MUST BE REMOVED AND REPOURED.
5. DRIVEWAY APPROACH WIDTH MAY BE WIDER ONLY WITH PRIOR APPROVAL OF THE CITY ENGINEER.
6. DRIVEWAY APPROACH CAN NOT EXCEED 30'.
7. DRIVEWAY APRON AND SIDEWALK MUST BE POURED SEPARATELY.
8. SIDEWALK THROUGH RESIDENTIAL (SINGLE FAMILY AND DUPLEX) DRIVEWAY MUST BE SIX (6") INCHES MINIMUM THICKNESS.
9. SIDEWALK THROUGH MULTI–FAMILY (TRI–PLEX AND LARGER), COMMERCIAL AND/OR INDUSTRIAL DRIVEWAY MUST BE EIGHT (8") INCHES MINIMUM THICKNESS.
10. SEE STANDARD DRAWING STD–165 AND STD–166 FOR ALTERNATIVE COMMERCIAL DRIVEWAY CONFIGURATIONS.
11. SEE STANDARD DRAWING STD–121 AND STD–141 FOR CURB/GUTTER AND SIDEWALK BEDDING AND JOINT DETAIL.
12. SEE STANDARD DRAWING STD–164 FOR ALTERNATIVE SIDEWALK/DRIVEWAY ADA REQUIREMENTS THROUGH DRIVEWAY.
13. ADDITIONAL MASTIC MAY BE REQUIRED BY CITY ENGINEER.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Standard Driveway Opening for Boulevard Sidewalk | Approved By City Engineer Kevin J. Slovarp | Adopted: 04/09/1973 | Revised: 02/08/2008 | STD - 162

TYPICAL INTERSECTION COVE GUTTER INSTALLATION

This configuration shall be used at public street intersections where the storm drainage must cross the intersection.
This configuration may be used for large commercial driveways.



← direction of flow

See STD DWG 121 FOR BEDDING AND JOINTING DETAILS

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Typical Intersection Cove Gutter Installation | Approved By City Engineer R. Steven King | Adopted: 02/29/1996 | Revised: 03/12/2004 | STD - 167

JOB #: 1931 | DRAWN: CRH | DESIGN: MH/AH | QA: KTS | DATE: 8/24/2020

MONTANA KODY THOMAS SWARTZ 30085 PE LICENSED PROFESSIONAL ENGINEER

DATE | DESCRIPTION

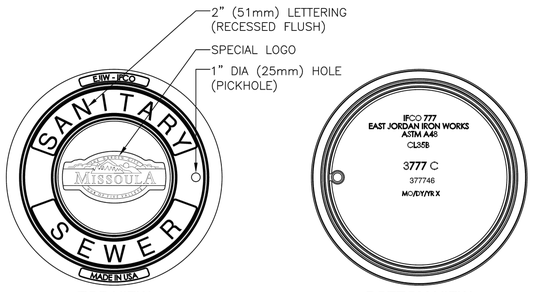
WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
403 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

PRELIMINARY - FIRST ELEMENT REVIEW

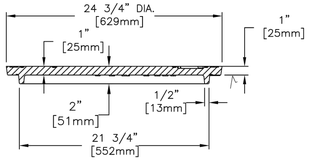
MONTANA
MCNETT FLATS
CURB, SIDEWALK, & DRIVEWAY DETAILS
MISSOULA
CURB, SIDEWALK, & DRIVEWAY DETAILS.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020

C7.1

EJIW / IFCO 3777–M OR APPROVED EQUIVALENT



TOP VIEW BOTTOM VIEW



SECTION

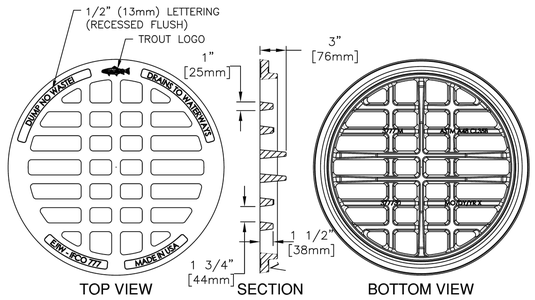
√ MACHINED SURFACE

SEE STD–300D FOR STANDARD MANHOLE RING AND DUSTPAN SPECIFICATIONS

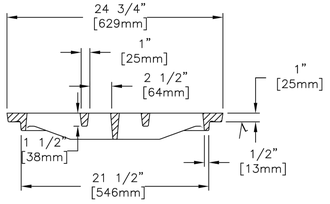
Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Sanitary Sewer Manhole Cover	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/05/2006 Revised: 01/08/2007	STD -300A

EJIW / IFCO 3777–M OR APPROVED EQUIVALENT



TOP VIEW SECTION BOTTOM VIEW



SECTION

√ MACHINED SURFACE

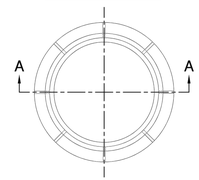
SEE STD–300D FOR STANDARD MANHOLE RING SPECIFICATIONS

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

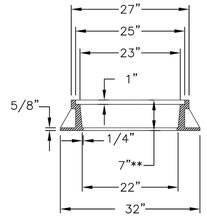
Missoula Engineering Division	Dry Well or Sump Cover	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/31/06 Revised: 01/08/2007	STD -300C

EJIW / IFCO NO. 3777 OR APPROVED EQUIVALENT

MANHOLE RING



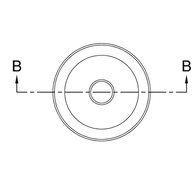
TOP VIEW



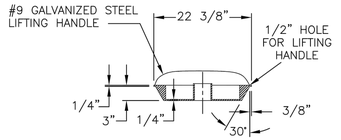
SECTION A-A

MANHOLE RING – MINIMUM 180lb.

DUSTPAN



TOP VIEW



SECTION B-B

DUSTPAN – GRAY IRON

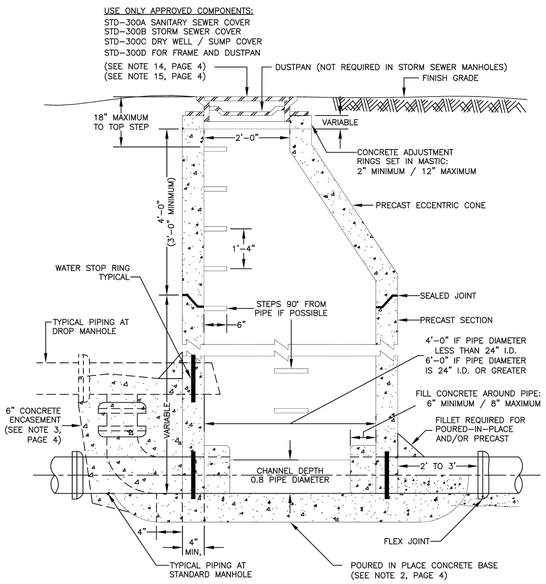
** 4" MANHOLE RING MAY BE USED ONLY WITH PRIOR CITY ENGINEER APPROVAL

USE ONLY APPROVED COVERS:
STD–300A SANITARY SEWER
STD–300B STORM SEWER
STD–300C DRY WELL / SUMP

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Standard Manhole Ring and Dustpan (Replaces STD-319)	Approved By City Engineer Kevin J. Slovarp	Adopted: 11/1997 Revised: 01/08/2007	STD -300D

USE ONLY APPROVED COMPONENTS:
STD–300A SANITARY SEWER COVER
STD–300B STORM SEWER COVER
STD–300C DRY WELL / SUMP COVER
STD–300D FOR FRAME AND DUSTPAN
(SEE NOTE 14, PAGE 4)
(SEE NOTE 15, PAGE 4)

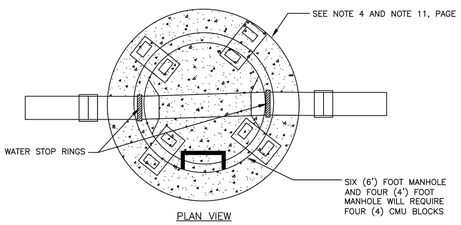


NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD–301

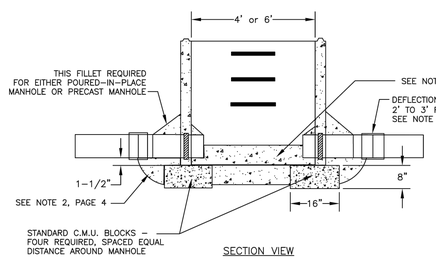
Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Sanitary and Storm Sewer Manhole Page 1 of 4	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/1973 Revised: 01/10/2007	STD - 301

POURED IN PLACE MANHOLE BASE



PLAN VIEW



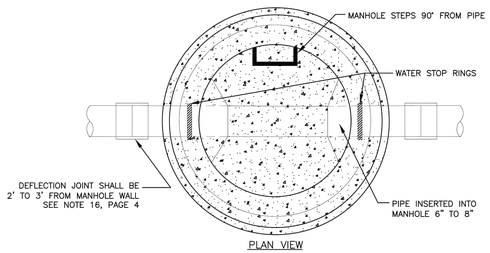
SECTION VIEW

NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD–301

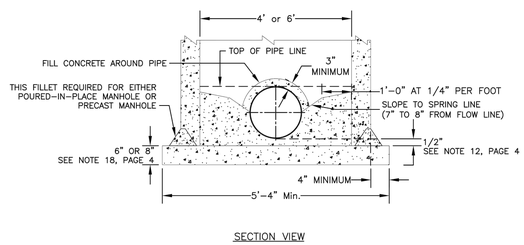
Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Sanitary and Storm Sewer Manhole Page 2 of 4	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/1973 Revised: 01/10/2007	STD - 301

PRECAST MANHOLE BASE



PLAN VIEW



SECTION VIEW

NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD–301

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Sanitary and Storm Sewer Manhole Page 3 of 4	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/1973 Revised: 01/10/2007	STD - 301

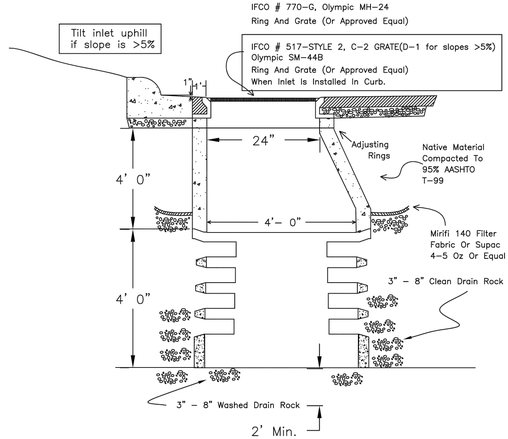
ADDITIONAL NOTES FOR MISSOULA SANITARY SEWER AND STORM SEWER MANHOLE STANDARDS

1. USE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS) SECTION 02700 WITH CITY OF MISSOULA AMENDMENTS.
2. POURED–IN–PLACE OR PRECAST BASE MAY BE USED.
   POURED–IN–PLACE BASE: MINIMUM CONCRETE THICKNESS MUST BE SIX (6) INCHES.
   PRECAST BASE: MINIMUM THICKNESS MUST BE SIX (6) INCHES PER MPWSS STANDARD DRAWING 02720–3
3. THE POURED–IN–PLACE CONCRETE BASE MUST START ONE (1') FOOT FROM OUTSIDE THE MANHOLE AND MUST BE A MINIMUM OF EIGHT (8") INCHES DEEP UNDER THE MANHOLE WITH A THREE (3") INCH COLLAR AROUND THE PIPE.
4. POUR AGAINST UNDISTURBED EARTH SIX (6") INCHES OF CONCRETE ENCASEMENT TO SPRING LINE AND FIRST JOINT OF INLET PIPE.
5. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM–NEK®" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL.
6. CONCRETE FOR DROP STRUCTURES SHALL BE FORMED.
7. ALL MANHOLE PENETRATIONS SHALL BE MADE BY CORE DRILLING.
8. DROP MANHOLE CONNECTIONS SHALL BE USED ONLY WHERE SLOPE OF LATERAL INCOMING TO MAIN SEWER WOULD EXCEED TEN PERCENT AND ONLY WITH APPROVAL OF THE CITY ENGINEER.
9. CROWN OF LATERAL MAIN SHALL MATCH CROWN OF TRUNK SEWER.
10. MANHOLES PLACED IN UNPAVED AREAS SHALL HAVE THE COVERS PLACED EIGHTEEN (18") INCHES ABOVE FINISHED GRADE PER CITY OF MISSOULA, ENGINEERING/UTILITY SECTION ADMINISTRATIVE RULE NO. 604.
11. BASE AND FILL CONCRETE MAY BE POURED MONOLITHICALLY.
12. ONE–HALF (1/2") INCH SPACING MAY BE OMITTED WHEN BASE AND FILL CONCRETE ARE POURED MONOLITHICALLY.
13. BASE IS TO BE SUPPORTED BY FOUR (4) CEMENT BLOCKS (CMU) EQUALLY SPACED AROUND PERIMETER OF MANHOLE.
14. DUE TO PROVISIONS IN THE FEDERAL TRANSPORTATION ACT, VENDOR MUST AUTHENTICATE UNITED STATES ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
15. COVERS (LIDS) MUST BE AS SPECIFIED IN STANDARD DRAWINGS; STD–300A (SANITARY SEWER), STD–300B (STORM SEWER) OR STD–C (DRY WELL OR SUMP).
16. ALL P.V.C. TO P.V.C. DEFLECTON JOINTS SHALL BE MADE WITH A GASKETED P.V.C. REPAIR COUPLING AS A GPK 906 STYLE COUPLING OR EQUIVALENT. THE USE OF A PIPE BELL AND SPIGOT ASSEMBLY WILL ALSO BE ALLOWED.
17. ALL PRECAST MANHOLE BASES SHALL HAVE A FOUR (4") INCH CONCRETE BASE EXTENSION OUTSIDE THE MANHOLE FOR SUPPORT.
18. ALL FLOW ACROSS MANHOLES SHALL BE ONE–TENTH (1/10') OF A FOOT FALL, UNLESS THE FLOW CHANGES DIRECTION MORE THAN FORTY–FIVE (45') DEGREES, THEN THE FALL SHALL BE TWO–TENTHS (2/10') OF A FOOT FALL OR GREATER.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Sanitary and Storm Sewer Manhole Page 4 of 4	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/1973 Revised: 01/10/2007	STD - 301

Elevation To Be Set By The Engineer



NOTE: Due To Provisions In The Intermodal Surface Transportation Act, Vendors Must Authenticate U.S. Origin of Castings In Projects Involving Federal Funds.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

Missoula Engineering Division	Standard 8' Precast Sump	Approved By City Engineer R. Steven King	Adopted: 04/24/1985 Revised: 03/12/2004	STD - 302

PRELIMINARY - FIRST ELEMENT REVIEW

JOB #: 1931 | DRAWN: CRH | DESIGN: MH/AH | QA: KTS | DATE: 8/24/2020

MONTANA KODY THOMAS SWARTZ 39085 PE REGISTERED PROFESSIONAL ENGINEER

DATE | DESCRIPTION

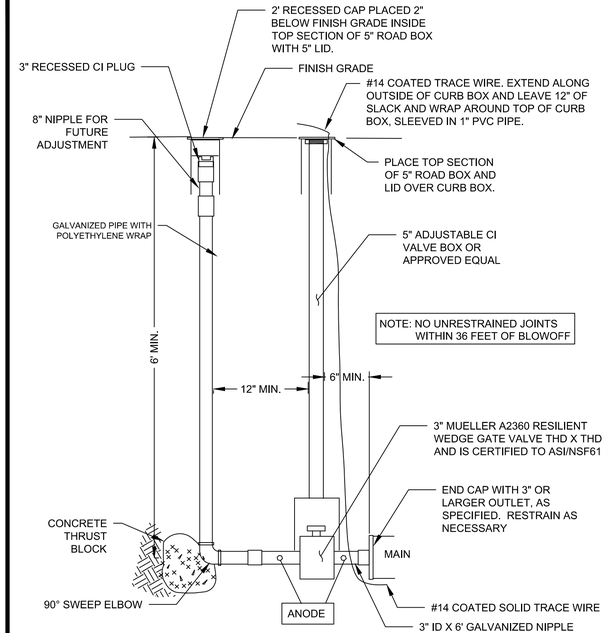
WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MISSOULA MCNETT FLATS MONTANA

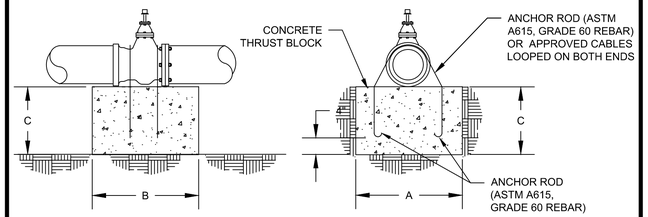
SANITARY & STORM SEWER DETAILS

SANITARY & STORM SEWER DETAILS.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020

C7.2



SD-1 **TYPICAL BLOW-OFF ASSEMBLY**
NTS



NOTES:

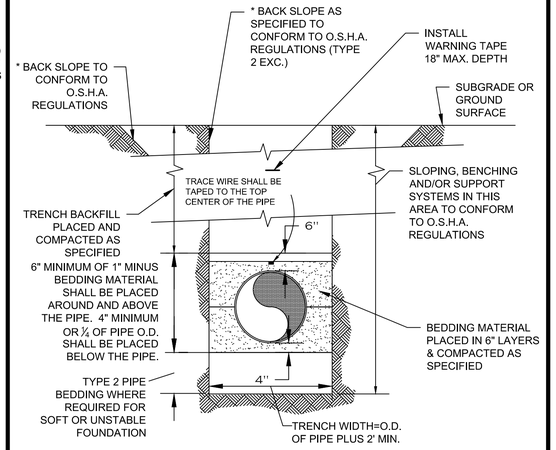
1. DIAGRAM DEPICTS GATE VALVES ONLY, VALVES 12 INCH AND LARGER TO BE BUTTERFLY, AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS WITH BLOCKS CENTERED UNDER LOAD BEARING PORTION OF VALVE.
2. STEEL CABLE (3/4" MINIMUM DIA. OR AS APPROVED BY THE ENGINEER) W/ANCHOR BOLTS MAY BE SUBSTITUTED FOR ANCHOR ROD.

STANDARD THRUST BLOCK DIMENSIONS

ANCHOR ROD SIZE	VALVE SIZE	100 PSI			150 PSI			200 PSI			250 PSI			300 PSI	
		"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"
3/4"	6" & 8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
3/4"	10"	2'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-0"	2'-9"	2'-6"	2'-6"	3'-0"	3'-0"	3'-0"	3'-7"	3'-0"
3/4"	12"	2'-3"	2'-0"	2'-0"	3'-0"	3'-0"	2'-8"	3'-5"	3'-0"	3'-0"	4'-3"	3'-0"	3'-0"	5'-1"	3'-0"
1"	14"	2'-3"	2'-0"	2'-4"	3'-5"	3'-0"	3'-0"	4'-6"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-9"	4'-0"
1 1/8"	16"	3'-0"	3'-0"	2'-11"	4'-4"	3'-0"	3'-0"	4'-1"	4'-0"	4'-0"	5'-1"	4'-0"	4'-0"	6'-1"	4'-0"
1 1/4"	18"	3'-8"	3'-0"	3'-0"	5'-5"	3'-0"	3'-0"	5'-1"	4'-0"	4'-0"	6'-4"	4'-0"	4'-0"	5'-9"	5'-0"
1 3/8"	24"	4'-4"	4'-0"	4'-0"	6'-5"	4'-0"	4'-0"	6'-6"	5'-0"	5'-0"	6'-5"	6'-0"	6'-0"	7'-8"	6'-0"

NOTE: Pressures shown above are maximum working pressure in system.

SD-2 **VALVE THRUST BLOCKING DETAIL**
NTS

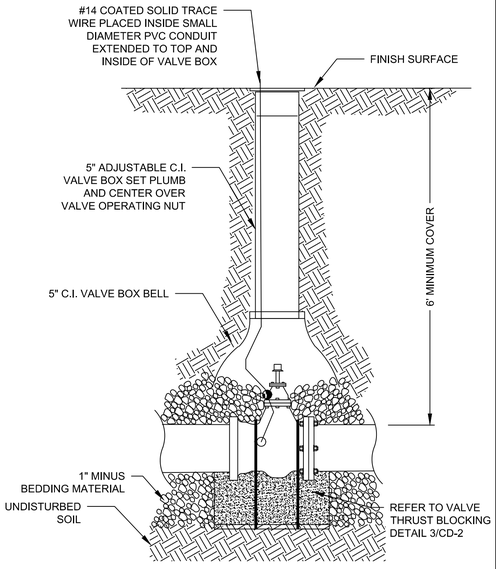


* SEE O.S.H.A. CONSTRUCTION STANDARDS FOR EXCAVATIONS, SECTION 1926, SUBPART P.

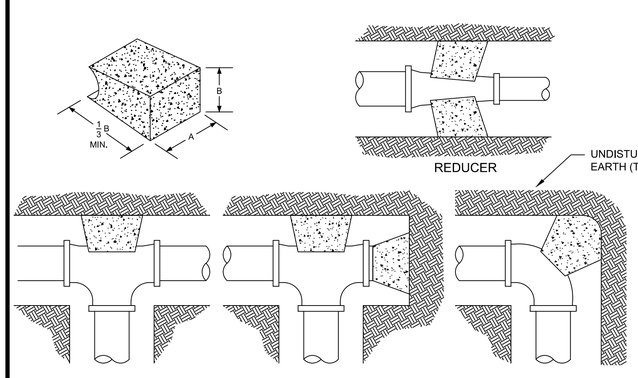
NOTE:

CASING PIPE (IF ANY) INSTALLED BY TRENCH CONSTRUCTION METHODS SHALL BE BEDDED AS SHOWN IN THIS DETAIL.

SD-3 **TYPICAL UTILITY TRENCH DETAIL**
NTS



SD-4 **VALVE DETAIL**
NTS

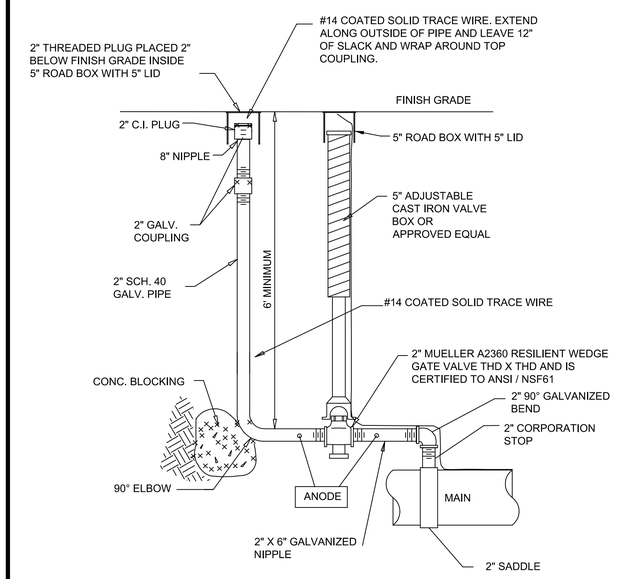


DIMENSIONS FOR THRUST BLOCKING

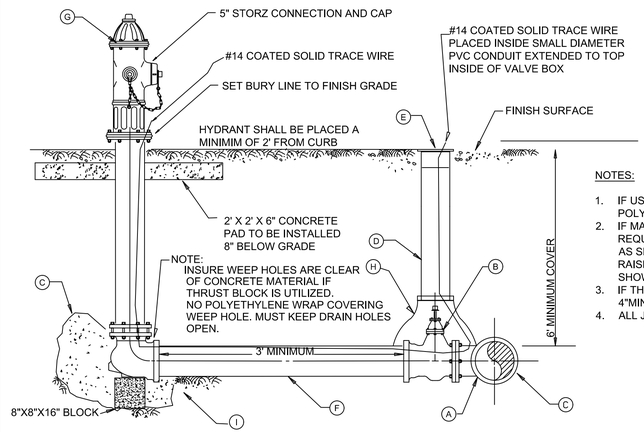
FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22 1/2" BEND	
	A	B	A	B	A	B	A	B
4" & 6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"
10"	4'-0"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"
12"	4'-0"	3'-10"	4'-8"	4'-8"	3'-8"	3'-3"	2'-7"	2'-3"
16"	4'-6"	4'-0"	5'-0"	4'-8"	4'-0"	3'-0"	3'-0"	2'-6"
20"	5'-0"	5'-0"	7'-0"	5'-0"	4'-6"	4'-0"	3'-0"	3'-0"
24"	6'-10"	5'-0"	10'-0"	5'-0"	5'-8"	4'-6"	3'-8"	3'-8"

NOTES:
1. This table is based on 2000 PSF soil bearing pressure and 150 PSI main pressure.
2. Wrap all fittings with polyethlene prior to placing concrete.

SD-5 **THRUST BLOCK DETAIL**
NTS



SD-6 **2-INCH MANUAL AIR RELIEF DETAIL**
NTS



A	APPROPRIATE SIZE X 6" FLG. OR MJ TEE AS REQUIRED.
B	6" FLG. OR MJ (OR COMBINATION) GATE VALVE--MUELLER OR APPROVED EQUAL
C	CONCRETE THRUST BLOCK IN ADDITION TO MEGALUG OR TIE-BOLT RESTRAINTS.
D	5" ADJUSTABLE C.I. VALVE BOX
E	5" VALVE BOX LID
F	6" DUCTILE IRON PIPE WITH #14 COATED SOLID TRACE WIRE
G	6" MUELLER CENTURION HYDRANT ASSEMBLY--MJ OR FLANGED (AS REQUIRED)
H	5" C.I. VALVE BOX BELL
I	PROVIDE IN ALL SOILS 1/2YD MIN. OF 3/4" CRUSHED ROCK. IN CLAY SOILS, PROVIDE 1 YD MIN.

NOTES:
1. IF USED, DUCTILE IRON PIPE SHALL BE WRAPPED WITH 8 MIL POLYETHYLENE
2. IF MAIN IS BELOW OR ABOVE STANDARD DEPTH, USE BENDS AS REQUIRED TO INSURE THAT HYDRANT IS PLACED ABOVE GRADE AS SHOWN. PLACE BENDS BETWEEN HYDRANT VALVE & MAIN TO RAISE VALVE TO NORMAL DEPTH WHEN MAIN IS BELOW DEPTH SHOWN.
3. IF THRUST BLOCK IS NOT USED, PLACE VALVE & HYDRANT ON 4"MINIMUM OF WASHED ROCK.
4. ALL JOINTS ON HYDRANT LEADS SHALL BE RESTRAINED.

SD-7 **HYDRANT DETAIL**
NTS

JOB #: 1931
DRAWN: CRH
DESIGN: MH/AH
QA: KTS
DATE: 8/24/2020

DATE | DESCRIPTION

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

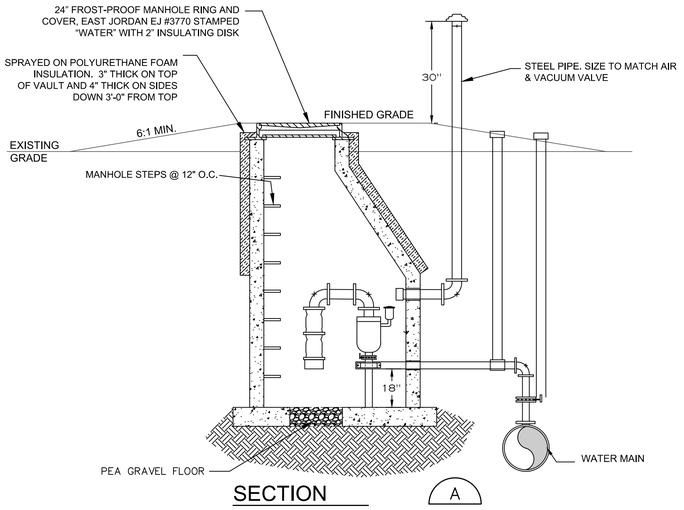
PRELIMINARY - FIRST ELEMENT REVIEW

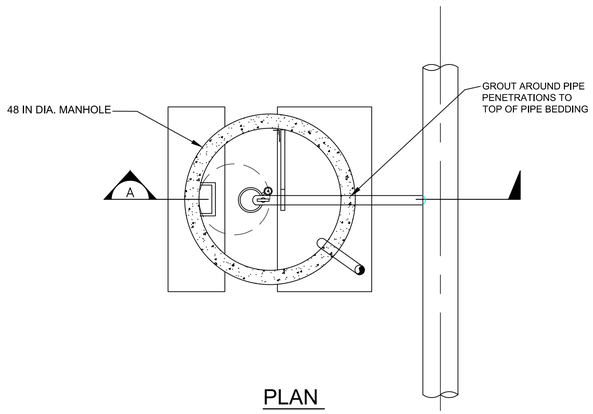
MONTANA
MCNETT FLATS
MISSOULA

CITY OF MISSOULA WATER DETAILS SD-1

C7.3

CITY OF MISSOULA WATER DETAILS SD-1.DWG PLOTTED BY:WEI-MSLA2 ON Nov.11, 2020

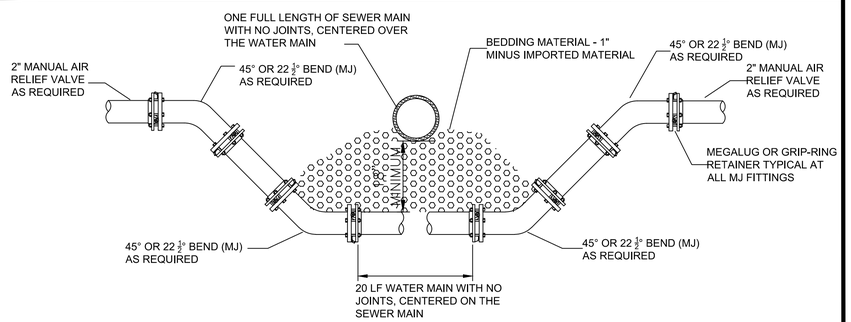




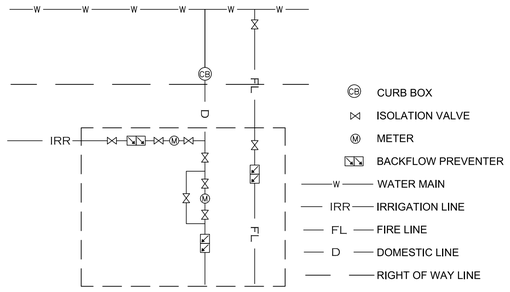
NOTES:

1. SWAY BRACE PRODUCT NUMBERS ARE UNISTRUT. USE UNISTRUT, KINLINE OR EQUAL. SECURE ARV TO SWAY BRACE w/ 2"x 12 GA. STRAP. USE STRUT MFR'S. BOLTS & NUTS. PAINT GALV. ITEMS PER MANUFACTURER'S RECOMMENDATIONS.

SD-8 **AIR/VACUUM RELIEF VALVE DETAIL**
NTS



SD-11 **TYPICAL WATER LINE CROSSING @ SEWER MAINS**
NTS

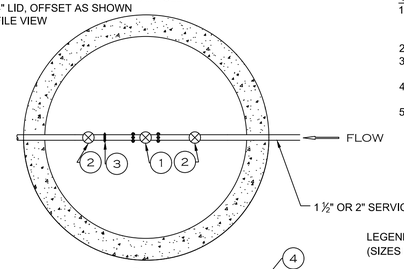


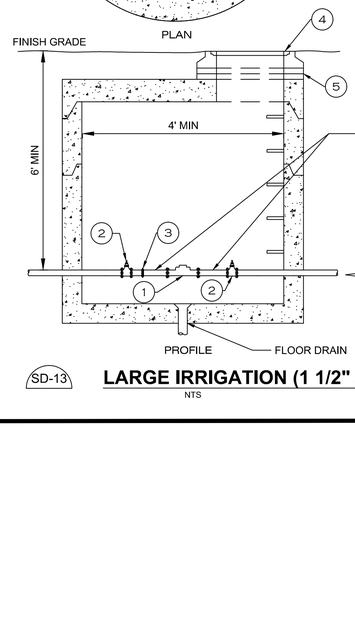
GENERAL NOTES

1. ALL COMMERCIAL WATER SERVICES REQUIRE BACKFLOW PREVENTION DEVICES INSTALLED IN ACCORDANCE WITH CITY BACKFLOW PROGRAM, INCLUDING PROVIDING ADEQUATE DRAINAGE IN THE EVENT OF DISCHARGE FROM THE BACKFLOW PREVENTER.
2. METERS LARGER THAN 1-INCH REQUIRE A BYPASS LINE AS SHOWN IN THIS DIAGRAM.
3. THERE MUST BE A MINIMUM OF 5 PIPE DIAMETERS UPSTREAM OF METER AND 3 PIPE DIAMETERS DOWNSTREAM OF METER OF STRAIGHT PIPE WITH NO VALVES, TEES OR APPURTENANCES.
4. COMMERCIAL BUILDINGS WITH FIRE LINES MUST HAVE A SEPARATE FIRE LINE AND DOMESTIC LINE, EACH WITH A SHUTOFF VALVE LOCATED IN THE RIGHT OF WAY.
5. IF MULTIPLE COMMERCIAL UNITS WILL OCCUPY THE BUILDING AND BE METERED SEPARATELY, EACH UNIT MUST HAVE A SEPARATE OUTSIDE SHUTOFF VALVE LOCATED IN THE RIGHT OF WAY.
6. THIS DIAGRAM IS NOT PROJECT SPECIFIC AND IS NOT INTENDED TO BE A DESIGN DRAWING. THE OWNER IS RESPONSIBLE TO COMPLY WITH ALL APPLICABLE BUILDING CODES. THIS DETAIL MAY CHANGE AT ANY TIME AND IT IS THE OWNER'S RESPONSIBILITY TO OBTAIN THE MOST CURRENT VERSION OF THIS AND OTHER CITY REQUIREMENTS.
7. INSTALL A 1/2" PVC CONDUIT INCLUDING PULL WIRE FROM THE WATER METER ALL THE WAY THROUGH AN EXTERIOR WALL OF THE BUILDING WITHIN 2-5' OF GROUND SURFACE, FOR INSTALLATION OF A REMOTE TRANSMITTER.

SD-12 **TYPICAL COMMERCIAL WATER SERVICE DETAIL**
NTS

4' MINIMUM DIAMETER PRECAST MANHOLE WITH 24" LID, OFFSET AS SHOWN IN PROFILE VIEW





GENERAL NOTES

1. MANHOLE BASE IS OPTIONAL. WHERE BASE IS NOT PROVIDED, MANHOLE SHALL BE PLACED ON FOUR STANDARD CMU BLOCKS SPACED EQUAL DISTANCE AROUND MANHOLE.
2. METER PIT SHALL BE INSTALLED 2-5' OUTSIDE THE RIGHT OF WAY.
3. NO OBSTRUCTIONS SHALL BE PLACED WITHIN A MINIMUM 4 FT RADIUS AROUND THE METER PIT TO ALLOW ACCESS TO THE PIT.
4. NO PRV'S, CHECK VALVES OR BACKFLOW DEVICES ALLOWED IN METER PIT.
5. THIS DIAGRAM IS NOT PROJECT SPECIFIC AND IS NOT INTENDED TO BE A DESIGN DRAWING. THE OWNER IS RESPONSIBLE TO COMPLY WITH ALL APPLICABLE BUILDING CODES. THIS DETAIL MAY CHANGE AT ANY TIME AND IT IS THE OWNER'S RESPONSIBILITY TO OBTAIN THE MOST CURRENT VERSION OF THIS AND OTHER CITY REQUIREMENTS.

LEGEND:
(SIZES BASED ON 2" METER, ADJUST ALL TO MATCH FOR 1 ½" METER)

1. 2" METER
2. 2" BALL VALVE
3. 2" UNION
4. EJIW 3770 CAST IRON RING AND COVER MARKED "WATER"
5. CONCRETE ADJUSTING RINGS

SD-13 **LARGE IRRIGATION (1 1/2" AND 2") IRRIGATION METER PIT DETAIL**
NTS

JOB #: 1931
DRAWN: CRH
DESIGN: MH/AH
QA: KTS
DATE: 8/24/2020

MONTANA
KODY THOMAS SWARTZ
No. 30085 PE
REGISTERED PROFESSIONAL ENGINEER

DESCRIPTION | DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
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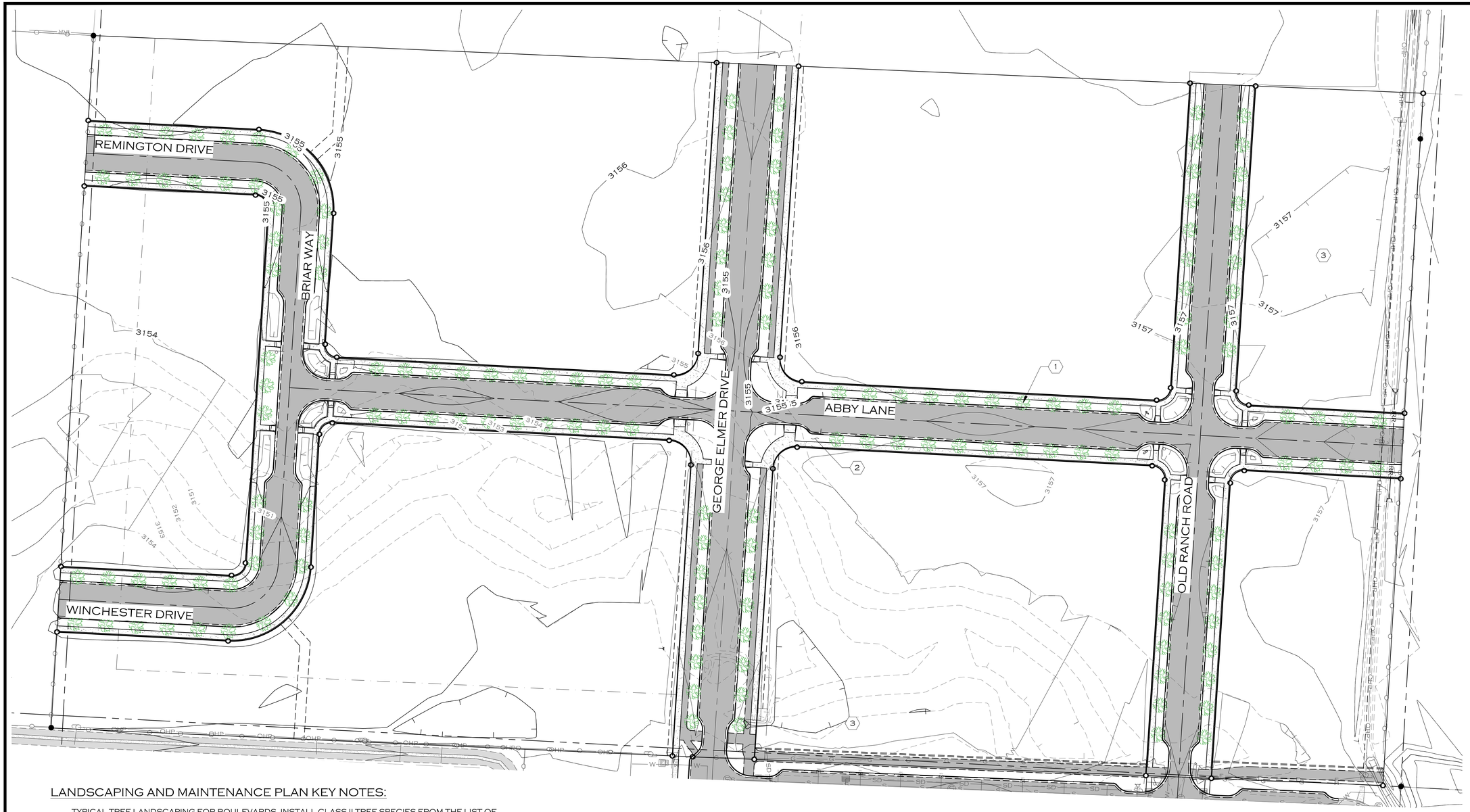
PRELIMINARY - FIRST ELEMENT REVIEW

MCNETT FLATS
MISSOULA MONTANA

CITY OF MISSOULA WATER DETAILS SD-2

C7.4

CITY OF MISSOULA WATER DETAILS SD-1.DWG PLOTTED BY:WEI-MSLA2 ON Nov 11 / 2020



LANDSCAPING AND MAINTENANCE PLAN KEY NOTES:

1. TYPICAL TREE LANDSCAPING FOR BOULEVARDS. INSTALL CLASS II TREE SPECIES FROM THE LIST OF APPROVED CLASS II MEDIUM STATURE TREES AS SPECIFIED IN "STREET TREES FOR MISSOULA AND A GUIDE TO THEIR SELECTION, PLANTING, AND LONG TERM CARE" (MISSOULA CITY COUNCIL RESOLUTION NO. 7891, JULY 28, 2014).
2. TYPICAL GRASS LANDSCAPING FOR BOULEVARDS. CONTRACTOR SHALL PREPARE AREA, IMPORT TOPSOIL, FERTILIZE, AND DRILL SEED PER SEED MIX SPECIFICATION.
3. TYPICAL PARKLAND; TURFED OPEN AREA. CONTRACTOR SHALL PREPARE AREA, IMPORT TOPSOIL, FERTILIZE, AND DRILL SEED PER SEED MIX SPECIFICATION. PROVIDE AUTOMATIC IRRIGATION SYSTEM DESIGNED BY AN IRRIGATION SPECIALIST AND APPROVED BY THE CITY OF MISSOULA.

LANDSCAPING AND MAINTENANCE NOTES:

1. BOULEVARD TREES SHALL BE INSTALLED AT THE SPACING RECOMMENDED ON THE APPROVED TREE LIST. TREE PLANTING LOCATIONS SHOWN ARE REPRESENTATIVE, AND FINAL PLANTING LOCATIONS WILL BE DETERMINED BASED UPON FINAL DRIVEWAY LOCATIONS, CONSIDERATION OF SIGHT TRIANGLES, AND SPECIES ARE SELECTED.
2. IT IS THE DUTY OF ANY REAL PROPERTY OWNER WITHIN THE CITY TO MAINTAIN OR CAUSE TO BE MAINTAINED ANY BOULEVARD THAT ADJOINS THE REAL PROPERTY. REQUIRED MAINTENANCE ACTIVITIES SHALL INCLUDE THE WATERING OF TREES, SHRUBS, PLANTS, GRASS, AND VEGETATION WITHIN THE BOULEVARD, MOWING OF THE GRASS, ELIMINATION OF WEEDS, AND ENSURING COMPLIANCE WITH THE PROVISIONS OF CITY ORDINANCES PERTAINING TO TRIMMING, PRUNING, OR REMOVAL OF ANY TREE, SHRUBS, PLANTS, OR VEGETATION.
3. PROVIDE AN AUTOMATIC IRRIGATION SYSTEM IN ACCORDANCE WITH THE CURRENT ADOPTED PLUMBING CODESTO MAINTAIN BOULEVARD AND PARK LANDSCAPING IN A HEALTHY, ATTRACTIVE CONDITION. IRRIGATION SYSTEM SHALL INCLUDE BACKFLOW PREVENTION, BE DESIGNED BY AN IRRIGATION SPECIALIST, AND APPROVED BY THE CITY OF MISSOULA.
4. REQUIRED LANDSCAPING MUST BE INSTALLED IN COMPLETE AND HEALTHY CONDITION, WITH OPERATIONAL IRRIGATION IN PLACE, BEFORE A FINAL OCCUPANCY PERMIT MAY BE ISSUED FOR ANY LOT.

PRELIMINARY - FIRST ELEMENT REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	8/24/2020

#	DESCRIPTION	DATE

MONTANA
KODY THOMAS SWARTOS
No. 30085 PE
REGISTERED PROFESSIONAL ENGINEER

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

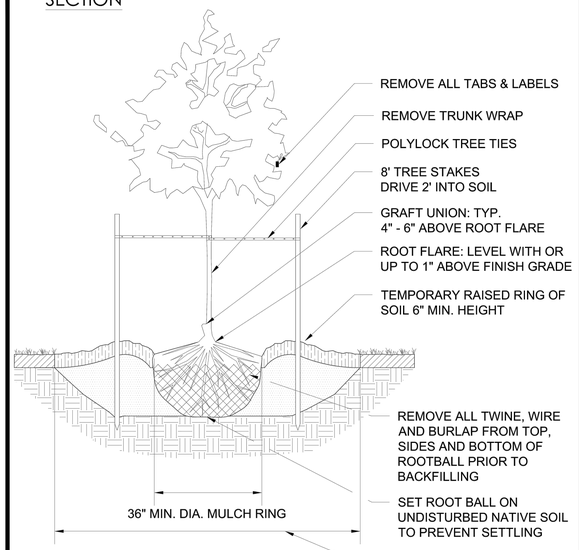
MCNETT FLATS
MISSOULA MONTANA

LANDSCAPING AND MAINTENANCE PLAN

C8.0

LANDSCAPING PLAN.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020

SECTION



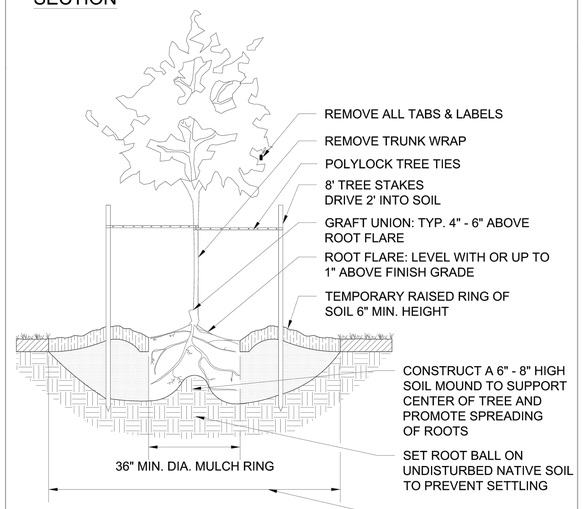
NOTES:

1. Plant material must meet the minimum acceptable standard set by the American Association of Nurserymen's American Standard of Nursery Stock: ANSI Z60.1. Broken, damaged, diseased, or substandard stock are prohibited from being planted in the public right-of-way and will be rejected.
2. Only class I (small growing) trees are permitted to be planted under or within fifteen (15') of overhead utility lines.
3. Prune only broken or damaged branches. Do not apply fertilizer at time of planting.
4. The root flare is the point where the top most structural root emerges from the trunk. The depth of the root ball shall be measured from the root flare to the bottom of the root ball. Handle B&B plants carefully when transferring to planting hole. Lift or carry by holding the root ball, not the trunk.
5. Remove any excess soil from the top of the root ball to expose the root flare. Place tree in planting hole with root flare level with or up to 1" above finish grade.
6. Remove all wire baskets and rope from root ball. Be careful to keep the root ball intact.
7. Remove all burlap from the root ball. Be careful to keep root ball intact.
8. Straighten, cut and remove any circling roots.
9. Backfill planting hole 2/3 full with existing soil, settle with water, continue to fill with soil, water again. Water thoroughly after installation to eliminate air pockets.
10. Construct a temporary raised ring of soil at edge of root ball to contain water. Remove or breach before winter.
11. Construct mulch ring with a minimum 36" diameter to a depth of 2" - 4"; leave 3" bare ground between mulch and tree trunk.
12. Set stakes parallel to prevailing wind and outside of root ball. Ties must be 1" wide minimum, flexible belt-like strapping. Do not use rope or wire. Do not over-tighten around tree. Ties should be tight enough to support the tree while allowing it to sway. Remove stakes and ties within one year after installation.
13. Trees benefit when irrigated separately from turf. Water new trees during summer months to a depth of 12" - 18" once per week (about 5 gallons of water per caliper inch) for the first 3 growing seasons. During periods of drought, new trees my need more frequent watering.

Parks and Rec. Dept.	BALL AND BURLAP TREE PLANTING DETAIL		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-101

Parks and Rec. Dept.	BALL AND BURLAP TREE PLANTING NOTES		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-101

SECTION



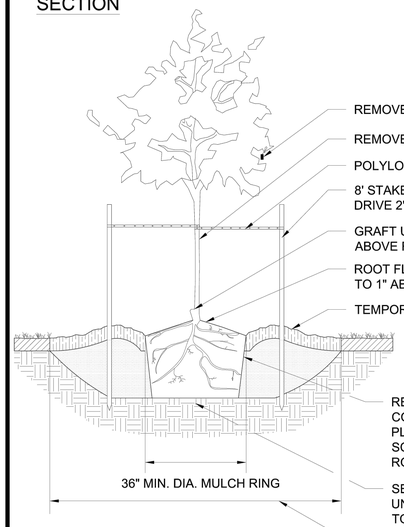
Parks and Rec. Dept.	BARE ROOT TREE PLANTING DETAIL		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-101-2

NOTES:

1. Plant material must meet the minimum acceptable standard set by the America Association of Nurserymen's American Standard of Nursery Stock: ANSI Z60.1. Broken, damaged, diseased, or substandard stock are prohibited from being planted in the public right-of-way and will be rejected.
2. Only class I (small growing) trees are permitted to be planted under or within fifteen (15') of overhead utility lines.
3. Prune only broken or damaged branches. Do not apply fertilizer at time of planting.
4. The root flare is the point where the top most structural root emerges from the trunk. The depth of the root ball shall be measured from the root flare to the bottom of the lowest root(s). Handle roots carefully when transferring to planing hole.
5. Remove all packing material from roots.
6. Plant root flare level with or up to 1" above finish grade.
7. Straighten, cut and remove any circling roots. Construct a mound of soil 6" - 8" high to support center of tree. Spread roots over mound, extending in a radial pattern from the trunk, distributing them evenly in the planting hole.
8. Backfill planting hole 2/3 full with existing soil, settle with water, continue to fill with soil, water again. Water thoroughly after installation to eliminate air pockets.
9. Construct a temporary raised ring of soil at edge of root ball to contain water. Remove or breach before winter.
10. Construct mulch ring with minimum 36" diameter to a depth of 2" - 4"; leave 3" of bare ground between mulch and tree trunk.
11. Set stakes parallel to prevailing wind and outside of root ball. Ties must be 1" wide minimum, flexible belt-like strapping. Do not use rope or wire. Do not over-tighten around tree. Ties should be tight enough to support the tree while allowing it to sway. Remove stakes and ties within one year after installation.
12. Trees benefit when irrigated separately from turf. Water new trees during summer months to a depth of 12" - 18" once per week (about 5 gallons of water per caliper inch) for the first 3 growing seasons. During periods of drought, new trees my need more frequent watering.

Parks and Rec. Dept.	BARE ROOT TREE PLANTING NOTES		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-101-2

SECTION

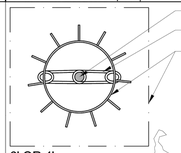


NOTES:

1. Plant material must meet the minimum acceptable standard set by the American Association of Nurserymen's American Standard of Nursery Stock: ANSI Z60.1. Broken, damaged, diseased, or substandard stock are prohibited from being planted in the public right-of-way and will be rejected.
2. Only class I (small growing) trees are permitted to be planted under or within fifteen (15') of overhead utility lines.
3. Prune only broken or damaged branches. Do not apply fertilizer at time of planting.
4. The root flare is the point where the top most structural root emerges from the trunk. The depth of the root ball shall be measured from the root flare to the bottom of the ball. Handle container plants carefully when transferring to planting hole. Lift or carry by holding the root ball, not the trunk.
5. Remove any excess soil from the top of the root ball to expose the root flare. Place tree in planting hole with root flare level with or up to 1" above finish grade.
6. Remove container from root ball. Be careful to keep the root ball intact.
7. Straighten, cut and remove any circling roots.
8. Backfill planting hole 2/3 full with existing soil, settle with water, continue to fill with soil, water again. Water thoroughly after installation to eliminate air pockets.
9. Construct a temporary raised ring of soil at edge of root ball to contain water. Remove or breach before winter.
10. Construct mulch ring with minimum 36" diameter to a depth of 2" - 4"; leave 3" of bare ground between mulch and tree trunk.
11. Set stakes parallel to prevailing wind and outside of root ball. Ties must be 1" wide minimum, flexible belt-like strapping. Do not use rope or wire. Do not over-tighten around tree. Ties should be tight enough to support the tree while allowing it to sway. Remove stakes and ties within one year after installation.
12. Trees benefit when irrigated separately from turf. Water new trees during summer months to a depth of 12" - 18" once per week (about 5 gallons of water per caliper inch) for the first 3 growing seasons. During periods of drought, new trees my need more frequent watering.

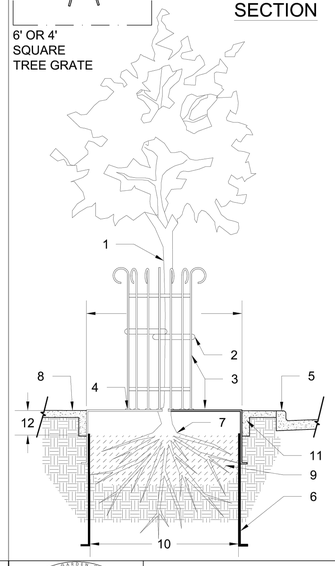
Parks and Rec. Dept.	CONTAINER TREE PLANTING DETAIL		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-101-3

Parks and Rec. Dept.	CONTAINER TREE PLANTING NOTES		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-101-3



PLAN

SECTION



NOTES:

1. Tree as per City of Missoula Parks & Rec. standards for selecting & planting landscape street trees
2. $\frac{3}{4}$" polylock tree ties, (2)
3. NEENAH R-8713, 180 deg. square 60" or 48" tree grate with tree guard, reference plan for construction details
4. Steel flange 2" x 3" pre-drilled to accept 2" x $\frac{1}{2}$" through bolt
5. Curb / Gutter or other approved equal
6. Root control barrier by "Deep Root Corp" or approved equal. 12" depth adjacent to sidewalks and 18" depth adjacent to curbs
7. First roots shall be visible at top of rootball. Set top of rootball 1" above finish grade to adjust for setteling.
8. Sidewalk
9. Backfill mix as per specifications or soil report
10. Planting pit shall be the width of the tree well and no deeper than the root ball. Scarify sides & bottom of planting pit.
11. Concrete edge to retain subgrade 4" thick minimum
12. Finish planter grade 7" below top of tree grate

Parks and Rec. Dept.	TREE GRATE & TREE GUARD DETAIL		
	Approved by Parks & Rec. Design Mgr. Neil Miner	Drawn by: GLS Checked by: CB Adopted:	PR-102

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	8/24/2020

#	DESCRIPTION	DATE

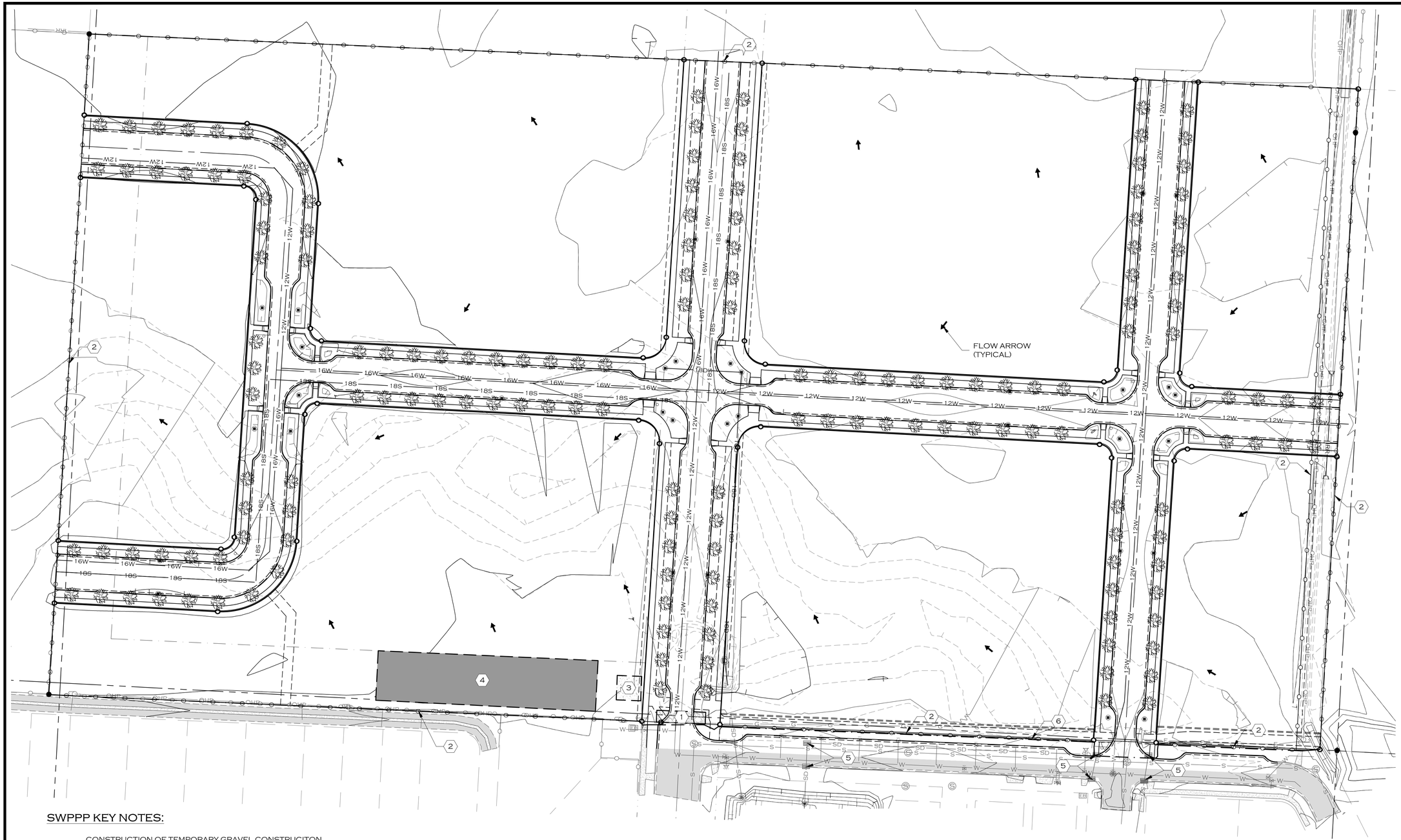
WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

PRELIMINARY - FIRST ELEMENT REVIEW

MCNETT FLATS
MISSOULA MONTANA

TREE PLANTING DETAILS

C8.1



SWPPP KEY NOTES:

1. CONSTRUCTION OF TEMPORARY GRAVEL CONSTRUCITON ENTRANCE PER CITY OF MISSOULA GUIDELINES. SEE CITY OF MISSOULA STANDARD DETAIL STD-607 ON SHEET C9.2 FOR DETAILS AND SPECIFICATIONS.
2. PROVIDE AND INSTALL SILT FENCE AS SHOWN. SEE CITY OF MISSOULA STANDARD DETAIL STD-604 ON SHEET C9.2 FOR DETAILS AND SPECIFICATIONS.
3. PROVIDE CONCRETE TRUCK WASHOUT AREA PER BEST PRACTICES ENSURING THAT ALL WASHOUT IS CONTAINED.
4. STAGING AREA AND MATERIALS STORAGE AREA ARE DESIGNATED AS SHOWN.
5. PROTECT EXISTING STORM DRAIN INLETS. SEE CITY OF MISSOULA STANDARD DETAIL STD-605 ON SHEET C9.2 FOR DETAILS AND SPECIFICATIONS.
6. LIMITS OF DISTURBANCE

PRELIMINARY - FIRST ELEMENT REVIEW

JOB #:	1931
DRAWN:	CRH
DESIGN:	MH/AH
QA:	KTS
DATE:	8/24/2020

MONTANA
KODY THOMAS SWARTZ
No. 30035 PE
REGISTERED
PROFESSIONAL ENGINEER

#	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
403 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3880 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

MCNETT FLATS
MISSOULA MONTANA

STORMWATER POLLUTION PREVENTION PLAN

C9.0

SWPPP.DWG PLOTTED BY:WEIMSLA2 ON Nov/11/2020

EROSION CONTROL AND MAINTENANCE NOTES:

1. SWPPP TO BE FILED WITH MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY BY GENERAL CONTRACTOR.
2. THE GENERAL CONTRACTOR MUST STRICTLY ADHERE TO THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) DURING CONSTRUCTION OPERATIONS.
3. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED FROM CITY OF MISSOULA.
4. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL ALL PERIMETER EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
5. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 14 DAYS OF FINAL GRADING.
6. SHOULD CONSTRUCTION STOP FOR LONGER THAN 14 DAYS, THE SITE SHALL BE SEEDED AS SPECIFIED.
7. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSPECTED ONCE EVERY SEVEN (7) DAYS AND WITHIN 24 HOURS OF A RAINFALL EXCEEDING 0.5 INCHES DURING A 24-HOUR PERIOD OR MORE FREQUENTLY IF REQUIRED BY GOVERNING NPDES GENERAL PERMIT. ALL MAINTENANCE REQUIRED BY INSPECTION SHALL COMMENCE WITHIN 24 HOURS AND BE COMPLETED WITHIN 48 HOURS OF REPORT.
8. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SOIL SEDIMENT FROM LEAVING THE SITE.
9. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
10. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.
11. GENERAL CONTRACTOR SHALL ESTABLISH PERMANENT SOIL STABILIZATION.
12. ON SITE DUST CONTROL SHALL BE ACCOMPLISHED BY USING WATER. APPLICATION OF WATER MAY BE REQUIRED MULTIPLE TIMES PER DAY DURING CONSTRUCTION ACTIVITY.
13. AN UP-TO-DATE SWPPP PACKET WITH SWPPP INSPECTION RECORDS SHALL BE PROVIDED TO THE ENGINEER TO PROVIDE TO THE CITY AT TIME OF AS-BUILTS. SWPPP PERMITTEE RESPONSIBLE FOR PROVIDED NOT AND NOT CONFIRMATION FROM DEQ TO CITY TO CLOSE OUT CITY STORM WATER PERMIT.

POLLUTION CONTROL NOTES:

1. ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS, THAT OCCUR DURING SITE CONSTRUCTION SHALL BE HANDLED AND DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORMWATER.
2. COVER, CONTAINMENT, AND PROTECTION FROM VANDALISM SHALL BE PROVIDED FOR ALL CHEMICALS, LIQUID PRODUCTS, PETROLEUM PRODUCTS AND NON-INERT WASTES PRESENT ON THE SITE.
3. MAINTENANCE AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES INVOLVING OIL CHANGES, HYDRAULIC SYSTEM DRAINAGE, SOLVENT AND DE-GREASING CLEANING ACTIVITIES, AND OTHER ACTIVITIES WHICH MAY RESULT IN DISCHARGE OR SPILLAGE OF POLLUTANTS TO THE GROUND OR INTO STORMWATER RUNOFF MUST BE CONDUCTED USING SPILL PREVENTION MEASURES, SUCH AS DRIP PANS. CONTAMINATED SURFACES SHALL BE CLEANED IMMEDIATELY FOLLOWING ANY DISCHARGE OR SPILL INCIDENT. EMERGENCY REPAIRS MAY BE PERFORMED ON SITE USING TEMPORARY PLASTIC PLACED BENEATH, AND IF RAINING, OVER THE VEHICLE.

BEST MANAGEMENT PRACTICE NOTES

INFORMATION PROVIDED TAKEN FROM THE EPA STORMWATER MENU OF BMP'S

SILT FENCE

PURPOSE AND DESCRIPTION

THE PURPOSE OF A SILT FENCE IS TO RETAIN THE SOIL ON DISTURBED LAND, SUCH AS A CONSTRUCTION SITE, UNTIL THE ACTIVITIES DISTURBING THE LAND ARE SUFFICIENTLY COMPLETED TO ALLOW REVEGETATION AND PERMANENT SOIL STABILIZATION TO BEGIN. KEEPING THE SOIL ON A CONSTRUCTION SITE, RATHER THAN LETTING IT BE WASHED OFF INTO NATURAL WATER BODIES (E.G., STREAMS, RIVERS, PONDS, LAKES, ESTUARIES) PREVENTS THE DEGRADATION OF AQUATIC HABITATS AND SILTATION OF HARBOR CHANNELS, AND NOT LETTING SOIL WASH OFF ONTO ROADS, WHICH READILY TRANSPORT IT TO STORM SEWERS, AVOIDS HAVING SEWERS CLOGGED WITH SEDIMENT. THE COST OF INSTALLING SILT FENCES ON A WATERSHED'S CONSTRUCTION SITES IS CONSIDERABLY LESS THAN THE COSTS ASSOCIATED WITH LOSING AQUATIC SPECIES, DREDGING NAVIGATION CHANNELS, AND CLEANING SEDIMENT OUT OF MUNICIPAL STORM SEWERS.
A SILT FENCE IS A TEMPORARY SEDIMENT BARRIER MADE OF POROUS FABRIC. IT'S HELD UP BY WOODEN OR METAL PORTS DRIVEN INTO THE GROUND, SO IT'S INEXPENSIVE AND RELATIVELY EASY TO REMOVE. THE FABRIC PONDS SEDIMENT-LADEN STORMWATER RUNOFF, CAUSING SEDIMENT TO BE RETAINED BY THE SETTLING PROCESSES. A SINGLE 100 FOOT (FT) RUN OF SILT FENCE MAY HOLD 50 TONS OF SEDIMENT IN PLACE. MOST CONSTRUCTION SITES TODAY DO HAVE SILT FENCES. BUT MANY DO NOT WORK EFFECTIVELY BECAUSE THEY ARE NOT WELL DESIGNED, INSTALLED, OR MAINTAINED. THE FOCUS OF THIS FACT SHEET IS-HOW TO MAKE SILT FENCES WORK.

DESIGN

THE THREE PRINCIPAL ASPECTS OF SILT FENCE DESIGN ARE: PROPER PLACEMENT OF FENCING, ADEQUATE AMOUNT OF FENCING, AND APPROPRIATE MATERIALS.

PROPER PLACEMENT OF FENCING

PLACEMENT IS IMPORTANT BECAUSE WHERE A FENCE STARTS, RUNS, AND ENDS IS CRITICAL TO ITS EFFECTIVENESS. IMPROPER PLACEMENT CAN MAKE THE FENCE A COMPLETE WASTE OF MONEY. ANALYZE THE CONSTRUCTION SITE'S CONTOURS TO DETERMINE THE PROPER PLACEMENT. SEGMENT THE SITE INTO MANAGEABLE SEDIMENT STORAGE AREAS FOR USING MULTIPLE SILT FENCE RUNS. THE DRAINAGE AREA ABOVE ANY FENCE SHOULD USUALLY NOT EXCEED A QUARTER OF AN ACRE. WATER FLOWING OVER THE TOP OF A FENCE DURING A NORMAL RAINFALL INDICATES THE DRAINAGE AREA IS TOO LARGE. AVOID LONG RUNS OF SILT FENCE BECAUSE THEY CONCENTRATE THE WATER IN A SMALL AREA WHERE IT WILL EASILY OVERFLOW THE FENCE.

INTAKE FILTER

DESCRIPTION

STORM DRAIN INLET PROTECTION MEASURES PREVENT COIL AND DEBRIS FROM ENTERING STORM DRAIN DROP INLETS. THESE MEASURES ARE USUALLY TEMPORARY AND ARE IMPLEMENTED BEFORE A SITE IS DISTURBED.

THERE ARE SEVERAL TYPES OF INLET PROTECTION:

EXCAVATION AROUND THE PERIMETER OF THE DROP INLET: EXCAVATING A SMALL AREA AROUND AN INLET CREATES A SETTLING POOL THAT REMOVES SEDIMENTS AS WATER IN RELEASED SLOWLY INTO THE INLET THROUGH SMALL HOLES PROTECTED BY GRAVEL AND FILTER FABRIC.

FABRIC BARRIERS AROUND INLET ENTRANCES: ERECTING A BARRIER MADE OF POROUS FABRIC AROUND AN INLET CREATES A SHIELD AGAINST SEDIMENT WHILE ALLOWING WATER TO FLOW INTO THE DRAIN. THIS BARRIER SLOWS RUNOFF WHILE CATCHING SOIL AND OTHER DEBRIS AT THE DRAIN INLET.

BLOCK AND GRAVEL PROTECTION: STANDARD CONCRETE BLOCKS AND GRAVEL CAN BE USED TO FORM A BARRIER TO SEDIMENTS THAT PERMITS WATER RUNOFF TO FLOW THROUGH SELECT BLOCKS LAID SIDEWAYS.

SANDBAGS CAN ALSO BE USED TO CREATE TEMPORARY SEDIMENT BARRIERS AT INLETS. FOR PERMANENT INLET PROTECTION AFTER THE SURROUNDING AREA HAS BEEN STABILIZED, DOD CAN BE INSTALLED. THIS PERMANENT MEASURE IS AN AESTHETICALLY PLEASING WAY TO FLOW STORMWATER NEAR DROP INLET ENTRANCES AND TO REMOVE SEDIMENTS AND OTHER POLLUTANTS FROM RUNOFF.

APPLICABILITY

ALL TEMPORARY INLET PROTECTION SHOULD HAVE A DRAINAGE AREA NO GREATER THAN 1 ACRE PER INLET. TEMPORARY CONTROLS SHOULD BE CONSTRUCTED BEFORE THE SURROUNDING LANDSCAPE IS DISTURBED. EXCAVATED DROP INLET PROTECTION AND BLOCK AND GRAVEL INLET PROTECTION ARE APPLICABLE TO AREAS OF HIGH FLOW, WHERE DRAIN OVERFLOW IS EXPECTED. FABRIC BARRIERS ARE RECOMMENDED FOR SMALLER, FLATTER DRAINAGE AREAS (SLOPES LESS THAN 5 PERCENT LEADING TO THE DRAIN). TEMPORARY DROP INLET CONTROL MEASURES ARE OFTEN USED IN SEQUENCE OR WITH OTHER EROSION CONTROL TECHNIQUES.

SITING AND DESIGN CONSIDERATIONS

WITH THE EXCEPTION OF SOD DROP INLET PROTECTION, INSTALL THESE CONTROLS BEFORE ANY SOIL DISTURBANCE IN THE DRAINAGE AREA. EXCAVATE AROUND DROP INLETS AT LEAST 1 FOOT DEEP (2 FEET MAXIMUM), EXCAVATING A VOLUME OF AT LEAST 35 YD^3 PER ACRE DISTURBED. SIDE SLOPES LEADING TO THE INLET SHOULD BE NO STEEPER THAN 2:1. DESIGN THE SHAPE OF THE EXCAVATED AREA SUCH THAT THE DIMENSIONS FIT THE AREA FROM WHICH STORMWATER IS EXPECTED TO DRAIN. FOR EXAMPLE, THE LONGEST SIDE OF AN EXCAVATED AREA SHOULD BE ALONG THE SIDE OF THE INLET EXPECTED TO DRAIN THE LARGEST AREA.

STAKE FABRIC INLET PROTECTION CLOSE TO THE INLET TO PREVENT OVERFLOW ONTO UNPROTECTED SOILS. STAKES SHOULD BE AT LEAST 3 FEET LONG AND SPACED NO MORE THAN 3 FEET APART. CONSTRUCT A FRAME FOR FABRIC SUPPORT DURING OVERFLOW PERIODS, AND BURY IT AT LEAST 1 FOOT BELOW THE SOIL SURFACE. IT SHOULD RISE TO A HEIGHT NO GREATER THAN 1.5 FEET ABOVE THE GROUND. THE TOP OF THE FRAME AND FABRIC SHOULD BE BELOW THE DOWNSLOPE GROUND ELEVATION TO KEEP RUNOFF FROM BYPASSING THE INLET.

BLOCK AND GRAVEL INLET BARRIERS SHOULD BE AT LEAST 1 FOOT HIGH (2 FEET MAXIMUM). DO NOT USE MORTAR. LAY THE BOTTOM ROW OF BLOCKS AT LEAST 2 INCHES BELOW THE SOIL SURFACE, FLUSH AGAINST THE DRAIN FOR STABILITY. PLACE ONE BLOCK IN THE BOTTOM ROW ON EACH SIDE OF THE INLET ON ITS SIDE TO ALLOW DRAINAGE. PLACE 1/2-INCH WIRE MESH OVER ALL BLOCK OPENINGS TO PREVENT GRAVEL FROM ENTERING THE INLET. PLACE GRAVEL (3/4 TO 1/2 INCH IN DIAMETER) OUTSIDE THE BLOCK STRUCTURE AT A SLOPE NO GREATER THAN 2:1.

DO NOT CONSIDER SOD INLET PROTECTION UNTIL THE ENTIRE SURROUNDING DRAINAGE AREA IS STABILIZED. LAY THE SOD SO THAT IT EXTENDS AT LEAST 4 FEET FROM THE INLET IN EACH DIRECTION TO FORM A CONTINUOUS MAT AROUND THE INLET. LAY THE SOD STRIPS PERPENDICULAR TO THE DIRECTION OF FLOWS, STAGGER THEM SO THAT THE STRIP ENDS ARE NOT ALIGNED. THE SLOPE OF THE SODDED AREA SHOULD NOT BE STEEPER THAN 4:1 APPROACHING THE DROP INLET.

LIMITATIONS

TO INCREASE THE EFFECTIVENESS OF THESE PRACTICES, USE THEM WITH OTHER MEASURES, SUCH AS SMALL IMPOUNDMENTS OR SEDIMENT TRAPS (USEPA, 1992). IN GENERAL, STORMWATER INLET PROTECTION MEASURES ARE PRACTICAL FOR AREAS RECEIVING RELATIVELY CLEAN RUNOFF THAT IS NOT HEAVILY LADEN WITH SEDIMENT. THEY ARE DESIGNED TO HANDLE DRAINAGE FROM AREAS LESS THAN 1 ACRE (CASQA, 2003). TO PREVENT CLOGGING , STORM DRAIN CONTROL STRUCTURES MUST BE MAINTAINED FREQUENTLY. IF SEDIMENT AND OTHER DEBRIS CLOG THE WATER INTAKE, DROP INLET CONTROL MEASURES CAN ACTUALLY CAUSE EROSION IN UNPROTECTED AREAS.

MAINTENANCE CONSIDERATIONS

CHECK ALL TEMPORARY CONTROL MEASURES AFTER EACH STORM EVENT. TO MAINTAIN THE CAPACITY OF THE SETTLING POOLS, REMOVE ACCUMULATED SEDIMENT FROM THE AREA AROUND THE DROP INLET (EXCAVATED AREA, AREA AROUND FABRIC BARRIER OR BLOCK STRUCTURE) WHEN THE CAPACITY IS REDUCED BY HALF. REMOVE ADDITIONAL DEBRIS FROM THE SHALLOW POOLS PERIODICALLY. THE WEEP HOLES IN EXCAVATED AREAS AROUND INLETS CAN BECOME CLOGGED, PREVENTING WATER FROM DRAINING OUT OF THE POOLS. IF THAT HAPPENS, IT MIGHT BE DIFFICULT AND COSTLY TO UNCLOG THE INTAKE.

STABILIZED CONSTRUCTION ENTRANCE

DESCRIPTION

THE PURPOSE OF STABILIZING ENTRANCES TO A CONSTRUCTION SITE IS TO MINIMIZE THE AMOUNT OF SEDIMENT LEAVING THE AREA AS MUD AND SEDIMENT ATTACHED TO VEHICLES. INSTALLING A PAD OF GRAVEL OVER FILTER CLOTH WHERE CONSTRUCTION TRAFFIC LEAVES A SITE CAN HELP STABILIZE A CONSTRUCTION ENTRANCE. AS A VEHICLE DRIVES OVER THE PAD, THE PAD REMOVES MUD AND SEDIMENT FROM THE WHEELS AND REDUCES SOIL TRANSPORT OFF THE SITE. THE FILTER CLOTH SEPARATES THE GRAVEL FROM THE SOIL BELOW, KEEPING THE GRAVEL FROM BEING GROUND INTO THE COIL. THE FABRIC ALSO REDUCES THE AMOUNT OF RUTTING CAUSED BY VEHICLE TIRES. IT SPREADS THE VEHICLE'S WEIGHT OVER A SOIL AREA LARGER THAN THE TIRE WIDTH.

IN ADDITION TO USING A GRAVEL PAD, A VEHICLE WASHING STATION CAN BE ESTABLISHED AT THE SITE ENTRANCE. USING WASH STATIONS ROUTINELY CAN REMOVE A LOT OF SEDIMENT FROM VEHICLES BEFORE THEY LEAVE THE SITE. DIVERTING RUNOFF FROM VEHICLE WASHING STATIONS INTO A SEDIMENT TRAP HELPS TO MAKE SURE THE SEDIMENT FROM VEHICLES STAYS ONSITE AND IS HANDLED PROPERLY.

APPLICABILITY

TYPICALLY, STABILIZED CONSTRUCTION ENTRANCES ARE INSTALLED WHERE CONSTRUCTION TRAFFIC LEAVES OR ENTERS AN EXISTING PAVED ROAD. BUT SITE ENTRANCE STABILIZATION SHOULD BE EXTENDED TO ANY ROADWAY OR ENTRANCE WHERE VEHICLES ENTER OR LEAVE THE SITE. FROM A PUBLIC RELATIONS POINT OF VIEW, STABILIZING CONSTRUCTION SITE ENTRANCES CAN BE WORTH THE EFFORT. IF THE SITE ENTRANCE IS THE MOST NOTICEABLE PART OF A CONSTRUCTION SITE, STABILIZING THE ENTRANCE CAN IMPROVE BOTH THE APPEARANCE AND THE PUBLIC PERCEPTION OF THE CONSTRUCTION PROJECT.

SITING AND DESIGN CONSIDERATIONS

STABILIZE ALL ENTRANCES TO A SITE BEFORE CONSTRUCTION AND FURTHER SITE DISTURBANCE BEGIN. MAKE SURE THE STABILIZED SITE ENTRANCES ARE LONG AND WIDE ENOUGH TO ALLOW THE LARGEST CONSTRUCTION VEHICLE THAT WILL ENTER THE SITE TO FIT THROUGH WITH ROOM TO SPARE. IF MANY VEHICLES ARE EXPECTED TO USE AN ENTRANCE IN ANY ONE DAY, MAKE THE SITE ENTRANCE WIDE ENOUGH FOR TWO VEHICLES TO PASS AT THE SAME TIME WITH ROOM ON EITHER SIDE OF EACH VEHICLE. IF A SITE ENTRANCE LEADS TO A PAVED ROAD, MAKE THE END OF THE ENTRANCE FLARED SO THAT LONG VEHICLES DO NOT LEAVE THE STABILIZED AREA WHEN THEY TURN ONTO OR OFF THE PAVED ROADWAY. IF A CONSTRUCTION SITE ENTRANCE CROSSES A STREAM, SWALE, OR OTHER DEPRESSION, PROVIDE A BRIDGE OR CULVERT TO PREVENT EROSION FROM UNPROTECTED BANKS. MAKE SURE STONE AND GRAVEL USED TO STABILIZE THE CONSTRUCTION SITE ENTRANCE ARE LARGE ENOUGH SO THAT THEY ARE NOT CARRIED OFF SITE BY VEHICLES. AVOID SHARP-EDGED STONE TO REDUCE THE POSSIBILITY OF PUNCTURING TIRES. INSTALL STONE OR GRAVEL AT A DEPTH OF AT LEAST 6 INCHES FOR THE ENTIRE LENGTH AND WIDTH OF THE STABILIZED CONSTRUCTION ENTRANCE.

LIMITATIONS

ALTHOUGH STABILIZING A CONSTRUCTION ENTRANCE REDUCES THE AMOUNT OF SEDIMENT LEAVING A SITE, SOME SOIL MIGHT STILL BE DEPOSITED FROM VEHICLE TIRES ONTO PAVED SURFACES. TO FURTHER REDUCE THE CHANCE OF THESE SEDIMENTS POLLUTING STORMWATER RUNOFF, SWEEP THE PAVED AREA ADJACENT TO THE STABILIZED SITE ENTRANCE. FOR SITES THAT USE WASH STATIONS, A RELIABLE WATER SOURCE TO WASH VEHICLES BEFORE LEAVING. THE SITE MIGHT NOT BE INITIALLY AVAILABLE. WATER MIGHT HAVE TO BE TRUCKED TO THE SITE AT ADDITIONAL COST.

MAINTENANCE CONSIDERATIONS

MAINTAIN STABILIZATION OF THE SITE ENTRANCES UNTIL THE REST OF THE CONSTRUCTION SITE HAS BEEN FULLY STABILIZED. YOU MIGHT NEED TO ADD STONE AND GRAVEL PERIODICALLY TO EACH STABILIZED CONSTRUCTION SITE ENTRANCE TO KEEP THE ENTRANCE EFFECTIVE. SWEEP UP SOIL TRACKED OFFSITE IMMEDIATELY FOR PROPER DISPOSAL. FOR SITES WITH WASH RACKS AT EACH SITE ENTRANCE, CONSTRUCT SEDIMENT TRAPS AND MAINTAIN THEM FOR THE LIFE OF THE PROJECT. PERIODICALLY REMOVE SEDIMENT FROM THE TRAPS TO MAKE SURE THEY KEEP WORKING.

EFFECTIVENESS

STABILIZINC CONSTRUCTION ENTRANCES TO PREVENT SEDIMENT TRANSPORT OFFSITE IS EFFECTIVE ONLY IF ALL THE ENTRANCES TO THE SITE ARE STABILIZED AND MAINTAINED. STABILIZING THE SITE ENTRANCES MIGHT NOT BE VERY EFFECTIVE UNLESS A WASH RACK IS INSTALLED AND ROUTINELY USED (CORISH, 1995). THIS CAN BE PROBLEMATIC FOR SITES WITH MULTIPLE ENTRANCES AND HIGH VEHICLE TRAFFIC.

JOB #: 1931
DRAWN: CRH
DESIGN: MH/AH
QA: KTS
DATE: 8/24/2020

MONTANA
KODY THOMAS SWARTZ
No. 30055 PE
REGISTERED PROFESSIONAL ENGINEER

#	DESCRIPTION	DATE

WOITH ENGINEERING, INC.
ENGINEERS & SURVEYORS
405 3RD STREET NW, SUITE 206 • GREAT FALLS, MT 59404 • 406-761-1955
3860 O'LEARY STREET, SUITE A • MISSOULA, MT 59808 • 406-203-9565
• WWW.WOITHENG.COM •

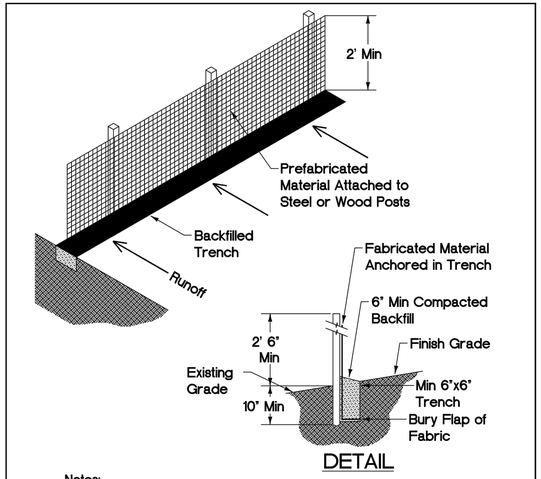
PRELIMINARY - FIRST ELEMENT REVIEW

MCNETT FLATS
MISSOULA MONTANA

STORMWATER POLLUTION PREVENTION PLAN NOTES

C9.1

SWPPP.DWG PLOTTED BY WEIMSLA2 ON Nov 11 / 2020



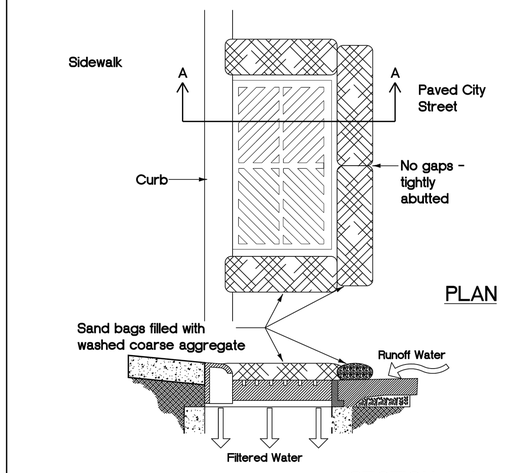
DETAIL

Notes:

1. Silt fence shall be installed before any earth removal or excavation takes place.
2. Set posts maximum 8 feet on center and excavate 6"x6" trench upslope along the line of posts.
3. Attach filter fabric to posts and extend it into trench.
4. Backfill and compact excavated soil.

MISSOULA Engineering Division | Approved By City Engineer R. Steven King | Adopted: 01/01/2005 Revised: | STD - 604

Silt Fence Installation



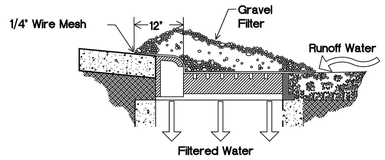
PLAN

SECTION A-A

Note: This application for paved streets. See STD-606 for inlets on gravel roads.

MISSOULA Engineering Division | Approved By City Engineer R. Steven King | Adopted: 01/01/2005 Revised: | STD - 605

Post-Paving Gravel Curb Intake Filter

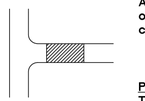


Notes: This application for gravel roads. See STD-605 for inlets on paved streets.

Sand bags filled with washed coarse aggregate may also be used.

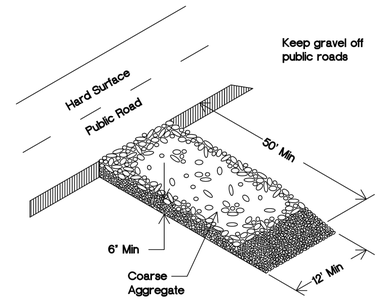
MISSOULA Engineering Division | Approved By City Engineer R. Steven King | Adopted: 01/01/2005 Revised: | STD - 606

Pre-Paving Gravel Curb Intake Filter



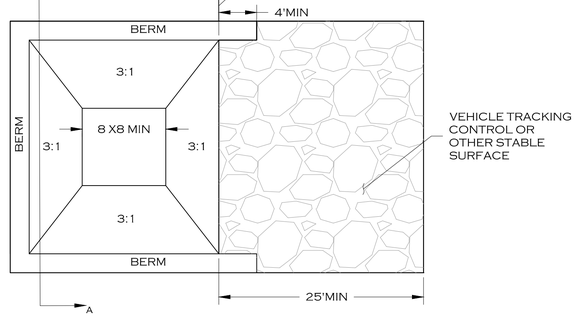
Definition
A stone stabilized pad located at points of vehicular ingress and egress on a construction site

Purpose
To reduce the amount of mud transported onto public roads by motor vehicles or runoff

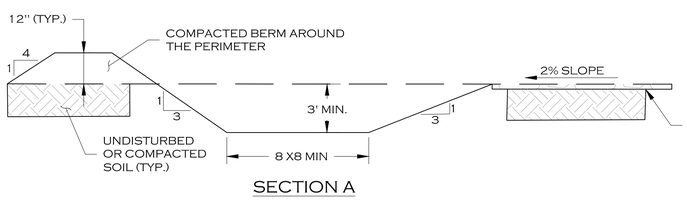


MISSOULA Engineering Division | Approved By City Engineer R. Steven King | Adopted: 01/01/2005 Revised: | STD - 607

Temporary Gravel Construction Entrance



PLAN



SECTION A

NOTES:

1. SEE PLAN VIEW FOR LOCATION OF CWA
2. DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (16 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
3. THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE
4. CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8' BY 8' SLOPES LEADING OUT OF THE SUBSURFACE SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
5. BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
6. VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
7. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
8. USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

CONCRETE WASHOUT AREA (CWA)

SCALE:N.T.S.

1

JOB #: 1931
DRAWN: CRH
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DATE: 8/24/2020

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PRELIMINARY - FIRST ELEMENT REVIEW

MCNETT FLATS
MISSOULA MONTANA

STORMWATER POLLUTION PREVENTION PLAN DETAILS

C9.2

SWPPP.DWG PLOTTED BY:WEIMSLA2 ON Nov 11 2020