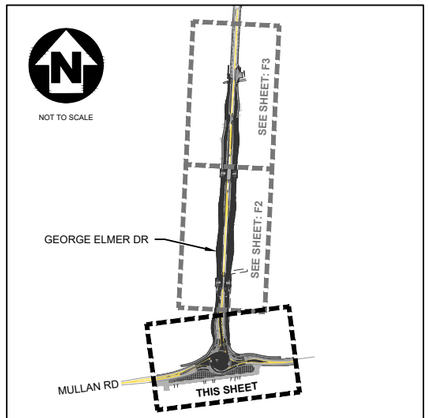
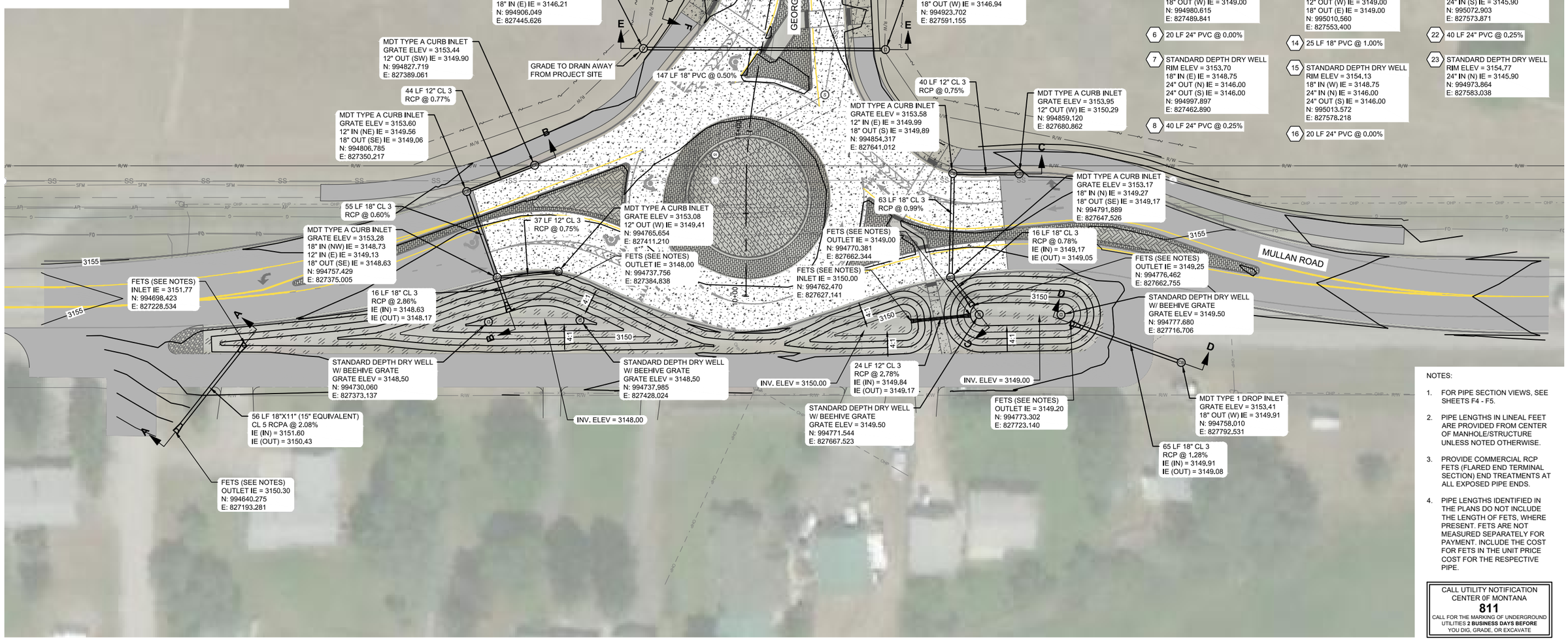


SHEET INDEX



STRUCTURES/PIPES:

1. STANDARD DEPTH DRY WELL RIM ELEV = 3154.71 24" IN (N) IE = 3145.90 N: 994938.709 E: 827457.510
2. 40 LF 24" PVC @ 0.25%
3. STANDARD DEPTH DRY WELL RIM ELEV = 3153.65 24" IN (N) IE = 3146.00 18" IN (E) IE = 3148.75 24" OUT (S) IE = 3146.00 N: 994978.006 E: 827464.977
4. 25 LF 18" PVC @ 1.00%
5. CITY OF MISSOULA 36" COMBINATION CURB INLET GRATE ELEV = 3152.48 18" OUT (W) IE = 3149.00 N: 994980.615 E: 827489.841
6. 20 LF 24" PVC @ 0.00%
7. STANDARD DEPTH DRY WELL RIM ELEV = 3153.70 18" IN (E) IE = 3148.75 24" OUT (N) IE = 3146.00 24" OUT (S) IE = 3146.00 N: 994997.897 E: 827462.890
8. 40 LF 24" PVC @ 0.25%
9. STANDARD DEPTH DRY WELL RIM ELEV = 3153.71 24" IN (S) IE = 3145.90 N: 995037.550 E: 827457.634
10. 25 LF 18" PVC @ 1.00%
11. CITY OF MISSOULA 36" COMBINATION CURB INLET GRATE ELEV = 3152.34 12" IN (E) IE = 3149.00 18" OUT (W) IE = 3149.00 N: 995000.506 E: 827487.753
12. 66 LF 12" PVC @ 0.00%
13. CITY OF MISSOULA 36" COMBINATION CURB INLET GRATE ELEV = 3152.33 12" OUT (W) IE = 3149.00 18" OUT (E) IE = 3149.00 N: 995010.560 E: 827553.400
14. 25 LF 18" PVC @ 1.00%
15. STANDARD DEPTH DRY WELL RIM ELEV = 3154.13 18" IN (W) IE = 3148.75 24" IN (N) IE = 3146.00 24" OUT (S) IE = 3146.00 N: 995013.572 E: 827578.218
16. 20 LF 24" PVC @ 0.00%
17. STANDARD DEPTH DRY WELL RIM ELEV = 3154.21 18" IN (W) IE = 3148.75 24" OUT (N) IE = 3146.00 24" OUT (S) IE = 3146.00 N: 995032.963 E: 827576.061
18. 25 LF 18" PVC @ 1.00%
19. CITY OF MISSOULA 36" COMBINATION CURB INLET GRATE ELEV = 3152.95 18" OUT (E) IE = 3149.00 N: 995030.448 E: 827551.183
20. 40 LF 24" PVC @ 0.25%
21. STANDARD DEPTH DRY WELL RIM ELEV = 3154.72 24" IN (S) IE = 3145.90 N: 995072.903 E: 827573.871
22. 40 LF 24" PVC @ 0.25%
23. STANDARD DEPTH DRY WELL RIM ELEV = 3154.77 24" IN (N) IE = 3145.90 N: 994973.864 E: 827583.038

NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEETS F4 - F5.
2. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.
3. PROVIDE COMMERCIAL RCP FETS (FLARED END TERMINAL SECTION) END TREATMENTS AT ALL EXPOSED PIPE ENDS.
4. PIPE LENGTHS IDENTIFIED IN THE PLANS DO NOT INCLUDE THE LENGTH OF FETS, WHERE PRESENT. FETS ARE NOT MEASURED SEPARATELY FOR PAYMENT. INCLUDE THE COST FOR FETS IN THE UNIT PRICE COST FOR THE RESPECTIVE PIPE.

CALL UTILITY NOTIFICATION CENTER 0F MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

REVISION	DATE	DESCRIPTION
-	-	-

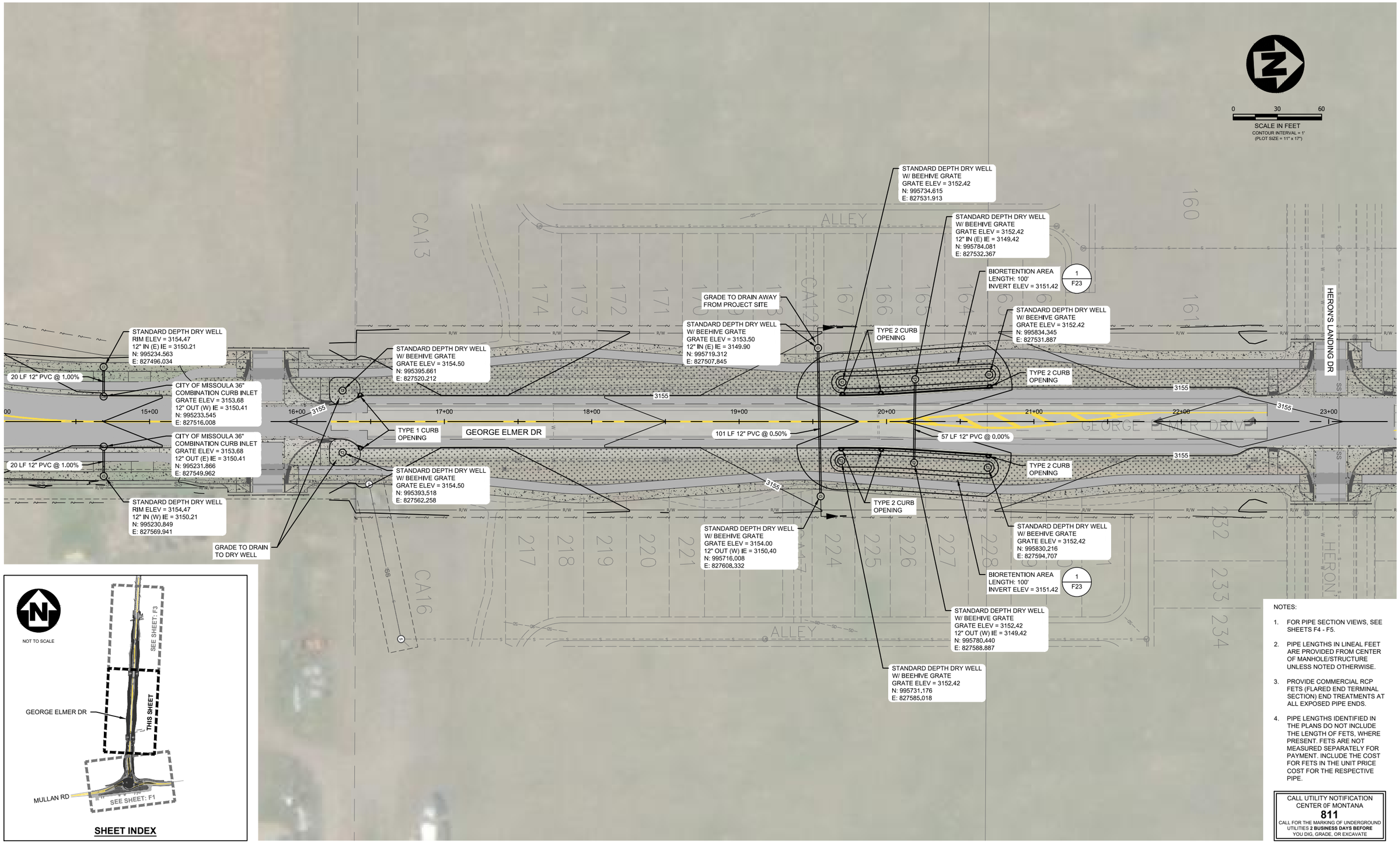
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive

SHEET F1 OF F25



NOTES:

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REVISION	DATE	DESCRIPTION
-	-	-

DESIGNER - PROJ. NO. -
DRAWN - DATE -
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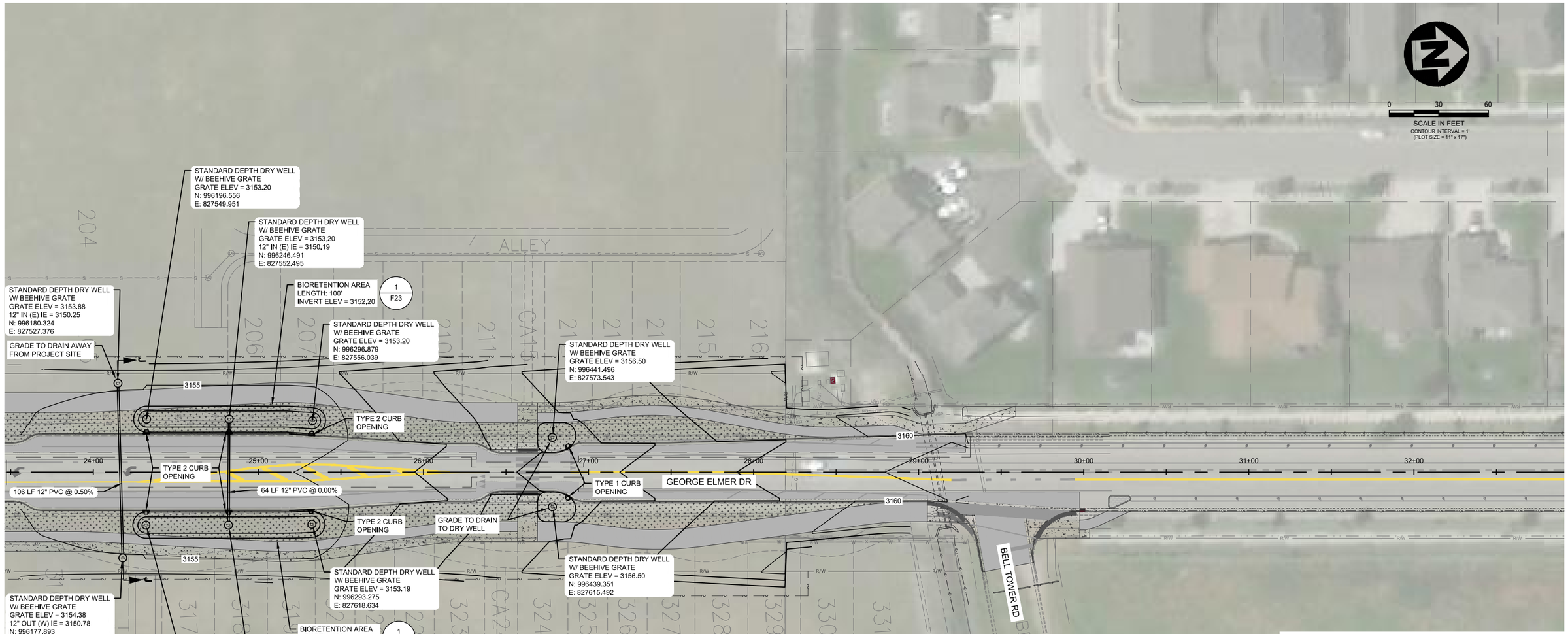
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive

SHEET F2 OF F25



NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEETS F4 - F5.
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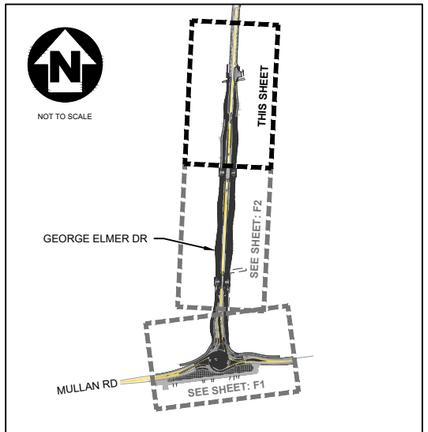
CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

NOT TO SCALE



SHEET INDEX

REVISION	DATE	DESCRIPTION
-	-	-

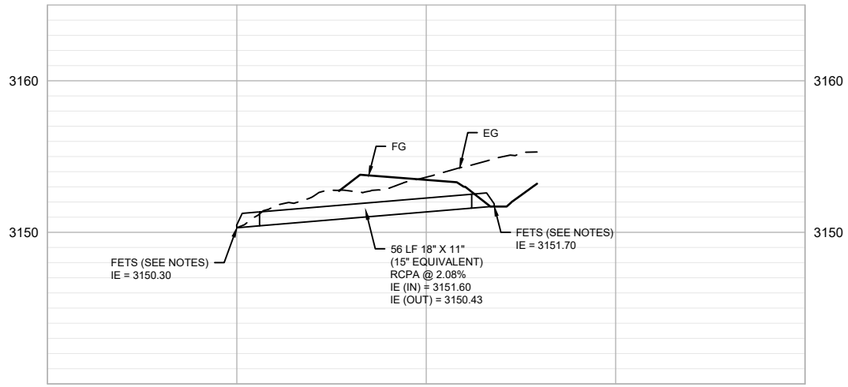
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

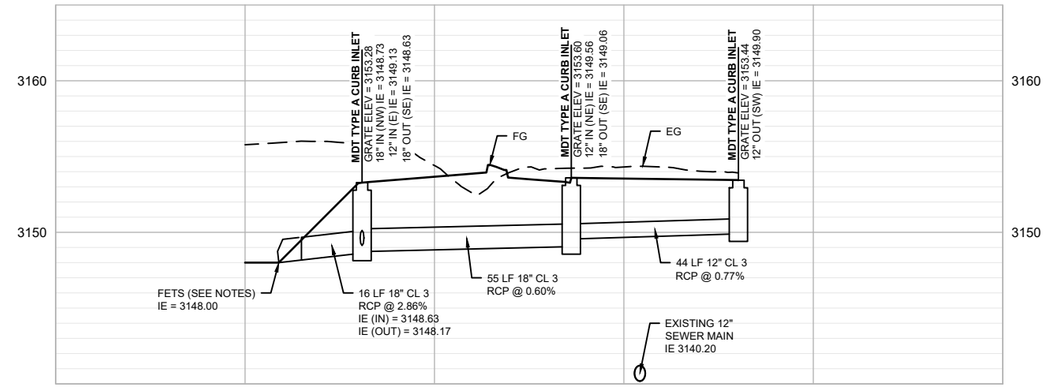
Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive

SHEET F3 OF F25



SECTION A-A



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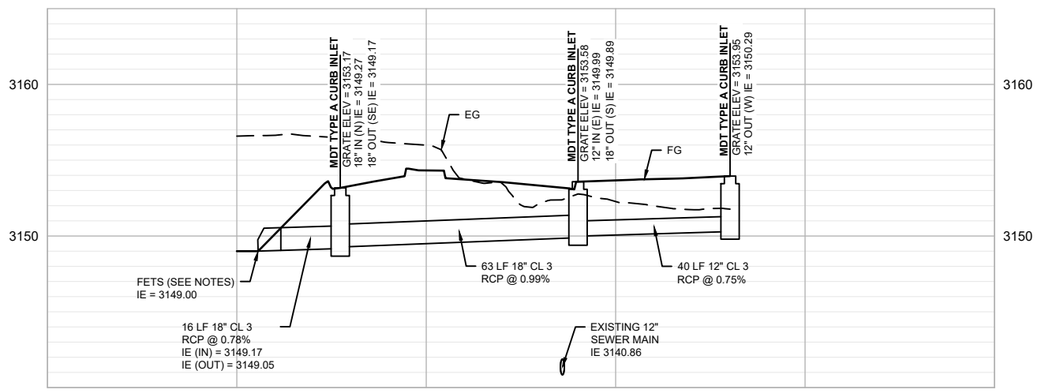

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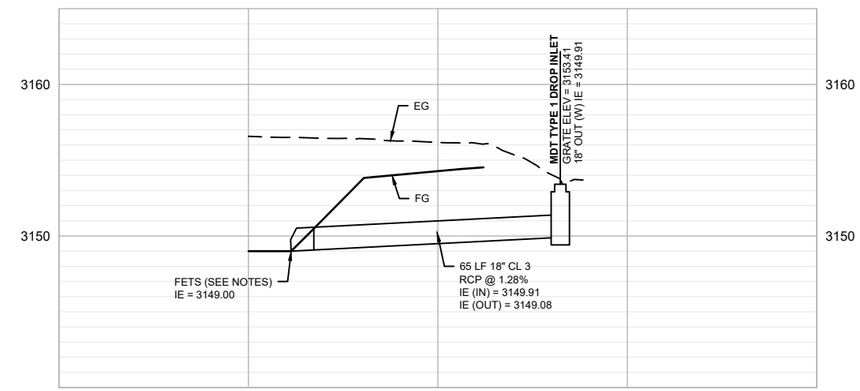
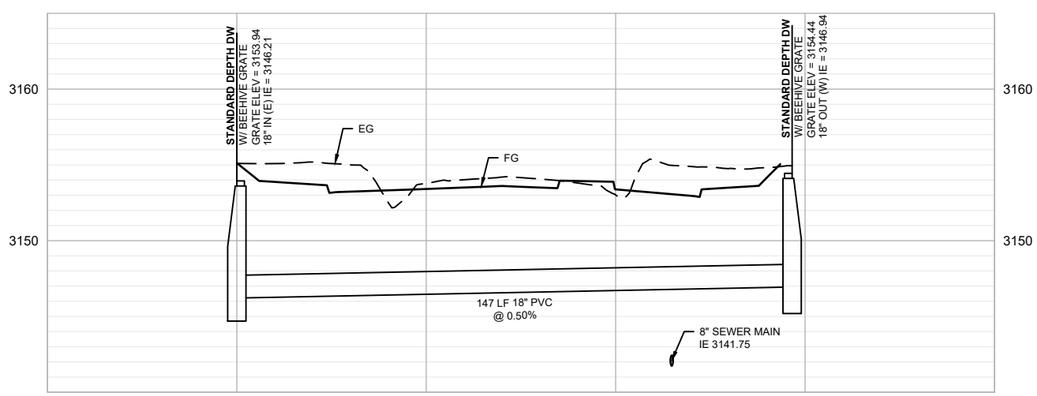
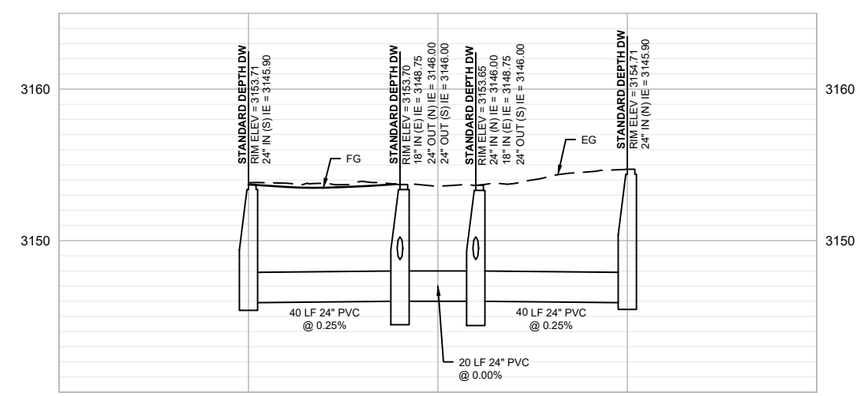


SECTION D-D



SECTION E-E



SECTION F-F

CALL UTILITY NOTIFICATION
CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND
UTILITIES **2 BUSINESS DAYS BEFORE**
YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

EG = EXISTING GROUND
FG = FINISHED GRADE
DW = DRY WELL

NOTES:

1. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.
2. PIPE LENGTHS IDENTIFIED IN THE PLANS DO NOT INCLUDE THE LENGTH OF FETS, WHERE PRESENT. FETS ARE NOT MEASURED SEPARATELY FOR PAYMENT. INCLUDE THE COST FOR FETS IN THE UNIT PRICE COST FOR THE RESPECTIVE PIPE.

REVISION	DATE	DESCRIPTION
-	-	-

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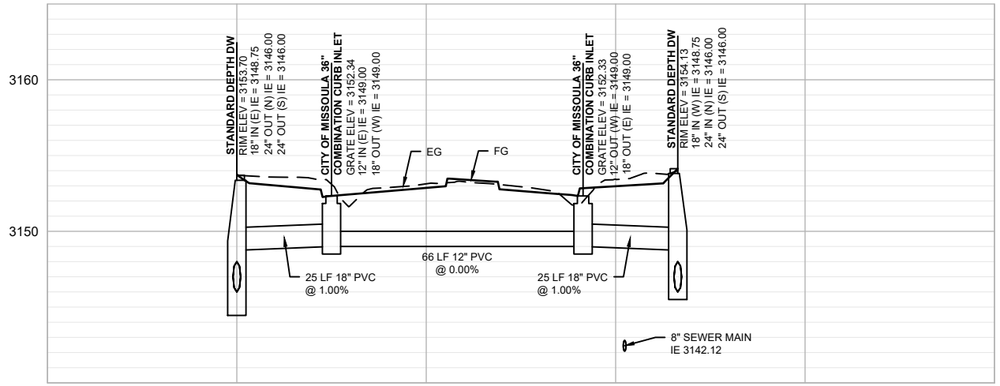
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive - Pipe Sections

SHEET F4 OF F25



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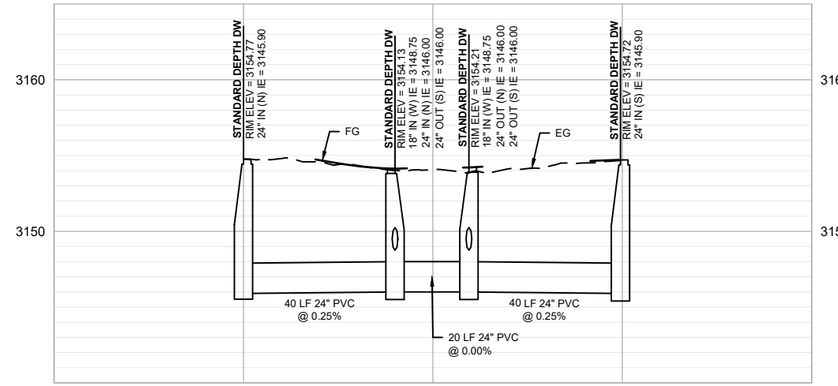

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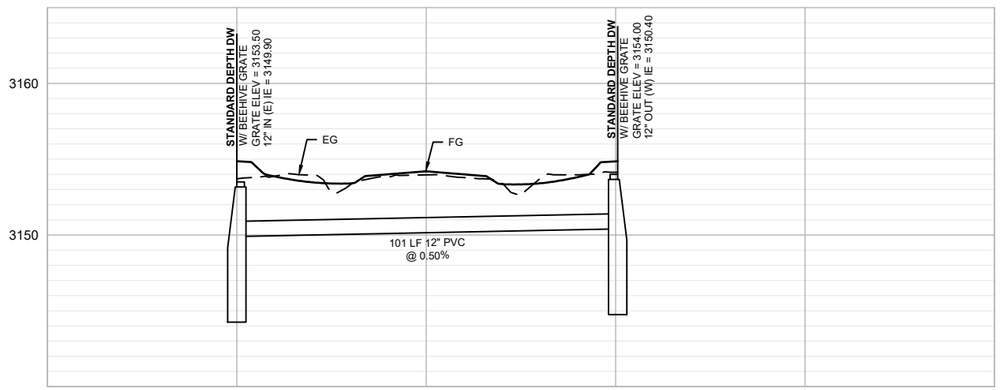
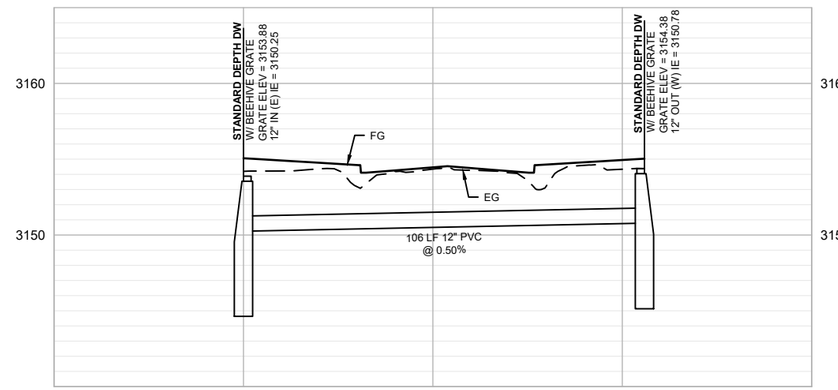


SECTION I-I



SECTION J-J

CALL UTILITY NOTIFICATION
CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND
UTILITIES **2 BUSINESS DAYS BEFORE**
YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

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REVISION	DATE	DESCRIPTION
-	-	-

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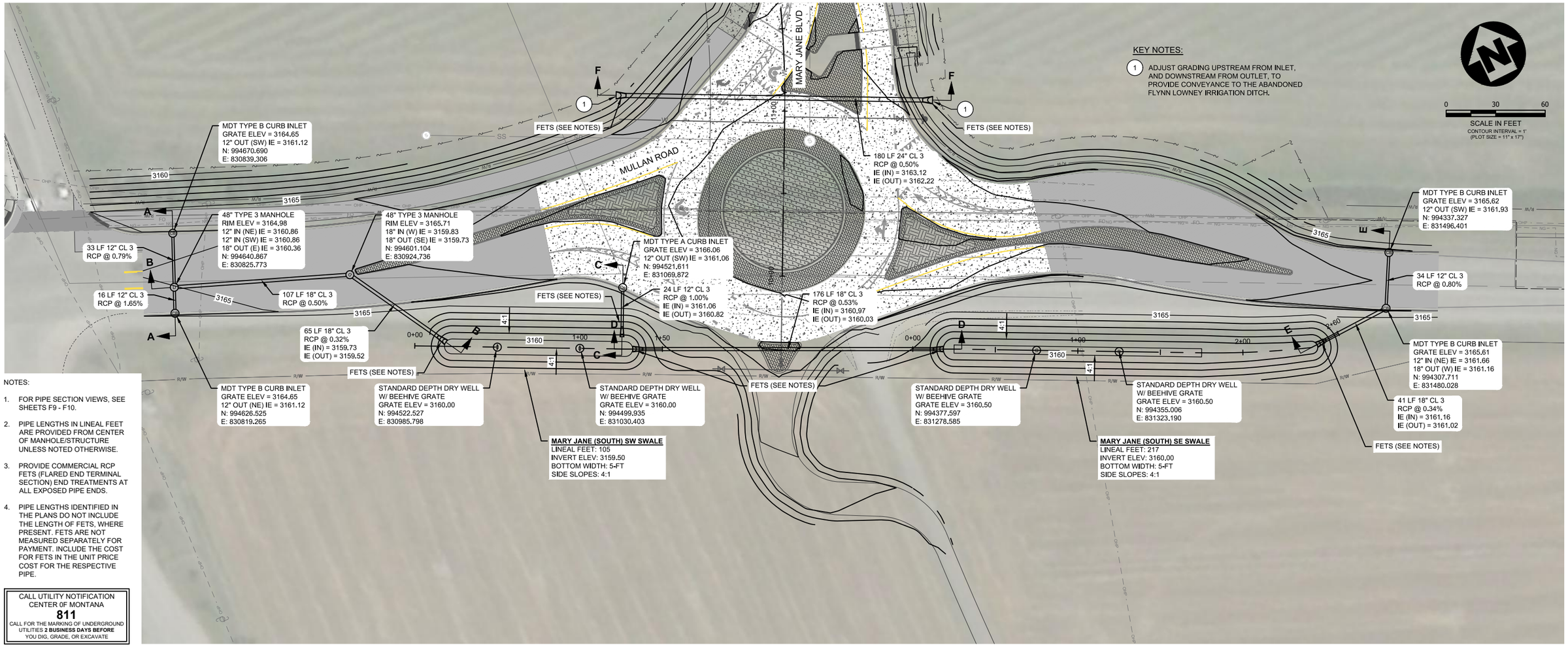
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive - Pipe Sections

SHEET F5 OF F25



NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEETS F9 - F10.
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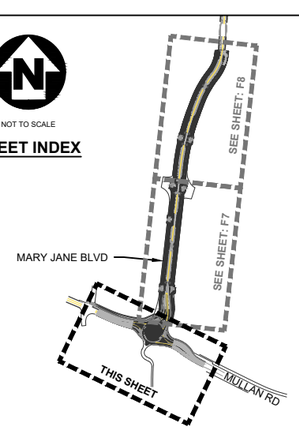
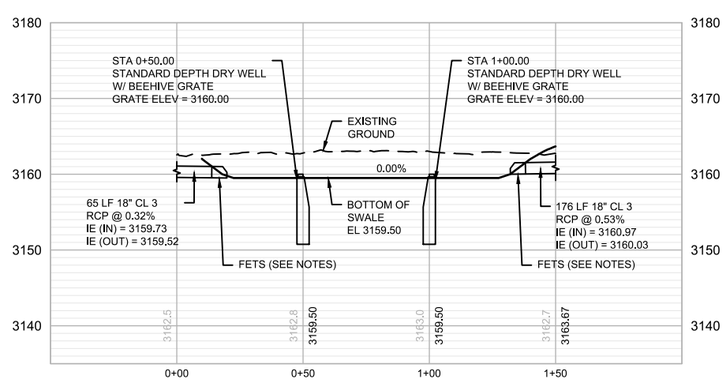
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

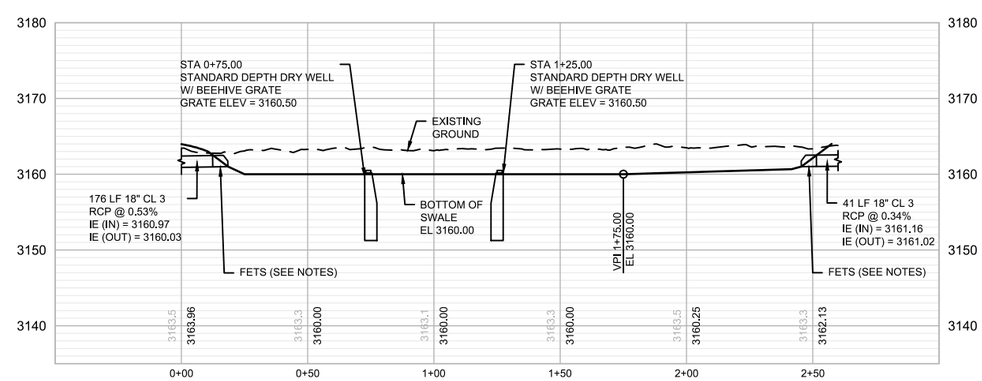
NOT TO SCALE

SHEET INDEX





MARY JANE (SOUTH) SW SWALE



MARY JANE (SOUTH) SE SWALE

REVISION	DATE	DESCRIPTION
-	-	-

DESIGNER - PROJ. NO. -
DRAWN - DATE -
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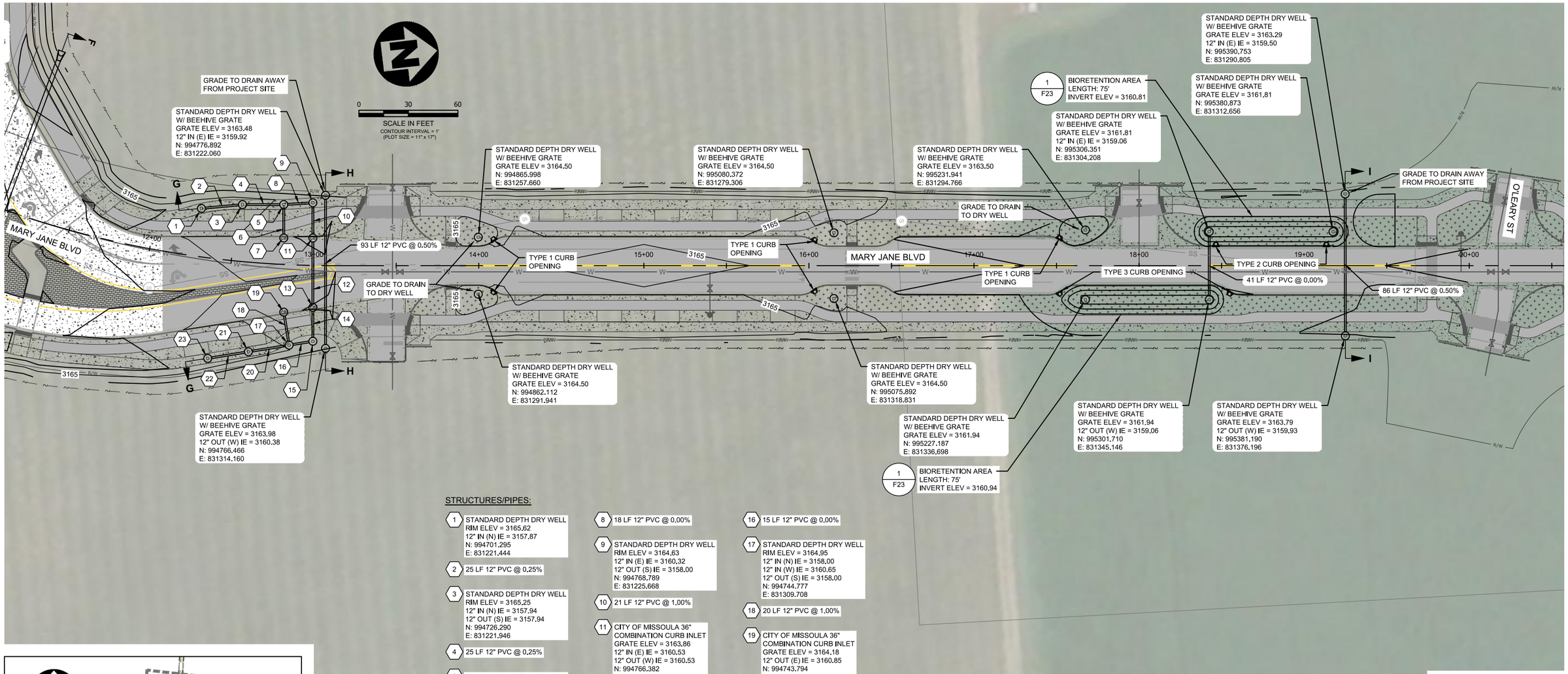
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (South)

SHEET F6 OF F25



STRUCTURES/PIPES:

1. STANDARD DEPTH DRY WELL
RIM ELEV = 3165.62
12" IN (N) IE = 3157.87
N: 994701.295
E: 831221.444

2. 25 LF 12" PVC @ 0.25%

3. STANDARD DEPTH DRY WELL
RIM ELEV = 3165.25
12" IN (N) IE = 3157.94
12" OUT (S) IE = 3157.94
N: 994726.290
E: 831221.946

4. 25 LF 12" PVC @ 0.25%

5. STANDARD DEPTH DRY WELL
RIM ELEV = 3164.88
12" IN (E) IE = 3160.59
12" IN (N) IE = 3158.00
12" OUT (S) IE = 3158.00
N: 994751.131
E: 831224.755

6. 20 LF 12" PVC @ 1.00%

7. CITY OF MISSOULA 36" COMBINATION CURB INLET
GRATE ELEV = 3164.12
12" OUT (W) IE = 3160.79
N: 994748.850
E: 831244.883

8. 18 LF 12" PVC @ 0.00%

9. STANDARD DEPTH DRY WELL
RIM ELEV = 3164.63
12" IN (E) IE = 3160.32
12" OUT (S) IE = 3158.00
N: 994768.789
E: 831225.668

10. 21 LF 12" PVC @ 1.00%

11. CITY OF MISSOULA 36" COMBINATION CURB INLET
GRATE ELEV = 3163.86
12" IN (E) IE = 3160.53
12" OUT (W) IE = 3160.53
N: 994766.382
E: 831246.871

12. 42 LF 12" PVC @ 0.00%

13. CITY OF MISSOULA 36" COMBINATION CURB INLET
GRATE ELEV = 3163.96
12" OUT (W) IE = 3160.53
12" OUT (E) IE = 3160.53
N: 994761.637
E: 831288.672

14. 20 LF 12" PVC @ 1.00%

15. STANDARD DEPTH DRY WELL
RIM ELEV = 3164.72
12" IN (W) IE = 3160.33
12" OUT (S) IE = 3158.00
N: 994759.330
E: 831309.000

16. 15 LF 12" PVC @ 0.00%

17. STANDARD DEPTH DRY WELL
RIM ELEV = 3164.95
12" IN (N) IE = 3158.00
12" IN (W) IE = 3160.65
12" OUT (S) IE = 3158.00
N: 994744.777
E: 831309.708

18. 20 LF 12" PVC @ 1.00%

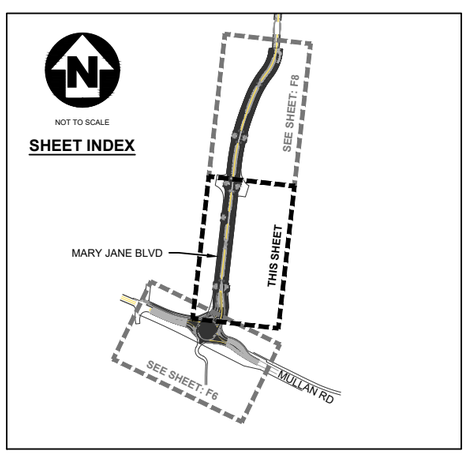
19. CITY OF MISSOULA 36" COMBINATION CURB INLET
GRATE ELEV = 3164.18
12" OUT (E) IE = 3160.85
N: 994743.794
E: 831289.483

20. 25 LF 12" PVC @ 0.25%

21. STANDARD DEPTH DRY WELL
RIM ELEV = 3165.29
12" IN (N) IE = 3157.94
12" OUT (S) IE = 3157.94
N: 994719.806
E: 831310.922

22. 25 LF 12" PVC @ 0.25%

23. STANDARD DEPTH DRY WELL
RIM ELEV = 3165.63
12" IN (N) IE = 3157.88
N: 994694.836
E: 831312.136



NOTES:

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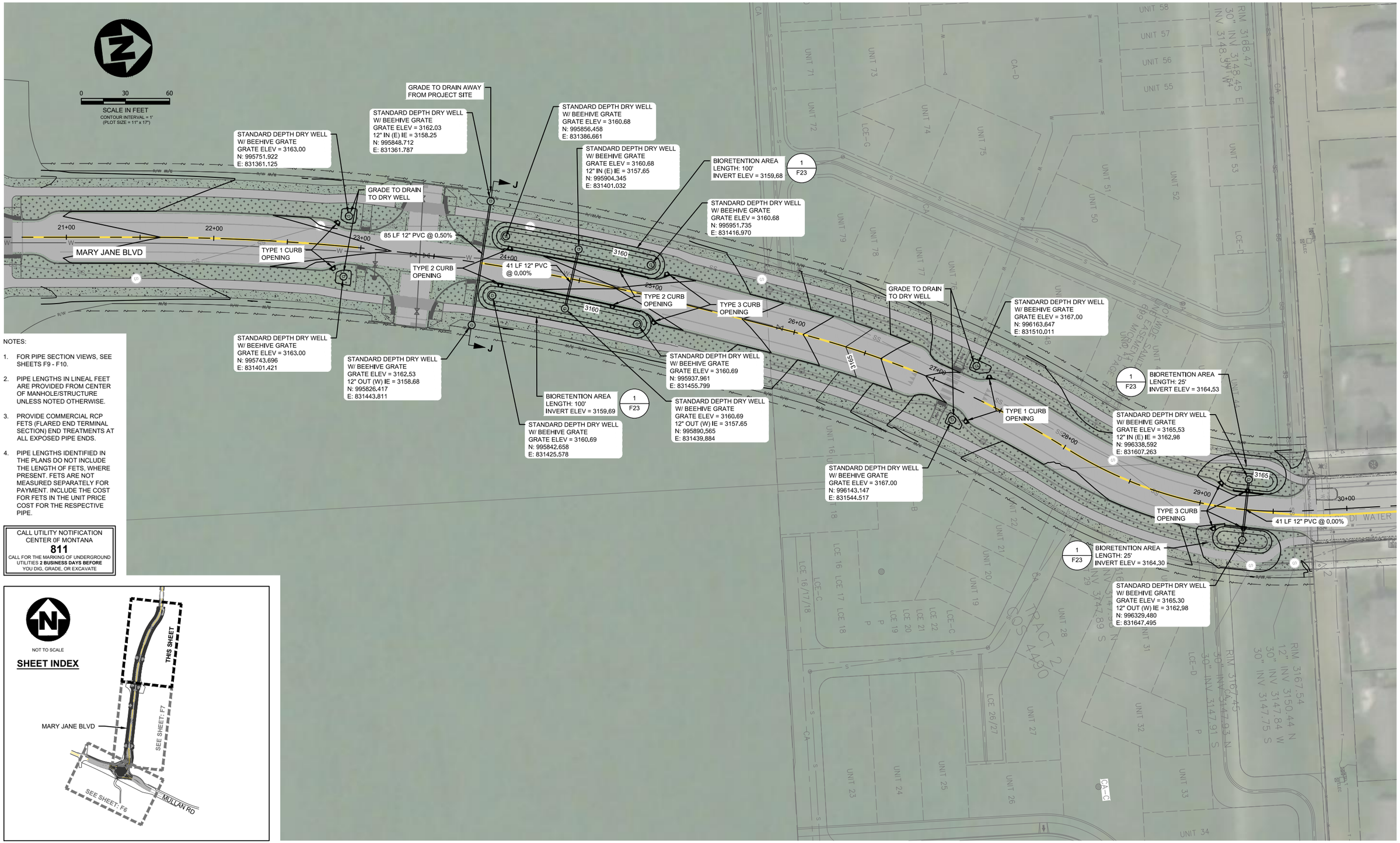
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (South)

SHEET F7 OF F25



REVISION	DATE	DESCRIPTION
-	-	-

DESIGNER - PROJ. NO. -
DRAWN - DATE -
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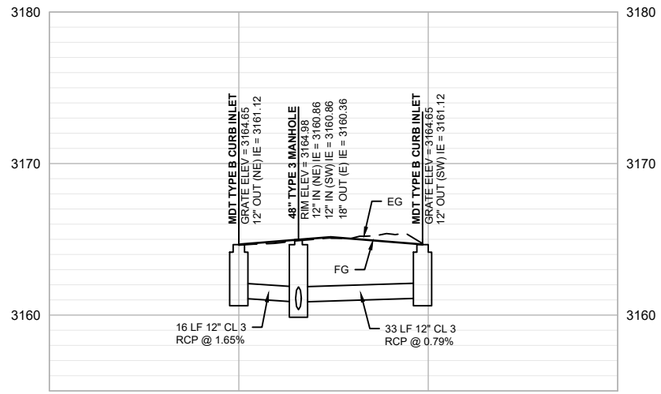
DJ&A ENGINEERS PLANNERS SURVEYORS

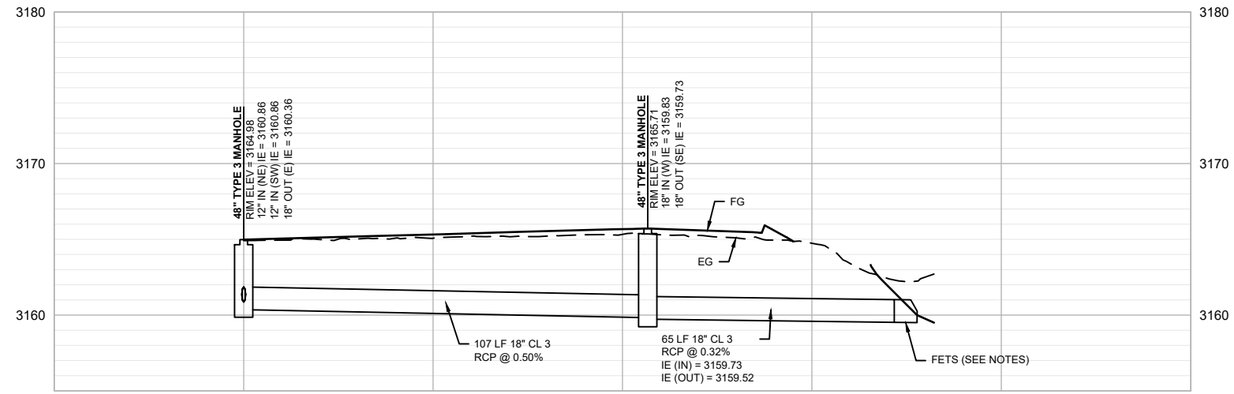
Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (South)

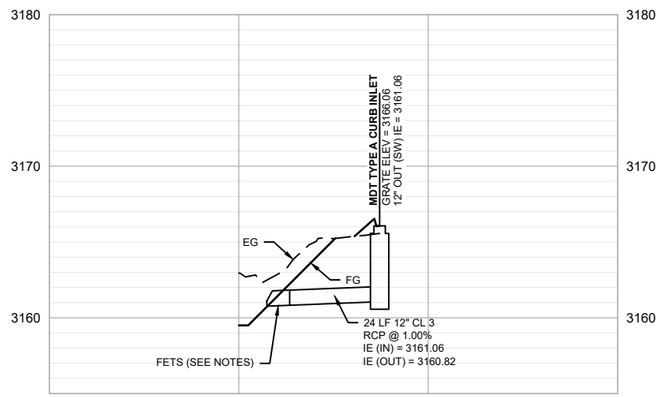
SHEET F8 OF F25



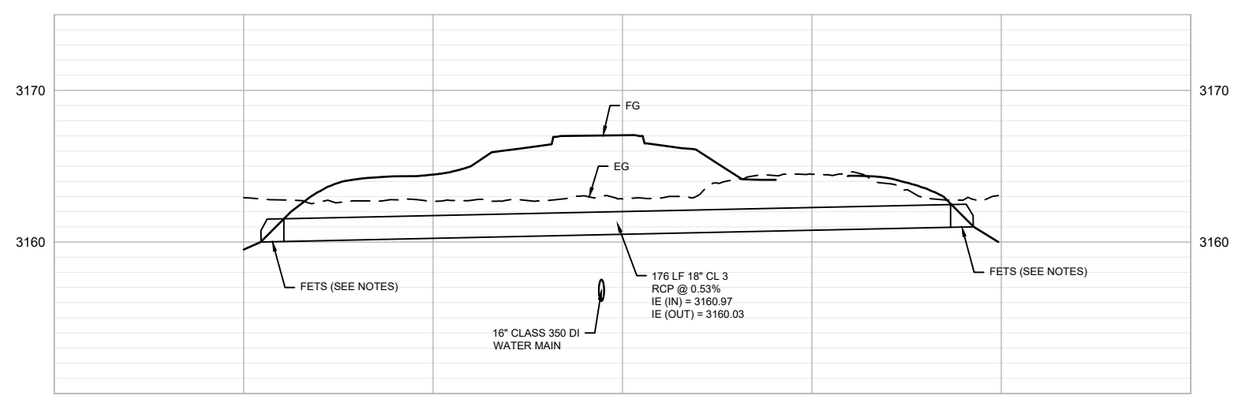
SECTION A-A



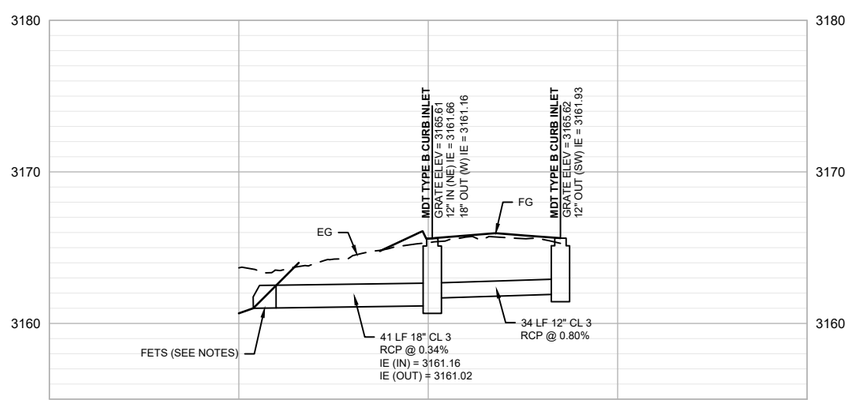
SECTION B-B



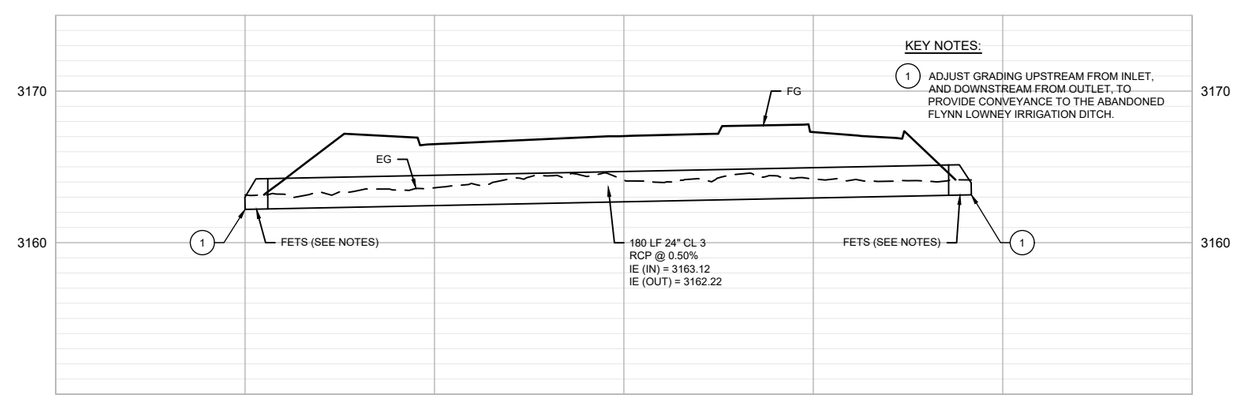
SECTION C-C



SECTION D-D



SECTION E-E



SECTION F-F

KEY NOTES:

1. ADJUST GRADING UPSTREAM FROM INLET, AND DOWNSTREAM FROM OUTLET, TO PROVIDE CONVEYANCE TO THE ABANDONED FLYNN LOWNEY IRRIGATION DITCH.

CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

EG = EXISTING GROUND
FG = FINISHED GRADE
DW = DRY WELL

NOTES:

1. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.
2. PIPE LENGTHS IDENTIFIED IN THE PLANS DO NOT INCLUDE THE LENGTH OF FETS, WHERE PRESENT. FETS ARE NOT MEASURED SEPARATELY FOR PAYMENT. INCLUDE THE COST FOR FETS IN THE UNIT PRICE COST FOR THE RESPECTIVE PIPE.

REVISION	DATE	DESCRIPTION
-	-	-

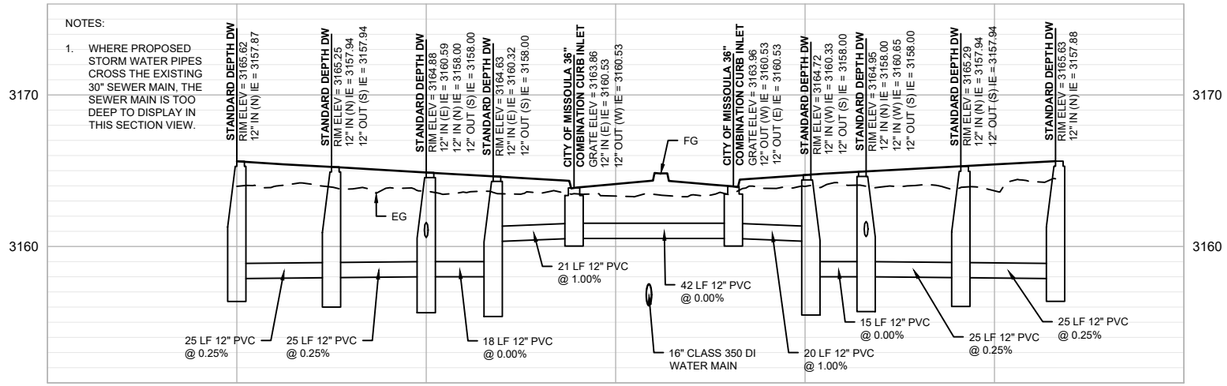
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED D,S&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (South) - Pipe Sections

SHEET F9 OF F25



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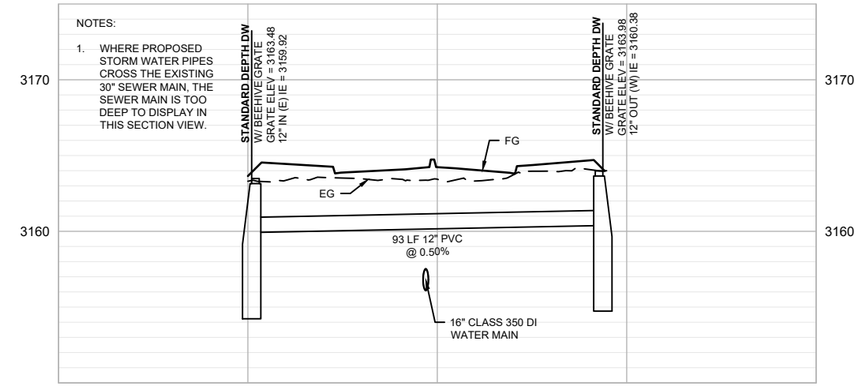
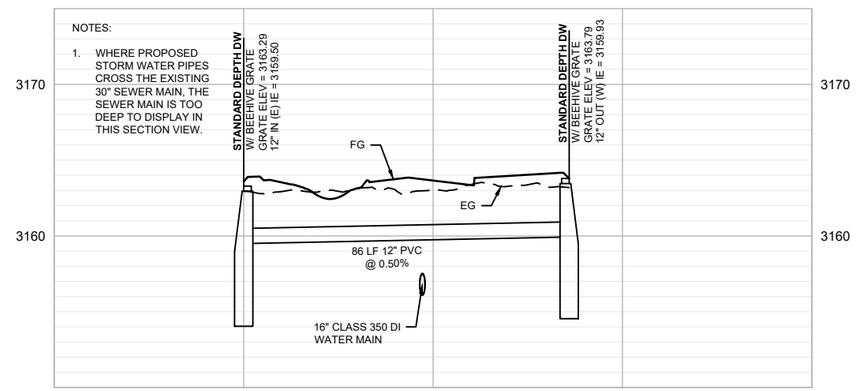
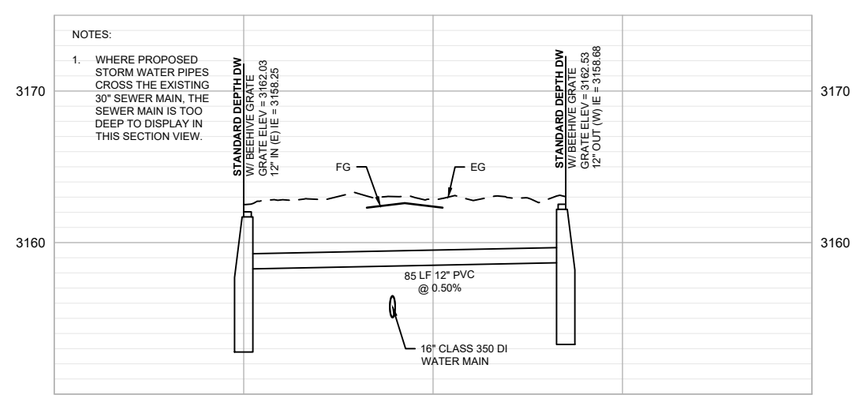


SECTION H-H



SECTION I-I



SECTION J-J

CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

EG = EXISTING GROUND
FG = FINISHED GRADE
DW = DRY WELL

NOTES:

1. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.

REVISION	DATE	DESCRIPTION
-	-	-

DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (South) - Pipe Sections

SHEET F10 OF F25

0 30 60

SCALE IN FEET

CONTOUR INTERVAL = 1'
(PLOT SIZE = 11" x 17")

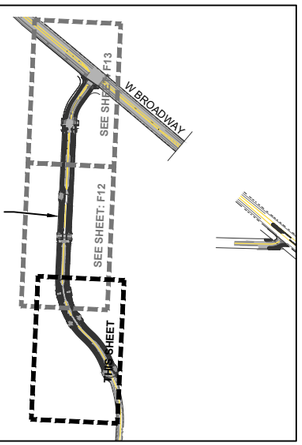
NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEET F14.
2. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.
3. PROVIDE COMMERCIAL RCP FETS (FLARED END TERMINAL SECTION) END TREATMENTS AT ALL EXPOSED PIPE ENDS.
4. PIPE LENGTHS IDENTIFIED IN THE PLANS DO NOT INCLUDE THE LENGTH OF FETS, WHERE PRESENT. FETS ARE NOT MEASURED SEPARATELY FOR PAYMENT. INCLUDE THE COST FOR FETS IN THE UNIT PRICE COST FOR THE RESPECTIVE PIPE.

CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

NOT TO SCALE

SHEET INDEX



GRADE TO DRAIN TO DRY WELL

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3174.00 N: 1000047.718 E: 831393.378

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3173.00 N: 999842.606 E: 831450.782

TYPE 1 CURB OPENING

GRADE TO DRAIN TO DRY WELL

TYPE 1 CURB OPENING

GRADE TO DRAIN AWAY FROM PROJECT SITE

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3173.00 N: 999862.318 E: 831486.090

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3171.82 12" IN (NE) IE = 3168.48 N: 999752.982 E: 831480.950

85 LF 12" PVC @ 0.50%

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3174.00 N: 1000051.436 E: 831433.829

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3170.59 N: 999746.949 E: 831513.881

GRADE TO DRAIN TO DRY WELL

TYPE 2 CURB OPENING

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3172.97 12" OUT (SW) IE = 3168.91 N: 999804.982 E: 831548.199

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3170.59 12" IN (NE) IE = 3167.21 N: 999707.339 E: 831550.998

1 F23

BIORETENTION AREA LENGTH: 100' INVERT ELEV = 3169.59

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3170.63 N: 999770.338 E: 831548.074

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3170.59 N: 999675.334 E: 831584.678

TYPE 2 CURB OPENING

41 LF 12" PVC @ 0.00%

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3170.63 12" OUT (SW) IE = 3167.21 N: 999737.026 E: 831579.566

TYPE 3 CURB OPENING

BIORETENTION AREA LENGTH: 100' INVERT ELEV = 3169.63

1 F23

DOUBLE DEPTH DRY WELL W/ BEEHIVE GRATE GRATE ELEV = 3170.63 N: 999699.927 E: 831618.203

CAMDEN ST

MARY JANE BLVD

REVISION	DATE	DESCRIPTION
-	-	-

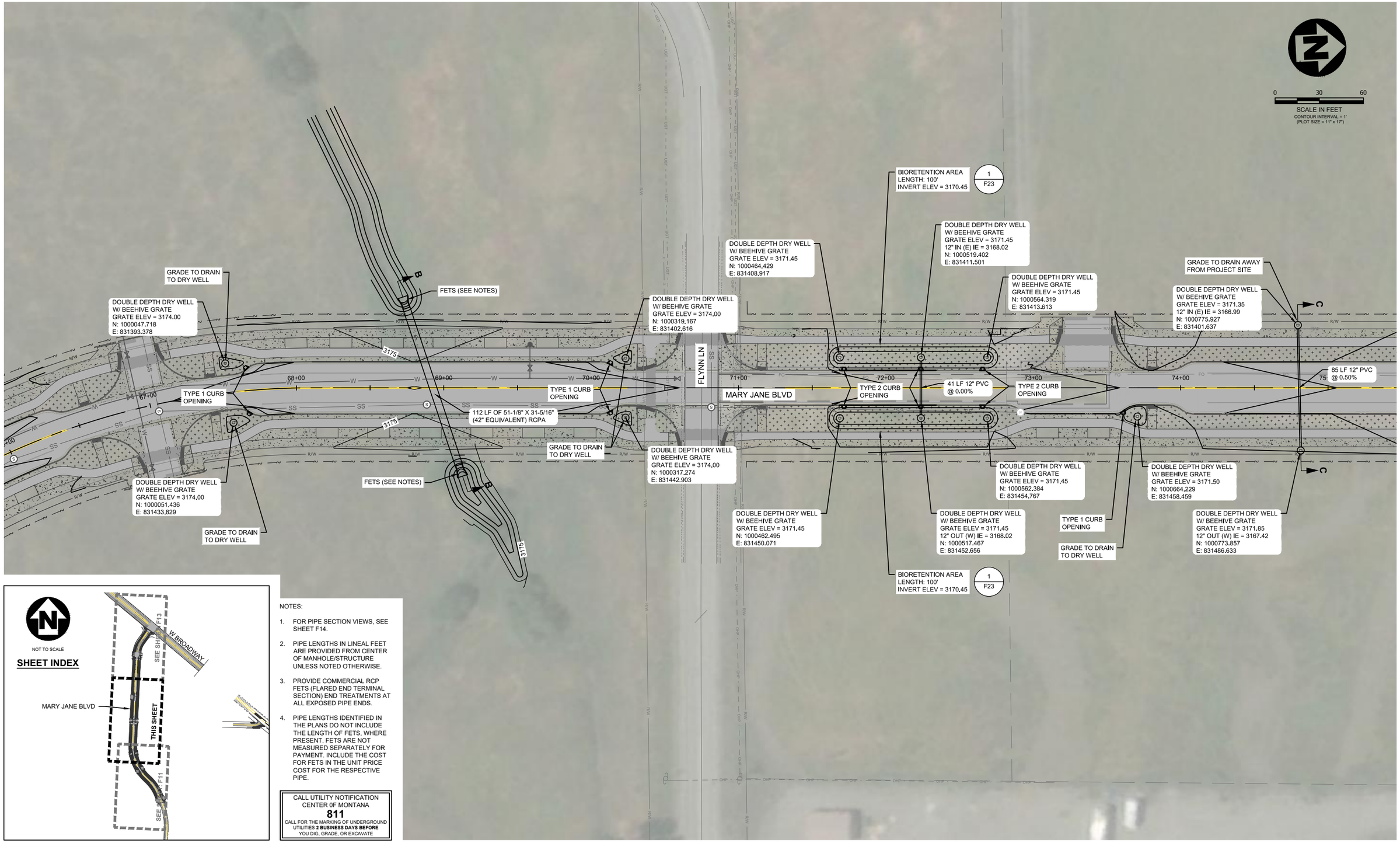
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (North)

SHEET F11 OF F25



NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEET F14.
2. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.
3. PROVIDE COMMERCIAL RCP FETS (FLARED END TERMINAL SECTION) END TREATMENTS AT ALL EXPOSED PIPE ENDS.
4. PIPE LENGTHS IDENTIFIED IN THE PLANS DO NOT INCLUDE THE LENGTH OF FETS, WHERE PRESENT. FETS ARE NOT MEASURED SEPARATELY FOR PAYMENT. INCLUDE THE COST FOR FETS IN THE UNIT PRICE COST FOR THE RESPECTIVE PIPE.

CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

REVISION	DATE	DESCRIPTION
-	-	-

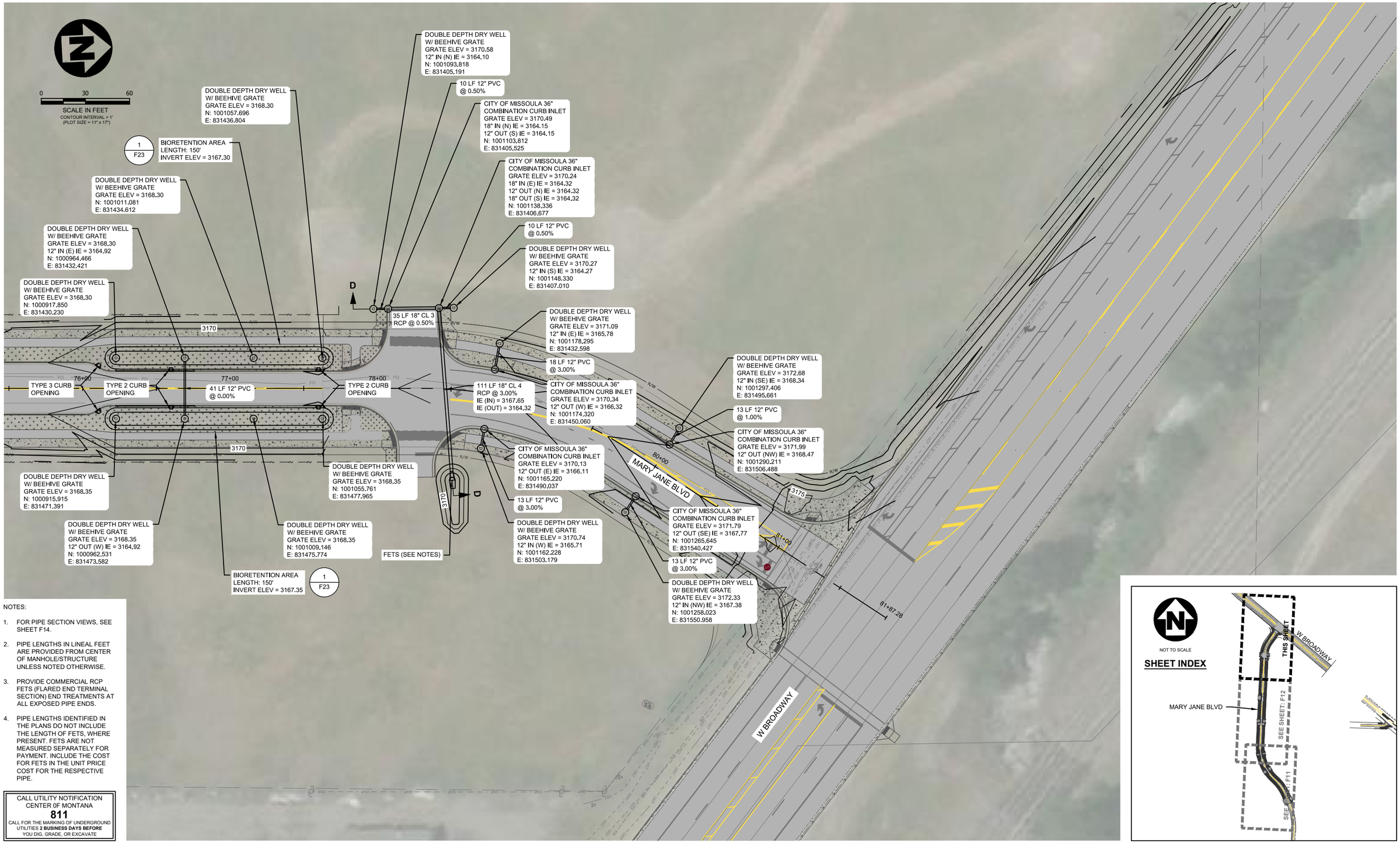
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (North)

SHEET F12 OF F25



NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEET F14.
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CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

REVISION	DATE	DESCRIPTION
-	-	-

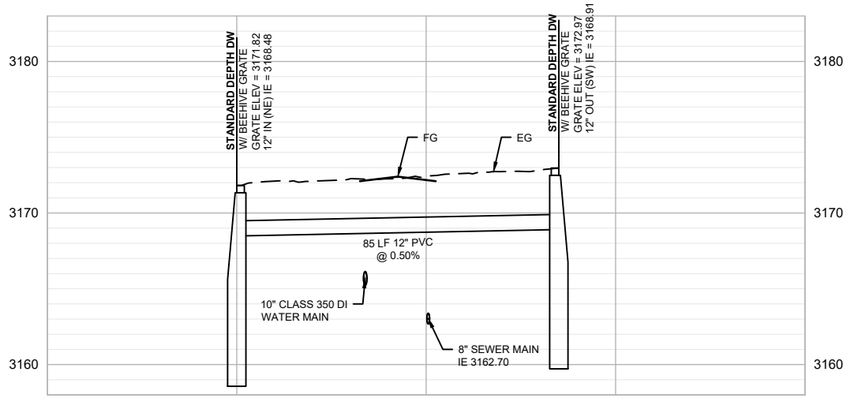
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

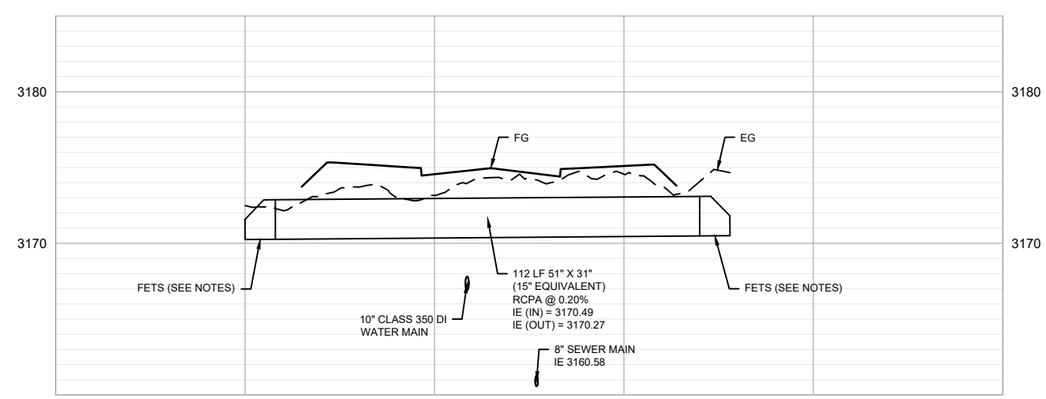
Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (North)

SHEET F13 OF F25



SECTION A-A



SECTION B-B

CALL UTILITY NOTIFICATION
CENTER 0F MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND
UTILITIES **2 BUSINESS DAYS BEFORE**
YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

EG = EXISTING GROUND
FG = FINISHED GRADE
DW = DRY WELL

NOTES:

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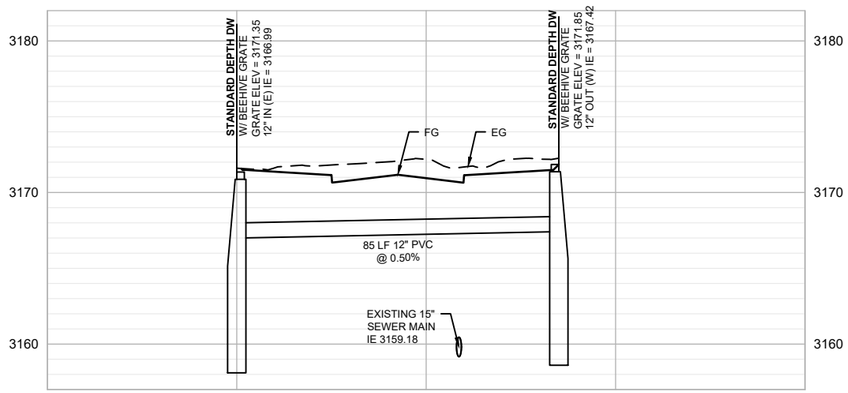
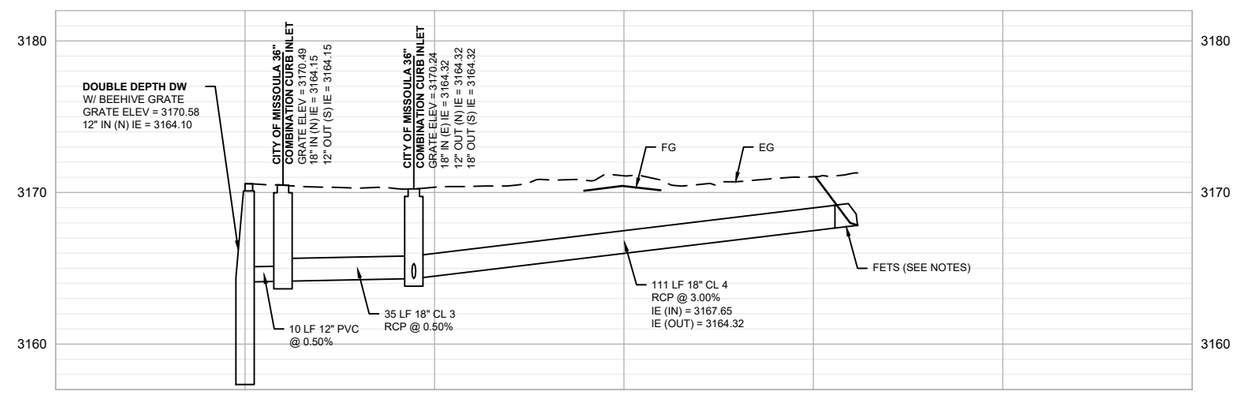


SECTION C-C



SECTION D-D

REVISION	DATE	DESCRIPTION
-	-	-

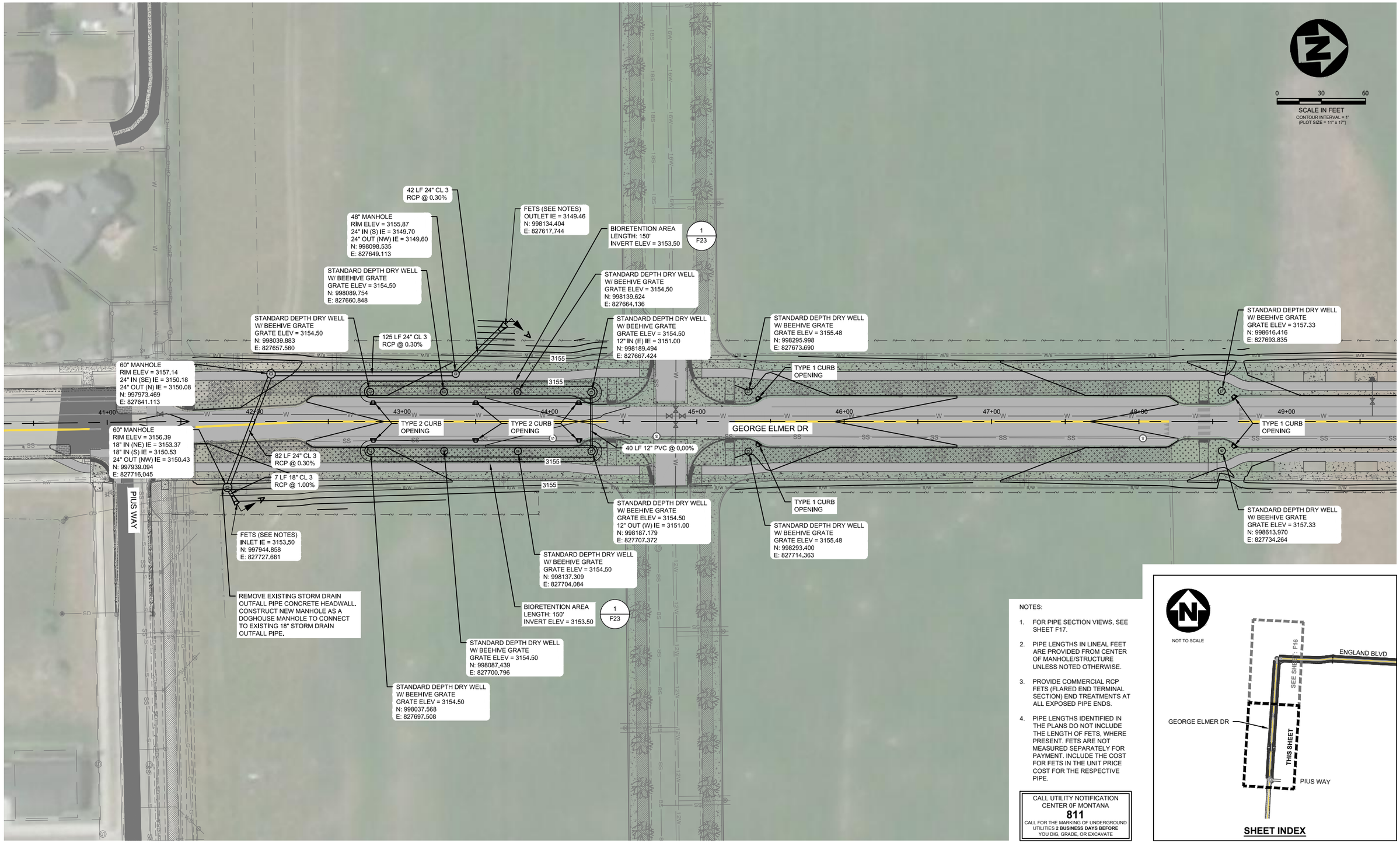
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

Mary Jane Blvd. (North) - Pipe Sections

SHEET F14 OF F25



NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEET F17.
2. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.
3. PROVIDE COMMERCIAL RCP FETS (FLARED END TERMINAL SECTION) END TREATMENTS AT ALL EXPOSED PIPE ENDS.
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CALL UTILITY NOTIFICATION CENTER 0F MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

NOT TO SCALE

SHEET INDEX

REVISION	DATE	DESCRIPTION
-	-	-

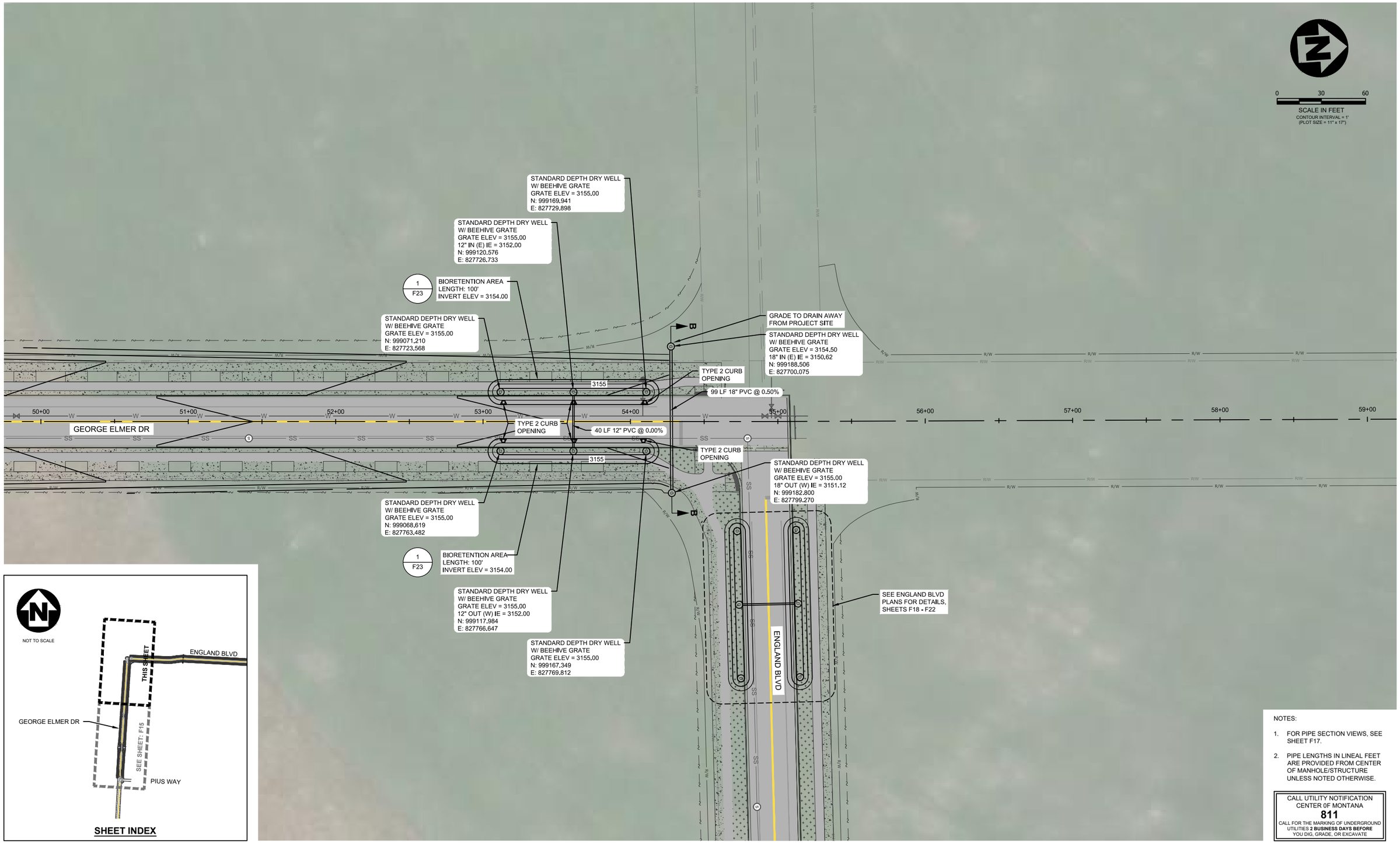
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive

SHEET F15 OF F25



NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEET F17.
2. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.

CALL UTILITY NOTIFICATION CENTER 0F MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

REVISION	DATE	DESCRIPTION
-	-	-

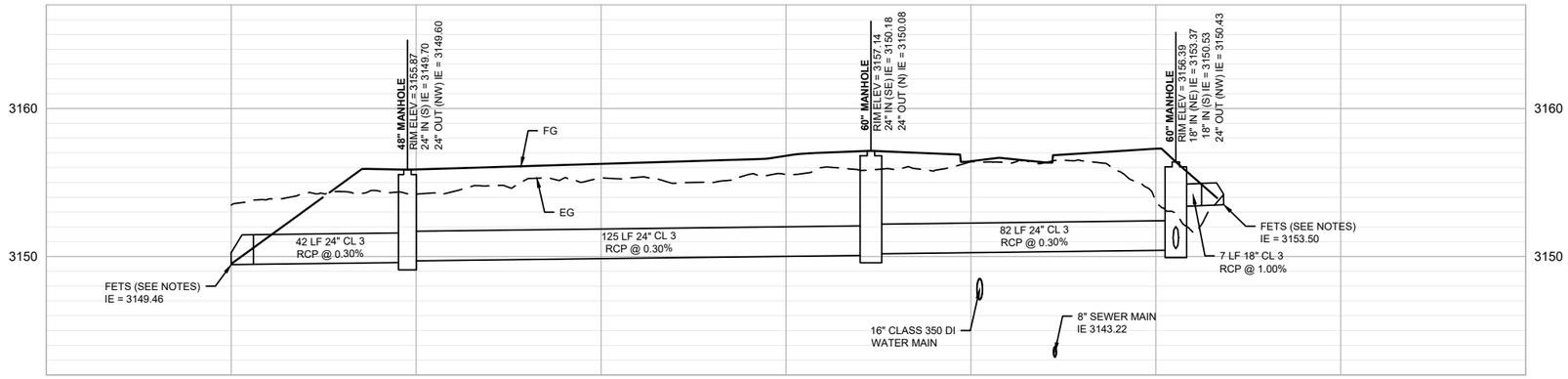
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

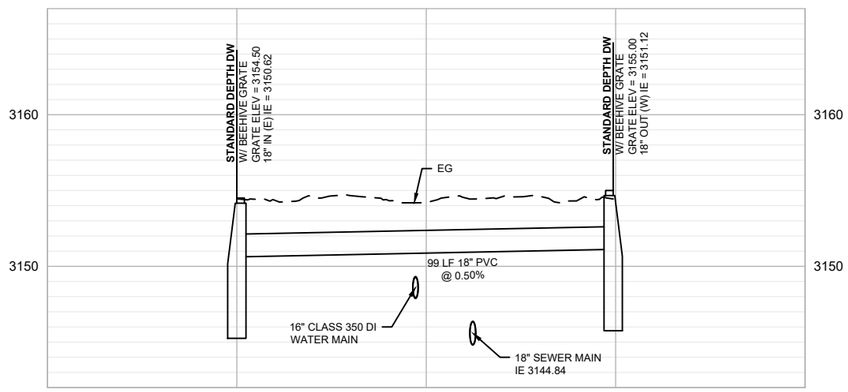
Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive

SHEET F16 OF F25



SECTION A-A



SECTION B-B

CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

EG = EXISTING GROUND
FG = FINISHED GRADE
DW = DRY WELL

NOTES:

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REVISION	DATE	DESCRIPTION
-	-	-

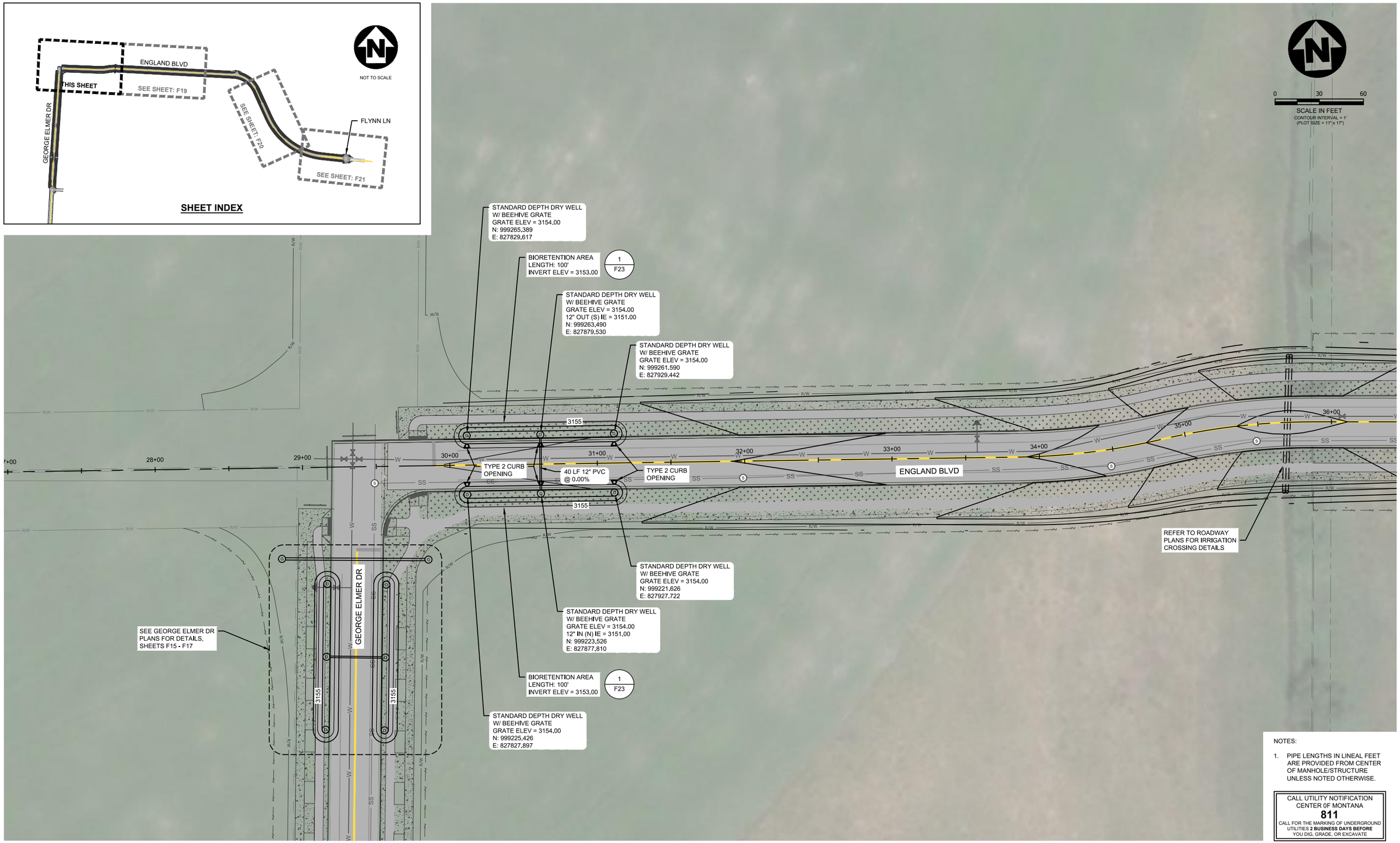
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

George Elmer Drive - Pipe Sections

SHEET F17 OF F25



NOTES:

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CALL UTILITY NOTIFICATION CENTER 0F MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

REVISION	DATE	DESCRIPTION
-	-	-

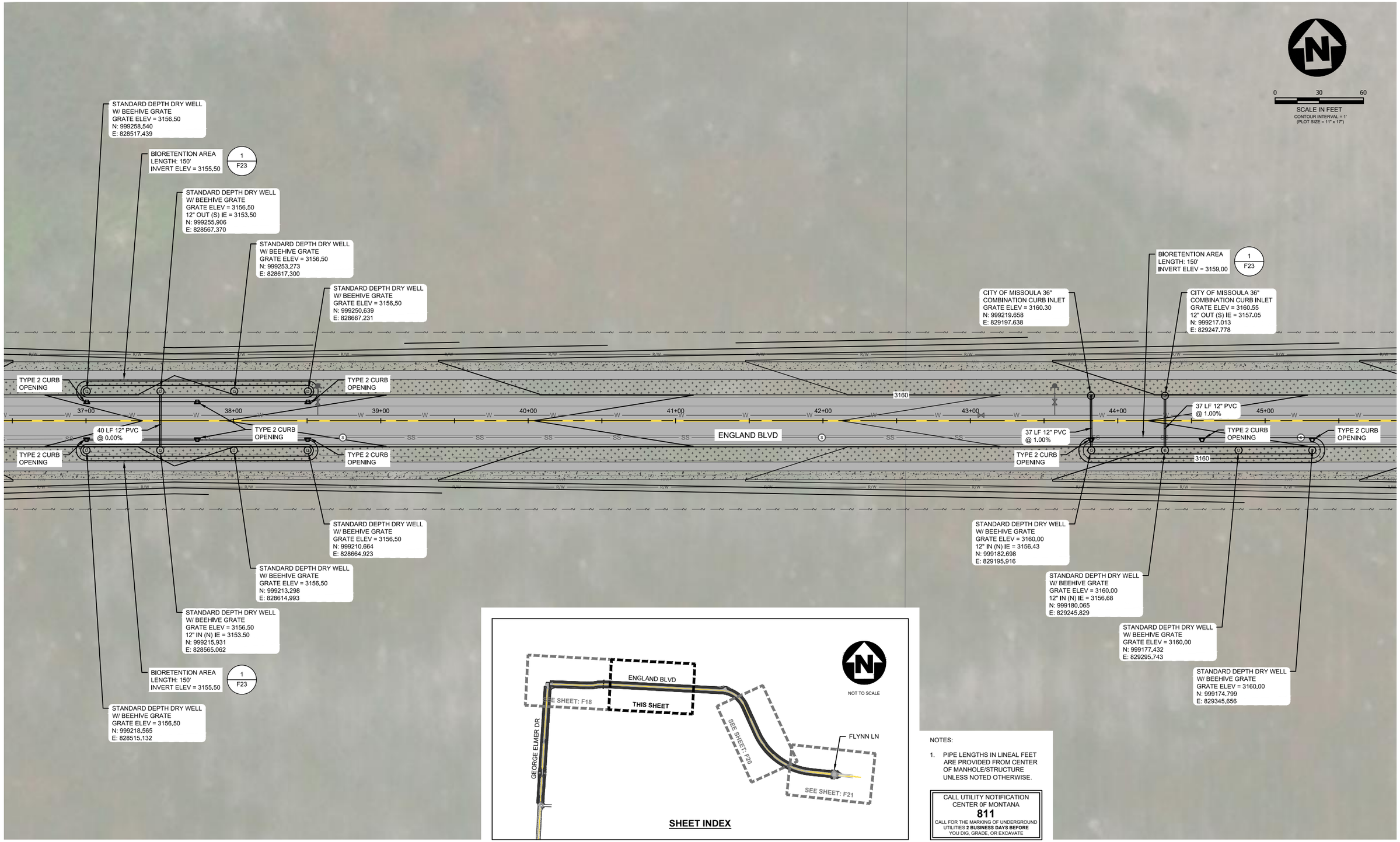
DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED DJ&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

England Blvd.

SHEET F18 OF F25



NOTES:

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CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE

REVISION	DATE	DESCRIPTION
-	-	-

DESIGNER - PROJ. NO. -
DRAWN - DATE -
CHECKED - SURVEYED D,&A, P.C.

DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

England Blvd.

SHEET F19 OF F25

0 30 60
SCALE IN FEET
CONTOUR INTERVAL = 1'
(PLOT SIZE = 11" x 17")

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
N: 999009.503
E: 829996.930

BIORETENTION AREA
LENGTH: 100'
INVERT ELEV = 3159.00

1
F23

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
12" OUT (W) IE = 3157.00
N: 998964.022
E: 830017.578

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
N: 998918.540
E: 830038.226

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3162.83
12" OUT (SW) IE = 3158.25
N: 998785.023
E: 830123.572

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
N: 998557.673
E: 830222.145

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
12" OUT (SW) IE = 3156.50
N: 998519.506
E: 830254.378

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
N: 998483.054
E: 830288.538

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
N: 998448.414
E: 830324.535

1
F23

BIORETENTION AREA
LENGTH: 150'
INVERT ELEV = 3158.50

TYPE 3 CURB
OPENING

TYPE 2 CURB
OPENING

TYPE 3 CURB
OPENING

42 LF 12" PVC
@ 0.00%

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
N: 998423.683
E: 830292.190

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
N: 998457.448
E: 830255.270

BIORETENTION AREA
LENGTH: 150'
INVERT ELEV = 3158.50

1
F23

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
N: 998533.452
E: 830190.312

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3159.50
12" IN (NE) IE = 3156.50
N: 998494.120
E: 830221.234

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3162.33
12" IN (NE) IE = 3157.83
N: 998749.889
E: 830046.198

GRADE TO DRAIN AWAY
FROM PROJECT SITE

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
N: 998861.846
E: 830020.034

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
N: 998907.360
E: 829999.334

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
12" IN (E) IE = 3157.00
N: 998952.874
E: 829978.634

BIORETENTION AREA
LENGTH: 150'
INVERT ELEV = 3159.00

1
F23

STANDARD DEPTH DRY WELL
W/ BEEHIVE GRATE
GRATE ELEV = 3160.00
N: 998998.388
E: 829957.934

TYPE 3 CURB
OPENING

41 LF 12" PVC
@ 0.00%

TYPE 2 CURB
OPENING

TYPE 3 CURB
OPENING

85 LF 12" PVC
@ 0.50%

ENGLAND BLVD

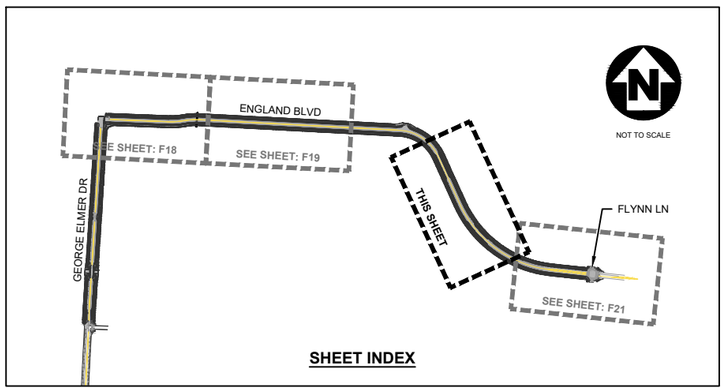
52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00

3160

NOTES:

1. FOR PIPE SECTION VIEWS, SEE SHEET F22.
2. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.

CALL UTILITY NOTIFICATION
CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE



REVISION	DATE	DESCRIPTION
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DESIGNER - PROJ. NO. -
DRAWN - DATE -
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DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

England Blvd.

SHEET F20 OF F25

0 30 60

SCALE IN FEET

CONTOUR INTERVAL = 1'
(PLOT SIZE = 11" x 17")

CITY OF MISSOULA 36"
COMBINATION CURB INLET
GRATE ELEV = 3163.91
12" OUT (N) IE = 3160.41
N: 998271.291
E: 830722.737

STANDARD DEPTH DRY WELL
RIM ELEV = 3164.50
12" IN (S) IE = 3160.33
N: 998279.244
E: 830723.608

8 LF 12" PVC
@ 1.00%

8 LF 12" PVC
@ 1.00%

CITY OF MISSOULA 36"
COMBINATION CURB INLET
GRATE ELEV = 3163.91
12" OUT (S) IE = 3160.41
N: 998237.494
E: 830719.027

STANDARD DEPTH DRY WELL
RIM ELEV = 3164.50
12" IN (N) IE = 3160.33
N: 998229.542
E: 830718.156

62+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00

3165

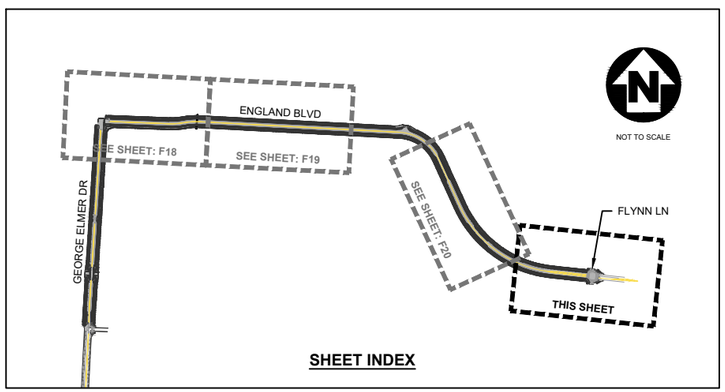
ENGLAND BLVD

FLYNN LN

NOTES:

1. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.

CALL UTILITY NOTIFICATION CENTER OF MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND UTILITIES **2 BUSINESS DAYS BEFORE** YOU DIG, GRADE, OR EXCAVATE



SHEET INDEX

REVISION	DATE	DESCRIPTION
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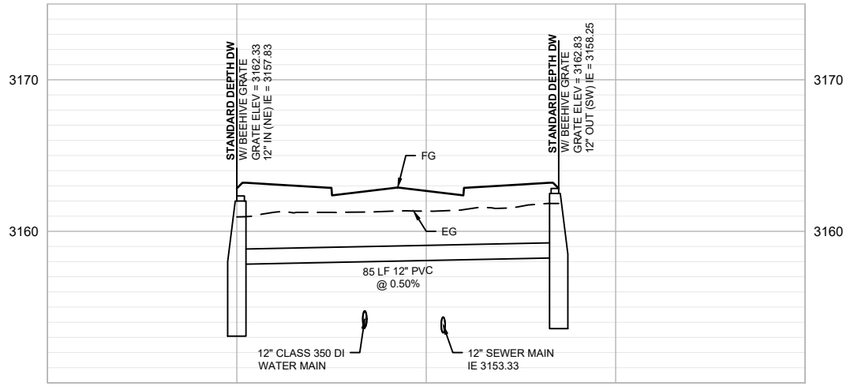
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

England Blvd.

SHEET F21 OF F25



SECTION A-A

CALL UTILITY NOTIFICATION
CENTER 0F MONTANA
811
CALL FOR THE MARKING OF UNDERGROUND
UTILITIES **2 BUSINESS DAYS BEFORE**
YOU DIG, GRADE, OR EXCAVATE

0 20 40
HORIZONTAL SCALE IN FEET

ABBREVIATIONS:

EG = EXISTING GROUND
FG = FINISHED GRADE
DW = DRY WELL

NOTES:

1. PIPE LENGTHS IN LINEAL FEET ARE PROVIDED FROM CENTER OF MANHOLE/STRUCTURE UNLESS NOTED OTHERWISE.

REVISION	DATE	DESCRIPTION
-	-	-

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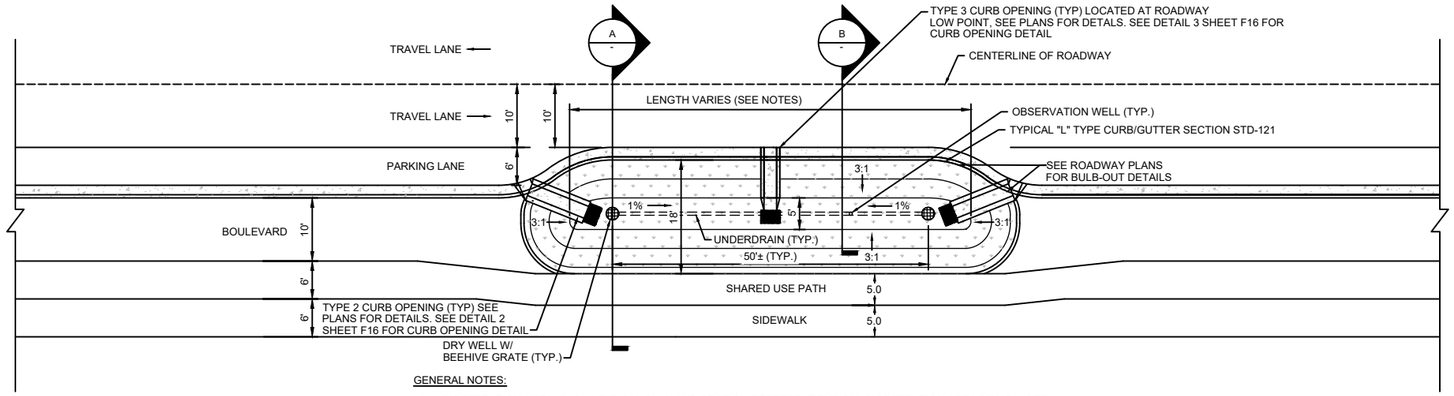
DJ&A ENGINEERS PLANNERS SURVEYORS

Mullan BUILD - Drainage - Stormwater - Irrigation

England Blvd. - Pipe Sections

SHEET F22 OF F25



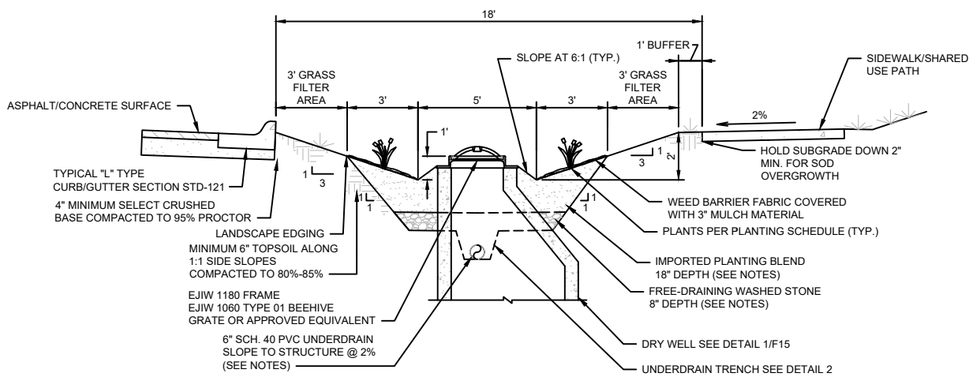
GENERAL NOTES:

1. BIORETENTION AREA (BASIN) TYPICAL PLAN AND SECTION REPRESENT TYPICAL BIORETENTION AREA DESIGN. SEE INDIVIDUAL PLAN SHEETS FOR SPECIFIC DETAILS ON BIORETENTION AREA, INCLUDING LOCATIONS, LENGTHS, ELEVATIONS, NUMBER OF DRY WELLS, ETC.

2. BIORETENTION AREA LENGTH IDENTIFIED IN THE PLAN SHEETS AND PROVIDED FOR THE BASIS OF MEASUREMENT AND PAYMENT MEASURED ALONG THE INVERT OF THE BIORETENTION AREA.

1 TYPICAL BIORETENTION AREA (BASIN) PLAN

NTS



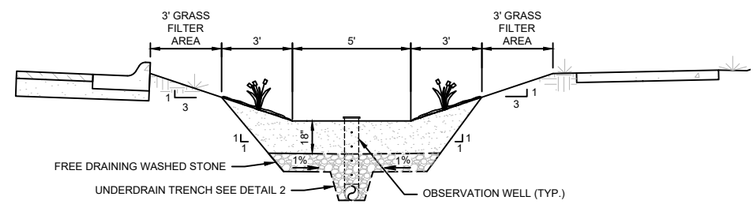
GENERAL NOTES:

1. DRY WELL/INLET SHALL BE INSTALLED A MINIMUM OF 8 FT FROM THE NEAREST INLET TO PREVENT DIRECT INFLOW INTO THE OVERFLOW GRATE.

2. THE CITY OF MISSOULA STORM WATER DEPARTMENT SHALL BE CONSULTED FOR PROPER PLANT SELECTION IN SWALE.

A TYPICAL BIORETENTION BASIN AREA SECTION

NTS



B OBSERVATION WELL

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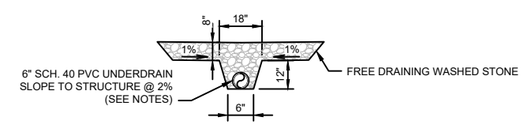

2 UNDERDRAIN TRENCH

NTS

BIORETENTION AREA NOTES:

1. APPLY APPROPRIATE EROSION CONTROL MEASURES TO MINIMIZE EROSION DURING CONSTRUCTION.

2. IF USED AS A CONSTRUCTION STORMWATER MANAGEMENT BMP, THIS BIORETENTION BASIN SHOULD BE DEWATERED, DREDGED, AND REGRADED PRIOR TO POST-CONSTRUCTION IMPLEMENTATION.

3. UNDERDRAIN PIPE SHALL BE 6" ASTM D1785-12 SCHEDULE 40 SLOTTED PVC PIPE.

   3.1. SLOTS SHALL BE CUT PERPENDICULAR TO THE LONG AXIS OF THE PIPE, 0.04" x 1" LONG, AND SPACED LONGITUDINALLY 1/4" APART. SLOTS SHOULD BE ARRANGED IN TWO ROWS SPACED ON 45-DEGREE CENTERS AND COVER ONE-HALF OF THE CIRCUMFERENCE OF THE PIPE.
   3.2. INSTALL WITH SLOTS ORIENTED ON THE BOTTOM OF THE PIPE.
   3.3. UNDERDRAIN PIPE SHALL NOT BE WRAPPED IN FILTER FABRIC.

4. A 3-INCH SURFACE COVER LAYER OF MULCH SHALL BE INSTALLED PER LANDSCAPING PLAN.

5. BIORETENTION SOIL MEDIA (IMPORTED PLANTING BLEND) SHALL MEET THE FOLLOWING CRITERIA. SOIL MEDIA MIX DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

   5.1. SOIL MIX COMPACTED TO 80% SHALL BE 20% TO 30% SCREENED TOPSOIL, 20% TO 30% ORGANIC MATER AND 50% TO 60% CLEAN SAND BY VOLUME.
   5.2. THE SAND PORTION OF THE SOIL MIX SHALL MEET THE FOLLOWING:

      5.2.1. CLASSIFICATION OF SANDY LOAM OR LOAMY SAND ON THE USDA TEXTURAL TRIANGLE.
      5.2.2. CONTAINING LESS THAN 8-12% FINES (SILTS AND CLAYS).
      5.2.3. GRADATION THAT ALIGNS WITH WASHED MEDIUM SAND OR ASTM C-33 STANDARD SPECIFICATION FOR CONCRETE AGGREGATES.
      5.2.4. COEFFICIENT OF UNIFORMITY OF LESS THAN FOUR AND COEFFICIENT OF CURVATURE BETWEEN ONE AND THREE.

6. SUBSTITUTION OF 'EQUIVALENT' MATERIALS SHALL BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK.

7. ALL MATERIAL AND PRODUCTS SHALL BE PLACED OR INSTALLED AS PER MANUFACTURER SPECIFICATIONS FOR WARRANTY INSTALLATION.

8. BIORETENTION AREA BOTTOM IN SITU SOILS SHALL NOT BE COMPACTED. IF COMPACTION OCCURS. RIP COMPACTED SURFACE TO A DEPTH OF 18 INCHES.

9. GRASS FILTER STRIP, COMPACTED TO 80%-85%, INSTALLATION SHALL HAVE ONE OF THE FOLLOWING OPTION SELECTED:

   9.1. SOD SHALL BE LAID.
   9.2. AREA SHALL BE HYDROSEEDED AND HYDROMULCHED.
   9.3. EROSION CONTROL BLANKET, NAG S751BN OR EQUIVALENT SHALL BE INSTALLED AFTER SEEDING.

10. OBSERVATION WELL, ONE REQUIRED PER BIORETENTION AREA, SHALL CONSIST OF:

   10.1. 36" X 6" SCHEDULE 40 PVC PIPE SECTION.
   10.2. DRILLED WITH 1/2" HOLES ON FOUR FACES OF PIPE SECTION AT 6" O/C.
   10.3. INSTALLED AND SECURED PIPE CAP ON SCHEDULE 40 PVC PIPE SECTION OBSERVATION WELL.
   10.4. WRAP SCHEDULE 40 PVC PIPE SECTION IN FILTER FABRIC TO PREVENT SOIL CONTAMINATION IN OBSERVATION WELL.

11. FREE-DRAINING ANGULAR OR CRUSHED WASHED STONE SHALL BE 3/4"-2" DIAMETER MATERIAL AND SURROUNDED WITH TENCATE MIRAFI (R) RSI SERIES GEOTEXTILE OR APPROVED EQUIVALENT - TOP, BOTTOM, AND ALL SIDES-OVERLAP SEAMS AND SECURE IN PLACE.

BIORETENTION AREA BULB-OUT PLANT SCHEDULE

SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	CONTAINER SIZE
ORNAMENTAL GRASSES				
JB	X PER LINEAR FOOT OF BIORETENTION AREA LENGTH (TO BE DETERMINED FOR FINAL DESIGN AND INCORPORATED INTO A LANDSCAPE PLAN)	JUNCUS BALTICUS	BALTIC RUSH	1 GAL
FORBS				
HA	X PER LINEAR FOOT OF BIORETENTION AREA LENGTH (TO BE DETERMINED FOR FINAL DESIGN AND INCORPORATED INTO A LANDSCAPE PLAN)	HELENIUM AUTUMNALE	SNEEZEWEED	1 GAL
AM	X PER LINEAR FOOT OF BIORETENTION AREA LENGTH (TO BE DETERMINED FOR FINAL DESIGN AND INCORPORATED INTO A LANDSCAPE PLAN)	ACHILEA MILEFOLIUM	YARRO	1 GAL
HA	X PER LINEAR FOOT OF BIORETENTION AREA LENGTH (TO BE DETERMINED FOR FINAL DESIGN AND INCORPORATED INTO A LANDSCAPE PLAN)	HELENIUM AUTUMNALE	SNEEZEWEED	1 GAL
FORBS				
RW	X PER LINEAR FOOT OF BIORETENTION AREA LENGTH (TO BE DETERMINED FOR FINAL DESIGN AND INCORPORATED INTO A LANDSCAPE PLAN)	ROSA WOODSII	WOODS ROSE	3 GAL

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Mullan BUILD - Drainage - Stormwater - Irrigation

Bioretention Area Plan & Section

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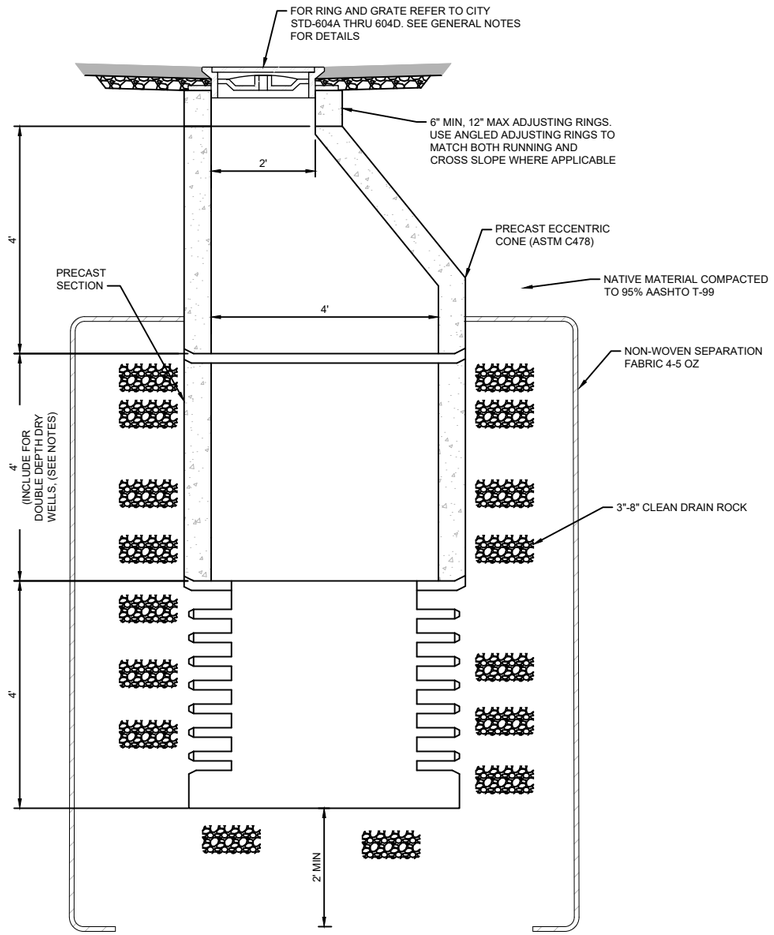
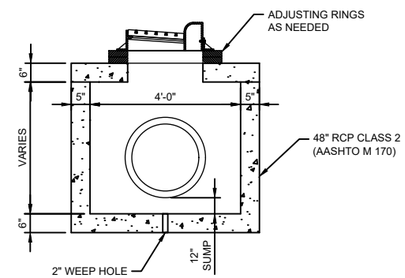


GENERAL NOTES:

1. OVER-EXCAVATE WHERE REQUIRED TO ENSURE BOTTOM OF EXCAVATION IS A MIN. 2-FT INTO GRAVELLY SOIL.
2. FOR DOUBLE DEPTH DRY WELLS, INCLUDE ADDITIONAL 4' BARREL SECTION. FOR STANDARD DRY WELLS, EXCLUDE ADDITIONAL 4' BARREL SECTION.
3. NO GRADE RING TO BE OFFSET MORE THAN 2" AND TOTAL OFFSET NOT TO EXCEED WALL THICKNESS OF CONE.
4. GRADE RINGS SHALL BE 2" THICKNESS MINIMUM.
5. NO WEDGES ALLOWED BETWEEN GRADE RINGS AND FRAME MUST BE SET FLUSH WITH TOP GRADE RING.
6. FOR DRY WELLS INSTALLED IN LANDSCAPED AREAS, INSTALL EJIW FRAME AND EJIM 1060 TYPE 01 BEEHIVE GRATE OR APPROVED EQUAL. FOR OTHER LOCATIONS, INSTALL STANDARD SOLID LID PER CITY STD-604B. REFER TO THE PLANS FOR DETAILS.
7. FOR PIPING CONNECTIONS TO DRY WELLS, CONNECTIONS SHALL BE IN ACCORDANCE WITH CITY OF MISSOULA STANDARDS FOR MANHOLES.

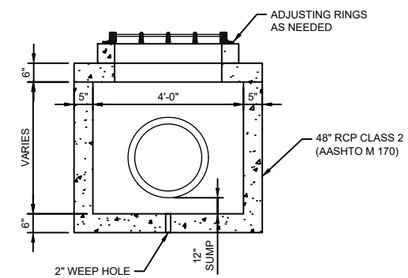
1 - DRY WELL (STANDARD AND DOUBLE DEPTH)

NTS



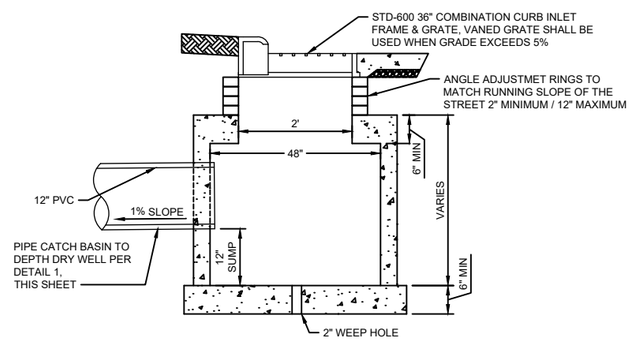
2 - MDT TYPE A AND B CURB INLET

NTS



3 - MDT TYPE 1 DROP INLET

NTS



GENERAL NOTES:

1. REFER TO STD-601 AND STD-614 FOR DETAILS.

4 - CITY OF MISSOULA STANDARD DRY WELL CATCH BASIN

NTS

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Standard Stormwater Details

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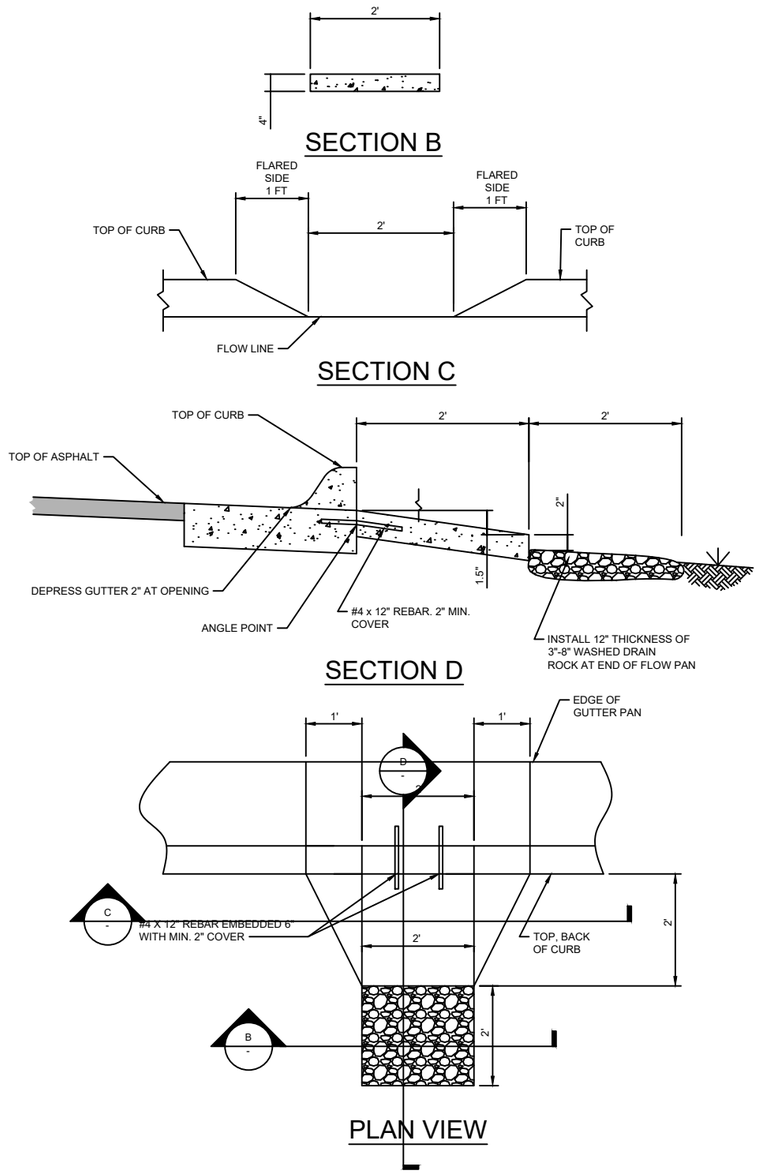
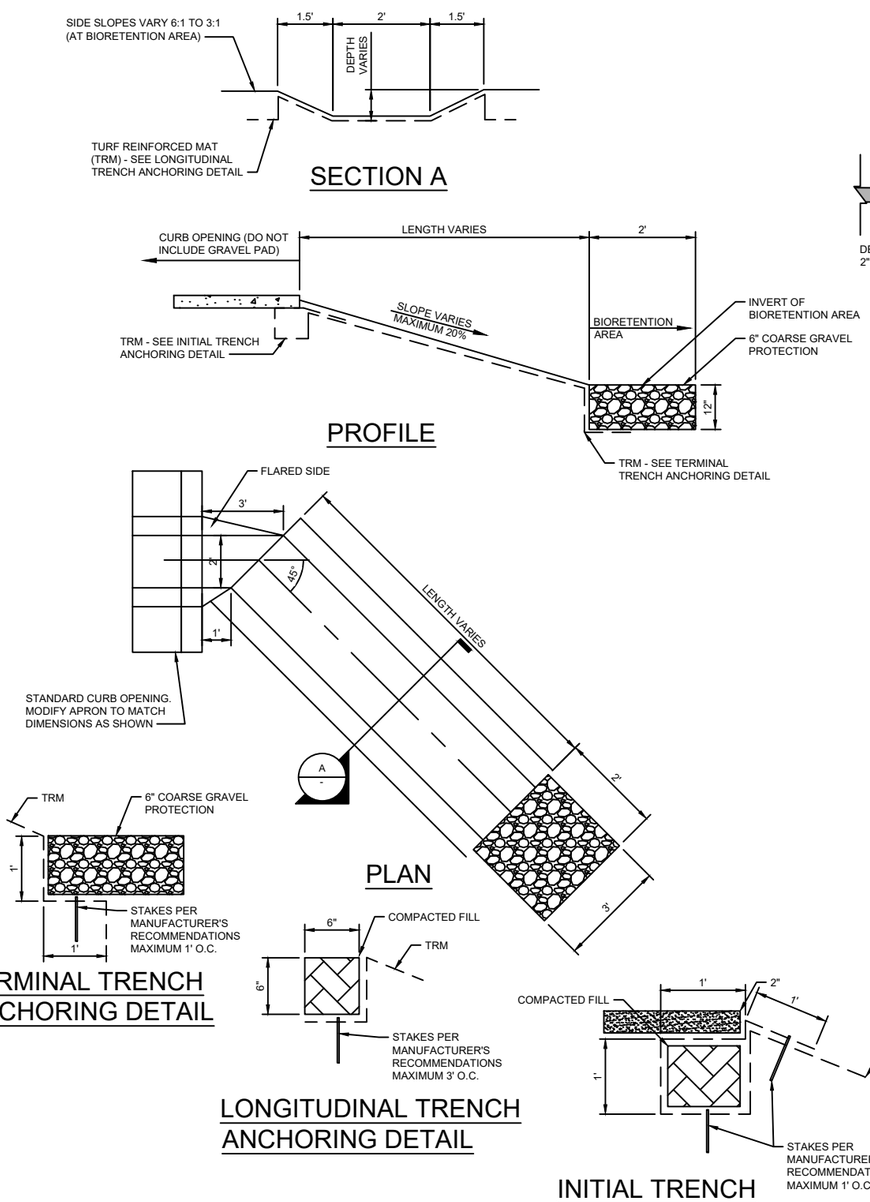


TYPE 1 CURB OPENING (STANDARD CURB OPENING)

1 NTS

GENERAL NOTES:

1. POUR ENTIRE CURB OPENING SECTION AS MONOLITHIC SLAB.
2. SEE STANDARD DRAWING STD- 740 'TYPICAL "L" CURB/GUTTER SECTION' FOR CURB/GUTTER SPECIFICATIONS.

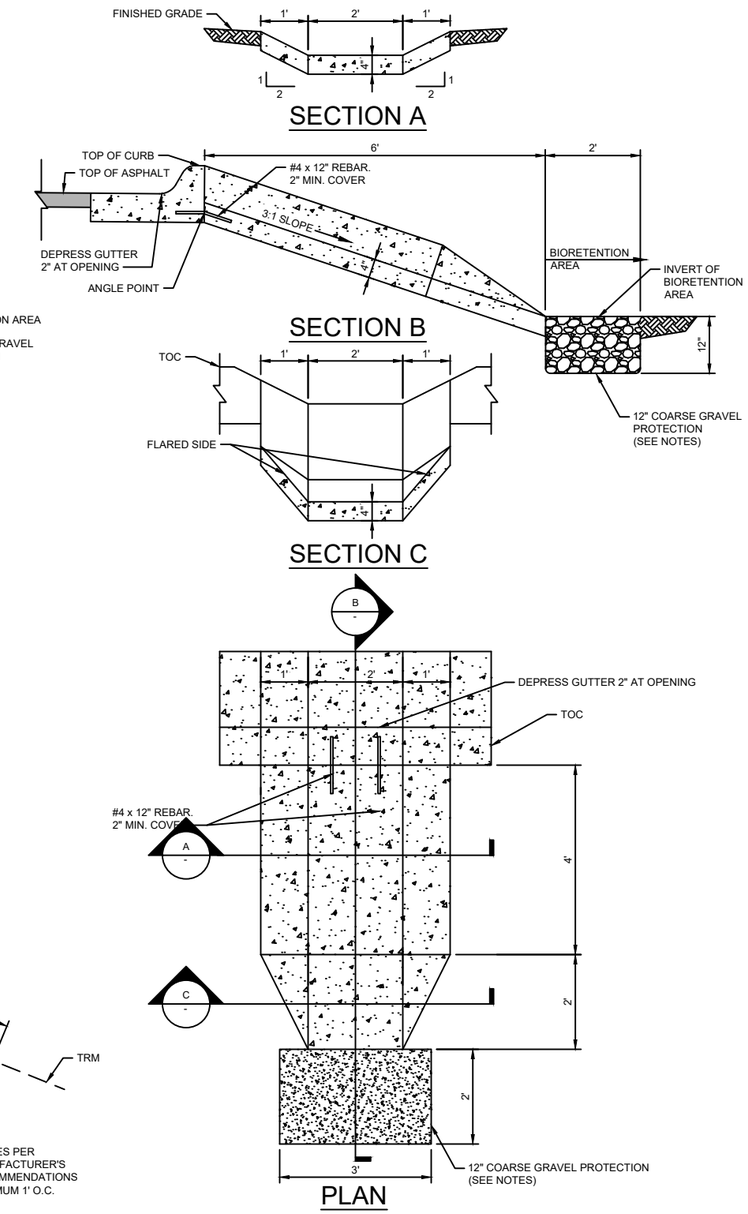


TYPE 2 CURB OPENING (CURB OPENING W/ VEGETATED CHUTE)

2 NTS

GENERAL NOTES:

1. TURF REINFORCED MAT (TRM) SHALL BE PERMANENT TRM MEETING THE MINIMUM REQUIREMENTS IDENTIFIED IN THE MONTANA DEPARTMENT OF TRANSPORTATION STANDARD AND SUPPLEMENTAL SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION 2020 EDITION, V1.0. TRM SHALL BE COMPRISED OF A SYNTHETIC FIBER MATRIX.
2. PRIOR TO INSTALLING TRM, PROVIDE A SOIL SURFACE STABLE FREE OF ROCKS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. PREPARE, SEED, AND FERTILIZE THE SOIL SURFACE PRIOR TO TRM INSTALLATION IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
4. INSTALL TRM IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THESE DRAWINGS. UNROLL THE TRM PARALLEL TO THE PRIMARY DIRECTION OF FLOW AND PLACE IT IN DIRECT CONTACT WITH THE SOIL SURFACE. DO NOT STRETCH OR ALLOW TRM TO BRIDGE OVER SURFACE INCONSISTENCIES.



TYPE 3 CURB OPENING (CURB OPENING W/ CONCRETE CHUTE)

3 NTS

GENERAL NOTES:

1. PLACE #4 REINFORCING BARS 12" ON CENTER, EACH WAY, THROUGHOUT THE CONCRETE CHUTE AND AND FLARE. MAINTAIN A MINIMUM OF 2" OF COVER FOR ALL REINFORCING BAR.
2. CHAMFER ALL EXPOSED EDGES AND CORNERS TO 1".
3. COURSE GRAVEL PROTECTION SHALL CONSIST OF 3/4" TO 6" DIAMETER ANGULAR CRUSHED ROCK.

REVISION	DATE	DESCRIPTION
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Standard Stormwater Details

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