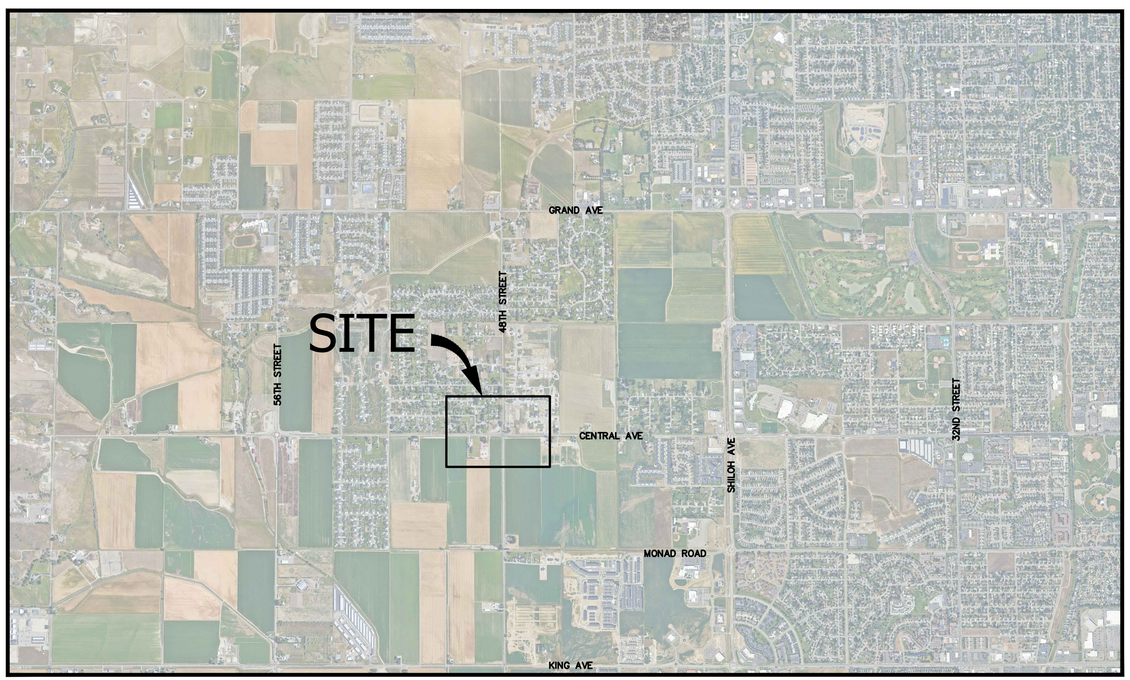
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST

INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

YELLOWSTONE COUNTY PUBLIC WORKS
2825 3RD AVE N, ROOM 608



NORTH

VICINITY MAP

NOT TO SCALE

FILE:	21001_14_COVER.DWG
PROJECT NO:	21001.14
CAD:	HDY
QUALITY ASSURANCE:	DJC, ESC

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
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-	-

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LINETYPES

EXISTING	PROPOSED
SS	SS
SD	SD
W	W
EDGE OF EX ASPHALT	
EDGE OF EX GRAVEL	
X	X
V	V
FO	FO
G	G
LP	LP
OIL	OIL
P	P
OHP	OHP
T	T
TV	TV
3157	3157

ABBREVIATIONS

AC = FINISHED GRADE AT ASPHALT
BC = FINISHED GRADE AT BUILDING CORNER
BRK = GRADE BREAK
BFV = BUTTERFLY VALVE
BVC = BEGIN VERTICAL CURVE
CS = CURB STOP
EA = FINISHED GRADE AT EDGE OF ASPHALT
EC = FINISHED GRADE AT EDGE OF CONCRETE
EVC = END VERTICAL CURVE
EW = FINISHED GRADE AT EDGE OF WALK
EX = APPROXIMATE EXISTING ELEVATION
FL = FINISHED GRADE AT FLOWLINE
FT = FEET
FG = FINISHED GRADE
GR = EXISTING GRADE AT GROUND
GV = GATE VALVE
HP = HIGH POINT
LF = LINEAL FOOT
LT = LEFT
PC = POINT OF CURVATURE
PI = POINT OF INTERSECTION
POC = POINT ON CURVE
PRC = POINT OF REVERSE CURVE
PT = POINT OF TANGENCY
PVI = POINT OF VERTICAL INTERSECTION
RED = REDUCER
RT = RIGHT
SD = STORM DRAIN
SDI = STORM DRAIN INLET
SDMH = STORM DRAIN MANHOLE
SRVC = SERVICE
SS = SANITARY SEWER
SSMH = SANITARY SEWER MANHOLE
TC = FINISHED GRADE AT TOP BACK OF CURB
TW = FINISHED GRADE AT TOP OF WALL
WTR = WATER
(TYP.) = TYPICAL

KEYNOTE CALL OUT (SEE KEYNOTE LEGEND)

GRADING PLAN

1. CATCH CURB — CATCH CURB → TOP OF CURB - 0.375' = LIP; TOP OF CURB - 0.50' = FLOWLINE
2. SPILL CURB — SPILL CURB → TOP OF CURB - 0.625' = LIP; TOP OF CURB - 0.50' = FLOWLINE
3. TRANSITION FROM CATCH TO SPILL CURB
4. TAPER CURB HEAD 3'

SYMBOLS

- WATER METER
- YARD HYDRANT
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER CLEAN OUT
- EXISTING STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN MANHOLE
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- PROPOSED ROOF DRAIN
- PROPOSED STORM DRAIN CLEAN OUT
- TELEPHONE BOX
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- COMMUNICATIONS MANHOLE
- COMMUNICATIONS PEDESTAL
- FIBER OPTIC PEDESTAL
- GAS MANHOLE
- GAS METER
- GAS WELL
- GAS VALVE
- ELECTRIC JUNCTION BOX
- ELECTRIC PEDESTAL
- TRANSFORMER
- POWER MANHOLE
- POWER METER
- POWER POLE
- GUYWIRE
- LIGHT POLE
- SIGN
- BOLLARD
- EXISTING MONUMENT BOX
- PROPOSED MONUMENT BOX
- IRRIGATION BOX
- IRRIGATION VALVE
- BUSH
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGNAL POLE
- FOUND CORNER MONUMENT AS NOTED
- SET CORNER MONUMENT, REBAR WITH CAP
- BENCHMARK
- SECTION QUARTER CORNER
- SECTION CORNER

NOTE:

-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, STORM, 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.

-ALL IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS 6TH EDITION, APRIL, 2010, AND THE CITY OF BILLINGS STANDARD MODIFICATIONS, DATED JANUARY, 2021.

-UNLESS OTHERWISE SPECIFIED, ALL CONSTRUCTION LAYOUT AND STAKING SHALL BE PERFORMED UNDER THE RESPONSIBLE CHARGE OF A LAND SURVEYOR LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED 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.

BIDDING PLANS

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET

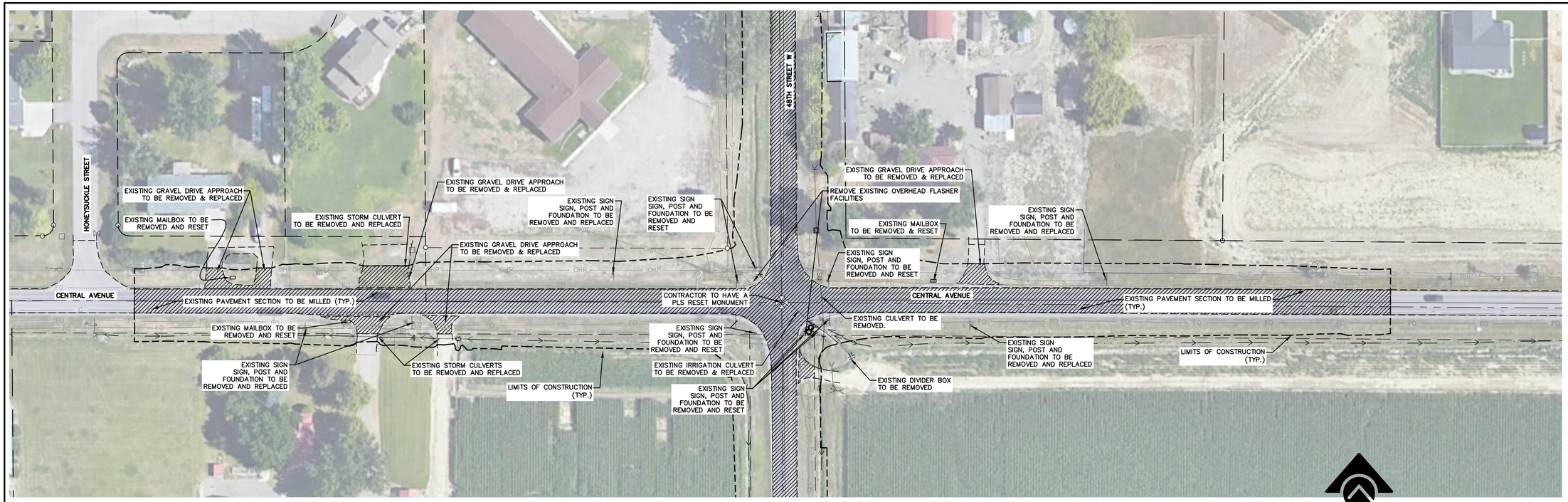
FILE: 21001_14_COVER.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE CO. TASK ORDER 14

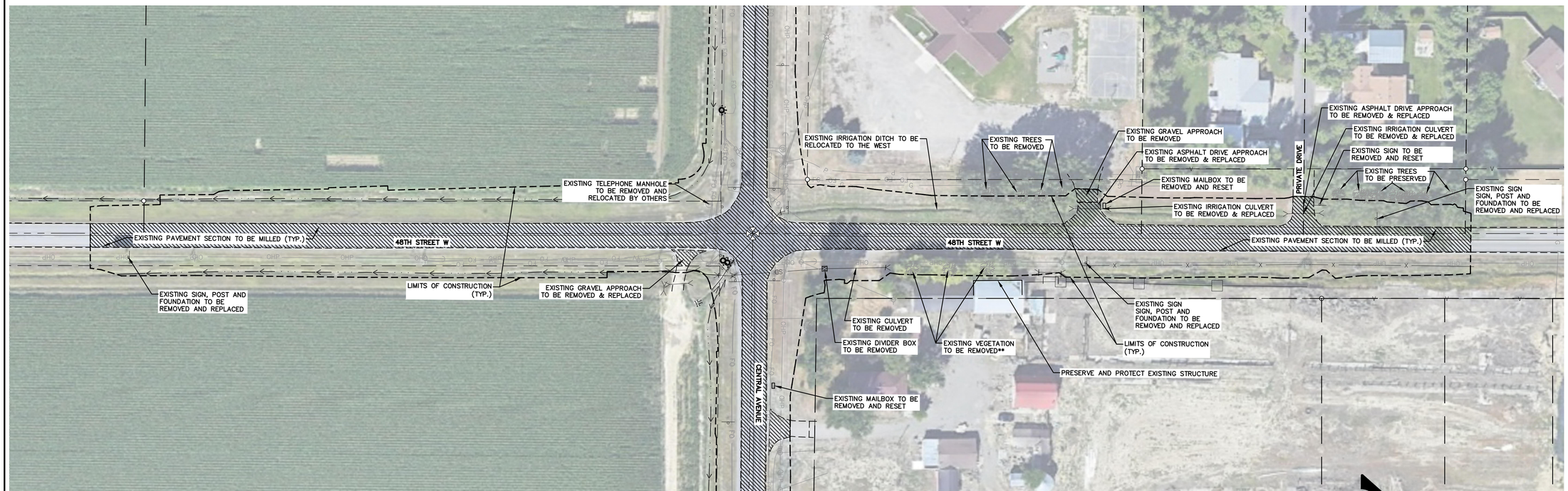
CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

LEGEND

C1.2



NORTH



CONSTRUCTION NOTES:

1. DRY UTILITIES WILL BE REMOVED AND RELOCATED BY THE RESPECTIVE UTILITY COMPANY.

**THIS VEGETATION IS TO BE REMOVED AS A LUMP SUM BID ITEM AS DESCRIBED IN AN EXPLANATION OF BID ITEM IN THE SPECIAL PROVISIONS

NORTH

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE SCALE ON 11X17 SHEET WITH 1:2 PLOT SCALE.

50 25 0 50 100

SCALE: 1" = 50'

BIDDING PLANS

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FILE: 21001_14_EXISTING_PROD.DWG

PROJECT NO: 21001.14

CAD: HDY

QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

CENTRAL AVENUE & 48TH STREET W DEMOLITION SITE PLAN

C2.1

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SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE SCALE ON 11X17 SHEET WITH 1:2 PLOT SCALE.

NORTH

75 38 0 75 150

SCALE: 1" = 75'

BIDDING PLANS

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FILE: 21001_14_OVERALL.DWG

PROJECT NO: 21001.14

CAD: HDY

QUALITY ASSURANCE: DJC, ESC

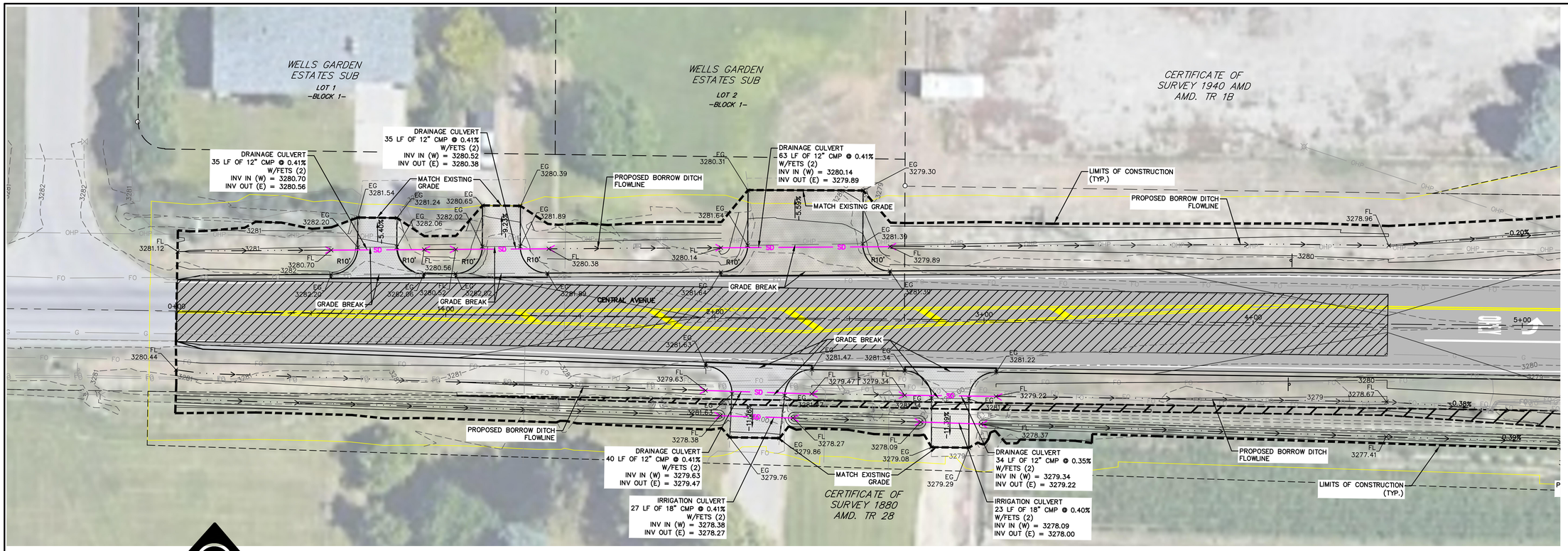
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

OVERALL SITE PLAN

C3.1

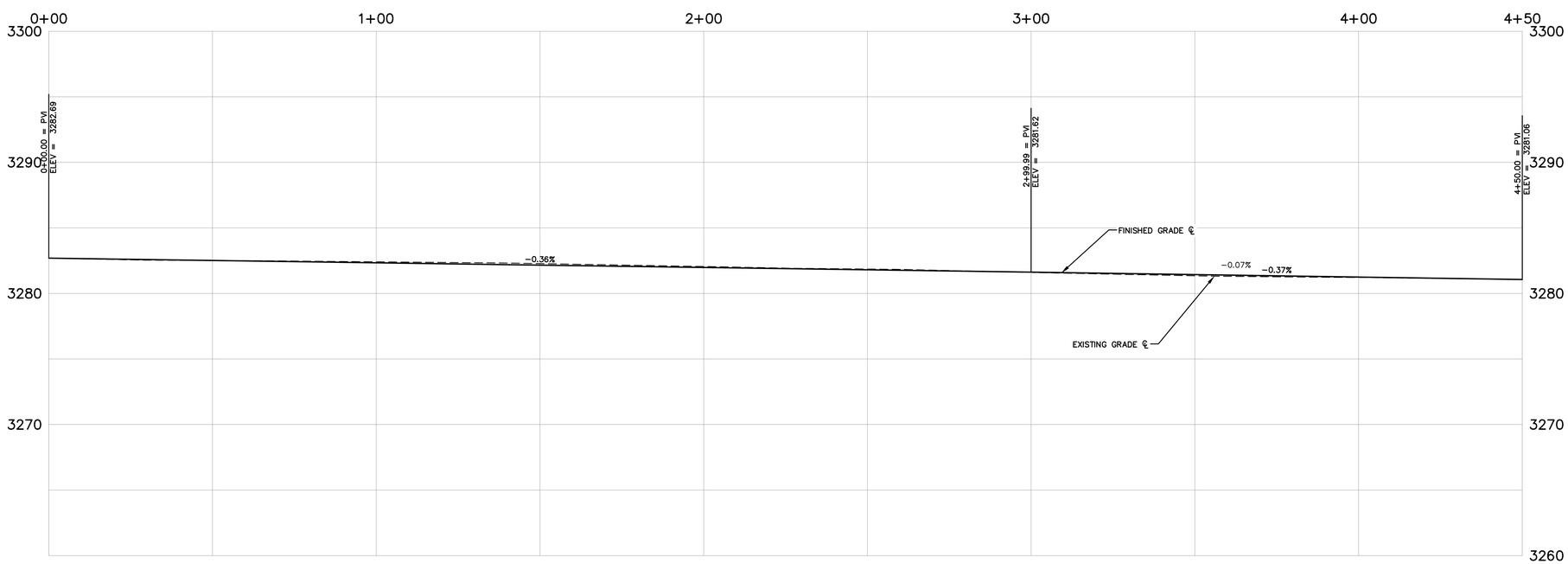


NORTH

10 0 20 40

HORIZONTAL SCALE:1" = 20'
VERTICAL SCALE: 1"=5'

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE HORIZONTAL AND VERTICAL SCALES ON 11X17 SHEET WITH 1:2 PLOT SCALE.



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YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

CENTRAL AVENUE PLAN & PROFILE STA. 0+00 TO 4+50

C4.1

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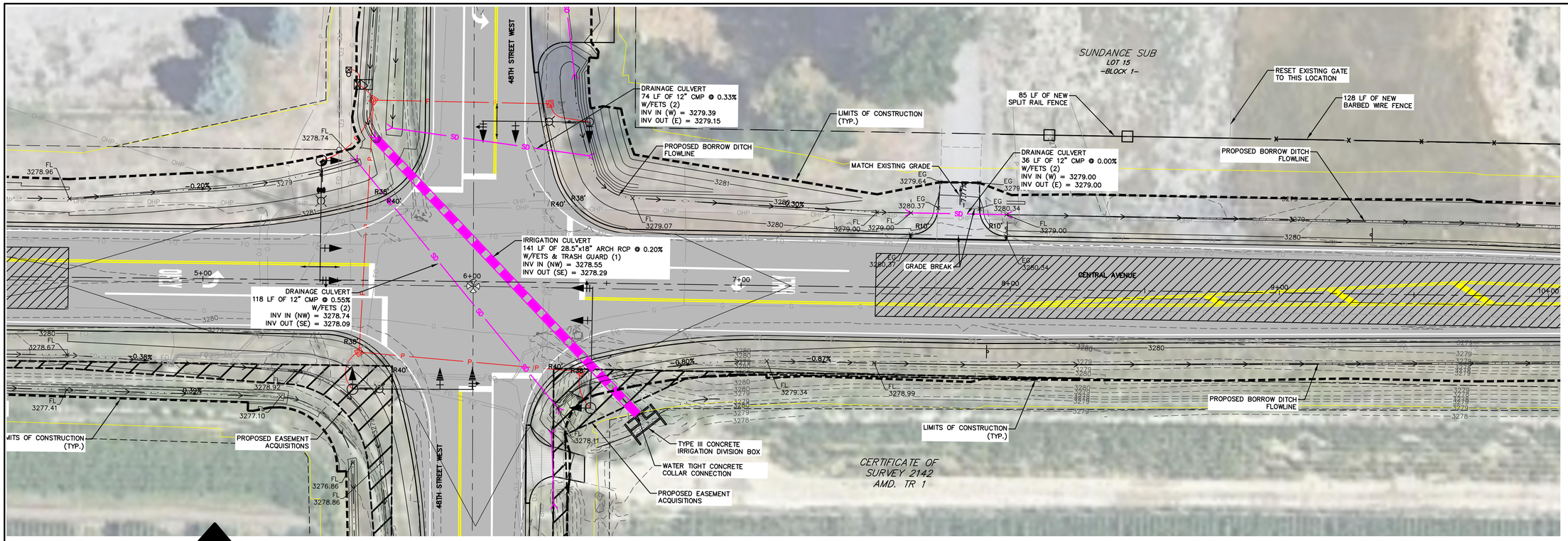

NORTH

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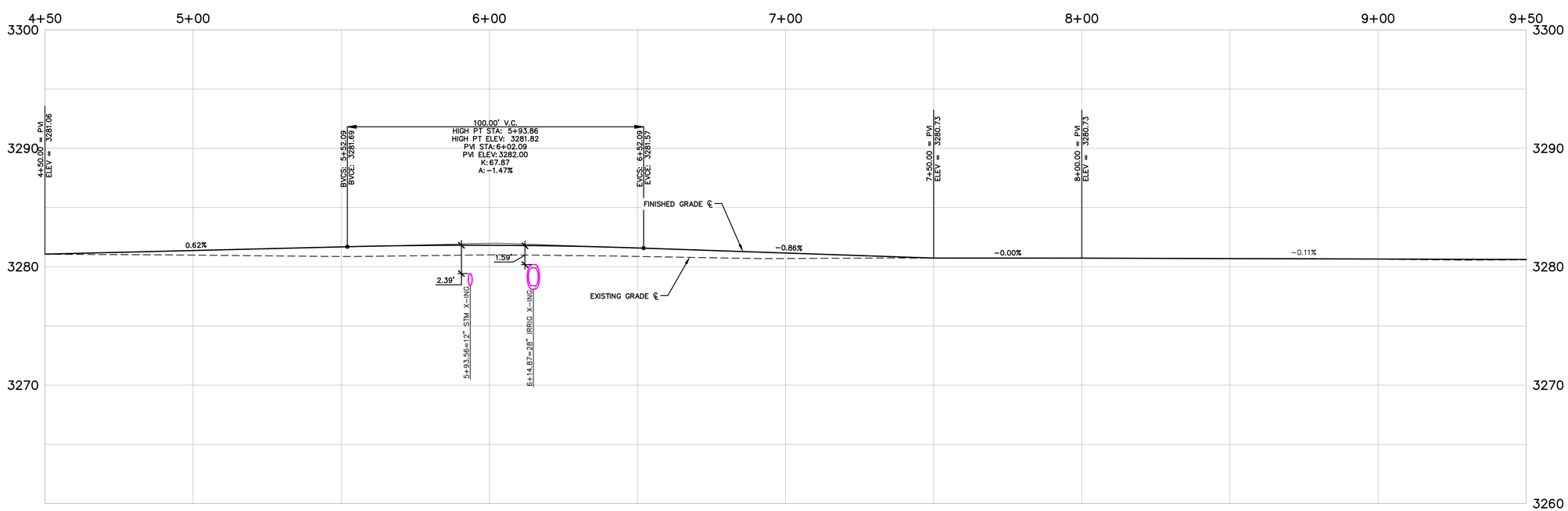

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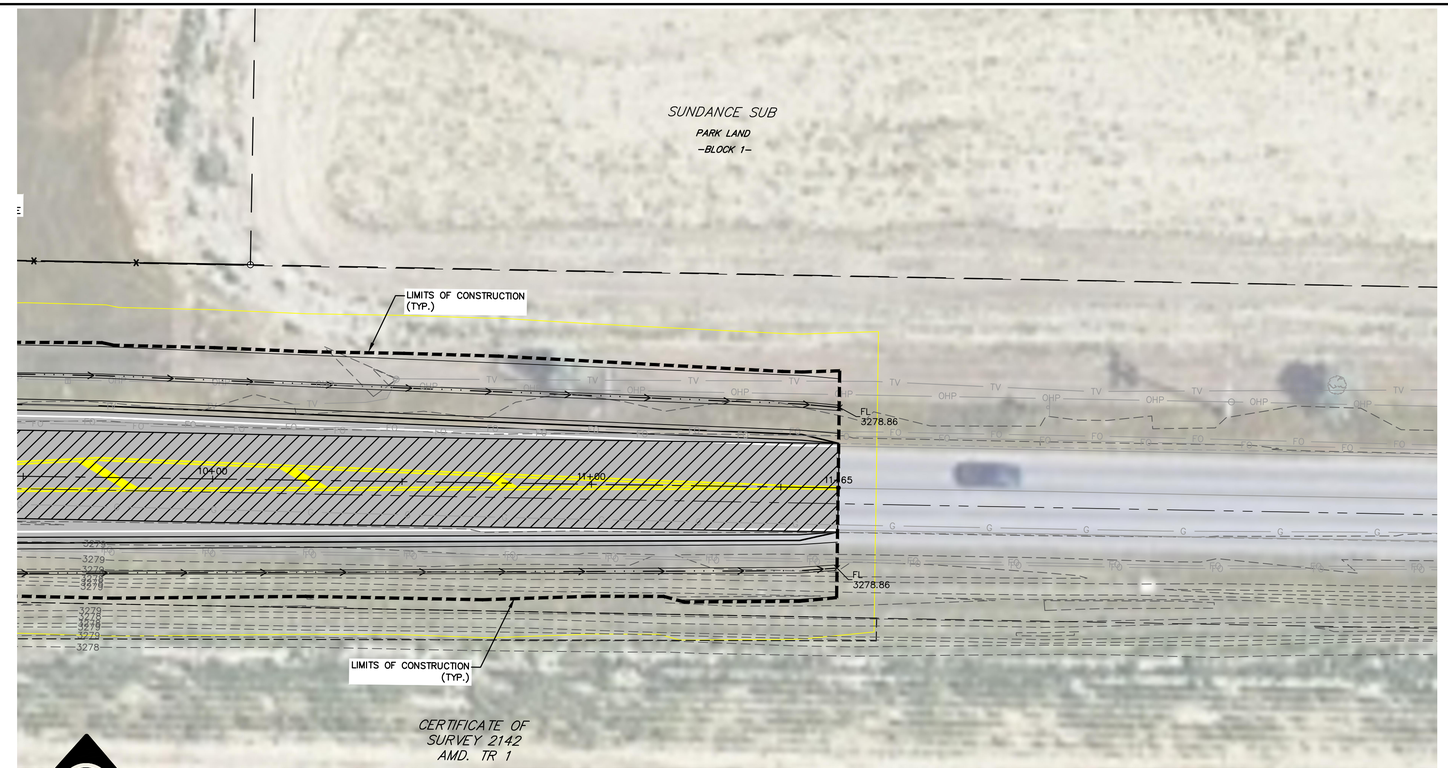
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

CENTRAL AVENUE PLAN & PROFILE STA. 4+50 TO 9+50

C4.2



NORTH

20 10 0 20 40

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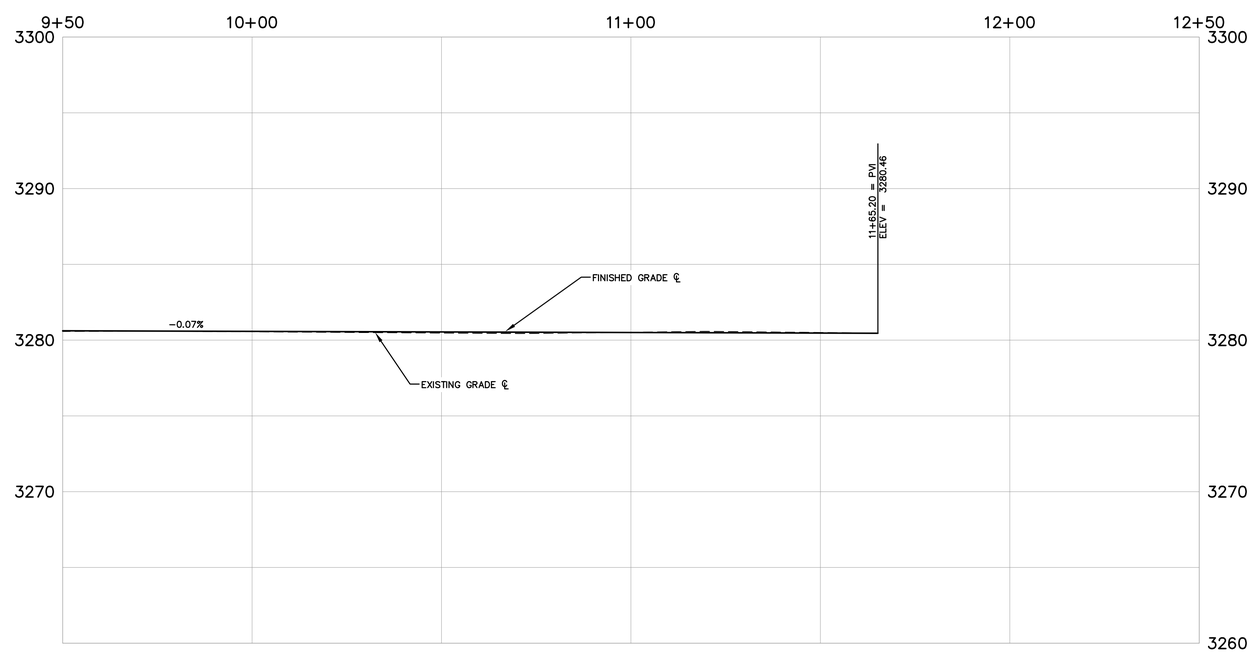

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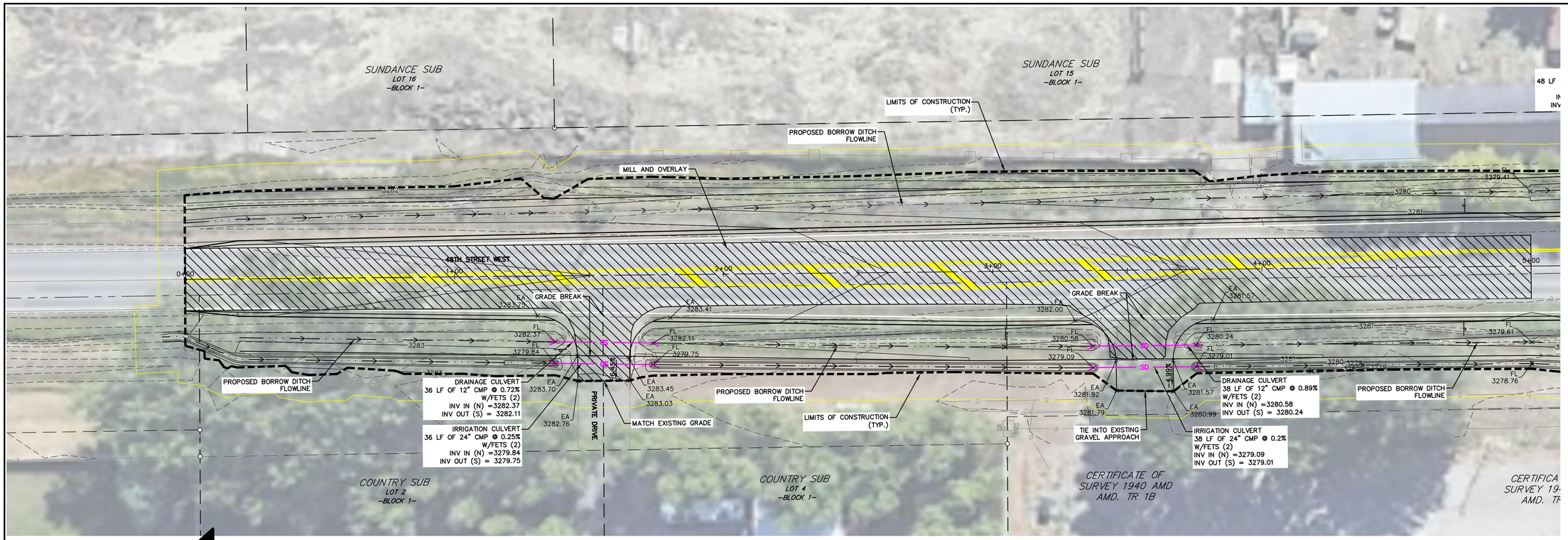
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

CENTRAL AVENUE PLAN & PROFILE STA. 9+50 TO 12+50

C4.3



NORTH

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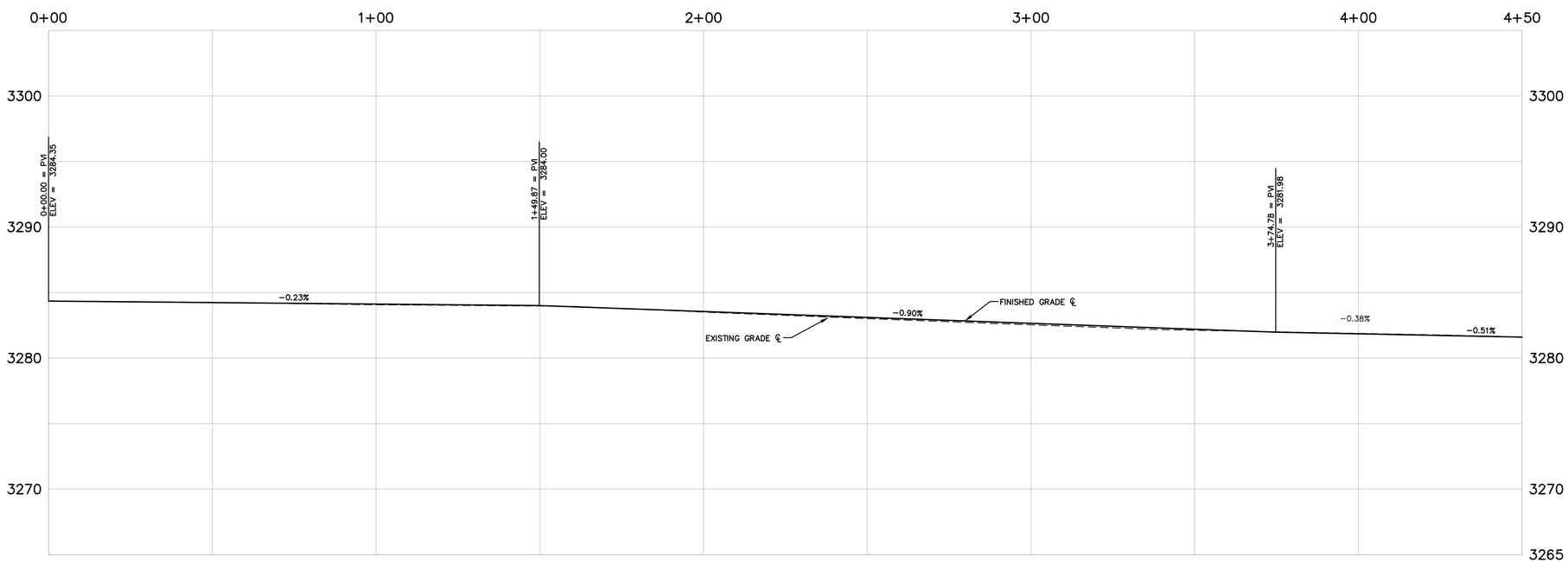

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FILE: 21001_14_48TH_PNP.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

48TH STREET PLAN & PROFILE STA. 0+00 TO 4+50

C4.4

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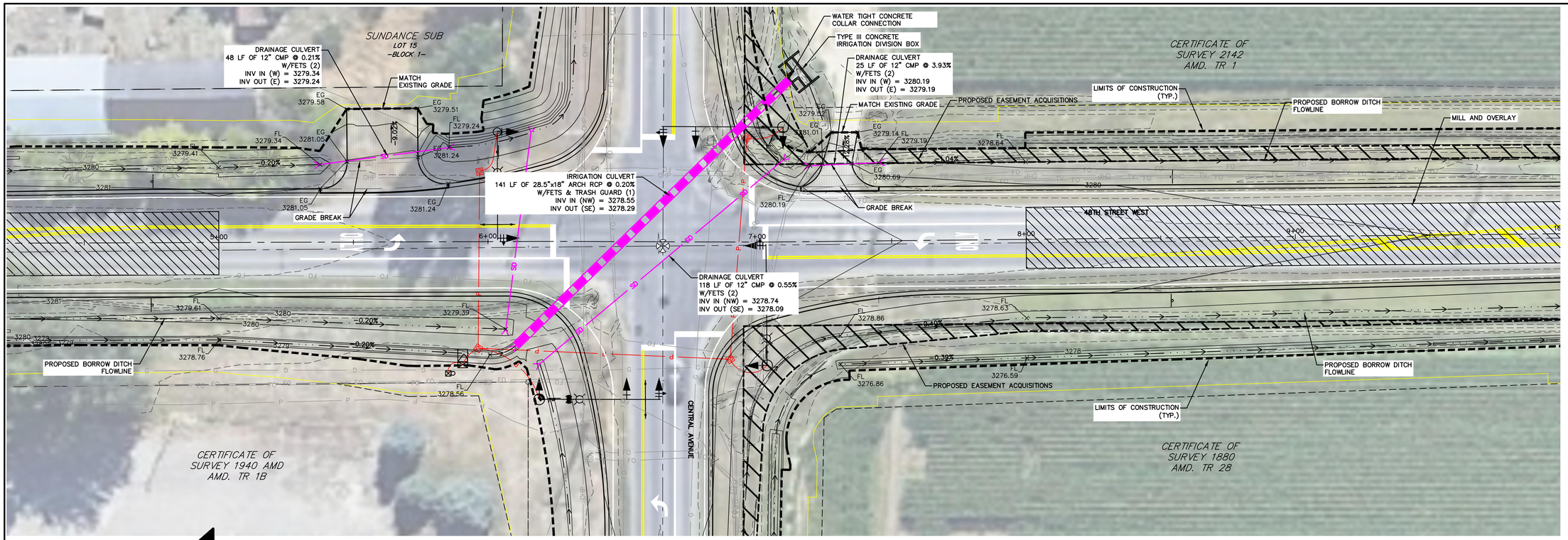

NORTH

10 0 20 40

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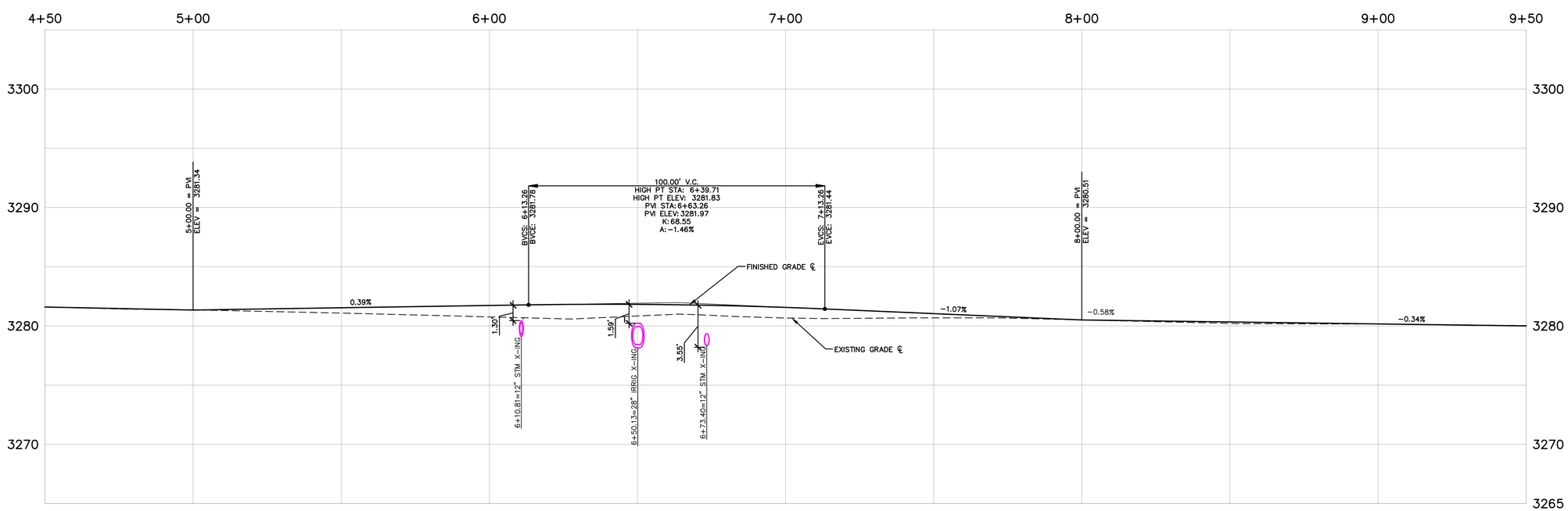

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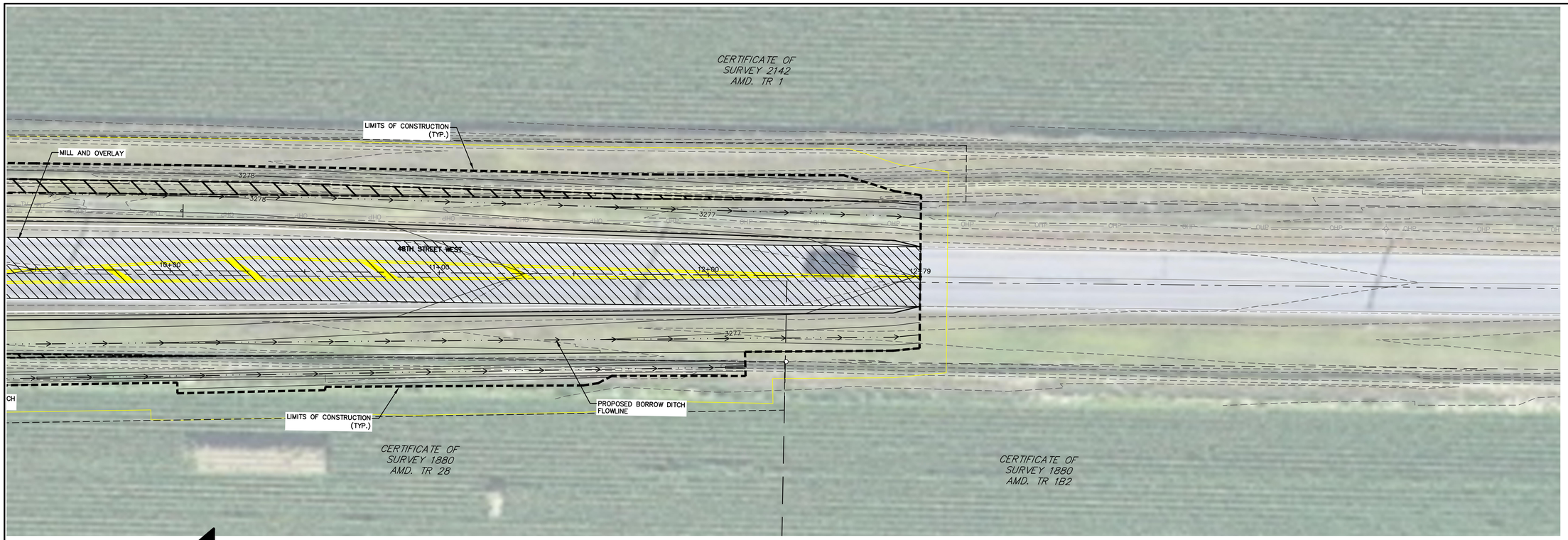
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

48TH STREET PLAN & PROFILE STA. 4+50 TO 9+50

C4.5



NORTH

10 0 20 40

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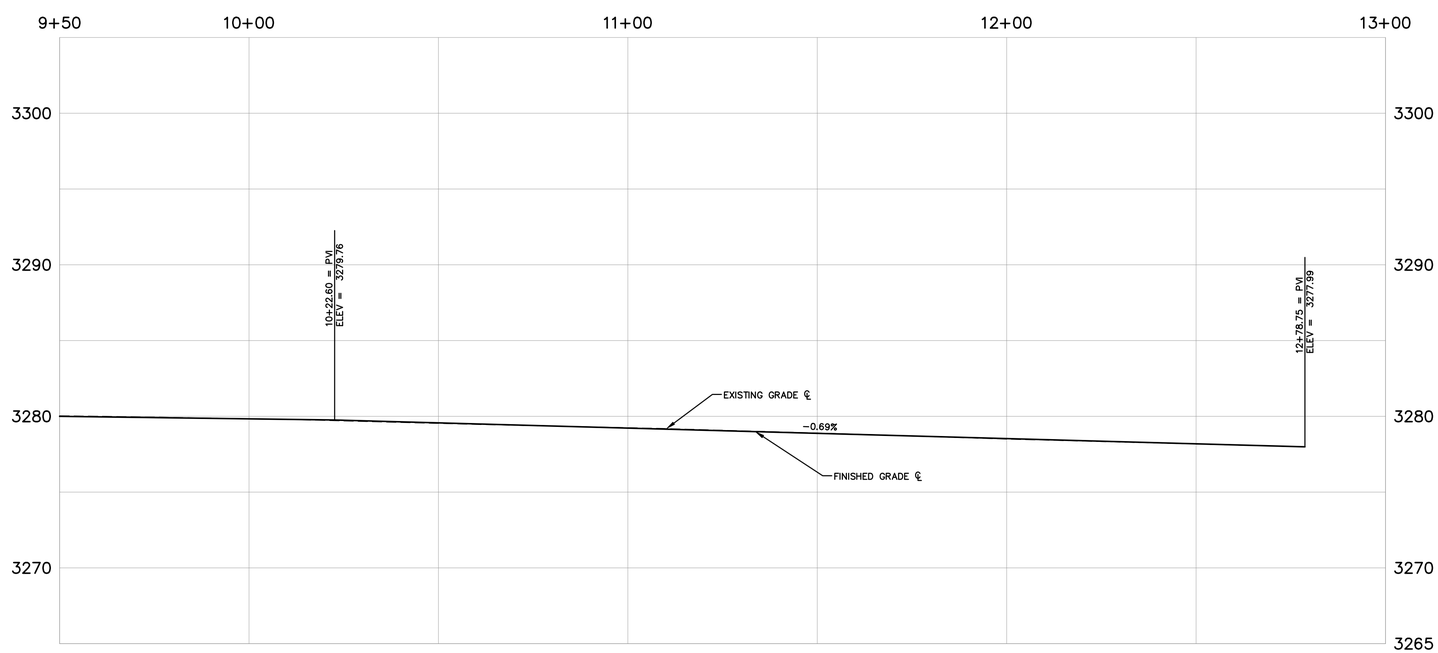

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YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

48TH STREET PLAN & PROFILE STA. 9+50 TO 13+00

C4.6

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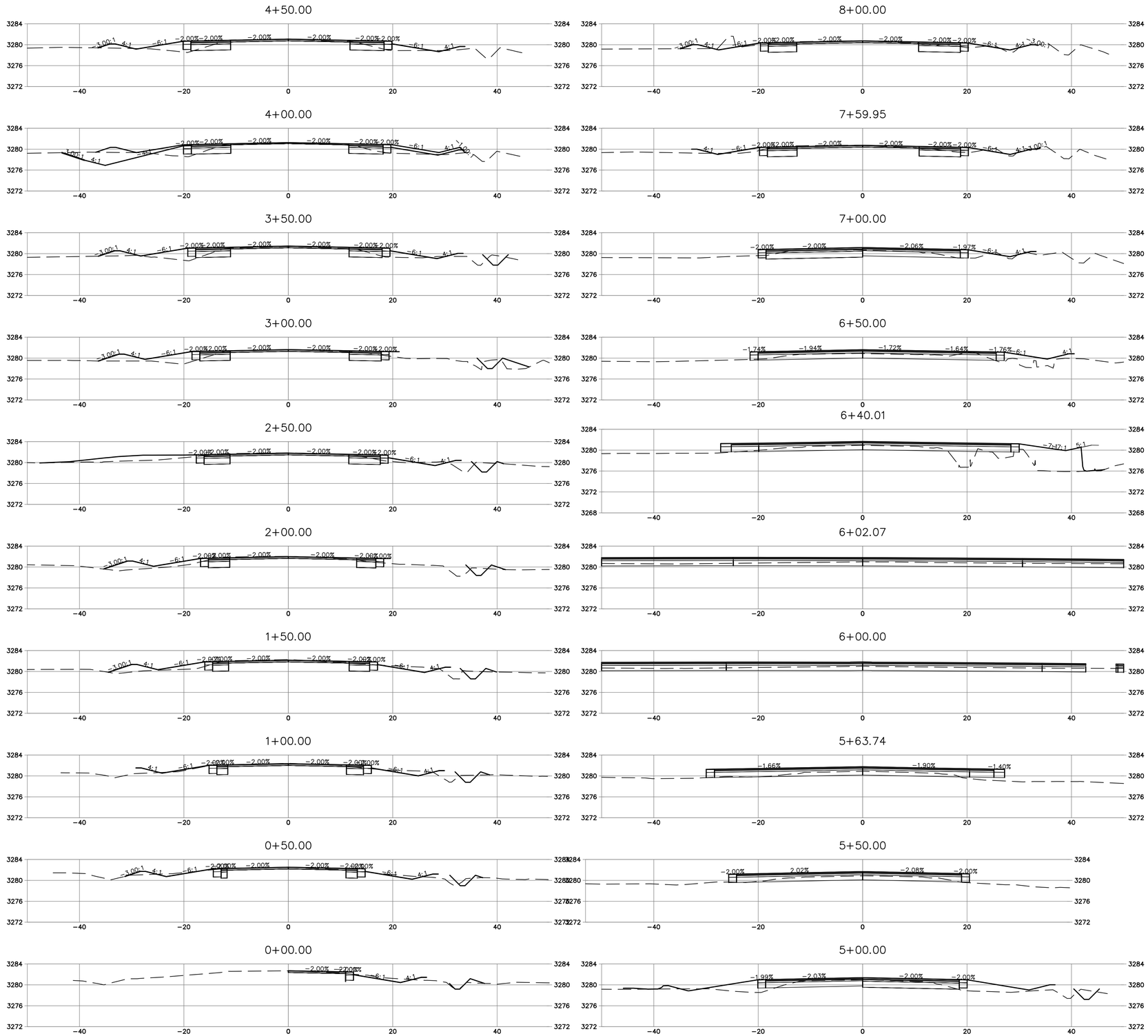
CENTRAL AVENUE



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10 5 0 10 20

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1"=10'

BIDDING PLANS

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FILE: 21001_14_CENTRAL_XSECT.DWG
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YELLOWSTONE CO. TASK ORDER 14

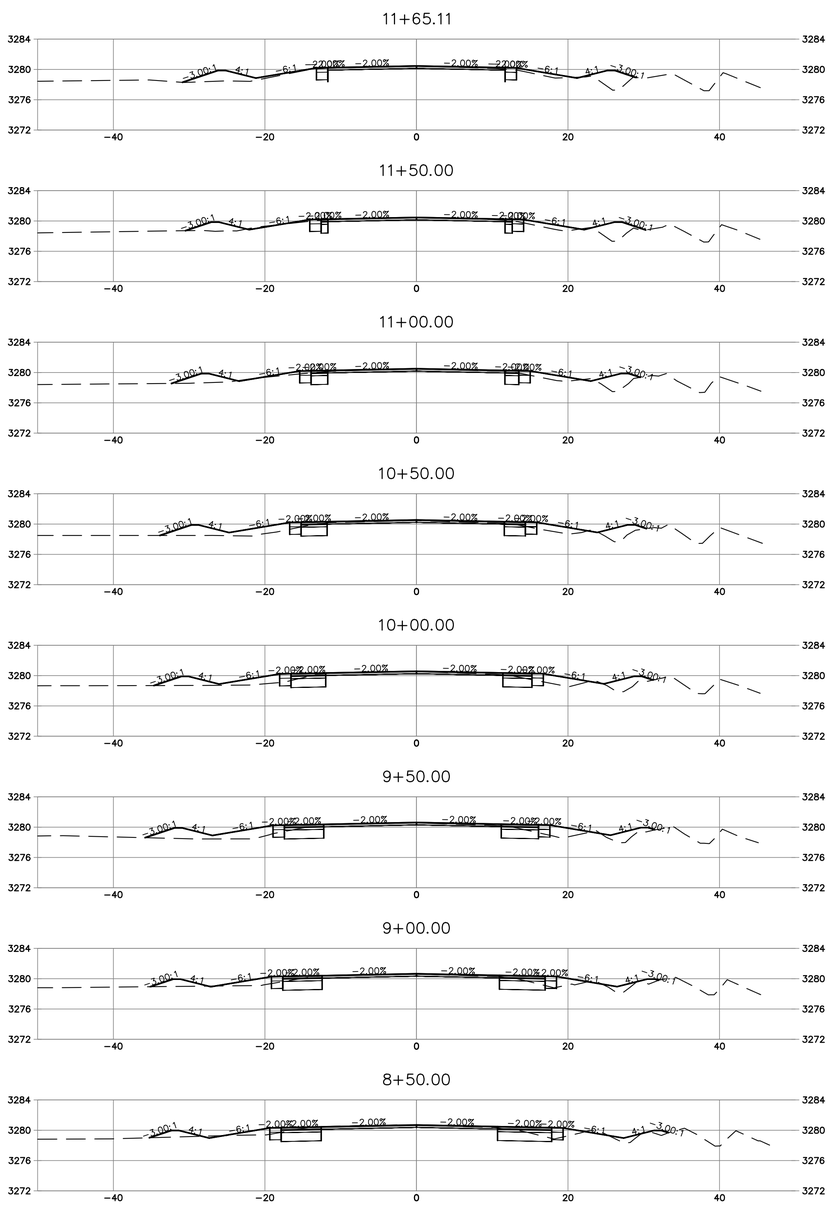
CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

CENTRAL AVENUE CROSS SECTION STA. 0+00 TO 8+00

C5.1

CENTRAL AVENUE



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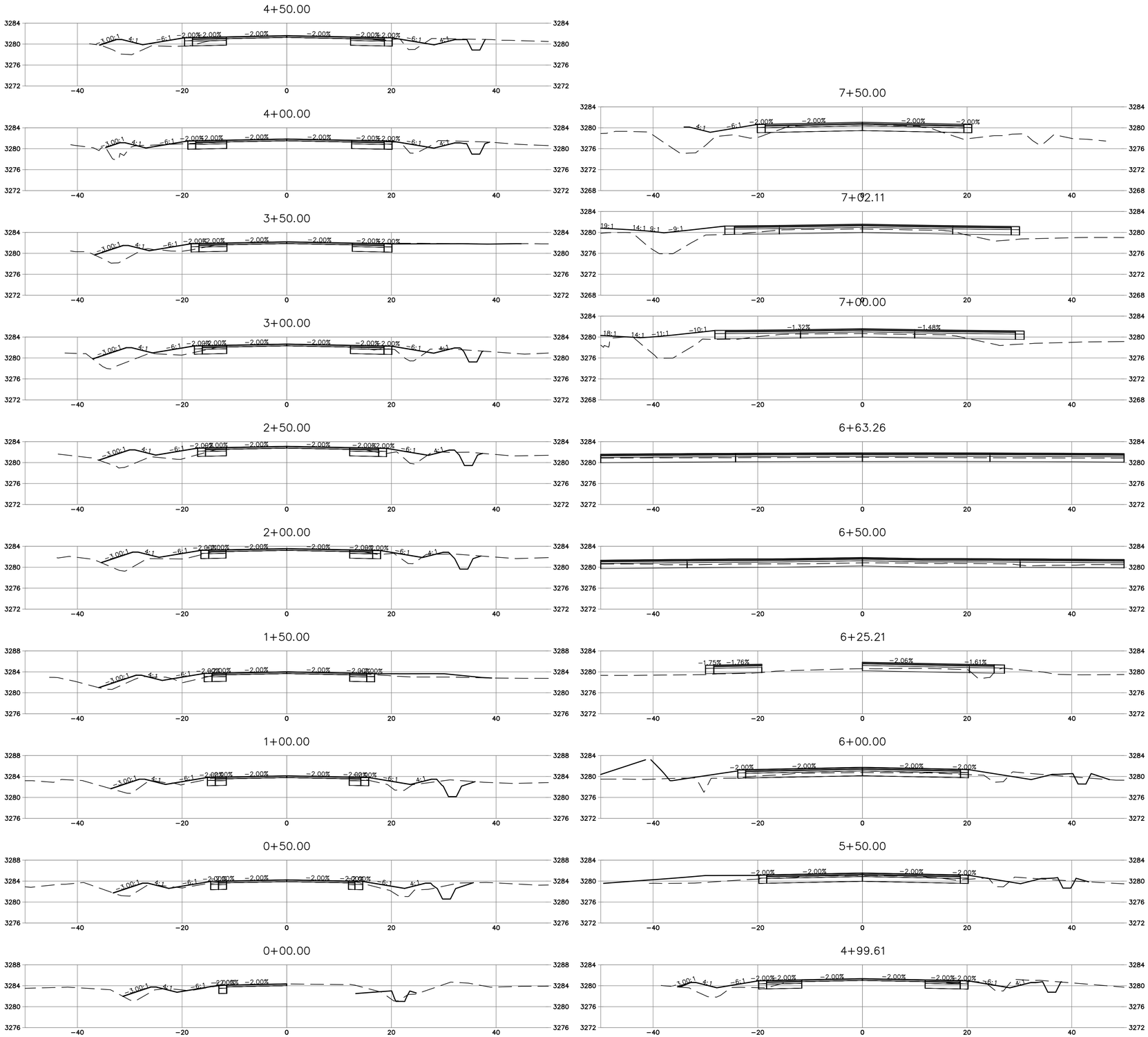
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

CENTRAL AVENUE CROSS SECTION STA. 8+50 TO 11+65

C5.2

48TH STREET WEST



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HORIZONTAL SCALE: 1" = 10'
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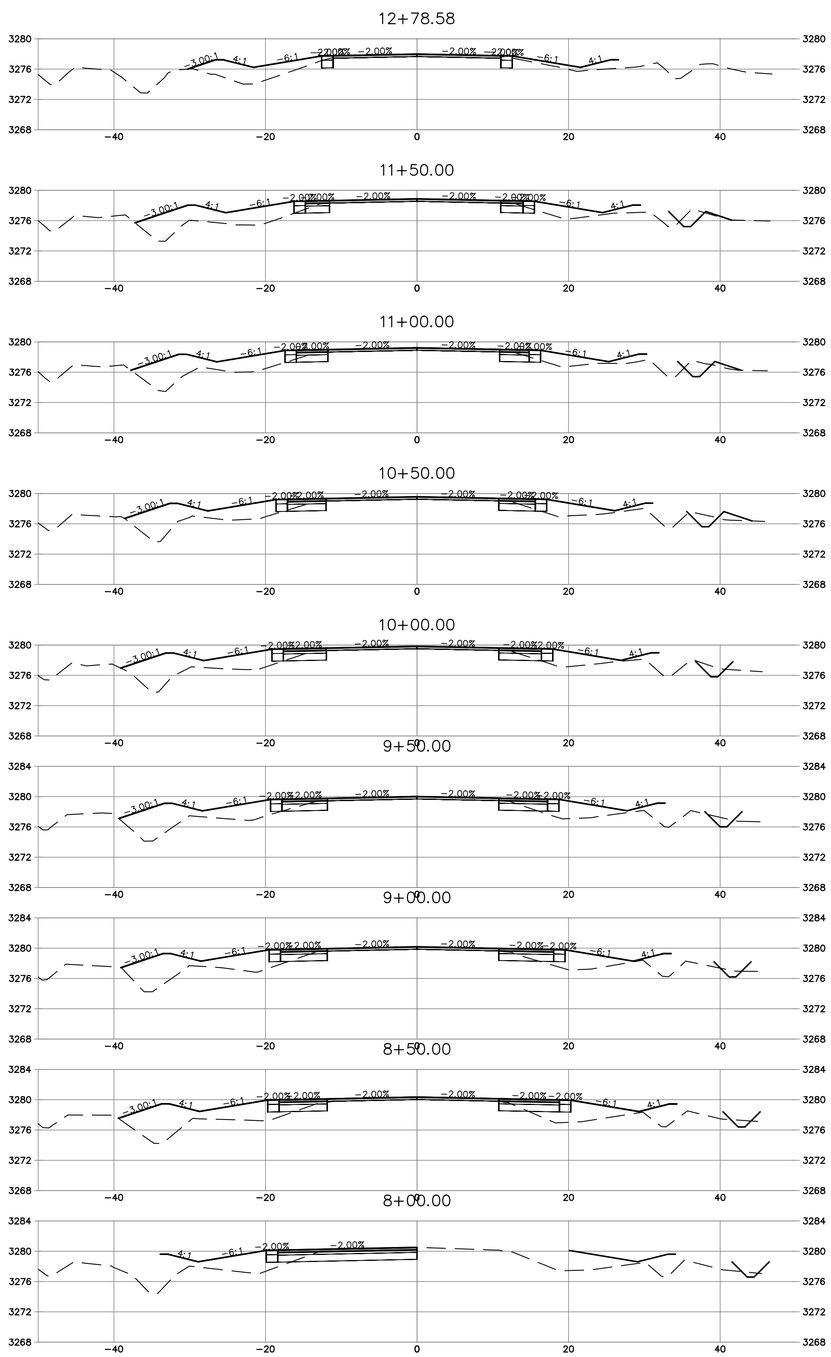
YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

48TH STREET CROSS SECTION STA. 0+00 TO 7+50

C5.3

48TH STREET WEST



EARTHWORK QUANTITY TABLE

Volume Summary							
Name	**Type**	**Cut Factor**	**Fill Factor**	**2d Area** (Sq. Ft.)	**Cut** (Cu. Yd.)	**Fill** (Cu. Yd.)	**Net** (Cu. Yd.)
STRIP M6 VS DITCH	full	1.000	1.150	88209	172.89	4839.51*	4666.62*
STRIP M6 VS FULL RECON DATUM	full	1.000	1.150	46447	847.58	228.50*	619.08*

Totals				
	2d Area (Sq. Ft.)	**Cut** (Cu. Yd.)	**Fill** (Cu. Yd.)	**Net** (Cu. Yd.)
Total	134657	1020.47	5068.00*	4047.54*

* Value adjusted by cut or fill factor other than 1.0

*QUANTITIES CALCULATED BASED ON SURFACE COMPARISONS. CONTRACTOR TO VERIFY AND NOTIFY ENGINEER OF ANY DISCREPANCIES

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE HORIZONTAL AND VERTICAL SCALES ON 11X17 SHEET WITH 1:2 PLOT SCALE.

10 5 0 10 20

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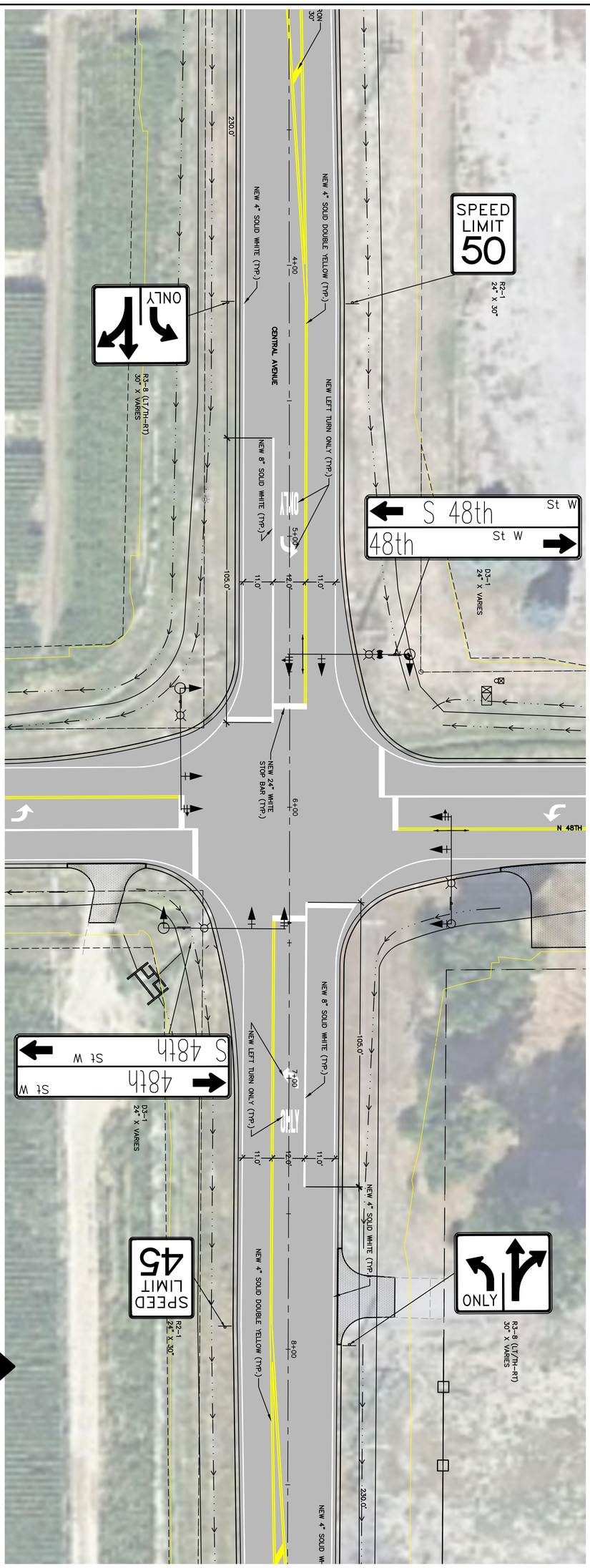
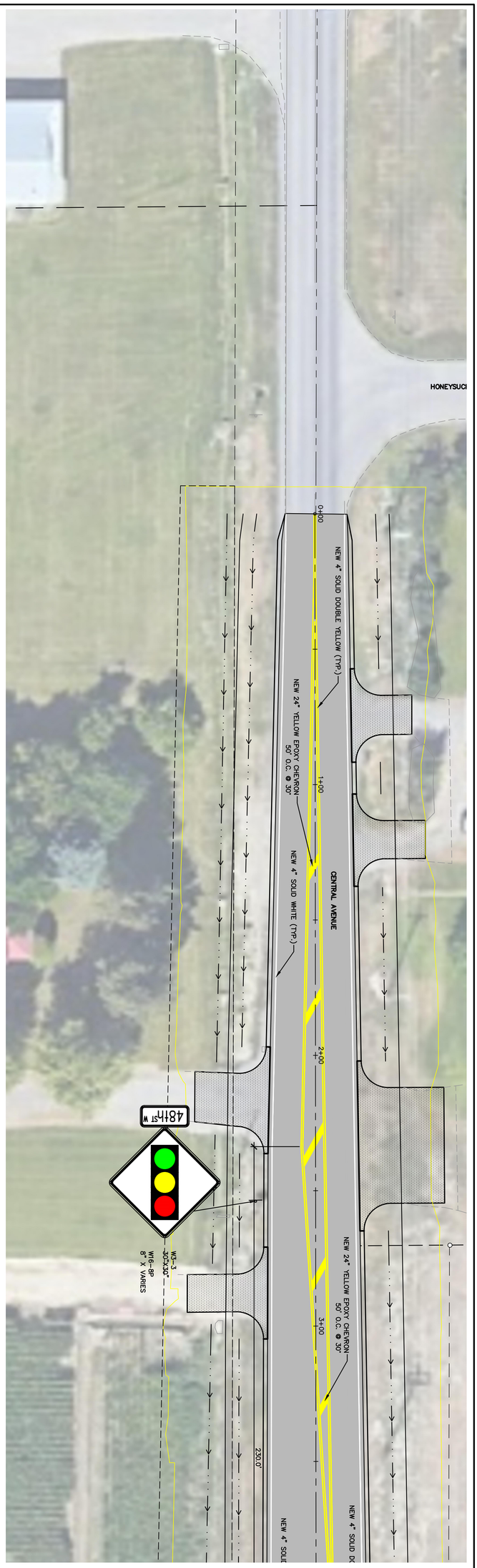
CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

48TH STREET CROSS SECTION STA. 8+00 TO 12+79

C5.4





NORTH

SCALE: 1" = 20'

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE SCALE ON 11X17 SHEET WITH 1:2 PLOT SCALE.

BIDDING PLANS

C6.1

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

CENTRAL AVENUE SIGNING & STRIPING PLAN STA. 0+00 TO 8+50

FILE: 21001_14_CENTRAL_SIGN_STRIPE.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
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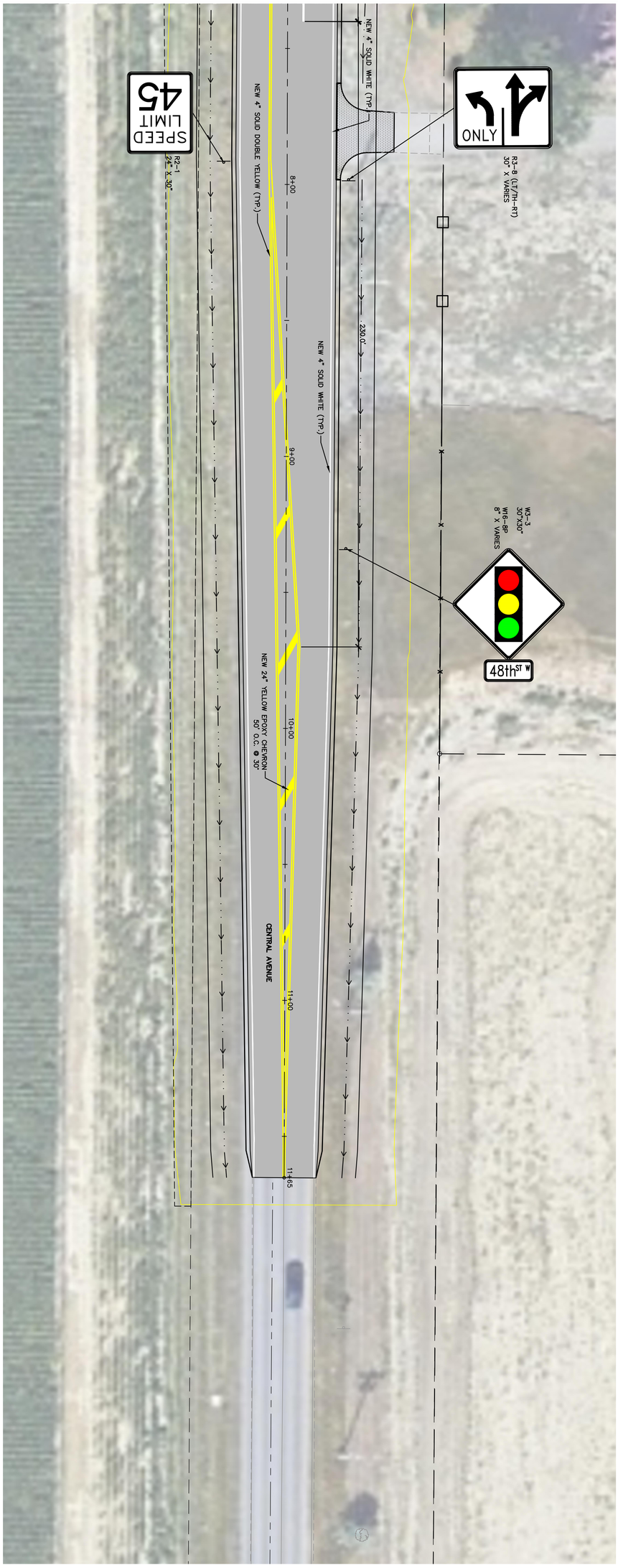

NORTH

20 10 0 20 40

SCALE: 1" = 20'

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. ON 11X17 SHEET WITH 1:2 PLOT SCALE.

BIDDING PLANS

C6.2

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

CENTRAL AVENUE SIGNING & STRIPING PLAN STA. 7+50 TO 11+65

FILE: 21001_14_CENTRAL_SIGN_STRIPE.DWG

PROJECT NO: 21001.14

CAD: HDY

QUALITY ASSURANCE: DJC, ESC

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
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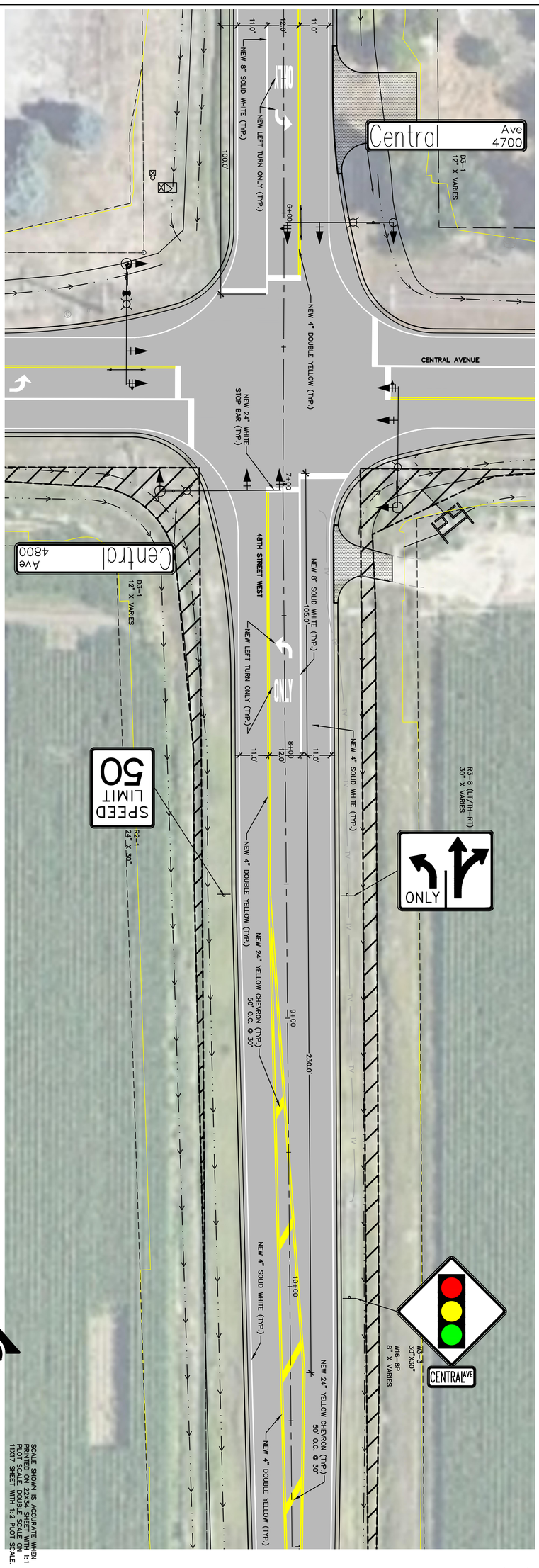

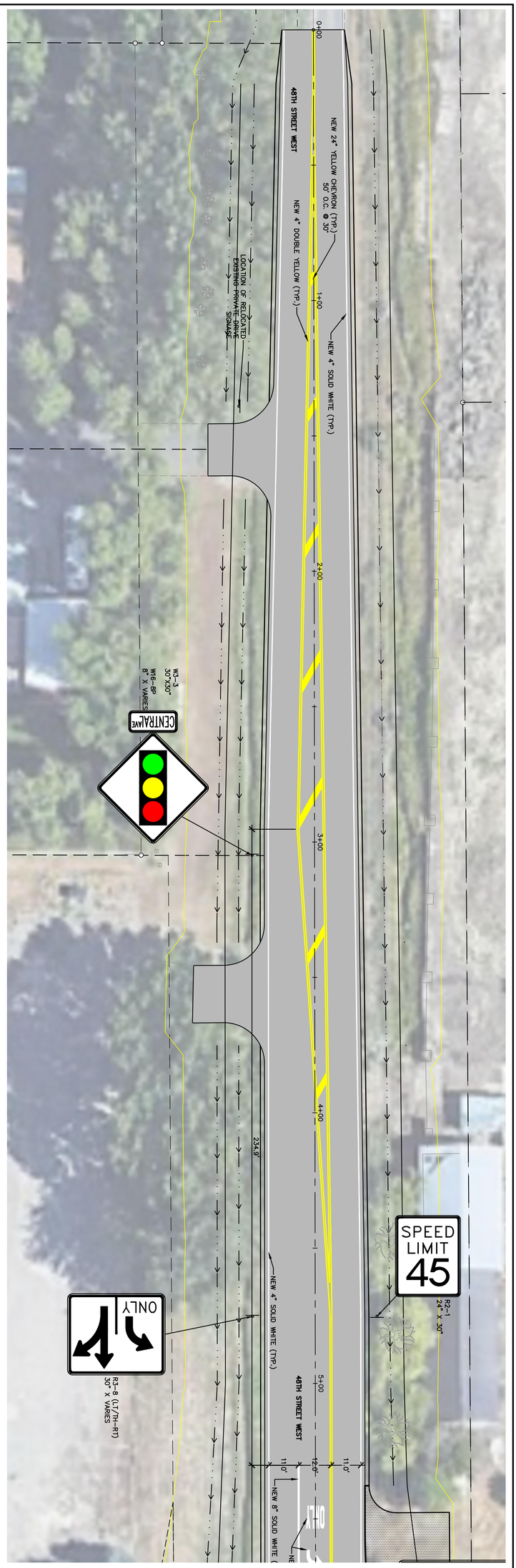

NORTH

SCALE: 1" = 20'

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. PLOT SCALE ON FULL SIZE 11X17 SHEET WITH 1:2 PLOT SCALE.

BIDDING PLANS

C6.3

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

48TH STREET SIGNING & STRIPING PLAN STA. 0+00 TO 11+00

FILE: 21001_14_48TH_SIGN_STRIPE.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
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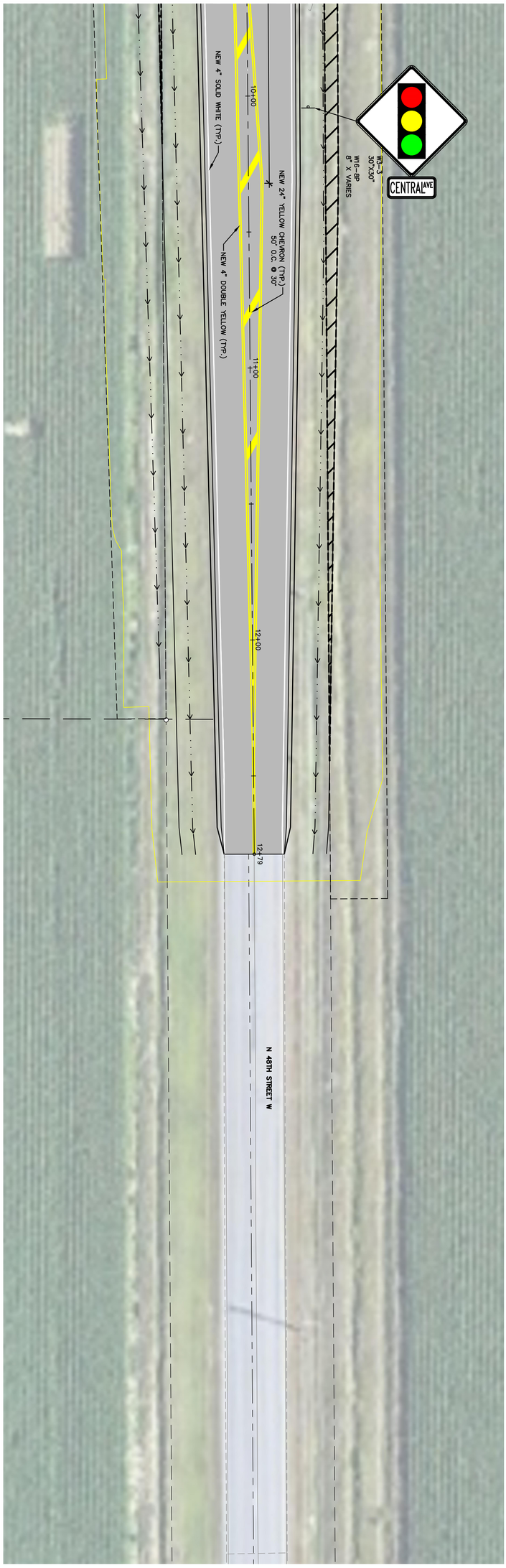

NORTH

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE SCALE ON 11X17 SHEET WITH 1:2 PLOT SCALE.

20 10 0 20 40

SCALE: 1" = 20'

BIDDING PLANS

C6.4

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

48TH STREET SIGNING & STRIPING PLAN STA. 10+50 TO 12+79

FILE: 21001_14_48TH_SIGN_STRIPE.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
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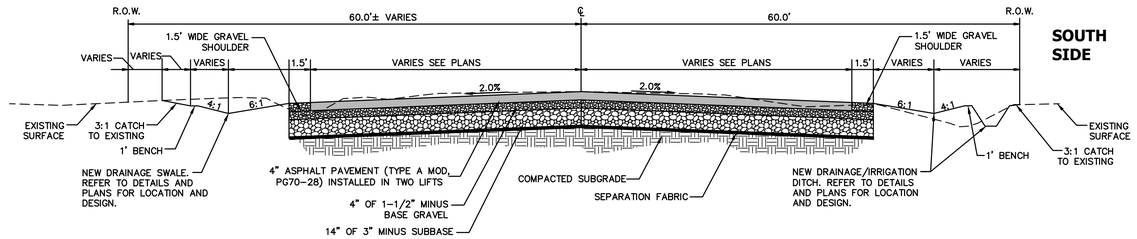
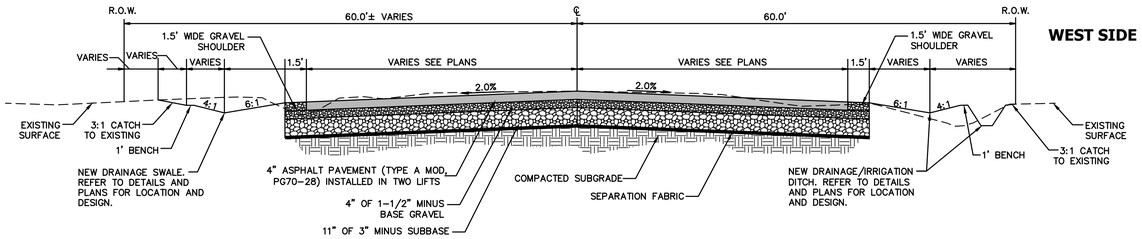


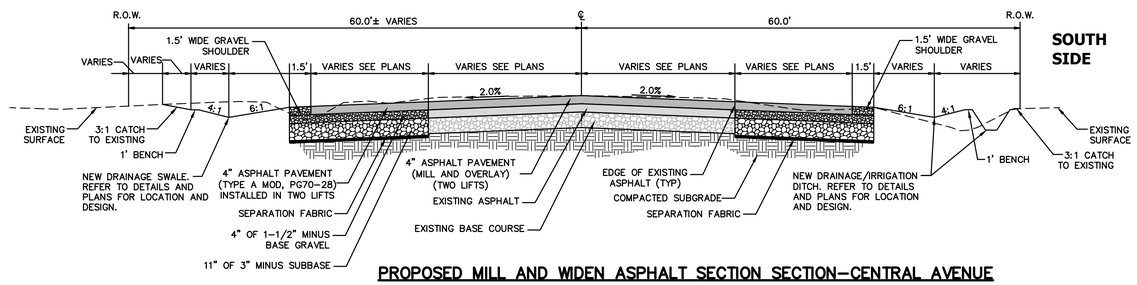
PROPOSED FULL REPLACEMENT ASPHALT SECTION SECTION–CENTRAL AVENUE

NOT TO SCALE



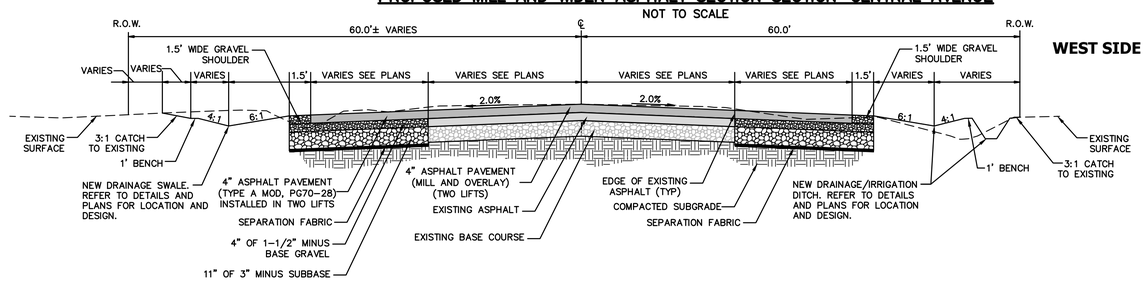
PROPOSED FULL REPLACEMENT ASPHALT SECTION SECTION–48TH STREET WEST

NOT TO SCALE



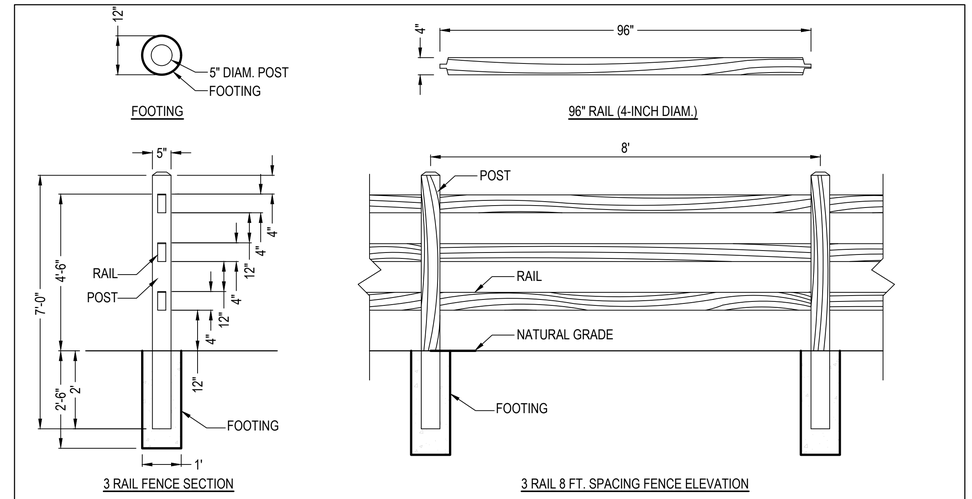
PROPOSED MILL AND WIDEN ASPHALT SECTION SECTION–CENTRAL AVENUE

NOT TO SCALE



PROPOSED MILL AND WIDEN ASPHALT SECTION SECTION–48TH STREET WEST

NOT TO SCALE

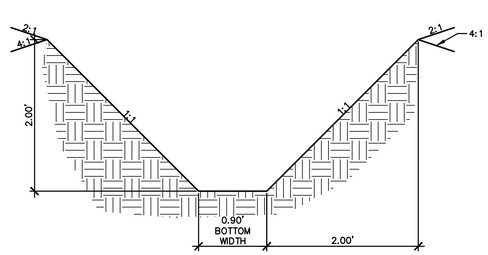


NOTES:

1. POSTS AND RAILS SHALL BE PRESSURE-TREATED WOOD
2. CONCRETE FOR FOOTINGS TO BE MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
3. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

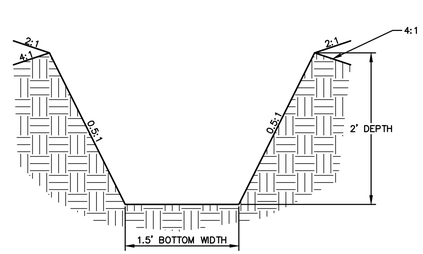
SPLIT RAIL FENCE DETAIL

NOT TO SCALE



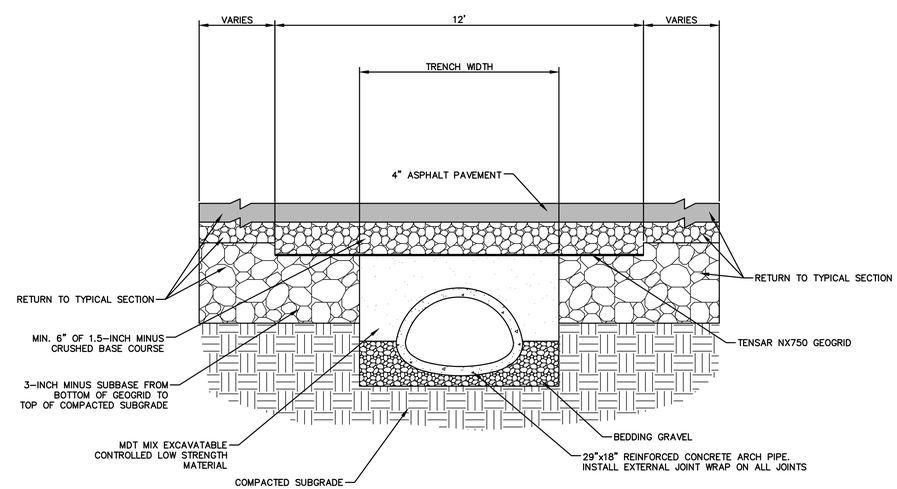
PROPOSED IRRIGATION DITCH SECTION (SOUTH OF CENTRAL AVE.)

NOT TO SCALE



PROPOSED IRRIGATION DITCH SECTION (NORTH OF CENTRAL AVE.)

NOT TO SCALE



PROPOSED IRRIGATION CULVERT CROSS SECTION

NOT TO SCALE

BIDDING PLANS

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
-	-
-	-
-	-
-	-
-	-

FILE: 21001_14_COVER.DWG

PROJECT NO: 21001.14

CAD: HDY

QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

DETAILS

C7.1

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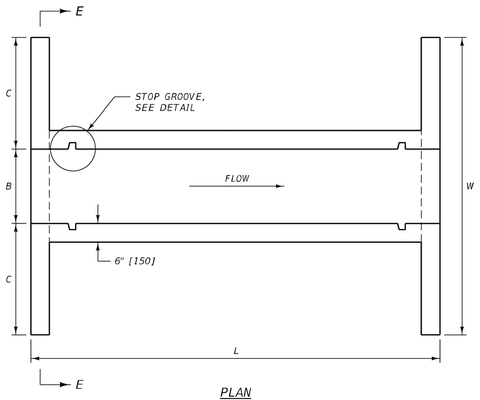
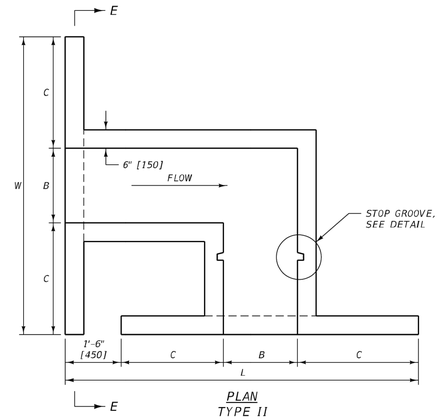
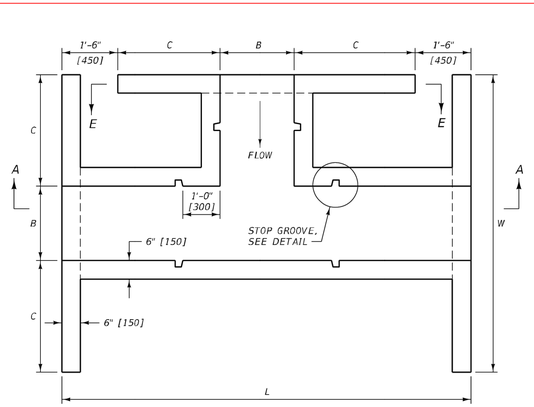


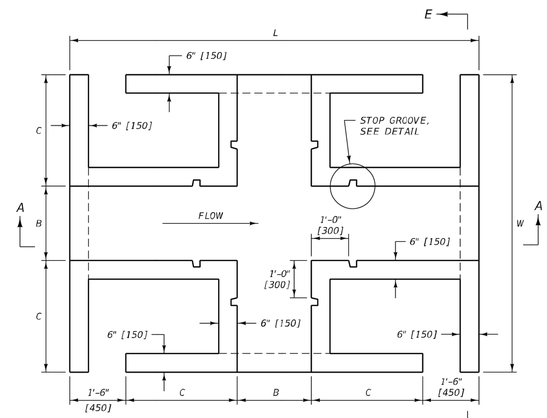
PLAN
TYPE I



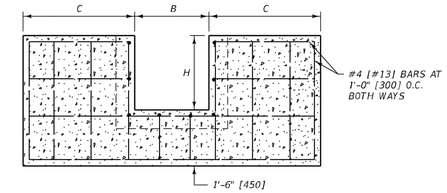
PLAN
TYPE II



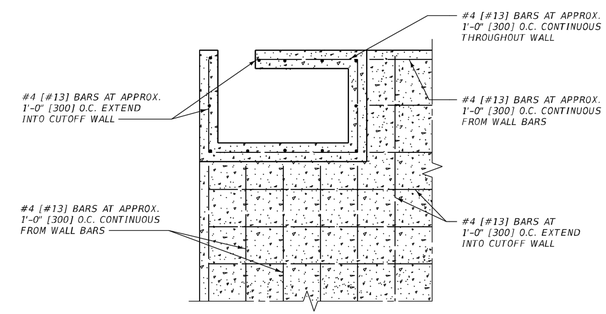
PLAN
TYPE III



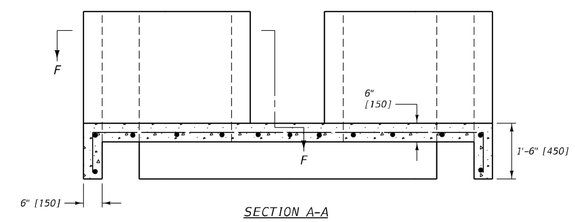
PLAN
TYPE IV



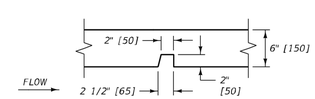
SECTION E-E



SECTION F-F



SECTION A-A



STOP GROOVE DETAIL

UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DIMENSIONS AND QUANTITIES

	B	C	H	L	W	CL. GENERAL CONC.OR EQUAL (C.Y.)	REINFORCING STEEL (LB.)
TYPE I	2'-0"	3'-0"	2'-0"	6'-0"	8'-0"	1.5	114.0
	2'-6"	3'-6"	2'-0"	6'-0"	9'-6"	1.7	124.4
	3'-0"	4'-0"	2'-6"	6'-0"	11'-0"	2.2	129.0
TYPE II	2'-0"	3'-0"	2'-0"	9'-6"	8'-0"	2.0	152.0
	2'-6"	3'-6"	2'-0"	11'-0"	9'-6"	2.4	190.0
	3'-0"	4'-0"	2'-6"	12'-6"	11'-0"	3.3	250.8
TYPE III	2'-0"	3'-0"	2'-0"	11'-0"	8'-0"	2.8	212.8
	2'-6"	3'-6"	2'-0"	12'-6"	9'-6"	3.4	258.4
	3'-0"	4'-0"	2'-6"	14'-0"	11'-0"	4.6	349.6
TYPE IV	2'-0"	3'-0"	2'-0"	11'-0"	8'-0"	3.4	266.0
	2'-6"	3'-6"	2'-0"	12'-6"	9'-6"	4.2	319.2
	3'-0"	4'-0"	2'-6"	14'-0"	11'-0"	5.6	425.6

METRIC DIMENSIONS AND QUANTITIES

	B (mm)	C (mm)	H (mm)	L (mm)	W (mm)	CL. GENERAL CONC.OR EQUAL(m^3)	REINF. STEEL (kg)
TYPE I	600	900	600	1850	2400	1.1	54.7
	750	1050	600	1850	2850	1.3	60.7
	900	1200	750	1850	3300	1.6	80.2
TYPE II	600	900	600	2850	2400	1.4	69.8
	750	1050	600	3300	2850	1.8	84.2
	900	1200	750	3750	3300	2.4	118.1
TYPE III	600	900	600	3300	2400	2.0	98.7
	750	1050	600	3750	2850	2.5	117.6
	900	1200	750	4200	3300	3.3	164.3
TYPE IV	600	900	600	3300	2400	2.5	121.1
	750	1050	600	3750	2850	3.0	144.4
	900	1200	750	4200	3300	4.1	201.9

NOTES:

1. MODIFY DIVISION BOX DIMENSIONS IF REQUIRED IN THE PLANS.
2. QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 552,615

DWG. NO. 615-04

STANDARD CONCRETE IRRIGATION DIVISION BOXES

MDT MONTANA DEPARTMENT OF TRANSPORTATION

BIDDING PLANS

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
-	-
-	-
-	-
-	-
-	-

FILE: 21001_14_COVER.DWG

PROJECT NO: 21001.14

CAD: HDY

QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST INTERSECTION IMPROVEMENTS

BILLINGS, MONTANA

IRRIGATION STRUCTURE DETAILS

C7.2

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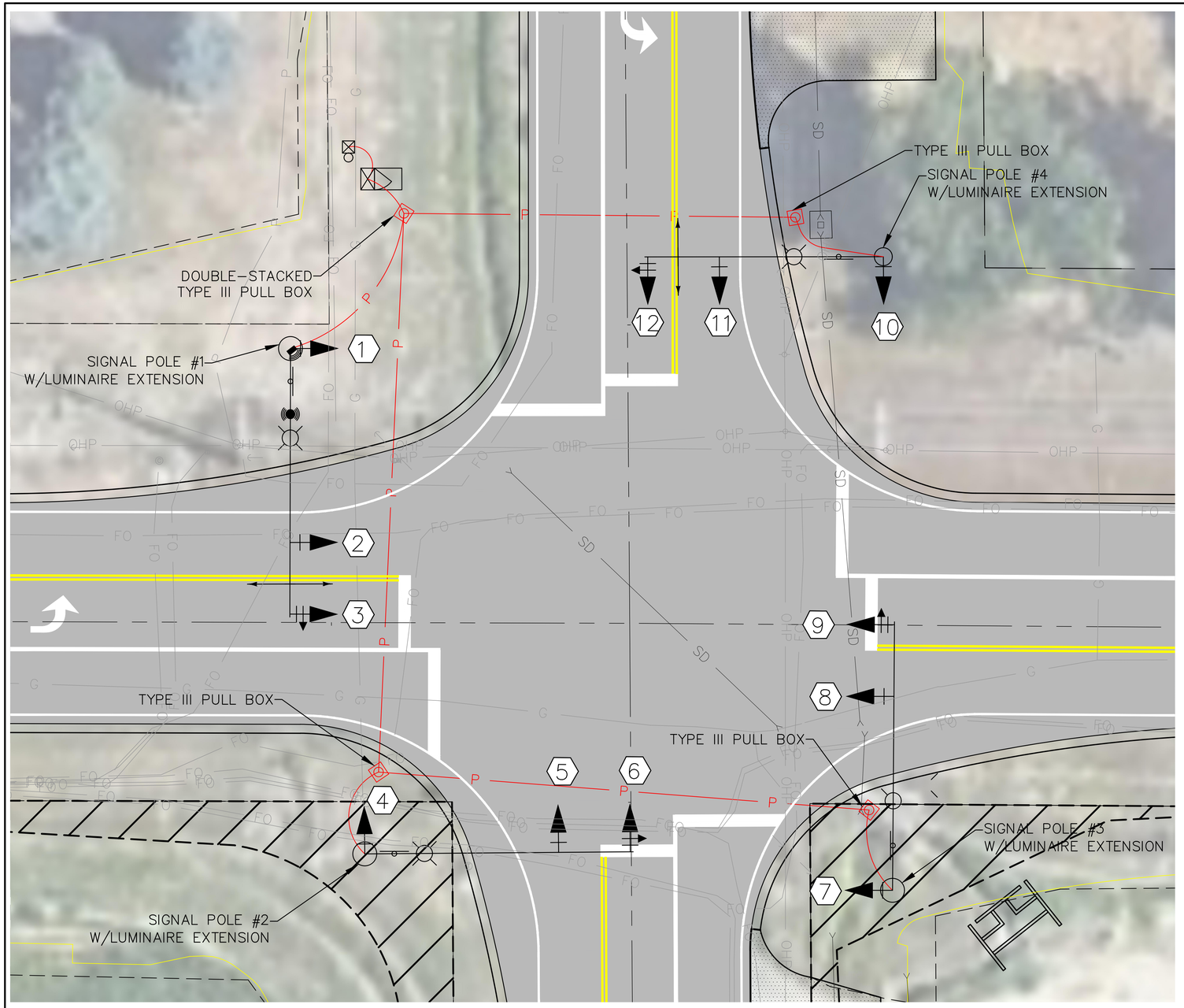

ESTIMATE OF QUANTITIES			
KEY	ITEM	QTY.	UNIT
	TYPE 3A SIGNAL STD. W/40' MAST ARM; & 15' LUMINAIRE ARM (#4)	1	EACH
	TYPE 3A SIGNAL STD. W/45' MAST ARM; & 15' LUMINAIRE ARM (#1,2,&3)	3	EACH
	3 SECTION VEHICLE SIGNAL HEAD	8	EACH
	3 SECTION VEHICLE SIGNAL HEAD WITH FLASHING ARROWS (SEE SIGNAL INDICATIONS BELOW)	4	EACH
	EMERGENCY VEHICLE PREEMPTION DETECTOR (721)	2	EACH
	NEW TYPE III PULL BOX	4	EACH
	NEW SERVICE (SEE DETAILS)	1	EACH
	ETHERNET RADIO COMMUNICATION	1	EACH
	CONTROLLER CABINET W/ CONTROLLER	1	EACH
	VIDEO DETECTION CAMERA	1	EACH
	2 INCH CONDUIT (TRENCHED)	10	LNFT
	3 INCH CONDUIT (TRENCHED)	650	LNFT
	CONCRETE FOUNDATION	20	CY

BIDDING PLANS

SIGNAL INDICATIONS

R 12" LED
SY 12" LED
FY 12" LED

12" LED
12" LED
12" LED

3 6 9 12

1 2 4 5
7 8 10 11

R = RED; G = GREEN
SY = STEADY YELLOW; FY = FLASHING YELLOW
PROVIDE A REFLECTIVE BORDER ON BACKPLATES

NORTH

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE SCALE ON 11X17 SHEET WITH 1:2 PLOT SCALE.

10 5 0 10 20

SCALE: 1" = 10'

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DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
-	-
-	-
-	-
-	-
-	-

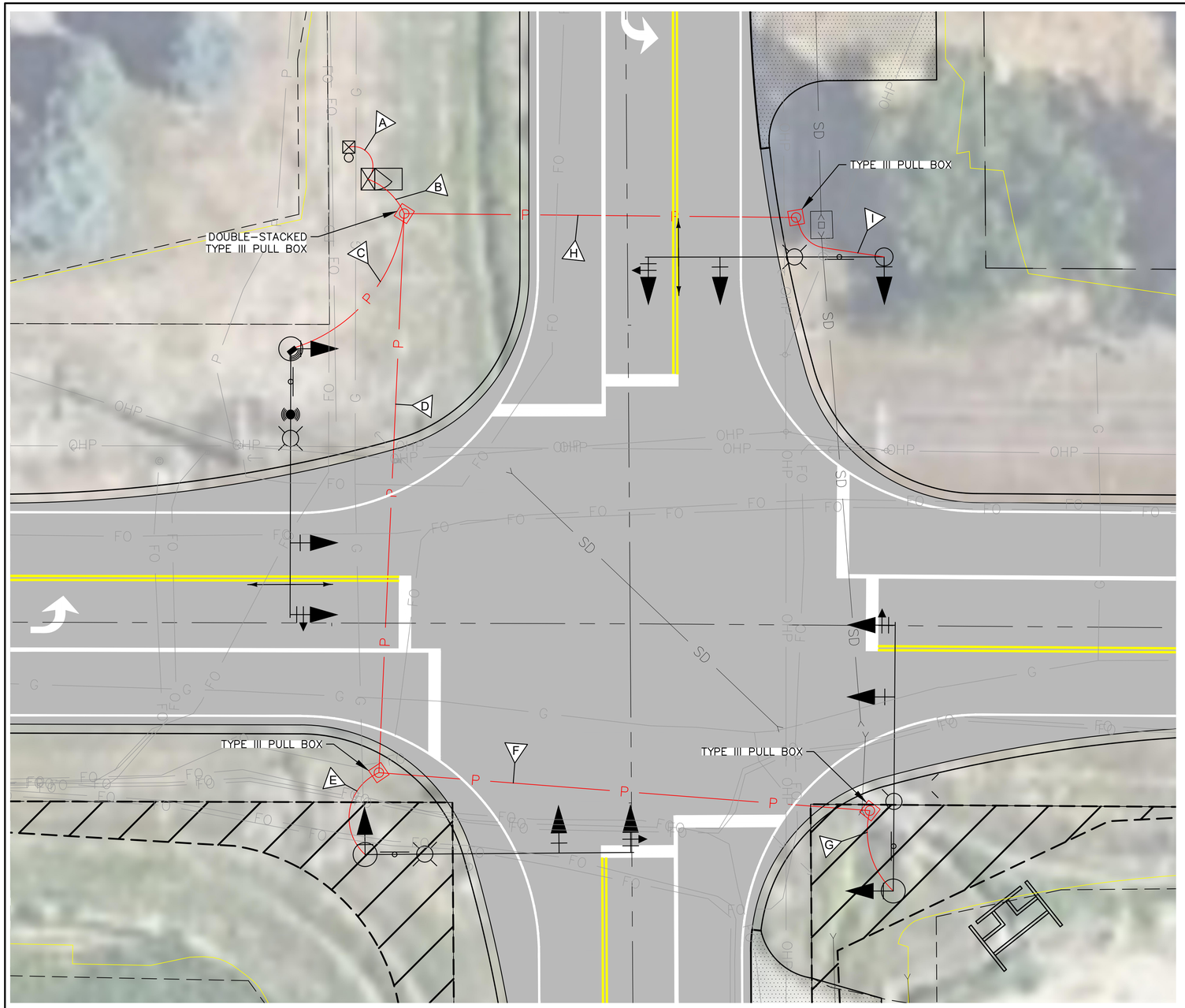
FILE: 21001_14_SIGNAL_PRO.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE COUNTY T.O. 14

CENTRAL AVENUE & 48TH STREET WEST
TRAFFIC SIGNAL IMPROVEMENTS
BILLINGS, MONTANA

SIGNAL PLAN

E1.1



CONDUIT AND WIRE SCHEDULE	
A TRENCH	1 OF 2" PVC CONDUIT 3 OF AWG NO. 6 CONDUCTOR (CONTROLLER) 1 OF AWG NO. 10 CONDUCTOR (GROUND)
B TRENCH	3 OF 3" PVC CONDUIT 2 OF AWG NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 2 OF 3 AWG NO. 20 SIGNAL CABLE (PRE-EMPT) 8 OF 7 AWG NO. 14 SIGNAL CABLE 1 OF VEHICLE DETECTION CABLE 1 OF ETHERNET CABLE
C TRENCH	1 OF 3" PVC CONDUIT 2 OF AWG NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 1 OF 3 AWG NO. 20 SIGNAL CABLE (PRE-EMPT) 2 OF 7 AWG NO. 14 SIGNAL CABLE 1 OF VEHICLE DETECTION CABLE 1 OF ETHERNET CABLE
D TRENCH	2 OF 3" PVC CONDUIT 2 OF AWG NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 4 OF 7 AWG NO. 14 SIGNAL CABLE
E TRENCH	1 OF 3" PVC CONDUIt 2 OF NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 2 OF 7 AWG NO. 14 SIGNAL CABLE
F TRENCH	2 OF 3" PVC CONDUIT 2 OF NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 2 OF 7 AWG NO. 14 SIGNAL CABLE
G TRENCH	1 OF 3" PVC CONDUIT 2 OF NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 2 OF 7 AWG NO. 14 SIGNAL CABLE
H TRENCH	2 OF 3" PVC CONDUIT 2 OF NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 1 OF 3 AWG NO. 20 SIGNAL CABLE (PRE-EMPT) 2 OF 7 AWG NO. 14 SIGNAL CABLE
I TRENCH	1 OF 3" PVC CONDUIT 2 OF NO. 8 CONDUCTOR (LIGHTING) 1 OF AWG NO. 10 CONDUCTOR (GROUND) 1 OF 3 AWG NO. 20 SIGNAL CABLE (PRE-EMPT) 2 OF 7 AWG NO. 14 SIGNAL CABLE

NOTE:
CONTRACTOR TO PLACE 2500# MULE TAPE IN UNUSED CONDUITS AND CAP THE ENDS.

NORTH

SCALE SHOWN IS ACCURATE WHEN PRINTED ON 22X34 SHEET WITH 1:1 PLOT SCALE. DOUBLE SCALE ON 11X17 SHEET WITH 1:2 PLOT SCALE.

10 5 0 10 20

SCALE: 1" = 10'

BIDDING PLANS

DRAWING HISTORY

DATE	DESCRIPTION
04/29/25	PRELIMINARY-FOR REVIEW
01/20/26	BIDDING SET
-	-
-	-
-	-
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FILE: 21001_14_SIGNAL_PRO.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE CO. TASK ORDER 14

CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA

CONDUIT PLAN

E1.2

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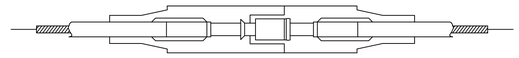
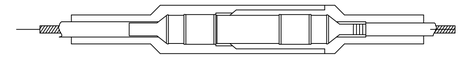
TYPES 1, 6, 11 & 16



NON–FUSED BREAKAWAY

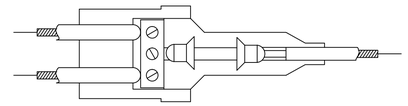
TYPES 2, 7, 12 & 17



FUSED BREAKAWAY

IDENTITY NO.	DESCRIPTIVE SYMBOL & WIRE SIZES
1	8 — 8
2	8 — 10
3	8, 8 — 10
4	8, 8 — 8
5	8, 8 — 8
6	6 — 6
7	6 — 10
8	6, 6 — 10
9	6, 6 — 6
10	6, 6 — 6
11	4 — 4
12	4 — 10
13	4, 4 — 10
14	4, 4 — 4
15	4, 4 — 4
16	10 — 10
17	10 — 10
18	10, 10 — 10
19	10, 10 — 10
20	10, 10 — 10
21	VARIES, VARIES — VARIES, VARIES

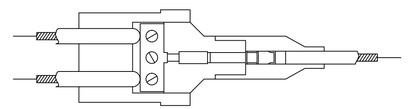
TYPES 3, 8, 13 & 18



FUSED BREAKAWAY

PROVIDE A PLUG AND RECEPTACLE HOUSED IN WATER–RESISTANT, SYNTHETIC RUBBER CAPABLE OF BURIAL IN THE GROUND OR INSTALLATION IN SUNLIGHT. THE HOUSING, CONSISTING OF 2 SECTIONS, PROVIDES A WATERTIGHT SEAL AROUND THE CABLE AND A WATERTIGHT SEAL BETWEEN THE TWO SECTIONS AT THE POINT OF DISCONNECTION. SUPPLY EACH KIT WITH SUFFICIENT SILICONE COMPOUND TO LUBRICATE METAL PARTS AND THE RUBBER HOUSINGS FOR EASY ASSEMBLY.

TYPES 4, 9, 14 & 19

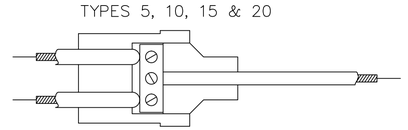


NON–FUSED BREAKAWAY

WHERE INDICATED, CRIMP A COPPER PIN AND A COPPER RECEPTACLE TO THE CABLE. THE RECEPTACLE IS TO ESTABLISH CONTACT PRESSURE WITH THE PIN THROUGH THE USE OF A COPPER BERYLLIUM SPRING AND BE EQUIPPED WITH A DISPOSABLE MOUNTING PIN. THE PIN IS TO BE CONSTRUCTED OF AT LEAST HALF–HARD MATERIAL. THE CRIMPING PORTION IS TO BE FULLY ANNEALED WHILE THE REST OF THE PIN IS MAINTAINED IN ITS ORIGINAL STATE OF HARDNESS. THE RECEPTACLE IS TO BE FULLY ANNEALED. THE PIN AND RECEPTACLE ARE TO LOCK TOGETHER SO THE CONNECTION IS MAINTAINED WHEN A MINIMUM FORCE OF 20 POUNDS TENSION IS APPLIED TO THE ATTACHED CABLES.

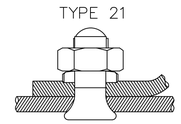
PROVIDE FUSED CONNECTOR KITS CONTAINING A PAIR OF SPRING LOADED 90% CONDUCTIVITY CONTACTS FOR GRIPPING A STANDARD MIDGET FERRULE TYPE FUSE. THE CONTACTS MUST BE FULLY ANNEALED AND ADAPTED TO BE CRIMPED TO THE CABLE.

TYPES 5, 10, 15 & 20



NON–FUSED NON–BREAKAWAY

TYPE 21



COPPER SPLIT BOLT – MAKE WATERTIGHT USING SELF ADHERING MASTIC

WATERTIGHT CONNECTORS

NO SCALE

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BIDDING PLANS

DRAWING HISTORY

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01/20/26	BIDDING SET
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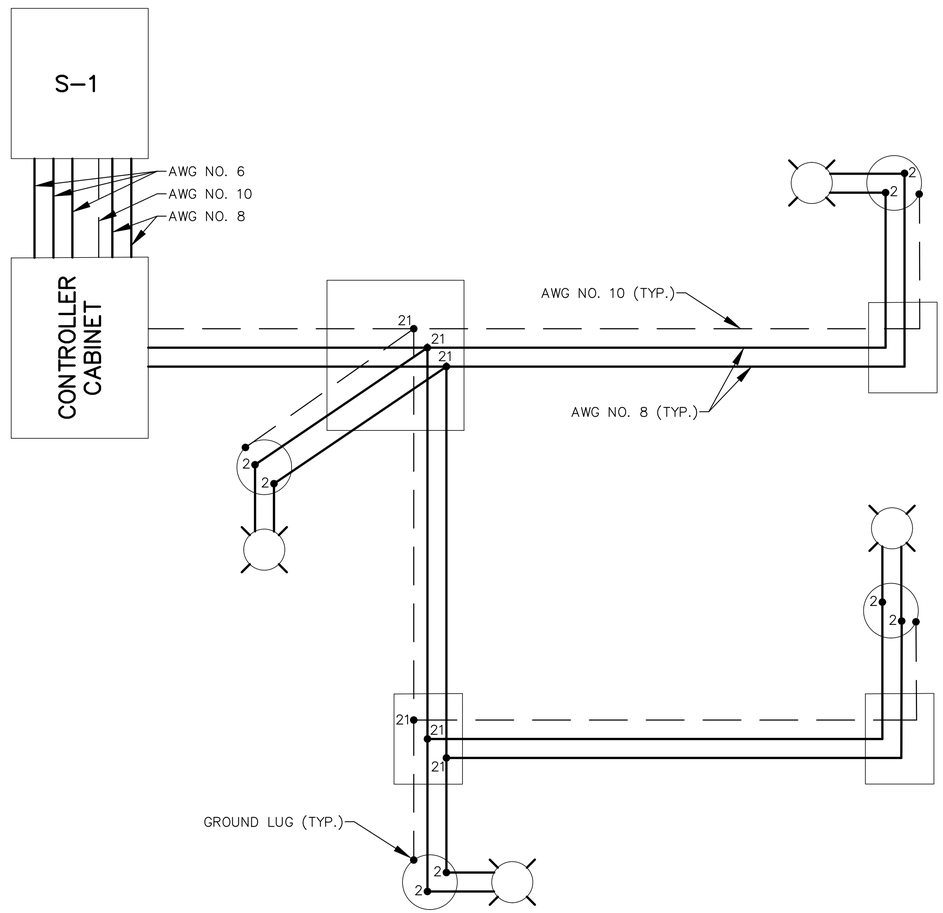
-	-
-	-
-	-

FILE: 21001_14_SIGNAL_PRO.DWG
PROJECT NO: 21001.14
CAD: HDY
QUALITY ASSURANCE: DJC, ESC

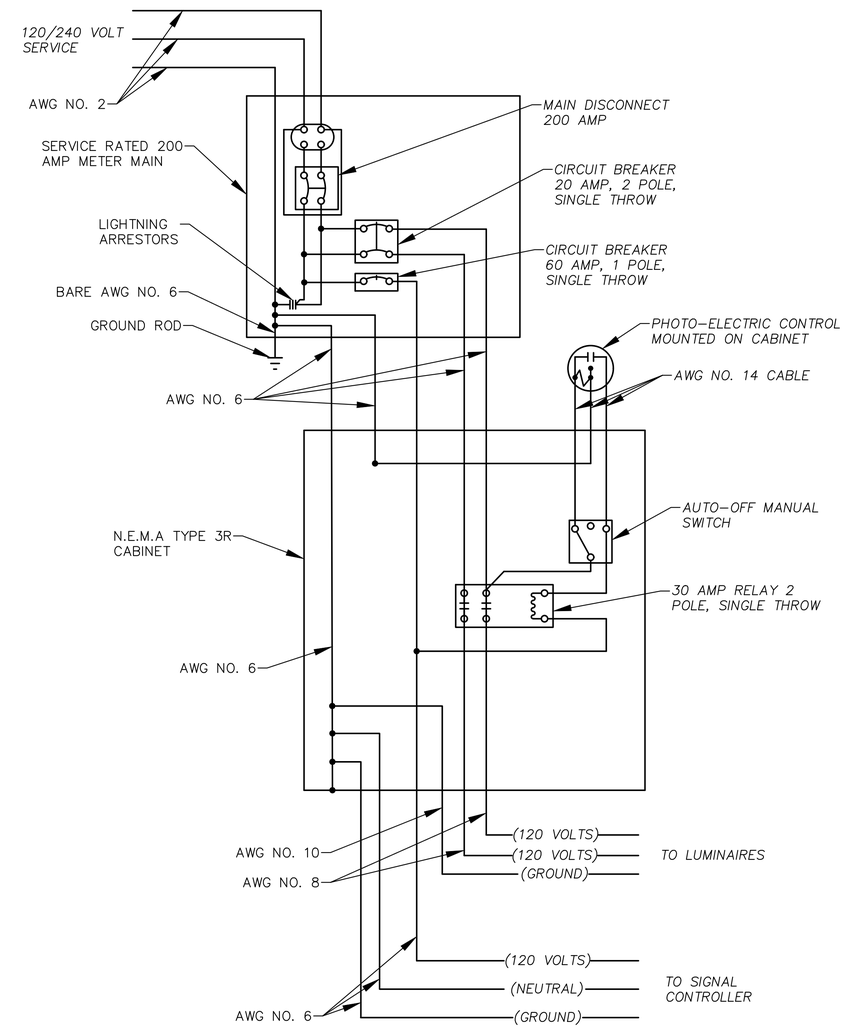
YELLOWSTONE CO. TASK ORDER 14
CENTRAL AVENUE & 48TH STREET WEST
INTERSECTION IMPROVEMENTS
BILLINGS, MONTANA
ELECTRICAL DETAILS

E1.3



STREET LIGHTING WIRING DIAGRAM

NO SCALE



SIGNAL SERVICE CABINET WIRING DIAGRAM

NO SCALE

NORTH

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BIDDING PLANS

DRAWING HISTORY

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01/20/26	BIDDING SET

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QUALITY ASSURANCE: DJC, ESC

YELLOWSTONE COUNTY T.O. 14

CENTRAL AVENUE & 48TH STREET WEST
TRAFFIC SIGNAL IMPROVEMENTS
BILLINGS, MONTANA

ELECTRICAL DETAILS

E1.4

TABLE 1		POLE SHAFT						SIGNAL ARM					FOUNDATION			
	(A)	(B)	(C)	(D)	MIN. BASE DIA.	MIN. WALL THICK	ANCHOR BOLTS	(E)	(F)	(G)	(H)	(J)	(K)	(L)	(M)	(N)
TYPE (A) LOWER SHAFT	15', 20', 25', 30', 35', 40'	19" SQ.		2"	13½"	⅝"	1¾" x 48"	22" SQ.	23"	1½" - 6 UNC - 6" A325	2"	2"	12	12' 0"	11' 6"	3' 0"
TYPE (B) LOWER SHAFT	45', 50', 55', 60'	21" SQ.	21"	2"	15"	⅝"	2" x 48"	24" SQ.	25"	1½" - 6 UNC - 6" A325	2"	2"	12	12' 0"	11' 6"	4' 0"

TABLE 2	MOUNTING POINTS							
	1 SIGNAL	2 EMERG. VEHICLE DETECTOR	3 - 3C SIGN PANEL	1A - *1C SIGNAL	* 7 LUMINAIRE	* 8 SIGNALS	* 9 PED. SIGNAL	* 10 CONTROLLER CAB.
DESIGN AREA	12.0 SQ.FT.	NIL	8.0 SQ.FT.	9.0 SQ.FT.	3.3 SQ.FT.	9.0 SQ.FT.	3.0 SQ.FT.	4.72 SQ.FT.
DESIGN WEIGHT	135 LB.	NIL	100 LB.	105 LB.	77LB.	210 LB.	80 LB.	200 LB.

TABLE 3	(A)			
	15'	20' & 25'	30', 35', 40' & 45'	50', 55' & 60'
MTG.PTS.	1, 2 & 3	1, 1A, 2, 3, & 3A	1, *1A, *1B, 2, *3, *3A, & *3B	*1, *1A, *1B, *1C, *2, *3, *3A, *3B, & *3C

NOTES

DESIGN STANDARDS IN ACCORDANCE WITH THE 2015 AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (AND ANY AMENDMENTS THERETO).

DESIGN PARAMETERS

DESIGN WIND VELOCITY 700 YEAR MRI BASIC WIND SPEED

FATIGUE CATEGORY 2

HEIGHT AND EXPOSURE FACTOR Kz
z = 16 FEET
α = 9.5
zg = TAKEN AS 900 FEET FOR EXPOSURE C

DIRECTIONAL FACTOR Kd = 0.95, GUST FACTOR = 1.14 DRAG COEFFICIENTS LFRD TABLE 3.8.7-1

NO ICE LOADS OR GALLOPING

DESIGN AREA = AREA WITH MAXIMUM WIND LOAD (WIND IS PERPENDICULAR TO STANDARD, AS SHOWN).

DESIGN WEIGHT = DEAD LOAD.

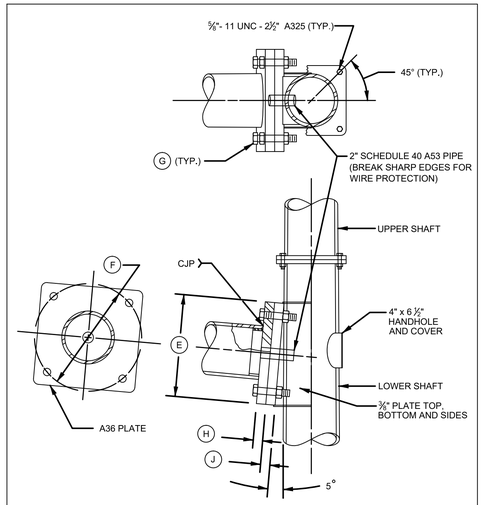
DESIGN ALL TYPE (A) LOWER SHAFTS FOR (A) = 40' AND A MOUNTING HEIGHT OF 45'.

DESIGN ALL TYPE (B) LOWER SHAFTS FOR (A) = 60' AND A MOUNTING HEIGHT OF 45'.

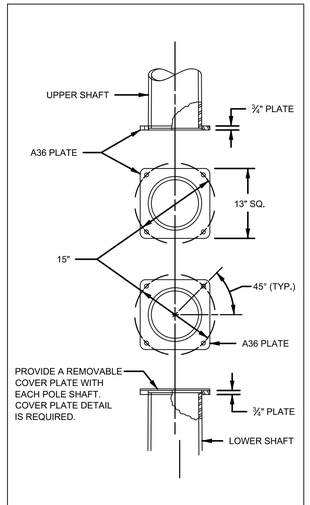
PROVIDE ANCHOR BOLTS CONFORMING TO ASTM F1554 OR EQUAL. GALVANIZE AND THREAD THE TOP END (12" MIN.).

CALL OUT WELDING PROCEDURES, SYMBOLS, BASE METAL SPECIFICATIONS AND GRADES PRIOR TO FABRICATION OR APPROVAL.

GALVANIZE POLE SHAFTS, ARMS, AND ACCESSORIES PER ASTM A123. GALVANIZE HARDWARE PER ASTM F2329.

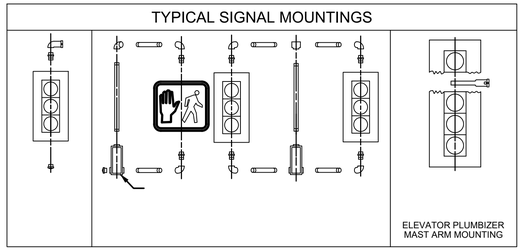


DETAIL 1 | SIGNAL ARM CONNECTION

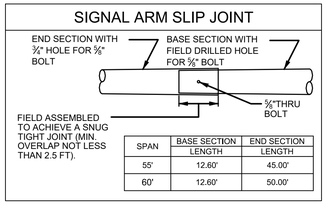


DETAIL 2 | SHAFT TO SHAFT

TYPICAL SIGNAL MOUNTINGS

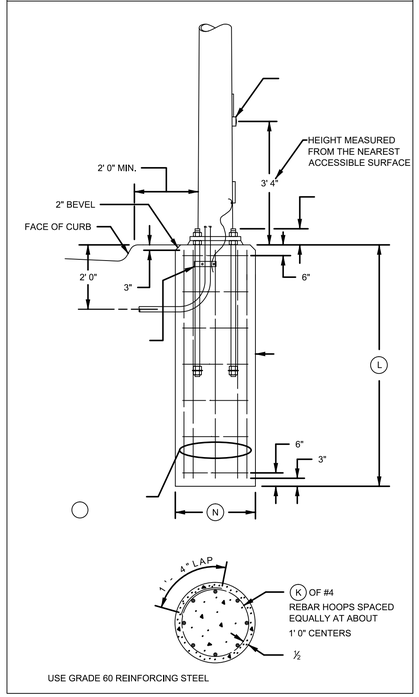


SIGNAL ARM SLIP JOINT

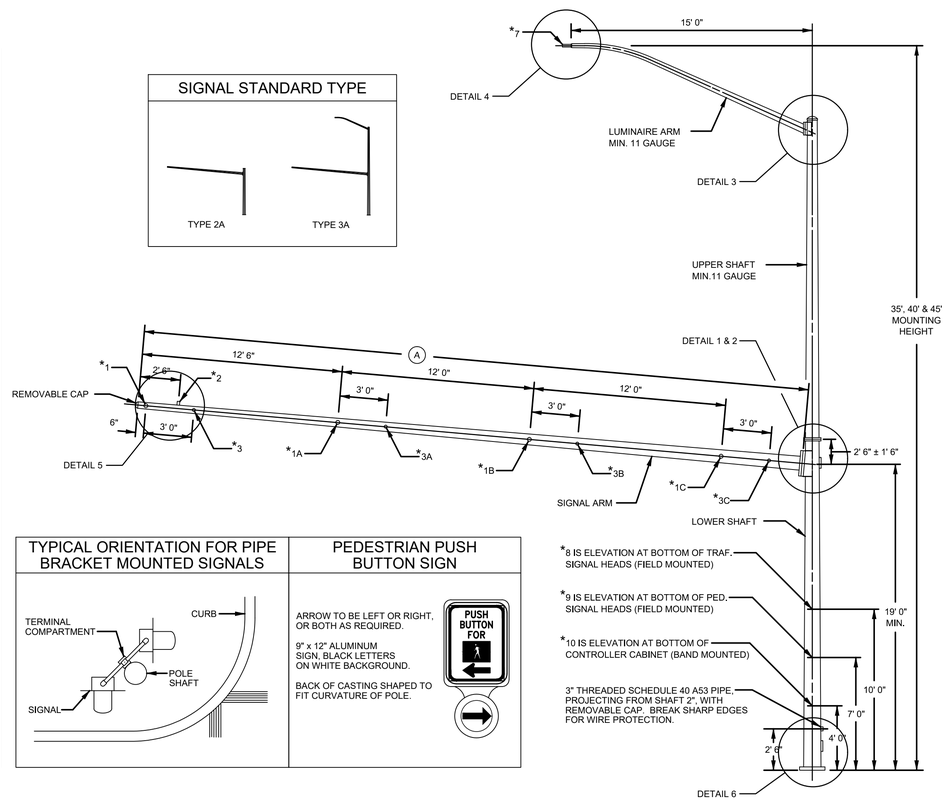


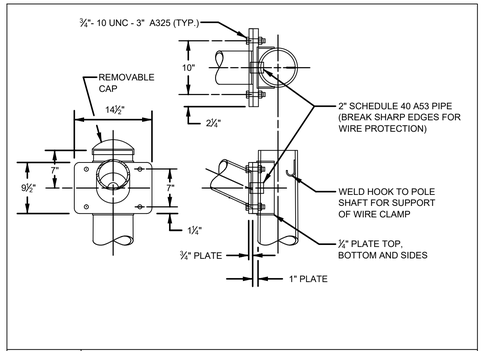
SPAN	BASE SECTION LENGTH	END SECTION LENGTH
55'	12.60'	45.00'
60'	12.60'	50.00'

TYPICAL FOUNDATION

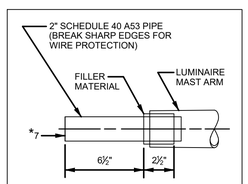


SIGNAL STANDARD TYPE





DETAIL 3 | LUMINAIRE ARM CONNECTION



DETAIL 4 | LUMINAIRE TENON

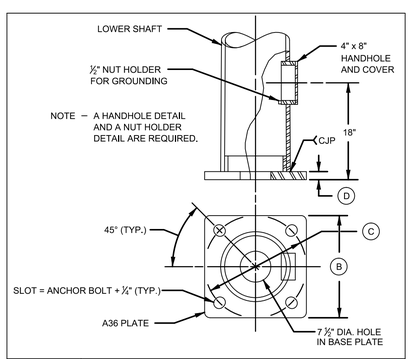
TYPICAL ORIENTATION FOR PIPE BRACKET MOUNTED SIGNALS

PEDESTRIAN PUSH BUTTON SIGN

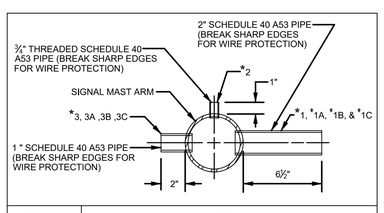
ARROW TO BE LEFT OR RIGHT, OR BOTH AS REQUIRED.

9" x 12" ALUMINUM SIGN, BLACK LETTERS ON WHITE BACKGROUND.

BACK OF CASTING SHAPED TO FIT CURVATURE OF POLE.



DETAIL 6 | BASE



DETAIL 5 | ARM TENONS

2015 LRFD TYPE 2A & 3A SIGNAL STANDARDS, FOUNDATION DETAILS, AND TYPICAL SIGNAL MOUNTINGS

NOT TO SCALE

BIDDING PLANS

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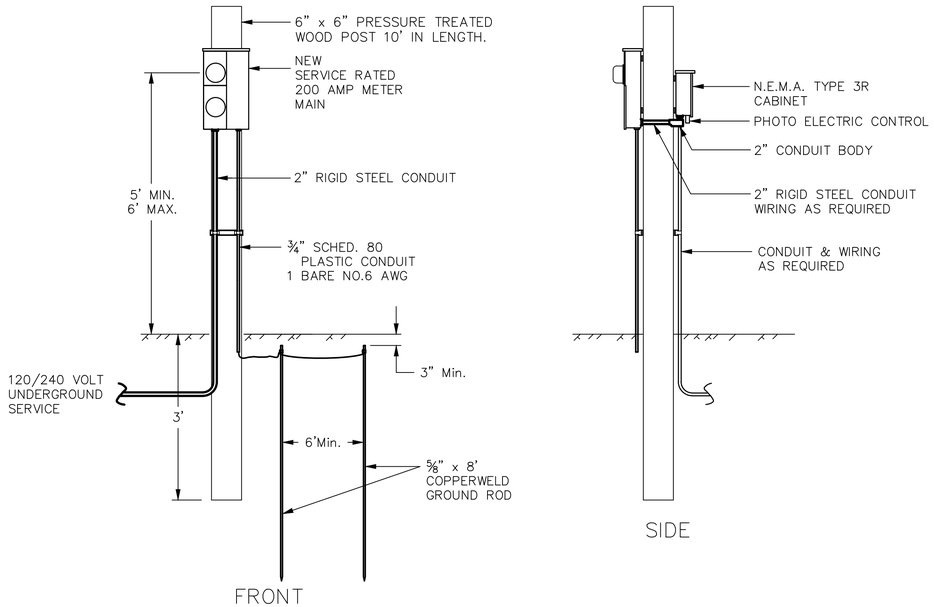
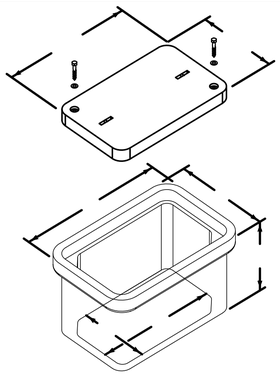
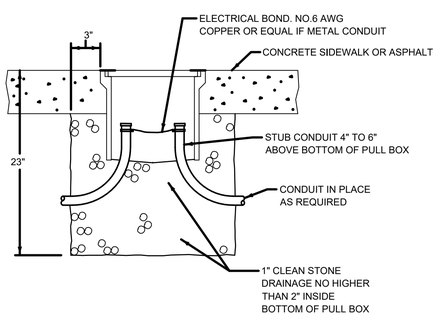


UNDERGROUND SERVICE ASSEMBLY DETAIL

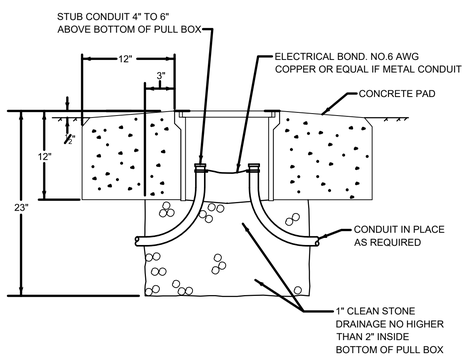
NO SCALE



PULL BOX - COMPOSITE MINIMUM DIMENSIONS		
TYPE 1	TYPE 2	TYPE 3
L = 20"	L = 25"	L = 32"
W = 13"	W = 15"	W = 19"
D = 12"	D = 12"	D = 12"
I D L = 17"	I D L = 21"	I D L = 28"
I D W = 10"	I D W = 11"	I D W = 15"
C L = 18"	C L = 23"	C L = 30"
C W = 11"	C W = 13"	C W = 17"



PULL BOX INSTALLED IN A SIDEWALK OR ASPHALT



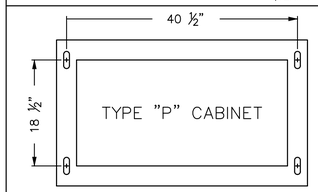
PULL BOX INSTALLED IN DIRT

PULL BOX-COMPOSITE TYPE 1, 2 & 3

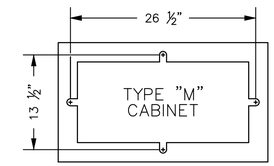
NOT TO SCALE

ANCHOR BOLT PATTERN

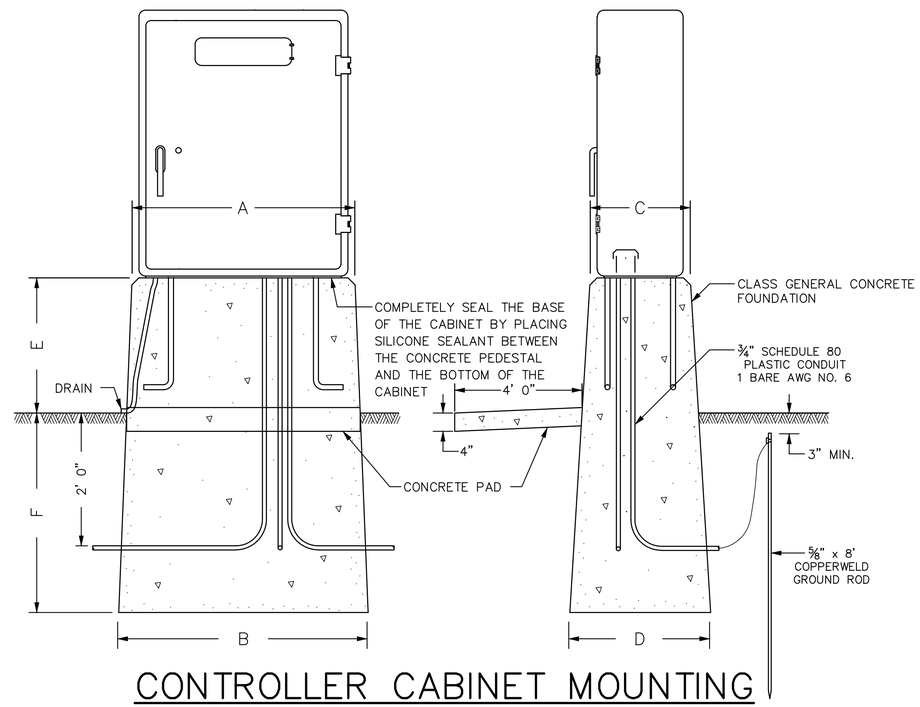
(VERIFY BEFORE PLACING ANCHOR BOLTS)



NOTE:
LOCATE CONDUITS NEAR THE CENTER OF THE PEDESTAL – BETWEEN 6" AND 10" FROM THE FRONT OF THE CABINET.
EXTEND CONDUIT 2" TO 4" ABOVE THE CONCRETE PEDESTAL.



NOTE:
LOCATE CONDUITS NEAR THE CENTER OF THE PEDESTAL – BETWEEN 4" AND 8" FROM THE FRONT OF THE CABINET.
EXTEND CONDUIT 2" TO 4" ABOVE THE CONCRETE PEDESTAL.



CONTROLLER CABINET MOUNTING

NOT TO SCALE

CONCRETE PEDESTAL DIMENSIONS

	A	B	C	D	E	F
TYPE M	2' 10"	3' 2"	1' 7"	2' 0"	2' 0"	3' 0"
TYPE P	4' 0"	4' 4"	2' 4"	2' 9"	2' 0"	3' 0"

TYPICAL CABINET DIMENSIONS

	WIDTH	HEIGHT	DEPTH
TYPE M	2' 6"	4' 2"	1' 5"
TYPE P	3' 8"	4' 6"	2' 2"

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BILLINGS, MONTANA
ELECTRICAL DETAILS

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