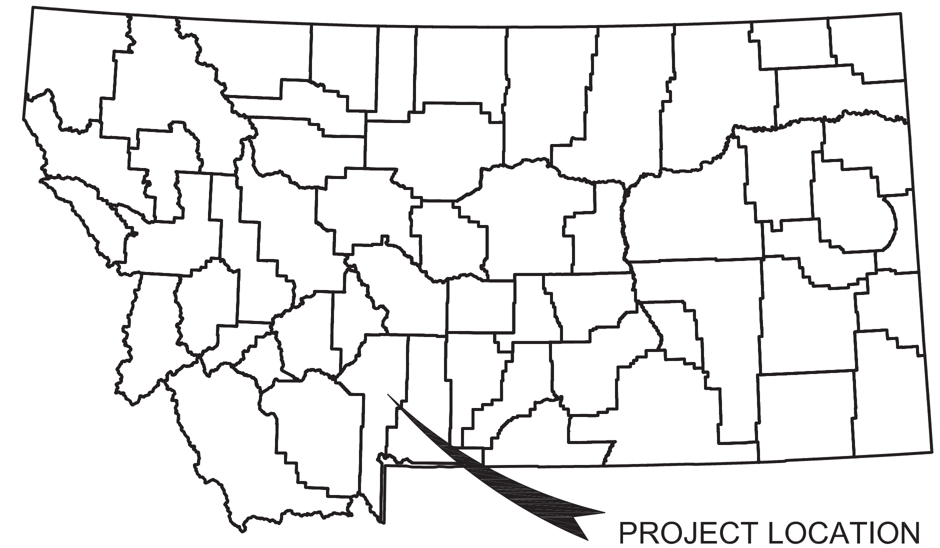
CAMPUS FIRE HYDRANT UPGRADES

WATER SYSTEM IMPROVEMENTS

PROJECT LOCATION: BOUNDED TO THE NORTH BY WEST COLLEGE STREET, TO THE EAST BY SOUTH 5TH AVE, TO THE SOUTH BY WEST KAGY AVE, AND WEST BY SOUTH 19TH AVE IN THE CITY OF BOZEMAN, MONTANA.

LEGAL DESCRIPTION: LOCATED IN SECTION 13, TOWNSHIP 02S, RANGE 05E, P.M.M., GALLATIN COUNTY, MT

NOVEMBER 17, 2023



MONTANA
RORY SCOTT ROMEY
No. 40776PE
11/17/2023
LICENSED
PROFESSIONAL ENGINEER

OWNER: MONTANA STATE UNIVERSITY - BOZEMAN
UNIVERSITY FACILITIES MANAGEMENT
PO BOX 172760
BOZEMAN, MT 59717-2760
PHONE: 406-997-2001

CIVIL ENGINEER: ALLIED ENGINEERING SERVICES, INC.
32 DISCOVERY DRIVE
BOZEMAN, MT 59718

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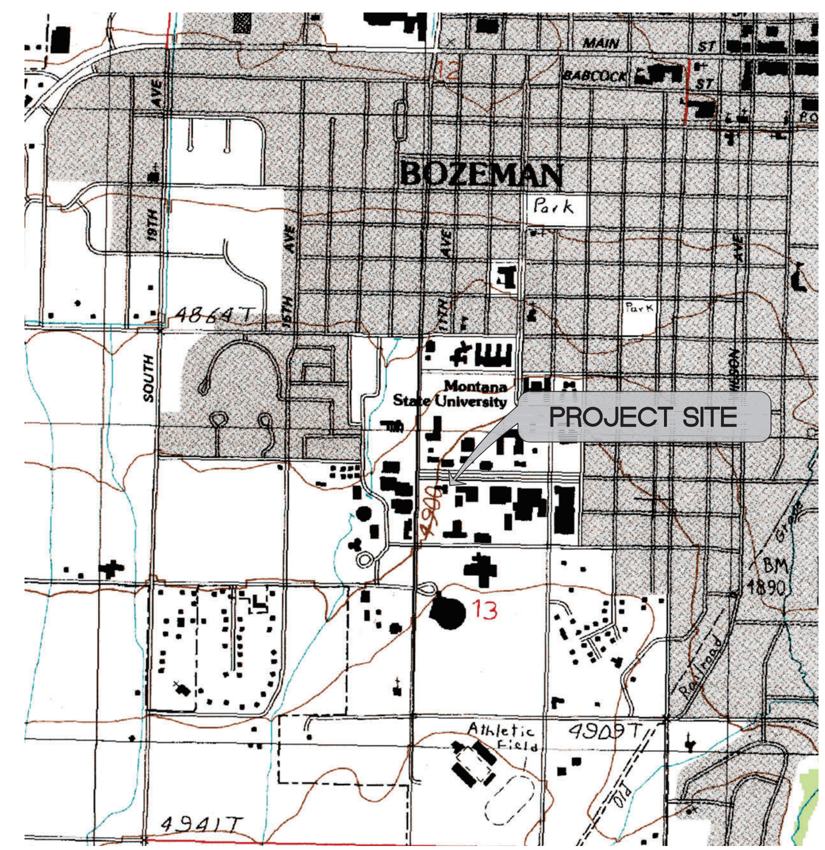
PROJECT ENGINEER: RORY S. ROMEY, PE

DESIGN ENGINEER: ERIC FOSS, EI

PROJECT SURVEYORS: GREG FINCK, PLS
BRANDON SCHREINER, PLS
CONNER SWITZER, EI
DAX GROSSMAN

LOCATION MAP

0 2,000 4,000 6,000
SCALE (FEET)



VICINITY MAP

0 1,000 2,000 3,000
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

PPA#22-0574
A/E#00-00-00
AESI # 22-133

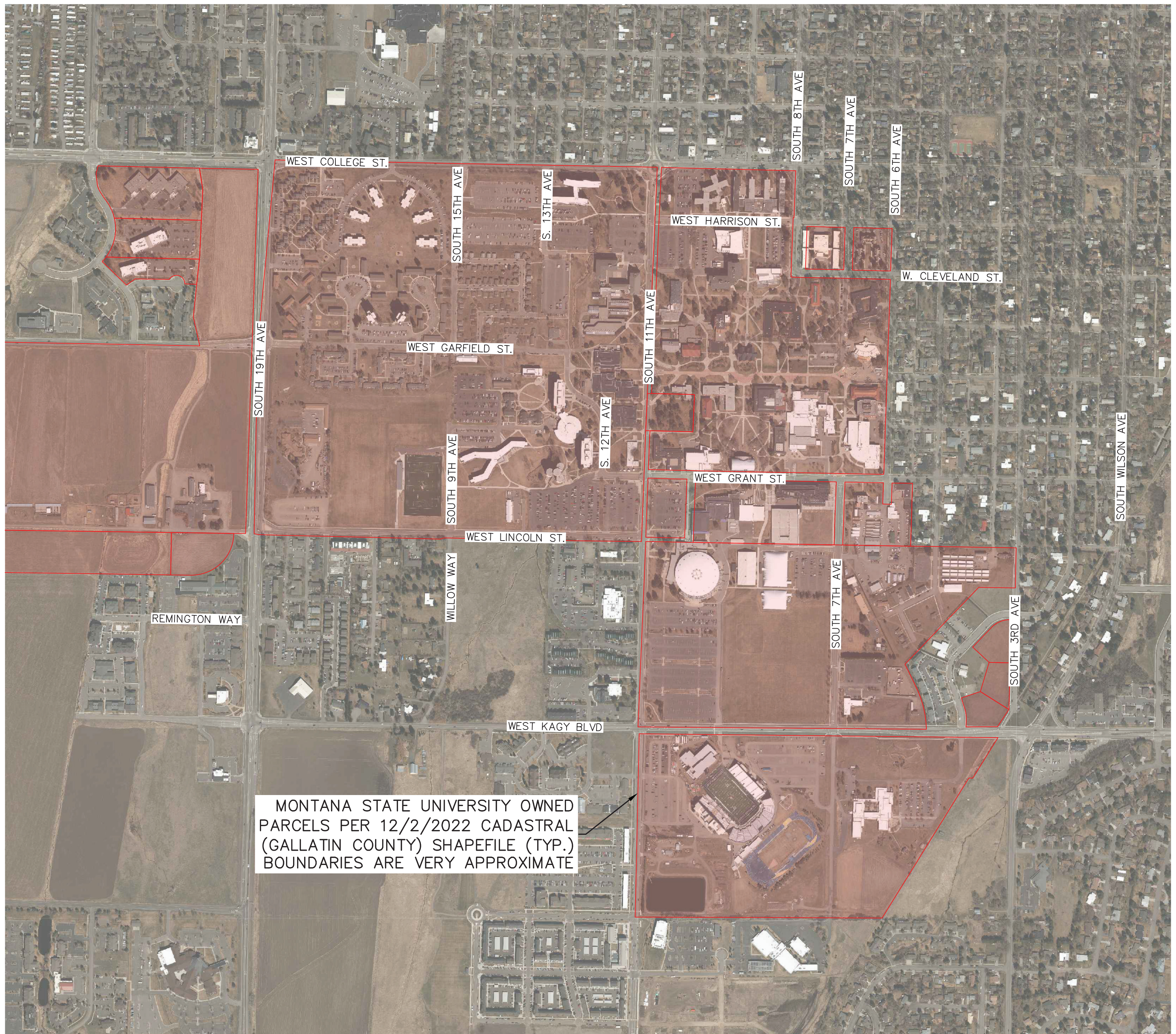
SHEET TITLE
C0.1

SHEET
COVER

DATE
11-17-2023

LEGEND

Symbol	Description
4705	INDEX CONTOUR – EG (5' INTERVAL)
4704	CONTOUR MINOR – EG (1' INTERVAL)
OHP	OVERHEAD POWER – EXISTING
G	UG GAS (FROM UTILITY LOCATE PAINT) – EX.
TEL	UG PHONE (FROM UTILITY LOCATE PAINT) – EX.
E	UG ELECTRIC (FROM UTILITY LOCATE PAINT) – EX.
F	UG FIBER (FROM UTILITY LOCATE PAINT) – EX.
	ROAD CENTERLINE – EXISTING
	EDGE OF PAVEMENT – EXISTING
	CURB FLOWLINE – EXISTING
	TOP BACK OF CURB – EXISTING
	EDGE OF CONCRETE – EXISTING
x	FENCE – EXISTING
	BUILDING – EXISTING
S	SEWER MAIN (FROM UTILITY LOCATE PAINT) – EX.
S	ANTICIPATED EX. SEWER MAIN PER MSU RECORD DWGS
SS	ANTICIPATED EX. SEWER SERVICE PER MSU RECORD DWGS
W	WATER MAIN (FROM UTILITY LOCATE PAINT) – EX.
W	ANTICIPATED EX. WATER MAIN PER MSU RECORD DWGS
WS	ANTICIPATED EX. WATER SERVICE PER MSU RECORD DWGS
SD	STORM DRAIN (FROM UTILITY LOCATE PAINT) – EX.
	FIRE HYDRANT – EXISTING
	FIRE HYDRANT – PROPOSED
	WATER VALVE/HYDRANT AUX VALVE – EX.
	ANTICIPATED EX. WATER VALVE PER MSU RECORD DWGS
	STORM DRAIN CURB INLET – EX.
	STORM DRAIN COMB. CURB INLET – EX.
	STORM DRAIN GRATE INLET – EX.
	SANITARY SEWER MANHOLE – EX.
	STORM DRAIN MANHOLE – EX.
	IRRIGATION CONTROL VALVE – EX.
	LIGHT POLE – EXISTING
	ELECTRICAL PEDESTAL – EXISTING
	ELECTRICAL BOX – EXISTING
	TELEPHONE PEDESTAL – EXISTING
	SATELLITE DISH – EXISTING
	GAS VALVE – EXISTING
	SIGN – EXISTING
	TREE CONIFER – EXISTING
	TREE CONIFER – EXISTING
	CONTROL POINT



LOCATION MAP

0 500 1,000 1,500

SCALE (FEET)

N

GENERAL SPECIFICATIONS & NOTES:

1. ALL CONSTRUCTION WILL CONFORM TO THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), SEVENTH EDITION, AND THE CITY OF BOZEMAN (COB) MODIFICATIONS TO MPWSS AND THE PROJECT SPECIFICATIONS.
2. CONTRACTOR SHALL FIELD-VERIFY LINE AND GRADE OF EXISTING CONNECTIONS. CONTRACTOR MUST NOTIFY ENGINEER IF EXISTING CONNECTION LOCATIONS AND ELEVATIONS ARE DIFFERENT THAN THOSE SHOWN ON THE PLANS.
3. ANY EXISTING OR NEW VALVES WHICH CONTROL THE COB's WATER SUPPLY OR MSU WATER SYSTEM SHALL BE OPERATED BY COB PERSONNEL ONLY OR MSU PERSONNEL ONLY, RESPECTIVELY.
4. THE CONTRACTOR SHALL NOTIFY THE WATER DEPARTMENT A MINIMUM OF 24-HOURS PRIOR TO BEGINNING ANY WORK.
5. CONSTRUCTION INSPECTION AND TESTING MUST BE PERFORMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MONTANA. THE ENGINEER SHALL BE NOTIFIED AT LEAST TWO DAYS PRIOR TO ANY WORK COMMENCING. THE CONTRACTOR AND THE ENGINEER WILL NEED TO COMMUNICATE DAILY SUCH THAT ALL CONSTRUCTION INSPECTION AND TESTING REQUIREMENTS CAN BE COORDINATED. INSPECTION AND TESTING SHALL MEET MPWSS, MDEQ, AND COB REQUIREMENTS.
6. THE CONTRACTOR IS REQUIRED TO CALL THE NATIONAL ONE CALL NUMBER FOR UTILITY LOCATES. NOT ALL EXISTING UTILITIES MAY BE SHOWN ON THE PLANS AND/OR THE DEPICTED LOCATIONS MAY NOT REPRESENT ACTUAL FIELD CONDITIONS. THEREFORE, THE CONTRACTOR SHALL ONLY USE THE UTILITY INFORMATION THAT IS SHOWN ON THE PLANS AS A GENERAL GUIDELINE AND MUST NOT DEPEND ON ITS ACCURACY. PRIOR TO PERFORMING ANY EXCAVATION, A UTILITY REQUEST SHALL BE MADE AND ALL UTILITIES SHALL BE MARKED BY THE UTILITY LOCATING COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR GIVING THIS NOTICE BY CALLING (800) 424-5555 (OR CALL 811) AT LEAST 2 BUSINESS DAYS PRIOR TO ANY EXCAVATION. UNDERGROUND UTILITIES MUST BE FLAGGED OFF BEFORE ANY EXCAVATION CAN BEGIN. THE ENGINEER HAS NOT PHYSICALLY LOCATED OR FIELD VERIFIED ANY OF THE UNDERGROUND UTILITY LOCATIONS AND THEREFORE IS NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE PLAN INFORMATION.
7. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS OR CONNECT. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY MODIFICATIONS WITHOUT DELAYING THE WORK. ALL UTILITY CROSSINGS SHALL BE POTHOLED AS NECESSARY PRIOR TO EXCAVATING OR BORING TO ALLOW THE CONTRACTOR TO PREVENT GRADE OR ALIGNMENT CONFLICTS.
8. ALL ELEVATIONS SHOWN ARE IN DECIMAL FEET. MOST DIMENSIONS ARE SHOWN IN DECIMAL FEET AND OCCASIONALLY SHOWN IN INCHES.
9. PIPE BEDDING (TYPE 1) AND TRENCH BACKFILL (SEE CITY OF BOZEMAN STANDARD DRAWINGS # 02221-1 AND # 02221-2) SHALL BE UTILIZED IN ACCORDANCE WITH MPWSS SECTIONS 02221, 02225, 02234, 02235, 02510 AND THE ASSOCIATED STANDARD DRAWINGS AND THE ASSOCIATED COB MODIFICATIONS TO MPWSS, UNLESS NOTED OTHERWISE IN THE PLANS.
10. CONTRACTOR SHALL PROVIDE WATER AND OTHER MEASURES AS NECESSARY TO CONTROL DUST TO AN EXTENT ACCEPTABLE TO THE UNDERLYING PROPERTY OWNERS.
11. IN ACCORDANCE WITH THE COB DESIGN STANDARDS AND SPECIFICATIONS POLICY, A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED BY THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION. THE CITY OF BOZEMAN, CONTRACTOR, ENGINEER, AND OTHER AFFECTED UTILITIES OR GOVERNMENT AGENCIES (IF APPLICABLE) SHALL BE PRESENT.
12. ALL CONSTRUCTION MATERIALS THAT ARE INSTALLED ON THIS PROJECT MUST BE NEW.
13. SHOP/FABRICATION DRAWINGS WILL BE REQUIRED FOR ALL INSTALLED CONSTRUCTION MATERIALS. THEY MUST BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER PER THE PROCEDURES SET FORTH IN SPECIFICATIONS FOR REVIEW PRIOR TO THE PRE-CONSTRUCTION MEETING.
14. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL NECESSARY PROJECT SITE ACCESS CONTROL DURING THE COURSE OF THE PROJECT.
15. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN A CLEAN JOB SITE.
16. THE CONTRACTOR WILL BE RESPONSIBLE FOR RESTORING THE GROUND SURFACE TO A PRE-PROJECT DISTURBANCE LEVEL INCLUDING BUT NOT LIMITED TO RESTORING VEGETATION, GROUND COVER, AND STREET AND SIDEWALK RESTORATION AND REPAIR.
17. REFER TO SPECIAL PROVISIONS FOR PERMITTING REQUIREMENTS.
18. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING CONSTRUCTION SAFETY AND SANITATION FACILITIES.
19. ALL THRUST BLOCKING FOR WATER MAIN FITTINGS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF BOZEMAN STANDARD DRAWINGS # 02660-1 AND 02660-3.
20. ALL WATER MAINS MUST BE TESTED IN ACCORDANCE WITH MPWSS AND COB MODIFICATIONS PRIOR TO BEING PLACED INTO SERVICE.
21. CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT AND FACILITIES REQUIRED FOR TESTING ALL UTILITY PIPING IN ACCORDANCE WITH MPWSS, MDEQ, AND COB SPECIFICATIONS. COST OF ALL INITIAL AND RETESTING SHALL BE BORNE BY THE CONTRACTOR.
22. THE CONTRACTOR SHALL PROVIDE A SET OF AS-BUILT DRAWINGS TO THE RPR PRIOR TO THE FINAL ACCEPTANCE.
23. WATER MAINS SHALL HAVE A MINIMUM OF 6.5-FT OF COVER. INSULATE OVER THE WATER MAINS WHERE MINIMUM COVER CANNOT BE MET.

AESI	ALLIED ENGINEERING SERVICES, INC.
AUX	AUXILIARY
BLDG	BUILDING
BM	BENCHMARK
BP	BEGINNING POINT
BVC	BEGIN VERTICAL CURVE
CL, ℄	CENTERLINE
CMP	CORRUGATED METAL PIPE
COB	CITY OF BOZEMAN
CONC	CONCRETE
CU	COPPER
CY	CUBIC YARD
DI	DUCTILE IRON
DIA	DIAMETER
DWG	DRAWING
DWGS	DRAWINGS
E	EAST
EA	EACH
EG	EXISTING GRADE
ELEV, EL	ELEVATION
EOP	EDGE OF PAVEMENT
EST	ESTIMATED
EVC	END VERTICAL CURVE
EX	EXISTING
FDN	FOUNDATION
FETS	FLARED END TERMINAL SECTION
FG	FINISHED GRADE
FHYD	FIRE HYDRANT
FL	FLANGE
FLR	FLOOR
FT	FEET
FTG	FOOTING
GPM	GALLONS PER MINUTE
GV	GATE VALVE
HORZ	HORIZONTAL
HWY	HIGHWAY
IE	INVERT ELEVATION
IN	INCH
INV	INVERT
LF	LINEAR FEET
LT	LEFT
MAT'L	MATERIAL
MFR	MANUFACTURER
MH	MANHOLE
MID	MID POINT
MIN	MINIMUM
MJ	MECHANICAL JOINT
MODS	MODIFICATIONS
MPW	MONTANA PUBLIC WORKS
MPWSS	MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
MSU	MONTANA STATE UNIVERSITY
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
N	NORTH
OFF	OFFSET
OHP	OVERHEAD POWER
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PL	PROPERTY LINE
PROP	PROPERTY
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PRV	PRESSURE REDUCING VALVE
Q	FLOW
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RDCR	REDUCER
ROW	RIGHT OF WAY
RPR	RESIDENT PROJECT REPRESENTATIVE
RT	RIGHT
S	SOUTH
SCH	SCHEDULE
SD	STORM DRAIN
SECT	SECTION
SS	SANITARY SEWER
SSMH	SANITARY SEWER MAN HOLE
STA	STATION
STD	STANDARD
TBM	TEMPORARY BENCHMARK
TBC	TOP BACK OF CURB
TDH	TOTAL DYNAMIC HEAD
TP	TEST PIT
TW	TOP OF WALL
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UPC	UNIFORM PLUMBING CODE
UG	UNDERGROUND
VERT	VERTICAL
W	WEST
W/	WITH
W/O	WITHOUT

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC

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BOZEMAN, MONTANA
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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.

Diverse Projects • Solutions that work

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#22-0574

A/E#00-00-00

AESI # 22-133

SHEET TITLE

C0.2

SHEET

PROJECT NOTES & GENERAL INFORMATION

DATE

11-17-2023

HYDRANT SUMMARY

EX. HYDRANT #	BID PRIORITY	HYDRANT & AUX VALVE INFO	HYDRANT LEAD ESTIMATED EXISTING INVERT ELEVATION*	EXISTING GROUND ELEVATION AT HYDRANT BASE	FINISHED GRADE ELEVATION AT HYDRANT BASE	ESTIMATED EXISTING HYDRANT HEIGHT**	ANTICIPATED PROPOSED HYDRANT ASSEMBLY HEIGHT (CONTRACTOR TO VERIFY)	REPLACE:	RELOCATE?	RECOMMENDATIONS
13	ALTERNATE 3	COVERED BY BAG AUX VALVE PRESENT	4914.00	4921.51	MATCH EG	7.5'	7.5'	HYDRANT & AUX VALVE (POTENTIALLY HYDRANT LEAD AS WELL)	–	
22	ALTERNATE 1	AUX VALVE PRESENT	4887.45	4894.93	MATCH EG	7.5'	7.5'	HYDRANT & AUX VALVE	–	
27	ALTERNATE 1	AUX VAVLE PRESENT	4876.25	4884.53	MATCH EG	8.3'	8.5'	HYDRANT & AUX VALVE (POTENTIALLY HYDRANT LEAD AS WELL)	–	
53	ALTERNATE 1	AUX VALVE PRESENT	4881.91	4888.18	MATCH EG	6.3'	6.5'	HYDRANT & AUX VALVE	–	
55	ALTERNATE 1	AUX VALVE PRESENT	4875.81	4882.57	MATCH EG	6.8'	7.0'	HYDRANT & AUX VALVE	–	
56	ALTERNATE 1	AUX VALVE NOT PRESENT DIRECTLY AT HYDRANT	4877.90	4883.44	4883.95	5.5'	6.0'	HYDRANT & AUX VALVE	YES	
58	BASE BID	AUX VALVE NOT PRESENT DIRECTLY AT HYDRANT	4877.47	4883.10	4883.80	5.6'	6.5'	HYDRANT & AUX VALVE	YES	
59	BASE BID	COVERED BY BAG AUX VALVE PRESENT	4874.65	4881.30	MATCH EG	6.6'	6.5'	HYDRANT & AUX VALVE	–	
61	BASE BID	COVERED BY BAG AUX VALVE PRESENT	4873.78	4880.47	MATCH EG	6.7'	7.0'	HYDRANT & AUX VALVE	–	
62	ALTERNATE 2	AUX VALVE PRESENT AUX VALVE NUT NOT ACCESSIBLE	4877.06	4881.22	4881.46	4.2'	4.5'***	HYDRANT & AUX VALVE	YES	POTHOLE 12" MAIN AT NEW HYDRANT LOCATION TO DETERMINE REPLACEMENT HYDRANT HEIGHT
63	ALTERNATE 2	AUX VALVE PRESENT	4874.01	4880.01	4880.04	6.0'	6.0'	HYDRANT & AUX VALVE	YES	
64	ALTERNATE 2	AUX VALVE PRESENT	4871.29	4878.02	MATCH EG	6.7'	7.0'	HYDRANT & AUX VALVE	–	
65	ALTERNATE 2	AUX VALVE PRESENT	4870.69	4876.41	4877.44	5.7'	7.0'	HYDRANT & AUX VALVE	YES	
68	BASE BID	COVERED BY BAG AUX VALVE BOX PRESENT AUX VALVE NUT NOT VISIBLE	4866.79	4873.74	MATCH EG	7.0'	7.0'***	HYDRANT & AUX VALVE	–	POTHOLE EXISTING HYDRANT LEAD TO DETERMINE REPLACEMENT HYDRANT HEIGHT
72	ALTERNATE 2	AUX VALVE BOX PRESENT AUX VALVE NUT NOT VISIBLE	4861.79	4866.02	MATCH EG	4.2'	4.5'***	HYDRANT & AUX VALVE	–	POTHOLE EXISTING HYDRANT LEAD TO DETERMINE REPLACEMENT HYDRANT HEIGHT
73	BASE BID	COVERED BY BAG AUX VALVE PRESENT	4861.42	4868.12	MATCH EG	6.7'	7.0'	HYDRANT & AUX VALVE	–	

* EXISTING HYDRANT LEAD INVERTS WERE ESTIMATED BY SURVEYING ELEVATION OF TOP NUT OF AUX VALVES AT EACH HYDRANT. TOP NUT TO INVERT AT AUX VALVES ASSUMED TO BE 21". ALL HYDRANT LEADS ASSUMED TO BE 6" NOMINAL PIPE SIZE.

** ESTIMATED EXISTING HYDRANT HEIGHT DETERMINED BY CALCULATING THE DIFFERENCE BETWEEN THE ESTIMATED EXISTING HYDRANT LEAD INVERT AND THE EXISTING GROUND ELEVATION AT HYDRANT. EXISTING BURY LINES ON HYDRANTS WERE NOT SURVEYED.

*** TOP NUT OF AUX VALVE WAS NOT ACCESSIBLE TO SURVEY AT THESE HYDRANTS. THEREFORE, THE ANTICIPATED PROPOSED HYDRANT ASSEMBLY HEIGHT IS VERY APPROXIMATE.

ASSUMPTIONS & ESTIMATES:

1. ALL EXISTING HYDRANT LEADS ASSUMED TO BE LEVEL (0% GRADE).
2. ALL EXISTING HYDRANT LEADS ASSUMED TO BE CAST IRON PER MSU RECORD DWGS. HOWEVER, MATERIAL MAY VARY.
3. EXISTING HYDRANT LEAD INVERTS WERE ESTIMATED BY SURVEYING ELEVATION OF TOP NUT OF AUX VALVES AT EACH HYDRANT. TOP NUT TO INVERT AT AUX VALVES ASSUMED TO BE 21". ALL HYDRANT LEADS ASSUMED TO BE 6" NOMINAL PIPE SIZE.
4. ESTIMATED HYDRANT HEIGHT DETERMINED BY CALCULATING THE DIFFERENCE BETWEEN THE ESTIMATED HYDRANT LEAD INVERT AND THE EXISTING GROUND ELEVATION AT HYDRANT. EXISTING BURY LINES ON HYDRANTS WERE NOT SURVEYED.
5. ALL SECTIONS OF EXISTING WATER MAINS AT EXISTING HYDRANT TEES ASSUMED TO BE CAST IRON PER MSU RECORD DWGS UNLESS OTHERWISE NOTED (HYDRANTS 13, 22, 72, 73 HAVE VARYING MATERIAL AT EX. TEES PER MSU RECORD DWGS).
6. ALL TRENCHES FOR REPLACING HYDRANTS ASSUMED TO BE 4-FT WIDE.

UTILITY NOTES:

1. UNDERGROUND UTILITIES NOT SHOWN IN PROFILE VIEWS.
2. UNDERGROUND UTILITIES SHOWN IN PLAN VIEWS MAY NOT BE ALL INCLUSIVE.
3. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES REGARDING ALL UTILITY CROSSINGS AND ANY POTENTIAL UTILITY CONFLICTS.

GENERAL NOTES:

1. GATE VALVES NOT SHOWN IN PROFILE VIEWS.
2. AERIAL IMAGERY FROM 2021 CITY OF BOZEMAN.

CONSTRUCTION NOTES:

1. REMOVE AND REPLACE ALL EXISTING HYDRANTS SHOWN ON SHEETS C2.1 THROUGH C2.6 (A TOTAL OF 16 HYDRANTS). SEE DETAIL 4/C4.1. INSTALL NEW AUX VALVE AND VALVE BOX AT EACH HYDRANT AS SHOWN IN DETAIL.
2. FINISHED GRADE ELEVATIONS TO MATCH EXISTING GRADE WHEN BACKFILLING AND REPLACING CONCRETE AND ASPHALT.
3. SEE DETAIL 2/C4.1 FOR TRENCHING AND BACKFILL REQUIREMENTS.
4. CONTRACTOR TO VERIFY ELEVATIONS OF HYDRANT LEADS AND TO DETERMINE APPROPRIATE HYDRANT ASSEMBLY HEIGHT TO MATCH FG AT EACH LOCATION. BURY LINE OF NEW HYDRANTS TO MATCH FG OR EXTEND A MAXIMUM OF 5" ABOVE FG.
5. CONTRACTOR TO INSULATE HYDRANT LEADS IN ALL LOCATIONS WHERE 6.5' OF COVER IS NOT MET. INSULATION TYPE TO SATISFY COB MODS TO MPWSS IN SECTION 02660, 2.15.A. INSULATION TO BE INSTALLED PER DETAIL 3/C4.1.
6. CONTRACTOR TO VERIFY SIZES AND TYPES OF EXISTING FITTINGS AND PIPES, AND MAKE APPROPRIATE CONNECTIONS.

SPECIFICATIONS:

1. PROJECT SCHEDULE: AS NOTED IN THE TABLE ABOVE ON THIS SHEET, SOME HYDRANTS ARE HIGH PRIORITY THAN OTHERS. THE HYDRANTS NOTED AS HIGH PRIORITY SHOULD BE REPLACED FIRST. CONTRACTOR SHALL COORDINATE WITH MSU AND THE ENGINEER FOR TIMING OF HYDRANT REPLACEMENTS. THERE WILL BE SOME FLEXIBILITY FOR TIMING OF REPLACEMENTS.
2. CONSTRUCTION INSPECTION AND TESTING: CONSTRUCTION INSPECTION AND TESTING WILL BE PERFORMED BY AESI. THE ENGINEER SHALL BE NOTIFIED AT LEAST TWO DAYS PRIOR TO CONSTRUCTION IN ORDER TO PROVIDE INSPECTION. COORDINATE WITH MSU AND THE ENGINEER FOR TESTING REQUIREMENTS.
3. TRAFFIC CONTROL: THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL NECESSARY TRAFFIC CONTROL DURING THE COURSE OF THE PROJECT. ALL ANTICIPATED TRAFFIC CONTROL MEASURES SHALL BE SUBMITTED BY THE CONTRACTOR TO THE PROJECT TEAM AND MUST BE APPROVED BY MSU AND THE PROJECT ENGINEER PRIOR TO ANY CONSTRUCTION ACTIVITY.
4. WATER MAIN MATERIAL: ZINC COATED PIPE WITH V-BIO ENHANCED POLYETHYLENE ENCASEMENT IS THE PREFERRED MATERIAL. COORDINATE WITH MSU AND THE ENGINEER FOR PRODUCT AVAILABILITY AND TIMING. IF NECESSARY DUE TO TIMING AND AVAILABILITY, STANDARD CLASS 51 DUCTILE IRON PIPE WITH V-BIO ENHANCED POLYETHYLENE ENCASEMENT MAY BE USED. ALL DUCTILE IRON PIPE AND FITTING ARE TO BE WRAPPED WITH V-BIO ENHANCED POLYTHENE.
7. EXPLORATORY EXCAVATION: ENGINEER RECOMMENDS USING A VAC TRUCK TO CONDUCTING EXPLORATORY EXCAVATION TO VERIFY LOCATIONS, ELEVATIONS, AND MATERIAL TYPES OF EXISTING HYDRANT LEADS PRIOR TO CONSTRUCTION. CONTRACTOR TO BACKFILL ANY HOLES OR TRENCHES FROM EXPLORATORY EXCAVATION.
8. IRRIGATION: COORDINATE WITH MSU FOR DAMAGE OR IMPACTS TO IRRIGATION LINES OR OTHER INFRASTRUCTURE.
9. CONSTRUCTION STAKING: CONTRACTOR TO COORDINATE WITH AESI FOR STAKING NEEDS. WE ANTICIPATE STAKES WILL BE PROVIDED FOR THE PROPOSED HYDRANT LOCATIONS AND FOR CONTROL. EXCESSIVE TRIPS REQUIRED DUE TO DISTURBED STAKES MAY BE AT THE COST OF THE CONTRACTOR.
10. MAIN SHUT-DOWNS: ANTICIPATED GATE VALVE LOCATIONS TO BE USED FOR MAIN SHUT-DOWNS ARE SHOWN ON SHEETS C3.0 THROUGH C3.4. COORDINATE WITH MSU AND THE ENGINEER FOR FINAL SHUT-DOWN SECTIONS AND TIMING.
11. PERMITS: CONTRACTOR TO OBTAIN STREET CUT PERMITS THROUGH THE CITY OF BOZEMAN FOR ALL WORK WITHIN PUBLIC STREETS. GROUNDWATER DEWATERING MAY BE REQUIRED. CONTRACTOR TO OBTAIN GROUNDWATER DEWATERING PERMIT.
12. BOLLARDS: IN GENERAL, BOLLARDS ARE TO BE INSTALLED AT ALL HYDRANTS WHERE PRACTICAL. COORDINATE WITH MSU AND THE ENGINEER FOR FINAL BOLLARD CONFIGURATIONS.
13. HYDRANT LEAD REPLACEMENT: VERIFY CONDITION OF EXISTING HYDRANTS LEADS AND REPLACE AS NEEDED. COORDINATE WITH MSU AND THE ENGINEER.
14. HYDRANT LEAD ABANDONMENT: CONTRACTOR TO COORDINATE WITH MSU AND ENGINEER ON MEANS/METHODS OF ABANDONING EXISTING HYDRANT TEES AND/OR TAPPING VALVES. SEE DETAIL 1/C4.1.
15. ASBESTOS CONCRETE PIPE: IT IS POSSIBLE THAT AN EXISTING ASBESTOS CONCRETE PIPE MAY BE ENCOUNTERED FOR HYDRANT 13 OR OTHER LOCATIONS. IF THE LINE IS FOUND TO BE ASBESTOS CONCRETE IT SHALL BE REMOVED AND REPLACED. ALL ASBESTOS ABATEMENT WILL BE IN COMPLIANCE WITH MT DEQ RULES AND REGULATIONS INCLUDING BUT NOT LIMITED TO: (NESHAP) 40 CFR 61, SUBPARTS A&M, (ARM) 17.74 SUBCHAPTER 3: ASBESTOS CONTROL, AND (MCA) TITLE 75, PART 5.

BASIS OF BEARING, COORDINATES

BEARINGS SHOWN ARE MONTANA STATE PLANE GRID.
DISTANCES ARE GROUND DISTANCES IN INTERNATIONAL FEET.

MONTANA COORDINATE SYSTEM NAD 83
HORIZONTAL DATUM: BOZEMAN CONTINUOUSLY OPERATING REFERENCE STATION

PID	DESIGNATION
DK7547	MTSU BOZEMAN CORS ARP

MONTANA STATE PLANE NAD 83(2011)(EPOCH: 2010.0000)
NORTH LATITUDE 45°39'40.37689"
WEST LONGITUDE 111°02'42.00898"
UNITS: INTERNATIONAL FEET
Convergence angle: −01°07'49"

DATUM NOTE: ELEVATIONS ARE BASED ON NAVD 88 VERTICAL DATUM

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

SHEET TITLE
C0.3

SHEET
EXISTING HYDRANT SUMMARY & NOTES

DATE
11-17-2023

0 200 400 600
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects • Solutions Inc.

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

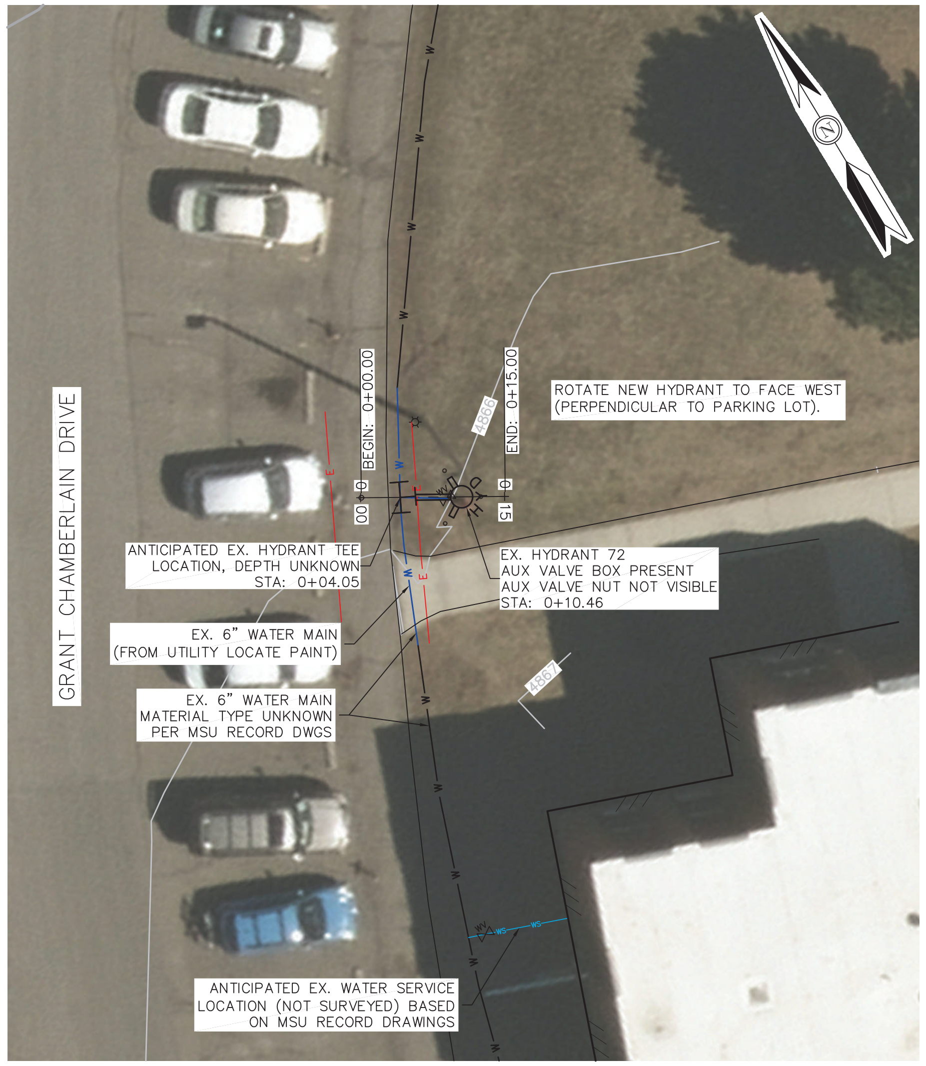
MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

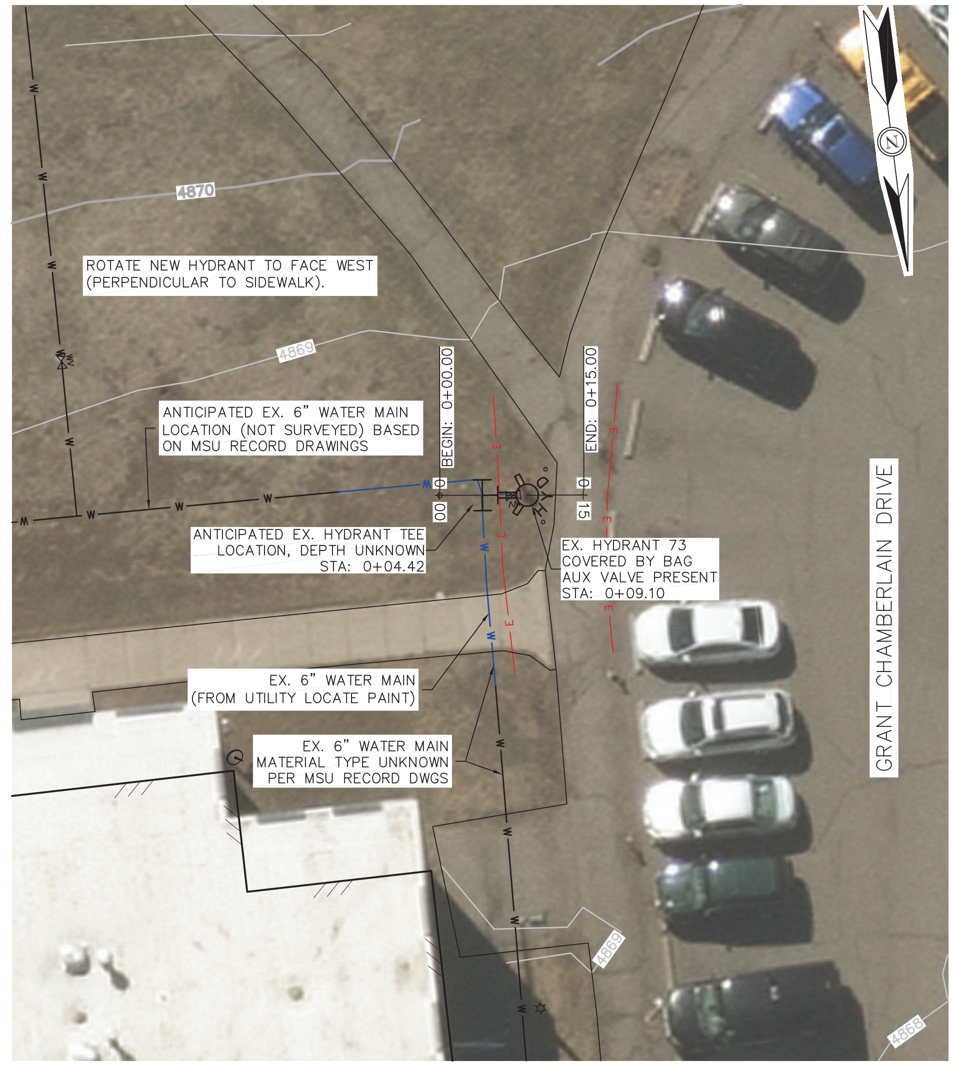
SHEET TITLE
C1.1

SHEET
PROJECT OVERVIEW PLAN

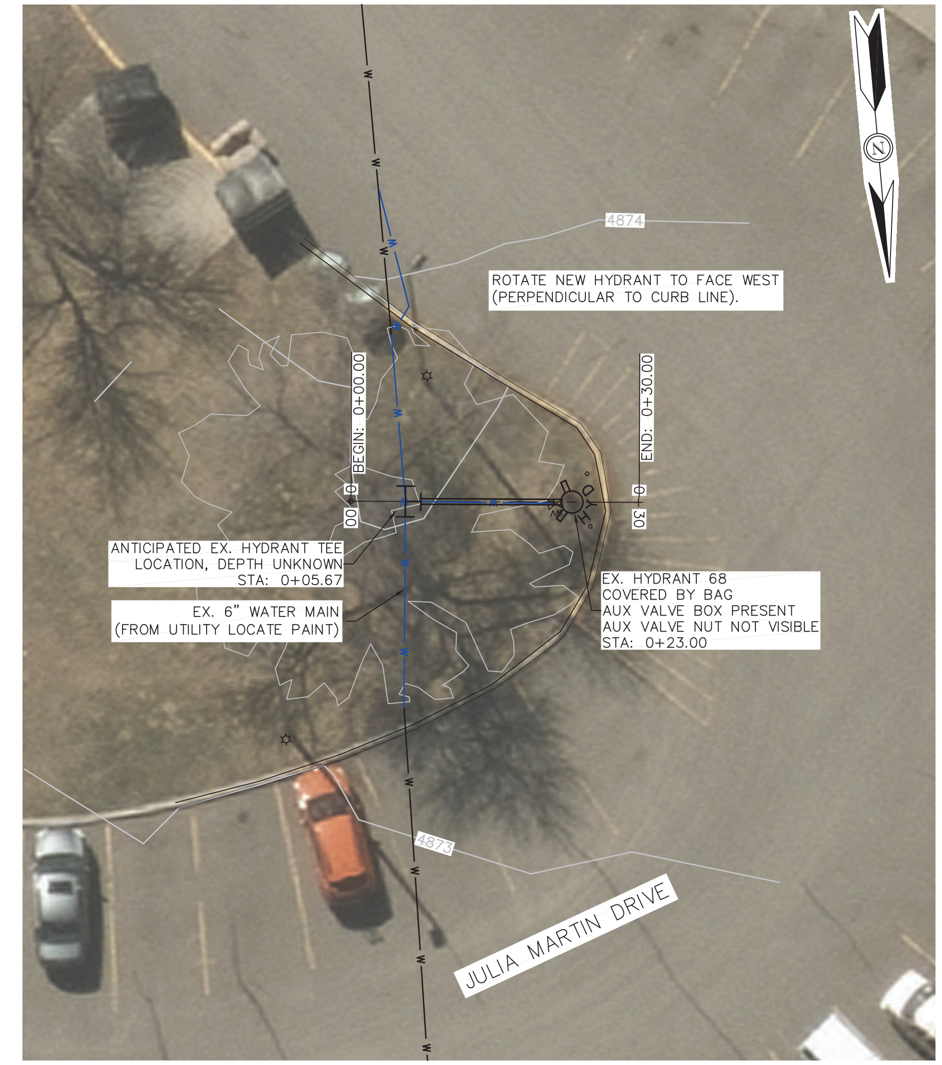
DATE
11-17-2023



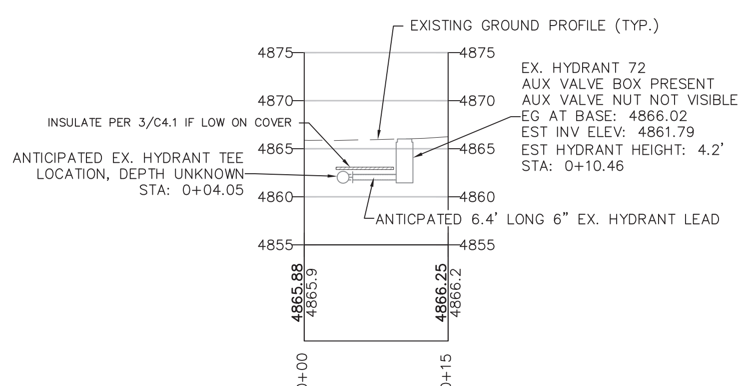
PLAN VIEW - HYDRANT 72
BID ALTERNATE #2



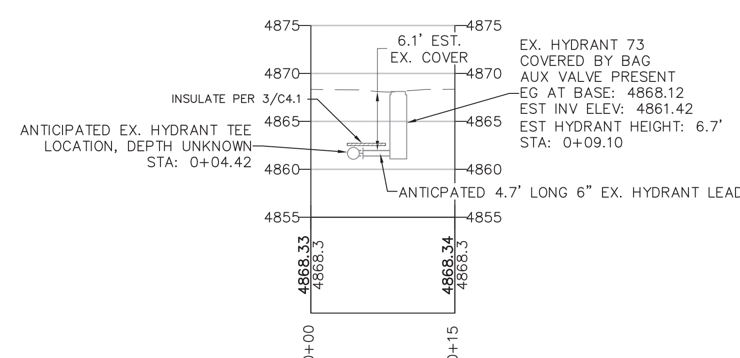
PLAN VIEW - HYDRANT 73
BASE BID ITEM



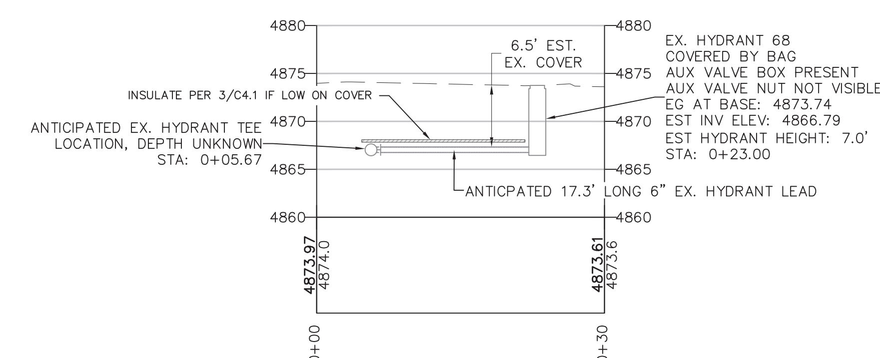
PLAN VIEW - HYDRANT 68
BASE BID ITEM



PROFILE VIEW - HYDRANT 72
BID ALTERNATE #2



PROFILE VIEW - HYDRANT 73
BASE BID ITEM



PROFILE VIEW - HYDRANT 68
BASE BID ITEM

0 10 20 30
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC

MONTANA STATE UNIVERSITY
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PHONE: 406.994.5413
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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

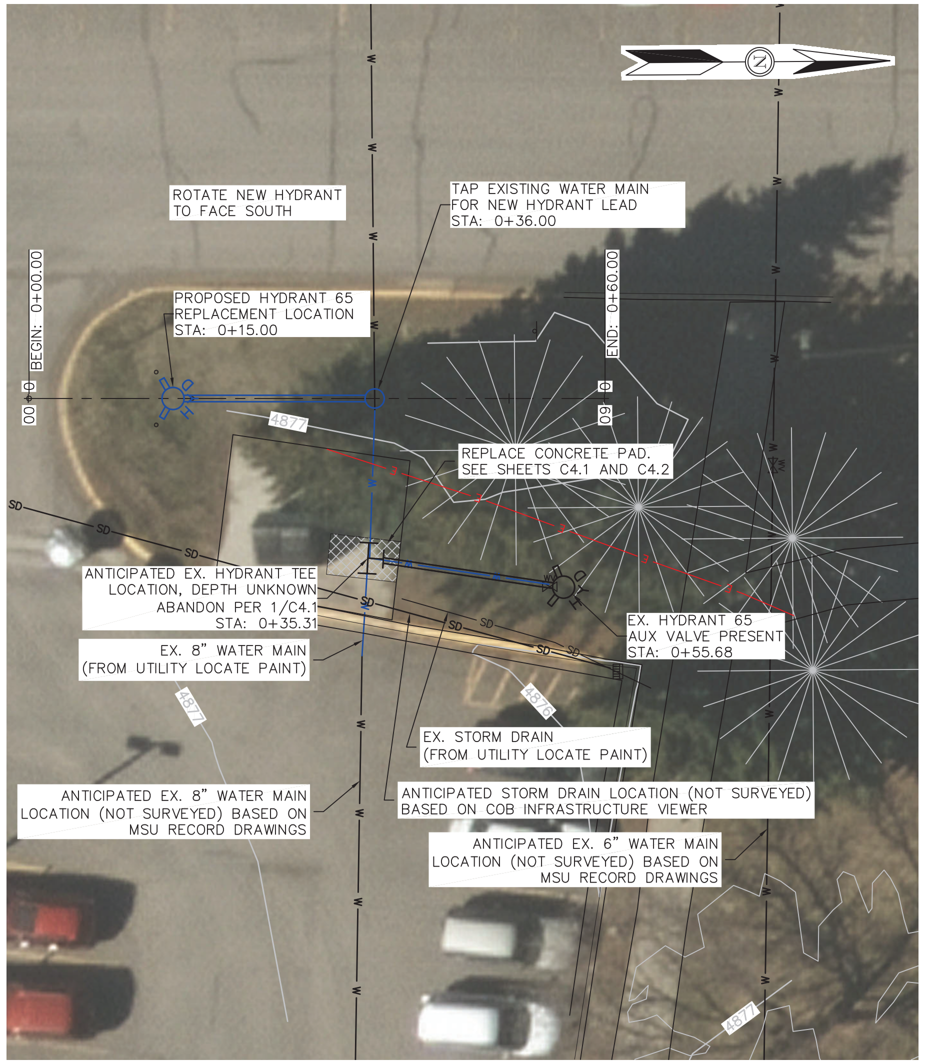
MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

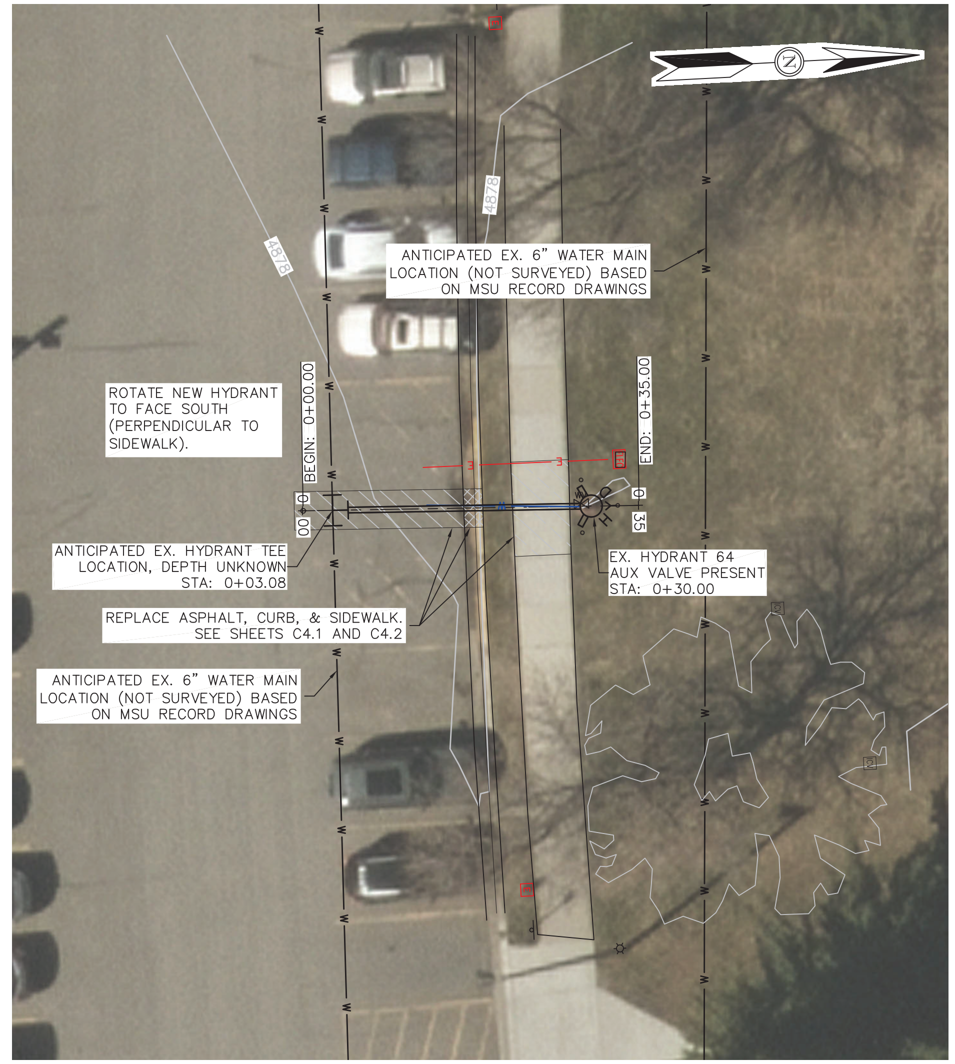
SHEET TITLE
C2.1

SHEET
PLAN & PROFILES: HYDRANTS 72, 73, 68

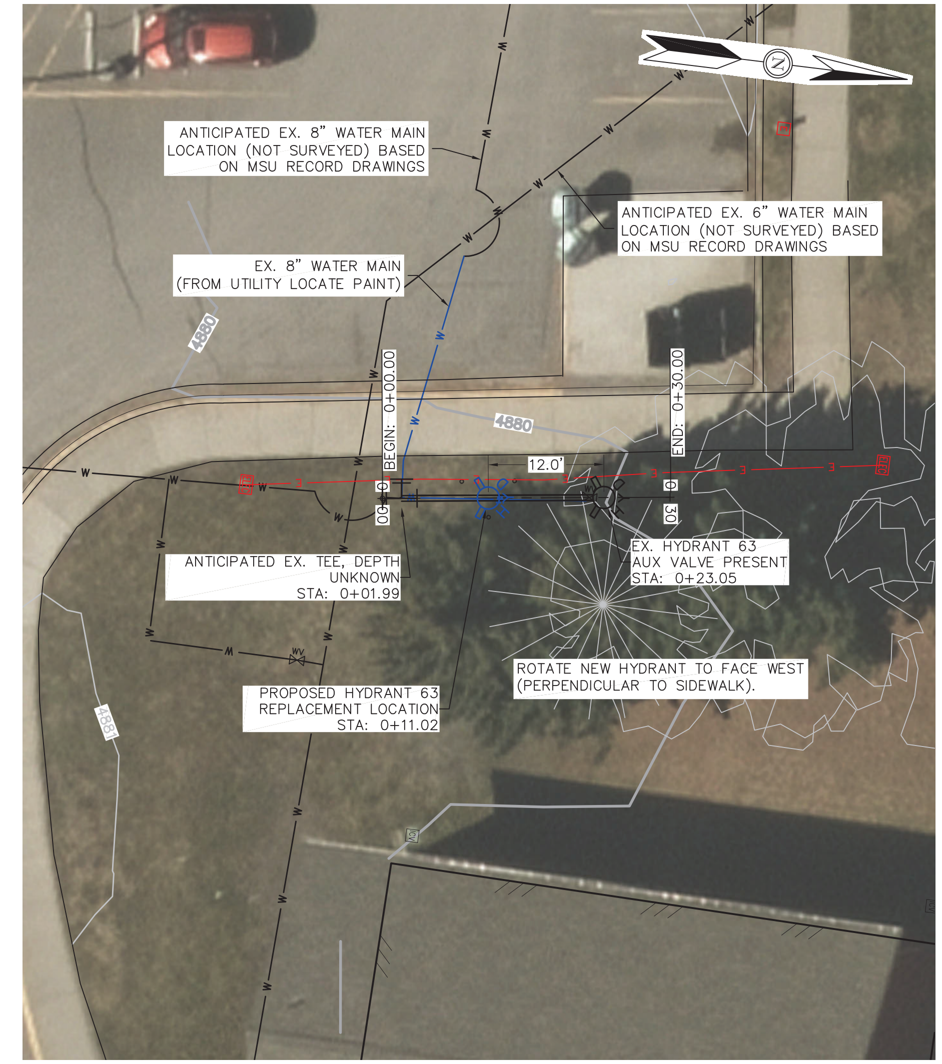
DATE
11-17-2023



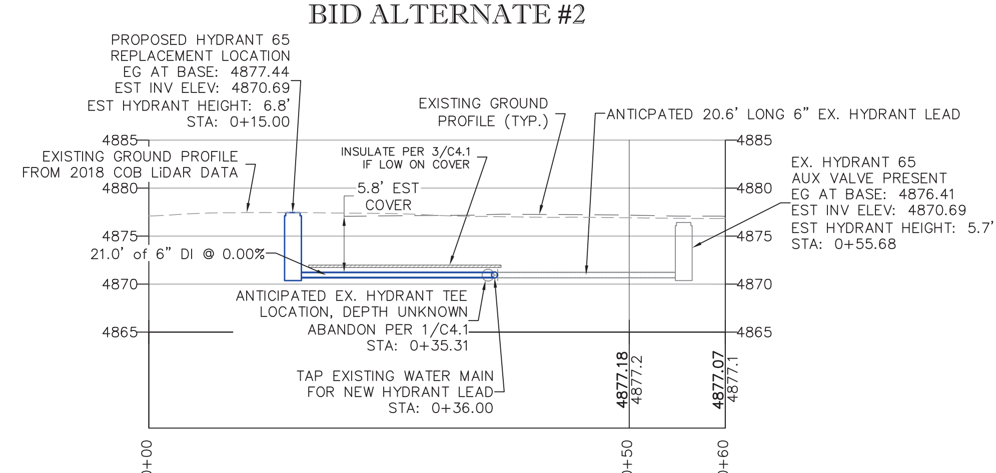
PLAN VIEW - HYDRANT 65
BID ALTERNATE #2



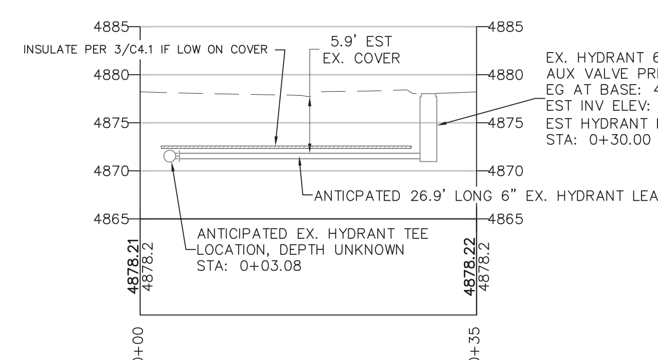
PLAN VIEW - HYDRANT 64
BID ALTERNATE #2



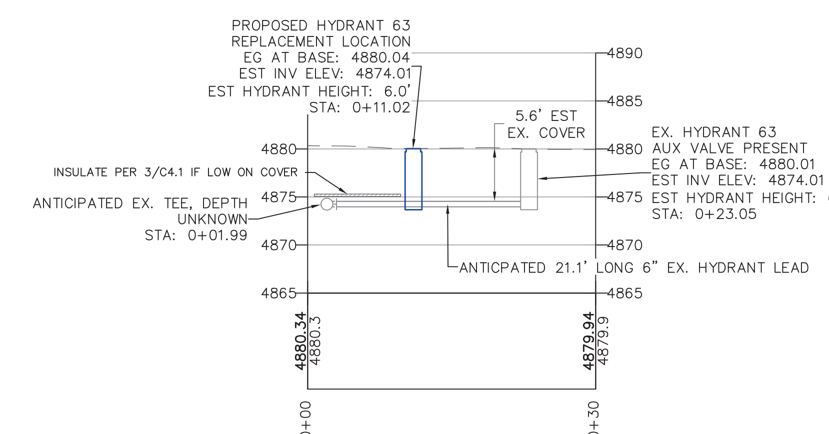
PLAN VIEW - HYDRANT 63
BID ALTERNATE #2



PROFILE VIEW - HYDRANT 65
BID ALTERNATE #2



PROFILE VIEW - HYDRANT 64
BID ALTERNATE #2



PROFILE VIEW - HYDRANT 63
BID ALTERNATE #2

0 10 20 30
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects • Solutions

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

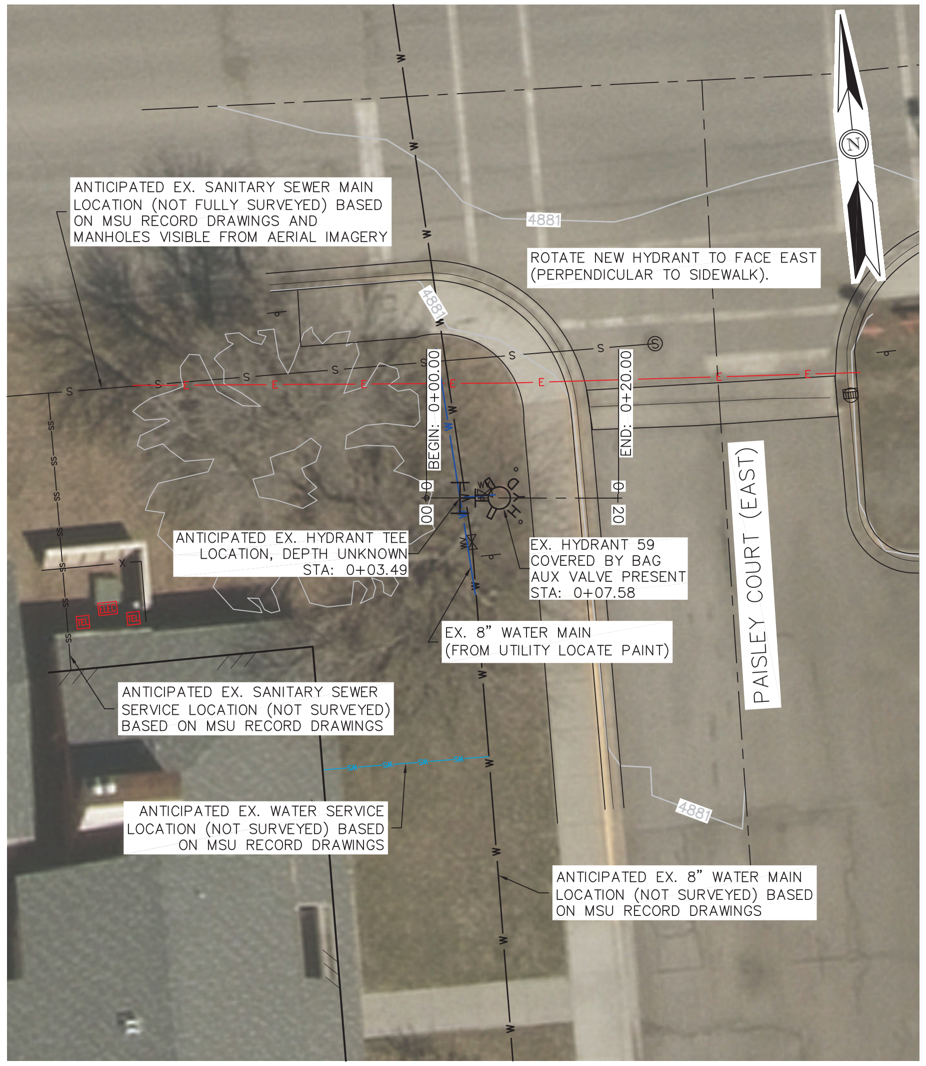
MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

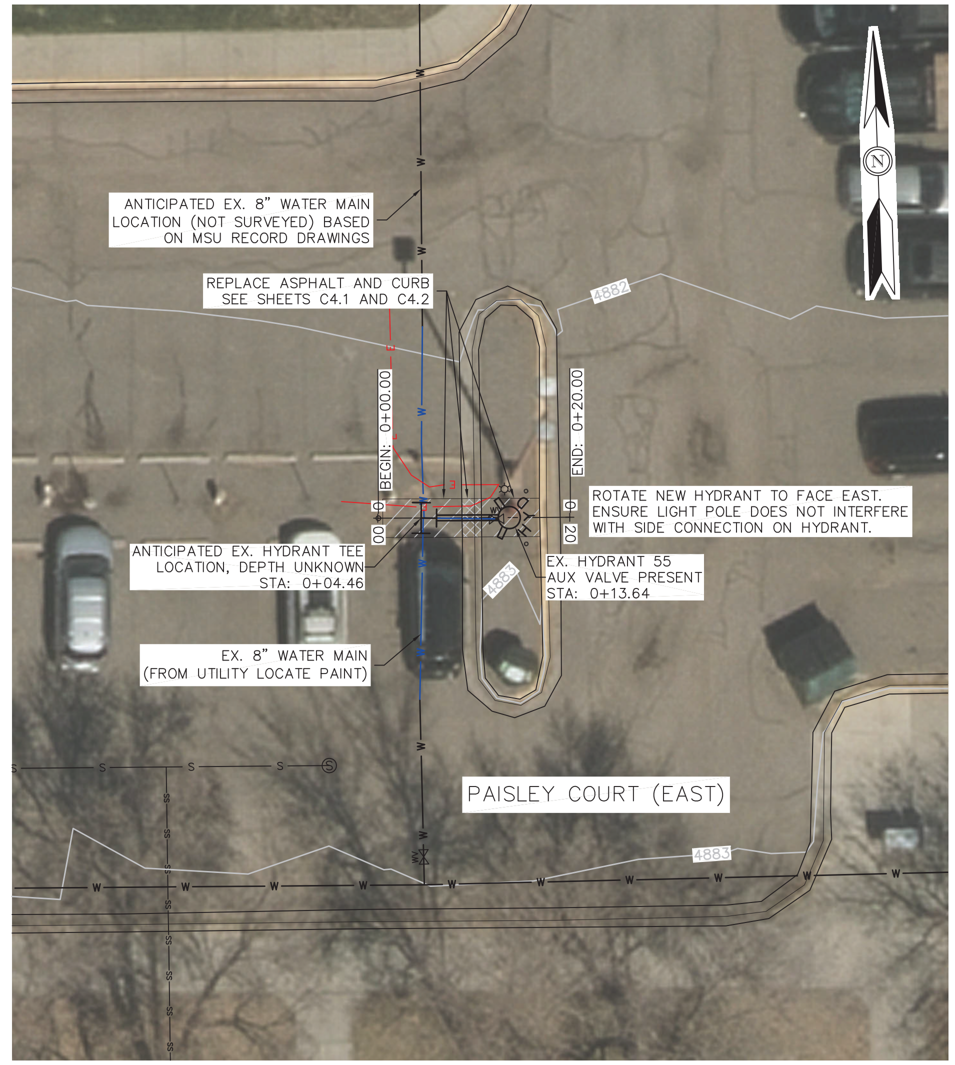
SHEET TITLE
C2.2

SHEET
PLAN & PROFILES: HYDRANTS 65, 64, 63

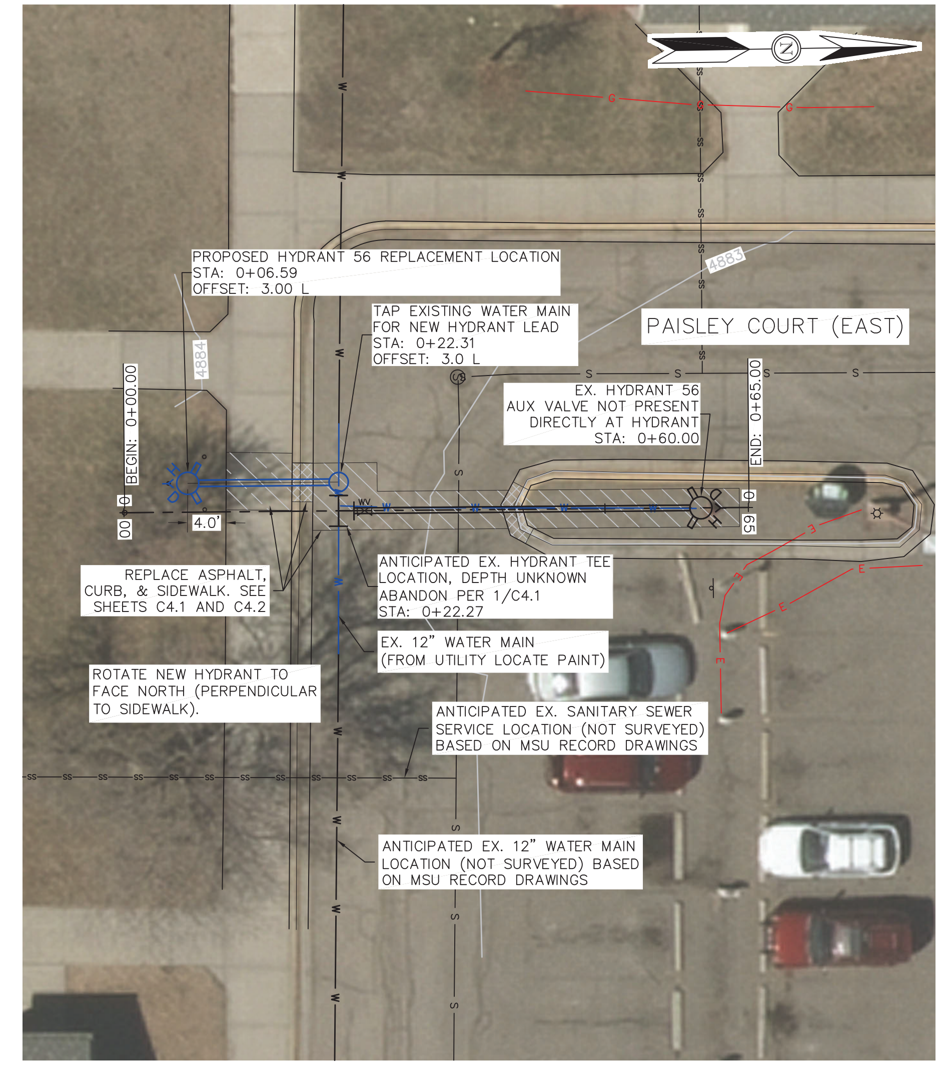
DATE
11-17-2023



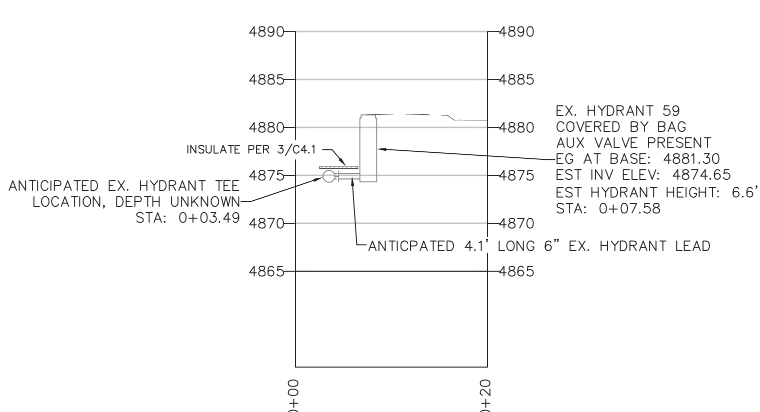
PLAN VIEW - HYDRANT 59
BASE BID ITEM



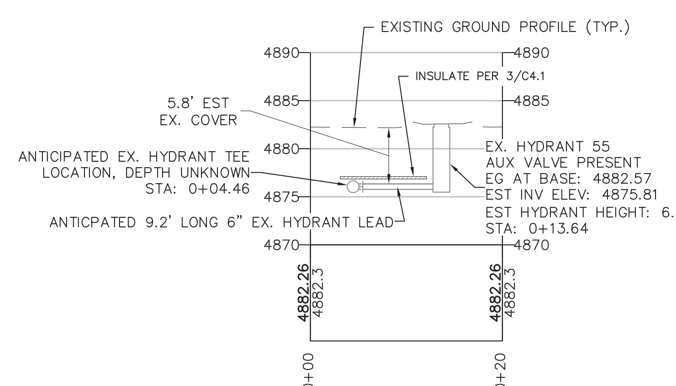
PLAN VIEW - HYDRANT 55
BID ALTERNATE #1



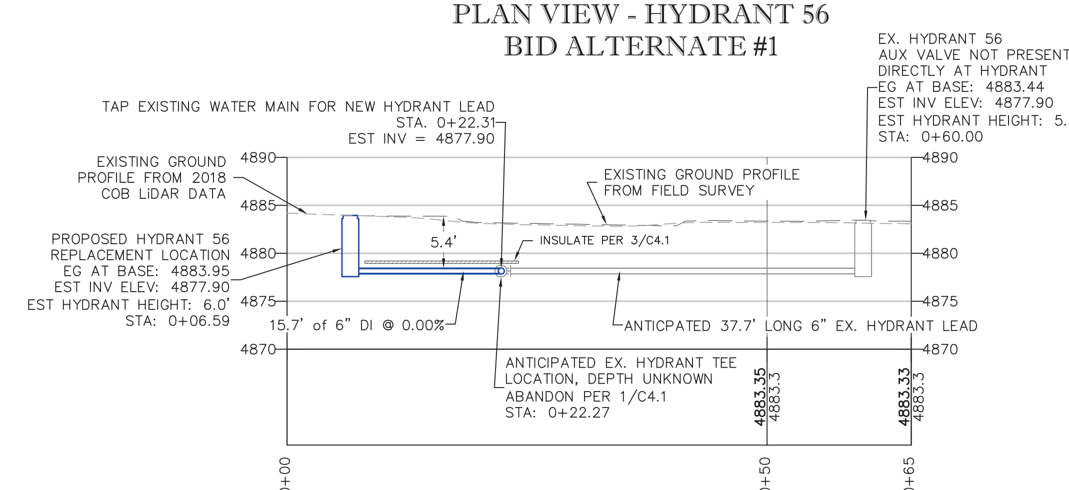
PLAN VIEW - HYDRANT 56
BID ALTERNATE #1



PROFILE VIEW - HYDRANT 59
BASE BID ITEM



PROFILE VIEW - HYDRANT 55
BID ALTERNATE #1



PROFILE VIEW - HYDRANT 56
BID ALTERNATE #1

0 10 20 30
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

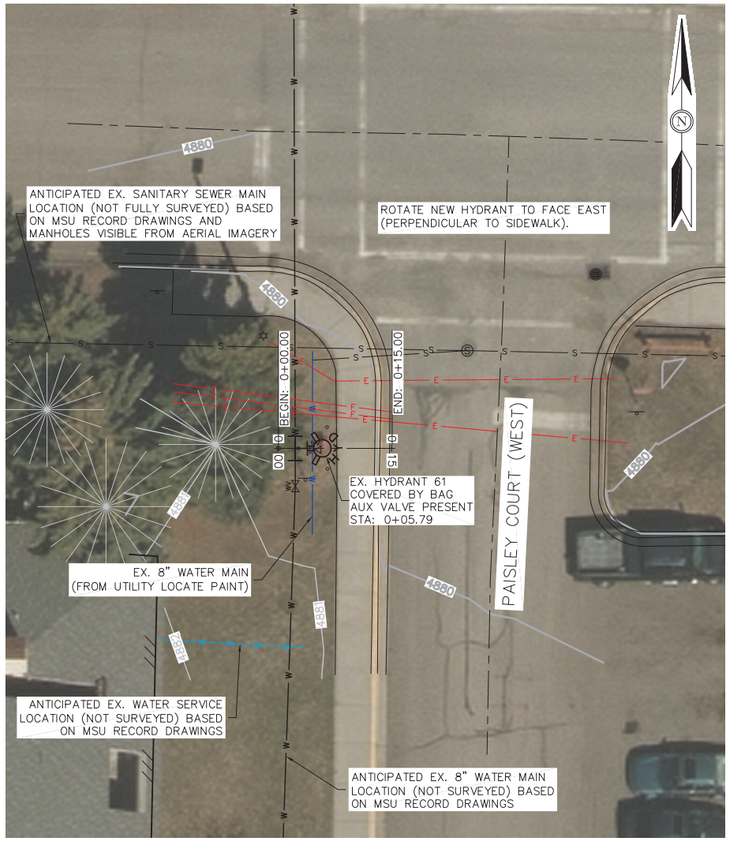
MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

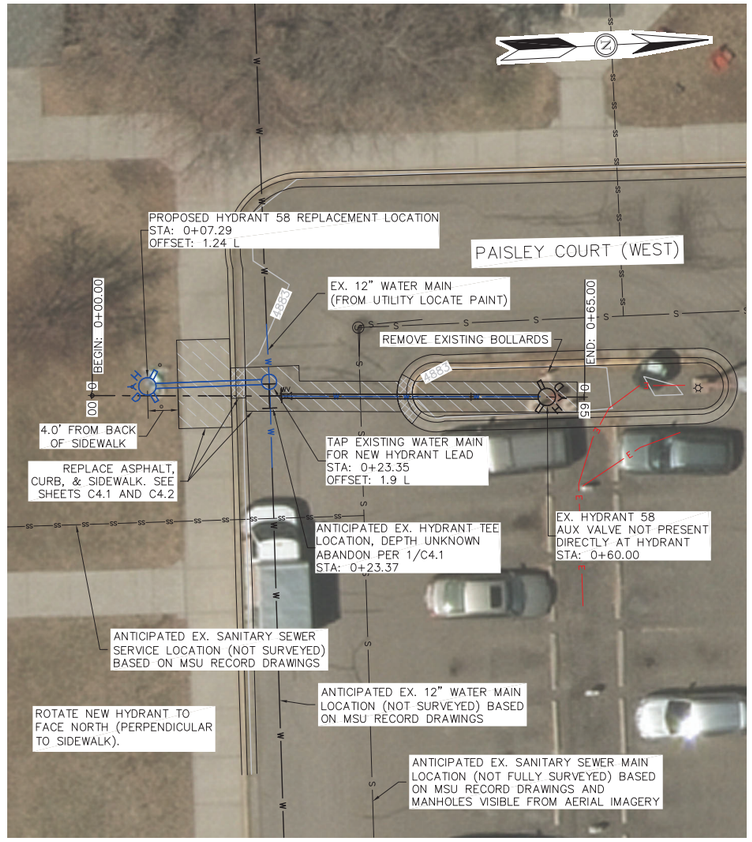
SHEET TITLE
C2.3

SHEET
PLAN & PROFILES: HYDRANTS 59, 55, 56

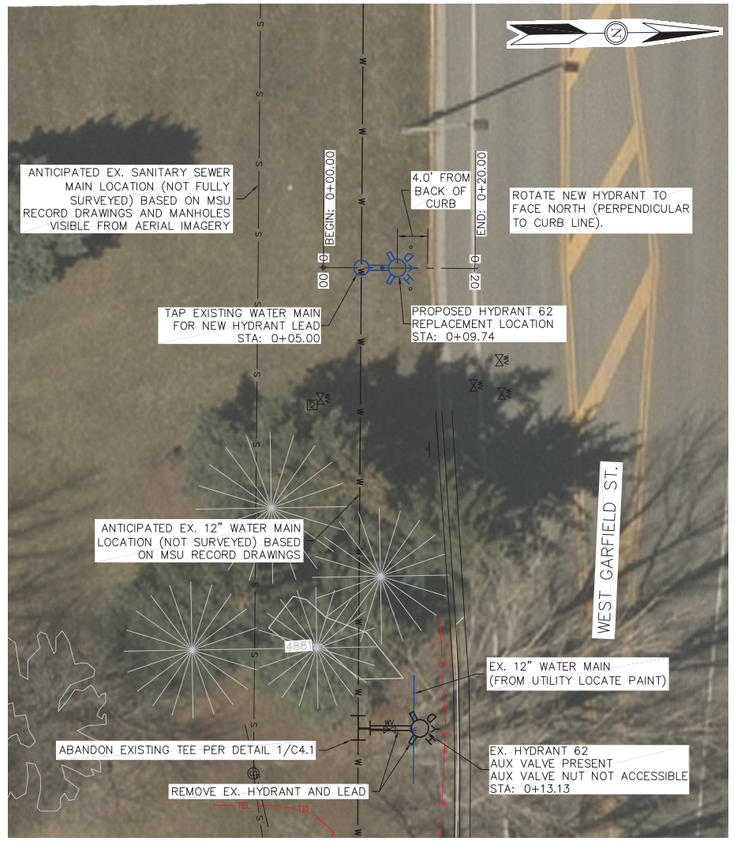
DATE
11-17-2023



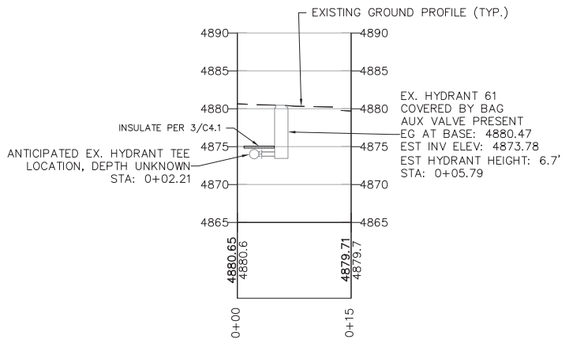
PLAN VIEW - HYDRANT 61
BASE BID ITEM



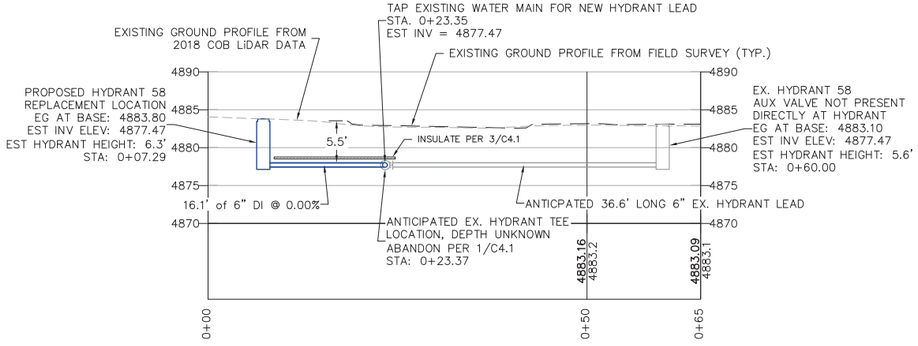
PLAN VIEW - HYDRANT 58
BASE BID ITEM



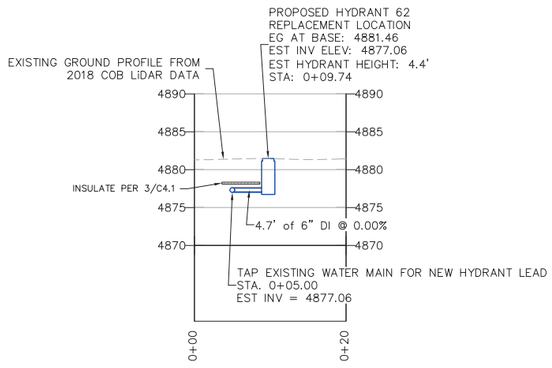
PLAN VIEW - HYDRANT 62
BID ALTERNATE #2



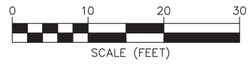
PROFILE VIEW - HYDRANT 61
BASE BID ITEM



PROFILE VIEW - HYDRANT 58
BASE BID ITEM



PROFILE VIEW - HYDRANT 62
BID ALTERNATE #2



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CAMPUS FIRE HYDRANT UPGRADES

PRELIMINARY - NOT FOR CONSTRUCTION

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

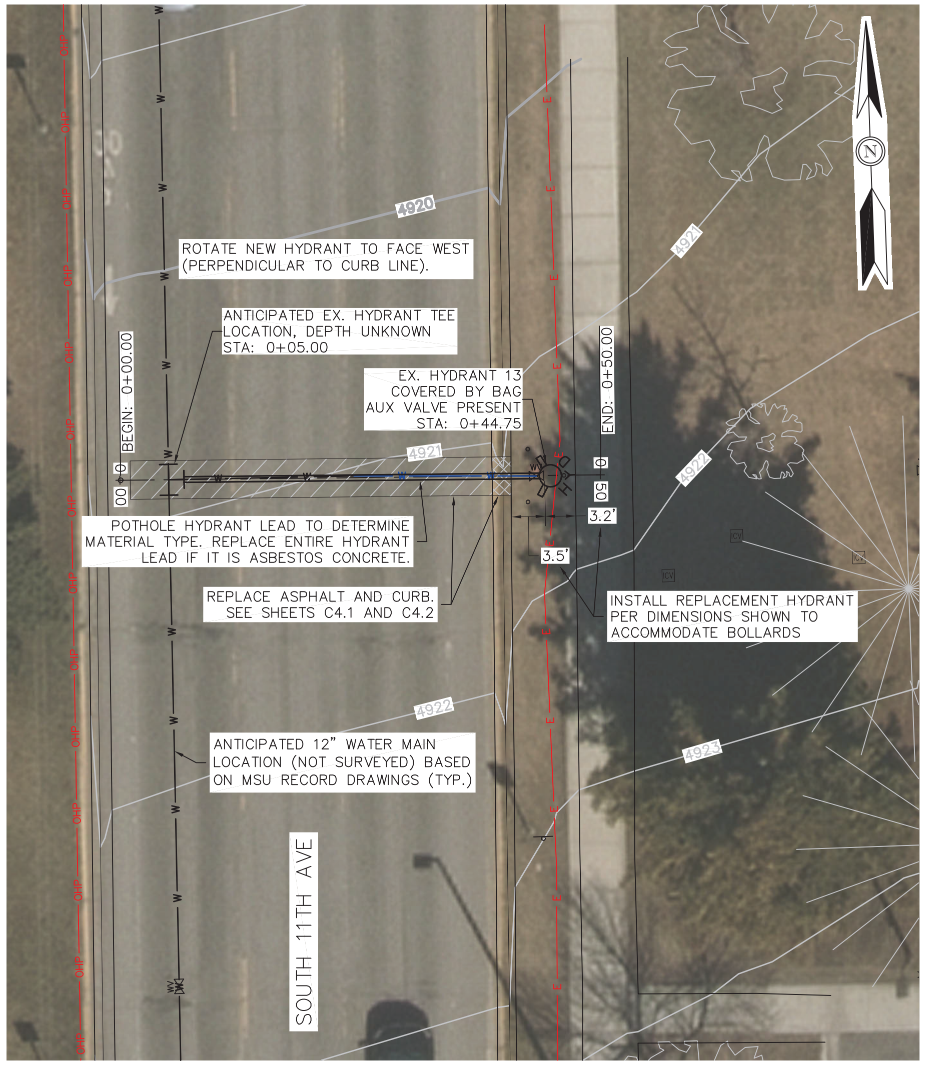
MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

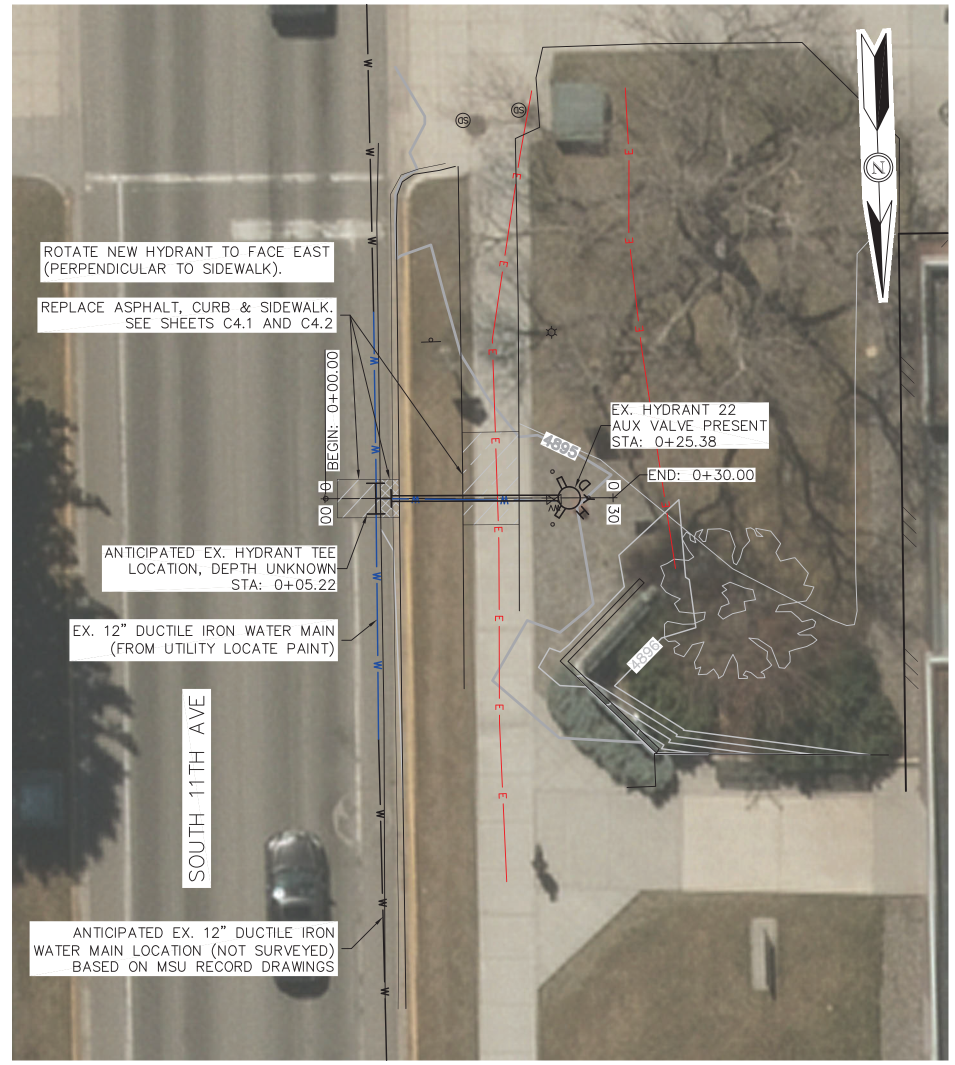
SHEET TITLE
C2.4

SHEET
PLAN & PROFILES: HYDRANTS 61, 58, 62

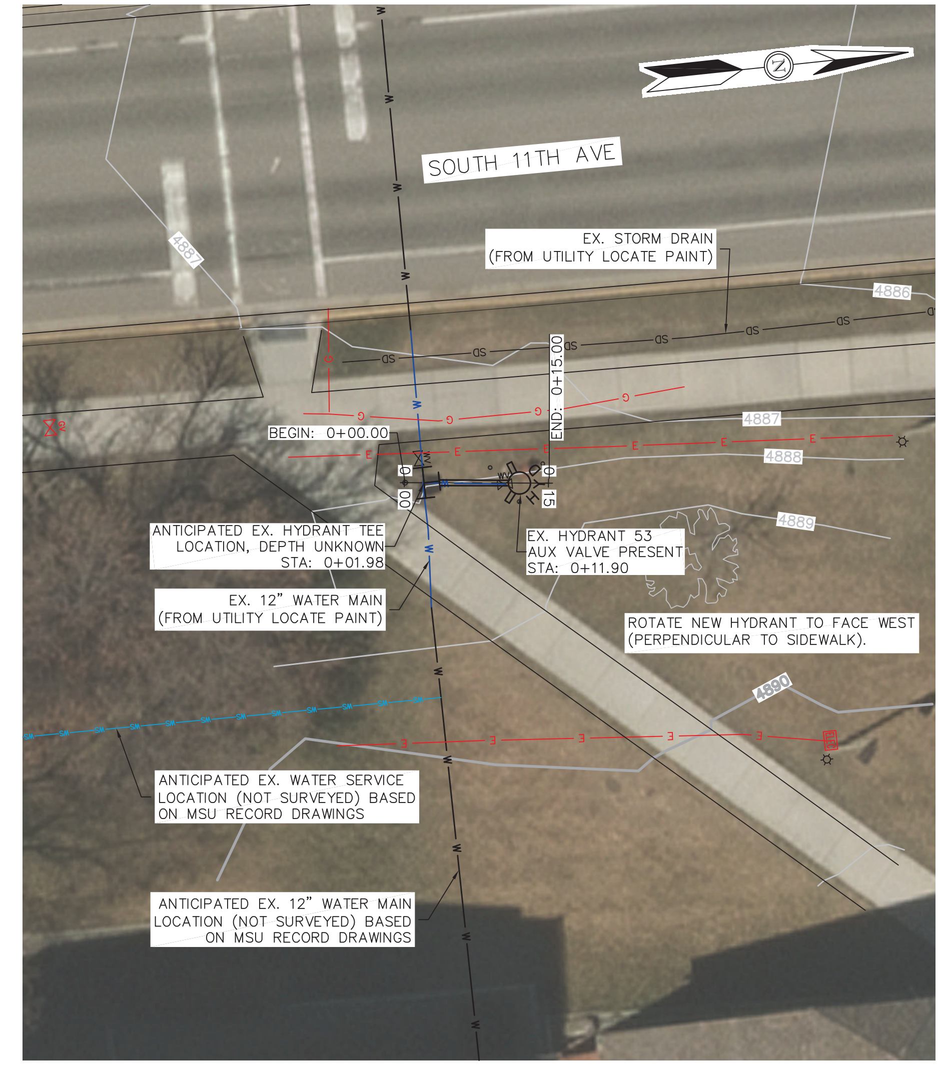
DATE
11-17-2023



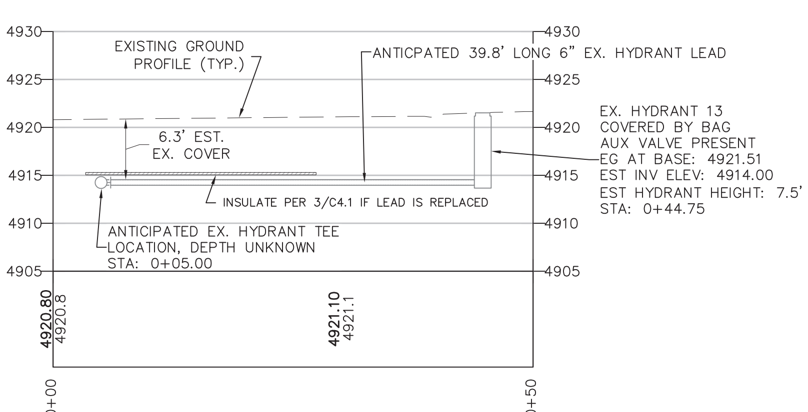
PLAN VIEW - HYDRANT 13
BID ALTERNATE #3



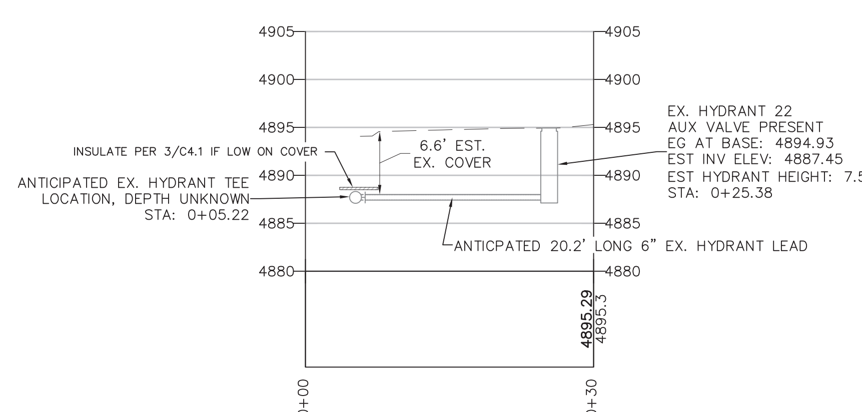
PLAN VIEW - HYDRANT 22
BID ALTERNATE #1



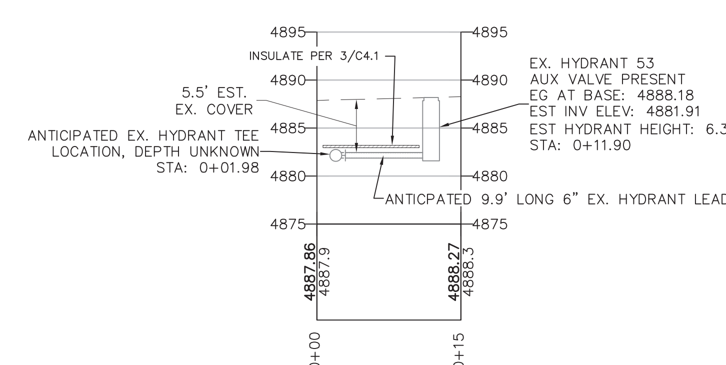
PLAN VIEW - HYDRANT 53
BID ALTERNATE #1



PROFILE VIEW - HYDRANT 13
BID ALTERNATE #3



PROFILE VIEW - HYDRANT 22
BID ALTERNATE #1



PROFILE VIEW - HYDRANT 53
BID ALTERNATE #1

NOTE:

ALL ASBESTOS ABATEMENT WILL BE IN COMPLIANCE WITH MT DEQ RULES AND REGULATIONS INCLUDING BUT NOT LIMITED TO: (NESHAP) 40 CFR 61, SUBPARTS A&M, (ARM) 17.74 SUBCHAPTER 3: ASBESTOS CONTROL, AND (MCA) TITLE 75, PART 5.

0 10 20 30
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

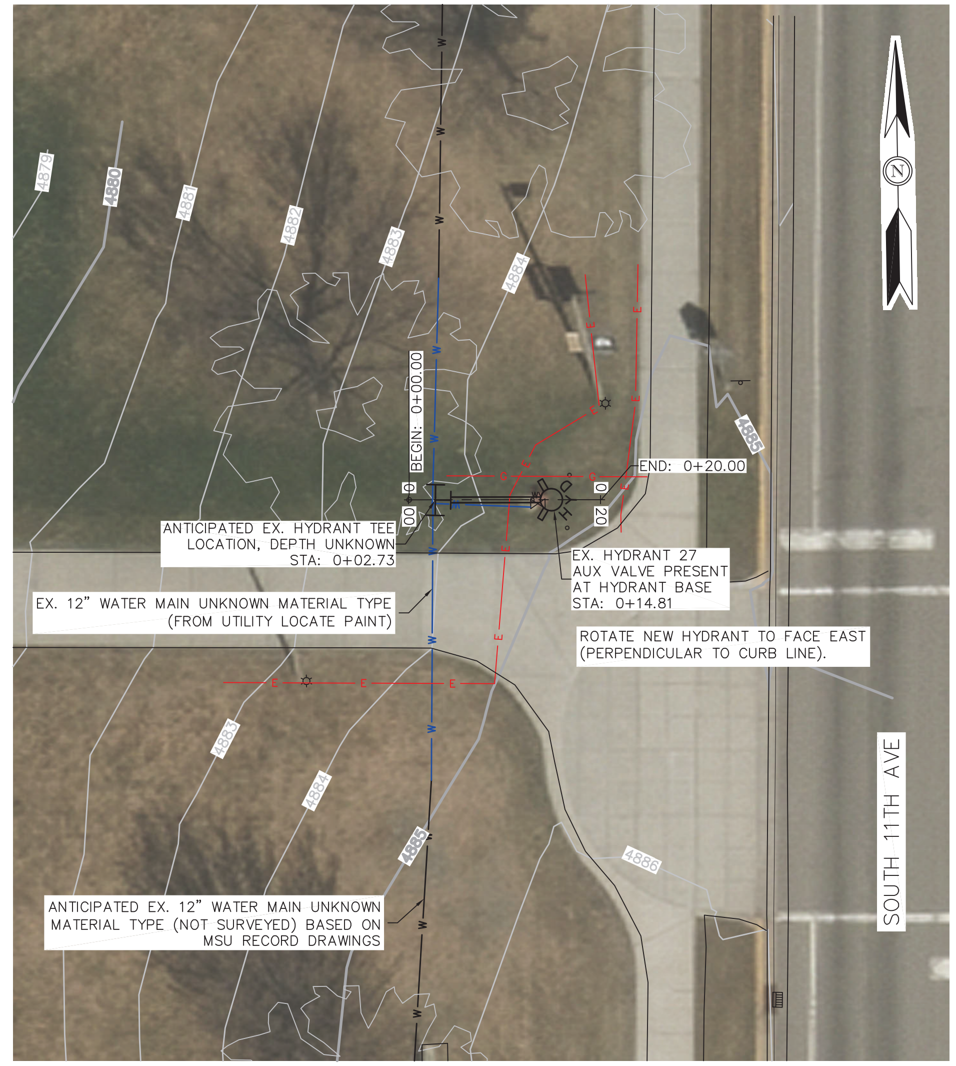
MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

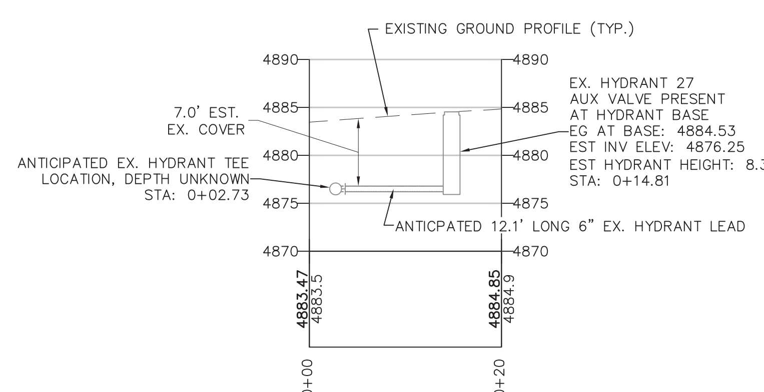
SHEET TITLE
C2.5

SHEET
PLAN & PROFILES: HYDRANTS 13, 22, 53

DATE
11-17-2023



PLAN VIEW - HYDRANT 27
BID ALTERNATE #1



PROFILE VIEW - HYDRANT 27
BID ALTERNATE #1

0 10 20 30
SCALE (FEET)

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

MSU-CPDC

MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

SHEET TITLE
C2.6

SHEET
PLAN & PROFILES: HYDRANT 27

DATE
11-17-2023

Nov 17, 2023 - 1:07pm - Plan And Profile.dwg
C:\aesi_wf\Designs\2022\22-133 MSU Fire Hydrant Replacements\29 CAD-Production\Water\

WATER SERVICE LINE NOTE:

1. ALL WATER SERVICE LINES SHOWN ARE ANTICIPATED LOCATIONS PER MSU RECORD DRAWINGS. ACTUAL LOCATIONS WILL VARY.

0 40 80 120

SCALE (FEET)

NOTE:

1. ANTICIPATED VALVE LOCATIONS AND ISOLATION PLAN. COORDINATE WITH MSU PRIOR TO CONSTRUCTION FOR ACTUAL MAIN SHUT-DOWNS AND ISOLATION VALVE OPERATION.

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

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BOZEMAN, MONTANA
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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

SHEET TITLE
C3.1

SHEET
ISOLATION PLAN:
HYD: 55, 56, 58, 59, 61, 62, 63, 64, 65

DATE
11-17-2023

WATER SERVICE LINE NOTE:

1. ALL WATER SERVICE LINES SHOWN ARE ANTICIPATED LOCATIONS PER MSU RECORD DRAWINGS. ACTUAL LOCATIONS WILL VARY.

0 40 80 120
SCALE (FEET)

NOTE:

1. ANTICIPATED VALVE LOCATIONS AND ISOLATION PLAN. COORDINATE WITH MSU PRIOR TO CONSTRUCTION FOR ACTUAL MAIN SHUT-DOWNS AND ISOLATION VALVE OPERATION.

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MONTANA STATE UNIVERSITY

MSU-CPDC

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FAX: 406.994.5665

CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects

DRAWN BY:	EJF	
REVIEWED BY:	RSR	
REV.	DESCRIPTION	DATE

MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#22-0574

A/E#00-00-00

AESI # 22-133

SHEET TITLE

C3.2

SHEET

ISOLATION PLAN: HYDRANTS 68, 72, 73

DATE

11-17-2023

WATER SERVICE LINE NOTE:

1. ALL WATER SERVICE LINES SHOWN ARE ANTICIPATED LOCATIONS PER MSU RECORD DRAWINGS. ACTUAL LOCATIONS WILL VARY.

0 40 80 120

SCALE (FEET)

NOTE:

1. ANTICIPATED VALVE LOCATIONS AND ISOLATION PLAN. COORDINATE WITH MSU PRIOR TO CONSTRUCTION FOR ACTUAL MAIN SHUT-DOWNS AND ISOLATION VALVE OPERATION.

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

SHEET TITLE
C3.3

SHEET
ISOLATION PLAN: HYDRANTS 22, 27, 53

DATE
11-17-2023

WATER SERVICE LINE NOTE:

1. ALL WATER SERVICE LINES SHOWN ARE ANTICIPATED LOCATIONS PER MSU RECORD DRAWINGS. ACTUAL LOCATIONS WILL VARY.

0 40 80 120
SCALE (FEET)

NOTE:

1. ANTICIPATED VALVE LOCATIONS AND ISOLATION PLAN. COORDINATE WITH MSU PRIOR TO CONSTRUCTION FOR ACTUAL MAIN SHUT-DOWNS AND ISOLATION VALVE OPERATION.

PRELIMINARY - NOT FOR CONSTRUCTION

MONTANA STATE UNIVERSITY

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FAX: 406.994.5665

CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

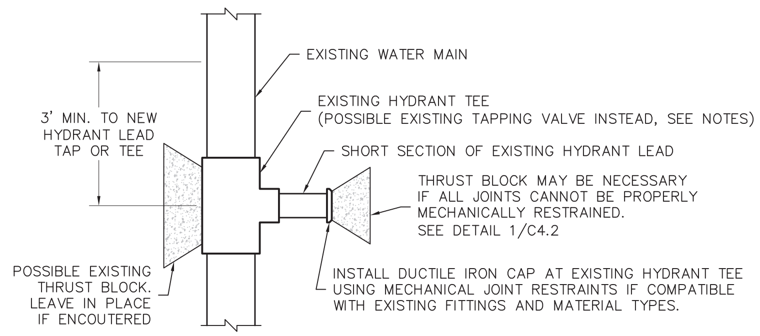
MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

SHEET TITLE
C3.4

SHEET
ISOLATION PLAN: HYDRANT 13

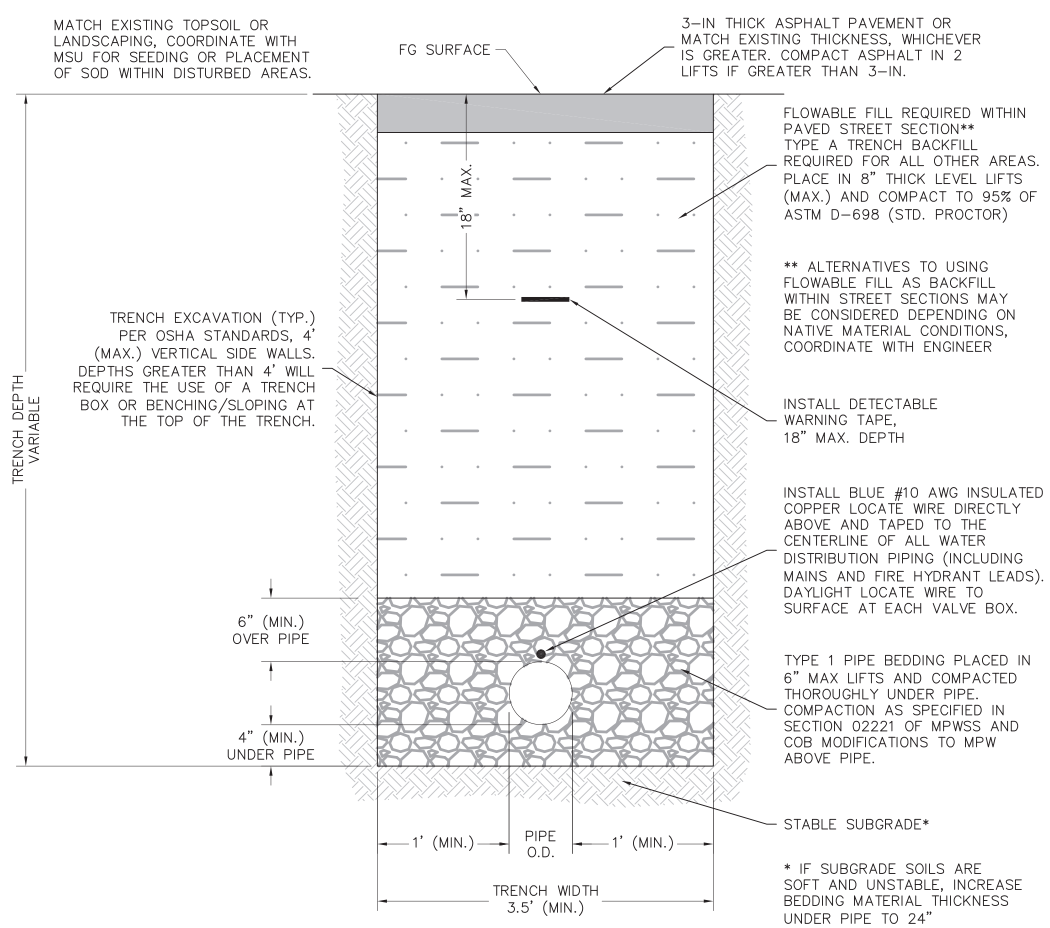
DATE
11-17-2023



NOTE:

1. IF EXISTING HYDRANT LEAD WAS INSTALLED WITH A TAPPING VALVE INSTEAD OF A TEE, USE APPROPRIATE METHODS AND MATERIALS TO ABANDON THE TAPPING VALVE. DISCUSS WITH ENGINEER AND CONFIRM WITH WATER DEPARTMENT BEFORE IMPLEMENTING.
2. IF A DUCTILE IRON CAP CANNOT BE USED TO ABANDON EXISTING HYDRANT TEE, DISCUSS WITH ENGINEER AND WATER DEPARTMENT BEFORE MOVING FORWARD WITH ABANDONMENT. MODIFICATIONS TO EXISTING MAIN MAY BE NECESSARY WITH TRANSITION FITTINGS AND/OR SOLID SLEEVE COUPLINGS.

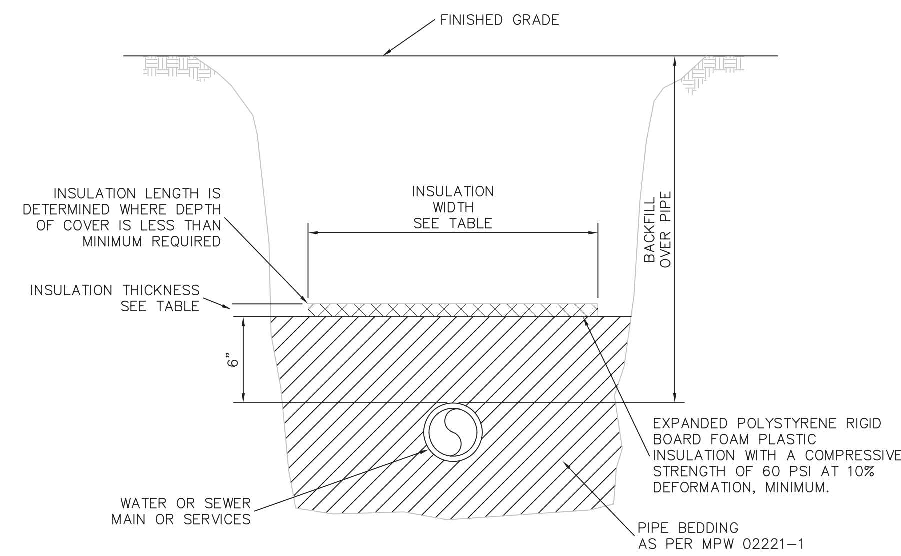
1 C4.1 DETAIL
ABANDON EX. HYDRANT TEE
NTS



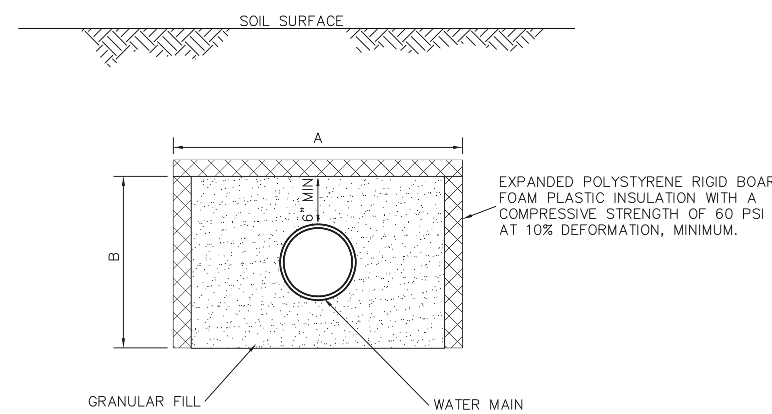
NOTES:

1. THIS DETAIL APPLIES TO ALL UNDERGROUND WATER LINES.
2. INSULATION BOARD SHALL BE INSTALLED ABOVE THE PIPE WHEREVER ANY WATER DISTRIBUTION PIPING (INCLUDING MAINS, SERVICES, AND FIRE HYDRANT LEADS) HAS LESS THAN 6.5' OF COVER. SEE PIPE INSULATION DETAIL 2/C4.1 FOR LOCATION AND WIDTH REQUIREMENTS.
3. WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING. WHERE NEAT LINE IS LESS THAN 3' FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.

2 C4.1 DETAIL
TRENCH EXCAVATION, BEDDING, AND BACKFILL
NTS



STANDARD INSULATION CONFIGURATION



NOTE: A+2B ≥ REQUIRED INSULATION WIDTH WHERE A = TRENCH WIDTH

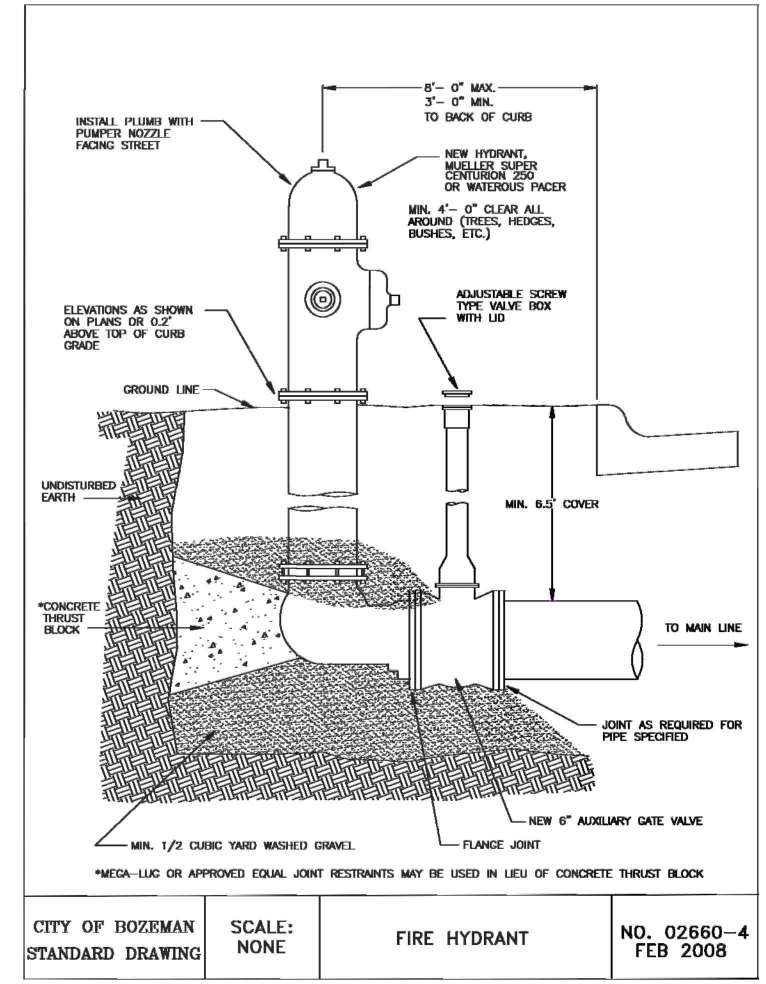
ALTERNATE INSULATION CONFIGURATION

INSULATION MINIMUM REQUIREMENTS TABLE

DEPTH OF BACKFILL OVER PIPE	INSULATION THICKNESS	INSULATION WIDTH*
2'-0"	4.0"	8'
3'-0"	4.0"	6'
4'-0"	2.0"	4'
5'-0"	2.0"	2'
6'-0"	2.0"	2'

* ACTUAL MINIMUM INSULATION WIDTH TO BE INSTALLED IS THE GREATER OF TRENCH WIDTH OR CALCULATED INSULATION WIDTH LISTED IN TABLE ABOVE.

3 C4.1 DETAIL
WATER LINE INSULATION
NTS



NOTE:

1. ALL HYDRANTS TO HAVE BOLLARDS INSTALLED PER DETAIL 4/C4.2.
2. THRUST BLOCKS MAY BE NECESSARY AT HYDRANTS IF MECHANICAL JOINT RESTRAINTS CANNOT BE PROPERLY FITTED TO EXISTING HYDRANT TEES OR TAPPING VALVES.

4 C4.1 DETAIL
FIRE HYDRANT
NTS

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CAMPUS FIRE HYDRANT UPGRADES

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects • Solutions that Last

DRAWN BY: EJF
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

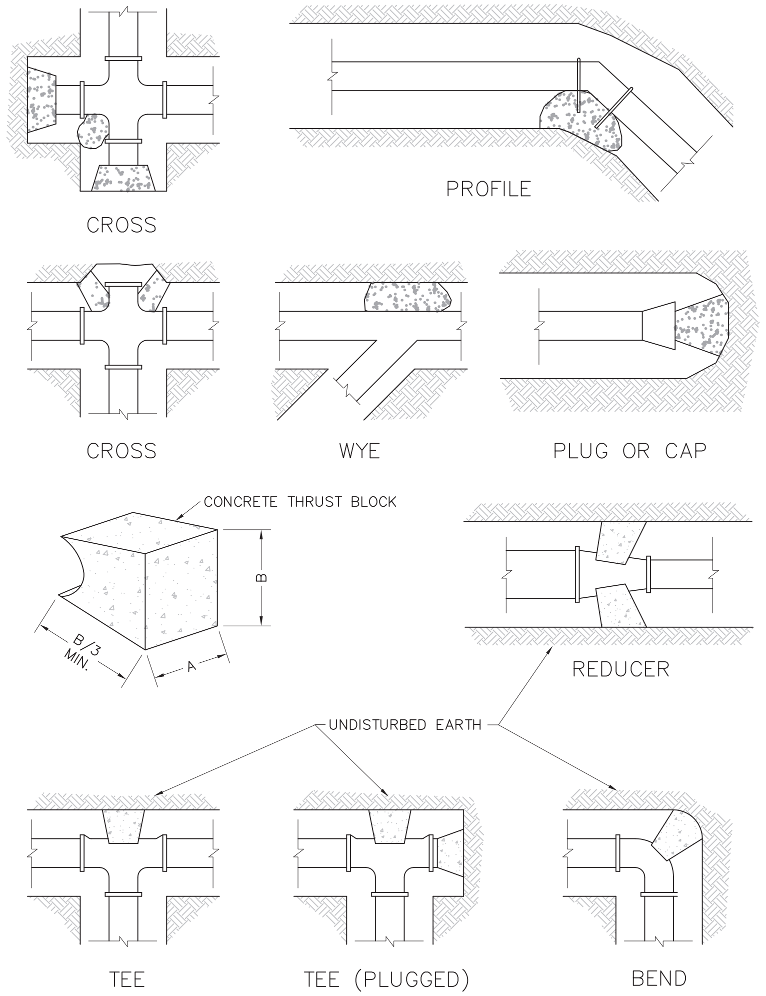
MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#22-0574
A/E#00-00-00
AESI # 22-133

SHEET TITLE
C4.1

SHEET
DETAILS

DATE
11-17-2023

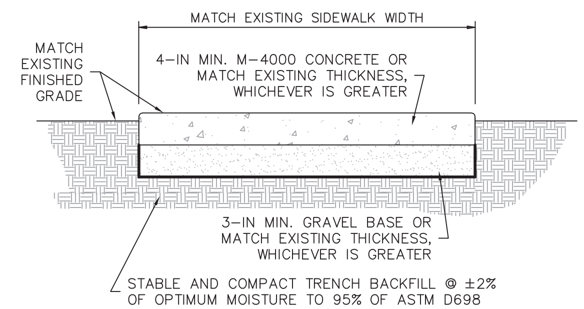


STANDARD DIMENSIONS FOR THRUST BLOCKING								
FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		RED. & 22.5° BEND	
	A	B	A	B	A	B	A	B
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"
10"	3'-4"	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"
14"	5'-5"	3'-10"	6'-6"	4'-11"	4'-9"	3'-5"	3'-5"	2'-5"

NOTES:

1. SOME LOCATIONS MAY REQUIRE CONCRETE THRUST BLOCKS TO BE INSTALLED BECAUSE MECHANICAL JOINT RESTRAINTS MIGHT NOT BE COMPATIBLE WITH EXISTING FITTINGS AND/OR EXISTING PIPE MATERIAL.
2. THE USE OF MEGA-LUG JOINT RESTRAINTS ARE RECOMMENDED AT ALL VALVES, FITTINGS, AND HYDRANTS. THRUST BLOCKING IS OPTIONAL AT EACH LOCATION WHERE MEGA-LUG JOINT RESTRAINTS ARE PROPERLY USED.
3. THIS TABLE IS BASED ON 150 PSI MAIN PRESSURE AND 2000 PSF SOIL BEARING PRESSURE.
4. WRAP ALL FITTINGS WITH POLYETHYLENE ENCASEMENT.

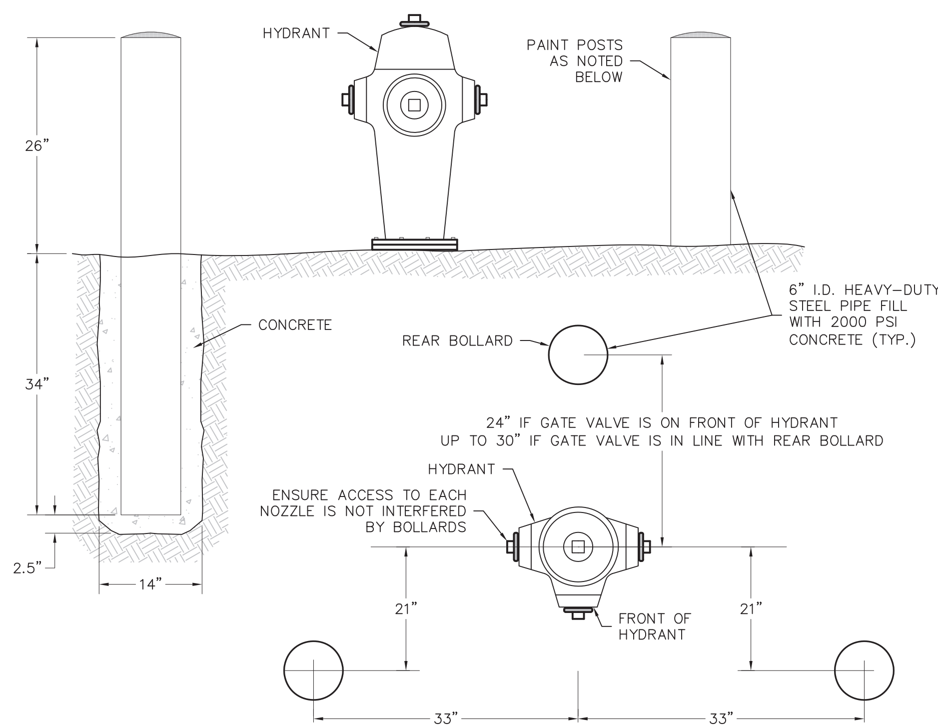
1 / C4.2 DETAIL
THRUST BLOCKING FOR PIPE FITTINGS
NTS



NOTE:

1. SAW CUT SIDEWALKS ALONG EXISTING JOINTS.

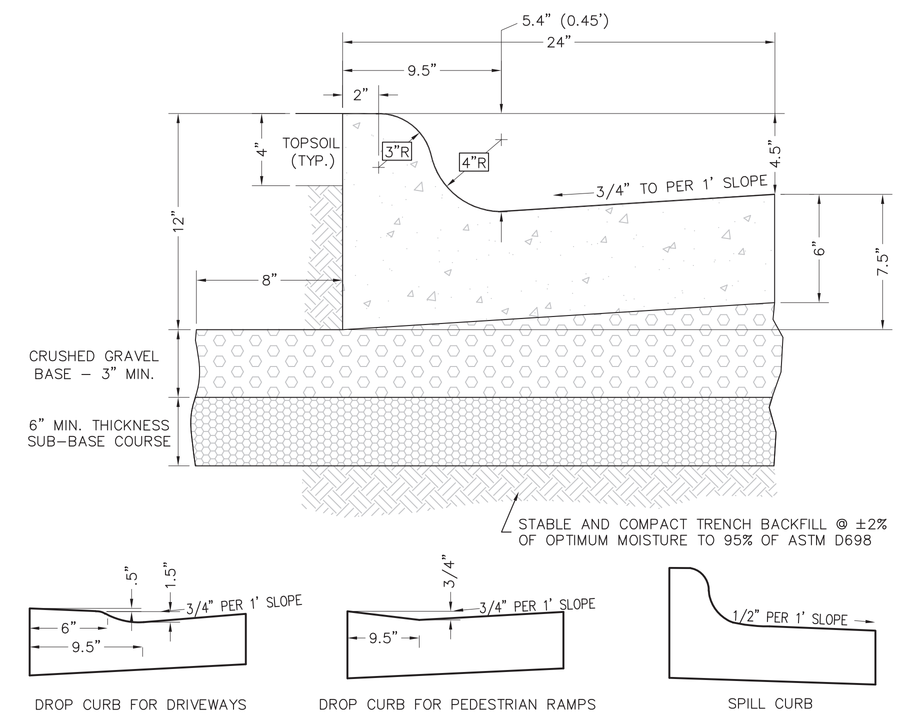
2 / C4.2 DETAIL
TYPICAL SIDEWALK REPLACEMENT
NTS



NOTE:

PAINT POSTS WITH SHERWIN-WILLIAMS METALATEX SEMI-GLOSS COATING, SAFETY RED (B42 R38 620-4069).

3 / C4.2 DETAIL
BARRIER BOLLARDS
NTS



NOTES:

1. MATCH EXISTING CURB & GUTTER PROFILE GEOMETRY. THE EXISTING GEOMETRY WILL LIKELY MATCH THE CITY OF BOZEMAN STANDARD SHOWN ABOVE.
2. SAW CUT CURB & GUTTER PERPENDICULAR TO FACE OF CURB.
3. SUBGRADE OR BASE COURSE COMPACTION SHALL CONFORM TO SECTION 02230 (M.P.W. SPECS.)
4. CONTRACTION JOINTS SHALL BE PLACED AT 10' INTERVALS AND SHALL HAVE A MINIMUM DEPTH OF 3/4" AND MINIMUM WIDTH OF 1/8".
5. 1/2" EXPANSION JOINT MATERIAL SHALL BE PLACED AT ALL P.C.S, P.T.S, CURB RETURNS AND AT NOT MORE THAN 300' INTERVALS. THE EXPANSION MATERIAL SHALL EXTEND THROUGH THE FULL DEPTH OF THE CURB & GUTTER.
6. CONCRETE SHALL BE CLASS M-4000.
7. CRUSHED GRAVEL BASE SHALL MEET THE REQUIREMENTS OF SECTION 02235 (MPW SPECS.) FOR CURB AND GUTTER REPLACEMENT PROJECTS, WASHED ROCK MAY BE USED FOR THE GRAVEL BASE.

4 / C4.2 DETAIL
TYPICAL CURB & GUTTER REPLACEMENT
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