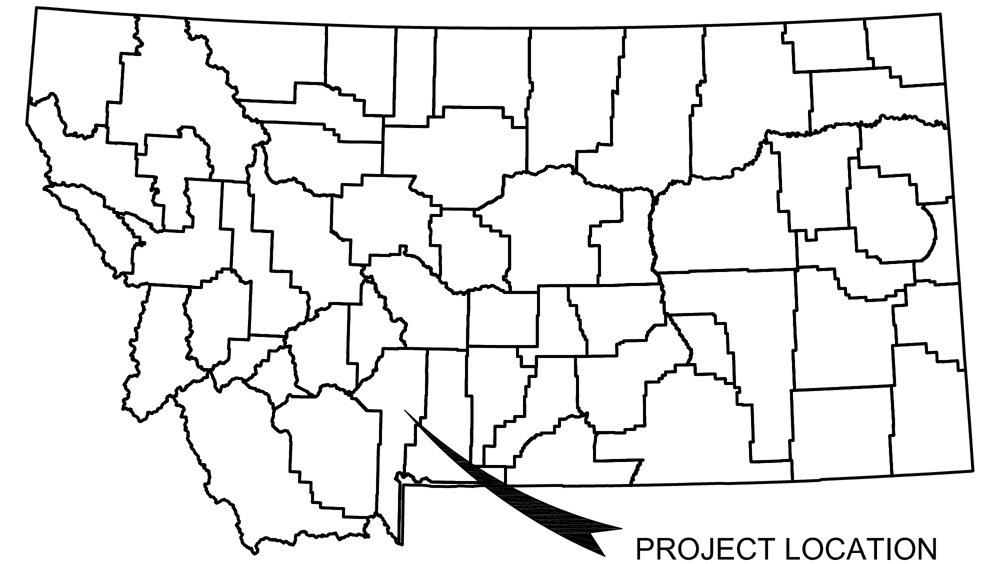
GAINES HALL WATER MAIN REPLACEMENT - PHASE 2

WATER MAIN IMPROVEMENTS

PROJECT LOCATION: BOUNDED TO THE NORTH AND WEST BY GAINES HALL, TO THE EAST BY ROMNEY HALL, AND TO THE SOUTH BY WEST GRANT STREET IN THE CITY OF BOZEMAN, GALLATIN COUNTY, MONTANA.

LEGAL DESCRIPTION: LOCATED IN THE NE 1/4 OF SECTION 13, TOWNSHIP 02S, RANGE 05E, P.M.M., GALLATIN COUNTY, MT

OCTOBER 2, 2024



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

MONTANA
RORY SCOTT ROMEY
No. 40776PE
10/2/2024
LICENSED
PROFESSIONAL ENGINEER

SHEET INDEX

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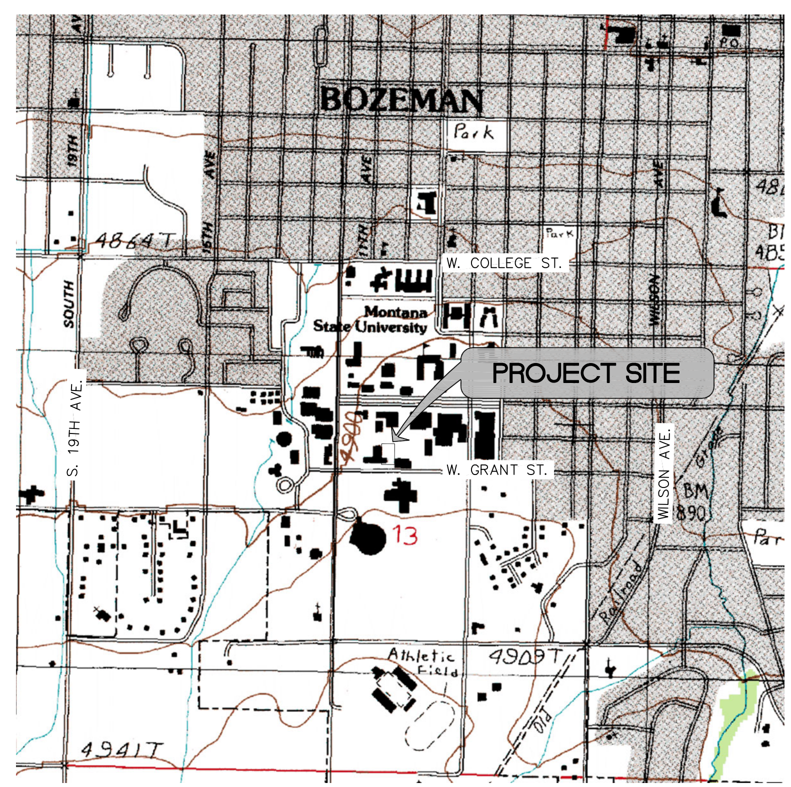


VICINITY MAP

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

AERIAL MAP

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

PROJECT ENGINEER: RORY S. ROMEY, PE

DESIGN ENGINEERS: ERIC FOSS, PE
COLE OSHIRO-LEAVITT, EI

PROJECT SURVEYORS: BRANDON SCHREINER, PLS
CONNER SWITZER, EI

CONSTRUCTION PLANS

MONTANA STATE UNIVERSITY

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

GAINES HALL WATER MAIN REPLACEMENT PHASE 2

ALLIED ENGINEERING SERVICES, INC.

DRAWN BY: EJF, COL
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

MONTANA
RORY SCOTT ROMEY
No. 40776 PE
LICENSED
PROFESSIONAL ENGINEER

PPA#23-0730
A/E#00-00-00
AESI # 23-022

SHEET TITLE
C0.1
SHEET
COVER

DATE
10/02/2024

LEGEND

Line type	Description
4690	INDEX CONTOUR – FG (5' INTERVAL)
4691	CONTOUR MINOR – FG (1' INTERVAL)
4705	INDEX CONTOUR – EG (5' INTERVAL)
4704	CONTOUR MINOR – EG (1' INTERVAL)
	ROAD CENTERLINE – EXISTING
	EDGE OF PAVEMENT – EXISTING
	CURB FLOWLINE – EXISTING
	TOP BACK OF CURB – EXISTING
	EDGE OF CONCRETE – EXISTING
	BUILDING – EXISTING
OHP	OVERHEAD POWER – EXISTING
G	UTILITY GAS – EXISTING
TEL	UTILITY PHONE – EXISTING
E	UTILITY ELECTRIC – EXISTING
F	UTILITY FIBER – EXISTING
S	SEWER MAIN – EXISTING
W	WATER MAIN –EXISTING
SD	STORM DRAIN – EXISTING
	WATER SERVICE – EXISTING
W	WATER MAIN – PROPOSED
WS	WATER SERVICE – PROPOSED

Symbol	Description
S	SANITARY SEWER MANHOLE – EX.
CO	CLEANOUT – EX.
	WATER VALVE – EX.
	WATER VALVE – PROPOSED
	FIRE HYDRANT – EX.
	FIRE HYDRANT – PROPOSED
CS	CURB STOP – EX.
	WATER WELL – EX.
SD	STORM DRAIN MANHOLE – EX.
	COMBINATION CURB INLET – EX.
ICV	IRRIGATION CONTROL VALVE – EX.
E	ELECTRICAL MANHOLE – EX.
E	ELECTRICAL PEDESTAL – EX.
ELEC	ELECTRICAL BOX – EX.
TEL	TELEPHONE PEDESTAL – EX.
GM	GAS METER – EX.
	GAS VALVE – EX.
SV	SPRINKLER VALVE – EX.
	SIGN – EX.
	LIGHT POLE – EX.

LOCATION MAP

0 100 200 300

SCALE (FEET)

N

GENERAL 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/MSU FACILITY SERVICES 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. CONTRACTOR SHALL PROVIDE WATER AND OTHER MEASURES AS NECESSARY TO CONTROL DUST TO AN EXTENT ACCEPTABLE TO THE UNDERLYING PROPERTY OWNERS.
10. A PRE–CONSTRUCTION MEETING SHALL BE SCHEDULED BY THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR, MSU FACILITY SERVICES, ENGINEER, AND OTHER AFFECTED UTILITIES OR GOVERNMENT AGENCIES (IF APPLICABLE) SHALL BE PRESENT.
11. ALL CONSTRUCTION MATERIALS THAT ARE INSTALLED ON THIS PROJECT MUST BE NEW.
12. 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.
13. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL NECESSARY PROJECT SITE ACCESS CONTROL DURING THE COURSE OF THE PROJECT.
14. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN A CLEAN JOB SITE.
15. 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.
16. WHERE WATER MAIN 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. THE THICKNESS OF THE ASPHALT PATCH SHALL BE EQUAL TO OR EXCEED THAT OF THE EXISTING ROADWAY BUT SHALL BE NOT LESS THAN 3". REFER TO THE PLANS AND DETAILS FOR ADDITIONAL INFORMATION AND TRENCH BACKFILL REQUIREMENTS.
17. REFER TO SPECIFICATIONS ON C0.3 FOR PERMITTING REQUIREMENTS AND ADDITIONAL PROJECT NOTES.
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 AND SPECIFICATIONS.
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

CONSTRUCTION PLANS

MONTANA STATE UNIVERSITY

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

GAINES HALL WATER MAIN REPLACEMENT PHASE 2

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

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

MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#23-0730

A/E#00-00-00

AESI # 23-022

SHEET TITLE

C0.2

SHEET

PROJECT NOTES & LEGEND

DATE 10/02/2024

SPECIFICATIONS:

1. PROJECT SCHEDULE: TO BE COMPLETED DURING THE FALL/WINTER OF 2024. ALL SITE WORK TO BE FINALIZED AND SURFACES RESTORED PRIOR TO THE SPRINT SEMESTER JANUARY 2025.

2. CONSTRUCTION INSPECTION AND TESTING: CONSTRUCTION INSPECTION AND TESTING WILL BE PERFORMED BY ALLIED ENGINEERING. THE ENGINEER SHALL BE NOTIFIED AT LEAST TWO DAYS PRIOR TO CONSTRUCTION IN ORDER TO PROVIDE INSPECTION OF THESE ELEMENTS. THE CONTRACTOR SHALL MAINTAIN AS-BUILT RECORDS FOR FUTURE USE IN DEVELOPING RECORD DRAWINGS.

3. COORDINATION: THE CONTRACTOR SHALL COORDINATE WITH MONTANA STATE UNIVERSITY AND ALLIED ENGINEERING. AESI WILL BE REQUIRED TO INSPECT AND TEST CERTAIN ELEMENTS OF THIS PROJECT. THE CONTRACTOR SHALL ENSURE THAT ALL ENGINEER REQUIRED INSPECTIONS ARE ACCOMMODATED. SEE THE GENERAL NOTES FOR ADDITIONAL ITEMS PERTAINING TO COORDINATION, INSPECTION, AND AS-BUILTS.

4. PROJECT SUPERINTENDENT OR FOREMAN: THE CONTRACTOR SHALL HAVE EITHER A PROJECT SUPERINTENDENT OR FOREMAN THAT IS ON-SITE THE MAJORITY OF THE TIME. THIS INDIVIDUAL IS RESPONSIBLE FOR REVIEWING/UNDERSTANDING THE PLANS AND FOR DIRECTING THE WORK. FIELD CHANGES THAT ARE DIRECTED BY THE ENGINEER WILL BE CONVEYED TO THIS INDIVIDUAL FOR IMPLEMENTATION.

5.
   - 5.1. OPEN TRENCHES/HOLES: NO TRENCHES OR HOLES SHALL BE LEFT IN AN OPEN CONDITION OVERNIGHT. ALL SUCH TRENCHES AND HOLES SHALL BE BACKFILLED, COMPACTED, AND CLOSED BEFORE THE END OF EACH WORK DAY.
   - 5.2. CONSTRUCTION ON WEST GRANT STREET IS CURRENTLY ONGOING AND IS CLOSED FOR THE WORK. CONTRACTOR TO COORDINATE WITH THE CONSTRUCTION MANAGER/PROJECT SUPERINTENDENT OF THE GRANT STREET PROJECT FOR SITE ACCESS, STAGING, AND MATERIALS STORAGE.

6. 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 AD MUST BE APPROVED BY MSU AND THE PROJECT ENGINEER PRIOR TO ANY CONSTRUCTION ACTIVITY. CURRENTLY, W. GRANT STREET IS CLOSED FOR CONSTRUCTION. COORDINATE AS NOTED ABOVE FOR SITE ACCESS.

7. SHOP DRAWINGS: SHOP DRAWINGS WILL BE REQUIRED FOR ALL WET UTILITY, GRAVEL, CONCRETE, AND ASPHALT MATERIALS. THEY SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. DRY UTILITY WORK WILL BE COMPLETED BY THE SERVICE PROVIDERS AND WILL NOT REQUIRE SHOP DRAWING SUBMITTALS.

8. CLEAN-UP: THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN A CLEAN JOB SITE.

9. FITTINGS: INSTALL ALL FITTINGS PER MANUFACTURER RECOMMENDATIONS.

10. RESTRAINTS: ALL BURIED VALVES AND FITTINGS SHALL BE RESTRAINED WITH THRUST BLOCKS OR MECHANICAL JOINT RESTRAINTS IN ACCORDANCE WITH THE PLAN DETAILS.

11. GAINES HALL WATER MAIN AS-BUILT MEASUREMENTS: GAINES HALL WATER MAIN REPLACEMENT WORK MUST HAVE FULL-TIME ENGINEER INSPECTION. THE ENGINEER WILL RECORD AS-BUILT MEASUREMENTS AND DOCUMENTATION DURING THE INSTALLATION AND TESTING OF THE NEW WATER MAIN.

12. WATER MAIN MATERIAL: ZINC COATED PIPE WITH V-BIO ENHANCED POLYETHYLENE ENCASEMENT IS THE PREFERRED MATERIAL. COORDINATE WITH MSU AND THE ENGINEER FOR AVAILABILITY AND TIMING. IF NECESSARY DUE TO TIMING AND PRODUCT AVAILABILITY, STANDARD DUCTILE IRON PIPE WITH V-BIO ENHANCED POLYETHYLENE ENCASEMENT MAY BE USED. ALL DUCTILE PIPE AND FITTINGS ARE TO BE WRAPPED WITH V-BIO ENHANCED POLYETHYLENE.

13. IRRIGATION: THERE ARE MULTIPLE IRRIGATION LINES IN THE VICINITY OF THE PROJECT SITE. DAMAGE TO, DISRUPTION OR RELOCATION OF EXISTING IRRIGATION INFRASTRUCTURE WILL NEED TO BE COORDINATED WITH MSU FACILITY SERVICES. CONTRACTOR MAY BE RESPONSIBLE FOR WORK ASSOCIATED WITH IMPACTS TO EXISTING IRRIGATION INFRASTRUCTURE.

14. UTILITY CONFLICTS AND IMPROVEMENTS: THERE ARE MULTIPLE UTILITIES (WET AND DRY) IN THE VICINITY OF THE PROJECT SITE. IN ADDITION TO THE STANDARD ONE-CALL UTILITY LOCATE SERVICE, CONTRACTOR SHALL COORDINATE WITH MSU FACILITIES MANAGEMENT FOR ADDITIONAL UTILITY LOCATES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING ANY DAMAGED OR DISTURBED UTILITY LINES. COORDINATE WITH MSU FACILITY SERVICES FOR OPERATION OF SYSTEM VALVES AND UTILITY CONNECTIONS.

15. TUNNEL ACCESS: A PORTION OF THE IMPROVEMENTS ARE LOCATED WITHIN THE UTILITY TUNNELS. CONTRACTOR TO COORDINATE WITH MSU FACILITY SERVICES FOR WORK ASSOCIATED WITH CONSTRUCTION, ACCESS, STAGING, AND MATERIALS STORAGE INSIDE THE TUNNEL.

16. CONSTRUCTION STAKING: THE CONTRACTOR SHALL COORDINATE STAKING NEEDS WITH ALLIED ENGINEERING. CONTROL POINTS WILL BE PROVIDED FOR USE NEAR THE PROJECT SITE. STAKING FOR WATER IMPROVEMENTS SHALL BE PROVIDED BY THE OWNER. WE ANTICIPATE UP TO 2 TRIPS FOR STAKING ITEMS REQUESTED BY THE CONTRACTOR. ADDITIONAL STAKING TRIPS WILL BE AT THE COST OF THE CONTRACTOR.

17. ABANDONMENT OF EXISTING WATER MAIN TO BE COORDINATED WITH MSU AND ALLIED ENGINEERING. IN LOCATION WHERE THE EXISTING WATER MAIN MATCHES THE ALIGNMENT OF THE PROPOSED WATER MAIN, REMOVAL AND DISPOSAL OF THE EXISTING WATER MAIN IS ANTICIPATED. IN LOCATIONS WHERE THE MAIN PASSES CLOSE TO OR UNDER EXISTING STRUCTURES OR UTILITIES, THE EXISTING WATER MAIN MAY BE ABANDONED IN PLACE AND FILLED WITH CONCRETE.

MONTANA STATE UNIVERSITY

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

CONSTRUCTION PLANS

GAINES HALL WATER MAIN REPLACEMENT PHASE 2

DRAWN BY: EJF, COL
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

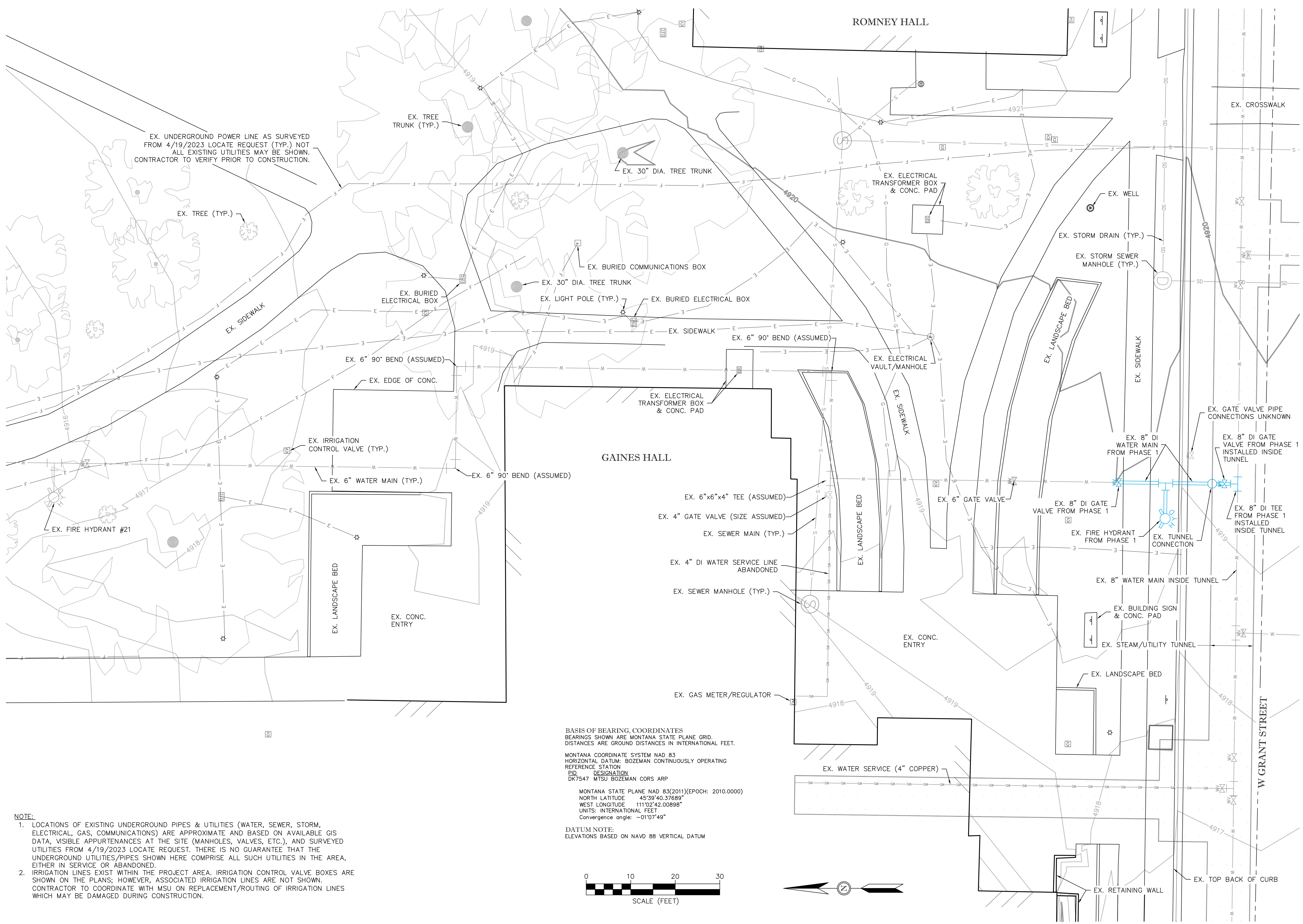
MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#23-0730
A/E#00-00-00
AESI # 23-022

SHEET TITLE
C0.3

SHEET
SPECIFICATIONS

DATE
10/02/2024



NOTE:
1. LOCATIONS OF EXISTING UNDERGROUND PIPES & UTILITIES (WATER, SEWER, STORM, ELECTRICAL, GAS, COMMUNICATIONS) ARE APPROXIMATE AND BASED ON AVAILABLE GIS DATA, VISIBLE APPURTENANCES AT THE SITE (MANHOLES, VALVES, ETC.), AND SURVEYED UTILITIES FROM 4/19/2023 LOCATE REQUEST. THERE IS NO GUARANTEE THAT THE UNDERGROUND UTILITIES/PIPES SHOWN HERE COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED.
2. IRRIGATION LINES EXIST WITHIN THE PROJECT AREA. IRRIGATION CONTROL VALVE BOXES ARE SHOWN ON THE PLANS; HOWEVER, ASSOCIATED IRRIGATION LINES ARE NOT SHOWN. CONTRACTOR TO COORDINATE WITH MSU ON REPLACEMENT/ROUTING OF IRRIGATION LINES WHICH MAY BE DAMAGED DURING CONSTRUCTION.

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 BASED ON NAVD 88 VERTICAL DATUM

CONSTRUCTION PLANS

GAINES HALL WATER MAIN REPLACEMENT PHASE 2

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ALLIED ENGINEERING SERVICES, INC.
Diverse Projects • Solutions that

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PROFESSIONAL ENGINEER

PPA#23-0730
A/E#00-00-00
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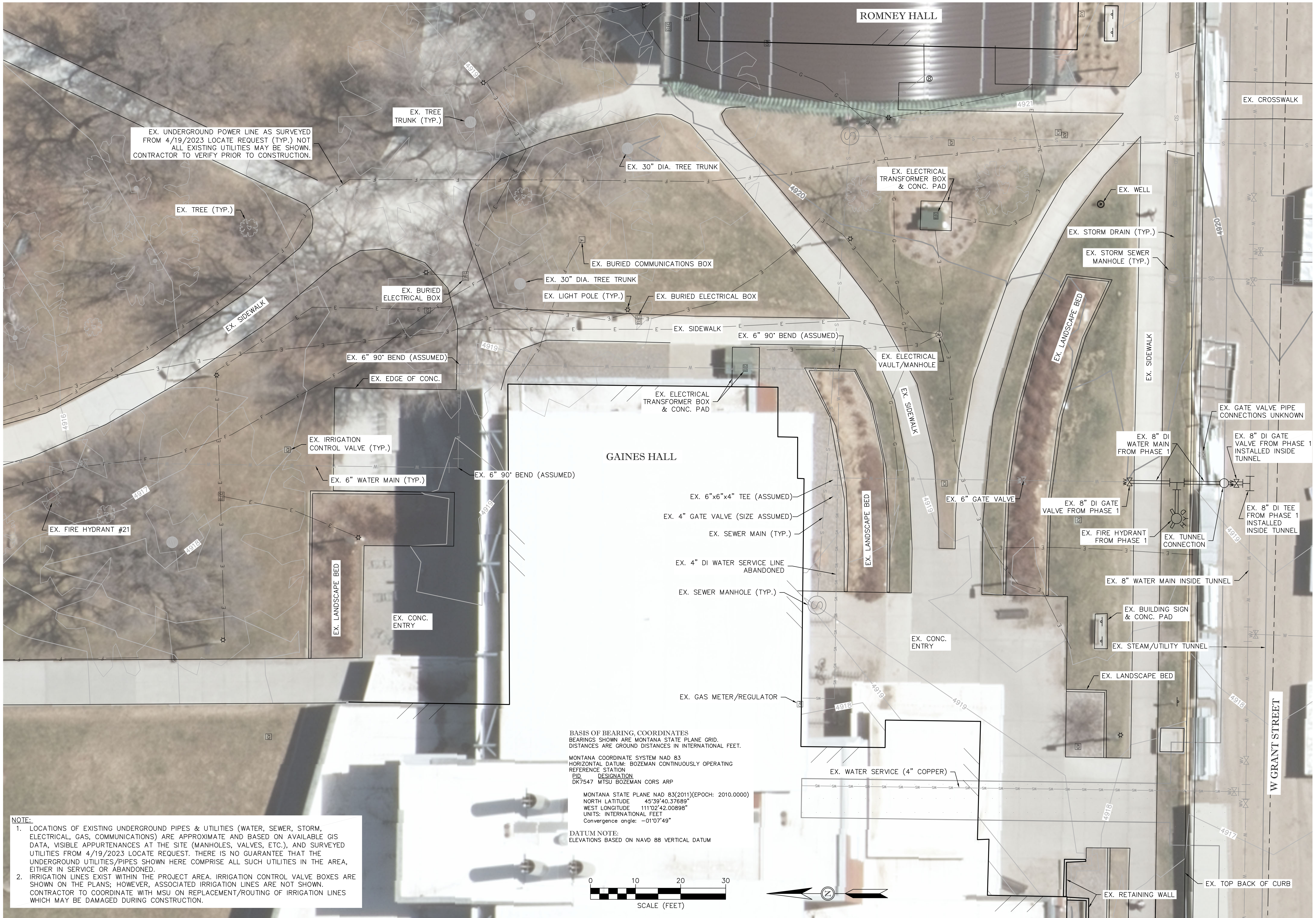
SHEET TITLE
C1.1

SHEET
EXISTING CONDITIONS

DATE
10/02/2024



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2. IRRIGATION LINES EXIST WITHIN THE PROJECT AREA. IRRIGATION CONTROL VALVE BOXES ARE SHOWN ON THE PLANS; HOWEVER, ASSOCIATED IRRIGATION LINES ARE NOT SHOWN. CONTRACTOR TO COORDINATE WITH MSU ON REPLACEMENT/ROUTING OF IRRIGATION LINES WHICH MAY BE DAMAGED DURING CONSTRUCTION.

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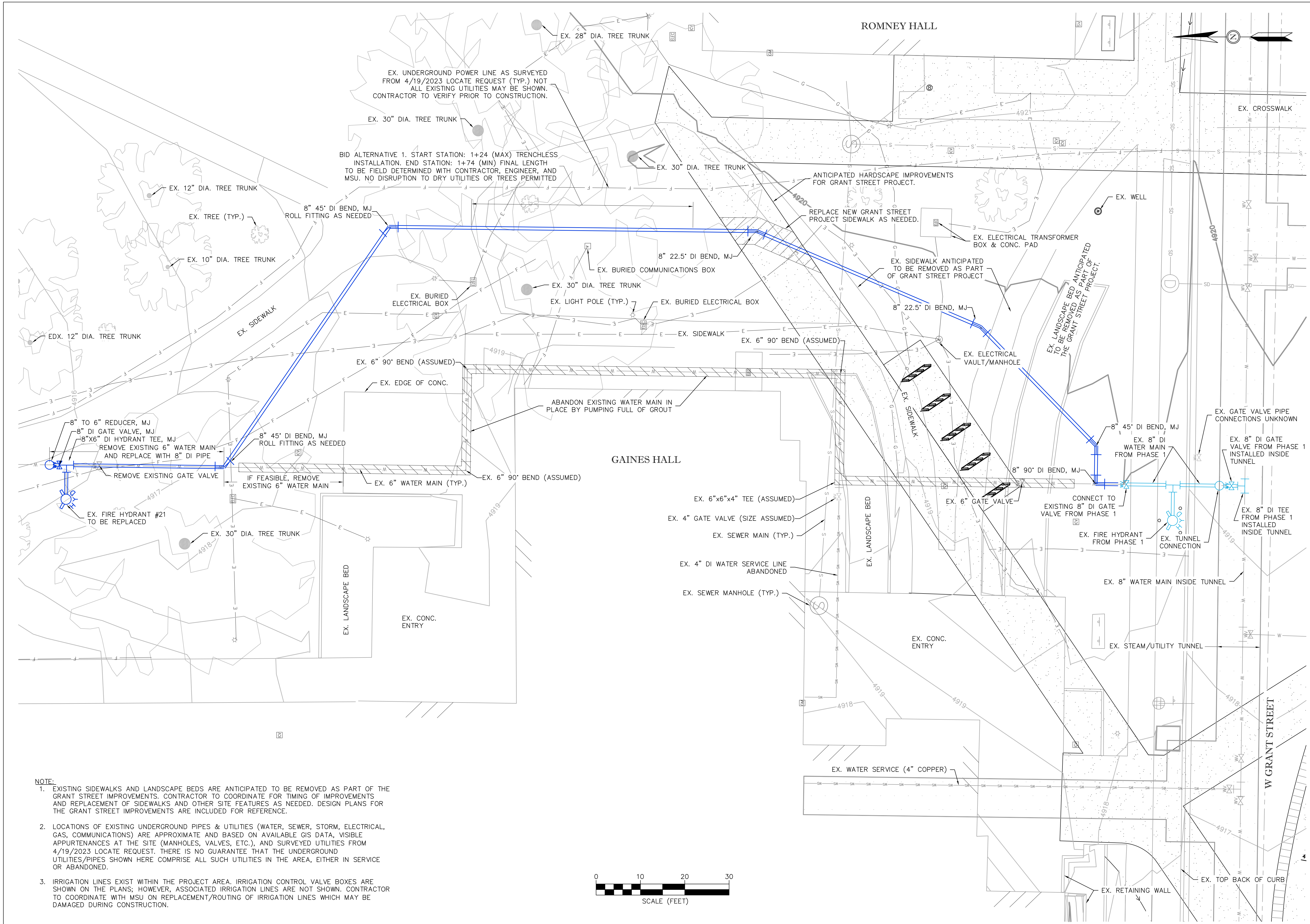
SHEET TITLE
C1.2

SHEET
EXISTING CONDITIONS W/ AERIAL

DATE
10/02/2024



NOTE:

1. EXISTING SIDEWALKS AND LANDSCAPE BEDS ARE ANTICIPATED TO BE REMOVED AS PART OF THE GRANT STREET IMPROVEMENTS. CONTRACTOR TO COORDINATE FOR TIMING OF IMPROVEMENTS AND REPLACEMENT OF SIDEWALKS AND OTHER SITE FEATURES AS NEEDED. DESIGN PLANS FOR THE GRANT STREET IMPROVEMENTS ARE INCLUDED FOR REFERENCE.

2. LOCATIONS OF EXISTING UNDERGROUND PIPES & UTILITIES (WATER, SEWER, STORM, ELECTRICAL, GAS, COMMUNICATIONS) ARE APPROXIMATE AND BASED ON AVAILABLE GIS DATA, VISIBLE APPURTENANCES AT THE SITE (MANHOLES, VALVES, ETC.), AND SURVEYED UTILITIES FROM 4/19/2023 LOCATE REQUEST. THERE IS NO GUARANTEE THAT THE UNDERGROUND UTILITIES/PIPES SHOWN HERE COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED.

3. IRRIGATION LINES EXIST WITHIN THE PROJECT AREA. IRRIGATION CONTROL VALVE BOXES ARE SHOWN ON THE PLANS; HOWEVER, ASSOCIATED IRRIGATION LINES ARE NOT SHOWN. CONTRACTOR TO COORDINATE WITH MSU ON REPLACEMENT/ROUTING OF IRRIGATION LINES WHICH MAY BE DAMAGED DURING CONSTRUCTION.

CONSTRUCTION PLANS

MONTANA STATE UNIVERSITY

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GAINES HALL WATER MAIN REPLACEMENT PHASE 2

ALLIED ENGINEERING SERVICES, INC.
Diverse Projects • Solutions

DRAWN BY: EJF, COL
REVIEWED BY: RSR

REV.	DESCRIPTION	DATE

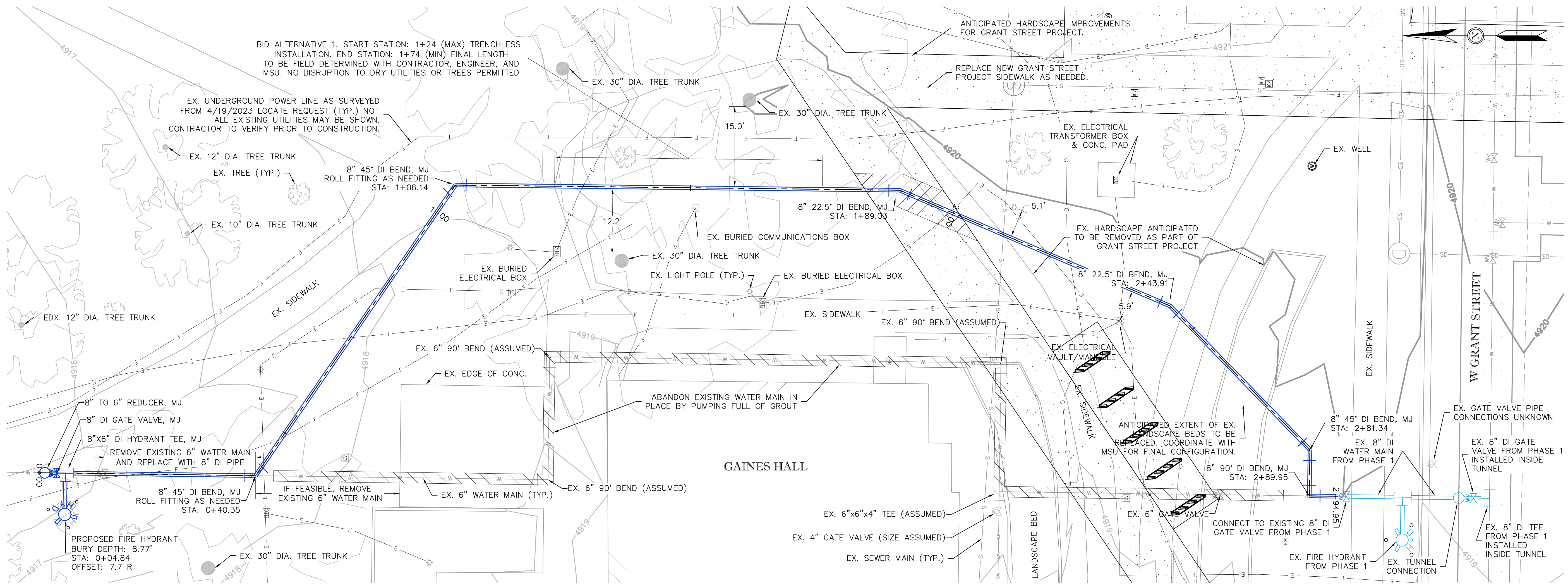
MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#23-0730
A/E#00-00-00
AESI # 23-022

SHEET TITLE
C1.3

SHEET
DESIGN PLAN

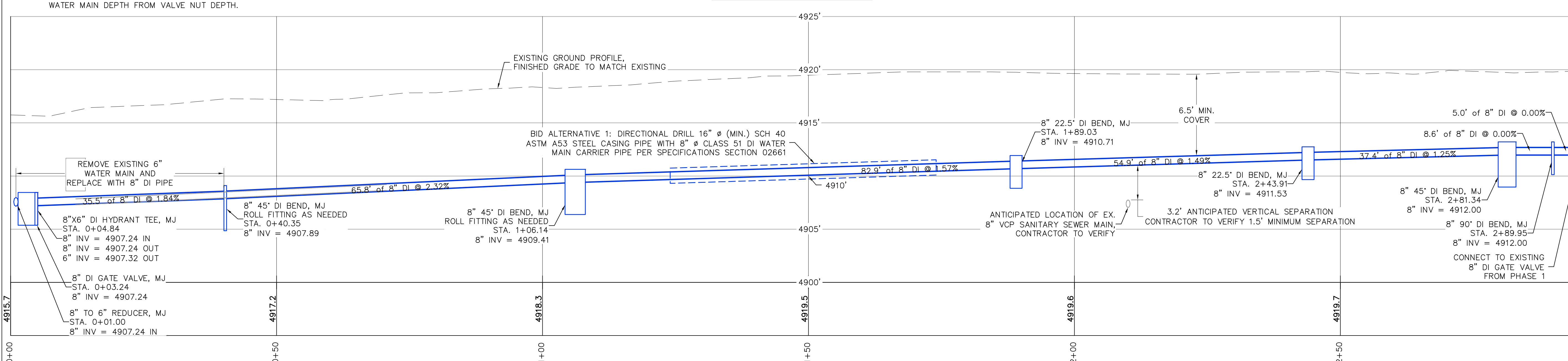
DATE
10/02/2024



NOTE: VERIFY HYDRANT BURY DEPTH PRIOR TO CONSTRUCTION. BURY DEPTH IS APPROXIMATE AND BASED ON ASSUMED WATER MAIN DEPTH FROM VALVE NUT DEPTH.

NOTE: TRENCH BACKFILL TO BE TYPE A FOR ALL AREAS.

WATER MAIN - PLAN VIEW



WATER MAIN - PROFILE VIEW

NOTES:

1. EXISTING WATER MAIN ELEVATIONS ARE APPROXIMATE AND WERE ESTIMATED BY SURVEYING ELEVATION OF TOP NUT OF VALVES WHERE THEY EXIST. TOP NUT TO INVERT AT VALVES ASSUMED TO BE 21". ALL EXISTING WATER MAIN WITHIN REPLACEMENT AREA IS ASSUMED TO BE 6" NOMINAL PIPE SIZE UNLESS OTHERWISE NOTED.
2. CONTRACTOR TO VERIFY SIZES, MATERIAL, AND ELEVATIONS OF EXISTING FITTINGS AND PIPES, AND MAKE APPROPRIATE CONNECTIONS.
3. UNDERGROUND DRY UTILITIES ARE NOT SHOWN IN PROFILE VIEWS.
4. UNDERGROUND UTILITIES SHOWN IN PLAN VIEWS MAY NOT BE ALL INCLUSIVE.
5. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES REGARDING ALL UTILITY CROSSINGS AND ANY POTENTIAL UTILITY CONFLICTS.
6. SEE SPECIFICATIONS ON C0.3 FOR PIPE MATERIAL REQUIREMENTS. ALL WATER MAIN TO BE ENCASED WITH V-BIO ENHANCED POLYETHYLENE.
7. REFER TO 3/C3.2 FOR JOINT RESTRAINT TABLE.

HORIZONTAL SCALE FEET: 0 10 20

VERTICAL SCALE FEET: 0 5 10

BID ALTERNATIVE A, TRENCHLESS INSTALLATION:

1. TRENCHLESS INSTALLATION SHALL UTILIZE 16" ø (MIN.) STEEL CASING PIPE AND 8" ø CLASS 51 DI CARRIER PIPE WITH RESTRAINED JOINT INTEGRAL BELL.
2. TRANSITIONS BETWEEN PIPE TYPE SHALL BE INCIDENTAL TO THE WORK.
3. CONTRACTOR SHALL MAKE EVERY EFFORT TO PULL TRACER WIRE BACK THROUGH WITH PIPE.
4. START AND END STATIONS OF TRENCHLESS INSTALLATION INDICATE THE MINIMAL EXTENTS OF INSTALLATION WHERE NO SURFACE DISRUPTION IS ALLOWED. CONTRACTOR SHALL LOCATE PITS AS NEEDED OUTSIDE OF THE BOUNDS OF THESE STATIONS AS NECESSARY TO COMPLETE THE WORK.
5. CONTRACTOR SHALL PROVIDE SUBMITTAL DETAILING PROPOSED METHODS, MATERIALS, AND PLAN FOR TRENCHLESS INSTALLATION PRIOR TO THE PRE-CONSTRUCTION MEETING.
6. SEE PROJECT SPECIFICATIONS MANUAL SECTION 02661 FOR ADDITIONAL TRENCHLESS INSTALLATION REQUIREMENTS .

NOTE: ACTUAL EXTENT OF IMPROVEMENTS MAY VARY BASED ON CONDITION OF THE EXISTING WATER MAIN. COORDINATE WITH AESI & MSU DURING EXCAVATION FOR EXTENT OF IMPROVEMENTS.

NOTES:

1. SAW-CUT EXISTING SIDEWALKS AT EXISTING JOINTS. THIS MAY REQUIRE A LARGER SAW-CUT THAN WHAT IS SHOWN.
2. COORDINATE WITH MSU FOR REMOVAL AND REPLACEMENT OF LANDSCAPE BEDS AND IRRIGATION IMPROVEMENTS.

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GAINES HALL WATER MAIN REPLACEMENT PHASE 2

ALLIED ENGINEERING SERVICES, INC.

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REV.	DESCRIPTION	DATE

MONTANA RORY SCOTT ROMEY No. 40776 PE LICENSED PROFESSIONAL ENGINEER

PPA#23-0730

A/E#00-00-00

AESI # 23-022

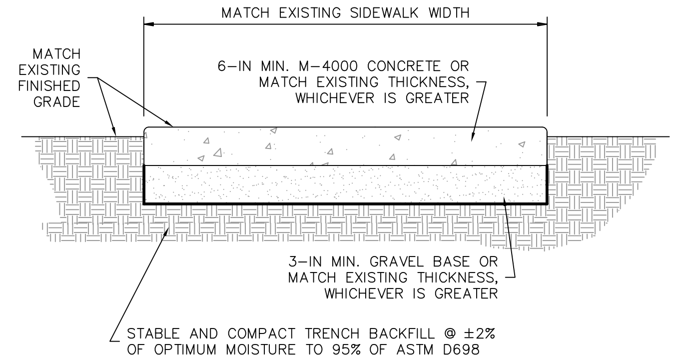
SHEET TITLE

C2.1

SHEET

WATER MAIN PLAN & PROFILE

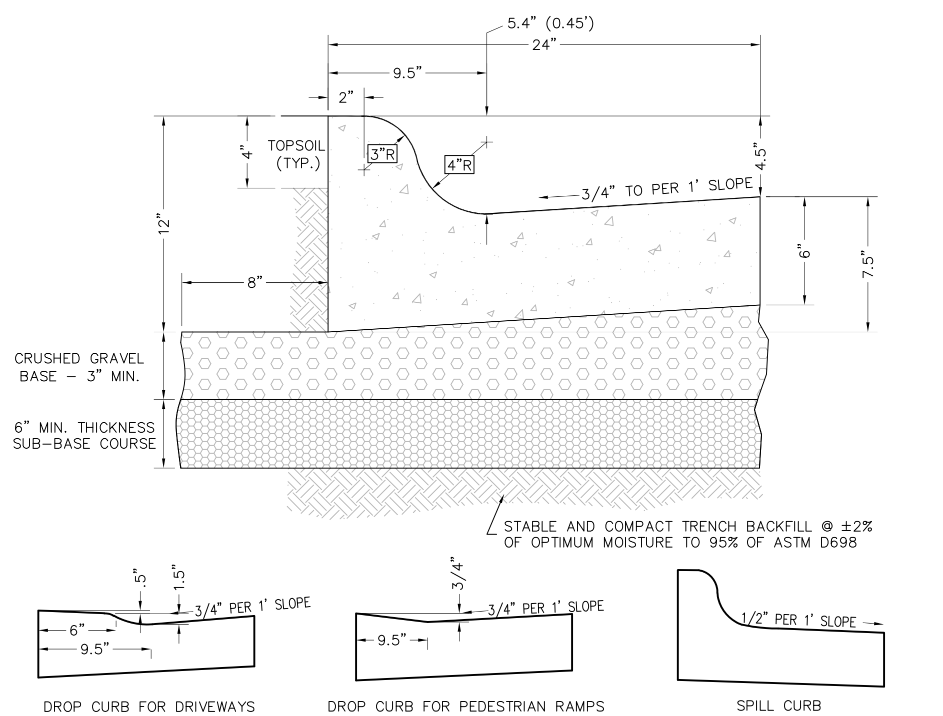
DATE 10/02/2024



NOTE:

1. SAW CUT SIDEWALKS ALONG EXISTING JOINTS.

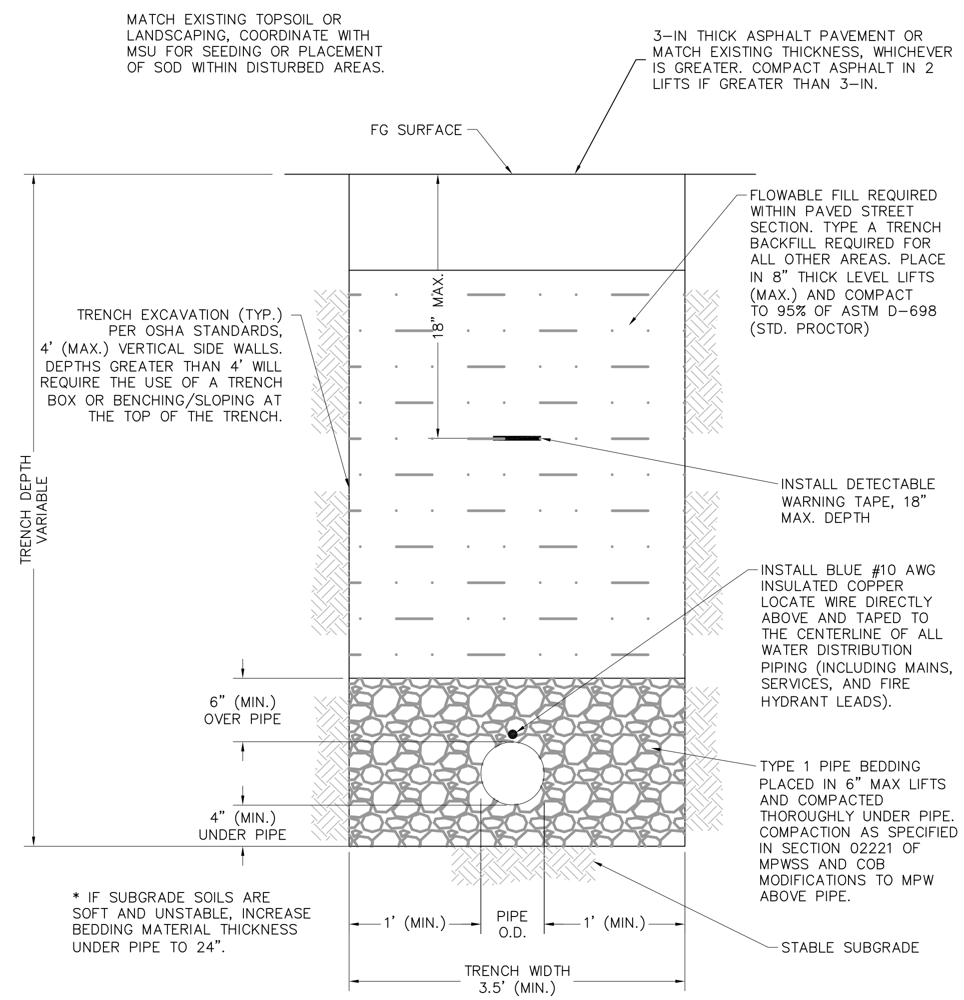
1 C3.1 DETAIL
TYPICAL SIDEWALK REPLACEMENT
NTS



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.

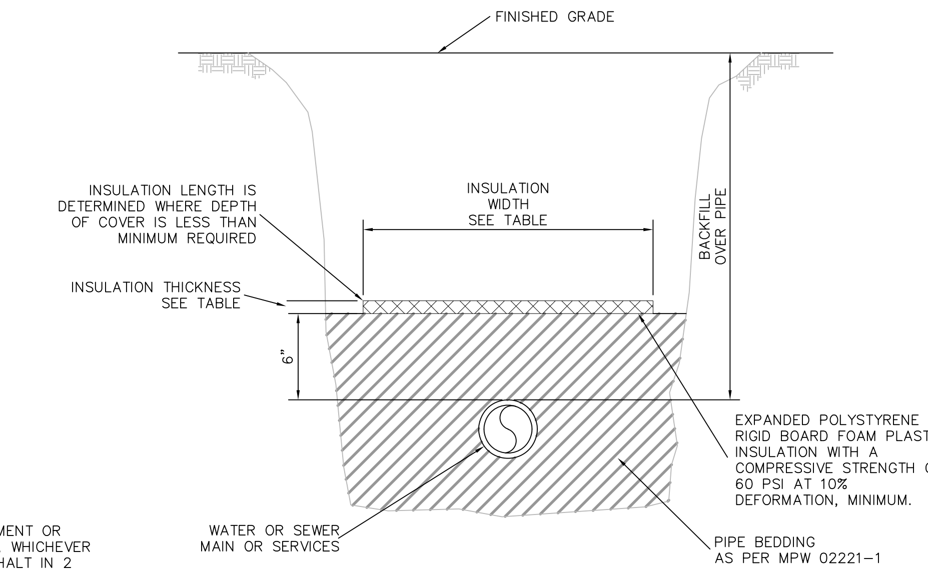
2 C3.1 DETAIL
TYPICAL CURB & GUTTER REPLACEMENT
NTS



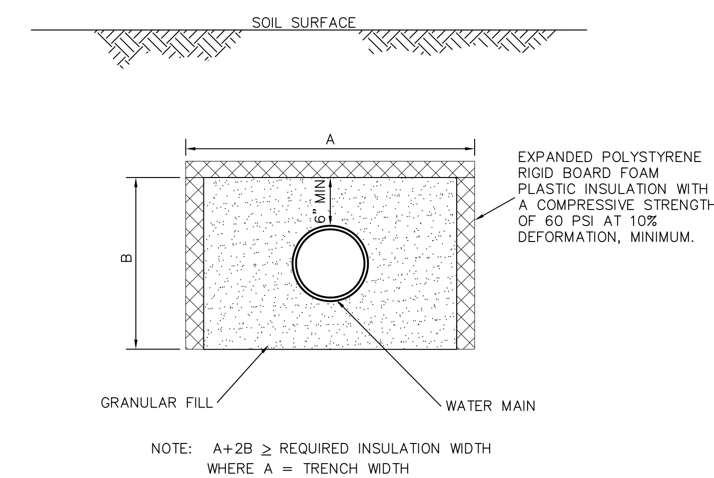
NOTES:

1. THIS DETAIL APPLIES TO ALL UNDERGROUND WATER LINES.
2. 4" THICK, RIGID POLYSTYRENE 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 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.

3 C3.1 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.

4 C3.1 DETAIL
WATER LINE INSULATION
NTS

CONSTRUCTION PLANS

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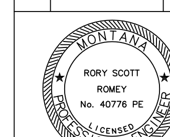
GAINES HALL WATER MAIN REPLACEMENT PHASE 2

ALLIED ENGINEERING SERVICES, INC.

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



PPA#23-0730
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SHEET TITLE
C3.1

SHEET
DETAILS

DATE
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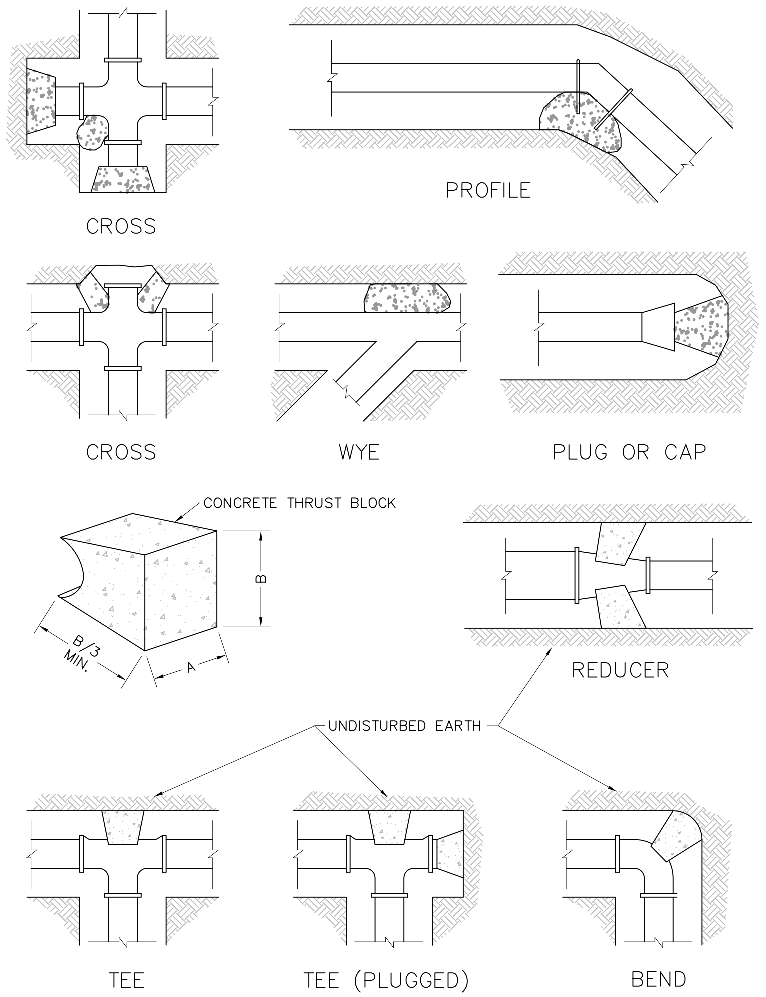
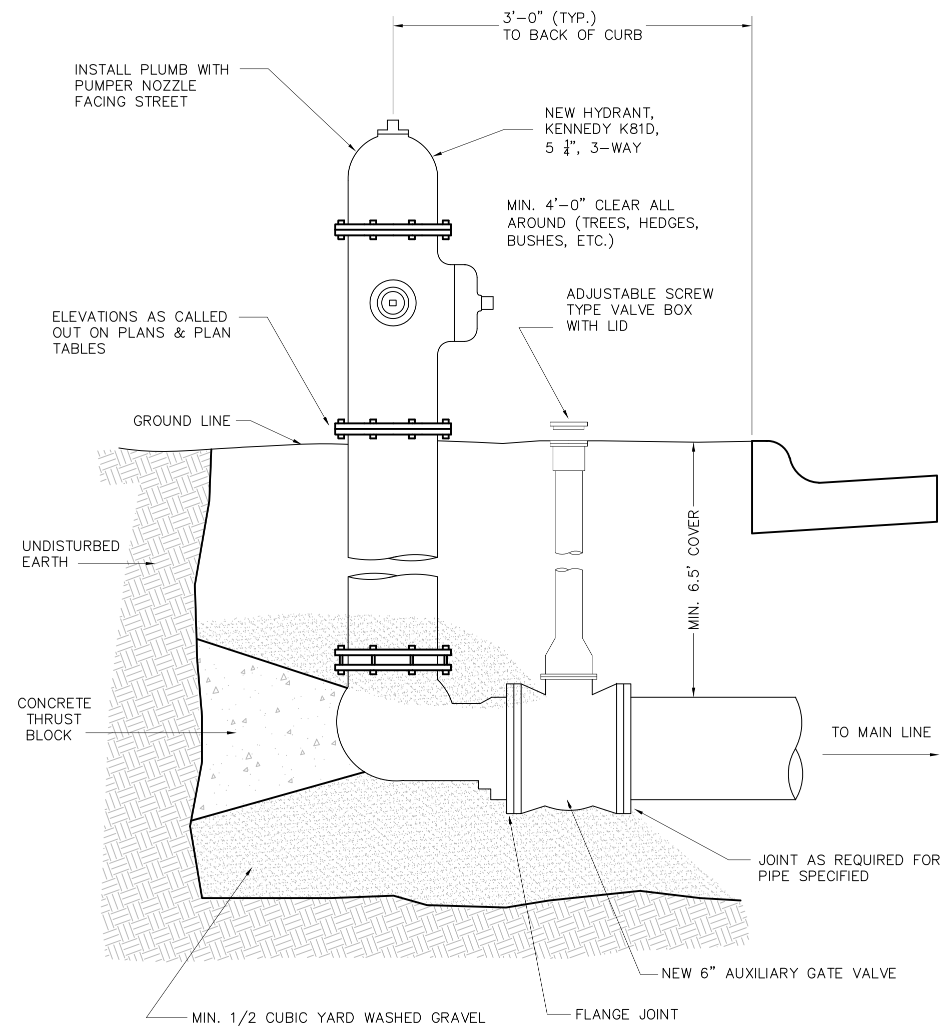


STANDARD DIMENSIONS FOR THRUST BLOCKING								
FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		RED. & 22.5° BEND	
	A	B	A	B	A	B	A	B
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"
10"	3'-4"	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.
5. CONCRETE SHALL BE CLASS M-4000, WHICH HAS A 3/4" MAXIMUM AGGREGATE SIZE AND A 28 DAY COMPRESSIVE STRENGTH OF 4,000 POUNDS PER SQUARE INCH (PSI).

1 DETAIL
C3.2
THRUST BLOCKING FOR PIPE FITTINGS
NTS



NOTES:

1. MEGA-LUG OR APPROVED EQUAL JOINT RESTRAINTS MAY BE USED IN LIEU OF CONCRETE THRUST BLOCK.
2. WRAP VALVE BOX AND FIRE HYDRANT ASSEMBLY WITH POLYETHYLENE ENCASEMENT.

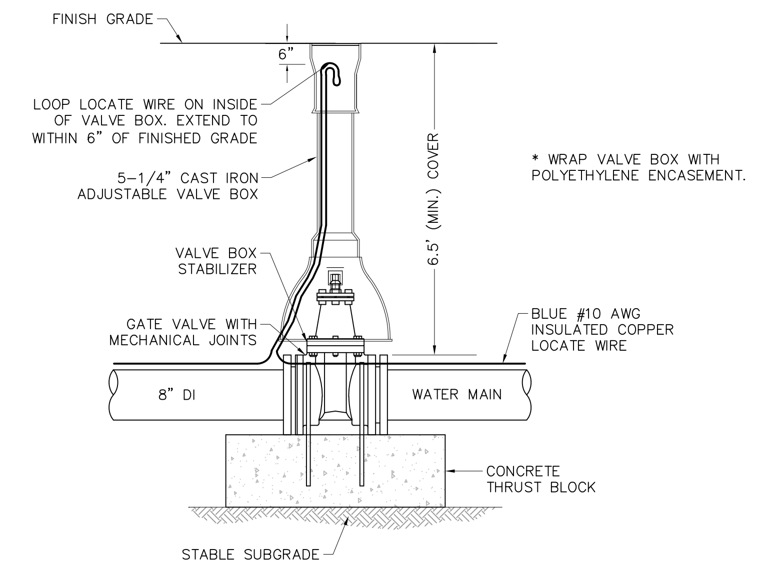
2 DETAIL
C3.2
FIRE HYDRANT
NTS

FITTING SIZE (IN)	FITTING	REQUIRED RESTRAINED LENGTH (FT)	COMMENTS *FOR TEE FITTINGS, THE FIRST DIMENSION LISTED IS THE NOMINAL PIPE SIZE, THE SECOND DIMENSION LISTED IS THE BRANCH PIPE SIZE
8"x6"	REDUCER	13'	APPLY TO LARGER SIDE OF REDUCER
8"	90° HORIZONTAL BEND	15'	EACH SIDE OF BEND
4"	90° HORIZONTAL BEND	8'	EACH SIDE OF BEND
8"	GATE VALVE	29'	APPLY TO EITHER SIDE OF IN-LINE VALVES
8"x6"	TEE	1'	5-FT MIN. SOLID PIPE ON EACH RUN
8"x8"	TEE	12'	5-FT MIN. SOLID PIPE ON EACH RUN

NOTES:

1. REQUIRED RESTRAINED LENGTHS APPLY TO EACH SIDE OF THE FITTING.
2. NO BELL AND SPIGOT JOINTS SHALL BE LOCATED WITHIN THE REQUIRED RESTRAINED LENGTH. INSTALL SOLID PIPE IN THESE AREAS ONLY.
3. WHEREVER THE REQUIRED RESTRAINED LENGTH EXCEEDS THE LENGTH OF A FULL STICK OF PIPE, THE BELL AND SPIGOT JOINTS SHALL BE MECHANICALLY RESTRAINED WITH A LOCKING GASKET OR PIPE HARNESS.
4. IF DISTANCE BETWEEN FITTINGS IS LESS THAN OR EQUAL TO THE CALCULATED RESTRAINT LENGTH, RESTRAIN ALL JOINTS BETWEEN THOSE FITTINGS.
5. SEE DETAIL 1/C3.3 FOR JOINT RESTRAINT REQUIREMENTS WITHIN TUNNEL.

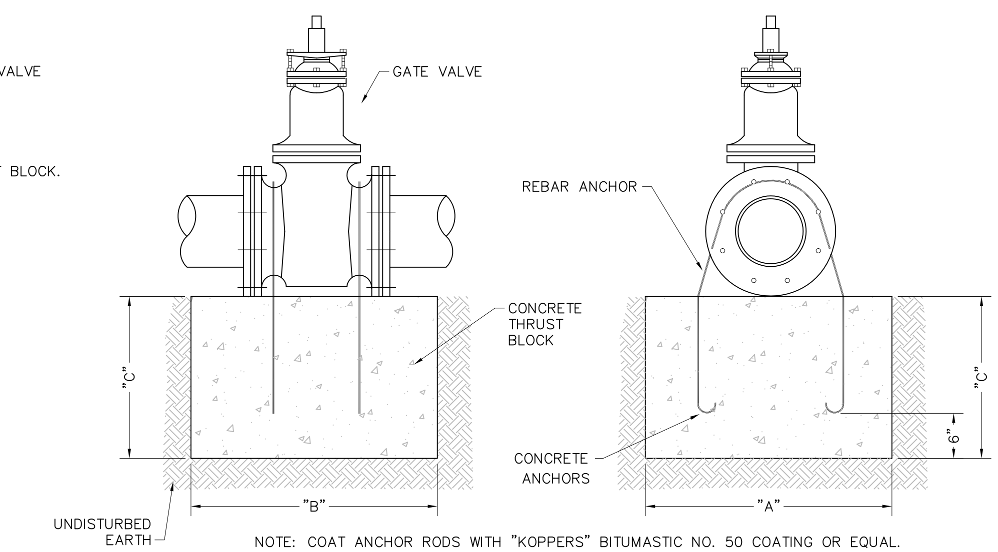
3 DETAIL
C3.2
PIPE JOINT RESTRAINT TABLE
NTS



NOTES

1. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT – NO EXCEPTIONS.
2. VALVE BOX TOP SHALL BE ADJUSTED TO MEET FINISHED GRADE.
3. SEE THE TRENCH EXCAVATION, BEDDING, AND BACKFILL DETAIL FOR SPECIFICATIONS ON PIPE BEDDING AND BACKFILL MATERIALS, ALONG WITH LOCATION REQUIREMENTS FOR DETECTABLE WARNING TAPE, INSULATED COPPER LOCATE WIRE, AND PIPE INSULATION.
4. ALL GATE VALVES SHALL BE AFFIXED WITH VALVE BOX STABILIZERS.
5. VALVE STEM EXTENSIONS SHALL NOT BE INSTALLED ON ANY GATE VALVES.
6. 4" THICK, RIGID POLYSTYRENE INSULATION BOARD SHALL BE INSTALLED ABOVE THE PIPE IN AREAS WITH COVER DEPTHS LESS THAN 6.5'.

4 DETAIL
C3.2
GATE VALVE AND VALVE BOX WITH THRUST BLOCK
NTS



NOTE: COAT ANCHOR RODS WITH "KOPPERS" BITUMASTIC NO. 50 COATING OR EQUAL.

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

NOTES:

1. THE PRESSURES SHOWN IN THIS TABLE ARE MAXIMUM WORKING PRESSURES IN THE SYSTEM.
2. THRUST BLOCKING AND ANCHORS ARE REQUIRED ON ALL 6" VALVES AND LARGER UNLESS SPECIFIED BY THE ENGINEER.
3. THRUST BLOCKS ARE NOT REQUIRED ON TAPPING VALVES.
4. CONCRETE SHALL BE CLASS M-4000, WHICH HAS A 3/4" MAXIMUM AGGREGATE SIZE AND A 28 DAY COMPRESSIVE STRENGTH OF 4,000 POUNDS PER SQUARE INCH (PSI).
5. MEGA-LUG OR APPROVED EQUAL JOINT RESTRAINTS MAY BE USED IN LIEU OF CONCRETE THRUST BLOCKS.

5 DETAIL
C3.2
THRUST BLOCKING FOR WATER MAIN VALVES
NTS

CONSTRUCTION PLANS

GAINES HALL WATER MAIN REPLACEMENT PHASE 2

MONTANA STATE UNIVERSITY

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