



Computer Aided Drawing (CAD) Standard

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Montana State University Computer Aided Drawing (CAD) Standard

Ownership

Montana State University (MSU) shall at all times have sole ownership of all drawings, documents and specifications, electronic or otherwise, produced by any Consultant or Contractor, intended for use in connection with a project (reference the current *Standard Form of Agreement Between Owner and Architect / Engineer*, paragraph 1.10, Ownership of Documents).

Use of MSU CAD Plans

Upon request, MSU may provide the Consultant with the most currently available drawings deemed to be of use for a project. Drawings will be provided in either the most current version of AutoCAD or the version currently being used by MSU.

The Consultant is solely responsible for verifying that drawings provided do not contain errors that might compromise a project. Field verification of existing conditions is always recommended.

Model Space

All building information is to be drawn in model space at 1:1 scale (actual size). Plan views of buildings will be made with north up.

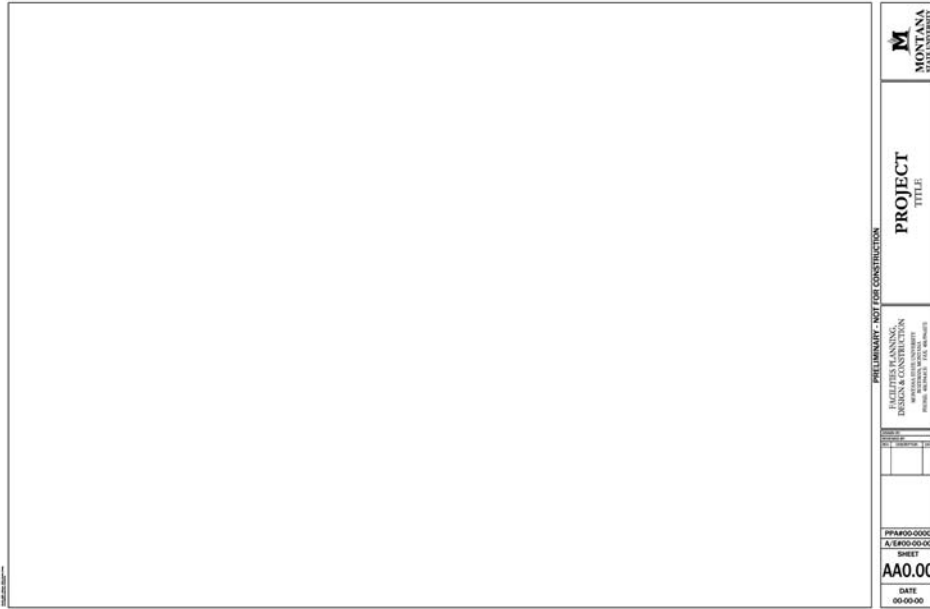
Paper Space

All drawing borders / title blocks are to be in paper space (Layout View). Drawings in paper space will be oriented for the most effective use of media space. It is recommended that the long axis of the drawing be aligned with the long axis of the plotting media. Assure that the north arrow is present and that it is oriented to true north.

In the absence of a long axis that would dictate orientation on the media, orient the drawing with north at the top of the page.

Drawing Border

Montana State University Facilities provides a standard border / title block that will be used on all Montana State University drawings. The border and associated text will not be altered, except that the Architect / Engineer may add their logo and stamp to the border as required.



An Architectural “D” (MSU_Border_D) or “E” (MSU_Border_E) size standard border / title block will be used for most drawing projects (“D” size recommended for most projects).

An 8-1/2” x 11” (MSU_Border_A) and 11” x 17” (MSU_Border_B) size standard border / title block are provided for special projects only.

The following Table 1 shows the font types and sizes of text for the Architectural “D” standard border / title block.

Table 1 – Architectural D Standard Border / Title Block			
Border / Title Block Area	Font	Height	Rotation
PROJECT	Garamond Bold	7/16”	90°
TITLE	Garamond	1/4”	90°
SHEET	Franklin Gothic Medium w/.8 width factor	1/2”	0°
PRLIMINARY - NOT FOR CONSTRUCTION	Franklin Gothic Medium	7/32”	90°
FACILITIES PLANNING, DESIGN & CONSTRUCTION	Garamond	7/32”	90°
MONTANA STATE UNIVERSITY, BOZEMAN, MT	Garamond	1/8”	90°
DRAWN BY, REVIEWED BY, REV., DESCRIPTION, DATE	Franklin Gothic Book	3/32”	0°
PPA NUMBER	Franklin Gothic Medium	3/16”	0°
A/E NUMBER	Franklin Gothic Medium	3/16”	0°
DATE	Franklin Gothic Medium	3/16”	0°

Drawing Title

The drawing title will reflect the project name used in the log, PPA or State A / E project file.

Electronic Drawing Name

The electronic name of the drawing file will consist of the following:

XXXXXXXXXX_AAN_NN

The project code. For example the log number, PPA number or State A&E number of the project

XXXXXXXXXX_AAN_NN

The sheet number as defined in this document. As an example, sheet A1.01 in PPA project 08-0018, would have the electronic drawing name 08-0018_A1_01.dwg.

Sheet Number

The drawing will use a six character alpha-numeric sheet number as defined in the following sections.

Discipline Designator

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The discipline designator, which consists of one alphabetical character and a hyphen (Level 1 Designator) or two alphabetical characters (Level 2 Designator). The discipline designator will be chosen from the following table:

Level 1 Designator	Level 2 Designator	Description	Content
G-		All General	All or any portion of subjects in the following Level 2 Designators
	GI	General Information	Drawing index, code summary, symbol legend, orientation maps
	GC	General Contractual	Phasing, schedules, contractor staging areas, fencing, haul routes, erosion control, temporary and special requirements
	GR	General Resource	Photographs, soil borings
H-		All Hazardous Materials	All or any portion of subjects in the following Level 2 Designators

Table 2 – Discipline Designator

Level 1 Designator	Level 2 Designator	Description	Content
	HA	Asbestos	Asbestos abatement, identification, or containment
	HC	Chemicals	Toxic chemicals handling, removal or storage
	HL	Lead	Lead piping or paint removal
	HP	PCB	PCB containment and removal
	HR	Refrigerants	Ozone depleting refrigerants
V-		All Survey / Mapping	All or any portion of subjects in the following Level 2 Designators
	VA	Aerial Survey	
	VF	Field Survey	
	VH	Hydrographic Survey	
	VI	Digital Survey	
	VU	Combined Utilities	
B-		All Geotechnical	
C-		All Civil	All or any portion of subjects in the following Level 2 Designators
	CB	Civil Beach Renourishment	Beach disposal and renourishment
	CD	Civil Demolition	Structural removal and site clearing
	CE	Civil Ecosystem Restoration	Environmental restoration
	CF	Civil Flood Control	Levees, spillways, pump stations
	CG	Civil Grading	Excavation, grading, drainage, erosion control, retention ponds
	CI	Civil Improvements	Pavers, flagstone, exterior tile, furnishings, retaining walls, and water features
	CN	Civil Navigation	Navigation, harbors, dredging
	CO	Civil Operation and Maintenance	Repair and upgrade to O&M structures
	CP	Civil Paving	Roads, driveways, parking lots
	CH	Civil Shore Protection	Erosion protection structures on shoreline
	CR	Civil Recreation	Recreation facilities
	CS	Civil Site	Plats, topographic, dimension control
	CX	Civil Security	Security related work
	CT	Civil Transportation	Waterways, wharves, docks, trams, railways, airfields and people movers
	CU	Civil Utilities	Water, sanitary sewer, storm sewer, power, communications, natural gas and steam systems
L-		All Landscape	All or any portion of subjects in the following Level 2 Designators
	LD	Landscape Demolition	Protection and removal of existing landscape
	LI	Landscape Irrigation	
	LP	Landscape Planting	
A-		All Architectural	All or any portion of subjects in the following Level 2 Designators
	AS	Architectural Site	
	AD	Architectural Demolition	Protection and removal
	AE	Architectural Elements	General architectural
	AI	Architectural Interiors	

Table 2 – Discipline Designator

Level 1 Designator	Level 2 Designator	Description	Content
	AF	Architectural Finishes	
	AG	Architectural Graphics	
S-		All Structural	All or any portion of subjects in the following Level 2 Designators
	SD	Structural Demolition	Protection and removal
	SS	Structural Site	
	SB	Structural Substructure	Foundations, piers, slabs and retaining walls
	SF	Structural Framing	Floors and roofs
I-		All Interiors	All or any portion of subjects in the following Level 2 Designators
	ID	Interior Demolition	
	IN	Interior Design	
	IF	Interior Furnishings	
	IG	Interior Graphics	Murals and visuals
Q-		All Equipment	All or any portion of subjects in the following Level 2 Designators
	QA	Athletic Equipment	Gymnasium, exercise, aquatic and recreational
	QB	Bank Equipment	Vaults, letter units, ATMs, drive-through
	QC	Dry Cleaning Equipment	Washers, dryers, ironing and dry cleaning
	QD	Detention Equipment	Prisons and jails
	QE	Educational Equipment	Chalkboards, library
	QF	Food Service Equipment	Kitchen, bar, service, storage and processing
	QH	Hospital Equipment	Medical, exam and treatment
	QL	Laboratory Equipment	Science labs, planetariums, observatories
	QM	Maintenance Equipment	Housekeeping, window washing and vehicle servicing
	QP	Parking Lot Equipment	Gates, ticket and card access
	QR	Retail Equipment	Display, vending and cash register
	QS	Site Equipment	Bicycle racks, benches, playgrounds
	QT	Theatrical Equipment	Stage, movie, rigging systems
	QV	Video / Photographic Equipment	Television, darkroom and studio
	QY	Security Equipment	Access control and monitoring, surveillance
F-		All Fire Protection	All or any portion of subjects in the following Level 2 Designators
	FA	Fire Detection and Alarm	
	FX	Fire Suppression	Fire extinguishing systems and equipment
P-		All Plumbing	All or any portion of subjects in the following Level 2 Designators
	PS	Plumbing Site	Extensions and connections to civil utilities
	PD	Plumbing Demolition	Protection, termination and removal
	PP	Plumbing Piping	Piping, valves and insulation
	PQ	Plumbing Equipment	Pumps and tanks

Table 2 – Discipline Designator

Level 1 Designator	Level 2 Designator	Description	Content
	PL	Plumbing	Domestic water, sanitary and storm drainage, fixtures
D-		All Process	All or any portion of subjects in the following Level 2 Designators
	DS	Process Site	Extension and connection to civil utilities
	DD	Process Demolition	Protection, termination and removal
	DL	Process Liquids	Liquid process systems
	DG	Process Gases	Gaseous process systems
	DP	Process Piping	Piping, valves, insulation, tanks, pumps, etc.
	DQ	Process Equipment	Systems and equipment for thermal, electrical, materials handling, assembly and manufacturing, nuclear, power generation, chemical, refrigeration and industrial processes
	DE	Process Electrical	Electrical exclusively associated with a process and not the facility
	DI	Process Instrumentation	Instrumentation, measurement, recorders, devices and controllers (electrical and mechanical)
M-		All Mechanical	All or any portion of subjects in the following Level 2 Designators
	MS	Mechanical Site	Utility tunnels and piping between facilities
	MD	Mechanical Demolition	Protection, termination and removal
	MH	Mechanical HVAC	Ductwork, air devices and equipment
	MP	Mechanical Piping	Chilled and heating water, steam
	MI	Mechanical Instrumentation	Instrumentation and controls
	MY	Mechanical Hydraulic Systems	Pump stations, spillways, slide gates
E-		All Electrical	All or any portion of subjects in the following Level 2 Designators
	EA	Electrical Airfield Lighting and Nav aids	Visual air navigation systems
	ES	Electrical Site	Exterior electrical systems (power, lighting, auxiliary)
	EC	Electrical Cathodic Protection	Cathodic protection systems
	EG	Electrical Grounding	Grounding, lightning protection devices
	ED	Electrical Demolition	Protection, termination and removal
	EP	Electrical Interior Power	Interior power
	EL	Electrical Interior Lighting	Interior lighting
	EI	Electrical Instrumentation	Controls, relays, instrumentation and measurement devices
	EY	Electrical Interior Auxiliary Systems	Alarms, nurse call, security, CCTV, PA, music, clock and program
T-		All Telecommunications	All or any portion of subjects in the following Level 2 Designators
	TD	Telecommunications Demolition	Protection, termination and removal
	TA	Audio Visual	Cable, music and CCTV systems
	TC	Clock and Program	Time generators and bell program systems
	TI	Intercom	Intercom and public address systems

Level 1 Designator	Level 2 Designator	Description	Content
	TM	Monitoring	Monitoring and alarm systems
	TN	Data Networks	Network cabling and equipment
	TS	SCADA	Supervisory Control and Data Acquisition (SCADA) systems and equipment
	TT	Telephone	Telephone systems, wiring and equipment
	TY	Security	Access control and alarm systems
R-		All Resource	All or any portion of subjects in the following Level 2 Designators
	RC	Resource Civil	Surveyor's information and existing civil drawings
	RS	Resource Structural	Existing facility structural drawings
	RA	Resource Architectural	Existing facility architectural drawings
	RM	Resource Mechanical	Existing facility mechanical drawings
	RE	Resource Electrical	Existing facility electrical drawings
X-		Other Disciplines	
Z-		Contractor / Shop Drawings	
O-		Operations	

Sheet Type Designators

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The sheet type designator, which consists of one numerical character. The sheet type designator will be chosen from the following table:

Sheet Type	Designator
General (symbols, legend, notes, etc.)	0
Plans (horizontal views)	1
Elevations (vertical views)	2
Sections (sectional views)	3
Large-Scale Views (plans, elevations, or sections that are not details)	4
Details	5
Schedules and Diagrams	6
User Defined	7
User Defined	8
3D Representations (isometrics, perspectives, photographs)	9

Sheet Sequence Number

AAN_**NN**

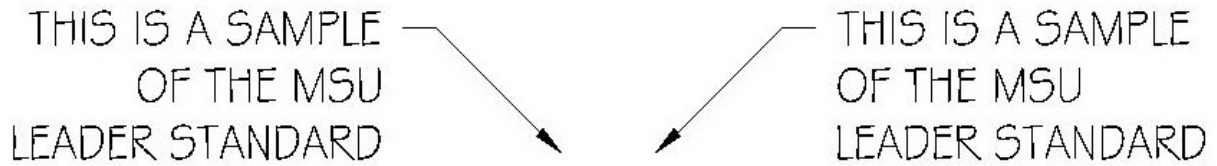
The sheet sequence number, consisting of one to two numerical characters.

Dimensioning

Dimensions will use the standard AutoCAD "Stylus BT" font, and print with 3/32" text size in paper space. The following are standards for MSU dimensioning:

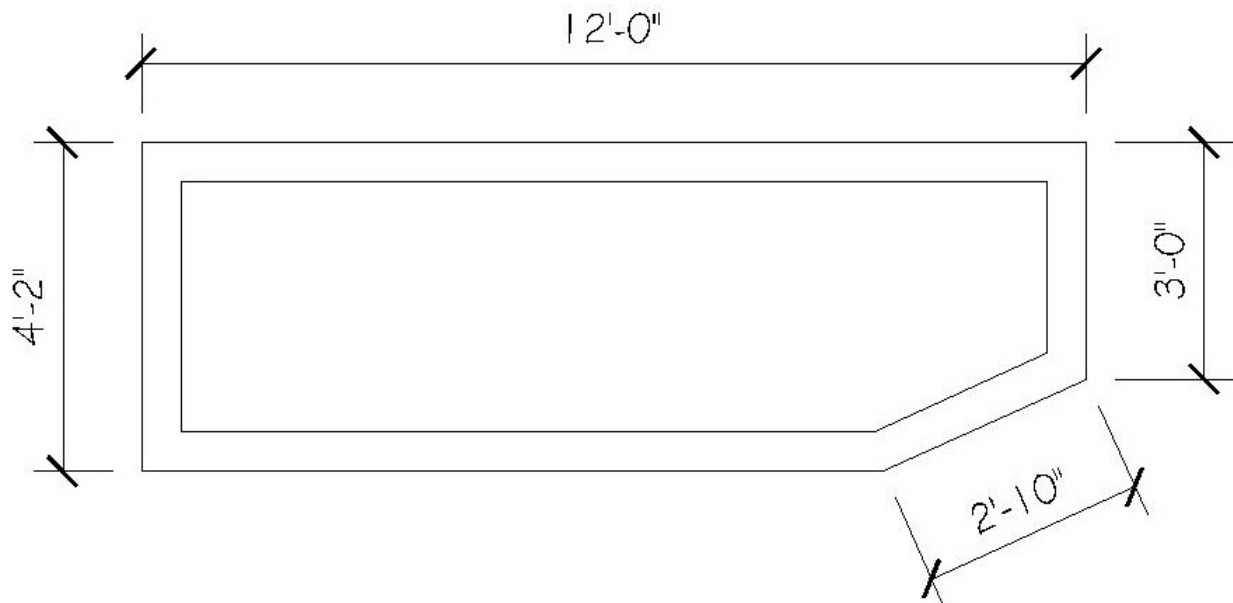
Leaders

Leaders will use the arrow style "closed filled arrow" aligned with the middle of the top line of text. Use the quick leader (qlleader) command to insert leaders.



Dimensions

Dimensions will use the arrow style "architectural tick". Text will be printed above the dimension line.

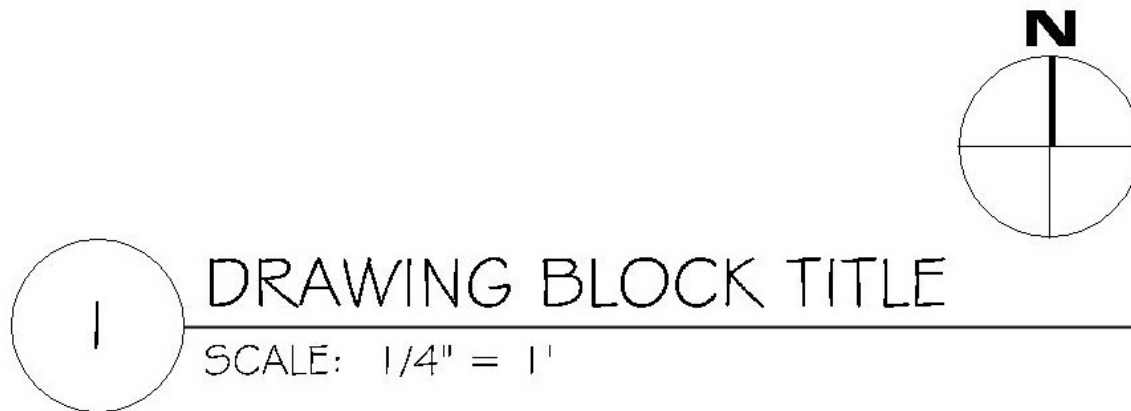


North Arrow

Drawings will use the standard AutoCAD “North Arrow M” to indicate true north.

Drawing Title Block

Drawings will use the standard AutoCAD “Title Mark”.



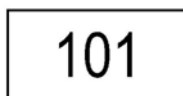
Room Numbers

Room numbers for current buildings shall be provided by the MSU CADD technician.

Room numbers for new buildings shall be based on the MSU Room Numbering Standard. This document can be found on the MSU Facilities Planning web site at:

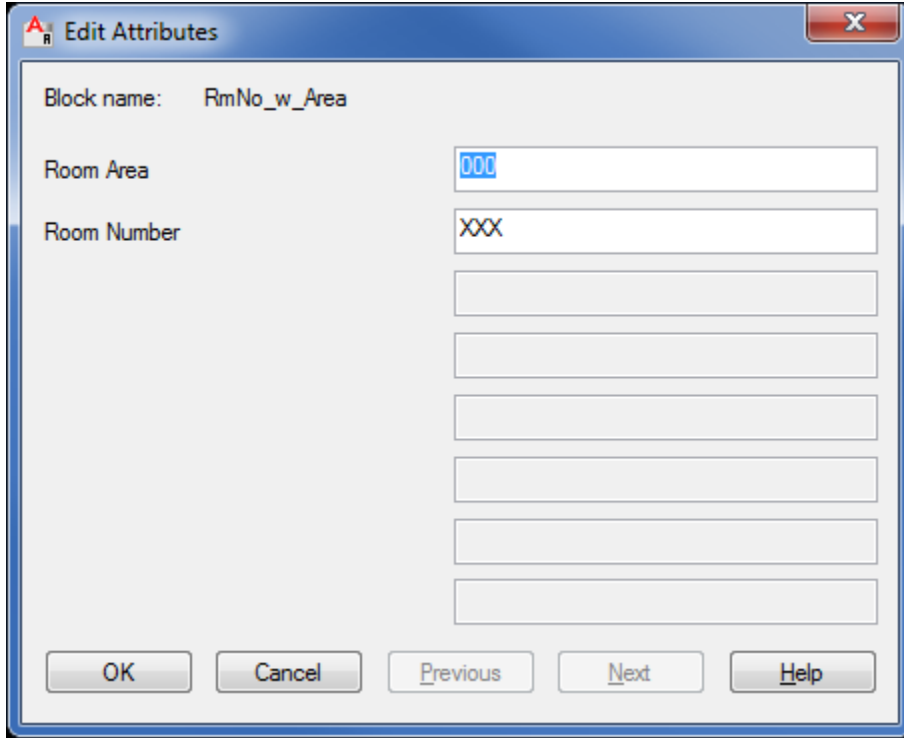
<http://www.facilities.montana.edu/pdc/planning/files/MSURoomNumberingStandard.pdf>

Building room numbers will be added using a standard block like the MSU block RmNo_w_Area. The room number block will be drawn in the A-Area-Iden drawing layer.



The room number block will have extractable attributes that include the room area and room number.

Room area will be calculated using a polyline drawn in the A-Area-Line drawing layer. The polyline will reflect the floor area of the room and extend half way through door openings.



Layers

The following table (Table 4) shows the recommended layers to be used for MSU drawings:

Table 4 – MSU Drawing Layers

Name	On	Freeze	Lock	Color	Linetype	Width (mm)	Plot Style	Plot	New VP Freeze	Description
0	ON	THAW	OFF	white	Continuous	Default	7	ON	THAW	0
A-ANNO-DIMS	ON	THAW	OFF	213	Continuous	.25	213	ON	THAW	Dimensions
A-ANNO-LEGN	ON	THAW	OFF	231	Continuous	.25	231	ON	THAW	Display theme legends
A-ANNO-NOTE	ON	THAW	OFF	231	Continuous	.25	231	ON	THAW	Notes, leaders, etc.
A-ANNO-REVS	ON	THAW	OFF	71	Continuous	.25	71	ON	THAW	Revisions
A-ANNO-SCHD	ON	THAW	OFF	231	Continuous	.25	231	ON	THAW	Schedule tables
A-ANNO-SCRN	ON	THAW	OFF	250	Continuous	.25	250	ON	THAW	A-Anno-Scrn
A-ANNO-SYMB	ON	THAW	OFF	131	Continuous	.25	131	ON	THAW	Annotation marks
A-ANNO-TEXT	ON	THAW	OFF	50	Continuous	.30	50	ON	THAW	A-Anno-Text
A-AREA-IDEN	ON	THAW	OFF	171	Continuous	.30	171	ON	THAW	Room numbers, tenant identifications, area calculations
A-AREA-LINE	ON	THAW	OFF	70	Continuous	.18	70	ON	THAW	Room area polyline
A-AREA-MASS	ON	THAW	OFF	70	Continuous	.18	70	ON	THAW	Massing elements
A-AREA-MASS-GRPS	ON	THAW	OFF	213	Continuous	.50	213	ON	THAW	Massing groups
A-AREA-MASS-SLCE	ON	THAW	OFF	51	DASHED2	.25	51	ON	THAW	Massing slices
A-AREA-SPACE	ON	THAW	OFF	32	Continuous	.35	32	ON	THAW	Spaces
A-AREA-SPCE-IDEN	ON	THAW	OFF	171	Continuous	.25	171	ON	THAW	Space numbers
A-AREA-ZONE	ON	THAW	OFF	34	Continuous	.70	34	ON	THAW	Zones
A-AREA-ZONE-IDEN	ON	THAW	OFF	151	Continuous	.25	151	ON	THAW	Zone tags
A-BLDG-OTLN	ON	THAW	OFF	118	Continuous	.20	118	ON	THAW	Building outline
A-CLNG	ON	THAW	OFF	213	Continuous	.50	213	ON	THAW	Ceiling Objects
A-CLNG-GRID	ON	THAW	OFF	72	Continuous	.35	72	ON	THAW	Ceiling grids
A-CLNG-IDEN	ON	THAW	OFF	151	Continuous	.25	151	ON	THAW	Ceiling tags
A-DELT-IDEN	ON	THAW	OFF	150	Continuous	.18	150	ON	THAW	Detail marks
A-DETL-FINE	ON	THAW	OFF	90	Continuous	.18	90	ON	THAW	Detail - fine lines
A-DETL-HIDE	ON	THAW	OFF	242	HIDDEN2	.18	242	ON	THAW	Hidden lines
A-DETL-MEDM	ON	THAW	OFF	31	Continuous	.25	31	ON	THAW	Detail - medium lines
A-DETL-PATT	ON	THAW	OFF	190	Continuous	.18	190	ON	THAW	Detail - hatching
A-DETL-THIN	ON	THAW	OFF	150	Continuous	.18	150	ON	THAW	Detail - thin lines
A-DETL-WIDE	ON	THAW	OFF	212	Continuous	.35	212	ON	THAW	Detail - wide lines
A-DIMENSION	ON	THAW	OFF	211	Continuous	.25	211	ON	THAW	Dimensions
A-DOOR	ON	THAW	OFF	31	Continuous	.20	31	ON	THAW	Doors
A-DOOR-IDEN	ON	THAW	OFF	132	Continuous	.35	132	ON	THAW	Door tags
A-ELEV	ON	THAW	OFF	111	Continuous	.25	111	ON	THAW	Elevations
A-ELEV-IDEN	ON	THAW	OFF	151	Continuous	.25	151	ON	THAW	Elevations marks

A-ELEV-LINE	ON	THAW	OFF	141	Continuous	.18	141	ON	THAW	Elevation definition lines
A-ELEV-PEPL	ON	THAW	OFF	40	Continuous	.18	40	ON	THAW	People
A-EQPM	ON	THAW	OFF	91	Continuous	.25	91	ON	THAW	Equipment
A-EQPM-IDEN	ON	THAW	OFF	91	Continuous	.25	91	ON	THAW	Equipment tags
A-FLOR-APPL	ON	THAW	OFF	211	Continuous	.25	211	ON	THAW	Appliances
A-FLOR-CASE	ON	THAW	OFF	31	Continuous	.25	31	ON	THAW	Casework
A-FLOR-CASE-IDEN	ON	THAW	OFF	191	Continuous	.25	191	ON	THAW	Casework tags
A-FLOR-EVTR	ON	THAW	OFF	172	Continuous	.35	172	ON	THAW	Elevators
A-FLOR-HRAL	ON	THAW	OFF	211	Continuous	.25	211	ON	THAW	Stair handrails
A-FLOR-IDEN	ON	THAW	OFF	171	Continuous	.25	171	ON	THAW	Finish tags
A-FLOR-STRS	ON	THAW	OFF	31	Continuous	.25	31	ON	THAW	Stairs
A-FLOR-TPTN	ON	THAW	OFF	110	Continuous	.18	110	ON	THAW	Toilet partitions
A-GLAZ	ON	THAW	OFF	151	Continuous	.20	151	ON	THAW	Windows
A-GLAZ-ASSM	ON	THAW	OFF	71	Continuous	.20	71	ON	THAW	Window assemblies
A-GLAZ-CURT	ON	THAW	OFF	52	Continuous	.35	52	ON	THAW	Curtain walls
A-GLAZ-CURT-UNIT	ON	THAW	OFF	51	Continuous	.25	51	ON	THAW	Curtain wall units
A-GLAZ-IDEN	ON	THAW	OFF	151	Continuous	.35	151	ON	THAW	Window tags
A-LEADER	ON	THAW	OFF	211	Continuous	.25	211	ON	THAW	Leader lines
A-POLY	ON	THAW	OFF	110	Continuous	.18	110	ON	THAW	AEC polygons
A-ROOF	ON	THAW	OFF	132	Continuous	.35	132	ON	THAW	Rooflines
A-ROOF-LEVL	ON	TAHW	OFF	150	Continuous	.20	150	ON	THAW	Roof level
A-ROOF-SLAB	ON	THAW	OFF	12	Continuous	.35	12	ON	THAW	Roof slabs
A-ROOF-SPCL	ON	THAW	OFF	96	Continuous	.18	96	ON	THAW	Roof specialties
A-SECT	ON	THAW	OFF	73	Continuous	.50	73	ON	THAW	Miscellaneous sections
A-SECT-IDEN	ON	THAW	OFF	191	Continuous	.25	191	ON	THAW	Section marks
A-SECT-LINE	ON	THAW	OFF	181	Continuous	.18	181	ON	THAW	Section lines
A-SLAB	ON	THAW	OFF	192	Continuous	.35	192	ON	THAW	Slabs
A-WALL	ON	THAW	OFF	113	Continuous	.35	113	ON	THAW	Walls
A-WALL-CHAS	ON	THAW	OFF	91	Continuous	.25	91	ON	THAW	Chases
A-WALL-FULL-EXTR	ON	THAW	OFF	113	Continuous	.35	113	ON	THAW	Walls - exterior
A-WALL-FULL-INTR	ON	THAW	OFF	53	Continuous	.30	53	ON	THAW	Walls - interior
A-WALL-IDEN	ON	THAW	OFF	211	Continuous	.25	211	ON	THAW	Wall tags
A-WALL-OPEN	ON	THAW	OFF	31	Continuous	.25	31	ON	THAW	Wall openings
AS-CTRL	ON	THAW	OFF	white	Continuous	.18	7	ON	THAW	Control points
AS-PROP	ON	THAW	OFF	white	Continuous	.18	7	ON	THAW	Property
AS-TINN	ON	THAW	OFF	white	Continuous	.18	7	ON	THAW	Triangulated irregular network
AS-TOPO	ON	THAW	OFF	white	Continuous	.18	7	ON	THAW	Topography
C-SITE	ON	THAW	OFF	91	Continuous	.25	91	ON	THAW	Site
C-SITE-PKNG	ON	THAW	OFF	70	Continuous	.18	70	ON	THAW	Parking symbols

C-SITE-UTIL	ON	THAW	OFF	91	Continuous	.25	91	ON	THAW	Site utilities
C-SITE-VHCL	ON	THAW	OFF	40	Continuous	.18	40	ON	THAW	Vehicles
C-STRM	ON	THAW	OFF	150	Continuous	.25	150	ON	THAW	Drainage
DEFPOINTS	ON	THAW	OFF	white	Continuous	Default	7	OFF	THAW	Default Non-Plotting Layer
E-ELEC	ON	THAW	OFF	71	Continuous	.25	71	ON	THAW	Electrical
E-ELEC-IDEN	ON	THAW	OFF	91	Continuous	.25	91	ON	THAW	Electrical tags
E-ELEC-SWCH	ON	THAW	OFF	110	Continuous	.18	110	ON	THAW	Electrical switches
E-LITE-CLNG	ON	THAW	OFF	33	Continuous	.50	33	ON	THAW	Ceiling lights
E-LITE-WALL	ON	THAW	OFF	53	Continuous	.50	53	ON	THAW	Wall lights
E-PATT	ON	THAW	OFF	134	Continuous	.18	134	ON	THAW	Electrical hatching
E-POWR-DEMO	ON	THAW	OFF	230	Continuous	.40	134	ON	THAW	Electrical demolition
E-POWR-EXST	ON	THAW	OFF	62	Continuous	.25	134	ON	THAW	Electrical existing
E-POWR-NEW	ON	THAW	OFF	210	Continuous	.60	134	ON	THAW	Electrical new
E-WALL-POWR	ON	THAW	OFF	130	Continuous	.18	130	ON	THAW	Electrical power
G-ANNO-MASK	ON	THAW	OFF	170	Continuous	.18	170	ON	THAW	AEC Masking objects
G-ANNO-MATC	ON	THAW	OFF	214	Continuous	.70	214	ON	THAW	Match lines
G-ANNO-NPLT	ON	THAW	OFF	140	Continuous	.18	140	OFF	THAW	Sheet view viewports
G-ANNO-TITL	ON	THAW	OFF	233	Continuous	.50	233	ON	THAW	Drawing title text
G-ANNO-TITL-SCAL	ON	THAW	OFF	231	Continuous	.25	231	ON	THAW	Graphical scales
G-ANNO-TTLB	ON	THAW	OFF	213	Continuous	.50	213	ON	THAW	Border and title block
G-ANNO-VIEW	ON	THAW	OFF	161	Continuous	.18	161	OFF	THAW	G-Anno-View
G-GRID-NPLT	ON	THAW	OFF	200	DASHED2	.18	200	ON	THAW	Layout grids
I-FURN	ON	THAW	OFF	40	Continuous	.18	40	ON	THAW	Furniture
I-FURN-IDEN	ON	THAW	OFF	211	Continuous	.25	211	ON	THAW	Furniture tags
M-PATT	ON	THAW	OFF	134	Continuous	.18	211	ON	THAW	Mechanical hatching
M-DUCT-DEMO	ON	THAW	OFF	240	Continuous	.40	211	ON	THAW	Mechanical demolition
M-DUCT-EXST	ON	THAW	OFF	51	Continuous	.25	211	ON	THAW	Mechanical existing
M-DUCT-NEW	ON	THAW	OFF	80	Continuous	.60	211	ON	THAW	Mechanical new
P-FLOR-FIXT	ON	THAW	OFF	131	Continuous	.20	131	ON	THAW	Plumbing fixtures
P-FLOR-FIXT-IDEN	ON	THAW	OFF	231	Continuous	.20	231	ON	THAW	Plumbing fixture tags
P-FLOR-SPCL	ON	THAW	OFF	90	Continuous	.18	90	ON	THAW	Plumbing specialties
P-PATT	ON	THAW	OFF	134	Continuous	.18	90	ON	THAW	Plumbing hatching
P-PIPE-DEMO	ON	THAW	OFF	191	Continuous	.40	90	ON	THAW	Plumbing demolition
P-PIPE-EXST	ON	THAW	OFF	32	Continuous	.25	90	ON	THAW	Plumbing existing
P-PIPE-NEW	ON	THAW	OFF	130	Continuous	.60	90	ON	THAW	Plumbing new
S-BEAM	ON	THAW	OFF	240	Continuous	.20	240	ON	THAW	Structural beams
S-BEAM-IDEN	ON	THAW	OFF	131	Continuous	.25	131	ON	THAW	Structural beam tags
S-COLS	ON	THAW	OFF	52	Continuous	.35	52	ON	THAW	Columns
S-COLS-BRCE	ON	THAW	OFF	32	DASHED	.70	32	ON	THAW	Structural braces

S-COLS-IDEN	ON	THAW	OFF	171	Continuous	.25	171	ON	THAW	Structural column tags
S-GRID	ON	THAW	OFF	191	CENTER2	.25	191	ON	THAW	Column grids
S-GRID-IDEN	ON	THAW	OFF	191	CENTER2	.25	191	ON	THAW	Plan grid bubbles
T-COMM	ON	THAW	OFF	130	Continuous	.18	130	ON	THAW	Communications
T-CTRL	ON	THAW	OFF	230	Continuous	.18	230	ON	THAW	Control systems

Note: Other layers may be added as required. Refer to the complete National Cad Standard (NCS) for appropriate layer names. When adding layers, select a color number above 30 and set the appropriate line weight.

Plotting

Starting with AutoCAD Architecture 2010, drawings will be plotted using the Plot Style Table “MSU 1-30 AIA 31-255 LWT by Object”. This plot style uses legacy line weights by color for colors 1 through 30 (see Table 5). Colors 31 through 249 will plot black at the line weight of the object (usually specified in the layer properties). Colors 250 (60%), 251 (50%), 252 (40%), 253 (30%), 254 (20%) will plot black at the screening level indicated.

In order to plot in color, a layer color must be selected from the True Color or Color Books tab in the Layer Properties Manager.

Table 5 – Legacy Line Weights			
Color Number	Color Name	Line Weight (mm)	Screening
1	Red	.45	100%
2	Yellow	.25	100%
3	Green	.60	100%
4	Cyan	.70	100%
5	Blue	.50	100%
6	Magenta	.35	100%
7	Black (White)	.80	100%
8	Gray	.40	100%
9	White (Black)	.15	100%
10	-	.13	100%
11	-	.025	100%
12	-	.09	100%
13	-	.13	10%
14	-	.05	100%
15	-	.025	100%
16	-	.05	100%
17	-	.25	100%
18	-	.25	100%
19	-	.25	100%
20	-	.05	20%
21	-	.25	100%
22	-	.025	100%
23	-	.25	100%
24	-	.25	100%
25	-	.25	100%
26	-	.25	100%
27	-	.25	100%
28	-	.25	100%
29	-	.25	100%
30	-	.25	30%

Plans Providing Survey Information

All surveys drawings will be prepared using the spatial reference, *Montana State Plane, NAD 83, COORS 96, Lambert Conformal Conic*. The National Geodetic Survey publishes NAD 83 coordinates in the metric system (i.e., meters). The conversion factor that should be used to convert between English and metric systems is the international conversion factor of 1 ft. = 0.3048 m.

Raw data collected during surveys will be provided to MSU upon request.

MSU Utility Information

Upon request, MSU may provide the Consultant with the most currently available utility drawings deemed to be of use for a project. Drawings will be provided in either the most current version of AutoCAD or the version currently being used by MSU.

It is the responsibility of the Consultant to confirm all utility information.

Prior to digging on the MSU campus, contact the Utility Protection Coordinator at 406-994-7301.

Locates on the MSU campus are not free. Be able to provide a billing number with the locate request.

Give (3) working days notice.

Provide a map of the area and / or mark the area with white paint or flags (on top of snow, use pink paint or flags).

Consultants will document the location of underground utility features before they are covered up. This information will be provided in the as-built drawing set at project closeout.

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To make additions or corrections:

**CADD Technician
406-994-7089**

Information contained in this manual is based in part from:

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1090 Vermont Avenue, NW, Suite 700
Washington, DC 20005-4905**