Kansas City Water Services Department (KCWSD)
CAD Design Standards and Specifications

JANUARY 2024

Table of Contents

INTRODUCTION

This document provides Kansas City Water Services Department (KCWSD) staff, and design professionals, with the guidelines necessary to prepare construction documents in a manner that is useful to the City's CAD, GIS, and BIM systems. CAD work completed for KCWSD, by staff or design professionals, must adhere to these standards. Drawings and models that do not comply with these standards may not be accepted. This is a dynamic document and will change in response to KCWSD needs, available resources and technological growth. Before starting a project, design professionals are responsible to check with the Project Manager or contact the CAD Manager for the latest revisions of these CAD Standards. It is recommended that there is a kickoff meeting that involves representation from the CAD staff responsible for production. Suggestions are welcome and are an important part of making these standards better.

Contacts:

Brian Kipper
CAD Manager, KCWSD
Brian.kipper@kcmo.org

1. General Standards

These general standards are intended to include the fundamental requirements for the efficient use of the AutoCAD system. Some of these standards will be repeated and further explained in other more specific chapters.

- All CAD drawings will be done in Autodesk based platforms: AutoCAD®, Civil 3D®, Map 3D®(.dwg) release 2019 or newer.
- All drawings will be drawn at true scale and true coordinates in model space.
- All plots will be made from paper space at 1:1.
- All externally referenced (XREF) drawings will be attached as "OVERLAY" into the appropriate layout tabs at 0,0,0.
- All line work and text lettering to be "color by layer"
- All blocks shall be created on layer 0 in order to inherit the properties of the layer for which they are placed.
- All drawings will contain a date stamp that includes the latest date modified, name of the last person to save the drawing, name of the pen table, the drawing path name, and the drawing file name.
- Layer names will conform to layering guidelines as described in this document and all drawing elements will be drawn on the appropriate layer.
- One single drawing file may contain multiple sheets (layout tabs), although it is recommended that the number of layout tabs be kept to a minimum in order to make working on drawings more efficient.
- All text shall be in CAPITAL letters. Standard text height will be 0.12". Minimum text size is 0.10" for full size drawings. Some exceptions apply to survey text which can be 0.08". (See Section 3.7)
- The paper size used for plotting shall be 24"x 36" (full size). 22"x 34" sheets can be accepted with prior approval by KCWSD.
- PDF's that are submitted to KCWSD shall be created at full size. Half size prints will be made from the full size PDF's.

2. FILE NAMING CONVENTION

2.1 General

KCWSD uses a Drawing Number to record As-Built drawings. During the design process, Drawing Numbers will be used to file and name CAD files. Drawing numbers are assigned by the City and can be obtained from the project manager. See below for the file naming methods for KCWSD projects.

2.2 Drawing Numbers

- Drawing Number: This number is assigned by the City. The format will vary based on the type of project.
- The name of the project folder shall be the Drawing Number.
    - **Water Project Format:** D12345
    - **Wastewater Project Format:** 1234.123 (use 1234-123 for electronic files)
    - **Facility Project Format:** 702-123
- Note: If the Drawing number contains a decimal point, a Hyphen shall be used to represent the decimal point for electronic files since dots and other symbols can be problematic for file names.
- Facility Drawing Numbers shall consist of a Facility Code and Project Index.
- Water and Wastewater Drawing Numbers will continue to use legacy format.

2.3 Survey Files

Survey filename:

- The unaltered original survey is archived in the project's **SURVEY** folder. Survey updates are organized in subfolders having the date reference as part of the name.
- The current working survey base file (copied from the original) is kept in the project's **BASE** or **XREF** folder and shall have a filename prefix of "V-" followed by the original filename given by Survey.
- (DisciplineDesignator)-(original survey filename).dwg
- **EXAMPLE:** V-8000123 NE 43rd Street.dwg
- Additional XREF files can be added by putting an "X-" before the description.

2.4 Project Files

Basemap:

- (DrawingNumber)-BASEMAP.dwg
- **EXAMPLE:** 20717-BASEMAP.dwg
- Note: Some designers prefer to create their proposed basemap over the top of the ACTIVE existing survey. In that case just re-name the survey file (copied from original) as you would for the proposed design basemap.

Drawing Sheet Set:

- (DrawingNumber)-(DisciplineDesignator)-(SequenceNumber)
- **EXAMPLE:** 20717-WL-03.dwg …Sheet 3 of the "Water Line" Drawings. Each sheet of the drawing set should have its own file. Exceptions can be made for drawing files containing more than one sheet (layout tabs).
- The name of the project folder shall be the Drawing Number.
- Each discipline shall have its own sub-folder. (Architectural, Plumbing, Structural, etc.)
- It is often convenient to have multiple sheets (layout tabs) in a single drawing. However, a large number of tabs can increase file size and increase initial load time. A file of average complexity might reasonably contain 6 tabs.
- If a drawing file contains more than one sheet the naming convention should be as follows: XXXXX-WL-03-06.dwg…Sheets 3 through 6 of the "Water Line" Drawings.
- Discipline Designators shall be consistent with the National Cad Standard (NCS) and Uniform Drawing System (UDS) with a few exceptions. See section 2.7 Sheet Identification Discipline Designators.

2.5 Final PDF Submissions

- Final PDF submissions must meet the requirements of Attachment B - Electronic Data Requirements for File Naming. A three-digit sequential number shall be added to order the drawing set properly.
- e.g. **001**-(DrawingNumber)-(DisciplineDesignator)-(SequenceNumber).pdf

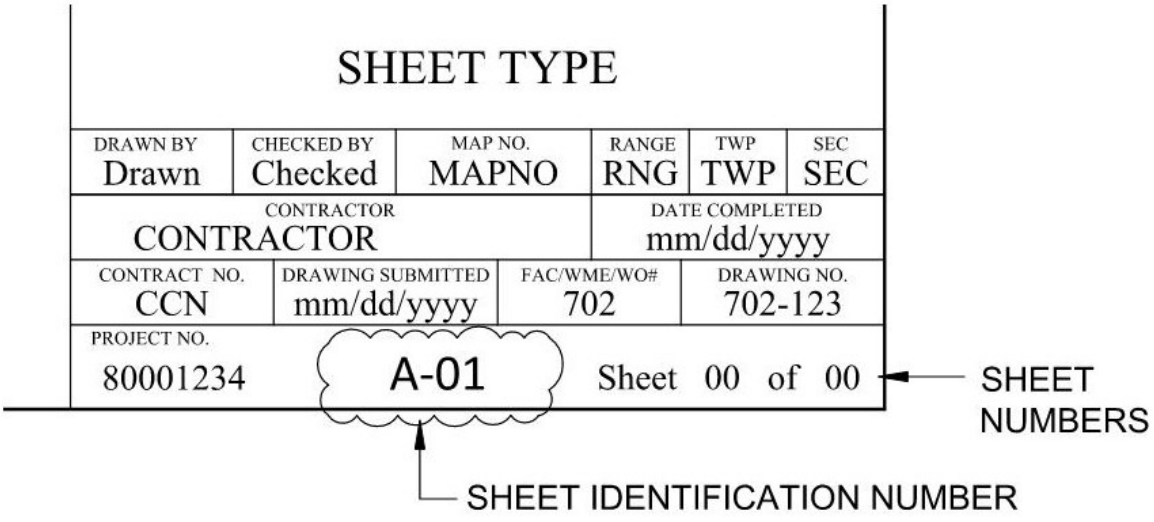
2.6 Sheet Identification

Large sets of drawings involving several disciplines often use a sheet identification format consistent with the National Cad Standard (NCS) and Uniform Drawing System (UDS). We will refer to this number as the Sheet Identification Number. There will be a separate place on the title block for this number. At the time of final project delivery, sheet numbers will be added to order the entire set.

Sheet Identification Number:

There are two components that make up the Sheet Identification Number. The first component, the discipline designator, identifies the construction discipline that the sheet covers – architectural sheets, plumbing sheets, structural sheets, etc. The final two digits, the sequence numbers, place the sheets in order per discipline.

- (DisciplineDesignator)-(SequenceNumber)
- **EXAMPLE:** A-01
- The discipline designator identifies the construction discipline that the sheet covers. See section 2.7 for a full list of Discipline Designators.
- The final component of the sheet identification number is the two-digit sequence number, which is between 01 and 99.



2.7 Sheet Identification Discipline Designators

The discipline designator helps to identify the type of work that is included on the sheets. Since sheets are distributed to the different sub-contractors in the field, it is helpful for the drawings to be organized by discipline. The following table indicates the letter designations to be used by KCWSD and the order that the disciplines should take.

DESIGNATOR	NAME	ADDITIONAL DESCRIPTION
COVER	Cover Sheet	
INDEX	Index	Sheet List
LEGEND	Legend	Legend/ Abbreviations
G	General	
DEMO	Demolition	
H	Hazardous Materials	Abatement, handling, etc.
V	Survey / Mapping	
B	Geotechnical	
C	Civil	General Civil Drawings
CST	Civil Storm Sewer	Storm Sewer Specific
CS	Civil Sanitary Sewer	Sanitary Sewer Specific
CIPP	Cured in Place Pipe	Cured in Place Pipe Specific
L	Landscape	
S	Structural	
A	Architectural	
I	Interiors	
Q	Equipment	
F	Fire Protection	
P	Plumbing	
D	Process	
M	Mechanical	
E	Electrical	
W	Distributed Energy	
WL	Water Line	Water Line Specific
T	Telecommunications	
TC	Traffic Control	Traffic Control Specific
R	Resource	Existing conditions / buildings
X	Other Disciplines	
Z	Contractor / Shop Drawings	
O	Operations	

3. CAD DRAWING PRODUCTION

3.1 Datum

Horizontal: All submitted CAD files must be spatially referenced to the North American Datum (NAD) 1983 State Plane Missouri West FIPS 2403 US Feet coordinate system.
Vertical: NAVD88

All civil engineering projects shall be expressed in feet and decimal parts thereof. Dimensions shall be accurate to two decimal places; however the model should be as accurate as possible, typically 4 decimal places.

Architectural projects shall be expressed in feet and inches. Dimension accuracy shall be 1/8", however the model should be designed as accurate as possible, typically 4 decimal places.

All elevations shall be indicated in NAVD 88 Datum (in feet and decimal parts thereof) and include the date of adjustment. The conversion from KC Datum to NAVD 88 Datum is +722.57 feet and shall be shown on the drawings in the proximity of the control point references.

3.2 Set up and File Format

Requesting files:

Request for copies of CAD files should be made through the Project Manager. Such data is provided for the convenience of the recipient only. This data is often gathered from a variety of sources and therefore may not conform to current CAD standards, may be incomplete or may not accurately reflect current conditions. KCWSD makes no representation as to the completeness or accuracy of the data.

Electronic File Format:

The City uses the following software for CAD and BIM. Due to lack of backwards compatibility with certain versions (2018 files are not compatible with 2016 software), coordination with all CAD team members is essential. As standard practice, check with KCWSD CAD Manager before starting your project.

- Autodesk AutoCAD based platforms: AutoCAD®, Civil 3D®, Map 3D®(.dwg)
- Autodesk Revit®(.rvt)
- Autodesk Navisworks® (.nws)

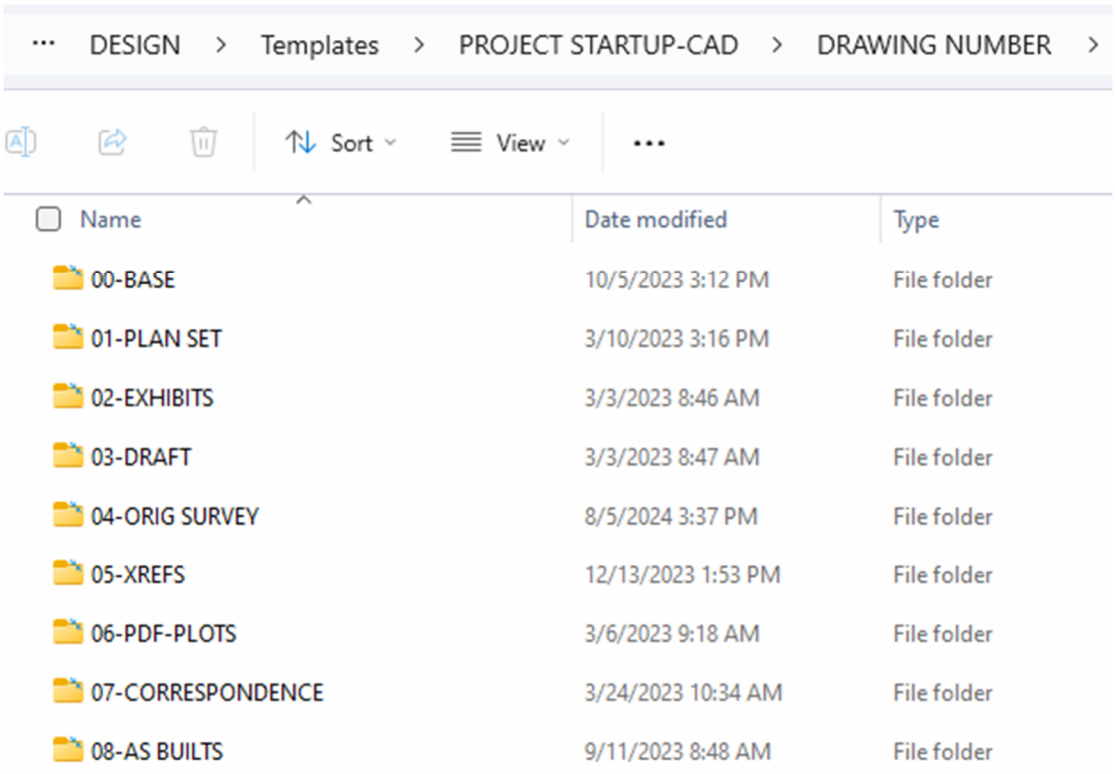
When design professionals submit CAD files to the City they must conform to the current CAD Drawing Standards. It is the design professional's responsibility to correct existing data provided, to the best of their ability, which could be obsolete, inaccurate or does not conform to the current KCWSD CAD standards.

Folder Structure:

Design professionals may follow their internal company standards for the folder structure. At the time of delivery, the design professionals should either:

- Set all the XREF paths to Relative so the links will not be broken.
- Provide a roadmap document detailing the file structure and where to find XREF's.

Shown below is the current folder structure for KCWSD projects.



3.3 Where to place Content

Model Space:

- Model content.
  Always drawn at full scale (Civil: 1 unit = 1', Architectural: 1 unit = 1")
  Model space content is scaled into a Paper space viewport for plotting at 1:1.
- Civil3D objects. (Pipe networks, Surfaces, Alignment, etc.)
- Civil profile or section views.
  Vertical can be exaggerated, horizontal remains at full scale.
- Annotation.
  Scale appropriately to plot correctly.
- Dimensions.
  Scale appropriately to plot correctly.
- Assigning object attributes (color, lineweight, linetype, or plot style) by entity is not allowed due to the difficulty required to locate these items when needing to change how they display.
- All line work and annotation to be "color by layer"

Paper Space:

- Not used on reference files for the purpose of creating published documents.
- Contains viewports for displaying scaled views of objects in Model space.
- Contains title blocks, matchlines, sheet set data fields.
- May contain legends, common notes, details, and P.E. stamps.
- May contain annotation for model content.

3.4 External References

In order to organize the CAD files some helpful conventions are used. CAD Drawings shall be set up in a layered manner using XREF files. This helps to keep files small and manageable, and to prevent accidental changes to survey base information.

- External reference (XREF) files are kept in the project's XREF folder and have a filename prefix of "X-" (Survey XREF's will have a file name prefix of "V-")
- Subfolders within the project folder are encouraged. Set all XREF paths to Relative.
- Insert XREF at (0,0,0) with scale factor of 1.
- XREF files are attached as "OVERLAY" to prevent circular references and slow drawing load times.
- Civil bases follow the City of Kansas City coordinate system (NAD) 1983 State Plane Missouri West FIPS 2403 US Feet coordinate system.
- The unaltered original survey is archived in project's Survey Folder. Survey updates are organized in subfolders having the date reference as part of the name. (See 2.3)
- The current working survey base file (copied from the original) is kept in the project folder or project subfolder and have a filename prefix of "V-" (See 2.3)
- Keep the XREF drawings original file name in the External Reference Manager dialog box with no aliases. This is important when trying to locate a missing file.
- Referenced files should be inserted on a layer such as "X-XREF" or separate layers such as "C-XREF- (BASE, STRM, SSWR, WATR)". Overall visibility can be controlled by "Reload or Unload" Status and selectively by the referenced drawing's layer.
- Scale, Units, and Tolerances: All CAD drawing models shall be drafted at full scale in the model space, located at the correct NAD 1983 State Plane Missouri West FIPS 2403 US Feet coordinate system. Special site coordinates are acceptable with prior consent from KCWSD. Drawing units should be appropriate for the discipline. Civil drawings are typically decimal units accurate to 4 decimal places with dimensions rounded to two decimal places.

3.5 Drawing Objects by Layer

All objects shall be drawn with the color, linetype, and plot style set to “By Layer.”

3.6 Blocks

KCWSD has created a standard block library which shall be used by the DP for water projects. They are located within the Autocad Template file. KCWATER.dwt

KCWSD requires that the following general rules be employed when handling block entities:

- Create blocks on layer “0”. The layer “0” should only be used when creating blocks (symbols), so that the blocks will take on the properties of the active layer when they are inserted into a drawing.
- Set plot style color and lineweight to “By Layer”.
- KCWSD Water blocks (symbols) are scaled according to their Paper space height. When inserting into model space, scale the blocks up to the intended scale.
- Create blocks with an insertion point related to normal field construction installation (e.g. water valves on pipe centerline)
- Attribute text styles follow the text style standards in this manual.

3.7 Fonts and Text Styles

AutoCAD generally supports two types of fonts, TrueType with TTF extension and a shape font with SHX extension. TrueType is Windows native font type which comes ready-made with your windows installation but shape fonts are AutoCAD specific fonts which are installed along with AutoCAD.

The Autodesk Romans.shx font is used for the custom linetypes and remains in the definition of the “Standard” style.

The style “Legend” is Calibri with a text height of 0.0 and not annotative. The text styles that are annotative should be named according to their Paper space height.

Existing or Survey Text:

- Preferred settings for existing or survey text are Romans or Simplex, 0.10” high, 0.9 width Factor, 40% screen, rotated to typical project view.
- Exceptions can be made for projects with extremely dense annotation.
- Existing text height can be 0.08” with Proposed or Design text 0.10”. (Option #2)

TYPE OF TEXT	TEXT HEIGHT (OPTION 1)	TEXT HEIGHT (OPTION 2)
Existing Survey	0.10”	0.08”
Proposed	0.12”	0.10”
Note Titles	0.15”	0.12”
View Titles	0.20”	0.16”

Proposed Design Text:

- Preferred settings for proposed or design annotation are Arial, Calibri, or Tahoma, 0.12” high, black.
- Exceptions can be made for projects with extremely dense annotation.
- Existing text height can be 0.08” with Proposed Design text 0.10”. (Option #2)
- Annotative text styles should be set up and named according to their Paper space height.

Miscellaneous Text:

TIMES NEW ROMAN: (TRUE TYPE)
ABCDEFGHIJK
123456789

STYLUS BT: (TRUE TYPE)
ABCDEFGHIJK
123456789

- Architectural projects can use Stylus BT as an alternative to the styles listed above.
- Times New Roman is used on Cover Sheets and Legend Sheets.
- Preferred text height should follow guidelines mentioned above for Existing and Proposed text.

Note:

- Symbols from the legend are drawn at their correct paperspace height and shall be inserted into the model at the appropriate scale. When using the smaller Text Height Option 2, Symbols can be scaled down or reduced by 20%.

3.8 Dimension Styles

- The appearance of dimensions should appear the same throughout all sheets.
- Dimensions may be put on a general layer such as “C-ANNO-DIMS or specific layers such as “C-WATR-DIMS”.
- Dimensions and Multileader styles should be set up for 0.08, 0.10, and 0.12 text heights and named accordingly.
- Dimensions, like other annotation, are usually located in Model space.
- Dimension variables such as color, linetype, and visibility are controlled by layer.
- Dimension text locations and orientations may be adjusted for drawing clarity.
- Make an attempt not to EXPLODE dimensions.

3.9 Graphic Scales

All drawings shall be drawn accurately to scale. Scales shall be indicated on each sheet with a numerically labeled bar graph. Plan views shall be drawn at a minimum of 1-inch = 50 feet. Profile views shall be drawn at a minimum of 1 inch = 10 feet. For drawings in high density (urban) areas a larger scale is required. Typically, 1 inch = 20 feet plan views and 1 inch = 5 feet profile views are more commonly used.

3.10 North Arrows

All sheets shall include an arrow to indicate the direction of North. North should point toward the top half of each drawing. On multi-sheet drawings, sheets shall be oriented to read continuously from left to right and in succession of sheet number from front to back.

3.11 Stationing

Survey stationing must be used to indicate the dimensions of the proposed infrastructure and appurtenances. The stationing should progress from left to right on each sheet. On multi-sheet drawings, stationing shall progress in succession with sheet numbers from front to back. Stationing shall begin at the connection point to the existing system. Stationing shall be indicated every 100’ and follow the centerline of the proposed alignment.

3.12 Matchlines

Match lines shall be used to show identical points on drawings for continuous mains shown on separate sheets or in separate drawings on the same sheet. Match lines shall be perpendicular to the proposed improvement and should be placed at an even survey station. Match lines should be labeled and include a reference to the related sheet of the drawings.

3.13 Content and organization

Cover Sheet:

The Cover Sheet can include but is not limited to the following items:
(See Section 8 for Cover Sheets and Templates)

- Project title
- General location map denoting area of work
- Reviewing authority’s name
- Name and seal of design engineer
- Drawing index
- Utility contacts

Legend Sheet:

The Legend Sheet can include but is not limited to the following items:

- General standard notes
- Project specific notes
- Legend
- Additional notes or details
- Project control points and benchmarks

General Layout Sheet:

The General Layout sheet shall contain a map or plat, depending on the size of area over which the project is located, at an engineering scale necessary to show the entire system on one plan sheet. Multi-sheet projects shall have a sheet layout index shown on this sheet. Project control points, benchmarks, or a table of coordinate values can be placed on this sheet if they cannot be added to the Index Sheet.

Plan and Profile sheets:

Plan Views:

All drawings shall include an accurately detailed plan view of the work area and any feature of the surrounding topography that could affect the construction activities. Special attention shall be given to sewers and other underground utilities. The plan view shall also include:

- Labeled and dimensioned public right-of-way lines
- City approved street names
- Labeled and dimensioned easement lines
- Labeled lot lines (LL), property lines (PL) , parcel lines, and subdivision boundary lines
- Lot or tract numbers in subdivisions
- Names and addresses of property owners
- Detailed description of infrastructure improvements

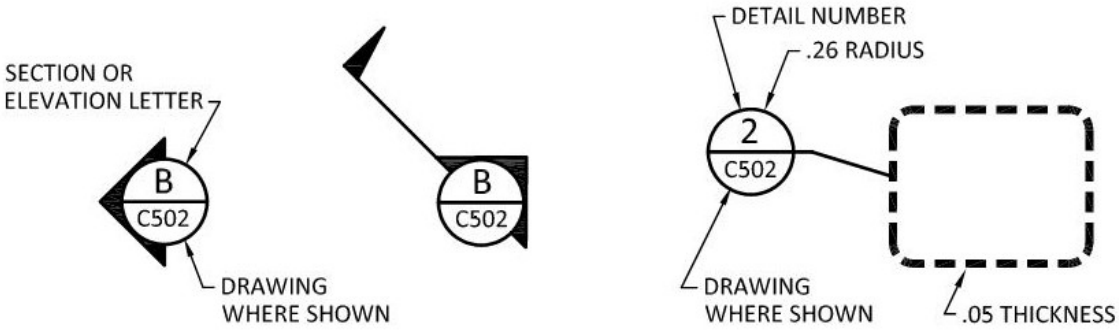
Profile Views:

All drawings shall include an accurately detailed profile view of the work and any feature that could affect the construction activities. The profile view shall be on the lower portion of the same sheet as the related plan view and generally align with the plan view. The profile view shall include elevations of all underground features. Special attention shall be given to size and location of sewers and other underground utilities or structures.

3.14 Callouts for Section, Elevation, and Detail

On a plan view drawing:

Callouts:

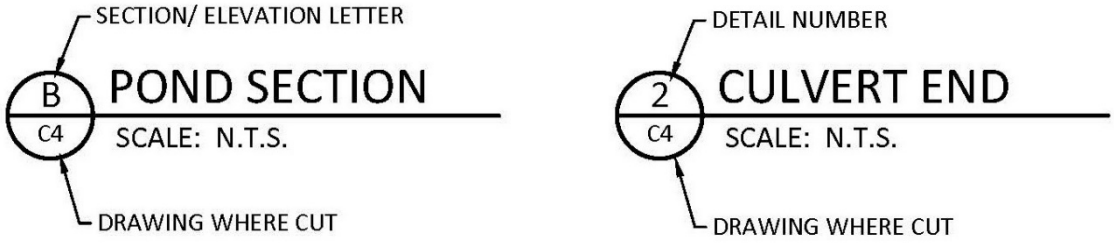


- Preferred settings for the text calling out the Section or Elevation letter and Detail number are Calibri with a text height of 0.15”.
- Preferred settings for the text calling out where the section or detail is shown are Calibri with a text height of 0.10”.
- Callout bubbles shall have a paper space radius of 0.26”.
- Callout bubbles and line work shall have a lineweight of 0.53mm.
- The linetype that windows the area of detail shall be dashed and have a paper space thickness of 0.0625”.
- Reduce Symbols and text by 20% if using text height option #2.

View Titles:

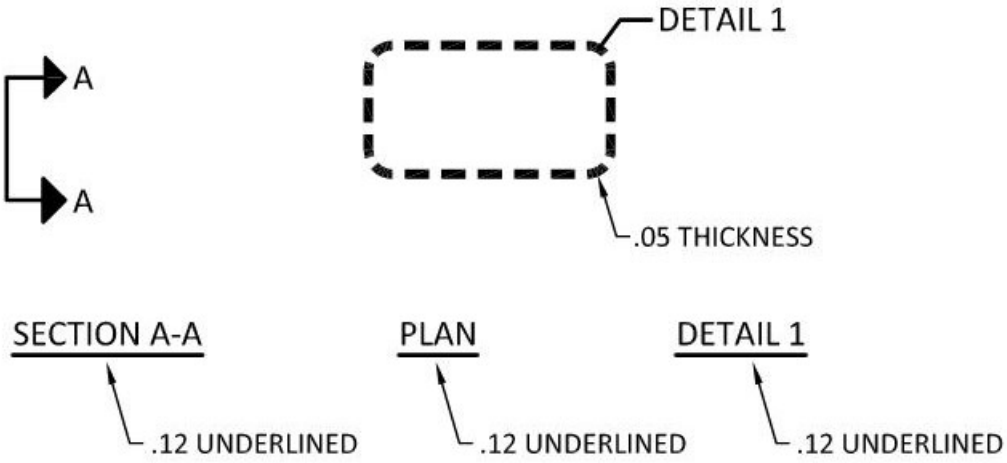
- "VIEW" Titles are Calibri with a text height of 0.20" and shall not be annotative.
- "VIEW" Titles shall have the underline selected, not a separate line object.
- Only the bottom line of the "VIEW" Title needs to be underlined if there is more than one line.
- The scale should be listed below and shall be Calibri with a text height of 0.12".
- View Titles shall have a lineweight of 0.53mm.
- Reduce text height by 20% if using text height option #2.

Detail Titles:



- "DETAIL" Titles are Calibri with a text height of 0.20" and shall not be annotative.
- The scale should be listed below and shall be Calibri with a text height of 0.12".
- View Titles shall have a lineweight of 0.53mm.
- Preferred settings for the text calling out the Section letter and Detail number are Calibri with a text height of 0.15".
- Preferred settings for the text calling out where the section or detail has been cut are Calibri with a text height of 0.10".
- Reduce text height by 20% if using text height option #2.

Within a detail:



- Since space is tight within a detail and a section is usually shown right next to where it is cut, a smaller symbol is used.
- Titles are a MTEXT, 0.12" high, underlined, and are placed on appropriate annotation layers and have a lineweight of 0.28mm.

Title Block Annotation:

- Preferred text for Title Block annotation: Times New Roman
- Cover Sheets and General Notes Sheets usually have multiple fonts. Standard templates are shown in Section 7 and Section 8.

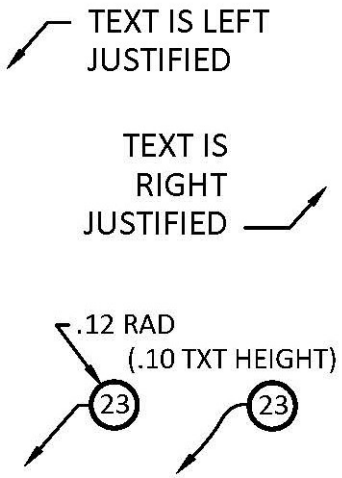
Text and Hatch Notes:

Drawings created using non-standard AutoCAD® fonts and hatch patterns can result in content discrepancies in the delivered drawing set. To ensure the integrity of the drawing set and minimize potential problems:

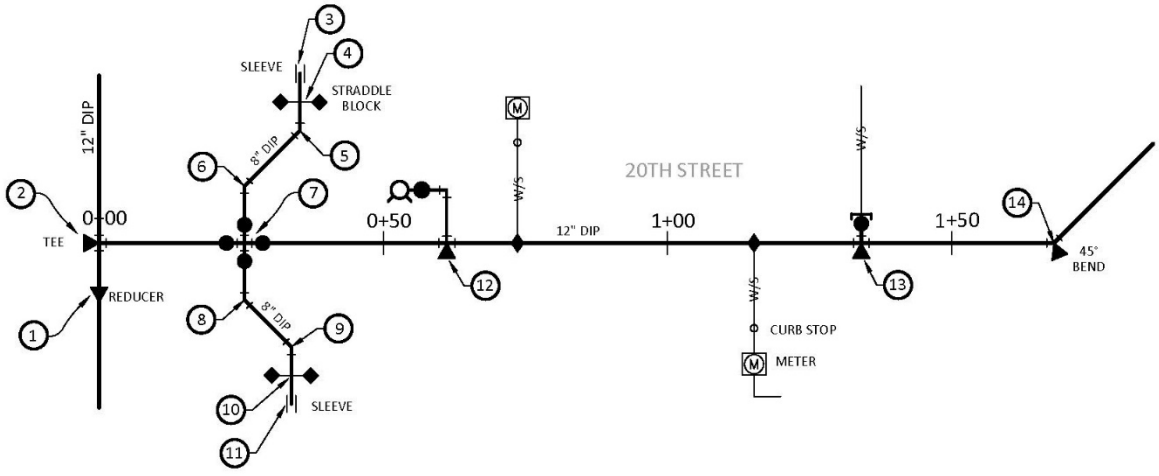
- Only native AutoCAD® fonts and hatch patterns are to be used. These are standard support features installed as part of a standard AutoCAD® installation.
- Custom fonts and hatch patterns, including those provided by 3rd party software, shall not be used.

Leaders, Notes and Bubbles:

For clarity, leaders from text, multileaders and bubbles are typically straight and aligned when possible. One exception being Water drawings where splines can be used. Text can be left or right justified and notes are aligned vertically when possible. The left attachment for leaders is the middle of the top line while the right attachment is the middle of the bottom line.



- Text for leaders and notes shall be the standard font used throughout the drawing.
- Text for bubbles shall be Calibri with a text height of 0.10”.
- An example for the use of bubbles is shown below.



4. OBJECT DATA

4.1 General

Object data is attribute data that is attached to AutoCAD geometry. Using the Planning and Analysis workspace in Autocad Map 3D or Civil 3D you can attach metadata to objects making it compatible with the ESRI GIS environment. Object data is created by creating tables and assigning fields for the type of information you want to add.
KCWSD will provide a template (KCWATER.dwt) that shall be used by the DP with pre-defined object data tables already created and attached to blocks within the template.
The object data tables consist of 5 major categories for Water projects.

- Pipes
- Fittings
- Valves
- Hydrants
- Service Lines

CAD objects within the drawing that belong to one of these 5 categories shall have the corresponding table attached. For example, each valve shall have the valve table attached. Each pipe segment shall have the Pipe table attached.

Once you attach data to an object, it now becomes part of that object and you can view that information from within the object properties dialogue box. You can also edit the object data from within the object properties dialogue box.

It shall also be a requirement for DPs to create an SDF (Spatial Data File) for the project. SDF is a native Autodesk file-based geospatial format that is optimized for storing large, classified data sets. SDF is like SHP format in that it contains both spatial data and attribute data. However, unlike SHP, it stores both types of data in a single file rather than a set of files. It is required that a separate DWG file would be created containing only proposed objects for the entire project. The name of the file(s) should follow the following format.
"drawing number"_ObjectData.dwg and "drawing number"_ObjectData.sdf

The video below demonstrates how to create tables and attach data.

https://www.youtube.com/watch?v=4bO4o9Wjzzk

4.2 Water Object Data Tables

The following tables were created in an effort to maximize the amount of design information attached to AutoCAD objects to make for a better conversion from CAD to GIS and shall be used for KCWSD drawings. The general layout CAD file (Basemap) must have the required object data elements populated. All object data elements per asset type shall be populated.

Included below is a list of the object data tables and attribute codes.

KCWATER OBJECT DATA TABLES

Table Name	Field Name	Data Type	Description
PIPE*			
	PipeSize	Integer	Pipe Diameter in Inches
	PipeMaterial	Character	Code for Pipe Material (see provided list)
	PipeType	Character	Code for Pipe Type (see provided list)
FITTINGS**			
	DrawingID	Character	Unique ID for Asset Per Project
	FittingType	Character	Code for Fitting Type (see provided list)
VALVE			
	DrawingID	Character	Unique ID for Asset Per Project
	ValveType	Character	Code for Valve Type (see provided list)
	ValveSize	Integer	Valve Size in Inches
HYDRANT			
	DrawingID	Character	Unique ID for Asset Per Project
SERVICE			
	REGSize	Character	Diameter in Inches
	REGMaterial	Character	Pipe Material
	REGType	Character	Code for Service Line Type (see provided list)
	REGNumber	Character	Register Number

*Shall be used for Mains and Hydrant Pipes
**Shall be used for Pipe Fittings and Service Fittings

4.3 Water Drawing ID

Drawing ID number shall be the Drawing Number followed by a lowercase letter to indicate valve, fitting, or hydrant then a sequential numbering system. Below are some examples where D##### represents the Drawing Number.

Example: D#####v0001, D#####v0002, D#####v0003…etc.

- Valves would be D#####v0001 through 9999.
- Fittings would be D#####f0001 through 9999.
- Hydrants would be D#####h0001 through 9999.

The Drawing ID number is what we need to link the spreadsheet to the actual drawing to relate the data attributes to the XY coordinate location. D20185v0001 from the valve table corresponds to valve 1 on Drawing number D20185.

- Spreadsheets are still required.
- Drawing Numbers will be provided by the project manager.

4.4 Water Type Codes

Code for PIPE MATERIAL

Type Code	Type Description
CIP	Cast Iron Pipe
DIP	Ductile Iron Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PVC	Polyvinyl Chloride Pipe
STEEL	Steel Pipe
UNK	Unknown
CU	Copper Pipe

Code for PIPE TYPE

Type Code	Type Description
Distribution	Distribution Line
Transmission	Transmission Line
Hydrant Line	Hydrant line
Plant	Plant Piping

Code for FITTING TYPE

Type Code	Type Description
BEND	Bend
CROSS	Cross
PLUG	Plug
REDUCER	Reducer
SLEEVE	Sleeve
TEE	Main Tee
HYDRANT TEE	Hydrant Tee
TAP SLEEVE	Tap Sleeve

Code for VALVE TYPE

Type Code	Type Description
AR	Air Release Valve
BV	Ball Valve
BO	Blow-Off Assembly
BFV	Butterfly Valve
CV	Check Valve
DR	Drain Valve
FA	Flushing Assembly
VALVE	Gate Valve
HV	Hydrant Valve
PRV	Pressure Regulating Valve
UNK	Unknown
XV	Boundary Valve

Code for SERVICE LINE TYPE

Type Code	Type Description
Domestic	Domestic Service Line
Fire Protection	Fire Protection Service Line
Lawn Irrigation	Lawn Irrigation Service Line Type
Unknown	Unknown Service Line Type

Code for SERVICE LINE FITTING

Type Code	Type Description
ST	Straight Tap
BT	Backtap
METER	Meter
MPIT	Meter Pit
ETD	End Tap
CBOX	Curb Box

4.5 Sewer Object Data Tables

KC SEWER OBJECT DATA TABLES

Table Name	Field Name	Data Type	Description
	PIPE_SIZE	Integer	Pipe Diameter in Inches
	PIPE_MATERIAL	Character	Pipe Material
	PIPE_TYPE	Character	Type of system
	PIPE_STATUS	Character	active or retired
	PIPE_SHAPE	Character	Shape of Pipe
	USAGE	Character	Sanitary or Storm
	LENGTH	Integer	Length of Pipe
	INV_EL_UP	Integer	Upstream Invert Elev.
	INV_EL_DN	Integer	Downstream Invert Elev.
	ID	Integer	Unique ID for Asset Per Project
	UNIT_ID_UP	Character	Upstream Unit ID
	UNIT_ID_DN	Character	Downstream Unit ID
	PIPE_OWNERSHIP	Character	KCMO or Private
	PIPE_ LINING_STATUS	Character	Pipe Lining Status
	SERVICE_ CONNECTIONS	Integer	Service connections per pipe

KC SEWER OBJECT DATA TABLES - Continued

Table Name	Field Name	Data Type	Description
	TYPE	Character	Structure Type
	UNIT_ID	Character	Unique ID for Asset Per Project
	SIZE	Character	MH DIA or INLET SIZE
	SYSTEM_USAGE	Character	Storm or Sanitary
	STATUS	Character	active or retired
	RIM_EL	Integer	Manhole Rim or Inlet Top
	INVERT_EL	Integer	Invert Elevation
	NO_PIPES	Integer	Number of Pipes
	COVER_TYPE	Character	Type of Lid
	LOCATION	Character	Location of Structure
	OWNERSHIP	Character	KCMO or Private
	DISTRICT	Character	Varies
	LINING_STATUS	Character	Structure Lining Status
	MATERIAL	Character	Structure Material

KC SEWER OBJECT DATA TABLES – Service Lines

Table Name	Field Name	Data Type	Description
	PERMIT_NO	Integer	Permit Number
	ADDRESS	Character	Address to receive service
	REGSize	Character	Size in Inches
	REGMaterial	Character	Material

- Listed below are some examples of the type of description data that will be entered.

STRUCTURES

TYPE	MANHOLE
UNIT_ID	N136-285
SIZE	5' DIAMETER
SYSTEM_USAGE	SANITARY
STATUS	ACTIVE
RIM_EL.	930.47
INVERT_EL.	917.37
NO_PIPES	2
COVER_TYPE	STANDARD
LOCATION	EASEMENT
OWNERSHIP	KCMO
DISTRICT	SWR LINE MAINTENANCE
LINING_STATUS	VARIES
MATERIAL	CONCRETE

PIPE

PIPE_DIAMETER	8"
PIPE_MATERIAL	PVC
PIPE_TYPE	GRAVITY
PIPE_STATUS	ACTIVE
PIPE_SHAPE	ROUND
USAGE	SANITARY
LENGTH	287.83
INV_EL_UP	910.49
INV_EL_DN	900.08
ID	1451773
UNIT_ID_UP	N136-284
UNIT_ID2_DN	N136-283
PIPE_OWNERSHIP	KCMO
PIPE_LINING_STATUS	VARIES
SERVICE_CONNECTIONS	3

SERVICE LINES

PERMIT NO.	VARIES
ADDRESS	VARIES
REGSize	VARIES
REGMaterial	VARIES

4.6 Water Project Submittal

Projects completed by the Design Professional will be required to submit the following "Object Data" requirements.

- **Create a separate DWG file** containing only proposed objects attached with Object Data for the entire project. This file will be submitted to KCWSD.
- **Define Object Data**. Object Data Tables must be created within the 3d CAD software. If you are using the KCWATER.dwt template the tables have already been created and can be accessed if you are using Map 3d or Civil 3d.
- **Attach the Tables**. The individual Data Tables shall be attached to the proposed objects within the drawing. (Attach Pipe Tables to Pipes, attach Valve tables to Valves etc.)
- **Populate the Data fields**. Select an object and pull up the object properties. If the data is not there it can be filled in from the object properties dialogue box.
- **Create an SDF file**. Once all the data has been entered you can now create the SDF.
- Re-Insert the SDF file back into the Cad drawing.
- You can now view the harvested data by viewing the project data tables.
- **Save the attribute tables in Excel format.** There will be 5 attribute tables including Pipes, Fittings, Valves, Hydrants, and Service lines.
- **Submit Excel Spreadsheets** to KCWSD.
- **Submit SDF file** to KCWSD.
- **Submit full set of CAD (dwg) files** for the project.
- **Submit full set of PDF's** for the project.

Note: eTransmit shall be used when packaging CAD files for delivery to KCWSD. eTransmit is a command within the CAD software that automatically includes all related dependent files such as xrefs and pentables.

Related Sections:

- Section 01300 - Submittals
- Attachment B – Electronic Data Requirements

Electronic file Formats:

- Autocad (latest release)
- Autocad Map 3d (latest release)
- Autodesk Civil 3d (latest release)
- Autodesk Civil 3d "Pressure Networks"

List of Assets and Object Data Fields

PIPES	FITTINGS	VALVES	HYDRANT	SERVICE
PipeSize	DrawingID	DrawingID	DrawingID	REGSize
PipeMaterial	FittingType	ValveType		REGMaterial
PipeType		ValveSize		REGType
				REGNumber

5. LAYERING

5.1 General

KCWS has adopted the layer name and use rules recommended in the United States National CAD Standard (NCS) - Version 6.0 for the following categories. These standards can be found at https://www.nationalcadstandard.org/ncs6/.

- Architectural.
- Electrical.
- Mechanical.
- Plumbing.
- Structural.

For additional detail, beyond what is outlined, please refer to the NCS.

Exceptions to the NCS:

The City of Kansas City Water Services Department (KCWSD) is in the process of developing their own internal standards for Sewer, Water, and Stormwater projects. This standard is based on the NCS but offers a certain degree of customization to more clearly define layer names. Below is a list of typical layer names used for Sewer, Water, and Stormwater projects.

- **Sewer Projects layers**

LAYER NAMES:	COLOR	LINETYPE	DESCRIPTION
C-SSWR-ANNO-NOTES			NOTES
C-SSWR-ESMT-PERM			PERMANENT EASEMENT
C-SSWR-ESMT-TEMP			TEMPORARY EASEMENT
C-SSWR-MANHOLE-A			ABANDONED
C-SSWR-MANHOLE-D			EXISTING TO DEMOLISH
C-SSWR-MANHOLE-E			EXISTING TO REMAIN
C-SSWR-MANHOLE-N			NEW WORK
C-SSWR-PIPE-A			ABANDONED
C-SSWR-PIPE-D			EXISTING TO DEMOLISH
C-SSWR-PIPE-E			EXISTING TO REMAIN
C-SSWR-PIPE-N			NEW WORK
C-SSWR-SERVICE-LINES			SERVICE LINE STUBS

- **Water Projects layers**

LAYER NAMES:	COLOR	LINETYPE	DESCRIPTION
C-WATR-ANNO-DIMS	240	CONTINUOUS	
C-WATR-ANNO-NOTES	255	CONTINUOUS	
C-WATR-ANNO-TITLES	140	CONTINUOUS	
C-WATR-BASELINE	255	CONTINUOUS	
C-WATR-CITY-LIMITS	31	PHANTOM2	
C-WATR-CONC-BLOCK	140	CONTINUOUS	
C-WATR-EXISTING	RED	HIDDEN2	
C-WATR-HYDRANT-E	RED	CONTINUOUS	EXISTING
C-WATR-HYDRANT-N	WHITE	CONTINUOUS	NEW WORK
C-WATR-HYDRANT-PIPE	WHITE	CONTINUOUS	
C-WATR-PIPE FITTINGS	140	CONTINUOUS	
C-WATR-PIPE-A	GREEN	CONTINUOUS	ABANDONED
C-WATR-PIPE-D	GREEN	CONTINUOUS	EXISTING TO DEMOLISH
C-WATR-PIPE-E	RED	HIDDEN2	EXISTING TO REMAIN
C-WATR-PIPE-N	YELLOW	CONTINUOUS	NEW WORK
C-WATR-SERVICE	30	CONTINUOUS	
C-WATR-SYMBOLS	GREEN	CONTINUOUS	
C-WATR-VALVE-A	GREEN	CONTINUOUS	ABANDONED
C-WATR-VALVE-D	GREEN	CONTINUOUS	EXISTING TO DEMOLISH
C-WATR-VALVE-E	RED	CONTINUOUS	EXISTING TO REMAIN
C-WATR-VALVE-N	140	CONTINUOUS	NEW WORK
Defpoints	WHITE	CONTINUOUS	
V-PROP-FENCE	14	FENCE	
V-PROP-LINE	164	PL	
V-PROP-ROW	130	RW	
V-UTIL-CATV-LINE	62	CATV_LINE	
V-UTIL-COMM-UNGR	32	Underground Communication	
V-UTIL-ELEC-LINE	52	ELEC_LINE	
V-UTIL-ELEC-OVHD	242	Overhead Electric	
V-UTIL-ELEC-UNGR	52	Underground Electric	
V-UTIL-FIBR-LINE	34	Fiber Optics	
V-UTIL-NGAS-LINE	52	Gas	
V-UTIL-SSWR-LINE	96	SAN_LINE	
V-UTIL-STRM-LINE	134	Storm	
V-UTIL-TELE	242	TELE_LINE	
V-UTIL-WATR-LINE	162	Water	
V-UTIL-WATR-SRVC	30	WS	

- **Stormwater Projects layers**

LAYER NAMES:	COLOR	LINETYPE	DESCRIPTION
C-STRM-ANNO-NOTES			NOTES
C-STRM-MANHOLE-A			ABANDONED
C-STRM-MANHOLE-D			EXISTING TO DEMOLISH
C-STRM-MANHOLE-E			EXISTING TO REMAIN
C-STRM-MANHOLE-N			NEW WORK
C-STRM-PIPE-A			ABANDONED
C-STRM-PIPE-D			EXISTING TO DEMOLISH
C-STRM-PIPE-E			EXISTING TO REMAIN
C-STRM-PIPE-N			NEW WORK
C-STRM-BASIN			DETENTION/ RETENTION PONDS, BASINS
C-STRM-STRUC			INLETS, JUNCTION BOX, OUTFALL STRUCTURES
C-STRM-CONTOUR-MAJOR			MAJOR CONTOURS
C-STRM-CONTOUR-MINOR			MINOR CONTOURS
C-ESMT-PERM			PERMANENT EASEMENT
C-ESMT-TEMP			TEMPORARY EASEMENT
C-STRM-GRADING			DITCHES/ SWALES
C-STRM-CHANNEL			PERMANENT CHANNELS
C-STRM-GREEN-INFRASTRUCTURE			GREEN INFRASTRUCTURE
C-STRM-FLOOD-100YR			
C-STRM-FLOOD-500YR			
C-STRM-FLOODWAY			
C-STRM-BUFFER-INNERZONE			
C-STRM-BUFFER-OUTERZONE			

5.2 Layer Name Format:

There are four field types organized as a hierarchy – Discipline Designator, Major Group, Minor Groups, and an optional Status Field – each separated by a dash. The layer name format allows the user to include field codes to the desired level of detail. The following is a description of the fields used.

5.3 Discipline Designator

The first character of the Discipline Designator denotes the category of subject matter contained on the specified layer. The second character is optional and can be used as a modifier to the first character, sometimes describing the source of the information on the layer.

AA	–	BBBB	–	CCCC	–	DDDD	–	E

5.3a Discipline Designators Level 1

LEVEL 1 DISCIPLINE DESIGNATORS	
G	General
H	Hazardous Materials
V	Survey/Mapping
B	Geotechnical
C	Civil
L	Landscape
S	Structural
A	Architectural
I	Interiors
Q	Equipment
F	Fire Protection
P	Plumbing
D	Process
M	Mechanical
E	Electrical
W	Distributed Energy
T	Telecommunications
R	Resource
X	Other Disciplines
Z	Contractor/Shop Drawings
O	Operations

5.3b Discipline Designators, Level 2

The optional second character is used to further define the discipline character. As an example, the level 2 Discipline Designators for Architectural are shown:

Designator	Description
A - Architectural	
AD – Architectural Demolition	
AE - Architectural Elements	
AF - Architectural Finishes	
AG - Architectural Graphics	
AI - Architectural Interiors	
AS - Architectural Site	
AJ - User Defined	
AK - User Defined	

5.4 Major Group

The Major Group denotes the main group of the subject matter and always consists of 4 characters.

AA	–	**BBBB**	–	CCCC	–	DDDD	–	E

5.4a Major Group Layer Name Descriptions

ACCS	Access
ACID	Acid waste systems
AERI	Aerial Survey
AFFF	Aqueous film-forming foam system

AFLD	Airfields
AIR~	Air
ALGN	Alignment
ALRM	Alarm system
ANNO	Annotation
AREA	Area
AUXL	Auxiliary systems
BARR	Barrier
BCST	Broadcast related system (radio or TV)
BEAM	Beams
BELL	Bell system
BLDG	Buildings and primary structures
BLIN	Baseline
BNDY	Political boundaries
BORE	Borings
BRCG	Bracing
BRDG	Bridge
BRIN	Brine systems
BRKL	Break / fault lines
BRLN	Building restriction line
BZNA	Buffer zone area
CABL	Cable systems
CATH	Cathodic Protection System
CATV	Cable television system
CCTV	Closed-circuit television system
CEME	Cemetery
CHAN	Navigable channels
CHEM	Chemical
CHIM	Chimneys and stacks
CLNG	Ceiling
CLOK	Clock system
CMPA	Compressed / processed air systems
CMPR	Computer
CNDW	Condenser water systems

CO2S	CO2 system
CODE	Code compliance plan
COLS	Columns
COMM	Communications
CONT	Controls and instrumentation
CONV	Conveying systems
CRPT	Carpet / carpet tiles
CSWK	Casework
CTRL	Control points
CWTR	Chilled water systems
DATA	Data / LAN system
DECK	Deck
DETL	Detail
DFLD	Drain fields
DIAG	Diagrams
DICT	Dictation system
DOMW	Domestic water systems
DOOR	Doors
DRAN	Drains
DRIV	Driveways
DTCH	Ditches or washes
DUAL	Dual temperature systems
DUST	Dust and fume collection systems
ELEC	Electrical system, telecom plan
ELEV	Elevation
ELHT	Electric heat
EMCS	Energy monitoring control system
ENER	Energy management systems
EQPM	Equipment
EROS	Erosion and sediment control
ESMT	Easements
EVAC	Evacuation plan
EXHS	Exhaust system

FENC	Fences
FIRE	Fire protection
FLHA	Flood hazard area
FLOR	Floor
FNDN	Foundation
FNSH	Finishes
FRAM	Braced frame or moment frame
FSTN	Fasteners and connections
FUEL	Fuel systems
FUME	Fume hood
FURN	Furnishings
GAS~	Gas
GATE	Gate
GLAZ	Glazing
GLYC	Glycol systems
GRID	Grids
GRLN	Grade line
GRND	Ground system
HALN	Halon
HWTR	Hot water heating system
HVAC	HVAC systems
HYDR	Hydraulic structure
IGAS	Inert gas
INGR	Ingrants
INST	Instrumentation system
INTC	Intercom / PA systems
IRRG	Irrigation
JNTS	Joints
JOIS	Joists
LAND	Land
LEGN	Legend, symbols keys
LEVE	Levee
LGAS	Laboratory gas systems

LIQD	Liquid
LITE	Lighting
LNTL	Lintels
LOCN	Limits of construction
LTNG	Lightning protection system
MACH	Machine shop
MAJQ	Major equipment
MDGS	Medical gas systems
MILL	Millwork
MINQ	Minor equipment
MKUP	Make-up air systems
MNTG	Mounting system
MPIP	Miscellaneous piping systems
NGAS	Natural gas systems
NODE	Node
NURS	Nurse call system
OBST	Obstructions
OIL~	Oil
OTGR	Outgrants
PADS	Pads
PERC	Perc testing
PGNG	Paging system
PHON	Telephone system
PIPE	Piping
PLAN	Key Plan (Floor Plan)
PLAT	Platform
PLNT	Plant and landscape material
POND	Ponds
POWR	Power
PRKG	Parking lots
PROC	Process systems
PROJ	Projector system
PROP	Property

PROT	Fire protection system
PRTN	Partitions
PVMD	Photovoltaic modules
PVMT	Pavement
RAIL	Railroad
RAIR	Relief air systems
RCOV	Energy recovery systems
REFG	Refrigeration systems
RIGG	Rigging / automation systems
RIVR	River
ROAD	Roadways
ROOF	Roof
RRAP	Riprap
RUNW	Runway
RWAY	Right-of-way
SECT	Section
SERT	Security system
SGHT	Sight distance
SIGN	Sign
SITE	Site features
SLAB	Slab
SLUR	Slurry
SMOK	Smoke extraction systems
SOIL	Soils
SOUN	Sound system
SPCL	Special systems
SPFX	Entertainment special effects system
SPKL	Sprinkler
SSWR	Sanitary sewer
STEM	Steam system
STIF	Stiffener
STRM	Storm sewer
STRS	Stairs

SURV	Survey
SWLK	Sidewalks
TEST	Test equipment
TILE	Tile
TINN	Triangulated irregular network
TOPO	Topographic feature
TRAL	Trails or paths
TRAN	Transmission system
TRUS	Trusses
TVAN	Television antenna system
TVVS	Television and video system
UNID	Unidentified site objects
UTIL	Utilities
VACU	Vacuum
VIDO	Entertainment projection systems
WALL	Walls
WATR	Water supply
WETL	Wetlands
WIND	Wind powered
WWAY	Waterway

5.5 Minor Groups

The optional Minor Groups denote a more detailed breakdown of the major group. This is usually one or two fields but can be more than 4 characters for clarity.

AA	–	BBBB	–	**CCCC**	–	**DDDD**	–	E

- User-defined Minor Groups are permitted. They can contain more than four characters for clarity if necessary but otherwise should closely follow the NCS layer naming format.

- The Minor Group field codes are logically grouped with specific Major Groups. However, any Minor Group may be used to modify any Major Group, provided that the definition of the Minor Group remains unchanged. Therefore, any reasonable combination of the prescribed Major Groups and Minor Groups is permitted.

5.6 Status (Phase)

The optional Status (Phase) field denotes the status of the work or a construction phase. Usually one character but can be lengthened to 4 characters for clarity.

AA	–	BBBB	–	CCCC	–	DDDD	–	**E**

STATUS FIELD CODES	
A	Abandoned
D	Existing to demolish
E	Existing to remain
F	Future work
M	Items to be moved
N	New work
T	Temporary work
X	Not in contract
1-9	Phase numbers

5.7 Layer Organization

The level of detail required within a project is coordinated with KCWSD project manager and the KCWSD CAD Manager. Objects can be organized by the number of groups used.

Example:

C-WATR-PIPE
This forces all proposed water lines, regardless of size or material, to be combined on one layer. This allows the visibility to be controlled with a single layer selection.

C-WATR-PIPE-12DI-
Proposed water lines are placed on separate layers according to size and material. They can then be selectively controlled within a viewport.

6. PEN TABLES

General: KCWSD currently uses a color dependent pen table (CTB), a copy of KCwater22.ctb can be provided. Named plot style tables (STB) are also acceptable. Submitted drawings shall be accompanied by the consultants' current plot settings file. (.ctb or .stb)

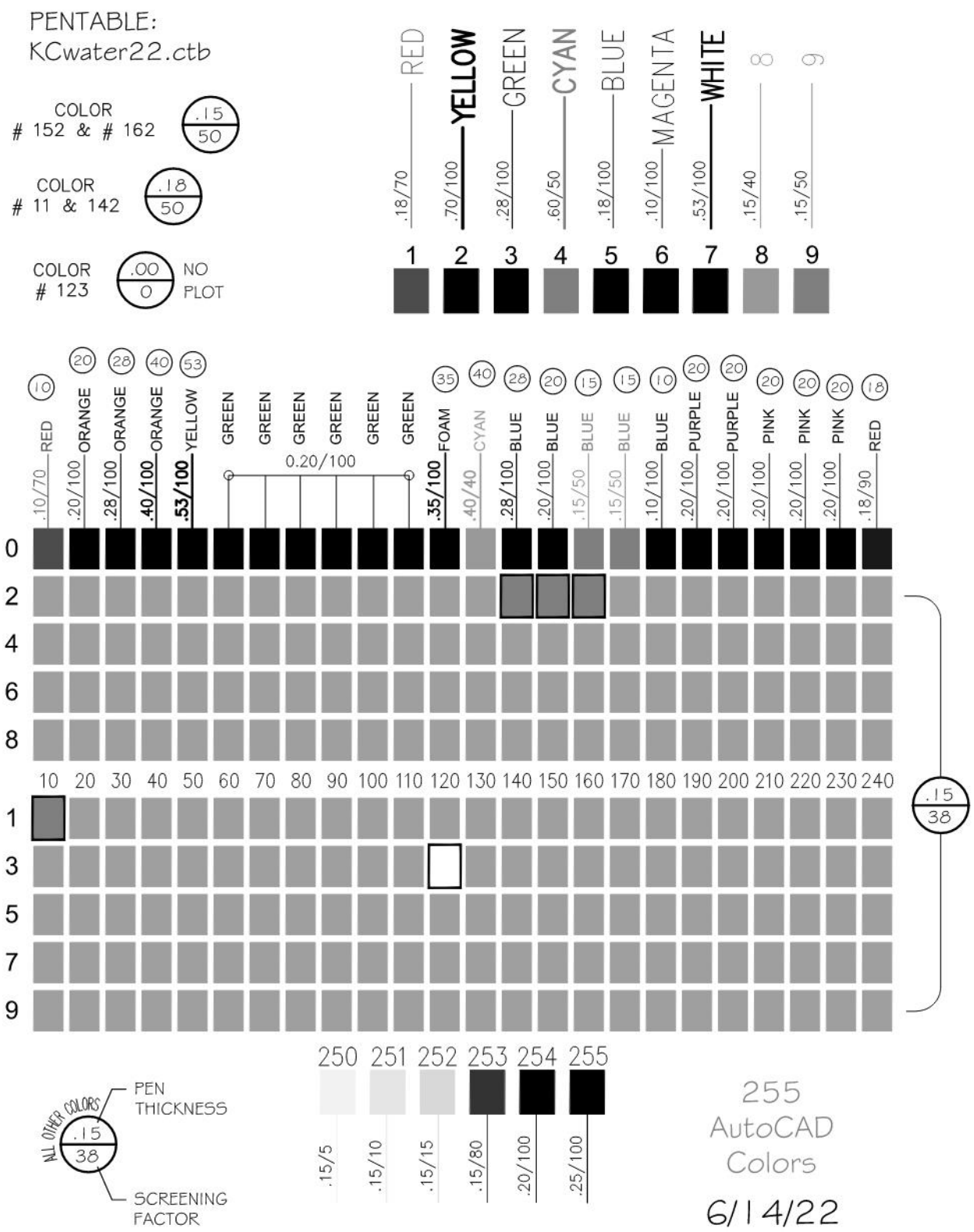
Colors: As a general rule for all projects, drawing entities should assume the color property of the layer on which they reside. This means that the color of individual entities should be assigned 'by layer' as opposed to 'by entity.' Entities which have been translated from other systems may fail to meet this requirement.

Linetypes: The default linetype of each layer is typically CONTINUOUS unless otherwise specified in the Standard Layer Listing.

Pen Weight: The following chart shows pen weight assignments which should maximize the printed clarity of drawings conforming to the color assignments of KCWSD's core layers. Other pen weights may be assigned at the discretion of the client with approval of the KCWSD CAD manager.

Pen #	Color	Weight	Screen
1	red	0.18mm	70%
2	yellow	0.70mm	100%
3	green	0.28mm	100%
4	cyan	0.60mm	50%
5	blue	0.18mm	100%
6	magenta	0.10mm	100%
7	white	0.53mm	100%
8	light gray	0.15mm	40%
9	dark gray	0.15mm	50%
123	(no plot)	0.00mm	0%

- A copy of KCWSD current pen table (KCWater22.ctb) is shown on the next page.
- Pen numbers chosen from the "AutoCAD Color Index" will show up as black and shades of grey. (See photo below)
- For adding "COLOR" to plots: Choose a color from the True Color Palette and select a RGB color value. RGB values will show up as color using the KCWater22.ctb pen table.


PENTABLE:
KCwater22.ctb
COLOR
152 & # 162
.15
50
COLOR
11 & 142
.18
50
COLOR
123
.00
0
NO
PLOT
1 RED .18/70
2 YELLOW .70/100
3 GREEN .28/100
4 CYAN .60/50
5 BLUE .18/100
6 MAGENTA .10/100
7 WHITE .53/100
8 .15/40
9 .15/50
0.20/100
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240
0
2
4
6
8
1
3
5
7
9
.15
38
250 251 252 253 254 255
.15/5
.15/10
.15/15
.15/80
.20/100
.25/100
ALL OTHER COLORS
.15
38
PEN
THICKNESS
SCREENING
FACTOR
255
AutoCAD
Colors
6/14/22

7. TITLE BLOCK INFORMATION

7.1 General

KCWSD uses project specific borders that apply to the different Divisions of the Water Services Department. Listed below are the Title blocks used by the different Divisions and the information required for each. (See Section 8 for a full list of drawing borders and templates.)

Required Title Block Project Information:

- ***DRAWN BY*** -- First initial and last initial of person that produced this sheet.
- ***CHECKED BY*** -- First initial and last name or initial of person who reviewed and approved this sheet.
- ***MAP NO.*** -- (See below)
  *WATER PROJECTS: Will reference pipeline plate numbers.
  *SEWER PROJECTS: Will reference Sewer Atlas Number.
- ***RANGE*** -- "Range" as defined based on the Public Land Survey System.
- ***TWP*** -- "Township" as defined based on the Public Land Survey System.
- ***SEC*** -- "Section" as defined based on the Public Land Survey System.
- ***CONTRACTOR*** -- Design Professional
- ***DATE COMPLETED*** -- Construction Date Completed.
- ***CONTRACT NO.*** -- Contract Number.
- ***DRAWING SUMMITTED*** -- Date of latest drawing revision.
- ***FAC/WME/WO#*** -- (See below)
  *FAC -- Facility Number for Facilities projects.
  *WME -- Water Main Extension Number for WME projects.
  *WO# -- Work Order Number for Water projects.
- ***DRAWING NO.*** -- Drawing number assigned by KCWSD
- ***PROJECT NO.*** -- ######## (8-digit KCWSD project number)
- ***SHEET IDENTIFICATION NO.*** – See Section 2.6
- ***SHEET NO.*** -- Sheet Number (sequential for entire set)

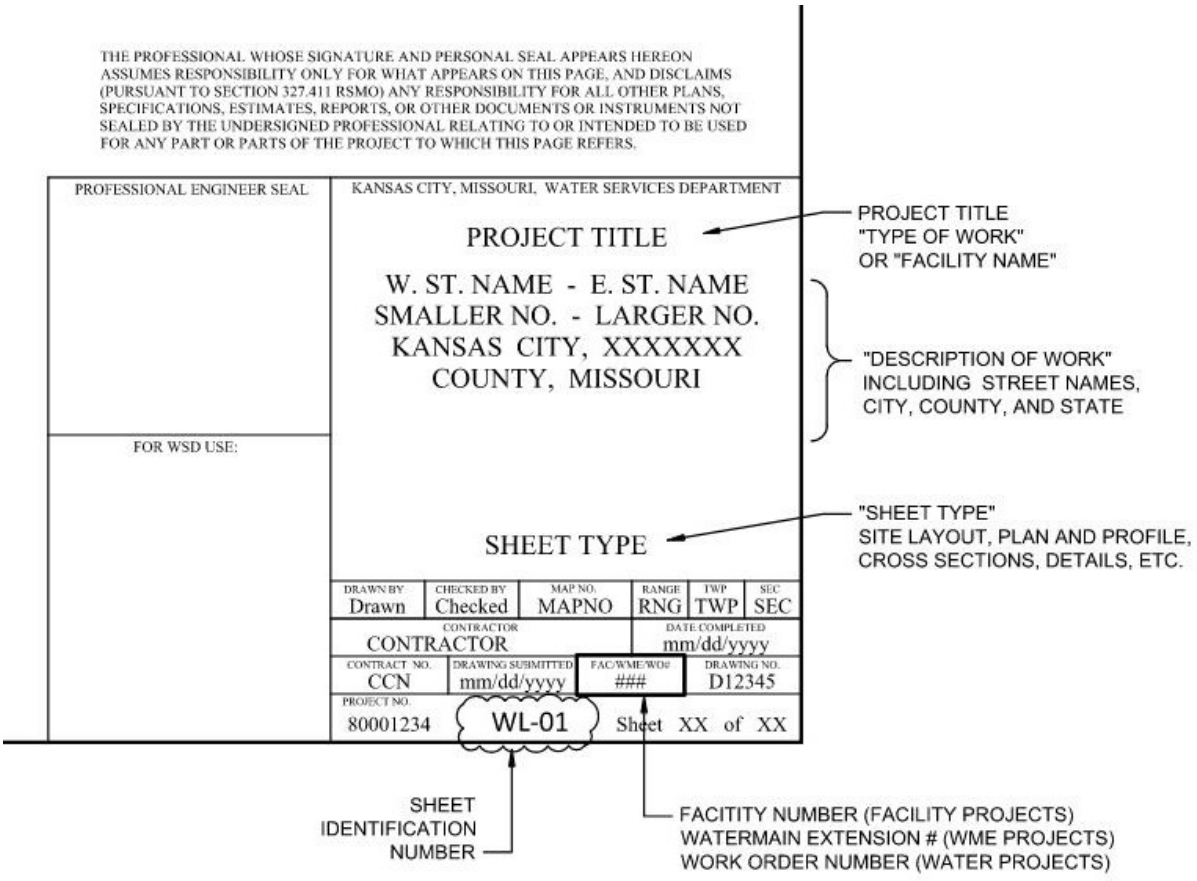
Map Number:

- Water projects will reference the Pipeline Plate numbers.
- Sewer projects will reference the Sewer Atlas numbers.

Pipeline Plate and Sewer Atlas numbers can be found at the KC Water GIS Maps website. Click on either the Water Distribution map or Wastewater and Stormwater Collection map and select “Map Sections” from the layer list. Any KCMO user should be able to access this site with single sign on. Signing in will create the user’s account - no separate account setup necessary.

https://maps.kcwater.info/portal/apps/sites/#/kc-water-gis-maps

7.2 Title Block Layout



8. COVER SHEETS AND TEMPLATES

8.1 General

Links to the KCWSD CAD Standards and drawing templates are located at:
https://www.kcwater.us/projects/rulesandregulations/

- **Computer-Aided Design (CAD and BIM) Standards**
  - **CAD Standards and Specifications**
  - **BIM Guidelines**
- **Cover Sheets and Templates**
  - **KCWATER**

- **KCWATER.dwt** (Water Object Data Template)
- **KCwater22.ctb** (Pen table)
- **24x36-KC-Border23.dwg** (KCWater Plan border - 24”x 36”)
- **24x36-KC-Cover24.dwg** (KCWater Cover sheet - 24”x 36”)
- **24x36-KC-Legend23.dwg** (KCWater General notes & Legend - 24”x 36”)
- **24x36-KC-Planpro23.dwg** (KCWater Plan and Profile border - 24”x 36”)
- **22x34-KC-Border23.dwg** (KCWater Plan border - 22”x 34”)
- **22x34-KC-Cover24.dwg** (KCWater Cover sheet - 22”x 34”)
- **22x34-KC-Legend23.dwg** (KCWater General notes & Legend - 22”x 34”)
- **22x34-KC-Planpro23.dwg** (KCWater Plan and Profile border - 22”x 34”)
- **22x34-KC-XREF-Border23.dwg** (Border created in model space for those who prefer to XREF into sheets)
- **24x36-KC-XREF-Border23.dwg** (Border created in model space for those who prefer to XREF into sheets)
- **KC-BRDR-INFO-SMART-22X34.dwg** (Title Block smart information attributes)
- **KC-BRDR-INFO-SMART-24X36.dwg** (Title Block smart information attributes)