

PORTAGE COUNTY WATER RESOURCES DRAFTING STANDARDS

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Portage County Water Resources Drafting Standards.
AutoCad 2000/Land Development Desktop R2
Friday, January 26, 2001

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PREFACE

The purpose of a set of plans is to delineate the intended work with sufficient details of design, supplemented with specifications, in such a manner that they are clearly and uniformly interpreted by engineers and contractors.

The drawing documents serve as a permanent record of the project and must provide sufficient data to enable the contractor to make an accurate bid and perform the work as intended. Clarity, completeness and conciseness are essential in avoiding misinterpretation. Unnecessary details should be avoided. Repetition of the specifications such as specifying capacities, etc., should also be avoided.

The plans become part of the contract and represent the detailed description of the work which the contractor agrees to do in consideration for an agreed sum. It is important the designer, engineer or technician understand that errors, contradictions or omissions in the plans may result in expensive change orders at the time of construction. The importance of minimizing this situation cannot be over-emphasized.

A general knowledge of drafting practices (as described in the American National Drafting Standards Manual – ANSI Y-14) is required by the Technician. It is assumed that the technician has prior exposure to ANSI Y14 from previous employment or educational background.

Part 1 GENERAL PRACTICES

1.01 SCALES

Preliminary plans should be plotted on paper. Final plans shall be plotted on mylar. The following are recommended plotting scales. Do not proceed with an assumed scale without consulting with the project engineer.

For treatment plant structures:

1/8"=1'-0" for general plan views
1/4" or 3/8"=1'-0" for plan views
1/4" =1'-0" for whole or half sections through tanks and buildings
3/8", 1/2" or 3/4"=1'-0" for enlarged sections and details

For plan and profile sheets:

1" = 100' general plans
1" = 20' horizontal and 1" = 5' for congested areas such as city streets
1" = 50' horizontal and 1" = 5' for more open areas such as country roads

1.02 TEXT STYLES

For process drawings:

Existing "style" parameters:

Font = Simplex
Height = "Leroy" #100
Width Factor = 0.8
Obliquing Angle = 15 degrees

For Plan and Profile Sheets:

Existing "Style" parameters:

Font = Simplex
Height = "Leroy" #100
Width Factor = 0.8
Obliquing Angle = 0

Proposed "Style" parameters:

Font = Simplex
Height = "Leroy" # 120
Width Factor = 1
Obliquing Angle = 0

When two (2) proposed utilities are shown on the same project (i.e., sanitary and waterline) the proposed text for the waterline should be differentiated from the sanitary with the use of a bolder color or text font such as "Romand".

1.03 PIPING CONVERSIONS:

For Process Drawings:

For plot scales of 1/4", 3/8" or 1/2", process piping of 3" and smaller will be shown with a single line. Process piping of 4" and larger will be shown with double lines. These standards may be modified for plot scales of 1/8" and smaller.

For Plan and Profile and/or Site Plan drawings:

For plot scales of 1=20, 1=30 or 1=40 - Plan view utility piping smaller than 18-inch will be shown with a single line. Profile view utility piping 18-inch and larger will be shown with double lines. See Section 2C for appropriate line types. These standards may be modified for plot scales of 1=50 and smaller.

1.04 DRAWING NUMBERING

The lead technician initiating work on a project is responsible for creating and distributing the title block information to all other technicians who will be involved on the project. The lead technician shall create a drawing of the title block area from the standard title block drawing.

The drawing shall be named as indicated below:

Applies to regular AutoCad drawings:

U:\ACADDATA\STD\.....for Standard Drawings

U:\ACADDATA\MISC\.....for Miscellaneous Drawings

U:\ACADDATA\SEWER\...for Sewer Projects created w/o Land Development

U:\ACADDATA\WATER\...for Water drawings created w/o Land Development

For Land Development Desktop Project files:

U:\ACADDATA\LAND PROJ R2\PROJECT NAME\DWG\....

The above “*PROJECT NAME*” shall be described with the official project name, obtainable from the Official Project List maintained by the Division Manager, but not limited by a precise number of characters; be concise with the project name. Then the name of the drawing shall be descriptive of the drawing itself, (i.e. – “planprof” will suffice for plan and profile drawings, etc.). It is the discretion of the drafter to name the drawing with the best, short descriptive name for the drawing.

Land Development Desktop projects share a common database from within the current project folder. Thus, all the drawings that pertain to that project shall be saved under the same project folder in the “DWG” folder.

1.05 MARK-UPS

When marking up a print for corrections or additions the following colors should be used.

Red - for things that are to be removed.

Red - for additions or corrections that are to be made.

Yellow – to indicate work that has been addressed.

Pencil – for drafting information only (i.e. sizes, dimensions or instructions not to be placed on the drawings).

1.06 BASIC DRAWING PRINCIPLES

There are some basic principles to be followed for the preparation of functional design drawings:

- Avoid artistry – do not indulge in representation to a point where it will border on artistry.
- Avoid repetition – drawings should avoid showing repetitive dimensions. (See also Part 4 “Dimensioning and Labeling”)

- meaning intended. Do Use simplicity – keep drawing so that they are clear and simple, but still convey the not show unnecessary detailing on equipment. In most cases an outline representation of equipment is adequate.

1.07 LAYERING SYSTEM: **CURRENTLY BEING UPDATED....**

As a rule, use the following system for layering:

Additional layers may be added or required to be more specific to the drawing. These are not limited to, but should consist of the above pattern of naming. It is still the drafter's best discretion to determine the exact layer names used in the drawing.

See Figure 1.07

1.08 HATCH PATTTTERNS

AutoCAD's hatch patterns are to be used to show certain types of materials used in construction. Consistency is to be used between drawings. A number of standard hatch patterns are stored in Land Development Desktop Library and can be used readily. A non-standard hatch pattern is not transportable unless the appropriate .PAT file is sent with the drawing file.

Part II. Legends and Symbols

2.01 PIPE LEGEND

The following standard legends are to be used on all construction drawings. The legends, with the exception of plan and profile sheets, are intended so as to avoid notation of each item.

See Figure 2.01 (below)

PIPE LEGEND

	4" & LARGER	3" & SMALLER		4" & LARGER	3" & SMALLER
WELDED OR P.V.C.			BALL		
FLANGED			BUTTERFLY		
BELL & SPIGOT (PUSH-ON)			GATE		
MECHANICAL			PLUG		
FLEXIBLE (DRESSER)			CHECK		
EXPANSION			PRESSURE REDUCING		
M.J. X FLG. W/TIE RODS			PRESSURE RELIEF		
CONCENTRIC REDUCER			AIR RELEASE		
ECCENTRIC REDUCER			AIR/VACUUM		
PIPING AND OTHER ITEMS TO BE REMOVED			UNION COUPLING		
PINCH			SLEEVE (THROUGH WALL)		
90° BEND			WALL CASTING		
45° BEND					
22.5° BEND					

Figure 2.01

2.02 PIPE FITTINGS

Pipe fittings may be inserted from the standard pipe fittings drawing located in the Standards folder on the network drive.

2.03 GENERAL PLAN SYMBOLS

Plan and profile line legends shall adhere to the following figure.

Figure 2.03

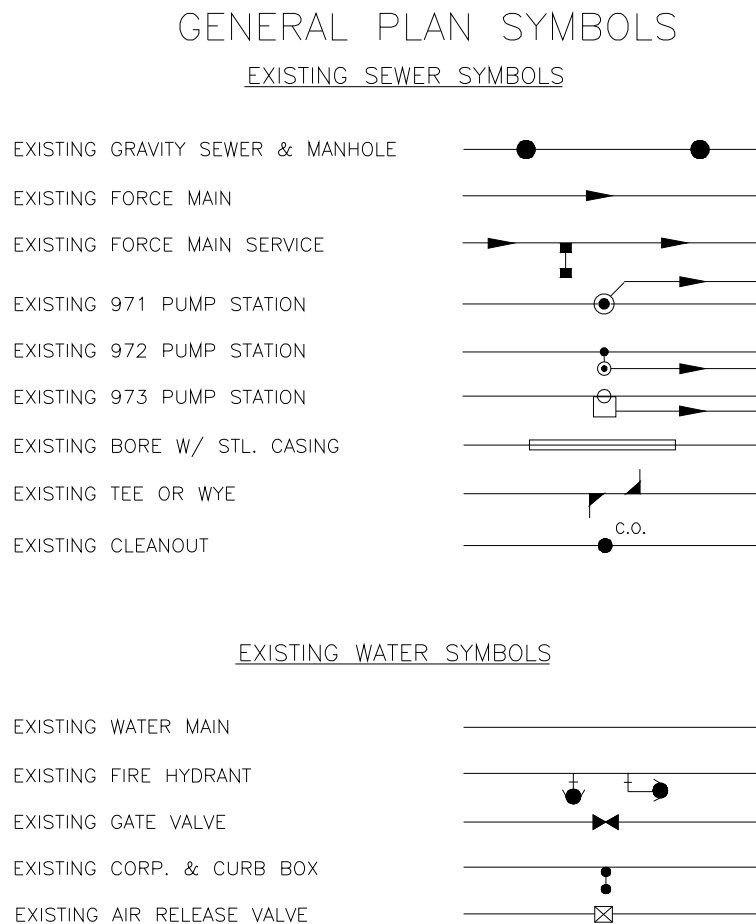


Figure 2.03 continued

FUTURE SEWER SYMBOLS

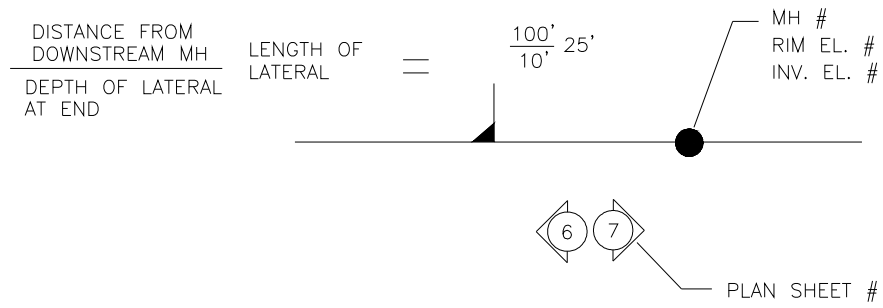
PROPOSED GRAVITY SEWER & MANHOLE	--○-----○--
PROPERTY FORCE MAIN	-----▷-----
PROPOSED FORCE MAIN SERVICE	--▷-----▷-- ┆ ┆
PROPOSED 971 PUMP STATION	-----○-----
PROPOSED 972 PUMP STATION	-----○-----
PROPOSED 973 PUMP STATION	-----○-----
PROPOSED BORE W/ STL. CASING	-----[=====]-----
PROPOSED TEE OR WYE	-----┐----- ┆
PROPOSED CLEANOUT	-----○ ^{c.o.} -----

FUTURE WATER SYMBOLS

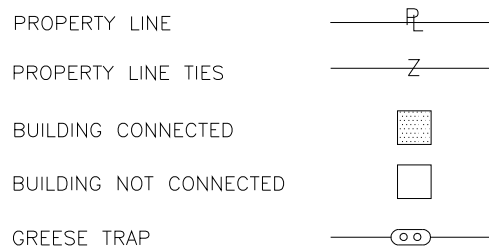
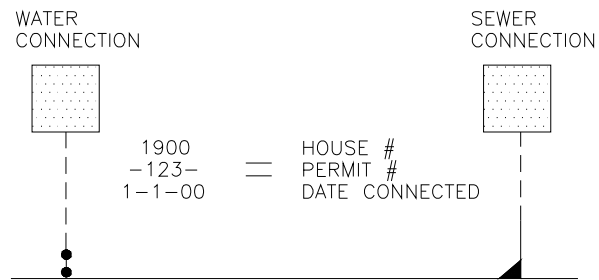
PROPOSED WATER MAIN	-----
PROPOSED FIRE HYDRANT	-----┐----- ┆ ┐ ┆ ┆
PROPOSED GATE VALVE	-----◀▶-----
PROPOSED CORP. & CURB BOX	-----○-----
PROPOSED AIR RELEASE VALVE	-----⊗-----

Figure 2.03 continued

GENERAL SYMBOLS
AS - BUILT



PERMIT INFORMATION

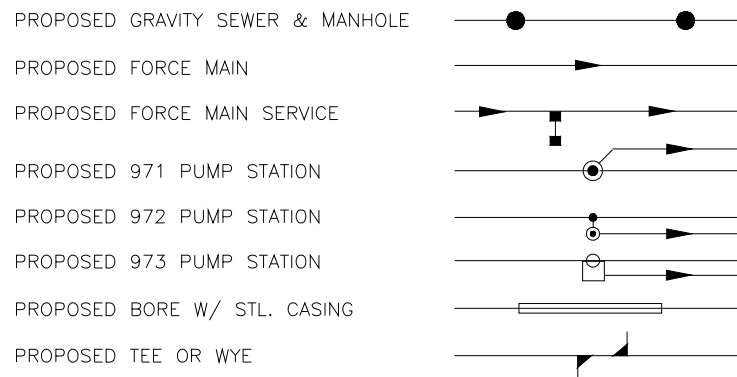


2.04 PLAN AND PROFILE SYMBOLS

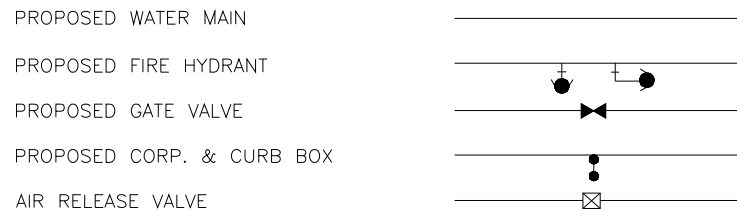
Figure 2.04

PLAN & PROFILE SYMBOLS

PROPOSED SEWER SYMBOLS



PROPOSED WATER SYMBOLS



EXISTING SEWER SYMBOLS

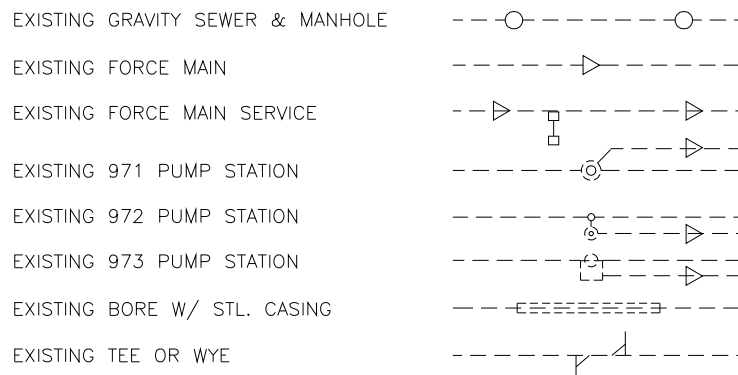



















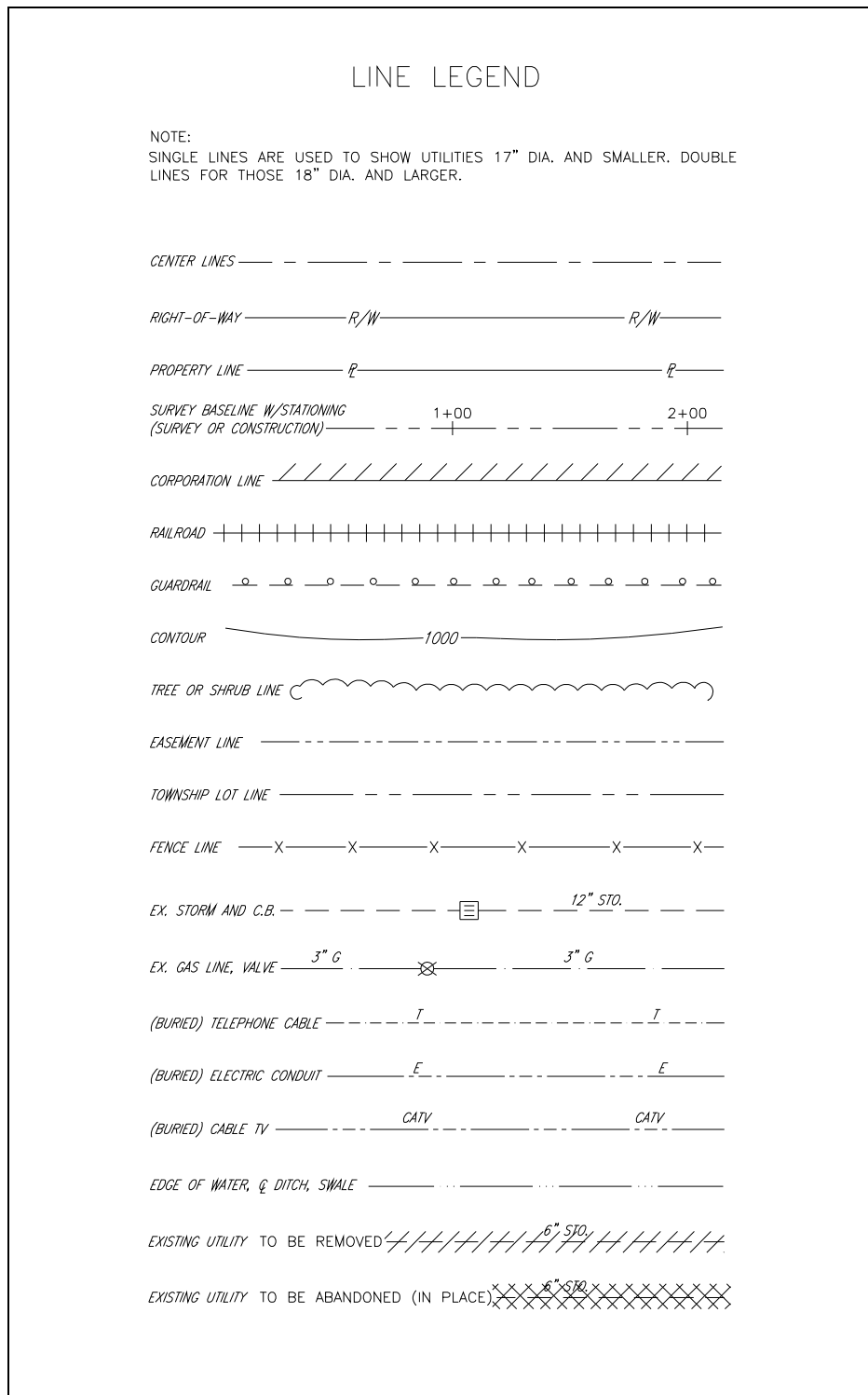
Figure 2.04 continued

EXISTING WATER SYMBOLS

EXISTING WATER MAIN	-----
EXISTING FIRE HYDRANT	----- 
EXISTING GATE VALVE	----- 
EXISTING CORP. & CURB BOX	----- 
EXISTING AIR RELEASE VALVE	----- 

GENERAL SYMBOLS

BORING	
CATCH BASIN	
CONCRETE MONUMENT	
X MARKS ON FENCE	
GUY WIRE	
HUB - SURVEY	
IRON PIN	
MAIL BOX	
METER	 METER
POLES	 LIGHT  POWER  TELEPHONE
PLUGS	
PINE TREE	
SIGN (STREET, STOP, ECT.)	
TREES AND STRUBS	
VALVE - GAS	



2.06 STANDARD TITLE SHEET

The standard prototype Portage County Water Resources Title sheet can be found on the server in the Standard folder and with the name of “STDTITLE.DWG”. In some cases the text may need to be changed to accommodate more lines of text, drawing lists, quantities and approvals. Do not change the grouping of the information without consulting the Project Engineer. Any other modifications should be kept to a minimum. The project location map should be inserted at the specified scale.

See Figure 2.06

2.07 STANDARD BORDER FRAME

The standard border frame is drawn at 1=1 and saved in the Standard folder on U:\ When inserting into a drawing, use the intended scale of the drawing scale.

See Figure 2.07

Part III Dimensioning and Labeling

3.01 BASIC PRACTICES

The following check list summarizes some common dimensioning conventions used to reduce mistakes.

- Each dimension should be given clearly, so that it can be interpreted in only one way.
- Dimensions should not be duplicated or information given two different ways. No dimensions shall be given except those that are needed for construction or estimated quantities.
- Dimensions should be given between centerlines or wall surfaces that have a functional relation to each other or that control the location of openings or access ways.
- Dimensions should be given so that it will not be necessary for the contractor to calculate, scale or assume any dimensions.
- Dimensions should be attached to the view where the shape is best shown.
- Avoid dimensioning to hidden lines.
- Dimensions should not be placed upon a view unless shown with clarity and long extension lines are avoided.
- Dimensions applying to two adjacent views should be placed between views, unless clearness is promoted by placing some of them outside.

- The longer dimensions should be placed outside all intermediate dimensions so that dimension lines will not cross extension lines.

3.02 PLACEMENT OF DIMENSIONS AND EXTENSION LINES

The correct placement of dimension lines and extensions is crucial to the legibility of the drawing. Shorter dimensions should be closest to the object while longer dimensions shall be placed outside and beyond the shorter dimensions. The crossing of extension lines shall be avoided this way. Extension lines shall never form a continuation of any line of the drawing to avoid confusion. Hidden lines should never be dimensioned unless no other view is available to show that dimension.

3.03 NOTES

Some dimensions may need to be supplemented with notes. They should be brief and carefully worded to be capable of one interpretation. Notes should be lettered horizontally on the sheet and arranged in a systematic manner. They should not be lettered in crowded places. Avoid placement of notes between views where possible. The notes should be placed next to the correct view where application is needed so as to not confuse the reader. Leaders should not cross intersections, specific points or corners of objects in the drawing and cross as few lines as possible.

Notes are classified as “general notes” that apply to the entire drawing. “Local notes” are notes that apply to specific items.

General notes should be lettered in the lower right-hand corner of the drawings, above or to the left of the title block, or in a central position below the view to which they apply.

3.04 ADDITIONAL INFO

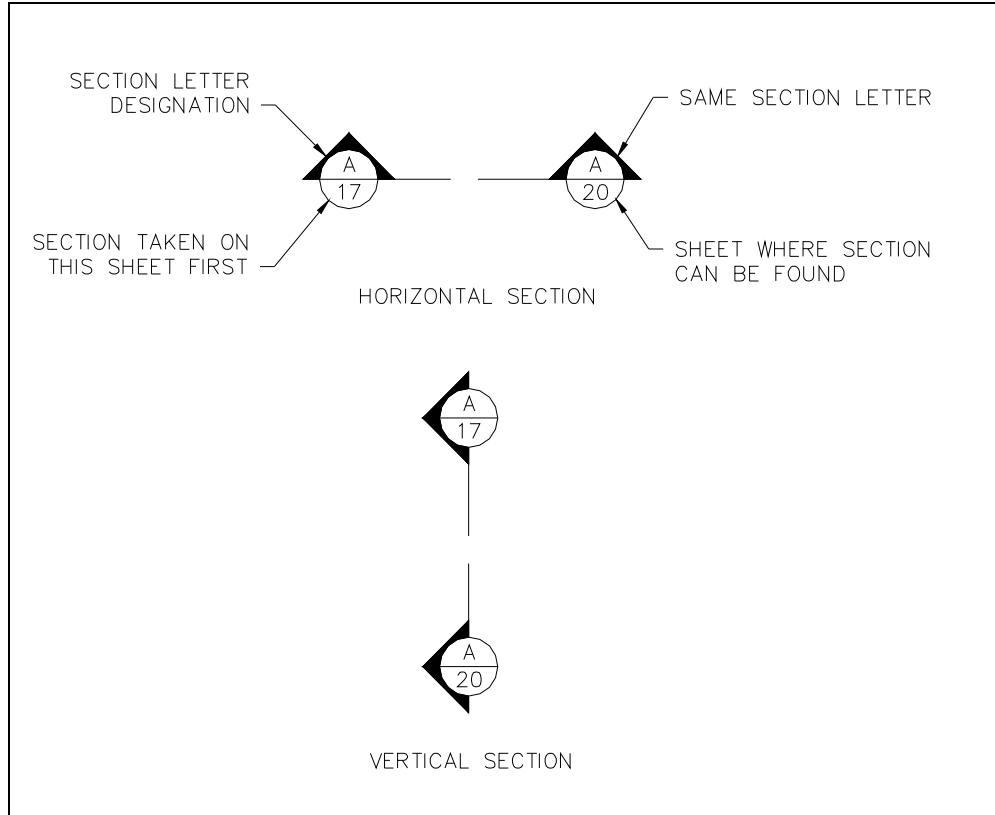
The main purpose of a plan view is to show equipment and piping relative to architectural space requirements.

Equipment and piping layout in plan view should be dimensioned from inside face of walls to important centerlines such as discharge and suction piping or centers of pump pads. In addition to pipe material, size and flow direction should also be indicated in both plan and section views. (ie., 6” DIP blower pump discharge).

Titles for plan views are to be labeled with reference to the elevation from which the plan is viewed and not the floor elevation. A plan “cut” five feet above a floor having an elevation of 985.00 would be labeled “PLAN @ EL. 990.00.

The cutting plane arrows used on architectural, process, structural, plumbing, HVAC and electrical plan views are shown here:

Figure 3.04



The corresponding sectional view is to be labeled as follows with the appropriate scale:

SECTION A17 – A20
SCALE: 1/4" = 1'-0"

Please note the left justification of the scale. Cutting plane arrows can be selected from the symbols library.

3.05 STANDARD ABBREVIATIONS

See the attached Figure 3.05 standard abbreviations for commonly used standard abbreviations that may be used on the drawings at any time.

Part IV Drafting Administration

4.01 DRAWING FILES

Drawing files are stored on the Network server. The location is as follows:

U:\ACADDATA\SEWER\Project Name\DWG Name (for sewer drawings done without Land Development Desktop). The drafter puts the project name and drawing name on the drawing.

U:\ACADDATA\WATER\Project Name\DWG Name (for water drawings done without Land Development Desktop)

U:\ACADDATA\LANDPROJ R2\Project Name\DWG\DWG Name (for drawings done with Land Development Desktop)

Note: Any drawings not saved on Network Drive U:\ will **not** be backed up by the server tape backup.

When saving a drawing and choosing a drawing name, a folder shall be created with the project name and the drawing shall be saved with a descriptive name into the respective project folder.

Drawings received on disk by surveyors and or consultants are to be copied onto the server under their respective project folder and the disk(s) shall be logged in to the data received log book.

4.01 PLOTTING PROCEEDURES

Drawings are plotted on paper and official title sheets for signatures are plotted on mylar. As-built drawings are plotted to mylar and stored in the hanging file.

4.02 STANDARD DETAIL MANAGEMENT

Water Resources Standard drawings are saved on the network drive on u:\acaddata\standard\ and are not to be altered or changed unless requested by the construction engineer or the engineering department itself. These drawings consist of standard water and sewer construction details, a title sheet, pump station drawings and miscellaneous drawings. Changes are submitted to the Engineering Division Manager for final approval.

Drawings are drawn at a scale of 1=1 and then plotted at the matching dimscale or the intended plot scale.

4.03 SPECIAL NOTES LIBRARY

Special notes are drawn at a scale of 1=1 and saved in the U:\Acaddata\Standard folder. They may be accessed and inserted into a drawing at the intended scale of the drawing.

4.04 GENERAL NOTES LIBRARY

General notes are drawn at a scale of 1=1 and saved in the U:\Acaddata\Standard folder. These may be accessed and inserted into a drawing at the intended scale of the drawing.