US Army Corps
Of Engineers®
Jacksonville District

A/E/C Computer-Aided Design (CAD) Plans preparation Manual

April 2023

1 Introduction

Purpose

This Plans Preparation Manual sets forth design criteria as well as procedures, for Design Plan Documents created for the U.S. Army Corp of Engineers, Jacksonville District projects. The information contained in this “Plans Preparation Manual” (PPM) applies to the preparation of contract drawings for water control structures, waterways, environmental restoration, facilities, surveys, and shoreline restoration. This document shall also serve as a CAD Standard for the Comprehensive Everglades Restoration Plan (CERP).

Authority

CECW-CE Memorandum for subordinate commanders, Implementation of the A/E/C CAD Standard in USACE, 23 July 2004 and CESAJ-EN Memorandum for EN division, Implementation of the A/E/C CAD Standard in Jacksonville District, 21 March 2005.

Scope

The procedures and criteria contained in this Plans Preparation Manual apply to all U.S. Army Corp of Engineers employees and contractors, including contracted A/E firms, preparing contract drawings for U.S. Army Corp of Engineers, Jacksonville District.

Procedure

The criteria in this manual represent requirements for Jacksonville District contract drawings which must be met for the preparation of project plans and reports unless approved exceptions or variations are obtained in accordance with procedures outlined in this manual.

Revisions and Updates

Plans Preparation Manual holders are encouraged to submit comments and suggestions for changes to the CAD/BIM Manager.

Recommendations or suggested additions should be sent to:

Jacksonville District
US Army Corps of Engineers
ATTN: CESAJ-EN-D/CAD Manager
701 San Marco Blvd.
Jacksonville, Florida 32207

Applicable Documents

The following specifications, standards, and handbooks form a part of this document to the extent specified herein.

A/E/C CAD Standard Rel. 6.1, ERDC/ITL TR-19-7, U.S. Army Engineer Research and Development Center

A/E/C Graphics Standard Rel. 2.1, ERDC/ITL TR-19-6, U.S. Army Engineer Research andDevelopment Center

Uniform Drawing System, The Construction Specifications Institute

AIA CAD Layer Guidelines, The American Institute of Architects

ASME Y14.2, The American Society of Mechanical Engineers

ASME Y14.3, The American Society of Mechanical Engineers

ASME Y14.4M, The American Society of Mechanical Engineers

ASME Y14.24, The American Society of Mechanical Engineers

Variations to this Manual

Waivers or deviations from the A/E/C CAD Standard or the Plans Preparation Manual are coordinated through the Jacksonville District, CAD/BIM Manager for approval by the Chief of Design Branch. Contact the Jacksonville District, CAD/BIM Manager when the requirements of the A/E/C/ CAD Standard or this manual interferes with the creation of a clear and concise drawing to determine the graphic presentationor criteria to resolve the conflict.

Plans Preparation Manual Format

This manual is written to provide requirements and guidance for those who are preparing design documents for the Jacksonville District, Corps of Engineers. The format used is targeted at the users preparing the design plans and is intended to be a resource, technical reference, and workflow for how the design work is to be accomplished. The body of the Plans Preparation Manual is a drafting manual describing techniques, procedures, and format requirements.

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2 Drawing File Organization

Standard File Requirements

The standard requirements listed below are to provide additional guidance not provided in A/E/C CAD Standard, ERDC/ITL TR-19-7.

Plotted Drawings. Every final plotted drawing sheet shall originate from its own separate electronic sheet model file. The electronic sheet file shall be made up of design model and/or drawing model files referenced to each sheet model file.

Border File. Only one border file shall be used for each project.

Reference File Method. With AutoCAD (DWG) file format the OVERLAY method of referencing design models and drawing models is the preferred method.

Drawing File Naming Conventions

Project Code used in file names is the six digit P2 project number, underscore, and then a short project description (12 characters), followed by a dash. The project Engineering Technical Lead will determine the short project description and obtain the P2 number.

If the project involves construction of multiple structures, facilities, features, or options the name of each item being constructed will be included as part of the Project Code. For example, a project containing multiple water control structures would have a Project Code which varies slightly by water control structure. Such as, 123456_BBCW_S-624-E-PPXXXX and 123456_BBCW_S-627-E-PPXXXX.

The model file user definable field can be used to further define the contents of the file or to designate the file's numeric sequence in a group of the same model file types.

Paragraph 2.4.3 Sheet file naming convention of ERDC/ITL TR-19-7 is deleted in its entirety.

The sheet file naming convention contains five fields, 4 are mandatory, while 1 is optional. The first field is a mandatory Project Code. The next two characters are the mandatory Discipline Designator with alpha code and dash (ERDC/ITL TR-19-7, Table 2-3). Third field is optional structure, facility, feature, or option identification number. Fourth field is mandatory Sheet Sequence Number (01-99). The mandatory last field is File Status field

In order to define file status such as Superseded, Modified, and As-built, 4 user definable characters will be added to the sheet file name. These 4 characters shall always be used. If the status of a file has not been modified, use four uppercase X. For example, 123456_BUNKHOUSE-A-02XXXX. The allowable characters for this field are: S,

superseded; abbreviated modification identification; abbreviated amendment identification; R, file record drawing.

For example, a sheet file name with only the 4 mandatory fields will be, 123456_BUNKHOUSE-S-06XXXX. An example of a multiple structure project sheet file name including the optional identification number is, 123456_BBCW_S-624-E-11XXXX. A sheet file which has been modified by modification RG0001 will have the file name of, 123456_BUNKHOUSE-A-06RG01. The file record version of this same sheet file will have the file name of 123456_BUNKHOUSE-A-06R.

Drawing Numbers (Sheet Identifiers)

Paragraph 2.5 Coordination between sheet file name and sheet identifier of ERDC/ITL TR-19-7 is deleted in its entirety. Paragraph 2.1.11 Sheet Identification Block of ERDC/ITL TR-19-6, A/E/C Graphic Standards is deleted in its entirety.

Sheet Identifiers are the Identifiers that are place in the Title Block lower-right of the drawingsheet. Sheet counter such as “Sheet X of Y” or “DWG X of Y” shall not be used. The Drawing Index Sheet is the record of every sheet in the drawing set and the order of drawings in the set.

Projects containing multiple structures, facilities, features, or options will be divided into categories by having a Feature Numeric Identifier assigned to each feature (or separate structure) of the project. The Feature Numeric Identifier is a single number code. Upon forming a Project Delivery Team (PDT) or receiving a Notice to Proceed (NTP) the Engineering Technical Lead or designated representative will publish a memorandum listing all project features and the numeric identifier assigned to each feature or phase of work.

Drawing numbers for use in the sheet identification portion of the sheet title block , reference bubbles, etc consist of the sheet file name Discipline Designator, optional Feature Numeric Identifier, and Sheet Sequence Number.

A basic Sheet Identifier will consist of the Discipline Designator, a dash, and Sheet Sequence Number. An example of a basic Sheet Identifier is V-09. A sheet belonging to a multiple features project will consist of the sheet file name Discipline Designator, optional Feature Numeric Identifier, and Sheet Sequence Number. For a multiple features project a typical Sheet Identifier is, E-503.

The BLDG_ID data field in the sheet title block will not be used.

Sheet Titles

Three lines are available for the sheet title. First line will always be the design discipline the sheet belongs to. Typical examples of the first line are: CIVIL, SURVEY, STRUCTURES, RESOURCE, etc. Second line is the sheet title of the sheet or the structure identification. Typical examples of the second line are: TYPICAL FENCE DETAILS, COFFERDAM PLAN, etc. Third line is a continuation of the sheet title or the sheet title of multiple features projects.

Sheet Titles - Multiple Features Project

When multiple structures or features are included in a project each sheet representing a structure or project feature will have the structure or feature identification in line 2 of the sheet title. As an example, line 1 is ELECTRICAL, line 2 is S-734 PUMPING STATION, line 3 is PIPE GALLERY 3 PHASE POWER PLAN. The Sheet Index entry under ELECTRICAL will be S-734 PUMPING STATION, PIPE GALLERY 3 PHASE POWER PLAN, all on one line.

Drawing Set Table of Contents

The sequence of the disciplines in a drawing set shall follow the order as shown in Table 2-1, of ERDC/ITL TR-19-7.

3 Preparation of Contract Drawings

Drawing Presentation

Drawings are a graphic design representation of contractual project requirements. Provide only essential details to achieve a clear graphical representation of the contract specifications. The drawings indicate the relationships between components and materials and should show location, identification, dimension, details, and shape and form. Care shall be exercised in showing all dimensions and notes necessary for the construction of the object represented.Omit from drawings, repetitive details and unclear contract requirements.

Indicate contract requirements only once on drawings. This shall be indicated at the first opportunity in the drawing set where the feature or item is shown. Do Not include any National Standard Publication identifiers such as ANSI, ASHRAE, FDOT or ASHTO standard IDs. These are to be included in the Contract Specifications. If it is necessary to refer to these standards, place a note on the drawing referring to the specification number as a requirement.

Limit cross-hatching or patterns to indicate only enough to clearly designate material. Show hatching and other patterns used for walls and other continuous features at the beginning and end of the representative element. Provide cross-hatching and patterning only at the outline edges of the feature unless it is a long distance, in which case provide intermittent indications to represent the feature.

The drawings indicate the relationships between components and materials and should show location, identification, dimension, details, and shape and form. Information such as physical quantities, chemical constituents, performance requirement, standards of workmanship, required quality of material and equipment. Installation requirements shall not be shown in the drawings but shall be included in the specifications.

Project File Set Up.

Based on the project type, the border (ANSI size D or E) is selected for the project by the

Engineering technical Lead. The standard size border is an ANSI D border . If the project is a large civil works project or a navigation project then the ANSI E border file is appropriate. The copy of the border file placed within the project folders shall be renamed to follow the A/E/C CAD Standards naming convention.

The border file contains the border template and project title block data used for each contract drawing. The project border file shall contain only the project title block data and the project production data.

Project production data used in the title block is standardized for preparing all contract drawings in the Jacksonville District and is not edited for each project.

Once a project border file has been created, the title block project information must be edited. For information related to completing the title block data refer to ERDC/ITL TR-19-6, A/E/C Graphic Standards. In the project identification block change the top 3 “X” placeholders to reflect theconstruction program title and the fourth line “X” placeholder to match the project title, see figure3-1.

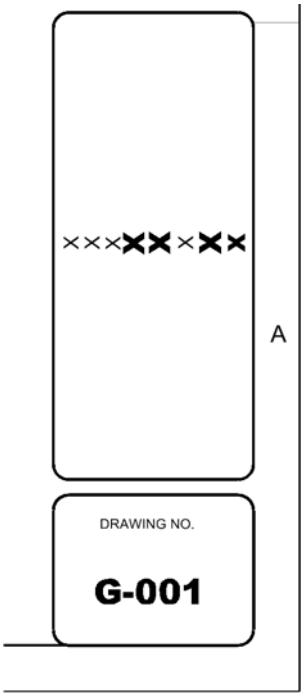

Figure 3-1

In the management block, edit the Issue Date, Contract Number and Solicitation Number, see figure 3-2.

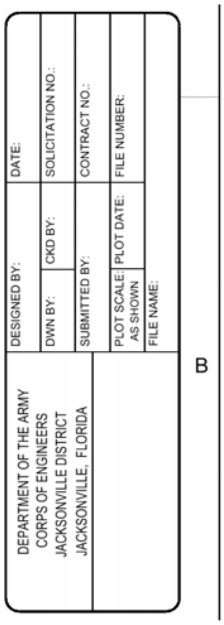

Figure 3-2

Based on the project, prepare a project cover sheet. The cover sheet is renamed to match the project naming convention that follows the Plans Preparation Manual. Edit the cover sheet Program Title line 1 Program Title Line 2, Project title and Additional Project Title, as required.

Based on the selected ANSI size of border the same size index is selected for the project. The index sheet file is preconfigured for the user to start developing the drawing index. The index sheet file template is shown in figure 3-3. Edit the project title place holders to reflect theproject's information. For small projects the drawing index may be placed on the cover sheet.

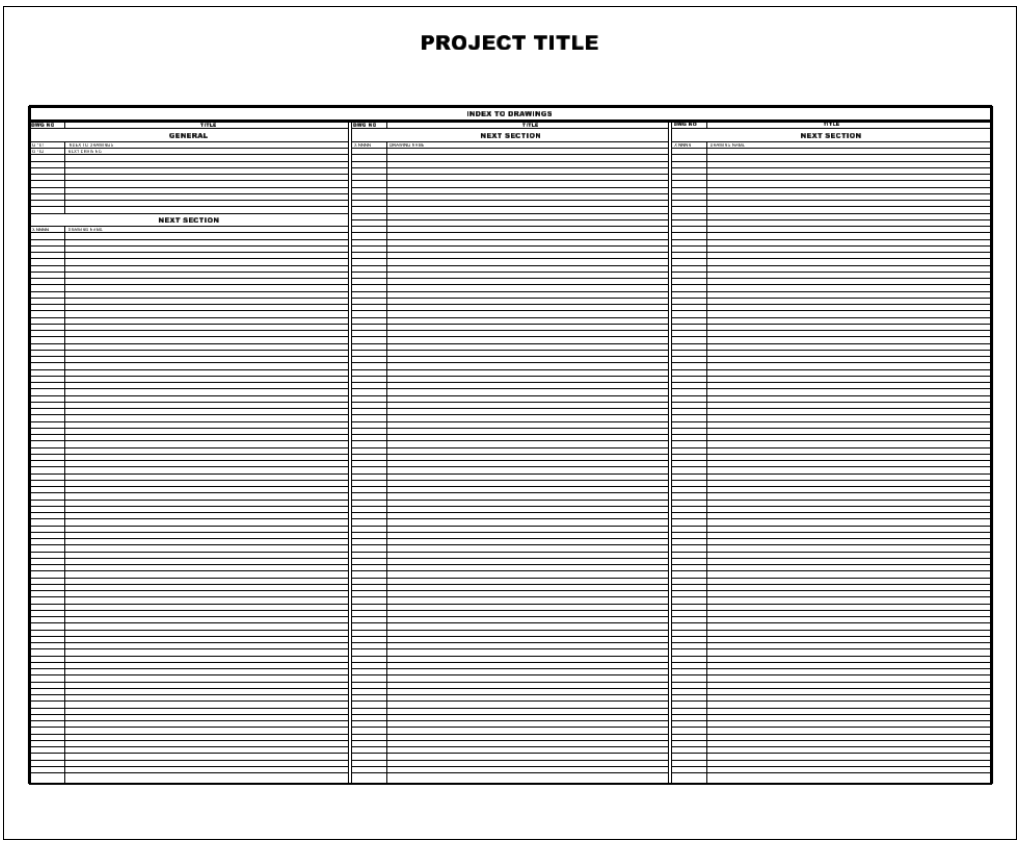

Figure 3-3

Standard General Project Abbreviations and Symbols sheets have been supplied for both ANSI D and ANSI E sizes and shall be included in all projects. A typical General Project Abbreviations and Symbols sheet is shown in Figure 3-4. While a standardized template is provided for the project, this sheet may be edited to reflect any project specific items or information. As a minimum the Table of Contents will be edited to reflect the discipline sequence used for the project.

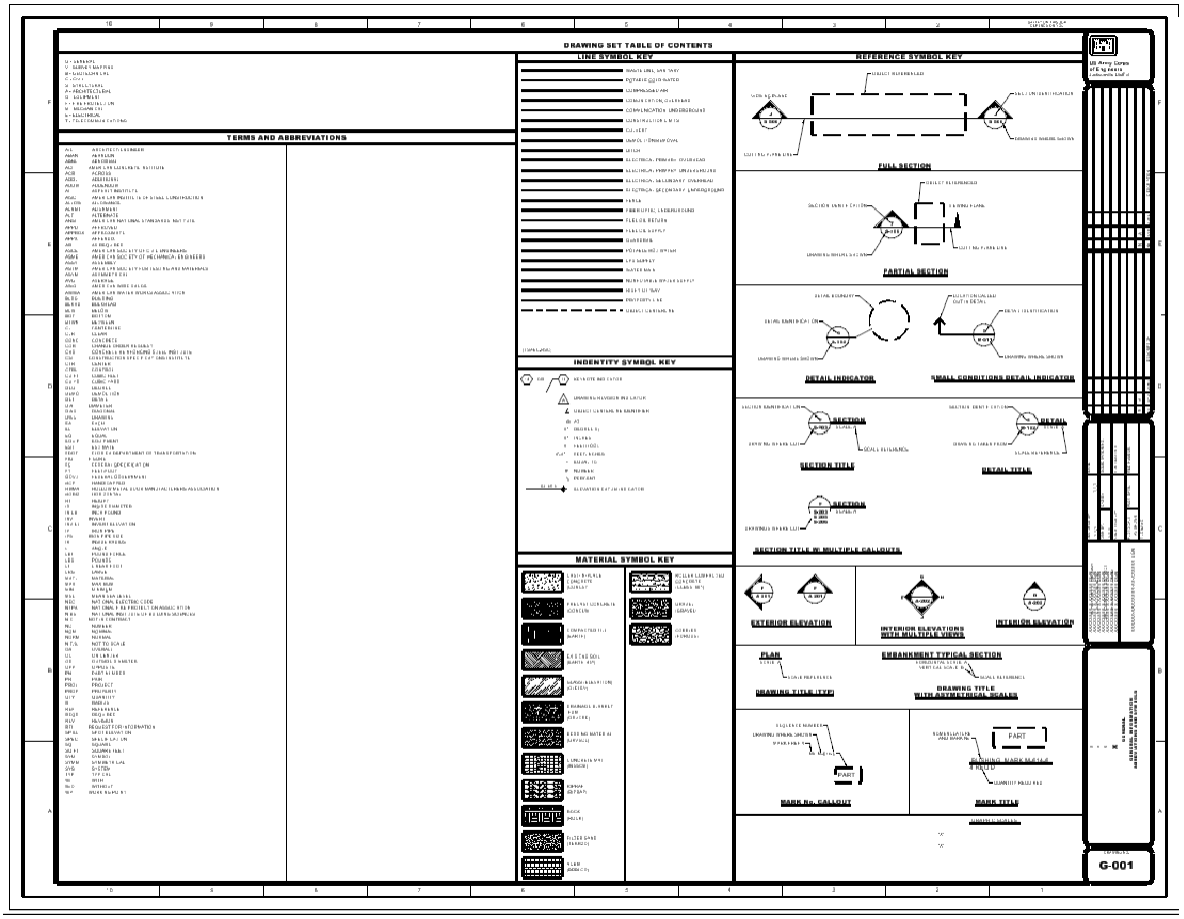

Figure 3-4

Design Files

Design Model File Preparation

For the typical large civil works project or large facility, such as a pump station, the project's design model files will be organized in accordance with A/E/C CAD Standard Rel. 6.1, ERDC/ITL TR-19-7, table 2-2, Model File Types. Autodesk Civil 3D civil modeling data will further be divided in accordance with Autodesk and Bentley recommended best practices relating to Data Short Cuts.

Elevation Views

Place the elevations in a logical order; normally the front elevation is placed at the top-left cornerof the sheet file. Other elevations are then placed to the right and below the front elevation. When a sheet file contains multiple views of a facility or structure, place the Plan View at the top-left corner of the sheet file. Then "unfold" the other views to the right and below the Plan view, see figure 3-5. The examples shown below are excerpts from the National CAD Standard and do not adhere to Jacksonville District's text/font standards but are show as an example only.

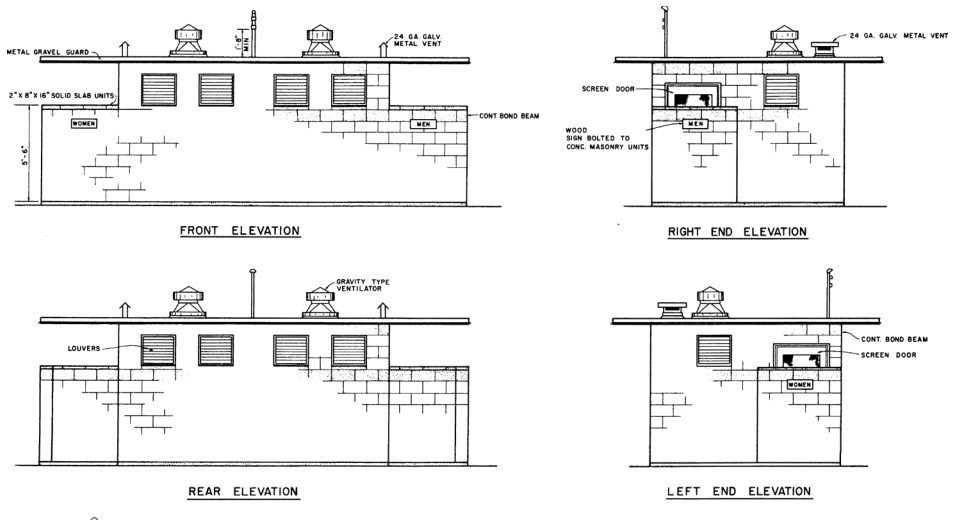

Figure 3-5

Cut sections from the bottom of the sheet to the top of the sheet, see figure 3-6.

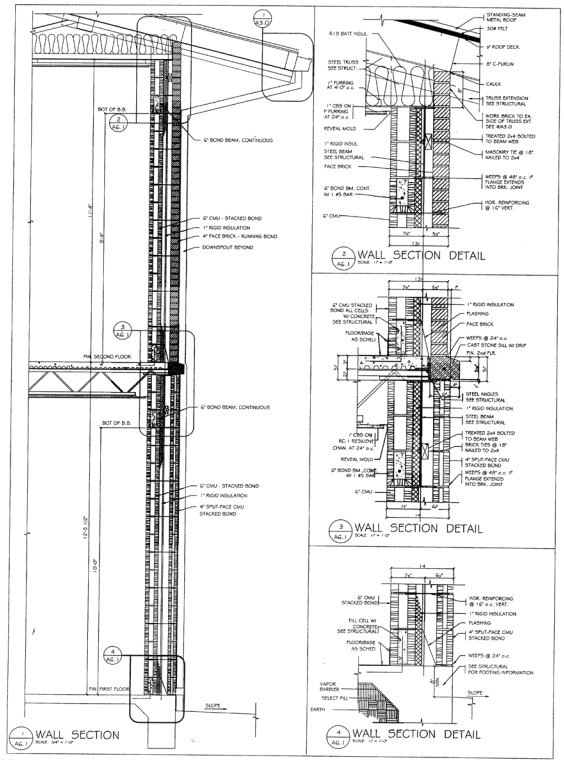

Figure 3-6

Set the views in a sequential flowing logical order, see example figure 3-7. If the sheet contains a plan view, place the plan view in the top-left corner of the drawing. When the drawing is laid out set all the views and sections in proper orientation to each other.

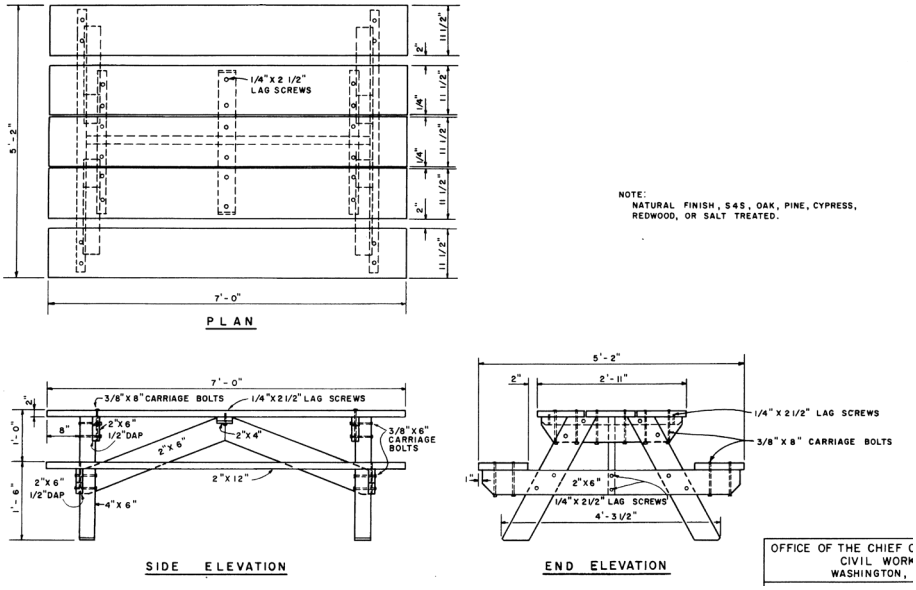

Figure 3-7

Detail Layout.

Set the details in a sequential flowing logical order, see figure 3-8. Details should be laid out in a grid pattern with a margin between adjoining details. You should ensure details do not overlap in any manner. When details are shown on a multi-view drawing, make sure the details are separated by a margin from the orthographic views or sections.

UDS SHEET FORMAT

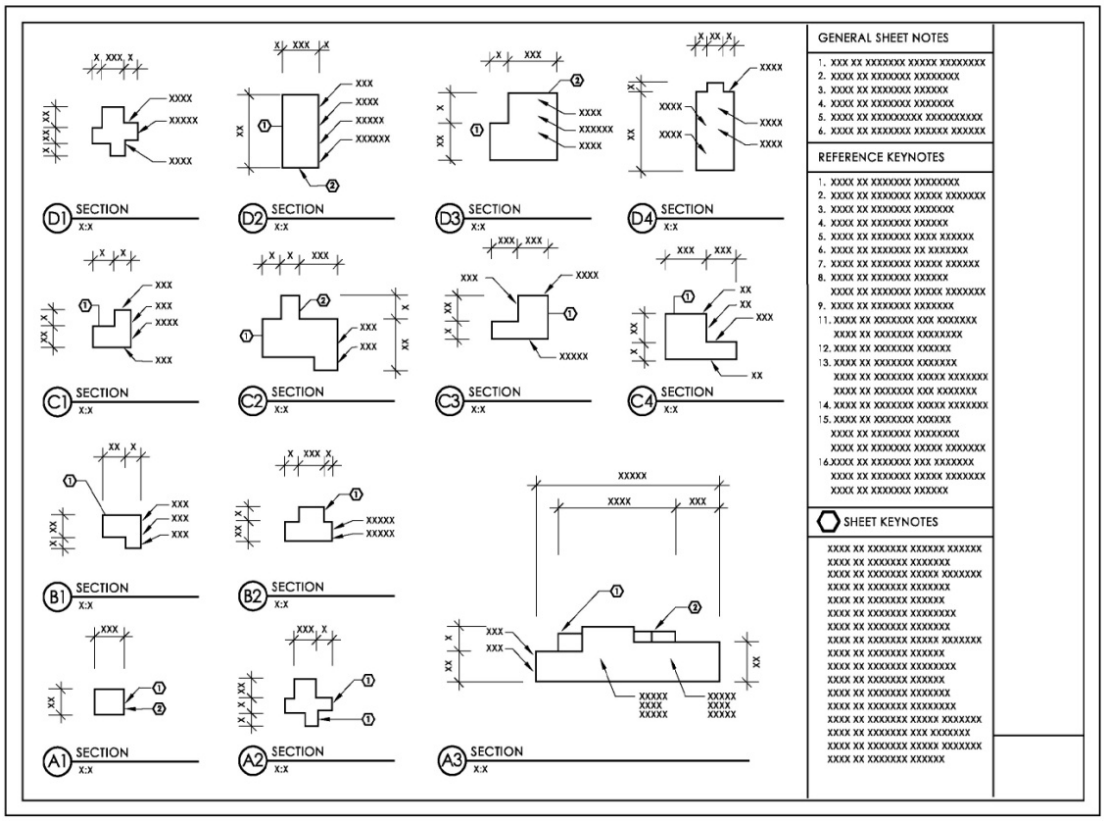

Figure 3-8

Drawing Symbology

Paragraph 4.2.3 Drawing area title of ERDC/ITL TR-19-6, A/E/C Graphic Standards is replaced as follows. Drawing area title symbology included in the A/E/C CAD Standard shall not be used. Jacksonville District unique symbol library will be used for the preparation of all drawing area titles.

4.2.3.1 The drawing area title is composed of multiple pieces and uses multiple formats based upon drawing area subject content. The drawing area content shall be categorized as non-referenced, referenced, or discrete subject.

4.2.3.1.1 A non-referenced drawing area title is used to label a drawing area, when the drawing area subject is not referenced from any other drawing area subject within the contract drawing set

(Figure 3-9). The non-referenced drawing area title contains a title line and scale bar Non-referenced drawing area titles are normally used for feature overall plans, stationing cross sections and alignment profiles. The height of the text on the drawing area title line shall be 1/4 in. The scale text underneath the drawing area title line shall be 3/32 in.

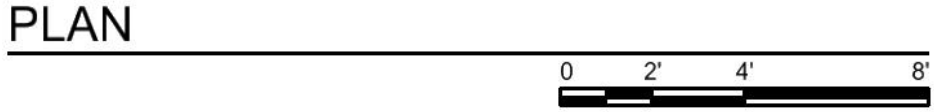

FIGURE 3-9. Non-referenced drawing area title identification symbol

4.2.3.1.2 A referenced drawing area title is used to label a drawing area, when the drawing area subject is referred to from another drawing area subject within the contract drawing set (Figure 3-10). The referenced drawing area title contains the reference identification, title line and scale bar. The reference identification is a two part circle that identifies the following: the top alpha or numeric tag contains the enlarged plan/elevation/section/detail identification and the bottom alpha/numeric tag contains the sheet number on which the enlarged plan/elevation/section/detail is called out within the contract drawing set. The enlarged plan/elevation/section drawing area identification shall consist of an alphabetical character, this does not apply to the detail identification. The letters O and I shall not be used. The character sequence shall be A,B,C … Z, AA, AB, AC … AZ, BA, BB, BC … BZ, etc. Enlarged plan/elevation/section identification character's shall be assigned in alphabetical sequence without regard to where the drawing area title is located within the contract drawing set. Each discipline designator contained in the contract drawing set shall have its own enlarged plan/elevation/section identification sequence. The detail identification shall consist of a numeric character, this doesn't apply to the enlarged plan/elevation/section identification. The detail drawing area identification character sequence shall be 1, 2, 3, 4 … etc. Detail drawing area identification characters shall be assigned in numerical sequence without regard to where the drawing area title is located within the contract drawing set. Each discipline designator contained in the contract drawing set shall have its own detail drawing area identification sequence. The height of the text on the drawing area title line shall be 1/4 in. The height of the text within the two part circle shall be 1/8 in. The scale text underneath the drawing area title line shall be 3/32 in.

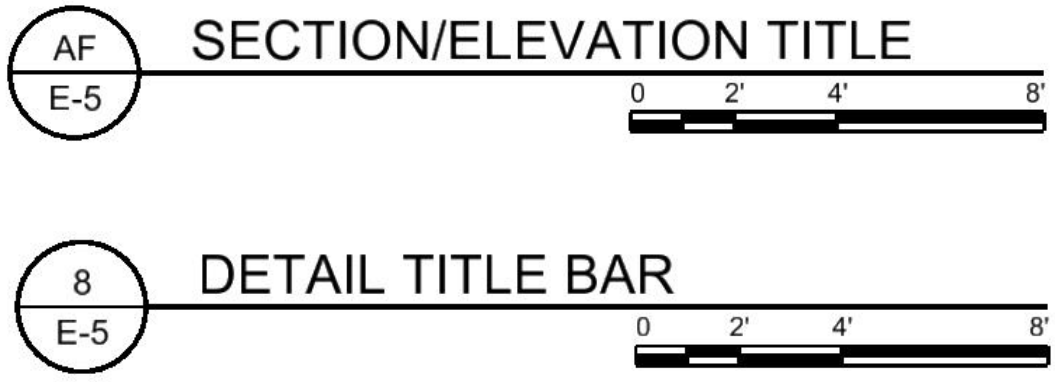

FIGURE 3-10. Referenced drawing area title identification symbols

4.2.3.1.3 A discrete drawing area title is used to label a drawing area, when the drawing area subject is a repetitive standardized fabrication detail referred to from another drawing area subject within the contract drawing set or a commercial off the shelf item (Figure 3-11). And the drawing area title will not reference another drawing area subject. The referenced drawing area title contains the reference identification, title line and scale identification. The reference identification is a bubble with a numeric character. The height of the text on the drawing area title line shall be 1/4 in. The height of the text within the bubble shall be 1/4 in. The scale text underneath the drawing area title line shall be 3/32 in.

FIGURE 3-11. Discrete drawing area title identification symbol

4.2.3.1.4 The decision on where to place the drawing area title within the drawing area of the sheet shall be based on priority and convenience, UDS Module 4 – Drafting Conventions [CSI 2014]:

[When placing details, sections, or elevations,] locate the most frequently used referenced drawing block at the lowest drawing module adjacent to the title or notation block [bottom right portion of the drawing area]. Add additional drawings in order of priority, from bottom to top and from right to left. Starting the drawings from the right to left makes it easier to use partially filled sheets. This eliminates the need to open a heavy set of drawings all the way to the binding to refer to a few details drawn on the left-hand side of the sheets.

4.2.3.1.5 When only one subject appears on a drawing, and its title already appears in the title block, a drawing area title shall also be placed under the entire area of the subject.

4.2.3.1.6 For consistency and uniformity, multiple details with subtitles are no longer allowed in the same drawing area. Details are to be single subject matter. Additional information can be added as a note.

4.2.3.1.7 A drawing area specific note may be added above the drawing area title line. The note shall be placed left justified with the drawing area title line, between the drawing area title line and the lowest part of drawing area subject graphics.

3. ERDC/ITL TR-12-1; Release 2.0, paragraph 4.2.3.2 is deleted in its entirety.

4. ERDC/ITL TR-12-1; Release 2.0, paragraph 4.2.3.4 is replaced in entirety as follows:

4.2.3.4.1 A geographic north arrow shall be provided on all sheets where a plan, key plan or partial plan is being shown. A geographic north arrow is not required on sheets containing only nonplan items such as riser diagrams, schematic diagrams, or one-line diagrams.

4.2.3.4.2 The north arrow (Figure 3-12) shall be placed above the drawing area title bar at the right side of the title bar. If possible, the orientation of true north shall be maintained throughout an entire drawing set. The orientation of true north shall be coordinated with the requirements of paragraphs 3.2.4 and 3.2.5. Architectural plans shall be adjusted so that the building grid is parallel to the sheet grid in accordance with paragraph 3.2.3.

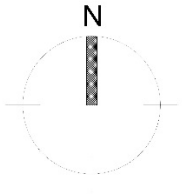

FIGURE 3-12. North Arrow

Model File Scale

Design Model files are drawn at real world scale and typically represent an existing or proposed object or surface as seen in plan view, elevation, section, etc. All details and sections are drawn at full size. Enlarged elements such as details are referenced and resized at desired scale. Design Model file plans and elevations do not contain any plot scale dependent information such as text, dimensions or graphic symbols. This type of information is placed on Drawing Model files.

Sheet File Development

The sheet file serves as a container to which the model files are referenced. The sheet file is a container “holding one or more models and general information”.

Border File Attachment.

Reference the border file to the sheet file, only one border file will be used in the drawing set.

Note: The border file should only be referenced to the sheet file and not copied into the sheet file.

Valve House Example.

This example of preparing a contract drawing illustrates the use of a border file, sheet file and multiple model files to create a finished drawing. Creation of a contract drawing begins with creating a sheet file to serve as a container for model files, border, dimensions, text, notes, etc.

Begin with the blank sheet file and insert the first model file reference. For this example the first model file reference is a structural drawing of the building floor plan., see figure 3-13.

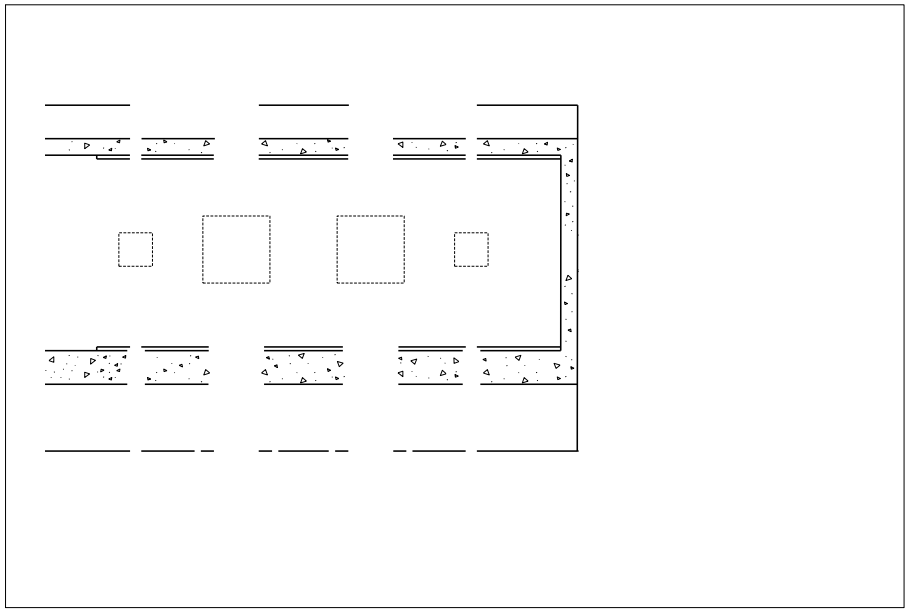

Figure 3-13

Continue adding other model files as required to complete the contract drawing. The second model file referenced in this example is a mechanical model of the piping and valves, see figure 3-14.

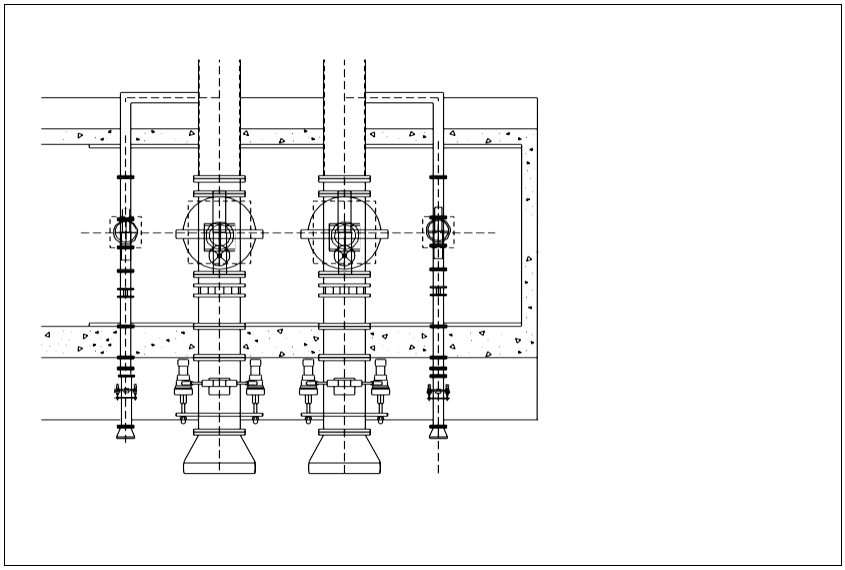

Figure 3-14

The border file is attached to the sheet file as a reference file, see figure 3-15.

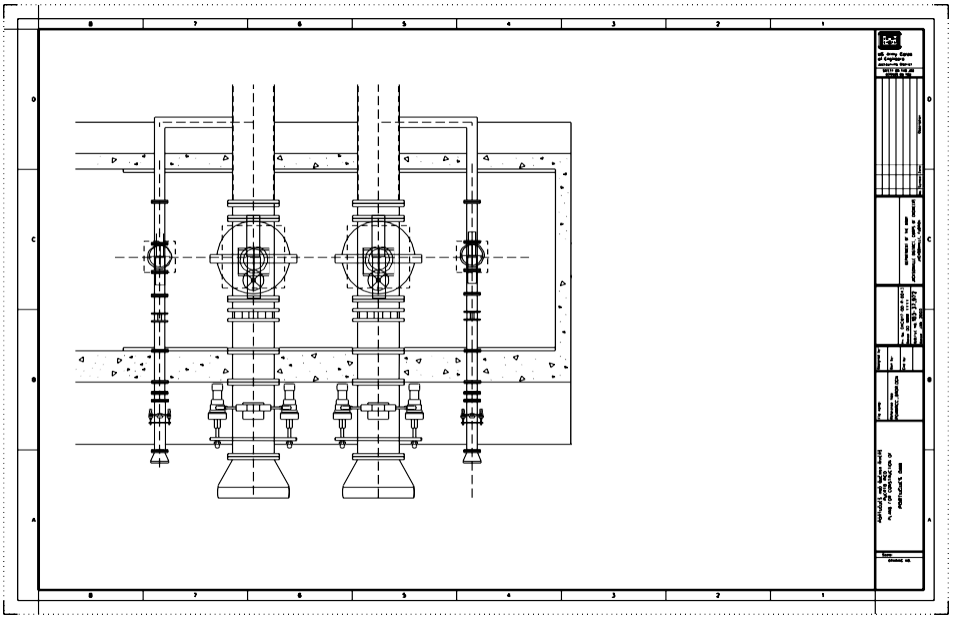

Figure 3-15

Finish the contract drawing by adding dimensions, text, notes and symbols to the sheet file, see figure 3-16. Edit the sheet file data to reflect the contract drawing identification information.

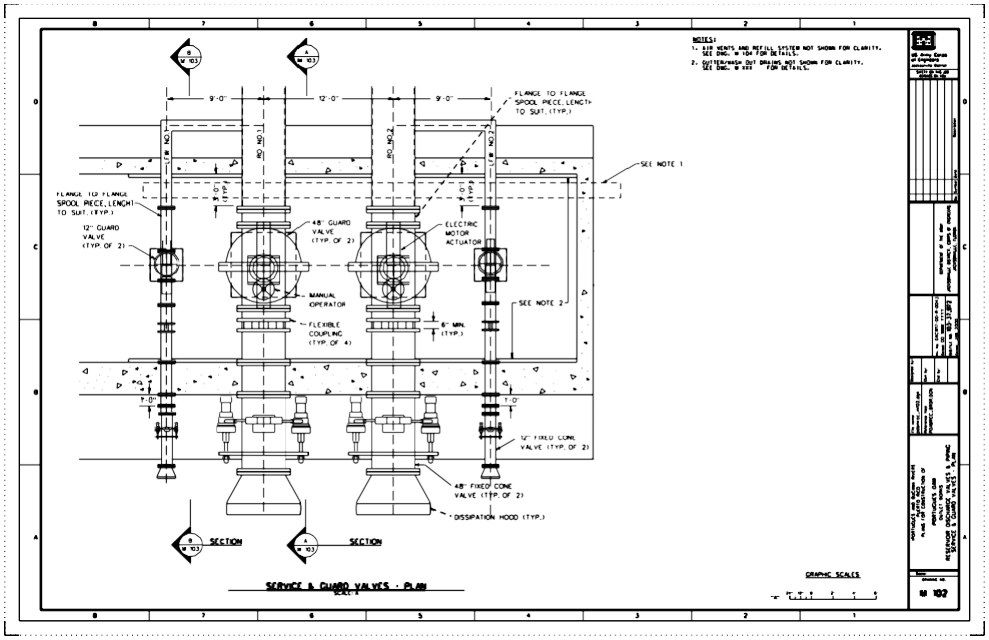

Figure 3-16

Notation Grammar and Style

Project specifications are directed to the construction Contractor. Do not use the term "the Contractor shall." The Contractor is responsible for performing the work as shown and specified; therefore, there is no reason to use the phrase. In general, use the imperative mood (e.g., Install equipment) except when clarity requires the use of the indicative mood (e.g., equipment must). Avoid the use of "shall" and "must;" if use cannot be avoided, use “must” instead of “shall” unless it changes the meaning of the sentence. The term “will” indicates contract requirements performed by the Government. Specify execution of alternatives with guidance. Use “may” only when specifying discretionary Government options. Do not use the word “should” in the notation text for mandatory requirements as “should” implies a recommendation. “Should” may be in the Notes to indicate desirable procedures that are advisory in nature. Do not use the term "furnish" unless only delivery of material to the site is required. Use "provide" to mean "furnish and install." Do not use the word "per" but use "in accordance with" instead.

In addition, requirements that are included in the specifications should never be repeated in the notes on drawings as it creates the potential for claims by the contractor. Also, submittal requirements must be placed in the specifications, not on the drawings. Submittal requirements placed on the drawings in notes (e.g., “Modifications to the contractors traffic control plan must be submitted to the Contracting Officer for approval.”) cannot be tagged or tracked efficiently and may be overlooked by construction personnel.

When preparing plans and specifications, specifications are used to describe the products to be used or work to be performed and how measurement or evaluation for acceptance is performed. This is usually accompanied by citing industry standards and requiring the contractor to submit documentation attesting compliance with criteria. The plans should be reserved only for those aspects of the contract that require graphical presentation and dimensions. When there is a contradiction between the plans and specifications, the specifications govern (FAR 52.236-21, para a). Our goal is to eliminate any potential for contradictions between the plans and specifications by keeping contract requirements in their appropriate areas.

Annotation

Paragraph 5.1.6 Text height of ERDC/ITL TR-19-6, A/E/C Graphic Standards is replaced as follows. Normal text height is 1/8” (0.125), Sub-title text height is 5/32” (0.156), Title text height is 3/16” (0.188). Standard USACE CAD software workspace libraries and/or configuration files will be modified as required to conform with this standard. Annotation used with in symbology shall normally have a height of 3/32”. Line spacing shall be equal to one-half (50%) of the text height. The text aspect ratio shall be 1:1 of the font type.

Site Plan.

Indicate on the site plan, all work and construction limits applicable to the project. Clearly delineate the right-of-way, work limits and access and indicate topographic detail that may affect or restrict the construction.

Key Plan.

A key plan representing a smaller image on a single drawing should be used when plans of larger buildings, structures or site work would be too large to show on a single drawing.

The key plan shall be placed in the notes area and shall indicate the represented plan area shown on the drawing by crosshatching.

A sheet key plan is not used to show segments of a linear project with adjacent sheets. Match-line symbology is used to indicate adjoining drawings of a linear project. An optional Key Sheet may be used in the drawing set to indicate the placement of each plan sheet on the overall project. A Key Sheet shall be placed in the drawing set prior to the first plan sheet shown on the Key Sheet.

Shore Protection – Beach Fill Plan Sheet Model Variation.

To maintain stationing and plan orientation the Beach Fill Plan sheets may use a variation of the A/E/C Standard sheet layout, see figure 3-17. The Key Map will be located in the top-right corner of the drawing area. A small General Sheet Notes can be located in the bottom-right corner when needed. The view title bar will be adjusted to fit if General Sheet Notes are used.

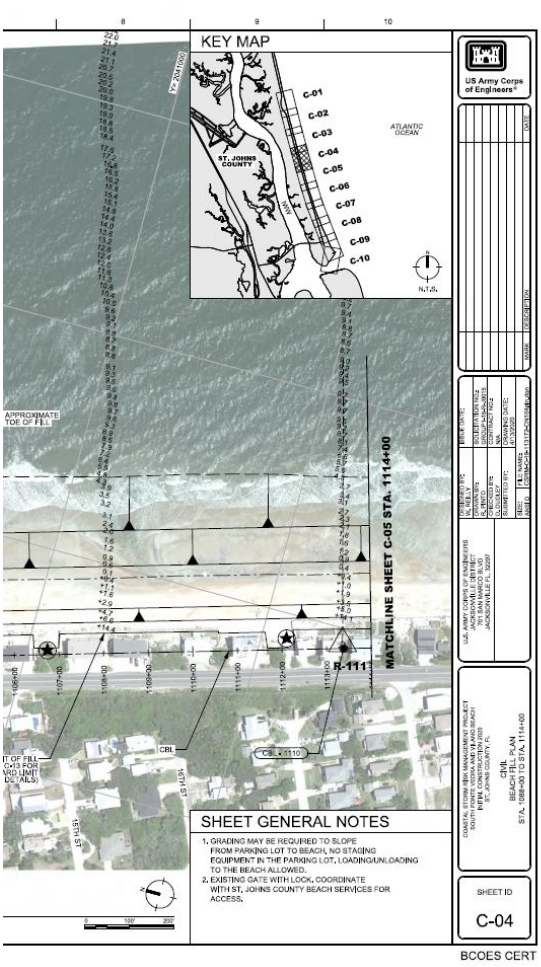

Figure 3-17

Utilization of Record Drawings Within the Contract Drawing Set.

Referenced “As-Built” drawings from previous contracts are deemed necessary for information purposes only. The original title blocks shall not be changed. All reference drawings shall be identified as such and listed in the Index of Drawings as “REFERENCE ONLY- name of record As-Built Drawing.” The reference drawing will be inserted in the project border at a reduced size, conforming to the available drawing area of the sheet size being used for the project. A drawing area title shall be used under the reference drawing image.

When ‘As-Built Drawings’ are used within the contract drawing set to depict work being performed under the current contract or provide any other type of contractual requirement, each contract drawing containing an ‘As-built Drawing’ shall have this note included, see Figure 3-17. The reference drawing will be inserted in the project border at a reduced size, conforming to the available drawing area of the sheet size being used for the project. A drawing area title shall be used under the reference drawing image.

“REDUCED SCALE DRAWING SHOWN IS A CONTRACT DRAWING FROM PREVIOUS PROJECT(S) AND MAY NOT REPRESENT CURRENT CONDITIONS. THIS DRAWING IS INCLUDED FOR REFERENCE ONLY. THIS REFERENCE DRAWING IS NOT TO SCALE AND SHALL NOT BE USED TO DETERMINE LINEAR OR ANGULAR MEASUREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING REFERENCE DRAWING INFORMATION USED DURING THE PERFORMANCE OF THIS CONTRACT. ALL KEY NOTES, GENERAL NOTES, AND NEW DETAILS SHOWN BESIDE OR BELOW THE REFERENCE DRAWING SHALL APPLY TO THIS CONTRACT.”

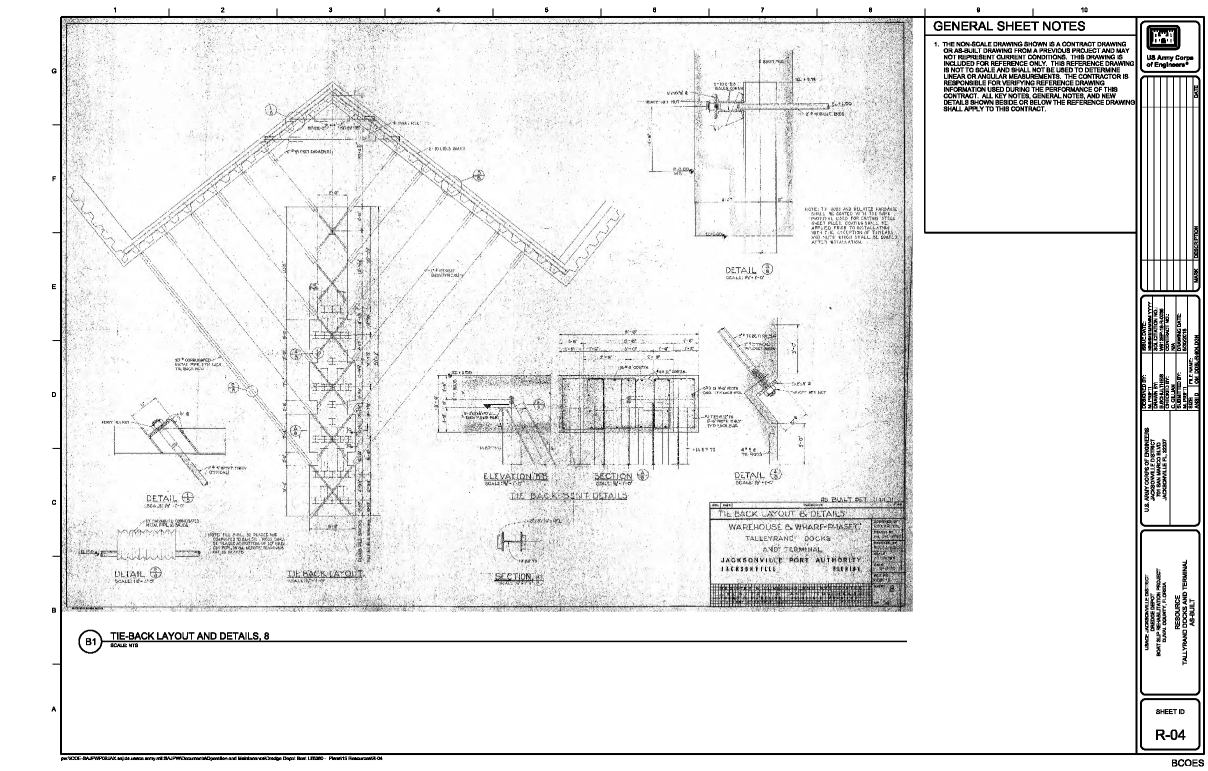

Figure 3-18

When reference to ‘As-Built Drawings’ from previous contracts are deemed necessary for information only purposes, but have been destroyed, are illegible or are missing, a developed current condition drawing may be prepared as a substitute. Any contract drawing created, as a developed current condition drawing will have this statement included in the general notes.

“DEVELOPED CURRENT CONDITION DRAWING SHOWN HAS BEEN CREATED

FROM AVAILABLE AS-FOUND AND/OR AS-BUILT INFORMATION. IS FOR INFORMATION ONLY, CONDITIONS, ARRANGEMENTS, DIMENSIONS AND APPLICATION HAVE NOT BEEN VERIFIED."

When the 'As-Built Drawing' is of poor quality, digital image of existing condition should be utilized to represent the condition.

Printing.

All contract drawings being delivered to external customers, i.e. contractors, government agencies, bidders, etc., will be printed as full size. In other words, the print size will be equal to the drawing border size specified in the title block. Full size prints are used to convey contractual information since the engineering drawing graphic scale is only accurate with full size prints.

Drawings printed as a submittal for internal review, i.e. DQCR, PQCR, BCOES, check prints, staff review, etc., will be printed as half of the full size, "half-size." The print shall be half of the drawing border size.

In accordance with USACE A/E/C CAD Standard, prints are defined as an Adobe PDF format file. The Adobe PDF file is the official/deliverable document prepared for the submittal. Copies of the Adobe PDF file may be plotted if the submittal process requires paper copies of the deliverable document.

The following table lists engineering drawing sizes utilized by the Jacksonville District.

Full Size	Half Size
ANSI-E	ANSI-C
ANSI-D	ANSI-B
ANSI-F	None (obsolete sheet size, common in historical engineering drawings)
ISO A0	ISO A2
ISO A1	ISO A3

Redline Procedures

These procedures are mandatory for all Army Corp of Engineers Jacksonville District employees or contracted employees, and do not apply to any outside agency or contractor.

Submittal review check prints shall be marked-up by the engineer or drawing checker using the following color notations:

Red – indicates correction, revision, or addition is required.

Green – indicates information to the technician or draftsman.

Blue – indicates deletion.

The designer or draftsman shall mark-up redline prints with a yellow highlighter as each correction, revision, or addition is accomplished. Once all corrections, revisions, or additions are

completed the redline print and a current check print of the drawing will be returned to the engineer or drawing checker.

Drawing Revision Process

Paragraph 7.1 Revision designations of ERDC/ITL TR-19-6, A/E/C Graphic Standards is amended as follows. Process for filing a contract drawing(s) revised to conform with a contract amendment or modification. These procedures apply to both sheet model files and design model files. Ensure the drawing index is revised and included in the modification or amendment.

A modification number or amendment number must be obtained prior to beginning the revision process. Prior to routing of the Amendment or Modification verify with the field office the amendment or modification identification is still valid. Ensure the field office has not issued any field modifications during the revision process which could change amendment or modification number or drawing file name suffix numbering.

To file the deliverable documents in the ProjectWise application for a modification or amendment create a folder with the name of the modification or amendment under the 180 – Amendments or 210 – Modifications folder. This folder will be used to file the deliverable PDF file containing the revised drawings. The ETL should contact the Data Manager or CAD Manager if assistance is needed to create a folder. Copies of the pre-modification or amendment contract files may be archived in this folder to create a Record Drawing of the file before revisions. These archive copies of amended or modified files shall be segregated from current contract drawings.

Folders for amendments will be named as 0003, 0012, etc. under the 180 – Amendments folder.

Folders for modifications will be named with the modification number, GN005, GN012, etc. under the 210 – Modifications folder.

Drawings included in the modification or amendment shall have a suffix appended to the file name and document name. The amendment or modification suffix will be appended to the user definable characters provided in the A/E/C CAD Standard. Adding the suffix applies to both sheet model files and design model files.

Drawing files being revised to conform with an amendment shall have a suffix convention of: A, last three numbers. For example, 114572-HHDRCRIP3-EP605A003.dgn or 114527-HHDRCRC5-SB319A001.dgn or HHDRCRC5-S-HSgateDT01A012.dgn.

Drawing files being revised to conform with a modification shall have a suffix convention of: two letters, last two numbers of the modification number. For example, 114527-HHDRCRC5-SB115WH13.dgn or 114527-HHDRCRC10-SB102WH11.dgn.

Sheet model file document names will have the same amendment or modification convention appended to the files ProjectWise document name. For example, E-23A004, or

T-505A008, or S-23WH11.

If a modification or amendment is being applied to a drawing which has already been revised by a prior modification or amendment. Replace the existing modification or amendment suffix with the current modification or amendment suffix. The file and ProjectWise document names will only reflect the current contractual status of each file being utilized in the contract.

The Drawing Index sheet is included in all amendments or modifications. The Drawing Index will be used to indicate the revision status of each sheet listed in the index. For every amendment or modification issued to the drawing set. The Drawing Index sheet will be revised to add a revision mark symbol next to each drawing included in the amendment or modification, refer to Figure 3-19. Adding a revision mark to indicate a change in drawing status does not require a revision cloud be added to the Drawing Index. The Drawing Index revision block will also be updated to reflect the amendment or modification, refer to Figure 3-20. When the Drawing Index revision block becomes full, use ERDC/ITL TR-19-6, Figure 7-4, Option 2 to add additional revisions. Use a revision cloud with a revision mark when an amendment or modification changes the content of the Drawing Index.

V-03	S-631, EXISTING CONDITIONS
V-04 B	AGRICULTURAL DITCH EXISTING CONDITIONS
	CIVIL
C-01 B	PHASE 1, S-633 TEMPORARY EARTHEN COFFERDAM
C-02	PHASE 1, S-632 TEMPORARY EARTHEN COFFERDAM
C-03 A C	PHASE 1, S-631 TEMPORARY EARTHEN COFFERDAM
C-04 A B C	PHASE 2 - S-633 TEMPORARY EARTHEN COFFERDAM TURNAROUND AND PIT
C-05	PHASE 2 - S-632 TEMPORARY EARTHEN COFFERDAM TURNAROUND AND PIT

Figure 3-19

MARK	DESCRIPTION	DATE
C	REVISED TO ACCOMPANY MODIFICATION SB0014	OCT 2025
B	REVISED TO ACCOMPANY MODIFICATION SB0005	JUL 2025
A	REVISED TO ACCOMPANY MODIFICATION SB0003	JUN 2025

Figure 3-20

All sheet model files affected by a modification or amendment will be included in one PDF file. File the PDF file containing all of the revised drawings in the folder created for the modification or amendment. This PDF file is the modification or amendment deliverable document and serves as the record copy of the modification or amendment. Since the PDF

file is a contract deliverable document ensure it is created as a full size print.

Drawing Revision Graphics (see figure 3-21)

Paragraphs 7.2 Revision graphics and 7.3 Revision (Issue) Block of ERDC/ITL TR-19-6, A/E/C Graphic Standards are appended as follows.

When revisions are numerous enough to exhaust the alphabet, the revision symbol following “Z” shall be “AA”, followed by “AB” and so on.

A short description shall be placed in the Revision Block when amendment changes are to be furnished to bidders by issuing a revised drawing and the amendment documents together. The wording in the Revision Block Description column shall be “REVISED TO ACCOMPANY” the amendment. If drawings are revised descriptively, then the drawing shall be revised after the amendment or modification is issued, and the wording in the revision block description column shall be “revised to conform to amendment.” The Engineering Technical Lead will provide information regarding the type of contract revision being done.

Some examples of amendment and modification revision statements:

a. Modification; “REVISED TO ACCOMPANY MODIFICATION CN002”
b. Amendment; “REVISED TO CONFORM TO AMENDMENT 0002”
c. Amendment; “REVISED TO ACCOMPANY AMENDMENT 0005”

When a drawing is to be replaced to consolidate numerous revisions into one change, the revision letter next in sequence shall be entered in the Revision Block. The description of the change shall be entered in the description column or reference made to a change authorization document describing the change. The following note shall be added to the drawing immediately above the Title Block “THIS DRAWING REPLACES PREVIOUS DRAWING CONTAINING REVSIONS “?” THROUGH “?””. The replaced drawing shall have the word “SUPERSEDED,” added to the old original one beside the title block. The drawing file that has been replaced shall have the code “sup” added at the end of the file name.

For deleted drawings, a line should be drawn through the index listing for that drawing with the word "deleted" inserted at the end of the title and a revision cloud added around the changed sheet information. The revision block of the Drawing Index should also be updated.

For added drawings the sheet information is added to the next available line on the Drawing Index. A revision cloud is placed around the sheet information with a revision mark. The revision block of the Drawing Index should also be updated. On the added sheet itself, a revision symbol is placed inside the drawing identification block of the added sheet. The revision block on the added sheet will use the description, “ADDED IN ACCORDANCE WITH MODIFICATION XXXXX.”

G	REVISED TO SHOW AS-BUILT CONDITIONS	AUG 2027
D	REVISED TO ACCOMPANY MODIFICATION WH014	JUN 2024
C	REVISED TO ACCOMPANY MODIFICATION WH011	NOV 2023
1	REVISED TO ACCOMPANY AMENDMENT 0007	MAR 2023
MARK	DESCRIPTION	DATE

Figure 3-21

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4 Graphic Concepts

Resources

The workspaces created for AutoCAD, Civil 3D, Microstation CONNECT, and Openroads Designer CONNECT must be used to obtain the standardized CAD tools. For AutoCAD use the vertical-imperial.arg. Civil 3D uses the USACE_Civil 3D-local.arg profile. Bentley CONNECT applications will use the Bentley developed workspace available from the CAD/BIM Center.

Line Work Delineation

Proper line work graphic delineation is essential to prepare contract drawings. The A/E/C CAD Standard defines the typical line work used for various categories of contractual information but does not override industry standard presentation guidelines. Line work may need to be presented with non-standard attributes depending upon the view. While the A/E/C CAD standard provides typical line work graphics. The intent or purpose of the view dictates the line work graphics used in the view.

Line Types/Styles

Centerlines

Centerlines should extend uniformly and distinctly a short distance beyond the object or feature of the drawing unless a longer extension is required for dimensioning or for some other purpose.

Dimension Lines

Dimension lines are used to indicate the extent and direction of dimensions and are normally terminated with arrowheads.

Extension Lines

Extension lines are used to indicate the point or line on the drawing to which the dimension applies.

Leader Lines

Leader lines are used to direct notes, dimensions, or symbols on the drawing. A leader is a straight inclined line, not vertical or horizontal, except for a short horizontal portion extending to the center of the height of the first or last letter or digit of the note. Leader lines should not be bent in any way unless unavoidable. Terminate leader lines with: a loop if they end on a dimension line; with a dot, if they end within outlines of an object; with an arrowhead, if they end on the outline of an object.

Hidden Lines

The hidden line is used to depict features that are not visible in the drawing view.

Patterning

Cross-hatching, patterning used to highlight an area of the drawing for indicating a unique condition.

Cutting Plane

Cutting plane lines areused with section bubbles to indicate the perpendicular cutting plane passing through the drawing view.

Freehand Break Line

A freehand break line is used to provide a local parallel cutting plane to depict objects located within the interior of a major feature.

Phantom Line

Use a phantom line to show an alternative location of movable parts, object features being shown in the view for reference purposes only, or existing objects not included in the current project, but could affect the contract.

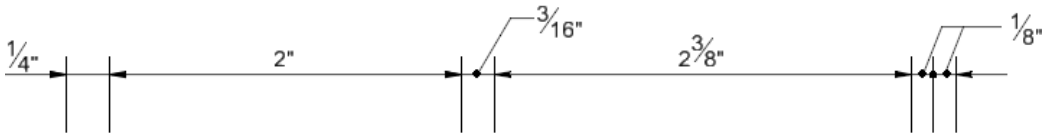
Object Lines

Object lines areused for representing visible edges or shape of an object. Typically object lines shown in section will be thicker than the same object shown in plan view.

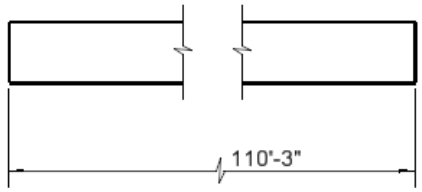
Dimensions and Leaders

Placement of Dimension and Extension Lines

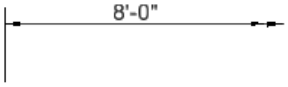
The shorter dimensions are nearest the object line. Dimension lines should not cross extension lines. It is permissible for extension lines to cross over each other. Dimension lines should not cross over each other. Dimension lines shall not overlay or be a continuation of any object line. Dimension should be aligned and grouped together as much as possible. Where a leader line crosses a dimension line the dimension line shall be continuous and the leader line shall be broken at the point it crosses the dimension line. Should an extension line cross a leader line both will be shown as solid continuous lines. See Figures 4-1 and 4-2.



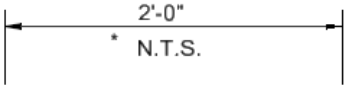
STANDARD DIMENSIONING



BROKEN DIMENSION LINE



FOR CONTINUATION

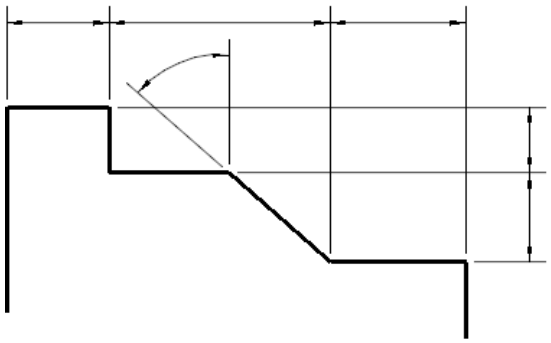


* NOT TO SCALE
USE WHEN REQUIRED

DIMENSIONING IN CROWDED AREAS

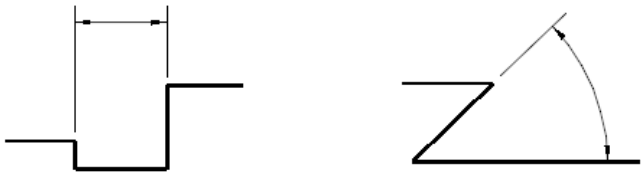
DIMENSIONS

Figure 4-1



NOTES:

1. DO NOT BREAK EXTENSION LINES THAT CROSS OTHER EXTENSION LINES OR DIMENSION LINES.



USE OF EXTENSION LINES

Figure 4-2

Leaders.

In Architectural and Civil Works drafting there are three allowable terminators for leader lines, closed filled arrowhead, solid dot, and a loop. When the leader refers to a geometric shape or feature the leader line should terminate in a closed filled arrowhead touching the object line. When the leader line refers to an area inside a geometric shape or feature, the leader line shall terminate in a solid dot. If the leader line is referring to a linear feature or object the leader line shall terminate in a loop.

Leader Line Composition

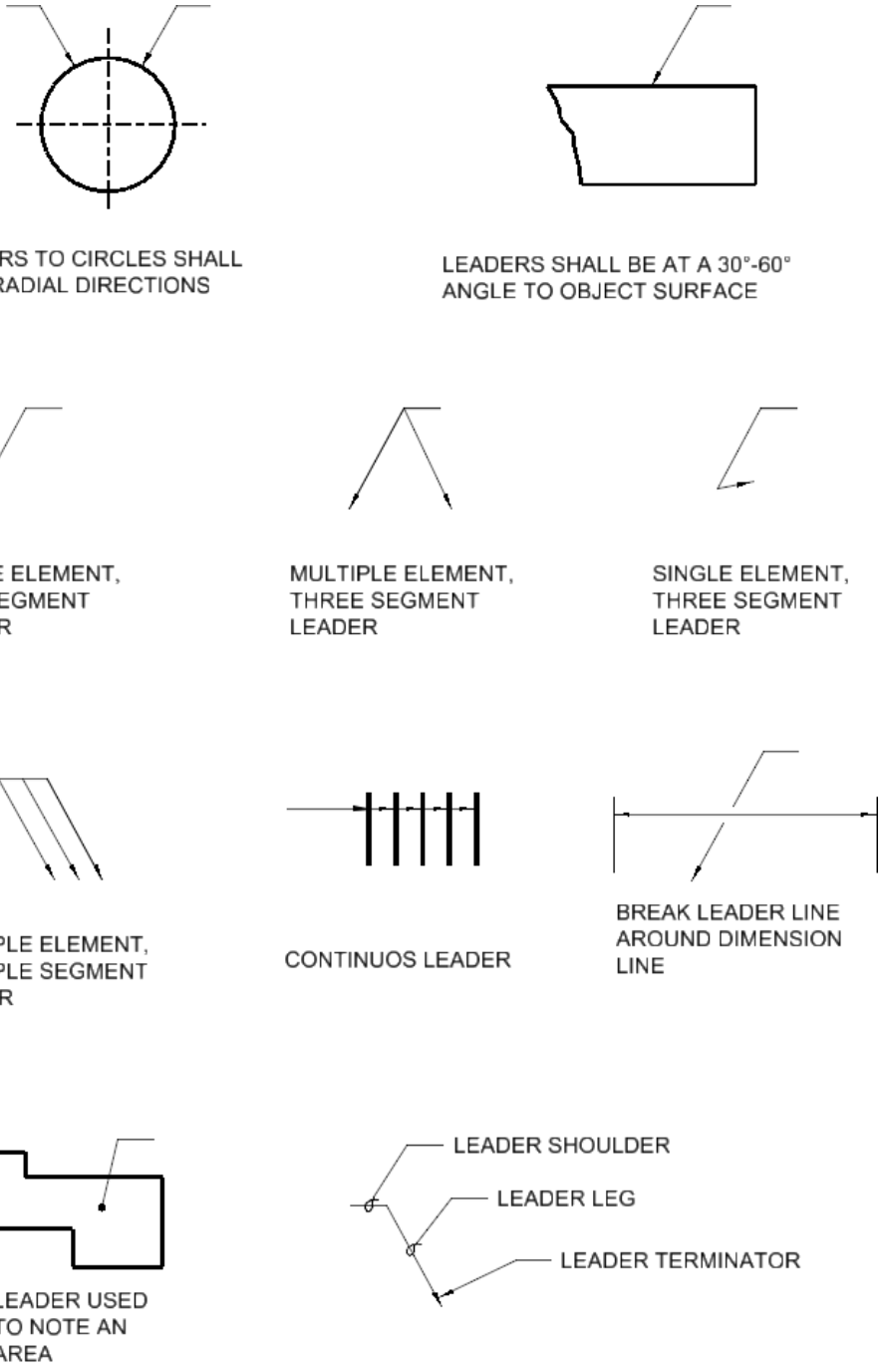
All leader lines shall be composed of one element with two or three segments. As a minimum each leader line shall have a leader shoulder consisting of a horizontal line about twice the text size in length and one or two straight leader lines going from the leader line shoulder to the object line. There shall be a half text size gap between the note text and the leader line shoulder. The leader line shoulder shall begin at mid height of the note text at the beginning or end of the note for single line text. If the note has multiple lines of text leader lines to the left shall have the leader line shoulder start at mid height of the top line of text and continue start at mid height of the bottom line of text and continue on to the right side of the note.

Leader Line to a Circle

A leader to a circle should point to the center of the circle but terminate at the circle object line. Leader lines in proximity to each other should be drawn parallel to each other. Leaders should cross as few lines as possible. If a leader line must cross a dimension line the leader line shall be broken at the crossing point. Leader lines shall not cross each other. Leader lines must not be drawn parallel to object or centerline. Do not draw excessively long leader lines, instead repeat the note and leader line as many times as required to adequately explain the feature.

Direction of Dimension Figures and Text

The aligned system of directions shall be used for Architectural and Civil Works drawings. All dimension figures are aligned with the dimension line so that they may be read from the bottom of the drawing or the right side of the drawing. Dimensions and notes with attached leader lines shall always be aligned with the bottom of the drawing.



LEADER LINE CONVENTION

Figure 4-3

Arc Dimensioning

A circular arc is dimensioned in the view in which its true shape is shown by giving the numerical value of its radius, followed by a space and the abbreviation R, such as 11'-3" R. For metric drawings the abbreviation R shall proceed the numerical valued without a space between them, such as R 28.5. The centers of arcs may be marked with a small cross; normally each leg of the cross will be twice the text size. The preferred method to dimension an arc is to place both the dimension line and dimension figure inside the arc, with the dimension line going from the arc center to the object line. If space is limited the dimension line may be placed inside the arc with the text outside of the arc.

For very small arcs or if space is severely restricted arcs may be dimensioned by use of a leader line.

For arcs of very large radii the arc may be dimensioned by the use of a false center. A center mark is placed in the direction of the truce center, but within the allowable drawing area. A dimension line is the started at the false center but is "jogged" or "zigzagged" before touching the arc object line. The dimension figure is then placed over a straight portion ofthe jogged dimension line.

Dimensions On or Off Views

Dimensions should not be placed upon a view unless doing so promotes the clearness of the drawing. The ideal form is to have all dimensions and notes placed outside the graphic view. Place dimensions outside of the graphic view where they will be closer to the features dimensioned. This must be done particularly for complicated drawings.

Dimensioning of Holes

A standard note with attached leader line usually specifies the size of a hole. The leader of the note is drawn pointing towards the center of the hole but terminates at the hole object line with a closed filled arrowhead. The dimension figure of a hole note shall consist of the numerical value followed by a space and the abbreviation DIA, such as 4'-3" DIA or 1-1/2" DIA. For metric drawings, the diameter symbol shall precede the numerical value within the dimension figure, shown as Ø54.

Notes

It is usually necessary to supplement the graphics and direct dimensions with notes. Notes shall be concise statements using the simplest words and phrases for conveying the intended meaning. Indefinite terms such as "and/or", "etc.", "e.g." and "i.e." shall not be used. Use commas to separate blocks of three digits or any number with four or more digits. Guidance to writing style can be found in Unified Facilities Guide Specifications (UFGS) Format Standard (UFC 1-300-02), specifically section 2-3. Requirements that are included in the specifications should never be repeated in the notes on drawings as it creates the potential for claims by the contractor. Also, submittal requirements must be placed in the specifications, not on the drawings. The contract drawings are reserved only for those aspects of the contract that require graphical presentation and dimensions.

Space Utilization

To save space do not use a period after commonly abbreviated words such as max, min, typ, spa, etc. Use a period only after abbreviations that spell a word, such as no., and abbreviations that are not commonly recognized. The ampersand symbol shall not be used in titles, subtitles, and notes, always use the word “and”. Refer to the Uniform Drawing System and ANSI Y1.1 for standard abbreviations.

Note Classification

Notes are classified as General Sheet Notes when it applies to an entire drawing and as local notes when they apply to specific items. Requirements specified by local notes apply only to the areas or points indicated or called out in the note. Keynotes are notes that apply only to the area or point of application but are too lengthy or complicated to place within the graphic area. General Sheet Notes are grouped together and presented in paragraph form while local notes and keynotes are used in conjunction with leader lines.

General Sheet Notes.

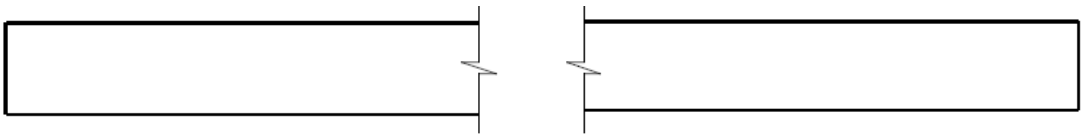
General sheet notes shall be numbered consecutively as a single list starting with 1. Note numbers of deleted notes are not reused after plans and specifications have been issued for solicitation and have the statement “NOT USED” inserted in place of the deleted note.

Reference to standardization or other technical documents shall be by basic identifier, excluding revision level, except where identification of a specific issue is essential to drawing interpretation.

Notes do not include contractual requirements, such as statements of costs; time and place of delivery; methods of payment; and requirements for submission, approval, or distribution of data or reports.

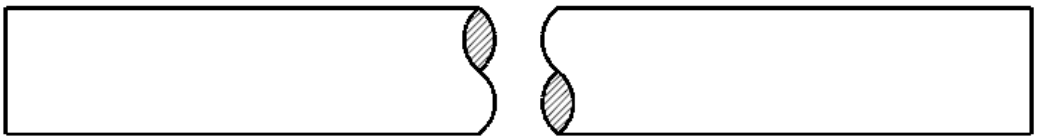
General notes, keynotes, and local notes shall use a justification of top-left.

a. All general notes shall be numbered.
b. Standard punctuation and grammar rules apply.
c. For multi line notes the second and successive lines shall be indented to show they belong to the same note.

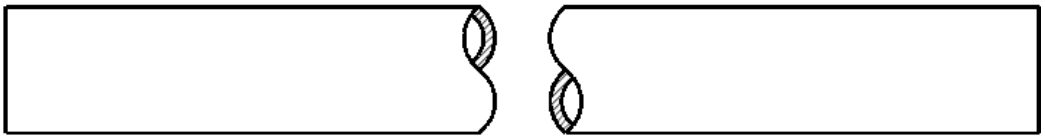


LONG BREAK LINE

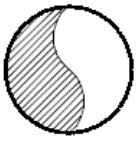
SHORT BREAK LINE



SOLID ROUND BREAK LINE



CYLINDER BREAK LINE



CYLINDER BREAK LINE
PARALLEL TO VIEWING PLANE

NOTE:

1. THIN BREAK LINES SHALL BE A LINE WEIGHT OF 0.25mm, LENGTH OF THE BREAK ZIGZAG IS 1 TO 1.25 TIMES THE TEXT SIZE.

2. SHORT BREAK LINES SHALL BE A LINE WEIGHT OF 0.50mm, HEIGHT OF THE HEIGHT OF THE BREAK LINE IS 1 TO 1.25 TIMES THE TEXT SIZE.

3. SOLID ROUND BREAK LINES AND CYLINDER BREAK LINES SHALL HAVE A LINE WEIGHT EQUAL TO THE ADJOINING OBJECT LINE. ANY PATTERNING OR POUCHE USED IN THE BREAK SHALL HAVE A LINE WEIGHT OF 0.18mm.

Figure 4-4

Local Notes

Local notes should be located as close as possible to the object it is describing. Local notes should be connected to the object by a leader line with the correctterminator. Avoid excessively long leader lines by repeating the note at each location it is required.

Lettering

Lettering on contract drawings shall be legible and scaled correctly to a height of 1/8" on the full size plotted drawing. Either inclined or vertical lettering shall be used based upon the subject matter. The preferred slope for the inclined letters is 22 deg. Uppercase letters shall be used for all lettering on contract drawings unless the subject matters requires otherwise.

Lettering on report plates is 3/32" high. This applies to all general sheet notes, local notes, and dimensions. Uppercase letters shall be used for all lettering on plates unless the subject matters requires otherwise.

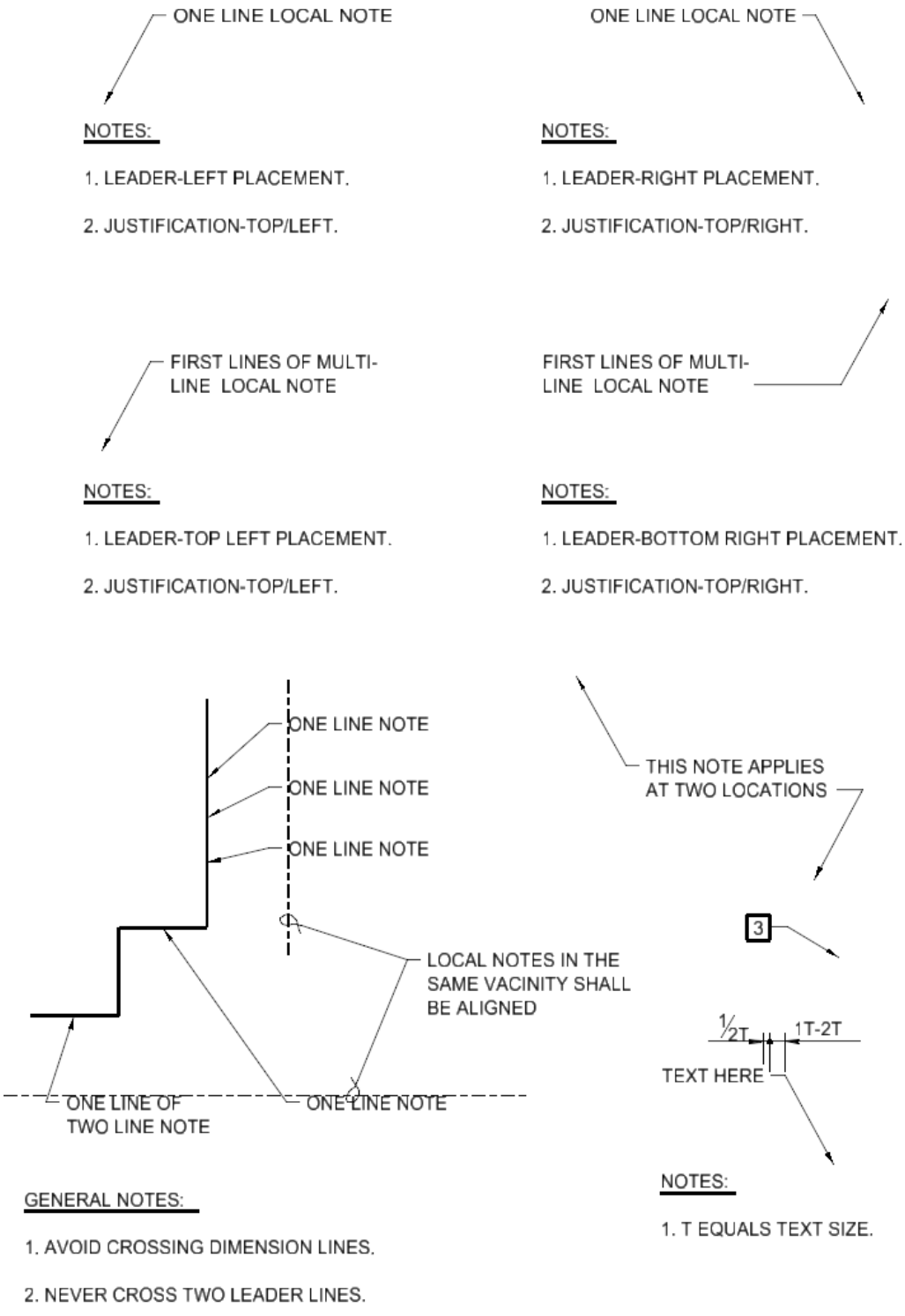
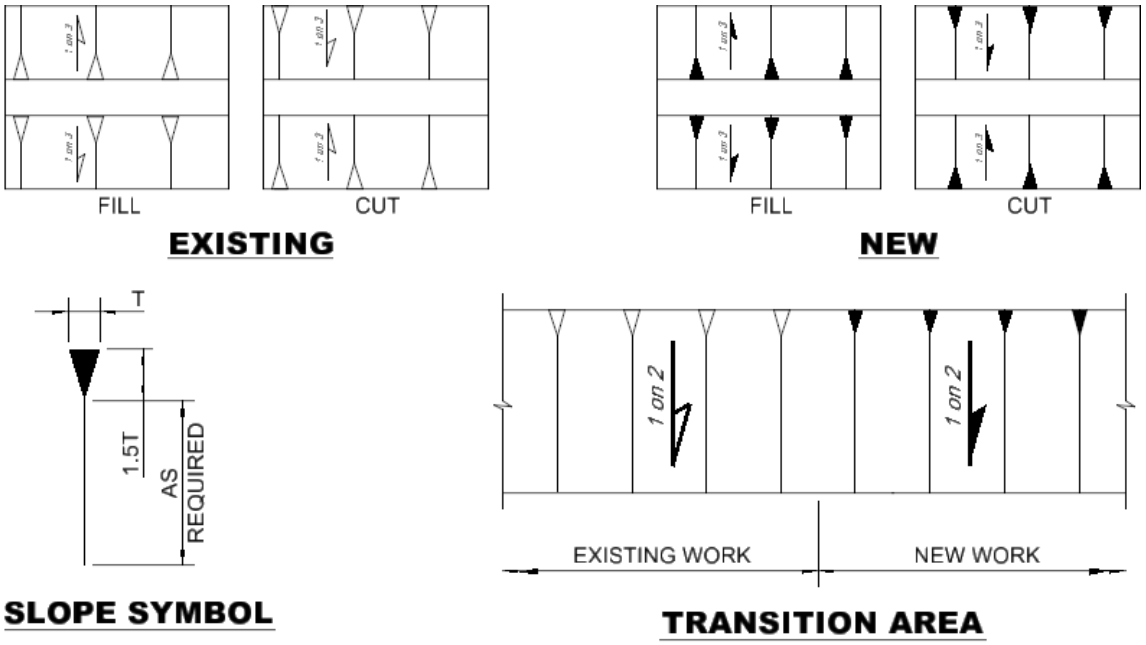

ONE LINE LOCAL NOTE
NOTES:
1. LEADER-LEFT PLACEMENT.
2. JUSTIFICATION-TOP/LEFT.
ONE LINE LOCAL NOTE
NOTES:
1. LEADER-RIGHT PLACEMENT.
2. JUSTIFICATION-TOP/RIGHT.
FIRST LINES OF MULTI-
LINE LOCAL NOTE
NOTES:
1. LEADER-TOP LEFT PLACEMENT.
2. JUSTIFICATION-TOP/LEFT.
FIRST LINES OF MULTI-
LINE LOCAL NOTE
NOTES:
1. LEADER-BOTTOM RIGHT PLACEMENT.
2. JUSTIFICATION-TOP/RIGHT.
ONE LINE NOTE
ONE LINE NOTE
ONE LINE NOTE
LOCAL NOTES IN THE
SAME VACINITY SHALL
BE ALIGNED
ONE LINE OF
TWO LINE NOTE
ONE LINE NOTE
GENERAL NOTES:
1. AVOID CROSSING DIMENSION LINES.
2. NEVER CROSS TWO LEADER LINES.
THIS NOTE APPLIES
AT TWO LOCATIONS
3
1/2T
1T-2T
TEXT HERE
NOTES:
1. T EQUALS TEXT SIZE.

Figure 4-5

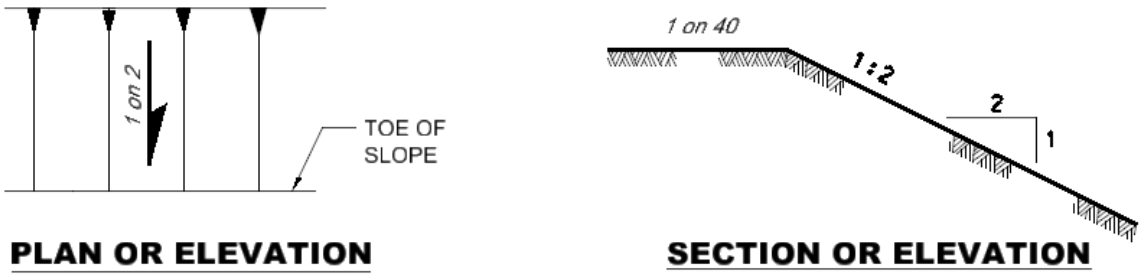
Symbology Convention

Symbols and conventions serve two purposes. One is to simplify the drawing and improve comprehension. The other is to follow or establish a national standard, which is easily recognized and acceptable. Symbols shall always be shown in the legend on the drawing where it is first used or on a general symbols, notes, and abbreviations drawing.

All symbology used to prepare contract drawings, report plates, and permits will conform to the A/E/C Symbols Guide, V1.4 or later.

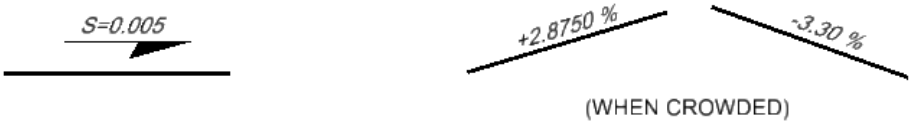


GRADE SYMBOLOGY



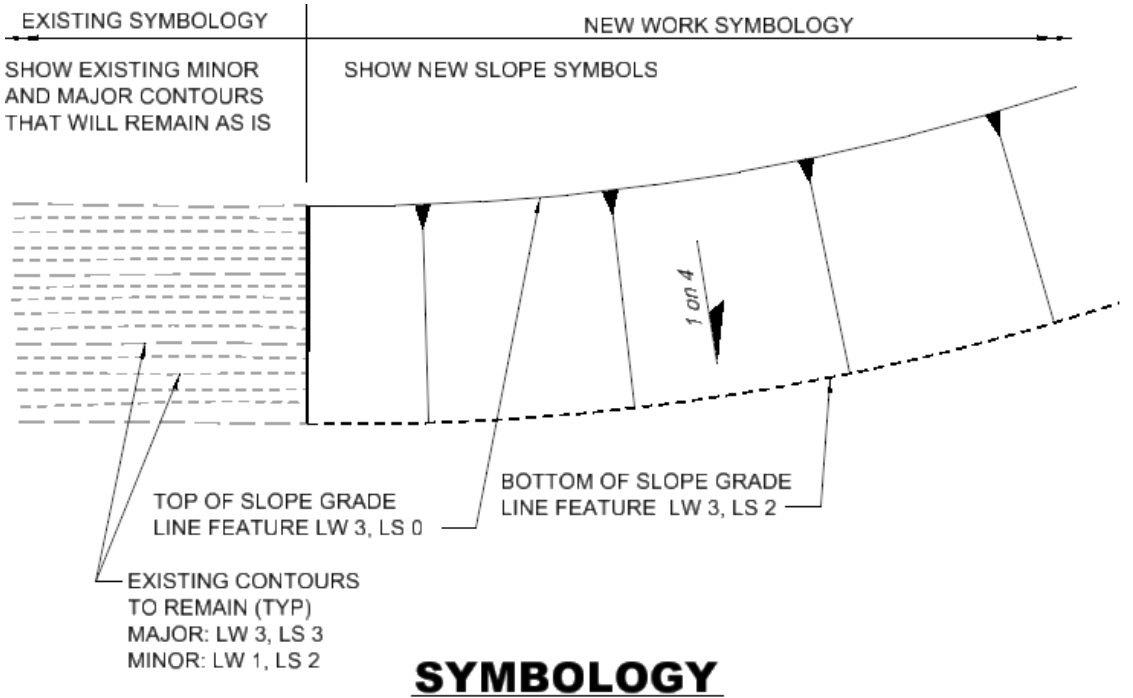
NOTES:

1. GIVE SLOPE AS RATIO OF THE VERTICAL RISE ON A HORIZONTAL DISTANCE.
2. NEW WORK WILL BE STRAIGHT LINES.
3. VARY SPACING OF SLOPE LINES TO SUIT SCALE OF DRAWING.



GRADES

Figure 4-6


EXISTING SYMBOLOGY
NEW WORK SYMBOLOGY
SHOW EXISTING MINOR AND MAJOR CONTOURS THAT WILL REMAIN AS IS
SHOW NEW SLOPE SYMBOLS
1 on 4
TOP OF SLOPE GRADE LINE FEATURE LW 3, LS 0
BOTTOM OF SLOPE GRADE LINE FEATURE LW 3, LS 2
EXISTING CONTOURS TO REMAIN (TYP) MAJOR: LW 3, LS 3 MINOR: LW 1, LS 2
SYMBOLOGY

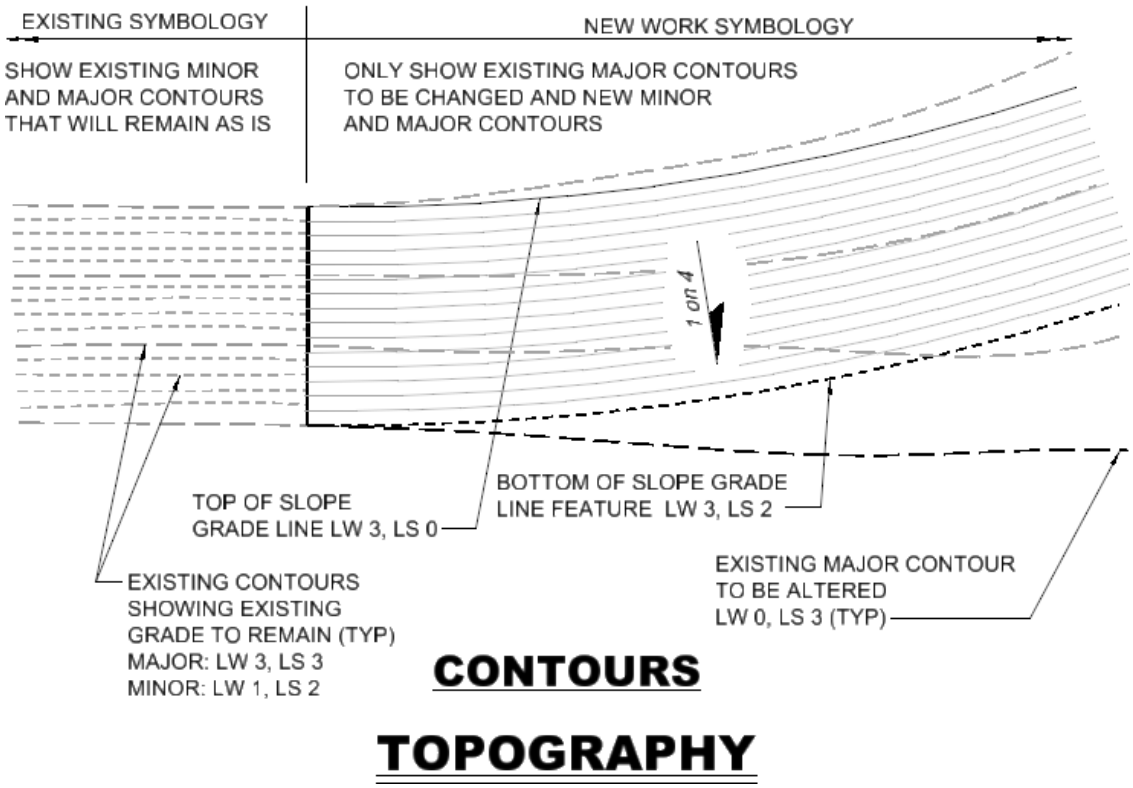
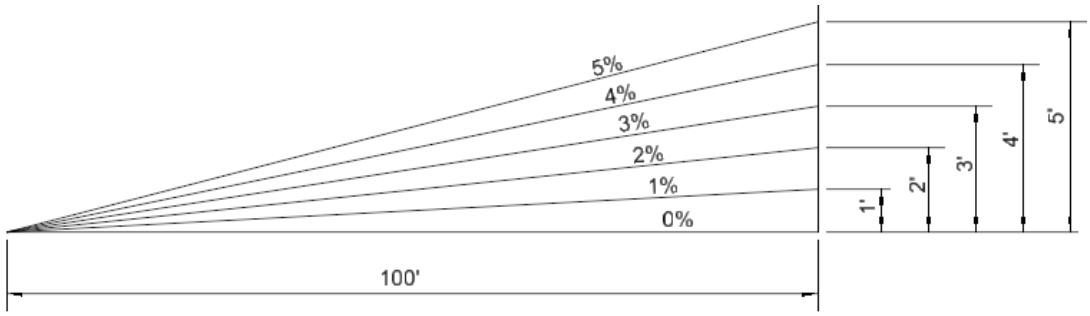
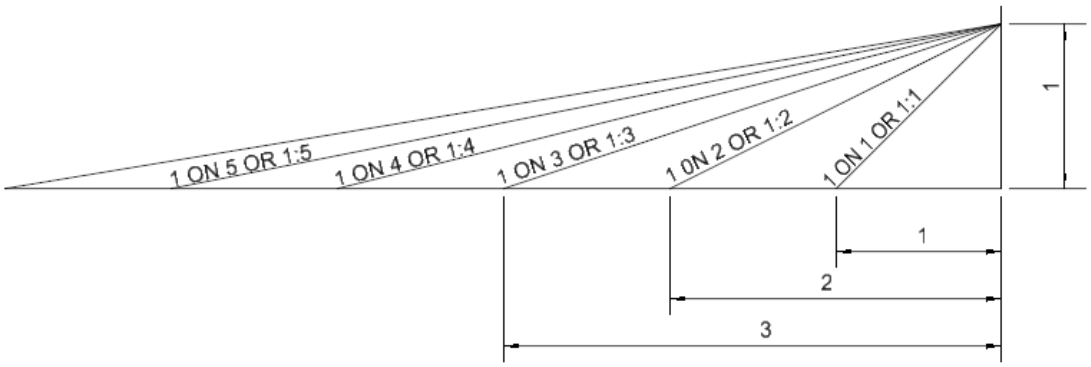

EXISTING SYMBOLOGY
NEW WORK SYMBOLOGY
SHOW EXISTING MINOR AND MAJOR CONTOURS THAT WILL REMAIN AS IS
ONLY SHOW EXISTING MAJOR CONTOURS TO BE CHANGED AND NEW MINOR AND MAJOR CONTOURS
1 on 4
TOP OF SLOPE GRADE LINE LW 3, LS 0
BOTTOM OF SLOPE GRADE LINE FEATURE LW 3, LS 2
EXISTING MAJOR CONTOUR TO BE ALTERED LW 0, LS 3 (TYP)
EXISTING CONTOURS SHOWING EXISTING GRADE TO REMAIN (TYP) MAJOR: LW 3, LS 3 MINOR: LW 1, LS 2
CONTOURS
TOPOGRAPHY

Figure 4-7



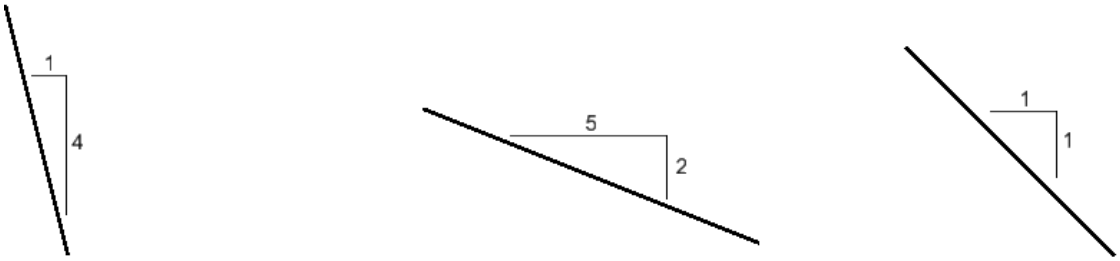
1% SLOPE RISE 1' IN DISTANCE OF 100'
2% SLOPE RISE 2' IN DISTANCE OF 100'
2.5% SLOPE RISE 2 1/2' IN DISTANCE OF 100'
2.75% SLOPE RISE 2 3/4' IN DISTANCE OF 100'

PERCENTAGE



1 ON 1 OR 1:1 SLOPE RISE 1' IN DISTANCE OF 1'
1 ON 2 OR 1:2 SLOPE RISE 1' IN DISTANCE OF 2'
1 ON 3 OR 1:3 SLOPE RISE 1' IN DISTANCE OF 3'

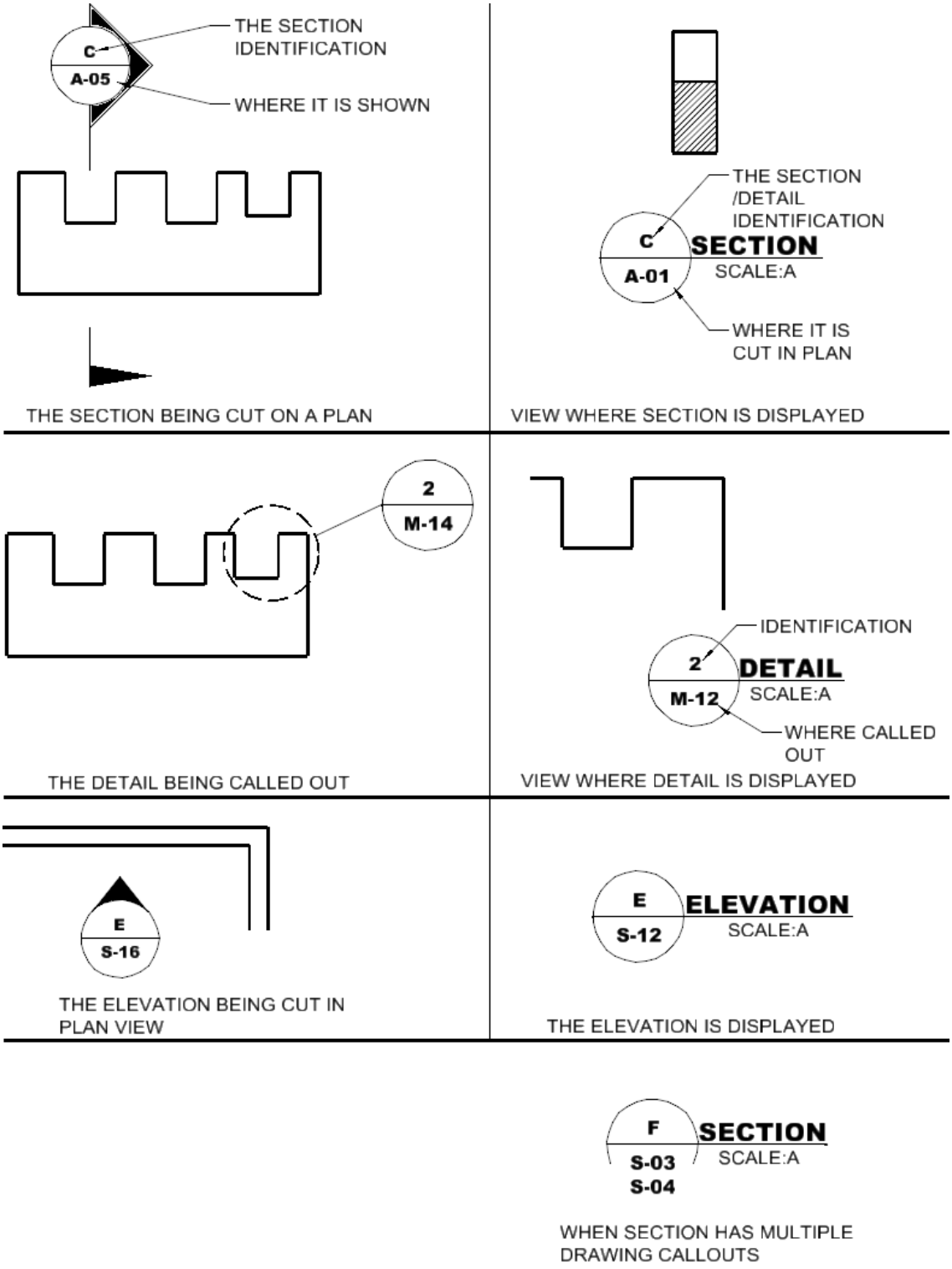
RATIO



ILLUSTRATION

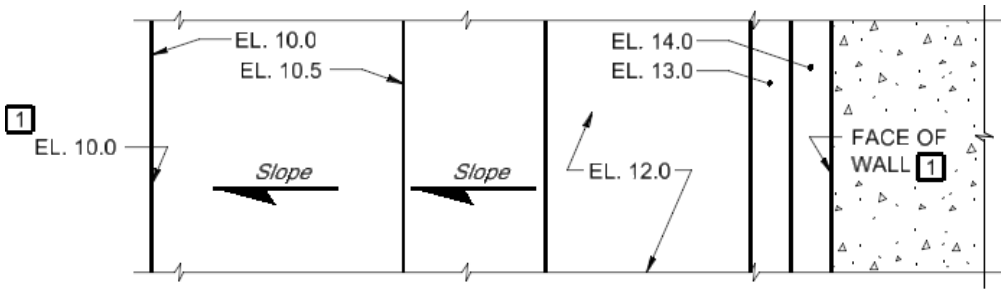
SLOPE EXPRESSIONS

Figure 4-8

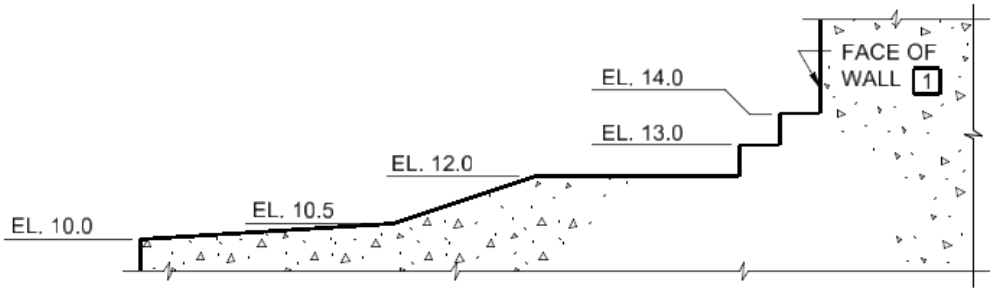


DETAIL AND SECTION CALLOUTS

Figure 4-9



PLAN VIEW



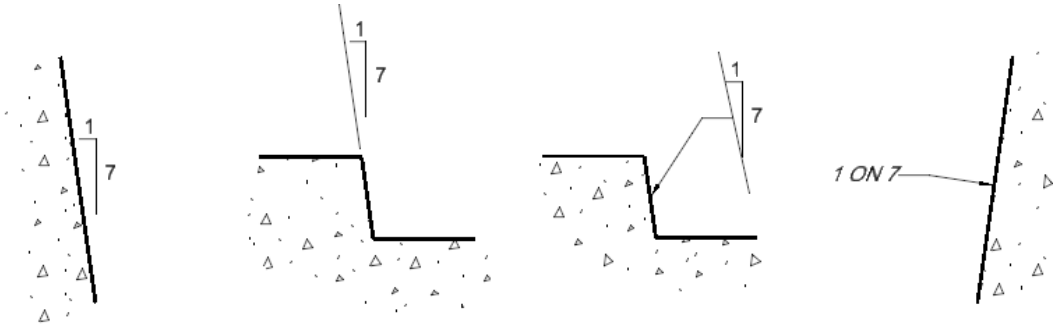
SECTION VIEW

KEY NOTES:

1 ONLY FOR CROWDED CONDITIONS.

ELEVATION (HEIGHT) INDICATIONS

Figure 4-10



SECTION OR ELEVATION

BATTER

NOTES:

1. GIVE BATTER AS A RATIO OF THE VERTICAL RISE TO THE HORIZONTAL OFFSET.

2. APPLICABLE FOR CONCRETE WORK OR ROCK EXCAVATION.

CENTERLINE INDICATIONS

NOTES:

1. SIZE OF THE "C" SHOULD BE EQUAL TO THE TEXT SIZE.

Figure 4-11

Drawing Scales

Typical drawing scales for both SI and inch-pound measurements are indicated in A/E/C Graphics Standard Rel. 2.1, ERDC/ITL TR-19-6, Table 5-3 and Table 5-4.

Dual Units

Only one unit system should be used on the projects.

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5 CAD Standards Compliance

Compliance Review

Each sheet file and model file included in the contract drawings must be reviewed for compliance with the Jacksonville District's standards.

Preparation of CAD Drawings Prior to Publication

Prior to releasing contract plans CAD files for publication or issuing to external agencies, customers, and Contractors the electronic files shall be prepared according to the following procedure prior to publication of contract drawings for each sheet file in the contract plan set.

Delete Graphics Outside the Border

Delete all working/construction graphics outside the margin area of the border.

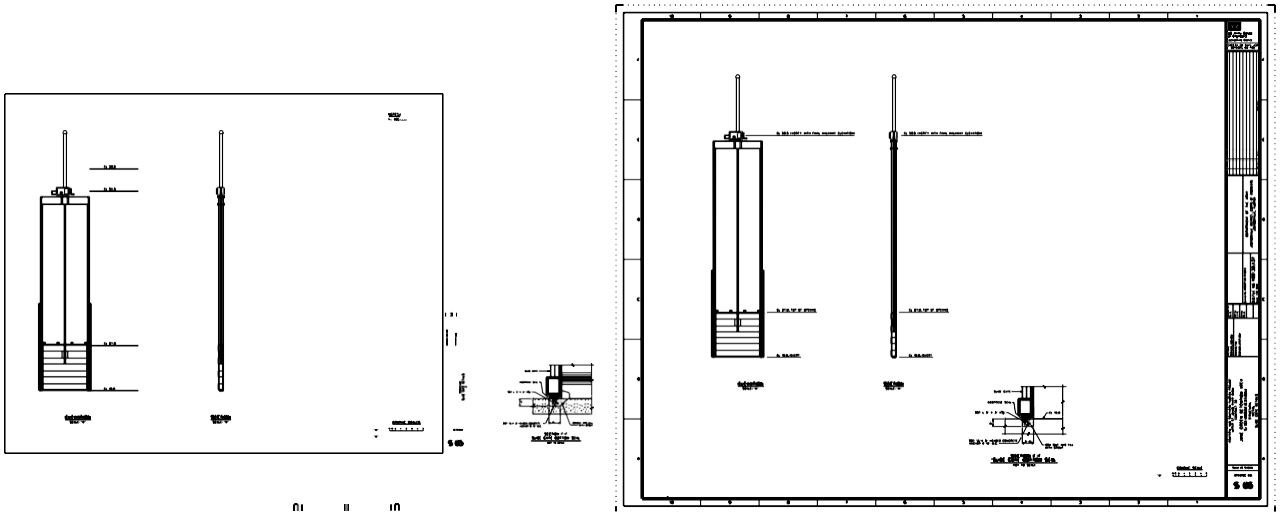

Figure 5-1

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6 Plotting

Project Deliverables

The contract drawing deliverable is a 2D, monochrome, full size sheet PDF file. The preferred deliverable format is to have all contract drawings in a single PDF file. If a single PDF file is impractical, the alternative is to create a PDF file for each structure, feature or construction phase of the project.

Single PDF files of individual sheet files shall only be used for amended or modified drawings. Contract drawing sets shall not be published/delivered as single PDF files.