Municipality of Anchorage

Port of Alaska

PORT OF ALASKA MODERNIZATION PROGRAM
DESIGN/BUILD SERVICES FOR
HELIPAD AND ACCESS ROAD

REQUEST FOR PROPOSAL NO. 2026P002

SECTION V

Sample Contract

Exhibit C

Owner's Project Criteria Documents

Part II.B

CADD Standards Manual

FINAL

Port of Alaska Modernization Program Computer Aided Design and Drafting (CADD) Standards Manual

Prepared for

Port of Alaska

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Revision Control Log

Revision	Date Issued	Description of Changes	Author	Checked	Approved
00	October 2015	Initial Release	JS	RB	LE
01	November 2017	Port name change, logo changes, facility codes update, sheet naming convention revision, Color Table(s) revisions	MH	RB	JB

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Acronyms and Abbreviations

2D	two-dimensional
3D	three-dimensional
ANSI	American National Standards Institute
AWWU	Anchorage Water and Wastewater Utility
CAD	computer-aided design
CADD	computer-aided design and drafting
CBT	Color Table
DCM	*Design Criteria Manual*
HVAC	heating, ventilation, and air conditioning
I&C	instrumentation and controls
MOA	Municipality of Anchorage
NCS	*United States National CAD Standard®*
NIC	not in contract
NTS	not to scale
PAMP	Port of Alaska Modernization Program
PDF	Adobe Portable Document Format
PME	Project Management & Engineering
POA	Port of Alaska
POL	Petroleum, Oil, and Lubricants
TAG	The Adherence Group
TOTE	Totem Ocean Trailer Express
UDS	Uniform Drawing System
USACE	U.S. Army Corps of Engineers
WYSIWYG	what you see is what you get

SECTION 1

Objective

This manual provides governance and standards for computer-aided design and drafting (CADD), and has been established to provide consistency on the Port of Alaska Modernization Program (PAMP).

By using consistent standards and procedures, project execution will be streamlined, and the ability to share resources amongst different parties will be enhanced. Ultimately, this translates into a higher-quality product for the PAMP.

Two key outcomes of this standard are to provide:

1. A consistent and quality presentation of contract drawings
2. Information exchange between various agencies

The purpose of this standard is to establish:

- The criteria for professional engineering construction drawings for the PAMP
- Guidelines for all CADD data produced for the PAMP

This manual is based, in large part, on the *United States National CAD Standard* (NCS). The *PAMP Computer-Aided Design and Drafting (CADD) Standards Manual* is a superset of the NCS, providing, in most cases, more specific detail and guidance.

The intent is to use the NCS as the authoritative reference on standards issues, and to comply with the NCS as much as possible to serve the needs of the client. Because of the timing of the revision cycles of NCS versions, the PAMP standard may contain some variances from the NCS. This PAMP standard is based on NCS version 5.0.

1.1 Coordination with other CADD Standards

The PAMP CADD Standard Manual should be used for all PAMP projects. In some cases, other agencies may require use of their standard for certain project deliverables, for example:

- Roadway infrastructure (roadways, storm drain, etc.) construction drawings for Municipality of Anchorage (MOA) owned roadways.
- Anchorage Water and Wastewater Utility (AWWU) utility construction drawings.
- U.S. Army Corps of Engineers (USACE) permit drawings.

If a use of a CADD standard other than the PAMP CADD Standard is required by an agency, coordinate and obtain approval from the Port of Alaska (POA) prior to beginning work.

1.2 Future Additions and Updates

These guidelines and criteria are intended to be neither static nor all inclusive. It is intended that this manual will be a living document, which will be used for all PAMP projects at the Port of Alaska (POA) and updated with current information, procedures, and forms as appropriate.

SECTION 2

General Items

Observe the following production procedures and standards throughout the duration of the project. Do not make modifications without the concurrence and knowledge of the Owner or Owner's Representative.

2.1 CAD Software

Provide all project deliverable drawings to the MOA in AutoCAD 2013 format at the 100 percent completion submittal. The MOA may request that intermediate submittals also be provided in digital format to facilitate checking and coordination with other disciplines and consultants; these will also need to be provided in AutoCAD 2013 format.

2.2 Drawing Management

It is the responsibility of the individual consultant to handle drawing control and file management on the project and facilitate a project-specific system for tracking their files. All consultants will create their own files, except for common project files created by the MOA or PAMP (that is, cover sheet, border, key plan, legend, and some details).

2.3 Project Border and Title Block

The PAMP border is 22 inches by 34 inches (American National Standards Institute [ANSI] sheet size D). This allows for half-scale sets that are 11 inches by 17 inches. Prepare all contract drawings on ANSI D sheets (see Appendix A for sample).

2.4 Sample Drawings

The POA provides the following standard AutoCAD sample drawings for the PAMP: (see Appendix A for PDF versions of these sample drawings)

- PAMP Cover sheet (PAMP-PlanCoverSheet.dwg)
- PAMP Plan/Detail sheet template (PAMP-PlanSheetTemplt.dwg)
- PAMP Plan and Profile sheet template (PAMP-PnPSheetTemplt.dwg)
- PAMP Sheet Setup and Annotation Symbols sheet (PAMP-SheetSetup.dwg)

The sample plots in Appendix A are all created using the project's color tables (PAMP-Half-size.ctb, PAMP-Full-size.ctb), title blocks (PAMP-TB-1.dwg, PAMP-TB-2.dwg), and title block attributes (PAMP-TB-INFO.dwg), which are also provided by POA.

2.5 Abbreviations

Use standard terms and abbreviations consistently in all drawings to clearly specify information and conserve space. Abbreviations for words or phrases frequently used in plans, sections, elevations, or details should follow the abbreviations as established in the template provided by the MOA and the NCS (*Uniform Drawing System [UDS] Module 5 – Terms and Abbreviations*). When possible, keep abbreviation use to a minimum. Other abbreviations, particularly discipline-unique abbreviations, may be used but must not conflict with those established in the NCS.

2.6 File Naming

The file naming convention is FFF-D-NVV.dwg, with FFF-D-NVV representing the drawing number. Refer to Section 3 of this *CADD Standards Manual* for instructions how to develop drawing numbers for sheet and model files. When drawings need to be submitted to the Program via Aconex, refer to the latest version of the *PAMP Document and Records Management Plan (DRMP)* (CH2M) for Aconex specific file naming convention.

2.7 North Arrow Orientation

North should be oriented to the top of the sheet or to the right. Refer to the PAMP Cover sheet (Appendix A) for an example.

2.8 Standard Symbols

Symbols used in drawings should be consistent with symbols commonly accepted by the respective disciplines, for example those presented in the NCS. At a minimum, adhere to the symbology presented in the PAMP Sheet Setup and Annotation Symbols sample drawing (in Appendix A) to provide consistent core symbology for the PAMP. In addition, symbology presented in Chapter 8 of the DCM (Figures 8B-5 through 8B-8) will be used. Place symbols on the appropriate layer, using the layer naming convention presented in Section 4 of this *CADD Standards Manual*.

SECTION 3

Document, Sheet Set Organization, and Numbering

3.1 Set Content and Order

Each consultant will include in each drawing set the following standard project drawings in the sequence noted. Each set will comprise the following:

1. Cover and Title Sheet with Site Location
2. Key Map, Index, and Legend Sheets
3. Plan and Profile Sheets
4. Discipline Drawings (if applicable)
5. Schedules
6. Details

Set content and order are components of discipline sets. Each discipline comprises either common or unique types per discipline. Most have Plans, Profiles, Elevations, Sections, Large-scale Views, Details, and Schedules and Diagrams. Section 3.2.4 presents how the drawing package is to be organized by discipline set.

3.2 Sheet and Model Naming Convention

For best results, this section should be printed in color.

Figure 3-1 presents the sheet model naming convention and color coding.

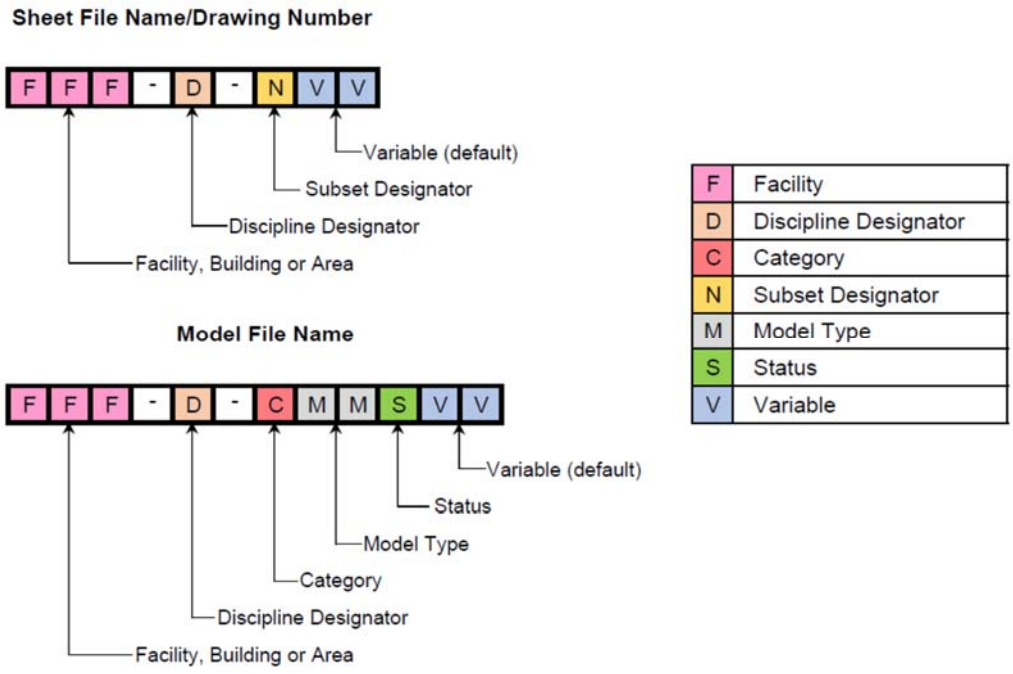


Figure 3-1. Sheet Model Naming Convention and Color Coding

Introduction: A consistent approach to file and sheet naming on a project reduces confusion and provides a basis of communicating changes, file transfers, and work separation among the project team, partners, and subconsultants. The file naming methodology outlined herein is intended to provide for the proper amount of

file separation in a modeling environment, along with a clear guideline for naming and numbering drawings. These conventions are also designed to provide flexibility to suit the needs of large, medium, or small projects.

The basic features guarantee uniqueness within the project, as well as a division of work by the following categories:

- Facility, Building, Zone, or Area
- Discipline
- Category, Model Type and Status
- Subset Designator
- Variable

Drawing Number – This is the drawing number in the lower right corner of the title block.

Sheet File Name – This name applies to the plotted sheet or drawing. The sheet file should reference the title block and any pertinent model data files. The **sheet file name** is the name you see listed in the folder directory through Windows Explorer.

Model File Name – This name applies to files containing Master Data as defined in Section 5.2 of this document. This will include two-dimensional (2D) plans, three-dimensional (3D) files, site plans, and 2D extractions. It may also include sections, details, and elevations if they are not drawn directly into the sheet file. The **model file name** is the name you see listed in the folder directory through Windows Explorer.

3.2.1 General Comments

- For all AutoCAD files, maintain the extension DWG. An extension is assumed but not necessarily shown at the end of each Model or Sheet File Name example shown in this section.
- Use a zero (0) as a placeholder for any character that does not apply.

3.2.2 Drawing Number Complexity

Figure 3-2 presents the drawing number complexity and color coding.

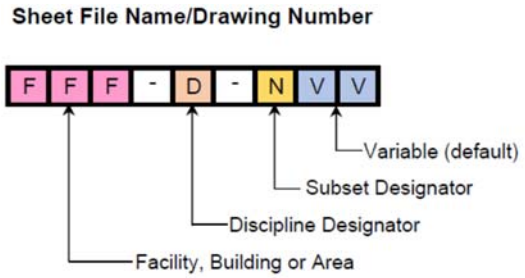
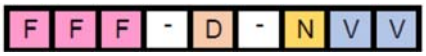


Figure 3-2. Drawing Number Complexity and Color Coding

Drawing Number Complexity: Because projects will range in levels of complexity, the drawing number may vary accordingly. It is very important that any of these options be applied consistently on a project.

Note: The drawing number will be the same as the sheet file name. This drawing number would appear in the title block and is what would be referenced for section and detail call-outs.



1. **FFF-D-NVV -** This is the highest level of complexity, using all available fields.

2. **D-NVV** – Use this truncated drawing number format with the Facility Code omitted if there is only one facility.

The owner will determine if Facility Code(s) are to be used and will provide them to the consultant at the beginning of each project. The use (or lack of use) of the Facility Code should be consistent throughout every discipline of a given project.

3.2.3 Facility Code

Figure 3-3 presents the Facility Code and color coding.

Sheet File Name and Drawing Number

F	**F**	**F**	**-**	**D**	**-**	**N**	**V**	**V**

Model File Name

F	**F**	**F**	**-**	**D**	**-**	**C**	**M**	**M**	**S**	**V**	**V**

Where F = Facility, Building Zone, or Area: *Two or three-character alphanumeric field defining a specific facility, building, or area of the project.*

Figure 3-3. Facility Code and Color Coding

Table 3-1 presents the Facility, Building, or Area Codes.

Table 3-1. Facility, Building, or Area Codes

Facility, Building, or Area			
T	1		Terminal 1 (Existing and Proposed) and POL Terminal 1 (Existing)
T	2		Terminal 2 (Existing and Proposed)
T	3		Terminal 3 (Existing)
P	C	T	Petroleum and Cement Terminal (Proposed)
P	T		POL Terminal 2 (Existing) and Petroleum Terminal (Proposed)
N	E	S	North Extension Stabilization
N	E	1	North Extension Stabilization Step 1
N	E	2	North Extension Stabilization Step 2
S	B	S	South Backland Stabilization
P	T	W	POA Transit Warehouse (Existing)
P	A	B	POA Administration Building (Proposed)
P	M	B	POA Maintenance Building (Proposed)
P	V	Y	POAVY
P	W	S	POA Warm Storage Building (Proposed)
T	A	G	TOTE TAG Building (Proposed)
.	.	.	etc.

Notes:
POAVY = Port of Alaska Valve Yard
POL = petroleum, oil, and lubricants
TOTE = Totem Ocean Trailer Express
TAG = The Adherence Group

3.2.4 Discipline Designator

Figure 3-4 presents the Discipline Designator and color coding.

Sheet File Name and Drawing Number

F	**F**	**F**	**-**	**D**	**-**	**N**	**V**	**V**

Model File Name

F	F	F	-	D	-	C	M	M	S	V	V

Where D = Discipline Designator: *One-character field defining the responsible in-charge architect, engineer, or designer. This typically correlates to stamping and signing responsibility.*

Figure 3-4. Discipline Designator and Color Coding

Refer to Table 3-2 for standard Discipline Designator Codes. The order shown in the table is the suggested drawing assembly order. The list of discipline designators in this section represents the available options and should be referenced for all computer-aided design (CAD)-related activities, such as level and layer naming, file naming, and sheet naming.

Internally automated systems support the standardized designators shown in the table. Additional discipline designators may be adopted based on project needs, but they may not be fully supported by all internal systems, such as document management, procurement, or integrated design.

Table 3-2. Discipline Designator

Discipline Designator	
Designator[a.]	**Description**
G	General
H	Hazardous Materials
V	Survey/Mapping
B	Geotechnical
X	Demolition
C	Civil
L	Landscaping
S	Structural
A	Architectural
J	Life Safety
I	Interiors
U	Industrial Planning
F	Fire Protection
D	Process
M	Building Mechanical (HVAC)
P	Plumbing
Y	Piping (Excludes Plumbing)
E	Electrical
T	Telecommunications
N	Instrumentation and Controls
Q	Machine Design
K	Packaging
R	Resources
Z	Contractor/Shop Drawings
O	Operations

Notes:

[a.] Not all discipline designators are NCS compliant.

HVAC = heating, ventilation, and air conditioning

3.2.5 Category

Figure 3-5 presents the category naming conventions and color coding.

Model File Name

F	F	F	-	D	-	C	M	M	S	V	V

Where C = Category: *Used to distinguish between different types of model files.*

Figure 3-5. Category Naming Conventions and Color Coding

Refer to Table 3-3 for standard Model File Codes.

Table 3-3. Model File Codes

Category	
Designator	**Description**
Z	3D Model
X	2D/Extraction
C	Container Model
R	Review Model

3D Model – 3D representation of a site, facility, or a particular system in a facility.

Container Model – A compilation of multiple 3D models from which an extraction is generated.

2D/Extraction – 2D representation of a building, facility, or site. May be generated from a 3D model but not necessarily.

Review Model – A compilation of multiple 3D models, which is then used in a visualization program, such as NavisWorks, CADView, or SmartPlant Review.

3.2.6 Model Type

Figure 3-6 presents the Model Type naming conventions and color coding.

Model File Name

F	F	F	-	D	-	C	M	M	S	V	V

Where M = Model Type – *Two-character field defining the type of model.*

Figure 3-6. Model Type Naming Conventions and Color Coding

More model types may be added on a project basis. Refer to Table 3-4 for standard Model Type Codes.

Table 3-4. Model Type Codes

Common Model Types	
AR	Architectural Room Tags
BD	Border
BT	Border Text
DG [a.]	Diagrams
DT [a.]	Detail
EL [a.]	Elevation
FP [a.]	Floor Plan
GR	Column Grid
KP	Key Plan
LG	Legend
QP [a.]	Equipment Plan/Model
SC [a.]	Section
SD	Seed or Template
SH [a.]	Schedule
SP [a.]	Site Plan/Model

Note:

[a.] Definition per NCS

Additional Model Types	
AP	Auxiliary Systems Plan/Model
CP	Communication/Security Plan/Model
CW	Control Wiring Plan/Model
DA	Drainage Area
EC	Erosion Control
FN	Furniture Plan/Model
FD	Foundation Plan/Model
GA	General Arrangement
GP	Grounding or Grading Plan/Model
HP	HVAC Plan/Model
IP	Instrumentation Plan/Model
LP	Lighting Plan/Model
PL	Plumbing Plan/Model
PP	Power or Piping Plan/Model
RC	Reflected Ceiling Plan/Model
RP	Roof Plan/Model
SB	Soil Borings
SF	Structural Framing
SH	Sheet Limit
SL	Slab Plan/Model
SN	Signage Plan/Model
SR	Structural Racks
SS	Secondary Systems
TC	Tray and Conduit
TF	Tank Farm
TP	Topographic Plan/Model
UP	Utility Plan
VP	Ventilation Plan/Model
WP	Wiring Plan
XP	Fire Protection Plan/Model

3.2.7 Status

Figure 3-7 presents the Status naming conventions and color coding.

Model File Name

F	F	F	-	D	-	C	M	M	S	V	V

Where:

S = Status: *Single-character field defining the status of the work contained within the model file. Project-specific phases or contract designations may be defined.*

Figure 3-7. Status Naming Conventions and Color Coding.

Refer to Table 3-5 for standard Status Codes.

Table 3-5. Status Codes

Status	
Status	**Description**
N	New Work
E	Existing Work
D	Existing to Demolish
F	Future Work
T	Temporary Work
M	Items to be Moved
X	Not in Contract
1-9	Phase Numbers

3.2.8 Subset Designator

Figure 3-8 presents the Subset Designator naming conventions and color coding.

Sheet File Name and Drawing Number

F	**F**	**F**	**-**	**D**	**-**	**N**	**V**	**V**

Where:

N = Subset Designator: *Single-character field defining a subset designator.*

Figure 3-8. Subset Designator Naming Conventions and Color Coding.

The subset designator is a numerical character used to define subsets of sheets to allow for organization of a plan set using industry best practices, with the goal of plans development that is clear to reviewers and contractors.

The character could consist of a Sheet Type, Group, or a Custom Subset Designator, as described in the following subsections.

In any case, a single subset designator style should be consistently applied within a discipline for the project plans. For example, the Architectural sheets could use Sheet Type while Structural uses a Custom Subset Designator.

3.2.8.1 Sheet Type

Figure 3-9 presents the Sheet Type naming conventions and color coding.

Sheet File Name and Drawing Number

F	**F**	**F**	**-**	**D**	**-**	**T**	**V**	**V**

T = Sheet Type: *Single-character field defining the type of sheet or drawing.*

Figure 3-9. Sheet Type Naming Conventions and Color Coding.

Refer to Table 3-6 for standard Sheet Type Codes.

Table 3-6. Sheet Type Codes

Sheet Type	
Sheet Type	**Description**
0	General (Symbol Legends, Notes, etc.), Schematics, and Diagrams
1	Demolition Drawings
2	Plans (Horizontal Views)
3	Elevations and Sections (Vertical Views, Sectional Views, Wall Sections)
4	Large-scale Views (Large-scale Plans, Large-scale Elevations)
5	Details (includes Standard Details)
6	Schedules
7	User-defined (for types that do not fall into other categories)
8	User-defined (for types that do not fall into other categories)
9	3D Representations (Isometrics, Perspectives, Photos, Images)

3.2.8.2 Group

Figure 3-10 presents the Group naming conventions and color coding.

Sheet File Name and Drawing Number

F	**F**	**F**	**-**	**D**	**-**	**G**	**V**	**V**

Where G = Group: *The Group designator character is used to define the content of a drawing. The number assignments may change to suit the needs of a given project.*

Figure 3-10. Group Naming Conventions and Color Coding

Refer to Table 3-7 for standard Group Codes.

3.2.8.3 Custom Subset Designator

Figure 3-8, above, presents the Custom Subset Designator naming conventions and color coding.

Refer to Table 3-8 for example Custom Subset Designator Codes, provided for reference only. The number assignments may change to suit the needs of a given project.

Table 3-8. Custom Subset Designator Codes

Custom Subset Designator			
Subset Code	**Description (per Discipline)**		
	Structural (Terminal)	**Civil**	**Mechanical**
0	General - Legend/Notes/Overall Plan		
1	Substructure	Site Grading	Terminal
2	Superstructure	Site Utilities	Piping Plan & Profile
3	Dolphins	Site Drainage	Piping Details
4	Fender System	Water (Potable and Fire)	POAVY
5	Appurtenances		
6			
7			
8		Dredging	

9	Misc.	Misc.	Misc.

3.2.9 Variable

Figure 3-11 presents the Variable naming conventions and color coding.

Sheet File Name and Drawing Number

F	**F**	**F**	**-**	**D**	**-**	**N**	**V**	**V**

Model File Name

F	**F**	**F**	**-**	**D**	**-**	**C**	**M**	**M**	**S**	**V**	**V**

Where V=Variable: *The Variable designators consist of numeric values between 01 and 99. To allow for insertion of sheets as a design progresses, the numbers do not need to be sequential. Variables are used to provide unique names for multiple files or drawings with the identical preceding characters, but differing content.*

Figure 3-11. Variable Naming Conventions and Color Coding

Table 3-7. Group Codes

Group									
Group	Description	Group	Description	Group	Description	Group	Description	Group	Description
A-Architectural		E-Electrical		J-Life Safety		P-Plumbing		T-Telecommunications	
0	Site	0	Site	1	Security/Access controls	0	Site	0	Site
1	Elements	1	Equipment	2	Evacuation Systems	1	Zoning	1	Audio Visual
2	Finishes	2	Power	3	Fire Alarm Systems	2	Equipment	2	Clock and Program
3	Interiors	3	Lighting	4	HPM Monitoring	3	Piping/Potable	3	Intercom
4	Graphics	4	Tray and Conduit	5	Liquid leak Detection	4	Waste/Vent	4	Monitoring
B-Geotechnical		5	Grounding	6	Smoke Exhaust	Q-Machine Design		5	Data Networks
0	Site	6	Auxiliary	7	Early Warning Smoke Detection	0	Site	6	Telephone
C-Civil		7	Instrumentation	K-Packaging		1	Food Service Equipment	7	Security
0	Site	8	Facility	0	Site	2	Pharmaceutical Equipment	U-Industrial Planning	
1	Erosion Control	9	Hazardous	1	Equipment	3	Manufacturing Equipment	0	Site
2	Existing Grading	F-Fire Protection		L-Landscaping		4	Consumer Goods Equipment	V-Survey/Mapping	
3	Rough Grading	0	Site	0	Site	5	Laboratory Equipment	1	Field Survey
4	Finished Grading	1	Zoning	1	Planting	6	Hospital Equipment	2	Digital Survey
5	Paving	2	Sprinkler Systems	2	Irrigation	7	Other Equipment	3	Combined Utilities
6	Improvements	3	Fire Suppression	M-Mechanical		R-Resources		4	Aerial Survey
7	Transportation	4	Fire Detection and Alarm	0	Site	1	Resource Civil	5	Hydrographic Survey
8	Utilities	H-Hazardous Materials		1	Zoning	2	Resource Structural	X-Other Disciplines	
D-Process		0	Site	2	HVAC	3	Resource Architectural	0	Site
0	Site	1	Asbestos	3	Piping	4	Resource Mechanical	Y-Piping	
1	Zoning	2	Chemicals	4	Instrumentation	5	Resource Electrical	0	Site
2	Equipment	3	Lead	N-Instrumentation and Controls		S-Structural		1	Zoning
3	Piping	4	PCB	0	Site	0	Site	2	General Arrangement
4	Instrumentation	5	Refrigerants	1	Panel Layouts	1	Substructure	3	Layout
5	Liquids	I-Interiors		2	Layouts	2	Framing		
6	Gases	1	Design						
7	Electrical	2	Furnishings						
		3	Graphics						

SECTION 4

Layers

4.1 Layer Naming Convention

All graphical information in CAD drawings is required to be placed on the proper layer. It is imperative that layer names are used to check that the correct information is on each layer.

A number of Ports and Maritime specific layer names are provided in Appendix B of this *PAMP CADD Standards Manual*.

Layer names used for PAMP will be developed based on this section, Appendix B, and NCS layering guidelines.

4.1.1 Description of Modules

The following is the structure of the layer names. Refer to Figure 4-1 for details associated with creating new layer names.

- Discipline Designators:
  - Same as defined in Section 3.2
  - Identifies the discipline to be used (for example, M = Mechanical)
- Major (System):
  - Identifies a major system type (for example, EXHS = Exhaust)
- Separators:
  - Identifies the type of item used to separate each group (for example, - = Dash)
- Minor (Components):
  - Identifies a subtype of the system; often called a component (for example, ACID = Acid)
- Minor (Discipline Modifiers):
  - Identifies only items that can be used by certain disciplines (for example, PIPE = Piping)
- Minor (Common Modifiers):
  - Identifies items that can be used by all disciplines (for example, IDEN = Identification)
- Status:
  - Identifies the status or phase of the layer or level (for example, N = New)

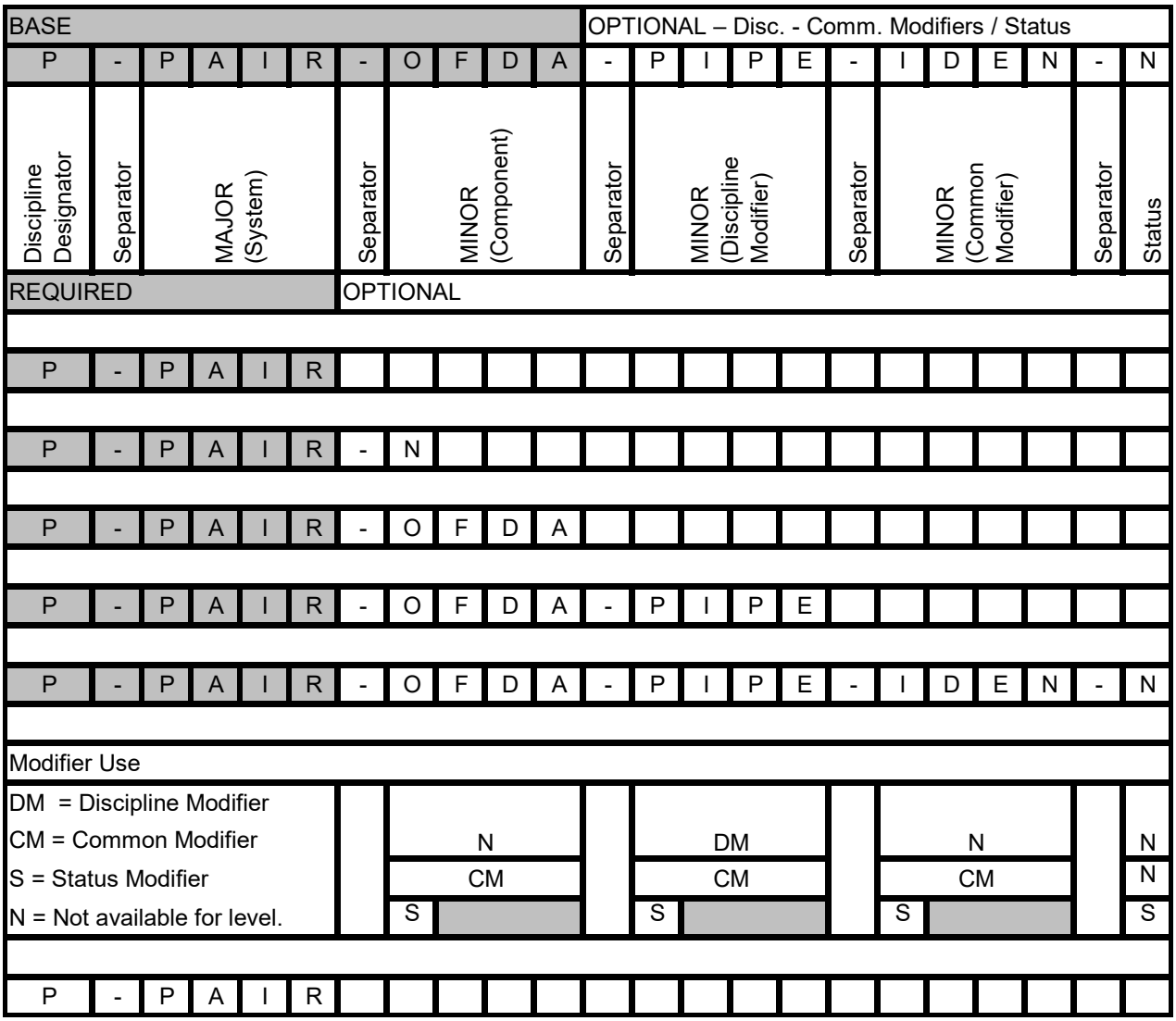


Figure 4-1. Layer Naming Conventions

SECTION 5

File Definitions and Relationships

Figure 5-1 shows the relationship of master data stored within independent files, separated by discipline, and referenced to a drawing layout or sheet. Follow this approach when developing project drawings.

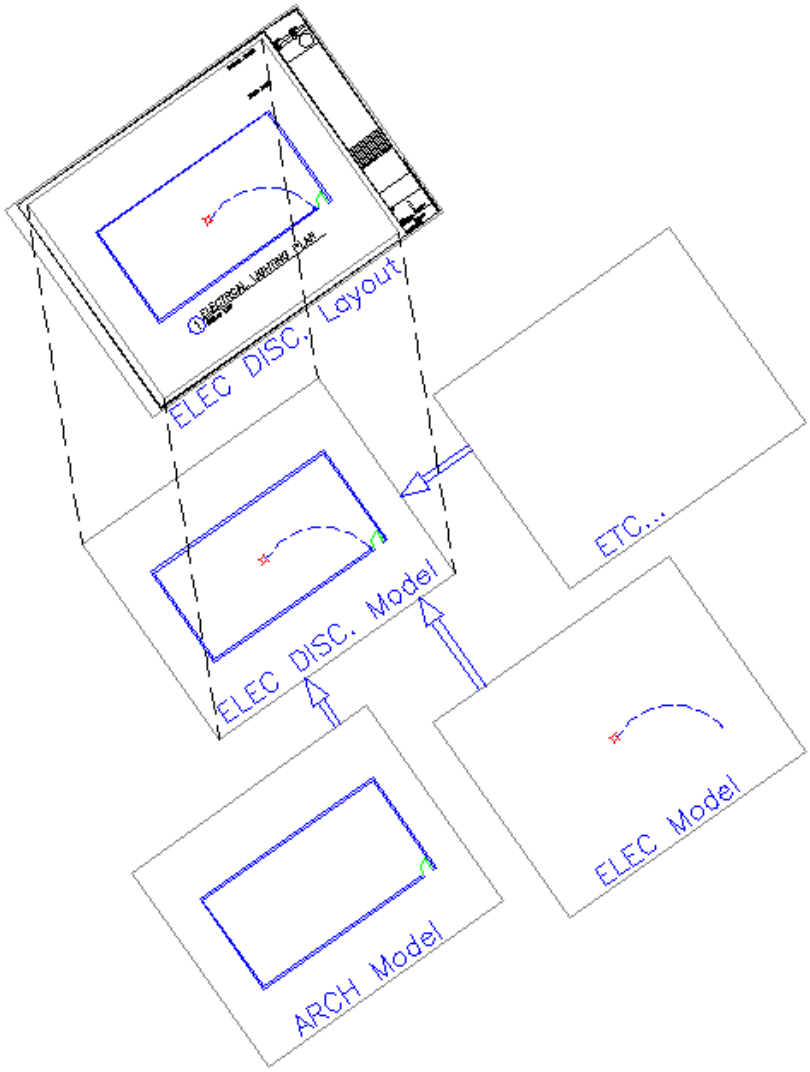


Figure 5-1. Relationship of Data to Files

5.1 Model Space

The Model Space refers to areas within CAD files that contain vector objects representing the main design data or a portion of design data. This is commonly referred to as master data, and is generally separated and stored within individual files or within the model space within a file.

5.2 Master Data Creation

Master data should be created and maintained from one location (file and model space) and referenced as necessary by other models, or from drawing layouts. Master data may include 2D-generated vector information, as well as 2D extractions from 3D models. Master data should never be manually

repositioned in the originating file. All master data should be created at true size, and at true position, which may be defined by the project as a state plane coordinate system or a local/facility/area coordinate system.

5.3 Drawing Sheet Composition

CAD files also commonly include separate storage areas for drawing layouts that are intended to represent the construction drawing as it will be printed. The following guidelines represent the standard for composing construction drawings in the AutoCAD platform.

5.3.1 AutoCAD Workflow

Layout and Paper Space:

- Include information such as title blocks (referenced), key plans, notes, revision triangles and clouds, and north arrow.
- Reference or insert the lower left corner of the border and title block at (0, 0).
- Reference or insert the border and title block at a scale of 1:1.
- Do not place extraneous information or Notes to Designer outside of the border cut line.
- Create the viewport, and set the appropriate drawing scale.

Model Space:

- Reference external master data at a scale of 1.

5.4 Referencing

Referencing master data is critical for proper coordination between disciplines, as well as ensuring that the most up-to-date information is being used by the entire project team throughout design and construction drawing preparation. Common CAD applications support file referencing, and the guidelines in this section enable useful and streamlined referencing.

- Keep reference data portable. Do not reference files using a saved full path specification, regardless of the location of the file. Use available project environment variables that have been defined for use at all times when attaching reference files. When referencing files, use the “Overlay” option and not the “Attach” option offered in AutoCAD.
- Do not copy reference data directly into a construction drawing unless:
  - They will be used to represent an enhanced detail figure specifically for that drawing
  - They will be used as a template to create other, similar objects in the design model
- Position reference data within the model space at real world coordinates.
- Position reference data within the drawing by moving the main reference or view port within the layout in AutoCAD to align within the border.
- Position multiple views to be shown in the same sheet by creating multiple view ports.
- Use a view port for limiting the amount of master data required for display within a drawing.
- Use a wipeout entity in AutoCAD to eliminate specific reference data from display within the drawing as needed. Master data that may not be appropriate for display include redundant or unnecessary peripheral data that may cause confusion when reading the drawing.

5.5 Raster Data

Raster data are defined as files that are scans or images that represent either pictures of engineering documents, aerial photos, or other representative images of engineering information. These raster data files can be in a variety of file formats, in either black and white line art style or a full color photograph, and can be either completely scalable or not at all to scale. The mix of these characteristics depends on the specific information requirement necessary to represent the concept in the deliverable documents.

Typically, these raster data files are attached or inserted as references to the deliverable documentation, then sized or scaled to adequately represent the content. It is then possible to overlay what is called vector graphics or line art over the raster data to better describe the condition or trace over information represented in the raster data for clarity.

In some cases, the raster data are then removed, leaving only the vector graphics.

In some cases, the raster data and vector graphics will be worked as one unit, typically called a hybrid drawing.

SECTION 6

Document and Sheet Content Conventions

6.1 Units

The project's unit of measure determines the format in which design information will be entered and displayed within the application.

6.1.1 AutoCAD Units

Within AutoCAD, the unit definitions imply a system of measurement by inferring a base unit according to Table 6-1. Engineering and Architectural units imply a base unit of inch, and decimal units imply a base unit of foot. Select Engineering or Architectural units for all projects based on the readout differences shown in the table. Use decimal units for Civil projects requiring a base unit of foot.

The standard unit of measure for PAMP is U.S. Customary Units.

Table 6-1. AutoCAD Unit Definitions

Unit	Example	Description
Decimal	15.50	Displays measurements in decimal notation.
Engineering	1'-3.50"	Displays measurements in feet and decimal inches.
Architectural	1'-3½"	Displays measurements in feet, inches, and fractional inches.
Fractional	15½	Displays measurements in mixed-number (integer and fractional) notation.
Scientific	1.55E+01	Displays measurements in scientific notation (numbers expressed in the form of the product of a decimal number between 0 and 10 and a power of 10).

6.2 Scales

The drawing scale is the ratio of measuring units expressing a proportional relationship between a drawing and the true size of the item it represents. The selection of the proper scale determines the readability of the drawing. The scale chosen should be large enough to allow the drawing to display its graphic, dimensional, and textual content clearly, without congestion or ambiguity (Reference NCS UDS-04.11).

6.2.1 Definitions

Create drawings at full size and plot them at the appropriate size for the project (see Section 8 of this *CADD Standards Manual,* Plotting, for half-size sheets). Selection of the proper scale will determine readability of all objects contained in the drawings.

Size graphic elements within the drawings, such as notes, leaders, dimensions, reference indicators, and other scale-dependent symbols, according to the scale of the final plot.

Avoid use of multiple scales on a single plan drawing wherever possible. If not possible, then indicate the scale for each object, and provide a note within the title of the view, detail, or object name.

SECTION 7

Annotation

7.1 Font Styles

Use Arial for all annotations.

7.2 Text Sizes

In all cases, the AutoCAD style must include a height of "0" in the style definition so that appropriate scales and text sizes can be applied as needed. See DCM Figures 8B-9 through 8B-11 for sample project text sizes. Place text on appropriate layer, using the layer naming convention presented in Section 4 of this *CADD Standards Manual.*

7.3 Noting Rules

7.3.1 General and Keyed Notes

Following is a discussion of Notes; reference Figure 7-1 for a visual example.

- Locate notes on the right side of the drawing.
- Use capital letters for all notes and titles.
- Use keyed notes in plans.
- Do not use keyed notes on sections and details unless specified at the project level.
- Do not duplicate specification information in drawing notes, except where the information facilitates interpretation of the drawings. When possible, refer to notes in other drawings to avoid repetition.

7.3.1.1 General Notes

Indicate general notes with numbers, not letters. The number designation is separate from the body of the note.

Lines of general notes can consist of single entities of text or multiline text, as follows:

- **If single entities or lines of text:** Start first string at least 1/4-inch from border, left-justified note letter, with a gap of at least 1/8-inch, and then start new left-justified text string for body of note.

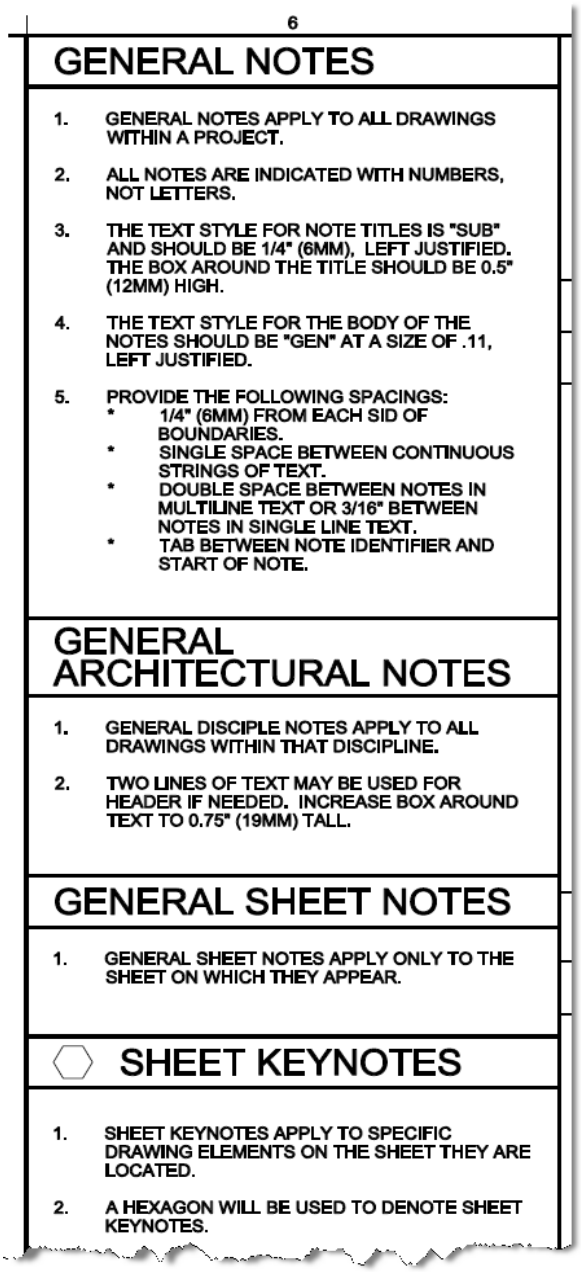


Figure 7-1. General Notes and Keyed Notes

- **If multiline text:** All text objects are contained inside boundary. Try to keep the same spacing as single entries.

Single-space general notes, and place a double-space between notes.

7.3.1.2 Keyed Notes

Follow general note rules for keyed notes.

7.3.2 Leader Lines

Use and set up multileaders as stated herein. Use each leader style as appropriate for drawing clarity. Examples of standard leader line terminators are found in Figure 7-2 and are summarized as follows:

- The standard leader is the arrow. The standard arrow leader size is 0.12 inches. All leaders can be found in specified locations based on the application platform.
- Left-justify leader text. The leader connection for the left attachment is the middle of the top line; for the right attachment, it is at the middle of the bottom line. Set the leader style for the landing gap to “Extend leader to text.”
- Use straight lines with appropriate termination.
- The line should be relatively short in length, and the line must point to the item being described by the note.
- Avoid crossing dimension, extension, or other leader lines, as well as congested areas.
- If crossing dimension or extension lines is unavoidable, break the leader, not the dimension line.

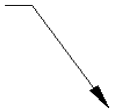
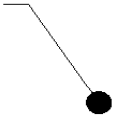
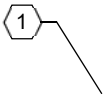
Name	Image	Description
Arrow		Most commonly used leader. This can be used anywhere.
Dot		Used to connect to a dimension that is too long to fit between dimension lines.
Ellipse		Used to identify specific items. This is usually used to denote groups of piping or conduit.
Keynote		Used when an item needs to be tied back to a common text string (the Keyed Notes).
Loop		Used to identify specific items. This is usually used to denote groups of piping or conduit.
Tick		To be used only in tight spots where the filled arrow will not fit.
Tilde		Used to identify face of material.

Figure 7-2. Standard Leader Terminators

7.4 Dimensioning

7.4.1 Dimension Concepts

Following is a discussion of dimension concepts:

1. Generally, express dimensions less than 1 foot in inches. Express dimensions 1 foot and larger in feet and inches (there will be some exceptions, such as in rebar spacing, duct sizes, equipment, and cable trays). Use diagonal stacked fractions.
2. Express dimensions in feet and tenths of a foot for Civil.
3. Only use slashes instead of filled arrowheads in tight spots.
4. When dimensions are taken from existing drawings, electronic files, or documents and used in new drawings, place a note to field-verify with the dimension or refer to field verification in a general note. For example, “Contractor will verify dimensions and conditions of existing construction before proceeding with the work.” Examples of where dimensions may be taken from include client-originated backgrounds; vendor equipment files; or drawings from major equipment suppliers, contractors, and surveyors.
5. Note dimensions “Not to Scale” with notation NTS directly under the dimension text. Note sections and details not drawn to scale with NTS below their title. Note drawings not drawn to scale “Not to Scale” in the title block.
6. Avoid repetitious dimensioning. Where dimension lines continue, make sure only one line exists.
7. Orient horizontal dimensioning slashes low end to high end and left to right. Orient vertical dimensioning slashes similarly as viewed from 90 degrees.
8. Avoid adding leader lines to dimensions in already overcrowded areas.
9. Avoid repeat dimensions or member sizes from view to view. Entering information in one place avoids possible errors in revising later. However, grid and datum dimensions in new sheets can be repeated if they will clarify important concepts to the contractor in the field.
10. When possible, do not close dimension lines; that is, if you show an overall dimension, do not provide a complete string of dimensions below it.
11. Show tolerance dimension when closure is necessary.
12. Identify dimension datum point in all drawings.

7.4.2 Characteristics

7.4.2.1 Styles

Table 7-1 summarizes dimensioning characteristics.

Table 7-1. Dimensioning Characteristics

Name	Description	Unit Use
English ft	Foot – Decimal Style	Civil and English Units
English ft-in	Foot –Inch Style	All other Disciplines and English Units

7.4.2.2 Settings

Place dimension text center-justified above the dimension line using the standard text style. The text margin should be set to **1/16 inch (0.0625 inches)**

Set dimension text units to read out with the following unit labels, depending on the type of drawing or project standard:

- English Civil drawings – Label format in feet with unit label displayed (x'). Accuracy set to two decimal places.
- English Architectural drawings – Label format in feet and inches with unit labels displayed (x'-y"). Accuracy set to 1/8 inch.

Do not show secondary units unless required for multiple units of measure on a specific project.

Show angular dimensions in degrees to four decimal points.

Dimension lines use a stack offset of **3/8-inch (0.375 inches)**.

Align dimension placement to the view; use automatic text location if available within the application.

Set the DIMASSOC (previously DIMASO) system variable setting to a value of 2 in AutoCAD when dimensioning reference or master data.

Dimension tolerance settings for automatic generation of upper and lower plus or minus tolerances are typically off.

Dimension Tool Settings can control the individual dimensioning components. The main settings for arrow-terminated dimensions are to automatically display both left and right terminators, as well as left and right extension lines. The setting for the orientation of text should be standard, which indicates that text is placed horizontally in the dimension line. No prefix or suffix settings are used.

Set extension lines to join with a connecting line when the dimension text falls outside of the extension lines. Set the offset, the distance between the start of the extension line and the element, to **1/16 inch (0.0625 inches)**. Set the extension, the distance the extension line extends beyond the dimension line, to **1/16 inch (0.0625 inches).**

7.4.3 Methods

7.4.3.1 Location

Locate dimensions outside the floor plan or other view being dimensioned, to minimize clutter and overlap with other graphics. Locate dimensions outside the view at the top and to the right side of the plans whenever possible.

Set offset dimension lines to **3/8 inch (0.375 inches)**.

When dimensions must be shown in the interior of a floor plan or other view, arrange the dimensions in continuous strings for clarity and consistency.

7.4.3.2 Types of Terminators

Terminators define the junction between a dimension line and the extension lines leading to the start and finish of the dimension. These terminators are in these forms: slash (slashes should always be parallel), arrowhead, or dot.

7.4.3.3 Text Size and Location

Match dimension text size to the size of the text in the drawing. Where possible, place the dimension text at the midpoint and on top of the dimension line

Arrange dimensions from general to specific: dimension overall; then structural grid or floor-to-floor heights; and then specific information, such as window and partition locations and centerlines or heights of various building components. For examples, see Figure 7-3.

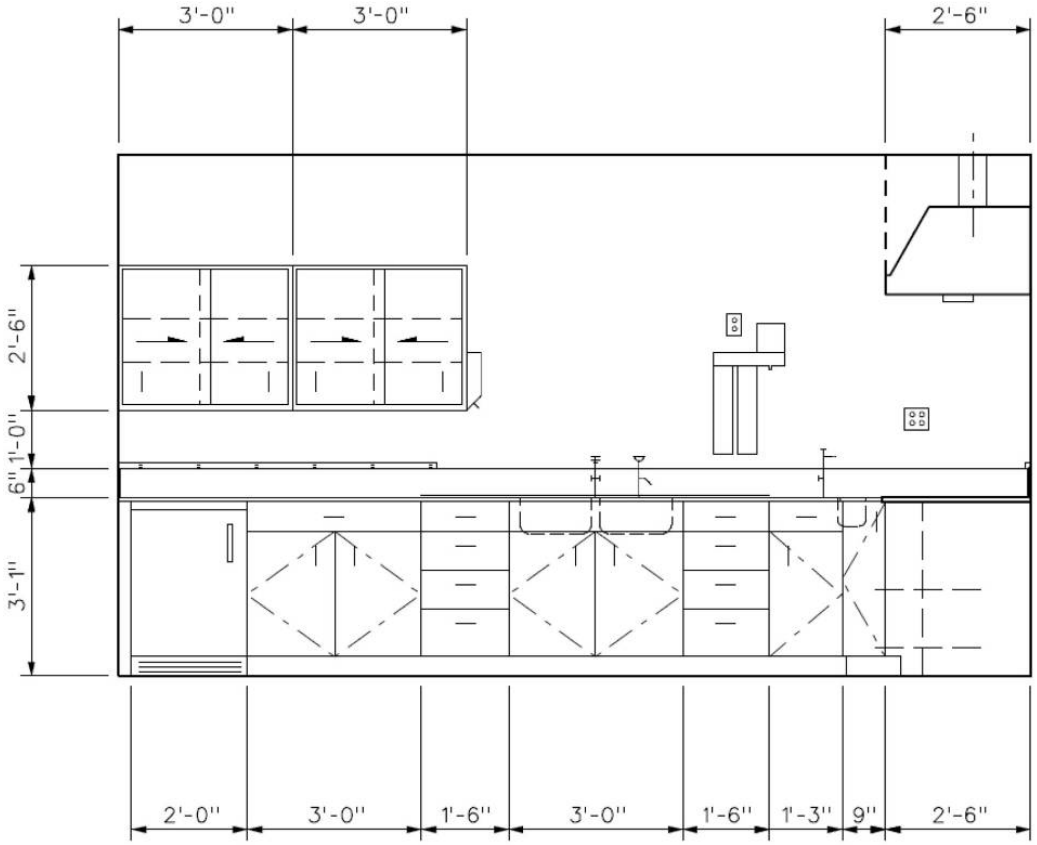


Figure 7-3. Dimensioning - Methods and Location

7.5 Hatching

Hatching is a series of dots, lines, or objects used in a pattern to identify the following:

- Materials: Types of walls (for example, brick, fire, and insulation). Also used in details and sections, such as cross cuts, showing earth, gravel, and concrete. Basically, any material can have a specific hatch pattern.
- Work areas: Used to show sections of work to be completed or to be demolished. Hatch patterns can also be used in the key plan to denote a section of work to be completed.

If large areas need to be hatched, break them into smaller hatch areas to keep readability at a maximum.

Use application default hatch patterns at all times, unless otherwise required by the PAMP.

Define all hatches used in the general or discipline-specific legend, as applicable. Sheet-specific hatches and an associated legend may be utilized, but use should be infrequent.

SECTION 8

Plotting

8.1 Pen Settings

Pen settings control the thickness of line work and screening behavior when drawings are plotted. For presentation and plotting consistency, standard colors and assigned pen widths have been developed. Assign line weights by layer. Refer to Appendix A for more information on the PAMP pen tables.

PAMP AutoCAD Plot/Style Table:

- PAMP-Full-size.ctb = Full-size black and white
- PAMP-Half-size.ctb = Half-size black and white

When plotting, use the appropriate Plot/Style Table for the sheet size being plotted (full-size or half-size), always leaving the “Scale Lineweights” option unselected.

8.2 Raster Images

Raster images may be included in plots similar to that described in Section 5.5 of this *CADD Standards Manual*, Raster Data, and also for the purposes of simple illustration or to represent a client logo on a border. Raster images cannot be screened back at plot time, and they do not inherit the line weight or color values related to plotted output.

Determine the appropriate image quality and density for the required use. Using raster images will certainly increase the relative size of the plot file output and may result in a much longer per-plot generating and processing time.

8.3 Screening Methodology

Screening or half-toning line work graphics may be necessary to emphasize certain aspects of a design, typically by screening the background objects behind or surrounding the desired subject. It will be necessary to reassign the symbology of screened objects to the appropriate color index value defined in the tables for plotting. The values are a close approximation of a halftone that will still produce a first or second generation copy of the original and still retain the desired appearance.

8.4 Black and White

All layers use a color, weight, and line style setting applied through a by-layer assignment.

Color is derived from the weight assignment and will be consistent with the conventional plotting requirements in the AutoCAD drawing.

8.5 Color

Projects will typically address color plotting needs using a what you see is what you get (WYSIWYG) method, allowing for the use of color, as necessary, to differentiate designs for specific presentations.

Color output may vary between devices.

Three types of color plotting are supported in the latest standard:

1. **NCS** – Limited available colors for use based on black, halftone and grey, gold, olive, green, forest green, blue, navy, purple, red, and magenta. Groups of colors are separated by black and halftone and grey color assignments.
2. **WYSIWYG** – The use of standard palettes as defined by the delivered application. The onscreen colors will translate into the closest plotted representation of each color.
3. **Industry Standard Color Books or Palettes** – The use of extended color palettes to achieve a wider range of plotted colors. The onscreen colors will translate into the closest plotted representation of each color.

8.6 Half-size Plotting

Half-size plots are generated by plotting drawings configured with the full-size border at half-size, using PAMP-Half-size.ctb.

SECTION 9

Works Cited

CH2M HILL Engineers, Inc. (CH2M). *PAMP Document and Record Management Plan*. Latest edition.

Municipality of Anchorage (MOA) Project Management & Engineering Department. 2007. *Design Criteria Manual.*

National Institute of Building Sciences. 2015. *United States National CAD Standards*. Version 5.

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Appendix A
Sample Drawings

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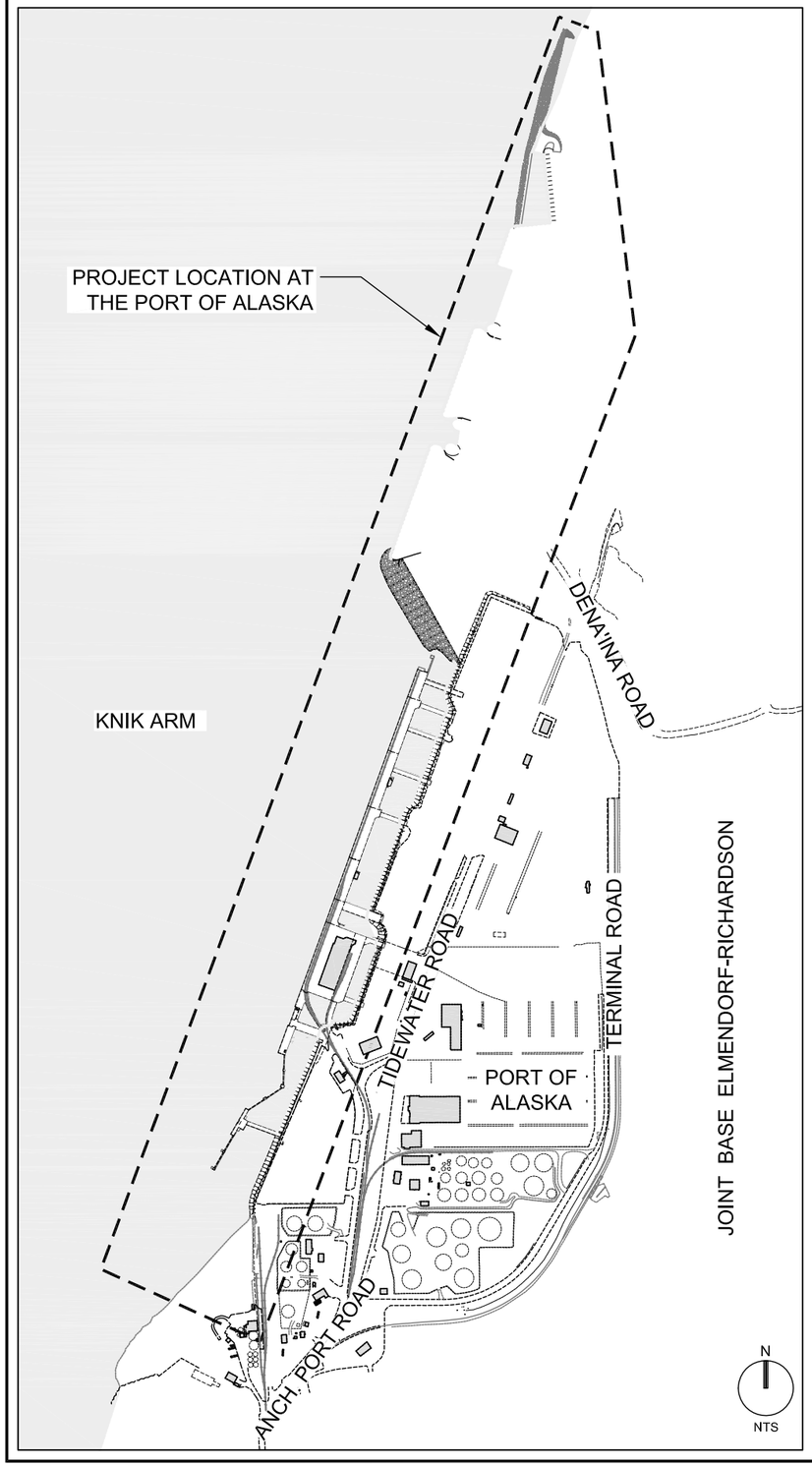

PORT OF ALASKA MODERNIZATION PROGRAM

PROJECT NAME
SUBMITTAL DATE
DESIGN LEVEL

RENDERING OF PROJECT
OR
ZOOMED-IN PLAN VIEW OF PROJECT

GOES HERE

Drawing: P:\AMP-PLAN\COVERSHEET.DWG
Date: Nov 21, 2017 - 1:51pm

Drawing: PAMP-PLANSHEETTEMPLT.DWG
Date: Nov 21, 2017 - 1:55pm

VERIFY SCALES

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

REV	DATE	DESCRIPTION	BY	APVD

REVISIONS

CONSULTANT LOGO
AND CONTACT INFORMATION

DSGN	DR	CHK	APVD
A. DESIGNER	B. DRAWNBY	C. CHECKER	D. APPROVER

CONSULTANT

STATE OF ALASKA
49th
X
XX-XXXXX
REGISTERED PROFESSIONAL ENGINEER

SEAL

PORT of ALASKA

PORT OF ALASKA MODERNIZATION PROGRAM

DISCIPLINE

TITLE 1
TITLE 2
TITLE 3

PORT OF ALASKA

PORT OF ALASKA MODERNIZATION PROGRAM

PROJECT TITLE

ANCHORAGE, ALASKA

HORIZ SCALE: AS SHOWN
VERT SCALE: NA

DATE: DATE

SHEET: X OF XX

FFF-D-NVV

100 100 100 100 100 100 100 100 100 100

10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00 10+00

VERIFY SCALES

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

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AND CONTACT INFORMATION

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A. DESIGNER	B. DRAWNBY	C. CHECKER	D. APPROVER

CONSULTANT

STATE OF ALASKA 49th X XX-XXXXX REGISTERED PROFESSIONAL ENGINEER

SEAL

PORT of ALASKA

PORT OF ALASKA MODERNIZATION PROGRAM

DISCIPLINE

TITLE 1
TITLE 2
TITLE 3

PORT OF ALASKA

PORT OF ALASKA MODERNIZATION PROGRAM

PROJECT TITLE

ANCHORAGE, ALASKA

HORIZ SCALE: AS SHOWN
VERT SCALE: AS SHOWN

DATE: DATE

SHEET: X OF XX

FFF-D-NVV

Drawing: PAMP-RNP-SHEETTEMPLT.DWG
Date: Nov 21, 2017 - 1:55pm

DRAWING SETUP INSTRUCTIONS

LAYER NAMES - USE NCS (BASED ON AIA LAYER NAMES) FOR ASSIGNING LAYER NAMES
- LAYERS HAVE BEEN ADDED WITH DISCIPLINE SPECIFIC FILTERS.

XREF PAMP-TB-1.DWG (TITLEBLOCK) INTO PAPERSPACE, 0,0 INSERTION..
* ALL XREFS, USE OVERLAY MODE AND NOT ATTACH MODE.

INSERT PAMP-TB-INFO.DWG (TITLEBLOCK ATTRIBUTES) INTO PAPERSPACE, 0,0 INSERTION.

TEXT

USE THIS FOR GENERAL TEXT FONT = ARIAL TEXT HEIGHT = .12

USE THIS FOR SUBTITLE TEXT FONT = ARIAL TEXT HEIGHT = .18

USE THIS FOR TITLE TEXT FONT = ARIAL TEXT HEIGHT = .24

STANDARD SYMBOLS

STANDARD DIMSTYLE

SECTION CUT CALLOUT

TITLE CALLOUT

TITLE CALLOUT WITHOUT BUBBLE

DETAIL CALLOT

NOTE CALLOUT OR GRID BUBBLE

KEYED NOTES

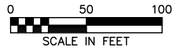
REVSION CALLOUT


REVSION CLOUD (style = normal, arc length = .375)

NORTH ARROW


LEADER WITH ARROW


LEADER WITH LOOP



SCALE BAR

COLOR/PLOTSYLE

USE COLOR TABLE
PAMP-Full-Size.ctb FOR 22x34 ANSI D PLOTTING
PAMP-Half-Size.ctb FOR 11x17 PLOTTING.
THESE COLOR TABLES ARE PRESENTED BELOW:

COLOR NO.	COLOR	FULLSIZE LINE WIDTH (mm)	HALFSIZE LINE WIDTH (mm)
1	RED	0.180	0.090
2	YELLOW	0.250	0.130
3	GREEN	0.350	0.180
4	CYAN	0.500	0.250
5	BLUE	0.700	0.350
6	MAGENTA	1.000	0.500
7	WHITE	0.025	0.130
8	GREY (screened)	0.350 (screen 50%)	0.180 (screen 50%)
250	GREY (screened)	0.350 (screen 50%)	0.180 (screen 50%)
251	GREY (screened)	0.250 (screen 50%)	0.130 (screen 50%)
252	GREY (screened)	0.350 (use object color)	0.180 (use object color)
252	GREY (screened)	0.500 (use object color)	0.250 (use object color)
253	GREY (screened)	0.700 (use object color)	0.350 (use object color)
254	GREY (screened)	1.000 (use object color)	0.500 (use object color)
255	GREY (screened)	2.000 (screen 10%)	1.000 (screen 10%)

GENERAL SHEET NOTES

1. GENERAL SHEET NOTES APPLY ONLY TO THIS SHEET.
2. ALL NOTES ARE INDICATED WITH NUMBERS.

SHEET KEYNOTES

1. SHEET KEYNOTES APPLY SPECIFIC DRAWING ELEMENTS ON THE THIS SHEET.
2. A HEXAGON WILL BE USED TO DENOTE SHEET KEYNOTES.

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

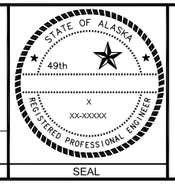
REV	DATE	DESCRIPTION	BY	APVD

REVISIONS

CONSULTANT LOGO
AND CONTACT INFORMATION

DSGN	DR	CHK	APVD
A. DESIGNER	B. DRAWNBY	C. CHECKER	D. APPROVER

CONSULTANT



SEAL

PORT of ALASKA

PORT OF ALASKA MODERNIZATION PROGRAM

DISCIPLINE
SHEET SETUP AND ANNOTATION SYMBOLS

PORT OF ALASKA

PORT OF ALASKA MODERNIZATION PROGRAM
PROJECT TITLE
ANCHORAGE, ALASKA

HORIZ SCALE: AS SHOWN
VERT SCALE: NA
DATE: DATE
SHEET: X OF XX

FFF-D-NVV

Drawing: PAMP-SHEETSETUP.DWG
Date: Nov 21, 2017 - 1:59pm

Appendix B
Ports and Maritime Layers

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Table B-1 provides Ports and Maritime Layers descriptions

Table B-1. Ports and Maritime Layers

Layer Name	Color	Line Style	Description
S-ANCR-WALE	6	Continuous	Anchor Wale Beam
S-ANCR-WALE-E	8	Continuous	Anchor Wale Beam (existing to remain)
S-ANCR-WALE-D	6	Continuous	Anchor Wale Beam (existing to demolish)
S-ANCR-WALE-X	9	Continuous	Anchor Wale Beam (NIC)
S-ANCR-WALL	6	Continuous	Anchor Wall
S-ANCR-WALL-E	8	Continuous	Anchor Wall (existing to remain)
S-ANCR-WALL-D	6	Continuous	Anchor Wall (existing to demolish)
S-ANCR-WALL-X	9	Continuous	Anchor Wall (NIC)
S-BEAM-TMBR	6	Continuous	Beams: Timber
S-BEAM-TMBR-E	8	Continuous	Beams: Timber (existing to remain)
S-BEAM-TMBR-D	6	Continuous	Beams: Timber (existing to demolish)
S-BEAM-TMBR-MBND	2	Continuous	Beams: Timber (material beyond cut)
S-BEAM-TMBR-X	9	Continuous	Beams: Timber (NIC)
S-CHAN-BWTR	6	Continuous	Navigable Channels: Breakwater
S-CHAN-BWTR-E	8	Continuous	Navigable Channels: Breakwater (existing to remain)
S-CHAN-BWTR-D	6	Continuous	Navigable Channels: Breakwater (existing to demolish)
S-CHAN-BWTR-X	9	Continuous	Navigable Channels: Breakwater (NIC)
S-FNDN-PILE-CONC-D	2	Continuous	Foundation Pile: Concrete (existing to demolish)
S-FNDN-PILE-CONC-MBND	2	Continuous	Foundation Pile: Concrete (material beyond cut)
S-FNDN-PILE-STEL-D	2	Continuous	Foundation Pile: Steel (existing to demolish)
S-FNDN-PILE-STEL-MBND	2	Continuous	Foundation Pile: Steel (material beyond cut)
S-FNDN-PILE-TMBR	6	Continuous	Foundation Pile: Timber
S-FNDN-PILE-TMBR-D	2	Continuous	Foundation Pile: Timber (existing to demolish)
S-FNDN-PILE-TMBR-MBND	2	Continuous	Foundation Pile: Timber (material beyond cut)
S-WARF-BKHD	6	Continuous	Wharf: Bulkhead
S-WARF-BKHD-E	8	Continuous	Wharf: Bulkhead (existing to remain)
S-WARF-BKHD-D	6	Continuous	Wharf: Bulkhead (existing to demolish)
S-WARF-BKHD-X	9	Continuous	Wharf: Bulkhead (NIC)
S-WARF-BKHD-TROD	6	Continuous	Wharf: Bulkhead Tierod
S-WARF-BKHD-TROD-E	8	Continuous	Wharf: Bulkhead Tierod (existing to remain)
S-WARF-BKHD-TROD-D	6	Continuous	Wharf: Bulkhead Tierod (existing to demolish)
S-WARF-BKHD-TROD-X	9	Continuous	Wharf: Bulkhead Tierod (NIC)

Table B-1. Ports and Maritime Layers

Layer Name	Color	Line Style	Description
S-WARF-BLRD	6	Continuous	Wharf: Bollard
S-WARF-BLRD-E	8	Continuous	Wharf: Bollard (existing to remain)
S-WARF-BLRD-D	6	Continuous	Wharf: Bollard (existing to demolish)
S-WARF-BLRD-X	9	Continuous	Wharf: Bollard (NIC)
S-WARF-CURB-TMBR	6	Continuous	Wharf: Curb Timber
S-WARF-CURB-TMBR-E	8	Continuous	Wharf: Curb Timber (existing to remain)
S-WARF-CURB-TMBR-D	6	Continuous	Wharf: Curb Timber (existing to demolish)
S-WARF-CURB-TMBR-X	9	Continuous	Wharf: Curb Timber (NIC)
S-WARF-FNDR	6	Continuous	Wharf: Fender
S-WARF-FNDR-E	8	Continuous	Wharf: Fender (existing to remain)
S-WARF-FNDR-D	6	Continuous	Wharf: Fender (existing to demolish)
S-WARF-FNDR-X	9	Continuous	Wharf: Fender (NIC)
S-WARF-FNDR-PANL	6	Continuous	Wharf: Fender Panel
S-WARF-FNDR-PANL-E	8	Continuous	Wharf: Fender Panel (existing to remain)
S-WARF-FNDR-PANL-D	6	Continuous	Wharf: Fender Panel (existing to demolish)
S-WARF-FNDR-PANL-X	9	Continuous	Wharf: Fender Panel (NIC)
S-WARF-FNDR-RUBR	6	Continuous	Wharf: Fender Rubber
S-WARF-FNDR-RUBR-E	8	Continuous	Wharf: Fender Rubber (existing to remain)
S-WARF-FNDR-RUBR-D	6	Continuous	Wharf: Fender Rubber (existing to demolish)
S-WARF-FNDR-RUBR-X	9	Continuous	Wharf: Fender Rubber (NIC)
S-WARF-FNDR-TMBR	6	Continuous	Wharf: Fender Timber
S-WARF-FNDR-TMBR-E	8	Continuous	Wharf: Fender Timber (existing to remain)
S-WARF-FNDR-TMBR-D	6	Continuous	Wharf: Fender Timber (existing to demolish)
S-WARF-FNDR-TMBR-X	9	Continuous	Wharf: Fender Timber (NIC)
S-WARF-WALL	6	Continuous	Wharf: Wall
S-WARF-WALL-E	8	Continuous	Wharf: Wall (existing to remain)
S-WARF-WALL-D	6	Continuous	Wharf: Wall (existing to demolish)
S-WARF-WALL-X	9	Continuous	Wharf: Wall (NIC)

Notes:

NIC = not in contract