

## Appendix E:

CAD-Spatial Data Drawing Standards



# CAD DRAWING STANDARD

CAD/GIS SERVICES

**REVISION: 7/14/20**

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## I) BEGINNING A NEW DRAWING *Chugach Electric Drawing Template*

An AutoCAD drawing template will be provided by CAD/GIS Services and is to be used when beginning a new drawing for all departments and all consulting firms. Please request the current Meridian recognized title block template at the beginning of every project.

The provided drawing template is recognized by our drawing database (Meridian) and will contain standard Chugach Electric (Chugach) layers, line types, colors, etc. When work is delivered to Chugach, the CAD drawing file, X-References, images, excel files, blocks and .ctb plot style files shall be included in the drawing package delivered to Chugach (if applicable, X-References shall be bound). The mask portion of any text masking shall be on its own layer, color yellow. **No yellow shall be used in the drawing except for masking.** Model Space scale is 1:1 and the Title Block shall reside on the Layout tab.

## II) DRAWING SETUP *(Defaults, unless otherwise defined in General Guidelines or template.)*

### A. **Layers** *(See attached Guidelines for additional layer standard.)*

BLOCK	GREEN, CONTINUOUS, ALL BLOCKS
CONDUCTOR	BLUE, CONTINUOUS, 0.35 LINEWEIGHT
DIM	BLUE, DIM. LINES & LEADERS
DWG-GRID	GRAY #9, HIDDEN2, DEFAULT LINEWEIGHT
DWG-GRID TIC MARKS	RED, CONTINUOUS, DEFAULT LINEWEIGHT
FENCELINE	GREEN, SURVEY FENCELINE (x-----x-----x-----x)
GROUND LINE	RED, CONTINUOUS, 0.35 LINEWEIGHT
HATCH	COLOR OPTIONAL, ON SEPARATE LAYER FROM HATCH BORDER POLY
MASKING	YELLOW, ALL MASKING ON SEPARATE LAYER FROM TEXT
NORTH ARROW	WHITE, CONTINUOUS
POLES	RED, CONTINUOUS, 0.35 LINEWEIGHT
POLE NUMBER TEXT	WHITE
REV CLOUD PREVIOUS	BLUE #152, CONTINUOUS, CLOUD
REV CLOUD CURRENT	BLUE #152, CONTINUOUS, CLOUD
REV NUMBER PREVIOUS	RED, CONTINUOUS, REV TRIANGLE
REV NUMBER CURRENT	RED, CONTINUOUS, REV TRIANGLE
SCALE BAR	WHITE, CONTINUOUS
TBLOCK	BLUE, TITLE BLOCK
TBLOCK TEXT	WHITE
TEXT	WHITE (NOTES & OTHER TEXT)
VIEWPORT	COLOR 201, CONTINUOUS
AC CIRCUITS	BLUE, CONTINUOUS, ALL AC CIRCUITS
CT CIRCUITS	CYAN, CONTINUOUS, ALL CT CIRCUITS
DC CIRCUITS	RED, CONTINUOUS, ALL DC CIRCUITS

## ***B. Line Types***

<b><i>Name</i></b>	<b><i>Description</i></b>	<b><i>Color</i></b>	<b><i>Line type</i></b>
CENTER	CENTERLINE	CYAN	CENTER
CONT	CONTINUOUS	RED	CONTINUOUS
DASH	LONG DASH	CYAN	DASHED
FENCELINE	X-----X-----X-----X	GREEN	SURVEY FENCELINE
HIDDEN	HIDDEN (.5x)	CYAN	HIDDEN2
PHANTOM	LONG DASH (2) SHORT DASHES	MAGENTA	PHANTOM
BLOCK	CONTINUOUS	GREEN	CONTINUOUS
TEXT	CONTINUOUS	WHITE	CONTINUOUS
DIM	CONTINUOUS	BLUE	CONTINUOUS
TBLOCK	CONTINUOUS	BLUE	CONTINUOUS
VIEWPORT	CONTINUOUS	201 LT PINK	CONTINUOUS

## ***C. Dimension Style***

DIM ARROW	CLOSED FILLED
DIM ARROW SIZE	0.180
DIM LINE COLOR	BLUE
DIM EX LINE COLOR	BLUE
DIM LINE EXTENSION	0.062
DIM OFFSET FROM ORIGIN	0.062
DIM PRIMARY UNITS	DECIMAL
DIM SCALE	1 = 1
DIM TEXT COLOR	WHITE
DIM TEXT HEIGHT	0.140
DIM TEXT STYLE	SIMPLEX

## ***D. Unit of Measurement***

Units of Measure	Type: Decimal, Precision = 0.0000
Decimal Degrees	Type: Decimal Degrees, Precision = 0
Direction for East	East 3 O'clock = 0
Drawing Units	Inches
BUILDING DWGS	ARCHITECTURAL - Inches

## ***E. Text***

All text	UPPER CASE UNLESS NOTED OTHERWISE.
Primary headings	Romant, 0.187; White (3/16")
Subheadings	Simplex, 0.125; White (1/8")
The word "NOTES"	Simplex, 0.125; White
Remainder of text or notes	Simplex, 0.100; White
Masking portion of all text on its own layer	Color Yellow #51

## ***F. Blocks***

CREATE all blocks on Layer 0, at a scale of 1:1.  
All blocks shall be inserted on the layer named "BLOCK".

*\*\*All contractor created blocks shall be furnished to Chugach.*

## ***G. Spatial Standards*** *(Spatial Standard document provided on request.)*

Drawings that are showing field facilities shall comply with the "CAD/GIS Spatial Data Standards" as appropriate. The minimum acceptable standard for a CAD drawing is incorporated below in AutoCAD. This coordinate standard can be assigned using the "AK83-4F" code:

### **Datum and Coordinate System**

Name: NAD 1983 Alaska State Plane Zone 4 FIPS (Federal Information Processing Standards) 5004 (US Survey Feet)

Select "AK83-4F" from the Coordinate System Ribbon using the Assign button.

Please refer to the Survey Section of the "CAD /GIS Spatial Data Standards" for best practice when utilizing locations that can be surveyed.

## **III) COMPLETING A DRAWING**

### ***A. Completion Requirements***

All drawings provided to Chugach shall be ended with the following parameters saved:

1. Purge all un-needed items.
2. Verify all x-refs and images are bound or included in package.
3. Before ending the drawing 'ZOOM EXTENTS'.
4. Text Style set to SIMPLEX.
5. Set plotter configuration to "NONE".
6. Send Plot Style (.ctb file) with package.
7. Verify NO YELLOW is used in drawing.

## IV) USE OF EXISTING AUTOCAD RECORD DRAWINGS WITHIN PROJECTS

Chugach currently uses AutoCAD Map 3D 2019. Chugach will not be responsible to provide existing AutoCAD drawings in a release newer than AutoCAD Map 3D 2019. Chugach will accept drawings in formats that can be opened and saved in AutoCAD Map 3D 2019.

## V) USE OF EXISTING RASTERIZED RECORD DRAWINGS WITHIN PROJECTS

Existing rasterized record drawings are .pdf, .tiff, CALS Group IV format with a .gp4 file extension, etc. Edits to these drawings are to be made with AutoCAD using AutoCAD Map Raster Design 2019. All standards within this document, which can be used with raster files, shall be applied.

When the edit results in two files, (one file has the edits in vector format and the second file is the remaining raster portion of the original drawing as a hybrid file) both files will be provided to Chugach.

## VI) CHANGES TO THE DRAWINGS

*See Attachment A for an example of where information from sections VI A-D is to be provided.*

### A. Design/Construction/As Built Revisions

1. The bottom left corner of the drawing has a "Revision" area. This revision area is used during DESIGN, CONSTRUCTION, and AS BUILT process only. When changes are made to the drawing during the DESIGN phase, capitalized alpha revisions are entered into the revision area, (see Table 1).

*Table 1*

NO.	DESIGN/CONSTRUCTION/AS BUILT REVISION	DWN. BY/DATE	REVIEWED MGR/SUPV/DATE	APPROVED DIRECTOR/DATE
A	PRELIMINARY DESIGN - TO ADD 75 MVA XFMR	D&L 3/3/19	SW 3/3/19	ATL 3/3/19
B	FINAL DESIGN	D&L 4/2/19	SW 4/9/19	ATL 4/10/19
C	IN-HOUSE REVIEW	CV 5/1/19	SW 5/4/19	ATL 5/5/19

2. Editing of a markup drawing being passed back and forth between the edit originator and a Chugach CAD/GIS Operator does not constitute a new revision in the revision block.
3. When the DESIGN has been approved for bidding/construction, all alpha revisions are removed. Revision 0 ISSUED FOR CONSTRUCTION is placed in the revision area. Any addendums shall be numbered 0-1, 0-2, etc., with the addendum number and a brief description in the comments area. Any change orders shall be continued in consecutive order 0-3, 0-4, etc., with the change order number and a brief description in the comments area. "As-builts" by various entities shall also follow numerically in sequence, 0-5, 0-6, etc. with a description of the entity and/or extent of the As-built (see Table 2).

Table 2

NO.	DESIGN/CONSTRUCTION/AS BUILT REVISION	DWN. BY/DATE	REVIEWED MGR/SUPV/DATE	APPROVED DIRECTOR/DATE
0	ISSUED FOR CONSTRUCTION	D&L 5/12/19	SW 5/15/19	ATL 5/16/19
0-1	ADDENDUM #1	CV 6/1/19	SW 6/3/19	ATL 6/5/19
0-2	CHANGE PER ICOR #444	JSP 7/15/19	SW 7/16/19	ATL 7/16/19
0-3	CHANGE PER ICOR #446	GC 8/1/19	SW 8/4/19	ATL 8/10/19
0-4	AS BUILT BY CONSTRUCTION CONTRACTOR	D&L 9/5/19	SW 9/20/19	ATL 9/20/19

If there is a handwritten signature or initials in the various columns of the revision block on the marked up original, the drafter shall add them to the electronic file, i.e. the name or initials and the date.

4. **SIGNED AND DATED CERTIFICATION STAMP:** If a signed and dated certification stamp is placed on the drawing, a note that describes the certification shall be added to the notes area within the body of the drawing above the Design Revision area if possible. Examples: A.) Certified for construction of W/O# by (first name, middle initial, last name), (license number), (firm worked for), (date on stamp). B.) Design certified for mfg./fabrication of W/O# by (first name, middle initial, last name), (license number), (firm worked for), (date on stamp). C.) “As-built” of W/O# certified by (first name, middle initial, last name), (license number), (firm worked for), (date on stamp). When the construction and as-built phases are complete ONLY the Certification notes from a PE will remain on the drawing and all others will be removed.
5. When the CONSTRUCTION and AS-BUILT phases are complete, **all** revisions are deleted from the bottom left revision area and a summary revision shall be place in the “Record Revision” area (see table 3).

## **B. Record Revisions**

1. All record drawing revisions shall be entered under “Record Revision” in the title block. All new revisions will be entered in numerical sequence starting at the top and working down through all revision lines, (see Table 3).
2. The Project Engineer will submit signed “AS-BUILT” drawings for Record Revision. Typically, the Project Description will be used as the revision description, unless otherwise noted by the Project Engineer. The drafter shall type in the date and name or initials as provided by the Project Engineer in the appropriate areas and add a new revision accordingly, to include a work order number and when available the Work Plan Number.



Table 3

NO.	RECORD REVISION	TECH / DWN. BY	WP#	WO# APPROVED	RECORD APPROVED	DATE
1	AS-BUILT - CONTRACTOR	D&L		E0920378	JDS	8/14/10
2	AS-BUILT EXISTING POLE	GC			CV	9/4/12
3	INSTALLED NEW TRANSFORMER	D&L 10/1/15	1001.345EN	E1520050	CV	3/14/16
4	AB-BUILT PER SHAWN WENDLING	GC		E1620049	SW	9/1/17

3. Once the revision block is filled, the oldest revision will be dropped, and all revisions moved up to make room for the new revision (Table 4).

Table 4

NO.	RECORD REVISION	TECH/ DWN BY	WP#	W.O. APPROVED	RECORD APPROVED	DATE
2	AS-BUILT EXISTING POLE	GC			CV	9/4/12
3	INSTALLED NEW TRANSFORMER	D&L 10-1-15	1001.345EN	E1520050	CV	3/14/16
4	AS-BUILT PER SHAWN WENDLING	GC		E1620049	SW	9/1/17
5	ADD CONFIDENTIAL STAMP TO TB	GC			GC	11/1/17
6	SWEC - GROUND GRID RELOCATED	D&L 7/16/18		E1713412	CV	8/10/18
7	AS-BUILT PER JOHN PAHKALA	GC		E1816222	JSP	1/14/19

4. The Standard As-built Drawing MARK UP Colors:

RED	ADD
GREEN	DELETE
BLUE	NOTE TO DRAFT PERSON

### C. Revision Clouds (Cloud around revised areas on the drawing.)

1. **New drawings:** When the “AS-BUILT” process is complete and the record revision (revision number 1) block is completed, all clouds will be removed in new Chugach drawings.

2. **Existing record drawings:**

**DESIGN:** The previous record revision cloud layer and triangles with record revision number layer shall be turned off on the drawing at the beginning of the DESIGN phase. During the DESIGN phase all revisions shall be clouded on the drawing with a triangle and corresponding capitalized alpha revision on the correct cloud and revision layer.

**ISSUED FOR CONSTRUCTION:** When a drawing moves to “Issued for Construction” (revision 0), all clouds where changes occurred shall remain visible. All capitalized alpha characters within triangles shall be change to a 0 (zero).

**AS-BUILT:** When the construction is complete and the drawing is as-built, the current cloud layer will be turned off, the previous cloud layer will be turned off and all the revision number triangles will remain on. There will be two cloud layers and two revision number layers to accommodate the layer on - layer off process. See II Drawing Setup, Layers for correct naming and color for clouds and revision numbers.

3. When the revision block area of the drawing becomes full, the earliest (top) revision shall be deleted. The triangle and cloud on the drawing which corresponds to that revision shall be removed, (see table 4).

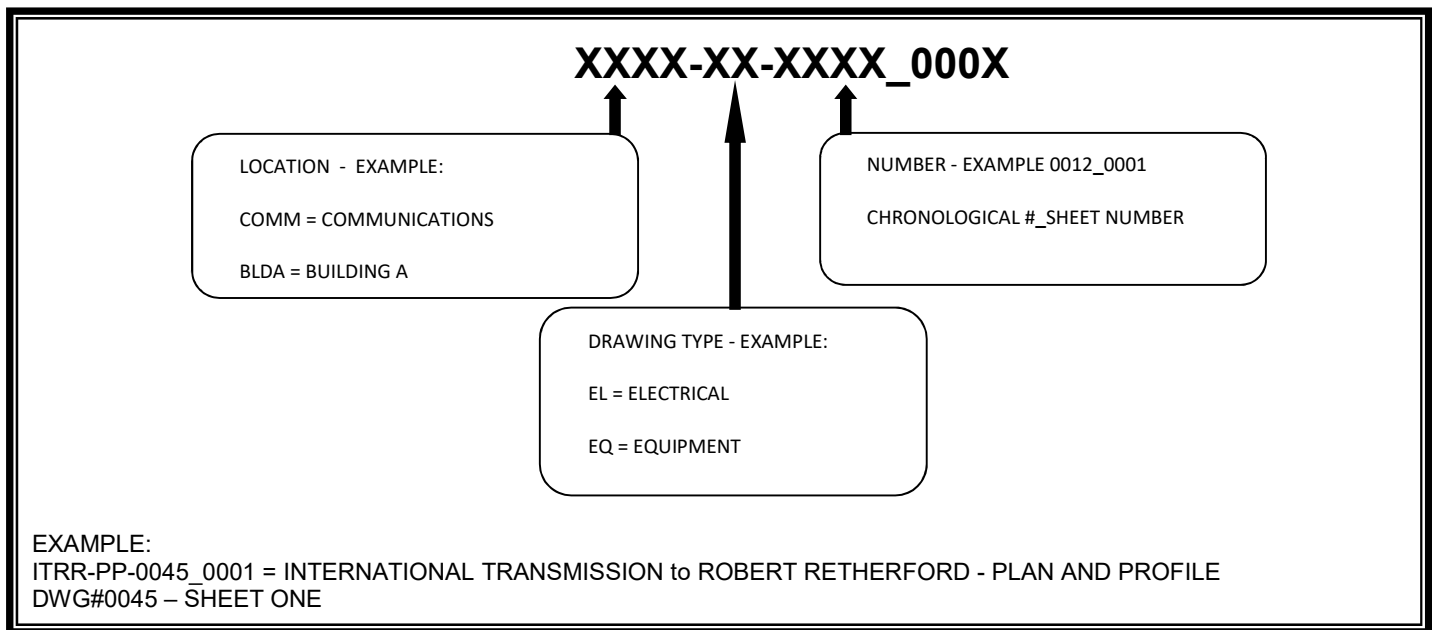
## **VII) SUBMITTING THE FINAL DRAWINGS TO CHUGACH ELECTRIC**

1. Each CAD project drawing shall be submitted in version from AutoCAD Map 3D 2019.
2. Documentation shall be provided listing new layers and blocks created during the project with a brief description of each.
3. An electronic copy shall be provided to Chugach containing the CAD file, all x-references, all images, world files, excel files, blocks and .ctb Plot Styles used and/or created during the project.
4. Projects that use a single electronic CAD file with multiple layout tabs as sheets in the set of drawings shall be limited to those that require match-lines, i.e. transmission line plan and profile sheets. X-referenced drawing shall be used on projects that have separate sheets for various layers within the project; examples would be substations with sheets for the ground grid, foundations, equipment, outlines, conduit, buildings, etc. All X-References shall be bound to the drawing when appropriate and an electronic file containing all X-Reference files shall be provided to Chugach.
5. Reference the current version of the U.S. National CAD Standard for Architecture, Engineering, & Construction for any standards not specifically addressed within this document and drawing guidelines.

## VIII) DRAWING NUMBERING: Meridian Drawing Database

(Note: Distribution drawings are NOT maintained in Chugach Meridian Drawing Database)

1. Drawing Numbers shall be issued for **SUBSTATIONS, TRANSMISSION LINES, SUBMARINE CABLES, POWER PLANTS, COMMUNICATIONS, COMMUNICATION SITES AND HEADQUARTER BUILDINGS** by Chugach CAD/GIS Services Staff via the responsible Chugach Project Engineer using the following format. The format of Meridian drawing numbers, title blocks and attributes dictate other functions within Meridian



2. Chugach’s CAD/GIS Services is the **SOLE SOURCE** provider of drawing numbers. There are **NO EXCEPTIONS** to this numbering process. All numbers shall be distributed by Chugach’s CAD/GIS Services staff.

## IX) DRAWING NUMBER – PREVIOUS/REFERENCE

The Drawing Number – Previous/Reference area of the drawing’s title block is to be completed for each drawing. (See Drawing Title Block Lines 1 to 5 and/or Attachment A.) The following choices are available:

1. **New** – Include the word “NEW” and date when the drawing is new.
2. **Drawing Number - Previous/Reference** - Add the old number if the drawing is being re-numbered. Often a manufacture’s number, an A/E firm’s project numbers, or an old Chugach record drawing number are placed here. Do not delete any number references in this attribute field.

## X) Drawing Title Block Lines 1 to 5

The first three lines of the drawing number in the Title Block are part of the CEA drawing database and must meet the required format. The last two lines describe the contents of the drawing. Chugach CAD/GIS Services Staff can provide the proper information format for the first three lines which are dependent on the type of drawing (Transmission, Substation, Communications, Power Plant etc.).


DRAWING NAME:	
138KV TRANSMISSION LINE GRAVEL JCT – NEW SEWARD HWY JCT PLAN & PROFILE 34.5 KV & 138KV OVERHEAD CIRCUITS	
<b>CONFIDENTIAL</b>	
DRAWING NO. – PREVIOUS/REFERENCE GJMJ-PP-0001_0001	
DRAWING NO.: GJSH-PP-0001	
SHEET 0001 OF 2 PAGE ____ / ____	

## XI) General Guidelines for Department Specific Drawings

### A. Guidelines for Transmission Drawings

1. As-built color markup standard:
  - RED – Add
  - GREEN – Delete
  - BLUE – Note for information to drafter / Do not add to drawing
2. No YELLOW on drawing. Yellow cannot be seen using a color printer.
3. Use the current CEA Meridian database recognized Title Block. Request current Title Block and numbers from CAD/GIS Services via your CEA contact.
4. Current CEA CAD version **AutoCAD Map 3D 2019 (Save all drawings to this version)**.
5. Title Block resides in the LAYOUT not Model Space.
6. Verify the CONFIDENTIAL stamp is on Title Block and text follows the guidelines, taking care of spacing, dash marks, periods, etc. as required by our Meridian drawing database.

Correct example:

 Chugach Electric Association, Inc. 5601 Electron Drive - P.O. Box 196300 Anchorage, Alaska 99519-6300	DRAWING NAME:		
	115KV TRANSMISSION LINE HOPE TAP – PORTAGE TAP PLAN & PROFILE STR HPPT 56-7 TO HPPT 58-1		
	<b>CONFIDENTIAL</b>		
	DRAWING NO. – PREVIOUS/REFERENCE NEW DRAWING NO.: HPPT-PP-0015		
		HPPT-PP-0015_0001	
		SHEET ____ OF ____ PAGE ____ OF ____	

7. ALL TEXT is to be **MTEXT**.
8. Any text or text blocks with masking must have the masking portion on its own layer and be color yellow.
9. Use **slash in all dates** (no dash). EXAMPLE 06/29/18

10. Format for adding alphabetical POLE NUMBER code is MTEXT and justified correctly:

EXAMPLE:

**HPPT 44-12** in Model Space

(AlphaAlphaAlphaAlphaSPACENumberDashNumber)

**STR HPPT 44-2 TO HPPT 45-4** is on the Title Block line

11. Pole numbers are to be on layer POLE NUMBER layer COLOR White



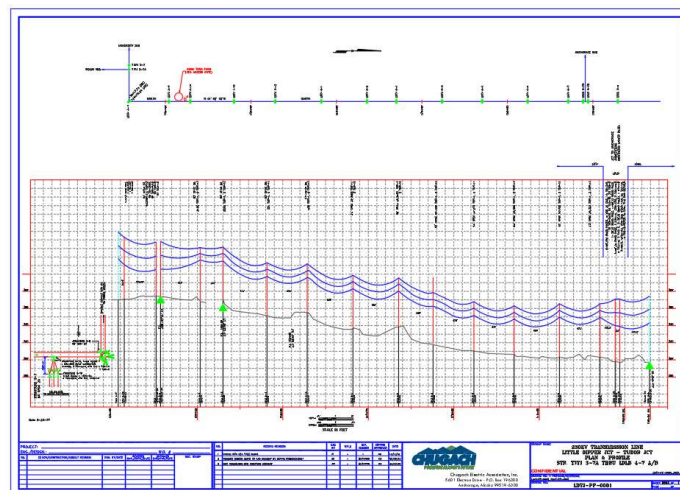
12. Scale Bar and North arrow reside in MODEL SPACE (Insert a scale bar with a reasonable and useable scale length).

13. All elements in MODEL SPACE should be grouped together at 1:1 scale.

14. PLAN & PROFILE elements: PLAN is on TOP and the PROFILE is on the BOTTOM.

15. If a grid is involved (Example PP drawings) the VERTICAL AND HORIZONTAL grid lines should be on the same layer name "GRID" Color Gray 9 Linetype HIDDEN2. Use red GRID TIC lines on the outside of the grid and tic marks at the horizontal stations on GRID-TIC layer. One horizontal line to be red at elevation tick mark location. Use GRID-TEXT layer for all grid text. Place structure information justified to the top red line as displayed in the example OR on top of the red line (justified to the red line) as space allows. Put structure code/number and structure station inside the bottom red line at structure station. Add structure number and station to PLAN VIEW (TOP) next to pole symbol (circle). From the centerline of the pole in the GRID, put Station Leader, color white, continuous line to the bottom station line. All text to be MTEXT and justified appropriately.

EXAMPLE:





16. Verify all viewports and/or text in the LAYOUT will plot at the appropriate font size (the same font size of other elements) on the plotted drawing sheet AND use the same font type for similar items in the layout. The layout should look “balanced”.
17. Layer Example:

S...	Name	O...	F...	VP ...	L...	P...	Color	VP Color	Linetype	VP Linetype	Lineweight	Trans
0							white	white	Continuous	Continuous	Default	0
	ACCESS ROUTE						190	190	DASHED	DASHED	0.30 mm	0
	ALIGNMENT						red	red	Continuous	Continuous	Default	0
	BLOCK						green	green	Continuous	Continuous	Default	0
	CONDUCTOR MARKER BALLS						red	red	Continuous	Continuous	Default	0
	CONDUCTOR SPLICE						red	red	Continuous	Continuous	Default	0
	CONDUCTOR1						blue	blue	Continuous	Continuous	0.35 mm	0
	CONT1						red	red	Continuous	Continuous	Default	0
	CONT2						red	red	Continuous	Continuous	Default	0
	Defpoints						white	white	Continuous	Continuous	Default	0
	DIMENSION						30	30	Continuous	Continuous	Default	0
	FENCELINE						green	green	xSurvey Pla...	xSurvey Plan\$...	Default	0
	FISH STREAM						140	140	PHANTOM	PHANTOM	Default	0
	GRID						9	9	HIDDEN2	HIDDEN2	Default	0
	GRID-TEXT						white	white	Continuous	Continuous	Default	0
	GRID-TEXT STATIONS						white	white	Continuous	Continuous	Default	0
	GRID-TIC						red	red	Continuous	Continuous	Default	0
	GROUND LINE PROFILE						white	white	Continuous	Continuous	0.30 mm	0
	IMAGE 1						white	white	Continuous	Continuous	Default	0
	IMAGE 2						white	white	Continuous	Continuous	Default	0
	IMAGE 3						white	white	Continuous	Continuous	Default	0
	IMPASS						30	30	Continuous	Continuous	Default	0
	LT_CENTER						cyan	cyan	CENTER	CENTER	Default	0
	LT_CONT						red	red	Continuous	Continuous	Default	0
	LT_CONT_THK						white	white	Continuous	Continuous	Default	0
	LT_DASH						cyan	cyan	DASHED	DASHED	Default	0
	LT_HIDDEN						cyan	cyan	HIDDEN	HIDDEN	Default	0
	LT_PHANTOM						image...	magenta	PHANTOM	PHANTOM	Default	0
	MASKING						51	51	Continuous	Continuous	Default	0
	NORTH ARROW						white	white	Continuous	Continuous	Default	0
	POLE LEADER						white	white	Continuous	Continuous	0.30 mm	0
	POLE NUMBERS						white	white	Continuous	Continuous	Default	0
	POLE STRUCTURES						red	red	Continuous	Continuous	0.50 mm	0
	POLE STRUCTURES - PROPOSED						red	red	Continuous	Continuous	Default	0
	REV CLOUD						152	152	Continuous	Continuous	Default	0
	REV NUMBER						red	red	Continuous	Continuous	Default	0
	ROAD						white	white	CENTER	CENTER	Default	0
	ROW						red	red	HIDDEN2	HIDDEN2	Default	0
	SCALE BAR						white	white	Continuous	Continuous	Default	0
	TBLOCK						blue	blue	Continuous	Continuous	Default	0
	TBTEXT						white	white	Continuous	Continuous	Default	0
	TEXT						white	white	Continuous	Continuous	Default	0
	TEXT-BACKSPAN						white	white	Continuous	Continuous	Default	0
	TEXT-DWG						white	white	Continuous	Continuous	Default	0
	TEXT-PI NUMBER						white	white	Continuous	Continuous	Default	0
	TRAILS						green	green	DASHED	DASHED	Default	0
	VIEWPORT						201	201	Continuous	Continuous	Default	0
	WETLANDS						140	140	Continuous	Continuous	Default	0

## B. Guidelines for Building Drawings

1. **No YELLOW on drawing.** Yellow cannot be seen using a color plotter.
2. Use current CEA Meridian recognized Title Block. Request current Title Block and drawing number specific for Building Drawings from CEA CAD/GIS Services.
3. Title Block text should follow the guidelines for upper case, spacing, dash marks, periods, etc. as required by our Meridian drawing database. The drawings require a Meridian database recognized CEA title block and number (the vendor title block can be inserted in model space). CAD/GIS Services will provide an empty, numbered Title Block, that is recognized by our Meridian database, for all new building drawings.
4. Recognized Chugach Electric title blocks and Drawing numbers will be assigned by CAD/GIS Services.
5. In general, proper layer use is important. Example: All colors per layer - do not assign individual colors to an object.
6. The Title Block resides in the LAYOUT not Model Space.
7. ALL TEXT is to be **MTEXT**. Any text or text blocks with masking must have the masking portion on its own layer and be color yellow. (It is preferred masking of text is not used.)
8. Use **slash in all dates** (not dash marks). EXAMPLE 06/29/18
9. North arrow and Scale Bar reside in MODEL SPACE.
10. MODEL SPACE scale is 1:1 ARCHITECTURAL for building drawings. Insert a scale bar in Model Space with a reasonable and useable scale length.
11. **The current CEA CAD version is AutoCAD Map 3D 2019. Save all drawings to this CAD version for delivery to CEA and import into CEA's drawing database managed by the CAD/GIS Services Department.**
12. Include in the drawing package delivered to Chugach Electric all x-ref files (bind x-refs if applicable), blocks, .ctb files, photos, etc.

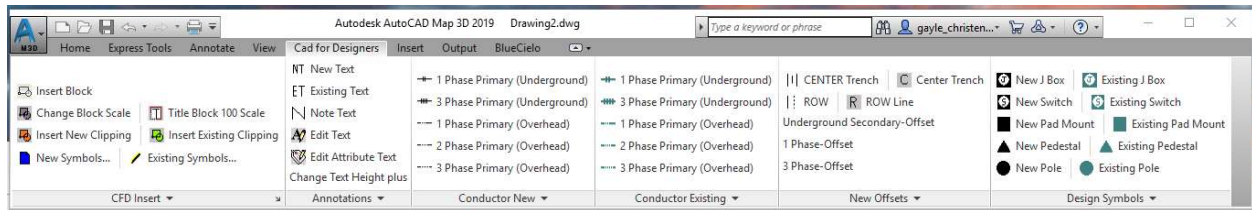
S.. Name	O...	F...	VP ...	L...	P...	Color	VP Color	Linetype	VP Linetype	Lineweight	Transp
0						white	white	Continuous	Continuous	Default	0
A-CLNG						red	red	Continuous	Continuous	Default	0
A-COLS						green	green	Continuous	Continuous	Default	0
A-DETL						red	red	Continuous	Continuous	Default	0
A-DOOR						image...	magenta	Continuous	Continuous	Default	0
A-ELEV						red	red	Continuous	Continuous	Default	0
A-EQPM						cyan	cyan	Continuous	Continuous	Default	0
A-FLOR						white	white	Continuous	Continuous	Default	0
A-FURN						yellow	yellow	Continuous	Continuous	Default	0
A-HVAC						red	red	Continuous	Continuous	Default	0
A-LITE						blue	blue	Continuous	Continuous	Default	0
A-ROOF						blue	blue	Continuous	Continuous	Default	0
A-SECT						red	red	Continuous	Continuous	Default	0
A-WALL						white	white	Continuous	Continuous	Default	0
BLOCK						green	green	Continuous	Continuous	Default	0
Defpoints						white	white	Continuous	Continuous	Default	0
DIMENSION						blue	blue	Continuous	Continuous	Default	0
FENCELINE						green	green	xSurvey Pla...	xSurvey Plan\$...	Default	0
HATCH						cyan	cyan	Continuous	Continuous	Default	0
IMAGE 1						white	white	CENTER	CENTER	Default	0
IMAGE 2						white	white	CENTER	CENTER	Default	0
IMAGE 3						white	white	CENTER	CENTER	Default	0
LT_CENTER						cyan	cyan	CENTER	CENTER	Default	0
LT_CONT						red	red	Continuous	Continuous	Default	0
LT_CONT_THK						white	white	Continuous	Continuous	Default	0
LT_DASH						cyan	cyan	DASHED	DASHED	Default	0
LT_HIDDEN						cyan	cyan	HIDDEN	HIDDEN	Default	0
LT_PHANTOM						image...	magenta	PHANTOM	PHANTOM	Default	0
MASKING						51	51	Continuous	Continuous	Default	0
NORTH ARROW						white	white	Continuous	Continuous	Default	0
REV CLOUD						152	152	Continuous	Continuous	Default	0
REV NUMBER						red	red	Continuous	Continuous	Default	0
SCALE BAR						white	white	Continuous	Continuous	Default	0
TBLOCK						blue	blue	Continuous	Continuous	Default	0
TBTEXT						white	white	Continuous	Continuous	Default	0
TEXT						white	white	Continuous	Continuous	Default	0
VIEWPORT						201	201	Continuous	Continuous	Default	0



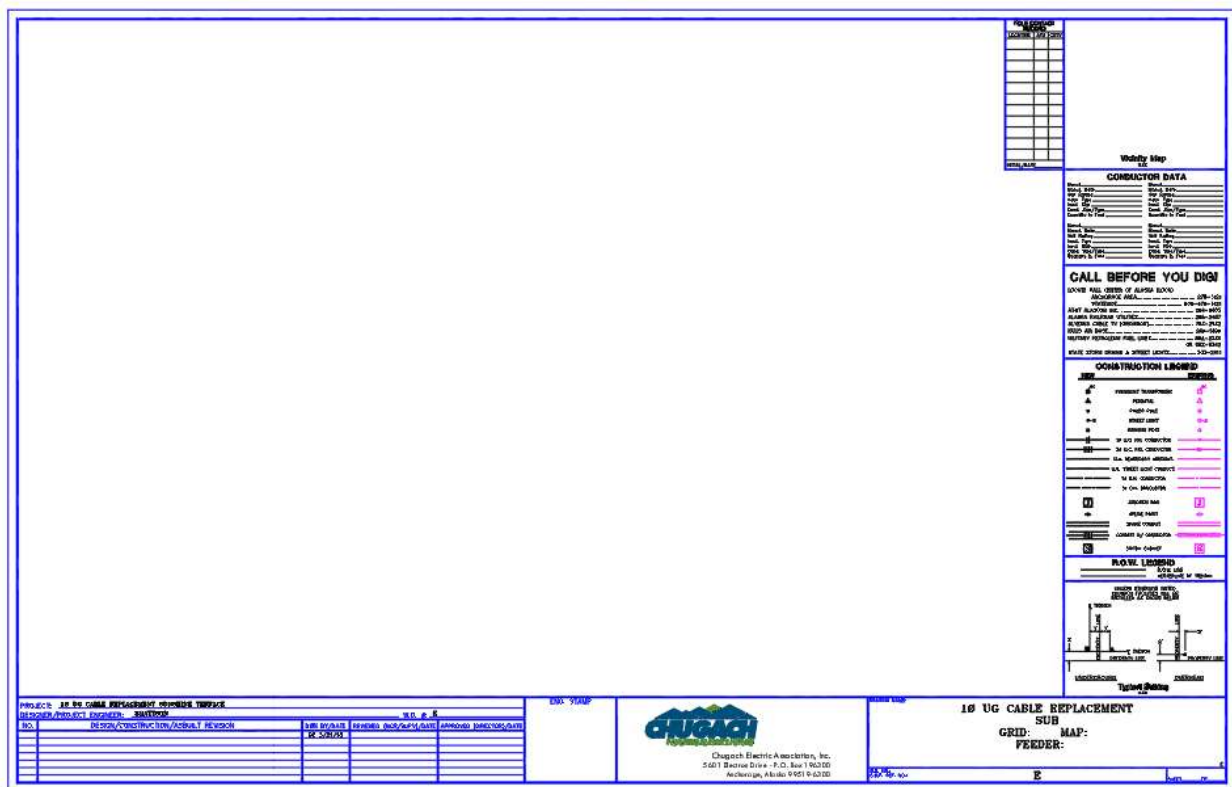
### C. Guidelines for Distribution Drawings

The Distribution Drawing Standard is driven by the Designer CUI, that provides the correct designer workspace ribbon, symbols and line types combined with the Designer PROTO template layer standard. The designer CUI ribbon contains the line types and symbols that are automatically assigned to the correct layer in the PROTO template, which drives the Distribution Drawing Standard.

## Designer Workspace Ribbon:



### Designer PROTO Title Block Template and Layers:





Current layer: 0

Search for layer

OPERTIES MANAGER

S.. Name	On	Fre...	Lock	Plot	Color	Linetype	Lineweight
0					white	CONTINUOUS	Default
BLK-N					magenta	CONTINUOUS	Default
CENTER					white	TRENCH	Default
CLIF					magenta	CONTINUOUS	Default
CONDUIT-TEXT					magenta	CONTINUOUS	Default
DASH_RW					magenta	CONTINUOUS	Default
DEFPOINTS					magenta	CONTINUOUS	Default
e-bldg					magenta	CONTINUOUS	Default
e-CONDUIT					magenta	CONTINUOUS	Default
e-Down-Guy					magenta	CONTINUOUS	Default
e-jbox					magenta	CONTINUOUS	Default
e-lot-line					magenta	CONTINUOUS	Default
e-MISC					magenta	CONTINUOUS	Default
e-Oh-1Phase					magenta	1_PRIMARY	Default
e-Oh-2Phase					magenta	2_PRIMARY	Default
e-Oh-2Wire-Sec					magenta	DUPLEX	Default
e-Oh-2wire-Ser					magenta	DUPLEX	Default
e-Oh-3Phase					magenta	3_PRIMARY	Default
e-Oh-3Wire-Sec					magenta	TRIPLEX	Default
e-Oh-3wire-Ser					magenta	TRI_SERVICE	Default
e-Oh-4Wire-Sec					magenta	QUADRUPLEX	Default
e-Oh-4wire-Ser					magenta	QUAD_SERVICE	Default
e-Oh-Slight					magenta	DUPLEX	Default
e-ohtransmission					magenta	TRAN_OH	Default
e-padmount					magenta	CONTINUOUS	Default
e-pedestal					magenta	CONTINUOUS	Default
e-Pole					magenta	CONTINUOUS	Default
e-railroad					magenta	CONTINUOUS	Default
e-section-line					magenta	CONTINUOUS	Default
e-str-line					magenta	CONTINUOUS	Default
e-Street-Light					magenta	CONTINUOUS	Default
e-Switch					magenta	CONTINUOUS	Default
e-text					magenta	CONTINUOUS	Default
e-text-primary-circuit					magenta	CONTINUOUS	Default
e-Transformer					magenta	CONTINUOUS	Default
e-Transformer2					magenta	CONTINUOUS	Default
e-Transformer3					magenta	CONTINUOUS	Default
e-Ug-1Phase					magenta	E1PH	Default
e-Ug-3Phase					magenta	E3PH	Default
e-Ug-Sec					magenta	UG_SECONDARY	Default
e-Ug-Service					magenta	UG_SECONDARY	Default
e-Ug-Slight					magenta	UG_ST_LIGHT	Default
e-ugtransmission					magenta	TRAN_UG	Default
e-water					magenta	CONTINUOUS	Default
e-xfmer-leader					magenta	CONTINUOUS	Default
EDGE					magenta	CONTINUOUS	Default
EXISTING					magenta	CONTINUOUS	Default
FJB					magenta	CONTINUOUS	Default
logo					159	CONTINUOUS	Default
LOGO2000					white	CONTINUOUS	Default

Current layer: 0

Search for layer

LAYER PROPERTIES MANAGER

S..	Name	On	Fre...	Lock	Plot	Color	Linetype	Lineweight
	logo					159	CONTINUOUS	Default
	LOGO2000					white	CONTINUOUS	Default
	n-center					white	TRENCH	Default
	n-conduit					white	CONTINUOUS	Default
	n-Down-Guy					white	CONTINUOUS	Default
	n-jbox					white	CONTINUOUS	Default
	n-Oh-1Phase					white	1_PRIMARY	Default
	n-Oh-2Phase					white	2_PRIMARY	Default
	n-Oh-2Wire-Sec					white	DUPLEX	Default
	n-Oh-2wire-Service					white	DUPLEX	Default
	n-Oh-3Phase					white	3_PRIMARY	Default
	n-Oh-3Wire-Sec					white	TRIPLEX	Default
	n-Oh-3wire-Service					white	TRI_SERVICE	Default
	n-Oh-4Wire-Sec					white	QUADRUPLEX	Default
	n-Oh-4wire-Service					white	QUAD_SERVICE	Default
	n-Oh-Slight-2Wire					white	DUPLEX	Default
	n-ohtransmission					white	TRAN_OH1	Default
	n-padmount					white	CONTINUOUS	Default
	n-pedestal					white	CONTINUOUS	Default
	n-Pole					white	CONTINUOUS	Default
	n-ROW					white	ROW	Default
	n-Street-Light					white	CONTINUOUS	Default
	n-street-line					white	CONTINUOUS	Default
	n-switch					white	CONTINUOUS	Default
	n-text					white	CONTINUOUS	Default
	n-text-electric					white	CONTINUOUS	Default
	n-text-note					white	CONTINUOUS	Default
	n-text-primary-circuit					white	CONTINUOUS	Default
	n-text-row					white	CONTINUOUS	Default
	n-Transformer					white	CONTINUOUS	Default
	n-Transformer2					white	CONTINUOUS	Default
	n-Transformer3					white	CONTINUOUS	Default
	n-Ug-1Phase					white	N1PH	Default
	n-Ug-3Phase					white	N3PH	Default
	n-Ug-Sec					white	UG_SECONDARY	Default
	n-Ug-Service					white	UG_SECONDARY	Default
	n-Ug-Slight					white	UG_ST_LIGHT	Default
	n-ugtransmission					white	TRAN_UG1	Default
	n-water					white	CONTINUOUS	Default
	NEW					white	CONTINUOUS	Default
	North Arrow					white	CONTINUOUS	Default
	NOTES					white	CONTINUOUS	Default
	OHMISC					white	CONTINUOUS	Default
	OHPOLE					white	CONTINUOUS	Default
	OHTRANS					white	CONTINUOUS	Default
	ROW					white	ROW	Default
	RR					white	CONTINUOUS	Default
	S1TB					white	CONTINUOUS	Default
	Scale Bar					white	CONTINUOUS	Default
	TEXT					red	CONTINUOUS	Default
	TEXT BLACK					white	CONTINUOUS	Default
	TEXT II					white	CONTINUOUS	Default

## D. Guidelines for Survey Drawings

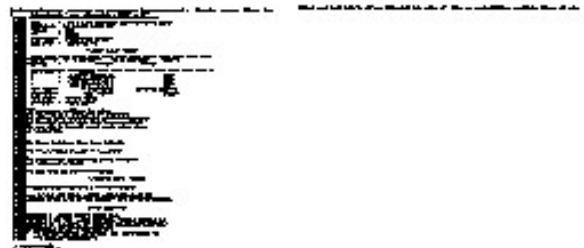
The survey department software is Autodesk Civil 3D 2019.

Survey Standard Layout:

LOT XX, XXXX SUBD.  
GRID: XXXX FB N/A FILE NAME XXXXXXXXX



### META DATA





## Survey Standard Layers:

S.. Name	O...	F...	L...	P...	Color	Linetype	Lineweight	T..	N...	Description
0					white	Continuous	Default	0		
Defpoints					white	Continuous	Default	0		
P-LINE-UTIL-CEA					cyan	Continuous	Default	0		
P-NODE-CEA					cyan	Continuous	Default	0		
P-POWR-EQUIP					cyan	Continuous	Default	0		
V-ALGN-LINE					white	Continuous	Default	0		
V-ALGN-PROF-VIEW-TE...					cyan	Continuous	Default	0		General text L140
V-ALGN-TABLE					white	Continuous	Default	0		Proposed centerline text
V-ALGN-TEXT					white	Continuous	Default	0		
V-ANNO-DIMENSIONS					white	Continuous	Default	0		DIMENSIONS TO LOT LINES
V-ANNO-PLAT INFO					white	Continuous	Default	0		RECORD PLAT INFORMATION, STREET NAMES
V-ANNO-TABL					white	Continuous	Default	0		LINE AND CURVE TABLES
V-ANNO-TEXT					white	Continuous	Default	0		GENERAL TEXT
V-ANNO-TEXT-LABELS					white	Continuous	Default	0		EQUIP. LABEL, EOP, UGG, UGE/, ETC.
V-ANNO-TEXT-LEGEND					white	Continuous	Default	0		LEGEND INFO, TITLE INFO
V-ANNO-TEXT-NAD83					white	Continuous	Default	0		notes, labels, general text NAD83 coordinate system.
V-LINE-BLDG					white	Continuous	Default	0		RANDOM LINE WORK
V-LINE-CTRL					cyan	Continuous	Default	0		LINES FOR CONTROL
V-LINE-FNCE					magenta	BARBWIRE	Default	0		FENCE LINES
V-LINE-PROP					green	Continuous	Default	0		Existing ROW and Boundary Lines
V-LINE-ROW					yellow	CENTER2	Default	0		centerline of ROW/ROADS
V-LINE-UTIL-ACS					30	Continuous	Default	0		LINE WORK FOR ACS-UGT-OHT
V-LINE-UTIL-CEA					red	Continuous	Default	0		UGE-OHE
V-LINE-UTIL-ENSTAR					yellow	Continuous	Default	0		ENSTAR LINE WORK
V-LINE-UTIL-ESMNT					magenta	DASHED2	Default	0		LINE WORK FOR EASEMENTS
V-LINE-UTIL-GCI					magenta	Continuous	Default	0		LINE WORK FOR GCI-UGC-OHC
V-NODE-ACS					30	Continuous	Default	0		UGT/OHT NODES
V-NODE-AWWU					cyan	Continuous	Default	0		SYMBOLS FOR AWWU FACILITIES
V-NODE-BKTRL					cyan	Continuous	Default	0		BIKETRAIL NODES-SEE V-LINE-BLDG FOR LINEWORK
V-NODE-BLDG					magenta	Continuous	Default	0		BUILDING NODES
V-NODE-BOLL					yellow	Continuous	Default	0		BOLLARD NODES/SYMBOLS
V-NODE-CEA					red	Continuous	Default	0		UGE-OHE NODES
V-NODE-CLVRT					red	Continuous	Default	0		CULVERT
V-NODE-CTRL					cyan	Continuous	Default	0		CONTROL NODES AND LINEWORK
V-NODE-ENSTAR					yellow	Continuous	Default	0		ENSTAR-UGG
V-NODE-EOD					cyan	Continuous	Default	0		EDGE OF DRIVE
V-NODE-FNCE					magenta	Continuous	Default	0		FENCE NODES
V-NODE-GCI					magenta	Continuous	Default	0		UGC/OHC NODES
V-NODE-GRND					green	Continuous	Default	0		GROUND SHOTS
V-NODE-LANDSCAPE					green	Continuous	Default	0		LANDSCAPE
V-NODE-MAIL					green	Continuous	Default	0		MAILBOX
V-NODE-MON					23	Continuous	Default	0		MONUMENTS
V-NODE-PARKING-LOT					cyan	Continuous	Default	0		
V-NODE-ROAD					yellow	Continuous	Default	0		ROAD NODES
V-NODE-RTNW					magenta	Continuous	Default	0		RETAINING WALL
V-NODE-SDWLK					cyan	Continuous	Default	0		SIDEWALK
V-NODE-SIGN					yellow	Continuous	Default	0		SIGN
V-NODE-SLP					red	Continuous	Default	0		STREET LIGHT POLE
V-NODE-SORTME					white	Continuous	Default	0		UNDEFINED POINTS
V-NODE-STAIR					magenta	Continuous	Default	0		STAIRS
V-NODE-TBC					white	Continuous	Default	0		TOP BACK OF CURB-V-LINE-BLDG
V-NODE-TEXT					white	Continuous	Default	0		TEXT FOR NODES

V-NODE-TEXT					white	Continuous	—	Default	0		TEXT FOR NODES
V-NODE-TOE					green	Continuous	—	Default	0		TOE OF SLOPE
V-NODE-TOP					green	Continuous	—	Default	0		TOP OF SLOPE
V-NODE-TRAFFIC					130	Continuous	—	Default	0		
V-PROF-LINE					white	Continuous	—	Default	0		PROFILE LINE
V-PROF-LINE-GRND					green	Continuous	—	Default	0		
V-PROF-LINE-NEUT					red	Continuous	—	Default	0		
V-PROF-LINE-PHASE					red	Continuous	—	Default	0		
V-PROF-TEXT					white	Continuous	—	Default	0		
V-PROF-VIEW					white	Continuous	—	Default	0		
V-PROF-VIEW-GRID-MI...					252	Continuous	—	Default	0		
V-ROAD-CNTR					white	Continuous	—	Default	0		Existing Centerline Alignment
V-ROAD-PROF					green	DASHED	—	Default	0		Existing Centerline Vertical
V-SYM-AWWU					blue	Continuous	—	Default	0		SYMBOLS FOR AWWU FACILITIES
V-SYM-CATV-GCI					magenta	Continuous	—	Default	0		symbol/node for GCI equipment
V-SYM-COMM-ACS					30	Continuous	—	Default	0		symbol/node for ACS equipment
V-SYM-MISC					white	Continuous	—	Default	0		SYMBOLS FOR AWWU FACILITIES
V-SYM-NGAS-EQPM					yellow	Continuous	—	Default	0		symbol/node for Enstar equipment
V-SYM-POWR-EQPM					red	Continuous	—	Default	0		symbol/node/line work for ALL CEA EQUIPMENT-N...
V-SYM-SURVY-MON					30	Continuous	—	Default	0		SYMBOL/NODE FOR SEWER MANHOLES ETC.
V-SYMB-MISC					cyan	Continuous	—	Default	0		symbol/node for Enstar equipment
V-TOPO					white	Continuous	—	Default	0		
V-TOPO-CONT-MAJR					9	Continuous	—	Default	0		Existing major contours
V-TOPO-CONT-MAJR-T...					9	Continuous	—	Default	0		Existing major contours text
V-TOPO-CONT-MINR					8	Continuous	—	Default	0		Existing minor contours
V-TOPO-CONT-MINR-T...					8	Continuous	—	Default	0		Existing minor contours text
V-TOPO-TEXT					white	Continuous	—	Default	0		
V-TOPO-TINN					white	Continuous	—	Default	0		Existing Topo Tin Model
V-TOPO-TINN-BNDY					white	Continuous	—	Default	0		Existing Topo Tin Model Border

## E. Guidelines for Power Plant Drawings

Power Plant Guidelines under review.

## Attachment A

<p>VI) CHANGES TO THE DRAWING DESIGN, CONSTRUCTION &amp; AS-BUILT REVISION TABLE 1 TABLE 2</p> <p>↓</p>										<p>VI) CHANGES TO THE DRAWING RECORD REVISION TABLE 3 TABLE 4</p> <p>↓</p>										<p>VIII) DRAWING NUMBERS TITLE BLOCK LINES 1 - 5</p> <p>↓</p>																													
<p>PROJECT: 100KV TRANSMISSION LINE - 100KV LINE EXTENSION DRAWN BY: JASON TENDLER DATE: 10/10/2018 SCALE: 1"=100'</p>										<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> <th>CHKD.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>100KV LINE RECORD</td> <td>10/10/2018</td> <td>JT</td> <td>ACU</td> </tr> </tbody> </table>										NO.	DESCRIPTION	DATE	BY	CHKD.	1	100KV LINE RECORD	10/10/2018	JT	ACU	<p>CHUGACH ELECTRIC ASSOCIATION, INC. 5421 DUNN DRIVE, P.O. BOX 155300 ANCHORAGE, ALASKA 99515-0300 907.562.4552</p>										<p>100KV TRANSMISSION LINE RANGE SUB - NEW SEWARD HWY JCT PLAN &amp; PROFILE ETS 1000 15 TO 1000 19</p> <p>CONFIDENCE DRAWN BY: JASON TENDLER CHECKED BY: JASON TENDLER DATE: 10/10/2018 SCALE: 1"=100'</p>									
NO.	DESCRIPTION	DATE	BY	CHKD.																																													
1	100KV LINE RECORD	10/10/2018	JT	ACU																																													

Chugach Electric  
CAD/GIS Services

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# CAD / GIS Spatial Data Standards

Last Revision Date: May 21, 2014

**Vision:** *Establish collection standards that affirm GIS as the visualization tool to integrate corporate information assets and facilitate data visualization and analysis.*

Chugach Electric Association, Inc.  
5601 Electron Drive  
P.O. Box 196300  
Anchorage, AK 99519-6300

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# CAD /GIS - Spatial Data Standards

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# CAD /GIS - Spatial Data Standards

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## 1. Introduction

The following document describes the spatial data standards of Chugach Electric Associations, Inc. (Chugach). The intent is to describe the:

- Coordinate System and Map Projection standard for delivered electronic data,
- Format of GPS and electronic survey data delivered in AutoCAD,
- Format of delivered electronic GIS data, project files, maps, and metadata.

This document is a reference guide for Chugach and Contractor employees working on behalf of Chugach; it specifies the standards for CAD/GIS spatial data deliverables. Any deviation from these specifications set forth in this document MUST BE APPROVED PRIOR TO DATA COLLECTION. This requirement ensures that the data collected will be viable when it enters Chugach's GIS records. When you request a deviation it enables us to evaluate and update this standards document as necessary. This document is intended to be a "living document" which will be updated as technology changes or as the standards adopted by Chugach change. In either case, we welcome your comments and specific feedback upon the Spatial Data Standards that follow.

# CAD /GIS - Spatial Data Standards

## 2. Coordinate System, Datum & Map Projection

The standard coordinate system, datum and map projection currently used in Chugach's GIS is Alaska State Plane Zone 4 NAD 83 (2002) also known as the (CORS96) realization.

NOTE: The term 'realization' is the National Geodetic Service's official name for revisions to the NAD83 system; however, 'epoch' is more commonly used in its place throughout the industry with the occasional use of 'revision' and 'datum tag'. Chugach has elected to use the term 'epoch' when referring to NGS realizations.

### a. Map Projection

The map projection that best serves Chugach facilities is Transverse Mercator. The specified coordinate system, datum and map projection is used by all of Chugach's GIS-based Transmission and Distribution Design and Mapping products.

Maps may be delivered to Chugach in other projections, with advance approval by the CAD/GIS manager.

### b. Datum, Coordinate System & Projection Information

Name: NAD 1983 Alaska State Plane Zone 4 FIPS (Federal Information Processing Standards) 5004 (US Survey Feet)

Projection: Transverse\_Mercator

#### i. **Map Projection Parameters**

Projection: Transverse\_Mercator

False\_Easting: 1640416.666667

False\_Northing: 0.000000

Central\_Meridian: -150.000000

Scale\_Factor: 0.999900

Latitude\_Of\_Origin: 54.000000

Linear Unit: Foot\_US (0.304800609601219)

#### ii. **Geographic Coordinate System**

Name: GCS\_North\_American\_1983

Angular Unit: Degree (0.017453292519943295)

Prime Meridian: Greenwich (0.000000000000000000)

#### iii. **Datum**

Name: D\_North\_American\_1983

Spheroid: GRS\_1980

Semimajor Axis: 6378137.000000000000000000

Semiminor Axis: 6356752.314140356100000000

Inverse Flattening: 298.257222101000020000

### c. NAD 27 to NAD 83 Conversion

The State Plane grid coordinates is a mathematical conversion that translates latitude and longitude into a Cartesian (or map) Northing (Y) and Easting (X) coordinate system, and this transformation must maintain the same datum tag (NAD83, NAD27, etc...) as the origin latitude and longitude coordinates. Following the conversion into State Plane (NAD27) a Lat-Long (NAD27) can be converted into State Plane (NAD83), using the NADCON conversion for Alaska.

# CAD /GIS - Spatial Data Standards

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Chugach's original ArcINFO coverages were stored in Alaska State Plane Zone 4 NAD27. These coverages were converted in June 2003 to Alaska State Plane Zone 4 FIPS 5004 (US Survey Feet), NAD83 (CORS96) (2002) using ESRI's ArcToolbox, and the **NAD\_1927\_to\_NAD\_1983\_Alaska** algorithm, to avoid the 400ft errors that the standard NAD\_1927\_to\_NAD\_1983\_NADCON creates. Chugach stores our Spatial Database in an Oracle GeoDatabase. The Municipality of Anchorage's GIS data is also stored in the Alaska State Plane Zone 4 (it is Chugach's understanding that the Datum is NAD83 (CORS96) (2002).

**NOTE:** Some State and Federal data may still be stored in the NAD27 Datum. If you utilize NAD27 data it will be necessary to convert your deliverable information into Chugach's standard datum. The NADCON datum conversion algorithm specific for Alaska will be used.

NADCON is a very common algorithm, which is included in projection software such as ESRI ArcCatalog, Intergraph Projection Manager, Tralaine and others. NADCON works very well for transforming data which spans a large geographic area such as Chugach's distribution and transmission network.

# CAD /GIS - Spatial Data Standards

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## GIS Data Deliverable Standards

The following standard is a guide for delivering GIS data to Chugach. These standards are designed to allow Chugach to easily import GIS data into their Oracle/SDE database.

### d. Data Format

GIS Data delivered to Chugach will be submitted in the currently installed version of ArcGIS in a personal or file geodatabase format. The use of feature datasets is encouraged within the personal or file geodatabase. Requests to deliver data in formats other than personal or file geodatabase must be approved by the GIS manager.

### e. Map Production

All GIS map products shall be completed using the currently installed version of ArcMap. Maps must be delivered to Chugach in MXD format. All data used to create maps must be contained within a personal or file geodatabase and delivered to Chugach. MXD's must be able to locate all data and attached files when transferred to Chugach. Maps must contain the following information:

- Chugach Logo
- All GIS map products shall display the copyright (©) symbol as follows: Copyright Chugach Electric Association, Inc. ©
- Chugach Disclaimer –  
“**Chugach** does not warrant the accuracy or completeness of the information contained on this map. The map may not be suitable for user's particular purpose. When accuracy is necessary for any purpose, it is the responsibility of the user to request locates of **Chugach** facilities. This map was produced for Chugach by [insert Engineering/Survey Firm Name].”

### f. Metadata

Complete ESRI metadata in the personal or file geodatabase will be required for each feature dataset or feature class. All fields listed as required in the metadata are to be filled out and detail the data acquisition and transformation processes utilized with the data being submitted to Chugach. In addition to populating, the Description Tab as shown in the sample of FGDC metadata below with the **REQUIRED** sections in bold, (which is important to Chugach long-term; it is vital that the Attributes Tab be populated, as it will allow us to know the meaning of the data represented in a given feature class.

NOTE: If you are editing metadata in ArcCatalog this can be found on the Attribute Tab inside the Entity Attribute Tab. It is imperative that column definitions be input and should include all value defaults and named domains. This information is the most important information for long term maintenance of the collected data being handed over to Chugach.

Identification\_Information:

Citation:

Citation\_Information:

Originator: **REQUIRED: The name of an organization or individual that developed the data set.**

Publication\_Date: **REQUIRED: The date when the data set is published or otherwise made available for release.**

Title:

Geospatial\_Data\_Presentation\_Form: vector digital data

Online\_Linkage:

Description:

Abstract: **REQUIRED: A brief narrative summary of the data set.**

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Purpose: **REQUIRED: A summary of the intentions with which the data set was developed.**

Time\_Period\_of\_Content:

Time\_Period\_Information:

Single\_Date/Time:

Calendar\_Date: **REQUIRED: The year (and optionally month, or month and day) for which the data set corresponds to the ground.**

Currentness\_Reference: **REQUIRED: The basis on which the time period of content information is determined.**

Status:

Progress: **REQUIRED: The state of the data set.**

Maintenance\_and\_Update\_Frequency: **REQUIRED: The frequency with which changes and additions are made to the data set after the initial data set is completed.**

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: **REQUIRED: Western-most coordinate of the limit of coverage expressed in longitude.**

East\_Bounding\_Coordinate: **REQUIRED: Eastern-most coordinate of the limit of coverage expressed in longitude.**

North\_Bounding\_Coordinate: **REQUIRED: Northern-most coordinate of the limit of coverage expressed in latitude.**

South\_Bounding\_Coordinate: **REQUIRED: Southern-most coordinate of the limit of coverage expressed in latitude.**

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: **REQUIRED: Reference to a formally registered thesaurus or a similar authoritative source of theme keywords.**

Theme\_Keyword: **REQUIRED: Common-use word or phrase used to describe the subject of the data set.**

Access\_Constraints: **REQUIRED: Restrictions and legal prerequisites for accessing the data set.**

Use\_Constraints: **REQUIRED: Restrictions and legal prerequisites for using the data set after access is granted.**

Native\_Data\_Set\_Environment: Microsoft Windows 2000 Version 5.0 (Build 2195) Service Pack 3; ESRI ArcCatalog 8.2.0.700

Spatial\_Data\_Organization\_Information:

Direct\_Spatial\_Reference\_Method: Vector

Distribution\_Information:

Resource\_Description: Downloadable Data

Metadata\_Reference\_Information:

Metadata\_Date: 20030425

Metadata\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: **REQUIRED: The organization responsible for the metadata information.**

Contact\_Person: **REQUIRED: The person responsible for the metadata information.**

Contact\_Address:

Address\_Type: **REQUIRED: The mailing and/or physical address for the organization or individual.**

City: **REQUIRED: The city of the address.**

State\_or\_Province: **REQUIRED: The state or province of the address.**

Postal\_Code: **REQUIRED: The ZIP or other postal code of the address.**

Contact\_Voice\_Telephone: **REQUIRED: The telephone number by which individuals can speak to the organization or individual.**

Metadata\_Standard\_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998

Metadata\_Time\_Convention: local time

Metadata\_Extensions:

Online\_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile\_Name: ESRI Metadata Profile

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## 3. Survey (AutoCAD) Deliverable Standards

The following standards are a guide to use when submitting survey data stored in an AutoCAD drawing file.

### a. Format

The AutoCAD format is a (.dwg) file that is no more than two (2) previous platforms release behind the most current version of AutoCAD.

NOTE: A platform release is defined as a change to the .dwg file format and not necessarily the incremental release of updated AutoCAD software.

### b. Block and Data Dictionary

With the submittal of AutoCAD mapping to Chugach, a data dictionary describing the layer naming convention and a copy of blocks used will be required. The data dictionary should list all layers in the drawing and describe what is present on the layer, list all blocks in the file, and include a title or description of the block. If the block is per a certain industry standard (i.e., ANSI, etc.), indicate the standard used. Any inserted blocks or XREF files should be listed in data dictionary.

### c. Projection Information

#### c.1 Horizontal Projection Information

The map projection will be required to be documented for the data set. If a plant (or local) grid is used, tie coordinates to NAD 1983 (2003) (CORS96) epoch Alaska State Plane Zone 4 FIPS 5004 (US Survey Feet) will be required.

#### c.2 Vertical Projection Information

All vertical data shall be based on the most current geoid, unless otherwise specified.

### d. Plant Grid

Chugach also uses a “plant grid” for construction projects. Plant Grid may also be referred to as a construction grid or a local coordinate system. When using the plant grid it will be necessary to establish at a minimum 3 control points at opposite sides of the Plant Grid which have both plant grid coordinates and Alaska State Plane Zone 4 NAD83 (2003) (CORS96) epoch coordinates established. This will allow Chugach to scale and rotate the data used in the plant grid so that it can be incorporated with Chugach’s existing GIS data.

#### d.1 Linear Projects

Linear Projects, such as transmission lines, shall incorporate the requirements noted above in 3.d and shall require an additional control point for every line-mile included in the scope of the project.

### e. Survey Datum

The datum used for survey purposes will be NAD83 (2003) (CORS96) epoch; this level of precision is specified to ensure that the coordinates referenced will be re-creatable when the NGS CORS Multi-Year Solution is implemented, by Chugach.



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## 4. Conventional and GPS (RTK) Survey Standards

The following standards are a guide to use when using GPS survey techniques on Chugach projects. All surveying must meet the minimum requirements set out in the ASPLS; Standards of Practice for Professional Land Surveyors.

### a. Electronic Data Collection

Chugach recognizes that some of the field data may be electronically collected and printed out on supplemental sheets rather than being written by hand in the field book. If used, these supplemental sheets must be initialed by the Party Chief or GPS Operator, referenced in the field book, kept with the field book, and are considered part of the field book.

### b. Minimum Standards and Limitation of Use for GPS Technology

We require the use of Bureau of Land Management standards as set forth in their publication: Standards for the Positional Accuracy of Cadastral Surveys When Using Global Navigation Satellites Systems (GNSS), February 23, 2009. See Attachment 1.

### c. GPS Deliverables

The following are required:

- Station Observation Logs (and Field Notes for conventional surveying)
- Digital Raw GPS Data (for Trimble that would be a .dat file)
- Copies of all processing reports produced by GPS processing software (like Trimble Geomatics Office and OPUS)
- Survey Report containing the following:
  - Equipment used
  - Methodology used
  - Control used
  - Datum used
  - Issues with the survey

### d. Emerging GPS Technologies

Chugach recognizes the dynamic nature of GPS surveying in the areas of real time positioning, quick ambiguity determination and "on the fly" initializing. Chugach's specifications are not intended to hinder the integration of advancements which may be beneficial, efficient, and accurate to our program, but rather, to guarantee the degree of confidence, reliability, and repeatability for verification that Chugach considers necessary in the performance of Cadastral Surveys.

Chugach encourages the presentation and discussion of these emerging technologies when considered a viable option in the performance of specific projects or portions of projects. In these instances the Chugach GPS standards must guide the formulation of procedures that maintain the degree of confidence, reliability, and repeatability in the final product that Chugach attains in the current standards. These procedures must closely reflect the approach that follows the professional standards and accepted procedures of the established surveying community.