

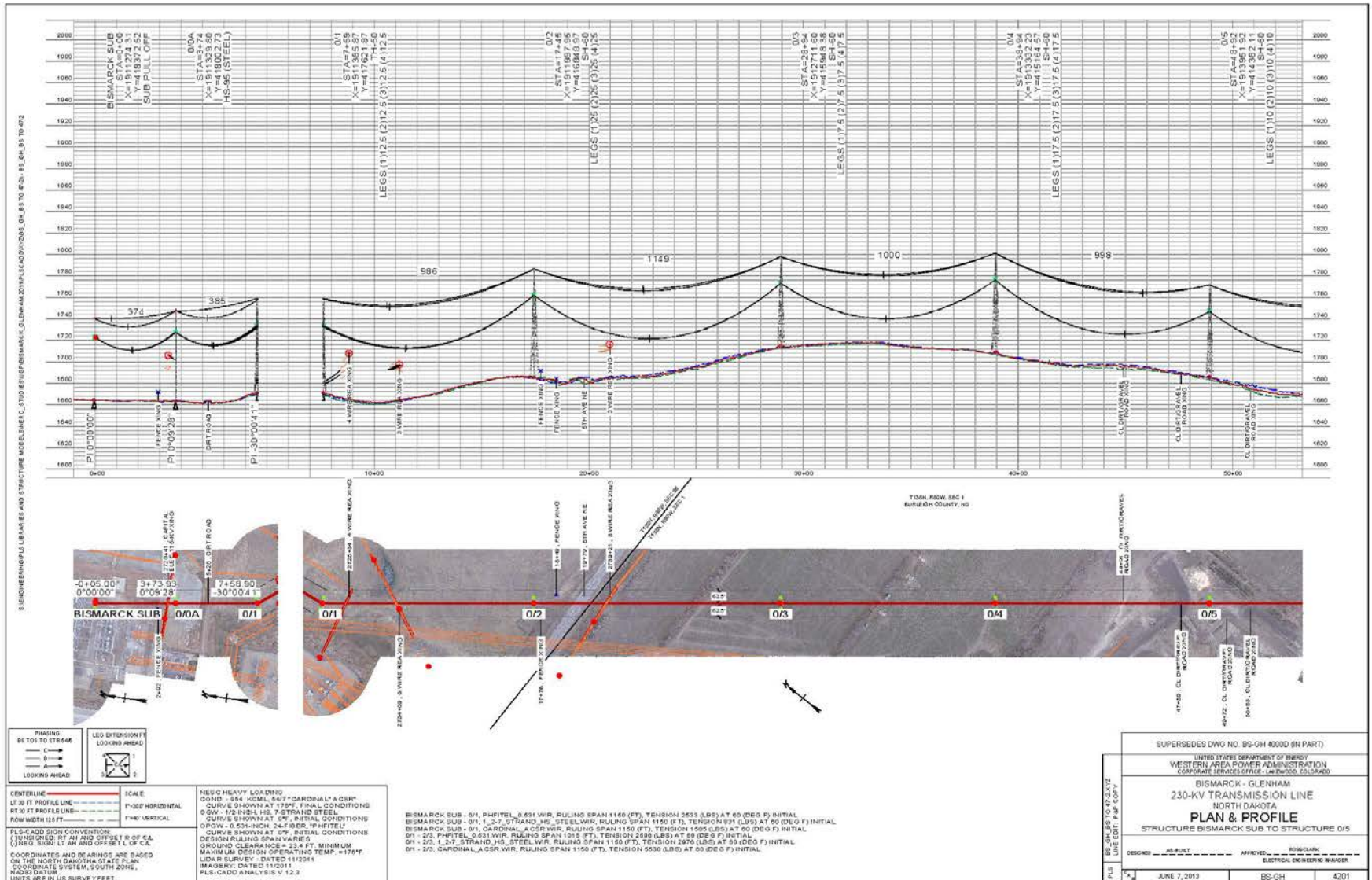
# Transmission Line Plan and Profile Drawings

Western Area Power Administration's  
approach to Generating Plan and Profile Drawings  
directly out of PLS-CADD

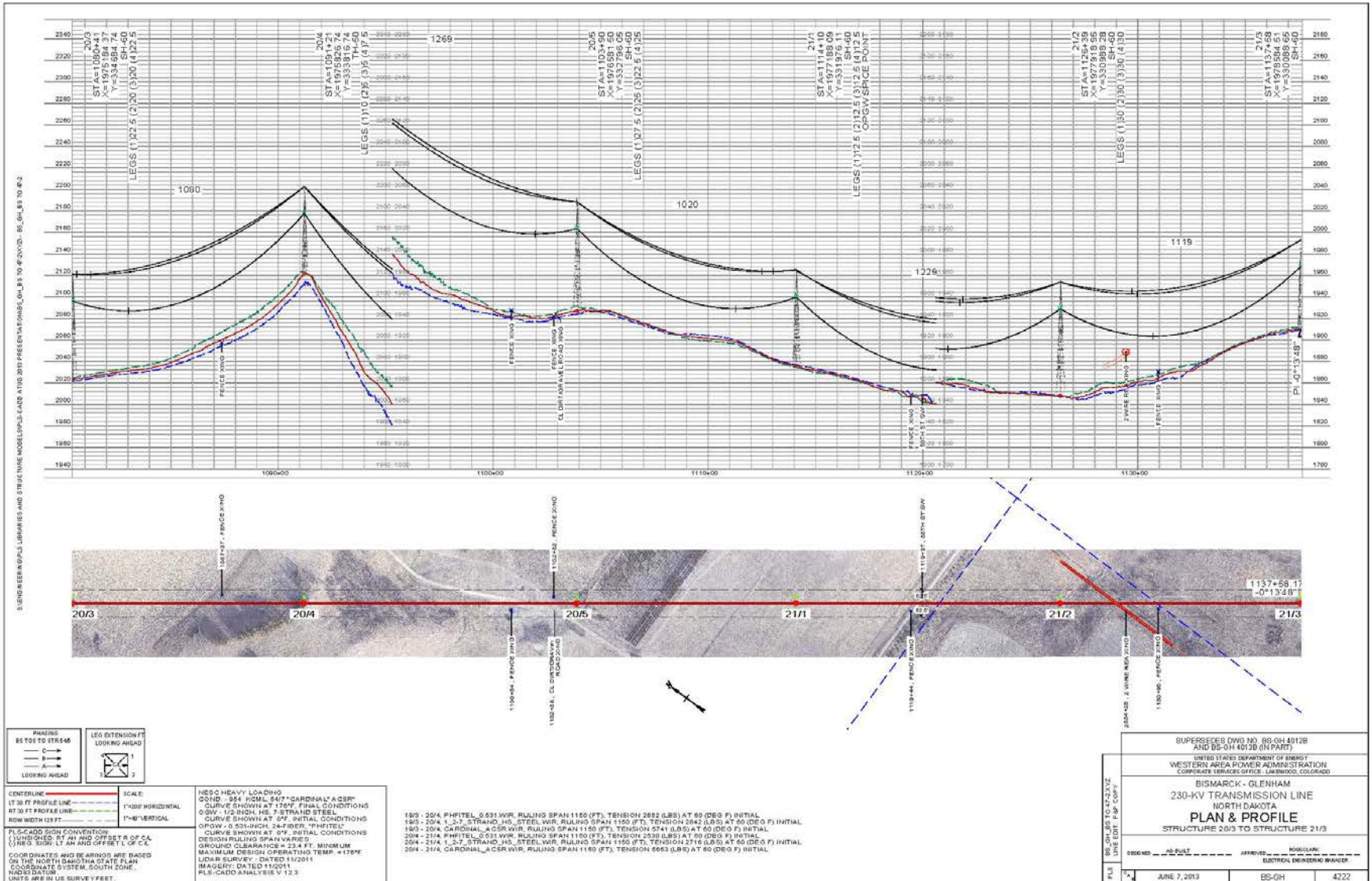


Presented by Josh Ross and Pat Lathrop

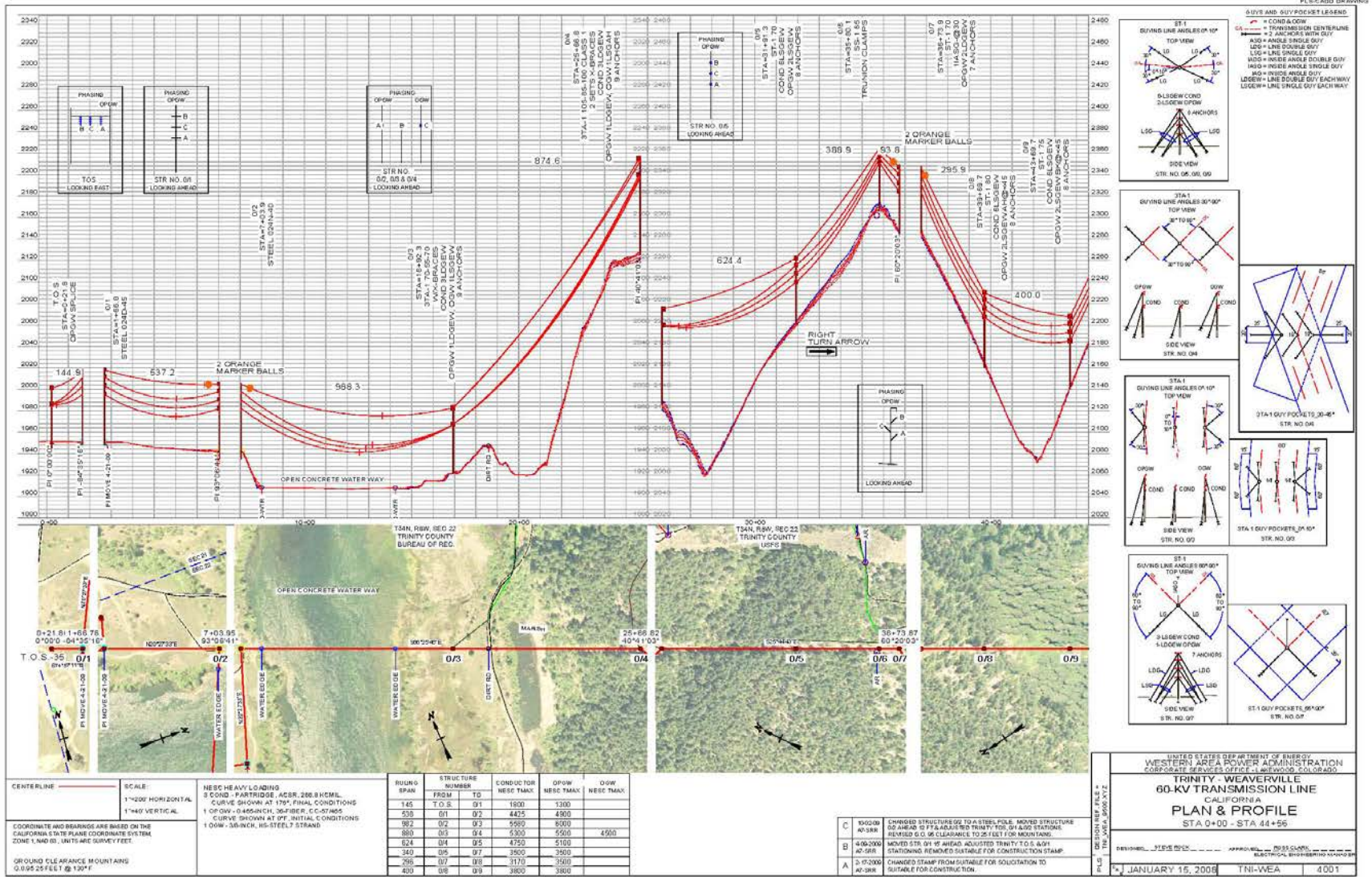
# Drawing BS-GH 4201 Generated from the PLS-CADD Model



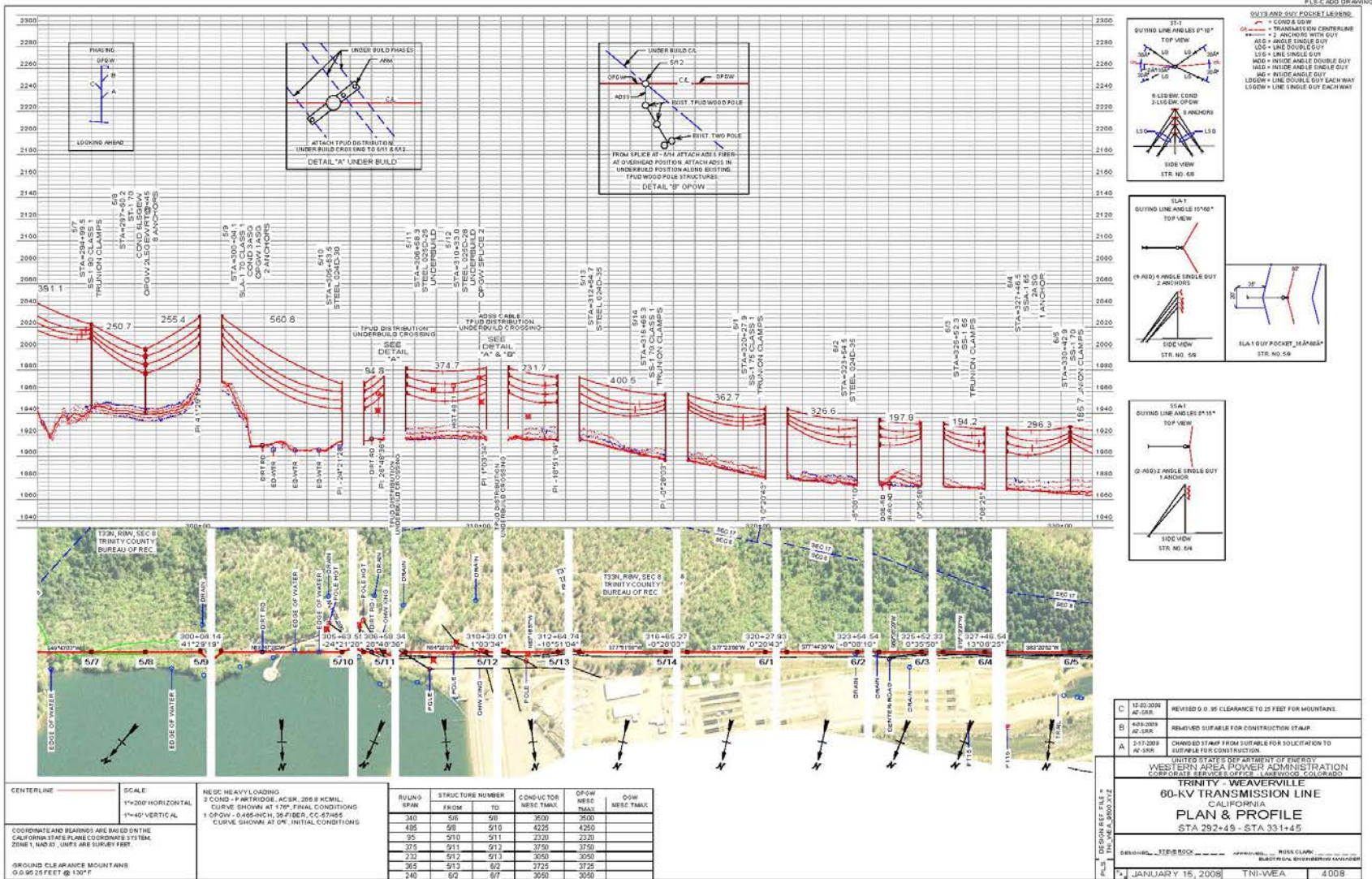
# Drawing BS-GH 4202 Generated from the PLS-CADD Model



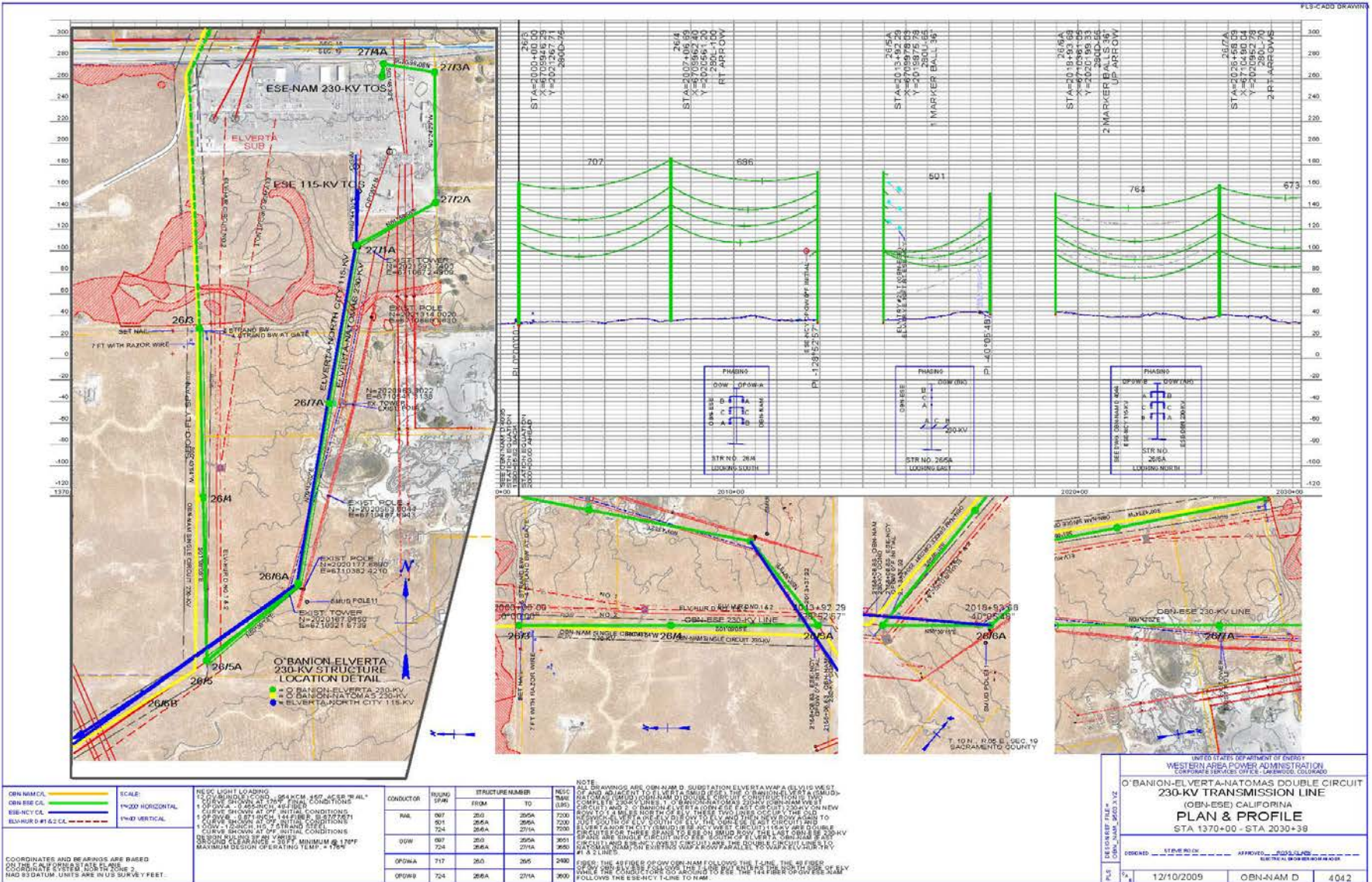
# Drawing TNI-WEA 4001C Generated from the PLS-CADD Model



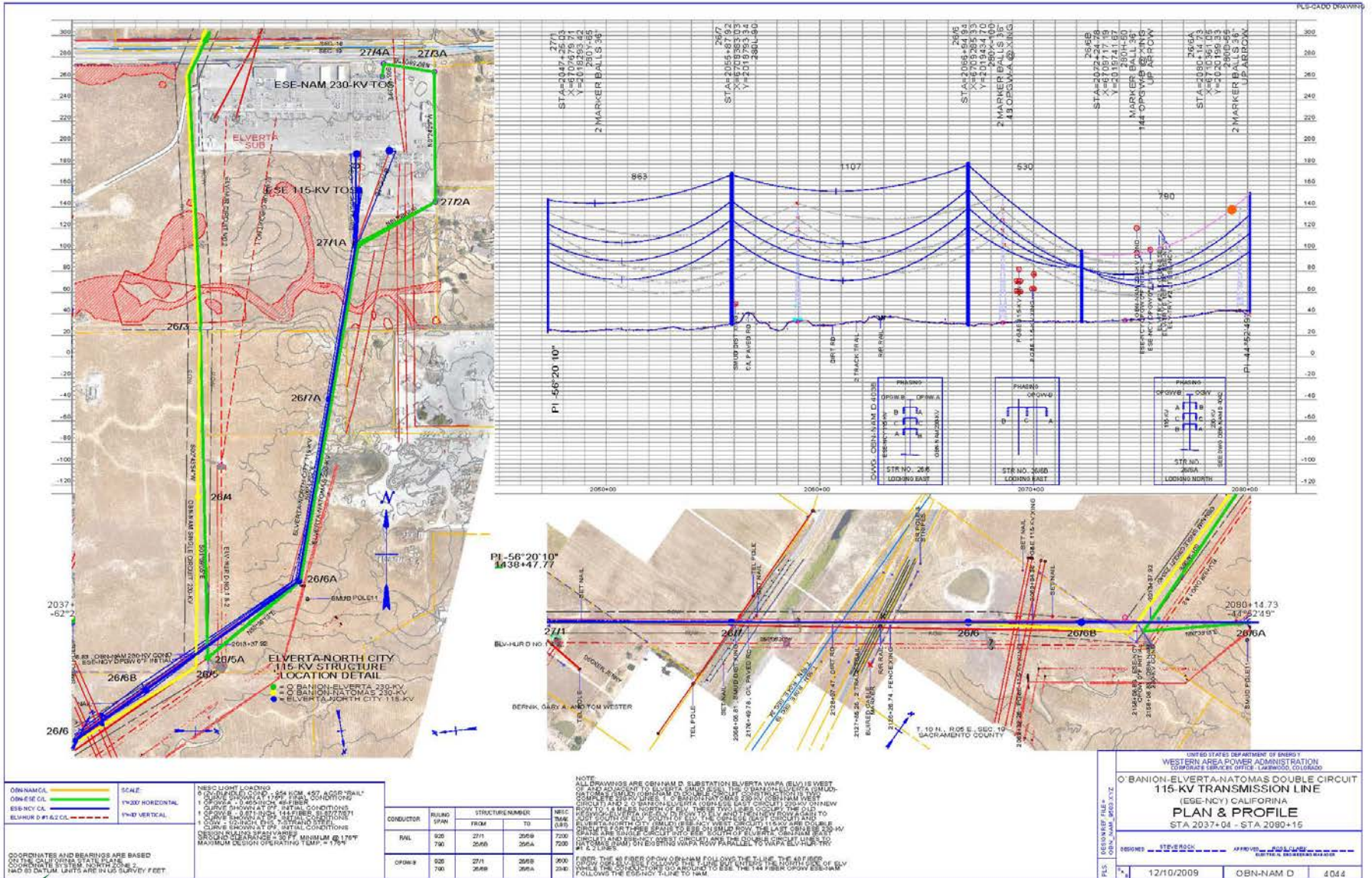
# Drawing TNI-WEA 4008C Generated from the PLS-CADD Model



# Drawing OBN-NAM D 4042 Generated from the PLS-CADD Model



# Drawing OBN-NAM D 4044 Generated from the PLS-CADD Model



UNITED STATES DEPARTMENT OF ENERGY  
 WESTERN AREA POWER ADMINISTRATION  
 3600 EAST 3RD AVENUE, DENVER, COLORADO 80218  
**0 BANCION-ELVERTA-NATOMAS DOUBLE CIRCUIT  
 115-kV TRANSMISSION LINE  
 (EGE-NCY) CALIFORNIA**  
**PLAN & PROFILE**  
 STA 2037+04 - STA 2090+15

DESIGNED	BY	APPROVED	DATE
12/10/2009			2009

FILE: OBN-NAM D 4044

# **“16” Menu Options to help Customize PLS-CADD Drawings**

- 1) Scales
- 2) Page Layout
- 3) Layers, Colors, Pen Styles, Text Heights and Pen Thickness
- 4) Structure and Section Labeling
- 5) Terrain Origin
- 6) Page Size
- 7) DXF Overlay Options
- 8) Paging Display Options
- 9) Text Orientation, Position and Background
- 10) PLS-CADD Annotation
- 11) Display Options for PI, Alignment, Right of Way
- 12) Survey Data Display Options
- 13) Line Edit Display Options
- 14) Multiple Alignment Display
- 15) Inset Plan Detail
- 16) Print Setup



# 1) Scales

**Scales**

**Scales**

Horizontal Scale (ft/in) 200.00

Vertical Scale (ft/in) 40.00

**Profile View Station and Elevation Grid**

Station Major Grid Lines (labels) (ft) 1000.0

Station Minor Grid Lines (ft) 100.00

Station Sub-Minor Grid Lines (ft)

Elevation Major Grid Lines (labels) (ft) 20.00

Elevation Minor Grid Lines (ft) 4.00

Elevation Sub-Minor Grid Lines (ft)

Label elevations at breaks in profile

**Plan View Station Labels and Tick Marks**

Station Label Interval (ft) 1000.0

Station Tick Mark Interval (ft) 100.00

**Margins and Page Overlaps**

Required Page Overlap (ft) 400.00

Allowable Overlap for Common Tower (ft) 600.00

Allowable Overlap for Common Span (ft) 460.00

Profile Break Abort Margin (ft) 60.00

Profile Bottom Margin (ft) 20.50

Minimum Required Plan View Offset (ft) 40.00

Cut profile if distance to wires exceeds (ft)

Force plan orientation to match alignment segments longer than n\*page width 0.50

Limit Profile & Page Breaks to Structure Locations

**Long Axis Plot Options**

Long Axis Plot

Gap at dead end structures (ft)

Gap at line angles (ft) 100.00

Minimum line angle for line angle gap (deg)

Show Plan View structure labels on both sides of gap

Show Plan View PI labels on both sides of gap

**Type of long axis**

Standard  REN (Portugal)

Gridless  IRANELSA (Argentina)

EDF (France)  National Grid (UK)

CFE (Mexico)  Terna (Italy)

SLE (Portugal)

**Rounding of Station at Start of Page**

Multiple of station label interval

Multiple of station grid interval

Do not round

**Station Label Orientation**

Vertical  Horizontal

**Station Label Format**

Standard (1000)

Station Plus (10+00)

Station Plus (1+000)

**Default Location for Structure Text**

Top justified within profile area

Height to reserve for text (-1 = automatic) (in) -1.00

In profile at set distance above structure

Distance above structure for text (in)

Elsewhere on the sheet

Location for labels (% of page height) 80.00

Apply OK Cancel

- Horizontal and Vertical Scale
- Profile View Station and Elevation Grid
- Plan View Station Labels and Tick Marks
- Margins and Page Overlap
- Long Axis Plot
- Rounding of Station at Start Page
- Station Label Orientation
- Station Label Format
- Default Location for Structure Text

## 2) Page Layout

**Page Layout** [?] [X]

Sheet width and height expressed as a percentage of page width and height. (0,0 is upper left)

	Xmin	Xmax	Ymin	Ymax
Sheet	<input type="text" value="0.0000"/>	<input type="text" value="100.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="100.0000"/>

Drawing areas expressed as a percentage of the sheet width and height. An area may be suppressed by setting its Xmin, Xmax, Ymin and Ymax to 0.

Area	Xmin	Xmax	Ymin	Ymax
Plan	<input type="text" value="3.0000"/>	<input type="text" value="79.5000"/>	<input type="text" value="60.0000"/>	<input type="text" value="88.1000"/>
Profile	<input type="text" value="3.0000"/>	<input type="text" value="79.5000"/>	<input type="text" value="2.0000"/>	<input type="text" value="59.2000"/>
Scales	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>
North Arrow	<input type="text" value="49.0000"/>	<input type="text" value="50.0000"/>	<input type="text" value="81.5000"/>	<input type="text" value="87.0000"/>
Title	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>
Station Labels			<input type="text" value="59.2000"/>	<input type="text" value="60.0000"/>

Elevation Area Width

- Plan size and Location
- Profile size and Location
- Scales size and Location
- North Arrow
- Title size and Location
- Station Labels Location
- Width of the Elevation Labels

# 3) Layers, Colors, Pen Styles, Text Heights and Pen Thickness

**Layers, Colors, Pen Styles and Pen Thicknesses**

Line thickness for 3D view structures and sections (pixels)

Symbol size for screen display of markers and terrain symbols in plan, profile and 3D views (pixels)

Automatically select text and symbol size for sheet view (see value to right).  
Note: This will erase the text size and symbol size settings in the table below. (in)

Use survey point feature description as layer name for survey point symbols, comments and labels (overrides layer selections made below)

Use PI and alignment display settings defined in the table accessed from Terrain/Alignment/Display Options for PI, Alignment, Right of Way... (override settings made below)

	Drawing Entity	Prof. Text Height (in)	Prof. Symbol Height (in)	Prof. Line Thick. (in)	Prof. Line Style	Prof. Color	Plan Text Height (in)	Plan Symbol Height (in)	Plan Line Thick. (in)	Plan Line Style	Plan Color	Prof. Line Layer	Prof. Text Layer	Plan Line Layer	Plan Text Layer
1	Major Station Grid	0.1000	NA	0.0100	Solid		0.1000	0.1200		Solid		gridmajor	Gridlabels	PLS	PLS
2	Minor Station Grid	NA	NA	0.0050	Solid		NA	0.0600		Solid		gridminor	NA	PLS	NA
3	Sub Minor Station Grid	NA	NA		Solid		NA	NA		Solid		PLS	NA	PLS	NA
4	Major Elevation Grid and Contour	0.1000	NA	0.0100	Solid		0.0010	NA		Solid		gridmajor	Gridlabels	PLS	PLS
5	Minor Elevation Grid	NA	NA	0.0025	Solid		NA	NA		Solid		gridminor	NA	PLS	NA
6	Sub Minor Elevation Grid	NA	NA	0.0010	Solid		NA	NA		Solid		PLS	NA	PLS	NA
7	Sheet Border	NA	NA	NA	NA	NA		NA		None		NA	NA	PLS	PLS
8	Sheet Scales Area	NA	NA	NA	NA	NA		NA		Solid		NA	NA	PLS	PLS
9	Sheet North Arrow	NA	NA	NA	NA	NA		NA		Solid		NA	NA	PLS	PLS
10	Sheet Title Area	NA	NA	NA	NA	NA		NA		Solid		NA	NA	PLS	NA
11	Alignment	NA	NA	0.0250	Solid		NA	NA	0.0500	Solid		proalignsym	proaligntxt	planalign	planaligntxt
12	Right-of-Way Lines	NA	NA	NA	NA	NA		NA		Solid		NA	NA	1	NA
13	PI Symbols and Leader Line	0.1400	0.1800	0.0250	Solid		0.1400	NA	0.0400	Solid		proalignsym	proaligntxt	planalign	planaligntxt
14	Ground Line	NA	NA	0.0050	Solid		NA	NA	NA	Solid		Elvctr	NA	PLS	NA
15	Left Side Profiles	NA	NA	0.0050	Dash		NA	NA	NA	Dash		Elvleft	NA	PLS	NA
16	Right Side Profiles	NA	NA	0.0050	Dash		NA	NA	NA	Dash-Dot		Elvright	NA	PLS	NA
17	Clearance line	0.1380	NA		Dot		0.1380	NA		Solid		clearance	PLS	PLS	PLS
18	Terrain Symbols, text, leaders	0.1000	0.0800		NA		0.1000	0.0500		NA		promise	proannotxt	planmisc	txt
19	Structures	NA	NA	0.0200	NA	NA	NA	0.1200	0.0100	NA	NA	prostr	NA	planstr	NA
20	Structure Labels	0.1400	NA	NA	NA		0.1600	NA	NA	NA		NA	prostrtxt	NA	planstrtxt
21	Sections, span lengths and Marke	0.1400	0.1380	0.0100	NA	NA	0.1100	0.1380	0.5000	NA	NA	Design	prospantxt	PLS	txt
22	Station Equations	0.1000	NA		Solid		NA	NA	NA	NA		Gridlabels	Gridlabels	NA	NA
23	Spotting Constraints	NA	NA	NA	Solid	NA	NA	NA		Solid	NA	PLS	NA	PLS	NA
24	Annotation	0.1000	NA		NA	NA	0.1000	0.3000		NA	NA	protxt	protxt	planmisc	planxtxt
25	DXF Attachments	0.1000	NA		Solid	NA	0.1000	NA		Solid	NA	NA	NA	PLS	NA
26	Markers	0.1000	0.1400		Solid	NA	0.1000	0.1400		Solid	NA	PLS	PLS	PLS	PLS

OK Cancel

Create Entity Layers, Select Colors, Text Height, Line Thickness, Line Types, and Symbol Size for both the Plan and Profile View.

## 4a) Structure and Section Labeling Menu

The screenshot displays the 'Structure and Section Labeling' menu in a software application. The menu is open, showing several options. The 'Sheet Profile View...' option is circled in red. The background shows a technical drawing of a power line structure with various labels and dimensions.

Menu items:

- Plan & Profile Sheet Configuration
- Structure and Section Labeling
  - Structure Numbers...
  - Profile View...
  - Plan View...
  - Sheet Profile View...
  - Sheet Plan View...
- Text Position, Orientation and Background...
- Text Size, Line Width, Style, Color and Layer...
- Line Width Multiplier...
- Profile View Aspect Ratio...

Other menu items:

- Black & White
- ✓ Show Cable Attachment Points
- Show Set and Phase Labels in 3D Views
- Show Structure and Section Check Bitmaps
- ✓ Show Insulator Counter Weights
- Show P&P Sheet Rectangles
- Load PPS (View Settings File)...
- Save PPS (View Settings File)...
- Attachments (Raster and Vector)
- Structure Text Position
- Lines and Annotation
- Inset Plan Detail

## 4b) P&P Sheet Profile View Structure Labels

**P&P Sheet Profile View Labels**

Structure Labels | Section Labels | Wire Labels | Span Length | Inset Views

Labels orientation:  Horizontal  Vertical

Labels to Display and their Order

Checked items will be displayed in the order shown below

- Structure number
- Structure file name
- Structure description
- Station
- X and Y coordinates
- Height and elevation
- Height adjustment (if nonzero)
- Orientation angle (if nonzero)
- Offset adjustment (if nonzero)
- Embedded length (if nonzero)
- Insulator counter weights
- Conductor attachment height
- Conductor attachment elevation
- Line angle (if nonzero)
- Structure comment #1 (Unnamed)
- Structure comment #2 (Unnamed)
- Structure comment #3 (Unnamed)

Material List Labels Options

Part File Column: Stock Number

- Show Blank Line Before and After Material List
- Show Headings
- Hide Quantity if 1

Items per line: 1

OK Cancel

Applied Selections:

- Structure Number
- Station
- Structure Comments 2-9
- Comment #1 has been reserved for and populated with Structure numbers. If selected again it would then repeat the structure label.
- Note: Set size of text in Menu option "Layers, Colors, Pen Styles, text Heights, and Pen Thicknesses (see slide 4e).

## 4c) P&P Sheet Profile View Section Labels

**P&P Sheet Profile View Labels**

Structure Labels | **Section Labels** | Wire Labels | Span Length | Inset Views

One block of horizontal section labels per P&P sheet.  
 One block of vertical section labels per P&P sheet  
 Horizontal section label at mid point of each section

Section Label Block Position

Horiz. position as % of page width: 29  
Vertical position as % of page height: 92

Do not display duplicate information

Labels to Display

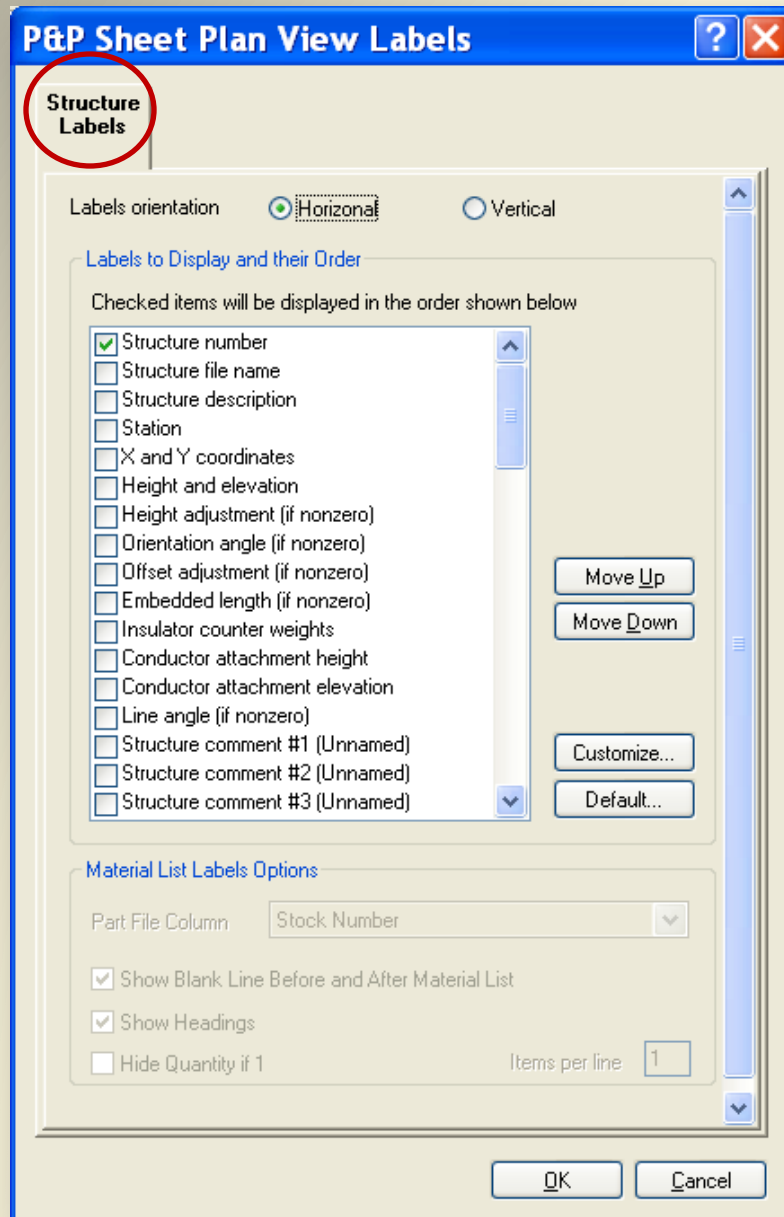
- Structure range
- Voltage
- Cable file name
- Cable file description
- Ruling span
- Number of phases and wires in bundle
- Design tension
- Displayed weather case, condition and tension
- Legend showing line color and style

OK Cancel

### Applied Selections:

- Structure Range
- Cable File Name
- Ruling Span
- Design tension
- Note: Set size of text in Menu option "Layers, Colors, Pen Styles, text Heights, and Pen Thicknesses (see slide 4e).

## 4d) Structure Labels P&P Sheet Plan View Structure Labels



Applied Selections:

- Structure Number

- Note: Set size of text in Menu option “Layers, Colors, Pen Styles, text Heights, and Pen Thicknesses (see slide 4e).

# 4e) Sections Labeling Text Size

Set Structure and Sections Labeling text size here.

## Layers, Colors, Pen Styles and Pen Thicknesses

Line thickness for 3D view structures and sections (pixels)

Symbol size for screen display of markers and terrain symbols in plan, profile and 3D views (pixels)

Automatically select text and symbol size for sheet view (see value to right).  
Note: This will erase the text size and symbol size settings in the table below.

(in)

Use survey point feature description as layer name for survey point symbols, comments and labels (overrides layer selections made below)

Use PI and alignment display settings defined in the table accessed from Terrain/Alignment/Display Options for PI, Alignment, Right of Way... (override settings made below)

	Drawing Entity	Prof. Text Height (in)	Prof. Symbol Height (in)	Prof. Line Thick. (in)	Prof. Line Style	Prof. Color	Plan Text Height (in)	Plan Symbol Height (in)	Plan Line Thick. (in)
2	Minor Station Grid	NA	NA	0.0050	Solid		NA	0.0600	
3	Sub Minor Station Grid	NA	NA		Solid		NA	NA	
4	Major Elevation Grid and Contour	0.1000	NA	0.0100	Solid		0.0010	NA	
5	Minor Elevation Grid	NA	NA	0.0025	Solid		NA	NA	
6	Sub Minor Elevation Grid	NA	NA	0.0010	Solid		NA	NA	
7	Sheet Border	NA	NA	NA	NA	NA		NA	
8	Sheet Scales Area	NA	NA	NA	NA	NA		NA	
9	Sheet North Arrow	NA	NA	NA	NA	NA		NA	
10	Sheet Title Area	NA	NA	NA	NA	NA	NA	NA	
11	Alignment	NA	NA	0.0250	Solid		NA	NA	0.0500
12	Right-of-Way Lines	NA	NA	NA	NA	NA	NA	NA	
13	PI Symbols and Leader Line	0.1400	0.1800	0.0250	Solid		0.1400	NA	0.0400
14	Ground Line	NA	NA	0.0050	Solid		NA	NA	NA
15	Left Side Profiles	NA	NA	0.0050	Dash		NA	NA	NA
16	Right Side Profiles	NA	NA	0.0050	Dash		NA	NA	NA
17	Clearance line	0.1380	NA		Dot		0.1380	NA	
18	Terrain Symbols, text, leaders	0.1000	0.0800		NA		0.1000	0.0500	
19	Structures	NA	NA	0.0200	NA	NA	NA	0.1200	0.0100
20	Structure Labels	0.1400	NA	NA	NA		0.1600	NA	NA
21	Sections, span lengths and Marke	0.1400	0.1380	0.0100	NA	NA	0.1100	0.1380	0.5000
22	Station Equations	0.1000	NA		Solid		NA	NA	NA
23	Spotting Constraints	NA	NA	NA	Solid	NA	NA	NA	



## 5a) At the First PI Set the Station Value

Default Station set to 0+00

### Terrain Origin ✕

XYZ file origin (not applicable to PFL files)

Station of first P.I. (ft)

PFL file origin (not applicable to XYZ files)

Azimuth of first point (deg)

X coordinate at station 0 (ft)

Y coordinate at station 0 (ft)

Note: Azimuth measured clockwise from North  
(North=0, East=90, South=180, West=270).

## 5b) Avoid Equation Stations if possible

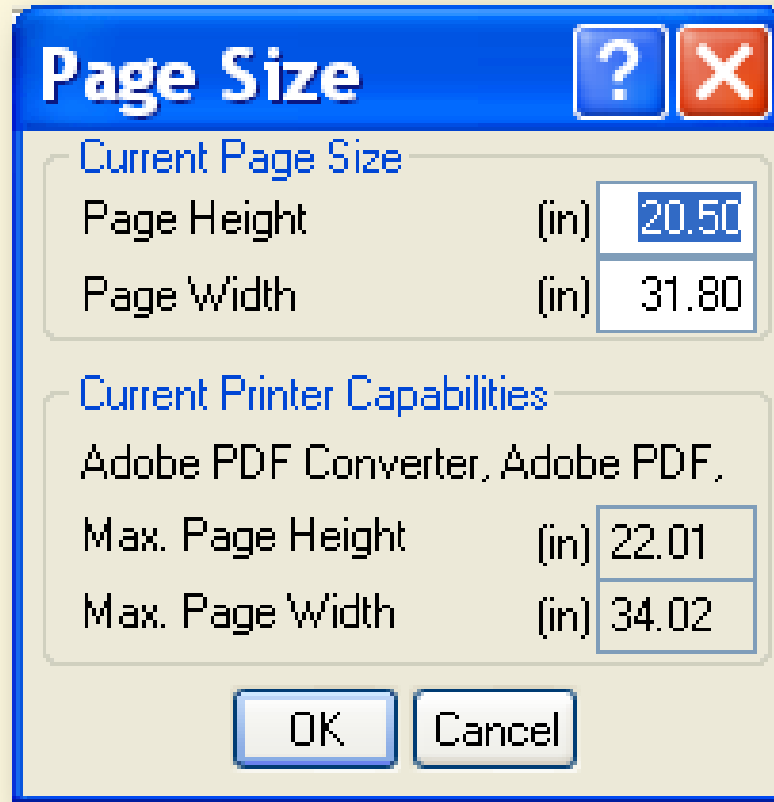
**Station Equations** ? ✕

PLS-CADD will display either true stations or equation stations depending on the setting of 'stations displayed' in the File/Preferences dialog.

Grid Scale Factor Information: PLS-CADD normally computes and displays stations based on XY distances. These are referred to as "grid stations". Distances measured at ground level or "ground stations" can differ from grid stations. If you know the grid scale factors necessary to convert between grid and ground stations you can enter them below to get ground stations displayed in reports and drawings. If you don't care about difference between grid and ground stations then pick "yes" to get station increasing to the right or "no" to get station decreasing to the right. The grid scale factor is equal to grid distance divided by ground distance (normally less than 1).

	True Station (ft)	Equation Station (ft)	Forward Direction or numeric Grid Scale Factor
1			
2			
3			
4			
5			

## 6) Set PLS-CADD Page Size



**Page Size** [?] [X]

**Current Page Size**

Page Height	(in)	20.50
Page Width	(in)	31.80

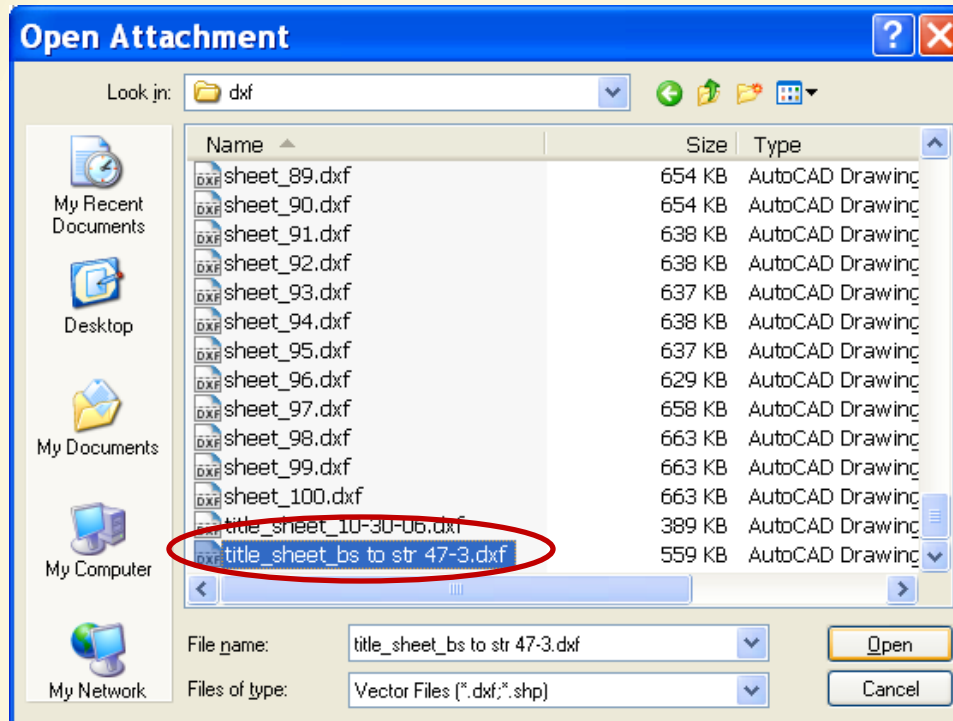
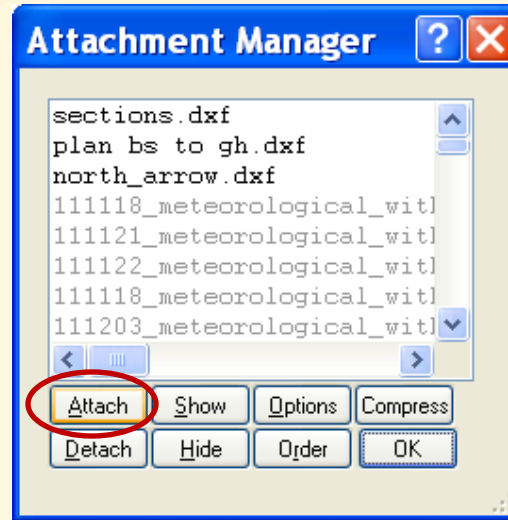
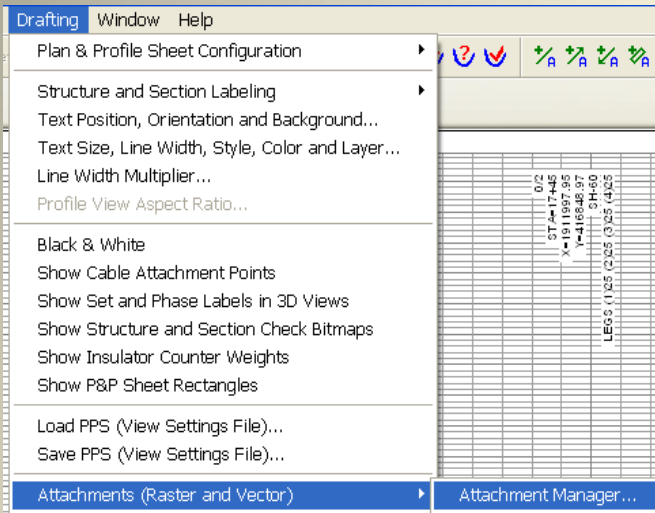
**Current Printer Capabilities**

Adobe PDF Converter, Adobe PDF,

Max. Page Height	(in)	22.01
Max. Page Width	(in)	34.02

OK Cancel

# 7a) Attach DXF



# 7b) Attach "Title Sheet.DXF" Settings

## Attach to P&P view

### DXF Overlay Options

File s:\engineering\pls libraries and structure models\pls-cadd atug 2013 presentation\trinity-weaverville\dxftitle\_sheet\_4-11-2006.dxf

Attach to

- Display only on specified P&P sheet
- Use the text size specified in the DXF file rather than text size set in this application. Text size used in sheet view is set in Drafting/Text size... while text size for other views is set in File/Preferences/Gr
- Use DXF text style (only TrueType fonts supported) instead of graphics font
- Use DXF file colors
- Use DXF file line weight (thickness) and line style (type) DXF line style scale (\$LTSKALE) = 1
- Apply additional scale factors and rotations. Options appear in new dialog box after pressing ok.
- Filter (remove) entities in paper space

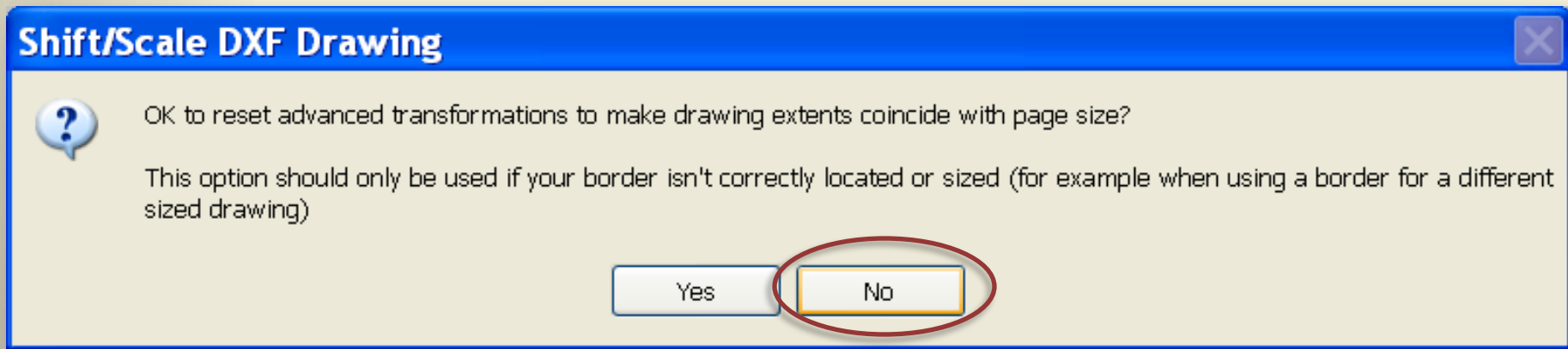
Extents

Coordinate system

Currently only TEXT, MTEXT, ATTRIB, ATTDEF, CIRCLE, ARC, ELLIPSE, LINE, POLYLINE, LWPOLYLINE, SOLID, TRACE, 3DFACE, POINT and BLOCK DXF entities are supported. SPLINE and LEAD

	Layer Name	Display	Color	Lines	Polylines	Arcs
1	0	Yes		3	3	
2	BORDER	Yes		21	2	
3	CLEARANCE_NOTE	Yes				
4	COORDINATE_NOTE	Yes				
5	DEFPOINTS	Yes				
6	DESIGN	Yes				
7	GRAPHICS	Yes				
8	GROUND	Yes				
9	KEY	Yes		1	8	4
10	PLS	Yes				

**7c) Western's Sheet dxf drawings**  
are designed to create full size to scale drawings.  
No Shift/Scale adjustments needed.



## 7d) Title Sheet DXF

31.75'

- “Sheet DXF” are sized to align to the PLS-CADD Page Size.
- No Shift Scale adjustment needed.
- “Title Sheet DXF” was created to display on all Sheets.

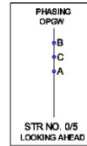
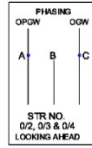
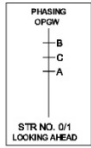
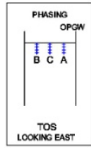
20.46'



<b>CENTERS, IN.</b>	<b>SCALE:</b>
LT 30 FT PROFILE LINE: ————	1"=60' HORIZONTAL
RT 30 FT PROFILE LINE: ————	1"=60' VERTICAL
ROW WIDTH 125 FE: ————	

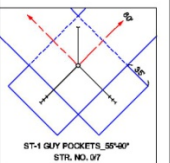
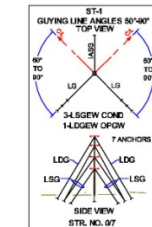
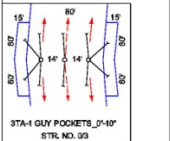
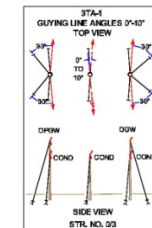
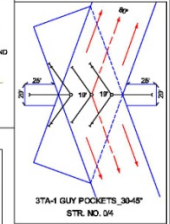
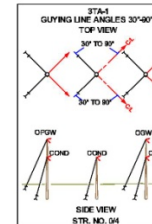
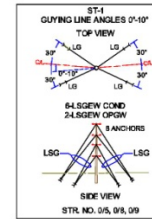
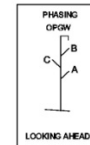
UNITED STATES DEPARTMENT OF ENERGY WESTERN AREA POWER ADMINISTRATION ESTIMATES SERVICE OFFICE - FORT COLLINS, COLORADO	
BISMARCK - GLEN-HAM 230-KV TRANSMISSION LINE NORTH DAKOTA PLAN & PROFILE	
DESIGNED: _____	APPROVED: ROSS CLARK ELECTRICAL ENGINEER/REGISTRAR
FILE: PLS DESIGN REF. FILE # _____	BS-GH

# 7e) Sheet Specific "Sheet 1.DXF" Attachments



• Sheet specific DXF attachments can provide a way to import a CAD drawings into one specified PLS-CADD sheets.

• The DXF can provide a location to add such items as revision notes, details, line work and other annotations pertinent to this one drawing.



RULING SPAN	STRUCTURE NUMBER FROM TO	CONDUCTOR NESC TMAX	OPGW NESC TMAX	OGW NESC TMAX
145	T.O.S. 0/1	1800	1300	
538	0/1 0/2	4425	4900	
982	0/2 0/3	5550	6000	
580	0/3 0/4	5300	5500	4500
624	0/4 0/5	4750	5100	
340	0/5 0/7	3500	3500	
296	0/7 0/8	3170	3500	
400	0/8 0/9	3800	3800	

1 OGW - 3/8-INCH, HS-STEEL 7 STRAND

### NOTES

- CUT STRUCTURES THAT CAN BE SHORTER FOR GUY INSTALLATION. MARK NEW HEIGHT AND CUT POLE.

C	10-02-09 A7-5PR	CHANGED STRUCTURE 0/2 TO A STEEL POLE. MOVED STRUCTURE 0/2 AHEAD 12 FT & ADJUSTED TRINITY T.O.S. 0/1 & 0/2 STATIONS. REVISED G.L. IS CLEARANCE TO 25 FEET FOR MOUNTAINS.
B	4-09-2008 A7-5PR	MOVED STR. 0/1 15' AHEAD. ADJUSTED TRINITY T.O.S. & 0/1 STATIONING. REMOVED SUITABLE FOR CONSTRUCTION STAMP.
A	2-17-2008 A7-5PR	CHANGED STAMP FROM SUITABLE FOR SOLICITATION TO SUITABLE FOR CONSTRUCTION.



# 7f) "Sheet 1.dxf" DXF

## DXF Overlay Options

File s:\engineering\pls libraries and structure models\pls-cadd atug 2013 presentation\trinity-weaverville\dxfl\sheet\_1.dxf

Attach to P&P view: DXF coordinates are x,y,z in inches

Display only on specified P&P sheet

1

- Use the text size specified in the DXF file rather than text size set in this application. Text size used in sheet view is set in Drafting/Text size... while text size for other views is
- Use DXF text style (only TrueType fonts supported) instead of graphics font
- Use DXF file colors
- Use DXF file line weight (thickness) and line style (type) DXF line style scale (\$LTSCALE) = 1
- Apply additional scale factors and rotations. Options appear in new dialog box after pressing ok.
- Filter (remove) entities in paper space

Extents Use program calculated extents

Coordinate system (Unknown or Unavailable:)

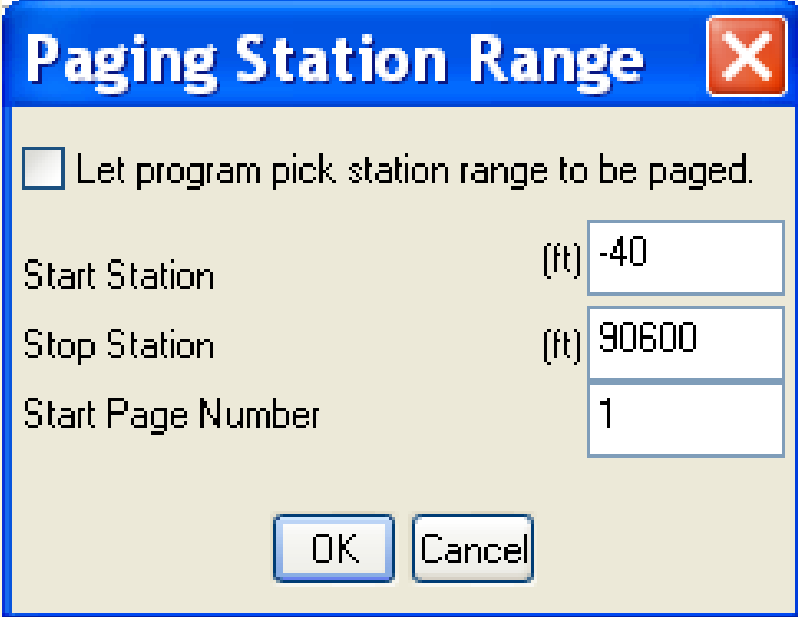
Currently only TEXT, MTEXT, ATTRIB, ATTDEF, CIRCLE, ARC, ELLIPSE, LINE, POLYLINE, LWPOLYLINE, SOLID, TRACE, 3DFACE, POINT and BLOCK DXF entities are su


	Layer Name	Display	Color	Lines	Polylines
1	0	Yes		347	315
2	51	Yes			850
3	59	Yes			
4	100ft_guy_pockets	Yes			
5	100ft_offset	Yes			

Display only on Specified P&P Sheet 1.

## 8) “Paging Station Range” sets the Sheet display range.

- Set the Start Station
- Set the stop station
- Set the Start Page Number (sheet number).



**Paging Station Range** 

Let program pick station range to be paged.

Start Station (ft) -40

Stop Station (ft) 90600

Start Page Number 1

OK Cancel

# 9) PLS-CADD Text Orientation, Position and Background

**Text Orientation, Position and Background** ? X

**Text Display Options**

- Opaque Text Background for Plan View
- Opaque Text Background for Views Other than Plan View
- Convert all Text to Upper Case

**Text Line Spacing Options**

- Spacing between lines set to 20% of height of upper case character. This may result in collisions between adjacent lines of text for some fonts, especially with opaque background.
- Adjust line spacing to leave room for lower case character descent and accents. This may result in large gaps between lines for some fonts.
- Adjust line spacing to leave room for lower case character descent but do not reserve space for accents (recommended on Windows Vista and newer).

**Terrain Related Text Position**

- Immediately adjacent to point without leader line
- Move text to minimize collisions with other Text and connect with leader line

Enter desired leader line lengths below or enter 0 for program defaults:

Leader line length for plan view PI labels	(ft)	100
Leader line length for profile view terrain text	(ft)	10
Leader line length for plan view terrain text	(ft)	120

- Wrap text to keep it on plan & profile sheet
- Restrict labeling of PI in sheet plan view to same PI visible in sheet profile view.
- Profile View Terrain and PI Text Above Ground
- Profile View Terrain and PI Text Below Ground

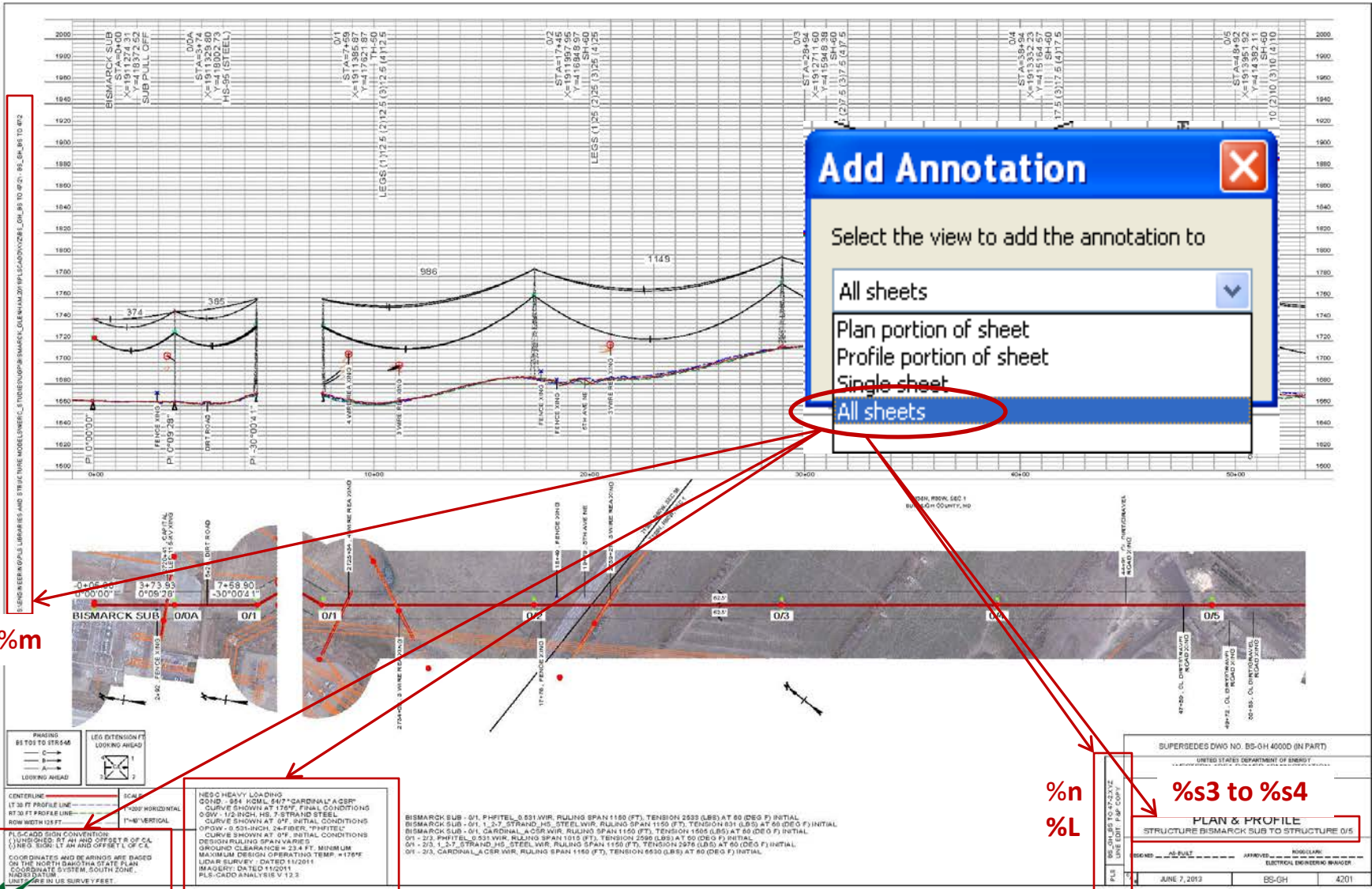
**Text Orientation Preference**

- Don't care Picking a preferred text orientation will cause text that would otherwise appear upside-down to be rotated 180 degrees.
- Horizontal Text
- Right Text
- Left Text
- Vertical text readable from right side of page

OK Cancel

- Text Display Options
- Text Line Spacing Options
- Terrain Related Text Position
- Text Orientation Preference

# 10a) PLS-CADD Annotation



ENGINEERING DESIGNS AND STRUCTURAL ANALYSIS CONSULTING, INC. 810 N. 24TH ST., SUITE 100, BISMARCK, ND 58103

%m

%n  
%L

%s3 to %s4

## 10b) Automatic insertion of text using “Special Codes”

- **%p** for the P&P sheet number
- **%q** for the total number of sheets
- **%n** for project name
- **%m** for project directory
- **%d** for the date
- **%L** for line name
- **%t** time
- **%s1** for start station
- **%s2** for stop station
- **%s3** for start structure
- **%s4** for stop structure
- **%C1...%C50** for specific rows of annotation input in the Criteria Notes
- **%R1...% R??** For specific rows of annotation from the Project notes in the Line/Edit dialog
- **%dim** for distance between dimension line end points (Optionally followed by desired digits after decimal line **%dim0** or **%dim2**)

# 11) Display Options for PI, Alignment, and Right of Way

Display Options for PI, Alignment, Right of Way

	Y (ft)	Z (ft)	Station (ft)	Alignment Number	Line Angle (deg)	Closest Structure	Stationing to Closest Structure (ft)	Label	PI Symbol/ Leader Line Color	PI Leader Line Style	Ahead- Segment Line Color	Ahead- Segment Line Style	Right- of-Way Left Offset (ft)	Right- of-Way Right Offset (ft)	Right- of-Way Line Color	Right- of-Way Line Style
1	418377.463	1664.052	-5	1		BISMARCK ST	5.0000	Main Line		Solid		Solid		0.000		Dot
2	418002.729	1663.261	373.928	1	0.16	0/OA		Main Line		Solid		Solid				Dot
3	417621.865	1671.290	758.898	1	-30.01	0/1		Main Line		Solid		Solid				Dot
4	408980.686	1659.250	11783.2	1	-0.20	2/2		Main Line		Solid		Solid				Dot
5	408277.062	1682.578	12683.3	1	-29.53	2/3		Main Line		Solid		Solid				Dot
6	407998.557	1683.391	13430.6	1	-0.27	2/4		Main Line		Solid		Solid				Dot
7	403764.454	1758.841	24927.8	1	-0.23	4/4		Main Line		Solid		Solid				Dot
8	403365.549	1772.321	26022.1	1	30.03	4/5	-2.5355	Main Line		Solid		Solid				Dot
9	402694.255	1791.817	26881	1	-0.22	5/1		Main Line		Solid		Solid				Dot
10	395764.785	1858.804	35773.5	1	14.67	6/5	-0.8530	Main Line		Solid		Solid				Dot
11	370746.507	1801.880	63189.1	1	-12.35	11/5		Main Line		Solid		Solid				Dot
12	330088.573	1910.073	113758	1	-0.23	21/3		Main Line		Solid		Solid				Dot
13	329294.178	1903.435	114749	1	20.96	21/4	-1.6083	Main Line		Solid		Solid				Dot
14	328532.796	1853.560	115540	1	-0.24	21/5	-0.8039	Main Line		Solid		Solid				Dot
15	276395.231	2005.250	169777	1	-0.02	32/1		Main Line		Solid		Solid				Dot
16	229492.457	1838.205	218571	1	-1.99	41/2		Main Line		Solid		Solid				Dot
17	203845.151	1733.884	245538	1	-3.00	46/3		Main Line		Solid		Solid				Dot
18	179556.519	1977.525	271555	1		73	-109.7123	Crossings		Solid						
19	418042.991	1663.176	271855	2		75	89.1987	Crossings		Solid		Solid				Dot
20	418037.761	1661.801	272201	2		76	43.5944	Crossings		Solid						
21	417552.874	1662.057	272501	3		77	124.2784	Crossings		Solid		Solid				Dot
22	417480.537	1661.883	272819	3		78	29.0984	Crossings		Solid						
23	417587.028	1661.624	273119	4		79	29.6514	Crossings		Solid		Solid				Dot
24	417388.509	1663.100	273337	4	0.36	80	70.1159	Crossings		Solid		Solid				Dot
25	417190.681	1659.967	273554	4		80	-147.2130	Crossings		Solid						
26	416595.745	1687.431	273854	5		81	-146.5680	Crossings		Solid		Solid				Dot

For the Sheet Plan View, PI and alignment settings in the table above are overridden by those in the drafting table. To change which settings should override, go to Drafting/Text size, Line width, Style, Color and Layer...

<p>Show alignment lines in:</p> <input checked="" type="checkbox"/> Plan View <input type="checkbox"/> Sheet Plan View <input checked="" type="checkbox"/> 3-D View	<p>Show right-of-way lines in:</p> <input checked="" type="checkbox"/> Plan View <input type="checkbox"/> Sheet Plan View <input checked="" type="checkbox"/> 3-D View	<p>Show PI Symbol in:</p> <input type="checkbox"/> Plan View <input checked="" type="checkbox"/> Sheet Profile View <input type="checkbox"/> 3-D View <input type="checkbox"/> Profile View	<p>Add above label to PI Leader Text in:</p> <input type="checkbox"/> Profile View <input type="checkbox"/> Sheet Plan View <input type="checkbox"/> Sheet Profile View
--	---	---	--

OK Cancel



# 12) Survey Data Display Options

**Survey Data Display Options** [?] [X]

**Ground Point Lines**  
Ground point lines are vertical lines passing through survey points on your centerline ground profile. These lines help you identify surveyed locations along the profile.  
 Display ground point lines  Draw point at base of survey points with nonzero H

**Survey Point Symbols**  
 Draw symbol selected in feature code table  
 Draw a point  
 Do not draw any symbols

**Survey Point Labels**  
 Label as per feature code table settings  
 Label everything (feature code, station, offset, elevation...)  
 Do not display any labels

**Survey Point Comments**  
 Show comments as per feature code table settings  
 Show all comments  
 Do not show any comments

**Additional options to disable display of selected feature codes, heights above ground or offset ranges**

Draw only designated feature codes  
Feature codes to draw: 3 12 42 45 47 49 61 63 64 65 67 68 76 79...

No restriction on point H or height above TIN  
Minimum height (ft) -3280.84 Maximum height (ft) 32808.40

Draw only points with height above TIN in range specified to right (note: computing TIN elevation below each point may produce noticeable delay when exiting this dialog)

Draw only points with H in range specified to right (requires survey data with nonzero H)

Draw only points within specified range of centerline stations and offsets  
Minimum station (ft) -3280839.90 Maximum station (ft) 3280839.90  
Minimum offset (ft) -32808.40 Maximum offset (ft) 3280.84

**LiDAR Point Color Coding**  
Survey points can have colors embedded within their plan comments. Colors are defined by their red, green and blue intensities. Intensity values are between 0 and 255 (example: red=255,0,0 yellow=255,255,0)

0/4175401 XYZ points appear to have valid color codes.

Hide color code in displayed comments  
 Use color from color code  
Pixel width and height to use for point symbol

# 13) Project Line Selection and Line Display Options

## Line

**Project Notes**

P&P Copy used for display in the AS-BUILT drawings.

**Project Lines**

HDR , Cost=0, 344 Structures, 92 Sections, Hide, Min Span=112, Max Span=1269, Created 10:23:05 AM 3/22/2012

HDR , Cost=0, 345 Structures, 89 Sections, Hide, Min Span=112, Max Span=1269, Created 4:06:03 PM 5/30/2013

**\* P&P Copy , Cost=0, 350 Structures, 102 Sections, Show, Min Span=111, Max Span=19971, Created 11:24:08 AM 4/1/2013**

Copy
Delete
Info
Show
Hide
Select and hide other lines
Select
Move Up
Sort by Cost
Line Specific Material List...
As-Built...
Project Estimator...
OK

## Line Display Options

**Line Name and Display Information**

Name: P&P Copy

350 Structures, 102 Sections, Cost=0, Created 11:24:08 AM 4/1/2013

Line Type:  Solid  Dash  Dot

Curve type:  Catenary  Parabola

**Section and Structure Display Options**

**Section** | Structure

**Section Color**

Draw each section with the color specified in Section/Modify

Draw all sections using the section color to the right (override Section/Modify display color) Section Color

Draw each section with the color specified in the cable file

**Phases Displayed**

Draw only the phase selected in the Section/Modify

Draw all phases (override Section/Modify display phase)

**Display Weather Case**

Display each section as selected in Section/Modify (each section can be at different weather case)

Display all sections for weather case below (override Section/Modify weather case or catenary)

Display parameters will be updated to reflect current ruling spans and weather cases selected in the section modify dialog box.

**Show Cables**

Plan View  Profile View  3-D View  Sheet-Plan View  Sheet-Profile View

OK Cancel

## Line Display Options

**Line Name and Display Information**

Name: P&P Copy

350 Structures, 102 Sections, Cost=0, Created 11:24:08 AM 4/1/2013

Line Type:  Solid  Dash  Dot

Curve type:  Catenary  Parabola

**Section and Structure Display Options**

Section: **Structure**

**Structure and Insulator Colors**

Render structures, insulators and wire in 3D views (will increase redraw time)  
(Requires structures saved in PLS-POLE or TOWER version 5.40 or later for full effect)

Draw all structures and insulators using the following colors

Structure Color:   Insulator Color:  

**Structure Symbols**

	Structure Element	Plan View	Profile View	3-D View	Sheet-Plan View	Sheet-Profile View	Sheet-Inset Views
1	Structure Center	Default	None	None	Default	None	Default
2	Pole Base	None	None	None	None	None	None
3	Tower Legs	None	None	None	None	None	None
4	Guy Anchor	None	None	None	None	None	None

**Show Structure Geometry**

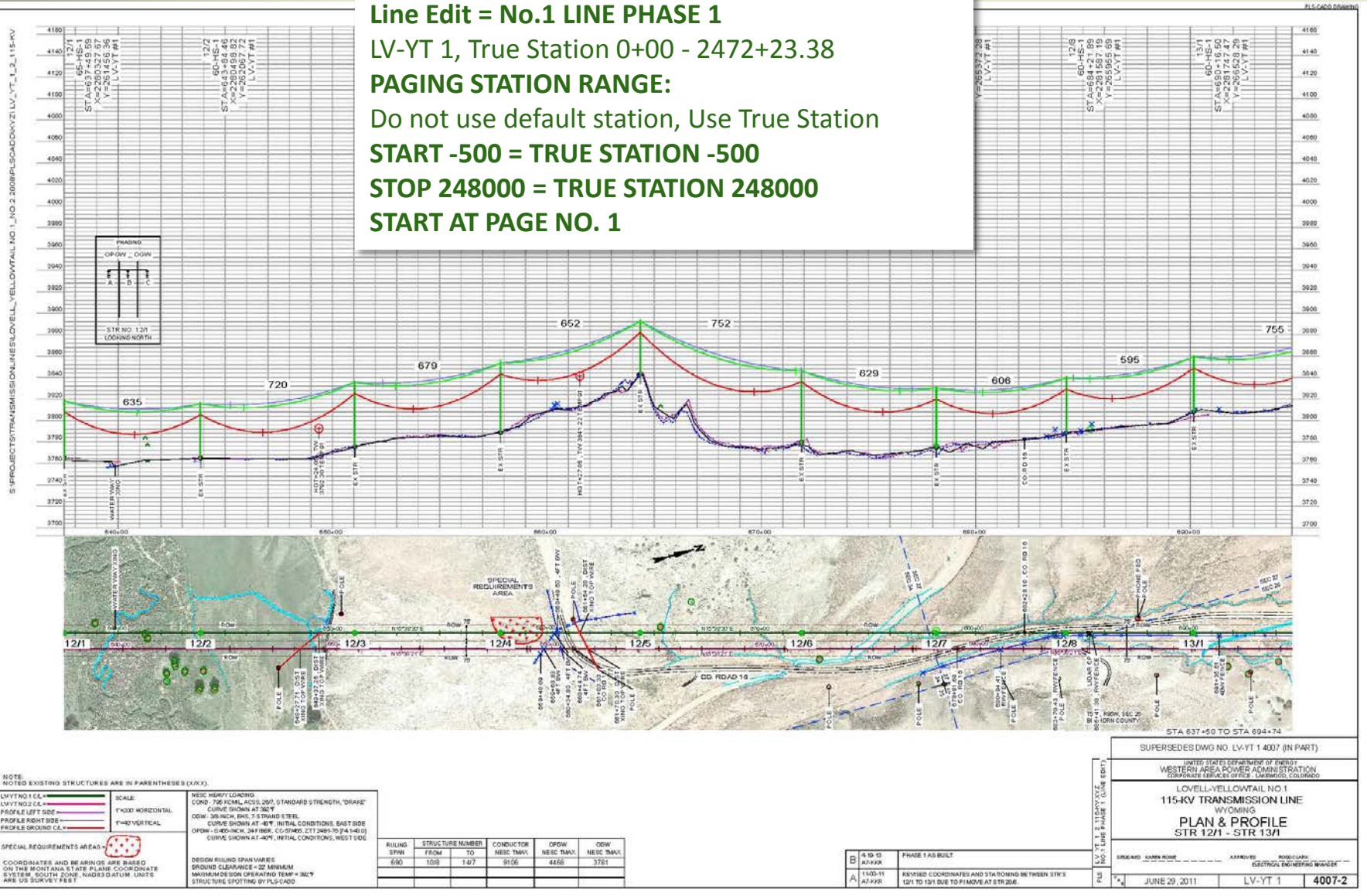
Plan View  Profile View  3-D View  Sheet-Plan View  Sheet-Profile View

OK Cancel



# 14) Multiple Alignments, Line Edit %L "No.1 LINE PHASE 1"

**Line Edit = No.1 LINE PHASE 1**  
**LV-YT 1, True Station 0+00 - 2472+23.38**  
**PAGING STATION RANGE:**  
 Do not use default station, Use True Station  
**START -500 = TRUE STATION -500**  
**STOP 248000 = TRUE STATION 248000**  
**START AT PAGE NO. 1**



# 14a) Multiple Alignments, Line Edit %L "No.2 LINE PHASE 1"

## Line Edit = No. 2 Line Phase 1

LV-YT 2, True Station Range 0+00 - 2469+95

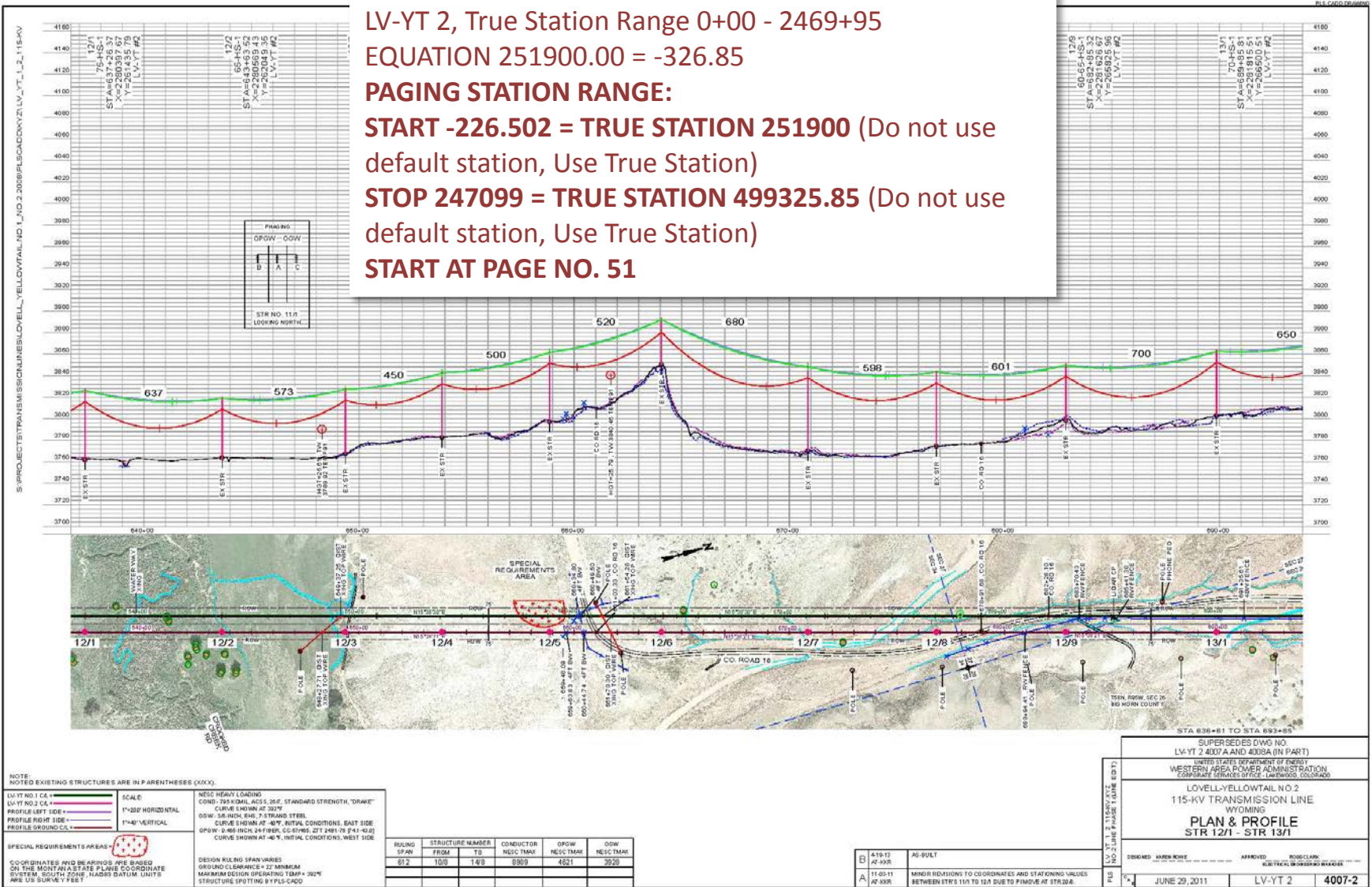
EQUATION  $251900.00 = -326.85$

### PAGING STATION RANGE:

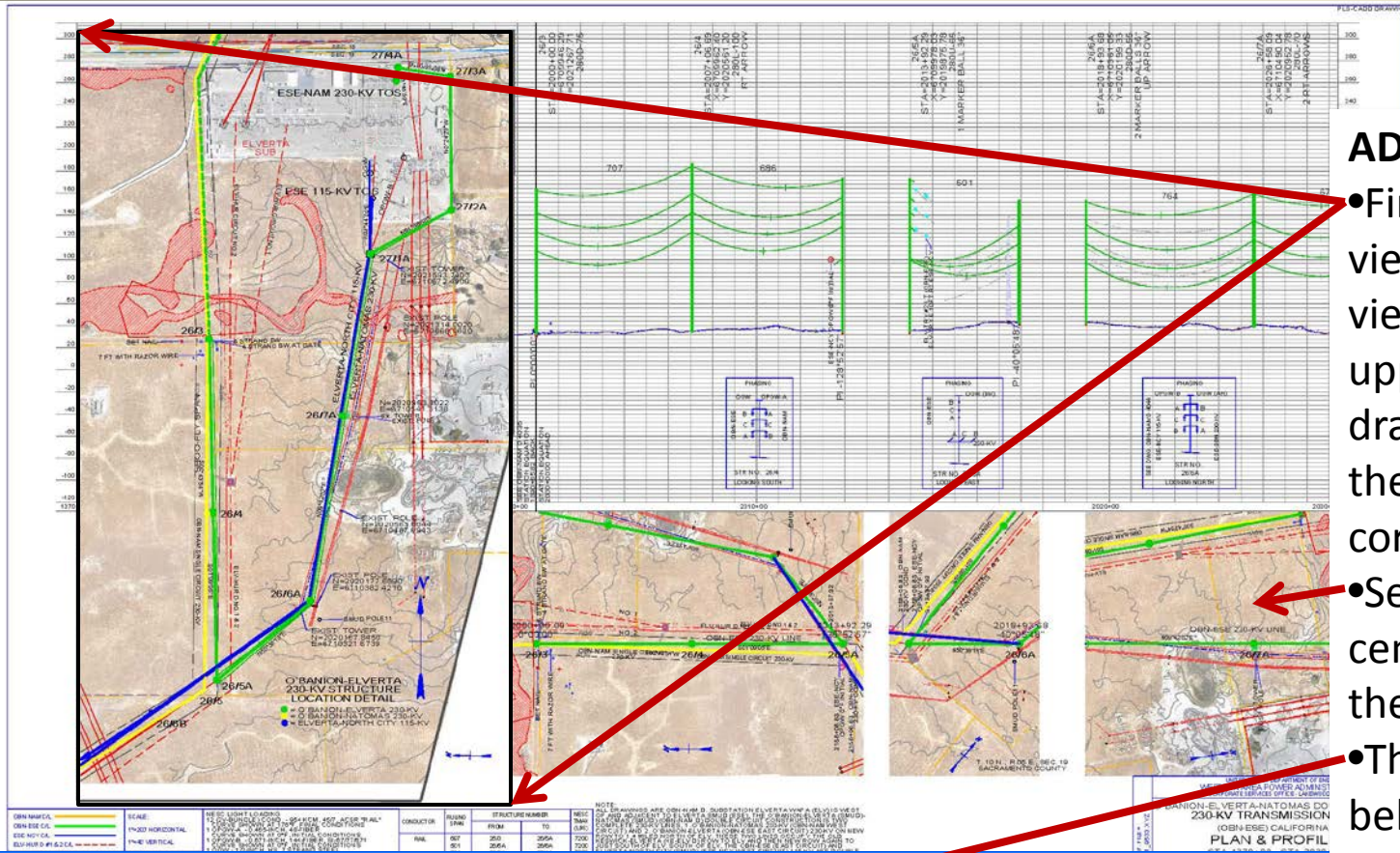
**START -226.502 = TRUE STATION 251900** (Do not use default station, Use True Station)

**STOP 247099 = TRUE STATION 499325.85** (Do not use default station, Use True Station)

**START AT PAGE NO. 51**



# 15a) Add Inset Plan Detail



- ADD:**
- First define the viewport in sheet view by picking the upper left corner and dragging the area to the lower right corner.
  - Second pick the center of view from the plan view.
  - Third use the table below to edit or delete inset view on plan and profile sheets.

## Sheet Inset Plan View

Use the table below to edit or delete inset plan views on plan and profile sheets.

Sheet Page Number	Inset View Xmin % Page Width	Inset View Ymin % Page Height	Inset View Xmax % Page Width	Inset View Ymax % Page Height	X (ft)	Y (ft)	Z (ft)	Depth Of Field Limit (ft)	Longitude (deg)	Latitude (deg)	Scale (ft/in)	Note	Show Structure Geometry	Show Wires	SI G Anc
7	65.000	2.100	95.000	85.100	6712000.000	2023000.969	66.908			90	20	2 background	No	No	
7	65.000	2.100	95.000	87.000	6710101.927	2020950.259	99.030			90	180	Detail	No	No	

# 15b) Edit Inset Plan Detail

- Sheet Page Number
- Detail's Width and Height
- Detail's plan view center point coordinates
- Scale ft/in
- Notes
- Show or Hide

Structure Geometry, Wires, Structure Annotation and Attachments, DXF and Shape files, Attached Images and Tin.

## Sheet Inset Plan View

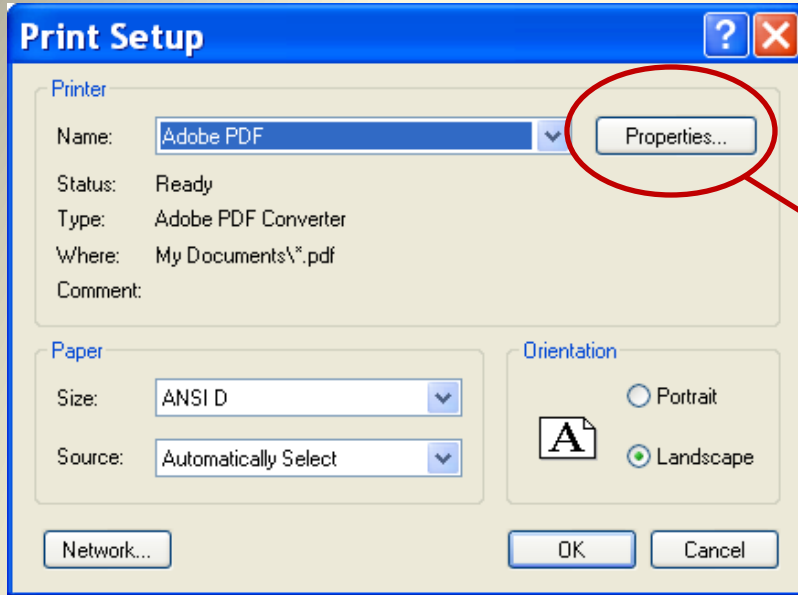
Use the table below to edit or delete inset plan views on plan and profile sheets.

	Sheet Page Number	Inset View Xmin % Page Width	Inset View Ymin % Page Height	Inset View Xmax % Page Width	Inset View Ymax % Page Height	X (ft)	Y (ft)	Z (ft)	Depth Of Field Limit (ft)	Longitude (deg)	Latitude (deg)	Scale (ft/in)	Note	Show Structure Geometry	Show Wires	Show Guy Anchors	Show Structure Annotation and Attachments	Show DXF and Shape-files	Show Attached Images	Show TIN
1	27	65.000	2.100	95.000	85.100	6712000.000	2023000.969	66.908			90	20	2 background	No	No	No	No	Yes	Yes	No
2	27	65.000	2.100	95.000	87.000	6710101.927	2020950.259	99.030			90	180	Detail	No	No	No	No	Yes	Yes	No
3	1	5.200	3.000	36.000	86.000	6710300.000	2020990.000	99.030			90	180	4042 tline 1	No	No	No	No	Yes	Yes	No
4																				
5																				
6																				

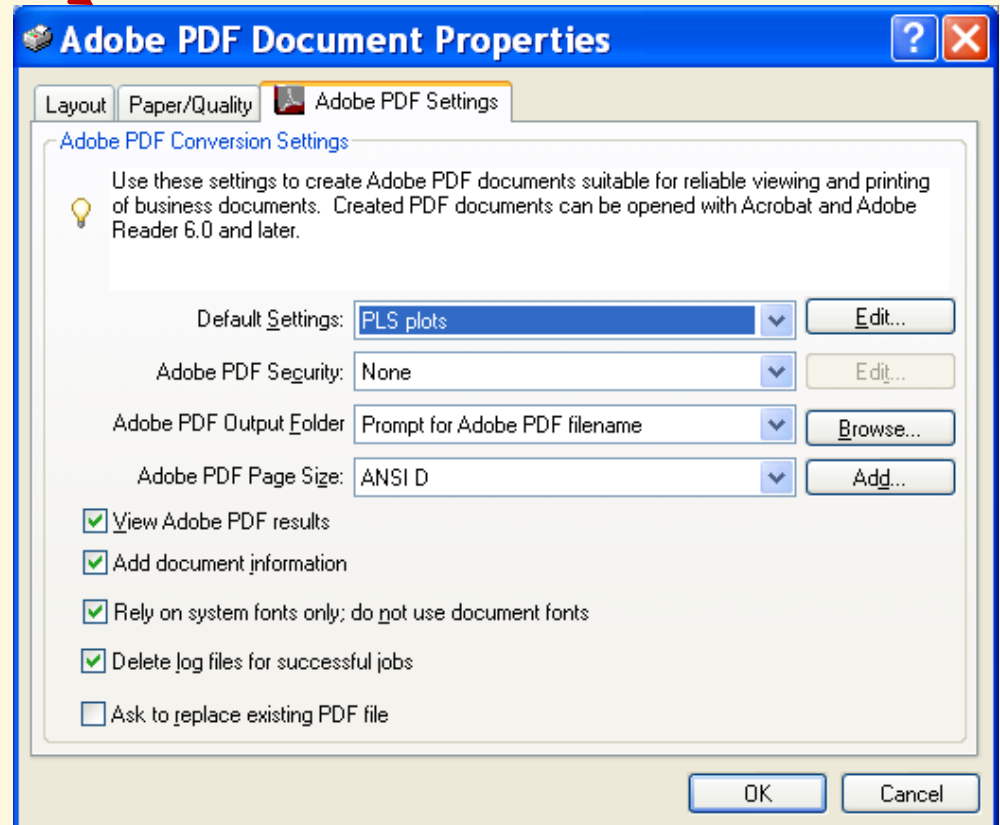


# 16a) Print to Scale

## PLS-CADD Adobe Print Setup



Adobe PDF Document Properties  
Western's Default Setting: PLS plots  
Adobe PDF Page Size: ANSI D



### Print Setup

Printer: Adobe PDF

Paper: Size ANSI D

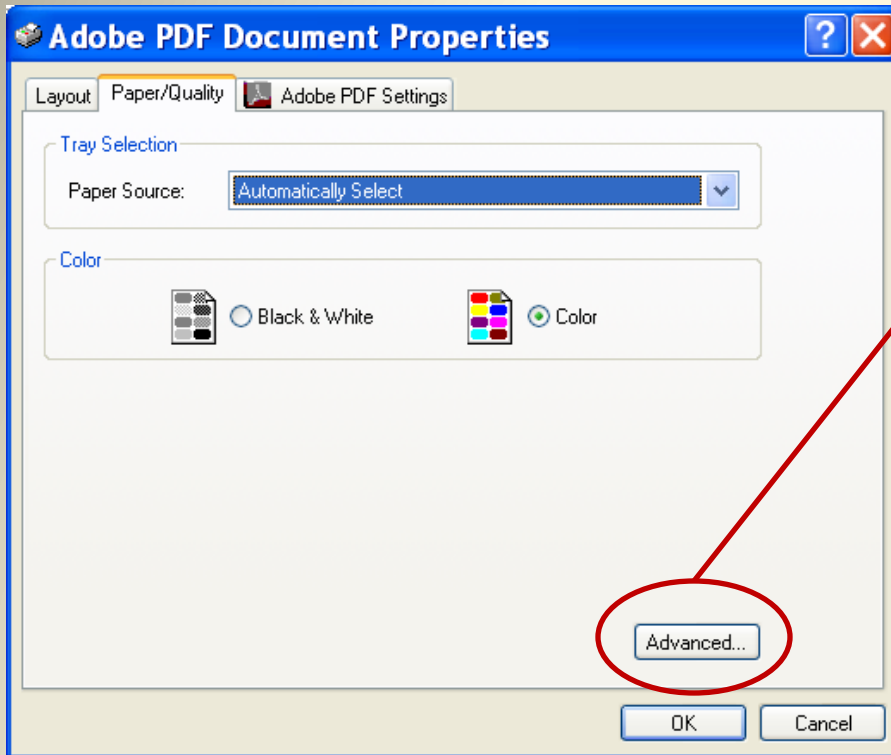
Orientation: Landscape

## 16b) PLS-CADD Adobe Print Setup continued...

### Paper/Quality Settings

Paper Source: Automatically Select

Color: Black and White or Color



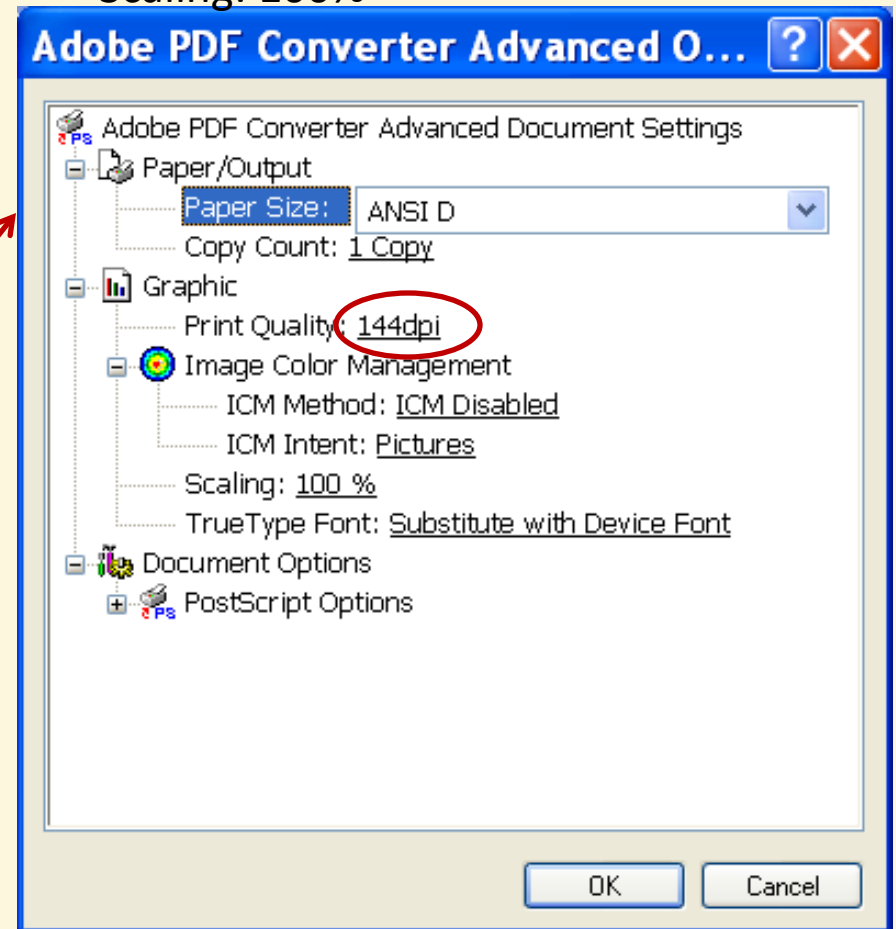
### Adobe PDF Converter Advanced

### Document Settings

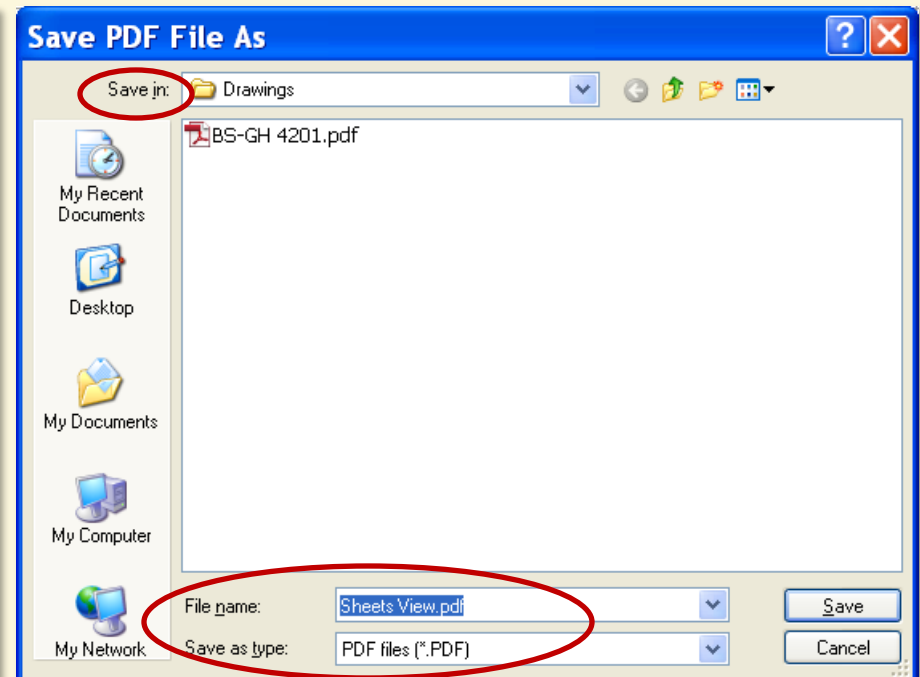
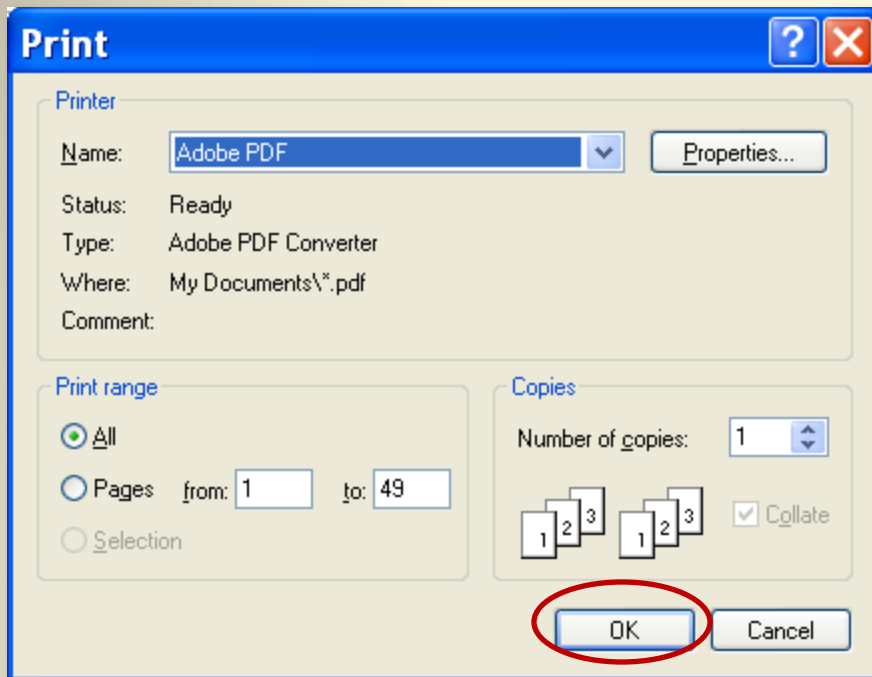
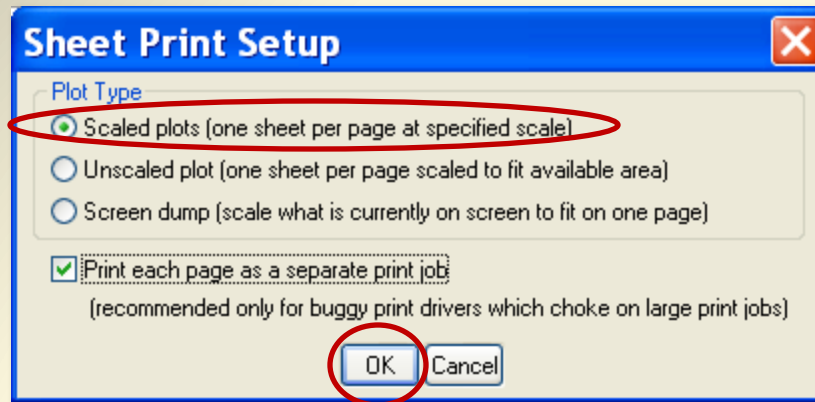
Paper Size: ANSI D

Print Quality: **144dpi**

Scaling: 100%

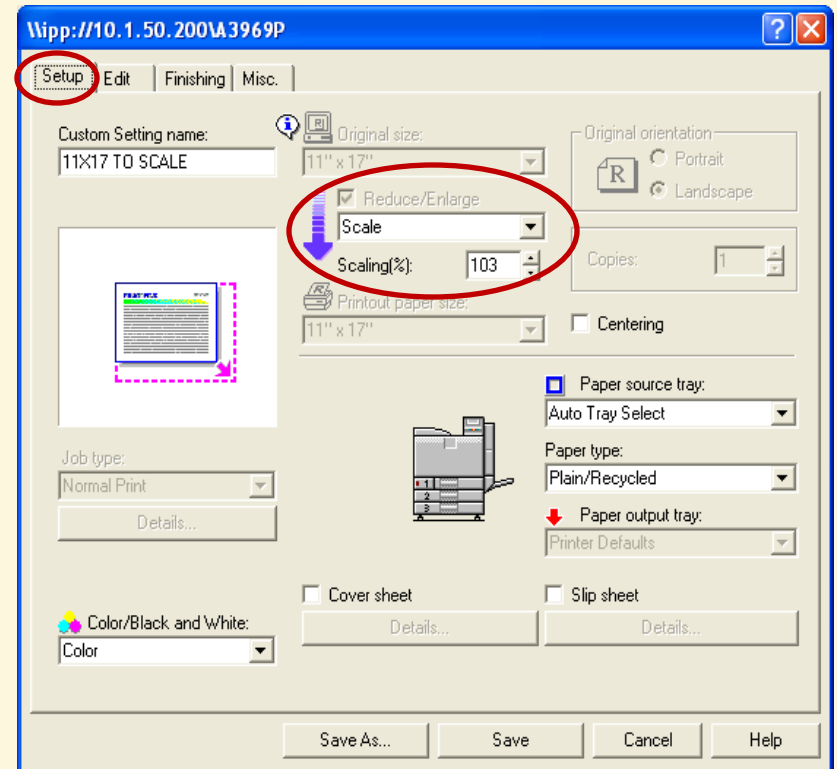
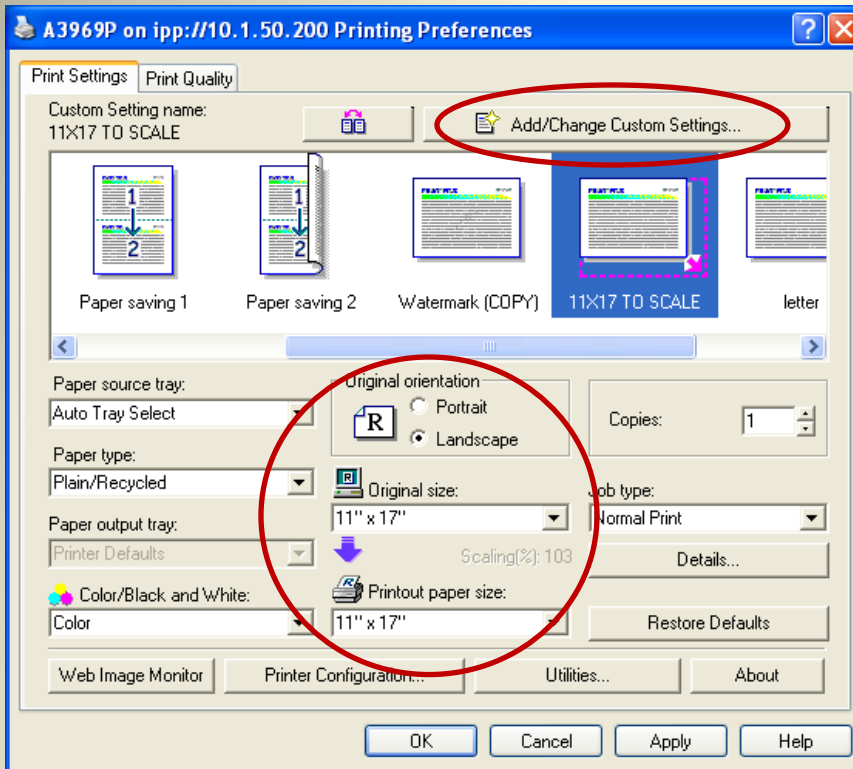


## 16c) PLS-CADD Adobe Print Setup continued...



## 16d) Print 1/2 size 11"x17" PDF drawings to Scale

We have found the following settings will create 1/2 size scaled prints of the Scaled PDF drawing .





**Thank you for Time.**

