



Ministry of  
Transportation  
and Infrastructure

## ELECTRICAL AND TRAFFIC ENGINEERING MANUAL

### **Section 700**

### **Drafting Standards**

Electrical and ITS Engineering

**January 2019**

**700 DRAFTING STANDARDS**

<b>701</b>	<b>INTRODUCTION .....</b>	<b>1</b>
	701.1 ABOUT SECTION 700 .....	1
	701.2 BEFORE YOU BEGIN.....	1
<b>702</b>	<b>DRAWING NUMBERING AND FILE NAMES .....</b>	<b>2</b>
	702.1 OLD DRAWING SERIES VS. NEW DRAWING SERIES.....	2
	702.2 DRAWING SHEET NUMBERING.....	2
	702.3 FILE NAMES – ELECTRONIC AND DRAWING SHEET .....	3
<b>703</b>	<b>STANDARD DRAWING SHEETS .....</b>	<b>4</b>
	703.1 GENERAL.....	4
	703.2 STANDARD DRAWING SHEET TITLEBLOCKS.....	4
	703.3 STANDARD DRAWING SHEET EDITING - GENERAL.....	4
	703.4 STANDARD DRAWING SHEET EDITING - TITLE BLOCK....	5
	703.5 STANDARD DRAWING SHEET EDITING - REVISIONS .....	5
<b>704</b>	<b>DRAWING LAYERS AND LINETYPES.....</b>	<b>7</b>
	704.1 GENERAL.....	7
	704.2 DRAWING LAYERS.....	7
	704.3 LINETYPES .....	9
<b>705</b>	<b>DRAWING SHEET LAYOUT .....</b>	<b>10</b>
	705.1 GENERAL.....	10
	705.2 SHEET LAYOUT FOR SMALL ELECTRICAL PROJECTS.....	10
	705.3 SHEET LAYOUT FOR LARGE ELECTRICAL PROJECTS .....	11
	705.4 SHEET LAYOUT FOR SIGNING & MARKINGS PROJECTS....	12
	705.5 KEY PLAN SHEETS.....	12
<b>706</b>	<b>SURVEY BASE PLAN DRAWINGS .....</b>	<b>14</b>
	706.1 GENERAL.....	14
	706.2 SURVEY BASE PLAN SCALE .....	14
	706.3 SURVEY BASE PLAN.....	14
	706.4 SURVEY BASE PLAN CONTENTS .....	14
	706.5 MODELSPACE AND PAPERSPACE .....	14
	706.6 EXTERNAL REFERENCE (X-REF) DRAWINGS .....	15
	706.7 VIEWPORTS.....	15
<b>707</b>	<b>SITE PLAN DRAWINGS .....</b>	<b>16</b>
	707.1 GENERAL.....	16
	707.2 TYPICAL SCALES .....	16
	707.3 SURVEY- RELATED SYMBOLS AND LABELS .....	16
	707.4 ELECTRICAL SITE PLAN SYMBOLS AND LABELS .....	18
	707.5 SIGNING & MARKING SITE PLAN SYMBOLS AND LABELS ...	22

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## TABLE OF CONTENTS

---

<b>708</b>	<b>POLE AND STRUCTURE ELEVATIONS.....</b>	<b>24</b>
708.1	GENERAL.....	24
708.2	ELEVATION SHEET LAYOUT.....	24
708.3	ELEVATION LABELING.....	25
708.4	CONCRETE BASES.....	25
708.5	LUMINAIRE POLE ELEVATIONS.....	25
708.6	SIGNAL POLE ELEVATIONS.....	25
708.7	SERVICE POLE ELEVATIONS.....	26
708.8	SIGN POLE ELEVATIONS.....	26
708.9	SIGN BRIDGE AND CANTILEVER ELEVATIONS.....	27
708.10	BREAKAWAY SIGN STRUCTURES.....	27
708.11	WOOD POST SIGN STRUCTURES.....	27
<b>709</b>	<b>ELECTRICAL DETAILS.....</b>	<b>28</b>
709.1	CONDUCTOR COLOUR CODE.....	28
709.2	SIGNAL OPERATION DIAGRAM.....	28
709.3	DETECTOR LOOP DETAILS TABLE.....	28
709.4	SERVICE WIRING DIAGRAM.....	28
709.5	LIGHTING DESIGN CRITERIA & LUMINAIRE TABLE.....	29
<b>710</b>	<b>DRAWING REVISIONS AND RECORD DRAWINGS.....</b>	<b>30</b>
710.1	DRAWING REVISIONS.....	30
710.2	TITLE AND REVISION BLOCK UPDATING.....	30
710.3	REVISION LABELING.....	30
710.4	RECORD DRAWINGS.....	31
<b>711</b>	<b>ELECTRONIC FILE STORAGE.....</b>	<b>32</b>
711.1	DRAWING STORAGE.....	32

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## TABLE OF CONTENTS

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### LIST OF TABLES

Table 1. Drawing Sheet Numbering Convention.....	3
Table 2. Electrical and ITS Standard Layers .....	8
Table 3. Survey Drawing (XREF) Colours and Layers.....	8
Table 4. Typical Scaling for Drawings .....	16

### LIST OF FIGURES

Figure 1. Drawing Sheet Numbering Convention .....	3
Figure 2. Example Title Block .....	6
Figure 3. Example Linetypes .....	9

### LIST OF APPENDICES

700.1 Standard Drawing Blocks
700.2 Sample Drawings

**Electronic versions of this manual and appendices available at:**

[http://www.th.gov.bc.ca/publications/eng\\_publications/electrical/electrical\\_and\\_traffic\\_eng/Electrical\\_Signing\\_Design\\_Manual/tableofcontents.htm](http://www.th.gov.bc.ca/publications/eng_publications/electrical/electrical_and_traffic_eng/Electrical_Signing_Design_Manual/tableofcontents.htm)

# 701 INTRODUCTION

## 701.1 ABOUT SECTION 700

- .1 Section 700 describes drafting standards established to ensure consistency in the creation of electrical, signing, and pavement marking drawings.
- .2 Electrical, signing, and pavement marking drawings are a separate set of drawings that share many common properties.
- .3 Drawings are produced electronically using AutoCAD™ Computer Aided Drawing (CAD) software. Electronic drawings are stored and distributed in the native AutoCAD™ format using “.dwg” filename extension. The Ministry of Transportation and Infrastructure (MoT&I) uses AutoCAD™ software exclusively for:
  - .1 Maintenance and development of drafting standards to ensure consistent format and presentation;
  - .2 Updating and revising existing drawings to accurately reflect modifications to infrastructure;
  - .3 Digitizing older, hand drafted drawings.
- .4 All examples references in this section can be found in Appendix 700.2.

## 701.2 BEFORE YOU BEGIN

- .1 Drafters shall confirm the current version of AutoCAD™ software being used by the ministry. Digital files are to be submitted in the ministry approved version only.
- .2 Efforts should be made to base new electrical designs on existing ministry drawings. If no existing drawings are available, a design should be started using a ministry template. The ministry requires that all drawings use standard symbols and details. A hardcopy of the library symbols and details are located in Appendix 700.1. An electronic copy can be downloaded from the ministry engineering website at:  
[http://www.th.gov.bc.ca/publications/eng\\_publications/electrical/electrical\\_and\\_trafic\\_eng/Electrical\\_Signing\\_Design\\_Manual/tableofcontents.htm](http://www.th.gov.bc.ca/publications/eng_publications/electrical/electrical_and_trafic_eng/Electrical_Signing_Design_Manual/tableofcontents.htm)
- .3 Before beginning, verify that you are using the current library. Note that the library contains some generic items that may require modifications.

## **702 DRAWING NUMBERING AND FILE NAMES**

### **702.1 OLD DRAWING SERIES VS. NEW DRAWING SERIES**

- .1 When drafting from an old design, determine if the new work is considered major or minor. If uncertain, contact ministry Electrical and ITS Engineering.
- .2 If revisions to existing designs are considered minor work (i.e., new curb return, pole relocation, etc.) use existing drawing TE- numbers.
- .3 If a complete re-design is required (i.e., new geometrics, all new conduit poles, etc.) a new drawing TE- number series will be required. Contact ministry Electrical and ITS Engineering for the new drawing TE- number series.

### **702.2 DRAWING SHEET NUMBERING**

- .1 A drawing series number as noted in Figure 1 is allocated to each project by ministry Electrical and ITS Engineering. This drawing number is described as follows:
  - .1 The prefix 'TE-' is used to designate electrical and signing installations.
  - .2 The first two digits to the right of the prefix indicate the year (96 = 1996, 00 = 2000, 18 = 2018) and the next three digits represent the sequence in that year (112 = 112th installation of the calendar year).
  - .3 The drawing number is suffixed with a sheet number and revision letter if required.
  - .4 Signing and pavement marking installations use the same naming convention as the Highway Design section.
- .2 The drawing sheet number and revision letter is placed on the bottom right corner of every sheet.

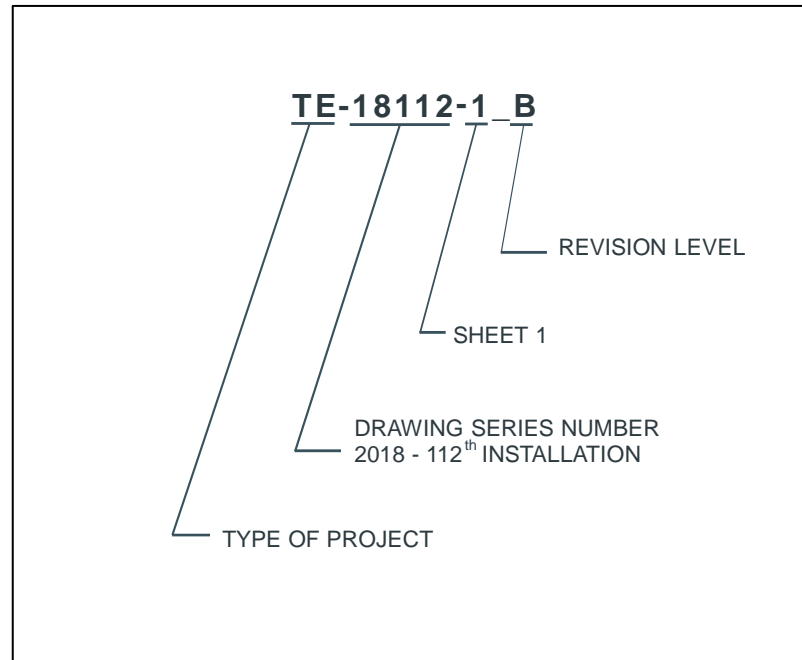


Figure 1. Drawing Sheet Numbering Convention

### **702.3 FILE NAMES – ELECTRONIC AND DRAWING SHEET**

- .1 The typical drawing number convention is shown in Table 1. Revised drawings are identified by adding the revision letter to the end of the drawing file name.
- .2 Electronic drawing file names are derived from the drawing series number as a five-digit drawing series number, with no prefix.

INSTALLATION TYPE	DRAWING SHEET NUMBER	COMPUTER FILE NAME
Signal and Lighting	TE-01112-14	01112-14
Signal and Lighting (Revised)	TE-01112-14_A	01112-14_A

Table 1. Drawing Sheet Numbering Convention

## 703 STANDARD DRAWING SHEETS

### 703.1 GENERAL

- .1 All electrical or signing and marking installation drawings are prepared using the template EITSE\_ATT.dwt.
- .2 Illustrations of the standard drawing title blocks are located in Appendix 700.1.
- .3 Examples of layering are located in Appendix 700.2.
- .4 Digital files of:

- .1 Drafting Library Blocks
- .2 Master Library Drawings
- .3 Templates and Linetypes
- .4 Base Sheets and Linetypes

in AutoCAD™ format can be downloaded from:

[http://www.th.gov.bc.ca/publications/eng\\_publications/electrical/electrical\\_and\\_traffic\\_eng/Electrical\\_Signing\\_Design\\_Manual/tableofcontents.htm](http://www.th.gov.bc.ca/publications/eng_publications/electrical/electrical_and_traffic_eng/Electrical_Signing_Design_Manual/tableofcontents.htm)

- .5 Drawing parameters such as layers, text style, linetypes, linetype scale factor, snap resolution, and system variables are defined in the templates. All ministry drawings must use the settings defined in these templates.

### 703.2 STANDARD DRAWING SHEET TITLEBLOCKS

- .1 The current EITSE\_ATT.dwt template file is used to create new drawings and update old drawings. It defines all allowable standards such as layers, text styles, linetypes, etc.
- .2 EITSE\_ATT.dwg shall not be modified and no other border drawings are to be used. EITSE\_ATT.dwg is to be inserted as a block in 'paperspace', at insertion point 0,0. STANDARD + LEGEND contains the legend and title block information and is for the plotting of sheet one only. STANDARD is to be used for all sheets other than sheet one.

### 703.3 STANDARD DRAWING SHEET EDITING - GENERAL

- .1 The EITSE\_ATT.DWT file contains the title block and revision block text entries that are edited on each drawing. These text entities are on their respective layers.
- .2 All text on electrical drawings is in upper case using the AutoCAD™ "Romans" font. No other fonts are to be used for the design. The border however, does use an Arial font. Descriptive text, such as callouts, dimensioning (including leaders), etc. is entered on the "E-TXT3" layer, 2.0mm in height, regardless of the rotation of the site plan. Text pertaining to the site plan (eg. roads, rivers, stationing, etc.) are rotated to match the site plan.



- .3 Single line callouts are shown using a dimension-leader with the Dimensioning System Variables set as in the templates supplied in Appendix 700.1. Multiple line callouts require the use of a facing bracket (a vertical line extending the depth of the lines of text) in conjunction with arrowhead leaders. Conduit callout brackets are to be as shown on sample drawings in Appendix 700.1.

#### **703.4 STANDARD DRAWING SHEET EDITING - TITLE BLOCK**

- .1 The title block section of “EITSE\_ATT.DWT” is edited to identify the following (refer to Figure 2):
  - .1 Line 1: Installation Type (e.g., SIGNAL AND LIGHTING INSTALLATION) as specified by the ministry representative.
  - .2 Line 2: Location of Installation (Highway number (“local name”) and cross street names).
  - .3 Line 3: City, Town or Area of Installation.
  - .4 Line 4: Drawing Contents, e.g., Site Plan - Notes - Wiring Diagram - Elevations - Details.
- .2 Sheet # of # - enter the sheet number and total number of sheets in the drawing series. Note that leading zeros are not used. (e.g., sheet 7 of 9, not sheet 07 of 09.)
- .3 District - enter the highway district number.
- .4 Region - enter the highway region number.
- .5 Drawing number - enter the drawing series number and sheet number as outlined in section 702.2
- .6 Revision - indicated by the text ‘CANCEL PRINTS BEARING PREVIOUS LETTER’ enter the current revision number. If it is the first issue of the drawing, add “.”.
- .7 Designed - enter designer’s initials (max 3 characters) and the month and year of the current design using 5 characters.
- .8 Quality Control - enter the reviewer’s initials (max 3 characters) and the month and year of the current design using 5 characters.
- .9 Quality Assurance - enter the engineer of record’s initials (max 3 characters) and the month and year of the current design using 5 characters.
- .10 Tran Electrical Design Review - To be hand initialed and dated by MoT reviewer
- .11 Seal - this space is reserved for the engineer of record to sign and seal the drawings.
- .12 CAD filename - enter the AutoCAD™ filename following the filenaming convention described in section 710.1

#### **703.5 STANDARD DRAWING SHEET EDITING - REVISIONS**

- .1 The revision block is edited for all drawings to include the following:

## STANDARD DRAWING SHEETS

- .1 Rev - enter the revision letter (unless it is the first issue of the drawing series, add “.”).
- .2 Date - enter the current month and year of installation or revision using 5 characters - e.g., DEC/10.
- .3 Description of why drawing was issued.
- .4 Drawn - enter the drafter’s initials.

REVISION LETTER (WHERE APPLICABLE)  
 5 CHARACTER ENTRY (EG. NOV/16)  
 DESIGNER'S FIRM LOGO IN THIS SPACE  
 3 CHARACTER ENTRY FOR COMPANY INITIALS  
 MINISTRY PROJECT NUMBER (WHERE APPLICABLE)  
 ACAD FILE NAME (18001-1\_A.dwg)

REGION PROJECT IS LOCATED  
 5 CHARACTER ENTRY (EG. NOV/18)  
 3 CHARACTER ENTRY FOR CONSULTANT EMPLOYEE INITIALS

**BRITISH COLUMBIA**  
**MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE**  
 ELECTRICAL AND ITS ENGINEERING

CAD FILENAME: XXXXX.dwg  
 PROJECT #: XXXXX

REV	DATE	REVISIONS	DRAWN
	MMM/YR	BRIEF PROJECT DESCRIPTION GOES HERE	→ XXX
A	MMM/YR	BRIEF PROJECT DESCRIPTION GOES HERE	XXX

TYPE OF INSTALLATION  
 HIGHWAY AT CROSS STREET CITY

DRAWING CONTENT

ELECTRICAL ENGINEER OF RECORD (FOR CURRENT REVISION) DATE:	SHEET NUMBER	DESIGNED	→ XXX	DATE	MMM/YR
	SHEET X OF X	QUALITY CONTROL	→ XXX	DATE	MMM/YR
		QUALITY ASSURANCE	→ XXX	DATE	MMM/YR
		TRAN ELECTRICAL DESIGN REVIEW		DATE	

SEAL

HWY.DIST REG DRAWING NUMBER  
 X X TE-18001-1 X

CANCEL PRINTS BEARING PREVIOUS LETTER

SHEET NUMBER  
 TOTAL NUMBER OF SHEETS  
 ENGINEER OF RECORD'S SEAL  
 HIGHWAY DISTRICT NUMBER  
 REGION NUMBER  
 REVISION LETTER (WHERE APPLICABLE)

Figure 2. Example Title Block

## **704 DRAWING LAYERS AND LINETYPES**

### **704.1 GENERAL**

- .1 Required drawing layering and linetypes for ministry electrical and signing and pavement marking drawings are described in the following clauses.

### **704.2 DRAWING LAYERS**

- .1 The layer colours, linetypes, and line weights for the electrical drawings are defined through the AutoCAD™ “BYLAYER” option; this shall be the only method used as it ensures all entities are on their proper layers. Only Survey plan layers are permitted to have more than one linetype and colour per layer.

- .1 Pen to line weight parameters are as follows:

<b><u>Pen No./Colour</u></b>	<b><u>Pen Width</u></b>
1 (Red)	0.25 mm
2 (Yellow)	0.35 mm
3 (Green)	0.50 mm
4 (Cyan)	0.70 mm
5 (Blue)	0.25 mm
6 (Magenta)	0.25 mm
9 (Grey)	0.25 mm
11 (Salmon)	0.01 mm
254 (Grey)	0.25 mm

- .2 Refer to Table 2 for a listing of commonly used layers.
  - .3 If it is necessary to create a new layer, use the naming convention outlined in Table 2 Electrical Drawing Layers

## DRAWING LAYERS AND LINETYPES

Layer	Colour	Line Type	Description
0	white	Continuous	Construction lines
C-ROAD-BARR-CONC	magenta	BAR-RB	Concrete barrier
E-COND-120V	cyan	120-240V	120/240V above/underground electrical conduit
E-COND-347V	cyan	347-600V	347/600V above/underground electrical conduit
E-COND-COMM	cyan	Communication	Above/underground communication conduit
E-DIMM-CNTR	red	Centerline	Dimension line (Center)
E-EQPT	red	Continuous	Electrical equipment
E-EQPT-FUTR	11	Dashed	Electrical equipment (Future)
E-EQUIP-HID	yellow	Hidden	Electrical equipment (Future/hidden EEYHI)
E-EQPT-RMOV	yellow	Smdots	Electrical equipment (To be removed/relocated)
E-POWR-OVHD	cyan	Continuous	Overhead conductors
E-SYMB-2	yellow	Continuous	Electrical symbols (EEYCO)
E-SYMB-3	green	Continuous	Electrical symbols (EEGCO)
E-SYMB-DA	yellow	Dashed	Electrical symbols (EEYDA)
E-TXT1	cyan	Continuous	Greater than 3.0mm text height
E-TXT2	green	Continuous	2.5mm text height
E-TXT3	yellow	Continuous	2.0mm text height
TITLEBLOCK	cyan	Continuous	Titleblock
V-RAIL	10	EXST-RAIL	Railways
VIEWPORT	white	Continuous	Viewport layer
X-REF	white	Continuous	X-REF's only

Table 2. Electrical and ITS Standard Layers

Layer	Colour	Line Type	Description
CE-ROAD-SIGN	254	Retain Civil LT	Stop bars, crosswalks and chevrons (bordered by a 0.25mm line)
CE-ROAD-EDGE	yellow	Retain Civil LT	Edge of pavement and misc. geometrics
CE-ROAD-SHDR	yellow	Retain Civil LT	Edge of gravel shoulder
CE-ROAD-RMOV	yellow	Retain Civil LT	Edge of pavement to be removed
CE-CTRL-STNM	green	Retain Civil LT	Control lines and station markings
CE-UTIL-UGND	11	Retain Civil LT	Underground utilities
CE-PPTY-BRDR	yellow	Retain Civil LT	Property lines
CE-LNED-LINE	9	Retain Civil LT	All lane lines and edge of lane lines

Table 3. Survey Drawing (XREF) Colours and Layers

### **704.3 LINETYPES**

- .1 For linetypes, use those supplied in the file “EEC.LIN”. Refer to the softcopy (digital file) of the symbols library in Appendix 1000.
- .2 The global linetype scale factor of 1.0 is used in electrical drawings.

<u><b>LINETYPE NAME</b></u>	<u><b>EXAMPLE:</b></u>
CENTER (CE)	-----
COMMCOND (COM)	-----
CONTINUOUS (CO)	-----
DASHED (DA)	-----
FUTURE (FU)	.....
HIDDEN (HI)	-----
PHANTOM (PH)	-----
SMDOTS (SM)	.....
TECK (TEC)	-----
TELEPHONE (TEL)	-----
120/240V (120)	-----
347/600V (347)	-----
PAINT LINE (P250) (1:250 SITE PLAN)	-----
PAINT LINE (P500) (1:500 SITE PLAN)	-----
CONTINUITY (C250) (1:250 SITE PLAN)	-----
CONTINUITY (C500) (1:500 SITE PLAN)	-----
<b>NOTE:</b> LETTERS ENCLOSED IN PARENTHESIS ( ) DENOTE ABBREVIATIONS FOR LINETYPES USED IN LAYER NAMES.	

Figure 3. Example Linetypes

## 705 DRAWING SHEET LAYOUT

### 705.1 GENERAL

- .1 Guidelines for the layout of drawings are as follows:
  - .1 The electrical legend is only presented on Sheet 1 of each drawing series.
  - .2 Location Plan and (if necessary), Sheet Key Plan (for large projects) and sheet index (for large projects) shall be placed on Sheet 1.
  - .3 Installation notes are placed on the first site plan sheet with enough space to accommodate them. The location of the notes is referenced on all other sheets.
  - .4 The colour code is typically placed on the site plan sheet identifying the service panel.
  - .5 Refer to the following sections and the examples shown in Appendix 700.2 for details.

### 705.2 SHEET LAYOUT FOR SMALL ELECTRICAL PROJECTS

- .1 The following are examples of drawing sheet layouts for small projects. The scale information enclosed in square brackets [ ] is for reference only and is not included in the drawing sheet title.
  - .1 Conduit and Junction Box Installation.
    - .1 Sheet 1: Site Plan [1:500] - Notes - Details
  - .2 Lighting Installation.
    - .1 Sheet 1: Site Plan [1:500] - Notes
    - .2 Sheet 2: Wiring Diagram - Elevations - Details
  - .3 Traffic Signal and Lighting Installation
    - .1 Sheet 1: Site Plan [1:500] - Notes
    - .2 Sheet 2: Site Plan [1:250] - Colour Code
    - .3 Sheet 3: Elevations - Wiring Diagram - Details
  - .4 Signing and Marking Installation
    - .1 Sheet 1: Site Plan [1:500] - Key Plan - Notes - Sign Listing
    - .2 Sheet 2: Elevations- Details
- .2 The inclusion of the wiring diagram and colour code on the site plan sheet, though preferable, is dependent upon the length of the roadway approaches to the signalized intersection. A traffic signal installation complete with advance warning signs generally requires two site plan sheets. Therefore, the wiring diagram, together with the elevations and installation details are placed on succeeding sheets. The colour code is placed on the 1:250 site plan sheet detailing the electrical wiring at the traffic controller.

**705.3 SHEET LAYOUT FOR LARGE ELECTRICAL PROJECTS**

- .1 Large Lighting Projects.
  - .1 Large lighting projects are presented at 1:500 scale using the basic layout technique of including the wiring diagram, colour code and service pole elevation on the site plan sheet identifying the location of the electrical service. The colour code and service pole elevation are included in the term “Details” in the drawing sheet title.
  - .2 The following is an example drawing sheet layout for a large lighting project. Information enclosed in square brackets [ ] is for reference only and not included in the drawing sheet title.
    - .1 Sheet 1: Location Plan - Key Plan - Notes
    - .2 Sheet 2: Site Plan
    - .3 Sheet 3: Site Plan - Wiring Diagram - Details [Service 1]
    - .4 Sheet 4: Site Plan
    - .5 Sheet 5: Site Plan - Wiring Diagram - Details [Service 2]
    - .6 Sheet 6: Site Plan - Wiring Diagram - Details [Service 3]
- .2 Large Lighting Projects with Signalized Intersections:
  - .1 Large lighting projects with signalized intersections are also laid out in consecutive order at 1:500 scale.
  - .2 A site plan enlargement reference box is drawn around the 1:500 scale signalized intersection site plan (on layer “E-TXT1”). The reference box area contains only the basic signal layout details, including the following:
    - .1 Traffic signal and luminaire pole locations.
    - .2 Service panel location.
    - .3 Traffic controller location.
    - .4 Luminaire Circuit Numbers / Wattage
    - .5 PEC location.
    - .6 Junction box and type.
    - .7 Conduits.
    - .8 Island flashers
  - .3 Signal wiring, phase identification, and installation detail labeling are not shown in this area.
  - .4 Cross-reference notes shall be added to the 1:500 scale site plan indicating “REFER TO SHEET X FOR SITE PLAN ENLARGEMENT” and “REFER TO SHEET X FOR WIRING DIAGRAM AND DETAILS”.
  - .5 An “enlargement reference box” is drawn around the necessary portion of the signalized intersection on the 1:500 scale site plan. This area is duplicated, enlarged to 1:250 scale and inserted onto a separate drawing sheet along with the colour code. This is to be followed by its respective elevation and detail sheet at the end of the project. The 1:250 scale site plan enlargement is shown enclosed within the same reference box lines

shown on the 1:500 scale site plan. The 1:250 box is cross-referenced to the 1:500 box with a match line and the text “FOR CONTINUATION SEE SHEET X” on layer “E-TXT2” at height of 2.5 on each side where the electrical continues on the 1:500 drawing.

- .6 The following are examples of drawing sheet layouts for a large lighting project with signalized intersections. Information enclosed in square brackets [ ] is for reference only and not included in the drawing sheet title.
  - .1 Sheet 1: Location Plan - Sheet Key Plan - Notes
  - .2 Sheet 2: Site Plan [1:500] - Elevations [Typical Luminaire]
  - .3 Sheet 3: Site Plan [1:500] - Wiring Diagram - Details [Lighting]
  - .4 Sheet 4: Site Plan [1:500] [Signal]
  - .5 Sheet 5: Site Plan [1:500] - Wiring Diagram - Details [Lighting]
  - .6 Sheet 6: Site Plan Enlargement [1:250] Wiring Diagram [Signal]
  - .7 Sheet 7: Elevations - Details [signal elevations, detector loop details, signal display, etc.]

#### **705.4 SHEET LAYOUT FOR SIGNING & MARKINGS PROJECTS**

- .1 The following is an example of a drawing sheet layout for signing and marking projects. The scale information enclosed in square brackets [ ] is for reference only and is not included in the drawing sheet title.
  - .1 Sheet 1: Site Plan [1:500] – Notes
  - .2 Sheet 2: Elevations - Details

#### **705.5 KEY PLAN SHEETS**

- .1 Key plan sheets are required for large projects extending over multiple site plan drawing sheets. Key plan sheets are required to serve as a quick reference for locating specific areas of the project by sheet number and for providing an overall view of the drawing sheet layout of the project. This is particularly true of interchange lighting projects where site plans tend to become fractured due to the limitations of the drawing sheet size. The key plan sheet shall contain the following:
  - .1 Notes - typical notes for entire project.
  - .2 Sheet Index - list of drawings by number with the exact title of each sheet.
  - .3 Project Location Map - a small map of the area to identify where the project is located.
  - .4 Sheet Key Plan - details the location of each site plan relative to the entire project.
- .2 The sheet layout is prepared using the project control line extracted from the roadworks plans. Boxes delineating the extents of each drawing sheet are then placed in consecutive order along the control line and labeled with the



corresponding sheet number. The sheet layout plan is completed to include the following:

- .1 Station numbers. (100 m intervals only).
  - .2 Highway number and/or name.
  - .3 Cross street names.
  - .4 Limits of Construction.
- .3 The presentation scale of the sheet key plan is optional, depending on the overall length of the project and availability of space on the drawing sheet. However, a formal scale should be used (E.G. 1:2000).
- .4 Separate key plan sheets are required for electrical and signing and markings drawing series.

## **706 SURVEY BASE PLAN DRAWINGS**

### **706.1 GENERAL**

- .1 Electrical and signing and markings site plans are generated from survey base plans. When no surveyed file is available the consultant is to create the base file from resources available.
- .2 The use of an externally referenced PDF can be used as a base plan when no CAD file is available.
- .3 The EITSE\_ATT.DWT file contained in the drafting standards library is used as a starting point when digitizing plans. This file is configured to include layers and drawing parameters set to ministry standards.
- .4 The use of an external reference (x-ref) is recommended. Refer to section 706.6 for more details.

### **706.2 SURVEY BASE PLAN SCALE**

- .1 Survey base plan x-refs are in metric units (millimetres) to 1:1000 scale.

### **706.3 SURVEY BASE PLAN**

- .1 Survey base plan x-refs are laid out so that the primary highway is run horizontally across the page with the cross streets run on the vertical when possible.

### **706.4 SURVEY BASE PLAN CONTENTS**

- .1 Survey base plan x-refs contain only the roadway geometrics, roadway paint markings and site layout details as described by layer in Chapter 704. Refer to the Manual of Standard Traffic Signs & Pavement Markings for complete guidelines of roadway paint markings and delineation.
- .2 There are to be no electrical symbols on submitted x-ref base plans. The layers these locative marks are on are turned off once the appropriately sized symbols are inserted into the drawing.

### **706.5 MODELSPACE AND PAPERSPACE**

- .1 The use of modelspace and paperspace in MoTI drawings is recommended. Everything in modelspace should be drawn at 1:1000 and everything in paperspace should be drawn at presentation scale (1:500, 1:250).
- .2 The drawing's modelspace will contain the survey base plan x-ref (1:1000). The use of an External Reference "X-ref" drawing is recommended. The civil base should be prepared with the standard MoTI drafting layers. All other information should be drawn on paperspace.

- .3 The use of multiple layout tabs will be accepted as an alternative to creating individual drawing files for each sheet. (e.g. a drawing series with three sheets could be condensed into one single .dwg file with three layout tabs).

### **706.6 EXTERNAL REFERENCE (X-REF) DRAWINGS**

- .1 Only one main x-ref should be used per project. All survey and Civil design should be included in the one file. If multiple x-refs are required they should be nested into one main x-ref which is then inserted into the design drawing.
- .2 When attaching the x-ref drawing to the design drawing, they should be located in the same folder. Ensure that the “retain path” is not checked in the x-ref Manager dialogue box.
- .3 X-ref drawing file names shall follow the same method as noted in Section 702.3 with exception of adding “-xref” at the end instead of the sheet number. (e.g., 18112-xref.dwg).
- .4 Set the User Coordinate System (UCS) in the x-ref drawing to “world”.
- .5 X-ref civil or survey base plan drawings should be inserted at 0,0 in modelspace of the design drawing. X-ref files shall be inserted on layer “X-REF”
- .6 X-ref drawings must be included with any digital drawing submissions to MoTI.

### **706.7 VIEWPORTS**

- .1 Viewports should use one of the typical MoTI scales for site plans as noted in Section 707.2 (i.e., 1:500, 1:250) depending on the type of Project.
- .2 Lock the viewport after the creation of all viewports. This ensures that the scale is not accidentally changed.
- .3 Set the "psltscale" to 1. This will ensure all linetype scales match between the site plan in modelspace and the viewport in paperspace.
- .4 Viewports shall be inserted on layer “VIEWPORT”. By default, this layer is not configured to plot

## 707 SITE PLAN DRAWINGS

### 707.1 GENERAL

- .1 When preparing any site plan drawings, the drafter shall use the standard library symbols located in Appendix 700.1.
- .2 Separate site plan drawings are required for electrical and signing and markings installations. These drawings are defined as follows:
  - .1 Electrical - Represent any installation with electrical equipment. This shall include any sign poles or structures with electrical equipment.
  - .2 Signing and Markings - These drawings show all signs and markings. Sign poles or structures with electrical equipment are shown on the electrical drawings and duplicated on the signing and markings drawings.

### 707.2 TYPICAL SCALES

- .1 Project drawings are constructed at presentation scale on the EITSE\_ATT.DWT Standard Template Sheet.
- .2 Plot scale is always set at 1:1.
- .3 Presentation scales for Site Plans (Viewports) are listed in Table 3

TYPE OF INSTALLATION	REQUIRED SCALE
Traffic Signal (Electrical)*	1:500 + 1:250
Lighting (Electrical)	1:500
Flashing Beacon (Electrical)	1:500
Pre-Duct (Electrical)	1:500
Signing and Pavement Markings	1:500
* Traffic signals include pedestrian and fire signals	

Table 4. Typical Scaling for Drawings

### 707.3 SURVEY- RELATED SYMBOLS AND LABELS

- .1 Once the survey base plan x-ref is positioned on modelspace (EITSE\_ATT.DWT), the following items will be added, as required. Refer to Appendix 700.1 for examples.
  - .1 North Arrow: - A north arrow shall be located in the top left-hand corner of the site plan and shall be inserted at 1:1 scale for both 1:250 and 1:500 site plans.

- .2 Installation Notes: - The appropriate installation “Notes” block, shall be inserted on a site plan drawing and modified, as required.
- .3 Posted Speed Note: - All electrical drawing sheets with site plans are to include posted speed information.
- .4 Miscellaneous Notes: - The appropriate notes shall be inserted on the site plan drawing and modified as required.
- .5 Roadway Geometrics Identification: - The following roadway geometric information, where applicable, shall be identified only once on each site plan drawing. If possible, the callouts should be grouped together on the left side of the site plan:
  - .1 Lane edge (Typ.).
  - .2 Edge of pavement (Typ.).
  - .3 Gravel shoulder (Typ.) or curb and gutter (Typ.).
  - .4 Existing roadway (Typ.).
  - .5 Future roadway (Typ.).
  - .6 Concrete roadside or median barriers.
  - .7 Property lines.
- .6 Other Site Plan Labeling - Items such as rivers and bridges located in the construction area are identified on the site plan on layer “E-TXT2”, 2.5 mm height and underscored.
- .7 Control Line and Station Numbers: - These markings should be on the survey base plan. Station Control line stationing are located at 20m intervals and labeled every 100m. Numbers shall be applied as follows:
  - .1 Station numbers identify the location of luminaire and traffic signal poles, poles located in traffic islands and sign structures, with respect to the construction control line. Station numbers are positioned behind the concrete base symbol and rotated at the same angle as the pole, generally perpendicular to the control line.
  - .2 Station numbers are rounded to the nearest metre, e.g., 105+02. If needed for clarity, it can be rounded to the nearest 0.5 metre.
  - .3 Rotation of station number text entries are entered as illustrated in Figure 4.
  - .4 The letters “Sta” are not required.
  - .5 Station numbers are only to appear when objects are being installed, relocated or removed. Station numbers are not required next to objects not being affected by a design.
- .8 Roadway Pavement Markings - Shall be added in accordance with the ministry *Manual of Standard Traffic Signs and Pavement Markings*. Typical pavement symbols have been developed and are shown in Appendix 700.1. When presenting pavement markings, make note of the following:

- .1 Directional arrows are inserted centered in the traffic lane and rotated at an angle parallel to the lane line. Generally, there are two arrows per turn slot, positioned three to five metres from each end.
- .2 Not all pavement markings are included on electrical installation drawings, therefore a paint marking exclusion note (stamps\_att.dwg) is added to all site plans. Dedicated left and right turn directional arrows are included, while “straight through” direction arrows are omitted.
- .3 On 1:250 scale drawings left turn arrows for signal site plan drawings are moved back from their actual locations so that detector loops are not obscured.
- .4 Linetypes shall be as noted in Figure 3 or as noted in the ministry *Highway Design Manual* Section 1200.
- .9 Road Names - Highway number and name, if applicable and cross-street names are entered on the site plan on layer “E-TXT2”, 2.5 mm height as follows:
  - .1 The ministry standard for highway identification is “Highway”, not route (e.g., Highway 3A, not Route 3A). Exceptions include unnumbered highways such as the Inland Island Highway and numbered highways identified locally with proper names such as Highway 7 (Lougheed Highway).
  - .2 The primary roadway name (e.g., Highway 22) is preferably located at the far left of the site plan. The text entries for both primary and cross street names are rotated to the same angle as the roadway lane lines.
- .10 Roadway Destination Indicators: - Roadway destinations such as “← To Whistler” or “To Vancouver →”, are identified on the primary highway at the extreme left and right-hand sides of the roadway, in the direction of travel. For multiple site plan projects, the destination indicators are identified on all site plan sheets. For roadway destination labels, refer to Appendix 700.1.
- .11 Title and Scale Identification: - Each site plan is labeled with the site plan reference and the scale. For site plan label, refer to Appendix 700.

### **707.4 ELECTRICAL SITE PLAN SYMBOLS AND LABELS**

- .1 Wiring Notes:
  - .1 All wiring and conduit shall be identified on the site plan drawings.
  - .2 Leaders are used for single conduit runs. For leaders identifying multiple conduit runs an ellipse shall surround the conduits. The leader directing to this ellipse shall have no arrowhead.
  - .3 Site plan conduit and wiring callouts and leaders are drawn on layer “E-TXT2”.
  - .4 The following list illustrates the order in which conductors are to appear within the wiring and conduit brackets:

- .1 Cont Pwr (Controller Power)
  - .2 Emerg Pre-empt Pwr (Emergency Pre-empt Power)
  - .3 O/C Sign Pwr (Open/Close Sign Power)
  - .4 Irr Pwr (Irrigation Power)
  - .5 Lum (Luminaire)
  - .6 PEC (Photo Electric Cell)
  - .7 Sig (Signals)
  - .8 Sig Neut (Signal Neutral)
  - .9 Adv Warn Flash No XX (Advance Warning Flasher No. XX)
  - .10 Is Flash (Island Flasher)
  - .11 Comm (Communication Intertie)
  - .12 Tel (Telephone) - obsolete
  - .13 Emerg Ind Lt (Emergency Indication Lights)
  - .14 Emerg Pre-empt Intercon (Emergency Pre-empt Interconnect)
  - .15 Emerg Pre-empt Sensors (Emergency Pre-empt Sensors)
  - .16 Rail Pre-empt Inter (Rail Pre-empt Interconnect)
  - .17 Rail Signing (Blankout sign)
  - .18 Loops (Detector Loops)
  - .19 Bond (Bonding Conductor)
  - .20 Ground (To ground plate, where applicable)
- .2 Service and Distribution Panels - The two main types of service used by the ministry for roadway signals and lighting are the overhead drop service and the underground dip service.
- .1 The symbols “PANEL” and “SERDISC” are used to locate the electrical service equipment on the ministry pole and Hydro utility, respectively. Refer to Appendix 700.1.
  - .2 The service panel or distribution panel and corresponding service disconnect panel are numbered and labeled on the site plan.
- .3 Division of Services - The division of services on projects with multiple services are indicated using the symbol “SERDIV” which clearly delineates the end of one service and the beginning of the next. Refer to Appendix 700.1.
- .4 Junction Boxes - Are represented by the generic “JB” symbol as shown in Appendix 700.1. The junction box type is identified by adding the appropriate JB number (e.g., 10, 11, 12, etc.) next to the JB symbol.
- .5 Concrete Junction Boxes - Are represented by the generic “CJB” symbol with the letters “CJB” beside it.
- .6 Conduit - drawn as follows:
- .1 By layer, according to purpose, such as 120/240V or Communication. Refer to Table 2 for a complete listing of conduit layers by application.

- .2 Dual conduit runs are drawn at an offset of 1.0 mm for both 1:250 plans and 1:500 plans and are centered on centre of junction box symbol. Triple and quadruple conduit runs are drawn in the same manner. Refer to Sample Drawings in Section 700.2 for depicting 3 or more conduits connecting to the junction box symbol.
- .7 Concrete Bases - Concrete bases are represented by the generic “circle” symbol integrated with the appropriate signal, luminaire or sign pole symbol. Refer to Appendix 700.1.
- .8 Luminaire Poles - All luminaire poles are represented by the generic “LT” symbol. Refer to Appendix 700.1. When presenting luminaire poles make note of the following:
  - .1 The symbols are inserted on the site plan perpendicular to the roadway.
  - .2 Each luminaire is identified with a luminaire number, wattage, LED label, and distribution type. Refer to Appendix 700.1.
- .9 Highmast Lighting - When presenting highmast lighting poles, note the following:
  - .1 The symbol requires the outline of the concrete base and the orientation of the luminaire optical system to be specified.
  - .2 Each luminaire shall be identified with the luminaire number, wattage, LED label, and distribution type.
- .10 Photo Electric Cell (PEC) – PEC`s are mounted on the service pole of the installation or on the closest luminaire pole to the service. The letters “PEC” are placed next to the appropriate pole to show its location. Generally there is one PEC per lighting service.
- .11 Frangible and Breakaway Bases – Poles equipped with frangible bases are designated by the letter “F”, which is placed next to the concrete base symbol. Poles equipped with breakaway bases are designated by the letter “B”, which is placed next to the concrete base symbol.
- .12 Traffic Signal Poles – when presenting signal poles make note of the following:
  - .1 Blocks are inserted onto the 1:250 scaled drawings and the line representing the arm is stretched to suit the desired reach. Arm length for poles is measured from the centre of the circle representing the base of the pole, for this purpose.
  - .2 The total arm length is labeled alongside the pole symbol on the 1:250 site plan. It is centered over the pole arm reach and entered on layer “E-TXT3”, 2.0 mm height. See Appendix 700.1 for example.
  - .3 Types 4, 4A and 5 signal posts symbols are edited, as required, to correspond with the number of signal heads side-mounted on the post. Refer to Appendix 700.1.
  - .4 Each traffic signal pole is individually numbered on the site plan in a clockwise manner, starting with the signal pole in the traffic controller quadrant. Refer to Appendix 700.1.



- .13 Signal and Pedestrian Heads - Are represented using the symbol “ahead.dwg”, which indicate primary and secondary heads respectively. Refer to Appendix 700.1. The symbols are inserted onto the signal pole symbol and rotated to the appropriate angle in the direction of the movement that the signal head is controlling. As shown on Figure 7, a letter designation such as A1, B2, PA2, is then placed next to the “signal\_head\_front\_att.dwg” symbol to identify the phase the signal head represents.
  - .1 Signal head tunnel visors shall be shown on both the site plan and elevation drawings with a “(T)”.
  - .2 Audible pedestrian signal indications are shown on the drawings to include “(a)” appended to the signal head designation on both the site plan and elevation.
- .14 Advance Warning Signs - Are installed on sign poles and are represented by the dynamic block “sign\_post\_att”. Refer to Appendix 700.1. When presenting advance warning signs, make note of the following:
  - .1 The advance warning sign number, such as No. A1, No. A2 written beside each pole as “ADVANCE WARNING SIGN No. 1”.
  - .2 The advance warning sign distance. In the case where an intersection is enlarged to a 1:250 scale site plan from a 1:500 scale layout, the advance warning sign distance is shown on both site plans.
  - .3 Approach grade is noted on both 1:250 and 1:500 traffic signal site plans.
- .15 Post Mounted Flashers - are represented by the symbol “FLASHER”. Refer to Appendix 700.1.
- .16 Traffic Controllers and Uninterruptible Power Supply (UPS) - The traffic controllers and UPS are to be labeled only on the 1:250 site plans.
- .17 Vehicle Detector Loops - four types of loops are presently utilized by the ministry Diamond, Round, Pre-formed and Rectangular. When presenting detector loops, make note of the following:
  - .1 Quadrupole Loop - symbol “LOOP” represents the obsolete standard detector loop and is used only when drafting existing installations.
  - .2 Loop Number Assignment - All loops shall be labeled starting at the traffic controller and numbered sequentially clockwise. Detector loops are labeled only on the 1:250 site plan. If the loops only appear on the 1:500 site plan, they are to be numbered there.
- .18 Emergency Vehicle Pre-emption - Siren, strobe, radio and digital cellular activated pre-emption systems are represented with the appropriate block as shown in the Drafting Standards Drawings, in Appendix 700.1. Sample project drawings illustrating the current electrical design and drafting presentation standards, for each type of emergency pre-emption system, are included in Appendix 700.1.
- .19 Railroad Pre-emption - Sample projects illustrating the current electrical design and drafting presentation standards for railroad pre-emption systems, including

designs with and without fibre-optic turn restriction signs, are included in Appendix 700.1.

- .20 Short Count Stations - Refer to Appendix 700.1 for drawing detail.
- .21 Permanent Count Stations - Refer to Appendix 700.1 for example drawings.
- .22 Proposed Electrical Equipment - such as poles and junction boxes are shown as inserted.
- .23 Existing Electrical Equipment:
  - .1 Poles, junction boxes and conduits are shown as inserted or drawn. The note block “ALL EQUIPMENT IS EXISTING EXCEPT WHERE NOTED” is placed on the drawing. Only objects being modified are tagged with “INSTALL”, “RELOCATE”, and “REV. [LETTER]”, when applicable, etc.
- .24 Existing Electrical Equipment to be Removed or Relocated - including conduit runs, are drawn on layer “E-EQPT-RMOV”, and labeled accordingly.

## **707.5    SIGNING AND MARKING SITE PLAN SYMBOLS AND LABELS**

- .1 Luminaire Signal and Sign Poles, Sign Bridge and Cantilever Structures - are shown on the signing and markings drawings using the appropriate symbols from drawing located in Appendix 700.1. When preparing drawings, make note of the following:
  - .1 Sign poles and structures with electrical equipment are shown on both the electrical and signing and markings drawings.
  - .2 Each sign pole and structure shall be individually numbered and labeled from the beginning to the end of the project to match electrical drawings.
  - .3 Each sign pole shall display the sign message. The sign faces should be shown on the 1:500 site plan. The sign face shall be oriented to face the flow of traffic. Refer to Appendix 700.1.
  - .4 Electrical information such as luminaire wattages, and circuit numbers are not shown on the signing and markings drawings.
  - .5 Electrical information is generally shown on the electrical drawings only.
- .2 Pole Mounted Signs - Smaller signs mounted on the shaft of a pole are represented by the “SNPT” symbol. Refer to Appendix 700.1.
- .3 Breakaway Sign Structures - are represented by the symbols “BRSN2” and “BRSN3” located in Appendix 700.1. Each breakaway sign structure shall be individually numbered and labeled “SNOTE4” and shall display the sign message as shown in Appendix 700.1.
- .4 Wood Post Sign Structures - are represented by the symbols “WP1” and “WP3” located in Appendix 700.1. Each multi leg wood post shall be individually numbered and labeled from the beginning to the end of the project with label “SNOTE5” and shall display the sign message shown in Appendix 700.1.

- .5 Perforated Square Steel Sign Structures - are represented by the symbols “SS1” and “SS2” shown in Appendix 700.1.
- .6 Round Steel Sign Structures - are represented by the symbols “RS1” shown in Appendix 700.1.
- .7 Barrier Mounted Sign Structures - are represented by the symbols “BSMCMB” and “BMCRB” shown in Appendix 700.1.
- .8 Signs With Flashing Luminares - sign posts with flashing amber luminaires shall be shown on both the signing and marking and electrical drawings and shall be labeled “For Information Only”. Refer to Electrical drawings on the signing and markings drawings.
- .9 Delineators - are represented by the symbols “STLTD”, “WPD” and “SSD” shown in Appendix 700.1. Each delineator shall show the number and colour of the reflectors, for example 1W for one white reflector, 3Y for three yellow reflectors.
- .10 Raised Pavement Markings - are reflectors mounted on pavement and/or concrete barriers and are represented by the symbols located in Appendix 700.1.
- .11 Sign Listing Table - each drawing series shall have a sign listing table indicating all required permanent signs. This listing table shall include ministry sign numbers, description of message, quantity and any mounting hardware normally supplied by the sign shop. Mounting hardware shall include J clips, aluminum T section and angle iron supports. The sign listing table block is in Appendix 700.1.

## 708 POLE AND STRUCTURE ELEVATIONS

### 708.1 GENERAL

- .1 All signal, lighting, sign poles and structures with electrical equipment are shown on the electrical elevation drawings. Sign poles and structures with no electrical equipment may be shown on electrical design drawings at the request of the Traffic Engineer.
- .2 Elevations are generally on the electrical drawings for the following:
  - .1 Each service pole.
  - .2 Each signal pole.
  - .3 Each advance warning sign pole.
  - .4 Each sign pole (with electrical equipment).
  - .5 Each luminaire pole type and mounting arrangement.
  - .6 Each pole with telephone demarcation panel.
  - .7 Each pole with emergency panel/indication lights.
  - .8 Each cantilever sign structure (with electrical equipment).
  - .9 Each sign bridge structure (with electrical equipment).
  - .10 Each sign mounted on an over/underpass structure (with electrical equipment).
  - .11 Any special poles or structures.
- .3 Elevations are generally required on signing and markings elevation drawings as follows:
  - .1 Each sign pole and structure with no electrical equipment.
  - .2 Each multiple leg wood post sign structure.
  - .3 Each breakaway sign structure.
- .4 Elevations are assembled from the ground upwards, starting with the concrete base. Each additional component of the pole or structure is inserted using AutoCAD™ “Osnap” exploded and trimmed as necessary. Elevations are oriented in such a way that the overhead primary signal heads or signs face forward (approach view).

### 708.2 ELEVATION SHEET LAYOUT

- .1 Pole and structure elevations are laid out across the drawing sheet from left to right in the order in which they are labeled on the site plan.
- .2 All elevations are drawn to a standard scale of 1:75
- .3 Sign structures with electrical shall generally be shown on the electrical drawing series, whereas signs with no illumination are generally shown on the signing and marking drawing series.

### **708.3 ELEVATION LABELING**

- .1 Each individual elevation shall be labeled as per the following examples:
  - .1 Service Poles - Service Pole No. 1 etc.
  - .2 Signal Poles - ①, ②, ③, etc.
  - .3 Advance Warning Sign Poles - Advance Warning Flasher No. A1, etc.
  - .4 Sign Poles - S1, S2, S3, etc.
  - .5 Luminaire Poles - TYPICAL NEW LUMINAIRE POLE, TYPICAL EXISTING LUMINAIRE POLE.
  - .6 Any special poles or structures - describe pole or structure and station.
  - .7 Multiple Wood Post Structures - Wood Post Structure No. 1, etc.
  - .8 Breakaway Sign Structures - Breakaway Sign Structure No. 1, etc.
  - .9 Cantilever Sign Structures - Cantilever Sign Structure No. 1, etc.
  - .10 Sign Bridge Structures - Sign Bridge Structure No. 1, etc.
- .2 Elevation labels are entered on layer “E-TEXT2”, 2.5 mm height and underscored. Station number identification is centered below the elevation label on layer “ETEXT3”, 2.0 mm height and underscored.
- .3 Title and scale identification (e.g., ELEVATIONS 1:75) shall be added under each set of elevations. Refer to Appendix 700.1 for standard drawing block.

### **708.4 CONCRETE BASES**

- .1 Standard concrete bases are represented with the appropriate symbols shown in Appendix 700.1. Non-standard bases must be drawn to scale.
- .2 The ministry utilizes a number of standard concrete bases for various pole and structure types.
- .3 Standard concrete bases for poles or structures shall be labeled with their base type. Non-standard concrete bases shall be labeled with a reference to the base design drawing.

### **708.5 LUMINAIRE POLE ELEVATIONS**

- .1 The wattage of luminaire required generally determines the height of the Type 2 pole used by the ministry for lighting roadways and other areas. Luminaire shafts and arms are represented with the applicable symbols shown in Appendix 700.1.

### **708.6 SIGNAL POLE ELEVATIONS**

- .1 The configuration of traffic signal pole elevations is determined from data provided on the site plan. Typical signal pole elevations are shown on the sample drawings located in Appendix 700.1.
- .2 Each elevation identifies the total reach of the pole arm.

- .3 Signal and pedestrian heads are added to the elevation and oriented in the direction shown on the site plan. Overhead primary signal heads are mounted to the signal arms using the appropriate mounting hardware. The secondary heads and the pedestrian heads are mounted to the pole shaft using single arm brackets. Standard signal heads and mounting hardware are represented with the applicable symbols shown in Appendix 700.1.
- .4 Pedestrian pushbuttons and signs, though not shown on the site plan, are added to the pole elevation and oriented in the direction of the movement of pedestrian traffic. Pushbuttons and signs are represented with the applicable symbols shown in Appendix 700.1.
- .5 Street name signs may be mounted on a signal arm. Street name signs are represented by the symbol “G7SN.DWG” (less than 70km/h), “G7OSN.DWG”(70km/h and higher) and “G8SN.DWG”(double street name signs) shown in Appendix 700.1.
- .6 Audible signals where required, shall be mounted on pedestrian heads. For audible signals use the dynamic block “audible\_att”.
- .7 Emergency pre-emption equipment where required, as shown on the sample project drawings in Appendix 700.2.
- .8 The signal pole elevation is completed by the addition of the following:
  - .1 If required, the luminaire davit arm and extensions, and the luminaire symbol. Labeling the wattage and lamp type (e.g., 108W LED), is centered below the luminaire, with the roadway luminaire number centered above (e.g., “2A6”).
  - .2 Signal displays such as A1, A2, B1, B2, PA1, etc., shall be shown next to the respective signal or pedestrian head.
  - .3 Pedestrian pushbutton and sign type shall be shown next to the pushbutton and sign.

## **708.7 SERVICE POLE ELEVATIONS**

- .1 Service and distribution panels are represented by the symbols shown in Appendix 700.1. Typical service pole elevations are shown on the sample drawings in Appendix 700.2.

## **708.8 SIGN POLE ELEVATIONS**

- .1 Standard sign poles are represented with the applicable symbols as shown on the sample drawings located in Appendix 700.2. Signs are not illuminated except where directed by the Senior Traffic Operations Engineer.
- .2 The sign message shall be imported off the sign record drawing. The sign face may also be shown on the 1:500 site plan, oriented to the direction of travel.
- .3 The total arm lengths and the span from the centre of the sign to the centre of the pole is identified on each pole.

- .4 The elevations shall be labeled as follows:
  - .1 If the sign pole supports a roadway luminaire show the make, model, and wattage centered below the luminaire, with the luminaire number centered above (e.g. “2A6”).
  - .2 The sign should be labeled with the dimensions and identification number.
  - .3 If applicable, the sign luminaire must have a label identifying the luminaire circuit, e.g., “SIGN LUM. ON CCT. A”.

#### **708.9 SIGN BRIDGE AND CANTILEVER ELEVATIONS**

- .1 A typical single truss sign bridge structure elevation is represented with the symbol shown in Appendix 700.1. This drawing is intended to serve as a guide when preparing sign bridges and cantilever elevations and shall be modified as required. Elevations for typical generic structures may be found in the Chapter 306 of the ministry *Electrical and Signing Material Standards*.
- .2 The sign message shall be imported from the sign record drawing.

#### **708.10 BREAKAWAY SIGN STRUCTURES**

- .1 Each breakaway sign structure is represented with the symbol shown in Appendix 700.1. This drawing is intended to serve as a guide for the presentation of breakaway sign elevations and shall be modified as required.
- .2 The sign message shall be imported from the sign record drawing.

#### **708.11 WOOD POST SIGN STRUCTURES**

- .1 Multi-leg wood post sign structures are represented by the symbols shown in Appendix 700.1. This drawing is intended to serve as a guide for the presentation of a wood post sign elevation and shall be modified as required.
- .2 The sign message shall be imported from the sign record drawing.

## **709 ELECTRICAL DETAILS**

### **709.1 CONDUCTOR COLOUR CODE**

- .1 A conductor colour code table is required for each electrical system.
- .2 Where audible signals are required, they shall be noted on the applicable pedestrian movements shown on the conductor colour code table. Refer to example drawing located in Appendix 700.2.
- .3 Typical conductor colour code tables are shown in Appendix 700.1. The drafter shall select the appropriate table and edit it to suit the electrical design.

### **709.2 SIGNAL OPERATION DIAGRAM**

- .1 A signal display is required for each signalized intersection to show the sequence in the signal operation. The signal display should match the signal display from the Traffic Engineering Checksheet.
- .2 Typical signal displays are shown in Appendix 700.1. The drafter shall select the appropriate table and edit it as required.
- .3 Where audible signals are required, they shall be noted on the signal display as shown in Appendix 700.1.
- .4 The signal display is completed by identifying the intersection's street names and the north arrow orientation in the first frame of the display only.
- .5 If emergency vehicle preemption is required, each preemption movement shall have its own signal display box. Refer to Appendix 700.1 for an example.

### **709.3 DETECTOR LOOP DETAILS TABLE**

- .1 A detector loop table is required for signalized intersections and any other installation using detector loops. The table lists the properties of each vehicle detector loop used in the design.

### **709.4 SERVICE WIRING DIAGRAM**

- .1 A service wiring diagram is required for each service panel.
- .2 Typical wiring diagrams are shown in Appendix 700.1. The drafter shall select the appropriate diagram and edit it as required. The following editing is required:
  - .1 The luminaire number if there is a luminaire located at the top of the service pole.
  - .2 Where required, the number of conductors that run up the pole to the traffic signal heads (e.g., X No. 14).
  - .3 Use the note block "WDNOTE" and edit it to suit when adding or removing equipment to the existing service panel.



- .4 The service or distribution panel number in the wiring diagram title, as applicable.
- .5 Service voltage.
- .6 Telephone demarcation and/or signal pre-emption equipment, as required.
- .7 Electric utility meter.

#### **709.5 LIGHTING DESIGN CRITERIA TABLE & LED LUMINAIRE TABLE**

- .1 A lighting design criteria table is required for all warranted lighting installations. The table should include, required lighting levels the lighting levels achieved in the design.
- .2 An LED luminaire table is required specifying the LED luminaires being installed in the design. The table should include wattage, type, luminaire manufacturer, model number and quantities being installed.

## **710 DRAWING REVISIONS AND RECORD DRAWINGS**

### **710.1 DRAWING REVISIONS**

- .1 When a revised edition of the drawing sheet is issued a revision letter such as A, B, or C is added to the end of the drawing file name (e.g., “941131.dwg” becomes “94113-1\_A.dwg”). Any revisions to the x-ref should be noted in a similar fashion as the design drawings. (e.g., 01121\_A-xref.dwg).
- .2 A revision is required on the drawing when any changes are made to a previously signed and sealed drawing.
- .3 A new digital drawing file is created for each revision issued, and is submitted to the ministry upon completion.
- .4 Revisions to existing electrical installations are presented as follows:
  - .1 Identify New Electrical - all new work on site plans, elevations and details are labeled with instruction notes: ADD:, INSTALL:, REMOVE:, etc. The addition of the note block “ALL EQUIPMENT IS EXISTING, EXCEPT WHERE NOTED” on the drawings. “ADD”, “REMOVE” and “INSTALL” notations are entered as necessary on layer “E-TEXT2”, 2.5mm high and underscored. Refer to the sample drawings located in Appendix 700.2.

### **710.2 TITLE AND REVISION BLOCK UPDATING**

- .1 Title and revision block updating include the following:
  - .1 Revision letter identification in the title block.
  - .2 Designer initials and date, revision letter and date, revision description and drafter initials in the revision block.

### **710.3 REVISION LABELING**

- .1 All changes to the current drawing are clearly labeled as the current revision, on layer “E-TEXT2”, 2.5 mm height and underscored (e.g., REV. A).
- .2 All previous revision labels are removed from the current drawing and those changes described in the previous revision completed to reflect current status. For example, on a “REV. B” drawing, all “REV. A” changes are completed on the drawing (e.g., phase additions, wiring changes, pole relocations, etc.). The “ADD” and/or “REMOVE” notations are erased and the “REV. A” labels are then removed. In rare circumstances, if the previous revision changes have not been built, keep both most recent revisions.

**710.4 RECORD DRAWINGS**

- .1 Drawings are revised and the drawing number brought to the next revision letter (as applicable) when “as-built” information is added to the drawing.
- .2 The notation “RECORD DRAWING” is entered in the revision block under the new revision letter.
- .3 Record drawings have the following characteristics:
  - .1 No electrical equipment tagged as existing. The “All equipment is Existing except where noted” block should be deleted.
  - .2 No references to the removal and/or addition of electrical components.
  - .3 No revision labels. (e.g., REV. B).
  - .4 No underground utilities (i.e., turn off or freeze the underground layer(s)).
  - .5 No removed curb and gutter shall be shown. The roadway should be presented as a continuous road way with no discernable changes from new and old geometrics.
  - .6 No control line or station numbers shall be shown.
  - .7 No stations or dimensions are to be shown. In exception is the advance warning flasher distance. (refer to section 707.4.15.2)
  - .8 All “ADD:” and “REMOVE:” instructions shall be combined into the callout. (e.g. a conduit with 11 existing No.14 signal conductors and a note to add 3 new No.14 signal conductors would now read 14 No.14 signal conductors.)

## **711 ELECTRONIC FILE STORAGE**

### **711.1 DRAWING STORAGE**

- .1 Once the drawings are finished, the items on the following checklist are completed:
  - .1 Drawing is at AutoCAD™: “Zoom - extents”.
  - .2 “PURGE” is used to remove all unused blocks, layers, linetypes, etc. to help reduce drawing file size.
- .2 Final drawing submissions are to include all externally referenced files, labelled appropriately.
- .3 The Consultant is required to maintain an electronic backup of the current revision of all drawings submitted to the ministry.