

HES CAD STANDARDS
DRAFT

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TRANSPORTATION & PUBLIC WORKS

HIGHWAY ENGINEERING SERVICES

Working CAD Standards

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Acknowledgement: This document is based on material compiled by the TPW Sub-Committee on CADD Drawing Standards. Ultimately, this document is intended to merge and blend with the TPW CADD Drawing Standards.

1 general introduction

Reasons for CAD standards

Revised excerpt from TPW CADD Standards:

Computer aided Drafting (CAD) standardization is an integral component of information management planning for the Nova Scotia Department of Transportation and Public Works (TPW). The digital files produced by and for the department are an important public asset and return their investment by allowing for quick retrieval and reuse of digital data for incorporation into a multitude of document types and future projects. In order for CAD files to be used efficiently they must adhere to a set of standards, which allows for easy transfer and compatibility by all users.

NOTE: This document, N. S. Department of Transportation and Public Works – Highway Engineering Services CAD Standards, and related material are dynamic standards and are subject to change and revision by the Department at any time. It is the responsibility of the person submitting work to this Department to ensure that he/she is using the most up-to-date version

2 computer assisted drafting conventions

2.1 production of contract drawings

Drawing sheet size shall conform to the following:

SHEET DESIGNATION	OVERALL SIZE (mm)	INSIDE BORDER SIZE
B1 (F)	707 x 1000	687 x 970
A0 (E)	841 x 1189	821 x 1159
A1 (D)	594 x 841	574 x 811
D+	610 x 914	600 x 900
A2 (C)	420 x 594	400 x 564
A3 (B)	297 x 420	277 x 390
A4 (A)	210 x 297	190 x 267

NOTE: When drawings larger than 860 x 1120 or A0 (E) are required, it is recommended that drawings be used having a width of 860 or 841 and a length in increments of 150. Digital files of standard TPW formats will be provided in required standard size and should not be altered or modified without authorisation.

All drawings will be microfilmed and / or scanned for archival purposes by TPW and all lines, lettering, notes, details, sections, etc., on the original drawings must be of sufficient size and weight of line to result in clear, legible drawings when reproduced. Particular attention is to be paid to the spacing between characters and printed lines of characters, and line weights assigned to symbols or standard conventions. Because distortion may result from the size reduction and enlargement process, completeness of dimensioning is essential in order that no scaling of drawings is necessary.

2.2 drawing file composition

Drawings are to be composed at a scale of 1:1, with text, symbols, hatch patterns and line widths adjusted by scale factor required. Completed drawings to be compiled on standard title sheets for final storage. Title sheet blocks must always be inserted at 0,0,0 with scale factor of 1 and rotation angle of 0 in Paper Space.

Drawings are to be prepared in Autocad 2000 compatible format, with a maximum of 1 title sheet presented per layout.

Compilation of final drawing packages must be done by placing Title Sheet in Paper space with Model space graphics in scaled viewports. Layer visibility may be controlled individually or by viewport if required.

2.3 system of measurement

The International System of units (S.I. metric) is to be used to prepare all drawings. The unit for linear dimensioning is the metre (m). All other dimensions and notations should be followed by the unit symbol.

2.4 reference points and orientation

All Plan Views must contain sufficient information to relate the new work to the actual existing site. There must be a minimum of two fixed reference points, or a baseline established on the plan from which the new work can be readily laid out or measured during and after construction. The corresponding reference points on the site must be clearly defined, accessible and unlikely to be disturbed during construction.

All Plans should be drawn using the World Coordinate System (WCS). The Grid North Arrow must be included, along with notation for specific mapping grid projection being used and grid coordinate values for reference points. User Co-ordinate Systems (UCS's) may be used to orient the drawing orthogonally as desired to facilitate work. The base point may be set to one of the reference points to facilitate insertion of the plan, but the WCS origin must remain at 0,0 to retain proper coordinate values. Plan entries must not be moved or rotated under any circumstances, as this would destroy spatial orientation.

Information to be tied into NSCM monuments with co-ordinants shown on the plan.

2.5 preferred scales

The selection of scale for drawings must be given careful attention to ensure that all information required to carry out work is accurately conveyed in the most economical space. The preferred scales for various drawing components are provided in the following table:

Commonly used preferred scales			
Stage:	Type of Drawing	Scale	Notes:
Design	Sketch and Preliminary drawings	-----	Scales will vary but it is recommended that preference be given to those used in the working drawing stage.
Working Drawings	Key Plan	1:50,000 1:2000 1:1000	
	Site Plan	1:500 1:200	
	General Location Drawings	1:200 1:100 1:50	
	Component range drawings	1:100 1:50 1:25 1:20	
	Plan/Profile drawings	1:1000 H 1:500 1:100 V	
Planning	Map Based Plan	1:1000 1:2000 1:5000 1:10,000 1:20,000 1:50,000	

In special cases, the recommended range of preferred scales might be extended; however, the new scale shall be created, in multiples of 10, from a recommended scale.

To facilitate scaling from reduced or enlarged reproductions, each plan, section, detail, elevation, profile, etc., on a completed drawing sheet shall be accompanied by a graphic scale.

The graphic scale shall be located immediately below the pertinent heading. The TPW standard graphic scales associated with this document are available in CAD format. The graphic scale should be placed in model space.












2.6 layer colours and pen weights

Colour is to be used in TPW drawings as the method of defining line weight to a plotter. Layers must be assigned appropriate colours and entities must be created with colour bylayer, except as provided for in the creation of symbols.

Where user defined pens are used, a configuration file must be supplied by the user, at the time each drawing is submitted to TPW.

Standard line weight assignments are as follows:

(Note: Mapping *information* is not required to adhere to the following colour standard. Where maps incorporate standard sheets or symbols, the sheets, symbols and other entities shall adhere to TPW CADD standards where applicable).

AutoCAD COLOUR		PLOT COLOUR	LINE WEIGHT	WIDTH SAMPLE
PRIMARY	SECONDARY			
1 (red)		Black	0.200mm	
2 (yellow)	11	Black	0.200mm	
3 (green)	12,14	Black	0.250mm	
4 (cyan)	15	Black	0.350mm	
5 (blue)		Black	0.350mm	
6 (magenta)		Black	0.600mm	
7 (white)		Black	0.350mm	
8 (dark grey)		Black	0.180mm	
9 (light grey)		Black	0.250mm	
16-249		Colour or black, user defined. Configuration file must be supplied at the time of each submission.	0.250mm or as assigned by user	
250-255		Various grey tones Assign respective pens 250-255	0.250mm	

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Note:

Pens 1-15 and pens 250 – 255 are to be used as the default pens for CAD drawings. Pens 16 – 249 are to be used only after the above pens have been assigned and additional pens are required.

Line use examples:			
Thin – 0.160mm	Medium – 0.250 to 0.400mm	Thick – 0.500mm	Extra Thick – 0.600mm & up
Reference plans Existing work Leader and extension lines Dimension lines Centre lines – axes Intermediate contour lines Phantom lines Hatching	Visible object outlines Hidden lines Index contour lines	Cutting / Section lines viewing planes Titles / headings Reference lines Match lines lines	Border lines

2.7 annotation styles

Text for drawings must be created using TPW standard text styles using only standard windows or AutoCAD font files as indicated below. Alternate fonts will be accepted only where required characters are not available in any standard Windows or AutoCAD font file and prior approval is obtained from the TPW representative reviewing the CAD files. Where alternate fonts are used, they must not be proprietary and digital files of the font file must accompany the drawings. Where applicable provide both compiled font file (.shx) and source file (.shp). Where company logos appear on the sheet the proprietary file (drawing or shape or other) must accompany the project. All text should be left justified (except as specifically required such as centered in symbols or blocks).

Font style names are to bear the same names as the font. The primary fonts to be used for the production of working drawings is the Romans (.shx) or Simplex (postscript) font. No “hand” style fonts are to be used on tender drawings. Text height is to be set to “0” in style definition.

TEXT STYLES		
STYLE (COMMON EXAMPLES)	FONT	USAGE
ROMANS, SIMPLEX	ROMANS SIMPLEX	ALL TENDER (WORKING) DRAWINGS. USE ONLY SANS SERIF FONTS FOR WORKING DRAWING PURPOSES.
ARIAL ARIAL BOLD	ARIAL ARIAL BOLD	HEADINGS, DETAIL NUMBERING, TITLE BLOCK INFORMATION (WHERE INDICATED BY DoT &PW) USE ONLY IN PAPER SPACE
“HAND”	ALL “HAND” STYLE FONTS	NOT PERMITTED FOR ANY CONSTRUCTION (TENDER) OR POST CONSTRUCTION PHASE DOCUMENT PERMITTED AT PRELIMINARY DESIGN STAGE FOR PRESENTATION PURPOSES ONLY. If used for this purpose, specialty or “hand” style fonts shall be <u>clearly</u> legible and shall be of sufficient size and clarity to meet microfilm standards.
OTHER STYLES (STYLE NAME TO MATCH FONT NAME)	OTHER STANDARD WINDOWS AND AutoCAD FONTS ONLY	USE ROMANS AND ARIAL FONTS FOR ALL CONSTRUCTION AND POST CONSTRUCTION PHASE DOCUMENTS. OTHER FONTS MAY BE USED BY PERMISSION OF DOT & PW ONLY AND ONLY WHERE NECESSARY TO DESCRIBE THE WORK . FONT SIZES ARE INDICATED IN TEXTSIZE TABLE

Standard text height for notes, dimensions and annotations, etc., must be 2.5mm (plotted height) minimum. Standard text height for major headings is to be 5.0mm and sub-headings to be 3.5mm. Text smaller than 2.5mm may only be used for special conditions and prior approval must be obtained from the DoT & PW representative reviewing the CAD files.

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SCALE:	TEXTSIZE						
	2mm	2.5mm	3mm	3.5mm	4.5mm	5mm	6mm
1:10	20	25	30	35	45	50	60
1:20	40	50	60	70	90	100	120
1:25	50	62.5	75	87.5	112.5	125	150
1:50	100	125	150	175	225	250	300
1:75	150	187.5	225	262.5	337.5	375	450
1:100	200	250	300	350	450	500	600
1:125	250	312.5	375	437.5	562.5	625	750
1:200	400	500	600	700	900	1000	1200
1:250	500	625	750	875	1125	1250	1500
1:300	600	750	900	1050	1350	1500	1800
1:400	800	1000	1200	1400	1800	2000	2400
1:500	1000	1250	1500	1750	2250	2500	3000
1:1000	2000	2500	3000	3500	4500	5000	6000
1:5000	10000	12500	15000	17500	22500	25000	30000
1:10000	20000	25000	30000	35000	45000	50000	60000
1:50000	100000	125000	150000	175000	225000	250000	300000

Pen weight for text shall be .20mm minimum typical weight. This shall be consistent across all drawings and details within a drawing where standard notational text occurs.

2.8 dimension styles

Standard TPW named dimension styles must be used at all times. All dimensioning must be created on entities in model space with associative dimensions. Two dimensioning formats are used to cover most applications for TPW projects:

Style 1: Engineering style for **all construction (tender documents) and working drawings** with open arrowheads for dimension terminators.

Style 2: Architectural with ticks for dimension terminators **for preliminary work and presentation drawings only**, (or Style 1 may be used everywhere, whichever is preferred)

Dimension styles are to be named cryptically according to the style they represent .

For example:

E_100mm represents style 1 – Engineering with scale 1:100 and millimetres for units.

A_50mm represents style 2 – Engineering with scale 1:100 and millimetres for units.

Dimensions may have a modifier added to the name: e.g. **E_100mm_0**

Modifiers are as follows:

NONE = normal

0 = Both extension lines suppressed.

1 = First extension line suppressed.

2 = Second extension line suppressed.

The time it takes to create, edit and maintain dimensions is reduced by using dimension styles. Dimension styles are created by specifying values for a number of dimension variables and saving the style with a unique name. The dimension style controls the appearance of all the dimensions created while the dimension style is active. Changes to the dimension style will automatically be reflected in the associated dimensions.

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DIMENSION VARIABLES			
Variable description	Variable	Engineering	Architectural
Alternate units selected	DIMALT	Off	Off
Alternate unit decimal places	DIMALTD	4	4
Alternate unit scale factor	DIMALTF	0.03937	0.03937
Alternate unit decimal places	DIMALTTD	4	4
Alternate tolerance zero suppression	DIMALTTDZ	0	0
Alternate units	DIMALTU	4	4
Alternate units zero suppression	DIMALTZ	0	0
Prefix and suffix for alternate text	DIMAPOST	Nil	nil
Create associative dimensions	DIMASO	On	On
Arrow size	DIMASZ	3.0000	3.0000
Angular unit format	DIMAUNIT	0	0
Arrow block name	DIMBLK	Nil	archtick
First arrow block name	DIMBLK!	Nil	nil
Second arrow block name	DIMBLK2	Nil	Nil
Centre Mark Size	DIMCEN	2.5	2.5
Dimension line and leader colour	DIMCLRD	1 (grey)	1 (grey)
Extension line colour	DIMCLRE	8 (grey)	8 (grey)
Dimension text colour	DIMCLRT	Bylayer	Bylayer
Decimal places	DIMDEC	0	0
Dimension line extension	DIMDLE	0.0000	0.0000
Dimension line spacing	DIMDLI	10.0000	10.0000
Extension above dimension line	DIMEXE	2.0000	2.0000
Extension line origin offset	DIMEXO	1.0000	1.0000
Fit text	DIMFIT	3	3
Gap from dimension line to text	DIMGAP	1.2500	1.2500
Justification of text on dimension line	DIMJUST	0	0
Linear unit scale factor	DIMLFAC	1*	1*
Generate dimension limits	DIMLIM	Off	Off
Prefix & suffix for dimension text	DIMPOST	Nil	Nil
Rounding value	DIMRND	0.0000	0.0000
Separate arrow blocks	DIMSAH	Off	Off
Overall scale factor	DIMSCALE	1*	1*
Suppress the first dimension line	DIMSD1	Off	Off
Suppress the second dimension line	DIMSD2*	Off	Off
Suppress the first extension line	DIMSE2*	Off*	Off*
Suppress the second extension line	DIMSE2*	Off*	Off*
Update dimensions while dragging	DIMSHO	On	ON
Suppress outside dimension lines	DIMSOXD	Off	Off
Current dimension style (read-only)	DIMSTYLE	E_100mm*	A_100mm*
Place text above the dimension line	DIMTAD	1	1

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Tolerance decimal places	DIMTDEC	4	4
Tolerance text height scaling factor	DIMTFAC	0.7500	0.7500
Text inside extensions is horizontal	DIMTIH	Off	Off
Place text inside extensions	DIMTIX	Off	Off
Minus tolerance	DIMTM	0.0000	0.0000
Force line inside extension lines	DIMTOFL	ON	ON
Text outside is horizontal	DIMTOH	Off	Off
Tolerance dimensioning	DIMTOL	Off	Off
Tolerance vertical justification	DIMTOLJ	1	1
Plus tolerance	DIMTP	0.0000	0.0000
Tick size	DIMTSZ	0.0000	0.0000
Text vertical position	DIMTVP	0.0000	0.0000
Text style	DIMTXSTY	Romans	Romans
Text height	DIMTXT	2.5000	2.5000
Tolerance zero suppression	DIMTZIN	0	0
Unit format	DIMUNIT	2	2
User positioned text	DIMUPT	Off	Off
Zero position	DIMZIN	8	8

*these dimension variable settings are to be adjusted to accommodate scaling and units.

DIMSCALE is to be set to match plotting scale, e.g. If plot scale is 1=50, then DIMSCALE = 50. This variable can be set through the command line or by opening the dimension style dialog box, selecting *geometry*, and entering the appropriate value in the *Overall scale* box.

DIMLFAC is set to be 1 where base units are millimetres and 1000 for metres. This allows indicated dimensions to be always in millimetres even though base units and measured distances may be in metres. (This variable can also be adjusted to accommodate drawings not at a real world size.) This variable can be set through the command line or by opening the dimension style dialog box, selecting *Annotation*, selecting *Units* in the Primary Unit Box and entering the appropriate value in the *Linear* box.

DIMSE1 and DIMSE2 are to be set to *On* to suppress the dimension extension lines where necessary. These variables can be set through the command line or by opening the dimension style dialog box, selecting *Geometry*, and selecting *Suppress 1st or 2nd* in the Extension Line box as required.

DIMSTYLE is a read only variable that reflects the current dimension style's name. Once the dimension variables have been set they can be saved as a new dimension style.

Note: When changing dimension variables, be sure to save the dimstyle or they will only be set as dimension overrides.

2.9 linetypes

The appearance of linetypes should appear similar in both layout space and model space.

The appearance of linetypes in the drawing is determined by the system variables MEASUREMENT, LTSCALE and PSLTSCALE. The MEASUREMENT variable determines which linetype description file to use for linetype loading, ("0" sets default file to the imperial unit file acad.lin and "1" sets default file to the metric unit file acadiso.lin). The LTSCALE variable sets the global linetype scale factor and the PSLTSCALE controls linetype appearance in paper (layout) space. For consistent plotting results, the recommended values for the variables are as follows:

1. Title sheet in Paper Space with multiple variously scaled VIEWPORTS.
 - a) MEASUREMENT = 1
 - b) LTSCALE = (Based on the Scale of the Drawing)
 - c) PSLTSCALE = 0 (Off)

Do not set Linetype scale at the entity level. The Current Object Scale in the Linetype Properties dialog box (System Variable CELTSCALE) must be set to 1.0 to ensure creation of new entities do not have entity level linetype scaling.

Linetypes should appear as "bylayer" where practical.

Drawings must not contain linetypes or complex linetypes other than those defined in the ACAD.LIN file supplied with AutoCAD.

2.10 drawing legibility and conventions

- 1 All line work should be connected having no overshoots or undershoots (gaps).
- 2 Text used on tender (construction, working) drawings is to be in block letters. Font: Romans or equivalent. No text style variables are to apply. Do not place boxes around text.
- 3 Text is to be placed so as not to overwrite other entities. Whenever possible or practical, textual information is to be placed away from the drawing's line work with leaders extending into the drawing area.
- 4 Leaders should originate in similar locations in relation to text and should generally not cross over each other or be drawn at differing angles. Leaders to use 30 deg, 60 deg and 90 deg and should appear similar to each other.
- 5 A variety of lineweights are to be used to enhance the readability of the drawings. On drawings showing new construction, existing condition entities are to be shown "greyed out" for clarity. New construction is to be in heavy, dark lineweight.
- 6 Only information pertaining to the drawing shall be displayed on a sheet, all other information is to be deleted or placed on frozen layers.

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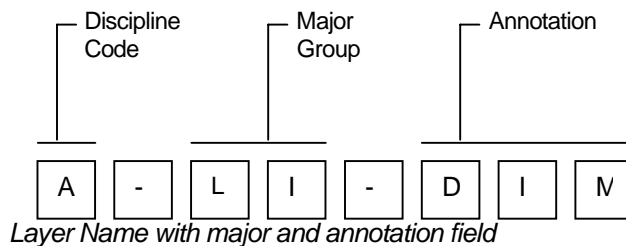
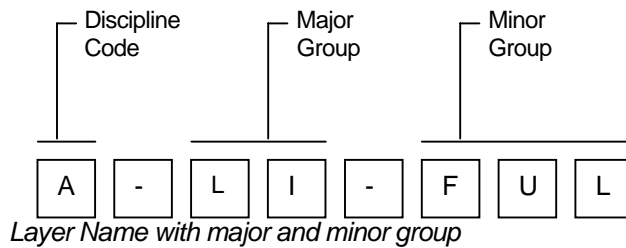
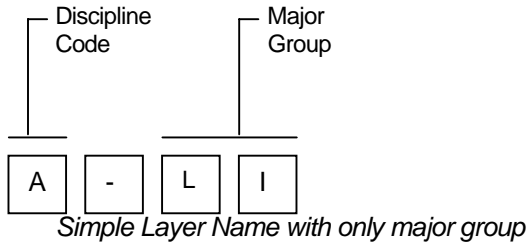
- 7 All partial plans are to be referenced to a “key” plan or detail reference to indicate where the partial plan is located in relation to the site.
- 8 Sheet details are to be given descriptive names as identified on the sheet.
- 9 Hatch patterns are to be on a separate layer for each major type of hatch.
- 10 Hatches are to be applied to new work as applicable to denote the extent and type of work. Existing structures are not to receive hatching.
- 11 The purpose of the drawings shall be clearly indicated by means of designation, eg: **“Concept only”**, **“Preliminary”**, **“Not for Construction”**, **“Issued for Construction”**, **“Record Drawing”**, **“[other reason for issue]”**, and should include any qualifying notation or limitation regarding the scope of the drawings. All releases shall be stamped and signed by the issuer (designer’s personal seal).
- 12 Imperial dimensions are not to be used for the preparation of tender documents. However, in the event that a circumstance dictates the use of Imperial dimensions , the correct notation is as follows: Express dimensions of less than 12 inches, as inches, i.e.: 11”, 7”, etc.. Express dimensions 12 inches and above as feet and inches with a zero place holder as required, i.e.: 1’-0”, 3’-4” 114’-0 3/4” etc.
- 13 Where details or sheets are omitted from a series or set such that there is a gap in the sequential numbering there shall be a notation to indicate that these missing elements do not comprise part of the final document set. This shall only be permitted to occur at the very end of the project where it would be difficult &/or time consuming to amend the documents. Gaps in the sequencing of sheets or details are to be corrected at the preliminary phases where possible.
- 14 The types of image files used within CAD drawings should be limited to .tif or .jpg where practical and these should be in native format and uncompressed. Where other file types are required these shall be co-ordinated through the project design leader.
- 15 All drawings are to be organised with layers conforming to guidelines as specified in this document.

3 layer name formats

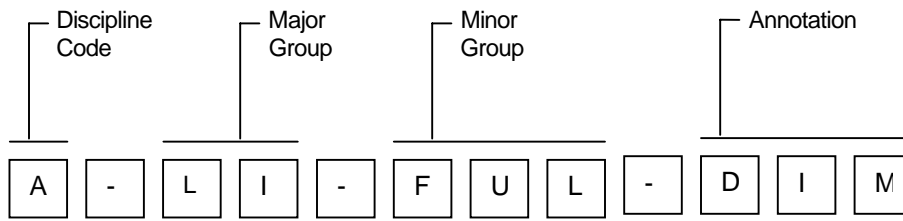
3.1 introduction

The *CAD Layer Guidelines* are organized as a hierarchy. This arrangement accommodates expansion and addition of user-defined extensions to the layer list. Layer names are alphanumeric and use abbreviations that are easy to remember.

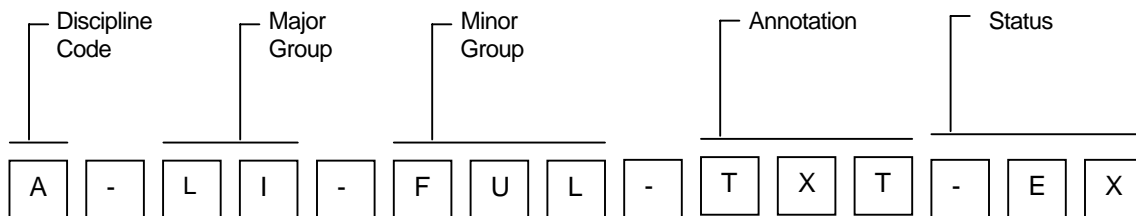
3.2 layer format



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Layer Name with major group, minor group, and annotation.



Layer Name with major group, minor group, annotation, and status field.

3.3 discipline code

The discipline code is a two-character field with the second character either a hyphen or a user-defined modifier.

- C – Civil/Highway
- B – Bridge
- E – Electrical
- N – Environmental
- S - Structural

3.4 major group

The major group designation identifies the major system. Although major groups are logically grouped with specific discipline codes, it is possible to combine major group codes with any of the discipline codes. For example, a drawing might contain the following layers.

- C-SA Sanitary Sewer
- C-SM Storm Sewer
- C-SV Survey Control

3.5 minor group

This is an optional, three-character field for further differentiation of major groups. For example, C-SA-MAN indicates civil, sanitary sewer manhole.

3.6 annotation

Annotation comprises text, dimensions, sheet borders, detail references, and other elements on CAD drawings that don't represent physical aspects of the project. Status fields designate annotation:

DIM	Dimensions
KEY	Keynotes
LEG	Legends and Schedules
NOT	Notes
REV	Revisions
SYM	Symbols
TXT	Text
TBL	Border and title block

Annotation can be placed both in model files and in sheet files. Dimensions, symbols and keynotes would typically be placed in model files. Legends, schedules, borders, and titles blocks would typically be placed in sheet files. The same layer names would be used in both cases.

3.7 status field

The status field is a two or three character designator that differentiates new construction from remodelling and existing to remain. The status field is optional and is only needed when phases of work need to be differentiated. Defined values for this field are as follows:

EX	Existing
PR	Proposed
FU	Future
RM	To be removed
SV	Surveyed
MP	Mapping

The status field is always placed as the last field of the layer name.

3.8 user definable fields

The minor group field can be defined by the user, allowing additional layers to be added to accommodate special project requirements. This should only be done if a defined layer does not apply to a project.

4 master layer list

4.1 introduction

This layer list is to be used for all projects submitted to the Department of Transportation and Public Works. This master layer list is to be used as a reference document.

Should a need exist, users are free to add their own layers according to the layer naming conventions identified in section 3 if there is no predefined layer. They should identify them as “user-defined”.

The use of an asterisk (*) indicates a placeholder for the discipline code, major group, or minor group.

annotation layers

*-**-DIM	Dimensions
*-**-KEY	Keynotes
*-**-LEG	Legends and Schedules
*-**-NOT	Notes
*-**-REV	Revisions
*-**-SYM	Symbols
*-**-TXT	Text
*-**-TBL	Border and title block

Note: The annotation field may also occur as the fourth field, following a minor group.

status field modifiers

EX	Existing
PR	Proposed
FU	Future
RM	To be removed

*-**-EX	Existing
*-**-PR	Proposed
*-**-FU	Future
*-**-RM	To be removed

Note: The status field may also occur as the fourth field, following a minor group.

4.2 engineering layers

Description	Discpl. Field	Major Group	Minor Group
Sanitary Sewer	C	SA	
Manhole Structure	C	SA	MAN
Treatment Area	C	SA	TRE
Underground Piping	C	SA	UND
Storm Sewer	C	SM	
Armour Stone, Rip Rap	C	SM	ARM
Catch Basin, Manhole	C	SM	MAN
Culvert	C	SM	CUL
Ditch Lines	C	SM	DHL
Subdrains	C	SM	SUB
Underground Piping	C	SM	UND
Survey Control	C	SV	
Horizontal Alignment	C	SV	HOR
NS Control Monument	C	SV	MON
Property Boundaries	C	SV	BND
Right-of-way Limits	C	SV	ROW
Spot Elevations	C	SV	SPT
Survey Marker, Iron Bar, Pin	C	SV	SVM
Traverse Point	C	SV	TBM
Topographical Information	C	TP	
Borehole Logs and Data	C	TP	LOG
Contour – Minor	C	TP	MIN
Contour - Major	C	TP	MAJ
Elevation Text	C	TP	TXT
Soil Sample Location	C	TP	SMP
Spot Elevations	C	TP	SPT

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Description	Discpl. Field	Major Group	Minor Group
Signs	C	SI	
Aluminum - Large	C	SI	ALU
Signs	C	SI	SGN
Sign Layouts and Detail	C	SI	SGL
 Site Features	 C	 SF	
Armour Stone, Rip Rap	C	SF	ARM
Building, Structure	C	SF	BDG
Culverts	C	SF	CUL
Debris, Rubble, Loose Rock	C	SF	DBR
Ditch Centre Line	C	SF	DCL
Driveway, Edge of	C	SF	DWY
Fencing	C	SF	FEN
Fire Hydrants	C	SF	FHY
Grass	C	SF	GRA
Marshes, Wetlands	C	SF	MAR
Miscellaneous Feature	C	SF	MIS
Railways	C	SF	RAI
Retaining Walls	C	SF	RTW
Shrubs, Bushes	C	SF	SHR
Sidewalk, Edge of	C	SF	SWK
Traffic Signals	C	SF	TRA
Trails	C	SF	TRL
Trees, Tree Lines	C	SF	TRE
Utility Poles, Structures	C	SF	UTL
Water Wells	C	SF	WEL
Watercourses, Shorelines	C	SF	WTR

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Description	Discpl. Field	Major Group	Minor Group
Roads	C	RO	
Bridges - General Layout	C	RO	BRG
Existing Centre Line	C	RO	CL
Curbs	C	RO	CRB
Guard Rail	C	RO	GRL
Guide Post	C	RO	GPT
Jersey Barrier, Concrete	C	RO	JB
Pavement Markings	C	RO	MRK
Edge of Traveled Lane	C	RO	ETL
Existing Edge of Pavement	C	RO	EP
Shoulder, edge of	C	RO	ESH
Sidewalk, edge of	C	RO	SWK
Toe of Slope	C	RO	TOS
Gas and Oil	C	GO	
Natural Gas Pipeline	C	GO	NPI
Hydrology	C	HY	
Catchment Area	C	HY	CAT
Drainage Area	C	HY	DRA
Flow/Discharge	C	HY	FLO
Environmental Controls	N	EN	
Straw Bale Barrier	N	EN	SBB
Sediment Control Fence	N	EN	SCF
Berm Barrier	N	EN	BBA
Sandbag Barrier	N	EN	SDB
Straw Bale Flow Checks	N	EN	SFC
Sandbag Flow Checks	N	EN	SDC
Rock Flow Check	N	EN	RFC
Sediment Ponds	N	EN	SDP
Turbidity Curtain	N	EN	TBC

TPW – HIGHWAY ENGINEERING SERVICES CAD STANDARDS

Description	Discpl. Field	Major Group	Minor Group
Horizontal Alignment	C	HA	
Centre Line	C	HA	CL
Stationing, Text, Ticks	C	HA	TXT
Vertical Profile	C	PF	
Base	C	PF	BASE
Grid	C	PF	GRD
Grid Text	C	PF	TXT
Existing Ground	C	PF	EG
Finished Ground	C	PF	FG
Cross Sections	C	XC	
Grid	C	XC	GRD
Grid Text	C	XC	TXT
Existing Ground	C	XC	EG
Finished Ground	C	XC	FG
Subgrade	C	XC	SG
Template	C	XC	TPL
Approach Slab	B	AP	
Plan	B	AP	PLN
Bearing Plan	B	BR	
Linework	B	BR	LIN
Bridge Deck and Components	B	DK	
Curbs/Sidewalks	B	DK	CBS
Deck Drains	B	DK	DDR
Deck Plans	B	DK	DEK
Expansion Joints	B	DK	EXJ
Railings/Barriers	B	DK	RBR
Steel Grating	B	DK	STG
Reinforcing	B	RB	
Reinforcing Steel	B	RB	STL

TPW – HIGHWAY ENGINEERING SERVICES CAD STANDARDS

Description	Discpl. Field	Major Group	Minor Group
Substructure	B	SB	
Abutment Plan	B	SB	ABP
Pier Plan	B	SB	PPL
Retaining Walls	B	SB	RWL
Columns, Piers	B	SB	COL
Scour Protection	B	SP	
Gabions	B	SP	GAB
Rip Rap	B	SP	RRP
Superstructure	B	SS	
Floor Beams Layout	B	SS	BEM
Bracing	B	SS	BRC
Girders/Truss Layout	B	SS	GTL
Stringers Layout	B	SS	SNL

5 survey

5.1 introduction

Survey drawings prepared for the Department of Transportation and Public Works shall adhere to the NS Department of TRANSPORTATION & Public Works CAD standards listed in this document

Layer names for survey are related to data point codes acquired from field work and should be constructed using the Spot Elevation layering combined with an alpha code such as:

C-SV-SPT-***

*** = Alpha code as defined in Section 5.2

The following chapter is to be used as a reference in order to assist in the preparation of survey drawings.

5.2 survey point codes and feature codes

Numeric Code	Alpha Code	Feature Definition
1	CL	Centre Line
2	FCCL	Chainlink Fence
3	COLUMN	Column
4	HEGE	Hedge
5	BRFT	Bridge Footing
6	DRPIP	Drain Pipe
8	MISC	Miscellaneous
9	MAIL	Mail Box
10	PP	Power Pole
11	TP	Telephone Pole
12	TELB	Telephone Junction Box
13	FCWB	Barbwire
14	SWA	Sidewalk (Asphalt)
15	PIER	Pier
16	WWALL	Wingwall
17	CRNPST	Corner Post
18	FCPW	Pagewire Fence
19	FCORN	Ornamental Fence
20	FCGATE	Gate Fence

TPW – HIGHWAY ENGINEERING SERVICES CAD STANDARDS

Numeric Code	Alpha Code	Feature Definition
22	CULV	End of Culvert
23	WDRD	Woods Road
25	EDWD	Edge of Woods
26	IB	Iron Bar
27	IP	Iron Pipe
28	SM	Survey Marker
29	WP	Wooden Post
30	PROP	Property Line
31	DRVG	Driveway (Gravel)
32	DWG	Dwelling Corners
33	MHOME	Mobile Home Corners
34	SHED	Shed Corners
35	GAR	Garage Corners
36	PMPIS	Pump Island
37	BARN	Barn Corners
38	STREE	Softwood Tree (Conifer)
39	BUSH	Bush
40	WELL	Well
41	RTWL	Retaining Wall
42	BRGE	Bridge Corners
43	BROK	Edge of Brook
44	RIVR	Edge of River
45	RR	Railroad
46	RRC	Railway Crossing
47	SBOX	Railway Switch Box
48	LP	Light Pole
49	CURB	Curb (Asphalt)
50	CBA	Catch Basin
51	MHSW	Manhole Sewer
52	UMH	Utility Manhole
53	WSOF	Water Shut Off
54	PAVE	Edge of Pave
55	SHLD	Edge of Shoulder
57	FPOLE	Flag Pole
58	STRE	Store Corners
59	CHUR	Church Corners
60	SIGN	Sign
61	GRAIL	Guardrail
62	NSPT	Nova Scotia Power Tower
67	ROWM	RT. Of Way Marker
68	HTREE	Hardwood Tree (Deciduous)
69	ABUT	Abutment
70	PLOT	Parking Lot
71	BM	Bench Mark
73	CWK	Crosswalk
74	GIDP	Guide Post
75	PMPST	Pump Station
77	HYDR	Fire Hydrant
79	FCRL	Fence (Rail)
80	LAKE	Lake Edge @ H.W.M.
81	HWM	High Water Mark
82	GYW	Guy Wire
83	WL	Water Line
84	RRSP	Railroad Signal Post

TPW – HIGHWAY ENGINEERING SERVICES CAD STANDARDS

Numeric Code	Alpha Code	Feature Definition
85	LWM	Low Water Mark
86	WHRF	Wharf
88	CULBOX	Box Culvert
89	GASL	Gas Line
90	GASM	Gas Meter
91	GASV	Gas Valve
92	GABN	Gabion Baskets
94	GUTR	Asphalt Gutter
96	DRVC	Driveway (Concrete)
97	CULCON	Culvert (Concrete)
98	LAWN	Edge of Lawn
99	FIELD	Edge of Field
101	FLGAR	Flower Garden
102	ARLT	Turning Arrow Left
103	ARRT	Turning Arrow Right
104	ARST	Straight Arrow
105	STOPB	Stop Bar
108	CLARR	Centreline of Abandoned Railroad
114	CEME	Cemetery
115	GRAV	Gravestone
118	PSTUR	Pasture
143	FINAL	Final Sections
144	GRUB	Grubbing Sections
145	PROG	Progress Sections
148	TROCK	Top of Rock Sections
149	CURBC	Curb (Concrete)
151	USROCK	Undercut Solid Rock Sections
152	UCOM	Undercut Common Sections
158	CPAD	Concrete Pad
161	JERS	Jersey Barrier
162	GYP	Guy Pole
163	TLST	Traffic Light Standard
164	TLSB	Traffic Light Switch Box
166	DRVP	Driveway (Paved)
167	SMWL	Stone & Masonry Wall
168	STEP	Steps
176	FOUN	Old foundation
178	CHUR	Church Corner
183	FOMARK	Fibre Optic Marker
185	ORGR	Original Ground Sections
186	TROCK	Top of Rock Sections
187	GRUB	Grubbing Sections
190	USROCK	Undercut Solid Rock Sections
191	UCOM	Undercut Common Sections
192	TSWAMP	Top of Swamp Sections
200	SWLINE	Solid, White
201	CLBW	Centreline Broken, White
202	CLDS	Centreline Double Solid Yellow
203	CLBY	Centreline Broken, Yellow
204	CLBS	Centreline Solid Left, Broken Right
205	CLBS	Centreline Broken Left, Solid Right
206	CLSY	Centreline Single Solid Yellow
207	DITCH	Centre of Ditch
209	DYKE	Dyke

TPW – HIGHWAY ENGINEERING SERVICES CAD STANDARDS

Numeric Code	Alpha Code	Feature Definition
210	STPL	Stock Pile
211	TOES	Toe of Slope
212	TB	Top of Bank
214	SWC	Sidewalk (Concrete)
215	SWMP	Swamp (Edge)
217	POND	Pond (Edge)
300	FINAL	Final Sections
301	PROG	Progress Sections
500	NSCM	Nova Scotia Control Monument
501	TRAV	Traverse Point

appendix

contact information:

For answers to questions, to obtain a copy of the standard, to make suggestions or recommendations, or to obtain electronic copies of template and reference drawing files please contact:

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definitions:

TPW, NS DoT & PW and the **Department** refer to the Nova Scotia Department of Transportation and Public Works, province wide, all groups. For contact information refer to **appendix c**.

CADD refers to Computer Assisted Design and Drafting. **CAD** refers to Computer Assisted Drafting. Both terms are used interchangeably except when Computer Assisted Drafting is used as a design tool, or when add on menu systems augment CAD systems and design is performed as a function of the program capability.

CADD & CADD related work: Refers to all work prepared by computer assisted design and /or drafting systems of any description. Refers to other associated graphical representation such as: (but not limited to) imaging, digital photographs, photo realistic rendering, etc. which is submitted to the department.