

INDOT CAD Standards Manual

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Indiana Department of Transportation
Office of Standards and Policy

Approval Routing



Director, Bridges

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Date



Director, Highway Design & Technical Support

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Date



Supervisor, Bridge Standards and Policy

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Date

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1. Introduction

The guidelines presented within this document provide information regarding the preparation and final appearance of plans produced for INDOT road, bridge, and traffic projects using Bentley's MicroStation and InRoads software programs. It is intended to be used as a guide and reference for CAD users in an attempt to attain a high level of consistency among plans. It is not intended to be a "how-to" guide for using these software packages. Throughout this document, it is assumed that the user has a working knowledge of the software and has some experience using it to produce the engineering drawings required for a complete set of construction plans.

Direction to implement the guidelines presented in this document should not be construed as a requirement to use a specific drafting platform. The deliverable required by INDOT continues to be the PDF. Requirements for an electronic deliverable (.dgn, .dtm, etc.) and implementation of the CAD standards associated with an electronic deliverable have not been determined. They are presented in this document to facilitate future implementation.

Users should also be aware that requirements related to the content of INDOT plans are available in the current *Indiana Design Manual*, and that document will govern in the event of conflicting information presented in this *CAD Standards Manual*.

For current versions of the user files mentioned throughout this guide, as well as additional information, please browse to the INDOT [CAD Support](http://in.gov/indot/3084.htm) website (<http://in.gov/indot/3084.htm>). For best results, it is highly recommended that users work in the same versions or newer of the CAD software as is currently installed on the INDOT system. Information regarding currently installed versions is available on the [Current Versions](http://www.in.gov/indot/3088.htm) webpage (<http://www.in.gov/indot/3088.htm>).

2. ProjectWise Information

INDOT has chosen Bentley ProjectWise for its project management software program. All in-house design projects reside in the secure managed ProjectWise environment. Information regarding navigation in ProjectWise is available in the following documents:

[*DOTWise--INDOT Plans Production and Survey Guide*](#), available for download on the CAD Support web site in the Documents section.

[*DOTWise--INDOT Plans Production and Survey Guide*](#), available in ProjectWise.

[*DOTWise Project Creator Quick Start Guide—ITAP and Project Creator Interface*](#), available in ProjectWise.

Throughout this manual, links are provided to resource files residing in the ProjectWise environment as well as on the World Wide Web for users not currently operating within the ProjectWise environment. For information regarding ProjectWise and to apply for an account, users should [contact CAD Support](#).

3. MicroStation Information

3.1 MicroStation

INDOT has selected MicroStation and InRoads for its Department-wide computer-aided drafting and design package used to generate most contract plans. This document provides the Department's CAD resources and expectation for plan development (e.g., cell library, levels, and text styles). Consistently using the established set of levels, styles, and reference files will allow various users within the Department to work on the same set of plans without interfering with each other's design work. By integrating or linking MicroStation with other software packages (e.g., InRoads, SignCAD, and various external databases), the designer can complete the design and layout of a project as well as calculate the quantities necessary to produce a complete set of construction plans. For specific information related to InRoads, please refer to the [DOTWise--INDOT Plans Production and Survey Guide](#) document mentioned previously.

3.2 Configuration Files

CAD Support at INDOT has created a CAD environment (for use with MicroStation and InRoads) which contains a basic configuration along with necessary resource files for the preparation of roadway and structure plans. This environment is available to users for download at [CAD Support V8i Downloads](#). All necessary files may be downloaded and installed as separate items in order to accommodate different networking configurations outside of INDOT.

When beginning any project the designer/drafter is responsible for verifying that the latest configuration files, resource files, design libraries, and cell libraries are installed on their systems.

3.3 Resource Files

It is the intent, at INDOT, to keep the resource files, including .pcf and standard configuration files, that come packaged with MicroStation, InRoads, DesCartes, etc... , as close to "out of the box" as possible. This is done in order to make implementation of INDOT's CAD Standards as straightforward as possible.

INDOT CAD resource files are available on the [CAD Support V8i Downloads](#) web page, along with their related configuration variable information. Those files necessary for preparation of INDOT production plans are as follows:

- Seed files: Contain initial configuration, including appropriate working units for INDOT drawing files. See section 4.5 for available seed files and settings.
- *IN_Units.def*: Units definition files for selecting the proper working units.
- *IN_Sheetsizes.def*: Definition file containing the settings for recommended sheet model sizes.

- Design library files:
 - *IN_Symbology.dgnlib*: Contains all level symbology including line styles as well as all text and dimension styles used in the INDOT environment. See section 4.1 for level definitions and section 4.2 for custom line styles. See sections 4.6 and 4.7 for text and dimension styles.
- Template drawing files: Contain borders used on INDOT plan sheets. See section 4.4 for more information.
- Cell library files: Contain cells to be inserted into INDOT base files and plan sheet files. See section 3.5 for cell libraries available.
- Plotting files: Contain pen tables, design scripts, and settings files for use with the ProjectWise InterPlot Organizer.
- InRoads resource files: Contain the INDOT-configured .xin file and borders required for use with InRoads Plan and Profile Generator and Cross Section creation tools.

3.4 Design Library Files

Design library (.dgnlib) files are files containing predefined settings for key design elements, including text styles, dimension styles, layers, custom line styles, etc. When an element is placed in a design file, MicroStation accesses the .dgnlib file for that element’s predefined properties or settings. Once placed, these elements become part of the active design file. If changes are later made to the .dgnlib file, those changes are not automatically updated in the drawing file. All or part of the settings can be updated from a revised .dgnlib file by executing the key-in command “dgnlib update (all, dimstyles, levels, etc.)”. It is also possible to update settings for individual elements (text styles, dimension styles, levels, etc.) by opening up each element’s Settings toolbox and choosing Update from Library from the appropriate menu.

3.5 Cell Library Files

Currently there are several cell libraries available for use in the preparation of INDOT plans. The current cell libraries are located in [DOTWise\Documents\INDOTWorkspace\Managed\Workspace\Standards\cell\](#) in ProjectWise. They, along with a catalog of cells, are available from [CAD Support V8i Downloads/Cell Libraries](#). See Table 3.5-1 for descriptions of INDOT cell libraries available.

Cell Library Filename	Description
IN_County.cel	Indiana county outlines for use on an INDOT Title Sheet
IN_DetailsEng.cel	Typical sections and detail drawings, US Customary units
IN_InRoads.cel	Plan symbols for use with InRoads
IN_Lighting.cel	Cells used on traffic lighting plans
IN_Patterns.cel	Cells used for pattern fills
IN_PvmtMarkings.cel	Cells used on traffic plans
IN_ScaleBars.cel	INDOT specific scale bars
IN_Signals.cel	Cells used on traffic signals plans
IN_SignalsLegend.cel	Cells used in the legend on traffic signals plans
IN_Signs.cel	Cells used on traffic signs plans
IN_Survey.cel	Cell versions of INDOT standard survey forms
IN_SurveyMonuments.cel	Cell versions of INDOT survey monument symbols
IN_Symbols.cel	Cells used at various times throughout the plans production process, including the north arrow symbol (NORTH.cel) and symbols for centerline, propertyline, and flowline
IN_TablesLegendsNotes.cel	Cells used to construct tables, legends, and notes on INDOT plan sheets
IN_TablesLegendsNotesTraffic.cel	Cells used to construct tables, legends, and notes on INDOT traffic plan sheets
IN_TitleSheetIntegration.cel	Cells used in INDOT workspace to populate various sheets via tags

Table 3.5-1 INDOT Cell Libraries

4. INDOT CAD Standards

4.1 Levels / Symbology

In the future, levels within drawing files will be critical for accurate quantity takeoff calculations prior to letting and asset inventory and maintenance applications after construction is completed. Levels and filters have been defined with these applications in mind. Definitions are stored in the *IN_Symbology.dgnlib* file for each department discipline within INDOT. In subsequent versions of the CAD Workspace, many more levels will be named according to specific Pay Items found in INDOT project contracts and their use should be reserved for items directly related to these Pay Items.

In addition to the name, level properties defined include color, line style, and weight. Each drawing object placed in a design file should be assigned to an appropriate level according to its function within the project. INDOT CAD level names are comprised of two category prefixes and a brief specific description. See Appendix A for level prefixes available and their intended use on INDOT plans. As long as the object's properties are set to "ByLevel", the object will take on the predefined symbologies associated with that level.

In order to assist the user in narrowing his/her focus to a particular discipline or type of plan sheet, a number of Filter Groups have also been defined. The Filter tool, located on the Attributes toolbar, allows users to define the group of levels viewed within the Level Manager or Level Display dialogs.

For most projects, the levels defined in the design library file will suffice throughout the plan preparation process. There will, however, likely still be unique situations that may require levels that do not already exist. For these situations, users should follow the naming conventions established in Appendix A.

4.2 Line Styles / Line Weights

Various line styles and weights are typically used to differentiate between elements of objects and to focus attention on key elements within a drawing. Regardless of the line style or weight chosen, all elements must be clearly visible and text must be easily read when the drawing is printed at its full size as well as when it is scaled for smaller printed formats. Users are discouraged from using line styles numbered 1-7 in design models, as their behavior is somewhat unpredictable on printed plans. Bentley recommends that users assign custom line styles to objects for more control of their appearance. Consequently INDOT has defined a number of custom line styles for use on INDOT plans. These definitions are also stored in *IN_Symbology.dgnlib*. See Appendix B for samples of INDOT custom line styles along with their intended uses. The appearance of lines on plans must be consistent with these samples.

In general, existing features should be shown using dashed lines or other appropriate line styles as shown in Appendix B. INDOT's preference is that existing features are screened back or grayed out so that they appear lighter than proposed work and are still clearly visible on half-size plots.

Users are discouraged from defining their own custom line styles. In the event that a new line style is needed, users should [contact CAD Support](#) for assistance.

4.3 Naming Conventions

The following prefixes shall be used when naming models and cells related to the various disciplines. File and level naming conventions differ slightly from these. See section 4.1 for level naming conventions and section 4.8 for file naming conventions.

Bridges	BR_	Signs and Lighting	SL_
Design	DS_	Signs	SN_
Lighting	LG_	Standards	ST_
Planning	PL_	Survey	SV_
Road	RD_	Traffic	TR_
Signals	SG_	Pavement Marking	PM_

4.4 INDOT Border / Sheet Models

A series of template sheet models has been developed for use when preparing INDOT Plans. Each of these sheet models contains the required INDOT sheet border, as well as additional pre-formatted text and commonly used symbols. These sheet models are designed to be imported into the working dgn file with a scale factor of 1.0 and placed at the origin (0, 0). The user should then edit text as needed and delete any items not needed. See the *Indiana Design Manual (IDM)* section 14-3.03 for appropriate sizing of plan sheets. Users should also be aware that unless they are operating within the INDOT ProjectWise managed workspace, some extra information may be visible and a certain amount of specialized functionality set up for these sheets may be diminished. Table 4.4-1 and Table 4.4-2 list the sheet models available from the following files located in the [DOTWise\Documents\Template Documents\DGN](#) folder in ProjectWise or downloaded from [CAD Support V8i Downloads/Sheet Files](#).

Ltr_sheets.dgn: For use with projects using letter size (8.5" x 11") paper.

D Size_sheets.dgn: For use with projects using full-size paper. The border sheets provided in this file have been formatted for use on "D" size (24" x 36") or 22" x 34" paper. No scaling is necessary for 22" x 34" paper, although users should be careful to position the frame appropriately.

In general, a north arrow should be placed on every plan view. Where it is needed but not already provided, the north arrow symbol (*NORTH* from the IN_Symbols.cel library file) should be inserted on a sheet model. The north arrow should appear the same size on all full-size sheets on which it is placed, and should be approximately 2 ½ in. from arrowhead tip to tail. Placing *NORTH.cel* using a scale of 1.0 will result in the correct sizing of the symbol. When placed on 8 ½" x 11" sheets, *NORTH.cel* should be scaled by 0.5.

Name	Description
Ltr. Detail	8.5" x 11" Detail Border – Portrait
Ltr. Detour Sheet Signing	8.5" x 11" Recommended Detour Signing Sheet
Ltr. Landscape Detail	8.5" x 11" Detail Border – Landscape
Ltr. Strip Map Sheet	8.5" x 11" Strip Map Sheet
Ltr. Title Sheet	8.5" x 11" Title Sheet

Table 4.4-1 Sheet Names and Descriptions of Models in Ltr_Size Sheets.dgn

Name	Description/Intended Use
BR_Detail Sheet	Detail Sheet for bridge plans—used for structure details, traffic maintenance details, soil borings, layout, general plan, approach details, and plan and profile sheets
BR_Index Sheet	Bridge Plan Index Sheet
BR_Soil Boring Sheet	Soil Boring Sheet—used for bridge plans
BR_Summary Sheet	Bridge Plan Bridge Summary Sheet
BR_Title Sheet	Bridge Plan Title Sheet
BR_Title Sheet Rehab	Bridge Rehab Plan Title Sheet
BR_Title Sheet ROW	Bridge Right-Of-Way Plan Title Sheet
LG_Highway Data Sheet	Lighting Plan Highway Data Sheet—used on road plans, bridge plans, and separate lighting plans)
LG_Index Sheet	Lighting Plan Index and General Notes Sheet
PL_Layout Sheet	Planning Layout Sheet
RD_Detail Sheet	Detail Sheet for road plans—used for roadway details, traffic maintenance details, and plan and profile sheets.
RD_Index Sheet	Road Plan Index and General Notes Sheet
RD_Pavement Marking Sheet	Pavement Marking Sheet—used for traffic-work details on road plans and bridge plans
RD_Pipe Material Sheet	Pipe Material Sheet—used for road plans and bridge plans
RD_Plat Sheet	Plat Sheet—used for survey route sheets on road plans
RD_Summary Sheet	Road Summary Sheet—used for road plans and bridge plans
RD_Title Sheet	Road Plan Title Sheet
RD_Title Sheet ROW	Road Right-Of-Way Plan Title Sheet
SG_Detail Sheet	Detail Sheet—used for plan and detail sheets on signalization plans
SG_Title Sheet	Signals Plan Title Sheet
SL_Plan Sheet	Plan Sheet—used for lighting and signing plan, layout, and details on traffic-signs plans, lighting plans, road plans, and bridge plans
SL_Title Sheet	Signs and Lighting Plan Title Sheet
SN_Index Sheet	Signs Plan Index and General Notes Sheet
SN_Panel Sign and Post Summary Sheet	Sign and Post Summary Sheet—used for panel-sign information on traffic-signs plans, road plans, and bridge plans
SN_Sheet Sign and Post Summary Sheet	Sign and Post Summary Sheet—used for sheet-sign information on traffic-signs plans, road plans, and bridge plans

Table 4.4-2 Sheet Names and Descriptions of Models in D Size_Sheets.dgn

4.5 Seed Files, Working Units, and Drawing Scales

The working units and a global origin have been defined in each seed file according to its intended use. The Department has set the global origin to x=0, y=0 and z=0 in all of the INDOT seed files. The following drawing seed files are available for download from [CAD Support V8i Downloads](#) and are located in [DOTWise\Documents\Template Documents\Seed\MicroStation](#) in ProjectWise. Users are expected to use the seed file appropriate for their specific application. Users should also note that these seed files are slightly different from those provided specifically for use with InRoads.

- *INDOT_US_SVFT_Seed.dgn*: Used for base drawing files, details, and exhibits using US Customary units. Working Units are set to Survey Feet (') and Inches (").
- *INDOT_US_seed.dgn*: Used for drawing files and detail drawings using US Customary units. Working Units are set to Feet (') and Inches (").
- *INDOT_SI_seed.dgn*: Only used for legacy projects using SI units. Working Units are set to Meters (m) and Millimeters (mm).

All objects shall be drawn at actual size in the design model. Scaling should only be applied when the model is referenced into the sheet model. This reference scale then determines the annotation scale to be used for the referenced design model. See Table 4.5-1 for the standard scales allowed on INDOT plans. See IDM section 14-3.05 for recommended drawing scales to be used on each type of plan sheet.

Drawing Scale (Anno. Scale)	True Scale (Ref. Scale)	Drawing Scale (Anno. Scale)	True Scale (Ref. Scale)
1/32 in. = 1 ft	1 : 384	1 in. = 5 ft	1 : 60
1/16 in. = 1 ft	1 : 192	1 in. = 10 ft	1 : 120
3/32 in. = 1 ft	1 : 128	1 in. = 20 ft	1 : 240
1/8 in. = 1 ft	1 : 96	1 in. = 30 ft	1 : 360
3/16 in. = 1 ft	1 : 64	1 in. = 40 ft	1 : 480
1/4 in. = 1 ft	1 : 48	1 in. = 50 ft	1 : 600
3/8 in. = 1 ft	1 : 32	1 in. = 60 ft	1 : 720
1/2 in. = 1 ft	1 : 24	1 in. = 100 ft	1 : 1200
3/4 in. = 1 ft	1 : 16	1 in. = 200 ft	1 : 2400
1 in. = 1 ft	1 : 12	1 in. = 300 ft	1 : 3600
1 1/2 in. = 1 ft	1 : 8	1 in. = 400 ft	1 : 4800
3 in. = 1 ft	1 : 4	1 in. = 500 ft	1 : 6000
6 in. = 1 ft	1 : 2	1 in. = 600 ft	1 : 7200
12 in. = 1 ft	1 : 1	1 in. = 1000 ft	1 : 12000
		1 in. = 2000 ft	1 : 24000

Table 4.5-1 Standard Scales Used on Plans

4.6 Text Styles

One of the most noticeable and most common drafting issues is inconsistency in the appearance of text from plan to plan and even from sheet to sheet within a set of plans. MicroStation allows for the definition of named text styles, which simplifies the placement and standardizes the appearance of text. When placing text, selecting a text style automatically adjusts the active text settings. When a set of named text styles are used, it is not necessary to manually change font, text height, text width, line spacing or other properties independently. It is only necessary to identify the scale and turn on the Annotation Scale lock when a drawing is started. INDOT text styles are defined in the design library file *IN_Symbology.dgnlib*. See Table 4.6-1 and Table 4.6-2 for specific INDOT text style settings. Sizes given in this table indicate the appearance of the text on plans printed with no scaling.

Text shall have a consistent appearance throughout the entire plan and must be consistent with the text styles described in this document. In general, text in text callouts, dimensions, and notes shall be in upper and lower case with appropriate capitalization. In all cases, grammar and spelling must be correct according to Standard English practice. When using a combination of upper and lower case text, apply either Sentence Case, also called First Capital, or Title Case as follows:

- Use Sentence Case for sentences and phrases involving design statements or construction directions. In these statements, only the first word of the statement and proper names are capitalized.
- Title Case may be applied to other text callouts which serve only to label elements in a drawing. In these labels, all major words are capitalized. Conjunctions, articles, and short prepositions are not considered major words; however, all words of four letters or more are capitalized.

Each drawing view, detail, or section on a sheet must have a title. These view titles should be brief and shown in all capital letters using 18 Point Text style on full-size (24" x 36" or 22" x 34") plan sheets and 14 Point Text style on 8 ½" x 11" plan sheets. Title text may be placed either in the design model or on the sheet model, so long as it is placed in the same manner throughout the plans.

Avoid abbreviations on plans. When an abbreviation must be used, use only those accepted throughout the construction industry. See Appendix C for acceptable abbreviations and their appropriate punctuation. Drafters and designers should spell out words not listed in Appendix C.

In general, leadered text callouts should be placed in the design model with the objects they are referencing. Legend or numbered keynote callouts with leaders and sheet or general notes should be placed on the sheet model with no scaling. Left justify notes and double-space between items. Place text on an appropriate text level according to its function within the drawing.

Lettering and dimensioning should be placed so they may be read from either the bottom of the sheet or the right side of the sheet.

Text Style Name	Font	Height (in.)	Width (in.)	Notes/Guidelines for Use
Text Styles for Full-Size Plan Sheets (24" x 36" or 22" x 34")				
10 Point Text	Tahoma	0.10	0.10	May be used for table data and proposed finish grade elevations on Plan and Profile sheet.
10 Point Text (Existing Elevations)	Tahoma	0.10	0.08	(Italic, Color 222) Use for existing-grade elevations on grid of plan and profile view. Minimum size for this application.
10 Point Text (Survey Text)	Arial Narrow	0.10	0.10	(Color 225) Use for selected survey text.
12 Point Text	Tahoma	0.12	0.12	Use for text callouts, dimensions, and notes. <i>Minimum size for text placed on Full-size plans other than text specified under 10 Point Text.</i>
14 Point Text	Tahoma	0.14	0.14	Use for selected text on title block, view subtitles, and column headings in tables.
14 Point Text (Property Owners)	Bookman Old Style	0.14	0.14	Use for parcel-owner text only. Use all upper case letters.
18 Point Text	Tahoma	0.18	0.18	Use for detail and section titles, and table titles on detail sheets.
30 Point Text	Tahoma	0.30	0.30	Use for selected text on title sheet of plans.
<p>30 Point Text Sample</p> <p>18 Point Text Sample</p> <p>14 Point Text Sample</p> <p>12 Point Text Sample</p> <p>10 Point Text Sample</p>				

NOTES:

1. All styles are set to 0.65 (exact) line spacing.
2. All styles are Center-Center justified initially; adjust as appropriate.
3. All styles are non-bold and non-italic, or non-slanted, and should remain so unless indicated otherwise above.
4. The Bentley font, Working, is allowed specifically for use in reference boxes on survey plat sheets only. Users should apply all other properties of 10 Point Text style for this application.

Table 4.6-1 INDOT Text Styles and Settings for Full-Size Plan Sheets

Text Style Name	Font	Height (in.)	Width (in.)	Notes/Guidelines for Use
Text Styles for Letter-Size Plan Sheets (8 ½" x 11")				
6 Point Text	Tahoma	0.06	0.06	May be used for table data, existing-grade elevations on grid of plan and profile view, and selected survey text.
7 Point Text	Tahoma	0.07	0.07	Use for selected text on title block., column headings in tables, and parcel-owner text.
7 Point Text (Survey Text)	Arial Narrow	0.07	0.07	(Color 222) Use for selected survey text.
9 Point Text	Tahoma	0.09	0.09	Use for text callouts, dimensions, notes, column headings in tables, and parcel-owner text. <i>Minimum size for all text placed on letter-size plans, other than text specified under 6 Point Text.</i>
12 Point Text	Tahoma	0.12	0.12	Use for selected text on title sheet of plans.
14 Point Text	Tahoma	0.14	0.14	Use for detail and section titles, and table titles on detail sheets.
<p>14 Point Text Sample</p> <p>12 Point Text Sample</p> <p>9 Point Text Sample</p> <p>7 Point Text Sample</p> <p>6 Point Text Sample</p>				

NOTES:

1. All styles are set to 0.65 (exact) line spacing.
2. All styles are Center-Center justified initially; adjust as appropriate.
3. All styles are non-bold and non-italic, or non-slanted, and should remain so unless indicated otherwise above.

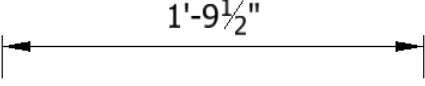

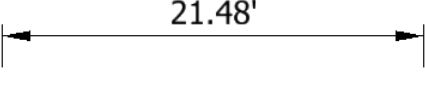

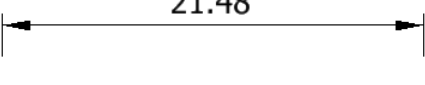
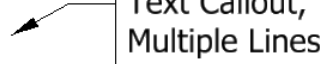
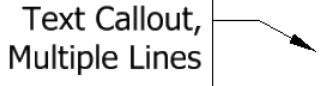
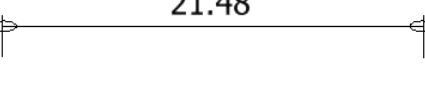
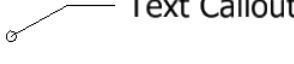
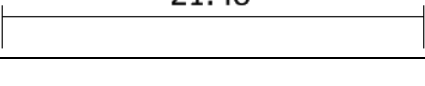
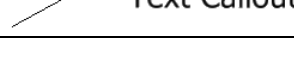
Table 4.6-2 INDOT Text Styles and Settings for Letter-Size Plan Sheets

4.7 Dimension Styles

Another feature in MicroStation which simplifies the placement of, and promotes uniformity in the appearance of dimensions is the ability to define settings for dimension styles. As with text styles, INDOT dimension styles are defined in the design library file *IN_Symbology.dgnlib*.

All dimensions should be placed in the design model and associated with their related objects. Dimensions should report dynamic values rather than static values. This will pose no problem if the object has been drawn to its actual size in the design model. Dimensions are placed on an appropriate



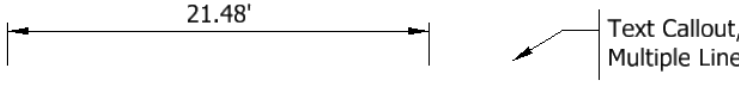


text/dimension level when they are placed using the INDOT dimension styles. See Table 4.7-1 and Table 4.7-2 for the dimension styles that are provided for use on INDOT plans. Dimensions and notes placed on full-size (24" x 36" or 22" x 34") plan sheets shall utilize 12 Point Text style, whereas those placed on letter-size plan sheets shall utilize 9 Point Text style. Their appearance must be consistent with the styles described in Tables 4.7-1 and Table 4.7-2.

<i>Dimension Style Name</i>	<i>Text Style</i>	<i>Units</i>	<i>Notes / Settings</i>
Dimension Styles for D-Size Plan Sheets			
Arch	12 Point Text	MU label-SU label, round to nearest 1/16	Arrow terminator, no text frame
Engr Arrow	12 Point Text	MU label, round to nearest 0.01	Arrow terminator, no text frame
Engr Arrow Line	12 Point Text	MU label, round to nearest 0.01	Arrow terminator, line text frame
Engr Circle	12 Point Text	MU label, round to nearest 0.01	Circle terminator, no text frame
Engr None	12 Point Text	MU label, round to nearest 0.01	No terminator, no text frame
Arch Style			
Engr Arrow Style			
Engr Arrow Line Style			
			
Engr Circle Style			
Engr None Style			

NOTES:

1. All styles are set to use Working Units; adjust precision as appropriate.
2. All styles are set to Dynamic Justify text notes.
3. All arrowhead terminators are filled, and have width = 1.2 x font height and height = 0.4584 x font height.

Table 4.7-1 INDOT Dimension Styles and Settings for Full-Size Plan Sheets

<i>Dimension Style Name</i>	<i>Text Style</i>	<i>Units</i>	<i>Notes / Settings</i>
<i>Dimension Styles for Ltr-Size Plan Sheets</i>			
Arch Ltr	9 Point Text	MU label-SU label, round to nearest 1/16	Arrow terminator, no text frame
Engr Arrow Ltr	9 Point Text	MU label, round to nearest 0.01	Arrow terminator, no text frame
Engr Arrow Line Ltr	9 Point Text	MU label, round to nearest 0.01	Arrow terminator, line text frame
Engr Circle Ltr	9 Point Text	MU label, round to nearest 0.01	Circle terminator, no text frame
Engr None Ltr	9 Point Text	MU label, round to nearest 0.01	No terminator, no text frame
Arch Ltr Style		21'-5 $\frac{3}{4}$ "	 Text Callout
Engr Arrow Ltr Style		21.48'	 Text Callout
Engr Arrow Line Ltr Style		21.48'	 Text Callout, Multiple Lines
Engr Circle Ltr Style		21.48'	 Text Callout
Engr None Ltr Style		21.48'	 Text Callout

NOTES:

1. All styles are set to use Working Units; adjust precision as appropriate.
2. All styles are set to Dynamic Justify text notes.
3. All arrowhead terminators are filled, and have width = 1.2 x font height and height = 0.4584 x font height.

Table 4.7-2 INDOT Dimension Styles and Settings for Letter-Size Plan Sheets

All dimensioning should be performed using US Customary units. The accuracy of plan dimensions should be consistent with data upon which they are based. See *IDM* 14-3.06 for guidance regarding accuracy of dimensions for various elements.

In general, use the unit method of feet and inches on all plans unless the unit method of decimals is called for below. Feet and inches may be shown either with unit abbreviations (4 ft 3 in.) or with punctuation (4'-3"), as long as they are shown as such consistently throughout the plans. When using unit abbreviations, provide a space between the value and the abbreviation. When using punctuation units, there should be a hyphen to separate the major and minor units, and no spaces in the dimension. The *Arch* dimension styles defined in the design library utilize punctuation according to these conventions.

The unit method of decimals (decimal-feet) should be used for the following:

- stations
- elevations
- percent grades
- areas
- latitude and longitude
- curve data
- length of project where called out in miles

When using the unit method of decimals, use either unit abbreviations (e.g. 75.42 ft) or punctuation (e.g. 75.42') as long as their use is consistent throughout the plans. As with the method of feet and inches, when using unit abbreviations, provide a space between the value and the abbreviation. When using punctuation units, there should be no space in the dimension. In addition, for a value less than 1, place a zero before the decimal point for clarity (e.g. 0.72 ft). The *Engr* dimension styles in the design library have been defined to use unit punctuation.

When a leader is necessary to connect dimension text to its extension lines or to attach a text note to an element, use a segmented line rather than a curved or spline leader along with an appropriate terminator. All arrowhead terminators should be filled and clearly visible on the plans.

4.8 MicroStation Drawing Names

The use of standard plan sheet names can eliminate numerous common problems. See Table 4.8-1 through Table 4.8-3 for names of typical drawing files created in MicroStation. For a complete discussion of the naming of base drawings and plan sheet drawing files created in InRoads, see the [DOTWise](#) document on the CAD Support web site or in [ProjectWise](#). See *IDM* section 14-3.07 for guidelines concerning the organization of plans sheets for various projects.

Description	Drawing File Name	Examples
Road Project		
Title Sheet	Sht Title.dgn	
Drawing Index and General Notes	Sht Index.dgn	
Typical Cross Sections	Sht Typical_ <i>nn</i> .dgn	Sht Typical_07.dgn
Survey Route (Plat No. 1)	Sht Plat1_ <i>nn</i> .dgn	Sht Plat1.dgn Sht Plat1_05.dgn
Survey Route Plat with Aerial Photography (Plat No. 3)	Sht Plat3_ <i>nn</i> .dgn	Sht Plat3.dgn Sht Plat3_05.dgn
Geometric Tie-Up	Sht Geometric Tie_ <i>nn</i> .dgn	Sht Geometric Tie_01.dgn
Traffic Maintenance Details	Sht MOT_ <i>nn</i> .dgn	Sht MOT_02.dgn
Plan and Profile	Sht PlanProfile_ <i>scale</i> _ <i>nn</i> .dgn	Sht PlanProfile_50_01.dgn
Superelevation-Transition Diagram	Sht Super_ <i>nn</i> .dgn	Sht Super.dgn Sht Super_01.dgn
Details		
Construction Details	Sht Const Detail_ <i>scale</i> _ <i>nn</i> .dgn	Sht Const Detail_30_01.dgn
Intersection Details	Sht Intersection_ <i>scale</i> _ <i>nn</i> .dgn	Sht Intersection_30_01.dgn
Spot Elevation Details	Sht Spot Elev_ <i>nn</i> .dgn	Sht Spot Elev.dgn Sht Spot Elev_01.dgn
Channel Details	Sht Channel_ <i>nn</i> .dgn	Sht Channel_01.dgn
Geometric Details	Sht Geom Detail_ <i>nn</i> .dgn	
Right-of-Way Details	Sht ROW Detail_ <i>nn</i> .dgn	Sht ROW Detail.dgn Sht ROW Detail_01.dgn
Grading Plan	Sht Grading_ <i>scale</i> _ <i>nn</i> .dgn	Sht Grading_30_01.dgn
Drainage Details	Sht Drainage_ <i>nn</i> .dgn	Sht Drainage_01.dgn
Erosion and Sediment Control Details (plan view)	Sht TEC_ <i>scale</i> _ <i>nn</i> .dgn	Sht TEC_30_01.dgn
Retaining Wall Details	Sht Retaining Wall_ <i>nn</i> .dgn	Sht Retaining Wall.dgn Sht Retaining Wall_01.dgn
Wetland Mitigation Details	Sht Mitigation_ <i>scale</i> _ <i>nn</i> .dgn	Sht Mitigation_30_01.dgn
Traffic-Work Details		
Signs (if separate traffic-sign plans are not required)	Sht Signs_ <i>nn</i> .dgn	Sht Signs.dgn Sht Signs_01.dgn
Signals	Sht Signal_ <i>scale</i> _ <i>nn</i> .dgn	Sht Signal_30_02.dgn
Lighting (if separate lighting plans are not required)	Sht Lighting_ <i>nn</i> .dgn	Sht Lighting.dgn Sht Lighting_01.dgn
Pavement Markings	Sht Pvmt Markings_ <i>scale</i> _ <i>nn</i> .dgn	Sht Pvmt Markings_30_03.dgn
Road Summary Sheet	Sht Road Summary.dgn	

NOTE: *_nn* is used to denote the drawing number for drawings with multiple sheets (*_01*, *_02*, etc.). Sheet numbers and scale values in drawing file names are preceded by an underscore.

Table 4.8-1 Typical Drawing File Names for Road Plan Sheets

Description	Drawing File Name	Examples
Bridge Project		
Title Sheet	Sht Title.dgn	
Index	Sht Index.dgn	
Typical Cross Sections	Sht Typical Cross Sections.dgn	
Traffic Maintenance Details	Sht MOT_ <i>nn</i> .dgn	Sht MOT_02.dgn
Traffic Detour Details	Sht Detour_ <i>nn</i> .dgn	
Temporary Runaround Details	Sht Runaround_ <i>scale nn</i> .dgn	Sht Runaround_50_02.dgn
Road Plan and Profile	Sht PlanProfile_ <i>scale nn</i> .dgn	Sht PlanProfile_50_01.dgn
Superelevation-Transition Diagram	Sht Super_ <i>nn</i> .dgn	Sht Super.dgn Sht Super_01.dgn
Roadway Details (see Road Plan sheets)		
Traffic-Work Details (see Road Plan sheets)		
Soil Borings	Sht Borings TB_ <i>nn</i> .dgn	Sht Borings TB_01.dgn
Channel Change Layout	Sht Channel_ <i>nn</i> .dgn	Sht Channel_01.dgn
Layout	Sht Layout_ <i>scale nn</i> .dgn	Sht Layout_30_01.dgn
General Plan	Sht General Plan.dgn	
Structure Details	Sht Structure.dgn	
Abutment/Bent/Pier Details	Sht End Bent Details_ <i>nn</i> .dgn Sht Pier No <i>x nn</i> .dgn	Sht End Bent Details_02.dgn Sht Pier No 2 and 3_01.dgn
Framing Plan	Sht Framing Plan.dgn	
Structural Steel Details or Precast-Concrete Beam Details	Sht Beam Details_ <i>nn</i> .dgn	Sht Beam Details_01.dgn
Bearing Details	Sht Bearing Details.dgn	
Superstructure/Floor Details	Sht Superstructure_ <i>nn</i> .dgn	Sht Superstructure_02.dgn
Railing Details	Sht Railing Details.dgn	
Screeds	Sht Screeds_ <i>nn</i> .dgn	Sht Screeds_02.dgn
Reinforced-Concrete Bridge Approach Details	Sht Approach Slab Details_ <i>nn</i> .dgn	Sht Approach Slab Details_02.dgn
Bridge Summary	Sht Bridge Summary.dgn	
Road Summary	Sht Road Summary. dgn	
Pipe Material	Sht Material.dgn	
Cross Sections	Sht Xsec_ <i>scale nn</i> .dgn	Sht Xsec_50_03.dgn

NOTE: *nn* is used to denote the drawing number for drawings with multiple sheets (*_01*, *_02*, etc.). Sheet numbers and scale values in drawing file names are preceded by an underscore.

Table 4.8-2 Typical Drawing File Names for Bridge Plan Sheets

Description	Drawing File Name	Examples
Traffic-Signs Project		
Title Sheet	Sht Title.dgn	
Index and General Notes	Sht Index.dgn	
Signing Plan	Sht Signing Plan_ <i>nn</i> .dgn	Sht Signing Plan _01.dgn
Sign Layout	Sht Panel Sign Layout_ <i>nn</i> .dgn Sht Sheet Sign Layout_ <i>nn</i> .dgn	Sht Panel Sign Layout_01.dgn Sht Sheet Sign Layout_01.dgn
Cross Sections	Sht Sign Cross Sections.dgn	
Sign Summary	Sht Panel Sign & Post Summary_ <i>nn</i> .dgn Sht Sheet Sign & Post Summary_ <i>nn</i> .dgn	Sht Panel Sign & Post Summary_01.dgn Sht Sheet Sign & Post Summary_01.dgn
Footing Details	Sht Signal Footing Details.dgn	
Structural Details	Sht Structural Details.dgn	
Signalization Project		
Title Sheet	Sht Title.dgn	
Index and General Notes	Sht Index.dgn	
Signal Plan	Sht Signal Plan.dgn	Sht US 41 & SR 57 Signal Plan.dgn
Signal Details	Sht Signal Details.dgn	
Lighting Project		
Title Sheet	Sht Title.dgn	
Index and General Notes	Sht Index.dgn	
Lighting Plan	Sht Lighting Plan.dgn	
Cross Sections	Sht Lighting Cross Sections.dgn	
Lighting Details	Sht Lighting Details.dgn	

NOTE: *_nn* is used to denote the drawing number for drawings with multiple sheets (*_01*, *_02*, etc.). Sheet numbers and scale values in drawing file names are preceded by an underscore.

Table 4.8-3 Typical Drawing File Names for Traffic Plan Sheets

4.9 CAD Standards Resources

When you have questions or need assistance:

INDOT CAD Support

Email: indotcadsupport@indot.in.gov

or through INDOT Sharepoint: <http://sharepoint.indot.in.gov/cadsite/default.aspx>

Web site: <http://in.gov/indot/3084.htm>

CAD Support Publications:

[*DOTWise Project Creator*](#), available in ProjectWise

[*INDOT New User 2A*](#), available in ProjectWise

[*DOTWise--INDOT Plans Production and Survey Guide*](#), available in ProjectWise

[*DOTWise--INDOT Plans Production and Survey Guide*](#), available for download from the CAD Support web site in the Documents section

Indiana Design Manual

http://www.in.gov/indot/design_manual/index.htm

INDOT Land & Aerial Survey Office

Web site: <http://www.in.gov/indot/2715.htm>

Land & Aerial Survey Office Publications:

[*Photogrammetric Mapping Specifications & Services Manual*](#), available for download from the Land & Aerial Survey Office web site in the Manuals & Standard Links section

Appendix A Standard Prefixes for INDOT CAD Levels

INDOT CAD level names are comprised of two category prefixes and a brief specific description.

Example:

P_RDWY_Guardrail

P_ First Position Prefix, indicates that the level contains information related to Proposed work

RDWY_ Second Position Prefix, indicates that the level contains information related to Roadway Features

Guardrail Brief Description, indicates that the level contains linework specifically related to Guardrail. Do not use "Miscellaneous" or other generalities.

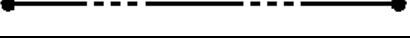
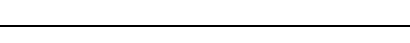
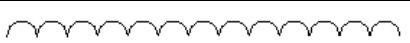
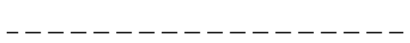

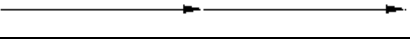
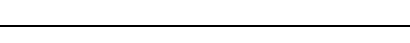

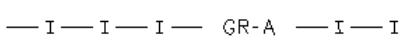
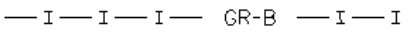

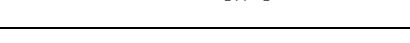
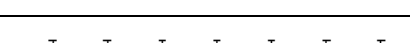
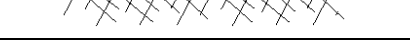
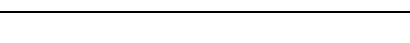
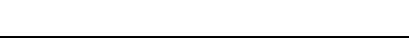

Level Prefix	Meaning and Intended Use	
First Position Prefixes		
BD_	Border	Elements of sheet border or frame
CG_	CoGo Points	2- and 3-dimensional points
E_	Existing	Existing features not typically recorded during survey
G_	Ground Surface	Graphical elements of DTM surface generated within InRoads
P_	Proposed	Elements related to proposed work
PP_	Plans Production	Graphical elements, grid lines, and text related to plan and profile generated within InRoads
PROF_	Profile	Elements related to profile features
RW_	Right of Way	Elements used to define land division boundaries
S_	Survey	Elements related to surveyed or existing topographical objects
ST_	Standard Drawings	Elements used to represent and annotate standard drawings <i>For use on Standard Drawings only</i>
XS_	Cross Section	Elements used to represent and annotate features on cross sections generated within InRoads





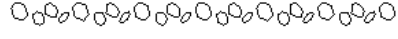
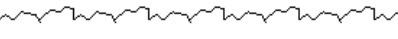

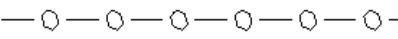

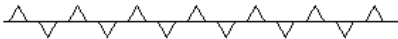




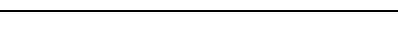
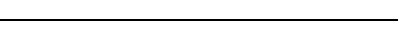
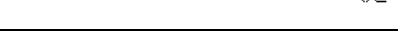
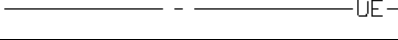


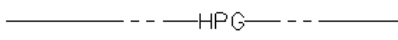
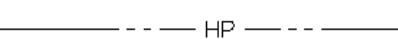
NOTE: Second Position Prefixes shown in table continued on next page.


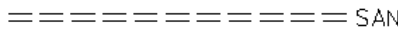
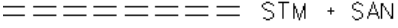
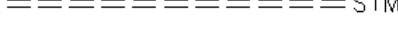



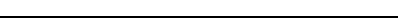
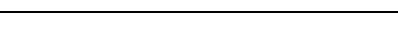
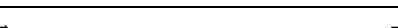










Level Prefix	Meaning and Intended Use	
Second Position Prefixes		
ALG	Alignment	Graphical elements used to define horizontal and vertical alignments generated within InRoads
BR	Bridge Features	Elements related to proposed bridge location, superstructure, piers, railings, etc.
CTRL	Survey Control	Graphical elements showing located survey markers and control points <i>For Survey Dept use only</i>
DR	Drainage Features	Elements showing natural and constructed drainage structures
EW	Earthworks Features	Elements related to proposed earthworks boundaries and calculations
G	Graphical Feature	Graphical elements, grid lines, and text related to plan and profile generated within InRoads
HY	Hydraulics Features	Elements related to hydrology
PROP	Property Features	Graphical elements showing located buildings, attached property objects, plants, and signs
PVMT	Pavement Features	Graphical elements related to pavement features and limits
RDWY	Roadway Features	Elements related to proposed roadway location, pavement, shoulders, curbs, sidewalks, traffic islands, defined safety region, and erosion control features; typically used on district resurface plans
RW	Right of Way	Graphical elements showing land division boundaries
SHT	Sheet	Elements of sheet border or frame
SURF	Surface Features	Graphical elements of DTM surface generated within InRoads
TC	Template Component	Graphical elements used to represent new-construction features on cross sections generated within InRoads
TOPO	Topographical Features	Graphical elements showing located topographic features <i>For Survey Dept use only</i>
TRAF	Traffic Features	Elements related to maintenance of traffic
UTIL	Utility Features	Graphical elements showing located utility lines and structures <i>For Survey Dept use only</i>
















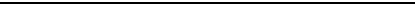
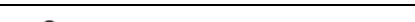


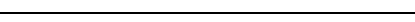

Appendix B INDOT Custom Line styles




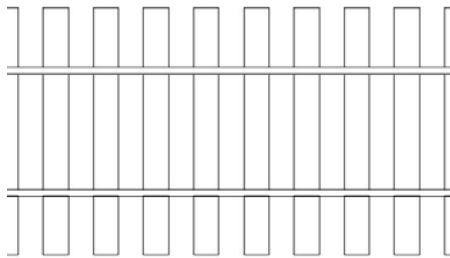




<i>Line Style Name</i>	<i>Sample</i>	<i>Intended Use</i>	<i>Notes</i>
Align		proposed alignment showing cardinal points	
becity		existing boundary line – city limits	For Survey Dept use only
becounty		boundary line, county border	For Survey Dept use only
befbd		fence, existing, wood board	For Survey Dept use only
befbw		fence, existing, barbed wire	For Survey Dept use only
befconc		fence, existing, concrete	For Survey Dept use only
befield		edge of field	For Survey Dept use only
befiron		fence, existing, wrought iron	For Survey Dept use only
befpcket		fence, existing, picket fence	For Survey Dept use only
befrail		fence, existing, railroad tie	For Survey Dept use only
befsw		fence, existing, smooth wire	For Survey Dept use only
beparks		boundary line, cemetery, national forest	For Survey Dept use only
beprrpty		right of way, existing	For Survey Dept use only
bestate		boundary line, state border	For Survey Dept use only
betwnshp		boundary line, township limit	
bpcl		construction limits	
bppl		property line, existing	For Survey Dept use only
bprw		right-of-way limit	For Survey Dept use only
bprwb		begin limited-access right of way	
bprwbe		begin and end limited-access right of way	

<i>Line Style Name</i>	<i>Sample</i>	<i>Intended Use</i>	<i>Notes</i>
bprwe		end limited-access right of way	
bprwn		no symbol limited-access right of way	
bprwplat		right of way for plat drawing	
bprwplatn		right of way for plat drawing, no circles	
cloud		revision cloud	
cloud invert		revision cloud	
conduit – wiring		conduit wiring, traffic signal detail	For Survey Dept use only
defl		water flow line, existing	For Survey Dept use only
depipe		drainage pipe, existing	For Survey Dept use only
dpfl		flowline, proposed	
excont		major contours, existing ground	
existing		existing features	
Existingx2		existing features, exaggerated	
gdrlal		guardrail, aluminum	For Survey Dept use only
gdrlbm		guardrail, beam	For Survey Dept use only
gdrlcb		guardrail, cable	For Survey Dept use only
gdrlot		guardrail, other	For Survey Dept use only
gdrlwd		guardrail, wooden	For Survey Dept use only
ge		guardrail, existing	
gp		guardrail, proposed	
ground line		ground line for section or profile details	
Handrail		handrail	
hedge		hedges	May also be used for coffer dams

<i>Line Style Name</i>	<i>Sample</i>	<i>Intended Use</i>	<i>Notes</i>
lbreak		object break line	
lcent		centerline	
reproperty		real estate property line	For Real Estate Dept use only
repropertyc		real estate property line	For Real Estate Dept use only
riprap		riprap	
rock		rock outcrop	For Survey Dept use only
silt fence		silt fence	
stonfc		stone face	For Survey Dept use only
stonwl		stone wall	For Survey Dept use only
treeconif		woods line, coniferous	For Survey Dept use only
treedecid		woods line, deciduous	For Survey Dept use only
ucabtv		cable tv line	For Survey Dept use only
ucabtv_Over		cable tv, overhead wire	
ucabtv_Under		cable tv, underground cable	
uelec		electrical line	For Survey Dept use only
uelec_Over		electrical overhead wire	
uelec_Under		electrical underground cable	
ufibopt		fiber optic underground cable	
ugas		natural gas pipe	
uhpg		high pressure gas pipe	For Survey Dept use only
uhpl		utility, high pressure line, unknown	For Survey Dept use only
uhpp		utility, high pressure, propane	For Survey Dept use only




<i>Line Style Name</i>	<i>Sample</i>	<i>Intended Use</i>	<i>Notes</i>
uother		other type of utility	For Survey Dept use only
usan		sanitary sewer pipe	For Survey Dept use only
ustmsn		sanitary/storm sewer pipe	For Survey Dept use only
ustorm		storm sewer pipe	For Survey Dept use only
utele		telephone line	For Survey Dept use only
Utele_over		telephone, overhead wire	
Utele_under		telephone, underground cable	
uwater		water pipe	For Survey Dept use only
wooded		woods/brush line	For Survey Dept use only
wtredeg		water edge	For Survey Dept use only
xe		cross section, existing	
xp		cross section, proposed	
Crosshatch 1'		crosshatch, 1-ft wide lines	True Scale LS
Crosshatch 4"		crosshatch, 4-in. wide lines	True Scale LS
Crosshatch 8"		crosshatch, 8-in. wide lines	True Scale LS
cl double		double yellow, 4-in. gap	True Scale LS
cl left pass		centerline striping, left pass	True Scale LS
cl no passing		centerline striping, no passing	True Scale LS
cl passing		centerline striping, full passing	True Scale LS
cl right pass		centerline striping, right pass	True Scale LS


<i>Line Style Name</i>	<i>Sample</i>	<i>Intended Use</i>	<i>Notes</i>
crosswalk		crosswalk striping	True Scale LS
curb & gutter – 4		curb and gutter, 4-in. height, proposed	True Scale LS
curb & gutter – 6		curb and gutter, 6-in. height, proposed	True Scale LS
curb & gutter – 8		curb and gutter, 8-in. height, proposed	True Scale LS
curb – 4		curb, 4-in. height, proposed	True Scale LS
curb – 6		curb, 6-in. height, proposed	True Scale LS
curb – 8		curb, 8-in. height, proposed	True Scale LS
ex. c & g – 4		curb and gutter, 4-in. height, existing	True Scale LS
ex. c & g – 6		curb and gutter, 6-in. height, existing	True Scale LS
ex. c & g – 8		curb and gutter, 8-in. height, existing	True Scale LS
ex. curb – 4		curb, 4-in. height, existing	True Scale LS
ex. curb – 6		curb, 6-in. height, existing	True Scale LS
ex. curb – 8		curb, 8-in. height, existing	True Scale LS
exaggerated left pass		centerline striping, left pass	True Scale LS
exaggerated no passing		centerline striping, no passing	True Scale LS
exaggerated right pass		centerline striping, right pass	True Scale LS
MOT barrels 100		mot barrels	True Scale LS
MOT barrels 50		mot barrels	True Scale LS
RPM 40ft		rpms at every skip	True Scale LS
RPM 80ft		rpms at alternate skips	True Scale LS
skips		base line style for centerline line styles	True Scale LS

<i>Line Style Name</i>	<i>Sample</i>	<i>Intended Use</i>	<i>Notes</i>
stop line		stop line	True Scale LS
striping		solid stripe, 4 in.	True Scale LS
TWLTL		offset double yellow for two-way left-turn lane	True Scale LS
rr2		railroad tracks, existing, for 1" = 2' depiction	
rr20		railroad tracks, existing, for 1" = 20' depiction	
rr50		railroad tracks, existing, for 1" = 50' depiction	For Survey Dept use only
rr100		railroad tracks, existing, for 1" = 100' depiction	For Survey Dept use only
rr2000		railroad tracks, existing, for 1" = 2000' depiction	

NOTE: " True Scale LS" indicates those line styles provided with the *IN_Symbology.dgnlib* file which have been developed to appear true to actual size when inserted in the design model.

Appendix C Abbreviations For Use on Plans

&	And	Bk.	Back or Bank
@	At		Baseline (ST_BOUNDLINE in IN_Symbols.cel)
Δ	Delta or Deflection Angle		
=	Equals	Bldg.	Building
	Fish	Blk	Block
	Parallel	Blktp.	Blacktop
%	Percent	Blvd.	Boulevard
\perp	Perpendicular	Bm.	Beam
\emptyset	Phase or Diameter	B.M.	Bench Mark
$\overline{\text{E}}$	Begin L.A. R/W	Bndry.	Boundary
$\overline{\text{E}}$	End L.A. R/W	Bot.	Bottom
A.A.D.T.	Annual Average Daily Traffic	Br.	Bridge
AASHTO	American Association of State Highway and Transportation Officials	Brg.	Bearing
		Brk.	Brick
Ab.	Abrupt	Br. S.	Bridge Seat
Abut.	Abutment	B.S.	Backsight
Ac	Acres	B. Spk.	Boat Spike
A.C.	Aluminum Cap/Asphalt Cement	B.S.T.	Bituminous Surface Treatment
A.C.L.	Access Control Line	Bur.	Buried
Add. Exc.	Additional Excavation	Calc.	Calculated
Adj.	Adjusted	C.A.P.	Corrugated Aluminum Pipe
Aggr.	Aggregate	C.A.T.	Crash Cushion/Attenuating Terminal Guard Rail End Treatment
Ah.	Ahead		
Alum.	Aluminum	Cb.	Curb
A.P.	Anchor Plate	C.B.	Catch Basin
App. Exist. R/W	Apparent Existing Right-of-Way	Cb.In.	Curb Inlet
App. P. L.	Apparent Property Line	Cb.L.	Curb Line
Appl.	Application	C.B.W.	Concrete Block Wall
Appr.	Approach	C.C.	Corn Crib
Approx.	Approximate	C-C	Center to Center
Art.	Article	Cdtn.	Condition
Asph.	Asphalt	Cem.	Cemetery
ASTM	American Society for Testing Materials	C.G.M.P.	Corrugated Galvanized Metal Pipe
		Ch.	Channel or Chain
Ave.	Avenue	Chan. Chg.	Channel Change
Avg.	Average	Chd.	Chord
AWG	America Wire Gauge	C.I.	Cast Iron
Az.	Azimuth	C.I.P.	Cast Iron Pipe
B.	Barn	Cir.	Circle
B.E.	Bridge End		Centerline (ST_CENTERLINE in IN_Symbols.cel)
Beg.	Begin	Cl.	Class or Clearance
B.I.P.	Boiler Iron Pipe	Clr.	Clear
Bit.	Bituminous or Bitumen	C.L.	Corporation or City Limits

C.L.T.F.	Chain Link Type Fence	E.F.	Each Face
C.M.B.	Concrete Median Barrier	E.G.	Edge of Gutter
C.M.P.	Corrugated Metal Pipe	Elec.	Electric
Co.	County or Company	El. or Elev.	Elevation
C.O.	Clean Out	E.M.	Edge of Metal (surface)
Col.	Column	Emb.	Embankment
Comp.	Compacted or Composite	E.P.	Edge of Pavement
Conc.	Concrete	Eq.	Equation
Conc. P.	Concrete Pipe	Esmt.	Easement
Conn.	Connection	E.T.L.	Edge of Traveled Lane
Const.	Construction or Construct	E.T.W.	Edge of Traveled Way
Cont.	Continuous	Exc.	Excavation
Cor.	Corner	Exist.	Existing
Corr.	Corrugated	Exp.	Expansion
Cov.	Cover	Ext.	Extension
C.P.	Catch Point	Fa.	Face
Cr.	Crushed or Creek	F.A.	Federal Aid
Crs.	Course	F.B.C.P.C.S.	Fully Bituminous Coated Perforated Corrugated Steel
C. Stn.	Crushed Stone	F.Div.	Field Division
Ct.	Court	Fdn.	Foundation
Ctr.	Center	Fe.	Fence
Cu.	Cubic	Fert.	Fertilizer
Cul.	Culvert	F-F	Face to Face
Cyd	Cubic Yards	F.F.	Front Face
C.Z.	Clear Zone or Construction Zone	F.F.T.F.	Farm Field Type Fence
D	Distribution of Traffic	F. Hyd.	Fire Hydrant
Dbl.	Double	Fig.	Figure
Defl.	Deflection	Fin.	Finish
Desc.	Description	Fix.	Fixed
Dest.	Destroyed	Fl.	Flush
Det.	Detour or Detail		Flow Line (ST_FLOWLINE in IN_Symbols.cel)
Detc.	Detector	Flg.	Flange
D.H.	Drill Hole	F.O.	Fiber Optic
D.H.V.	Design Hourly Volume	F.P.	Fence Post
Dia.	Diameter	F.R.	Frontage Road
Diaph.	Diaphragm	F.S.	Far Side or Foot of Slope
Dim.	Dimension	F.T.	Farm Tile
Dist.	Distance or District	ft	Feet
Dn.	Down	Ftg.	Footing
Dp.	Deep	Fut.	Future
D.S.	Downstream	Fwy.	Freeway
Dr.	Drain or Drive	G.	Garage
Dt.	Ditch	Galv.	Galvanized
Drwg.	Drawing	G.B.A.	Gravel Barrel Array Impact Attenuator
E	East	G.B.E.S._ _	Grated Box End Section (Pipes)
Ea.	Each		
E.B.	Eastbound		
E.B. L.	Eastbound Lane		

Gdr.	Girder	Jct.	Junction
Geod.	Geodetic	Jt.	Joint
G.L.	Gas Line	L	Length of Curve, Liter or Loop
G.P.	Guy Pole	L.A.	Limited Access
G.P.S.	Global Positioning System	L.A.R/W.	Limited Access Right of Way
G.R.	Guard Rail	Lb	Pounds
Grav.	Gravel	L.C.	Long Chord
G.R.E.A.T. ___	GREAT Unit (Bays)	L _c	Length of Circular Curve
G.R.E.T.	Guard Rail End Treatment	L.D.	Loop Detector
G.R.T.	Guardrail Transition	Leng.	Length or Lengthen
Grnd.	Ground	Ln.	Lane
Gr.Sep.	Grade Separation	LRFD	Load Resistance Factor Design
G.S.	Gravel Surfacing	L.S.	Land Surveyor
G.S.P.	Galvanized Steel Pipe	L.S.R.	Local Service Road
Gut.	Gutter	Lt.	Left
G.V.	Gas Valve	Lt. P.	Light Pole
H.H.	Hand Hole	L.W.	Low Water
Hdw.	Headwall	Mac.	Macadam
H.I.	Height of Instrument	Matl.	Material
H.	House	Max.	Maximum
Horiz.	Horizontal	Mbox.	Mailbox
H.P.S.V.	High Pressure Sodium Vapor	Mdwl.	Mudwall
H.S.	High Strength	Meas.	Measured
Ht.	Height	Med.	Median
H.W.	High Water	Mh.	Manhole
H.W.L.	High Water Line	Mi	Miles
Hwy.	Highway	Min.	Minimum, Mineral or Minute
I	Interstate	Misc.	Miscellaneous
I.C.	Incidental Construction	Mkr.	Marker
I.D.	Inside Diameter	ML	Mainline
I.F.	Inside Face	Mncpl.	Municipal
IMSA	International Municipal Signal Association	M.O.	Mid Ordinate
in.	Inches	Mom.	Moment
In to In	Inside to Inside	Mon.	Monument
Inc.	Incorporated	M.P.C.	Mid-Point of Curve
Incl.	Included	N	North
Inlt.	Inlet	N.B.	Northbound
Instr.	Instrument	N.B.L.	Northbound Lane
Inters.	Intersection	N.C.	Normal Crown
Intch.	Interchange	N.E.	Northeast
Inv.	Invert	Neg.	Negative
I.P.	Iron Pipe	NEMA	National Electrical Manufacturers Association
I.P.B.	Iron Pipe Buried Below Plow Depth	N.E.P.L.	No Evidence of Property Line
I.P.F.	Iron Pin Flush	N.F.	Near Face
I.P.L.	Iron Pin Lightly Buried	N.G.	Natural Gas
I.P.N.F.	Iron Pin Not Found	N.G.S.	National Geodetic Survey
		Nl.	Nail

Nly.	Northerly	P.T.	Point of Tangent (End of Curve)
No. or #	Number	Pub.	Public
N.S.	Near Side	Pv.C.	Polyvinyl Chloride
N.W.	Northwest	P.V.C.	Point of Vertical Curve
O.C.	On Centers or Overhead Crossing	P.V.I.	Point of Vertical Intersection
O.D.	Outside Diameter	Pvm't.	Pavement
O.F.	Outside Face	P.V.T.	Point of Vertical Tangent
Off.	Offset	Pwp.	Powerpole
Oh.	Overhang or Overhead	Pwr.	Power (Lines)
O-O	Out to Out	Q	Peak Discharge (Water)
O.P.O.C.	Offset Point on Curve	R.	Range or River
O.P.O.S.T.	Offset Point of Semi-Tangent	Rad. or R.	Radius
O.P.O.T.	Offset Point on Tangent	R.C.	Rapid Curing, Reinforced Concrete or Remove Crown
Out.	Outlet	R.C.P.	Reinforced Concrete Pipe
Oz	Ounces	Rd.	Road
P	Power Cable or Pipe	Rdl.	Radial
P. or Pg.	Page	Rd. N.	Road Nail
P.B.	Pull Box	Rd NF.	Road Nail Flush
P.C.	Point of Curve (Beginning of Curve)	Rd NL.	Road Nail Lightly Buried
P.C.C.	Point of Compound Curve or Portland Cement Concrete	Rdwy.	Roadway
Ped.	Pedestrian	Rec.	Record or Recommended
Pen.	Penetration	Ref.	Reference
Perf.	Perforated	Reinf.	Reinforcement, Reinforcing, Reinforced
P.G.	Profile Grade	Req'd.	Required
P.I.	Point of Intersection	Ret.	Retaining
	Plate (ST_PROPLINE in IN_Symbols.cel)	Rev.	Revised
	Property Line (ST_PROPLINE in IN_Symbols.cel)	R.M.	Reference Monument
Plas.	Plastic	R.P.	Reference Point
P.M.P.	Perforated Metal Pipe	R.P.M.	Raised Pavement Marker
P.O.C.	Point on Curve	R.R.	Railroad
Pos.	Positive	R.R. Spk.	Railroad Spike
P.O.S.T.	Point on Semi-Tangent	Rt.	Right or Route
P.O.T.	Point on Tangent	Rte.	Route
P.O.V.C.	Point on Vertical Curve	R/W	Right-of-Way
Pp.	Pages	R/W Mkr.	Right-of-Way Marker
P.P.B.	Pedestrian Push Button	Rwy.	Railway
P.R.C.	Point of Reverse Curve	S	South
Prest.	Prestressed	S.	Shed
Priv.	Private	San.	Sanitary Sewer
Proc.	Processing	S.B.	Southbound
Proj.	Project or Projected	S.B.L.	Southbound Lane
Prot.	Protect, Protector or Protection	Sched.	Schedule
P.S.D.	Paved Side Ditch	Sdwk.	Sidewalk
Pt.	Point	S.E.	Southeast
		SE	Superelevation
		Sec.	Section or Second

Sec. Line	Section Line	Tfp.	Telephone Pole
Ser. Rd.	Service Road	Temp.	Temperature or Temporary
S.G.	Subgrade	T.O.	Top of Opening
Sht.	Sheet	T.O.B.	Top of Bank
Shldr.	Shoulder	T.O.P.	Top of Pipe
Sig.	Signal	T.O.S.	Top of Slope
S.L.D.	Sea Level Datum	Topog.	Topographic
Sly.	Southerly	T.P.	Turning Point
Spa.	Spaces, Spacing	Trans.	Transmission Line or Transition
Spec. Prov.	Special Provision	Trav.	Traverse
Spk.	Spike	T.T.	Transmission Tower
Spl.	Special or Splice	Twp.	Township (as Center Township)
Sq.	Square	T.W.L.T.L.	Two-Way Left-Turn Lane
Sft	Square Feet	Typ.	Typical
Sq. in.	Square Inches	U.	Unit
S.R.	State Road or State Route	Ug.	Underground
S.S.	Stainless Steel	Uncl.	Unclassified
St.	Street	U'pass.	Underpass
Sta.	Station	U.S.	Upstream
Std.	Standard	U.S.C. & G.S.	U.S. Coast & Geodetic Survey
Std. Spec.	Standard Specifications	U.S.Co.E.	U.S. Corps of Engineers
Stiff.	Stiffener	U.S.F.S.	U.S. Forest Service
Stk.	Staked or Stake	U.S.G.S.	U.S. Geological Survey
Stl.	Steel	U.S.P.L.S.	U.S. Public Land Survey
Str.	Structure, Structural	V	Design Speed or Velocity
Subd.	Subdivision	V.C.	Vertical Curve
Subgr.	Subgrade	Veh.	Vehicle, Vehicular
Substr.	Substructure	Vert.	Vertical
Supstr.	Superstructure	W	West, Wide Flange Beam or Water
Surf.	Surface or Surfacing	W/	With
Surv.	Survey	W.B.	Westbound
S.W.	Southwest or Sidewalk	W.B.L.	Westbound Lane
Sym.	Symmetrical	Wd.	Wood
T.	Tangent Length or Township (as T-6-N)	W.L.	Water Line
T	Ton	Wly.	Westerly
Tan.	Tangent	W.P.	Working Point
T.B.	Test Boring	Wt.	Weight
T.B.M.	Temporary Bench Mark	W.T.	Water Table
Tbr.	Timber	W.V.	Water Valve
Tel.	Telephone	W.W.	Wing Wall or Woven Wire
Tel.C.	Telephone Cable	Xing.	Crossing
Tgp.	Telegraph Pole	Xsec.	Cross Section

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Appendix D Revisions to *CAD Standards Manual*

Revisions to the following sections have been incorporated into this publication of the *CAD Standards Manual*:

Section	Topic	Description of Revision, March 2014
All sections	Hyperlinks to INDOT resources	Revised name and link to DOTWise—INDOT Plans Production and Survey Guide (previously INDOT Plans Production—Plans, Plotting, ProjectWise). Updated all links to CAD Support webpages and locations of documents within the ProjectWise environment.
3.5	Cell Library Files	Removed IN_DetailsMet.cel and added IN_SurveyMonuments.cel to Table 3.5-1.
4.4	INDOT Border / Sheet Models	Revised name of BR_Quantities Sheet to BR_Summary Sheet in Table 4.4-2.
4.8	MicroStation Drawing Names	Revised name of Bearing Details sheet to Sht Bearing Details.dgn/
Appendix A	Standard Prefixes for INDOT CAD Levels	Added _PVMT_ as a standard Second Position Prefix for pavement-related levels, typically used on district resurface plans.

Section	Topic	Description of Revision, September 2013
Table 4.4-2	Models in D Size_Sheets.dgn	Removed SV_Reference Point Box Sheet and SV_Section Corner Reference Card Sheet. Removed SG_Detail Sheet EIT and SG_Detail Sheet PE; replaced with SG_Detail Sheet. Renamed RD_Soil Boring Sheet to BR_Soil Boring Sheet and revised intended use to show that sheet is primarily used on bridge plans.
Table 4.6-1	INDOT Text Styles and Settings for Full- Size Plan Sheets	Added application for 10 Point Text. Clarified that 14 Point Text (Property Owners) should be shown in all upper case.
Appendix A	Standard Prefixes for INDOT CAD Levels	Added E_ to list of First Position Prefixes to be used for existing features not typically recorded during survey. Removed _E_ from list of Second Position Prefixes. Added "erosion control features" to list of intended uses for levels containing _RDWY_ in the second prefix position. Added BD_ to list of First Position Prefixes to be used for elements of sheet border or frame. Added _SHT_ to list of Second Position Prefixes to be used for elements of sheet border or frame.
Appendix B	INDOT Custom Line Styles	Corrected bprwe line style sample. Removed "For Survey Dept use only" from existing and ge line styles. Corrected name of cl double (previously cl 4 lane undiv).

Section	Topic	Description of Revision, March 2013
1.	Introduction	<p>Clarified current expectation that the deliverable continues to be the PDF, not the electronic drawing source files.</p> <p>Added language to emphasize that the current <i>Indiana Design Manual</i> proper governs the content on plans, while this <i>CAD Standards Manual</i> governs the look-and-feel appearance of the plans as well as some structural elements of their CAD source files.</p>
4.2	Line Styles / Line Weights	Added language to indicate that in general, existing features should be shown using dashed lines or other appropriate line styles shown in Appendix B. INDOT's preference is that existing features are also screened back so that they appear lighter than proposed work and are still clearly visible on half-size prints.
4.3	Naming Conventions	Revised text, "The following prefixes should shall be used when naming models and cells related to the various disciplines."
4.4	INDOT Border / Sheet Models	Added note indicating that the borders found in the <i>D Size_sheets.dgn</i> template file are designed to also be used with 22" x 34" format plans. No scaling of the borders is necessary.
4.5	Seed Files, Working Units, and Drawing Scales	<p>Added language indicating that users are expected to use the seed file appropriate for their specific application.</p> <p>INDOT will continue to provide seed files with working units set to both US Customary feet and survey feet.</p>
4.6	Text Styles	<p>Revised text, "Lettering and dimensioning shall should be placed so they may be read from either the bottom of the sheet or the right side of the sheet."</p> <p>Added graphic samples of text styles.</p> <p>Added note describing allowed use of the Bentley font, Working.</p>
4.7	Dimension Styles	<p>Added graphic samples of dimension styles, including example of text justification expected with multiple line text callouts.</p> <p>Added language to allow use of unit punctuation with decimal units.</p>
4.8 Table 4.8-1 Table 4.8-2 Table 4.8-3	MicroStation Drawing Names	<p>Added naming conventions for Detour (Sht MOT Detour nn.dgn) and Temporary Runaround (Sht MOT TR nn.dgn) sheets.</p> <p>Added note regarding use of underscore in file names.</p>
Appendix B	INDOT Custom Line Styles	Added note clarifying meaning of "True Scale LS".
Appendix C	Abbreviations For Use on Plans	Added "Elev." as an acceptable abbreviation for Elevation.
Multiple		Replaced "D-size plans" with "full-size plans" to include both 24" x 36" and 22" x 34" sheets.