Production Solution Products

Release 6
for
AutoCAD Civil 3D

Standards Documentation
for Release 6 for 2016

Table of Contents

1 Overview

1.1 The Complete Template Solution

The supplied Production Solution products are a "collections" of one or more templates:

- **Working or Model Drawing Templates**
  - Both simple and more complex style collections may be supplied
  - Styles and Sets for proposed and existing conditions are supplied within the template(s)
- Two **Sheet Templates** that supports both the Plan Production Tool in Civil 3D and implementation of the AutoCAD Sheet Set Manager
- An Integrated **Sheet Set Template** for the Sheet Set Manager that includes a Uniform Drawing Standard (UDS) based storage structure
- An integrated **Civil 3D Project Template** (also based on the UDS recommendations) that can be used as a basis for project storage and archiving in both AutoCAD Vault and file based project storage scenarios.
- Integrated Layer Standards resources with supplied Layer States. Products may include optional City Standards.
- An entire sample project with working example drawings including a Sheet Set.
- Production Solution base ACAD resource files and additional may be supplied based on the Production Solution product downloaded and/or purchased.
- Trial download versions of platform product will or may not contain all the resources referred to in this document.

1.2 The Project Dataset

A working sample project with resource data, drawings, data shortcuts, and example finished sheets is supplied to help you become familiar with the template collection and its many features and capabilities. Spend the time to play in it.

The sample project also serves as an integral part the continuous development process you should employ to create, manage and maintain production Civil 3D templates. Instructions on how to create an AutoCAD Profile is supplied in the installation instructions that points to the default installation location. You should work on a copy and modify the Profile file locations based on your new project location.

1.2.1 Where is the Project Dataset?

The manual installation process that we recommend for all Production Solution products allows you to locate the sample project at any location you choose.

The default location should be your local computer. It is possible to relocate the project to any network location or to Autodesk Vault server.

See the product Installation Instructions for the specific details needed to accomplish this.

1.3 Easy to Customize

The collection of templates is designed from the ground up to be easily customized and to help you maintain your customization from release to release of Civil 3D.

Even the Trial download product is both a template Management solution and a basic Civil 3D User solution.

Every product collection's templates include common Feature and Label Styles. Typically they contain more than most organizations will employ in production templates.

The Style collections are designed to be thinned down to produce a set of typical production templates for Civil 3D.

The Production Solution product "collections" are designed to provide you with a stable and in-depth collection of standardized Feature Styles to use and/or modify.

The TRIAL collection is designed to provide you with a better place to start in Civil 3D and therefore significantly reduce the time and energy required to implement and maintain Civil 3D within your organization.

You should perform customizations and perform production work in products that you pay for only. The previous Free downloads include minor but intentional errors and omissions.

Paid products (InstantOn products and The Jump Kit) include more variety and more depth of every resource.

- National CAD Standard (NCS 4.0/5.0+) layer names and properties based on the Tri-Service plotting standards are employed
- The base Symbol Set - A standardized set of blocks based on typical Land Desktop symbol libraries is integrated into the supplied Civil 3D Point Feature Styles, Marker Styles, and other Feature and Label Styles where appropriate.
- Additional Symbol Sets may be available for purchase or may be supplied based on the product you have.

- A standardized block naming convention based on an NCS like naming convention is employed.
- The model templates support both native AutoCAD Style-based and the more advanced hierarchical model built into Civil 3D Feature-Label Styles.
- Important Style differences are documented in every individual style throughout the entire collection.
- A standardized and documented set of rule-based Style naming conventions are employed for all Features and their related Label Styles.
- Many configured Sets (collections of Styles) are supplied for all Features that support Set functionality.
- A standardize naming convention is supplied for Textstyles, Linetypes, Blocks, and all necessary and typical AutoCAD resources.
- You will not need or want all the Sets, Feature Styles, and Label Styles supplied included in your production templates
- You will not need or want all the Textstyles, Linetypes, and Blocks.
- You can mix and match as you see fit, and still upgrade in the future with fewer hassles and headaches.
- Complete customization services and training is available upon request. Please, send inquiries to **sales@cadpilot.com**

2 Standards and Conventions

The Production Solution is not only compliant with more published Standards than anything else available in the worldwide civil engineering marketplace for any price.
The platform product is unquestionably becoming an emerging standard itself.
Platform products are in daily use in every State in the United States and in many other countries as well.
Ports of the platform have been done into metric and multiple foreign languages.
Customers include some of the largest civil engineering firms in the world. Many of the ENR top 100 have downloaded and or employ all or portions of the platform.
Many US Local and County governments employ the platform in various flavors.

Many of the US State DOTS have downloaded versions of the platform and/or employ portions or are evaluating it.
Many Federal departments use or are presently evaluating all or portions of the platform.

2.1 Production Solution Tools

Production Solution products employ Excel spreadsheets to standardize, maintain, and create much of the integrated standards supplied and discussed below.
See the separate Production Solution Tools documentation for details about customizing Production Solution products with the spreadsheet tools.
Site Membership and login at cadpilot.com required.

2.2 National CAD Standards

We strongly suggest that you subscribe to and get copy of the National CAD Standard. It is a valuable and useful reference.
The goal of the NCS and its array of included standards is to produce common published plan sets and embrace those needs across all the Architectural, Engineering, and Construction disciplines.
We employ a "civilized" variant of the AIA NCS.
We employ a modified variation of the AIA Major and Minor Key structure optimized for civil engineering, survey, and mapping work.
The Civil variant does not conflict with the AIA Keys and we check for new conflicts when NCS releases occur.
Our Standard Keys are an Open resources and may be downloaded from **www.cadpilot.com**

2.2.1 A Path of Least Resistance

The published NCS standards and recommendations are the path of *least resistance*. By *least resistance* we mean, it is easier to take the skilled and experienced work of others and modify that than to recreate the wheel from scratch.
As a nationally recognized (and more frequently required) governmental standard, the NCS is easier to simply use and work around than ignore or fight.
The NCS is not perfect, it does provide a common ground across the many Architectural, Engineering, and Construction disciplines.
The NCS is notably short on Civil Engineering details. While conforming to all the NCS intent and many details, we have

filled in the Civil Engineering gaps for you and your implementation of AutoCAD Civil 3D.
We supply a civilized NCS.

2.2.2 NCS Layer Standard Version (NCS)

The National CAD Standard version 4.0/5.0 layer standards naming conventions were employed in the construction of the product's templates.
Many other recommendations of the NCS are employed in the construction of the various templates and other support files contained within the product or are available in other platform products.

2.2.3 Uniform Drawing Standards (UDS)

The Uniform Drawing Standards recommendations and naming conventions were employed in:
o   Civil 3D project folder template –
    a project folder structure to work in Civil 3D
o   Civil 3D Sheet Set customizable dst file –
    the Sheet Set approach for consistent plotting
o   The example Layouts and the included titleblocks supplied generally conform to NCS/UDS conventions

2.2.4 Tri-Service and Department of Defense Plotting Standards

The Tri-Service plotting (output) conventions and general recommendations were applied to layer properties and the other important relationships between color and output as they apply to both feature and label styles in Civil 3D.
o   ByLayer properties were used in Civil 3D feature and label styles used for construction documentation output
o   ByBlock and/or other forced component properties were used in some design feature and label styles where this made sense. Primarily this method of style is used for quality assurance and working design styles.

2.3   Layer Properties

All the templates employ a consistent set of Layer properties that should meet most commercial, governmental and general GIS requirements with only minor modifications. The layer names are NCS compliant and employ the systematic NCS rule based arrangement to layer name construction. We employ the "large" project naming convention as this works best for most organizations and allows easier integration with work from the other Architectural, Engineering, and Construction (AEC) disciplines.

2.3.1 The layer standard with hyphen separators:

<Discipline>-<Major Key>-<Minor Key>-<Detail>
o   This is the NCS "Large" Project Layer Naming Convention
o   Discipline is a Single character
o   All Major and Minor Categories use 4 letter codes
o   Detail typically also uses a 4 letter code but a 1 letter code may be used in certain special circumstances
o   Since Civil 3D will not require you to make lots of changes to Layer States in typical project drawings, the NCS Layer Standard and naming convention makes sense for most firms and governmental organizations.
o   Autodesk's example templates also employ the NCS layer format so any previous experience and the product's included training materials will generally employ a similar layer system
o   Layer Rename scripts, the Layer Manager tool, and or Map queries can be employed to change the named layers employed.
    Rename layers in a drawing with the Civil 3D Styles you want to use already in place.
o   Sample Design and Survey Layer States files are included with the template and may be employed to help you create and maintain different versions of the template.

2.3.2 Utility Layers

o   The AIA based layer standards of the NCS employ Major Categories for utilities that are not alphabetically arranged. (e.g. SSWR, WATR, etc.).
o   Major Categories beginning with "UT" were used in the templates to better group typical civil engineering utility layers
    This is compliant with the recommendations and far more usable in a production civil environment.
o   Sample layer scripts are supplied with most products to conform final deliverables to a strict NCS Major Group Layer convention for utilities.

2.3.3 Proposed Conditions

o   All Features and Labels are routed by component to NCS Design "C-" layers

- o Proposed (design) label styles use the "Proposed" textstyle by default.
  Prior versions used an "arial" textstyle by default
- o Label Styles for Features employ a (Pr) prefix when the style is used to annotate design
- o Label Styles for Profile and Section View typically are designed to display Above the feature and to the left
- o A "Design" Layer State and external file is provided

2.3.4 Existing Conditions

- o All Features and Labels are routed by component to NCS Survey "V-" layers
- o Existing conditions label styles use the "Existing" textstyle
  Prior versions employed "oarial" textstyle by default or are forced to an italic arial when necessary in labels contain both conditions
- o Label Styles for Features employ an (Ex) prefix when the style is used to annotate survey and/or existing conditions
- o Label Styles for Profile and Section View typically are designed to display Below the feature and to the right
- o A "Survey" Layer State and external file is provided

2.4 Text Layers

2.4.1 NCS -LABL Layers

- o Civil 3D Label Styles are different and more complex object than the text primitives expected by the National CAD Standard recommendations.
- o By default all Feature generated labels are sent to NCS Design and Survey layers ending in "–LABL" to clarify this innate difference.
- o LABL layers can be easily renamed to the default NCS "IDEN" modifier if required
- o General text labels are routed to an NCS General "C-ANNO" layer(s)

2.4.2 NCS -TEXT Layers

- o Layers with NCS "–TEXT" endings are supplied throughout the layer list but are NOT employed for the supplied Feature Label Styles. "–TEXT" layers are supplied for manually entered text not generated by Label Styles.

2.5 Layer Color Properties

The colors of layers in the template have a formal relationship to actual line weights and screening in plots produced from the template(s) supplied in any platform products.

2.5.1 Simple Color Rules

Production Solution products never use the first 16-19 colors except Black|White.

- Why? People simply don't act like they actually care about what others do with their colors.
- The odds are if you work with anyone else they use these old school colors more than anything else.
- If they use CTB, they are usually adamant about what their color to lineweight means to them. You don't have to argue about that. You're smart and employ a dumb down to CTB template to publish for them.

2.5.2 Last Digit Rule

The Last Digit Rule employs ONLY the final digit of an AutoCAD color in the ACI color table to derive the properties of the Layer. Essentially any color SHADE (first digits) may be employed for a Key and the properties of the Layer.
The last digit of the color index number (ACI) is mapped to a lineweight
We employ this simple table based on NCS recommendations and NCS named plotstyles.
There's significantly less to learn and remember. This is exactly the point.

MM	STB	STB Screened	%	Color Digit
0.000	Invisible Ink			
0.180	Fine	Fine screened	50	0
0.250	Thin	Thin screened	50	1
0.350	Medium	Medium screened	50	2,3
0.500	Wide	Wide screened	50	4
0.700	Extra Wide	Extra Wide screened	50	5
1.000	Moderate Bold	Moderate Bold screened	50	6
1.400	Bold	Bold screened	50	7

2.000	Extra Bold	Extra Bold screened	50	8

No one says you can't tweak the table perhaps to employ more final digits and or different Named plotstyles in a category as done with 2 and 3 the table above.

Layer Standards employ the last digit of 2 for *proposed* **Mediums** and 3 for *existing* **Mediums** for consistency's sake.

The next digits reading from right to left in the ACI number and color table determine the SHADE of color. We employ regular themes in our supplied Layer States. VEGE stuff shades of green and the various UTILs is the obvious shades of color for example.

Utility colors approximate standard USA roadway markup colors

Changing the SHADES applied to Civil 3D's numerous annotative layers can theme your Civil 3D templates and drawings in dramatic fashion, if you are so inclined. The C3D View Features and related layers based on the Standard Keys demonstrate clearly how a theme may be done.

2.5.3 Black or White Background Matters

Layer Standards employ the next digits reading right to left to the help manage color visibility differences between black and white screen backgrounds. For example: yellow is easy to see on black but problematic on white.

The device of adding or subtracting 100 for these problematic ACI numbers (Shades of Color) works with our supplied system management tools.

2.5.4 Layer Standards Spreadsheet

A Layer Standards spreadsheet is supplied with InstantOn and Jump Kit products that allows rapid customization of the Layer properties.

2.5.5 Color is a Matter of Choice

We employ named plot style (STB) methodology instead of the older color based (CTB).

Therefore, you can assign layer property color to ANY Shade of color you prefer without changing the final output which is determined by Plotstyle. (see the Last Digit Rule)

Layer or Object Color does not matter.

Why STB? STB is functionally easier to employ to produce consistent output in Civil 3D. We recognize that many firms employ the traditional CTB plotting method. However, CTB practically is more difficult and more expensive in man-hours to employ than the STB method. Layer properties are not as important in the dynamic Model and Style centric structure of Civil 3D.

2.5.6 Basic AutoCAD Colors

By intent none of the first ACAD 9 colors are employed in any layer in the template(s). There are simply too many different usages in place for these colors to be the basis of a generalized standard.

The Tri-Services standard (part of the NCS) color plotting convention are used to assign colors and lineweight to layers. The NCS standard employs the last color number digit method to assign final plotted line weight to all colors except the first single digit colors.

You can change any layer color properties to suit your preferences but still produce consistent output using the STB method and the supplied STB support files.

o Monochrome and Color Plotstyle support files are supplied and support screening

o Layer States are included in the templates and external versions are also provided to help you maintain and track changes

2.5.7 Tri-Services Plotting Guidelines

The template layers employ the US Department of Defense (DOD) or Tri-Services Plotting guidelines color property to line weight conventions and guidelines as mentioned above. These conventions conform to the NCS 4.0/5.0 version with minor variations.

o The use of the first 9 "basic" AutoCAD colors was intentionally avoided in the construction of the template.

o A number of Civil 3D Features Styles may employ colors forced for specific Feature Components. You can find these in the Display tab of the Feature Style.

o Forced Component Colors are documented in the template(s) in the Description field on the Information tab of the Style

The following table expresses the color numbering to named plot style employed in the templates.

Basic Color Number to Pen Weight to Plotstyle

Color	Pen Weight	Plotstyle
Ends in 0	0.18mm	Fine or Fine Screened

Ends in 1	0.20mm	Thin or Thin Screened
Ends in 2	0.35mm	Medium or Medium Screened
Ends in 3	0.35mm	Medium or Medium Screened
Ends in 4	0.50mm	Bold or Bold Screened

2.5.8 NCS 4.0/5.0 Plotting Guideline Changes

All color conditions were specifically removed from the NCS in the 4.0+ versions. An optional block of specific colors was set aside for screening.

2.6   Linetypes

A minimum number of basic AutoCAD linetypes are employed in the product templates. There is a lot of organizational and jurisdiction preference in regards to linetype.

For the Production Solution itself we intentionally chose a "leave it alone" linetype strategy. This allows you to load your own custom linetypes and apply them to Layers as you see fit.

o   Most of the layers are set to the AutoCAD default "Continuous" linetype

o   The Civil 3D feature and label styles in the template intended for final output all use a ByLayer convention. Therefore, modifying the linetype properties of the output layer will change all the related feature style output.

o   A few layers are set to other typical and long employed AutoCAD linetypes merely to differentiate linework where it was deemed necessary as an example and clarification

o   A few Civil 3D styles employ linetypes forced for specific Feature Components. You can find these in the Display tab of the Feature Style.

o   Forced Component linetypes are documented in the template(s) in the Description field on the Information tab of the Style

o   Specific Production Solution products may include specific and/or additional ACAD linetype resource files.

2.6.1 Load and Assign Linetypes

You will need to Load and Assign to Layers your own specific Linetypes according to your preferences.

We recommend doing this in templates used for publishing and not in model templates except as necessary.

o   The Platform product includes NCS compliant linetype and NCS compliant shape files (.shx).

o   These resources files may be found in the common resources folder in a Linetypes folder.
This folder may not exist in Trial downloads.

o   The linetype resource files if employed should be made available in each user's typical AutoCAD Profile Support path.

o   Specific Production Solution products may include specific and/or additional Layer State files that may be employed to Set Layer Linetype Properties.

2.6.2 Linetype Naming Convention

The default ACAD linetypes are NOT renamed and the supplied resource file includes the common acad.lin typetypes unchanged to allow for backward compatibility.

For other linetypes Platform products employ an NCS "like" linetype naming convention.

The intent is to make Linetype assignment By Layer or Civil 3D Feature Display tab properties a simpler using a by Name match methodology.

o   Common NCS Major Group codes are employed in the naming convention.

o   The platform's modified civil utility Major Group Codes of "UTXX" (where the two final characters define the utility type) are employed.

o   A "C-" predicate implies the linetype is intended for proposed conditions.
"C-" linetypes with text employ CAPITOL letters

o   A "V-"predicate implies the linetypes is intended for existing conditions.
"V-" linetypes with text employ lowercase letters
NCS compliant text linetypes with X subscripts are also included for major utility types

2.6.3 NCS 4.0/5.0 Linetype Resources

Beyond the linetype naming conventions listed above the NCS versions of Production Solution products include a special resource files (a .lin and .shx files) to add support for typical NCS linetype conventions.

The included NCS40.lin and NCS50.lin files includes the specific documented linetype details. Check that resource file. The other general details are summarized below.

o   Linetypes that include referenced named NCS SHAPES reference a default NCS40.shx file

- All linetypes are based on the public domain NCS40 linetype specification.
  Minor modifications have been made for architectural to civil units and default text heights.
- All text in linetypes employs the NCS compliant Arial Windows True Type font by reference to a named textstyle.
  Production Solution NCS 4.0/5.0 products employ a "Proposed" textstyle.
  Early versions employed an "Arial" textstyle.
  The textstyle must exist in drawings prior to loading linetypes or load errors will occur.
- A default 0.1 text height is used for linetypes that include text
- Prototype Text based linetypes are supplied in the .lin files
- Support for classic NCS subscript "x"
- Support for typical DOT upper and lower case "condition" based linetypes
- Support for all common external NCS utilities
- Support for typical pipes and materials
- Support of typical property, boundaries, and related right-of-ways
- Support for common NCS site features – fences, hedge lines, treelines, water features, etc.

2.7   Plotstyles

The Civil 3D drawing templates included in the product are all based on named plotstyle (STB) and NOT color based (CTB) plot methodology. (see below).

- A separate STB based set of Assembly drawings and a Tool Palette that references these drawings is provided.
- Specific Production Solution products may include specific and/or additional STB resource files.

2.7.1 Layer Standards Spreadsheet

A Layer Standards spreadsheet is supplied with InstantOn and Jump Kit products that allows rapid customization of the Layer properties.

2.8   Style Based Plotting (STB)

The template collection is delivered with multiple NCS compliant STB files and relies on named plotstyles rather than older and potentially more confusing color table based (CTB) files.

- The included STB files need to be located properly in the Support path as a resource for every computer that employs the template(s).

2.8.1 Reasons to use STB

There are a host of good reasons to make the change from CTB to STB when you move to Civil 3D. Civil 3D features contain multiple components which can automatically go to multiple layers based on the current AutoCAD view direction of the feature. This is called a Display Representation. Civil 3D will typically use more layers than LDT and other traditional ACAD based applications, but users should spend significantly less time in the Layer Manager.

Styles control how things look in Civil 3D NOT layer properties. The STB approach allows you to use color any way you like visually on the screen, but still produce consistent plotted output. Users have less to worry about and to get all the details "right" at project crunch time – plot time.

- Both monochromatic and color based versions of the STB files.
- A Colors Layer State file is supplied to aid the editing and maintenance of your Layer Colors
- Recognize that you can employ one or more modified color based STB files (not supplied) to create quality control and other specialized output. Coupled dwf plots from color STBs can make checking and redlining processes much faster.
- It is possible to convert the STB templates to CTB versions using built in tools in Civil 3D. This is not recommended, but possible with minor effort.

2.9   Hatches and Fills

Only basic hatch patterns included with Civil 3D are employed in the template(s). It was not our intention or expectation that typical users will be satisfied with the basic hatches and examples in the template(s).

- Only where necessary are hatches scaled and rotated to clarify output.
- Civil 3D Shape Styles employ hatches as an integral part of the display of Shapes in Plan, Section Views and in Assemblies.
- Shape Component hatches are NOT documented in the template(s) in the Description field on the Information tab of the Style.
- The Display tab for the Shape Style will show you the hatch patterns used.

- o Piping Pipes and Structure also include the ability to include hatches when published in Profile and Section Views.
- o All hatches are sent to various layers ending with "-PATT" in the NCS layer scheme employed
- o By default –PATT layers are screened in the templates
- o Specific Production Solution products may include specific and/or additional .pat resource files.

2.9.1 Load and Assign Hatches

You will need to Load your own .pat file and Assign specific hatch patterns with the Feature Styles where appropriate. NCS PATT Layers all supplied for you to route the hatching to the typically output Layers.

2.10 Fonts and Textstyles

We employ two common Windows True Type fonts in all the labels styles in the template(s) - arial and arial italic.
The Sheet template(s) also employ arial Windows True Type font
There are multiple AutoCAD textstyles supplied in the template. Most are supplied as examples and are NOT used in the Styles supplied.

- o Both regular and annotative textstyles are supplied but no annotative textstyles are used within the feature labels styles in the current release.
- o All the labels styles employ traditional (non-annotative) textstyles by default
- o Additional existing named textstyles employed in typical Autodesk supplied block libraries and other resources are supplied in the templates.
  All the supplied textstyles are modified to employ the arial Windows True Type font.

2.10.1 Default Proposed and Existing Textstyles

- o The default textstyle for all proposed and design conditions is named "Proposed".
  This textstyle employs the arial Windows True Type font with a 0 degree oblique angle
  Previous versions of the platform employed the textstyle named "arial"
- o The default textstyle for all existing conditions is named "Existing".

This textstyle employs the arial Windows True Type font with a 11 degree oblique angle
Release 5 product employed a arial italic
Earler versions of the platform employed the textstyle named "oarial"

- o Changing the Label Style Defaults textstyle at the root Drawing Setting and or Feature level will convert most label styles below that level to use any textstyle you choose.
- o Note that some Label Styles below Parents have overrides applied at a lower level.
  These are easy to identify based on their typical (Pr) and (Ex) naming convention prefixes. (see below about Condition based naming conventions)

2.10.2   Load and/or Edit Textstyles

You may want to Load and reference your own font files. Take some care to employ fonts that map approximately to the standardized Windows True Type fonts we employ.
The NCS recommends you employ Windows arial True Type fonts or an equivalent font.

- o Editing the fonts employed within the default textstyles will change the display text down to the Symbol level.
  In other words, changing the font applied to the Proposed or Existing textstyles to Roman versions of these fonts will update all the structured references with a drawing or template.
- o You can assign new textstyles via Label Style Defaults at various levels within most Features.

2.11 Blocks

2.11.1   Model Templates

The template(s) contain a library of typical civil engineering symbols.

- o The base Symbol Set - A standardized set of blocks based on typical Land Desktop symbol libraries is integrated into the supplied Civil 3D Point Feature Styles. Marker Styles and other Feature and Label Styles where appropriate
- o Additional Symbol Sets may be available for purchase or may be supplied based on the Production Solution product you have

- A standardized block naming convention based on an NCS like naming convention is employed

Both NCS Design and Survey blocks are supplied.

- NCS Design block names begin with "C-"
- NCS Survey block names begin with "V-"

In the base Symbol Set most of the named blocks are renamed versions of classic Land Desktop symbols commonly used by many firms.

In many cases the blocks are duplicates. The different named blocks are supplied so they may be easily customized to produce different Proposed and Existing versions as you see fit.

Other typical Civil 3D blocks that are included in the standard or default Civil 3D block library are also included.

A few other blocks are also included and may be employed in Markers Styles, Features and their Label Styles.

2.11.2   Symbols and Blocks

Blocks represent a key and very significant graphic ingredient to successful plan set publication. Block graphics coupled with text are the primary means by which information is passed in published work.

Traditional AutoCAD blocks are used differently within Civil 3D than in AutoCAD. AutoCAD blocks are typically wrapped into Civil 3D Feature objects and their attached and integrated Feature Labels Styles. This allows the Feature and Label to scale automatically for publication. Secondly, the textual information is generated and updated directly from the Feature and represented via attached Labels and not by traditional AutoCAD attribute data.

We refer to these wrapped or "wrappered" blocks as "Symbols" to differentiate this key aspect.

2.11.3   Symbol Sets

A collection of named Symbols is referred to as a "Symbol Set" in the Production Solution product line.

Symbol Sets are designed to be replaceable allowing you to insert Civil 3D drawing data that uses one Symbol Set into a drawing that uses another Symbol Set to publish your work to multiple graphic Standards more easily.

Symbol Sets therefore employ exactly the same Symbol Names but vary in the specifics of the graphic representation attached to the symbol.

The names of the blocks in the Symbol Set are the same, but the pictures employ can be different.

- The default platform Symbol Set is based on the standard Land Desktop based symbol libraries and blocks
- Additional NCS compliant blocks are included
- All blocks have been cleaned and modified to conform to platform naming conventions for textstyle, linetype, etc.
- Most symbolic blocks are constructed within a 1 unit square or circle and employ unit less definition. These blocks can therefore be employed in metric conversion without modification.
- All the blocks employ the "Proposed" and "Existing" textstyle naming convention
- Specific products may or may not include separate independent block libraries and/or Tool Pallets.
- Specific templates may include selection sets (parts) of the complete default Symbol Set.
- Specific Production Solution products may include specific and/or additional Symbol Sets and resource files.

2.11.4   Block Naming Convention

Standardization of Block names is a critical component to successful Symbol Set replacement methodology and practice.

The AutoCAD blocks included in are categorized and named according to the following generalized naming rule:

<NCS Discipline>-<Major>-<Common Name><Version>

A proposed sewer manhole Symbol is named:
"C-UTSS-MHOL"

A Point Style employing this Symbol would has the same platform name:
"C-UTSS-Mhol –JS"

2.11.5   Sheet and Layout Template Blocks

Only sample title blocks and a Civil 3D view Callout tag block from the current version of Civil are included.

These are necessary to understand and successfully employ the Sheet Set Manager and included Sheet Set template successfully.

3 Hierarchy, Customization, and Maintenance

3.1 Civil 3D Style and Setting Hierarchy

Civil 3D employs a hierarchical model to Styles (how things look) and Settings (how the software behaves). Changes made at higher levels in the Civil 3D Toolspace Settings tab cascade down to lower levels unless there is an existing child override already applied at the lower level.

3.1.1 Hierarchy in Civil 3D

Here are the three levels of hierarchy in Civil 3D:
o Drawing Level
o Feature/Style Level
o Command/Object/Instance Level

The template(s) are constructed with this hierarchical structure and methodology in mind.

3.1.2 Label Style Defaults (LSD)

The hierarchical model applies to Feature Label Styles. Label Style Defaults may be applied down to the Label Style"Type" level in all releases of the product.

3.1.3 Parent and Child Label Styles

Below the Label Style Type level one Label Style may control most of the properties of other Labels. This is referred to as a "parent child relationship".
 If you are familiar with AutoCAD dimension styles, the vernacular is essentially the same.

3.2 A Template is the Top Level of the Hierarchy

From a template (or any drawing) you can import and/or overwrite styles.
o Be careful about copying groups of styles between drawings from middle levels in the tree. Depending on the release of Civil 3D you are using you may get unexpected results.
o Styles in use are clearly marked in the Toolspace Settings tree with an icon. Make sure you refresh the Toolspace itself before depending on the current use display.

o A style that is referenced by another Style or Set is in use even though it may not be used directly in the current drawing.
o You can replace references to one named Style with another in the Setting tab of the Toolspace
o You can easily Delete or Purge styles that are not in use.
o To Delete a parent style you must Delete all the child styles that refer to the parent first.

The Import and Purge Utilities
o Newer version of Civil 3D include Import and Purge utilities. These are found in the Manage Ribbon.
o The Import Style utility currently does not support Description Key Set imports.
o Be careful not to Purge "Standard" styles as these are required for most Civil 3D Features in the object model.

3.2.1 You must manage changes in the template(s) you employ.

1. Do not change templates used in production too frequently.

- We recommend that you only deploy changes on a quarterly or on a new project basis.
- Consistency should rule over immediacy.

2. Employ a formal Change Management process (**Plan Do Check Act)** loop to the modification of the template(s).

- Plan – write up why and what you plan to change
- Do – make the change and document How you did it
- Check – use live data to make sure the change performs as you expect
- Act – assess, fix and correct the documentation
- Repeat until done

3. Employ a naming convention to all styles

- Style naming is even more important than layer naming conventions and issues you are familiar with in AutoCAD, Land Desktop, or other previous third party applications
- The product ships with a reasonable, consistent, and usable Style naming convention in place

4. Document styles in the Description property of the style.

- What is the style used for
- Why is it different
- For label styles we recommend more detail so users do not have to root around to understand the label.

5. Simplify whenever and wherever possible.

- Ruthlessly remove styles you do not use
- Remember that you can employ special templates to store special and/or rarely used styles.
- A needed style can be added to production drawings from specialized templates as needed.
- You do not have to, nor should you attempt to, cover every possible style need or scenario in the model template(s) you employ in production.

3.3   The Simple Style Rules

1. Never edit a Style in a production drawing.

- This creates chaos and inconsistency in your production drawings and projects.
- You will be tempted to break Rule #1.
  You will do it.
  You will probably regret it later.
- You are much more likely to lose data and/or corrupt styles and related features when you edit styles In Use in a drawing.

2. Always Use Copy and/or New to create a different named version of the style if you must make a change in a production drawing.

- Employ the Apply button when changing tabs and before using the OK button
- Save frequently when editing styles
- If you do not like things and want to change them, do so at the highest level possible.

3. Always test your results with a standard test drawing that includes both Civil 3D data and typical production Layouts that actually plot on your hardware and that you understand thoroughly.

3.4   The Hierarchy Rules

1. Get the Drawing Settings Right

- Adjust the Default settings for your common usage in you production template(s)
- Document your changes
- Check Drawing Settings in new drawings
- Review Drawing Label Style Defaults

2. Get the Feature Settings Right

- Adjust the Default Styles for your common usage in your production template(s)
- Document your changes
- Check them before you bring in data or start to work
- Review Feature Label Style Defaults

3. Label Style Issues

- Always Add & Name the components in Parents
- Be careful of reconnecting the parts differently
- Never change the component Name in a child
- Expressions CANNOT be renamed only rebuilt

3.5   Multiple Model Templates

The product contains multiple model drawing templates used for the creation, editing, and maintenance of the Civil 3D project model.

Our approach to these templates is based on a "thin down what you do not need" methodology rather than supplying many separate and different templates. In other words, you will not need or use all the styles and layers included in your production templates.

Secondly, Feature and Command Settings are NOT set in the templates as references in these locations make deleting unwanted styles more cumbersome.

3.5.1 The Basic Templates

A "NoStyles" template containing only "Standard" styles. The NoStyles template is useful for:

o   Storing project data used as data references

o   A basis for constructing custom templates

Multiple working Model templates - a "Simple" and more complex sets of Civil 3D styles.

o   "Simple" and more complex "Design" templates

o   "Simple" and more complex "Survey" templates

o   A "Resources" template that exists as a backup of the complex "Design" template

The templates intentionally contain the same layers (with different layer properties) and the similar sets of "Simple" and more in-depth feature and label styles.

3.5.2 Complementary Layer State files

A collection of "Design" and "Survey" Layer State files are supplied so that you can manage the layer properties of the templates as necessary. Both black and white background compatable versions of the Layer State files are supplied.

Layer Standards files included Layer State collections.

The Design and Survey templates were set up this way so you can do an entire small project in just one drawing.

o   This is NOT the best way to use Civil 3D in production, but most firms have the need from time to time.

You will NOT need all the styles and all the layers in both templates.

You will need to set Feature and Command setting defaults in your production templates.

3.5.3 Make a Backup Copy of All the Templates

•   We are human and we will mess things up. Before you change it, back it up.

3.5.4 Delete Styles in Production Templates

o   Use an example drawing from the supplied project (or one that you create) and evaluate the important feature styles and their related label styles.

o   The goal is NOT to see all the cool things you can do with ALL the Civil 3D styles in the templates, but exactly the opposite – eliminate everything that you do NOT NEED.

o   Identity the Styles and Label Style you want to keep for a Feature

o   Identify the ones you want to delete.

If there is a Label Set associated with the Feature, you must adjust the list of label styles included the existing Labels Sets before you begin actually removing label styles for the Feature. Otherwise you will need to rebuild the Label Sets manually.

o   Identify Styles you want to remove that are currently used in the Sets and replace the styles in use with ones you want to keep or "Standard" styles

o   Delete styles that you do NOT expect to use immediately.

You can create one or more special templates to hold the styles you MIGHT use occasionally.

Civil 3D makes it relatively easy to get styles from one drawing to another via drag and drop and the Import utility.

o   You can use the built-in Overwrite facility in Civil 3D to fix Styles in a drawing when you accidently break the Simple Style Rules and mess up a production drawing.
It will happen.

o   Always use the –PURGE command to purge the Regapps from your templates

o   ALWAYS use the RECOVER and/or AUDIT command on EVERY edited template BEFORE you put the template to use in production. Broken Sets and Styles will produce errors in the file that need to be fixed.

o   During the Audit process watch and review the command line history for errors and fixes.

3.5.5 Thin down the Design Templates

You should probably remove many of the Survey "V" layers and Survey (Ex) styles from the Design template to work on larger multiple drawing projects.

o   Layers referenced in Styles or Label Styles cannot be removed or purged.

The existing conditions may often be Xrefed or data referenced into design publishing drawings.

3.5.6 Thin Down the Survey Template

You should probably remove many of the Design "C" layers and the Design (Pr) styles from the Survey template.

o   Layers referenced in Styles or Label Styles cannot be removed or purged.

The proposed conditions may often be Xrefed or data referenced into survey publishing drawings.

There are some Design layers and styles you need to keep in your Survey template to view and error check Profile and Section data of existing conditions.

4 Fonts and Text Styles

4.1.1 Proposed is the Default Textstyle

The default textstyle for all label styles in all templates is named "Proposed".

The Proposed textstyle references (or is connected to) the externally referenced Windows True Type font – "Arial".

The use of this font conforms to the NCS 4.0/5.0 recommendations.

In prior versions of all platform products this textstyle was named "arial".

You can update drawings employing older standards by using the AutoCAD RENAME command or Style command to rename "arial" to "Proposed".

A complimentary textstyle named "Existing" is also based on Arial with a default 11 oblique angle to also conform to the NCS 4.0/5.0 recommendations.

 In prior releases this textstyle was called "oarial" and it employed an 11 obligue property.

o The "Proposed" and "Existing" named textstyles are used by default in all Feature related Label Styles.

o Table styles previously employed a "verdana" but now conform to platform these currect platform standards.

4.1.2 Referenced Textstyles

o The default Symbol Set employs blocks that include ONLY references to these included textstyles.

o There may be a few block referenced (nested) textstyles contained in some product template(s).

o Be careful not to inadvertently introduce new unwanted textstyles into your production templates via block references.

4.1.3 Modified Historic Textstyles

The commonly used historic textstyles employed in Autodesk supplied block libraries are not included in templates, but are supplied in a separate resource file.

o All the supplied historic textstyles have been modified to employ the default Arial Windows True Type font for consistency.

Text Style	Description	Font	Plotted Size
Proposed	New Proposed	Arial	0
Existing	New Existing	Arial	0
arial	Previously used for Proposed	Arial	0
oarial	Previously used for Existing	Arial with 11 oblique	0
verdana	Previously Used for Table Styles	Not Used	0
overdana	Not Used	Not Used	0

5 Hatch Patterns

Only the hatch patterns supplied in the typical AutoCAD Civil 3D install are employed.

o Symbol Sets that are often supplied with Production Solution products may contain additional and specialized hatch patterns.

o Be careful not to inadvertently introduce new unwanted or unreferenced hatch patterns into your production templates.

6 Layers

There are a significant number of unused and/or unreferenced Layers in the templates.

Instead of supplying lots of templates with lots of different collections of Layers a single set of Layers is employed in all the Working templates.

6.1.1 Delete unwanted Layers

You should remove unnecessary layers from you production templates.

Many of the unreferenced layers in the templates are referenced in the supplied Description Key Sets.

6.1.2 Renaming Layers

You may rename the Layers in the templates with Layer rename script files. Do this with the Styles and Label Styles in place in the template as this will update the referenced Layers in the Styles at the same time.

6.1.3 Layer State External Files

External Layer State files are supplied to change drawings from Proposed to Existing conditions.

The templates all employ STB plotting methodology. Therefore, you can change colors of layers at will. However, it is probably a good idea to conform to the NCS Standard Tri-Service color to lineweight rules to make things easier to maintain.

The Jump Kit product contains basic Excel data tables that edit and used to create Rename scripts to make changes.

Layer Rename processes should be performed in drawings that contain the referencing Feature and Label Styles.

The previously supplied Layer table has been removed from this document. The raw data is a more useful resource than the printed table.

See the Resources\Layer Standards folder in the produce for the supplied resources available to you.

7 Reports

Only the default Civil 3D reports supplied in the typical install are employed.

8 Drawing Settings > Object Layers

8.1 Design Templates

The following default Object layers are used in Design templates:

Specifics may vary by product.

Object	Layer
Alignment	C-ALGN
Alignment-Labeling	C-ALGN-LABL
Alignment Table	C-ALGN-TABL
Appurtenance	C-UTIL-STRC
Appurtenance-Labeling	C-UTIL-STRC-LABL
Assembly	C-VIEW-SCTN
Building Site	A-BLDG
Cant View	C-VIEW-PROF
Catchment	C-HYDR-CTCH
Catchment-Labeling	C-HYDR-CTCH-LABL
Corridor	C-ALIN-CORR
Corridor Section	C-VIEW-SCTN
Feature Line	C-SITE-FEAT
Fitting	C-UTIL-STRC
Fitting-Labeling	C-UTIL-STRC-LABL
General Note Label	C-ANNO-LABL
General Segment Label	C-PROP-LABL
Grading	C-TOPO
Grading-Labeling	C-TOPO-LABL
Grid Surface	C-TINN-GRID
Grid Surface-Labeling	C-TOPO-LABL
Interference	C-UTIL-STRC-LABL
Intersection	C-ALGN-INTS
Intersection-Labeling	C-ALGN-LABL
Mass Haul Line	C-VIEW-MASS-LINE
Mass Haul View	C-VIEW-MASS
Match Line	C-ANNO-MTCH
Match Line-Labeling	C-ANNO-MTCH-LABL
Material Section	C-VIEW-SCTN-PATT
Material Table	C-VIEW-SCTN-LABL
Parcel	C-PROP
Parcel-Labeling	C-PROP-LABL
Parcel Segment	C-PROP-LINE
Parcel Segment-Labeling	C-PROP-LINE-LABL
Parcel Table	C-PROP-TABL
Pipe	C-UTIL
Pipe-Labeling	C-UTIL-LABL

Pipe and Structure Table	C-UTIL-LABL
Pipe Network Section	C-VIEW-SCTN-LINE
Pipe or Structure Profile	C-VIEW-PROF-LINE
Point Table	C-NODE-LABL
Pressure Network Section	C-VIEW-SCTN-UTIL
Pressure Part Profile	C-VIEW-PROF-LINE
Pressure Part Table	C-UTIL-LABL
Pressure Pipe	C-UTIL-STRC
Pressure Pipe-Labeling	C-UTIL-STRC-LABL
Profile	C-VIEW-PROF-LINE
Profile-Labeling	C-VIEW-PROF-LABL
Profile View	C-VIEW-PROF
Profile View-Labeling	C-VIEW-PROF-LABL
Sample Line	C-ALGN-SAMP
Sample Line-Labeling	C-ALGN-SAMP-LABL
Section	C-VIEW-SCTN-LINE
Section-Labeling	C-VIEW-SCTN-LABL
Section View	C-VIEW-SCTN
Section View-Labeling	C-VIEW-SCTN-LABL
Section View Quantity Takeoff Table	C-VIEW-SCTN-LABL
Sheet	C-VIEW-SCTN-SHET
Structure	C-UTIL-STRC
Structure-Labeling	C-UTIL-STRC-LABL
Subassembly	C-VIEW-SCTN
Superelevation View	C-VIEW-SUPR-LABL
Surface Legend Table	C-TOPO-TABL
Survey Figure	V-BRKL
Survey Figure-Labeling	V-SURV-LABL
Survey Figure Segment Label	V-SURV-LABL
Survey Network	V-CTRL
Tin Surface	C-TOPO
Tin Surface-Labeling	C-TOPO-LABL
View Frame	C-NPLT
View Frame-Labeling	C-NPLT

8.2 Survey Templates

The following default object layers are used in Survey templates:

- Note that Profile and roadway object layers use design layer for the sake of simplicity.
- The Survey layer state does not screen C-ROAD and C-ROAD-PROF layers back.

- A reduced number of layers is used for existing conditions.
  Specifics may vary by product.

Object	Layer
Alignment	V-ALGN
Alignment-Labeling	V-ALGN-LABL
Alignment Table	V-ALGN-LABL
Appurtenance	V-UTIL-STRC
Appurtenance-Labeling	V-UTIL-STRC-LABL
Assembly	C-VIEW-SCTN
Building Site	A-BLDG
Cant View	C-VIEW-PROF
Catchment	C-HYDR-CTCH
Catchment-Labeling	C-HYDR-CTCH-LABL
Corridor	C-ALGN-CORR
Corridor Section	C-VIEW-SCTN
Feature Line	V-BRKL
Fitting	V-UTIL-STRC
Fitting-Labeling	V-UTIL-STRC-LABL
General Note Label	C-ANNO-LABL
General Segment Label	V-PROP-LABL
Grading	V-TOPO
Grading-Labeling	V-TOPO-LABL
Grid Surface	V-TOPO-GRID
Grid Surface-Labeling	V-TOPO-LABL
Interference	V-UTIL-STRC-LABL
Intersection	C-ALGN-INTS
Intersection-Labeling	V-ALGN-LABL
Mass Haul Line	C-VIEW-MASS-LINE
Mass Haul View	C-VIEW-MASS
Match Line	C-ANNO-MTCH
Match Line-Labeling	C-ANNO-MTCH-LABL
Material Section	C-VIEW-SCTN-PATT
Material Table	C-VIEW-SCTN-LABL
Parcel	V-PROP
Parcel-Labeling	V-PROP-LABL
Parcel Segment	V-PROP-LINE
Parcel Segment-Labeling	V-PROP-LABL
Parcel Table	V-PROP-LABL
Pipe	V-UTIL
Pipe-Labeling	V-UTIL-LABL
Pipe and Structure Table	V-UTIL-LABL
Pipe Network Section	C-VIEW-SCTN-UTIL
Pipe or Structure Profile	C-VIEW-PROF-UTIL

Point Table	V-NODE-LABL
Pressure Network Section	C-VIEW-SCTN-UTIL
Pressure Part Profile	C-VIEW-PROF-UTIL
Pressure Part Table	V-UTIL-LABL
Pressure Pipe	V-UTIL
Pressure Pipe-Labeling	V-UTIL-LABL
Profile	C-VIEW-PROF
Profile-Labeling	C-VIEW-PROF-LABL
Profile View	C-VIEW-PROF
Profile View-Labeling	C-VIEW-PROF-LABL
Sample Line	C-ALGN-SAMP
Sample Line-Labeling	C-ALGN-SAMP-LABL
Section	C-VIEW-SCTN-LINE
Section-Labeling	C-VIEW-SCTN-LABL
Section View	C-VIEW-SCTN
Section View-Labeling	C-VIEW-SCTN-LABL
Section View Quantity Takeoff Table	C-VIEW-SCTN-LABL
Sheet	C-VIEW-SCTN-SHET
Structure	V-UTIL-STRC
Structure-Labeling	V-UTIL-STRC-LABL
Subassembly	C-VIEW-SCTN
Superelevation View	C-VIEW-SUPR-LABL
Surface Legend Table	V-TOPO-LABL
Survey Figure	V-BRKL
Survey Figure-Labeling	V-SURV-LABL
Survey Figure Segment Label	V-SURV-LABL
Survey Network	V-CTRL
Tin Surface	V-TOPO
Tin Surface-Labeling	V-TOPO-LABL
View Frame	C-NPLT
View Frame-Labeling	C-NPLT

8.3   New Feature Layers

The following table lists all *new* object types added to the object layers tab and their content for templates.

8.3.1 2010

Object	Layer	Modifier	Value
Building Site	C-BLDG		
Intersection	C-ROAD-INTS		
Intersection-Labels	C-ROAD-INTS-LABL		

8.3.2 2011

Object	Layer	Modifier	Value
Point Clouds	V-SITE-SCAN		
Superelevation Views	C-ROAD-SUPR		
Mass Haul Views	C-ROAD-MASS-VIEW		

8.3.3 2012

Object	Layer	Modifier	Value
Catchments	V-SITE-SCAN		

8.3.4 2013

Object	Layer	Modifier	Value
Cant Views	C-RAIL-CANT-VIEW		
Pressure Pipe Networks	V-UTIL		
Pressure Pipes	V-UTIL		
Fittings	V-UTIL		
Apurtenances	V-UTIL		

9   Feature Style Conventions

9.1   The Power of Names

If you have used an AutoCAD based application for even a short time you are probably very aware of how reliant the software is on the NAMES you supply.

9.1.1 Layers are a simple Style

The best examples of this "Power of Names" in AutoCAD are Layers.
In AutoCAD or Land Desktop, the only thing that makes a sewer line different from a water line is the layer it resides on. So, if your good buddy in the cube next door goes into your drawing and moves the sewer linework to a water layer or renames the sewer layer to a water layer name, you have a PROBLEM.
Civil 3D does use layers, BUT then again Civil 3D, run properly, almost doesn't use layers at all from a user's working perspective. Users can learn and use Civil 3D and almost NEVER visit the Layer Manager to do anything. Somehow you can even manage to plot a project without the Layer Manager!
Civil 3D Feature and Label Styles do the work for you.

9.1.2 Feature and Label Styles Do the Work

When used to its best potential Civil 3D does NOT rely on user manual control of AutoCAD layers and their properties. This is probably the most difficult thing for new users migrating from older Autodesk software to get their head around. How is that even possible? The Power of Names.

9.1.3 The Display tab

Actually if you root around in any Civil 3D Feature Style you will find the Display tab. This looks remarkably like the Layer Manager, but in Civil 3D this box controls the display properties of feature *Components* not Layers. Every Civil 3D Feature has different *Components*.
In our templates we made things easy. Mostly, but NOT always, the Components are mapped to a ByLayer property. Since Color doesn't matter (we use the STB plotting method), we do force Component Color properties occasionally to make things easier to visualize feature Component differences better. This is done so you can visualize, analyze, and decide faster. Therefore you can also design faster in Civil 3D.

9.1.4 Style Names Matter More

If Layer names mattered to you in AutoCAD, Style names matter even more in Civil 3D. Style names themselves are used to link lots of things together inside Civil 3D.
You know what a nested layer can do in a block?

- Recognize that Civil 3D uses a similar concept of nested Styles to do almost all of the annotation of the model.

Layers are important to your output in AutoCAD. Styles are more important in Civil 3D.

- Style names are used to determine how the output of almost everything in the model looks and how it is labeled.

Civil 3D Name mapping speeds up complex tasks

- Styles with the same name but referring to another Feature altogether can speed up and simplify some complex tasks like Corridor creation in Civil 3D.

Sets of Named Styles keep it simple

- Collections of Styles called SETS can make all the difference between being productive and being frustrated with the software.
- Sets allow you to remember just one name instead of five names and a bunch of other related detailed property information.
- Hint: If the task appears complex and detailed, there is probably a Set and/or a wizard that uses the Sets available to make the process easier.

9.1.5 Take what you Name in Civil 3D seriously.

- You may have to live with the name longer than you expected.

9.1.6 Always use the Description box

- Document what you've done because you will name a lot more things in Civil 3D than in AutoCAD or Land Desktop
- The Description fields in Features, Feature Styles, and Feature Label Styles are there to help you. If you don't use them you will waste time and work a lot harder. Your work will also be much harder for others (and you) to follow.
- You will forget you did. Document:
  Why you made it?
  What did you make it for?
  How did you make it?
  What makes it different?

9.2   Style Naming Conventions

Now that we know that Names are really important in Civil 3D, it stands to reason that we need some rules about how to name things – a naming convention.

Civil 3D contains a large number of Features and many Features have a potential host of related Label Styles that are used to annotate the civil engineering model.

Over the last five+ years we have attempted a number of naming schemes to address the complexity problem that Civil 3D users face. The conventions used are the result of our long-term effort to discover something that works but is not too complex or difficult to learn. The template(s) themselves are a continuous work in progress and we are always searching for a better, cleaner, and easier way to get it done. We employ a planned way of naming everything in the template(s). Unfortunately this cannot be an absolute LAW with a single set of rules. Civil 3D's power, functionality, and variety of solution paths appear to make that impossible unless you want to have long and overly complex names.

9.2.1 Naming Convention Goals

Balance is the goal of our naming conventions. Make the naming convention:

- Relatively easy to train, learn, and understand
- Useful and meaningful during the operation of critical tasks inside the workflow of Civil 3D.
- As easy as possible to maintain

9.2.2 The Need for Style Ownership

You may employ the template(s) as is. However, many organizations will make some level of changes almost immediately. At some point almost everyone will begin to make changes to the template(s) and the styles they contain.

- You should spend the time initially to take ownership of the styles you believe you will commonly use in the template(s).

9.2.3 Own the Sets

- Sets for complex features like Alignments, Profiles, and Sections are the best place to start.
- Configure the Sets to use the most suitable styles supplied in the template.
- Rename the Set(s) by changing the " – JS" end string that consists of these characters:
  <space><hyphen><space> JS
- Change the string to include your organization initials (e.g. <space><hyphen><space> BTTB)
- From the Edit Sets dialog box
- Rename all the styles in the Set by changing the " – JS" end string
- Change the string to include your organization initials (e.g. <space><hyphen><space> BTTB)

9.2.4 Own the Grading Criteria Tools

Grading Criteria tools also need to be renamed and owned. You cannot drag and drop update Grading Criteria tools that are embedded by name into existing Features. This is particularly important for Grading Tools as their property definitions are linked by name applied at grading creation. Update commands and processes are designed not destroy your existing work.

9.2.5 Obey the Rules

If you want to modify a style, OBEY the Simple Style Rules (see above).
If you follow the Simple Style Rules, you will have both the benefit of production consistency and personal innovation and creativity.

9.3   Label Styles are a Challenge

Our detailed Style Naming rules are a structured approach to a complex problem.
Most of the detailed naming issues have to do with the large number of Label Styles associated with many Features. Profile

View and Section View Features are excellent examples of this.

Between Alignments, Profiles, Assemblies and their two View Features, Civil 3D has lots of potential label styles grouped with very similar group or Type names in the Toolspace Settings tab like:

- Major
- Minor
- Line
- Curve
- Etc

9.3.1 Label Style Defaults (LSD)

Label Style Defaults from the drawing level down throughout the hierarchy are the best way to control text size and other key Label Style properties.

The Label Style is all Production Solution products conform to this model and method for standardizing properties.

9.3.2 Parent and Child Styles

The Style naming convention differentiates key parent Label Styles to help you maintain Label Styles that upgrade well and without structural issues from release to release.

Do not add new components to child Styles. Add the new components at the parent level and make the component invisible where necessary in children.

9.3.3 Label Styles have built-in Geometry

Label Styles have a user controllable geometric structure to them. The components are attached to either a Feature's specific Anchor points or the Anchor points of other components.

Maintaining a clean a stable geometric pattern and method for these varied attachments in critical to stable Label Styles.

Do not restructure child Styles if you want to rearrange the components in the Label Style. Modify the parent Style or Copy and create a new parent to do this.

9.4 The Label Set Power

In Civil 3D groups of Label Styles related to a specific Feature may also be collected into Label Sets. Label Sets allow the end user to rapidly change the entire collection of labels and other default values.

You should take ownership and/or make copies of Set collections in your templates (see above). This will make maintenance and upgrades easier.

Understanding a couple of Civil 3D Label Set rules and caveats will help you employ Label Sets more effectively.

9.4.1 Label Set Caveats…

- Label Set application appears in a number of different user interface dialog boxes and wizards throughout Civil 3D. Unfortunately, the dialog interfaces are all slightly different due to the functional complexity of the specific Features.
  Are you being asked for a Set name or a Style name?
- Many Civil 3D wizards employ Set selection pick list boxes to apply named Sets to Features on different pages in the wizard.
  If your Sets have very similar names to your styles this can be confusing. You think you are applying a single style when you are actually applying a Collection of styles and a set of property values at the same time.
- The applied Label Sets generated from a wizard interface can be changed later, but typically this is NOT done by repeating the wizard.
  You must know where to change the Set properties for the specific Features.

9.4.2 Some Basic Label Set Rules…

- Sets in Civil 3D help you control the application of all the details at once.
  It is good practice to use a Label Set rather than construct the labels list and all the related values on the fly in a Feature's Labels tab or dialog box.
  Building the list manually produces inconsistent results because you often have a lot of properties values you must get set to produce suitable results.
- Importing a Label Set to a Feature will add OR replace the existing list of styles in the dialog box and relabel the Feature with the new styles and values saved in the Label Set when the list is applied.
  It is the ADD OR REPLACE that can fool you.
- Import a blank or empty Label Set (+NOLABELS) to clear the Style and property list quickly.

- You must hit the Apply button to display the new Set in the drawing with the Set values without leaving the Label Set dialog box.
- The OK button will Apply the new style list (and associated values) and will also exit the dialog box.

9.5   General Style Name Rules

The following are the general naming conventions used and why we did things the way we did.

9.5.1 Toolspace Sorting and Grouping

The naming conventions have a significant relationship to the display and grouping of Feature Sets, Styles, and Label Styles in the Civil 3D Toolspace.

The default general naming convention makes significant use of the standard Toolspace sort to make locating the "right" style easier for the end user. The naming convention therefore GROUPS types of named styles together based on the default Toolspace sorting.

- The Toolspace employs a common sort based on UNICODE character sets.
- Special characters precede numbers that precede alpha characters in the default sort.

9.6   Style Name Conventions

Annotative

(An)

Styles for Features that are used to display in a complex feature in a very simple form employ the (An) prefix

The (An) naming prefix is used only occasionally as an example

Existing Conditions

(Ex)

Styles for most Features and their related Label Styles employ the (Ex) prefix when the style is used to annotate survey and/or existing conditions

Existing conditions Label Styles use the Existing *textstyle by default*

Proposed Conditions

(Pr)

Styles for most Features and their related Label Styles employ the (Pr) prefix when the style is used to annotate design

Proposed (design) Label Styles use the Proposed textstyle by default

Quality Assurance

(Qa)

Styles for Features that are used typically for quality assurance and/or assessment employ the (Qa) prefix

The (Qa) prefix is used mostly to group Surface Feature Styles

These styles may also often be used for presentation purposes

Label Rotation

###

In Label Styles numbers representing the default rotation of the label relative to the current View are used to organize the Label Styles in lower levels in the Toolspace tree

Most rotational label styles have a View Orientation not an Object Orientation

+INVISIBLE Special Feature and Label Styles

+INVISIBLE

Styles for Features that are used to turn OFF the displayed Feature or Label Style.

(+) the plus character is typically used to arrange or group INVISIBLE Styles with other special styles

a)   INVISIBLE may be achieved by an easy methods for all Feature Styles

The default method employed – A forced OFF of the visibility property for ALL Feature Components in the Display tab

b)   INVISIBLE for Label Styles uses a similar method

The default method employed – A forced OFF of the visibility property in the General tab of the Label Style

All Label Style Components could also have their individual visibility property turned OFF as an alternate and more difficult solution to maintain.

+NEW Special Feature and Label Styles

+NEW

The template(s) include many named +NEW Sets, Feature Styles, and Label Styles.

(+) the plus character is typically used to arrange or group NEW Sets and Styles with other special Sets and Styles in the Toolspace

Typically +NEW styles always contain a DEFAULT set of properties as a start point

a) **+NEW** styles exist as a base Style that users may employ to create Copies or New instances of the Style

Copy creates a duplicate of the Style at the current level – a new parent style

New creates a duplicate at a lower level – a child style

+NOPLOT Special Feature and Label Styles

+NOPLOT

Styles for Features that are used to display but do not produce any output when plotted are employed throughout the template(s).

(+) the plus character is typically used to arrange or group NOPLOT Styles with other special styles

a) NOPLOT may be achieved by different methods for Feature Styles

The default method employed - Forced routing of a Feature Component to a –NPLT in the Display tab

A forced Plotstyle property of a Feature Component to Invisible in the Display tab

A combination of both methods

b) NOPLOT for Label Styles uses a similar method

The default method employed - Forced routing of the Label to a –NPLT layer in the General tab of the Label Style

+NOPLOT Label Sets

+NOPLOT

Label Sets are typically included for Features that employ Label Sets

NOPLOT Label Sets can be used to perform quality assurance checks and examine civil engineering model data express in many features in detail

+NOLABELS Special Label Sets

+NOLABELS

Label Sets for Features that use this name or prefix may be used to remove the current list of labels and associated values from a Feature.

(+) the plus character is typically used to arrange or group NO LABELS Sets with other special Set or Styles

9.6.1 General Label Style Rules

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter.

e.g. Desc+Elev would mean the description and the elevation are shown as one line of text - Top of Bank 110.00

o

Label that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

e.g. Desc o Elev would mean the description and the elevation are shown stacked on top of one another as

Top of Bank
110.00

Common Label Style Anchor Codes

Where a Profile or a Section label is attached makes a big difference in the label's behavior.

Anchor or Label Location

The terms "Anchor" or "Label Location" are used in Plan, Profile, and Section Views to mean a point directly on the displayed feature itself.

Attaching to the Feature's Anchor or Label Locations itself is useful when you want labels either perpendicular (Perp) or parallel (Para) to the Feature itself.

Anchor Extension

The term "Extension" is used in Profile and Section labels to refer to label locations offset from the labeled feature. The offset location is typically best controlled by a Set.

Dimension

The term "Dimension" is used in Pipe Network features to refer to label location offset from the labeled feature. The offset location only appears in Profile and Section Views and is controlled manually often with the AutoCAD Property box.

Attaching to Anchor Extensions or the Dimension anchors is easiest to deal with most of the time and allow you to space complex sets of values from the Extension or Dimension location.

Remember that Label Sets for Profiles and Sections contain important properties that can automate the arrangement of lots of labels via the Extensions.

a

Label is designed to be attached to the Anchor point on the Feature

x

Label is designed to be attached to the Anchor Extension or Dimension point of the Feature

xBup

Label is designed to be attached to the Anchor Extension or Dimension at Profile or Section View Bottom going up

This is typically used for Existing conditions (Ex)

xTtd

Label is designed to be attached to the Anchor Extension or Dimension at Profile or Section View Top going down

10 Feature Styles

10.1 General Multi-purpose Styles
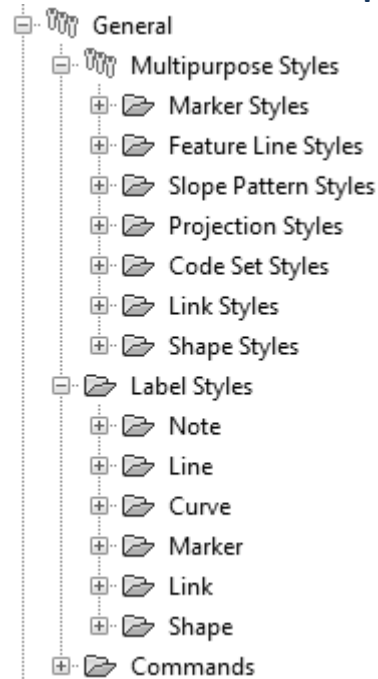
The styles listed in this section of the Toolspace are used by other parts of the software and are typically nested into other Features. Any style related to Assemblies is used in Section Views.

- Markers are directly related by NAME to Point Codes employed in the Subassemblies supplied with Civil 3D.
- The names used for Marker Styles generally should conform to Subassembly Point Code names so the Markers can be mapped by NAME quickly in Code Set Styles used in Corridors.
- The supplied roadway Subassemblies employ a generally standardized set of Codes for Points, Links and Shapes.
- However, individual Subassembly Code names DO vary depending on the specific release of Civil 3D and the subassemblies employed.
- The default Code Sets file can be found at <install drive>: \ProgramData\Autodesk\C3D <Release>\enu\C3DStockSubassemblyScripts.codes
- In 2013+ the generic descriptions have been modified to support typical short abbreviations and a more consistent "naming convention" for similar Codes for use in annotative labels . The pattern example:
  Base, Base-1, Base-2, Base-3

The templates commonly employ the same general naming convention used for common roadway Subassemblies for Markers and Feature Lines included in the template.

- The templates DO NOT employ true name matched names for Marker styles.
- This is a trade-off between a bit more manual Code Set Style maintenance versus maintaining potential larger numbers of Marker styles that may not need to actually differ visually or when plotted.
- You may find that you can be more productive with and even smaller list of general Marker styles.
- Hatch patterns are by default NOT employed in Plan representations – only in Profile and Section reps
- 2012+ Marker, Link, and Shape Label Styles may employ parameter based Expressions and use scales percentages of common expression to arrange these labels in Section Views for Assembly annotation.
- Care should be taken to include the base Label Style that includes the parameter Expressions in all copies of Label Styles.
  These styles are clearly marked as ALWAYS IMPORT.

Multipurpose Styles	Label Styles
Marker Styles Used by Labels, Alignments, Profiles, Feature Lines, Survey features, Assemblies/Subassemblies	**Marker** Used to Label Markers in Assemblies/Subassemblies, Survey Figures, and for individually placed Labels
Link Styles Used in Assemblies/Subassemblies and Corridors	**Link** Used to Label Links in Assemblies/Subassemblies and Corridors
Shape Styles Used in Assemblies/Subassemblies and Corridors	**Shape** Used to Label Shapes in Assemblies/Subassemblies
Code Set Styles Used by Corridors in conjunction with all the other parts of a Corridor	**Note** Used for Labels
Feature Line Styles Used by Grading, Corridor collections and in Survey	**Line & Curve** Used for Labels of Civil 3D Features and general CAD primitive line work. 2010+ may be employed to label Parcel segments.
Slope Pattern Styles Used by Grading and Corridor collections	
Projection Styles Used to project AutoCAD objects to Civil 3D Profile and Section Views	

Marker Styles

Used extensively by Subassemblies and other features to visually document named Point Code locations

Used in Alignments, Profiles, Feature Lines and Survey figures to document the various potential point locations on the features.

Used by some types individually placed Labels to document Plan, Profile View and Section View locations

Naming Rule:

<Optional Condition> <Anchor Code><Point Code Name>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Markers used in Corridors use typical Civil 3D roadway Subassembly Point Code Names

Roadway and Ditch Markers are generally sent to a NCS compliant C-ROAD-NPLT layer

G

Updated from (G) used in 2008 styles

General multiple Use Marker Styles

a) These simple Marker Styles may be used to simplify the display of Markers in Assemblies/Subassemblies and Sections.
   This requires manually creating and/or editing a Code Set Style and therefore would not use automated Name Matching capability.

b) These simple Markers may be used with Label routines that may optionally insert Markers.

CR

Updated from (Cr) used in 2008

Marker Styles for typical Corridor Assembly/Subassembly locations

SR

Updated from (Sv) used in 2008

These basic Markers are supplied to be used with Markers employed in Survey Figures

2013+ Added Markers for use with Survey Figure annotative labels.

CT

Added in 2011-12 supplied for Markers used specifically with Catchment components

Marker Label Styles

Type Code = GM

Used to create Labels for the Markers that appear in Section Views and a variety of other Marker references

Naming Rule

<Type Code> <Anchor> <Rotation or In/Out> <Contents>

Typical +NEW, an +NOPLOT prefix conventions are used

Styles using In or Out employ expressions that reference offset distance to arrange labels.

2012+ these may be parameter expression driven – one or more expressions supply scaled arrangement values to all the labels.

Typical Content names are used

Typical Label Style Contents Separators are used

Typical Label Style Anchor codes are used

Link Styles

Naming Rule:

<Optional Condition> <Point Code Name>

Typical (Ex), (Pr), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Link Styles used in Corridors use typical Civil 3D roadway Subassembly Link Code Names

Roadway and Ditch Link Styles are generally sent to a NCS compliant C-ROAD-CORR layer

Typically representations are COLOR forced to help visually differentiate various Links.

Link Styles plot by Layer

CR

Link Styles for typical Corridor Assembly/Subassembly links

G

Currently no styles supplied

These general Link Styles may be used to simplify the display of Links in Sections. This requires manually creating and/or editing a Code Set Style and therefore would not use automated Name Matching capability.

Link Label Styles

Type Code = GL

Used to create Grade or Slope Labels for Links that appear in Section Views

Naming Rule

<Type Code> < Rotation> <Content> <Orientation - In/Out/Top/Bottom/Above/Below/Left/Right/Center>

Typical +NEW, and +NOPLOT prefix conventions are used

Styles using In or Out employ expressions that reference offset distance to arrange labels

2012+ these may be parameter expression driven – one or more expressions supply scaled arrangement values to all the labels.

Para (parallel to Link) and Perp (perpendicular to Link) are used to clarify label location and reference

Typical Content for Grade and Slopes are used

Some styles employ an Expression the differentiates FLAT grades from STEEP slopes based on >5% grade

Shape Styles

Naming Rule

<Type Code> <Point Code Name> <Optional Plan Suffix>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Type Codes

CR

Updated from (Cr) used in 2008

Used for Subassembly links display in Corridor Sections

Pipe

Used for Pipe display in Corridor Sections

Shape Styles for typical Corridor Assembly/Subassembly shapes

Shape used in Corridors use typical Civil 3D roadway Subassembly Shape Code Names

Roadway and Ditch Shapes are generally sent to a NCS compliant C-ROAD-CORR layer

Shape hatching sent to a NCS compliant C-ROAD-CORR-PATT layer

Shape Label Styles

Type Code = GS

Used to create Shape Labels for Shapes that appear in Section Views

Naming Rule

<Type Code> <Rotation or In/Out> <Contents>

Typical +NEW, and +NOPLOT prefix conventions are used

Styles using In or Out employ expressions that reference drawing scale to arrange labels

2012+ these may be parameter expression driven – one or more expressions supply scaled arrangement values to all the labels.

Typical Content for Shapes are used

Code Set Styles

Code Set Styles are collections of named Style references.

They contain Link, Point, Shape, and Feature Line named references used by all Corridors.

Code Set Styles are employed four ways.

> Assemblies and Subassemblies in Plan
>
> View and Edit Section Command
>
> Section Views
>
> Plan View of Corridors

Styles referenced in a Code Set Style:

Links

Link Style, Link Label Style, Render Material, Material Area Fill (Shape Style)

Points

Marker Style, Marker Label Style, Feature Line Style

Shape

Shape Style, Shape Label Style

Descriptions can be edited for each entry in the Code Set Style. Descriptions can help you remember and discover what Point Codes do in the corridor. Descriptions in the Code Set Style may be referenced and used in labels for annotation and for QA.

a) Code Set Styles are the central connector between Subassembly code and how the various parts of a Corridor are drawn in Plan and Section display representations.

b) If you employ a Subassembly previously not used in the template, you may have to create a new Code Style to define how the parts are displayed or edit an existing Code Set Style.
You can IMPORT Code Names from any Assembly in the current drawing as a starting point.
You can Edit the supplied Code Set Styles to change how the parts are connected and displayed by named Style reference

Supplied Code Sets Styles are built around typical roadway Subassembly Point Codes

The Help file for every supplied Subassembly contains the details of the Point Codes used and their location at the bottom of the help page.

Naming Rule:

<Optional Type> Description

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Code Set Types are used to help tell the difference between Code Sets used for typical Plan or Section representations and typically differ by the Shape Styles applied.

All Codes and All Codes – JS code sets are supplied that include all point codes from subassemblies in the supported software versions.

Note that the Tool Palette tools for Assemblies reference drawings in an All Users folder called Assemblies.

Pln

Used for Code Sets with shape fills for Plan views of corridors. Use with +Invisible corridor style.

Sec

Used for Code Set of Section views of corridor Assemblies and the labeling in Section views

VE

Used for Code Set of Section views for use in the Corridor Section Editor

Feature Line Styles

Used to display Feature Lines employed in Survey, Grading and Corridor Features

Naming Rule:

<Optional Prefix> <Point Code Name>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Markers in Feature Line Style are typically matched by name to Marker Styles

Feature Line Styles used in Corridors are connected by Subassembly Point Code Names

Roadway and Ditch Link Styles are generally sent to a NCS compliant C-ROAD-CORR layer

CR

Updated from (Cr) used in 2008

Feature Lines typically employed and produced in Corridor tasks

Use C-ROAD-CORR layer for display

Typically representations are COLOR forced to help visually differentiate various Feature Lines.

Color is typically forced but plot by Layer

Linetype may be forced for specific styles

GR

Updated from (Gr) used in 2008

Feature Lines typically employed and produced in site Grading tasks

Use C-TOPO-GRAD layers for display

Typically representations are COLOR forced to help visually differentiate various Feature Lines.

Color is NOT typically forced. Linetype may be forced for specific styles

Slope Pattern Styles

Used to graphically annotate with line work patterns slopes generated between Feature Lines in Gradings and Corridors.

These Styles are always employed by reference; therefore layer and other display properties are determined elsewhere.

Both Fixed Lengths and Schemed patterns may be generated

All Styles employ 2 Components

Schemes may employ any of three different methods to generate the pattern displayed (see the Civil 3D help file).

Naming Rule:
<Optional Prefix> <PatternType>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

a)   Slope Pattern Styles used in Corridors are connected by manually selecting two displayed Feature Lines

b)   Slope Pattern Styles used in Gradings are a Grading property and selected during creation or in the Grading Property box

Projection Styles

Used to graphically project AutoCAD objects to Profiles and Sections

Naming Rule:
<Optional Prefix> <Type>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Note Label Styles

Typical example Notes.

These styles contain text that can be manually edited on the fly by editing the Style.

However, typical notes used frequently in your plan set should be given Note Label Style names and included in your template or in a specialized template for storage maintenance and production use.

Naming Rule:
<Optional Condition> <Note Purpose>

Typical (Ex), (Pr), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Styles use C or V-ANNO-LABL layers

Line & Curve Label Styles

Used to manually label AutoCAD line work for annotation in a similar fashion to labels generated from Civil 3D Feature geometry.

These styles are NOT the same styles related to specific Parcel and Alignment Features but generally will accomplish the same annotative task on raw AutoCAD line work and on Civil 3D linear Features.

Line and Curve Label Styles use the (Ex), (Pr), +NEW, and +NOPLOT general prefix conventions detailed above.

Multiple rotational versions of the formats are supplied.

Naming Rule:
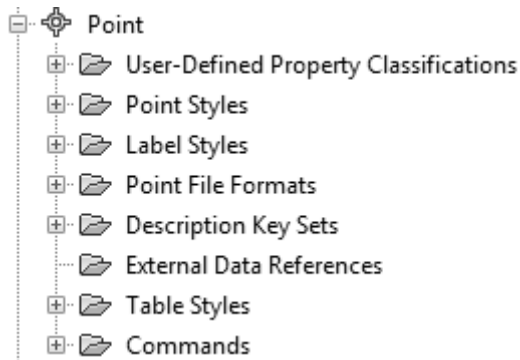
<Condition> <optional Span><Contents>…

Contents use typical linear data civil annotation derived from geometry the objects.

Labels with optional [Span] will label multi- segment objects

Typical Content names are used

Typical Label Style Contents Separators are used

10.2 Points

```
Point
    User-Defined Property Classifications
    Point Styles
    Label Styles
    Point File Formats
    Description Key Sets
    External Data References
    Table Styles
    Commands
```

Point Groups

Point Groups are drawing specific.

Point Groups are a data collection in the Properties tab.

All Civil 3D Point Features are always a member of one or more Point Groups. Point Features are always collected. They are never independent of a Point Group collection.

Point Groups collect Point Features based on the varied specific Properties that determine Point membership.

Point Groups are not a Style in Civil 3D. They determine the Point Style or Label Style for member Point Features unless this is overridden by Description Key Set or individual point editing.

The Point Groups have a Priority property. Priority determines how the Point Features will resolve to common Point Style and Label Style properties.

Point Groups & Description Key Sets

Point Style and Point Label Style properties in the individual Description Keys included in a Description Key Set (DKS) determine how much Point Feature control can be managed by Point Group in the drawing.

Setting the Point Style property in a Key to a value other than <default> will set the Point Style property individually for each point as the point enters the drawing.

Point Style properties set this way are a Child Override and the Point Group Point Style control will NOT affect the displayed Point Style.

Point Styles

Point Styles are generally named and therefore classified and sorted in the Toolspace into general groups based on the NCS.

Naming Rule:
<NCS Discipline Code> <hyphen> <NCS Group> <hyphen> <Symbol Purpose>...

C
Styles for Features that are used typically for Design point symbols use the (C) prefix

V
Styles for Features that are used typically for Survey or Existing point symbols use the (V) prefix

Label Styles

Used to label Civil 3D Point Features

Naming Rule:

<Condition> <Format> <space> <optional Group or Purpose> <Rotation Angle> <Contents>...

Point Label Styles use the (Ex), (Pr), +NEW, and +NOPLOT general prefix conventions detailed above.

Multiple rotational versions of the formats are supplied.

Formats

There are 4 formats of labels supplied:

BL - Broken Line label styles

Component(s) contents are underlined with a two part line. Rotation is controlled by an invisible Marker.

IL – In Line label styles

Component(s) contents are underlined with a single line. Rotation is controlled by the visible Line component.

S – Stacked label styles

A single Point Data component contains the contents. No Rotation versions are supplied
is used to represent POINT NUMBER data

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.
e.g. Desc+Elev would mean the description and the elevation are shown as one line of text

Top of Bank 110.00

o

Label that include multiple lines use the lower case "o" character and <spaces> as a delimiter. The character separates the contents of the label style.
e.g. Desc o Elev would mean the description and the elevation are shown stacked on top of one another as
Top of Bank
110.00

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Point File Formats

No changes

External Data References

No changes

Table Styles

Uses Table Style naming rules based on abbreviated contents

User Defined Property Classifications

No changes

Description Key Sets

PDF files of supplied Description Key Sets are located at \\Resources\Styles\Description Key Sets folder

Description Key Sets control how point import events generate Point Styles, Point Label Styles, and other Point Feature specifics in detail.

The Description Key Set group has a Priority property that determines the order the Sets are searched for matches.

Multiple distinct Description Key Set (DKS) are supplied. Each Key employs blocks included in the template(s).

2012 – In prior releases each Set supplied used the same set of Description Keys and only the properties of the Keys differed.

2012+ The Sets supplied may contain a variety of different Keys in specific groupings based on the product. For example- Utility structure Keys may be included in a separate set.

The naming rule for Description Key Sets changed in 2012+ to more easily categorize a more complex variety of Description Key Sets that may be used for varied point publishing purposes.

Naming Rule:

<Optional Prefix>-<Discipline> <LineCode>-<PointStyleCode><Label Style Code>-<FormatDesc>-<Contents>

Optional Prefix

Used in product templates for product abbreviations and/or to organize the collection order of the Sets

Discipline

Single letter Codes match the NCS Layer Standard Discipline Keys

C

Keys are mapped to NCS Design Layers and employ design Point Styles and labels

V

Keys are mapped to NCS Survey Layers and employ survey Point Styles and labels

Line Codes

Line# or Lines##

Denotes the use of single or double digit numeric linecodes if employed in the DKS to match an appropriate figure prefix database

Point Style Codes

Default(s) - single D or double DD

Denotes whether Point Style and/or Point Label Style are set to default and therefore controlled by Point Group properties

PD

Employs Explicit Point Styles – controlled by point feature and default Point Label Styles.

DL

Explicit Point Label Styles – controlled by point feature and default Point Styles

FormatDesc

Describes the general purpose and/or contents of the Format field

Contents

Other specifics about the Description Key Set – e,g the support of a specific standard "NCS", "CADOT", etc

10.3   Point Clouds

Point Cloud
    Point Cloud Styles
    Commands
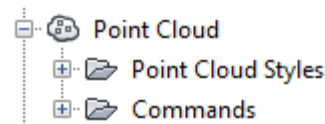
Point Cloud Styles

Used to display and control the properties of point clouds. Typically this involves the processing of the point cloud data set into ranges by a variety of values dependant on the data supplied.

Typically only portions of the Naming Rule are employed. Often only the simple displayed Results of the processing applied are used in the Name.

Naming Rule:

<Classification> <Range Method> <Range Detail><Content Specifics> ...

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Point Cloud Property Classification tab may be used

Often Range Method and Range Details may be used

The Significant Point Cloud Display properties are used for Content Specifics – hence a color result is common

10.4 Surfaces

- Surface
  - Surface Styles
  - Label Styles
    - Contour
    - Slope
    - Spot Elevation
    - Watershed
  - Table Styles
    - Direction
    - Elevation
    - Slope
    - Slope Arrow
    - Contour
    - Watershed
    - User-Defined Contour
  - Commands

Surface Styles

Used to display and control the substantial number of properties of surface models

Surface Styles contain built in Analysis display capabilities that can significantly speed up surface quality control and communication via different presentations

Naming Rule:

<Condition> <Contents> <Content Detail>…

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Surface Property tab names are used for Contents

Significant surface properties are used for Content Detail

Surface styles employ ByLayer properties except where component properties are controlled by reference in the various Analysis forms.

Surface Label Styles

Used to annotate surface models

4 Surface Label Style types are available.

Surface Contour Label Styles

Naming Rule:

<Condition> <Optional Varied Type><Group><Detail>…

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

(None), Box, Circle, Oval type names are used to clarify bounding shapes used in the Label Style

Major and Minor group names are used to clarify text height differences

Details typically deal with Label Style layer properties – the layer the labels are displayed on
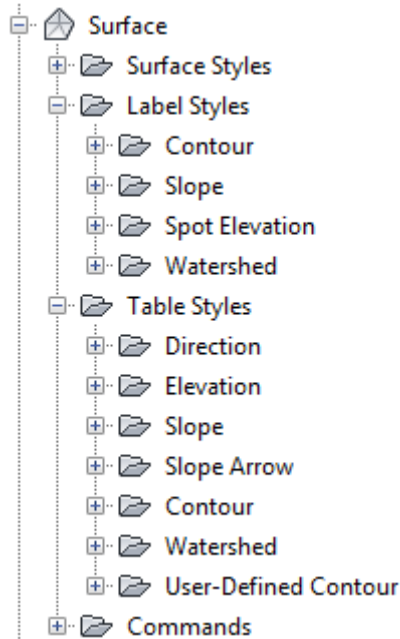
Surface Slope Label Styles

Used to label the Grade or Slope between two selected points on the surface model.

Point location selection can be critical to the displayed value.

Use a Surface Style with Triangles displayed can often be helpful in fine tuning point locations.

Naming Rule:

<Condition> <Optional Format> <Contents>…

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Multiple Formats are used

Above and Below are relative to the selected Start and End points.

AL – Above the Direction Arrow

BL – Below the Direction Arrow

IL – In the middle of the Direction Arrow and parallel

EL – At the end point of the Direction Arrow Perpendicular

SL – At the start point of the Direction Arrow Perpendicular

Typical Content for Grade and Slopes are used.

Para (parallel to Link) and Perp (perpendicular to Link) may be used to clarify label location and reference.

Some styles may employ an Expression to differentiate slopes based on a percent grade criteria

Surface Spot Elevation Label Styles

Used to label single point locations on the surface model

Naming Rule:

<Condition> <Format> <space> <optional Surface> <Rotation Angle> <Contents>…

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Labels are routed to C or V-TOPO-LABL layers

Multiple formats are supplied

Formats

There are 2 formats of labels supplied:

IL – In Line label styles

Component(s) contents are underlined with a single line. Rotation is controlled by the text component.

is used to represent Surface Elevation data

S – Stacked label styles

A single Surface Data component contains the contents. No Rotation versions are supplied

is used to represent Surface Elevation data

EG & FG

Optional Surface codes of EG and FG define order and arrangement of multiple surface labels

These styles employ a second Surface reference which is assumed to the EG surface

Labels for the reference surface are forced to italic to be consistent with (Ex) conventions

Label Style Component Contents Separators

+ Separators

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o Separators

Label that are include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Typical Content for Surface Elevations are used

Surface Watershed Label Styles

Used to label watershed areas and locations on the surface model

Naming Rule:

<Condition> <Format> <Name>…

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Labels are routed to C or V-TOPO-LABL layers

Formats

S – Stacked label styles

A single Surface Data component contains the contents.

No Rotation versions are supplied

Surface Table Styles

Used to annotate surface data in a tabular form

Used as the published Legends for all Surface Analysis processes

Data for any of the Analysis tabs and the surface model can be published via tables

7 Surface Table Style types are available

All use typical surface data from the specific analysis for Contents used in the naming convention

All use Table Style naming rules based on abbreviated contents

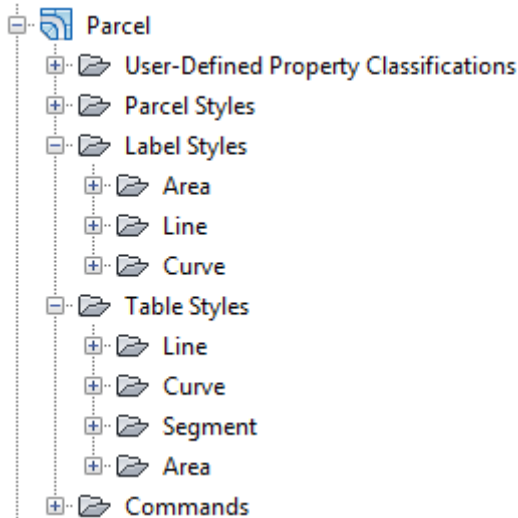All use typical separators

Direction

Elevation

Slope

Slope Arrow

Contour

Watershed

User Defined Contour

10.5 Parcels

```
Parcel
  User-Defined Property Classifications
  Parcel Styles
  Label Styles
    Area
    Line
    Curve
  Table Styles
    Line
    Curve
    Segment
    Area
  Commands
```

Parcel Styles

Used to display and control parcel models and their included linear geometry

Naming Rule:

<Condition> <Parcel Type Name> or <Contents> <Details>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical descriptive land division Type Names are used

Construction/QA Styles employ Color Number and Hatch Angle naming convention

Parcel Style names are used in the default Parcel Name Template

Linear objects to NCS C or V-PROP-LINE (or CURV) layers

Area hatch to NCS –PATT layers

Styles typically employ ByLayer properties for all Components

Area hatches are typically not displayed except in Construction/QA styles

Parcel Label Styles

Used to Label Parcel geometry

3 Types of Parcel Labels Styles

Parcel Area Label Styles

Used to label resolved areas within the Site Parcel topology

Naming Rule:

<Condition> <Contents> <Details>…

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Symbol Only and Symbols with Parcel numbers are supplied in addition to typical annotative Parcel info Labels

Labels are routed to C or V-PROP-LABL layers

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Symbols and/or typical Content for Parcel Area are used

Details may include: Content specifics and/or bounding box configuration

Parcel Line Label Styles

Used to label resolved segments in the parcel topology

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Potential Stacked Format versions are included. These may be also generated using Dragged State labels

Labels are routed to C or V-PROP-LABL layers

Naming Rule:

<Condition> <optional Span><Contents> <Arrow and/or Mark Code>…

Contents use typical linear data derived from the parcel segment data.

Labels with optional [Span] will label multiple segment features

Typical Line Content names are used

Typical Label Style Contents Separators are used

Tag Label Styles are included

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

Component Content for Arrows, Marks, and Crowsfeet

A – an Arrow

M – a symbol Mark at segment start and end

C - a Crowsfoot at at segment start and end

Parcel Curve Label Styles

Used to label curve segments in the parcel topology,

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used.

A Stacked Format is typically used for most Curve labels.

Labels are routed to C or V-PROP-LABL layers.

Naming Rule:

<Condition> <Contents>…

Contents uses typical linear data derived from the parcel segment data.

Typical Curve Content names are used

Typical Label Style Contents Separators are used

Component Content for Arrows, Marks, and Crowsfeet

A – an Arrow

M – a symbol Mark at segment start and end

C - a Crowsfoot at at segment start and end

Tag Label Styles are included

Parcel Table Styles

Used to annotate Parcel data in a tabular form

4 Types of Parcel Labels Styles

All use typical Segment or Area data from the parcel topology for Contents used in the naming convention

All use Table Style naming rules based on abbreviated contents

All use typical separators

Line

Curve

Segment

Includes both Line and Curve data

Area

Parcel User Defined Property Classifications

Used to define additional customized Parcel data properties

10.6 Grading

```
⊟ ◇ Grading
  ⊞ 📂 Grading Styles
  ⊞ 📂 Grading Criteria Sets
  ⊞ 📂 Commands
```
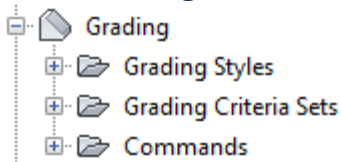
Grading Styles

Used to display Grading Features

Slope Pattern Styles are potentially nested into Grading Styles

They are found in the Multipurpose Style at the top of the Toolspace used in Grading Styles

Naming Rule:

<Condition> <Grading Task Name> <Slope Pattern>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Slope Pattern Styles pattern types are used in the naming convention for Grading Styles

Fixed

References a Fixed Length Slope Pattern Style

Scheme

References a Scheme Slope Pattern Style

None

References no Slope Pattern Style

Typical descriptive grading task Names are used.

Linear objects typically to NCS C or V-TOPO-GRAD layers.

Slope Patterns to NCS –CUT or -FILL layers.

The Center Marker Component plotstyle property in all styles is forced to Invisible Ink so the Markers do not plot.

Styles typically employ ByLayer properties for all Components.

Grading Criteria Sets

Used to control the defaults of Grading criteria (applied to Feature Lines) when creating a Grading within a Grading Group.

You should take ownership of (rename) all the included styles to simplify layer updates. You cannot Overwrite named Grading Criteria Tools that are in use in a drawing.

Naming Rule:

<Locked or Unlocked> <Grading Task Name>

Both Locked (cannot be changed) and Unlocked (can be changed during creation) Grading criteria are supplied.

3 example Grading Criteria Sets are supplied.

Lot Grading

A mix of typical lot grading tools used in building pad and general grading tasks.

A mix of Locked and Unlocked tools.

Roads and Parking

A mix of typical Grading Criteria used to create roadway and parking lots features.

All Unlocked.

Walls

A mix of typical Grading Criteria used to create retaining wall related features.

All Unlocked.

10.7 Alignments

- Alignment
  - Alignment Styles
  - Design Checks
    - Design Check Sets
    - Line
    - Curve
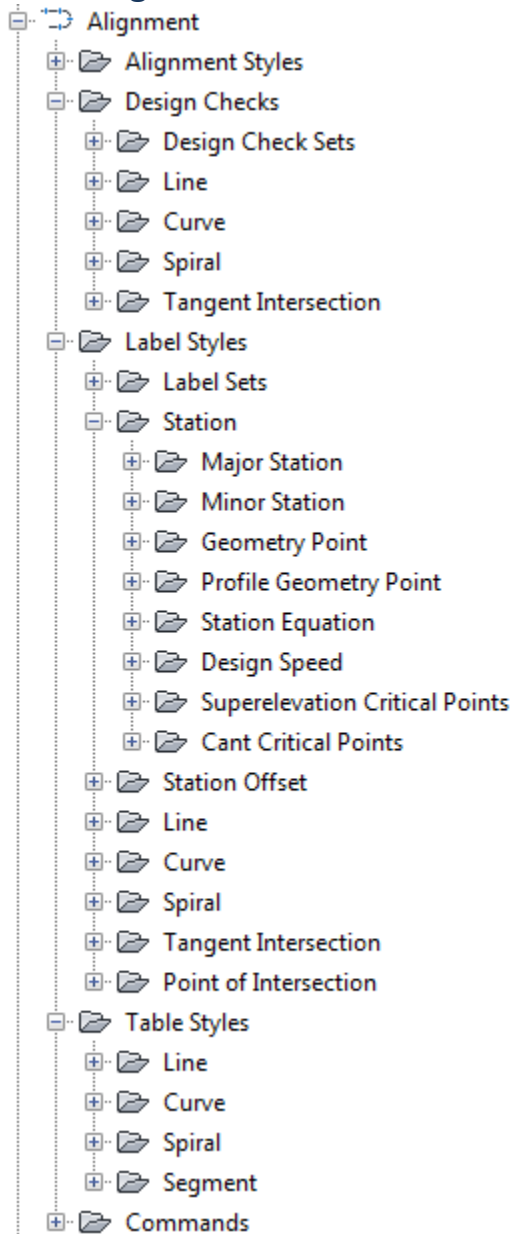   - Spiral
    - Tangent Intersection
  - Label Styles
    - Label Sets
    - Station
      - Major Station
      - Minor Station
      - Geometry Point
      - Profile Geometry Point
      - Station Equation
      - Design Speed
      - Superelevation Critical Points
      - Cant Critical Points
    - Station Offset
    - Line
    - Curve
    - Spiral
    - Tangent Intersection
    - Point of Intersection
  - Table Styles
    - Line
    - Curve
    - Spiral
    - Segment
  - Commands

Alignment Styles

Used to display alignment geometry

Alignments supply the horizontal control for other Features

Naming Rule:

<Condition> <Alignment Purpose Name>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical descriptive alignment purpose names are used

Linear objects to various NCS C or V-ROAD and/or RAIL layers

Styles typically employ ByLayer properties for all Components

Annotative Alignment Styles

A variety of Alignment Styles are supplied that employ NCS "like" naming conventions for Utilities, common Site features, Property boundaries, easements, etc.

Alignment Design Checks

Design Check Sets

Used to collect combinations of Line, Curve, Spiral and Tangent Intersection Design Check Rules

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Naming Rule:

<Condition> <Details>...

Line

Line Design Check Rules

Curve

Curve Design Check Rules

Spiral

Spiral Design Check Rules

Tangent Intersection

Tangent Intersection Design Check Rules

Alignment Label Sets

Used to collect multiple Alignment Feature labels and often use label property values together by name

Naming Rule:

<Condition> <optional Rotation> <space> <Contents> <Details>...

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

+NOLABELS Set in supplied to speed label removal.

Para (parallel to Alignment) and Perp (perpendicular to Alignment) are used to clarify label location and reference

Example Label Sets may be named outside the convention

Alignment Label Styles

Used to label individually or by Group the various geometry parts and/or referenced geometry to an Alignment Feature

Alignment Label Styles may reference model properties from other connected Features like Surfaces and Profiles via dynamic or static connections.

Naming Rule:

<Condition> <Alignment Label Type Code><L or R and/or optional Rotation><space><Contents> <optional On suffix>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

The Alignment Label Type Codes are listed with the Alignment Label Styles below

Para (parallel to Alignment) and **Perp** (perpendicular to Alignment) may be used to clarify label rotation

L (left) and **R** (right) codes are used with Para e.g. **LPara**

On suffix used for Labels on the Alignment

Linear objects to various NCS C or V-ROAD-LABL layers

Styles typically employ ByLayer properties for all Components

Contents include Alignment and related Feature properties

A descriptive alignment purpose name may be used for special case instead of the naming convention

Major Station Annotative Label Styles

A variety of Major Station Label Styles are supplied that employ NCS "like" naming conventions for Utilities, common Site features, Property boundaries, easements, etc.

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

There are multiple groups of Alignment Label Styles that provide the ability to annotate an alignment in depth based on the model properties of the Feature.

Component Content for Arrows, Marks, and Crowsfeet

A – an Arrow

M – a symbol Mark at segment start and end

C - a Crowsfoot at at segment start and end

Alignment Station Group

A collection of Alignment Labels Styles all connected to the station locations of the alignment. These are referred to as Group labels.

Alignment Major Station Label Styles

Type Code = A

Used to label the Major Station increment along the station

Increment value can be adjusted by both changing Alignment Labels properties and/or applying a Station Equation at a station

Alignment Minor Station Label Styles

Type Code = A

Used to label the Minor Station increments along the station

Increment value can be adjusted by both changing Alignment Labels properties and/or applying a Station Equation at a station

Alignment Geometry Point Label Styles

Code = AH

Used to label geometry location points on the Alignment itself

Alignment Profile Geometry Point Label Styles

Type Code = AP

Used to label geometry locations from a connected Profile

Alignment Station Equation Label Styles

Type Code = AQ

Used to label on the alignment Station Equation values

Alignment Design Speed Label Styles

Type Code = AS

Used to label on the alignment Design Speed values changes

Alignment Superelevation Critical Points Label Styles

Type Code = AC

Used to label on the alignment superelevation points

The other Alignment labels all employ the same naming convention as above

Contents vary by the type of label and its purposes

Alignment Cant Critical Points Label Styles

Type Code = AT

Used to label on the alignment Cant points

The other Alignment labels all employ the same naming convention as above

Contents vary by the type of label and its purposes

Alignment Station Offset Label Styles

Type Code = AO

Used to label point locations relative to an Alignment

A Format Code may be added to the naming convention for this Label Styles. Multiple formats are supplied.

Formats

There are 2 formats of labels supplied:

IL – In Line label styles

Component(s) contents are underlined with a single line. Rotation is controlled by the text component.

S – Stacked label styles

A single or multiple Alignment Data components contain the contents. No Rotation versions are supplied

Alignment Line Label Styles

Type Code = AL

Used to label Tangents in the Alignment geometry

Labels behave and are named similar to Parcel Line labels

A Tag label style is supplied

Alignment Curve Label Styles

Type Code = AC

Used to label Curves in the Alignment geometry

Labels behave and are named similar to Parcel Curve labels

A Tag label style is supplied

Alignment Spiral Label Styles

Type Code = AS

Used to label Spirals in the Alignment geometry

Labels behave and are named similar to Parcel Curve labels

A Tag label style is supplied

Alignment Tangent Intersection Label Styles

Type Code = AI

Used to label Tangent Intersections in the Alignment geometry

Labels behave and are named similar to Station Offset labels

Alignment Point of Intersection Label Styles

Type Code = AP

Used to label Point of Intersection in the Alignment geometry

Labels behave and are named similar to Station Offset labels

Alignment Table Styles

Used to annotate alignment data in a tabular form

4 Types of Alignment Table Labels Styles

All use typical Segment data from the alignment geometry for Contents used in the naming convention

All use typical separators

Line

Curve

Spiral

Segment

Includes Line, Curve, Spiral, and Segment data

10.8 Profiles

```
─ Profile
  ├─ Profile Styles
  ├─ Design Checks
  │   ├─ Design Check Sets
  │   ├─ Line
  │   └─ Curve
  ├─ Label Styles
  │   ├─ Label Sets
  │   ├─ Station
  │   │   ├─ Major Station
  │   │   ├─ Minor Station
  │   │   └─ Horizontal Geometry Point
  │   ├─ Grade Breaks
  │   ├─ Line
  │   └─ Curve
  └─ Commands
```
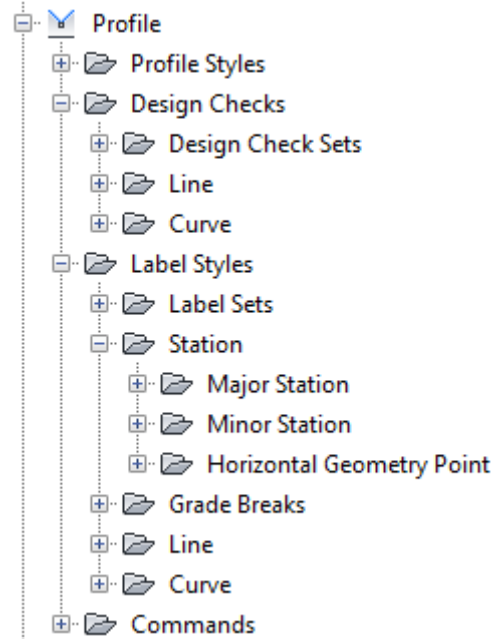
Profile Styles

All Profile Styles are applied and generate labels ONLY in Profile Views

Used to display Profile geometry in Profile Views

Profile Features supply the vertical control for other Features

Naming Rule:

<Condition> <Profile Purpose Name>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical descriptive profile purpose names are used

Linear objects to various NCS C or V-ROAD-PROF layers

Styles typically employ ByLayer properties for all components

Annotative Profile Styles

A variety of Profile Styles are supplied that employ NCS "like" naming conventions for Utilities.

Profile Design Checks

Design Check Sets

Used to collect combinations of Line and Curve Design Check Rules

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Naming Rule:

<Condition> <Details>…

Line

Line Design Check Rules

Curve

Profile Label Sets

Used to collect multiple Profile Feature labels and often used label property values together by name.

Naming Rule:

<Condition> <optional Purpose> <space> <Contents> <Details>…

Typical (An), (Ex), (Pr), (Qa), +NEW, +NOPLOT and +NOLABEL prefix conventions may be used

+NOLABELS Set in supplied to speed label removal.

Special example Label Sets may employ names outside the convention

Profile Group Label and Profile Views

Multiple different versions of Profile Group labels may be employed to label a single Profile to deal with different Profile geometry. For example: Two different types of Vertical Curve in a Profile. Station Control of the Group controls the display.

Profile Group Labels for Tangents and Vertical Curve may cross between different Profile Views. Dim type labels with centered data display key Tangent and Curve data in multiple and split Profile Views.

Profile Label Styles

All Profile Label Styles are applied and generate labels ONLY in Profile Views

Updated name convention in 2012+

Used to label individually or by Group the various geometry parts and/or referenced geometry to a Profile Feature

Major Station Annotative Label Styles

A variety of Major Station Label Styles are supplied that employ NCS "like" naming conventions for Utilities.

Existing Conditions

Labels are designed to display BELOW the Profile (typically bottom up from Anchor Extensions)

All use Existing textstyle

All display to the right in single line labels.

Proposed Conditions

Labels are designed to display ABOVE the Profile (typically top down from Anchor Extensions)

All use Proposed textstyle

All display to the left in single line labels.

Naming Rule:

<Condition> <Profile Label Type Code><Anchor Code><optional connection point><space> <optional Symbol Code><Contents> <Dim Suffix>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Dim or D suffix is used for label styles with dimension like formatting.

The Profile Label Type Codes are listed with the Profile Label Styles below

Anchor Codes

Where a Profile or a Section label is attached makes a big difference in its behavior.

Attaching to Anchor Extensions is easiest to deal with most of the time and allow you to space complex sets of values from the Extension location.

Remember that Label Sets can automate the arrangement of lots of labels via the Extensions.

Attaching to the Anchor itself is useful when you want labels either perpendicular (**Perp**) or parallel (**Para**) to the Feature itself. This works for Ticks and simple Stationing.

a

Label is designed to be attached to the Anchor point on the Profile

x

Label is designed to be attached to the Anchor Extension point

xBup

Label is designed to be attached to the Anchor Extension at Profile View Bottom going up

This is typically used for Existing conditions (Ex)

xTtd

Label is designed to be attached to the Anchor Extension at Profile View Top going down

This is typically used for Proposed conditions (Pr)

Para (parallel to Profile) and Perp (perpendicular to Profile) may be used to clarify label rotation

Linear objects to various NCS C or V-ROAD-PROF-LABL layers

Styles typically employ ByLayer properties for all Components

Contents may include Profile and related Feature properties

A descriptive Profile purpose name may be used for special cases instead of the naming convention

Symbol Codes

Profile labels may employ Circular and Rectangular symbols with simplified single or double digit Station data

C

Used for labels with Circular Symbols

R

Used for labels with Rectangular Symbols

Label Content Conventions

BE

Begin and End Location is supplied

Hpt

High Point Location is supplied

Lpt

Low Point Location is supplied

cData

Used for typical Vertical Curve data

tData

Used for typical Tangent data

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

There are multiple groups of Profile Label Styles that provide the ability to annotate a Profile in depth based on the model properties of the Feature.

Profile Station Group

A collection of Profile Labels Styles all connected to the station locations of the profile. These are referred to as Group labels.

Labels in the Station Group were constructed with:

(Pr) Proposed labels Top Down and to the left and showing above the profile

(Ex) Existing labels in both Top Down and typical Bottom Up and to the right and showing below the profile

Major and Minor Station labels may employ Circular and Rectangular symbols with simplified single or double digit Station data

Multiple different versions of Profile Group labels may be employed to label a single Profile to deal with different Profile geometry. For example: Two different types of Vertical Curve in a Profile. Station Control of the Group controls the display.

Profile Group Labels for Tangents and Vertical Curve may cross between different Profile Views. Dim type labels with centered data display key data components in all Profiles.

Profile Major Station Label Styles

Type Code = P

Used to label the Major Station increments at the connected Alignment station

Updated name convention in 2012+

Uses Profile Labels naming conventions

RO and LO

Special Right Offset and Left Offset Label Styles are supplied to label offset and other added Profiles in a Profile View

C

Used for labels with Circular Symbols

R

Used for labels with Rectangular Symbols

Profile Minor Station Label Styles

Type Code = P

Used to label the Minor Station increments at the connected Alignment station

Updated name convention in 2012+

Uses Profile Labels naming conventions

Para (parallel to Profile) and Perp (perpendicular to Profile) are used to clarify label location and reference

Profile Horizontal Geometry Point Label Styles

Type Code = PH

Updated name convention in 2012+

Used to label Profile geometry location points on the Profile

Uses Profile Labels naming conventions

Profile Grade Breaks Label Styles

Type Code = PG

Updated name convention in 2012+

Used to label Profile grade break points on the Profile

Grade Breaks typically requiring Weeding for existing surface Profiles

Uses Profile Labels naming conventions

Profile Line Label Styles

Type Code = PL

Updated name convention in 2012+

Used to label Profile geometry location points on the Profile

Uses Profile Labels naming conventions

Styles may include optional invisible components

Profile Curve Label Styles

Type Code = PC

Updated name convention in 2012+

Used to label Profile geometry location points on the Profile vertical curves

2012+ eliminated nested Parent styles previously supplied

Styles may include optional invisible components

Labels include many curve Anchor data and Anchor Dimension attachment points

2012 - All potential attachment points are not necessarily employed because not all available Anchor points currently produce labels in all geometric circumstances

K values are typically rounded to whole numbers

Other vertical curve data rounded to common double digit precision values

Uses Profile Labels naming conventions

Crest and Sag labels include basic vertical curve data and may be employed for generic vertical curve annotation

Crest

Labels include basic vertical curve data, passing site distance and stopping distance data

Sag

Labels include basic vertical curve data and headlight distance data

Above and **Below** label position codes may be used to clarify vertical curve data positioning relative to horizontal linework if employed

High and **Low** label position code may be used to clarify vertical curve data positioning based on High and Low Point Anchor locations for **Crest** or **Sag** labels
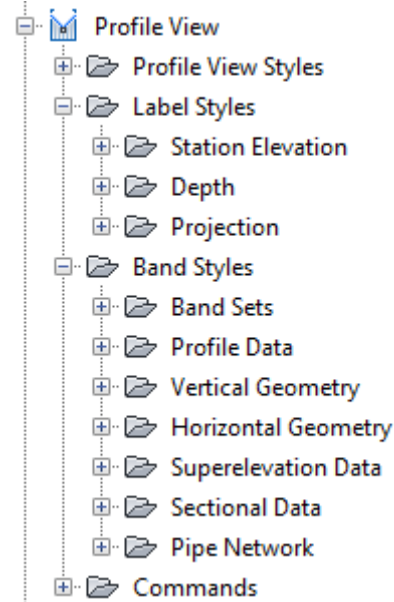
Asy

Asymmetric Parabolic Vertical Curve data is supplied – no Passing Sight, Stopping Sight, or Headlight Distance data

Cir

Circular Vertical Curve data is supplied – no Passing Sight, Stopping Sight, or Headlight Distance data

10.9   Profile Views

- Profile View
  - Profile View Styles
  - Label Styles
    - Station Elevation
    - Depth
    - Projection
  - Band Styles
    - Band Sets
    - Profile Data
    - Vertical Geometry
    - Horizontal Geometry
    - Superelevation Data
    - Sectional Data
    - Pipe Network
  - Commands

Profile View Styles

Used to display Profile View Features

Profile and Section View Features are the publishing engines for sectional data in Civil 3D.

The View features include a large number of components that are controlled in a relatively complex user interface to adjust all of the parts and their properties. A View Style puts a name to all of that detailed work to make things easier.

Existing or Proposed conditions do NOT matter for Profile View Styles specifically.

By default all Profile View components are routed to the same collection of NCS Design Road Profile layers C-ROAD-PROF-* in all the supplied Styles except NOPLOT versions.

Profile View Styles and Section View Styles share a specific View naming convention.

Naming Rule:

<Grid Type> <optional Grid specifics>

<Annotation Location> <View Specifics> <Split(s)>...

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

All objects to various NCS C-ROAD-PROF layers

Styles typically employ ByLayer properties for all Components

In 2009+ Minor station Axis labels are typically produced only with the digits to the right of the station mark. Some styles may employ full station annotation.

##x in View Specifics

The default is 10x if it is not specified in the name.

Vertical Exaggeration is used in naming convention. A **4x** Profile View style in a 1=40' scale drawing will produce a with a 1=10' vertical scale profile.

The typical range of scales supplied is 1x, 3x, 4x, 5x, 6x 7.5x and the default 10x. Not all scales are supplied for all versions.

Grid Types

Clip

The grids in clipped to profiles in the View. There are basically two possible methods.

HV – the clipping is controlled by the Clip to Highest property of the Profile View Style

PP- the clipping is controlled by the specific Profile selected for clipping in an individual Profile View objects properties.

Full

The grids in one form or another go all over the Profile View

None

No grids are displayed in the Profile View

Annotation Location

In

The annotation is generally all inside the Axis borders of the Profile View

Out

The annotation is generally all outside the Axis borders of the Profile View

View Specifics

Updated name convention in 2012+

##x

Exaggeration factor used - the number is multiplied by the Current Horizontal Drawing Scale to produce the Actual Vertical Exaggeration of the profile view.

All

All the various Axis annotation is ON

Majors

Only Major Axis annotation is ON for both Elevations and Stations

Vert

Horizontal Axis annotation is Vertical

Same

All Axis annotation is sized with the same text heights

Split Names

Updated name convention in 2012+

SLeft

Split Left - Right vertical Axis components are turned OFF for use in split profiles. Right Horizontal Axis Offset set to 0.0".

SMiddle

Split Middle - BOTH vertical Axis components are turned OFF for use in split profiles. Horizontal Axis Offsets are set to 0.0".

SRight

Split Right - Left vertical Axis components are turned OFF for use in split profiles. Left Horizontal Axis Offset set to 0.0".

Stacked Names

Updated name convention 2012+

TTop

Stack Top -Bottom horizontal Axis components are turned OFF for use in triple pane profile sheets. Bottom Horizontal Axis Offset set to 0.0".

TCenter

Stack Middle - Both horizontal Axis components are turned OFF for use in triple pane profile sheets. Vertical Axis Offsets are set to 0.0".

TBottom

Stack Bottom - Top horizontal Axis components are turned OFF for use in triple pane profile sheets. Top Horizontal Axis Offset set to 0.0".

Profile View Style Notes

a) A selection of Profile View Styles are provided and are constructed in a reasonably consistent fashion.

b) All the styles are reasonably documented for key properties in the Description of the style.

c) However, the various textsize and locations are not documented in detail. There are a lot of details that you need to be careful to make the same or complimentary to produce consistent Profile View Styles.

d) Title annotation is typically ON and typically sized and located with the same common specifics.

e) Top and Bottom Axis Titles include Station Range data by default

f) Left and Right Axis Titles include Elevation Range data by default

g) Additional Geometry and Sample Line Grids are ON by default in most Styles

h) Geometry Point Grids annotation is ON by default

i) For some Profile View Styles Left, Middle, and Right versions are supplied to support the need for split profiles.

j) Any of the supplied styles can be copied to produce a similar set of styles after adjusting the Display properties appropriately.

Superimposed Profiles in Profile Views Notes

a)   You must create a separate Profile View to superimpose a profile into another Profile View.
The Profile labels can be copied over or created independently after the fact.

b)   A superimposed profile is not necessarily dependent on the original Profile View container.
Therefore, you can optionally delete the originating Profile View if you plan to make no changes in the superimposed profile.
Existing ground roadway offsets would be a typical example.

Profile View Label Styles

Used to label specific locations in the Profile View with the Civil 3D Labeling tool and may include optional Markers.

Therefore the styles below do not include built in symbol blocks.

The Profile View Labels locations are not covered by grouped Profile labels that are generated specific to each Profile displayed in a Profile View.

These labels create label values ONLY based on the Profile View specifics.

Naming Rule:

<Condition> <Profile View Label Type Code><Anchor Code><space><Contents>
<Optional Dim Suffix>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Dim suffix denotes labels styles that appear dimension like

The Profile View Label Type Codes are listed with the Profile Label Styles below

Anchor Codes

All Profile View Labels are attached to the Anchor

a

Label is attached to the Anchor point on the Profile

x

Label is designed to be attached to the Anchor Extension point

Profile View Station Elevation Label Styles

Type Code = SE

Labels at a location in the Profile View based on primary profile Station and Elevation.

Assumes the use of a (G) type Marker Style to mark location.

(Eg) versions of the label are supplied for consistency.

Profile View Depth Label Styles

Type Code = D

Labels the difference between two point locations in the Profile View expressed as a Change in Elevation Grade or Slope.

Multiple types of labels with different data contents are supplied including dimension like versions with Station, Elevation, Elevation Change and Percent Grade.

Profile View Band Styles

Used to annotate the various geometry parts and/or referenced geometry to a Profile(s) included in the Profile View in a Band located either at the Top or Bottom of the view.

All included Band Styles are by default located at the Bottom of the Profile View.

Basic examples are provided for all Band Style types. More detailed styles may be provided for typically employed band requirements.

Graphic representations used in the Band Styles typically employ

Naming Rule:

<Type Code><space> <Band Contents Summary><Contents><Detail>…

The Profile View Band Type Codes are listed with the Profile Band Styles types below

No +INVISIBLE, +NEW, and +NOPLOT prefix conventions are to be used

All objects to various NCS C-ROAD-PROF layers

Profile View Band Sets

Collect named groups of Band styles and property settings for Bands added to Profile Views

Used to collect multiple Profile View Bands and often used label property values together by name.

Band Sets can control the Top or Bottom location of the Bands. The default used is Bottom.

Naming Rule:

<Condition> <optional Purpose> <space> <Contents> <Details>…

+NOBANDS Set in supplied to speed Band removal.

Special example Label Sets may employ names outside the convention

Profile View Profile Data Band Styles

Type Code = PD

Displays any data from the profiles included in the Profile View

Typically this Band type will show profile elevations or differences between two profile elevations including Cut & Fill at Station Locations.

Profile View Vertical Geometry Band Styles

Type Code =PVG

Displays Alignment data in ONE simplified graphic form with labels

Profile View Horizontal Geometry Band Styles

Type Code = PHG

Displays Profile data in multiple simplified graphic forms with labels

Curvature, Geometry and Radius forms are supplied

Profile View Superelevation Data Band Styles

Type Code = SE

Displays Superelevation data in simplified graphic forms with labels

2012+ Add support for Divided Crowns with and without Shoulders

Divided Styles may employ color forced linework to clarify band contents and differentiate between Right and Left Lane and Shoulder contents

Consistency format changes are supplied by basic Autodesk single crown and double crown examples

Profile View Sectional Data Band Styles

Type Code = PS

Displays Sectional data in simplified graphic forms with labels

2012+ added Volume Data Styles

Requires a Sample Line Group existing as a data source

Profile View Pipe Network Band Styles

Type Code = PN

2012+ Added support for Sanitary Sewer Analysis data

Displays Pipe Network data in simplified graphic forms with labels

Requires that Pipe Network data has been added to the Profile View

SSA (Storm and Sanitary Sewer Analysis) data may be required to populate some Styles

Styles may employ shortened codes for Band Style contents. Descriptions of these styles include full contents details.

10.10 Superelevation Views

```
└─ 🖾 Superelevation View
     ├─ 📂 Superelevation View Styles
     └─ 📂 Commands
```
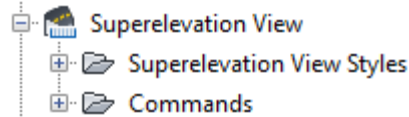
Superelevation View Styles

New in 2011. Used to display and control Superelevation parameters and some specifics for an Alignment.

Limited Style property control in 2011

Naming Rule:

<Stationing> <Tick Type> <View Specifics>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

By default all Superelevtion Feature are on NCS Design (C-) layers
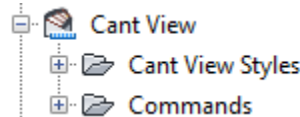
All objects to various NCS C-ROAD-SUPR layers

Styles typically employ ByLayer properties for all Components

Complex Styles may employ specific Color forcing to improve editing of specific Superelevation View parameters in the Feature

Specific Lane and Shoulder color settings are controlled by the specific Superelevation View Feature and NOT by the Style

10.11 Cant Views

```
└─ 🖾 Cant View
     ├─ 📂 Cant View Styles
     └─ 📂 Commands
```

Cant View Styles

New in 2013. Used to display and control Cant parameters and some specifics for a Rail Alignment.

Limited Style property control in 2013

Naming Rule:

<Stationing> <Tick Type> <View Specifics>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

By default all Cant View Feature are on NCS Design (C-RAIL) layers

All objects to various NCS C-RAIL-CANT layers

Styles typically employ ByLayer properties for all Components

Complex Styles may employ specific Color forcing to improve editing of specific Cant View parameters in the Feature

10.12 Sample Lines

Sample Line
- Sample Line Styles
- Label Styles
- Commands
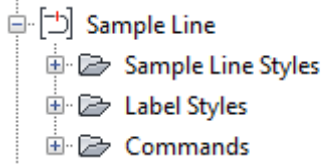
Sample Line Styles

Used to display and control Sample Line Features.

Sample Lines are OFF by default in 3D Representations

The display of the Sample Line Feature is probably the least important part of this Feature.

Sample Lines within the Sample Line Group collect together all the potentially sampled data and control the geometry of the sampling itself for all potential cross section data and annotation displayed in Section Views.

By default all supplied Sample Line Label Styles are Proposed

Sample Line Notes

Sample Lines are collected into named Sample Line Groups.

Sample Lines are placed relative to a defined alignment. Therefore to generate Site type sections you must use a simple alignment to control the creation of the Sample Line Group and the sectional data.

Typically you should edit the Sample Line Group's properties and not the properties of an individual Sample Line instance in the drawing.

For example to add more data sources to sample you must edit the Sample Line Group.

Sample Lines can use multiple of data sources:

a) Multiple surfaces
   including internal Corridor and Grading Group surfaces

b) Multiple Assemblies

c) Multiple Material lists

d) Pipe Networks

Sample Line Groups also connect together the collection of sampled data to the Section Views themselves.

Naming Rule:

<Road or Site><Sample Line Purpose>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

By default all Sample Line Features are on NCS Design (C-) layers

Road to C-ROAD layers

Site to C-TOPO layers
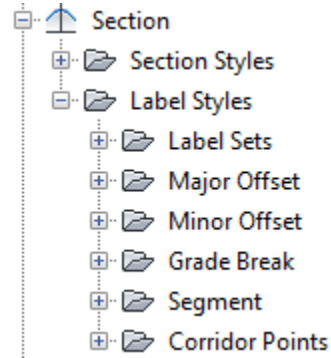
Sample Line Label Styles

Used to label and add symbol graphics to Sample Line Features

Naming Rule:

<Road or Site><Condition> <Contents><space>…<Details>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

10.13 Sections

Section
- Section Styles
- Label Styles
  - Label Sets
  - Major Offset
  - Minor Offset
  - Grade Break
  - Segment
  - Corridor Points

Section Styles

All Section Styles are applied and generate labels ONLY in Section Views

Used to display Section geometry in Section Views.

The Section and Profile features share much in common as do the connected Section and Profile View features.

Naming Rule:

<Condition> <Section Purpose Name>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical descriptive section purpose names are used

Linear objects to various NCS C or V-ROAD-SCTN layers

Ground Styles typically employ ByLayer properties for all Components

Styles for other surface data are Color forced for on screen display but Plotstyles are ByLayer

Components are OFF in 3D Representations

Section Label Sets

Used to collect multiple Section Feature labels and often used label property values together by name.

Naming Rule:

<Condition> <optional Purpose> <space> <Contents> <Details>…

Typical (An), (Ex), (Pr), (Qa), +NEW, +NOPLOT and +NOLABEL prefix conventions may be used

+NOLABELS Set in supplied to speed label removal.

Special example Label Sets may employ names outside the convention

---

Section Label Styles

All Section Label Styles generate labels ONLY in Section Views

Section Label Styles DO NOT label Assemblies shown in Section Views

Used to label Section geometry displayed in a Section View

Existing Conditions

Labels are designed to display BELOW the Section line (typically bottom up from Anchor Extensions)

All use Existing textstyle

All display to the right in single line labels.

Proposed Conditions

Labels are designed to display ABOVE the Section line (typically top down from Anchor Extensions)

All use Proposed textstyle

All display to the left in single line labels.

Naming Rule:

<Condition> <Section Label Type Code><Anchor Code><optional connection point><space><Contents>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

The Section Label Type Codes are listed with the Profile Label Styles below

Anchor Codes

Where a Profile or a Section label is attached makes a big difference in its behavior.

Attaching to Anchor Extensions is easiest to deal with most of the time and allow you to space complex sets of values from the Extension location.

Remember that Label Sets can automate the arrangement of lots of labels via the Extensions.

Attaching to the Anchor itself is useful when you want labels either perpendicular (Perp) or parallel (Para) to the Feature itself. This works for Ticks and simple Stationing.

a

Label is designed to be attached to the Anchor point on the Profile

x

Label is designed to be attached to the Anchor Extension point

xBup

Label is designed to be attached to the Anchor Extension at Profile View Bottom going up

This is typically used for Existing conditions (Ex)

xTtd

Label is designed to be attached to the Anchor Extension at Profile View Top going down

This is typically used for Proposed conditions (Pr)

Para (parallel to Section) and Perp (perpendicular to Section) may be used to clarify label rotation

Linear objects to various NCS C or V-ROAD-SCTN-LABL layers

Styles typically employ ByLayer properties for all Components

Contents may include Section and related Feature properties

A descriptive Section purpose name may be used for special cases instead of the naming convention

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

There are multiple groups of Section Label Styles that provide the ability to annotate a Section in depth based on the model properties of the Feature.

Section Offset Group

A collection of Section Labels Styles all connected to the offset locations of the profile. These are referred to as Group labels.

Labels in the Offset Group were constructed with:

(Pr) Proposed labels Top Down and to the left and showing above the profile

(Ex) Existing labels Bottom Up and to the right and showing below the profile

Section Major Offset Label Styles

Type Code = MO

Used to label Sections at Major Offsets from the centerline of the Section

Section Minor Offset Label Styles

Type Code = NO

Used to label Sections at Minor Offsets from the centerline of the Section

Section Grade Break Label Styles

Type Code = SB

Used to label Sections at Grade Break locations on the Section Line

Weeding is typically applied to these labels

Section Segment Label Styles

Type Code = SS

Used to label individual segments of the Section line with grade or slope information

Weeding is typically applied to these labels

Section Corridor Points Label Styles

Type Code = SC

Used to optionally label CODE SET STYLE point locations on Assemblies in Section Views with corridor supplied data

Must be added to a Section View's Label Set

The **P**oint option for the CORRIDORSECTIONLABELCON command must be used and applied to a Section View.

Command Setting may be changed to employ Corridor Point Labels in Section Views by Default

Only points on subassemblies assigned labels in the CODE SET STYLE are labeled.

Stagger is typically applied to these labels

10.14 Section Views

- Section View
  - Section View Styles
  - Group Plot Styles
  - Sheet Styles
  - Label Styles
    - Offset Elevation
    - Grade
    - Projection
  - Band Styles
    - Band Sets
    - Section Data
    - Section Segment
  - Table Styles
    - Total Volume
    - Material
  - Commands

Section View Styles

Used to display cross-section data including sampled data from any number of user selectable sources in the Sample Line Group producing the Section View

Profile and Section View Features are the publishing engines for sectional data in Civil 3D.

The View features include a large number of components that are controlled in a relatively complex user interface to adjust all of the parts and their properties. A View Style puts a name to all of that detailed work to make things easier.

Existing or Proposed conditions do NOT matter for Section Views

By default all Section View components are routed to the same collection of NCS Design Road Profile layers C-ROAD-SCTN-* in all the supplied Styles except NOPLOT versions.

Section View Styles have a different naming convention shared in common with Profile View Styles.

Naming Rule:

<Grid Type> <optional Grid specifics> <Annotation Location> <View Specifics>…

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

All objects to various NCS C-ROAD-SCTN layers

Styles typically employ ByLayer properties for all Components

Grid Types

Clip

The grid is clipped to profiles in the View. There are basically two possible methods.

HV – the clipping is controlled by the Clip to Highest property of the Section View Style

PP- the clipping is controlled by the specific Section selected for clipping in an individual Section View objects properties.

Full

The grids in one form or another go all over the Section View

None

No grids are displayed in the Section View

Annotation Location

In

The annotation is generally all inside the Axis borders of the Section View

Out

The annotation is generally all outside the Axis borders of the Section View
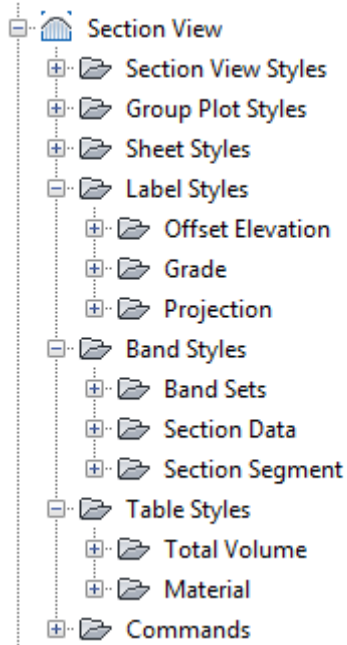
View Specifics

View Specifics

Updated name convention 2012

##x

Exaggeration factor used - the number is multiplied by the Current Horizontal Drawing Scale to produce the Actual Vertical Exaggeration of the Section view.

All

All the various Axis annotation is ON

Majors

Only Major Axis annotation is ON for both Elevations and Offsets

Vert

Horizontal Axis annotation is Vertical

Same

All Axis annotation is sized with the same text heights

Section View Style Notes

A selection of Section View Styles are provided and are constructed in a reasonably consistent fashion.

All the styles are reasonably documented for key properties in the Description of the style.

However, the various textsize and location details are not documented. There are a lot of details that you need to be careful to make the same or complimentary to produce consistent Section View Styles.

a) Title annotation is typically ON for Out types and typically sized and located with the same common specifics.

b) Top and Bottom Axis Titles include Offset data by default

c) Left and Right Axis Titles include Elevation Range data by default

d) Additional Geometry Grids are ON by default in most Styles

Section View Label Styles

Used to label individual locations within and relative to the Section View.

Used to label specific locations in the Section View with the General Civil 3D Labeling tool and may include optional Markers.

Therefore the styles below do not include built-in symbol blocks.

These labels create label values ONLY based on the Section View.

Naming Rule:

<Condition> <Section View Label Type Code><Anchor Code><space><Contents>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

The Section View Label Type Codes are listed with the Section Label Styles below

Anchor Codes

All Profile View Labels are attached to the Anchor

a

Label is attached to the Anchor point on the Profile

x

Label is designed to be attached to the Anchor Extension point

Section View Label Notes

Labels that appear in Section views come from the multiple features that are data sampled in the Sample Line Group.

Assemblies (Marker, Link, and Shape Labels), Surfaces (Section Labels), and these individual labels may all appear in a Section View. Therefore, what feature is producing what label is important to track while tuning Section View output.

Labels for the Assembly come from the applied Code Set Style. Contents of Code Set Style generated Labels may be determined by the Code Description in the Code Set or the built in "Code" found in the default or modified Civil 3D code sets resource file. Code Sets Styles CODE contents are determined by the added Subassemblies or by manual Code creation.

Section View Offset Elevation Label Styles

Type Code = OE

Labels at a location in the Section View based the the Profile View Offset and Elevation.

Assumes the use a (G) type Marker Style to mark location.

(Eg) versions of the label are supplied for consistency.

Section View Grade Label Styles

Type Code = SG

Labels the difference between two point locations in the Section View expressed as a Change in Elevation Grade or Slope.

Multiple types of labels with different data content are supplied including dimension like versions with Offset, Elevation, Elevation Change and Percent Grade.

Section View Band Sets

Collect named groups of Band styles and property settings for Bands added to Section Views

Used to collect multiple Section View Bands and often used to label property values together by name.

Bands Sets can control the Top or Bottom location of the Bands. The default used is Bottom.

Naming Rule:

<Condition> <optional Purpose> <space> <Contents> <Details>…

+NOBANDS Set in supplied to speed Band removal.

Special example Label Sets may employ names outside the convention

Section View Band Styles

Used to annotate the various geometry parts and/or referenced geometry to the Section surface(s) included in the Section View

All included Band Styles used in the supplied Sets are by default located at the Bottom of the Section View.

Basic examples are provided for all Band Style types. More detailed styles may be provided for typically employed band requirements.

Bands without Band Titles and/or Borders are supplied for Section Views that do not display Axis lines

Graphic representations used in the Band Styles typically employ

Naming Rule:

Revised for 2012+ for working Section Segment Styles

<Type Code><space> <Title and Border Display><space> <Band Label Rotation><Band Contents Summary>…

The Section View Band Type Codes are listed with the Section Band Styles types below

No +INVISIBLE, +NEW, and +NOPLOT prefix conventions are be used

Title and Border Display Codes

T

Title is displayed

B

Border is displayed

Band Label Rotation

Typically 0, 90, or 270 rotational display of data contents

All objects to various NCS C-ROAD-SCTN layers
2012+ All labels to C-ROAD-SCTN-LABL from C-ROAD-SCTN-TEXT

Section View Section Data Band Styles

Type Code = SVD

Displays any data from the sections included in the Section View

Typically this Band type will show Section elevations.

Elevations @ Major Offset and Centerline are typically shown

Section View Section Segment Band Styles

Type Code = SVS

Displays Section data from a selected and weeded surface in ONE simplified graphic form with Band labels at a variety of key Section surface locations.

Prior to 2012 Segment Band Styles were not particularly useful because you could not weed the length of segments sampled from the section. They did work for large segment lengths in (Pr) Site type Sections at Major Offset locations.

Section View Table Styles

Used to produce table output for Cut and Fill and the various Materials sampled at a specific station

Generating the tables will increase the space necessary to display and plot Sections.

Two Section View Table Style types are available:

Total Volume

Material

When you generate one or more Sections you can also chose to create one of these types of tables. However, you must have sampled the data source in the Sample Line Group for output to be produced.

Naming Rule:

<Contents><+><Contents> …

All use typical sectional data Contents based on the sampled Section defined in the Sample Line Group

Section View Group Plot Styles

Used to arrange the published Sections by Rows or Columns in pre-2011 release they are directly related to a named Section View Sheet Style.

In 2011+ the array start location and limits are determined by the Section paperspace viewport information supplied by the selected Layout chosen in the wizard.

Pages of Section are also affected by the Horizontal Offset sample width of the Sample Line Group, the Vertical Scale Exaggeration of the Section View Style, and the Elevation Range of Section Views.

Section View Group Plot Styles typically need to be built for each vertical exaggerated scale of Section View Style
or
Section View Group Plot Style can also edited "on-the-fly" in the output drawing. This is often the easier and more productive alternative to lots of these styles.

Employing Section Tables will increase the space requirements for Sections on Pages.

Naming Rule:

<optional Plot > <Section Type> <Sheet Size> <Section Scale> <Write Direction> <Rows or Columns> …

Plot determines whether or not the referenced Sheet Style components plot or not. +NOPLOT is typical

Section Types

Road

The Group Plot Styles supplied for this were built for about a 120' maximum total length for the Sample Lines in a Sample Line Group.

Site

The Group Plot Styles supplied for this were built for about a large maximum total length for the Sample Lines in a Sample Line Group.

Only 1 Section is created per Row by default for large Sample distances

Only 2 Sections are created per Row by default for medium Sample distances

Section View Sheet Styles

No longer specifically employed in 2011+.

Styles are supplied in 2011+ only for consistency and compatibility for upgraded projects.

Previously used to define the plotted area for related Group Plot Styles

The Sheet Style definition is directly connected to a Model space Page Setup that must be defined in the drawing.

The Sheet tab box refers to Page Setups as "Page Layouts" providing a list of the currently defined Page Setups available in Model space only.

Colors are adjusted in the Sheet Styles to differentiate Sheet Style sizes. The Border and Printable area displayed colors are different for each typical sheet size.

D size sheets assume an Arch expanded 24x36 printable area

E size Sheet Styles assume a ANSI expanded 34x44 printable area

Naming Rule:

<Contents><+><Contents> …

NOPLOT Sheet Styles

We employed NOPLOT type borders and grids in the Sheet Styles that we consider working examples.

The Sheet used in a Group Style will display and show border, printable area, and major grids but will not plot.

Manually relocating the displayed Sheet View in the drawing where the Sections are produced is often the easier course of action.

However, changing the uphill properties like the Section Group Style and/or Section View Style for the Sample Line Group will require you to repeat the move of the displayed Sheet process again.

The supplied Sheet Styles are provided only as an example. You will have to adjust the properties for your specific circumstances if you employ printable grids.

Plot Sheet Style versions are only supplied as examples.

Rotation is OFF for In types.

10.15 Mass Haul Lines

> ⊟ 𝄜 Mass Haul Line
>   ⊞ 📂 Mass Haul Line Styles
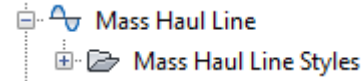
Mass Haul Line Features

Mass Hail Line Features display both the volumetric profile lines and the hatch/filled areas under the Mass Haul Lines
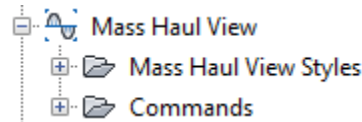
Naming Rule:

<Line Type> <Area Type>…

Both Free haul Balance and Grade point style types are supplied.

Both hatched and Fill Area style types are supplied

10.16 Mass Haul Views

> ⊟ 𝄜 Mass Haul View
>   ⊞ 📂 Mass Haul View Styles
>   ⊞ 📂 Commands

Mass Haul View Features

Used to display Mass Hail data sampled from Material Lists in the Sample Line Group producing the Mass View

Mass Hail Views are like Profile and Section View Features.

The View features include a large number of components that are controlled in a relatively complex user interface to adjust all of the parts and their properties. A View Style puts a name to all of that detailed work to make things easier.

Existing or Proposed conditions do NOT matter for Mass Haul Views

By default all Mass Haul View components are routed to the same collection of NCS Design Road layers C-ROAD-MASS-* in all the supplied Styles except NOPLOT versions.

Mass Haul View Styles have a different naming convention shared in common with Profile View and Section View Styles.

Naming Rule:

<Grid Type> <optional Grid specifics> <Annotation Location> <View Specifics>…

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

All objects to various NCS C-ROAD-MASS layers

Styles typically employ ByLayer properties for all Components

Vertical Exaggeration Should be Adjusted

The default vertical exaggeration for all supplied Mass Haul View Styles is 0.001.

Depending on the scale of the volume of material sampled you should adjust this property to an appropriate value

Grid Types

Clip

The grid is clipped to profiles in the View. There are basically two possible methods.

HV – the clipping is controlled by the Clip to Highest property of the Mass Haul View Style

PP- the clipping is controlled by the specific Profile selected for clipping in an individual Mass Haul View objects properties.

V – only the vertical grid is shown

Full

The grids in one form or another go all over the Mass Haul View

None

No grids are displayed in the Mass Haul View

Annotation Location

In

The annotation is generally all inside the Axis borders of the Mass Haul View

Out

The annotation is generally all outside the Axis borders of the Mass Haul View

View Specifics

All

All the various Axis annotation is ON

Majors

Only Major Axis annotation is ON for both Elevations and Stations

Elevs

Elevation Minor Axis annotation is ON

Station Minor Axis annotation is OFF

Offs

All Station Axis annotation is ON

Elevation Minor Axis annotation is OFF

Mass Haul View Style Notes

A selection of Mass Haul View Styles are provided and are constructed in a reasonably consistent fashion.

All the styles are reasonably documented for key properties in the Description of the style.

However, the various textsize and location details are not documented. There are a lot of details that you need to be careful to make the same or complimentary to produce consistent Mass Haul View Styles.

Title annotation is typically ON for Out types and typically sized and located with the same common specifics.

Axis Title annotation is OFF for In types

10.17 Catchments

- Catchment
  - Catchment Styles
  - Label Styles
  - Commands
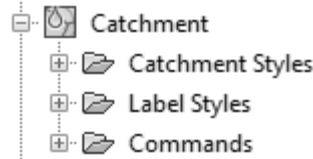
Catchment Features

Used to display both the Boundary area of the catchment, the catchment's Flow Path based on the calculated Time of Concentration and Markers at TOC locations. By default Civil 3D 2012+ employs the NRCS (SCS) TR-55 method to calculate TOC (you may also employ a user defined value).

Catchment can be constructed from surface Features and/or manually from polyline data with elevation. Time of Concentration calculations are performed serially for the Flow Path and Markers. The Flow Path Segments can be manually added and edited in the Flow Path vista. For SSA output no more than 3 segments or any type are supported in the Flow Path.

Markers are produced at the Most Distance Point, Discharge Point, and calculated Flow Path segment start points.

Graphic representations used in the Catchments typically employ

Naming Rule:

< Contents><Detail>…

+INVISIBLE, +NEW, and +NOPLOT prefix conventions are used

All objects to various NCS C-HYDR-CTCH layers

Catchment Area Label Styles

Used to annotate Catchment Area features in Plan

Type Code = CA

Naming Rule:

<Condition><Contents>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

All objects to NCS C-HYDR-CTCH-LABL layer

Catchment Flow Segment Label Styles

Used to annotate Flow Segments within Catchment features in Plan

Type Code = CF

Naming Rule:

<Condition> <Anchor Code> <space> <Rotation> <Contents>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

All objects to NCS C-HYDR-CTCH-LABL layer

Para (parallel to Flow Segment) and **Perp** (perpendicular) may be used as well as **Rotation** values to clarify label rotation. Numeric Rotation values indicate View Oriented labels.

Anchor Codes

Flow Segment Labels are attached to the Feature Label Anchor

a

Label is attached to the Anchor point on the Object

L

Label Left of the Segment

R

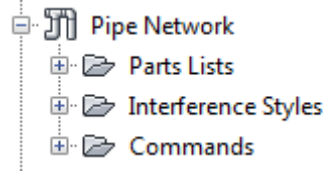Label Right of the Segment

On

Label On the Segment

Stack

Label is View Oriented and include stacked Flow Segment data values

10.18 Pipe Networks

Parts Lists

Supplied are example parts lists based on the default Pipe and Structure libraries that ship with Civil 3D.

No attempt was made to provide an in-depth set of examples beyond the essential basics.

Naming Rule:

<System> <space> <Contents> …

The following System codes were used and are additionally employed by other network features.

System Code = SD

Storm drainage systems

System Code = SS

Sanitary sewer systems

System Code = WR

Water systems

Interference Styles

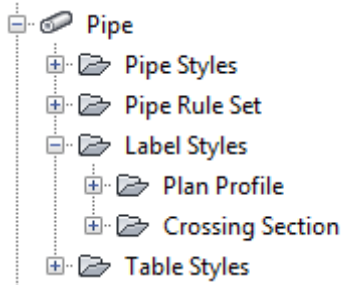Used as an error checking tool to display interferences between parts in pipe networks.

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

All components employ NCS NOPLOT layers

Naming Rule:

<Display Type> <space> <Contents> …

10.19 Pipes

- Pipe
  - Pipe Styles
  - Pipe Rule Set
  - Label Styles
    - Plan Profile
    - Crossing Section
  - Table Styles

Pipe Styles

Used to display and control pipe in Pipe Network models and their included geometry

Supplied are basic examples and prototype styles.

2012+ added support for common NCS utilities

Naming Rule:

<Condition> <System><# Lines>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical Pipe Network system type names are used

Linear objects to NCS C or V-<short system Name> layers

Area hatches to NCS –PATT layers

Area hatches are typically not displayed

Styles typically employ ByLayer properties for all Components

Pipe Rule Set

Contains Pipe Rules used to set Rules on pipes in pipe networks

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Naming Rule:

<System><Size><optional Purpose Name> <Contents>…

Typical +NEW, and +NORULES prefix conventions may be used

+NORULES may be used to remove rules from Pipes

Special example Sets may employ names outside the convention

Pipe Label Styles

Used to annotate Pipe features in Plan, Profile and Section

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Existing Conditions

All use Existing textstyle and to
V--<short system name> layer

Proposed Conditions

All use Proposed textstyle and to
NCS C -<short system name>-LABL layers

Naming Rule:

<Condition> <System><Anchor Code> <space> <Rotation> <Contents>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Para (parallel to Pipe) and Perp (perpendicular to Pipe) may be used to clarify label rotation

Anchor Codes

Pipe Labels are attached to the Feature Label Anchor or the Feature Dimension Anchor

a

Label is attached to the Anchor point on the Object

x

Label is designed to be attached to the Pipe Dimension Anchor point

xBup

Label is designed to be attached to the Pipe Dimension Anchor point at Profile or Section View Bottom going up

This is typically used for Existing conditions (Ex)

Proposed conditions may also employ the code for Pipe labels

xTtd

Label is designed to be attached to the Pipe Dimension Anchor point at Profile or Section View Top going down

This is typically used for Proposed conditions (Pr)

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Typical Content for Pipe features is used

Typical Pipe Network System Codes are used

Pipe Plan Profile Label Styles

Used to label Pipes in both Plan and Profile views

Uses Pipe Label Style naming convention

a

Label is designed typically for PLAN configurations and is attached to the Pipe Label point

x

Label is designed typically for Profile use and is attached to the Pipe Dimension point

Expressions may be employed in some styles

Special Stacked versions of label styles are supplied

Pipe Crossing Section Label Styles

Used to label Pipe in Section views

Uses Pipe Label Style naming convention

x

Label is designed typically for Section use and is attached to the Pipe Dimension point

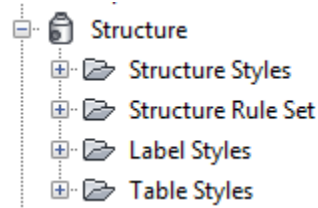Expressions may be employed in some styles

Pipe Table Styles

Used to produce Pipe data from the Pipe Network in a tabular form

Naming Rule:

<Contents> <+ char><Contents>…

All use typical and shortened Pipe data names for Contents used in the naming convention

10.20 Structures

Structure Styles

Used to control and display Structure Features

Naming Rule:

<Condition> <System><Purpose Name>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical Pipe Network system type names are used

Linear objects to NCS C or V-<short system Name> layers

Area hatches to NCS –PATT layers

Area hatches are typically not displayed

Styles typically employ ByLayer properties for all Components

Structure Rule Set

Contains Structure Rules used to set Rules on Structures in Pipe Networks

Supplied are basic examples and prototype styles.

2012+ added support for common NCS utilities

Naming Rule:

<System> <optional Purpose Name> <Details>…

Typical +NEW, and +NORULES prefix conventions may be used

+NORULES may be used to remove rules from Structures

Special example Sets may employ names outside the convention

Structure Label Styles

Used to annotate Structure features in Plan, Profile and Section

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Existing Conditions

All use Existing textstyle and to
V--<short system name> layer

Proposed Conditions

All use Proposed textstyle and to
NCS C -<short system name>-LABL layers

Naming Rule:

<Condition> <System> <Anchor Code> <space> <optional Rotation> <Contents>

Typical (An), (Ex), (Pr), +NEW, a +NOPLOT prefix conventions may be used

Para (parallel to Structure) and Perp (perpendicular to Structure) may be used to clarify label rotation

Typical Pipe Network System Codes are used

Typical Content for Structure features are used

Anchor Codes

Structure Labels are attached to the Feature Label Anchor or the Feature Dimension Anchor

a

Label is attached to the Anchor point on the Object

aL or aR

Label is attached to the Anchor point on the Object

These labels typically align themselves "automatically" with the pipe run.

Rotation is locked to the structure rotation and the Dragged state is As Composed so the label typically will stay parallel to the pipe "run" even when dragged.

Left and Rights are therefore needed to resolve dragged state leader issues based on the rotation of the structures.

x

Label is designed to be attached to the Structure Dimension Anchor point

xBup

Label is designed to be attached to the Structure Dimension Anchor point at Profile or Section View Bottom going up

This is typically used for Existing conditions (Ex)

Proposed conditions may also employ the code for Structure labels

xTtd

Label is designed to be attached to the Structure Dimension Anchor point at Profile or Section View Top going down

This is typically used for Proposed conditions (Pr)

Existing conditions may also employ the code for Structure labels

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Structure Table Styles

Used to produce Structure data in tabular formats

Naming Rule:

<Contents> <+ char><Contents>…

All use typical and shortened Structure data names for Contents used in the naming convention

10.21 Pressure Pipe Networks

- Pressure Network
  - Parts Lists
  - Commands
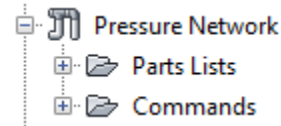
Parts Lists

New in 2013 – Section support added in 2014

Supplied are example parts lists based on the default Pressure Pipe Catalogs that ship with Civil 3D.

No attempt was made to provide an in-depth set of examples beyond the essential basics.

Naming Rule:

<System> <space> <Contents> …

The following System codes may be used and are additionally employed by other Pipe and Pressure Pipe network features.

System Codes

CO, FO, IL, IR, IW, NG, PH, SD, SS, WR

10.22 Pressure Pipes

- Pressure Pipe
  - Pressure Pipe Styles
  - Label Styles
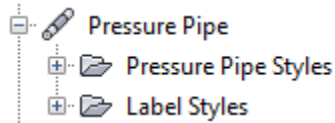
Pressure Pipe Styles

New in 2013 – Section support added in 2014

Used to display and control pipe in Pressure Pipe Network models and their included geometry

Supplied are basic examples and prototype styles.

In depth support for all common NCS utilities

Naming Rule:

<Condition> <System><# Lines>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical Pipe and Pressure Pipe Network system type names are used

Linear objects to NCS C or V-<short system Name> layers

Area hatches to NCS –PATT layers

Area hatches are typically not displayed

Styles typically employ ByLayer properties for all Components

Pressure Pipe Label Styles

New for 2013

Used to annotate Pressure Pipe features in Plan and Profile.

Sections are not supported in 2013

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Existing Conditions

All use Existing textstyle and to
V--<short system name> layer

Proposed Conditions

All use Proposed textstyle and to
NCS C -<short system name>-LABL layers

Naming Rule:

<Condition> <System><Anchor Code> <space> <Rotation> <Contents>

Typical (An), (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Para (parallel to Pipe) and Perp (perpendicular to Pipe) may be used to clarify label rotation

Anchor Codes

Pipe Labels are attached to the Feature Label Anchor or the Feature Dimension Anchor

a

Label is attached to the Anchor point on the Object

x

Label is designed to be attached to the Pipe Dimension Anchor point

xBup

Label is designed to be attached to the Pipe Dimension Anchor point at Profile or Section View Bottom going up

This is typically used for Existing conditions (Ex)

Proposed conditions may also employ the code for Pipe labels

xTtd

Label is designed to be attached to the Pipe Dimension Anchor point at Profile or Section View Top going down

This is typically used for Proposed conditions (Pr)

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Typical Content for Pressure Pipe features is used

Typical Pipe and Pressure Pipe Network System Codes are used

Pressure Pipe Table Styles

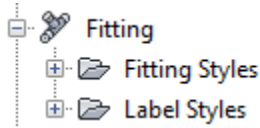*No Pressure Pipe Table Styles are supported in 2013.*

Added for future implementation and consistency.

Naming Rule:

<Contents> <+ char><Contents>…

All use typical and shortened Pressure Pipe data names for Contents used in the naming convention

10.23 Fittings

- Fitting
  - Fitting Styles
  - Label Styles

Fitting Styles

New in 2013 – Section support added in 2014

Used to control and display Fitting Features

Naming Rule:

<Condition> <System><Purpose Name>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical Pipe and Pressure Pipe Network system type names are used

Linear objects to NCS C or V-<short system Name> layers

Area hatches to NCS –PATT layers

Area hatches are typically not displayed

Styles typically employ ByLayer properties for all Components

Fitting Label Styles

Used to annotate Fittings features in Plan and Profile

Sections are not supported in 2013

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Existing Conditions

All use Existing textstyle and to
V--<short system name> layer

Proposed Conditions

All use Proposed textstyle and to
NCS C -<short system name>-LABL layers

Naming Rule:

<Condition> <System> <Anchor Code> <space> <optional Rotation> <Contents>

Typical (An), (Ex), (Pr), +NEW, a +NOPLOT prefix conventions may be used

Para (parallel to Structure) and Perp (perpendicular to Structure) may be used to clarify label rotation

Typical Pipe Network System Codes are used

Typical Content for Structure features are used

Anchor Codes

Structure Labels are attached to the Feature Label Anchor or the Feature Dimension Anchor

a

Label is attached to the Anchor point on the Object

aL or aR

Label is attached to the Anchor point on the Object

These labels typically align themselves "automatically" with the pipe run.

Rotation is locked to the structure rotation and the Dragged state is As Composed so the label typically will stay parallel to the pipe "run" even when dragged.

Left and Rights are therefore needed to resolve dragged state leader issues based on the rotation of the structures.

x

Label is designed to be attached to the Structure Dimension Anchor point

xBup

Label is designed to be attached to the Structure Dimension Anchor point at Profile or Section View Bottom going up

This is typically used for Existing conditions (Ex)

Proposed conditions may also employ the code for Structure labels

xTtd

Label is designed to be attached to the Structure Dimension Anchor point at Profile or Section View Top going down

This is typically used for Proposed conditions (Pr)

Existing conditions may also employ the code for Structure labels

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Fitting Table Styles

No Fitting Table Styles are supported in 2013.
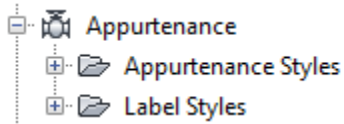
Added for future implementation and consistency.

Naming Rule:

<Contents> <+ char><Contents>…

All use typical and shortened Structure data names for Contents used in the naming convention

10.24 Appurtenances

- Appurtenance
  - Appurtenance Styles
  - Label Styles

Appurtenance Styles

New in 2013 – Section support added in 2014

Used to control and display Appurtenance Features

Naming Rule:

<Condition> <System><Purpose Name>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Typical Pipe and Pressure Pipe Network system type names are used

Linear objects to NCS C or V-<short system Name> layers

Area hatches to NCS –PATT layers

Area hatches are typically not displayed

Styles typically employ ByLayer properties for all Components

---

Appurtenance Label Styles

Used to annotate Appurtenance features in Plan and Profile

Sections are not supported in 2013

Supplied are basic examples. No attempt was made to provide an in-depth set of examples.

Existing Conditions

All use Existing textstyle and to
V--<short system name> layer

Proposed Conditions

All use Proposed textstyle and to
NCS C -<short system name>-LABL layers

Naming Rule:

<Condition> <System> <Anchor Code> <space> <optional Rotation> <Contents>

Typical (An), (Ex), (Pr), +NEW, a +NOPLOT prefix conventions may be used

Para (parallel to Structure) and Perp (perpendicular to Structure) may be used to clarify label rotation

Typical Pipe Network System Codes are used

Typical Content for Structure features are used

Anchor Codes

Structure Labels are attached to the Feature Label Anchor or the Feature Dimension Anchor

a

Label is attached to the Anchor point on the Object

aL or aR

Label is attached to the Anchor point on the Object

These labels typically align themselves "automatically" with the pipe run.

Rotation is locked to the structure rotation and the Dragged state is As Composed so the label typically will stay parallel to the pipe "run" even when dragged.

Left and Rights are therefore needed to resolve dragged state leader issues based on the rotation of the structures.

x

Label is designed to be attached to the Structure Dimension Anchor point

xBup

Label is designed to be attached to the Structure Dimension Anchor point at Profile or Section View Bottom going up

This is typically used for Existing conditions (Ex)

Proposed conditions may also employ the code for Structure labels

---

xTtd

Label is designed to be attached to the Structure Dimension Anchor point at Profile or Section View Top going down

This is typically used for Proposed conditions (Pr)

Existing conditions may also employ the code for Structure labels

Label Style Component Contents Separators

+

Labels that are in a single line use the plus character as a delimiter. The character separates the contents of the label style.

o

Labels that include multiple lines use the lower case "o" character and <spaces> as a delimiter.

The content string may be made of multiple Label Style components or a single formatted stack in one component within the label style.

Appurtenance Table Styles

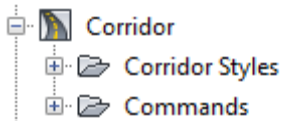*No Fitting Table Styles are supported in 2013.*

Added for future implementation and consistency.

Naming Rule:

<Contents> <+ char><Contents>...

All use typical and shortened Structure data names for Contents used in the naming convention

10.25 Corridors

```
⊟ 🗻 Corridor
   ⊞ 📂 Corridor Styles
   ⊞ 📂 Commands
```

Corridor Styles

Used to control the display of Corridor Features in Plan view for design purposes.

The current Code Set Style property also affects the resolved Plan display.

Components are generally sent to a NCS compliant C-ROAD-CORR layers
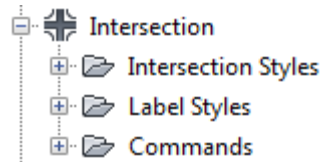
Typically you only need new Corridor styles if you want the Corridor to display components differently or rout the Corridor contents to different layers

Naming Rule:

<Purpose>

Typical (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

10.26 Intersections

```
⊟ ✛ Intersection
   ⊞ 📂 Intersection Styles
   ⊞ 📂 Label Styles
   ⊞ 📂 Commands
```

Intersection Styles

Used to control the display of Intersection Features

Marker component sent to a NCS compliant C-ROAD-INTS layer

Naming Rule:

<Purpose>

Typical (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Intersection Label Styles

Used to annotate Intersection features in Plan

Existing Conditions

All use Existing textstyle and to V-ROAD-INTS-LABL layer

Proposed Conditions

All use Proposed textstyle and to NCS C-ROAD-INTS-LABL layer

Naming Rule:

<Condition> <Anchor Code> <space> <optional Rotation> <Contents>

Typical (An), (Ex), (Pr), +NEW, a +NOPLOT prefix conventions may be used

Assembly Drawings

Used to collect subassemblies into full and partial road sections

The supplied examples are employed in the supplied Assembly Sets.

All the supplied assemblies are stored in STB drawings reference the default Production Solution monochrome STB file.

The Assemblies are named with standard naming convention.

Cross Section Naming Rule:

<Speed> <AASHTO Name> <Section Purpose Type> <Optional Code>

Curb Return Naming Rule:

Curb Fillets <Optional Code(s)>

Speed

Based on basic AASHTO "Green Book" maximum design speed table for medium traffic ratings where applicable.

Assemblies also conform to SmartCode 9+ specification and conventions.

SmartCode conformance is documented in the Descriptions of the Assemblies.

AASHTO Name

Names used are based on the AASHTO "Green Book" generic names. (e.g. "Collector", "Local")

Section Purpose Type

Generic names are used to describe the usage of the assembly in the Intersection Assembly Sets.

2010 Intersection Assembly Set may contain:

o   Full Sections – used for complete centerline cross sections

o   Half Sections – used for half centerline cross sections

o   Part Sections – used for both travel lanes and one side cross sections

o   TPart Sections – used for centerline single lane when a partial T intersection is desired

o   Tru Sections – used for centerline both travel lanes

Optional Codes

Descriptive code are used to clarify composition of the cross section and/or daylight direction

Assembly Sets

An external XML file used to collect assemblies for Intersection Features

The additional Sets employ the Assemblies list above in various combinations

Naming Rule:

<Release> <Speed> <AASHTO Name> <Speed> <AASHTO Name> <Optional Code>

AASHTO Name

Names used are based on the AASHTO "Green Book" generic names. (e.g. "Collector", "Local")

Speed

Based on basic AASHTO "Green Book" maximum design speed table for medium traffic ratings where applicable.

Assemblies also conform to SmartCode 9+ specification and conventions.

SmartCode conformance is documented in the Descriptions of the Assemblies.

Optional Code

"Half T" is used to document special Sets that produce Intersections with only half sections for the Primary Road.

These Sets can be used as the basis to create multiple eccentric Intersections where more multiple secondary alignments meet the primary in close proximity to one another. Manual corridor region edits will be required.

10.27 Assemblies

Assembly
  Assembly Styles
  Commands
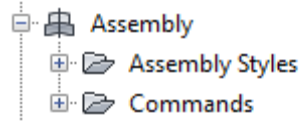
Assembly Styles

Used to control the display of the components of an Assembly feature

Components are generally sent to a NCS compliant C-ROAD-ASSM layers

Rail Assemblies components to a NCS compliant C-RAIL-ASSM layers

Typically you only need new Assembly styles if you want the Assembly to display components different or route the Assembly contents to different layers

Naming Rule:
<Purpose>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

10.28 Subassemblies

Subassembly
  Commands
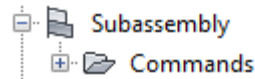
No Styles

This collection documents the Subassembly features in the drawing in the Prospector tab. The Settings tab is empty except for Feature Settings.

Only included for consistency

10.29 Quantity Takeoffs

- Quantity Takeoff
  - Quantity Takeoff Criteria
  - Table Styles
    - Total Volume
    - Material
  - Commands
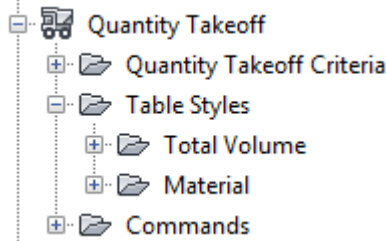
Quantity Takeoff Criteria

Establishes what Shape areas are used to calculate areas and volumes

Quantity Take Criteria can be automatically generated from any Sample Line Group based on the data sources sampled within the Group.

QTC can be constructed manually by adding and renaming either Surface or Shape criteria.

Naming Rule:

<Purpose> <Contents>…

Quantity Takeoff Table Styles

Used to publish volume output from the Quantity Takeoff Criteria in tabular form

QTC tables can be added and placed anywhere in a drawing

Tables are sent to NCS Design ANNO table layers

Naming Rule:

<Contents>…

Two types of tables Styles are available

Total Volume

Tables from Surface data takeoffs

Material

Tables from Shape data takeoffs
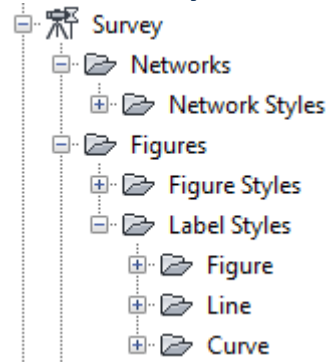
10.30 Survey

- Survey
  - Networks
    - Network Styles
  - Figures
    - Figure Styles
    - Label Styles
      - Figure
      - Line
      - Curve

Survey Network Styles

Used to display various components of a Survey network

The Survey Feature has no Label Styles because labeling is typically done with Point and Point Label Styles.

Typical various components are Color forced to aid in network visual assessment

Components are generally sent to a NCS compliant V- layers based on the Network Contents

Naming Rule:

<Optional Condition> <optional Purpose> <Contents>…

Typical (Ex), (Pr), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Survey Figure Styles

Used to display Survey figures

Naming Rule:

<Optional Condition> <optional Link Code Name or Purpose>

Typical (Ex), (Pr), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Figure Styles employ general Markers to display vertices of various types at various point locations on the linear feature.

Figure Styles may use typical Civil 3D roadway Subassembly Code Names so automatic match can occur easily.

Figures are generally sent to a NCS compliant V- layers based on the Figure Contents

Survey Figure Label Styles

New for 2013

Used to annotate Survey figures

Naming Rule:

<Condition> <Contents>…

Contents use typical Figure Feature data annotation derived from geometry the objects.

Labels to typical NCS compliant V-LABL Layers

Survey Line & Curve Label Styles

Used to manually label Figure features in a similar fashion to labels generated from other Civil 3D Feature geometry.

These styles are NOT the same styles related to specific Parcel and Alignment Features but generally will accomplish the same annotative and quality assurance tasks on Figure Features.

Line and Curve Label Styles use the (Ex), (Pr), +NEW, and +NOPLOT general prefix conventions detailed above.

Multiple rotational versions of the formats are supplied.

Naming Rule:

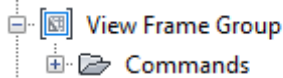**<Condition> <Contents>…**

Contents use typical linear data civil annotation derived from geometry the objects.

Typical Content names are used

Typical Label Style Contents Separators are used

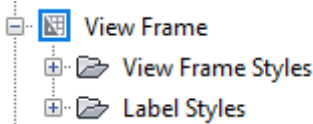Labels to typical NCS compliant V-LABL Layers

10.31 View Frame Groups

🔲 View Frame Group
　📂 Commands

No Styles

Collects View Frames generated by the Plan Production tool.

Only included for consistency

10.32 View Frames

🔲 View Frame
　📂 View Frame Styles
　📂 Label Styles

View Frame Styles

Used to display print areas as View Frame features generated for the Plan Production tool

Naming Rule:

<Condition> <Contents>

Typical +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Linear objects to NCS C-ANNO layers

Styles typically employ ByLayer properties for all Components

View Frame Label Styles

Used to label View Frames

Naming Rule:

<Side> <Contents>

All the View Frame label styles use this above naming convention.

Labels to NCS C-ANNO layers

View Frame Label Style

Used to label the displayed View Frames

10.33 Match Line Features

📐 Match Line
　📂 Match Line Styles
　📂 Label Styles
　　📂 Match Line Left
　　📂 Match Line Right
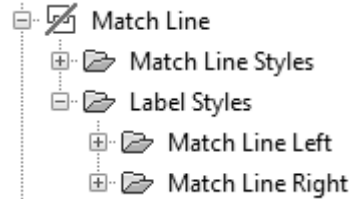
Match Line Styles

Used to document the breaks between View Frames

Naming Rule:

<Condition> <Contents>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Linear objects to NCS C-ANNO layers

Styles typically employ ByLayer properties for all Components

Match Line Label Styles

Used to label Match Lines

Naming Rule:

<Side> <Contents>

All the Match Line labels styles use this above naming convention.

Match Line Left Label Styles

Used to produce Left side Match Line labels

Match Line Right Label Styles

Used to produce Right side Match Line labels

10.34 Building Sites

🏢 Building Site
　📂 Building Site Styles
　📂 Commands
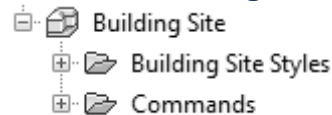
Building Site Styles

Used to display ADSK file imports

Naming Rule:

<Condition> <Contents>

Typical (Ex), (Pr), (Qa), +INVISIBLE, +NEW, and +NOPLOT prefix conventions may be used

Linear objects to NCS C-BLDG layers

Styles typically employ ByLayer properties for all Components

11 Object Defaults

Feature and Command Settings are purposefully NOT set in the supplied templates.

This does NOT mean that these choices are not important.

Feature and Command Setting should be set up in your production versions of the templates.

Many of these choices are Style centric and make removal of a referenced Style (used in Feature and Commands Settings) problematic.

You need to choose which of the various Styles you will employ most frequently first.

You should then set the Feature and Command Defaults in your production templates.

12 Tool Palette(s)

12.1 Assemblies

A single Tool Palette is supplied with modified The Assemblies employ STB based drawings to eliminate introduction of the CTB "default" plotstyle.

All the supplied Assemblies and Assembly Sets employ the "Standard" Code Set Style.

Therefore the Subassemblies will inherit the Code Set Style assigned to the containing Assembly OR if inserted without attachment will have the Standard Code Set Style.

The referenced Assemblies were constructed using only Standard Civil 3D Assembly and Code Set Styles.

Therefore inserting any supplied Subassembly or Assembly Set with NOT introduce new Styles or Label Styles to any drawing.

12.2 Material Styles

Stock Materials are employed and reference have been kept to minimum in all Styles included

12.3 Drawing Symbols and (MV)Blocks

The drawing symbols (blocks) supplied are modified versions of typical Land Desktop and Civil 3D blocks.

All blocks have been modified to reduce the number of textstyles employed in their construction to two textstyles. This removes unnecessary old textstyles from all the templates.

Therefore, you can change the font definitions of the default "Proposed" and "Existing" textstyles and change the look of the annotation for all the templates, all the drawings in a project, or an individual drawing as needed.

Default install versions of all MVblocks are employed.

13 Pipe, Structure and Pressure Pipe Catalogs

Typical files supplied with default Civil 3D install.

14 Highway and Railway Design Check Files

Typical files supplied with default Civil 3D install.

15 Quantity Take Off

Typical files supplied with default Civil 3D install.

16 Superelevation and Railway Cant Standards

Typical files supplied with default Civil 3D install.

17 Intersection Feature – Styles, Names and Assembly Sets

A collection of STB based Assemblies are supplied and used in Intersection Assembly Sets.
Stored in the default Civil 3D content storage location..\Assemblies\Imperial STB_US folder
All the included Assemblies employ:
 the "Standard" Assembly Style
the "Standard" Code Set Style
This allows you to employ the assemblies without having to customize them and/or remove unwanted Code Set Styles and referenced Styles from your templates or production drawings.
Intersection Assembly Sets are also supplied and located in the same folder.

17.1 Assembly Drawings

Assembly Drawings

Used to collect subassemblies into full and partial road sections

The supplied examples are employed in the supplied Assembly Sets.

All the supplied assemblies are stored in STB drawings reference the default Production Solution monochrome STB file.

The Assemblies are named with standard naming convention.

Cross Section Naming Rule:

<Speed> <AASHTO Name> <Section Purpose Type> <Optional Code>

Curb Return Naming Rule:

Curb Fillets <Optional Code(s)>

Speed

Based on basic AASHTO "Green Book" maximum design speed table for medium traffic ratings where applicable.

Assemblies also conform to SmartCode 9+ specification and conventions.

SmartCode conformance is documented in the Descriptions of the Assemblies.

AASHTO Name

Names used are based on the AASHTO "Green Book" generic names. (e.g. "Collector", "Local", "Rural")

Section Purpose Type

Generic names are used to describe the usage of the assembly in the Intersection Assembly Sets.

Intersection Assembly Set may contain:

- o **Full Sections** – used for complete centerline cross sections
- o **Half Sections** – used for half centerline cross sections
- o **Part Sections** – used for both travel lanes and one side cross sections
- o **TPart** Sections – used for centerline single lane when a partial T intersection is desired
- o **Tru** Sections – used for centerline both travel lanes

Optional Codes

Descriptive code are used to clarify composition of the cross section and/or daylight direction

Assembly Drawing Name	Description
15 Drive Full Section STB_US	Used for alleys and parking lot entrances
15 Drive Half Section DL STB_US	2-8' travel lanes with 8" pavement section and lighter curbs
15 Drive Half Section DR STB_US	A 5' sidewalk 7' to MultiIntercept daylight
15 Drive Part Section DL STB_US	
15 Drive Part Section DR STB_US	
15 Drive Tru Section STB_US	
25 Local AOR Full Section STB_US	Used for small rural and suburban Intersections
25 Local AOR Half Section DL STB_US	2 10' travel lanes with no parking lane
25 Local AOR Half Section DR STB_US	Employs AOR (Axis of Rotation) lane Subassemblies
25 Local AOR Part Section DL STB_US	A 6' median 5' sidewalk 1' to MultiIntercept daylight
25 Local AOR Part Section DR STB_US	
25 Local AOR Tru Section STB_US	
25 Local Full Section STB_US	Used for small rural and suburban Intersections
25 Local Half Section DL STB_US	2 10' travel lanes with no parking lane
25 Local Half Section DR STB_US	A 6' median 5' sidewalk 1' to MultiIntercept daylight
25 Local Part Section DL STB_US	
25 Local Part Section DR STB_US	
25 Local Tru Section STB_US	
25 Rural AOR Full Section STB_US	Used for small rural and suburban Intersections with shoulders
25 Rural AOR Half Section DL STB_US	Employs AOR (Axis of Rotation) lane Subassemblies
25 Rural AOR Half Section DR STB_US	2 10' travel lanes with Extended Shoulder and no daylight
25 Rural AOR Part Section DL STB_US	
25 Rural AOR Part Section DR STB_US	
25 Rural AOR Tru Section STB_US	
25 Rural Full Section STB_US	Used for small rural and suburban Intersections with shoulders
25 Rural Half Section DL STB_US	2 10' travel lanes with Extended Shoulder and no daylight
25 Rural Half Section DR STB_US	
25 Rural Part Section DL STB_US	
25 Rural Part Section DR STB_US	
25 Rural Tru Section STB_US	
30 Local AOR Full Section STB_US	Used for suburban and rural Intersections
30 Local AOR Half Section DL STB_US	Employs AOR (Axis of Rotation) lane Subassemblies
30 Local AOR Half Section DR STB_US	2 10' travel lanes with 8' parking lane
30 Local AOR Part Section DL STB_US	A 6' median 5' sidewalk 1' to MultiIntercept daylight
30 Local AOR Part Section DR STB_US	
30 Local AOR Tru Section STB_US	
30 Local Full Section STB_US	Used for suburban and rural Intersections
30 Local Half Section DL STB_US	2 10' travel lanes with 8' parking lane
30 Local Half Section DR STB_US	A 6' median 5' sidewalk 1' to MultiIntercept daylight
30 Local Part Section DL STB_US	
30 Local Part Section DR STB_US	
30 Local Tru Section STB_US	

Assembly Drawing Name	Description
30 Rural AOR Full Section STB_US	Used for rural and suburban Intersections with shoulders
30 Rural AOR Half Section DL STB_US	Employs Axis of Rotation lane Subassemblies
30 Rural AOR Half Section DR STB_US	2 18' travel lanes with 5' Extended Shoulder and no daylight
30 Rural AOR Part Section DL STB_US	
30 Rural AOR Part Section DR STB_US	
30 Rural AOR Tru Section STB_US	
30 Rural Full Section STB_US	Used for rural and suburban Intersections with shoulders
30 Rural Half Section DL STB_US	Employs Axis of Rotation lane Subassemblies
30 Rural Half Section DR STB_US	2 18' travel lanes with 5' Extended Shoulder and no daylight
30 Rural Part Section DL STB_US	
30 Rural Part Section DR STB_US	
30 Rural Tru Section STB_US	
35 Collector AOR Full Section STB_US	Used for typical suburban collector to collector Intersections
35 Collector AOR Half Section DL STB_US	Employs Axis of Rotation lane Subassemblies
35 Collector AOR Half Section DR STB_US	2 12' travel lanes with 8' parking lane
35 Collector AOR Part Section DL STB_US	A 6' median 5' sidewalk 1' to MultiIntercept daylight
35 Collector AOR Part Section DR STB_US	
35 Collector AOR Tru Section STB_US	
35 Collector Full Section STB_US	Used for typical suburban collector to collector Intersections
35 Collector Half Section DL STB_US	Employs Axis of Rotation lane Subassemblies
35 Collector Half Section DR STB_US	2 12' travel lanes with 8' parking lane
35 Collector Part Section DL STB_US	A 6' median 5' sidewalk 1' to MultiIntercept daylight
35 Collector Part Section DR STB_US	
35 Collector Tru Section STB_US	
35 Rural AOR Full Section STB_US	Used for rural and suburban Intersections with shoulders
35 Rural AOR Half Section DL STB_US	Employs Axis of Rotation lane Subassemblies
35 Rural AOR Half Section DR STB_US	2 24' travel lanes with 8' Extended Shoulder and no daylight
35 Rural AOR Part Section DL STB_US	
35 Rural AOR Part Section DR STB_US	
35 Rural AOR Tru Section STB_US	
Curb Fillets D STB_US	Curb with only MultiIntercept daylight
Curb Fillets M+S+D STB_US	Curb with a 6' median 5' sidewalk 1' to MultiIntercept daylight
Curb Fillets S+D STB_US	Curb with a 5' sidewalk 7' to MultiIntercept daylight
Curb Fillets STB_US	Curb Only
Null Assembly STB_US	No Subassemblies in Assembly
Shoulder Fillets STB_US	Extended Shoulder no Daylight

17.2   Assembly Sets

A collection of STB based Assemblies Sets are supplied and are used to generate Intersections and Corridors from the Intersection.

Assembly Sets are EXTERANL XML files.

Stored in the default Civil 3D content storage location..\Assemblies\Imperial STB_US folder

All the included Assembly Sets employ Assemblies that use:
 the "Standard" Assembly Style
the "Standard" Code Set Style

This allows you to employ the Assemblies and the Sets without having to customize them and/or remove unwanted Styles from your templates or production drawings.

A wide variety of common Intersection solutions can be generated from the supplied Sets. The common Assemblies used in the Sets can be edited after the Intersection is generated in a drawing to include subassemblies that employ more complex horizontal and vertical control.

The Intersection Wizard and editing capabilities can be used in a three step process. Generate the Control Alignments and Profiles (no corridor); Edit the automatically built control and assemblies; and afterwards generate a more refined Intersection Corridor.

Assembly Sets

An external XML file used to collect assemblies for Intersection Features

The additional Sets employ the Assemblies list above in various combinations

Naming Rule:

<Release> <Speed> <AASHTO Name> <Speed> <AASHTO Name> <Optional Code>

AASHTO Name

Names used are based on the AASHTO "Green Book" generic names. (e.g. "Collector", "Local")

Speed

Based on basic AASHTO "Green Book" maximum design speed table for medium traffic ratings where applicable.

Assemblies also conform to SmartCode 9+ specification and conventions.

SmartCode conformance is documented in the Descriptions of the Assemblies.

Optional Code

"Half T" is used to document special Sets that produce Intersections with only half sections for the Primary Road.

These Sets can be used as the basis to create multiple eccentric Intersections where more multiple secondary alignments meet the primary in close proximity to one another. Manual corridor region edits will be required.

All the drawings and subassemblies have been upgraded to employ Civil 3D 2016 versions of the subassemblies.

Basic Sidewalks subassemblies in all Assemblies have been upgraded to Urban Sidewalks and now employ 2% default slopes. Typical Curb Fillets employ a full width Sidewalk at Curb Returns.

Assembly Sets include:

Support for AOR (Axis of Rotation) lane subassemblies

Rural and Rural AOR Assembly Sets with Shoulder Fillets

Driveway Assembly Sets for alley and parking entrance intersections

Assembly Set Name	Description
_16 25 Local-15 Drive (Imperial) STB_US Primary Use 10' Offset for default width Secondary Use 8' Offset for default width	Used for small rural and suburban Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary 2 10' travel lanes with no parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight Secondary 2-8' travel lanes with 8" pavement section and lighter curbs A 5' sidewalk 7' to MultiIntercept daylight
_16 25 Local-25 Local (Imperial) STB_US Primary Use 10' Offset for default width Secondary Use 10' Offset for default width	Used for small rural and suburban Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary and Secondary 2 10' travel lanes with no parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 25 Local AOR-25 Local AOR (Imperial) STB_US Primary Use 10' Offset for default width Secondary Use 10' Offset for default width	Used for small rural and suburban Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Axis of Rotation Lane Subassemblies Primary and Secondary 2 10' travel lanes with no parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 25 Rural-25 Rural (Imperial) STB_US Primary Use 10' Offset for default width Secondary Use 10' Offset for default width	Used for small rural and suburban Intersections with shoulders Employs Shoulder Fillets without Daylight Change Shoulder Targets to Width after Intersection Creation Primary and Secondary 2 10' travel lanes with Extended Shoulder and no daylight
_16 25 Rural AOR-25 Rural AOR (Imperial) STB_US Primary Use 10' Offset for default width Secondary Use 10' Offset for default width	Used for small rural and suburban Intersections with shoulders Employs Shoulder Fillets without Daylight Change Shoulder Targets to Width after Intersection Creation Employs Axis of Rotation lane Subassemblies Primary and Secondary 2 10' travel lanes with 5' Extended Shoulder and no daylight
_16 30 Local-15 Drive (Imperial) STB_US Primary Use 18' Offset for default width Secondary Use 8' Offset for default width	Used for suburban and rural Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary 2 10' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight Secondary 2-8' travel lanes with 8" pavement section and lighter curbs A 5' sidewalk 7' to MultiIntercept daylight
_16 30 Local-25 Local (Imperial) STB_US Primary Use 18' Offset for default width Secondary Use 10' Offset for default width	Used for suburban and rural Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary 2 10' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight Secondary 10' travel lanes with no parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 30 Local-30 Local (Imperial) STB_US Primary Use 18' Offset for default width Secondary Use 18' Offset for default width	Used for suburban Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary and Secondary 2 10' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight

Assembly Set Name	Description
_16 30 Local AOR-30 Local AOR (Imperial) STB_US Primary Use 18' Offset for default width Secondary Use 18' Offset for default width	Used for rural and suburban Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Employs Axis of Rotation lane Subassemblies Primary and Secondary 2 10' travel lanes with 8'parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 30 Rural-30 Rural (Imperial) STB_US Primary Use 18' Offset for default width Secondary Use 18' Offset for default width	Used for rural and suburban Intersections with shoulders Employs Shoulder Fillets without Daylight Change Shoulder Targets to Width after Intersection Creation Primary and Secondary 2 18' travel lanes with Extended Shoulder and no daylight
_16 30 Rural AOR-30 Rural AOR (Imperial) STB_US Primary Use 18' Offset for default width Secondary Use 18' Offset for default width	Used for rural and suburban Intersections with shoulders Employs Shoulder Fillets without Daylight Change Shoulder Targets to Width after Intersection Creation Employs Axis of Rotation lane Subassemblies Primary and Secondary 2 18' travel lanes with 5' Extended Shoulder and no daylight
_16 35 Collecor-15 Drive (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 8' Offset for default width	Used for typical suburban collector to local Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary 2 12' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight Secondary 2-8' travel lanes with 8" pavement section and lighter curbs A 5' sidewalk 7' to MultiIntercept daylight
_16 35 Collector-25 Local (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 10' Offset for default width	Used for typical suburban collector to local Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary 2 12' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight Secondary 2 10' travel lanes with no parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 35 Collector-30 Local (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 18' Offset for default width	Used for typical suburban collector to local Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary 2 12' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight Secondary 2 10' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 35 Collector AOR-35 Collector AOR (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 24' Offset for default width	Used for typical suburban collector to collector Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Employs Axis of Rotation lane Subassemblies Primary and Secondary 2 12' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 35 Collector -35 Collector (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 24' Offset for default width	Used for typical suburban collector to collector Intersections Employs Curb Fillet S+D (full sidewalk and daylight) Primary and Secondary 2 12' travel lanes with 8' parking lane A 6' median 5' sidewalk 1' to MultiIntercept daylight
_16 35 Rural-35 Rural (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 24' Offset for default width	Used for rural and suburban Intersections with shoulders Employs Shoulder Fillets without Daylight Change Shoulder Targets to Width after Intersection Creation Primary and Secondary 2 24' travel lanes with 8' Extended Shoulder and no daylight
_16 35 Rural AOR-35 Rural AOR (Imperial) STB_US Primary Use 24' Offset for default width Secondary Use 24' Offset for default width	Used for rural and suburban Intersections with shoulders Employs Shoulder Fillets without Daylight Change Shoulder Targets to Width after Intersection Creation Employs Axis of Rotation lane Subassemblies Primary and Secondary 2 24' travel lanes Shoulder and no daylight

18 Symbol Set Naming Conventions

Production Solution products are all specifically targeted at allowing you to produce work in the Style managed environment of Civil 3D and publish that work to multiple Standards.

By-and –large, this is accomplished by providing different Model templates that share the SAME standard naming conventions used throughout the template structure.

Typically, most standards vary to one extent or another in both the symbols employed and the specific annotative labels used to document the existing conditions and the proposed design.

Simply put – If you ALWAYS use the SAME standards Label Style and Set NAMES, you can employ different versions of these collected into templates to produce different graphic and annotated results.

18.1 Complete Symbol Documentation

The complete Symbol Set documentation which includes representative pictures of the blocks supplied is included in a separate document provided with all products. A PDF of the current version is available on the website.

18.2 It's About Plan Set Publication

It is important to recognize that the goal of the Symbol Set technology is to help produce published Plan Sets with less man-hours invested for a reasonable and predictable result. A couple of caveats are important to recognize.

18.2.1.1 Symbols are Not Objects

Blocks (symbolic graphics used over and over) are not the same thing as "data" created model-based objects that are beginning to appear in Civil 3D and already exist in other model-based applications. These objects are designed represent real world objects, take up real space, and potentially respond to the surrounding objects accordingly. The best example of this in Civil 3D at present are the Pipe Network and its related Features - Pipes and Structures.

At this time these Civil 3D Features allow you to attach common symbols to represent these in various views (Plan, Profile, Section, etc), but also have the ability to represent themselves in more elaborate ways inside the application.

Both Surfaces and Corridor Features also have these capabilities as well to some degree.

These "objects" are data collectors, responders, and producers. Therefore more care must be taken moving them around.

The National CAD Standard and many other Standards organizations all point out the significant difference between SYMBOLIC representations and these other "model-based" objects. Confusing the two is often easy to do.

Symbol Sets are about the location Symbol representation that Civil 3D addresses by employing Style.

18.2.1.2 Text and Shapes

All CAD applications collect CAD primitives together to create blocks, cells, groups or whatever they are called. Lines, arcs, and circles etc are well agreed upon (geometry is geometry), but more complex objects – particularly text and text-like SHAPES are handled differently by different applications. These primitives are more scale dependent and more restricted than any simple graphic symbol.

Readability and rapid identification is important.

Since model based software is more data driven and more capable than traditional CAD applications at producing text based annotation "on-demand", removing alpha-numeric text from the symbols themselves is potentially a good goal.

However, the text we use is in these common Symbols is there because we use it a lot when we interpret plans. Generating separate data driven labels requires more processes, more specific Styles, and at times more user maintenance work. Presently in Civil 3D some Features are easy to annotate effectively and other (particularly older core Features) are more problematic.

We have to strike a balance between the text conversion problem and the on-going maintenance to do it differently.

18.2.2   Styles and Set Naming Consistency

Styles and Sets allow considerable potential variety of Labels and Label Sets with Civil 3D.

Producing Label Styles and Sets that mimic different standards is usually relatively easy provided the SAME Style Names are used or shared between the developed templates.

Civil 3D Features can be inserted into templates sharing the same Style and Sets names and then display the Feature data much differently.

Entire drawings employing one Set of Style Standards can be inserted into a template that employs the same names to change the drawing to another standard configuration.

Smaller template drawing templates can be employed in this to update drawings as needed.

18.2.3   Textstyle Naming Consistency

All the blocks employed must use a common set of textstyles. The basic Platform Symbol Set s employs only the default Proposed and Existing textstyles. Additional Symbol Sets may employ additional standardized textstyles.

18.2.4   Linetype Naming Consistency

All linetypes supplied with the platform are historic AutoCAD linetypes or new linetypes that adhere to an NCS like naming convention.

18.2.5   Block Name Consistency

Civil 3D effectively "wrappers" existing AutoCAD block object technology. This allows for publishing of Civil 3D Features at multiple scales with few to zero manual alterations to the data. The traditional AutoCAD blocks are referenced by BOTH Feature Styles AND Label Styles.

A block naming convention and name consistency must be maintained to simplify any Standards conversion, any Style update processes, or digital conversion to a different CAD or GIS data format.

Simply put – the block names remain the same but the graphic content of the blocks differs.

There is rarely a perfect ONE to ONE match between and two graphic standards, but MOST symbols have avatars across multiple standards.

Typically, minor variations are also acceptable.

18.3   Block Graphic Assessment

We employ a standard method to assess symbol graphic contents. It is used to CODE existing graphic symbols for comparison purposes. The methodology allows us to generalize and compare graphics between multiple published standards. This produces a standardized block name like

C-PONT-Benchmark-SDT

The block naming convention using full categorization is:

<Discipline>-<Group>-<Contents>-<Block Type><Shape><Graphic>

Our basis was a collection of blocks and cells found in public domain and/or published versions of

       The National CAD Standard NCS 3.1

       The National CAD Standard NCS 4.0/5.0

       The Autodesk version of American Public Works Associations (APWA)

       Common Autodesk block libraries delivered with Civil 3D and Land Desktop

       A number of State DOT cell libraries available in multiple graphic and digital formats

You may find this method useful to employ to categorize your current blocks and compare them to the supplied Symbol Set blocks or other Standard you need to match.

18.3.1   Common Block Name Coding

We categorize blocks based on usage. In other words, the symbol receives a Group code based on how it may be employed on typical plan sheets. For example: representing a utility structure, property corner, etc.

18.3.1.1 Block Group Category

Typical National CAD Standard Layer scheme Major Group Key codes are used to gather Symbol Groups.

A symbol Group may be represented on multiple NCS Layer Major Keys as shown in the table below.

The following table reflects typical Named GROUPS identified and employed.

NCS Layer Major Key	Group	Description
ANNO	A----	Annotative
ANNO	AMRK	Mark
ANNO	ATRM	Terminator
ANNO	ALIN	Line
ANNO	ASYM	Symbol
ANNO	AIDN	Identify
ANNO	ANOT	Note
ANNO	ANAR	North Arrow
ANNO	ASCL	Scale
SITE, TOPO	BORE	Test Boring
EROS	EROS	Erosion Control
CTRL,PROP,TOPO,NODE	PONT	Point
	P---	Point or Property
PROP	PCNR	Corner
PROP	PMON	Monument
PROP	PSEC	Section
PVMT, ROAD,PKNG	PVMT	Pavement Marks
RAIL	RAIL	Railroad
SITE	SITE	General Site
SITE, TOPO	TOPO	Surface Features
VEGE	PLNT	Shrubs
TRAF	TRAF	Traffic
TRAF	TRSG	Traffic Signal
TRAF	TRSN	Traffic Sign
VEGE	TREE	Tree
UTIL,WATR,SSWR,POWR,NGAS,FOIL	UT--	Utility
UTIL	UTIL	General
POWR	UTEL	Power
WATR	UTWR	Water
SSWR	UTSS	Sanitary
STORM	UTSD	Storm
NGAS	UTNG	Natural Gas
FUEL	UTFO	Fuel Oil
PHON	UTPH	Phone Communications
	UTIW	Industrial Waste
COMM	UTCO	Communications Cable

See the Layer Standards spreadsheet tool for release specific details and changes.

18.3.1.2 Block Graphic Typing

We also further type the block based on both common SHAPES and more specific Graphic contents.

For example a symbol is Square, using a Cross symbol or a Circle, Solid filled.

The purpose of the secondary graphic assessment is to help identify consistent and inconsistent application of standard general graphic display methods both within a single Standard and also make generic comparisons between multiple Standards.

The graphic assessment allows us to answer questions like,

"Do the symbols employ filled and unfilled symbols to clarify the difference between existing and proposed conditions?" Or "Do these two Standards employ similar methods of utility structure symbology and/or how to do they generally differ."

The Shape and Graphic Codes are the last two characters in the block name.

Our example block name

"C-PONT-Benchmark-SDT"

is a Small Circle Shape using Text

The following table reflects typical graphic assessment Shape and graphic codes identified and employed.

Shape Code	Shape Description
1	Point
C	Circle
D	Small Circle
V	Oval
T	Triangle
3	Small Triangle
Q	Square
S	Small Square
I	Diamond
R	Rectangle
E	Rect Elliptical Top
F	Filleted Rectangle
4	Horizontal Rectangle
5	Pentagon
6	Hexagon
7	Septagon
8	Octagon
Y	Butterfly
2	Horizontal Line
L	Line
A	Arrow
Z	Characters
N	Numbers
G	Graphic
B	Combination
O	Object

Graphic Code	Graphic Description
S	Solid
O	Open
F	Filled
T	Text
H	Hatched
P	Part Fill
C	Cross
X	X
G	Target Cross
R	Target X
L	Lines Horz
V	Lines Vert
D	Gradient
M	Mask
N	Not Apply

18.4 A Process of Continuous Improvement

Maintaining and building upon the NAME match list(s) is critical to any conversion process. This is detailed work that does require decision making. It also often cannot be automated as a person with knowledge is required to interpret the meanings and intent on both sides of the conversion.

"Do these two different symbols mean the same thing?"
The goal of Symbol Set is, in part, to simplify this translation problem by creating a common ground and basis – a benchmark not connected to where you are now, but to a larger world. The other part is to produce a replicatable process for product users to implement the benchmark effectively in the real world.

19 What's New Summaries

Detailed records of changes made in each Release cycle of the Production Solution products are available on **cadpilot.com**.
See the **Solutions>>Release 6** page for those details. Release 5 details are also available on that page.