

Moving from Land Desktop to Carlson Civil

Welcome to Carlson Software:

Thank you for your interest in Carlson Software's technologically advanced options for civil engineers, surveyors, designers, or CAD managers looking to update or upgrade their current software. This is written for those needing to move from Land Desktop, but also applies to those just investigating their software choices.

The Carlson Civil Suite is the flagship office product from Carlson Software, encompassing all of the functionality of Survey, Site Grading, Road Design, Hydrology and GIS, along with a comprehensive set of drafting and annotation tools. The four modules of the Carlson Civil Suite – Civil, Survey, Hydrology, and GIS – all run atop any installed AutoCAD executable, running as plain AutoCAD, or found within Map, Land Desktop or Civil 3D, versions 2010-current.

Carlson Survey, Civil, Hydrology, and GIS may also be purchased as individual, standalone programs, depending on individual or company needs. Each program includes a free copy of embedded IntelliCAD, which now includes support for Microsoft Windows 10 along with multi-core processing when opening and regenerating files, which provides a 1.5 to 3 times performance improvement on multi-core computers.

The Carlson Civil Suite provides several state-of-the-art tools, including a dynamic road design program called RoadNetwork, and a dynamic storm drain design program called SewerNet. Move into 3D as needed with 3D intersection design, multi-baseline road networks, lot layout, storm and utility analysis and design, and more. While these functions automatically respond to design changes, adjusting sections, profiles, and grading, Carlson accomplishes this automation without introducing custom objects, so sharing drawings with others is not an issue.

All programs in the Carlson Civil Suite are part of the Carlson Software tradition of unlimited free tech support, so when needed, help is always a free phone call away. Support is also available through an online, web-based reference manual, complete with demonstration and training movies.

TRY IT!
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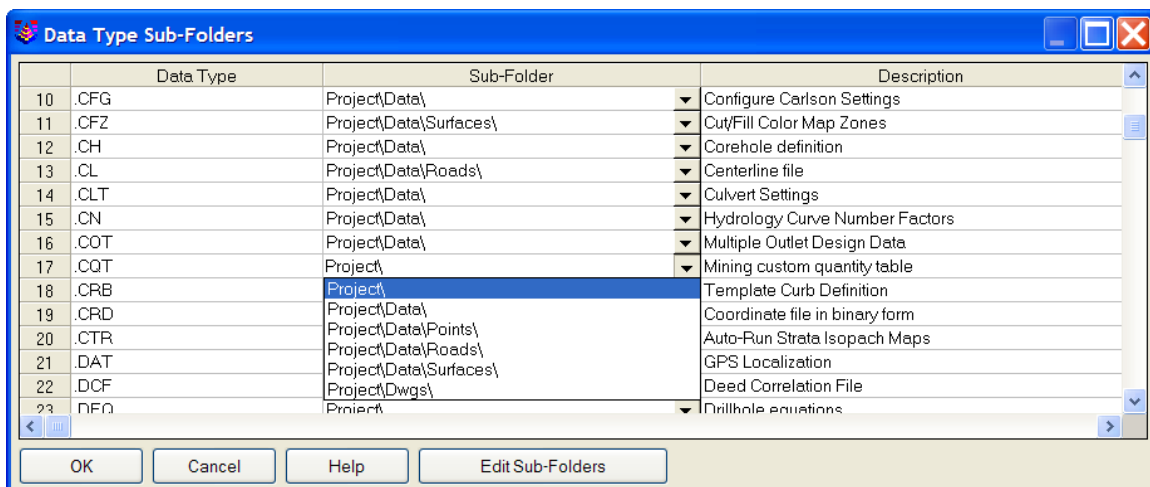
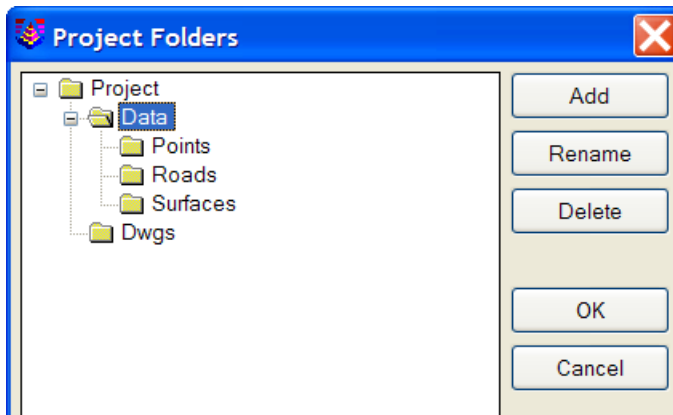
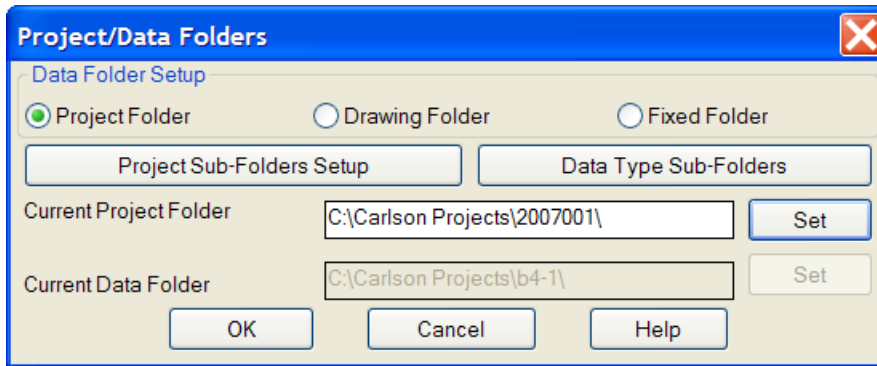
The Migration Guide

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Data File Types and Storage

Carlson Civil has a similarity to Land Desktop in the use of external files to store design data, but differs significantly in that in Carlson Civil the naming and placement of these files is determined by the user, not the software. Carlson Civil offers three distinct methods of file storage, the choice is up to the end user. Carlson Civil data files can either be placed in a single location, known as a data folder, placed with the drawing they are associated with, or placed in a user-defined folder structure. The placement of files within that structure is also totally user-defined, based on the assignment of file types (extensions) to folders.



File types used by Carlson Civil include:
 .crd – Point data, coordinate file

.rw5 – raw survey data, contains all observations
.cl – centerline, describes a 2D alignment
.tin – Surface, newer format, more efficient than .flt in most cases, especially for machine control
.flt – Surface, original format
.grd – Surface grid file, used for volumes
.cfg – Stores configuration settings
.fld – Field to Finish file, stores rules for inserting symbols for points (LDT Description Key functionality) and automated linework functionality (Autodesk Survey Figures equivalent)
.lot – Lot file, stores parcel geometry
.adf – Annotation Default file
.pro – Profile file
.mxs – Section Alignment file
.grp – Point Group definitions
.rdn – Roadway Networks
.sct – Road Sections
.tpl – Road Templates
.rdf – Road Design Files

Settings

Carlson Civil uses several techniques to store settings. There are three main categories of settings; Drawing Setup settings, such as drawing scale and units, Command-specific settings, such as the layer to draw contours on, and Generic control settings, such as whether to link drawing points to the external coordinate file (.CRD).

Drawing Setup settings are stored directly within the drawing files (.DWG). Carlson Civil also creates a file for each drawing using the drawing name with a (.INI) file extension. This file stores a list of all of the design files that are used or created from within the drawing, such as centerline files (.CL), profile files, (.PRO), etc.

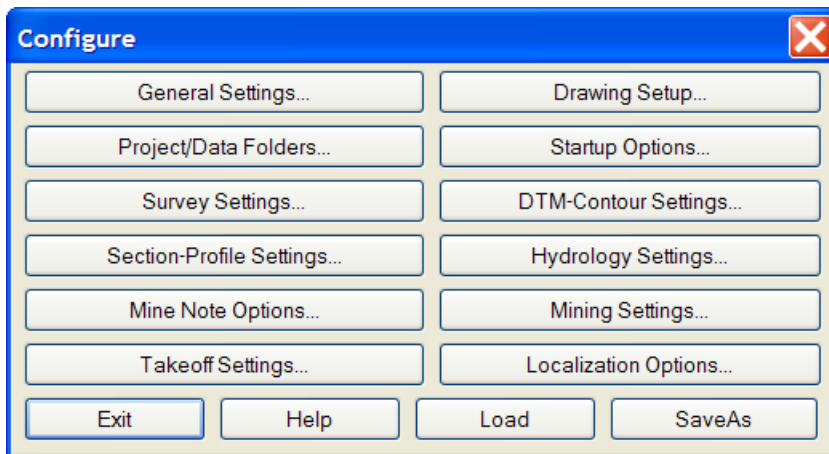
Command-specific settings are stored within a set of files with (.INI) file extensions, with the command name as a filename, such as roadnet.ini, or mapcheck.ini. These are typically stored in the \USER folder, and are created as the commands are first accessed.

Generic control settings are stored within a special (.INI) file named Carlson.ini. When new drawings are created, this file is read to set these type of generic controls.

Drawing Setup settings can be accessed directly from the Settings menu, or through the Configure command. If the Drawing Setup dialog is accessed through the Configure command, when exiting the main Configure dialog, the user is prompted whether to save changes to Current and Future drawings, or Future drawings only. Current and Future saves the Drawing Setup settings to the current drawing internally, and updates the Carlson.ini file, while the choice of Future Only does not affect the current drawing, only the Carlson.ini file, and therefore any new drawings created. To change Drawing Setup settings for only the current drawing, do not go through Configure, but use the Drawing Setup command directly off of the Settings menu.

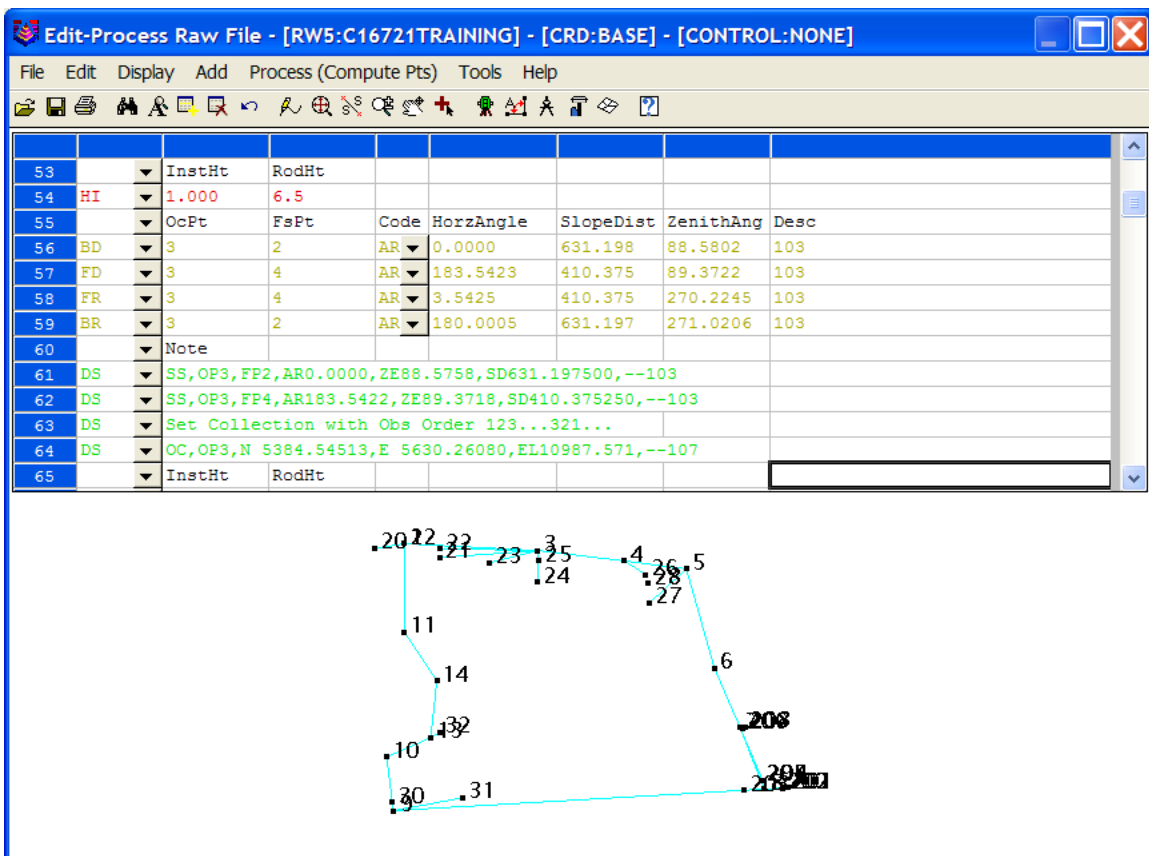
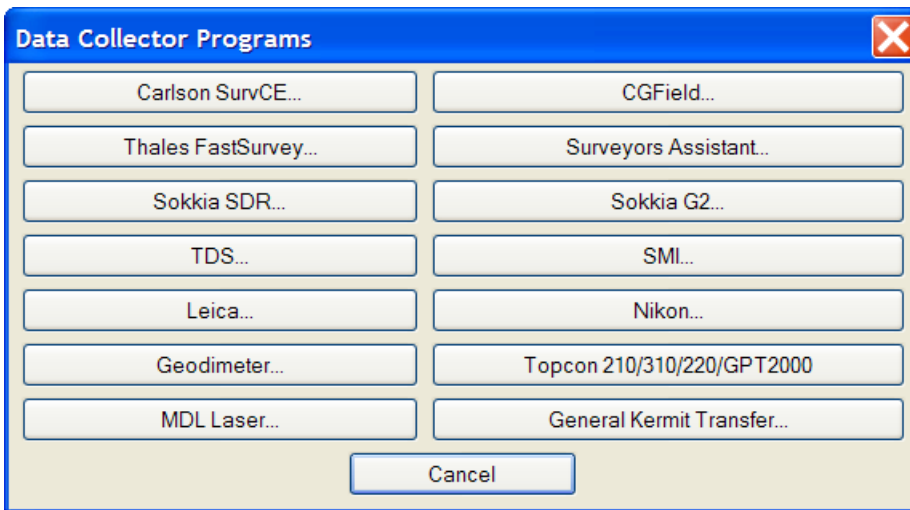
Command-specific settings are accessed when the commands are actually run. The settings displayed are being read from the command's own specific (.INI) file, and any changes made are written to the same files. This way the commands automatically recall the settings that were used for the previous run. Alternatively, the Configure command can be used to access command-specific settings.

The Configure command provides access to a dialog box with 12 buttons, each leading to settings for specific aspects of the software. Changes made within any of these are also automatically saved to the corresponding command (.INI) file, or to the Carlson.ini file in the case of generic settings. The Configure command also provides a Save and Load functionality, utilizing configuration files (.CFG). Saving a configuration file (.CFG) saves all settings currently stored in all of the command-specific (.INI) files, and the Carlson.ini file. Loading a configuration file (.CFG) sets all settings within all these files.



Survey

The complete range of Survey functionality is contained within the Carlson Civil, and is also available in the Carlson Survey program. This includes communication with data collectors, editing and processing of raw survey data, including traverse adjustment, and Field to Finish, which controls the generation of point symbols and linework.



Land Desktop uses Description Keys for point-based symbol insertion, and Autodesk Survey uses Figure notation for the generation of linework. Autodesk requires field coding to produce linework, and the processing of that information takes place when the raw file (.fbk) is Imported. Carlson inserts symbols and linework with one function known as Field to Finish (F2F), and performs this task using the point descriptions from the coordinate file, not the raw observations file. So linework can actually be generated from any set of points, even if no field coding has taken place. However, the addition of field coding can certainly make the generation of linework more precise. Carlson Civil can use LDT Description Key file to start a Field to Finish Code File.

Code Table Settings

Code File:

Coding Method

Process Carlson Coding

Process Eagle Point Coding

Process CAiCE Coding

Split Multiple Codes

All None Prompt

Draw Field Codes Without a Suffix as Points Only

Use Multiple Codes for Linework Only

Max Delta-Height for Linework:

Max Length for Linework:

Field to Finish

DATA:C:\Carlson projects\B4-1\Deed-reader.crd, CODE:C:\Carlson2007b5\Data\Carlson.fld

CODE	FULL NAME	DESC	SYMBOL	LINETYPE	ENTITY	TIE	LAYER	ON/OFF
SIGN	SIGN	SIGN	spt17	BYLAYER	Point	Open	SIGN	On
SHD	TOP OF CUR	SHD	spt10	BYLAYER	3DPlane	Open	CURB-TOP	On
WLK	SIDEWALK	SW	spt10	BYLAYER	2DPlane	Open	SIDEWALK	On
----> UTILITIES <----								
WG	WG	WG	spt39	CONTINUOUS	Line	Open	UTILITY	On
MH	MANHOLE	MANHOLE	SPT34	sewer	2DPlane	Open	SEWER	On
SMH	SMH	SMH	spt50	CONTINUOUS	Line	Open	SEWER	On
TELBOX	TELBOX	TELE	spt30	CONTINUOUS	Line	Open	UTILITY	On
BOX	BOX JUNCTI	BOX	spt30	BYLAYER	Point	Open	UTILITY	On
CATU	CABLE TU	CATU BO	spt29	BYLAYER	Line	Open	UTILTY	On
CB	CATCH BASI	CB	spt66	BYLAYER	Line	Open	DRAINAGE	On

Code Table

Code Definitions

Coordinate File

Edit Field Code Definition ✖

Category
 Processing ON
 Sequence
Companion Codes...

Code:
Define Code Sequence...

Full Name:
Point Group:

Description:
 Use Raw Description

Main Layer: Set

Distinct Point Layer Set

Dual 3D Polyline Layer: Set

Separate Attribute Layers: Set
Set Linetype
Set Symbol

Unit Symbol
Symbol Pts...

Symbol Size Scaler:
Text Size Scaler:
Line Width:

Line Type Spacing Scaler:
Line Type Text Scaler:

Template: Edit Set None

Entity Type

3D Polyline
 3D and 2D
 2D Polyline
 Line
 Points Only

Connection Order: ▼
 Locate Pts on Real Z

Tie: ▼
 Non-Surface

Attribute Layout ID: ▼
 Random Rotate

Elevation Decimals: ▼
 Smooth Polyline

Elevation Prefix:
Suffix:
 Hard Breakline

Set Color...

OK
Cancel
Help

Points and Point Groups

This use of point data in Carlson Civil revolves around the use of .crd files, also known as coordinate files.

Carlson Civil supports the creation of Point Groups similar to LDT and applies them in many applications, such as using them to create surfaces, editing and listing. Carlson Civil stores Point Group definitions are associated individually to each .crd file.

New Point Group

Group Name:

Description:

Include Exclude

Inclusion rules are applied before exclusion rules.

A point that meets all of following rules is included.

Include All

Point List

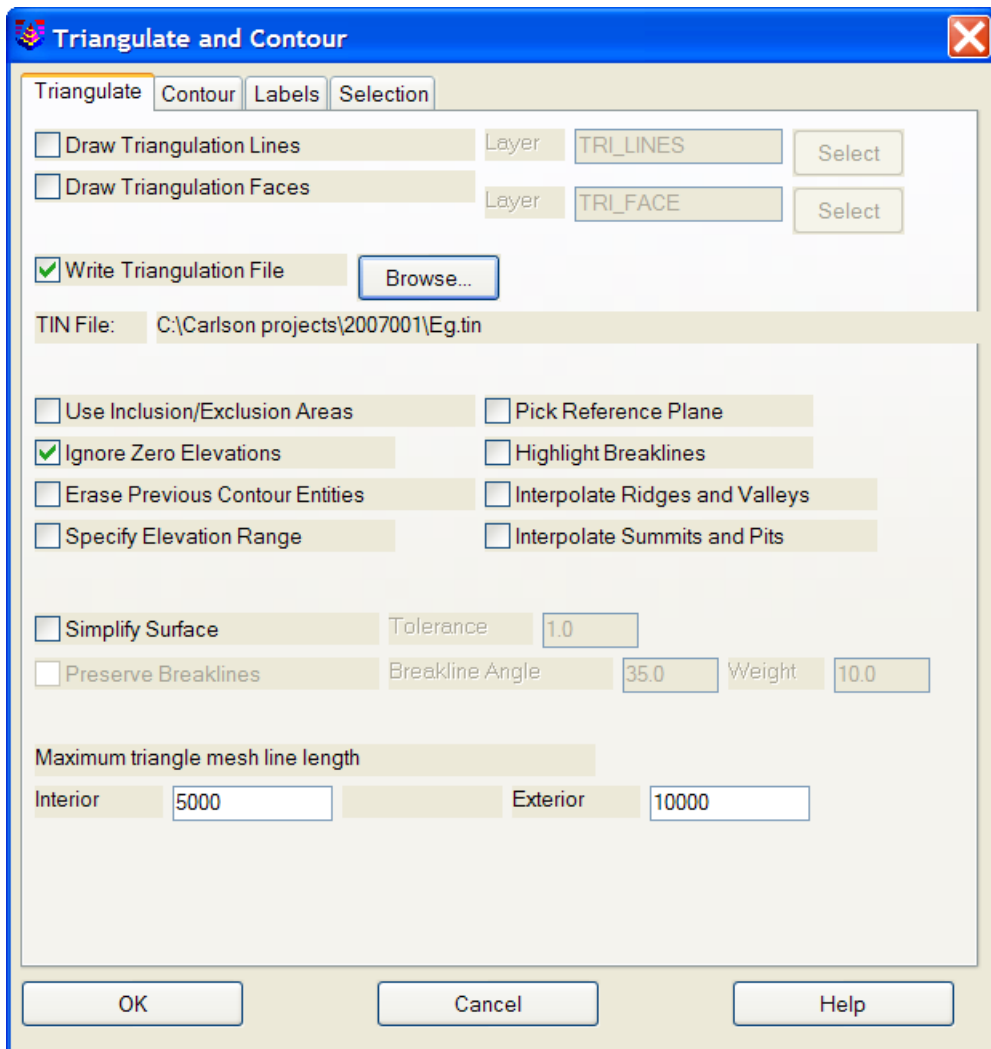
Elevation Range Minimum Maximum

Description

Surfaces and Contours

In Carlson Civil, Surfaces can be written out as external files, but a lot of design and computations involving surfaces can also be accomplished directly within the drawing without writing out external files. Triangulation surfaces can be written out as .tin or .flt and grid surfaces as .grd files. When an external file is generated, a named Surface is also stored in the drawing. This named Surface is accessed through the Surface Manager, where it can be edited.

The main Carlson Civil command for working with Surfaces is called Triangulate and Contour. It is a single dialog box with four tabs, and covers the entire process of specifying the general settings to generate the Surface, creating Contours, generating Labels, and specifying the data source(s) for the Surface.



In Carlson Civil, Contours are generated as regular AutoCAD Polylines. Contours can be generated and automatically labeled simultaneously, or labeled after they are generated. Labels can be generated with wipeouts to hide the contour beneath them, and can also be slid along the contour to easily change their location.

The Triangulation Surface Manager has tools to edit, add and remove data points and breaklines and update the triangulation dynamically. It also allows you to change the display properties for the triangulation, contours and labels.

Line and Curve Labeling

Carlson Civil refers to the process of labeling lines and curves as Annotation. Lines and curves can be labeled in a dynamic or static mode, depending on the label settings. There is also a powerful set of tools to check for and correct overlapping labels.

Annotate Defaults ✖

Horizontal Scale:	<input type="text" value="50.00"/>	Text Size Scaler:	<input type="text" value="0.080"/>
Annotation Layer:	<input type="text" value="BRGTX"/>	Text Style:	<input type="text" value="ROMANS"/>
Distance Suffix:	<input type="text" value=""/>	Text Offset Scaler:	<input type="text" value="0.060"/>
Line Type Spacing:	<input type="text" value="0.500"/>	Line Type Text Scaler:	<input type="text" value="0.100"/>
Arc Length Label:	<input type="text" value="A"/>	Arc Text Spacing Factor:	<input type="text" value="1.050"/>
Bearing Prefix:	<input type="text" value=""/>	Bearing Suffix:	<input type="text" value=""/>
Azimuth Prefix:	<input type="text" value="AZ"/>	Azimuth Suffix:	<input type="text" value=""/>

Bearing Annotation Precision

Deg,Min,Sec
 Deg,Min
 Deg
 Other

Precision: Seconds

Bearing Direction Method

Toward Picked End
 Away From Picked End
 North Only
 By Linework

Bearing Labels

Normal
 Strip Spaces in Bearing Labels
 Add Spaces in Bearing Labels

Label Both Feet and Meters
2nd Dist Decimals:
2nd Dist Label:

Drop Trailing Zeros
 Draw Bearing Leaders
 Use 2nd Dist Brackets

Draw Leaders to Endpoints
Leader Size Scaler:
Offset Scaler:

Leader Style:
Leader Layer:

Volumes

There are several ways to generate volumetric calculations within Carlson Civil. Volumes By Layers, Volumes by Triangulation, Calculate Section Volumes and Two Surface Volumes (Grid volumes).

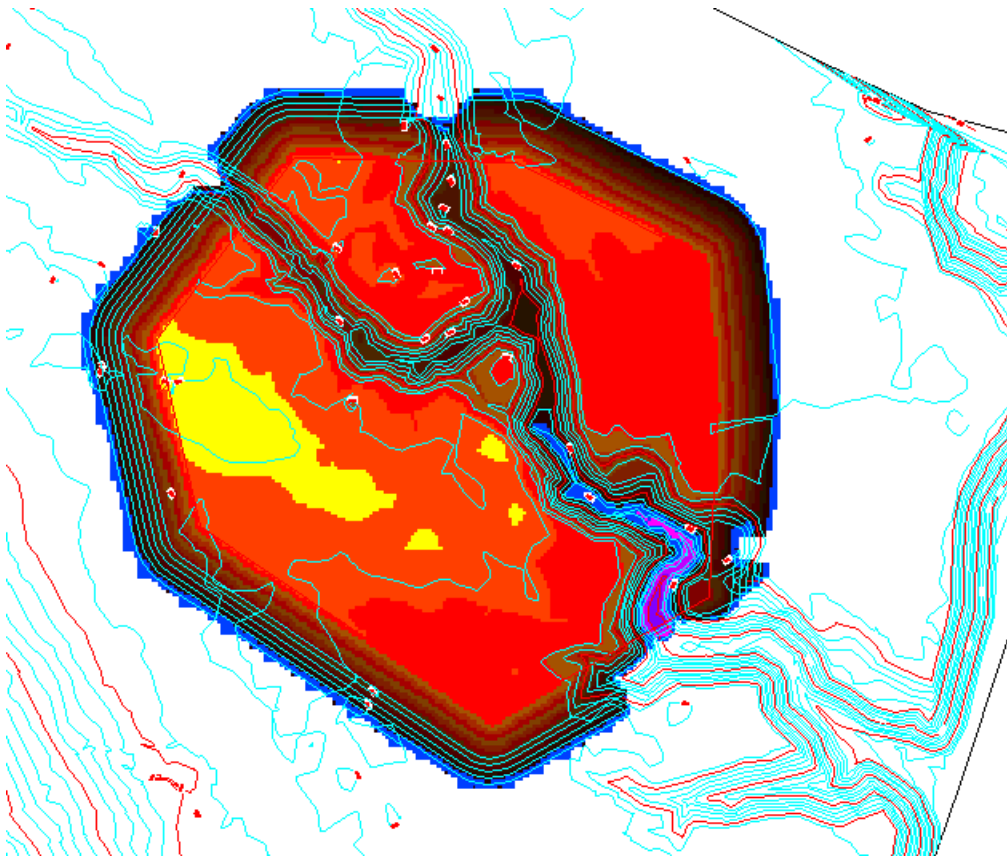
Volumes by Layers is potentially the quickest method. It needs no existing data files and creates no files in the process. You simply specify which layers to use for each of the 2 surfaces.

Volumes by Triangulation uses two triangulated surface files as the source of the data. These files are created through the Triangulate and Contour command. You can choose to create contours in the drawing when you create the TIN files, or just create the files without generating contours.

Calculate Section Volumes calculates volumes by end areas from two cross section files.

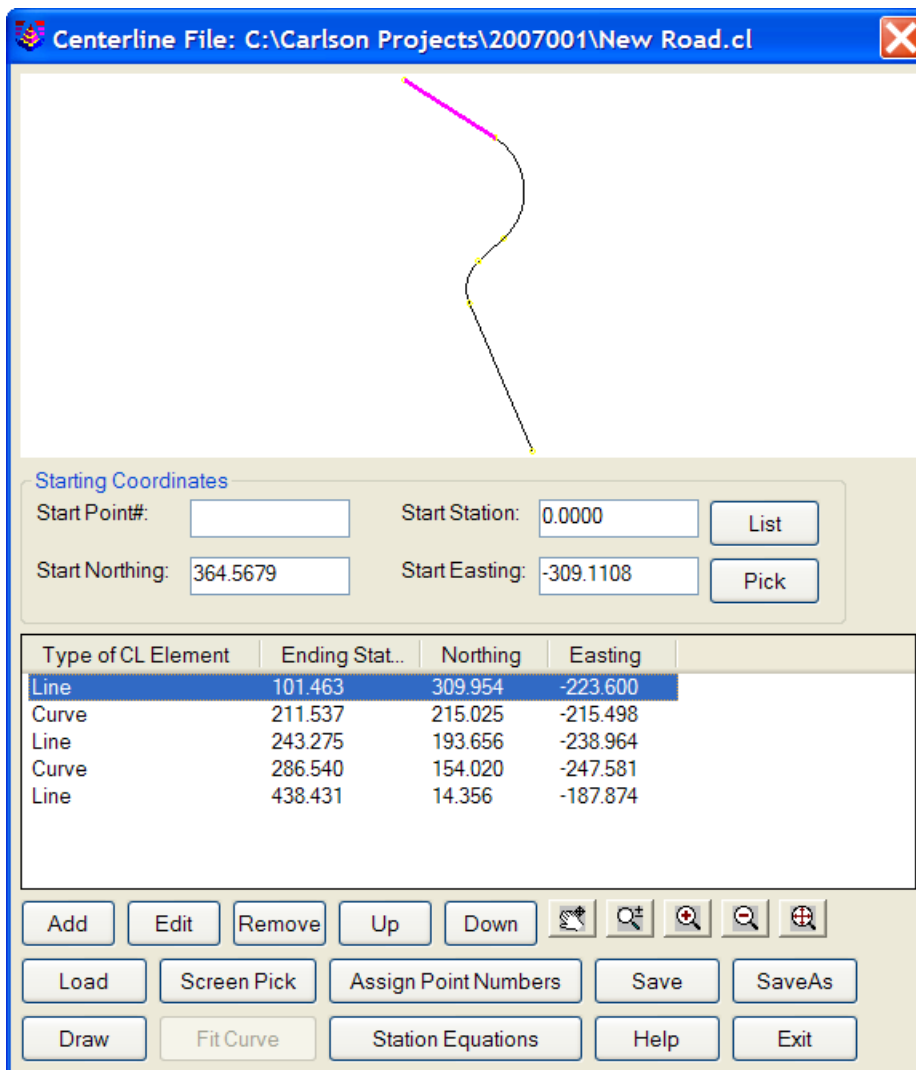
The Two Surface Volumes method uses two predefined Surface files as the data source for the calculations.

Once calculated, you can generate Cut and Fill Color Maps, Cut and Fill Centroids, and Cut and Fill Labels to illustrate the volumes.



Alignments

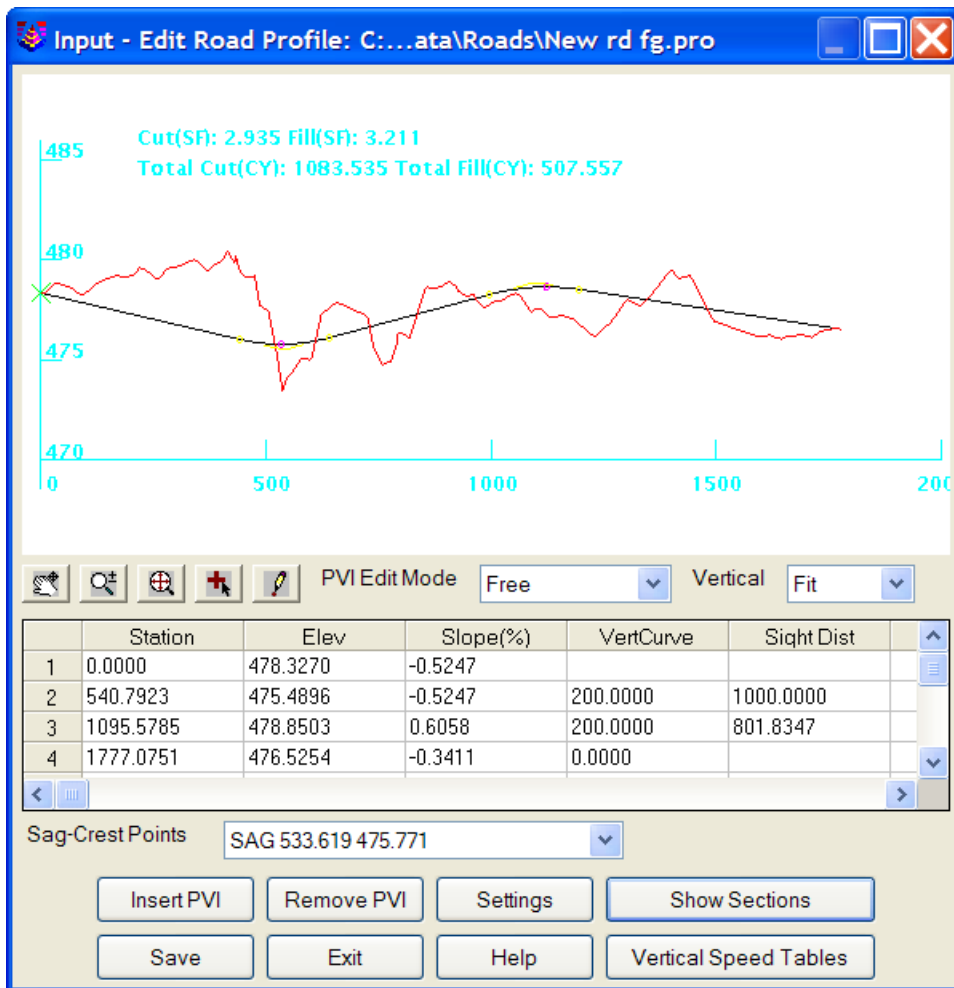
Horizontal Alignments in Carlson Civil are known as Centerlines. They are stored in .cl files. They can be created and edited through the Input-Edit Centerline File command. Polylines can be drawn first and then used to define Centerlines. Once defined as a centerline, double-clicking on the polyline invokes the Input-Edit dialog box.



Profiles

Profiles are stored within .pro files, with user-defined names. Existing Ground/Surface Profiles and Proposed Finished Grade/Design Profiles both use this filetype. Multiple .pro files can be drawn on the same Profile Grid.

There are several different routines for creating profiles including Profiles From Triangulation Files, Profile From Surface Entities and Profile From Points On Centerline. Before using these profile creation routines, the horizontal alignment needs to be created as a centerline file or polyline. The Quick Profile routine can be used to create profiles in one step.



When using Process Road Design or RoadNet, the existing ground Profile can be generated automatically as part of the process, simply by specifying the Surface to use, and so is not a separate prerequisite. The Proposed Finish Grade Profile can then be added in the editor, and the Roadway processed, all without ever drawing anything in the drawing itself. The more traditional LDT approach of generating an existing ground Profile in the drawing and then adding a proposed finish grade Profile by drawing on it in the drawing is also an option.

Roadway Cross Sections

Roadway Cross Sections are based on Cross Section Alignments (.mxs files) that are defined by the Input-Edit Section Alignment command to set the station interval and max offsets left and right. Similar to profile creation, there are several routines to create sections including Sections From Triangulation, Sections From Surface Entities and Sections From Points. The Process Road Design and RoadNet commands can create final sections.

Once section files (.sct) are created, the Input-Edit Section File command allows you to review and edit the section data. Also the Draw Section File and Section Report commands can be used.

Input-Edit Section File

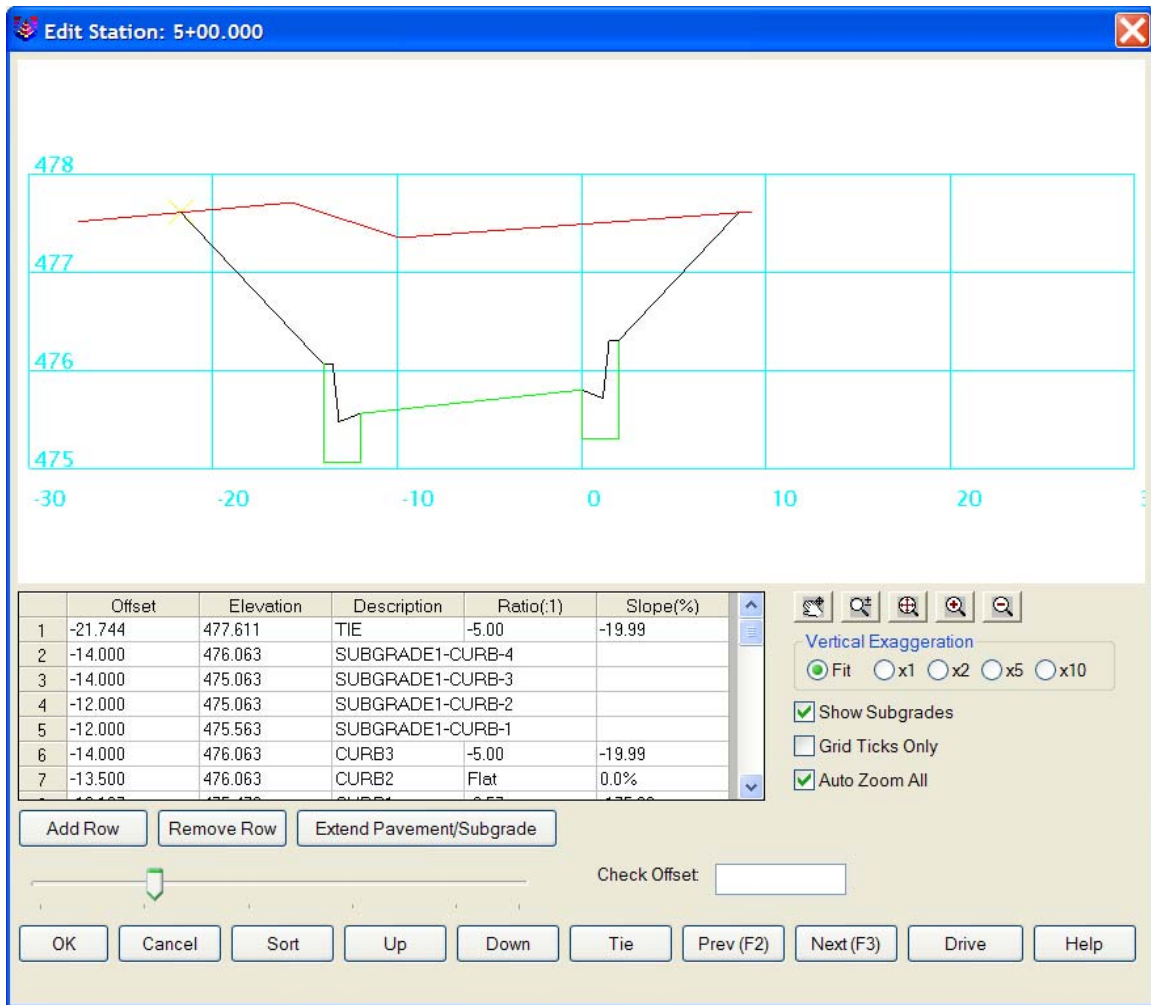
1st C:\Carlson projects\B4-1\New-rd fg.sct
2nd C:\Carlson projects\B4-1\New rd eg.sct

Buttons: Edit, Translate, Scale, Delete Stations, Reduce, Sort, Combine Stations, Interpolate, Copy Station, Tie Station, Save, SaveAs, Exit

Stations List

0+00.000
0+50.000
1+00.000
1+50.000
2+00.000
2+50.000
3+00.000
3+50.000
4+00.000
4+40.792
4+50.000
5+00.000
5+33.619
5+50.000
6+00.000
6+40.792
6+50.000
6+92.589
7+00.000
7+50.000
8+00.000
8+50.000
8+71.941
9+00.000
9+50.000

Station to Edit:



Roadway Templates

Roadway Templates are created within the Design Template dialog box. They are stored as .tpl files, and can be applied to any road design. Templates are used in Process Road Design, Road Network and within the Input-Edit Road Profile dialog.

The Design Template defines the road grades, subgrades, curb, superelevation break points and cut/fill slope treatments.

Design Template: C:\CARLSON2007\DATA\12-CURB.TPL

MEDIAN
 GRADES
 CURB
 RIGHT OF WAY
 CUT
 FILL
 SUBGRADE
 SHOULDER SUPERELEV

Right Side Same As Left
 Left Side Display: Cut Fill None
 Right Side Display: Cut Fill None

Left Surface
 *** CENTER ***
 GRADE: 12.000,-2.000%,PAVE
 CURB: CURB

Right Surface
 *** CENTER ***
 GRADE: 12.000,-2.000%,PAVE
 CURB: CURB

Left Sub-Grades
 *** SURFACE ***
 SUBGRADE1: 12,-0.50.

Right Sub-Grades
 *** SURFACE ***
 SUBGRADE1: 12,-0.50.

Move Up Move Down Edit Remove Report IDs
 Save SaveAs Draw Exit Help

Curb Dimensions

Curb 1
 Curb 2
 Curb 3

Dimension Units: Inches Feet
 Rounding: Rounding Straight
 Integral Curb/Separate Curb: Integral Separate

Base Slope Type: Flat Base Match Crown Special
 Slope %: Slope Only Base

Curb Dimensions
 Top: Width: Taper:
 Drop: Height 1: Height 2: Base:

Material: ID: Direction: Left Right

OK Cancel Load Save Help

Design Control

The idea of Design Control in LDT exists in Carlson Civil in a number of places.

Template Control – Templates are assigned to centerlines either in the Process Road Design dialog box, or in the Input-Edit Road Profile dialog.

Slope Control – In Carlson Civil, side slopes are actually part of the Template definition.

Ditches – Ditches are defined within the Design Template as part of the cut/fill treatment.

Transitions – There are four methods to work with Transitions in Carlson Civil. The first is called a Template Series, in which multiple Templates are assigned to a single Centerline at different stations. Next is a Template transition, in which a single Template is assigned to the entire Centerline and the user edits it at different stations. Next is a Template Point Centerline, in which a secondary Centerline is defined and attached to a point on the Template for specific horizontal control, such as a lane widening. Last is a Template Point Profile, in which an additional Profile is defined and attached to a point on the Template for specific vertical control, like the flow line of a ditch.

Superelevations – The template breakpoints for superelevation pivots are defined within Design Template. The stations for the superelevation transitions are set in the Input-Edit Superelevation command.

Roadway Intersections

One of the very exciting features of Carlson Civil is the use of Roadway Networks. These are sets of centerlines that are aware of each other and clean up at intersections, horizontally and vertically.

Road Network: Salem

Road Name

Main
NEW RD

Add Edit Remove

Intersection

Main and NEW RD
Main and MULT2:NEW RD

Edit Intersection

Cul-de-Sac

NEW RD at End

Add Edit Remove

Process Report Settings Help

Save SaveAs Load/New Exit

Cul-de-Sacs

Cul-de-sacs are handled elegantly with the Road Network. Cul-de-sacs can be easily added to any roadway, and designed at a very detailed level, including a profile for the circumference.

Edit Cul-de-Sac



Road Main: 0+00.000 to 2+83.315

Input Data

Cul-de-Sac Centerline Position

Start End

Center Station Delta

Cul-de-Sac Radius

Fillet Radius

Offset

Tear Drop Mode Setback

Template ID

Profile Transition VC

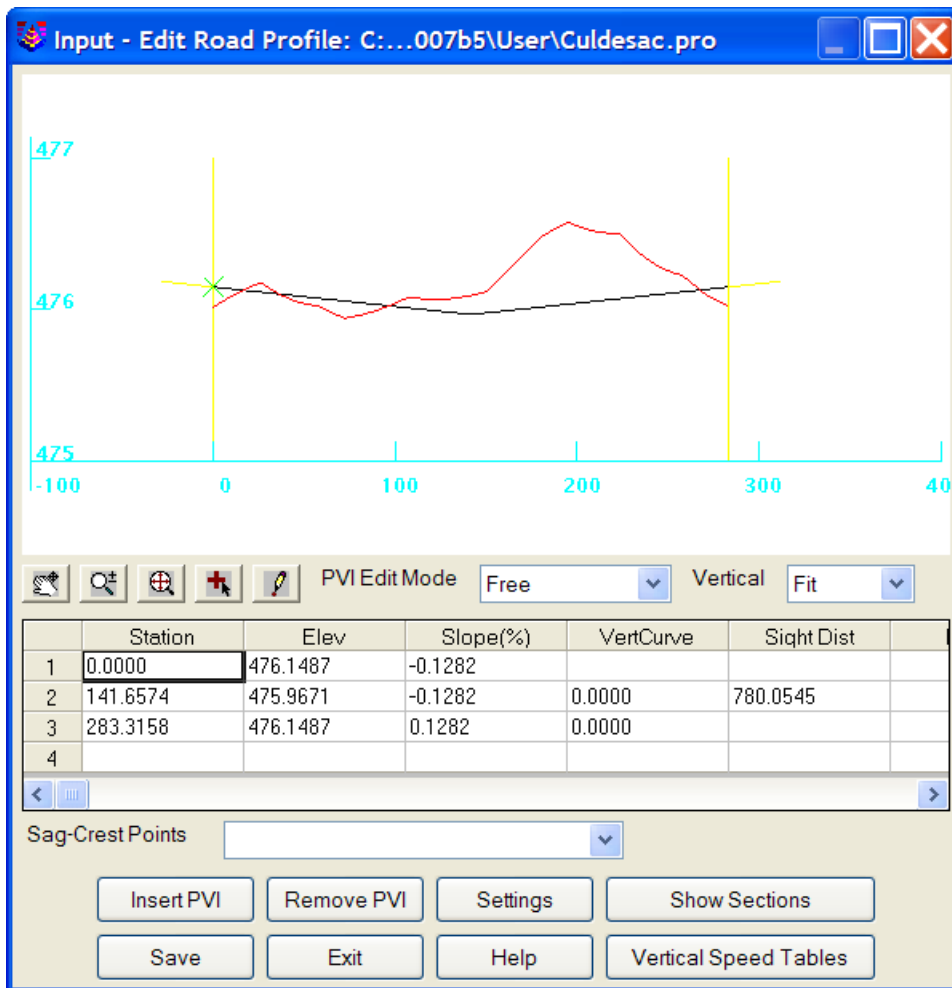
Output Files

NONE

NONE

NONE

NONE



Grading

Carlson Civil does grading through the use of a Pad Template, which is essentially the equivalent of an LDT Grading Object. Pad Templates provide some significant improvements, however, such as the ability to have a separate surface for the area inside the “pad”, which moves horizontally and vertically with edits to the pad, and the ability to use a template for the side slopes, so they can project complex grading designs.

Use Slope Groups Set

Fill Slope:

Cut Slope:

Pad Elevation:

Pad Volume:

Fill: 0.0 C.Y.

Cut: 61169.9 C.Y.

Surface: EG Set

<input type="button" value="Move Pad"/>	<input type="button" value="Move Vertex"/>
<input type="button" value="Offset"/>	<input type="button" value="Rotate Pad"/>
<input type="button" value="Balance"/>	<input type="button" value="Delete"/>
<input type="button" value="Report"/>	<input type="button" value="Exit"/> <input type="button" value="Help"/>
<input type="button" value="Process"/>	

LandXML data transfer

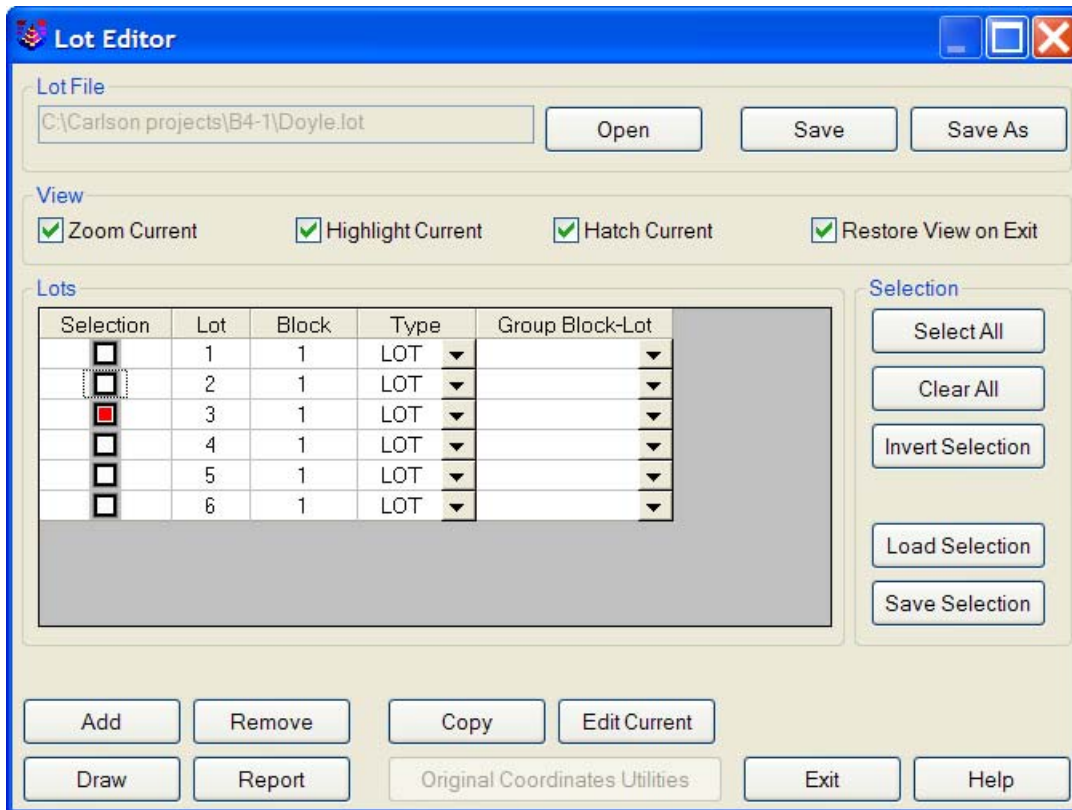
Transfer of data between LDT and Carlson Civil can be accomplished in several ways, depending on the type of data in question, but the best overall method is the use of LandXML files.

Pipes

Pipe Profiles can be entered or designed on a profile grid using the Design Sewer/Pipe Profile command. Alternatively, Pipe Profiles can be created and edited in the Input-Edit Profile dialog, and then drafted in the drawing. In Hydrology, Pipe Networks can be created, which are dynamic and “intelligent”, and so automatically respond to design changes.

Lots

Carlson Civil includes a set of tools for lot layout and lot design. Defined lots can be stored in a lot file (.lot). Another way to define a set of Lots automatically is with the Lot by Enclosed Text command, which searches for closed areas with enclosed text, and creates lots out of them, using the enclosed text for the lot name/number. Defined Lots can be accessed and edited through the Lot Editor.



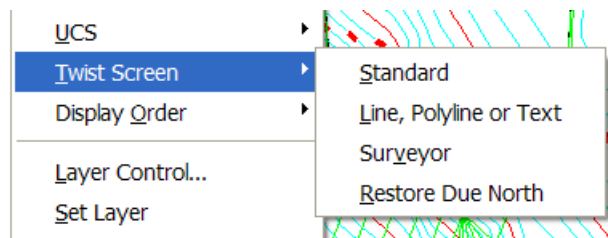
Text Height

In LDT, as part of drawing setup, a set of text styles is created based on information contained in a file with a .STP file extension, most commonly used is the LEROY.STP. These text styles all have fixed heights assigned to them, based on the current horizontal scale set in the drawing. If the horizontal scale is changed, the heights of the text styles are all changed.

In Carlson Civil, each of the various commands that involve annotation set the text style to be used and the desired height for the text, using a "scaler", which is multiplied by the current drawing scale. The AutoCAD text style should be set with a height of zero.

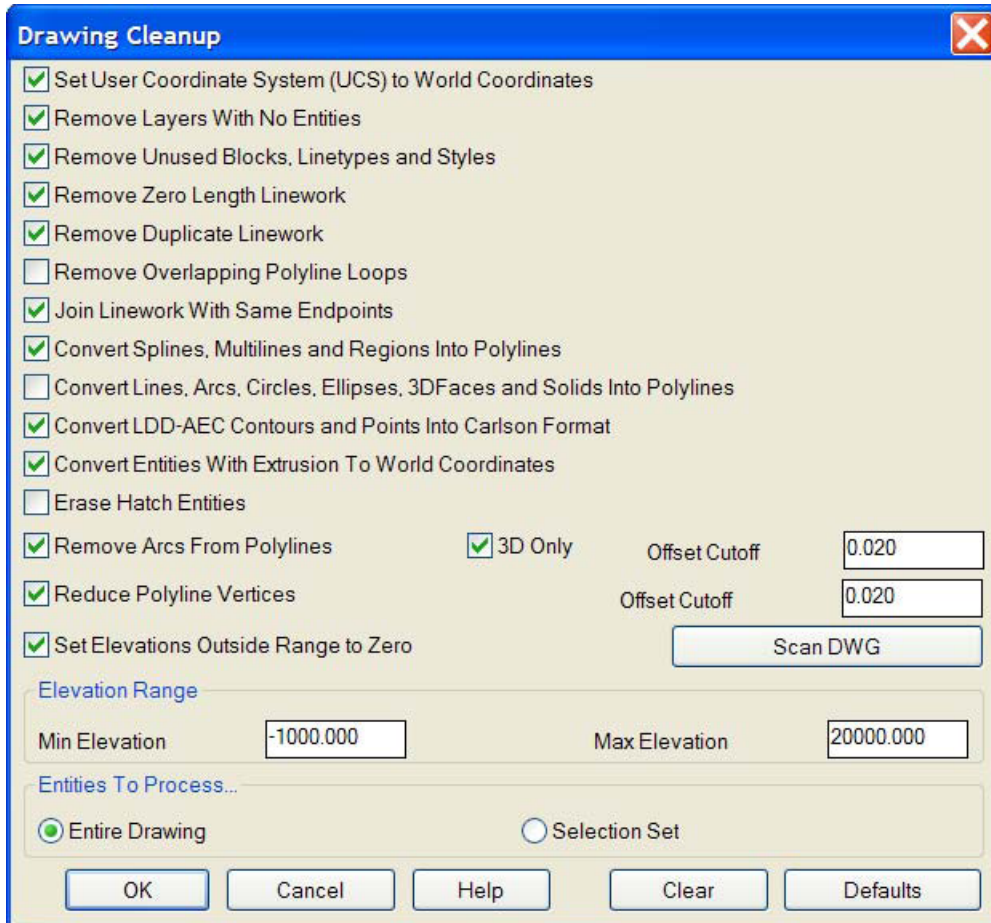
North Rotation

Carlson Civil does not support the concept of a secondary UCS to define and store North, as is done with LDT North Rotation. Instead, Carlson Civil relies on the use of DVIEW Twist to reorient North, and contains a thorough set of tools to work with that command.



Drawing Cleanup

If you're not running Carlson Civil on top of Map, or even if you are, Carlson Civil includes an awesome Drawing Cleanup function to find and resolve a wide range of common drawing problems.



The screenshot shows the 'Drawing Cleanup' dialog box with the following options and settings:

- Set User Coordinate System (UCS) to World Coordinates
- Remove Layers With No Entities
- Remove Unused Blocks, Linetypes and Styles
- Remove Zero Length Linework
- Remove Duplicate Linework
- Remove Overlapping Polyline Loops
- Join Linework With Same Endpoints
- Convert Splines, Multilines and Regions Into Polylines
- Convert Lines, Arcs, Circles, Ellipses, 3DFaces and Solids Into Polylines
- Convert LDD-AEC Contours and Points Into Carlson Format
- Convert Entities With Extrusion To World Coordinates
- Erase Hatch Entities
- Remove Arcs From Polylines 3D Only Offset Cutoff
- Reduce Polyline Vertices Offset Cutoff
- Set Elevations Outside Range to Zero

Elevation Range

Min Elevation Max Elevation

Entities To Process...

Entire Drawing Selection Set

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For more information or to download a demo visit www.carlsonsw.com