

Autodesk®
Civil 3D®
2007

Feature Enhancements

Autodesk® Civil 3D® 2007 software is a powerful, mature, civil engineering application designed to significantly increase productivity, save time, and decrease costs. It uses an industry-proven dynamic engineering model that maintains intelligent object relationships. A change made in one place instantly updates your entire project, helping you complete transportation, site, sewer, storm drain, and subdivision projects faster and more accurately. All team members work from the same consistent, up-to-date model, so they stay synchronized throughout all project phases, including survey, design, drafting, reporting, analysis, and visualization. Enhanced consulting, training, third-party developer products, and application development tools form a powerful enterprise civil engineering solution.

With Civil 3D software, your organization can standardize on one powerful product for all of its civil engineering design, drafting, and GIS needs. Reduce training and support costs, simplify licensing and subscription renewals, minimize data translation requirements, and substantially improve the quality of your deliverables with one powerful solution.

This document highlights the feature enhancements in Autodesk Civil 3D 2007. For comparison purposes, feature enhancements in Autodesk Civil 3D 2004, 2005, and 2006 are also included.

Autodesk Civil 3D 2007	
Feature	Function
Survey Functionality	<ul style="list-style-type: none"> • Survey commands are cleanly integrated into the Civil 3D toolset and user interface. Users have a consistent environment for all tasks, ranging from fieldbook import, least squares adjustment, and editing of survey observations to management of point groups, creation of surfaces, and layout of parcels and alignments.
Multuser Project Environment	<ul style="list-style-type: none"> • Multuser project support for core elements has been added in Civil 3D 2007. The Project support in Civil 3D takes advantage of the core data management capabilities of Autodesk® Vault functionality to ensure that the entire project team has access to the data that they need to complete their work. With Civil 3D 2007, users can include the following model data in a project so that it can be efficiently and safely shared by the entire project team: <ul style="list-style-type: none"> ○ Points ○ Surfaces ○ Alignments ○ Profiles ○ Pipe Networks (New in 2007) ○ Survey Data (New in 2007)
Vault Explorer	<ul style="list-style-type: none"> • Use this stand-alone tool too help design teams track work in progress, maintain version control in a multuser environment, and improve design reuse by consolidating product information in one place.
Corridor Modeling	<ul style="list-style-type: none"> • New graphical editing capabilities have been added to make station-specific edits to the corridor model. <ul style="list-style-type: none"> ○ Ability to insert, delete, or graphically move points of links at a unique section ○ Ability to insert or delete subassemblies at a unique section • Named surfaces are now created directly from the corridor model. Any change to the corridor results in the surface being updated. Because this is now a standard Civil 3D surface, users can use all the surface editing, reporting, drafting, and visualization tools that already exist in Civil 3D. Other objects such as pipe networks or grading objects can also be used directly with the surface. • Usability enhancements such as the ability to rename regions, change the region start/end graphically, control the section view display, select a polyline as a corridor boundary, and more help users become more productive more quickly. • New subassemblies in the box help you solve different types of design challenges.
Alignments	<ul style="list-style-type: none"> • A series of new floating and free entities: <ul style="list-style-type: none"> ○ Floating curve with transition ○ Floating line with transition ○ Free spiral between tangents ○ Free spiral between curves • Addition of reverse and compound curves <ul style="list-style-type: none"> ○ Free reverse spiral-line-spiral ○ Free compound spiral-line-spiral ○ Free reverse spiral-spiral ○ Free compound spiral-spiral

Autodesk Civil 3D 2007	
Feature	Function
	<ul style="list-style-type: none"> • A variety of drafting enhancements, including <ul style="list-style-type: none"> ○ Ability to draft profile PVI locations/elevations on alignment ○ Perpendicular and parallel object snap support ○ Alignment labels that can include references to surfaces and profiles
Profiles	<ul style="list-style-type: none"> • Introduction of element-based (free, floating, and fixed) vertical geometry that can be used to design proposed vertical alignments. • Additional labeling support, including display of sampled sections and pipe networks in profile bands and access to alignment and surface model data in profile label styles. • Usability enhancements such as the ability to graphically manipulate profile data labels, streamlined access to profile labeling settings, and more.
Grading Improvements	<ul style="list-style-type: none"> • A new collection of powerful day-lighting and grade projection tools can be used to generate surface models for any type of grading project. • Flexible and easy-to-use approach enables you modify groups of grading projections to quickly solve complex design problems.
Grading Feature Lines	<ul style="list-style-type: none"> • A new collection of easy-to-use 3D entity manipulation tools can be used in the development of any surface. • Edits to polylines, 3D polylines, feature lines, parcel lines, and other 3D objects are made via tabular and graphical input and result in instant updates to surfaces. • Improved interaction between tabular editor and feature lines helps users confirm vertices that they are editing.
Quick Profiles	<ul style="list-style-type: none"> • Temporary sections can be generated from objects to display underlying surface conditions and the geometry of 3D feature lines. Surface changes or edits to the feature line are instantly reflected in the quick section.
Pipe Layout/Design	<ul style="list-style-type: none"> • Expanded ability to set and customize Pipe Rules to account for regional, company, and client standards for pipe design and layout. • Added ability to create a pipe network from a polyline and points with elevations. • Added ability to create an alignment from the centerline of an existing pipe network. • Inclusion of Part Builder so that users can create their own pipe components (structures and pipes). • Automatic resizing of pipes if model changes. • Improved usability that affects part size editing, grip editing of the network, and more.
Pipe Interference Detection	<ul style="list-style-type: none"> • Added a system for interference detection between pipes.
Sections	<ul style="list-style-type: none"> • Added tables for total volumes and material volumes.
General	<ul style="list-style-type: none"> • New Toolbox interface includes Civil 3D Reports Manager, where custom or third-party applications can be integrated into Civil 3D. • New Inquiry tools enable users to easily extract data from the Civil 3D model. • Zoom to entries in the Event Viewer so that you can quickly evaluate issues that have been found during design and analysis. • Support for LandXML 1.1, including expanded support for survey and corridor model data. • Ability to export Civil 3D model elements to SDF for import into Autodesk

Autodesk Civil 3D 2007	
Feature	Function
	MapGuide® or Autodesk Map® 3D software applications.
Style Management	<ul style="list-style-type: none"> • Drag styles between drawings. • Easily share styles between drawings; merge, copy, or rename any duplicates found.
Labels and Tables	<ul style="list-style-type: none"> • Added “reference” text component to surface, alignment, and profile labels. Create a single label that contains data from various objects or types of object in your model. • New ability to edit any text in Civil 3D labels. For example, you can now modify the descriptive text on a single station/offset label without having to create a new label style. • All object styles now include expressions (formulas) that can be incorporated into a label style. • A general “Note” label can compile object information from alignments, profiles, and surfaces into a single, style-based note. • Label simple AutoCAD® lines, arcs, and polylines with style -based labels. • Add a mask to text labels, hiding data in the drawing that resides “below” the text label. • Use numerous label settings, such as display of alignment Left versus Right value, anchor locations, behavior of leaders, direction formatting, and more.
Reports	<ul style="list-style-type: none"> • Provided flexible, real-time, and extensible report generation directly in the product. Data is derived directly from the Civil 3D model, resulting in a real-time view of the design model.
Visualization	<ul style="list-style-type: none"> • Civil 3D includes rendering capabilities right out of the box. Apply render materials to your site, road, and pipe network, and create visually pleasing renderings and animations.
Points	<ul style="list-style-type: none"> • Convert Autodesk® Land Desktop points in drawing. • Copy description keys between drawings. • Create points based on alignment and profile geometry or corridor feature line. • Reset point elevations from surface. • Graphically change an individual point’s rotation angle.
Surfaces	<ul style="list-style-type: none"> • Use new edit feature to analyze and augment triangulation when building surfaces from contour data. The result is a surface (and contour display) that more accurately matches the contours that were used to initially build the surface. • Point format selection/creation when building surfaces from external point files.
AutoCAD DWG Environment	<ul style="list-style-type: none"> • Built on the AutoCAD® 2007 foundation, Autodesk Civil 3D 2007 provides a native DWG environment.

Autodesk Civil 3D 2006	
Feature	Function
Pipe Layout	<ul style="list-style-type: none"> • Lay out sanitary and storm drainage systems as dynamic, interactive networks • Edit structures and pipes—which are completely integrated with the Civil 3D model—using graphical and numeric input

Autodesk Civil 3D 2006	
Pipe Drafting	<ul style="list-style-type: none"> Plot and complete final drafting of the pipe network in plan, profile, and section views Annotate pipes and structures in plan and profile views
Pipe Analysis	<ul style="list-style-type: none"> Share pipe network information, such as material and size, with analysis software
Multiuser Access to Surfaces, Points, Alignments, and Profiles	<ul style="list-style-type: none"> Reference surfaces, alignments, and profiles between drawings so that multiple people can use the object's intelligence across multiple drawings Use the new Shortcuts interface to manage and edit these references
Corridor Model	<ul style="list-style-type: none"> Edit your design at a single station or between a range of stations Edit your design more efficiently with Corridor Properties user interface enhancements Compute volumes from the subassembly shapes, and use enhanced LandXML reporting capabilities for corridor output Use new subassemblies for road rehabilitation Label corridor sections using new Code Point, Link, and Shape label styles
Alignments	<ul style="list-style-type: none"> Create Bloss Spiral in alignment layout and design Use design speeds when calculating superelevation values along an alignment Customize speed tables using an open schema
Points	<ul style="list-style-type: none"> Add user-defined attributes to points Create AutoCAD blocks from Civil points
COM API	<ul style="list-style-type: none"> Create custom corridor modeling, pipes, points, and surfaces using an improved application programming interface (API)
Surfaces	<ul style="list-style-type: none"> Improve analysis capabilities with new Waterdrop utility Preserve the edges of 3D faces when adding them as surface data Use corridor feature lines as breakline data
Profiles and Profile Views	<ul style="list-style-type: none"> Superimpose a corridor feature line onto a profile view Use the PLINEGEN variable to set display of profile linetypes Create a buffer on the left and right side of the profile view to incorporate vertical design that begins and ends before and after the existing ground stationing
Parcels	<ul style="list-style-type: none"> Move a parcel from one site to another Add user-defined attributes and labels to parcels
Other Data Formats	<ul style="list-style-type: none"> Use a variety of import/export utilities to work with point files, GIS data sources, other CAD formats, and generic ASCII data Generate 3D Autodesk DWF™ files for use on the web or for mass communication Rotate the view of 3D DWF files to more clearly understand the details of the model
Visualization	<ul style="list-style-type: none"> Visualize your design using an updated release of Autodesk® VIZ Render, included with Autodesk Civil 3D
Subscription Aware	<ul style="list-style-type: none"> Access subscription services, including web support and e-Learning, directly through the Help menu (Autodesk Subscription members only)

Autodesk Civil 3D 2005	
Feature	Function
Corridor Model	<ul style="list-style-type: none"> • Use a new model for the design and creation of 3D corridor models for roads, railroads, and other facilities from assemblies and horizontal and vertical alignments • Use styles that support the new corridor and assembly objects • Apply corridor design to full alignment or station range • Expand basic view options, including pan/zoom, go to station, vertical exaggeration, grid spacing, display of labels, traversing, and dynamic linking • Create a surface from any of the corridor components, such as top surface, datum surface, and material surface • Render models and apply user-defined slope patterns • Analyze volumes of corridor
Corridor Assemblies and Subassemblies	<ul style="list-style-type: none"> • Model the cross-sectional road design characteristics using a new assembly object, which is a collection of subassemblies that constitute the building blocks of the corridor design • Create, manage, and edit subassemblies: <ul style="list-style-type: none"> ○ Ability to draw and define subassembly shapes graphically ○ Create, Edit, Save, and Save As menus ○ Creation and management of subassembly libraries ○ Definition of key points for building and labeling horizontal and vertical geometry • Use lanes, curb and gutters, shoulder, side-slope grading, and benching subassemblies • Define subassemblies to follow transitional horizontal and vertical elements • Define symmetrical and asymmetrical assemblies
Alignments	<ul style="list-style-type: none"> • Use enhanced curve/spiral layout configurations • Create labels based on station count • Label the information about the entity on either side of the geometry point using geometry point labels • Define symbols rotation relative to the alignment using enhanced station offset label • Use enhanced superelevation definition that is part of the horizontal alignment and applied in the corridor model • Use spiral types for various country rail design requirements: <ul style="list-style-type: none"> ○ Sine-half wavelength diminishing tangent to meet requirements in Japan and China ○ Cubic, to meet requirements in Japan ○ Ability to label points of intersection (PI) along an alignment
Profiles and Profile Views	<ul style="list-style-type: none"> • Superimpose the profile data from an offset alignment onto the profile of a selected alignment • Define a radius when creating a vertical parabolic curve • Use profile grip to hold grade when grip-editing the vertical alignment • Use superelevation band type that can be plotted along the feature in profile view bands
Sections, Sample Lines, Section Views	<ul style="list-style-type: none"> • Use enhanced section view of the corridor model • Edit in place using sample line grips, including stretching and sliding of the

Autodesk Civil 3D 2005	
Feature	Function
	<p>sample line along an alignment</p> <ul style="list-style-type: none"> • Derive sample line locations from a corridor sample location • Edit station-offset of section data using new Section Editor • Use new corridor section viewer for navigating along the sections of a corridor model
Volumes	<ul style="list-style-type: none"> • Calculate the average end-area volumes based on sample lines along a selected alignment or corridor
Terrain Modeling	<ul style="list-style-type: none"> • Work faster with overall performance enhancements and optimizations, especially with larger surfaces • List, zoom to, and pan to individual breaklines from the Prospector tab for enhanced breakline editing and viewing • Apply new render material styles to surfaces and surface masks • Use AutoCAD Copy, Move, Rotate, and Scale commands when editing surfaces
Surface Editing	<ul style="list-style-type: none"> • List, zoom to, and pan to individual breaklines from the Prospector tab for enhanced breakline editing and viewing • Use subentity selection • Use AutoCAD Copy, Move, Rotate, and Scale commands when editing surfaces
Grading	<ul style="list-style-type: none"> • Implement user-defined slope patterns • Force a slope direction for instances in which the first solution found may be opposite of desired cut or fill slope • Create transitions and edit transition length and location • Balance volumes • Disconnect a grading from the surface created from it
Parcels	<ul style="list-style-type: none"> • Expand your design capability for parcel layout using enhanced Parcel Layout toolbar, which gives you the ability create multiple parcel lines based on a given frontage and area criteria • Label the entire length of a boundary line, as well as the individual segments created by intersections with other parcel lines • Use Create Right of Way command to select Chamfer for intersecting parcels and alignments
Coordinate Geometry (COGO)	<ul style="list-style-type: none"> • Create points using new commands • Use redesigned Create Points dialog box for better consistency with Autodesk Civil 3D user interface • Override an attribute of a point with information stored in an external database using XDREF functionality • Use scaling parameters more easily with enhancements to Description Key dialog box • Calculate geodetic volumes more easily with enhancements to the geodetic calculator, including the ability to select an X,Y coordinate, and integration into the Prospector tab • Work more efficiently with enhancements in the selection of points and point groups in the AutoCAD Object Properties window
Visualization	<ul style="list-style-type: none"> • Visualize your designs with VIZ Render, included with Autodesk Civil 3D 2005

Autodesk Civil 3D 2005	
Feature	Function
	<ul style="list-style-type: none"> • Use material definitions for rendering surface models within surface masks
LandXML Support	<ul style="list-style-type: none"> • Import breakline data for surface creation • Import and export profile data
Data Migration	<ul style="list-style-type: none"> • Migrate profiles from Autodesk Land Desktop
API	<ul style="list-style-type: none"> • Use COM API for all major Autodesk Civil 3D 2005 components, including the style definitions of the corridor model • Improve illustration and documentation capabilities • Draw custom graphics in profile view, section view, and the bands in each of these views using expanded API

Autodesk Civil 3D 2004	
Feature	Function
Object Management System	The object-oriented Autodesk Civil 3D 2004 architecture defines each point, surface, alignment, grading, section, and profile as an intelligent object that can have an interdependent relationship with other objects.
Easy-to-Use Interface	<p>The Civil 3D 2004 user interface incorporates the following enhancements:</p> <ul style="list-style-type: none"> • Microsoft® Windows® Explorer–like Toolspace window that lists objects and provides management functions • Menus organized for consistency, with similar commands for all objects • Layout tools that provide quick access to creation and editing commands for some objects • Consistency in editing methods that include commands or grips
Standard Controls for Styles and Labels	Every Autodesk Civil 3D 2004 object has an assigned style. Creating, assigning, and managing styles are the same for all objects. Autodesk Civil 3D 2004 includes three types of styles—for objects, labels, and tables.
Settings	Settings in Civil 3D 2004 cover a wide variety of preset values—ranging from basic drawing settings, such as units, scale, and coordinate system—to optional defaults, such as default layers for object creation.
Surfaces	In Autodesk Civil 3D 2004, the build process for surfaces is incremental. When you add data or edit the surface, the surface is updated; when you remove data, the surface is rebuilt.
Surface Analysis	Autodesk Civil 3D 2004 includes a variety of analysis functions, such as thematic displays, watershed delineation, surface volumes, and surface smoothing.
Surface Contours	Autodesk Civil 3D 2004 treats contours and contour labels as a representation of the surface. Any change to the surface results in updated contours. Labels also automatically react to changes.
Surface Visualization	Create 2D and 3D representations of the surface, including contours, surface triangles, elevation and slope thematic, surface face direction, watershed areas, grid and slope arrows, and more. The software associates all these representations with the surface itself, so changes to the surface result in updated 2D and 3D representations.

	Autodesk Civil 3D 2004
Feature	Function
Point Groups	Flexible point group capabilities enable you to group points based on user-defined values such as description, description key, elevation range, graphical selection, and more. You can also use point groups to define the graphical appearance of points and point labels in the drawing. Finally, you can use point groups in the creation of surfaces, reports, drafting, and other commonly used objects.
Point Description Keys	Define description keys that control the symbol, description, scale, rotation, and group of any points that you add into Autodesk Civil 3D 2004.
Alignments	The alignment object includes lines, curves, and spirals as well as any labeling that you want for finished drafting. Edits via tabular editor or graphical movement automatically update labeling.
Alignment Constraints	Autodesk Civil 3D 2004 introduces alignment layout tools that enable you to specify design controls within the alignment. For instance, you can constrain a curve or tangent to pass through a selected point, or require a tangent to maintain a given direction while edits are made to the alignment.
Profiles	Extract profiles of multiple surfaces based on alignment geometry. Autodesk Civil 3D 2004 automatically creates the profile appearance and annotation based on the styles that you select. Any changes to the horizontal alignment result in updates to the profile and all labels.
Finished Ground Design	Use the layout tools in Autodesk Civil 3D 2004 to design the proposed vertical geometry for an alignment. The software automatically draws vertical curves based on predefined curve parameters. Refine your design by editing values in the tabular editor or by graphically editing location points on the proposed vertical alignment.
Plotted Cross Sections	Autodesk Civil 3D 2004 includes tools to extract surface sections along a road centerline. Generate section plot sheets based on styles that include annotation appearance, scale, layout, and so forth. Any changes to the road geometry result in updated section sheets.
Parcels	Autodesk Civil 3D 2004 treats parcels as a single related topology so that a change to one parcel results in changes to neighboring parcels. If you move a shared line, the software updates the area of affected parcels.
Parcel Layout	Generate parcels by converting existing AutoCAD polylines or by using the flexible layout tools provided in Autodesk Civil 3D 2004. Dynamic layout tools, such as slide and swing bearing, provide immediate graphical updates to parcel geometry and annotation.
Parcel Annotation and Reports	As it does with other objects, Autodesk Civil 3D 2004 automatically updates parcel annotation and tables when you make changes to the parcel geometry. To help complete the process, reports and parcel properties such as Mapcheck require only a single mouse-click.
Grading	Use powerful new grading capabilities to design even the most complex scenarios. Build one grading element off another to create stepped slopes or complex grading combinations. Grade into neighboring grading objects.
Grading Output	Create surface models from a grading “group” (collection of grading objects) to build a comprehensive finish surface. Paste the grading object directly into a selected surface.
Object Styles	Each type of object has its own style, which controls its display characteristics. Autodesk Civil 3D 2004 provides a standard style for each object preset to default values. You can collect groups of styles into a template (.dwt) file, so that all drawings based on that template share the same style configuration.

Autodesk Civil 3D 2004	
Feature	Function
Label Styles	An object has customizable labels, which are controlled by label styles. Labels are part of the object and are automatically updated whenever the object changes. Labels can include text, blocks, lines, ticks, and leaders.
Drawing Templates	Templates (.dwt files) typically include object styles, label styles, and settings such as drafting units, precision, and coordinate systems.
Toolspace for Object Management	The Toolspace provides an object-oriented view of your engineering projects and is divided into two parts, or tabs: <ul style="list-style-type: none"> • Prospector tab for navigating through the list of objects • Settings tab for managing styles and settings
Item View	Item view offers a list view of a selected folder's contents, or a graphical view of selected objects.
Grips	When you select an object in a drawing, grips appear on the object so that you can edit the object dynamically. For example, you can use grips to move points of intersection or points of line-arc tangency when editing road alignments.
Panorama Window	The Panorama window is a floating, dockable window that you can keep open as you work. When you edit certain objects (for example, an individual alignment), and then choose the View button, the Panorama window displays an editable table of the entities that make up the object.
Properties Editor	When you right-click any object on the Prospector tab, and then choose Properties, you have edit access to all the properties of that object.
Layout Tools	Use the layout tools for creating and editing different kinds of objects, such as grading and alignments.
Standardized Menus	The menus in Autodesk Civil 3D 2004 are designed to be consistent. Different features have almost identical menu options.
Context-Sensitive Menus	Context-sensitive menus appear when you right-click an object in a drawing, a set of items, or an individual item in the Toolspace window.

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