



Features and Benefits

CAiCE™ Visual Drainage® 10 software provides a comprehensive and compatible set of tools for completing both simple and complex roadway drainage design scenarios. CAiCE Visual Drainage simplifies roadway drainage design and analysis by automating the calculation of hydrologic and hydraulic parameters and integrating the data with your roadway design model.

By combining solid engineering methodologies with interactive graphics and high-speed visualization, CAiCE Visual Drainage makes roadway drainage design an intuitive, visual process that helps you save time and money. CAiCE Visual Drainage is used by roadway and stormwater engineers with civil engineering consulting firms, municipal agencies, and departments of transportation for projects of every type, including urban closed-conduit networks, rural open systems, pond design and routing, or any combination of the three.

Primary features include the following:

- **Design Database Integration**
CAiCE Visual Drainage integrates with roadway design models. Alignments, profiles, superelevation, digital terrain models (DTMs), and cross sections created as part of the design process provide information that is used throughout the drainage engineering workflow. Whether the roadway has been designed with CAiCE™ Visual Roads® software or imported through LandXML, CAiCE Visual Drainage uses the project data to accurately design and analyze the roadway drainage infrastructure.
- **Interactive Design Approach**
CAiCE Visual Drainage software's interactive design approach makes it easy to learn and use. You can interactively develop a stormwater design, run the analysis, organize the reports, and produce the required plan and profile sheets. CAiCE Visual Drainage features a detailed error-checking and design-constraint utility that provides instant feedback. In addition, it features smooth integration with both DGN and DWG formats for efficient plans production.
- **Design Visualization**
CAiCE Visual Drainage lets you see the proposed drainage network in plan, profile, and perspective views simultaneously. This capability makes it easy to spot and resolve problem areas and conflicts.
- **VBA Customization**
Microsoft® Visual Basic® for Applications (VBA) offers scalability and customization to meet the needs of both small businesses and large organizations. Using VBA, you can customize CAiCE Visual Drainage to meet your unique organizational requirements.
- **Digital Terrain Modeling**
Provides complete DTM creation, editing, and display capabilities, including draping of raster images. The software's DTM methodology is optimized for large data sets, such as those encountered in transportation projects.

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Feature	Function	Benefit
Digital terrain modeling	<p>With the integration of digital terrain modeling, CAiCE Visual Drainage uses design project data to efficiently and accurately design and analyze roadway drainage infrastructures.</p> <ul style="list-style-type: none"> • Easy loading and construction • Color by slope, elevation, or surface type • Automated flow path modeling • Ability to construct and draw contours of the modeled surface • Ability to construct terrain cross sections perpendicular to an alignment 	<p>Because CAiCE Visual Drainage software is integrated with the roadway design DTM, created as part of the design process, it provides pertinent information throughout the drainage workflow. It enables you to use the project data to efficiently and accurately design and analyze your roadway drainage infrastructure.</p>
Interactive network layout tools	<p>CAiCE Visual Drainage includes numerous utilities for positioning storm drain inlets:</p> <ul style="list-style-type: none"> • Ability to automatically locate inlets at crest and sag along gutter profiles • Free-form digitizing • Manual numerical entry • Interactive entry based on coordinate geometry (COGO) • Ability to automatically place inlets at specified intervals • Ability to locate flanking inlets using HEC-22 flanking structure analysis 	<p>Rather than repeatedly configuring your drainage network, analyzing the results, and adjusting the input, you can interactively develop a stormwater design, execute the analysis, organize the reports, and produce the plan and profile sheets. Capitalizing on powerful DTM capabilities, the automated basin delineation and time of concentration applications provide quick and accurate hydrology calculations.</p>
Visual Toolbox [®] feature	<p>CAiCE Visual Drainage components are organized in an easy-to-use Visual Toolbox, which consists of a collection of different types of objects, commands, and system components. The information that specifies the categories and object names, the parameter list with default values, the help file, and any associated macros are stored in a Microsoft[®] Access database that you can customize to suit your departmental standards.</p>	<p>The Visual Toolbox organizes and packages similar components for quick selection and insertion.</p>
Automated basin delineation	<p>CAiCE Visual Drainage provides powerful basin and subcatchment delineation:</p> <ul style="list-style-type: none"> • Time of Concentration (Tc) calculator • Rational methodology • Automated flow path • Intensity Duration Frequency (IDF) Table Editor 	<p>Capitalizing on CAiCE's powerful DTM, CAiCE Visual Drainage enables you to digitize a point and immediately view the area contributing flow to that position. You can then store the area for reference in future hydrology calculations.</p>
Automated inlet spread analysis	<p>CAiCE Visual Drainage provides full HEC-22 analysis of intercepted and bypass flow computations. It also offers</p> <ul style="list-style-type: none"> • Multiple inlet configuration • Interactive spreadsheets <ul style="list-style-type: none"> ○ Reads hydrology and automatically populates parameters ○ Performs error checks 	<p>The interactive application automatically reads hydrology parameters, allows for multiple inlet configurations, and automatically performs error and design constraint checks.</p>

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Automated storm drain computations	<p>CAiCE Visual Drainage features an automated approach to storm drain computations that enables you to specify structure and pipe losses, multiple pipe sizes and configurations, and multiple structure sizes.</p> <ul style="list-style-type: none"> • HEC-22 methodology • HGL/EGL analysis • Pipe and structure loss calculator • Pipe sizing and design analysis • Multiple pipe shapes and configurations • Metric and English measurements • Interactive spreadsheet • Error checks • Single dialog box and right-click options • Reduced data entry • Ideal for site and subdivision design projects 	<p>CAiCE Visual Drainage saves you time by automatically sizing pipes to convey the calculated flows, performing error checks to prevent excessive velocity or violation of cover minimums, and calculating the respective hydraulic grade line (HGL) and energy grade line (EGL).</p>
Project default and error-checking parameters	<p>CAiCE Visual Drainage enables you to specify or edit your own default and error-checking parameters.</p> <ul style="list-style-type: none"> • Easily access default design parameters through drop-down menus • Establish or edit your own default parameters • Load parameters from preestablished settings file • Import geometry elements from DWG, DGN, or CAiCE Design file 	<p>These parameters, which can be loaded from a preestablished settings file, provide instant feedback on the accuracy of any calculated design values.</p>
Open channel analysis	<p>CAiCE Visual Drainage provides both channel capacity and channel lining analysis in one application. The channel analysis tool routes flow down and channel; solves for normal depth, critical depth, velocity, and freeboard; and calculates side shear stress, bend shear stress, and flow superelevation.</p> <ul style="list-style-type: none"> • Channel lining analysis <ul style="list-style-type: none"> ○ Side shear stress ○ Bend shear stress ○ Flow superelevation • Cross drain analysis • Integrated with design data • Ditch bottom inlet analysis • HEC-22 capacity analysis • Velocity and freeboard calculations 	<p>The channel analysis tool enables you to specify the appropriate lining material to prevent erosion or scour of the channel side slopes.</p>
Pond routing and analysis	<p>Once your network design and analysis is complete, CAiCE Visual Drainage assists you in designing and analyzing your receiving pond.</p> <ul style="list-style-type: none"> • Multiple hydrograph generation • Pond volume estimation • Pond geometry specification • Control structure specification • Boundary condition specifications 	<p>CAiCE Visual Drainage provides multiple inflow hydrograph capabilities, pond volume and geometry analysis, control structure specifications, and design checks, along with multiple boundary condition capabilities and routing result reporting options that save you</p>

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	<ul style="list-style-type: none"> • Pond routing results 	time and help increase productivity.
Report generation	CAiCE Visual Drainage enables you to define and customize all your reporting needs. CAiCE Visual Drainage provides storm sewer tabulation sheets, gutter spread analysis reports, along with a custom report generator. It also provides flexibility in generating quantity takeoffs and pay item quantity tables.	CAiCE Visual Drainage report tools and custom report generator enable you to produce just the right reports for your entire client base.
Visualization, graphics, and imaging	<p>CAiCE Visual Drainage provides many visualization capabilities, including the following:</p> <ul style="list-style-type: none"> • View contours, wireframe grids, slopes, and drainage information in 3D • View background files • Drape images onto surfaces • Supports GIF, JPEG, TIFF, BMP, CMP, KODAK, and other major formats • Map images to real-world coordinates • Display realistic, real-time renditions of your project • Create and play AVI files for drive-throughs, design reviews, and client presentations 	CAiCE Visual Drainage software's 3D visualization utilities make it easy to spot and resolve problem areas and conflicts. The drive-through utility enables you to view any path to see the design models and existing topography. Dynamic visualization while you design saves you and your organization time and helps ensure on-time project delivery.

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