

5 common drainage design challenges and how to solve them

Create more efficient and sustainable drainage designs with InfoDrainage





Introduction

Drainage design can be challenging and inefficient—from tracking multiple iterations of a design using multiple programs to complete a single analysis. The process often consumes significant time and budget during a critical time in the project lifecycle. In this ebook, we cover **five obstacles you might encounter with your drainage designs**, along with practical solutions to overcome them using advanced software capabilities.

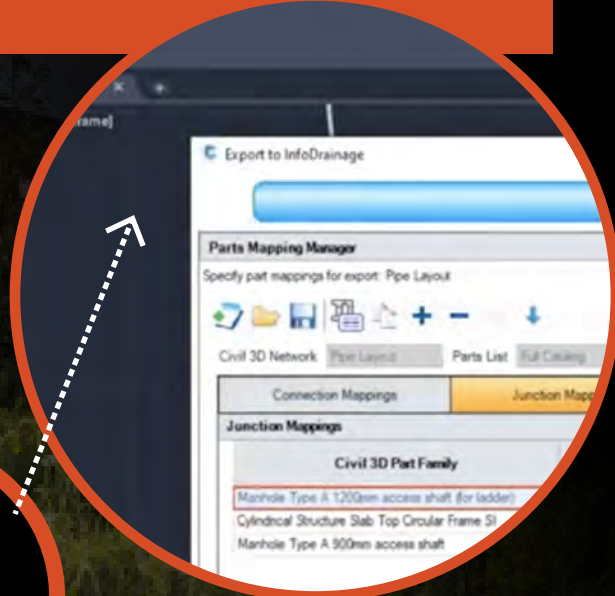
- 01 You have to do a lot of manual design work
- 02 The iterative design process is hard to track
- 03 Green infrastructure design is complex
- 04 It's difficult to get buy-in from non-technical stakeholders
- 05 You're up against local regulatory compliance

CHALLENGE 1

Your drainage designs require a lot of manual work

When drainage designs are performed using individual spreadsheets, disparate hydraulic calculators, or other non-visual tools—you have to face the rework that comes with manually converting designs to a BIM format. This is time consuming and opens your design up to errors.

MANUAL WORKFLOWS



PRESSURES



RECREATING WORK IS INEFFICIENT

Drainage design teams are subject to design changes and evolving requirements from the client and other project stakeholders. These changes cause rework that is time consuming when using manual tool sets.

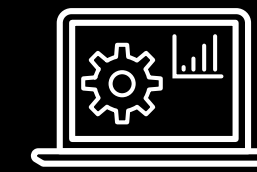
MANUAL INPUT IS ERROR PRONE

Transcribing data from one program to the other for analysis opens the design up for errors—and puts your firm at risk for negative cost implications and reputational damages. Using multiple programs for your drainage designs puts you at risk each time you open the program to manually transcribe data.

YOUR TEAM IS USING TOO MANY TOOLS

Having to switch between multiple tools for different aspects of the drainage design process is manual and inefficient.

SOLUTIONS



ROUNDRIP WORKFLOWS WITH CIVIL 3D

Integrated data exchange with round-tripping support in Civil 3D to update pipe networks and maintain pipe network references (e.g. surfaces, annotations, alignments, etc.) to maintain 3D models for BIM compliance. This roundtrip workflow minimizes model setup time and ensures design changes are always reflected in your drainage model.

DESIGN DATA TIED TO PIPES AND STRUCTURES

Design data from Civil 3D (slopes, sizes, etc.) follows pipes and structures directly into InfoDrainage. This means you don't have to manually transcribe the specifications in your drainage model, reducing risk of human error.

SINGLE PLATFORM FOR YOUR DRAINAGE DESIGN & ANALYSIS

Use a single, automated platform for any project, with intuitive controls and clear visualization. Instead of using separate tools for pipe sizing, pond sizing, and running drainage related reports, InfoDrainage can streamline the process in a single, comprehensive solution.

OUTCOMES



REDUCE ERRORS AND REWORK

Drainage designs are completed in a BIM compliant tool where outputs can easily be consumed by other BIM compliant software, eliminating error-prone rework and manual entry.

IMPROVE COLLABORATION

Drainage designs are conducted concurrently with other design disciplines, eliminating bottlenecks and allowing projects to finish on time and on budget.

IMPROVE OVERALL DESIGN QUALITY

Using a design tool that consumes data from designers of diverse disciplines ensures drainage structures fit within the allocated space on site, avoiding construction errors and clashes. Drainage designers are able to deliver construction-ready outputs.

INCREASE WORKLOAD CAPACITY

By automating time consuming and mundane drainage design tasks, your firm can positively influence workforce capacity and utilization. Use your skilled resources more efficiently to increase time spent on high-value work.

CHALLENGE 2

The iterative design process is hard to track

A good drainage design will go through an optioneering exercise with multiple iterations to exhaust all opportunities and identify the optimum location, volume, and type of storage structures that achieve the best results for the lowest cost possible. However, this iterative process can be hard to track if you don't have the right tools to properly manage your data.

DESIGN ITERATION



PRESSURES

FILE TRACKING IS DIFFICULT WITH MULTIPLE VERSIONS
As changes are made to a digital design file, designers often need to save their work as a new file so they don't override previous versions. This makes it difficult to track who worked on what and which designs are the latest.

PHASE MANAGEMENT CREATES FILE COMPLEXITY
A design will normally pass through different stages, or phases, from initial pre-development calculations through to the final design. Equally, a number of different scenarios may be considered during the design process as there can be multiple solutions to the same problem.

DESIGN OUTPUTS ARE DIFFICULT TO COMPARE
When collaborating on a design that involves multiple disciplines, there will be changes coming from different sources. Without proper tools, comparing these different designs to determine the best one can be time consuming.

SOLUTIONS

SAVE MULTIPLE DESIGN ITERATIONS IN ONE FILE
Multiple design iterations can be saved in the same InfoDrainage file making it easy to keep track of your data.

SIMULATE MULTIPLE PHASES IN A SINGLE FILE
With the ability to save multiple phases in the same InfoDrainage file, you can run new scenarios and easily analyze multiple phases in one pass.

COMPARE DESIGNS IN A COMPREHENSIVE REPORT
Comparing the results between multiple scenarios helps to streamline the design process as it is possible to make a quick informed decision.

OUTCOMES

REDUCE DESIGN COMPLEXITY
Manage drainage design complexity in the most efficient way with better file management, comprehensive simulation capabilities, and streamlined reporting.

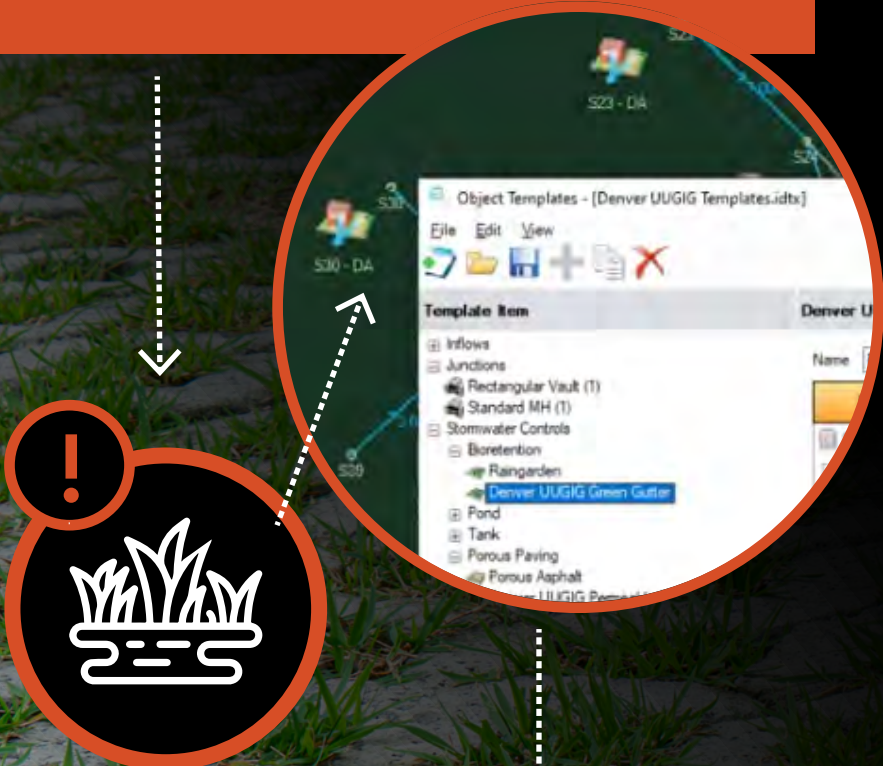
REDUCE ERRORS AND REWORK
As design changes and multiple phases are able to be easily tracked within InfoDrainage, designers can be confident they are working on the latest files. This reduces design errors and laborious rework due to iterative processes.

CHALLENGE 3

Green infrastructure design is complex

Sustainable or green drainage design is more complex than the traditional design approach because it requires multiple green infrastructure elements connected in a series to achieve the same storage requirements as a traditional site design. With this approach, we not only need to solve for water quantity, but also water quality, amenity and biodiversity. This is a complex design challenge that requires specialized software to address.

GREEN INFRASTRUCTURE



PRESSURES



DEMAND FOR GREEN INFRASTRUCTURE IS INCREASING

Globally, there is an increased demand for the incorporation of green drainage structures due to the environmental benefits. Designers are pressured to deliver even though there is a lack of information in the industry on how to incorporate complex green infrastructure in the design process.

SOFTWARE DOESN'T SUPPORT GREEN DRAINAGE DESIGN

Green drainage elements are often oversimplified in the design process because standard analysis software and hydraulic calculators either do not support these structures, or make overconservative assumptions rather than taking a physics based approach for accurate hydraulic analysis.

GREEN INFRASTRUCTURE DESIGN IS COMPLEX

The process of designing a chain of green structures is far more complicated than sizing a drainage pipe because the structures have many more components. Without the right tools, this process can be manual and time consuming.

SOLUTIONS



EASY DRAG-AND-DROP GREEN INFRASTRUCTURE DESIGN

InfoDrainage includes built-in green stormwater controls that can be dragged and dropped right into your design, replacing traditional drainage structures.

CUSTOM TEMPLATES FOR GREEN INFRASTRUCTURE

Create custom templates for various types of stormwater controls—like bioretention, swales, and porous pavement—directly in InfoDrainage to make green infrastructure easy to incorporate into your designs. Use these templates across multiple projects for greater efficiency and

TOOLS TO AUTOMATICALLY SIZE PIPES

By using the Network Design Wizard option in InfoDrainage, you can automatically size a network of pipes and/or channels to ensure they meet sustainability requirements.

OUTCOMES



BUSINESS GROWTH

Increase recognition as an industry leader in sustainable, green infrastructure design. Improve client satisfaction and grow your business.

ACHIEVE HEALTH & SUSTAINABILITY GOALS

Exceed sustainability performance requirements on a project and reduce environmental impact of your designs.

MEET REGULATORY REQUIREMENTS

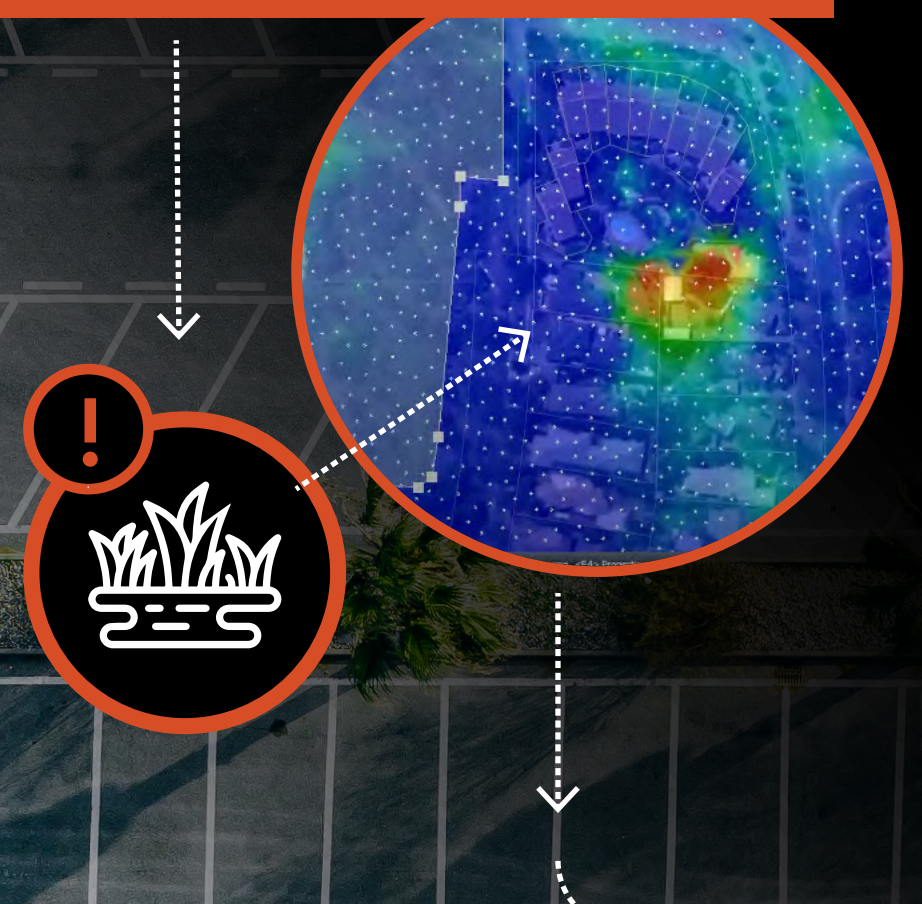
Meet regulatory and compliance requirements with ease. Experience quick approvals that won't slow down your project timeline.

CHALLENGE 4

It's difficult to get buy-in from non-technical stakeholders

Drainage designs can be complex and involve intricate details. Communicating these concepts visually and effectively to non-technical stakeholders can be challenging. Civil engineers are tasked with simplifying complex ideas and creating visual aids separate from their design to help stakeholders grasp the design intent.

NON-TECHNICAL STAKEHOLDERS



PRESSURES



PROJECTS ARE GETTING LARGER AND MORE COMPLEX

Engineering software is hard to understand, especially when you use non-visual tools like spreadsheets or standard hydraulic applications. As projects grow in complexity, so do designs, and designers are tasked with helping non-technical stakeholders make informed decisions.

COMPLIANCE AND REGULATORY APPROVALS ARE CUMBERSOME

Decision makers and other non-technical stakeholders don't always have the information they need to assess whether a design meets regulatory, sustainability, or other compliance requirements. This causes mistakes and rework late in the process.

QUALITY CONTROL OF DESIGNS CAN BE DIFFICULT

Without the right tools to detect QA/QC issues, mistakes often go unnoticed in the design stage. These flaws are especially difficult to catch for a non-technical reviewer.

SOLUTIONS



INTUITIVE USER INTERFACE AND VISUAL RIBBONS

The ribbon tabs across the top of the screen in InfoDrainage give a simple, ordered approach to the typical workflow of managing site data and building a drainage scheme. The ribbon tabs are a good way for non-technical stakeholders to contextualize the design scope.

DELUGE TOOL TO VIEW SURFACE LEVELS

Deluge allows the site to be assessed by applying an amount of rainfall to the surface to establish likely channeling and ponding. This will provide a visual indication of where the best locations for Stormwater Controls may be for easy decision making.

PLAN VIEW WITH VISUAL NOTIFICATIONS

The Plan view is the main design surface in InfoDrainage that shows the graphical layout of the site. Flood risk indicators make it easy to see where water levels are reaching flood levels.

OUTCOMES



INCREASE STAKEHOLDER BUY-IN

Manage stakeholder expectations, achieve faster approvals, and keep your designs moving by easily communicating technical concepts in a visual and intuitive format.

IMPROVE CLIENT SATISFACTION

Make sure your client team is informed every step of the way with the necessary project updates presented with a clear, visual interface.

MEET OR EXCEED DESIGN REQUIREMENTS

Even the most non-technical designers can achieve high quality designs that exceed project requirements using simple software controls and visual indications to check design quality as you go.

CHALLENGE 5

You're up against local regulatory compliance

Local regulatory compliance standards can be complex and highly technical, requiring a thorough understanding of various codes, regulations, and ordinances. These standards can also change frequently due to evolving legal, environmental, and safety requirements. Staying up-to-date with these changes and ensuring compliance can be a significant challenge for any engineer.

REGULATORY COMPLIANCE

PRESSURES

REGULATORY COMPLIANCE IS A MANUAL PROCESS

It is hard to track all of the different items and values that are required to get approval of a drainage design. Without the right design tools, you are required to manually ensure your designs are meeting specific standards every step of the way. This causes huge delays in the design process.

REPORT GENERATION IS TIME CONSUMING

Creating reporting profiles and tables typically requires information to be pulled from various sources. It can be hard to find all the information you need and make sure you are adhering to all of the requirements for approval.

YOUR PROJECTS RANGE FROM LOCATION TO LOCATION

More than likely, you will be required to work on multiple projects that do not have the same local regulations. This can be hard to keep track of and could cause mistakes and rework.

SOLUTIONS

DESIGN WIZARD IS BASED ON LOCAL STANDARDS

The Network Design Wizard in InfoDrainage allows you to size pipes, channel, and manholes according to local standards. This way, you know during initial phases of design that your output will be compliant with slope and size requirements.

ENGINEERING AUDIT TOOL AND HGL PROFILES

With InfoDrainage, you can evaluate different aspects of your design after you've run your analysis to set maximum, minimum, or a range of values to ensure your design falls within required guidelines. Export your HGL profiles as images, PDFs or CAD files for easy reporting.

EASY CUSTOM REPORT GENERATION

Create graphs and customizable reports to visually demonstrate where your designs are compliant with regulatory requirements -- or quickly see where you need to make adjustments.

OUTCOMES

MEET OR EXCEED DESIGN REQUIREMENTS

Ensure your drainage designs always meet the requirements of local municipalities. Use automated tools to check your work as you go and facilitate quicker approvals.

REDUCE OVERALL DESIGN TIME

Decrease the time it takes to create compliant designs, demonstrate compliance to your stakeholders, and create impactful reports. Increase your team's capacity and deliver projects on time.

REDUCE ENVIRONMENTAL IMPACT

Deliver drainage designs that meet local environmental and sustainability requirements without added design process or complexity. Design green infrastructure as easily as traditional drainage systems to make a bigger impact on the environment and the communities you serve.

Getting started

With the right technology solution, you can confidently address your most challenging design and approval hurdles. Start achieving better project outcomes with **InfoDrainage**, an advanced design and analysis tool that takes you from initial concept to detailed designs using both traditional and sustainable elements.

Built-in integrations with Civil 3D and data exchange with other CAD and GIS platforms shortens design time, allowing teams to optimize workflows and obtain faster approvals.

Learn more about InfoDrainage at the site below and get started today by **downloading a free 30-day trial**.

[Learn more](#)

