



# Aquaterra

by CGS Labs



**BIM READY CHANNEL / RIVER ENGINEERING  
DESIGN SOFTWARE**



# BIM READY CHANNEL / RIVER ENGINEERING DESIGN SOFTWARE

Aquaterra is a professional software for channel and river engineering design. It integrates MIKE FLOOD and HEC-RAS hydraulic calculations with flood protection design, torrent and landslide control, and irrigation systems design.

Using its flexible, dynamic data model, it supports BIM workflows and processes, and IFC standardized data format. Carefully designed UI and workflows are consistent with the engineering practices. This makes Aquaterra surprisingly fast-to-learn and easy-to-use.



TRUSTED MOST  
BY DESIGN PROFESSIONALS

## FIELDS OF USE

01 RIVER CHANNEL DESIGN

02 FLOOD PROTECTION DESIGN

03 TORRENTS AND LANDSLIDES CONTROL

04 RIVER RESTORATION

05 IRRIGATION SYSTEMS DESIGN

06 DAM RESERVOIRS DESIGN

07 WETLAND PROTECTION

08 EARTHWORKS: QUARRIES, OPEN MINE PITS, DUMP AREAS, EARTH BARRIERS, ETC

08 REHABILITATION OF LANDSLIDES

## REFERENCES

ADT | ΩMEGA

LAHMEYER  
INTERNATIONAL

PÖYRY

INŠTITUT  
ZA VODE  
REPUBLIKE  
SLOVENIJE  
Institute  
for Water of  
the Republic  
of Slovenia

Институт  
за  
водoprивреду  
Jaroslav

ipz

# FEATURES

## SUPPORT FOR BIM AND IFC

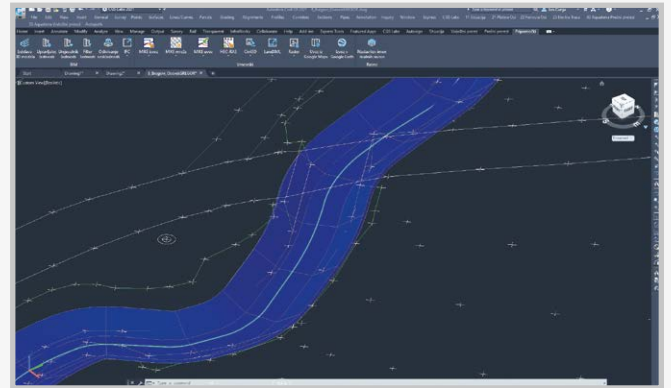
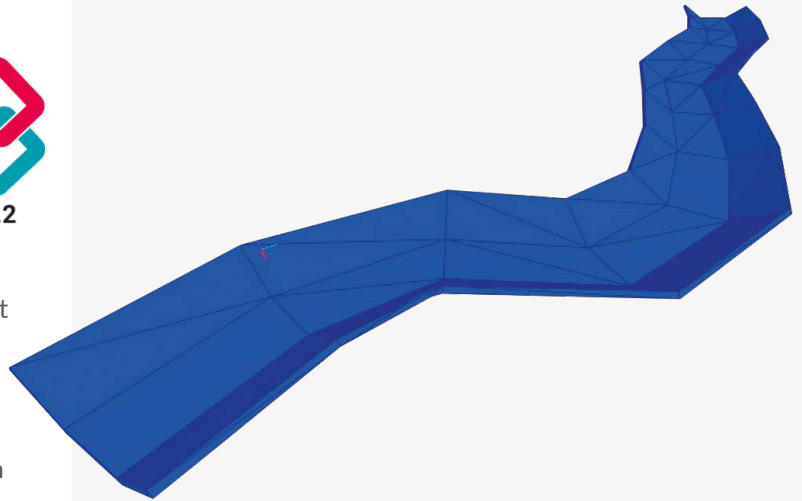


CGS Labs solutions provide extensive BIM data support not limited to CAD platforms in use. 3D roadway, railway or river channel models are generated as detailed 3D solid objects with extended BIM metadata attached to objects, or as multiple surfaces for use with computer guided machines etc.

Aquaterra offers capable Property Manager for adding and changing 3D solids property data, which enables COBie (Construction Operations Building Information Exchange) compatibility.

Aquaterra 3D models and attribute data can be exported to IFC files. IFC export format is regularly updated according to buildingSMART International specifications.

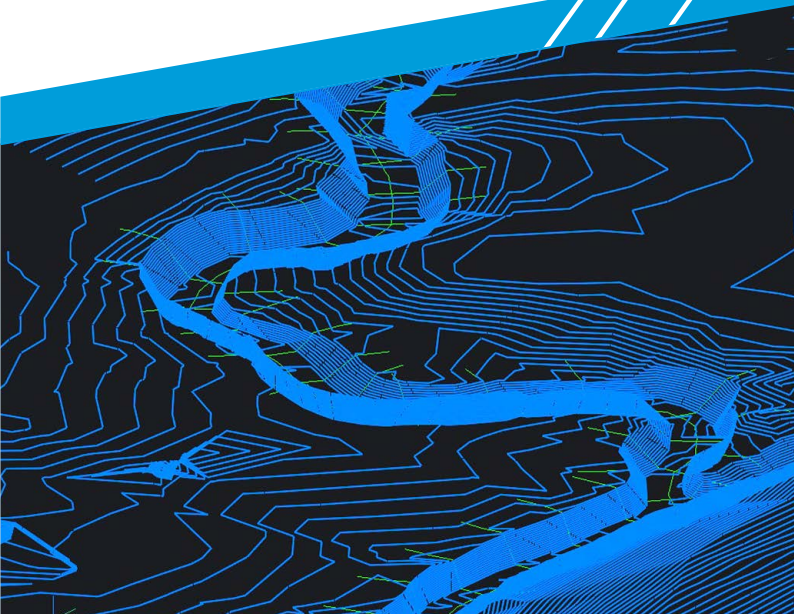
Clash detection tool enables designer to search for possible collisions among selected 3D solid objects within the drawing itself thus saving the time to export models and create clash analysis in third party applications outside CAD environment.



## URBAN & SITE DESIGN

### DIGITAL TERRAIN MODELING

The Surface creation tool is included in CGS Labs software to produce a detailed Digital Terrain Model (DTM) based on various surveys or other input data: total station data files, points, break lines, blocks, etc. This offers the possibility to use Aquaterra on plain AutoCAD or BricsCAD. Aquaterra supports also surfaces from Civil 3D and BricsCAD (V20 or newer).



## GRADING

Creation of complex slopes with multiple conditions in cut or fill gives users the capability to cover various design scenarios and geometry requirements for all kind of road projects, from simple forest road design to complex intersection geometry design.

Furthermore, creating ponds, parking areas, platforms, road, rail tracks, river channels, and other features is easier and faster with CGS Labs grading functionality.

## CHANNEL / RIVER ENGINEERING DESIGN

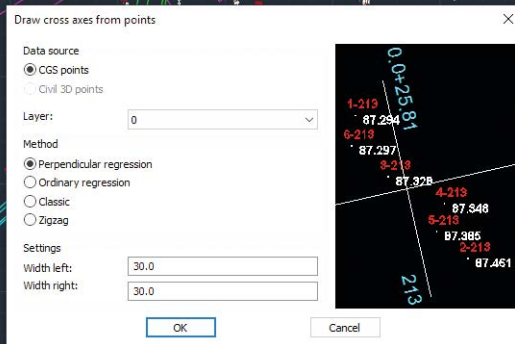
### 3D SURFACE AND 3D SOLID MODEL

Channel and river bed 3D model can be created as 3D surface or 3D solid model. 3D surface model can be generated automatically from 3D channel or river bed cross sections definition and terrain model, or it can be built with the grading function.

3D solid model is created on the basis of cross-section areas, with materials and volumes defined as extended data. All solid models, including extended data, can be imported into Autodesk InRoads, Navisworks and can be used in various BIM workflows.

### RIVER ALIGNMENT DESIGN TOOLS

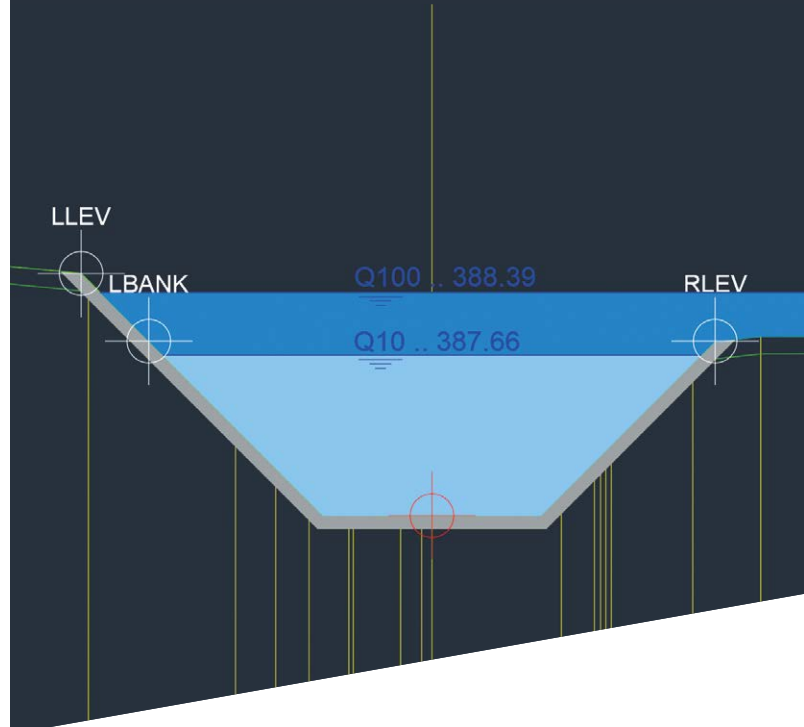
Aquaterra provides a wide range of advanced alignment, profile geometry design, and editing tools. They include P(V)I design, floating and fixed elements design, alignment design created from the existing polyline, or ultimately creating a best-fit alignment based on existing channel or river bed survey data. A number of alignment labels, reports and data export options give you the flexibility to cover a wide range of user requirements.



## WATER LEVEL REPRESENTATION AND SMART LINES DEFINITION

Water level lines represent data obtained from hydraulic calculation software (MIKE FLOOD or HEC-RAS). They are displayed relative to the specific alignment in the drawing. To present side objects like channels, dykes, property limits, etc., you can define smart lines in the layout and project them to profile and/or cross section views.

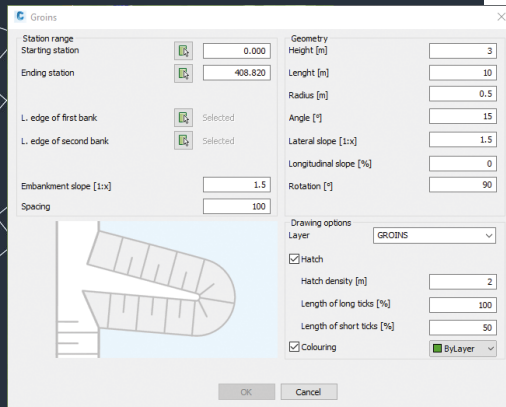
The Smart lines functionality is connected with the point's projection, which offers similar projection options, but dedicated to point objects along any alignment.



## RIVER GROINS

Groins are a rigid hydraulic structures built from a bank in rivers that interrupt water flow and limit the movement of sediment.

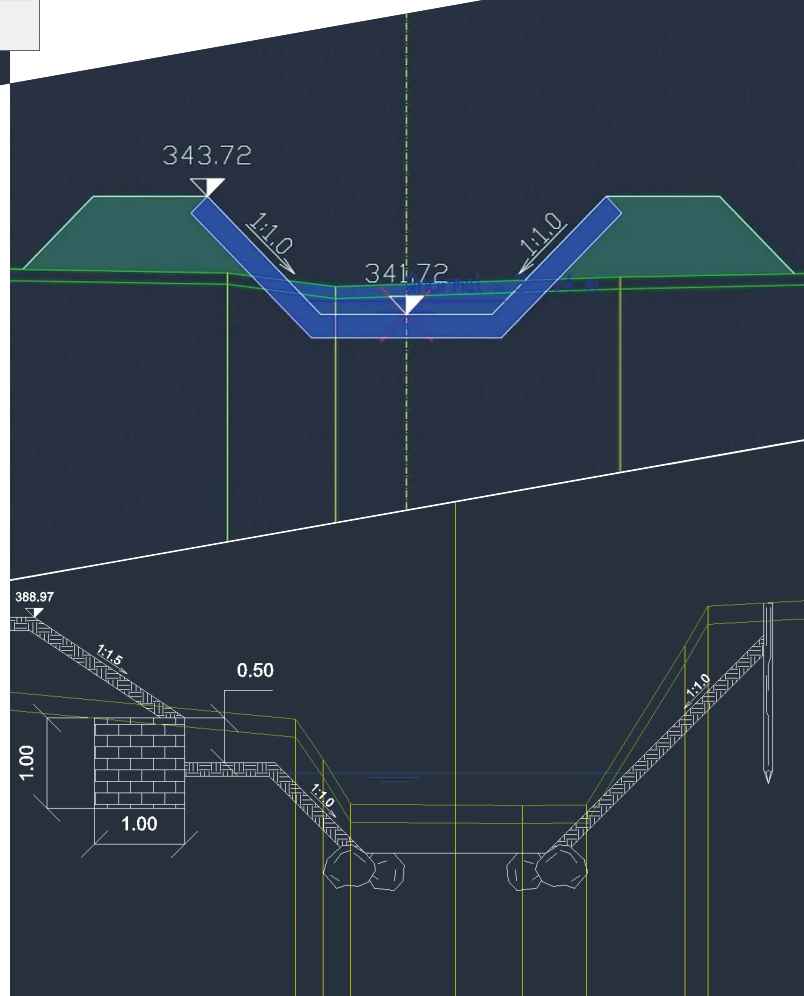
Aquaterra supports design of groins along selected banks as 2D elements with varying gradient values.



## CROSS SECTIONS DESIGN AND EDITING CAPABILITIES

Enter 1D, 2D water levels or combined calculations and design new or edit existing channel and river bed cross sections geometry.

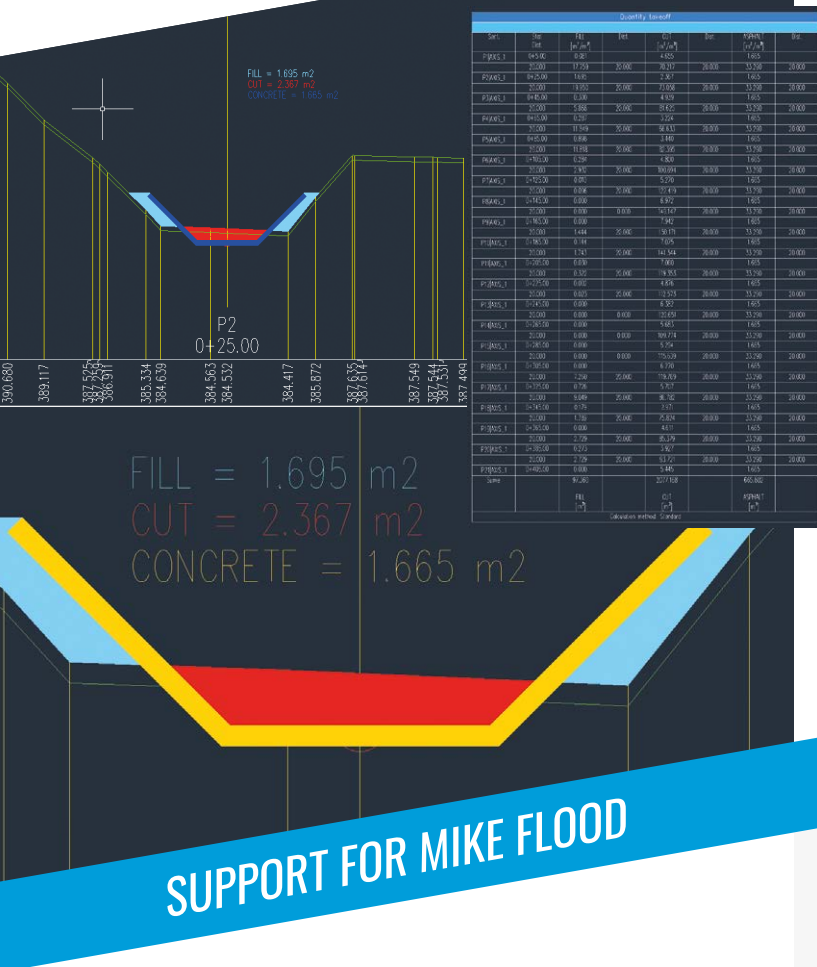
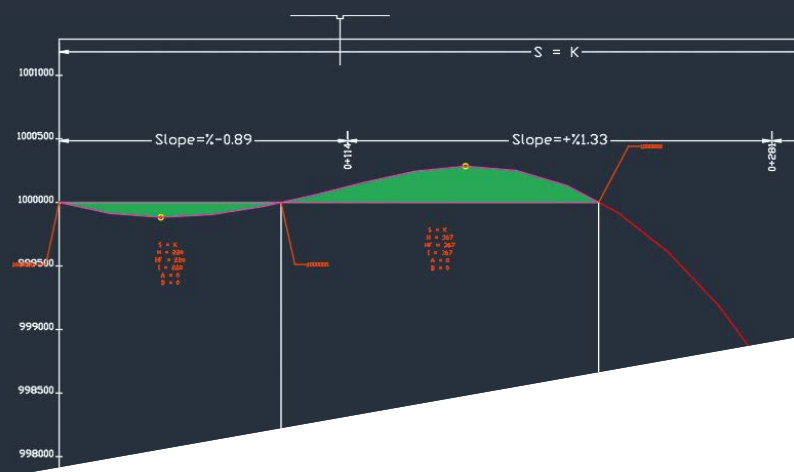
Add dykes and other objects using the large set of tools available. Recalculate water levels and check geometry changes impact for accurate project evaluation.



# MASS HAUL DIAGRAM

Mass haul diagram presents a graphical view of the material moved in the proposed design site.

Mass haul diagrams help designers and contractors understand where gross material movements occur and compare the economies of alternative designs.



# QUANTITY TAKE-OFF (QTO)

Aquaterra calculates material quantity take-off and features a QTO data export tool with custom defined Pay Item (Bill of materials) options.

It gives users the possibility to link material defined in the drawing with a material database in cost estimate software, thus supporting digital data transfer and fast cost recalculation when project changes arise.

# SUPPORT FOR MIKE FLOOD

MIKE FLOOD by DHI is an advanced professional flood modeling solution that enables simulation of any flood problem. It can involve rivers, floodplains, flooding in streets, drainage networks, coastal areas, dams, levee and dike breaches, or any combination of these.

Aquaterra's integrated MIKE FLOOD interface transfers graphical data into MIKE FLOOD where water flow calculations are made. These results are transferred back into Aquaterra where water levels can be displayed in profile and cross section.

MIKE FLOOD 2D results (floodplain lines) export to Aquaterra is also supported for drawing production within the CAD environment.

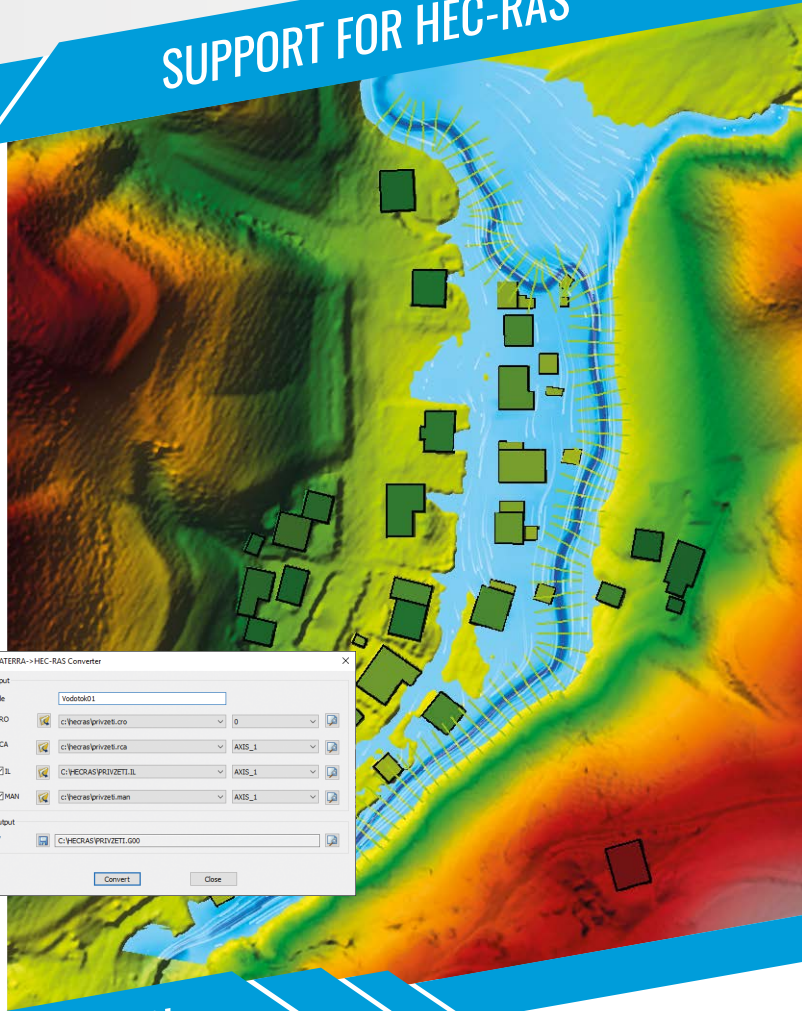
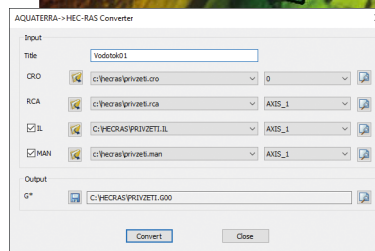


## SUPPORT FOR HEC-RAS

HEC-RAS is an established software for one-dimensional steady flow and two-dimensional unsteady flow hydraulic calculations.

Aquaterra's integrated HEC-RAS interface enables the transfer of channel or river geometry from a CAD environment into HEC-RAS where water flow calculations are made. Calculation results can be transferred back into Aquaterra where calculated water levels are displayed in profile and cross sections. Taking into account the results, engineers can now modify existing channel or river topography, using Aquaterra's advanced cross-section design and editing tools.

Through Aquaterra's interface, geometry can also be imported directly from HEC-RAS, edited in Aquaterra and sent back to HEC-RAS for further analysis.

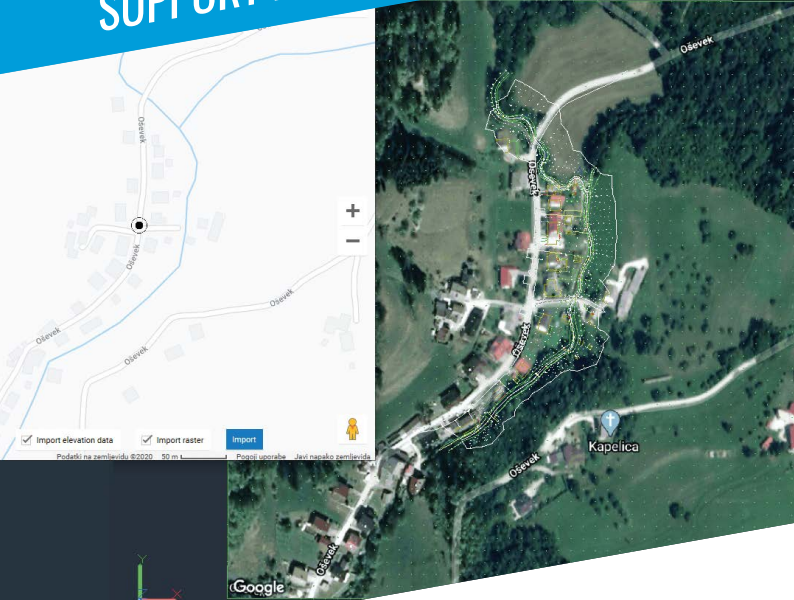


## SUPPORT FOR GOOGLE MAPS AND GOOGLE EARTH

### GOOGLE MAPS & GOOGLE STREET VIEW

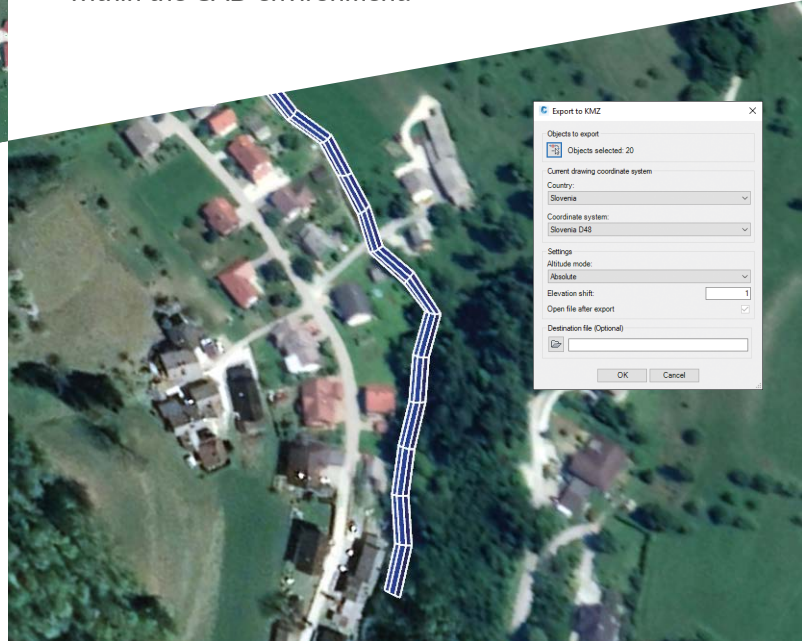
Google Maps Import makes it easy to import raster images and elevation data of a selected location from Google Maps into a DWG drawing in the selected coordinate system.

Google Street View functionality is also available to allow the user to view the selected area interactively within the CAD environment.



### GOOGLE EARTH EXPORT

BIM (3D solid) model of the infrastructure can be quickly visualized directly into Google Earth. This allows us to present the project in an environment that enables the user to have exceptional visual performances.



# GENERAL FEATURES

## DYNAMIC DATA MODEL

Aquaterra stores all design data inside a .dwg data file, making for quick geometry updates and data exchanges within CGS Labs and Autodesk software solutions. LandXML and AutoCAD Civil 3D data exchange interfaces are available. Dynamic updates to all geometry changes or design parameters are supported within single or multiple drawings with separated layout/profile and cross sections data.

## AQUATERRA SUPPORTS LARGE PROJECTS

Aquaterra easily handles large projects with very long alignments and thousands of cross-sections within seconds. Projects are neither limited in size nor is the performance critically affected while working on large scale projects, including extra long and multiple alignments, profiles, and cross section views. Cross sections can provide a high level of details with on-demand synchronization options, great processing speed, and consistent data.

## INTUITIVE USER INTERFACES AND WORKFLOWS

User oriented ribbon layout and comprehensive dialogues enable fast learning for the first time users while toolbox and command line options provide faster design options for experienced users. Aquaterra time-saving UI design and simple to follow workflows help users to use their creativity without compromising engineering efficiency. Automated functions make designs time saving.

## SUPPORTED LANGUAGE VERSIONS

Aquaterra is available in several languages. Customers are entitled to use any country specific version of the software in case of designing projects for the foreign countries.

Supported country/language versions:

- ✓ English
- ✓ German
- ✓ Croatian
- ✓ Serbian
- ✓ Slovenian

## SUPPORTED CAD PLATFORMS

CGS LABS software runs on top of 2018–2025 versions of Autodesk AutoCAD and Civil 3D as well as BricsCAD Pro, BIM and Ultimate V22 to V24. AutoCAD LT and BricsCAD Lite are not supported! Only 64-bit versions are supported!



**Bricsys®** Application Partner  
part of Hexagon

**AUTODESK**  
Authorized Developer



# VERSIONS

	ULTIMATE	STANDARD
Survey data import	✓	✓
Digital terrain modeling tool (CGS Labs DTM)	✓	✓
3D Grading	✓	✓
Support for Civil 3D in BricsCAD surface	✓	✓
Alignment design	✓	✓
Profile design	✓	✓
Cross sections design	✓	✓
3D River modeling	✓	✓
Points, lines and 3D solids projection to Profile View & Cross Sections Views	✓	✓
Labeling and dimensioning tools	✓	✓
Quantity Take-off & Mass Haul diagrams	✓	✓
Riverbanks design	✓	✓
River groins design	✓	✓
Water level representation	✓	✓
Interface for Civil 3D objects <-> Aquaterra	✓	✓
Support for HEC-RAS hydraulic interface	✓	✓
Support for MIKE-FLOOD by DHI hydraulic interface	✓	✗
Support for 3D Solid objects	✓	✗
BIM object property tools (manager/editor/filter)	✓	✗
3D/BIM object clash analysis within AutoCAD, Civil 3D, and BricsCAD	✓	✗
Import of Google Maps geospatial data in CAD drawing	✓	✗
Import/Export LandXML data	✓	✗
Import/Export 3D/BIM model to IFC 4.2 data format	✓	✗
Export 3D river model to Google Earth	✓	✗

# ABOUT CGS LABS

Laboratory of ideas, a software company engaged in the digitization of built and the natural environment.

CGS Labs is innovative software company with more than 30 years of experience developing solutions for the design, construction and maintenance of transportation infrastructure. Our applications promote openBIM approach and standardized IFC data exchange. We contribute to greater transparency, quality and cost-effectiveness of construction projects and support sustainable decisions.

## 01 SOLUTIONS FOR THE DESIGN OF CIVIL INFRASTRUCTURE

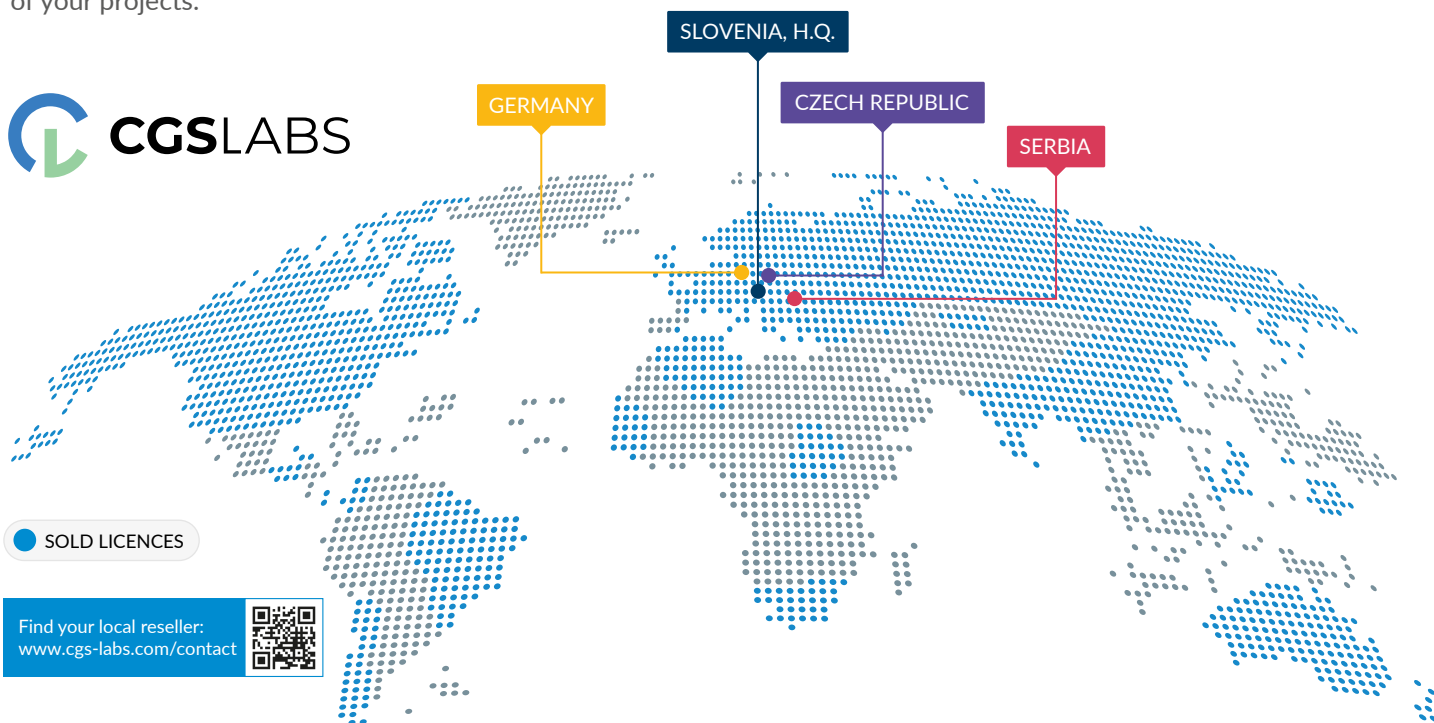
CGS labs develops specialized software solutions for the design of roads (Plateia, Autopath, Autosign), railways (Ferrovia) and channel - river engineering works (Aquaterra). Our software solutions incorporate local design standards.

## 02 CUSTOMER CARE & EDUCATION

We are not just a software vendor! Our goal is to successfully integrate CGS Labs solutions into your design processes. Our engineers help you get to the highest experience level for the use of CGS Labs software. Besides the always accessible on-line knowledge base, we organize traditional live customer trainings, as well as trainings per customer request, where we discuss selected topics according to the specific requirements of your projects.

## 03 TECHNICAL SUPPORT

Complete customer satisfaction is very important to us. If any problems should arise while using CGS Labs software, our team of experts is there to assist you, so your design process runs with minimum interferences or delays.



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