BBSoft

RELIABLE - PRACTICAL - CUSTOMER ORIENTED

AUTODESK Reseller Partner

Value Added Services
Authorized Developer

35 JAHRE
zuverlässig - praxisnah - kundenorientiert
seit 1989

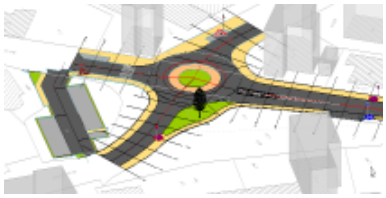
Product information

BIM in civil engineering

Learn more about building information modeling (BIM) in civil engineering and how you can use BBSoft® in your digital construction projects in the best way.

Surveying

Our base software for importing measuring data of current device manufacturers, for mapping and for compiling of location plans.

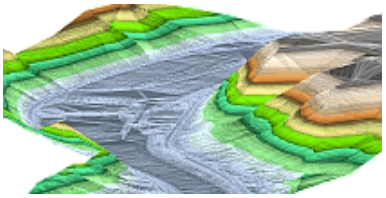


Road planning

The software fulfills all current requirements in road planning, especially in site development, in redevelopment and in the design of intersections.

Sewer and water networks

The complete solution for planning, hydraulic calculation, redevelopment and condition classification for sewer and waterline networks.



Digital Terrain Model

With BBSoft you can compile quickly a DTM from terrain data, points (laser scan data also) and breaking edges.

Urban planning

You can edit your master- and urban plans quickly and easily under consideration of the standard for map symbols.

Calculation of quantities

You can automatically record, calculate and manage your masses and areas with the help of check routines with BBSoft.

GIS

Our GIS-information system for engineering offices and communes makes it possible to access upon information and to induce own application modules.

Water planning

Software for the sectors dike- and water planning plus high tide simulation with interfaces for the hydraulic calculation.

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Contents

1 General

1.1 About us

BBSoft® - reliable, practical, customer oriented
B&B Ingenieurgesellschaft is a leading provider of civil engineering solutions on the basis of CAD in Germany, Austria and Switzerland. Engineering offices, planning- and surveying offices, city administrations, civil engineering departments, construction companies and industrial companies are among out clients. Continuous growth, acquisition, cooperation and last but not least our reliability designate our success.

The roots in the engineering office are still crucial and mark the programs. The constant further development of our software, the orientation towards customer requirements, the ambition for better software and services are a challenge and a personal commitment for us. We attach great importance on practical software and on the satisfaction of our clients. Longtime experience and qualified personnel ensure a fast and well established costumer service. Our capable assistants have a sympathetic ear for every individual concern and are on hand with help and advice for you.

In addition to our comprehensive software solutions we offer you with our partner, the company below software GmbH, also BricsCAD software together with the corresponding workshops directly from the Rhine Main Area.

1.2 Technical specifications

BBSoft is a civil engineering software and presents an easy to use and sector-specific extension of CAD-programs and ORACLE. The software was mainly developed for engineering-, planning- and surveying offices and for civil engineering departments. All functions of BBSoft are aimed to support and to release you during your daily structurally engineered design work. The focus during the development was thereby placed onto the practical relevance and the simple operability.

The software calculates planning- and result recommendations based upon your inputs and/or based upon the imported data, which is i.a. liable to structurally engineered controls, evaluations, duty of inspections and plausibility checks. The software is constructed modularly and supports you specifically in the following named areas. For more details please refer to the module overview in the appendix.

General product features

- The software is available optionally as a single-user or as a network licence
- An ORACLE XE-database is used for particular BBSoft-modules
- The scope of service is at all times expandable through the implementation of other available BBSoft-modules
- Output of results/calculation reports in i.a. ASCII, HTML, PDF and OpenOffice
- An automatic software-update (for customers with maintenance contracts)

System requirements

The permanent guarantee of system requirements lies in the area of responsibility of the customer. For the use of BBSoft you need a CAD-program as basis-software, the compatible programs can be called up among: bbsoft.de/cad-en.
The system requirements for the use of BBSoft you will find among: bbsoft.de/systemrequirements.

Scope of delivery

BBSoft is delivered inclusive Oracle XE either per download or physical on an installation medium as a software package. As documentation a user-manual is supplied as digital version (PDF). The delivery comprises the use according to the currently effective licenece agreement (EULA), which we will provide on request with pleasure.

1.3 Service & Support

What can we offer you?
More than 35 years of experience and exactly the service you want.

Of course, the customer service is very important to us . For more than 35 years we program our civil engineering software BBSoft®. Therefore, we know what it takes.

We support you professionally and personally at all steps, which are necessary for a successful implementation and use of our civil engineering software. Finally you want a software that fits perfectly to your requirements.

We advise you within the scope of free presentations (online & on your location) already before you purchase our software. During the phase of using , you will benefit from our extensive range of service offers, such as service contracts, individual financing possibilities like leasing or rent of our software, hotline, remote maintenance, trainings and special consulting services.

During the office hours our staff is available for you personally via email, telephone and fax. We have established a specific support hotline for you for interrogations by phone. You can rely on professional assistance and on short response times.

2 BIM in civil engineering

BIM - a short introduction
According to the Road Map for Digital Design and Construction, Building Information Modeling (BIM) is said to make it easier for all project participants, to acquire, to interchange and to maintain data, starting with the first draft right up to the renaturation of a building. Planning errors can be recognized early enough by the help of clash detections and can be eliminated before the real construction starts, via the primarily digital planning with the help of a 3D-model. Cost-intensive postprocessings are avoided in this way as well as unnecessary delays in the time schedule.

Unfortunately, the reality turns out to be more complicated. Where it is already possible in the structural engineering to exchange data successfully via the propagandised IFC-interface (Industry Foundation Classes), it unfortunately doesn't look that promising in the civil engineering sector (e.g. road, sewer). Here it is necessary to establish an universal standard for data exchange.

BIM - by BBSoft®
We have realized at an early stage, that BIM is much more, as simple 3D-representation: it's about the object-oriented planning of infrastructural projects.

All subsections of BBSoft® provide an opportunity of connection and creation of object dependecies among each other: e.g. if you change something at the contour map of a road, the manhole covers of the sewer will be retraced automatically. If you have calculated catchments, the corresponding road gullies will be placed automatically. Hereby essential process steps are expedited and your postprocessings will be significantly decreased.

With our software we cover all steps of infrastructural planning: from the design to the accounting. With BBSoft® you can generate 3D-objects in certain subsections (e.g. route solid, sewer, manholes and reaches). In the CAD these 3D-solids can be committed via IFC-interface to further CAD-programs (e.g. Autodesk™-Revit), in order to perform clash detections across the 3D-surfaces in already existing structural engineering projects. In longitudinal sections and cross-profiles (road, sewer, surveying) conduit clashes are highlighted automatized via the option „crossing elements". By the use of such early visual inspections the cost control remains in your hands and time delays during the building phase are minimized.

To meet our own requirements to accompany you optimally on the way to BIM-compliant planning of digital civil engineering projects, we provide an insight into the current state of development of the topic BIM by BBSoft®: an IFC-export was now integrated in our software. With that it is possible to export technical data and geometries (3D-solids) of sewer data via IFC (2x3 or 4) out of the BBSoft®-database.

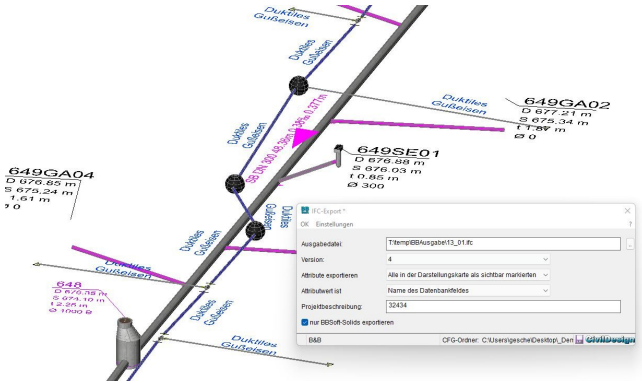
BBSoft® is a member of buildingSMART e.V.
We are a member of buildingSMART e.V., the association for further development and standardization of open exchange standards for the sofware-independent exchange of information in BIM-projects.

buildingSMART® German Chapter Member

The membership is a sign for our understanding, that the digitization in civil engineering proceeds and we want to influence this development actively. Furthermore the membership provides us a stage for the exchange of information and an access to current information and innovations in the field of BIM/IFC.

2.1 IFC export

Technical data and geometries (3D-solids) of sewer data can be exported via IFC out of the BBSoft®-database.



Further features:

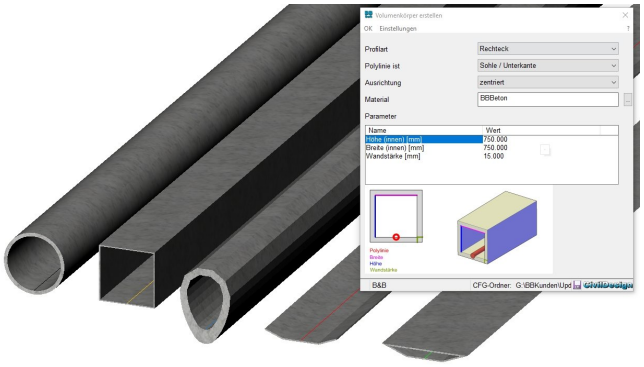
- export possible with IFC version 2x3 or 4
- relevant information like e.g. names, geographical/hydraulical data and 3D-solids can be imported via IFC from shaded cadastre
- possibility to assign 3D-solids with technical data
- the number of technical data, which should be exported, can be defined independently
- manholes, reaches, road gullies, special buildings can be exported
- presentation of imported project in an IFC viewer
- IFC export is possible too for water conduits and water nodes (valve, cross and T-piece)

Notes: only available with BricsCAD® BIM or BricsCAD® Ultimate from V20.2.04

required modules: BB-VGR, BB-LGGR, BB-VSHPKML (additionally the subsections must be licensed, which should be exchanged, e.g. sewer or water)

3 Surveying

Surveying comprises the inclusion of important parts in civil engineering and serves here as a basis for entering, organization, administration and visualization of geospatial data.

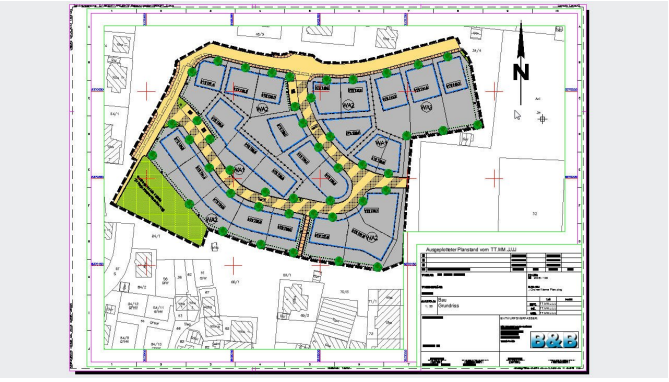


Further features:

- record and document measuring data tacheometrically, photogrammetically, by the positioning of satellites or by laser scanning
- measuring data (with location and altitude information) can be displayed directly in the CAD in 2D or 3D
- importing and processing of measuring data
- geodata is administered in an own GIS-solution (CivilDesign®)
- common interfaces, like e.g. Shape, XML, KML, ISY-BAU and DWA are supported
- consistent editing and graphical differentiation of measuring points
- im-/export of DXF™/DWG™ and REB-conform interfaces are contained

3.1 Base module

The base module is the basis for all other modules of the BBSoft® civil engineering software. It takes over the complete project control (measuring data, drawings and texts) and arranges a smooth teamwork of the different program parts.



Further features:

- processing of surveying data
- output of point/pegging lists
- block manager for administration of civil engineering-compliant symbols
- clear layer manager
- creation of cadastre plans
- Shape-import
- editing of drawings with switchable map scales, line types, hatch patterns and automatic inscriptions
- measuring point transformation
- BBSoft® adopts necessary measuring point conversions and the following mapping from 2D- or 3D-points
- automatic area division and calculation
- output of coordinate lists of line objects
- import and editing of terrain data is made possible via the field book interface
- administration and editing of measuring points

required modules: BB-VGR

3.2 Measuring points

The measuring point menu of BBSoft® makes it possible for you, to import and to export measuring point files very easily. The compilation of new measuring points is possible too, like the editing, the deletion or the searching for them. You can compile measuring points of all CAD-objects (CAD-points, block references, texts, arrows and polylines) automated.

Further features:

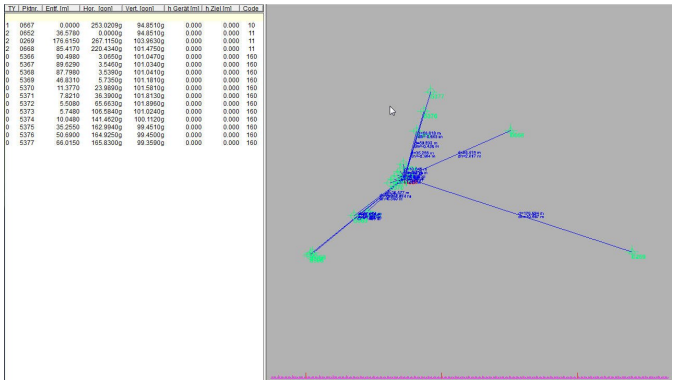
- it is possible to assign every measuring point a symbol via the point code. You can also create individual symbols
- measuring points can be connected to polylines dialog-controlled
- miscellaneous measuring point files can be transferred in the specific BBSoft®-format (INP-file) with the help of a conversion table (IOC-editor)
- measuring point recordings can be checked optionally for plausibility: equivalent points (with equal coordinates with tolerance specification, point number or point code) can be deleted or edited
- measuring point heights can be released in relation to a base height

- measuring point attributes can be highlighted with a background hatch pattern
- the positions of the attributes can be shifted automatically or by hand: the affiliation to the point symbol doesn't get lost
- all settings can be saved in one sample, thereby all measuring points can be presented uniformly in an office
- a legend with a symbol and his description can be created with one click in the drawing
- you can transfer Gauß-Krüger coordinates into ETRS coordinates
- number of decimal places for the height attribute is individually adjustable
- drawing of reference lines to the inscriptions of the attributes point number, -code und -height is possible

required modules: BB-VGR, BB-VPKB

3.3 Point transformation

BBSoft® point calculation ETRS89/UTM expands the field book interface of the basis module by survey-technical mathematical methods and instantiates the change of coordinates from Gauß-Krüger to ETRS89/UTM. The calculated measuring data can be directly imported in the CAD or field book to continue there with the analysis. BBSoft® supports different geodesic mathematical methods.



Further features:

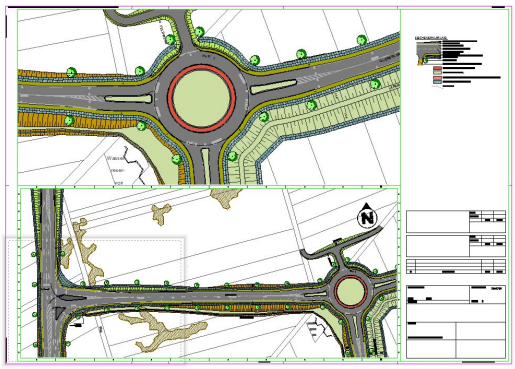
- famous measurement device manufacturer are supported (e.g. Trimble, Leica, Topcon, Sokkia, Geodimeter and more)
- free positioning (via polar coordinates or Helmert/Affin-transformation)
- intersection (arc calculation, forward insection, backward insection (by Cassini)
- station abridgement (output of orientation unknowns and of standard deviation is possible)
- polar addition (point determination by polar addition to a well-known point)
- traverse (for one-sided and on both sides connected traverses)
- traverse (with the possibility to distribute the angle exclusion failure)
- traverse (with output of temporary coordinates, improvements and final coordinates)
- traverse (with optional distribution of the coordinates exclusion failure)
- transformation constants and standard deviations are listed in the lists output
- you can intervene manually upon the angle exclusion failure and the error limit
- there is the possibility to execute different reductions, as well as other deviations

ETRS89/UTM The so far used Gauß-Krüger-coordinate system is replaced by the European terrestrial reference system ETRS89 with the Universal Transversal Mercator (UTM)-illustration. Background of this change is a uniform and official geospatial reference, which becomes effective transnational. BBSoft® makes use of the worldwide deployed Ntv2-transformation model (National Transformation version 2) for transformations. This takes place by default with the nationally valid BeTa2007-grid file from the AdV for the transformation of geotopographical data.

required modules: BB-VGR, BB-VPKB

3.4 Map frame

A map frame of BBSoft® creates a frame around your drawing or only around a section of it with desired size and adjustment. As a consequence of that the compilation of maps is speeded up, because the map frame manages all map formats and layouts centrally.



Further features:

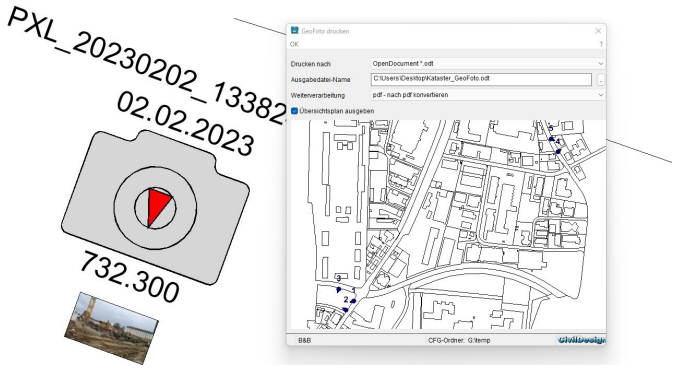
- selection of various north arrows and title blocks
- another symbol, e.g. a QR-code, can be integrated into your map frame additionally to north arrow and title block
- the creation of an individual title block (with the respective company logo) is without any problems possible for a consistent layout
- the title block can be positioned arbitrarily and can be designed in the presentation, the text content and the size
- the north arrow can be set centrally in the map frame
- the format of the map can be adjusted on usual or

on free definable formats
- via an own presentation map, it is possible to define and edit the line types for the paper- and model space
- all texts along the edge can be adjusted in position and presentation, inclusive the folding mark
- maps with different output scales can be combinded with each other
- a second viewport can be displayed additionally, also with a different scale
- the settings of a map frame can be exported in a .txt-file (this file can be used for the import too)
- map frames can be arranged automatically along a defined alignment, inclusive the consideration of the overlaps (map frame group)
- the scale of the plot measurement can be defined precisely and can be adjusted to the paper format
- it is possible to mark the presentation area in the model area in order to see exactly which part is displayed in the map frame
- coordinate inscriptions at the edge of a section can be configured according to appearance and height of texts
- optional possibility for the creation/insertion of grid squares
- selection, if map frame groups should be displayed space-saving in one layout or individually in separate layouts
- for the creation of a map frame group a sewer harness can be used also
- a map frame group can be rotated around 180°, so that the viewing direction is not adjusted mandatory to the north
- a map frame can be copied into an existing or an completely new layout
- a CSV-export exists, which exports the object-ID, the name of the layout, the left bottom corner as insertion point and the angle

required modules: BB-VGR

3.5 Geo photo

The import of GeoPhotos makes it possible, to deal efficiently with stationary photos in the CAD.

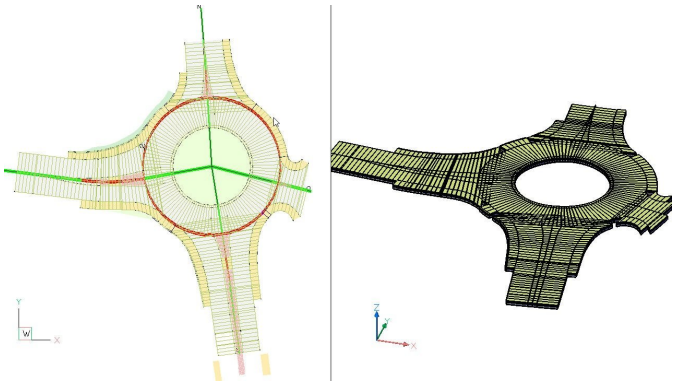


Further features:
- images with location information can be imported directly as symbol or with thumbnail into the CAD and illustrated there as well
- photos can be imported with the geographical location of the location
- corresponding coordinate systems for transformation into the Gauss-Krueger or UTM-system are available (for Germany, Austria and/or die Switzerland)
- image position can be shifted in alignment direction or completely free
- at the symbol the viewing direction of the camera is considered (a red arrow marks the viewing direction)
- printing of protocol output with general map is possible
- image name, date (of taking the image) and -height and the appropriate coordinates (geographical location) will be displayed
- image preview via hyperlink to linked viewer for an enlarged view

required modules: BB-VGR

4 Road planning

BBSoft® is an interactive tool for the street-and site development planning. The civil engineering software meets the current requirements for road construction, especially for site development, for redevelopment and for the planning of intersections and roundabouts.



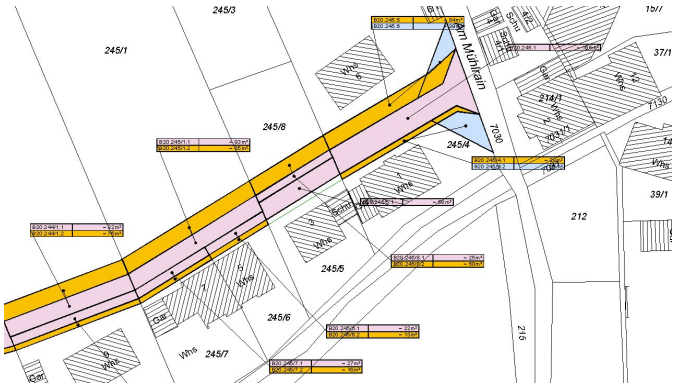
Further features:
- valid route design guidelines of Germany, Austria and Switzerland were considered
- raod markings can be created with different marking types
- road signpost plans and a street lighting cadastre can be easily produced with the aid of a block manager and if required can be transferred into a database
- changes and adjustments at the route will be updated automatically in the location plan, the longitudinal section and the cross-profile

- extensive functions for street furniture are available

required modules: BB-VGR, BB-VSTR

4.1 Land purchase

The land purchase/land acquisition is a function for displaying of plot areas or lots, which shall be bought or used momentarily. These partial or total areas are calculated and inscribed with used and unused areas. Further commands are implemented for the marking of buildings that shall be demolished. The presentation and the inscription are editable and are already integrated for customers in Switzerland and Germany.



The adjustment of these marking- and inscription elements is carried out in the user interface for map symbols and signatures.

Further features:

- illustration of areas and building demolitions (based on RE)
- ”areas, which shall be purchased” will be considered
- ”parcels of land, which shall be considered” will be observed
- including of ”areas, which shall be used momentarily”
- ”areas, which shall be loaded” will be acquired
- output of a land purchase index in tabular form
- output of a surface statistic

required modules: BB-VGR, BB-VKNT, BB-VPLV

4.2 Swept path

BBSoft® offers a comprehensible solution for testing the trafficability of traffic areas. With this module you can draw driving curves of different vehicle types (car, bus, ...) with different steering behaviour and adjust them in an interactive way in the location plan to the local situation.

The user can choose between four different ways of driving:

- **Way of driving along a constraining line:** The vehicle is dragged along upon the polygon, without considering the minimal radius of the turning circle and without balancing the polygon also.
- **Way of driving 1 (according to FGSV):** The steering angle is carried out during the driving. The transition points from the line into the circular arc occur tangentially, so that no buckles will develop on them.
- **Way of driving 2 (according to FGSV):** The driver turns in with an almost standing vehicle and initiates then. This way of driving, with a maximal change of the steer angle during standing, is simulated with the assumption of an abrupt transition between line and circular arc.
- **Way of driving during parking processes:** By this way of driving the driver turns in the front wheels while almost standing and drives therefore directly from a line in a circular arc with a constantly held steering angle.

Further features:

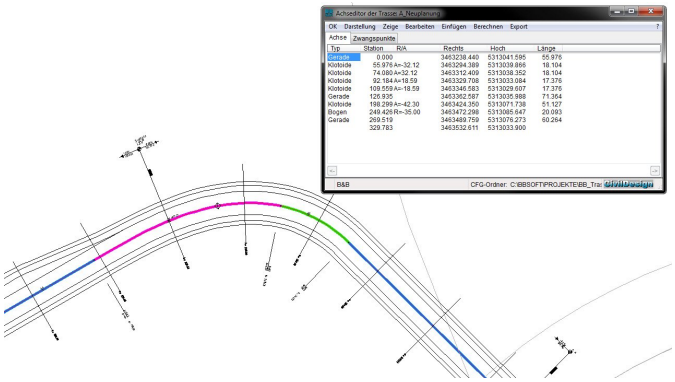
- determining swept pathes over a quick construction or along an existing CAD-polygon (e.g. borders)
- standard design vehicles according to the FGSV
- new guideline ”Bemessungsfahrzeuge und Schleppkurven zur Überprüfung der Befahrbarkeit von Verkehrsflächen RBSV (2020)” was integrated
- define own vehicle types in a comfortable vehicle editor (e.g. fire engine and combine harvester)
- an individual configuration of vehicles is possible
- surface, which is overrun, total surface and room for manoeuvre can be hatched differently
- vehicle changes can be performed without any problems
- dynamic driving simulation
- automatic creation of a legend
- consideration of room for manoeuvre left/right
- reference point (alignment, left/right front wheel) freely selectable
- reversing for single vehicles

- subsequent editing of swept path simplified: real time preview of required space during shifting of base point
- additional identic trailer
- preview during creation of driving curve: turning circle radius to the left/right

required modules: BB-VKNT

4.3 Alignment construction

A variety of construction possibilities with various calculation results are available for the user. Parameters like size of radii, length of tangents and clothoids can be changed at any time during the construction. The automatic tracing and calculation of changes happens in the background and provides an opportunity to control adjustments immediately.



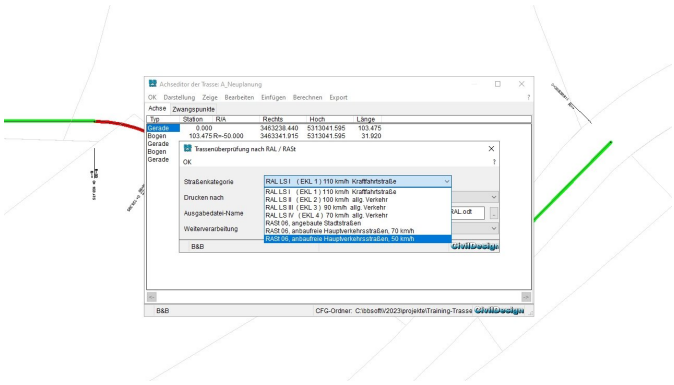
Further features:

- construct tangents in the location plan
- adoption of CAD-elements (lines, arcs and circles) out of DWG/DXF for alignment elements
- definition of transition- and buffer elements
- a subsequent integration of alignment elements into an existing alignment is possible
- constraining points are considered and deviations will be displayed graphically
- automatic and individually adjustable inscription of alignment main elements
- output of a record of alignment
- determine polygon adjustment, for creation of an alignment between two polygons

required modules: BB-VGR, BB-VSTR

4.4 Route optimization

The route optimization contains checking and modification functions. It complements the road construction base module with interactive commands for alignment editing and for the automated check routine of the alignment, of the vertical alignment and of the traces.



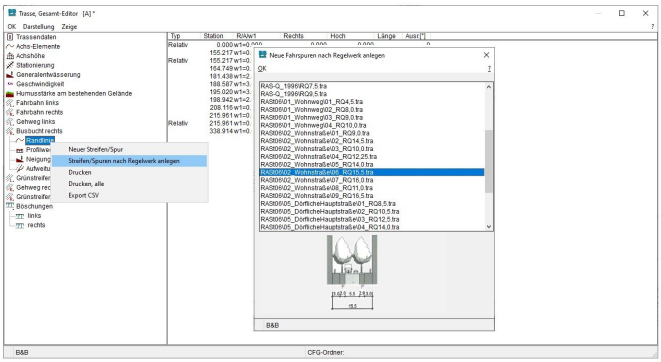
Further features:

- inspection of route mapping based on RAL, RASt, VSS, RVS considering of road category and design speed
- single elements, like lines, clothoids and arcs, can be shifted tangentially and adjusted during editing of alignment (this editing takes place in the location plan)
- a change of the internal radius and a shifting of tangent intersections is possible afterwards
- shift tangents parallelly
- provide tangents with a predefined internal radius, this will protect you from multiple editing
- graphical display if defined inclination parameters were not observed

required modules: BB-VGR, BB-VSTR, BB-VSOP

4.5 Route editor

The route editor (total editor) is the central control tool, for clear and quick considering and editing of the most important data of a route. All information of alignment, vertical alignment, traces with widths, change in gradient, structures and embankment can here centrally be examined and if necessary edited. Changes will be saved automatically and updated during the redrawing of the route in the location plan.



Further features:

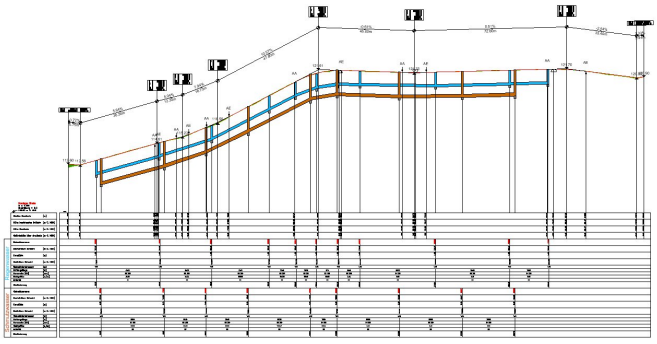
- up to 30 traces per alignment are definable
- traces can be compiled according to the guidelines (RAA, RAL, RAS-Q, RASt06)

- subsequent adoption of traces in an existing planning
- simple adoption of drawn border lines from external data (e.g. house facades, boundary lines)
- control of widenings, design speed and thickness of humus
- trace names, type of hatch pattern and color values can be assigned individually
- definition of subsoil drainage (formation level)
- calculation of road widening in bends according to RASt06, RAL 2008, RAA 2008 and VSS-Norm (SN 640 105b)
- an entire presentation of a route (inscription of slopes, widths of trace, high- and low points of route, intersection of tangents) saves the route editor in a separate dialogue
- text positions can be saved
- country settings for Switzerland and Austria are electable

required modules: BB-VGR, BB-VSTR

4.6 Longitudinal section

The contour map illustrates the longitudinal section of the alignment and the terrain in the alignment. BBSoft® supports you by the automatic generation of a contour map and the therewith connected vertical alignment connection with the help of an existing terrain model (3D-surfaces). Longitudinal gradients and heights of tangents are editable in the list view, beyond that, the software permits an interactive editing in the plotted section. New tangent points can be induced and modified by mouse-click. The program automatically calculates the lenghts and inclinations of the tangents newly and updates these in the section. This tool is also suitable for the water- and dam planning through the flexible application and the extensive adjustment- and presentation options.



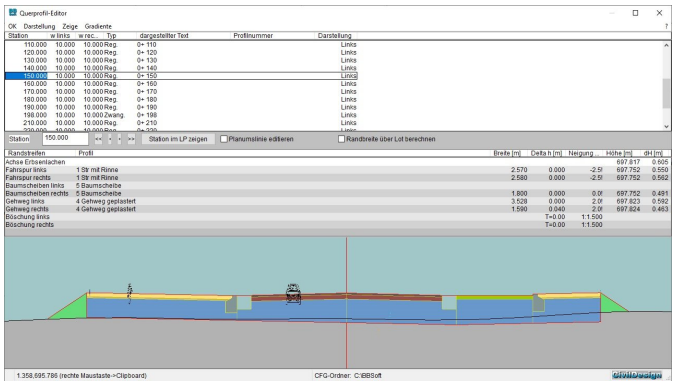
Further features:

- interactive adjustment of summits and basins in the drawn longitudinal section
- additional display of curvature, slopes and longitudinal gradients
- stopping and overtaking sight distance can be displayed as separate strings
- adjust the vertical alignment automatically to an existing terrain
- presentation based on RE
- parallel supply lines (gas-, water- or sewer conduits) are considered and processed as separate strings
- edge- and embankment courses can be shown beside the vertical alignment
- crossing elements in in terms of CAD-polylines/-blocks (e.g. supply lines, building points,..) can be displayed as symbols in correct position
- formation level can be drawn additionally
- connecting alignments were considered
- several terrain models are possible
- optional display of bend and slope string
- display of a sight distance string
- 3D-solids (e.g. bridge structures) can be illustrated
- vertical alignment can be generated from a CAD-polyline in the drawn longitudinal section
- filling and cutting areas, humus and formation level can be drawn
- adjoining alignments/polylines can be mapped in separate strings

required modules: BB-VGR, BB-VSTR

4.7 Cross section

The cross-profile-editor is the central tool for the presentation and for the output of cross-profiles and of typical cross sections. The materials and pavement constructions of a route will be determined with a cross-profile at the single stations. The output is automatically generated for the whole planning as well as for a selection. The program directly draws the profiles in the location plan and arranges these, depending on the adjustment. The editing of single parameters occurs in a dialog, the consequences of the changes will be seen immediately and you can rework (if necessary).



Further features:

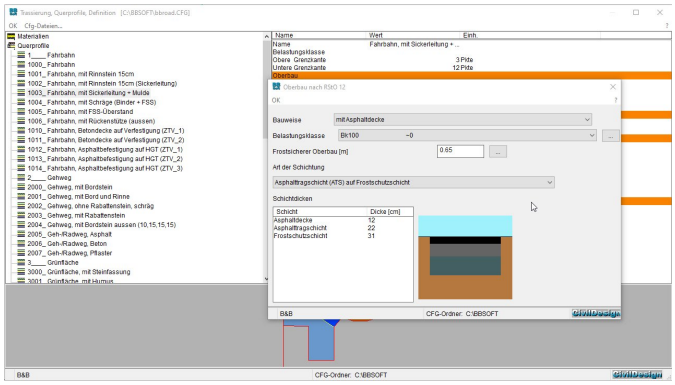
- display based on RE
- crossing elements in terms of CAD-polylines/-blocks (e.g. supply lines, building line,..) can be displayed as symbols in correct position
- sewer conduits will be integrated in the cross-profile (correctly in position and height)

- several terrain models are possible
- 3D-solids (e.g. bridge structures) can be illustrated
- filling/cutting areas and humus can be drawn
- automatic connection and transfer of cross-profiles to the calculation of quantities, for connecting these with a bill of quantities
- cross-profiles can be dimensioned automatically
- if changes were made, alreday drawn cross-profiles will be updated via mouse click
- slopes and elevation levels can be inscribed
- adjacent routes will be considered and mapped in the cross-profile
- a horizontal/vertical grid can be highlighted for water planner
- a ”dynamic section” can be set interactivally along the alignment. This can subserve for a quick query and display of a cross-profile in the location plan
- the viewer of the cross-profiles is qualified for the planning in the stock
- individual cross-profile structures can be im-/exported

required modules: BB-VGR, BB-VSTR

4.8 Raod pavement construction

With BBSoft® it is possible to compile and edit the different layers and borders for the road pavement construction easily in a clearly arranged dialog.



Further features::

- already drawn standard profiles or those who are adopted from external programs can be used
- road pavement constructions can be defined via existing CAD-polylines or via the thickness of layer of the single materials
- for classified road construction the profile structure can be determined standard-compliant according to RStO12 or RVS and the corresponding load class can be calculated
- every selected layer will be highlighted in color and updated in the preview automatically
- an accounting number can be allocated to every material, so that these can be used for the determination of masses from cross-profiles
- the results of the calculation of load classes can be handed over in a separate printout as verification

required modules: BB-VGR, BB-VSTR

4.9 Drainage

The surface drainage takes a high priority in the road planning, given that the structure and the traffic safety could be at risk. The program calculates the number of road gullies and places them automatically in the location plan on the basis of the ascertained drainage area and a predefined absorbing power.

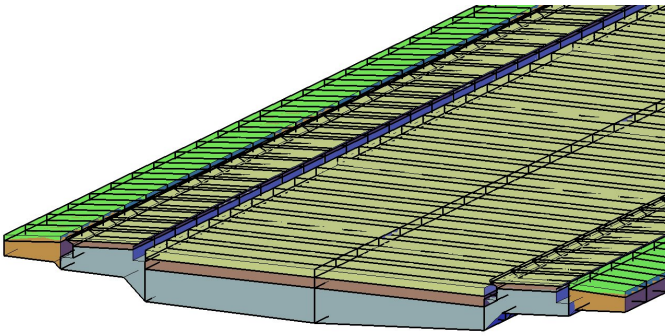
Further features:

- calculation and analysis of catchment areas takes place based on RAS-EW
- graphically appealing illustration of drainage areas and low points inside route
- clear listing of all drainage low points
- tagging on which side of route it will be drained
- marking in the location plan, if longitudinal gradient declines below 0.5%
- absorbing power can be defined freely
- partial areas will be added together and are integrated into a calculation
- road gullies can be spread automatically and can be connected with an existing sewer system
- output of road gullies with related coordinates
- road gullies can be added subsequently, can be shifted to another station or can be deleted
- flow arrows can be displayed for a visual control

required modules: BB-VGR, BB-VSTR

4.10 Quantity survey

BBSoft® provides you different possibilities for the calculation and analysis of route data.



Mass calculation (according to Elling)

- single traces or materials can be excluded from the calculation: a calculation in sections is possible
- output of data types DA66, DA54, DA53, DA51
- display control profiles in the CAD
- creation of a HEC-RAS-file for river engineering
- an output of the calculation formulas (station by station), of masses per lane and layer and of the total masses is possible

Mass calculation (solids)

- creation of 3D-solids for every material individually (with output of masses)
- a calculation in sections is possible
- this calculation should be used only for the purpose of plausibility check

DTM/embankment

- DTM-creation under consideration of vertical alignment, slope and width change
- display embankment edges as 3D-polylines in the location plan
- automatic display of embankment arrows, hatch patterns and inclination units
- colouring of filling/cutting areas according to RE
- the new road area is merged automatically with the stock-DTM
- manholes and reaches can be automatically included into the road terrain
- stations will be set automatically during the shift of filling/cutting
- contours of route can be calculated
- single traces can be excluded from the calculation
- treads (e.g. kerbstones) are intermeshed vertically with each other

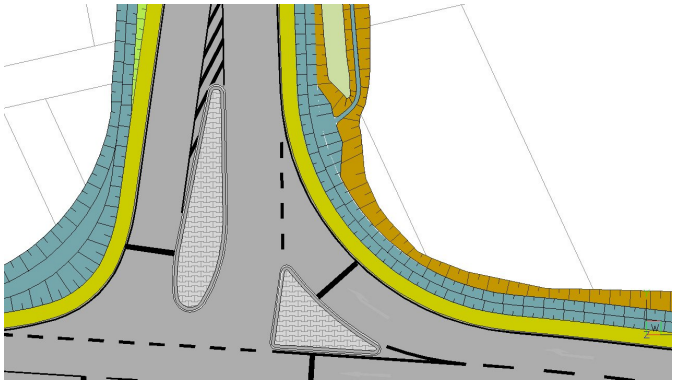
Pavement design specification

- output of pavement heights and pegging plans
- a calculation in sections is possible
- output of a formation level book and a formation level terrain model
- grader-control: output of contour points with defined distance to alignment
- securing of alignment: output of contour points with defined distance to alignment/border
- consideration of highest/lowest points and change of inclination/widths/main element or tangents
- user-defined specification of point number and coding (per border)
- text positions of elevation level were maintained in the location plan
- output of elevation level (absolute or as delta to alignment)/DTM-creation
- simultaneous output of heights for stock and planning
- symbol of elevation level individually adjustable
- export of contour points as DA45, CSV, TXT
- output of a ”written longitudinal section”

required modules: BB-VGR, BB-VSTR

4.11 Intersection planning

Intersection planning complements the extensive road planning program towards a complete, user-related and graphical road planning tool. For the user a large number of construction elements and calculations are available, which are necessary for the planning of intersections and roundabouts. The planning process considers the country-specific norms (RAS-K, RASt06, RAL, VSS and ÖNorm)



Further features:

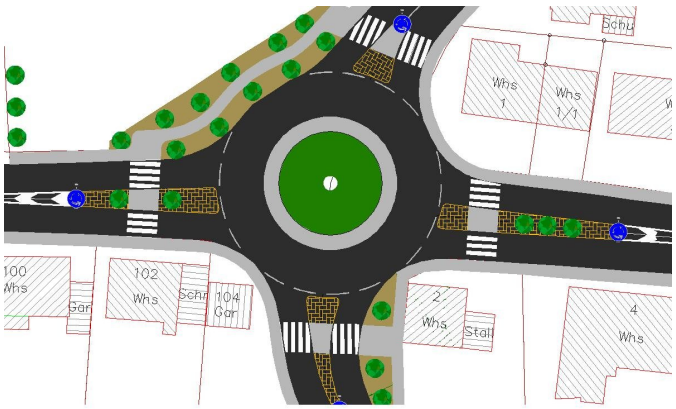
- turning circle
- turning lane
- jughandle
- small and large traffic island
- road dividers and entries and exits (based on BMV ARS and VSS)
- field of views for car, pedestrian and cyclist
- sight distance (based on RAL2012)
- distances, radii and lengths are dialog-controlled
- heights and connections will be updated automatically during changes at alignments and borders
- height information of existing borders will be adopted and interpolated in connection ranges
- via selection of borders in the location plan the program set automatically connection points at the intersection of lines and adopts the selected height

- bus bays and turning bays (based on RASt06, EAÖ2013, Tiroler Standard (AUT))
- S-internal radius, whereby the warpage length can be determined automatically with the aid of the design speed
- include polygonal edging courses (e.g. borders)
- determine vertical alignment out of edge heights (redevelopment planning)
- generate automatized crown of a road or unilateral inclined profile

required modules: BB-VGR, BB-VSTR, BB-VKNT

4.12 Street furniture

Different measures can be taken for affecting the behaviour of road users. Generally these methods are linked with the term ”street furniture”. Among others, these include: traffic signs, markings, sign-posting, signalisation and illumination. All existing road markings are updated if changes in the course of the route occured and all markings are based on PlanzV90, RAS, StVO, SNV and ÖNORM.



Further features:

- road markings are guided by the alignment and borders and will be updated automatically during changes of the course of the route
- traffic signs catalogue 2017
- street lighting
- longitudinal markings (narrow/wide lane line, in town, out of town, motorway, bicycle path)
- lateral markings (stop- and waiting line, pedestrian crossing, traffic calming)
- restricted zones
- parking lots (stopping- and no-parking restrictions, stationary traffic)
- pictograms (arrows, other markings)

required modules: BB-VGR, BB-VSTR

4.13 Interfaces

BBSoft® provides a comprehensive variety of interfaces for the interchange of alignment- and route surveying data. In this way data of different source can be imported and exported too with BBSoft®.

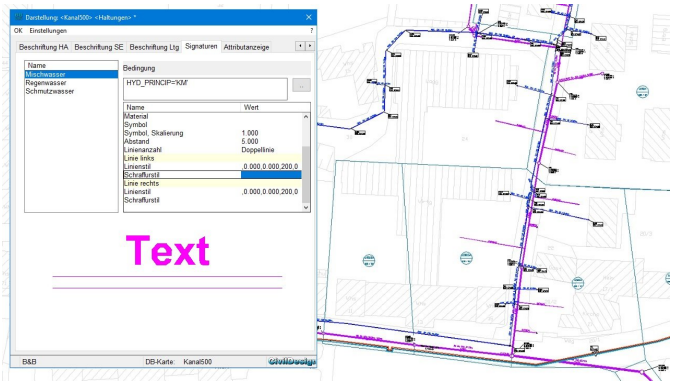
Further features:

- BBSoft-distinctive backup file TRA, which saves the complete route with all information
- LandXML
- DA21 (vertical alignment)
- DA40 (alignment), S40
- DA50 (bend string)
- DA66 (cross-profiles)
- DA22 (slope string)
- DA23 (width string)
- DWG/DXF

required modules: BB-VGR, BB-VSTR

5 Sewer and water networks

The pipe-, conduit- and cable control of BBSoft® is subdivided into the following categories: wastewater, water supply, gas, power and district heat. The current focus of our software is on sewer- and water systems with their respective planning functions, longitudinal sections and hydraulic calculations.



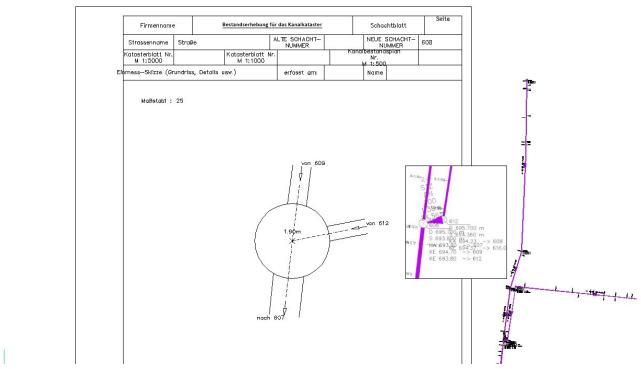
Further features:

- schedular as well as graphical data management (without CAD) is possible through an implemented viewer
- gratuitous CAD-connection is integrated
- it is possible to plan and to work unproblematically on the same project with several users: real multiuser functionality is given and the software automatically prevents the simultaneous access onto the same object
- realise cross-project, hydraulic calculations and longitudinal sections
- dates and reminders can be created for database objects (e.g. for inspections/cleanings of reaches to predefined times or for creation of flushing schedules)
- the presentation is modifiable or arbitrary user-configurable, by means of supplied, standardized presentation models (thematic maps)
- presentation maps, text positions and the geometry

record completly in the database (the CAD serves only for visualization)
- extensive automatizations through templates definition for all important database objects

5.1 Sewer stock

The sewer application module of BBSoft® facilitates the comfortable acquisition and administration of sewer data: e.g. it is possible to compile a descriptive and structured sewer system out of basic surveying data, which can be saved and further edited in our database.



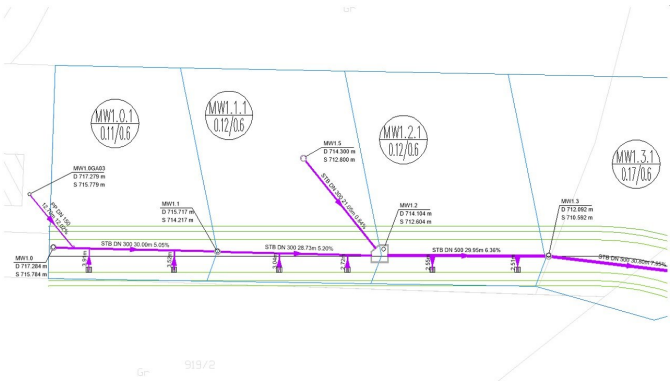
Special features:

- reaches, conduits, manholes, house connections, road gullies, covers, catchments, inspections and redevelopment arrangements can be recorded in our database, filled with technical data
- a huge number of predefined filter possibilities (e.g. show all reaches with condition class 5) exists
- design plans flexible through freely configurable texts, colours, line styles and hatch patterns
- extensive code catalogues (profile types, materials etc.), according to DWA/ISYBAU, are included in delivery
- the presentation of the conduits (and of all other objects) takes place in the BBSoft®-Viewer or in the CAD
- an output of manhole and reach details is possible

required modules: BB-VGR, BB-LGGR, BB-LKAN

5.2 Sewer planning

With the sewer planning BBSoft® offers the user an efficient and comfortable extension of the sewer database for the planning of new networks, network extensions, of single sections as well as for the subsequent insertion of manholes in already existing reaches. Thereby the module offers at each point in time the connection to the terrain model and to all data. Textpositions and presentation options are stored in the database. Equally the functions for the planning of house connections and road gullies are unsurpassed, optionally with an automatic connection of the road gullies from the route design module 'road drainage' to the main network. The functions of the longitudinal section set standards- and is constantly developed together with our customers.



Further features:

- automatic generation of manholes and reach sections from 2D- and 3D-polylines
- clash validation of conduits and reaches
- quick and comfortable generation of reach sections using templates (e.g. for rain- and dirty water) with automatic determination of the cover level from a DTM
- determination of reach length, either through a mouse click or through a direct specification of the requested reach length
- preview of the splitting of pipes under specification of the standard pipe length
- subsequent inclusion of arbitrary manholes in a DTM
- material changes in reaches can be considered
- administration of an uncertain number of terrain models in one drawing
- shift of manholes- and reach templates during the section planning (e.g. change of diameter)
- comfortable reproducing and moving of manholes and reaches in another project
- intelligent insertion of manholes according to an user-defined interval
- comfortable renaming of manholes of entire reach sections according to user-defined specifications
- editing of entire sections with only one mouse click is possible - select the lowest reach and all superior ones are opened in an editor
- shifting of rescheduled sewer systems in the height about an user-defined amount (e.g. change of the planned altitude of the draining ditch or of the collector)
- automatic generation of road gullies out of blocks with parallel landing of the associated conduits with vertical connection to the main reaches
- interactive planning of the falling gradient in the longitudinal section with automatic calculation of crashes
- comfortable planning of house inspection manholes and road gullies with automatic, ISYBAU-compliant naming, determination of the connection

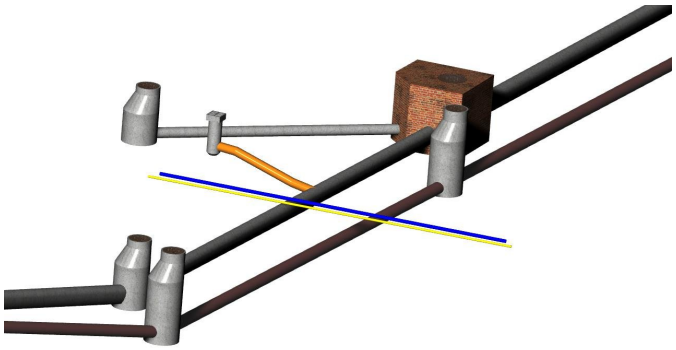
height to the pipe (equal bottom-, crown- or shoulder), automatic calculation of the bottom level out of the desired falling gradient of the conduit
- planning of house conduits also in the stock, especially important during redevelopment: thereby the height of the house connection or of the inspection manhole is maintained and the falling gradient is modified

required modules: BB-VGR, BB-LGGR, BB-LKAN, BB-LCPL

5.3 Sewer visualization

Because of the rising project requirements to customers in the area of the 3D-presentation (usually connected to the BIM idea) there is now also the possibility in BBSoft® to visualize a sewer in 3D: at the push of a button the planning 2D-data can be transformed into visualized 3D-data and in combination with the road it is possible to map sewer- and raod data together.

Presentations convey a totally new insight into the planning and coming construction projects, via the inspection of a digital 3D-model instead of a 2D-plan. As a consequence of that you make it possible for all stakeholders to participate actively at the planning process.



Further features:

- it is possible to illustrate manholes, reaches, conduits and road gullies as 3D-solids in the CAD
- manholes can be illustrated as one piece or multipiece 3D-solid
- reach inflections, arcs and different profile types (e.g. round-, quadratic-, rectangle-, taper- and trapezoidal profile) are considered for the representation in 3D
- in the 3D-model a clash validation of conduits is easily realizable. Possible errors will be highlighted graphically and can be fixed BEFORE the laying of pipes and inconvenient postprocessing (accompanied by higher costs) can be avoided
- the input of a ”buffer” makes it possible, that not only crossing conduits were localized, but also conduits which lie too close to each other, e.g. gas and water
- for a realistic illustration a material allocation (concrete, iron or PVC) for 3D-solids is possible in the location plan
- a live section through a 3D-manhole-solid can be performed, which offers the possibility to analyze the single layers of the solid once again
- calculation of 3D-volumes
- possibility of transfer to other visualization programs (e.g.Autodesk InfraWorks® 360)

required modules: BB-VGR, BB-LGGR, BB-LKAN

5.4 Sewer hydraulics

An essential component of the hydraulic sewer calculation are functions, which complement the planning ideally. The software provides the calcualtion of flow and flow velocity (Q und v) within pipes and assumes the measurement of a conduit and the calculation of flow time: The program recognizes the reaches which lie above in flow direction, calculates the flow time of these and writes this to every manhole. In addition to it catchments can be compiled and assigned to the reaches, a calculation of the fixed amount via an overlay of arbitrary CAD-areas is integrated. The values in [%]of the total area and in [ha]are directly written into the database.

Further features:

- the following calculations are integrated in our software: time coefficient (also under consideration of the reduction according to Imhoff), summation diagrams method (consideration of the intensity of rainfall according to Reynolds, KOSTRA interpolated, KOSTRA directly), flow velocity [v]and flow [Q], efficiency, calculation of flow time, special building measurement (RÜ), flow times and filling quantities
- the complete net or only single areas can be calculated in the plan
- ’Stop’-manholes can be defined at which the net calcualtion can be stopped
- the software provides the opportunity to declare manholes as flow-dividing structures (gate), at which the water quantity is linearly divided onto the branches, besides by loops in the net it is automatically prohibited that superior catchments are considered twice
- natural catchments can be automatically generated

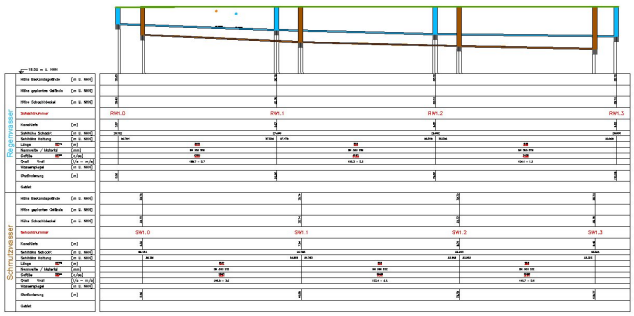
with the module 'DTM-analysis' and the geometry can be adopted via mouse click into the database
- additionally the medium falling gradient is calculated by the DTM-analysis and therefore you can use it for the calculation of the drain coefficient
- the program provides the specification of the minimum pipe diameter, which would be necessary for implementing the calculated water quantity at the desired efficiency (e.g. 90%). Thereby the planner can flexibly decide, if he switchs onto the superior diameter or if he maintains the dimensions for economic reasons
- alternatively the user allows the software to dimension the net according to certain criteria. The efficiency plays an essential role. Furthermore it can be specified, if the calculated DN is always = or >towards the existing DN. In addition to that, the software can prevent, that the dimensioning at steep sections jumps onto a smaller diameter
- the backwater heights (backwater- and energy grade line) and the frequency of flooding of hydrodynamic calculation systems are represented too (e.g. from HYSTEM-EXTRAN)

Special feature stormwater overflow:
From the database independent tool in CivilDesign® for the calculation of stormwater overflows. The user is directed through the dialog-boxes with the help of an assistent. The input of the required values is simplified by means of descriptive graphics. The calculation results can be exported via an integrated print function towards Microsoft® Office, OpenOffice™, HTML, etc.

required modules: BB-VGR, BB-LGGR, BB-LKAN

5.5 Longditudinal section of a sewer

With the logitudinal section BBSoft® provides a very efficient tool for the planning as well as for the stock. There is the possibility to present sewer harnesses and parallel water conduits together, crossing conduits can be represented unproblematically in the longitudinal section, too.



Further features:

- completely user configurable longitudinal section block (colors, text size and -style, number and type of information, decimal places etc.)
- presentation of crossing conduits: database as well as arbitrary external components
- presentation of crossing or adjoining points (B&B measuring points, blocks)
- with [move element]an entire longitudinal section can be moved (e.g. for plotting)
- presentation of crossing 3D-buildings (solids)
- interactive falling gradient planning under consideration of a minimal reach falling gradient as well as optionally of a maximal pipe incline
- automatic generation of crashes during the exceedance of the maximal pipe incline (module planning)
- interactive changes with preview (dragging) of inlet- and outlet levels, manhole bottom, cover level and reach heights (e.g. pressure pipe) with continuous preview of level and station (module planning)
- for reaches with several height differences the single segments were inscribed
- insertion of manholes in already existing reaches in the longitudinal section,
- direct access onto the characteristics and direct editing of manholes and reaches is given in the longitudinal section (e.g. change of material, diameter, system)
- contemporary display of the planning- and original terrain in the longitudinal section
- presentation of backwater curve and energy grade line out of the hydraulic calculation
- drawing of longitudinal section can be delimited with [from station]- [to station](e.g. for plotting)
- presentation of up to four sections in one longitudinal section
- wall thickness at manholes and reaches can be drawn
- selection of equal bottom-, crown- or axial connection (planning)
- storing of the longitudinal sections and their presentation options in the database
- possibility for the colored presentation as solid hatch patterns of manhole bottom, manholes and reaches as well as the overlap, separate adjustable for every section
- the specification of a reference horizon for the longitudinal section is possible
- a display of a border makes it possible, to shift a longitudinal section easily
- it is possible to use in the longitudinal section and in the location plan the same line type for reaches (line type adjustable via symbol)
- inspections and redevelopment arrangements can be displayed in separate strings

required modules: BB-VGR, BB-LGGR, BB-LKAN

5.6 Sewer condition classification

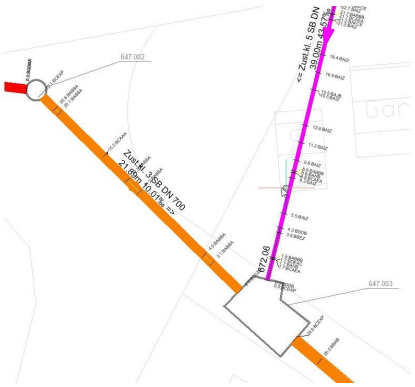
The sewer classification and sewer evaluation of BBSoft® makes it possible for you to evaluate inspection data quickly and reliable, from the classification of the single damages over the evaluation of the basic conditions up to the creation of priority lists.

Schadenstyp-Verteilung (Punktuelle Schäden)

Typ	Anzahl	o.A.	Kl. 3	Kl. 4	Kl. 5	
BABBB	4	0	4	0	0	
BAHB	6	0	6	0	0	
BAIZ	17	0	0	0	17	
BAJB	1	0	0	1	0	
BBAB	4	0	4	0	0	
BBAC	1	0	0	0	1	
BBEZ	1	0	1	0	0	
BCAAA	4	4	0	0	0	
BCAAB	3	3	0	0	0	
BCAEA	6	6	0	0	0	
BCDXP	5	5	0	0	0	
BCEXP	5	5	0	0	0	
BDEAC	1	1	0	0	0	
Gesamt	58	24	15	1	18	

Schadenstyp-Verteilung (Streckenschäden)

Typ	Anzahl	Gesamtlänge [m]	o.A. [m]	Kl. 2 [m]	Kl. 3 [m]	Kl. 4 [m]
BABBA A/E	7	2.68	0.00	0.00	2.68	0.00
BAFCE A/E	1	1.43	0.00	1.43	0.00	0.00
BBFA A/E	1	0.00	0.00	0.00	0.00	0.00
BBFC A/E	1	0.00	0.00	0.00	0.00	0.00
BDDB A/E	1	4.30	4.30	0.00	0.00	0.00
Gesamt	11	8.41	4.30	1.43	2.68	0.00



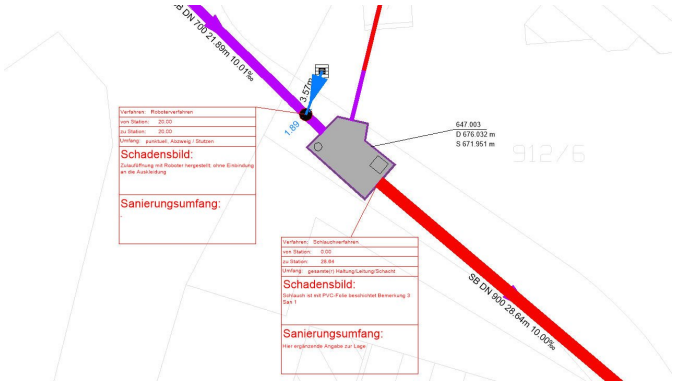
Further features:

- reaches can be evaluated according to DWA-M 149-7: you can define the wastewater type and the subject of protection as basis of the evaluation with regard to environmental relevance
- evaluations are possible, according to ATV M149, DWA M149-3, DWA M149-7 or ISYBAU 96/01/06/18
- the inspection and damage codes, according to DIN EN 13508-2, are included in the delivery
- for every object various inspections can be maintained (damage history)
- an improved readability/clarity is achieved through an exemption of the damage texts
- our software regulates an extensive range of representation possibilities: models according to ISYBAU and DWA are provided
- for improvement of clarity damage codes can be complemented or replaced by expressive symbols respectively

required modules: BB-VGR, BB-LGGR, BB-LKAN, BB-LAS

5.7 Sewer redevelopment

The planner or the sewer system operator creates with BBSoft® a redevelopment concept, based upon the results of the damage classification and damage evaluation (number of redevelopment requirements, priority list), according to DWA or ISYBAU, under consideration of the aspects leak proofness, stability, operating safety, area-wide basic conditions, traffic situation/type of road, duration of building measures, production costs, a possible extension of the operating life, profitability etc.



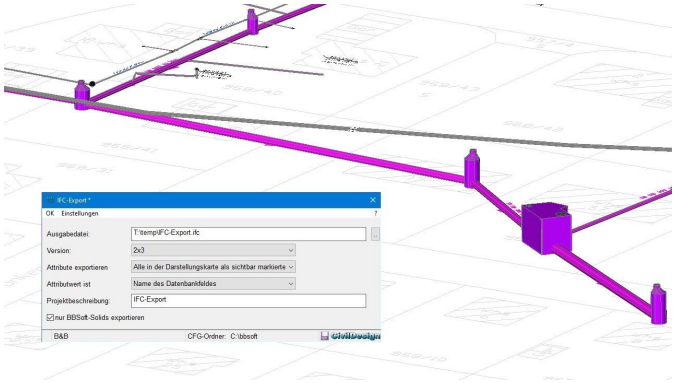
Further features:

- the output of the redevelopment cost estimation in LibreOffice Calc and Writer is possible
- a statistic of redevelopment arrangements can be created
- clear plans with a punctate or linear presentation of the redevelopment arrangements can be produced
- after (partial)redevelopments material and/or diameter-changes within a reach can be inscribed (without insertion of a fictive manhole)
- redevelopment arrangements and leak proofness inspections can be saved in the database of BBSoft® and can be exported via ISYBAU 06/XML
- redevelopment arrangements can be created automatically too with the aid of an adjustable list of criteria

required modules: BB-VGR, BB-LGGR, BB-LKAN, BB-LAS

5.8 Sewer interfaces

The sewer modul of BBSoft® contains a considerable number of gratis interfaces for the import and/or for the export of data:



- text/ASCII
- measuring points (*.inp)
- ISYBAU (XML)
- DWA M 150
- Hystem-Extran

Optionally the following interfaces (chargeable) are available, but only for the export:

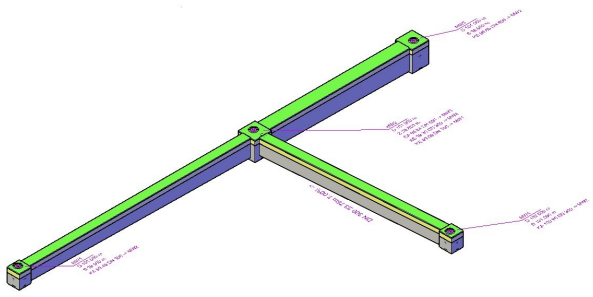
- Shape

- KML
- IFC

required modules: BB-VGR, BB-LGGR, BB-LKAN

5.9 Sewer mass calculation

The sewer mass calculation, based on DIN/ÖNORM EN 1610 and ATV A 139, is contained in the module "calculation of quantities". The calculation of the sewer trench can take place via a standard interface or directly out of the database. However the calculation is not bound to a database, but can also be operated alone as a module. A library, classified according to pipe diamters and material, enables the individual adaptation of the external diameter respectively wall thickness to the preferred pipe manufacturer. Furthermore different trench width can be predefined, if the editor want to deviate from the standard. Pipe bedding, embedment and trench width are calculated according to EN 1610, ATV A 139 or according to steady values. The trench widening can be calculated with or without pit lining, different support angles are possible. The working space for the manholes can be indicated explicitly. Further calculation parameters are available for the excavation depth. By the use without database, the presentation of the network can also take place without the CAD, with the result that always an overview about the currently calculated pipe sections exists.



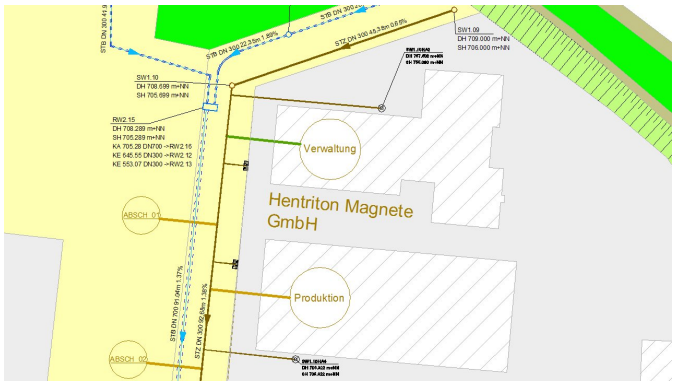
Further features:

- A detailed report is compiled, in which the calculated parameters (e.g the middle trench depth, surface, total area, excavation, frost protection, soil replacement and pipe extrusion) with the used formulas are registered for every reach respectively for every manhole clearly in one document. The output of the total masses takes place in the end of that accounting,
- additionally for every manhole a manhole component list as well as a total list of all required manhole components is exported,
- manhole cones, manhole rings and spacers, manhole bottoms and crampons are determined and
- for the evidence a detailed legend with appropriate graphics is compiled, which explains the parameters.

required modules: BB-VMABR

5.10 Indirect discharger

The indirect discharger cadastre of BBSoft® provides communes and wastewater associations a tool for the efficient administration of all companies which should be supervised. In the database it is possible during a contamination of wastewater to detect the perpetrator by means of various filter functions.



Further features:

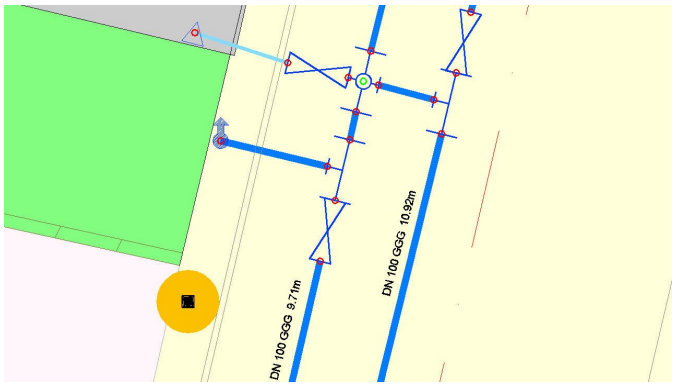
- for companies transfer points can be created, at which the wastewater belonging to the company is transferred to the public sewer system
- sampling points and wastewater inspections again could be created for the transfer points
- in the CAD reaches and manholes can be directly assigned to transfer points. Therefore a so-called net backtracking is possible: the flow of the concerning chemical is replicable via highlighting in the reach net. According to this measures could be taken/li>
- all relevant operating data (e.g. addresses, contact people, water protection officer, etc.) can be stored and edited in our database
- utilized chemicals and waste material can be recorded in the databsse. 1775 chemicals and 550 waste materials, inclusive CAS- and AVV number, are available in the database from the beginning
- the hazard potential of the discharge of harmful substances of companies can be calculated
- limit exceedances will be represented in the database in red. An overview could be released, which lists all substances with limit exceedances

required modules: BB-VGR, BB-LGGR, BB-LKAN, BB-LIND

5.11 Water supply

With the water supply of BBSoft® you plan objects, like fittings, house connections or conduits in the CAD (in 2D or 3D) and administrate these in the database. Planning commands facilitate the semiautomatic planning of water conduit nets, composed of single strings and water nodes. An automatic actualization occurs always in

the longitudinal section, in the location plan and in the database if something was changed in or at the water conduit net.



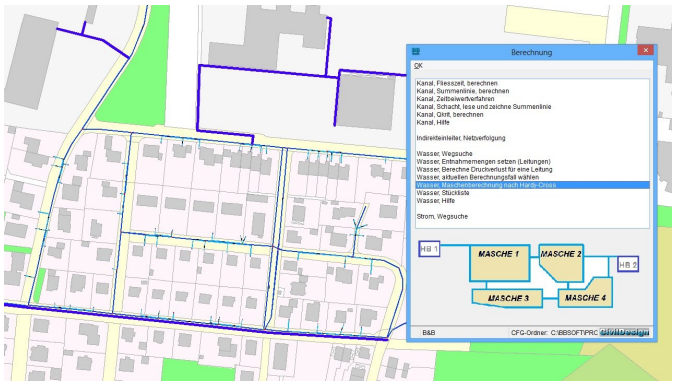
Further features:

- an extensive list of fittings is available for you, whereby DIN-notations and DIN-illustration are implemented
- integration of fittings, of complex fittings-groups too, occurs automatically in the existing conduit, with adjustment and height interpolation
- create and record group objects (connections of single water fittings) as a sample
- across the whole conduit section a profile presentation with cutting conduits and collateral sewer sections is possible
- visual assistance (display of length and angle) during creation of water conduits
- deploy water conduits in the location plan
- adjustment of the falling gradient between water nodes in the longitudinal section and insertion of additional nodes in the conduits
- for an optimal splitting of a water conduit an inflection point can be inserted subsequently
- transform existing (3D)-polylines into water conduits and record them in the database
- you can shift node combinations as a group and rotate them additionally
- water nodes of an entire string can be renamed and renumbered
- shift or copy water-elements (e.g. nodes/conduits) into another database-project
- automatic inclusion of nodes and conduits in a 3D-terrain model (DTM)
- information for location and adjustment of the elements is included in the database and the user can administrate details for redevelopment and for hydraulic data: these serve as a basis for the following net calculation

required modules: BB-VGR, BB-LGGR, BB-LWAS, BB-LWSB

5.12 Water network calculation

The calculation module of BBSoft® makes it possible to calculate a pressure pipe system according to Hardy-Cross with different options and commands. Extraction quantities at nodes and conduits must be defined by the user, also one or several water reservoirs.



Further features:

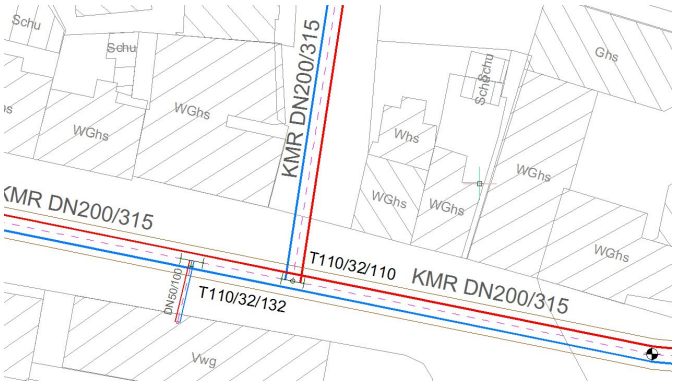
- inspection via water-flow path (backtracking), if the complete water network is closed
- the pressure loss of water conduits can be calculated (based on the defined extraction quantity and the flow)
- under consideration of different calculation cases (loading/fire conditions) the pressure loss for single conduit sections can be determined
- valves (opened und closed) will be integrated during calculation
- fittings, that go beyond or rather below the predefined minimum and maximum pressure, are highlighted
- meshes, conduits, nodes and fittings will be listed in the calculation protocol
- automatic inscription in the location plan of: incoming and outgoing water quantity, extraction quantity and pressure head loss at nodes and conduits

required modules: BB-VGR, BB-LGGR, BB-LWAS, BB-LWSB

5.13 District heating / communal heat planning

On the 1st of January 2024 the law for heat planning and for decarbonization of heat networks (Wärmeplanungsgesetz) and therewith a mandatory heat planning has become effective. So the creation of heating plans is designated for cities (more than 100.000 inhabitants) until **30th June 2026** and for towns (less than 100.000 inhabitants) until **30th June 2028**.

For supporting you optimally during the implementation of the municipal heating planning, BBSoft® enables the CAD-based planning of district heating conduits and -networks, their maintainance in a database and an editable presentation.



Further features:

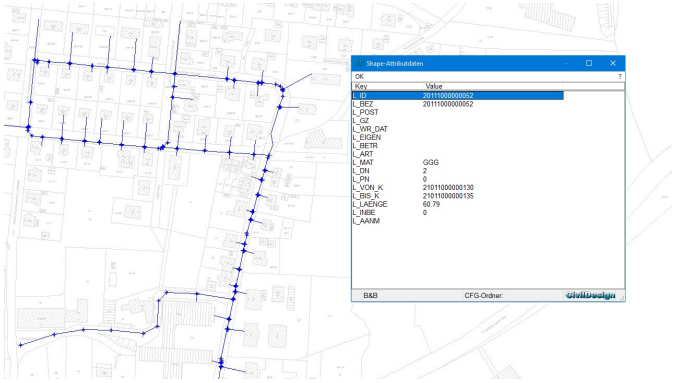
- automatic generation of nodes and conduits from 2D-/3D-polylines
- visual assistance (display of length and angle) during creation of district heating conduits
- an extensive node- and fitting library is available
- welded joints, expansion cushions and fixed points can be created
- inserting of U-arcs into dictrict heating conduits and subsequent editing is possible
- initial and end station of flow and return of expansion cushions don't have to be identical
- nodes will be inserted automatically in an existing conduit with adjustment and height interpolation
- for recurring oparations you can compile individual samples
- a cutting presentation with crossing conduits is possible (over the entire district heating section)
- parallel branches are graphically considered
- in the location plan the falling gradient can be interpolated between the nodes
- in the longitudinal section additional nodes can be inserted to the section
- flow and return and trench widths can be represented graphically in the location plan
- turning points are represented with user-specific symbols
- district heating conduits can be deployed in the loacation plan
- information according to location and adjustment of the district heating elements is contained in the database
- connection points of district heating nodes can be interchanged (the direction of nodes can be changed so)

required modules: BB-VGR, BB-LGGR, BB-LH

5.14 LIS-interface

For the transfer of the water- and sewer cadastre, this im- and export was designed (especially for Austria), based on Richtlinien zur Übergabe von Daten des Wasserleitungskatasters/Kanalkatasters (Leitungsinformationssystem Kanal / LIS-Kanal), Schnittstelle der Bundesländer Steiermark, Kärnten, Oberösterreich, Salzburg, Tirol, Burgenland und Niederösterreich, version 3.6, effective from 27. Mai 2019.

The interface is currently under development. With this interface an implementation of the im- and export to its full extent ist not possible.



Further features:

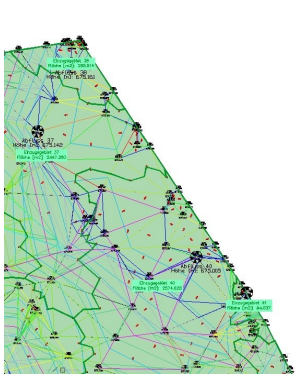
- we facilitate your data transfer
- this exchange format is precondition for the receipt of grants
- data export of water conduits and -nodes in the LIS-format
- data export of reach- and manhole data in the LIS-format
- LIS-format is a Shape-format

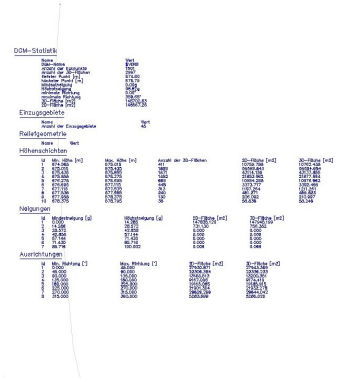
required modules: BB-VGR, BB-LGGR, BB-VSHPKML, BB-VSHPLIS

6 Digital Terrain Model

With BBSoft® you can unproblematically create a digital 3D-terrain model (DTM) from different basic elements, e.g.:

- from points (in a drawing or from a measuring point file),
- from points and breaking edges,
- from breaking edges, e.g. contours without points or
- from laserscan-data.





The DTM is on the one hand used for the presentation of

ground levels and layers of earth and on the other hand it is used for the planning of rainwater retention basins, pits, spoil banks, water reservoirs and dumps.

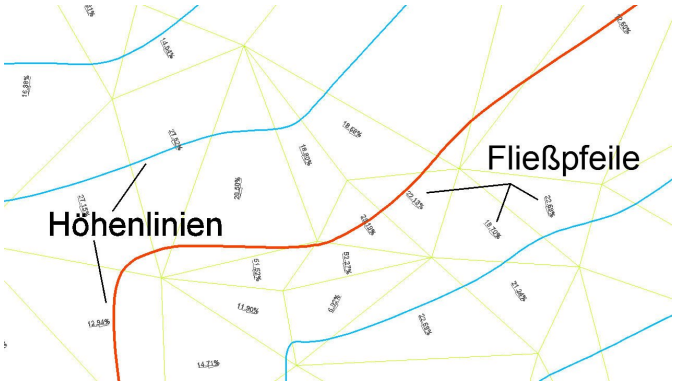
Further features:

- adoption of digital terrain models from other projects
- DTMs can be easily created in a drawing or in the BBCivil-database
- if identical points exists in your drawing, the creation of 3D-surfaces is discontinued: the space between points has to be at least 1 mm in YX-direction
- in one drawing several 3D-models can be generated
- a smooth data exchange with other programs via REB or XML is possible
- out of laserscan-tile-files you can create DTMs (the data is displayed as entirety)
- with one DTM you create the precondition for further editing with contours, terrain sections or a quantity survey

required modules: BB-VGR, BB-VDGM

6.1 DTM, compile and manage

With BBSoft® it is possible to maintain and to edit digital terrain models dependably. The editing and the processing of very big amounts of data is possible too.



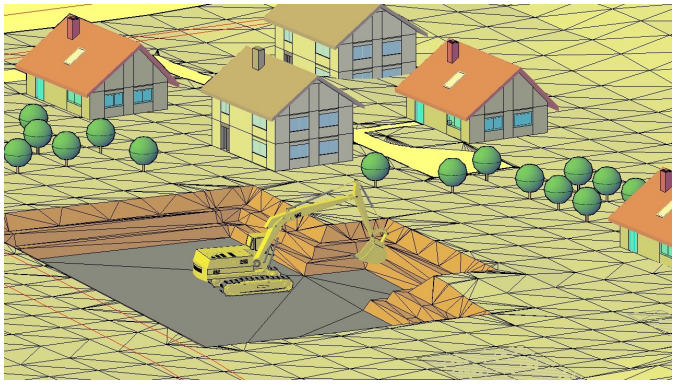
Further features:

- subsequent insertion and deletion of points in the DTM
- commands for the construction of pits and dams
- intersection of digital terrain models
- heights of corner points of 3D-surfaces can be changed absolutely or towards a height difference
- exempt DTM inside/outside boundary edge
- imported terrain models can be analyzed precisely with a plausibility check
- plausibility check for created DTMs: inspection upon gaps, shifted/overlapping 3D-surfaces plus side contacts
- integration of a plausibility check for breaklines (e.g. with double interpolation points)
- the ground level in the 3D-model can be inquired at each position
- import of DA58/45/30- or LandXML-files exists
- export of DA58/45/49- or LandXML-files is possible
- a cutting line between a DTM and a 3D-solid can be generated
- existing DTMs composed of 3D-surfaces can be exported as 3D-solid

required modules: BB-VGR, BB-VDGM

6.2 Embankment/berm

The construction of embankments and berms belongs naturally to the planning of civil engineering. BBSoft® meets the requirements and makes a simple creation possible via the DTM-module. An embankment connects two levels in the terrain with small inclination with a third level, which is steeper (e.g. left/right of a road). A berm divides the embankment into several horizontal subareas, so that the earth pressure on the embankment foot is decreased.



Further features:

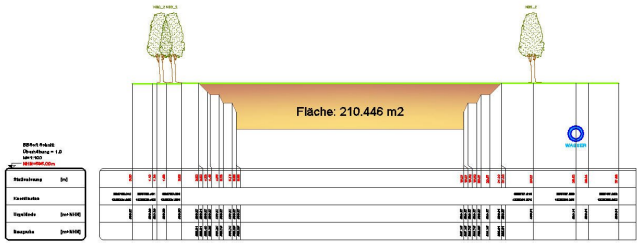
- the embankment base edge can be a 2D-/3D-polyline or a line with height information
- the embankment base edge can refer to a DTM, a reference horizon with a specific height or to a further boundary edge
- the initial embankment edge can be modified afterwards: in this manner the embankment route can be updated alongside the embankment edge
- the creation of an embankment hatch pattern is possible, whereby filling and cutting can be highlighted
- an embankment element is a BBSoft-element and can be edited with our element commands
- the inclination direction of the embankment can be determined (upwards, downwards, automatic)
- a plausibility check of the terrain model of the embankment can be performed
- the 3D-surfaces of a calculated embankment can be drawn and shown
- planning of rainwater retention basins possible
- creation of graded embankments (with integrated berms)
- embankments can be created upon an inclined layer
- an embankment calculation upon a boundary edge without height
- the profile construction of embankments and berms

can be drawn into the CAD and visualized there
- embankments can be created upon the top edge of 3D-solids
- you can export the settings of an embankment and transfer these onto another embankment

required modules: BB-VGR, BB-VDGM

6.3 Terrain section

Longitudinal- or rather cross-sections can be generated with the terrain section of BBSoft®. These illustrate one or several surfaces as well as cutting elements. The terrain section mainly exemplifies the course of the ground along an alignment.



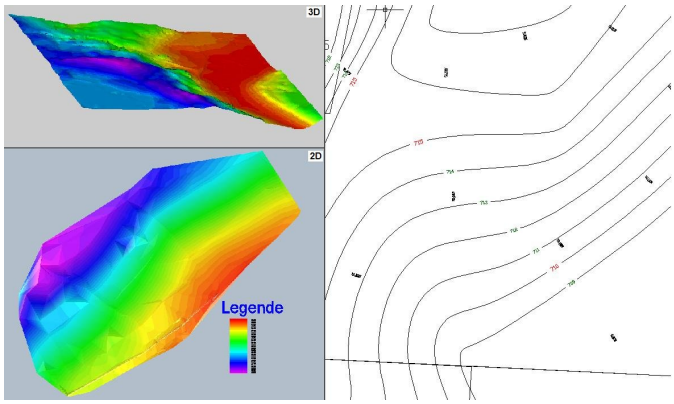
Further features:

- creation of a section course: either via input of beginning-, intermediate- and end coordinates or via mouse-click
- a line is the default for the section course: via a special command this can be rounded after creation
- the drawing direction of section corresponds to the stationing direction of stations: with the help of a special command you can turn round the stationing
- via element-command a shifting of the axis (togehther with the stationing) is possible
- section-templates can be adapted individually: the layout of the section (head and positioning of texts) is adjustable
- it is possible to insert measuring points into an already drawn/existing profile
- the difference height to another DTM can be displayed in a separate string
- measuring point numbers and codings can be displayed in separate strings
- presentation of crossing 3D-solids in the longitudinal section
- a grid with electable distance can be displayed for better orientation
- the predefinition of not vertical and asymmetrical cross-sections is possible
- a reference horizon can be determined as reference line, which is then valid for all profiles
- drawing of profiles with or without superelevation
- the subsequent editing of drawn profiles is easily possible
- settings for every section are saved related to object
- the stationing inscription can be provided with a background color
- the highest and the lowest point of a DTM can be determined in the section: these emerge as crossing elements

required modules: BB-VGR, BB-VDGM, BB-VSCH

6.4 Contours/DTM-Analysis

With the DTM-analysis BBSoft® makes it possible for you, to obtain further information via the terrain surface with the help of a 3D-terrain model.



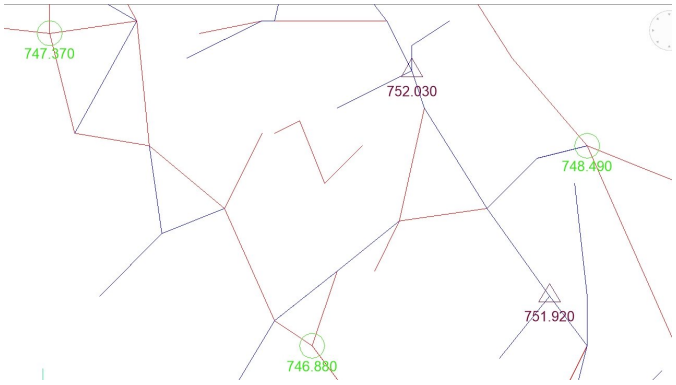
Further features:

- contours (main-, middle and simple contours) make a visual analysis of the 3D-terrain model possible
- the inscription of contours can be stored upon a separate layer and can be adjusted individually (colour, text height, inscription method)
- contour levels can be represented in terms of colour shadings in the terrain model
- it is possible to analyse several subareas of a DTM, without overwriting already existing subareas
- inclinations of 3D-surfaces can be highlighted in different colours
- the results of the DTM-analysis are BBSoft-elements and can be edited with our element commands
- the settings of a DTM-analysis can be exported and transferred upon another DTM in another drawing
- above all 3D-surfaces flow arrows can be created, an optional inscription with the respective inclination and with adjustment of the size of the flow arrow is possible too
- output of a legend/statistic at a free selectable position
- calculation and display of catchments and valleys
- valleys can be coated with a water texture
- valley areas can be displayed as 3D-surfaces

required modules: BB-VGR, BB-VDGM, BB-VHLN

6.5 Relief geometry

You will get an precise overview above the state of your DTM with the help of the different presentation options of the relief geometry (segment of the DTM-analysis).



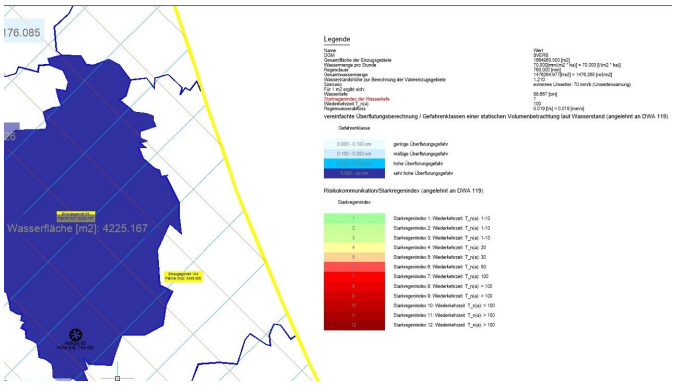
Further features:

- regional high- and low points, e.g. hills and valleys, will be marked with symbols (blocks) in the terrain model
- depression contours (e.g. valleys) and ridges (e.g. mountains) will be clearly sketched in the DTM and highlighted in color
- single plateaus (regional lowlands) will be marked too
- the output of vertical- and horizontal curvatures is possible as hatch pattern, as pixel image or as 3D-surface
- convex and concave curvatures and linear surfaces can be coated with hatch patterns and can be highlighted in this way

required modules: BB-VGR, BB-VDGM, BB-VHLN

6.6 Rainwater analysis

The rainwater analysis of BBSoft® will convey you a realistic presentation of different rain occurrences within a DTM. It is performed by initially calculating the catchment areas with their respective surface within a DTM in order to conduct a rainwater analysis subsequently. Based on the drawing, with the selection of rain occurrence, the duration of this and the water amount per hour possible flooding surfaces can be recognized in advance and countermeasures can be taken.



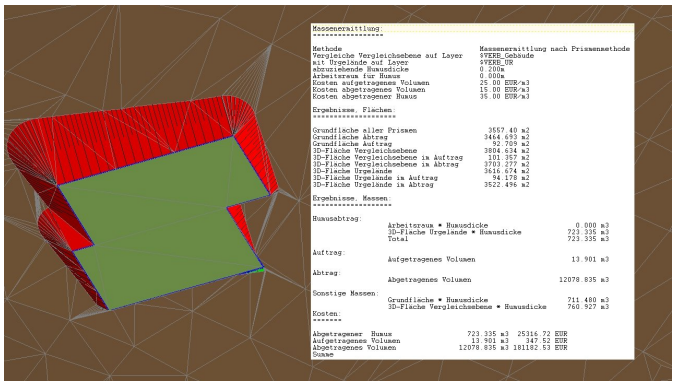
Further features:

- selection of different scenarios of rainwater analysis, e.g. shower, heavy or constant rain or tropical storm (with the declaration of duration of shower and the respective water amount per hour)
- rainwater analysis report
- possibility to draw water valleys in 3D
- highlighting in the CAD, if a catchment was extended because of exceeding the min. drain height
- water depth and volumina of each catchment are inscribed in your drawing
- in the legend you can display the respective heavy rain index of your rain occurrence
- the hazard classes for the risk of flooding will be highlighted in the CAD (you can choose, if with or without inscription)

required modules: BB-VGR, BB-VDGM, BB-VHLN

6.7 Quantity survey

The quantity survey calculates the volume between two 3D-terrain models, e.g. stock and intended terrain. Referring to the prism-method REB the calculation of the masses is made. The mass difference is indicated in cubic metres and is sub-divided into filling- and cutting surfaces. The cutting of a defined humus layer is considered optionally. The single, with each other compared, surfaces receive numbers and are described in a calculation report with corner points and their appropriate heights. A cost estimation (€, CHF or self-defined currency unit) is executed in the protocol through the input of the cubic metre prices for filling, cutting and humus cutting.



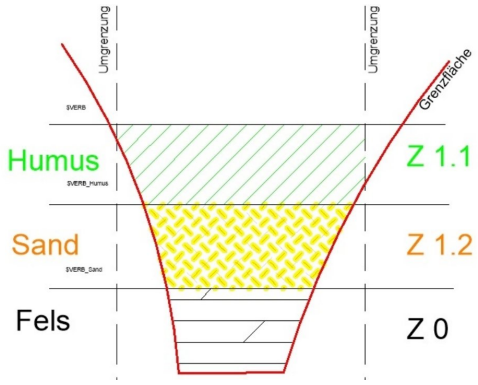
Further features

- BBSoft® makes mass balancing available, in case, that the quantity survey does not fulfill the given masses
- you can shift your layer of comparison in vertical direction, to adapt your filling- or rather cutting surfaces
- the output of a prism list and the inscription of prism numbers is possible in the CAD
- filling and cutting can be displayed with surface hatch patterns or just with '+' and '-'
- our software calculates the masses of misshapen building pits, quarriers or waters immediately and unproblematically
- the quantity survey between thousands of surfaces occurs very fast and is completely reviewable
- filling and cutting can be displayed as 3D-solids
- by using our software in the area of river engineering shorelines as well as water depths of flood plaines can be determined and represented comfortable
- an output of an visual appealing legend or statistics will be obtained via different presentation possibilities
- you can scale water-management sites with the water level analysis (reservoir capacity heights and the respective heading up volumina will be displayed in a diagram)
- it is possible to display all gradients of your model as hatch patterns via height difference layers
- construction works (subsection calculation of quantities) can be assigned to objects/calculations.

required modules: BB-VGR, BB-VDGM, BB-VMAS

6.8 Soil management

With the help of a calculation of separate soil layers, BBSoft® supports you to record, how much mass of soil (with different classification values) will accumulate on your construction site and which amount of volumina can be directly used once more at the construction site. On this way it is possible, that you increase you installation potential, because an expensive intermediate storage or a disposal can be avoided.



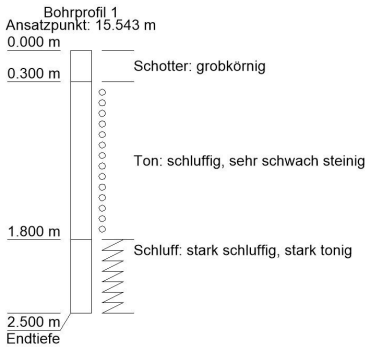
Further features:

- presentation of excavations as 3D-solids is possible
- optional creation of terrain section in the location plan
- output of legend and statistics at free selectable position
- notation of volumina and classification values in the location plan (tabularized)
- output of backfilling calculation is possible
- you can print a summary, which contains all volumina of excavation and backfilling
- soil layers of a calculation can be transferred to a new soil management object
- consideration of the Swiss waste category (according to VVEA (regulation via avoidance and disposal of wastes))

required modules: BB-VGR, BB-VMAS

6.9 Drilling logs

BBSoft® makes the graphical presentation of soil layers/or drill tests possible, which were recorded protocolar in a layer register, e.g. via core drilling.



Further features:

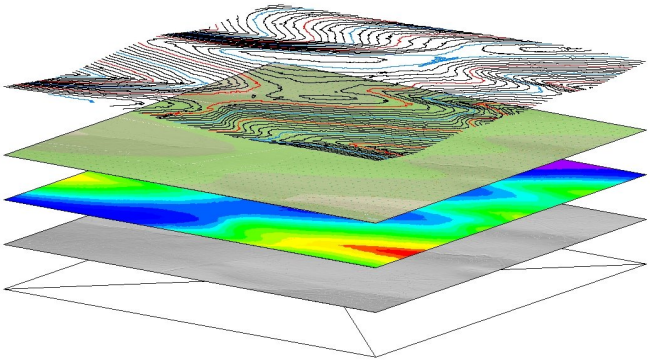
- an output of the drilling log-soil layers as 3D-solid is possible
- a layer register can be displayed in the location plan
- essential material types/substances are predefined and will be delivered
- soil layers of a drilling log can be transferred to a new drilling log object
- ground conditions can be displayed graphically in the profile in the location plan

required modules: BB-VGR, BB-VMAS

6.10 DTM from Laserscan

Our civil engineering software makes the usage and the processing of enormous grid-laserscan data possible. These is provided in high resolution from the responsible authorities of the federal states (format: tile in grid). The grid-laserscan data contains already georeferenced, in a

grid arranged points, which describe the ground level.



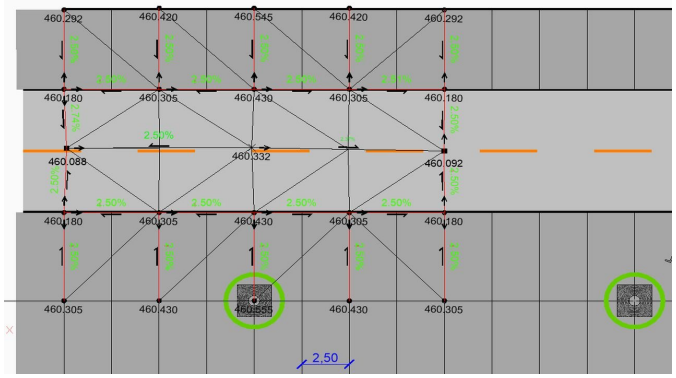
Further features:

- for a low capacity utilisation of the CAD: laserscan data is always stored in the project directoy and is not loaded into the CAD
- via a constructed reference to the tile the information about height can be interrogated within seconds off the CAD
- no thinning out of data: this is available to the full extent
- the processing of surface analyses, infrastructure planning and profiles is possible over several kilometres
- considerable visualization with the help of all functions from the DTM-analysis: e.g. contours, contour levels and inclination- or flow arrows
- during import of laserscan-tiles the formats from the federal states Hesse and Lower Saxony are supported too
- if a UTM/GK-meridian strip is not deposited in the tile, it can be inserted easily via a dialogue
- a rectangular basic form is not mandatory precondition for a laserscan tile: also ”fragmentary” tiles were imported in constant position
- optionally overlay of Open Street Map data (OSM) for each tile
- the generation of Hillshade surfaces is possible: this gives the user a spatial impression of the relative altitude differences in the terrain
- plausibility check of laserscan data is possible
- direction of the points in a tile: right to left and from above to below is possible too

required modules: BB-VGR, BB-VDGM

6.11 Surface drainage

Surface drainage, which is a part of the software BBSoft®, creates conditions for user and planners to design parking areas, roundabouts and junctions exactly and to guarantee a properly drainage of this surfaces. Measuring points can be constructed via distances and via a specification of an inclination.



Further features:

- the surface drainage was extended of the ”measuring point out of falling gradient”-command
- surface drainage can be created by quick design (without previously assigning inclinations and heights)
- an automatic adjustment of the falling gradients is possible: if the value ”height” at the starting point is changed, all other measuring points, which are connected to the start, can be re-calculated
- closed systems can be designed
- broken elements (e.g. line connections) of surface drainage can be fixed
- drainage paths (line connections and points) can be exported out of a project and imported in another
- during the planning in the drawing a direct display takes place of your drainage direction
- you can construct the surface drainage along a predefined or new defined contour
- multiple processing of surface drainage objects is possible
- visual representation of tolerance areas is possible: too weak or too high inclinations are highlighted in color
- a DTM can be calculated based on existing measuring points and existing connecting lines (breaking edges)
- the definition of reference distances is possible: tolerance areas for inclinations, but also for a reference-DGM, can be determined and indicated
- generated measuring points can be shifted to the height of a DTM
- the insertion of additional interpolation points in an already existing connection is made possible
- a unified dependence direction or inclination along a drainage path can be set
- created surface drainage objects can be checked upon plausibility

required modules: BB-VGR, BB-VDGM

7 Urban planning

Which engineering office or civil engineering department doesn’t wish for an extensive software solution, which

hold a proper tool ready even for not frequently occurent requirements? A lot of work is still carried out manually in the AutoCAD® (e.g. the drawing of master plans), because of too high costs for specialised software. How many time could be stinted through omitted tedious adaptation- and selection processes, information procurements and test phases, if only one additional activation for a module is basically needed?

For this reason BBSoft® offers functions, as a supplement to the planning modules, for the faster and more comfortable creation of parametrizable 3D-buildings. From simple single houses over school- and office buildings to churches and castles the ground-floor plans, which are available in the CAD out of ALKIS, can be converted. Of course we offer as well a tool for the signatures of the map symbol V90. This fits in perfectly into the handling of the other modules and offers the possibility to compile high quality master plans.

Additionally for every client is the base module available, a tool for the calculation of surfaces and the generation of own, even complex sigantures: route types with blocks, but also surface signatures with fore-and background hatch patterns and additional symbols, facilitate a high quality planfinish according to the actual standards.

7.1 Standard for map symbols

The civil engineering software **BBSoft®** contains an easy handling of land use-, land development and urban plans under consideration of the standard for map symbols 1990. An appealing plan design is easily possible with the help of symbols, line types and fillings of the surfaces.

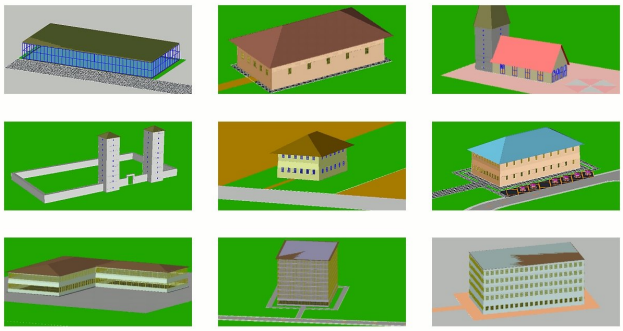
Further features:

- XPlanung: import of land development plans according to BauGB and BauNVO
- creation of high-quality land-use plans
- automatized creation of map symbols via a conversion table
- surfaces are shaded automatically and assigned with the essential symbol
- changes of scale are possible: the symbols will be adjusted to the new scale
- check created map symbols upon plausibility and list discrepancies in a dialogue
- check routines prevent the accidentally creation of double surfaces
- optical warnings inhibit the transformation of already assigned symbols
- a legend can be created in the model- or layout section
- output of a detailed surface statistics
- own elements and symbols can also be created for plan design

required modules: BB-VGR, BB-VPLV

7.2 3D-buildings/3D-appointments

In addition to the planning modules, BBSoft® provides functions for fast and comfortable creation of parametrizable 3D-buildings, walls and fences. These represent an ideal supplement for road planning: streets can be visualized without any great effort.



Further features:

- twelve predefined building- and six wall- respectively fence prototypes are available for plan design (these are scalable individually in width and hatch pattern)
- lots of creative leeway is possible via diverse selection possibilities (hip-, flat- or gable roof, roof overhang, -pitch and -color, number of floors, window type, -height and -width)
- roofs and exterior walls of buildings can be coated with a texture (material)
- possibility to project buildings directly upon an existing DTM

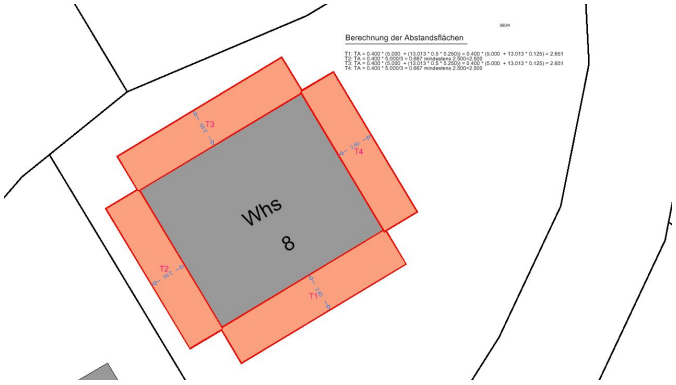
- buildings can be displayed as solid
- a direct storing at the CAD-object of usage, street and house number connects in turn to the ALKIS
- all objects will be compiled out of CAD 3D-surfaces and form therefore an excellent initial point for the transfer to visualization programs

3D-buildings out of property cadastre
As fast 1-click solution serves the creation of standard buildings directly out of the building groundplan into the database. All buildings with standard values are converted with a unique image build-up. This process is very easy and makes a certain overview available. As part of the incorporation of building parameters into ALKIS (by the land surveying offices) it is planned in the midterm, to import these data to the database and to recreate the buildings realistically by means of their characteristics, like number of floors or ridge height. The cost-intensive and complex installation of additional software for the creation of a 3D-city model for planning purposes is consequently omitted.

erforderliche Module: BB-VGR, BB-VPLV

7.3 Distance spaces

This module makes it possible to structure and edit distance spaces according to the german building regulations law in order to keep overground physical structures clear. With different gable types you can simulate the distance spaces, which must be adhered in each case and to check every option consequently towards the adherence of the minimum distance.



Further features:

- a clear legend for the distance spaces can be released
- distance depths can be calculated for different gable types by reference to formulas
- an output of a report for the distance spaces depths is possible in HTML- or LibreOfficeWriter
- previews in the dialog illustrate you the view onto the ground-floor plan and your distance spaces
- gable ends and eaves sides are marked in the dialog
- before publishing you can finalize your plan of distance spaces via editing of the line-, hatch pattern- and colour types and create in this way an informative plan

required modules: BB-VGR, BB-VPLV

7.4 XPlanung

After the IT Planning Committee decided 2017 that XPlanung should be used mandatory for the exchange of spatial plans in the construction- and planning sector, BBSoft® provides the XPlanung interface in the release 5.2 for the import of land development plans (according to BauGB and BauNVO). Consequently you are positioned ideally with BBSoft® because until 2024 all cities in Germany must support the data standard XPlanGML (in the case of urban planning). The data format XPlanGML is available for you, which enables an easily and lossless data exchange in a standardized and manufacturer independent data format.

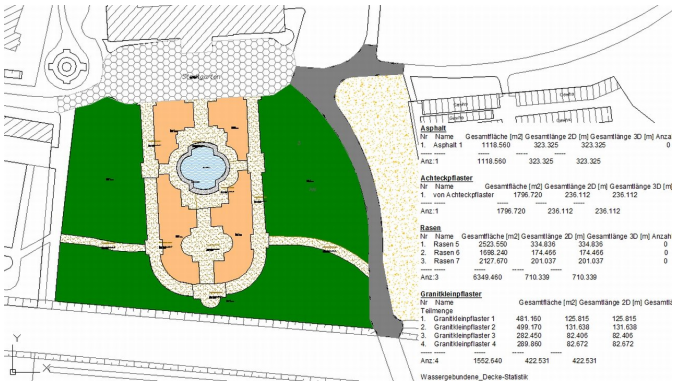
Further features:

- the object type catalogue XPlanung 5.2 is supported by BBSoft®
- editing and specification of XPlanung objects is easily possible
- an output of a legend and/or statistic directly in the CAD or as HTML-file
- export of some selected XPlanung objects in a XPlanGML-file
- the implementation of the INSPIRE-requirements will be fulfilled by XPlanGML (common european geo data infrastructure)
- between all parties involved in construction an accurate exchange of planning documents is possible via the standardized XPlanGML-data exchange format

required modules: BB-VGR, BB-VPLV

8 Calculation of quantities

The module calculation of quantities of BBSoft® is used for the graphical inquiry of quantities for positions of a building measure (lengths, surfaces, number of items and volume of different construction works) and also as graphical addition component to current AVA-programs.



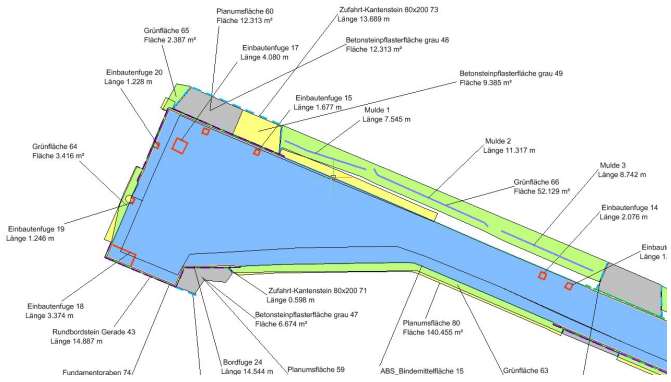
Further features:

- import of the corresponding bill of quantities via REB DA81-DA86
- after recording of surfaces and measuring points, the software indicates the differences
- automatic transfer of the real site measuring data per data interface DA11 to the tender- and accounting program
- the user receives a warning, if the units of the CAD-object don't match with the corresponding units in the bill of quantities
- texts, which mark deviations, will be highlighted in red
- a module for the sewer mass calculation according to ATV A 139 or rather DIN EN 1610 is available too

required modules: BB-VMABR

8.1 Accounting of CAD-objects

A quick acquisition of surfaces, lines and punctate objects off the CAD, the transformation in accounting objects/material allocations and their connection to the bill of quantities with automatic quantity control are only a few options, which are available for you for the accounting of CAD-objects in the the calculation of quantities module of BBSoft®.



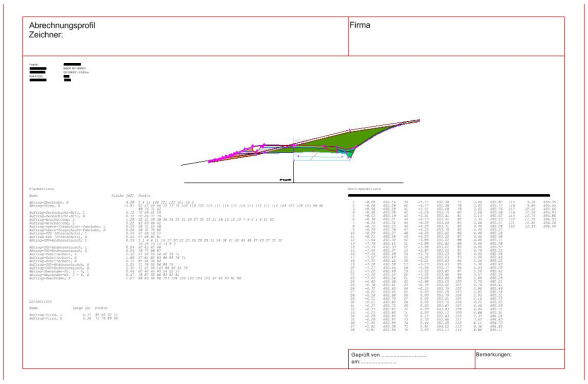
Further features:

- import interface GAEB DA81-86 is available
- the adjustment with the employer takes place as difference data file REB DA11
- you can select calculated CAD-elements with the help of different filter functions (e.g. after surfaces, polylines, points and layers) and convert them into accounting objects in one operation
- all objects, classified according to type or unit, as well as the bill of quantities with the positions appear in a clear editor
- assignment of positions in the construction work editor via Drag'n'Drop
- processed CAD-elements will be marked in color after the assignment, similarly the positions, which already have an assigned CAD-element
- the clarity will be increased by coloured markings and errors can be avoided
- a basic library of signatures or rather accounting types will be supplied for a high-quality plan design of accounting plans
- entries from the basic library can be copied as samples: so you can create an own extensive library of signatures
- important display parameters will be considered (e.g. automatic inscription of name, of 2D/3D-surfaces, of 2D/3D-lenghts and of segment dimensioning)
- the calculation and inscription of the barycentres and the coordinates (with or without z-component) and their distances will be recorded too
- measured surfaces receive a surface name and are automatically incremented
- accounting objects become "smart" elements, which can be individually changed at all times with the element commands of BBSoft® (e.g. assign to another accounting type or change the name)

required modules: BB-VMABR

8.2 Cross-profile accounting

The automatic acquisition of cross-profiles with integrated accounting according to Elling or ÖNORM is a further feature of the calculation of quantities module of BBSoft®. In this way it is possible to reconstruct quickly an accounting from only in the CAD graphically existent cross-profiles.



Further features:

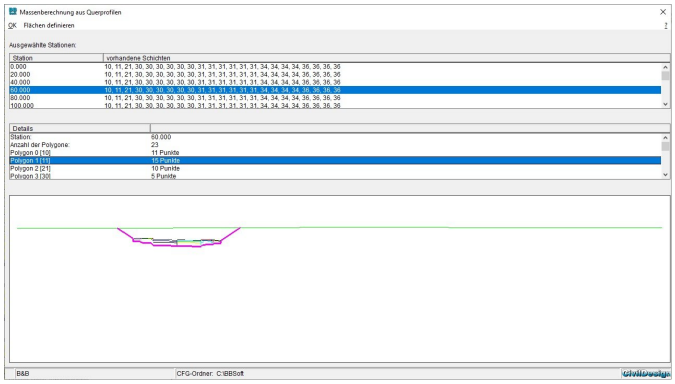
- after the definition of a conversion table drawn

cross-profiles can be recorded by the compiler
- an exact aquisition of single profiles is easily possible
- automatic conversion of all surfaces
- creation of contour points and their single levels
- generation of a map frame in DIN A4/DIN A3
- inscription of profiles with all necessary lists (e.g. surface list with square meter specifications, contour point list with coordinates and numbers plus project names and data of the compiler
- after acquisition all levels and cross-profile components will be listed organized in one editor
- assignment of one position in the bill of quantities via Drag'n'Drop
- diverse filter functions available for ordering of levels
- accountings occur via reports
- comparison of units and check routines: different units between bill of quantities and recorded CAD-objects will be recognized
- automatic plot function, which sends all profiles to a favored plotter
- profiles can be saved and sent individually as a PDF too
- an export of difference data in REB DA11 plus ÖNORM B2114 and B2114 XML is possible

required modules: BB-VMABR

8.3 Mass calculation between boundary lines

With the mass calculation between boundary lines according to DA66 BBSoft® makes a new tool available, in order to determine quickley and easily out of cross-profiles in the form of a REB DA66-file the quantities of a vertical alignment according to the procedural rules REB-VB_21.013.



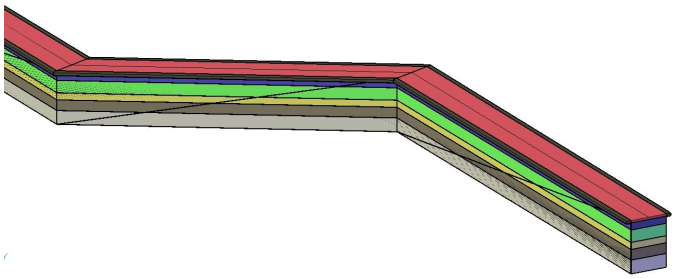
Further features:

- after the import of the file all optical horizons are displayed as boundary lines in color
- all boundary lines are displayed station by station in a list with their names and their code numbers
- the positions can be defined out of the names and code numbers
- the software can realize independently filling and cutting areas and print these areas into a protocol
- furthermore it is possible, to print all polygon points with their x- and y-coordinates in one list

required modules: BB-VMABR

8.4 Conduit trench calculation

The conduit trench calculation of BBSoft® facilitates the calculation of trench-volumes, independent of reaches or manholes. The volumes can be calculated via normal CAD-polygons.



Further features:

- display the single layers in the conduit trench as 3D-solid
- it is possible to coat the layer with specific layer thickness, a material or a color
- trench walls can be drawn as 3D-surfaces
- an overview via the conduit trench segments and their total masses can be displayed
- the height of the trench bottom and the trench depths can be edited subsequently
- display a cross-profile of a self-chosen station
- a longitudinal section of a trench conduit can be drawn

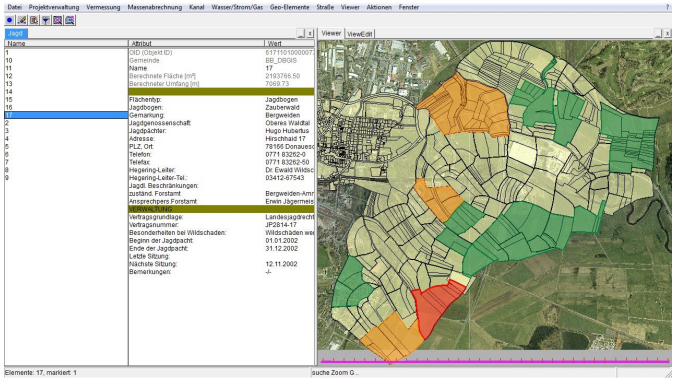
required modules: BB-VMABR

9 GIS

Our GIS- information system, based upon the free of charge Oracle®-XE-database, offers engineering offices and communes the possibility to represent and to administrate specific geodata functionally, easy to use and clearly arranged.

Through the optional CAD-connection additional possibilities are available for the user for the graphical editing, for the plannings, calculations and for alternative presentation possibilites.

BBSoft® helps you to stay flexible as an user, because with our GIS-system you can generate quickly, uncomplicated and without additional costs your own application modules with associated technical data masks.



BBSoft® makes i.a. the following GIS - application modules available:

- property cadastre (parcels of land, buildings, borders, lease, topography)
- split sewer charge (sealed surfaces)
- hunting cadastre
- mobile mapping
- cemetery cadastre/cemetery administration
- environment (green area, tree, stream, dangerous waste, recycling)
- traffic area (lamp, sign, condition)
- building

9.1 Data exchange

The data exchange is needed in order to pass on technical data to e.g. an engineering office or to a commune. BBSoft® offers the possibility to export technical data in an ASCII-, HTML-, LibreOffice Calc, Writer- or simple in a txt.-format.

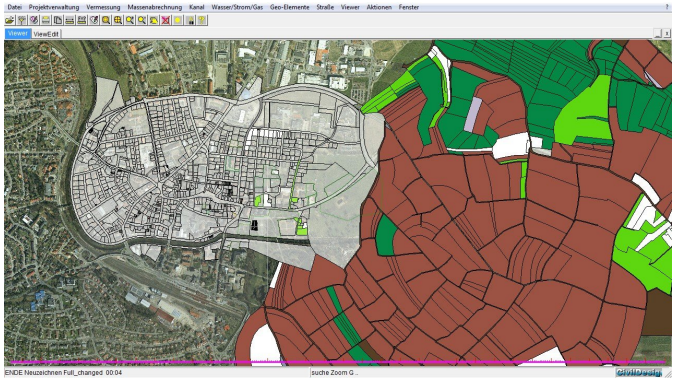
Further features:

- A direct access with Microsoft® Access® and with ODBC-capable programs is possible
- Nearly all existing technical data information can directly be exported out of the database, also as Shape-files (points, lines and surfaces)
- It is possible to specify precisely by a editor, which technical data should be exported out of the database (areas could be renamed or deleted completely)
- An attribute-statistic can be compiled directly from the database: the number of the objects as well as their type of use are registered there
- The output of an additional location plan is optionally available.

required modules: BB-VGR, BB-LGGR, BB-GEGR

9.2 Presentation

The presentation of the GIS-data, like for example for the groups sewer, water, power and for all further application modules, occurs at the BBSoft®-viewer. This displays the geographical position of the technical data from the Oracle®-database and serves for the graphical presentation.



Further features:

- single objects (e.g. houses or green areas) can be displayed in the GIS-viewer
- with the help of an filter-editor it can be searched for special technical data (e.g. according to the name or to the use)
- the technical data regulates the presentation (e.g. colouring of the buildings and inscription of the parcels of land)
- the information content within the viewer is dependent from the adjusted scale
- multiple layers can be selected simultaneously for a differentiated presentation (e.g. buildings, house connections and green areas in one figure)
- a full-scale printing of the view in the viewer-window is possible (e.g. 1:100, 1:250, 1:1000)
- distances between objects or complete area sizes can be measured in the GIS-viewer

required modules: BB-GVIEW

9.3 CAD-connection

BBSoft® provides a CAD-connection in order to make a specific elaboration and a clearly arranged presentation of their GIS-data for users possible. In this way entire database projects can be loaded and edited uncomplicated in the CAD.

Further features:

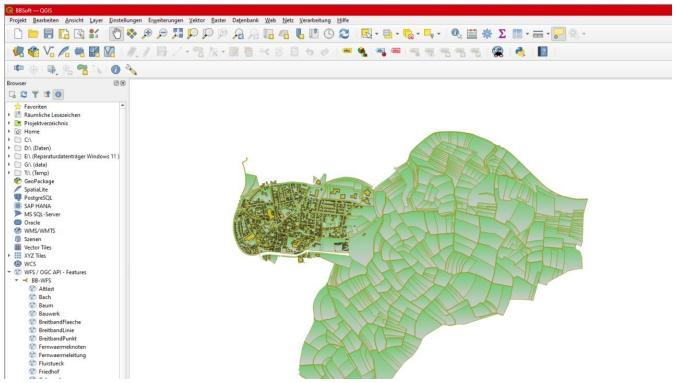
- the location plan can be further elaborated graphically in the CAD and consequently a professional presentation can be achieved
- objects of the database can be represented and inscribed with different colours
- already existing drawings in the CAD can be reviewed with the help of the data of the database and can be adjusted if necessary
- it can be determined, which contents of a drawing shall be updated in the CAD by means of the Oracle®-database (all objects or only the visible ones in the selected area)
- elements outside of the selected area are deleted

during the redrawing. This process ensures the clarity of a drawing
- inserted additional-inscriptions in the CAD can be simply transferred in the database
- BBSoft® synchronizes the input at the database as well as in the CAD during changes of the data in the location plan
- a printing true to scale is possible out of the CAD

required modules: BB-VGR, BB-LGGR

9.4 Web Feature Service (WFS)

For enabling an integration of BBSoft®-database data into GIS-programs, BBSoft® is currently in the middle of devolpment of an own Web Feature Service (WFS).



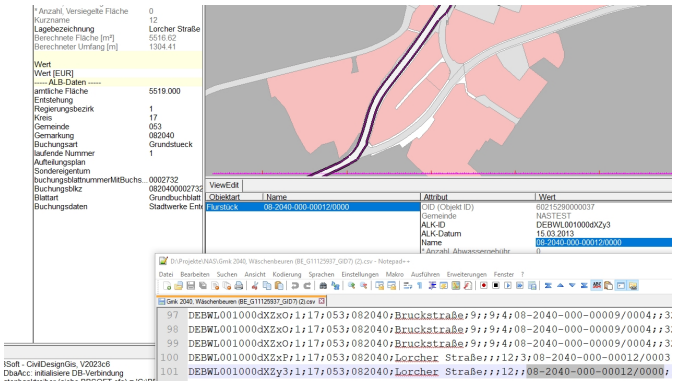
Further features:

- serves exclusively for presentation of data
- the prototype is usable for the following subsets: geo-elements, district heating and water supply
- without im- or exporting the data, the GIS-system can read the planning data
- currently the usage is only possible in the Intranet (only http-connection, not yet https)
- the program QGIS can read/process GIS-data

required modules: BB-VGR, BB-LGGR, BB-GEGR

9.5 Property cadastre

The Property Cadastre of BBSoft® serves communes and engineering offices for the administration of cadastral data, which they receive from the land surveying offices or from the administrations of surveying. It is a pure information system, which holds information about plots and their owners ready.



Further features:

- the converted data can be directly imported as DXF™/DWG™ in the CAD or in a Oracle®-based database
- technical data of buildings and parcels of land can be exported as a list or in terms of detailed overviews
- the user can regulate the graphical configuration in the database (colouring of buildings and of agricultural areas)
- continuance data can be imported and facilitate thereby the adoption of changes in the database.

In order to use the above mentioned functions for the cadastral data in BBSoft® primarily these have to be imported with our NAS-converter.

required modules: BB-VGR, BB-LGGR, BB-VNAS, BB-GEGR, BB-GFKAT

9.6 Split sewer charge

With the Split Sewer Charge BBSoft® offers the possibility to conduct the calculation of the sewer charge according to rules for the precipitation amount, which is induced from every parcel of land in the public sewer system. The number of square metres of the sealed surfaces is automatically calculated. The areas and surfaces from the official property cadastre serve as basis for acquisition. These were obtained through aerial views and scanned charts. Communes and engineering offices are supported at all stages of the surface determination.

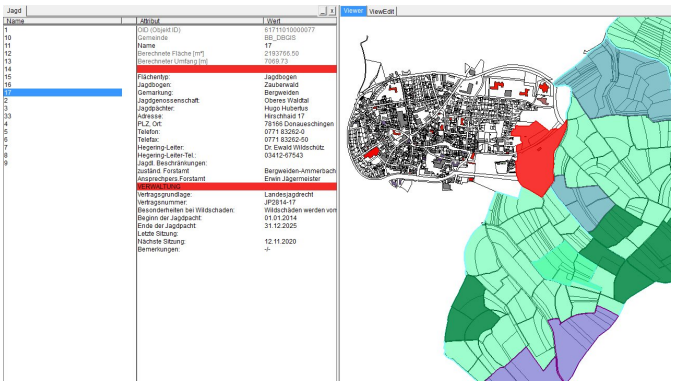
Further features:

- cropping of the considered parcel of land occurs automatically and facilitates the work enormously
- deposited aerial views allow for an accurate evaluation of the covering surface
- the surface detailing can be determined by the user in person, e.g. only the roof surface area according to inclination classes or to the pavement types
- functions for plotting allow for the compilation of full-scale plans
- generation of full-scale parcel of land plans, in which the citizens can insert supplements and annotations
- the addressees of the notifications of charge could be imported in the database from existing calc-lists
- prefabricated example cover letters for the information disclosure are included as a sample (LibreOffice)
- the automatic generation of serial letters is possible
- the collected data can be transmitted to the responsible office for the cost estimation and for the notifications of charge

required modules: BB-VGR, BB-LGGR, BB-GEGR, BB-GFKAT, BB-GFAWG, BB-VNAS

9.7 Hunting cadastre

The Hunting Cadastre of BBSoft® administeres clearly all huntable surfaces. Extensive information is supplied, besides the surface type, e.g. about the hunting association, about the tenants of a hunt and about the chief of the hunters' association, about the responsible forestry office (with the respective contact person) and datailed information for a lease contract is provided.



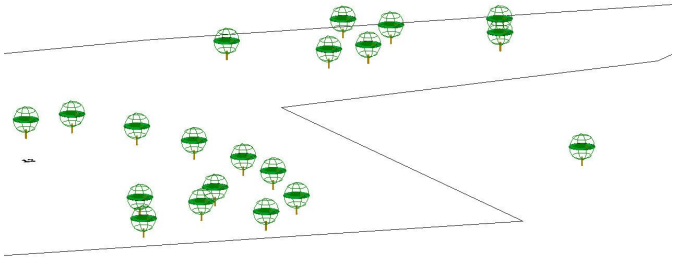
Further features:

- a visually appealing presentation with predefined signatures for hunting grounds, pacified areas and parcels of land
- individual setting options for the inscription (area size, tenant of a hunt and end of the tenancy of a hunt)
- the output of individually designed reports and invitations to hunting conventions, in Microsoft® Word or Excel® is possible
- comfortable administration of convention protocols, which can be directly opened and edited in LibreOffice Writer und Calc
- implementation of counting of votes after hunting conventions, at which the presence of the owner as well as the area size of the parcel of land are considered
- pacified areas are automatically excluded from the counting, because they house small towns or farms and doesn't count to the hunting ground
- the polygon overlay of pacified areas and hunting grounds can be clearly illustrated in the Viewer window
- all plots are apparent in an extensive presentation through the loaded cadastral data in the background

required modules: BB-VGR, BB-LGGR, BB-GEGR, BB-GFJGD

9.8 Tree cadastre

With the tree cadastre from BBSoft® you can record, manage, illustrate and evaluate punctate objects (trees). This cadastre was developed in collaboration with park commissions and enables the owners to fulfill their traffic safety obligation. In the GIS-database you can record general information about trees (like e.g. diameter, width, tree type, etc.), but also specific hints to maintenance measures, damages or regularly check-ups of stock of trees. Data can be managed comfortably and subsequent editing of recorded trees is easily possible.



Further features:

- the tree cadastre is based on the FLL - Baumkontrollrichtlinien
- a visually appealing presentation in the location plan with symbols for deciduous trees or conifers
- the creation of own signatures is possible
- technical data of trees can be displayed as list or in the form of detailed overviews with a picture
- for the evaluation of the amount of dead wood and of the crown of a tree it is possible to make specifications from which it is possible to deduce thereof resulting measures
- a consistent data management is given by the geographic information system, previous controls can be proven seamlessly, with the result that the traffic safety obligation can be guaranteed continuously

required modules: BB-VGR, BB-LGGR, BB-GEGR, BB-GFUMW

9.9 Cemetery cadastre

The cemetery cadastre of BBSoft® is a geographic information system, which makes it possible, to record all relevant data of graves, additionally with a graphic presentation. The administration of the cemetery is simplified by the using of this cadastre and thereby can be organized very clearly. The graves can be transferred in the CAD out of the GIS-database and can be shiftet there from their position. The new position, with x- and y-coordinates, will automatically be saved and recorded in the geographic information system.

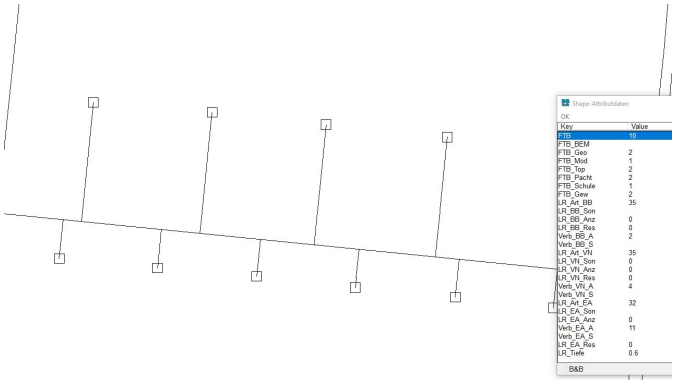
Further features:

- precise grave registration and presentation of graves
- printing of occupancy reports, burial certificates and cost reports in OpenOffice™
- view of spatial data and administration of technical data in the geographic information system and in the CAD
- all relevant data to the funeral (date of the burial and funeral service) and all contact persons (payer, undertaker, invoice recipient) can be managed clearly in the geographic information system

required modules: BB-VGR, BB-LGGR, BB-GEGR, BB-GFFRD

9.10 Broadband cadastre

With the module multimedia-broadband-nets of BBSoft® you can plan, maintain, illustrate and evaluate punctate (nodes), linear (conduits/pipes) and extensive objects (area). This broadband-cadastre facilitates the SHAPE-export as support for requests for broadband subsidies, at the moment version 1.1. The whole structure of this geo-element is based on ”GIS-Nebenbestimmungen (GIS-NBest BW)”, at the moment version 1.2 from 30.06.2023. General information can be recorded in the GIS-database to nodes (e.g. construction types, usage), lines, conduit types, conduit diameter and areas (including network areas, usable areas). Specific advice to the construction/acceptance date or to regular appointments of the broadband net can be managed. Subsequent editing of data and of captured or planned network areas is unproblematically possible.



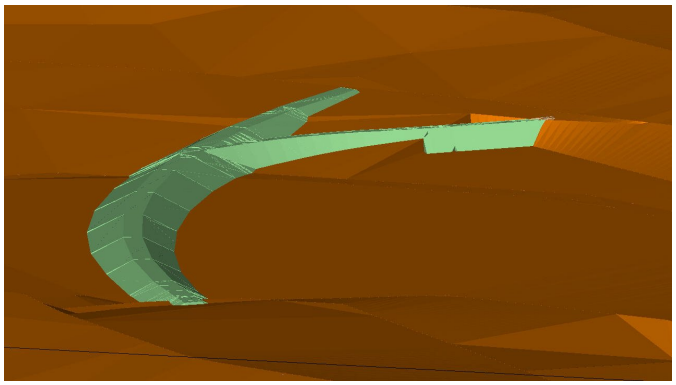
Further features:

- output of adjustable lists with numbers, lengths, construction type
- SHAPE-export: based on ”GIS-Nebenbestimmungen”
- a visually appealing display in the location plan with symbols for e.g. consoles, fibre optic couplers
- different conduit types can be displayed and inscribed very well
- the creation of own symbols and namings is easily possible
- technical data of broadband-objects can be displayed as list or in terms of detailed overviews with picture
- a consistent data management is constituted by GIS

required modules: BB-VGR, BB-GEGR, BB-LGGR, BB-VSHPKML, BB-GMBN

10 Water planning

The water planning is used for the observation and implementation of all geomorphological and water-ecological fundaments. Under the hydraulic, hydrologic and ecologic aspects waters in Germany are analyzed, observed and planned according to the EU-water framework directive. It is possible to conduct environmental sustainability studies on the just mentioned fundaments, to observe or to evaluate the development of watercourses or to build a biotope cadastre.



The civil engineering software BBSoft® is a flexible tool, which is in total accordance with the requirements of a **water-/dike planning and the surveying of a river**. The software offers you the opportunity to observe the development of waters and to conduct the maintenance planning as well as the renaturation of watercourses. The water planning is composed of the modules dike planning and surveying of rivers, which make it possible to plan dikes and flumes as well as to generate automatic profiles of courses of rivers.

Specific adjustments for the fields water development, planning of water courses, river engineering and the planning of dams are also implemented in the software. Additionally there are options for displaying of flood plaines, flooded surfaces and filling or rather excavated areas.

BBSoft® makes it possible for you to plan dam bodies interactive, to generate longitudinal- and lateral profiles and to export masses.

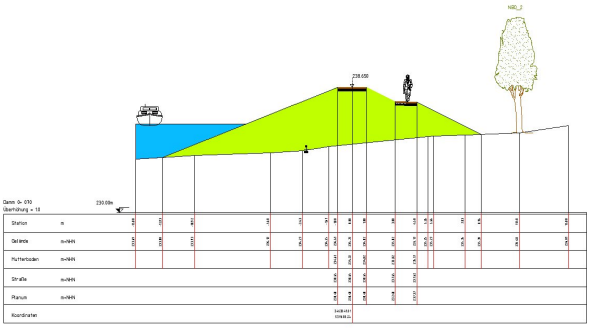
The surveying of a river serves for the observation of all with the waterway connected important parts, like bridge constructions, vegetation, sewer inlets and weires. Furthermore water tables and historic water levels could be illustrated in the profil.

The import or rather the export of DXF™/DWG™, LandXML and the REB-conform interfaces belong naturally in the same place to it. It is possible to transfer these results to hydraulic calculation programmes (Jabron, Rehm, WSP-WIN, WSP-ASS).

required modules: BB-VGR, BB-VSTR

10.1 Dike planning

An alignment is specified on the basis of a terrain model by the **water-/dike planning**. The alignment can be made up of CAD-lines or she can be modelled with the alignment construction of the civil engineering solution "location". The planning in a longitudinal section allows an accurate definition of height and falling gradient of the crest or rather of the channel bed. Further information, like ground levels, stations of the location plan as well as crossing elements, can be illustrated synchronically also in the longitudinal section. The user defines dam embankments, service ways and retention areas while he is supported by a dialog. At this point it is also possible to indicate specifications of heights, widths and slopes. If materials and embankment proportions are familiar you could use these as well. A comfortable planning is possible through consideration and displaying of constraining heights, borders or bridges. The user experiences the maximal support through lists of material and water profiles, which he can configure freely.



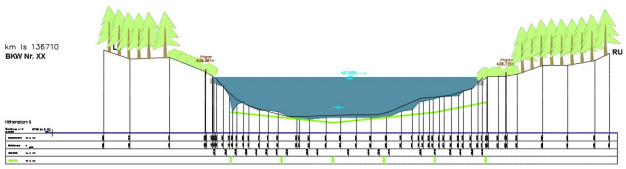
The cross-profile editor offers the opportunity to move through the scheduled water-/dam body. The "Show"-order draws every favoured cross-profile as a CAD-element with desired text-dimensions, scale and as well hatch patterns. Crossing elements like borders, counduits or cables, are also illustrated. These are drawn differently corresponding to their type. Naturally at this time also the vegetation or trees are discernible. The program distinguishes between the diverse levels through the selection of the terrain models. Therefore different gauges can be simulated or rather measured and without any further graphical effort the cutting line, inclusive the filling of the surface, can be represented in the CAD. The DA51, 53, 54 and 66 can be imported and exported for the mass confirmation, apart from the data of the alignment in form of the data type 21, 40 and 50. As an additional examination a record of the alignment is written. Ground levels of dam or rather flume can be displayed as ASCII-file. The results are transferred to hydraulic calculation programmes (Jabron, Rehm, WSP-WIN, WSP-ASS) by means of DA66. BBSoft® makes with LandXML a channel of communication available, which is to this time in the world of civil engineering the latest!

required modules: BB-VGR, BB-VSTR

10.2 River surveying

River surveying is used for admittance and continuance measurement of waters. The civil engineering software was developed in cooperation with the LUBW (Regional office for environment Baden-Württemberg) and the BAFU (Federal Office for environment, Switzerland). The applications are directed especially at the surveyors who record and analyze a river water body-specifically and at hydraulic engineers as precondition for further calculations. Surveying data is available as basis, which was

recorded stationary and which can be provided with up to three different codings pro measuring point . The user can very easily determine the appearance of his symbols by size, angle, distance as well as his labelling, briefly, he can determine the entire presentation of his obtained data in the profile and he can design his plans individually quite comfortable .



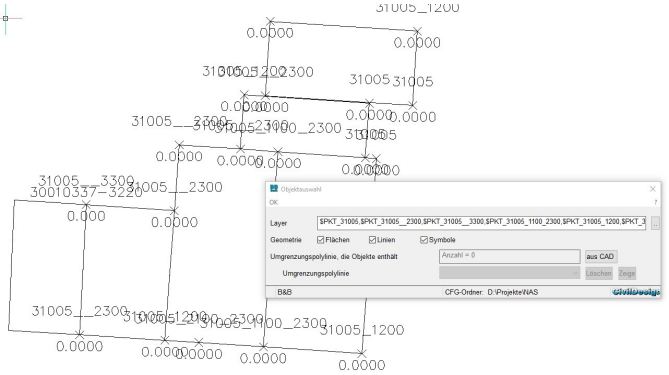
Further features:

- multiple codings for vegetation and subsoil
- profile with for yourself defined grid
- processing of sonar recordings
- representation of the high tide mark, of crests, bridges and barriers
- automatic marking of water level height
- evaluation and representation of historical profile measurements for Switzerland
- evaluation and representation of minimum clearance outline profiles for Germany
- data exchange by GPRO and DA66
- via GPRO-export longitudinally accompanying structures can be exported as single points
- output of lists.

required modules: BB-VGR, BB-VRIV, BB-VSCH

11 Cadastre ALK/ALKIS

Cadastre comprises the area-wide description of all parcels of land of one section or of one land. The geometrical position, the structural properties, the kind of usage and the size are specified in a descriptive part (ALB) and in charts (ALK). The civil engineering software BBSoft® makes interfaces like NAS available, for the conversion of the cadastral data of the land surveying offices.



Further features:

- Missing parts of the cadastre out of analogous charts can be added afterwards
- The cadastre can be kept permanently up-to-date through the continuance data
- BBSoft® offers you a GIS-database import for importing property data out of a geographic information system (GIS)
- The GIS-Viewer makes it possible to look at your technical data, to print plans according to scale, to serach for characteristics or to measure surfaces and distances.

11.1 General

The stocktaking is one part of surveying. It deals with the acquisition and the documentation of topographies. In line with this surveyings the recordings are made during external work to make it possible after this to generate an accurate evidence of the available stock in the actual state. The digital cadastre charts of the land surveying offices are described by NAS. Stocktaking is carried out through the base module of BBSoft®.

Further features:

- The following data formats can be imported in our software: DWG™, DXF™, Microstation, NAS, LandXML, ArcView, ArcInfo, MapInfo
- Auxiliary functions enable you to design location plans individually, to digitize cadastre plans, to measure distances in 2D and 3D and to determine surfaces
- Measuring points can be adapted individually through the adequate presentation
- The creation of map frames is quickly and easily

possible.

11.2 NAS

The standard-based exchange interface (NAS) was defined in line with the introduction of the geographic information systems AFIS, ALKIS and ATKIS (AAA-model). This data interface serves for the exchange of geo data. Henceforth the until now accepted data formats BGRUND and DFK are replaced through it. The BBSoft® NAS-converter translates the XML-based property cadastre in CAD- and in database utilizable files. The extensive data model of the BBSoft® solution contains an expansive conversion catalogue.

Import

- different requirements of the federal states are supported
- possible adjustment of the ALKIS-import to the office standards of the user
- an import of several XML-files in only one pass is possible
- huge amounts of data can be managed quickly and clearly in a GIS-database.

DXF™/DWG™ output
The NAS-converter offers, besides the possibility to generate GIS-data, also the automatic generation of a DXF™-location plan.

- the conversion generates geometric objects of points, lines, surfaces and texts
- the presentation occurs on different layers, according to the specialised meaning
- the use-related filling of the surface can be determined by closed polylines (buildings or parcels of land)
- a professional implementation of the symbolism of points, including bench marking and quality level, is possible.

Adoption in the Oracle®-database
It is possible to take over the ALKIS and ALB data in the Oracle®-database through a particular file format. The data can be represented in the BBSoft®-viewer and/or in the CAD and you will receive access to the ALB-data, belonging to the object, very easily.

Further features:

- NAS-export of building points, ridge lines and building surfaces (based on MiA-GÜVO)
- the implementation is adapted to GeoInfoDok 6.0, 6.1, 7.0, 7.1 and tested with the official test cases of all currently delivering federal states
- user-specific presentation methods are given, like e.g. free layer- and symbol assignment
- presentation of watercourses and parcels of land with flow arrows and belonging lines
- included libraries with a variety of of symbols and presentation options
- preset hatch patterns for better determination of main- and adjoining building (e.g. depending on type of use)
- presentation of parcel boundaries according to type of use
- correct presentation of islands of parcel of land
- adoption of posting data
- adaptations and corrections, which occur continuously on the NAS-format, can be obtained online
- adoption of boundary- and topographical lines in the database
- differentiation for limiting-, recording-, covering- and other points. Separate marking of trigonometrical points
- presentation is controllable for point type, for data origin and for the kind of bench marking

required modules: BB-VGR, BB-LGGR, BB-GFKAT, BB-GEGR, BB-VNAS

12 Appendix

12.1 Module overview and interfaces

module notation	shortcut	application area	required modules
Basis-Modul [1]	BB-VGR	• control of BBSoft-modules, inspect DWG-standards • measuring point maintenance with im-/export and individual symbol configuration • intelligent DWG-maintenance, like layer-/block manager • automatized creation and maintenance of map frame • area calculation/-design, construction dimensioning, surface creation with contour-following • Shape-import	CAD
Punktberechnungen	BB-VPKB	• field book interface (e.g. Trimble, Leica, Topcon, REC500) • surveying calculations (e.g. free positioning, traverse, median orientation) • transformations (shift, linear, affin, helmert, ETRS89)	CAD, BB-VGR
DGM-Grundmodul	BB-VDGM	• DTM from points, breaklines, drone data, contours or laserscan • building pits, rainwater retention basins, berms, embankments • surface drainage/drain, transfer heights • REB-import/-export (DA45, DA58, DA49) • LandXML, MTS-DG1	CAD, BB-VGR
DGM-Schnitt	BB-VSCH	• quick presentation of longitudinal sections/cross-profiles, out of laserscan data too, drone flights • clear section presentation out of terrain models, points, cross-profile recordings • premium output of factory conduits, automatic configuration and text exemption • contour levels and grid display with inscription of horizons • insert additional points in the drawn profile (re-digitize) • DA66-export, HEC-RAS-export • optical clash validations	CAD, BB-VGR, BB-VDGM
DGM-Analyse	BB-VHLN	• contours, contour levels, presentation of inclination/incline, Hillshade • rainwater analysis, water-flow path, flow directions • relief geometries (highest/lowest points, ridges, depression levels) • catchments, valleys, water table	CAD, BB-VGR, BB-VDGM
DGM-Massen	BB-VMAS	• mass calculation out of terrain surfaces, according to prism method (REB 22.013) • balancing of masses/-optimization • water level analysis, height difference levels • layer of earth/soil management	CAD, BB-VGR, BB-VDGM
Planzeichen & Signaturen	BB-VPLV	• XPlanung-import/export • points, lines and surfaces according to PlanzV90 • distance spaces and split surfaces • 3D-visualisation objects, road marking, land purchase/land acquisition • legends, statistics • tailorable lines- and surface symbols	CAD, BB-VGR

[1] *The Basis-Modul is required for the usage of all other modules.*

module notation	shortcut	application area	required modules
Kataster 'NAS' [2]	BB-VNAS	• import of cadastral data in the NAS-format (*.XML) and generation of a DXF-file • export owner directory as CSV • different cadastre models (500, 1000, 2000) • configurable presentation models and symbol library	CAD, optional for GIS database management: Oracle Database XE, BB-VGR, BB-LGGR, BB-GFKAT, BB-GEGR
Flussvermessung	BB-VRIV	• create longitudinal/cross sections out of water surveyings • special profiles, building presentation in the cross-profile • presentation of historic profile recordings • GPRO-export • analysis of several codings • illustrate water table and calculate hydraulic radius	CAD, BB-VGR, BB-VSCH
Straßenbau-Grundmodul	BB-VSTR	• new road/redevelopment planning and dike/dam planning, river route surveying • longitudinal section/cross-profile with display of crossing supply lines • mass calculation as solid and out of profiles (e.g Gauß-Elling) • pavement design specification, pegging data, reports, elevation levels • automatic surface drainage from longitudinal gradient and slope • route as solid, 3D-model, surface/line presentation • traffic signs	CAD, BB-VGR, BB-VDGM
Straßenbau-Knotenplanung	BB-VKNT	• internal radius, traffic island, turning lane, restricted zone • junction areas with traffic islands and restricted zones, bus lanes, turning bays • swept paths with a considerable selection of verifying- and dimesioning vehicles • automatic integration of existing boundary and building edges • land purchase/land acquisition plan • road markings • additional planning functions (e.g. include polygonal border lines)	CAD, BB-VGR, BB-VSTR
Straßenbau-Optimierung	BB-VSOP	• graphical change of alignment with tangentially adjustment of lines, clothoids and arcs • change, remove and insert alignment elements, with automatic adjustment of traces • check route according to standards and design specifications	CAD, BB-VGR, BB-VDGM, BB-VSTR, BB-VKNT
GIS-Grundmodul	BB-LGGR	• essential module for data/project maintenance • extensive presentation models • deployment of text suggestions, templates and standards • im-/export interfaces (partially self configurable) • control of print output, CAD-independent graphics-viewer • filter and search functions	Oracle Database XE, CAD, BB-VGR

[2] *The mentioned interfaces don't raise a claim upon completeness, but rather describe exemplary the often addressed types of transfer in practice. Upon request you receive details to single interfaces, to a possible data conversion (import/export) and to the thereof resulting data quality.*

module notation	shortcut	application area	required modules
Kanal-Grundmodul	BB-LKAN	• presentation and editing of conduit data in the technical data mask or CAD • allocation of templates, editing with multi selection • illustrate longitudinal profiles with manholes, reaches, special buildings, crossing conduits • clash validation, also visible with external subsections in the longitudinal section • sewer visualisation as solid, surface/line presentation • easy defining of inscriptions and filters, without SQL-programming • ISYBAU-/DWA-interface • Hystem-Extran/ASCII interface • output of lists, statistics, search- and filter functions • flexible extension of selection lists (code numbers), e.g. further materials	Oracle Database XE, CAD, BB-VGR, BB-LGGR
Kanal-Planung & -Berechnung	BB-LCPL	• create reach section automatized in the CAD (e.g. via existing CAD-polygons) • hydraulic calculations (time coefficient, summation diagram), Qkrit • edit longitudinal profile • catchments • include manholes into terrain • create house connections and road gullies automatized	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-LKAN
Kanal-Schadensbewertung	BB-LAS	• condition evaluation according to DWA/ISYBAU • plausibility check of condition data • automatically creation and maintenance of redevelopment arrangements • estimation of redevelopment costs	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-LKAN
Kanal-Haltungsblatt	BB-LHBT	• clear presentation of reach with manholes and inspections • reach detail as DWG- or PDF-output • attach user-defined images	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-LKAN
Kanal-Schachtblatt	BB-LCSP	• detailed manhole sketch and corresponding technical data • angle- and height inscriptions • manhole detail as DWG- or PDF-output • attach user-defined images	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-LKAN
Kanal-Indirekteinleiter	BB-LIND	• management • companies and indirect discharger • comprehensive list for selection of chemicals, contaminants or waste materials • management of laboratory testings • output of lists, statistics, search-and filter functions	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-LKAN
Wasserversorgung-Grundmodul	BB-LWAS	• creation and editing of conduits, fittings and manholes • presentation and editing of conduit data in the technical data mask or CAD • allocation of templates, editing with multi selection • illustrate longitudinal sections with fittings, conduits, inflection points and crossing conduits • clash validation, also visible with external subsections in the longitudinal section • conduit visualisation as solid, surface/line presentation • output of lists, statistics, search-and filter functions • flexible extension of selection lists (code numbers), e.g. further materials • net tracking (backtracking) • gas supply	Oracle Database XE, CAD, BB-VGR, BB-LGGR

module notation	shortcut	application area	required modules
Wasserversorgung-Planung & -Berechnung	BB-LWSB	• automatic transformation of existing wiring diagrams into water conduits • mesh calculation (Hardy-Cross) • edit longitudinal section • set extraction quantities and calculate pressure loss • transform CAD-polylines into water conduits • include nodes and conduits into terrain and further planning commands	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-LWAS
Fernwärme	BB-LH	• creation and editing of conduits and fittings • presentation and editing of conduit data in the technical data mask or CAD • allocation of templates, editing with multi selection • illustrate longitudinal profiles with fittings, conduits, inflection points, crossing conduits • clash validation, also visible with external subsections in the longitudinal section • conduit visualisation as solid, with conduit width, single/multiple line presentation • transform CAD-polylines into conduits • include fittings, bends and conduits into terrain and further planning commands • output of lists, statistics, search-and filter functions • flexible extension of selection lists, e.g. further materials	Oracle Database XE, CAD, BB-VGR, BB-LGGR
Stromversorgung	BB-LSTR	• creation and editing of conduits and fittings • presentation and editing of conduit data in the technical data mask or CAD • allocation of templates, editing with multi selection • illustrate longitudinal profiles with conduits, inflection points, crossing conduits • clash validation, also visible with external subsections in the longitudinal section • conduit visualisation as solid, surface/line presentation • transform CAD-polylines into conduits • output of lists, statistics, search-and filter functions • flexible extension of selection lists, e.g. further materials • net tracking (backtracking)	Oracle Database XE, CAD, BB-VGR, BB-LGGR
Massenabrechnung Bau & Kanal	BB-VMABR	• accounting of punctate/linear and extensive objects in the CAD • cross-profile accounting • mass calculation between boundary lines • sewer-/conduit masses • DA66, DA11, DA81, GAEB, ÖNORM	CAD, BB-VGR
GeoElemente-Grundmodul [3]	BB-GEGR	• create user-definable GIS-application modules (points, lines, surfaces) • presentation and editing of conduit data in the technical data mask or CAD • creation and editing of data • creation of templates, adaption of selection lists • CAD- and database administered, with configurable CAD-presentation and editing • output of lists, statistics, search- and filter functions	Oracle Database XE, CAD, BB-VGR, BB-LGGR

[3] *For this module further application modules, like e.g. Abwassergebühr (BB-GFAWG), Friedhof (BB-GFFRD), Jagdkataster (BB-GFJGD), Kataster (BB-GFKAT), Umwelt (BB-GFUMW), Multimedia-Breitband-Netze (BB-GMBN) und Verkehrsraum (BB-GFVKR), are available.*

Modulbezeichnung	Kurzbezeichnung	Einsatzbereich	benötigte Module
IFC- [4]/KML-/Shape-Export [5,7]	BB-VSHPKML	• Shape-export of geometries and technical data, based upon database • IFC-export of technical data and geometries out of sewer database	Oracle Database XE, CAD, BB-VGR, BB-LGGR
LIS-/Shape Import/Export (für Österreich) [5,6,7]	BB-VSHPLIS	• import/export of sewer/water data in the LIS-format of the Austrian federal states	Oracle Database XE, CAD, BB-VGR, BB-LGGR, BB-VSHPKML

[4] *Only available with BricsCAD® BIM or BricsCAD® Ultimate from V20.2.04*

[5] *The mentioned interfaces don't raise a claim upon completeness, but rather describe exemplary the often addressed types of transfer in practice. Upon request you receive details to single interfaces, to a possible data conversion (import/export) and to the thereof resulting data quality.*

[6] *Not all fields will be considered, because of different data versions at LIS and BBSoft. Upon request you receive a detailed list of limitations.*

[7] *additionally the subsections must be licensed, which should be exchanged, e.g. sewer or water*

12.2 Exchange formats

The mentioned exchange formats don't raise a claim upon completeness, but rather describe exemplary the often addressed types of transfer in practice. Upon request you receive details to single exchange formats, to a possible data conversion (import/export) and to the thereof resulting data quality.

exchange format	file type	version	import	export	publisher	advice
AKG C01	*.c01	-	✓	-	AKG Software®, AKG-Firmengruppe	-
AKG S40	*.s40	-	✓	✓	AKG Software®, AKG-Firmengruppe	-
ATKIS®-DGM	*.xyz	-	✓	-	Arbeitsgemeinschaft der Vermessungsverwaltungen der Länder der Bundesrepublik Deutschland (AdV)	-
Bayern 1m	*.g01dgm	-	✓	-	Landesamt für Digitalisierung, Breitband und Vermessung, München, Bayrische Vermessungsverwaltung	-
Bayern 2m	*.g02dgm	-	✓	-	Landesamt für Digitalisierung, Breitband und Vermessung, München, Bayrische Vermessungsverwaltung	-
Bayern 5m	*.g05dgm	-	✓	-	Landesamt für Digitalisierung, Breitband und Vermessung, München, Bayrische Vermessungsverwaltung	-
CADdy KOR-Format	*.kor	-	✓	✓	CADdy Geomatics GmbH	-
Civil 3D	-	-	(✓)[1]	(✓)	Autodesk Inc. USA	up to Civil 3D®2022 ®ActiveX (points, DTM, road alignments)
DA01	*.d01	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA11	*.d11	REB23.003 from 1979	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA21	*.d21	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA22	*.d22	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA23	*.d23	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA30	*.d30	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA40	*.d40	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA45	*.d45	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA49	*.d49	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA50	*.d50	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
DA58	*.d58	-	✓	-	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-

[1] *A tick mark in brackets means that there are limitations during import and/or export.*

exchange format	file type	version	import	export	publisher	advice
DA66	*.d66	-	✓	✓	REB, Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)	-
Dac E	*.sav	-	✓	✓	Carl Zeiss AG	-
DWA M-150	*.xml	04/2010	✓	✓	Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V. (DWA)	-
EF 800	*.ef8	-	✓	-	Leica Geosystems AG	-
GAEB 90	*.d81, *.d82, *.d83, *.d84, *.d85, *.d86	REB23.003 from 1979	✓	-	Gemeinsamer Ausschuss Elektronik im Bauwesen (GAEB)	-
GAEB XML	*.xml, *.x81, *.x82, *.x83, *.x84, *.x85, *.x86	GAEB DA XML 3.2, 05/2013	✓	-	Gemeinsamer Ausschuss Elektronik im Bauwesen (GAEB)	-
Geodimeter	*.obs	-	✓	✓		-
GPRO	*.csv	20.09.2018	-	✓	Landesanstalt für Umwelt Baden-Württemberg (LUBW)	-
HEC-RAS	*.sdf	-	-	✓	Hydrologic Engineering Center (HEC) in Davis, California	-
Husky-Hunter	*.hhu	-	✓	✓	Husky Computers Ltd.	-
HYSTEM-EXTRAN	*.net	6.4 (2004)	✓	✓	Institut für technisch-wissenschaftliche Hydrologie GmbH (itwh)	-
IFC	*.ifc	2x3, 4	-	(✓)	BuildingSMART International	no own classification for civil engineering elements
ISYBAU	-	96/01	(✓)[2]	(✓)	Bundesministerium des Innern, für Bau und Heimat (BMI), Bundesministerium der Verteidigung (BMVg)	only type: K, LK, H, LH, S, EY
ISYBAU (XML)	*.xml	12/2019	✓	✓	Bundesministerium des Innern, für Bau und Heimat (BMI), Bundesministerium der Verteidigung (BMVg)	-
Kern	*.mes	-	✓	-	Kern & Co. AG Aarau	-
KML	*.kml	-	-	(✓)	Open Geospatial Consortium (OGC)	-
LandXML	*.xml	LandXML-1.0	✓	✓	Konsortium von Partnern: www.landxml.org	points, DTM, breaklines, alignment
Leica-Wild	*.wld, *.gsi	-	✓	✓	Leica Geosystems AG	-
LIS	*.shp, *.dbf, *.shx	version 3.6	(✓)	(✓)	Austrian federal states	-
MTS-DG1-format (DTM)	*.dg1	-	-	✓	MTS Schrode AG	-
NAS(ALKIS)	*.xml	GeoInfoDok 6.1, 7.1	✓	(✓)	Arbeitsgemeinschaft der Vermessungsverwaltungen der Länder der Bundesrepublik Deutschland (AdV)	-
ÖNORM A 2063 (XML)	*.onlv	01.06.2009	✓	-	Austrian Standards International	-
ÖNORM B 2063	*.dta	01.09.1996	✓	-	Austrian Standards International	-
ÖNORM B 2114	*.dta	01.09.1996	✓	✓	Austrian Standards International	-
ÖNORM B 2114 (XML)	*.xml	-	-	✓	Austrian Standards International	-
REC 500	*.sav	-	✓	✓	Carl Zeiss AG	-
SIA 451	-	01.12.1992	✓	-	Schweizerischer Ingenieur- und Architektenverein (SIA)	-
Shape	*.shp, *.dbf, *.shx	1998	(✓)	(✓)	ESRI Inc.	import in the CAD, export from DB
Sharp	*.sav	-	✓	✓	-	-
SOKKIA	*.sdr	-	✓	✓	Topcon Positioning Systems, Inc.	-
TOPCON	*.dat	-	✓	✓	Topcon Positioning Systems, Inc.	-
Trimble®	*.jxl	-	✓	✓	Trimble Inc.	-
X31	*.x31	GAEB DA XML 3.2, 05/2013	✓	(✓)	Gemeinsamer Ausschuss Elektronik im Bauwesen (GAEB)	-
XPlanung	*.gml	5.2, 28.11.2018	✓	✓	Leitstelle XPlanung / XBau, Landesbetrieb Geoinformation und Vermessung	-
Zeiss M5	*.dat	-	✓	✓	Carl Zeiss AG	-

[2] *A tick mark in brackets means that there are limitations during import and/or export.*

12.3 Reference Customers

Our greatest success: satisfied customers
More than 1,000 customers from different industry segments rely on BBSoft® and benefit from our efficient software solutions. Among our customers are public institutions, engineering offices, planning and surveying offices and internationally active building companies. BBSoft® relies on reliability, practical relevance and on sustainable customer orientation.

You can find an extract of our reference customers on our homepage at https://www.bbsoft.de/references.