

ArCADia-SEWAGE NETWORKS

ArCADia - SEWAGE NETWORKS User Manual

2019-10-02

INTRODUCTION

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INTRODUCTION

1. INTRODUCTION

INTRODUCTION

1.1. ABOUT THE PROGRAM

ArCADia-SEWAGE NETWORKS is a program of the ArCADia BIM system for the design of conventional external gravity and pumping sewage systems. It also provides an overlay that extends the capabilities of the AutoCAD graphics program with tools that enable the design of external sewage systems in the ArCADia BIM system.

The thematic scope of the **ArCADia-SEWAGE NETWORKS** program makes it possible to design both collectors and sewer collection channels, as well as external sewerage systems together with connections. Due to the type of sewage, the program takes into account the division into sanitary, stormwater and combined sewage networks.

The functionality of the program enables object-oriented drawing of spatial development maps in the field of conventional sewage systems. On the basis of the drawn network model, the designer has the ability to generate auxiliary drawings, perform simulations of sewage flows through individual calculation sections, generate hydraulic calculations of filling and speed calculation values, and generate lists of materials, invert channels of concrete wells and coordinates.

1.1. FEATURES AND POSSIBILITIES OF THE PROGRAM

Technical scope of the software and its basic features:

- Determining the location of the objects on the underlay map (outlets from buildings, inspection chambers, tanks, pumping stations) and connecting them with pipelines with designated diameters and slopes or without designing the vertical system.
- Defining and assigning characteristic information for sources of sanitary and stormwater in buildings.
- Automatic detection of the type of network according to the type of wastewater defined in individual sources.
- Generation of sewage network profiles with the possibility of editing pipeline parameters: directions of slope, values of slopes as well as material and diameters.
- Possibility to modify the descriptions appearing in the profiles in terms of content and additional information required by the user.
- Generation of hydraulic calculations of sections in the scope of filling and speed.
- Ability to edit parameters of pipe types of calculation sections from the calculation tables.
- Verifying the validity of the designed sewage network.
- Generating calculation reports.
- Automatically generating a legend of the symbols used in the project.
- Generating schedules of quantities for the materials used in the project.
- Transferring materials used for the creation of the sewage installation along with the fittings to software used for preparing schedules of values, such as Ceninwest or Norma.

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1.2. REFERENCES

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2. INSTALLING AND RUNNING THE PROGRAM

Installing and running the program

2.1. HARDWARE REQUIREMENTS

- Pentium IV PC (min. Intel Core i5 recommended)
- 8 GB RAM (2 GB minimum)
- Approximately 3GB of free HDD space for the installation
- DirectX 9.0 compatible graphics card (min. 1 GB card recommended)
- OS Windows 10 or Windows 8.1, or Windows 7 SP1 (recommended 64-bit system).

2.2. INSTALLING

The program installation is started automatically when the CD is inserted into the CD drive. The installation should be started manually if the Autostart function is disabled. Open the CD content (Computer/CD drive), and run the Setup.exe file from the program folder. Once the installation is started, proceed according to instructions displayed on the screen.

2.3. RUNNING

The ArCADia software:

The software may be started by double-clicking on the ArCADia or ArCADia LT program icon located on the Desktop and then selecting one of the icons on the ribbon in the **Sewage** tab.

AutoCAD

The software may be started by double-clicking on the CAD program icon located on the Desktop and then selecting one of the icons in the **ArCADia-SEWAGE NETWORKS** toolbar.

2.4. OPENING A PROJECT (CAD)

Any of the following file types may be opened:

- A standard DWG drawing file.
- Any of the following sample drawings supplied with ArCADia LT or ArCADia software may be used.
- A DXF drawing exchange file.
- A DWF network transmission file.
- A DWT drawing template file.

In order to quickly access the last edited drawing choose File > <file name>. The software stores the names of the last four drawings. In order to quickly access a drawing from the Open drawing dialogue box, double-click the drawing name


A drawing may be opened when browsing drawings on the computer using e.g. Windows Explorer. All you need to do to open the drawing in ArCADia LT or ArCADia is to double-click the file. Miniature drawings displayed when browsing facilitate the identification of the selected drawing.

Installing and running the program

Opening an existing drawing


The ArCADia software:

Use one of the following methods:

- Choose the Home ribbon and then in the Files logical group choose the Open button.
- Press the **ArCADia** , button and then press the **Open** button.

AutoCAD:

Use one of the following methods:

- Choose **File>Open**.
- On the **Standard** toolbar select the **Open**  tool.
- Write *open* and then press Enter.

In common for the ArCADia and AutoCAD programs:

1. Choose the type of the file you want to open from the file type.
2. Choose the folder that contains the selected drawing.
3. Do one of the following:
 - Choose the drawing that you want to open and click **Open**.
 - Double-click the drawing you want to open.

If the drawing requires a password, provide the password, click **OK** to verify the password and then click **Open** again.

2.5. SAVING THE PROJECT (CAD)

Rysunek można zapisać w dowolnej chwili.

Aby zapisać rysunek, użyj jednej z poniższych metod:

The ArCADia software:

- Choose the **Home** ribbon and then in the **Files** logical group select the button **Save**. Press the **ArCADia** button and then the **Save** button.

AutoCAD:

- On the **Standard** toolbar click **Save**.
- Choose **File>Save**.
- Write *save* and then press Enter.
- Write *qsave* and then press Enter.

When you save a particular drawing for the first time, the system will display a dialogue box **Save drawing as**, which enables you to select the folder and provide the name for the drawing. You can use any name at all when saving the drawing for the first time. In order to save the same drawing under a different name later, select **File>Save as** and then type in the new name.

Installing and running the program

2.6. AUTOSAVE AND BACK-UP COPY

In order to avoid data loss in case of a power outage or another system error, it is necessary to save your drawing files often. The software may be configured to periodically save your drawings automatically. The **Autosave** setting determines the interval in minutes between automatic saves. The software resets this interval each time the user saves a drawing file (*feature available in ArCADia and AutoCAD*).

When the **Autosave** feature is activated, the software creates copies of the drawing. This file is automatically saved to the folder provide under **Options>Paths/Files>Temporary file** and particular the extension indicated in **the Drawing autosave file extension** (SV\$ by default).

Configuring ArCADia-INTELLICAD to automatically save drawings

1. Do one of the following:
 - **Select Tools>Options.**
 - Write *config* and then press Enter.
2. Click the **General** tab.
3. In the **Autosave** area select one of the check boxes in order to turn the **Autosave** feature on and select the autosave frequency.
4. Click **OK**.

3. WORKING WITH THE SOFTWARE

Working with the software

3.1. BASIC INFORMATION ABOUT THE SOFTWARE

The **ArCADia-SEWAGE NETWORKS** program allows for the design of conventional gravity sewerage networks with pump support. The user can design a sewage network and external sewage installations: sanitary, stormwater, and combined. The user also has the option of choosing the materials needed for the construction of circular pipelines and other network elements or external installations. Drawings of spatial development can be made on map underlays in raster or vector file format.

In the beginning, the user makes a spatial development plan, introducing sewage network objects onto the map and connecting them with pipelines. Due to the high flexibility and editing capabilities, the user can start entering objects in any order and at any height arrangement. The user is able to determine the order of entering objects and connecting them with each other.

In the beginning you can insert connecting objects (wells, tanks) with correctly set elevations of the terrain and with a permanent depression, then connect the objects with pipelines to the invert channel and get the altitude system according to the slope of the terrain. At the same time, spatial development facilities for existing networks that intersect with the planned sewage system are to be introduced. After such preparation of the model, it is possible to generate a profile. The height arrangement can then be edited already on the profile, which gives you full control over collisions with existing utilities and the vertical layout of the network.

Another way of starting the project is to introduce a pipeline with set slopes and correct elevations of the area. Then, at the points of network bends, connection of several pipelines or anywhere in the pipeline, the user inserts wells with a connection to the invert channel. Then proceed as described above.

Also, to aid the construction of the geometric arrangement of the map is the ability to model the terrain and some already existing objects on the surface and underground infrastructure elements. After creating such a terrain model, the user no longer has to enter the elevations, but by using the **Get Value From Surface** function, he can automatically get the elevation values.

In order to create a calculation model and enter types of sewage on individual sections, the user must insert natural sources of sewage (e.g. building connections, road inlets) or define sources of sewage in connection objects specifying the calculation flow. On the basis of sewage sources, the program will determine the type of sewage system: sanitary, stormwater or combined. In the program it is possible to perform calculations of the amount of flowing wastewater by algorithms for sewage networks (e.g. in the case of sanitary sewage the flow is calculated from population density in a given area served by the calculation section) and separately for external installations and connections (in the case of sanitary sewage the flow is calculated according to the number and types of sanitary fixtures in buildings). In the case of stormwater flows in sewer networks, the program can simulate by two methods: the method of constant intensities and the method of limiting intensities. Calculation methods of stormwater flows in the network are set in the **Project Options** and apply to the entire project in the scope of storm water drainage.

The **ArCADia-SEWAGE NETWORKS** program is intended for the design of conventional networks with the possibility of introducing sewer sections operating under forced pressure. To this end, the user enters the pumping station object and then runs a pressure pipeline.

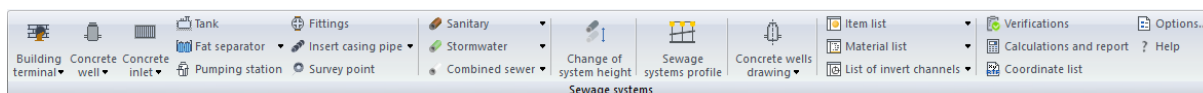
Working with the software

After developing the graphic model of the sewage system on a map projection and determining the diameters and slopes of pipelines, the user has the ability to generate hydraulic calculations. Calculations are generated separately for some external installations and separately for the sewage network system, taking into account the division into types of wastewater and the mode of transport (by gravity, under forced pressure). The designer receives information about the amount of wastewater flowing through a given calculation section and about the filling and flow speed through the channel. In the case of sections with forced pressure, the user has information about the flow rate of a given amount of sewage, pressure drops and, above all, about the pumping station operation parameters. After generating calculations, the program automatically divides into calculation sections, i.e. sets of pipelines with the same type parameters, geometry and operating conditions. In generated calculation tables, the designer can change the diameter on the calculation sections, which allows you to control the working conditions of the entire calculation sections. After applying the changes, the introduced modifications are transferred to the drawing model automatically. The changes are visible in plans and profiles and in other supplementary drawings. After making calculations and selecting diameters, the designer can make additional corrections at each stage of the project and re-calculate. In the event of a designer error, the program will generate a warning and provide limit parameters.

After the complete design of the external sewage system and confirmation of the correctness of the design, the user can generate a calculation report along with the List of materials and other supplementary drawings. If this is required at the final stage, it is recommended to generate Lists and supplementary drawings: construction views of the well, material lists, invert channel lists of concrete wells and lists of coordinates of objects and points indicated by the designer.

3.2. DESCRIPTION OF PROGRAM ELEMENTS

Toolbar functions for AutoCAD or ArCADia (column I) and ribbons of ArCADia LT, ArCADia and AutoCAD (column II):



Drop-down button ▼ have more than one command

Fig.1. Toolbar of ArCADia-SEWAGE NETWORKS
(ArCADia LT, ArCADia and AutoCAD Programs)

















Toolbar of ArCADia- EXTERNAL SEWAGE
(AutoCAD or ArCADia Program)














***BIM** – options available to ArCADia BIM license holders, i.e. after purchasing one of the programs: ArCADia, ArCADia AC, ArCADia LT or ArCADia PLUS.

Tab. 1 Functions of the module ArCADia - SEWAGE NETWORKS











Working with the software

Icon	Option	Description	*BIM
	Building Terminal	Allows to define the place of sewage outflow, the type of sewage system dependent of the sewage type and the relative elevation outflow positioning.	X
	Free outlet	Inserts the final object of the sewage system which represents the free outlet of the pipeline (eg rainwater to the field receiver).	X
	Concrete chamber	Inserts the concrete chamber connected with subparts (eg rings, manhole) together with the description and parameters	X
	Plastic Well	Inserts a well made of plastic with with subparts (eg manhole, invert channel) together with the description and parameters.	X
	Concrete inlet	Inserts the inlet on the concrete chamber connected with subparts (eg grate) together with the description and parameters.	X
	Plastic inlet	Inserts the inlet on the plastic well with the components (eg grate) together with the description and parameters.	X
	Linear drainage	Inserts the linear drainage together with the description and parameters.	X
	Tank	Inserts the tank together with the description and technological parameters.	X
	Fat separator	Inserts the fat separator together with the description and technological parameters.	X
	Petroleum derivative separator	Inserts the petroleum derivative separator together with the description and technological parameters.	X
	Pumping station	Inserts the pumping station separator together with the description and technological parameters.	X
	Fittings <i>Insert casing pipe</i>	Inserts cut-off valves or non-return valves with their selected parameters	X
	Insert casing pipe	Inserts <i>casing pipe</i> in the map view on the section of the pipeline running with a slope or horizontal	X
	Insert vertical casing pipe <i>Survey point</i>	Inserts <i>vertical casing pipe</i> in the map view on the section of the vertical pipeline	X

Working with the software

	Survey point	Allows to insert anywhere on a given object (e.g., all corners of the tank) a point whose coordinates will be generated in the coordinate list in RTF format.	X
	Sanitary	Enables inserting pipelines with a given slope, ordinates or horizontal on the map base..	X
	Sanitary – vertical	Enables inserting only vertical pipelines with given ordinates on the map base.	X
	Change line into sanitary sewer pipe	Changes the line or polyline into the pipeline.	X
	Stormwater	Enables inserting pipelines with a given slope, ordinates or horizontal on the map base.	X
	Stormwater – vertical	Enables inserting only vertical pipelines with given ordinates on the map base	X
	Change line into stormwater system pipe	Changes the line or polyline into the pipeline.	X
	Combined sewer	Enables inserting pipelines with a given slope, ordinates or horizontal on the map base..	X
	Vertical combined sewer	Enables inserting only vertical pipelines with given ordinates on the map base.	X
	Change line into combined sewer pipe	Changes the line or polyline into the pipeline.	X
	Change of system height	Allows to change a group of sewage system objects ordinates by a given value (eg by 0.5 m).	X
	Sewage systems profile	Enables you to generate a section profile of the sewage system.	X
	Concrete wells drawing	Allows to generate schematic drawings of concrete wells used in the project.	X
	Drawing of selected concrete wells	Allows to generate schematic drawings of only selected concrete wells used in the project.	X
	Item list	Inserts list of the sewage system elements along with graphic symbols, names, markings and quantity.	X

Working with the software

	<i>Selected elements list</i>	Inserts list of selected on the view sewage system elements.	X
	<i>Material list</i>	Inserts a list of materials on the view.	X
	<i>Selected elements material list</i>	Inserts a list of selected materials on the view.	X
	<i>List of invert channels</i>	Inserts a list of concrete wells' invert channels in the drawing.	X
	<i>List of selected invert channels</i>	Inserts a list of selected concrete wells' invert channels in the drawing.	X
	<i>Verification</i>	Generates a list of incorrectly designed elements. Detects pipe sections with improper functions in the sewer line.	X
	<i>Calculations and report</i>	Displays calculation tables showing technical calculations and correctness of the designed sewage system. The window is able to generate calculation reports in RTF format.	X
	<i>Coordinate list</i>	Generates a report in RTF format of coordinates of sewage system objects and inserted geodetic points.	X
	<i>Options</i>	Displays the project options	X
	<i>Help</i>	Displays the software help contents	X

3.2.1. PROJECT MANAGER


The **Project Manager** allows you to manage all elements of the ArCADia program depending on the project being implemented: buildings, floors, electrical and gas installations, sewage systems, telecommunications networks etc.

Activation :

ArCADia Program:

- **System** Ribbon ⇒ logical group **Project** ⇒  **Project Manager**

AutoCAD Program:

- **View** Ribbon ⇒ logical group **View** ⇒  **Project Manager**

Or type

Working with the software

- ISA_tllv.

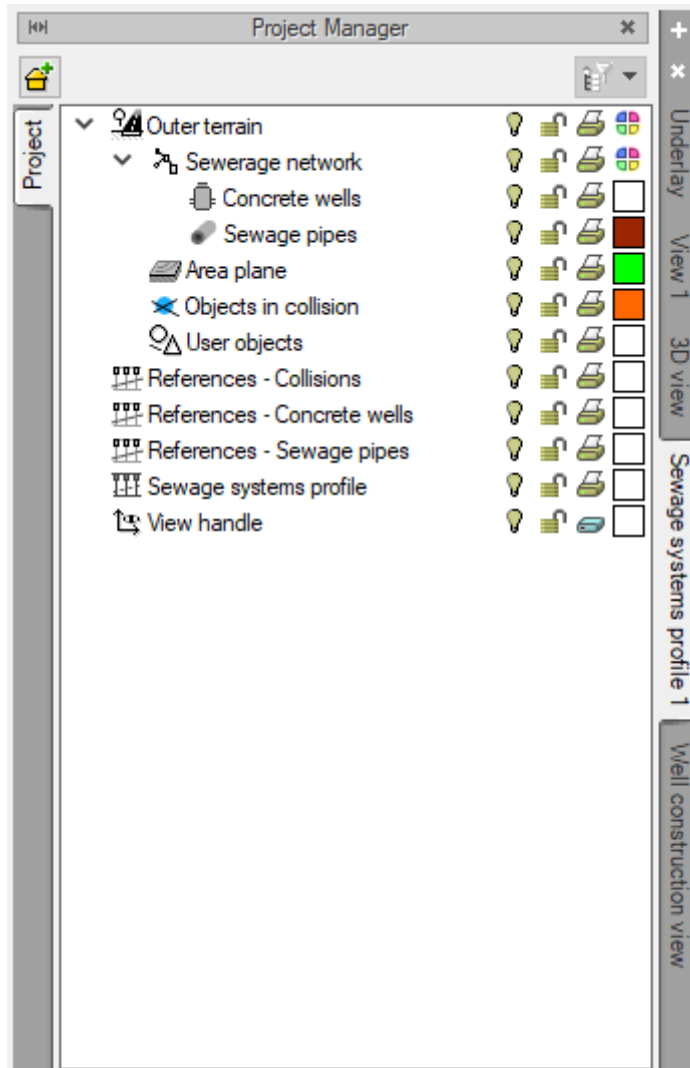


Fig.2. The ArCADia program Project Manager window.

On the right hand side of the **Project Manager** there are tabs for activating the generated views: profile network views. After clicking the left mouse button on the projection name (vertical inscription), the selected view is activated in the drawing field (the inactive one is grayed out).

If the user right-clicks on the name of a given view, the view properties window opens, in which the user can change its name, refresh method and drawing units (see chapter 4.2).

The Project Manager has a list of object groups entered by the user into the network project. Selecting the appropriate option next to the name of a group of objects allows you to define the visibility and color of drawing and printing. After right-clicking on the object name, the user can select all objects from a given group or enter a new subgroup of objects of a given type.

Working with the software


3.2.2. GENERAL SOFTWARE OPTIONS –ARCADIA OPTIONS

To display a dialog box with general system options of **ArCADia BIM**, click the icon:

ArCADia Program:

- **System** ribbon ⇒ logical group **Options** ⇒ 

AutoCAD Program:

- **System** ribbon ⇒ **Options** 

Or type

- ISA_O.

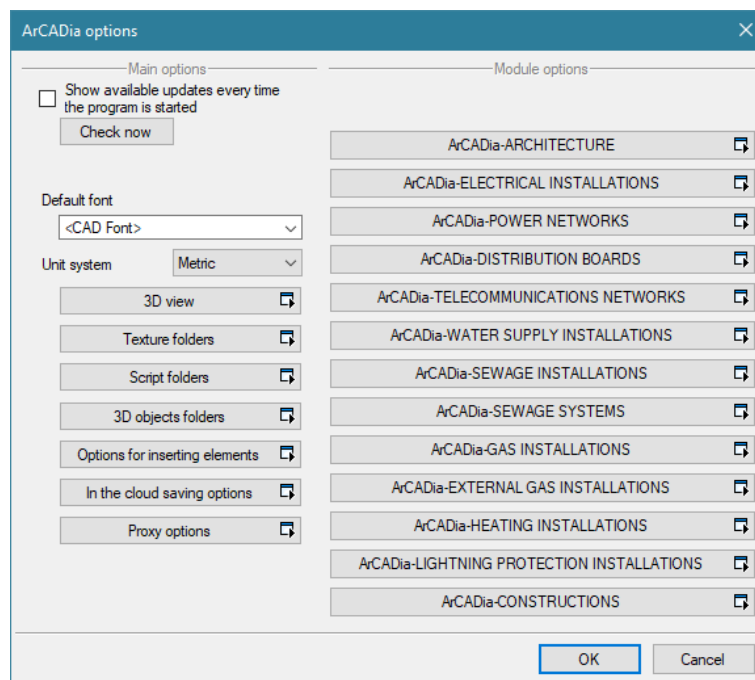


Fig.3. *ArCADia* system options window

The main options window activated from the Ribbon or **System** toolbar window is opened regarding the tab of available **ArCADia BIM** programs and general options of the **ArCADia BIM** system.

Main Options panel

In the **Main Options** panel found on the left hand side, the user has access to some system settings. Under the **Folder** button (textures, scripts, 3D objects) the user can set the path and where to store and retrieve these objects for projects.

Tracking options button

After clicking this button, the following window appears:

Working with the software

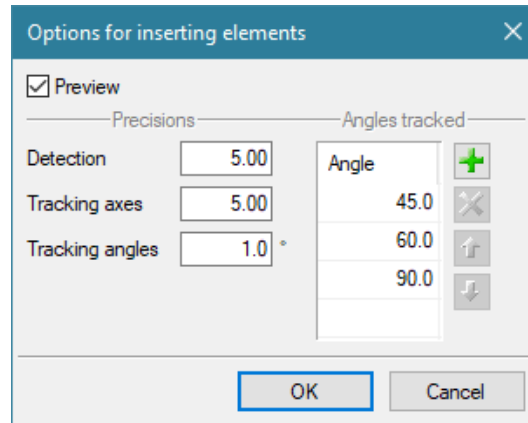








Fig.4. Tracking precision options window of the ArCADia program

On the left side the user may define how precisely (maximum distance from the element axis which will allow for detection) will the elements, axes and angles be detected while element axis  and angles  tracking is enabled and elements detection  is enabled.

Angles tracked may be inserted on the right side of the window. In the table the user may add, using the  button, another angle that he wants to be tracked when entering elements. If the user wants to delete one of the angles, he needs to select it by clicking it in the table and then delete one of the values using the  button on the right.

After defining the detection and tracking precision, the number of angles tracked and their values, the user may confirm changes using the **OK** button (changes will be saved in the software) or discard them using the **Cancel** button (all changes done in the in the tracking options window will be canceled).

An important element when drawing pipelines connected to each other is the Angle Tracking function. It enables the connection of pipelines at an acute angle specified by the user. The  button must be selected in the insert window .

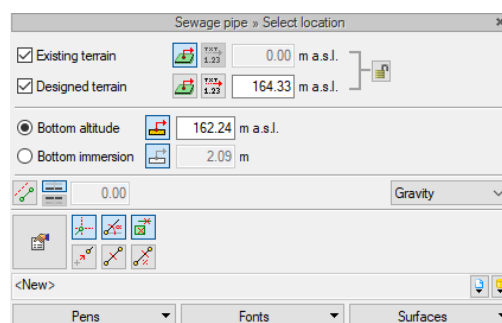



Fig.5. Location of the tracking function in the pipe insertion window

After activating the **Insert Pipeline** command and after moving the cursor over the selected point of the previously introduced pipeline, an X will appear ( must be selected).

Working with the software

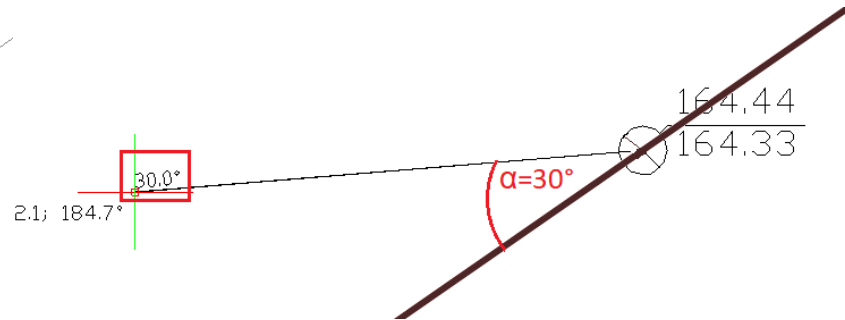


Fig.6. Drawing field view with detection of connection angle between pipelines

Then select the direction of insertion of the pipeline and, after setting the correct angle, the value will be displayed taking into account the set precision in the Tracking options window.


Module Options panel

On the right side of the **ArCADia Options** window is a panel with a list of buttons enabling access to options specific to individual industry programs.

3.2.3. OPTIONS OF THE ARCADIA-SEWAGE NETWORKS PROGRAM

In the **ArCADia Options** window, select **ArCADia-SEWAGE NETWORKS** and activate the window for setting options for the Sewer Network program or select:

ArCADia Program:

- **Sewage ribbon** ⇒ Grupa logiczna **Sewage Networks** ⇒  Options...

AutoCAD Program:

- **Sewage Networks toolbar** ⇒ 

Or type

- OSWR_OPPT.

Working with the software

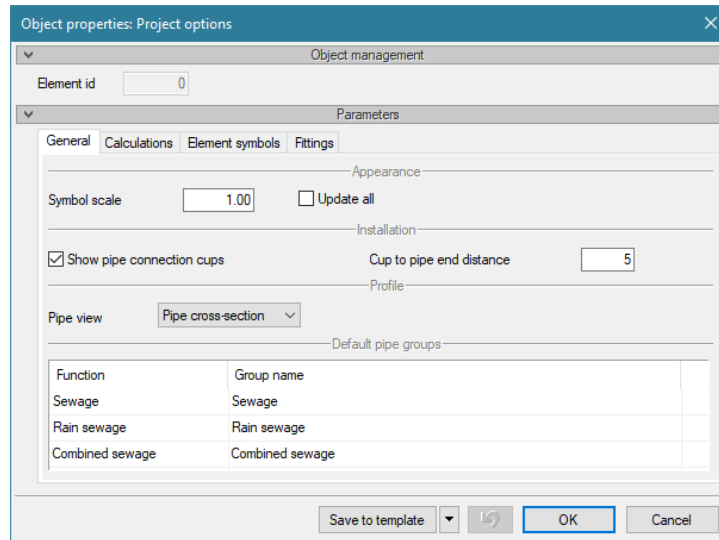


Fig.7. ArCADia Project Options window, General tab

In the **Project Options** window under the **General** tab in the **Parameters** panel there are tabs for selecting type of settings

General tab

View panel

Symbol scale - an edit field that allows setting the size of characters corresponding to objects that do not have a representation in the form of a symbol with dimensions, such as **Fixtures**. After inserting the symbol, you can go to **Project Options** and then insert the value (e.g. 5). You must also select **Update all**, which will cause all previously inserted symbols to be increased by the given value.

Installation panel

Show pipe connection cups – a check box that allows you to view cup symbols for pipes with cup connections.

Cup to pipe end length – field enabling setting the number of CAD units being the distance of the cup symbol from the end of the pipe.


Pipe view


Pipe view – drop-down menu:


1. Pipe bottom – in the profile view, the pipeline is drawn as a single line corresponding to the position of the ordinate of the pipeline.
2. Pipe cross-section – in the profile view, the pipeline is drawn in the form of two lines corresponding to the cross-section of the pipe.
3. Pipe cross-section with axis – two lines as in position 2 with an additional line in the middle constituting the axis of the pipeline - this option is recommended when making pipeline profiles of larger diameters.
4. **Default pipe groups panel**

Working with the software

Information for the user about entering permanently inserted pipeline groups. These groups correspond to the pipe selection buttons on the ribbon or toolbar.

Sanitary sewage – pipe inserted with  Insert sanitary pipeline

Stormwater sewage – pipe inserted with  Insert stormwater pipeline

Combined sewage – pipe inserted with  Insert combined pipeline

Calculation tab

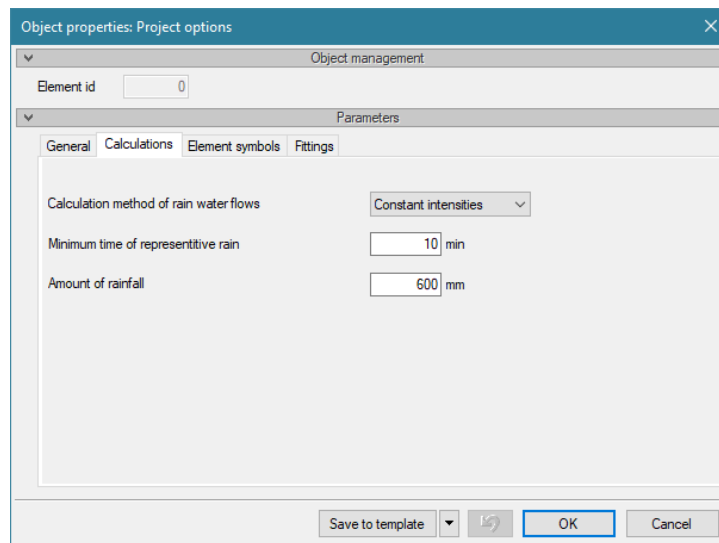


Fig.8. ArCADia program options window, Calculations tab

The tab is for the setting of data for calculating the amount of rain intensity and the amount of rainwater flowing through the calculation sections of the stormwater network.

There are **two** ways to calculate rainwater flow on sections of the stormwater drainage network:

- Constant intensities method – applies to both calculations for the sewage installations and the sewage network. Flows from calculation sections preceding a given section are added together.
- Limit intensities method – applies only to calculations carried out for sewage networks. The calculation flow for a given section of the sewage network is calculated taking into account the flow time through the calculation sections. This method is used for large rainwater catchments.

In addition, the user has the option of setting the of amount rain and duration of the rainfall depending on the area where the project is located.

Working with the software

Element symbols tab

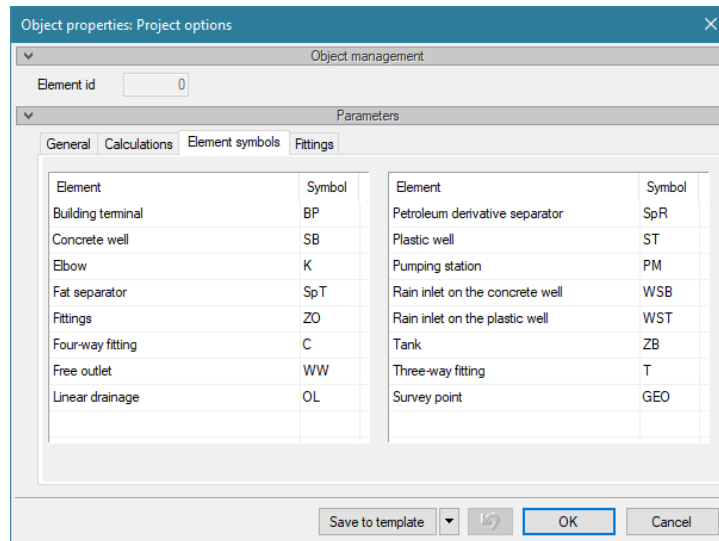


Fig.9. ArCADia program options window, elements symbol tab

In the options window in the tab **Element symbols** the user can change the default symbol describing the object by clicking on the selected cell of the **Symbol** column. For example, you can change the SB symbol for a concrete well to the Sd symbol, which can mean rainwater. Symbols can also be changed individually in the object's property windows.

Elements

The user has the option of leaving or entering his own markings for sewage network facilities. They will be inserted automatically in the plan together with the object. In each individual object, the user can change the symbol for a given type of element. Symbols will be inserted on the plan and on other views, e.g. development or profile.

Fittings

As above, the user can insert a symbol for the object **Fitting**. The difference is that the fitting is not an object inserted by the user, but only a modified one. This element is created when connecting pipelines as a set of fittings. The symbol is defined for the main fitting (elbows, three-way and four-way), which is a calculation point and characteristic in a view such as a profile.

Working with the software

Fittings tab

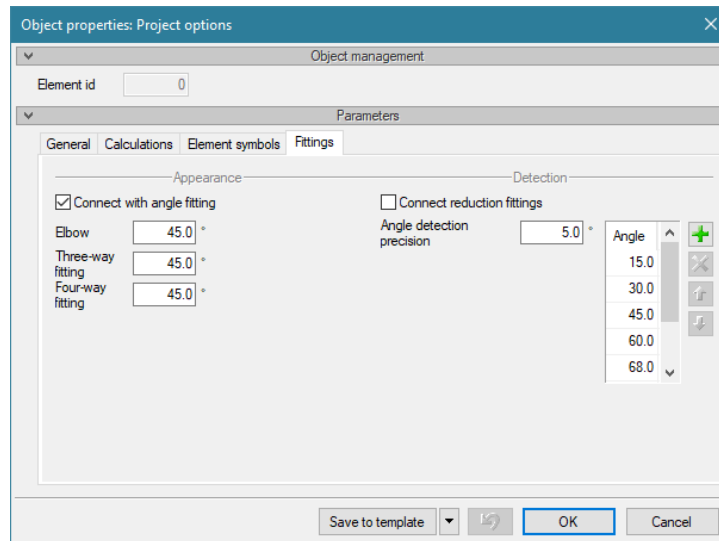


Fig.10. ArCADia program options window, Fittings tab

The tab of the project options **Fittings** is used to select and / or change the default connection settings (fittings) created in the project when entering the sewage network route.

Appearance

Connect with angle fitting – is used to change the automatic input of connections between pipelines using angle fittings. If the user enters the network route with the Ortho function of the ArCADia or AutoCAD programs (introduction at an angle of 90°) or without its use (provided that they are inserted at a right angle to the existing pipeline), they have the ability to automatically detect and enter angular connection fittings, i.e. 45° elbows or a 60° tee. To automatically create such connections when entering, just select the checkbox on the left next to **Connect with angle fitting**.

Below, the user will be able to define what default connections are to be made depending on the number of pipes connected, i.e. the type of fitting. For tees, the branch angle from the passage is given, and for tees the angle of both branches.

NOTE! In each fitting (set of fittings), you can individually change the default settings and enter the appropriate angle or totally disable the option of inserting angle fittings.

If the user does not select the **Connect with angle fitting** checkbox, connections will be made as a result fitting with any branch angles implemented at the time of connecting the pipelines. A 57° tee can therefore be created, which makes it possible to introduce rarely used or custom-made fittings.

Detection

Connect reduction fittings – option enabling default setting of connections made using reducing fittings (checkbox selected) or fittings and reduction (checkbox deselected). This means that by default the user will have, for example, the Dn100 / Dn50 reducing tee or DN100 tee and DN50 reduction. Other parameters, such as angle and material of the fitting, depend on other settings and parameters of pipelines introduced into the project.

Angle detection precision and angle list – This option allows you to determine the angles to which connections should be brought to connect pipes without function **Connect with angle fitting**.

Working with the software



Example:

The user unchecks the **Connect with angle fitting** function, e.g. when the network route is not entered using the Ortho function (at a right angle) and wants the connections to be detected automatically, but in relation to existing products on the market, regardless of with which precision pipelines are inserted into the project. Then the connection at any angle will be taken to the angle that is given in the list of detected angles. Detection can be narrowed down to the appropriate number of degrees. According to the settings in Fig. 10, the connection of two pipes at an angle of 28° 32 ' will be in combination with a 30° elbow (5° detection).

If the user specifies 2 ° in the **Angle detection precision** field for the above-mentioned example set of typical angles, then:

- angles between 28° – 32° will be treated as 30°,
- angles between 43° – 47° will be treated as 45°,
- angles between 58° – 62° will be treated as 60°,
- angles between 88° – 92° will be treated as 90°.

This allows you to quickly and easily enter the network route, e.g. for the needs of bill of materials or preparation of a simplified cost estimate.

Adding further items is possible by pressing , and deleting after clicking on the item with the entered angle and clicking .

4. DESCRIBING AND EDITING ITEMS

Describing and editing items

4.1. PRELIMINARY NOTES ON ITEM EDITING

Editing each item consists in inserting an item symbol to the blueprint. The software offers two types of items divided due to the definition of their characteristic geometric real dimensions, i.e. : items that require geometrical parameters to be defined and items that are only reflected as graphical symbols, without defining their real dimensions.

The item symbol includes information about the characteristic parameters, i.e. technical, process and geometric parameters of the item (if required), which are necessary to execute supplementary drawings, calculations and verify their validity.

An item is inserted in the model by selecting the appropriate icon from the software toolbar Fig.1. The item insertion window appears. The window for each item enables selecting the item location by defining a handle in the contour or the item's characteristic point and enables spatial localization for example to insert the installation level.

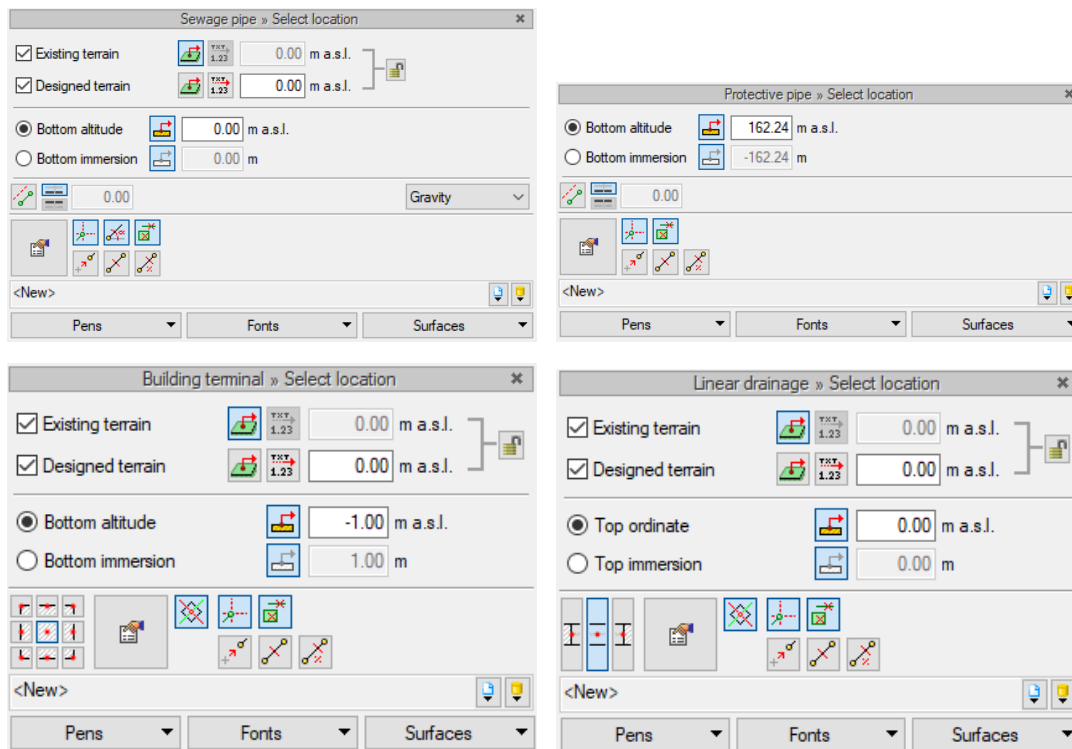























Fig.11. View of the insertion windows for sewage objects

Describing and editing items


Tab. 1. Buttons for functions in the object insertion windows

Icon	Options	Description
	Import from terrain	The function is used in the case of earlier modeling of the terrain with altitude points contained in the Landscape module. The user inserts the object and the ordinate value is automatically taken from the previously inserted terrain.
	Get value from text	When inserting an object on a digital map, the function allows you to enter the elevation value of the terrain by clicking on the elevation value text on the map. The land elevation will be entered in the ordinate field of the existing or projected terrain.
	Sync values	The use of this function is suggested when the designed area coincides with the existing one or in the case when in the project, the existing area will be restored to its pre-construction status. After entering the value in the existing field, it will be automatically written into the field of the planned area.
	Import from element	The function enables connecting objects at the characteristic points of these objects.
	Go to properties dialog box	The button opens the object properties window in which it is possible to set parameters for the given object.
	Parallel offset	The function is available for linear objects (pipelines). Inserts the object at a given distance from the selected line (e.g. edge on the map).
	Angle	The function is available for linear objects (pipelines). It enables the connection of pipelines with angle detection between them from the list defined in the project options.
	Length	The function is available for linear objects (pipelines). It allows to insert a pipeline of a given length at a graphically or numerically indicated angle (relative to the coordinate system).
	Parallel	The function is available for linear objects (pipelines). It allows insertion of a pipeline parallel to two points indicated on the map.
	Insert with rotation	The function is available for objects with a symbol or dimensions. Allows you to rotate the symbol around the object's attachment point after the first click. The second click sets the position and locates the object.
	Tracking axes	This function is useful when inserting an object relative to a characteristic point of another object located in another location.
	Element and section detection	This function is important when connecting the pipe to the object. Determines the place of connection (acts as the location point of sewage objects).

Describing and editing items

	Reference	This function allows you to determine the location of an object point relative to another previously inserted point.
	Between points (center)	The function enables the insertion of a characteristic point of the object symmetrically between two arbitrarily selected points.
	Between points (percentage)	This function allows you to insert a characteristic point of an object at a percentage distance between two freely selected points on the map.
     	Corners	Determining attachment points for objects with at least two flat dimensions.
	Edge	
	Center	
	Edge	
	Axis of symmetry	

Along with the object insertion window, an object symbol is generated in the drawing area that is attached to the cursor and moves according to the mouse movements. Objects with at least two flat dimensions have default dimension values set, which can be changed during insertion by entering the


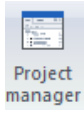
properties window by selecting the icon in the insertion window **Go to properties dialog box** .

You can change the attachment of the cursor using the cursor attachment points: .

4.2. STARTING WORK ON THE PROJECT ON THE MAP

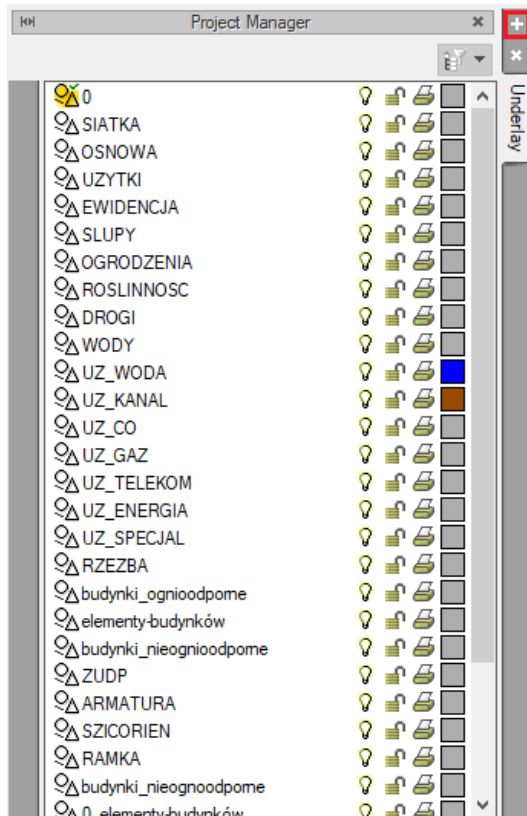
How to insert from the Project Manager window:

1. Open the file containing the map drawing or other image related to the investment area. It can be a drawing in DWG or DXF format containing a vector map with embedded coordinates. You can also add a vector map or a scaled raster map to a clean DWG file.

2. Select the **Project Manager** icon from the **System** toolbar or ribbon:  or .

Describing and editing items

3. In the **Project Manager** window, select the "+" sign for **Insert view**.



A view handle attached to the cursor will be generated, which should be inserted into the drawing field (outside the map).

NOTE! If the map is embedded in coordinates and the user generates a coordinate summary, then the view handle must be inserted at a point with coordinates 0, 0, 0 in the global CAD system and if the map is drawn in units of **Meters**, then the View unit of **Meters** should be set in **View Properties**.

Describing and editing items

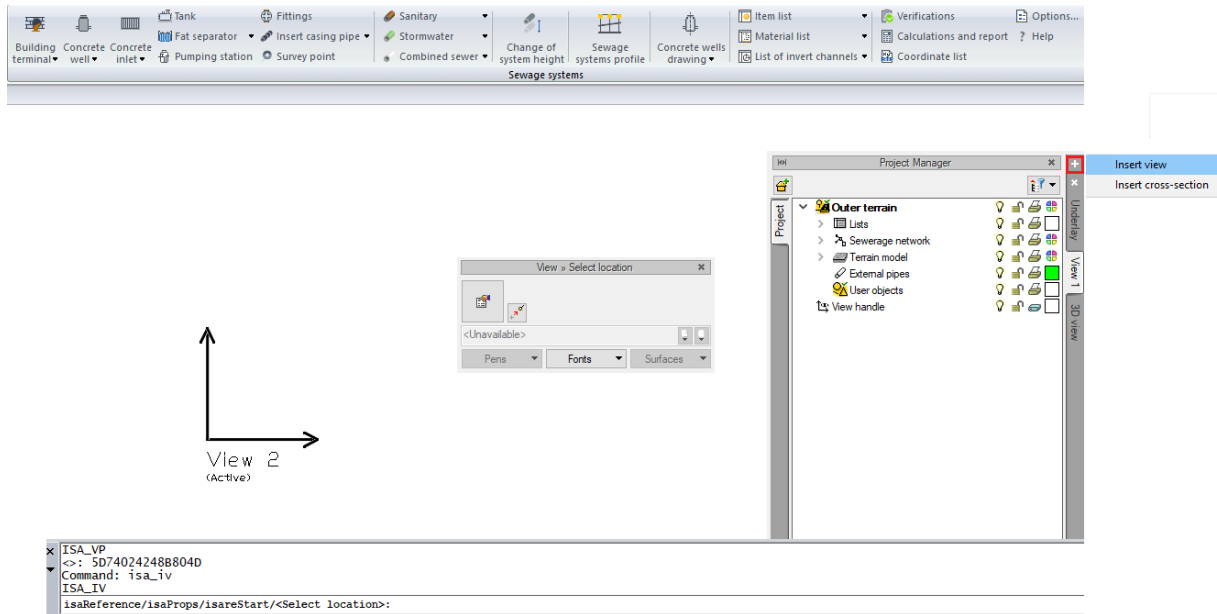






Fig.12. Drawing field view when inserting the ArCADia BIM View

	View tabs - located on the right or on the left side of the Manager window
	Go to properties dialog box
	View anchor
	Coordinates of the view anchor handle can be entered in the command line.

- After inserting the **View Handle**, in the **Project Manager** window the View 1 tab will be created on the sidebar. After right-clicking, you can open the properties window of the element **View**.

Describing and editing items

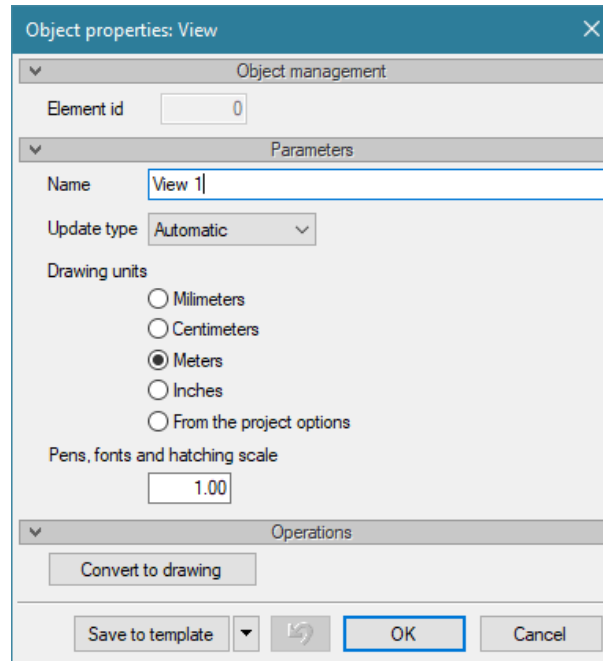



Fig.13. View properties window

Automatic way to insert a view :


1. Select a button of any object (e.g. well) from the ribbon or the **Sewage Network** toolbar.
2. If the inserted object is disproportionately large in relation to the map elements, stop the command and change the drawing units.
3. In the **Project Manager** window, right-click on the created **View 1** tab.
4. Open the View Properties window, set the Drawing Units according to the units used on the map.
5. The project handle will automatically be located at a point with 0,0,0 coordinates (beginning of the CAD drawing coordinate system).




4.3. RULES FOR ENTERING OBJECTS INTO THE DRAWING FIELD


In programs for designing the underground infrastructure network in the window of objects located relative to the area, you must define the ordinates of the existing and planned terrain planes. Along with the object, an altitude point is inserted, which is a separate object from the Landscape module, which is partly added to the purchased license for the **ArCADia-SEWAGE NETWORKS** program. Thanks to this, the user can use some of the functions contained in the **Landscape** module (**basic functions available with the license for ArCADia-SEWAGE NETWORKS**). The depth of pipelines and sewage facilities is always related to the designed area. If the planned area is not envisaged, the same value should be entered as for the existing area. There is a padlock mark  next to the input fields. Applying it automatically assigns the existing value to the designed area.

NOTE! Important rule! *If a sewage object connected to an elevation point with defined elevations is inserted, then the object attached to it (with elevation set) will overwrite the elevation value. If the user does not want to change the ordinates set in the previously entered object, deactivate the ordinate entry (checkbox on the left of the description) or enter the same values.*

Describing and editing items

By clicking **Import from element**  you have the option of inserting an object, connecting it at an appropriate characteristic point for a given object with a connecting element characteristic of another object already inserted in the drawing (e.g. for pressure pipelines, the connecting point is the axis of the pipe, for gravity pipes it is the bottom, for wells bottom of the invert channel, for tanks the bottom of the tank, etc.).


There are also options in the window that help you insert the object precisely. These options are activated by pressing the corresponding tracking function buttons  or detection  other elements existing in the drawing and angles .

Pressing  allows you to draw a pipeline parallel to any line or line object with a fixed offset.

Insertion into the drawing can be done in two ways:

First method:

After selecting the appropriate **ArCADia-SEWAGE NETWORKS** icon (Fig. 1), the object insertion window will appear. Then proceed to editing the object parameters by selecting the **Element**

Properties button  in the object insertion window.

The **Object properties window** will be displayed, allowing you to set the characteristic parameters of the object. After doing the settings, press the **OK** confirmation button, which will return to the object insertion window, and click on the selected object symbol in the drawing field. The procedure of such object insertion remembers parameter settings as well as fonts, pens and surfaces for each subsequent object from the same group.

Second method:

After selecting the appropriate icon (Fig.1), insert the object symbol using the object location function. Then select the object, which displays the toolbar for modification.

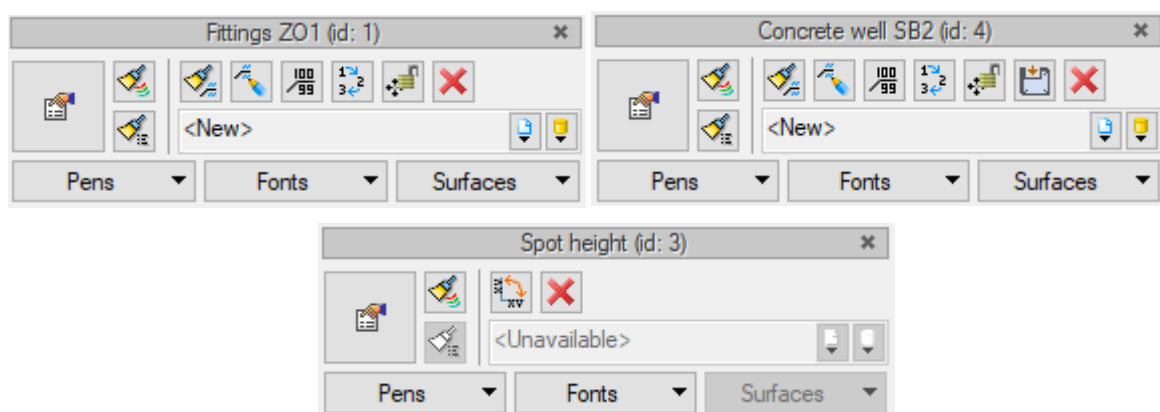















Fig.14. Object modification selection toolbar - basic functions view

Describing and editing items

Tab. 2. Function keys of object selection window

Icon	Option	Description
	Go to properties dialog	Opens an object property window that allows you to define geometric and technological parameters.
	Fonts and pen painter	After selecting a function and clicking an object of the same type, it transfers the properties of fonts and markers (size, color, font type).
	Type painter	After selecting a function and clicking on an object of the same type, it transfers the properties of fonts and markers (size, color, font type) to the second object.
	Description painter	After selecting the function and clicking on the object of the same type, it transfers the description properties (displaying descriptions, description layout).
	Change direction of description	If the description is on a reference, it is possible to change from horizontal to vertical descriptions.
	Edit description	Sets the description properties.
	Set description on the link	Insert a description on the link.
	Object renumbering	Opens a window enabling logical numbering of objects of a given type.
	Move without connections	Moves the object while maintaining connections with other network objects.
	Insert source	The function is available for objects that can be a source of sewage. The function describes the sewage inflow to a given calculation section.
	Insert outlet	The function sets the end object for a given sewage network system.
	Delete selected elements	After pressing, the object is removed from the drawing (Delete).

NOTE! Other modification icons specific to the type of objects may appear on the windows of individual objects.

You can go to editing object parameters by selecting the button . After setting the parameters in the **Object properties** window, press the **OK** confirmation button, which will change the parameters of the previously inserted object.

The **Object Properties** windows are used to set the characteristic, geometric and technical parameters of the object and are divided for each object into groups of controls:

Describing and editing items

Control Group Object management

Symbol – setting the name displayed on the view together with the object's sequence number. If the user does not make any changes in the active window, the name will be generated from the **Options** window.

Element Id– the number of the next inserted element of a given type.

Type – allows you to enter objects with common parameters into the project library.

Grupa – common to each of the objects. Allows you to group selected objects and enter them into the **Project Manager**.

***NOTE!** It is important that the division into groups applies to all facilities and with the help of groups included by default, the user can define the purpose of the designed sewage network (sanitary black or gray sewage, rainwater or technological). When drawing the first of the objects, the user gives it the appropriate group and the next element of this kind will be drawn in the same group..*

Control Group Appearance

The set of controls contained in this group is the same (or very similar) for all objects contained in the program.

Description content – enables running the configurator for setting description content and its organization. By selecting the **Description** check box, the user decides whether the description will appear on the view.

Angle – by changing the value in the edit field the user can change the insertion angle of the object.

Pens – setting the thickness, stroke drawing lines on the model and 3D view.

Font – setting the font format of the name displayed on the drawing views

Surfaces – setting colors and patterns of surfaces viewed on 3D.

Describing and editing items

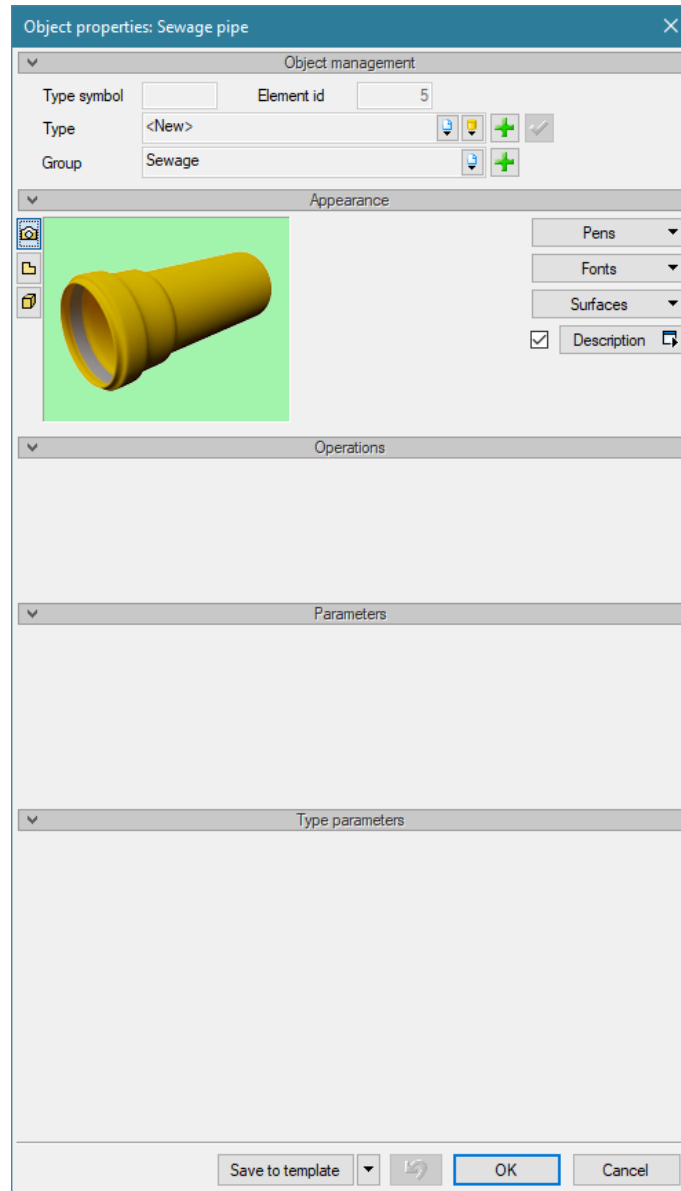


Fig.15. Element properties window of Sewer pipe, general appearance

Control Group Operations

A set of individual controls for individual types of objects. Sets parameters for additional elements, e.g. terrain elevations.

Control Group Parameters

A set of individual controls for each of the objects. It allows you to set assembly parameters that define, for example, the location of the object, functions performed, and altitude position.

Control Group Type Parameters

A set of individual controls for each of the objects. It enables setting parameters specifying a given object, e.g. technical and geometrical parameters (diameter, material, etc.).

Control Group accepting (OK or Cancel)

Describing and editing items

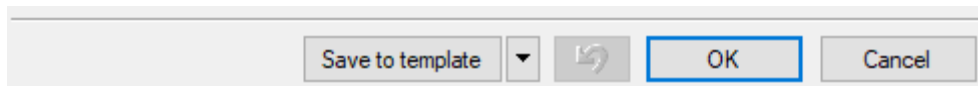


Fig.16. Save or cancel buttons

Save to template – allows you to save the default object type in the selected template.



– button to restore the initial settings to the type.

OK – acceptance and introduction of changes.

Cancel – cancel changes and return to the previous window.

In the **Appearance** controls group, after selecting the check box to the left of the **Description** button (inserting the hook), the **Description** button is activated, and when it is pressed, the description appearance configurator window is activated.

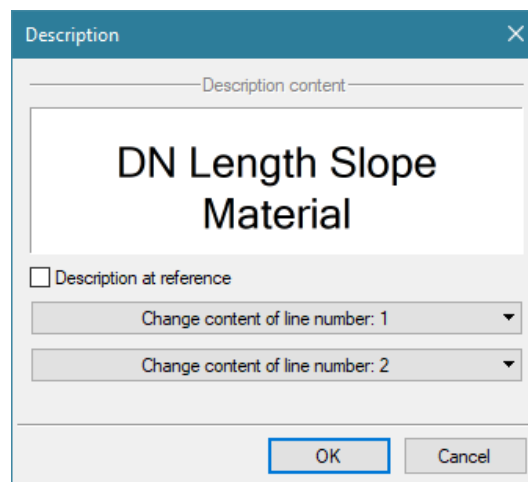


Fig.17. Description configurator, general view window.

The user has options in the window to set the substantive content of the description components (different for a given object) and their order of location and location relative to the description line.

After pressing the appropriate line content button (top or bottom), an additional window is opened enabling the appropriate selection of layout and content (Fig. 18 **Błąd! Nie można odnaleźć źródła odwołania.**), example of setting the bottom description line for a pipeline).

Describing and editing items

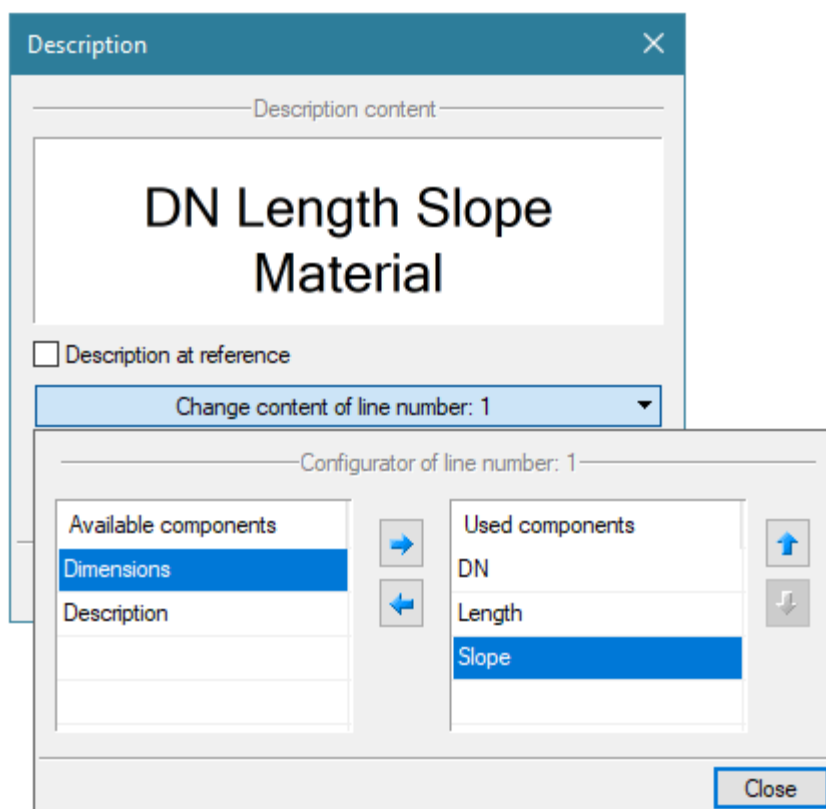


Fig.18. Description configurator, view of the description appearance window.

Tab. 3. Button functions in the Description Configurator window.

DN Length Slope Material	Description setting preview window
<div>Available components</div> <div>Dimensions</div> <div>Description</div>	Table of available components
<div>→</div>	Flip button
<div>↑</div> <div>↓</div>	Reorder buttons
<div>Used components</div> <div>DN</div> <div>Length</div> <div>Slope</div>	Table of the description content on the given line


The description configurator window has two tables: on the left available components and on the right the content of a given line. Availability of components for a particular line depends on the introduction of the inactive line. Introduction to the description on the desired line consists in selecting the name

Describing and editing items

of the description and pressing the arrow in the direction of the table of contents of the line description. The selected description title will be moved, so it will not be located in the table of available components. If the user wants to share the component, he proceeds in a similar way by selecting the description item in the line content table and using the arrow to move to the table of available components.

The order of the description components on a given line is set from left to right, according to the order in the table content of the line from top to bottom. The order is changed by selecting the item's position in the line content table and controlling the change order buttons, which changes the order of the given item by one field. Each press of the arrow changes the order one space up or down. After pressing the **Close** button, the changes will be applied.

NOTE! If we select several pipelines with different descriptions (then the square next to the description will be painted blue), we can change the description for everything at once. In this situation, the description configurator defaults to an empty description on the link. Click the Description control and set the appropriate description components.

You can go to editing the object description by selecting the button  **Edit description** on the toolbar for selecting object modifications (Fig.14). Then we have the description editing window available (Fig.19).

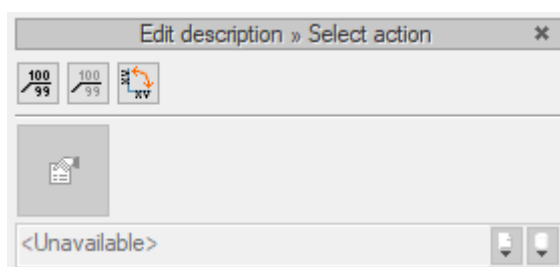






Fig.19. Description edit window

Tab. 4. Description organization buttons

Icon	Option
	Turn description on / off
	Enable / Disable link
	Change direction

To transfer description settings from one item, select the button  **Type painter** on the toolbar for selecting object modifications (Fig.14). Then a window will be available in which the user can mark by unchecking the appropriate checkbox which parameters of the description are to be transferred ("painted") to the description of the next element.

Describing and editing items

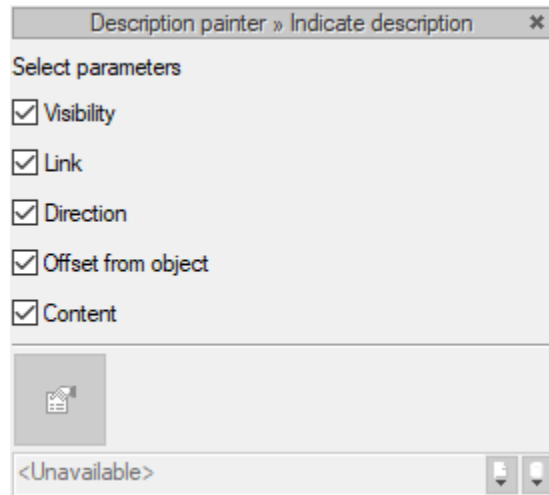


Fig.20. Type painter window

Available parameters are:


Visibility – moves the setting of the enabled (disabled) description.

Link – moves the description setting with or without a link.

Direction – moves the vertical (horizontal) orientation of the description.

Offset – moves the next item to the description position relative to the object.

Content – transfers the content of description lines set in the description configurator.

To renumber network elements, you need to press  **Renumber objects** from the object modification toolbar. A renumbering window will appear in which you can specify:

the symbol of the object from which the renumbering will begin,

- method of renumbering; after unchecking the Increase field, numbering will begin from the digit of the symbol upwards, without unchecking the Increase field, the program will give the same symbol to all objects of a given type,
- automatic renumbering,
- the direction from which the corner of the document will begin renumbering and whether it will take place horizontally or vertically.

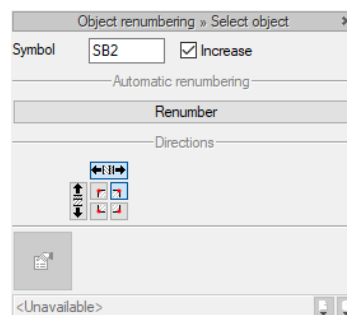



Fig.21. Object renumbering window

Describing and editing items

Editing and entering types

To display the **Type Library Editor** dialog box, click on the icon:

ArCADia Program:

- **System ribbon** ⇒ Logical group **Library** ⇒ 

AutoCAD Program:

- **ArCADia-SYSTEM toolbar** ⇒ 

Or type

- ISA_ETL.

Type Library Editor is used to edit and introduce new types of **ArCADia** objects. It facilitates access to producer catalogs and allows the selection of only those catalogs that the user most often uses at the design stage. In addition, it divides types into **Standard Library** (that is, included with the given software version) and **Project Library**, which contains all new or modified types of elements..

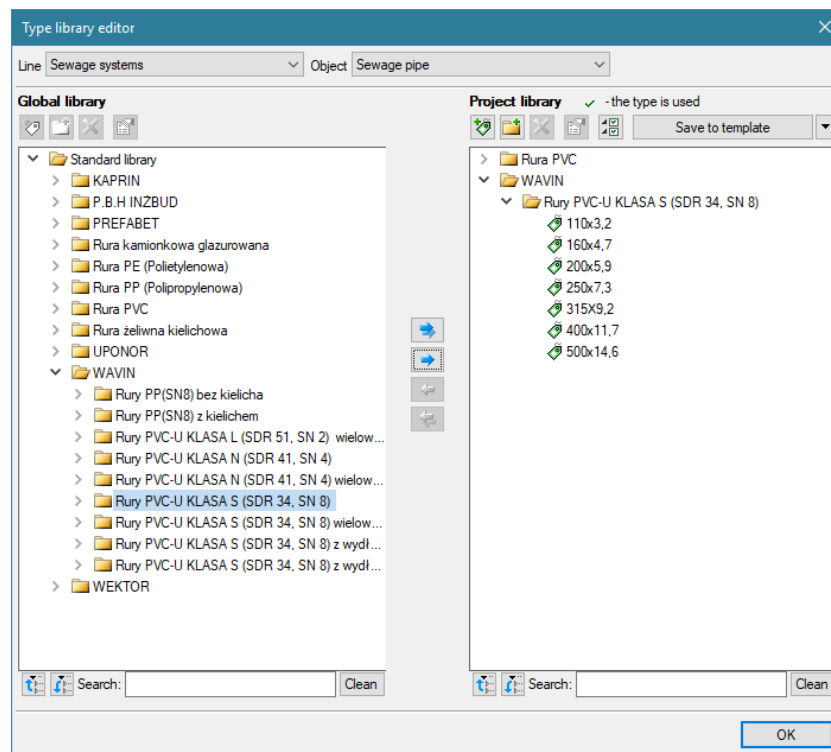


Fig.22. Type Library Editor window

At the top of the **Type Editor** window (Fig.22) the user has the option of choosing an industry from the drop-down list that contains all the industries available in the **ArCADia BIM** system - modules.

Describing and editing items

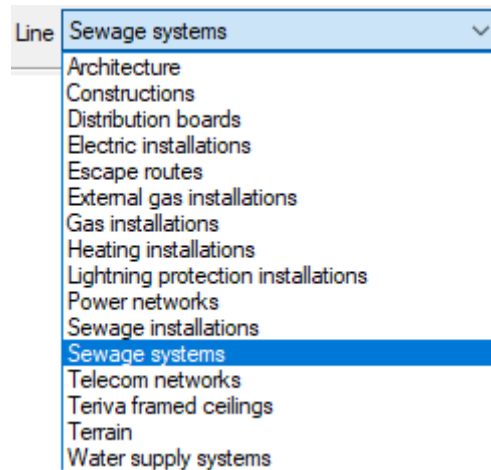


Fig.23. View of the expanded list of industries available in the ArCADia BIM system

After selecting the industry that is right for you, the user in the drop-down list **Elements** (on the right) has all elements available in the selected industry (module), e.g. sewage pipe (Fig.24).

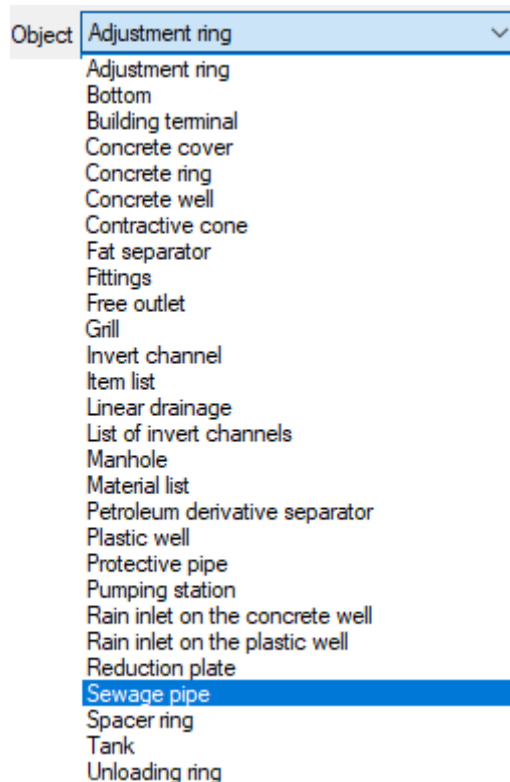


Fig.24. View of the expanded list of elements available in the Sewage Networks industry in the ArCADia BIM system

After clicking on the selected item in the **Global Library** all types of elements will be available. The first time they start, they will be **Standard Library** types (files included with the given program version). During the design process, you can add additional types by creating a **User Library**.

Describing and editing items

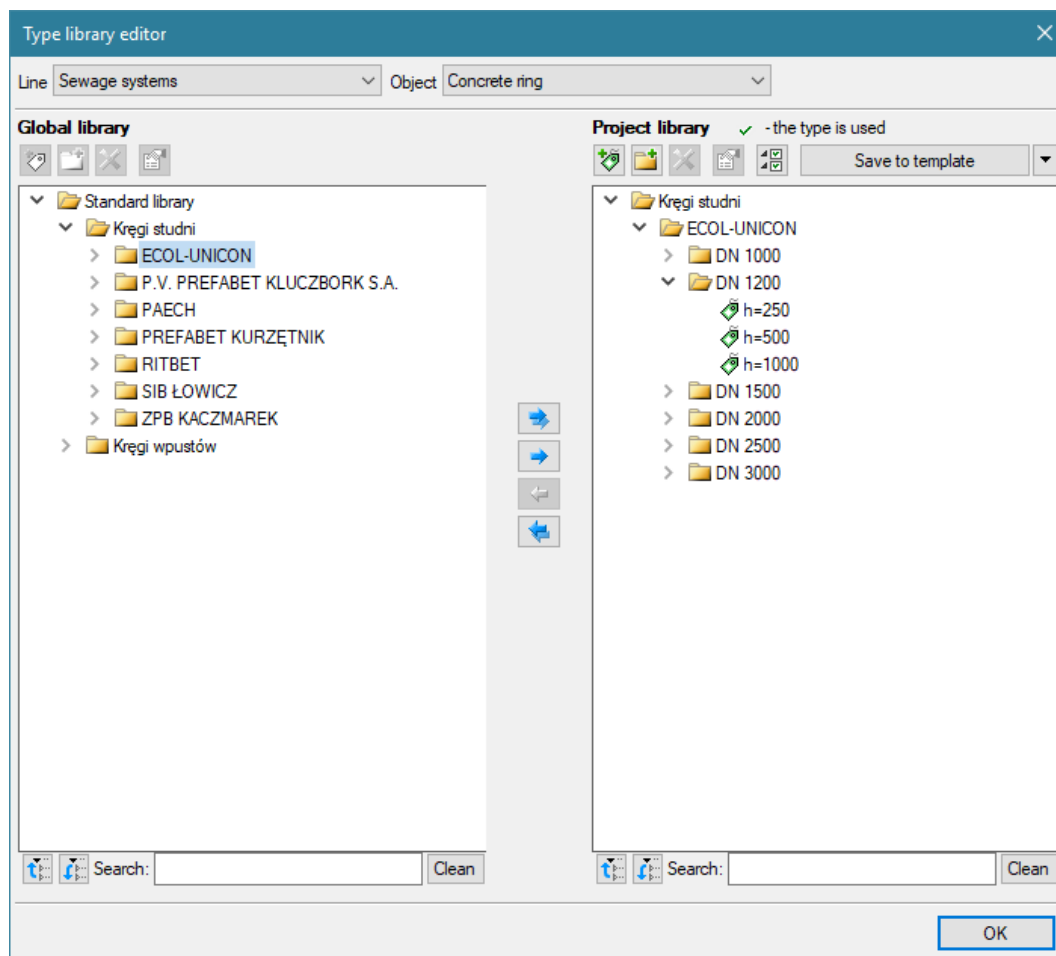


Fig.25. The type library editor window after selecting the appropriate industry and one of its elements.

The lower part of the editor window is divided into the **Global Library** page (left) and the **Project Library** (right).

The **Global Library** is a place where all the types of elements available to the user are added by default and during working with the program, divided into the **Standard Library** (and which the user does not change) and the **User Library**, which contains elements (types) entered by the user while working with the program.

The **Project Library** is a place in which there are all the types of elements used or possible to use in the project. The type for an element can be set from the element properties window (Fig.26, Fig.27):

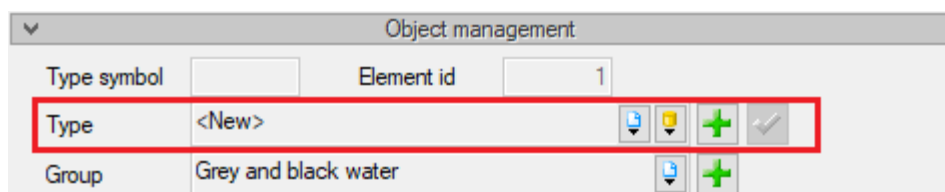


Fig.26. Place of entering the type from the element properties level,

Describing and editing items

and on the modification and insertion windows:

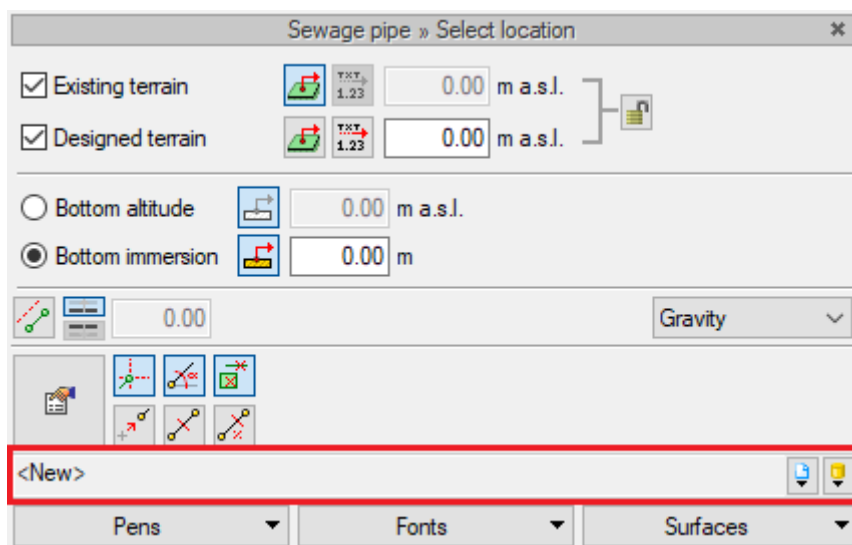


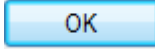



Fig.27. Place of entering the type from the level of inserting and modifying the element.

Above the type library windows are icons with the following uses:

Add new type  – after clicking on this icon the user can add a new type to the **Global Library** or to the **Project Library** (to the **User Library**). It is also possible to edit the type properties for an element, where the user can assign the element all those parameters that are characteristic for it, e.g. these are the type parameters, view.

Add new folder  – after clicking on this icon the user has the option of adding a new folder to which he will then be able to add item types. A window will appear with the option of entering the folder name. After entering the name, press the button , to add a folder to the library, or , to cancel the command.

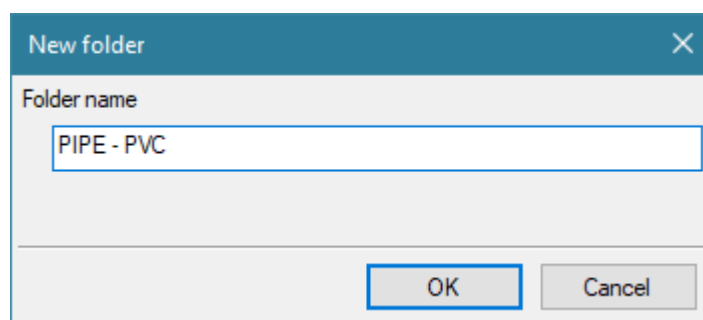





Fig.28. Window of type folder being entered

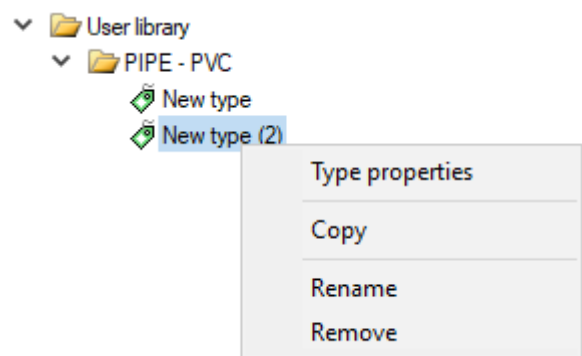
Delete  – after clicking on this icon the user can delete the selected type or folder.

Type properties  – after pressing this icon the user will have access to the properties of the selected type. He can change and save them here.

Leave only Types used in Project  – after clicking this icon in the w **Project Library** there will remain only those types that were used in the project (have been used in some object).

Describing and editing items

After right-clicking on a type, a menu is available:



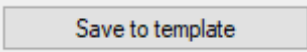

Type properties – functions like the icon described above.

Copy – copies the given type.

Paste – pastes the previously copied type and inserts with the same name and subsequent number.

Rename – the user can change the name of the previously entered type.

Delete – functions like the icon described above.

Above the **Project Library** you can find the  button. After clicking this button, the **Project Library** settings will be saved in the template and will be available for subsequent projects carried out in this template. Next to it is the  icon, after clicking it the user has a list of available templates.

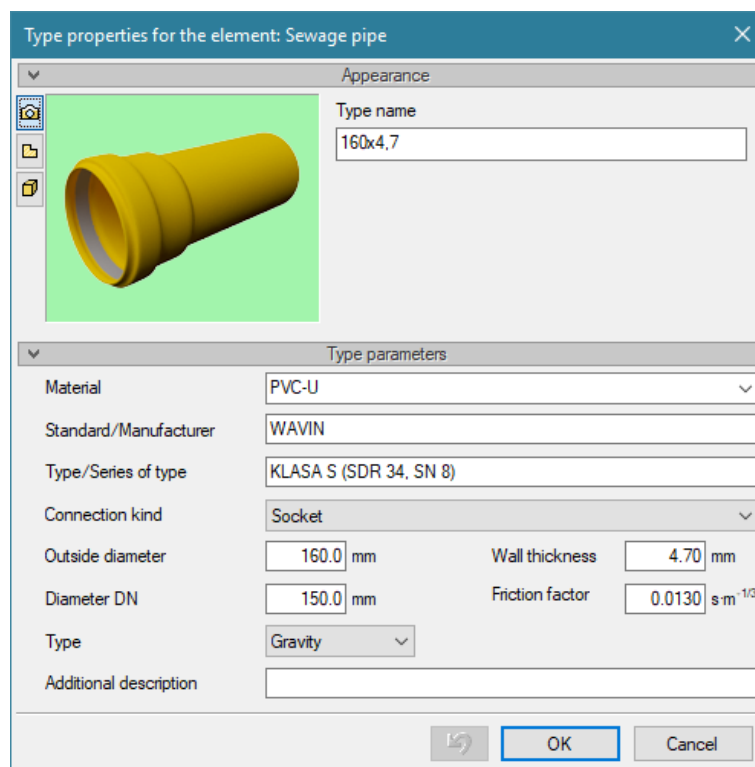


Fig.29. Przykładowe okno właściwości

Describing and editing items

In the **Project library window** you can also check what element types are currently used in the project. Next to the name of this type there is a sign ✓.

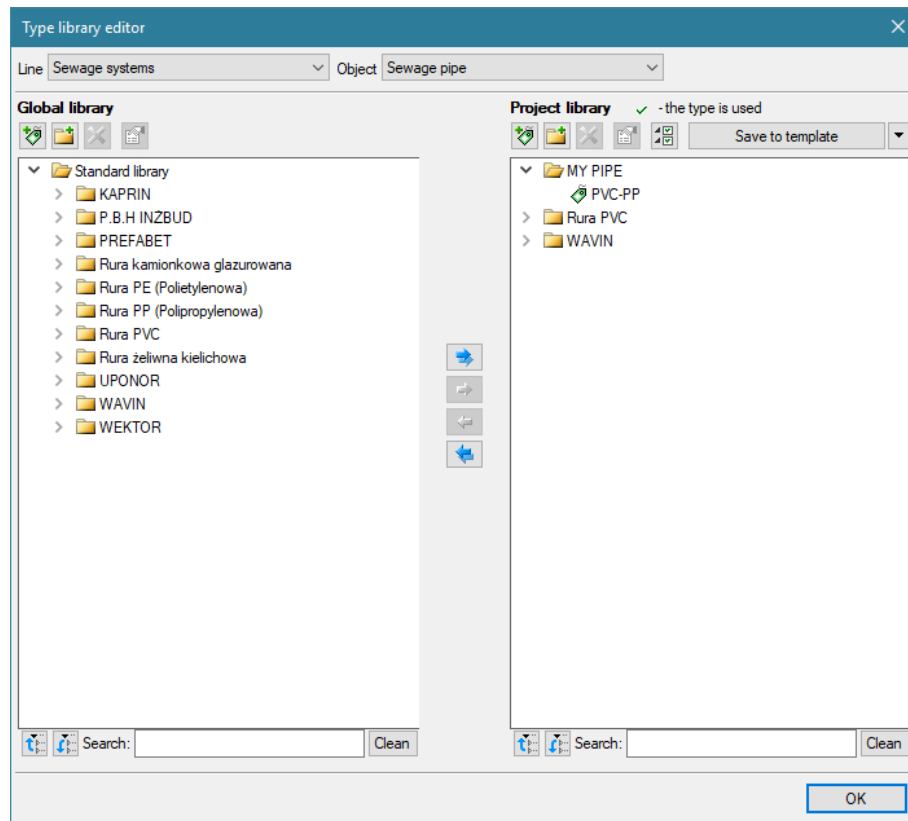




Fig.30. The Type Library Editor window after entering the type in the Project Library


Under both libraries you can find the following icons:

Hide everything  – after clicking on such an icon the type tree in a given library will be collapsed to the root directories.


Show everything  – after clicking on such an icon the type tree in a given library will be expanded.


The user can also search the type library by typing in the field all or part of the name of the searched type. Next to it is a button . After clicking on it, the search edit box will be cleared.

After selecting types or folders, the toggle buttons between libraries become active.

Copy everything to the Project Library  – copies the entire contents of the Global Library to the Project Library.

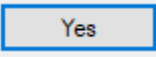
Copy to the Project Library  – copies selected items to the Project Library.

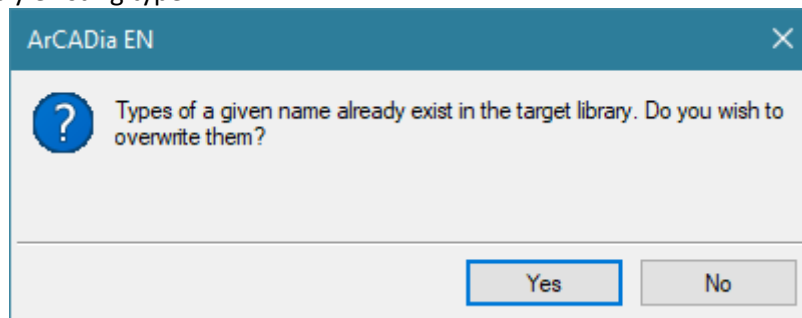
Copy to the Global Library  – copies selected items to the Global Library.

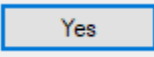
Copy everything to the Global Library  – copies the entire contents of the Project Library to the Global Library.

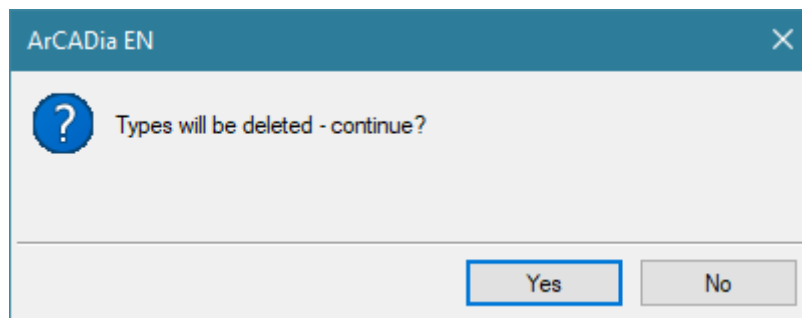
Messages that appear when working with the **Type Library Editor**:

Describing and editing items

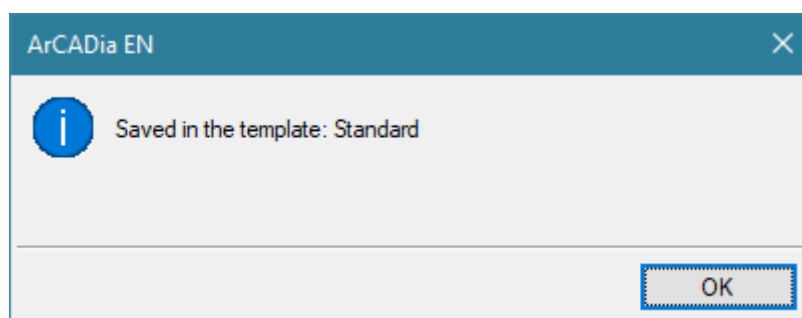
1. This message indicates that a type with this name already exists. After clicking  the information contained in the new type will be saved and replace those that were in the previously existing type.



2. This message indicates that the types selected by the user will be deleted. The button  accepts the deletion of types.



3. The message informs that the project Library layout has been saved in the project template, e.g. Standard.



NOTE! If the user made changes to the Project Library, changed existing types or extended them with new types while working on a project, they may be available for subsequent projects. Then, use the toggle buttons to add new types to the Global Library.

5. DEFINING OBJECTS

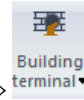
Defining Objects

5.1. BUILDING TERMINAL

In order to insert the object **Outflow point for the sewage line**, click on the icon:

ArCADia Program:

- **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks toolbar** ⇒



Or type

- oswr_bp.

The object insertion window appears. It is an object that defines the foundation wall of a building object from which sewage or rainwater flows.

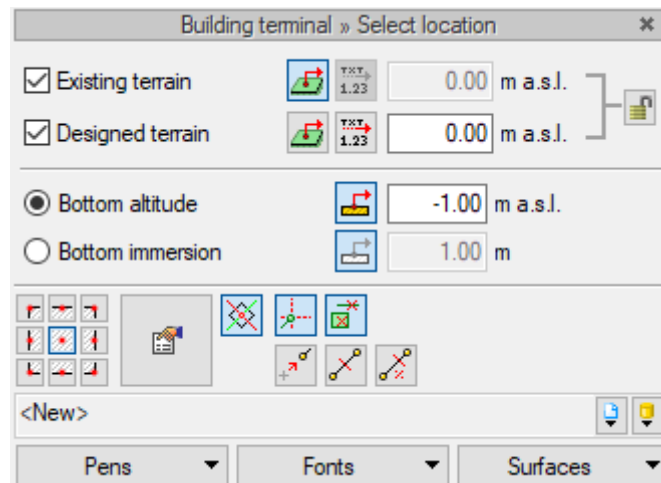


Fig.31. Object insertion settings window of Building connection

The **building terminal** object symbolizes and defines dimensions of the foundation footing and its depression as well as the location of the bottom of the pipeline relative to the terrain.

The insertion window allows you to choose the correct position for inserting the foundation footing symbol in the map projection by:

- The user selects the anchor point on the contour or in the center of the footing symbol.
- Selecting the insert function relative to elements already drawn, i.e. setting of element detection and sections , tracking elements and ends of sections .
- Settings of ordinates of the **designed terrain** and the **existing terrain**.
- Setting the **bottom altitude** or **bottom immersion** of the pipeline relative to the designed area - pressing the Import from element button immersion of the bottom of the pipeline relative to the designed area - pressing the Download from element button allows you to adjust the depth of the axis to the object previously drawn (e.g. pipe). A minus sign when the Bottom

Defining Objects

immersion position is active means that the pipeline is placed above the surface of the designed area.

When the insertion window is active, a schematic plan view of a fragment of the building foundation appears on the model drawing area. Clicking on a selected place in the drawing area inserts a symbol to symbolize the object (building foundation). The designation on the projection of the object has real dimensions. To change the length and / or width of the building terminal, change the parameters in the **Object properties** window. After inserting the object and selecting its symbol, the object modification window appears on the view.

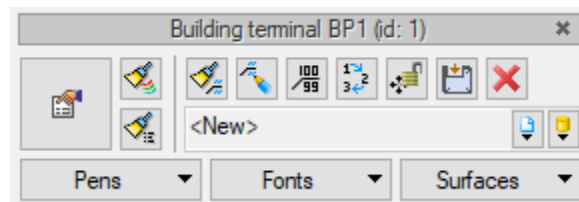



Fig.32. Object modification window Building terminal

This object is a natural source of sewage and is inserted with a reference to the source of sewage. At the same time a button is available on the action bar  **Insert source**, which allows you to define a second type of wastewater.

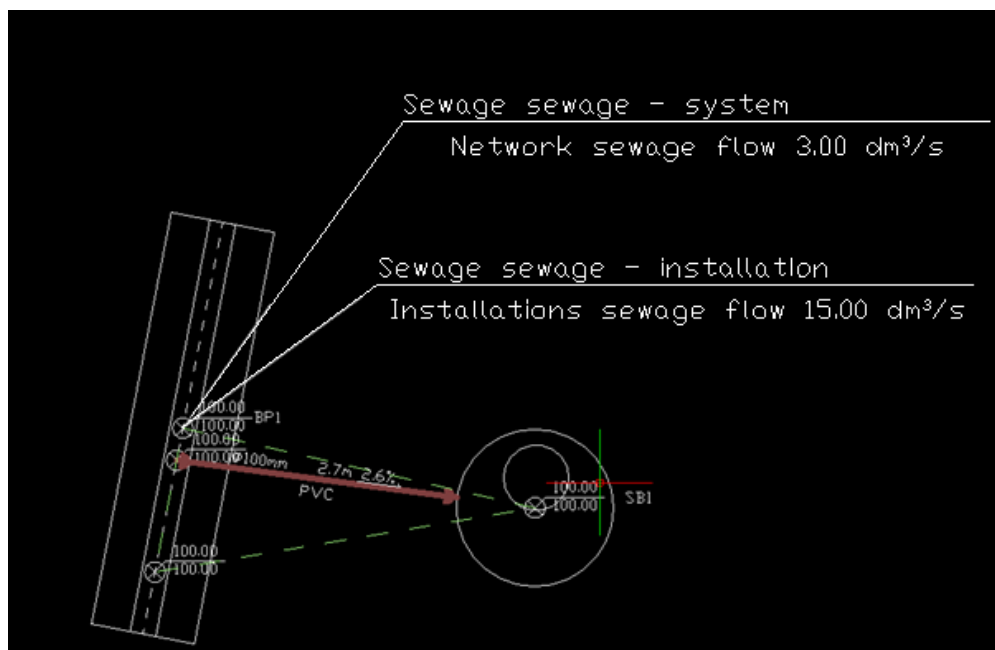



Fig.33. View of the inserted object Building terminal with two types of sanitary sewage sources defined

On the Fig.33 the object view is shown with wastewater parameters references. One reference is automatically inserted for all objects constituting a natural source of sewage. A second reference can be added after pressing the button  **Insert source**, from the action window.

Defining Objects

After inserting a reference for the source, the user can define the type of wastewater and the amount of wastewater flowing out of the building. To do this, click on the source link and go to the properties window of the **Source** object from the action window.

When defining the amount of wastewater discharged from one connection to a building, two values can be distinguished, which are transferred respectively to determine the calculation flow for the external network or for the calculation flow for the sewage network.


Calculation of the amount of sanitary sewage to determine the calculation flow of the external network or connection is based on the analysis of the amount and types of sanitary accessories in the building. In the case of rainwater, the amount of waste water is calculated for the external network only by the constant intensity method.

Calculation of the amount of sanitary sewage to determine the calculation flow for the sewage network is based on the analysis of the number of users and unit outflows depending on the type of building. In the case of rainwater flowing into the sewage network, the analysis of computational flows through individual sections of the network can be based on the method of constant and limiting intensities.

Description of the source window settings can be found in chapter 6.1.

NOTE! *Only one pipeline can be connected to the building terminal object. If several pipes need to be led out of one building, then several objects should be inserted in the building drawing on the map. Building terminal (several wall fragments with foundation).*

Defining Objects

By choosing the button  in the action window (Fig.32) or Double-clicking the window for defining the properties of the **Building terminal** point appears.

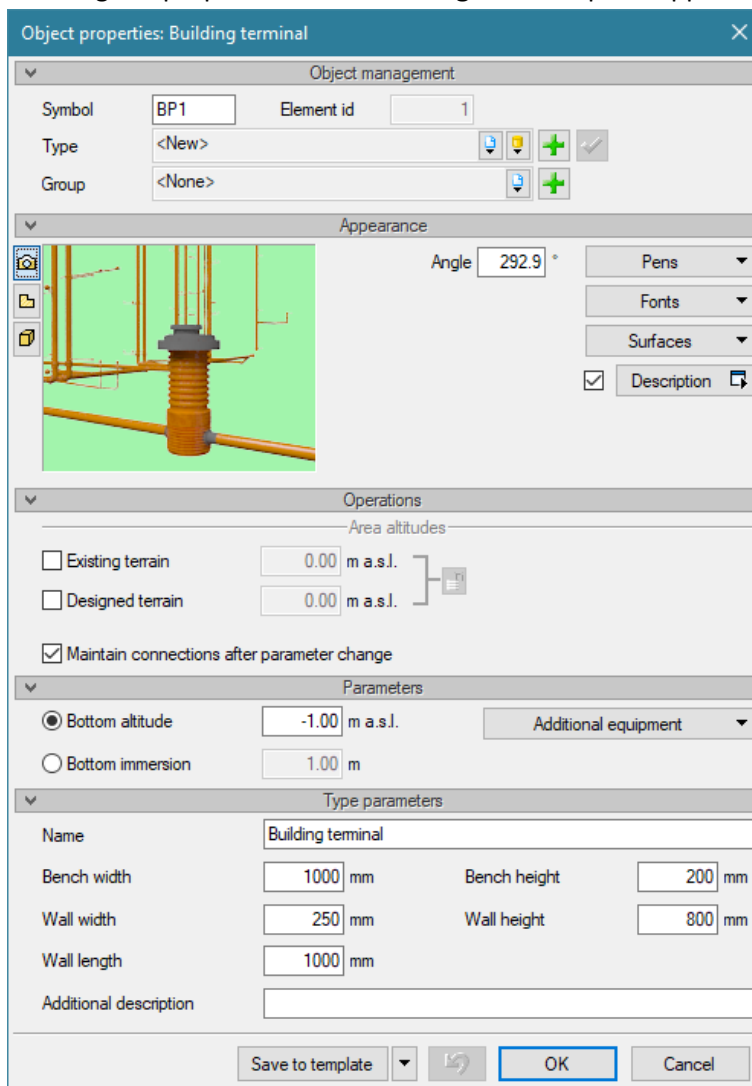


Fig.34. Building terminal properties window

Control group Operations

Rzędne terenu

Existing terrain – if the user selects this control, he can edit the elevation of the terrain and it will be changed at the height point located in the axis of the well.

Designed terrain – if the user selects this control, he can edit the elevation of the terrain and it will be changed at the height point located in the height point axis.

Maintain connections after parameter change – selecting this function maintains the connection point of the object after changing its geometric parameters (e.g. with pipes, which may cause a change in pipe slope when the depth of the connection point of the pipeline exit from the building changes).

Control group Parameters

Setting the assembly and technological parameters of the outflow point for the building terminal:

Defining Objects

Bottom ordinate – the user inserts the size of the required elevation of the connection point below the area between the indoor installation and the external pipeline (in the window the **immersion** publishes automatically).

Bottom immersion – interchangeable option to the bottom altitude: the user inserts a immersion in relation to the designed area (the altitude is published in the window).

Control group **Type Parameters**

Name – editable field. The user inserts the name he wants to publish on the other views.

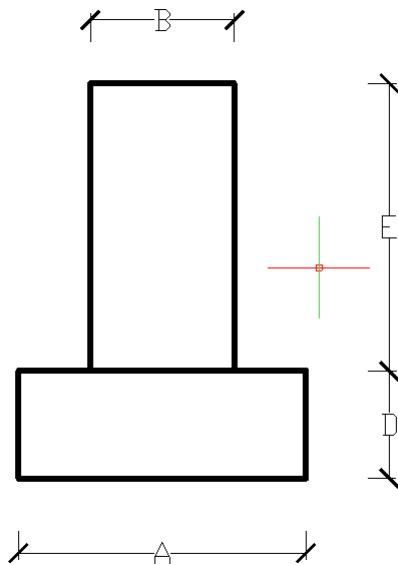


Fig.35. Dimensions of the strip footing of the building Building terminal

Strip footing width – dimension A

Wall width – dimension B

Wall length – dimension C (length on the map projection along the building wall)

Strip footing height– dimension D

Wall height – dimension E

Additional description – edit field, in which the user can own information which can later be published in the Lists.

Defining Objects

5.2. FREE OUTLET

To insert on the model the object **Free outlet** (icon extends with the object **Building terminal**), click the icon:

ArCADia Program:

- **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks toolbar** ⇒



Or type

- OSWR_OP.

Then the object insertion window appears:

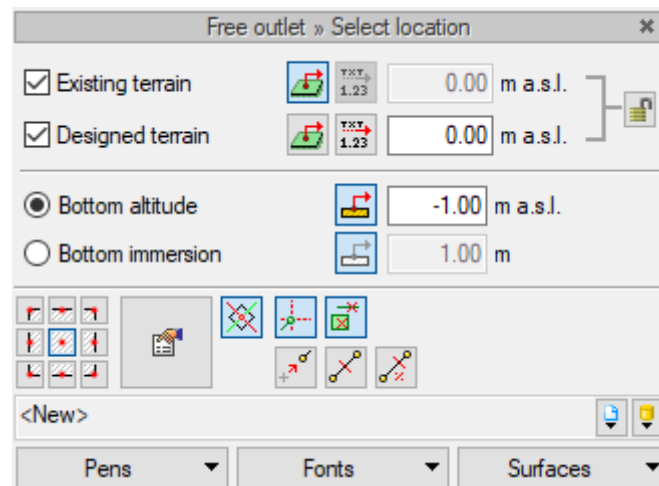


Fig.36. Free outlet properties window

The object simulates the free end of the pipeline (without the end object) and is a natural end to the connected sewer lines. A link is inserted with the object, which gives the values of sewage outflow. Clicking on the link opens an action window in which you can go to the property window and remove the marker. In the properties window, in addition to standard functions, you can find information on the amount of wastewater flowing from the network (non-editable fields).

Clicking on the description or the free description symbol opens the action window.

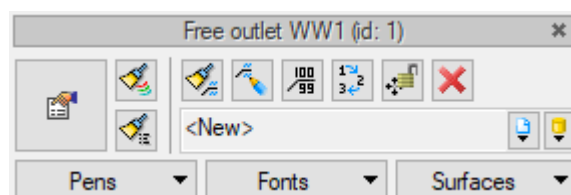
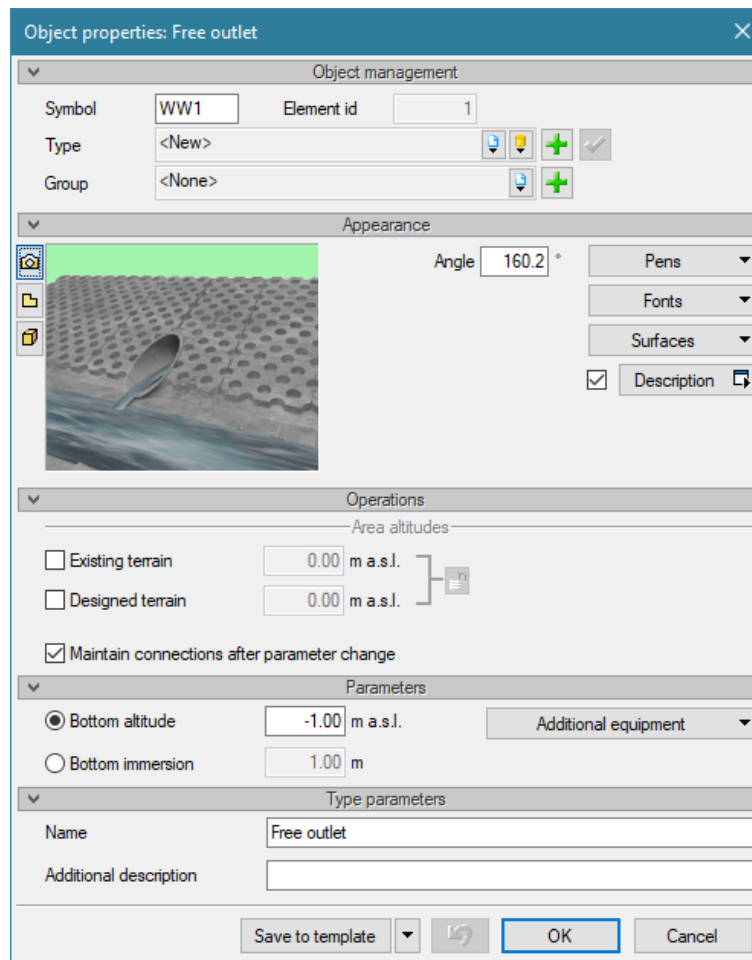


Fig.37. Action window of the Free outlet object

Defining Objects

In case the user deletes the link **Sewage outflow**, additionally it has an icon **Insert a source** .

After moving to the object's properties a window is displayed:



The dialog box titled "Object properties: Free outlet" contains several sections:

- Object management:** Includes fields for Symbol (WW1), Element id (1), Type (<New>), and Group (<None>). It also has icons for adding, deleting, and saving.
- Appearance:** Features a preview image of a pipe outlet, an Angle field (160.2°), and dropdown menus for Pens, Fonts, and Surfaces. A checked checkbox for Description is also present.
- Operations:** Contains checkboxes for Existing terrain and Designed terrain, both set to 0.00 m a.s.l. A checked checkbox for "Maintain connections after parameter change" is also shown.
- Parameters:** Includes radio buttons for Bottom altitude (selected, -1.00 m a.s.l.) and Bottom immersion (1.00 m). An "Additional equipment" dropdown menu is also present.
- Type parameters:** Includes a Name field (Free outlet) and an Additional description field.

At the bottom, there are buttons for "Save to template", "OK", and "Cancel".

Fig.38. Free outlet Object properties

Only standard functions are included in the window .

Defining Objects

5.3. CONCRETE WELL

To insert the object **Concrete well**, click the icon:

ArCADia Program:

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks** toolbar ⇒



Or type

- OSWR_CW.

Then the object insertion window appears.

 A screenshot of the 'Concrete well » Select location' dialog box. The window has a title bar with a close button. It contains several sections:

- Terrain Selection:** Two checked options, 'Existing terrain' and 'Designed terrain', each with a small icon and a value of '0.00 m a.s.l.'.
- Ordinate Selection:** Four radio button options:
 - Base bottom ordinate:** Selected, with a value of '-3.00 m a.s.l.' and a small icon.
 - Invert channel bottom immersion:** Unselected, with a value of '3.00 m' and a small icon.
 - Manhole assembly ordinate:** Unselected, with a value of '0.00 m a.s.l.' and a small icon.
 - Manhole installation level:** Unselected, with a value of '0.00 m' and a small icon.
- Tools:** A row of icons for various drawing and editing functions.
- Buttons:** '<New>' button, and three dropdown menus labeled 'Pens', 'Fonts', and 'Surfaces'.

Fig.39. Settings window for inserting an external inspection and connection concrete well

With the well insert window active, an object symbol appears in the model drawing area (plan). Clicking on a selected place in the drawing area inserts the object. After selecting it, the object modification window appears.

In this window, the user receives information about the ordinate of the manhole assembly. The default is set to be in line with the terrain. If the user wants the ordinate of the manhole to be different, then during insertion, go to the properties window and set the constant elevation or constant immersion there (default setting - 0.00 immersion).

Po wstawieniu obiektu i jego kliknięciu otwiera się okno akcji.

Defining Objects

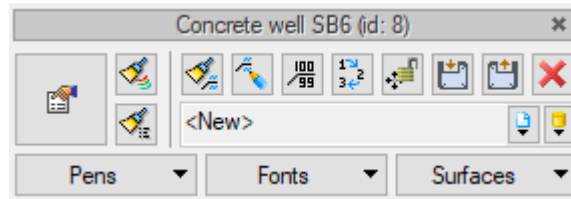



Fig.40. Modification window of the Inspection and connection well object

By choosing the button  or double-clicking the inserted element, the window for defining the properties of the designed well appears.

Object management

Symbol: SB6 Element id: 8

Type: <New> Group: <None>

Appearance

Angle: 0.0° Pens: Fonts: Surfaces: Description: ☒

Operations

Area altitudes

☐ Existing terrain: 0.00 m a.s.l.

☐ Designed terrain: 0.00 m a.s.l.

☒ Maintain connections after parameter change

Parameters

☒ Base bottom ordinate: -3.00 m a.s.l. Additional equipment:

☐ Invert channel bottom imm: 3.00 m

Invert channel height over the bottom: 0.10 m Inlets/outlets:

☐ Manhole assembly ordinat: 0.00 m a.s.l. Manhole:

☒ Manhole installation level: 0.00 m

Type parameters

☒ Automatic well construction Components:

Bottom and rings: Coping

Bottom:

No.	Concrete rings
1	Concrete ring $\varphi=1200$ mm, h=1000 mm
2	Concrete ring $\varphi=1200$ mm, h=250 mm

☐ Reduction plate:

Buttons: Save to template, OK, Cancel

Fig.41. Properties window of the object - Concrete inspection and connection well
- view of the Automatic Well Construction mode in the control group Type parameters

Defining Objects

In the element properties window, the projection appearance and the assembly and technical parameters are set.

Control group Parameters

Base bottom ordinate – the user defines the elevation of the bottom of the invert channel.

Invert channel bottom immersion – the user defines the elevation of the bottom of the invert channel.

Invert channel height over the bottom – this parameter is used to define how high the invert channel is above the base of the bottom. The parameter is used to count well elements. For wells with prefabricated invert channels, where the bottom of the invert channel is complete, you can enter 0, which means that the bottom of the invert channel coincides with the base of the bottom.

Manhole assembly ordinate – in the edit field, the user defines the ordinate of the top of the manhole (it is possible to make it above or below the ground). The mounting level of the manhole is displayed below.

Manhole installation level – in the edit field, the user defines the height of the top of the manhole (it is possible to make it above or below the ground). The converted ordinate is displayed above.

Inlets/Outlets – refers the user to the table of defined pipelines entering the well. This function allows the user to specify which pipelines will form a invert channel in the Lists.

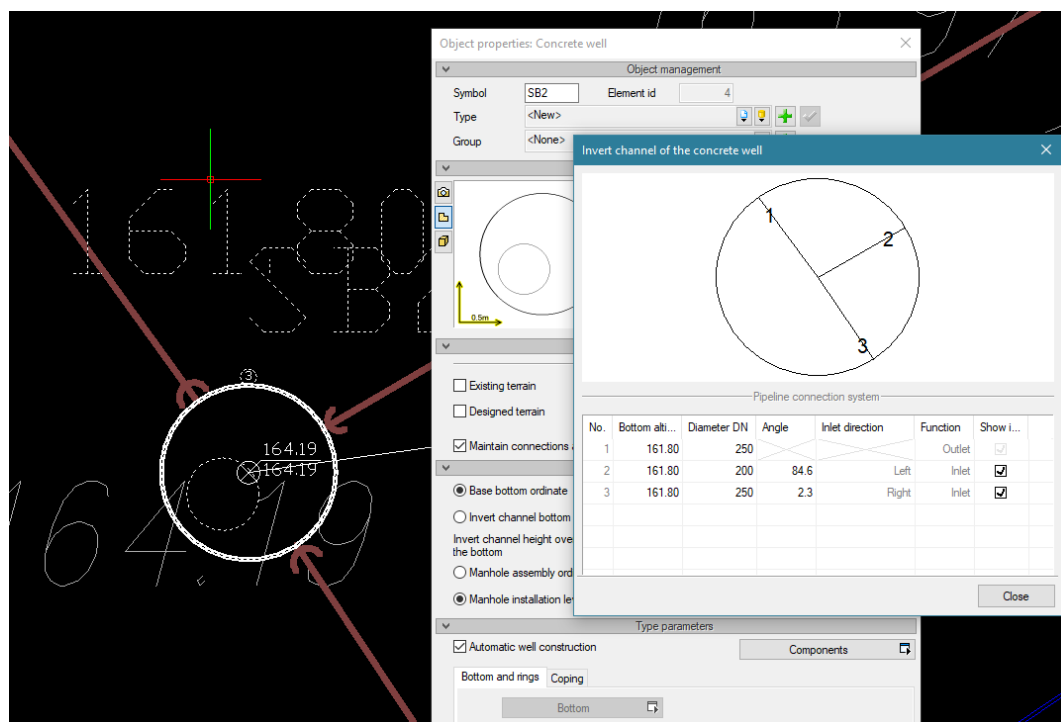


Fig.42. View of the window with a table of pipelines connected to the well

NOTE! The invert channel system in a concrete well is created automatically after the inlet and outlet pipelines are properly connected. Pipelines should be connected in a way that allows proper determination of the direction of waste water flow or should be inserted into the source and outflow systems, respectively.

Defining Objects

Determination of the inlets and outlets to the well is based on the detection of the direction and size of the slope of pipelines introduced into the well and the arrangement of the sources and outlet of sewage. If the user connects all pipelines with a slope to the well, they will be identified as inlets and the angle will be given relative to the x axis of the coordinate system. However, if of a few, two of the inlets are with a slope from the well, then the larger slope will be identified as the outlet, and the remaining angles will be given to the extension line of this pipeline. Therefore, it is recommended to review the invert channels after completing the height modeling of sewer lines. If there is a pipeline connected above the bottom of the invert channel, the user may decide that no invert channel will be created from the pipeline (for differences, it is recommended not to show the upper inlet pipe, but only the inlet to the invert channel of the difference pipe).

Manhole – the function transfers to the manhole properties window. The manhole is located in the **Parameters** panel due to the possibility of selecting manholes from other sets of types.

Control group **Type Parameters**

A concrete well is a structure composed of many elements with the possibility of various configurations depending on the needs. The definition of well parameters boils down to setting the parameters of well components, such as the bottom, coils, reduction plate (when using coils with a smaller diameter than the bottom), concrete cover or concrete cone and adjustment rings.

This panel has two modes of well construction: automatic and manual.

Automatic well construction

Automatic mode of concrete well construction is available after checking the box **Automatic well construction**. The mode is set by default. This mode allows the insertion of a well automatically in accordance with the elements selected by the user and with the general principles for the construction of concrete wells for road inlets. The user selects or downloads the available elements to build a well from the **Type library**. After selecting the automatic mode, the function of selecting components for the construction of the **Components** well is available. The functions for building a manual well are not available in the window **Object properties: Concrete well**.

Components – function enabling the user to determine the elements from which elements to build the well in automatic mode will be selected. After selecting the function, this window is displayed **Well construction scheme**. The order of tabs and buttons of the window was determined in accordance with the order of construction of the well from the bottom and regulating elements under the manhole at the end.

Defining Objects

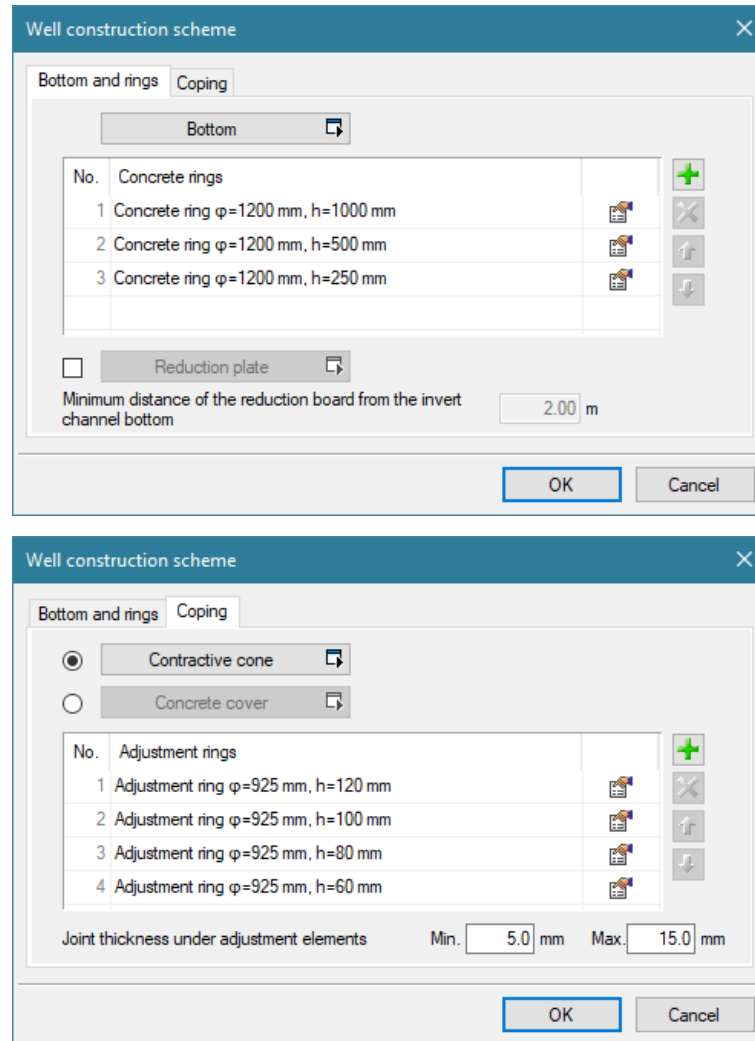


Fig.43. Window of components of the well. Well construction scheme: Bottom and Rings tab, Coping tab

In the **Well construction scheme** window the user has two tabs.

Bottom and rings Tab

Bottom – the button opens the bottom parameters definition window. Users in a given series of diameters can define only one bottom (i.e. one set height). If the user wants to generate a well with a different height, a new well type must be defined.

Rings – the table in which available ring elements in a given diameter series are defined. Using the automatic well construction mode, the program arranges rings according to a set algorithm. And the ring with the biggest height will be designed the lowest. If you cannot insert a ring with the same height, the program chooses a smaller ring. In this case, the order in which the items in the table are set is not critical (it is optional). Repetitive elements (elements with the same parameters) in the table will not necessarily be used repeatedly and there is no need to duplicate them.

Reduction plate – button activated by a check box. After checking the box, it is possible to display the reduction plate properties window and enter the minimum distance of the reduction plate from the

Defining Objects

bottom of the invert channel. The introduction of a reduction plate makes sense when the user defines rings with different diameters (a well with a smaller diameter manhole is planned).

Coping Tab

In the automatic selection mode, the user defines the upper elements of the well above the vertebrae.

Contractive cone/Concrete cover – controls optionally selected to insert a Contractive cone or concrete cover. After pressing the control, the element's property window opens.

Adjustment rings – the table in which available ring elements in a given diameter series are defined. Using the automatic well construction mode, the program arranges rings according to a set algorithm. And the ring with the biggest height will be designed the lowest. If you cannot insert a ring with the same height, the program chooses a smaller ring. In this case, the order in which the items in the table are set is not critical (it is optional). Repetitive elements (elements with the same parameters) in the table will not necessarily be used repeatedly and there is no need to duplicate them.

Joint thickness under adjustment elements – to fill the minimum and maximum thickness of the joint mortar between the adjusting rings and the manhole. The manhole height to be adjusted to the terrain will be selected between these values. In other words, it is a value to spread on the gaps between the adjusting rings and the manhole.

Manual well construction

If the field **Automatic well construction** is unchecked (empty), it will be possible to build a well according to the data entered by the designer.

In this mode, the user completely selects the elements of the inspection chamber.

For the set ordinate of the manhole, the total height of the elements must be smaller than the distance resulting from the ordinate of the bottom of the well (after adding the height of the invert channel above the base of the bottom and the thickness of the base of the bottom).

If the sum of the height of well elements selected by the user is greater than the distance resulting from defined elevations, a message appears:

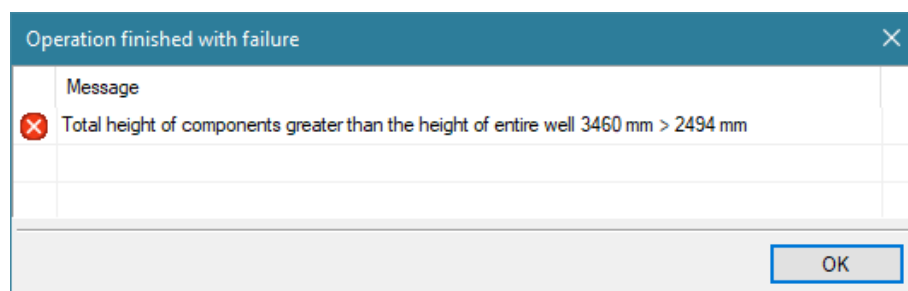





Fig.44. A message generated when the distance between the ordinate of the manhole and the bottom of the well is less than the sum of the heights of all elements.



Defining Objects

Object properties: Concrete well *

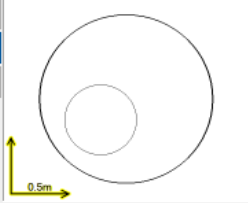
Object management

Symbol Element id

Type   


Group  

Appearance

 Angle ° Pens

Fonts

Surfaces

☒ Description 

Operations

Area altitudes

☐ Existing terrain m a.s.l.


☐ Designed terrain m a.s.l.


☒ Maintain connections after parameter change

Parameters

☒ Base bottom ordinate m a.s.l. Additional equipment


☐ Invert channel bottom imm m

Invert channel height over the bottom m Inlets/outlets 


☐ Manhole assembly ordinat m a.s.l. Manhole 






☒ Manhole installation level m


Type parameters

☐ Automatic well construction Components 

Bottom and rings Copping

Bottom 

No.	Concrete rings	
1	Concrete ring $\varphi=1200$ mm, h=1000 mm	
2	Concrete ring $\varphi=1200$ mm, h=1000 mm	
		
		
		

☐ Reduction plate 


Save to template 

Fig.45. View of the Type parameters control group in the concrete well properties window with the manual mode of concrete well construction (unchecked field of Automatic well construction) - Bottom and rings tab

Defining Objects

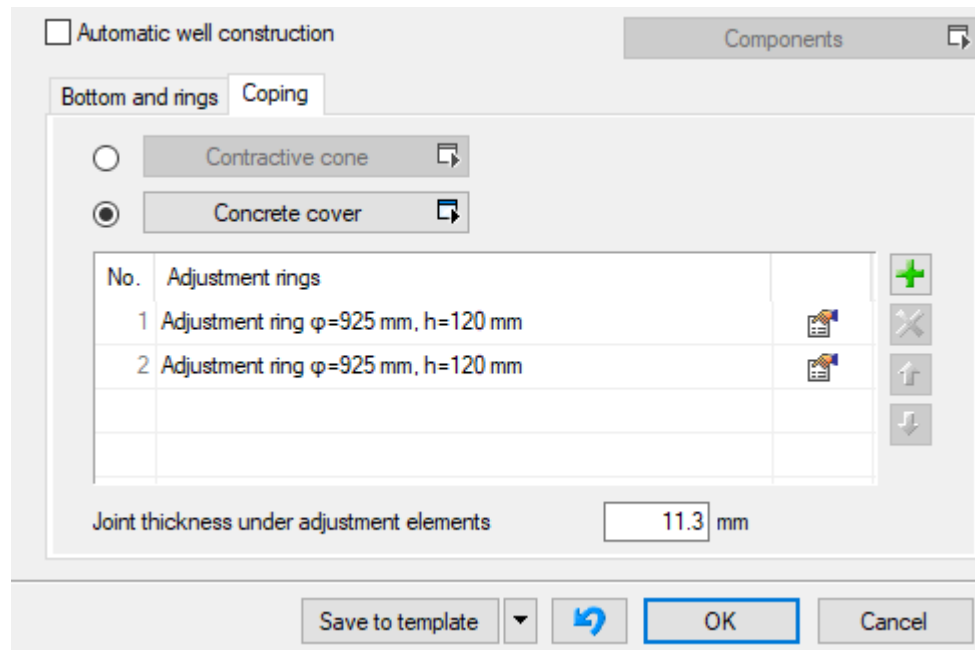



Fig.46. View of the Type parameters control group in the concrete well properties window with the manual mode of concrete well construction (unchecked field of Automatic well construction) - Coping tab

Bottom and Ring Tab

Bottom – the button opens the bottom parameters definition window. Users in a given series of diameters can define only one bottom (i.e. one set height). If the user wants to generate a well with a different height, a new well type must be defined.

Concrete rings – table in which the designer indicates the exact types of rings and in what order they will be used to build the well. In manual build mode, the order and number of rings are important. The order of settlement is from the bottom of the well. If a given ring is inserted in the first place from the top of the table, it will be placed first on the bottom. If the table has two rings with the same parameters, they will be used according to the position in the table. To set the order, these buttons  are used which are placed on the strip on the right side of the table with the add and remove element button.

Reduction plate – button activated by a check box. After checking the box, it is possible to display the reduction plate properties window and enter its minimum distance from the bottom of the invert channel. The introduction of a reduction plate makes sense when the user defines rings with different diameters (a well with a smaller diameter manhole is planned).

Coping Tab



In the manual selection mode, the user defines the upper elements of the well above the rings.

Contractive cone/Concrete cover – controls optionally selected to insert a Contractive cone or concrete cover. After pressing the control, the element properties window opens.

Adjustment rings – table (adjustment rings for the manhole) in which the designer indicates the exact types of rings and in what order they will be used to build the well. In manual build mode, the order

Defining Objects

and number of rings are important. The order of settlement is from the bottom of the well. If a given ring is inserted in the first place from the top of the table, it will be placed first on the bottom. If the table has two rings with the same parameters, they will be used according to the position in the table.

To set the order, these buttons   are used which are placed on the strip on the right side of the table with the add and remove element button.

Joint thickness under adjustment elements – field to be filled. The designer inserts the thickness of the joint mortar between the adjusting rings and the manhole. This is the only value that, if needed, will "pull" the hatch to a given elevation and will change (increase) automatically. If the distance is too large, the thickness of the joints will be significant, which does not give the correct result. It is recommended to carefully analyze the number and height of the elements used and supplement them accordingly. Well assessment and modeling is the responsibility of the designer.

Manhole

The **Manhole** object is not inserted from the *ArCADia program ribbon* or from the *AutoCAD program toolbar*. It has no insert window or action window. It is a component of a concrete well.

The object is inserted from the concrete well properties window with a button located in the control group **Parameters**.

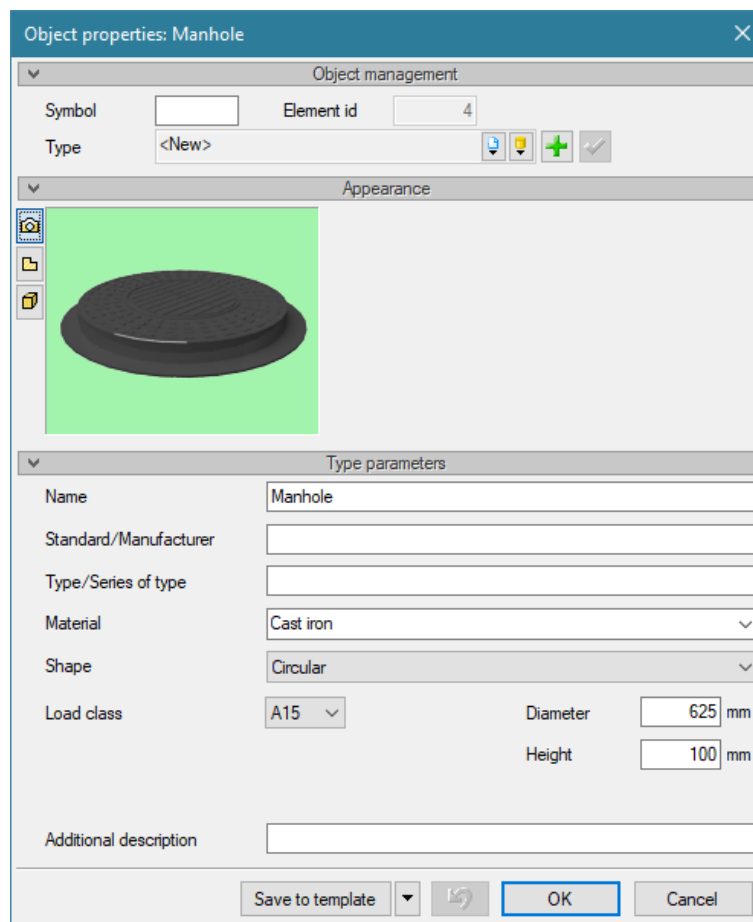


Fig.47. Properties window of the object Manhole

Defining Objects

Control group **Parameters**

Name – enter the name of the object, e.g. a cast iron manhole with concrete filling.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Shape – drop-down list with shape entries. After selecting the shape, the edit fields describing the dimensions of the manhole are adjusted accordingly.

Load class – drop-down list describing the technological parameter determining the manhole load.

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

5.3.1. BOTTOM

The base object of the concrete well, which determines the diameter of the object in the technological sense.

The object **Bottom** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of a concrete well.

The object is inserted from the concrete well properties window with a button located in the control group **Type Parameters**.

Fig.48. Properties window of the object - Bottom

Defining Objects

Name – enter the name of the object, e.g. Concrete well manhole.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Inner diameter – edition field – inner diameter of the well [mm].

Side wall thickness – edit field - side wall thickness [mm].


Base thickness – pole edycyjne – grubość dna dennicy. W przypadku kinety prefabrykowanej zespolonej z dnem podać wymiar od zewnętrznej strony dna do dna kinety. W oknie studni w polu edycyjnym **Invert channel height above bottom** wpisać 0,0 [mm].

Height – pole edycyjne – wysokość liczona od wewnętrznej strony dna [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

5.3.2. CONCRETE RINGS

The object **Rings** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.

The object is inserted from the concrete well properties window with a button  located in the control group **Type Parameters**.

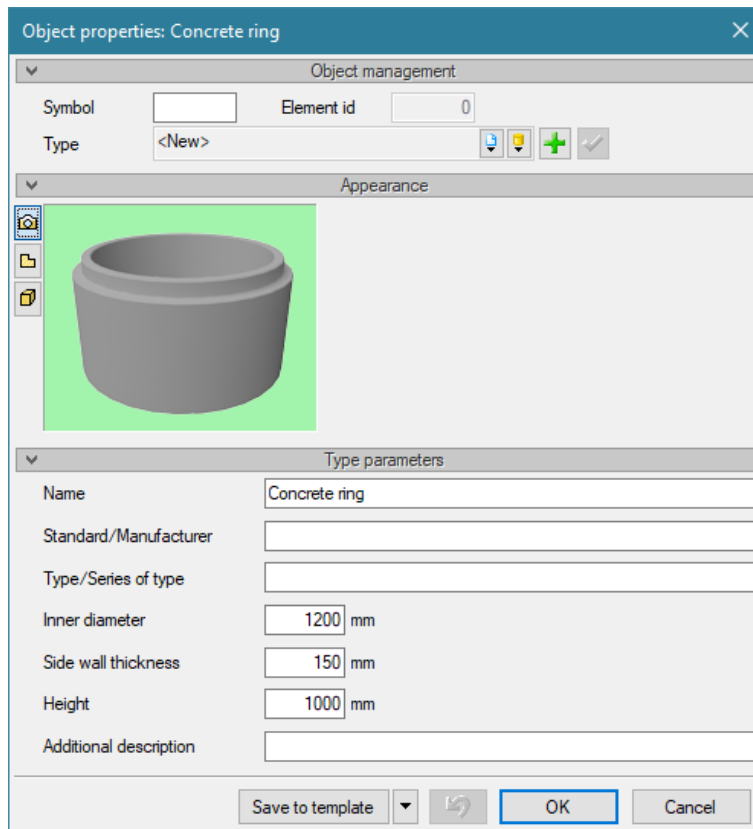


Fig.49. Properties window of concrete rings

Defining Objects

Name – enter the name of the object, e.g. Concrete rings class C35/45.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Inner diameter – edition field – inner diameter of the well [mm].

Side wall thickness – edit field - side wall thickness [mm].

Height – edit field – height calculated from the inner side of the bottom [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

5.3.3. REDUCTION PLATE

Concrete well object.

The object **Reduction plate** cannot be entered from the [ArCADia program](#) ribbon nor from the toolbar of the [AutoCAD program](#). It has no insert window or action window. It is a component of the concrete well.

The object is inserted from the **concrete well properties window** located in the control group **Type Parameters**, in the tab **Bottom and rings**, after checking the activation box. This object is defined when there are rings of two different diameters. Bottom rings should match the inside diameter of the bottom and the outside diameter of the reduction plate. After inserting the reduction plate, it is possible to place on it (above the opening) rings with a smaller inner diameter corresponding to the inner diameter of the opening in the reduction plate.

Defining Objects

Object properties: Reduction plate

Object management

Symbol Element id

Type

Appearance

Type parameters

Name

Standard/Manufacturer

Type/Series of type

Outside diameter mm

Opening diameter mm

Height mm

Hole gauge distance from the board edge mm

Additional description

Save to template OK Cancel

Fig.50. Properties window of the object Reduction plate

Name – enter the name of the object, e.g. Reduction plate 3000/1200.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Outside diameter – edit field - the diameter of the plate should correspond to the outer diameter of the rings [mm].

Opening diameter – edit field - the diameter of the opening in the plate should correspond to the inner diameter of the rings placed on the plate [mm].

Height – edit field - plate thickness [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Hole gauge distance from the board edge – edit field - opening location, distance from the edge of the plate edge of the opening. It most often corresponds to the wall thickness (possibly increased by 5 cm) of the lower rings with a larger inner diameter [mm].

Defining Objects

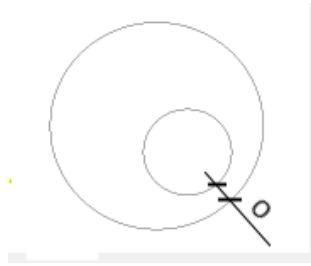


Fig.51. Distance between the hole gauge and the edge of the plate (O marking)

5.3.4. CONTRACTIVE CONE

Concrete well object.

The object **Contractive cone** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of a concrete well.

The object is inserted from the **Concrete Well Properties** window with the button in the control group **Type Parameters**, in the tab **Coping**, after selecting the check box (choice between concrete cover and the constrictive cone). If the user wants to use a contractive cone, he presses the check box next to the element, which activates the button **Contractive cone**. Clicking it opens the element properties window.

Fig.52. Properties window of the object - Contractive cone

Defining Objects

Name – enter the name of the object, e.g. Contractive cone 600/1200.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Main diameter – edit field - internal diameter of the lower part of the contractive cone. The diameter should coincide with the internal diameter of the coils mounted below the cone [mm].

Constriction diameter – edit field - inner diameter of the upper part of the contractive cone, the diameter should correspond to the diameter of the manhole [mm].

Height – edit field – distance between the top and the bottom of the cone [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Constriction distance from the side wall – edit field - sets the shape of a cone. If set to 0, the cone will be asymmetrical with one wall perpendicular to the base of the cone [mm].

5.3.5. CONCRETE COVER

Concrete well object.

The object **Concrete cover** cannot be entered from the [ArCADia program](#) ribbon nor from the toolbar of the [AutoCAD program](#). It has no insert window or action window. It is a component of a concrete well.

The object is inserted from the **Concrete Well Properties** window with the button in the control group **Type Parameters**, in the tab **Coping**, after selecting the check box. If the user wants to use a **Concrete cover**, he presses the check box next to the element, which activates the button **Concrete cover**. Clicking it opens the element properties window.

Defining Objects

Fig.53. Properties window of the element - **Concrete cover**

Name – enter the name of the object, e.g. Concrete cover 600/1200.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Outside diameter – edit field - the diameter of the plate should correspond to the outer diameter of the coils under the cover [mm].

Opening diameter – edit field - the diameter of the hole in the slab should correspond to the diameter of the manhole [mm].

Height – edit field – distance between the top and the bottom of the concrete cover [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Hole gauge distance from the board edge – edit field - opening location, distance from the edge of the cover edge of the opening. It most often corresponds to the wall thickness (possibly increased by 5 cm) of the lower rings with a larger inner diameter [mm].

Defining Objects

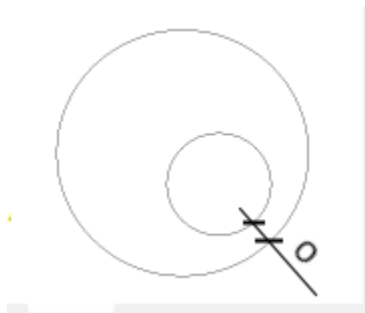


Fig.54. Odległość skrajni otworu od krawędzi płyty (oznaczenie O)

5.3.6. ADJUSTMENT RING

Concrete well object.

The object **Adjustment Ring** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.


The object is inserted from the concrete well properties window with a button  located in the control group **Type Parameters**.

Fig.55. Properties window of the object - Adjustment ring

Name – enter the name of the object, e.g. Adjustment ring H = 30 cm.

Defining Objects

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Outside diameter – edit field - the diameter of the plate should correspond to the outer diameter of the coils under the cover [mm].

Opening diameter – edit field - the diameter of the hole in the slab should correspond to the diameter of the manhole [mm].

Height – edit field – ring thickness [mm].

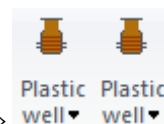
Additional description – the user enters additional data specifying the object and moving to the bill of materials.

5.4. PLASTIC WELL

To insert the **Plastic Well** object on the model, click on the icon:

ArCADia Program:

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks** toolbar ⇒



Or type

- OSWR_PW.

The object insertion window appears.

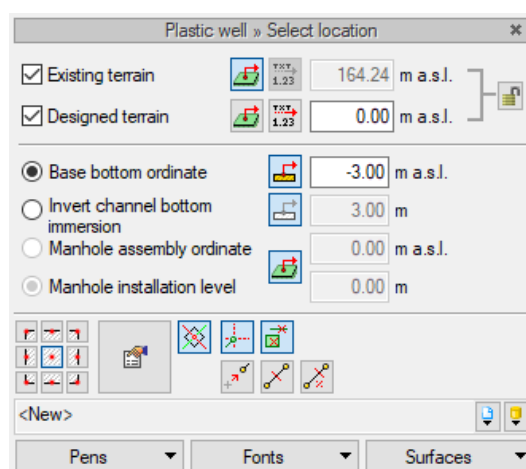


Fig.56. Plastic well insertion settings window

Defining Objects

The plastic well in the ArCADia-SEWAGE NETWORKS version is a simplified facility. Due to the variety of solutions for plastic wells, the type was limited to the definition of basic dimensions: the external and internal diameter of the well and its depth. Additional definable elements are: manhole (shape, diameter, height, load class) and invert channel (number of inlets, diameters of inlets and outlets, angles between pipelines connected to the well).

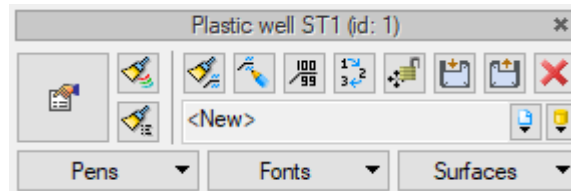


Fig.57. Element modification window - Plastic well

Object properties: Plastic well

Object management

Symbol: ST1 Element id: 1

Type: <New>

Group: <None>

Appearance

Angle: 0.0 °

Operations

Area altitudes

☐ Existing terrain: 164.33 m a.s.l.

☐ Designed terrain: 0.00 m a.s.l.

☒ Maintain connections after parameter change

Parameters

☒ Base bottom ordinate: -3.00 m a.s.l.

☐ Invert channel bottom imm: 3.00 m

☐ Manhole assembly ordinat: 0.00 m a.s.l.

☒ Manhole installation level: 0.00 m

Type parameters

Name: Plastic well

Standard/Manufacturer:

Type/Series of type:

Material: Polypropylene

Inner diameter: 1200 mm

Outside diameter: 1500 mm

Additional description:

Buttons: Save to template, OK, Cancel

Fig.58. Properties window of the object - Plastic well

Defining Objects

DEFINING THE TYPE AND LAYOUT OF PLASTIC WELL INVERT CHANNELS

The invert channel property setting window is opened after clicking the Invert channel button in the plastic well properties window.

NOTE! The system and the diameter of the inlet and outlet are set by the user. The invert channel is not created automatically as in the case of concrete wells and is independent of the connection angles between the pipelines. The invert channel direction setting is adjusted by the user.

Object properties: Invert channel *

Object management

Symbol Element id

Type

Appearance

Diagram showing a circular well with three connection points labeled 1, 2, and 3. A scale bar indicates 0.5m.

Type parameters

Name

Standard/Manufacturer

Type/Series of type

Material

Pipeline connection system

No.	Diameter DN	Angle	Inlet direction	Function
1	200			Outlet
2	200	45.0	Left	Inlet
3	200	45.0	Right	Inlet

Additional description

Save to template

Fig.59. Invert channel definition window

Each time the user must define the type of invert channel and the diameter of the connections. By default, the well is inserted with one "connector pipe" constituting the outlet from the well (marked by default in the Table as 1).

The invert channel is defined by the user adding connectors to the outlet wells and entering their diameter and angle relative to the inlet extension line and determining the inflow direction.

Defining Objects

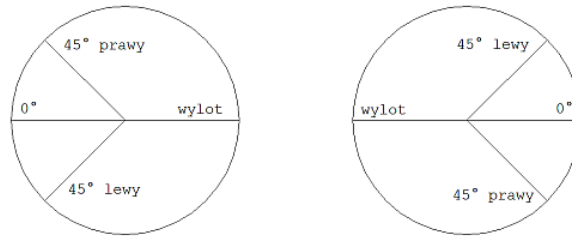


Fig.60. Rules on the definition of the invert channel in a plastic well.

NOTE! There is a rule that only one outlet can be defined in the well. Angles are given relative to the outlet extension line or the inlet with an angle of 0° to the outlet.

NOTE! If the user defines two outlets or two inlets with the same angles and on one side, the message '**Incorrectly defined pipe connection system**' will be displayed.

The object is inserted with rotation. After running the command and clicking on the drawing field, the object is rotated with the cursor positioned in the direction of the defined well **outlet**.

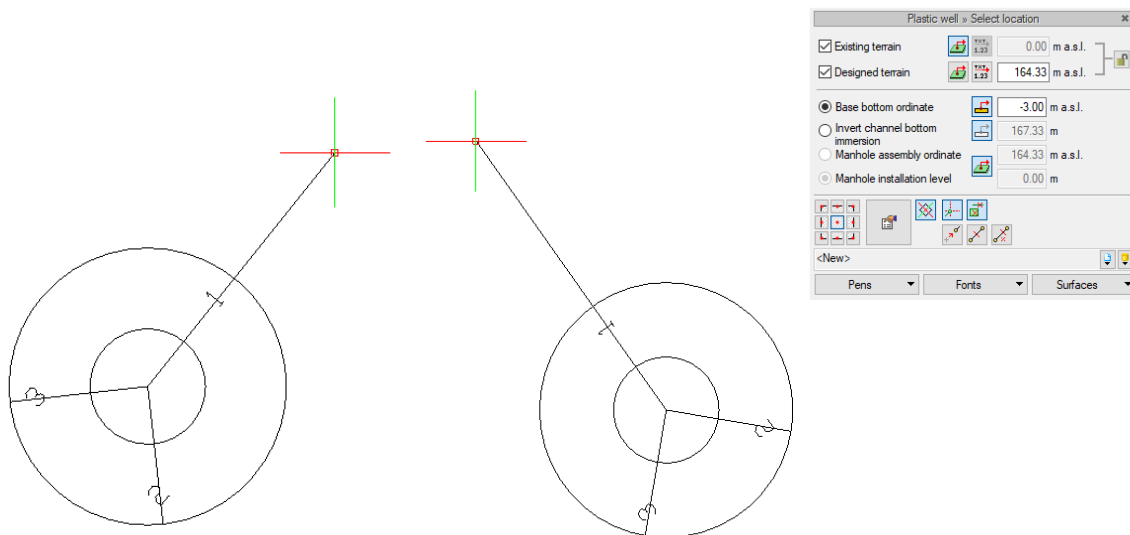
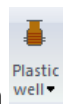


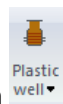
Fig.61. View of inserting a plastic well

It is recommended to introduce the well so that the outlet coincides with the designed outlet pipe. In order to achieve graphic compliance of the outflow direction with the outlet pipeline, after introducing the plastic well, it should be rotated in such a way that the invert channel outlet direction matches the planned route of the pipeline draining sewage from the inserted well.

The order of inserting objects is up to the user.

The procedure for inserting a well as the first object:







- 1) Choose the icon , in the insertion window set the elevation of the terrain and the ordinate of the invert channel bottom or the invert channel bottom.
- 2) Go to the properties window and set the type of invert channel (this operation can be done at the end, after inserting the well).
- 3) Click on the drawing field in the selected place on the map.




Defining Objects

- 4) Rotate the well, keeping the cursor in line with the planned drain pipe route.
- 5) Click again to enter the well into the drawing field.

Method I – pipeline exiting from the well

- Choose icon  **Insert pipeline (ex. sanitary)** and place the cursor over the well. If the user wants to add the pipeline to the invert channel, activate the button **Import from element**  in the insertion window.
- Insert terrain elevations in the insert window (if the terrain ordinates entered are different than the ordinates of the well elevation point, new terrain ordinates will be assigned to the well) or retrieve elevations from the well elevation point by selecting the option **Import from terrain** .
- Click on the well field, which will determine the start point of the pipeline.
- Trace the pipeline from the well
- Enter the elevations in the insert window generated for the other end or, if a terrain surface is entered, enter them by running the option **Import from terrain** .
- Click on the selected place in the drawing field, which will determine the second point of the pipeline and the new height point.

Method II – pipeline entering the well

- Choose icon  **Insert pipeline (ex. sanitary)** and set the elevation values of the ground and the ordinate value of the bottom of the pipe (or optionally the immersion in relation to the designed area).
- Click in the desired place in the drawing field. If the pipeline being inserted will be outflow, it is recommended that the planned route coincide with the direction of outlet from the well.
- Select the direction of the pipeline route to the previously introduced well.
- Place the cursor over the well and in the insertion window of the second pipeline point, set the elevations (if the elevations entered are different from the ordinates of the well elevation point, then new ordinates will be assigned to the well) or retrieve elevations from the well elevation point by selecting the option **Import from terrain** .
- Enter the value of the ordinate bottom of the invert channel above the bottom value of the invert channel well (the case when the user does not want to include the invert channel in the well) or activate the button **Import from element**  in the insert window (in the case of being included in the invert channel).

Defining Objects

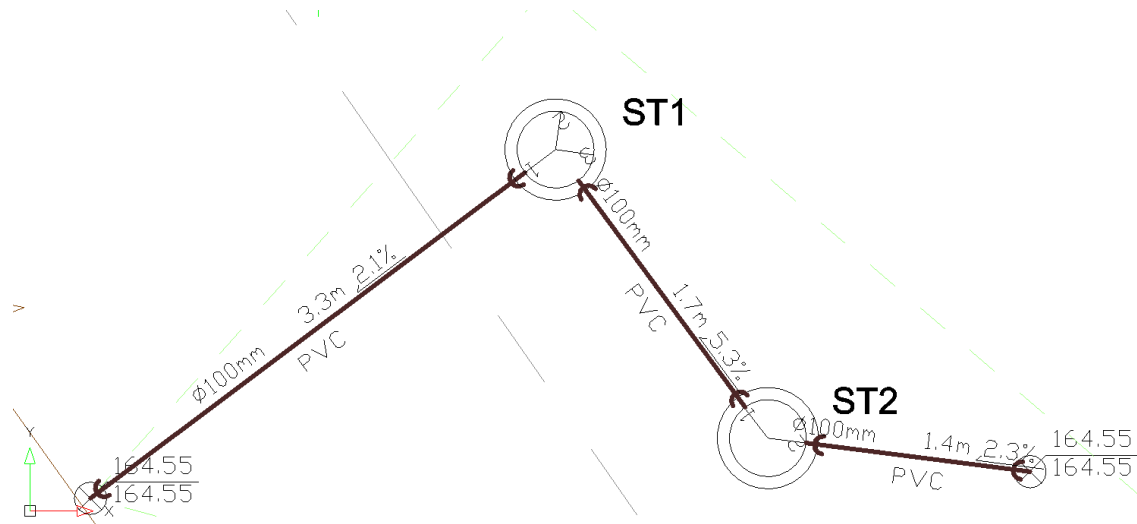


Fig.62. View of pipeline connections in plastic wells with invert channel angled at 90 ° without forming an elbow (ST1) and 45 ° (ST2) with directional pipeline insertion

If a well is inserted with a prefabricated invert channel with inlets at an angle of e.g. 45 ° (e.g. well invert channel PP / PVC 315 mm, PP / PVC 425 mm) with respect to the inlet line extension, when implementing a right-angle approach to the outlet, the pipeline can be connected to the center of the well and the pipe will be connected in a simplified way to the center of the well.

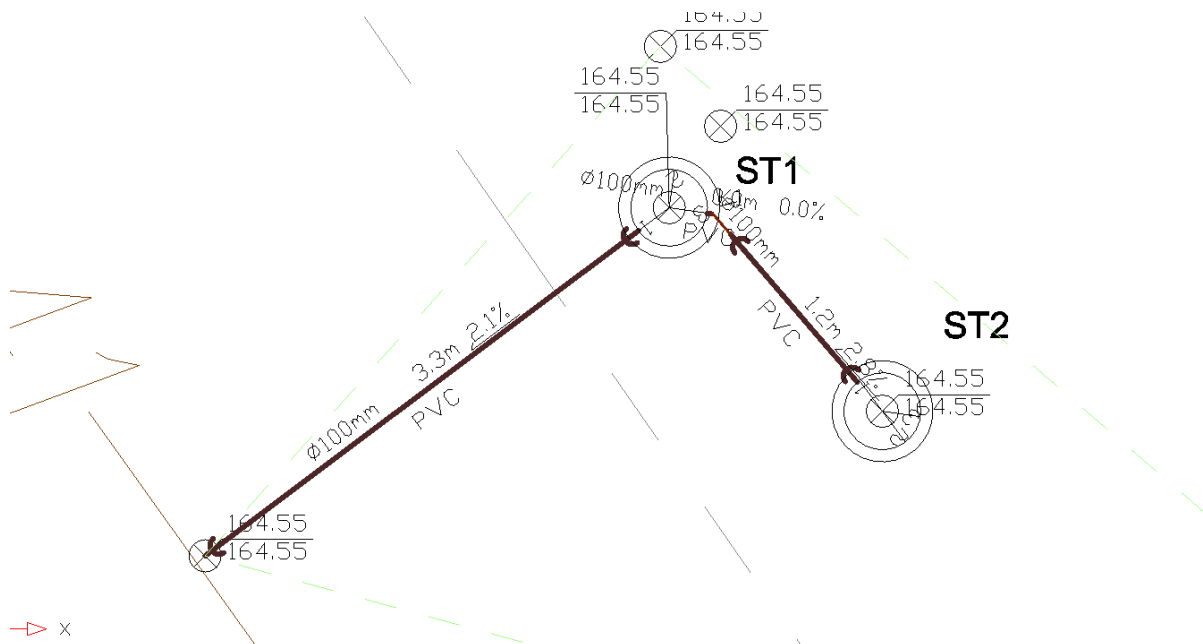






Fig.63. View of the connection of pipelines in a well at a 90 ° angle in the ST1 well with the creation of a 45 ° elbow in the well with an angled invert channel.

If the user plans to show the exact connection of the pipeline (at an angle of 90 ° to the outlet of the wastewater from the well) to the connector of the invert channel made at an angle of 45 °, you should:

Defining Objects

- Choose the icon  **Insert pipeline (e.g. sanitary)** and place the cursor over the well. If the user wants to incorporate the pipeline into the invert channel, the button **Import from element**  must be activated in the insertion window.
- Insert terrain elevations in the insert window (if the terrain ordinates entered are different from the ordinates of the well elevation point, new terrain ordinates will be assigned to the well) or retrieve terrain ordinates from the well elevation point by selecting **Import from terrain** .
- Click on the well, which will determine the start point of the pipeline.
- Bring out a short pipeline from the well along the inlet path (ordinates of the terrain in line with the ordinates of the point of the well).
- Click behind the well.
- Then select the Insert pipe icon again, connect the new pipeline to the short end and lead out the pipe (with the same parameters as the short one).

NOTE! It is recommended to enable the angle tracking function in the insertion window  and definitely the option detection feature .

5.5. RAIN INLET ON CONCRETE WELL

In order to insert the object **Rain inlet on concrete well**, click the icon:

ArCADia Program:

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks** toolbar ⇒ 

Or type

- OSWR_CGR.

The object insertion window then appears.

Defining Objects

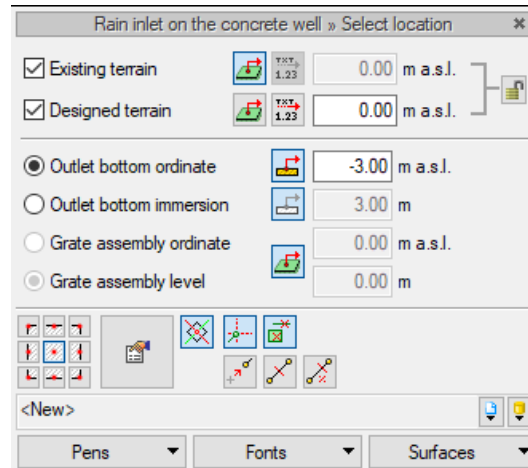


Fig.64. Insertion settings window for the object **Rain inlet on concrete well**

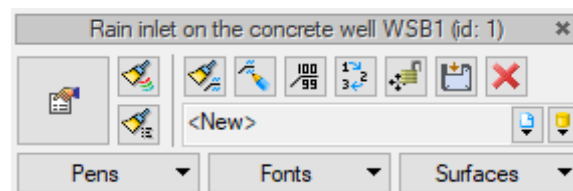




Fig.65. Window for modifying the element **Rain inlet on concrete well**

The principle of manual and automatic construction of the object and the division into components are the same as in the case of the **Concrete well**.

The rain inlet is a natural source of rainwater sewage. Along with the insertion of the object, an indicator for the sewage source is attached, in which you can define the amount of sewage and the type of rainwater sewage. At the same time the button  **Insert source** is available on the action bar which allows you to define a second type of rainwater sewage, e.g. for calculating flows for indoor installations on site.

See chapter 6.1 for more information on entering sources.

After selecting inlet in the insert window or in the modification window the button  (you can also use a double click on the inserted object) an **Properties window** will be generated for the element **Rain inlet on concrete well**.

Defining Objects

Object properties: Rain inlet on the concrete well

Object management

Symbol: WSB1 Element id: 1

Type: <New> [Icons]

Group: <None> [Icons]

Appearance

[3D Model] Angle: 0.0° [Pens] [Fonts] [Surfaces] [Description] (checked)

Operations

Area altitudes

☐ Existing terrain 0.00 m a.s.l.

☐ Designed terrain 0.00 m a.s.l.

☒ Maintain connections after parameter change

Parameters

☒ Outlet bottom ordinate -3.00 m a.s.l. [Additional equipment]

☐ Outlet bottom immersion 3.00 m

☐ Grate assembly ordinate 0.00 m a.s.l. [Grill]

☒ Grate assembly level 0.00 m

Type parameters

☒ Automatic inlet construction [Components]

[Bottom]

Outlet bottom distance from the internal bottom: 500 mm

No.	Concrete rings	[Icons]
1	Concrete ring $\varphi=500$ mm, h=1000 mm	[Icons]
2	Concrete ring $\varphi=500$ mm, h=1000 mm	[Icons]
3	Concrete ring $\varphi=500$ mm, h=250 mm	[Icons]

[Unloading ring] [Spacer ring] [Concrete cover]

[Save to template] [OK] [Cancel]

Fig.66. Properties window of the object **Rain inlet on concrete well**Control group Parameters

Outlet bottom ordinate – the user defines the ordinate of the bottom of the outlet opening from the inlet well.

Outlet bottom immersion – the user defines the immersion of the bottom of the outlet from the inlet well in relation to the designed area.

Defining Objects

Grill assembly ordinate – in the edit field, the user defines the ordinate of the top of the manhole (it is possible to make it above or below the ground level). The grill assembly level is displayed below.

Grill assembly level – in the edit field, the user defines the height of the top of the manhole (it is possible to make it above or below the ground level). The converted ordinate is displayed above.

Grill – the function transfers to the grate properties window. The grate is located in the **Parameters** panel due to the possibility of selecting grates from other series of types.

Control group **Type Parameters**

The concrete well of the road inlet is an object made of many elements with the possibility of various configurations, depending on the needs. The definition of well parameters comes down to setting the parameters of the well components: bottom, rings, reduction plate (when using rings with a smaller diameter than the bottom), concrete cover or tapering cone and adjustment rings.

This panel has two possibilities for well construction: automatic and manual.

Automatic inlet construction mode

The automatic mode of constructing a concrete well for a road inlet is available after checking the box **Automatic Inlet construction**. The mode is set by default. This mode allows the insertion of a well automatically in accordance with the elements selected by the user and with the general principles for the construction of concrete wells for road inlets. Available elements for the construction of the well are selected by the user or downloaded from the **Type Library**. After selecting the automatic mode, the function of selecting **Components** for building a well is available. The functions for building a manual well are not available in the window **Element Properties: Concrete Well**.

When inserting an inlet on a concrete well, first of all you need to set the ordinate (or immersion) value of the outlet and in the inlet properties window the parameter **Distance from the bottom**, which will define the height of the settling well. The parameter **Distance from the bottom** from the bottom is available in the property window after unchecking the **Automatic inlet construction** box. If the **Automatic inlet construction** field is checked, the **Outlet from bottom** setting is available after activating the **Components** component button that opens the **Inlet construction diagram** window.

Elementy składowe – function enabling the user to determine the elements from which wells will be built in the automatic mode of element selection. The button is active after checking the box next to it.

After selecting the function, the **Well Construction Scheme** window is displayed. The order of tabs and window buttons was determined in accordance with the order of construction of the well from the bottom, starting with the **bottom** and ending with regulating elements under the **manhole**.

Defining Objects

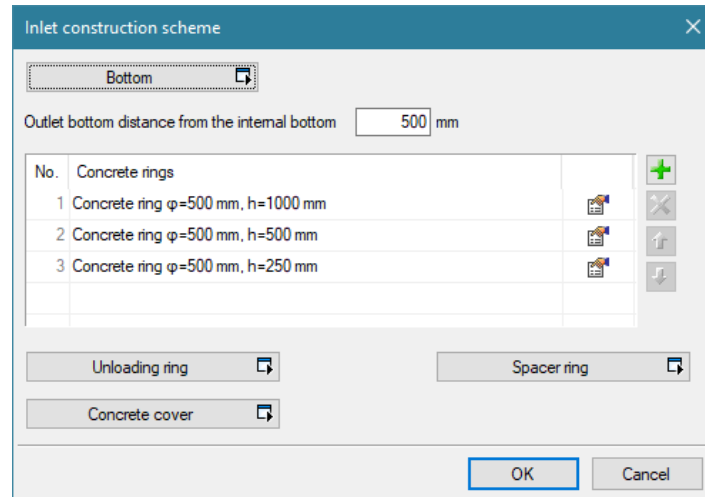


Fig.67. Window for setting the scheme of the Inlet construction

5.5.1. INLET GRILL ON A CONCRETE WELL

The operating principle of the grate is the same as that of the manhole of the concrete connection wells. The grill of the concrete well rain inlet, thanks to the possibility of using various types (regardless of the series of concrete structures), is located in the control panel **Type Parameters**.

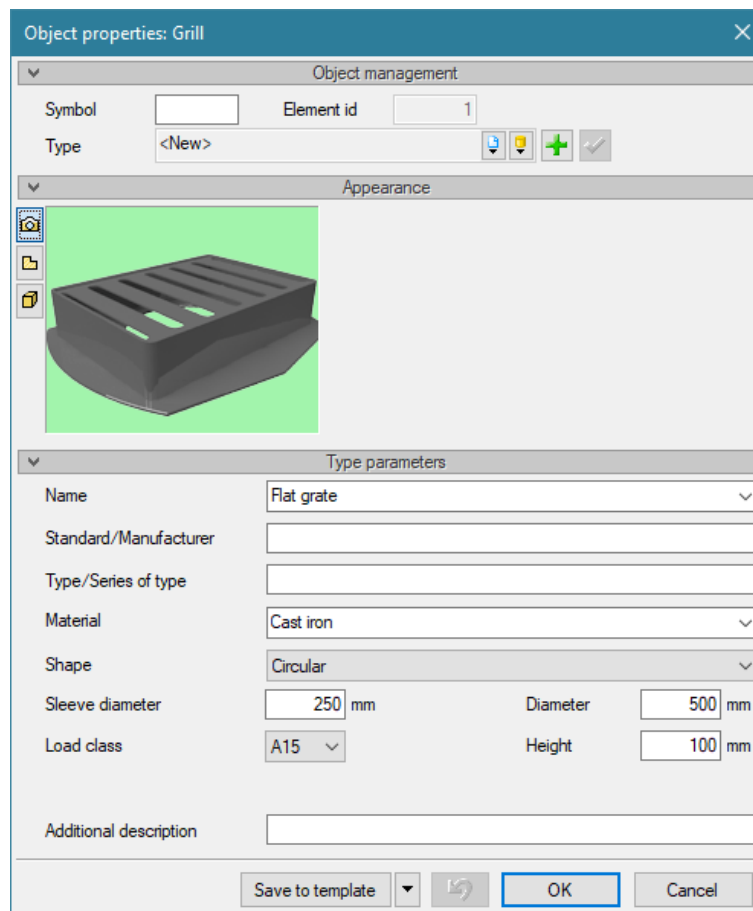


Fig.68. Properties window of the element - Grill

Defining Objects

Name – you must enter the name of the object, e.g. Flat grate or Curb grate (name given by manufacturer).

Standard/Manufacturer – field in which we enter the number of the standard or the manufacturer of a given element.

Type/Series – field in which we write the element type or series, or catalog number.

Material – edit field - the user types the material: cast iron, polymer concrete, stainless steel.

Shape – drop-down list - the user chooses a **Rectangular** or **Round** shape:

for a round shape you can choose the dimensions: **Diameter** and **Height**,

for a rectangular shape you can choose the dimensions: **Width**, **Depth** and **Height**.

Sleeve diameter – the internal diameter of the cover connection is given. It should be greater than or equal to the diameter of the hole in the concrete cover of the inlet.


Load class – drop-down list - the user has a choice of: **A15**, **B125**, **C250**, **D400**, **E600**, **F900**.

Additional description – the user enters additional data specifying the object and those moving to the bill of materials.

5.5.2. RAIN INLET BOTTOM ON CONCRETE WELL

The base object of a concrete well for a rain inlet, which determines the diameter of the object in terms of technology.

The object cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.

The object is inserted from the concrete well properties window with a button  located in the control group **Type Parameters**.

On the properties window of the rain inlet element **Bottom**, the user can only set type parameters containing geometric parameters as well as the names of the series and element.

Name – enter the name of the object, e.g. The Bottom of a road inlet of a concrete

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Inner diameter– edit field – inner diameter of the well [mm].

Side wall thickness – edit field – side wall thickness [mm].

Base thickness – edit field – thickness of the Bottom. In the case of a prefabricated composite invert channel, specify the dimension from the outside of the bottom to the bottom of the invert channel. In the well window in the edit field **Height of invert channel above bottom** type 0,0 [mm].

Height – edit field – height calculated from the inner side of the bottom [mm].


Defining Objects

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Fig.69. Properties window of the object - **Bottom** – element of the concrete well inlet

5.5.3. INLET CONCRETE RING ON CONCRETE WELL

The object **Ring** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.

The object is inserted from the concrete well properties window with a button  located in the control group **Type Parameters**.

Defining Objects

Fig.70. Properties window of the object Rings – element of the concrete well inlet

Name – enter the name of the object, e.g. Concrete ring class C35/45.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Inner diameter– edit field – inner diameter of the well [mm].

Side wall thickness – edit field – side wall thickness [mm].

Height – edit field – height calculated between mounting surfaces [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

5.5.4. INLET UNLOADING RING ON CONCRETE WELL

The object **Unloading ring** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.

The object is the base for the elements of the top of the rain inlet. It is a round plate with an opening in the middle, set on the ground around the rings (extensions) of the inlet well. The opening in the ring must be larger than the outer diameter of the rings.

Defining Objects

Object properties: Unloading ring

Object management

Symbol Element id

Type

Appearance

Type parameters

Name

Standard/Manufacturer

Type/Series of type

Outside diameter mm

Opening diameter mm

Height mm

Additional description

Save to template OK Cancel

Fig.71. Properties window of the object Unloading ring – element of the concrete well inlet

Name – enter the name of the object, e.g. Unloading ring Ø 1150/680 mm.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Outside diameter – edit field - the diameter of the plate should correspond to the outer diameter of the ring [mm].

Opening diameter – edit field - the diameter of the opening in the ring should be greater than the outside diameter of the rings and bottom [mm].

Height – edit field – thickness of ring [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Defining Objects

5.5.5. INLET SPACER RING ON A CONCRETE WELL

The object **Spacer ring** cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.unloading ringun

It is a rain inlet crown element, mounted between the cover (inlet base) and unloading ring. It has a round shape and height greater than the wall thickness.

Fig.72. Properties window of the object Spacer ring– element of the concrete well inlet

Name – enter the name of the object, e.g. Spacer ring Ø 920/680 mm.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Outside diameter – edit field - the diameter of the plate should correspond to the outer diameter of the ring [mm].

Opening diameter – edit field the diameter of the opening in the ring should be greater than the outside diameter of Rings and Bottom [mm].

Height – edit field – ring thickness [mm].

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Defining Objects

5.5.6. INLET CONCRETE COVER ON CONCRETE WELL

The **Inlet concrete cover** object cannot be entered from the *ArCADia program* ribbon nor from the toolbar of the *AutoCAD program*. It has no insert window or action window. It is a component of the concrete well.

It is a rain inlet crown element, mounted on the spacer ring and is the base of the frame.

Fig.73. Properties window of the object Concrete cover – element of the concrete well inlet

Name – enter the name of the object, e.g. Concrete cover Ø 920/680 mm.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Outside diameter – edit field - the diameter of the plate should correspond to the outer diameter of the ring [mm].

Opening diameter – edit field the diameter of the opening in the ring should be greater than the outside diameter of Rings and Bottom [mm].

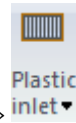
Height – edit field – ring thickness [mm].


Additional description – the user enters additional data specifying the object and moving to the bill of materials.

Defining Objects

5.6. WPUST DESZCZOWY NA STUDNI TWORZYWOWEJ*ArCADia Program:*

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒

*AutoCAD Program:*

- **Sewage Networks** toolbar ⇒ 
- Or type
- OSWR_PGR.

The object insertion window then appears.

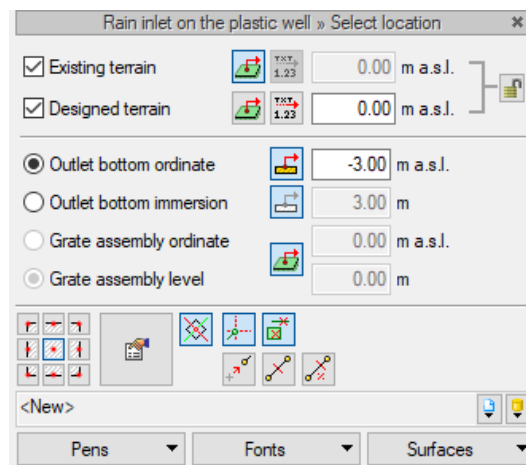


Fig.74. Insertion settings window of Rain inlet on the plastic well

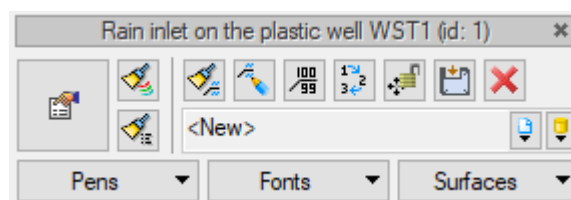


Fig.75. Modification window of the element - Rain inlet on the plastic well

Defining Objects

Fig.76. Properties window of the object - Grill

Name – you must enter the name of the object, e.g. Flat grate or Curb grate (name given by manufacturer).

Standard/Manufacturer – field in which we enter the number of the standard or the manufacturer of a given element.

Type/Series – field in which we write the element type or series, or catalog number.

Material – edit field - the user types the material: cast iron, polymer concrete, stainless steel.

Shape – drop-down list - the user chooses a **Rectangular** or **Round** shape:

for a round shape you can choose the dimensions: **Diameter** and **Height**,

for a rectangular shape you can choose the dimensions: **Width**, **Depth** and **Height**.

Sleeve diameter – the internal diameter of the cover connection is given. It should be greater than or equal to the diameter of the hole in the concrete cover of the inlet.

Load class – drop-down list - the user has a choice of: **A15**, **B125**, **C250**, **D400**, **E600**, **F900**.

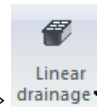
Additional description – the user enters additional data specifying the object and those moving to the bill of materials.

NOTE! The object is a simplification of the real device consisting of tray segments. If the user wants to insert several drains, they must insert separate drainage sections.

Defining Objects

5.7. LINEAR DRAINAGE

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks** toolbar ⇒
- Or type
- OSWR_DH.

The object insertion window then appears for both ends.

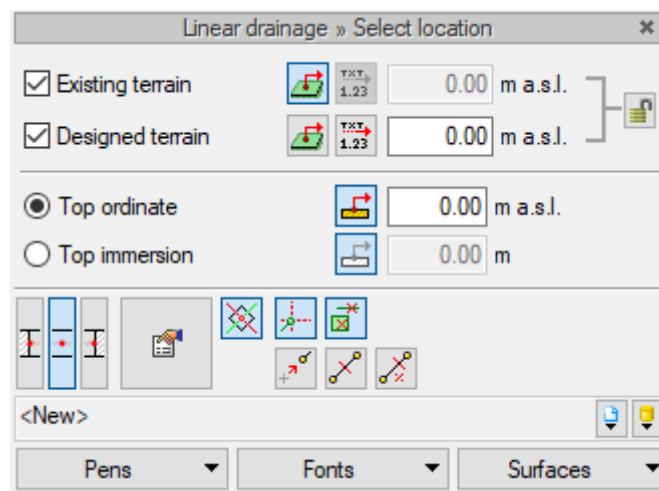


Fig.77. Insertion settings window of Linear drainage

The object is inserted by clicking on one point and "stretching" it in the direction chosen by the user, and then clicking on the second point. When inserting a linear drainage system whose grill surface will be level with the ground level (which is almost always the case), select the **Top immersion** in the insertion window and enter values 0.00.

It is recommended to put in the line drainage first, and lead the pipeline out of it or connect to the outlet.

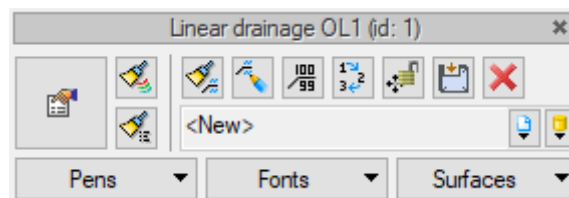


Fig.78. Modification window of the element – Linear drainage

Defining Objects

Setting the organization of the outflow water drainage is made in the properties window by selecting the position: **from the side wall** or **well** and setting the appropriate distance from the bottom of the drainage element.

Fig.79. Properties window of the object Linear drainage

Type Parameters:

Name – you must enter the name of the object, e.g. linear drainage S 200.

Standard/Manufacturer – field in which we enter the number of the standard or the manufacturer of a given element.

Defining Objects

Type/Series – field in which we write the element type or series, or catalog number.

Drainage type – drop-down list – the organization of water drainage from the linear drainage should be chosen:

- **Well** – the geometrical parameters of the well that are to be set appear in the window:
Distance of drainage bottom from the bottom of the well, thereby obtaining a settling part.
Length of well
Width of well
Height of well
- **From the side wall of linear drainage** – this parameter appears in the window:
Outlet distance from the bottom – edit field – the user sets the height of the bottom of the drain from the bottom of the channel. When exiting the bottom with a vertical pipe, the value 0.00 should be set. If the opening gauge connects with the bottom of the channel, then 0.00 is also set.

Width – wartość **dotyczy szerokości korytek** odwodnienia liniowego. The width of the channel is usually equal to or less than the width of the well outflow.

Height – edit field – the user inserts the height of the channels (Note: in the case of channels with a slope it is best to provide the highest value, in the case of collisions and close encounter there will be a safe distance from the existing underground utilities).

Bottom slope – drop-down list – parameter do specify the element and description.

Load class – drop-down list – parameter do specify the element and description.

Additional description – the user enters additional data specifying the object and those moving to the bill of materials.

UWAGA! *When determining the depth of the bottom of the outflow from the linear drainage well, the height of the settling part should be subtracted from the height of the well (distance of the outflow from the bottom of the well).*

In order to insert the object **Tank**, click the icon:

ArCADia Program:

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒ 

AutoCAD Program:

- **Sewage Networks** toolbar ⇒ 

Or type

- OSWR_CT.

The object insertion window then appears.

Defining Objects

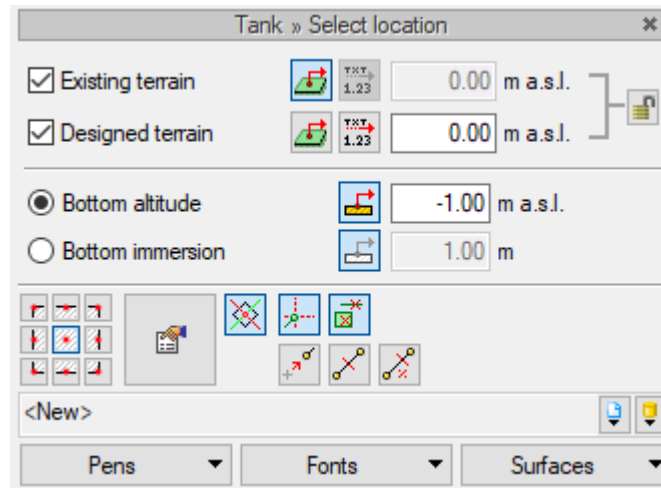


Fig.80. Insertion settings window of Tank

The tank definition in the insert window is limited to the definition of the elevation or the bottom of the tank. Other parameters should be defined in the properties window by going to it during insertion or after inserting the tank.

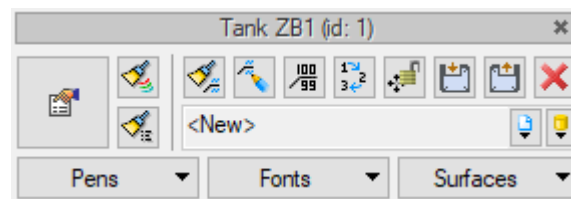



Fig.81. Action window of the object - Tank

It is recommended that the tank be inserted first, and then connect the pipelines from or to the tank with the walls. If the **Import from element**  function is enabled, when connecting the pipe to the tank wall, the bottom of the pipeline will be connected to the wall at the bottom of the tank.

If the function **Import from element** is not active, then the pipeline will connect to the wall on the ordinate or depression entered in the pipeline insertion window, provided that the ordinate is between the bottom and the tank ceiling

The tank is a simplified object, without manholes raised to the surface. On the profile, the tank is visualized as a rectangle (horizontal cross section between inflow and outflow).

An spot height is automatically inserted in the center of the tank on the plan..

NOTE! *In order for the area above the tank to reflect correctly on the profile, a spot height should be placed above each corner.*

Defining Objects

5.8. TANK

Object properties: Tank

Object management

Symbol: ZB1 Element id: 1

Type: <New> [Icons]

Group: <None> [Icons]

Appearance

[Icons] Angle: 0.0° Pens: [Dropdown] Fonts: [Dropdown] Surfaces: [Dropdown] Description: [Checked] [Icon]

Operations

Area altitudes

☐ Existing terrain 0.00 m a.s.l.

☐ Designed terrain 0.00 m a.s.l.

☒ Maintain connections after parameter change

Parameters

☒ Bottom altitude -1.00 m a.s.l. Additional equipment: [Dropdown]

☐ Bottom immersion 1.00 m

Manhole: [Icon]

Manhole position: [Dropdown]

Type parameters

Name: Tank [Dropdown]

Standard/Manufacturer: [Text]

Type/Series of type: [Text]

Material: Concrete [Dropdown]

Shape: Cuboid [Dropdown]

Side wall thickness: 50 mm Length: 2.00 m

Base thickness: 50 mm Width: 1.00 m

Height: 1.00 m

Additional description: [Text]

Save to template [Dropdown] [Icon] OK Cancel

Fig.82. Properties window of the object - Tank

Name – enter the name of the object, e.g. Retention Tank.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Material – field with editing possible - selection of tank body material or entering your own.

Defining Objects

Shape – field - basic shapes of retention tanks are available; cuboid, horizontal cylinder and vertical cylinder.

Side wall thickness – edit field – the user inserts the thickness of the side walls and cover, which will determine the internal dimensions.

Base thickness – edit field – tank bottom thickness. Increasing the thickness of the bottom of the tank reduces its internal dimensions (internal height).

Length – edit field – external dimension, conventional tank length [mm].

Width – edit field – external dimension, conventional tank width [mm].

Diameter – edit field – appears when choosing a cylinder shape.

Height – edit field – height calculated from the inside of the bottom [mm] to the outer cover of the tank.

Additional description – the user enters additional data specifying the object and moving to the bill of materials.

5.9. FAT SEPERATOR

- **Sewage** ribbon ⇒ logical group **Sewage Networks** ⇒  Fat separator

AutoCAD Program:

- **Sewage Networks** toolbar ⇒ 

Or type

- OSWR_GRS.

The object insertion window then appears.

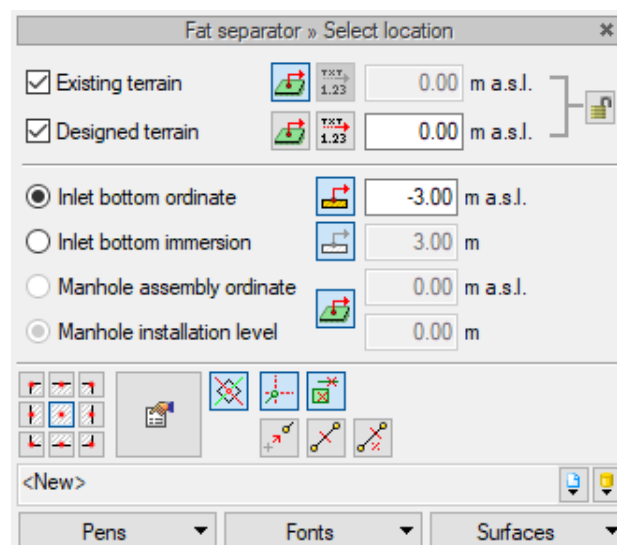


Fig.83. Insertion settings window of the element – Fat separator

Defining Objects

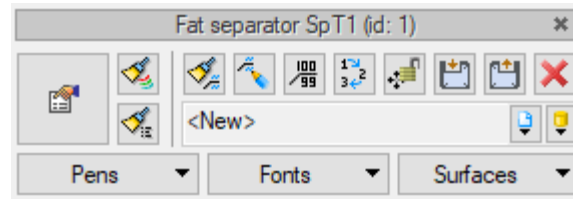


Fig.84. Action window of object – Fat separator

To determine the installation height of the separator relative to the terrain, the ordinate or inlet assembly level and the ordinate or level of the manhole assembly are defined in the insertion window. These two elements decide on the height of settling the separator tank.

Other geometrical parameters are set in the properties window.

Parameters:

Inlet bottom ordinate/Inlet bottom immersion – parameter setting the foundation of the separator tank.

The location of the outlet is set in the **Type Parameters** section and is given as the height difference from the inlet to the device.

Manhole assembly ordinate/Manhole installation level – parameter enabling definition of manhole location relative to the terrain. If the manhole ordinate will be inserted the same as the land ordinate or the assembly level is set at 0.00 m, the manhole will coincide with the area.

Required rated flow capacity – parameter set by the user based on the flow calculated by the program.

Additional equipment – launches a window for inserting elements of additional device equipment in order to specify it in the material lists.

Manhole – launch the manhole property setting window.

Manhole position – manhole position activation.

Type Parameters:

Name – enter the name of the object, e.g. Fat separator.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Material – edit field with editing– choosing the tank body material or entering your own.

Shape – edit field – basic shapes of separator tanks are available: cuboid and vertical cylinder.

Side wall thickness – edit field – the user inserts the thickness of the side walls and cover, which will determine the internal dimensions.

Base thickness – edit field – thickness of the bottom of the separator chamber. Increasing the thickness of the bottom of the tank reduces its internal dimensions (internal height).

Length – edit field – external dimension, conventional tank length [mm].

Defining Objects

Diameter – edit field – when choosing a cylinder shape.

Width – edit field – external dimension, conventional tank width [mm].

Height – edit field – height calculated from the inside of the bottom [mm] to the outer cover of the tank.

inlet/outlet Diameter – edit field – diameter of the openings in the separator tank for the inlet and outlet pipelines.

Inlet bottom distance from the internal bottom – edit field – the parameter determines the depth of the bottom relative to the inlet to the device.


Nominal capacity – edit field – technological parameter defining the nominal flow through the device.

Full store capacity – edit field – technological parameter defining the capacity of the device tank.

Additional description – the user enters additional data specifying the object and moving it to the Lists

Method of inserting object:

It is recommended to enter this object first. The user generally defines the ordinate of the bottom of the inlet pipeline or its immersion in relation to the designed area. Other dimensions are set on the property window relative to the bottom of the inflow pipeline. To connect the pipeline to the inlet connection you should:





1. Select the pipeline icon from the ribbon and move the cursor over the separator view, or run the pipe view from any point, and with the other point move it to the separator.
2. Select in the insert window the option **Import from element**  and set the ordinate value above the tank inlet ordinate or the immersion value less than the inlet immersion of the separator tank.
3. Click on the separator view field, which connects the pipeline and shortens the pipe to the contour of the separator.



Defining Objects

Object properties: Fat separator






Object management

Symbol: SpT1 Element id: 1

Type: <New>    


Group: <None>  

Appearance

 Angle: 0.0° Pens:  Fonts:  Surfaces:  Description: 

Operations


Area altitudes

☐ Existing terrain 0.00 m a.s.l. 


☐ Designed terrain 0.00 m a.s.l.


☒ Maintain connections after parameter change

Parameters

☒ Inlet bottom ordinate -3.00 m a.s.l. Additional equipment: 

☐ Inlet bottom immersion 3.00 m


☐ Manhole assembly ordinat 0.00 m a.s.l. Manhole: 


☒ Manhole installation level 0.00 m Manhole position: 

Required rated flow capacity 0.00 dm³/s

Type parameters

Name: Fat separator

Standard/Manufacturer: 

Type/Series of type: 

Material: Concrete

Shape: Cuboid

Side wall thickness: 50 mm Width: 0.80 m


Base thickness: 50 mm Depth: 0.80 m

Inlet/outlet diameter: 200 mm ☒ Outlet bottom distance from the internal bottom: 100 mm

Inlet bottom distance from the internal bottom: 120 mm ☐ Outlet bottom depression in relation to the inlet: 20 mm

Nominal capacity: 0.00 dm³/s

Fat store capacity: 0.00 dm³

Additional description: 


Save to template:  OK Cancel

Fig.85. Property window of the object - Fat separator

In the dialog box, the user specifies the value of the inlet bottom ordinate (or the value of the immersion of the inlet bottom) to the separator (in the **Parameters** panel) and on this basis the object is placed relative to the terrain. Other geometrical parameters are set in the **Type Parameters** panel as characteristic for a given separator model:

Defining Objects

- **Inlet bottom distance from the internal bottom.** – determines the foundation of the bottom relative to the ground calculated as the sum of the immersion of the bottom of the inlet pipeline and the distance of the bottom of the inlet from the inside part of the bottom.
- **Outlet bottom distance from the internal bottom.** – this parameter indirectly determines the height difference between the inlet and outlet pipelines. Determines the position of the bottom of the outlet pipeline relative to the position of the bottom of the separator, previously defined as the distance of the bottom of the separator from the bottom of the inlet pipe. It is activated optionally.
- **Outlet bottom depression in relations to the inlet** – the parameter directly determines the distance of the bottom of the inlet from the bottom of the outlet. The parameter is run optionally.
- **Width/depth** – definition of dimensions in the view on the map.

NOTE! When inserting on the map, the separator has no specific flow direction through it. The connection of the pipeline to the separator with the active function **Import from element** depends on the ordinate or depth value specified by the user.

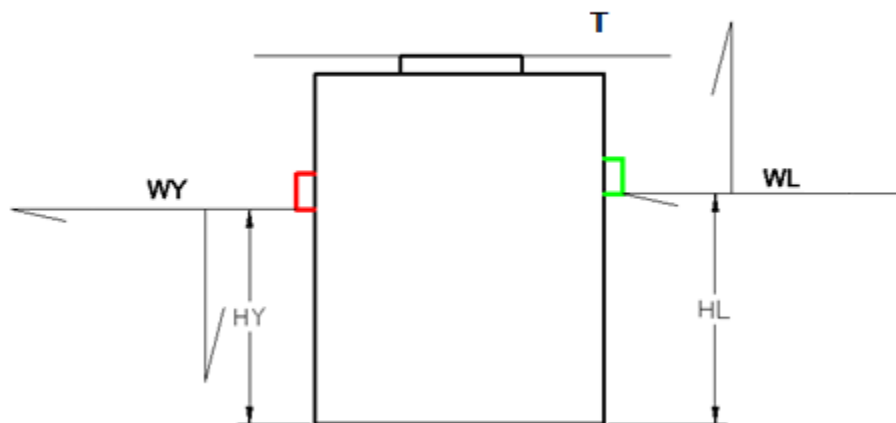


Fig.86. Separator cross-section – diagram of how to insert a separator

T	Ground level
WY	Outlet bottom ordinate
HY	Outlet bottom distance from the internal bottom
WL	Inlet bottom ordinate
HL	Inlet bottom distance from the internal bottom

Defining Objects

If the user intends to first connect the pipeline to the separator inlet, then in the insertion window, with the function **Import from element** active, insert the ordinate value above the inlet ordinate to the separator (usually the inlet is lower than the outlet by 2 to 5 cm) or the depression lower than depression of the bottom of the outlet. The ordinate (or depression) values of the inlet and outlet should be set in the separator properties window.

If the user intends to first connect the pipeline to the outlet, then in the insert window, with the function active **Import from element**, insert the ordinate value below the expected ordinate of the outlet from the separator or a depression larger than the depression in the bottom of the outlet. The difference between inlet and outlet should be checked in the object's property window.

e.g.

- Ordinate of terrain 101.00.
- The separator inlet is on the ordinate WL = 100.00.
- The outlet from the separator is on ordinate WY = 99.95.
- The difference between the inlet and the outlet is 0.05 m.

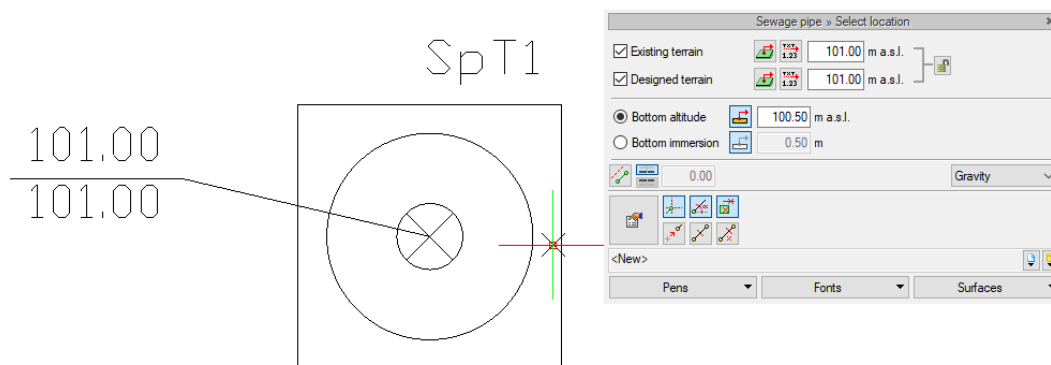


Fig.87. Example of setting the ordinate of the pipe end when connecting to the separator inlet.

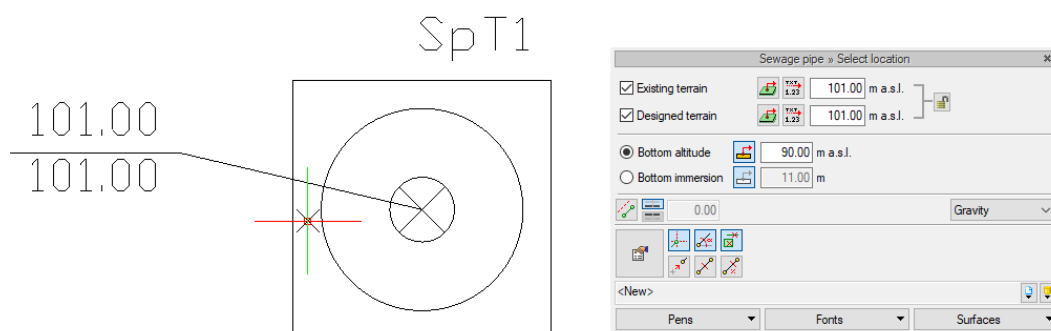
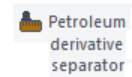


Fig.88. Example of setting the ordinate of a pipe end when connecting to the separator outlet connector

Defining Objects

5.10. PETROLEUM DERIVATIVE SEPERATOR

- **Sewage Networks ribbon** ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks toolbar** ⇒

Or type

- OSWR_PTS.

The object insertion window appears.

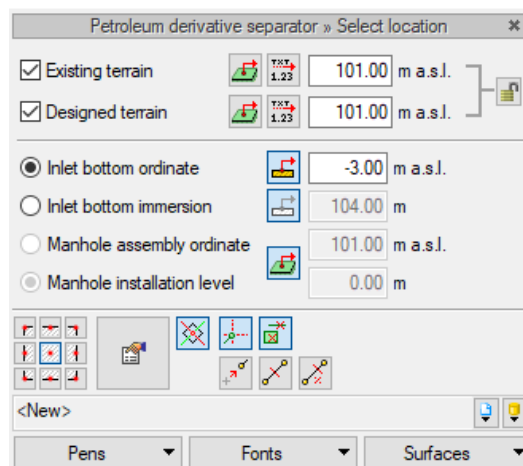


Fig.89. The setting window for the object - Petroleum derivative separator

The method of inserting the separator and defining its petroleum substances are the same in the diagram as the Fat separator object.

In the property window, the only difference is the introduction of technological data characterizing the type of construction of the petroleum substance separation system:

Type –selection list – 1) Lamellar, 2) Coalescent.

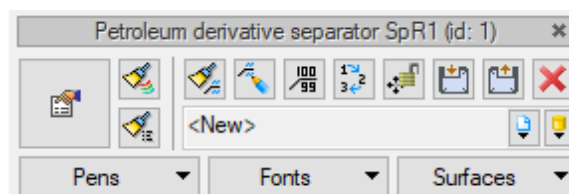


Fig.90. Action window of the Petroleum derivative separator

Defining Objects

Object properties: Petroleum derivative separator

Object management

Symbol: SpR1 Element id: 1

Type: <New>

Group: <None>

Appearance

Angle: 0.0°

Pens:

Fonts:

Surfaces:

Description:

Operations

Area altitudes

☐ Existing terrain 101.00 m a.s.l.

☐ Designed terrain 101.00 m a.s.l.

☒ Maintain connections after parameter change

Parameters

☒ Inlet bottom ordinate -3.00 m a.s.l. Additional equipment:

☐ Inlet bottom immersion 104.00 m

☐ Manhole assembly ordinat 101.00 m a.s.l. Manhole:

☒ Manhole installation level 0.00 m Manhole position:

Required rated flow capacity 0.00 dm³/s Required maximum flow capacity 0.00 dm³/s

Type parameters

Name: Petroleum derivative separator

Standard/Manufacturer:

Type/Series of type:

Material: Concrete

Shape: Cuboid

Side wall thickness 50 mm Width 0.80 m

Base thickness 50 mm Depth 0.80 m

Inlet/outlet diameter 200 mm ☒ Outlet bottom distance from the internal bottom 100 mm

Inlet bottom distance from the internal bottom 120 mm ☐ Outlet bottom depression in relation to the inlet 20 mm

Nominal capacity 0.00 dm³/s Maximum flow capacity 0.00 dm³/s

Oil store capacity 0.00 dm³ Type: Lamellar

Additional description:

Save to template OK Cancel

Fig.91. Properties window of the object - Petroleum derivative separator

The insertion scheme for the petroleum derivative separator is the same as for the fat separator. The differences only apply to technology.

Defining Objects

5.11. PUMPING STATION

- **Sewage Networks ribbon** ⇒ logical group **Sewage Networks** ⇒  **Pumping station**

AutoCAD Program:

- **Sewage Networks toolbar** ⇒ 

Or type

- OSWR_PS.

The object insertion window appears.

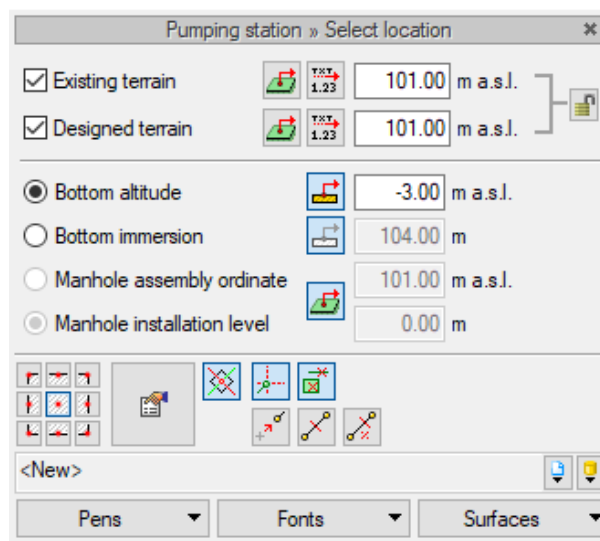


Fig.92. Insertion settings window of the object - Pumping station

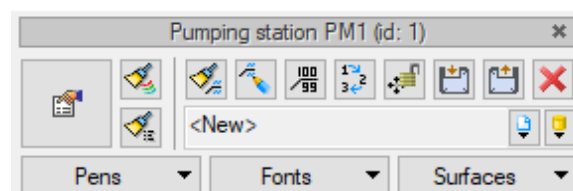


Fig.93. Action window of the object - Pumping station

The pumping station is a simplified object that should be treated as a geometric connection of pipelines. The object allows the inclusion of any number of gravity inlet pipelines and pressure drainage. When calculating, however, you can indicate only one outflow that will create calculation paths, directing the total amount of wastewater to one indicated outflow.

Due to the diversity of pumping station designs, only the model and simplified view will be created, without any technological definitions.

Defining Objects

Object properties: Pumping station

Object management

Symbol: PM1 Element id: 1

Type: <New> [Icons]

Group: <None> [Icons]

Appearance

[3D Model of Pumping Station Tank]

Angle: 0.0 ° [Pens] [Fonts] [Surfaces] [Description]

Operations

Area altitudes

☐ Existing terrain 101.00 m a.s.l.

☐ Designed terrain 101.00 m a.s.l.

☒ Maintain connections after parameter change

Parameters

☒ Bottom altitude -3.00 m a.s.l. [Additional equipment]

☐ Bottom immersion 104.00 m

☐ Manhole assembly ordinat 101.00 m a.s.l. [Manhole]

☒ Manhole installation level 0.00 m [Manhole position]

Type parameters

Name: Pumping station

Standard/Manufacturer: []

Type/Series of type: []

Material: Concrete

Shape: Cuboid

Side wall thickness: 50 mm Width: 0.80 m


Base thickness: 50 mm Depth: 0.80 m

Additional description: []

[Save to template] [OK] [Cancel]

Fig.94. Properties window of the object - Pumping station

The definition of the height position of the pumping station is limited to the indication of the manhole ordinate or, optionally, the level of the manhole assembly and the bottom ordinate or, optionally, the bottom immersion in relation to the designed area.

It is recommended to connect the pipelines with the disabled function **Import from element**  with the ordinate above the bottom of the pumping station tank. The mechanism of connecting pipelines with a pumping station is the same as with connection wells. If the **Import from element** function is activated, the pipeline will be connected to the bottom of the pumping station tank.

Defining Objects

Parameters:

Bottom altitude/Bottom immersion – parameters determining the foundation of the bottom of the pumping station tank.

Manhole assembly ordinate/Manhole installation level – parameter enabling definition of manhole location relative to the terrain. If the manhole ordinate will be inserted the same as the terrain ordinate or the assembly level is set at 0.00 m, the manhole will coincide with the terrain.

Additional equipment – launches a window for inserting elements of additional device equipment in order to specify it in the Lists of materials.

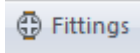
Manhole – launches the manhole property setting window.

Manhole position – launches the manhole position window.

5.12. FITTINGS

To insert on the model objects symbolizing fittings mounted on drain pipes, click on the icon:

ArCADia Program:

- **Sewage Networks ribbon** ⇒ logical group **Sewage Networks** ⇒ 

Program AutoCAD:

- **Sewage Networks toolbar** ⇒ 

Or type

- OSWR_SA.

The object insertion window appears.

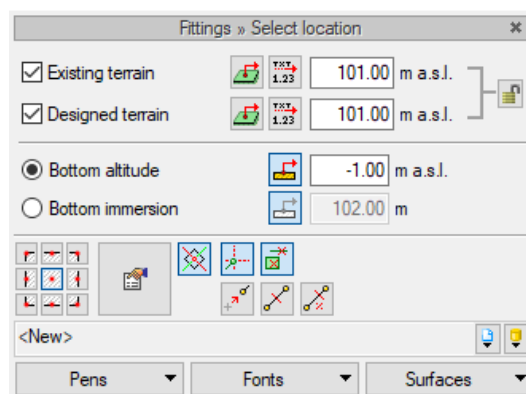





Fig.95. Insertion window of the object - Fittings

The window allows for:

- Selecting the insert function relative to the elements already drawn, i.e. setting the detection of elements and segments  and tracking elements and end sections .

Defining Objects

- Setting the level of installation on the pipeline by pressing the **Import from element** button , which allows the automatic plugging of the fittings into the pipeline. An object plugged into the pipeline divides the pipe into two parts.
- Using libraries – from the drop-down list of a given library, the user can choose a sample type of fittings and use in the project.

After selecting the inserted element, the element modification window appears.

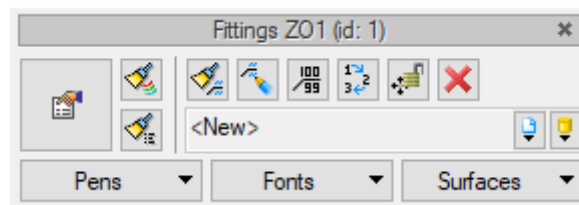



Fig.96. Okno modyfikacji obiektu Armatura

By choosing the button  or a double-click on the inserted element, a window for defining the properties of the designed type of fitting appears.

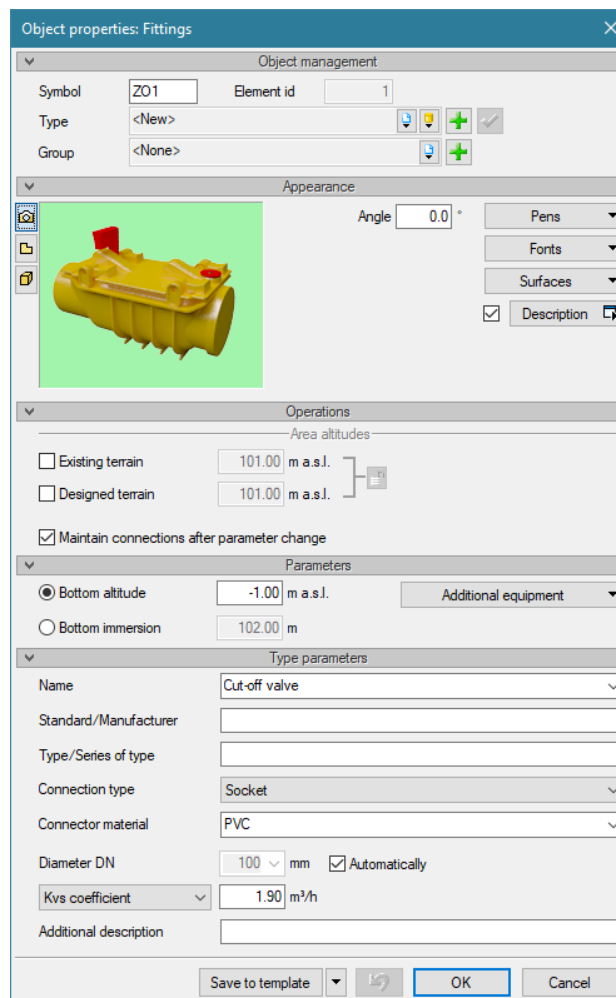


Fig.97. Properties window of the object - Fittings

Defining Objects

Controls set - Parameters

ordinates of the area

Existing terrain – if the user selects this control, he can edit the ordinate of the terrain and it will be changed at the height point located in the axis of the well.

Designed terrain – if the user selects this control, he can edit the ordinate of the terrain and it will be changed at the height point located in the axis of the well.

Maintain connections after parameter change – selecting this function maintains the connection point of the object after changing its geometrical parameters (e.g. with pipes, which may cause a change in pipe slope when the depth of the connection point of the building changes).

Additional equipment – launches a window for inserting elements of additional device equipment in order to specify it in the Lists of materials.

Controls set – Type Parameters

Name – enter the name of the object, e.g. cut-off valve or choose from the drop down menu.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Connector material – the designer selects from the drop-down list the material of pipe connectors of a given element.

Diameter – the designer selects the nominal diameter of the fitting from the drop-down list. If the check box next to the **Automatic** diameter is unchecked (the parameter is set by default), the selection of the valve diameter is blocked and the valve assumes a diameter such as the diameter of the pipeline in which it is inserted.

Additional description – the user enters additional data specifying the object and what is moving to the List of materials.

5.13.SEWAGE FITTING

In the **ArCADia-SEWAGE NETWORKS** sewage fittings are created automatically when entering the sewage network route at pipeline connections. Fittings are created graphically as elbows, tees, crosses and connections of several pipes (above four pipelines). Each such fitting is a connection set consisting of a sufficient number of elements needed to complete a given connection. Different configurations of such connection sets are possible. In the program, by default, the most optimal and adapted to the design options are selected, but in the properties of sewage fittings it is possible to change and choose another set.

Connection type setting options are described in section 3.2.3.

Basic sewage fittings that the program generates in the List of materials:

- Change of direction (angle), e.g. elbow 40°,
- Change Diameter, e.g. reduction DN150/DN250,

Defining Objects

- branches: three-way, four-way, connection „X” pipe (not standard connection),
- change material (PVC/stoneware connection).

Sewage fittings are created in two ways, depending on how the route was drawn.

1. If the user uses the **Ortho** function, the fittings will form as angular automatically or when connecting to the pipeline at a right angle, and the angle settings will be as set in the **Project Options**.
2. If the route is not entered with right angles, then the fittings will be created with any entered angles, and their detection can be changed in the project options.

The object **Sewage fittings** is inserted automatically on connections between pipes. The default settings with which the fittings are inserted can be entered and changed in the **Project Manager**


The Project Manager allows you to manage all elements of the ArCADia program depending on the project being implemented: buildings, floors, electrical and gas installations, sewage systems, telecommunications networks etc.

Activation :

ArCADia Program:

- **System** Ribbon ⇒ logical group **Project** ⇒  **Project Manager**

AutoCAD Program:

- **View** Ribbon ⇒ logical group **View** ⇒  **Project Manager**

Or type

- ISA_tllv.

Defining Objects

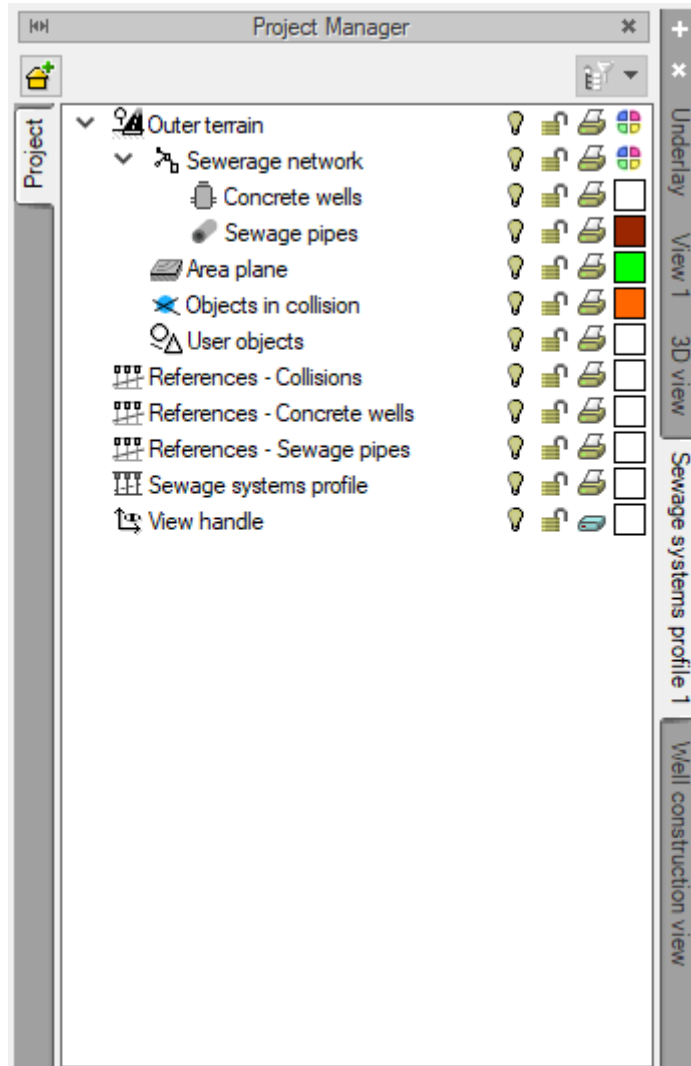


Fig.98. The ArCADia program Project Manager window.

On the right hand side of the **Project Manager** there are tabs for activating the generated views: profile network views. After clicking the left mouse button on the projection name (vertical inscription), the selected view is activated in the drawing field (the inactive one is grayed out).

If the user right-clicks on the name of a given view, the view properties window opens, in which the user can change its name, refresh method and drawing units (see chapter 4.2).

The Project Manager has a list of object groups entered by the user into the network project. Selecting the appropriate option next to the name of a group of objects allows you to define the visibility and color of drawing and printing. After right-clicking on the object name, the user can select all objects from a given group or enter a new subgroup of objects of a given type.

Defining Objects

.

In the place of such a connection, a set of fittings is created and the user has a choice of various options for implementing this connection, e.g. he decides whether the fittings should be reducing.

After clicking on the object **Sewage fittings** or selecting it from the project tree in the **Project Manager** a modification window will be available (Fig.99).

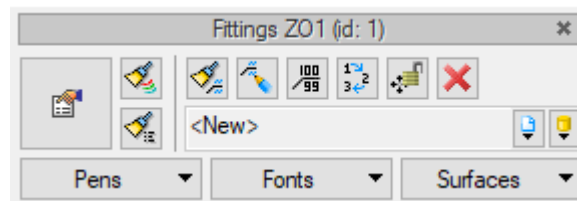



Fig.99. Modification window of the element - **Sewage fitting**.

The user can change the color and thickness of the pen, the color, size and type of the description font, as well as modify the appearance of the Sewage fitting surface on view.

After clicking on the icon  or by double clicking on the **Sewage fitting** the properties window will become available

Defining Objects

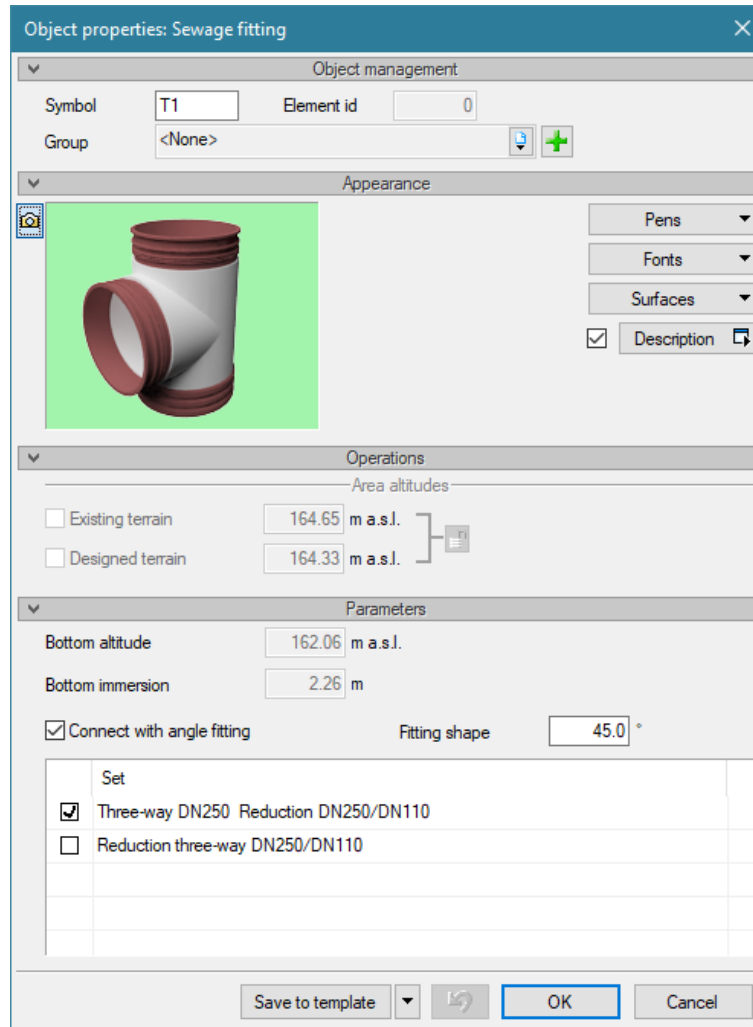


Fig.100. Sewage fitting properties window

Three groups of controls are available in the window:

Appearance

The user can change the color and thickness of the line pen, color, size and type of the font in the description, as well as modify the appearance of the sewage fitting surface on plan.

It is also possible to insert a fitting description after checking the Description box. After clicking the Description button, the description configuration window is available. By default, the description is set as a fitting symbol, e.g. T1.

Parameters

Connect with angle fitting – after selecting this checkbox, the fitting will be formed with the fitting angle given next to it. This means that if two pipes are drawn on a projection at a right angle, e.g. using the drawing with **Ortho** function, then the connecting fitting between them will automatically be inserted with the fitting angle entered in the properties.

Set – table with possible connection sets. After clicking on a given row, the user can check exactly what Sewer fittings are in a given set and how many pieces of these fittings there are.

Defining Objects

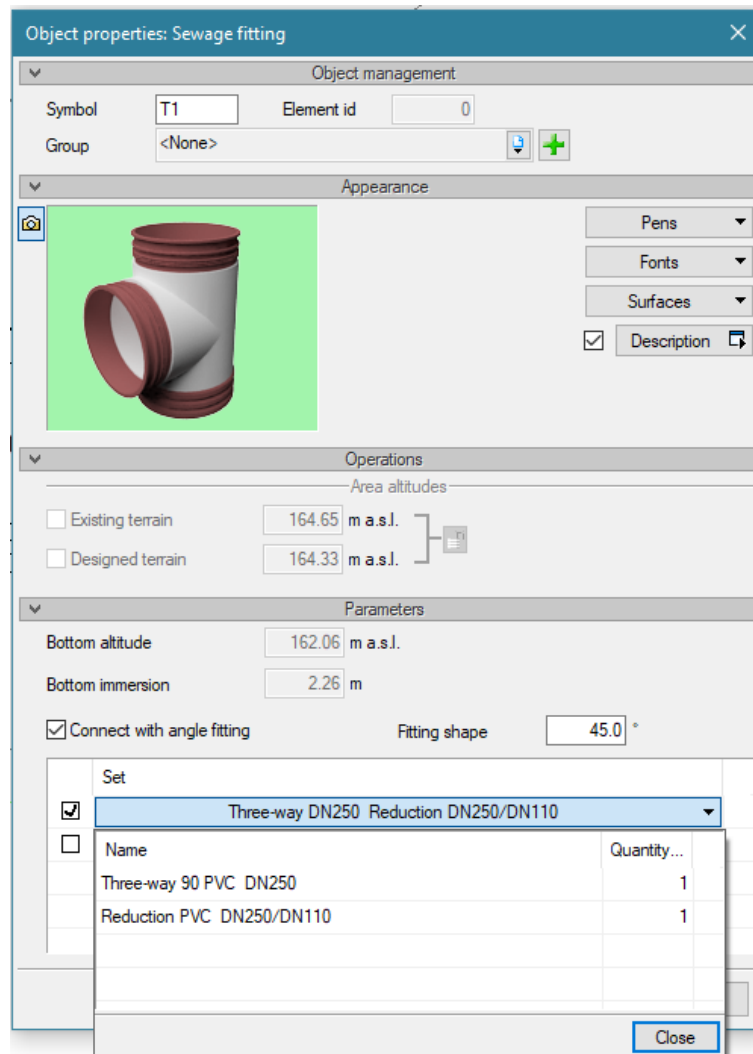


Fig.101. Properties window with expanded list of sewage fittings from a given set.

If the user selects the appropriate set, he confirms the selection with the **OK** button and closes the properties window.

The set of fittings created in this way is automatically added to the List of materials.

List of sewerage system materials

Item...	Name	Unit	Quantity	Dimensions
Sewage				
1	Pipe PVC	m	81.45	DN200 200.0x5.90 mm
2	Pipe PVC	m	63.33	DN250 250.0x7.30 mm
3	Pipe PVC	m	4.35	DN100 110.0x3.25 mm
Ungrouped				
1	Concrete well	pcs	5.00	1200 mm
2	Reduction PVC DN250/DN110	pcs	1.00	DN250/DN110
3	Three-way 90° PVC	pcs	1.00	DN250

Fig.102. An example of a created List of materials

Defining Objects

5.14.SURVEY POINT

To insert into the model the object **Survey point**, click the icon:

ArCADia Program:

- **Sewage Networks ribbon** ⇒ logical group **Sewage Networks** ⇒ 

AutoCAD Program:

- **Sewage Networks toolbar** ⇒ 

Or type

- OSWR_GEO.

The object insertion window appears. This object is a point inserted anywhere, for which a geodetic coordinate will then be generated. If the user inserts points at the corners of the tank, coordinates will be generated for them. For objects such as wells, pumping stations, tanks or separators, coordinates are generated automatically for their geometric centers.

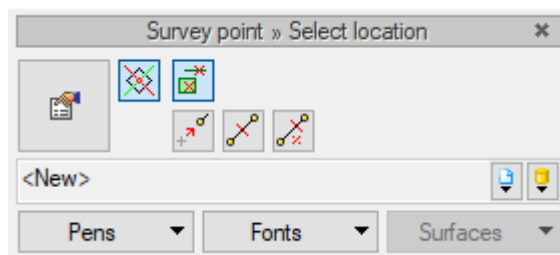



Fig.103. Insertion window of the Survey point

The window allows you to select the insertion function relative to already drawn elements, i.e. to set detection of elements and segments .

After inserting a given object and selecting it, the object modification window is available.

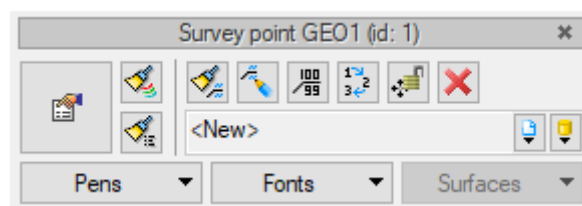



Fig.104. Modification window of the element Survey point

By choosing the button  or a double-click on the inserted element, the window for defining the properties of the Survey point appears.

Defining Objects

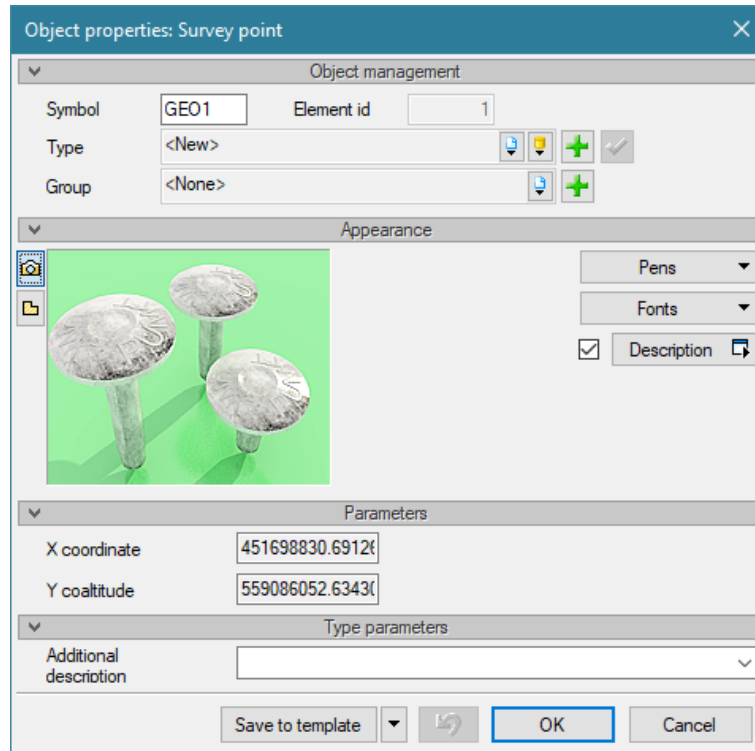


Fig.105. Properties window of the element Survey point.

Control set **Parameters**

Coordinate X – Field to read the coordinate.

Coordinate Y – Field to read the coordinate.

Additional description – the user enters additional data specifying the object and what is moving to the List of materials.

Defining Objects

5.15. PIPE

The sewage network pipelines are divided into three groups according to their intended use: sanitary, stormwater and combined.

Pipelines are selected from the toolbar and depending on the location they are distinguished by: laid with a slope (they do not have a name - in other words, non-vertical), vertical.

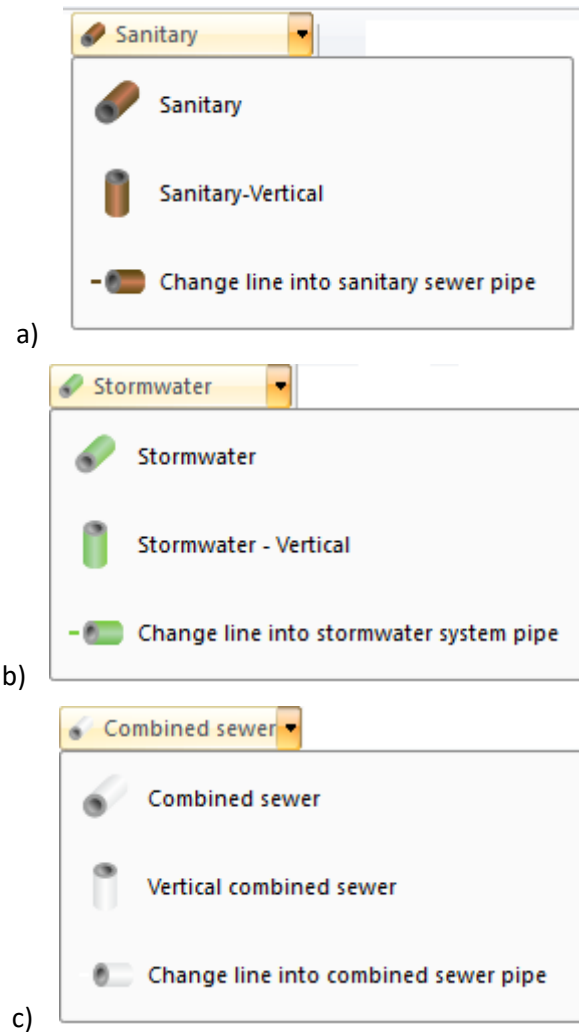


Fig.106. Drop-down lists for the selection of the location of pipes with a slope, vertical and the function of changing the line into a pipe for the types of sewage: sanitary, stormwater and combined

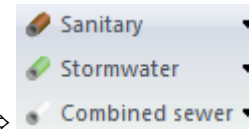
Defining Objects

5.15.1. PIPELINES INSERTED WITH A SLOPE

To insert a **horizontal pipeline** into the project, both outflow as well as internal, click on the icon:

ArCADia Program:

- **Sewage Networks ribbon** ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Sewage Networks toolbar** ⇒



Or type

- OSWR_SGC – sanitary
- OSWR_RWGC – stormwater
- OSWR_GC – combined

Then the window for inserting the beginning of the pipeline section is displayed. As in previous cases, by unchecking the appropriate check box, the tracking and detection of previously drawn objects is activated.

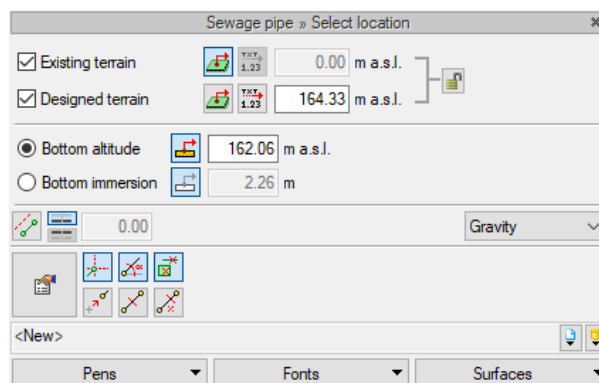


Fig.107. Insertion window of horizontal sewage pipe – beginning

Defining Objects

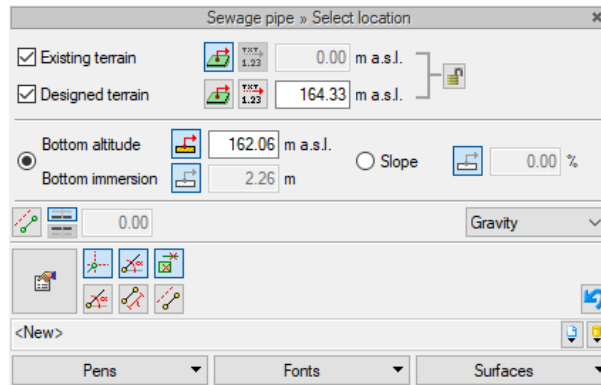






Fig.108. Insertion window of horizontal sewage pipe – end

Inserting a „horizontal” (not vertical) pipeline with the function of manual entry consists of entering by the user in the edit fields the initial height of the segment and the final height (looking in the drawing direction). The operation is performed when the **Installation level** box is checked. The user clicks on the point that is the beginning of the section, and then pulls the line in the selected direction and ends by clicking on the point that will be the end of the section of the sewer pipe.

If the user wants to insert a pipe with a constant slope, select the box **Slope**. In this case, the **Section Level** edit field is blocked, and the field enabling to enter the percentage decrease (**Section slope**) is unlocked. The fall direction is in line with the drawing direction. If the user wants the end of the pipeline to be higher than the beginning, he inserts a slope with a sign „-”.

Clicking the button **Import from element**  allows you to attach pipeline sections to points of previously drawn elements. The selections can be used independently, i.e. you can select one or both boxes. For the beginning of the section, the user inserts the estimated height (as close as possible) to the point from which the height will be taken. This estimation gives the possibility to specify from which element (from which height point of the element) the drawing will start. Finishing the drawing can be done according to the way above or by pressing the button **Import from element** at the estimated height of the end of the section and joining exactly to the desired point. In addition, in the part of defining the drawing method, the user can turn on and off the options for drawing with given angles . This function activates the pipe drawing mode according to the angles defined in the options (discussed in the section on program option settings).

Pressing the button **Parallel offset**  allows the network to be drawn parallel to other elements (e.g. walls) and offset from them by a given distance. Two buttons are used to select the direction of offset from the object, **Offset direction** . Next to it is the edit field in which the offset value should be entered (the field is activated after pressing the button **Parallel offset**).

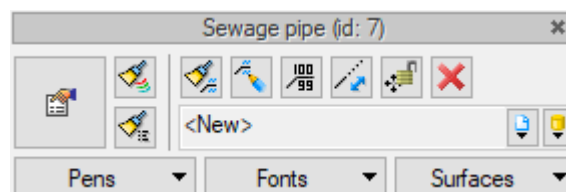



Fig.109. Toolbar for modifying the element - Sewer Pipe

Defining Objects

The toolbar has additional icons specific only to the object **Pipe**.

Lengthen/Shorten pipe maintaining slope – the procedure allows lengthening or shortening of the pipeline while maintaining the slope. After selecting the section, the user moves the cursor to the end of the pipeline and the stretching symbol appears. Then you click the left mouse button, which starts the lengthening or shortening procedure. Then you move the mouse in the planned direction by the appropriate value, which causes a change in the length of the pipeline section. Clicking the left button again ends the lengthening procedure.



By selecting the button  or a double-click on the inserted pipe, the window for defining the properties of the designed pipe section appears.

Controls set – Parameters

Bottom installation level– starting – enter the bottom assembly level of the channel beginning,
– ending – enter the end assembly level.

Actual length and Length on the projection– as in the description. Parameters are different if the pipeline is sloped and the **Automatically** checkbox is not marked.

Slope – value calculated from the difference between the level of assembly of the beginning and end of the pipeline. The slope is assigned in the insertion window of the end of the section.

Controls set – Type Parameters

Material – the user in this field can change or give a new material name for a given element.

Standard/Manufacturer – field, in which we write the norm number or the producer of the given element.

Type/ Series of type – field in which we type the element type or series, or catalog number.

Diameter DN – nominal diameter DN should be inserted.

Outside diameter – insert the outer diameter of the pipeline [mm].

Wall thickness – insert the wall thickness of the pipeline.

Defining Objects

Fig.110. Properties window of the sewer pipe laid with a slope

Material – the user from the drop-down list inserts the material used for pipe sections. The designer inserts materials approved for use in a given part of the building in accordance with the regulations.

Diameter DN – from the drop-down list, the user selects the nominal diameter of the pipeline section (in accordance with the selected series).

Outside diameter – pipe diameter is calculated on the external dimensions, corresponding to a given series of types for their nominal diameter.

Defining Objects

Wall thickness – pipe wall thickness for a given outer diameter. There may be several pipe wall thicknesses for a given outer diameter. By entering into the edit field, the user can choose any series of pipelines.

Type – drop-down list: pressure, gravity.

Friction factor – the friction coefficient is set by default in line with materials; for network construction - default is 0.013. However, the user can set a different value.

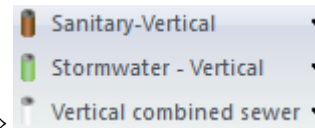
Additional description – the user enters additional data specifying the object and what is moving to the List of materials.

5.15.2. VERTICAL PIPE

To start drawing **vertical pipelines**, click on the icon:

ArCADia Program:

- **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒





AutoCAD Program:



- **Sewage Networks** toolbar ⇒

Or type

- OSWR_VSGC – sanitarna
- OSWR_VRWGC – deszczowa
- OSWR_VGC – ogólnospławna

The window for inserting vertical pipes is now displayed. As in previous cases, by deselecting the corresponding check box, the tracking function is activated  and detection  of previously drawn objects.

Pipeline insertion procedures are determined by the appropriate function setting in the vertical sewer pipe insertion window.

Defining Objects

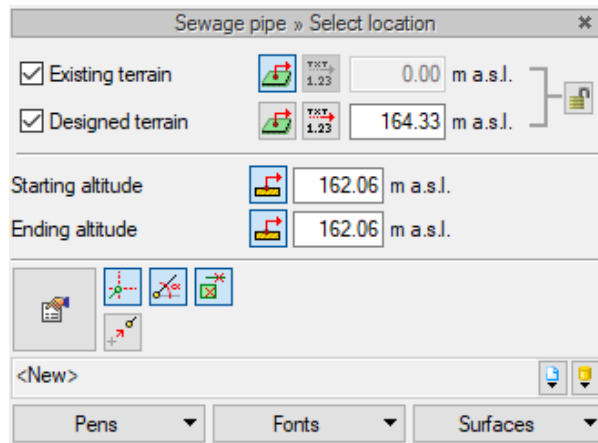




Fig.111. Insertion window of the vertical sewage pipe

Inserting a vertical pipeline with the manual entry function consists of the user entering in the edit fields ordinates for both ends of the pipeline. Then, the vertical segment is edited with the given heights of the segment ends.

The button **Import from element**  gives the option to attach pipeline sections to points of previously drawn elements. Editing with this method is performed in the same way as for horizontal

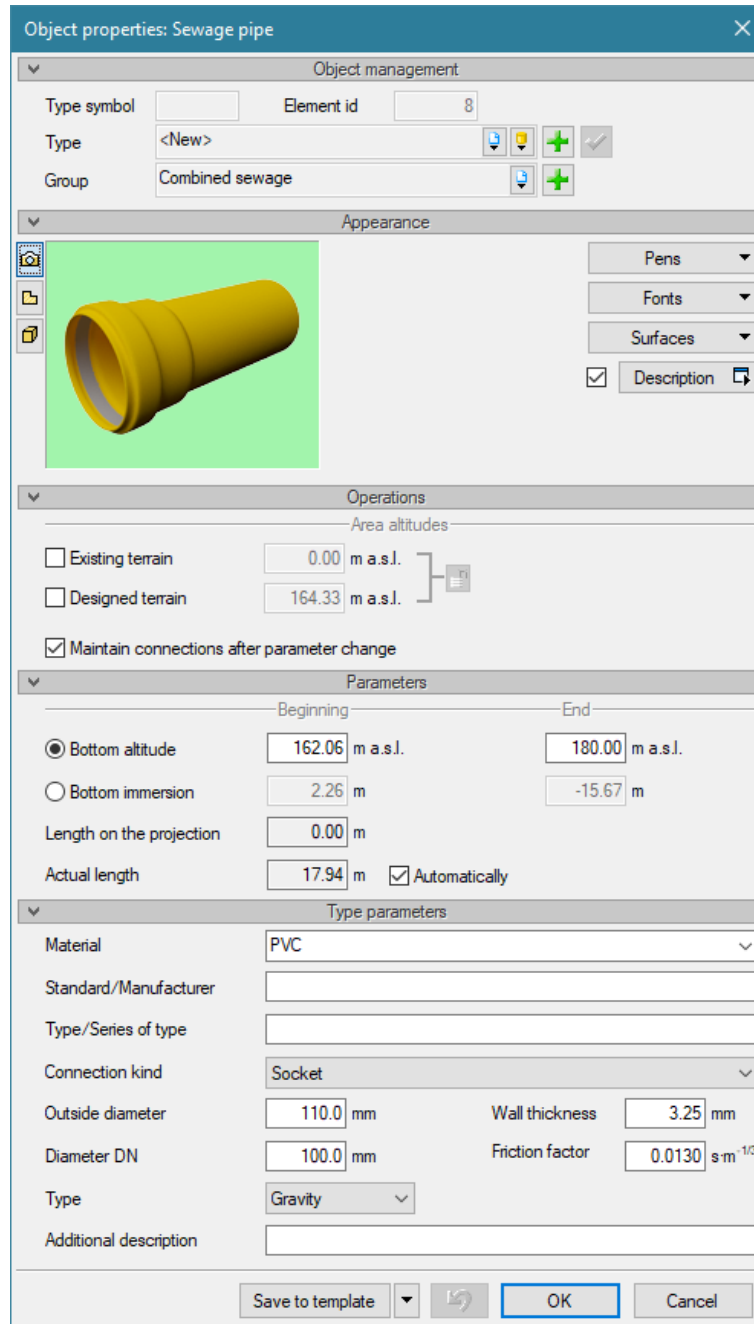
pipes. By choosing the button  or double-clicking on the inserted pipe, a window for defining the properties of the designed section of the vertical sewer pipe appears.

The window and functions are the same as for the horizontal pipe. The only difference is the lack of a slope (vertical pipe).

In addition, a revision can be defined on the vertical drain pipe by checking the appropriate box, and then entering, if necessary, a housing, e.g. a well.

If the user selects the function **Stack**, then, to enter the numbering of the stacks, you must tick in the **Parameters** the checkbox **Stack** and insert the stack number in the edit field.





Defining Objects





Object properties: Sewage pipe

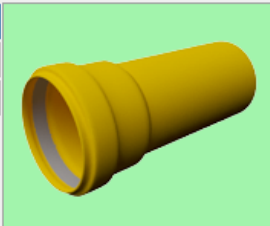
Object management

Type symbol: Element id:


Type:    

Group:  

Appearance



Pens: Fonts: Surfaces:

☒ Description 

Operations

Area altitudes

☐ Existing terrain m a.s.l.

☐ Designed terrain m a.s.l.

☒ Maintain connections after parameter change

Parameters

Beginning End

☒ Bottom altitude m a.s.l. m a.s.l.

☐ Bottom immersion m m

Length on the projection m

Actual length m ☒ Automatically

Type parameters

Material:

Standard/Manufacturer:

Type/Series of type:

Connection kind:

Outside diameter: mm Wall thickness: mm

Diameter DN: mm Friction factor: s m^{1/3}

Type:

Additional description:


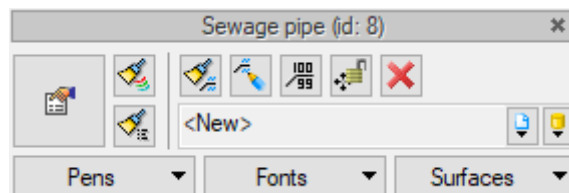







Save to template: 



Fig.112. Vertical sewer pipe properties window

After selecting the inserted vertical tube object, the modification bar appears.



Sewage pipe (id: 8)

Pens: Fonts: Surfaces:

Fig.113. Modification selection window of the vertical pipeline

Defining Objects

There is an icon on the bar that allows you to stretch vertical pipelines not only on a given floor, but also between them.

NOTE! After inserting a horizontal or vertical section of a sewage network, two functions are available to support the correct design of the network. After marking the horizontal pipeline, numbers appear at its ends indicating the installation height of the beginning of the section and its end, respectively. In addition, numbers appear in circles at the ends of the pipeline to indicate the number of elements connected to that end. For vertical pipes, after marking them as above, the numbers appear below each other, with the upper ones being assigned to the lower end and the lower ones to the upper end of the marked section of the vertical pipeline.

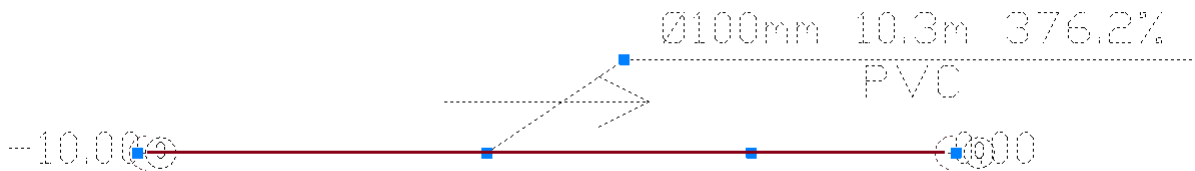


Fig.114. Description drawing of the function supporting the correct network design

<p>Diagram showing a horizontal pipeline section with installation heights marked at the ends: -10.00 on the left and 0.00 on the right.</p>	<p>numbers appear at its ends indicating the installation height of the beginning of the section and its end eg. -10,00; 0,00</p>
<p>Diagram showing a horizontal pipeline section with connection counts marked at the ends: '0' in a circle on the left and '0' in a circle on the right.</p>	<p>numbers appear in circles at the ends of the pipeline to indicate the number of elements connected to that end eg. "0"</p>

5.16. COLLIDING PIPELINES. ENTERING COLLISIONS AND INTERSECTIONS IN THE TERRAIN

5.16.1. INTRODUCTION OF ANY COLLIDING PIPELINE

To enter any colliding or intersecting pipeline with the sewage pipeline entered into the drawing, use the ArCADia-Landscape toolbar.

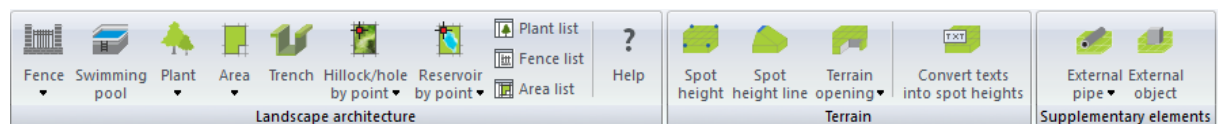


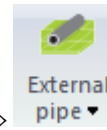
Fig.115. View of the Landscape toolbar

Into the drawing you need to introduce the object **External pipe** similarly to the object **Pipe**, from the **Sewage Networks** toolbar.

Defining Objects

ArCADia Program:

- **Landscape** toolbar ⇒ logical group **Sewage Networks** ⇒



AutoCAD Program:

- **Terrain** toolbar ⇒



Or type

- `iu_op`.

Then the window for inserting the external pipe of the first point appears.

In the insertion window for the beginning of the pipeline, the user, like for sewage pipes, enters the ordinates of the terrain and the ordinate of the axis of the beginning of the drawn section. Then on the map on the line symbolizing the given pipeline (e.g. water pipe in 160 mm) clicks and inserts the first point of the colliding pipeline.

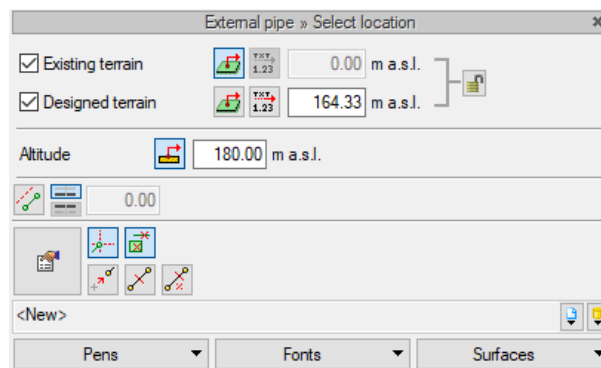


Fig.116. Window for inserting the first point of the external pipe

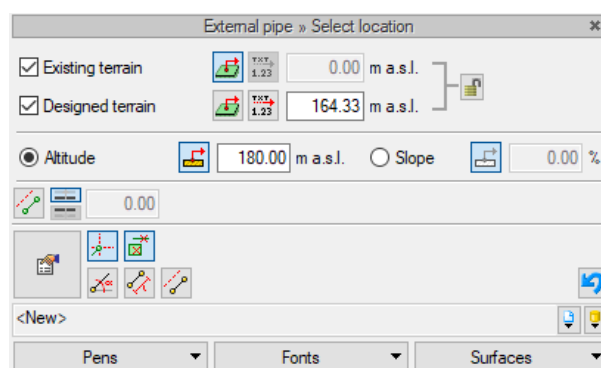


Fig.117. Window for inserting the second point of the external pipe.

After entering the first point, a window for inserting the second point of the external pipe is generated. In this window, set the ordinate and enter the ordinate of the axis or optionally enter the slope, and then click on any point on the line symbolizing the utilities pipeline. To get a picture of a collision or intersection on the profile, the external pipeline must cross the route of the designed sewage pipeline.

Defining Objects

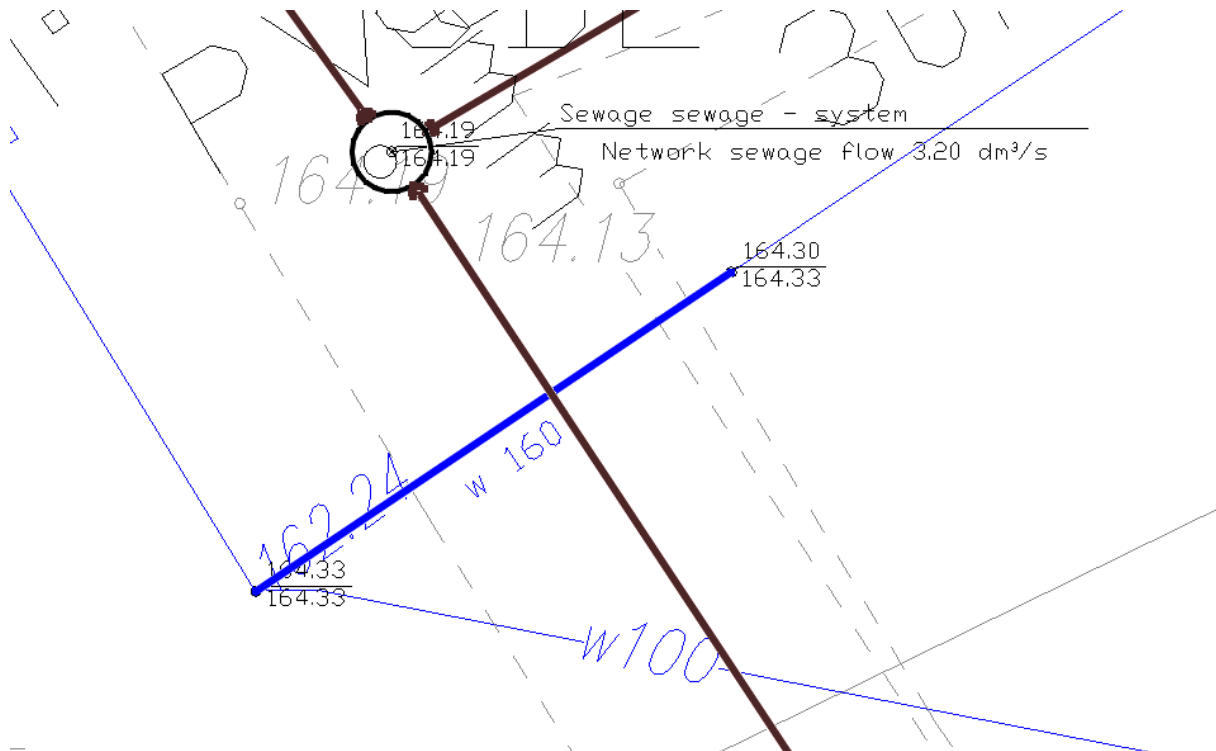


Fig.118. Scheme of inserting an external pipeline into a line symbolizing the water supply.

After selecting the entered external pipeline, the action window is displayed.

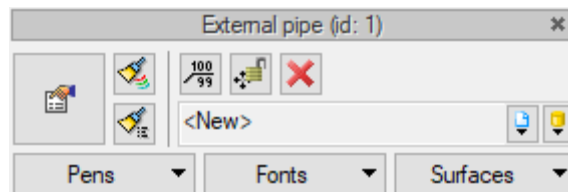


Fig.119. External pipe action window

After clicking the button **Go to Properties dialog box** or double-clicking on the object, the properties window of the object is opened.

Defining Objects

Fig.120. Properties window of the External pipe

Controls set – Parameters

Starting axis altitude – start – enter the ordinate of the installation axis of the pipeline beginning,

Ending axis altitude – end – enter the axis assembly level of the pipe end.

Length on the projection – as in the description. The parameters are different if the pipeline is run with a slope and the **Automatic** checkbox is not marked.

Controls set – Type Parameters

Diameter –in this field the user inserts in the outer diameter of a given pipeline [mm]. The diameter of the pipeline will be reflected on the profile

Additional description – a description suggesting the type underground technical infrastructure is possible.

6. CALCULATIONS AND RESULT INTERPRETATION


Calculations and result interpretation

6.1. INTRODUCTION OF SOURCES AND OUTFLOW

Before generating calculations, the user must properly organize the sewage network, i.e. give the direction of sewage flow and enter the size and type of sewage. Giving direction and preliminary parameters (type of sewage, sewage flow) is done by introducing one outflow for the sewage network system and, depending on the needs of the system, many sources on the sewage network.


Sewage outlet

Each system of connected pipelines should be ended with a sewage outflow element. Sewage **outlet** can be any cubature connection object: free outlet (outflow naturally having sewage outlet parameters), connection well, reservoir, fat separator, petroleum derivative separator. If the object is determined as Sewage **outlet**, then regardless of the slope, sewage from the entire sewage system will be directed to this object. If, on the calculation section, the pipeline slope is inconsistent with the sewage **outlet** designated by the location, the program after running the calculations will display the message "Sewer pipe with incorrect slope". After clicking on this message, the pipeline will be indicated with a slope in the opposite direction.

Introducing a **Sewage outlet** in objects (objects, which are not a natural outlet) consists of selecting the inserted object and selecting from the modification window the icon **Insert an outlet** . A marker is attached to the cursor, and after determining its location, a description is attached to the object. After calculations, the value describing the amount of inflowing sewage is shown in dm³ / s.

In the properties window flow results divided into types of wastewater are presented.

Sewage source

To each object you can connect a **Sewage source**. For objects constituting a natural source of sewage (building connection, road inlets, drainage line) the sewage source is connected by default. For other objects, after selecting the object and displaying the modification window, press the button  and generate a tag. After determining the position relative to the object in the drawing area, insert it. After clicking or double-clicking on the description text or tag reference, you can go to the properties window.

After entering the appropriate calculation flows, the sewage source connected to the given object defines the inflow of sewage to the calculation section in the direction of sewage outflow. By inserting the definition of the wastewater source correctly, a section flow of sewage from connections that do not need to be entered into the project will be determined, and finally the calculation flow for a given calculation section will be determined.

Calculations and result interpretation

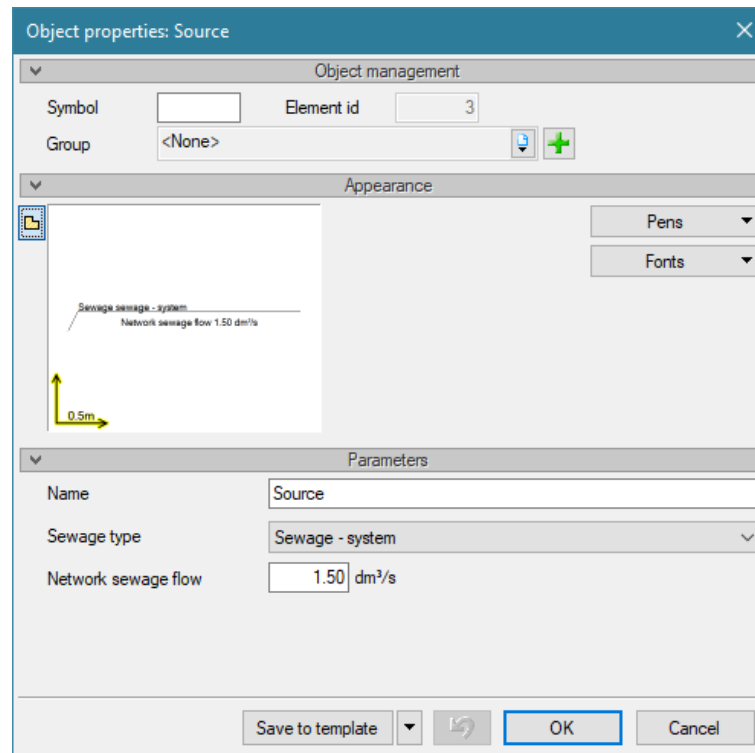


Fig.121. Sewage source properties window.

Controls set – **Parameters**

Name – the user can give any name for a given sewage source.

Sewage type – drop-down list– the user defines the type of sewage and its origin, needed to adopt the scheme such as for external installations on the terrain or as for the sewage network. The division was introduced due to various algorithms for calculating sewage flows for connection installations together with external installations on the terrain and for sewage networks.

Network sewage flow – numeric field in which the user enters the value of sewage flow calculated according to formulas for the sewage network, e.g. for the sanitary network, from the number of people served by a given calculation section. For installation items, this value is also activated at the user's request.

Installations sewage flow – numeric field in which the user enters the value of sewage flow calculated according to the formulas for the sewage installation, e.g. for the sanitary network, from the number and type of intake points. This value is not available for sewer network items.

Organization of the sewage network and installation - source setting

To carry out hydraulic calculations at the end of a given system of connected pipelines, it is necessary to insert an object constituting a sewage outlet. Sewage sources can be connected to any object, both at the end and in the middle of the development. The type of development (network or installation)

Calculations and result interpretation

depends on the furthest set source on the development. The main rule is the priority of source setting for sewage networks.

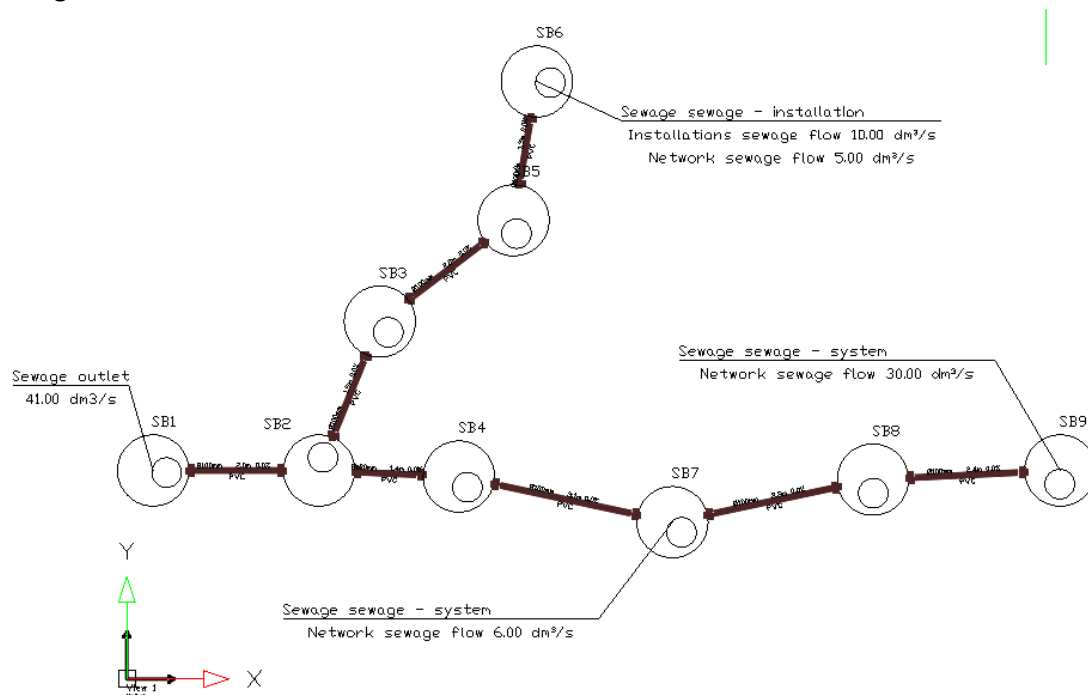


Fig.122. Source settings diagram for the sanitary sewage system

In the drawing in Fig.121 shows how to define the settings and types of sewage sources to properly divide the system into a sewage network and sewage installation.

Priority of the last object in the development is given to the source defining the sewage network. In the example there are two sewage lines: SB1-SB6 and SB1-SB11. Due to the fact that the type of the entire line is primarily determined by the object with the source for the network, the SB1-SB6 will be a sewage network, while the SB2-SB11 will belong to the external installation on the terrain (with the terminal).

Considering another variant, e.g. if a sewage source was assigned in the SB10 well for a sewage network, two sewer networks would be designated: SB1-SB10 and SB1-SB2, and section SB10-SB11 would be assigned to the installation.

However, if to the SB3 well a sewage source of the installation was defined, the SB1-SB6 section will still remain a section of the sewage network.

The sewage inflow determined for the sewage system is not involved in the calculations of the sewage network. In the calculation section SB1-SB2, only inflows from sources defining the sewage network are added, i.e.: $q_{11} = 5 \text{ dm}^3 / \text{s}$, $q_6 = 30 \text{ dm}^3 / \text{s}$, $q_4 = 6 \text{ dm}^3 / \text{s}$.

At all calculation sections from SB2 to SB11, the flow would be $10 \text{ dm}^3 / \text{s}$, i.e. the value defined in the SB11 well for an outdoor installation in the area.

Calculations and result interpretation

6.2. VERIFICATION OF THE DRAWN NETWORK

After completing the drawing of the network and after connecting all pipelines and elements, it is possible to check the project execution in terms of the correctness of pipeline connections and other elements introduced into the project. To start the network verification function, click the icon from the program toolbar:

ArCADia Program:

- **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒ 

AutoCAD Program:

- **Sewage Networks** ribbon ⇒ 

Or type

- OSWR_VER.

Then the command "Please select start object" appears in the ArCADia LT command bar at the bottom of the screen. For example, choose a route outlet point.

In the table, the user receives information about the number of deficiencies in the network continuity. The program detects unconnected network elements and pipelines that have no connection to the outlet.

The user, after clicking on the error information, will start detecting errors in the drawing. The program on the model will mark lines and elements where errors occur. The designer can make adjustments in the drawing by connecting elements to ensure network continuity.

After making corrections, the program reports on the correctness of the constructed network.

In the left part of the window the user will be able to filter out errors and display only selected descriptions.

In the Installation drop-down list the user selects an outflow point.

From the **Location** drop-down list, the user can limit the display of errors to a given level.

The **Elements** drop-down list gives you the opportunity to select one of several groups of unconnected elements. If there are connection errors in the **Fittings**, **Revision** groups, the user can select, e.g. only the **Revision** group.

From the **Category** drop-down list, the user selects the type of error that occurs in the project: unconnected elements, incorrect connection.

After completing the selection from the drop-down lists, the user can select objects in the drawing that are unconnected and which correspond to the given grouping. To do this, press the **Show selected** button. Then the area of the network view will be moved to the given fragment of the network drawing, showing the group of connection errors and the selection of incorrectly connected elements with dashed lines with visible handles.

Calculations and result interpretation

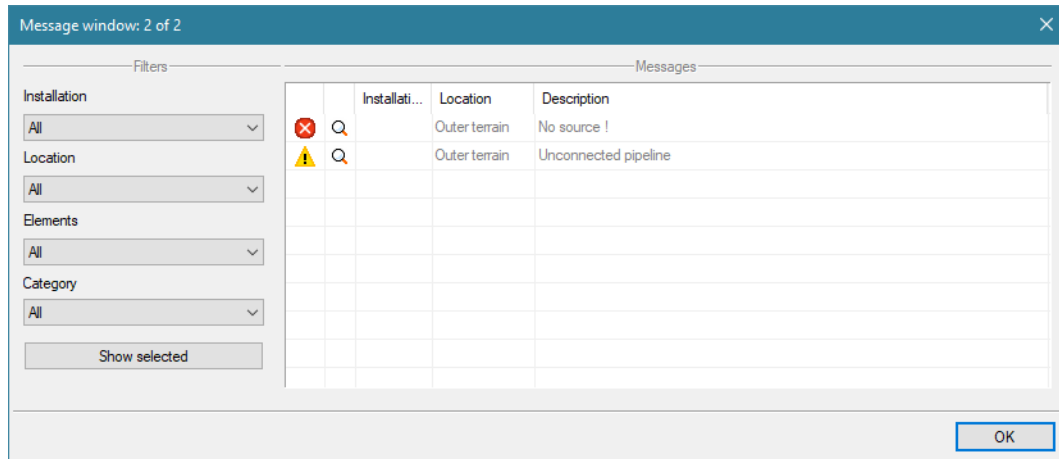


Fig.123. Table - Sewerage network report with information on the correctness of the constructed network.

Message types (differ by the icon next to the message):

- Information
- Warning
- Error

Content of messages - Interpretation

1. The network design is correct

This message occurs when there is a connection point in the network, and all objects directly and indirectly connected to this point form an installation built correctly in terms of connections.

2. No outflow point

This message occurs when there is no outflow point in the project.

3. Unconnected pipeline

The message occurs when there is a pipeline in the project that is not connected.

4. Unconnected components: e.g. Fittings

The message occurs when an object is not connected to any pipelines.

5. Elements not connected to any line: e.g. Sewer pipe


The message occurs when the object (including the pipeline) has no direct or indirect connection to the connection point. (Can be connected to pipelines, but these pipelines have no connection to the terminal point.)

Calculations and result interpretation

6.3. CALCULATIONS

After checking the correctness of the constructed network model and after selecting the pipeline diameters, you can perform calculations by pressing this icon in the toolbar of the program:

ArCADia Program:

- **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒  **Calculations and report**
 - for determining the diameters of outflow pipelines
- Or type
- OSWR_CALC.

The calculation window is launched.

By expanding the list, the user can sort by calculation line length or flow rate. Then the user selects the line chosen for calculations.

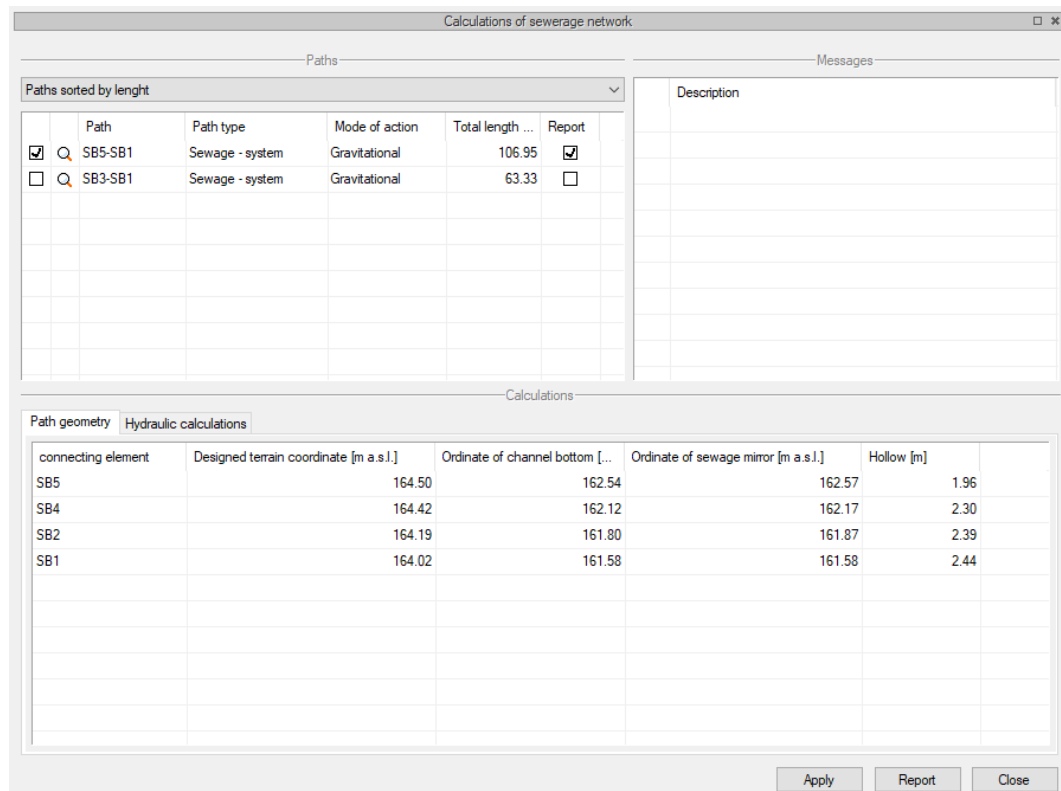


Fig.124. Calculation table view, geometry calculation path tab.

After selecting a given path in the bottom table, next to the **Network geometry** tab, the location data of the characteristic ordinates and the network immersion are shown.

Calculations and result interpretation

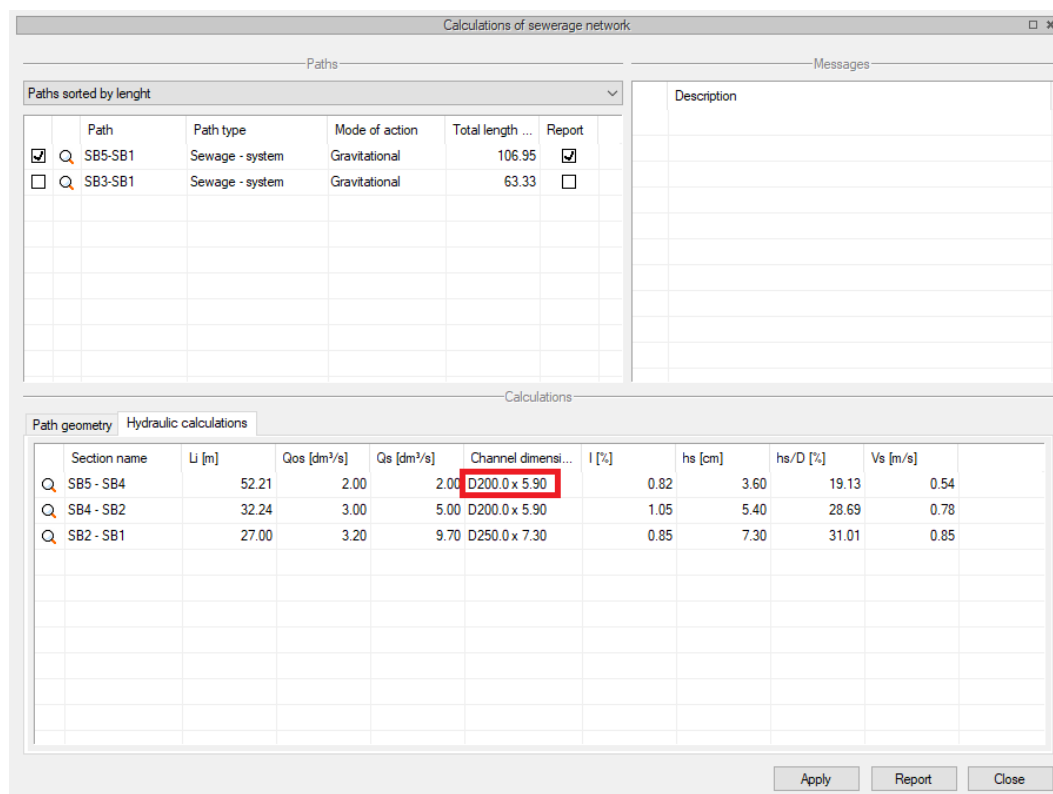


Fig.125. Table view, Hydraulic calculations tab

From the table the user is able to assess the selection of the horizontal cross-sectional dimensions of the channel based on published fills in the channels. However, if the cell in the table is crossed out, it means that the fill level has been exceeded and the flow is too high. To change the type of channel on a given calculation segment from the table level, just click on the cell with the dimensions of the channel cross-section and the **Pipe Properties** window will open.

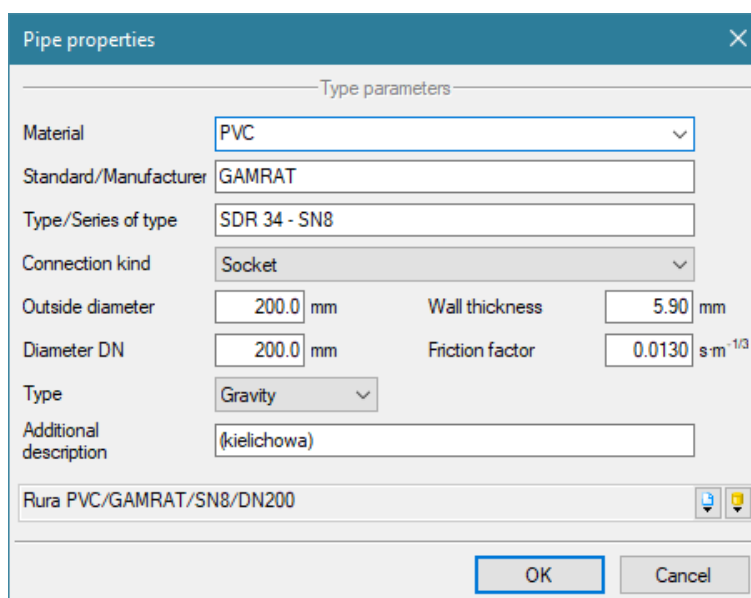



Fig.126. Channel type parameters window.

7. LONGITUDINAL PROFILE FOR NETWORK SECTIONS

After completing the network drawing on the map, it is possible to automatically generate the main profile and side profiles.

ArCADia Program:

- 
- Sewage systems profile



- `oswr_pv`.

Fig.127. Profile insertion window

After selecting the start element (e.g. existing end well or free outlet), a profile path selection window will appear.

Path selection

Paths

	Name	Length [m]
<input checked="" type="checkbox"/>	SB2-SB5	81.45
<input type="checkbox"/>	SB2-SB3	37.84
<input type="checkbox"/>	SB2-	32.52
<input type="checkbox"/>	SB2-SB1	25.50

Select terminal element OK Cancel

Fig.128. The main profile path selection window

LONGITUDINAL PROFILE FOR NETWORK SECTIONS

The user can choose a path from the list of possible paths or indicate the end element using the **Select end element** button.

NOTE! *The beginning elements will be on the left side of the profile, and the end elements on the right side.*

After selecting the path or end element, a second window appears enabling you to add supplementary profiles to one drawing. This window allows you to change the order of profiles in the drawing or allows you to delete a previously selected profile.

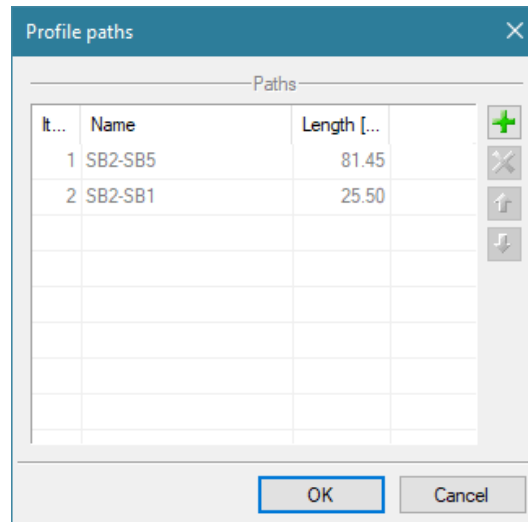


Fig.129. Window for organizing profiles in a view (drawing)

After using the OK button, the axes marking the beginning of the profile projection (bottom left corner of the projection frame) are attached to the cursor. Then the user clicks on the drawing field (next to the map) and inserts the profile.

NOTE! *By default, the profile projection is inserted in centimeters. If the map view is in meters, the profile will be much larger than the map view.*

If the user wants to generate a profile view in a different unit, then in the profile insertion window he



should select the button **Go to the properties dialog box**, open the view properties window and change the unit, e.g. to meters.

With the active view **Sewage network profile**, by clicking on the profile frame, the user activates the modification window.

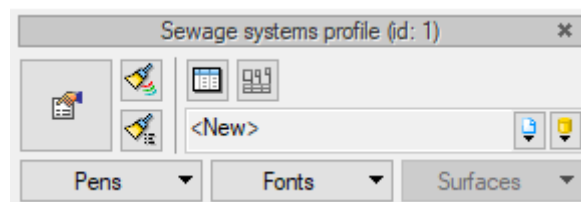



Fig.130. Profile modification window

LONGITUDINAL PROFILE FOR NETWORK SECTIONS

After selecting the button  or double-clicking on the profile frame, a window for defining profile properties appears.

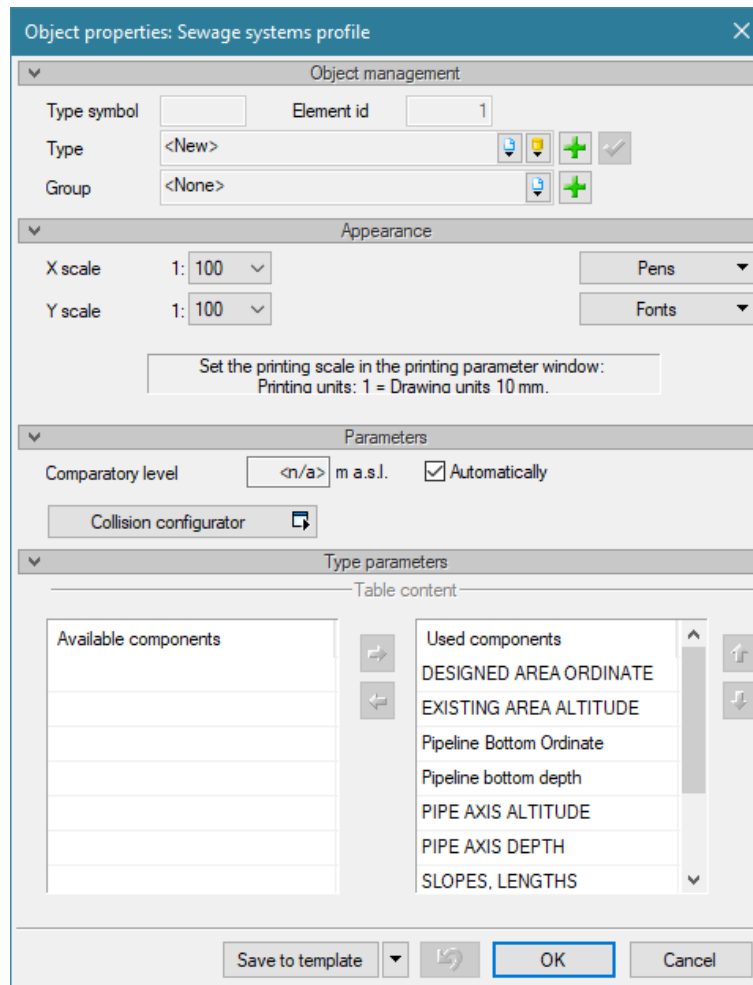


Fig.131. Properties window of the Sewer Network Profile object

Controls set – Appearance

Scale X and Scale Y – the user can set the scale in which the network profile will be drawn from the drop-down list.

Controls set – Parameters

Comparison level – the user can enter the level of comparative profile drawing with the **Automatic** check box selected. The comparative level is set at a level 5 m lower than the lowest point of the sewage network.

The **Collision configurator** button – After clicking this button, the user has a collision configuration window available, where they have another two windows at their disposal, in which they select which objects of the **ArCADia BIM system** will be involved in the collision check. You can save this setting as a type in the **Project Library**.

LONGITUDINAL PROFILE FOR NETWORK SECTIONS

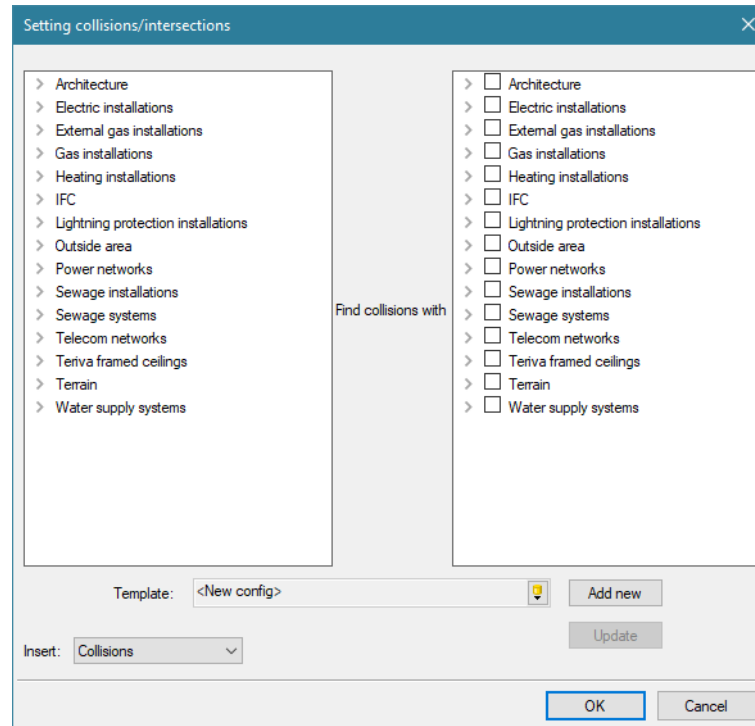


Fig.132. Collision and intersection configurator windows.

At the bottom of the window, there is a drop-down list in which the user chooses whether he wants to check **Collisions**, **Intersections** or **Collisions and Intersections**.

After confirming with the **OK** button the colliding elements will be visible on the profile.

7.2. WORKING ON THE PROFILE

In the view it is possible to shape the foundation height of pipelines, wells and other objects. Changes made to the profile are also automatically made on the projection.

It is possible to:

- change of descriptions on vertical references,
- change of ordinates of objects directly on vertical references with a simultaneous change of pipeline slope or induction of a difference pipe,
- change area ordinates above the objects,
- change in pipeline slope with a change in the well bottom foundation or induction of a difference pipe,
- changing the description of the pipeline material and wrapping the outgoing text.

Changes made to links

To make a change to a link, click on the link and on the action window displayed select the button to move to the link properties window.

LONGITUDINAL PROFILE FOR NETWORK SECTIONS

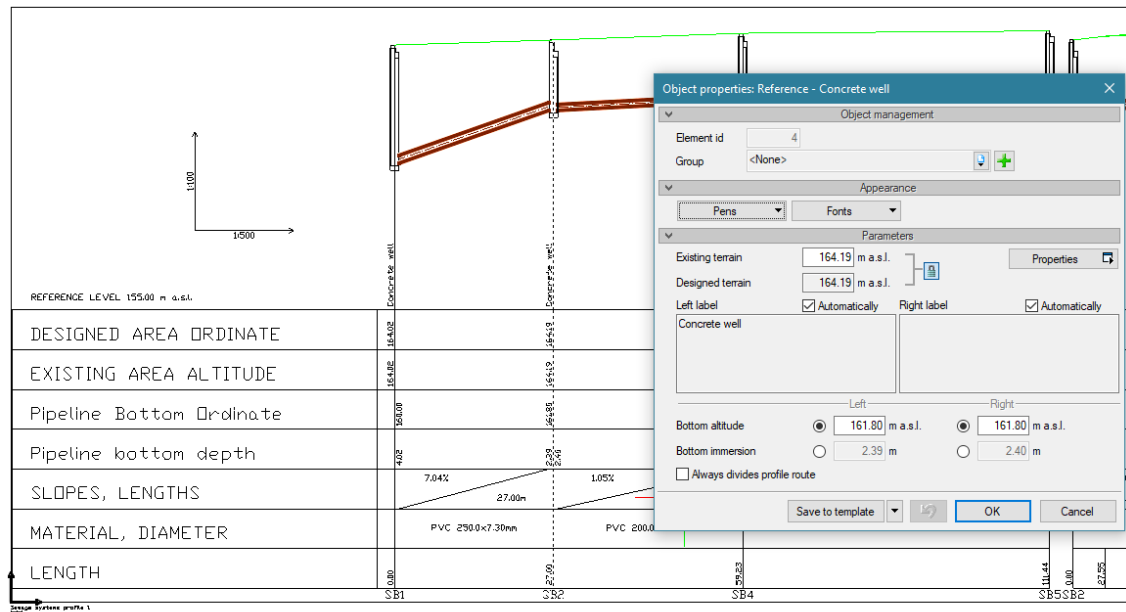


Fig.133. View of the profile link properties window after selecting the link on the profile

Controls set – Type Parameters

Existing terrain / Designed terrain – the user can change the ordinates of the terrain with a change in the spot height above the object.

Left / right label – after unchecking the selected box **Automatically**, the user can enter their own text, which will be entered on the selected side of the vertical reference (e.g. instead of a concrete well, you can enter the Inspection Well DN 1.2 m).

Bottom ordinate / Bottom immersion – the user can change the ordinate (or immersion) of the pipelines on the left side of the well and on the right side of the well. If the user sets a lower ordinate of the pipeline than the ordinate of the designed well, the end of the pipeline will be lowered along with the bottom of the well. If an ordinate greater than the ordinate of the bottom of the well is set, then the pipeline will be connected above the bottom of the well, and the bottom of the well will remain in place.

LONGITUDINAL PROFILE FOR NETWORK SECTIONS

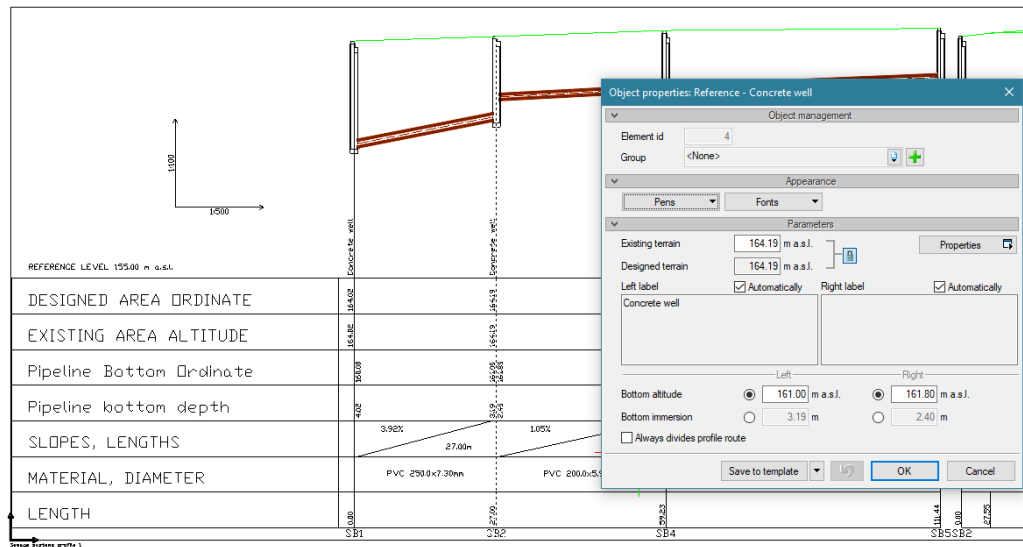


Fig.134. Setting in the ordinate the value of point SB2 to 161.00. The end of the pipeline changes the ordinate with the bottom of the well.

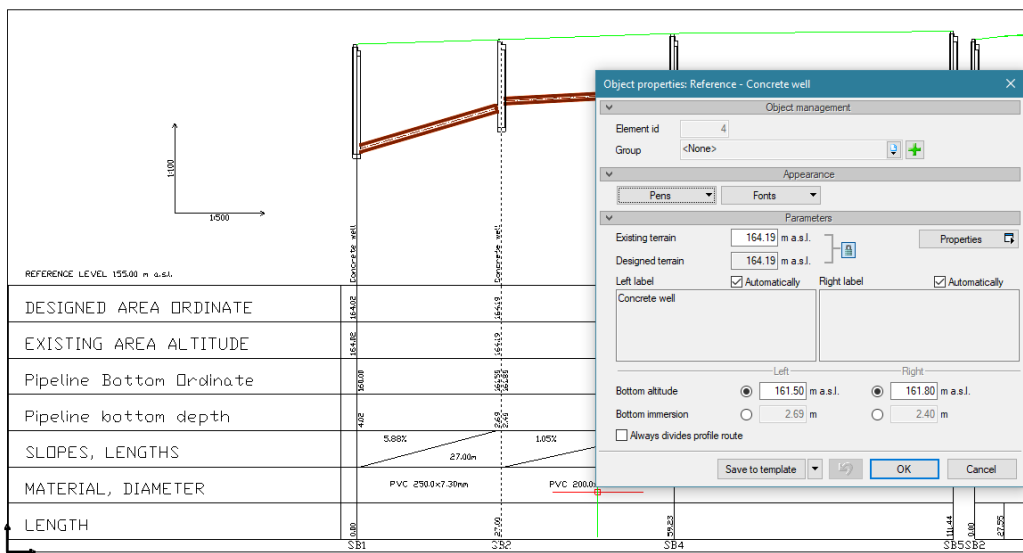


Fig.135. Changing the setting in the ordinate window from 161.00 to 161.50 results in moving higher the end of the pipeline, leaving the bottom of the well below it.

If the user wants to reattach the well invert channel to the lowest pipeline, then select the pipeline or well on the profile and bring up the action window for the selected object.

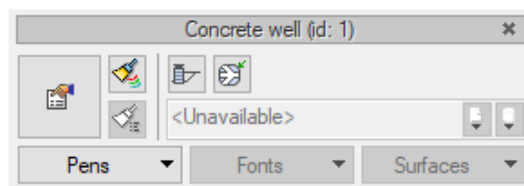



Fig.136. Action window after selecting the well on the active profile.

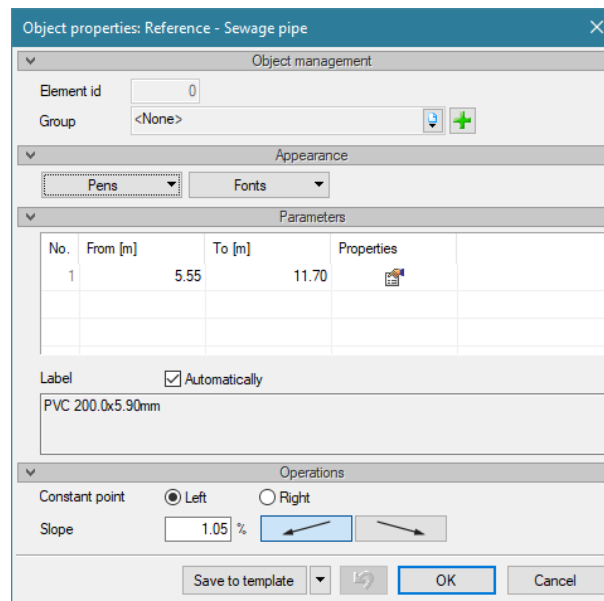
LONGITUDINAL PROFILE FOR NETWORK SECTIONS

In the well and pipeline action window, when the pipeline is above the invert channel, this icon is activated  **Snap invert channel to the nearest pipe**. If a pipe is selected, the icon name is **Snap the pipe to the well's invert channel**. After selecting this icon, depending on the selected object, the pipe or well will be connected by the invert channel.

NOTE! After selecting several links, you can make changes to the descriptions on all the selected objects.

Changes in slopes and descriptions in the horizontal lines of the profile table


To enter a slope change or pipeline description, the user clicks (or double clicks) on the selected description (on the pipe description text or on the slope value). The action window is displayed and after switching to the dialog properties, the window is displayed **Properties of Element: Reference - Sewer pipe**.



No.	From [m]	To [m]	Properties
1		5.55	11.70

Fig.137. Window enabling changing the pipe properties, material description and slope

Parameters

This section of the window has a pipeline information table. After selecting the button  the user opens the pipeline properties window.

After unselecting the checkbox **Automatically** the pipeline description text field is activated and you can insert your own text.

Operations

In this part of the dialog box, the user can change the slope of the pipeline by selecting the appropriate **fixed point**, i.e. the end of the pipeline of which the ordinate will not be changed. Then the user enters the slope value in% and selects the slope direction.

It is possible to select several calculation sections and enter a common slope value, which will make uniform the slope on all selected sections.

LONGITUDINAL PROFILE FOR NETWORK SECTIONS

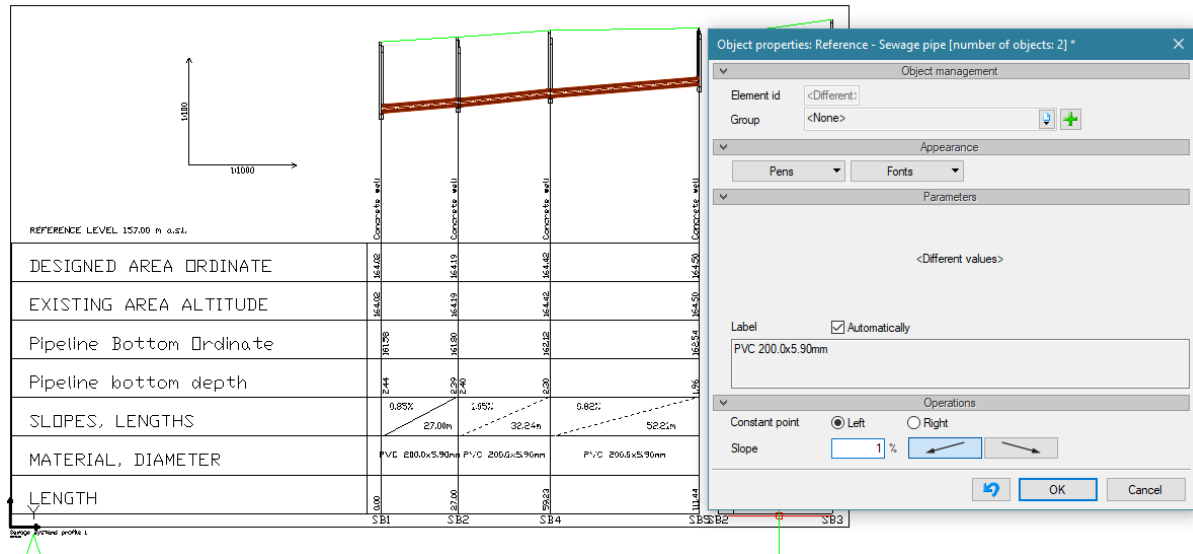


Fig.138. Settings in the slope window to make uniform the slope on the SB1-SB4 section

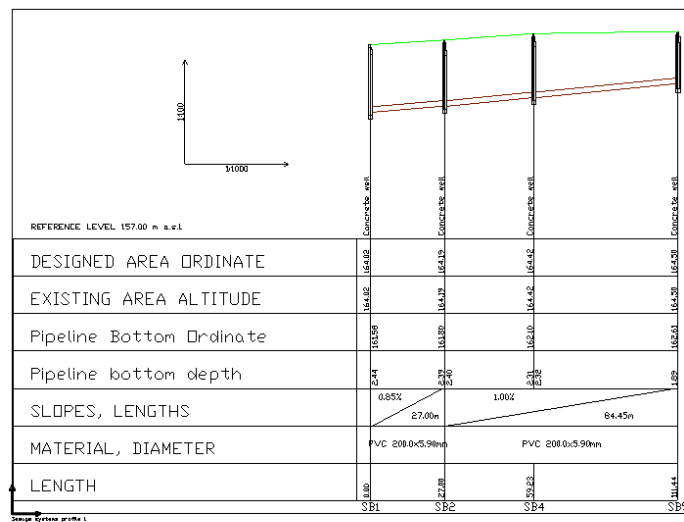



Fig.139. Section SB1-SB3 after confirming the settings and making uniform the slope

8. REPORTS AND LISTS

Reports and Lists

8.1. CALCULATION REPORTS

For a correctly designed network, it is possible to obtain a calculation report.

Report – the button is located at the bottom of the window with calculation tables triggered by the button  **Obliczenia i raport**. After pressing the button, the text editor is started, e.g. ArCADia-TEXT.

On the editor's sheets calculation tables are printed for lines marked in the **Report** column in the line filtering table.

ArCADia-SEWAGE SYSTEMS
Author: Internal License - ArCADiasoft [L01]

Sewerage calculation report

Path geometry: SB5-SB1

connecting element	Designed terrain coordinate [m a.s.l.]	Ordinate of channel bottom [m a.s.l.]	Ordinate of sewage mirror [m a.s.l.]	Hollow [m]
SB5	164.50	162.54	162.54	1.96
SB4	164.42	162.12	162.12	2.30
SB2	164.19	161.80	161.80	2.39
SB1	164.02	161.58	161.58	2.44

Path hydraulical calculations: SB5-SB1


Section name	L_i [m]	Q_{os} [dm ³ /s]	Q_s [dm ³ /s]	Channel dimensions [mm]	I [%]	h_s [cm]	h_s/h_k [%]	V_s [m/s]
SB5 - SB4	52.21	2.00	2.00	D200.0 x 5.90	1.00	3.50	18.60	0.59
SB4 - SB2	32.24	3.00	5.00	D200.0 x 5.90	1.00	5.40	28.69	0.76
SB2 - SB1	27.00	3.20	9.70	D200.0 x 5.90	0.85	8.10	43.04	0.86

Fig.140. Printout of the sample report for one calculation line

8.2. LIST OF MATERIALS AND LISTS OF ELEMENTS

The program has the ability to generate List of materials and a list of elements of the sewage network.

To enter the **List of Materials** for the sewage network, click on the icon:


ArCADia Program: Sewage ribbon ⇒ logical group **Sewage Networks** ⇒  **Material list**

AutoCAD Program: Sewage Networks toolbar ⇒  (or type ISWR_SLI)

Reports and Lists

or

to enter the **Element list of the** sewage network click on the icon:


ArCADia Program: **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒  Item list

AutoCAD Program: **Sewage Networks** toolbar ⇒  (or type ISWR_IL).

Then it is possible to insert in the drawing a table with a list or bill of materials of all elements contained in the project.

To insert a list or a list of only a part of the elements, e.g. for one well:

To enter **List of materials for selected elements** for the sewage network, click on the icon:


ArCADia Program: **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒  Selected elements material list



AutoCAD Program: **Sewage Networks** toolbar ⇒  (or type OSWR_SLSI), select items on the view and confirm with Enter

or

to enter **List of selected elements** for the sewage network, click on the icon:

ArCADia Program: **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒  Selected elements list

AutoCAD Program: **Sewage Networks** toolbar ⇒  (or type OSWR_SIL).

Clicking on the table line or going to the properties gives you the option to edit the contents of the table. After pressing the button  it is possible to obtain reports in the RTF format. After pressing the button  the program also allows exporting data from the bill of materials to the Ceninwest program.

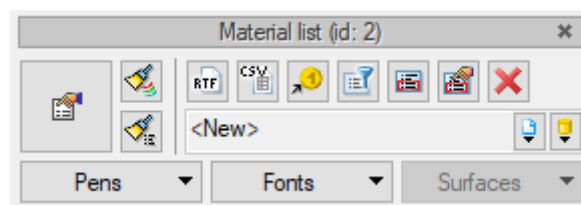


Fig.141. Window for modification of the sewage network List of materials

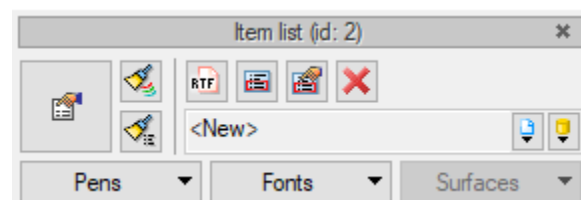


Fig.142. Window for the modification of the list of sewage network elements

Reports and Lists

After inserting the list of elements or List of materials for the sewage network and selecting the button



or double-click on the list frame, the window for defining the properties of the list appears: elements (Fig.143) and materials(Fig.144).

In them, you can modify the appearance and content of the table by adding or removing columns (components) in the properties window.

Fig.143. Object properties window List of elements of the sewage network

Reports and Lists

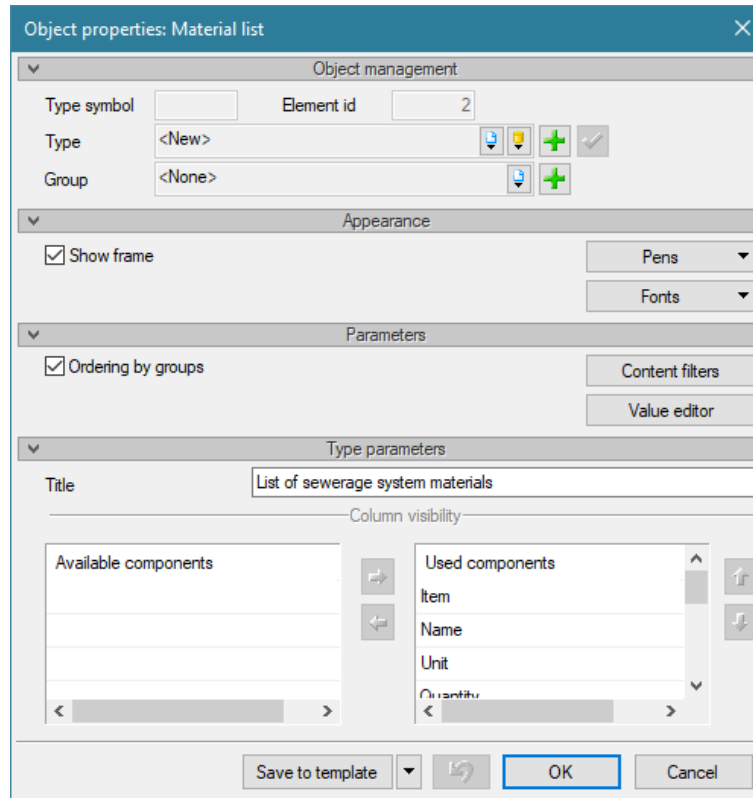





Fig.144. Properties window of the object - Bill of materials of the sewage network


After entering **List of Materials** or **List of Elements** it is possible to select them – then the modification window will be available with the icon  **Selecting chosen elements on the view**. After clicking on the icon, the user can select items in the lists with the mouse. The highlighted row in the table can be clicked and all the items in that row will be marked in the view.

To change properties for all selected objects, e.g. type parameters (diameter, manufacturer, type of connections or other), click the icon  **Change properties of selected elements**.

8.3. COORDINATES LIST

A list of coordinates of sewage facilities introduced into the project and geodetic points inserted, e.g. on tees or network bends or in other chosen places can be obtained by selecting:

ArCADia Program: Sewage ribbon ⇒ logical group **Sewage Networks** ⇒  **Coordinate list**

AutoCAD Program: Sewage Networks toolbar ⇒  (or type ISWR_RTFXY)

After selecting the commands, select the objects for which the user wants to generate coordinates.

To avoid time-consuming selection of objects, you can change the order: in the open **Project Manager** window, hover over a selected group of objects and right-click, and then choose **Select elements** from the expanded list (e.g. concrete wells). After selecting you call the **Coordinate List**. A text editor will be launched with printed coordinate tables.

Reports and Lists

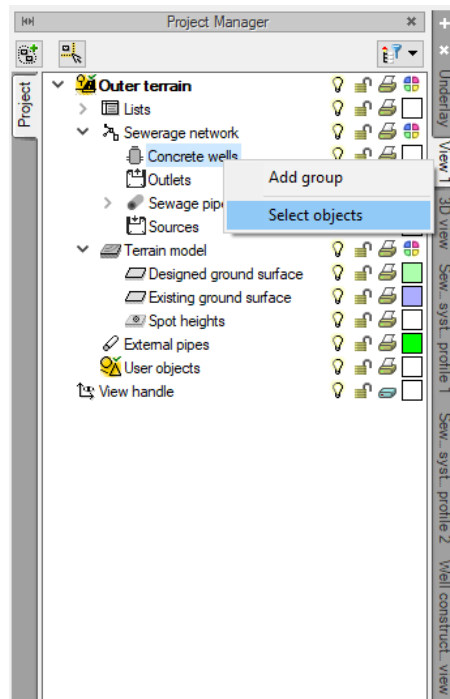


Fig.145. Selecting a group of objects before selecting the command generating the coordinates

NOTE! You can only select one group of objects at a time. To generate coordinates for another group, you must perform the procedure again, which will open a new RTF document.

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Altitude list

Item	Symbol	X	Y
1	SB1	5590783.18	4516843.64
2	SB2	5590761.28	4516859.42
3	SB3	5590727.83	4516881.52
4	SB4	5590777.59	4516887.22
5	SB5	5590807.33	4516930.14

Fig.146. View of generated coordinates in a text editor in RTF format

8.4. INVERT CHANNEL LIST

In the program it is possible to obtain inlet angle diagrams of concrete wells and invert channel layout.

To insert invert channel Lists of all concrete wells used in the project, click on the icon:

ArCADia Program: Sewage ribbon ⇒ logical group **Sewage Networks** ⇒  List of invert channels

AutoCAD Program: Sewage Networks toolbar ⇒  (or type OSWR_CBL)

Reports and Lists

To insert invert channel Lists of only some of the wells (**List of selected invert channels**), click on the icon:

ArCADia Program: Sewage ribbon ⇒ logical group Sewage Networks ⇒



List of selected invert channels

AutoCAD Program: Sewage Networks toolbar ⇒ (or type OSWR_SCBL), select items on the view and confirm with Enter.

List of invert channels of the sewerage system

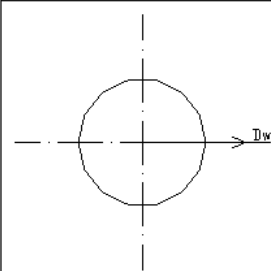
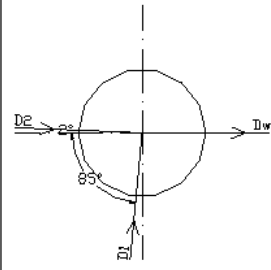
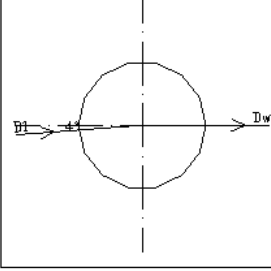
Drawing	Name	Marking	Quantity
		SB1 SB3 SB5	3 pcs
	Connection invert channel in the well Ø1200mm, 2 x Inlet Dw1: Ø200, PVC D1: Ø200, PVC, 85° D2: Ø200, PVC, 2°	SB2	1 pcs
	Through angular invert channel in the well Ø1200mm Dw1: Ø200, PVC D1: Ø200, PVC, 4°	SB4	1 pcs

Fig.147. View of the invert channel List after inserting into model area


After clicking on the frame, an action window is displayed enabling the selection of the object on the map or moving to the object's property window. After moving to the properties window, the user can filter objects and determine which columns in the list are to be displayed.

8.5. DRAWINGS OF THE CONCRETE WELLS

The program has the ability to generate schematic drawings of the well with a list of elements from which it was built.


Reports and Lists


If the user wants to get drawings of all the wells (the program automatically sets the drawings vertically), selects the commands:

ArCADia Program: **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒  **Concrete wells drawing**

AutoCAD Program: **Sewage Networks** toolbar ⇒  (or type OSWR_CV).

If the user wants to select wells on separate drawings, he chooses:

Program ArCADia: **Sewage ribbon** ⇒ logical group **Sewage Networks** ⇒  **Drawing of selected concrete wells**

Program AutoCAD: **Sewage Networks** toolbar ⇒  (or type OSWR_CV) – select items on the view and confirm with Enter.

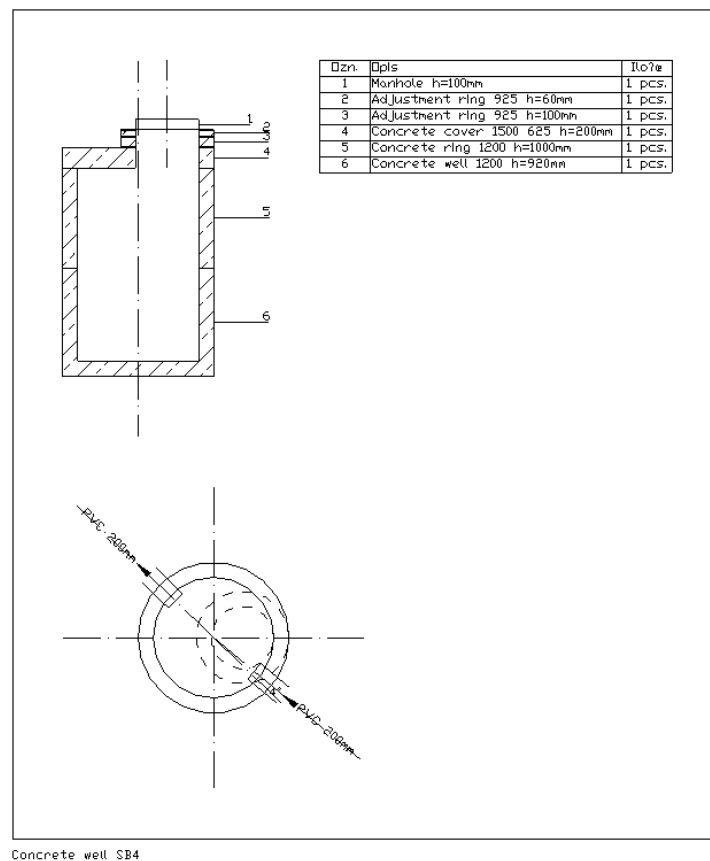


Fig.148. View of the well drawing

In the case when the user wants to change the location of one of the many drawings (after the **Concrete wells drawing** command), he should select the inner frame, grab the handle in the lower left corner and move the drawing to the selected place.