



Advanced Underground Design Massive Tutorial

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Product

Surpac™ 6.6

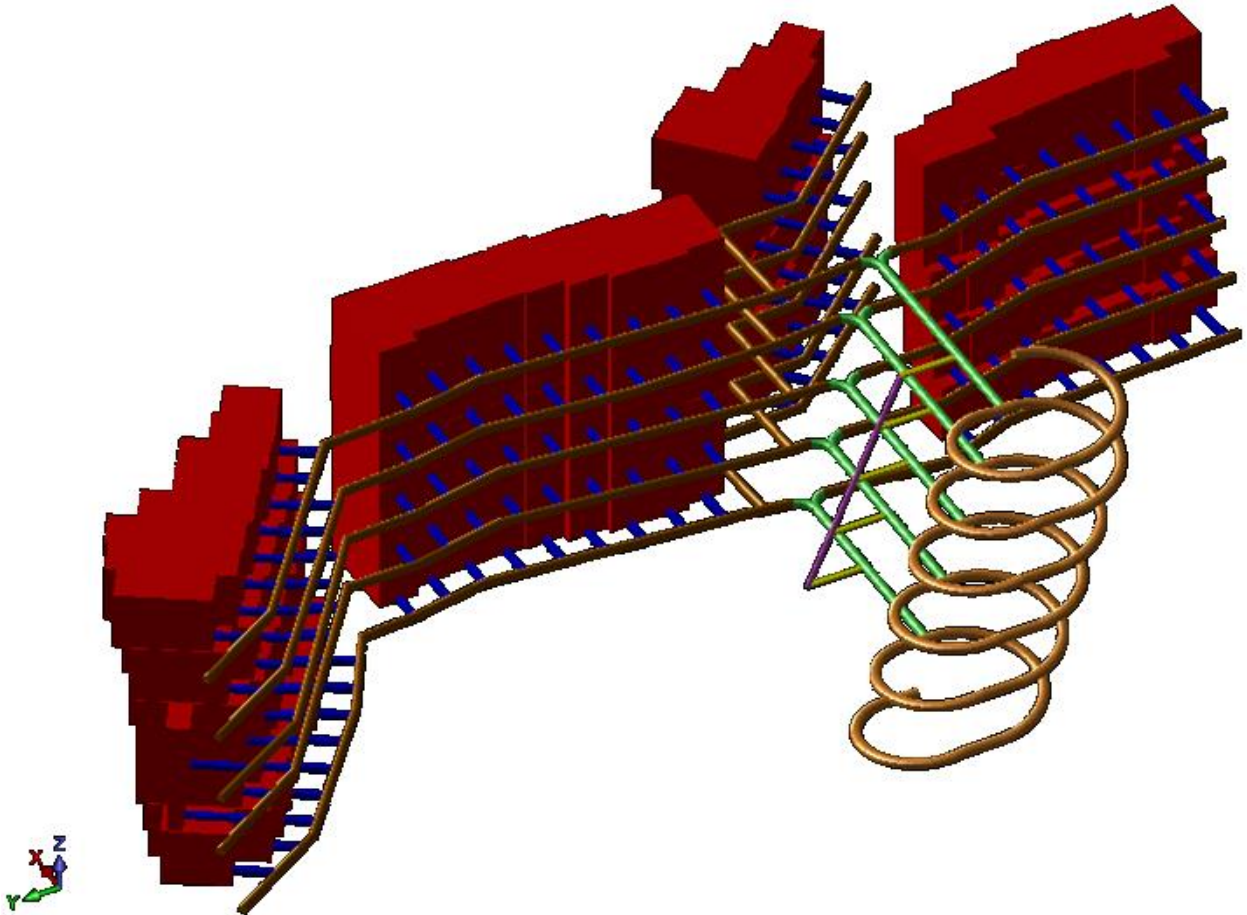
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Introduction

This tutorial shows you how to design an underground mine using the Massive template.



By completing this tutorial you will create the following files:

- **massive.str** (your massive design file)
- a range of profile strings
- MineSched block model reports

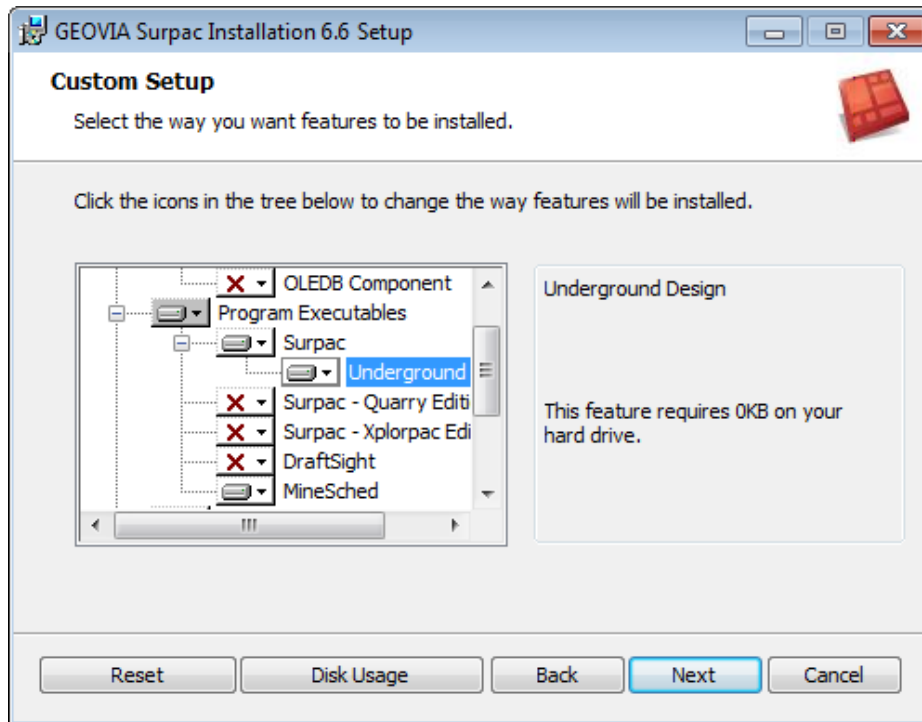
Requirements

Installation

To complete this tutorial you must have installed:

- Surpac 6.4 or a later version

When you install Surpac, make sure you install Underground Design as part of it



- MineSched 7.1 or a later version.

Data set

The minimum files you require to complete this tutorial are:

- **area_definition.str**
- **AUD massive example levels.xlsx**
- **Massive_71.minesched**
- **massives_mod1.mdl**
- **sample_ramp2.str**
- **ore_body1.str** and **ore_body1.dtm**; **ore_body2.str** and **ore_body2.dtm**; **ore_body3.str** and **ore_body3.dtm**; **ore_body4.str** and **ore_body4.dtm**
- **minesched_bm_period_detailed.csv**
- **grid1.str**, **grid2.str**, **grid3.str**, **grid4.str**
- **dp_grid.str**

The data set is installed to: **C:\Users\Public\GEOVIA\Surpac\<version>\share\AUD\Tutorials\Massive**

Document conventions

Typographical conventions

Some text in this manual has special formatting to identify it as a particular element of information. The following list describes the different formats and their meanings:

Text Format	Meaning
<Bold Italic>	Text or data that varies with each input is shown in italic font and enclosed in angle brackets. Some examples are installation directories, dates, names and passwords. When you substitute the text for the variable, do not include the brackets. For example: <password> requires you to substitute a password in place of ' <password> '.
<i>Italics</i>	A word or phrase to which the author wants to give emphasis. For example: you must select an item from the list to continue.

Text Format	Meaning
Bold	<p>This typeface indicates one of the following:</p> <ul style="list-style-type: none"> • A file name, path or URL. • Strongly emphasized text. For example, “It is very important to save the data [...]”. • Text that a procedure has instructed you to type. • A menu option, tab, button, check box, list, option button, text box, icon, field, or area of the user interface. <p>For example: Open pit1.str into Graphics.</p>

Keyboard conventions

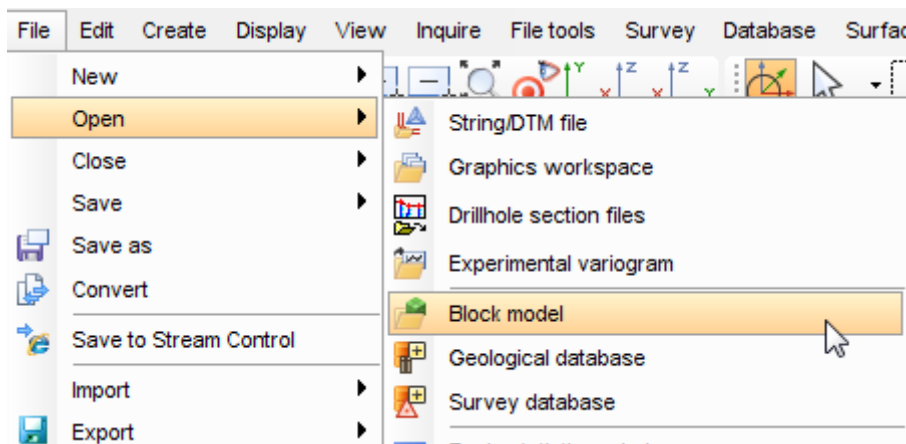
Key Combination	Meaning
<key>+<key>	Press and hold down the first key, then press the second key. For example: CTRL+Z means hold the CTRL key down, then press Z.

Menu conventions

In this documentation, the following example demonstrates the syntax used for menus and submenus:

Choose **File > Open > Block model**.

This means click the **File** menu, move the pointer over the **Open** command, and select **Block model** on the submenu.

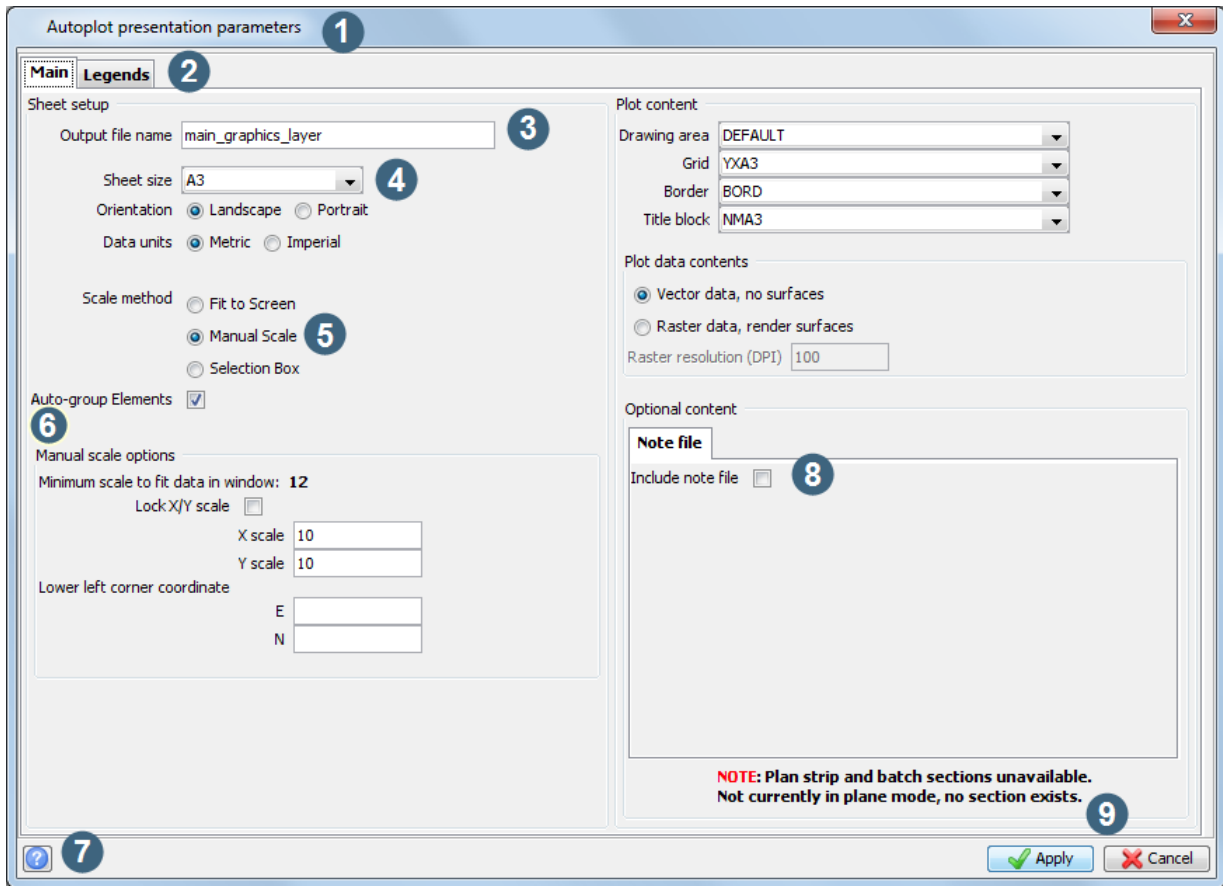


Mouse conventions

Action	Description
Click	Quickly press and release the left mouse button without moving the mouse.
Right-click	Press and release the right mouse button without moving the mouse.
Double-click	Without moving the mouse, click the left button twice rapidly.
Drag and drop <an object>	With the pointer over the object, press and hold down the left mouse button to select the object. Move the mouse until the pointer is in the position you want and then release the mouse button.
Drag	Press and hold down the left mouse button. Then move the mouse in the direction that the text specifies.
Right drag	Press and hold down the right mouse button. Then move the mouse in the direction that the text specifies.
Rotate	Use your finger to make the wheel button roll. Move it forward, that is in a clockwise direction, or backward, that is in an anticlockwise direction.

Forms





Forms contain elements that you will use to provide information to Surpac:



Element	Description	Example
1. Title	Title of the form.	
2. Tab	Labelled group of options used for many similar kinds of settings.	
3. Text box	Rectangular box in which you can type text. If the box already contains text, you can select that text and edit it.	
4. Combo box or Drop-down list	Closed version of a list box with an arrow next to it. Clicking the arrow opens the list.	
5. Radio button or Option button	Round button you can use to select one of a group of mutually exclusive options.	
6. Label	Text attached to any option, box, button, or to any other element of a window or form.	
7. Help	Context-sensitive help button.	
8. Check box	Square box that you select or clear to turn an option on or off.	
9. Button	Rectangular or square button that initiates an action. Buttons have text labels to indicate their purpose.	

Icons

The following icons appear in Advanced Underground Design.

Icon	Meaning
	An AUD project.
	A scenario.
	The selected scenario has valid data for this step in the AUD workflow. You can proceed to the next step in the workflow.
	The selected scenario does not have valid data for this step in the AUD workflow. Alternatively, a project, instead of a scenario, is selected.

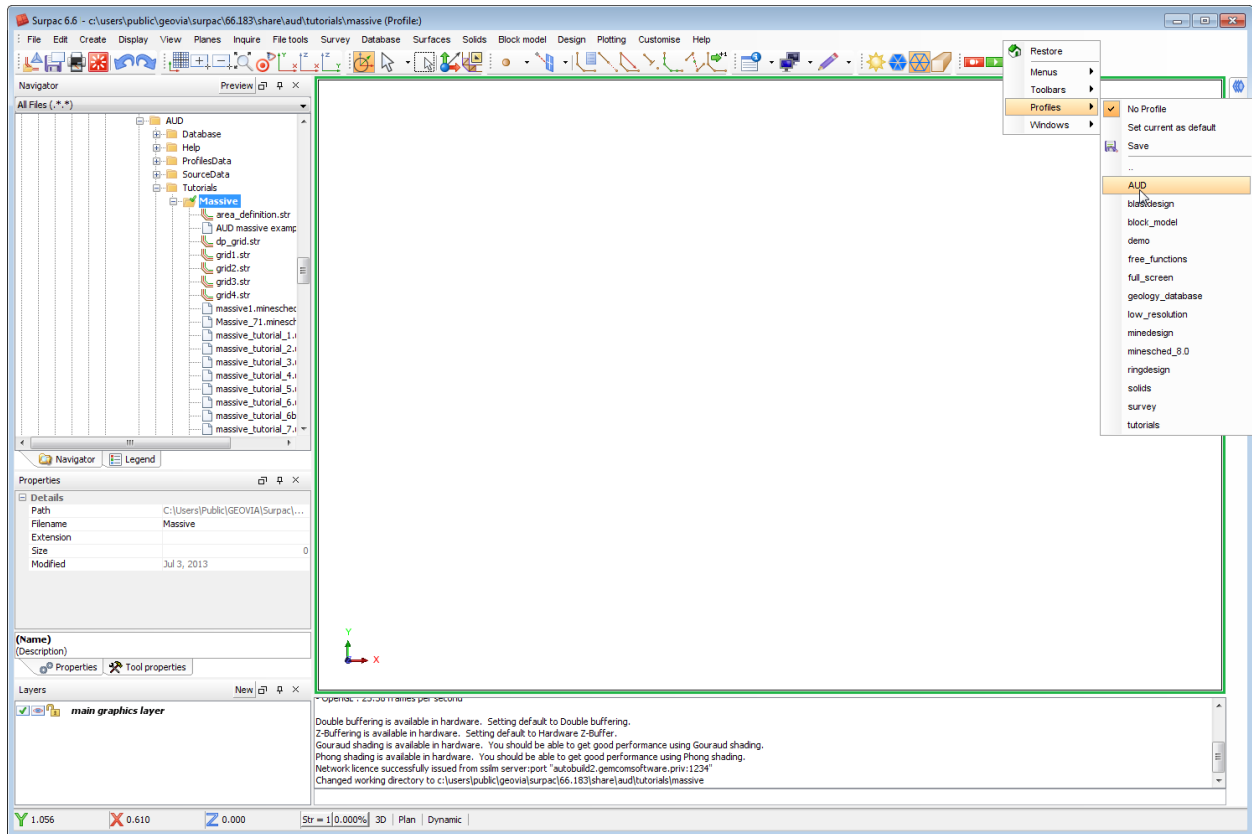


Whenever you see this icon in this document, it indicates a saved project that you can import. By doing this you can skip through earlier parts of the tutorial to focus on specific topics.

Opening AUD

Advanced Underground Design (AUD) opens in a separate window from Surpac.

1. In Surpac, set the working directory to **C:\Users\Public\GEOVIA\Surpac\<version>\share\AUD\tutorials\Massive**.
2. In Surpac, right-click in the area to the right of the menus and toolbars.
3. Choose **Profiles > AUD**.



4. Click the **AUD** icon, in the top right of the Surpac window, to open the AUD interface.



Projects and scenarios

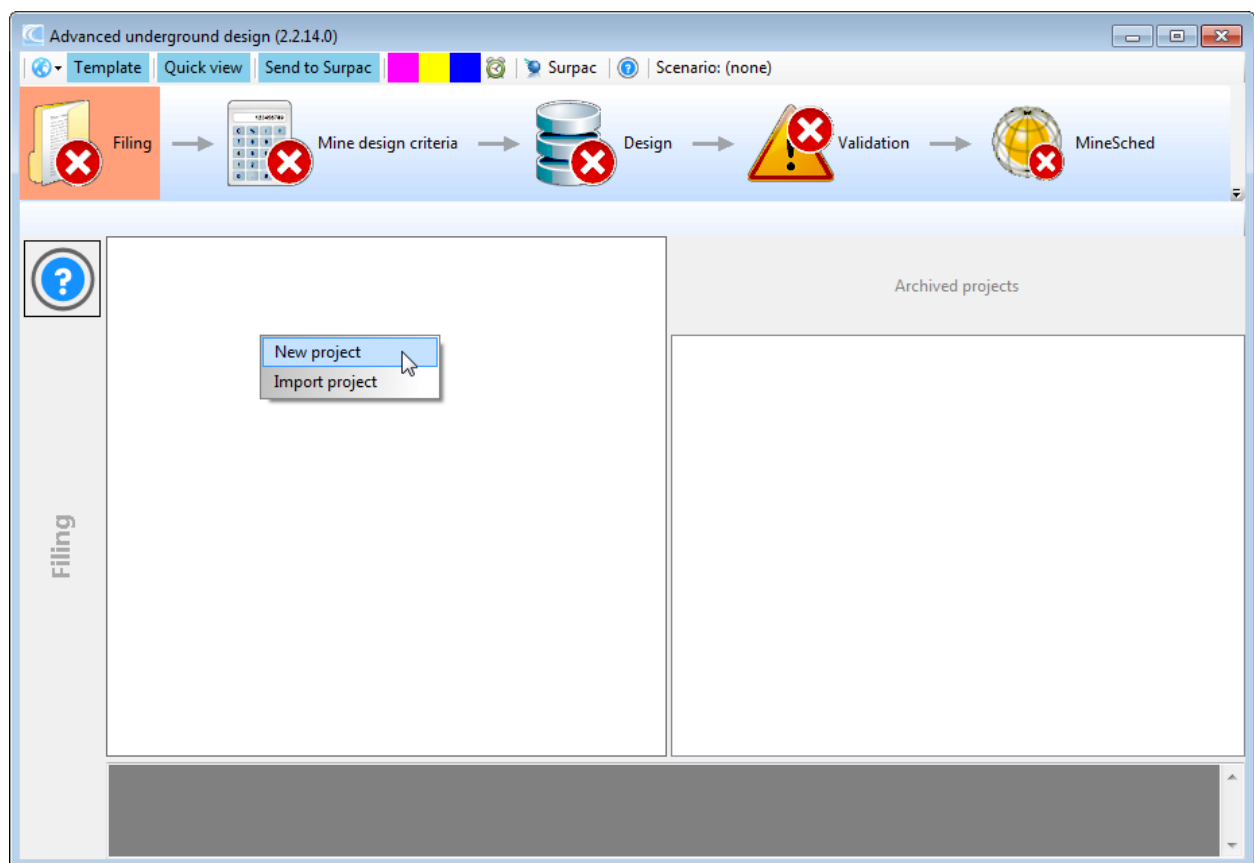
To work with AUD, you need an AUD project and a scenario. Projects and scenarios are stored inside a database with an **.sdf** file extension.


You can also export a project to a **.upj** file, and import a project from a **.upj** file. You select the **Filing** button to create, delete, import, or export projects.

Creating a New Project and Scenario by Template

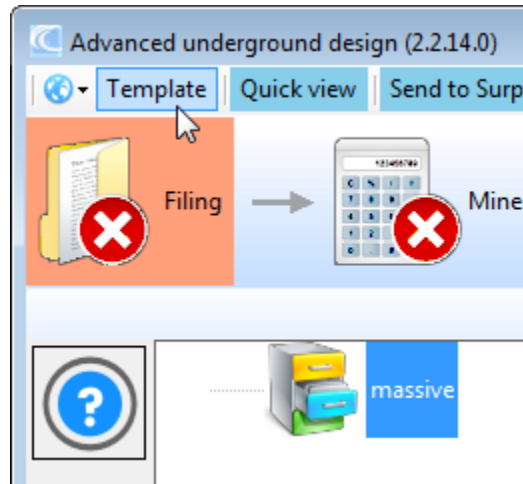
In this activity you will create a new project, and then make a new scenario from a template.

1. Right-click in the left panel of AUD, and select **New Project**.

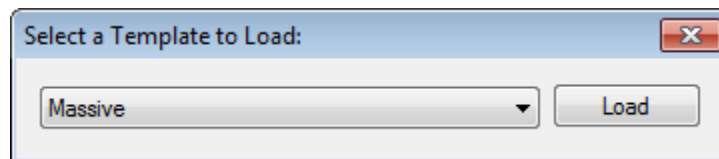



2. Type **massive**.
 **Note:** No white spaces, foreign characters, or capitals are allowed. Use only lower-case alphanumeric characters.

3. Click the **Template** button at the top of the window.



4. Select **Massive**, and click **Load**.



 **Note:** When you load a scenario from a template, AUD automatically creates default profiles and sets the most common global parameters.

Importing an existing project

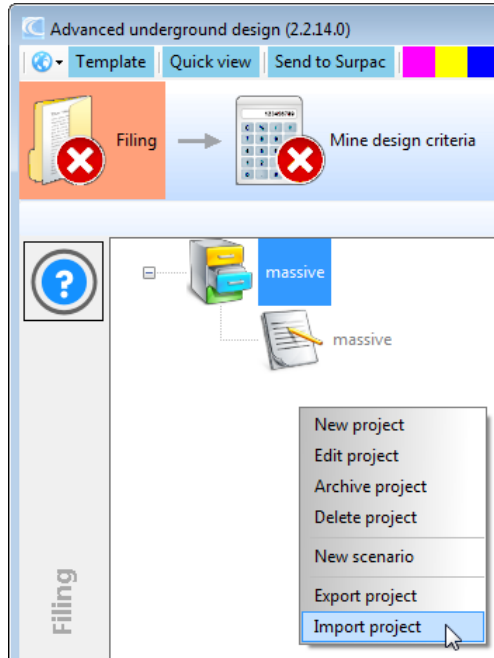
Several **.upj** files are supplied with AUD. You can import these files to move through parts of the tutorial so that you can focus on specific topics.

To help you become familiar with the import process, in the following task, you will import one of the **.upj** files.

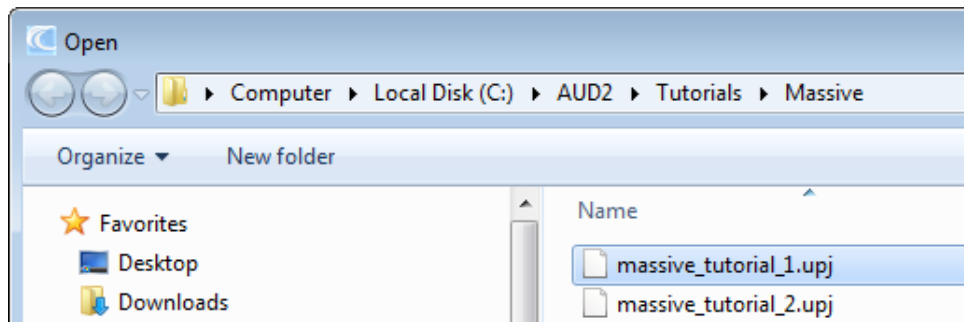
1. Click the **Filing** button.
2. Select the **massive** project.

You do this so that no existing project is selected. You cannot import a project when an existing one is selected.

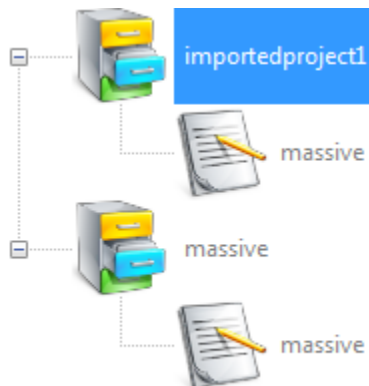
3. Right-click in the left pane, and choose **Import project**.




- 4. Browse to **massive_tutorial_1.upj**, and click **Open**.



The project is imported and called **importedproject1**.



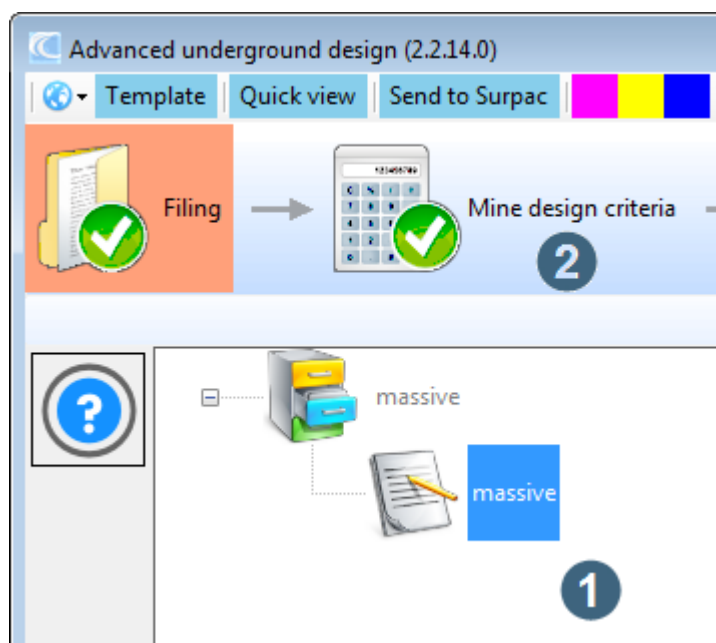
Next, to avoid possible confusion, you will delete the imported project.

- 5. Right-click **importedproject1**, choose **Delete project**, and click the green check mark.
 **Note:** However, **massive_tutorial_1.upj** is not deleted, so you can retrieve the project again later if you wish.

Mine Design Criteria

It is important to understand how your geological model is constructed and what attributes you will use for the reporting process. You should understand what you want to achieve with your design and schedule, what inputs you require, and what assumptions you will make, before you do your design. You can come back to the mine design criteria (MDC) and change your assumptions during the design process if necessary.

- Select the 'massive' scenario that AUD has created, and click **Mine design criteria**.



In this tutorial you will use a three-dimensional Surpac block model, **massive_mod1.mdl**, which contains the following attributes:

- Density attribute: dens; Float, 1 decimal with a background value of 2.9
- Grade attribute: grade; Float, 1 decimal with a background value of 0
- Material attribute: material; integer; with a background value of 0 and a value of 1 inside the modelled ore body

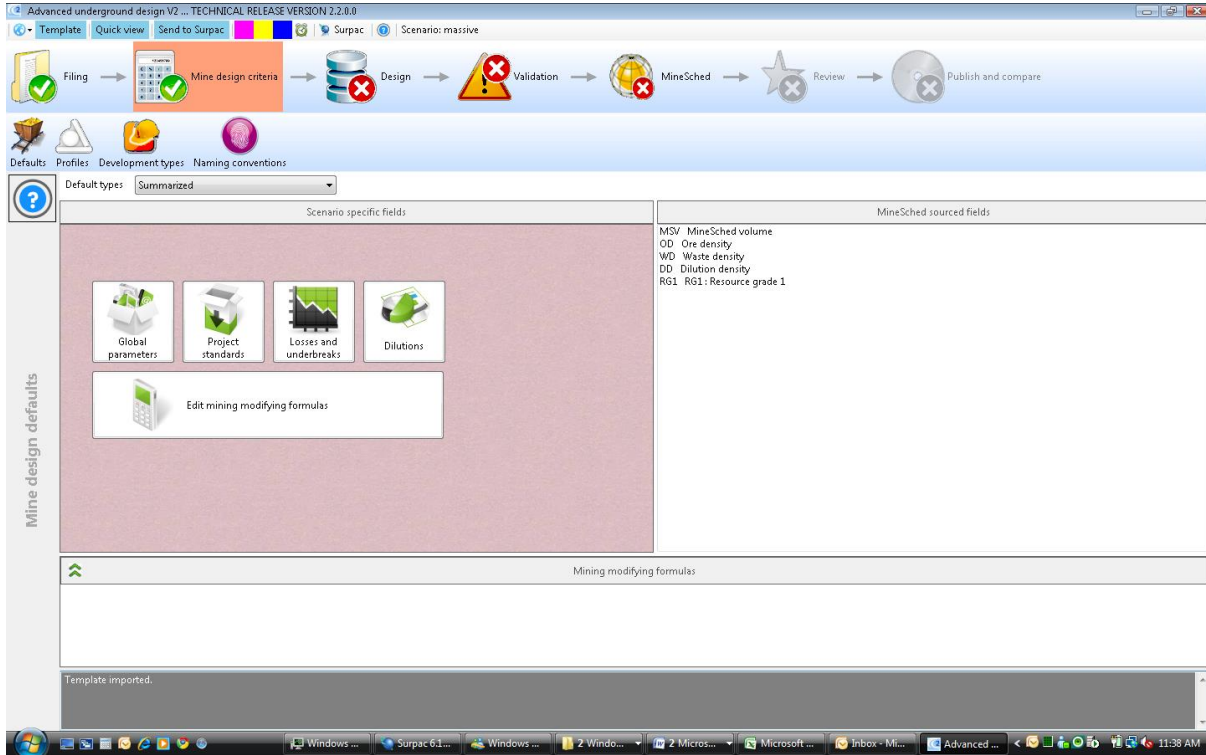
Default parameters

Global parameters

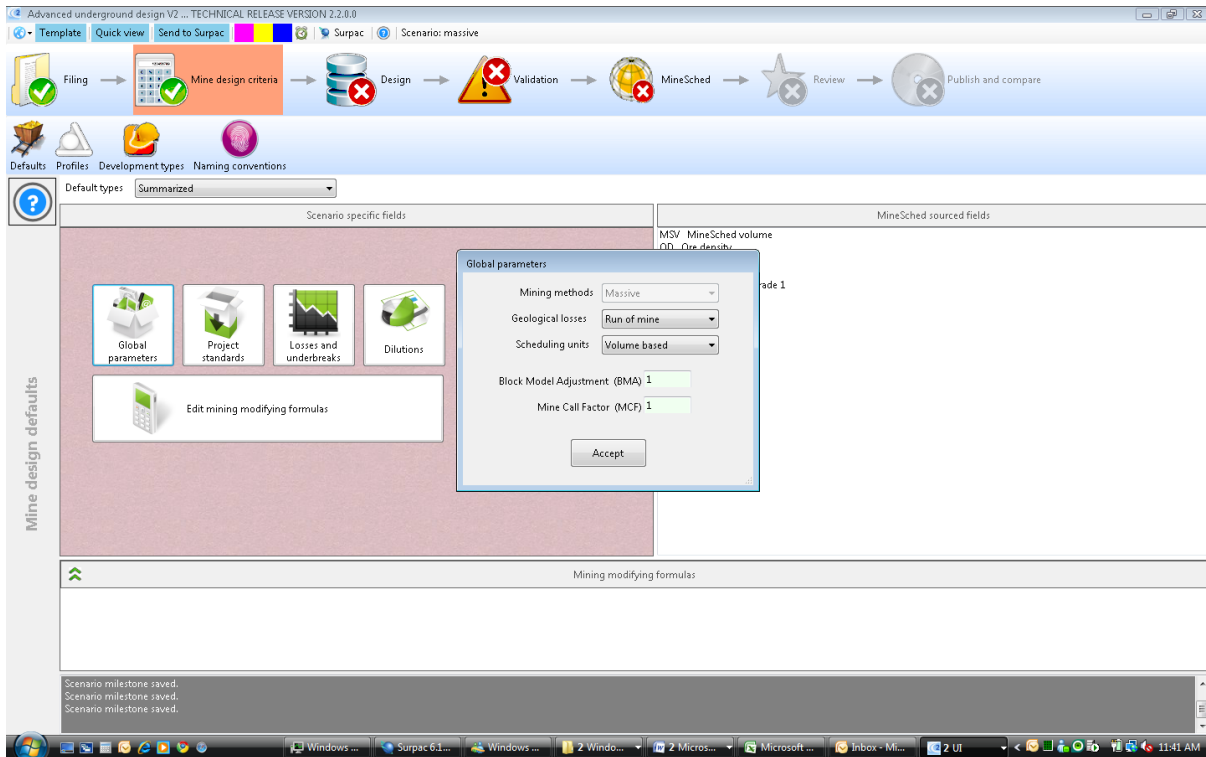
You use global parameters to determine how to apply mine design criteria based on your mining method and your geological model.

MineSched sourced fields are fields that exist in the block model used by MineSched, and which become part of your Minesched reports.

The default setup provided by the massive template, is set to require five MineSched sourced fields in your block model. Because you do not have some of these fields, you will adjust the parameters.



- Click on **Global parameters**.



- **Mining method**

The **Mining method** remains unchanged because the template you have chosen defines a **Massive** mining method.

- **Geological Losses**

For **Geological losses (GL)**, choose **Run of Mine**.

Geological losses determines how the losses are applied, and where the losses are reported. If you plan to mine through geological loss areas, the loss tonnes would report as part of your Run of Mine (ROM) tonnages, at zero content and zero grade. If you have a geological loss of 10%, this means that 10% of your resource would be mined at zero grade. The value for geological loss is supplied by the geologist to account for unknown losses. Although these tonnes have modelled qualities or grades in the block model, not enough information is available to model exactly where these unknown geological losses will occur during mining. Please refer to your project geological documentation to get the full definition of geological losses and how it was modelled for your project. This, and your mining method and infrastructure, will imply how you will handle the losses.

In this case we assume that we will not be able to leave the geological loss areas as pillars underground and that we will have to mine through it. So we select **Run of mine**. When the loss areas are mined we do not lose any tonnages but, because it is mined at zero grade, we lose 10% of the content. As a result there is a grade impact. If we had chosen **Not mined**, it would imply that we lose 10% of the tonnages (left as pillars), and therefore lose 10% content. In that case there would be no effect on grade but 10% lower tonnages.

- **Scheduling units**

For **Scheduling units**, choose **Volume based**.

The volumes reported in MineSched are the volumes referenced during the reporting section of this project. All the formulae for ROM Stopping tonnes and content; ore development tonnes and content; and waste tonnes are derived from the volumes as reported from MineSched.

- **Block Model Adjustment**

In this tutorial we assume no **Block Model Adjustment (BMA)** exists, and use a value of one.

Block Model Adjustment (BMA) is the constant value by which you want to adjust the block model grade. If you know the block model grades are underestimated, you can use a BMA with a value of greater than 1. If you know the block model grades are overestimated, use a BMA with a value of less than 1. BMA only affects grade; it does not affect tonnages. You should use BMA only in very specific circumstances, and based on specialist recommendations.

- **Mine Call Factor**

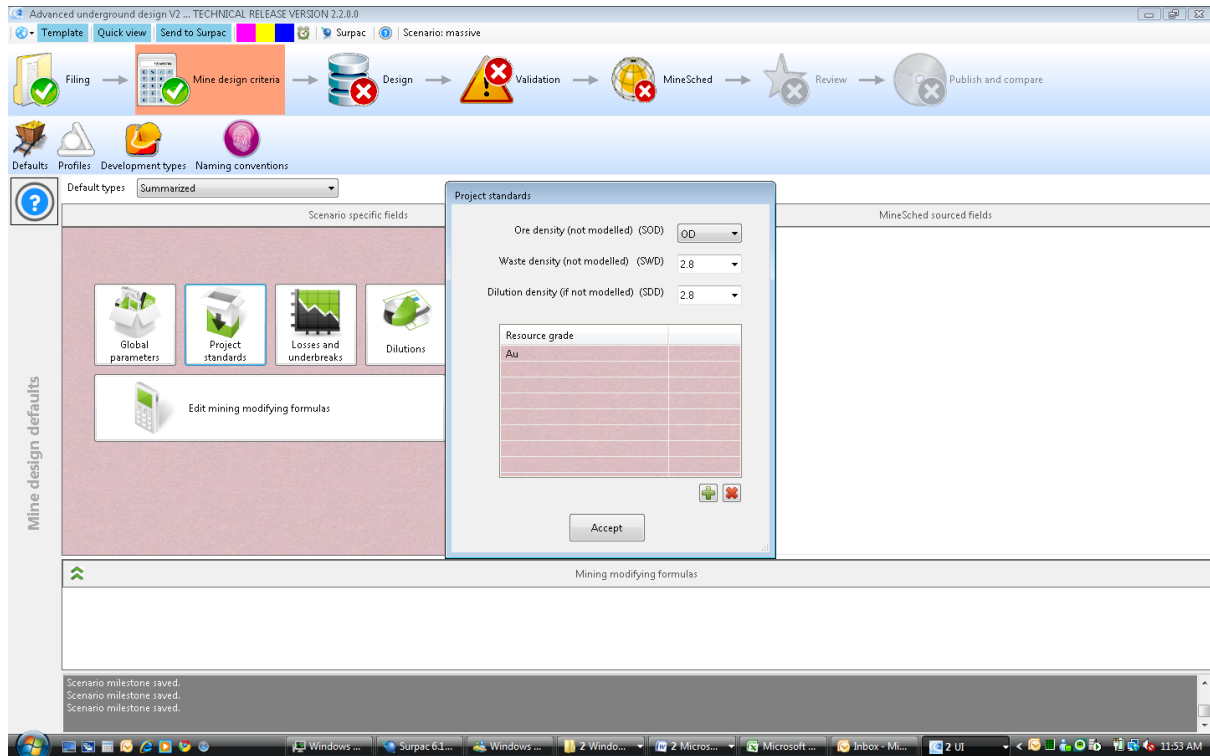
For this tutorial we assume that no **Mine Call Factor (MCF)** exists, and use values of one.

Mine Call Factor (MCF) is the ratio, expressed as a percentage, of the specific product at recovery, accounted for in “recovery plus residue”, to the corresponding product “called for” on the mine’s measuring and valuation methods. Normally MCF applies only to certain gold projects. This should normally be less than 1, and is specific to your particular project.

Note: The application of an MCF as defined here implies that no tonnage is lost, only a metal content loss, which implies a lower grade.

Project standards

1. Select **Project standards**.
2. In **Waste density (not modelled) (SWD)** and **Dilution density (if not modelled) (SDD)**, select 0, and then type 2.8.
3. In Resource grade, Type **Au**.



The block model contains a modelled density attribute. Therefore, the ore density (OD) is a source field and you should reference that field in your MineSched setup. Source fields that exist in the block model used by MineSched become part of your MineSched reports.

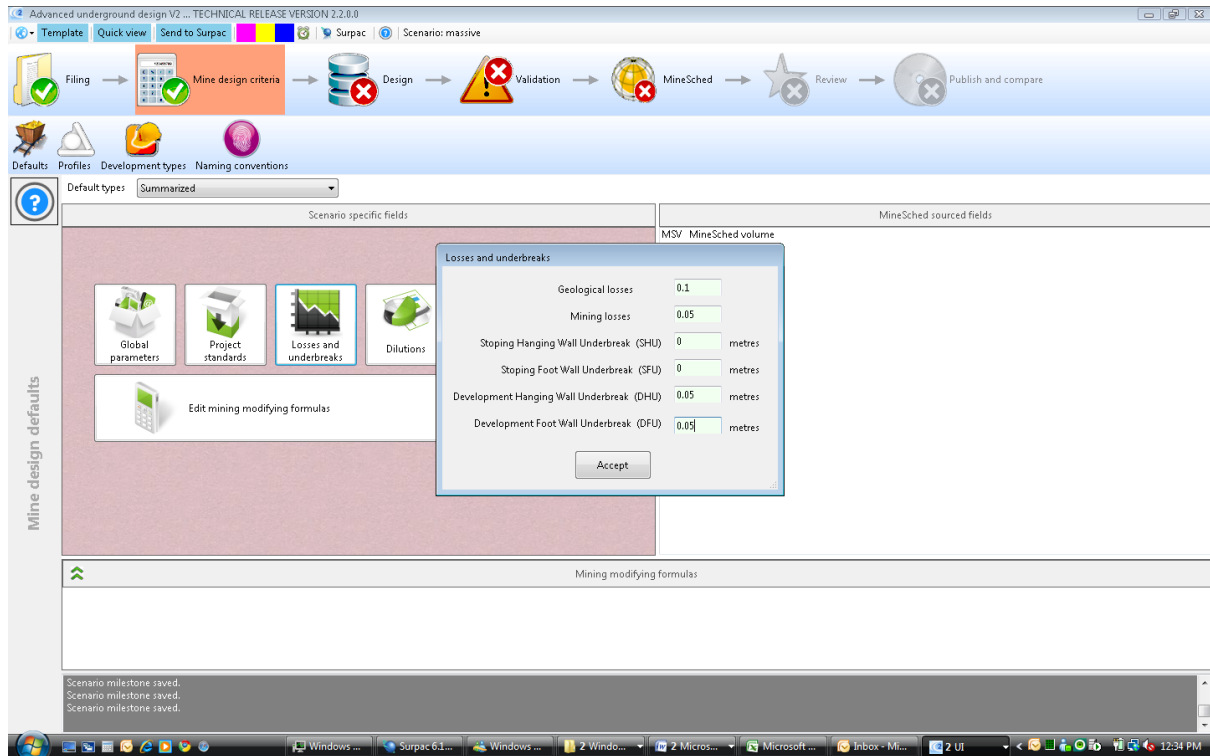
You will use a constant density in this project for the dedicated waste mining and for the dilutions. Because these two fields (**Waste density** and **Dilution density**) do not exist in your block model, and therefore do not exist in your MineSched reports, you use constant values for these densities.

Gold (Au) is the resource grade that you will modify into a ROM head grade during the planning process. If you want to add additional resource grades, click the green plus icon, and type the name of the second grade that you want to reference during the reporting process. Double-click the name of the resource grade to change the name.

Losses and under breaks

In the *Losses and underbreaks* form, you define all the parameters that define the loss (in tonnages) in terms of losses and underbreaks.

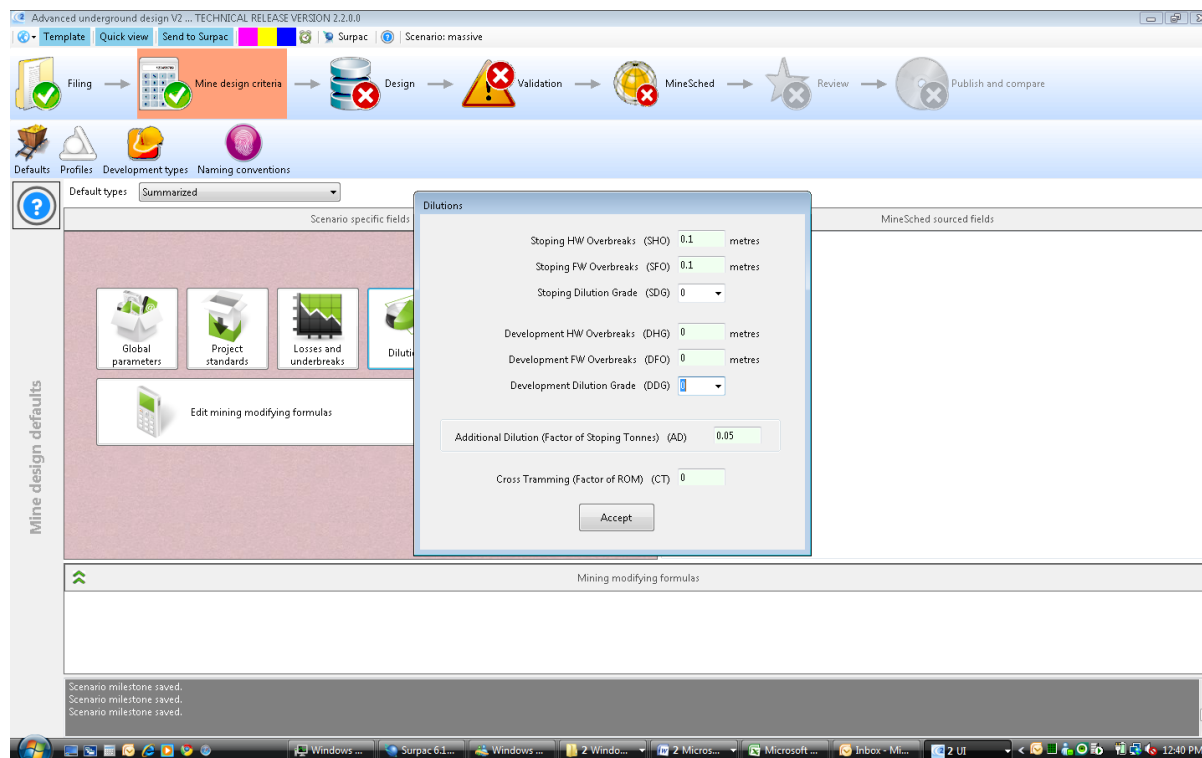
1. Select **Losses and underbreaks**.
2. Enter the parameters shown in the following image.



- **Geological losses (GL)**
 Geological losses define the percentage of geological losses. They are defined as a fraction , not a percentage. A geological loss factor of 0.1 is equivalent to a 10% geological loss.
- **Mining losses (ML)**
 Mining losses are applied as a tonnage and content loss. They are defined as a fraction, and should be less than 1. A value of 0.05 implies that 5% of your resource is lost and does not form part of your ROM tonnages and content. Mining losses do not affect grade.
- **Stopping Hanging Wall Underbreak (SHU) and Stopping Foot Wall Underbreak (SFU)**
 SHU and SFU are defined in metres. If you applied a value of 0.05, it implies that 5cm is left in the hanging wall and 5cm is left in the footwall. A total 10cm of resources would be lost and not mined. In this tutorial, we do not allow for any stoping underbreaks.
- **Development Hanging Wall Underbreak (DHU) and Development Foot Wall Underbreak (DFU)**
 DHU and DFU are defined in metres. A value of 0.05 implies that 5cm is left in the hanging wall and 5cm is left in the foot wall, at the ore development ends. A total of 10cm of resources is lost, not mined.T

Dilutions

1. Select **Dilutions**.
2. Enter the parameters shown in the following image.



- Stopping HW Overbreaks (SHO), Stopping FW Overbreaks(SFO), and Stopping Dilution Grade (SDG)

SHO and SFO are defined in metres. If you apply 10cm overbreaks in the hanging wall and 10cm overbreaks in the footwall, assign values of 0.1 in these two fields. The tonnes are then added to your resource tonnes, and the tonnes are applied at the stopping dilution grade (SDG) that you specify.

In this tutorial, the dilution is applied at a zero grade. To apply the dilution at the resource grade, you would select **RG**. Choosing **RG** will increase the overall resource. It would also imply that the dilution material added to your ROM stream would not decrease the ROM head grade. Choose a constant SDG of 0.

- Development HW Overbreaks (DHG), Development FW Overbreaks (DFO), and Development Dilution Grade (DDG)

DHG and DFO are defined in metres. In these fields, you specify development overbreak dilutions for the 'development end' hanging wall and footwall (DHG and DFO).. is the DHG and DFO are usually applied at a zero grade. Choose zero for all values for this tutorial.

- Additional Dilution (Factor of Stopping Tonnes) (AD)

AD is expressed as a percentage of the total stopping ROM tonnes. Use this factor if you want to add additional dilution. In this tutorial you will add 5% additional dilution to your stopping by applying a factor of 0.05. The factor is applied only to stopping. You can use AD to cater for the dilutions associated with the gully.

You could also use this factor to cater for shortfall/excess or trammings width, depending on the level of detail applied to the schedule, and the requirements of the specific project. Tonnage discrepancy is the difference between the tonnage hoisted as ore, as calculated by the surveyor, and the tonnage accounted for by the plant measuring methods. It is expressed as a percentage of the tonnage hoisted as ore. The discrepancy is known as a **shortfall** when the tonnage calculated by the surveyors is less than the tonnage accounted for in the plant. The discrepancy is known as an **excess** when the tonnage calculated by the surveyors is greater that the tonnage accounted for at the plant.

Trammings width (TW) is a calculated width that expresses the relationship between a specific reef excavated and the relevant total tonnes trammed from underground sources. This implies that if the trammings width, applied as AD in AUD, is 0.1, then an additional 10% of waste is trammed as ore and becomes part of your ROM reserve. The factor is applied to stopping only. This factor is usually not used if a comprehensive design is done.

Note: The additional waste that is trammed as ore is counted in addition to the other sources of waste material already defined in AUD. As a result the definition of trammings width as defined here is not a full and traditional trammings width definition. Cross Trammings (Factor of ROM) (CT).

This factor allows for waste that was supposed to be trammed to waste but that has been incorrectly trammed to and ore stream. If your ROM tonnages are increased by 2% due to cross trammings, then you would use a CT factor of 0.02. Please note that, at this stage, no waste development reduction is allowed for. In this tutorial we do not allow for cross trammings, so you enter in the **CT** field.

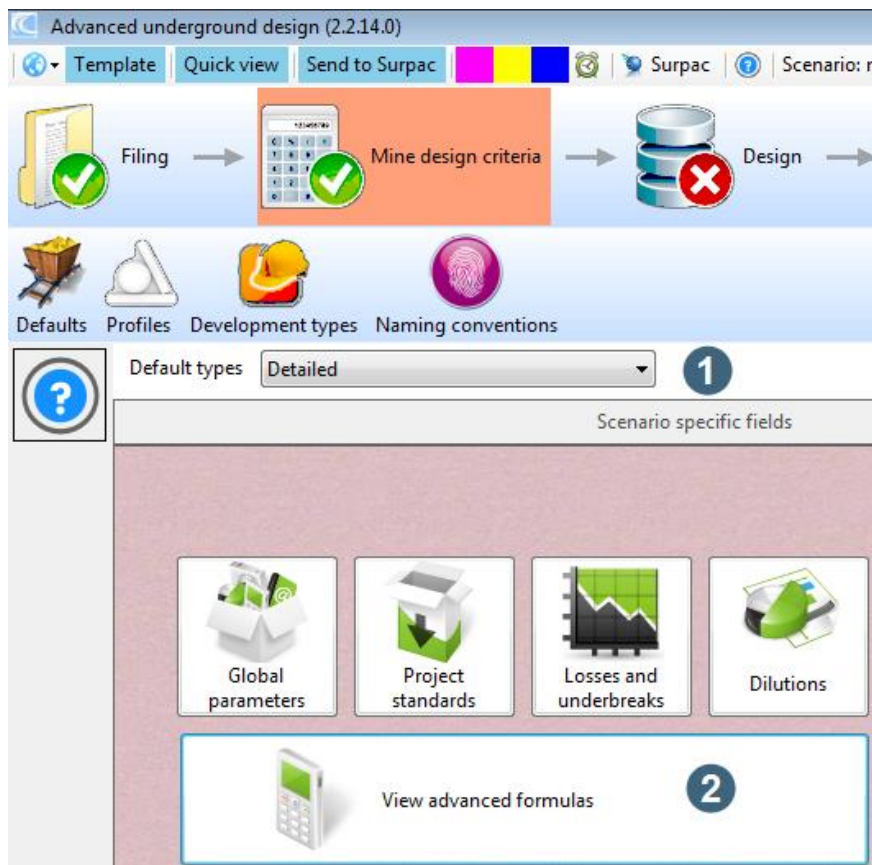
Formulae

The mine design criteria and mining-related modifying factors that you select at this stage determine the various source fields that you use for input during the MineSched scheduling. The selected source fields are listed in the **MineSched sourced fields** tab. Mining-related modifying factors allow different formulae for waste tonnes, stoping ROM tonnes, development ROM tonnes, and stoping and development content (for each resource grade). These factors determine a diluted and modified ROM head grade or plant feed grade.

There are two ways of applying formulae: summarised and detailed. At this stage, the summarised formulae are approximated but you can modify them in several ways. The detailed formulae are more systematically applied but you cannot modify them. To understand the differences between the formulae, you can choose **Detailed**.

Detailed

1. In the **Default types** list, choose **Detailed**, and then click **View advanced formulas**.



Advanced formulas

Resource in design RTID	-	Geological loss tonnes GLT	-	Mining loss tonnes MLT	-	Underbreak tonnes UBT	+	Overbreak tonnes OBT	+	Stoping dilution tonnes SDT
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ROM Stopping tonnes

Click the variables to see the sub-formulas

Resource tonnes in design RTID	-	Mining loss tonnes MLT	-	Stoping Underbreak tonnes SUBT	+	Stoping Overbreak tonnes SOBT	+	Specialist stoping dilution tonnes SSDT
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The detailed formulae allow for the following modification methodology for ROM tonnes:

ROM tonnes = Resource tonnes in design (RTID) - geological loss tonnes (GLT) - mining loss tonnes (MLT) - underbreak tonnes (UBT) + overbreak tonnes (OBT) + stoping dilution tonnes (SDT).

For ROM stoping tonnes in this project, this formula is applied as:

ROM stoping tonnes = RTID - MLT - Stoping UBT + Stoping OBT + Stoping SDT.

Geological losses (GLT) are not applied in this project because we defined in the global parameters that geological losses are mined through, and reported to, ROM material based on our current project.

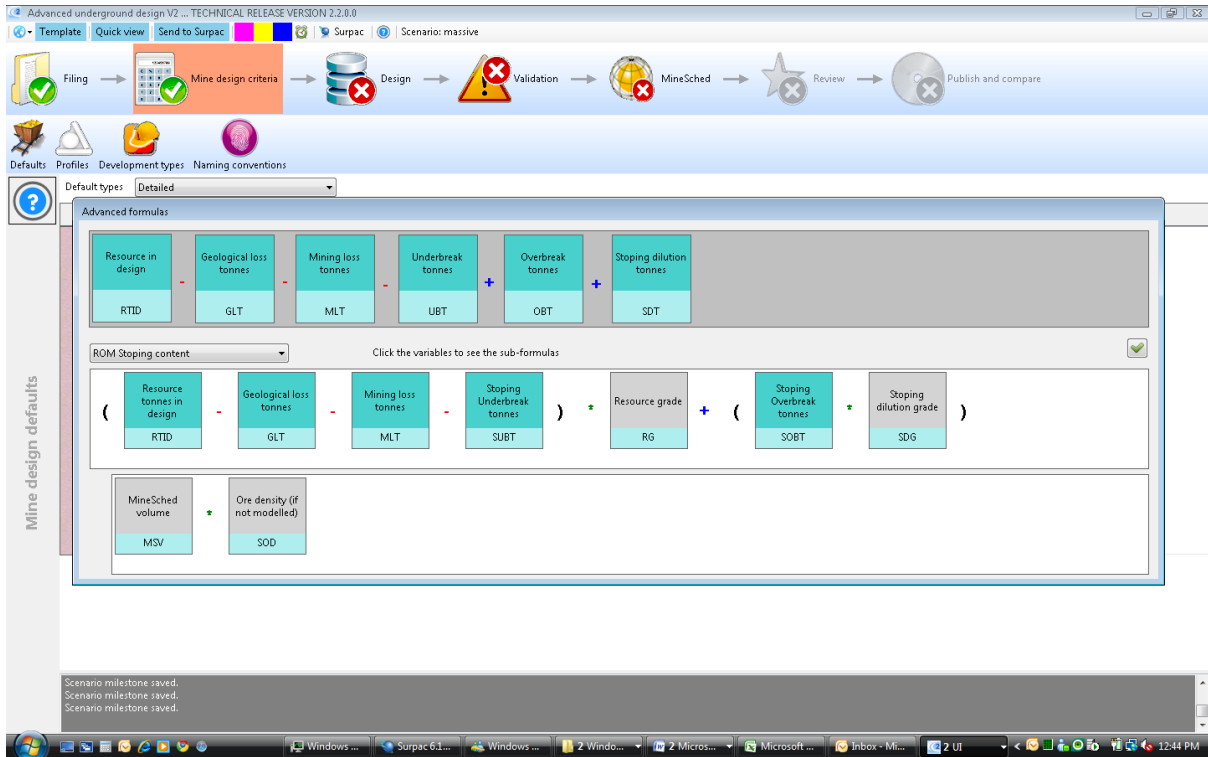
- In the lower left, click **RTID**.

Squares displayed in green indicate that there is another level of detail that you can view if you click the square. Grey squares indicate that there is no more detail available.

- Click on **Stoping Overbreak tonnes** to see the relevant formula that determines how these dilution tonnages are calculated.

- Choose **ROM Stopping content** from the drop-down list, and click **Stopping Overbreak tonnes** or **Stopping dilution tonnes** to see how it is determined.

RTID, GLT and MLT can display more detail. Click on the options to become familiar with the formulae for the different mining values.



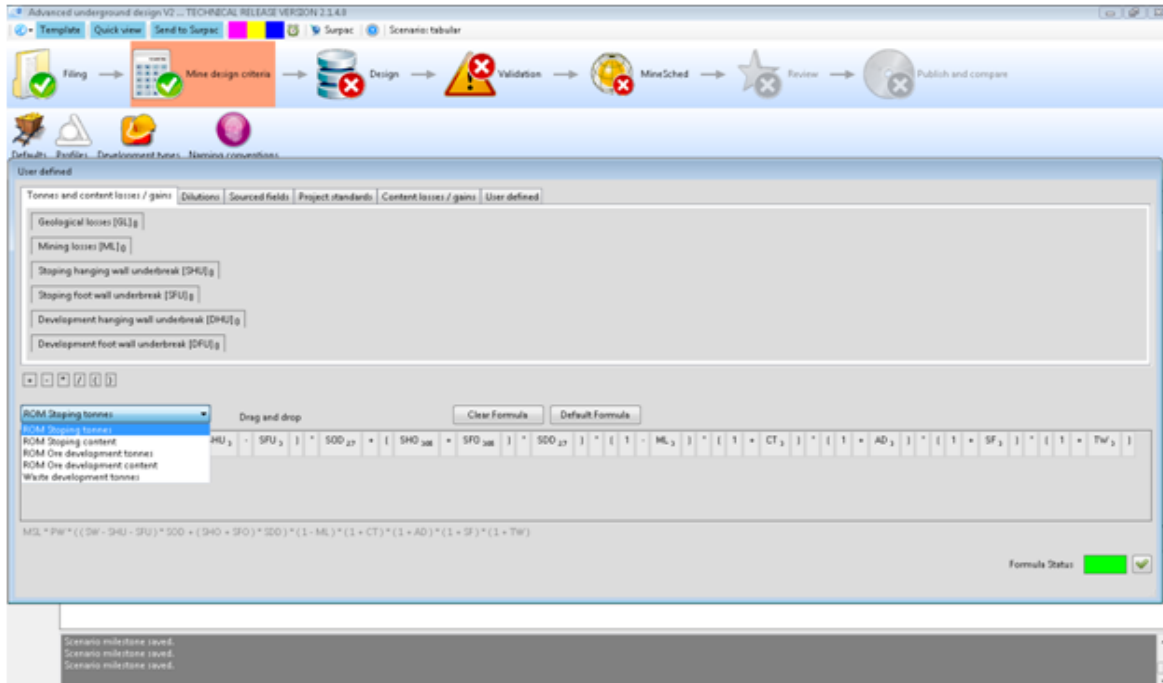
- Click the green check mark to close the *Advanced formulas* window.

Summarised

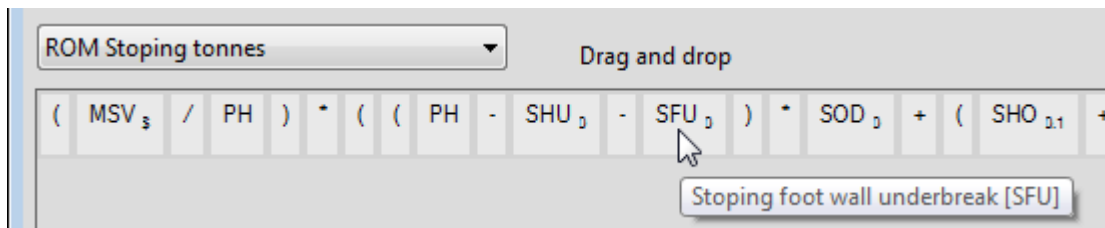
- From the **Default types** list, choose **Summarised**.
- Click the **Edit mining modifying formulas** button.
- Choose **ROM stopping tonnes** from the drop-down list.

Formulae exist for ROM stopping tonnes, ROM stopping content, ROM ore development tonnes, ROM ore development content and waste development tonnes.

Note: The content is used to ensure accurate weighted average estimations of grade per scheduled period. The content is defined by the tonnage per development type (or grouped development type) per period and is a product of the grade and tonnage per scheduled period. The sum of the modified content divided by the sum of the modified tonnes per period is used to determine the grade for those elements for the period in question. Content is not reported in the tonnage and grade profiles but used only to determine the relevant element grade for each period.

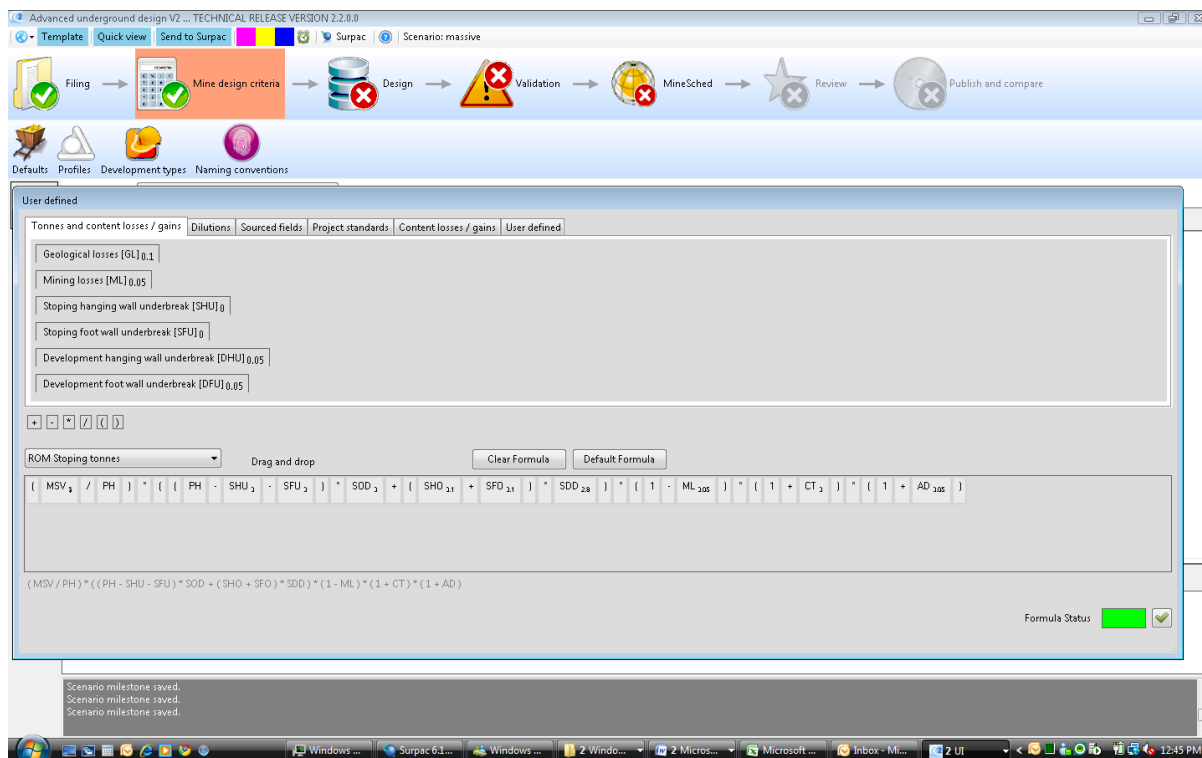


When you select an item from the list, its formula is displayed in the **Drag and drop** section. Move the pointer over each variable in the formula to see a ToolTip that shows the variable name.



If the value at this stage is assigned as a constant, it is displayed in subscript. If the field is a source field (sourced from your MineSched schedule block model report), a "\$" character is displayed in the subscript. You can modify all of these formulae by dragging variables from the section at the top of the form to the formula in the lower part of the form. Variables are grouped under the following tabs:

- Tonnes and content losses/gains
- Dilutions
- Sourced fields
- Project standards
- Content gains/losses and user defined



Default formulae are based on the settings that you have specified. The formulae deliver ROM tonnes, and content for stoping and development, to use to calculate a diluted head grade. Waste development tonnes are also defined and estimated.

You can modify any of the formulae to enable project, regional, and mineral-specific application of mining-related modifying factors and philosophies.

Formulae must be valid before you can apply and close the form. Alternatively you can revert back to the default formulae.

Note: The PH variable represents profile height.

By modifying the formulae, you create the eventual mineral inventory or reserve from the resource.



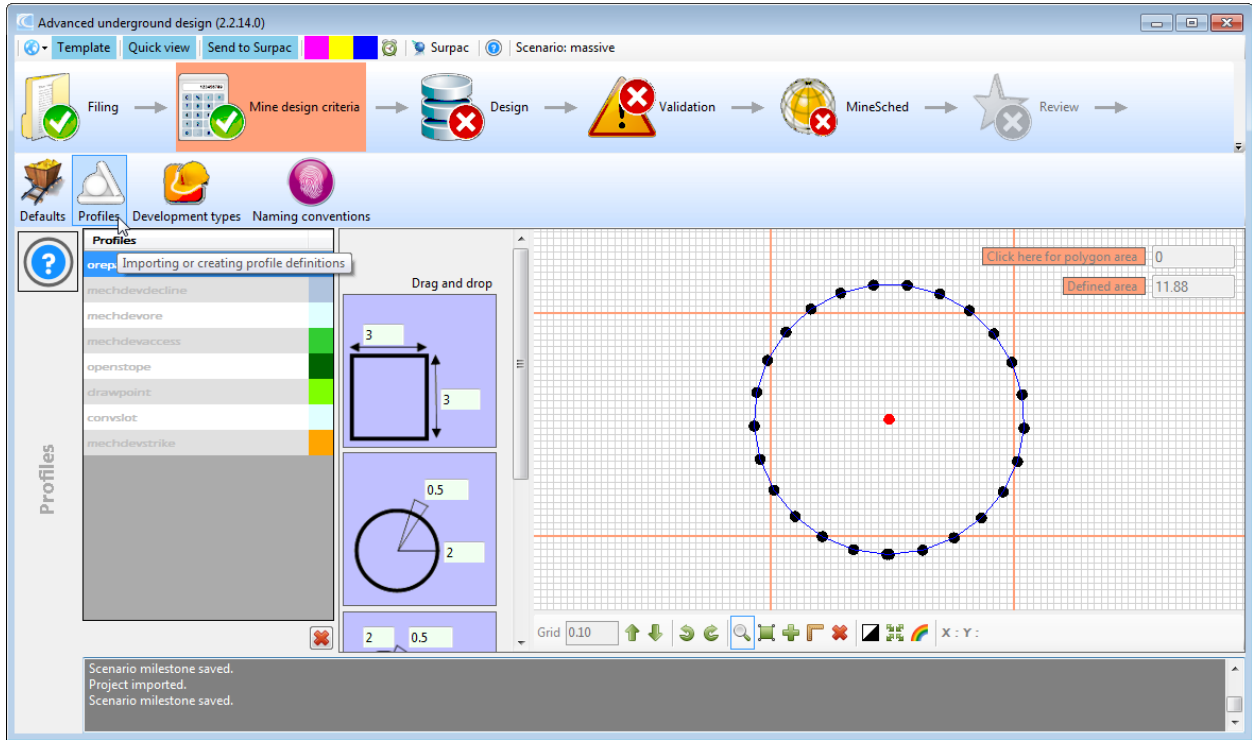
Massive_tutorial_1.upj

Adding profiles

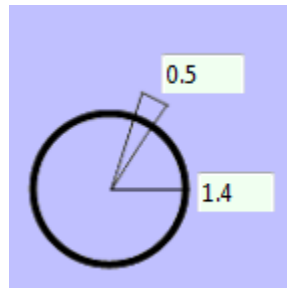
You can design development profiles in Surpac and reference them in AUD. This function fills the d3 and d4 description fields, creates a string file profile, and references it for use in MineSched. Alternatively, you can design the profile in AUD. For this tutorial you will design a haulage and dropraise profile.

There are three types of profile base designs that you can create: a circle, an arch, and a square profile. After you have changed the profile design parameters and dropped the profile onto the grid graphics space, you can edit the profile by adding, deleting, or moving points, and you can move the X=0, Y=0 reference point.

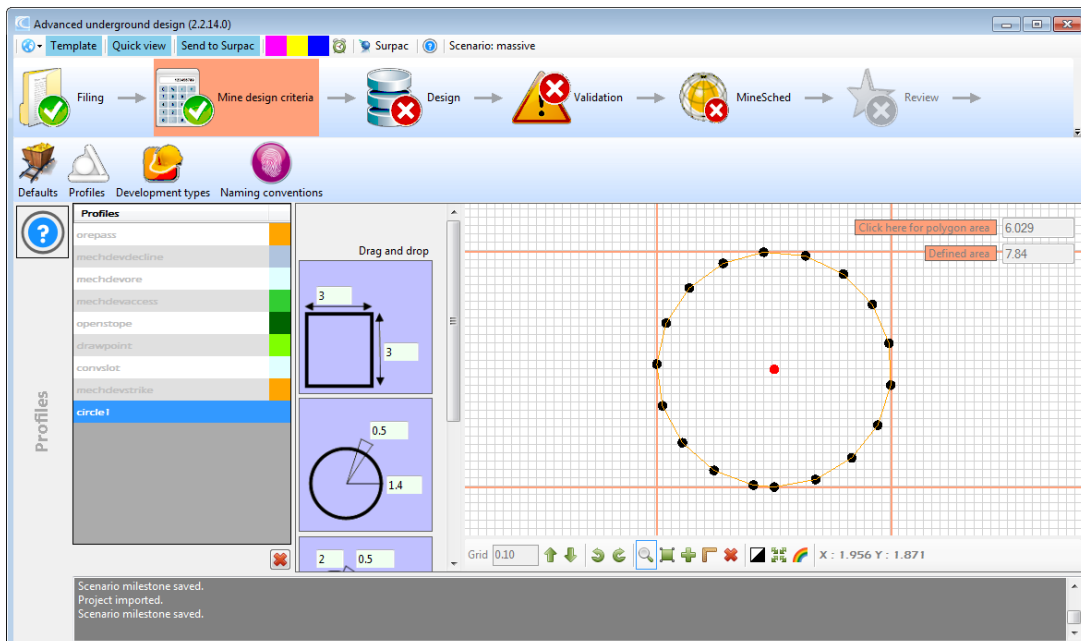
1. Select **Profiles**.



- To design the circle 'dropraise' with a radius of 1.4m, change the default value in the circle button to 1.4. Leave the 0.5 arc length unchanged.



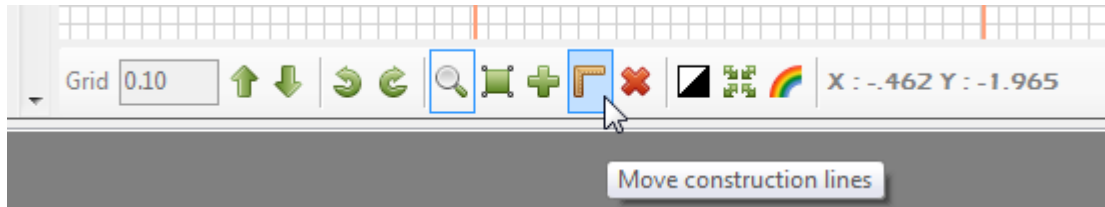
- Drag the circle onto the grid on the right.



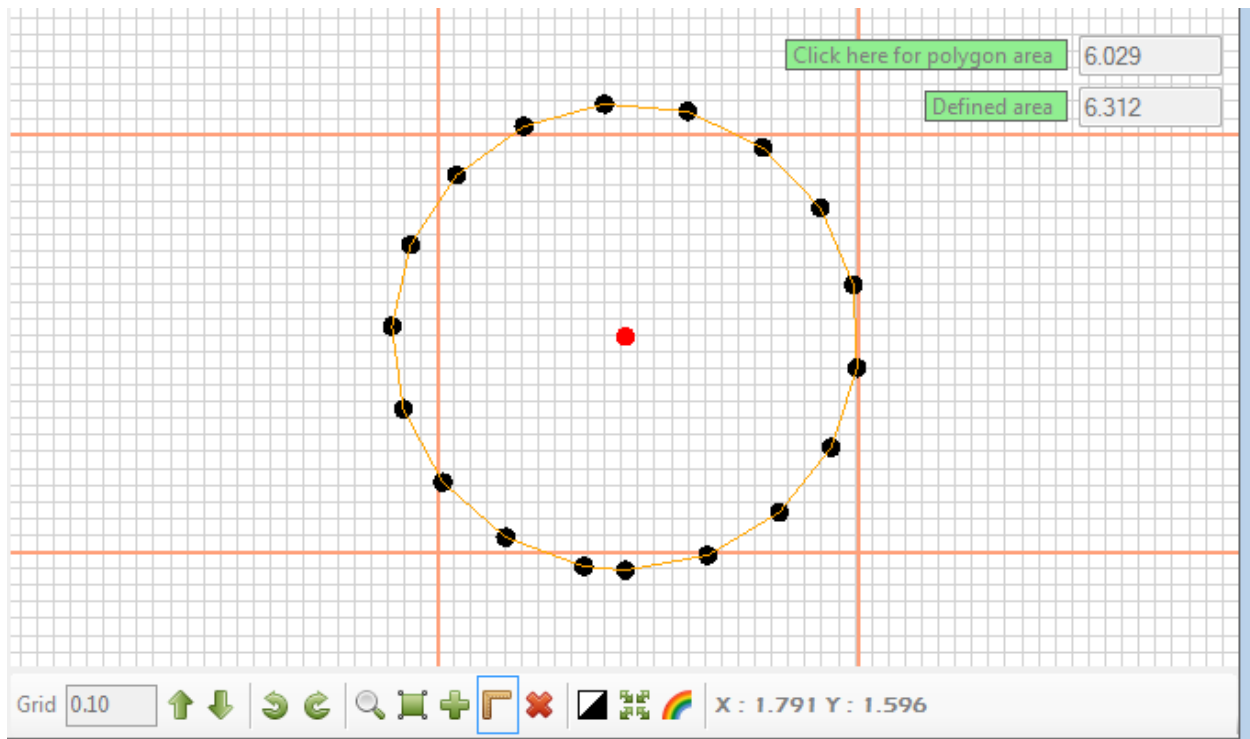
A circle is displayed, and also some orange construction lines. The purpose of the construction lines is to determine the height and width with which to fill the d3 and d4 fields in Surpac. The d3 and d4 fields are then used in MineSched to reference the height and width.

Next you will modify the construction line to get a representative profile area relative to the exact circle area.

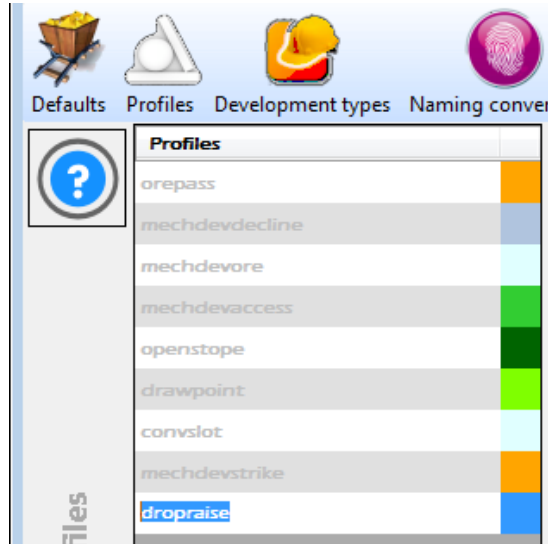
4. Click the orange **Click here for polygon area** box, to calculate the circle area.
The area should be 6.029m² relative to the 7.84m² currently defined by the construction lines.
5. Click the **Move construction lines** icon.



6. Drag the construction lines until the orange boxes change to green.
The text boxes become green when the area of the circle is within a 10% variance of the area of the construction line box.

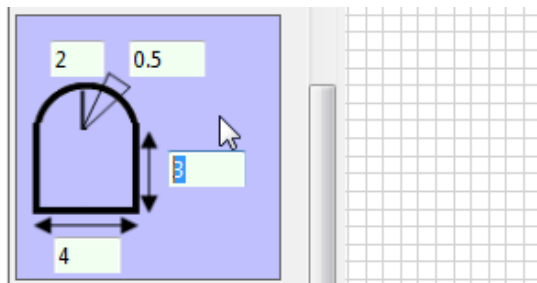


7. Click the profile name and rename it from 'circle1' to 'dropraise'.

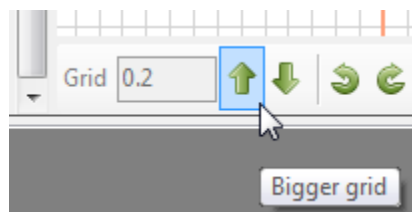


Next you will design an arch type 'haulage' profile.

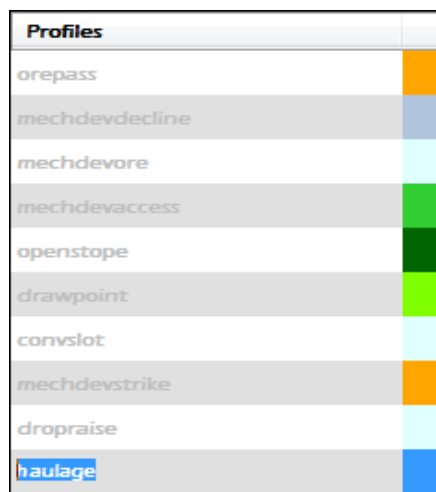
8. Beside the **Arch** icon, change the height to **3**.
9. Drag the **Arch** icon onto the grid on the right.



10. Increase the **Grid** increments to **0.2**.

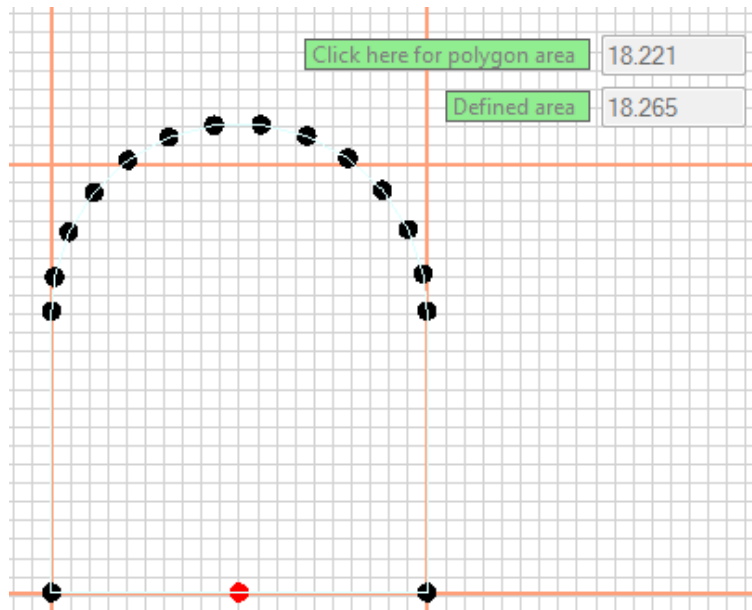


11. Change the profile name from 'arch1' to 'haulage'.



Again you should fit construction lines to ensure that the development type area from the d3 and d4 fields in MineSched give the same area as derived from the actual string profile.

12. Move the top construction line downwards.



Massive_tutorial_2.upj

Adding development types

1. Select **Development types**.

Note: Several profiles and development types are already listed. These were part of the **Massive** template you used at the start of the project.

Advanced underground design (2.2.14.0)

Template Quick view Send to Surpac Surpac Scenario: massive

Filing Mine design criteria Design Validation MineSched Review

Defaults Profiles Development types Naming conventions

Create at least one profile definition.
Development types in use cannot be changed to other types or deleted.

Development type	Profile	Waste/Ore	Stoping/Development
footwalldrift	mechdevstrike	Waste	Development
oredrift	mechdevore	Ore	Development
slotraise	convslot	Ore	Development
orepass	orepass	Waste	Development
accessdrift	mechdevaccess	Waste	Development
drawpoint	drawpoint	Waste	Development
decline	mechdevdecline	Waste	Development
stope	openstope	Ore	Stoping

Details

Type: orepass
Profile: orepass

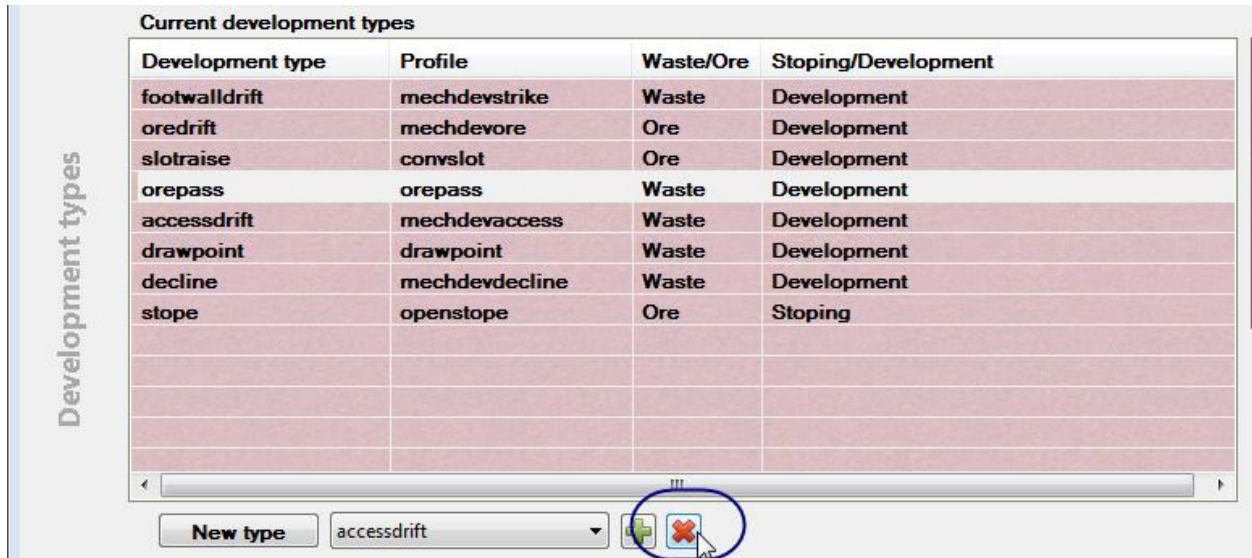
Ore Waste
 Stoping Development

New type: accessdrift

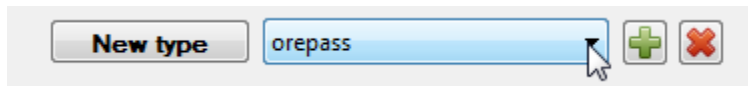
Scenario milestone saved.
Scenario milestone saved.

In this tutorial, you will delete the 'orepass' development type and replace it with a new development type using the 'dropraise' profile you created earlier.

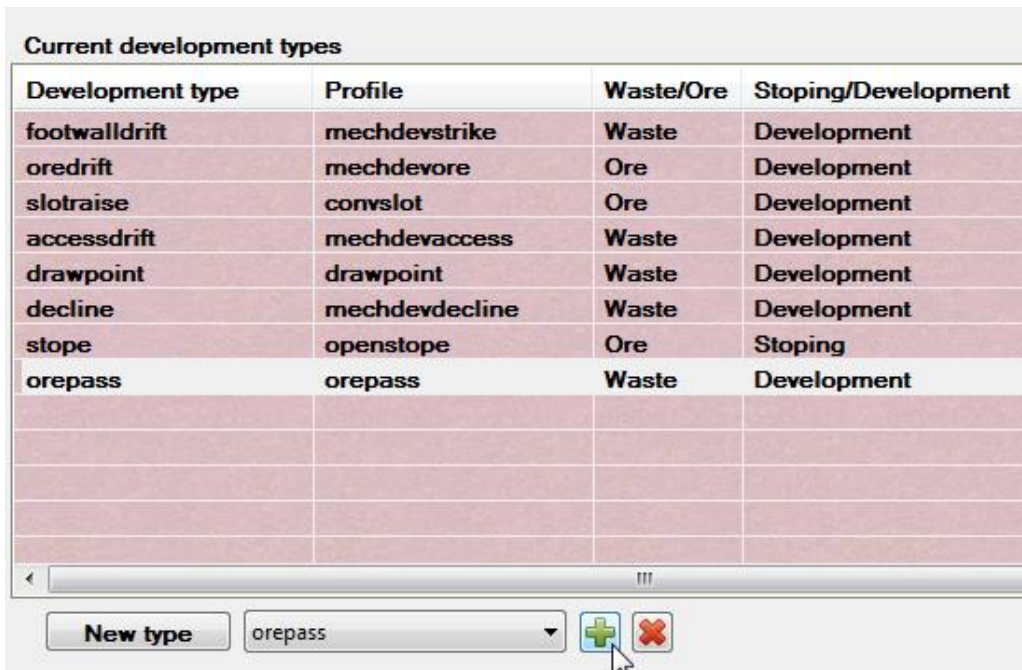
- In the **Current development types** area, click the 'orepass' development type, then click the red cross at the bottom of the screen.



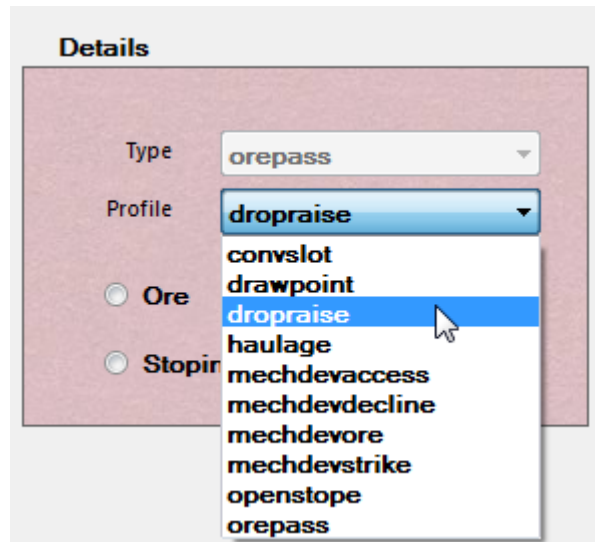
- Click the **New type** list, and select **orepass**.



- Click the green cross plus to add the development type to the list.
The **orepass** development type is added to the list of development types.



- In the **Details** area, click the **Profile** list, and select **dropraise**.



The formulae you defined earlier are applied to each development type based on the classification in **Development types**.

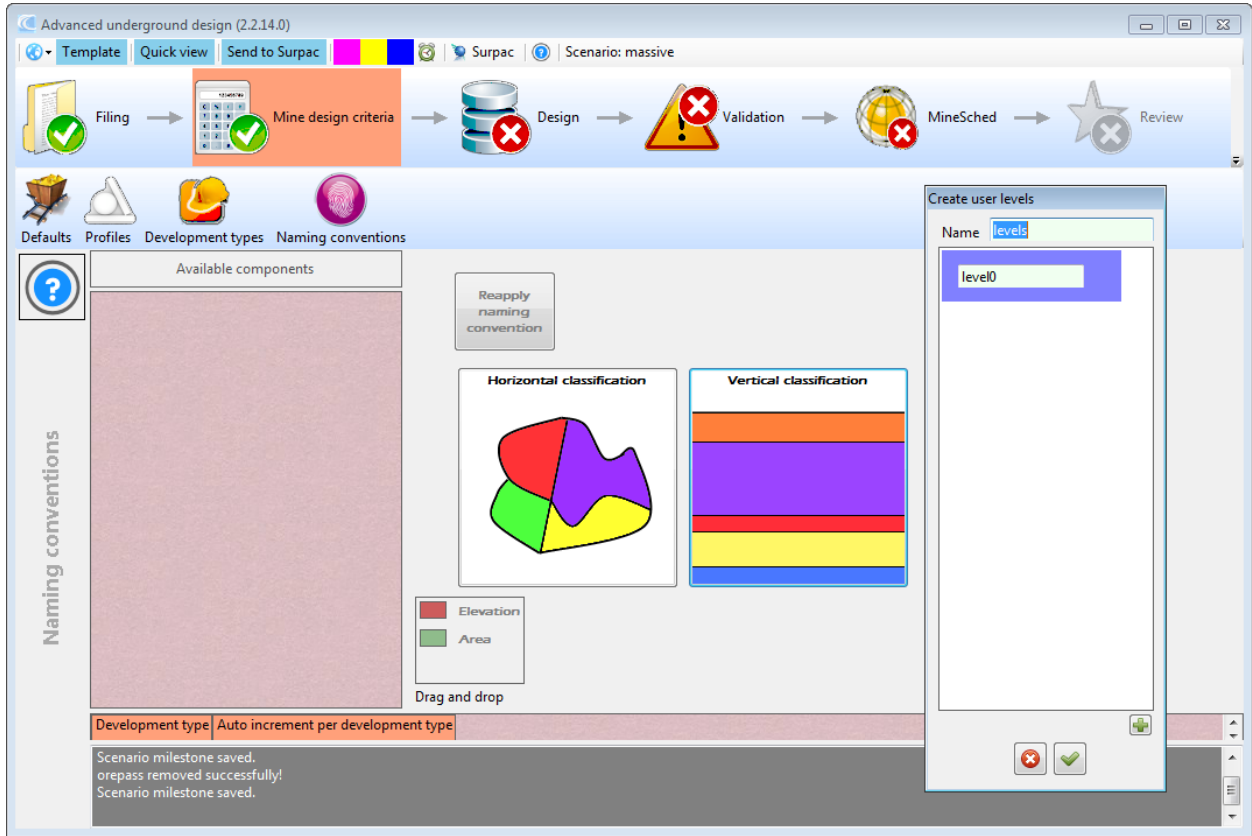
6. Click **Waste** and **Development**.



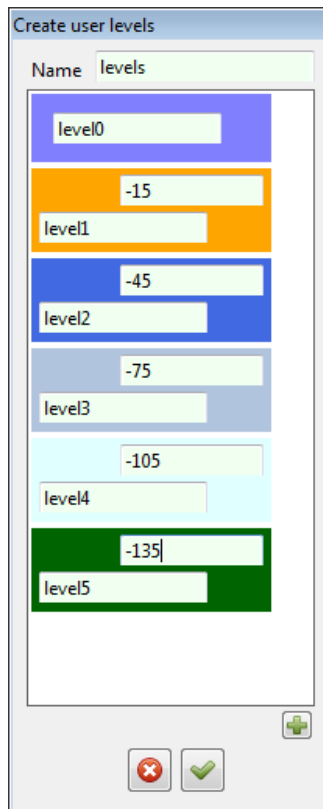
Massive_tutorial_3.upj

Setting up the Naming Conventions

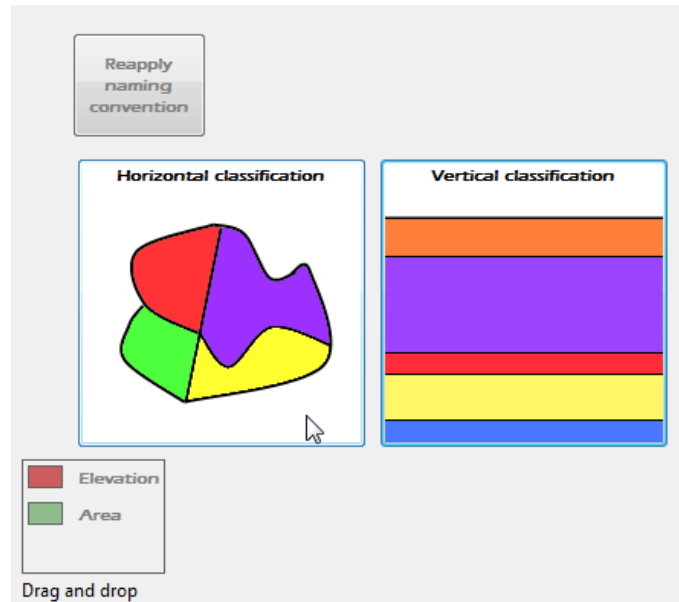
1. Select **Naming conventions**, and then click **Vertical classification** to create user levels.



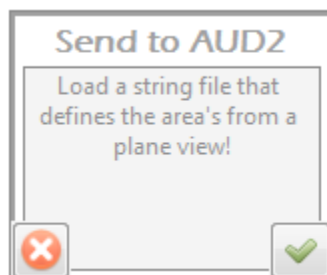
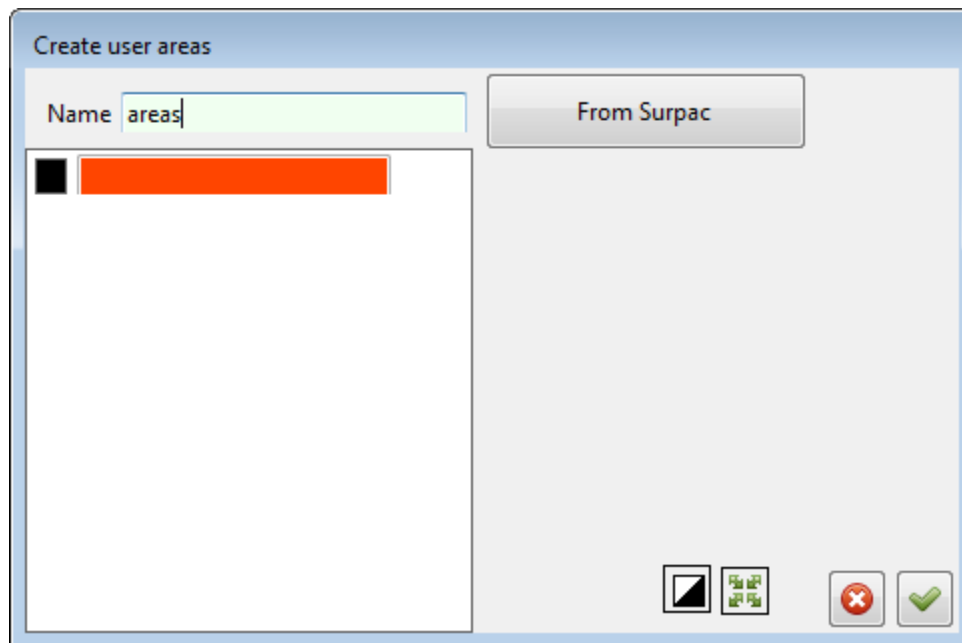
2. Create the user levels shown in the following image.
 - a. Click the green plus icon to add a new level.
 - b. Click the green check mark to save the changes when you have added all the levels.



- Click **Horizontal classification**.



- Change the name to **areas**, and click **From Surpac** to import the **area_definition.str** string from Surpac.

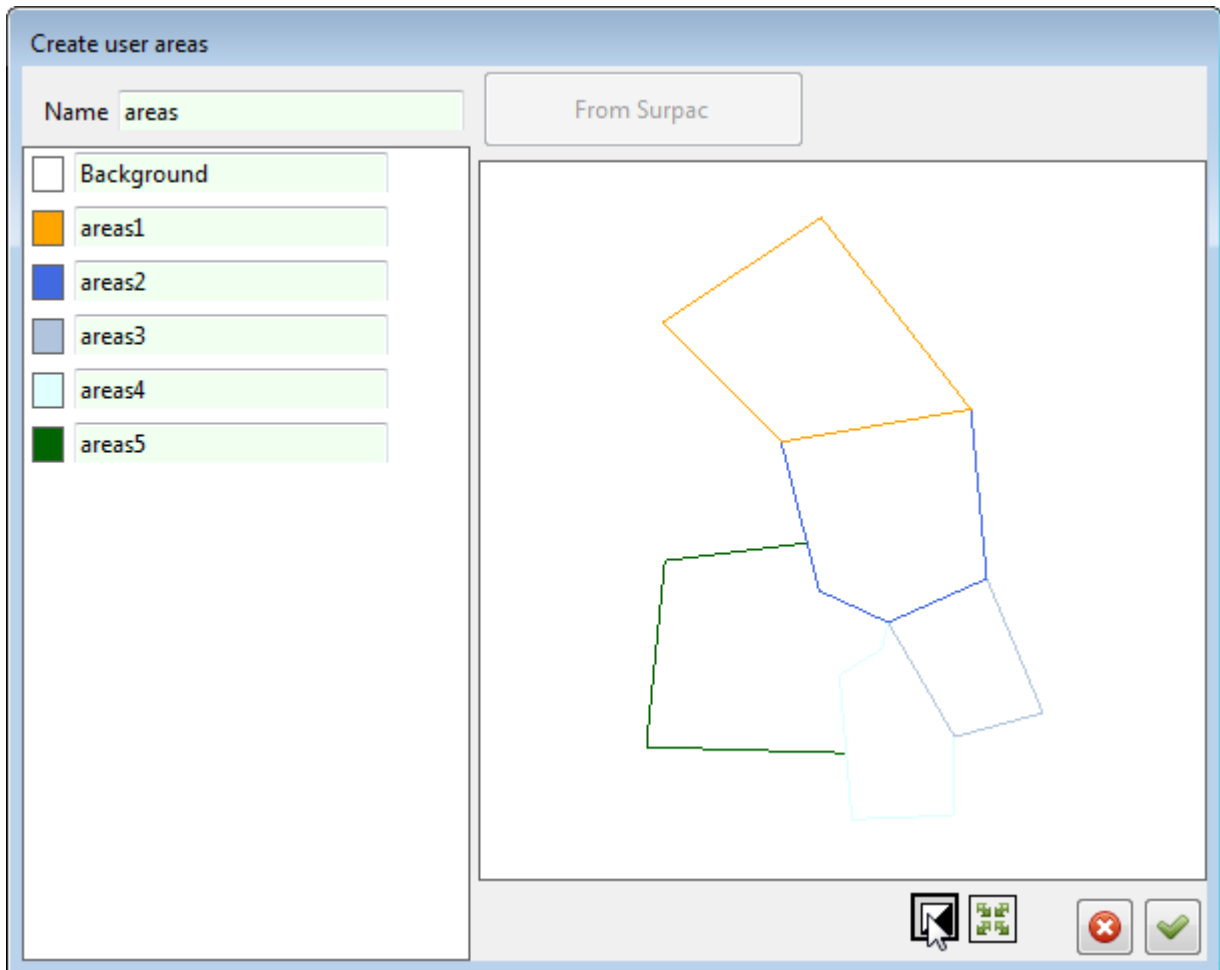


- In Surpac, open **area_definition.str**.
Area_definition.str is stored in the folder that contains the Massive data set.

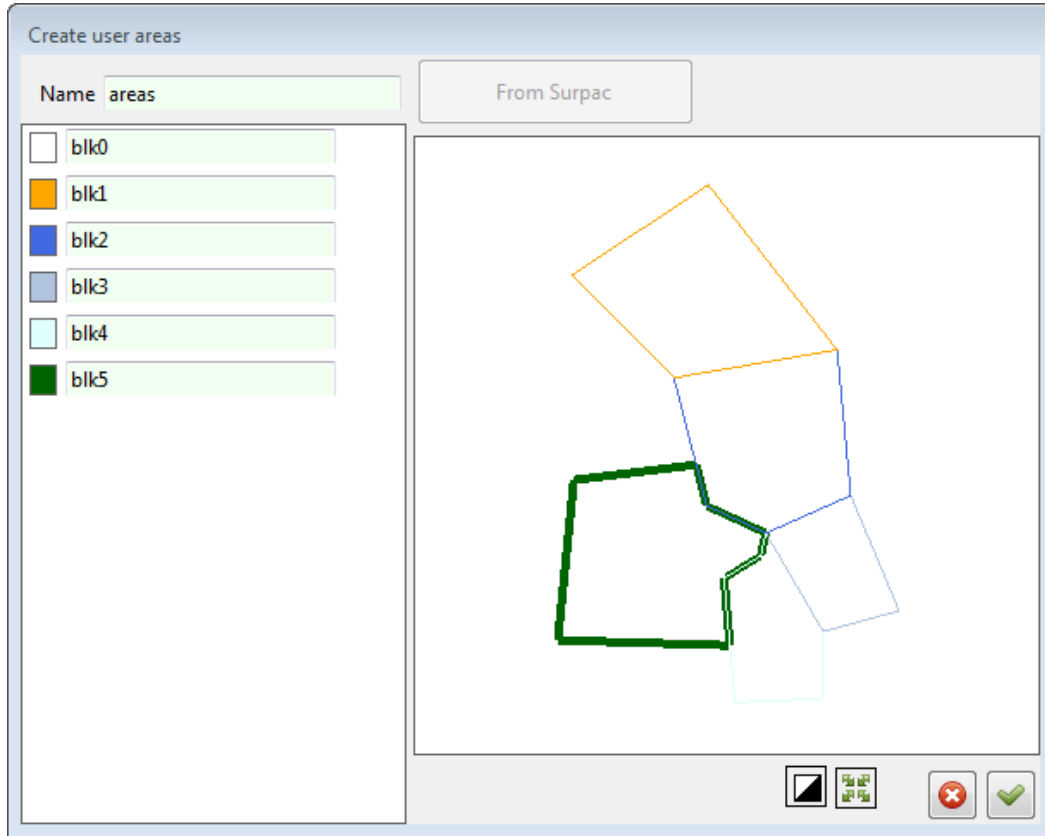
- Click the green check mark.

The string is displayed in the *Create user areas* window.

Tip: You can click the black and white icon to change from a black to a white background. You might do so if you have a black or white string that you want to view.



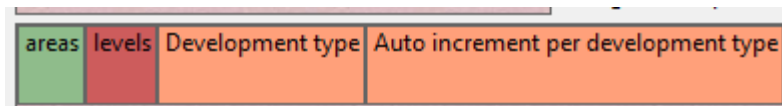
- Change the names of each area to **blk0**, **blk1**, **blk2**, **blk3**, **blk4**, and **blk5** respectively



8. Click the green check mark to save the changes.

Any current segment, any segments that are imported, designed manually or with automated tools later in the process are classified as one of **blk1** to **blk5**, depending on the X, Y coordinates of the first point of the segment. If the first point is outside all the closed polygons, the **blk0** background value is assigned.

9. If the naming convention order is different from the following illustration, drag nodes from the **Available Components** section to match, and click **Reapply naming convention** to set the new naming convention.

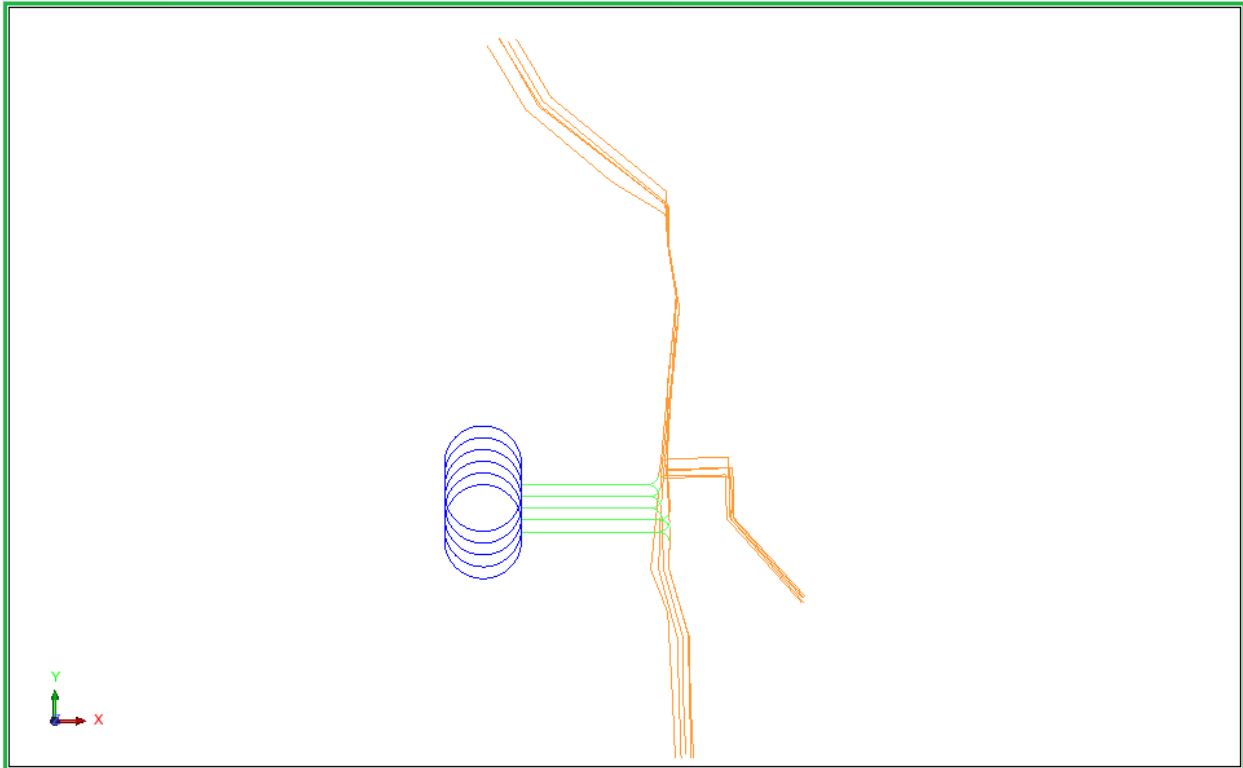


Massive_tutorial_4.upj

Setting up the Design

Adding a Start String from Surpac (Manual Design)

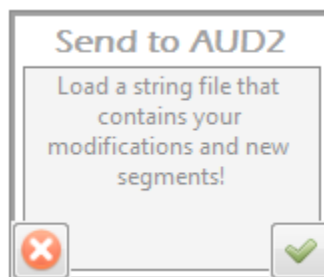
1. In Surpac, reset **Graphics**, and open the string file **sample_ramp2.str**.



2. In AUD, click **Design**.



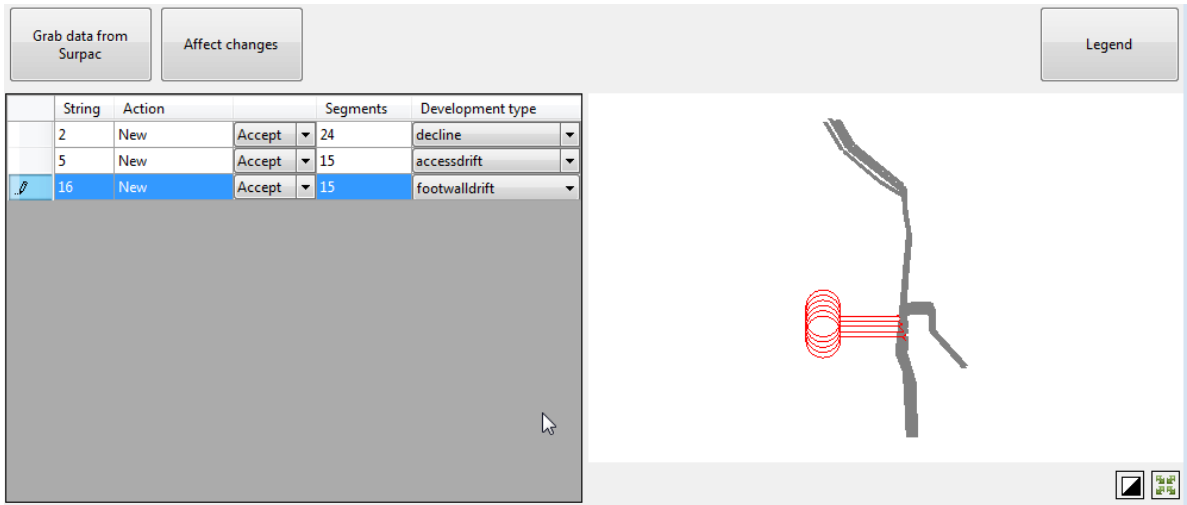
3. Select **Manual**, then click **Grab data from Surpac**.



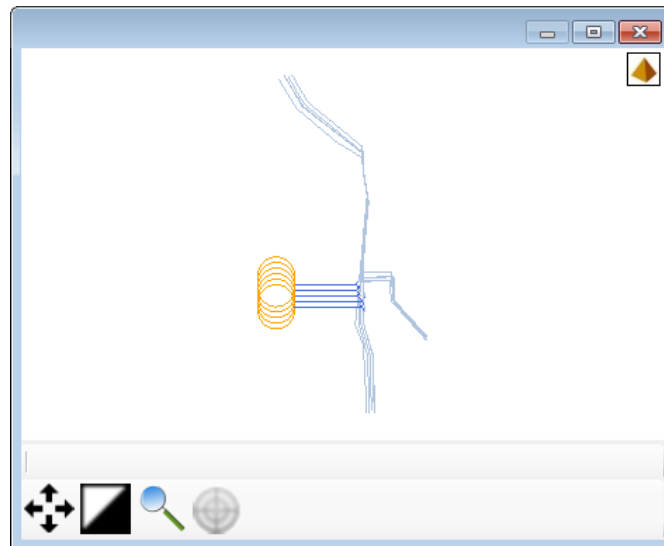
Note: You have already opened the string in Surpac.

4. Click the green tick in the **Send to AUD2** message.
The string is loaded to AUD.
5. Change the development types for this imported string as follows, and click **Affect changes**.

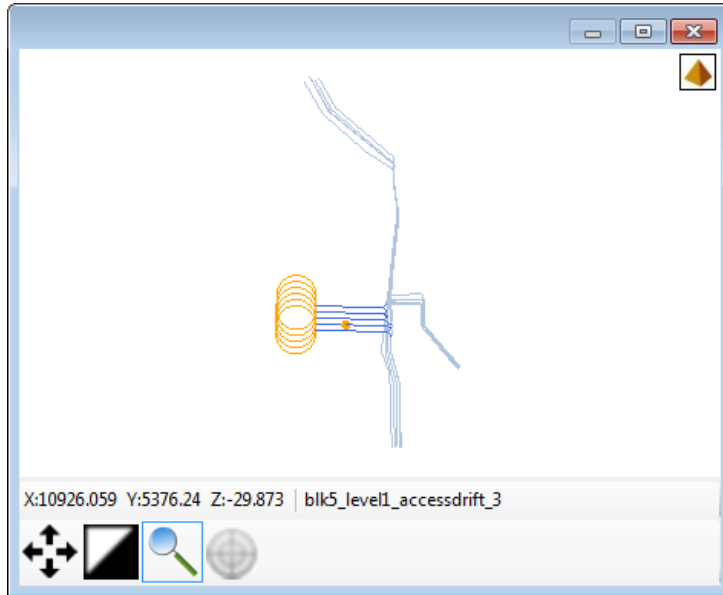
String	Development type
2	decline
5	accessdrift
16	footwalldrift



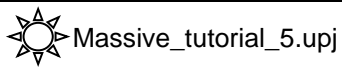
6. After processing is completed, click **Quick view** to display your design.



7. Click the magnifying glass icon and click on several of the segments to see the naming convention that has been applied.



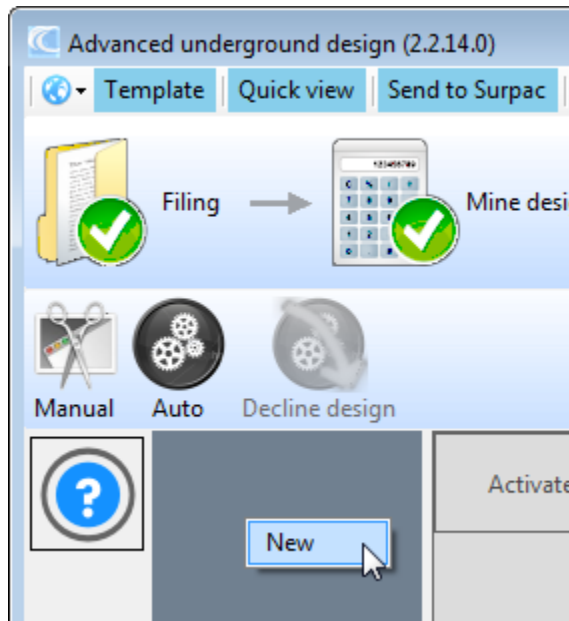
The action of using the magnifying glass icon is called 'querying' the design.

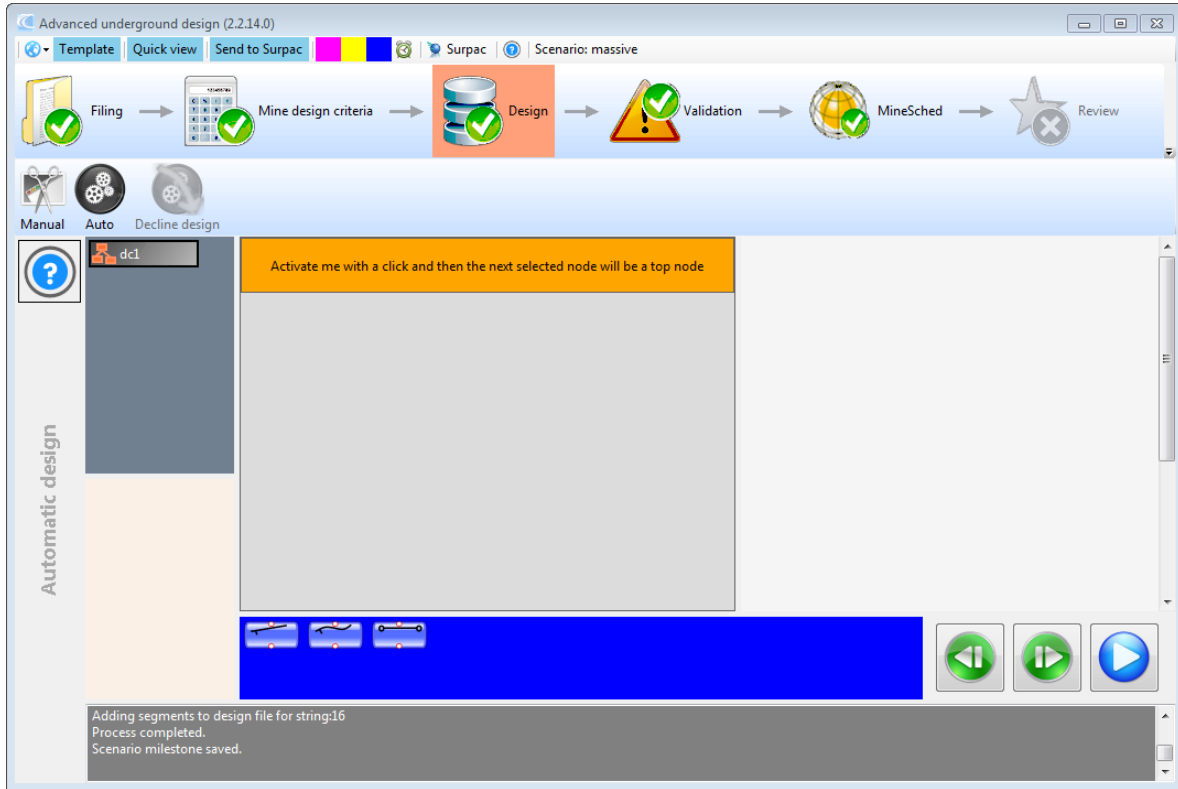


Adding to your design (Automatic Design)

Design charts consist of one or more nodes that each describe a design logic that has to be applied to your design at that stage. You can draw segments, curves or connect a range of segments.

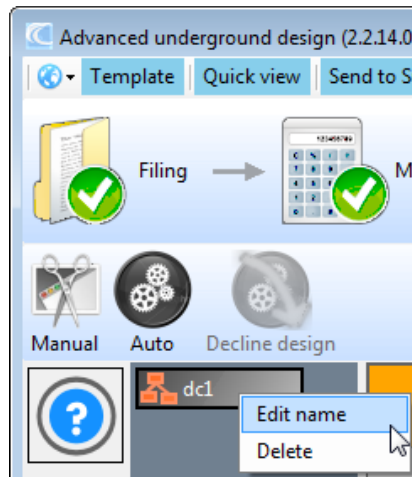
1. Click **Auto** to start designing charts.
2. Right-click in the grey area on the left, and click **New**.



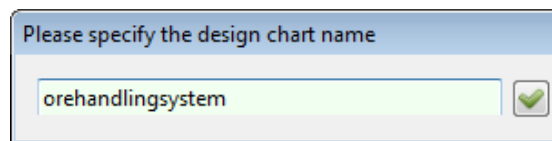


First you will design the ore-handling system. This includes drawpoints from the access drives and ore passes that connect the drawpoints.

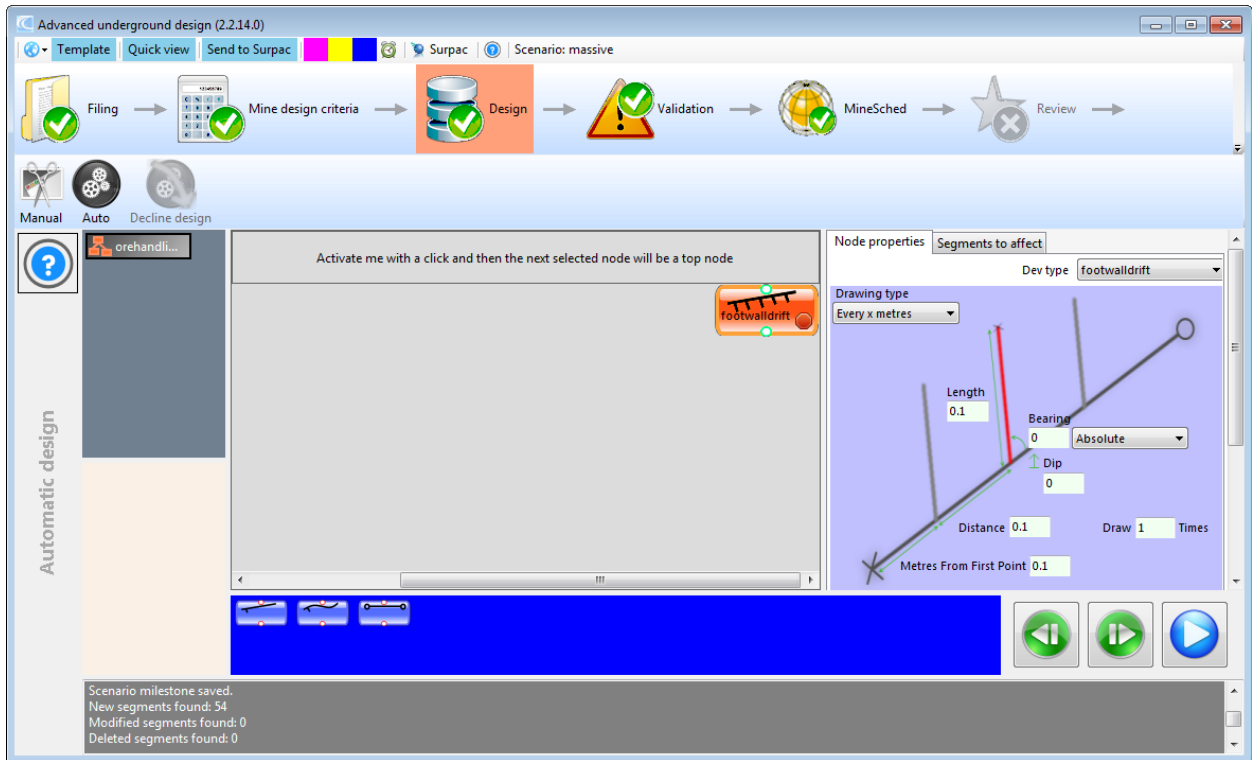
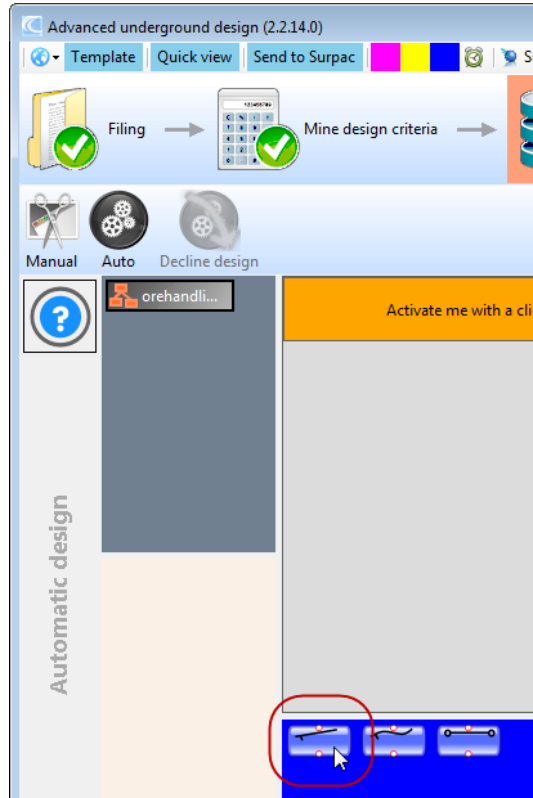
3. Right-click the chart name, and select **Edit name**.



4. Rename the chart to **orehandlingsystem**.

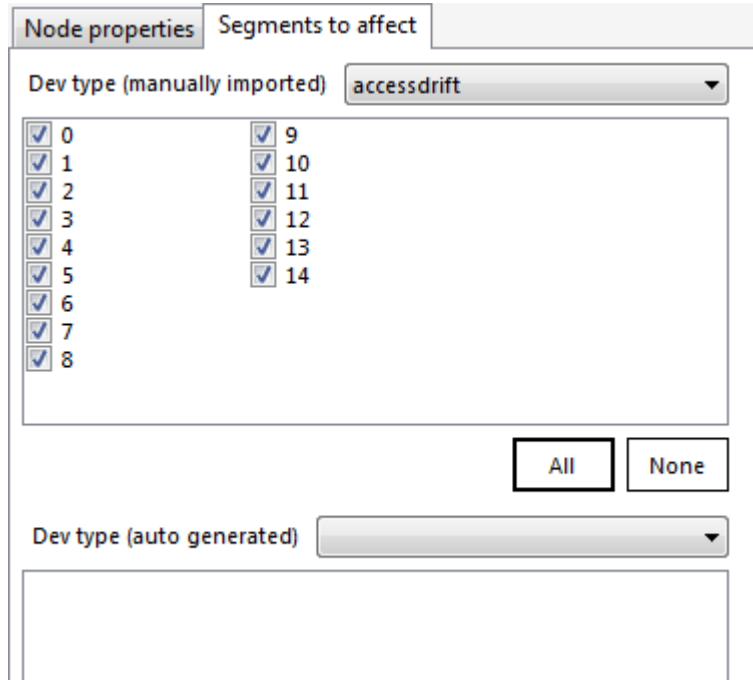


5. Click the **Activate me ...** bar to make it orange.
The next node you add will be a top node.
6. Click the **draw line** node at the bottom to add a 'draw line' node.

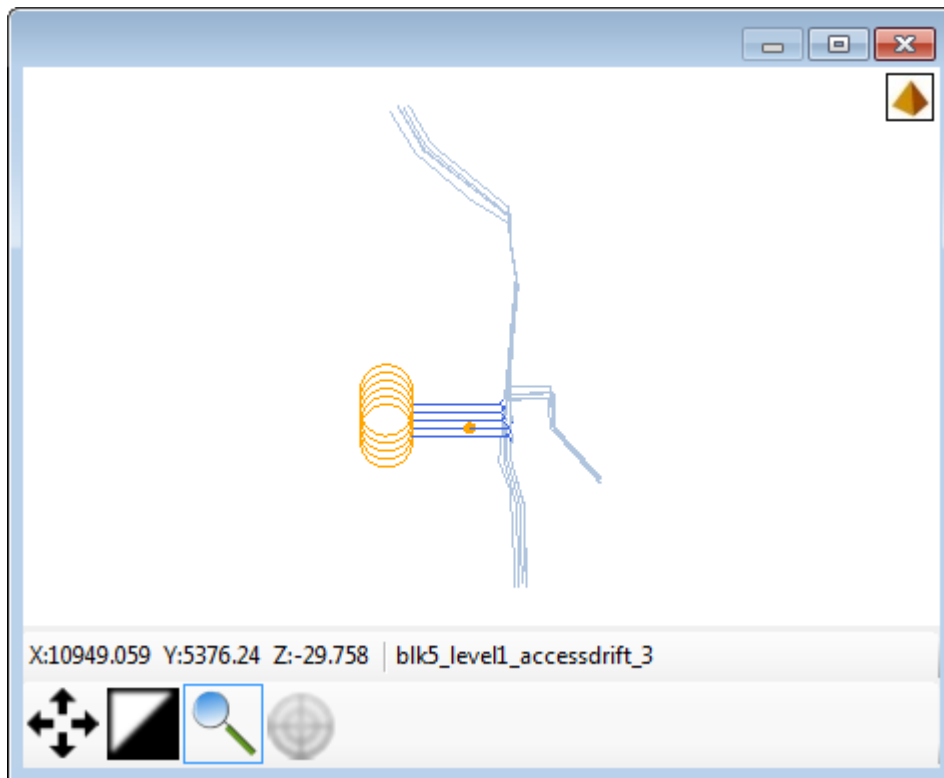


Because this is a top node, you should state which segments, in the current design, this design action will affect.

7. Click the **Segments to affect** tab on the right.
8. In the drop-down list, select **accessdrift**.



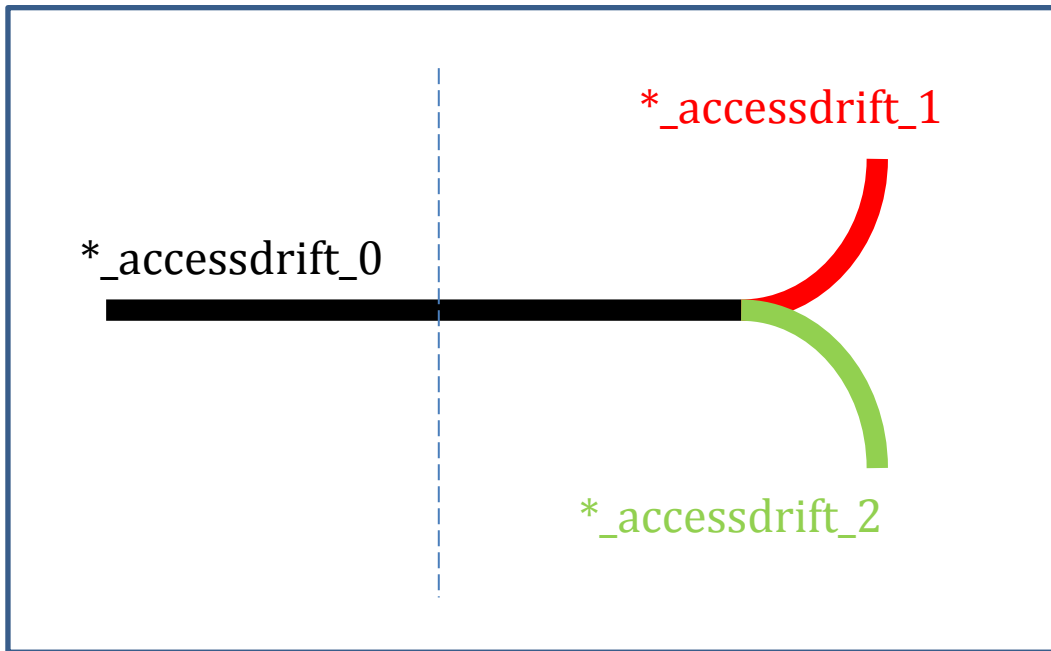
9. Click **All**.
This design action will apply to all segments that are designed as access drifts.
10. Click **Quick view** and query your design to make sure you understand which elements are classified as access drifts.



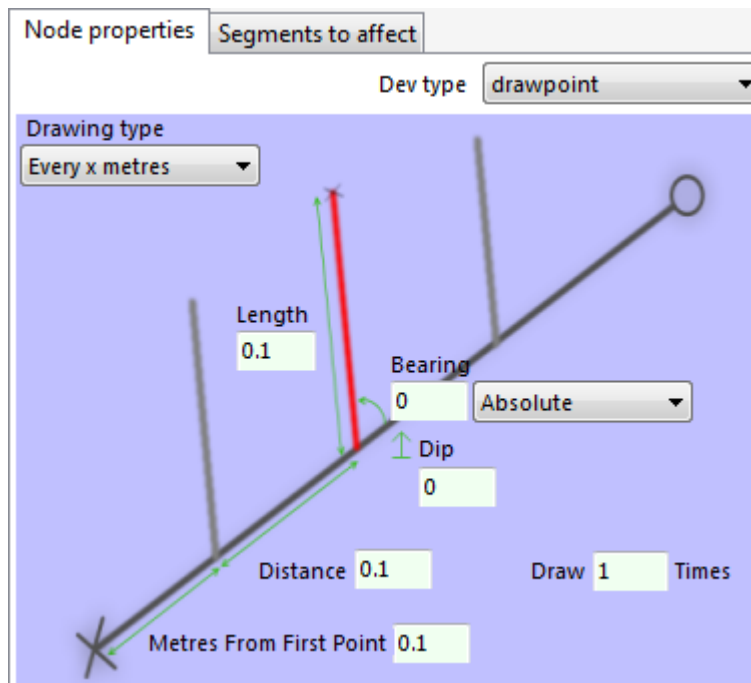
There are 15 access drifts and 3 per level.

The following image shows the access drifts for level 0. Three access drifts were designed manually in this tutorial to allow for the turning radius into the footwall drifts. The dotted line indicates the grid intersection points where these draw points are to be designed. It is not important

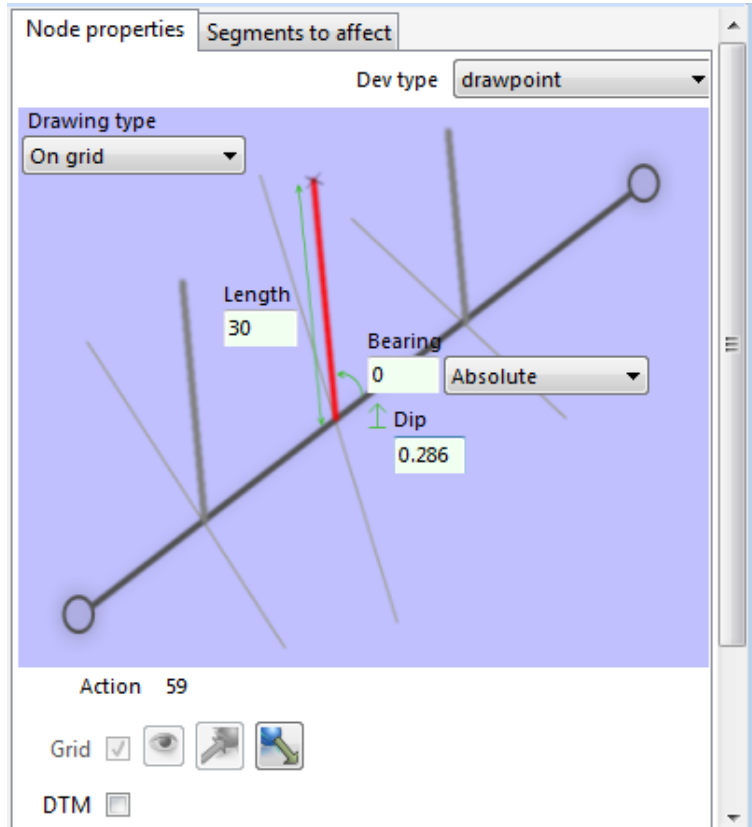
that you specify all the 'access drifts' in this case because only the access drifts that intersect the grid line would be affected. For this project, you would check the boxes for accessdrifts; 0,3,6,9,12.



11. Close the **Quick view** window.
12. Select the **Node properties** tab.
13. In the **Dev type** list, select **drawpoint**.

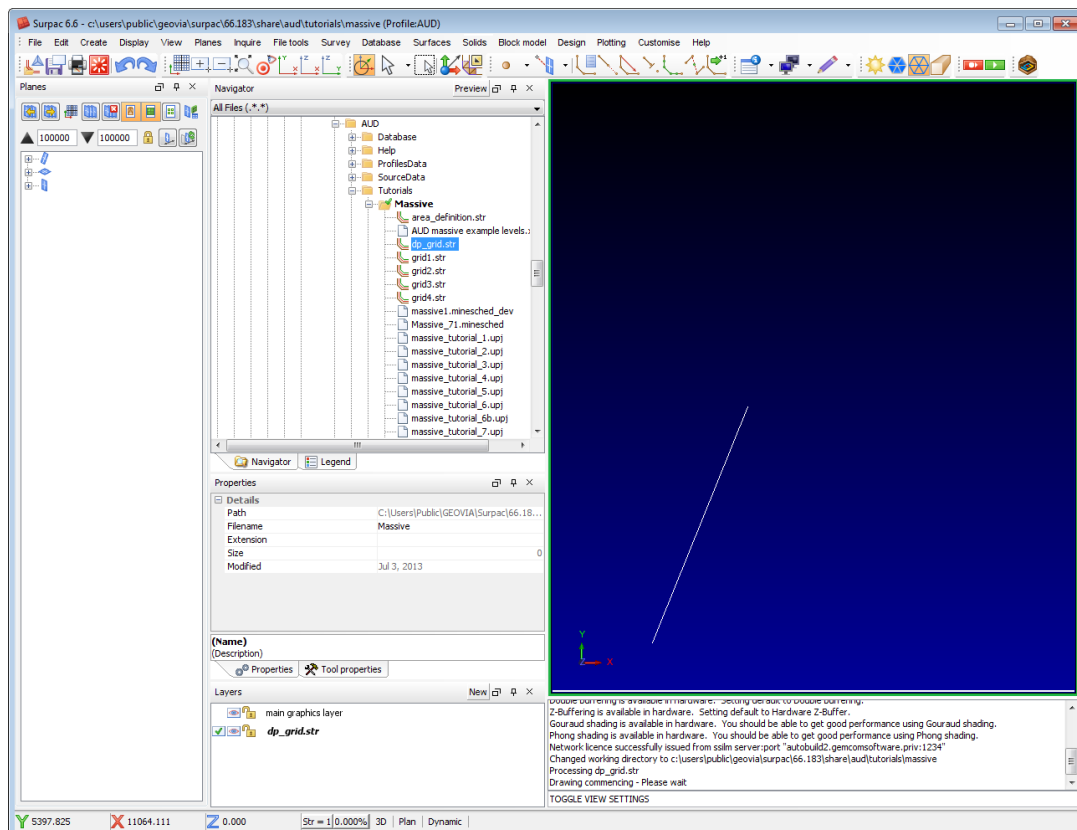


14. In the **Drawing type** list, select **On grid**.
15. Change the **Length** to **30**, and change the **Dip** to **0.286**.

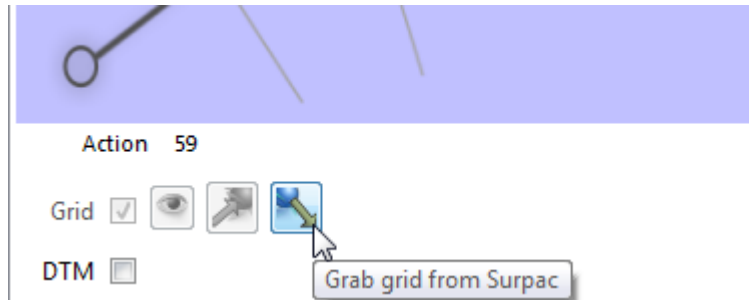



Draw points will be created on intersections of the **dp_grid.str** and any accessdrift. Draw points are created in a northern direction at a gradient of 1:200 and a length of 30m.

- In Surpac, open **dp_grid.str**.



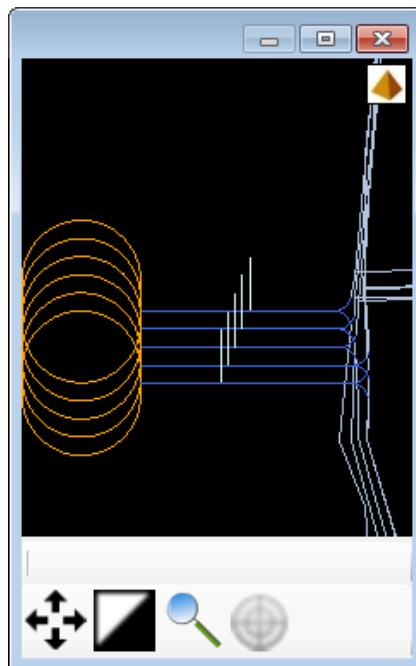
17. In AUD, click **Grab grid from Surpac** .



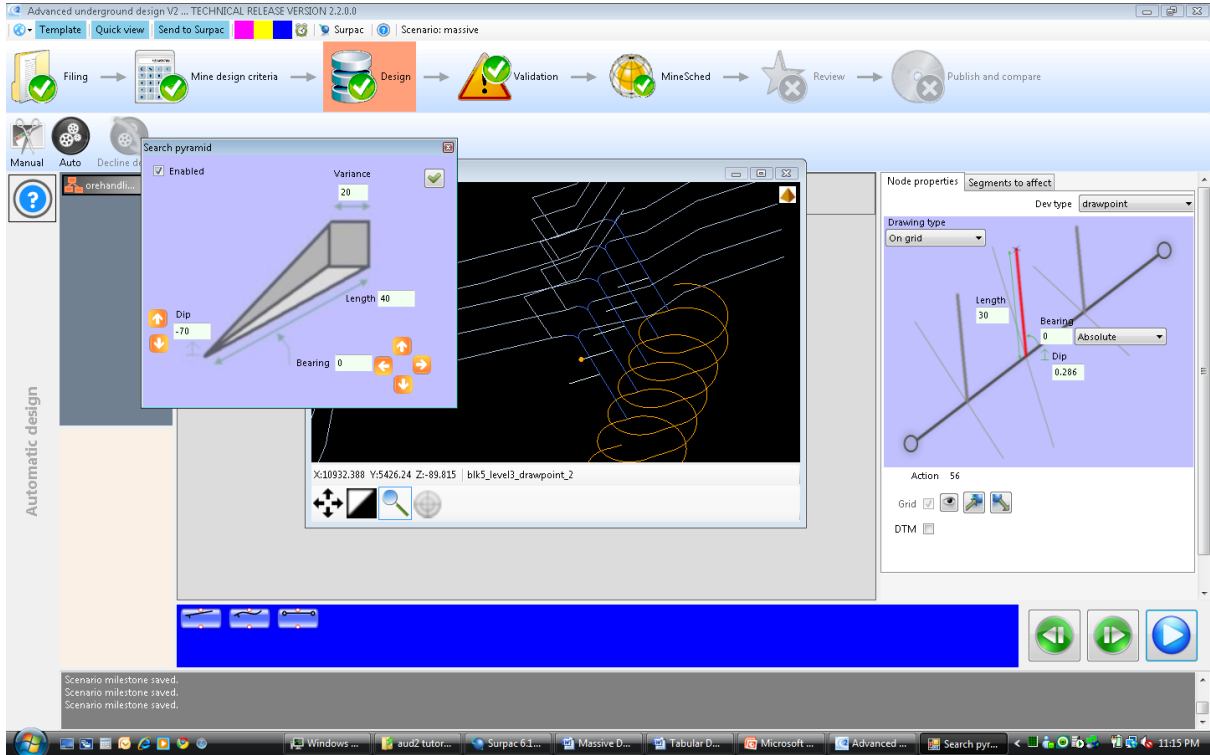
18. Click the green check mark.
19. Click **Preview the stored grid**  to view the file loaded from Surpac.
20. Close the preview.
21. Click the blue **Execute the current flowchart** button.



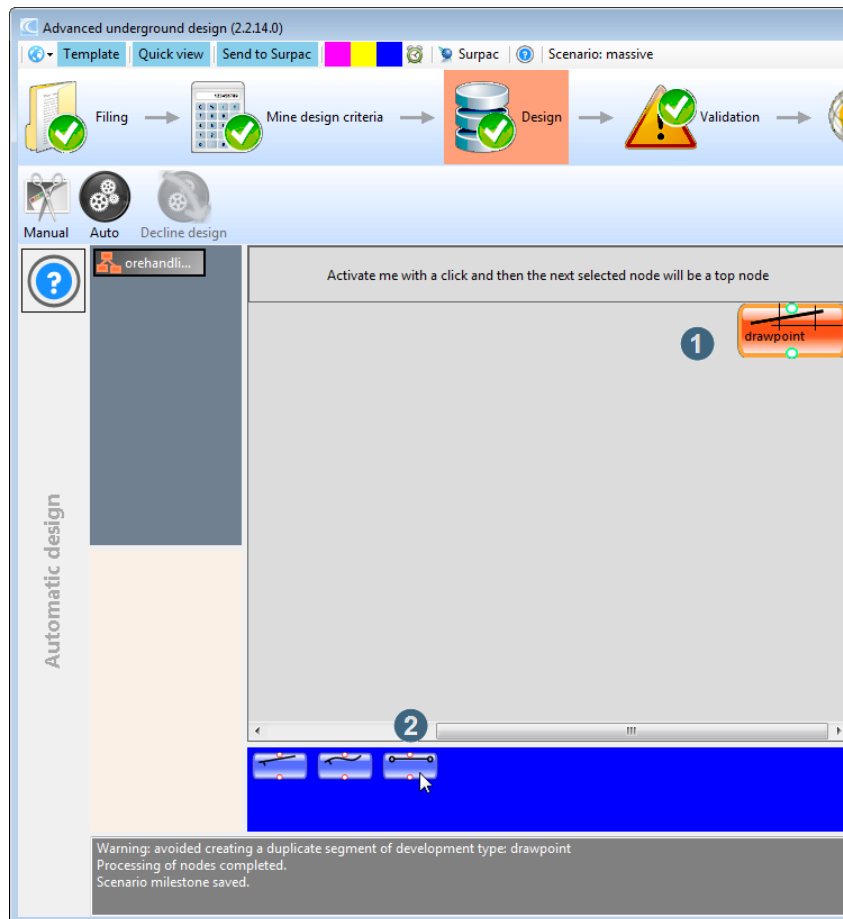
22. Click **Quick view** to see the five drawpoints.



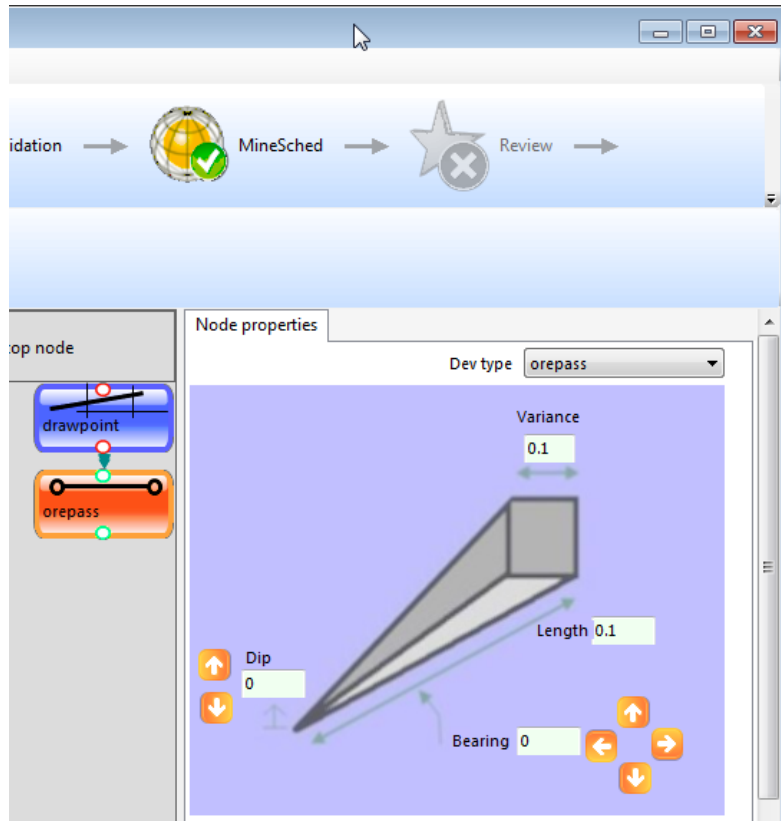
Next you will design the ore passes using the connect function, where you connect the ends on the drawpoints with each other. The connect function defines a search pyramid and will connect the ends of drawpoints with each other if the apex of the cone is at the 'from' development type and the 'to' development type is within the space of the search pyramid.



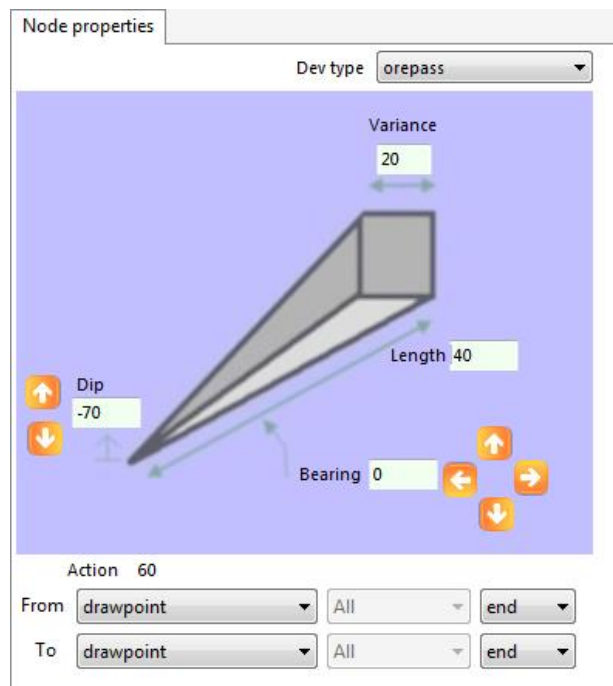
23. Close the **Quick view** window.
24. Click the **drawpoint** node to indicate that the 'connect' is applied after the drawpoint.
25. Click the **connect** node at the bottom of the AUD window.



26. In the **Dev type** list, select **orepass**.



27. In the search pyramid parameters, type **Variance: 20**, **Length: 40**, **Dip: -70**, and **Bearing: 0**.



28. Make sure that the **Node properties** are set to connect from **drawpoint** end to drawpoint **end**.

29. Click **Undo a flowchart execution** to return your design to the state it was in before any drawpoints were designed.

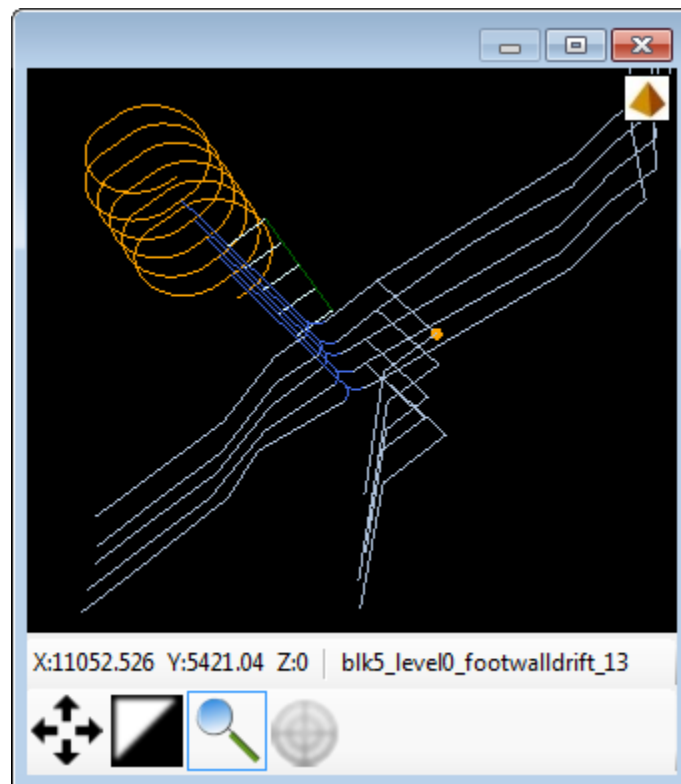


30. Click **Execute the current flow chart**.

A temporary view is displayed for a moment, which shows each of the drawpoints and ore passes you are designing.

31. Click **Quick view** to see the design additions.

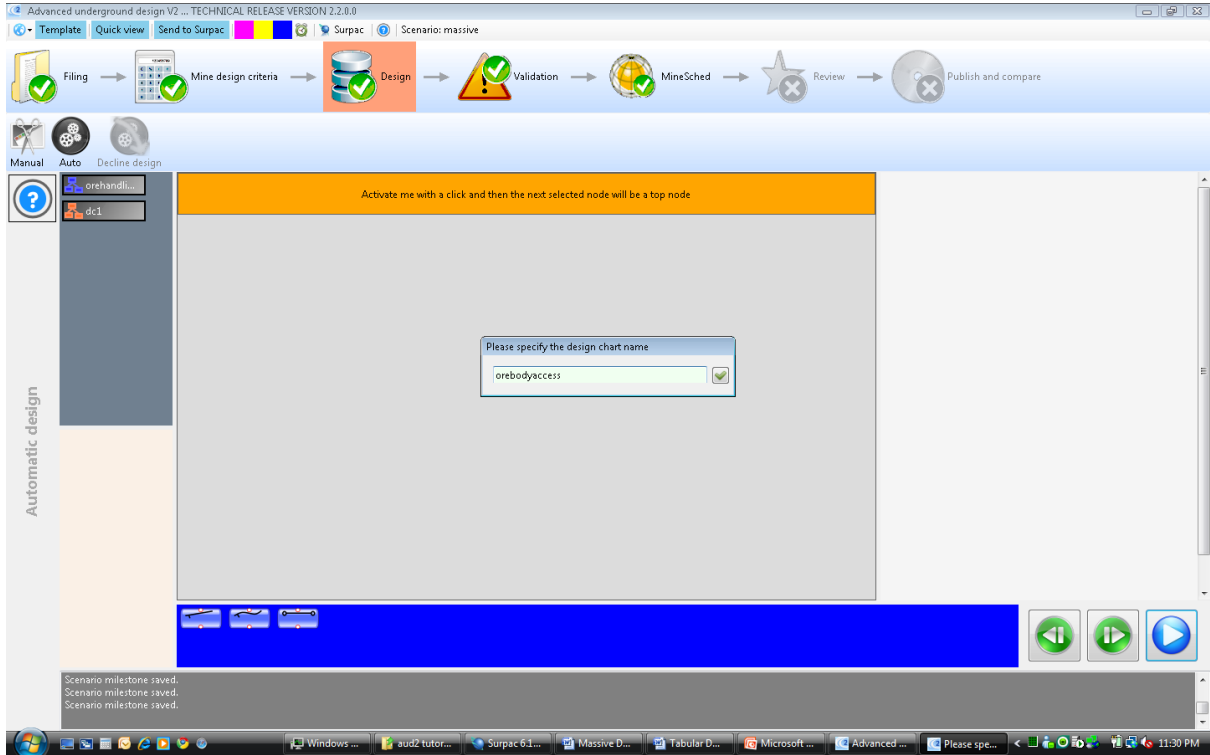
The four ore passes have been created.



Massive_tutorial_6.upj

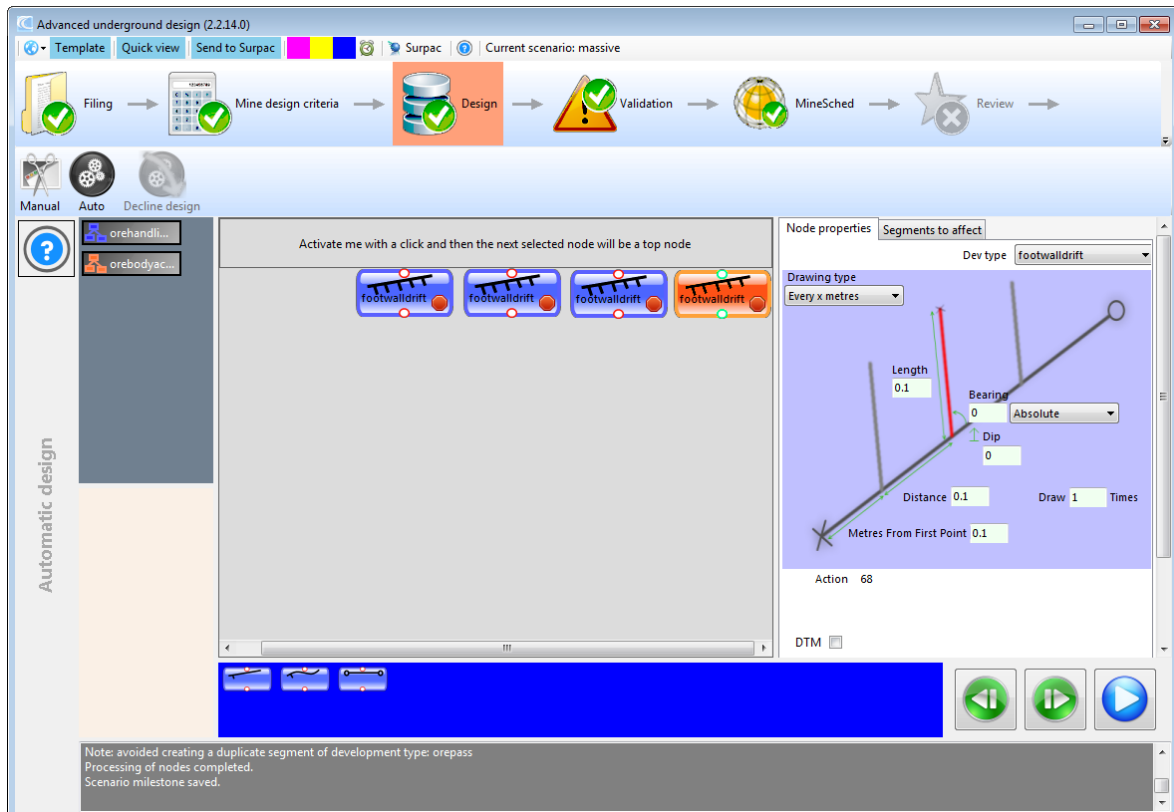
Creating orebodyaccess design chart

1. Create a new design chart, and call it **orebodyaccess**.



Next you will add several 4 draw 'line nodes' where you would design 'ore drifts' up to 5m past the solid ore body.

2. Click the 'Activate me...' bar to indicate a top node.
3. Click the **Draw line** node at the bottom.
4. Click the top tab to indicate another top node and click on the **Draw line** node at the bottom.
5. Create four of these nodes as shown in the following image.

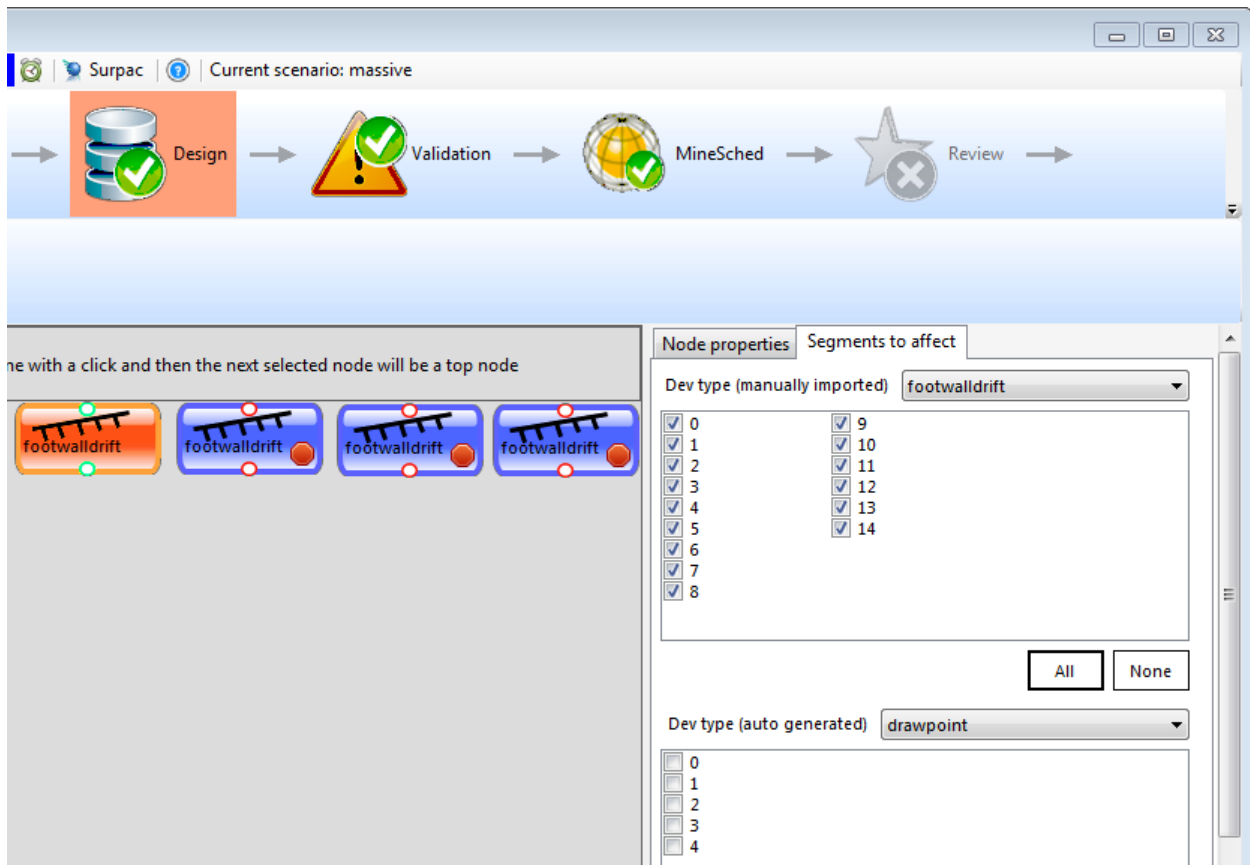


You will now specify several 4 'ore drifts', each with a different absolute bearing, grid reference string file, and DTM intersection ore body file as shown in the following table:

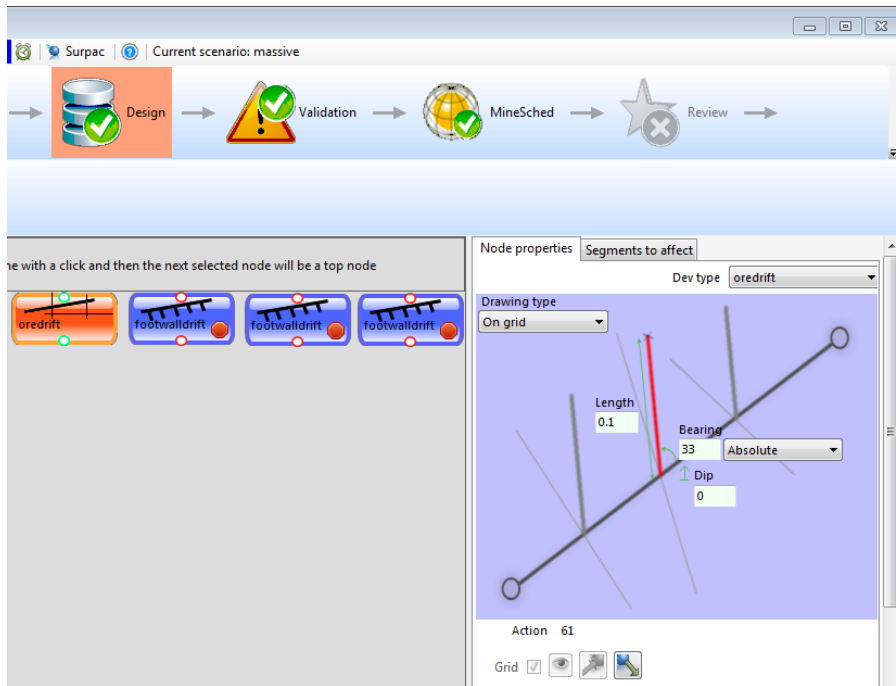
NODE	BEARING	BLK NUMBER	GRID FILE	ORE BODY FILE
1	33	1	grid1.str	ore_body1.dtm
2	90	2	grid2.str	ore_body2.dtm
3	48	3	grid3.str	ore_body3.dtm
4	86	4	grid4.str	ore_body4.dtm

6. Select the first created node.
7. Select the **Segments to affect** tab.
8. Click the **Dev types** list, select **footwalldrif**, and then click **All**.

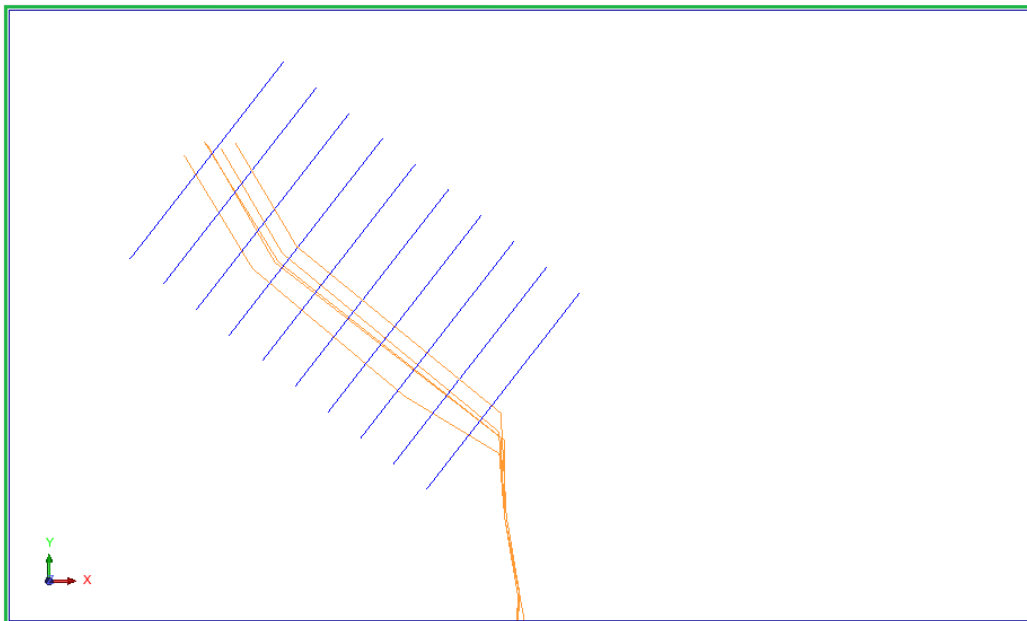
You can select all the footwall drifts because ore drifts will only be designed where the grid files intersect the footwall drifts.



9. Select **Node properties**.
10. Click the **Dev type** list, and select **oredrift**.
11. Change **Drawing type** to **On grid**, and **absolute bearing** to **33**.

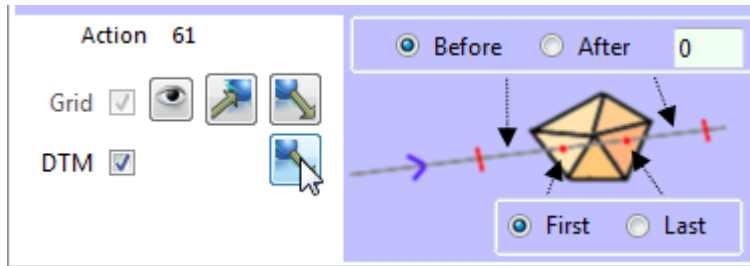


12. Click **Grab grid from Surpac** .
13. In Surpac, open the string grid file for block 1, **grid1.str..**

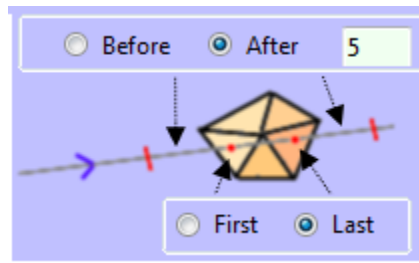


14. Click the green check mark.
Next you will specify that you need a solid intersection 5m past the last intersection. This is to ensure that the ore drift has been developed until a full waste intersection has been found through the ore body.

15. Select **DTM**.



16. Select **After**, and type **5** into the field to the right.



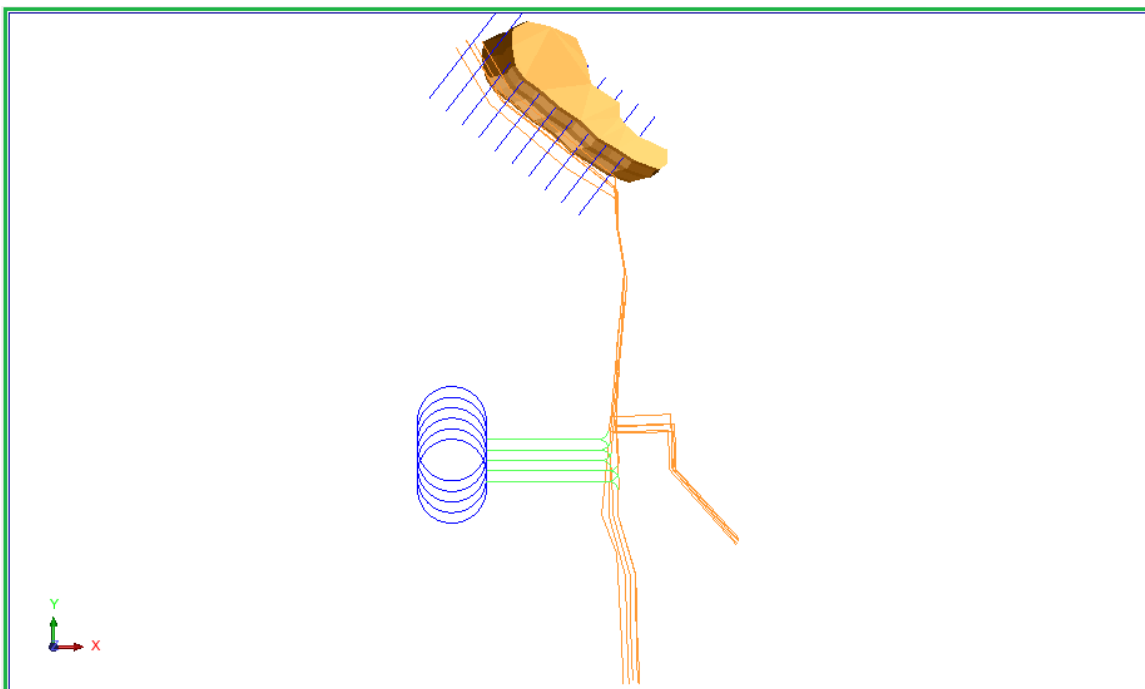
17. Select **Last**.

18. Click **Grab dtm from Surpac** .

Next you will specify the DTM to intersect with.

19. In Surpac, open **ore_body1.dtm**.

20. Click the green check mark.



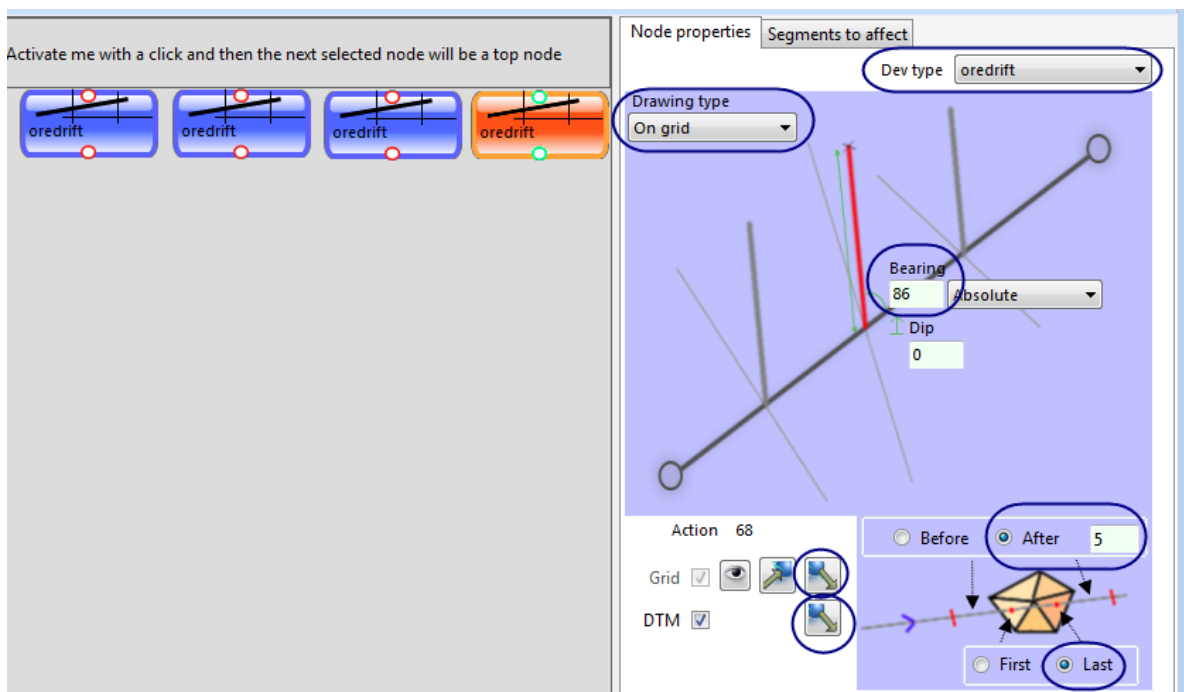
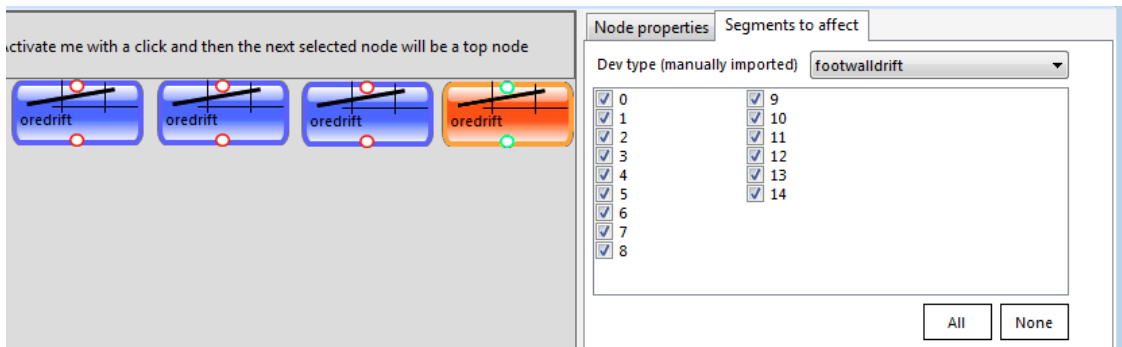
21. Now fill the other three nodes with values. For each node:

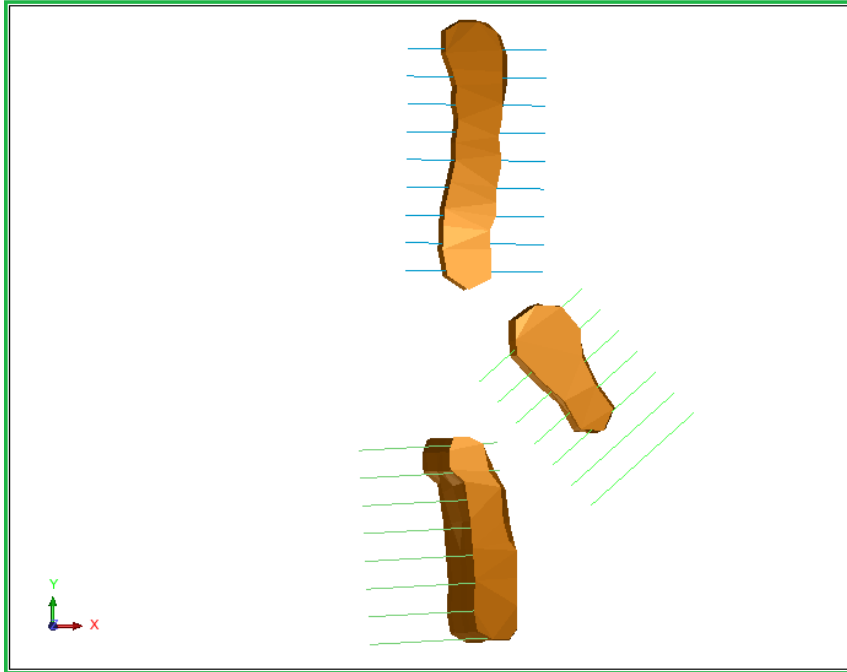
- a. Select the node.
- b. Click **Node properties**.
- c. Click the **Dev type** list, and select **oredrift**.
- d. Click **Segments to affect**.
- e. Click the **Dev type** list, and select **footwalldrft**.


- f. Click **All**
- g. Select **Node properties**.
- h. Click the **Drawing type** list, and select **On grid**.
- i. In the **Bearing** field, type the value given in the following table.
- j. Click **Grab grid from Surpac**.
- k. In Surpac, open the grid file given in the following table.
- l. In AUD, select the green check mark.
- m. Select **DTM**.
- n. Select **After**, and type **5** in the field to the right.
- o. Select **Last**.
- p. Click **Grab dtm from Surpac**.
- q. In Surpac, open the dtm file given in the following table.
- r. Click the green check mark.

The following table shows the parameters for the 2nd, 3rd, and 4th node.

NODE	BEARING	BLK NUMBER	GRID FILE	ORE BODY FILE
2	90	2	grid2.str	ore_body2.dtm
3	48	3	grid3.str	ore_body3.dtm
4	86	4	grid4.str	ore_body4.dtm

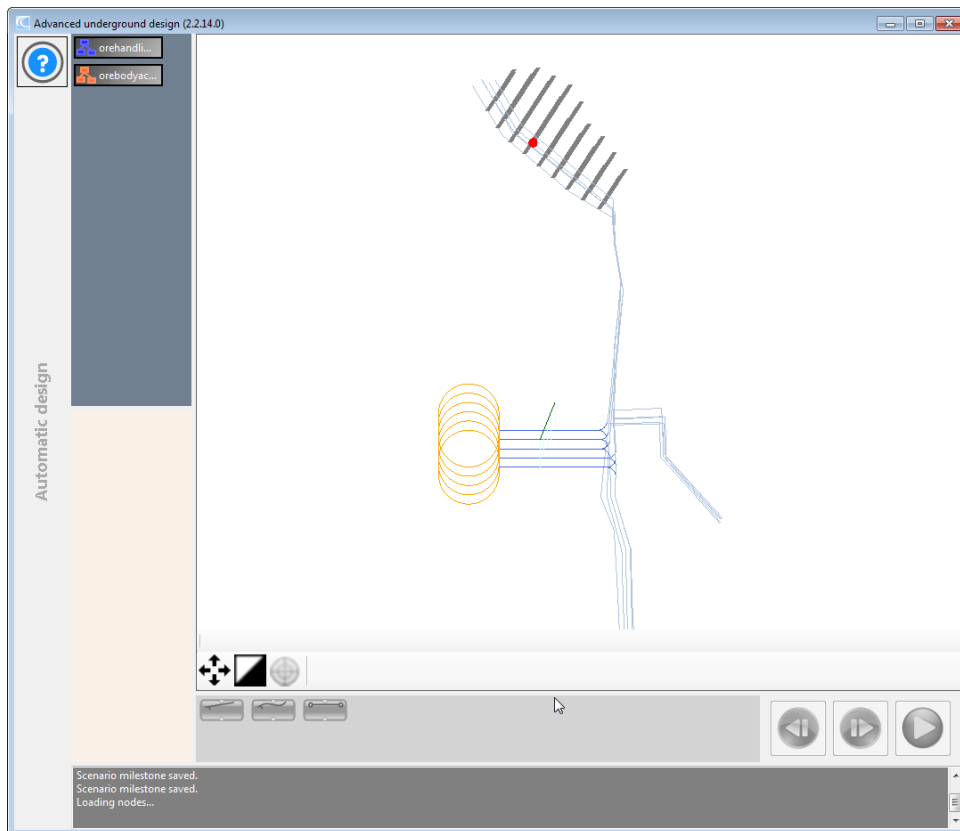





 Massive_tutorial_6b.upj

22. Click **Execute the current flow chart.**

The design is displayed, each design action is implemented sequentially, and then the main AUD window is made active again.



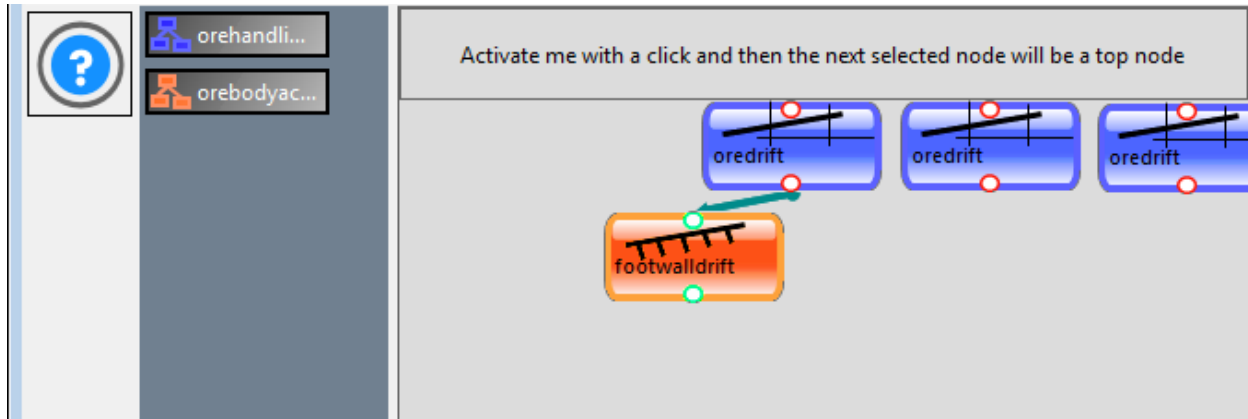
 Massive_tutorial_7.upj

Designing the open stopes

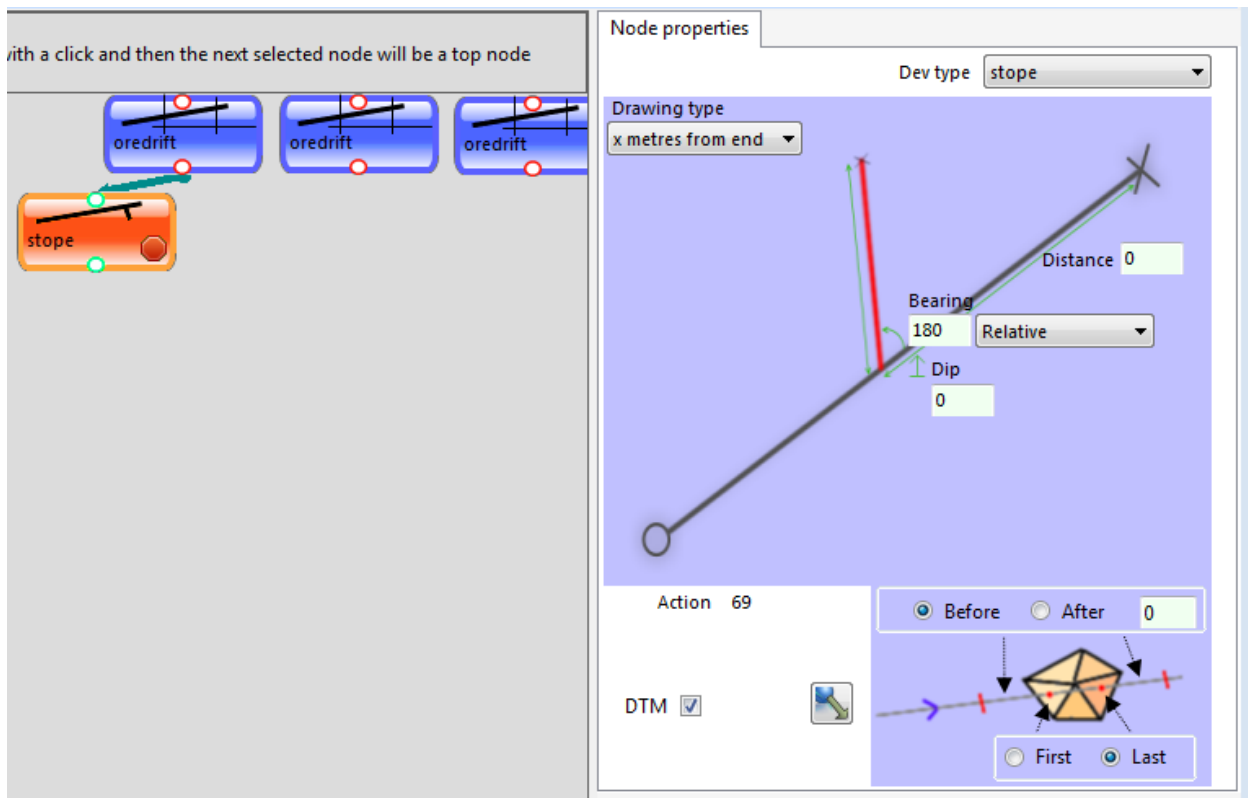
Next you will design the open stopes from the end of the ore drifts back to the last ore body intersection.

1. Select the first **oredrift** node.
2. Click on the **Draw line node** at the bottom.

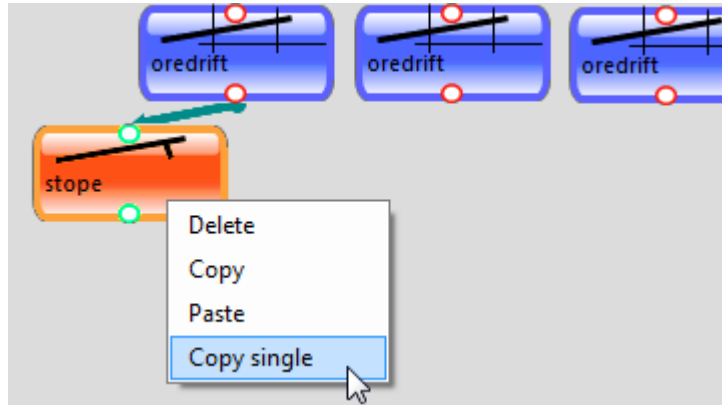
The new node appears below the first oredrift.



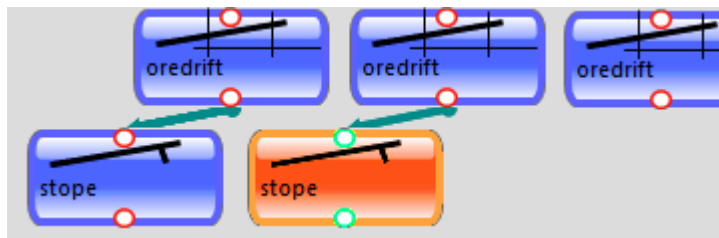
3. Change **Dev type**, **Drawing type**, **Distance**, **Bearing**, **bearing type**, and **Dip**, as shown in the following image, select the **DTM** check box, and select **Last**.



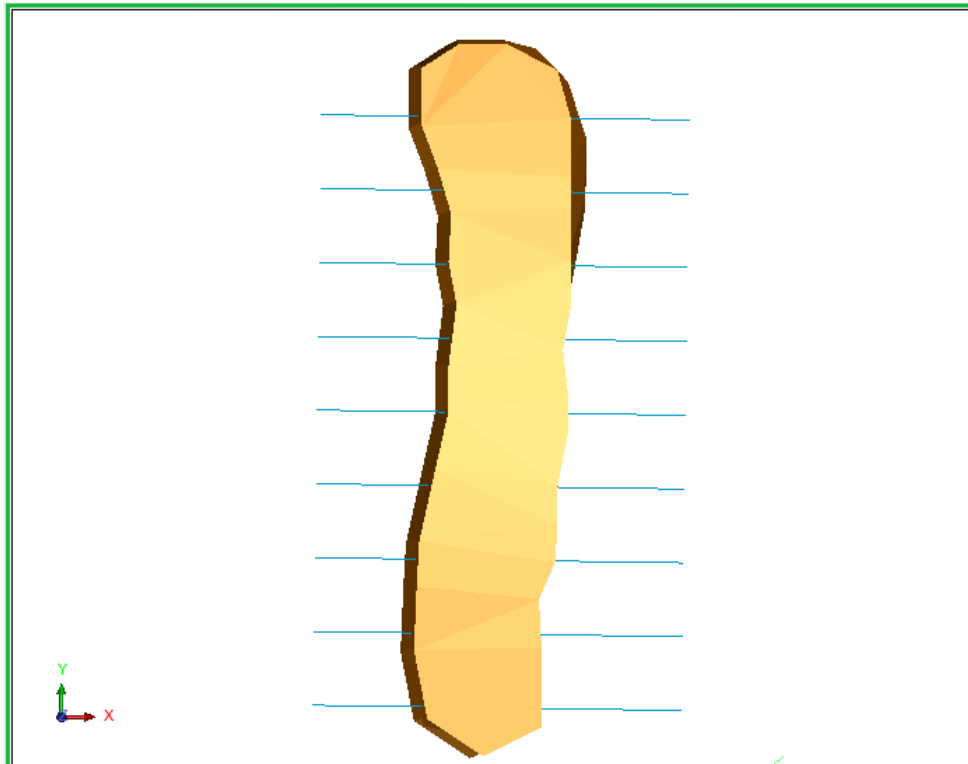
4. Click **Grab dtm from Surpac**.
5. In Surpac, open **ore_body1.dtm**.
 - Note:** Make sure the bearing is **Relative**.
6. Right-click on the **stope** node, and select **Copy single**.



7. Click on the second ore drift node, right-click, and paste.



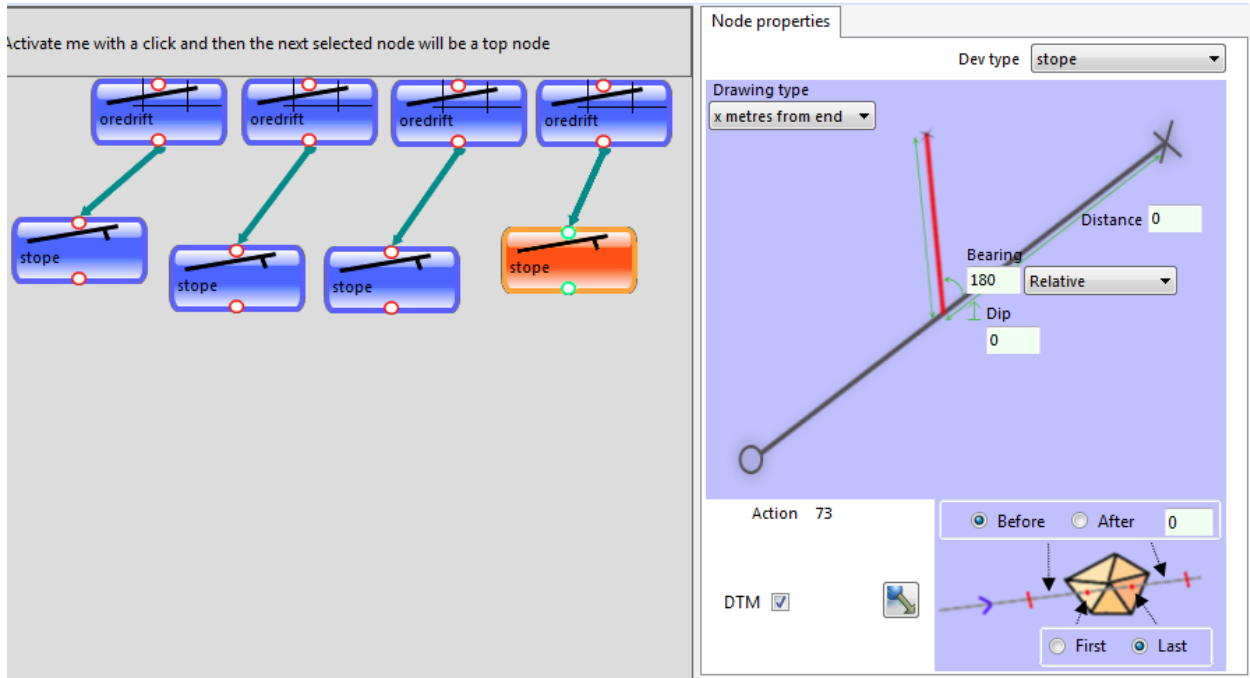
8. Click **Grab dtm from Surpac**.
9. In Surpac, open **ore_body2.dtm**.



10. Paste stopes to the two remaining **oredrift** nodes, click **Grab dtm from Surpac**, and, in Surpac, open **ore_body3.dtm** and **ore_body4.dtm** respectively.

If you do not change the DTM for the nodes, no intersections will be found.

Your design chart should now appear as shown in the following image.




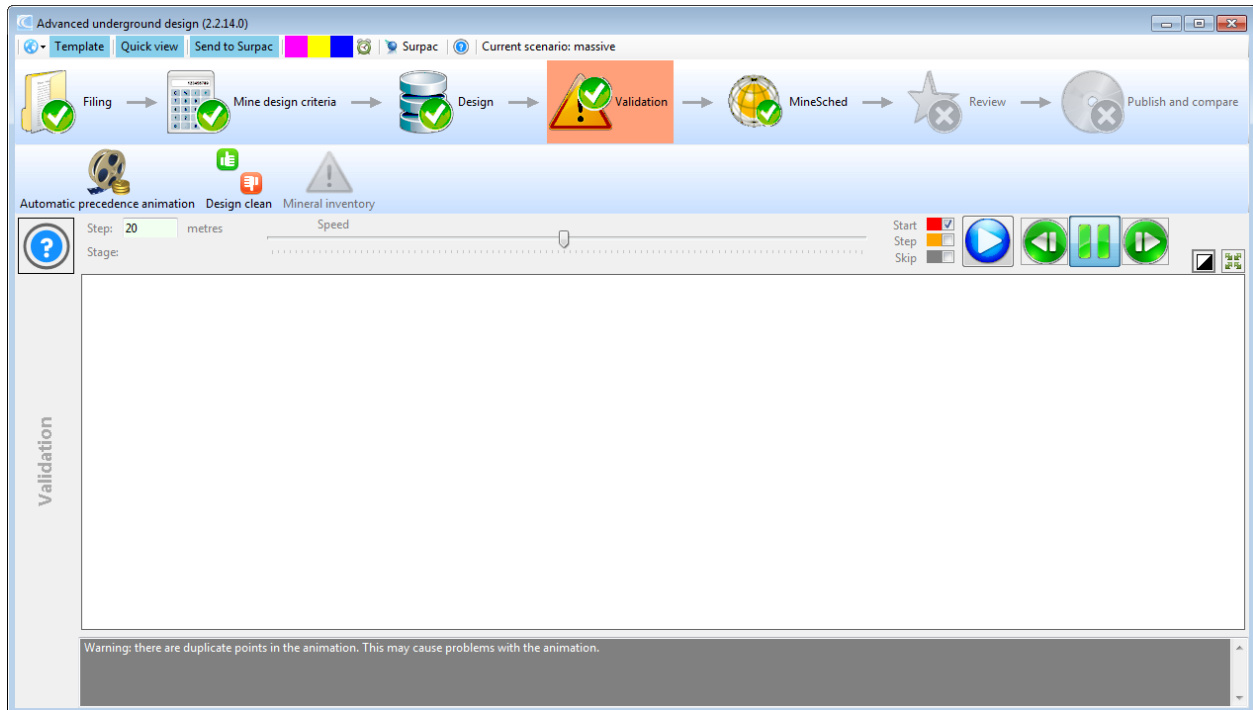
11. Click **Execute the current flowchart.**



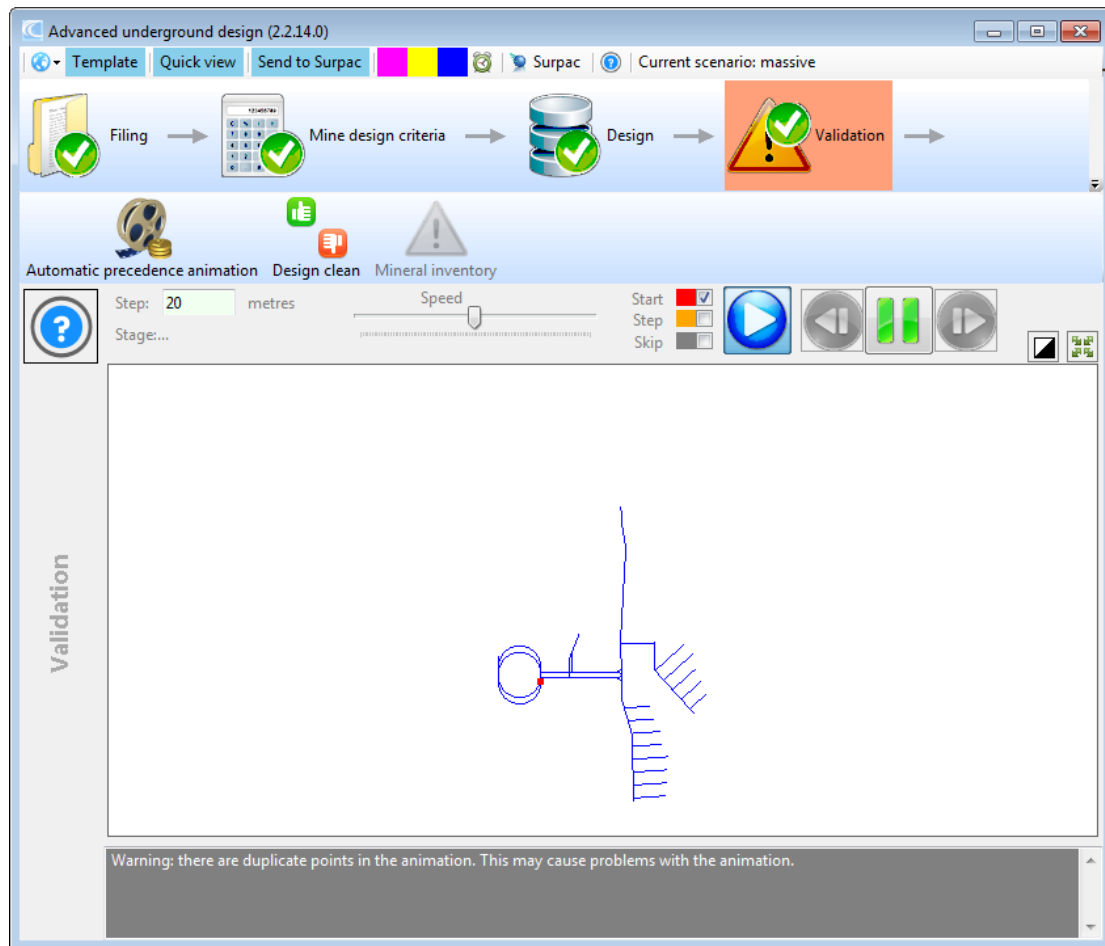
Validation

1. Select **Validation** to animate the automated precedence and report on design cleaning requirements.

 **Note:** The **Design Clean** process might identify some points as very close. You can ignore the issue of very close points for this design.



2. Click **Execute the current flow chart** to see your 'automatic precedence animation'.



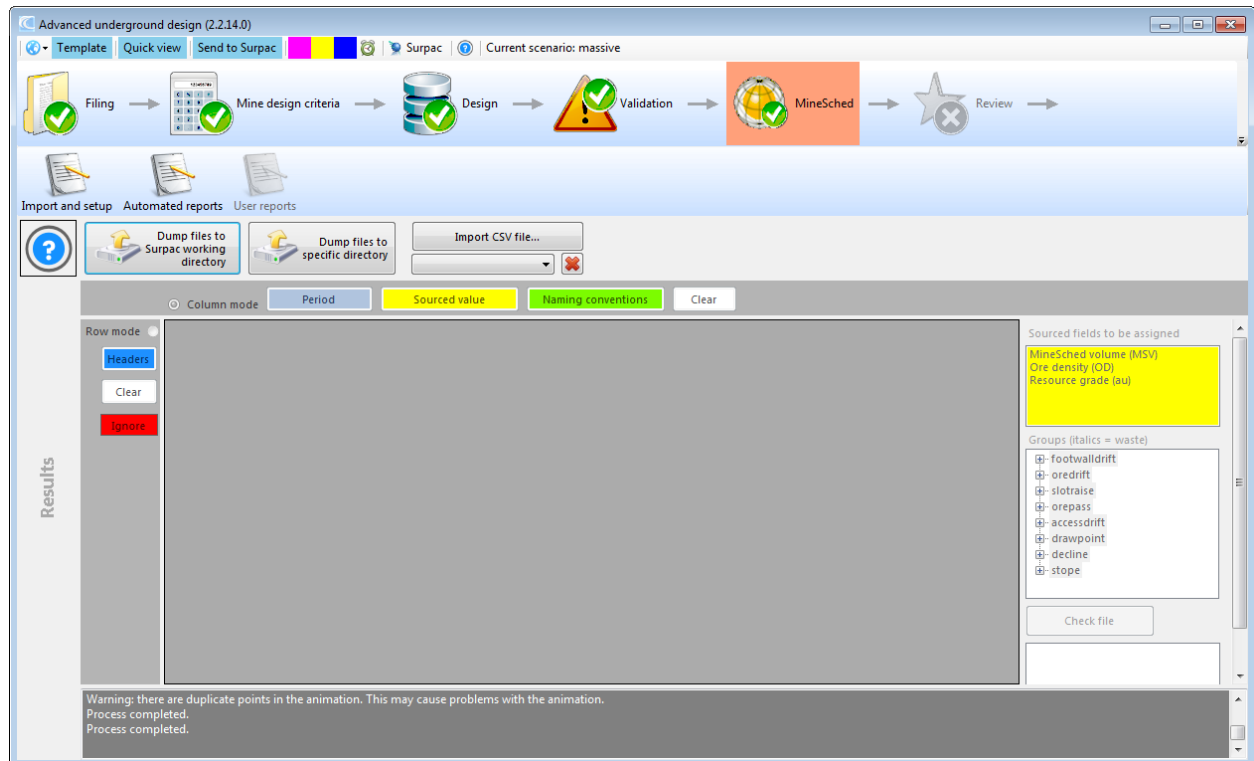
-  **Note:** If your animation is not displayed, click **Send to Surpac**, edit the strings, and then in AUD click **Manual**, and click **Grab data from Surpac**.

MineSched

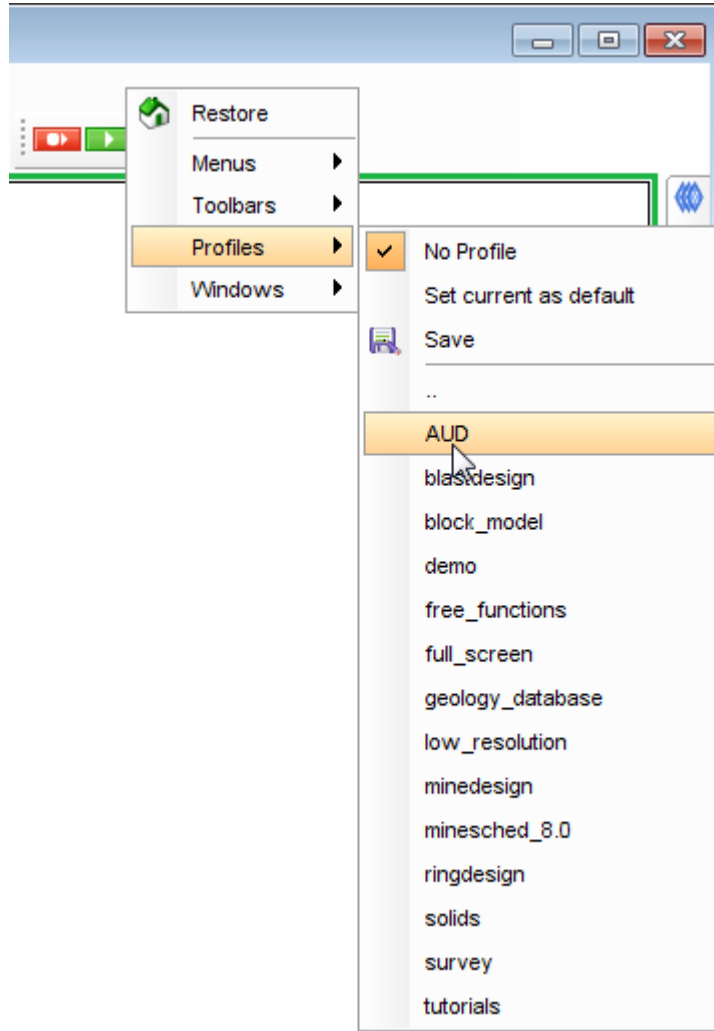
You can now prepare your design for scheduling in MineSched.

1. In AUD, click **MineSched**.
2. Click **Dump files to Surpac working directory**.

The file **massive.str** is created in the Surpac work directory.



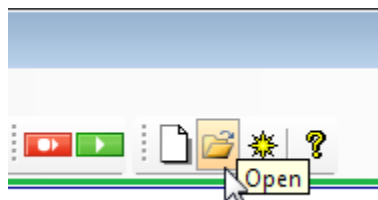
3. In Surpac, open **massive.str**.
4. In Surpac, right-click in the area to the right of the menus and toolbars, and choose **Profiles > MineSched_8.0** to activate the profile for MineSched.



The MineSched toolbar is displayed.



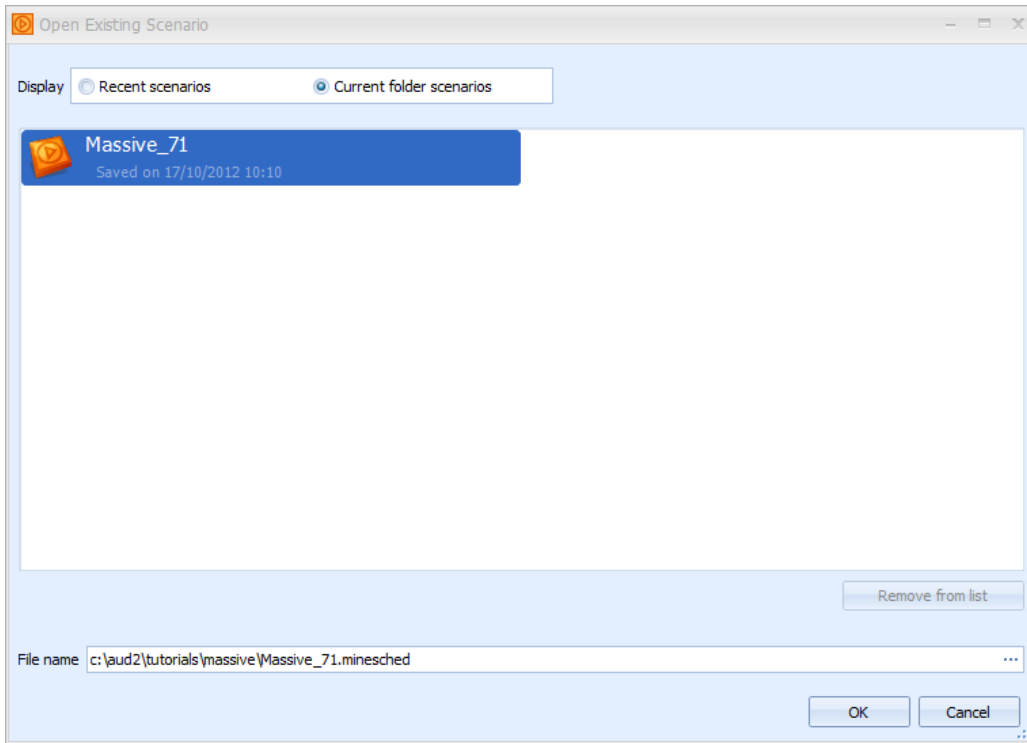
5. Click **Open** on the MineSched toolbar.



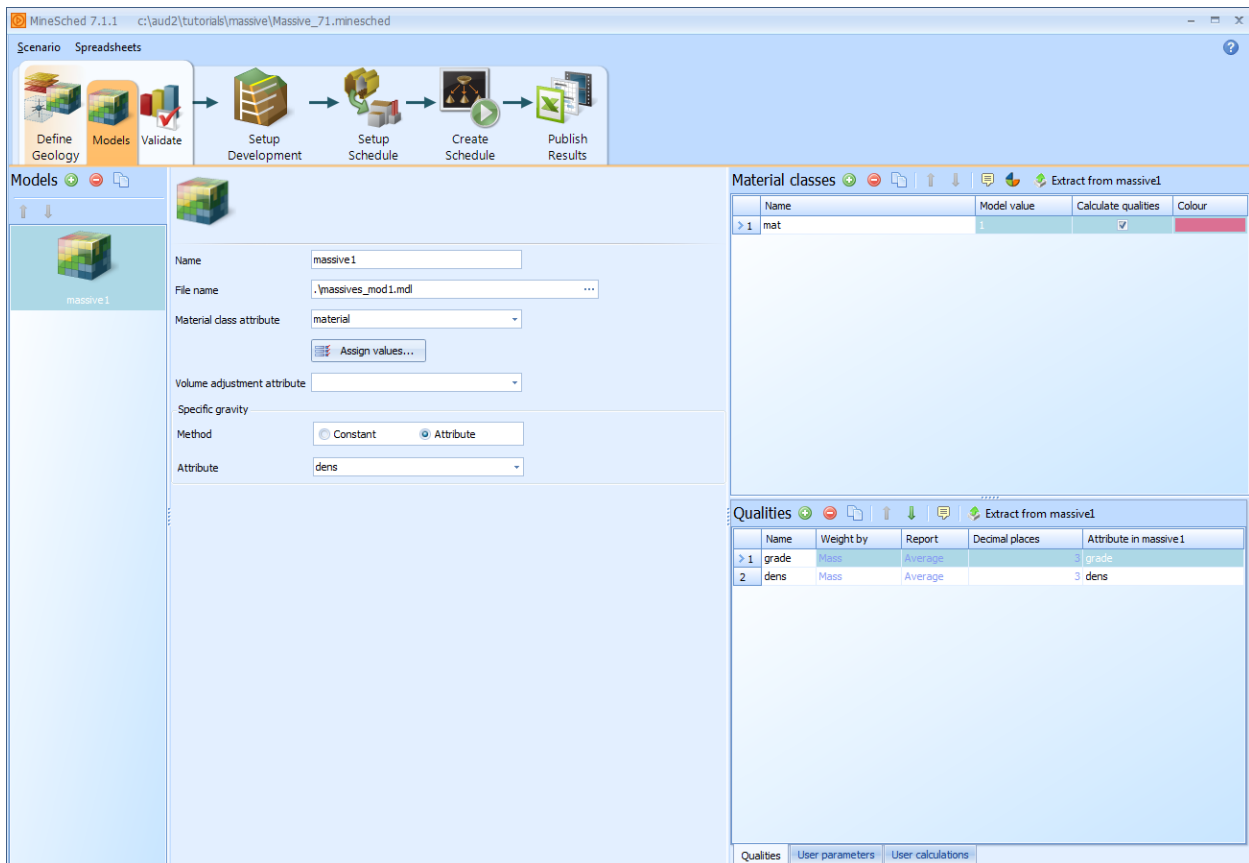
You will open an existing MineSched ‘scenario’. A MineSched scenario is a set of scheduling parameters, including parameters that relate to geology, mining engineering, and logistics.

Tip: Alternatively, you could click the button to the left of **Open** to create a new scenario, and then enter each of the parameters individually.

- In MineSched, set the *Open Existing Scenario* form to open the **Massive_71 scenario**, and click **OK**.



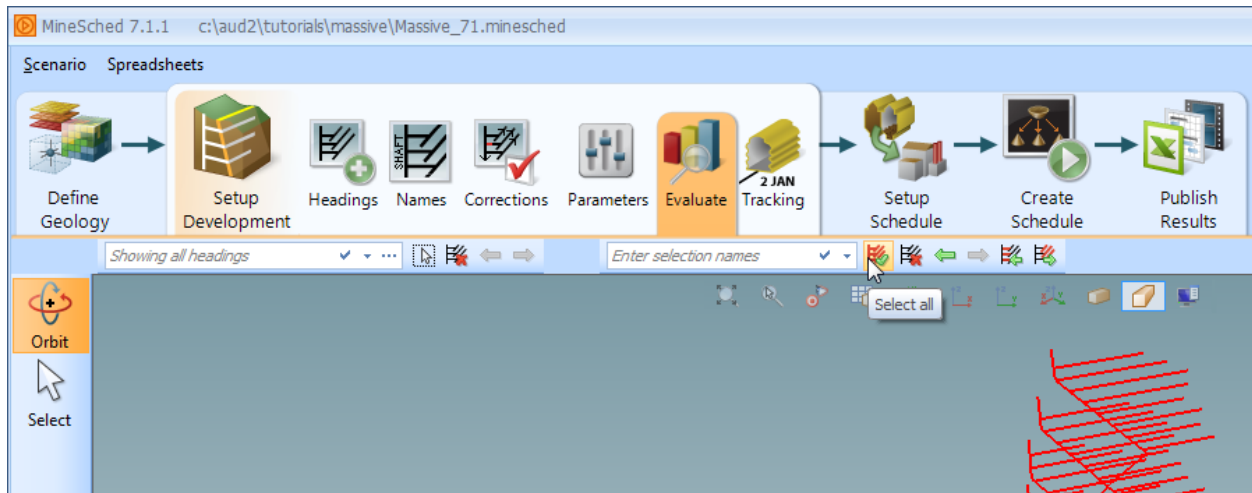
MineSched displays a set of parameters, with the block model parameters displayed.



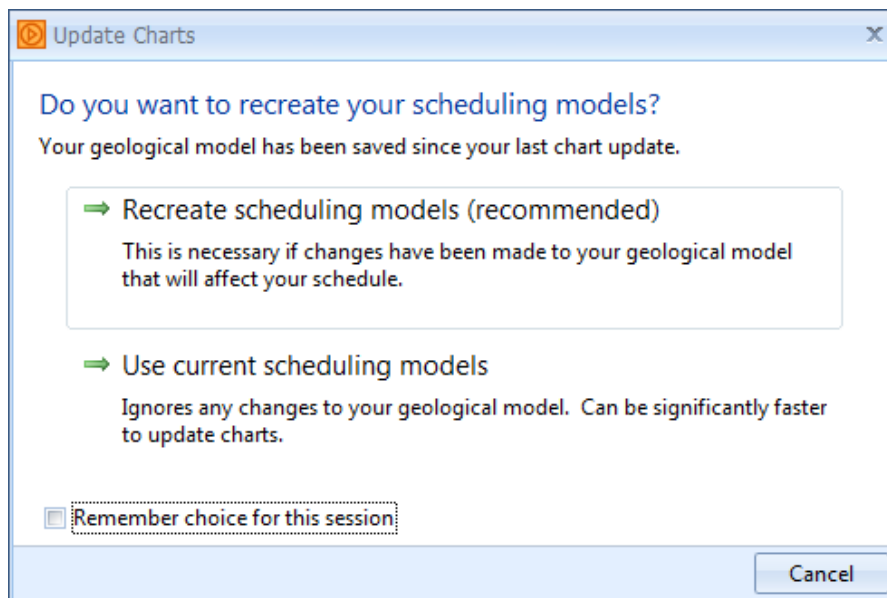
If you wish, you can click on any of the buttons to the right of **Define Geology** to see the parameters.

You do not need to change most of the parameters for this tutorial.

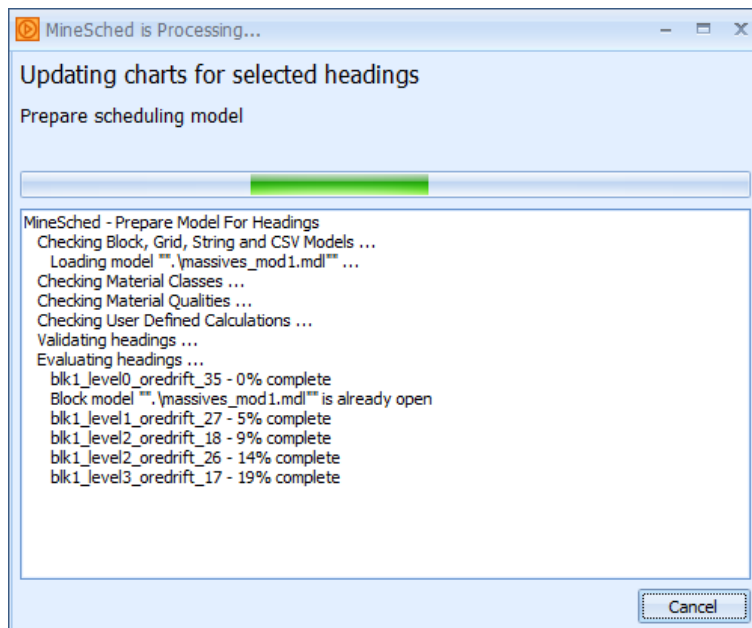
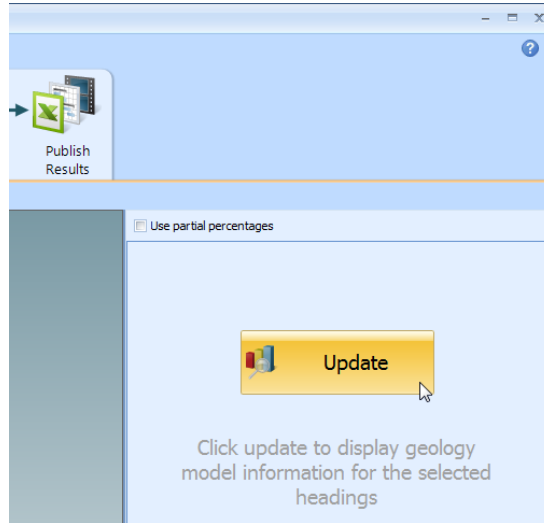
7. Click **Setup Development > Evaluate**.
8. Click **Select all**.



9. Click **Recreate Scheduling Model** if you are prompted to do so.

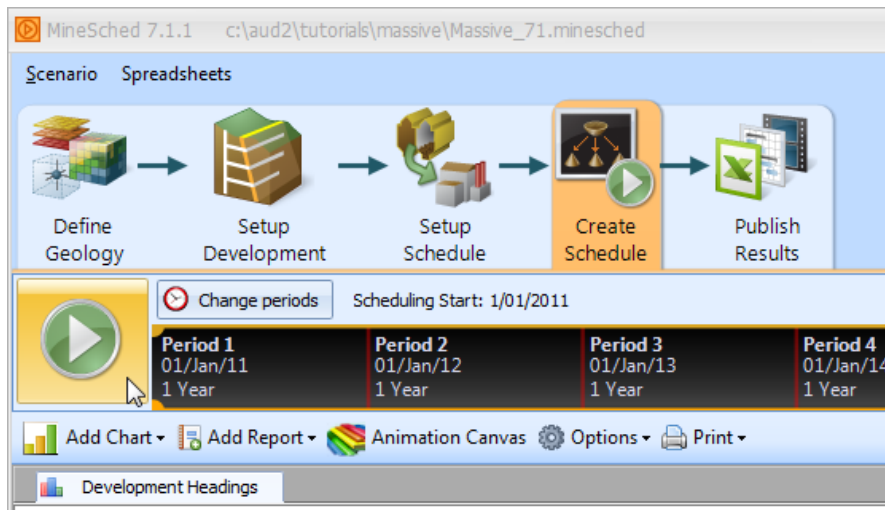


10. Click **Update**.

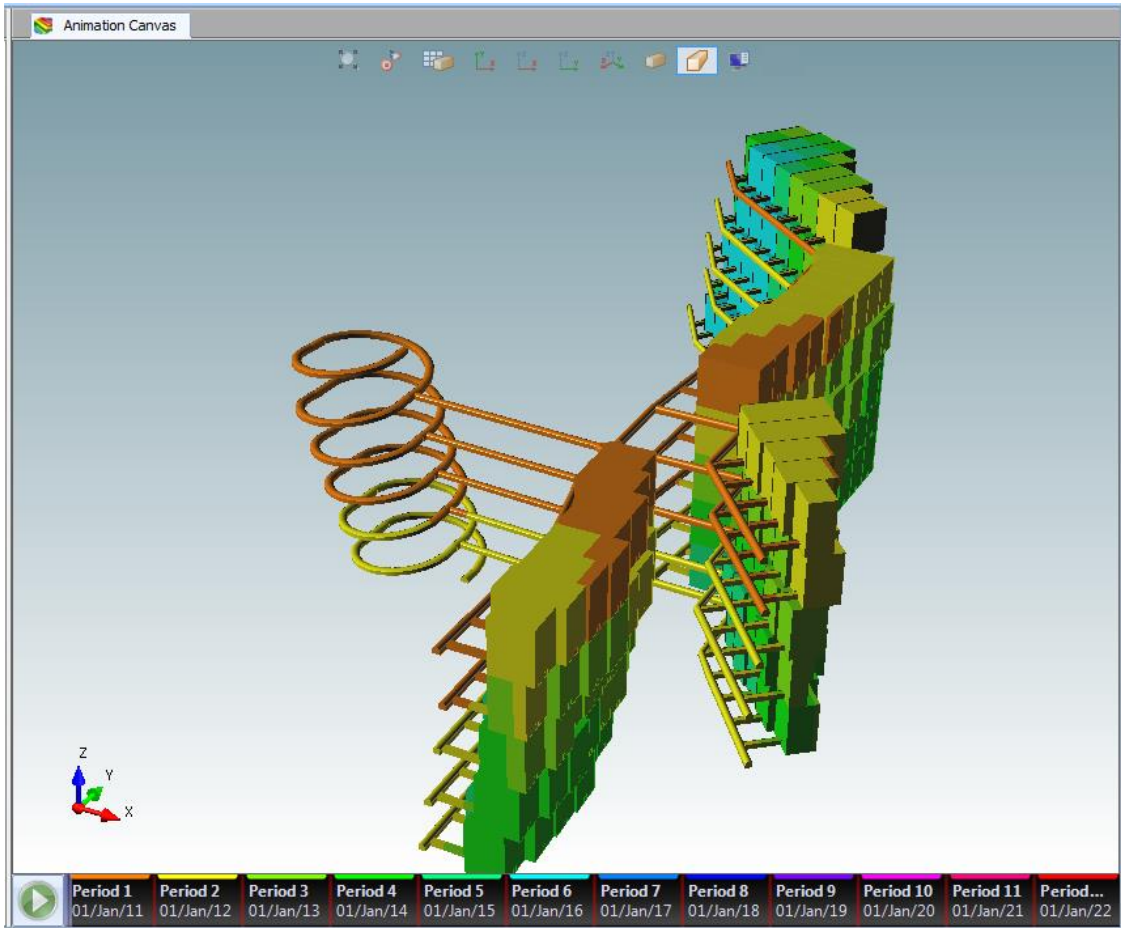


11. When the update has finished, click **Create Schedule**.

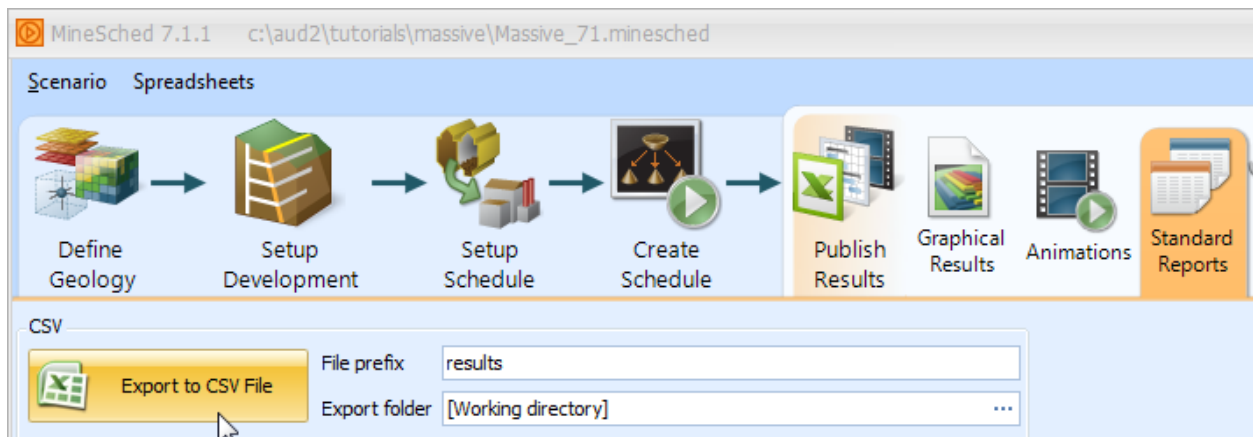
12. Click  to run the schedule.



Minesched colours the mine design by the period in which each area will be mined.



13. Select **Publish Results > Standard Reports**.
14. Click **Export to CSV File**.

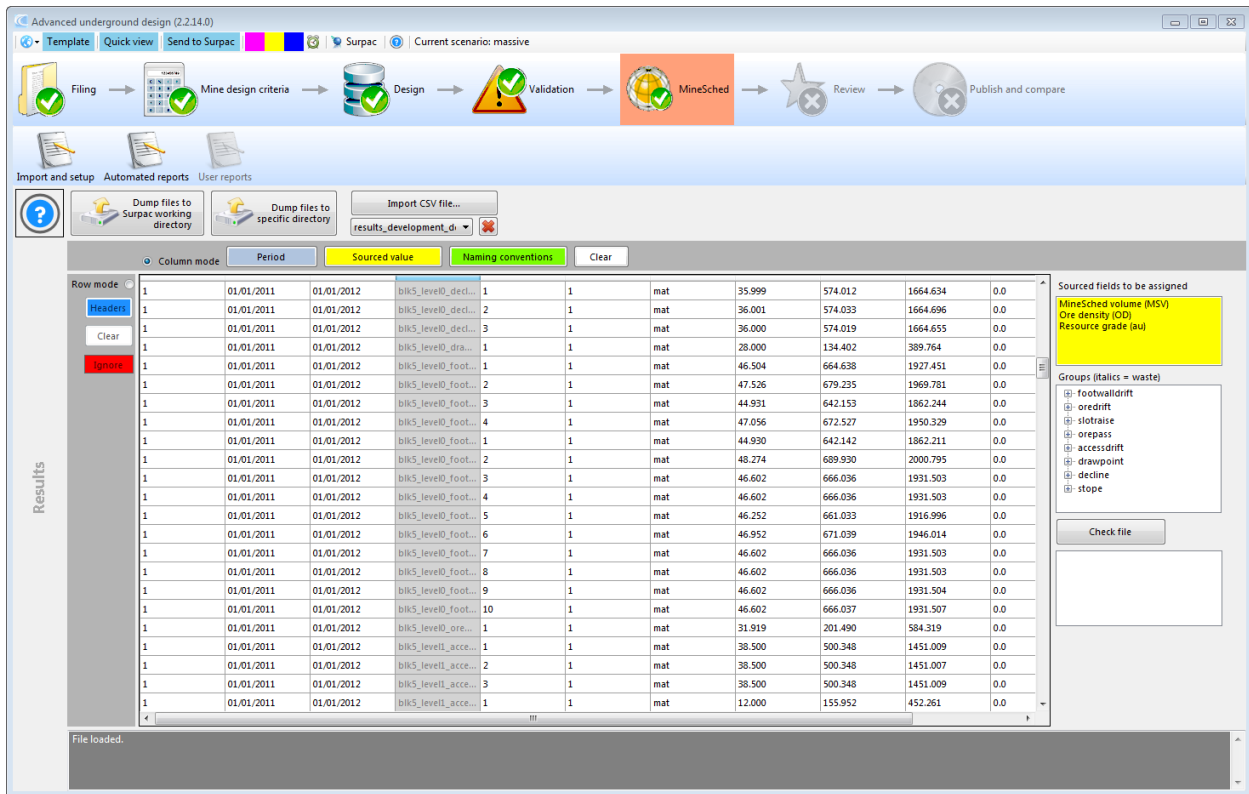


Several CSV files, with the **results** prefix, are created in your Surpac working directory.



Massive_tutorial_9.upj

15. In AUD, select the **MineSched** step, and click **Import CSV file**.
16. Browse for **results_development_summary.csv**, and click **Open**.

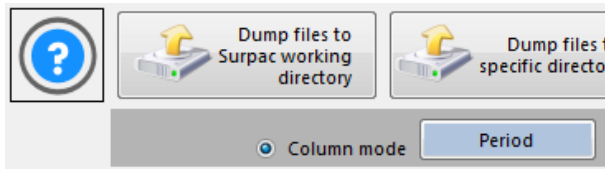


The csv file appears in AUD.

Reports

Next you will define where to find the source fields, where the period number is, and where the naming conventions are.

1. First specify the column for period numbers.
 - a. Click the first column - the column that contains the period numbers.
 - b. Click the blue **Period** button.



Row mode	Period	Sourced value	Naming conventions	Clear	Period	StartDate	EndDate	Heading	Material	Length	Volume	Mass	grade	dens
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	45.48700121878...	409.3830109690...	1187.211031810...	0	2.900000000000...					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	56.36600288660...	507.3020259798...	1471.176075341...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	18.48155945147...	166.3340350632...	482.3692649357...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	49.52726528739...	445.7453875865...	1292.662168316...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	39.63348669668...	356.7061204090...	1034.448815717...	0	2.900000000000...					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	31.44403357168...	282.9938878922...	820.6825967880...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	24.49976023939...	220.4971790849...	639.4424824159...	0	2.9					
1	01/01/2011	01/01/2012	blk1_level0_ore...	mat	43.86399984154...	394.7759985739...	1144.850995864...	0	2.900000000000...					
1	01/01/2011	01/01/2012	blk1_level1_ore...	mat	4.142326388888...	37.28084889029...	108.1144706428...	2.2	2.899999999999...					
1	01/01/2011	01/01/2012	blk3_level0_ore...	mat	59.30799854635...	533.7739869171...	1547.944962059...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk3_level0_ore...	mat	45.79200234926...	412.1310211435...	1195.181061316...	0	2.9					
1	01/01/2011	01/01/2012	blk3_level0_ore...	mat	40.49899846367...	364.4889861731...	1057.017959902...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk3_level0_ore...	mat	33.21399846367...	298.9269861730...	866.8879599019...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk3_level0_ore...	mat	60.72399681024...	546.5179712920...	1584.903916746...	0	2.900000000000...					
1	01/01/2011	01/01/2012	blk3_level1_ore...	mat	48.90579951358...	440.1503212623...	1276.436243712...	2.652806323586...	2.899999999999...					
1	01/01/2011	01/01/2012	blk3_level1_ore...	mat	38.86851273834...	349.8151692891...	1014.464002687...	2.470323125361...	2.899999999999...					
1	01/01/2011	01/01/2012	blk3_level1_ore...	mat	30.84480771940...	277.6059211947...	805.0575692227...	3.000000000000...	2.900000000000...					
1	01/01/2011	01/01/2012	blk3_level1_ore...	mat	23.99270728801...	215.9355374257...	626.2132343095...	2.7	2.900000000000...					
1	01/01/2011	01/01/2012	blk3_level1_ore...	mat	18.44909417369...	166.0423492244...	481.5225619204...	2	2.9					
1	01/01/2011	01/01/2012	blk4_level0_foot...	mat	186.884	2670.949000000...	7745.750999999...	0	2.900000000000...					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	47.86800143986...	430.8130129588...	1249.358037580...	0	2.9					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	51.71200730957...	465.4000657850...	1349.661190776...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	42.66800347222...	384.0140312501...	1113.641090625...	0	2.900000000000...					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	43.51999421296...	391.6759479171...	1135.859848959...	0	2.9					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	52.66399526014...	473.9799573409...	1374.541876288...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	52.20599829833...	469.8519846850...	1362.569995586...	0	2.899999999999...					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	39.08600694444...	351.7760625003...	1020.151181251...	0	2.9					
1	01/01/2011	01/01/2012	blk4_level0_ore...	mat	38.36800347222...	345.3130312500...	1001.408090625...	0	2.900000000000...					

The column is highlighted in blue. Next you will specify to use the **Heading Name** column for naming conventions.

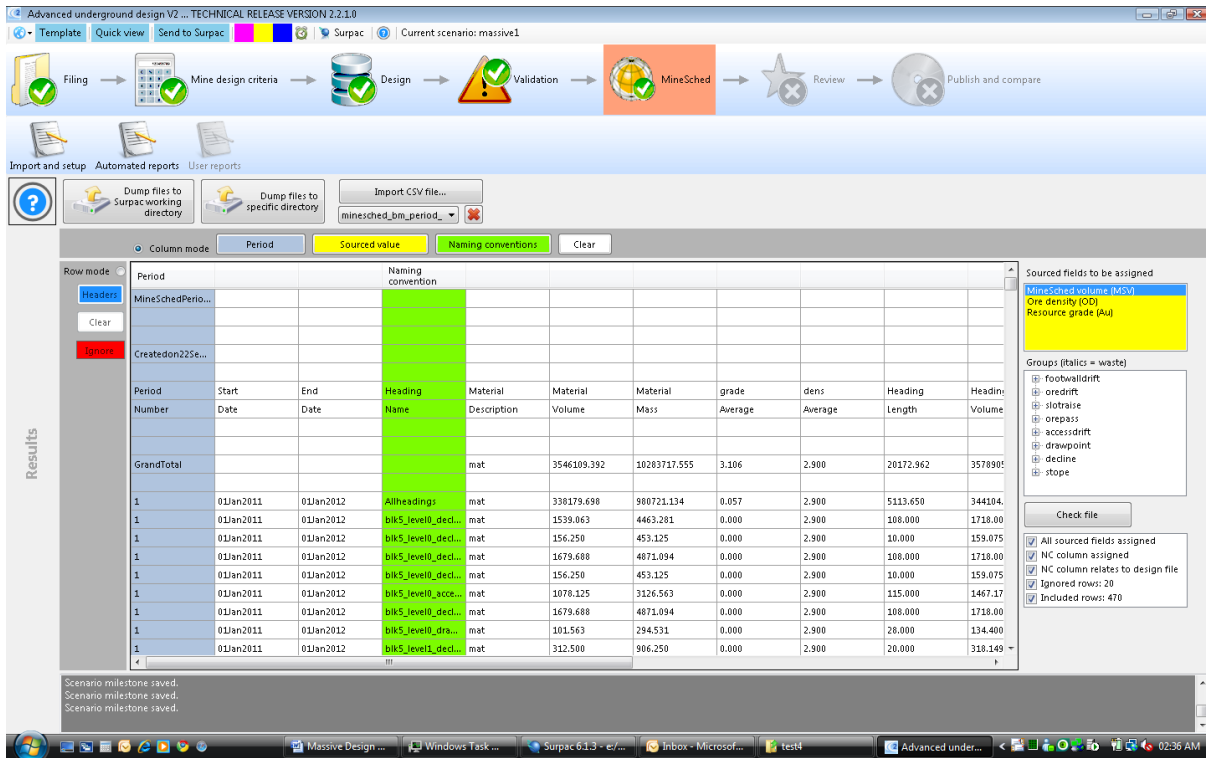
- Click in the **Heading** column, and click the green **Naming Conventions** button.

The column is highlighted in green.

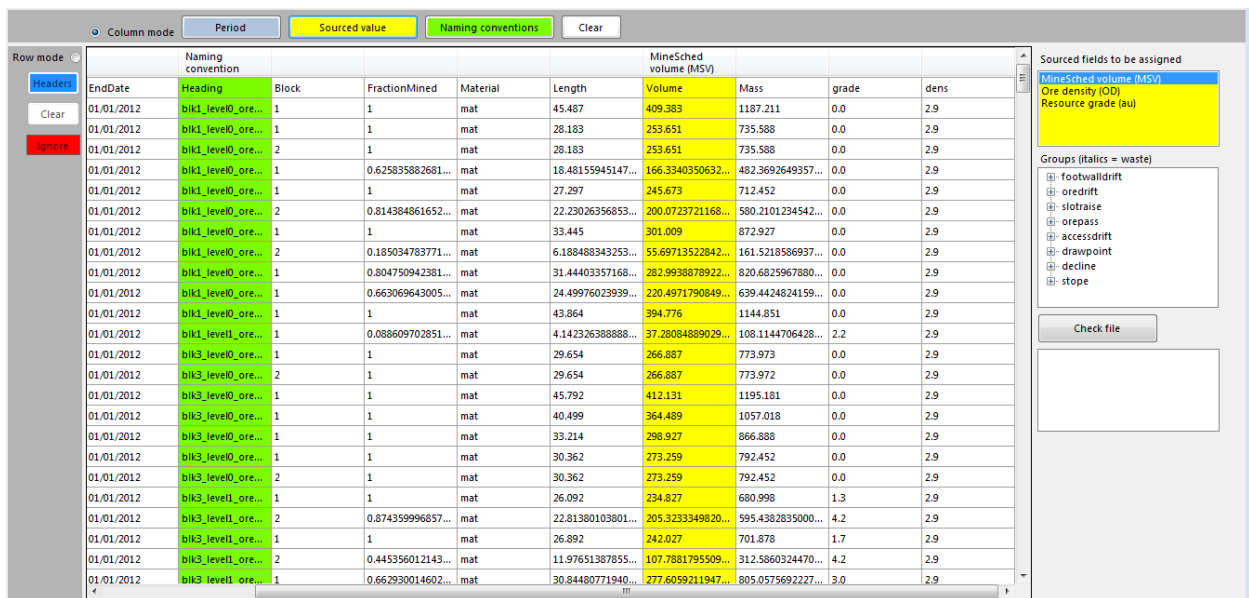
The screenshot shows the MineSched software interface. At the top, there is a progress bar with steps: Filing, Mine design criteria, Design, Validation, MineSched, Review, and Publish and compare. Below this is a toolbar with icons for import and setup, automated reports, and user reports. The main window displays a data table with columns: Period, StartDate, EndDate, Heading, Block, FractionMined, Material, Length, Volume, Mass, grade, and dens. The 'Heading' column is highlighted in green. Above the table, there are buttons for 'Column mode', 'Period', 'Sourced value', 'Naming conventions', and 'Clear'. The 'Naming conventions' button is highlighted in green. On the right side of the table, a dialog box titled 'Sourced fields to be assigned' is open, showing a list of fields to be assigned to the table columns. The fields listed are: MineSched volume (MSV), Ore density (OD), Resource grade (au), Groups (italic = waste), footvaldrift, ore drift, slotraise, orepass, accessdrift, drawpoint, decline, and stoppe. There is a 'Check file' button at the bottom of the dialog box.

You will now define the three source fields.

- In the yellow section on the right, select **MineSched volume (MSV)**.
You have selected a source field.



- Click on the **Volume** column, and then click the yellow **Sourced value** button.
The **MineSched volume** column is highlighted in yellow.



- Assign the **Ore density (OD)** and **Resource grade (au)** attributes in the same way.
AUD should now appear similar to the following:

Column mode | Period | Sourced value | Naming conventions | Clear

Row mode | Headers | Clear | Ignore

EndDate	Heading	Block	FractionMined	Material	Length	Volume	Mass	Resource grade	Ore density (OD)
01/01/2012	blk1_level0_ore...	1	1	mat	45.487	409.383	1187.211	0.0	2.9
01/01/2012	blk1_level0_ore...	1	1	mat	28.183	253.651	735.588	0.0	2.9
01/01/2012	blk1_level0_ore...	2	1	mat	28.183	253.651	735.588	0.0	2.9
01/01/2012	blk1_level0_ore...	1	0.625835882681...	mat	18.48155945147...	166.3340350632...	482.3692649357...	0.0	2.9
01/01/2012	blk1_level0_ore...	1	1	mat	27.297	245.673	712.452	0.0	2.9
01/01/2012	blk1_level0_ore...	2	0.814384861652...	mat	22.23026356853...	200.0723721168...	580.2101234542...	0.0	2.9
01/01/2012	blk1_level0_ore...	1	1	mat	33.445	301.009	872.927	0.0	2.9
01/01/2012	blk1_level0_ore...	2	0.185034783771...	mat	6.188488343253...	55.69713522842...	161.5218586937...	0.0	2.9
01/01/2012	blk1_level0_ore...	1	0.804750942381...	mat	31.44403357168...	282.9938878922...	820.6825967880...	0.0	2.9
01/01/2012	blk1_level0_ore...	1	0.663069643005...	mat	24.49976023939...	220.4971790849...	639.4424824159...	0.0	2.9
01/01/2012	blk1_level0_ore...	1	1	mat	43.864	394.776	1144.851	0.0	2.9
01/01/2012	blk1_level1_ore...	1	0.088609702851...	mat	4.142326388888...	37.28084889029...	108.1144706428...	2.2	2.9
01/01/2012	blk3_level0_ore...	1	1	mat	29.654	266.887	773.973	0.0	2.9
01/01/2012	blk3_level0_ore...	2	1	mat	29.654	266.887	773.972	0.0	2.9
01/01/2012	blk3_level0_ore...	1	1	mat	45.792	412.131	1195.181	0.0	2.9
01/01/2012	blk3_level0_ore...	1	1	mat	40.499	364.489	1057.018	0.0	2.9
01/01/2012	blk3_level0_ore...	1	1	mat	33.214	298.927	866.888	0.0	2.9
01/01/2012	blk3_level0_ore...	1	1	mat	30.362	273.259	792.452	0.0	2.9
01/01/2012	blk3_level0_ore...	2	1	mat	30.362	273.259	792.452	0.0	2.9
01/01/2012	blk3_level1_ore...	1	1	mat	26.092	234.827	680.998	1.3	2.9
01/01/2012	blk3_level1_ore...	2	0.874359996857...	mat	22.81380103801...	205.3233349820...	595.4382835000...	4.2	2.9
01/01/2012	blk3_level1_ore...	1	1	mat	26.892	242.027	701.878	1.7	2.9
01/01/2012	blk3_level1_ore...	2	0.445356012143...	mat	11.97651387855...	107.7881795509...	312.5860324470...	4.2	2.9
01/01/2012	blk3_level1_ore...	1	0.662930014602...	mat	30.84480771940...	277.6059211947...	805.0575692227...	3.0	2.9

Sourced fields to be assigned: MineSched volume (MSV), Ore density (OD), Resource grade (au)

Groups (italics = waste): footwalldrift, ore drift, slotraise, ore pass, access drift, drawpoint, decline, stope

Check file

Next you will define where the csv file headers are.

- Click the **Row mode** option.
- Click the heading row, and then click the dark blue **Headers** button.

Column mode | Period | Sourced value | Naming conventions | Clear

Row mode | Headers | Clear | Ignore

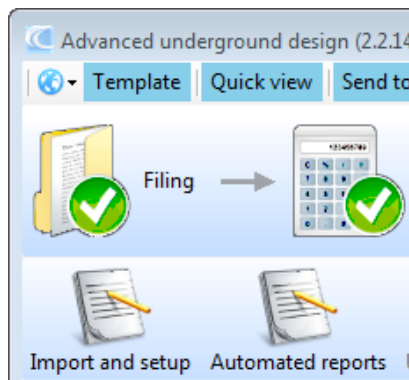
PeriodNumber	StartDate	EndDate	Heading	Block	FractionMined	Material	Length	Volume	Mass
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	1	mat	45.487	409.383	1187.211
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	1	mat	28.183	253.651	735.588
1	01/01/2011	01/01/2012	blk1_level0_ore...	2	1	mat	28.183	253.651	735.588
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	0.625835882681...	mat	18.48155945147...	166.3340350632...	482.3692649357...
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	1	mat	27.297	245.673	712.452
1	01/01/2011	01/01/2012	blk1_level0_ore...	2	0.814384861652...	mat	22.23026356853...	200.0723721168...	580.2101234542...
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	1	mat	33.445	301.009	872.927
1	01/01/2011	01/01/2012	blk1_level0_ore...	2	0.185034783771...	mat	6.188488343253...	55.69713522842...	161.5218586937...
1	01/01/2011	01/01/2012	blk1_level1_ore...	1	0.804750942381...	mat	31.44403357168...	282.9938878922...	820.6825967880...
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	0.663069643005...	mat	24.49976023939...	220.4971790849...	639.4424824159...
1	01/01/2011	01/01/2012	blk1_level0_ore...	1	1	mat	43.864	394.776	1144.851
1	01/01/2011	01/01/2012	blk1_level1_ore...	1	0.088609702851...	mat	4.142326388888...	37.28084889029...	108.1144706428...
1	01/01/2011	01/01/2012	blk3_level0_ore...	1	1	mat	29.654	266.887	773.973
1	01/01/2011	01/01/2012	blk3_level0_ore...	2	1	mat	29.654	266.887	773.972
1	01/01/2011	01/01/2012	blk3_level0_ore...	1	1	mat	45.792	412.131	1195.181
1	01/01/2011	01/01/2012	blk3_level0_ore...	1	1	mat	40.499	364.489	1057.018
1	01/01/2011	01/01/2012	blk3_level0_ore...	1	1	mat	33.214	298.927	866.888
1	01/01/2011	01/01/2012	blk3_level0_ore...	1	1	mat	30.362	273.259	792.452
1	01/01/2011	01/01/2012	blk3_level0_ore...	2	1	mat	30.362	273.259	792.452
1	01/01/2011	01/01/2012	blk3_level1_ore...	1	1	mat	26.092	234.827	680.998
1	01/01/2011	01/01/2012	blk3_level1_ore...	2	0.874359996857...	mat	22.81380103801...	205.3233349820...	595.4382835000...
1	01/01/2011	01/01/2012	blk3_level1_ore...	1	1	mat	26.892	242.027	701.878
1	01/01/2011	01/01/2012	blk3_level1_ore...	2	0.445356012143...	mat	11.97651387855...	107.7881795509...	312.5860324470...
1	01/01/2011	01/01/2012	blk3_level1_ore...	1	0.662930014602...	mat	30.84480771940...	277.6059211947...	805.0575692227...

Sourced fields to be assigned: MineSched volume (MSV), Ore density (OD), Resource grade (au)

Groups (italics = waste): footwalldrift, ore drift, slotraise, ore pass, access drift, drawpoint, decline, stope

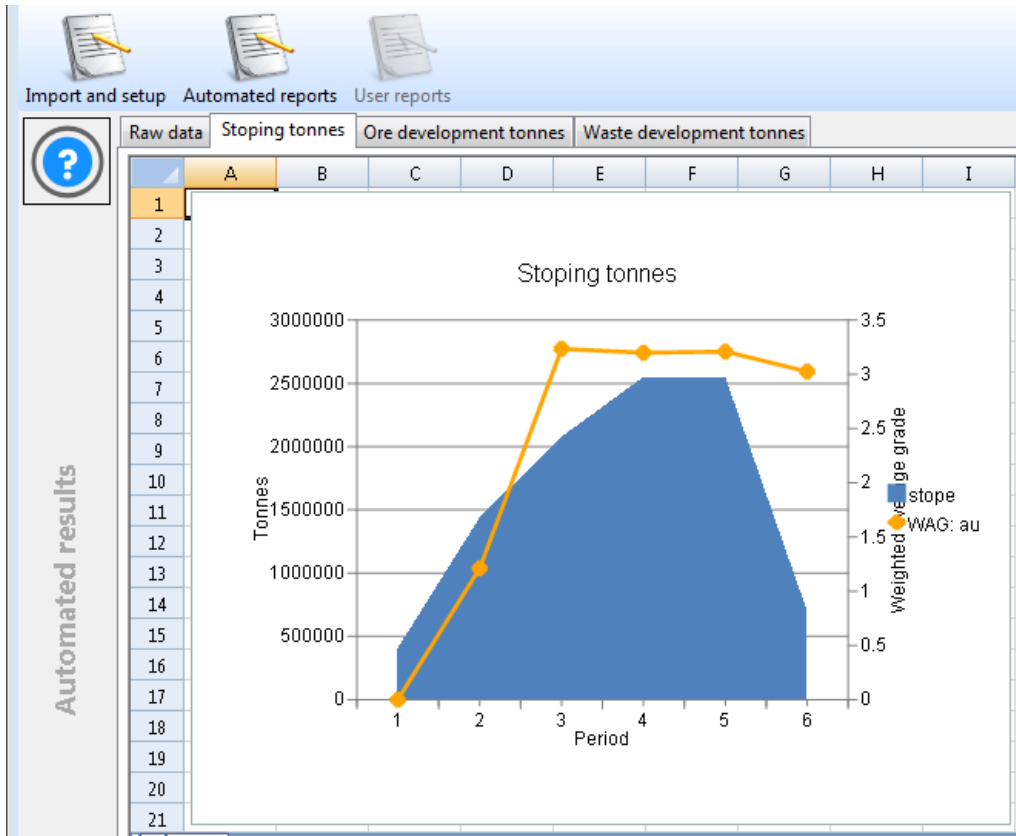
Check file

- Click **Automated reports**.



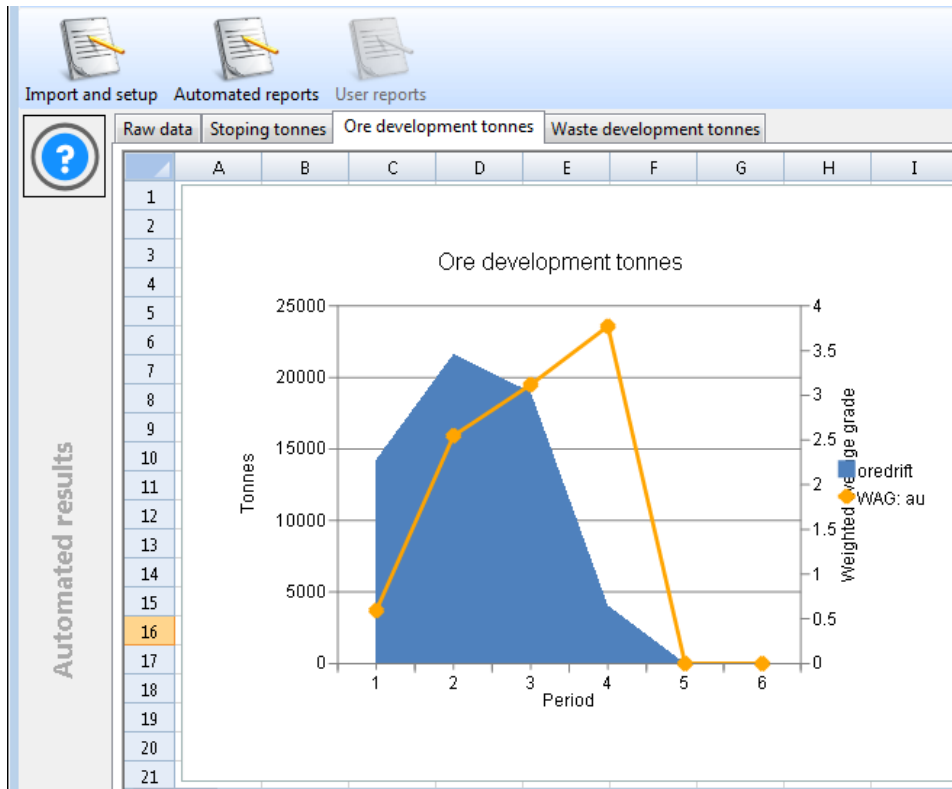
To see your tonnage and grade profiles, you can click on the tabs below **Automated reports**.

- Click **Stoping tonnes**.



The mine is planned at 2.5 million tonnes of ore per year from stoping and it delivers a stoping ROM head grade of 3.2 g/t Au with a project life of 6 years.

10. Now select **Ore development tonnes**.



Ore development delivers 22,000 tonnes per year maximum and at an average grade of between 2.4g/t and 3.5g/t.

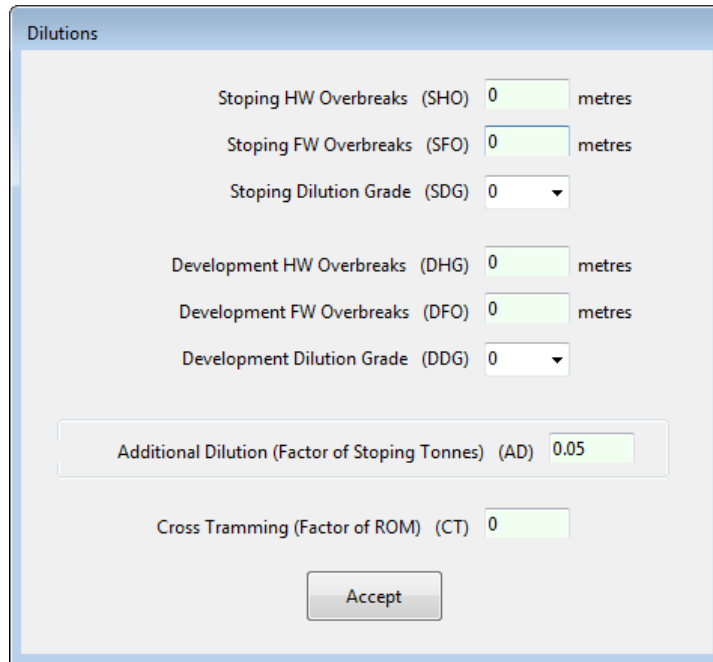
11. To see the effect of geological losses and dilutions on the project, select **Mine design criteria**, click **Global parameters**, and for **Geological losses**, select **Not mined**.

For this run, it is assumed that you can design the stopes to leave the unplanned geological loss areas as **Not mined**.

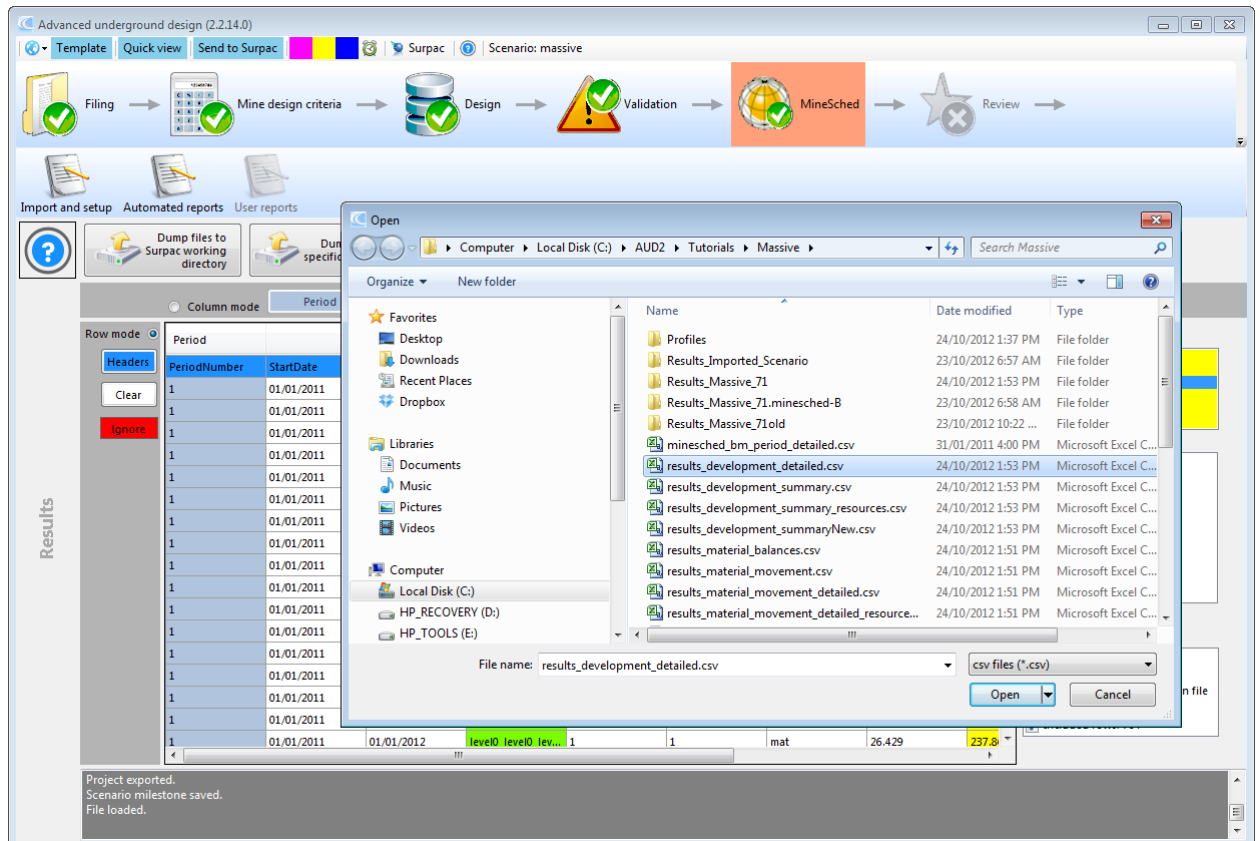
12. Click **Accept**.

13. Click **Dilutions**.

- Set overbreaks to 0.



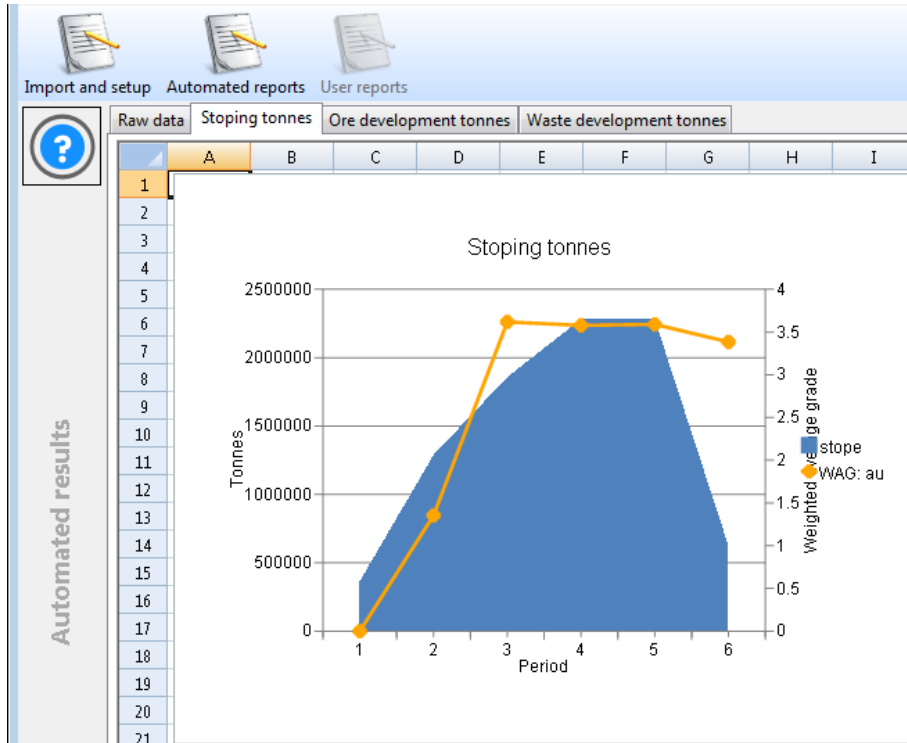
- Click **Accept**.
- Click the **MineSched** step.
- Click **Import CSV file**, and browse to **results_development_detailed.csv**, and click **Open**.



- Select **Column mode**, then assign the source and other fields, using the same method as you did earlier in this procedure.

The screenshot shows the MineSched software interface. At the top, a workflow bar includes steps: Filing, Mine design criteria, Design, Validation, MineSched, Review, and Publish and compare. Below this, there are options for 'Import and setup', 'Automated reports', and 'User reports'. The main area is a 'Results' table with columns: Period, Naming convention, Resource grade (Au), Ore density (OD), and MineSched volume. A 'GrandTotal' row shows a volume of 3578901. On the right, there are panels for 'Sourced fields to be assigned' and 'Check file' options.

19. Click **Automated reports**.



The mine now delivers 2.3 million tonnes of ore per year versus the previous 2.5 million tonnes in the previous scenario from stoping. The head grade has improved from 3.2g/t to 3.5g/t.