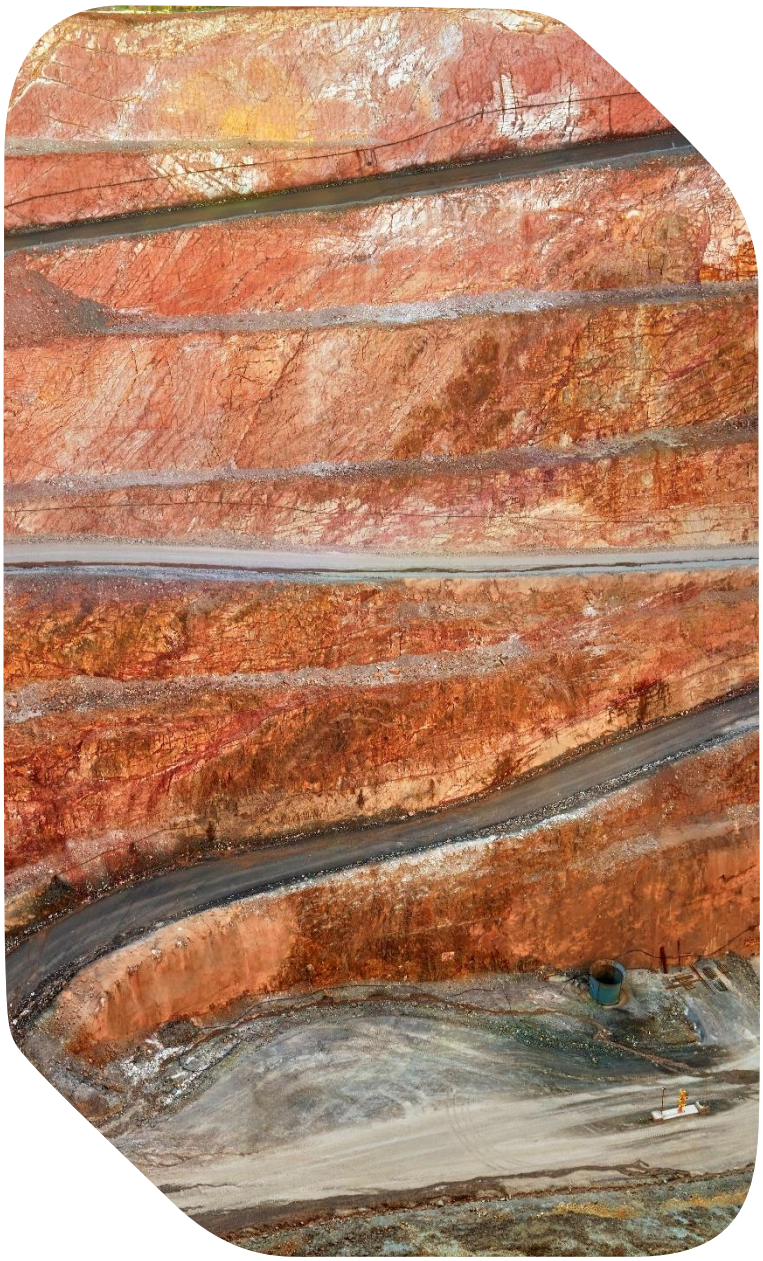
micromine alastri

Introduction to **Micromine Alastri Rapid Reserver**

Training Booklet

Version 01 November 2021



Introduction

The purpose of Rapid Reserver (RR) is to prepare geological reserves for scheduling in Alastri Tactical and Production Schedulers.

Rapid Reserver creates blast masters, dig floors, grade control blocks and scheduling blocks for the entire mining technical services team. It works by drawing lines to cut solids, so that mining blocks are automatically closed, validated and adjoined to their neighbours.

Solids, blast boundaries and reserves are dynamically displayed and can be exported to any mine design software, scheduler or fleet management system

This document provides step-by-step instructions for creating such a project, including instructions for setting parameters, creating solids based on the current survey, working with blasts and mining blocks, reporting and plotting the data of interest, as well as exporting the prepared reserve model file for further use in mine planning.

Terminology

User Interface Terms

Design window	The main 3D design area in the Network tab
Viewport	Any 3D visualisation area
Tab	Tabbed working area
Panel	Interactive frame within a tab
Dialog	A new window that opens to enter information
Dropdown	A dropdown box that lets you choose from a list
Icon / Button	A button that can be pressed
Checkbox	A box that can be ticked on or off

Mining Terms

Increment	The height of the bench, flitch, cut or lift
Block model	Reserves file
Parcel	One-component material inside a given block (in the reserves file)
Block solid	3D object
Mining solid	3D object with either regular or irregular outline representing an area of cut or fill within an increment of a phase
Blast solid	A mining solid with an irregular outline
Phase	Master solid to be sub-divided into increments and mining solids
Constraint	A surface, solid or polygon used to delineate a composite solid
Named Polygon	Polygon including Blast Type as description

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Contents

INTRODUCTION I
TERMINOLOGY I
PREREQUISITES 3
SYSTEM REQUIREMENTS 3
FIRST PRINCIPLES 4
PROJECT SETUP 5
Creating and opening a project 5
SETUP TAB 6
Settings step 6
Tables step 7
Block Model step 8
Block Model Gap Filling step 14
Phases step 14
Phase/Blast/Dig Properties steps 17
Bench Templates step 18
Depletion Surfaces step 21
Phase Exclusion Areas step 22
Phase Details step 22
Bench Preconditioning step 23
Bench Depletion step 25
Wall Controls step 26
Wall Control Designs step 27
Run Setup steps 28
SOLIDS LAB TAB 29
Operations 29
CREATING SOLIDS IN THE SOLID LAB EXERCISES 30
Creating an Operations set 31
1. Clipping a surface 35
2. Intersecting Solids 36
3. Clipping Solid by Polygon 37
4. Subtracting Solids 39
5. Cleaning Solid from Remnant Blocks 41
DESIGNER TAB 43
Navigate 43
Design 46
Generate 51
Exercises 53
View 54
Inspect 63
REPORTING 64
Plots 65
IMPORT AND EXPORT 66
Import 66
Export 67
Exercise: configuring and exporting plot with custom labels, shading and constraint 68
SOFTWARE SUPPORT 74

Prerequisites

To complete the workshops in this series you will require:

1. A valid 20-digit license key.
2. A personal login to https://www.alastri.com/.
3. Rapid Reserver installed on your computer.
4. Download files:
    a. Block Models CSVs: “pit1a”, “pit2a” and “pit3a”;
    b. Pits and Dumps designs: “pit1_s1.00t”, “pit1_s02.00t”, “pit1.00t”, “pit2.00t”, “pit3.00t”, “dump1.00t”, “dump2.00t”, “dump3.00t” and “lg1.00t”;
    c. Surveys: “topo.00t” and “EOM_Survey.00t”.

System Requirements

The following information outlines the recommended system requirements to run the Alastri suite of products. As the hardware required depends on the complexity of the mine and the amount of data, meaningful minimum requirements cannot always be listed. Ultimately the only way to know whether specific hardware will work for a specific mine site is to validate the software's performance during the free trial period.

- For large multi-pit mines with raw LIDAR surfaces and block models with 80M blocks the requirements will be at the extreme end.
- The minimum requirements will only support small mines with a small block model and surfaces with low triangle counts. Running Alastri Rapid Reserver on minimum system requirements may slow the application response, depending on the size of the model. Use recommended requirements for optimal use.

Component	Minimum	Standard	Extreme
Processor	Intel i5	Intel i7	Intel i9
Memory (RAM)	8 GB	64 GB	128 GB
Operating System	Windows 10 x64	Windows 10 x64	Windows 10 x64
Video Memory (GRAM)	2 GB	8 GB	12 GB
Monitor	1920 x 1080	Dual 1920 x 1080	Triple 1920 x 1080
Video Connection	HDMI, DisplayPort, DVI, VGA - *USB not supported*		
Video Driver	Driver no more than 6 months old (OpenGL 4.6+)		
Hard Drive	Solid State Drive with at least 50 GB Free		
Power Connection	AC Power - *Battery power not supported (plug in the laptop)*		
Network Connection	Consistent, reliable, high speed (>1 MB/s) connection to the Internet		
Software Prerequisites	.NET 4.7.2 Microsoft Visual Studio 2019 C++ Redistributables (https://aka.ms/vs/16/release/vc_redist.x64.exe)		
Input Devices	Microsoft Excel Keyboard and Mouse with a left mouse button, right mouse button, and middle mouse button/scroll wheel		

Many IT departments block downloads of Microsoft prerequisites, so you may need to download them manually. The installation error "Element Not Found" indicates that you must download and install these manually.

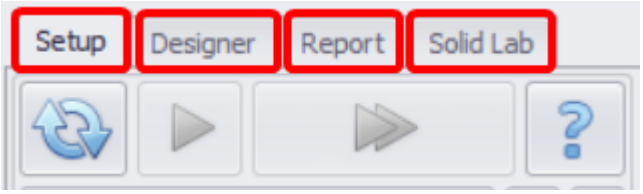
- Microsoft .NET Framework 4.5.1.
- Microsoft VSTO Runtime for Office 2010.

First Principles

Rapid Reserver works by creating a master solid, partitioning that solid into benches and blocks, overlaying the blocks against a block model and then dynamically calculating reserves.

This information is collected in four tabs: **Setup**, **Designer**, **Report** and **Solid Lab**.

The **Setup** and **Report** tabs tell Rapid Reserver how to read the block model and what reserves to report for each solid. The **Designer** and **Solid Lab** tab are where solids are created.



Setup tab	Contains a series of steps that must be completed to create a valid project. To proceed to the next steps and run your model you'll be prompted to complete every step of this tab.
Designer tab	Contains the 3D work environment to cut solids from benches.
Report tab	Allows the user to QAQC the reserves without leaving the application.
Solid Lab tab	May be used to create pit solids and dump solids.

This document provides only a brief description of all the steps and tools for working with you mine site reserves. For a full and detailed description, see Rapid Reserver Documentation section of the main documentation portal.

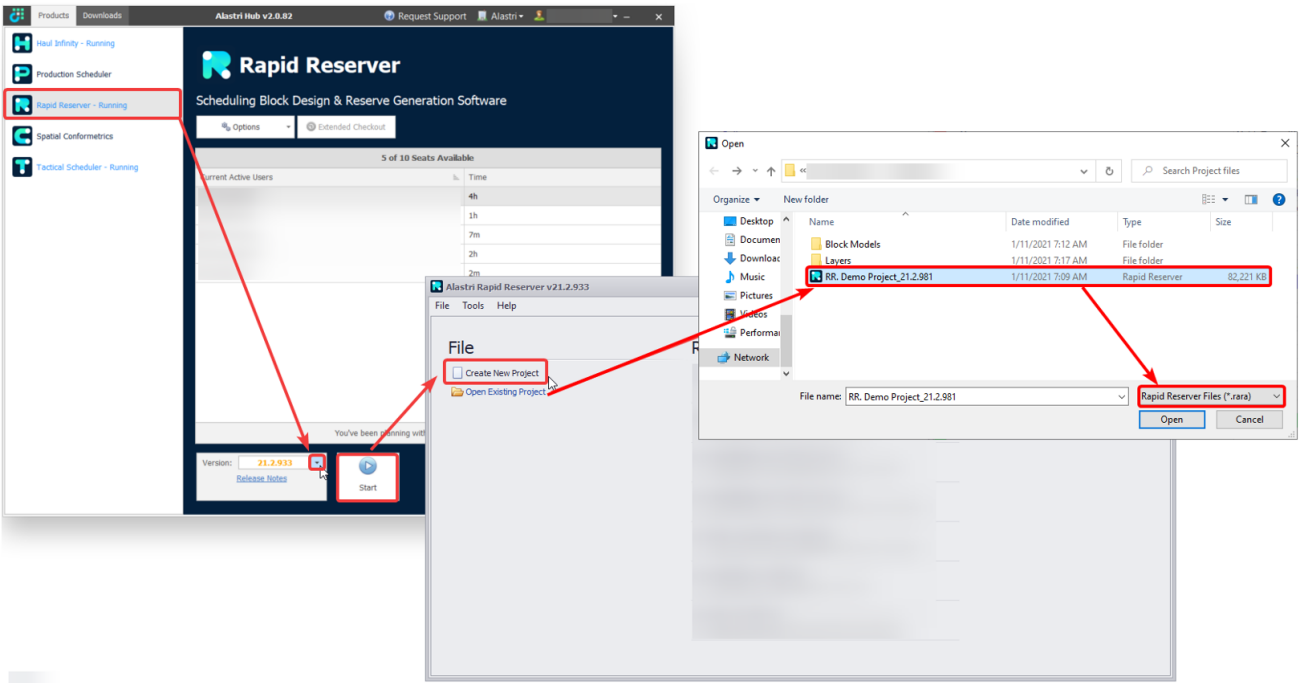
The exercises in this chapter are for familiarisation purposes and are deliberately light on detail. More in-depth discussion follows in the next section.

Unless otherwise noted, each exercise follows from the preceding exercise.

Project Setup

Creating and opening a project

1. Download the latest version in the Alastri Hub and start Rapid Reserver.
2. Create a new project and name it "RR. Demo Project". The main Rapid Reserver project file is saved in ".rara" format.



When Rapid Reserver project is saved, multiple different files will appear in the save location.

.rara	Rapid Reserver project file
.lock	Locks out a file to one user at a time
.old	If the main project files are corrupted for any reason, the ".old" files can be restored as functional project files by removing ".old" from the file name
.resultCache	Reduces scheduling time by saving results of previous runs
.layers	Saves triangulations external to the main project. Deleting the ".layers" file is the same as deleting all layers from the project
.drapeImages	Saves draped images external to the main project. Deleting the ".drapeImages" file is the same as deleting all draped images from the project

Example:

demo_BenchBlocks_newmodel.drapeImages	11/11/2019 12:21 PM	DRAPEIMAGES File	9,033 KB
demo_BenchBlocks_newmodel.layers	11/11/2019 12:21 PM	LAYERS File	72,469 KB
demo_BenchBlocks_newmodel	11/11/2019 12:24 PM	Rapid Reserver	45,306 KB
demo_BenchBlocks_newmodel.rara.layers	11/11/2019 12:24 PM	LAYERS File	1 KB
demo_BenchBlocks_newmodel.rara.old	11/11/2019 12:21 PM	OLD File	71,516 KB
demo_DigBlocks_newModel	23/10/2019 12:02 PM	Rapid Reserver	99,691 KB
demo_DigBlocks_newModel.rara.drapeImages	23/10/2019 12:02 PM	DRAPEIMAGES File	9,033 KB
demo_DigBlocks_newModel.rara.layers	23/10/2019 12:02 PM	LAYERS File	72,469 KB
demo_DigBlocks_newModel.rara.old	23/10/2019 10:08 AM	OLD File	96,542 KB

Setup tab

The purpose of Rapid Reserver (RR) is to prepare geological reserves for scheduling in the Alastri scheduler.

In the **Setup** tab data is imported and information required for the inventory model created.

- Geological Block Models
- Pit Phase solids
- Current Mine Surveys for depletion
- Client Grade Control Databases can be imported

Information can be added to the inventory:

- Data hierarchy created
- New properties can be added
- Bench structure added to the reserves
- Material can be depleted/removed for the current project
- Wall control parameters can be added

Within RR there are 4 places where data can be removed from the Inventory. This can be used to tidy up remnant data which does not need to be scheduled, or temporarily remove data which does not need to be scheduled in the course of the current plan.

1. Setup > Depletion Surfaces:
   a. Depletion Surfaces can be added here, based on the latest mine survey.
   b. Top RIs can be set – data above/below these levels will not be included in the inventory.
2. Setup > Phase Exclusion Areas:
   a. Digitise polygons to include/exclude remnants or whole areas not to be included in the current inventory.
3. Setup > Bench Depletion:
   a. Data on whole benches (or part thereof) can be removed.
4. Designer > Properties panel > Force Exclude checkbox.
   a. Blocks can be selected in the graphics screen and excluded.

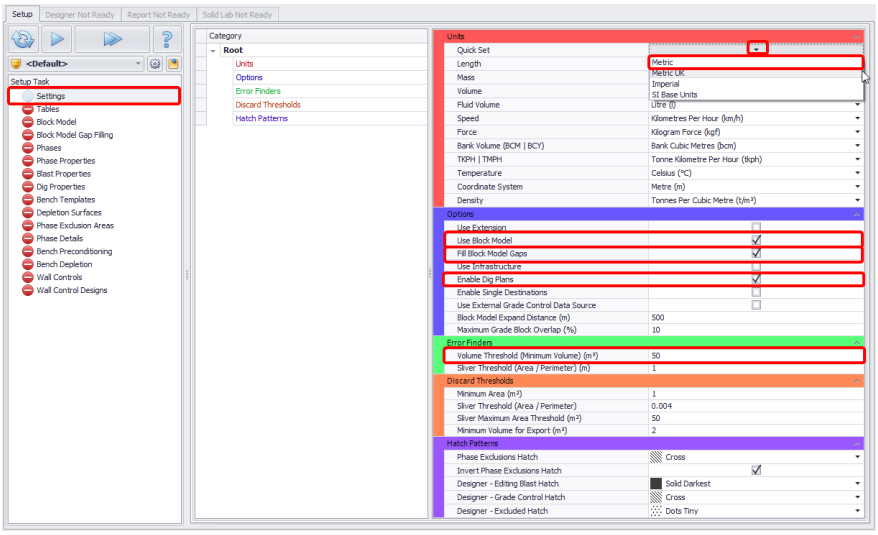
Settings step

The first step in creating a project is to review the project settings.

1. Select the units of measurement. Use the **Quick Set** field to select the metric units.
2. Depending on which options are ticked in the **Options** section, different steps appear in the Setup Tasks list. In the current project, we will need to tick the **Use Block Model**, the **Fill Block Model Gaps**, and the **Enable Dig Plans** features.
   a. **Use Extensions**: allows extra custom scripts to be added to project.
   b. **Use Block Models**: toggle to use block models for reserving.
   c. **Fill Block Model Gaps**: option to fill voids in block models with a default material.
   d. **Use Infrastructure**: needs custom Extension scripts.
   e. **Enable Dig Plans**: allows blast solids to be subdivided into dig blocks.
   f. **Enable Single Destinations:** force one material type per dig block, for grade control blocks.
   g. **Use External Grade Control Data Source**: needs custom Extension scripts to read in the customers database.

h. **Block Model Expand Distance**: visible block models are clipped to the Expand Distance around the current selection.
i. **Maximum Grade Block Overlap**: error threshold for overlaps of imported grade control polygons, in percent.

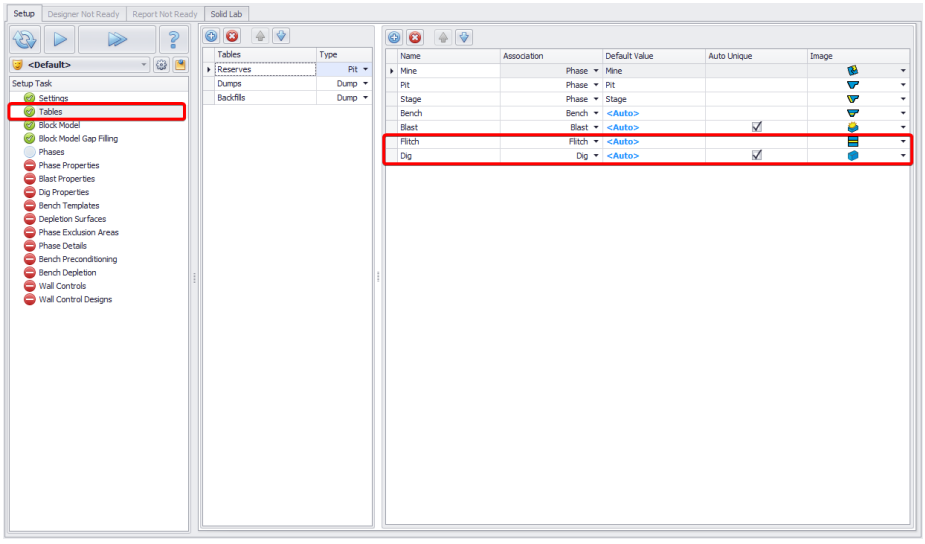
3. Set the thresholds for error (**Error Finders**) and remnant blocks exclusion.
   a. Set the minimum block area to 50 bcm.
   b. **Discard Threshold** fields: filters out solids below the specified area/width/volume.
   c. In the **Hatch Patterns** area, select a pattern from the dropdown list to highlight different areas for phase exclusion, blasts, or grade control.



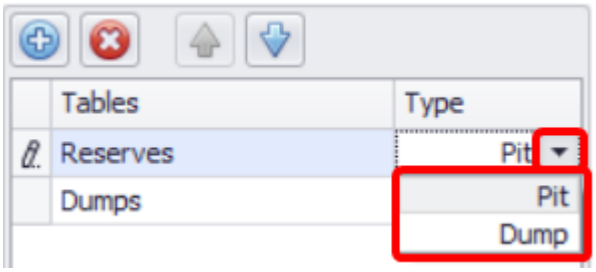
Tables step

Each table in the **Tables** step is an ordered hierarchical address, such as "Mine/Pit/Stage/Bench/Solid/Flitch/Dig".

- Long term projects may schedule to the Bench/Blast level.
- For Shorter term projects sites can schedule to Flitch and Dig blocks.
- The more blocks are created in Rapid Reserver, the slower the final schedule is, so only create down to the level required.



1. A table is either a **Pit** or a **Dump** type. This determines whether the solids will be reserved or not.



2. Add **Flitch** and **Dig** levels to the **Reserves** table.
3. Verify that the levels in the **Association** column are assigned correctly.
    a. Levels may be associated as “Phase”, “Bench”, “Flitch”, “Blast” or “Dig”. Phase levels act like folders (mine, pit, stage, pushback, …) whereas the “Bench”, “Blast”, “Flitch”, and “Dig” levels refer to specific mining terms.
    b. Each table must have exactly one "Blast" level and exactly one "Bench" level. All other levels (such as "Mine", "Pit", "Stage") are called "Phase levels".

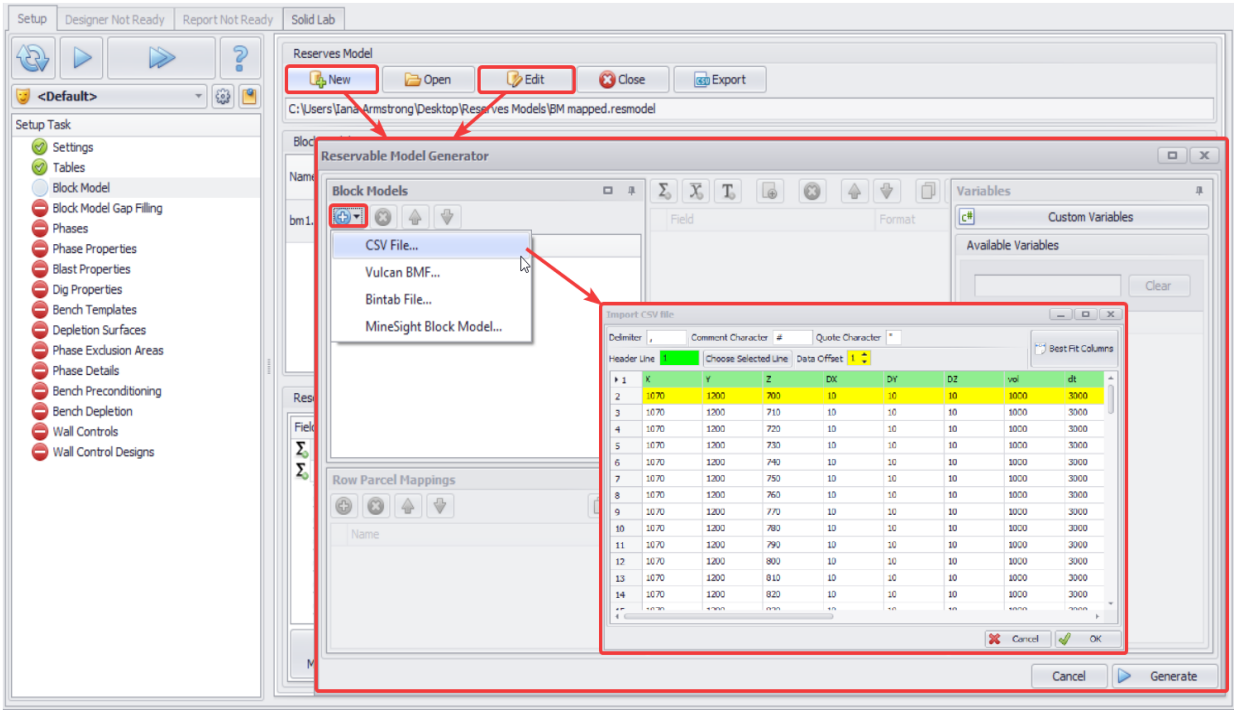
If in the **Settings** step **Enable Dig Plans** option is ticked, then one “Dig” or one “Flitch” level are required.

4. Check the **Auto Unique** column to automatically assign blocks with unique names.
5. Select the relevant images for each level.
6. Press the blue plus icon to run this step and proceed to the next one.

Block Model step

In the **Block Model** step, you will be prompted to load your block models.

1. Click the **New** button to open the **Reservable Models Generator** window.
2. Press the blue plus button and import block models CSVs: “pit1a”, “pit2a” and “pit3a”.
3. In the **Import CSV file** window, select the applicable parameters and set the Header Line and Data Offset, if necessary.
    a. Set the green **Header Line** to match the header text.
    b. Set the yellow **Data Offset** to match the first row of data.
    c. Press OK to finish.



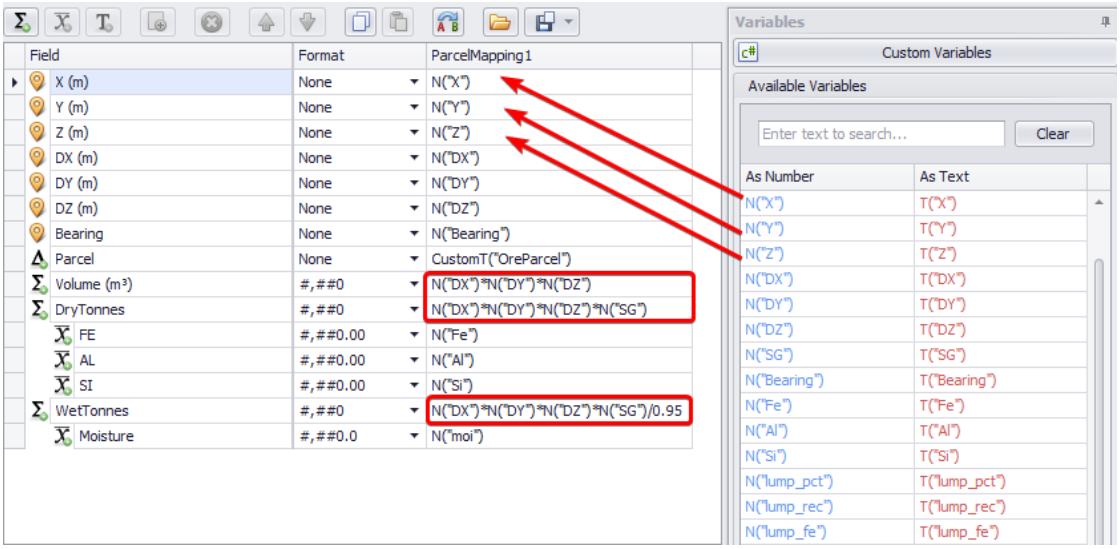
When importing Block Model CSV, you'll see a preview of the first 100 rows of this CSV. It's a good time-saving feature, as your site Block models CSVs can be of a very large size and take a long time to open.

Once the block model has loaded, its header fields are listed in the **Variables** panel on the right.

The **Field** column (on the left) lists the fields of the reserves model, and you will need to map them with the fields from the imported block models.

Example:

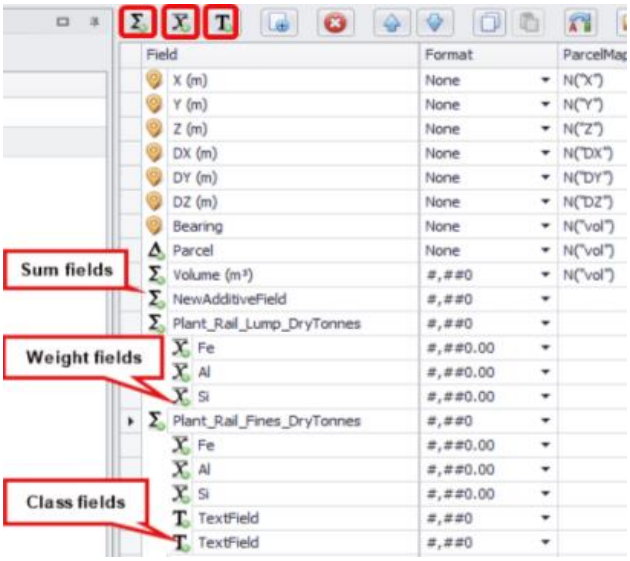
- Drag and drop N("X") variable to the X (m) field, N("Y") variable to the Y (m) field, etc.
- For the **Volume** field use the formula N("DX")*N("DY")*N("DZ").
- For the **DryTonnes** field use the formula N("DX")*N("DY")*N("DZ")*N("SG").
- For the **WetTonnes** field use the formula N("DX")*N("DY")*N("DZ")*N("SG")/0.95.



Fields

Numeric fields use the N("field") syntax, and text fields use the T("field") syntax.

New reserve model fields can be created by clicking the sum, weighted, and class icons located in the top button toolbar. These add new rows into the field list.



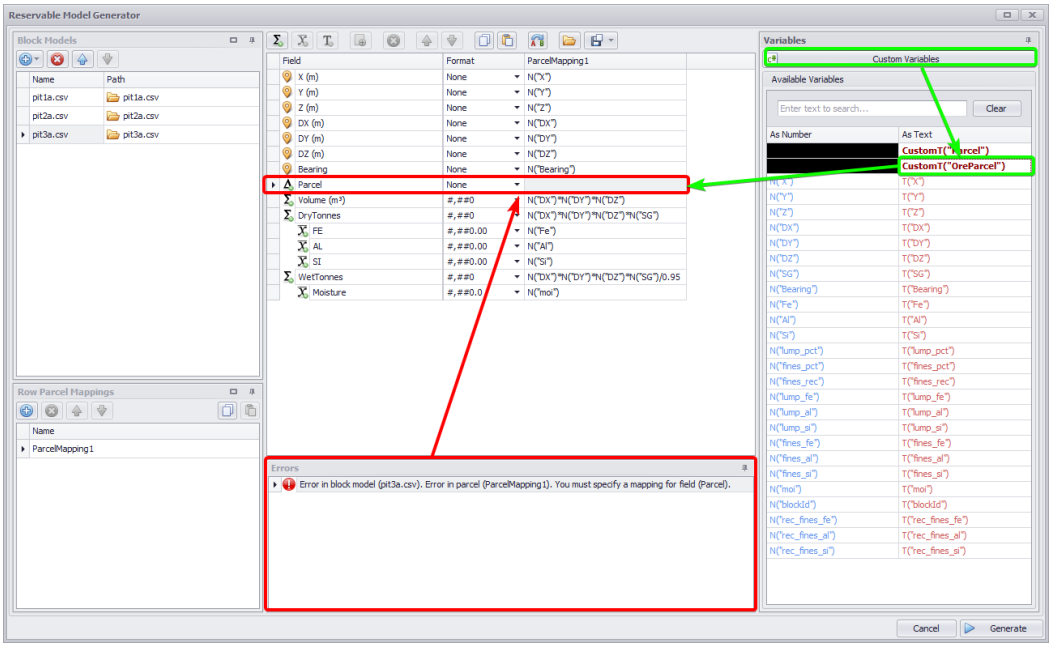
- **Sum** fields are summed together, such as volumes, tonnes, and gold ounces.
- **Weighted** fields are weight-averaged by their parent field, such as iron percent or gold ppm.
- **Class** fields create subtotals of their parent fields, such as tonnes of Indicated / Inferred / Measured.

➢ Create and map the fields for Fe, Al, and Si.

- Use the top button toolbar to add the fields under the correct parent.
- Use the variables list to map values into the fields.
- Select the appropriate format for each field.

- Check for hints in the **Errors** panel below the fields.

If required variable is not available, you must create/edit it in the **Script Editor** window, which can be accessed via the **Custom Variables** button.

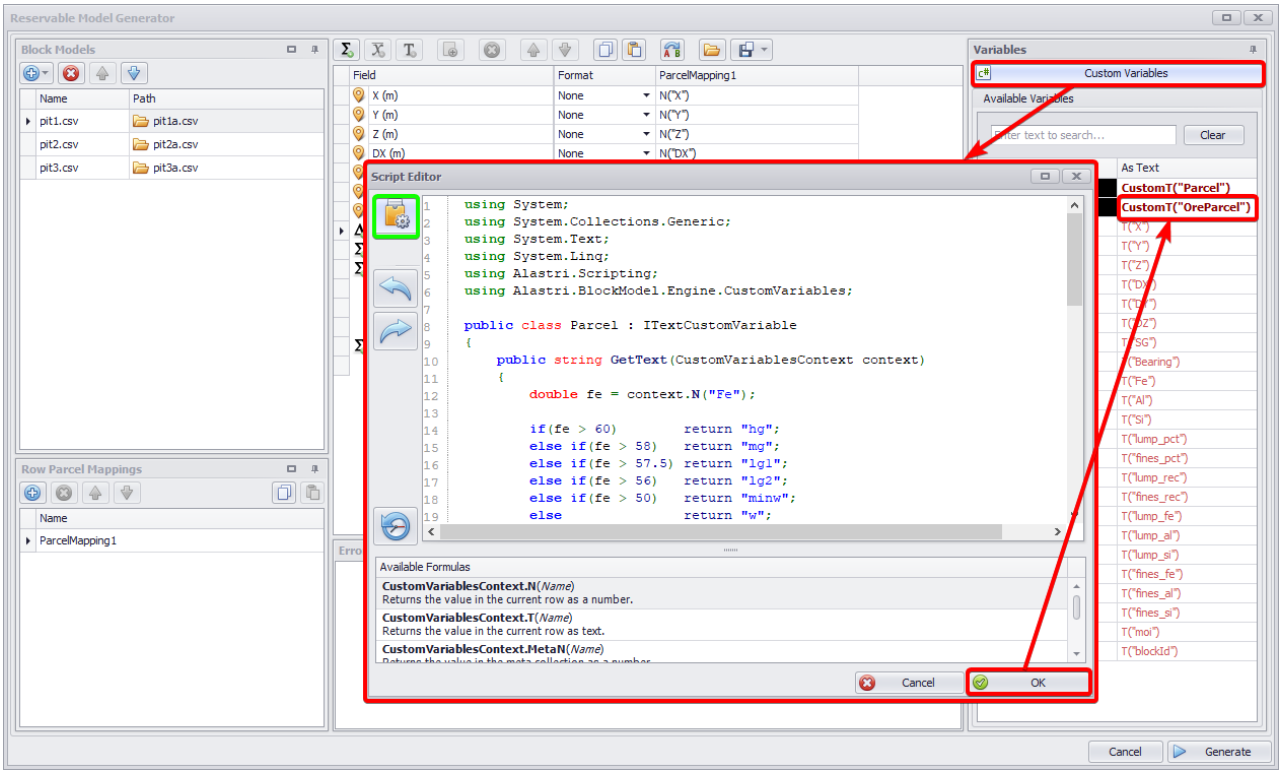


Creating Custom Variable

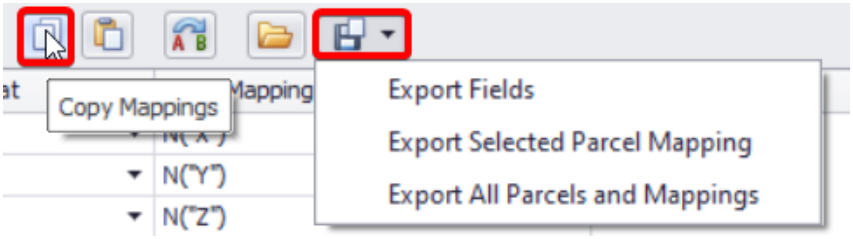
To create a custom variable required for fields mapping and reserves model generation:

1. Press the **Custom Variables** button.
2. In the **Script Editor** window, customize the formula code.
3. You can copy sample scripts from the RR. Block Model Custom Variables section in the main documentation space and paste them into the Editor window (for easy access: press the **Help** icon (Question mark) and navigate *Rapid Reserver Documentation > RR. Exercises > RR. Block Model Custom Variables*).

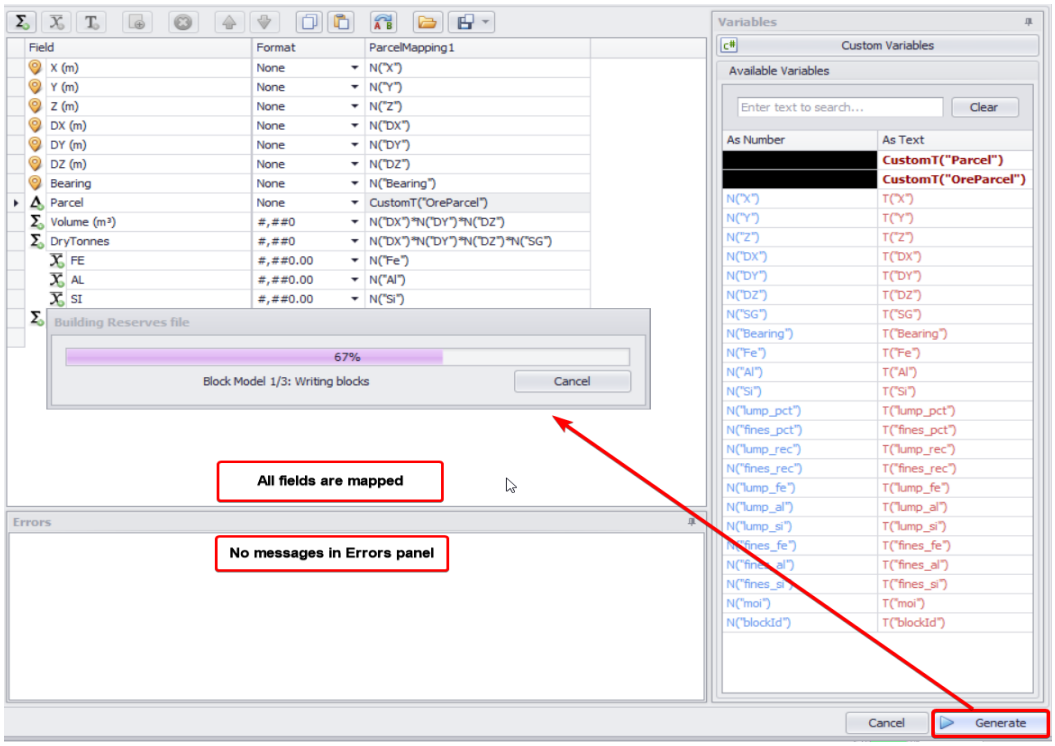
4. Change the required values, such as the parcel and thresholds.
5. Verify that the code is correct by pressing the **Compile** button.
6. If there are no errors, click OK.
7. The new custom variable will appear in the **Variables** list on the right in bold. Drag and drop it to map it to the applicable field.



Once all the fields for the pit1 are mapped, copy or export them for further pasting in pit2 and pit3 models.

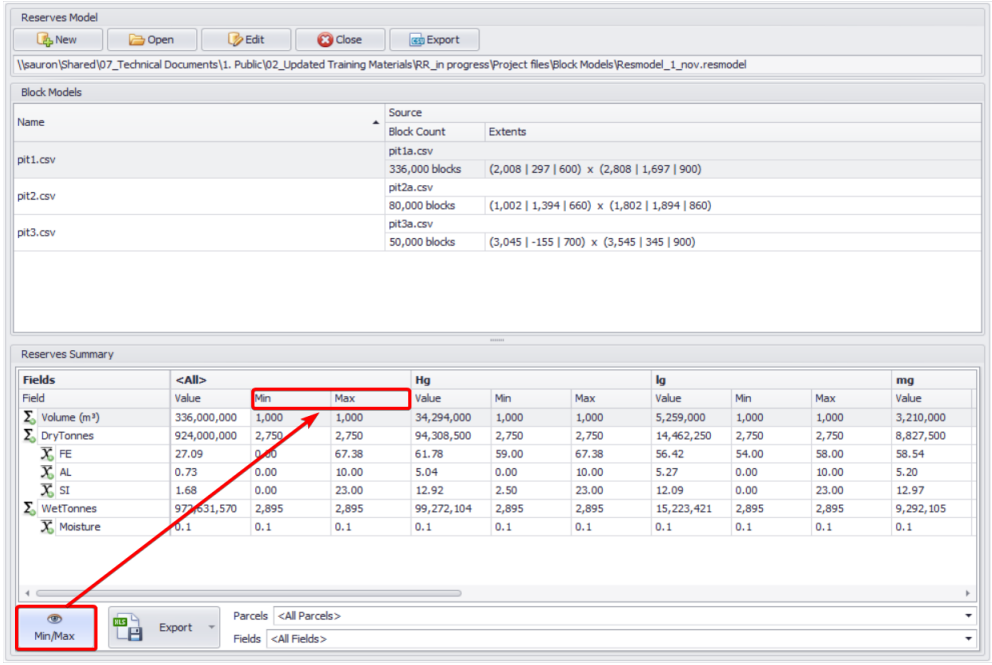


- If the **Errors** panel is blank, and all relevant fields are mapped, press **Generate** to build the reserve model.



Once the reserve model file has been generated, a block model summary is displayed for each loaded block model.

- Use the **Min/Max** toggle to inspect the data for missing or rubbish values.
- Check the material types, tonnes and grades for ballpark accuracy.

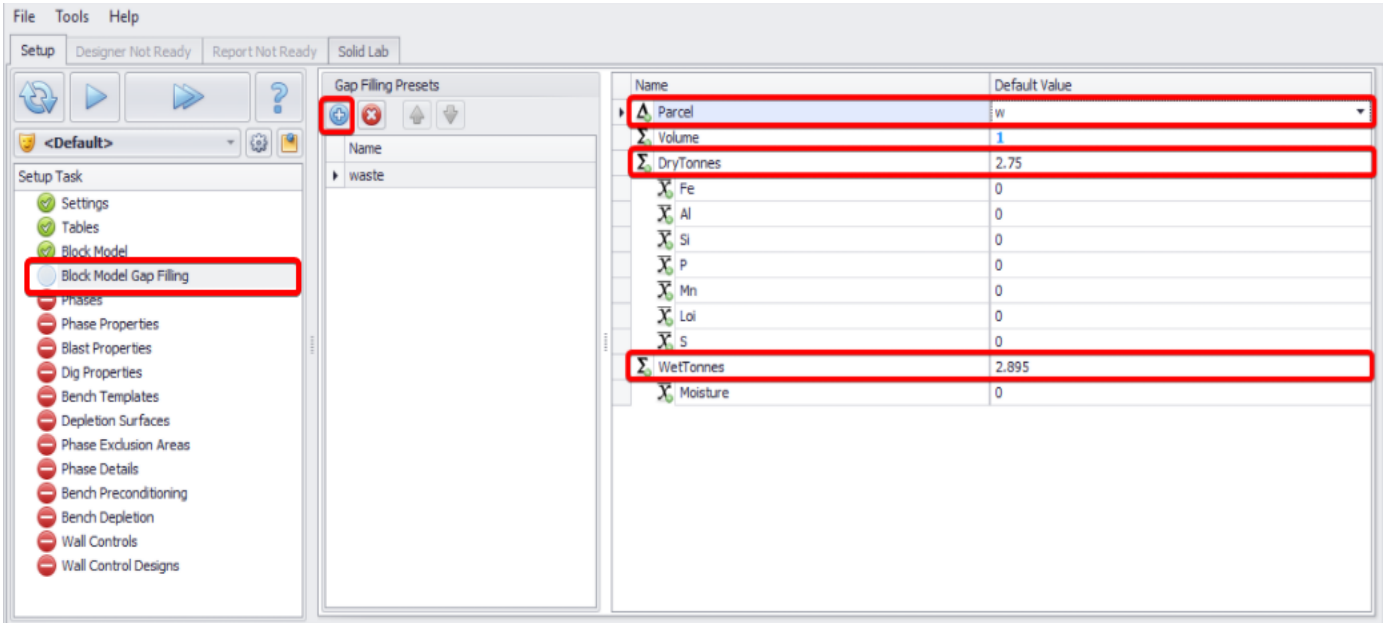


Press the blue play icon to run this step and proceed to the next one.

Block Model Gap Filling step

Option to fill voids in block models with a default material. Where the mining solid surface is outside the block model extents. Gap filling material should be waste, if it could be anything else, discuss with the geologists who prepared the blockmodel. If gaps are present and gap fill is not used, the schedule will apply zero tonnes for this mining area.

1. In the **Gap Filling Presets** column, add a new preset for the material used to fill the voids. Name it, for example, "w" (waste).
2. In the **Parcel** field select "w" (waste) from the dropdown.
3. Set DryTonnes to 2.75 and wetTonnes to 2.895.
4. Press the blue play icon to run this step and proceed to the next one.



Phases step

In the **Phases** step, the user is prompted to create/import phases for later reference in the project. Note that the names and order of the phases in the entire project are specified in this step. Make sure that the phases are added, named and listed in the correct order.

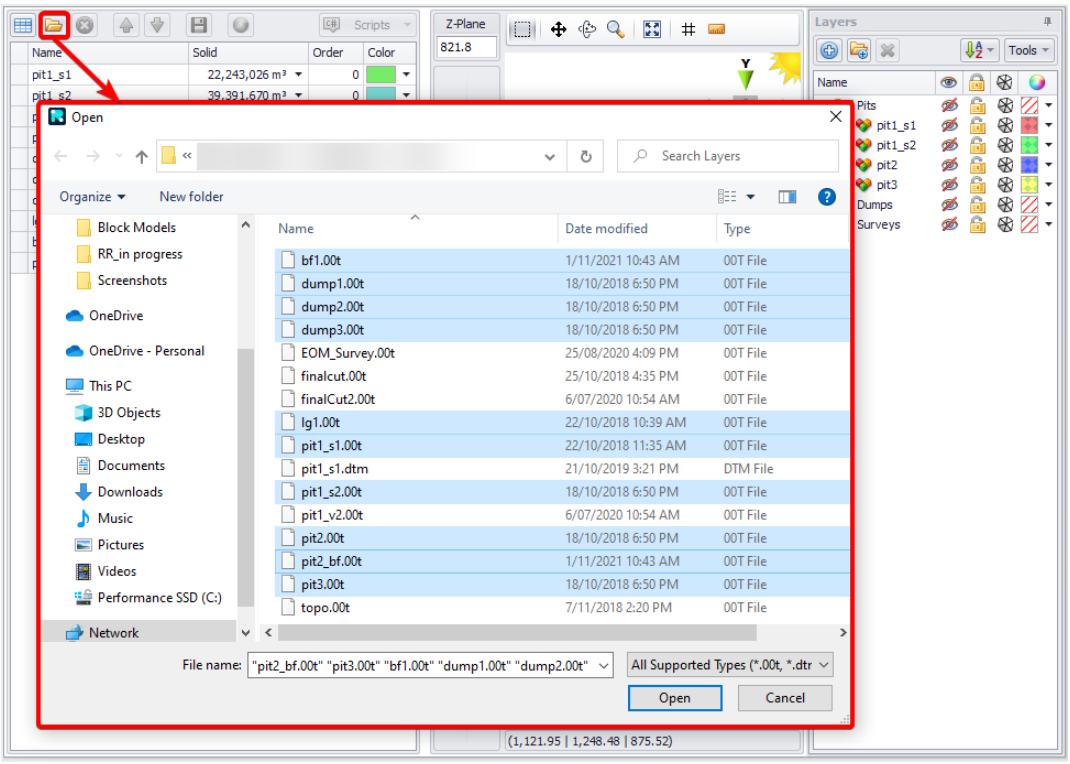
Each phase is defined by a **closed** master solid.

1. Import updated and new phases.

If you do not have closed pit solids (as in this training project), navigate to the **Solid Lab** tab section to generate them from designs.

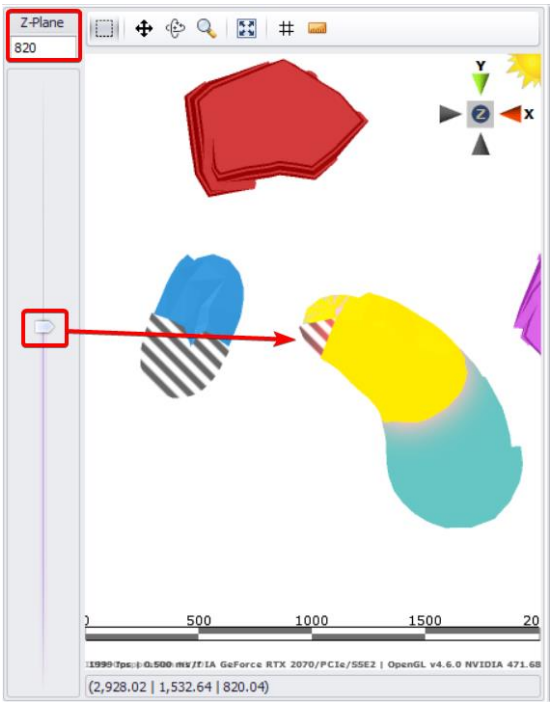
2. You can import from a file, **Solid Lab** tab, or a third-party package (Vulcan/Minesight/Surpac).
3. Pit solids must be closed (NOT open pit designs).

If you have closed pit solids:

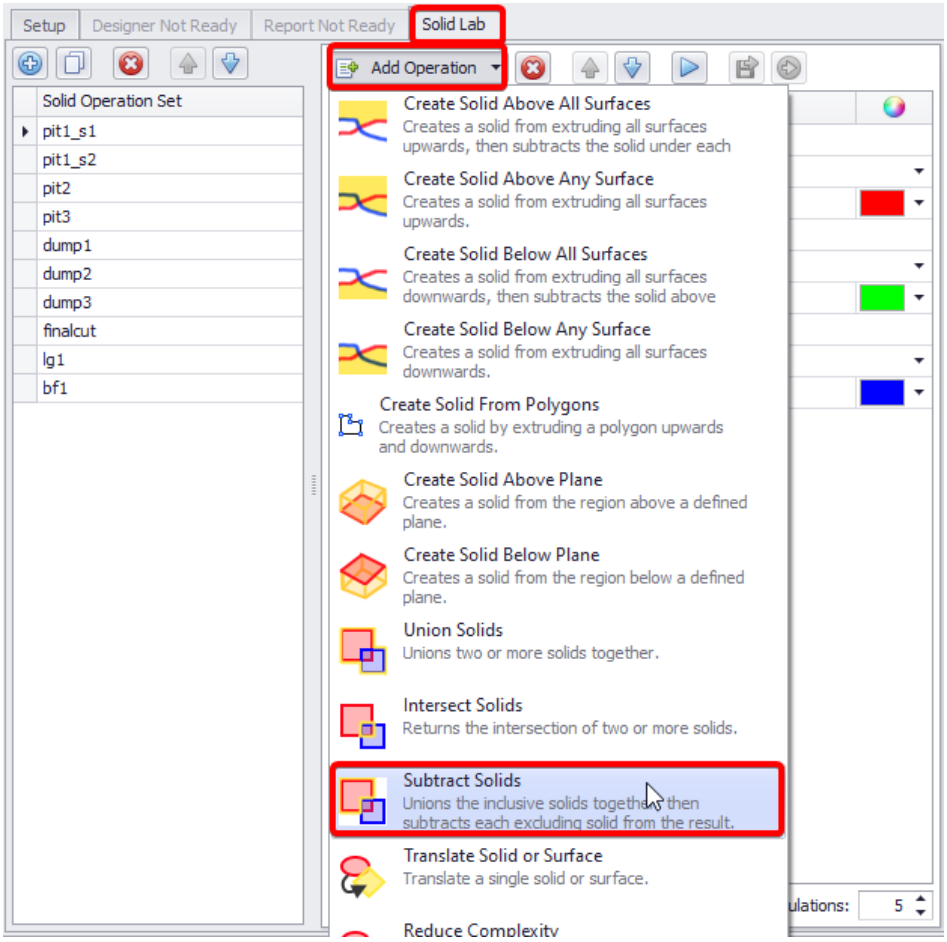


Use the vertical slider (between the phases list and the view area) to check for overlaps.

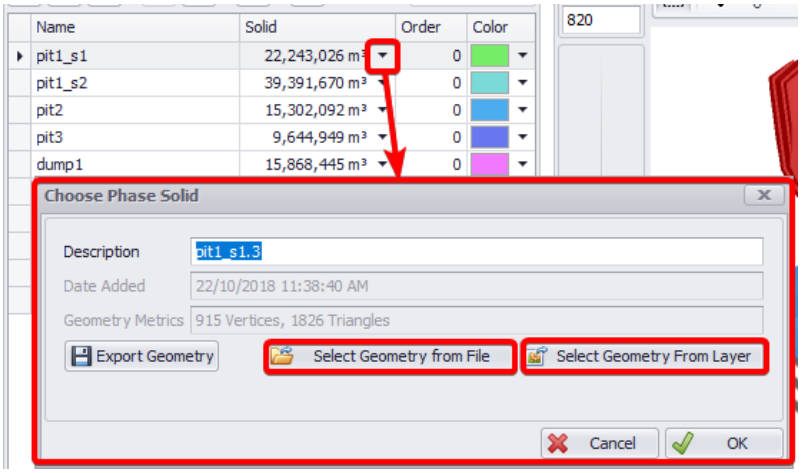
- Overlaps are a problem when material is included in multiple phases leading to double counting of tonnes – this must be fixed. So each block is mined only once.
- In the image below see that the same area is used for 2 different purposes: first Pit1 is mined out, then the area is used as a backfill. The block is mined once, the area is then available to backfill with waste.



- To avoid double-counting tonnes in an overlap, revert to the **Solid Lab** and use the **Subtract Solids** function to clean up the data.



To update the solid for a given phase, click in the **Solid** dropdown and select Geometry from File or from Layer.

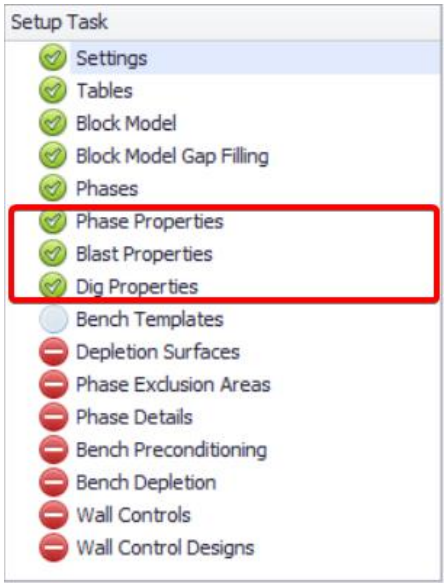


When updating solids, avoid deleting them and adding new ones, as it will prompt you to re-populate phases details and other settings. Always re-import solids to update phases, instead of deleting them.

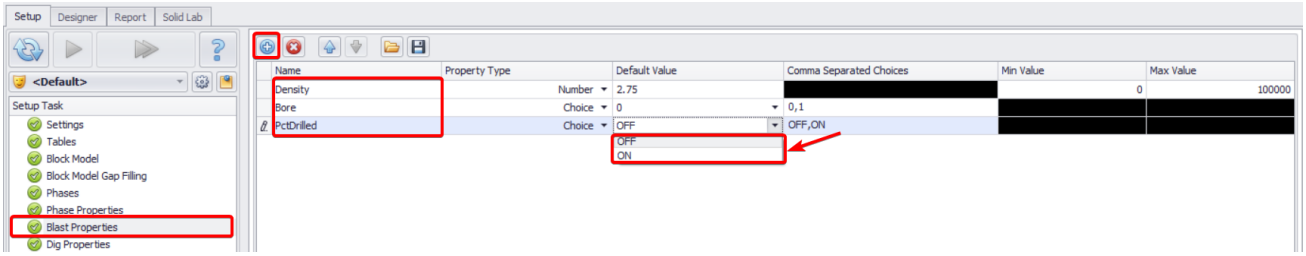
Phase/Blast/Dig Properties steps

If extra properties (that are not mapped across in the Resmodel) are required for later scheduling purposes they can be added here under the relevant step.

- **Phase Properties** step provides option to create properties for each phase. This might be used to flag some phases for special treatment, such as backfill ramp solids vs. reserve solids.
- **Blast Properties** step can be used to assign a tag or a value to a blast for use in schedule software downstream.
- **Dig Properties** step can be used to assign a tag or a value to a dig for use in preschedule software.



1. In the **Blast Properties** step create a new property for Density (Default 2.75).
2. Add a PctDrilled property - for a schedule that has drilling. Default is set to OFF (0), in the **Designer** tab you can set blocks as already drilled or partially drilled (have to script in drilling in the Scheduler).
3. Add a property for Bore – default is set to OFF (0), in the **Designer** tab can switch to ON (1) for blocks with Bores. Allowing scripts to be written in the Scheduler and add a delay around moving bores.
    a. If you select the **Choice** property type, create comma-separated properties (0,1 or OFF,ON) that can be selected from the **Default Value** dropdown.
    b. If you select the **Number** property type, enter a numeric Default Value.

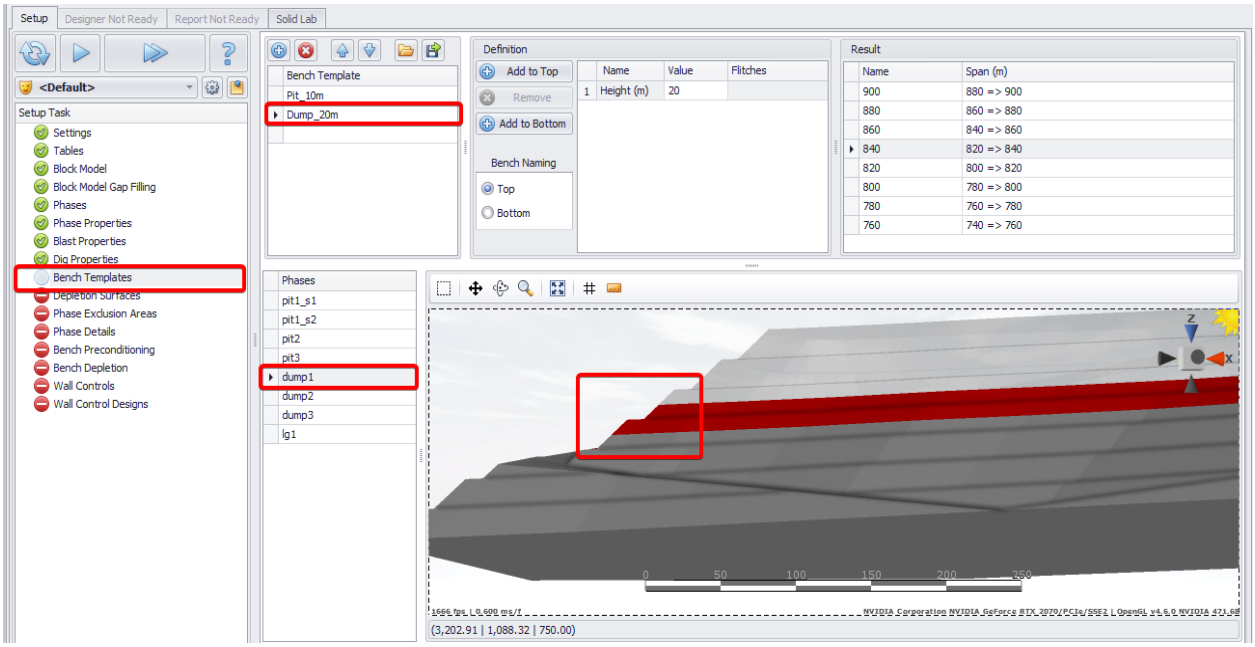


Bench Templates step

In the **Bench Templates** step we create the bench height options that can be applied to phases. You may choose a single template to cover all pits or have multiple templates for different mine areas.

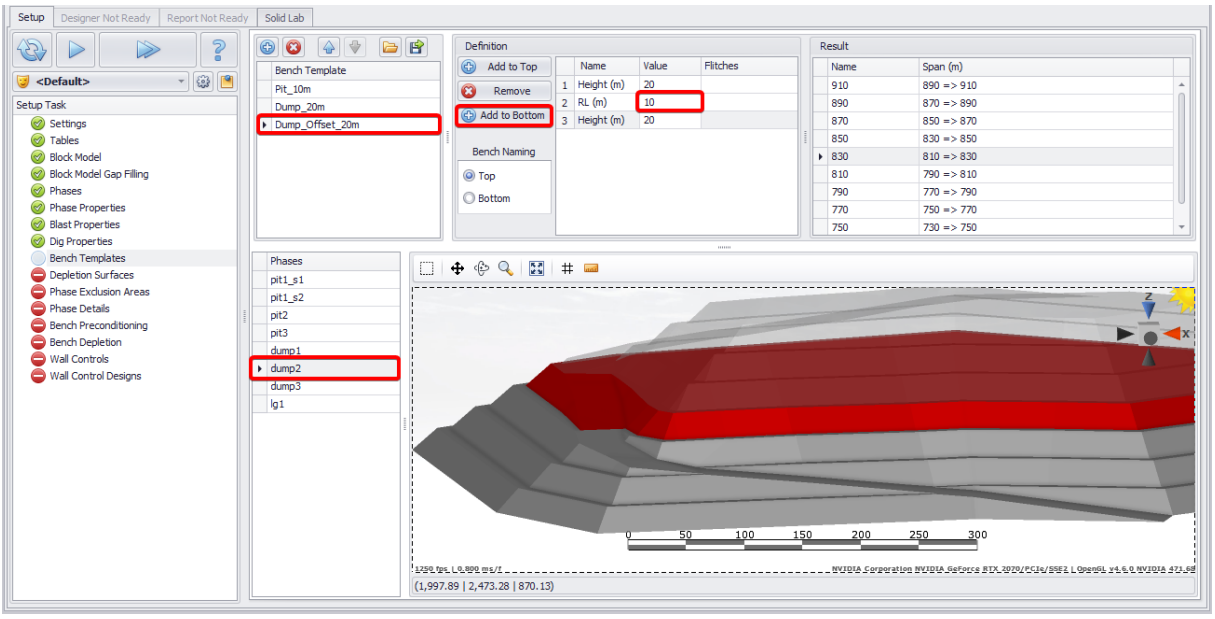
Click the blue plus sign icon in the **Bench Template** panel to add a new template.

1. Add a New Template for pit bench, rename it to "Pit_10m".
    a. In the **Bench Naming** field tick **Bottom**.
    b. Set bench template height to 10.
    c. Ensure that the template fits the pit design (Pit1_s1). The red template should match the pit solid contours, without offsetting.
2. Add a new template for dump lift, rename it to "Dump_20m".
    a. In the **Bench Naming** field tick **Top**.
    b. Set bench (lift) template height to 20.
    c. Ensure that the template fits the dump design. The red template should match the dump solid contours, without offsetting. For Dump1 a template set to 20m lifts will be offset against the design, as shown below.



To fix, set the RL for the template used for Dumps 1 and 2.

1. Add a new template for dump offset, rename it to “Dump_Offset_20m”.
2. Select “Add to Bottom”.
3. Add Reference Level = 10.
4. Set Height 20m above and below the reference (RI).



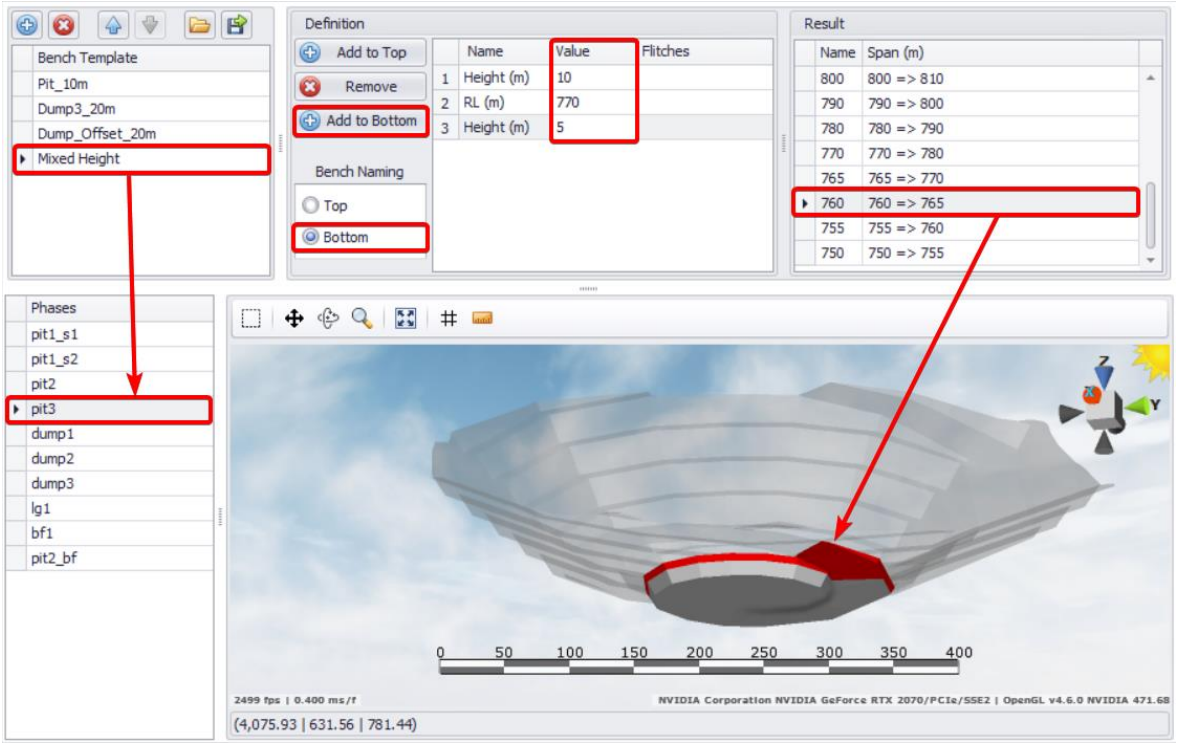
Check Dump1 and 2 using the new template - the red template should fit the lift design.

5. Rename Dump_20m to **Dump3_20m.**

Naming templates should be the same as the Phase they apply to. It will help to choose the correct template in the **Phase Details** step.

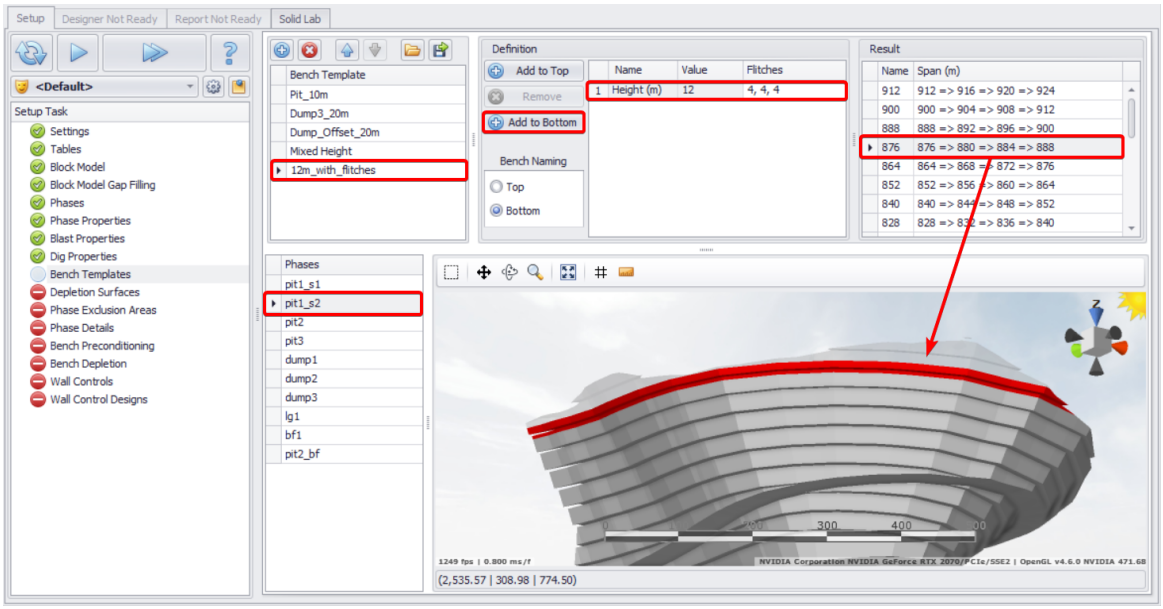
Exercise 1. Create a mixed-height template

1. Press the blue plus icon to add a new bench template.
2. Rename it to “Mixed Height”.
3. In the **Definition** panel, press **Add to Bottom**.
4. Change the threshold RL to the elevation where the bench heights change (set to 770m).
5. Set the bench height above the threshold (set to 10m).
6. Set the bench height below the threshold (set to 5m).
7. Review how this template fits pit3 solid in the viewport.



Exercise 2. Create a bench template with flitches

1. Press the blue plus icon to add a new bench template.
2. In the **Definition** panel, press **Add to Bottom** and change the height to 12 m.
3. In the **Flitches** column enter the comma separated flitch heights (4,4,4).
4. In the **Phases** panel select pit1_s2 and review in the viewport how this template fits pit1_s2 solid at the 876RL.



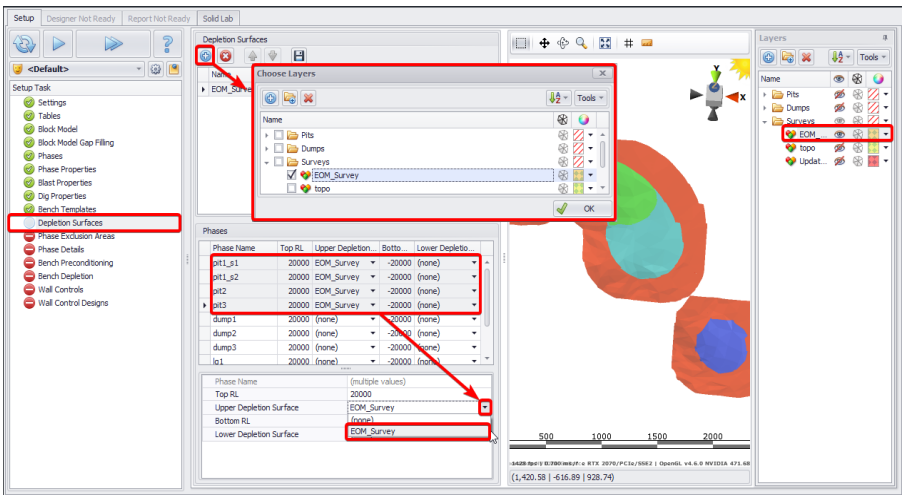
Once you are satisfied, press blue play button to proceed to the next step.

Depletion Surfaces step

Update Phases with latest mine survey.

- Only import blocks relevant to the current schedule.
- Top RLs can be set – data above/below these levels will not be included in the inventory.

1. Add a depleted surface survey.
2. Select the phases to apply this survey to. Use the <CTRL> and <SHIFT> keys to select multiple.
3. Use the dropdowns to select Upper and Lower depletion surfaces to be applied to the selected phases.
4. In the **Layers** panel, display the End of Month surface and check the result in the viewport.
5. Press the blue play icon to run this step and proceed to the next one.

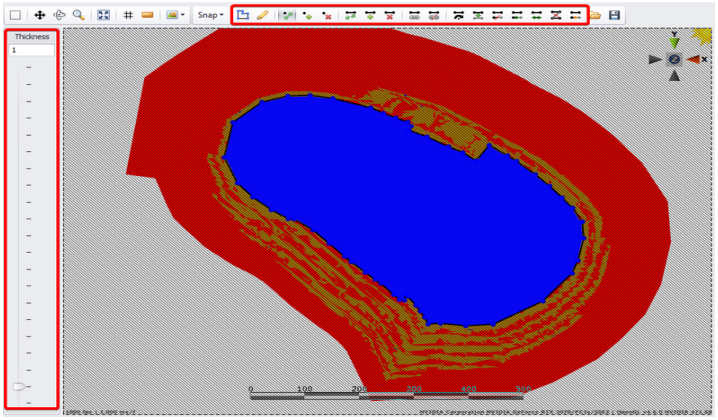


Phase Exclusion Areas step

When the Depletion Surface has been applied to the pit phases, in **Phase Exclusion Areas** step we can remove remnant material from the reserves.

1. Select Z to view the pit in Plan view.
2. Set the vertical slider to identify the areas to remove - remnants on the wall < 1m thick.
3. Draw a polygon around the areas to keep for scheduling.

a. If mistakes are made in digitizing, use the edit icons to move points etc.



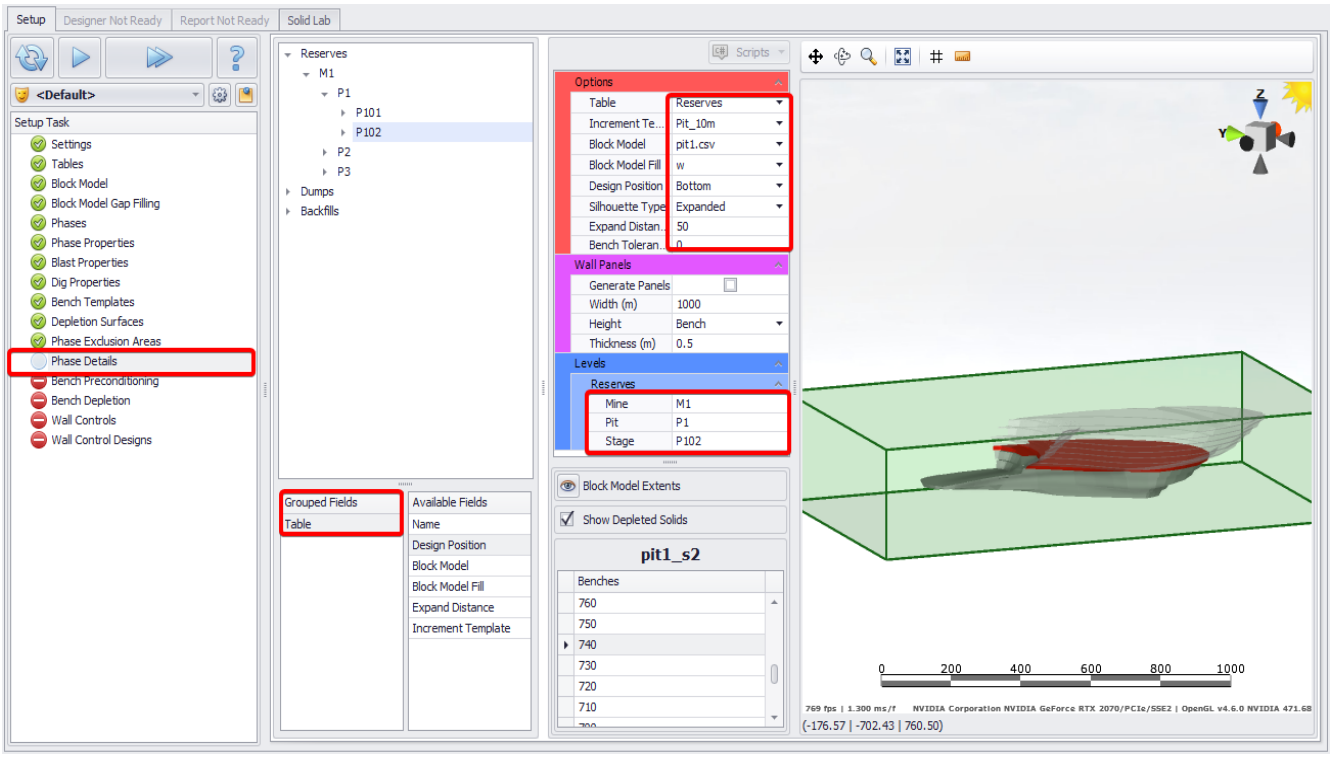
If required, you can include/exclude whole areas not to be included in the current inventory.

Phase Details step

In this step you may update the table, block model, bench template, and default properties for each phase, including:

Update phase details for all phases including:

1. Table Type: is it Reserves/Dumps/Backfills?
2. Increment Templates: what are the bench heights? (Ensure that the correct template is applied).
3. Block Model: which block model to reserve from? (For dumps = (none)).
4. Block Model Fill: which material to fill block model gaps with? (waste).
5. Design Position: elevation of exported polygons (top or bottom of bench).
6. Silhouette Type: select “Expanded”, “Normal”, or “None” silhouette type.
7. Expand Distance: this value should almost always be left at the default 50 meters.
8. Bench Tolerance: threshold depth for eliminating skirts and brims from bench solids.

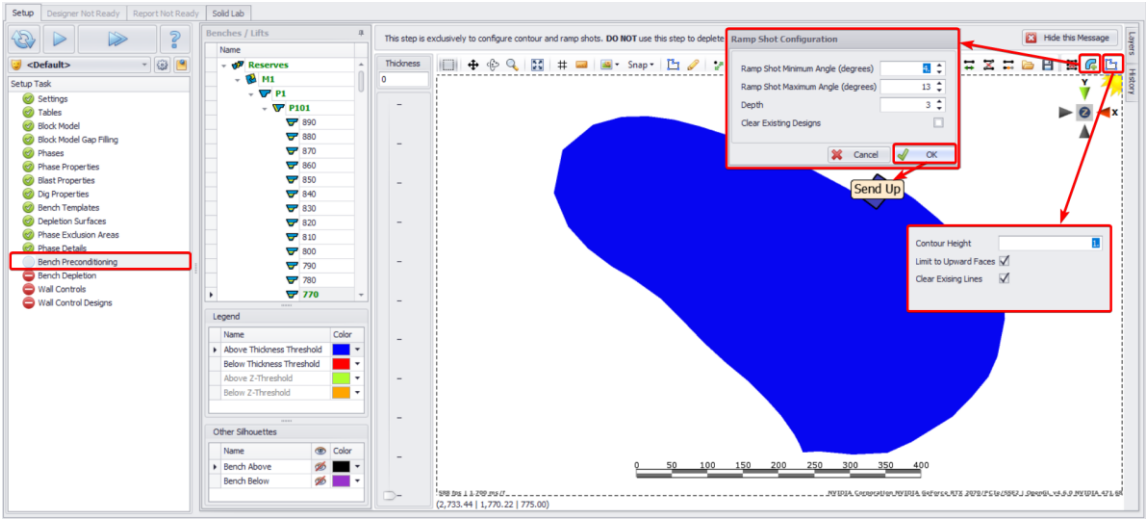


Make sure that each level is assigned with a unique name. Otherwise, you won't be allowed to proceed to the next step.

Bench Preconditioning step

The **Bench Preconditioning** step allows users to send material between benches where it makes sense to do so. Common scenarios where this may occur are sump shots, shallow contour areas and ramp preconditioning. This step **should not** be used to send remnants to the below benches. This can be achieved in the next step (Bench Depletion).

This step is exclusively to configure contour and ramp shots. DO NOT use this step to deplete benches or flitches!

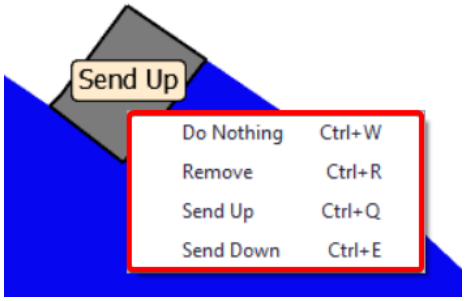


Defining Areas

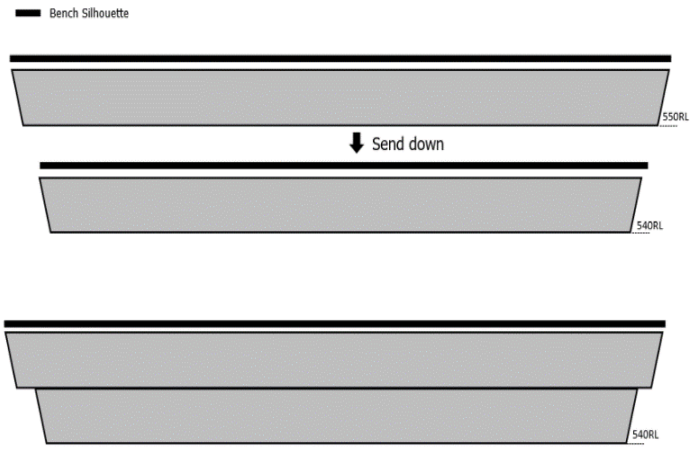
Areas within the bench to be reallocated need to be defined by a closed polygon that can be created using the CAD tools in the viewport toolbar. The CAD tools are found in various other steps within Rapid Reserver and behave in the same manner, except for two buttons, **Generate Ramp Shots** and **Add Contours**, circled in red in the figure below.

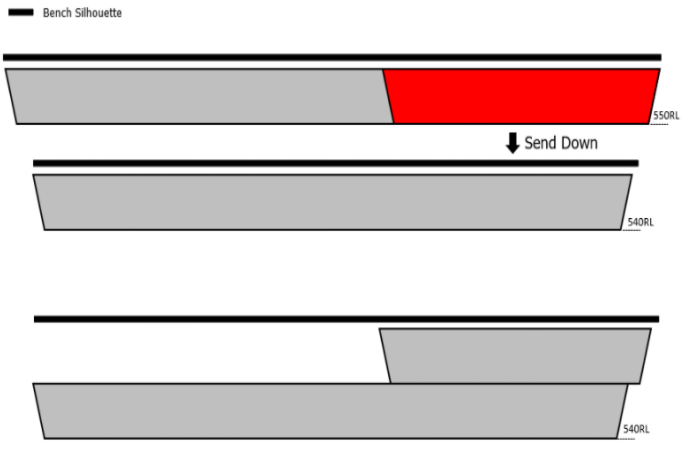
Reassigning Material

Choosing what to do with the material enclosed within a polygon can be made by right-clicking on the polygon and selecting an option from dropdown.



It is important to understand, that the benches dealt with in Bench Preconditioning are based on the **Original Phase Solids**, not the depleted Phase Solid. This means that material sent between benches can affect the final silhouettes of the benches. Two simple examples of this are shown in the images below.

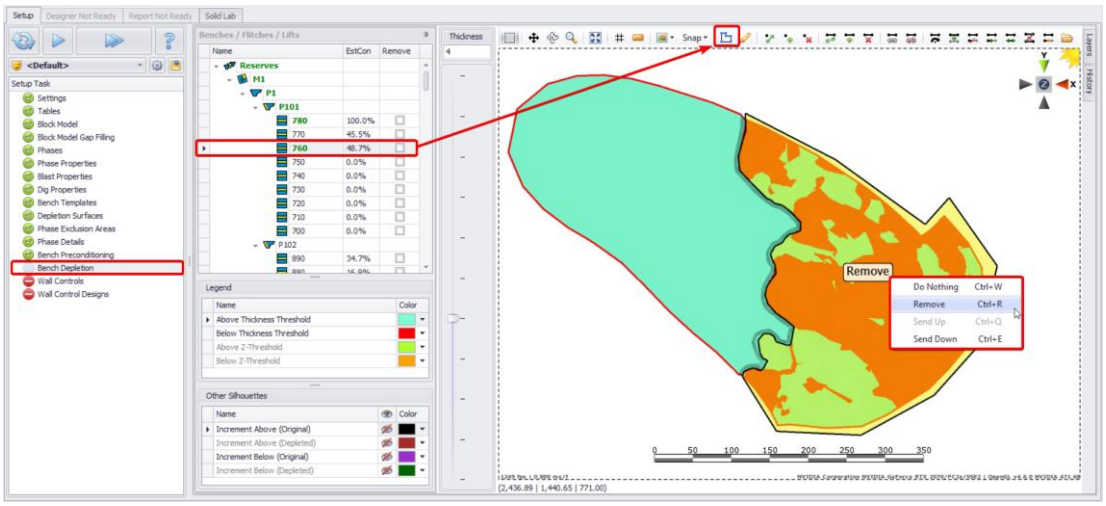




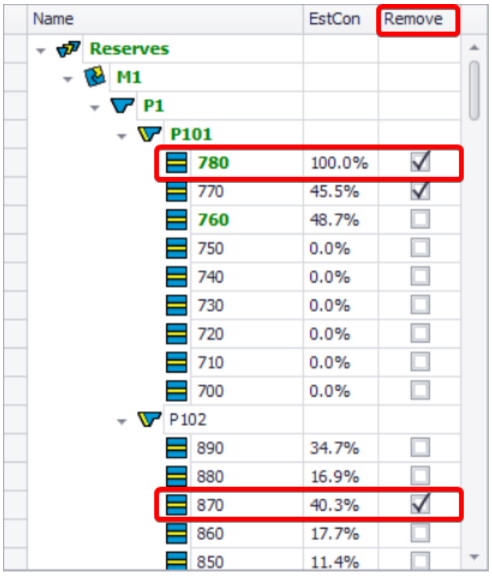
Bench Depletion step

To remove or Send Down bench/flitch material of a thickness below specified:

1. Double click a bench to select it.
2. Use the vertical slider to visually display areas to be excluded (thickness < 4).
3. Digitize a polygon around an area to remove/send down – press <Esc> when finished.
4. Click the drawn block - it will be shown in yellow.
5. Right-click to display a list of options, available for the selected material. The selected material can be removed or sent down to be mined with the material of the bench below.



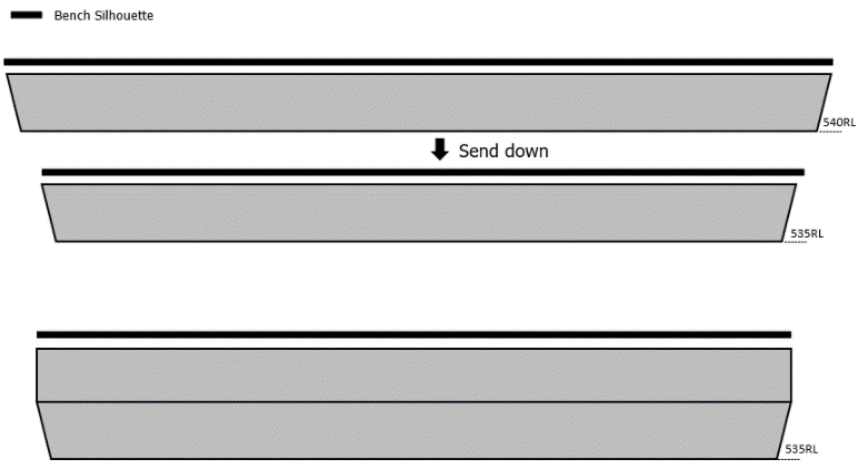
You can tick a box to remove an entire bench/flitch (if the remnant material percentage is too high).



The **EstCon** (estimated contour) column provides users with a high-level estimate on whether or not remnant material may be present within a flitch. This number is not used anywhere else within the software and is by no means accurate. The higher the number, the higher the change there is material that needs attention.

- ✓ The grades and material types will the same as those of the new bench. The information is not transferred to the new bench, just the extra tonnes.
- ✓ This is useful in a short-term schedule. Generally irrelevant in a long term and this material could be removed.

It is important to understand, that the benches dealt with in Bench Depletion are based on the **Depleted Phase Solids**, not the Original Phase Solid. This means that material sent to the flitch below will be trimmed by the silhouette of the receiving flitch. A simple example of the behaviour is shown below.

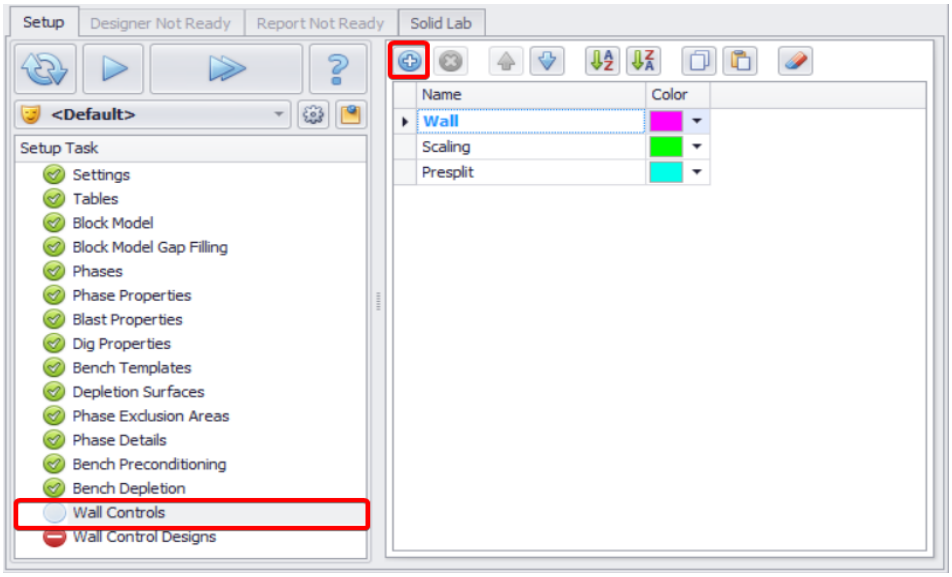


- ✓ Material from the flitch above gets trimmed by the silhouette of receiving flitch below.

Wall Controls step

The **Wall Controls** step allows users to specify blast properties such as wall edges and presplit edges. This may be used to calculate drill and blast values in scheduling software downstream.

Wall is set by default. Press blue plus icon to create new wall controls techniques specific for your project, such as pre-splitting, scaling or meshing, if required.



Wall Control Designs step

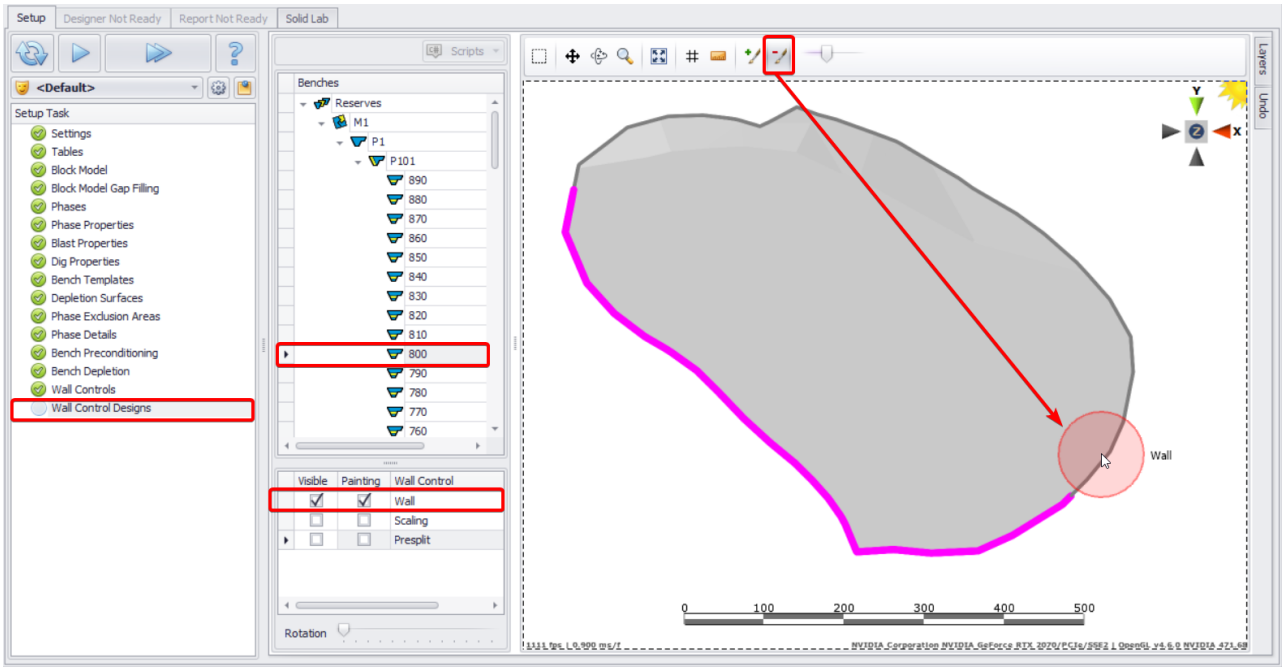
In this step you have an option to edit wall control properties by benches.

Example: extra properties to define activities that only occur in a wall shot.

Here area defined as Wall will have Trim blasts, with the rest of the bench having Production blasts. With further scheduling, rules can be set so that the production blasts in front of a Trim blast must be mined first.

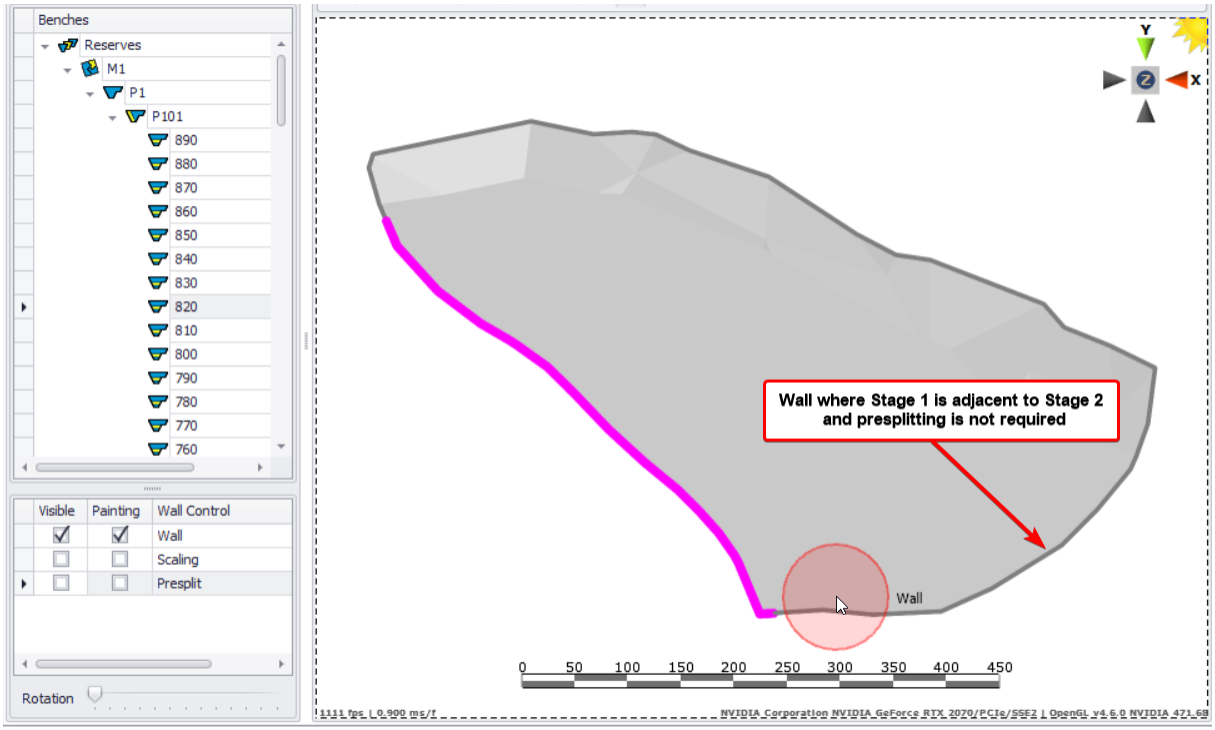
Areas where Pit1_s1 is adjacent to Pit1_s2 will not require Trim blasting. So this wall should be removed.

1. Select bench required from the **Benches** tree, it will be displayed in the main viewport.
2. Check the Wall Control for Painting.
3. Select the Remove Wall Icon.
4. Un-paint the area where wall control is not required (adjacent phases).
5. Use the horizontal slider to adjust the size of the paint brush.



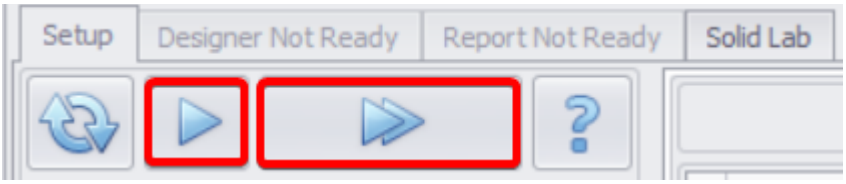
Exercise:

Click on every single bench of the Stage 1 (P101) and remove walls adjacent to Stage 2 (P102). Since these stages are adjacent, presplitting is not required on the neighbouring walls.



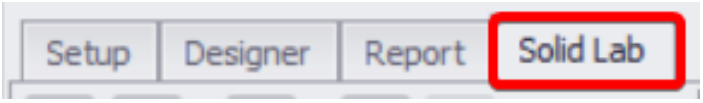
Run Setup steps

When you have completed all the Setup steps of the **Setup Task** list, click the blue play button to run the last step or all steps to confirm and move to the **Designer** and **Report** tabs.

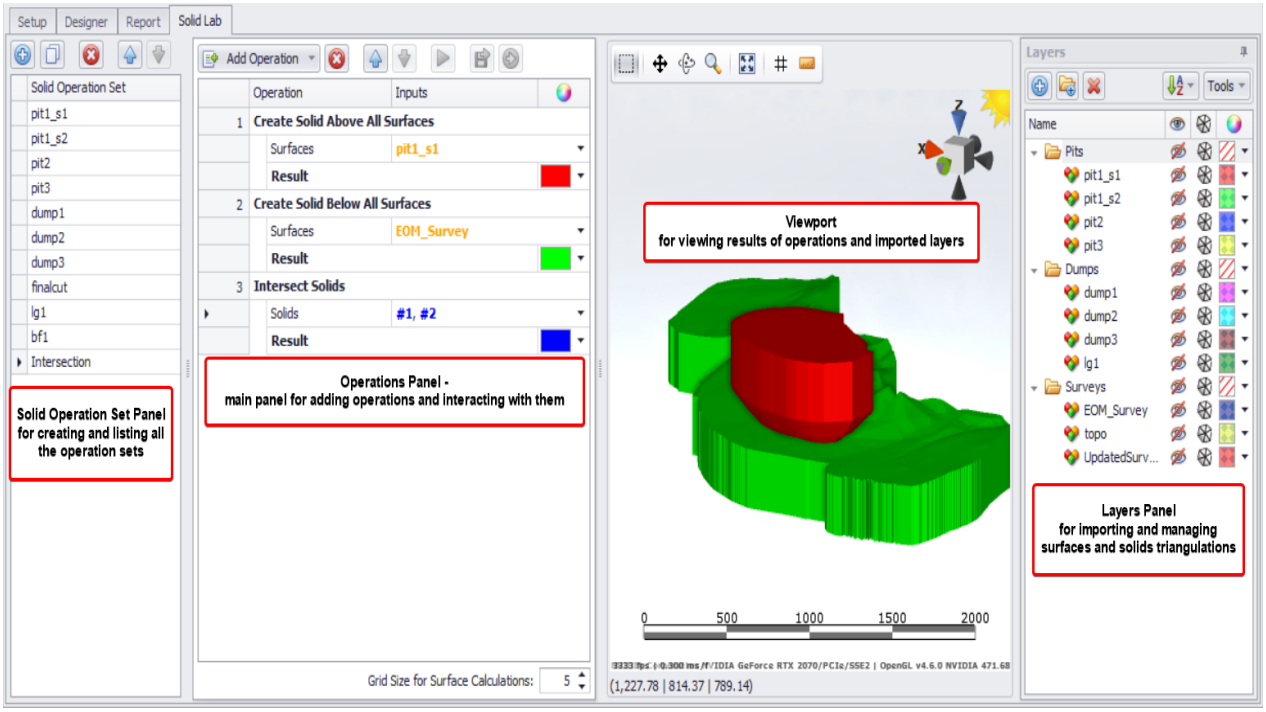


Solids Lab tab

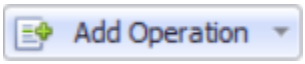
All benches in Rapid Reserver are cut from a master solid. These can be imported as existing solid files or created in the **Solid Lab** tab.



The **Solid Lab** tab consists of four main sections, shown in the image below:



Operations

Click the **Add Operation** button 

to display a list of the available operations. Each operation performs a single boolean step and a number of these steps are used in concert to create the final result.

Operations from **Add Operation** dropdown are explained in table below.

Operation	Description
Create Solid Above All Surfaces	If multiple surfaces are overlapping, this option will use the **upper** triangulated surface of the overlapping surfaces as the base for the solid being created. Then this surface projects up to create a closed solid.
Create Solid Above Any Surface	If multiple surfaces are overlapping, this option will use the **lower** triangulated surface of the overlapping surfaces as the base for the solid being created.
Create Solid Below All Surfaces	If multiple surfaces are overlapping, this option will use the **lower** triangulated surface of the overlapping surfaces as the top for the solid being created.
Create Solid Below Any Surface	If multiple surfaces are overlapping, this option will use the **upper** triangulated surface of the overlapping surfaces as the top for the solid being created.
Note	If only one surface is loaded **Create Solid Above All Surfaces** or **Create Solid Above Any Surface** will behave the same and lead to the same result. If only one surface is loaded **Create Solid Below All Surfaces** or **Create Solid Below Any Surface** will behave the same and lead to the same result.
Create Solid From Polygons	Creates a solid from a polygon. These polygons can be digitised or imported
Create Solid Above Plane	Define a plane by typing in an X, Y, Z value. An upper surface is projected above this plane and a closed solid is triangulated.
Create Solid Below Plane	Define a plane by typing in an X, Y, Z value. An upper surface is projected below this plane and a closed solid is triangulated.
Union Solids	Joins two or more solids into the same layer. These solids can be intersecting, but may be free standing.
Intersect Solids	Intersects solids. Returns the intersection of two or more solids. The result is that part that is common to all imported solids. Multiple solids may be imported here.
Subtract Solids	Outersects solids. Firstly, unions the inclusive solids together, then subtracts each excluding solid from the result. The result is that part of the Inclusive solids that has had the Excluding solids removed from it.
Translate Solid or Surface	Type in an X, Y, Z value to define the translation. Existing triangulated surface is translated to the new location.
Reduce Complexity	Reduces the complexity of a solid. This functionality can be used to remove shards left over after another operation (Example: **Subtract Solids** operation). Input the solid with multiple solids, give a minimum acceptable volume, all the minor solids with a volume below that minimum value will be removed.
Upper Surface	An open surface is created of the upper part of the input solid(s).
Lower Surface	An open surface is created of the lower part of the input solid(s).
Clip Surface by Polygon (Exclude Outside)	Intersect a surface with a polygon(s). This can be digitised or imported . Exclude the outside.
Clip Surface by Polygon (Exclude Inside)	Outersect a surface with a polygon(s). This can be digitised or imported . Exclude the inside.
Append Surfaces	Append surfaces to one another in the given order.

Creating Solids in the Solid Lab exercises

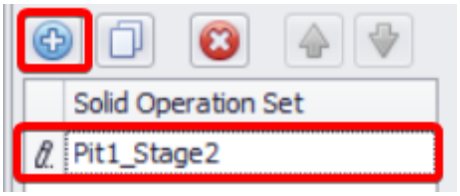
The following are some examples on how to use the **Solid Lab** tab functionality.

Many of these operations can be included in one Operations set to achieve a final outcome.

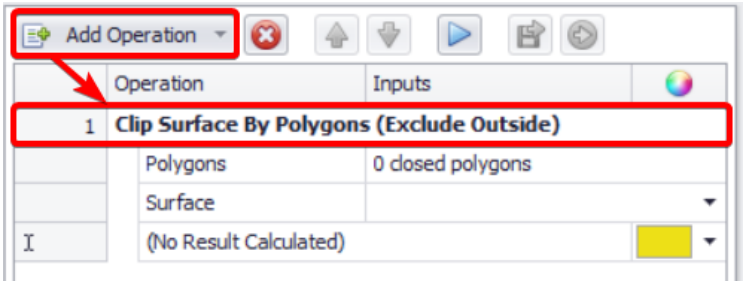
Example, the following operations can be performed in one Operation Set to achieve a final phase solid for Pit1 Stage 2.

Creating an Operations set

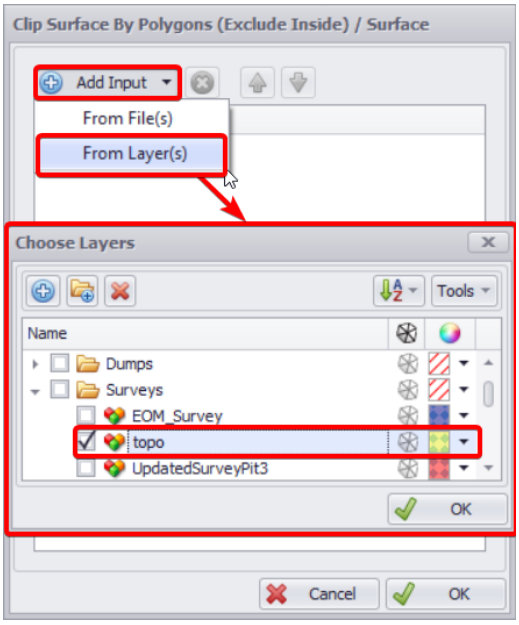
1. Add Operations Set and rename it to "Pit1_Stage2".



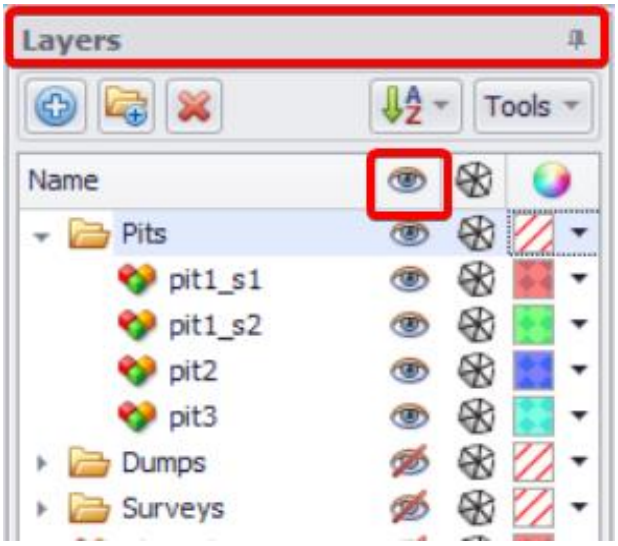
2. Add operation **Clip Surface By Polygons (Exclude Outside)**.



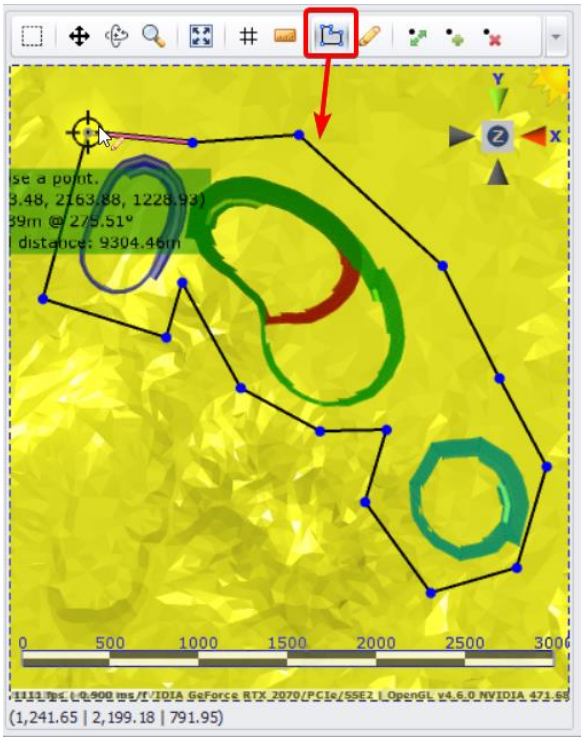
3. In the **Surfaces** dropdown import topo from layers or files.



4. In the **Layers** panel toggle to display all the Pit designs.

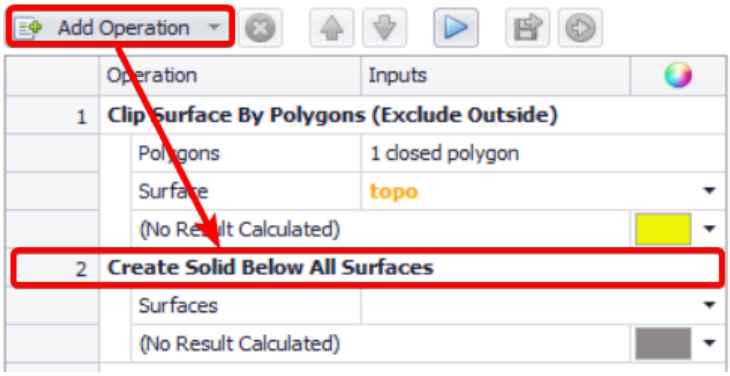


5. Draw one closed polygon around them.

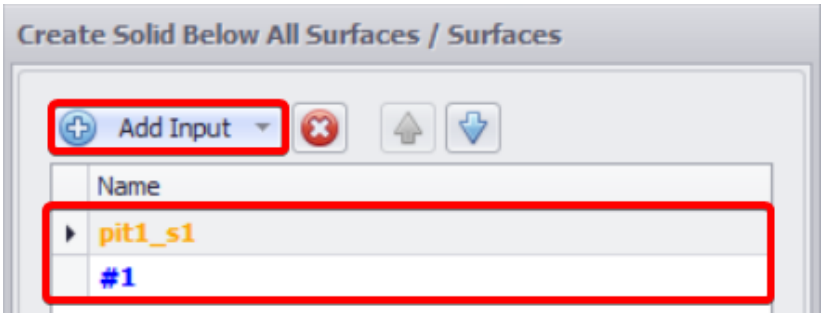


6. Press play button  to run results.

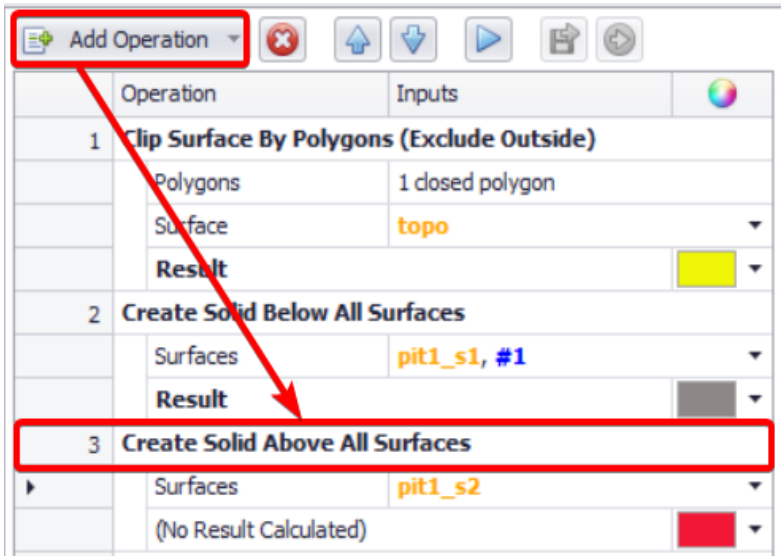
7. Add operation **Create Solid Below All Surfaces**.



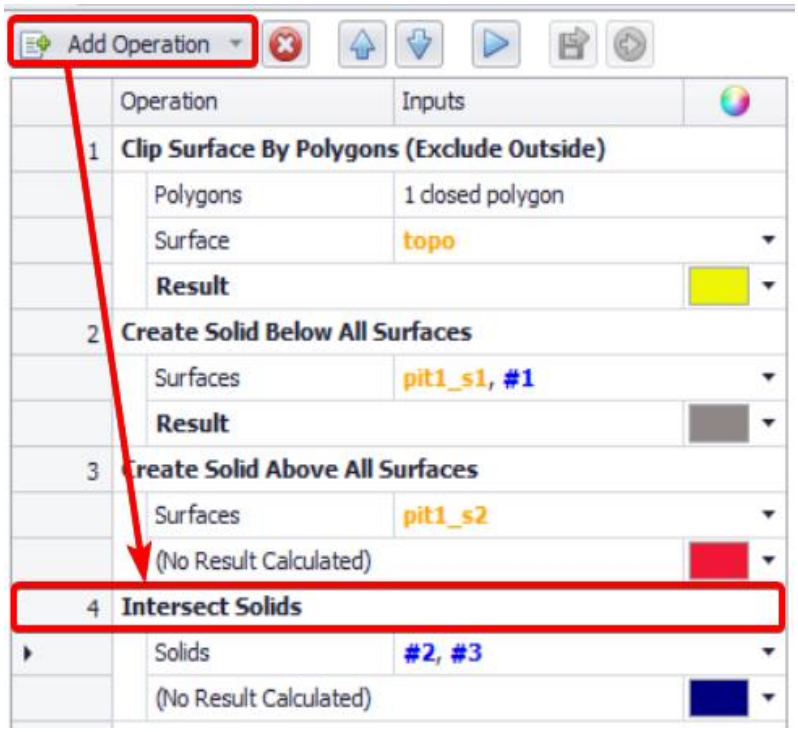
8. Import surfaces "pit1_s1" and "Output From Operation #1".



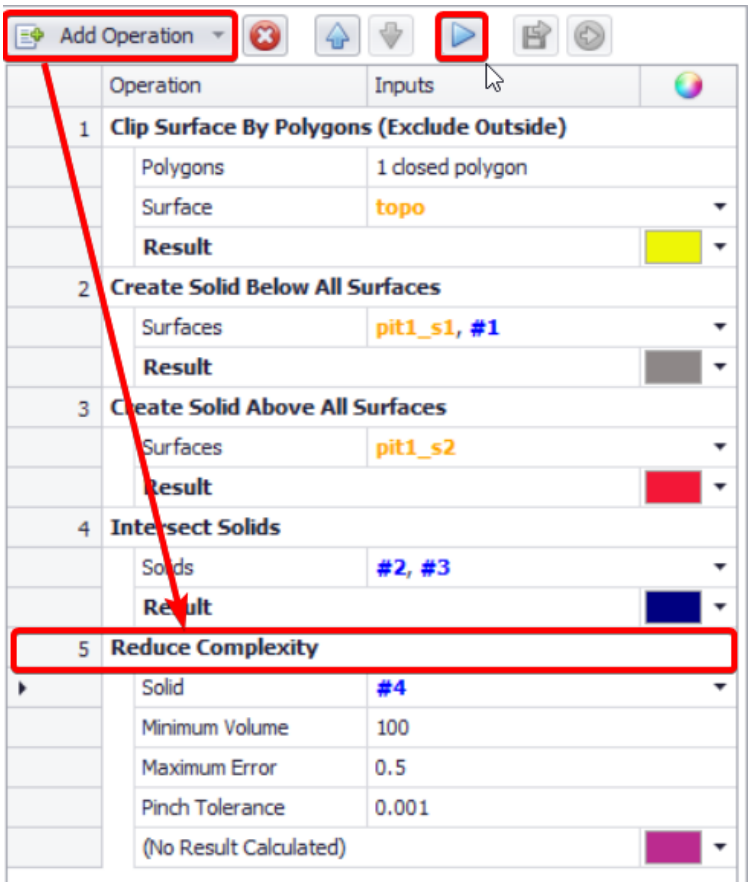
9. Add operation **Create Solid Above All Surfaces**.
10. Import surface "pit1_s2".



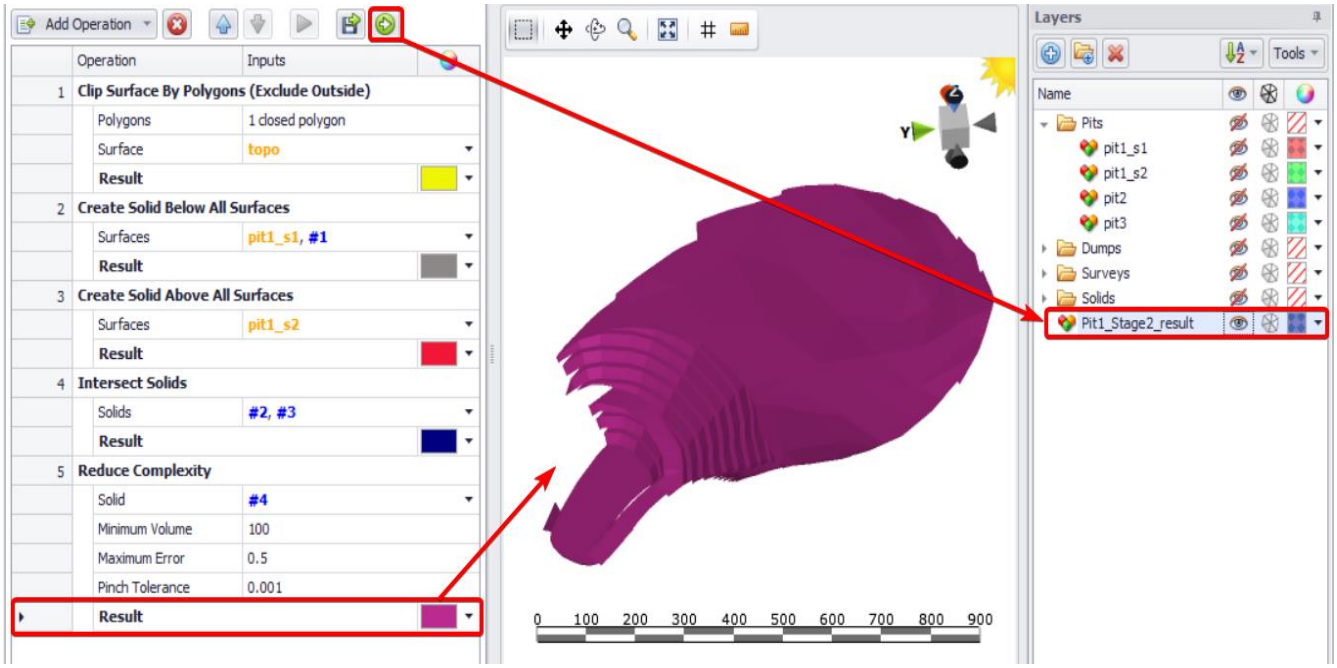
11. Intersect the results of Steps 2 and 3 (#2, #3).



12. Reduce the Complexity for the result of step 4 (#4) and run all operations.



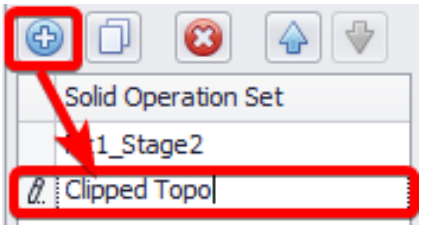
13. Save resulting solid to the **Layers** panel and review in the viewport.



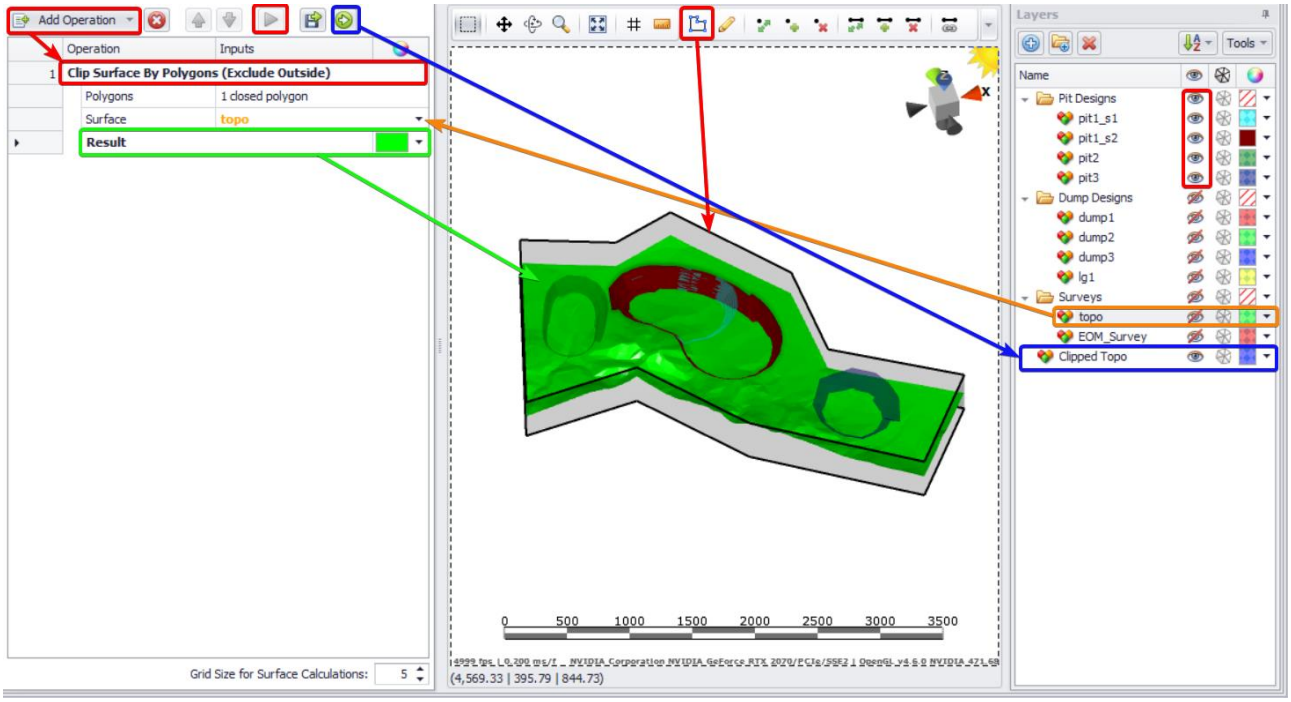
1. Clipping a surface

Reduce the size of a surface file. Load smaller files into memory, excluding data not required.

1. In the **Solid Operation Set** panel add a new set.
    a. Rename it to "Clipped Topo".

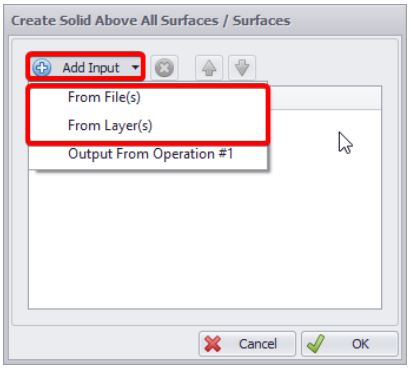


2. Press **Add Operation** button to add operation **Clip Surface By Polygons (Exclude Outside)**.
    a. In the **Surfaces** field import "topo" surface file (can be imported from file(s)/layer(s) or dragged from the **Layers** panel).
3. In the **Layers** panel toggle to display all the pit designs.
4. Using the polygon tool draw a polygon around the area to keep.
5. Run the operation by pressing the blue play sign.
    a. Click on **Result** row to see the outcome in the viewport.
6. Click on the green arrow icon to save the result to the **Layers** panel.
    a. Rename this new layer to "Clipped Topo".



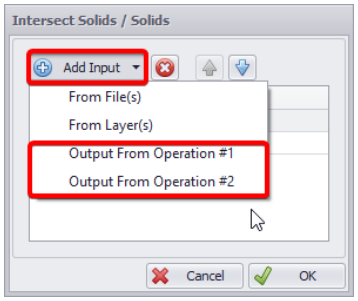
2. Intersecting Solids

1. In the **Solid Operation Set** panel add a new set.
   a. Rename it to "Pit1_s1".
2. Press **Add Operation** button to add operation **Create Solid Above All Surfaces**.
   a. Add "pit1_s1" surface to the **Surfaces** field:
      i. Either by dragging and dropping it from the **Layers** panel, or
      ii. Importing it from file(s) or from layer(s) through **Add Input** button dropdown.

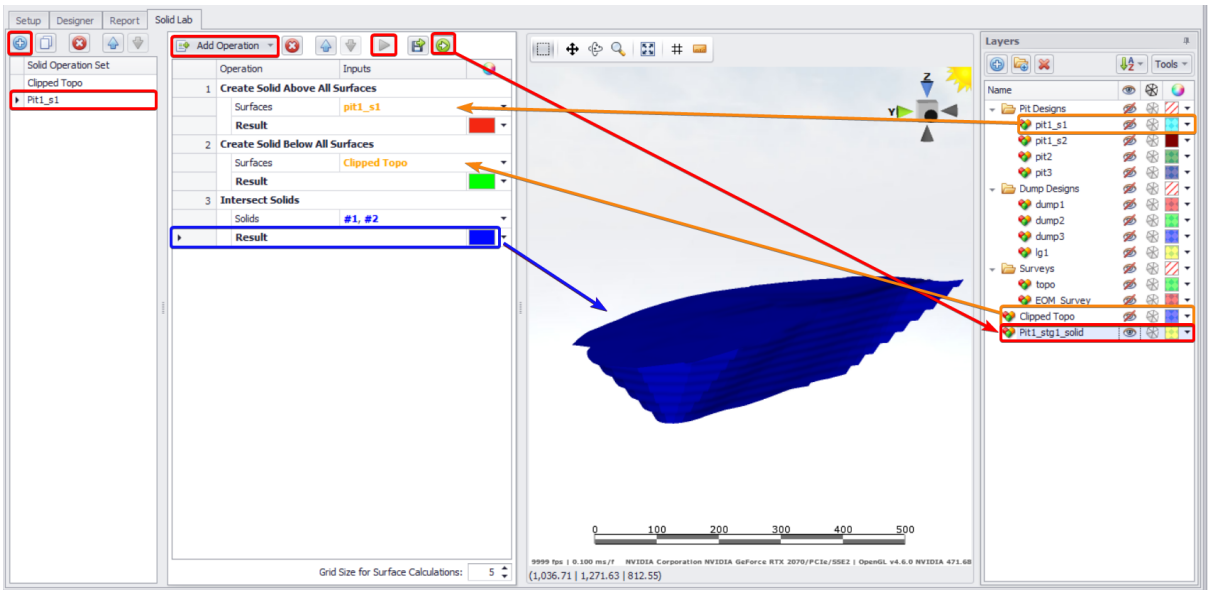


3. Press **Add Operation** button to add operation **Create Solid Below All Surfaces**.
   a. Add "Clipped Topo" surface to the **Surfaces** field:
      i. Either by dragging and dropping it from the **Layers** panel, or
      ii. Importing it from file(s) or from layer(s) through **Add Input** button dropdown.
4. Press **Add Operation** button to add operation **Intersect Solids**.
   a. Click in the **Solids** field.

b. Press **Add Input** button and select “Output from Operation #1” and “Output from Operation #2”.



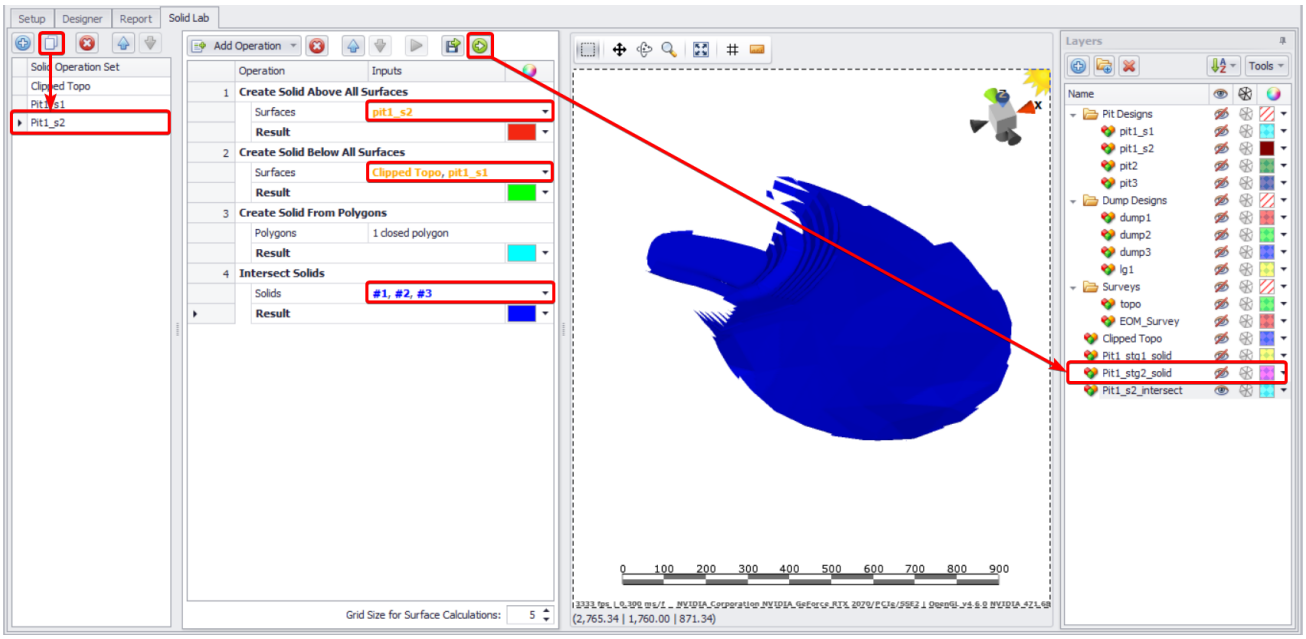
c. Run the operation by pressing the blue play sign.
d. Click on **Result** row to see the outcome in the viewport.
e. Click on the green arrow icon to save the result to the **Layers** panel.
f. Rename this new layer to “Pit1_stg1_solid”.



3. Clipping Solid by Polygon

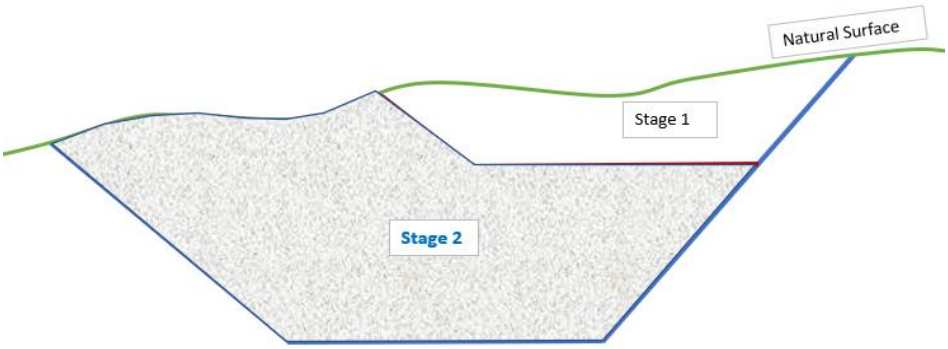
1. Press the copy icon to copy the solid operation set for pit1_s1.
   a. Rename the copy to "pit1_s2".
   b. In **Create Solid Above All Surfaces** field change the **Surfaces** selection to "pit1_s2".
   c. In **Create Solid Below All Surfaces** change the **Surfaces** selection to "pit1_s1" and the topography.
   d. Run the operations by pressing the blue play button.
   e. Click on the green arrow icon to save the result to the **Layers** panel.
2. Click **Add Operation** and select "Create Solid From Polygons".
   a. Press the up/down icons to move the operation to third place in the list.
   b. Press the **Draw Polygon** icon and draw around the pit solid, excluding the batter shards.
3. In **Intersect Solids** field change the Solids selection to include "Output From Operation #3".
   a. Run the operations by pressing the blue play sign.

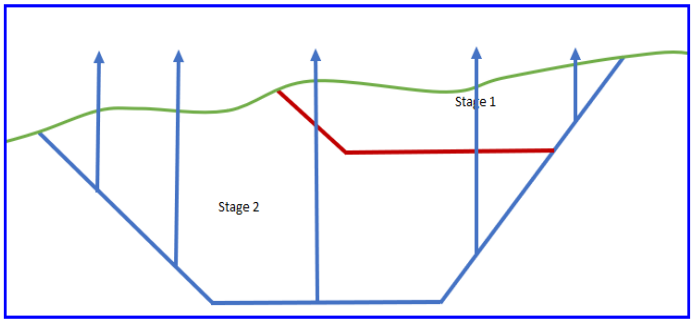
b. Select the **Result** row to see the result in the viewport.
c. Save the result to the **Layers** panel.
d. Rename this new layer to “Pit1_stg2_solid”.

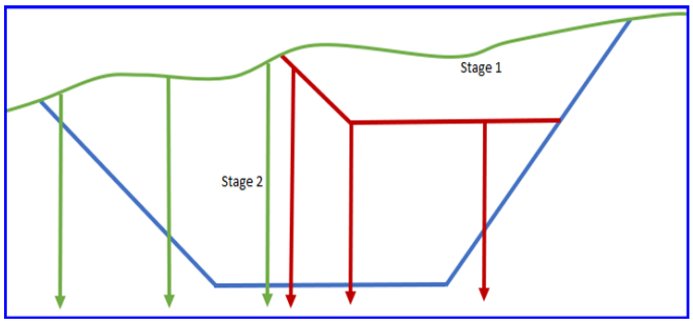


This operation can be graphically explained as below:

Imported surfaces: Natural Surface = topo, Stage 1 = pit1_stg1_solid, Stage 2 = pit1_stg2_solid.

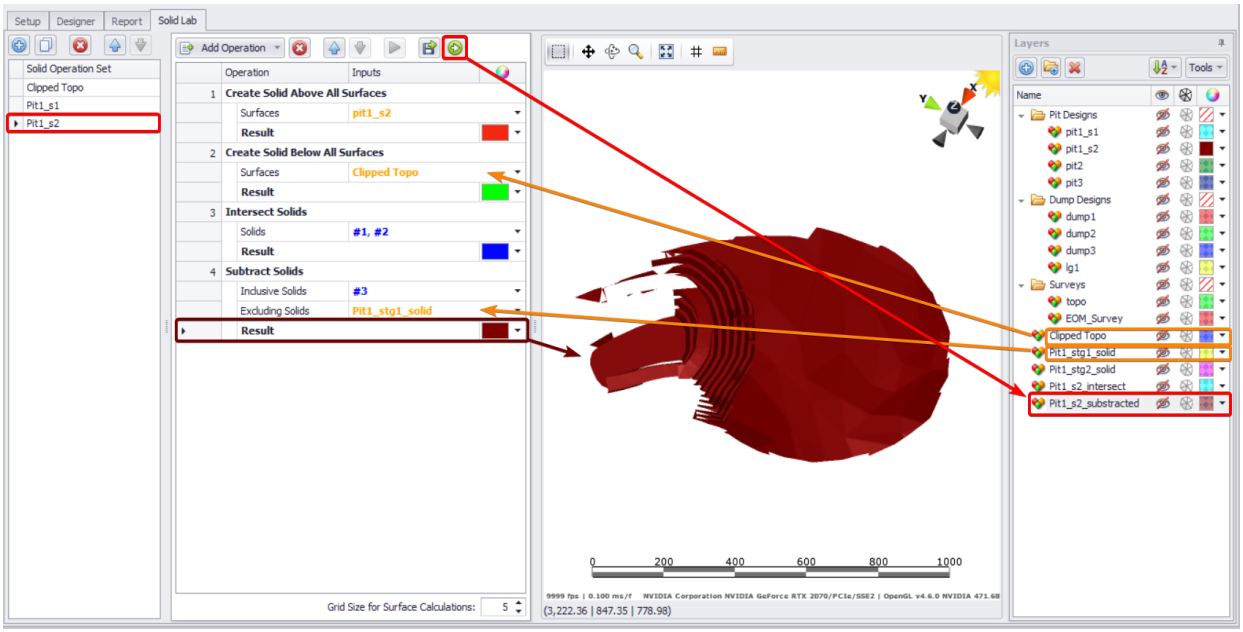






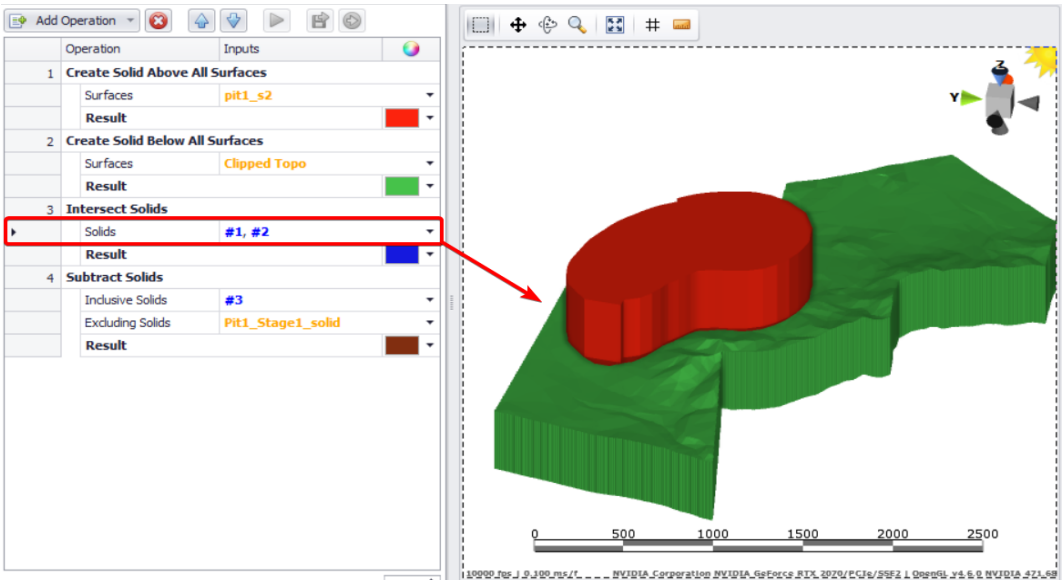
4. Subtracting Solids

1. In the same Solid Operation Set “Pit1_s2”.
   a. Remove operation **Create Solid From Polygons**.
   b. In the **Create Solid Below All Surfaces** operation field change the Surfaces selection to include "Clipped Topo".
   c. In the **Intersect Solids** operation field change the Solids selection to include "Output From Operation #1" and "Output From Operation #2".
   d. Run the operations by pressing blue play button.
   e. Save the result to the **Layers** panel.
2. Click **Add Operation** and select "Substract Solids".
   a. In the **Inclusive Solid** field include "Output From Operation 3".
   b. In the **Exclusive Solid** field add previously exported "Pit1_stg_1_solid".
   c. Run the operations by pressing the blue play button.
   d. Select the **Result** row to see the result in the viewport.
   e. Save the result to the **Layers** panel as “Pit1_stg2_solid”.

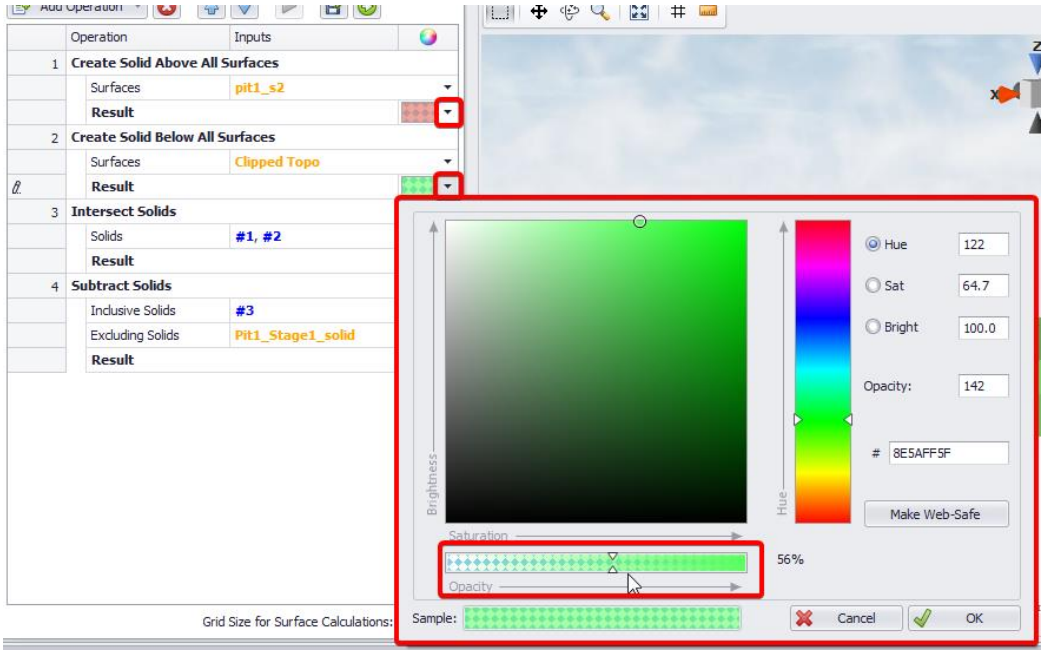


Recommendation

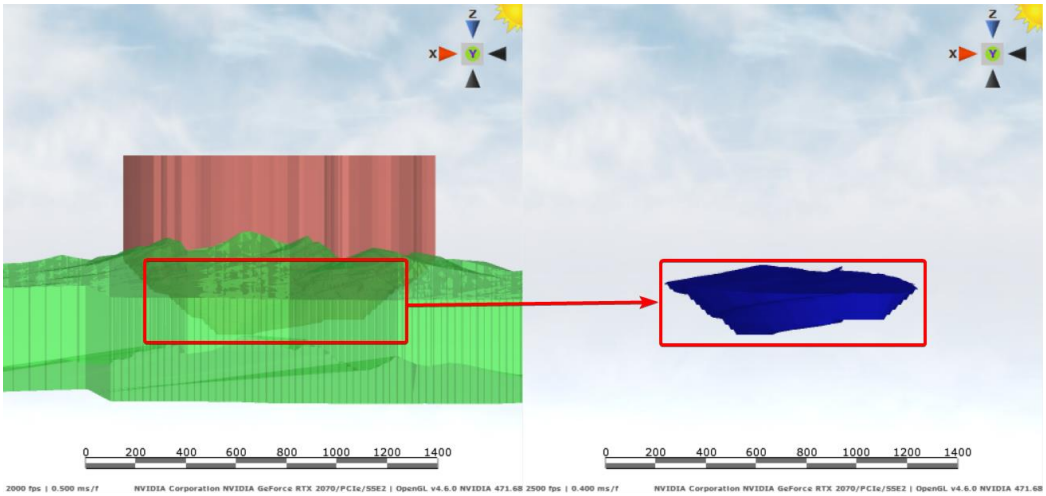
When intersecting solids click on the row with the added solids. In the viewport, you will see two solids, one above the other, as shown below. This is not a very clear example, as we cannot really see intersecting area.



For better clarity, change the transparency of these solids.



Rotate the resultant solids for better seeing the overlapping area. This area is the result of the intersection.

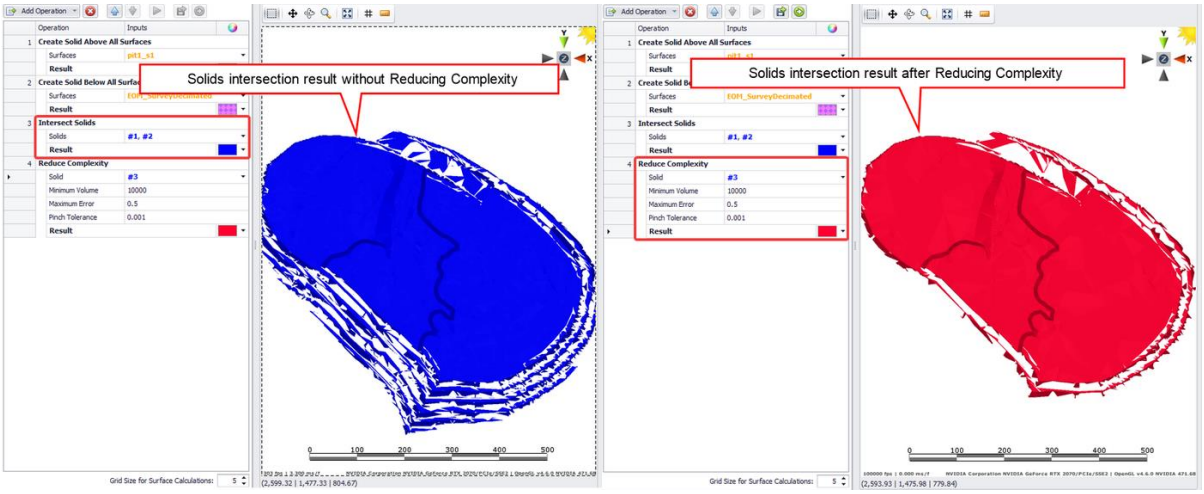


5. Cleaning Solid from Remnant Blocks

As a result of overlapping solids and surfaces, you can see a lot of remnant blocks around the resultant solid that you want to remove to facilitate further scheduling. Two basic methods to accomplish this goal are outlined below.

Method 1.

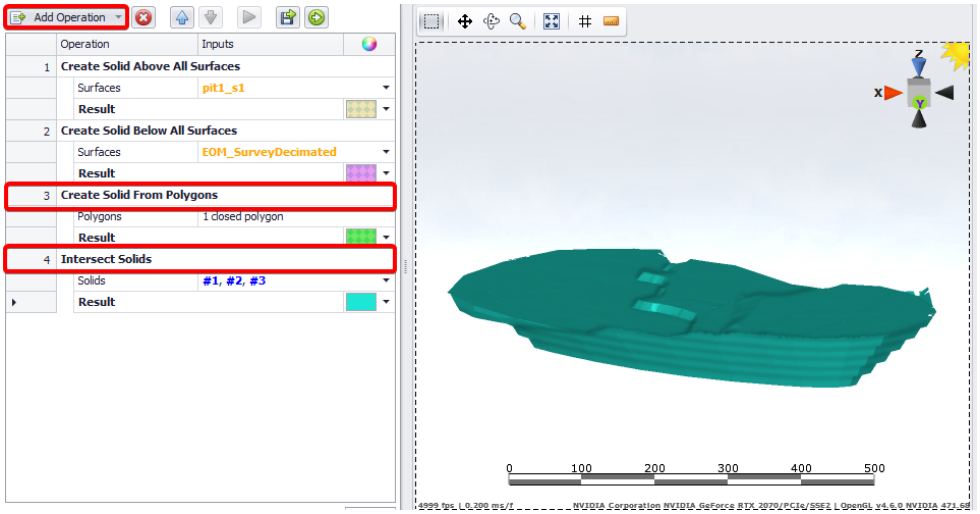
1. Add a new operation - **Reduce Complexity**.
2. Add output from operation **#3**, which is the result of intersecting solids **#1** and **#2**.
3. In the **Minimum Volume** field specify the minimum volume, blocks smaller than which will be excluded. In this example, 10 000 cubic meters.
4. In the **Maximum Error** field, set the triangulation error limit to 0.5.
5. Run the operation and review the result.



Compare results. In example on the right, you can see that there are fewer remnant blocks around main solid.

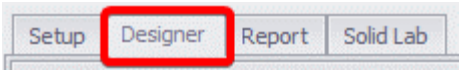
Method 2.

1. Add new operation - **Create Solid From Polygons**.
2. Draw a closed polygon around the solid.
3. Run the operation and export the resultant polygon to the **Layers** panel.
4. Add a new operation - **Intersect Solids**.
5. Using the up and down arrows, place the **Create Solid From Polygons** operation in front of it.
6. Add the outputs of operations **#1**, **#2** and **#3** to the **Intersect Solids** operation.
7. Run the operation and review the result. If all steps are done correctly, you should get a result like in the figure below - a solid with smoother boundaries, without extra remnant artefacts, fitting the outlined polygon.

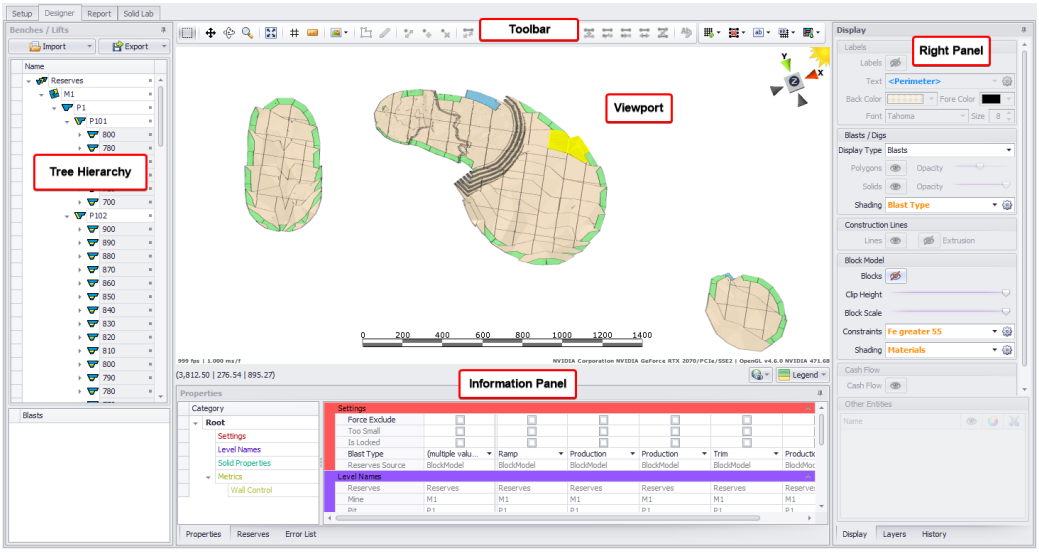


Designer tab

The **Designer** tab it's your main area to view, create, modify, manipulate and analyze Reserves (and Dumps) levels solids and lines.



The **Designer** tab consists of four areas, such as Tree Hierarchy (on the left), Viewport with toolbar, Information Panel (below viewport) and Right Panel (on the right), each of those includes several elements, tabs or fields.



Navigate

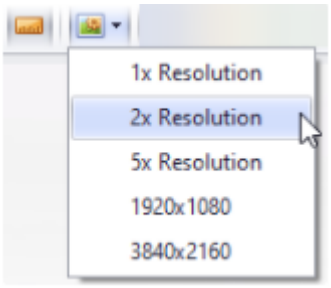
- ✓ Depending on the operations that are being run, different icons become available at a top of viewport.
- ✓ All icons have tools tips, that appear when hovering mouse cursor over them.

In the tables below all toolbar icons are listed with description and hotkeys available.

Mouse controls

Selection		Left click and drag
Pan		Middle click and drag
Rotate		Right click and drag
Zoom		Scroll wheel
Zoom Extents		Left click on the compass widget
Vertical Exaggeration		<CTRL> + Scroll wheel

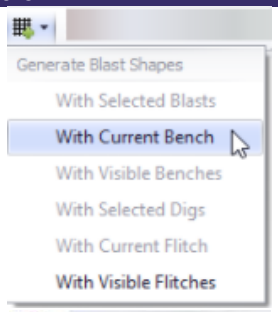
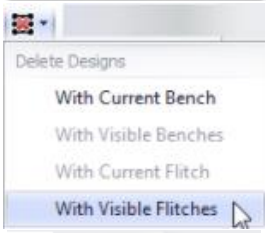
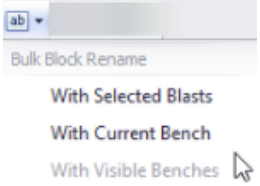
Measurement and screenshot

Show/Hide grid		Toggle grid
Measure Distances		<Enter> - Toggle Including Mouse-Point in Result <Backspace> Remove Last Point
Screenshot		Make a screenshot and choose a resolution required

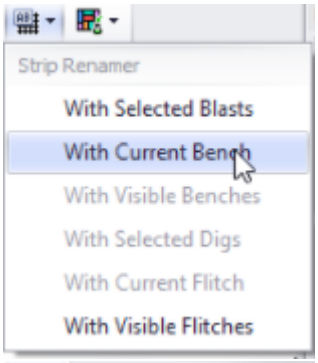
Compass

Plan View Zoom Extents		Click on the axis cones to snap to orthogonal views Click on the grey cube to zoom to extents
Night Mode		Click on the sun icon to toggle night mode and back

Extended Design tools

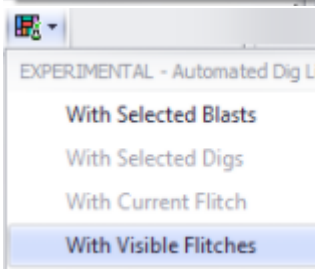
Generate Blast Shapes		Choice of Blast shapes generation from dropdown. Production, Trim, Ramp and Contour blasts shapes can be generated for the entire project. Available options depend on an element selected.
Delete designs		Choice of designs to be deleted. Available options depend on an element selected
Bulk Block Rename		Rename Blasts options

Strip Renamer



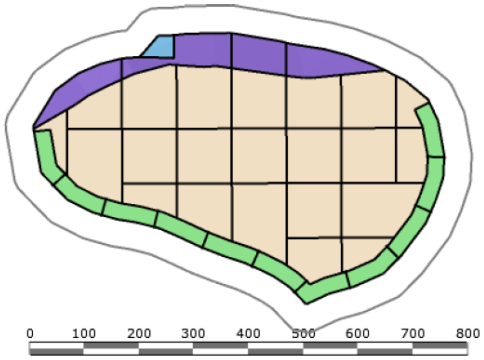
Strip Namer option to set Horizontal/Vertical Naming, Included Blast Types and Grid Orientation

Automated Dig Line Creation



To create automated dig lines with selected blasts/digs or current/visible flitches.

Use the **Scale Bar** to estimate distances and scale in the viewport.



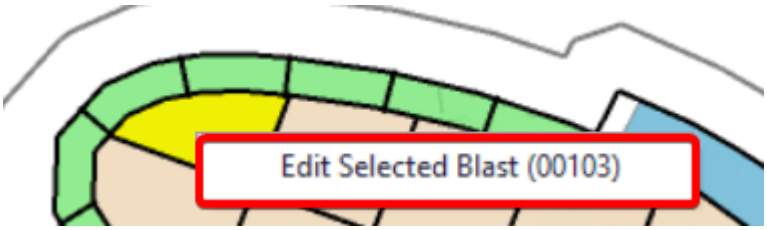
By pressing on a level in the Tree Hierarchy it will display in the viewport. You may also select the whole reserve/mine/pit/stage/bench to display or selected solids using <CTRL> and <Shift> hotkeys.

- Left-click on any level to display it in the viewport. You can use the arrow keys on your keyboard to quickly view and navigate between the level records.
- Expand the tree structure to the desired level.
- Double-click a level to zoom to it in the viewport.
- To display a list of blasts:

- select a solid in the viewport and double-click on it (the bottom left panel will also display Flitches on the selected Block, as shown in the figure above).
- In the **Display** panel on the right, in the **Display Type** field, select "Blasts" (the bottom left panel will display a list of the available Blasts on the selected Bench, where you can also use the arrow keys to navigate through).

In a viewport you may review and work with results of operations and imported layers.

- Double click on a blast in the viewport to enter edit mode, or
- Right-click on a blast and choose “Edit Selected Blast (…)” to edit the selected blast.



- To exit the edit mode, right-click anywhere in the viewport and choose “Stop Editing Blast”, or click on any higher level in the tree (bench, stage, pit, mine).

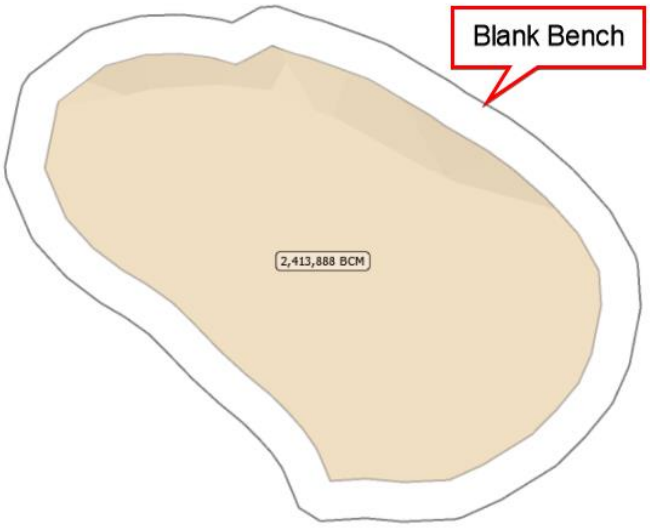
- Box select group of blocks to select multiple and compare them in the **Properties** panel.

In the edit mode, right click on the selected block and choose the applicable option from its dropdown:

- “Extend selection to flitch (…)” - to extend the selected flitch over lower ones (used to combine multiple flitches for one blast);
- “Do not extend selection” - to cancel flitch extension made.

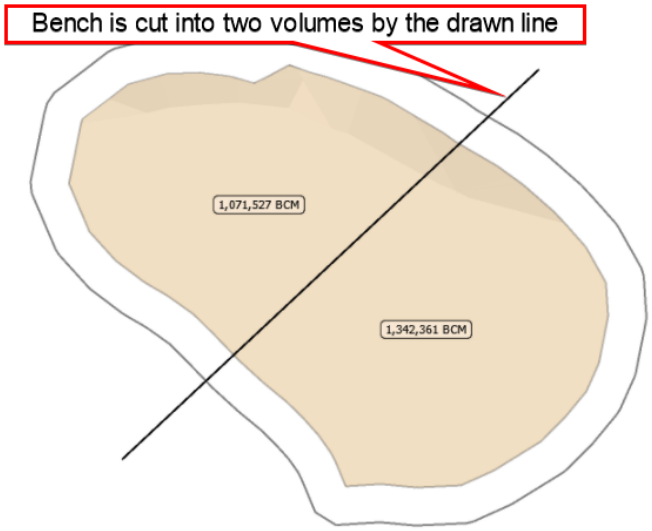
Design

Pick a bench in the level tree and cut up blasts as shown.



Draw Line

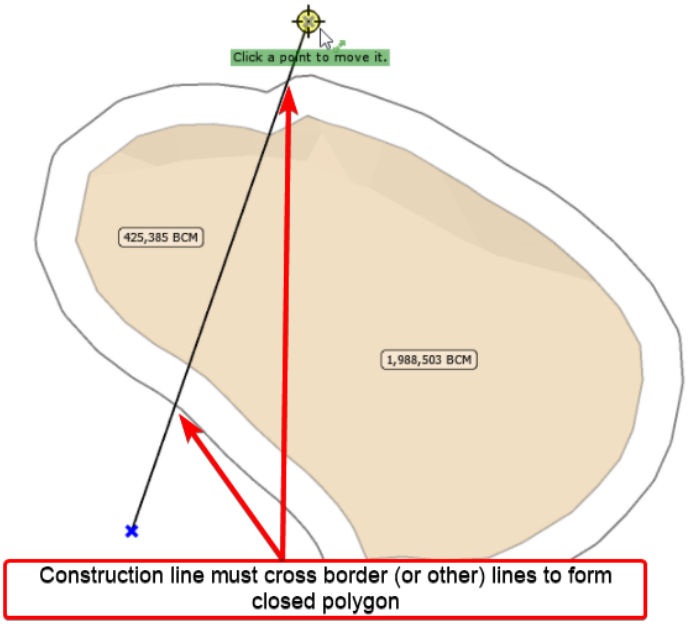
1. Click on the draw icon  or type keyboard shortcut <D>.
2. Left click on one side of the bench, outside the boundary line.
3. Left click on the other side of the bench, outside the boundary line.
4. Press <ESC> to finish.



✓ During drawing, the <Backspace> key works as an Undo hotkey.

Move Point

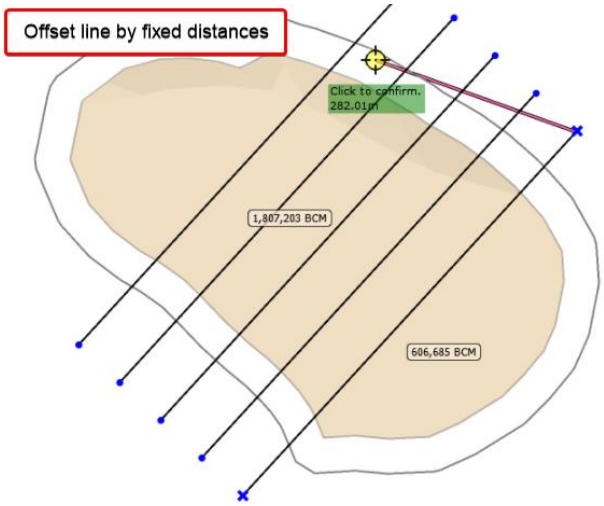
1. Click the point-move icon  or type keyboard shortcut <F>.
2. Select a point on a line.
3. Click the new point coordinates to move it there.

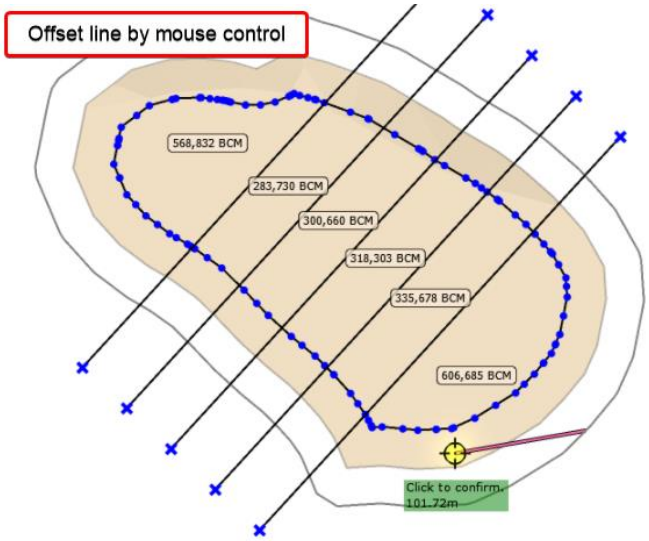


✓ Construction lines must form a closed polygon into order to cut solids. This means they must cross another line, or cross through the border polygon.

Offset Lines

1. Click the line-offset icon  or type keyboard shortcut <O>.
2. Select a line to offset (this may include the bench boundary polygon).

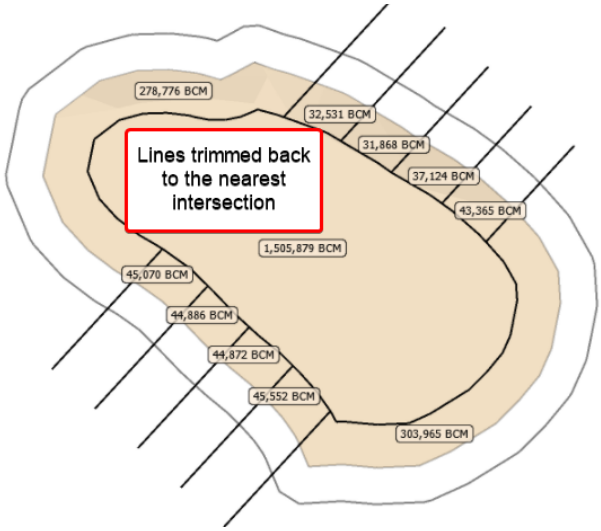




Trim Lines

1. Click the line-trim icon  or type keyboard shortcut <T>.

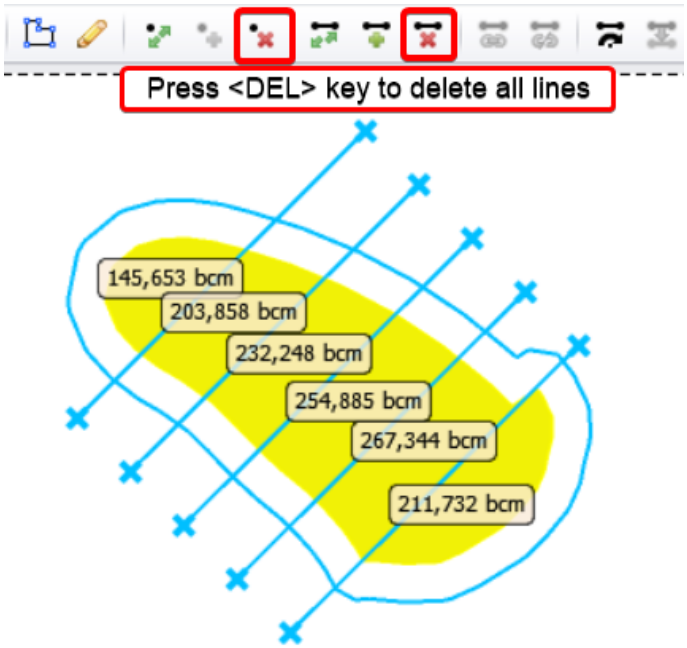
2. Click on a line to trim it back to the nearest intersection.



✓ The Trim tool may not detect an intersection where two closed polygons form an adjacent corner. For these cases, use the Break tool  to clear the segment.

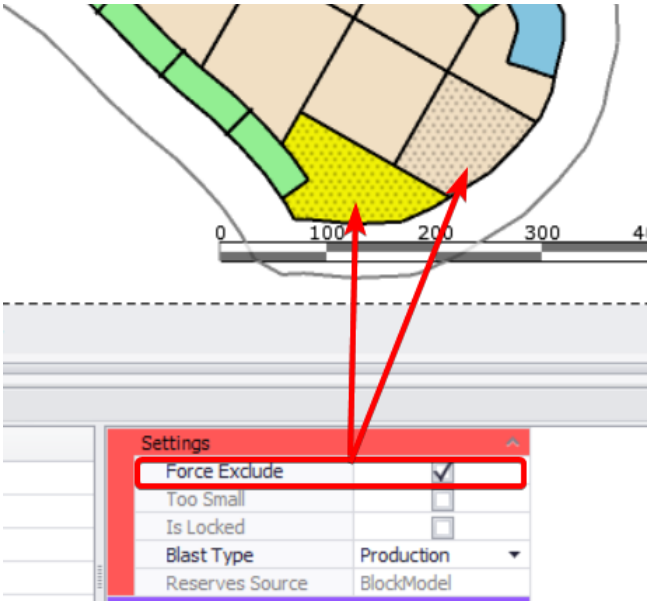
Delete Lines

1. Box-select all lines in the viewport (they will become blue).
2. Press the <Delete> key or the delete icon  .



✓ Even if you have solids selected, the <Delete> key will not delete them. The only way to remove solids is by toggling the **Force Exclude** property in the **Properties** panel.

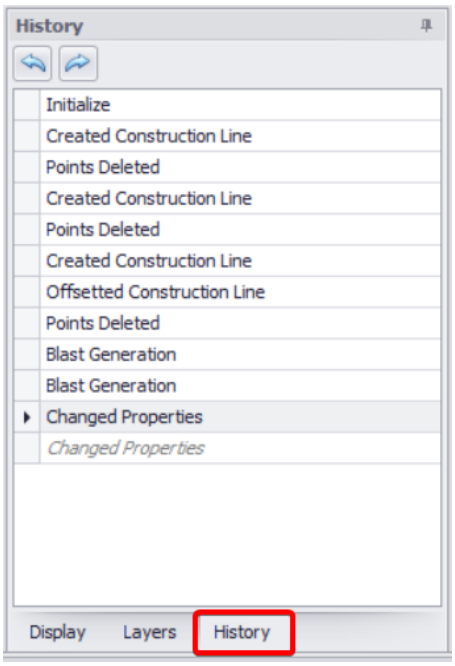
✓ Excluded blocks will be hatched according to the Hatch pattern set in the *Setup > Setting*.



Undo / Redo

There are two ways to undo/redo changes made in the **Designer** tab:

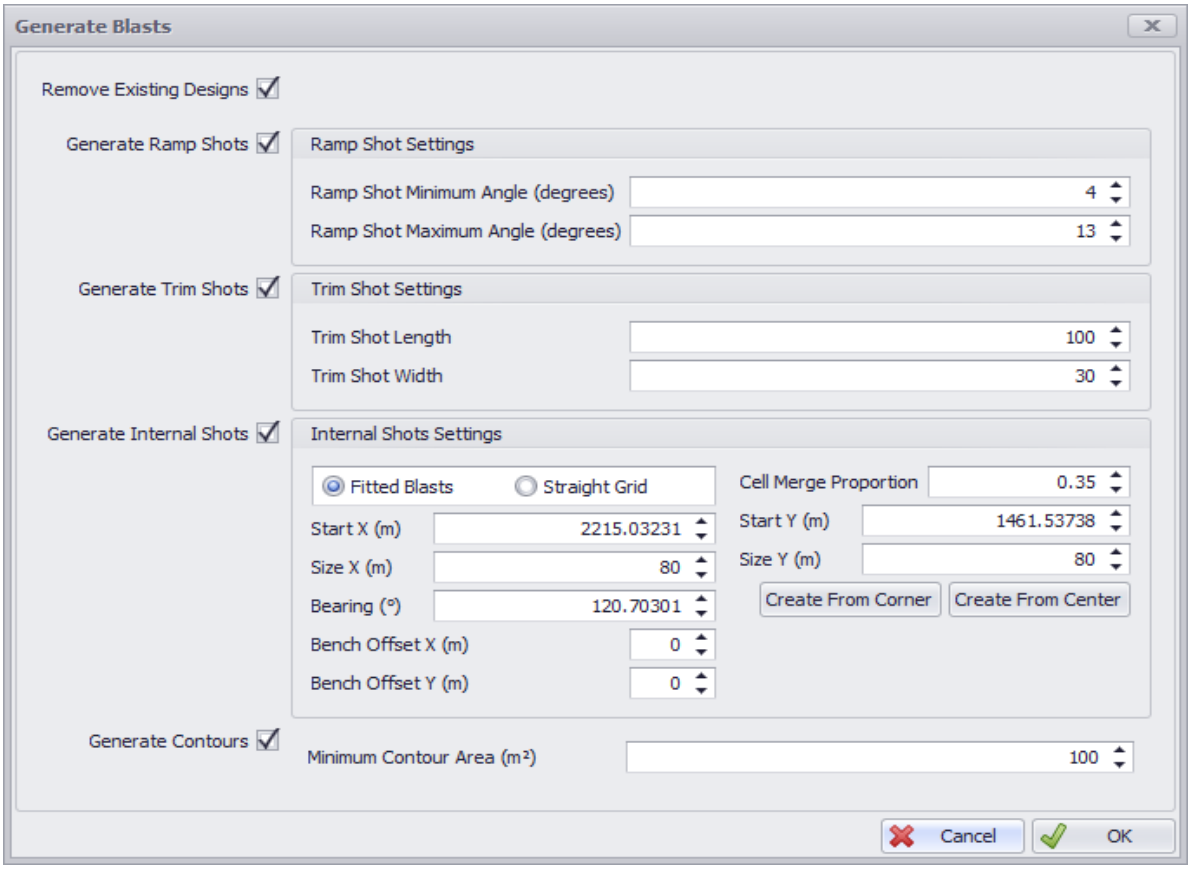
1. Left click in the 3D viewport to activate the area.
   i. Press <CTRL> + <Z> to undo the last change.
2. Open the **History** panel in the bottom right of the application.
   i. Click through the history list to see different past states.



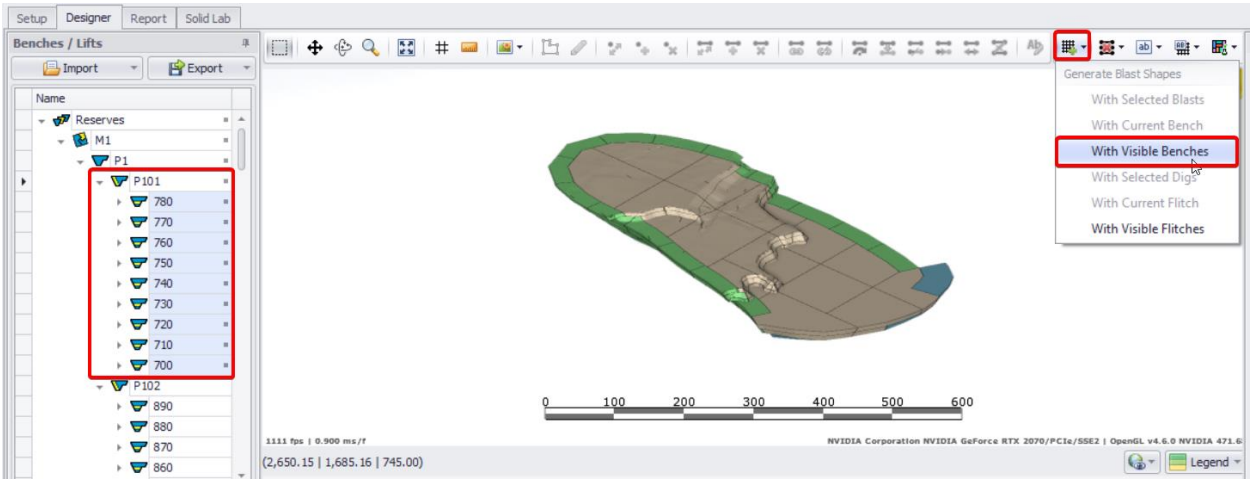
Generate

Rapid Reserver contains tools for automatically generating blast masters on a single bench, or across the entire mine.

Auto Grid Tool



1. In the Level Tree, select the Stage1 collection so that all benches in Stage 1 are visible.
2. Press the **Generate Blast Shapes** button and select "With Visible Benches".

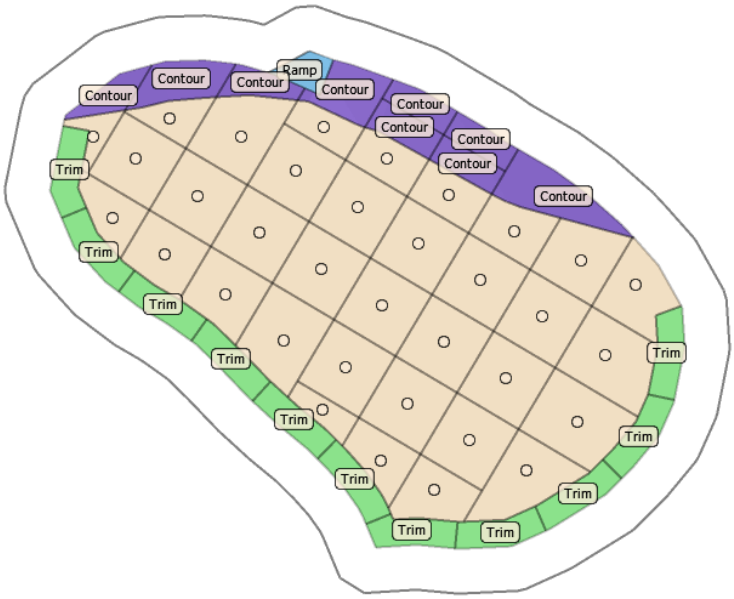


3. The **Generate Blasts** window will open.

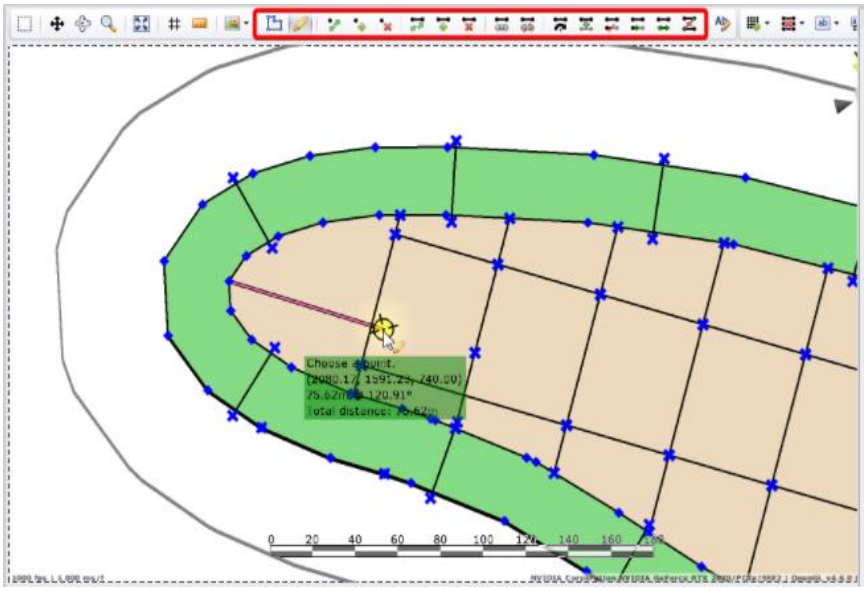
4. Tick **Remove Existing Designs** to clear existing linework.
5. Tick **Generate Ramp Shots** and enter the min/max ramp angle to detect.
6. Tick **Generate Trim Shots** and enter the trim shot length and width.
7. Tick **Generate Internal Shots**,

    a. set the grid type to "Fitted Blasts",
    b. set the Size X and Size Y to the blast dimensions (80 x 80),
    c. set the Bearing to match the pit orientation (120°).

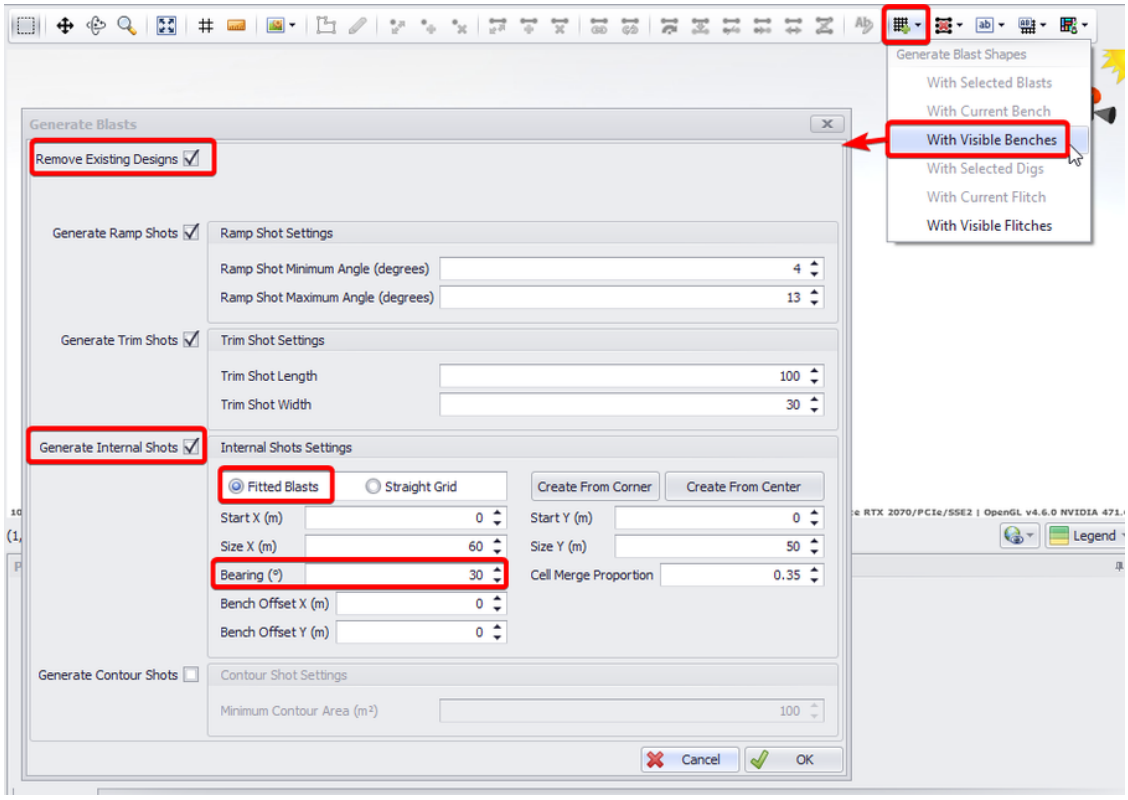
8. Tick **Generate Contours** and enter the minimum contour area.
9. Press OK to finish.



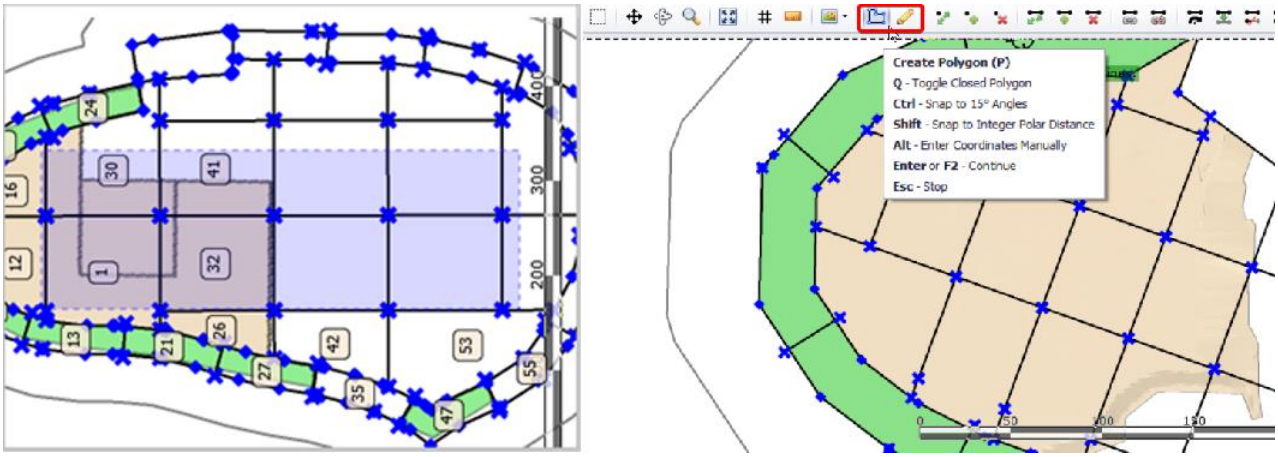
Use the top toolbar buttons to manually draw, move, join, and delete points and construction lines.



1. Double click Mine1\Pit1\Stage1 to center it in the viewport.
    a. Press **Generate Blast Shapes** button > "With Visible Benches".
    b. In the **Generate Blasts** window create Fitted Blasts at 30° bearing, as shown below.



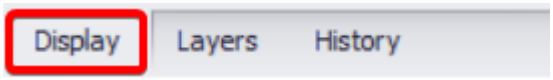
2. For Stage1 bench 780, delete Production Blasts and manually create new blasts using **Create Polygon** and **Create Construction Line** tools.
    a. Remove existing internal blasts using **Delete Segment** tool (or highlight lines and delete them).
    b. Create Polygons and Construction lines.



3. Repeat for Pit1/Stage2/Bench 830.

View

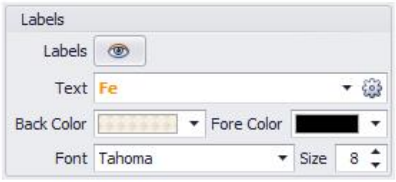
Use the **Display** panel to control the viewport display.

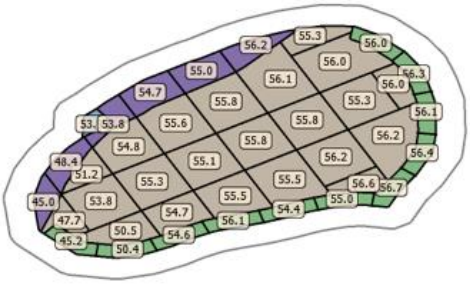


Labels

Labels may be used to show solid properties, reserves, and attributes at a glance.

- Toggle the eyeball icon to show and hide labels.
- Select a text to display in a label from the **Text** dropdown or configure custom labels via gear icon .
- Use the colour, front and size selectors to alter the label display.





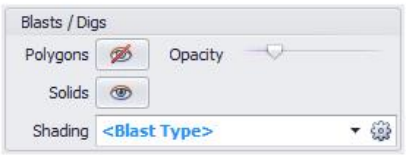
Blasts/Digs

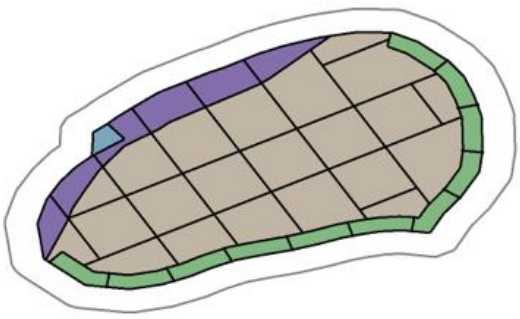
Blast solids and Dig solids may be displayed as 2D polygons or as 3D triangulations.

In the **Blasts/Digs** part of the **Display** panel you may choose type of solid to display (Blast or Dig) and set its shading and opacity.

Note that different properties may be edited depending on whether Blast or Dig display is selected.

- Press the eyeball icons to show and hide entities.
- Drag the opacity slider to make polygons more or less opaque.
- Use the **Shading** dropdown to colour the solids by their properties or contents.

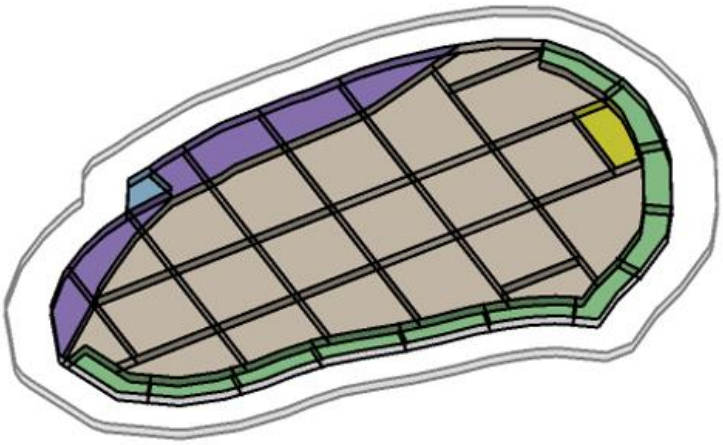


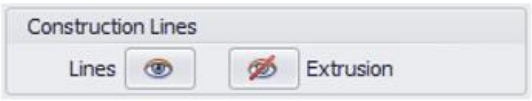


Construction Lines

Benches are divided into blasts by drawn construction lines. By pressing eyeball toggle, you can:

- toggle visibility of lines,
- display lines as fences.

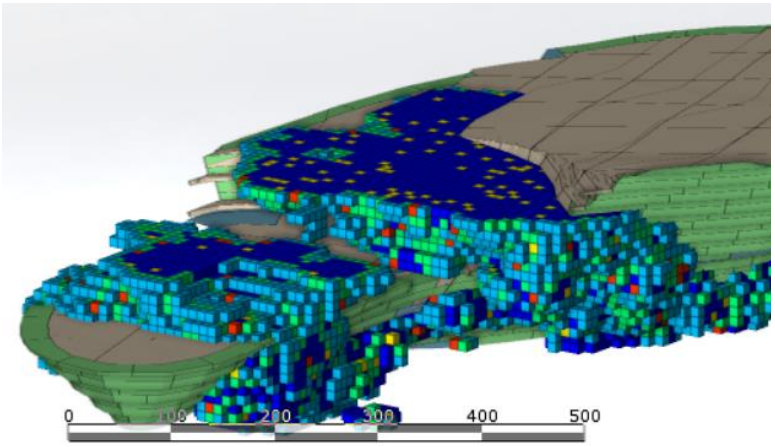


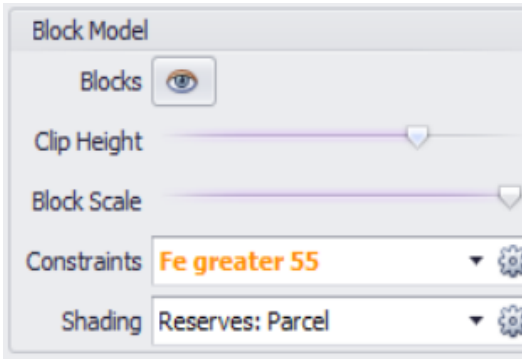


Block Model

Blast reserves are calculated by intersecting the 3D solid with the block model cells.

- Press the eyeball icon to show or hide blocks.
- Use the **Clip Height** slider to view the block model's cross section.
- Adjust blocks scale as desired.
- Use the **Constraints** and **Shading** selectors to choose what to display and what to hide.
  - Press the gear icon to open the **Configuration** window, where you can create custom codes and formulas for constraints/shadings.

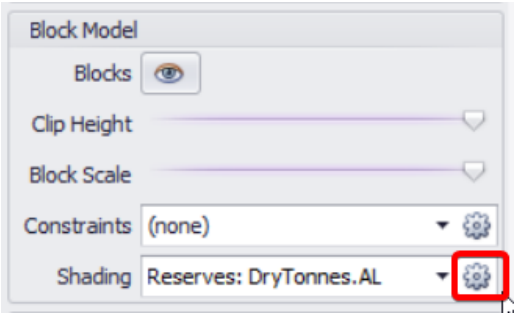




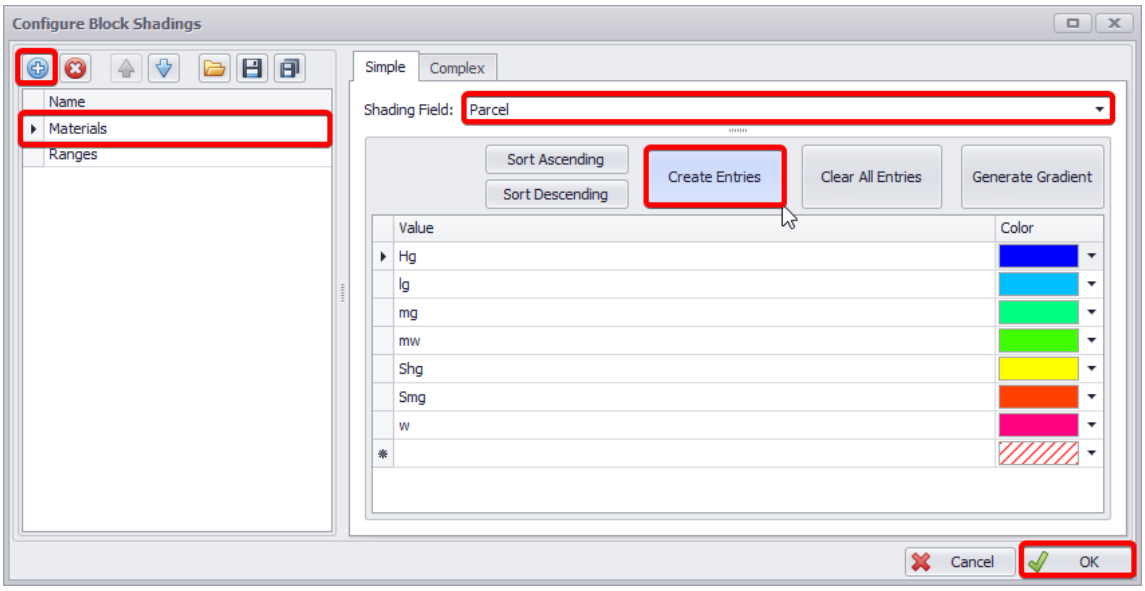
CREATING BLOCK MODEL CUSTOM SHADINGS

Simple shading example:

1. Press the gear icon next to the **Shading** dropdown. This opens the configuration dialog.

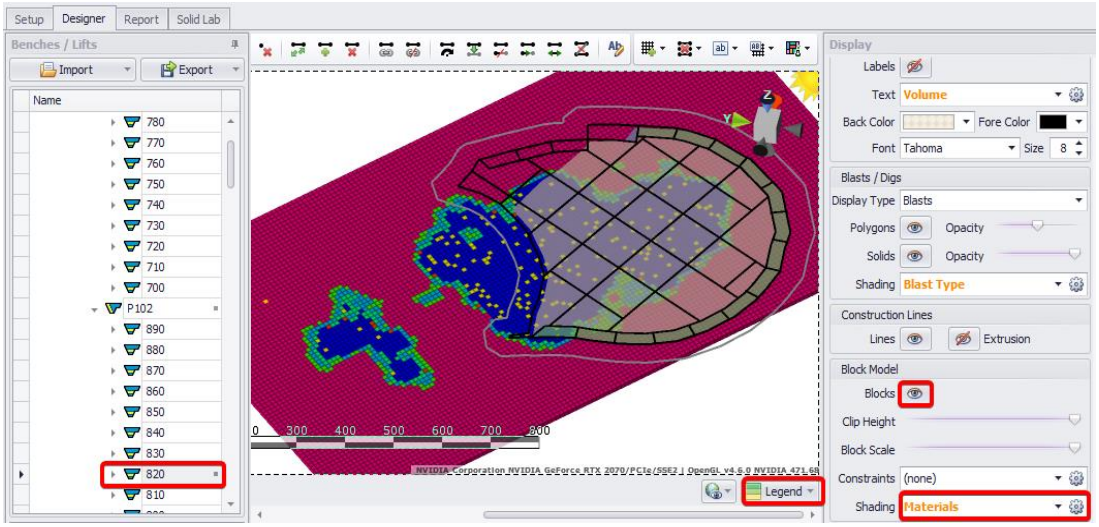


2. Press the blue plus icon to add a new shading set.
3. Rename the shading to "Materials".
4. Drop down the **Shading Field** and select “Parcel”.
5. Press the **Create Entries** button to populate all parcel names.
6. Assign a colour to each parcel.
7. Press OK to accept.



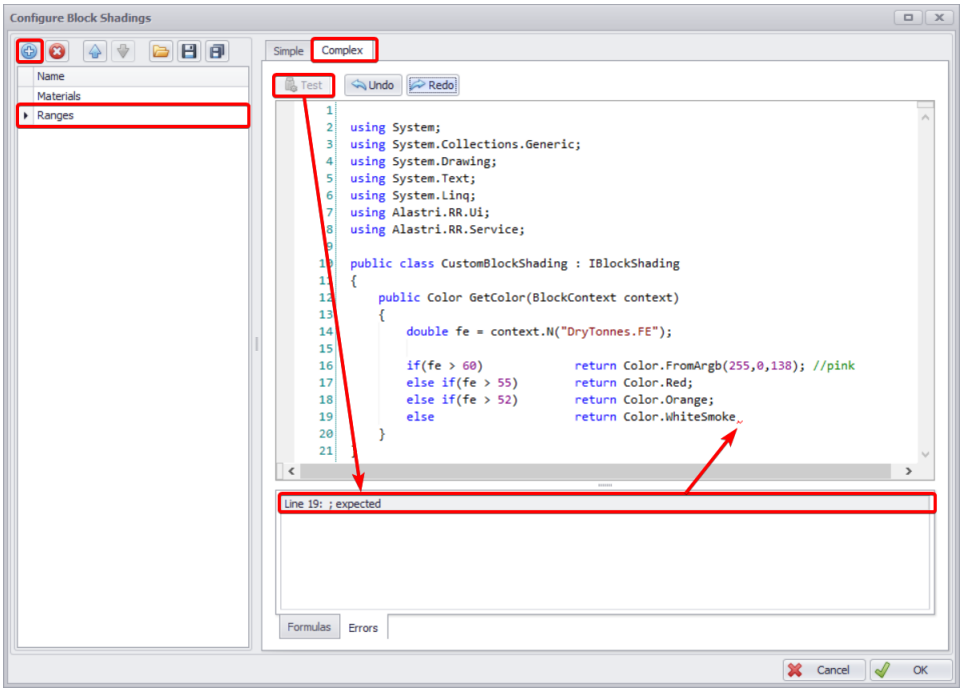
8. In the **Block Model** panel on the right, toggle eye icon to show blocks and from the **Shading** dropdown select the blocks shading you have created - **Materials** (Note that custom shadings are shown in **bold orange**, while standard shadings are shown in normal black).
9. Select bench(es) from the tree on the left to display the viewport and review the result.

10. Colours assigned for block shading can be seen in the **Legend** (bottom right, below the viewport).

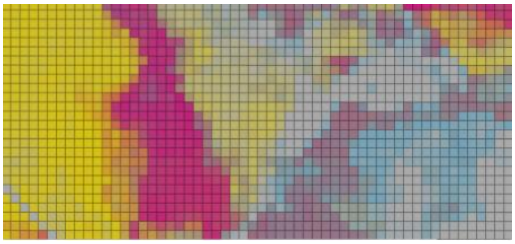


Complex shading example:

1. Press the gear icon next to the **Shading** dropdown. This opens the configuration dialog.
2. Press the blue plus icon to add a new shading set.
3. Rename the shading to "Ranges".
4. Select the **Complex** tab to open the code editor.
5. Paste in one of the sample code snippets.
6. Press the **Test** button to make sure your code is correct. Any errors found will be shown in the **Errors** panel and won't let you to proceed.



7. Fix any errors detected, run test again and press OK to accept.
8. Review the resultant shading in the viewport.



✓ Shading high Fe (pink and blue) vs. high Al (grey and blue).

SHADINGS CODES EXAMPLES

Simple Grade Shading

```
using System;
using System.Collections.Generic;
using System.Drawing;
using System.Text;
using System.Linq;
using Alastri.RR.Ui;
using Alastri.RR.Service;

public class CustomBlockShading : IBlockShading
{
  public Color GetColor(BlockContext context)
        {
    double fe = context.N("DryTonnes.FE");

                    if(fe > 60)       return Color.FromArgb(255,0,138); //pink
    else if(fe > 58)    return Color.Red;
                    else if(fe > 56)    return Color.Orange;
    else          return Color.WhiteSmoke;
  }}
```

Multi-Variable Shading

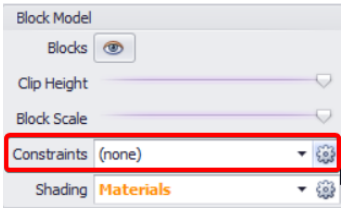
```
using System;
using System.Collections.Generic;
using System.Drawing;
using System.Text;
using System.Linq;
using Alastri;
using Alastri.RR.Ui;
using Alastri.RR.Service;

public class CustomBlockShading : IBlockShading
{
  Color e1_low_e2_low = Color.Magenta;
  Color e1_high_e2_low = Color.DeepSkyBlue;
  Color e1_low_e2_high = Color.Yellow;
  Color e1_high_e2_high = Color.White;

  double element1_Min = 0;
  double element1_Max = 12;
  double element2_Min = 1.5;
  double element2_Max = 3;

  public Color GetColor(BlockContext context)
  {
    double element1 = context.N("Head_Tonnes.SiO2");
    double element2 = context.N("Head_Tonnes.Al2O3");

    double x = element2 - element2_Min;
    x = Math.Max(0, x);
    x = Math.Min(x, element2_Max - element2_Min);

    double y = element1 - element1_Min;
```

```
32.         y = Math.Max(0, y);
33.         y = Math.Min(y, element1_Max - element1_Min);
34.
35.         Color topLerp = Lerp(e1_low_e2_high, e1_high_e2_high, x / (element2_Max - element2_Min));
36.         Color lowLerp = Lerp(e1_low_e2_low,  e1_high_e2_low,  x / (element2_Max - element2_Min));
37.         Color lerp =    Lerp(lowLerp,        topLerp,         y / (element1_Max - element1_Min));
38.
39.         return lerp;
40.     }
41.
42.     public Color Lerp(Color one, Color two, double pct)
43.     {
44.         return Color.FromArgb( (int)(one.R + pct * (two.R-one.R)) ,
45.                                (int)(one.G + pct * (two.G-one.G)) ,
46.                                (int)(one.B + pct * (two.B-one.B)) );
47.     }
48  }
```

CREATING BLOCK MODEL CUSTOM CONSTRAINT

Constraints may be used to hide parts of the block model based on some criteria, such as material type or grade threshold.

1. Press the gear icon next to the **Constraint** dropdown. This opens the configuration dialog.

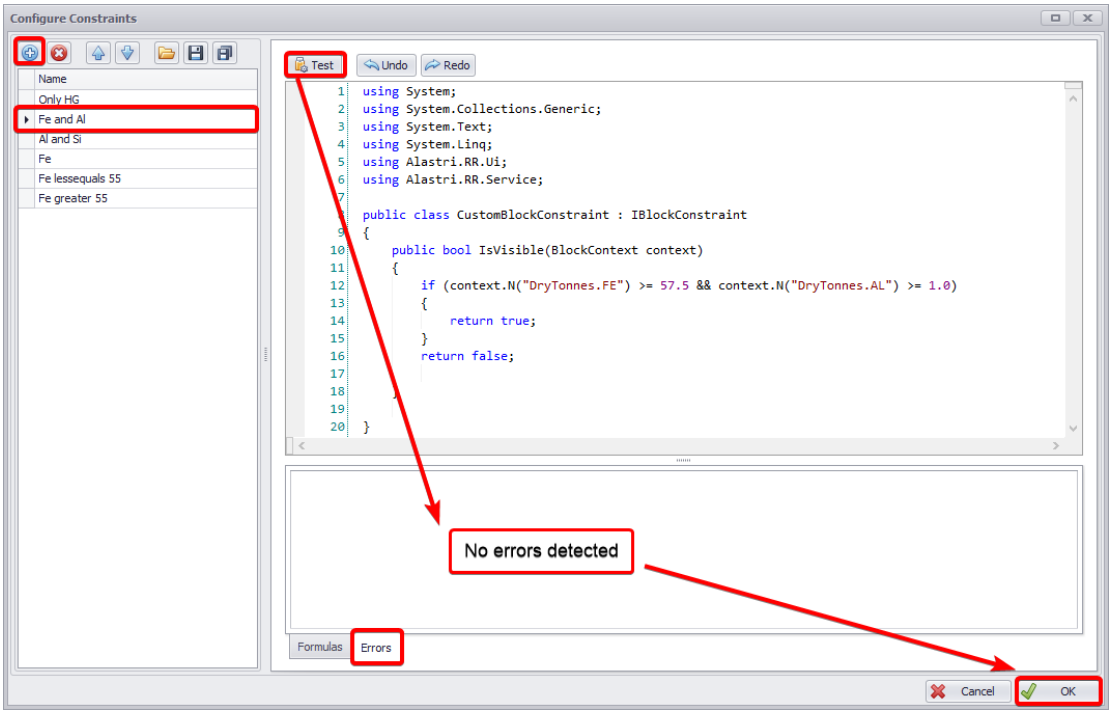


2. Click the blue plus icon to add a new constraint.
3. Rename the label to "Fe and Al".
4. Paste the sample formula into the code editor.

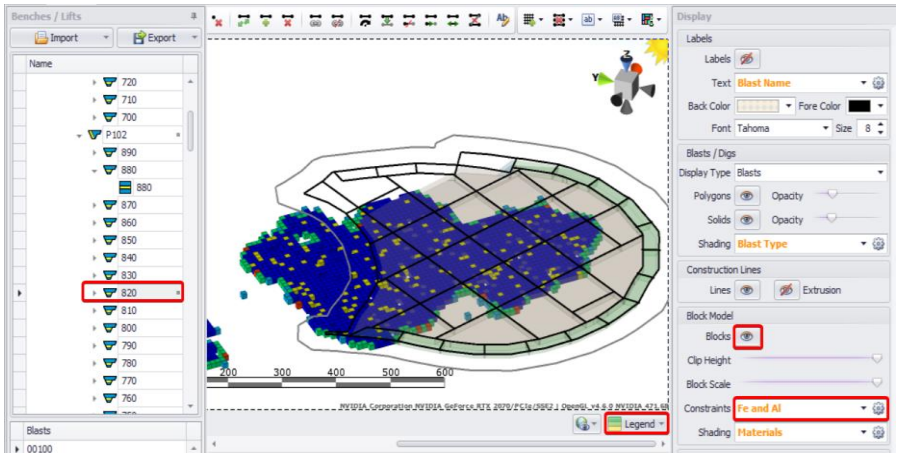
Filter by Fe and Al

```
1.  using System;
2.  using System.Collections.Generic;
3.  using System.Text;
4.  using System.Linq;
5.  using Alastri.RR.Ui;
6.  using Alastri.RR.Service;
7.
8.  public class CustomBlockConstraint : IBlockConstraint
9.  {
10.     public bool IsVisible(BlockContext context)
11.     {
12.         if (context.N("DryTonnes.FE") >= 57.5 && context.N("DryTonnes.AL") >= 1.0)
13.                         {
14.                                 return true;
15.             }
16.                         return false;
17.
18.             }
19.
20. }
```

5. Press the **Test** button to make sure your code is correct. Any errors found will be shown in the **Errors** panel and won't let you to proceed.
6. Fix any errors detected, run test again and press OK to accept.



7. In the **Block Model** panel on the right, toggle eye icon to show blocks and from the **Constraint** dropdown select the constraint you have created – **Fe and Al** (Note that custom shadings are shown in **bold orange**, while standard shadings are shown in normal black).
8. Select bench(es) from the tree on the left to display the viewport and review the result.
9. Colours assigned for block shading can be seen in the **Legend** (bottom right, below the viewport).



Create other constraints (such as “Only HG”, “Fe greater 55”, “Only Fe”) using codes listed below, or practice writing your own.

Show only HG

```
using System;
using System.Collections.Generic;
using System.Text;
using System.Linq;
using Alastri.RR.Ui;
using Alastri.RR.Service;
```

```
public class CustomBlockConstraint : IBlockConstraint
{
  public bool IsVisible(BlockContext context)
  {
    if (context.N("DryTonnes.FE") >= 57.5 && context.N("DryTonnes.AL") >= 1.0)
                {
                        return true;
        }
                return false;

        }

}
```

Filter by Fe

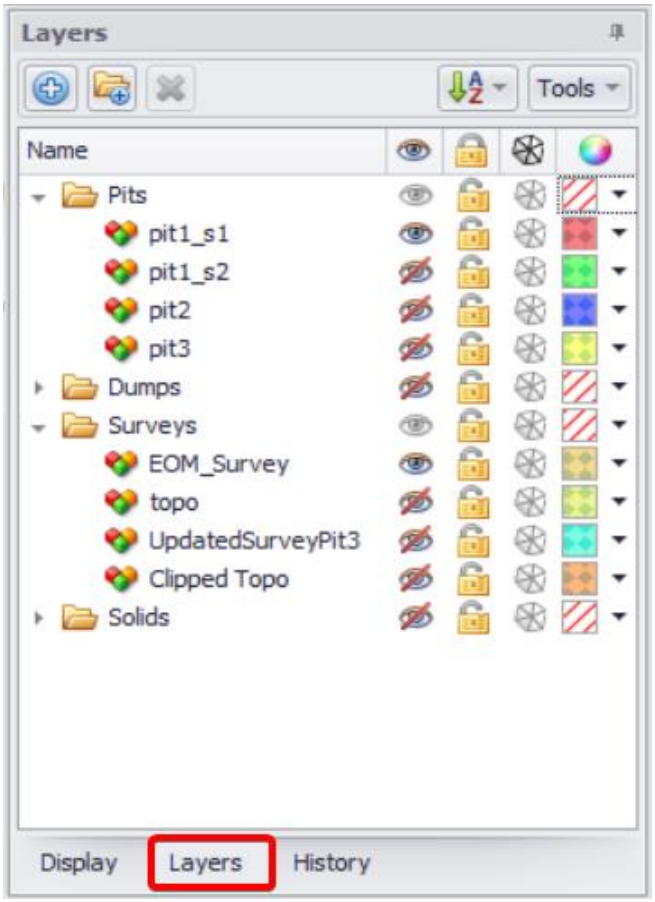
```
using System;
using System.Collections.Generic;
using System.Text;
using System.Linq;
using Alastri.RR.Ui;
using Alastri.RR.Service;

public class CustomBlockConstraint : IBlockConstraint
{
  public bool IsVisible(BlockContext context)
  {
    if (context.N("DryTonnes.FE") >= 57.5)
                {
                        return true;
        }
                return false;

        }

}
```

Fe greater 55

```
using System;
using System.Collections.Generic;
using System.Text;
using System.Linq;
using Alastri.RR.Ui;
using Alastri.RR.Service;

public class CustomBlockConstraint : IBlockConstraint
{
  public bool IsVisible(BlockContext context)
  {
    if (context.N("DryTonnes.Fe") > 55)
                {
                return true;
        }
                return false;

        }

}
```

Layers

Triangulations and linework may be loaded in the **Layers** panel. This may be useful for visualising the pit extents, topography and design lines.



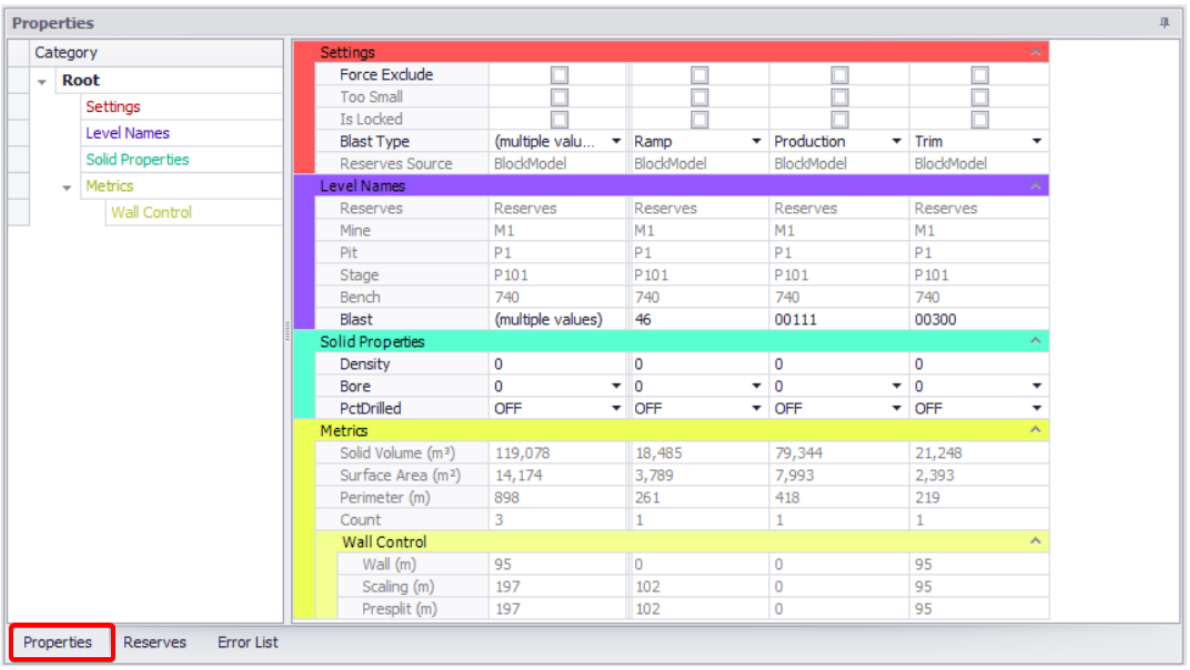
Layers panel tools

	Add Layer
	Remove Layer
	Create Folder
	Sort Layers
	Tools
	Visibility Toggle
	Snap To Surface
	Show Edges on Triangulations / OverDraw on Polylines/Points
	Color Selector

The **Layers** panel supports drag and drop of triangulation files directly from Windows Explorer.

Inspect

The **Properties** panel displays the properties and attributes of the current solid selection.

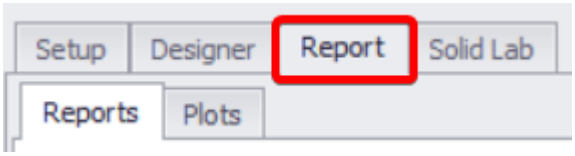


Settings	
Force Exclude	Excludes unwanted solids from the reserves
Too Small	Excludes smaller solids from being displayed
Is Locked	Prevents a solid from being edited
Blast Types	Trim / Contour / Ramp / FreeDig / Production
Reserves Source	Block Model / Grade Control
Level Names	
Reserves/Mine/Pit/Stage/Bench	Level address of the solid
Blast (Solid)	Unique blast name
Solid Properties	User specified values in **Phase/Blast/Dig Properties** setup steps
Metrics	
Solid Volume	Solid volume (m3)
Surface Area	Solid surface area (m2)
Perimeter	Solid perimeter (m)
Count	Solid count
Wall Control	
Wall, Scaling, Presplit	User specified partial perimeters in **Wall Controls** setup step (example, wall, scaling, presplit)

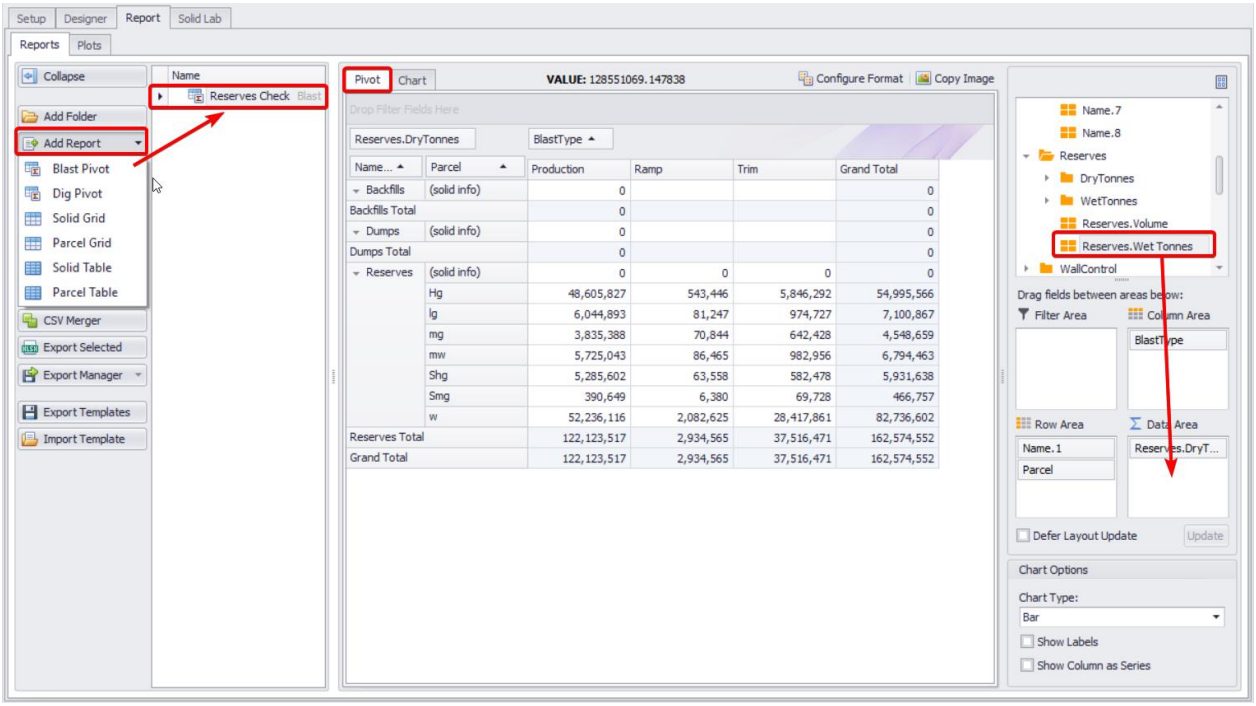
Reporting

Create report to check tonnes and grade by Stage and Parcel.

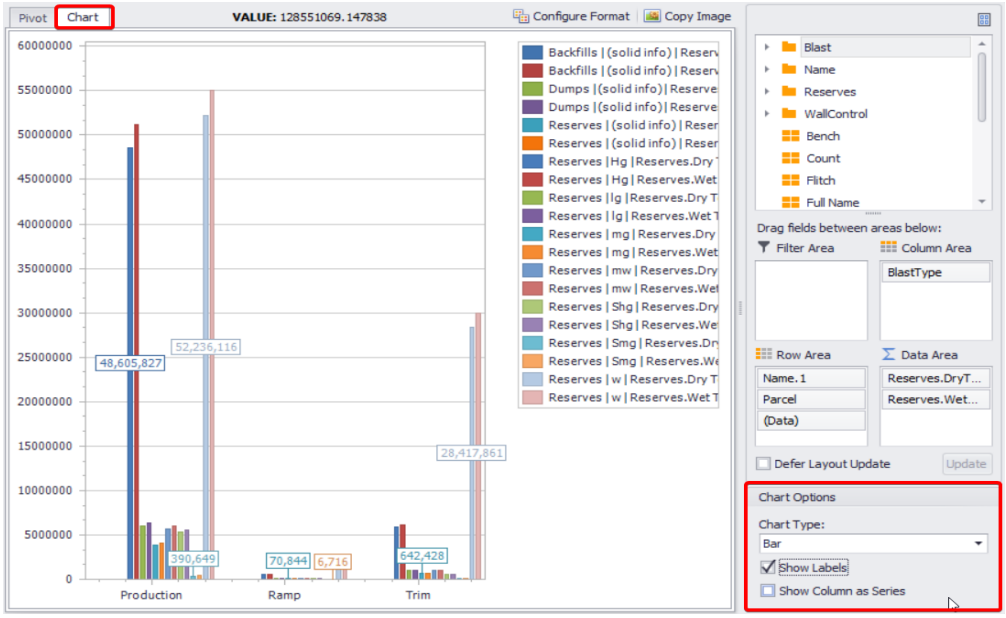
1. Navigate to the **Report** tab > **Reports**.



2. Press **Add Report** button > Blast Pivot.
3. Name it "Reserves Check".
4. Drag fields between **Filter**, **Column**, **Row** and **Data** areas:
   a. "Blast Type" header to the **Column Area**,
   b. "Name.1" and "Parcel" headers to the **Row Area**,
   c. "Reserves.WetTonnes" and "Reserves.DryTonnes" headers to the **Data Area**.

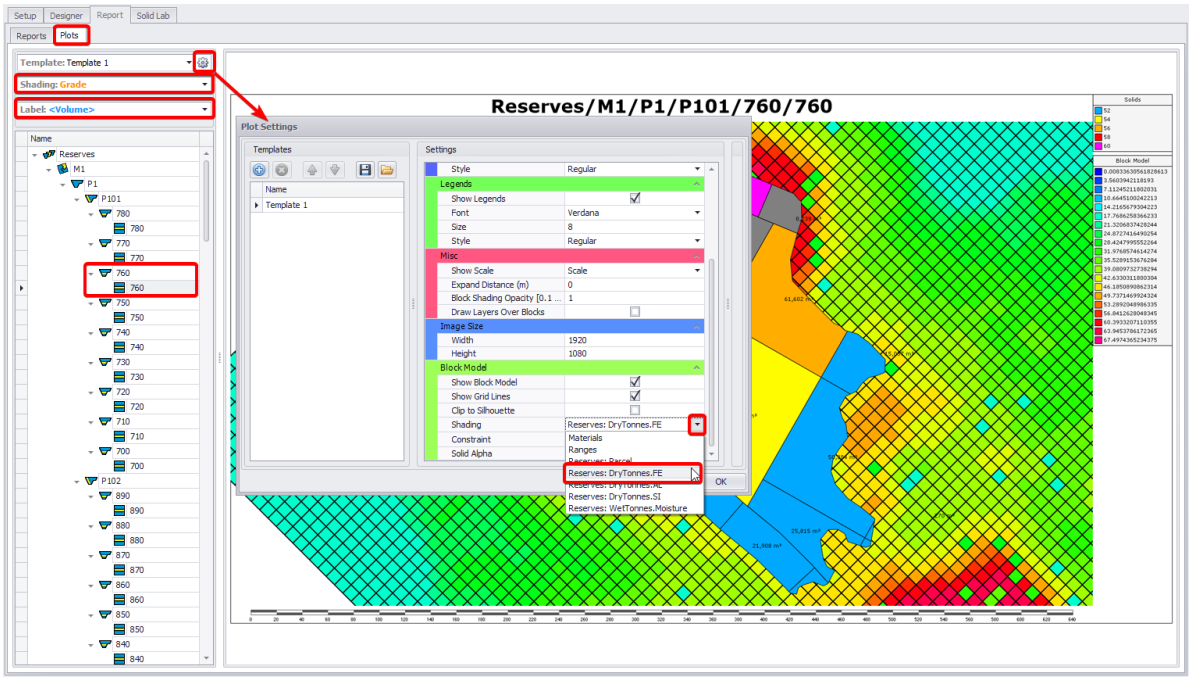


5. Open the **Chart** tab to view the chart.
   a. Map other fields, if required,
   b. Change Chart type, and toggle labels and columns display options in the **Chart Options** panel on the bottom right.



Plots

1. Select a bench, lift or flitch from the tree on the left and its blocks will be displayed in the main viewport.
2. Press the gear icon and configure Custom Template with data you wish to display in the plot report.
3. Select a shading and label you wish to apply to the selected element by choosing them from **Shadings** and **Label** dropdowns accordingly.



Information on other reporting options and report types available in this tab see in the RR. Report tab section in the main documentation space.

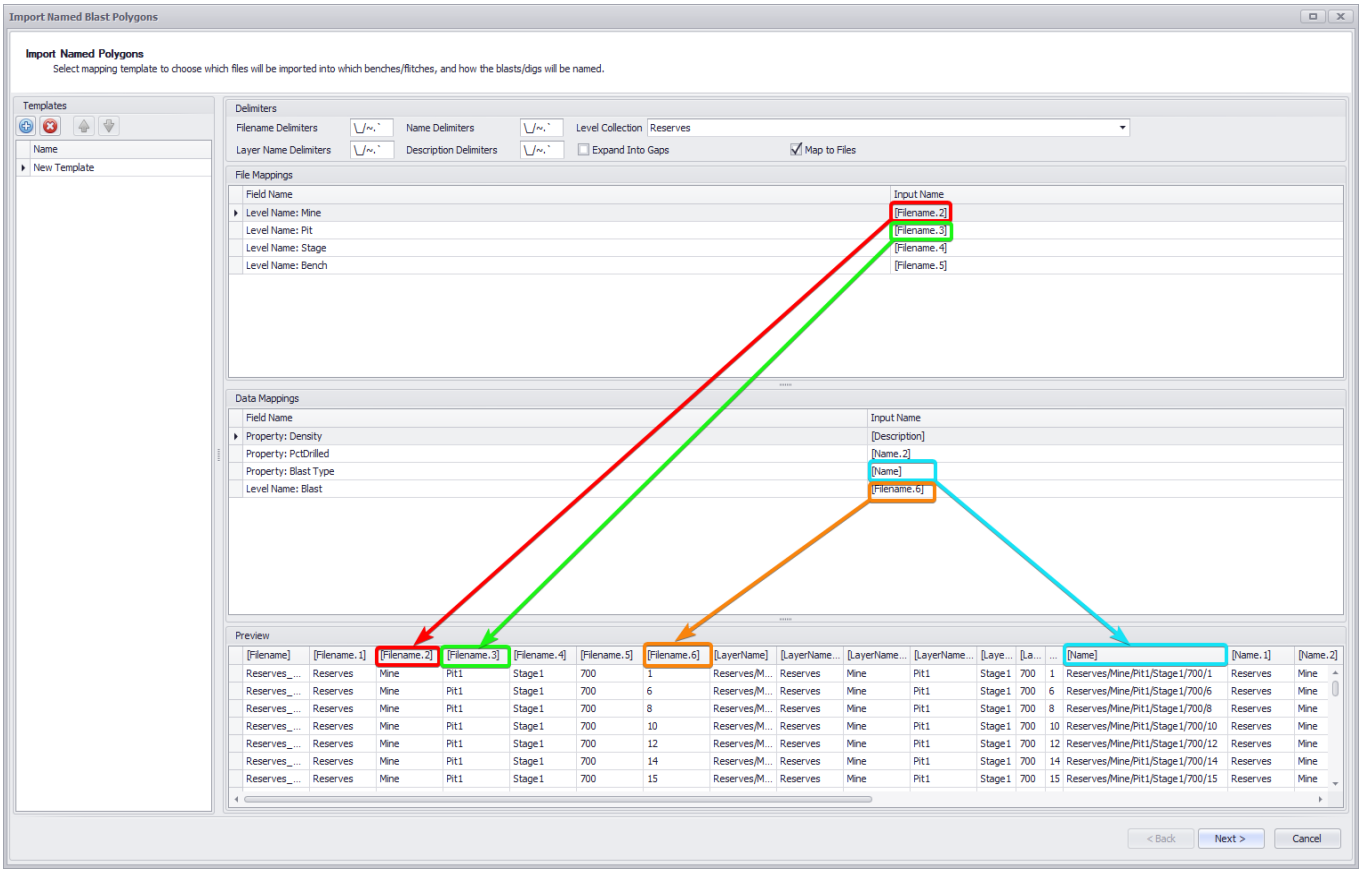
Import and Export

- ✓ If blasts designs have been created outside Rapid Reserver, they can be imported into the project.
- ✓ Or blasts created by Rapid Reserver can be exported and used in another software for drill and blast design.

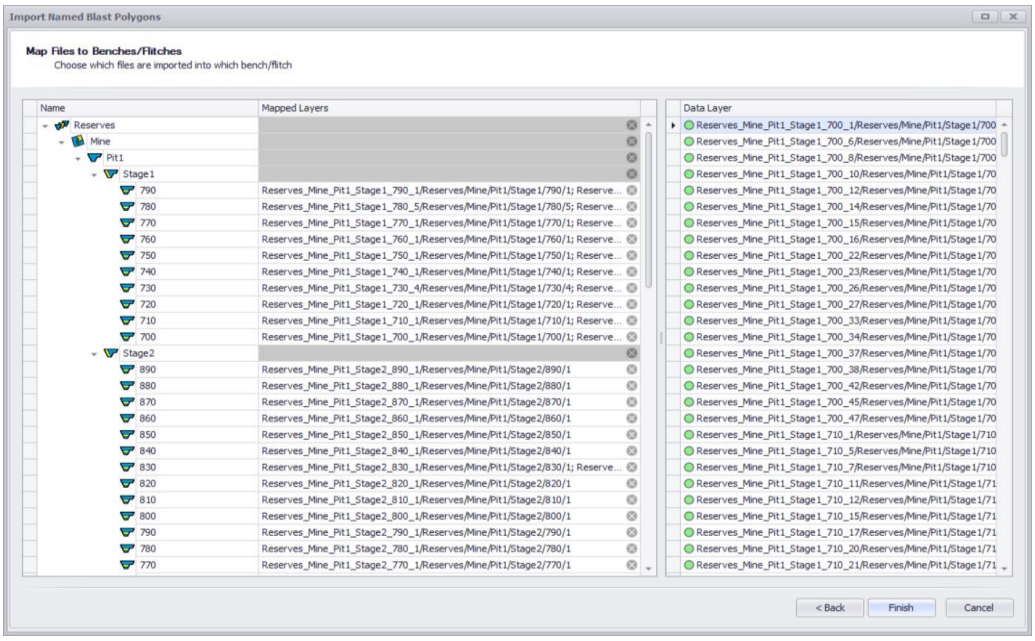
Import

Import Blast Polygons, as follows:

1. Go to **Designer** tab > **Benches/Lifts** panel > **Import** button > "Into Project" option > "Named Blast Polygons".
2. Review the mapping template to choose which files to be imported into which benches/flitches, and how the blasts/digs will be named.
   a. The blasts are automatically inserted into the correct location.
   b. If blasts are not mapped, they can be dragged into the correct location.

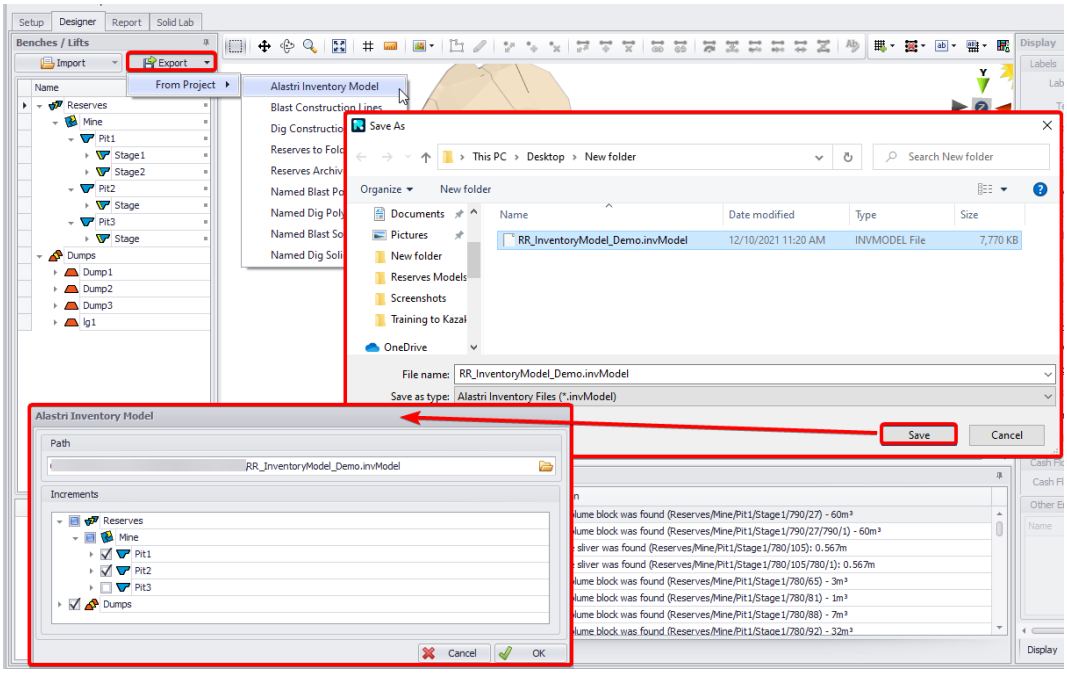


If the previous form is filled out correctly, the next form should be able to identify the correct file to map to each bench due to activating the **Map to Files** option. If the files are not mapped to the correct bench, you can delete the auto mapping and drag and drop the correct file to the correct bench.



Export

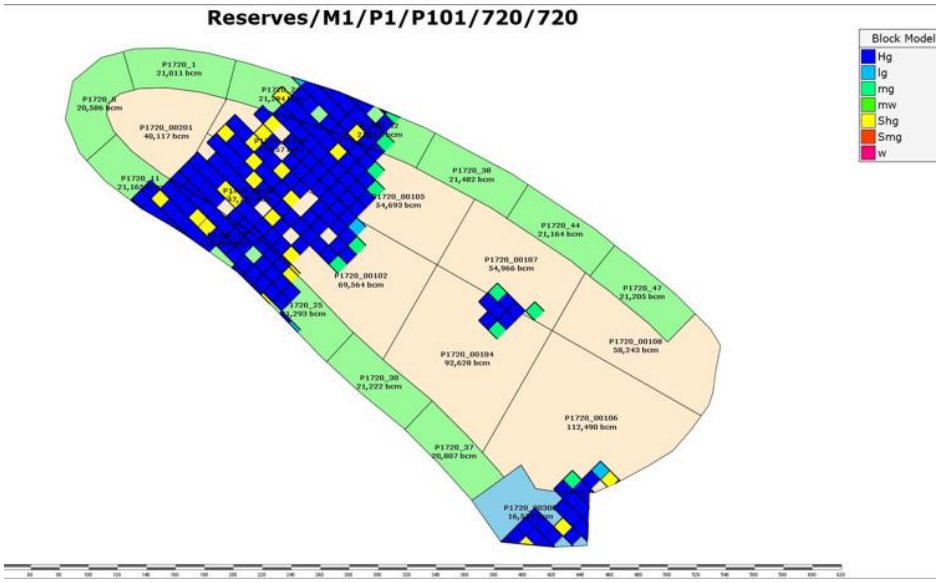
Export reserves model to Alastri Inventory Model files (".invmodel") for further import into Haul Infinity or Tactical Scheduler.



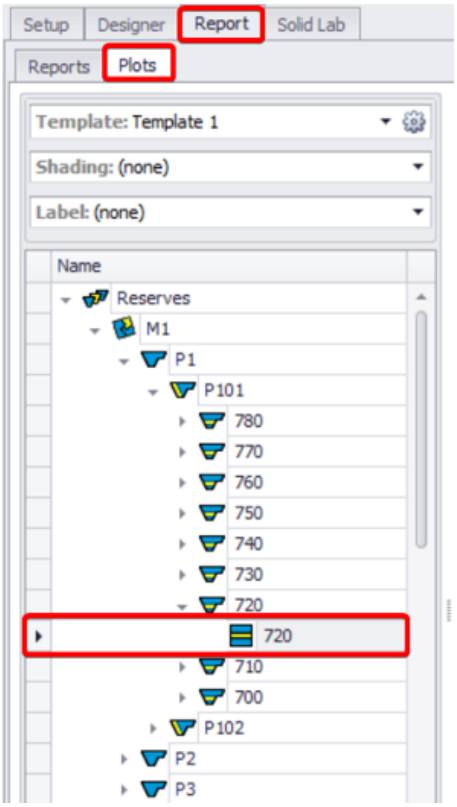
Information on other import and export options see in the RR. Imports and Exports section in the main documentation space.

Exercise: configuring and exporting plot with custom labels, shading and constraint

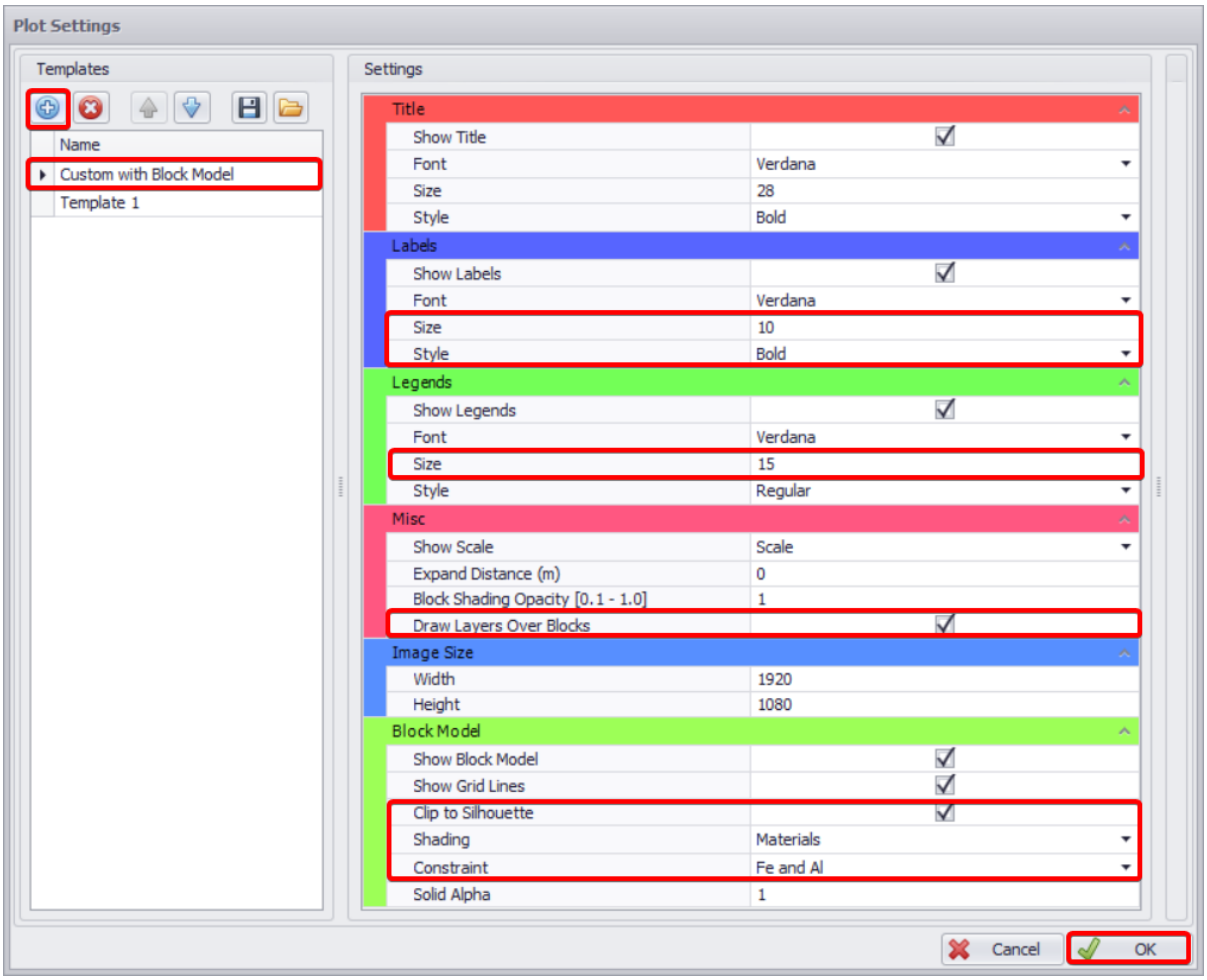
Complete the following step to get an exported plot report as shown below:



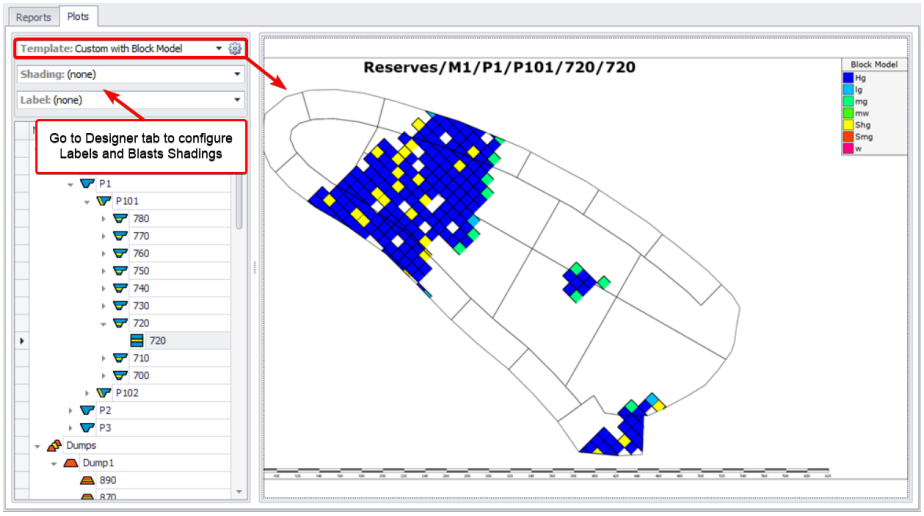
1. Navigate to the main **Report** tab > **Plots** tab and extend the tree structure to the bench required. Here - 720. In the plot viewport you'll see only a grid and bench contour. To display relevant information, you will be prompted to configure a template and select preconfigured shadings and labels.



2. Locate the **Template** field and press the gear icon to the right .
3. Create new template and rename it to “Custom with Block Model”, for example.
4. Populate the settings required:
    a. Change Labels display Size to 10 and Style to Bold.
    b. Change Legend Size to 15.
    c. Flag **Draw Layers Over Blocks** checkbox.
    d. Flag **Clip to Silhouette** checkbox.
    e. From the **Shading** dropdown select preconfigured template **Materials** (If not preconfigured, see instruction in Designer tab > View > Exercises > Creating Block Model Custom Shading section above).
    f. From the **Constraint** dropdown select preconfigured template **Fe and Al** (If not preconfigured, see instruction in Designer tab > View > Exercises > Creating Block Model Custom Constraint section above).
    g. Make sure checkboxes to show title, labels, legends, block model and grid lines are flagged.
    h. Make any additional changes to sizes, fonts, and styles of any of other plot elements, to suit your preferences.

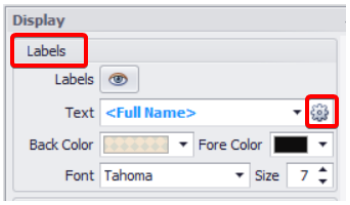


5. Press OK and review the plot. You may notice that some relevant information is lacking, such as labels and blasts shading. These must be preconfigured in the **Designer** tab.



CONFIGURING BLAST CUSTOM LABEL

1. Go to the **Designer** tab > **Display** panel > **Labels** section > **Text** field > gear icon. This will open the **Configure Labels** window.



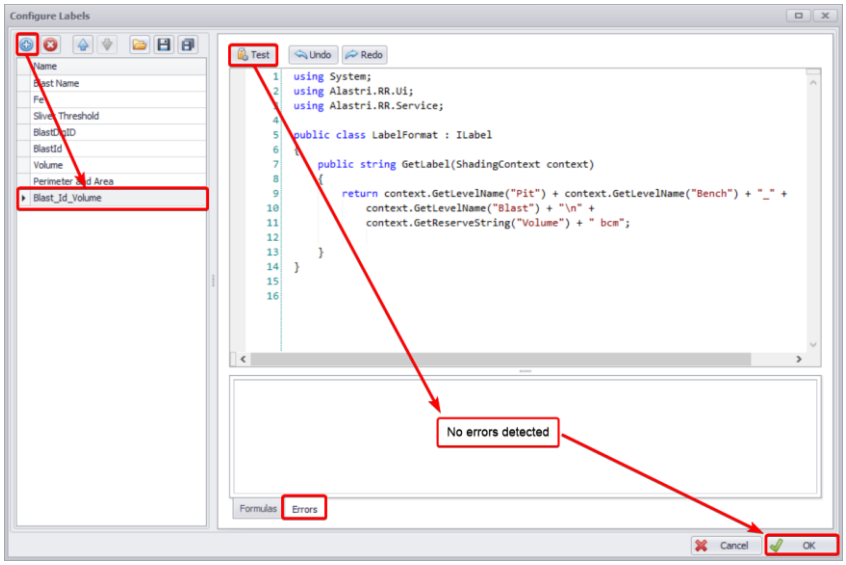
2. Press the blue plus button to add a new label, rename it to "Blast_Id_Volume".
   a. Create or paste in the sample formula into the code editor.

ID and Volume

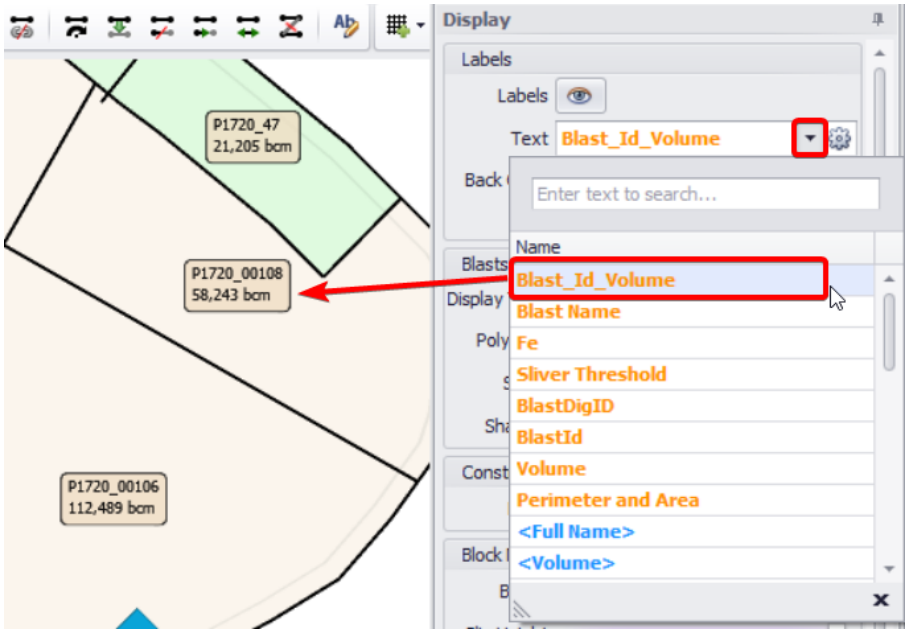
```
using System;
using Alastri.RR.Ui;
using Alastri.RR.Service;

public class LabelFormat : ILabel
{
  public string GetLabel(ShadingContext context)
  {
    return context.GetLevelName("Pit") + context.GetLevelName("Bench") + "_" +
                                         context.GetLevelName("Blast") + "\n" +
                                         context.GetReserveString("Volume") + " bcm";

  }
}
```

   b. Double click in Available Formulas list for code hints.
   c. Press **Test** button to check for compile errors.

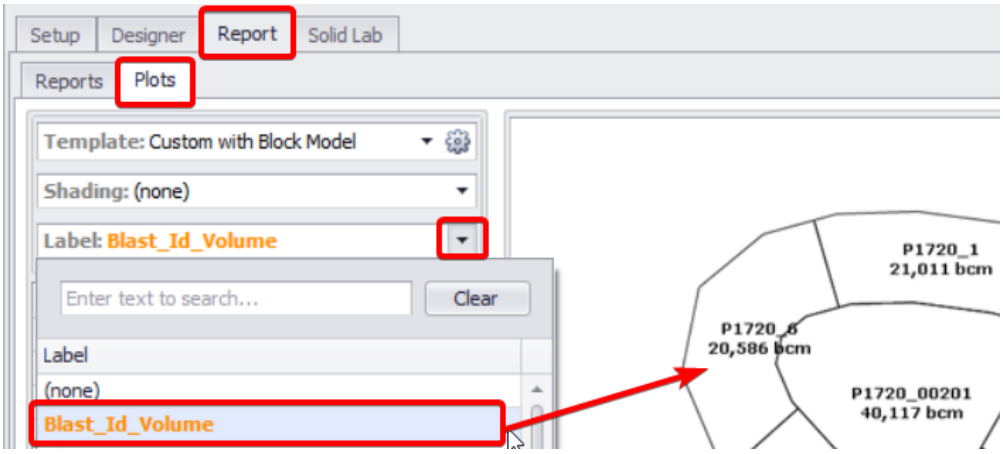
d. Fix all the errors, if any, and press OK to proceed.



Now you can select this custom blast label from the **Text** field dropdown. All custom labels are shown in **bold orange**.

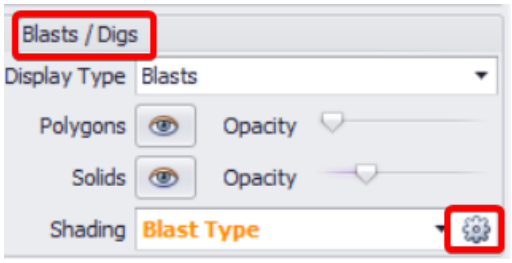


e. Return to the **Report** > **Plots** tab and from the **Label** field dropdown select that newly created label.

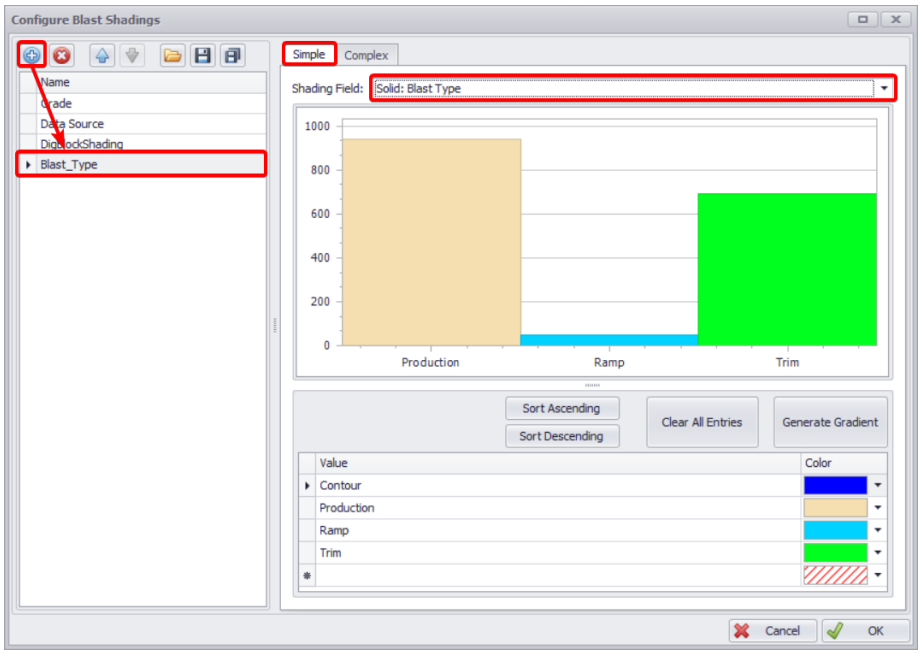


CONFIGURING BLASTS CUSTOM SHADING

1. Go to the **Designer** tab > **Display** panel > **Blasts/Digs** section > **Shading** field > gear icon. This will open the **Configure Blast Shadings** window.



2. Press the blue plus button to add a new blast shading, rename it to “Blast_Type”.
    a. In the **Simple** tab drop down the **Shading Field** and select “Solid: Blast Type” template.
    b. In the **Values** table, populate blast types (contour, production, ramp, trim) and assign colour to each interval.



c. Alternatively, click the **Complex** tab to open the code editor.
d. Create or paste in the sample formula.

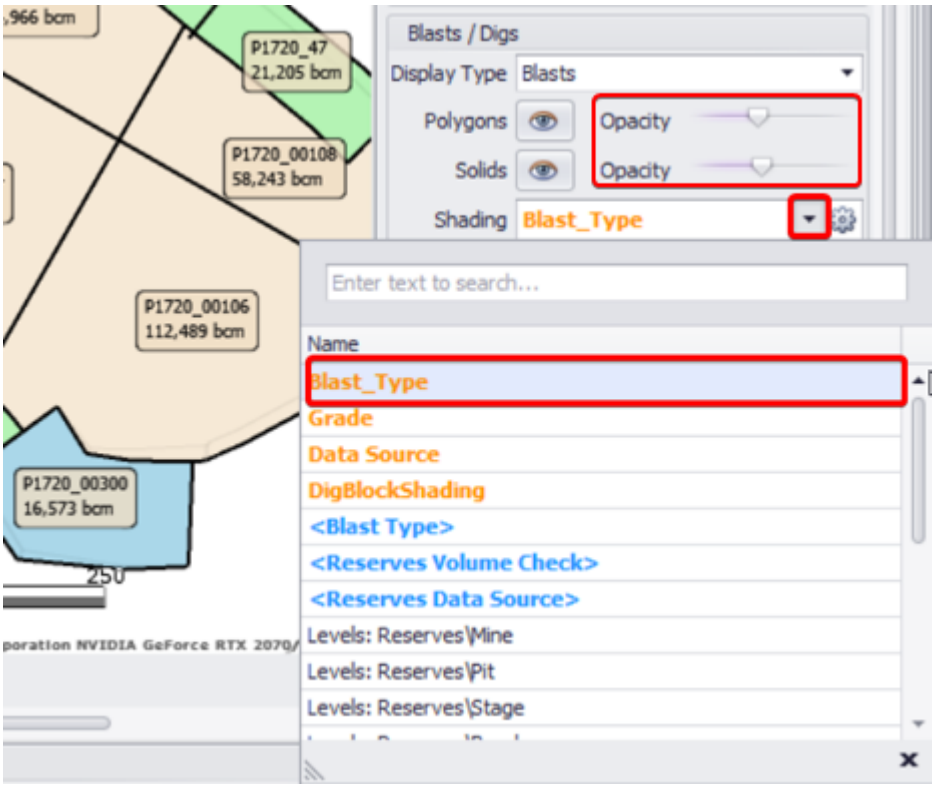
Simple Blast Shading

```
using System;
using System.Collections.Generic;
using System.Drawing;
using System.Text;
using System.Linq;
using Alastri.RR.Ui;
using Alastri.RR.Service;

public class CustomBlastShading : IBlastShading
{
  public Color GetColor(ShadingContext context) {

                    if(context.BlastType.ToString() == "Contour") return
Color.MediumPurple;
                    if(context.BlastType.ToString() == "Trim") return Color.PaleGreen;
                    if(context.BlastType.ToString() == "Ramp") return Color.SkyBlue;

                    return Color.BlanchedAlmond;
  }
}
```

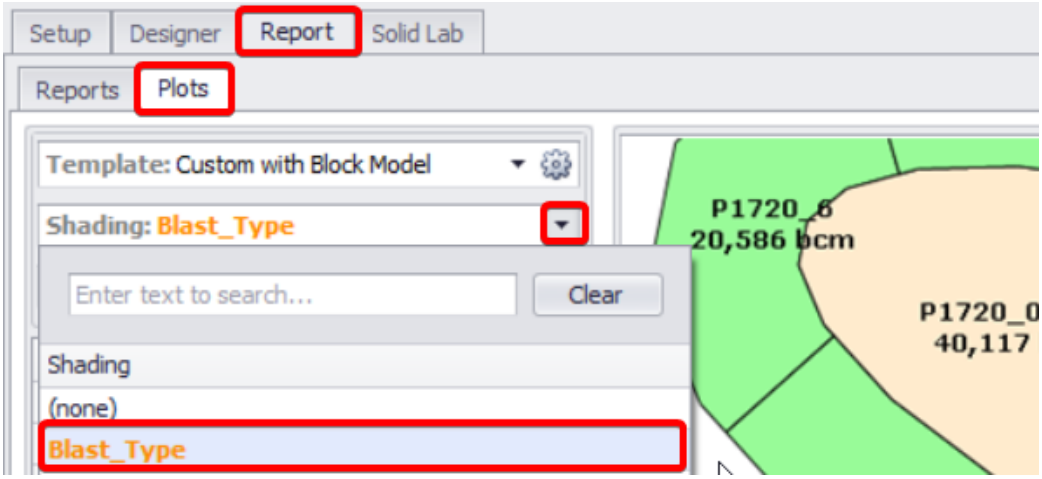
e. Fix all the errors, if any, and press OK to proceed.

Now you can select this custom blast shading from the **Shading** field dropdown. All custom shadings are shown in **bold orange**.

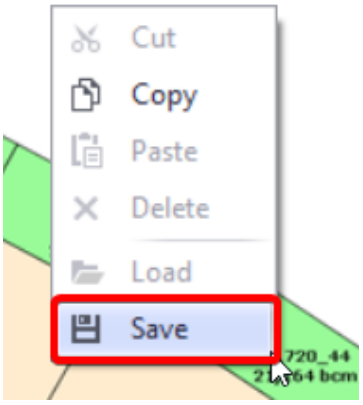
Adjust polygons and solids Opacity for a better viewing.



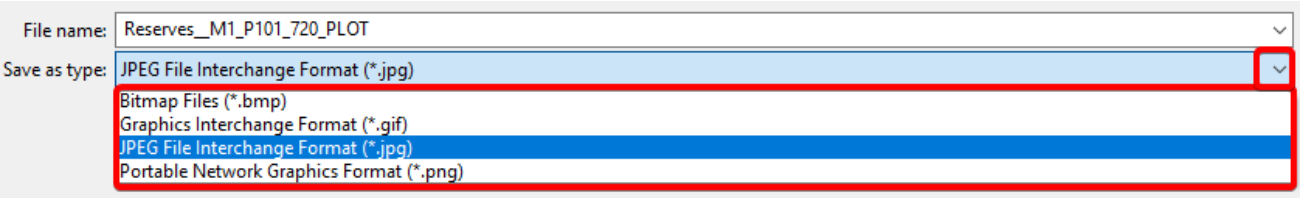
3. Return to the **Report** > **Plots** tab and from the **Shading** field dropdown select that newly created blast shading.



a. Review the configured plot in the viewport. You can always go back to the Template settings to change any display parameters, if desired.
b. To save the plot, right click anywhere in the viewport and select "SAVE" option.



c. In the **Save As** window, specify file name and select a format (available formats are: *.bmp, *.gif, *.jpg and *.png).



Software Support

Our aim is to give great aftercare and support to all Alastri customers. If you have a problem, try searching by keyword in the online help documentation, asking a question in the user forums, learning from our video tutorials or by contacting an Alastri customer support representative.

Documentation	Extensive online documentation is accessible through the Help menu.
Website	Software updates are available at www.alastri.com.au

User Forum	Learn from the experts at www.linkedin.com/groups/6788736
Video Tutorials	Search for Alastri on www.youtube.com
Contact	Send your support requests to support@alastri.com.au

Sometimes we may link advanced users to preview releases on the Alastri website. It is possible that these unstable versions may crash, and if they do, we ask that you copy down the error message and send it to support@alastri.com.au.