I2D GPU User Manual

For Rhino 8 on Windows

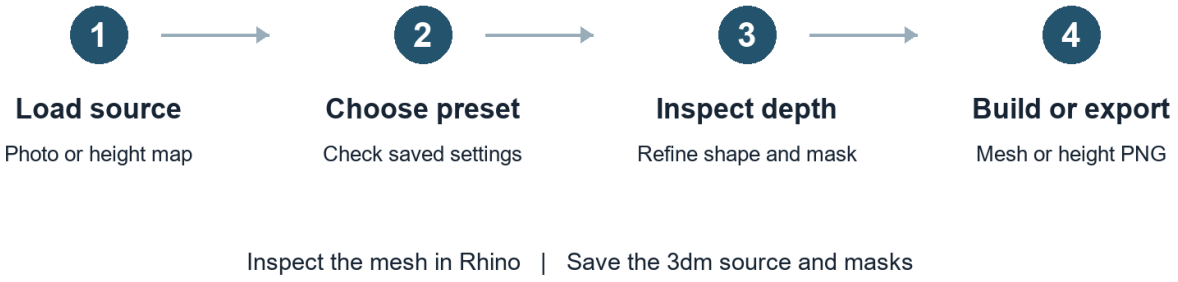
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I2D GPU turns a photograph or artwork into a relief mesh in Rhino. You can build a flat relief, place the relief on an existing surface or mesh, correct its subject mask, export a height map, and revisit meshes that retain their I2D settings.

This manual explains the 1.0.4 panel and the six BR presets, including Custom depth curve, Fast QEM mesh reduction and shared action progress. Start with a preset close to your image, inspect the generated depth, and refine only the settings that address a visible problem. The Quick Start User Manual provides a shorter first project workflow.

What you will create

The result is a mesh whose height comes from inferred or imported depth. AI depth describes a plausible visible shape from one image. It does not reconstruct hidden surfaces or provide measured dimensions of the photographed object. You choose the physical relief depth in the Rhino document.



The working sequence from source image to a reusable Rhino relief

Choose your output

Use **Add mesh** for a relief on a flat plane. Use **Project to surface** to position relief on an existing target. Use **Export final resolution…** when you need a grayscale height image rather than mesh geometry.

Keep the project reusable. Save the Rhino 3dm, the original source image, and any manual mask files. A saved I2D mesh can remember its settings, but the original image remains a separate file.

About this edition

Instructions use the English control labels. This edition follows the current plugin source and the preset folder supplied for this manual. Preset settings were checked on 14 October 2026. Your installed build or translated panel may display slightly different wording. The figures explain behavior. The Custom curve chapter also includes a rendered editor example using cached depth; its values are illustrative.

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A useful reading order

For a first project, read **Setup and licensing**, **Your first flat relief**, and **Choosing a current preset**. For a cutout, continue with **Background and mesh footprint** and **Editing the mesh mask**.

To refine the appearance, use **Image and relief adjustments**, **Using the depth curve**, and **Balanced relief controls**. For placement on a model, read the two projection chapters.

If you already have a mesh, go directly to **Updating an existing I2D mesh**. For slow builds or unexpected results, use the two troubleshooting chapters.

Setup and licensing

Prepare Rhino

1. Install the current I2D GPU package for Rhino 8 on Windows using the supplied installation instructions. Keep the plugin and its accompanying pipeline files together. Restart Rhino after an update.
2. Open or create a Rhino document. Check its model units before setting relief depth. A Target depth of 3.2 means 3.2 of those units.
3. Run **I2DGPUOpenPanel** in Rhino. If Rhino does not recognize the command, check that the plugin is installed and loaded before troubleshooting the GPU engine.
4. Choose a panel language in **File & actions** if needed. Close and reopen the panel to refresh all translated labels.

Activate access

Expand **Licensing** and read the status. **Get trial license** requests trial access when available. **Buy a license** opens the configured checkout. After paying, return to Rhino and use **Complete purchase** if it is shown, then **Refresh license**. Use **Copy** beside Hardware ID when support requests that identifier.

Buttons depend on the current license state and the online service configuration. Read the status if a button is unavailable. Trial validity and online checks are determined by the issued license; a GPU installation does not activate the plugin.

Prepare the depth engine

Install Python first. A full 64-bit Python 3.12 or 3.11 installation with pip is required to prepare the managed engine. The plugin installer does not install base Python. Follow the separate Installation Guide, including any Python version requirement supplied with your package.

1. In **GPU depth engine**, choose **Install / repair GPU engine**. Allow the runtime, packages, and required downloads to finish.
2. Use **Refresh GPU status** to check readiness. **Download model** prepares the selected checkpoint when it is missing.
3. If you change the model in Advanced GPU settings, allow its download to finish before generating depth.

Device: CUDA / GPU uses an NVIDIA GPU. **Device: Auto** uses CUDA when available; **Device: CPU** uses the processor and can take longer. Internet access is needed for initial downloads and online licensing operations. Existing local model files can be reused.

No single VRAM requirement fits every model and input size. Begin with a manageable size and read the actual runtime status. If setup fails, export GPU diagnostics; see Troubleshooting depth and performance.

Your first flat relief

Load an image and a preset

1. In **File & actions**, leave **File is pre-made depth / height map** off for ordinary photographs and artwork.
2. Choose **Browse…** and open your source. Supported image types include PNG, JPEG, BMP, TIFF, GIF, and WebP. Use a clear image with enough pixels for the detail you want.
3. In **Preset**, choose **Open settings…**, select a current BR preset, and click **Open**. If unsure, start with **BR_Universal**. Check the **Loaded preset** label.
4. In **Output quality**, change the grid from the presets' Ultra setting to **Draft — 256** or **Standard — 512** for a first mesh check. Leave Live mesh off initially.

Choose a model whose terms fit your project. Several supplied presets save Large; loading a preset can change the model as well as the relief settings. The model notices chapter explains this choice.

Generate and inspect

5. Choose **Update depth map**. The shared animated bar identifies the action and shows the current stage below it. Wait for **Depth map updated** and the depth image. Read the status if a download, fallback, or error is reported.
6. Inspect the broad form first. Check which areas are high, whether the subject is intact, and whether unwanted background is raised. Use the mask and relief chapters to correct a specific problem.
7. In **Relief parameters**, set **Target depth (max 20)** in document units. Check **Invert depth**, the solid mode, and **Scale XY with target depth** before building.
8. Choose **Add mesh**. The same bar identifies mesh creation and stays animated through the build. Wait for **Mesh added** and the model in the viewport. Inspect the result from above and at a low angle in Rhino. Check its bounding size against the intended physical dimensions.

Refine and save

Change one setting at a time and compare the mesh. Raise output quality when the shape and footprint are satisfactory. Increasing resolution before solving an incorrect shape only makes that shape denser.

Use **Save settings…** to save a tuned setup under a new name. Save the Rhino document and retain the original image. **Add mesh** creates a separate object each time; to replace an existing I2D object, use **Load from mesh…** and **Update loaded mesh**.

Expected result. A relief mesh appears in the Rhino document. A depth preview alone is an image preview; it does not add mesh geometry.

Choosing a current preset

The current set contains six presets. Names below match the settings picker, including the existing spelling of Medalions. The image descriptions are practical starting points based on those names, not automatic guarantees of the best result.

Preset	Start here for	What to check next
BR_Universal	Mixed artwork, photographs, or an unfamiliar image	Broad shape, background height, and whether more source detail helps
BR_Black and White images	Monochrome artwork and strong tonal separation	Stronger depth curve and fine detail; higher saved AI input size
BR_Blue and White images	Blue and white decorative artwork	Separation of decorative marks from broad shape
BR_line Art	Drawings, outlines, logos, and fine linework	Narrow raised edges, text, and source detail strength
BR_Medalions	Coin or medallion style relief artwork	Subject footprint and whether a usable mask is available
BR_Medalions_Smoother	Medallion artwork needing gentler local detail	Automatic background mask and the cost of its dense tile grid

Apply a preset deliberately

Choose **Open settings…**, select the preset, and check the loaded name. A preset restores many controls at once, including depth, model, background options, solid mode, projection controls, and output quality. Review those choices after loading.

The current automatic image suggestions use names such as Photo, Portrait, Coin, and Line Art. Those names do not match this six-preset set. If an automatic suggestion reports that its preset is unavailable, use **Open settings…** and select a BR preset manually.

Preserve a useful result

Choose **Save settings…**, enter a descriptive name, and save. Use a new name to retain the supplied preset. If that name already exists, the panel asks whether to overwrite it. **Reset settings…** returns build controls to plugin defaults; it does not recreate the selected BR preset. Open that preset again to restore it.

Named presets normally live in **%APPDATA%\McNeel\I2D_GPU\presets**. They store reusable build settings. Source-specific mask corrections are separate, so a preset cannot carry a subject cutout from one image to another.

Current preset settings

These tables show the saved settings in the six supplied files. Short labels refer to the full names in Choosing a current preset. Values are rounded for reading; the preset files retain their original precision.

Short label	DA model	DA input	Depth curve	Relief smoothing	Source detail	Tile grid
Universal	Large	1023	1.10	0.45	1.00	2 by 2
Black and White	Large	2048	1.50	0.40	0.75	3 by 3
Blue and White	Small	1023	1.10	0.45	1.00	4 by 4
Line Art	Large	1023	1.30	0.25	1.50	4 by 4
Medalions	Large	1023	1.65	0.25	1.00	4 by 4
Medalions Smoother	Small	2048	1.65	0.30	0.75	8 by 8

Short label	Remove background	Subject only mesh	Fidelity mode	Selective refinement
Universal	Off	Off	Off	Off
Black and White	Off	Off	On	On
Blue and White	Off	Off	Off	Off
Line Art	Off	Off	On	Off
Medalions	Off	On	On	Off
Medalions Smoother	On	On	On	Off

Settings shared by all six

All six use **Balanced relief**, Relief strength **2.00**, Tile detail amount **1.00**, CUDA device mode, Ultra mesh grid **2048**, quad faces, and **Solid bottom: subject / heightfield**. Adaptive reduction is off. Base offset is 0, Depth curve start is 0, and Preserve detail in depth curve is on. Invert depth and Trim uniform border are off. Scale XY with target depth is on.

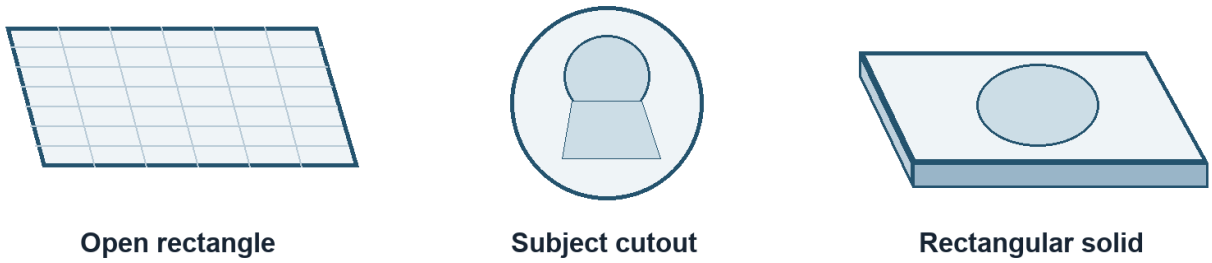
Target depth is approximately **3.2** document units: 3.22 in Universal, Black and White, and Blue and White; 3.20 in the other three. At those depths, an untrimmed flat long edge is about 64 to 64.4 units because XY scaling is enabled.

Read the actual input setting. The GPU depth quality dropdown displays the nearest named quality level. It is not an exact display of every preset input size. Open Advanced GPU settings to read DA input size, especially for the presets saving 2048.

These are saved treatments, not the neutral defaults. For a quicker test, reduce output quality first; if inference is still too costly, reduce DA input size or tiled detail and compare the resulting shape.

Background and mesh footprint

Background removal changes depth processing. Subject only mesh changes where mesh faces are built. Border trimming crops the rectangular working area. Select these independently for the result you want.



Conceptual footprints for an open rectangle a subject cutout and a rectangular solid

Desired result	Background and mask	Relief solid mode
Full image as an open relief	Subject only mesh off; remove background only if needed	Open relief surface
Subject shaped solid cutout	A usable alpha or generated mask; Subject only mesh on	Solid bottom: subject / heightfield
Relief with a thin surrounding rectangle	Remove background on; Subject only mesh off	Solid bottom: subject / heightfield
Full rectangular backing	Choose depth background handling for appearance	Solid bottom: full rectangular slab

Generate a background mask

Enable **Remove background before depth (BiRefNet)**, then choose **Update depth map**. BiRefNet supplies subject coverage used during depth processing. A higher **Background threshold** removes more marginal coverage. **Background blur** softens the transition; 0 removes feathering. **Background size** controls mask prediction resolution and GPU cost.

The panel ranges are 256 to 2048 for Background size, 0 to 1 for threshold, and 0 to 16 for blur.

Subject only mesh (no background faces) uses image transparency or an available generated or corrected mask. An opaque image without a mask keeps its rectangle; this option does not guess a subject from color or from low heights. This matters for BR_Medalions, which enables Subject only mesh but saves background removal off.

Crop or retain the image border

Trim uniform border (tight box) removes unused margins by cropping to a bounding rectangle. **Border / background sensitivity** affects which frame-like areas count as border for cropping. Cropping alone does not make a silhouette or remove holes inside the subject.

A solid backing cannot flatten a background that is already raised in the depth map. If the result looks like a thick rectangular mat, correct the depth background first. Base offset moves the relief; it is not a backing thickness control.

Editing the mesh mask

Use **Edit mesh mask…** in Background & mask when automatic coverage removes wanted detail or retains unwanted areas. The source image stays unchanged. With BiRefNet background removal enabled, a Keep correction also restores inferred relief before the background is flattened; regenerate the depth to see that effect.

Correct a cutout

1. Load the source image. Enable background removal and generate depth if you want an automatic BiRefNet mask as the starting point.
2. Choose **Edit mesh mask…**. Green overlay areas are kept; red areas are removed. Turn on **Silhouette** to inspect the cutout without the source colors.
3. Choose **Keep brush** to restore missing parts or **Remove brush** to erase background and unwanted islands. Drag across the area you want to change.
4. Set **Brush radius (pixels)** for the feature size, from 1 to 200. The outline shows the brush footprint. The radius refers to source image pixels; zoom changes the display scale.
5. Increase **Zoom**, from 1 to 4, for small gaps and edges. Resize the editor or use its scrollbars to inspect other parts of the image.
6. Choose **Apply** to save the correction. Enable **Subject only mesh** for a cutout, then choose **Update depth map** before judging depth changes or building the final mesh.

Choose the right editing tool

Tool or action	Effect
Keep brush and Remove brush	Paint a local correction along a stroke
Keep region and Remove region	Change a connected mask area with a click; inspect the affected area carefully
Undo	Revert a recent edit; mask editing keeps up to eight undo checkpoints
Reset mask	Return to the automatic or original starting mask; Apply commits the reset
Cancel	Close without saving the edits from this session

Import a prepared mask

Choose **Import mask…** and select a PNG matching the source dimensions. In an opaque grayscale mask, white keeps and black removes. If the PNG contains transparency, alpha supplies coverage. Review the silhouette, then Apply.

Keep thin bridges, small holes, and isolated pieces large enough to survive the output grid. The mesh builder can bridge corner-only contacts, but it can still reject other invalid solids. If a part disappears, inspect the mask at the final resolution rather than only at editor zoom.

Image and relief adjustments

Adjust the source before inference

Lighten shadows (%) brightens dark source detail before AI depth generation. 0 is off and 100 is the full adjustment. The source preview shows the adjustment; the original file is unchanged. Start with a modest amount and regenerate depth to judge its effect. **Reset shadow lift** returns to the original source tones.

Shadow lift can help expose dark features, but it can also change the shape the model infers. It is hidden for pre-made height maps because those files already contain height data.

Adjust generated heights

Control	Neutral setting and range	Effect
Contrast	1.00; 0.20 to 2.00	Expands or compresses generated height contrast around mid-height
Brightness	0.00; -0.30 to 0.30	Raises or lowers normalized generated heights
Gamma	1.00; 0.20 to 5.00	Above 1 lowers mid-heights; below 1 raises them
Base offset	0 is no offset	Moves the relief relative to its base plane in document units
Target depth	Panel range 0 to 20	Sets the height scale in document units
Invert depth	Off means white high	Reverses high and low before the depth curve

Contrast, brightness, and gamma can push heights into their upper or lower limits. If broad areas lose detail, return these controls toward neutral before increasing mesh resolution.

Understand flat relief dimensions

With **Scale XY with target depth** off, the long edge spans 100 document units before later object transformations. With it on, the flat long edge scales as **100 × Target depth ÷ 5** for a positive depth. At depth 3.2, that is 64 units. Trimming and image proportions determine the other edge.

Projection size follows the selected target and its projection controls instead. This XY option does not resize a projection footprint.

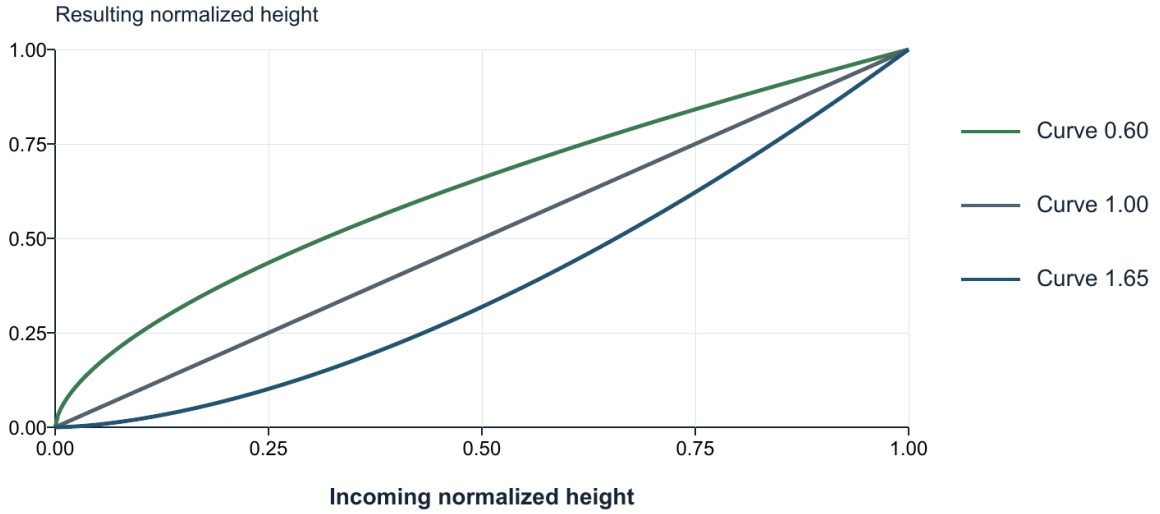
Refresh the result

Source shadow lift, model settings, background handling, and Balanced relief controls require **Update depth map** to refresh the displayed depth. Ordinary relief controls can refresh the preview after a short pause. Watch the status for a pending depth update. A final mesh build uses the current settings; inspect a refreshed preview first when comparing appearance.

Imported height mode disables the panel's generated tone controls. Select Standard, set Depth curve to 1 and check inversion when you want to begin with the imported height distribution unchanged by a curve.

Using the depth curve

The depth curve redistributes normalized heights after inversion and before conversion to document units. In **Relief parameters**, choose **Standard** or **Custom**. Custom replaces the Standard mapping; it does not add a second gamma curve. Both modes affect meshes and depth exports.



Standard depth curves with curve start at zero and detail preservation off

Adjust the Standard curve

Depth curve 1.00 is neutral. Values above 1 lower middle heights; values below 1 raise them. The panel allows 0 to 10, with a calculation minimum of 0.1. Strong curves can flatten shallow ornament or steepen transitions.

Depth curve start leaves lower normalized heights unchanged and begins the curve above that level. Its range is 0 to 0.95. At 0, the curve affects the full range.

Enable **Preserve detail in depth curve** when shallow ornament fades. Broad height relationships still follow the curve. All six supplied BR presets save this Standard option on; older or personal presets can differ.

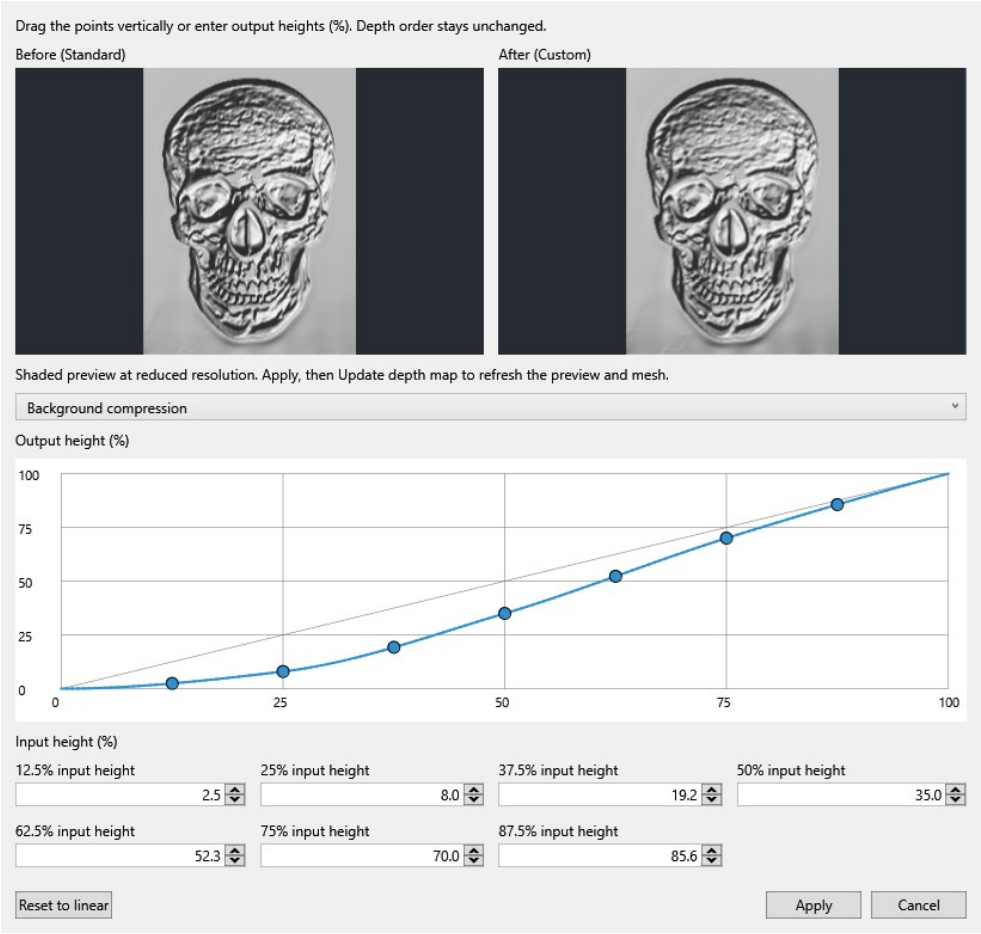
Keep Target depth fixed while comparing the curve. Inspect the mesh at a low angle, then set the final physical depth. Invert depth changes polarity before either curve mode; solid mode does not reverse heights.

Switch between modes

Selecting **Custom** uses the saved seven-point curve. Selecting **Standard** restores the gamma, start and detail-preservation controls. The Standard values remain saved while Custom is active. Apply a Custom edit, then choose **Update depth map** before judging the refreshed result.

Editing a Custom depth curve

Choose **Custom** in Relief parameters, then **Edit curve…**. A smooth curve maps incoming normalized height to output height. The endpoints stay fixed at 0% and 100%; seven intermediate points can move vertically without reversing height order.



Custom curve editor with a background compression example and reduced-resolution shaded previews

1. Choose **Linear**, **Background compression**, **Middle-height emphasis** or **Foreground compression** as a starting point. Editing a point selects Custom.
2. Drag a graph point vertically or enter its output percentage. The seven input positions are 12.5%, 25%, 37.5%, 50%, 62.5%, 75% and 87.5%. Neighboring points limit each value.
3. Compare **Before (Standard)** and **After (Custom)**. Previews use cached depth at reduced resolution and do not run new AI inference. Without cached depth, you can still edit the curve.
4. Choose **Apply**, then **Update depth map**. **Cancel** discards this editor session; **Reset to linear** restores an identity curve, saved only when applied.

The curve is stored in settings, named presets and new mesh recipes. It shapes height distribution; it cannot recover missing AI shape. Adjust Target depth afterward for physical scale.

Output quality and build cost

Output quality controls the longest edge of the height grid used to build the mesh. It is separate from the AI input size. Sources smaller than the chosen cap are not enlarged; aspect ratio and trimming can reduce the dimensions.

Mesh grid	Longest edge cap	Suggested use
Draft	256	Check broad form, solid choice, and footprint quickly
Standard	512	Refine a first working mesh without maximum density
High	1024	Inspect finer geometry when the result is already satisfactory
Ultra	2048	Final work requiring the finest available output grid

Understand face count

An unmasked square grid with N samples on each edge has roughly N squared top vertices. It has (N - 1) squared quad cells, or twice that many triangle faces. Ultra can therefore create over four million top quad cells before backing and side geometry. An irregular or cropped footprint can use fewer faces.

Mesh faces: triangles splits each cell into two triangles. **Mesh faces: quads** uses one quad per cell, so its top face count is lower, but relief quads may be non-planar. The current presets save quads. Choose according to your downstream workflow and inspect the geometry.

Reduce a finished mesh

Enable **Adaptive mesh reduction** to use the bundled native **Fast QEM** process after the initial mesh build. It runs on the CPU and reduces triangle count while protecting boundaries, sharp edges and attribute seams. Reduced output can be triangulated even when the input uses quads. No separate Python package or GPU setup is needed for reduction.

Maximum reduction error is the permitted deviation from the original mesh in Rhino document units. For example, 0.01 in a millimetre document means 0.01 mm. Smaller values require closer agreement and can allow less reduction. The plugin verifies deviation in both directions and checks geometry safety and topology. If these checks cannot establish an acceptable result within the available work, it keeps the original mesh. A retained original is a normal outcome, not a frozen process.

Mesh memory budget (MiB) limits an estimated build requirement. It does not represent Rhino's entire memory use or the GPU's VRAM budget. Lower the grid if a build exceeds it. Increase the budget only when sufficient system memory is available.

Use live mesh selectively

Live mesh in viewport replaces the previous automatic preview after adjustments pause. It can build a full resolution mesh, so use a modest output grid while tuning. **Add mesh** creates a deliberate separate object. Use the mesh **Cancel** button to stop an active build; wait for cancellation to complete before starting again.

Balanced relief controls

Balanced relief is the current enhancement treatment. It keeps the AI structure and adds controlled local detail derived from the source image. The panel no longer asks you to choose among older enhancement modes.

Open **Advanced GPU settings** and enable **Show advanced GPU depth settings**. Change one control, choose **Update depth map**, and compare against the previous result at the same Target depth and output quality.

Control	Range	How to use it
Relief strength	0 to 2	0 retains incoming depth; 1 is the standard treatment; 2 is saved in every current BR preset
Relief smoothing	0.25 to 3	Higher values soften source detail; start at 1 for a neutral treatment comparison
Source detail	0 to 2	0 removes source texture while retaining depth cleanup; 1 is standard; higher values strengthen source detail
Selective detail refinement	Off or on	Reduces broad shadow-related ridges while retaining fine detail; compare on strongly lit images

Separate shape from source marks

Source detail can turn image highlights, shadows, text, and fine marks into geometry. If a dark stripe becomes an unwanted ridge, lower Source detail before changing the entire depth curve. If the image contains real fine ornament that is missing, increase it carefully and inspect the mesh from a low angle.

Relief smoothing controls the softness of this detail. It cannot correct an incorrectly inferred broad silhouette. Use a different preset, model or input size, or a prepared height map when the broad form is wrong.

Selective detail refinement is useful when broad shadow boundaries dominate the surface. It may also make small edges and texture appear sharper. Check thin lettering and smooth faces after enabling it. BR_Black and White images saves it on; the other current presets use off.

Compare rather than accumulate

1. Load the closest preset and generate depth.
2. Adjust Source detail to distinguish useful ornament from lighting marks.
3. Adjust smoothing to control roughness, then strength if the whole treatment is too strong or weak.
4. Save the successful combination under a new preset name.

Older preset files may contain controls from earlier enhancement treatments. Their presence in a file does not make them current panel options. Use the visible Balanced relief controls for this edition.

Advanced depth controls

Model and inference resolution

DAv2 model offers Auto, Small, Base, Large, and Giant. Auto selects Small. Choose another explicitly when you want to compare its inferred geometry. A larger model does not guarantee a better relief for a particular artwork.

GPU depth quality offers Draft 518, Standard 756, High 896, and Ultra 1022. **DA input size** in Advanced GPU settings allows 224 to 2048 and shares the inference setting. The quality dropdown shows the closest named level for intermediate or larger saved values. Read DA input size for the exact request.

Higher inference sizes use more VRAM and time. The runtime can align the actual processing size to model requirements. Giant may use an efficient attention backend or retry at a lower size after a memory failure. Read the status for the size actually used; a requested 2048 is not a promise that every GPU can run it.

Background range and broad tilt

Fidelity mode (keep subject height range) prevents the remaining subject from being stretched to the full height range or dropped to a derived silhouette floor during background processing. Background can still be removed. Compare this when a cutout changes the height relationships unexpectedly.

Plane removal removes broad tilt before the relief treatment. Range 0 to 2. Reduce it if useful broad sloping form is being lost; increase cautiously when the entire relief leans. The normalization percentile sliders have been removed from the panel. Existing saved normalization settings remain compatible; no new adjustment is required for this update.

Tiled detail

Tiled detail runs additional DA-V2 predictions over overlapping parts of the image and blends local detail into the global result. A 2 by 2 grid has four tiles; 4 by 4 has sixteen; 8 by 8 has sixty-four. Tiles run in sequence after the global prediction, so a denser grid adds substantial inference work.

Tile detail amount controls the blend, from 0 to 1; 0 disables the pass. For a gentle comparison, try 0.05 to 0.15. All six current presets save 1.00. **Tile grid** selects 1 to 8 tiles per axis. **Tile overlap** controls feathering, from 0 to 0.45. **Tile blur sigma** separates local detail for blending, from 0.1 to 64. Start near overlap 0.25 and blur 8 for your own treatment.

Save stage comparison images writes intermediate images for diagnosis. Enable it only when you need to inspect stages or support requests it. Tiled detail is a depth operation; it is separate from increasing mesh density.

Projecting relief onto a target

Use **Project to surface** to place relief on an existing surface, polysurface, or mesh. The tool creates relief mesh geometry on the target; it does not automatically perform a union or other manufacturing operation with the target.

Place a relief

1. Load the image and a suitable preset. Set its depth and mask as you would for a flat relief. Generate a depth preview to inspect the result.
2. In **Project to surface**, choose a placement preview quality before starting. Medium or Low provides a responsive first placement.
3. Choose **Project to surface** in File & actions. Select the target in Rhino and follow the selection prompt.
4. Wait for depth preparation. Move the pointer over the target to see the shaded relief preview. The projection controls section opens automatically.
5. Adjust footprint and height with the wheel shortcuts or the panel. Check orientation and normal direction.
6. Click to accept the placement and build the final mesh. Press **Escape** to cancel placement without adding a result.
7. Inspect the completed mesh against the target, including its edges, holes, and underside. Save the Rhino document when satisfactory.

Adjust while positioning

Gesture in the Rhino viewport	Effect
Ctrl plus mouse wheel	Increase or decrease Project inset / size
Alt plus mouse wheel	Increase or decrease Projected height scale
Add Shift to either gesture	Use steps ten times finer
Mouse wheel without modifiers	Normal Rhino zoom
Click	Accept the current placement
Escape	Cancel the placement

Wheel up increases the selected scale; wheel down decreases it. **Wheel sensitivity (%)** sets the change per notch. Its default 1 percent changes a scale by 0.01; reduce it for finer control. Accepted values appear in the panel and are saved with the new object. Escape discards placement adjustments.

Prepare the target. Start with a target large enough for the footprint. Edges and holes constrain placement. If the preview or final build is rejected near a boundary, reduce size or move it farther inside the usable target.

Projection settings and preview

Size height and orientation

Control	Effect
Project inset / size	Scales the footprint within the target domain; range 0.01 to 1
Projected height scale	Multiplies automatically scaled relief height along the target normal; range 0 to 3
Project flip X	Mirrors horizontally in the target's local plane
Project flip Y	Mirrors vertically in the target's local plane
Project rotation	Rotates in 90 degree steps in the target's local plane
Project fit: preserve aspect	Retains image proportions
Project fit: fill target	Stretches the relief to the target domain
Project normal	Selects the surface normal or its reverse as the growth direction

Flips and rotation change placement orientation. **Invert depth** changes the height distribution instead. If the subject is mirrored, use the flip controls. If the relief grows on the wrong side, use the normal direction control.

Projected height is scaled to the target workflow. Use Projected height scale to tune it, then measure the result in Rhino. It should not be treated as a guaranteed one-for-one flat Target depth on every target.

Choose placement preview quality

Preview level	Longest edge cap	Use
Low	96	Fast movement and broad placement checks
Medium	192	More visible detail for ordinary positioning
High	320	Finer close inspection
Max	512	Most detailed placement preview; more update work

This setting affects the temporary hover preview only. The final mesh uses **Output quality**. Choose the preview level before starting placement. If movement is slow, cancel placement, lower preview quality, and try again.

The preview responds to flips, rotation, fit, and normal direction while you position the relief. Subject cutouts can fit more of the target because transparent image corners do not restrict their footprint, but target boundaries and holes are still checked.

If you need a different target or a new position for an existing projected mesh, use Project to surface again. Updating its saved recipe uses its original target shape and placement; see Updating an existing I2D mesh.

Imported height maps and depth export

Build from existing height data

1. Enable **File is pre-made depth / height map** before loading the image. This bypasses AI depth inference.
2. Browse to the height image. Prefer a 16-bit grayscale PNG when you want to retain fine height levels.
3. Check **Invert depth**. With it off, white is high and black is low. With it on, the mapping reverses.
4. Select **Depth curve: Standard** and set its curve to 1 for an initial curve-neutral comparison. Choose Target depth, Base offset, solid mode, and output grid.
5. Inspect the preview and choose Add mesh or Project to surface.

Generated tone controls are disabled in this mode, but saved tone values can still affect imported heights. For a neutral starting point, set Contrast 1, Brightness 0, and Gamma 1 while photo mode is still enabled, then switch to imported height mode. Loading a BR preset can restore photo mode and a non-neutral curve; review these settings after loading.

An opaque height image does not automatically provide a subject mask. If you need a cutout, provide a suitable mask through the mask editor and enable Subject only mesh. A dark area of a height map can be low relief without being absent geometry.

Export a height image

Use **Export preview…** or **Export final resolution…** in Image adjustment after a valid depth result is available. Both generate from the current settings and save a **16-bit grayscale PNG**.

Export	Resolution behavior
Export preview	Preview resolution, up to 1024 pixels before cropping and other limits
Export final resolution	Selected output grid, limited by source dimensions and trimming

Choose a file location and wait for the reported saved dimensions. Use **Cancel export** to stop the current export. If export is disabled after a depth setting changes, choose Update depth map to refresh the result first.

Understand what the PNG contains

The exported grayscale values encode relative final heights, normalized over the exported height range. White represents the higher exported height; black represents the lower. The PNG does not store physical width, Target depth, Base offset as a physical dimension, solid backing, projection target, or a subject mask.

Keep a named preset or mesh recipe alongside the PNG when you need to reproduce the physical result. When reimporting an exported map, start with inversion off and a neutral curve to avoid unintentionally remapping an already processed image. Set its dimensions and depth deliberately in the destination application.

Updating an existing I2D mesh

New I2D meshes store a build recipe. This lets you return to the original source and settings, then replace the object in place. The recipe survives saving the Rhino 3dm, but source images and manual masks remain external files.

Replace a mesh in place

1. Choose **Load from mesh…** in File & actions and select an I2D mesh in the active Rhino document.
2. Check the **Loaded mesh** label. The panel restores its settings, source image, and original mask reference. Loading a recipe turns Live mesh off.
3. If the source moved, use the file picker to locate an identical copy. Changed image contents are rejected rather than silently substituted.
4. Adjust the settings. Use Update depth map if you want to inspect a fresh depth preview; it is not required before the rebuild itself.
5. Choose **Update loaded mesh**. The original stays in place until a complete replacement is ready.
6. Inspect the updated object. Rhino Undo restores the previous geometry and recipe if needed.

Add mesh still creates a separate object. Browsing to another source clears the loaded-object association. Loading a different mesh changes which object Update loaded mesh will replace.

What is retained

The replacement keeps the object ID and its attributes, including name, layer, material, color, and unrelated user strings. Supported object moves, rotations, and scales are retained. Direct vertex edits, remeshing, and other geometry edits are replaced by the regenerated result.

Projected recipes retain a copy of their original target shape and placement. Updating uses that saved target even if the separate target object changed or was deleted. To choose a different shape or position, create a new projection.

An older mesh without a recipe must be rebuilt once using the current plugin before this workflow is available. A changed runtime or model manifest can produce different detail; read any status message when loading older work.

Keep regeneration dependable

Retain the source image unchanged and back up the **MaskEdits** folder. Each recipe can reference a particular saved mask version. Saving only the 3dm or a preset is insufficient. Missing or corrupt masks stop regeneration; use the mask editor to reset or replace the correction deliberately.

Unlock the object before updating it. Avoid changing the document, object geometry, or settings during a build. Cancellation or a failed build leaves the existing object in place.

Practical relief workflows

A subject cutout

Start with a suitable preset and inspect the depth. Enable Remove background before depth and Update depth map. Correct the mask with Keep and Remove tools, Apply, then update depth again. Enable Subject only mesh and choose Solid bottom: subject / heightfield. Build at a modest grid first, inspect thin connections, then raise the output grid for the final object.

BR_Medalions already enables Subject only mesh but leaves background removal off. BR_Medalions_Smoother enables both. In either case, inspect the actual coverage; an option being enabled does not mean the automatic mask is perfect.

A thin rectangle around the subject

Enable Remove background before depth so the surrounding background is flattened. Leave Subject only mesh off and use Solid bottom: subject / heightfield. Keep Trim uniform border off when you want the original image rectangle. Inspect the background level in the depth preview before building.

If the rectangle still looks thick, reduce unwanted background height rather than using Base offset as a thickness control. Choose a full rectangular slab only when that backing mode is what you intend.

Fine lines and lettering

Start with BR_line Art. Inspect broad form and thin ridges at a low angle. If source lettering becomes too tall or rough, lower Source detail or increase Relief smoothing. Check Preserve detail in depth curve when shallow marks fade. Increasing grid density may preserve narrow features better, but it cannot remove an incorrect lighting-derived ridge.

A dark or strongly lit source

Start with BR_Universal or the preset matching the artwork. Try a small amount of Lighten shadows, then Update depth map. If broad lighting boundaries appear as ridges, compare Selective detail refinement and lower Source detail. Keep the output grid and Target depth constant while comparing settings.

A final production mesh

When the shape and mask are satisfactory, choose the needed output grid and face type. Inspect overall size, relief depth, closedness where required, and small islands or holes. If density is excessive, try Adaptive mesh reduction with an appropriate document-unit tolerance.

Save the 3dm, source, mask files, and tuned preset before exporting to another workflow. An export format may not retain the I2D recipe. Perform any required joining, machining preparation, or print validation in the tools used for that production process.

Troubleshooting depth and performance

The depth engine is unavailable

Use Refresh GPU status and read the reported problem. If the runtime is missing or damaged, run Install / repair GPU engine. If the selected model is missing, use Download model and wait for completion. Check network access and available disk space for downloads. If CUDA is unavailable, select Auto or CPU to distinguish a GPU problem from a general setup problem.

Use Export GPU diagnostics… for a redacted status report. It excludes license files and personal folder names. Include the visible error text and the model and input size when requesting support.

Read action progress

The wide bar in File & actions is shared by depth updates, mesh builds and other active operations. Its moving segment indicates activity rather than an estimate of time remaining. Read the action inside and the stage below, including geometry building and optimization. Completion text stays visible. **Cancelled** and **Operation failed** indicate different outcomes; read the status or Rhino command history for details. Final native document insertion can briefly pause panel painting.

Generation is slow or runs out of GPU memory

Lower DA input size or choose a smaller model, then regenerate. Reduce Tile detail amount or Tile grid if the additional predictions dominate the work. Reducing mesh output quality helps mesh construction, but it does not directly reduce the requested AI inference size.

The current presets can be demanding: Black and White and Medalions Smoother save DA input 2048; Medalions Smoother saves an 8 by 8 tile grid. Read runtime fallback messages instead of assuming the requested size was used.

The relief shape is wrong

Confirm that a photo is not being treated as a pre-made height map. Check inversion and inspect the broad AI depth before adding more detail. Compare a different preset, a different model, or lower source detail. A single photograph may not support an accurate shape, especially where lighting or occlusion obscures it. Use prepared height data when precise authored heights are required.

The source changed but the preview looks old

Check the loaded source path, the Loaded preset label, and any pending depth update message. Choose Update depth map after changing inference, source shadow lift, background, or Balanced relief controls. Unchanged processing stages can reuse cached results; reuse alone does not mean your settings were ignored.

A suggestion or a control is unavailable

Use Open settings to select a current BR preset if the automatic suggestion names an older preset. Expand the relevant section; enable Show advanced GPU depth settings to reveal advanced controls. Imported height mode disables generated tone controls. A pending license check or failed activation can disable working sections; inspect Licensing and Refresh license.

Troubleshooting masks meshes and projection

Symptom	Check and corrective action
Subject only mesh still builds a rectangle	An opaque source needs a usable mask. Generate BiRefNet coverage or import and Apply a mask; update depth
A wanted part is missing	Inspect Silhouette; use Keep brush; reduce an overaggressive background threshold; check final grid resolution
A Keep area remains flat	Enable BiRefNet background removal if using its corrected-depth workflow; Apply the correction and Update depth map
Unwanted islands remain	Use Remove region or Remove brush and inspect disconnected pieces before building a solid
Thin connections or holes fail	Broaden the connection, remove unintended fragments, or change output resolution; rebuild and inspect
Solid build is rejected	Review the mask and the reported geometry error; try an open relief to inspect the surface before closing it
Full rectangle looks like a thick mat	Flatten unwanted depth background; solid mode cannot remove raised background height
Mesh exceeds memory budget	Lower output grid or simplify the footprint; adaptive reduction happens after the initial build
Projected relief is mirrored	Check Project flip X, Project flip Y, and rotation
Projection grows on the wrong side	Reverse Project normal; do not use depth inversion to correct side selection
Projection is rejected near an edge or hole	Reduce inset / size or move inside the usable target domain
Projection movement is slow	Cancel and select Low or Medium placement preview quality before restarting
Update loaded mesh is unavailable	Load an I2D object with a recipe from the active document; unlock it if necessary
Regeneration rejects the image	Relink to an unchanged copy of the original; changed image contents are not interchangeable

Diagnose at the right stage

First inspect the source, then the depth image, then the mask silhouette, and finally the mesh. A correct-looking top view can hide steep walls, raised background, or poor backing geometry. Orbit to a low angle and examine the underside when a solid is intended.

When a build is cancelled, wait for its status to settle. If you cancel during projection point picking, Escape or the next pick ends the picker without adding a result.

Report a reproducible issue

Record the exact message, image dimensions and type, loaded preset, model, DA input size, output grid, face type, solid mode, and background settings. State whether the problem affects Add mesh, Project to surface, export, or regeneration. Include diagnostics for engine failures and an example image or mask only when you are able to share it.

Files commands and terminology

Back up the reusable project

Item	Normal location or purpose
Rhino 3dm	Saved meshes and their attached I2D recipes
Original source image	Your chosen image location; keep an unchanged copy
Named presets	%APPDATA%\McNeel\I2D_GPU\presets
Manual mask snapshots	%LOCALAPPDATA%\I2D_GPU\MaskEdits
Exported height PNG	Your selected export location; relative height data only

Custom data-root configurations can relocate runtime and mask data. Keep masks with the project backups rather than treating them as disposable GPU cache files. Presets do not embed images or source-specific mask edits.

Rhino commands

Command	Purpose
I2DGPUOpenPanel	Open the I2D GPU panel
I2DGPUClosePanel	Close the panel
I2DGPUResetSettings	Restore default build settings; interactive use asks for confirmation
I2DGPUHelp	Open the built-in help; scripted use prints help in the command window

Use **Collapse all** and **Expand all** to manage panel sections. The separate Preset controls save and load reusable setups. A preset name remains a useful starting reference even after you tune its controls; save a new preset to capture the tuned state.

Terms used in this manual

Depth map or height map is an image of relative heights. **Inference** is the model's prediction from the source image. **DA input size** is the resolution request used for that prediction. **Output grid** is the sampling grid used for mesh construction.

Mask is coverage that keeps or removes subject regions. **Footprint** is the plan shape occupied by the relief. **Heightfield** is relief described by one height at each grid position. **Solid backing** closes an appropriate relief surface with bottom and sides.

Recipe is settings and references attached to an I2D mesh for rebuilding. **Projection normal** is the direction in which relief grows from a target. **MiB** measures system-memory capacity; **VRAM** is memory available to the GPU. These are separate resources.

Model notices and support

Check the selected checkpoint

I2D's plugin license and the downloaded model terms are separate. The supplied presets save particular models, so loading a preset can change the checkpoint used for inference.

The Depth Anything V2 project lists Small under Apache 2.0 and Base, Large, and Giant under CC BY NC 4.0. The Giant checkpoint card used by the plugin displays a different license label; the bundled notices record that conflict. Review the selected checkpoint's terms for your intended use.

For work requiring the Apache-licensed checkpoint, explicitly select **DAv2 model: Small — vits** or **Auto**, then regenerate and compare the result. Changing models can change geometry. Save the revised setup as a new preset.

Current preset	Saved checkpoint
BR_Blue and White images and BR_Medalions_Smoother	Small
BR_Universal, BR_Black and White images, BR_line Art, and BR_Medalions	Large

Refer to the package's **licenses** folder for the I2D EULA and third-party notices. The model statements above were checked against the published project and checkpoint card on 14 October 2026.

Published references

Depth Anything V2 project and model notices

https://github.com/DepthAnything/Depth-Anything-V2

Giant checkpoint card used by the plugin

https://huggingface.co/Nap/depth_anything_v2_vitg

BiRefNet project for background segmentation

https://github.com/ZhengPeng7/BiRefNet

Get useful help

Start with **I2DGPUHelp** and the troubleshooting chapters. For a support request, provide the exact error, the task that failed, your Rhino version, and the relevant settings. Export GPU diagnostics for installation, model, or CUDA problems. Retain the original source and mask so the problem can be reproduced.

This edition documents the six BR preset files and the visible current control layout. It deliberately uses the current Balanced relief workflow rather than the older multi-mode enhancement instructions. After a plugin or preset update, check its release guidance and compare a saved example before replacing important work.