GTS

By Procedural Worlds

GTS is a powerful terrain shading solution that provides a significant visual improvement over the default Unity terrain shader making it the perfect solution for professional results.

About Procedural Worlds

At Procedural Worlds our mission is to empower people to create, automate and navigate worlds. Our products are easy to use, nicely integrated and well supported.

We service indies, professionals and enterprise with our tools, and deliver custom projects for studios, enterprise and government. Our special power is that we have both a deep procedural technology stack, and an amazing team of experts, and we leverage this unique combination to create applications, games, sims, mapping and mmo / metaverse experiences at a fraction of the typical time and cost. Check out our gallery, and then contact us.

We are a Unity Partner, Intel Partner, and have been a top asset store publisher since we first launched Gaia in 2015. Our reviews over this time speak for themselves.

Our Products:

Bundles

World Building Bundle - 2021 Edition - Get another 20% off our most popular tools with this awesome bundle. It includes Gaia Pro 2021, Gena Pro, Ambient Sounds, Pegasus and SECTR 2019.

Tools

Gaia Pro 2021 - Gaia 2 is an introductory version of Gaia Pro. Gaia 2 expands on the original Gaia 1 with multi terrain and biome support.

GeNa Pro - GeNa Pro os the big brother of GeNa 2. It is a complete re-write, and includes all of the capability of GeNa 2 plus the ability to create splines, rivers, roads and villages and to shape and fill your terrain with rocks, trees grasses and more.

GTS - Glyph Terrain Shader – An easy to use terrain shader that enhances the terrain rendering with a lot of additional features - creates great results within minutes, works across all render pipelines.

SECTR Complete 2019 - A suite of performance-enhancing tools that enable open world streaming, massive mobile games and includes the latest techniques in audio occlusion and propagation.

Ambient Sounds - A tool that creates interactive soundscapes that also comes with professionally composed sound effects and music library.

Pegasus - A system that can drive anything along a path. Great for cut-scenes, and even has an ambient ai that supports formations, animation and local avoidance for your NPCs and animals!

Stamp Packs

As the inventor of the stamp concept, and obsessive landscape creators, we know a thing or two about stamps. Check out our Stamp Packs for a range of landscapes that work with Unity, our tools, and any other tool that supports the stamp concept.

Game Ready Levels

If you have our tools and would like some optimised levels to build your game around or learn from, then check out our Game Ready Levels.

Micro Biomes

Micro Biomes are small biomes that are designed to be mixed and matched to create more interesting environments with Gaia Pro 2021 and GeNa Pro.

Procedural Spawner Packs

We take some of the best modular assets in the store and make it easy for you to use them in your scene with Gaia Pro and GeNa Pro and our Procedural Spawner Packs. Bring your artistic vision to life and procedurally create in minutes what would take weeks or months by hand!

NEW! Canopy community

Find support and tutorials for the above products and discuss game development with other Procedural Worlds users. Join us at https://canopy.procedural-worlds.com/!

Support, Chat, Tutorials, etc.

Canopy – Official Support Site & Community: https://canopy.procedural-worlds.com/
Discord – Community Chat: https://discord.gg/TggjQNN
Tutorials: https://canopy.procedural-worlds.com/library/
Forums: https://canopy.procedural-worlds.com/forums/
Website: https://www.procedural-worlds.com/
Contact us / Newsletter: https://www.procedural-worlds.com/subscribe

Social Media:

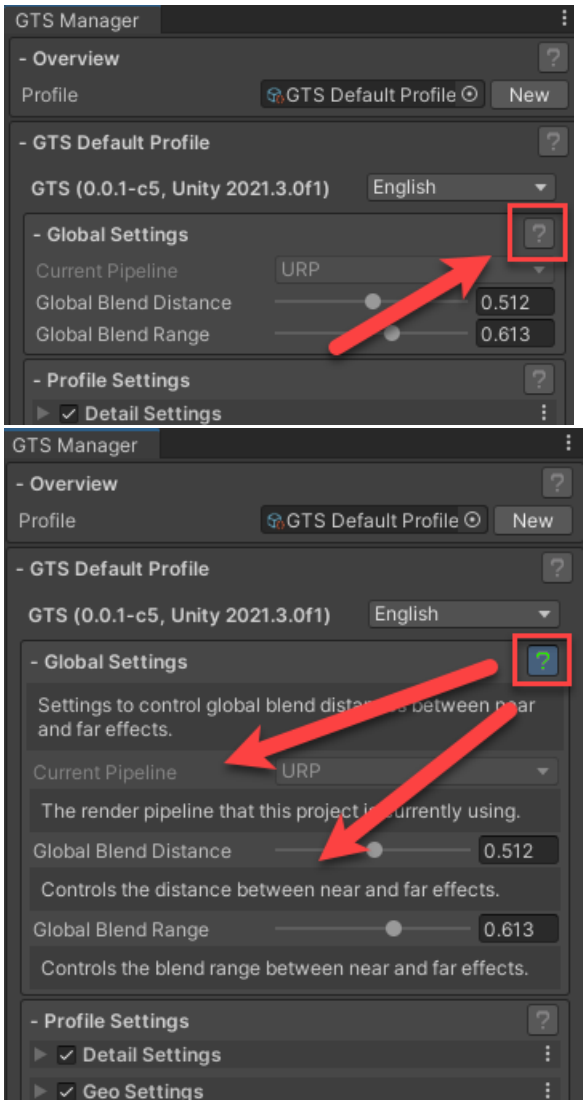
Facebook: https://www.facebook.com/proceduralworlds
Twitter: https://twitter.com/ProcWorlds
Instagram: https://www.instagram.com/procedural_worlds/
YouTube: https://www.youtube.com/user/btektube
Support, Chat, Tutorials, etc.

Introduction

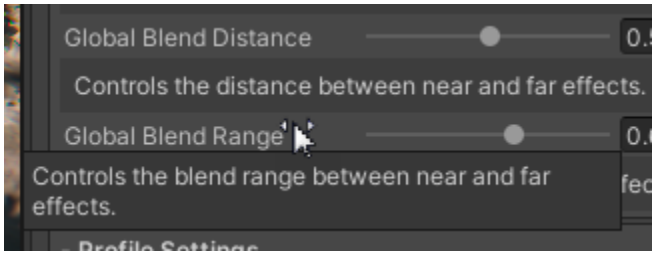
Concepts

In Place Help

To understand the intended usage of the settings in a panel use the in-place help system. Toggle in-place help by pressing the "?" button on the panel. *NOTE:* In Place help will always be more up to date that the written documentation.



You can also select and hover over the title of a control to get a tool tip description of what the impact of the field is.



Tutorials, Chat, Ticketed Support

To help you take advantage of this asset we have created an awesome support network:

Discord: https://discord.gg/TggjONN

Tutorials: https://canopy.procedural-worlds.com/library/tools/gena-pro/37_tutorials/

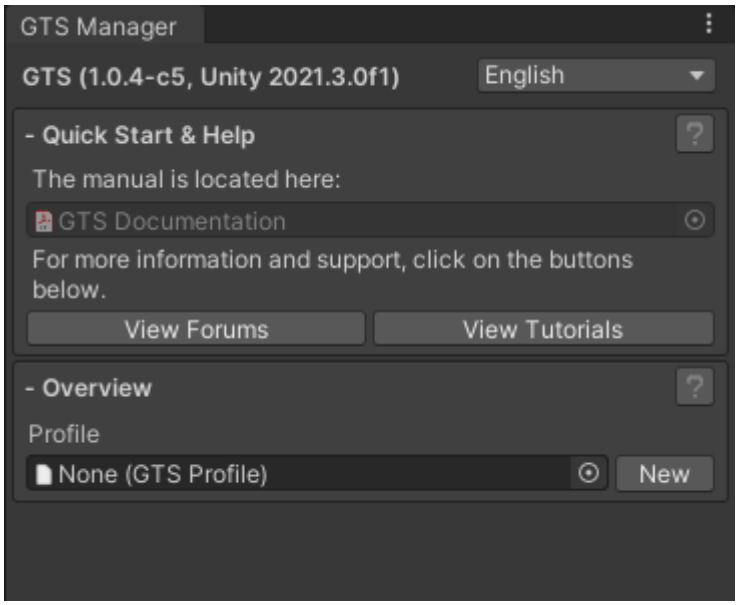
Support: https://www.procedural-worlds.com/support/

Quick Start

1. Open the GTS Manager

The GTS Manager can be opened clicking on:

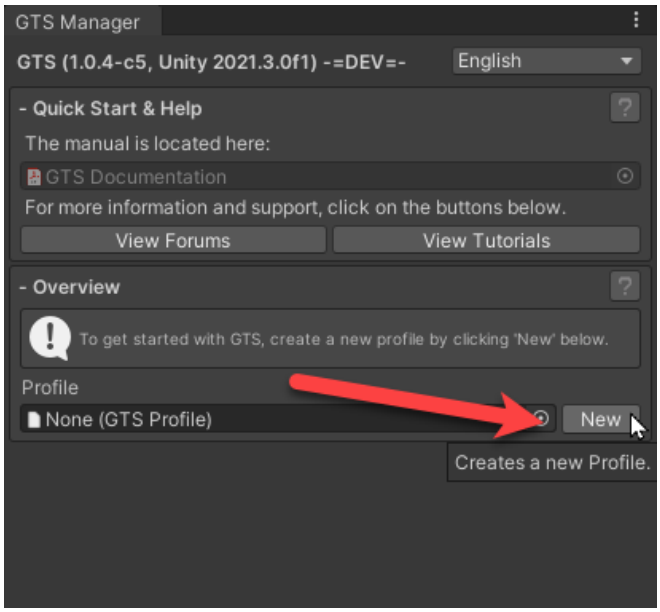
Window -> Procedural Worlds -> GTS -> Manager.



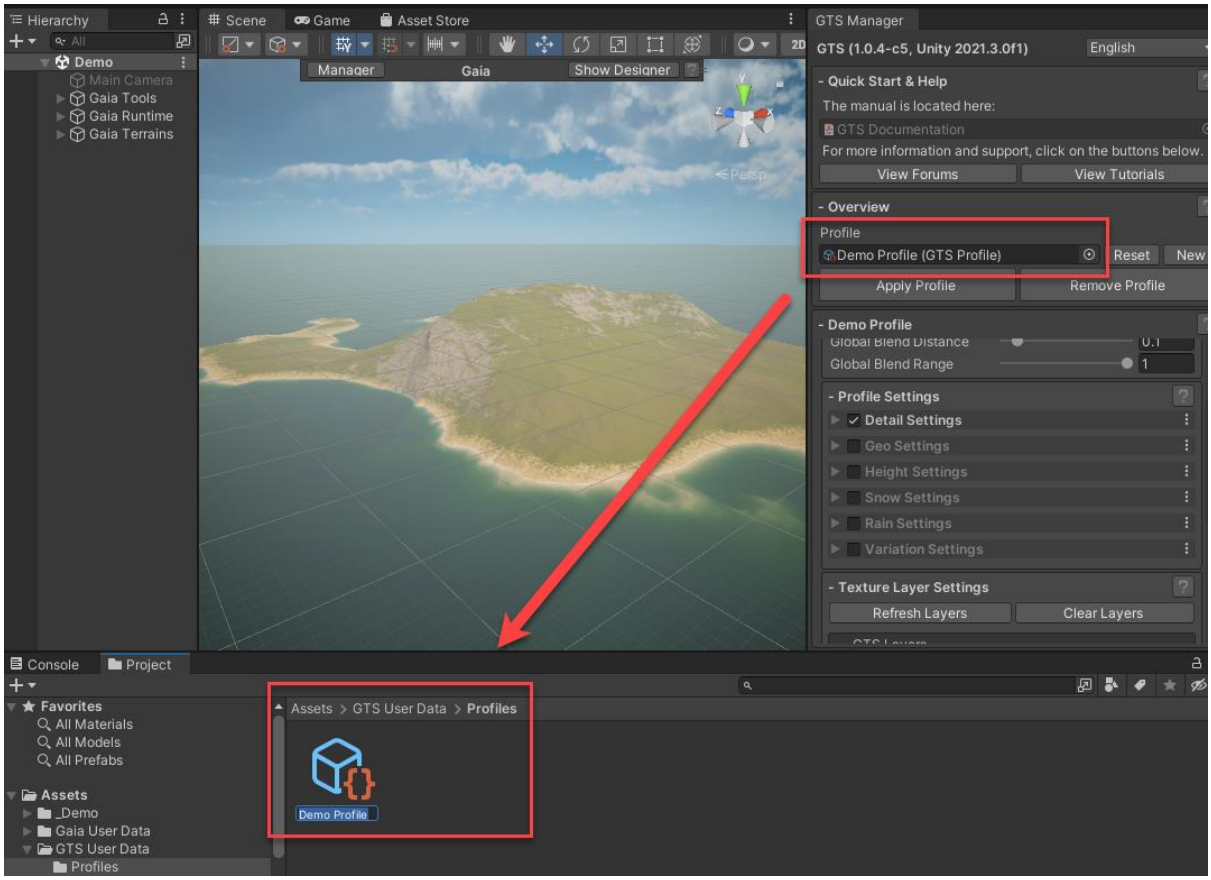
2. Create a new GTS Profile.

Before you can start modifying the Terrain, you will need to create a new Profile.

Click on the 'New' button in the Overview Panel.

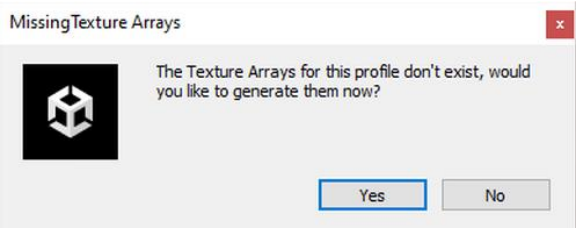


This will create a new Profile in the 'GTS User Data' folder and prompt you to give the File a name. We'll just call it "Demo Profile" for now.

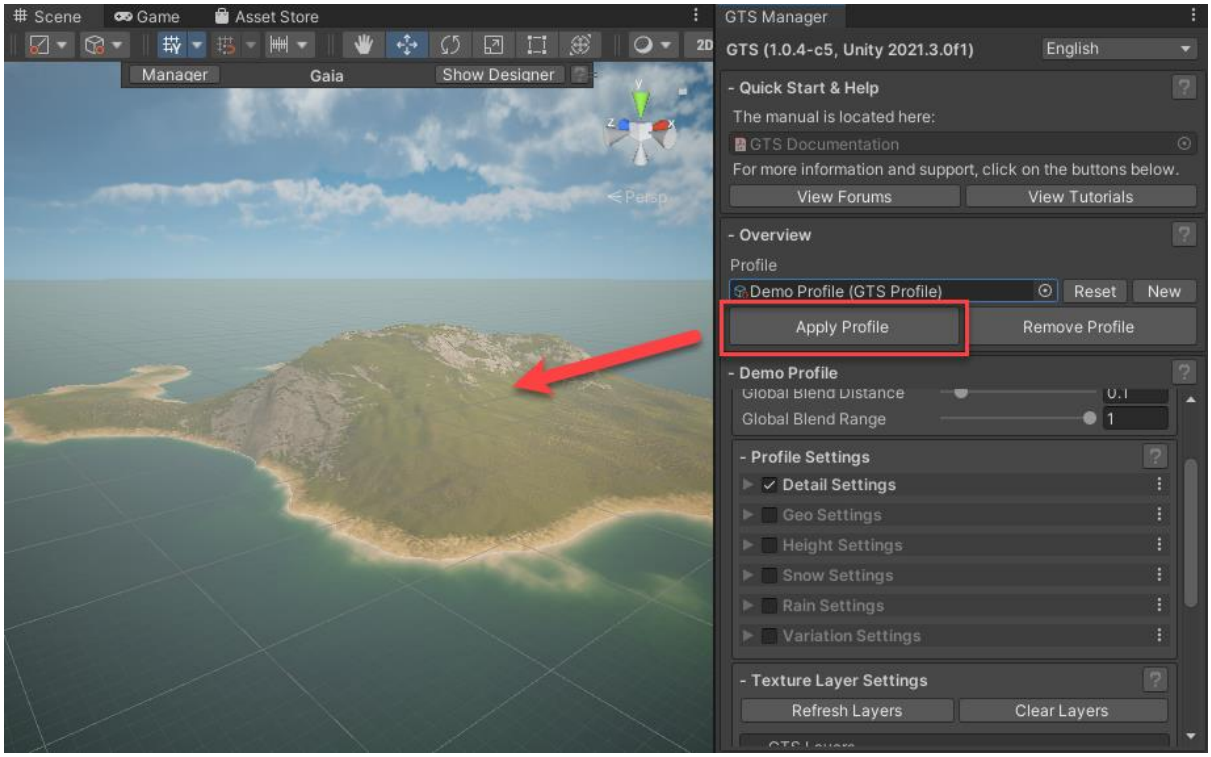


3. Apply Profile to Terrain

To convert a terrain into the format that GTS understands, press the 'Apply Profile' button. Note: This setup may take some time if you have many terrains in your scene.



For first time setups, a dialog box should appear requesting if you should generate texture arrays. Hit 'Yes'.

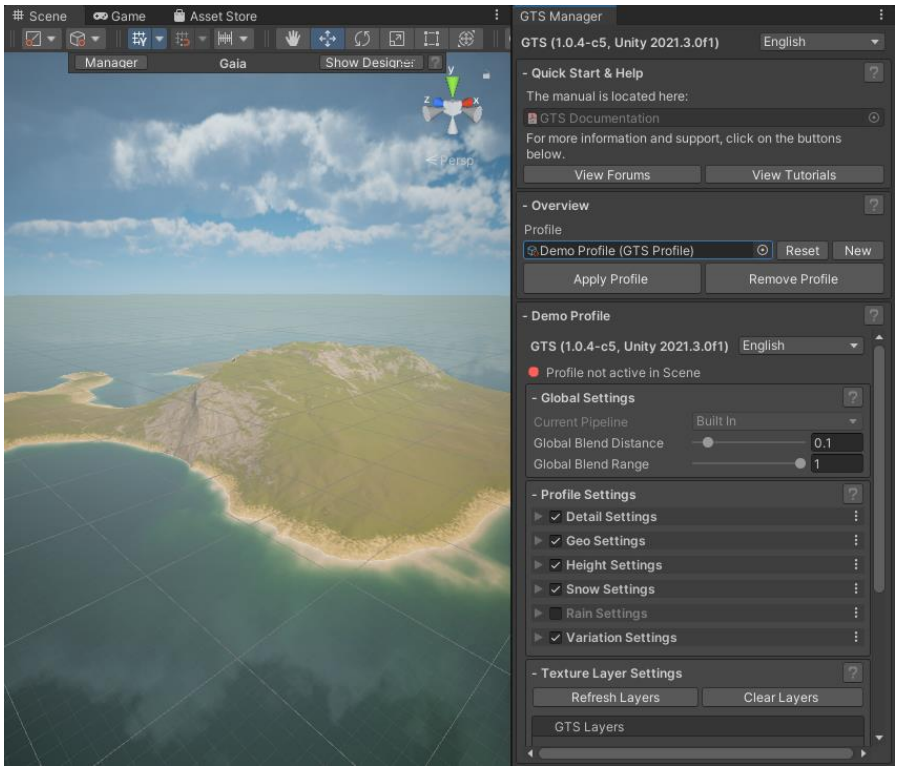


Upon finishing the setup process, GTS is ready to be used. Initially, the terrain may look like the previous terrain. GTS provides several features that can be turned on / off depending on your visual goals and optimisation considerations.

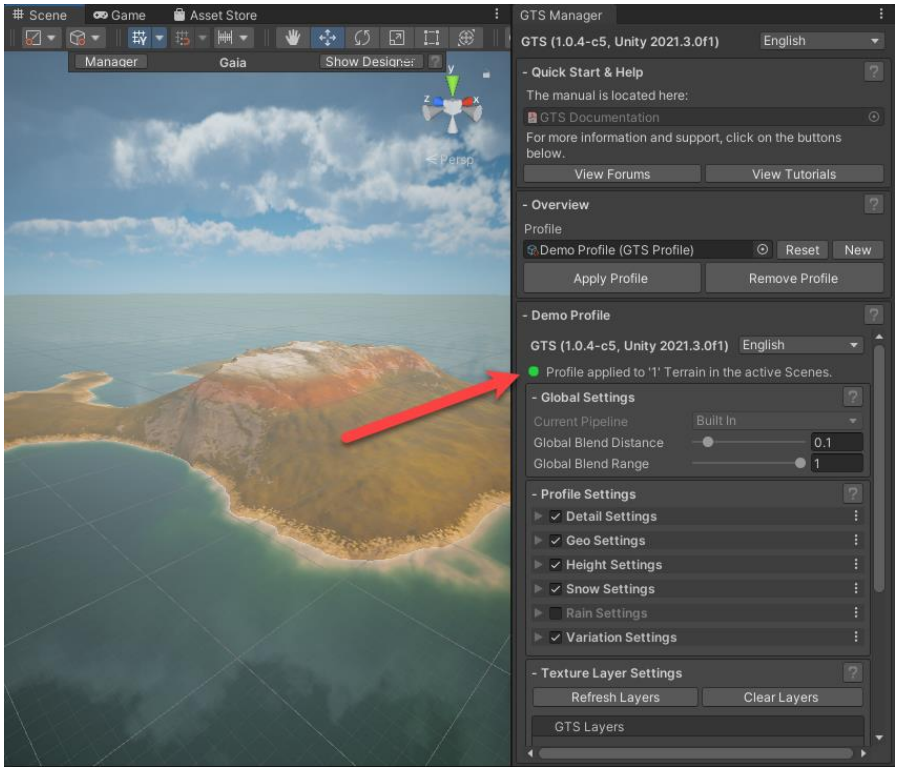
If you have made changes to the terrain layers (such as swapping the textures) since applying the profile for the first time, you can re-generate the texture arrays with 'Create Texture Arrays'.

You can also use the indicator icon located at the top of the Profile to see if a profile is active or not.

Profile not active in Scene:

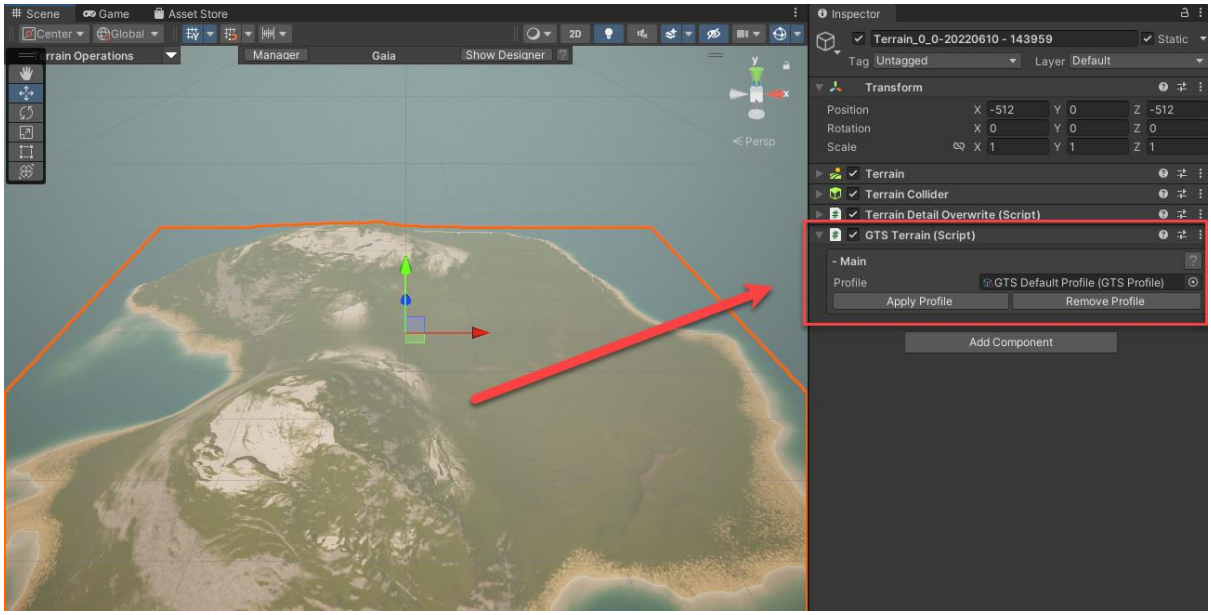


Profile applied to the terrain:

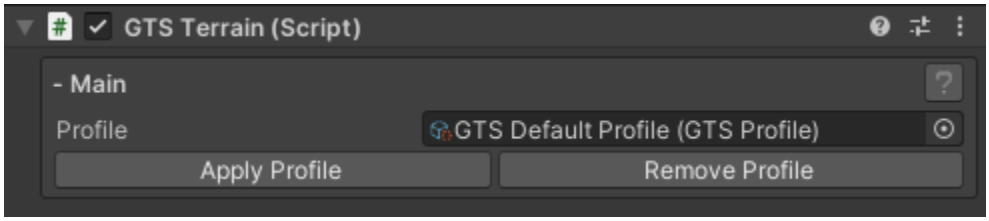


GTS Terrain

The GTS Terrain script connects the individual terrains with GTS Profiles. This script applies profile settings changes to the material attached to that terrain.



Interface



Profile: The profile this terrain uses for rendering.

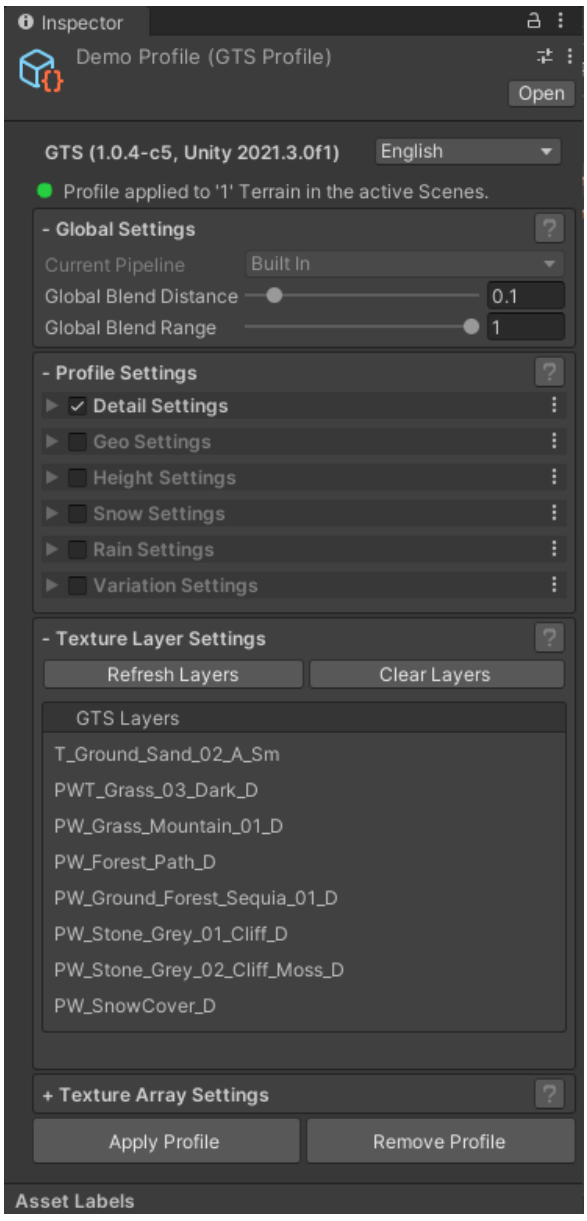
Apply Profile: Applies the GTS profile to the terrain.

Remove Profile: Removes the GTS profile from the terrain.

GTS Profile

The GTS Profile is a Scriptable Object type that contains all the settings in relation to the GTS Material. It is also in charge of applying these changes to the Terrain.

Interface

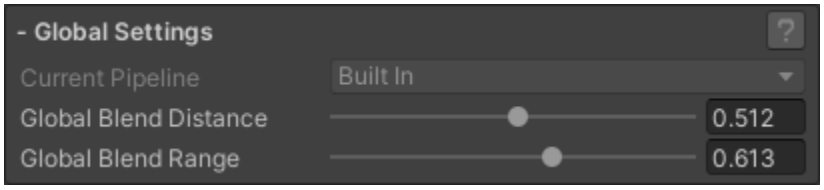


Apply Profile: Applies the GTS profile to the terrain.

Remove Profile: Removes the GTS profile from the terrain.

Global Settings Panel

Settings to control global blend distances between near and far effects.



Current Pipeline: The render pipeline that this project is currently using.

Global Blend Distance: Controls the distance between near and far effects.

Global Blend Range: Controls the blend range between near and far effects.

Target Platform: The target hardware that this project will be built for.

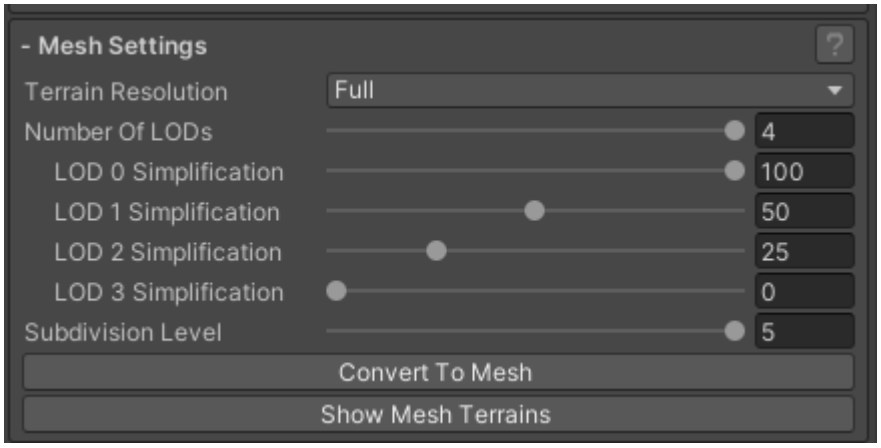
UV Space: The type of UV data to use for the terrain.

- Object Space allows for position, scaling, and rotation to be unique to the object it is applied to.

- World Aligned is used when the mesh using a GTS material has no uv sets, so it is recalculated on the fly.

Mesh Settings Panel

Settings to convert terrains into meshes.



Terrain Resolution: The base resolution to convert the terrain into a mesh, from which the sub terrain tiles and LOD level simplification occurs.

Number of LODs: Number of Level of Detail stages to use for each subtile of the terrain.

LOD 0 Simplification: Controls by how much in percentage % to simplify the terrain's vertex density.

100% = No simplification

50% = Simplifies the mesh by half of its resolution.

0% = Lowest resolution simplification

LOD 1 Simplification: Controls by how much in percentage % to simplify the terrain's vertex density, relative to the previous LOD level.

100% = No simplification from its previous LOD level resolution.

50% = Simplifies the mesh by half of its previous LOD level resolution.

0% = Lowest resolution simplification of its previous LOD level resolution.

LOD 2 Simplification: Controls by how much in percentage % to simplify the terrain's vertex density, relative to the previous LOD level.

100% = No simplification from its previous LOD level resolution.

50% = Simplifies the mesh by half of its previous LOD level resolution.

0% = Lowest resolution simplification of its previous LOD level resolution.

LOD 3 Simplification: Controls by how much in percentage % to simplify the terrain's vertex density, relative to the previous LOD level.

100% = No simplification from its previous LOD level resolution.

50% = Simplifies the mesh by half of its previous LOD level resolution.

0% = Lowest resolution simplification of its previous LOD level resolution.

Subdivision Level: Controls how many times the terrain gets split into sub tiles. This subdivision occurs on each terrain tile, and LODs are then generated for each subtile.

Subdivision Level 0: No splits, the whole of the terrain tile is Lodded.

Subdivision Level 1: 1 split vertically and horizontally, resulting in 2x2 grid of sub terrain tiles.

Subdivision Level 2: 2 splits vertically and horizontally, resulting in 3x3 grid of sub terrain tiles.

Subdivision Level 3: 3 splits vertically and horizontally, resulting in 4x4 grid of sub terrain tiles.

Subdivision Level 4: 4 splits vertically and horizontally, resulting in 5x5 grid of sub terrain tiles.

Subdivision Level 5: 5 splits vertically and horizontally, resulting in 6x6 grid of sub terrain tiles.

Convert to Mesh: Convert all terrains using this profile into a mesh. The generated meshes are placed in a new scene root gameobject, and the original terrains are hidden from drawing geometry, but their other features are still available to edit. Pressing this button once a mesh terrain has already been generated will remove the previous mesh terrains and the newly generated ones will be added into the scene.

Show Mesh / Unity Terrains: Turns the visibility of mesh terrains / Unity terrains on in the scene.

Profile Settings Panel

All configurable settings for the material.

Detail Settings Panel

Normal Texture: The compacted texture to use to add detail to the terrains. Textures should not be of type 'NormalMap', but rather left at 'Default'. sRGB should also be unchecked.

The format is: (R: Normal.r, Normal.g, Noise Variation A, Noise Variation b).

Near Tiling: The UV Scale of the near detail normal.

Near Strength: Controls the amount of influence the near detail normal will have on the terrains.

Far Tiling: The UV Scale of the far detail normal.

Far Strength: Controls the amount of influence the far detail normal will have on the terrains.

Geo Settings Panel

Settings to control additional geological data on the terrains.

Albedo Texture: The albedo texture to use for geological influence.

Normal Texture: The normal texture to use for geological influence. Texture should be marked as Normal Map type.

Near Strength: The amount of influence the geological maps have on the terrains at a close range.

Near Normal Strength: The amount of influence the geological normal map has on the terrains at a close range.

Near Scale: The UV scale of the geological maps at a close range.

Near Offset: The amount of offset to add to the sampling of the geological maps at a close range.

Far Strength: The amount of influence the geological maps have on the terrains at a far range.

Far Normal Strength: The amount of influence the geological normal map has on the terrains at a far range.

Far Scale: The UV scale of the geological maps at a far range.

Far Offset: The amount of offset to add to the sampling of the geological maps at a far range.

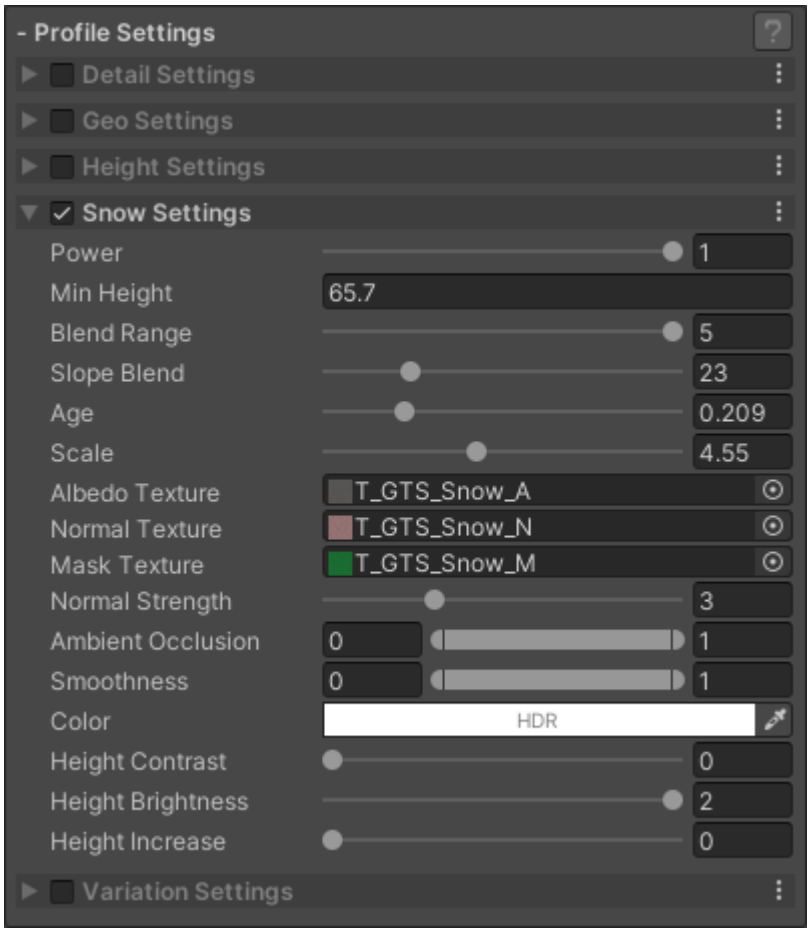
Height Settings Panel

Settings for height blending on terrains.

Height Blend Factor: Controls the overall amount of contrast of height blending between the layers. Layer specific control can be adjusted per GTS Layer.

Snow Settings Panel

Settings to control how snow appears on the terrains.



Power: Controls the amount of snow that gets blended into the terrain.

Min Height: The minimum height in world units at which snow starts appearing on terrains.

Blend Range: The transition range between where the snow starts and where it ends. Lower values will result in a sharper contrast.

Slope Blend: The amount of influence the terrain's slope should contribute to where snow appears. Lower values will result in less slope masking, whilst higher values will determine that snow only appears on top facing surfaces.

Age: The time passed at which snow has settled on the terrain. Higher values will result in less snow appearing.

Scale: The UV scale of the snow texture set.

Albedo Texture: The albedo texture to use for the snow.

Normal Texture: The normal texture to use for the snow. Texture should be marked as Normal Map.

Mask Texture: The mask texture (R: Metallic, G: AO, B: Height, A: Smoothness) to use for the snow. Metallic values are not supported in the shader.

Normal Strength: The intensity of the normal map, which affects how lighting is calculated.

Ambient Occlusion: Drag the sliders from each end to affect the minimum and maximum values for the Ambient Occlusion map.

Smoothness: Drag the sliders from each end to affect the minimum and maximum values for the Smoothness map.

Color: A color tint that is applied to the final albedo output for snow.

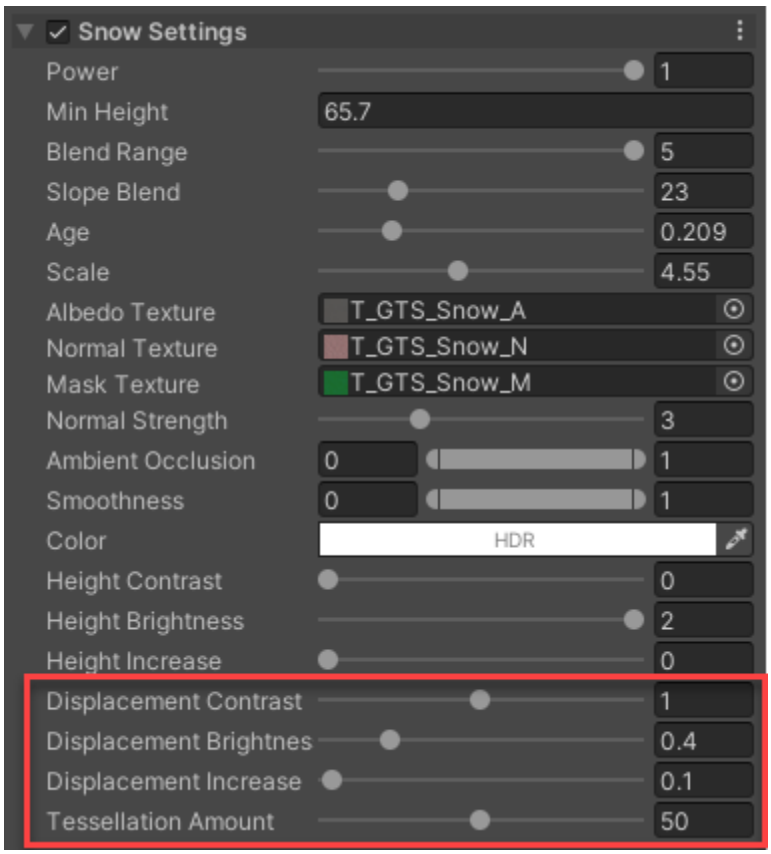
Height Contrast: The amount of contrast remapping that will be applied to this layer's displacement blending of the terrain.

Height Brightness: The amount of brightness remapping that will be applied to the snow's displacement blending of the terrain.

Height Increase: An overall increase in values that will be applied to this layer's height blending of the terrain.

HDRP Only

This profile setting contains a few options that are only available in HDRP.



Displacement Contrast: The amount of contrast remapping that will be applied to this layer's displacement blending of the terrain.

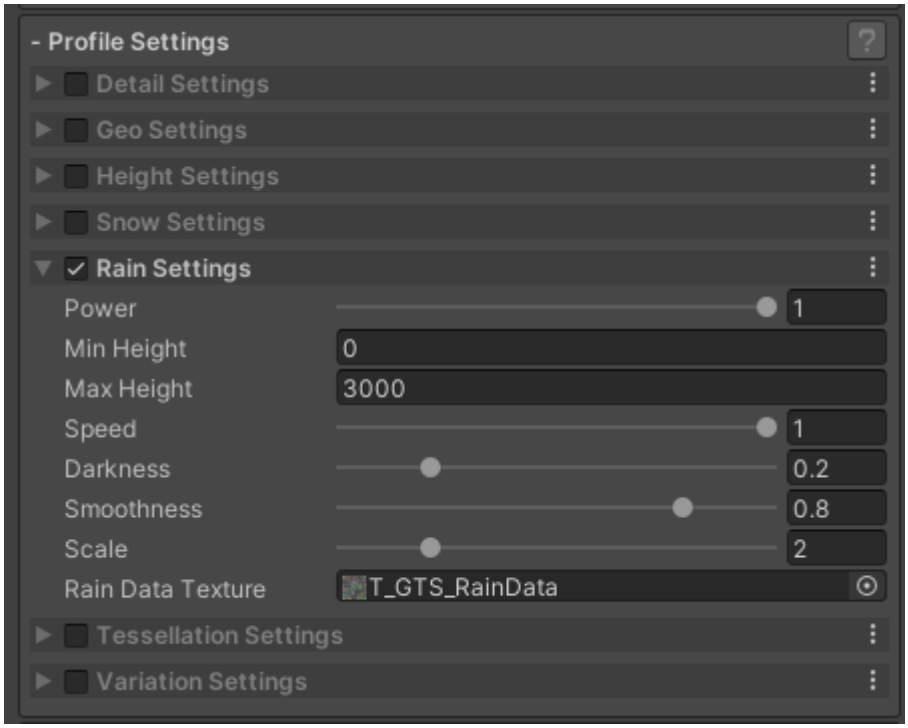
Displacement Brightness: The amount of brightness remapping that will be applied to the snow's displacement blending of the terrain.

Displacement Increase: An overall increase in values that will be applied to the snow's displacement blending of the terrain. Higher values will raise the snow above other layers.

Tessellation Amount: The amount of tessellation to be applied to snow. Lower values result in more performance, but less detail, higher values result in less performance, but more detail.

Rain Settings Panel

Settings to control how rain appears on the terrains.



Power: Controls the amount of rain that gets blended into the terrain.

Min Height: The minimum height in world units at which rain starts appearing on terrains.

Max Height: The maximum height in world units at which rain starts appearing on terrains.

Speed: The speed at which ripples form on flat surfaces on the terrain.

Darkness: Controls how much the base color of the terrain gets darkened when it is raining.

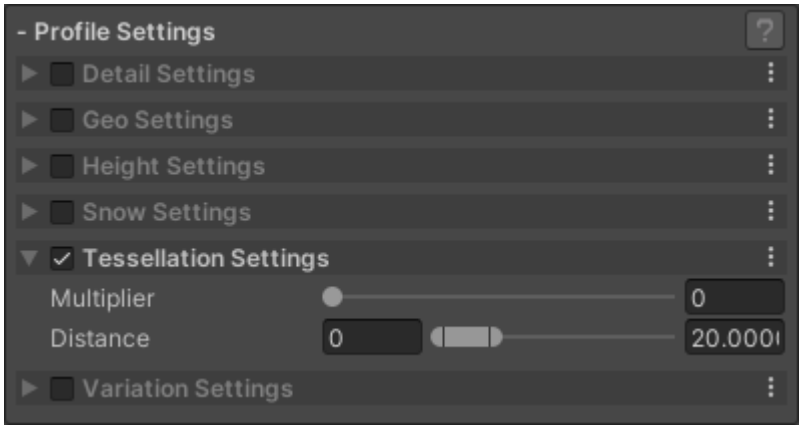
Smoothness: The amount of smoothness the rain effect should adjust the terrain by.

Scale: The UV scale of the rain texture.

Rain Data Texture: The data texture used to generate raindrops. Each channel (RGBA) represents unique starting positions for each set of ripples.

Tessellation Settings Panel – HDRP Only

Settings for tessellation / displacement mapping on terrains. Note: Tessellation is a very expensive operation, and higher densities can easily reduce performance. Use with caution.

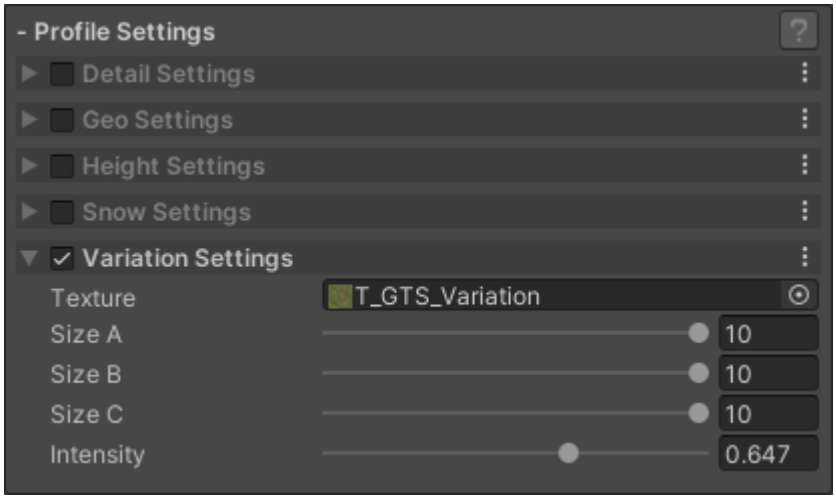


Multiplier: Controls the overall tessellation amount on terrains. This is multiplied with each layer's tessellation amount. A lower amount of tessellation will be more performant but less detailed, whilst a higher amount of tessellation will be less performant but more detailed.

Distance: Controls the minimum and maximum range for tessellation density. Note: A higher range will reduce performance as more vertices are added. Use appropriate ranges for what is needed to achieve the effect and falloff between the camera and the terrain.

Variation Settings Panel

Settings to control large scale variation to help add detail and hide tiling on terrains.



Texture: The variation texture to use. Uses the Red channel of the texture. Other channels have no effect on the shader currently.

Size A: The smallest tiling scale of the first variation map to influence the terrain.

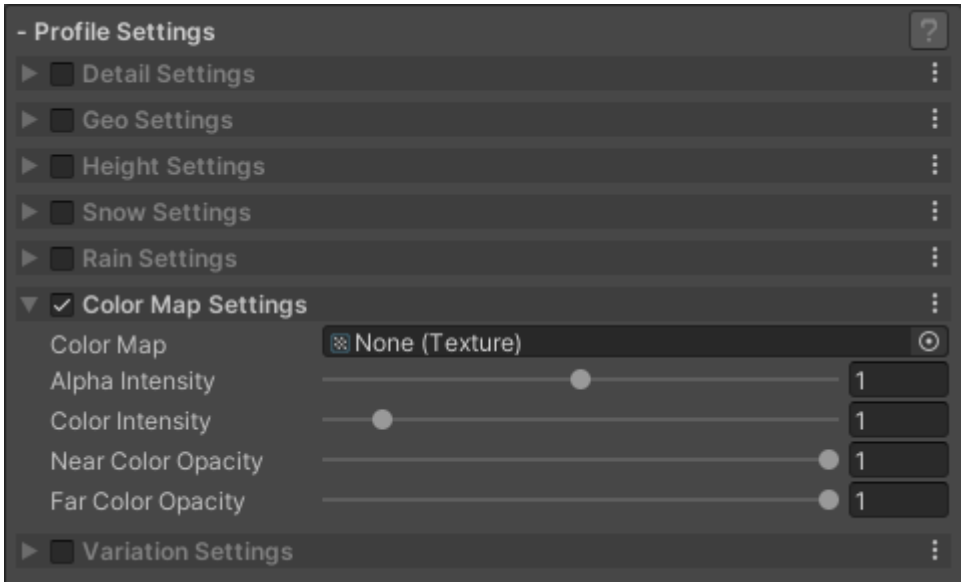
Size B: The medium tiling scale of the first variation map to influence the terrain.

Size C: The largest tiling scale of the first variation map to influence the terrain.

Intensity: The amount of influence the variation maps will affect the terrains.

Colormap Settings Panel

Settings to control large scale variation to help add detail and hide tiling on terrains.



Color Map: The color map texture to use.

RGB: Color

Alpha: The opacity / alpha mask on where the color map should display.

Alpha Intensity: Controls the visibility of the where to display the colormap data.

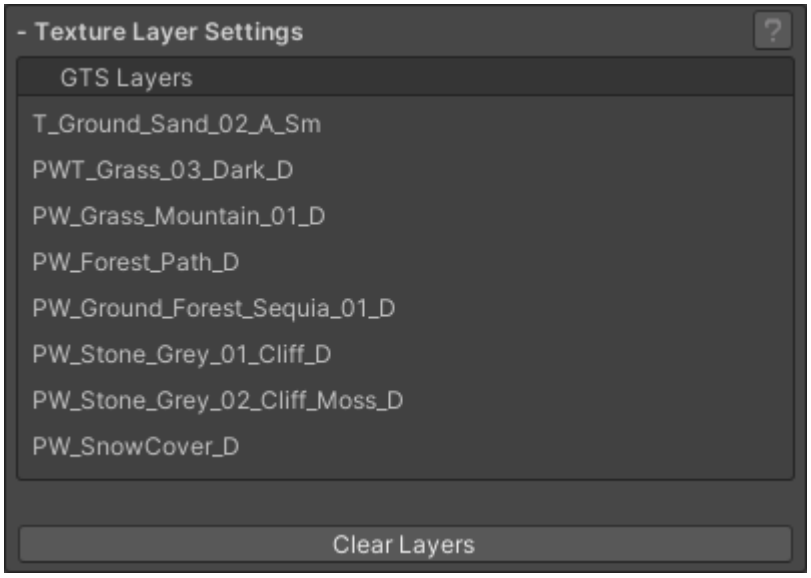
Color Intensity: Controls the brightness of the colormap.

Near Color Opacity: Controls the near opacity of the color map.

Far Color Opacity: Controls the far opacity of the color map.

Texture Layer Settings Panel

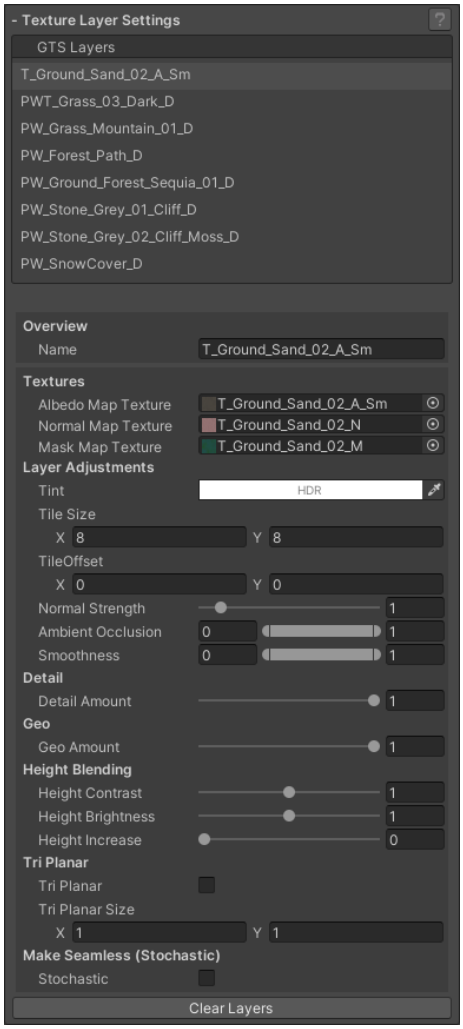
Settings controlling the ingested terrain layers used with the material.



GTS Layers: A list of GTS Layers. Select one to inspect the layer's properties.

Clear Layers: Clears the current GTS layers.

GTS Layer



Overview

Name: The name of the GTS Layer.

Textures

Albedo Map Texture: The albedo texture to be used on this layer.

Normal Map Texture: The normal texture to be used on this layer. Texture should be marked as Normal Map.

Mask Map Texture: The mask texture (R: Metallic, G: AO, B: Height, A: Smoothness) to be used on this layer. Metallic values have no effect on this shader.

Layer Adjustments

Tint: A color tint that is applied to the final albedo output on this layer.

Tile Size: The X and Y tiling scale of the layer's UV.

Tile Offset: The X and Y offset of the layer's UV.

Normal Strength: The intensity of the normal map, which affects how lighting is calculated.

Ambient Occlusion: Drag the sliders from each end to affect the minimum and maximum values for the Ambient Occlusion map.

Smoothness: Drag the sliders from each end to affect the minimum and maximum values for the Smoothness map.

Detail (requires enabling details)

Detail Amount: The amount of influence that the detail normal will affect this layer.

Geo (requires enabling geo)

Geo Amount: The amount of influence that the geological data will affect this layer.

Height Blending (requires enabling height)

Height Contrast: The amount of contrast remapping that will be applied to this layer's height blending of the terrain.

Height Brightness: The amount of brightness remapping that will be applied to this layer's height blending of the terrain.

Height Increase: An overall increase in values that will be applied to this layer's height blending of the terrain.

Tri Planar

Tri Planar: Enables / Disables Tri Planar blending for this layer. Enabling this feature will cost more in performance.

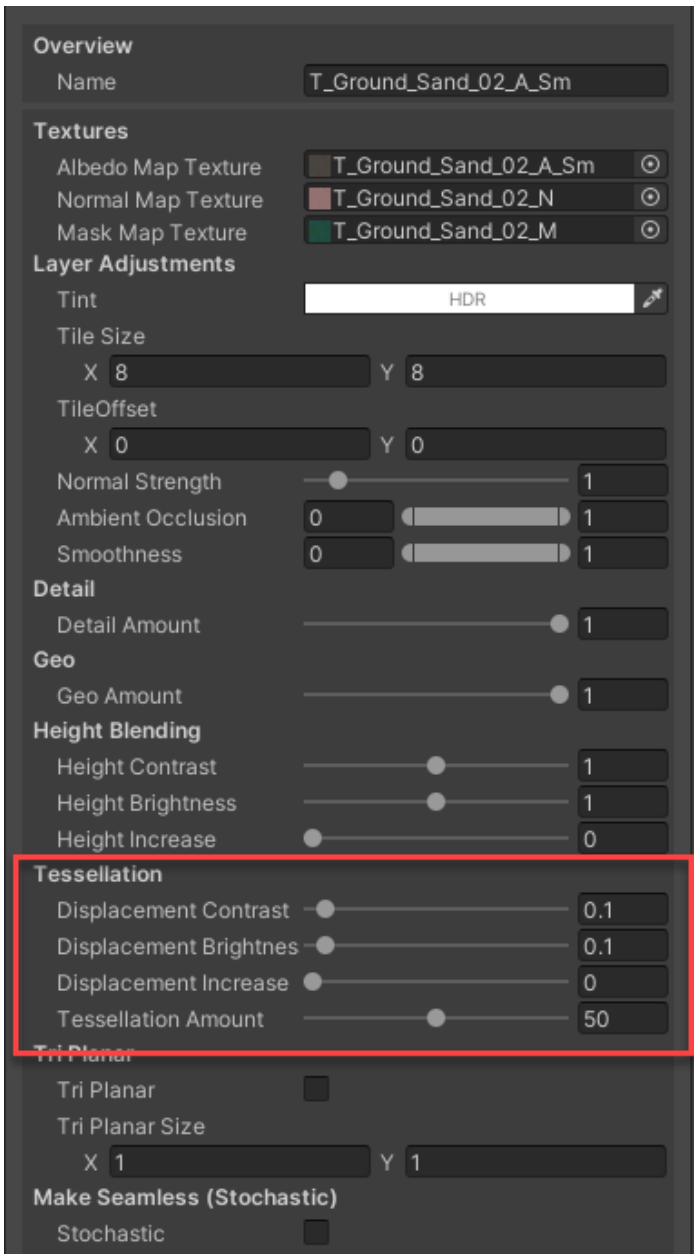
Tri Planar Size: The X and Y size relative to the normal axis to scale the tri planar UVs by.

Make Seamless (Stochastic)

Stochastic: Enables / Disables Stochastic blending, a technique used to hide noticeable tiling. Enabling this feature will cost more in performance.

HDRP Only

The GTS Layer contains a few options that are only available in HDRP.



Displacement Contrast: The amount of contrast remapping that will be applied to this layer's displacement blending of the terrain.

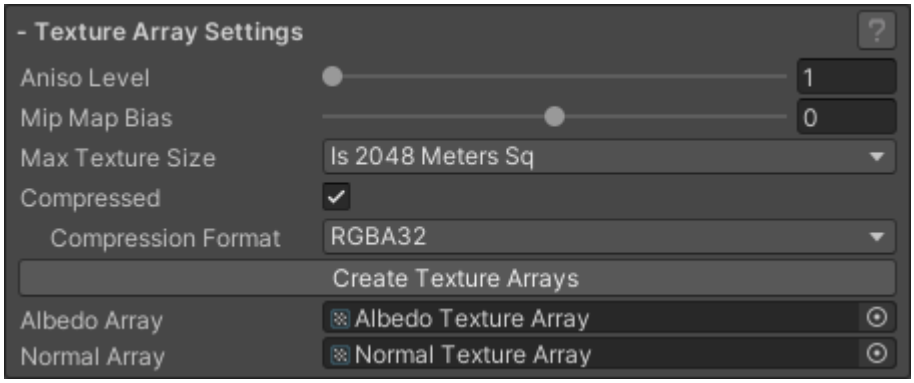
Displacement Brightness: The amount of brightness remapping that will be applied to this layer's displacement blending of the terrain.

Displacement Increase: An overall increase in values that will be applied to this layer's displacement blending of the terrain. Higher values will raise this layer above other layers.

Tessellation Amount: The amount of tessellation to be applied to this layer. Lower values result in more performance, but less detail, higher values result in less performance, but more detail.

Texture Array Settings Panel

Settings to control how texture arrays are generated and compressed.



Aniso level: Anisotropic filtering makes textures look better when viewed at a shallow angle, but it can be slower to process on the GPU. Anisotropic filtering is commonly used to improve the appearance of floor, ground, or road Textures.

The value range of this variable is 0 to 16. A value of 1 equals no filtering applied and 16 equals full filtering applied. As the value gets bigger, the Texture is clearer at shallow angles. Lower values mean the Texture is blurrier at shallow angles.

Max Texture Size: The maximum size for all textures contained within the texture array.

Compressed: Enable this to override the texture array's format (default format is RGBA32).

Compression Format: The format to store the texture array in. The texture arrays require the full RGBA channels. Some compression formats strip out some of these channels, so be mindful when choosing the appropriate format.

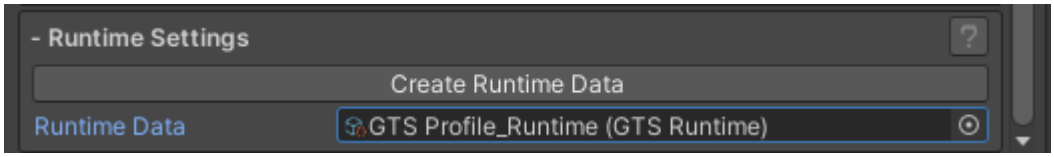
Create Texture Arrays: Creates the texture arrays for the profile based on the above settings.

Albedo Array: Packed Albedo Array to use on the terrain. Format is: RGB: Albedo, A: Height

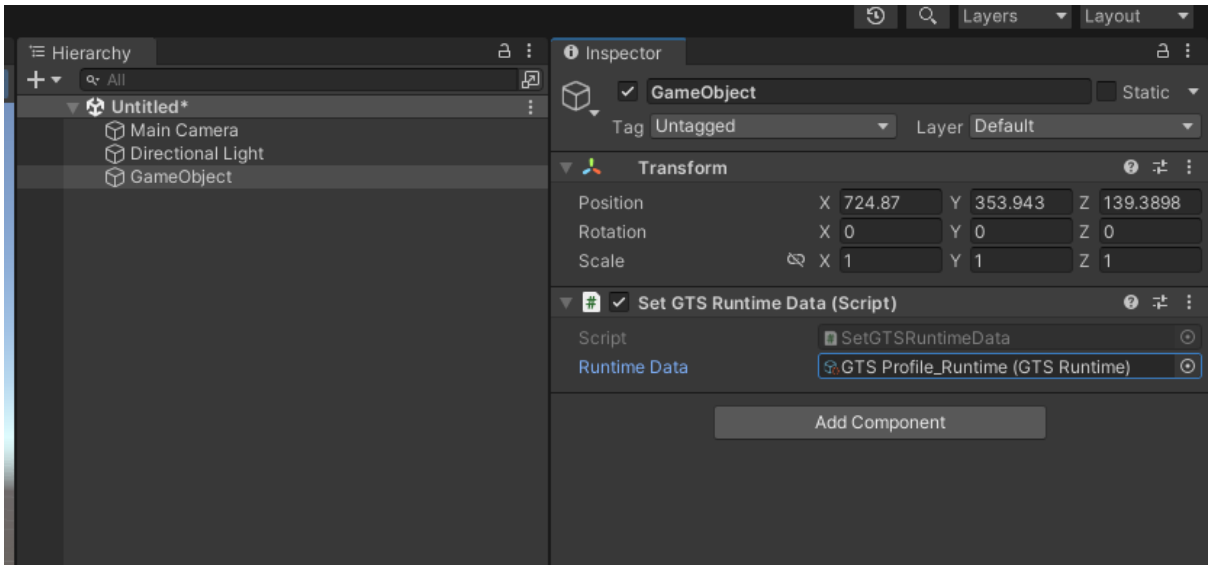
Normal Array: Packed Normal Array to use on the terrain. Format is: RG: Normal's X & Y components, B: Ambient Occlusion, A: Smoothness

Runtime Settings

During the initialization of a scene, the GTS component on the terrain sets up global shader values required for correct rendering of the shader. If you are running a scenario where you cannot add the GTS component on a terrain or where terrains are being loaded in from a dynamic source (e.g. asset loading through the Unity addressable system) you can force the initialization of the global shader values with this runtime settings system.



In the source project, where you create and edit your scenes, click the "Create Runtime Data" button to create a settings asset containing the runtime Data for the current GTS profile.
In your target project, create an empty game object and attach the "Set Runtime Data" component to it.

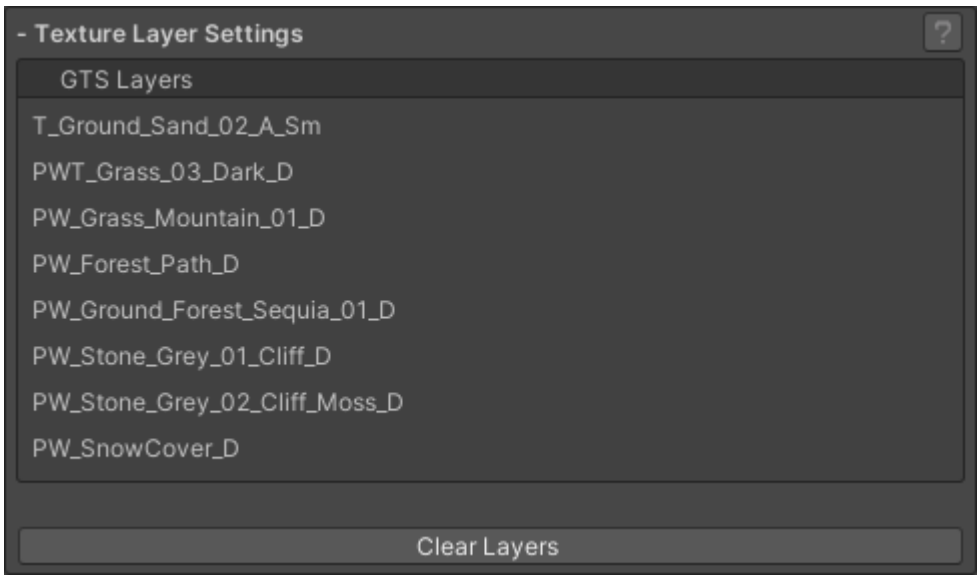


Assign the runtime data settings asset you created in the source project in this component. When the scene starts, the required global shader values will be set as soon as the scene starts.
Doing this is only required when you are encountering issues with GTS in scenarios where terrains are being loaded from addressables, asset bundles or other sources. In a "regular" Unity scene you will not need to do this as the GTS component will do the initialization of the global shader values automatically.

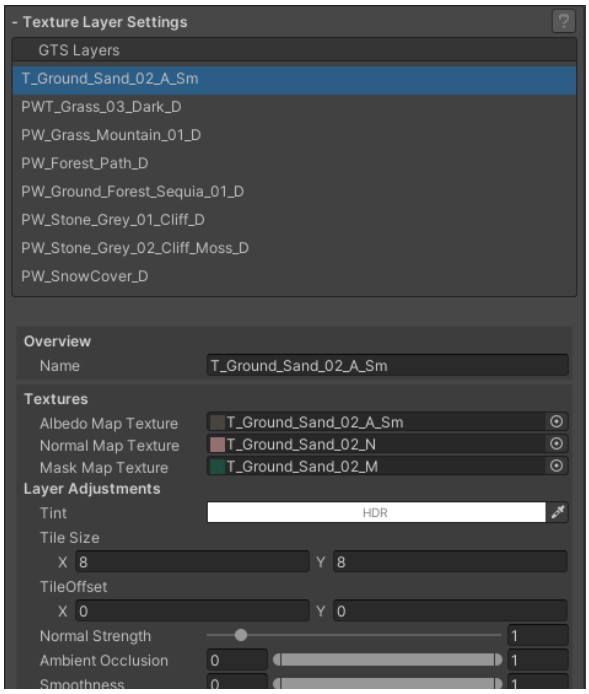
Usage

Editing terrain layers

GTS terrain layers can be edited by navigating to the GTS Layers section near the bottom of the profile.



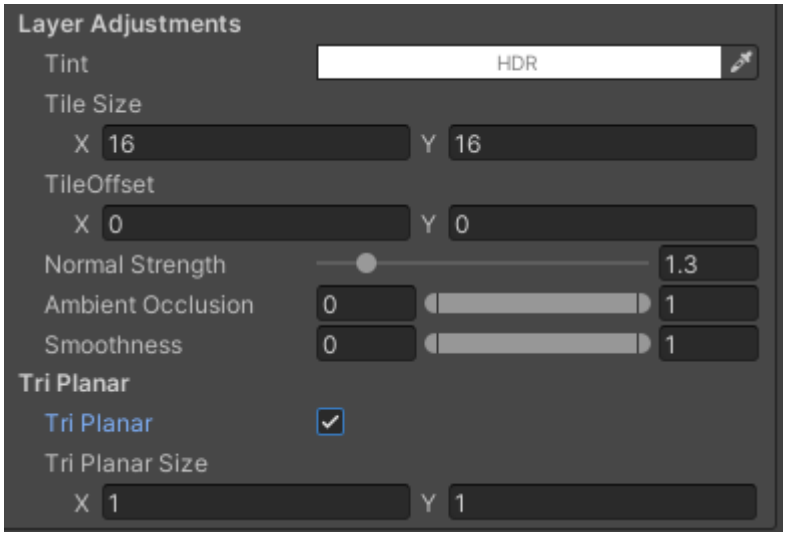
Clicking on any of the displayed layers will expand their properties.



Once expanded, a more settings can be altered to change how the layer is presented. As other features are turned on / off, additional settings will appear in this section that relate to per layer control of the desired feature.

Tri Planar

Enabling Tri Planar will project a layer across 3 planes, resulting in a world aligned blend that will not be limited to stretching issues that can occur with the default terrain UV Mapping.

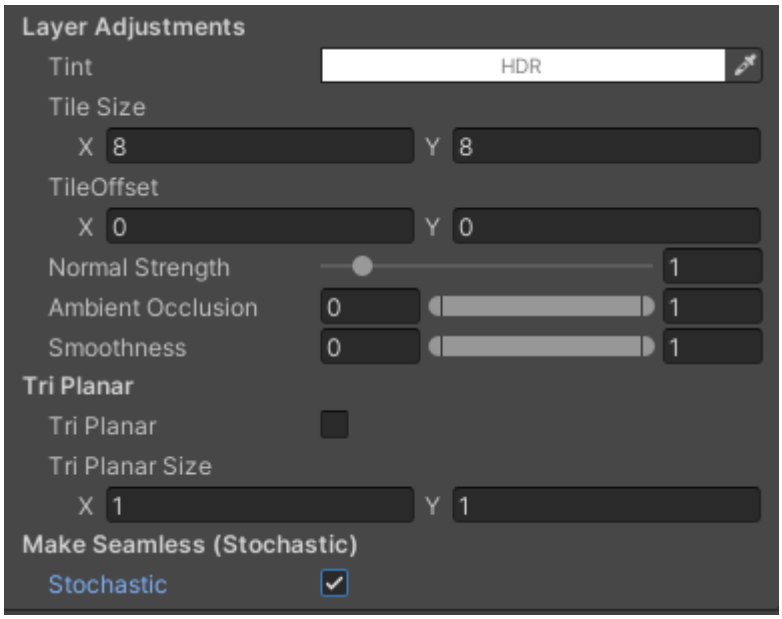


Note: The Tri Planar technique requires additional texture sampling that can be costly to performance. Turn this feature on for layers that require it such as cliff textures for mountains.

	
Tri Planar OFF	Tri Planar ON

Make Seamless

Enabling Make Seamless will use the stochastic technique to reduce the tiling repetitions seen on terrain layers.



Note: The Make Seamless technique requires additional texture sampling that can be costly to performance. Turn this feature on for layers that require it such as textures with noticeable tiling.

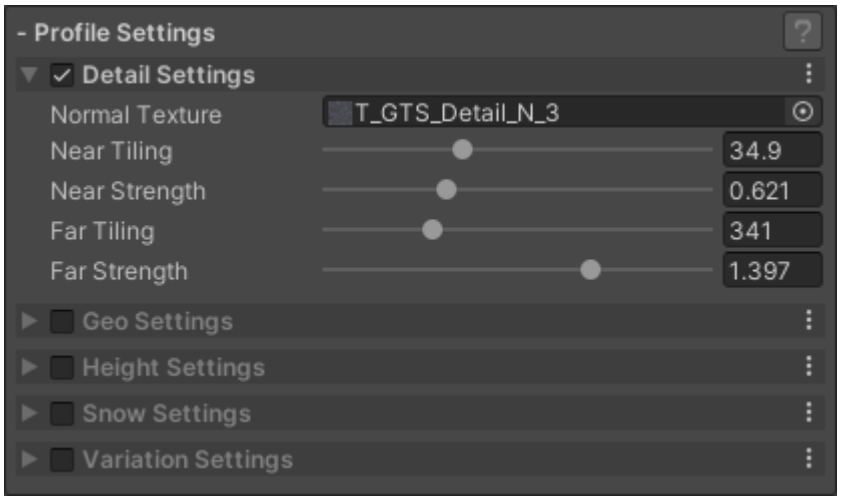
	
Make Seamless OFF	Make Seamless ON

Profile Settings

GTS includes several ready to use additional terrain features to improve the visual appearance of your scene. Each feature can be expanded on by clicking on their name.

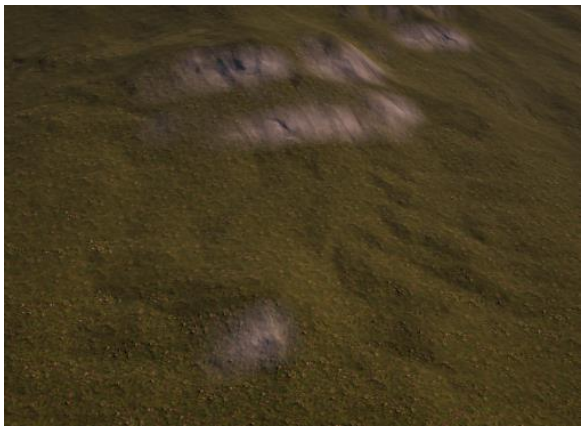
Detail Settings

Enabling detail settings allows additional detail maps to be used to influence the terrain's normals and base color.



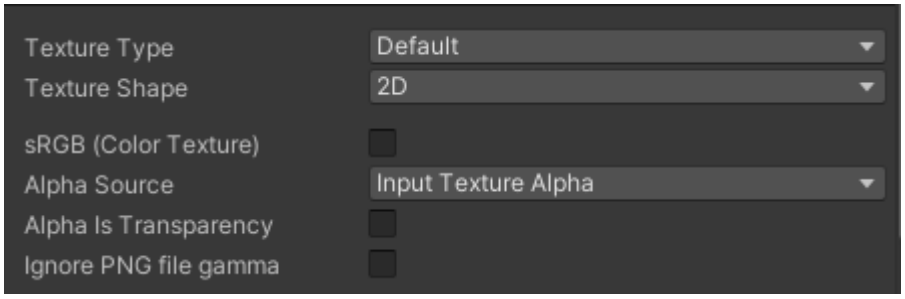
Detail Settings include separate near and far variables. The distance to control the range between near and far settings can be controlled in the Global Settings.

Detail Settings OFF



Detail Settings ON

The detail texture used is not to be confused with a Normal Map texture. The format of the detail texture should be as follows:

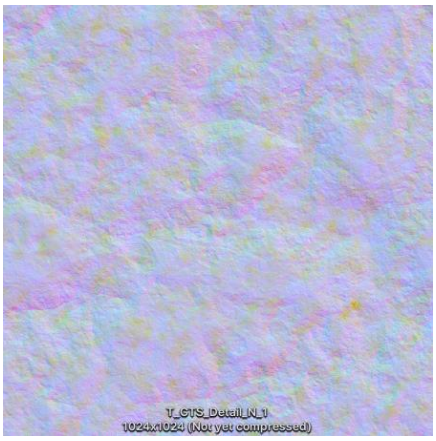


- Texture Type: Default

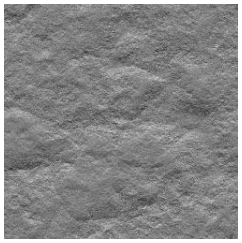
- sRGB (Color Texture): false

The format of the detail texture's channels should be as follows:

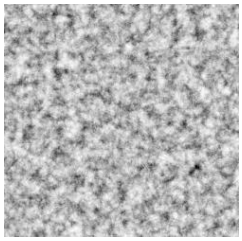
- Red Channel: Normal Map X direction (i.e., Normal Map Red component)
- Green Channel: Normal Map Y direction (i.e., Normal Map Green component)
- Blue Channel: Optional – either a noise texture or full black or white
- Alpha Channel: Optional – either a noise texture or full black or white



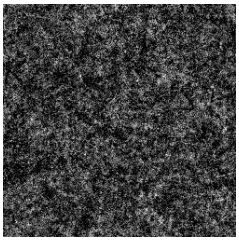
Red Channel



Green Channel



Blue Channel



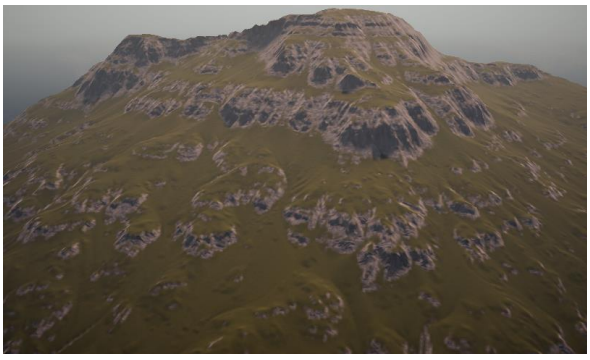
Alpha Channel

Geo Settings

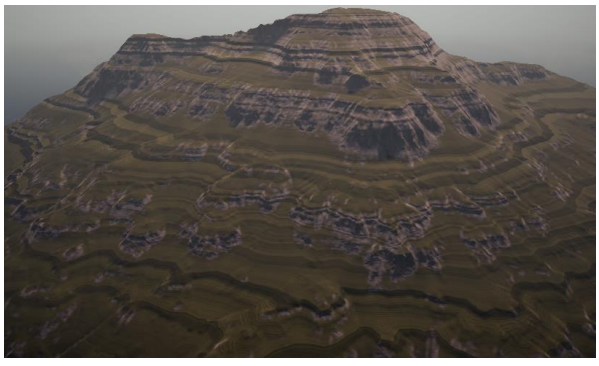
Enabling Geological Settings adds geological color and normal data into your terrains.

Geological Settings include separate near and far variables. The distance to control the range between near and far settings can be controlled in the Global Settings.

The intensity of each layer's geological influence can be controlled in each GTS Layer. These settings will appear once Geo Settings have been enabled.

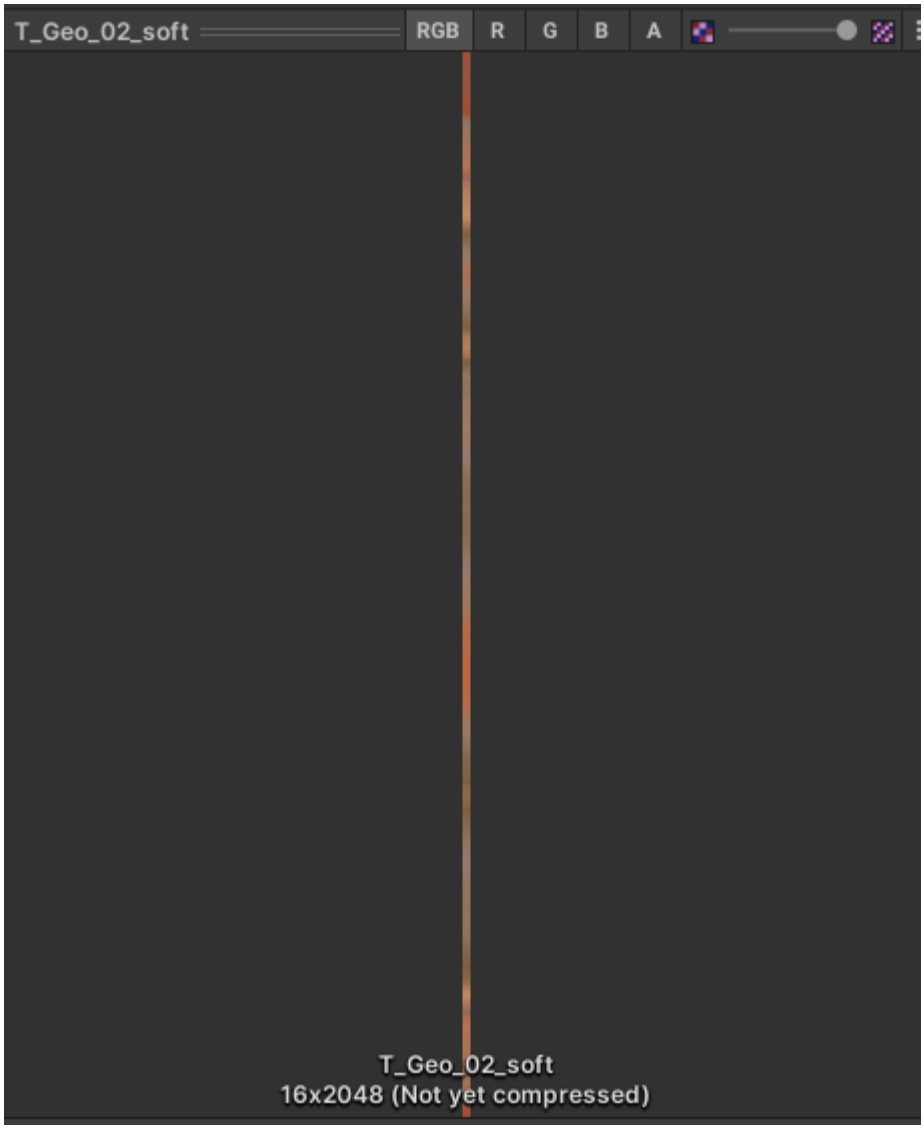


Geo Settings OFF



Geo Settings ON

Geological textures included in the package have a width of 16 pixels and height of 2048. This texture is mainly used to sample the variation of color banding data that occurs in canyon type areas, so a texture with a lot of variation between the Y coordinate of the image makes for a good compatible texture. More examples for the format of the textures can be found in GTS -> Content Resources -> Textures -> Geo.


T_Geo_02_soft
RGB
R
G
B
A
T_Geo_02_soft
16x2048 (Not yet compressed)

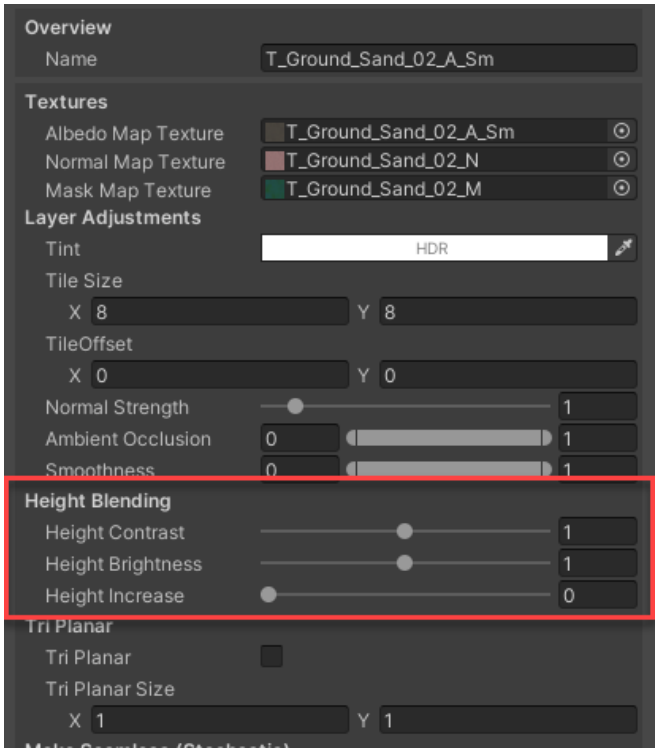
Height Settings

Enabling height blending allows the terrain layers to be blended using the heightmap contained within the texture set.

Height Settings OFF

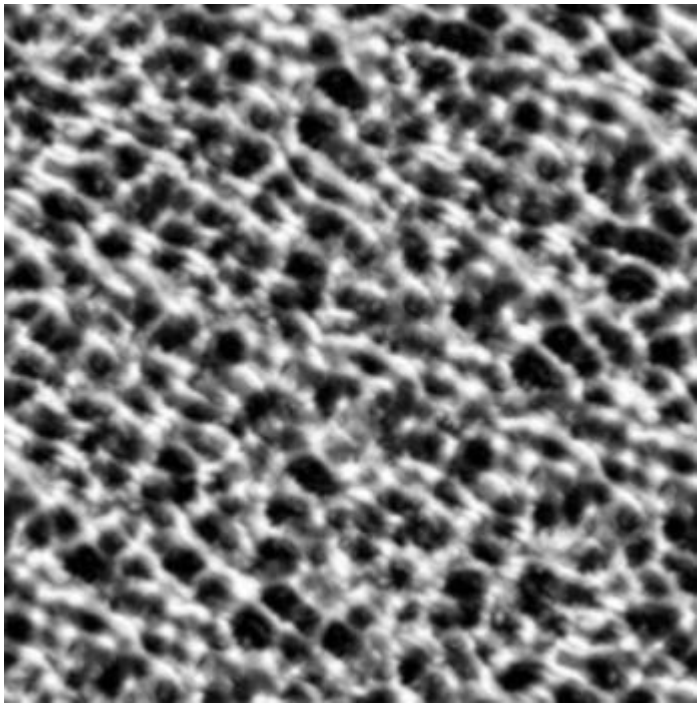
Height Settings ON

The contrast and intensity of each layer's height map can be controlled in each GTS Layer. These settings will appear once Height Settings have been enabled.

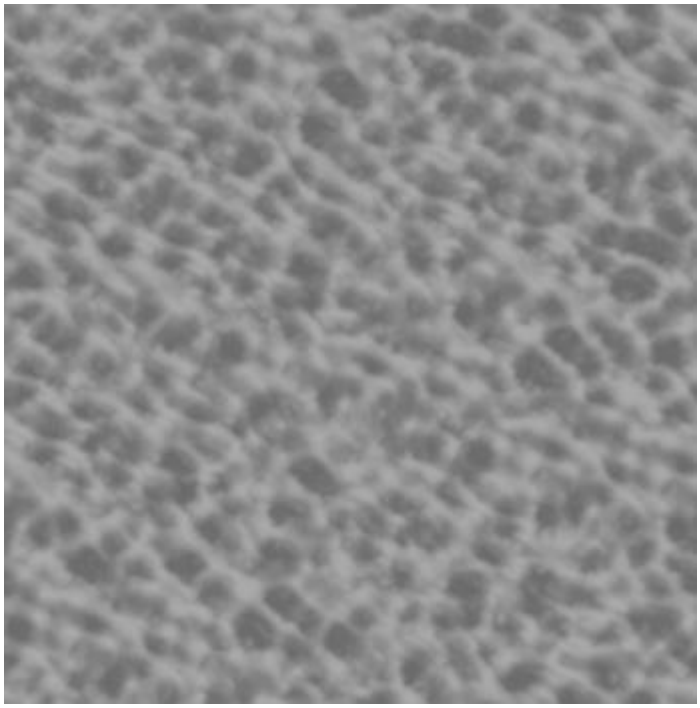


Height Maps

GTS's height blending works best with height maps that have a full range of greyscale values stored in them. An ideal heightmap texture's contrast could like the following:

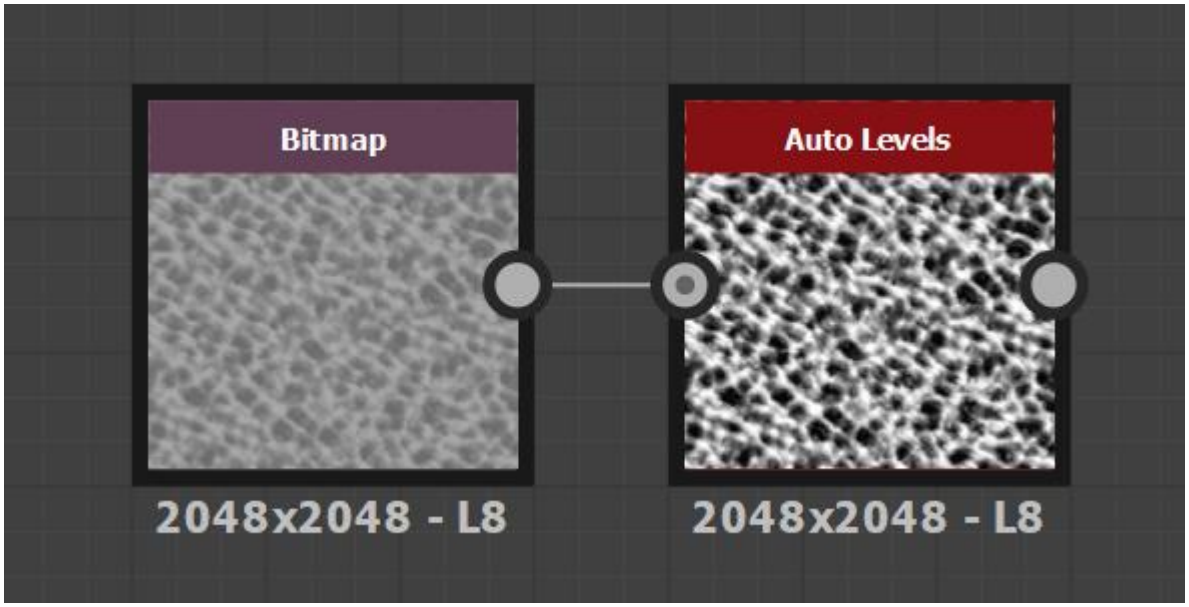


3rd party height map textures may look a little different, and store more of a range closer to 0.3 and 0.7, producing the greyer looking image:

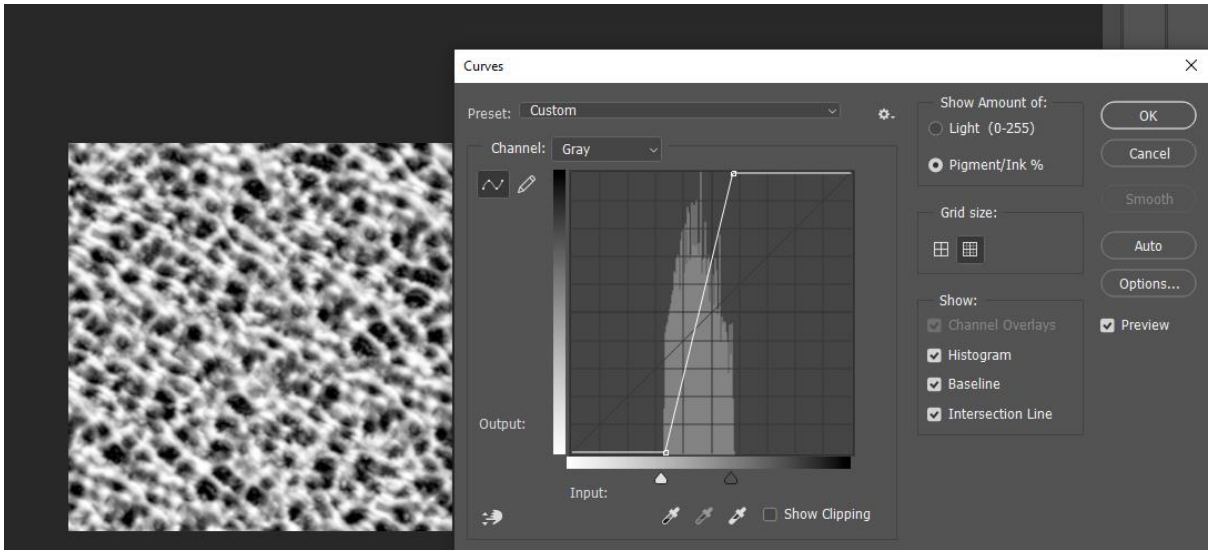


Whilst GTS has values available to edit this heightmap, such as the Height Contrast, Height Brightness and Height Increase, the impact of these remapping values may be limited by an

already restricted heightmap range. Corrections can be made to the heightmap in 3rd party image editing software, such as Substance Designer (by using an Auto Levels node) or Photoshop (by using a Curves adjustment and pressing Auto).



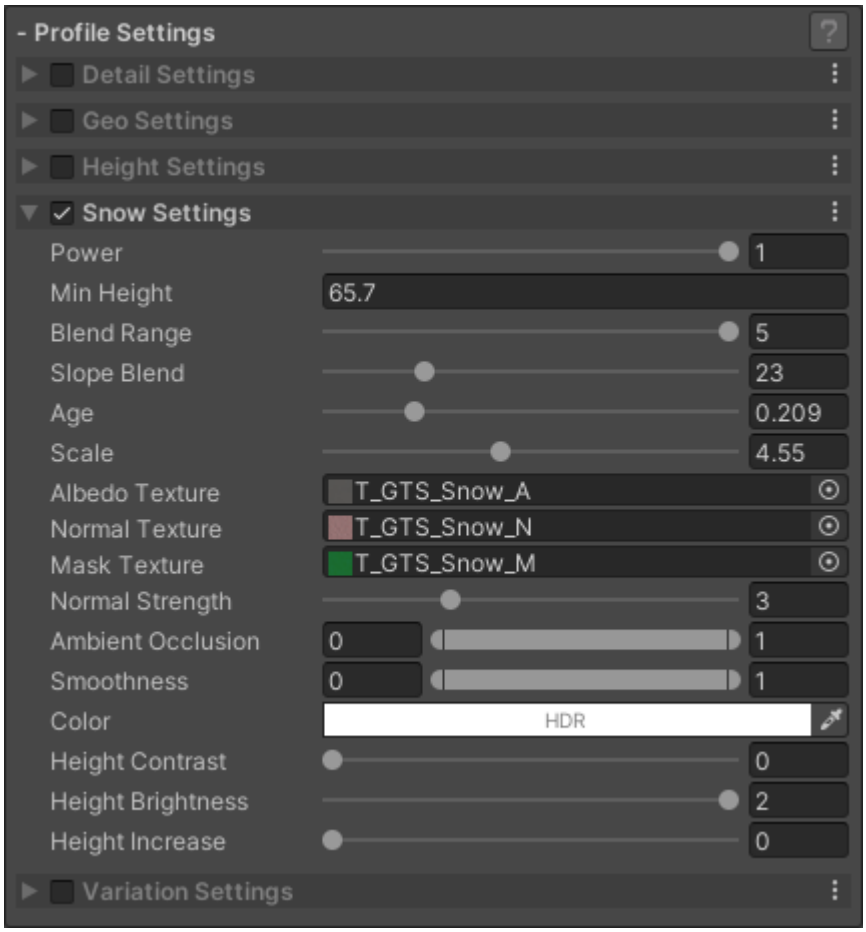
Auto Levels node in Substance Designer



Curves modifier in Photoshop

Snow Settings

Enabling Snow Settings will add a layer of snow on the terrains.



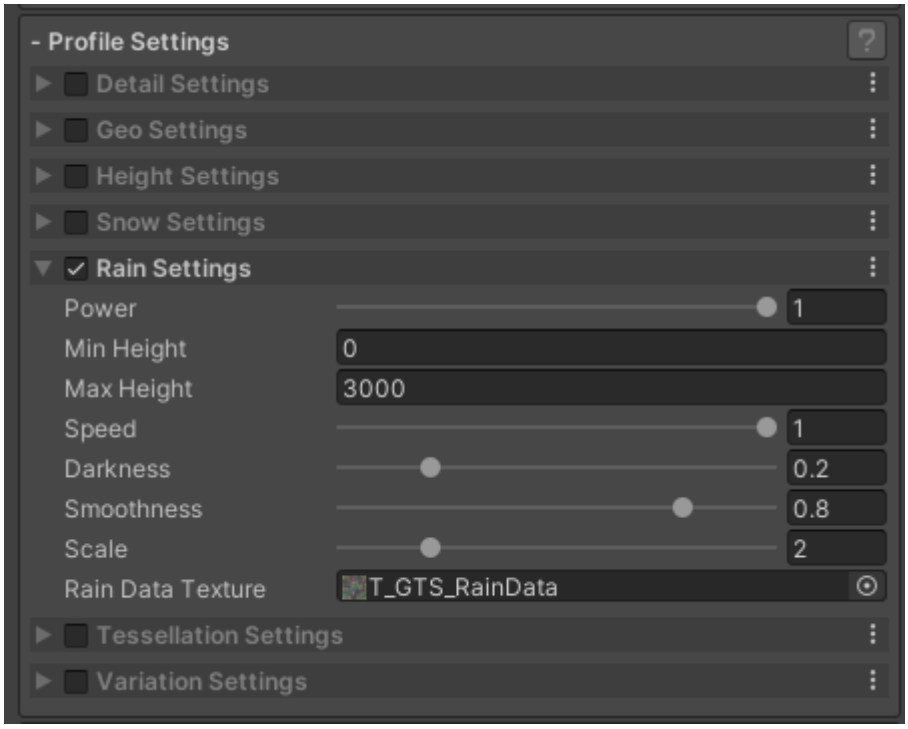
Snow can be controlled through variables such as the Min Height, Blend Range, Slope Blend and Age. PBR settings such as ambient occlusion and smoothness can also be controlled.

Snow Settings OFF

Snow Settings ON

Rain Settings

Enabling Rain Settings will add rain across your terrain.



The amount of rain can be controlled through the Power slide. A range of 0 will result in no rain, whilst 1 will result in full rain.

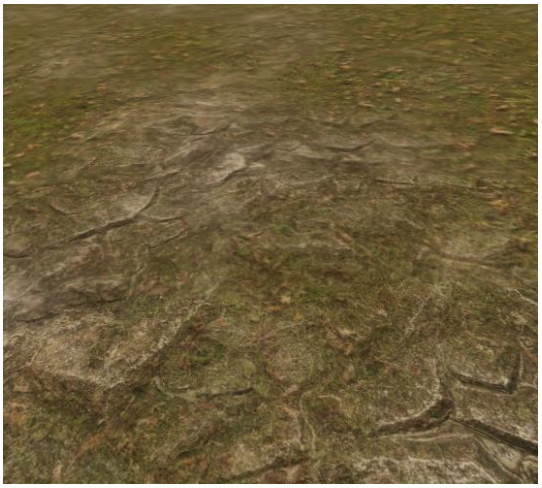
The height range in which rain can appear on the terrain can be controlled through the Min and Max height settings.

Increasing the speed will increase the rate at which raindrops appear on the terrain.

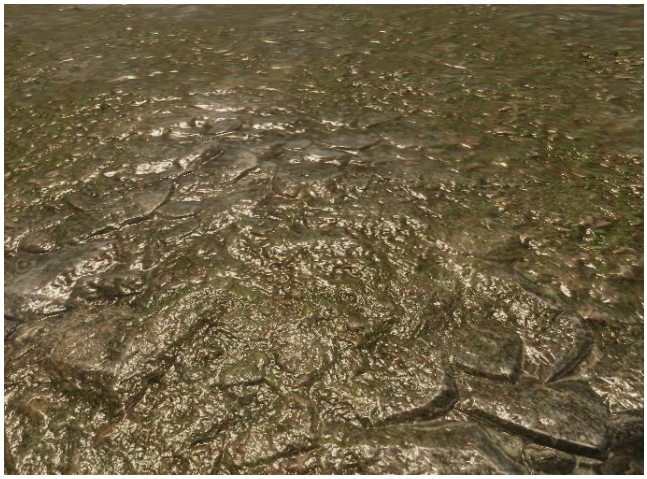
Increase the darkness parameter will tint the terrain in the area where rain is applied, to simulate the wet look.

The Smoothness value will control how wet and reflective the terrain appears. Sloped areas automatically appear less smooth.

Scale controls the texture size of the ripples across the terrain.



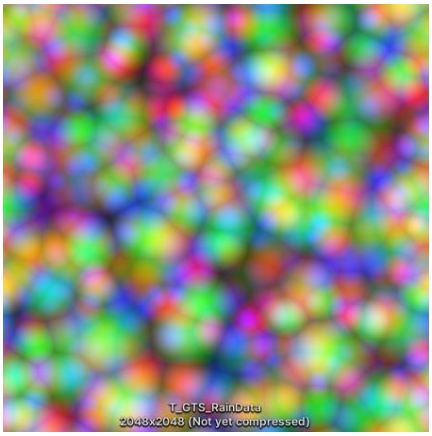
Rain Settings OFF

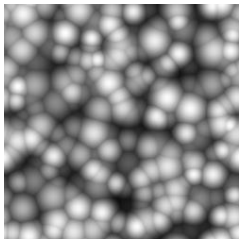


Rain Settings ON

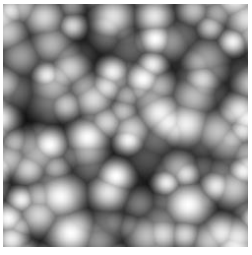
The rain data texture is comprised of varying levels of scattered greyscale spheres, resembling Voronoi generated noise at different scales and intensities.

- Red Channel: Scattered spheres variation A
- Green Channel: Scattered spheres variation B
- Blue Channel: Scattered spheres variation C
- Alpha Channel: Scattered spheres variation D

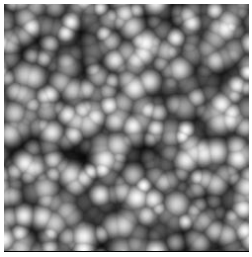




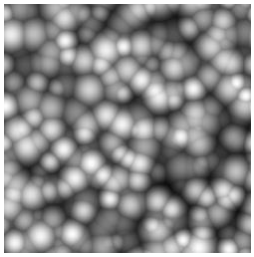
Red Channel



Green Channel



Blue Channel



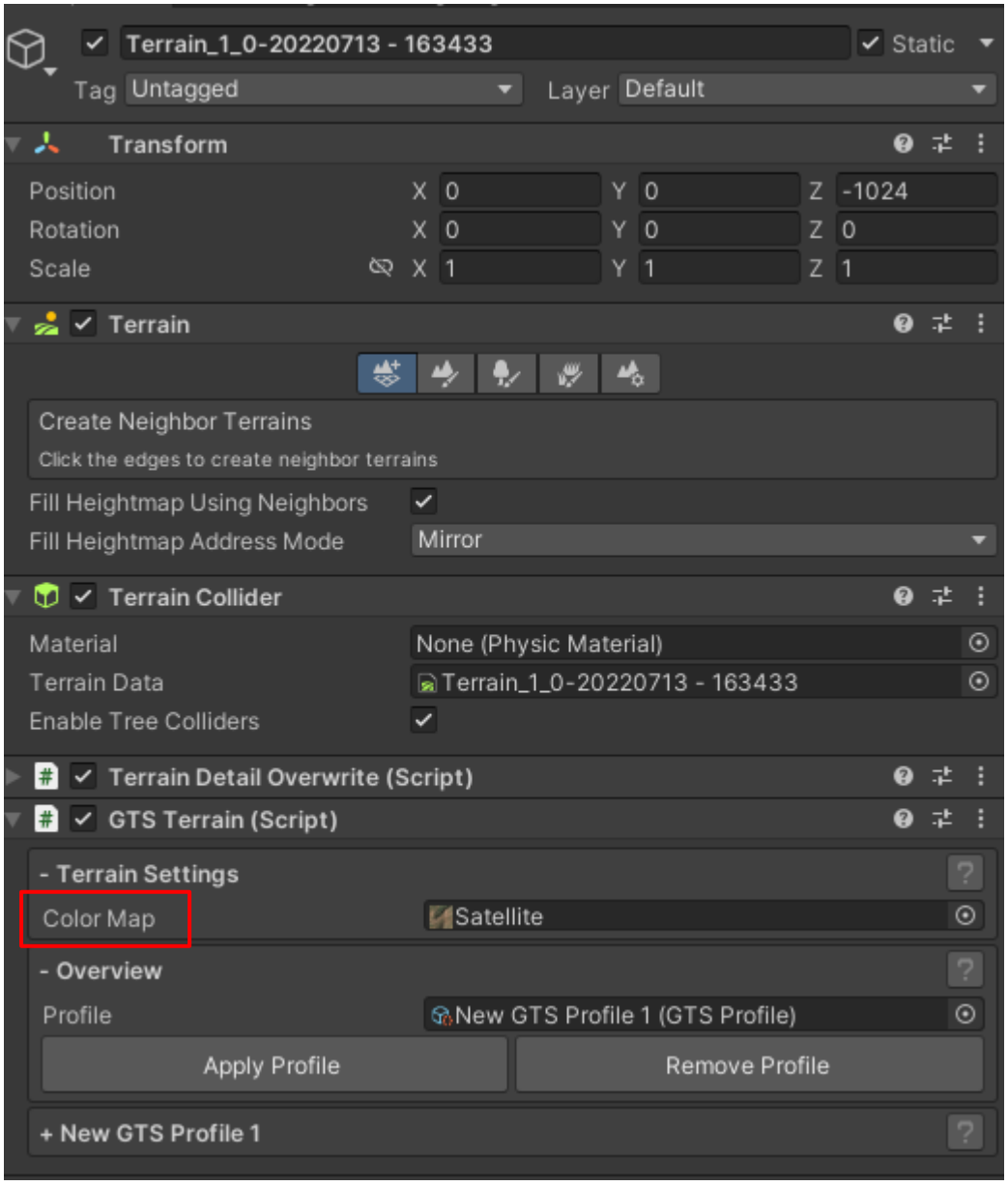
Alpha Channel

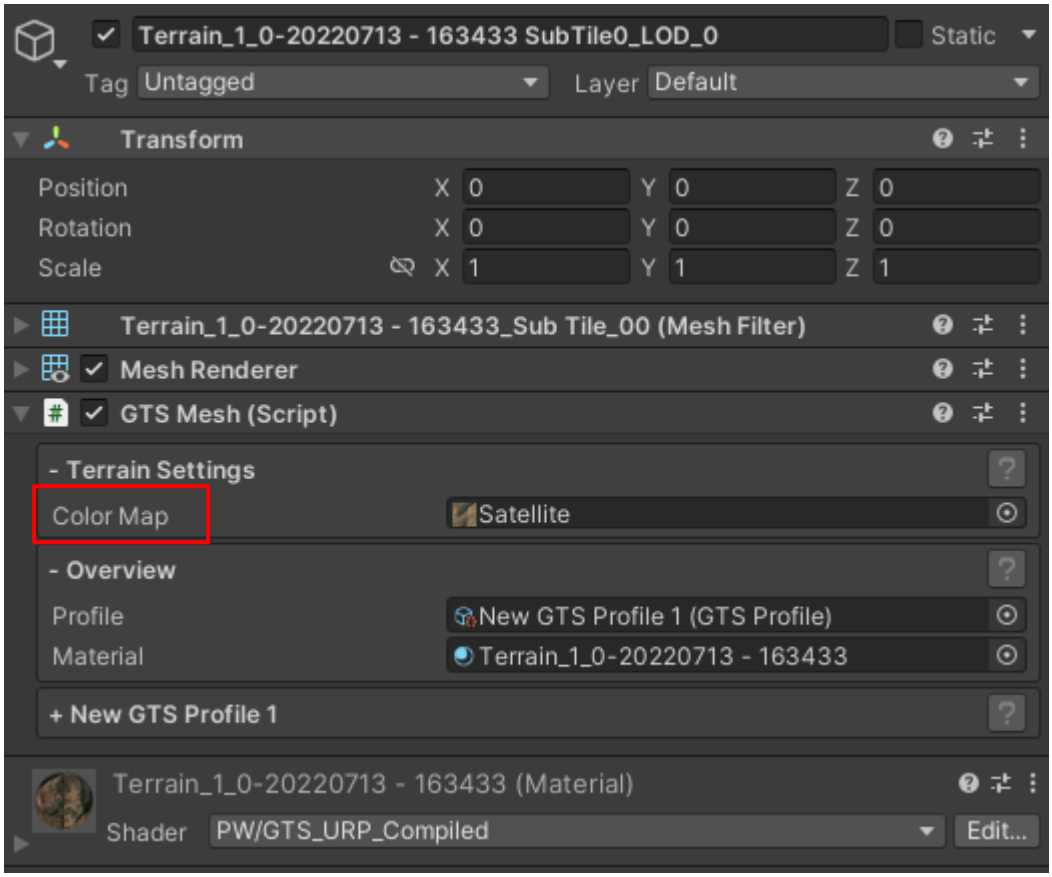
Colormap Settings

Enabling Colormap Settings will add a custom color texture to influence the terrain.

This can be used for adding terrain specific data into the final color of the shader, such as using a satellite image to blend in with the terrain from a far away distance.

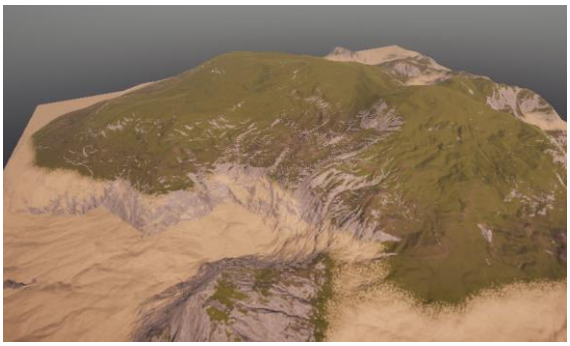
For Unity terrains, the input for the Colormap texture can be found in the GTSTerrain component. For generated mesh terrains, the input for the Colormap texture can be found in the GTSMesh component. The terrain will update this texture if the profile is expanded.



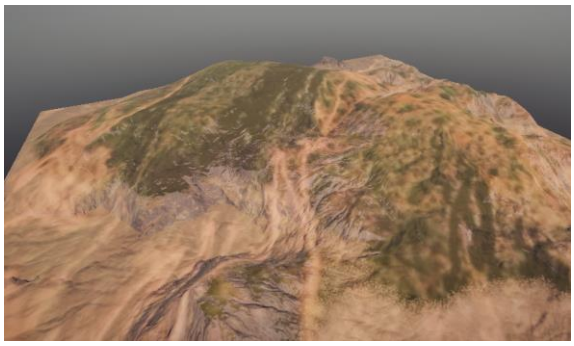


The alpha intensity controls the blend between the terrain layers and the alpha map contained within the colormap image provided. The color intensity can brighten / darken this colormap to fit the color of the terrain beneath.

The near and far color opacity allows control over the amount to blend the colormap in when close to and far from the terrain. For example, the colormap may have a lower Near Color Opacity to show more of the terrain layers colors when close to the terrain, but still have a Far Color Opacity closer to 1 so from a distance the terrain layers blend into the color map.



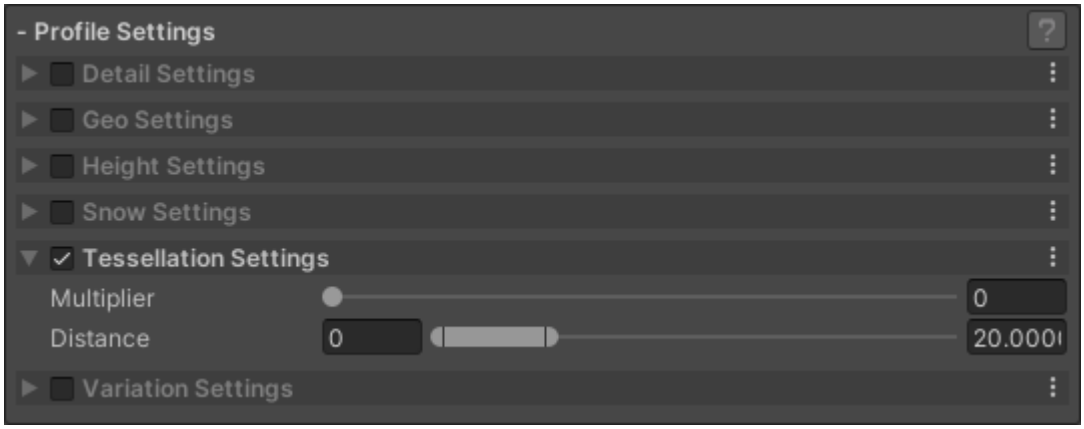
Colormap Settings OFF



Colormap Settings ON

Tessellation Settings (HDRP Only)

Enabling Tessellation Settings adds tessellation and displacement mapping on the terrains.



A multiplier can be used to increase the density of the tessellation across all terrain layers. The distance parameters can be used to control where tessellation starts and ends.

Tessellation Settings OFF

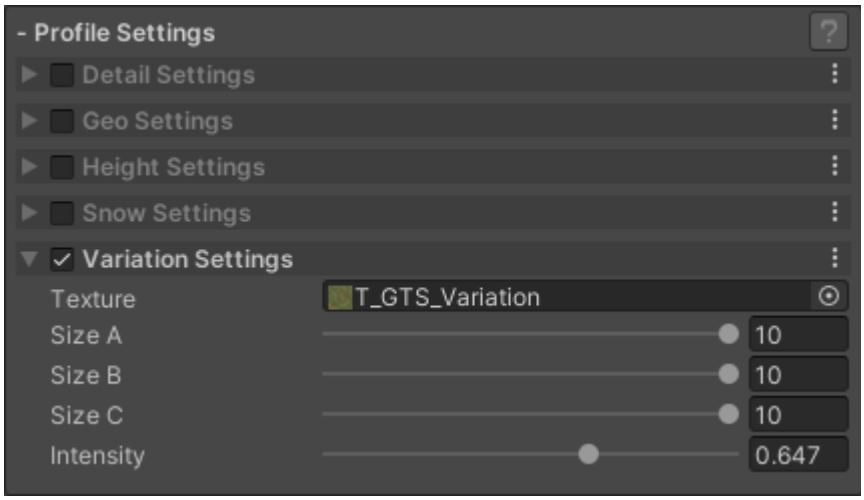
Tessellation Settings ON

The contrast and intensity of each layer's displacement, as well as each layer's tessellation amount, can be controlled in each GTS Layer. These settings will appear once Tessellation Settings have been enabled.

Note: Tessellation can be a costly operation to render. Higher densities and draw distances will significantly impact the performance of the scene.

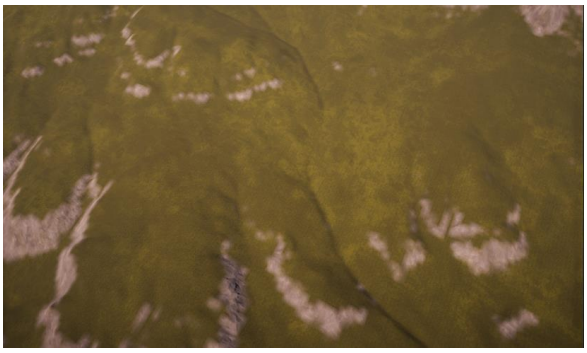
Variation Settings

Enabling Variation Settings adds an additional variation map over the terrain that tints the terrain slightly to hide noticeable tiling.



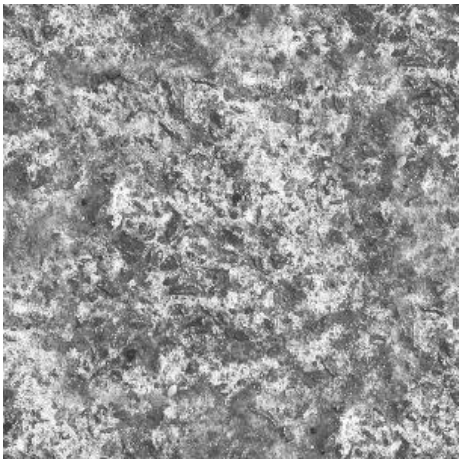
The scale of the same at 3 different sizes can be controlled, as well as the intensity of the tint effect.

Variation Settings OFF



Variation Settings ON

The variation texture currently only utilises the red channel of the provided texture. Variation works by slightly darkening areas on the terrain using 3 different scales of this texture. Having a variation with a lot of gradient and greyscale data from black to white will utilise this technique well. For example, the provided variation texture is a seamless greyscale concrete texture.



Variation texture's Red Channel

Trouble Shooting

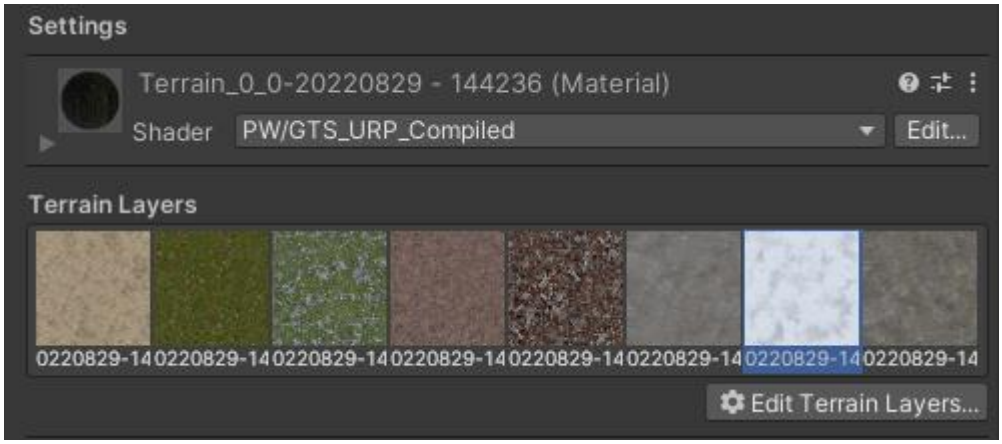
Multi Terrain Layer Mismatch

When converting a Unity Terrain into the format that GTS needs to render it, GTS creates texture arrays for each GTS profile. A texture array stores a list of all the terrain layers textures in a compact format for shader use. Each terrain layer texture is assigned a unique index number ranging from 0 to 7 (GTS currently supports only 8 terrain layers). This requires that the order of the terrain layers, across all terrain tiles, should be the same, as when a terrain layer is painted on the terrain, it is also painting that terrain layer's index in that area.

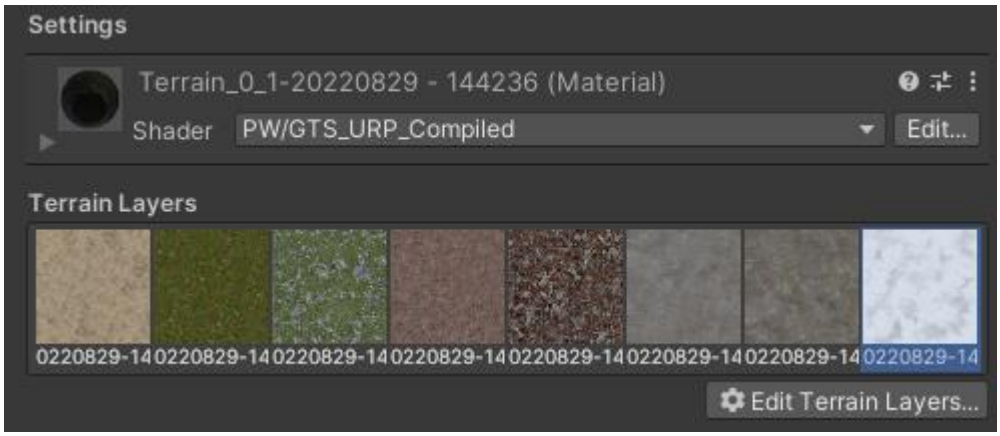
If your setup looks like this:

Where two converging terrain tiles seem to swap what terrain layer is being painted on, please ensure that the terrain layer order is the same on both terrain tiles.

Terrain A:

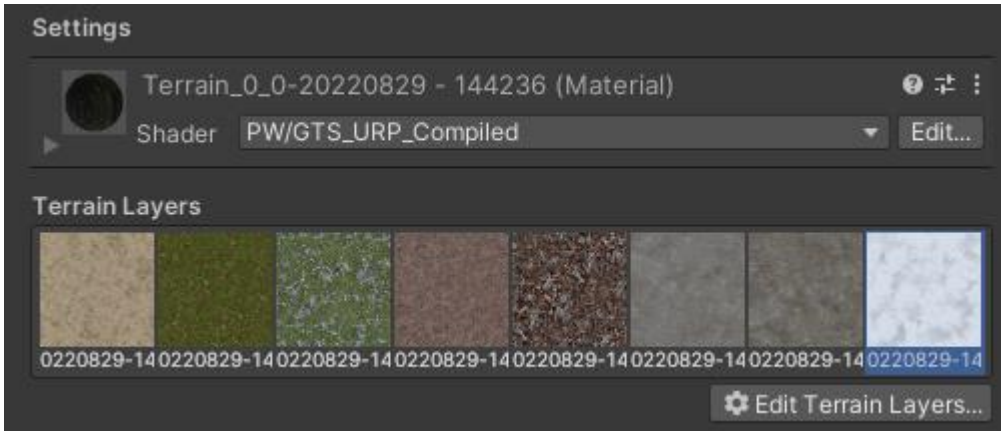


Terrain B:

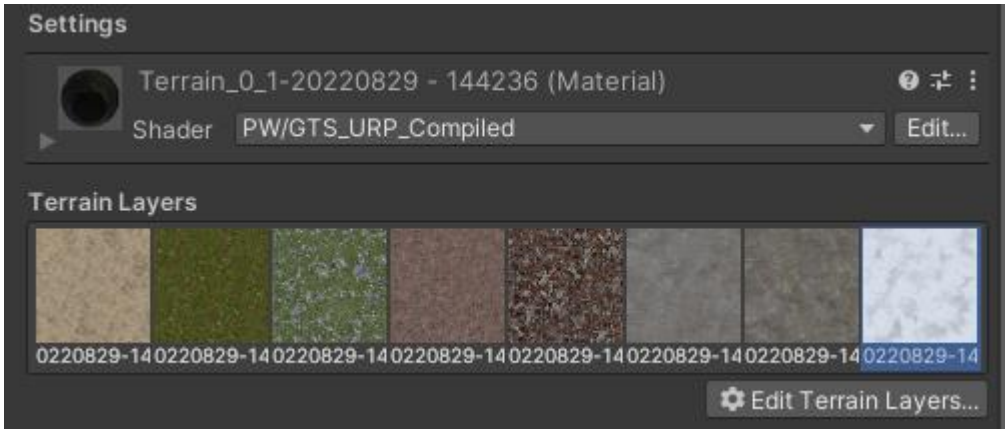


Take note of how the order of the snow layer in Terrain A comes before the mossy stone layer, but in Terrain B the snow layer comes after the mossy stone layer. Ensure that both of these terrains have the same order:

Terrain A:

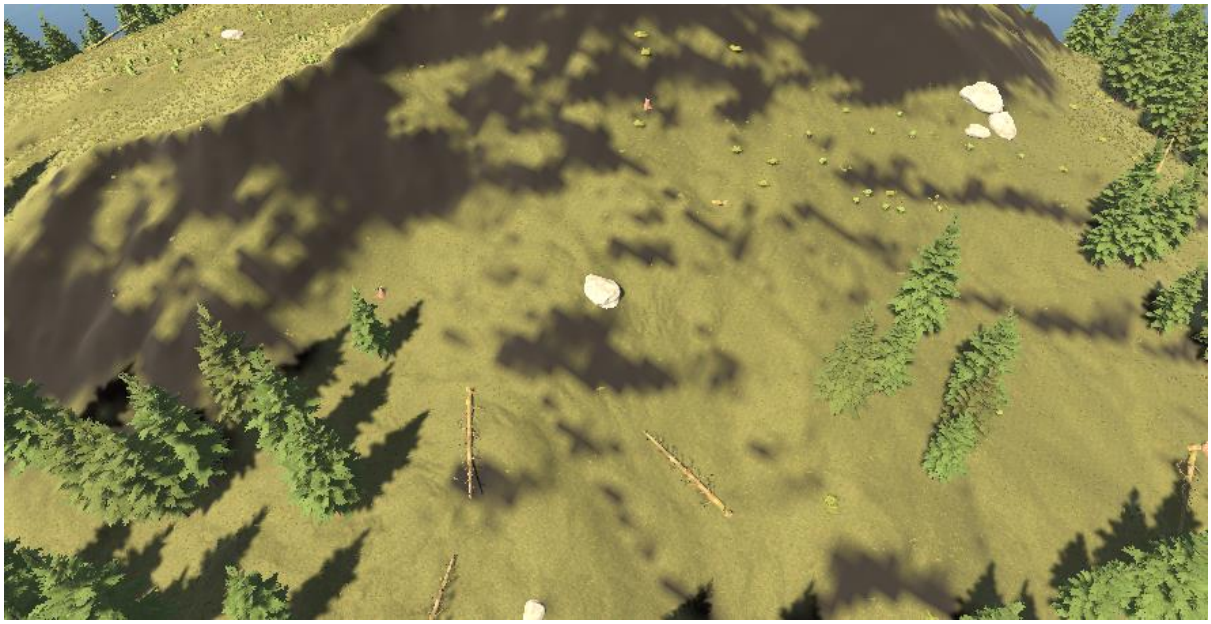


Terrain B:



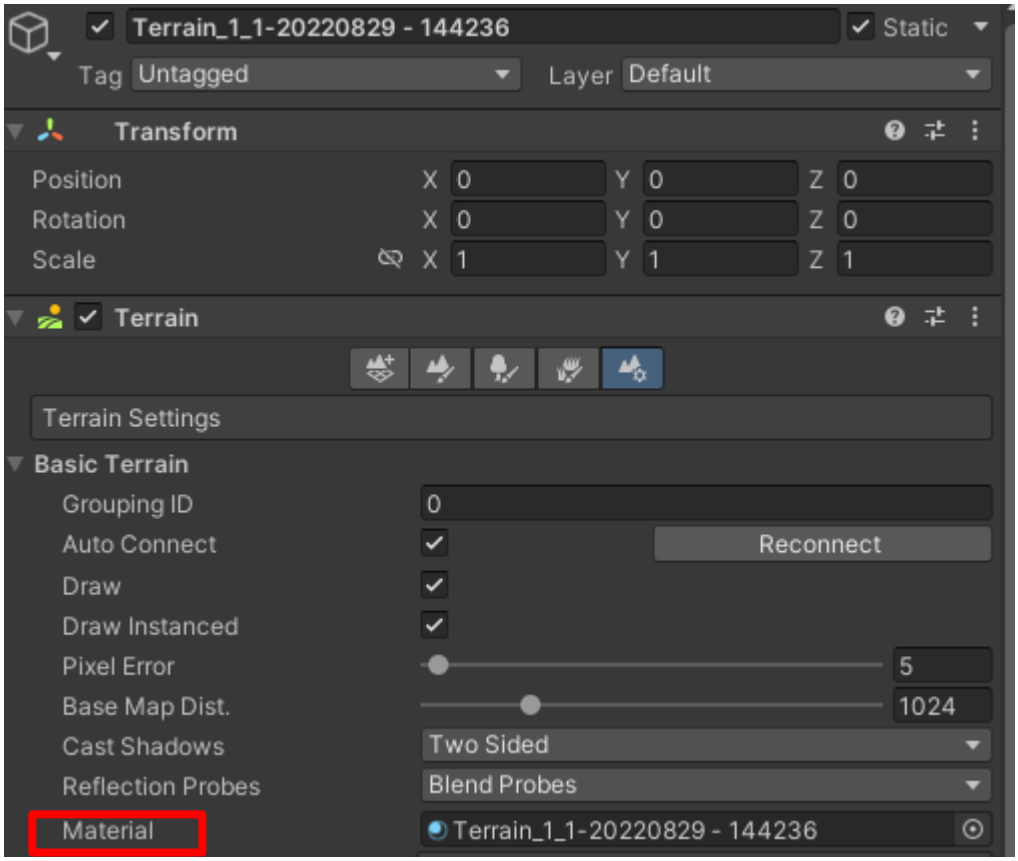
Fixed result after hitting 'Apply Profile' on the GTS manager:

GTS Terrain Turning Black After Save

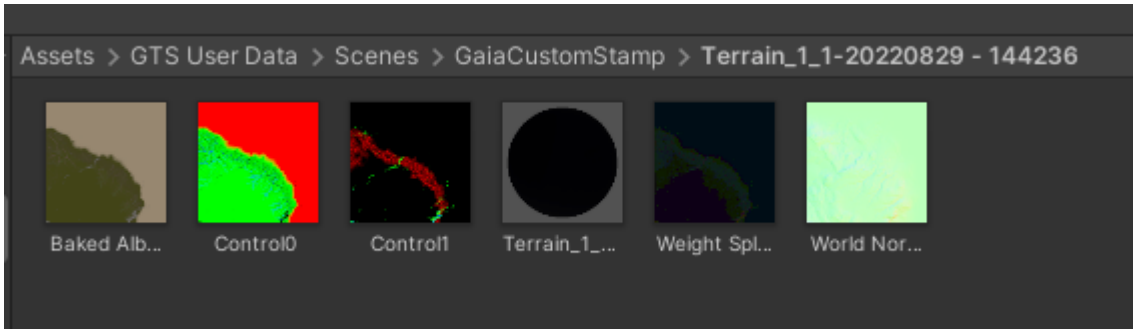


Previous versions (1.0.3 and lower) of GTS use an older save location system. Removing the previous data will ensure that the terrain data is generated in the right locations.

Locate the folder where the generated GTS material is saved to. This can be done by selecting the affected terrain, going into the settings, and selecting the material slot (when GTS is applied):



Selecting the material will show where it is saved in the project window:



The black terrain issue can stem from some of these textures missing, such as the Control0 and Control1 not being present in this folder.

All these files can safely be deleted.

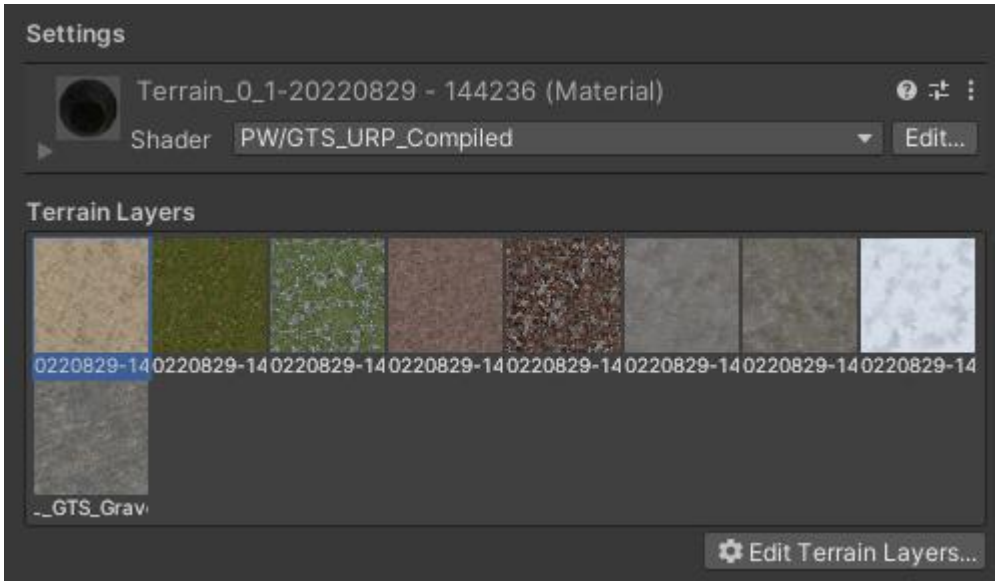
Once deleted, return to the GTS manager, and hit 'Apply Profile' again. Then save the project. The files should be regenerated.

Result after regeneration:

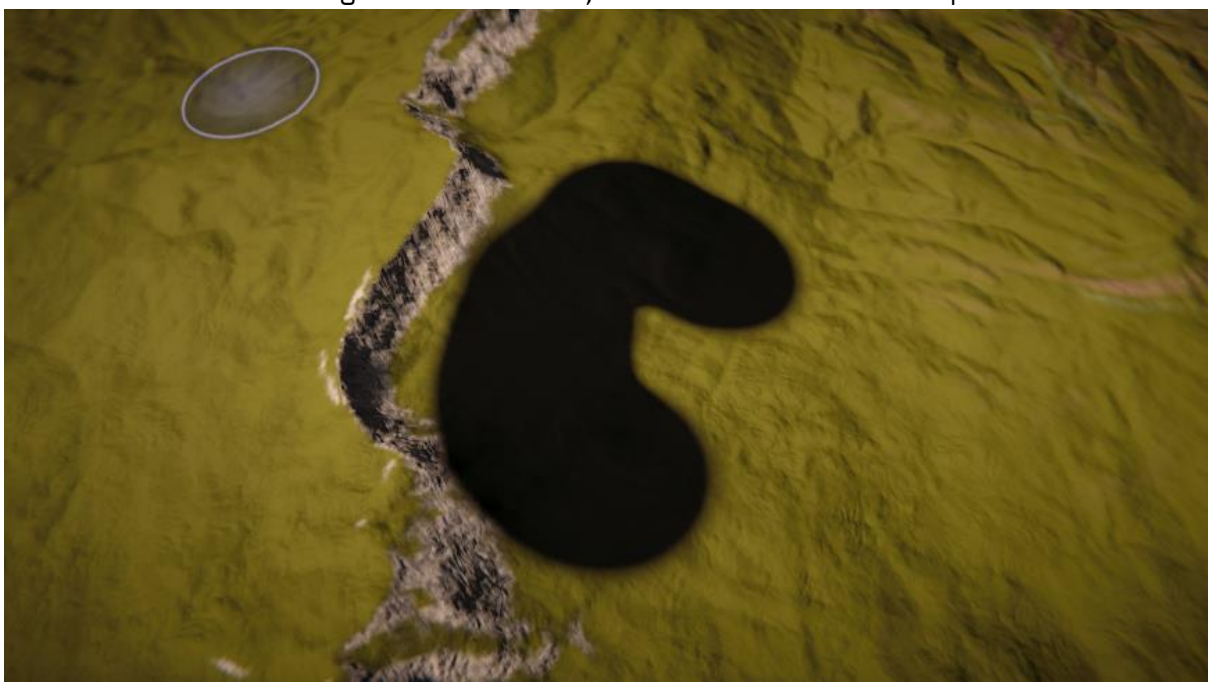
Unsupported Number of Terrain Layers

GTS only supports a maximum of 8 terrain layers across all terrains. Please ensure that each terrain tile has a maximum of 8 layers.

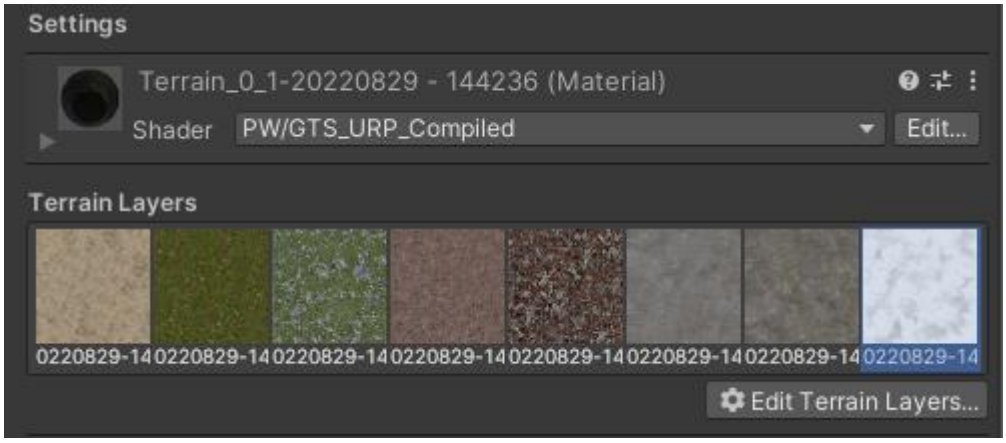
Terrain tile with more than 8 terrain layers:



This can result in black regions where the layer that exceeds the limit is painted:



Fixed result, with 8 or less terrain layers:



Issues with Addressables / Dynamic Loading

If your GTS scene is being loaded dynamically in a project, e.g. by using the Unity Addressable system or from asset bundles, you might see rendering issues on the terrain. This is because the initialization of the shader through the GTS component does not take place as it would normally. You can avoid this by using the GTS runtime settings system. Please see "Runtime Settings" in this manual for more.