InTerra

DOCUMENTATION (4.8.0)

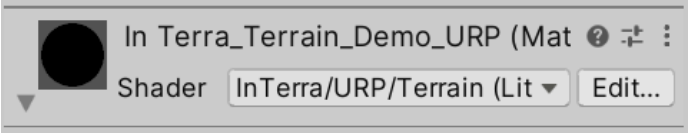
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1. TERRAIN SHADERS



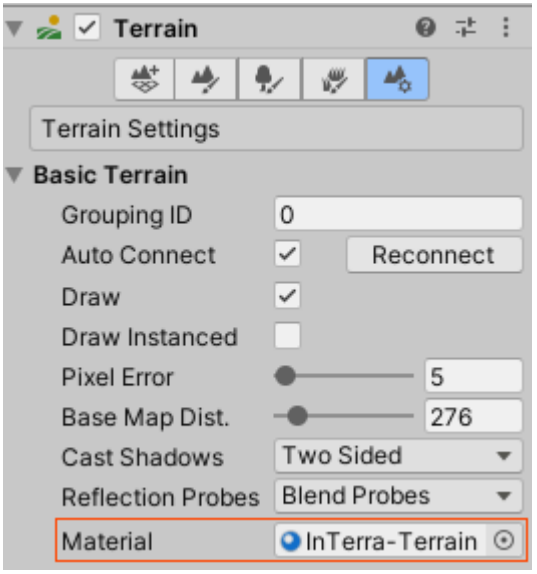
InTerra Terrain shaders can be found in following shader folders:

InTerra/Built-in/Terrain (Standard With Features)
InTerra/Built-in/Diffuse/Terrain (Diffuse With Features)

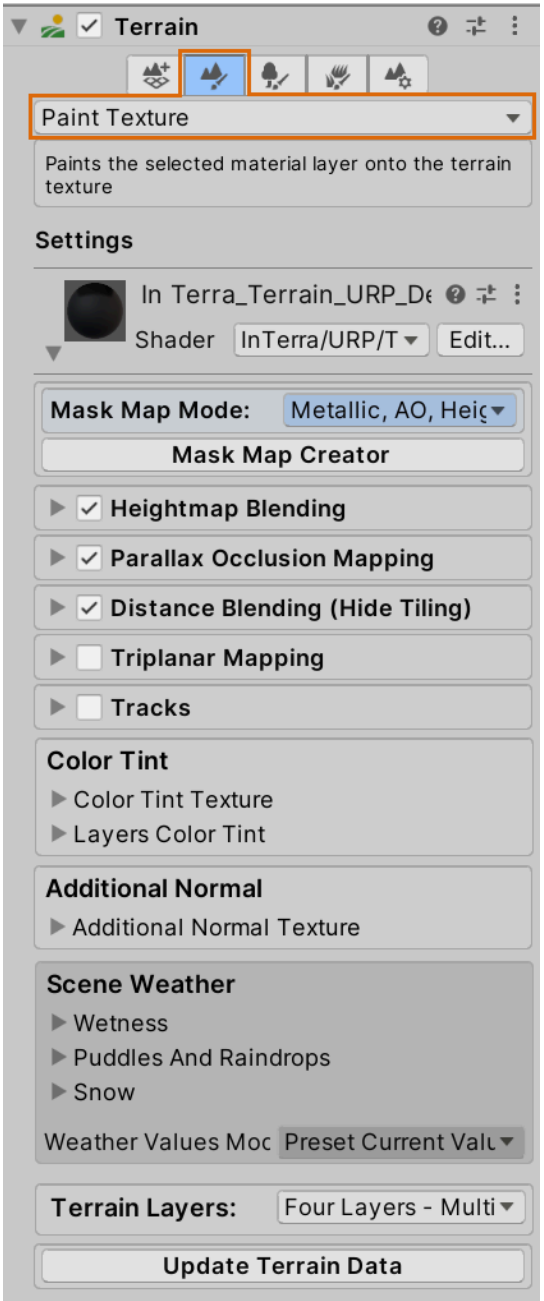
InTerra/URP/Terrain (Lit With Features)
InTerra/URP Tessellation/Terrain (Lit With Features)

InTerra/HDRP/Terrain (Lit With Features)
InTerra/HDRP Tessellation/Terrain (Lit With Features)

You can select the Material with InTerra shader in **Terrain settings**

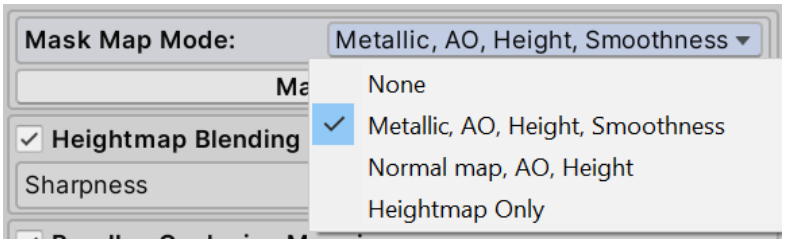


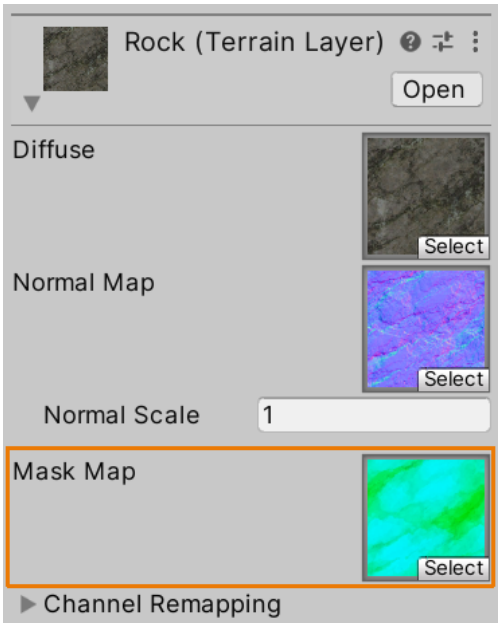
After selecting the Material, the settings for the Terrain shader is in **Paint Terrain** under **Paint Texture** selection.



1.1 MASK MAP MODE

This is the setting for **Mask Maps** of **Terrain Layers** and allows you to choose which texture maps will **Mask Map** contain.





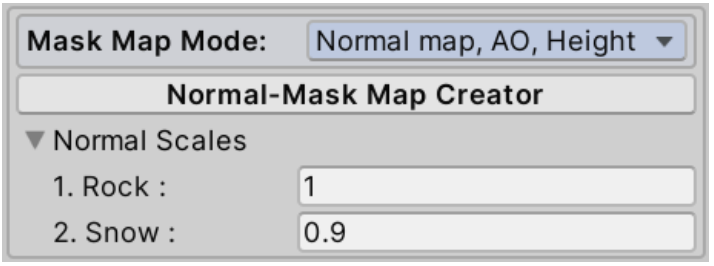
You can easily create the **Mask Map** with the Mask Map Creator accessible via the button below the enum, the button will open the creator for the selected option.

1.1.1 Metallic, AO, Height, Smoothness

This option for **Mask Map** is the same as it is for the default Unity Terrain shader in **URP** and **HDRP**. The color channels of the **Mask map** for this option should include following texture maps:

Red - Metallic
Green - Ambient occlusion
Blue - Heightmap (sometimes referenced as Bump map. A displacement map can also be used.)
Alpha - Smoothness (or inverted Roughness texture)

1.1.2 Normal map, AO, Height



This option was designed as a possibility for improving performance, if you do not need the **Metallic** map for **Terrain Layers**, you can choose this option where **Normal maps** will be included in **Mask Maps** and therefore there will not be need to sample **Normal maps** separately in shader.
If you choose this option, the **Mask Map** color channels should include following texture maps:

Red - Ambient Occlusion
Green - Bitangent(Green channel from Normal map)
Blue - Heightmap (sometimes referenced as Bump map. Displacement map can also be used.)
Alpha - Tangent(Red channel from Normal map)
(Green and Alpha channels are chosen for normal channels because of providing better quality.)

Smoothness map can be added as an Alpha **channel** in **Diffuse(Albedo)** texture**.**

There is also an option to set **Normal Scales** because if the Normal map is not selected, the option of setting it in Layer settings is not available.

The **Mask map** Texture has to be set in **Import Settings**/**Texture Type** as **Default** and **sRGB(Color Texture)** has to be unchecked! It is also recommended to set the compression format of the texture to **High Quality** or even **None** to improve normals quality.

1.1.3 Heightmap Only

If this option is selected you can use just Heightmap (or Displacement) textures as Terrain Layers Mask maps.

1.2 HEIGHTMAP BLENDING

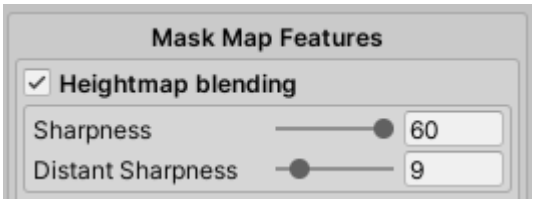
This feature provides the Terrain Layers blending based on heightmaps.

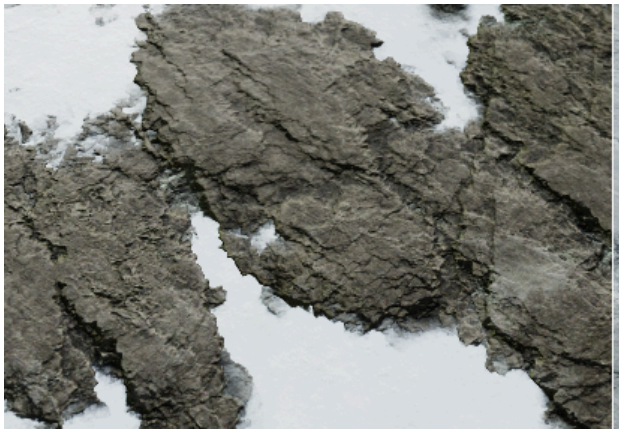
There is a need of Heightmap Textures to be included in **Terrain Layers Mask Maps** (for more info about **Mask Maps** see the **MASK MAP MODE**), just in case of using **Built-in Diffuse** shaders the Heightmap has to be in **Alpha channel** of **Diffuse(Albedo)** Texture.

Heightmap texture is sometimes also referred to as Bump map. **Displacement** texture can also be used.

This feature works only with the first Terrain shader pass, in default setting it is four Layers for **Built-in** and **URP,** eight for **HDRP**. For **Built-in** and **URP** there is a possibility to set Eight Layers pass (in Terrain Layers enum), but in that case you will be limited to Eight Layers in total (the same way as it is in **HDRP**).

Sharpness - Sharpness of the textures transitions.
Distant Sharpness - Sharpness of the textures transitions for the distant area setted in **Hide Tiling** - it is available only if **Hide Tiling** is set on.





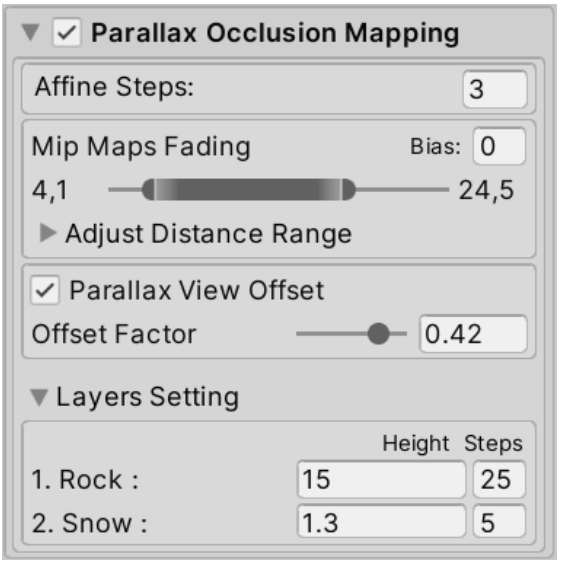
Heightmap blending ON



Heightmap blending OFF

1.3 PARALLAX OCCLUSION MAPPING

An illusion of 3D effect created by offsetting the textures depending on heightmaps.
The heightmap textures are taken from the **Blue channel** of the Terrain **Mask maps**



Affine Steps: Number of steps to affine the search - the higher number, the more smooth transition between steps will be, but also the higher number will increase performance heaviness.

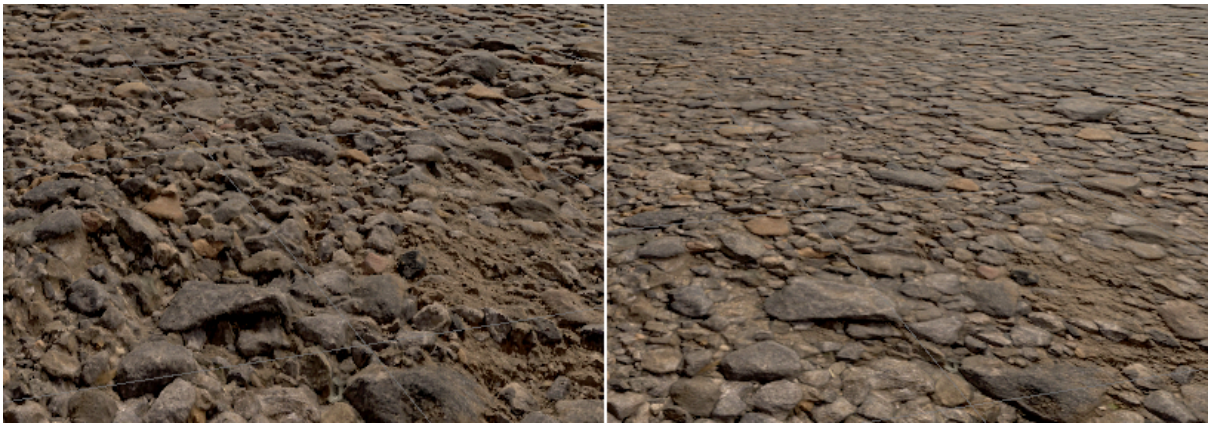
Mip Maps Fading - Mip maps levels fading. The fading will start at the distance of the min value of the slider and end at the max value of the slider.
Bias - Minimal Mip map level where the fading will start.
Adjust Distance range - Setting of minimum and maximum values for fading slider.

Parallax View Offset - Enable additional offset that can improve parallax occlusion from some view angles.
Offset Factor - Smaller factor will make the parallax more prominent, but it can increase artifacts/curvation in some non-flat areas, which can be reduced by setting the factor higher.

Layers Setting

Height : The value of the height illusion.
Steps: Each step is creating a new layer for offsetting. The more steps, the more precise the parallax effect will be, but also the higher number will increase performance heaviness.
If you set the **zero** the parallax effect will not be applied.

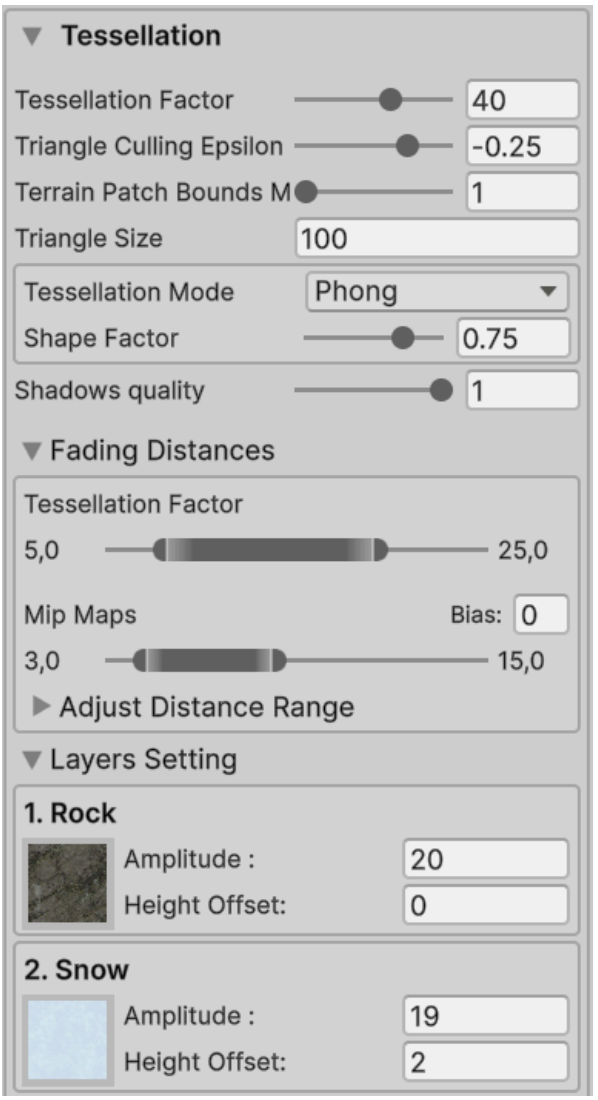
The **Parallax** effect will not be applied on **front** and **side** projection of **Triplanar Mapping** because of performance heaviness.



Parallax Occlusion Mapping ON **Parallax Occlusion Mapping OFF**

1.4 TESSELLATION

(Not available in Built-in)



Tessellation Factor - Controls the strength of the tessellation effect. Higher values result in more tessellation. Maximum tessellation factor is 15 on the Xbox One and PS4.

Triangle Culling Epsilon - Controls triangle culling. A value of -1.0 disables back face culling for tessellation, higher values produce more aggressive culling and better performance.

Terrain Patch Bounds Multiplier - Increasing bounds multiplication prevents Unity from culling Patches of Terrain too soon.

Triangle Size - Sets the desired screen space size of triangles (in pixels). Smaller values result in smaller triangles. Set to 0 to disable adaptative factor with screen space size.

Tessellation Mode - Specifies the method HDRP uses to tessellate the mesh. None uses only the Displacement Map to tessellate the mesh. Phong tessellation applies additional Phong tessellation interpolation for smoother mesh.

Shape Factor - Controls the strength of Phong tessellation shape (lerp factor).

Fading Distances - Sliders for setting the **Tessellation Factor** fading and **Mip maps** levels fading. The fading will start at the distance of the minimum value of the slider and end at the maximum value of the slider.

Bias - Minimal Mip map level where the fading will start.

Adjust Distance range - Setting of minimum and maximum values for both distance sliders.

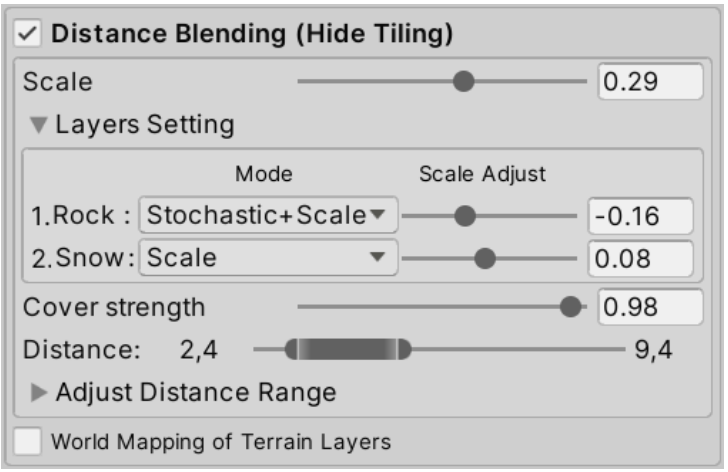
Layers Setting

Amplitude - Amplitude of the Height Map (Blue channel in **Mask Map**).
Height Offset - Height offset for Layer displacement.

1.5 DISTANCE BLENDING (HIDE TILING/TEXTURE REPETITION)

This feature helps to hide texture repetition by covering the texture by its scaled up version and/or with stochastic texturing in the given distance from the camera. The setting should be done from the player perspective.

Scale - This value is multiplying the size of the Textures tilling in the distant area.



Layers Setting

Mode:
- **Scale** - Layer textures will be scaled up.
- **Stochastic + Scale** - Layer textures will be scaled up and stochastic texturing will be applied.
- **Non-Scaled Stochastic** - Only stochastic texturing will be applied.
- **Disable -** Distance Blending will not be applied at all.

Adjust Layers Scales - This setting allows you to adjust scales of each Layer individually.

Cover strength - Strength of covering the Terrain textures in the distant area.

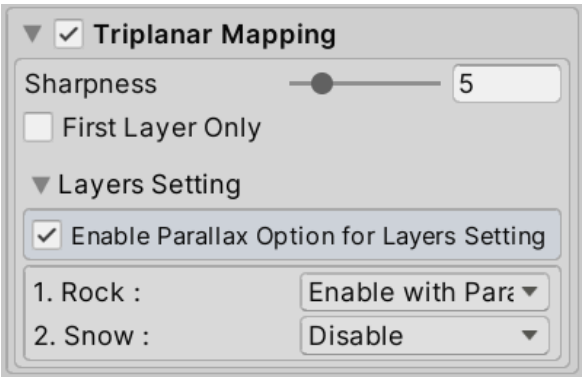
Distance - The distance where the covering will start and end.
Adjust Distance range - Setting of minimum and maximum values for Distance slider.

World Mapping Of Terrain Layers - This option is useful if you have multiple Terrains connected to prevent possible seams at Terrain edges, the tilling of terrain Layers will not rely on Terrains UVs but world position.



Hide Tiling ON **Hide Tiling OFF**

1.6 TRIPLANAR MAPPING (STEEP SLOPES TEXTURING)



This feature is for steep slopes texturing - the textures will not be stretched. This option has a bigger performance impact because all Terrain textures have to be sampled three times - Top, Front and Side.

Sharpness - This value adjusts the sharpness of blending between Top, Front and Side texturing.

Layers Setting

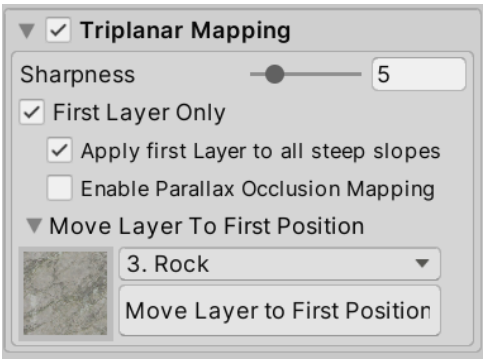
Enable Parallax Option for Layers Setting - Global setting for adding **Parallax Occlusion Mapping** option for Terrain Layers setting.

- **Enable** - Enable Triplanar Mapping for the Terrain Layer.
- **Enable With Parallax** - Enable Parallax for Triplanar Mapping for the Terrain Layer.
- **Disable**- Disable Triplanar Mapping for the Terrain Layer.

Note: Triplanar features will be applied on **Terrain Base map** only if you do not have more than one pass and you are using **"First Layer Only"** - otherwise the calculation would be too heavy and the Base map would become pointless.



Triplanar Mapping ON **Triplanar Mapping OFF**



1.6.1 First Layer Only

This option is for performance reasons and if checked only first Layer will be sampled as triplanar.

1.6.2 Apply First Layer to all steep slopes

All the steep slopes will be automatically textured with the first Layer.

1.6.3 Enable Parallax Occlusion Mapping

Enable Parallax Occlusion Mapping to be calculated for the triplanar mapping of the first Terrain Layer.

1.6.4 Move Layer to First position

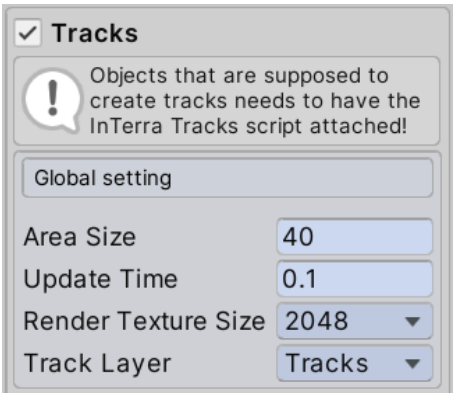
Here you can easily move the Terrain Layer to the first position - just select the Layer and press “Move Layer to First Position”.

1.7 TRACKS

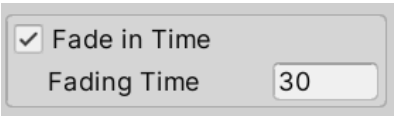
This feature will enable the tracks on Terrain. Tracks can be created by Objects that have assigned the script **InTerra Tracks**.

Global setting:

Area Size - Size of area around the camera where Tracks will be visible.
Update Time - Time interval in seconds for updating the Tracks.
Render Texture Size - Size of the Render Texture for capturing the tracks.
Track Layer - Layer for rendering tracks, it is needed for this Layer to be exclusively used just for this feature.

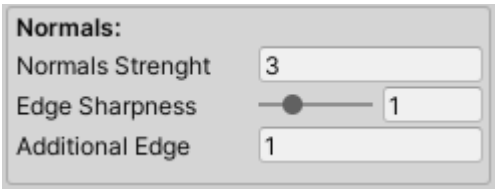


Fade in Time - Enable Tracks to disappear in a given time.
Fading Time - Time in seconds for tracks to completely disappear.
Time setting is applied to the whole scene and you can set it via script by




```
InTerra.InTerra_Data.SetTracksFadingTime(float time);
InTerra.InTerra_Data.SetTracksFading(bool enable);
```

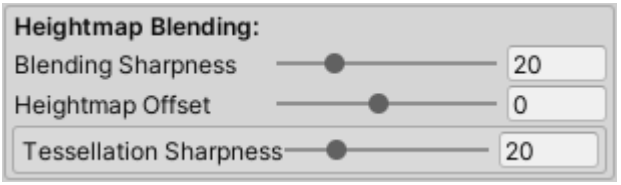
Normals:
Normals Strength - Strength of normals calculated from tracks heightmap.
Edge Sharpness - Sharpness of the edge of the tracks.
Additional Edge - Strength of normals for additional edge around tracks.



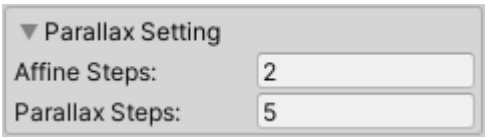
Ambient Occlusion - Ambient Occlusion for tracks.



Heightmap Blending:
Blending Sharpness - Sharpness of heightmap blending transition.
Heightmap Offset - Offset for tracks heightmap.
Tessellation Sharpness **(HDRP only)** - Sharpness of heightmap blending for tessellation of track.



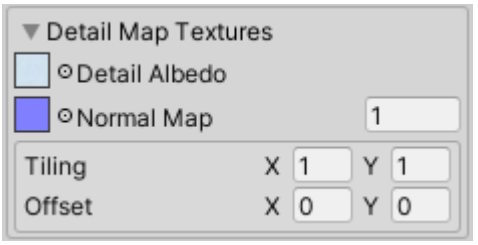
Parallax Setting (Available only when Parallax feature is enabled)



Affine Steps: Number of steps to affine the search - the higher number, the more smooth transition between steps will be, but also the higher number will increase performance heaviness.

Parallax Steps: Each step is creating a new layer for offsetting. The more steps, the more precise the parallax effect will be, but also the higher number will increase performance heaviness

Detail Map Textures

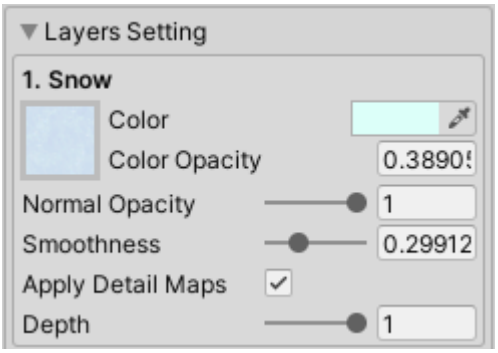


Detail albedo - Detail color texture that can be applied to tracks.

Normal map - Detail normal texture that can be applied to tracks.

Tiling and Offset for Detail textures.

Layers Setting



Color Color - Color tint for the tracks.

Color Opacity - Opacity strength of the track color

Normal Opacity - Opacity strength for normals of the tracks.

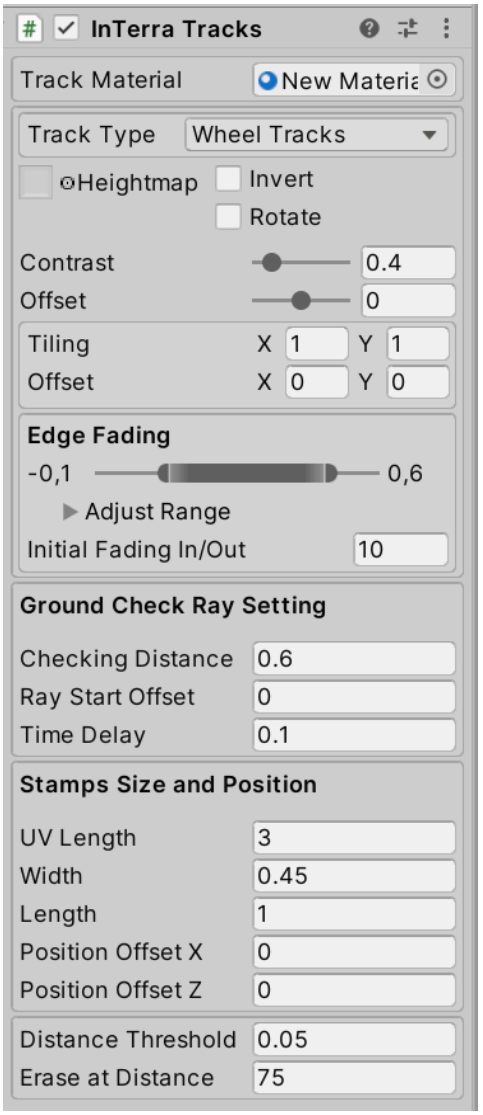
Smoothness - Smoothness strength of the tracks.

Apply Detail Maps - If checked detail maps will be applied for tracks.

Depth Parallax or tessellation depth of the tracks.

1.7.1 InTerra Tracks Script

This script is creating track stamps meshes under Terrain in the Tracks Layer. The stamps are then projected into Terrain and draws the Tracks.



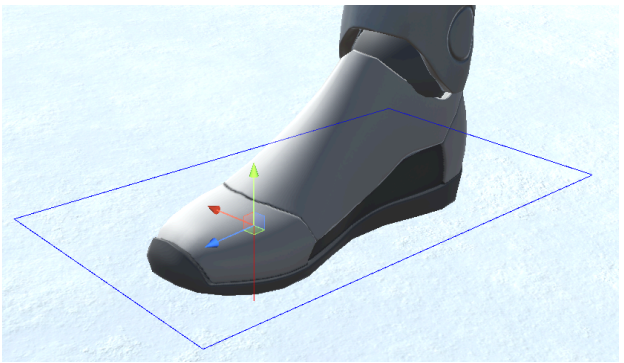
Track Material - This material will be applied on the tracks stamps and need to have the Track Material shader attached.
Track Type - Define the way the tracks stamps will be created.
• **Default** - Universal usage without heightmap.
• **Footprints** - Allows you to add heightmap of footprint
• **Wheel Tracks** - Allows you to add heightmap of wheel track, the tracks are correctly drawn only if the wheel is rotating around x axis.

Heightmap - Heightmap of track or footprint.
Invert - Inverting Heightmap texture.
Rotate - Heightmap is rotated 90° counterclockwise.
Contrast - Contrast of Heightmap.
Offset - Offset of Heightmap.
Tiling and Offset for Heightmap .
Edge Fading - Setting of where the fading of track edges starts and ends.
Initial Fading In/Out - The length of fading in and out of the initial track stamp. (Available only for Wheel Tracks.)

Ground Check Ray Setting
Checking Distance - The length of checking ray.
Ray Start Offset - Offset of start position of checking ray.
Time Delay - The ray has to be detecting ground for this amount of time (in seconds) for the object to be considered grounded.

The checking ray can be seen in editor drawn with red color and Stamp size with blue if gizmos are enabled.

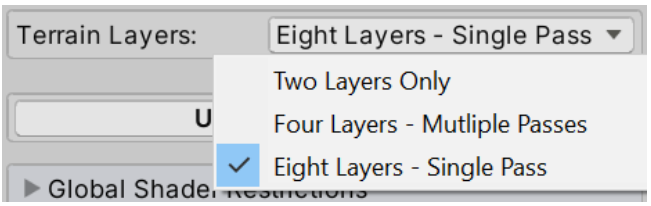
Stamps Size and Position
UV Length - Available only for Wheel Tracks and helps to adjust UV tiling of the X axis of Heightmap.
Width - Width of stamps.
Length - Length of stamps.



Position Offset X - Position offset on X axis.
Position Offset Z - Position offset on Y axis.

Distance Threshold - The stamps for drawing track will be created only if the object reaches this distance.
Erase at Distance - Threshold distance after which the track's stamps will be erased.

1.8 TERRAIN LAYERS



In this enum you can select the number of Terrain Layers / Shader Passes.
Option “Four Layers - Multiple Passes” is the same as for the default Unity shader in Layer in **Built-in** and **URP** and you can have multiple passes with four layers, but Heightmap Blending feature is available only to first pass. This option is not available in **HDRP**.
In **HDRP** there is an option for Sixteen Layers single pass, but for this option it is needed that all the Diffuse textures of Terrain Layers to be the same size and format, the same thing is also needed for Normal maps Textures.

1.9 NORMAL MAPS IN DEPTH PASS (URP SSAO Forward Rendering Path)

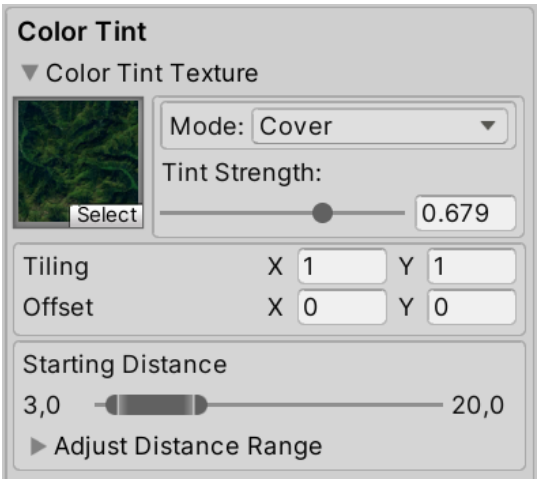


This option is for **URP Terrain Shader** only. You can enable the Normal Maps to be sampled in terrain shader Depth Pass, it will affect performance a bit.
You can see the effect only if the **Screen Space Ambient Occlusion** is enabled and you are using **Forward Rendering Path**.

1.10 COLOR TINT

1.10.1 Color Tint Texture

The Texture that will cover the whole Terrain and will affect the color tint.



Mode:
- **Multiply** - Color tint texture will be multiplying the color values of Terrain Layers.
- **Cover** - Color tint texture will be covering/replacing the color values of Terrain Layers.

Tint Strength: Value of how strong the tint will be.

Tiling and Offset for color tint texture.

Starting Distance: Distance where the Color Tint Texture will start applying.

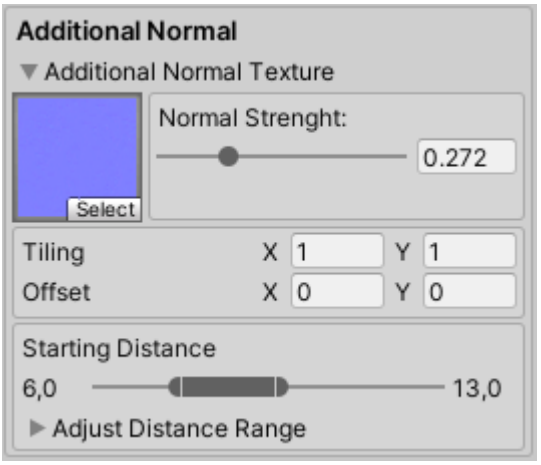
1.10.2 Layers Color Tint

Adjustment of the color tint for Terrain Layers.



1.11 ADDITIONAL NORMAL

Additional normal texture will cover the whole Terrain and will affect the normals.



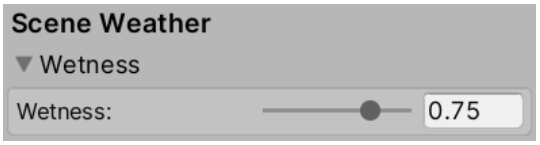
Normal Strength: Value of how strongly the normal will be applied.

Tiling and Offset for additional normal texture

Starting Distance: Distance where the additional normal texture will start showing.

1.12 SCENE WEATHER

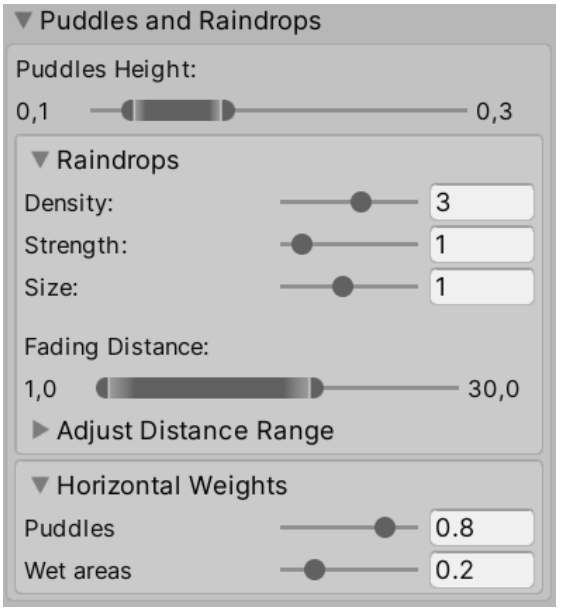
1.12.1 Wetness



In this section you can adjust the strength of applied wetness. If you want to set the wetness via script, use following code:

```
Shader.SetGlobalFloat("_InTerra_GlobalWetness", float Wetness value from zero to one);
```

1.12.2 Puddles And Raindrops



Puddles Height: This min-max slider will affect puddles height (min value) and the height of the wetness around the puddle (max value).

Raindrops

Density: A full number value from zero to five that indicates the density of raindrops ripples
Strength: Strength of raindrops ripples effect.
Size: Size of raindrops ripples.
Fading Distance: Raindrops fading will start at the distance of the min value of the slider and end at the max value of the slider.
Adjust Distance Range - Setting minimum and maximum values for Fading Distance slider.

Horizontal Weights

Horizontal weights indicate how strictly the horizontal areas where the puddles will be created are calculated, the higher the number is the stricter the calculation is.
Puddles - Weight for calculating puddles.
Wet areas - Weight for calculating wet areas where could be a puddles if the surface would be horizontal, but because of slope it is just wet without collected water.

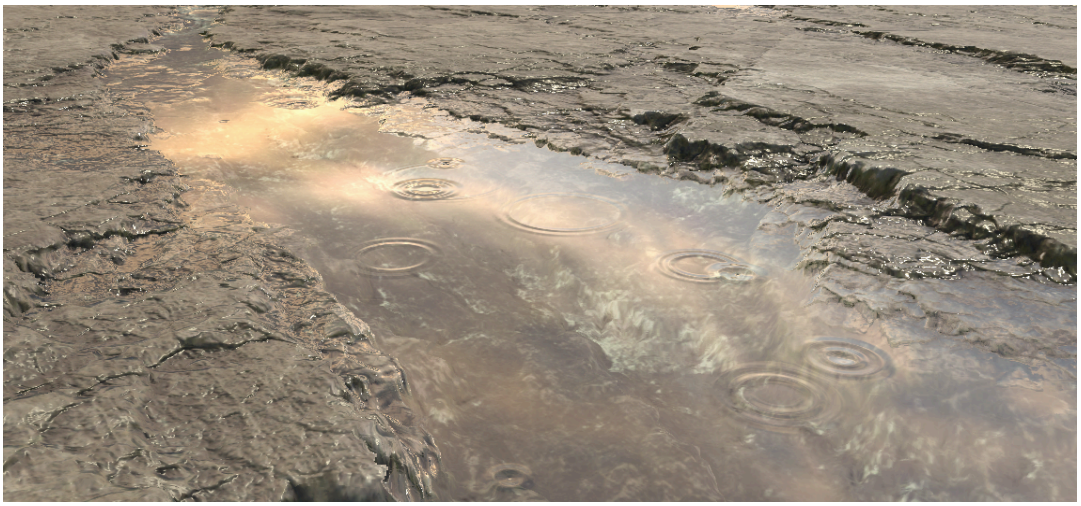
For setting puddles values via code use:

Puddles Height:

```
Shader.SetGlobalVector("_InTerra_GlobalPuddles", Vector2 Min-max values of puddles height);
```

Raindrops:

```
Shader.SetGlobalVector("_InTerra_GlobalRaindropRipples", Vector3(Density, Strength, Size));
```



1.12.3 Snow

In this section you can set the amount of snow cover.



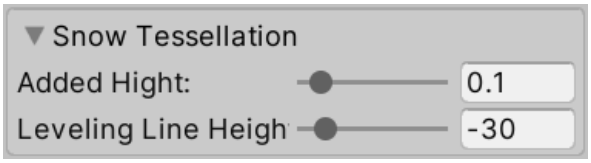
Snow Layer: Selection of Terrain Layer that will be applied as snow and the setting of the color tint of the snow Layer.

Snow Cover: Amount of snow cover.

For setting value via code use:

```
Shader.SetGlobalFloat("_InTerra_GlobalSnow", float Snow Cover Value);
```

Snow Tessellation



Added Height: Height of snow that will be added to underlying Layer heightmap.

Leveling Line Height: Height at which the snow will be leveled, it is recommended to start increasing it after you have a full snow cover.

For setting the tessellation values via code use :

```
Shader.SetGlobalFloat("_InTerra_GlobalSnowTessellationAddHight", float Added Height);
Shader.SetGlobalFloat("_InTerra_GlobalSnowTessellationLeveling", float Leveling Line Heigh);
```

Snow Area Restrictions



Height: This min-max slider limits the geological height of the snow, the snow cover will start to increase at the min part of the slider and will be fully applied at the height of the max value of the slider and above. If you want the snow to be applied with the same intensity across all terrain heights, set the both min and max values to be below terrain lowest position.

Steepness transition: Sharpness of transition between horizontal and steep areas.

For setting restriction values via code use :

```
Shader.SetGlobalVector("_InTerra_GlobalSnowHeight",Vector2 Min-max values of Height);
Shader.SetGlobalFloat("_InTerra_GlobalSnowSteepness", float Steepness Transition value);
```

Snow Phase

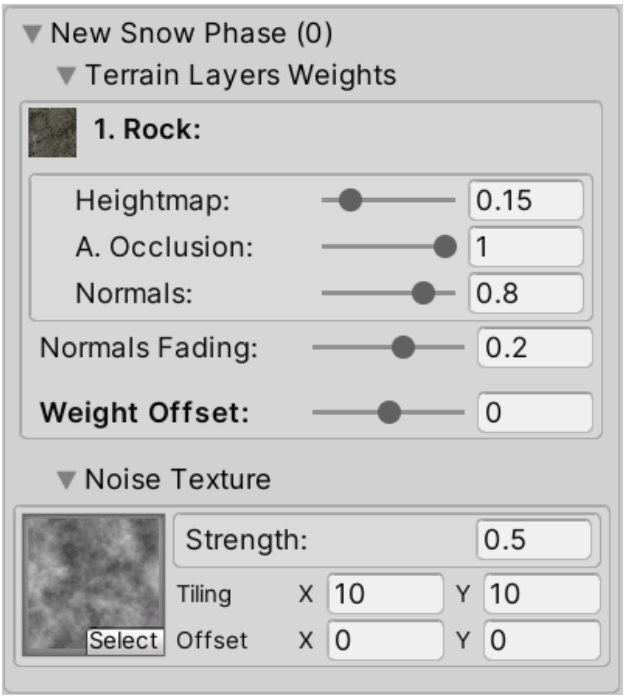


Snow Phase setting is specifically for the blending of Snow Layer and Terrain Layers ranging from **zero** that indicate new/fresh snow to **one** which indicates the thawing snow.

For setting snow phase value via code use :

```
Shader.SetGlobalFloat("_InTerra_GlobalSnowPhase", float Snow Phase value);
```

New Snow Phase (0) In this section you can set values for the new snow blending. When the Snow Phase is set to **zero** the Snow Layer will be applied at the highest points of the underlying Terrain Layers.



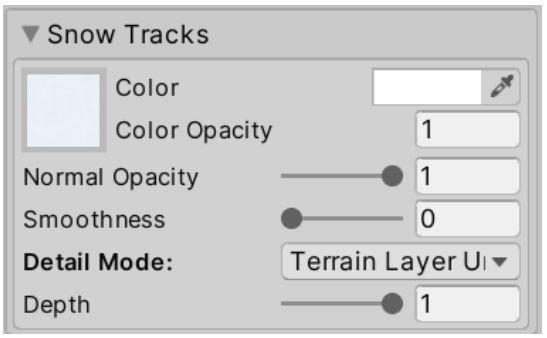
Thawing Snow Phase (1) In this section you can set values for the thawing snow blending. When the Snow Phase is set to **one** the Snow Layer will be applied from the lowest points of the underlying Terrain Layers.

Terrain Layers Weight
Heightmap: Weight of Heightmap for snow blending.
A.Occlusion: Weight of Ambient Occlusion map for snow blending.
Normals: Weight of Normal map for snow blending.

Normals fading: Offset at which normals of underlying Terrain Layers start to fade. If the value is **-1** the normals of underlying Terrain Layer will not be seen at all. If the value is **1** the normals of underlying Terrain Layer will always be fully present.
Weight Offset: Overall offset for blending the Snow Layer with the Terrain Layer.

Noise Texture
Noise texture will determine where the snow appears first (lighter color) and last (darker colors).
Strength: Value of how strongly the noise texture will be applied.
Tiling and Offset for the Noise Texture.

Snow Tracks
Color Color - Color tint for the tracks on Snow Layer.
Color Opacity - Opacity strength of the track color.
Normal Opacity - Opacity strength for normals of the tracks on Snow.
Smoothness - Smoothness strength of the tracks on Snow.



Detail Mode:
• **Terrain Layer Underneath:** Values of Terrain Layer underneath the snow will be applied as the detail maps.
• **Terrain Layer Underneath with its Track:** Values of Terrain Layer underneath the snow together with its values setted in Tracks setting of the Terrain Layer will be applied as the detail maps.
• **Tracks Detail Maps:** Tracks Detail maps will be applied to Snow Layer the same way as for other Terrain Layers.
• **None:** No Detail map will be applied.

Depth Parallax depth for the Snow Layer. (Available only when using **Parallax Occlusion Mapping**).

1.12.4 Weather Values Mode

Setting for Weather values loading mode.



Preset Current Values at Scene Load: Current values that are set in the editor will be applied at scene load.
Preset Default Values at Scene Load: Default values will be set at scene load.

1.12 UPDATE FOR INTEGRATED OBJECTS

By pressing **"Update Terrain Data"** all Materials using **Object into Terrain Integration** shader will recheck on which Terrain are placed and take the actualised data from that Terrain.



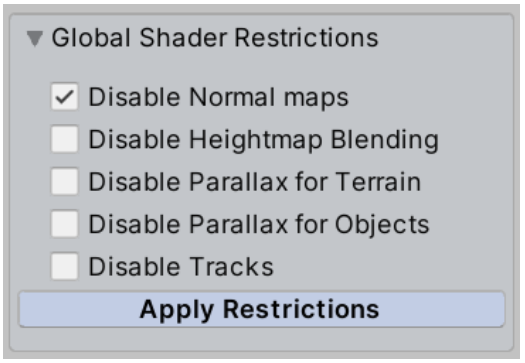
The update for Objects also happen automatically at various events, for example when the Terrain Heightmap is discarded because it is the Render Texture, or if you do some changes in Object or Terrain GUI, but if you want to specify it more closely, you can do it in the file In**Terra_Setting** in ***Script*** folder.

There are three variables:

DisableAllAutoUpdates - This will cause that there will be no auto updates at all.
DictionaryUpdate - When false the auto update will be sending the Terrains data only to Materials that are included in the dictionary. Dictionary update requires check on all renderers and will be updated only via click on the **Update Terrain Data** in Terrain or Object GUI.
ObjectGUICheckAndUpdateAtOpen - At opening of GUI for Object shader there will be check if any render with this Material is on wrong Terrain or outside of Terrain, if this bool is false this check will be done only if you open the **Objects Info** foldout.

1.13 GLOBAL SHADER RESTRICTIONS

In this section you can globally disable features that are not used in the entire project - it will help to improve performance and reduce compilation time. Shader restrictions are available for the features that do not have Keywords defined as "shader feature" inside the shader.
This was done as a workaround to prevent too many shader variants and branching relies on shader properties instead, which in case you are not using the feature may more or less negatively influence the performance.



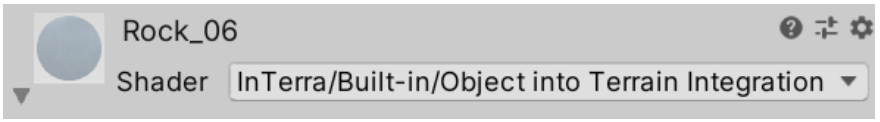
2. OBJECT SHADERS

The shaders for Objects can be found in:

InTerra/Built-in/Object into Terrain Integration
InTerra/Built-in/Diffuse/Object into Terrain Integration (Diffuse)

InTerra/URP/Object into Terrain Integration
InTerra/URP Tessellation/Object into Terrain Integration Tessellation

InTerra/HDRP/Object into Terrain Integration
InTerra/HDRP Tessellation/Object into Terrain Integration Tessellation



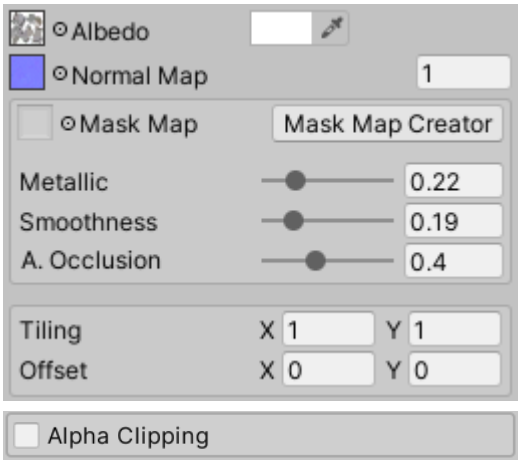
These shaders are providing various options for the visual integration of Objects into Terrain.



Object into Terrain Integration Shader **Unity Standard Shader**

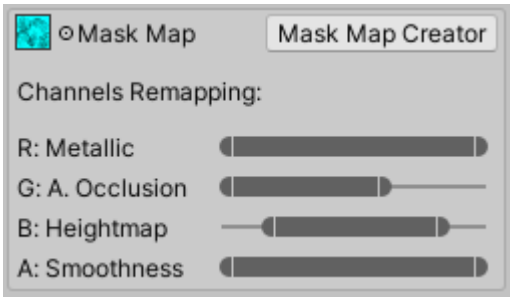
2.1 OBJECT TEXTURING

Albedo - Color (RGB) texture and the color tint
Normal map - Normal map texture and normal scale
Mask map (not available for diffuse shader) :
- **Red channel** - Metallic
- **Green channel** - Ambient Occlusion
- **Blue channel** - Heightmap or Displacement
- **Alpha channel -** Smoothness (or inverted Roughness)



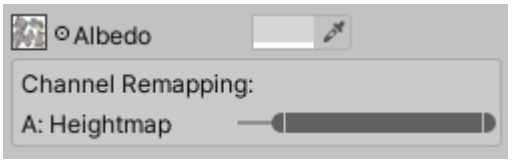
Mask map Creator button open window where you can quickly create the mask map.
Tiling and Offset for the main textures

Alpha Clipping: If enabled the transparent part of albedo texture will be cut off. (Available only in **URP** and **HDRP**)



If Mask Map texture is not selected, you can set Metallic, Smoothness and Ambient Occlusion with a value otherwise you can use Channels Remapping for adjusting the values.

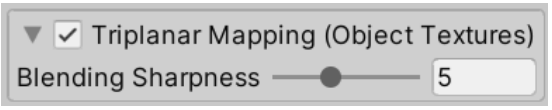
Diffuse shader
For Diffuse shader the mask map is not available, but if Albedo texture has an alpha channel, the alpha channel will be used as a heightmap and there will be remapping for the heightmap.



Triplanar Mapping (Object Textures)

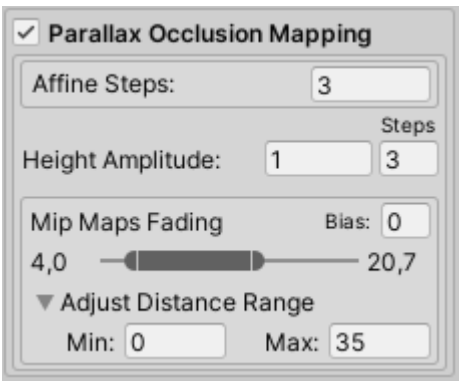
This feature is applying the Object textures via triplanar mapping.

Blending Sharpness: The sharpness of blending between Top, Front and Side texturing.



Parallax Occlusion Mapping

(not available for diffuse shader)

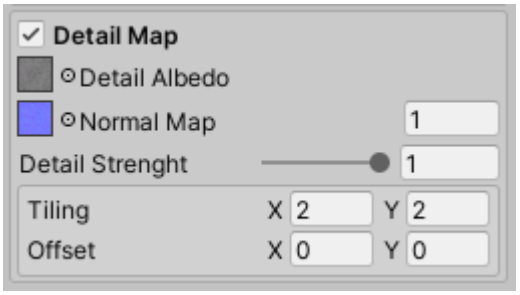


An illusion of 3D effect created by offsetting the texture depending on heightmap.
Affine Steps: Number of steps to affine the search - the higher number, the more smooth transition between steps will be, but also the higher number will increase performance heaviness.
Height Amplitude: The value of the height illusion.
Steps: Each step is creating a new layer for offsetting. The more steps, the more precise the parallax effect will be, but also the higher number will increase performance heaviness.

Note: ***Mip Maps Fading*** *setting is taken from the Terrain setting if the Terrain has* ***Parallax Occlusion Mapping*** *enabled, in which case it is not available in Object setting.*

Mip Maps Fading - Mip maps levels fading. The fading will start at the distance of the minimum value of the slider and end at the maximum value of the slider.
Bias - Minimal Mip map level where the fading will start.
Adjust Distance range - Setting of minimum and maximum values for fading slider.

Detail Map



Detail albedo - Secondary color texture.
Normal map - Secondary normal map texture.
Detail Strength - Strength of detail textures.

Tiling and Offset for Detail textures.

Emission



Emission Map - Color map texture for emission and emission color.

Tiling and Offset for emission color map texture.

Exposure weight (HDRP only) - Controls how the camera exposure influences the perceived intensity of the emissivity. A weight of 0 means that the emissive intensity is calculated ignoring the exposure; increasing this weight progressively increases the influence of exposure on the final emissive value.

Global illumination - Specifies how the light that this Material emits affects the contextual lighting of other nearby GameObjects. There are three options:
• **Realtime**: Unity adds the emissive light from this Material to the **Realtime** Global Illumination calculations for the Scene. This means that this emissive light affects the illumination of nearby GameObjects, including ones that are moving.
• **Baked**: Unity bakes the emissive light from this Material into the static Global Illumination lighting for the Scene. This Material affects the lighting of nearby static GameObjects, but not dynamic GameObjects. However, Light Probes still affect the lighting of dynamic GameObjects.
• **None**: The emissive light from this Material does not affect Realtime lightmaps, Baked lightmaps, or Light Probes in the Scene. It does not illuminate or affect other GameObjects. The Material itself does have the emission color.

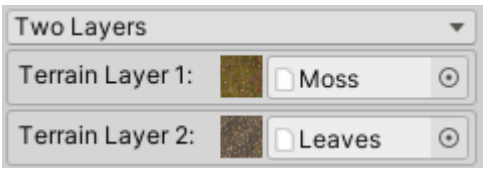
2.2 TERRAIN LAYERS

For performance reason, there are three shader variants for object integration:

One Layer - Integration just with one selected Terrain Layer. This variant has the smallest impact on performance



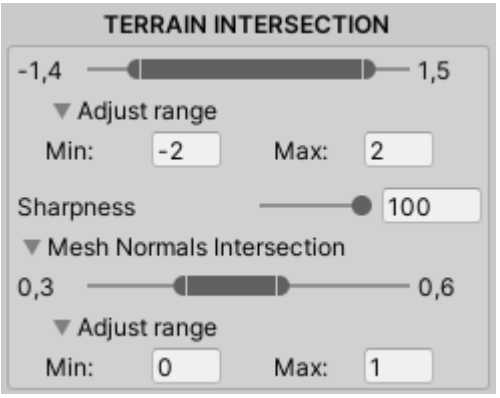
Two Layers - Integration with two selected Terrain Layers.



One Pass - Integration with Layers of one selected Terrain shader pass. This variant has the biggest impact on Performance, although you may need less Materials in some areas where you are mixing more Layers and so there can be less draw calls.
The pass in **Built-in** and **URP** has four Layers, in **HDRP** it depends on the number of your Layers, so if you do not have more than four Layers then only four Layers will be sampled, otherwise eight Layers will be sampled.
(For now HDRP has just one pass, so you cannot choose the number of pass)

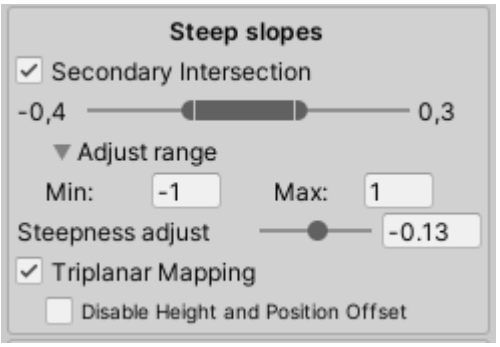


2.3 TERRAIN INTERSECTION



The first slider is for setting the height of Terrain textures intersection - the closer the sliders are, the sharper is the transition.
Adjust range - Setting minimum and maximum values for intersection slider.
Sharpness - Sharpness of Object-Terrain heightmap blending textures transition.
Mesh Normals Intersection - Setting the height of intersection of terrain's and object's mesh normals.

2.3.1 Steep slopes

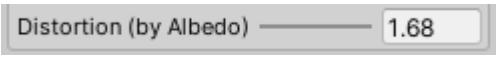


Secondary Intersection - This option allows you to set intersection for steep slopes separately. The slider works the same way as the **Terrain Intersection** but only applies to the steep slopes.

Steepness adjust - this value adjusts the angle that will be considered as **steep**.

Triplanar Mapping - This option will cause the Terrain texture to be sampled three times - Top, Front and Side. The textures on steep slopes of Object will not be stretched.

Disable Height and Position Offset - Front and Side projection of Terrain textures are offset by position and height to fit the Terrain texture as much as possible, but in some cases, for example if there is too steep slope of terrain, it can get stretched because of it and it is better to disable the offsetting. This may lead to some more or less visible seam.



Distortion - This value distorts stretched texture on steep slopes, this is useful if you don't want to use **Triplanar mapping** which is more performance heavy. Distortion is calculated by Albedo Texture and it doesn't work with a single color. This setting is available only if **Triplanar Mapping** is not enabled.

All functions in Steep slopes depend on correctly calculated Objects mesh normals!

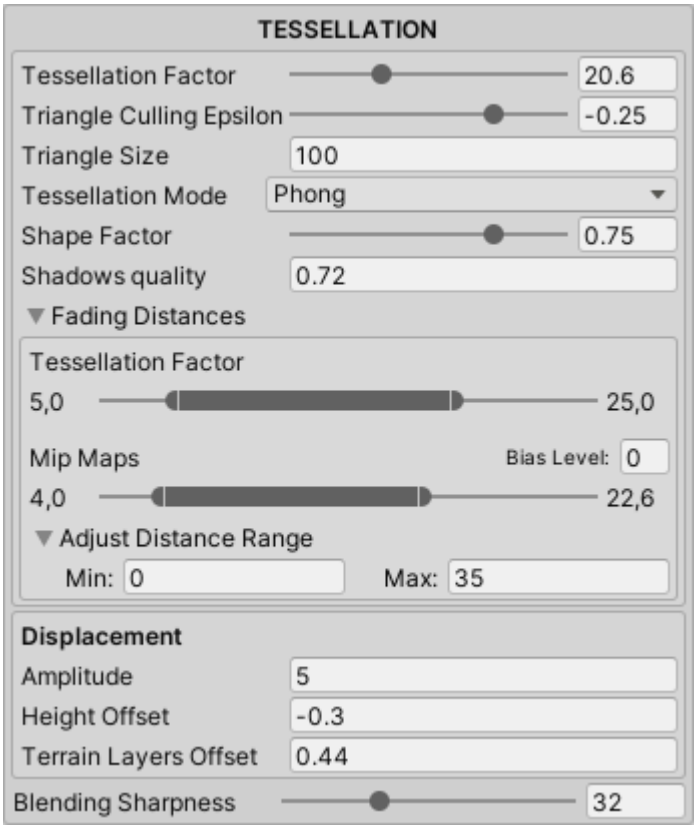
2.3.2 Disable Hide Tiling (For Material Only)



If the Terrain **Hide Tiling** is set on, this option will turn it off only for the Material to prevent additional samplings and calculations. This may cause some more or less visible seams in the distant area.

2.3.3 Tessellation

Not available in **Built-in**!
The full support for **URP** is from the **6000.0** Unity version because shadergraph in previous versions does not support using pragmas.



Tessellation Factor - Controls the strength of the tessellation effect. Higher values result in more tessellation.

Triangle Culling Epsilon - Controls triangle culling. A value of -1.0 disables back face culling for tessellation, higher values produce more aggressive culling and better performance.

Triangle Size - Sets the desired screen space size of triangles (in pixels). Smaller values result in smaller triangles. Set to 0 to disable adaptative factor with screen space size.

Tessellation Mode - Specifies the method HDRP uses to tessellate the mesh. None uses only the Displacement Map to tessellate the mesh. Phong tessellation applies additional Phong tessellation interpolation for smoother mesh.

Shape Factor - Controls the strength of Phong tessellation shape (lerp factor).

Note: *The **Fading Distances** setting for **Tessellation Factor** and **Mip maps** levels and the setting for **Shadows quality** is taken from the Terrain setting if the Terrain has InTerra shader with Tessellation.*

Fading Distances - Sliders for setting the **Tessellation Factor** fading and **Mip maps** levels fading. The fading will start at the distance of the minimum value of the slider and end at the maximum value of the slider.

Bias - Minimal Mip map level where the fading will start.

Adjust Distance range - Setting of minimum and maximum values for both distance sliders.

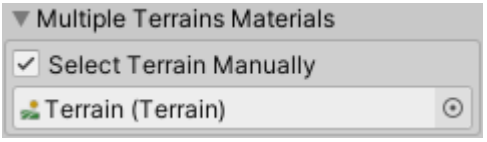
Displacement

Amplitude - Amplitude of the Height Map (Blue channel in **Mask Map**).
Height Offset - Height offset for displacement.
Terrain Layers Offset - Offset for Terrain Layers displacement.

Blending Sharpness - Heightmap blending sharpness between Terrains and Objects Textures for Tessellation.

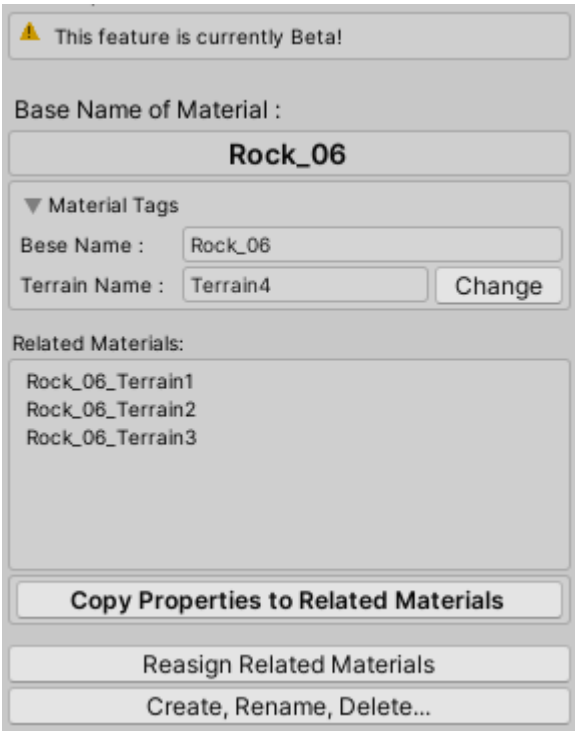
2.3.4 Multiple Terrains Materials

This section is available only for projects with multiple Terrains in one scene.



Select Terrain Manually
In case of some Terrains are overlapping, you can select the blending Terrain for Material manually.

(The following section is currently Beta!)
This section is not available when the “Select Terrain Manually” is checked. It can help with creating needed Materials and synchronizing their properties.



Each Material created by this tool will be in format
of Base Name (Original name of the Material), underscore and Terrain name, each Material will have Tags with the Base name and Terrain name, so in case you would accidentally rename the Material it will help to resolve possible issues.

Note: *You cannot use this tool if some Terrains in one scene have the same name or if some of the Terrain names contain characters that are not allowed in file name. The tool is also not available when there are some instanced Materials with InTerra* ***Object into Terrain Integration*** *shader.*

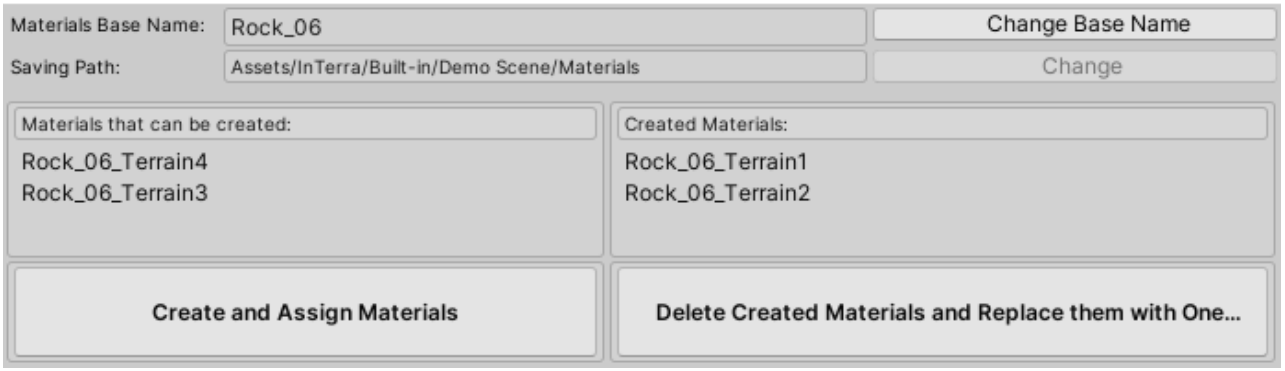
Base Name of Material - By default this name is the original name of the Material from which the set of Materials was created, but it can be changed.
Material Tags - This fold-out shows Material tags and allows you to change the Terrain Name tag if needed.
Related Materials - This List contains all Materials with the same Base name Tag as selected Material.

Copy Properties to Related Materials - This button will copy the properties from currently selected Material to all Materials that are in **Related Materials** list.

Reassign Related Materials - This button will check position of all Objects using currently selected Material and all the related Materials and if some Object was moved to different Terrain the proper Material
will be assigned if the Material exists.

Create, Rename, Delete… - This button opens the window **Multiple Terrains Materials Creator** for creating Materials for all Terrains where the Objects using currently selected Material (or Materials with same Base name) are placed.

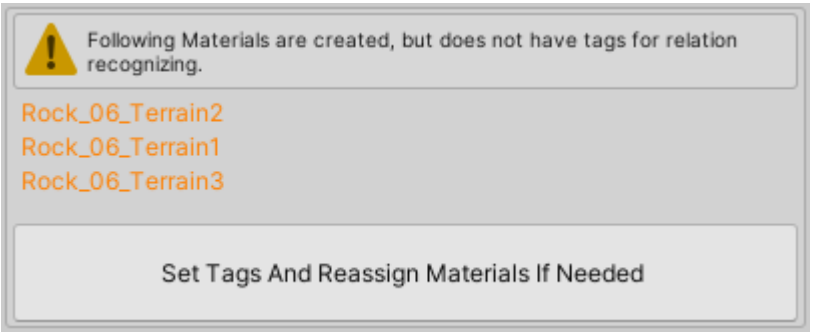
Multiple Terrains Materials Creator



Change Base Name - Allows you to change the Base name of the Material and will also change all the created Materials names.

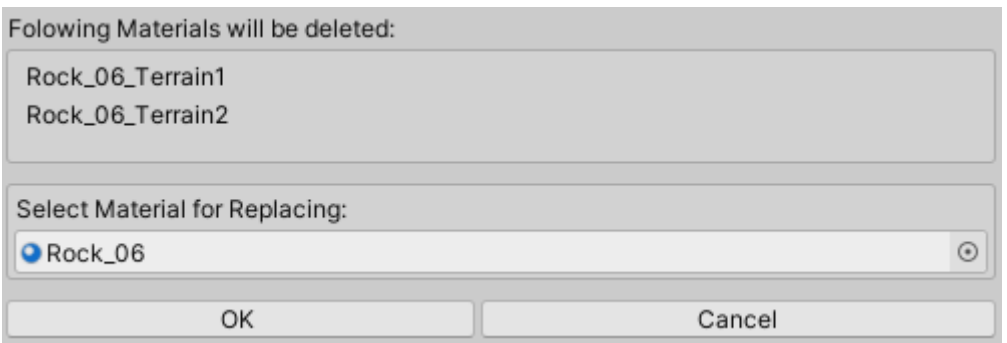
Create and Assign Materials - This button will create the Materials in the "*Materials that can be created*" list and will assign them to Objects that are using the selected Material or Objects that have the Materials with the same **Base name** Tag.

If you have already created Materials and the name has needed format, there will be possibility to add the Materials needed Tags so you can use them with the ***Multiple Terrains Materials*** tool.



Set Tags And Reassign Materials If Needed - This button will add the *Multiple Terrains Materials* Tags to the Material and will reassign the Materials if needed.

Delete Created Materials and Replace them with One… - This button opens the window where you can select the Material that will replace all created Materials that will be deleted. This step cannot be undone, but it is easy to recreate the Materials again.
For avoiding the inconsistency you cannot select Materials that belong to different set of Materials with different Base name.



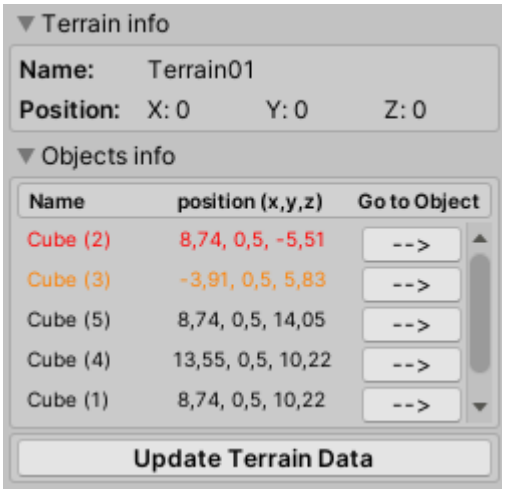
2.3.5 Terrain info

Information of Terrain the Material is blended with. The Terrain is determined by the average position of all objects that are using this Material.

2.3.6 Objects info

List of all Objects using the Material and their positions. Red text labels mean that the Object is outside of any Terrain.
Orange text labels mean that the Object is on different Terrain than the Material is receiving data from.

The buttons in the “Go To Object” column will select and focus Object.



2.3.7 Update Terrain Data

All Materials using **Object into Terrain Integration** shader will recheck on which Terrain are placed and take the actualised data from that Terrain.

2.4 OBJECTS ON MULTIPLE TERRAINS

There is no special setting, but you cannot use one Material on multiple Terrains. One Material can receive data only from one Terrain which is determined by the average position of all Objects using the Material, so for multiple Terrains you will need a copy of Material for each Terrain.

You can use the 2.3.4 Multiple Terrains Materials for creating needed sets of Materials.

3. MESH TERRAIN SHADER

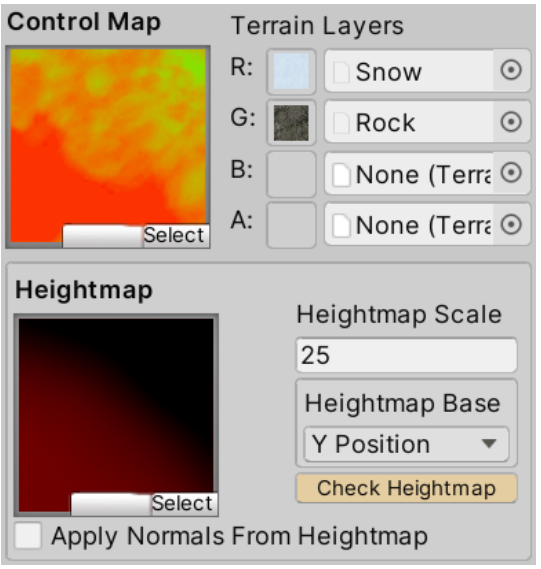
Mesh Terrain shaders allow you to use Terrains based directly on mesh instead of Unity Terrain. All settings are the same as for Terrain Shader, but with additional section for Controlmap and Heightmap. If you have one material assigned to multiple mesh terrains the **Control** and **Height** textures will be stretched across them!

The shaders for mesh terrain can be found in:

InTerra/Built-in/MeshTerrain (Standard With Features)
InTerra/Built-in/Diffuse/Mesh Terrain (Diffuse With Features)

InTerra/URP/Mesh Terrain

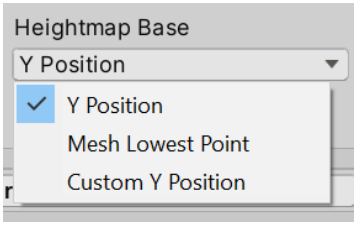
InTerra/HDRP/MeshTerrain
InTerra/HDRP/Tessellation/Mesh Terrain



Control map
*(**Control map** texture is sometimes also referred to as **Splat map** or **Alpha map**.)*
For each color channel of your **Control map** you should assign the Unity **Terrain Layer** which you can create just like any other file in the Project window.

Heightmap
Heightmap is needed only for **Object integration** and seamless blending depends on correct setting of the **Scale** and **Base**.

Heightmap Scale: is the number for calculating height from height map and it is basically the maximum possible height of mesh terrain.



Heightmap Base: The base is the height (y position) from which the calculation of mesh terrain height starts and is basically the lowest possible point of the terrain.

Check Heightmap: If you hold the button the vertices of the mesh terrain will be displaced according to Heightmap and its setting. Terrain will have an orange tint while the displacing is active. If the Heightmap and its Scale and Base are set correctly Terrain height or position should not change or just minimally.

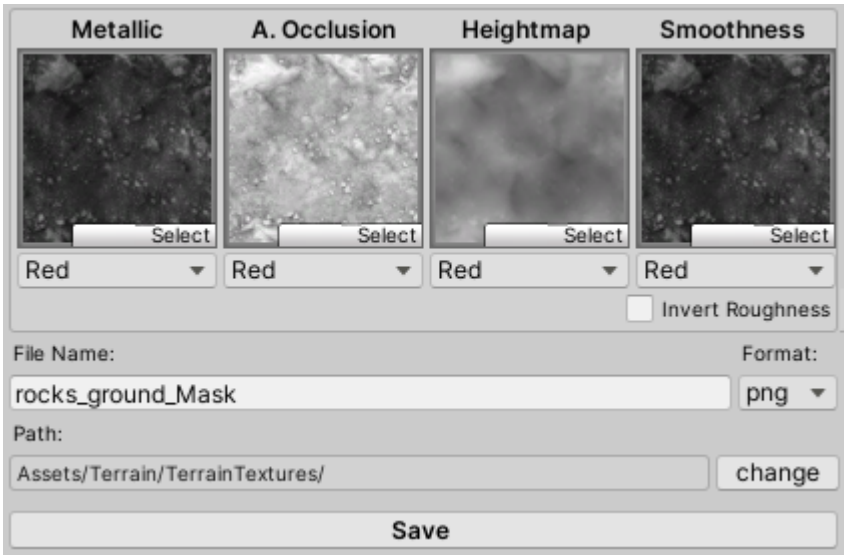
Apply Normals From Heightmap: This option will replace the terrain mesh normals with normals calculated from provided Heightmap. This can help with better Object integration and in case of terrain being created from multiple tiles it can help to remove seams.

Heightmap and **Control map** textures **Wrap mode** should be set as **Clamp** in **Import setting** and **Heightmap** texture **Format** should be set as **R8** or **R16!**

IMPORTANT NOTE: Mesh Terrains should be placed the same way as **Unity Terrains**, always aligned with the world axis. Oriented according to **Control map** and **Heightmap** sampling which always begins from bottom left corner at min X and Z position to top right corner at max X and Z position!

4. MASK MAP CREATOR

The Mask Map creator can be opened from the Terrain Material setting.



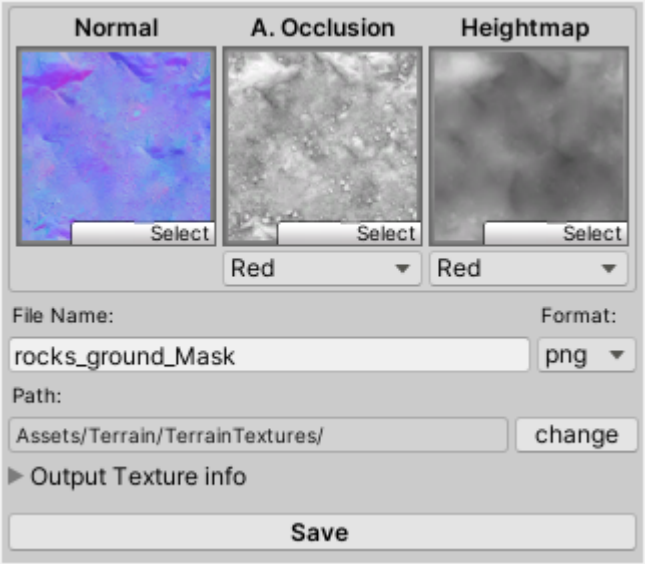
You have to select at least one texture map. There is a possibility to choose a specific color channel if you are selecting a texture map from different kind of Mask map.

If you have a **Roughness** texture instead of **Smoothness** you can select the **Roughness** one and check the "**Invert Roughness**" which will convert it into **Smoothness**.
You can choose the format **PNG** or **TGA** for the output file.
The path is setted the same as the location of the first texture you selected, but you can choose another one by pressing the "**change**" button.

Output Texture channels info:
Red - Metallic map
Green - Ambient Occlusion
Blue - Heightmap or Displacement map
Alpha - Smoothness map

4.1 NORMAL-MASK MAP CREATOR

! IMPORTANT !
The output Texture of **Normal-Mask Map Creator** has to be set in Import Settings **Texture Type** as **Default** and **sRGB(Color Texture)** has to be unchecked!
(This setting is automatically applied if you save the Texture to your actual projects Asset folder.)



Output Texture channels info:
Red - A.Occlusion
Green - Bitangent(Green) from Normal map
Blue - Heightmap
Alpha - Tangent(Red) from Normal map.