BIG MESH TERRAIN

Package Documentation

JOE GUY GAMING, LLC.
Denver, Colorado

JOE GUY GAMING™

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INSTALLATION AND SETUP

BIG Mesh Terrain requires Unity version 2022.3 or higher with Shader Graph, regardless of render pipeline used (Built-In, URP, or HDRP); prior versions are not supported.

USING BIG MESH TERRAIN WITH THE BUILT-IN RENDER PIPELINE

To use the BIG Mesh Terrain with the Built-In render pipeline, you must first install Shader Graph.

Shader Graph for the Built-In render pipeline is available starting with Unity version 2022.3.

Once Shader Graph is installed, navigate to the Package Manager, and install BIG Mesh Terrain.

Installing Shader Graph

Please use the instructions show below and in Figure 1 to install Shader Graph:

1. Navigate to the **Window** menu item.
2. Select **Package Manager.**
3. In the **Packages** drop-down select **Unity Registry.**
4. In the **Search Box** type "**Shader Graph**."
5. Click **Install.**

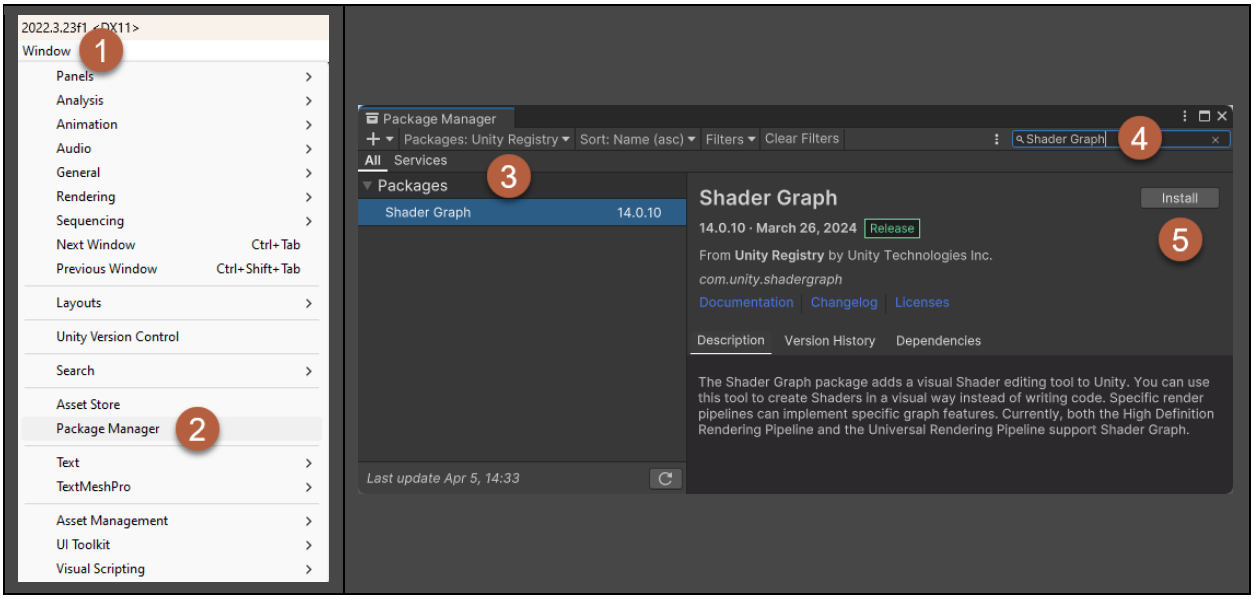

Figure 1 - Installing Shader Graph for the Built-In Render Pipeline.

USING BIG MESH TERRAIN WITH URP

Since Shader Graph is already included with the URP Render Pipeline there is no need to install it separately. Simply navigate to the Package Manager and install BIG Mesh Terrain.

Note!
There is **no need to convert materials** when using BIG Mesh Terrain with URP.
The shaders already have URP set as an active target.

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USING BIG MESH TERRAIN WITH HDRP

Since Shader Graph is already included with the HDRP Render Pipeline there is no need to install it separately, but the shaders must be updated to work properly.

Updating the Shaders for use with HDRP

Please use the instructions below and in Figures 2 and 3 to update the shaders for use with HDRP:

1. In the Project window navigate to **Assets/Joe Guy Gaming/BIG Mesh Terrain.**
2. Locate and double click the **BMT HDRP ExtractMe** file.
3. Accept all defaults and click **Import**.

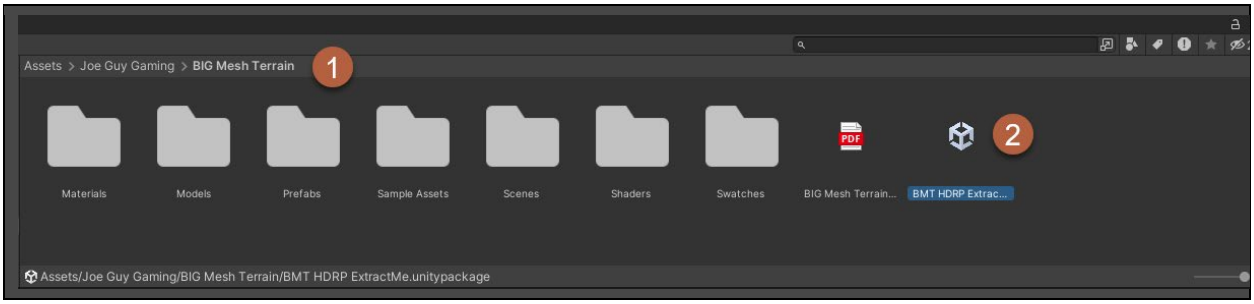

Figure 2 - Importing shaders for use with HDRP.

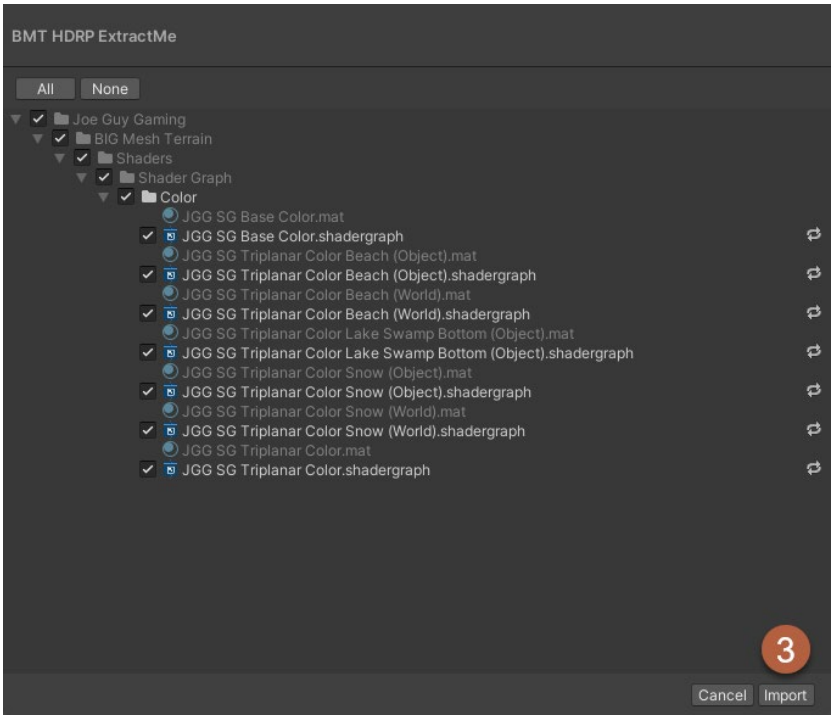

Figure 1 - Importing shaders for use with HDRP.

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WHAT IS BIG MESH TERRAIN?

BIG Mesh Terrain is a collection of 185+ terrain assets created in the flat-shaded, low poly style, designed to satisfy three primary objectives:

1. Quickly assemble low poly style game environments.
2. Provide an abundance of flat surfaces for buildings, bases, etc.
3. Enable the combination of multiple biomes in a single scene.

WHAT ARE THE FEATURES OF BIG MESH TERRAIN?

MESH SIZE

Terrain assets are either Small, Medium, Large, or Extra Large (XL) as shown in Figure 3:

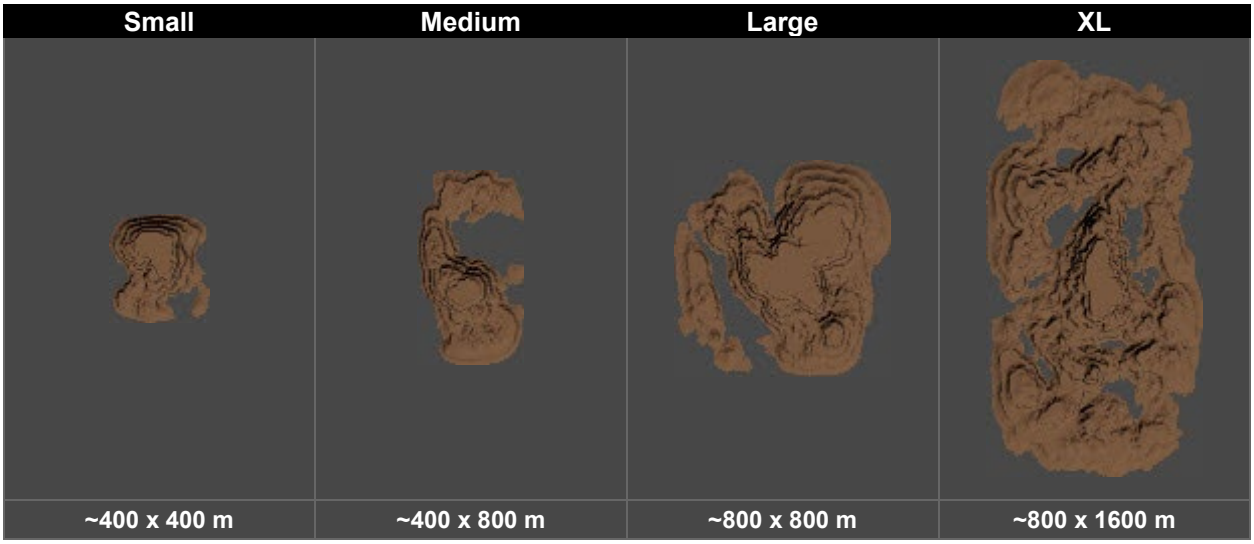

Figure 3 - Mesh Size with approximation in meters.

LEVEL OF DETAIL (LOD)

BIG Mesh Terrain assets include LODs, with each level of detail representing a 50% reduction over the prior level.

Asset prefabs are saved with rapidly declining camera transitions to showcase polygon geometry up close while quickly shedding triangle and vertex complexity as the player / camera move away as shown in Figure 4:

	Level of Detail	Transition
LOD0	100.0%	95
LOD1	50.0%	90
LOD2	25.0%	85
LOD3	12.5%	1

Figure 4 - BIG Mesh Terrain Prefab LOD and Camera Transition settings.

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Tip!
Please see the Appendix for instructions on how to create your own script (including the code) for mass updating LOD Camera Transition settings.

FLAT AND RIDGED

Hill and Island assets are provided in both Flat and Ridged crests as shown in Figure 5:

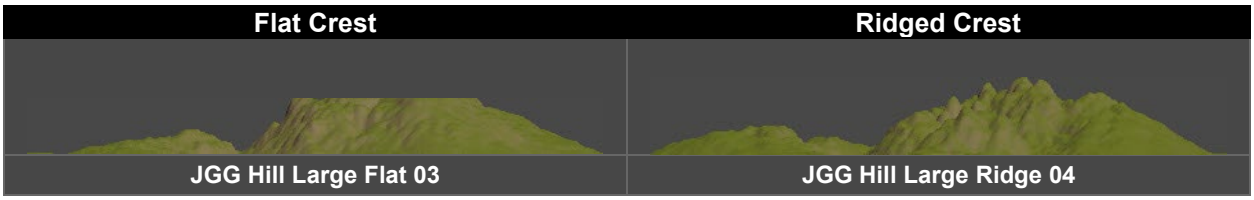

Figure 5 - Examples of available Crest Types.

When combined with Deserts and Mesas (flat crests by default) and Mountains (ridge crests), BIG Mesh Terrain affords a wide variety of terrain configuration possibilities.

AVAILABLE TERRAIN TYPES

BIG Mesh Terrain assets are divided into thirteen categories as shown in Figure 6:

Mesh Type	S	M	L	XL	# Flat	# Ridge	Total
Curvy Hill	6	6			6	6	12
Desert	3	3	3	3	12		12
Dune	3	3	3	3		12	12
Hill	6	6	7		9	10	19
Island	6	15	8	6	21	14	35
Lake	3	3	3	3	12		12
Mesa	3	3	4	3	13		13
Mountain	3	3	4	4		14	14
Platform	3	3	3	3	12		12
Rolling Hill	6	6	6	6	12	12	24
Skirt	1	1	1	1	4		4
Swamp	3	3	3	3	12		12
Volcano	3	3				6	6

Figure 6 – A breakdown of the 187 assets available included with BIG Mesh Terrain.

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SHADERS, SWATCHES, COLORS, AND MATERIALS

BIG Mesh Terrain uses triplanar color materials; textures are not used. The colors are selected from color swatches based on biome (Alpine, Desert, Forest, etc.), and all materials are created using shader graph shaders.

SHADER GRAPH SHADERS

All BIG Mesh Terrain materials use Shader Graph. Please follow the guidelines in the Installation and Setup section to ensure the assets are configured properly for use with your project's render pipeline.

BIG Mesh Terrain ships with multiple shaders, each created to facilitate a specific purpose as shown in Figure 7:

#	Shader Name	Purpose
1	JGG SG Base Color	A single color with no blending
2	JGG SG Triplanar Color	Blending two colors of mesh surface and sides
3	JGG SG Triplanar Color Beach (Object)	Same as Triplanar Color + Sand in Object Space
4	JGG SG Triplanar Color Beach (World)	Same as Triplanar Color + Sand in World Space
5	JGG SG Triplanar Color Lake Swamp Bottom (Object)	Same as Triplanar Color + Bottom Surface Blending
6	JGG SG Triplanar Color Snow (Object)	Same as Triplanar Color + Snow in Object Space
7	JGG SG Triplanar Color Snow (World)	Same as Triplanar Color + Snow in World Space

*Figure 7 – Shaders located in the **Assets/Joe Guy Gaming/BIG Mesh Terrain/Shaders/Shader Graph/Color** folder.*

Object Space vs. World Space

Object Space means the material **color(s) will remain in the same position** on the mesh (prefab) regardless of where that prefab is positioned in the scene as shown in Figure 8.

World Space means the material color(s) will appear on the mesh (prefab) relative to the prefab's position in the scene as shown in Figure 9.

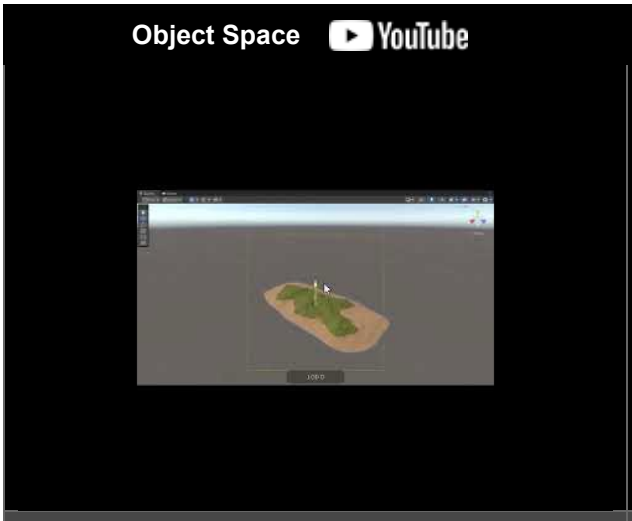

Figure 8 – Video demonstration of Object space.

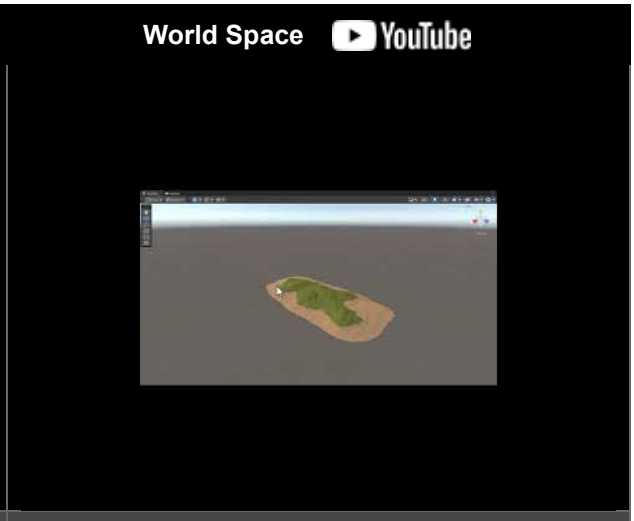

Figure 9 – Video demonstration of World space.

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COLOR SWATCHES

BIG Mesh Terrain includes collections of colors to aid in the creation of materials. The collections are grouped by biome (Figure 10). The colors contained in each biome group represent the biome color theme:

Figure 20 - Biome folders containing Color Swatches.

Figure 11 below shows the contents of a biome group – in this case, the **Meadow** folder:

- Each biome group contains color swatches.
- Each color swatch is represented as an image.
- Each image contains five (5) colors.
- Each color includes the hex code for the color.

Adobe Color was used for the creation of biome color themes.

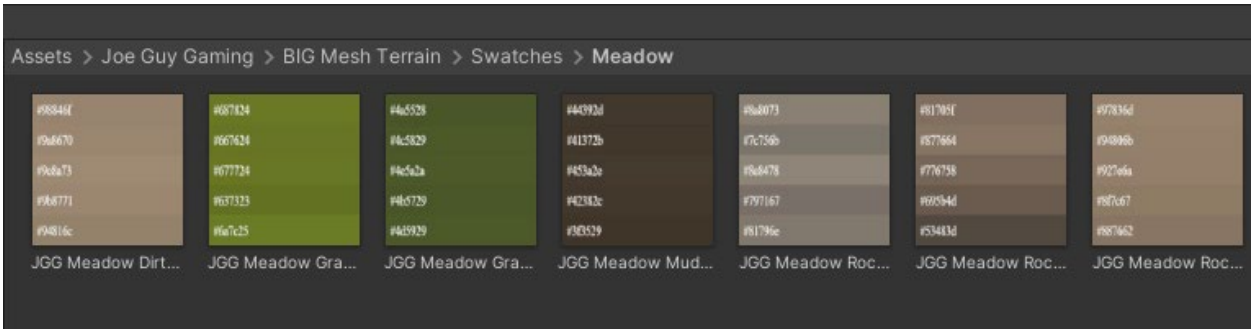

Figure 11 - The color swatches contained in the Meadow biome color group.

Information!

When creating the biome color groups, careful consideration was given to ensure the biome group naming convention and biome colors work harmoniously with popular low-poly assets found on the Unity Asset Store.

The triplanar terrain texture materials included in those popular low-poly assets work perfectly well with BIG Mesh Terrain assets.

However, using texture materials on BIG Mesh Terrain assets masks the polygon geometry; it cannot be seen very well.

Therefore, if performance on mobile and low-end devices is a primary requirement, BIG Mesh Terrain may not be the right choice for your project.

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COLOR MATERIALS

Understanding the color swatches is key to understanding how the premade triplanar color materials were generated.

As an example, Figure 12 below shows the triplanar color materials for the Meadow biome, and Figure 13 shows the names of each of these materials:

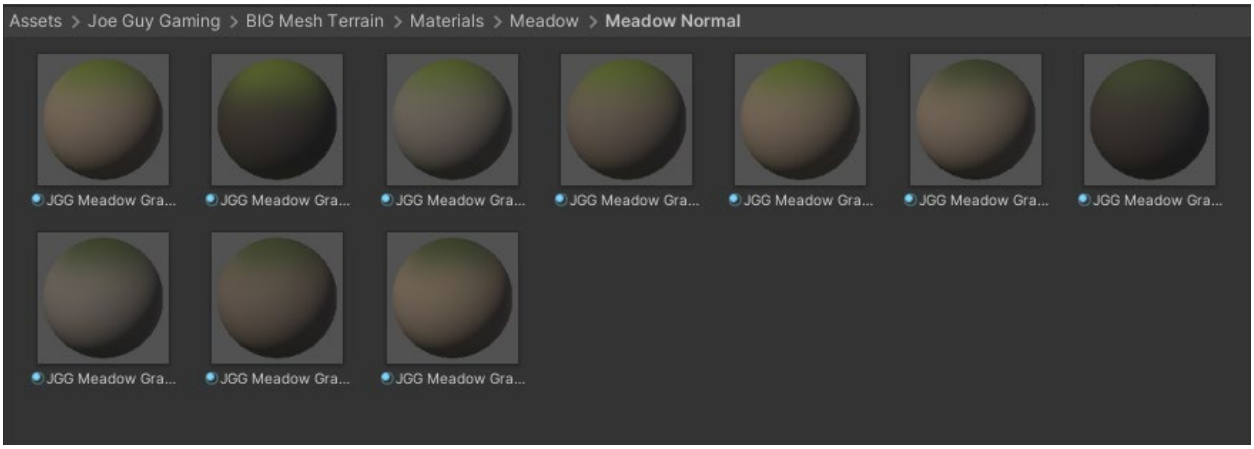

Figure 12 - Premade Meadow biome color materials.

Figure 13 - Names of the triplanar Meadow color materials.

NAMING OF THE PREMADE TRIPLANAR COLOR MATERIALS

Example #1 – Default (Normal) Naming

Referring to Figure 13 above, the name of the first Meadow triplanar material is:

JGG Meadow Grass 01 Dirt 01

Next, Figure 14 below shows a closer look at the color swatches in the Meadow biome group:

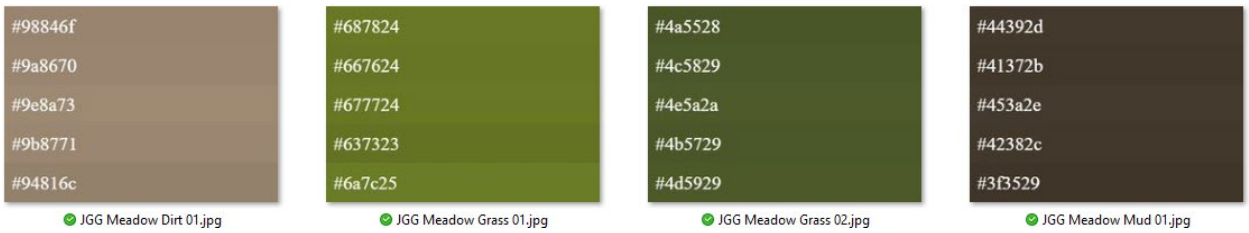

Figure 14 - Closer look at the color swatches in the Meadow biome group.

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The name of the premade triplanar color in this example was derived as follows:

“JGG Meadow Grass 01 Dirt 01” =

Prefix	Biome Name	Triplanar Top Color	Triplanar Side Color
JGG +	**Meadow +**	**Grass 01 +**	**Dirt 01**

Figure 15 - Explanation of naming convention for "JGG Meadow Grass 01 Dirt 01".

Note!
Unless otherwise specified the first (top) color in each Color Swatch is the color used in the premade triplanar color material name.

Example #2 – Naming with Color other than First (top) Color

If a color other than the first (top) color is used, it is designated by its order / number in the swatch:

“JGG Volcanic Rock 01 Lava 02 #4” =

Prefix	Biome Name	Triplanar Top Color	Triplanar Side Color
JGG +	**Volcanic +**	**Rock 01 +**	**Lava 02 #4**

Figure 16 - Explanation of naming convention for "JGG Volcanic Rock 01 Lava 02 #4".

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Example #3 – Naming with Colors from Different Biomes

One common use case is the addition of “Tropical Sand” with another biome.

In these instances, the materials are very specifically placed in a separate folder (either Object or World space) to avoid confusion as shown in Figure 17 …

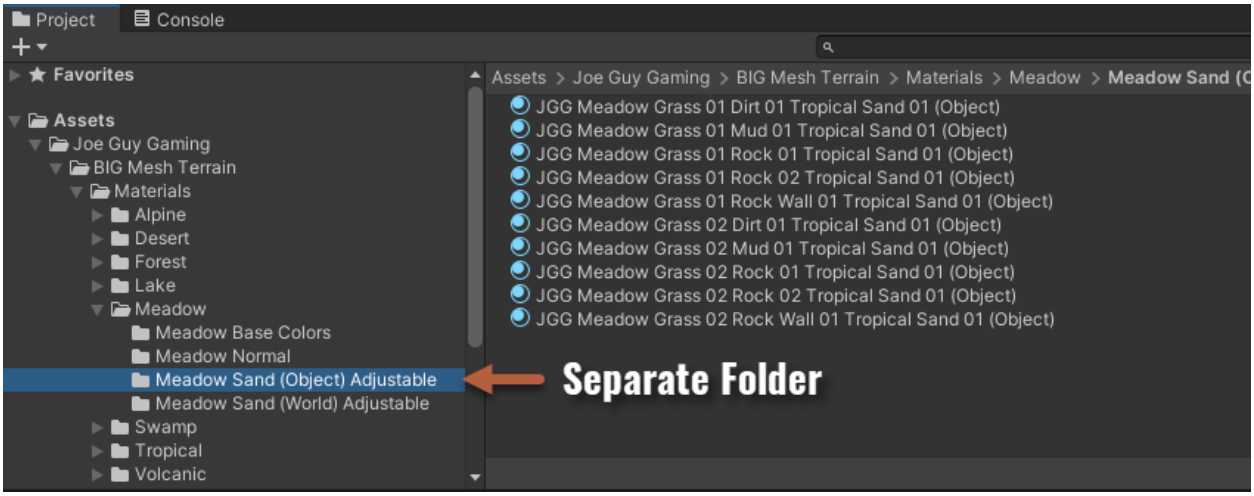


Figure 17 - Materials consisting of colors between two biomes are placed in separate folders.

… and the secondary biome and color are included in the material name:

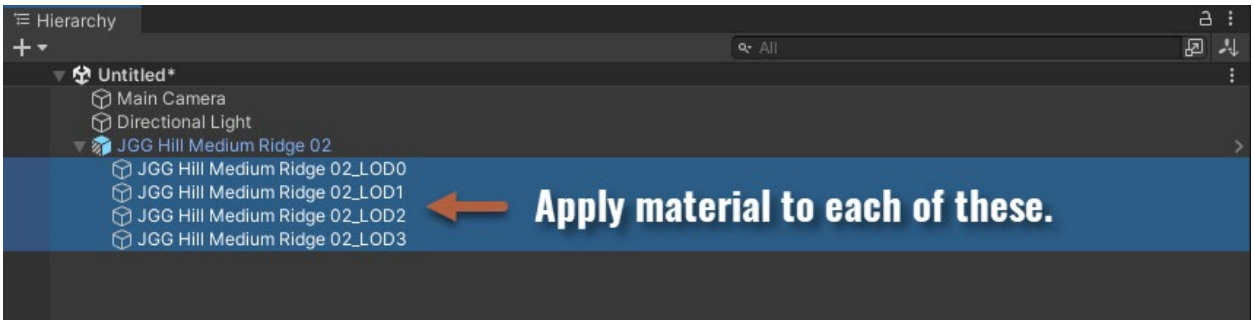
“JGG Meadow Grass 01 Dirt 01 Tropical Sand 01 (Object) =

Prefix	Primary Biome Name	Primary Biome Top Color	Primary Biome Side Color	Secondary Biome Name	Secondary Biome Color	Object / World Space
JGG +	Meadow +	Grass 01 +	Dirt 01 +	Tropical +	Sand 01 +	(Object)

Figure 18 - Explanation of naming convention for "JGG Meadow Grass 01 Dirt 01 Tropical Sand 01 (Object)".

APPLYING MATERIALS TO PREFABS WITH LODS

When applying new materials be sure to apply the new material to each of the prefab’s underlying LODs:



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TERRAIN ASSETS

Terrain assets included with BIG Mesh Terrain:

CURVY HILL

DESERT

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DUNE

HILL

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ISLAND - FLAT

ISLAND - RIDGE

Island Tip!
All flat islands are 17 meters high.

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LAKE

Lake Tip!
All lakes are less than 50 meters deep, so they fit properly within Skirts.

MESA

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MOUNTAIN

Mountain Tip!
The mountains are varying degrees of ruggedness: Rugged, a little rugged, and a little smooth.

ROLLING HILL - FLAT

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ROLLING HILL – RIDGE

SWAMP

Swamp Tip!
All swamps are 10 meters deep.

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VOLCANO

PLATFORM

Platform Tip!
All platforms are 30 meters high. They're great for building up the terrain or using as cliffs.

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SKIRT

Skirt Tip!
All skirts are 50 meters high to accommodate the placement of Lakes and Swamps inside. When placing a Lake or a Swamp on elevated terrain it can be easier to use them with a Skirt. All skirts are double the size of the normal S, M, L, and XL assets. The XL Skirt, therefore, is approximately 1,500 x 3,000 meters. Best practice would be to use them sparingly.

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SAMPLE ASSETS

BIG Mesh Terrain ships with some sample environment assets.

These assets are intended for prototyping purposes and may not be appropriate for production use. They are Public Domain and included for free, so you're welcome to use them however you wish.

To use the sample environment assets, navigate to Joe Guy Gaming > BIG Mesh Terrain > Sample Assets > Sample Prefabs as shown in Figure 19:

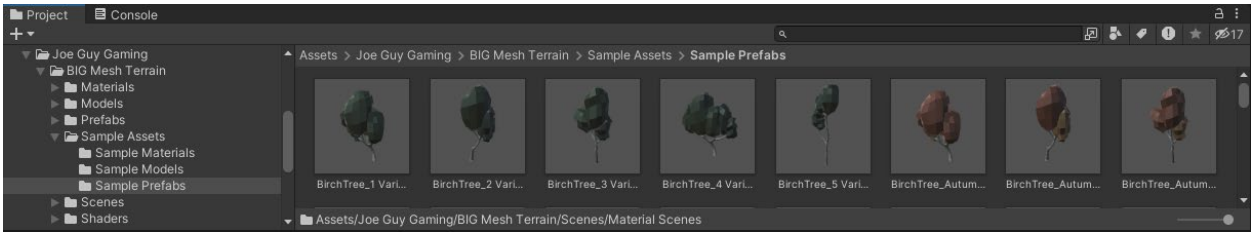

Figure 19 - Locating the sample environment assets in the project hierarchy.

The sample environment assets use separate materials than the terrain assets but are also updated appropriately when following the guidelines in the Installation and Setup section.

FREQUENTLY ASKED QUESTIONS

Can I use these assets in my game?

- Yes, that is their intended purpose.

Can I use the Sample Assets in my game?

- Yes, you may use them however you wish; they are Public Domain.

Can I use the Demo Scene in my game?

- Yes

Is the water shown in the Demo Scene included?

- No. Please see the Appendix for information on the tools and assets used during the creation of the Demo Scene.

Is the skybox shown in the Demo Scene included?

- No. Please see the Appendix for information on the tools and assets used during the creation of the Demo Scene.

How come there aren't any rivers?

- We have not yet created a satisfactory river solution that meets our quality standards.

Can I have the original Blender files?

- No.

Will there be roads and paths in a future release?

- We are currently working on a Path solution to be offered as a separate package.

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APPENDIX

MASS UPDATING PREFAB LODS

BIG Mesh Terrain does not ship with, nor does it support any scripts.

For your convenience, however, we are sharing the following, which is code we found useful for mass updating LOD camera transitions.

This will create a new menu item, “Component” with the option to “Set Default LOD Range.”

To use, select one or more prefabs to update, then select the menu item.

```
using UnityEditor;
using UnityEngine;

public class MultiSetLOD : MonoBehaviour
{
    [MenuItem("Component/LOD/Set Default LOD Range", false, 0)]
    static void DoSetDefaultLODRange()
    {
        var list = Selection.GetFiltered<GameObject>(SelectionMode.TopLevel);
        foreach (var go in list)
        {
            var d = go.GetComponent<LODGroup>();
            if (null != d)
            {
                var lods = d.GetLODs();
                lods[0].screenRelativeTransitionHeight = 0.95f;
                lods[1].screenRelativeTransitionHeight = 0.90f;
                lods[2].screenRelativeTransitionHeight = 0.85f;
                lods[3].screenRelativeTransitionHeight = 0.01f;
                d.SetLODs(lods);
                PrefabUtility.RecordPrefabInstancePropertyModifications(d);
            }
        }
    }
}
```

For assistance with creating scripts please refer to the Unity documentation.

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DEMO SCENE ASSETS AND TOOLS

Here is the list of assets and tools used during the creation of the BIG Mesh Terrain Demo Scene. The links provided were active at the time of this document.

Ocean Water

KWS Water System (URP Rendering)

This is a paid asset. The URP version was used for the Demo Scene, but they also offer versions for the Built-In and HDRP rendering pipelines.

Lake and Swamp Water

Stylized Water 2

This is a paid asset. Stylized Water 2 is for URP only, but they do offer a version for the Built-In rendering pipeline.

Skybox

Fantasy Skybox FREE

This is a free asset. FS002_Day was used in the Demo Scene.

Placement of Sample Assets

Mass-Spawner Object Placement Tool

This is a free asset. It is easy to use and offers a high degree of control over prefab placement including layers to include / exclude, elevation, slope, and prefab offset, rotation, and scale settings.

Camera Flythough

Pegasus

This is a paid asset. When using latest versions of Unity you will need to install Timeline separately from the Package Manager otherwise it generates errors.

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