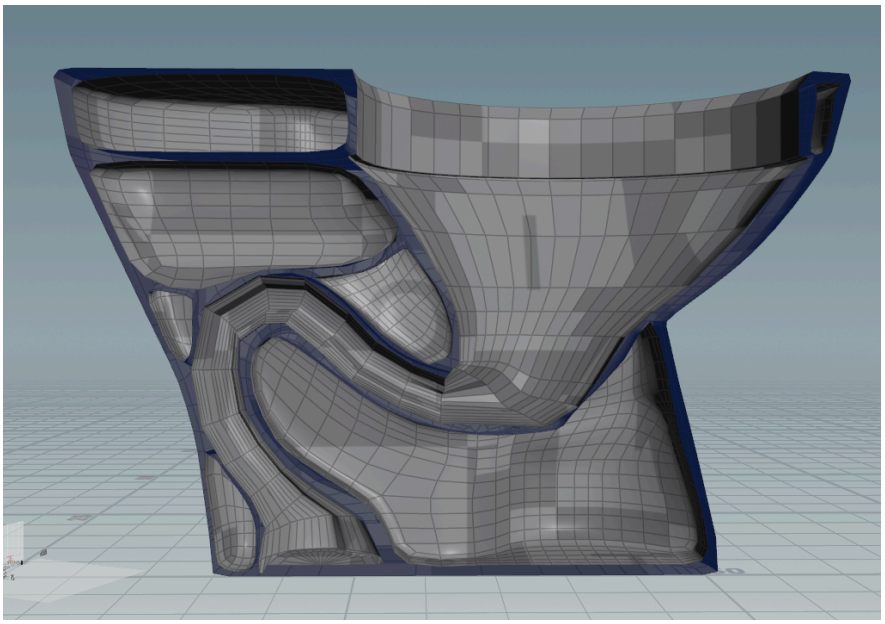
Exercise 3: Destruction | Storm Slawson Villasmil

2/18/2024
Houdini Version:19.5

Reference Videos: https://www.youtube.com/watch?v=HTPBDPUYs1s

Technical Guide | Asset

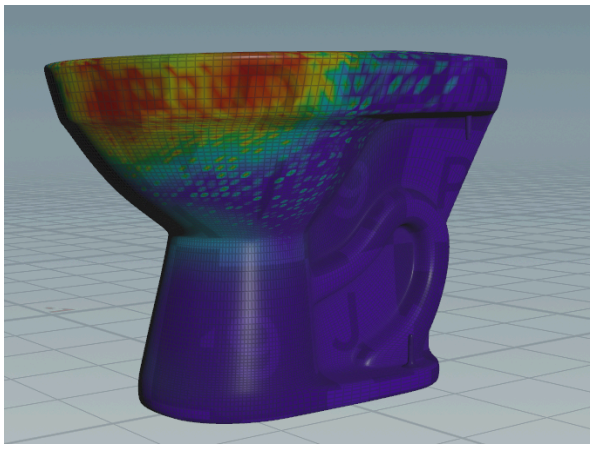
I spent the most amount of time on this project finding and preparing the toilet asset. None of the models had the interior sections of a toilet modeled, so I had to take an existing model and hollow it out so it would look good in the destruction sim.

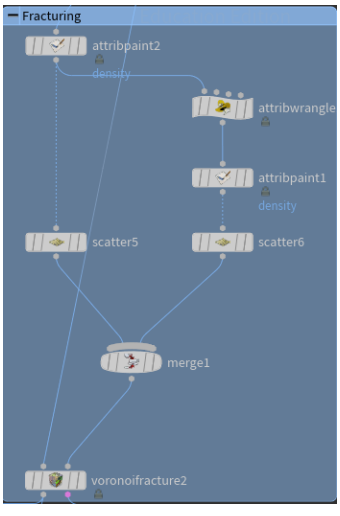


Cross section of model

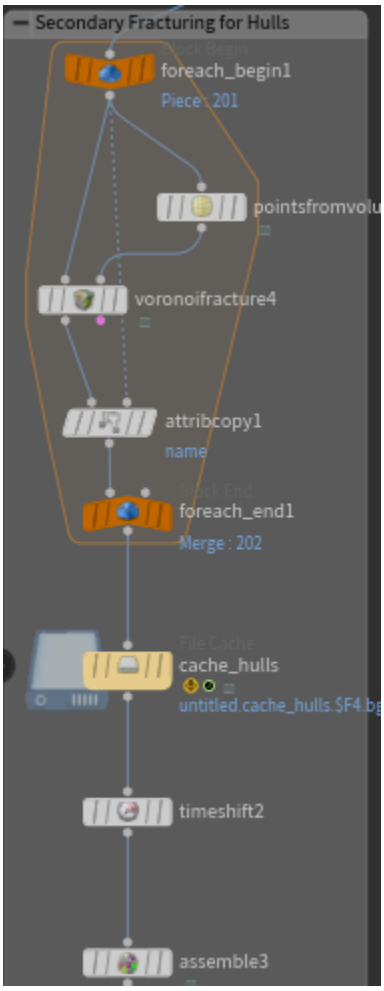
Technical Guide | Fracturing and Simulation

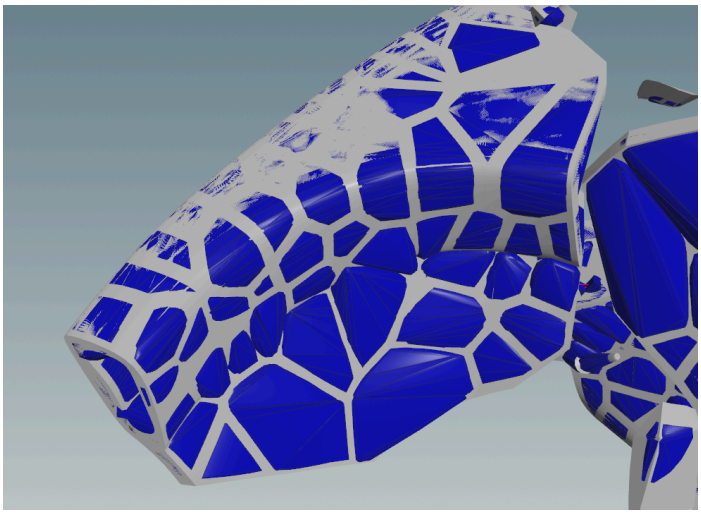
The fracturing is done by attribute painting a density attribute on the model and scattering based on that attribute. I create a secondary paint layer at a lower value which I used to create the larger fractured pieces



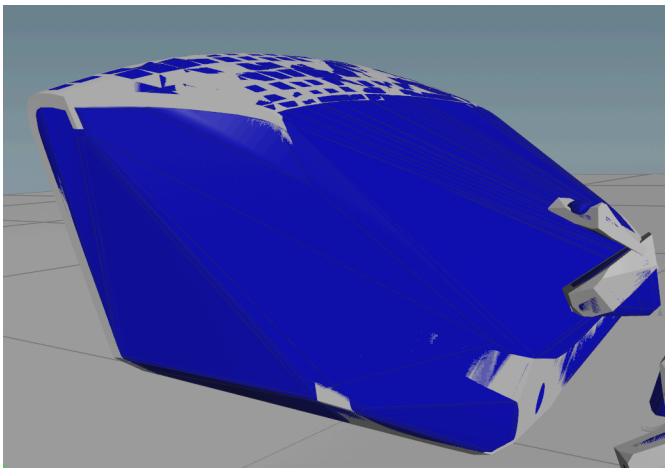


Because the larger pieces convex hull's were creating some weird interaction in the bullet solver, and also because concave is just too slow, I to created a secondary fracture that breaks up the pieces into smaller ones, in order to have more accurate collision geometry.



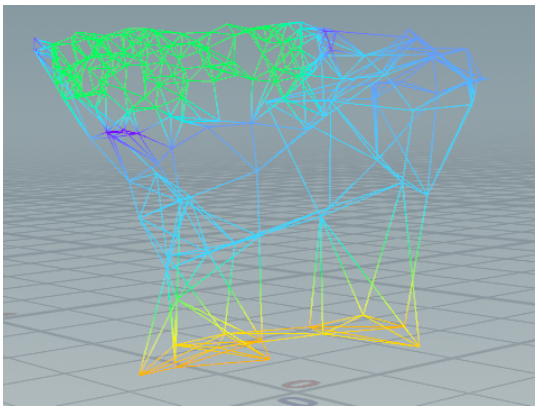


Convex hull of a larger piece with secondary fracturing

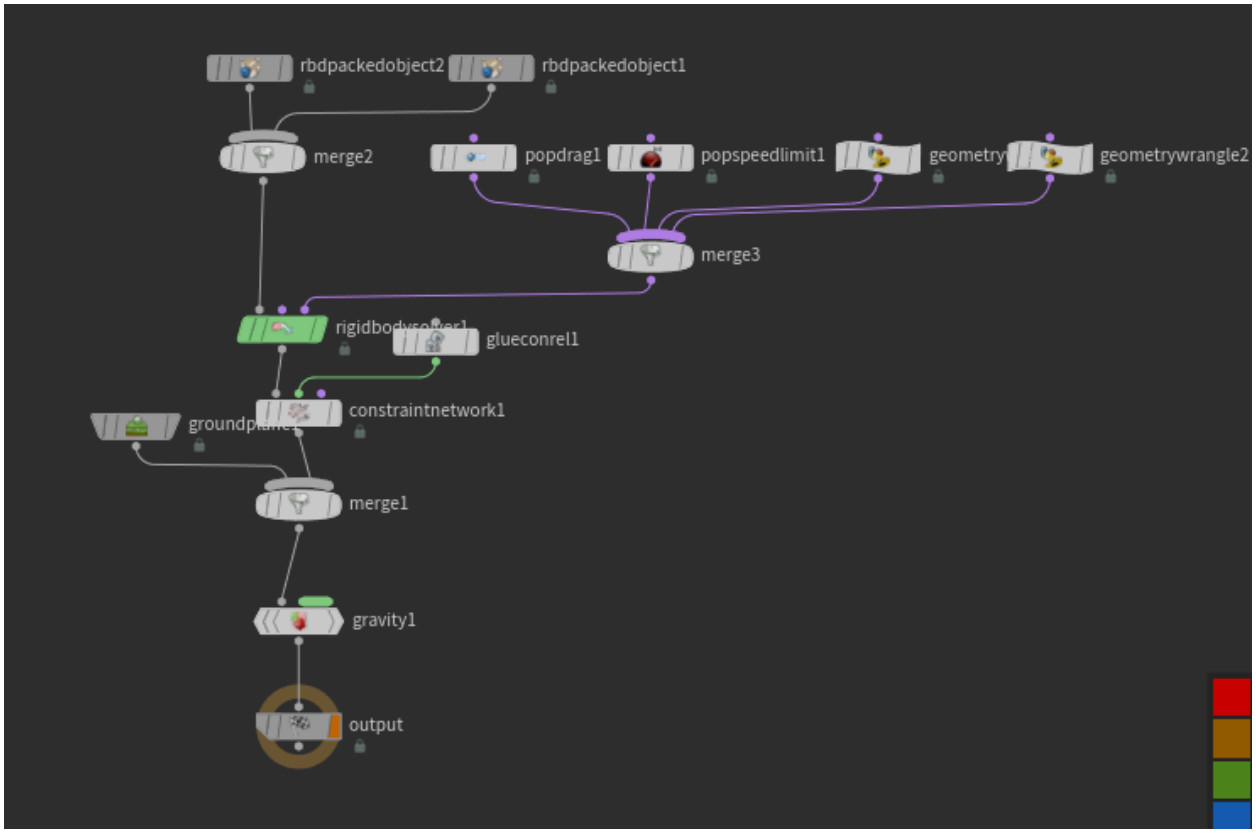


Convex hull without secondary fracturing

The constraint strength attribute is also painted



Dop Setup



Inside of the first geometry wrangles I have a simple setup for drag and angular drag. I was running into an issue with pieces not sleeping correctly and sliding, so I wrote this expression and it fixed the issue. There is most definitely a better way to fix that problem.

VEXpression

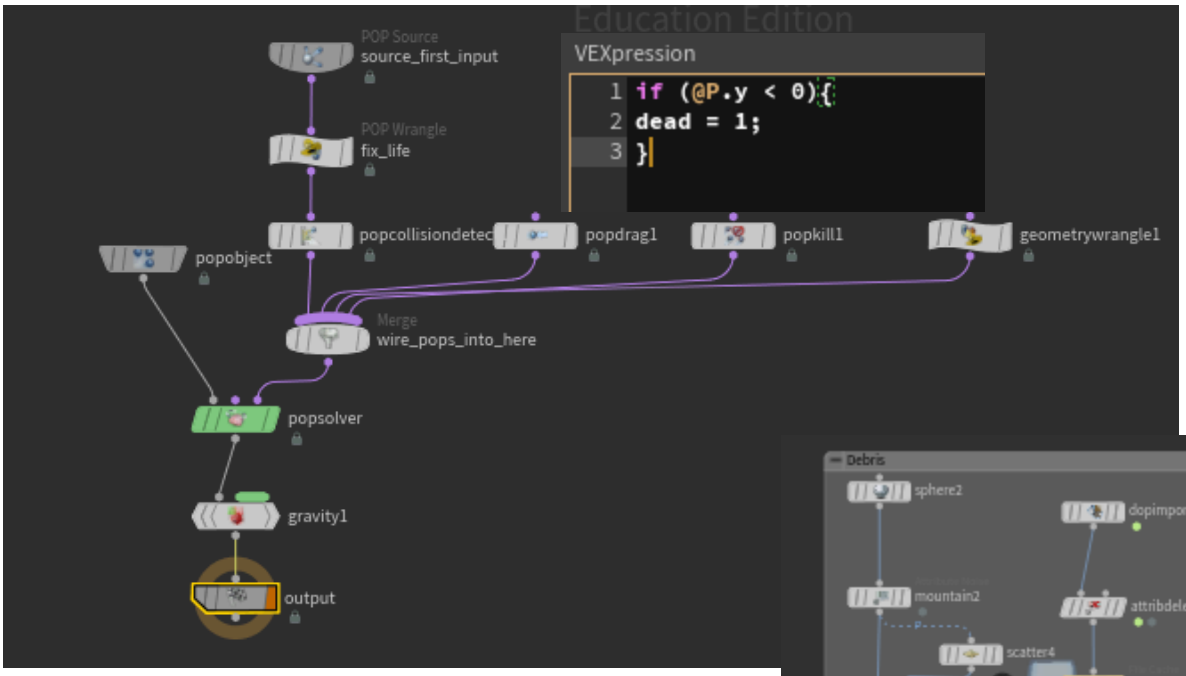
```
1 float drag = ch("drag_force");
2 float angular_drag = ch("ang_Drag");
3 if (@P.y < .15){
4 v@v *= (1-drag);
5 v@w *= (1-angular_drag);
6 }
```

VEXpression

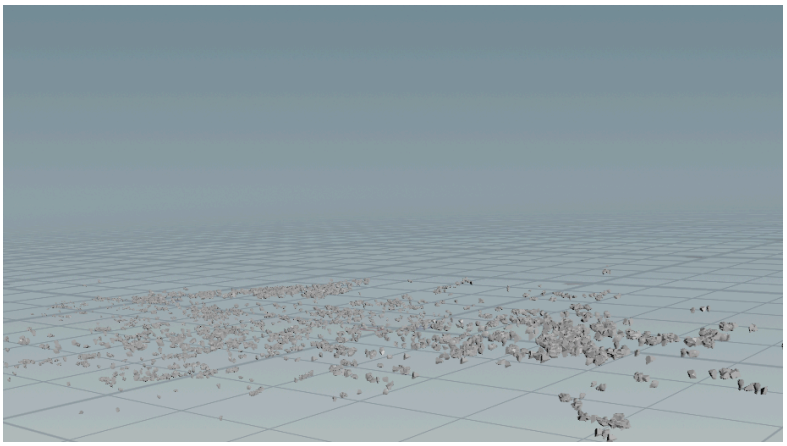
```
1 if (@deactivation_time > 3.8){
2 @active = 0;
3 }
```

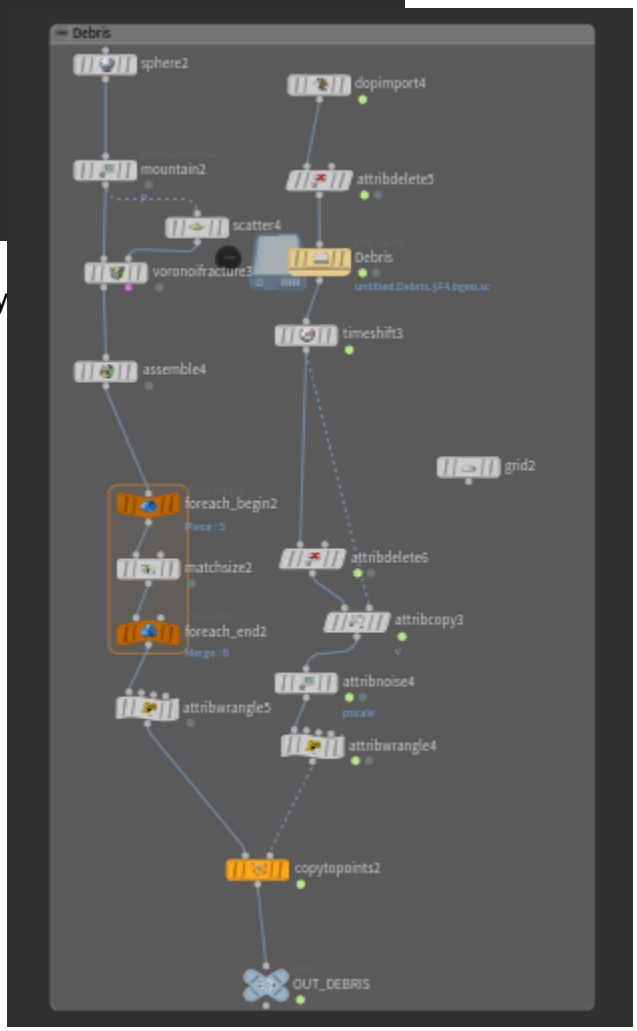
Technical Guide | Debris

POPNet of the debris simulation. The particles are sourced directly from the cached RBD sim. Inside of the geometry wrangle I have the standard drag setup. Inside of the popkill I have an expression to kill the particles that were passing through the ground plane.

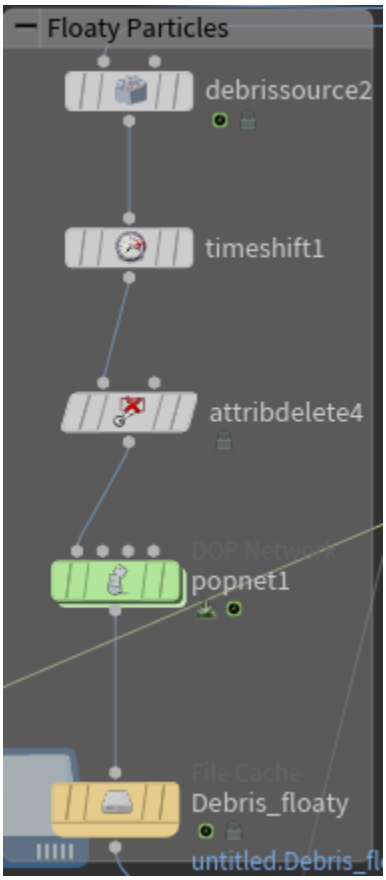


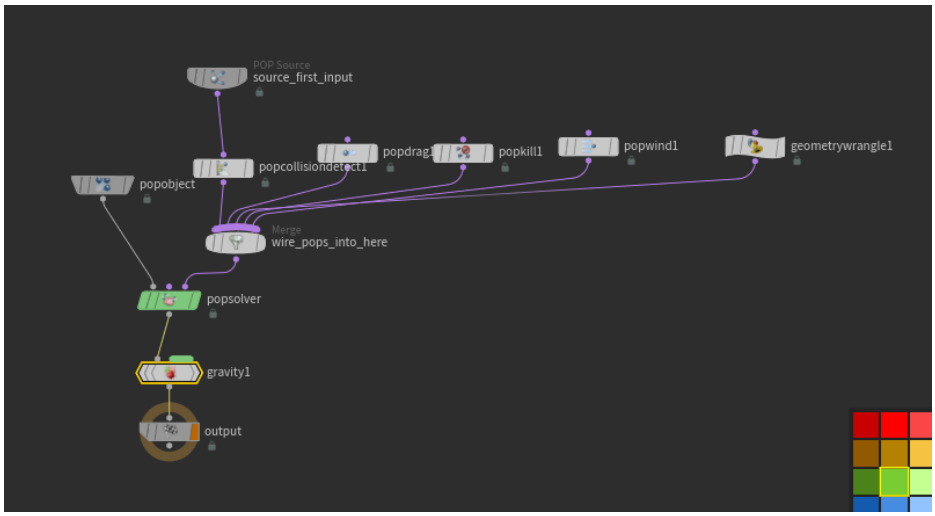
To get the small shards i fracture a small sphere and copy
The small pieces to the points from the debris simulation.





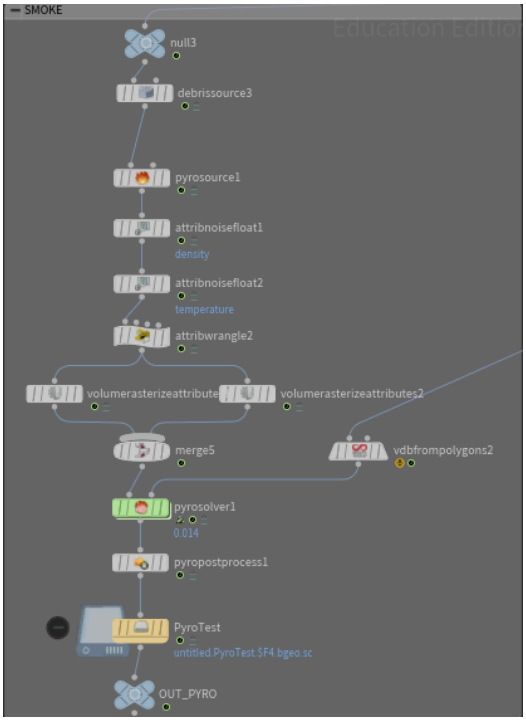
For the smaller floaty debris particles I have a second simulation, where the gravity is lowered and more wind is applied.

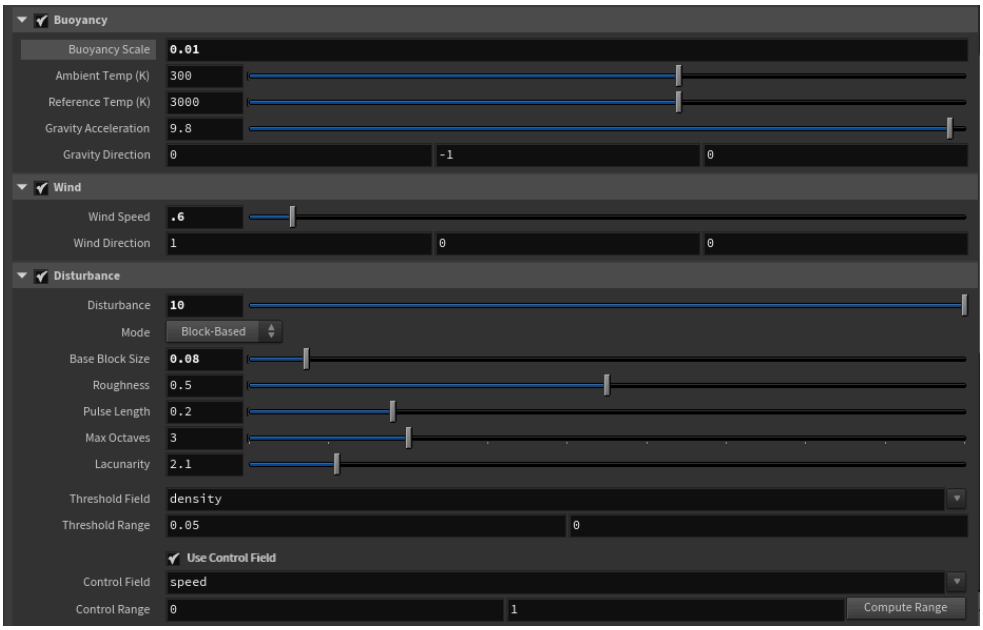




Technical Guide | Pyro

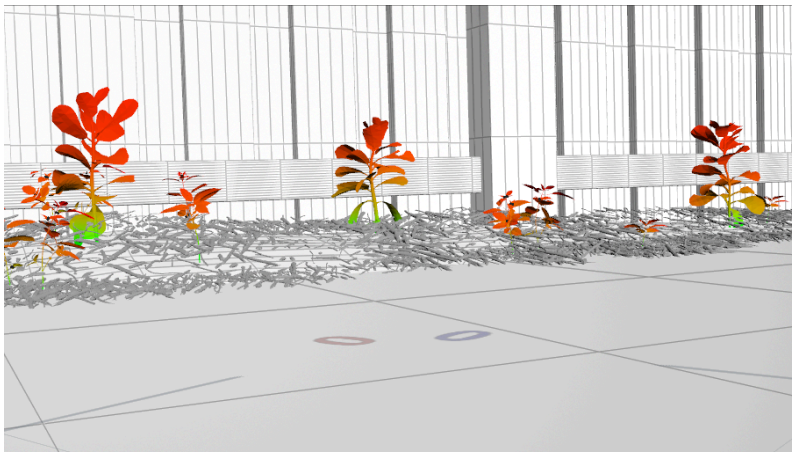
The pyro setup is done using the SOP pyro sparse solver. I source the pyro using a debris source and applying the respective attributes needed.





Technical Guide | Environment

I tried to match the environment that was in the reference. To accomplish this I gathered a lot of assets from Quixel Megascans and scattered them across the background. This includes twigs, small plants, and a fence I made.



Materials used for the scene

Technical Guide | Comp

Some comp to edit the final picture