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GAD214.2 World Crafting: Design and Implementation - Example 1

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Campus: Adelaide

Final work/Project deliverables

Google Drive Folder: https://drive.google.com/drive/folders/1RD1nd8K7zSIhh9E-DZ0o57ez3t8Sc5HT?usp=drive_link

Project ZIP: https://drive.google.com/file/d/1qXi47ynopqLcZIIpjQEreFbFSzDzD3Cj/view?usp=drive_link

Build: https://drive.google.com/file/d/1OgsIqfpb424OXOxvUq8xHOo7Ie4TwWE5/view?usp=drive_link

Level Cinematic Fly-through Video: https://www.youtube.com/watch?v=j8FJ_v0WDWk

Level Character Walk-through Video: https://www.youtube.com/watch?v=4RL5DSHv7AA

Introduction

A cyberpunk urban environment for a third-person action role-playing game. I will create the homebase for the protagonist, which is his apartment, the hallway and ground floor of the apartment building and as much of the surrounding street area as possible.

Process Documentation

Concept Development

Overview

The level I'm creating is for a third-person person cyberpunk action role-playing game. The environment is urban, at night and would serve as a central hub for a portion of the game. The player character's home is an apartment in a mega building which is somewhere the player returns frequently to store items, save their game, etc. Outside the building, we see commercial areas with a pedestrian shopping street nearby.

The aesthetic that is cyberpunk is defined as "high tech, low life". While the area is populated with people on the lower end of the socioeconomic scale technology is seen everywhere. Neon lights and video billboards are seen everywhere on the street. In a Cyberpunk setting, we also see body modifications where people have prosthetic limbs, mechanical eyes, and other technological implants in their bodies. All while being dirty and unkept, both literally and figuratively.

The environment is a place for a story about an anti-hero. There is nothing flashy or glamorous about the narrative and this is reflected in the environment. If it weren't for the Vegas-like neon light everywhere it would be quite depressing. The story takes place in the near future (less than a hundred years from now) so we would expect to see a mixture of familiar technology as well as things that don't exist yet. We would also see a fusion of Western and Eastern cultures as the city is a melting pot of cultures, something that's already happening in present-day cities and I predict will continue in the future.

Reference and Mood boards

Cyberpunk 2077

Night City from Cyberpunk 2077 (CD Projekt Red, 2020) is the perfect example of a near-future cyberpunk environment. It is the primary inspiration for this project. We see a fusion of Eastern and Western cultures, buildings stacked on top of each other, neon lights and advertisements everywhere, the city and the people in it live a high-tech but dirty life. We see garbage and explicit material everywhere. I've included some general screenshots from the game but primarily the entrance area from the protagonist's apartment. Walking up the stairs we see food vendors outside the lift area as well as down the stairs just outside the building entrance. The noodle shop trope is something I'm looking to replicate in my environment.

Blade Runner

The original Blade Runner (Scott, 1982) is a classic in the sci-fi genre. Here we see a a future with a dirty densely packed city. During the movie, you see a lot of people on the streets all the time and it's hard to move around. We see a blending of Eastern and Western cultures. We see neon signs and advertisements everywhere. The city is also quite dirty with a lot of trash everywhere. The Tyrell building stands out as a monolith next to the city's skyscrapers. The neon lights, air travel, the foot traffic and just the general vibe are what I'm looking to replicate in the level.
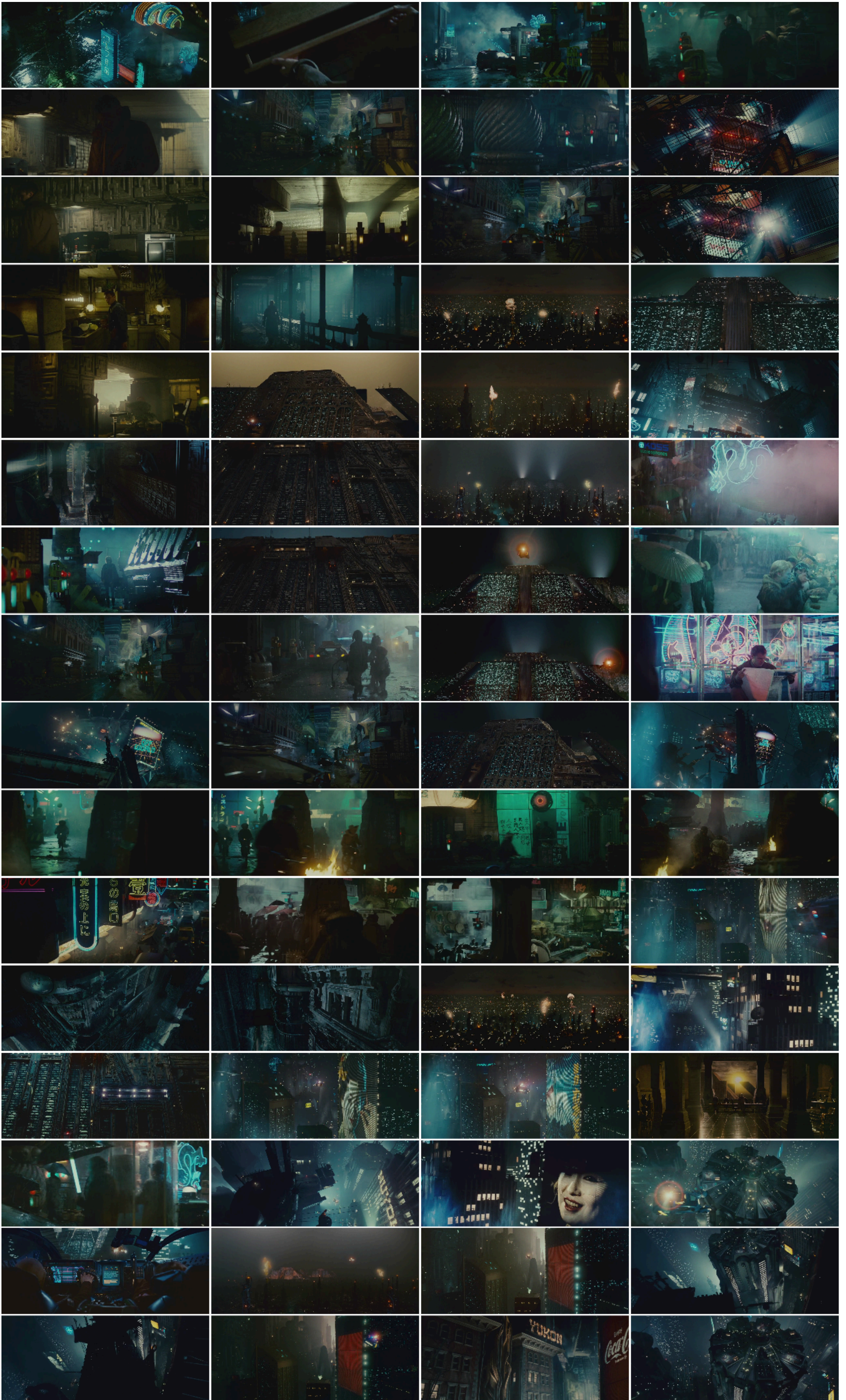
The Fifth Element

The Fifth Element (Besson, 1997) is not necessarily a cyberpunk movie but it is set in the future and depicts a city and how one might live in it in a way that I would also like to depict in the level. The city we see has skyscrapers high above the ground and in a densely packed grid with flying cars flying in between them. At one point we also see a train that travels vertically, this gives the audience the impression that the skyscrapers are so tall they warrant such transportation. I would also take inspiration from the protagonist's apartment, which is very small to fit as many people as possible in the city. The apartment makes use of space effectively with different room functions retracting into the wall or ceiling. For example, the fridge moves down to reveal a shower complete with an automated clearing system. The bed also retracts into the wall with automated bed-making functionality. It seems that buildings were just built on top of other buildings with the lowest level being abandoned or doesn't see much use, we see that a layer of smog separates it from the rest of the city. The verticality of the city, the tightness of living spaces, and the use of flying vehicles are something that I would like to depict on the level.

Blade Runner 2049
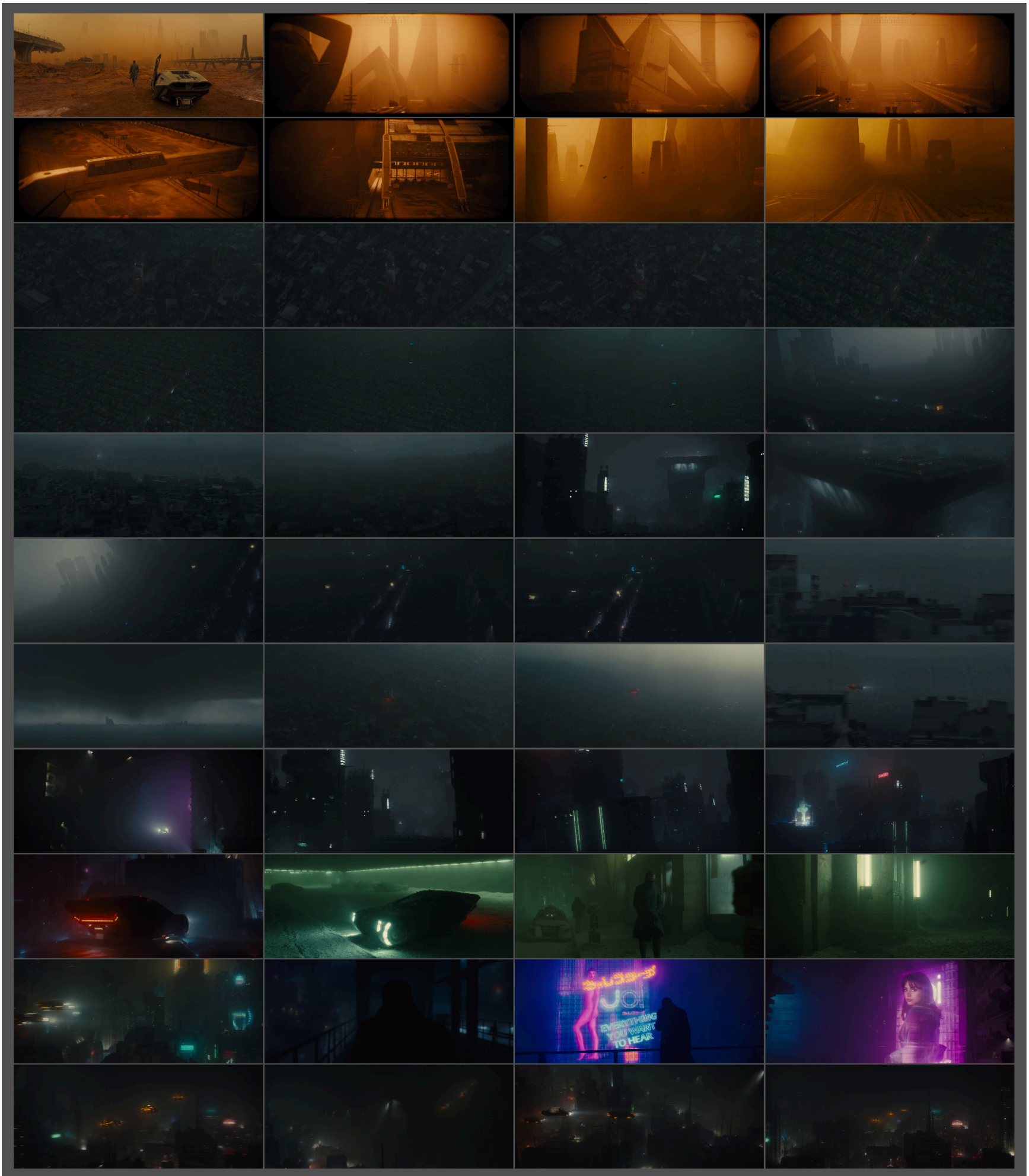
Blade Runner 2049 (Villeneuve, 2017) also depicts a densely packed city full of skyscrapers with mega-buildings that rise above them. The mega-buildings are almost like grand monuments like the Pyramids at Giza. We see neon signs and advertisements depicting nudity showing us that moral standards have fallen in the future. It's hard to see some of the city sometimes because of heavy fog or pollution but in the daytime scenes, we get a better sense of the architecture. The style of architecture, the lighting, pollution and style of vehicles are what I would like to depict in the level.

Design and Blockout

Exemplars

Technology, neon lights, video billboards

Something that is common to Cyberpunk themed media is the depiction of a city filled with neon signs and video advertisement billboards. This comes from the growing expansion of corporations looking to sell their products. Typically these settings are set in the future where technology has advanced forward typically faster than what we see in real-life. So these depicted cities feature inhabitants that have cybernetic implants, prosthetic limbs, and are generally seen wearing high-technology.

Multi-level, walking spaces above the standard "street level" we also see a mixture of grounded and flying vehicles.
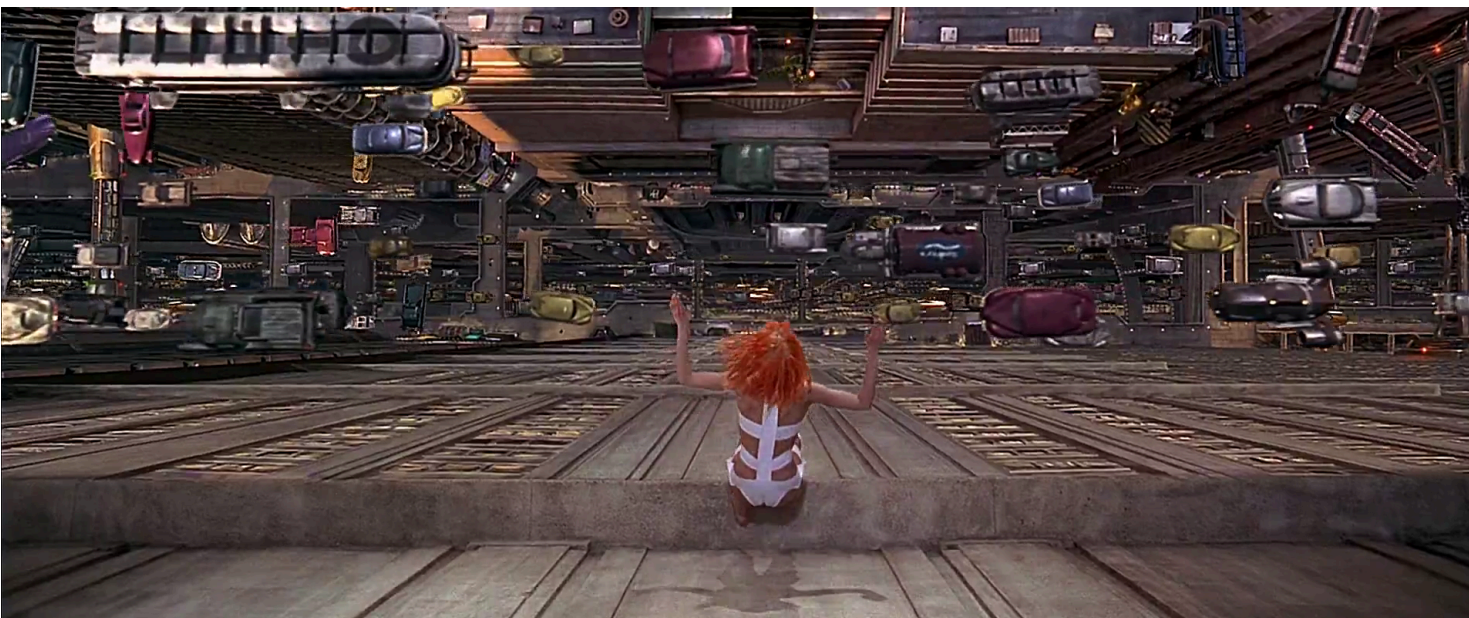
Another thing we see depicted in Cyberpunk themed settings are large cities with very tall buildings. The buildings are sometimes even built on top of each other. We see multiple layers of traffic with flying cars in vertical lanes.

### Dirty, low-life. People doing questionable things, ie prostitution, drugs, gambling.

Typically what we see in a Cyberpunk setting is technological advancement but cultural and moral regression. Crime is more prevalent and people have looser morals. This is partially due to the corporations pandering to humanity's more primitive instincts in pursuit of profit.

Level/Set Design:

Level Design Document:

https://docs.google.com/document/d/1bkifVhmPrMVmMaldCJTnQpok_0b8Rye3ZE653z7ixjM/edit?usp=drive_link

I began by sketching out a plan for the nearby area of the city. I found it hard to show vertically so I have shown some overhead roads and railways in red.
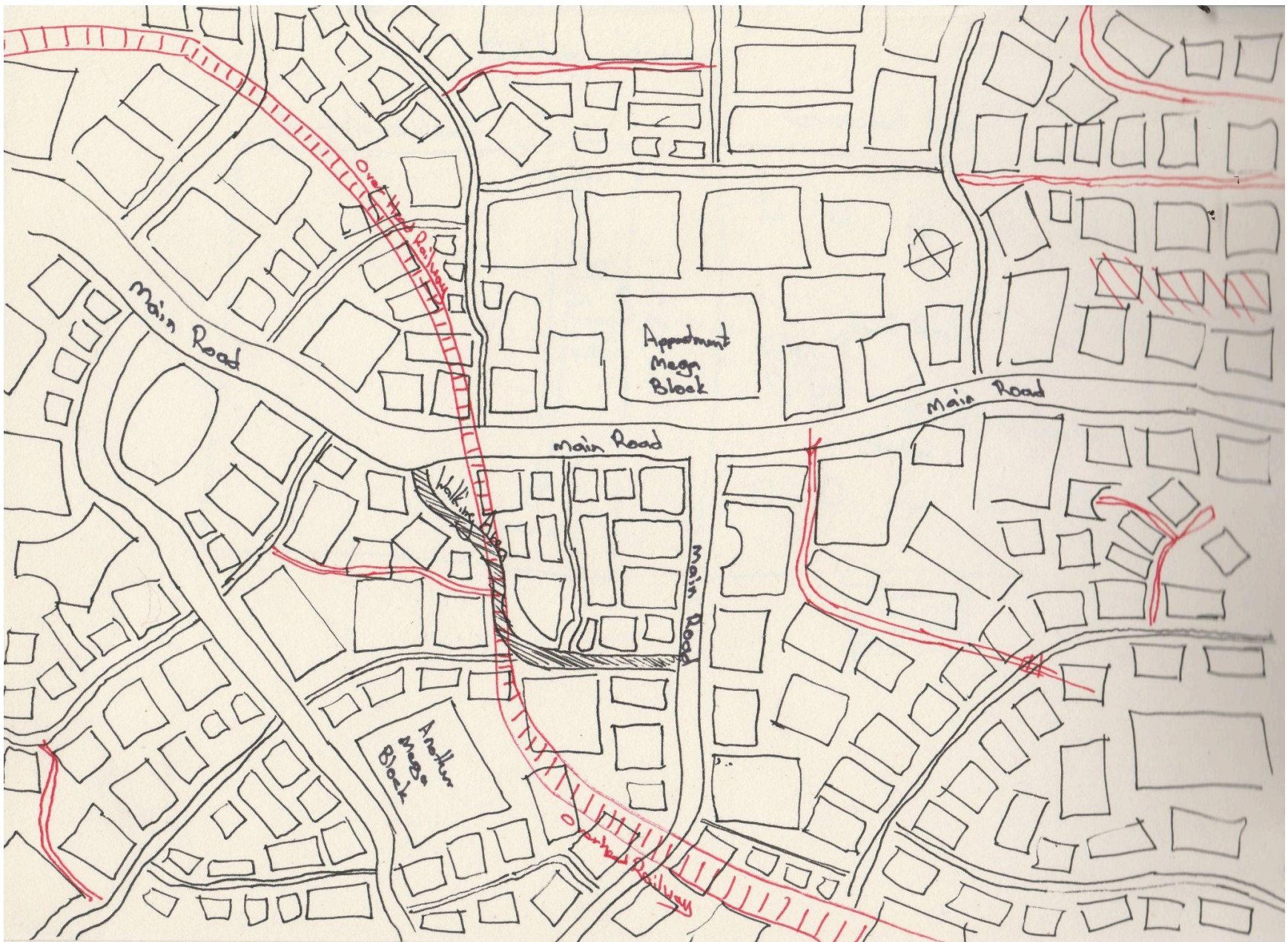

I also worked on sketching out the interior of the main building. The idea is that the player would start from the apartment, walk down the hall, and take the elevator down. On the ground floor, there would be many food stalls and other low-end commerce. Once the player exits the building they are at the central T-intersection.

Building Interior

Appartment floor

Ground Level

Elevator

App.

Elevator

Food Stalls

Vendors

Elevators

Walkable

2.5 M

1.6

2.2

2.5 M

1 M
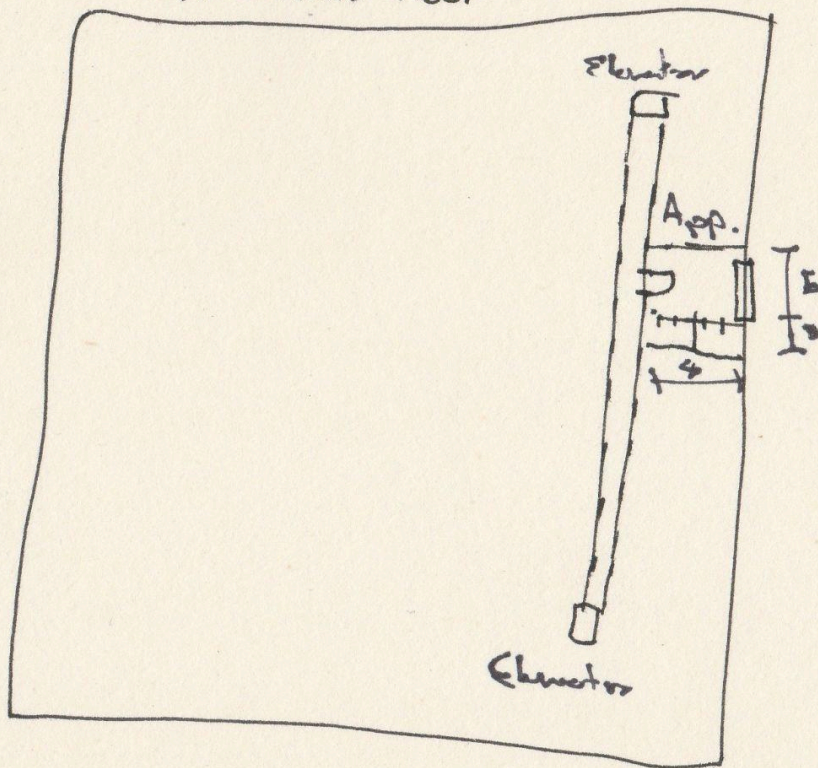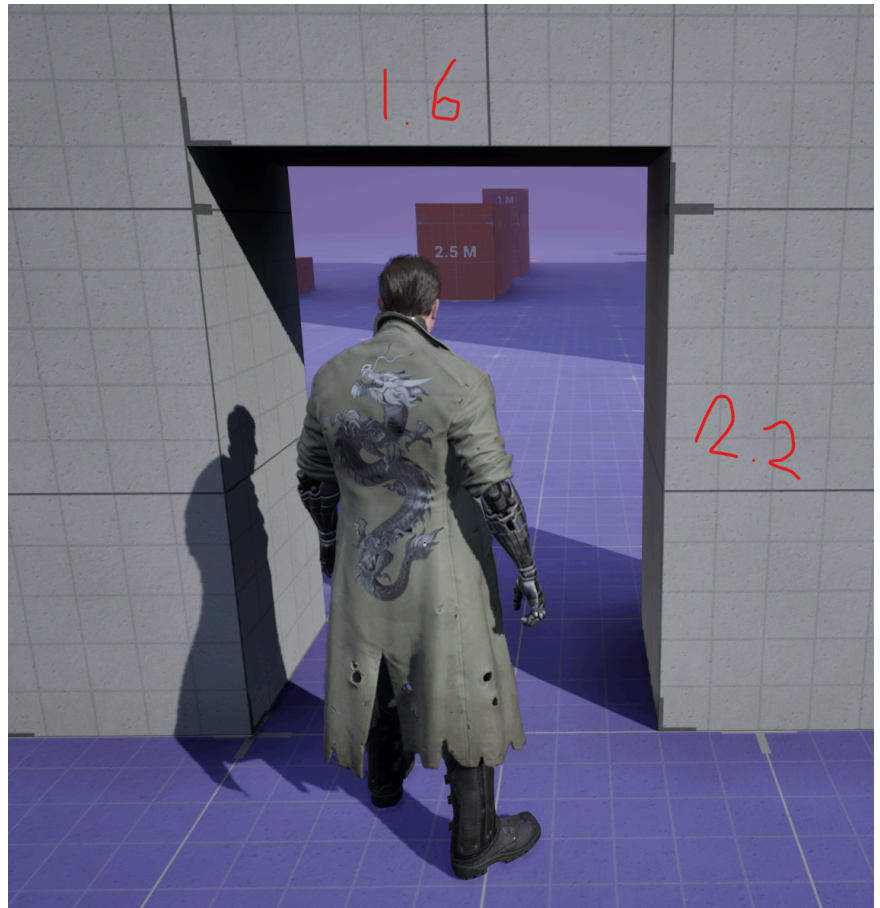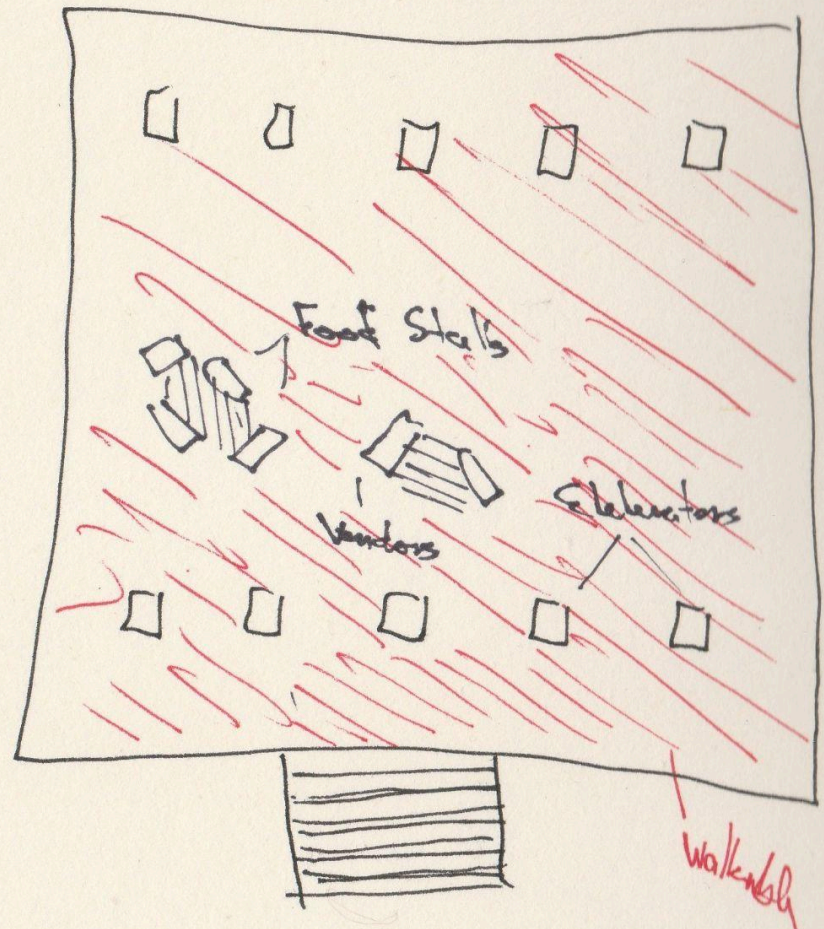
I started by downloading the Game Animation Sample Project (Epic Games, 2024) and I performed some testing at the gym level. I found that a doorway should not be smaller than 1.6 metres wide and 2.2 metres tall. The character could also vault over obstacles 1 metre high and climb up vertically on a ledge up to 2.5 metres high.

I placed some building-size blocks and found that alleyways should be about 4.6 metres wide or less, but bigger than 3.5 metres in width. For the street, I found that a car lane should be 6 metres wide with a 1-metre gap in between. The sidewalk should be between 4 metres and 8 metres, with the ideal size being 6 metres wide.
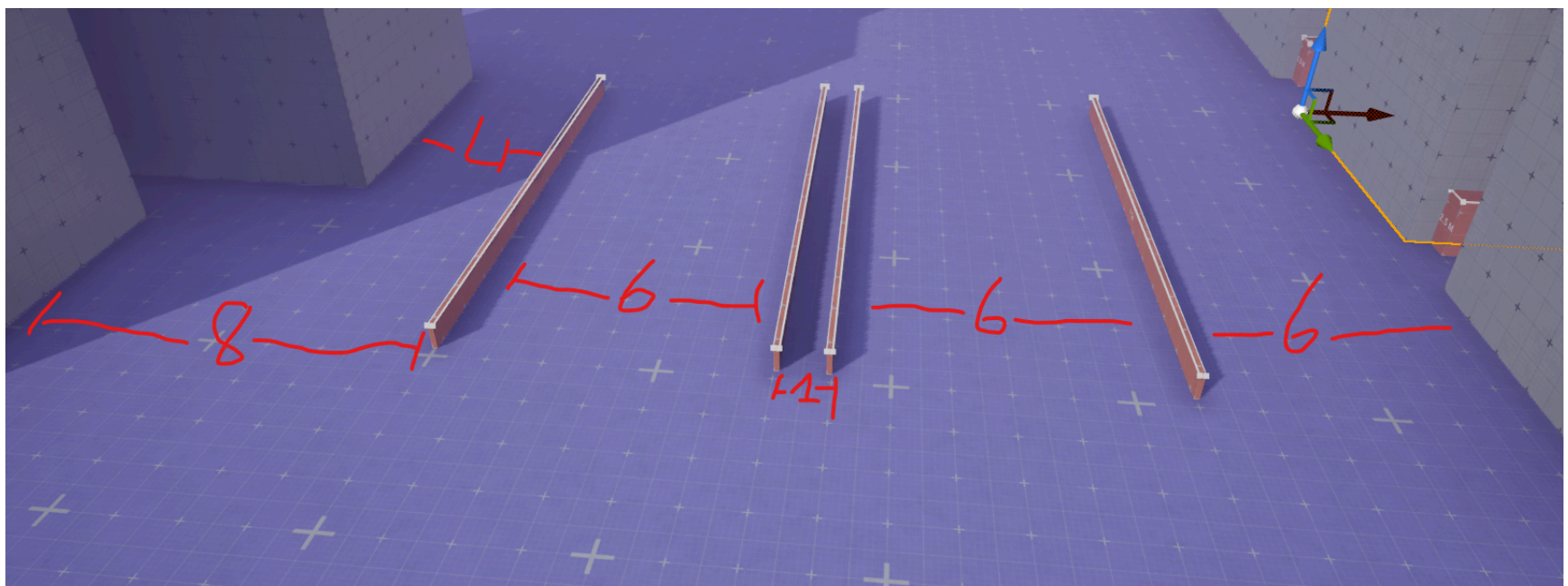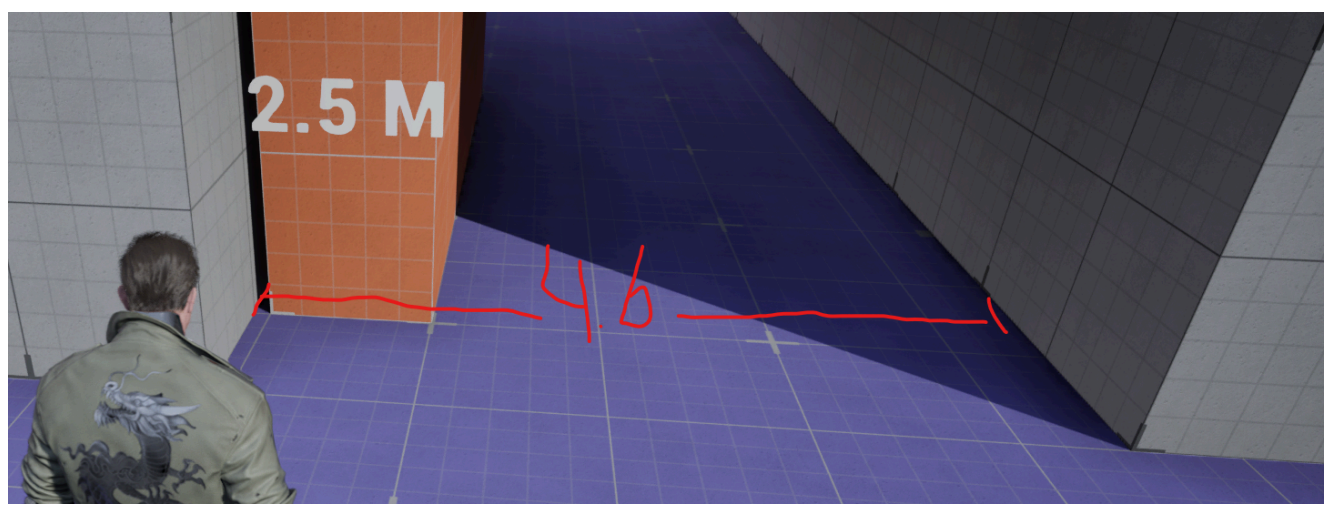
Blockout
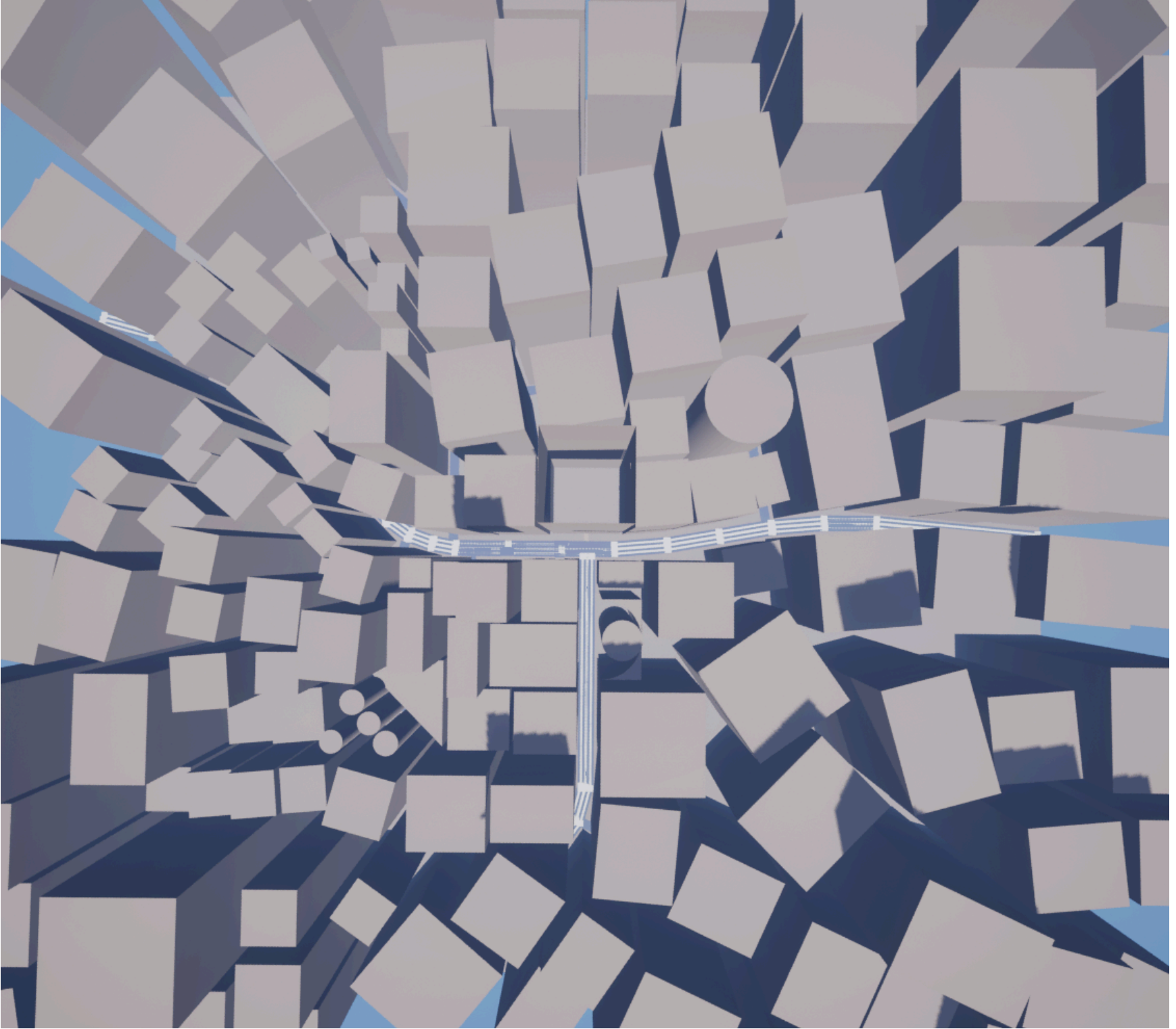
I began by blocking out the city according to the hand-drawn map I mentioned earlier. I first drew out the main road and began placing rectangle-shaped objects to represent buildings. I also created a blockout of the main building which included the ground floor and elevator placement.

I was able to test it out with the character walking around in the blockout world, this was captured in a YouTube video. I found the scale to be quite large and will focus on specific spots in the city. I then proceeded to start adding assets to the level.


Asset list

https://docs.google.com/spreadsheets/d/18iJchIXPyAyjZXA1Gb2MO7g8AioXQeawSG1moHmRO3I/edit?usp=drive_link

Asset Packs used:

- Cyberpunk City (Cyberpunk, Cyberpunk City, Sci-Fi City) (Epic Games, 2023)
- City Environment Megapack vol 02 (Epic Games, 2021)
- Tokyo Stylized Environment (Epic Games, 2023)
- Cyberpunk Japan holograms (Leartes Studios, n.d.)
- Student apartment (Leartes Studios, n.d.)
- Cyberpunk benches (Leartes Studios, n.d.)

Production

Asset production (3D models, textures and materials)
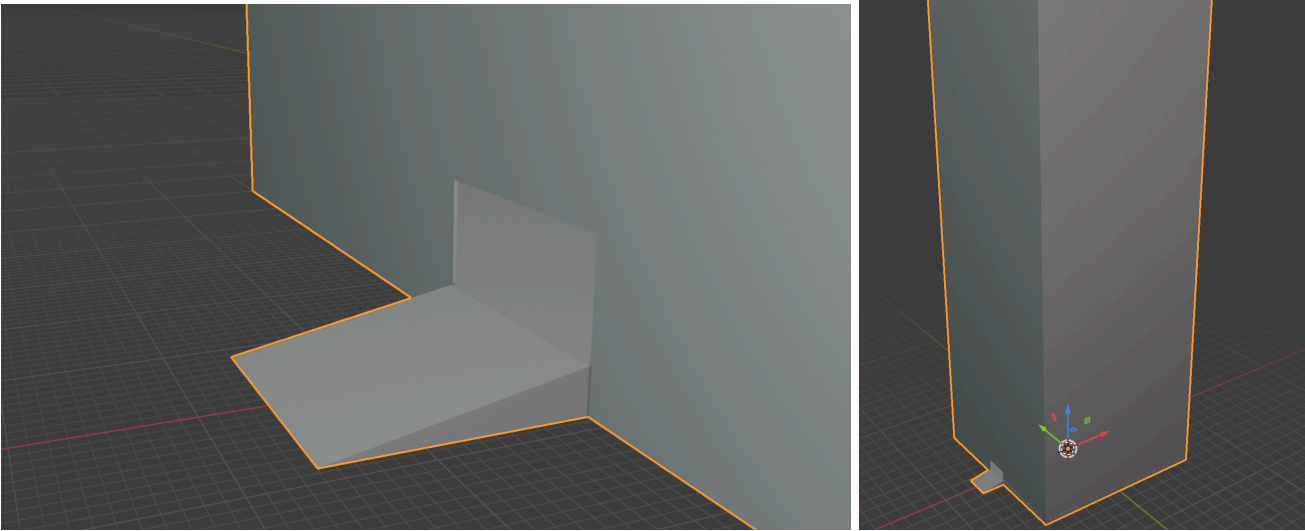
I began by making the building in Blender. I created a cutout for the ground floor and doorway. Then adding a slope for the front stairs.
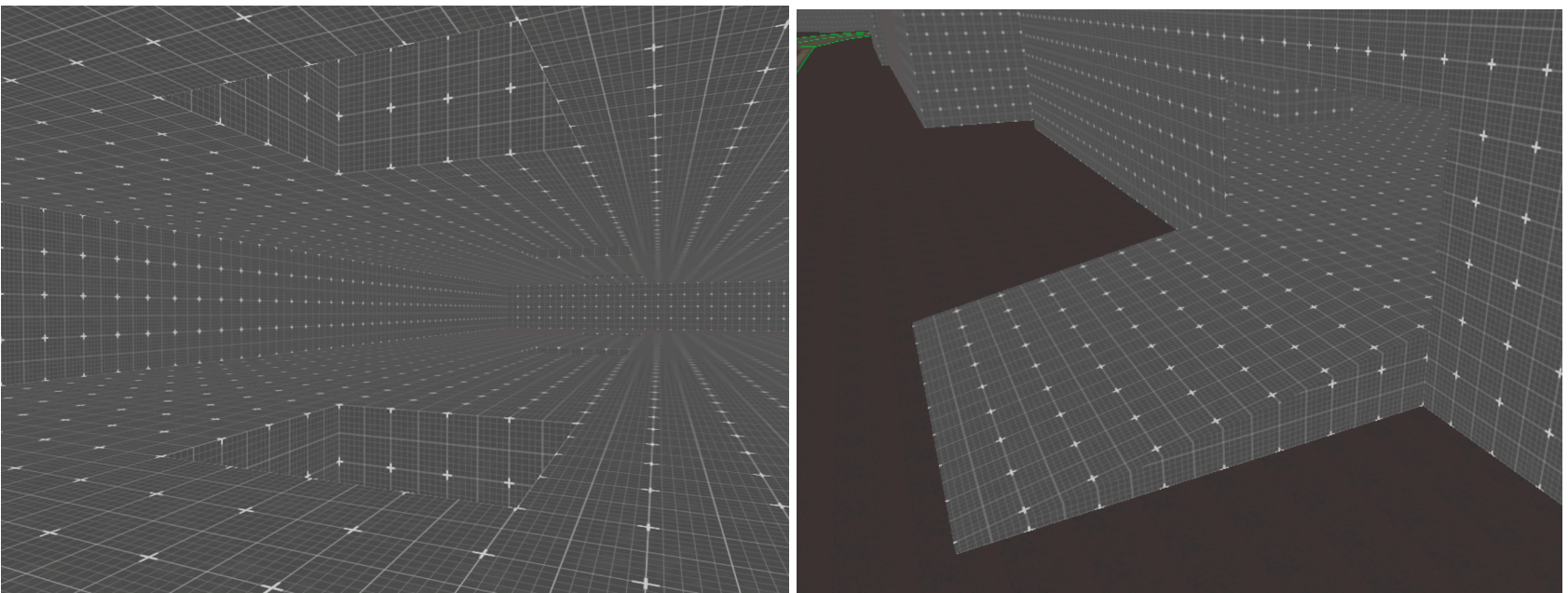
I hollowed out the ground floor and the apartment level floor as well as the elevator shafts. I also added a slope to the front of the building where the stairs would be.
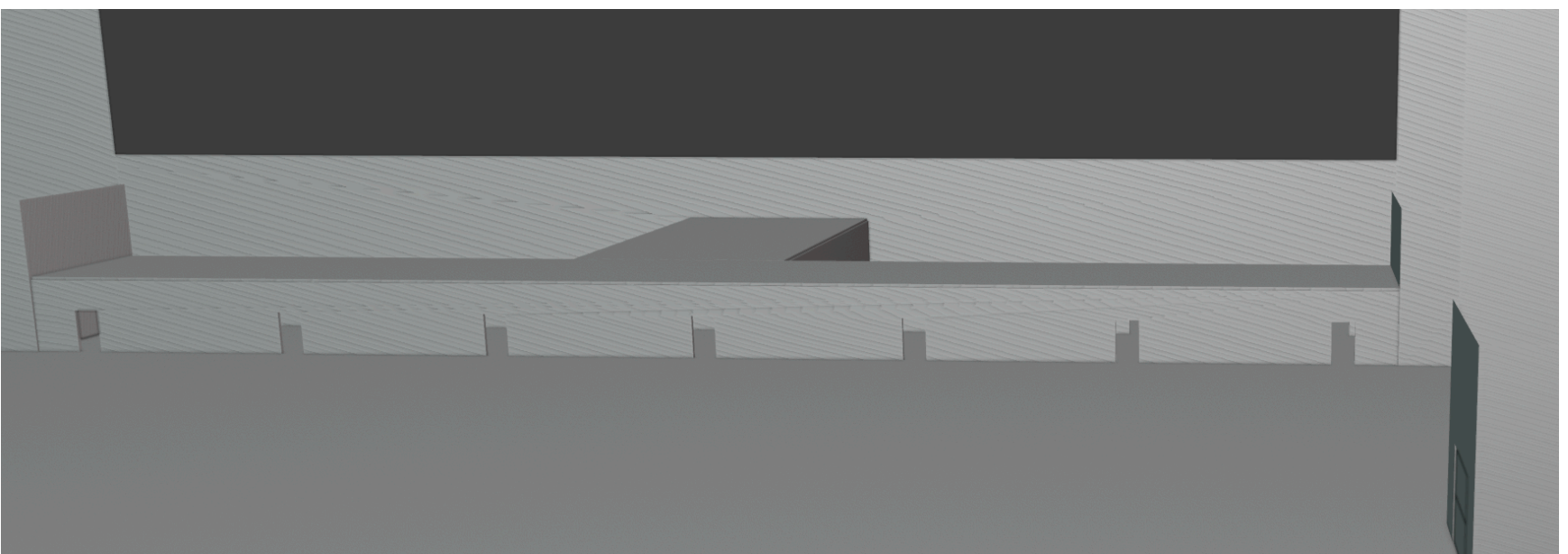
I then added walls for the hallway and the apartment itself. A window was also added to the apartment.
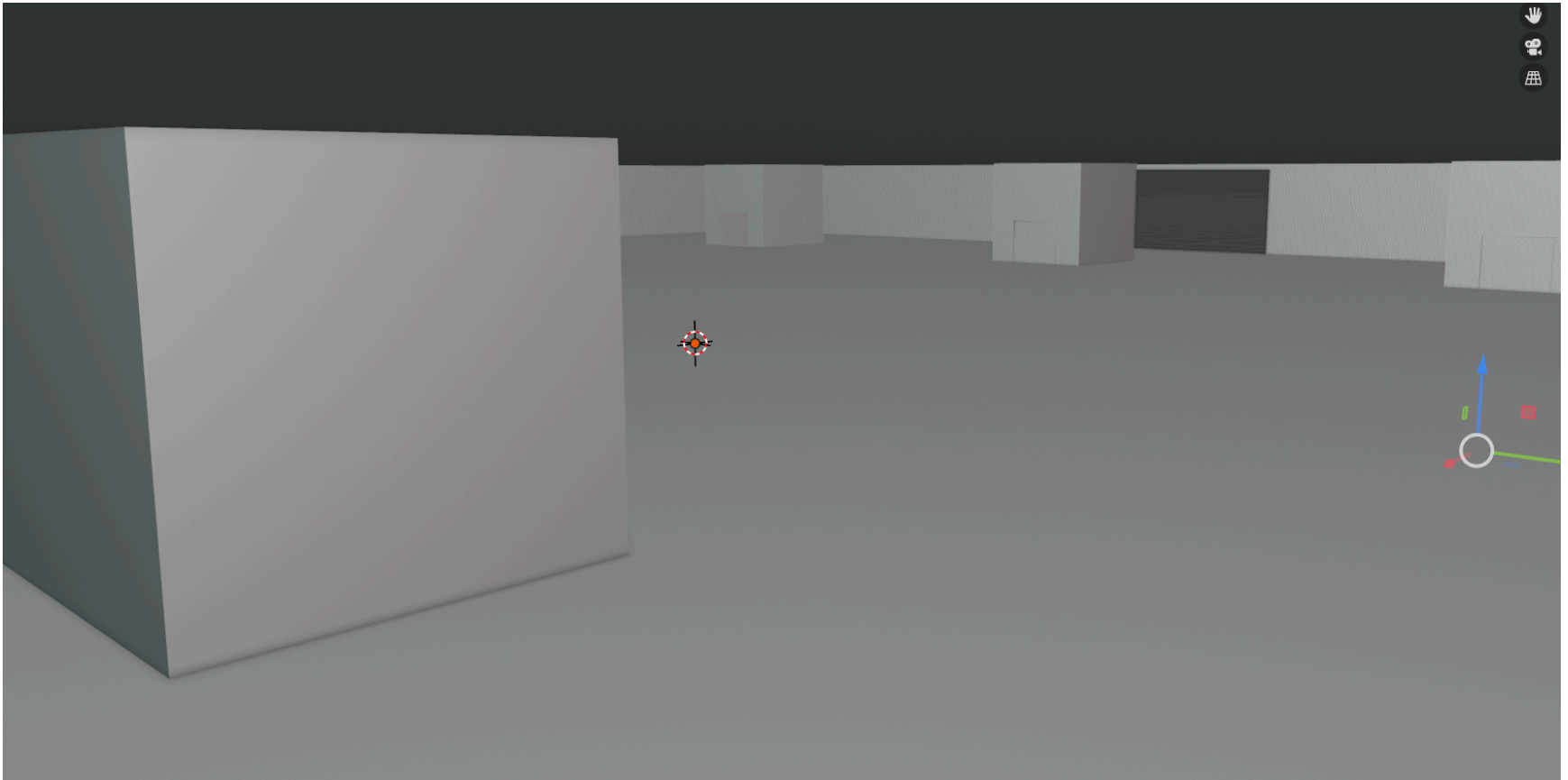
I made cutouts for the doorways for the elevators and individual apartments. I then made doors and used them to cover the doorways that wouldn't get used. The door objects themselves were exported out into unreal.
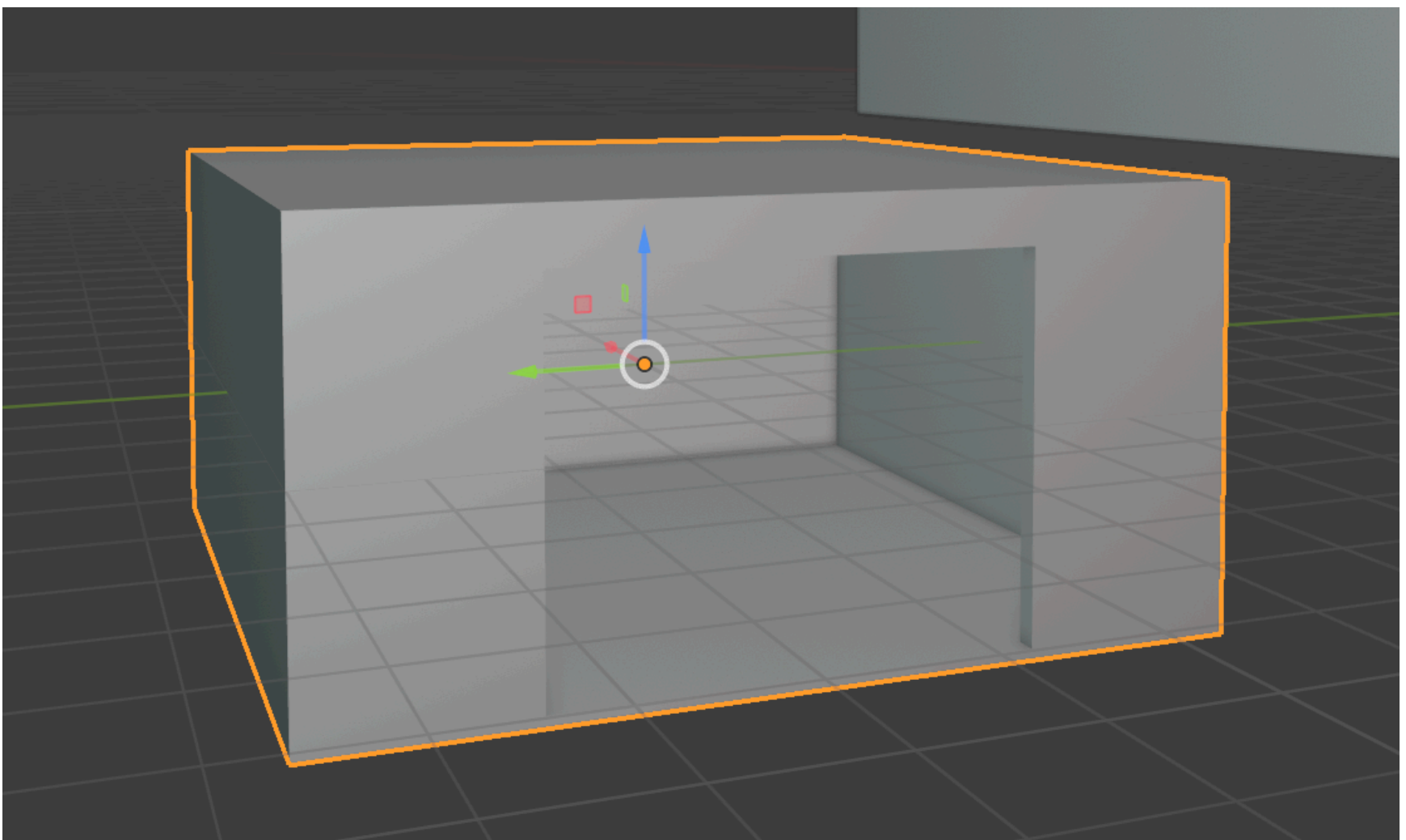
I made an elevator that would travel between the floors. This was also exported out.
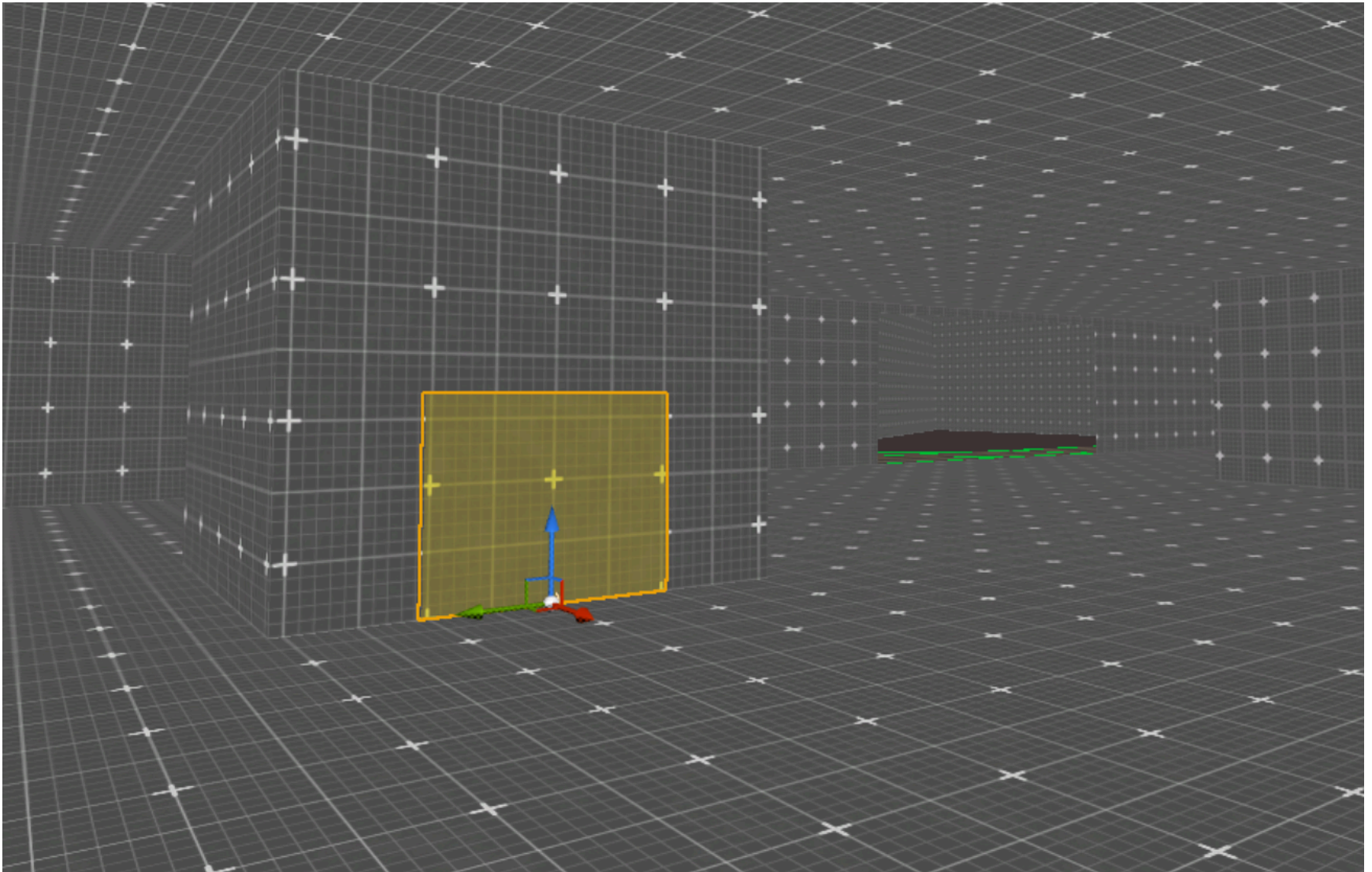
Once back in engine I began working on making the doors and elevator blueprints.
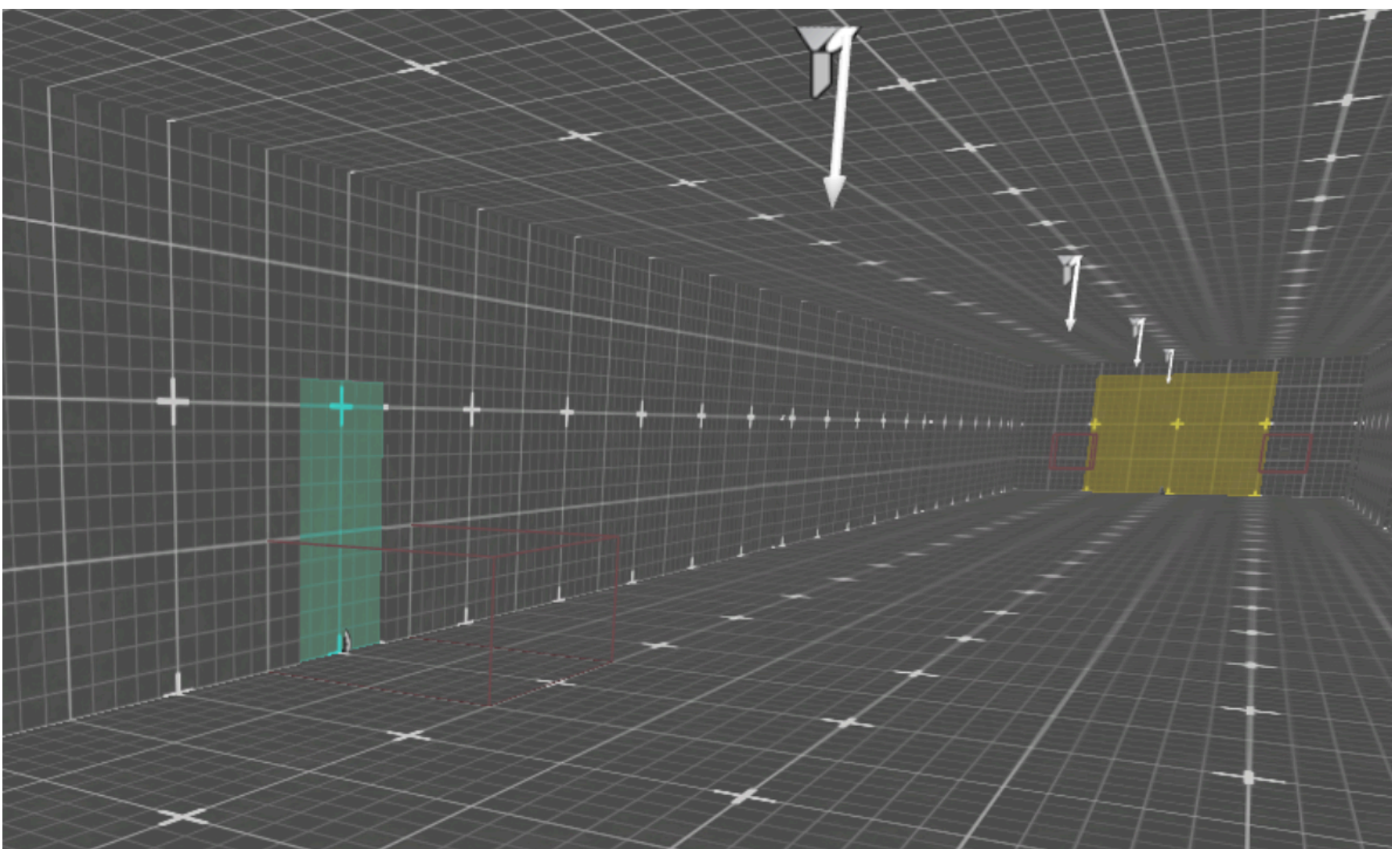
I used different colours to show the doors that move when the player interacts with them.

I created a [second YouTube video](#) showing the building model and its functionality I created via blueprints.
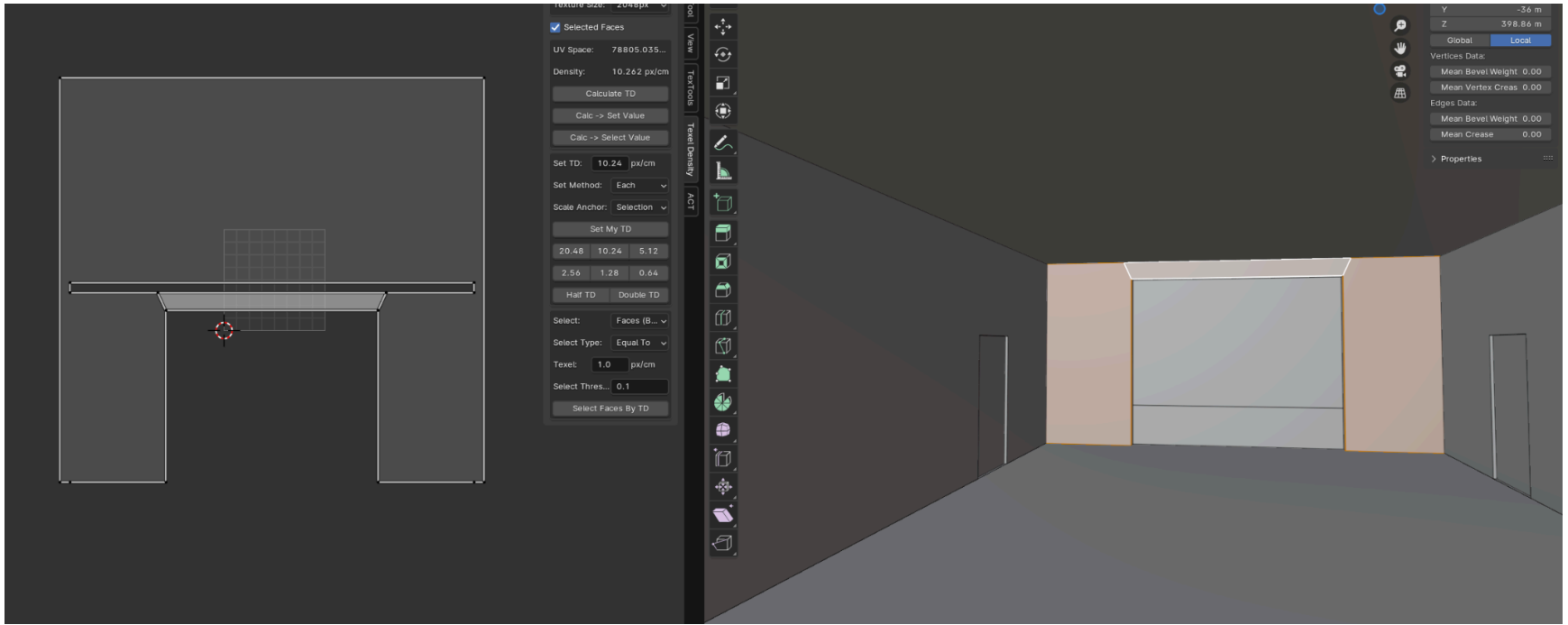
Next I began UVing the building model. I kept the elevator doors, hallway doors and the elevator itself separate. Used 10.24 texel density on all the UVs.
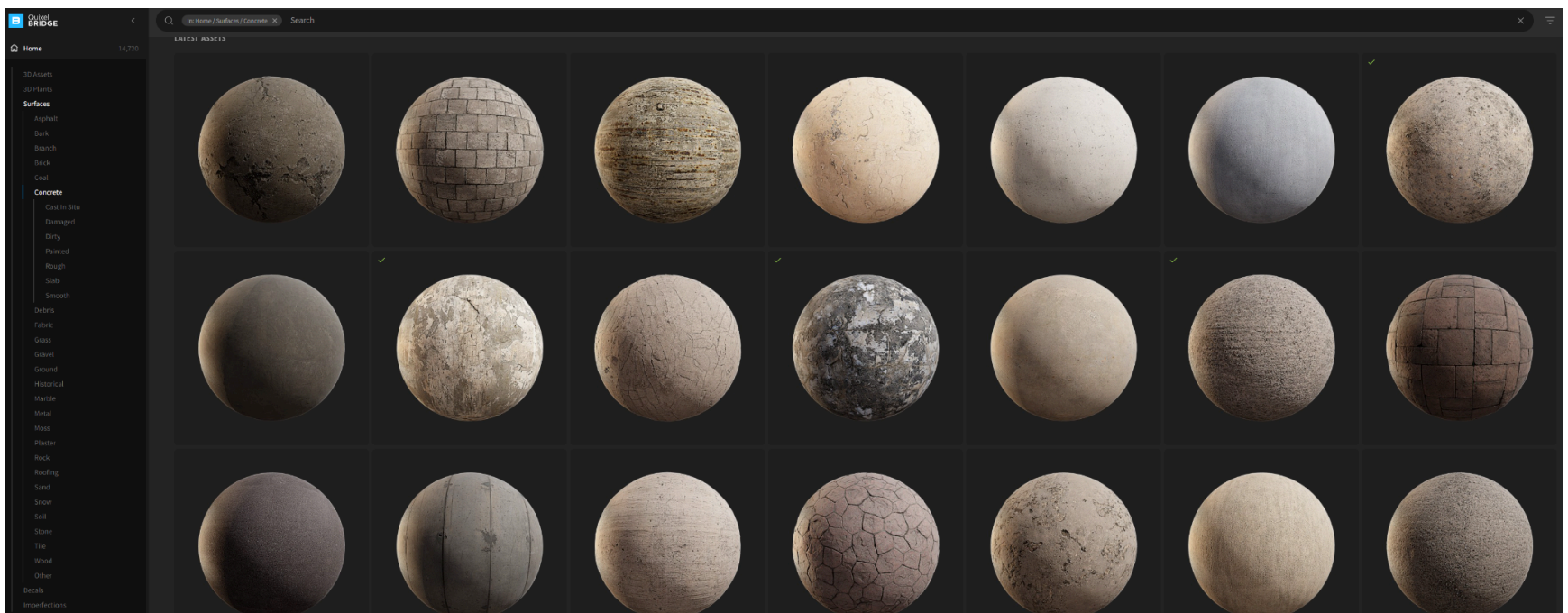
For texturing the building I downloaded textures from Quixel Bridge.
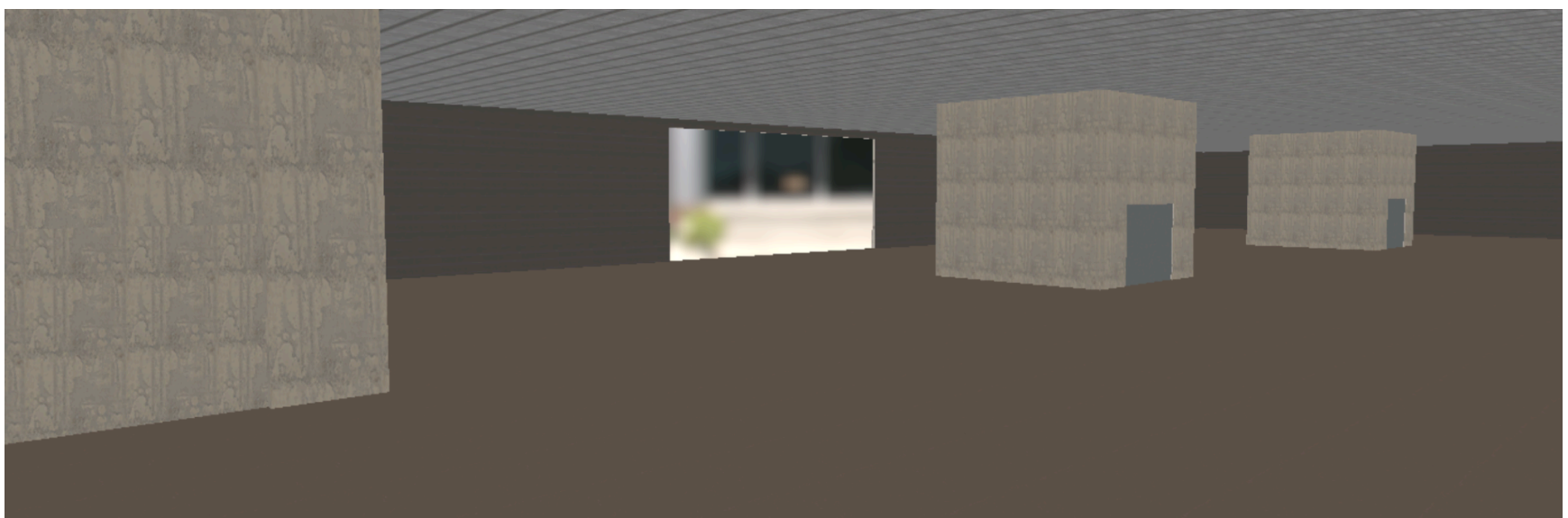
In unlit mode we can very obviously see the tiling of the textures but with the low lighting of the level this won't be so noticeable.

I reused the door switch I made in the last project but used different textures on it.

Scene assembly and set dressing

I began by experimenting with adding street lights and the first few floors of a building over the top of my blockout. I added a tile texture to the buildings and changed the lighting so it's night time.

I experimented with splines for different over hanging lanterns and cables.

I also began experimenting with adding trash and random street items.

Later I began adding a crowd using the *Procedural NPC Crowds V2* (Epic Games, 2022) asset pack. This is showcased in the [third youtube video](#).

Once the building was UV'd and textured I added props to the apartment using the *Student Apartment* (Leartes Studios, n.d.) asset pack.
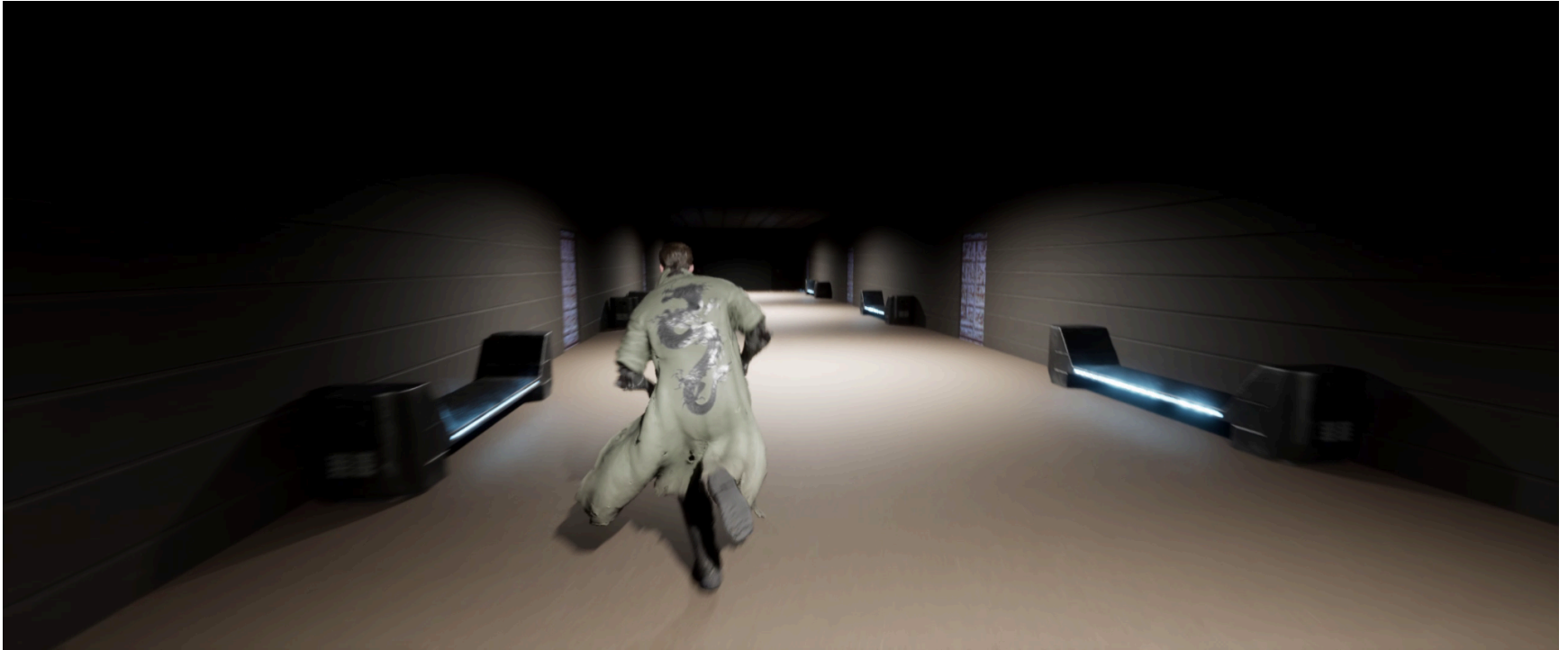
I added benches to the hallway and the street level from the Cyberpunk Benches (Leartes Studios, n.d.) asset pack.

Outside the apartment I dressed the building with holograms from the Cyberpunk Japan holograms (Leartes Studios, n.d.) asset pack.

I also began using these on the street level. The goal is to have at least every building having a word style sign as they help to light up the scene. Progress to this point can be viewed in the fourth youtube video.

Next I added variation to the crowd using the *Scanned 3D People Pack* (Epic Games, 2019) asset pack. More progress can be viewed in the fifth youtube video.
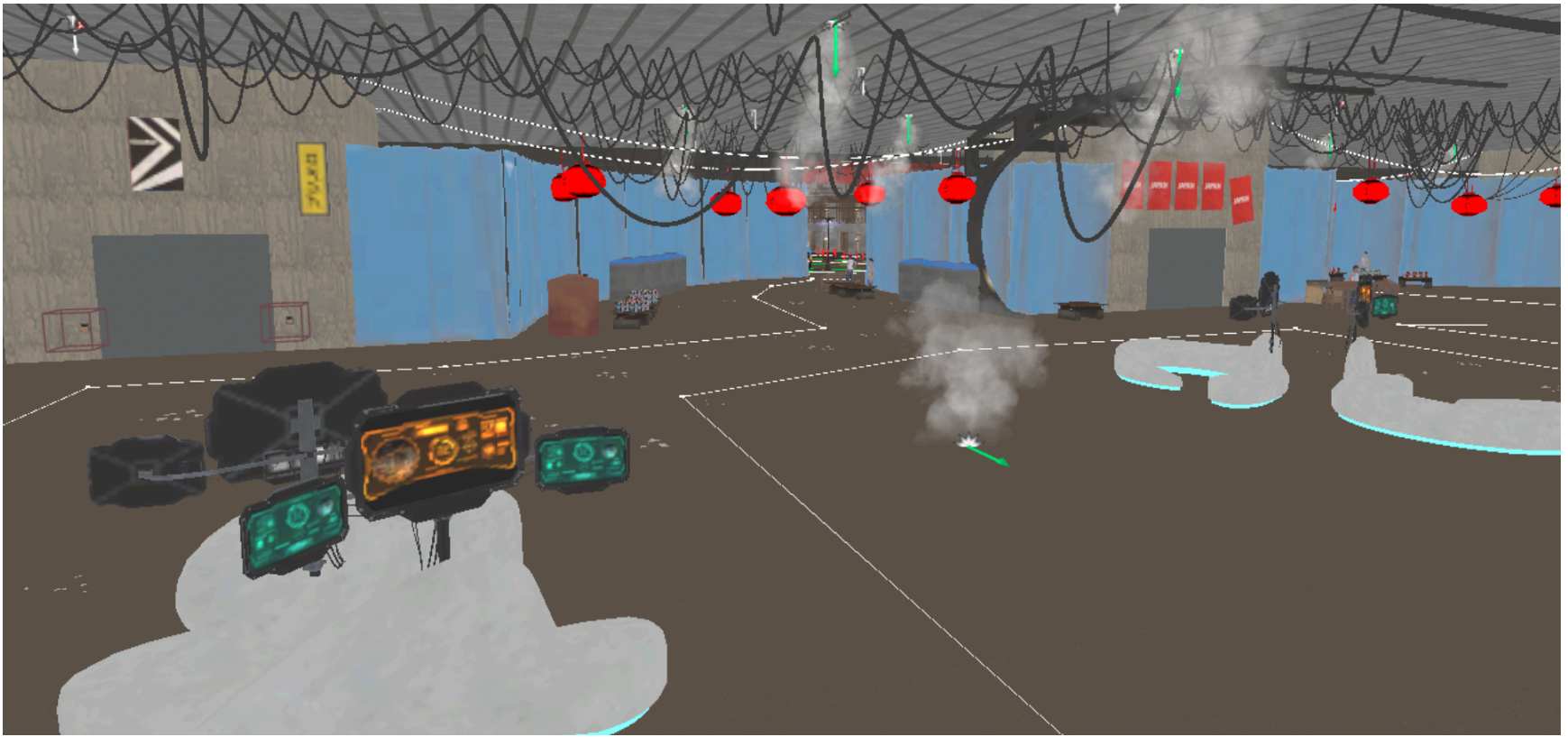
I then began working on the ground floor of the apartment building. I added tarps around the inside to reduce the floor space, and began adding stalls with vendors standing ready to sell items to passer-byers.

I added a vehicle pack and created a simple Blueprint for static meshes to travel along a spline. I created a second blueprint for the car models which would choose one at random on spawn, and with functionality to travel along the splines. The first blueprint then spawns as many cars as it needs to fill its spline. As the cars get to the end of their path they are destroyed and the spline blueprint spawns in a new one. Progress up to this stage can be viewed in the sixth YouTube video.

Using the spline tool and the Procedural Content Generation plugin I created a groudrail that separates the cars on the street and the pedestrians on the sidewalk.

I continued filling the ground floor with vendors. I would create a stall that featured one item or a mixture of similar items and then I would reuse that stall a couple of times in the area. I also added more lantern lights in the area.

Lighting

The environment takes place at night so most of the lighting would come from artificial light sources instead of the sun in the sky.

I began with the street light models found in the Cyberpunk asset pack which I adjusted for my scene, it already included two point lights, spot lights and lens flares in the blueprint. Along with the holographic signage these street lights would light up the street level portion of the level.

The apartment itself was lit using two spotlights which I made the outer core angle set to 90 degrees.

Similarly the hallway was lit using spotlights but with the outer core angle at 80 degrees.

The ground floor of the apartment building was lit using spotlights with the outer core angle at 50 degrees. Later I added the lanterns which provide much of the red light that we see in this area and this provides a mixture of red light and normal white light as you walk through the area.

Testing and Iteration

Testing and Optimisation

Throughout the development of the level I would regularly create a build and test walking through the level. This allowed me to detect problems as they arise. This required adjusting lighting or spacing lighting sources further apart. There were some technical problems which I did not have time to address such as when the character is riding the elevator down their coat flys up as if they are falling. I chose not to address it because it falls outside of level design and art.

The street part of the level has a lot of moving parts including the crowd and vehicles. The street level needed to appear that it is in use but for the purpose of this project they did not need to have the mechanics we would expect in such a game. For example the individual crowd members don't try to avoid each other. That is to say they will collider with each other because the model has a collider but they are not "thinking" about where they walk.

Similarly the vehicles spawn and move on a path, they have slightly different speeds and they are spawned to be spaced out. But they can only have straight A to B paths which is a problem as the apartment building is in front of an intersection. I simply had one path terminate inside the straight part. So it's possible to see cars inside of each other as well as vehicles drive into other vehicles as they merge into traffic off a turn. Tweaking the variables it's possible to keep it to a minimum but if a player were to stand watching the traffic they would see these mistakes. Having said that, keeping the processing of traffic and crowd movement to a minimum enabled the level to be performant.

The most expensive part of the screen is the ground level of the apartment. This not only has a moving crowd which needs to appear that they are wandering around. We also see vendors in front of their stalls and a lot of lanterns giving off light. The area is not as congested as I intended because as I added more to it I was noticing a performance drop. I believe this is due to the amount of individual static meshes that form just one stall. I got to a point where I decided not to keep adding to that part as there is enough there to sell the idea.

Final Deliverables

Google Drive Folder: https://drive.google.com/drive/folders/1RD1nd8K7zSlhh9E-DZ0o57ez3t8Sc5HT?usp=drive_link

Project ZIP: https://drive.google.com/file/d/1qXi47ynopqLcZllpjQEreFbFSzDzD3Cj/view?usp=drive_link

Build: https://drive.google.com/file/d/1OgsIqfpb424OXOxvUq8xHOo7Ie4TwWE5/view?usp=drive_link

Level Cinematic Fly-through Video: https://www.youtube.com/watch?v=j8FJ_v0WDWk

Level Character Walk-through Video: https://www.youtube.com/watch?v=4RL5DSHv7AA

Video Development Log YouTube Playlist:
https://youtube.com/playlist?list=PLoqGXox0v_wquLpOW8Vk07pchJbd0U99k&feature=shared

Project Reflection:

Appraisal:

I am happy and proud of what I achieved by the end of this project. However I think I only achieved 60% of what I originally set out to do. Firstly I overestimated how much I could complete in the allotted time. I planned to have more street level areas with a back alley area and a shopping street similar to open-air malls we have today. I also did not have time to add the verticality to the level I was looking for; there are no flying cars or anything really above eye level as the character walks through the street. I also did not add anything that uses the mechanics the character comes with such as vaulting or climbing up vertically.

People skills:

During the project we would share our progress in class with our facilitator. Steve, our facilitator, provided feedback and suggestions on how the next step of the process could be completed. Steve would offer asset packs that contained elements for our levels, a weather system for example, but I did not receive any of these nor did I see him post them in our class's slack channel, which would have been useful in the completion of the level. Steve did provide resources and recommended videos from professionals in the field which were very helpful in learning the process of environment art and using Unreal Engine.

Challenges:

The biggest challenge was to complete the amount of content I originally set out to complete. During the process I decided to focus on three particular areas which were the minimum of my original vision, namely, the apartment, the ground floor of the apartment building and the street area just outside of the apartment. I planned to complete the work in layers, if the level was a painting I started with the largest brush completing the broad strokes and then switching to finer brushes to add detail. This method worked well and this is how I would plan for levels to be completed in the future.

Future Goals:

Moving forward I believe my skills will improve with practice. In terms of set design and using blender to create assets. The steps to complete the level from planning to blockout to set-dressing in layers worked well and I would replicate this methodology in all my productions. What didn't work were some of the assets, I think that just comes from experience knowing what is going to work and what isn't. I think I could have done a better job of considering all the props I was going to use. Basically I found that I didn't have all the props I wanted to fill out an area or I made the area too big for the props that I was going to put in it. The use of google docs and spreadsheets didn't work for me, it's a bit "backyarder" for me, coming from having managed projects in my career I prefer a tool for the management of a project such as Jira or Trello. This way tasks are linked to assets in an asset list as well as the documentation of the work being carried out. Having everything in multiple separate documents is far too inefficient to complete a project, doing paperwork shouldn't take up half of my project time. So this isn't something I will take on-board for future projects.

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Villeneuve, D. (Director). (2017). *Blade Runner 2049* [Film]. Warner Bros. Pictures.