THE GORGE

SUBMERSION FROM SUBTRACTION

BACHELOR PROJECT

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JONATHAN KONRADSSON
THE GORGE
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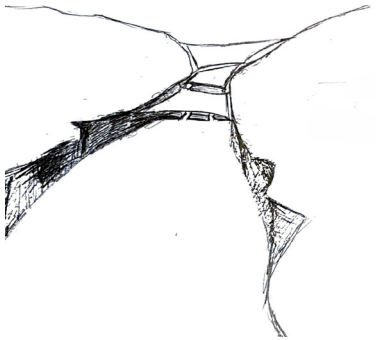

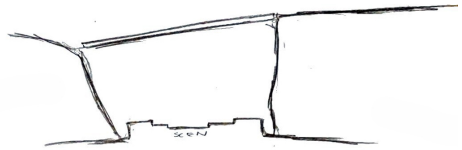

IDEA

The first iteration of our project come to in an excersice where three large sections of different ideas were drawn, spanning several meters each. We realised and agreed that one of our ideas stood out for us - The Gorge. The idea of reshaping the ground and "carving" a pavilion from the ground meant challenges, but also that we could experiment with geometries, floorplanning and innovation in a way that the other ideas did not allow.

MODELS AND SKETCHES

To further develop our ideas of The Gorge, many sketches and clay models were made before any digital modelling. Ideas were illustrated quickly and enabled creative discussions. By conversing with our acoustician thorugh this, we were able to develop a geometry that would work well from an acoustic point of view as well as architectural. This way, we iterated multiple times, making sure all relevant aspects were considered.

THE GORGE
Is a submerged venue where ancient silhouettes meet technological advancements - a steel grid hovering over a buried amphitheatre.

LANDSCAPE
The terrain consists of rocks and grass, creating a barren landscape. By reshaping the ground we create passages and spaces embraced by curved walls, exposing the natural elements of the ground. By doing this, we enclose the soundsource while also minimizing the changes of the landscape silhouette. The soil removed is used to gently reshape the terrain surrounding the gorge as well as building up berms along the roads. A multipurpose-grid is constructed between the two main walls and acts as a support for the weather protecting membrane above, but also mounts speakers, lighting and most importantly - carries the stage roof. The transparent membrane offers natural light for the seated area and allows a glimpse of the impressive grid structure from outside.

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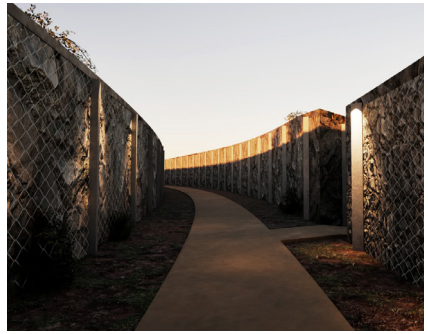
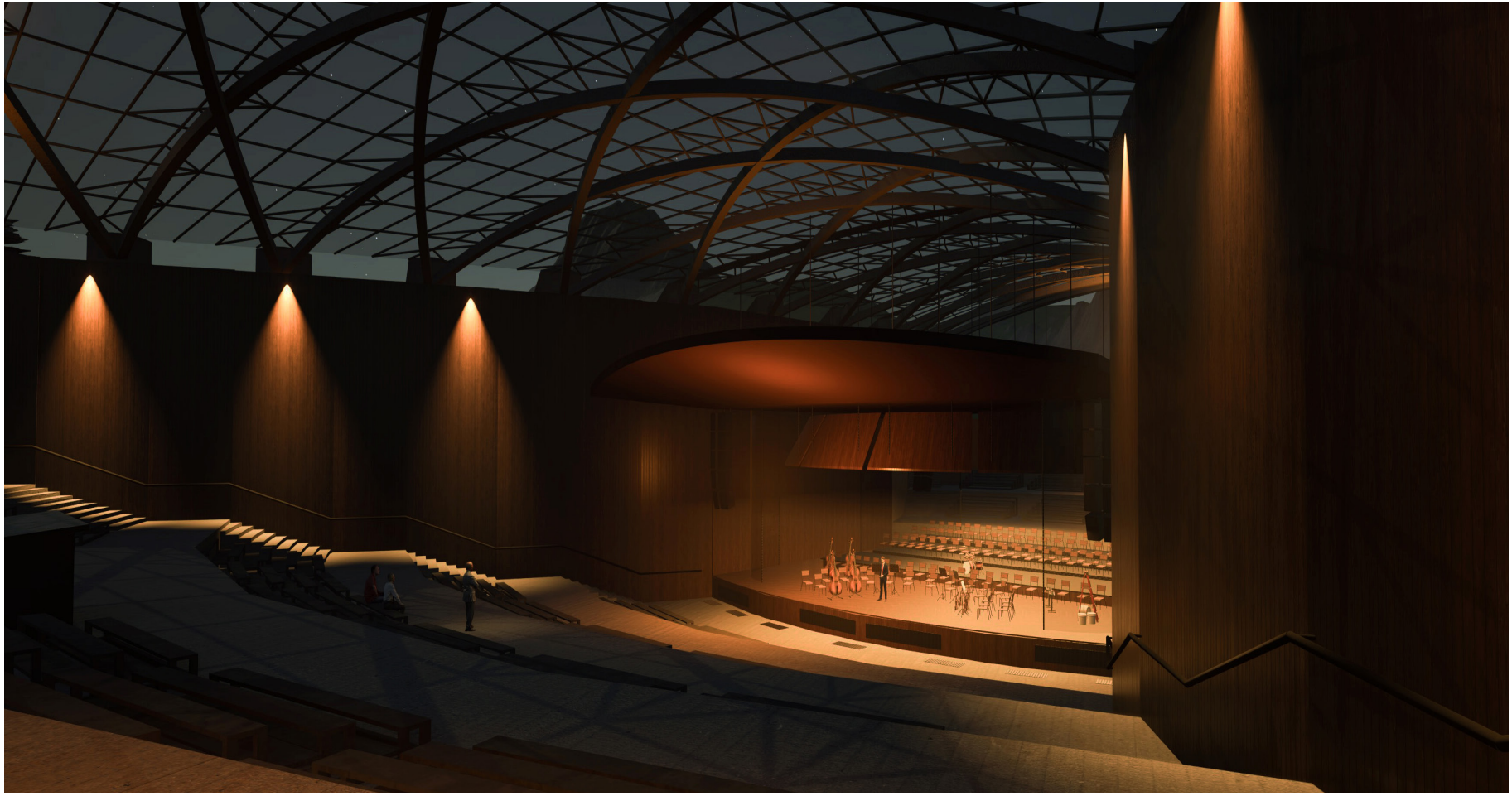
SEQUENCE

To enhance the buried character of the venue, parking lots and public transport are located a few hundred meters from the actual pavilion. Starting at ground level, the paths leading to the pavilion are gradually lowered into the ground, creating a calm and expectant ambience, isolated from outer noise pollution. Eventually there is a hint of something more, until the walls finally open up and the venue is in full view.

LOCATION

In order to protect the residential area and shield the pavilion from noise pollution, the arena is situated in the north-west corner of the site. The pavilion is rotated SE-NW inorder to shield musicians and instruments on stage from the sun during evening concerts. By combining a low profile and far distance from residentials, the visual impacts on the site are more or less unaffected.





GEOMETRY

The stage is located where the two walls converge at the deepest level. Seating is provided closest to the stage in rising arcs followed by lawn-audience. As the stage is two-directional, the possibility of modifying the audience capacity opens up, while also introducing an acoustical challenge.

SEATED EXPERIENCE

The venue offers multiple seated options, whether you are out to seek a fully invested music experience or just background sound for a picnic on either of the big open lawns. The bleachers are all retractable into the wall behind, making it possible for a standing audience during eg. a rock concert. A stair lift along the handrails allows for visitors in wheelchair to sit wherever they prefer, not limiting any preferences.

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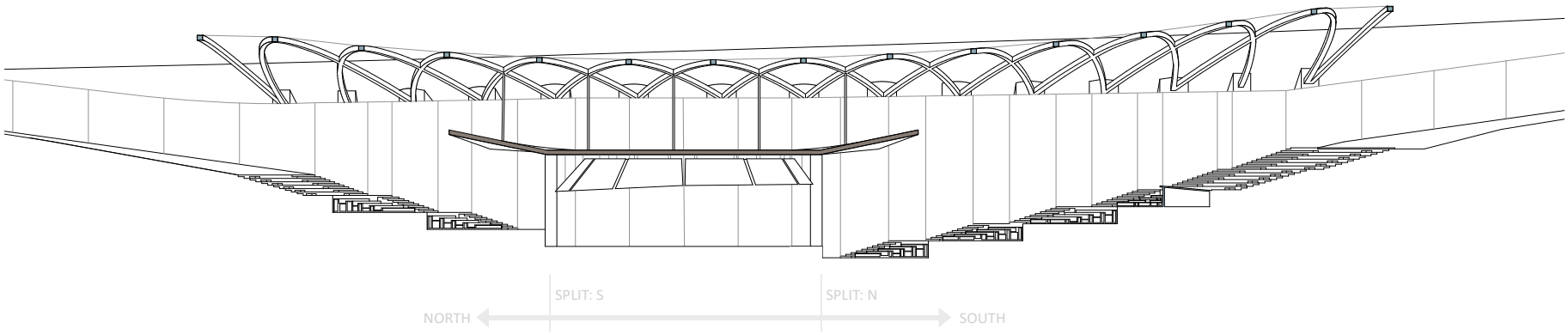
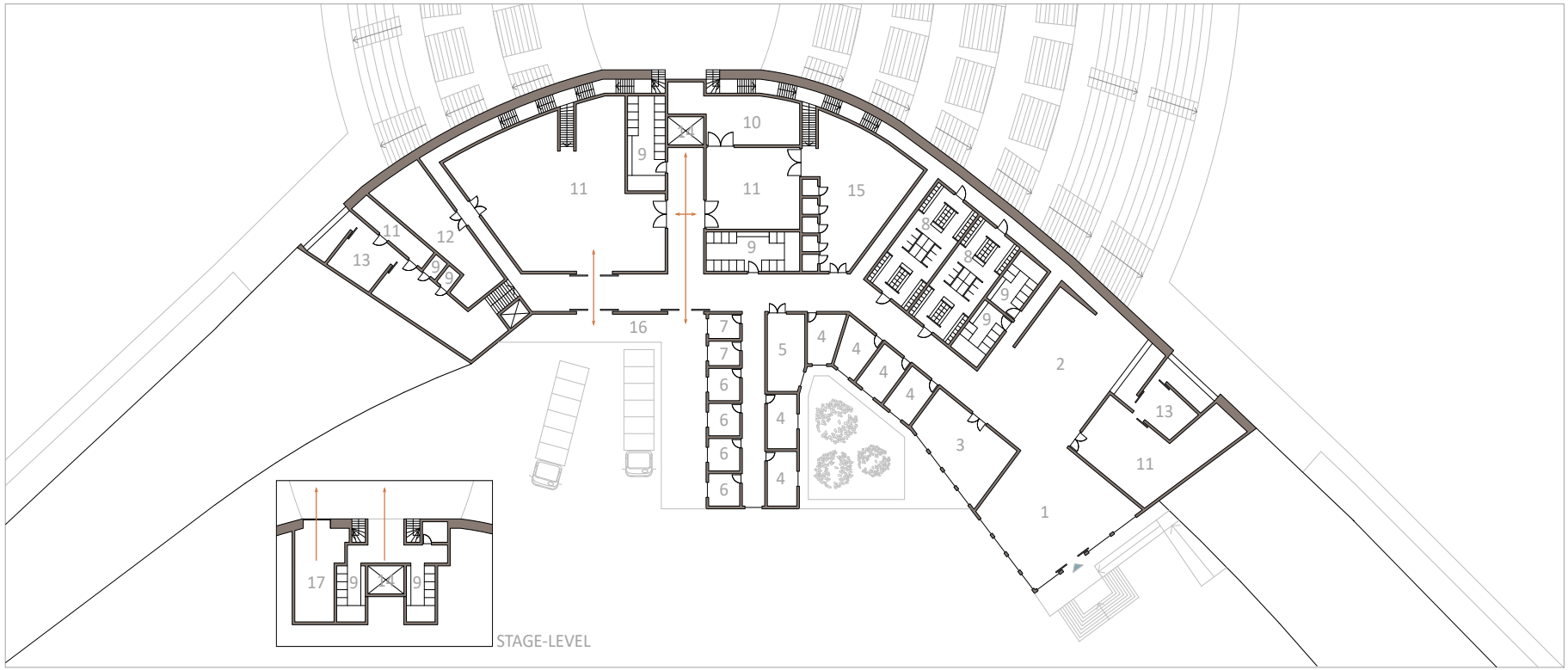


CAPACITIES

Seated audience can easily be converted to standing audience by retracting the foldable bleachers. By adding a third wall along either the north or south edge of the stage the arena becomes one directional. Since the capacity on either side of the stage is unique the three different capacities become:

NORTH	3365 p = 845 S + 2520 L
SOUTH	9635 p = 2155 S + 7480 L
FULL	13 000 p = 3000 S + 10 000 L

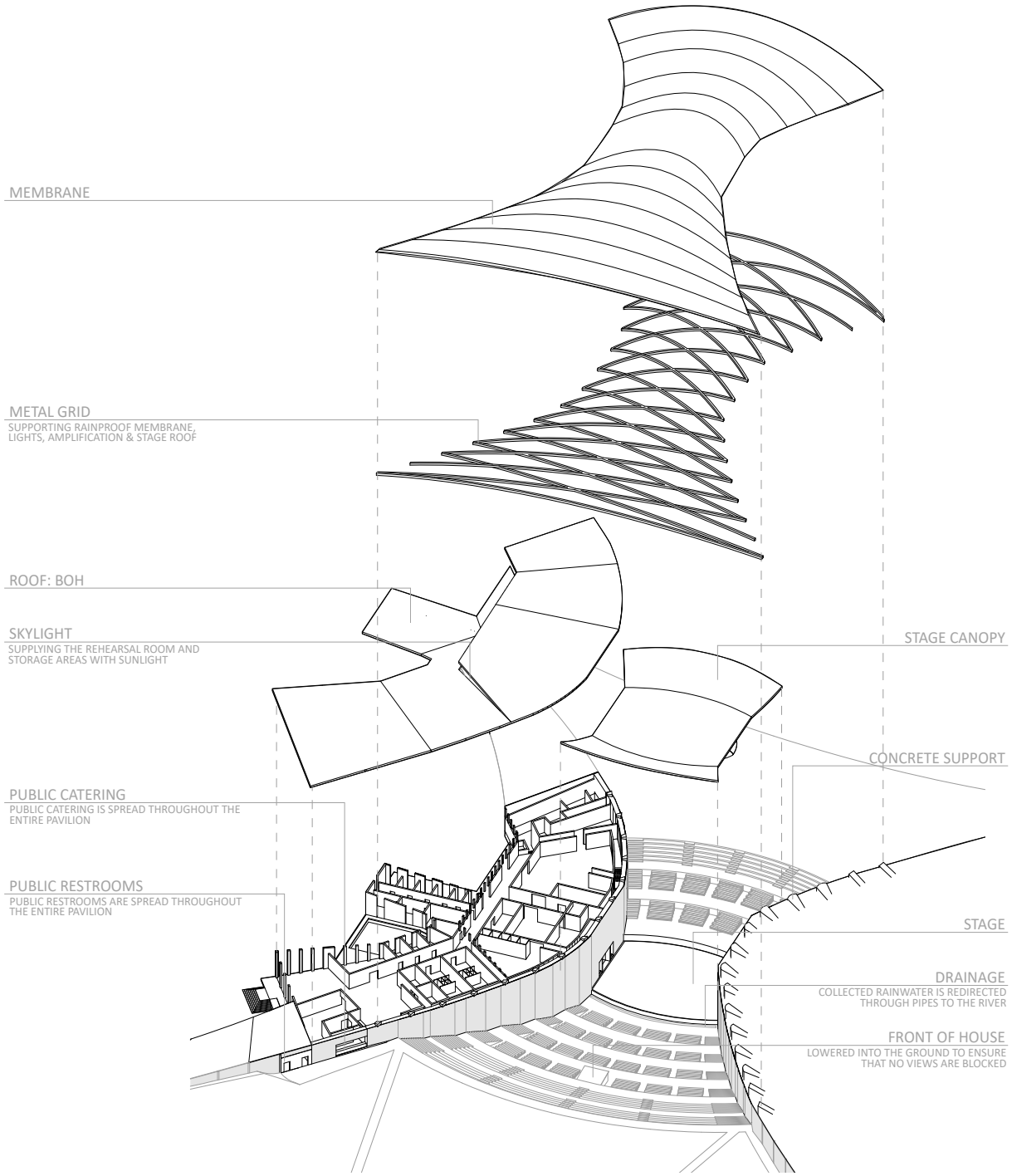


BACK OF HOUSE

The shape of BOH strictly adapts to the geometry of the stage area, with a thick wall separating the spaces. Imitating the opposite wall, the wall contains not only BOH, but also mounds of earth below, as well as public restrooms situated next to the multiple catering spots.

The straight path from the loading dock to the stage elevator creates a natural division between noisier and calmer spaces providing storage on both sides of the passage. This way noise sensitive spaces are well separated from machines etc. Along the corridor walls absorbing panels help maintaining a lower noise level. To enable efficient deliveries and other transportations without collisions, the musicians/employees have an entrance of their own with direct passages to the stage.The wing enables a small garden, offering a calmer view for the solo dressing rooms.

1	LOBBY	158m^2
2	DINING	175m^2
3	GREEN ROOM	72m^2
4	SOLO DRESSING ROOMS	19 m^2
5	STAR DRESSING ROOM	33m^2
6	OFFICES	12m^2
7	TOUR-OFFICES	9m^2
8	LOCKER ROOMS	73m^2
9	WC	189m^2 (TOTAL)
10	STORAGE: CLIMATE CONTROLLED	70m^2
11	STORAGE: REGULAR	526m^2 (TOTAL)
12	MECHANICAL EQUIPMENT ROOM	81m^2
13	KITCHEN WITH SERVING	103m^2 (TOTAL
14	ELEVATOR	12m^2
15	REHEARSAL ROOM	149m^2
16	LOADING DOCK	153m^2
17	STORAGE: EXTRA STAGE WALL	55m^2

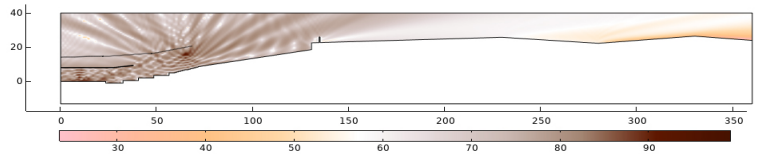


LAYERS

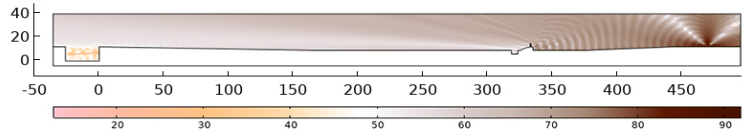
The stage is located at a low point and connects to BOH through an elevator. Two different roof structures are used in the project. Above BOH is a conventional roof with high placed windows to let daylight in to the otherwise dark spaces. As mentioned, the grid structure is the key element for carrying the membrane above as well as the stage roof below, which in turn carries the reflecting panels for the stage acoustics.

ENVIRONMENTAL NOISE

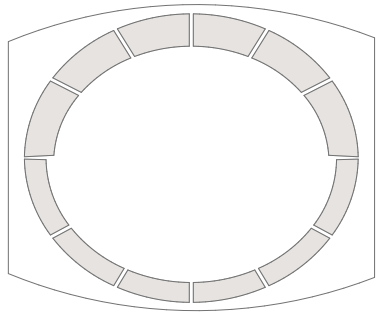
Noise originating from the highway is dealt with by strategically placing berms and noise barriers along the edges of the site. Additionally a highly porous, low flow resistivity soil substrate, is lined around the edges of the landscape. Due to the immersion of the stage, further reduction from noise propagating from the highway is achieved.

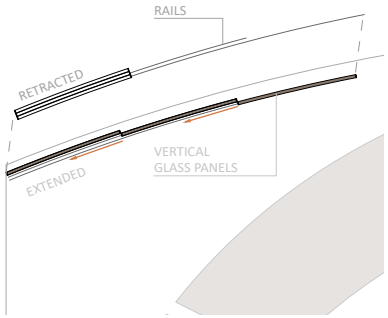


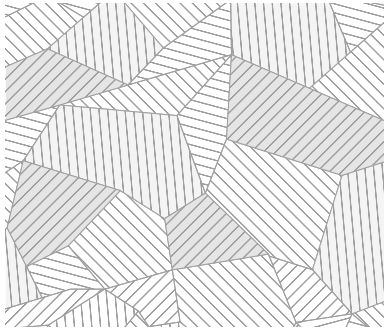
NOISE DISTRIBUTION: STAGE TO RESIDENTIAL AREA (D-D) [f=125 Hz]



NOISE DISTRIBUTION: INTERSTATE TO STAGE (C-C) [f=125 Hz]





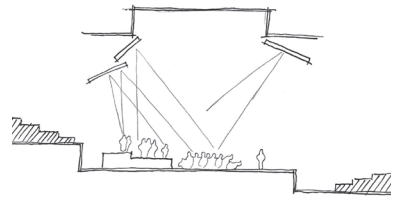


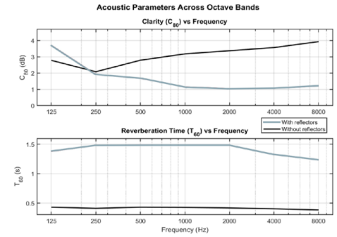
STAGE

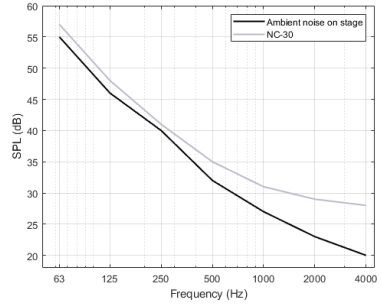
The stage includes a variety of reflectors to help redirect and give strong early reflections for the ensemble on stage. Reflectors are hanging in a circular shape, while the side walls of the stage are fabricated panels with varying geometrical irregularities allowing diffusion over a wider range of frequencies. This is done to keep the soundscape on stage warmer and lively while still maintaining the energy leakage of the semi-open stage at acceptable levels to not be detrimental for the reverberation time.

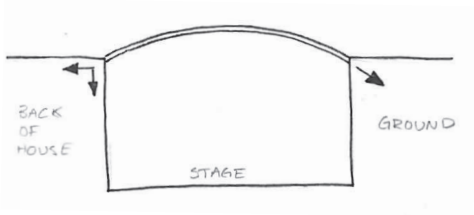
VARIABLE ACOUSTICS

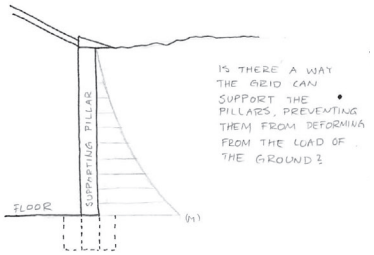
Since the stage is designed for different music types, it can take different shapes when there is a need for different acoustical characteristics. The canopy of reflectors can be retracted upwards to the roof and the side panels of vertical glass reflectors can be retracted to the sides. This reduces the amount of focused reflections and increases the energy leakage of the stage, which in turn gives the stage a more dry feel acoustically.



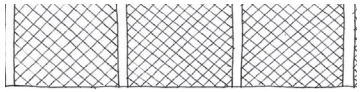


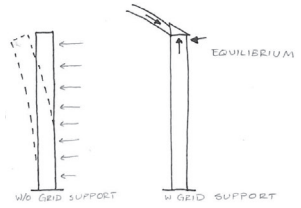






PILLARS HOLDING UP A WIRE FENCE, PREVENTING GROUND FROM FALLING IN. LARGE MOMENT FORCE BY FLOOR LEVEL ?



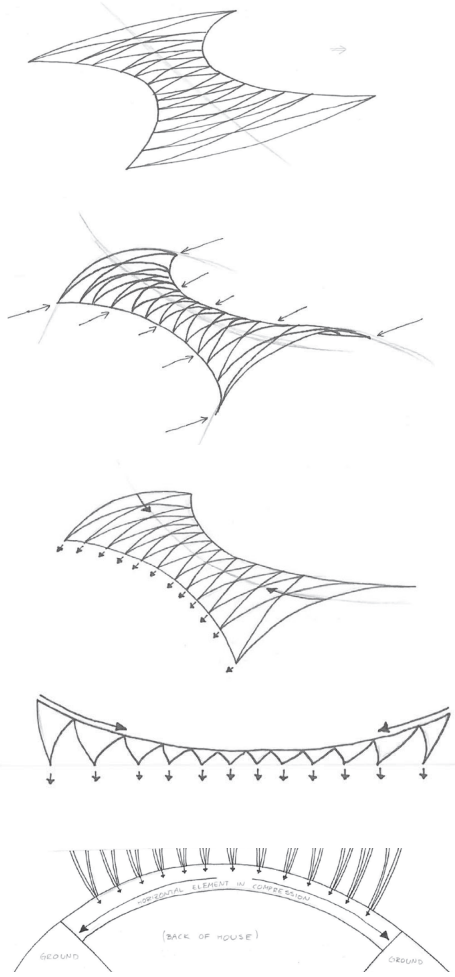


PHYSICS

As both of us were interested in the construction aspect of the project, some thought went into it as well. Was the grid supposed to be a triangulated shell structure or not? As the grid had many functions, we realised beams was the way to go. The challenge was now to find a way for the grid to span the distances and how to hold up the massive valls around the stage. Our sketches show ideas of how the forces are led on without disrupting any facilities.

GRASSHOPPER

Using the Grasshopper tool from Rhino, the grid was constructed. Two curves, from the main walls, divided into a set of points, set the base for the geometry. These curves, along with a centered curve arching up at both ends, were the bounding shapes for the grid and the program allowed for us to experiment with patterns, shapes and number of beams.

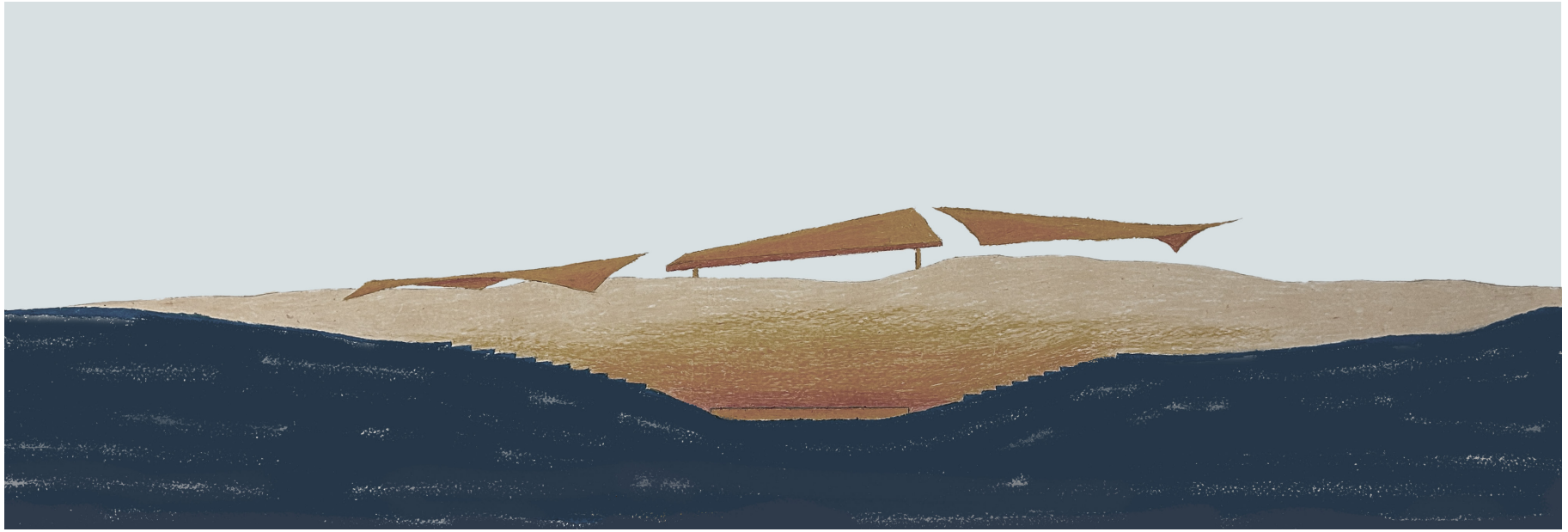


SUSTAINABILITY

As the building industry accounts for approximately 40% of all emissions, sustainability is a major aspect to consider. The concept of our project is to dig, creating a venue by subtraction rather than addition. In that way, the need for material is reduced, and the large volume of earth that has been removed, is used to enhance wall heights, as well as noise barriers along the roads. As the seated area - the amphitheatre, has to be firm enough to support thousands of people moving, there will be a need for something sturdier, like rock or concrete to hold up the levels. The part of the dug out earth that consists of rocks can be used as ballast in the concrete.

Another important aspect is multifunctionality. Instead of having a lot of components, all with one function each, how can we condense it to just a few with several functions? One example of this is the grid. While being a visually attractive addition to the venue it also carries the stage canopy with the hanging reflecting panels. It carries loudspeakers, lighting as well as the weather proof membrane on top. Through this, it also serves as a protection from direct sunlight to the stage. Throughout the project, one of the issues was how to hold up the (<12 m high) walls embracing the venue. A further challenge could have been to see if the grid also could have filled a supporting function for the walls. Along the lower walls, multiple pillars can be traced alongside, holding up a wire fence, which in turn prevents rocks and soil from falling down. Conveniently, soil proves to be quite a good absorber of noise, so the exposure of it adds a function as well as a visual effect.

One could argue this project has a massive impact on the site, which it of course does. How reasonable is it after all to dig to this extent? But while so, the venue hides below the surface, leaving a small visual effect when looking from afar. Which also has acoustical advantages, leaving a reduced need for additional noise barriers. The big walls around the venue protects the visitors from the interstate noise, while defining the lawn area. As it is a conceptual design, it could take different shapes depending on the slope of the ground etc, but essentially being the same.



ARCHITECTURAL QUALITIES

SUBTRACTIVE/ADDITIVE

The venue combines two different ways of building - subtractive and additive, by removing ground and then using that newfound volume to add something new. Though the digging has a major impact on the site, looking back, we wouldn't have gotten the same effect without it, unless there is a natural canyon, offering the same experience of walking through the passages. To recreate the passages in an additive way, aka. above the ground could seem a little tacky and not at all give the same sense of exploration, as you're not in direct contact with the ground materials.

ADAPTIVITY

The project started with the idea of a canyon enclosing the stage, connected though a light roof, but with a possibility to see through to the other side of the stage. As we wanted to keep this architectural quality undisturbed, we kept the venue as clean as possible and all the back of house facilities were placed behind an artificial canyon wall, imitating the one on the opposite side of the stage. The effect is a maze of corridors and rooms for the musicians and staff to smoothly get from A to B, while for the visiting guests it all seems like big walls closing in on them.

HIDDEN

As almost everything is below ground level, the venue has a distinct hidden character, having little visual effect on the scenery as a whole, as opposed to a massive building above the ground, if you look at the site from a distance. Once submerged, the place transforms into a world of its own, and the two levels can coexist without disturbing the other one. This is an attempt to treat the scenery gently and give the already existing a say on where the project will go. The venue claims its place, but not more than necessary.

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ENDING NOTE

The Gorge was one idea of three, which we chose to pursue, as it opened up for further exploration of geometries. It was a conceptual idea which turned out to hold many possibilities, making it exciting to work with until the end.

The past few months have been an iterative process, always balancing playful modelling, ideas of the structural, architectural and acoustical, while keeping in mind, the potential problems. Maybe it was the conceptuality of the idea, and some luck, but most of the problems we faced seemed to just work out. There are of course still unresolved aspects, and a further exciting iteration could be to go into detail about the structural part of it, analyzing the forces and reduce the amount of needed material while still preserving the architectural identity.

I think our intentions was to do a solid, descent project. Something to be proud of, but not letting it take over our time. Both of us had our lives outside of school, and I think that letting well-being have a say was what made the team work well. If we were tired, what we had produced, had to be enough for this time. It is a privilege to be able to think that way, as it it not always allowed, but this time it was. The balance between ambition and life aside from work remains to be explored.