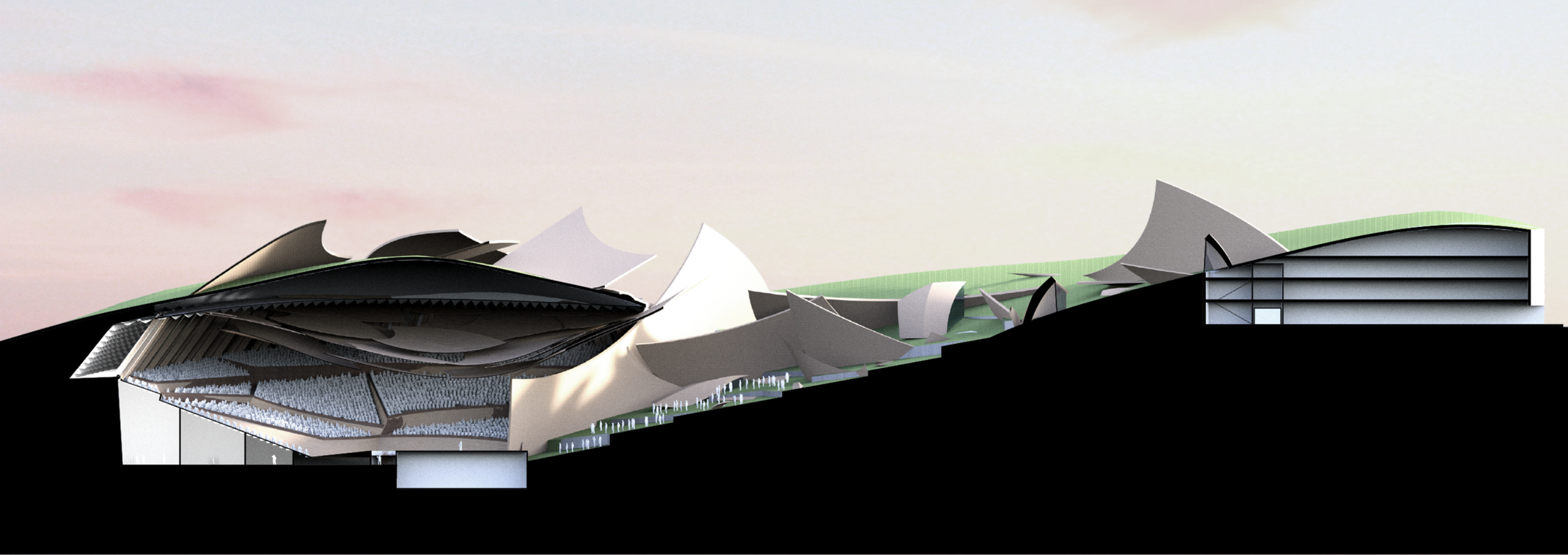
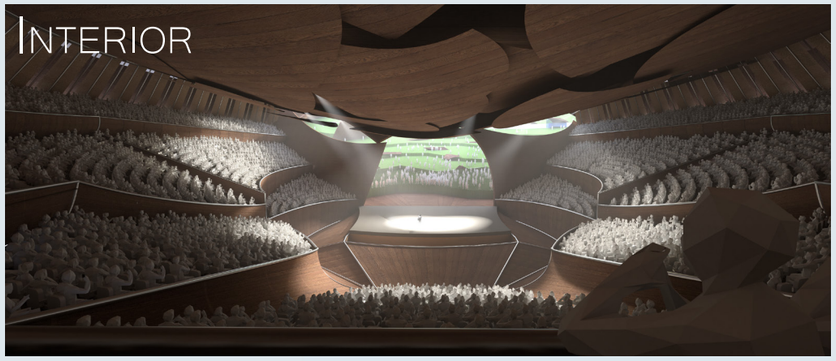
Armado

Project Portfolio

Simon Wikström AT3
In collaboration with Herman Ehrnberg and Joep Wulms
ACEX-15 Bachelor's Project Architecture and Civil Engineering



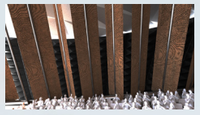
Interior

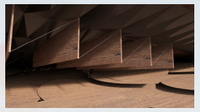


The auditorium

Inspired by the complex shapes a crashed wooden meteor would infer, Armadon's interior is set to use this as a tool to create an atmosphere where any musicians performance would create even stronger memories in their audiences minds.

The seated audience are enveloped in a wooden shell where they are arranged to sit close to the performance with other, perhaps cheering, audience member as a backdrop. The general shape of the evelopment is designed to help bring focus down to the stage and make visitors perceive the room as smaller and more intimate. Armadon's distinguished sculptural appearance with its connection to the outside lawn is set out to make any event leave exciting memories.



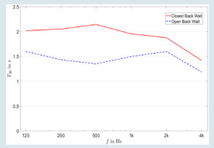


Flexible acoustics

Through the use of three different methods, flexible acoustics are achieved. This is needed due to different types of performances requiering different acoustical properties.

The back wall reaching around the indoor seating area contains spinning panels that can open up towards a sound absorbing area behind. This provides full control of mainly the reverberation time.

The hanging ceiling's height can be adjusted individually which helps control the early reflections to both the audience and performers.To have flexible brilliance adjustable absorption of low frequency is needed. This is reached through the use of small holes in the reflective ceiling allowing low frequency soundwaves to pass through to a high absorption ceiling. This ceiling can be covered by adjustable panels which negates their effects. This gives the performer control of what brilliance level they wish to have.

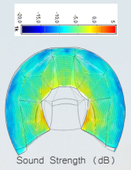


Reverberation time (s)

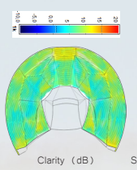
Acoustical values

For the interior acoustic there are several different parameters to take into consideration for the different performances. Clarity, C80, is preferably found inbetween -4dB and 4dB to be suitable for all perormances. Armadon can vary its reverberation time to be anything inbetween these values as the graph shows. The clarity inside the pavilion has an average in this zone. Sound strenght, G, should preferably reach through the whole venue without electrical amplifications. Speach translation Index, STI,between 0.60 and 0.75 and better th higher it is.

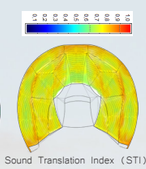
Reverberation time, T30, 1.5s for theatre and 2s for the orchestra.



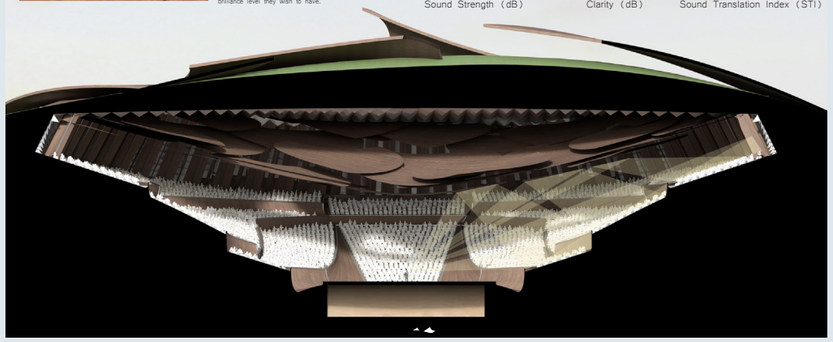
Sound Strength (dB)



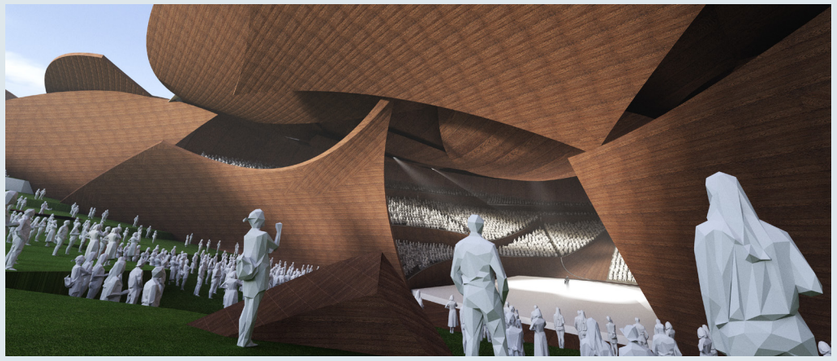
Clarity (dB)



Sound Translation Index (STI)



Armado



Interior

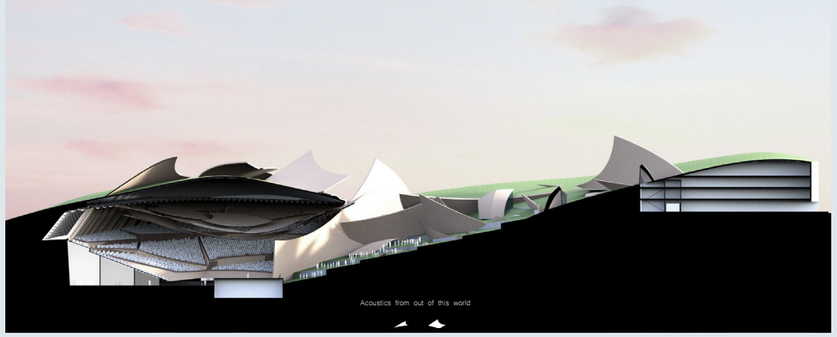
The indoor seating area for approximately 5000 people is set inside the shattered cave consisting of many wooden shards that comes together in a unity of warm, rounded shapes. The rest of the functions needed are located under and behind the seating area, with entrance through a shard above ground.

Armado

Stepping out from the wooden shard connecting to the underground parking house you are met by an extraordinary sight. The scattered shards of a crashed wooden meteor. As you walk on small paths down the slope towards the cave that is the center of the chrash site you pass shards in many different sizes in a dynamic landscape where no perspective is like any other and with new situations and possibilities around every corner. When you enter the cave built up by several massive shards you step into a sea of chairs on different platforms arranged around a central stage. Bright light from the outside finds its way between the large outer shards onto the stage creating a balance between light and darkness and gives a connection from the warmth of the inside to the open lawn outside.

Exterior

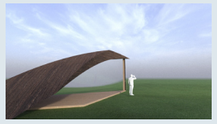
The exterior design takes its roots in the crashing of a great wooden meteor scattering its shards around the area while drilling into the ground to create the natural slope and the cave. Under the hill of excavated earth a parking house for the audience can be found, with enough room for a full house.



Exterior

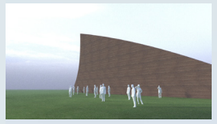
Shards

The shards scattered over the area are all made of wooden material being able to reflect soundwaves back to the audience. They consist of three different kinds, all of which have roles of their own besides reflecting the sound.



The volume shards is built up of a large wooden shard leaning forwards with the other walls in tinted glass. Its purpose is to house entrances to the staff area and the parking garage, as well as restrooms, shops and also additional speakers and lighting.

The small shards has the purpose of providing dynamic and excitement to the landscape at the same time as working as backrests and benches for the audience.



The large outer shards protects the area from high noises and from wind blowing through. They also have the purpose to protect the area around the site from noise leaking out and disturbing the peace.

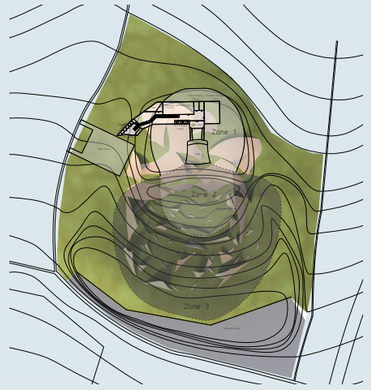
Zones

The area as a whole consists of three zones divided by the shards.

Zone 1: The indoor seating area, providing the best seating and acoustics. This zone can be provided a great acoustic experience using only natural acoustics.

Zone 2: The area closest to the stage and in front of the first row of bigger shard, providing both good acoustics and a great view of the stage for an exiting and adrenaline filled experience for approximately 5000 spectators. The goal of this zone is to only make use of natural acoustics, but speakers can be used as well if needed.

Zone 3: Inbetween the shards further in the back, providing a calmer experience for a more private session or maybe a picnic. The sound sound quality will still be great due to implementation electro acoustics but some areas in the zone will be more quiet and invite to conversations or for people with sensitive hearing.

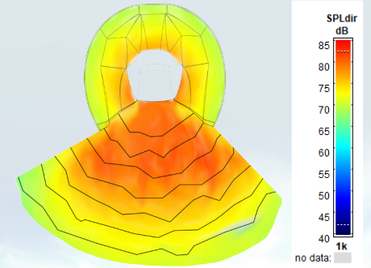


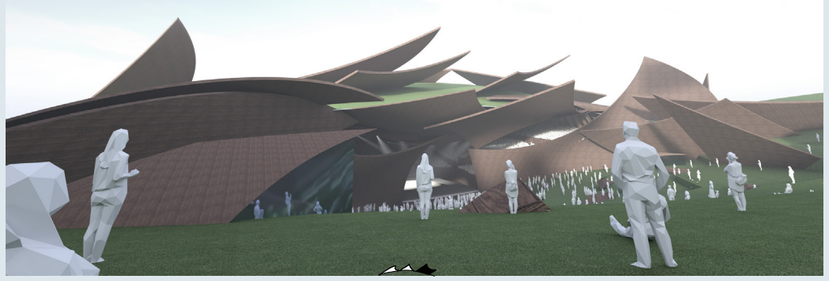
Functions

The central stage which creates interesting possibilities for the performers while having an intimate connection to the audience, both under the roof and on the lawn. The indoor functions have a quick connection to the stage and is connected by the Orchestra pit via stairs and an elevator. Under the stage there is storage rooms and a loading dock to the elevator with connection to the back of the building. The back of the building also host the other functions such as the dressing rooms, room for the MER and the rehearsal rooms. The different rooms have good acoustical properties due to electro-acoustic elements. The offices is placed above ground in the entrance shard being exposed to the daylight while at the same time being close to the staff parking area.

Acoustics

On the open lawn seating area the Sound pressure level should be able to reach through the whole area to make the sound reach the whole audience. As can be seen in the graphics the sound pressure level is great in Zone 2 and still good in Zone 3. Speakers are implemented in the shards around the opening and on the volume shards in the slope.





Plan and Section

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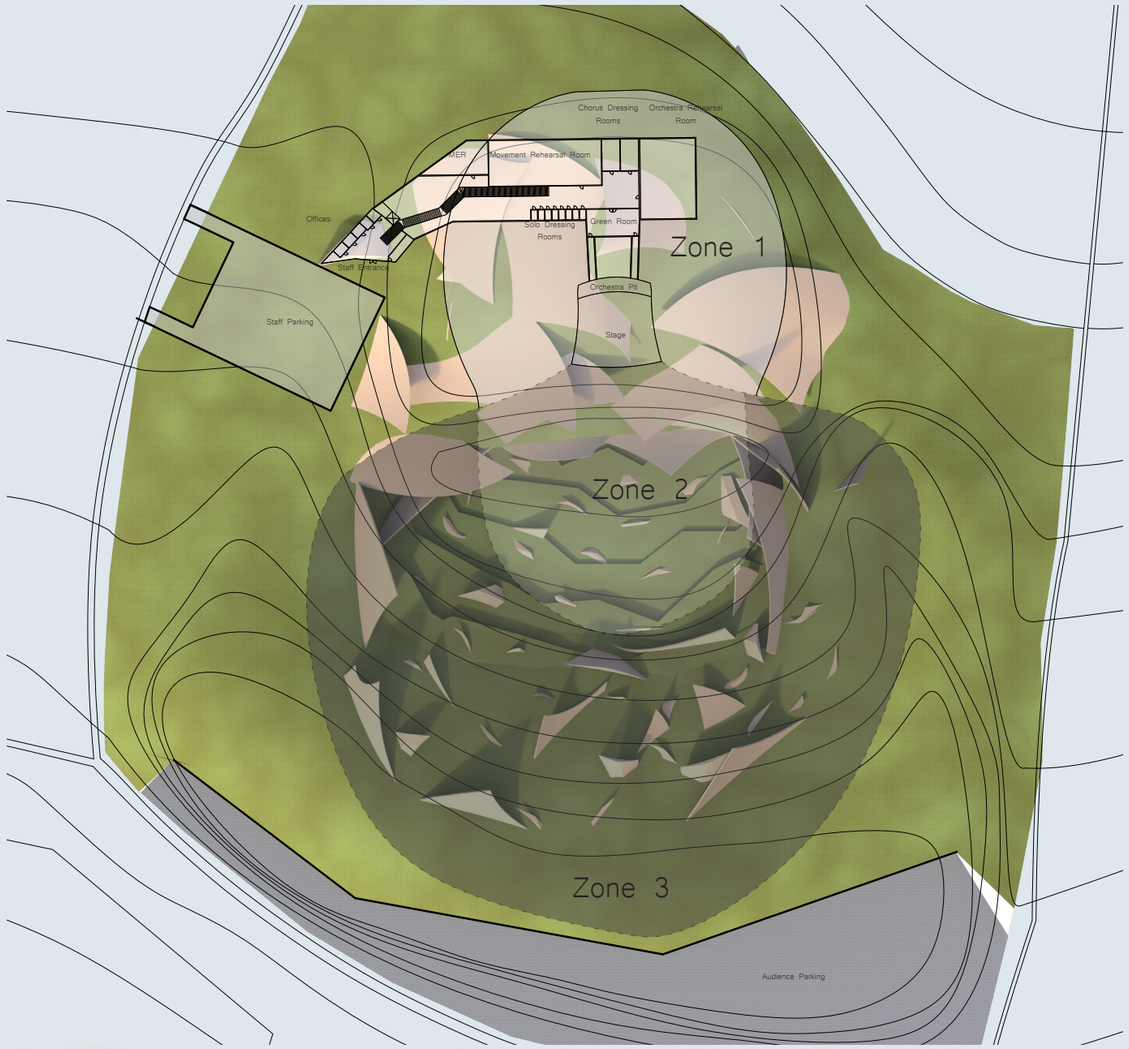
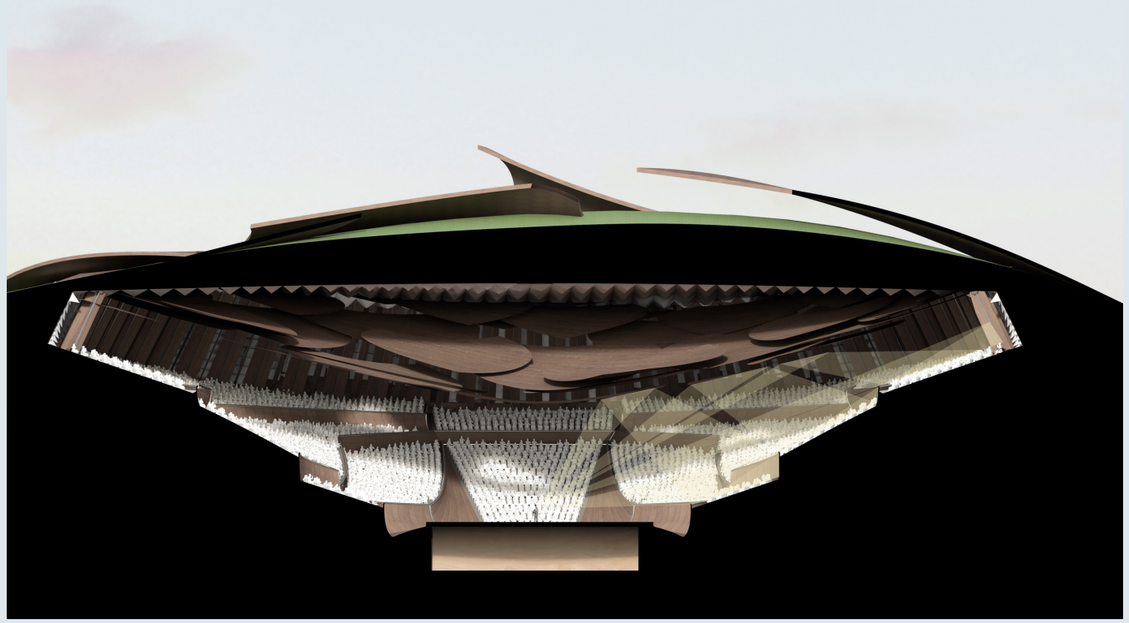
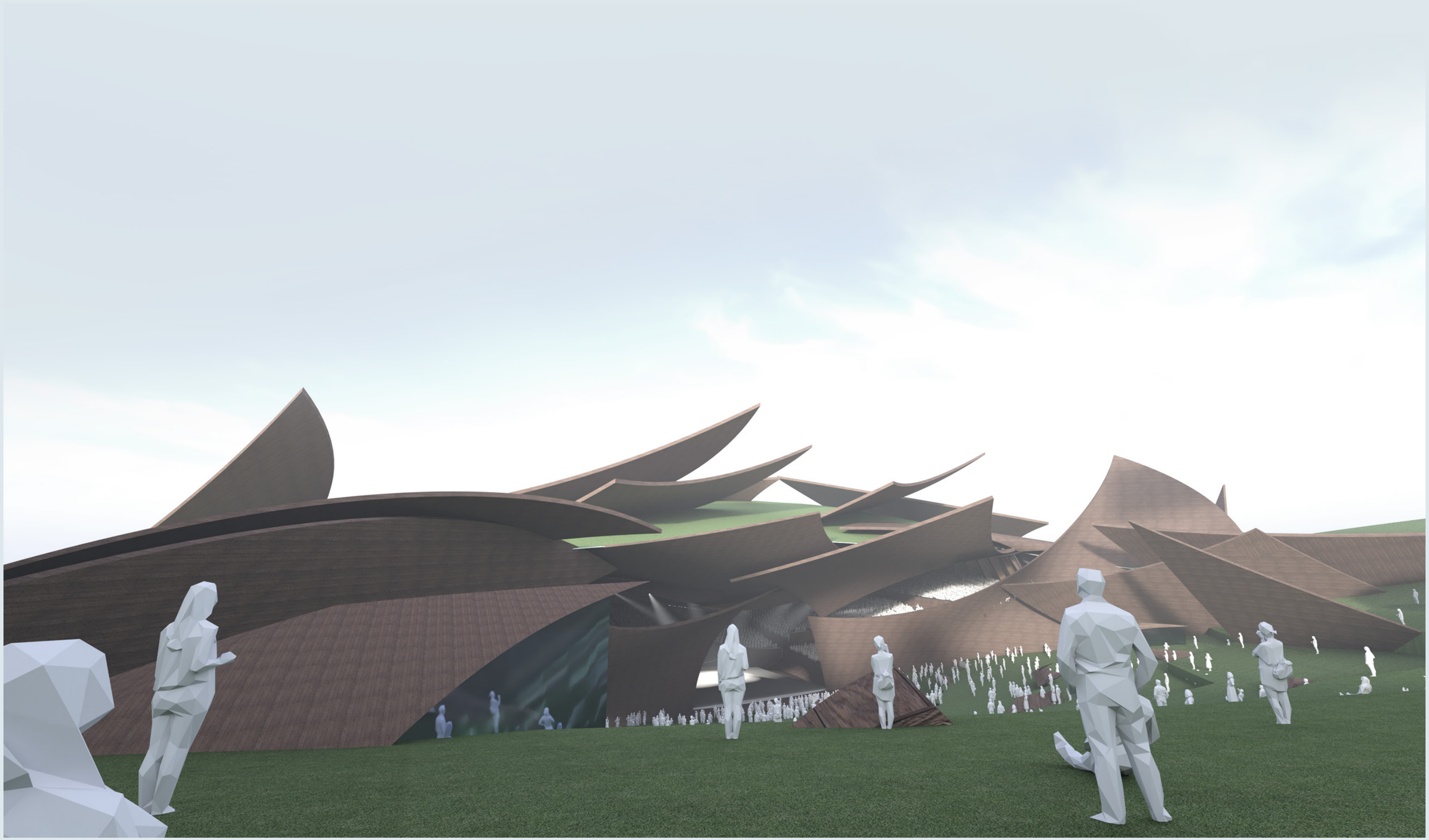




Exterior



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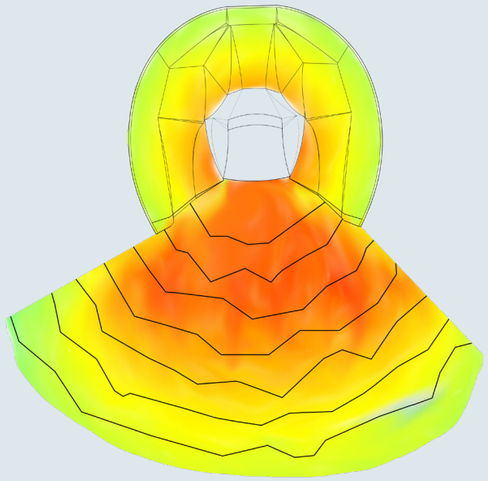
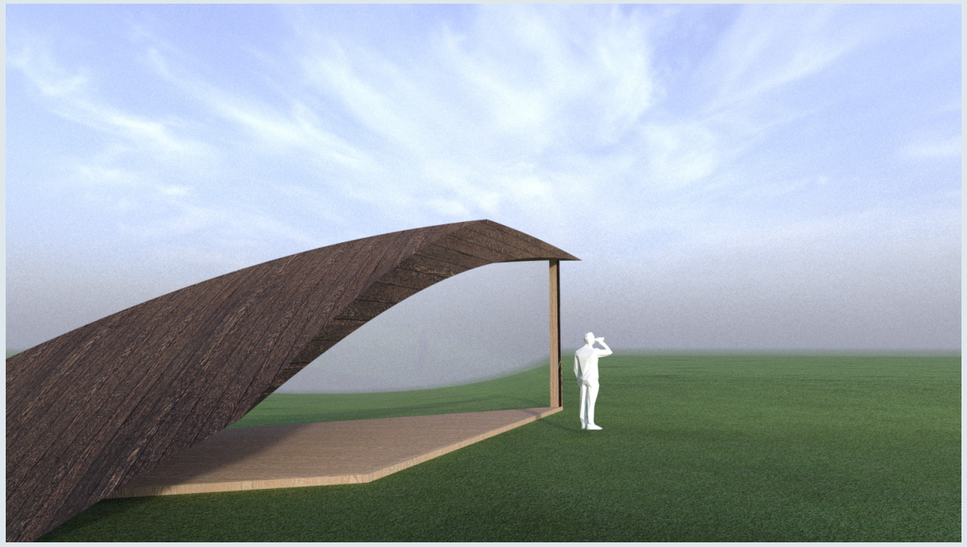
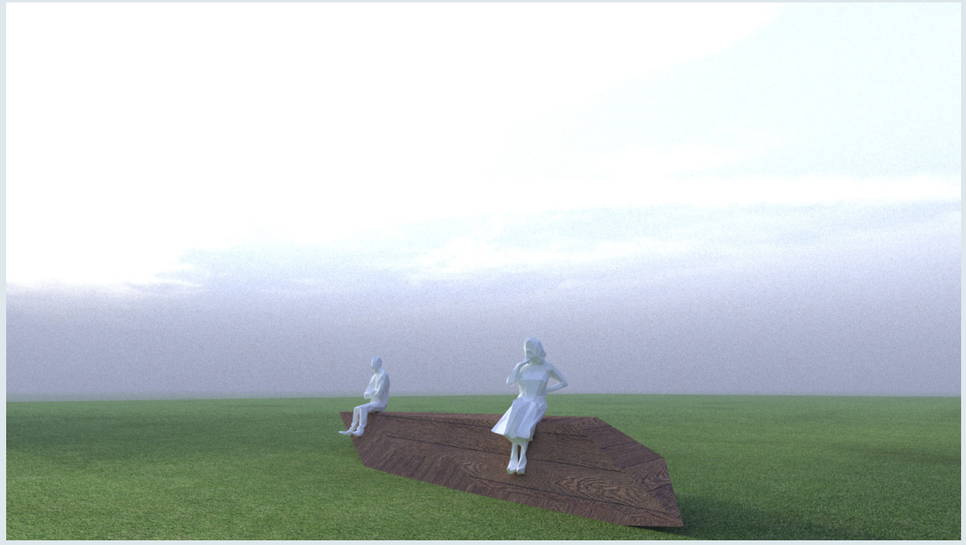
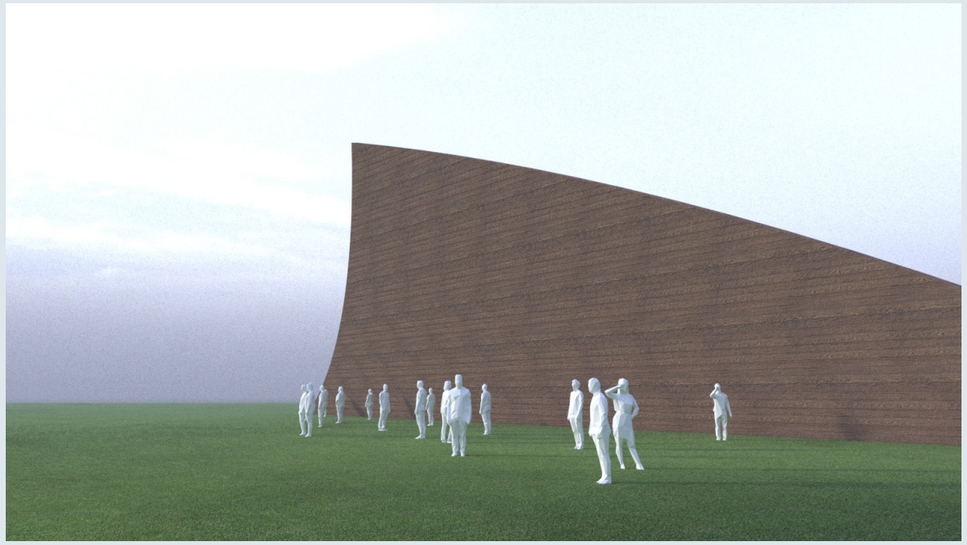
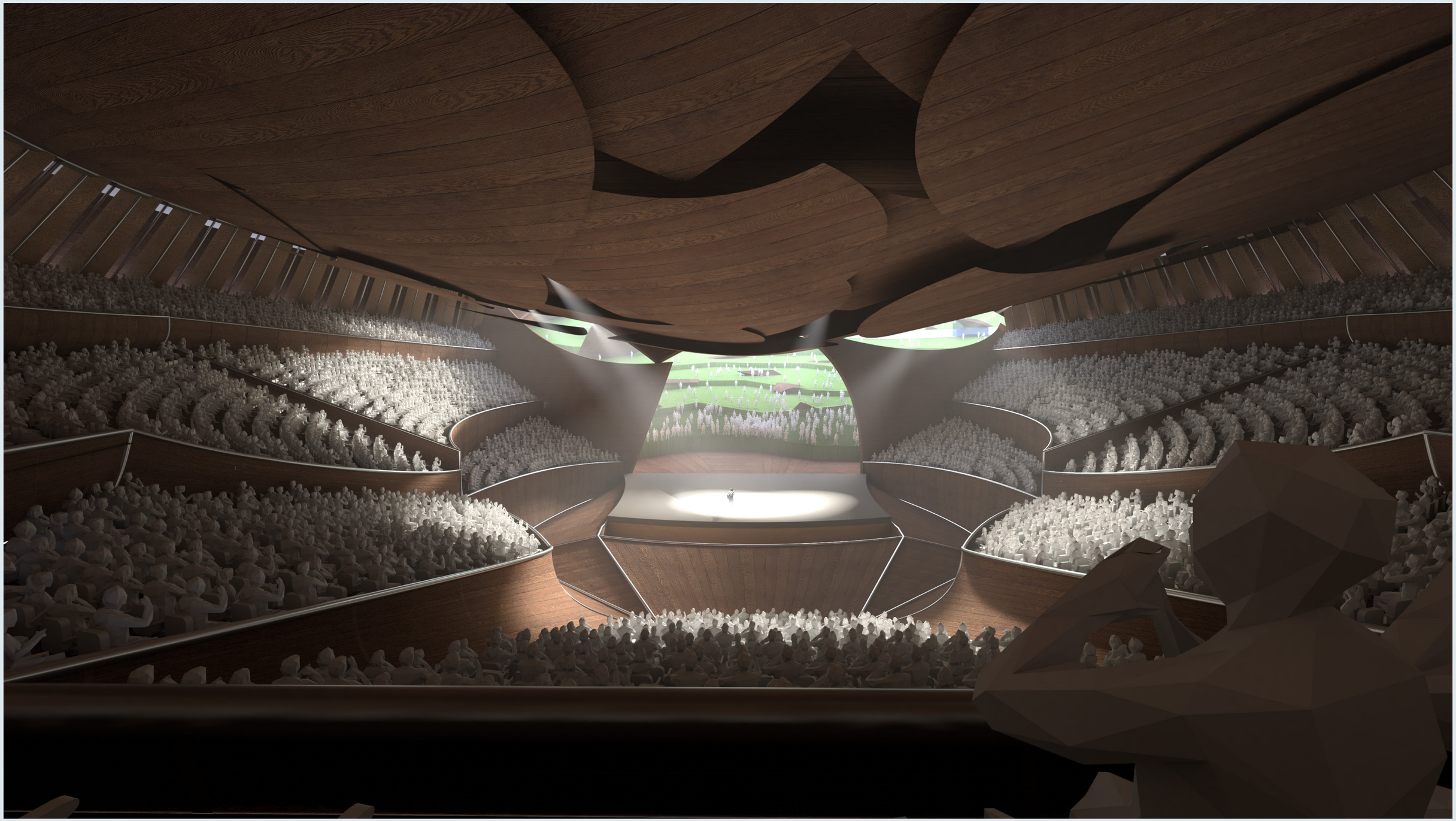








Interior



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The ceiling is designed to spread strong early reflections to both the audience and performers. The walls of the different audience-plateaus provide varied timings of refletions to the performers as well as amplifies the sound for the audience members.

Through the use of three different methods, flexible acoustics are acheived. This is needed due to different types of performances requiering different acoustical properties.

The back wall reaching around the indoor seating area contains spinning panels that can open up towards a sound absorbing area behind. This provides full control of mainly the reverberation time.

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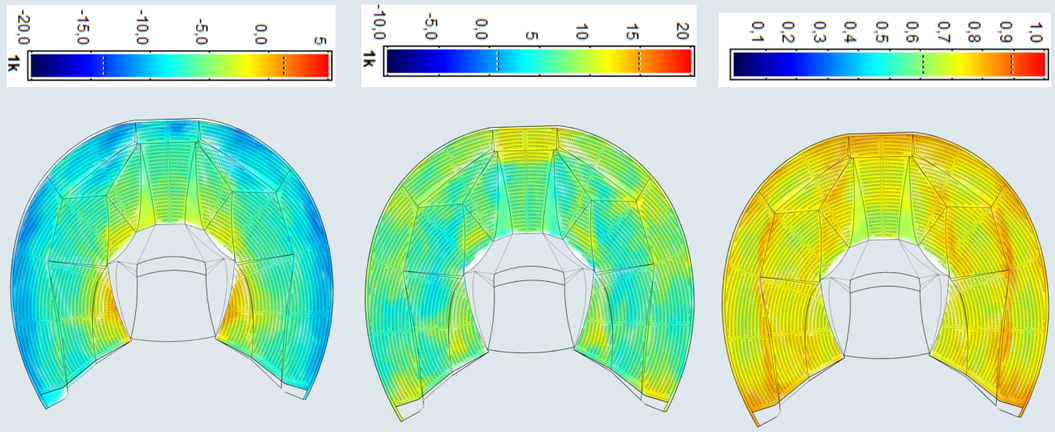
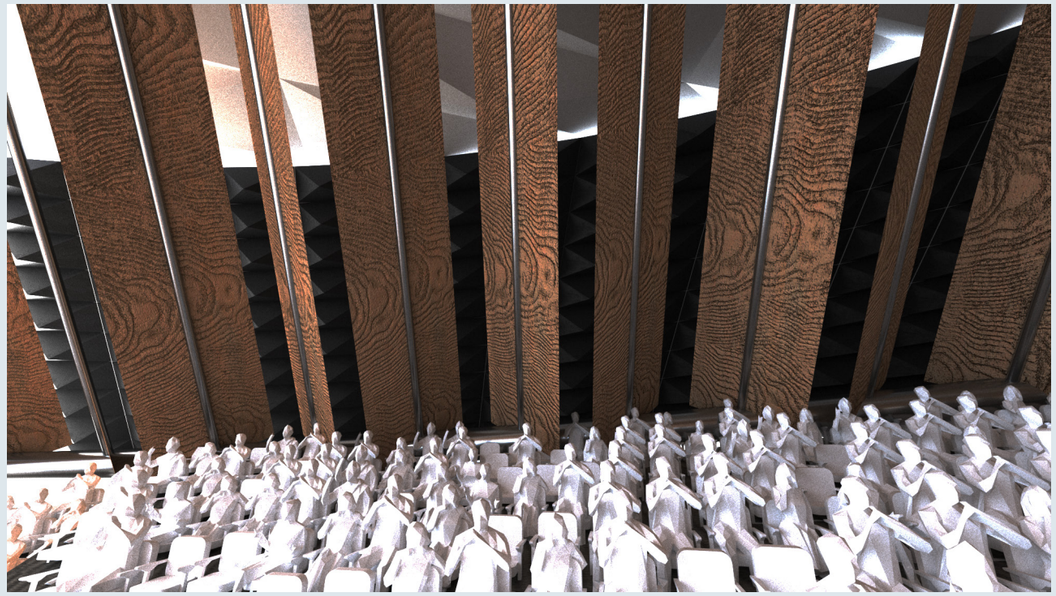


Sound Strength (dB)　　Clarity (dB)　　Sound Translation Index (STI)

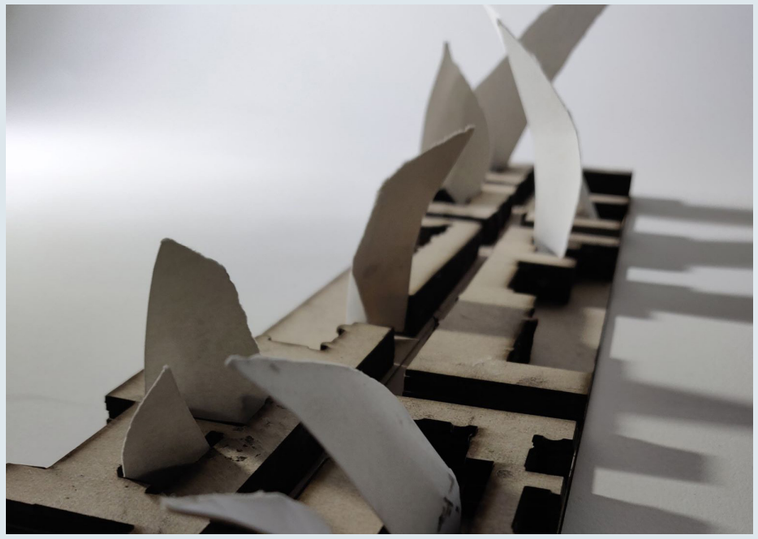


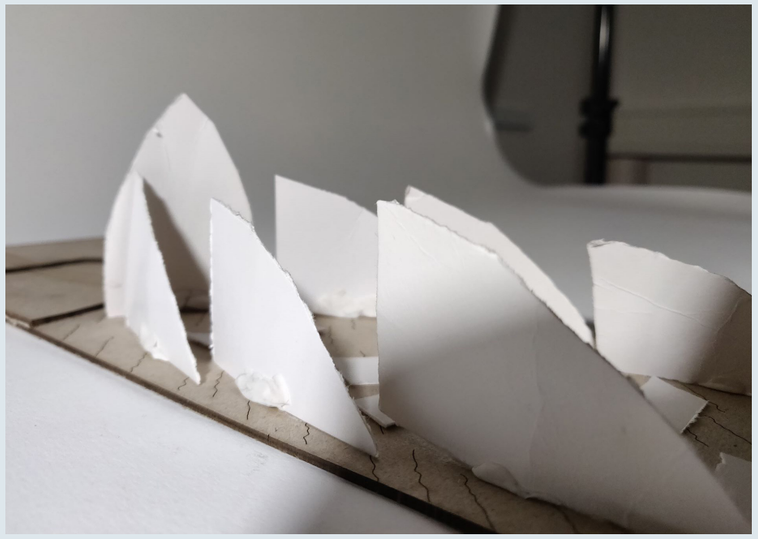
Design Process One - Model building and sketches

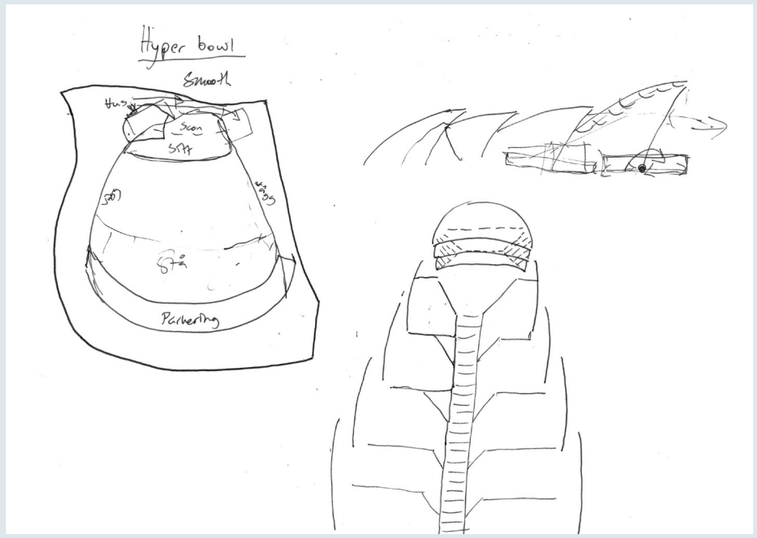
We started the project by making models over different locations in Gothenburg. What we brought with us from these models were the use of giant shards as sound reflectors, both to keep the outer sound out and the inner soundin. From these models we took the step to sketching, where we tried to bring all our ideas down on paper to easier understand eachother and what we wanted from the project.

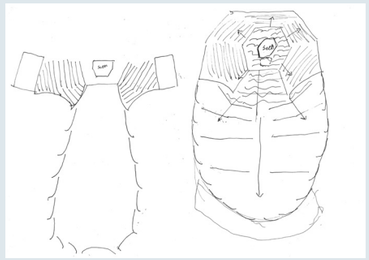
Here we early on tried to work with the shards out on the open lawn and bring the same shapes into the roof structure which we wanted to do with several shells. We figured we could use the parking house needed to build up the hill a little more to create a slope with the right angle. We also realised we wanted a central scene to be able to use the roof structure over the scene as also the one over the seated audience.

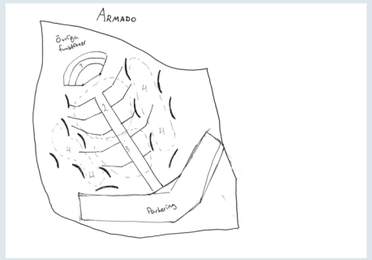
During this process we tried several different takes on the same concept base, mostly on how to shape the roof structure to make it go together with the shards out in the open, but also on how to place the shards for the most interesting area. We didn't want the open lawn to feel too closed in. In the end we landed on a more open structure of the shards and the idea of the different zones. From here we took the leap to the computers to try to make 3D models of the site to increase our understanding of the project.

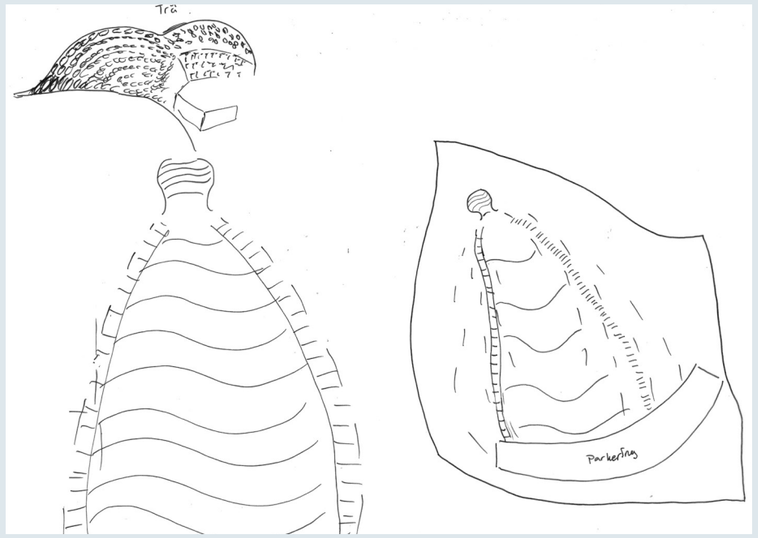










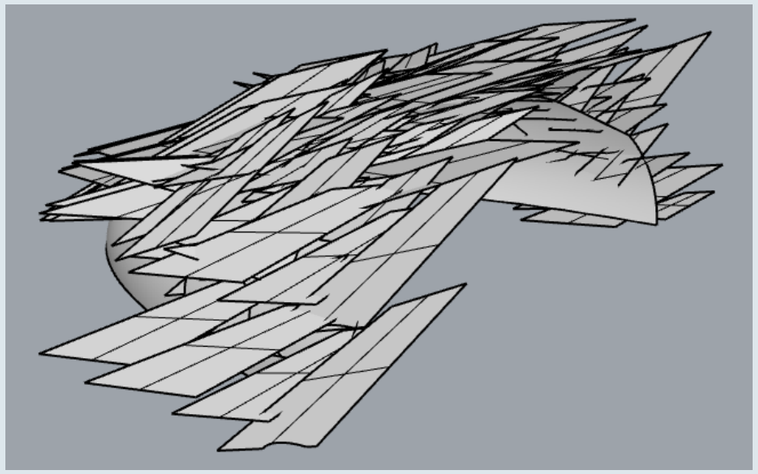


Design Process Two - 3D sketching

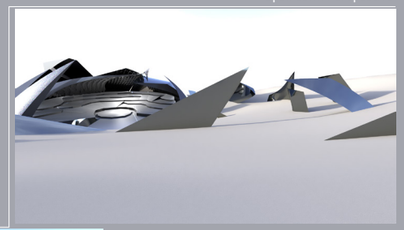
Working on the computers we soon found ourselves in the concept of the crashed meteor and we tried to develop the shards and the roof structure built up by them while simultaneously creating a base shape for the seating to, already now, make sure we were working in the right scale. We also started spreading out the small shards in a more precise way and getting ready for the Middle Critics and the presentation for the acoustics students.

Area 17

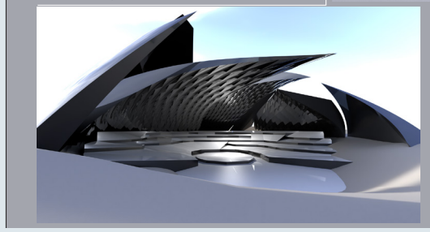
Acoustics from out of this world

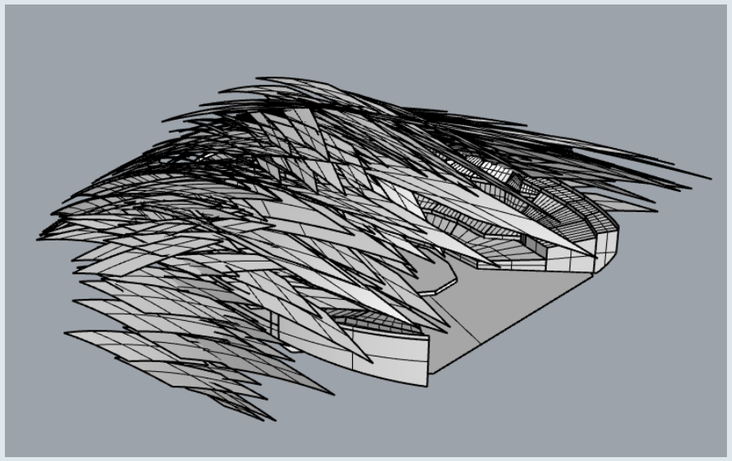


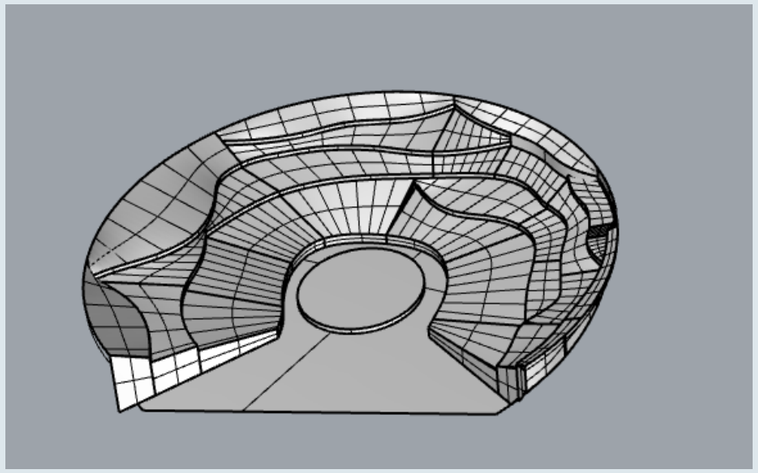
Open Lawn Perspective



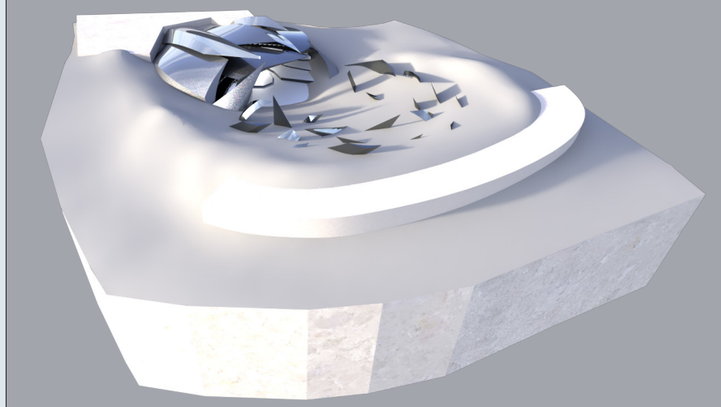
Exterior Perspective





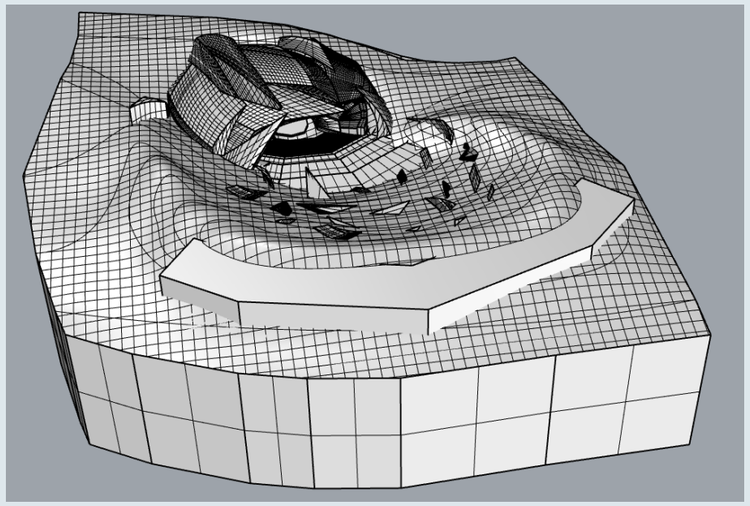


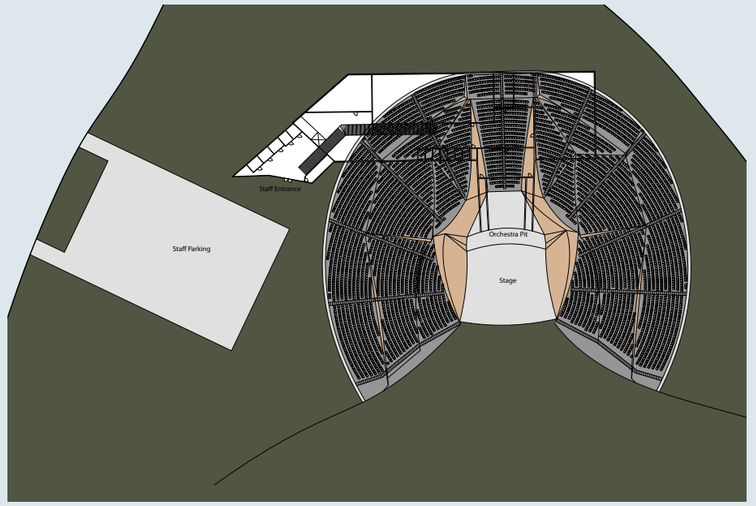
Bird Perspective over the Area

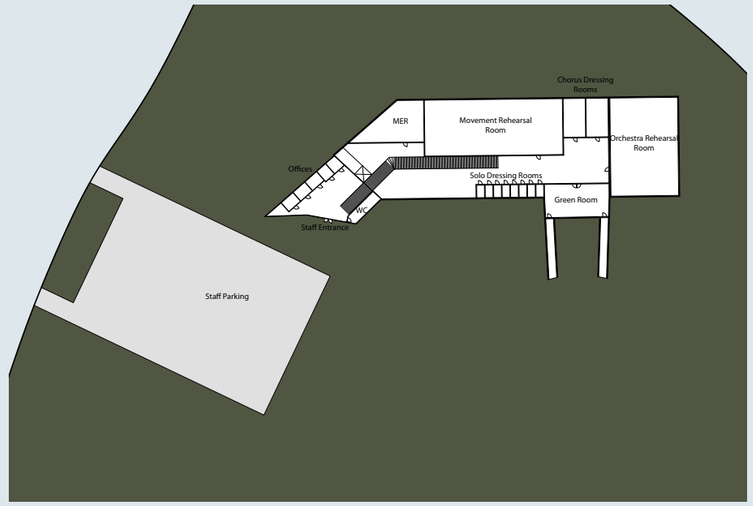


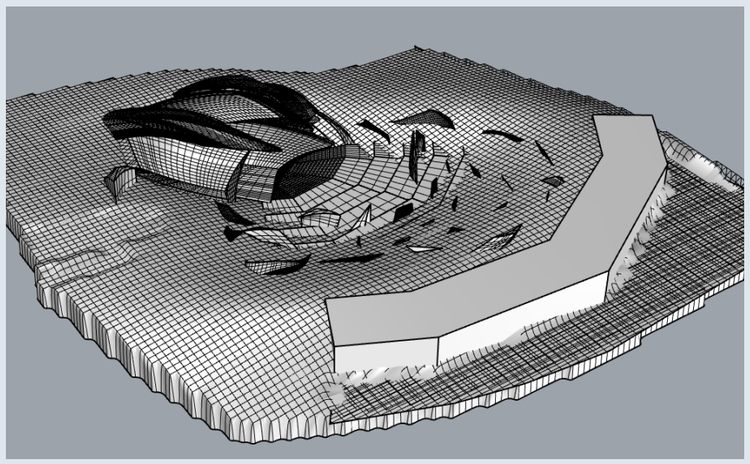
Design Process Three - 3D-Modeling and Details

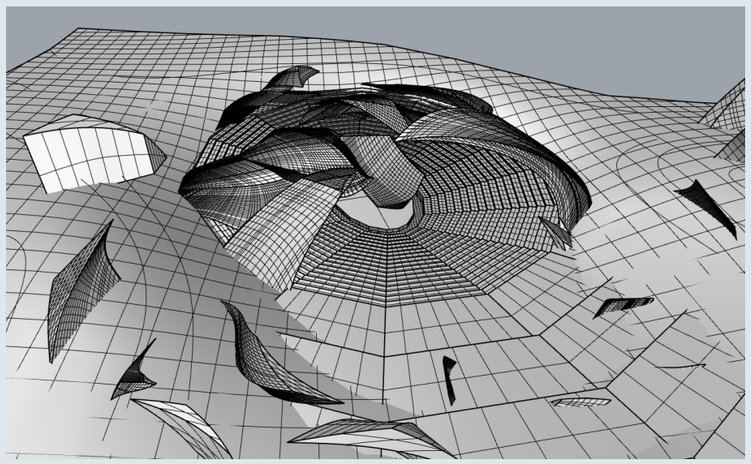
After the Middle critics we made some changes in the project. We moves our back functions from a house in the back to under ground to move them closer to the stage. And we tried to make the roof structure and the outer shards move closer together design wise and form a unity built up by “crashed shards” more than two different entities. Here our acoustics student joined us as well and we started working on more precise acoustic properties.

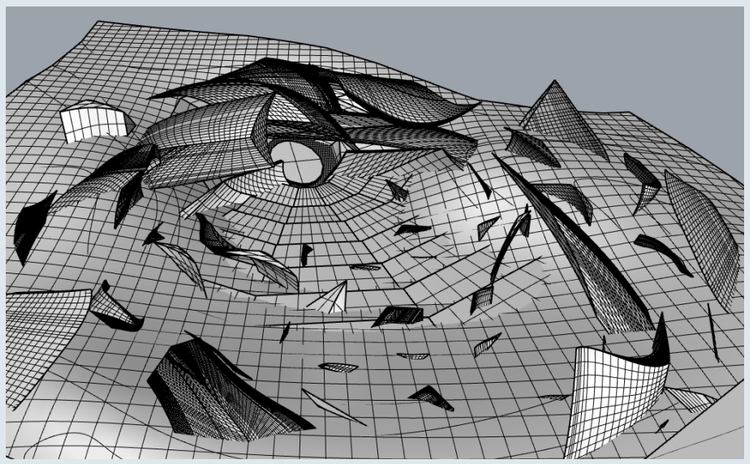






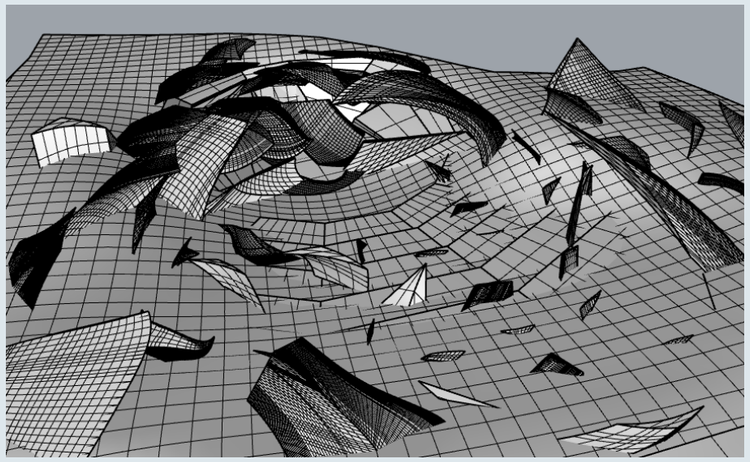


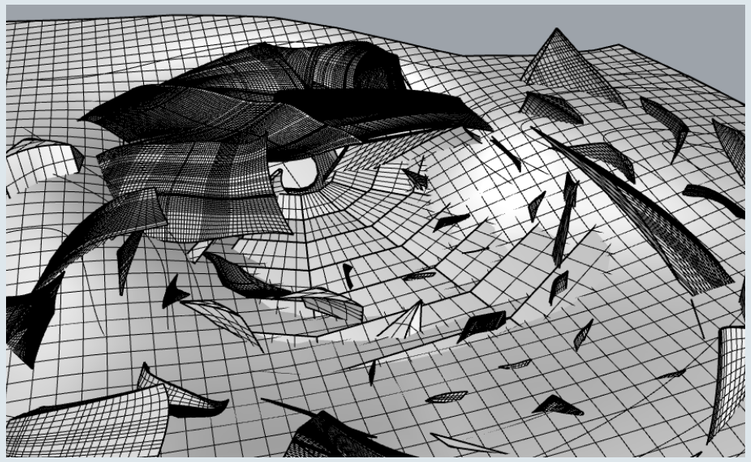


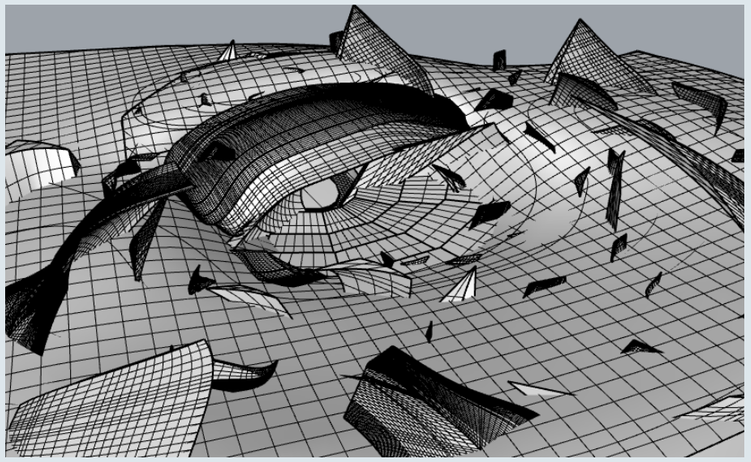


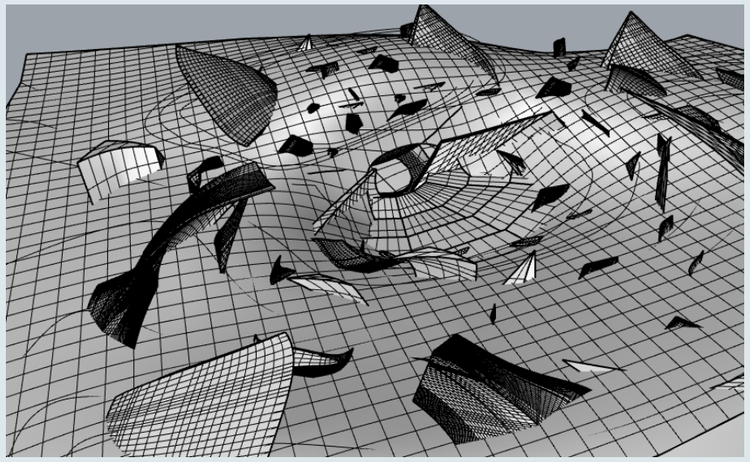
Design Process Four - Finishing up!

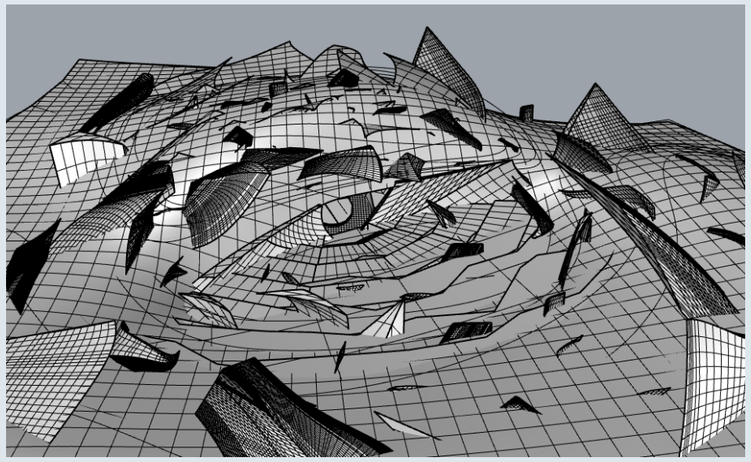
When we started working more and more on the acoustical properties we realised that it was going to be hard to create great acoustics with the shards as a roof structure. Here we started covering the seating area more and more and in the end we covered it completely in a cave-like structure. This, I would say, is the most important route choice in our project since it changed the overall look drastically and also improved our interior acoustics. Although it is also here we started putting to much effort into the interior while neglecting the exterior. Which in turn created a project that doesn't really tie together completely. From here I would say we should have either tried developing the "shards-idea" further, or continued as we did but also put more effort into evolving the exterior in the same pace as the interior

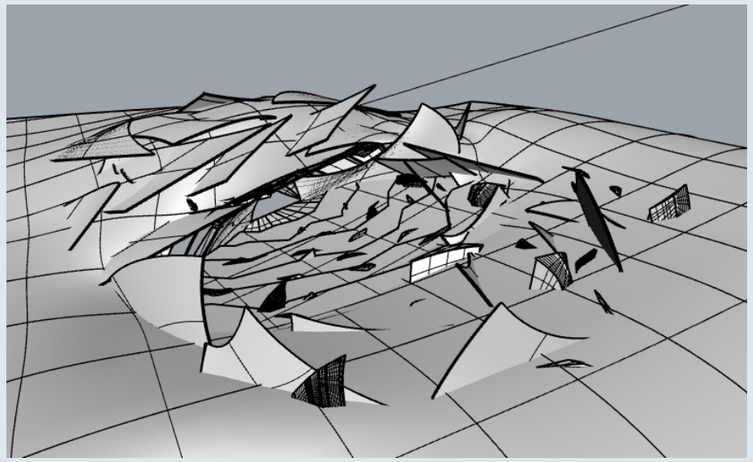












Reflections

The collaboration with our partner from the acoustics masterprogram went great. From the start it felt like we were working towards the same goals and trying to evolve the project. We had regular meetings where we could keep ourselves posted on the latest updates of the project and its acoustic properties and a good discussion on how to further develop these. I would say this collaboration worked very well and is the reason our acoustical results became as good as the are.

We started the project with sketching and discussing our ideas and tried to get as much as possible down on paper. This gave us a good understanding of what each of us were thinking and gave the possibility of building a strong concept early in the project to work from. As soon as we found this concept we started making 3D models and sketches on the computer to further understand what we wanted to do and to be able to make a presentation for the acoustic master students which would be easy to understand. Once we paired up with an acoustic master student we started working side by side on perfecting the acoustical properties of the project while at the same time keeping to our concept. This was harder than expected, and in order to get the acoustical properties we wanted we had to make compromises in our original design. When the acoustical matter started to clear out we could focus more on the artistic design of the project and on making the final posters for the presentation.
I think our process went very well and we always knew what to work on to take the project forward. Although I think it was a shame that we had to compromise our concept to create better acoustics I'm still satisfied with the outcome of the project, although, I would have wanted to see where we could have gone if we would have compromised a little more on the acoustics in order to evolve our conceptual design in the original direction.

Acoustically our project became very good, on the interior seating i beilive we reached all our goals and managed to create a great environment for natural acoustics, with an even sound distribution over the entire seating and good acoustical values considering the size of the hall. For the open lawn seating we also reached our goals for the different zones with good natural acoustics in the front, and an even decrease in sound pressure level further back. And with electro acoustics also there a good acoustical experience for the audience.
Architecturally i think the exterior became good and i think we managed to create a dynamic and interesting landscape for the audience to enjoy. The interior in itself also became great with its flowing, soft shapes and the many parts coming together in unity. It became very artistically and sculpturally beautiful but it didn't really go together with the exterior in a perfect way as it strayed to far away from the main concept of the shards of a crashed meteor. I also think the choice of wooden material (which I think looked great on the interior) is a to far stretch from the concept and that we could have been closer to our original ideas if we would have choosen a more "crystalised" material to work with. I would have liked to see the project being finished more like our original ideas with everything being built up by the shards in a very extreme way. But if I would get the chance to evolve our current project I would work a lot on the exterior, trying to create a feeling more like the interior even there, for a more evenly distributed project.