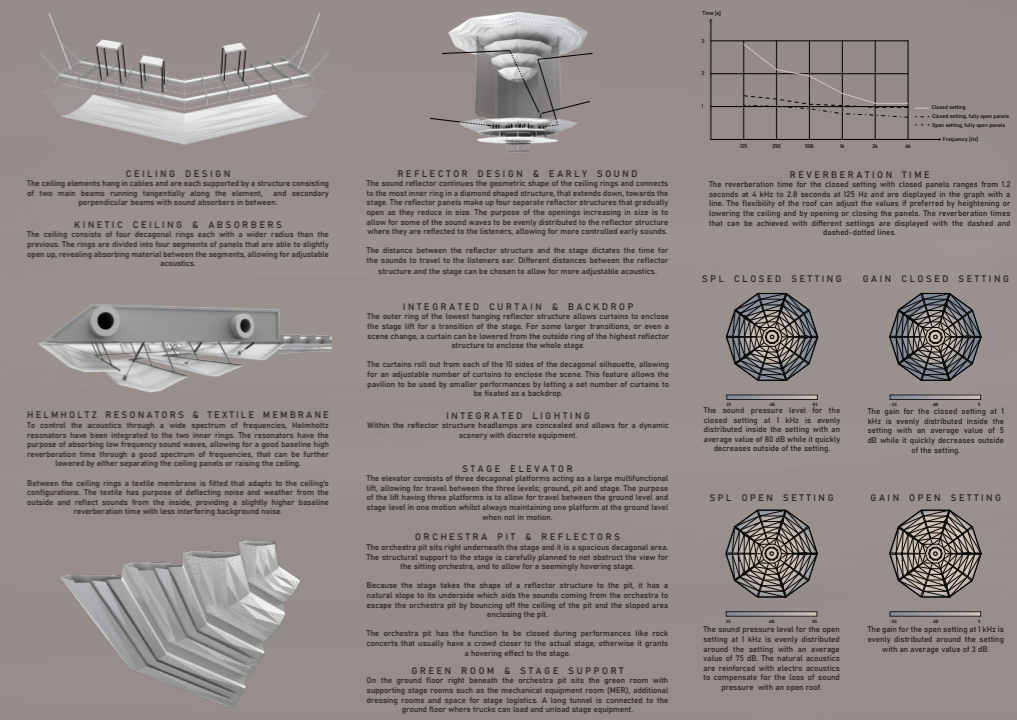
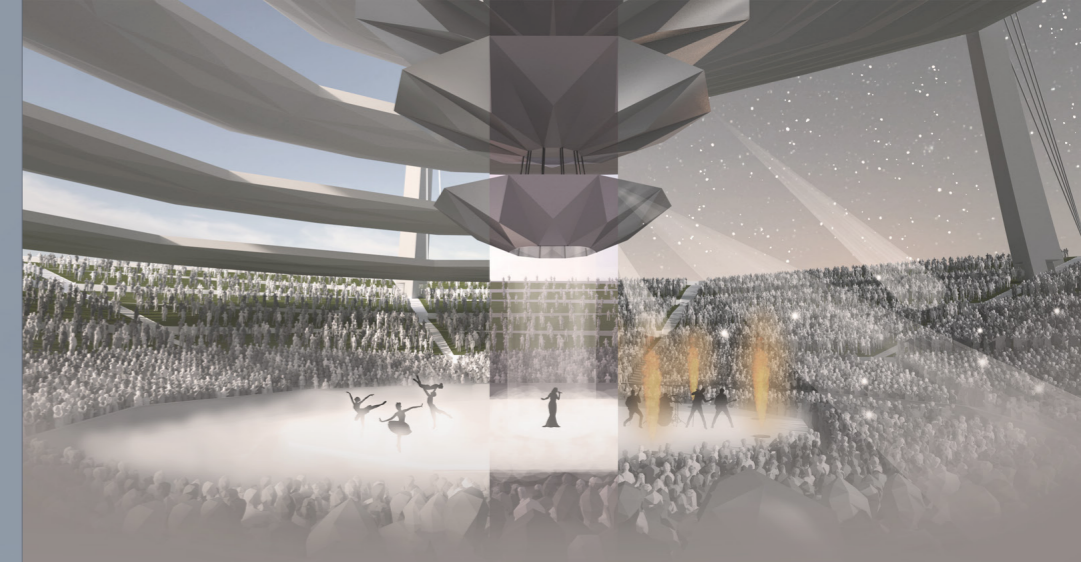
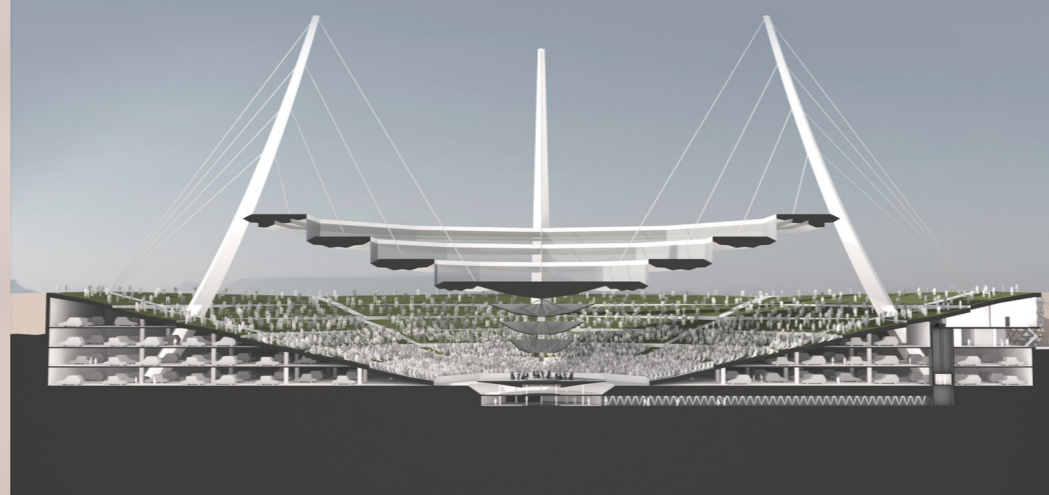
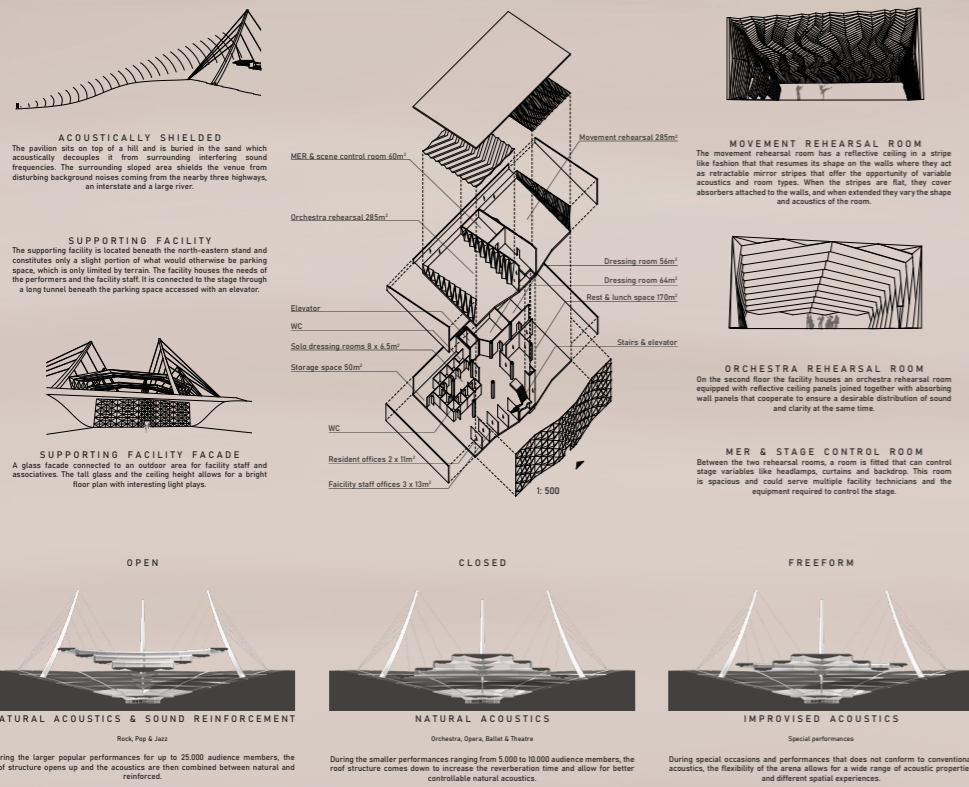


# OASIS

BORN FROM UNUSUAL ACOUSTICAL CIRCUMSTANCES



# ACEX 15

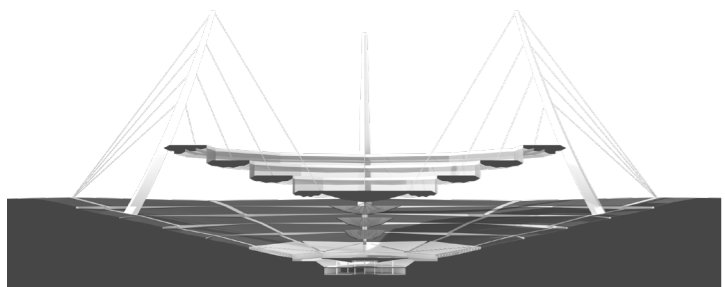
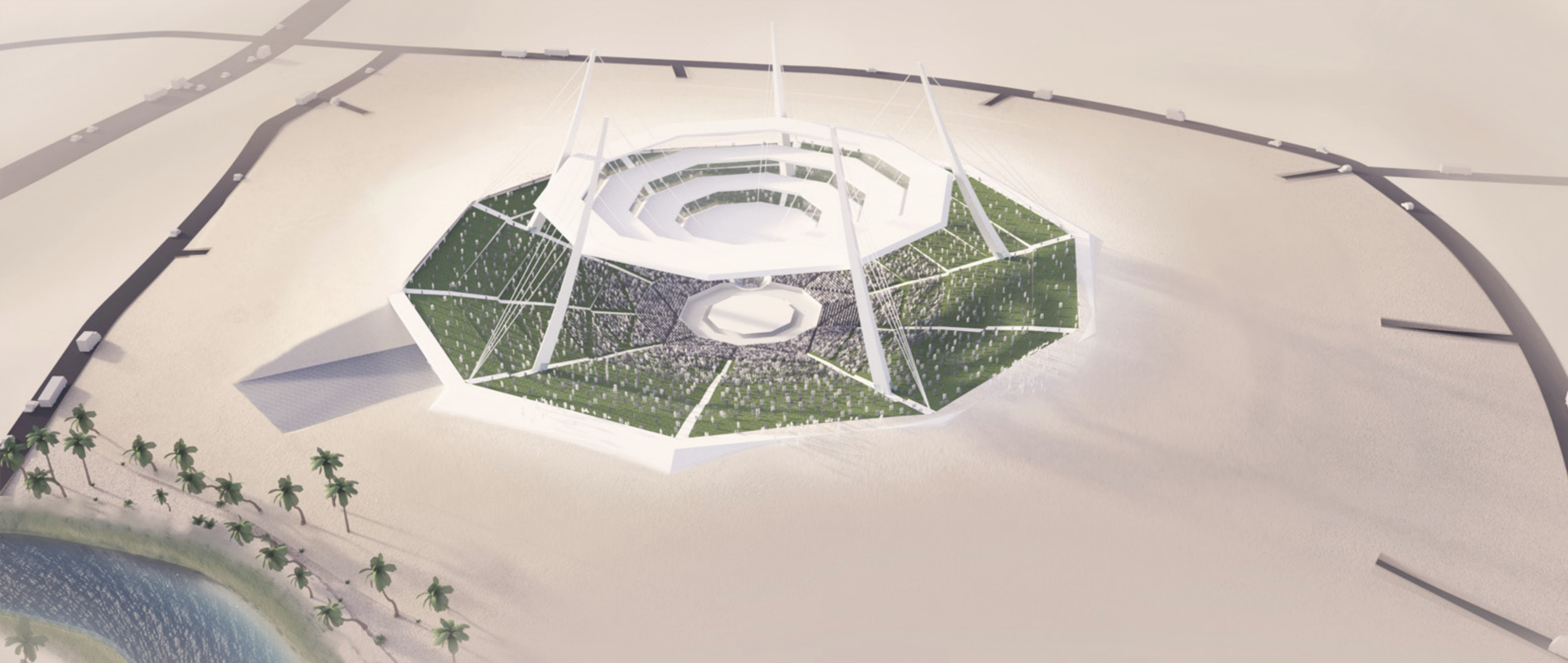
BACHELOR PROJECT IN ARCHITECTURE & ENGINEERING  
2020 ASA STUDENT DESIGN COMPETITION PROPOSAL  
EXAMINER MORTEN LUND

The Oasis is a buried pavilion with five tall pillars carrying a roof structure that spans over large green seating areas. Like an oasis is born from unusual circumstances, this oasis was born from unusual acoustical needs.

The venue will serve as an outdoor summer concert arena where life and music are celebrated together with thousands of people, musicians and dancers. Popular acts will be combined with orchestra, theatre and ballet in a mix of a flourishing environment.

To supply the circular stage and the audience with proper acoustics and utilities, the pavilion can be shaped to fulfill the preferences of all kinds of performances and audience members. By heightening and lowering the ceiling together with a kinetic ceiling structure, a wide range of acoustical demands can be met.

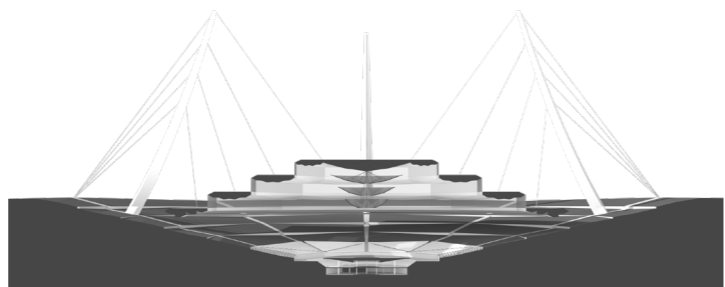




**NATURAL ACOUSTICS & SOUND REINFORCEMENT**

Rock, Pop & Jazz

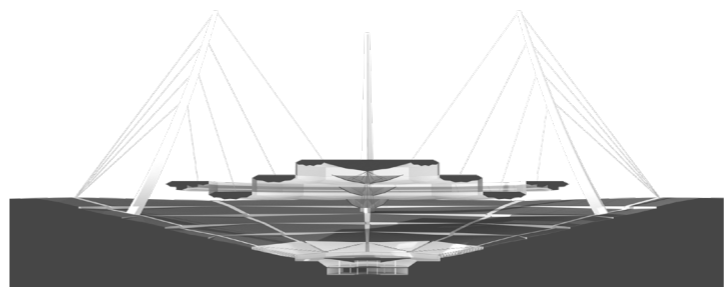
During the larger popular performances for up to 25,000 audience members, the roof structure opens up and the acoustics are then combined between natural and reinforced.



**NATURAL ACOUSTICS**

Orchestra, Opera, Ballet & Theatre

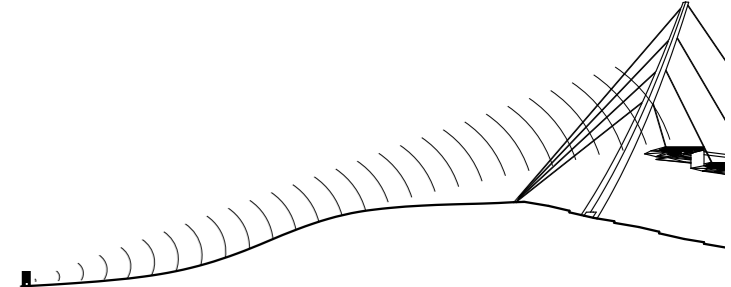
During the smaller performances ranging from 5,000 to 10,000 audience members, the roof structure comes down to increase the reverberation time and allow for better controllable natural acoustics.



**IMPROVISED ACOUSTICS**

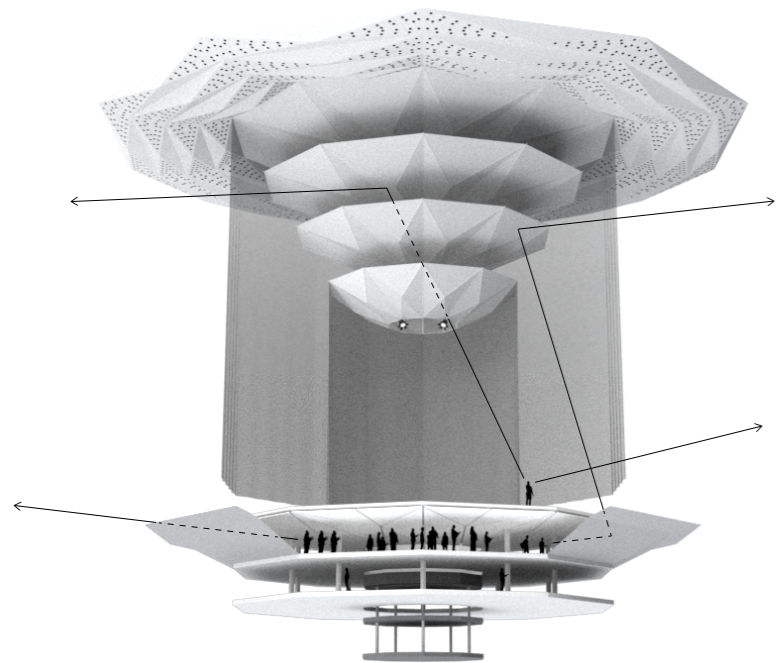
Special performances

During special occasions and performances that does not conform to conventional acoustics, the flexibility of the arena allows for a wide range of acoustic properties and different spatial experiences.



**ACOUSTICALLY SHIELDED**

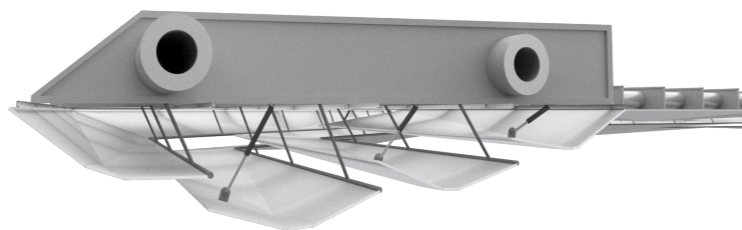
The pavilion sits on top of a hill and is buried in the sand which acoustically decouples it from surrounding interfering sound frequencies. The surrounding sloped area shields the venue from disturbing background noises coming from the nearby three highways, an interstate and a large river.



### REFLECTOR DESIGN & EARLY SOUND

The sound reflector continues the geometric shape of the ceiling rings and connects to the most inner ring in a diamond shaped structure, that extends down, towards the stage. The reflector panels make up four separate reflector structures that gradually open as they reduce in size. The purpose of the openings increasing in size is to allow for some of the sound waves to be evenly distributed to the reflector structure where they are reflected to the listeners, allowing for more controlled early sounds.

The distance between the reflector structure and the stage dictates the time for the sounds to travel to the listeners ear. Different distances between the reflector structure and the stage can be chosen to allow for more adjustable acoustics.

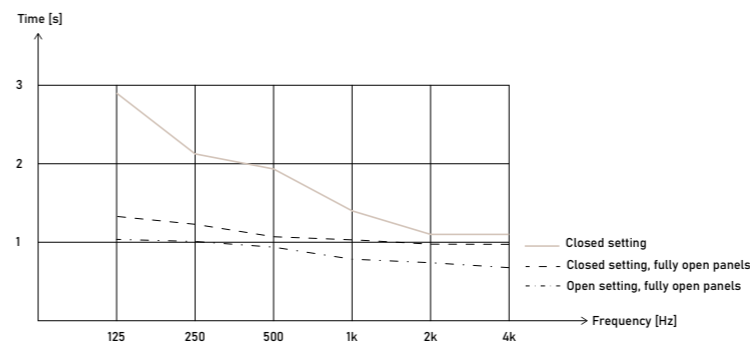


### CEILING DESIGN

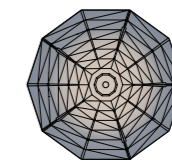
The ceiling elements hang in cables and are each supported by a structure consisting of two main beams running tangentially along the element, and secondary perpendicular beams with sound absorbers in between.

### KINETIC CEILING & ABSORBERS

The ceiling consists of four decagonal rings each with a wider radius than the previous. The rings are divided into four segments of panels that are able to slightly open up, revealing absorbing material between the segments, allowing for adjustable acoustics.

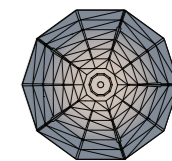


### SPL CLOSED SETTING



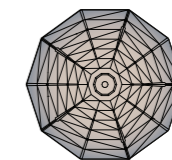
The sound pressure level for the closed setting at 1 kHz is evenly distributed inside the setting with an average value of 80 dB while it quickly decreases outside of the setting.

### GAIN CLOSED SETTING



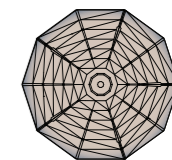
The gain for the closed setting at 1 kHz is evenly distributed inside the setting with an average value of 5 dB while it quickly decreases outside of the setting.

### SPL OPEN SETTING

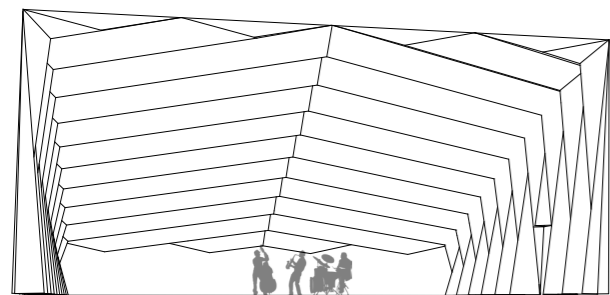
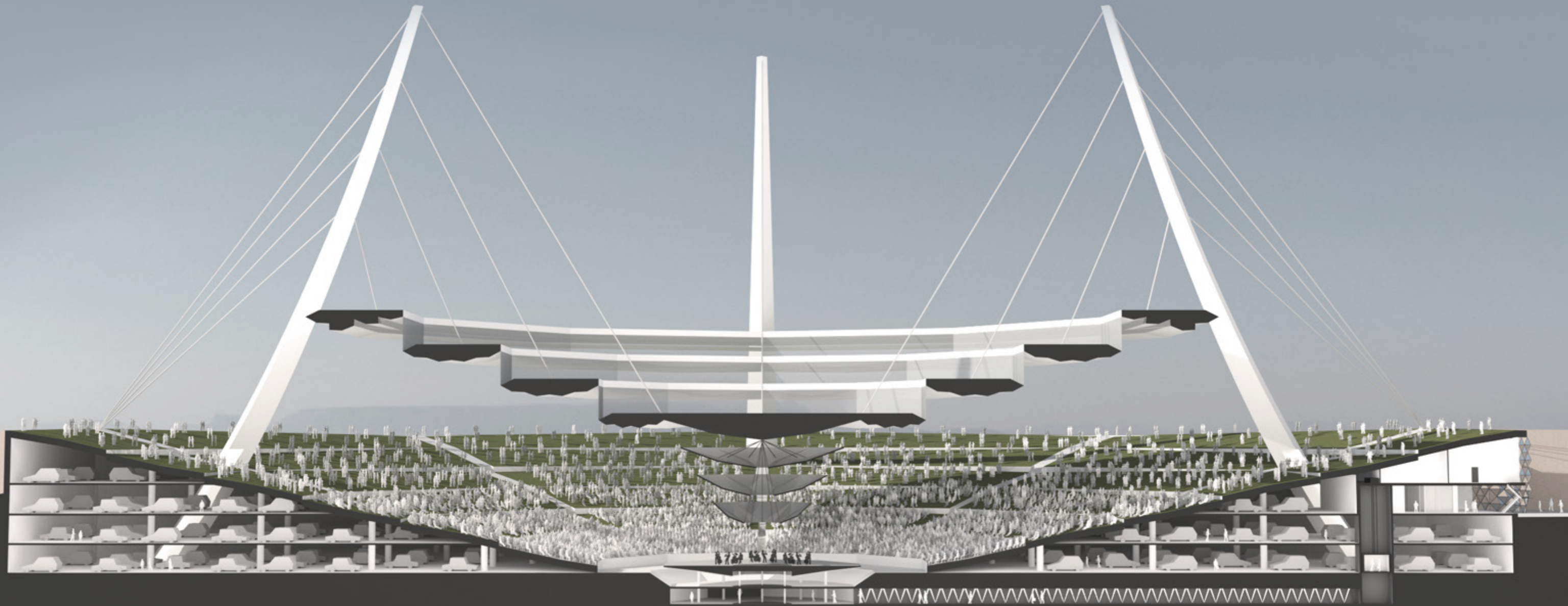


The sound pressure level for the open setting at 1 kHz is evenly distributed around the setting with an average value of 75 dB. The natural acoustics are reinforced with electro acoustics to compensate for the loss of sound pressure with an open roof.

### GAIN OPEN SETTING

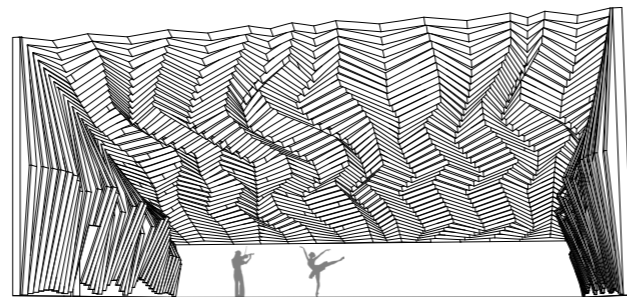


The gain for the open setting at 1 kHz is evenly distributed around the setting with an average value of 3 dB.



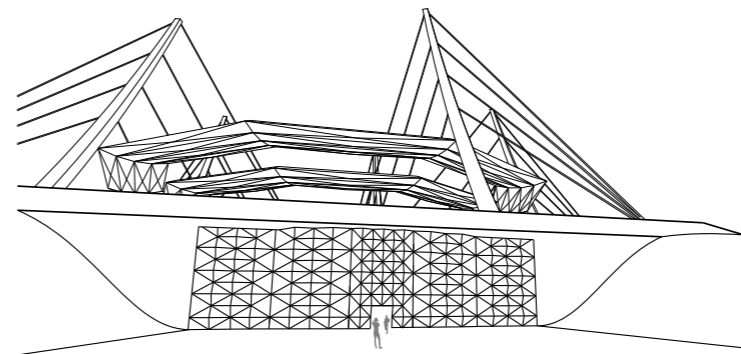
**ORCHESTRA REHEARSAL ROOM**

On the second floor the facility houses an orchestra rehearsal room equipped with reflective ceiling panels joined together with absorbing wall panels that cooperate to ensure a desirable distribution of sound and clarity at the same time.



**MOVEMENT REHEARSAL ROOM**

The movement rehearsal room has a reflective ceiling in a stripe like fashion that that resumes its shape on the walls where they act as retractable mirror stripes that offer the opportunity of variable acoustics and room types. When the stripes are flat, they cover absorbers attached to the walls, and when extended they vary the shape and acoustics of the room.

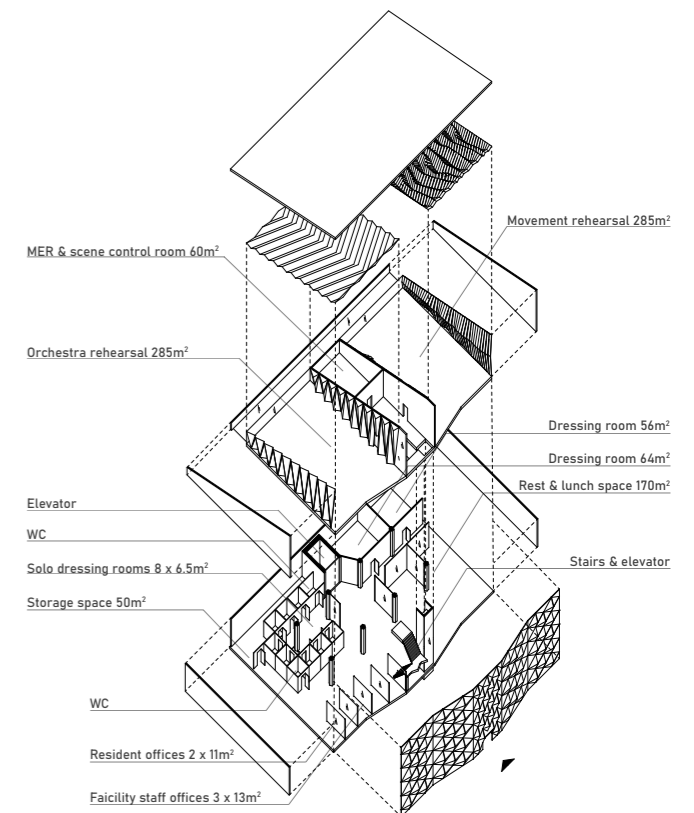


**SUPPORTING FACILITY FACADE**

A glass facade connected to an outdoor area for facility staff and associates. The tall glass and the ceiling height allows for a bright floor plan with interesting light plays.

**SUPPORTING FACILITY**

The supporting facility is located beneath the north-eastern stand and constitutes only a slight portion of what would otherwise be parking space, which is only limited by terrain. The facility houses the needs of the performers and the facility staff. It is connected to the stage through a long tunnel beneath the parking space accessed with an elevator.



MER & scene control room 60m<sup>2</sup>

Orchestra rehearsal 285m<sup>2</sup>

Elevator

WC

Solo dressing rooms 8 x 6.5m<sup>2</sup>

Storage space 50m<sup>2</sup>

WC

Resident offices 2 x 11m<sup>2</sup>

Facility staff offices 3 x 13m<sup>2</sup>

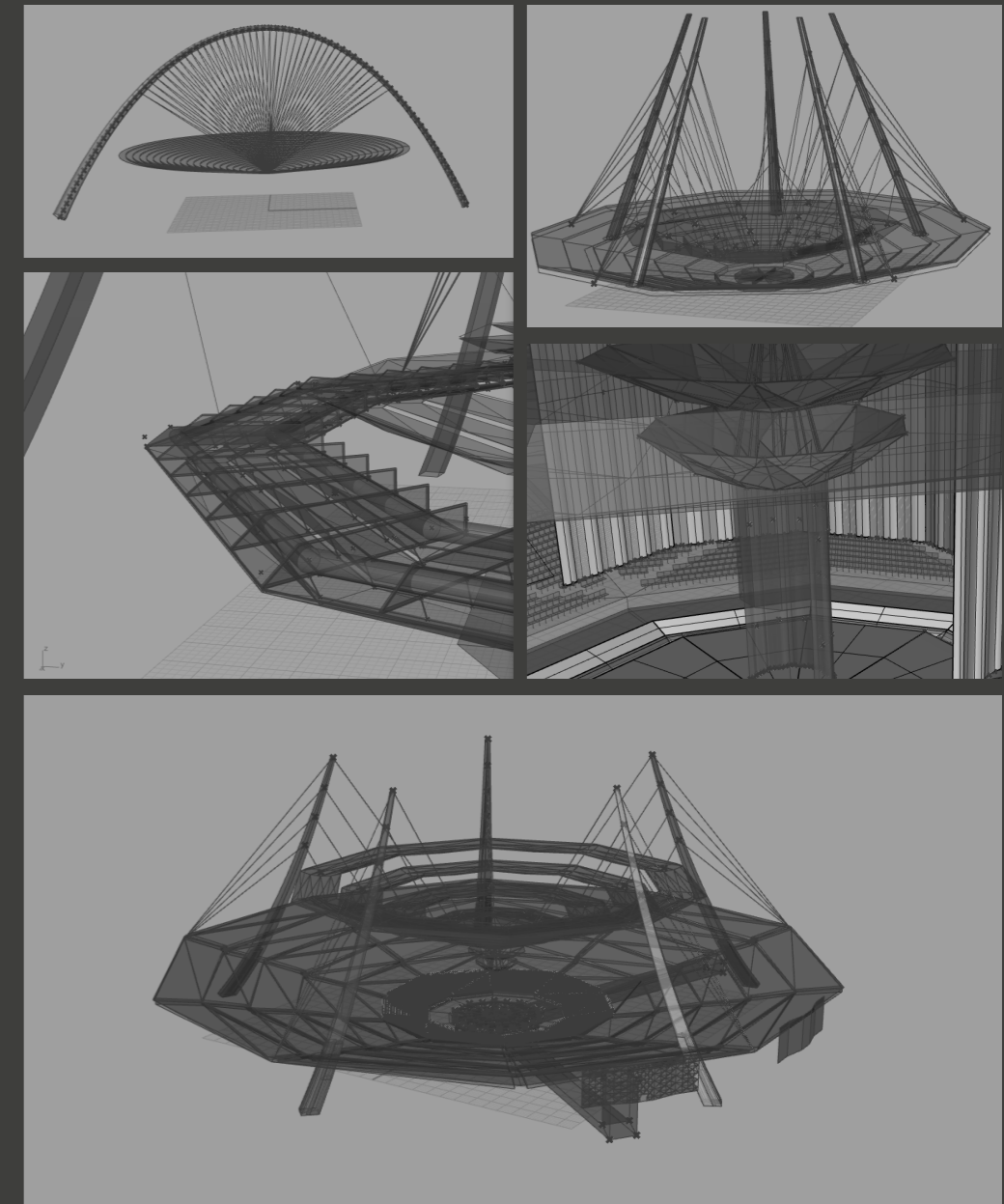
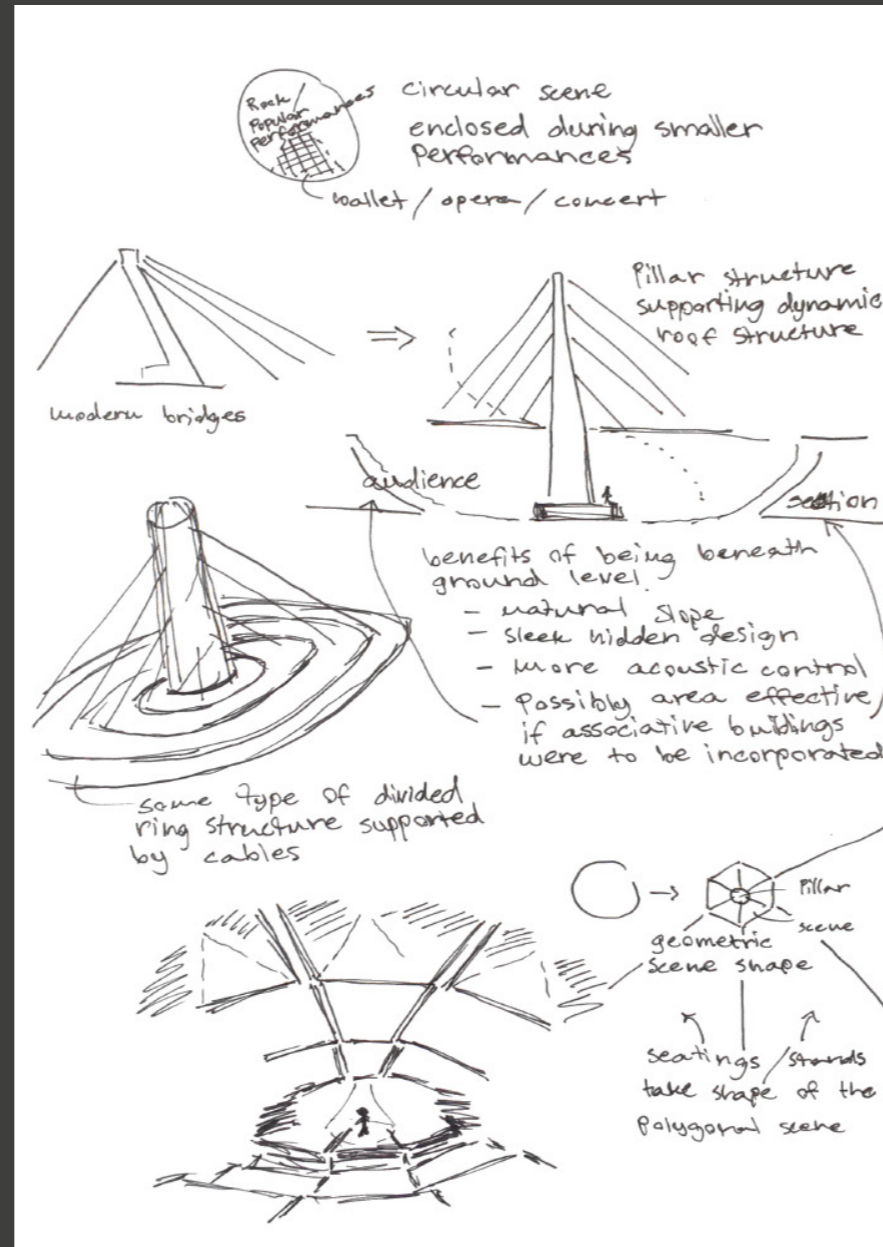
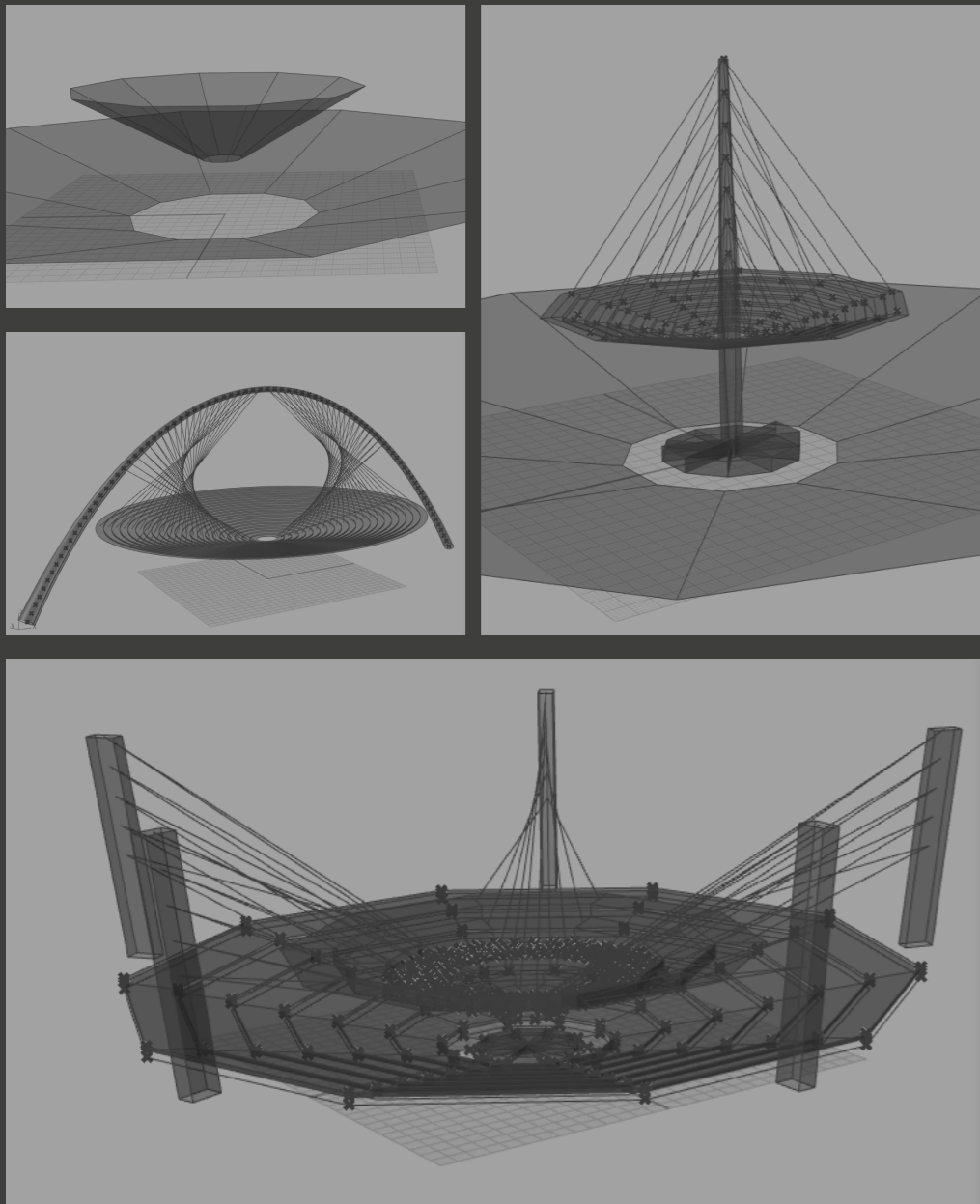
Movement rehearsal 285m<sup>2</sup>

Dressing room 56m<sup>2</sup>

Dressing room 64m<sup>2</sup>

Rest & lunch space 170m<sup>2</sup>

Stairs & elevator



## COLLABORATION

The collaboration between our group and the acoustician that were to help us went good. He understood our ideas briefly and gave us useful information about what solutions that could be applied to create a good acoustic environment.

Sometimes it was hard to understand each other and discuss ideas because we couldn't meet face to face because of the circumstances of Covid-19. This led to some misunderstandings that cost us valuable time in a hectic time schedule.

Another time consuming process was the fact that the roof of Oasis is very flexible which required a lot of different analysis work from the acoustician where one analysis could take up to twelve hours. This led to that we got our analysis results quite late which gave a little time for modification, but with the acoustic flexibility that our project has we were confident that we could achieve the results we wanted.

## METHODOLOGY

We applied a methodology where we focused very much on the concept in the early stages of the project. We sat for almost three weeks just discussing what we wanted to achieve with the project before we began to work with the actual idea.

Our workflow was completely parametric to optimize the design process both in the architectural and acoustical perspective. The pavilion is built up in grasshopper where everything can be adjusted with parameters, and therefore the optimal design could be achieved.

The parametric workflow worked good for the group where we had a grasshopper script in common that we worked on. This saved us a lot of time where the design always was tested with different parameters and not made manually which gave a lot of different design proposals in a small time frame.

## QUALITIES

The qualities achieved with the project was a pavilion that gave an architectural and acoustical experience for the visitor. The arena is a spatial experience with acoustical properties that can fit a wide range of performances thanks to great flexibility.

The project is planned in detail with construction and acoustic solutions to strengthen the ideas of the project with underlying supportive arguments.

Overall it is a concert experience you will never forget with great acoustical properties and it will never be the same each time you visit.