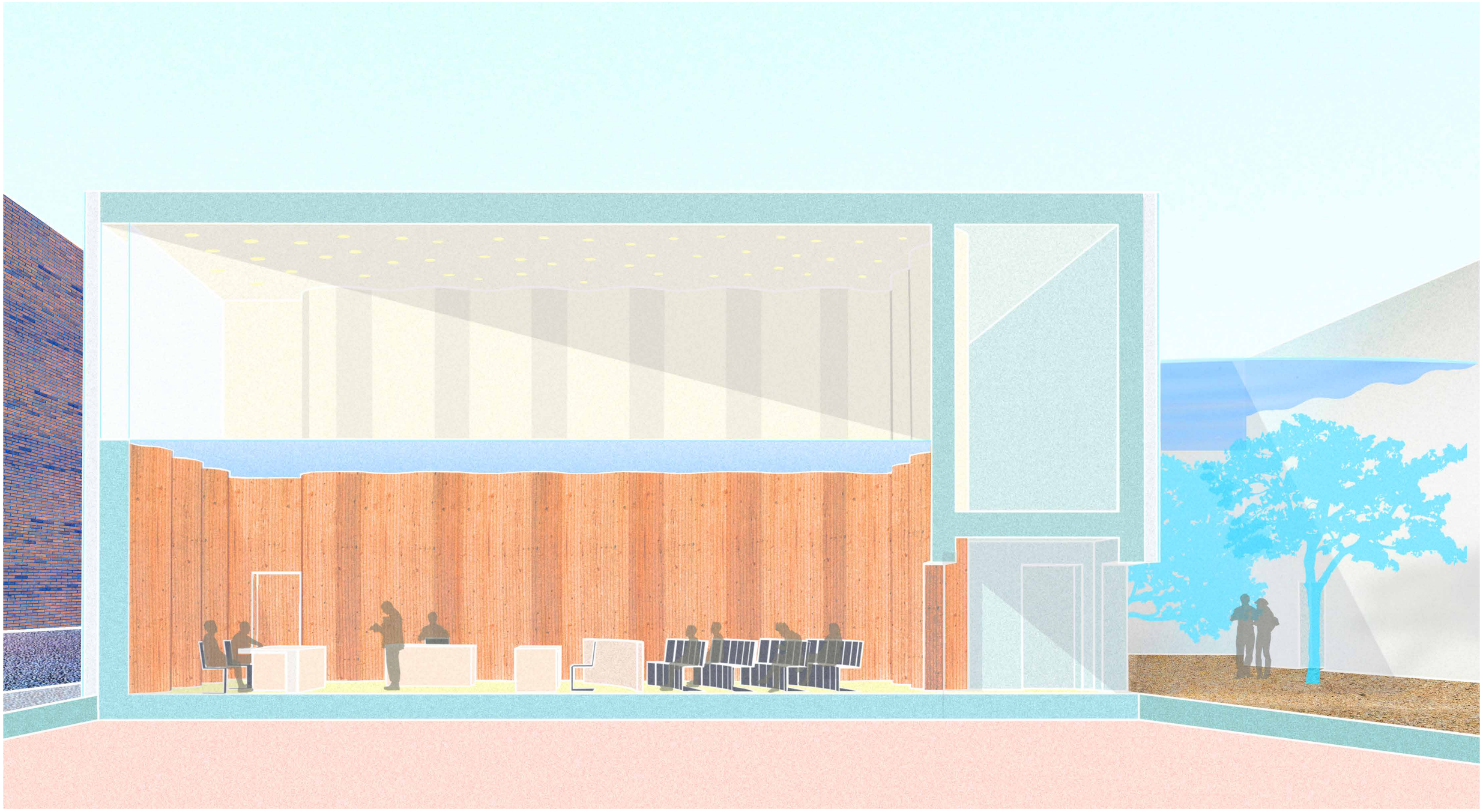


THE COURT ROOM

In the court room there are wooden walls in the wavy, rippled shape and a glass roof that has a flatter appearance like the calm surface of a lake.

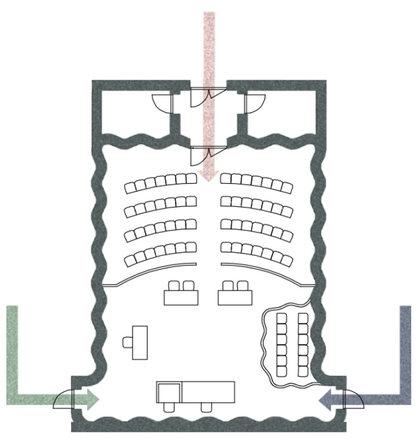
The room can handle an audience of 56 people with a volume of 800 cubic meters. This combined with clever material choices grants a room with great sound properties for speech as well as a feeling of spaciousnes. The layout of the room is classic with the audience in the back, seperated from the court and surrounded by absorbent walls to minimize disturbing noises from the crowd. The seats for the twelve jury members are framed by a wavy low wall which connects to the other walls.

SEPARATED AND SECURE ACCESS

One of the short sides of the room are facing the street outside and the other three walls offer three different ways to enter the room. The public audience can enter the court room from the back of the room, the judge and the jury from one side of the room and anyone in custody will enter from the other side. None of them have to interfere and interrupt each other before the trial which simplifies the procedure. There is also a separate outdoor access from the side of the building to the cell area to ease the relocation of detainees.

PRIVATE CONFERENCE ROOMS

To obtain the highest possible privacy during the attorney and client discussions the conference rooms are placed on the second floor of the building, only accessible for those with authorization. The walls are also made extra thick to prevent any sound from escaping.



A LIGHT SKY

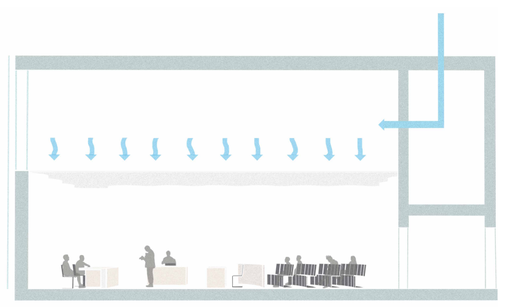
The court is a place where difficult considerations and decisions are made. It is therefore of great importance that the room feels safe from insight. To get natural lighting in the room without compromising the insight protection and the noise control, the courtroom has a glass ceiling. This creates an atmosphere like that of a light sky. The hard surfaces of the glass ceiling acts as reflectors which provides early reflections and further increases the strength of the speech. During darker hours, the room is illuminated by small but strong spotlights mounted above the interior glass ceiling.

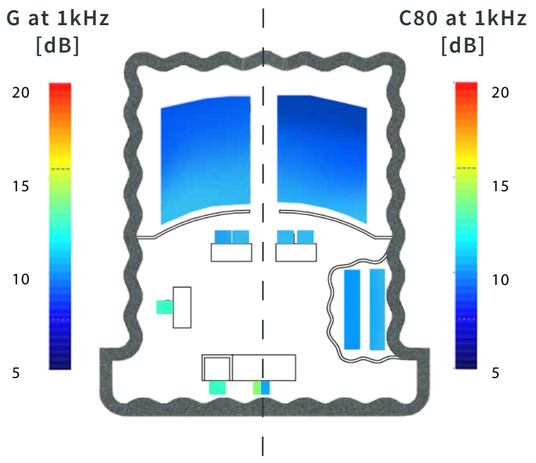
WAVY WALLS

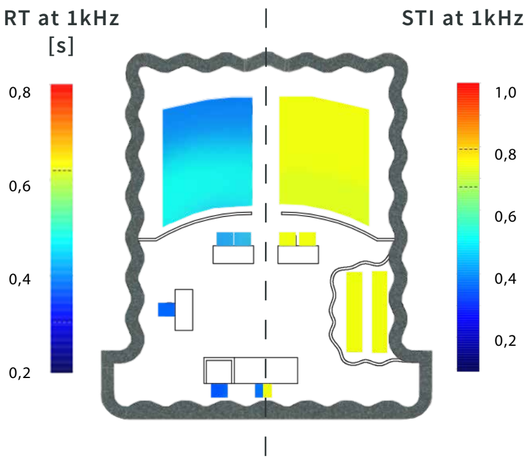
The interior walls consists of standing wooden slits, covering a layer of acousticaly absorbant foam. This grants the possibility to create the unique shape of the walls, while maintaining good acoustical properties for the room. Besides associating to the core concept of ripples, the complex shape also provides extra scattering which leads to a homogeneous soundscape from the reflections.

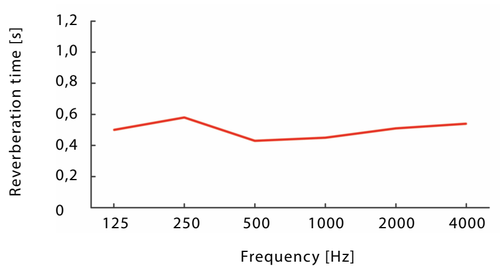
SILENT HVAC SYSTEM

The electrical and mechanical rooms connected to the court room are placed on the second floor above the cell area. This way they are close to the community hall but placed in such a way so that they cause the least disturbance. The ventilation air is being brought in from the roof and transported into the room through small slits between the glass panes. It is evenly distributed over the whole room with a low velocity to prevent the people in the room from hearing and noticing the ventilation.







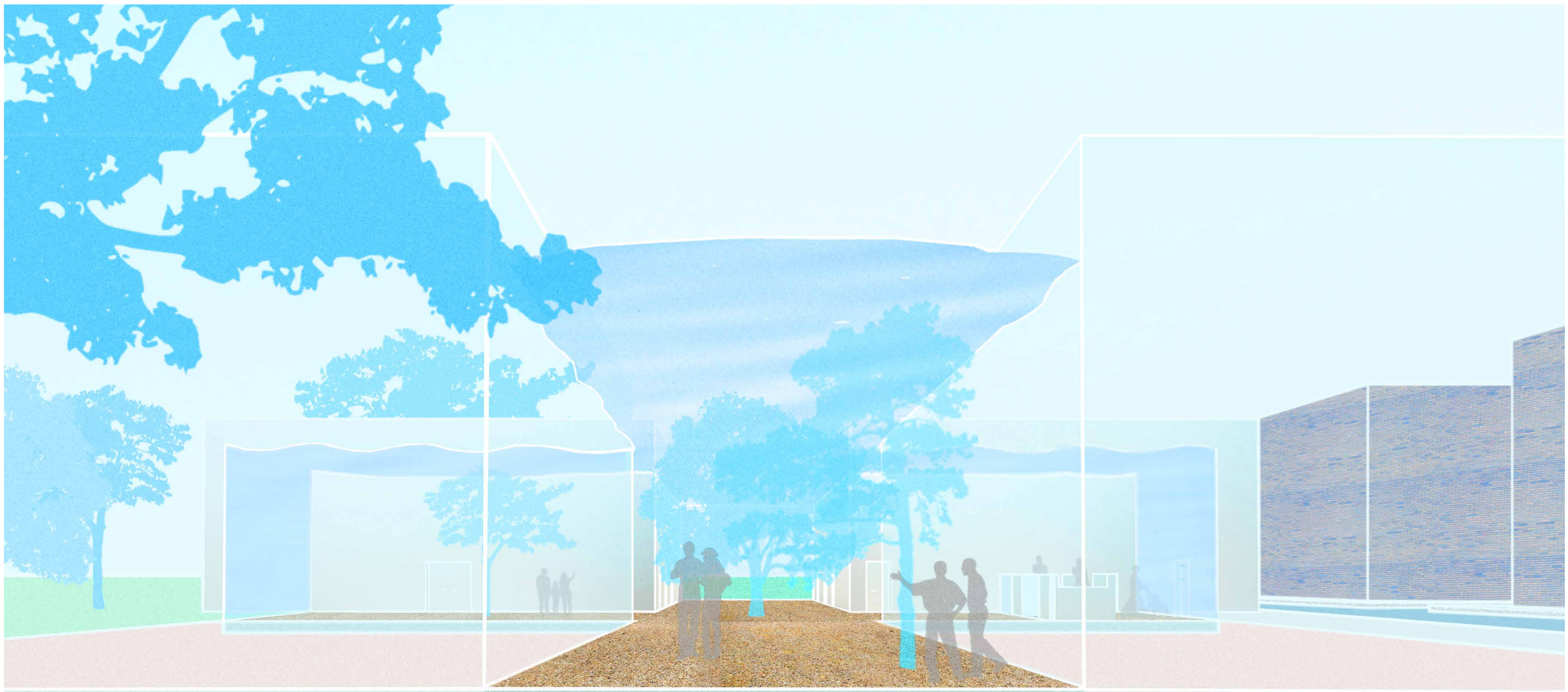


Mean at 1kHz	C-80	RT	G	STI
Speech	9,53	0,45	10,51	0,78

With a strength level above 10 dB it is clear that the room itself will contribute to the voice of whoever is speaking inside the litigation area. This is obtained through the hard surface of the glass ceiling, which generates strong reflections and further increases intelligibility of the sound. This allows the trial to be heard clearly by all participants.

The soundscape of the room is well balanced, making it just as easy to hear and feel present as a part of the jury and as a part of the audience.

By adjusting the thickness of the absorbtion interlayer in the walls, the properties can be varied without any visual que from inside the room. This allows for optimization of the acoustical parameters without losing the spatial and visual qualities.



THE RIPPLE

ENTERING THE QUIET FROM THE NOISE

This project takes place in a commercial district in a north-eastern American suburban city where the noise is relatively loud and the surroundings are heavily trafficked. Both by cars and people but also by a newly built light-weight train system which has a station right in front of the building. The Ripple is located in a small park next to the crossing between two bigger streets containing both a police station and a firehouse on the opposite side. When entering the building from one of the streets the noise is noticeable lower while the park behind remains clearly visible through the glass facade.

A BUILDING THAT GATHERS

The Ripple is a place for the public where everyone can gather for different events and stand on equal grounds. Addressing both criminal cases with some cases requiring a jury together with city council meetings and smaller musical and dramatic performances under the same roof. About half of the building also contains city offices and some community conference rooms.

LIKE RIPPLES ON THE WATER

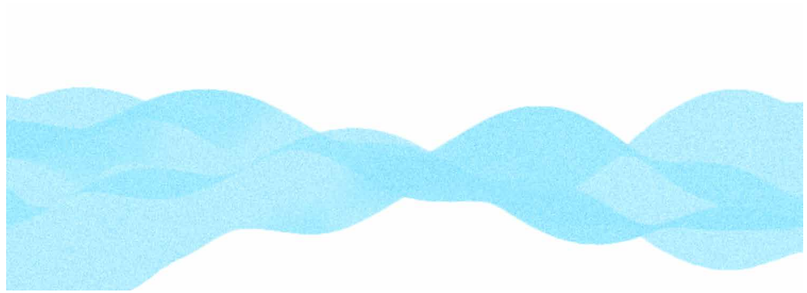
When a drop of water falls on a plain surface, the surface will bend and create peaks and valleys spreading outwards just like the sound spreads through air. If the waves were frozen in time they could be used to direct the sound hitting the surface and refracting the light. The interpretation in glass instead of water waves, will create this effect with beautiful light patterns in the lobby and directed sound transmission in the community hall. The flat glass ceiling in the courtroom acts as a calm surface like that of a lake.

FOUR ACOUSTICALLY SEPARATED BOXES

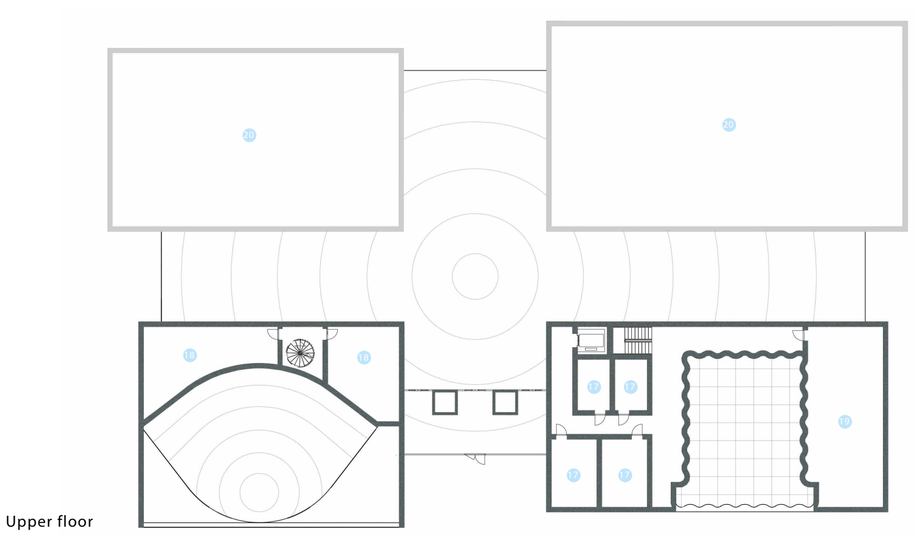
The building is divided into four spatially and acoustically separated parts which are all reached through a common entrance in the lobby. The broad, cross shaped lobby ranging from the different sides of the building to the center links each part together. The community hall and the court room are placed in different ends of the building to prevent acoustical interferences between the two. Other sound generating spaces such as the restrooms and the city offices are placed further away in the two buildings across the lobby.

LIST OVER ROOMS

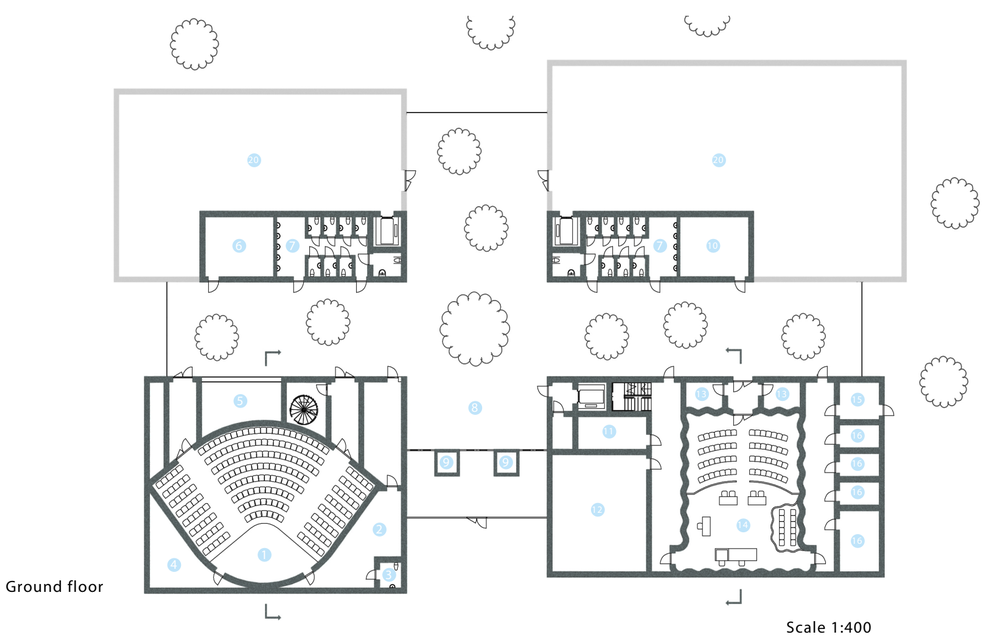
1. Community hall
2. Anteroom
3. Private restroom
4. Storage room
5. Wardrobe
6. Storage room
7. Restrooms
8. Lobby
9. Security control
10. Storage room
11. Judge's office
12. Jury room
13. Storage rooms
14. Court room
15. Bailiff's office
16. Cells
17. Conference rooms
18. Mechanical and electrical rooms
19. Mechanical and elecitrical room
20. City offices buildings



Like ripples on the water surface, the new municipal building should be a place where the visionary ideas from the members of the city council as well as the public, can spread.



Upper floor



Ground floor

Scale 1:400

INDOOR TO INDOOR SOUND TRANSMISSION

The boxes connected by the lobby all mimics each other in the way they are constructed. The concrete walls covered by the frosted glass facade covers the four different buildings on both the outside as well as in the lobby. This provides an spacious hallway with great sound insulation between the different buildings.

THE INDOOR PARK

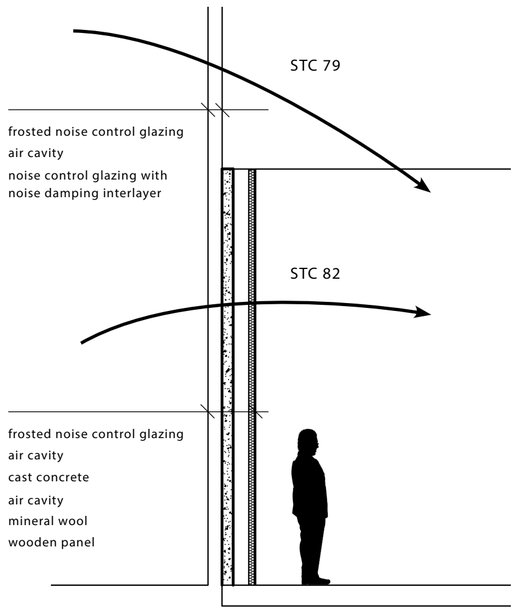
The cross shaped lobby is covered by a rippled shaped glass roof with the ripples originating from the center of the building. It is a living space with trees and a natural stone floor. This combined with the big glass roof gives the feeling you are outside when you are inside.

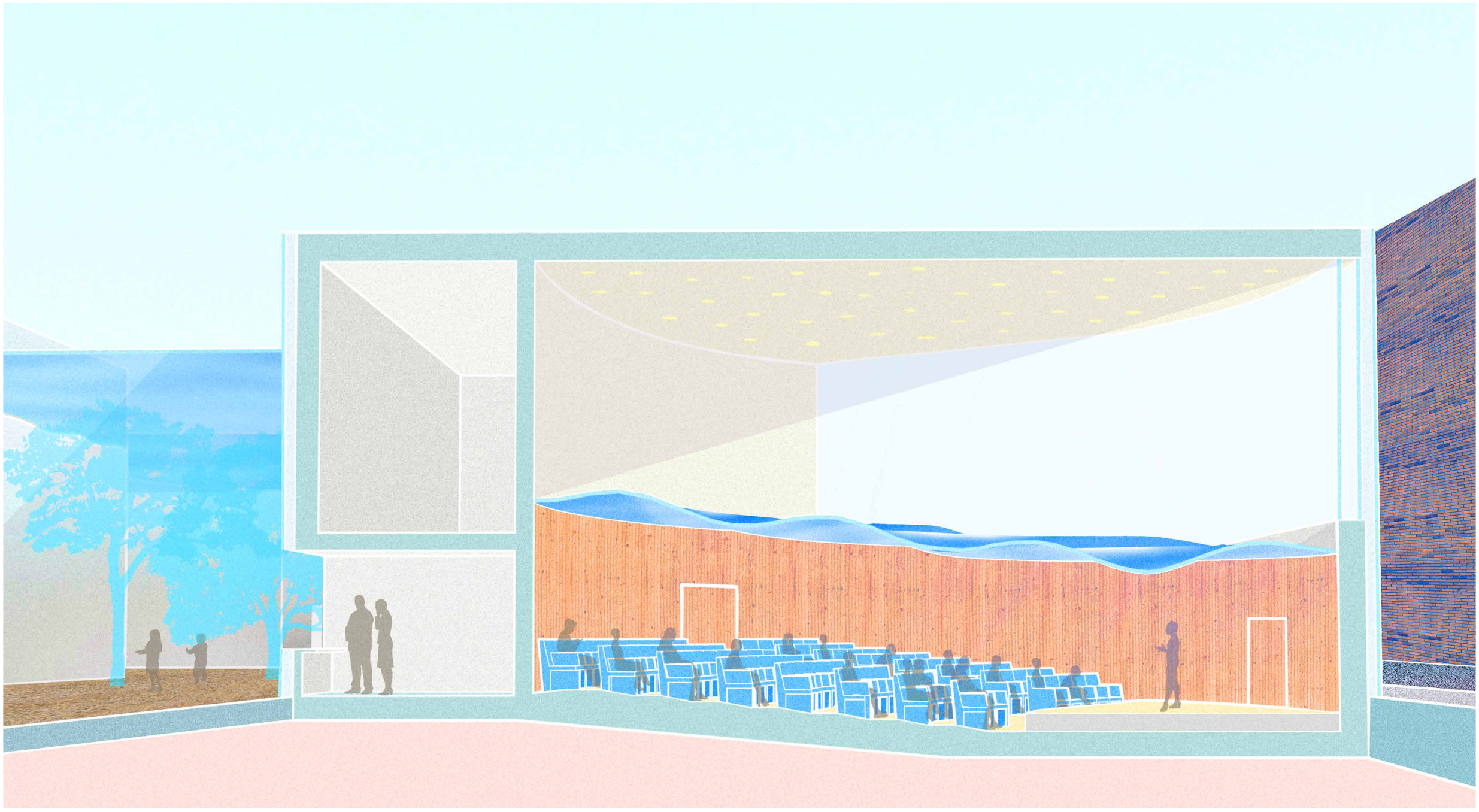
OUTDOOR TO INDOOR SOUND TRANSMISSION

As the surroundings of the building consists of heavy traffic noises, the exterior sound insulation is of the utmost importance. The outdoor to indoor environment are separated by several layers of different materials, all containing different eigen frequencies. This ensures that the sound insulation is even throughout the frequencies of interest.

In order to get natural lighting while still maintaining a high sound transmission class, heavy glass panels with noise damping interlayers were used on the upper wall of the boxes.

Due to the light-weight train traffic close to the town hall, all load bearing structures are placed on vibration isolation material which provides a coupling frequency below 15Hz. This ensures that any eventual vibration from nearby light-weight trains can't be felt from inside the building.

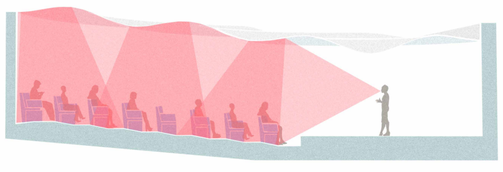




THE COMMUNITY HALL

The community hall a humble room for 200 people and has a unique design for an adjustable ceiling. The water surface-like roof is kinetic and can be adjusted for different occasions to provide the desired sound qualities. The rooms volume can vary between 500 and 1100 cubic meters. This provides the possibility to alter the room character between a closed, intimate feeling for speech to a wide and open configuration for musical performances.

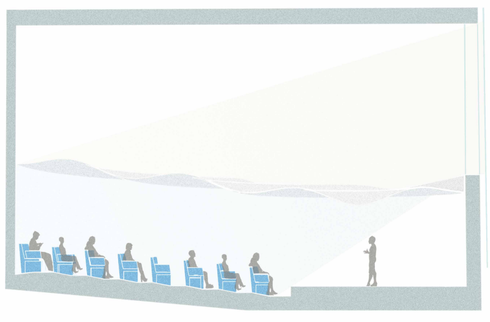
The speech configuration uses the beautiful ripple shaped ceiling to direct the sound from the stage towards the audience and provide early reflections which leads to an even soundscape.



The wavy roof is designed to amplify the sound strength by giving the audience early reflections. The ripples also help distributing the sound evenly.

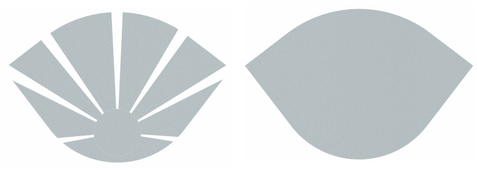
DAYLIGHT FROM THE ROOF

The roof in the community hall is made of the ripple shaped glass ceiling. Daylight is let in through a wide gap, not visible from within the community hall, stretching from each side of the wall behind the stage. The light is made diffuse by the frosted facade glass and gets a bluish tone when entering the room. The feeling when sitting in the community hall is that you are sitting under a water surface, because of the vague reflections created both on the floor and the walls. During darker hours the spotlights creates a starry night sky.



A MOVING GLASS ROOF

During musical performances when a longer reverberation time is required the roof can be opened to reveal a bigger volume above. The glass roof is divided into pieces where every other piece can move sideways like a folding fan and position itself on top of the neighbouring piece.



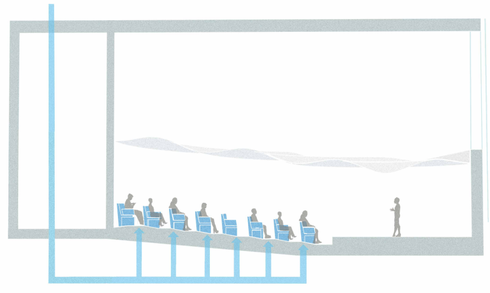
Principled pictures of the opening of the roof to create a bigger room volume.

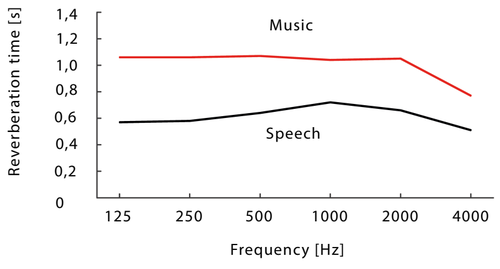
REFLECTIVE AND ABSORBING WALLS

The appearance of the interior walls is the same all around the community hall, however, under the wood surface between the wood paneling slits, different parts of the room have different acoustic qualities. The lower parts of the side walls are all made reflective as well as the walls behind the stage. This spreads the sound from the stage and reflects it to the audience. The upper parts of the walls are made absorbent so that no unwanted echo is created.

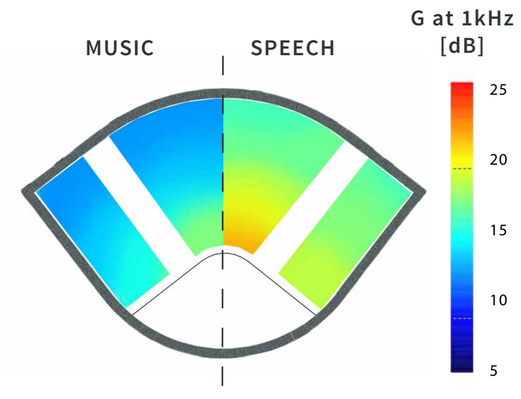
SILENT HVAC SYSTEM

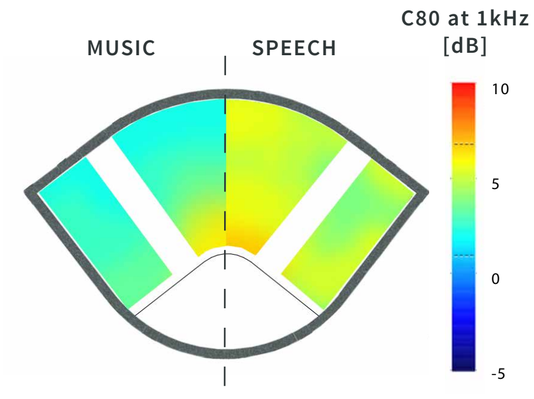
The electrical and mechanical rooms connected to the community hall are placed on the second floor above the wardrobes on the first floor. This way they are close to the community hall but placed in such a way so that they cause the least disturbance. The ventilation air is being brought in from the roof and transported down under the seats. It is evenly distributed under every seat with a low velocity to avoid generating noise.

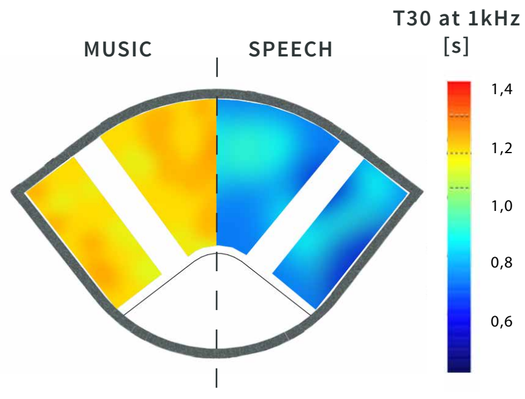




Mean at 1kHz	C-80	RT	G	STI
Speech	5,24	0,72	17,22	0,72
Music	2,70	1,04	12,72	0,6







By only opening up the ripple ceiling, the character of the room changes drastically. The reverberation time is noticable amplified for all frequiencies, providing a balanced soundscape for acoustical performances.