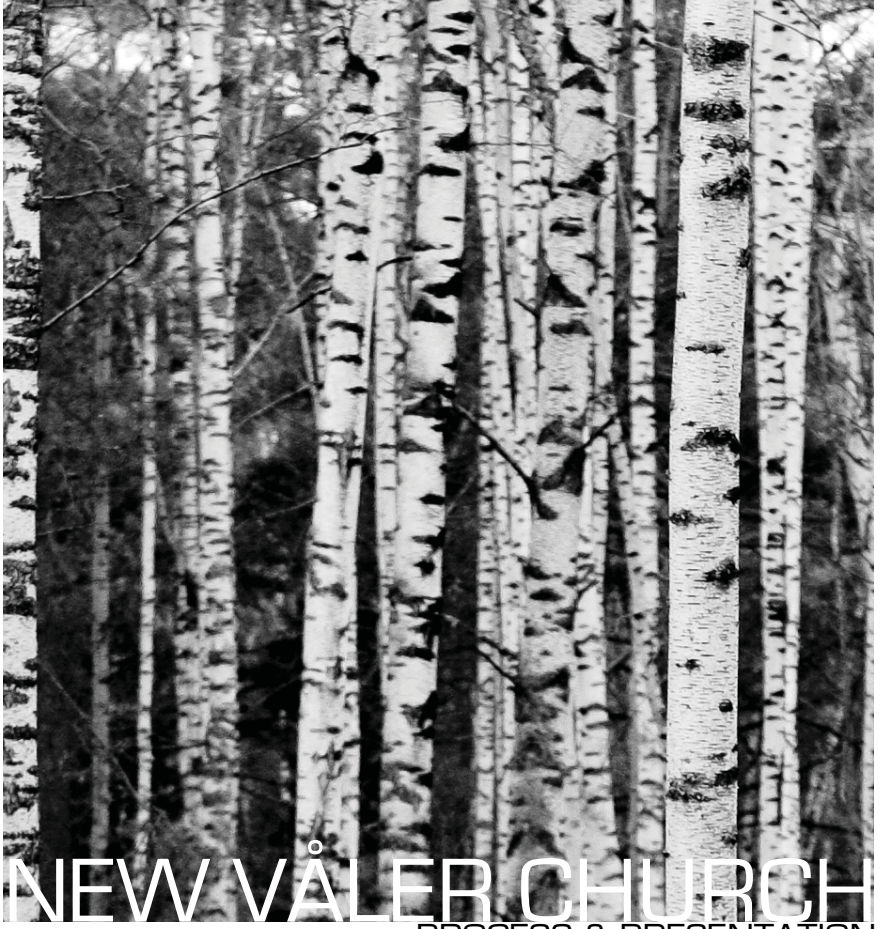

NEW VÅLER CHURCH

PROCESS & PRESENTATION

AALBORG UNIVERSITY, DEPARTMENT OF ARCHITECTURE,
DESIGN & MEDIA TECHNOLOGY
MSC4, ARCHITECTURAL DESIGN, SPRING 2012

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SYNOPSIS
PROCESS & PRESENTATION

The project is based upon an open competition which took place in the autumn of 2011, formulated by the municipality of Våler. The competition describes the design of a new church for the parish of Våler, as a result of the devastating fire which destroyed the original Church of Våler.
To support the design of the church, theoretical investigations about Sacred Spaces, Nordic architecture and Tectonic design have been made. Furthermore, as the technical focus of the project is sustainability and energy, these themes have also been studied.
The new Våler church is designed as a low-energy building in a Scandinavian context.

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PROCES & PRESENTATION

#2 | THE WOODLANDS CEMENTARY, STOCKHOLM

DESIGN
PROCESS

The design concept of the new church of Våler derives from the project vision and the wishes from the inhabitants of Våler. As described in the summary of the brief, the conditions of erecting the new church took a radical change of perspective in relation to the original competition program. Due to the requests and wishes from the parish of Våler, erecting the new church hall on the site of the old constitutes the point of departure of the design concept, as it is of a great interest. The symbolism of creating a new church that is founded in the original site of the old timber-constructed church is of an important value, as it keeps the link between the old and the new church.
As a part of designing the new church on the existing site, it is clear that is not possible to create the requested facilities on the rather small site. From an architectural and theological point of view it is of great interest to separate the sacred space from the serving facilities, as it can ensure and enhance the possibilities of the space ability to find its sacral essence. Therefore the secondary facilities will be placed in a separated building.

The design process chapter is divided in three sections. In the first part, the relation between the two buildings and the overall concept has been explained, followed by an explanation of the development of the form of the church hall and the framing building, respectively.


07
DINING ROOM
KITCHEN
LIVING ROOM
RAGGING ON FF57
RAGGING ON FF58
RAGGING ON FF59
RAGGING ON FF60
RAGGING ON FF61

DESIGN CONCEPT
DEVELOPMENT

As described in the phenomenological approach, the ruin of the old church is paced in a small plateau, having a strong visual connection with the forest towards east, view which is desired to keep from the inside of the church hall. In order to emphasise the view from the church hall, creating a feeling of connection between the church and the forest, and giving it an inspired sacred atmosphere, a transition element between the building and the forest is created. This transition element is expressed as a wall which acts as a line of symbolic value, giving the transition between the mundane and the sacral.
The wall reaches from the south towards north, defined by lines given from the centre of the crucifix form of the old church. Towards north the wall shades the private villas from the church hall, while importantly, not shading the villa's view to the city. Towards south the wall shades a railway bridge, which crosses the south road.

The wall, a major object within the perception of the concept, defines the boundaries of what to be seen from the church hall. By dividing the wall into two walls, a frame towards the forest in east is established. The line which defines the cut towards north is defined by an extension of the north part of the original granite foundation, where the second line opens up towards the most dense, delicate and distinctive part of the forest. The division of the wall becomes a contemplation space for the church hall.

The two walls which define the overall view from the church hall will constitute the building for the serving facilities, divided in two volumes according to the needs of its two distinctive functions, administration and mortuary functions, and according to the requirement from the brief. In the volume towards north the administration part is located, where the volume towards south will content the mortuary functions. The contemplation space between the volumes makes the link between the volumes and the church hall.

I - THE WALL AS AN ELEMENT

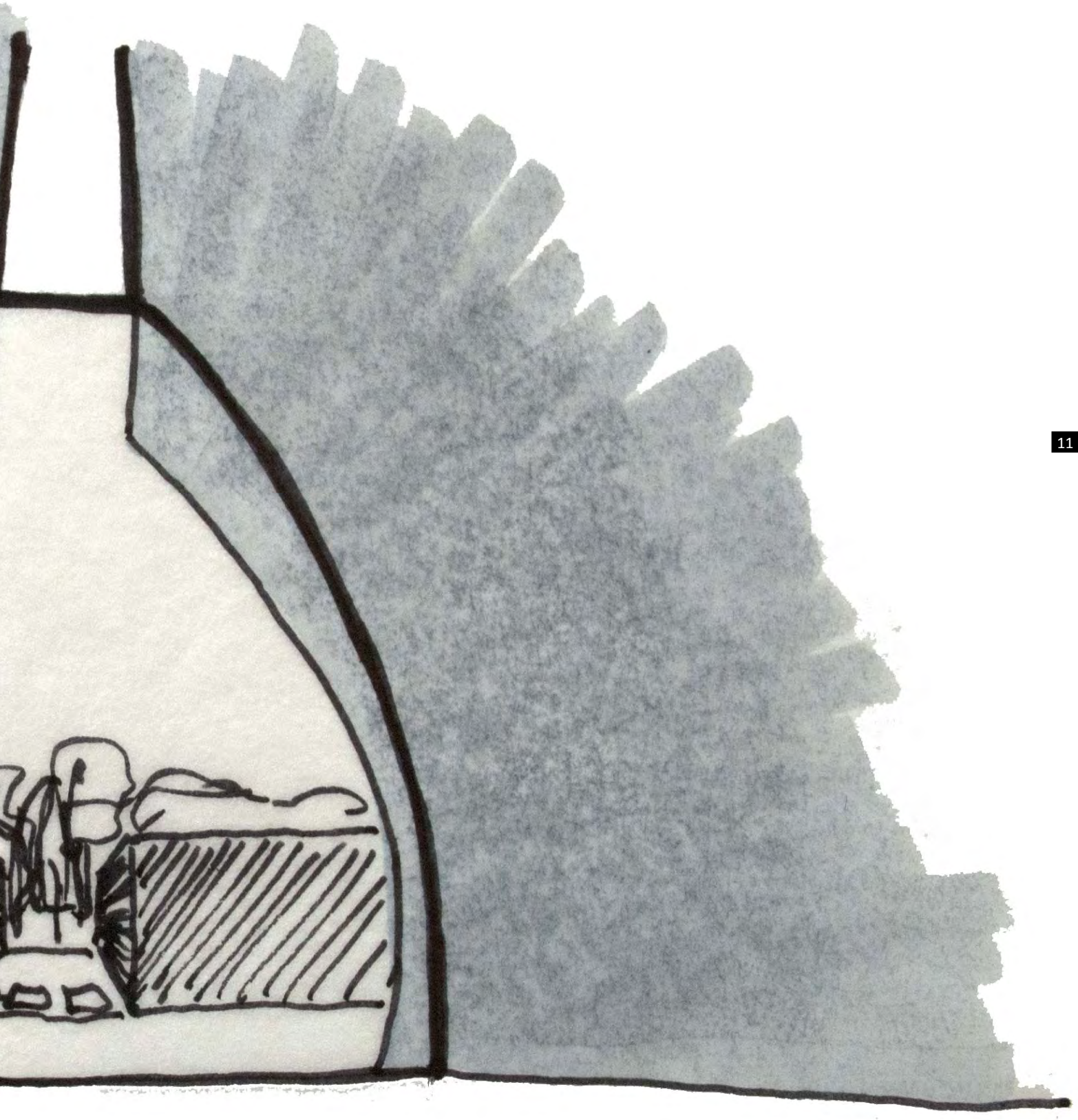
II - THE WALL AS THE FRAME TOWARD THE FOREST

III - ESTABLISHMENT OF THE BUILDING VOLUMES BEHIND THE WALL.

DESIGN CONCEPT
ATMOSPHERE

The conceptual sketch illustrates the whished connection between the church hall and the secondary facilities building, located to east of the old church, and placed in axis with it.
The secondary facilities building will shape and frame the view from the church hall towards the forest, creating a dependent interaction between the two buildings, and prolonging the space from the altar until the forest, making it part of the room.

#5 | INITIAL SKETCH - RELATION BETWEEN CHUCH HALL AND VOLUMES




I
II
III
IV
V
II

DESIGN CONCEPT
FUNCTIONAL DISTRIBUTION

Distribution
The whole experience of the concept is defined by the relation between each volume and its facilities. As described, the secondary facilities building become the frame of the view from the church hall towards the forest, and will content the administration and mortuary functions. These functions are divided as it is a wish from the competition brief to design the two facilities so they can be served with individual entrances, and work without disturbing the everyday life in the parish.

The administration building works as an office building for the daily activities of the employees of the parish, containing an entrance hall, offices, a meeting room, storages etc.
The mortuary building will content a chapel for intimate ceremonies, a coffin handling room, with cool room and a maintenance room for external purposes.

Arrivals
To serve the church hall, the parking facilities will be placed in the existing parking lot, located on the opposite site of the main road (I).
The arrival to the church hall is made to west of the building, where the original iron gate (II) will welcome the people on the way towards the new church hall.
In a daily use, the two volumes of the framing building are served from each entrance. The administration building towards north, serves the main activities on a daily basis, and therefore parking lots will be established near the entrance for the employees and the guests.
The mortuary building towards south will be served from south, in order to hide the mortuary activities from the everyday use of the parish. Thereby will an entrance road from south be established for the refuse collection vehicle and the hearse, and also for access to the maintenance room.

I - ORIGINAL PARKING LOT

II - ORIGINAL IRON GATE

III - ENTRANCE TO THE NEW CHURCH

IV - ENTRANCE TO ADMINISTRATION BUILDING

V - ENTRANCE TO MORTUARY BUILDING

CHURCH HALL DEVELOPMENT

POINT OF DEPATURE

From a conceptual point of view, the church hall design has origin in the phenomenological analysis of Våler, *Sensing the Place, characteristics & details*.

Inspired in the surrounding woodlands, the church hall form will appear with an organic shape, symbolic related to the nature shell-structures, as they act as protection against the nature, while expressing nature in itself. The church hall form will be expressed as two leafs embracing the old church.

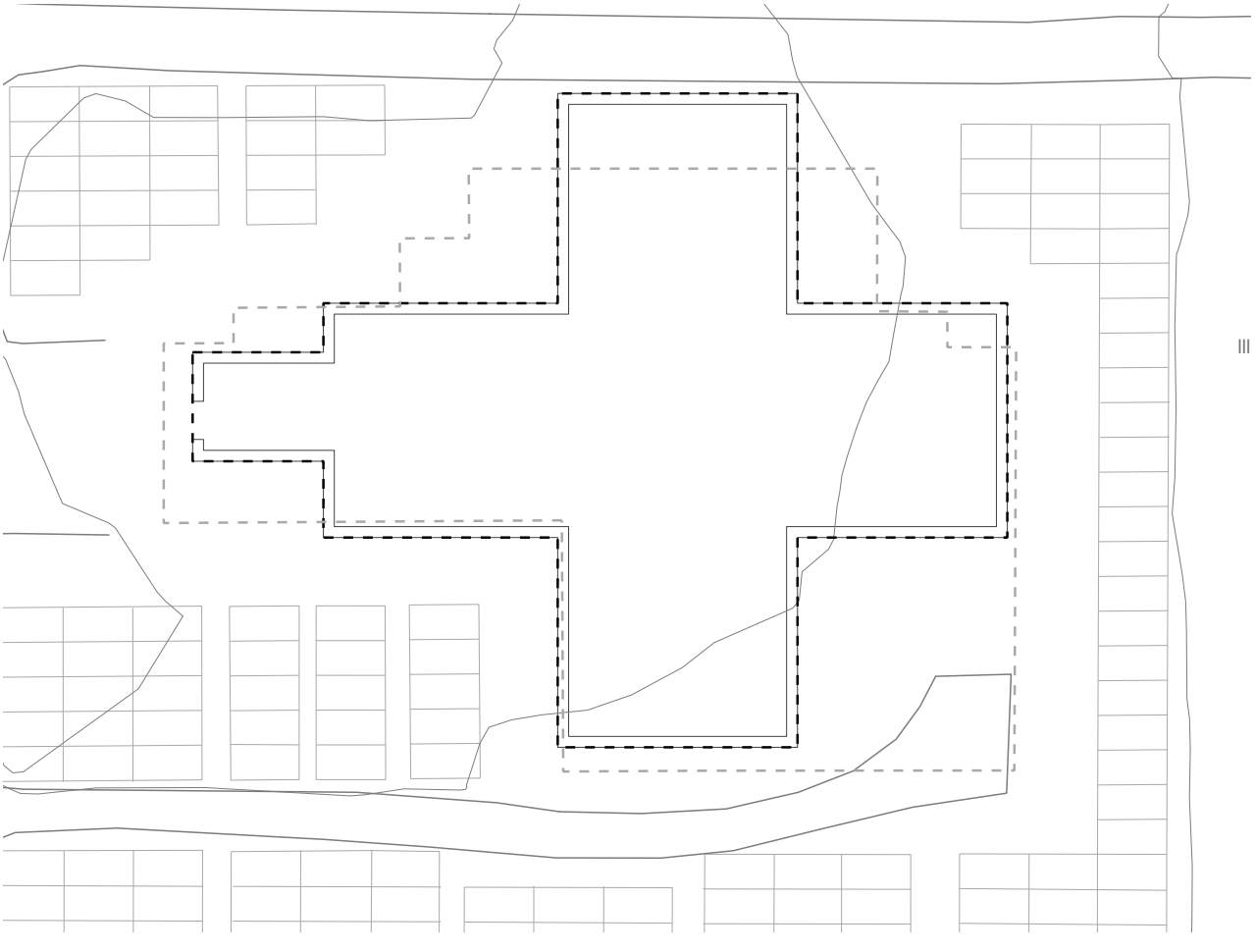
BUILDING LIMITATIONS
OLD CHURCH RUIN

The design of the new Våler church in the site of the old is quite limited, due to its placement in the middle of the cemetery. The black dotted line, in the plan to the right, defines the placement of the original granite foundation, also displayed in the picture above. The rectangular figures surrounding the old church foundation represent existing graves which, due to a moral question is wished to keep untouched. According to the Norwegian Church Law, a new building should be placed within a 3m line of distance from the pre-existing graves, which is represented with a light grey dotted line in the same plan. However, due to the wish of build the new church in the place of the old one, the parish centre of Våler has a permission to dispense this law, if the new building is kept within the ruins of the old. Thereby, and as visible in the map, the placement of the church hall is almost limited to the footprint of the old church.

From a symbolic point of view there is a great potential of keeping traces of the old church in the new. Thereby, the old well-preserved foundation is kept and integrated in the new church, seen as the link which unites the old church with the new, figuratively carrying it into a new future.

As mentioned in *Introduction*, the devastating fate of the old church will most likely overshadow the new, creating the basis of comparison. Therefore, to create a church with a new contextual belonging, released from the old, requires the new church to have a strong narrative.
Thus the new church will be placed within the footprint of the old, but not directly on top of the crucifix form as that would not release the new church from the fate of the old.

#8 | THE ORIGINAL CHURCH FOUNDATION



III

INITIAL FORM DEVELOPMENT

ARCHITECTURAL VISION

The initial form development grounds upon the architectural vision for the project and within the boundaries defined by the site.

The first sketches shown on the opposite page (sketch I-III) are from the very beginning of the development of the church hall. They are based upon the idea of create a church hall which reflects the organic structure of the surrounding nature, and as well how the daylight can penetrate the shells, and thereby define the atmosphere.

With inspiration in Matti Sanaksenaho's St. Henry's Ecumenical Art Chapel (Program, p.36-37) the approach for the design of the church hall is initiated. The qualities of St. Henry's Chapel are bound upon the Nordic tradition of creating greatness in architecture through simplicity, and which reflect holiness and spirituality, qualities which are wished to implement into the church hall.

The sketches IV to VII display the initial thoughts of how to create the embracement of the old church. Each of the sketches is based upon the creation of simple arches, which figuratively embrace the old church.

As the initial design is based upon having the new church rising on top of the foundation of the old, the first initial detailing is drawn. The sketches VIII and IX show the preliminary vision of how the church should rise. The common approach to the details is the idea of create a clear hierarchy between the existing and the new. Therefore, the shells in both cases are displaced with a distance to the original foundation.

The sketches are leading towards the development of a contextual shell structure, orientated along the long axis of the old church, and giving the direction towards the forest.

I - INITIAL SKETCH

II - INITIAL SKETCH OF TWO SHELL STRUCTURES

III - INITIAL SKETCH OF TWO SHELL STRUCTURES

IV - PERSPECTIVE DRAWING OF INITIAL ARCH STRUCTURE

V - PERSPECTIVE DRAWING OF INITIAL ARCH STRUCTURE WITH OVERHANG

VI - PERSPECTIVE DRAWING OF INITIAL ARCH STRUCTURE OPENING UP IN TWO SHELLS

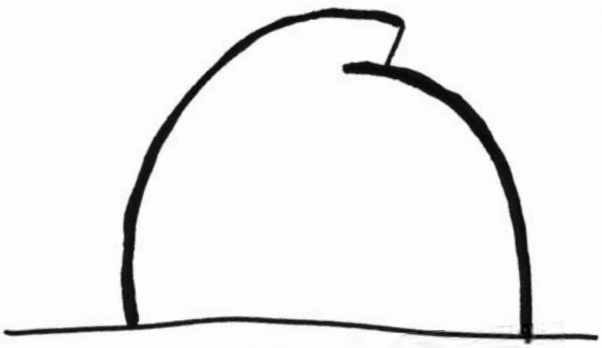
VII - PERSPECTIVE DRAWING OF INITIAL ARCH STRUCTURE WITH A DRAMATIC CURVATURE

VIII - CONCEPTUAL DETAIL SECTION OF THE JOINT BETWEEN OLD CHURCH FOUNDATION AND THE SHELL

IX - CONCEPTUAL DETAIL SECTION OF THE INTERSECTION BETWEEN OLD CHURCH FOUNDATION AND THE SHELLS

I

II



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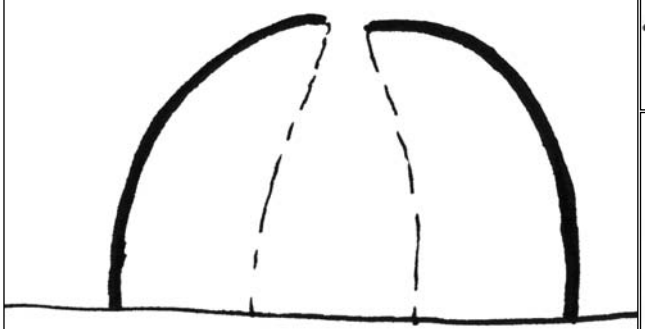

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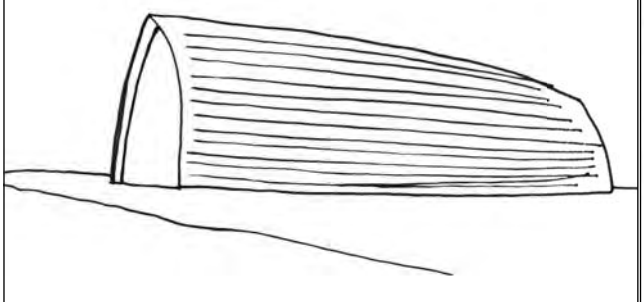
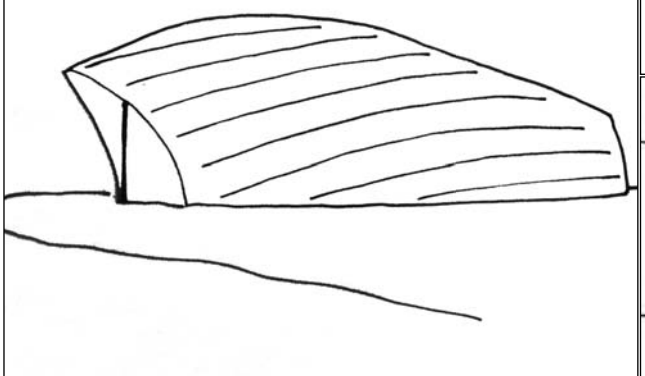
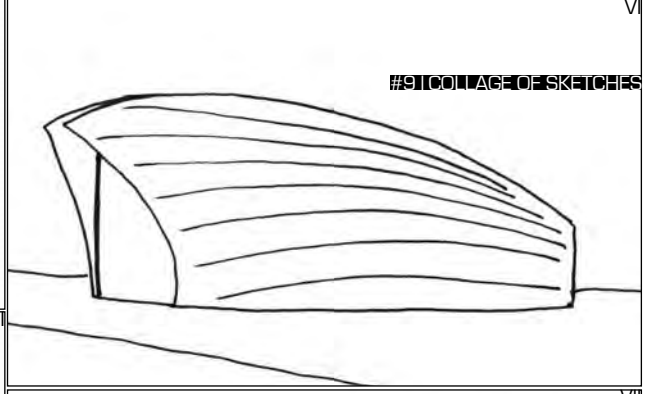


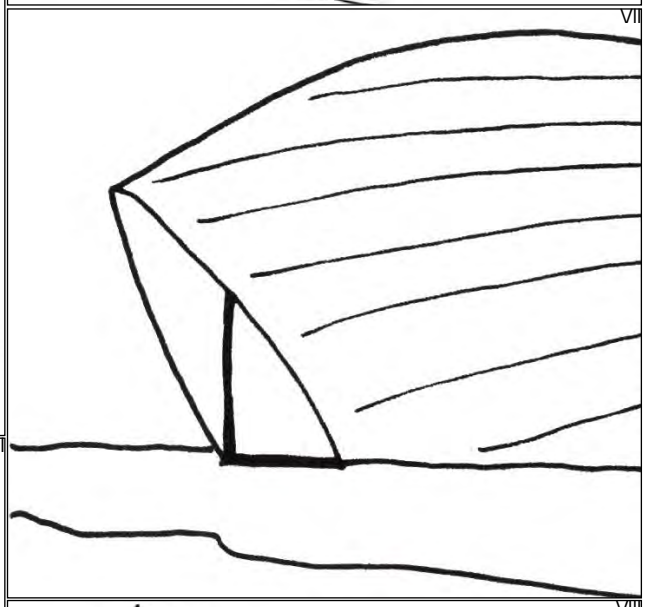
V



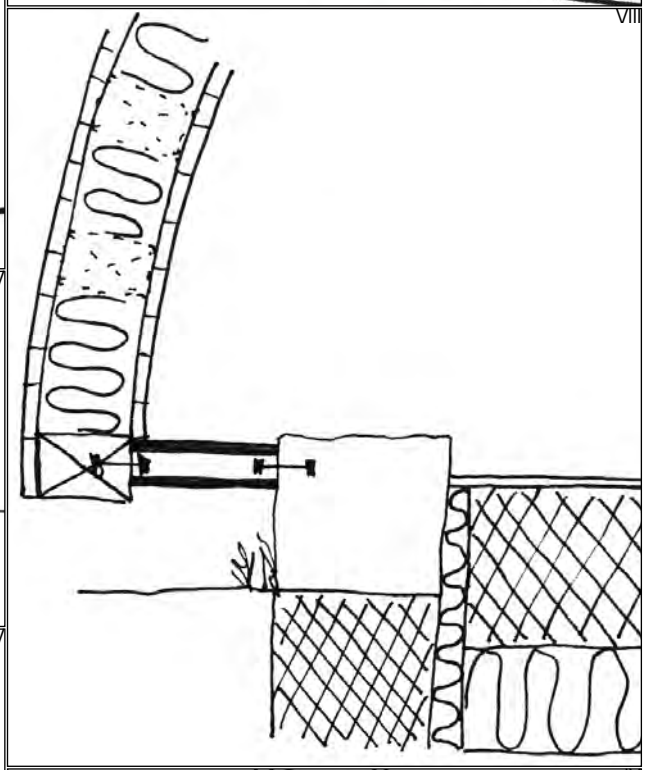
VI



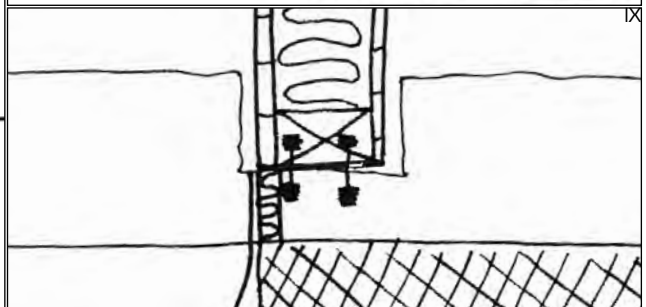
VII

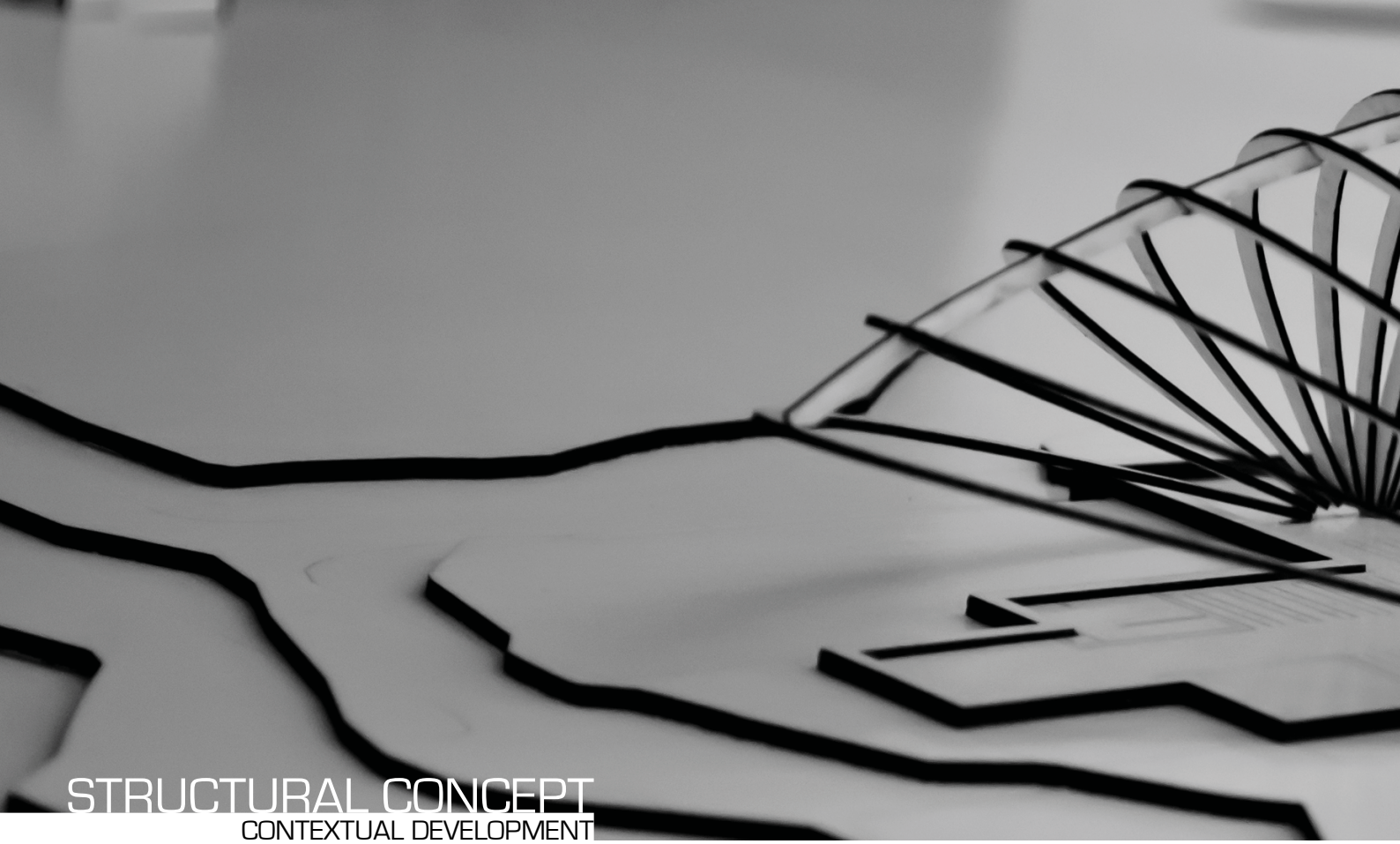


VIII



IX





STRUCTURAL CONCEPT

CONTEXTUAL DEVELOPMENT

The natural limitations defined by the site result in a rethinking of how to develop the shell structure for the new church hall within the ruins of the old.

Rise a shell structure literally on top of the old is not seen as an actual option since, as described, the new church has to be released from the old. Furthermore, the total area of the rectangle inside the foundation constituted by the main aisle of the crucifix form only reaches 215m2, which is too small in relation to the required program. Thus the form of the shell has to take advantage of some of the space from the side aisles, while still be kept inside the ruin due to the presence of the graves.

With this in mind, the development of the structure emerges. The model studies displayed on the opposite page show the conceptual idea of the structural performance development.
So far, the shell structure has been defined as simple supported arches defining the two shells. By making the arches rise from the same point, they can extend out to the side aisles, expanding the total area available for the church hall.
This structure also meets the requirements defined from the Norwegian Church Law, respecting the placement of the existing graves, as all of them will be untouched. Furthermore, it also gives the aimed direction towards the forest.

#10 | PHOTO OF THE INITIAL STRUCTURAL MODEL

I - PHOTO OF A CONCEPTUAL MODEL OF SIMPLE SUPPORTED ARCHES

II - PHOTO OF THE CONCEPTUAL MODEL OF THE CHURCH HALL

GEOMETRICAL SHAPE
OPTIMISATION

The potential of the structural system is determined by its optimisation. Therefore, the aim is to create a pure shape through a geometrical simplification.

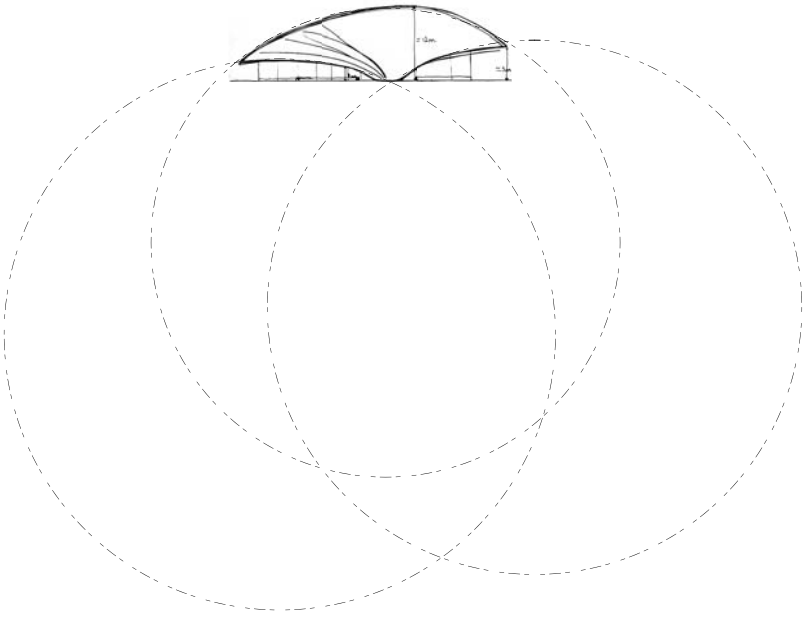
Within this mind-set, the whole optimisation process initiated, with inspiration of Jørn Utzon's Sydney Opera House, which became realised through a geometrical optimisation.

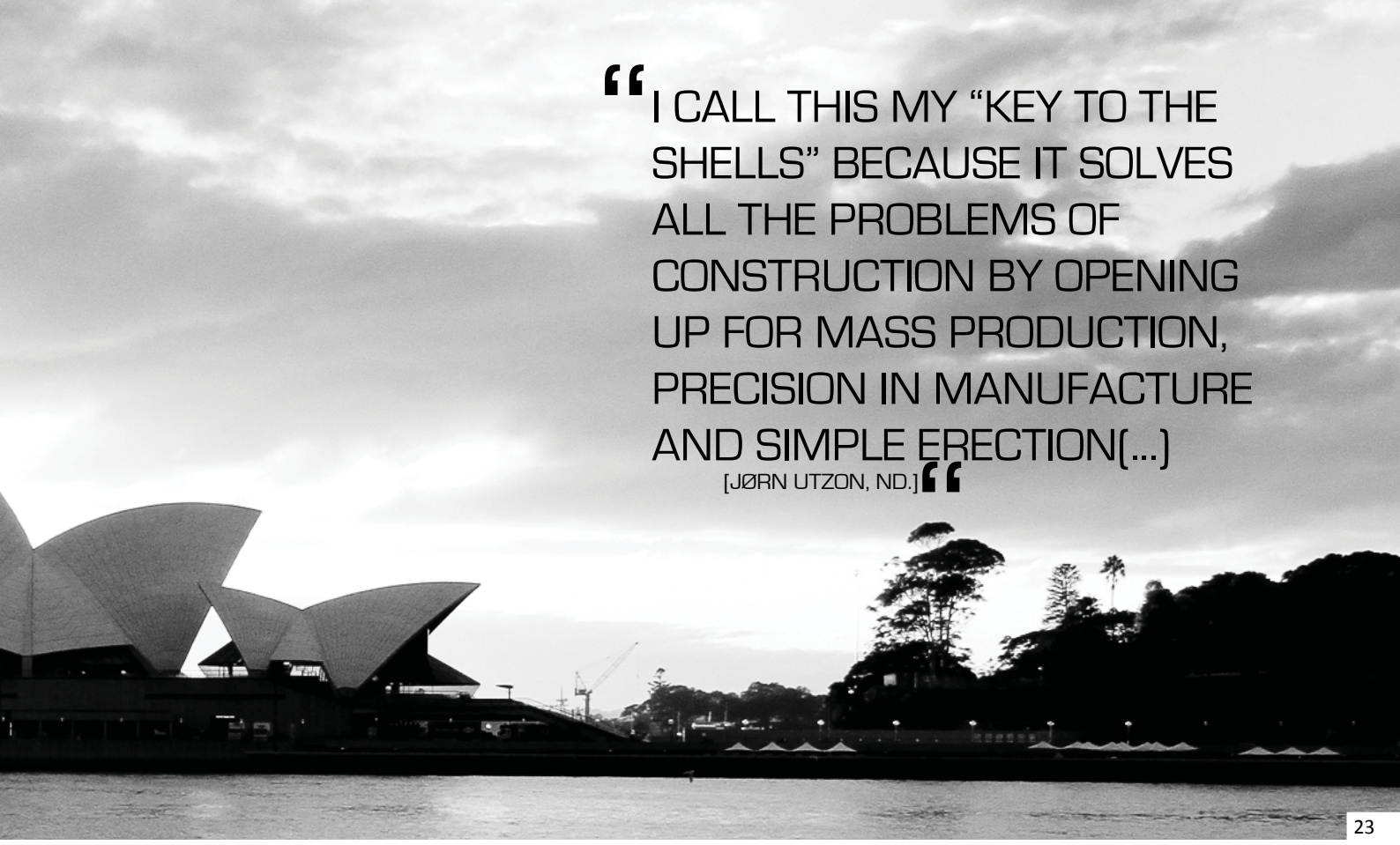
The sketch of the circle, shown to the right, displays the process of how the optimisation of the shape took place. The initial idea has been to draw a circle, which defines the curvature of the shape in section. This method gives a clear freedom to control the dimensions of the interior of the future church hall. In addition, a second and a third circles define the cuts which create the overall surface. The precision of these circles is of great importance when it comes to the proportions of the shell, but also as they define the height on top of the graves above which the shell will float. Later in the process, these two last circles which define the angles of the openings of the shell, have been replaced by two lines, making the shell expression even more simplified.

The next step of the optimisation takes place by adding a secondary ellipse in the horizontal plane, which will control the size of the shell in plan. Through these circle and ellipse, an ellipsoid has been created. This geometry, as shown on the opposite spread, has been the geometrical controller through the process of creation of the arches and the interior and exterior shells.

The geometrical optimization of the pure form provides simplicity to the shape, making it a potential self-caring structure. Further on also gives the possibility to optimize the shape in a future production. Overall, the structure consists of fourteen arches fixed on a concrete foundation, which from there spread out, as the structure of a leaf.

"ALL LARGE SURFACES ARE EASILY READ OR COMPREHENDED BECAUSE OF THE GEOMETRICAL ORDER."
[UTZON, 1962]





"I CALL THIS MY "KEY TO THE SHELLS" BECAUSE IT SOLVES ALL THE PROBLEMS OF CONSTRUCTION BY OPENING UP FOR MASS PRODUCTION, PRECISION IN MANUFACTURE AND SIMPLE ERECTION(...)"

[JØRN UTZON, ND.]

I - OPTIMISATION STEP 1 - EARLY SKETCH OF THE GEOMETRICAL OPTIMIZATION THROUGH THE CREATION OF CIRCLES

II - OPTIMISATION STEP 2 - ELLIPSOID CREATED TO SHAPE THE SHELL

REDUCTION OF FORM
ENERGY COMPARISON

The conceptual idea of creating a shell structure which embraces the church has, from energy perspective great advantages. To illustrate that, some early studies of exposed surface area and respective energy consumption have been made, using the month average spread sheet.

As can be seen in the table, it is clearly defined that by going from a rectangular shape into a shell structure, the surface-area to area is highly reduced, and thereby also the exposed surface area towards outside. Thus, this will have a great influence of the total energy consumption of the church hall. The visualisation to the right shows the geometrical optimisations of the shape, and how through the several steps the overall energy consumption has decreased. In addition, a geometrical compact shape also results in a better acoustic performance.

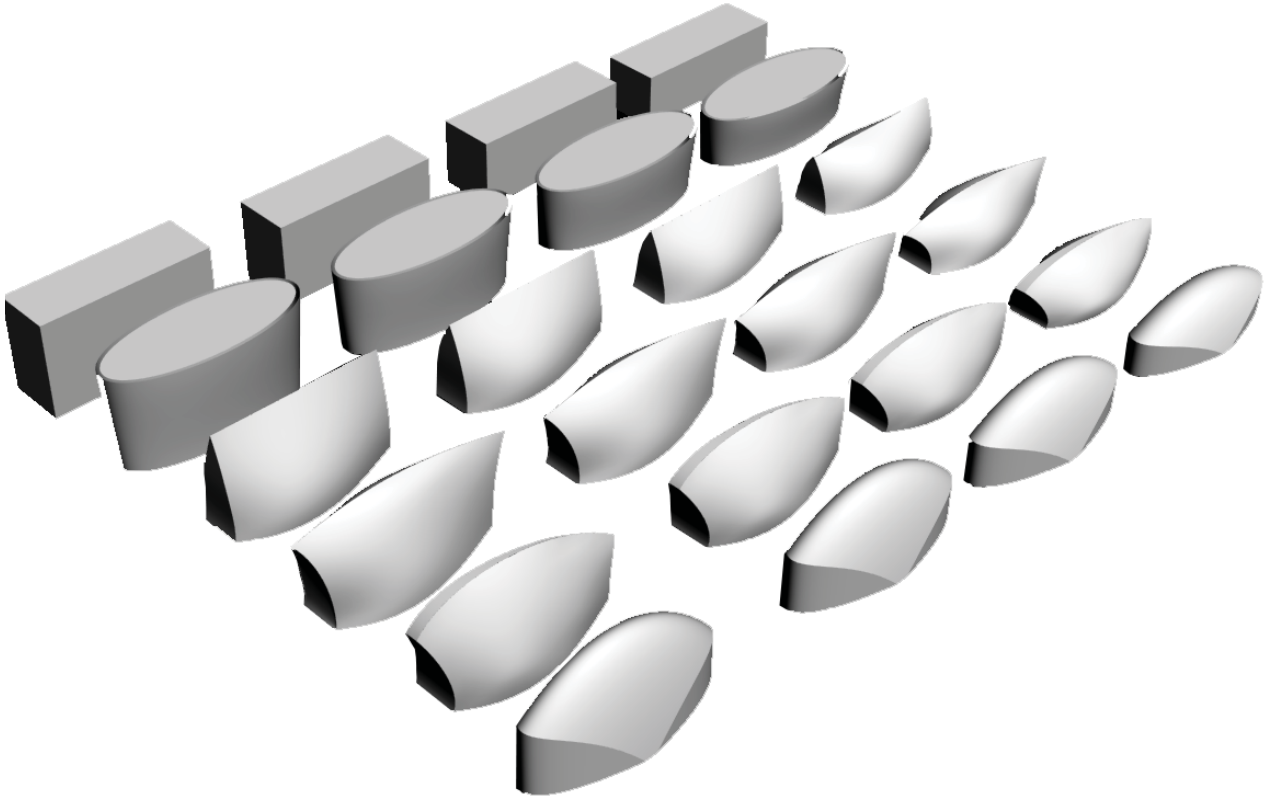
In the table below, an overview of the initial calculations is displayed, where can be seen that the overall consumption drops more than 35 KWh/m^2/year through the optimisation of the initial form.

The full table with calculations can be seen in Appendix 2.2.2.

I - TABLE SHOWING THE RELATION BETWEEN ENERGY CONSUMPTION AND SURFACE-AREA

SHAPE	HEIGHT [m]	SURFACE-AREA TO AREA RATIO	ENERGY CONSUMPTION [KWh/m^2/year]
RECTANGULAR SHAPE	10	4,12	92,3 (0,0)
	12	4,75	103,5 (0,0)
SHIP STRUCTURE	10	4,12	97,9 (0,0)
	12	4,70	110,2 (0,0)
SHELL STRUCTURE 0	10	2,85	66,9 (0,0)
	12	3,37	74,9 (0,0)
HELL STRUCTURE 1	10	2,96	67,3 (0,0)
	12	3,44	74,3 (0,0)
SHELL STRUCTURE 2	10	2,88	67,2 (0,0)
	12	3,31	73,0 (0,0)
SHELL STRUCTURE 3	10	2,74	61,2 (0,0)
	12	3,16	66,8 (0,0)

#12 | ST HENRY'S ECUMENICAL ART CHAPEL BY MATTI SANAKSENAHO



I - FORM OPTIMIZATION FOR DIFFERENT VOLUME HEIGHTS

TRANSITION SPACE
THE PORTAL AS AN OBJECT

As referred in Design Parameters, “people have to be moved physically before they can be moved spiritually” [White, 1988]. This enhances the need for a transition space before enter the sacred room, so that people can let behind all what is combined with the everyday life, creating focus on the religious dimension.

With this in mind, and inspired by the entrance portal of Gunnar Asplund’s Woodlands Cemetery, two boxes with facilitating rooms have been placed in each side of the aisle, creating a portal that makes the division from the entrance to the church room. The portal defines a mental transition, dividing the mundane from the sacred and eternal. It defines a break in the space, and thereby becomes a transition space.

Furthermore, the churchgoers will only see a minor part of the shell structure before entering the church hall, creating a moment of anticipation before entering the space. Centred in the portal, a narrow and lightly sloping passage will lead the churchgoers into the church hall, where the arch construction will be manifested.

The boxes consist of a serving staircase for the employees, which gives access to a basement and as well a minor tribune located above. The second box contains serving facilities for the churchgoers, as a wardrobe, toilets and baby changing space.

These boxes are also a resemblance to the old Våler Church where the entrance to the church room was also made through a narrow corridor, with small storages on each side. The plans of the old church of Våler can be seen in Appendix 1.

As a sign of respect for the old church, the boxes will be placed with a distance from the existing ruin, creating a hierarchy between the old and the new.

I - RENDER SHOWING THE TRANSITION SPACE CREATED BY THE BOXES AND THE TRIBUNE

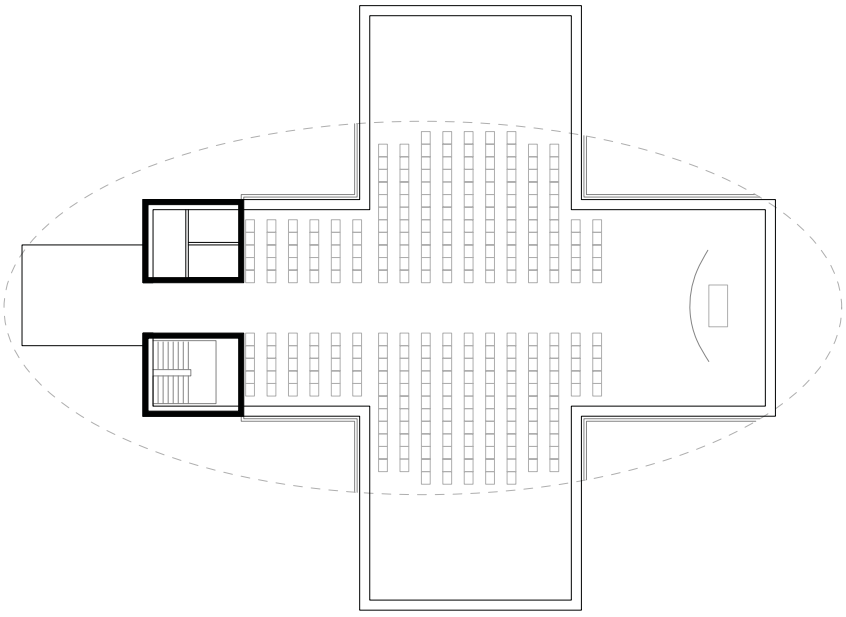
PLAN DEVELOPMENT

CHURCH HALL

During the development of the plan many studies have been made in order to understand which distribution could work better in relation to the given space, according to its expression and atmosphere. As the total area defined by the shell structure is small in relation to the requested number of seats, the plan development is focused in the creation of the most efficient plan distribution, which meets the requirements for a sacred space.

Different plans have been studied, with both axial and central distribution, as displayed on the page to the right. However, due to the concept relation of the church hall with the framing building and the forest behind, an axial distribution plan with a clear direction towards the view is desired. Thus the plan chosen has an axial distribution, as can be seen in the figure to the right. This plan solution is also the most efficient concerning the amount of seats, with a number of 250 seats.

Although the program defines a need of 350 seats, as it has been chosen to place the church hall on the old site, has been decided to accept this fact. Furthermore, the placement of the church in the old site corresponds to the wish of the parish of Våler.



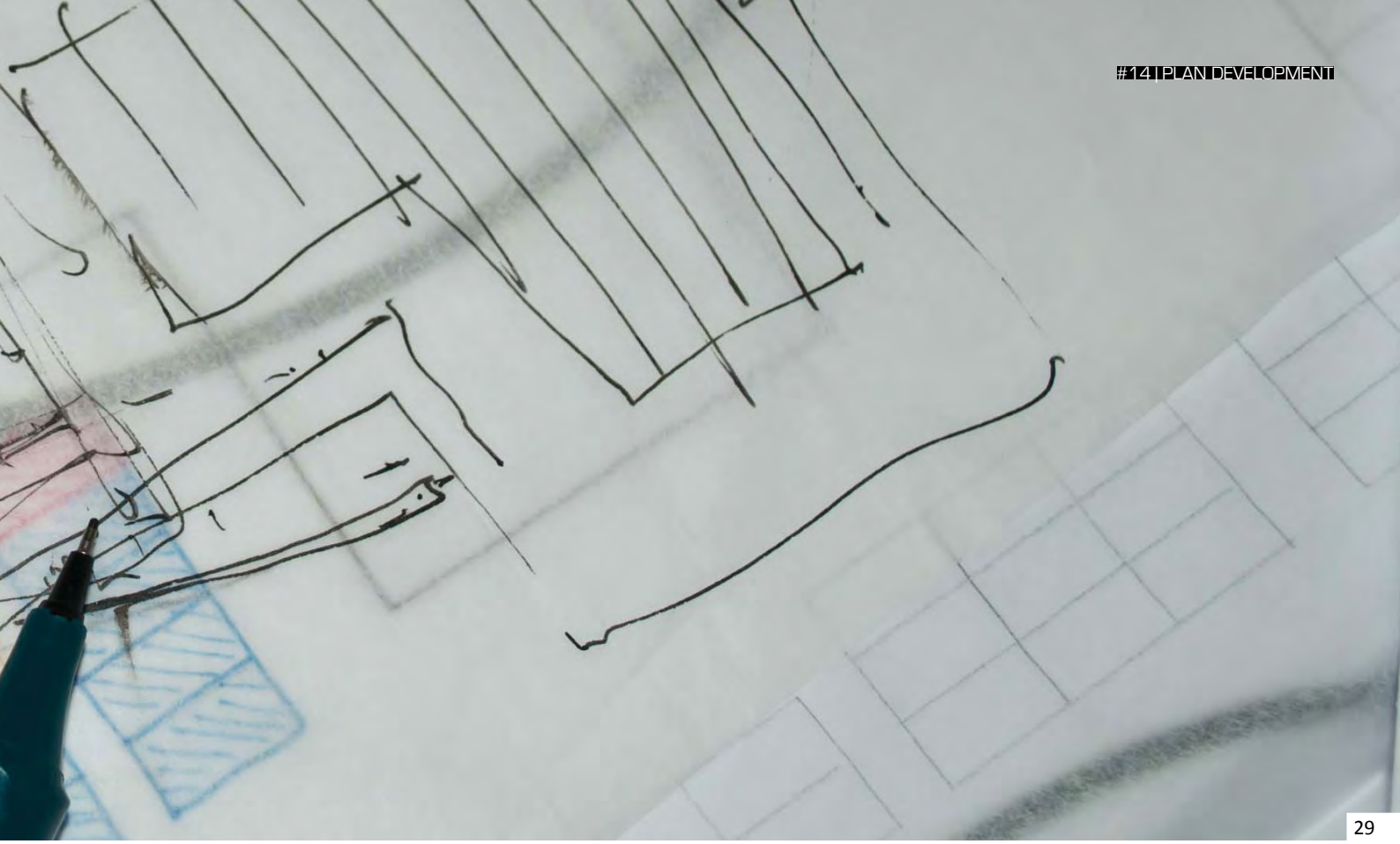
I - AXIAL PLAN DISTRIBUTION | SCALE 1:300

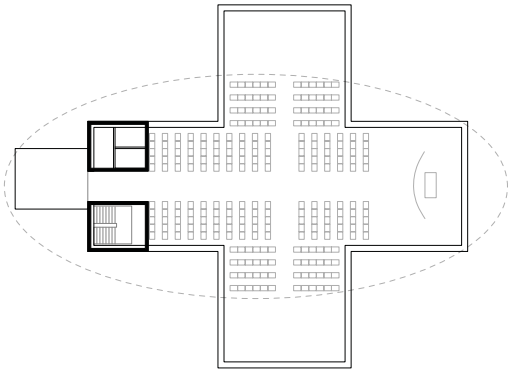
II - CENTRAL PLAN DISTRIBUTION | SCALE 1:500

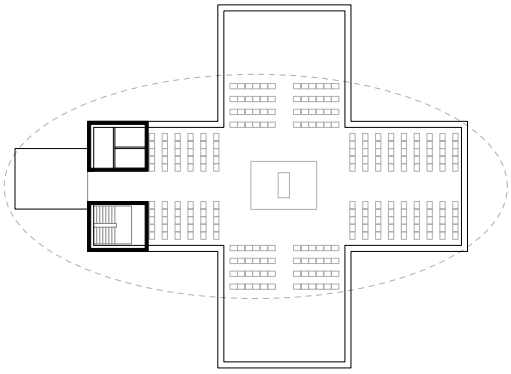
III - CENTRAL PLAN DISTRIBUTION | SCALE 1:300

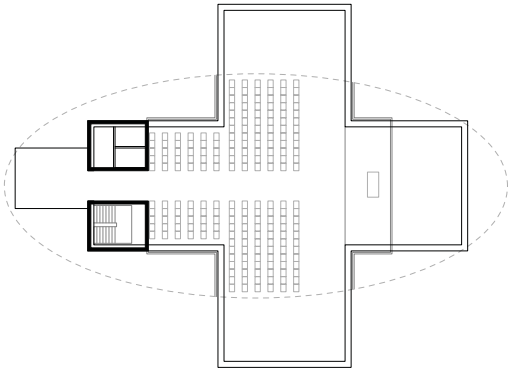
IV - AXIAL PLAN DISTRIBUTION | SCALE 1:300

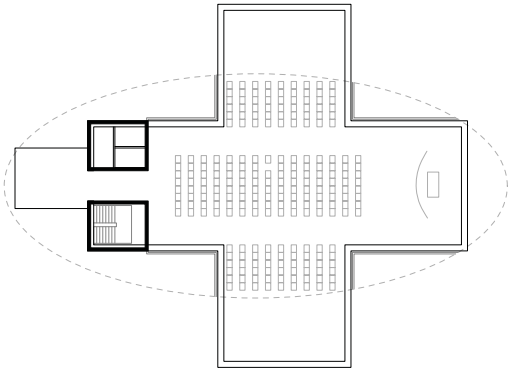
V - AXIAL PLAN DISTRIBUTION | SCALE 1:300











CHURCH HALL
ATMOSPHERE

As mentioned before, the old foundation wall is of great value in the project, and therefor has had a significant influence in the development of the building envelope. Thus the old form of the church, symbolised through the crucifix form, will shape the walls. From the outside of the granite foundation, a curtain glass wall raises until meet the shell, resulting in a symbolic erection of the old church within the new contemporary church hall. The glass wall is connected to the ruin wall from the outside, with a symbolic distance to it, and without touching the ground. By placing the wall in the exterior part of the ruin, this constitutes part of the room, shaping its atmosphere.

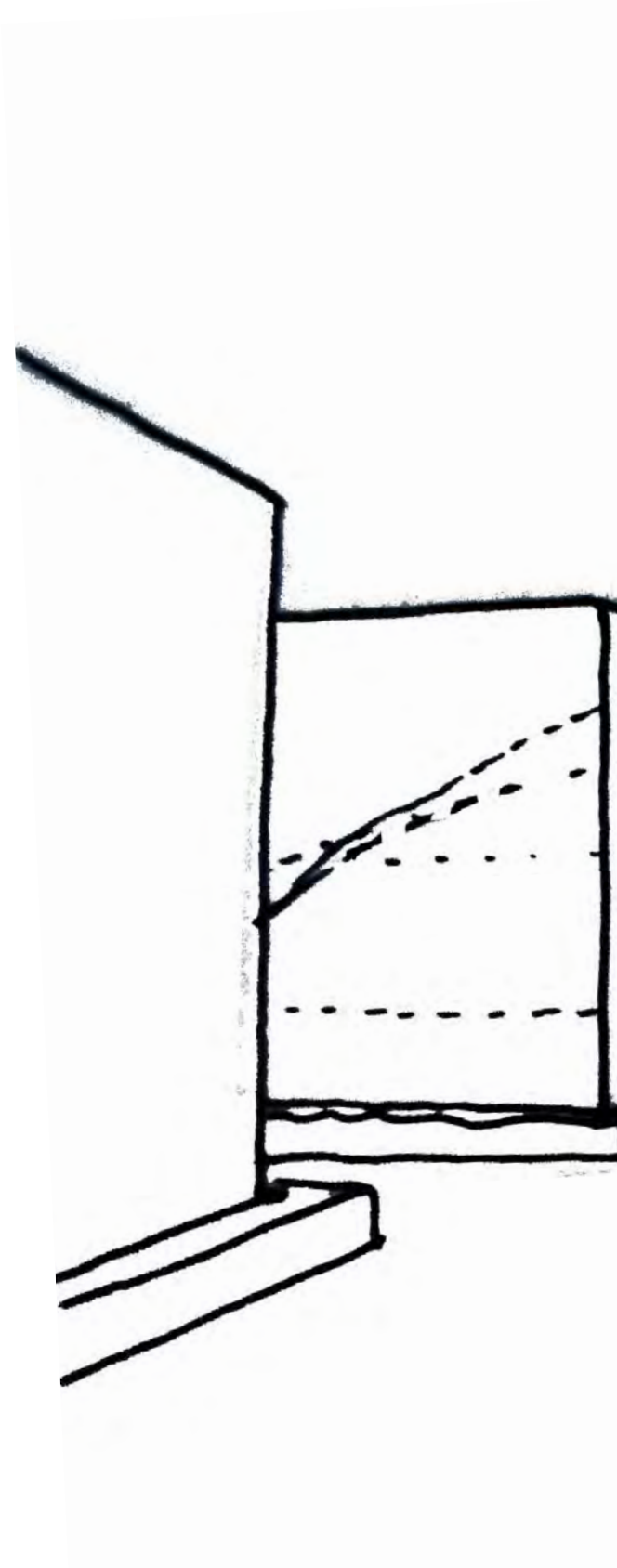
The big glazing area of the room gives openness and almost floating feeling to the church hall. The glazing provides closeness from the church hall with the surrounding nature, as the room appears as being within the nature.

Furthermore, the wooden shell with the exposed beams shaped in pinewood, contributes to a unique sensorial perception of the space, with its smell and golden coloration emphasised by the light provided through the glazed facades.

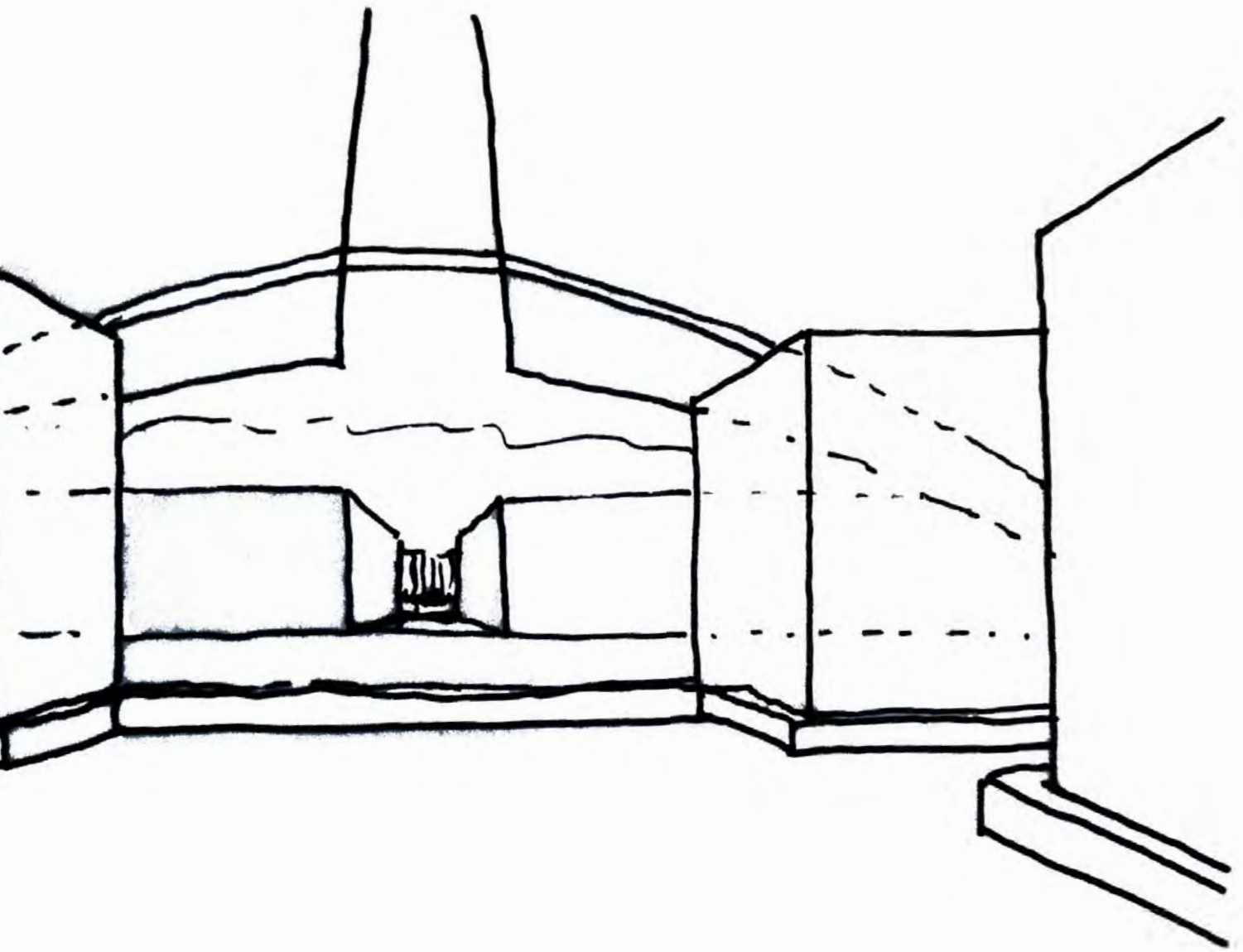
The furniture elements of the church hall are also shaped in pinewood and, in resemblance with the boxes are placed within a distance to the ruin wall, as a sign of respect for the old church.

Due to the size limitations of the ruin, it is not possible to create a separated baptism sacristy. Thereby, the old baptism font, rescued after the devastating fire, is placed in the front of the church, next to the altar.

In resemblance with the medieval churches, the choir and is placed in the back of the church, on top of the tribune created by the two boxes. Due to its elevated position, this creates good acoustic qualities both for the choir and the organ.



#15 SKETCH OF THE CHURCH HALL



DETAIL DEVELOPMENT
INSPIRATION

The connection between the vertical element of the glass and the organic shape of the shell structure constitutes a delicate detail, as it is desired to develop it in the most simple and silent way, in order to not overshadow the shell structure. Thereby, analyses of some architectural works which express similar solutions have been made.

The collage displays some inspiration works when it comes to the way to articulate the joint of the glass with the shell, but also the atmosphere of a glass church and the striving for a sacred space.
The examples have in common an expression of openness, creating a close contact with the surrounding nature, which becomes part of the space. The glass facades also give the feeling of a floating roof, expressing something beyond the plausible, and adding to the space a divine atmosphere.
Concerning the joint between the glass and the shell, the examples have in common a clear hierarchy between the roof and the vertical elements that support it and carry the glass.
Common to the examples, both religious and cultural buildings is also their striving for verticality, despite the varied expressions, achieved by the vertical elements that carry the glass.

The Wayfarrer Chapel (pictures IV) designed by Frank Lloyd Wright Jr., has a significant atmosphere, achieved through the way that the vertical wooden columns became part of the outside landscape, due to the transparency of the facades, as trees in a forest. In this chapel is also visible a clear hierarchy between the stone foundation, the wooden arches and the glazing. The expression as a sacred space is beautifully articulated through the sculptural qualities of the columns, appealing for a connection with the divine.

I - SYDNEY OPERA HOUSE - JØRN UTZON

II - CHAPEL AT RIO GRANDE RANCH - MAURICE JENNINGS + WALTER JENNINGS ARCHITECTS

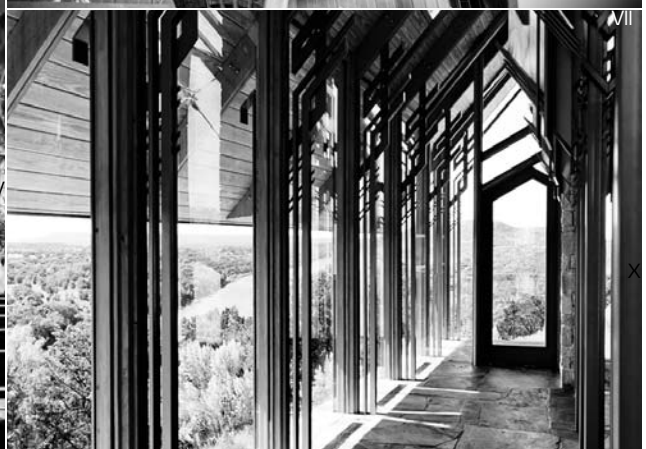
III - CHAPEL AT RIO GRANDE RANCH - MAURICE JENNINGS + WALTER JENNINGS ARCHITECTS

IV - WAYFARRER CHAPEL - FRANK LLOYD WRIGHT, JR.

V - ST HENRY'S ECUMENICAL ART CHAPEL - MATTI SANAKSENAHO

VI - SYDNEY OPERA HOUSE - JØRN UTZON

VII - CHAPEL AT RIO GRANDE RANCH - MAURICE JENNINGS + WALTER JENNINGS ARCHITECTS



#17 | RENDER OF THE JOINT BETWEEN THE GLASS AND THE SHELL

DETAIL DEVELOPMENT

THE EXPRESSION

Within the inspiration of the above mentioned works, the detailing of the church hall is initiated.

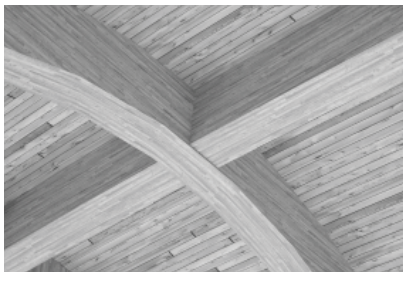
As the shell structure within the church hall is very significant, it is important that the rest of the structural elements are silent in order to support the expression of the shell, not overshadowing it. As a result, and according to the examples, a clear hierarchy have been made. As the arches and the shell represent the main expression, the curtain wall is subjected to the shell.
The shell articulates a verticality which is interesting to be repeated within the glazing. Hereby cobber cladded vertical columns are displaced underneath the arches, creating a system that follows the shell structure. Thus the distance between the vertical elements will vary according to the rhythm given by the shell.
The system consists of various vertical window bands creating the building envelope. In the slender window bands between the cobber cladded columns, materialised glazing is chosen. It creates a clear distinction between the narrow vertical bands and the larger window bands, which are provided with normal glazing. This will emphasize the hierarchy and also create a varied expression of the daylight within the church hall.
The glazing will be connected in the under part of the beams with a curved horizontal frame, which is created from the same ellipsoid that shaped the shell. Within each arch an adjusted frame is located, which allows the glazing to continue in between the arches, until meet the shell.

#18 | MODEL PHOTO OF THE STRUCTURAL PERFORMANCE

STRUCTURAL PERFORMANCE
DETAILING

Structural considerations
The shell structure has been designed through a geometrical optimisation of the form, as mentioned above. In order to improve the structural performance of the arches, in a tectonic point of view, these have also been object of study. The wood laminated arches have been examined, so that the dimensions of the arches are related to the applied stresses. By focussing on one arch, it is clear that the applied stresses decrease as the arch reaches the top of the structure. As a result, the arch can emerge more and more slender from the foundation towards the top. The transverse beam is characterised in a similar way. Naturally, the transverse beam is not only exposed for vertical loads but also horizontal stresses, which means that the dimension of the transverse beam is defined by the horizontal tensions. The tension decreases from the centre of the structure towards the edge, hence the transverse beam can emerge likewise more and more slender, from the centre towards the edges. These examinations are based upon the understanding of the theoretical behaviour of the structure, and do not correspond to definite calculations, as it is not the technical focus point of this project. Thereby, the slenderness of the arches is only indicative, not representing the correct dimensions given by the forces.

Articulation of the joints
The joint between the laminated wood arches and the cast-concrete foundation is articulated by a distance between the two structural parts. Inspired by Sverre Fehn, the segregation symbolically releases the arches from the foundation, hence resulting in a shell appearing as a "lifted" structural element. The articulation of the joint is represented by the addition of a third material, inspired by Carlo Scarpa. In this case, a steel fixture will transfer the loads from the arches towards the arch foundation. The joint between the arches and the concrete foundation is, in a tectonic perspective, defined as the structure and the construction, respectively. From the result of the given interplay between the arches and foundation, the definition as a tectonic structure emerges.

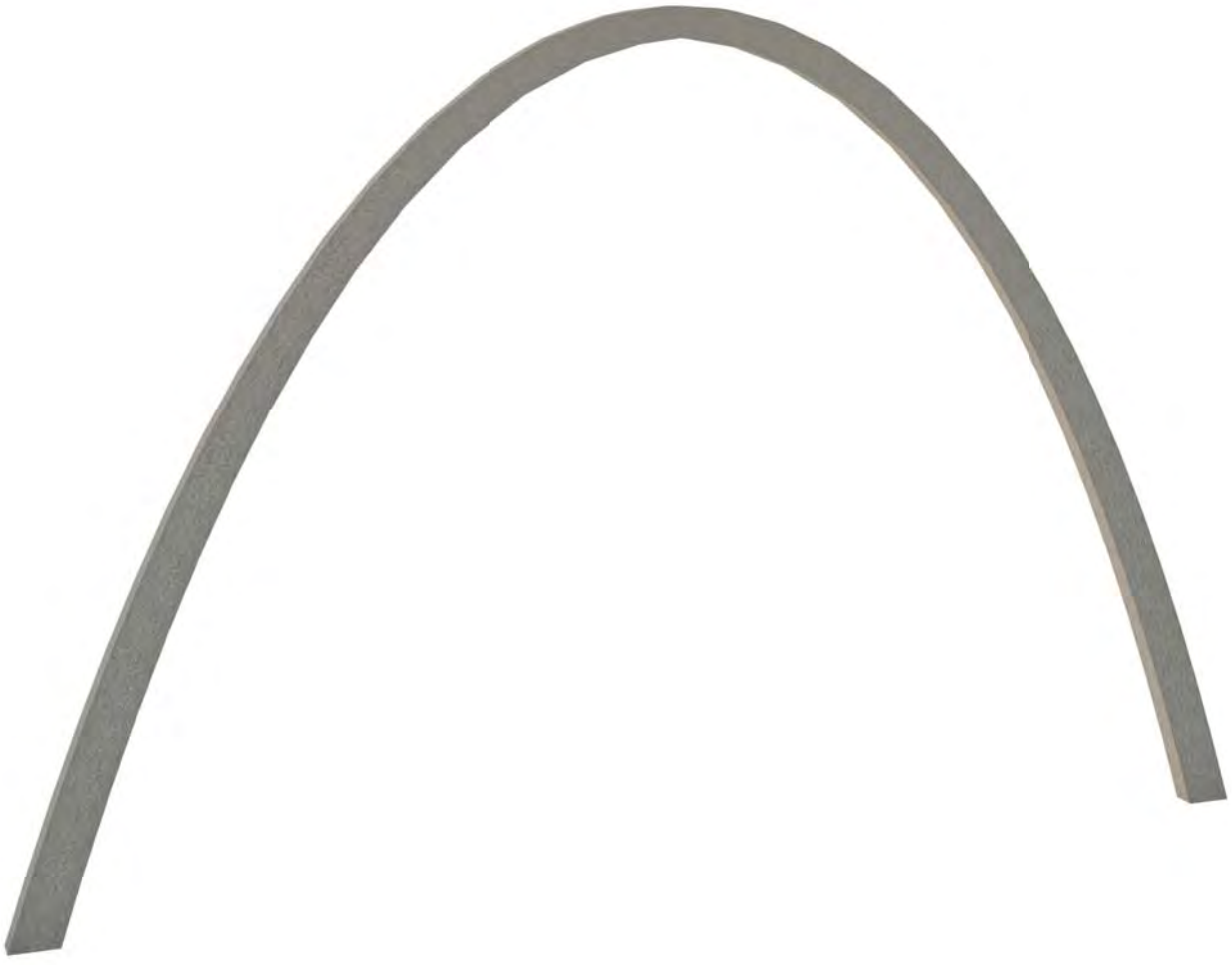


I - CLOSE UP OF THE JOINT BETWEEN THE ARCHES AND THE TRANSVERSE BEAM

II - CLOSE UP OF THE JOINT BETWEEN THE ARCHES AND THE ARCH FOUNDATION

III - CLOSE UP OF ONE OF THE ARCHES, AS IT GET SLENDER TOWARDS THE TOP

"A TRANSFORMATION IS SOMETHING POETIC(..)"
[VITRUVIUS, CITED BY HARTONIAN, 1994.]



MATERIALITY
EXPRESSION

The exterior of the church hall will be cladded in copper expressing thus a significant character. The choice of copper for exterior cladding is made due to its resistance to the tough climate conditions, but also due to its natural characteristics that change as it ages. The copper will slowly age, changing and adapting its tonality within the expression of the surrounding nature. It becomes a representation of the characteristics of the nature, and therefore an integrated part of the place.
As expressed in St. Henry's Chapel by Matti Sanaksenaho, the copper provides a narrative to the chapel, which corresponds to the surrounding expressions of the nature.

The church hall interior will be dominated by the warm expression of the laminated wood arches, and the pine wood cladding, which will shape the overall surface of the shell. Through the materiality of the wood, the sensorial perception of the space is stimulated, through the warm glow of the pine wood with its intense smell, and the tactile feeling of the old granite foundation.
The materiality of the floor and the boxes, produced in polished cast-concrete, relates and makes the connection with the framing building. Symbolically, the boxes become a representation of the two buildings in the church hall, through its simple expression and materiality.
The glass walls and its verticality, expressed in the frame elements constitute also an important part of the atmosphere of the church hall. As described before, it gives to the hall openness and closeness to the surrounding nature. The materialized glass brings, furthermore, a sacred atmosphere to the place, with its display of light.

I - AGED COPPER FACADE

II - PINE WOOD CLADDING, ST HENRY'S ECUMENICAL ART CHAPEL BY MATTI SANAKSENAHO

III - THE ORIGINAL GRANITE FOUNDATION FROM THE OLD CHURCH

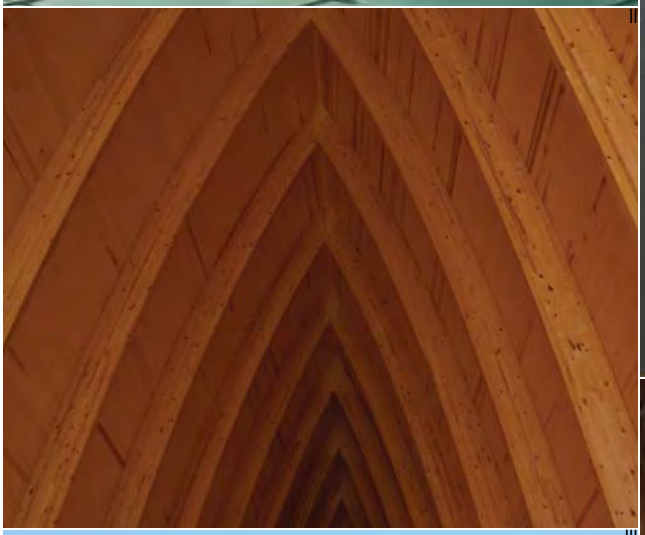
IV - CAST-CONCRETE, CHICHU MUSEUM BY TADAO ANDO

V - AGED COPPER FACADE, ST HENRY'S ECUMENICAL ART CHAPEL - MATTI SANAKSENAHO

VI - NEW COPPER FACADE, ST HENRY'S ECUMENICAL ART CHAPEL - MATTI SANAKSENAHO

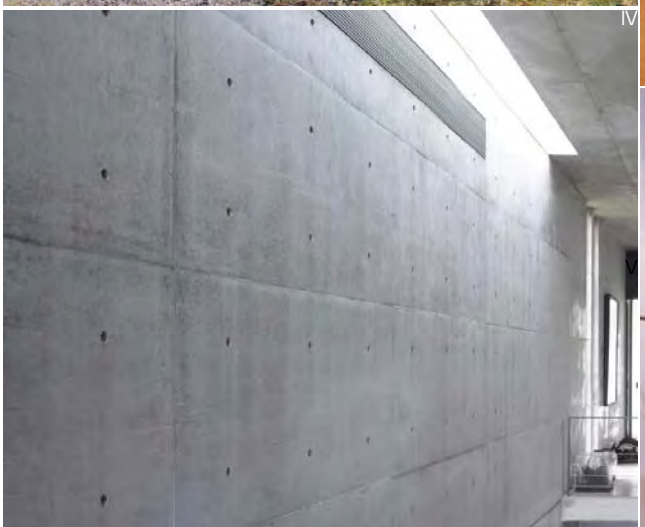
VII - NEW COPPER FACADE, DES MOINES PUBLIC LIBRARY BY DAVID CHIPPERFIELD

I



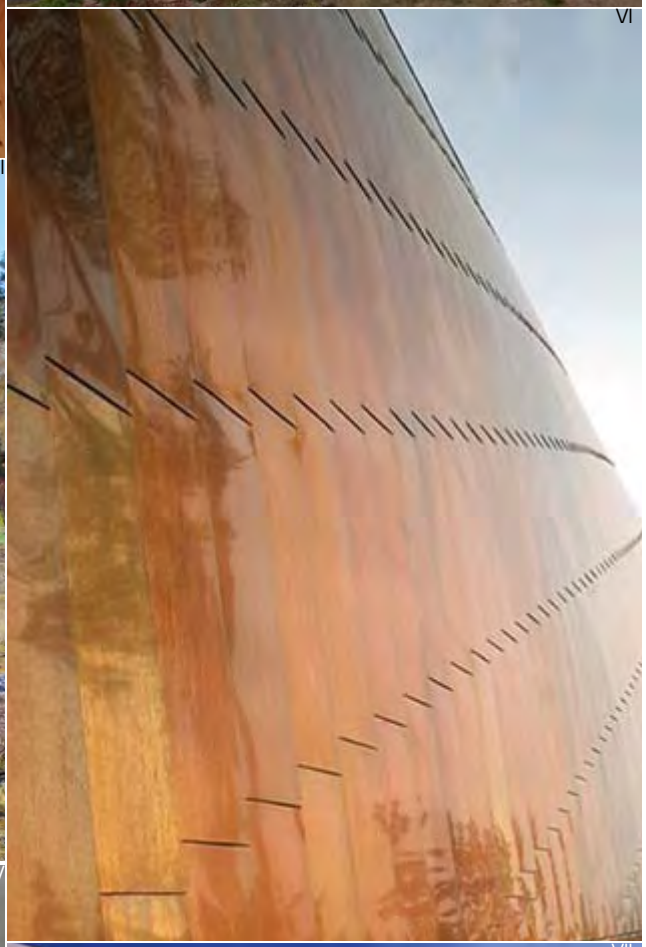
II

III



IV

V



VI

VII

X

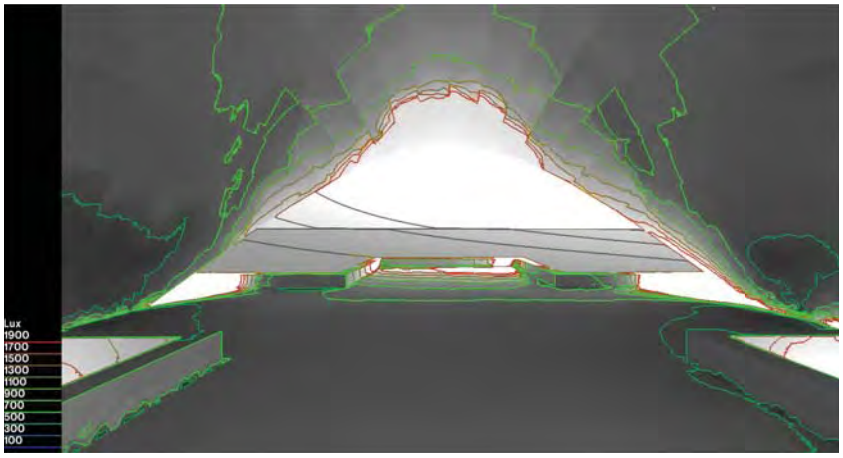
DAYLIGHT
ATMOSPHERE

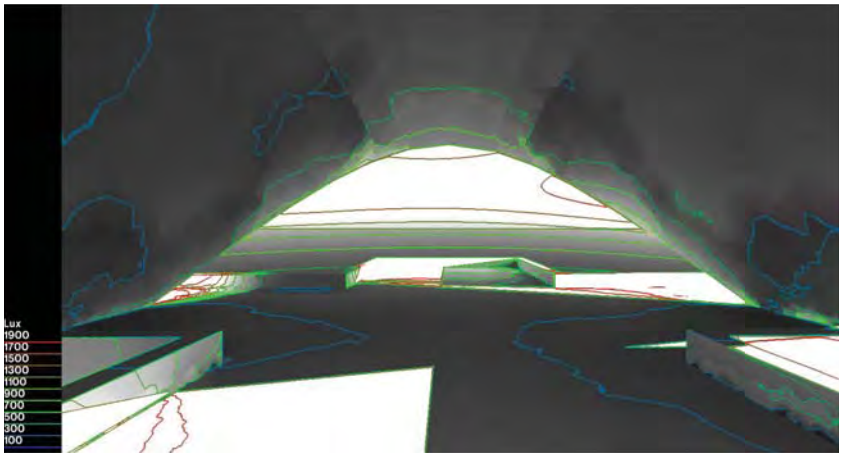
Daylight is one of the main factors that shapes the way how the church hall is interpreted, being capable to determine the sacredness of the space.
Through the use of natural light, the spatial qualities of the room are defined. As the light penetrates through the curtain walls, it enlightens the shell, lifting it up, and giving it a feeling of being floating.
The vertical columns covered with copper, filter light through the translucent materialised glass, underlining the sacredness of the space, by creating an atmosphere of contemplation, both for solemnity and festivities. The distinction of glazing provides the church hall a diverse appearance which, through the materialised glazing will give to the light a feeling of weightlessness. By opposition, the transparent glazing will let the sun penetrate unfiltered through, resulting in a juxtaposition of layers of light.
Furthermore, the great amount of glazing makes the atmosphere of the church hall vary according to the seasonal changes, expressing and reflecting the dramatic changes of the landscape around. In spring, the daylight will reflect the various colours of the surroundings, providing a feeling of lightness and of life to the church hall. As the seasons change towards autumn and winter, the light will provide an atmosphere dominated by mysterious and meditative light settings.

The artificial light is defined as up-light, enlightening the structure and the shell from underneath, and thereby providing it with a feeling of lightness. The artificial light should have a warm toning, which will relate to the tone of wood, and give a warm feeling to the space, as seen in St. Henry's Chapel (Matti Sanaksenaho) or in the Chapel at Rio Grande Ranch (Maurice Jennings + Walter Jennings Architects). Hereby will the materiality and tactility of the wood be exposed, and reflect the atmosphere of the space.
In the evening, the glazing also provides a feeling of openness to the church hall, making it appealing for the churchgoers, as it appears as a "floating" lantern in the glow of the dusk.

Daylight Analysis
In a technical point of view, the light in the church hall have been analysed with the program Radiance. The images to the right display the daylight levels inside the room, for the months of December and June, showing how the natural light will change with the seasons. Through the images is visible that, as expected, the levels of daylight inside the room are high, both for winter and for summer.

#20 | RENDER OF THE ATMOSPHERE OF THE DAYLIGHT





I - PICTURE ABOVE: DAYLIGHT LEVELS IN THE CHURCH HALL FOR THE MONTH OF JUNE, IN LUX

II - PICTURE TO THE RIGHT: DAYLIGHT LEVELS IN THE CHURCH HALL FOR THE MONTH OF DECEMBER, IN LUX

ACOUSTICS
CONSIDERATIONS

As mentioned in the chapter Religious Architecture – Acoustics in Sacred Spaces, the sound in a sacred building is fundamental in the experience of the atmosphere of the space and in the way it is perceived. However, as acoustics is not the technical focus of the project, only a simple acoustic analysis of the Church Hall has been made, to illustrate the sound distribution in the space. The reverberation time in the Church Hall was also calculated with the program Ecotect, to give an idea of the potential of the space.

Sound distribution

In the section is represented a diagram of the sound rays reflecting from the shell and the wooden beams. Due to the soft curvature of the shell the sound is quite evenly distributed in the whole room, resulting in a good acoustic indoor climate. The exposed wooden beams, with its big variety of angles will both contribute to a more diffuse sound field in the room, due to the different reflections and to a better sound reduction because of the bigger surface area.

Reverberation time

As mentioned in the chapter Religious Architecture – Acoustics in Sacred Spaces, a sacred building demands a wide variety of functions, from readings to songs, and thereby the reverberation time should be optimised both for speech and for music. The reverberation time, time required for the sound level to fall 60dB, is dependent of the volume and exposed area of the room, and as well the abortion coefficient of the materials of the room. The reverberation time has been calculated with both Sabine and Eyring formulas, for comparison. However, as the Church Hall has the shell and beams in wood, glass walls and concrete floor, the material distribution in the room is not even, and thereby the Eyring distribution would better represent the actual reverberation time in the Church Hall.

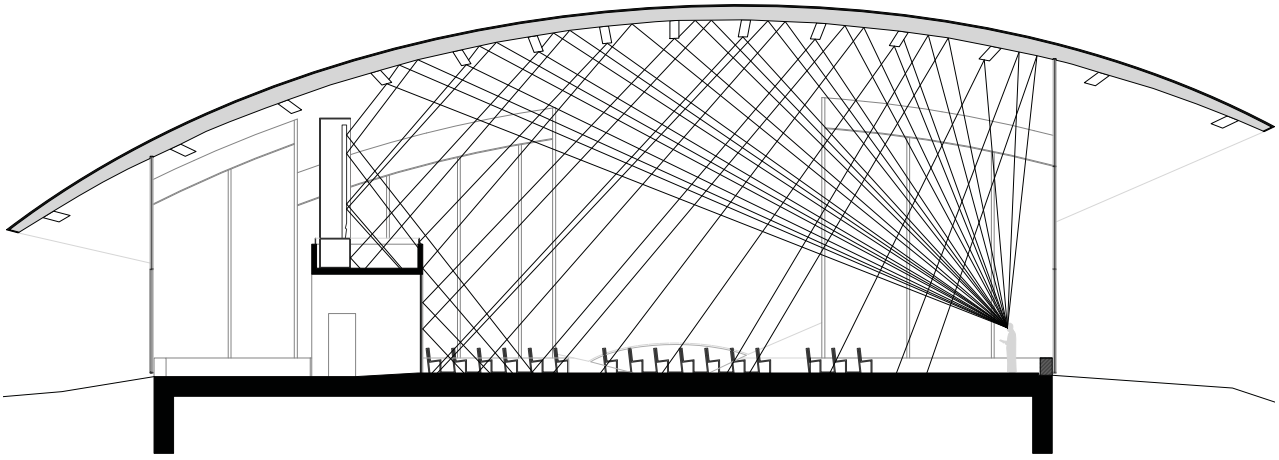
The graphic shows the reverberation time for a range of frequencies between 0Hz and 10.000Hz, as the human perception of the sound for a speech is approximately situated between 400 Hz and 4000 Hz, while for music varies between 50Hz and 10.000Hz approximately.

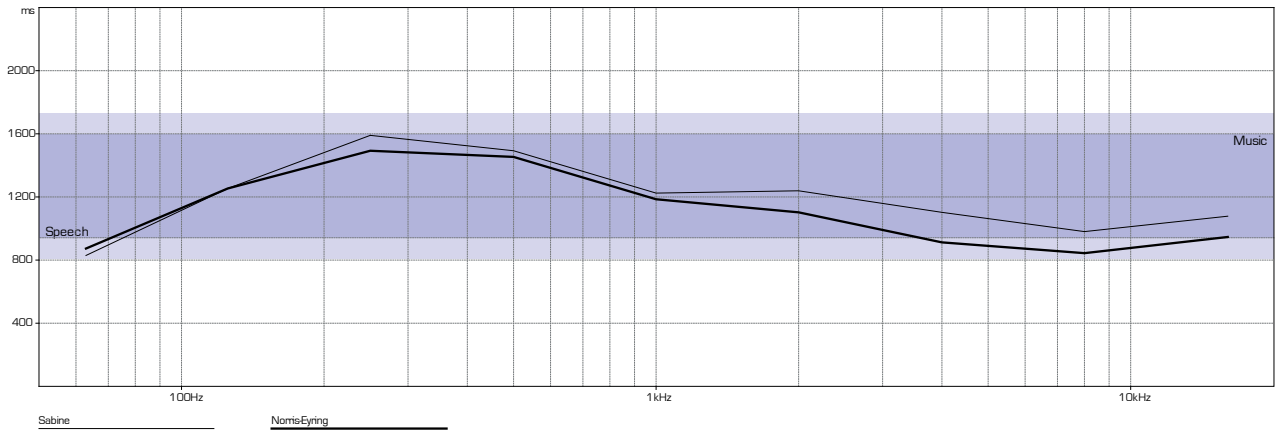
The reverberation time for each frequency is situated in between the optimal frequency for music and for speech. This result in lightly higher RT for speech than the recommended for an auditorium, for example, which gives a feeling of spaciousness desired for a sacred building. A higher reverberation time also gives good acoustic qualities for music.

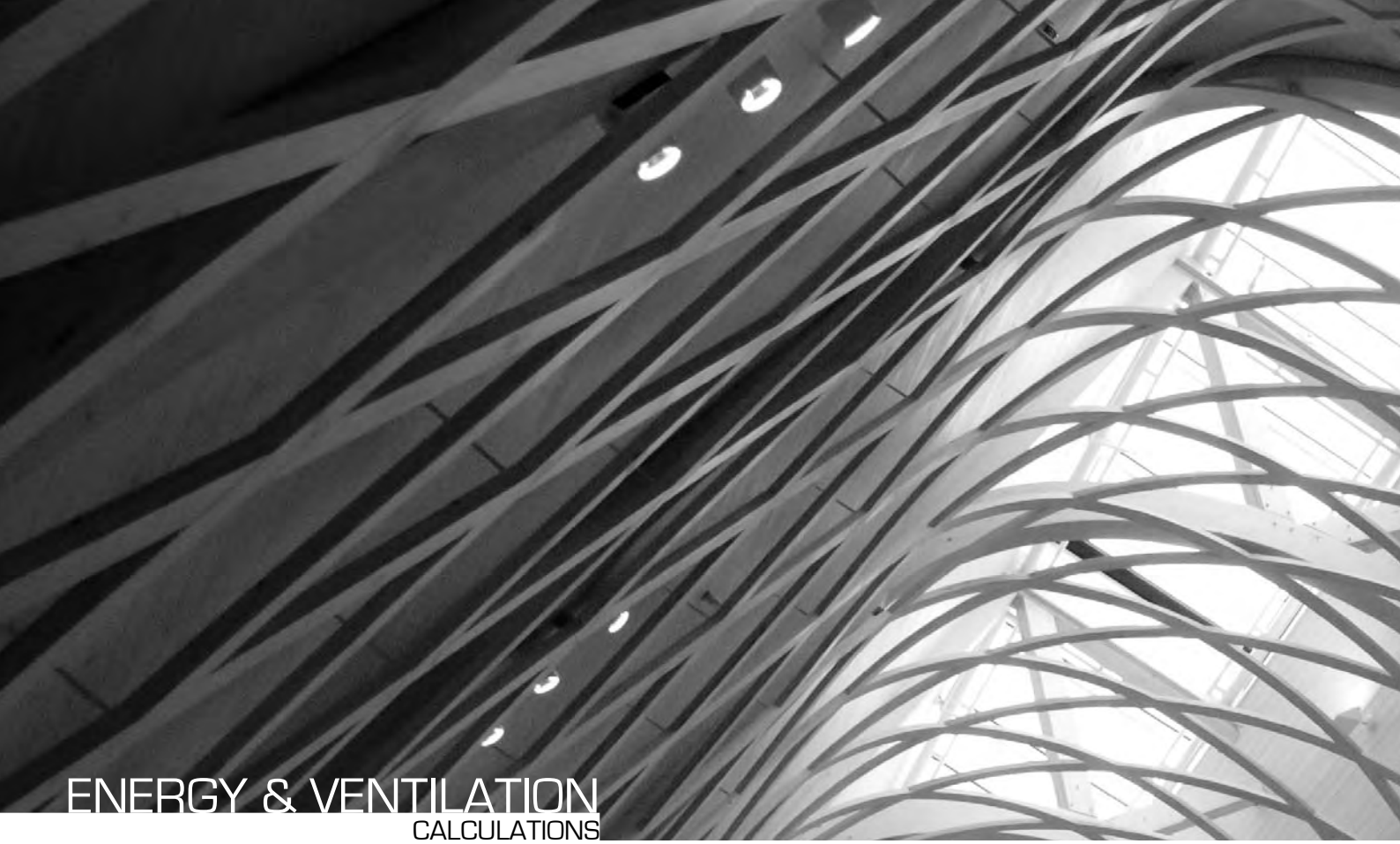
The curve of the reverberation time shows lower values for low and high frequencies, than for frequencies between 400 Hz and 4000 Hz (audible in a speech). The acoustic performance of the Church hall for music could be further improved by making the reverberation time curve higher for low and high frequencies, while maintaining the value for the speech. This could be improved by adding absorbing materials with special acoustics performance behind the wood cladding of the shell.

I - LONGITUDINAL SECTION ILLUSTRATING A RAY SOUND DIAGRAM OF THE CHURCH HALL

II - GRAPHIC SHOWING THE REVERBERATION TIME OF THE CHURCH HALL PER FREQUENCY




ms
2000
1600
1200
800
400
Music
Speech
100Hz
1kHz
10kHz
Sabine
Norris-Eyring



ENERGY & VENTILATION
CALCULATIONS

Energy Aim

According to the recommended criterias for low energy buildings in Norway, “Criteria for Passive and Low Energy Buildings”, the recommended energy consumption for a Cultural Building is 50 KWh/m2/year. This future recommendation has been aimed for in the development of the New Våler Church, and applied in both volumes of the framing building. For the Church Hall, however, as it has been chosen to develop it within the ruins of the old church, this building has the character of a renovation building and, thereby will aim to fulfil the Energy Frame of the present Norwegian legislation (TEK10) of 165 KWh/m2/year.

The energy consumption analyse has been made with the Danish Program Be10, as it constitutes part of A&D study program. Be10 takes in consideration the weather data of Copenhagen, which is lightly milder then the Norwegian climate, with colder winters and warmer summers. This would increase lightly the heat consumption during the winter, and increase the number of hours of overheat during the summer. However, as the climate difference is not extremely significant, the results would not be so different from the actual result.

According to the Danish Building Regulations, the energy frame is defined by the Primary Energy Factor, which establish the relation between the produced amount of heat and the amount of energy which is used in the production of the concerning heat. It is assumed that in the near future the same amount of heat will be cheaper to produce due to the use of renewable resources. Therefor the energy factor which, in the present regulation (BR10) is given as 1, will fall to 0,6 in 2020.

In Norway, the Primary Energy Factor for district heating is not defined at the present, but the assumed primary energy factor, according to SINTEF (Science Institute of Scandinavia) is 0,6, which is equal to the value defined for 2020 building regulations in Denmark. Thereby, the result presented for the energy frame will be taken from the conditions of 2020 regulations. However, as the primary energy factor is an assumption, the present energy frame based upon BR10 will also be presented.

Actual Energy Frame

To analyse the building energy consumption, several parameters have been taken into consideration, such as the building envelope, heating, ventilation, etc. The inputs are based upon investigations and calculations on the indoor climate, according to the recommended criterias for low energy buildings in Norway (SINTEF), and can be seen in Appendix 3.2. The U-values used for the different elements of the building envelope can be seen in Appendix 4.1.

The actual total energy consumption for the Church Hall, both according to BR10 and 2020 regulations can be seen in the following table I:

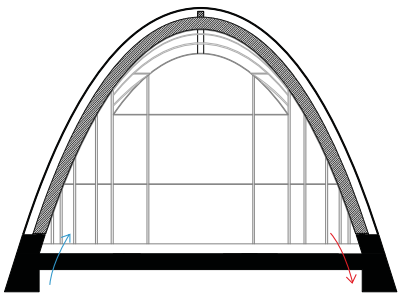
ENERGY FRAME	ENERGY CONSUMPTION
BR10	160,3 KWH/m^2/ YEAR
2020	96.3 KWH/m^2/ YEAR

The energy consumption is distributed mostly for heating, and also for domestic hot water and appliances, with no cooling demands, as the excessive temperature in the building is null.

The complete BE10 calculations can be seen in Appendix 3.2.5

Ventilation

As the Church Hall has the character of a renovation building, mechanic ventilation is used both in winter and in summer. The ventilation principle used is mixed ventilation, with inlets along one of the long walls of the church and outlets in the opposite wall, as illustrated in the section. The air is supplied through a grid hidden in the gap between the concrete floors and the granite wall. The air flow rate used have been calculated according to the perceived air quality, with a value of 0,82 l/s.m2. The opening dimensions calculation can be found in Appendix 3.2.4.



I - CHURCH HALL ENERGY CONSUMPTION FOR BR10 AND 2020

II - CROSS SECTION SHOWING THE VENTILATION PRINCIPLES

PRODUCTION
LAMINATED WOOD

Due to the complex shape of the wooden beams of the church hall, some investigations about its production have been made.

Laminated wood is used worldwide to day, and its history can be traced back more than 100 years. The laminated wood is characterised through its warm glow and exposed as a genuine material. The laminated wood is chosen to the carrying arches due to it's highly flexibility, and its great lightness in relation to its strength. In addition, it can be formed as requested by the process of a CNC miller. Furthermore, laminated wood has a great resistance against moisture, and with a simple surface treatment, is applicable in outdoor environments. In energy perspective is a reasonable choice, as its thermal conductivity is poor. Hereby, the laminated wood can be used as carrying constructing part, which reaches from an indoor to an outdoor environment, without resulting in condensation problems, discolouration of the wood surface and unwished thermal losses. [Lilleheden, n.d]

Designtoproduction is a company specialised in the production of laminated wood structures, creating the link between design and production. Among others, Designtoproduction have been responsible for the production of the Pompidou Centre in Metz, from Shingeru Ban. Accordingly, some statements from this company are here presented, to explain the production process of laminated wood structures with a CNC miller. The company method is divided in three steps; optimisation, simplification and materialization.

Optimise

"With optimization tools that exploit the power of bottom-up methods like Genetic Algorithms and Swarm Intelligence it is possible to find good solutions for complex systems – maintaining the non-regular forms". [designtoproduction,2012]

Simplify

"Integrating thorough knowledge about fabrication technologies, materials and joints into the detailing leads to smarter, leaner, and more rational production processes – and to a result that comes close to the intention of the original design without busting the budget". [designtoproduction,2012]

Materialise

"CNC machines make it possible to fabricate individual components almost at the cost of mass production". [designtoproduction,2012]

I - CNC MILLED LAMINATED WOOD BEAM FOR POMPIDOU CENTRE METZ

II - CNC MILLED OF A LAMINATED WOOD BEAM

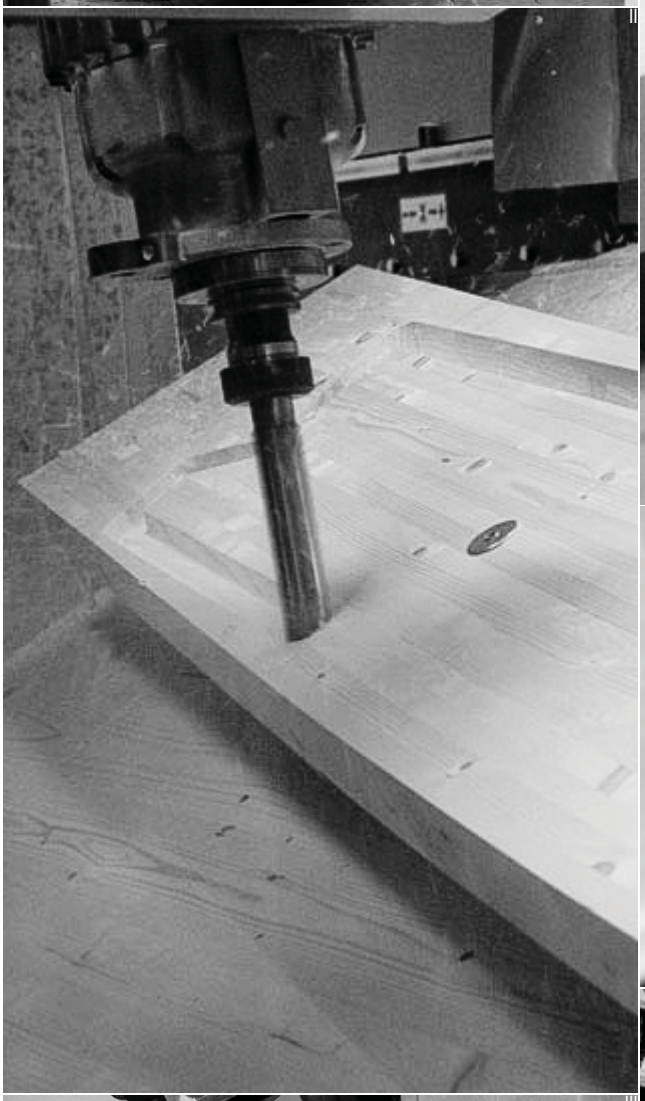
III - CNC MILLED OF A LAMINATED WOOD BEAM

IV - CNC MILLED OF A LAMINATED WOOD BEAM

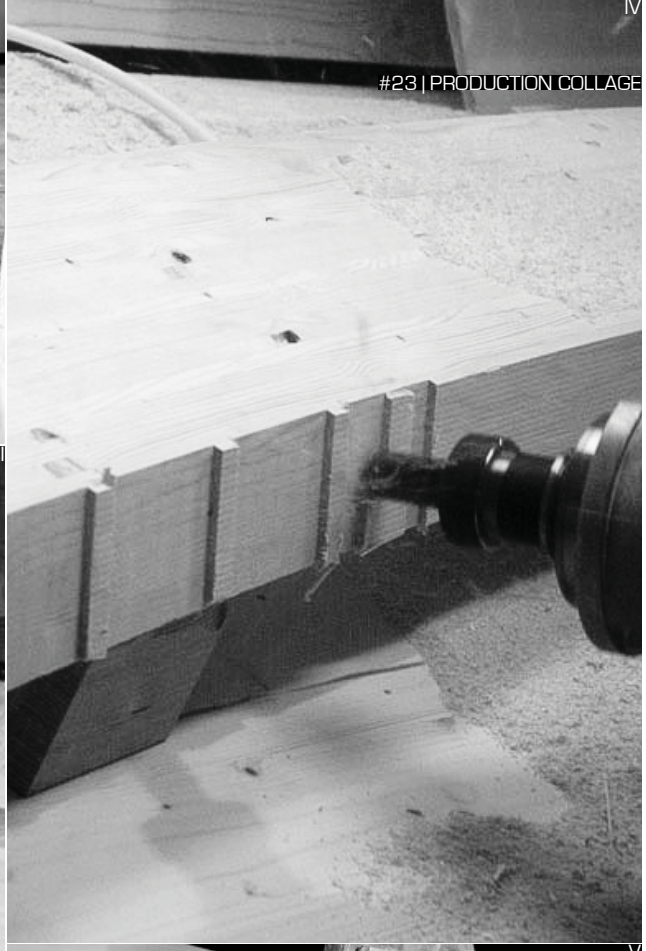
V - CNC MILLED LAMINATED WOOD BEAM FOR POMPIDOU CENTRE METZ

VI - CNC PRODUCED LAMINATED WOOD BEAM

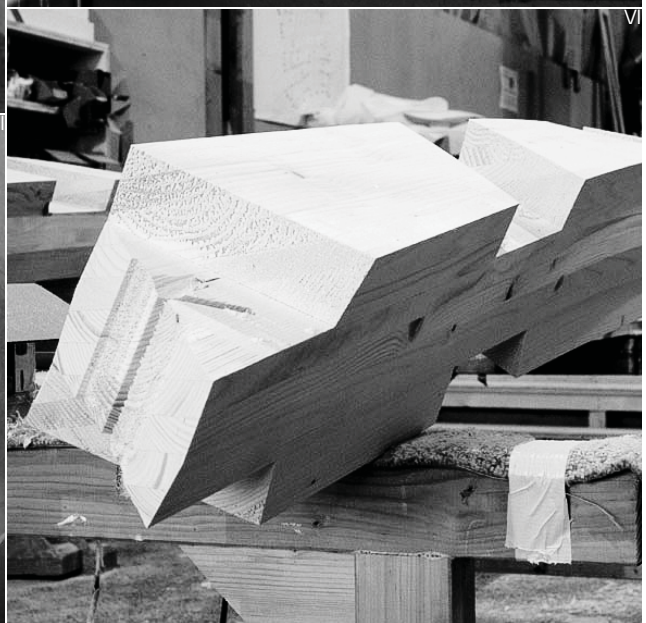

I


II


III


IV


V


VI

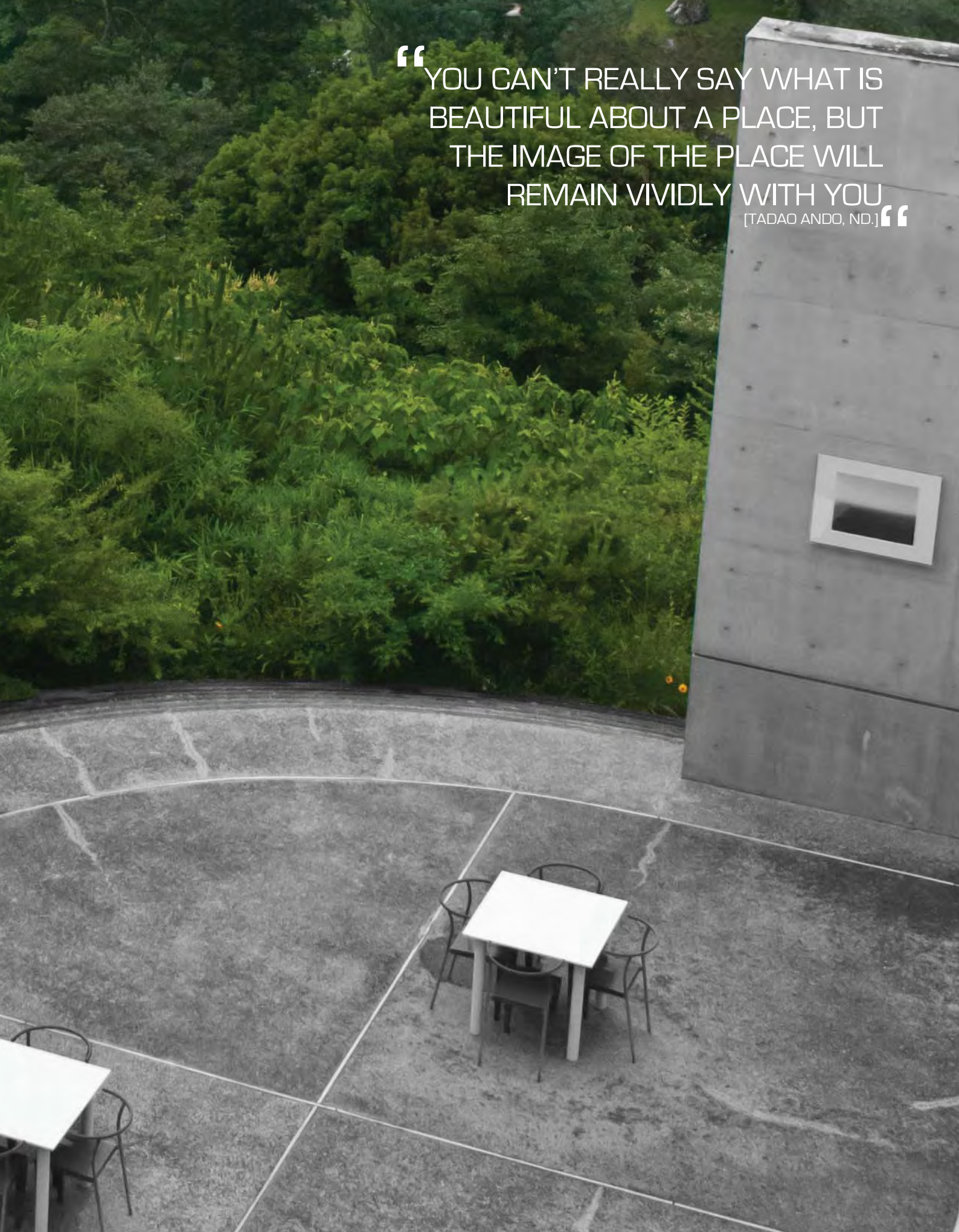
FRAMING BUILDING DEVELOPMENT

POINT OF DEPARTURE

From a conceptual point of view, the design of the framing building also takes shape from the phenomenological analysis of Våler, *Sensing the Place, Characteristics & Details*.

The framing building aims to express simplicity in a rigorous design, as opposition to the church hall.

The symbolism of the framing building can be seen as the element which acts as a mental transition, framing the view from the church hall, and open it to the forest behind, appearing as the border between the mundane and the sacred.



"YOU CAN'T REALLY SAY WHAT IS BEAUTIFUL ABOUT A PLACE, BUT THE IMAGE OF THE PLACE WILL REMAIN VIVIDLY WITH YOU"
[TADAO ANDO, ND.]

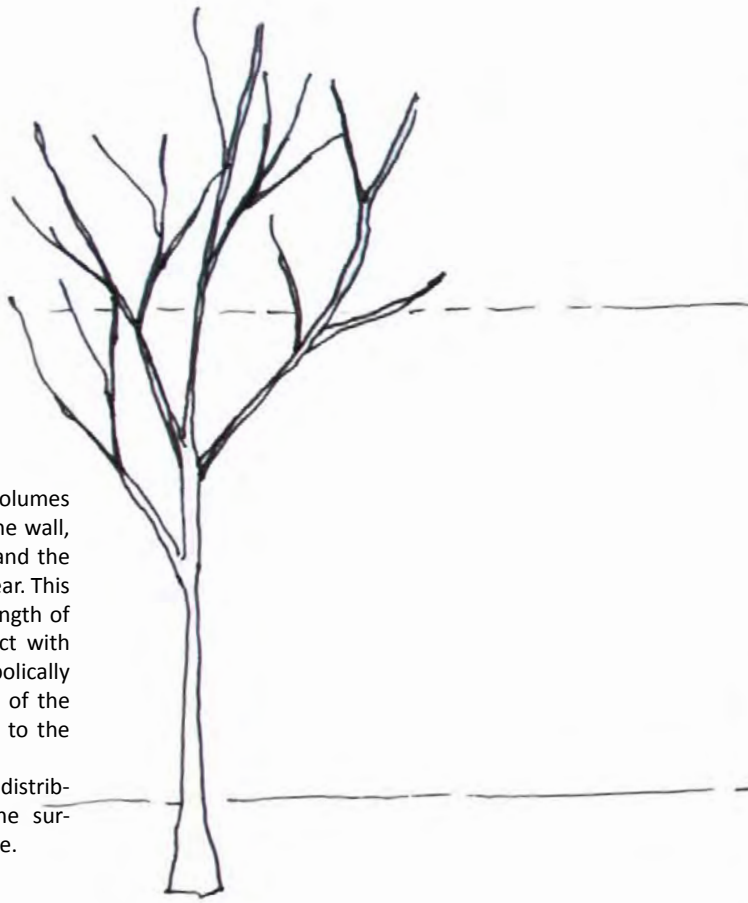
ARCHITECTURAL VISION

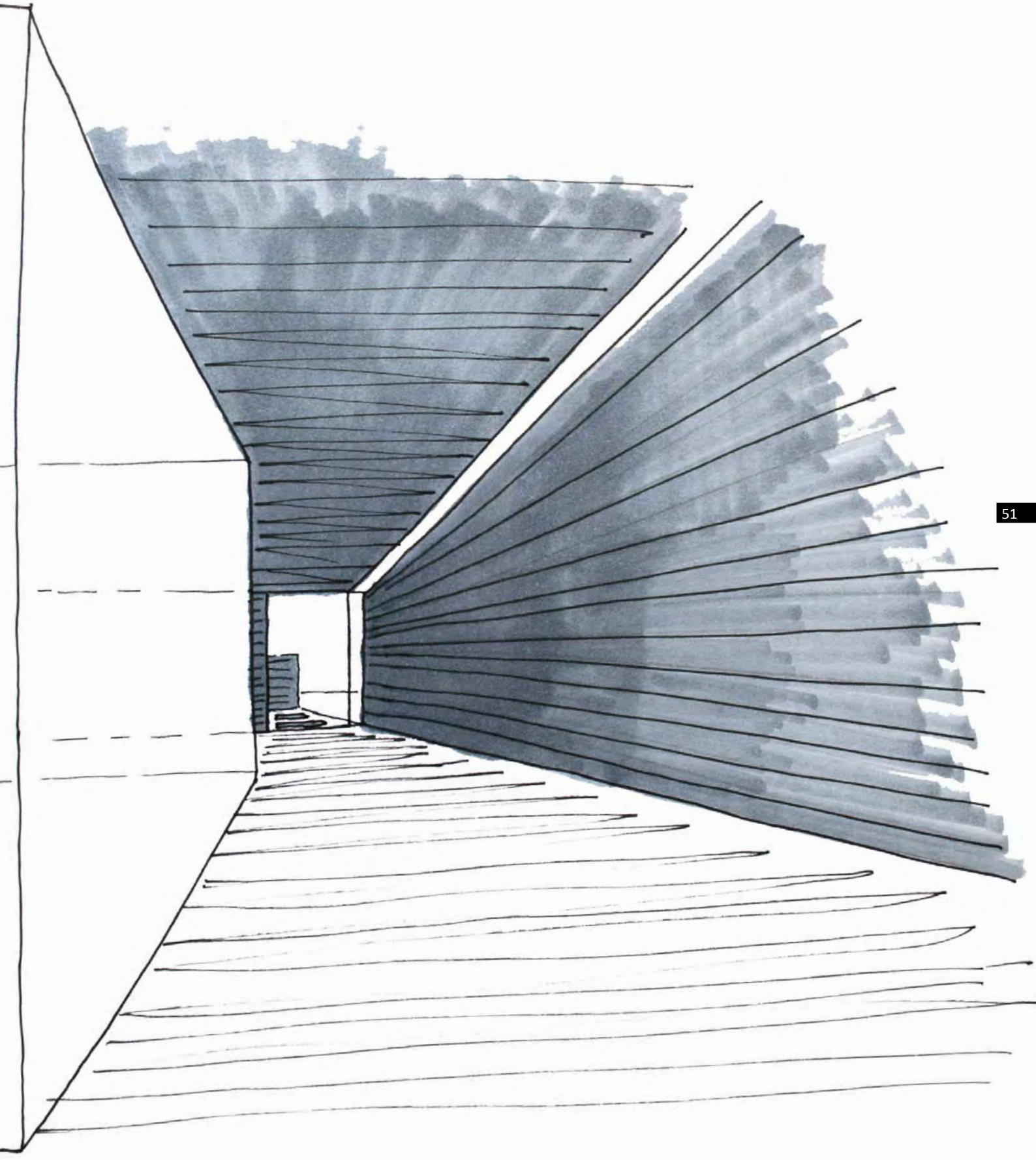
THE WALL AS GUIDELINE

As mentioned above, the architectural vision of the framing building is manifested through the wall that frames the views from the church hall, acting as a transition element. Thereby, the wall is defined as a secluded element in the landscape, from where the two volumes raise behind, with a distance to it. Through the division between the wall and the building volume, light penetrates through, emphasising the materiality and tactility of the wall. To the framing building, this wall acts as a guideline, giving the direction towards the chapel located in the other volume.

The different functions of the two volumes are placed within a distance to the wall, creating a break between them and the wall, and keeping the direction clear. This space follows along the whole length of the wall, creating a visual contact with the landscape at the end, symbolically representing the light in the end of the tunnel, which guides the visitors to the chapel.

The functions of the building are distributed around patios, bringing the surrounding nature close to the inside.





I

II

III

IV

V

VI

VII

INITIAL FORM DEVELOPMENT

INSPIRATION

The collage displayed on the opposite page shows some examples used as inspiration for the initial design development of the framing building.

The Church on the Water (picture II), by Tadao Ando is inspiring in its elegance of how to invite the surrounding nature within the church hall. The water mirror, a reflection of the surrounding nature and the Christian symbol of the cross, becomes an important element of the atmosphere of the Church.

Chichu Museum (picture III), also by Tadao Ando is an inspiration of how to work with the light as an element which dramatizes the space, and hereby defines a clear direction.

The Serpentine Gallery Pavilion by Zumthor (picture IV) shows the atmosphere of the patios as they become an import element within the building volume, as a representation of the surrounding nature.

Furthermore, Benesse house also designed by Ando, can be seen in the pictures I, VI and VII. In picture I, the light gap underneath the exterior wall brings a sharp light penetrating into the space, letting the wall seem floating, and making the space behind seem undefined, acquiring an atmosphere that transmits eternity.
In picture VI, is visible how Ando takes advantage of the symbolic value of the wall as a monumental gesture, which becomes an element in the landscape.
Finally, in picture VII, the opening between the exterior walls constitutes a frame of the nature, inviting it inside the space, inspiration which have been used in the design of the conceptual idea of the wall.

At last, in Serralves Museum from Alvaro Siza (picture V) is visible that the angle displaced between the two volumes creates a tension that emphasizes the clear direction given by the wall. In the gap between the two volumes light comes through giving dynamic to the space.

I - BENESSE HOUSE BY TADAO ANDO

II - CHURCH ON THE WATER BY TADAO ANDO

III - CHICHU MUSEUM BY TADAO ANDO

IV - SERPENTINE GALLERY PAVILION BY PETER ZUMTHOR

V - SERRALVES MUSEUM BY ALVARO SIZA

VI - BENESSE HOUSE BY TADAO ANDO

VII - BENESSE HOUSE BY TADAO ANDO

FUNCTIONAL DISTRIBUTION

DIVISION OF FUNCTIONS

As showed in the sketch, the distribution of the functions in the framing building is made around patios. The different spaces are then articulated by central cores, which content the serving facilities.

Inspired by Aalborg South Hospital Chapel, designed by Friis and Moltke, the entrance will be made through a patio, giving a first framed view to the forest. Furthermore, this patio also hides the parking lot from the building entrance, creating a green break before enter the building.

From the entrance hall it is desired to have view to the exterior, giving to the visitor the feeling of being close to the nature, and thereby a second patio is created. Around the patio the administration offices are placed.

Due to the requirements of the parish functions, the administration part consists of five offices and a small meeting space for the parish. In addition, a space for informal gathering of the staff is created. The technical room and the storage of the building are placed separately, after a third patio, as its requirements for the indoor climate are different from the rest of the functions.

The arrival to the minor chapel takes place from north, through the administration part, where the main wall acts as a guideline, towards the chapel. Before entering the chapel, the mourners are led through a water mirror, placed in between the two volumes of the framing building. The water mirror constitutes thereby a transition space, which symbolically represents purification before entering the chapel.

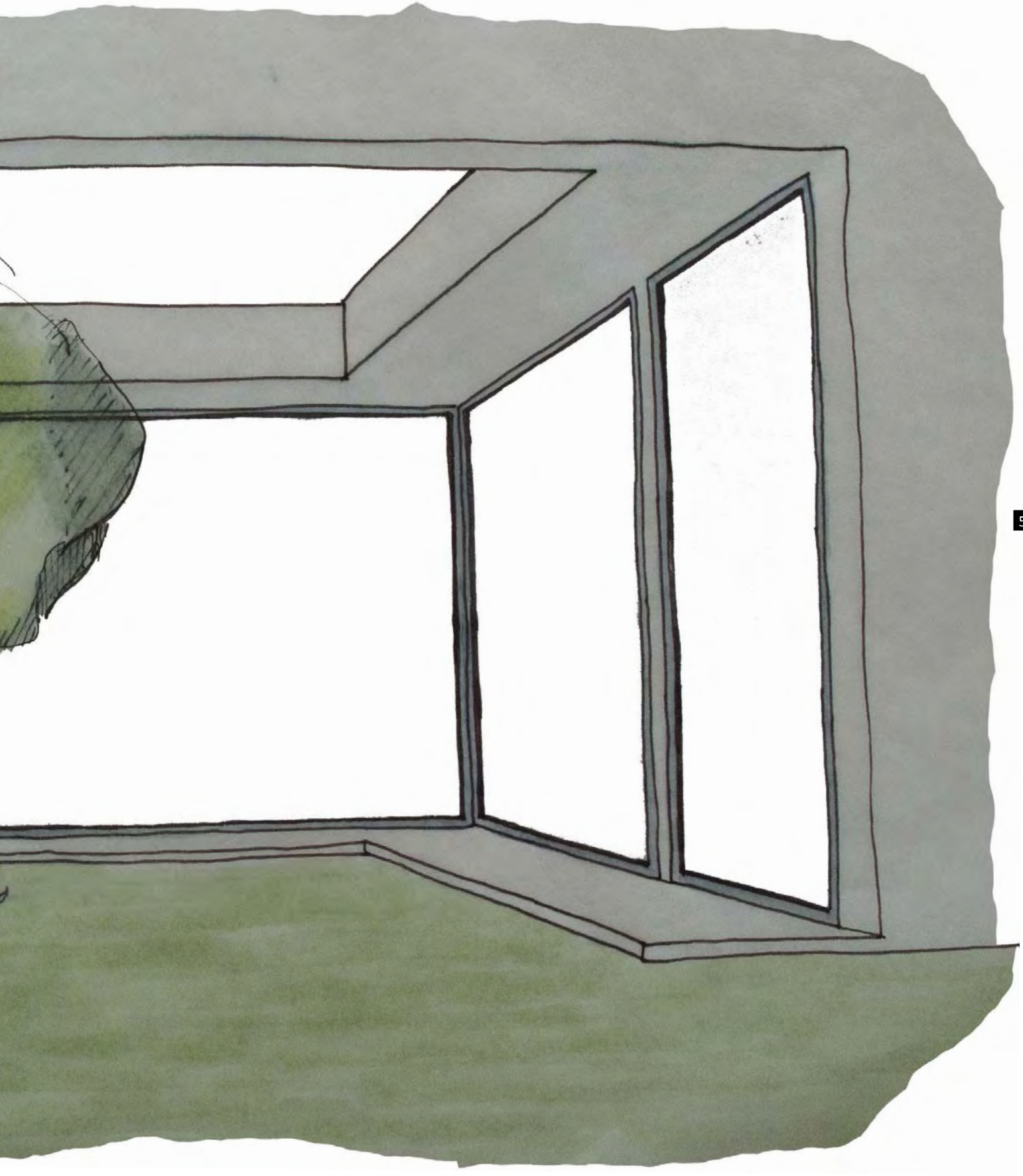
THE PATIOS
ATMOSPHERE

The patios are experienced as green spaces within the framing building, bringing the surrounding nature into the facilities, and giving a feeling of being within the nature. As they pull the nature in until the corridor along the wall, the patios create breaks along the building, through the change of the light settings, articulated through the different intensities and tones.

The expression of the patios is dominated through the large window sections, incorporated in the walls, floor and ceiling; hence experienced as an invisible wall, erasing the border between inside and outside. To emphasise this feeling, the concrete floor is extended to the outside, as an extension of the interior, creating a path around the patios. With a similar expression, the roof is also extended creating an overhang on top of the path.

The different offices and the meeting room are distributed around the patios having, thereby a close relation with the exterior, while receiving a good amount of daylight. The building is open almost exclusively to the patios, making it an introverted space with a reflective and austere atmosphere.

In the offices, the windows are protected from the excessive sun with movable perforated copper panels, bringing a deflected light into the spaces, and creating an atmosphere dominated by a golden light tonality. In addition, the copper screens also link the framing building with the church hall, both in materiality and tactility, but also in the tonality of the light golden by the copper.



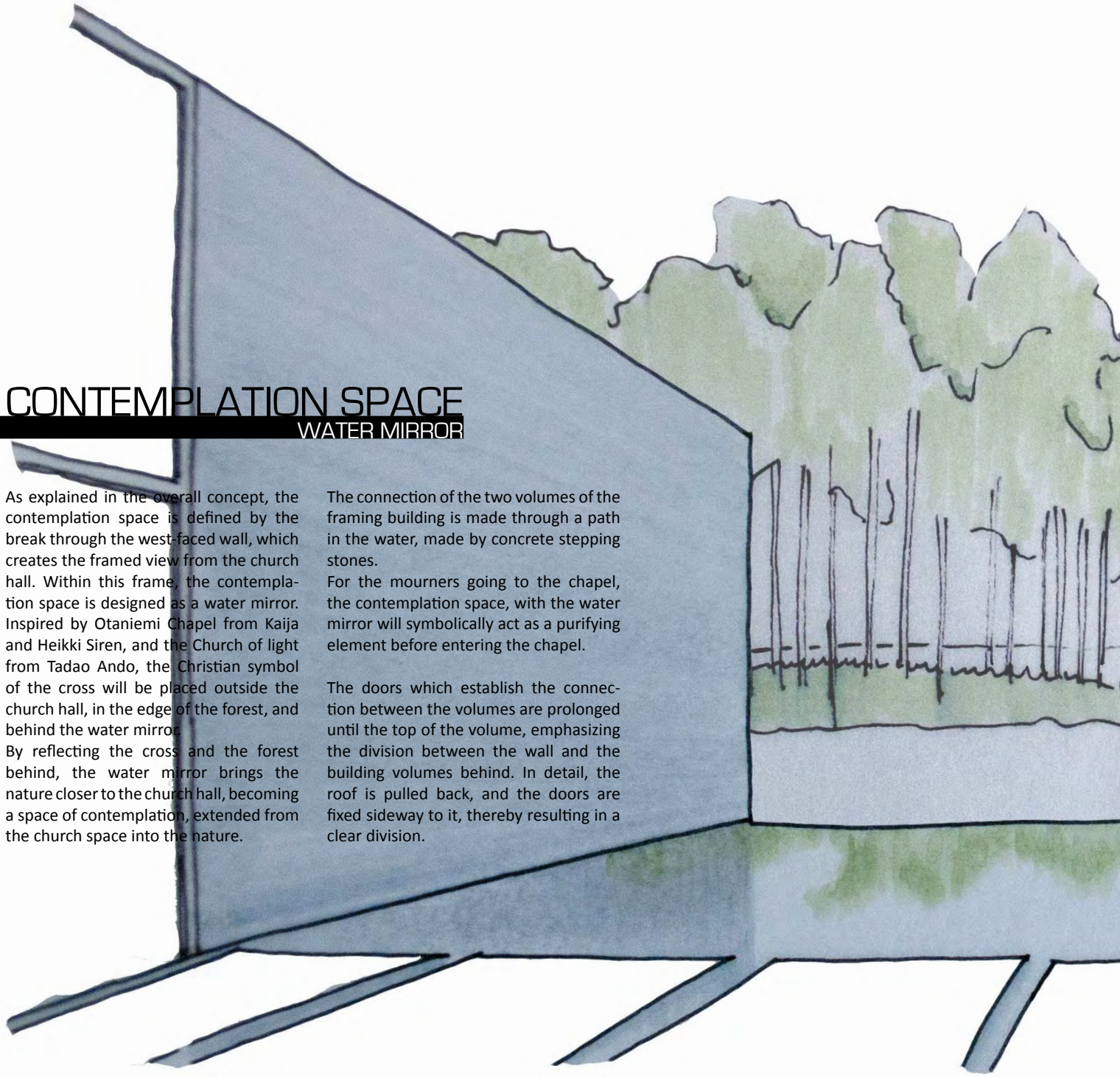
CONTEMPLATION SPACE

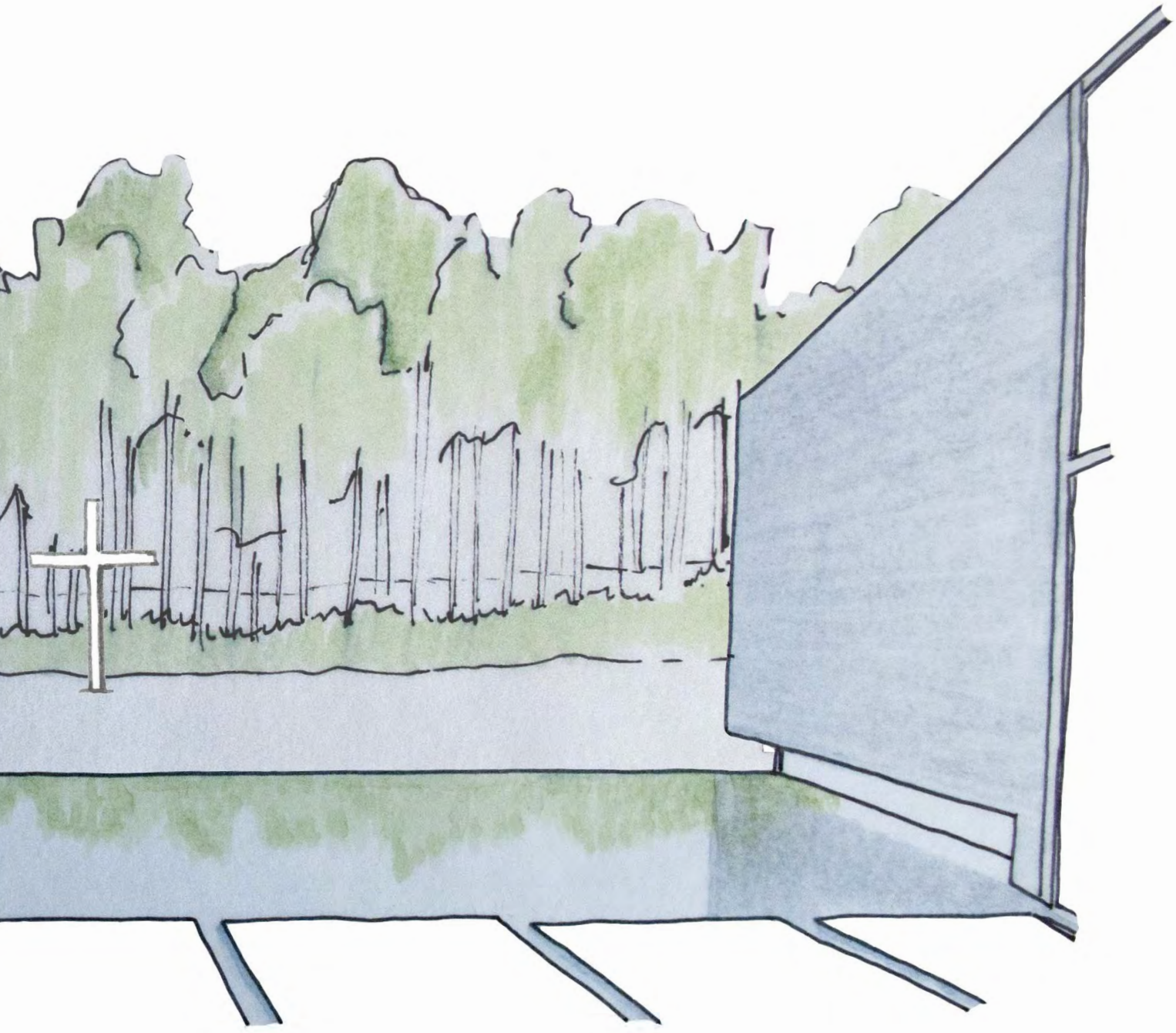
WATER MIRROR

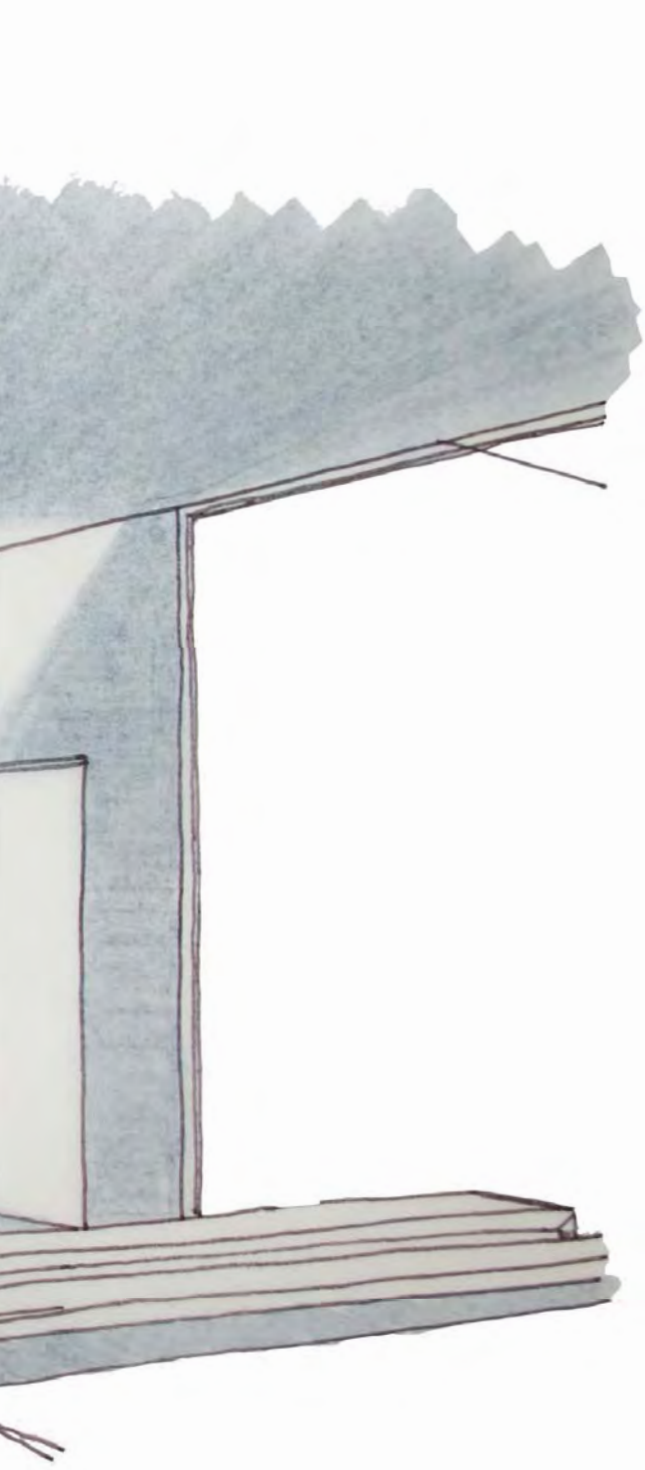
As explained in the overall concept, the contemplation space is defined by the break through the west-faced wall, which creates the framed view from the church hall. Within this frame, the contemplation space is designed as a water mirror. Inspired by Otaniemi Chapel from Kaija and Heikki Siren, and the Church of light from Tadao Ando, the Christian symbol of the cross will be placed outside the church hall, in the edge of the forest, and behind the water mirror.
By reflecting the cross and the forest behind, the water mirror brings the nature closer to the church hall, becoming a space of contemplation, extended from the church space into the nature.

The connection of the two volumes of the framing building is made through a path in the water, made by concrete stepping stones.
For the mourners going to the chapel, the contemplation space, with the water mirror will symbolically act as a purifying element before entering the chapel.

The doors which establish the connection between the volumes are prolonged until the top of the volume, emphasizing the division between the wall and the building volumes behind. In detail, the roof is pulled back, and the doors are fixed sideway to it, thereby resulting in a clear division.







THE CHAPEL
REFLECTIVE SPACE

The expression of the chapel appears in an opposition to the church hall. In the church hall, life, happiness, song and music will be celebrated, while the chapel is designed for grief, and reflection. Thus, the chapel expresses simplicity and quietness, giving space to reflections and emotions.

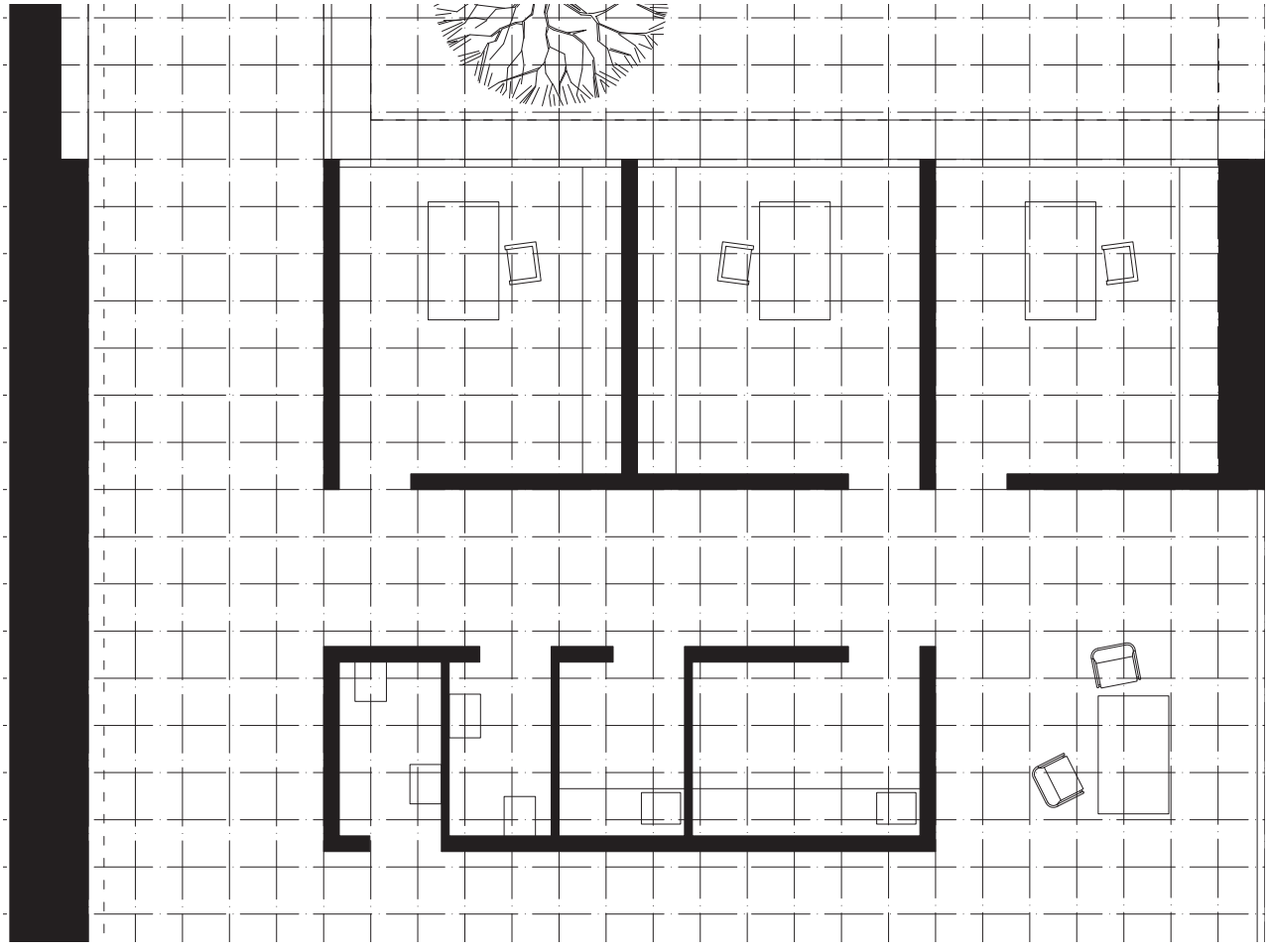
The chapel is expressed within the orthogonal grid system of the framing building, with the direction towards the view given by the angled wall, the same which opens the view from the church hall towards the most dense, delicate and distinctive part of the forest. This angled wall constitutes an exception in the rigid grid of the framing building, marking the sacred character of the space, and linking it conceptually to the church hall.

The north wall of the chapel is lifted from the floor, creating a gap that brings the water mirror to the edge of the room. The light reflections in the water are thereby reflected inside the chapel, giving to the space a reflective atmosphere and an expression of eternity.
To the south, a small patio brings extra light to the chapel, creating a space between it and the mortuary functions.
This patio also contains a water mirror, giving to the chapel an appearance of being floating in the water, symbolically relating it to the Christian symbol of a ship navigating through the waters.

BUILDING PERFORMANCE
THE MODULAR SYSTEM

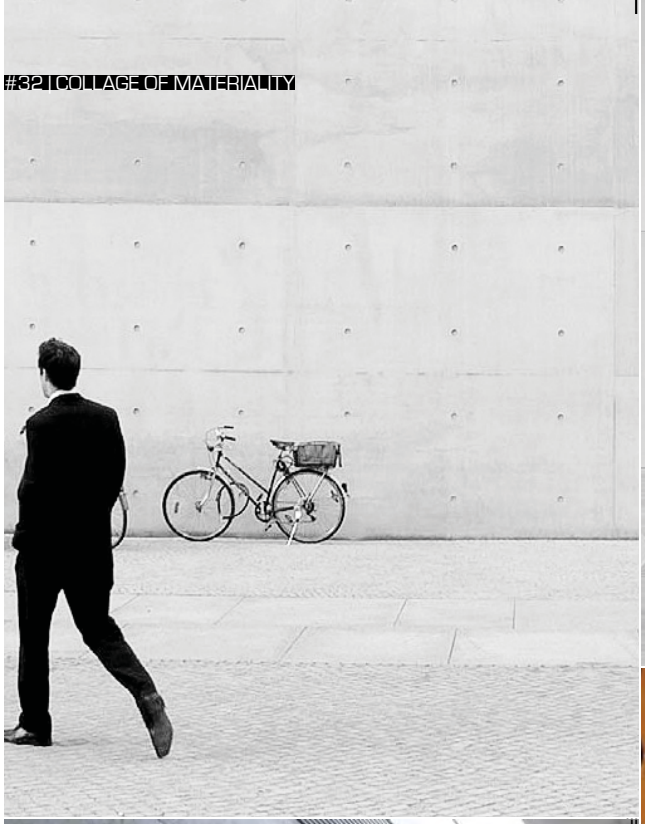
In contrast with the complexity of the church hall, the framing building expresses a clear simplicity, through a rigorous design that enhances the qualities of its materiality. The building is thought to be made in polish cast-concrete, due to its smooth texture, enriched with the marks from the cast.
However, as the building has been made with a modular grid of 600 mm, this can be easily adapted and replaced by prefabricated concrete elements, reducing the production costs.
Due to the desired clean expression of the building, has been chosen to place the installations, as ventilation, electricity, sanitation, etc., in the floor. Thus, the ceiling can be kept clean, and within the same materiality of the rest of the building. This also strengthens the feeling of continuity from inside out, as the concrete of the ceiling is prolonged to the overhang of the patios. Furthermore, the installations placed in the floor can be easily accessible, facilitating the maintenance of the building.
In the floor, next to the glazing, convector ditches are also placed, in order to block the downdraft caused by the windows. Furthermore, the convectors are easy adjustable, allowing a better control of the indoor climate conditions.
In the cores, as several of the rooms are wet rooms, the installations will be lead through the light division walls within the cores.

I - A PLAN SEGMENT OF THE OVERALL PLAN, SOLVED WITH A 600 MM GRID, HENCE OPTIMISED FOR REPLACEMENT OF THE CONCRETE FOR PRE-FRABRICATED ELEMENTS



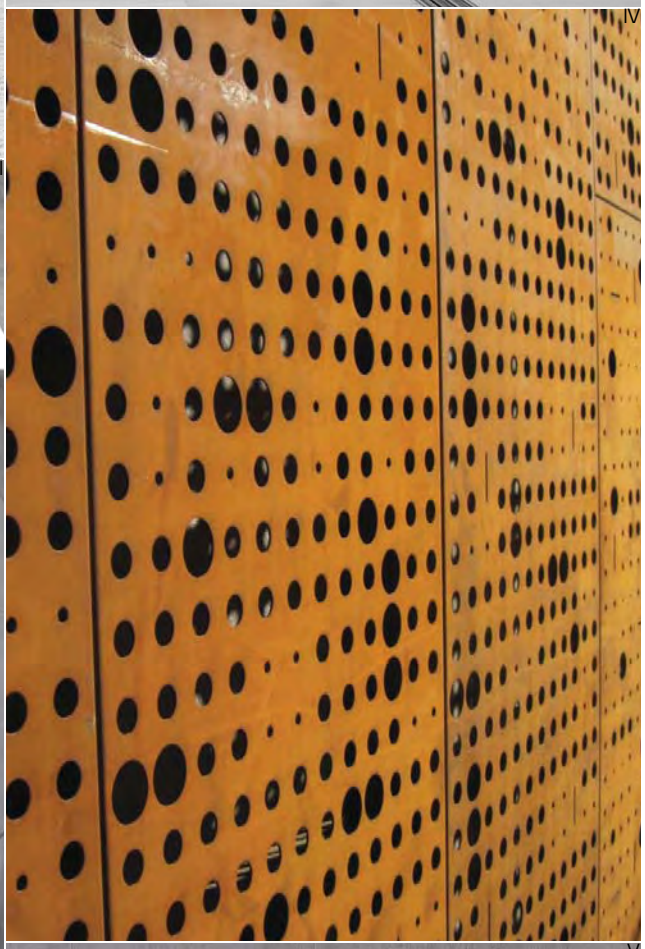
#32 | COLLAGE OF MATERIALITY

I

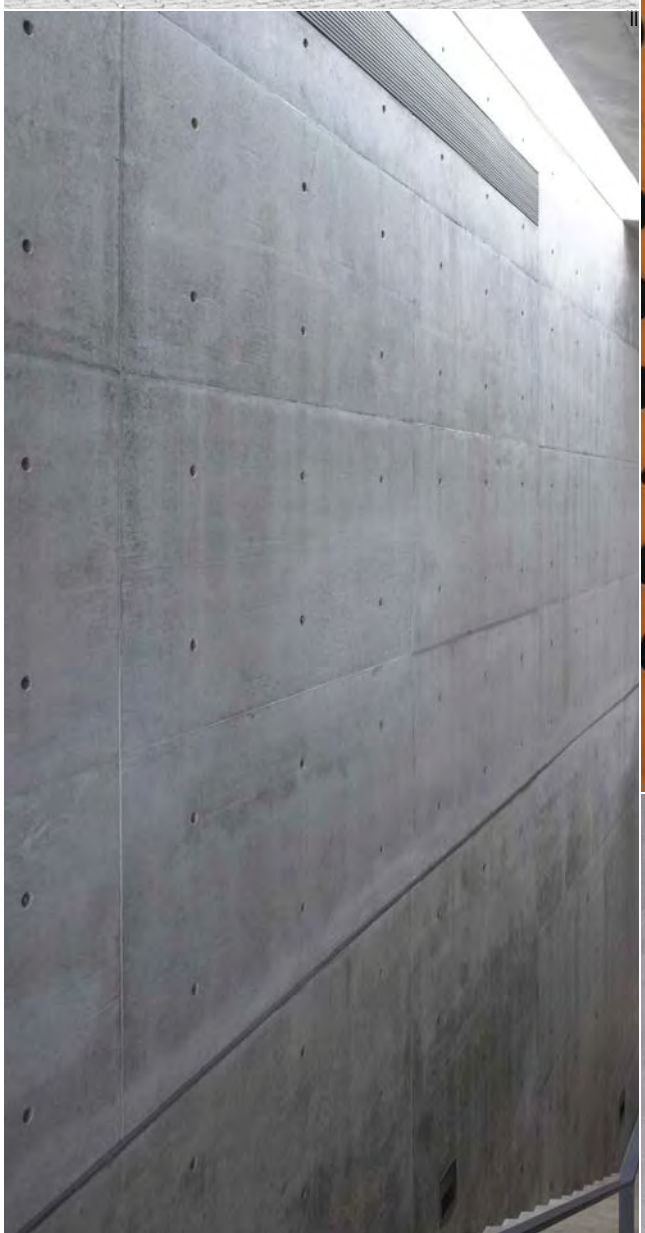


III

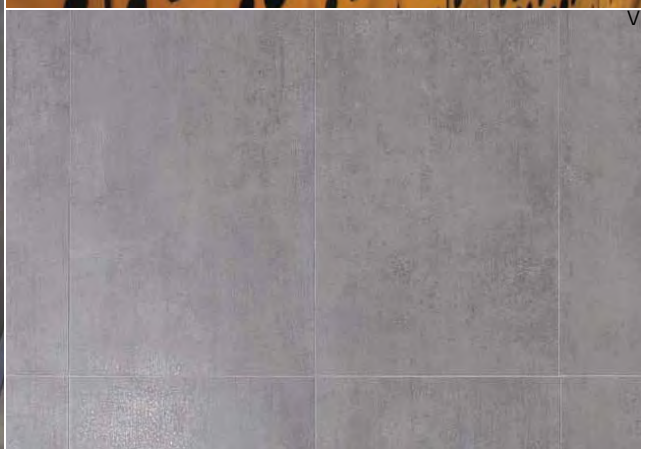
IV



II



V



MATERIALITY
EXPRESSION

The materiality of the building is expressed through the simple character of the cast concrete. The cast concrete appears from distance simple and harsh, as the surrounding nature. In a close up, is visible that the surface is smooth, constituting the main feeling within the building.
The light leaded through the gap between the wall and the volume illuminates the smooth surface of the wall from above, outlining the tactility of the concrete.

The Vitrocsa windows are an important part of the overall expression of the framing building, as through their minimalistic design, the border between inside and outside is almost invisible, giving a feeling of being close to the outside nature.
The perforated copper screens provide solar shading for the offices, bringing a warm light into the austere language of the concrete, hence creating a warm and pleasant environment.

In the floor, concrete tiles have been chosen in order to keep the clean expression, while providing a flexible access to the installations placed underneath.

The heavy building components, as the floors, walls and ceiling, act as heat accumulators, when the solar radiation penetrates the building volume. The high amount of heavy building components is an important factor of taking advantage of the passive solar gains, as they release in the night the heat accumulated during the day. Further on, it stabilizes the indoor climate, securing only few temperature fluctuations.

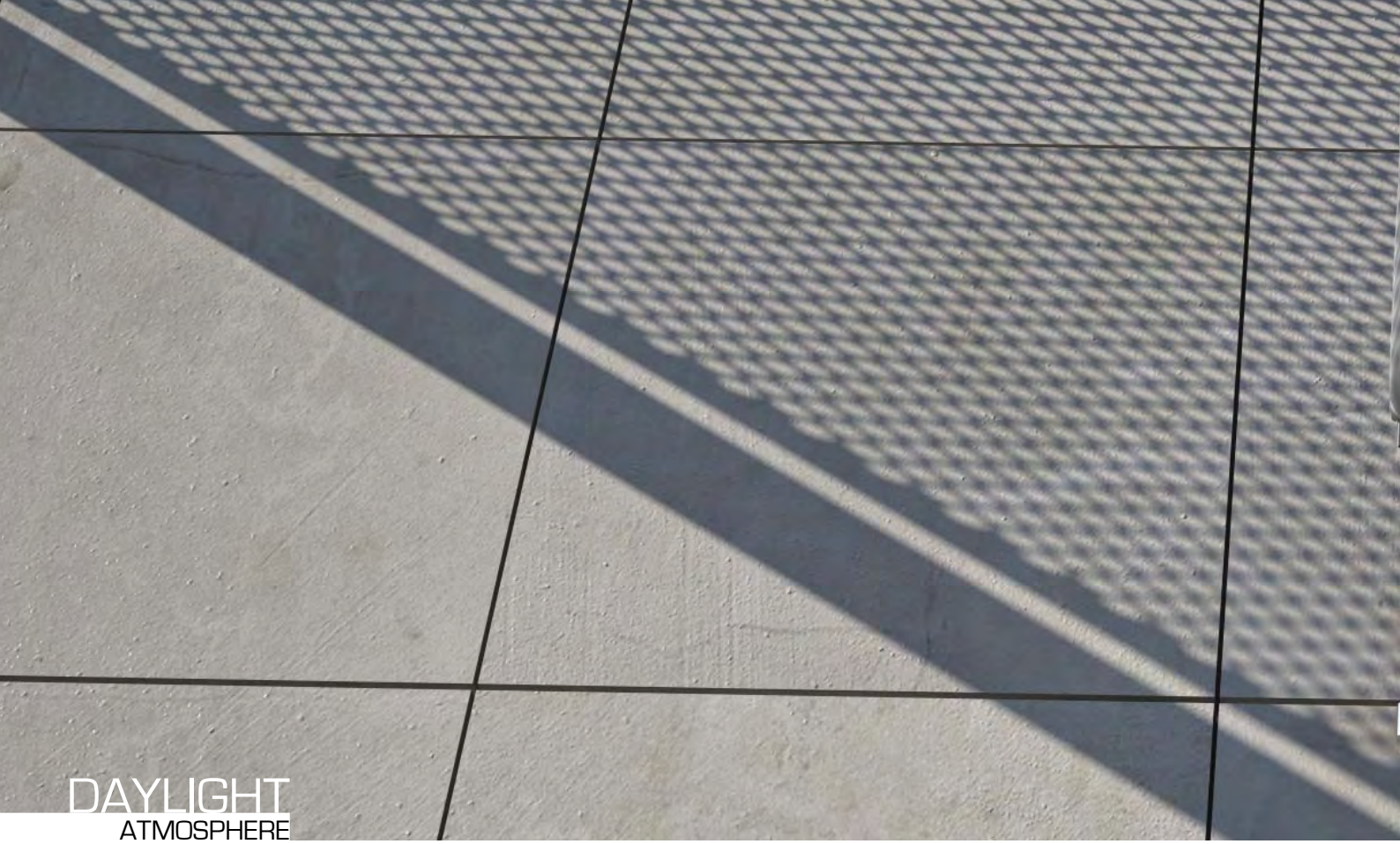
I - EXTERIOR EXPRESSION OF CAST-CONCRETE FACADE

II - DOWN-LIGHT EMPHASISING THE TACTILITY OF THE CAST CONCRETE

III - VITROCSA WINDOWS, AN IMPORTANT ELEMENT OF THE BUILDING

IV - PERFORATED COPPER SCREENS

V - CONCRETE TILES FOR THE RAISED FLOOR



DAYLIGHT
ATMOSPHERE

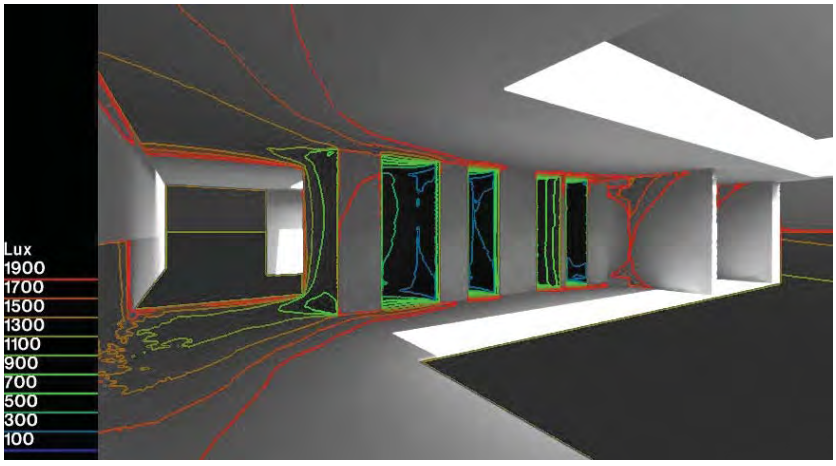
The daylight conditions in the framing building are distinctively different from the Church hall, as this building has to work in a daily use as an office building. Hence it is requested to design the offices so they receive a good amount of daylight. According to the Norwegian building regulations (TEK 10), in an office the daylight levels on a horizontal surface have to be equal or higher than 200 lux. As displayed in the render on the opposite page, the offices receive a big amount of daylight, and thereby the required lux levels are achieved, fulfilling the requirements.

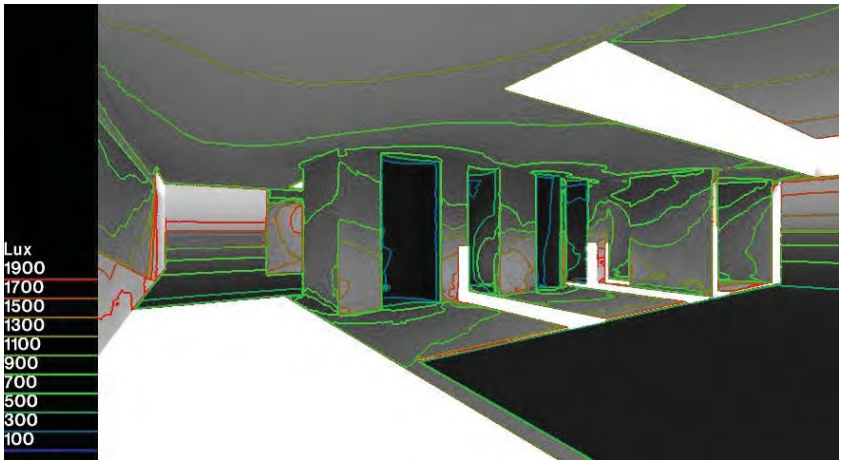
A great part of the experience of the framing building is made through the feeling and the atmosphere of the daylight, as it penetrates into the spaces, emphasising the rigorous lines of the design. The west faced-wall is the main element within the building, being thus lightened from above by the light that penetrates through the gap between the wall and ceiling, emphasising its materiality and tactility.
The space along the wall is clearly defined by the presence of the patios, as they bring distinctive layers of light into the space. As a result the space along the wall is divided in segments by the changes of light.

The copper screens in the windows act as a filter of the direct solar radiation, bringing diverse light settings to the space, and creating an atmosphere dominated by a golden light tonality. The copper screens thus become a warm filter within the offices and the informal spaces.

In resemblance to the gap next to the west wall, the artificial light is installed in fissures between the walls and the ceilings, outlining the spaces and keeping the expression of the ceiling clean.

#33 | RENDER OF THE ATMOSPHERE OF THE DAYLIGHT





I - PICTURE ABOVE: DAYLIGHT LEVELS IN THE FRAMING BUILDING FOR THE MONTH OF JUNE, IN LUX

II - PICTURE TO THE RIGHT: DAYLIGHT LEVELS IN THE FRAMING ROOM FOR THE MONTH OF DECEMBER, IN LUX

ENERGY & VENTILATION
CALCULATIONS

Energy Frame
As mentioned before, according to the recommended criterias for low energy buildings in Norway the recommended energy consumption for a Cultural Building is 50 KWh/m2/year. This value has been aimed for in the development of both volumes of the framing building.
The energy consumption of these buildings has also been evaluated with the program Be10. The calculations of the indoor climate are based in the recommended criterias for low energy buildings in Norway (SINTEF), and can be seen in appendix 2.3. The U-values used for the different elements of the building envelope can be seen in the attached CD.

The actual total energy consumption for the framing building, both according to BR10 and 2020 regulations can be seen in the following tables, both for the administration building and for the mortuary building.

Table I - Administration Building:

ENERGY FRAME	ENERGY CONSUMPTION
BR10	39,7 KWH/m²/ YEAR
2020	23,9 KWH/m²/ YEAR

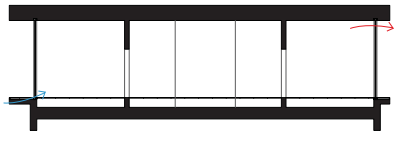
Table 2 - Mortuary Building:

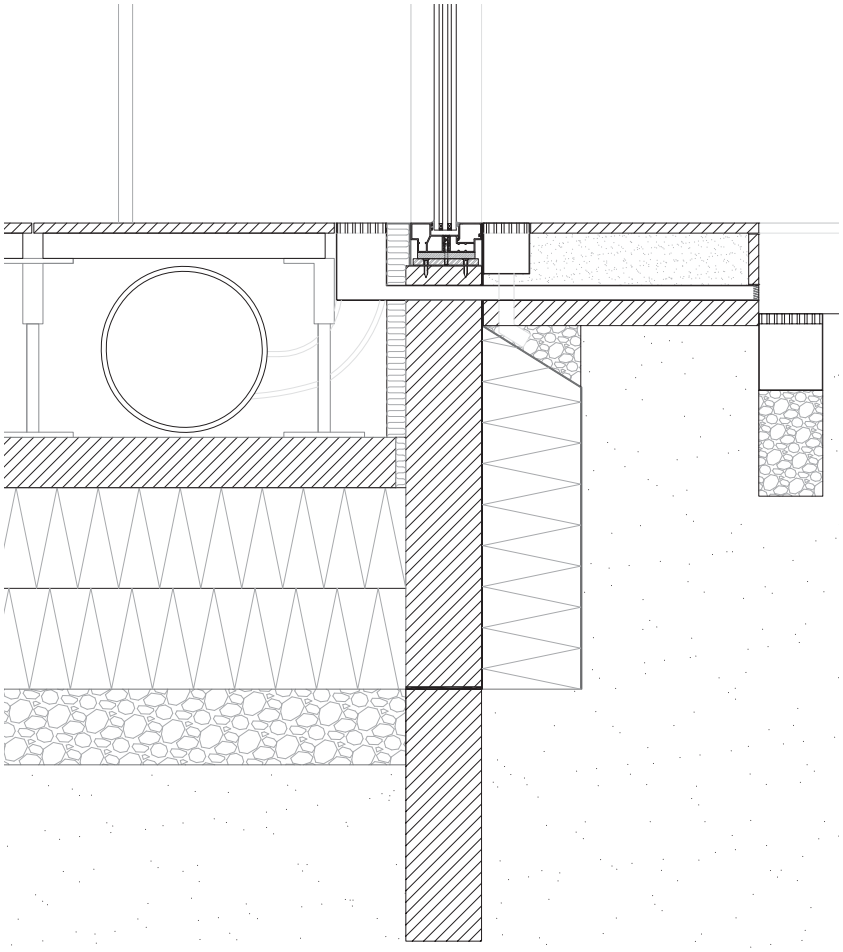
ENERGY FRAME	ENERGY CONSUMPTION
BR10	58,9 KWH/m²/ YEAR
2020	35,5 KWH/m²/ YEAR

In both buildings the energy consumption is distributed mostly for heating, and also for domestic hot water and appliances, having no cooling demands, as the excessive temperature is null.
The complete Be10 calculations can be seen in appendix 2.3.4.

Ventilation
In the framing building, both in the administration volume and in the Chapel, the ventilation method chosen is hybrid ventilation, with natural ventilation in the summer and mechanical in the winter. Hybrid ventilation, as described in the chapter *Indoor Climate – Ventilation Strategies* is chosen as an optimal solution, as the use of natural ventilation during the summer months will reduce the energy consumption for ventilation. In the coffin handling room in the mortuary building, mechanical ventilation will be used during the whole year due to the demands of its functions.

For natural ventilation, the ventilation principle used is cross ventilation. As the predominant wind in Våler, is both from north and south directions, both facades will have inlet and outlet openings, so that natural ventilation can be provided in both conditions. The inlet is made through the floor, through a grid under the windows, and the outlet is made through the ceiling, thereby taking advantage of thermal bouncy.
During the winter, the ventilation is made through a mixed mechanical system, with inlets and outlets in the floor.
The air flow rate used have been calculated according to the perceived air quality, with a value of 0,8 l/s.m2 for both buildings. The opening dimensions calculation can be found in Appendix 2.3.3.





I - ENERGY FRAME FOR BR10 AND 2020, ADMINISTRATION BUILDING

II - ENERGY FRAME FOR BR10 AND 2020, MORTUARY BUILDING

III - CROSS SECTION SHOWING THE VENTILATION PRINCIPLES

III - FACADE DETAIL | SCALE 1:15

INDOOR CLIMATE
BSIM DOCUMENTATION

According to the Norwegian legislations for indoor climate is recommended not to exceed 50 hours above 26 degrees during the entire year. The simulations made with the program BSim show that the temperature above 26 degrees is only exceeded in 36 hours, and thereby it is within the recommended values, as shown in the table below.

To provide efficient shading, it has been chosen to integrate copper perforated screens in the exterior of the windows, with an openness of 50%, which both from an architectural and technical point of view corresponds to the vision of the building.

BSim takes in consideration the weather data of Copenhagen, which is lightly milder then the Norwegian, with colder winters and warmer summers. As the summers in Norway are, in average around 1 to 2 degrees warmer, this could cause slightly more overheat than the simulated with the BSIM model. However, the number of hours of overheat, leaves a small buffer to the maximum of 50 hours. Furthermore, the BSim model does not take in consideration the vegetation in the patios, which would provide efficient extra shading during the warm months.

The graphics displayed in the next page show the air change rate, the CO2 levels and the temperatures in the building, simulated with BSim.

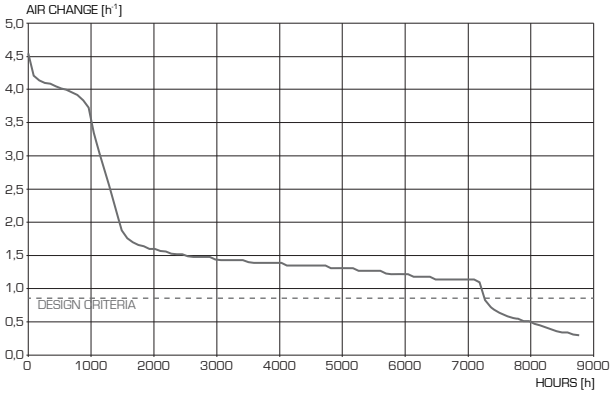
The CO2 level is very stable, barely exceeding the outdoor values, since the person load in relation to the square meters is quite low.

The air change is also stable through the most of the year, having some fluctuations in the summer months. These fluctuations are due to the use of natural ventilation, as a higher ventilation rate is required due to the high amount of passive solar gains. The maximum air change is located between 4 - 4,5 h-1, in order to not create draught.

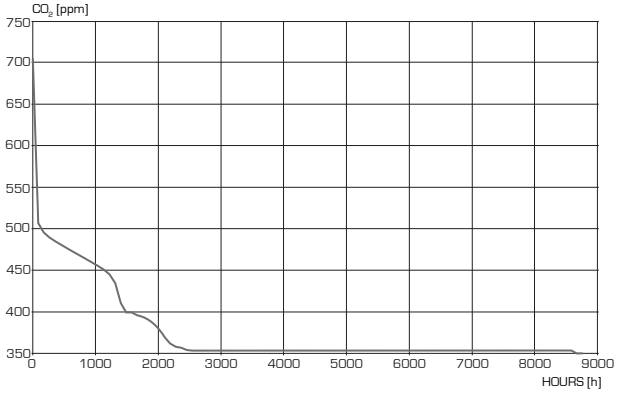
As displayed in the graph *air change rate*, it is visible that the ventilation rate does not constantly fulfills the requirements for the perceived air quality, given by the value of 0,8 l/s/m2. This is caused as the natural ventilation does not provide a constant ventilation rate, since is controlled by the climatic conditions. To avoid this, the mechanical ventilation could have been activated when the natural ventilation does not have the sufficient performance.

TYPE	UNITS	SUM/ MEAN	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
$T_{op,mean}$	C	22,9	23	23	23,0	23,1	23,0	22,8	22,4	23,0	22,8	23,0	23,0	23,0
HOURS <20	C	0	0	0	0	0	0	0	0	0	0	0	0	0
HOURS >26	C	32	0	0	0	0	3	12	3	14	0	0	0	0
HOURS >27	C	4	0	0	0	0	0	3	0	1	0	0	0	0
AIR CHANGE	h^{-1}	1,6	1,3	1,3	1,3	1,3	1,4	2,2	2,2	2,2	1,3	1,3	1,3	1,3
CO_2 LEVEL	ppm	372,8	378,3	377,9	375,6	377,5	375,6	363,8	354,4	363,6	375,1	378,0	376,3	377,7

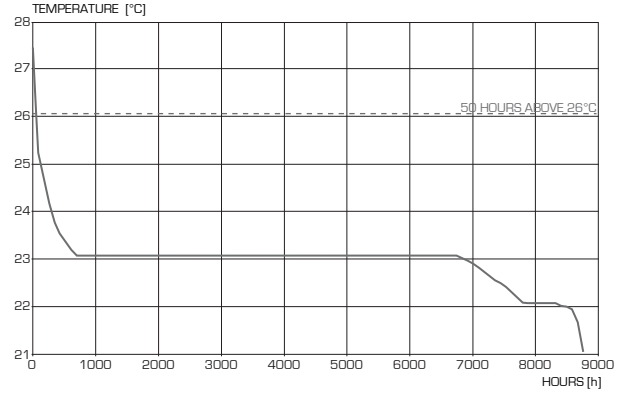
AIR CHANGE RATE



POLLUTION



OPERATIVE TEMPERATURE



I - HEAT BALANCE, TABLE OF ZONE 1

II - GRAPHIC OF AIR CHANGE RATE OF ZONE 1, SHOWING NUMBER OF HOURS ABOVE $4H^{-1}$

III - GRAPH OF CO^2 LEVEL OF ZONE 1, SHOWING NUMBER OF HOURS ABOVE THE EXTERIOR LEVELS

IV - GRAPH OF OPERATIVE TEMPERATURE OF ZONE 1, SHOWING NUMBER OF HOURS ABOVE 26ºC

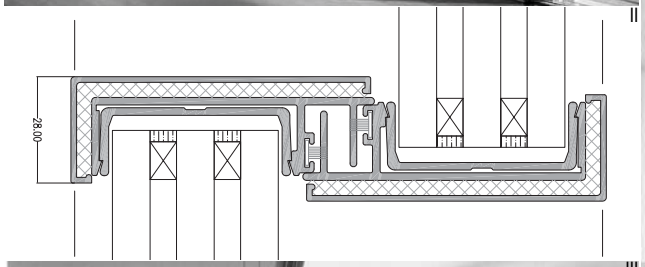
#36 | COLLAGE OF VITROCSA WINDOWS

I

VI

VII

II

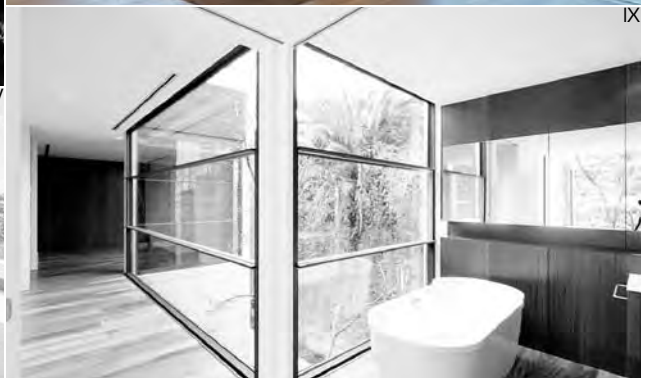


III

VIII

IV

IX



V

PRODUCTION
THE INVISBLE WALL

As described before, the glazing is an important part of the overall expression of the framing building, as it is desired to make the border between inside and outside almost invisible. Thereby, the expression given by several windows have been studied, in order to find the frames with the right expression. The *Vitrocsa* frames, with a profile of only 18mm, have been used both in the Church Hall and in the Framing Building, giving the possibility for the buildings to express the right atmosphere. Thus the window system will be here briefly explained.

The *Vitrocsa* frames, produced in Switzerland, emerge from the visions of the producer to fulfil the requirements from architects and engineers. The *Vitrocsa* frames are produced in different systems, as fixed widow solutions and sliding glass door systems. The sliding door system expose only 18 mm, while the fixed connection between two glasses has 28mm.

Furthermore, the frames are also produced in two different profiles with different energetic performance. The TH+ profile used both in the church hall and the framing building is provided with a system which has an efficient thermal break, therefore achieving a U-value of 0.28 W/m2K.

"This search for simplicity has resulted in the reinvention of the traditional sliding windows. What sets *Vitrocsa* apart is the slimness of the frame and the large glass panes which can be achieved using a combination of structural glazing and careful engineering, whereby the rollers are installed in the frame rather than in the window thus ensuring the window's stability." [Vitrocsa]

"The *Vitrocsa* framing system has a vast range of possible combinations depending on the specific demands of each project. Its frame is made in aluminum with a polyamide thermal break. The sliding system functions with rollers on stainless steel ball bearings, to erase its functioning. The minimalist ironmongery is complimentary and easy to use". [Vitrocsa]

I - VITROCSA WINDOWS - SLIDING WINDOW SOLUTION

II - VITROCSA WINDOWS - SLIDING DOOR DETAIL

III - VITROCSA WINDOWS - SLIDING WINDOW SOLUTION

IV - VITROCSA WINDOWS - GUILLOTINE WINDOW SOLUTION

V - VITROCSA WINDOWS - SLIDING WINDOW SOLUTION EXPRESSION

VI - VITROCSA WINDOWS - SLIDING WINDOW SOLUTION CLOSE UP

VII - VITROCSA WINDOWS - SLIDING WINDOW SOLUTION

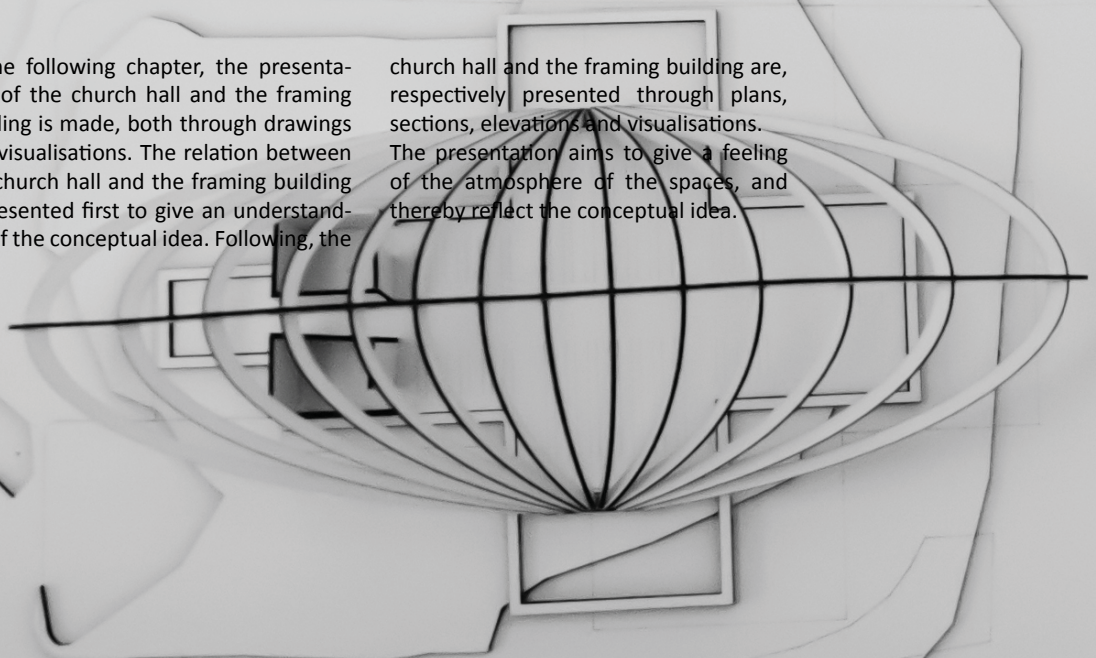
VIII - VITROCSA WINDOWS - FIXED WINDOW AND INTEGRATED DOOR

IX - VITROCSA WINDOWS - GUILLOTINE WINDOW SOLUTION

PRESENTATION

INTRODUCTION

In the following chapter, the presentation of the church hall and the framing building is made, both through drawings and visualisations. The relation between the church hall and the framing building is presented first to give an understanding of the conceptual idea. Following, the church hall and the framing building are, respectively presented through plans, sections, elevations and visualisations. The presentation aims to give a feeling of the atmosphere of the spaces, and thereby reflect the conceptual idea.



SITE PLAN

The site plan shows the overall relation between the church hall and the framing building, and also between the buildings and the pre-existing chapel placed to north of the church hall. In the south of the framing building the bell tower is placed, creating thereby a harmonious composition of the buildings in relation to the old chapel with its high spire.

The church hall is served by the existing parking facilities located on the opposite site of the main road. The arrival to the church is made to west of it, where the original iron gate welcomes the church-goers.

In a daily use, the two volumes of the framing building are served from each entrance. The administration part towards north serves the main activities of the parish centre on a daily basis, and therefore parking lots are created near the entrance.
The mortuary building towards south is served from south, where an access road is established.

#38 | SITE PLAN | SCALE 1:1000

EXTERIOR EXPRESSION

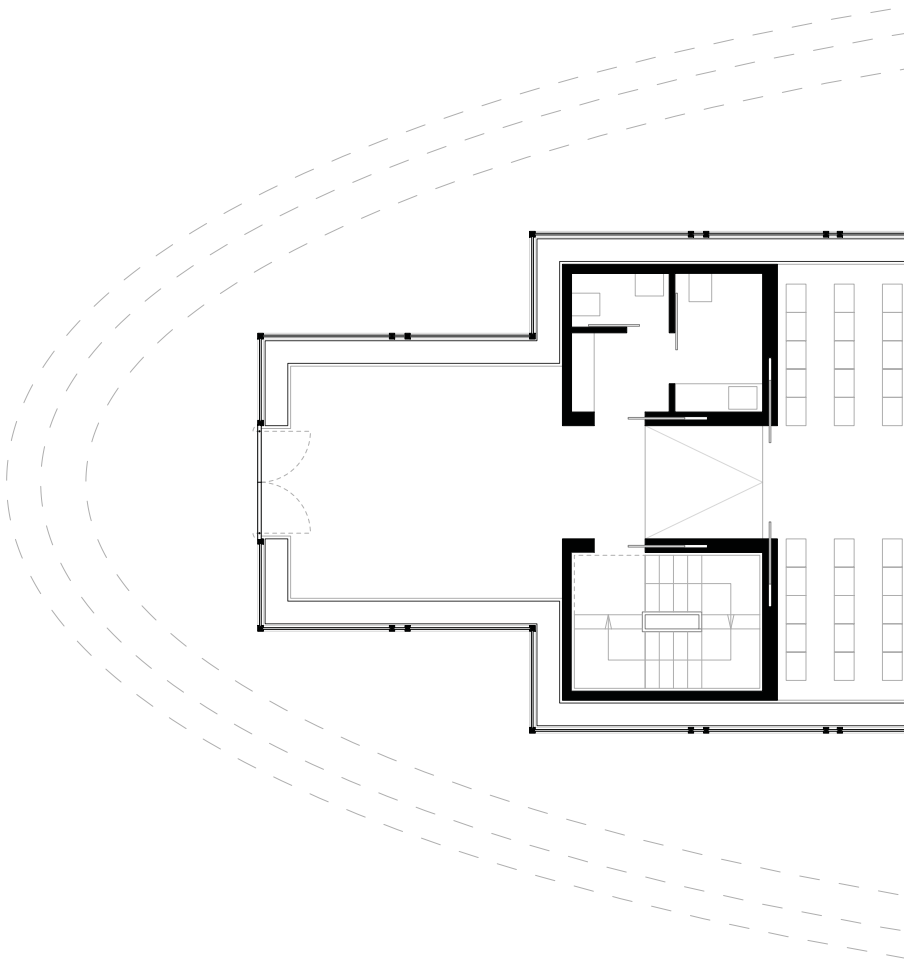
The exterior visualisation displays the interaction between the church hall and the framing building. The church hall is exposed through its refined, vertical and sculptural appearance, while the framing building, in opposition, appears austere and horizontal in its expression.

CHURCH HALL
GROUND PLAN

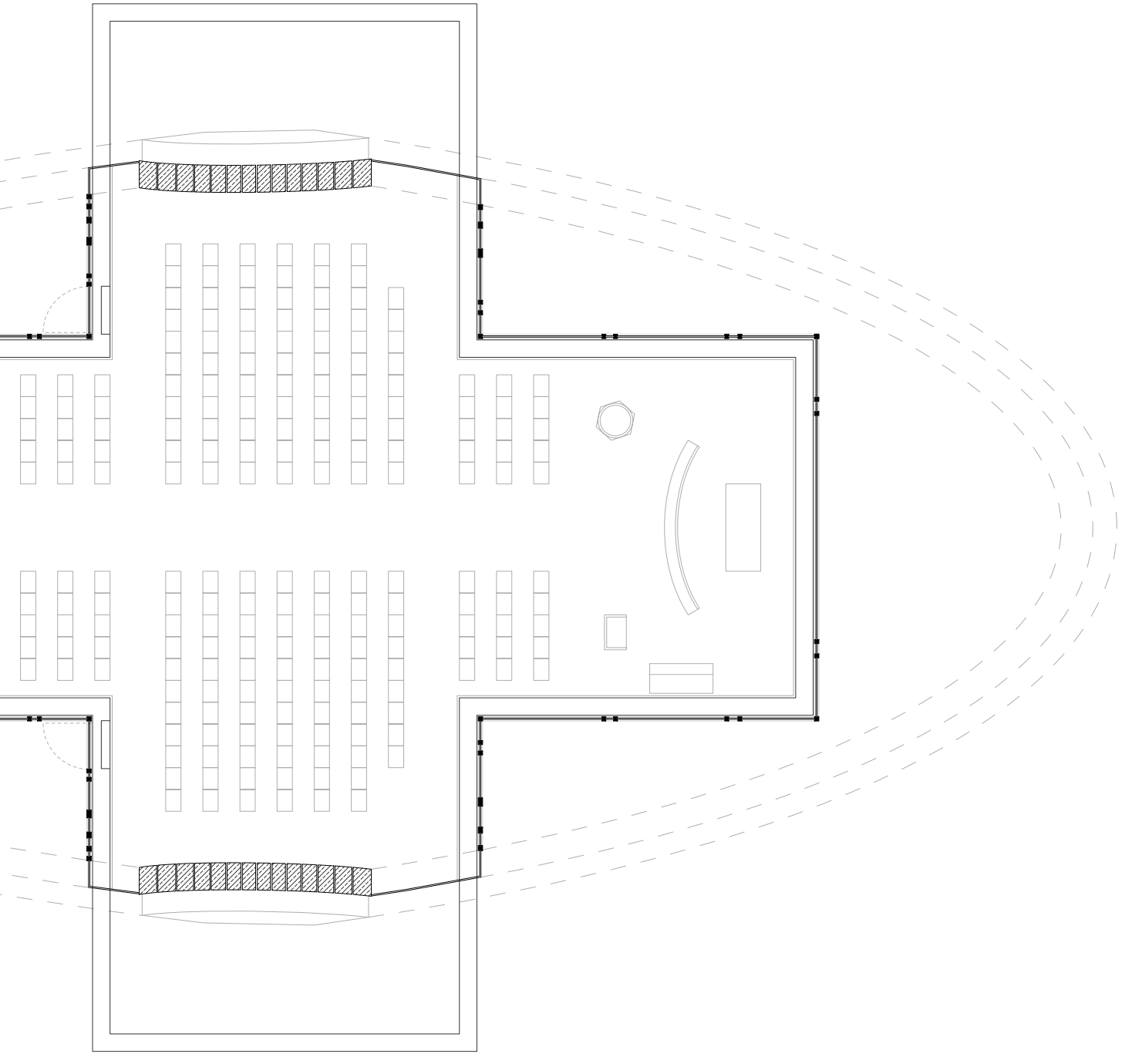
The church hall is shaped as a processional church, with a rational and rigorous plan with seats distributed on each side of the aisle. At the end of the aisle, the altar and the altar call are located. On the right side of the altar, are placed the pulpit and the grand piano, while the old baptism fond is situated to the left.

The churchgoers are led to the church hall through the narrow passage of the portal that separates the entrance from the sacred space. As the churchgoers enter the church hall, the arch construction will be manifested.

The portal consists of two boxes, which contain a service staircase and serving facilities for the churchgoers, such as a wardrobe, toilets and a baby changing space. The serving staircase gives access to the basement and to the tribune placed above.



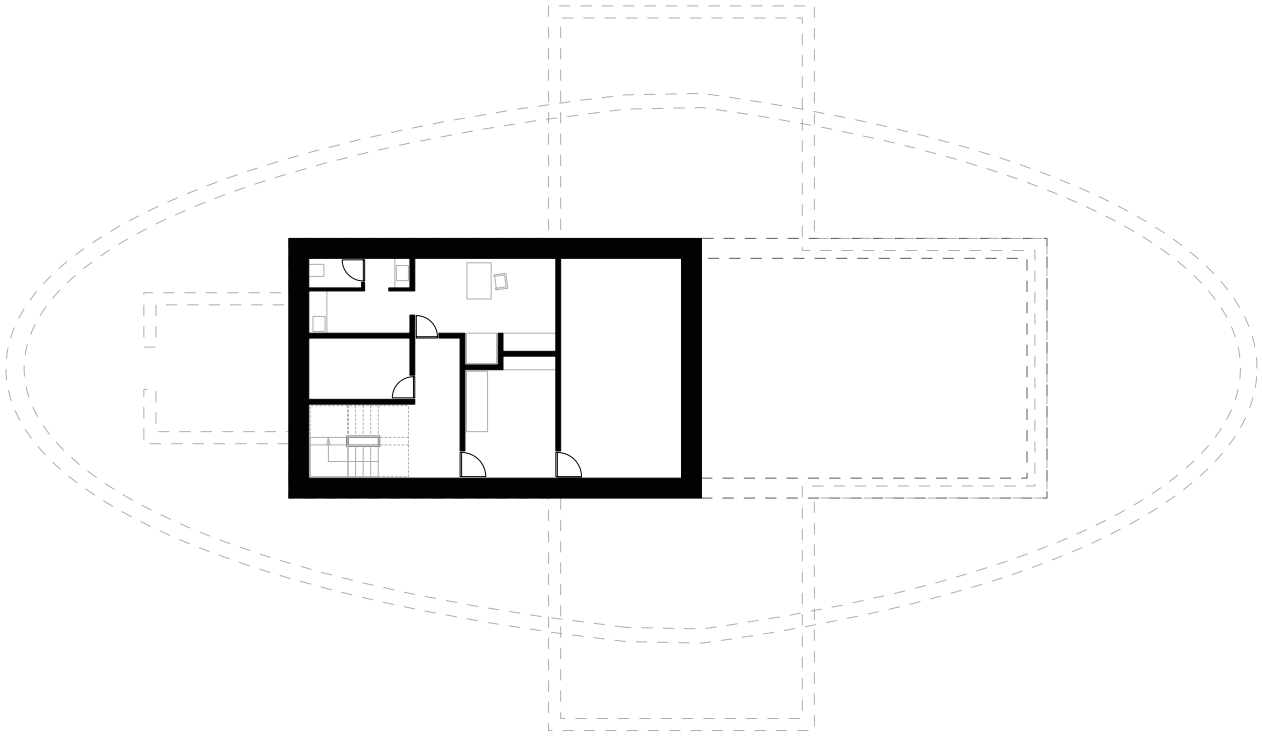
#40 | GROUND PLAN OF THE CHURCH HALL | SCALE 1:150

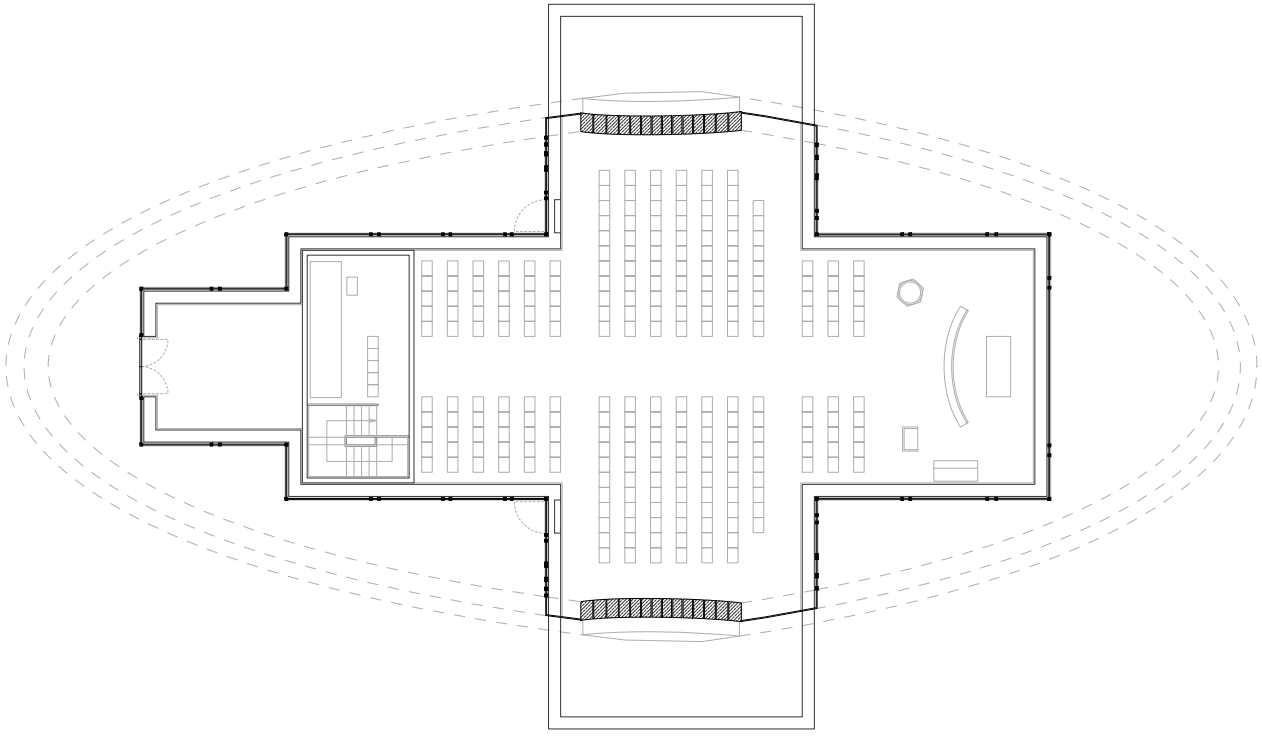


CHURCH HALL
BASEMENT & TRIBUNE

The basement only serves the priest and the serving staff. The basement plan is rationally distributed, and consists of a working room for the priesthood, with toilet, kitchenette and a safe for the silver; a maintenance room for the verger, a storage and as well a technical room.

In the tribune the organ and the choir are situated. The placement of these functions in the back, in an elevated position, as seen in the medieval processional churches, improves their acoustic performance within the church hall.
In addition, the audio visual equipment will also be located in the tribune.



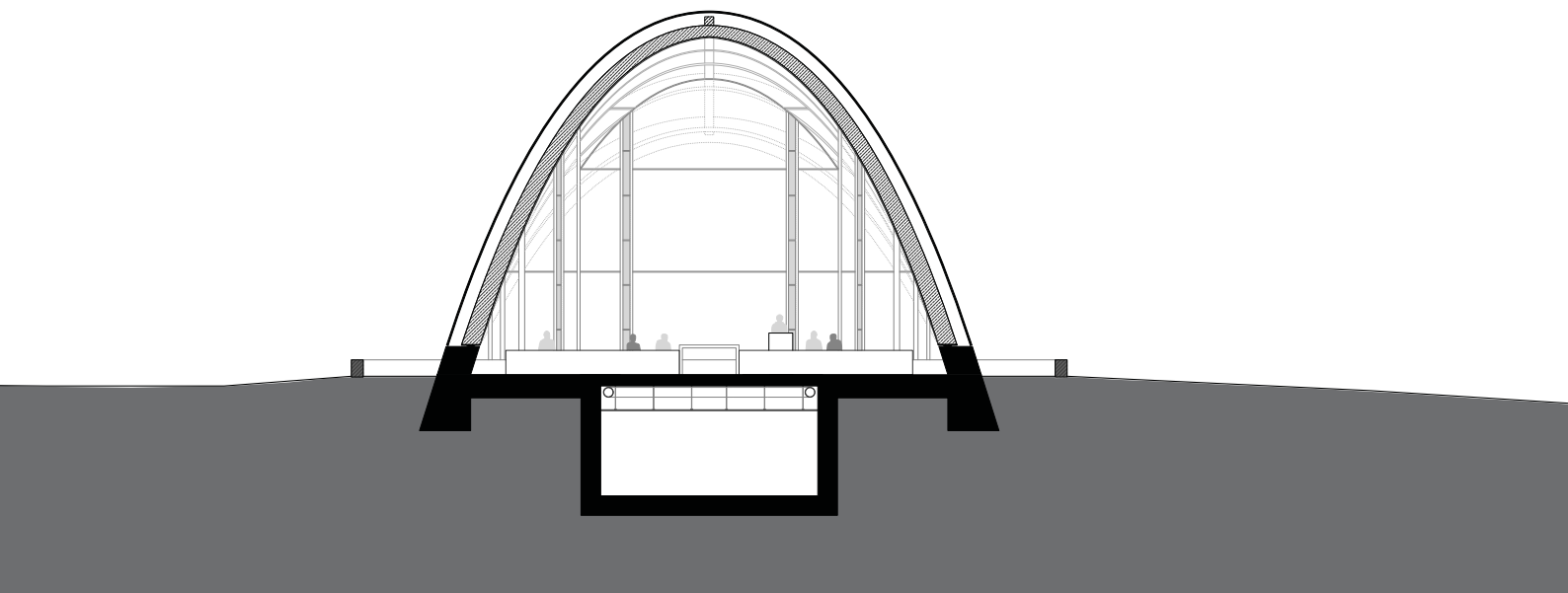


I - FIRST FLOOR PLAN | SCALE 1:250

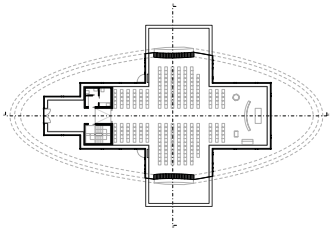
II - BASEMENT PLAN | SCALE 1:250

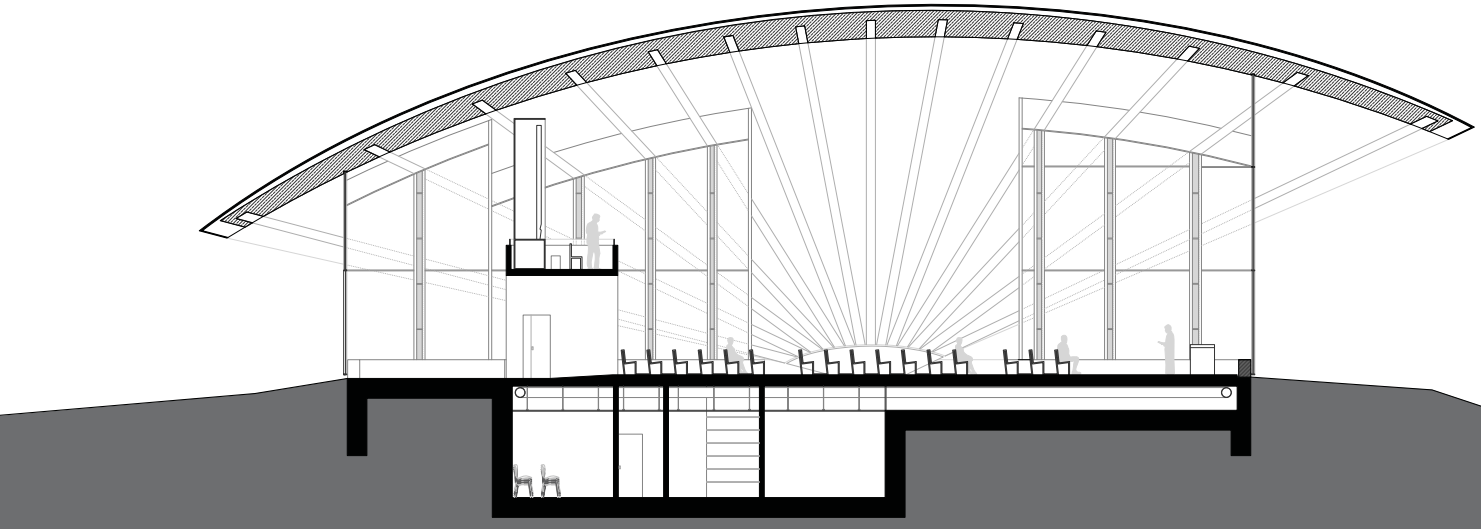
CHURCH HALL
SECTIONS

The sections show the atmosphere of the church hall, and how the arches become a major part of the feeling of the space. The feeling of embracement of the ruin is clearly visible.
The longitudinal section displays the proportions of the shell, showing the change of dimension of the arches, which become slender from the middle to the edges of the shell.



#42 | SECTIONS OF THE CHURCH HALL | SCALE 1:250

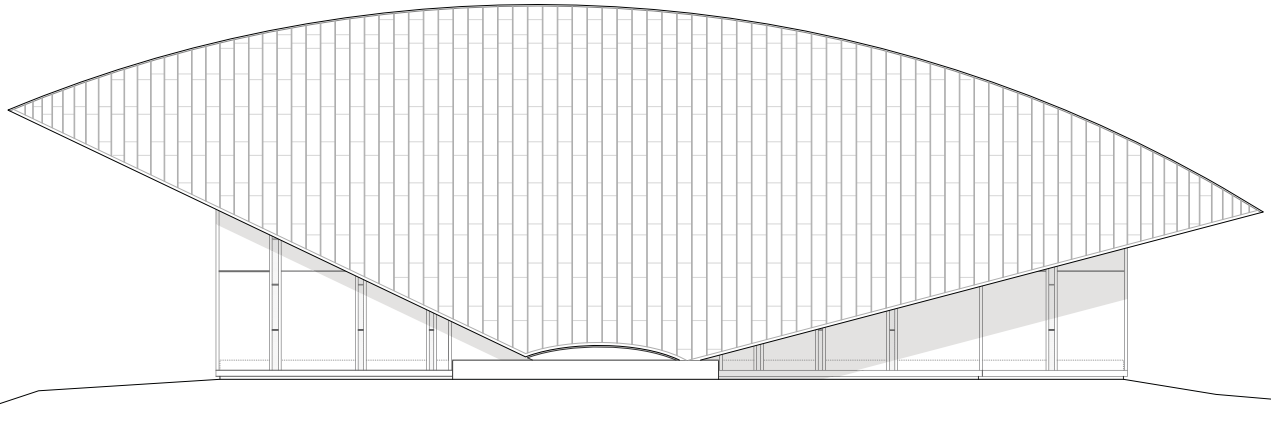




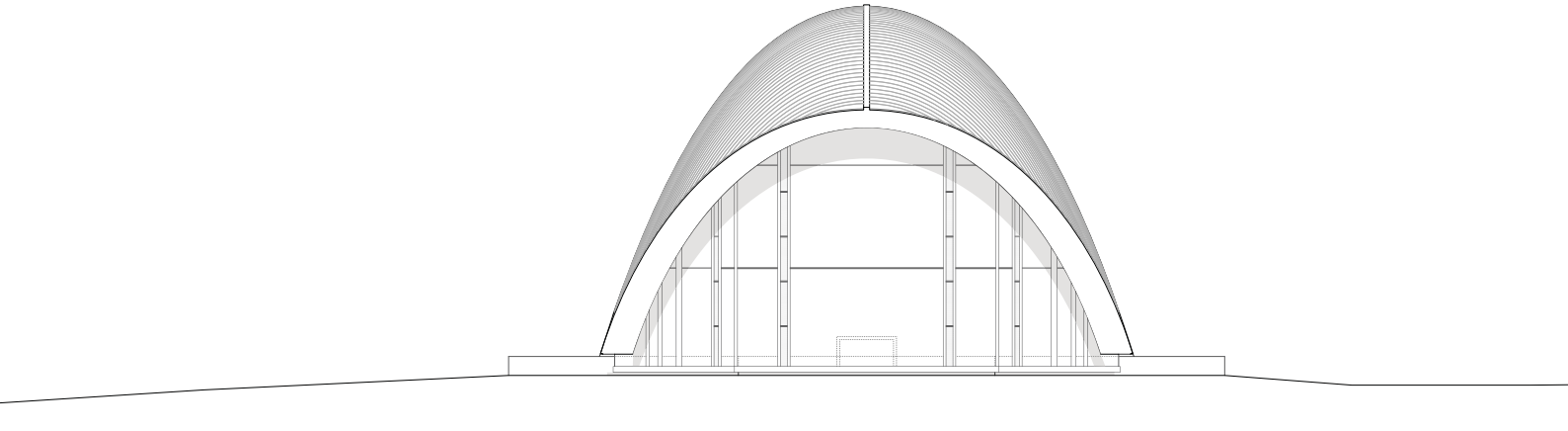
CHURCH HALL
ELEVATIONS

The elevations display the proportions of the shell as it rises up from the side aisles, embracing the ruin.
The distinctive geometrical shape is generated so it opens up towards east, where the altar is placed

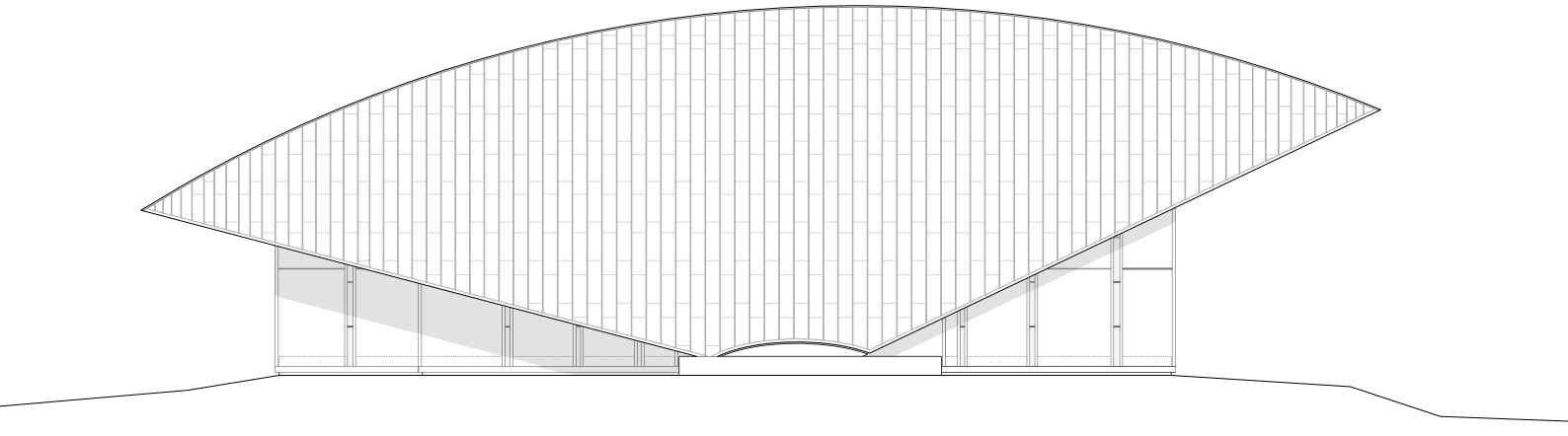
The east elevation shows the striving for verticality of the church hall, derived from the texture of the copper cladding and the vertical frames which carry the glazing.



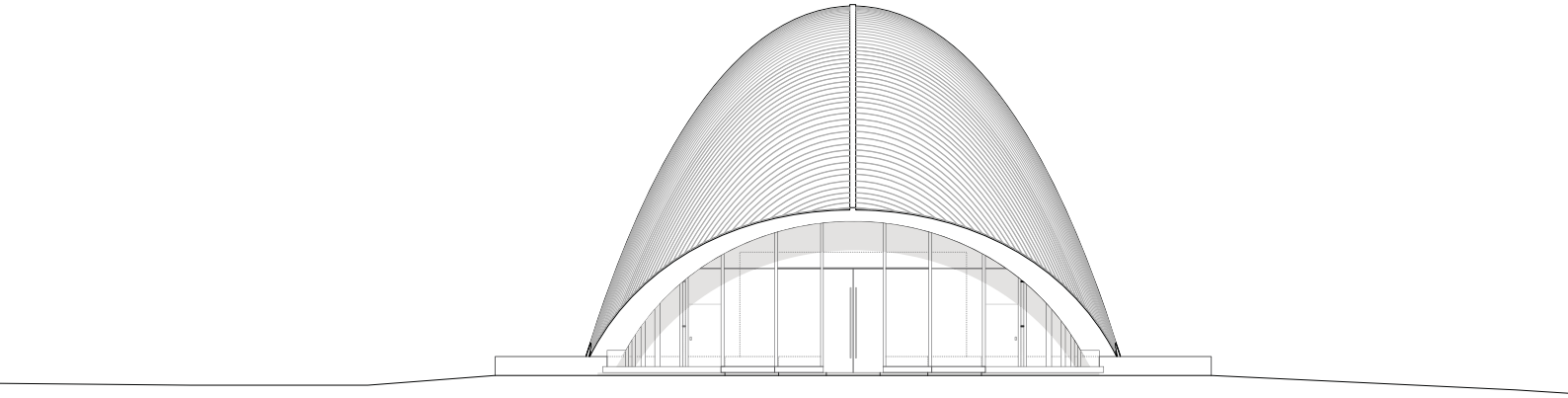
#43 | NORTH & EAST ELEVATION | SCALE 1:250



CHURCH HALL
ELEVATIONS



#44 | SOUTH & WEST ELEVATION | SCALE 1:250



CHURCH HALL
DETAIL

The detail shows how the glass sections are mounted on the existing granite foundation. The Vitrocsa window frame, cladded in copper, is carried by a HEA 120 profile, which is fixed to the granite wall from the outside. The frames are further insulated to ensure the establishment of a thermal break within the old granite foundation

The old granite wall is stabilised by the cast-concrete elements, while they become the walls of the basement.

The slab of the church hall is a prefabricated slab, which is covered with a polished concrete floor. In the fissure between the floor and the granite wall, light fittings are located.

1 - CONCRETE SLAB | 180 mm

2 - POLISHED CONCRETE FLOOR | 50 mm

3 - SOUND INSULATION PLATE | 25 mm

4 - LIGHT FITTINGS, UP LIGHT

5 - OLD CHURCH FOUNDATION

6 - 3-LAYER ENERGY GLAZING, WINDOW TYPE 4-18-4-18-4 - ENERGY/CLEAR/ENERGY

7 - VITROCSA FRAME 3001, FIXED

8 - HEA PROFILE 120

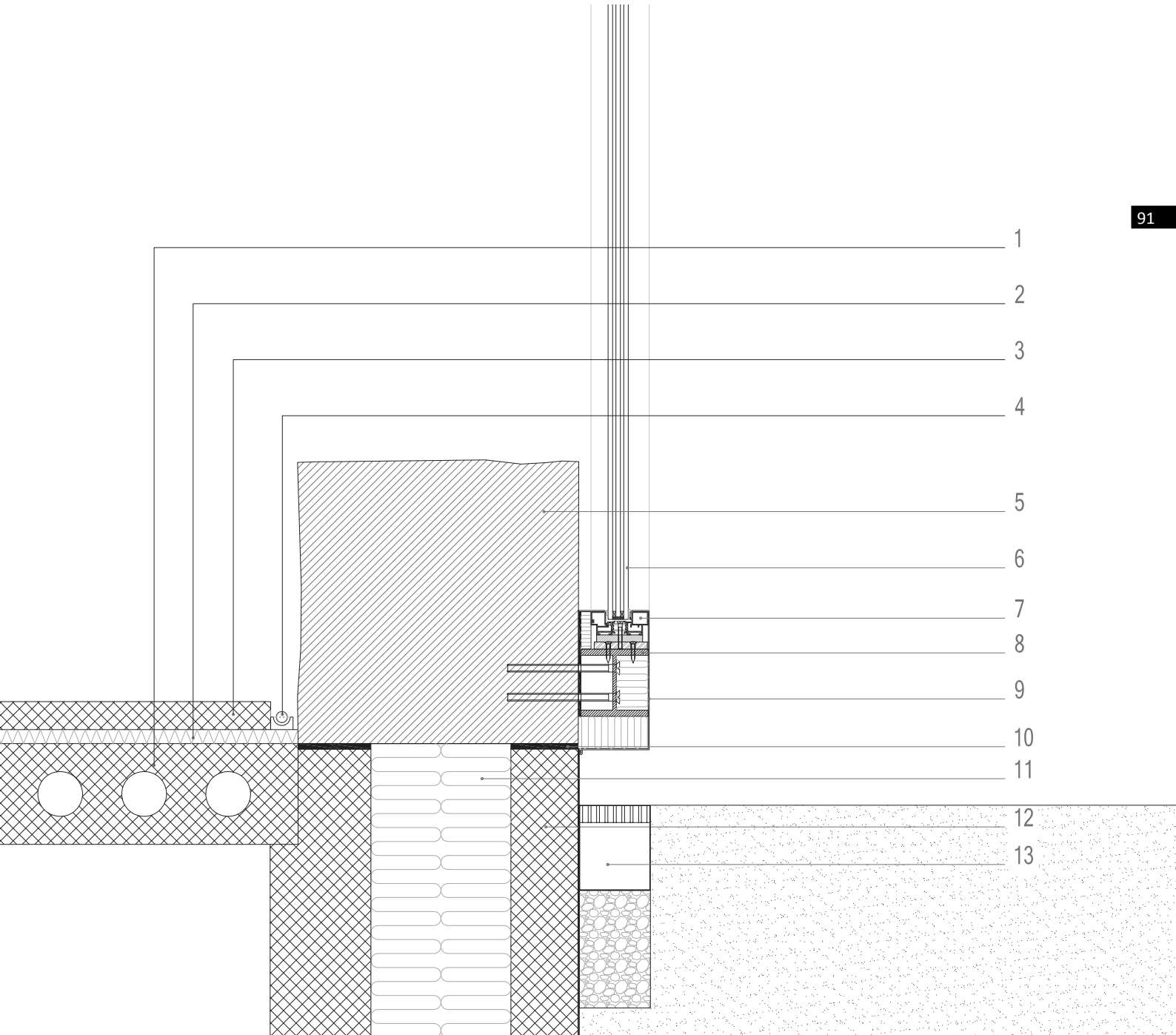
9 - COPPER CLADDING | 2 mm

10 - ABSORBTION LAYER

11 - ROCKWOLL FLEXIBATTS | 250mm

12 - CAST-CONCRETE ELEMENTS | 180 mm / 120 mm

13 - DRAIN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CHURCH HALL
DETAIL

The detail shows how the glazing units cross the old granite wall, next to the arches foundation.

As the window frame crosses the granite wall, a fissure is created to gentile locate the frame within the wall, thereby hiding it. Under the window a thermal break and a vapour barrier are established.

The frame is also hidden within the outline of the shell, being mounted to a CNC produced laminated wood beam.

The exterior is cladded with copper plates, mounted on plywood elements.

The interior is cladded with pinewood planks, which are mounted to a wooden carcass. The carcass is established as an inhomogeneous layer, as it consists of the wooden grid and insulation.

1 - COPPER CLADDING | 2 mm

2 - PLYWOOD TO MOUNT THE COPPER PLATES

3 - ROCKWOOL FLEXIBATTS | 400 mm

4 - LAMINATED WOOD ARCH

5 - PINE WOOD CLADDING | 22 mm

6 - LAMINATED CROSS BEAM

7 - VITROCSA FRAME 3001, FIXED

8 - VAPOUR BARRIER

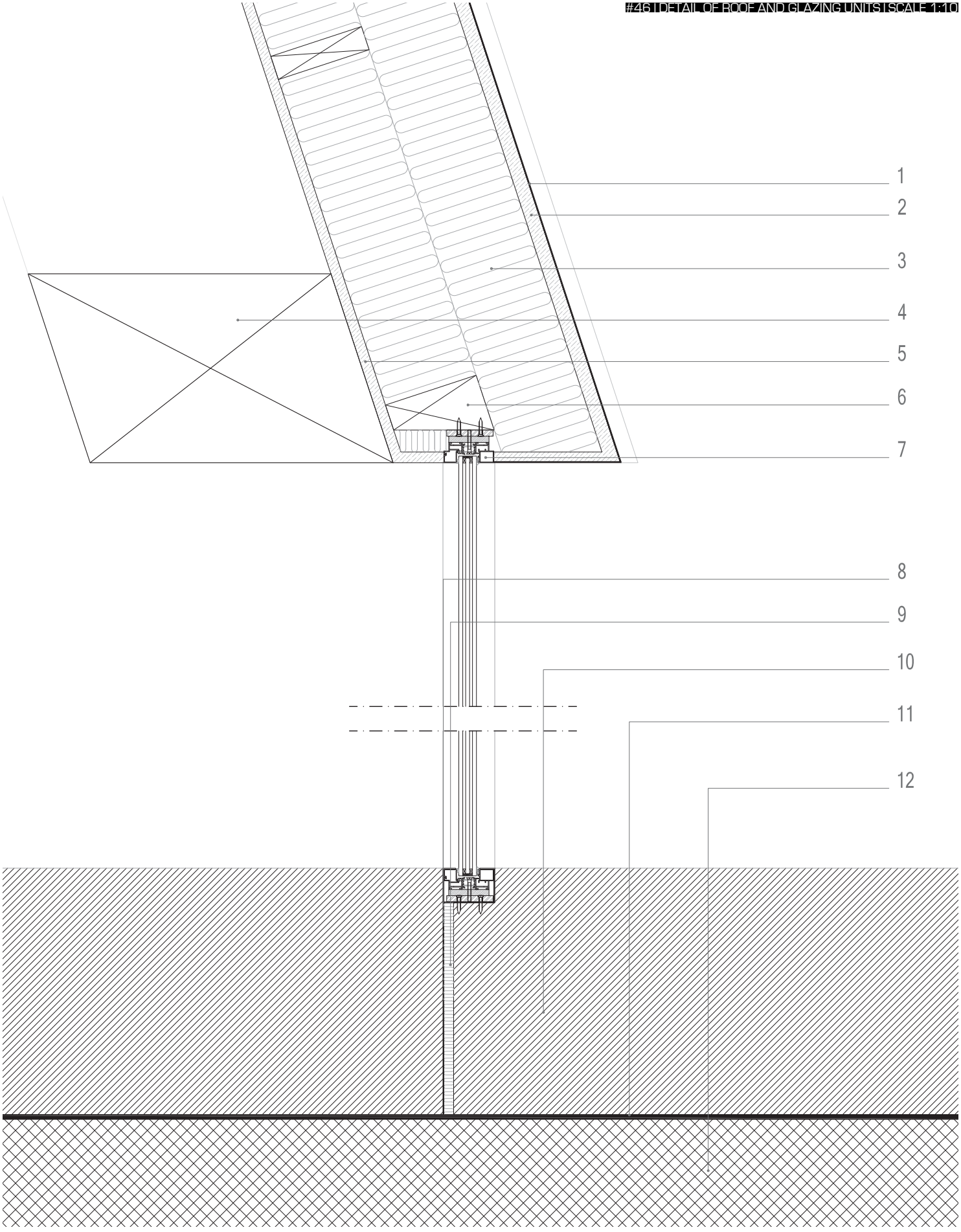
9 - THERMAL BREAK, POLYSTYRENE INSULATION | 20 mm

10 - OLD GRANITE FOUNDATION

11 - ABSORBTION LAYER

12 - CAST-CONCRETE FOUNDATION

#46 | DETAIL OF ROOF AND GLAZING UNITS | SCALE 1:10



CHURCH HALL
INTERIOR RENDER

From the interior of the church hall the connection with the forest behind, framed by the secondary facilities building is clear. The space in between the buildings becomes a space for contemplation that extends the room from its physical limits towards the forest where the crucifix symbol is placed.

The big windows give openness to the room, creating a feeling of closeness with the nature.

The church hall is dominated by the warm expression of the wooden arches which, through its golden coloration give a unique atmosphere to the space.

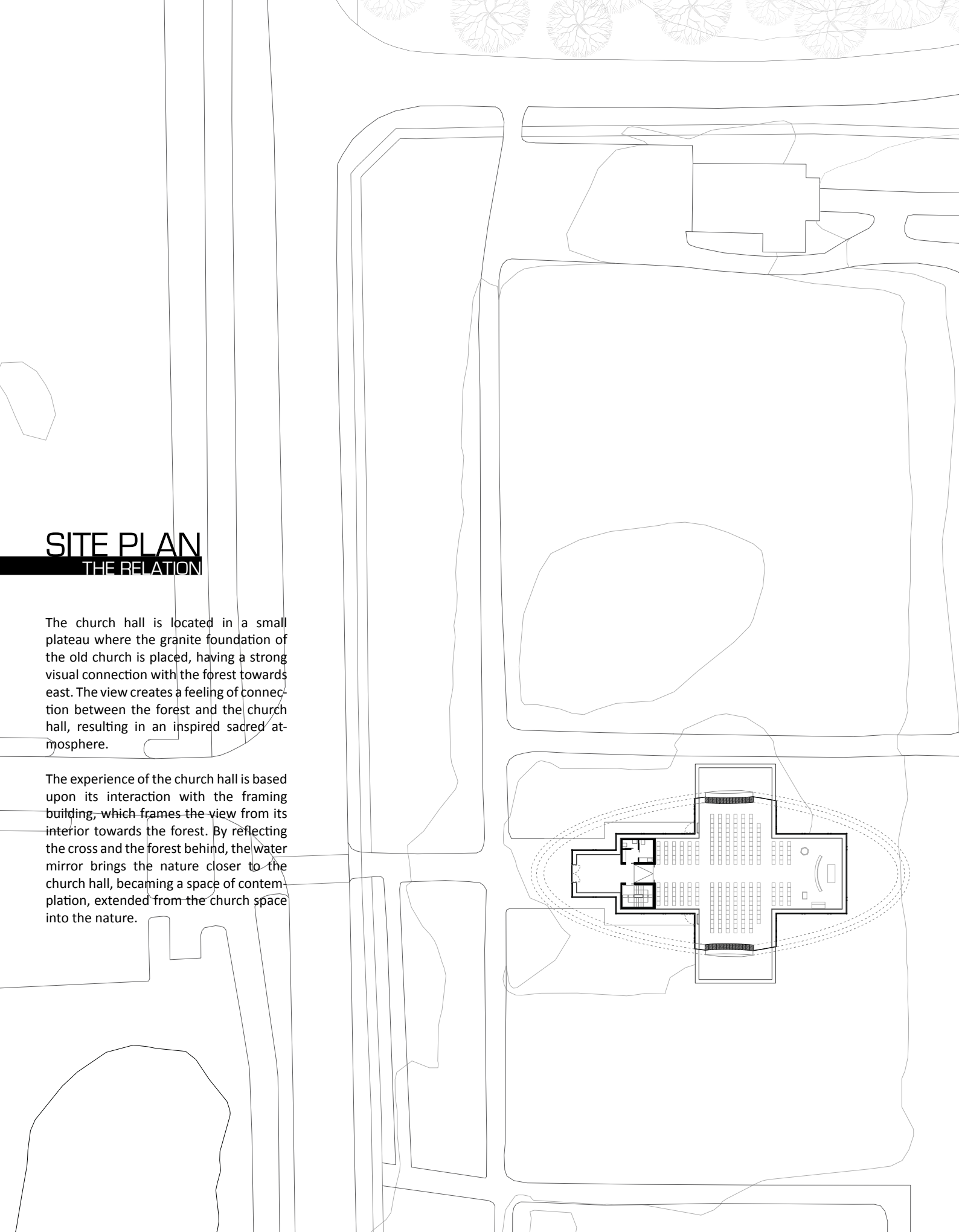
CHURCH HALL

INTERIOR RENDER

SITE PLAN
THE RELATION

The church hall is located in a small plateau where the granite foundation of the old church is placed, having a strong visual connection with the forest towards east. The view creates a feeling of connection between the forest and the church hall, resulting in an inspired sacred atmosphere.

The experience of the church hall is based upon its interaction with the framing building, which frames the view from its interior towards the forest. By reflecting the cross and the forest behind, the water mirror brings the nature closer to the church hall, becaming a space of contemplation, extended from the church space into the nature.



#49 | SITE PLAN CLOSE UP | SCALE 1:500

FRAMING BUILDING
ADMINISTRATION

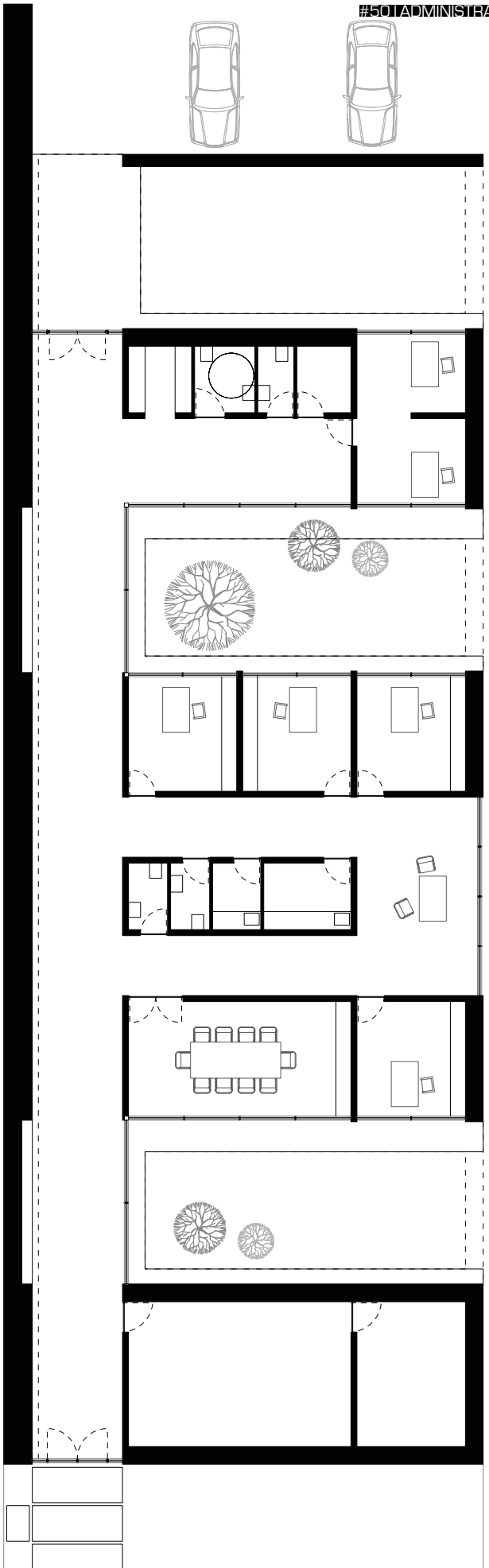
The arrival to the administration building takes place from north, where the entrance is located. Hidden behind the west-faced wall, a minor parking area is established, and thereby serves the employees and guests in daily use. The entrance of the building is defined by the green entrance patio, which states the first view towards the forest.

The entrance hall is an open space with direct view to the second patio and the nature outside. In the entrance hall the first core is established, where a wardrobe, toilets and a storage are placed. A large office will serve the secretary and church officer of the parish centre.

After the first patio, the main administration part is situated, with offices to serve the verger, the priest, the organist and the deacon. In connection to the offices a central core is established. It contains toilets, storage and a serving point. An informal meeting space with view towards the forest is created next to the core. In addition, the administration part contains a meeting room which can be used for parish meetings and educational purposes.

Separated by a third patio, a large storage is located together with the technical room.

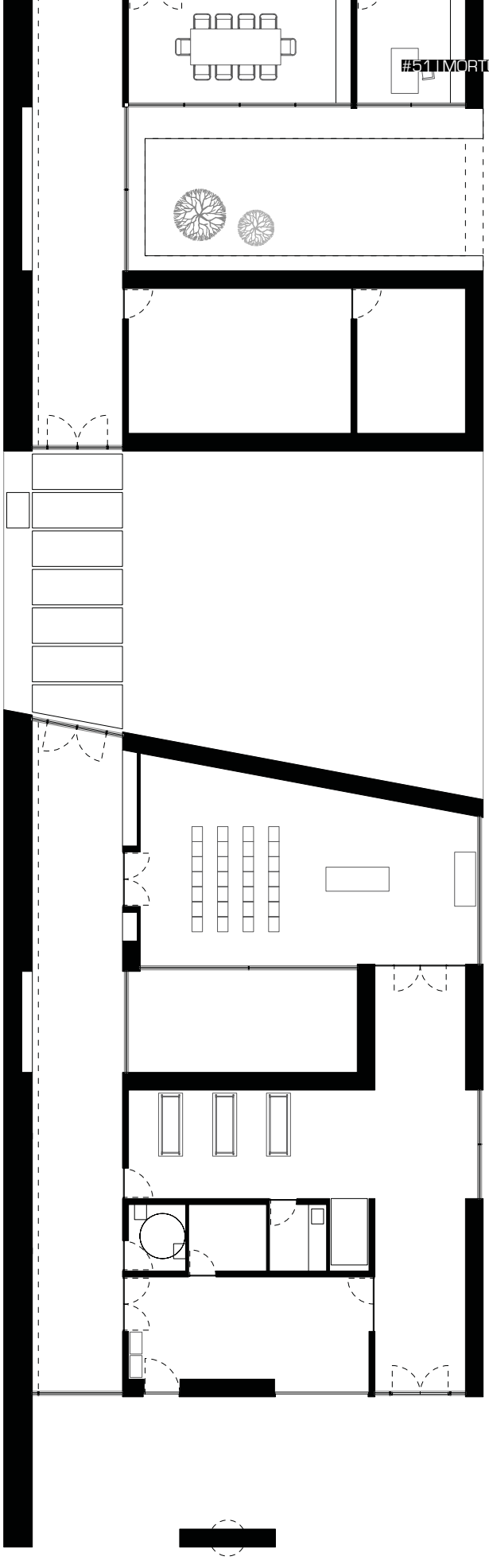
#501 ADMINISTRATION BUILDING PLAN SCALE 1:200



FRAMING BUILDING
MORTUARY FUNCTIONS

The mortuary building is served from an access road from south, for the refuse collector vehicle and the hearse.
The mourners access the mortuary building from the main entrance of the administration building. They are led along the west-faced wall, emphasised by the light from the skylight, until the chapel.
The passage over the water mirror of the contemplation space will symbolically act as a purifying element before entering the chapel.

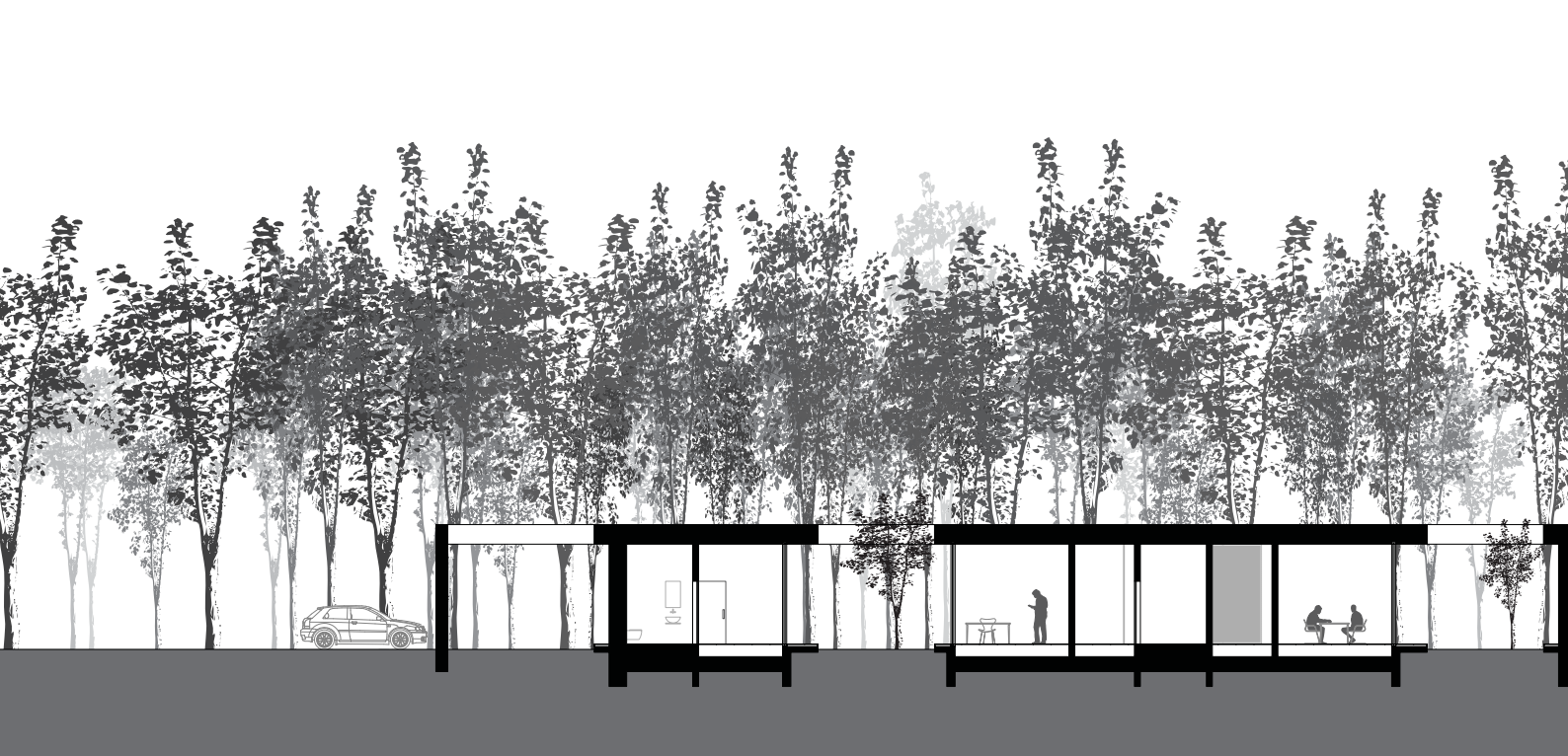
To south of the chapel a small patio creates a space between it and the mortuary functions, which are constituted by the coffin handling room and the cool room. The maintenance room for external purposes and the waste disposal are located in the end of the building with connection to the exterior.
In the end of the building, in a perpendicular position to the wall, the bell tower is placed.



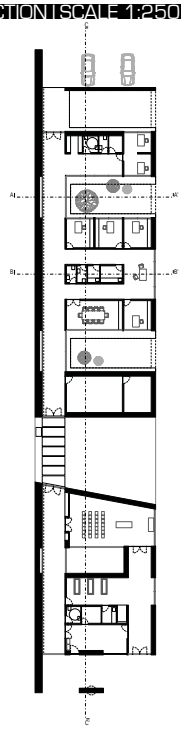
#51 | MORTUARY BUILDING PLAN | SCALE 1:200

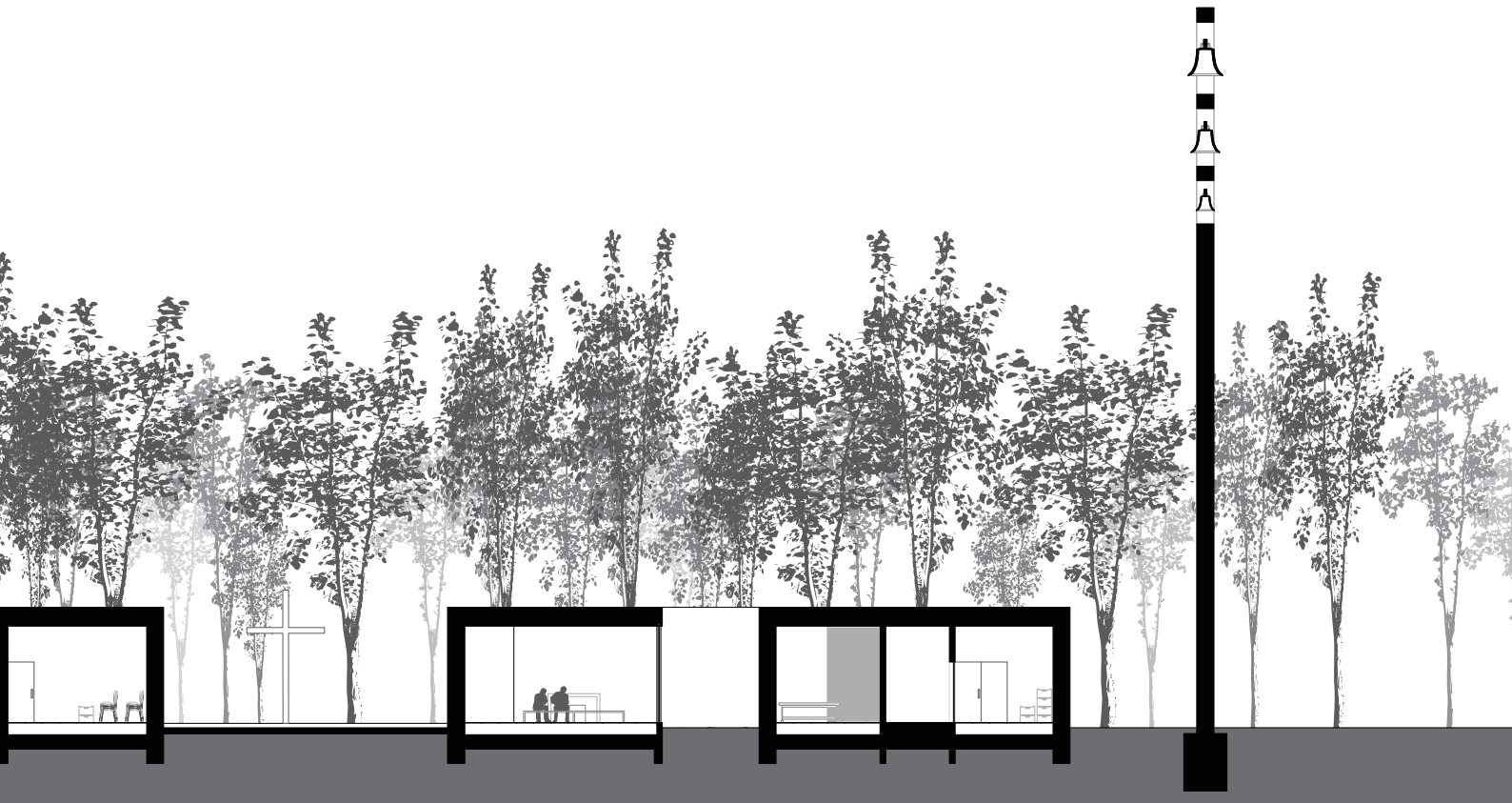
FRAMING BUILDING
LONGITUDINAL SECTION

The longitudinal section shows the clear division of the two volumes of the framing building by the contemplation space. The contemplation space, the frame from the church hall to the forest, has the big cross in the background, and the forest as scenery.



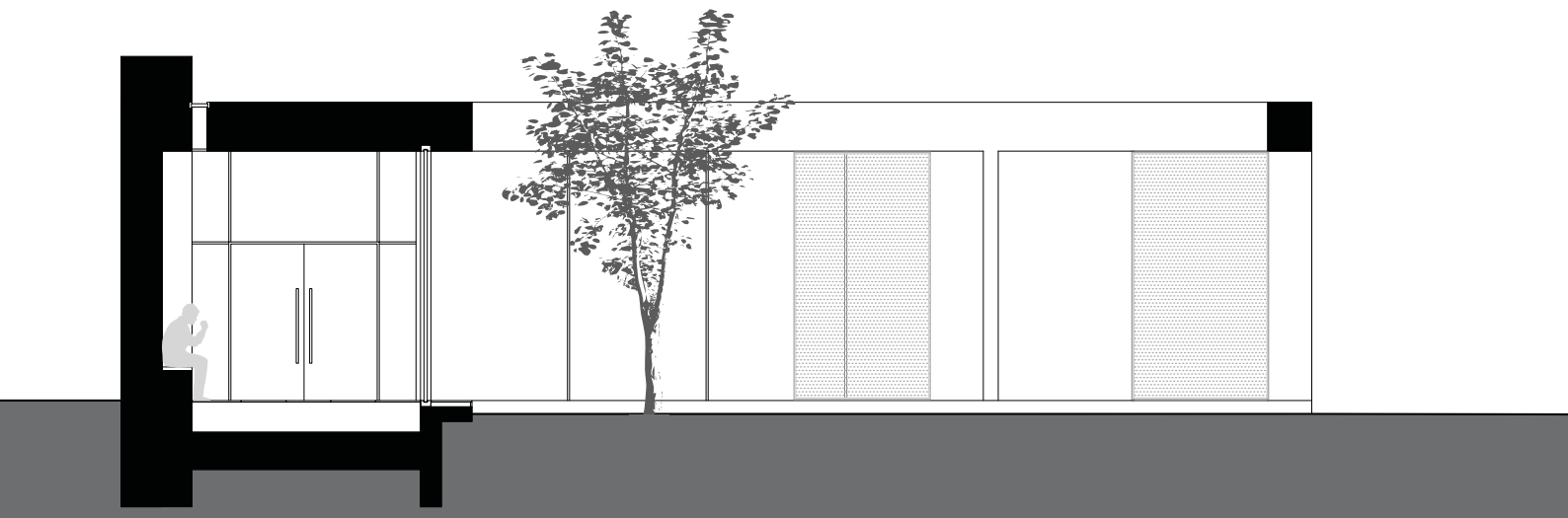
#52 | LONGITUDINAL SECTION | SCALE 1:250



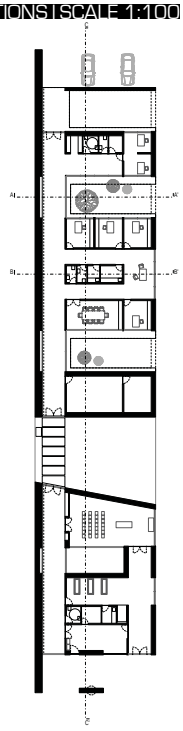


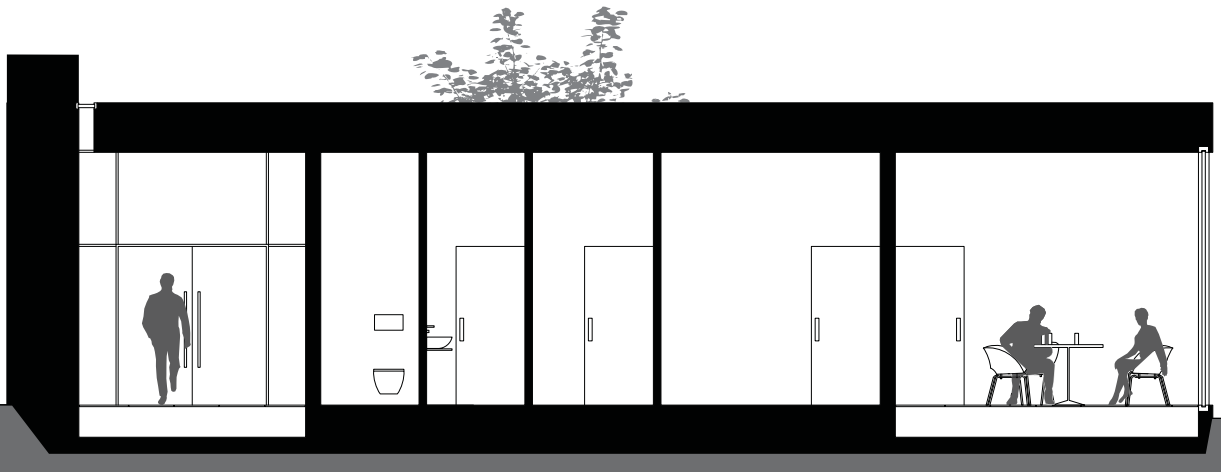
FRAMING BUILDING
CROSS SECTIONS

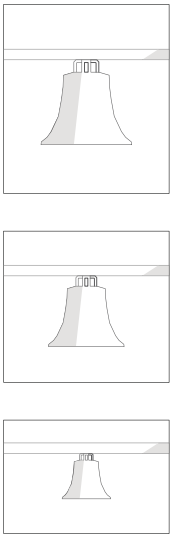
The cross sections illustrate the west-faced wall separated from the rest of the volume through the narrow skylight band, appearing thereby as a secluded element. Due to its bigger height in relation to the building volume, the wall will reflect light more deep into the space. The section underneath shows the relation from the building with the patios, which create breaks within the space, through the change of light and the presence of the nature. In front of the patios, the big wall is shaped to create incorporated benches, in a straight connection with the exterior.



#53 | CROSS SECTIONS | SCALE 1:100

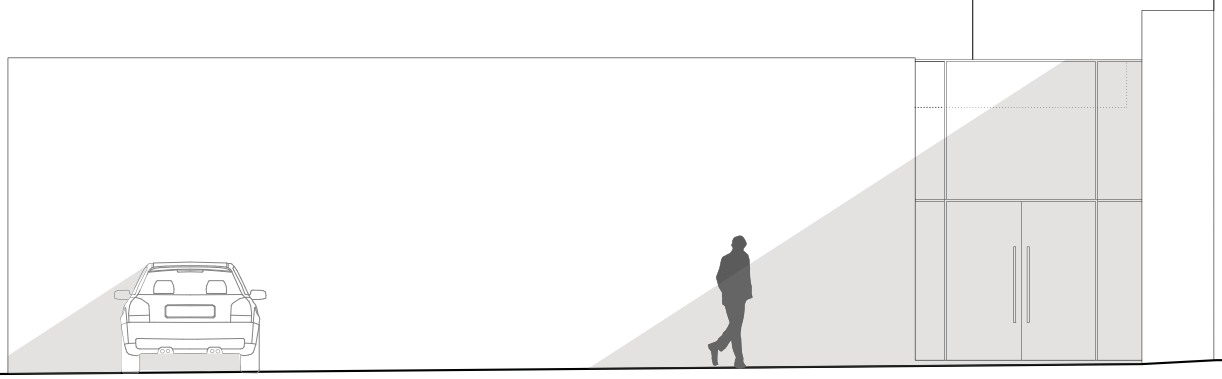


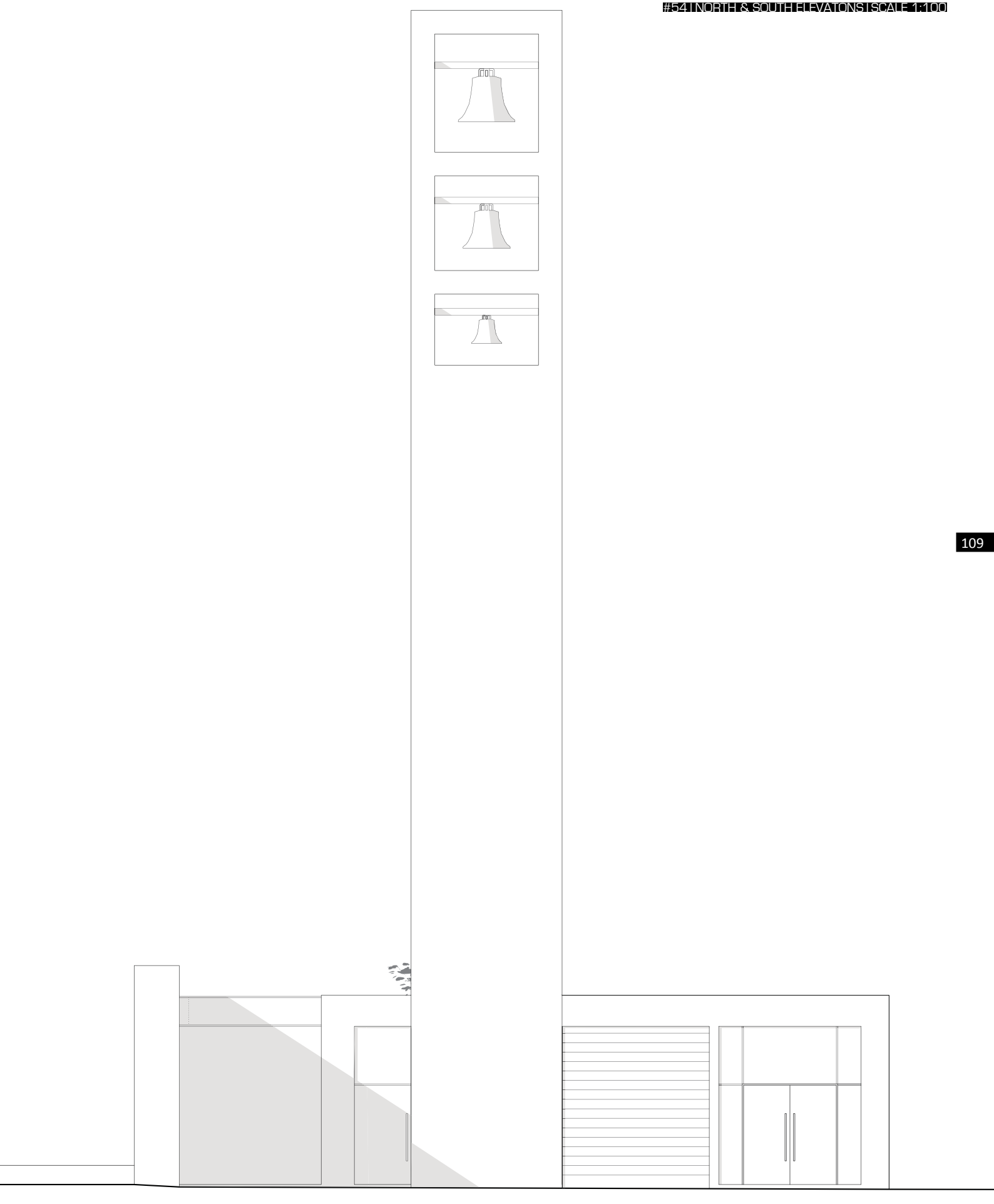




FRAMING BUILDING
ELEVATIONS

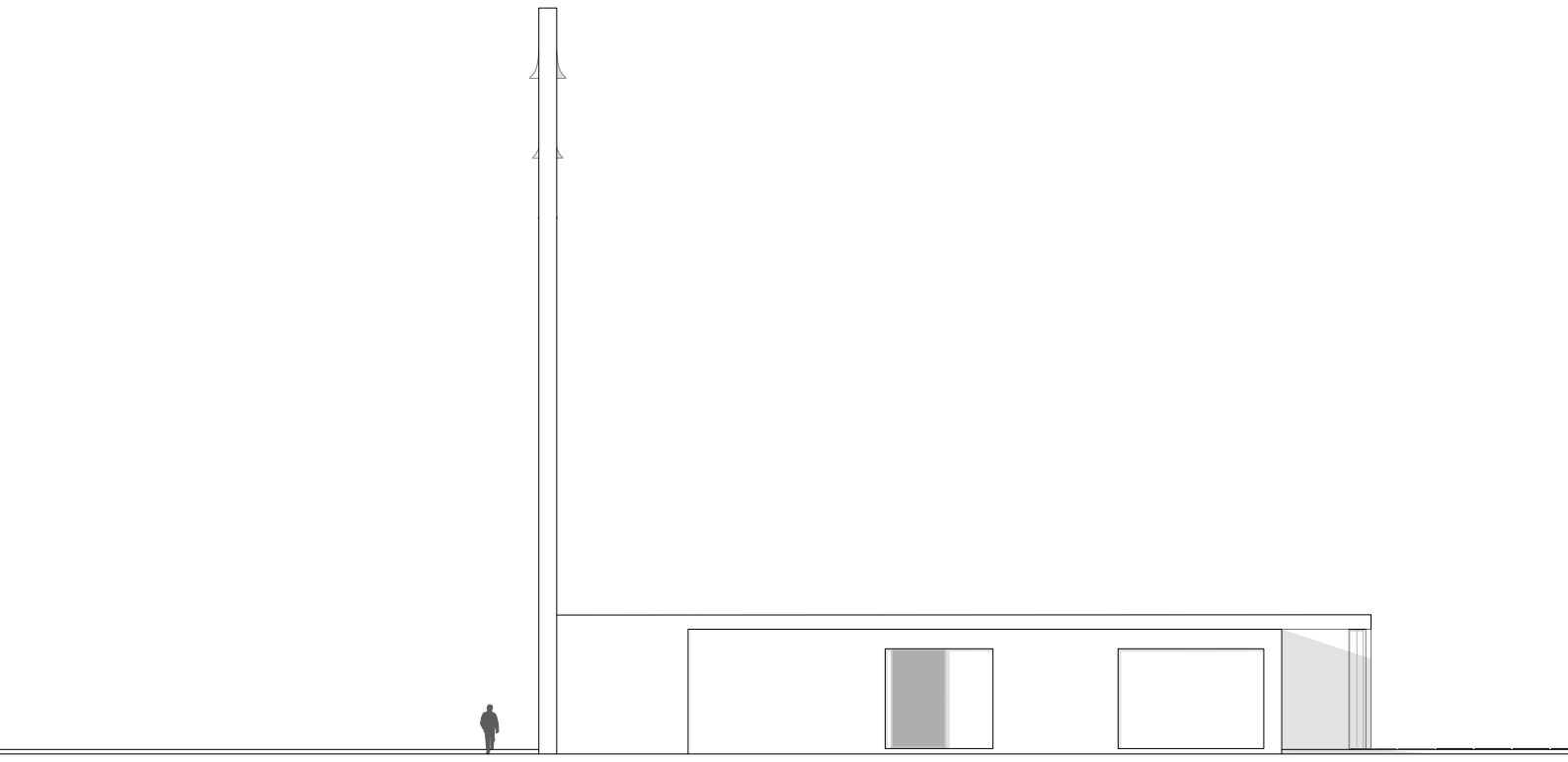
The south and north elevations display the clear proportions between the bell tower and the horizontal expression of the building.
The bell tower is expressed through a slim concrete element displayed perpendicularly to the west wall, thus appearing elegant from the church hall, and without overshadow the wall.



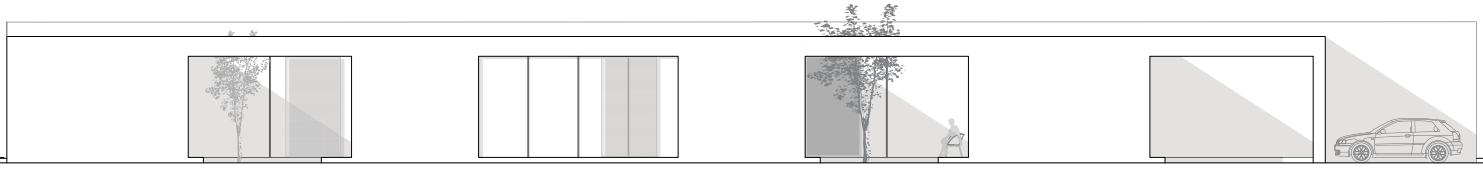


FRAMING BUILDING
ELEVATIONS

The east elevation illustrates the importance of the patios, as they divide the framing building into segments where the nature is invited in, becoming a part of the building.



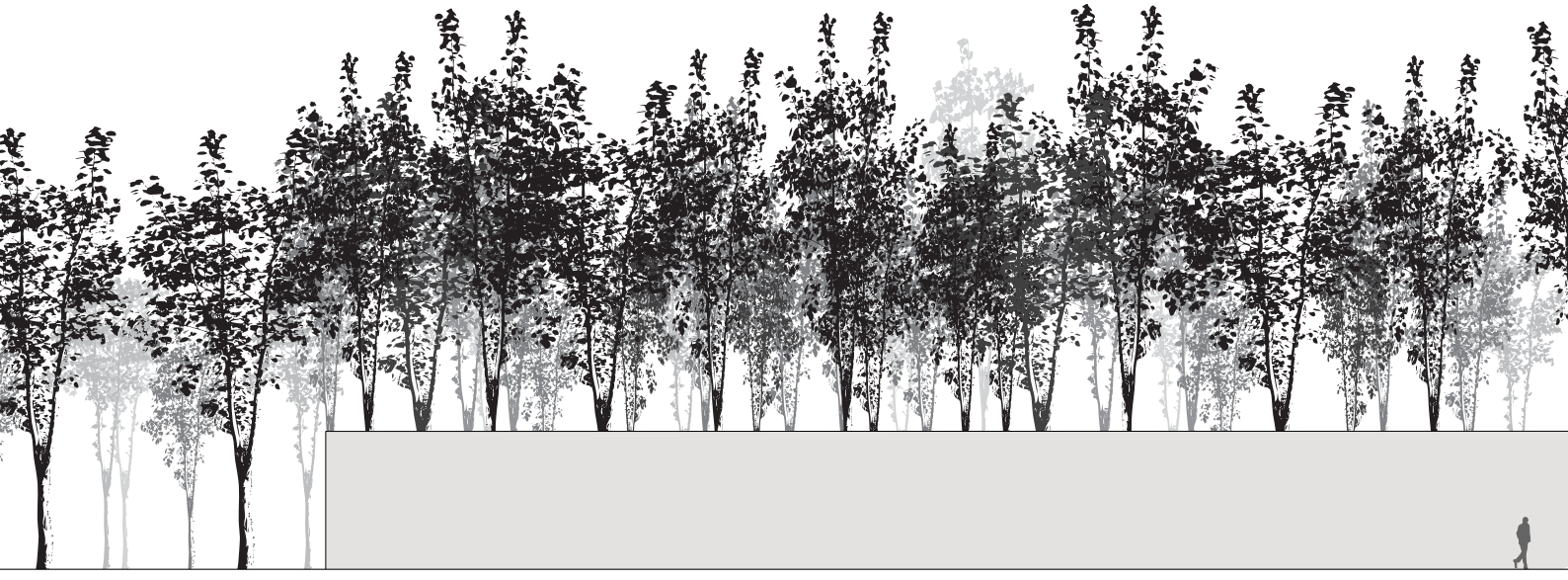
#55 | EAST ELEVATION | SCALE 1:250



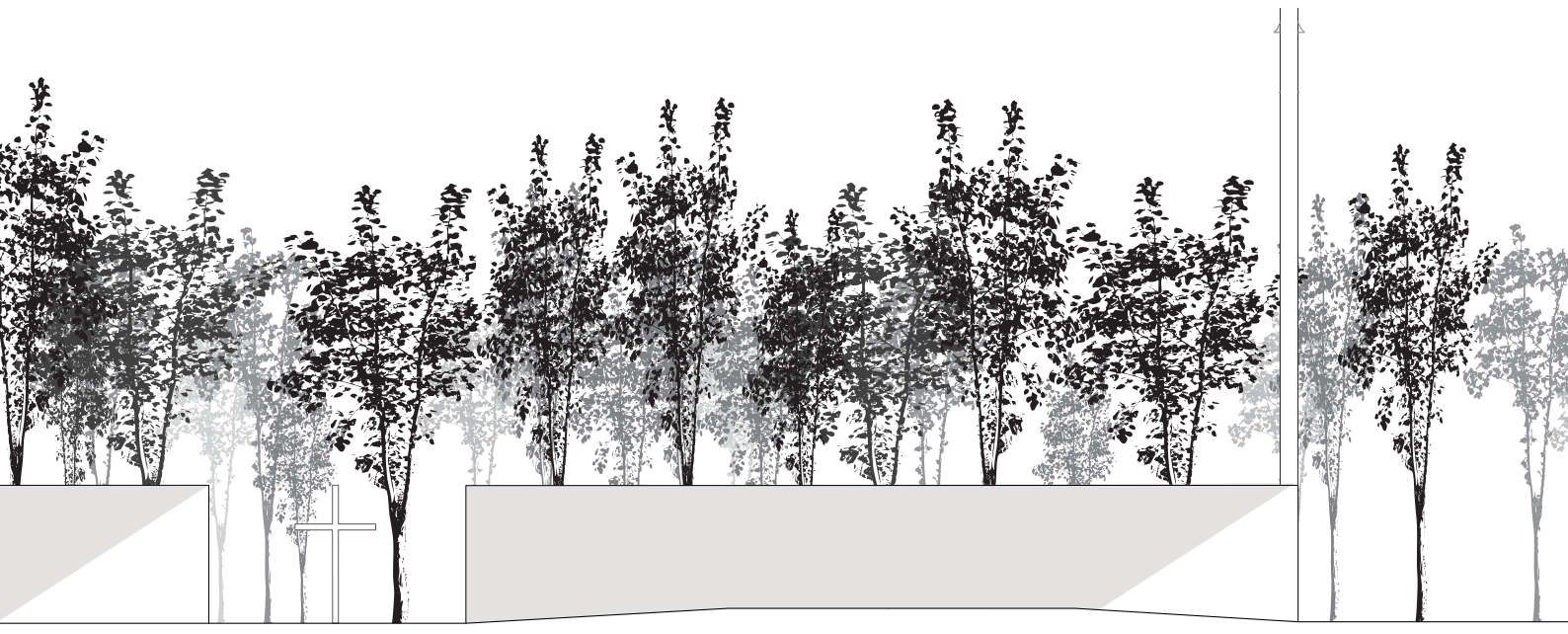
FRAMING BUILDING
ELEVATIONS

The west elevation is seen as the manifest of the concept, as through its simple expression underlines the essence of the framing building.
Framed by the two volumes of the building, the forest and the cross are revealed to the church hall, emphasised by the reflection in the water mirror.

The framing building becomes thus the transition line, which mentally divides the mundane with the sacred.

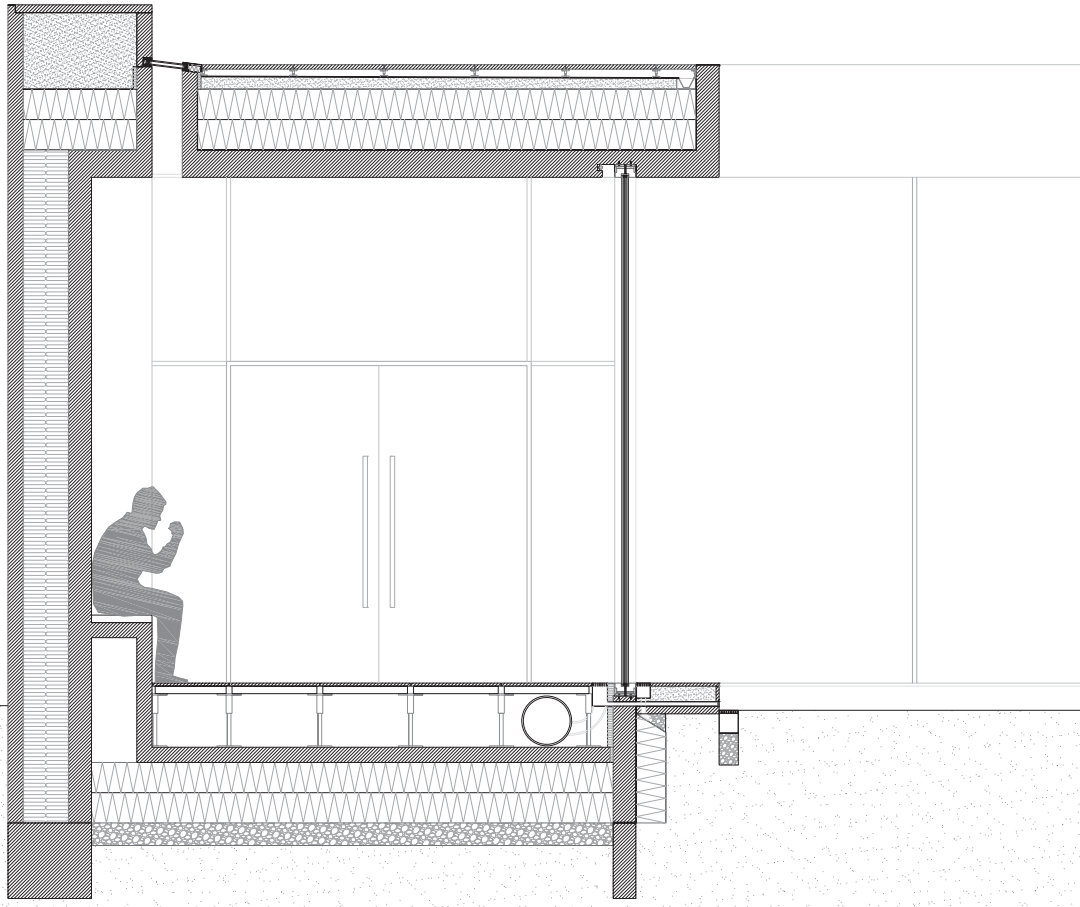


#56 | WEST ELEVATION | SCALE 1:250



FRAMING BUILDING
DETAILED CROSS SECTION

The technical cross section shows the performance of the building. To achieve the clean interior expression the different installations are led through the raised floor. This way the whole interior is expressed in concrete, and the walls and ceilings are kept clean, giving to the building an expression of simplicity.
Furthermore, the raised floor also provides an easy installation and simple maintenance, as is easy accessible.



#57 | DETAILED CROSS SECTION | SCALE 1:50

FRAMING BUILDING
DETAIL

The detail displays the raised floor, showing the ventilation solutions. In the interior, a grid is established along the windows, which serves for mechanical and natural ventilation and also for heating.

For natural ventilation, the inlet is made through the floor, through a grid located under the windows around the patio edge. The outlet is made through the ceiling thereby taking advantage of thermal bouncy.

During the winter, the ventilation is made through a mixed mechanical system with inlets and outlets in the floor.

In addition, convector ditches are placed next to the large glazing sections, blocking the downdraft caused by the windows.

Furthermore, in the detail is shown the frame totally hidden within the building, hence giving the feeling of an invisible wall.

1 - MECHANICAL VENTILATION DUCT

2 - CONCRETE TILES | 22mm

3 - VENTILATION GRID | 100 mm

4 - VITROCSA WINDOWS | TH+ PROFILE, FIXED

5 - CONCRETE FOUNDATION WALL

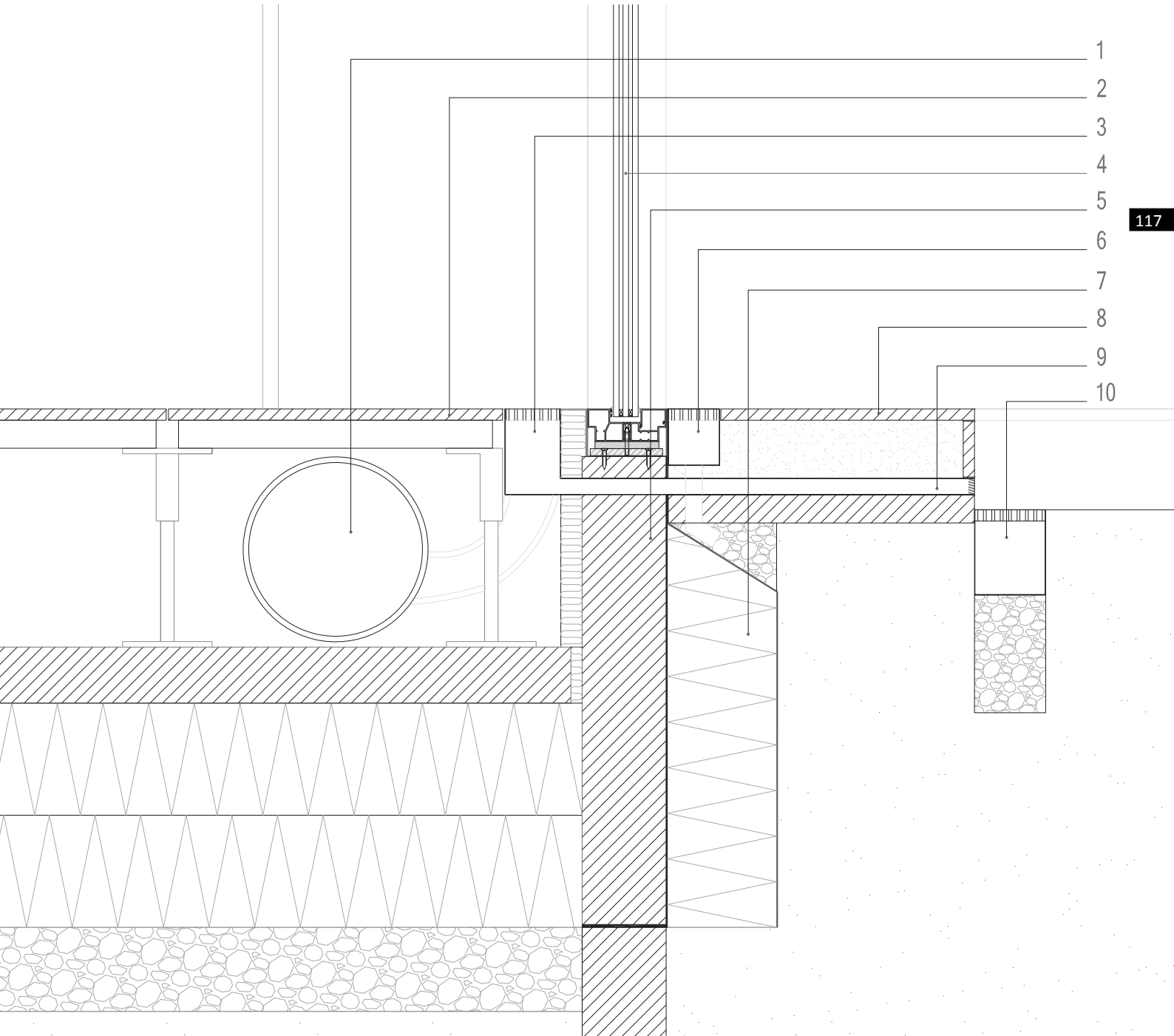
6 - DRAIN

7 - POLYSTYRENE INSULATION | 195mm

8 - CONCRETE TILES | 22mm

9 - NATURAL VENTILATION DUCT WITH AUTOMATIC CONTROLED VALVS

10 - DRAIN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FRAMING BUILDING

RENDER OF THE WALL

From the entrance, the wall gives a clear direction towards the chapel in the other building, emphasised by the gap in the ceiling.
The patios bring the nature to the building, creating informal spaces along the wall.

FRAMING BUILDING

RENDER OF PATIO

The patios are experienced as green spaces within the building, bringing the surrounding nature into the space.
The expression of the patios is dominated by the large window sections, incorporated in the walls and thus erasing the border between inside and outside.
In the offices, the windows are protected from the excessive sun with movable perforated copper panels, bringing a deflected golden light into the spaces.

FRAMING BUILDING

RENDER OF THE CHAPEL

In contrast to the church hall, the chapel expresses simplicity and quietness, giving space to reflections and emotions.
The north wall of the chapel is lifted from the floor, creating a gap that brings the water mirror to the edge of the room. The light reflections in the water are thereby reflected inside the chapel, giving to the space a reflective atmosphere and an expression of eternity.

FRAMING BUILDING

RENDER OF THE CHAPEL

RECAPITULATION

The chapter recapitulation is constituted by the conclusion and the reflection. The conclusion sums up the essential achievements through the development of the project, where the reflection will evaluate the different choices made, and reflect how they contribute to the design.

CONCLUSION

The design of the New Våler Church is created within the limitations and possibilities of erecting the church on the footprint of the old church. The design of the church is characterised by a new narrative while, importantly keeping traces from the old unified in the new and thereby carried it into the future of Våler. The church hall and the framing building bring contemporary facilities to the parish, hence giving the community a modern church, which symbolically embraces the history of Våler. From a sustainable point of view, the new church brings Våler into a green future, as the framing building is categorised as a low energy building, with a total energy consumption of the administration volume and the mortuary volume of 23,9 KWh/m2/year and 35,5 KWh/m2/year, respectively. The church hall, characterised as a renovation project as it raises from the foundation of the old, is not a low energy building, fulfilling the present Norwegian legislations with a total consumption of 96,3 KWh/m2/year.

The concept of the project is based upon the interaction of the church hall and the serving facilities, separated in two buildings. The secondary facilities frame the view from the church hall into the forest, creating a contemplation space prolonged axially from the altar towards the cross, placed in the limits of the forest, and thereby making the nature a part of the sacred space.

The main expression of the church hall is articulated through the self-carrying structure, related to the place as it is inspired in the refined vegetation of the nature around. Symbolically, the church hall embraces the ruins of the old, as two protecting leafs. The structure dominates the space of the church hall, figuratively supported by the foundation of the old church. The shell expression is defined by its contextual belonging, as it takes advantage of the possibilities of the site, while respecting the surrounding graves.
As the structure reflects the main expression of the church hall, it has been of great importance to design a pure geometrical form, which simplifies the articulation of the shell. This geometrical simplification has from a sustainable perspective shown great possibilities, as it reduces the overall energy consumption with more than 35 KWh/m2/year.
The plan layout of the church hall is defined through the distribution boxes in the entrance, as they separate the entrance hall with the church hall. The boxes are designed as a monumental portal, which leads the churchgoers through a narrow passage, before experiencing the church hall. The Church hall is shaped as a processional church, with a simple and rigorous plan with seats distributed on each side of the aisle, and with the organ and choir located in the back of the church. This plan layout has traces to old medieval churches, where similar distribution is used. This classic processional layout gives to the church hall improved acoustic conditions for the choir and the organ, as they are placed in an elevated position.
The old form of the church, symbolised through the crucifix form gives shape to the glass walls, resulting in a symbolic erection of the old church within the new. The light penetrating through the glass enlightens the shell lifting it up, and giving it a feeling of weightlessness.
The quality of the daylight is an important parameter in the definition of a sacred space and therefore has been of great importance throughout the design of the church hall. The vertical columns covered with copper, filtrate the light through a translucent materialised glass, underlining the sacredness of the space, by creating an atmosphere of contemplation.

The design of the framing building reflects the conceptual idea of the creation of a transition line, which mentally divides the mundane with the sacred. This transition line is expressed as a wall, which distinctively states the frame of the nature from the church hall, while functionally divides the framing building in two sections, an administration building and a mortuary building.
The administration part contains offices to serve the daily needs of the parish, while in the mortuary building a small chapel will be placed, together with the mortuary functions. These two volumes are served with separated entrances, according to the requirement of the brief.
In the building, the different functions are distributed around patios, bringing the surrounding nature into the facilities, and giving a feeling of being within the nature.
For the framing building, the wall acts as a guideline towards the chapel, symbolically leading the mourners towards the light in the end of the tunnel. Before entering the chapel, the mourners cross the stepping stones of the water mirror in the contemplation space, which acts as a purifying transition space.
The expression of the chapel appears in opposition to the church hall, expressing simplicity and quietness, giving space to reflections. The chapel has a close relation to the forest outside, brought in through the large window towards east.

Reflecting the idea of a dualistic design concept, the church hall and the framing building express a contrast in its form, materiality, textures and tactility. In opposition to the organic and complex shape of the church hall, in a striving for verticality; the framing building appears as a solid foundation, with a simple order, expressed in the clean horizontal lines.
Although different in expression, the church hall and the framing building are closely related through their materiality. The cast concrete of the boxes in the church hall makes the connection with the two volumes of the framing building, with resemblance in the articulation of the details. In the same way, the copper creates a link between the church hall and the framing building, as in both cases lets a filtered warm light penetrate through, embracing the atmosphere of the buildings.

REFLECTION

General considerations
Due to the dualistic design concept of the project, where the church hall and the framing building are defined as two independent volumes, the project consists in practice in the design of two individual buildings. As each of the buildings requires separate technical investigations and architectural detailing, this have been time consuming, naturally resulting in sacrifices in some aspects of the project. Thereby, the acoustic analyse of the church hall have been made in a very simplified way, with no possibility to further improve the room performance. Furthermore, due to the developed form of the church hall it would be interesting to proceed with further tectonic investigations, in order to improve the structural performance of the shell, giving a thorough idea of its proportions and dimensions.

Church Hall
The choice of placing the church hall in the ruins of the old, within its physic limitations, lead to a reorganization of the functions, resulting in a division in two buildings. From a theological perspective, a clear segregation of the sacred space from the serving facilities is of great value, as it emphasises a clear distinction between the daily activities and the space for warship. In practice, this separation could result in a less flexible functionality in a daily use. However, as Enghøj Church designed by Henning Larsen Architects has a similar division of functions, a visit to the church have been made. It has been clarified from the verger of Enghøj Church that this segregation in a daily use is functional, as in practice the church hall is only used few times during a week. This supports the decision of dividing the sacred space from the serving facilities.
The placement of the new church in the ruins of the old also results in a smaller seat capacity than the desired from the brief, but as the architectural qualities of erecting the church on the old site have a high value; it has been chosen to accept this fact. Furthermore, the erection of the new church in the place of the old is also a clear wish from the population and the parish of Våler.

The main expression of the church hall is articulated through the self-carrying structure that embraces the ruins of the old, as two protecting leafs. As a sign of respect for the old ruin, has been chosen to place the boxes and the different elements inside the ruin, within a distance to it. This choice can be seen as too respectful to the old ruin, which instead could be used as a direct support for the new church, in resemblance to the solution used by Peter Zumthor in Kolumba Museum. However, within the history of Våler church, the importance of defining a significant narrative released from the shadow of the old is essential to create a church with a new contextual belonging. Thereby, the symbolic distance to the ruin represents a liberation from its past, embracing it towards a new future.

The joint between the vertical glass sections and the shell requires a great detailing, as it is a complex joint between two different geometric typologies. The detailing of the church hall and in particular of this connection is of great importance, as it defines the atmosphere of the space, eventually conferring to it a sacred feeling. Thereby, it was aimed to make this connection in the most delicate, simple and silent way, in order to not shadow the simple and yet complex shell structure.
Naturally, it could have been detailed differently. In principle, it could be designed as a glass box within the shell structure, and hereby avoiding the jointing. However, by making the shell a part of the room, the church hall is enriched with the distinctive feeling of the wood, its characteristic smell, colouration and tactility,

characteristics which are important in the definition of the atmosphere of the church hall, and which are combined with the tradition of Nordic Architecture. Furthermore, the glazing reaching the shell gives an open feeling to the church hall, resulting in a clear hierarchy between the vertical elements and the shell, and importantly, bringing nature within the church hall.

Sacred Space

As defined in the Theoretical approach, *Religious Architecture - Sacred spaces*, an unequivocal definition of a sacral space is not plausible. The frame of a church can be described as the eternal frame of holiness, and should have certain physical characteristics which appeal to the senses through a strong narrative.

Erecting the church hall upon the ruins of the old is in itself a poetic narrative of how to celebrate the old church within the new, which in its turn is symbolically carried by the foundation of the old. Through the creation of a shell structure that appears to float in the landscape, a dilution of the senses is created, giving the perception of being within the nature, and thereby in a straight connection with the place, granting a feeling of permanence and belonging. Thus, the shell structure becomes an object in the landscape, underneath which the believers are gathered, symbolically related with the Christian symbol of the gathering under the tree, in a return to the fundamental meaning of the Christian worship and liturgy.

The vertical connection between the ruin and the shell, symbolically uniting the old and the new, illustrates a striving for verticality, emphasised by the pale light filtered through the materialised glass that concedes to the space a sacred atmosphere.

Framing Building

The essential expression of the framing building is represented through the west-faced wall that frames the view from the church hall towards the forest. The wall is thought as a transition line, and thereby articulated as a higher element secluded from the rest of the volume, with a distance to it. The wall could have been kept in the same height of the building, thereby constituting together with it a more clean volume. However, inspired by Alvaro Siza's Serralves Museum, it has been chosen to make this wall slightly higher, reinforcing the idea of being an element in itself, in tension with the volume behind. In addition, due to its extra height the wall helps to reflect light into the gap, thereby penetrating further down along the wall. This distance between the wall and the volume is kept with purpose as a slender division, as it is seen more as a gap than an actual skylight.

For the framing building, the wall expresses the narrative of the building, as it guides the visitors towards the chapel, with the symbolic light in the end of the tunnel. Despite its importance to the overall concept of the project, it can be said that the space distributed along the wall constitutes a too long hallway, occupying too many square meters. However, through the proportions given to the space, this hallway becomes more as an informal room, where the patios that cut the building create, through light and nature, breaks within the space.

As the framing building and church hall are developed from a dualistic concept and expressed through an opposition, they express naturally a diverse character. Despite the resemblance between them, when seen in distance, it might not be readable that they are designed by the same architect. The essence here is that the architecture should speak for itself. As say by Álvaro Siza, "sometimes silence is the best answer".

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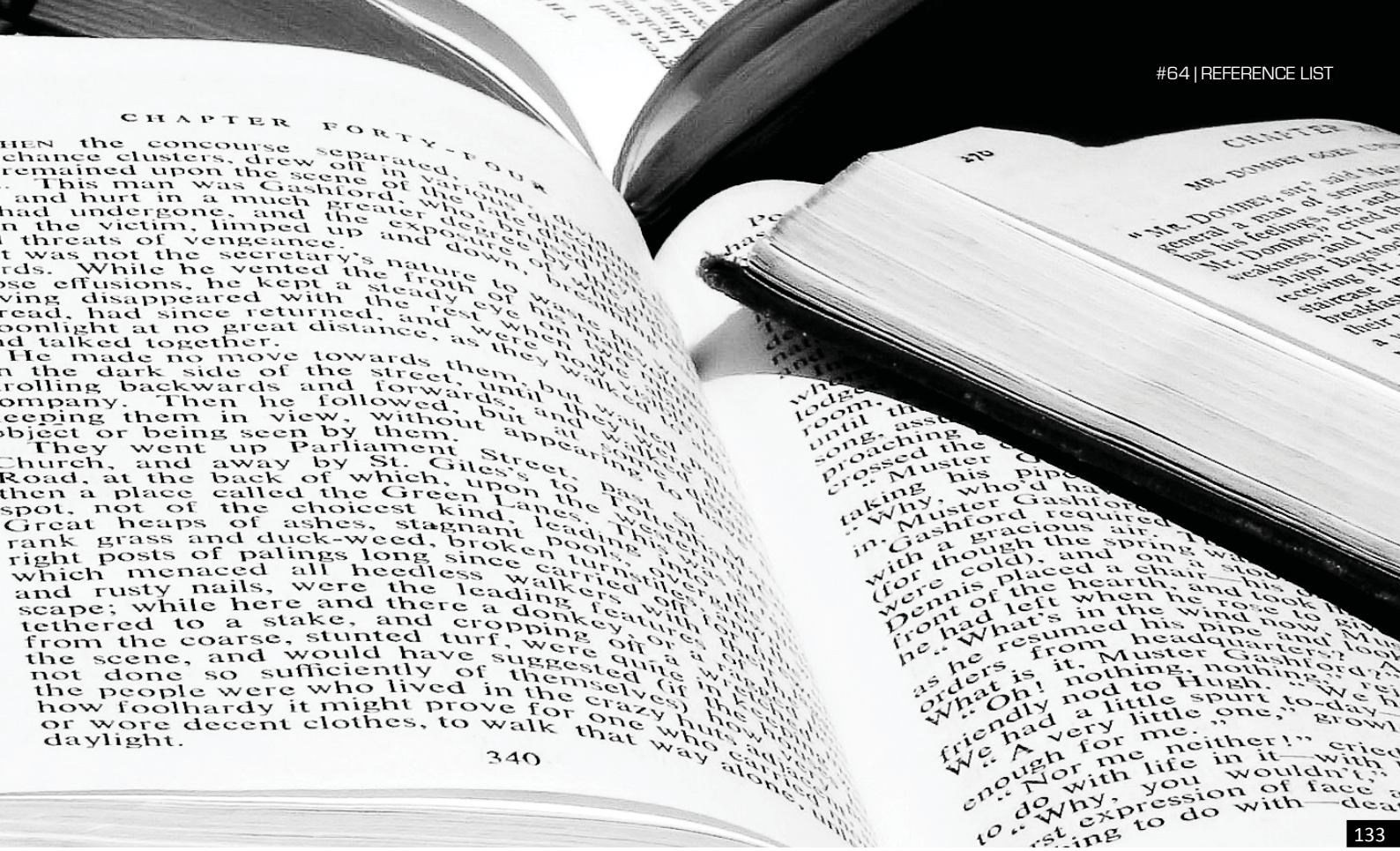
CHAPTER FORTY-FOUR
HEN the concourse separated, and
chance clusters drew off in various
remained upon the scene of the fight
This man was Gashford, who had
and hurt in a much greater degree by
had undergone, and the exposure
n the victim, limped up and down,
threats of vengeance.
t was not the secretary's nature to
rds. While he vented the froth of
se effusions, he kept a steady eye on
ving disappeared with the rest when
read, had since returned, and were
oonlight at no great distance, as they
d talked together.
He made no move towards them, but
n the dark side of the street, until
rolling backwards and forwards,
ompany. Then he followed, and
eeping them in view, without appearing
bject or being seen by them.
They went up Parliament Street,
Church, and away by St. Giles's to
Road, at the back of which, upon the
then a place called the Green Lanes. This
spot, not of the choicest kind, leading
Great heaps of ashes, stagnant pools,
rank grass and duck-weed, broken turnstiles,
right posts of palings long since carried off,
which menaced all heedless walkers with
and rusty nails, were the leading features
scape; while here and there a donkey, or a
tethered to a stake, and cropping off a
from the coarse, stunted turf, were quite
the scene, and would have suggested (if
not done so sufficiently of themselves)
the people were who lived in the crazy huts,
how foolhardy it might prove for one who
or wore decent clothes, to walk that way alone,
daylight.
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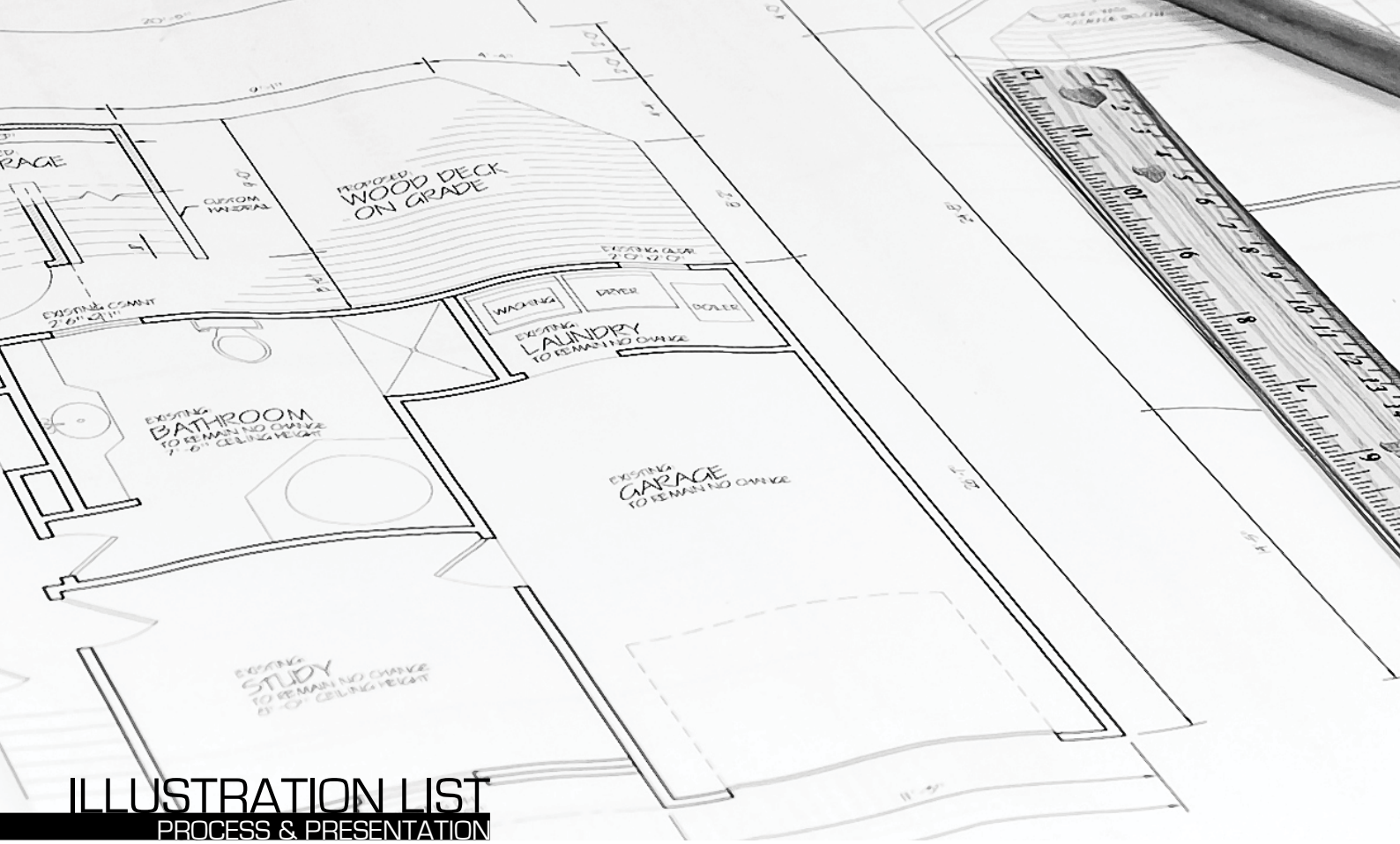

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#17 | Render of joint. Own render

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#18 | Model photo of the strcutral performance. Own photo
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I-II - Own render

p.42-43 ACOUSTICS

#21 | Own photo
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#24 | Benesse House. Own photo

p.50-51 ARCHITECTURAL VISION

#25 | Sketch of arcchitectural vision. Own drawing

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