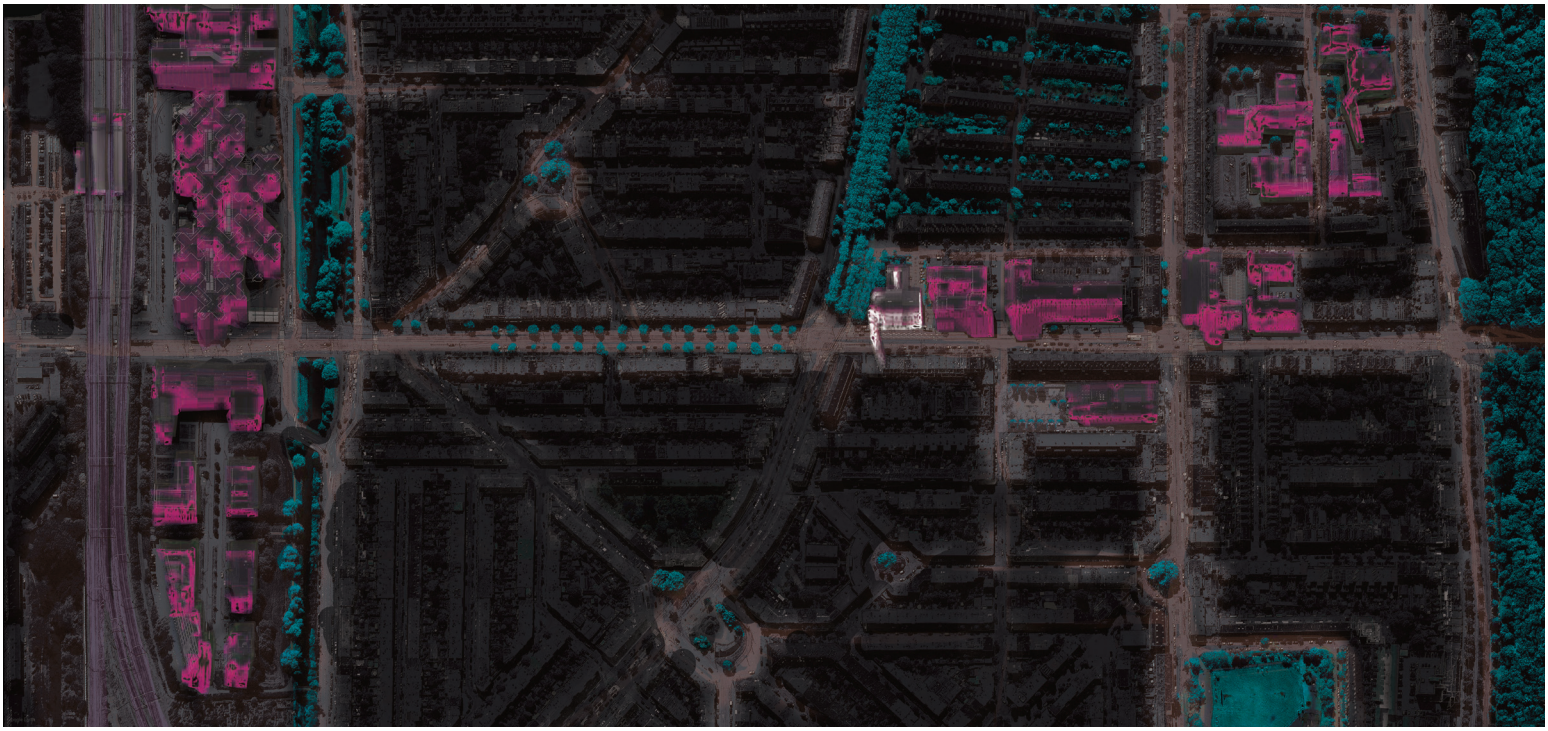
# CHRISTUS TRIUMPHATORKERK

analysis



5514371 JuiLin Liu

# 1.0 LITERATURE STUDY

The research started with case studies of churches that I'm interested in. Firstly, the architect Drexhage's church de Ontmoetingskerk in Loosduinen, suburb the Hague caught my eye. The simplicity of its material use and the familiar but different atmosphere of it drove me to have a closer look into it. However, the church was going to be demolished before the end of the year 2022 and it's no longer open for visitors. Thus I searched for another church that was designed by the same firm in the 1960s by Geert Drexhage.

The archive resource of Christus Triumphatorkerk was abundant and I was able to have access to most of the drawings and original photos of the church. Although the church was ordained as a National Monument, few studies and literature by researchers were found for explaining the values of the church. Most of the writings about the church were by the public or by the church users so a closer analysis should be made. In the chapter firstly I documented the result of the literature research according to shearing layers for a tangible-intangible attribute & value assessment for continuing analysis into archive drawings.



DSBV *Architectenbureau Drexhage, Sterkenburg, Bodon & Venstra / Archief*

DSBV.110289179
Gereformeerde kerk te Dubbeldam
1965
Architecten zijn A. van Walraven, A.J. van Walraven en G. Drexhage
DSBVt6 ontwerptekeningen, rol 1, 1 rol
DSBVt7 ontwerptekeningen, rol 2, 1 rol
DSBVt8 ontwerptekeningen, rol 3, 1 rol
DSBVt37 perspectieftekening
DSBVd832 bestek en voorwaarden
DSBVf39 maquettefoto's gemaakt door N. van der Horst, foto perspectieftekening
DSBVf99 foto´s gemaakt door Publicam
DSBV.110289187 dia's. negatief van foto plattegrond (zie DSBVn139)
DSBVd585 artikel Dordts Dagblad
DSBVmf710/lade1 microfilm

DSBV.110289509
Kerkelijk centrum aan de Aaltje Noordewierstraat, Den Haag
1966-1969
in opdracht van de Kerkeraad Gereformeerde Kerk Loosduinen
DSBVt57 perspectieftekening
DSBVf64 foto's gemaakt door Publicam, foto van perspectieftekening
DSBVf100 foto´s gemaakt door Topeye, Publicam
DSBVf189 foto´s gemaakt door Topeye, Publicam
DSBVmf888/lade18 microfilm

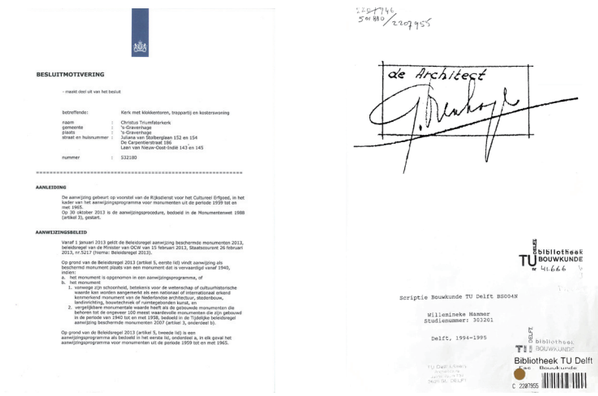
DSBV.110288477
Gereformeerde Kerk "Christus Triumfator" aan de Laan van Nieuw Oost Indië/Juliana van stolberglaan/Carpentierstraat, Den Haag
1959
i.o.v. de Kerkeraad Gereformeerde Kerk (Triumfatorkerk)

**Archive research**

INGEBRUIKNEMING
TRIUMFATORKERK
LAAN VAN NIEUW OOST-INDIË
WOENSDAG 21 MAART 1962
GEREFORMEERDE KERK 's-GRAVENHAGE-OOST

De verwarmingsinstallatie van de Triumfatorkerk te Den Haag

**Articles**



BESLUITMOTIVERING

betreffende: Kerk met klokkentoren, trapopbouw en kosterswoning
naam: Christus Triumfatorkerk
gemeente: 's-Gravenhage
plaats: 's-Gravenhage
straat en huisnummer: Laan van Nieuw Oost-Indië 143 en 145

nummer: 532180

AANLEIDING

De aanwijzing gebeurt op voorstel van de Rijksdienst voor het Cultureel Erfgoed, in het kader van het aanwijzingsprogramma voor monumenten uit de periode 1939 tot en met 1965.
Op 10 oktober 2013 is de aanwijzingsprocedure, bedoeld in de Monumentenwet 1988 (artikel 3), gestart.

AANWIJZINGSBESLUIT

Vanaf 1 januari 2013 geldt de Beleidsregel aanwijzing beschermde monumenten 2013, beleidsregel van de Minister van OCW van 15 februari 2013, Staatscourant 26 februari 2013, nr.5217 (hierna: Beleidsregel 2013).

Op grond van de Beleidsregel 2013 (artikel 5, eerste lid) vindt aanwijzing als beschermd monument plaats van een monument dat is vervaardigd vanaf 1940, indien:
a. het monument is opgenomen in een aanwijzingsprogramma, of
b. het monument
1. vanwege zijn schoonheid, betekenis voor de wetenschap of cultuurhistorische waarde, zeldzaamheid of representativiteit in de ontwikkeling van de stad of kenmerkend monument van de Nederlandse architectuur, stedenbouw, landinrichting, bouwtechniek of ruimtegebonden kunst, en
2. behoort tot een categorie van gebouwde objecten, die de monumenten die behoren tot de eerstejaar 100 meest waardevolle monumenten die zijn gebouwd in de periode van 1940 tot en met 1958, bedoeld in de Tijdelijke beleidsregel aanwijzing beschermde monumenten 2007 (artikel 3, onderdeel b).

Op grond van de Beleidsregel 2013 (artikel 5, tweede lid) is een aanwijzingsprogramma als bedoeld in het eerste lid, onderdeel a, in elk geval het aanwijzingsprogramma voor monumenten uit de periode 1959 tot en met 1965.



de Architect

TU Delft bibliotheek BOUWKUNDE
Scriptie Bouwkunde TU Delft B0004N
Willemineke Hanmer
Studienummer: 3032261
Delft, 1994-1995
Bibliotheek TU Delft

**Books and research papers**

25 Years of Christ Triumfatorkerk 1962-1987, *Jubilee issue Onder Onze*, 1987
H.Willemineke, *de Architect Geert Drexhage*, 1995
National Monument, Justification Christus Triumfatorkerk, 2013
GJKOK, 'CHRIST TRIUMFATORKERK' THE HAGUE 60 YEARS, 2022
Het bericht in 'Kerk in Den Haag', Christ Triumfatorkerk celebrates jubilee, 2022

## ATTRIBUTE

## VALUE

**Site**

The church is strikingly located at a crossroads and forms a benchmark in the urban structure of the district. The church rises above the city bustle by placing of the main volume and the bell tower on a 'stage'.

Due to its special location on a busy road, a quiet center has been built here, that on the other hand, due to the large number of classrooms, it is an activity center, a center of 'pastoral and apostolate'.
The church is a lively and living building in which a lot is happening. First of all, a Protestant neighborhood congregation uses it for the Sunday church service and the weekday church meetings, catechizations, Bible study and discussion groups, neighborhood evenings, etc. In addition, many activities take place that are more or less separate from the church.
Architect Geert Drexhage designed the originally reformed Christ Triumphator Church with a nod to the great Le Corbusier. The publicly accessible halls are at street level and the ' private ' spaces - ... church hall on the first floor . From the outside , the building looks like a massive concrete bunker , a closed square box without ornaments . Following the fashion of the construction years , the high tower stands on its own , separate from the building . Architecturally speaking, the Christus Triumfatorkerk falls under 'brutalism', a movement in architecture that has only recently been given some appreciation.

**Structure**

To ensure that these pilasters could bear the pressure of the roof, the system of post-tensioned concrete was used for the first time in the Netherlands by putting it under tension after the top beam had been casted.
Furthermore , to accompany the special facade design of Drexhage , re made the styles of prestressed netting . This made further stability provisions superfluous, but also the money, so that in addition to the often depicted side of glass, masonry and concrete, the building has been given a cheaper side. The rooms for catheges and the rectory are located here in a sleek , steel structure .

The church is of architectural-historical value as it has a special design (hall church on the first floor so-called multi-storey church).
When there was not much to innovate in the technology itself, Drexhage tried out various techniques in combination. For example , he exchanges bricks for concrete and glass in laboratories , universities , churches and factories and does not shy away from experimenting with timber construction and alternative facade forms ...He was led by an uncontrollable work ethic , by a rapidly changing society , with new materials and possibilities , by changing wishes of more and more clients and at his later workplace often by the prominent constructors present there .

**Skin**

-The church is an example of a technical development because of the prestressed masonry, which was unique in its kind at the time.The church has innovative value due to the architect's chosen solution to exclude the noise from the traffic intersection where the church is situated:tilted piers block direct view and double glazing provides a good sound insulation.
-There is a special connection between exterior and interior...makes it possible to see from the outside where the church hall is.
As a young designer , Drexhage already wanted glass to appear as an image defining element in the facade , averse to architecture in which brick was the predominant role .

Drexhage was proud to have realized one of the first glass facades in the Netherlands. The Italian Aisco - Malugani glass facade system with vertical sliding windows was mainly used around 1960 because it was cheap . Later on he was able to use the advantage of the cheap especially with his churches , where he always had little money left over after excesses at the service parts.The fact that Drexhage really liked the smooth and abstract glass facades.
Because of the walls also function as windows, there are remarkable light affect.

**Services**

With the exception of a concerntration of lamps above the liturgical center, the evening lighting seems to be thrown systemlessly against the ceiling, while floodlight shines along the edges of the ceiling.
Supporting structure of the benches of the service room with the heating of the room, so that hot air is blown from under the benches towards the floor

Oh, that big building over there on the corner." That beautiful building, I say. The answer is often: 'Do you like it?' Apparently many neighbors do not think our church is that beautiful. It is a robust, large building that does not immediately resemble a church. It's a concrete colossus. That was part of the time and the architectural style. ir. Drexhage chose it all with care. But apparently it is nowa hindrance because the church building does not look inviting. Perhaps Drexhage did it on purpose to make the transition stronger to the nice, amiable interior. For example, look at the ceiling with the starry sky

**Space Plan**

-The Christus Triomfatorkerk is a good example of a church in which the architect was allowed to design the liturgical center, which resulted in an amphitheater-like arrangement with the pulpit placed slightly off center.
-The consistory had released the architect when furbishing the liturgical center, the pulpit is no longer in the center ... To the left of this is the Lord's Supper table, while the baptismal font is placed on the edge...The office holders no longer sit in a separate...
-This church building, designed as a community center, has no fewer than thirteen classrooms, the largest of which is the community hall with 240 seats and a stage.

The high-quality aesthetic qualities of the design are especially reflected in the translation of a traditional setup (basement, church hall, clock tower) on a technically functionalistic way with angular contours and surfaces.
However , the abundance of materials makes the whole thing more unclear . The building is a sum of wishes and possibilities, whereby the rest of the building clearly suffers from the financial priority of one part. We are now in an era in which the church has become the " just recognizable place of meeting " . " I leave the choice of whether or not the abstract whole in The Hague is recognizable as a church .
As usual , most visitors take an almost untraceable , narrow door in a scrap wall around the corner . A kind of service entrance. That's how it often goes. People who put a building into use develop their own habits, regardless of what the master builders have come up with.

**Stuff**

Benches are covered with foam rubber...Remarkably enough, the money was partly spent on reducing the capacity of the church hall. A number of benches have been removed...space has been created for enlarging the liturgical centre, the 'stage', and for creating a center of silence.

In the design he had been guided by the method of the reformed churches. These were primarily places of meetings, where God's Word was proclaimed and the Sacraments were administered. That is why he had placed the four benches groups in a semi-circle around the liturgical center.
The comfortable benches with purple fabric cover are arranged in width , with a good view of the liturgical center . Opinions on the establishment appear to be divided . Van der Linden : ' My mother does not think it is a warm , cozy church . ' Van den Akker : ' Because the benches are in a wide , semicircle , I have direct contact with the public . When I casually ask a question , people respond immediately . They feel free here.

**Spirit of Place**

The church is an important work in the oeuvre of Drexhage, who increasingly used abstraction in his church building.
In all, it is the largest post-war reformed church, In the opinion of the Centraal Weekblad" also the most beautiful. However, for the sake of completeness it is also necessary to say: one of the most expensive."
When you come out of church on a Sunday , you descend to all those coffee - drinking people here . That gives a nice picture. Conversely , whoever sees a stranger coming down on his own can quickly go there and start a chat . " The hall with the colorful furniture is the heart of the church . Call it a covered village square . The atmosphere is that of a grand café . This is where all the meeting rooms open out . On one side is a large glass wall overlooking the courtyard It is striking that there is no direct contact with the stree

Policy Rule 2013 (Article 5, second paragraph)
A. the relevant monument is an obvious milestone in the development of architecture urban planning land development construction technology or space-related art in the Netherlands, which is apparent from, among other things, aprominent position and interpretation in the national and international professional literature
B. the monument in question is an essential example of the cultural-historical or social-historical developments of the reconstruction period in the Netherlands.
Policy Rule 2013 (Article 7)
a. a positive conservation perspective has both technical and functional and
b. has a positive influence on the quality of the spatial environment.

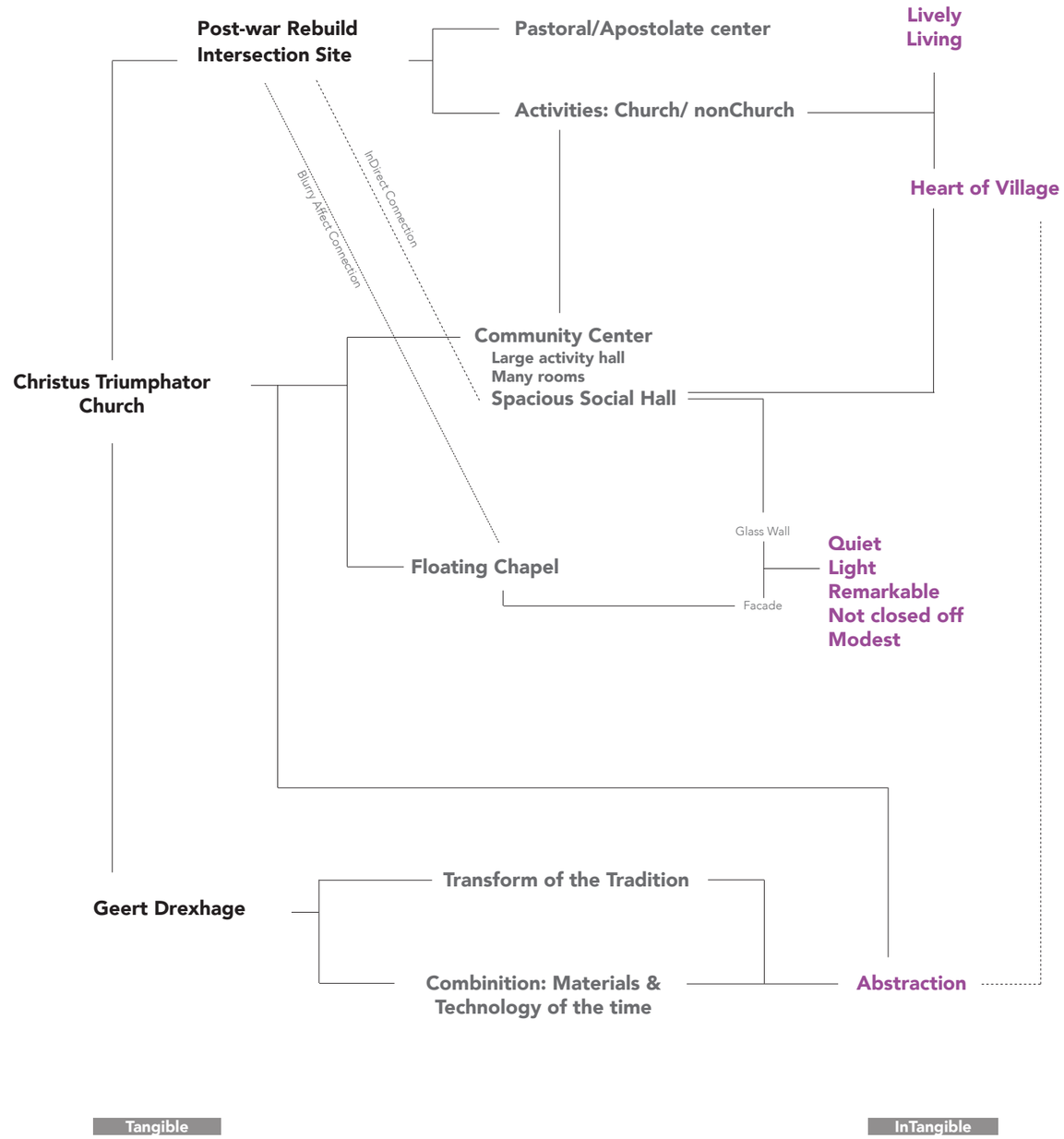
It can be concluded that the values indicated in this Decree DO justify protection under the Monuments Act 1988.

## 1.1 VALUE CODING

After the tracking list in layers, I started to locate and separate the main ideas according to their tangible and intangible aspects. The diagram shows the result and how they are related to each other. The main quality of the church described by people are 'lively', 'living', 'heart', 'quiet', 'light', 'remarkable', and 'abstract'. And they were linked to the combination of techniques and materials, arrangements of programs and spaces in the context done by the architect (in grey color).

In the middle column that linked the main quality and the tangible church, we see concepts, skills, and the ability for integration of the architect and his team, as the main ideas of how they redefined a mixed-use church complex in the urban; The complex was designed as a pastoral and apostate center, and from urban form to the function order were set to achieve that.

After the diagram, I tried to locate the values in a table that highlights the significance of the church.

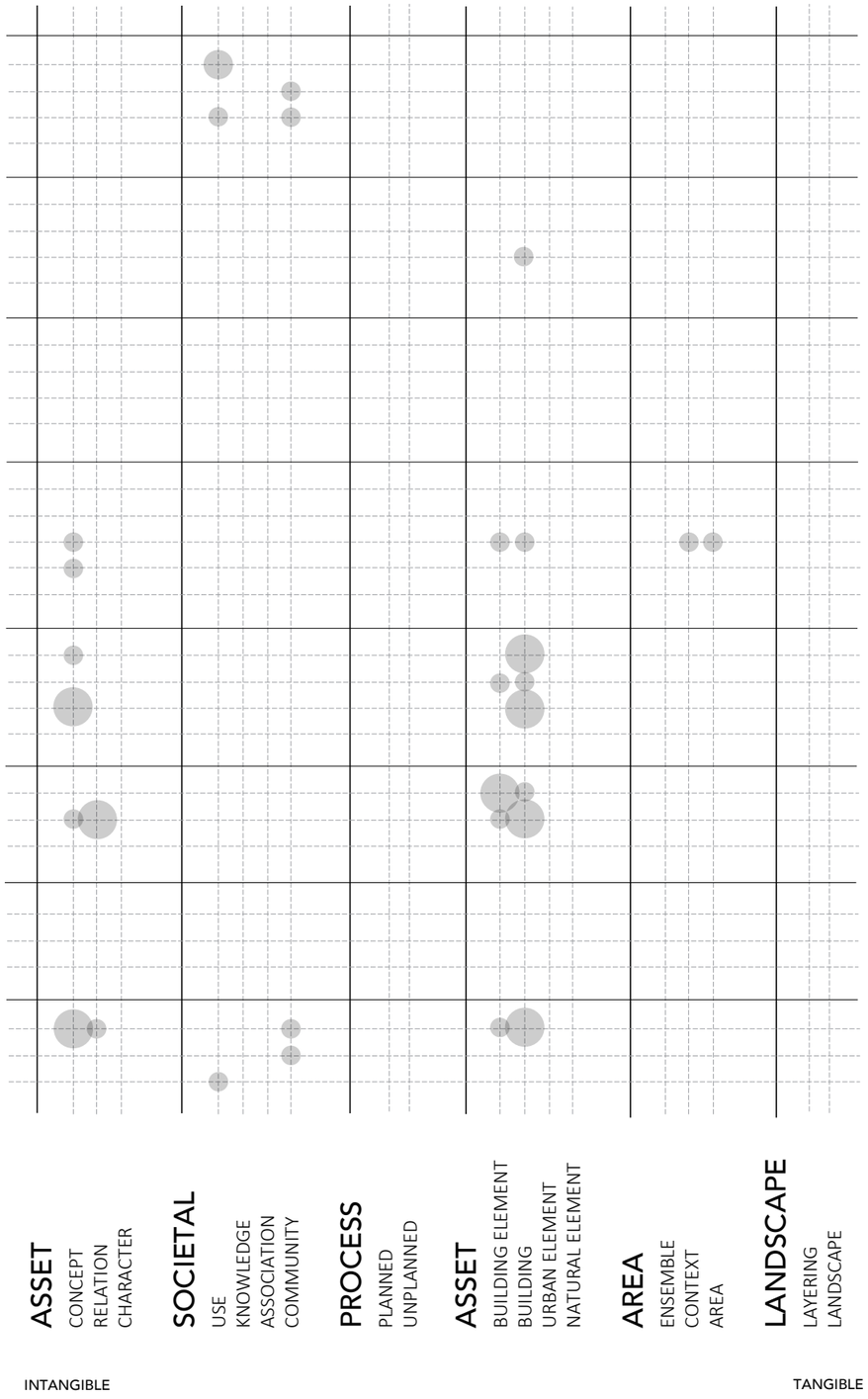


## 1.2 CONCLUSION

According to the table made with the former diagram, the church has values mainly in how aesthetics were combined with scientific means into materialization, and how it was and is still connected to the surrounding context socially, ecologically, and historically.

And another point important to mention is the relationship between tangible assets and intangible assets. Although the intangible assets are invisible in the church, the users feel and understand the uniqueness of the church through time and experiences. And indeed, as a post-war rebuild church, it was innated with concepts, thoughts, and techniques of the time into a new typology.

To conclude, the church and its integrated values in tangible forms are prominent, however, how the values in intangible assets that led to the built form could also be emphasized for further analyzing that we can know why the church complex is still livily in its social values for future maintenance and renewals of the church.

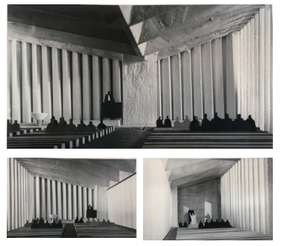


# 2.0 ARCHITECT

In the post-war requirements of new neighborhoods and their community activity centers, Geert Drexhage was chosen by the Protestant Parishes for developing a new type of complex church. A series of three church projects were done in the1960s that we can trace some characteristics and experiments the architect had left in his works.The use of abstraction to transform the traditional churches into new narratives and the influence of Modern Art in materialization and space can be seen in his projects. As the pictures show, symbols were detached from the main bodies of the chapels to form new realms and spaces in the cities(1). Volumes expressed materiality itself and light affects(2). Constant testing between the sculptural-like solid part and the space part of the chapel directs the functional meanings(3). The development of the shell of the chapel find balances between scientific developments and aesthetic achievements. And redesigns of the traditional arrangements(4).

However, two of them had been demolished with only Christus Triumphatorkerk left. The historical and physical context that resulted in this church will be analysis in the following chapter.



| **Reformed Church-hood Center the Hague** (1962- ) complex for 750 people | **Reformed Church-hood Center Dordrecht** (1966-2011x) complex for 450 people | **Reformed Church-hood Center Loosduinen, the Hague** (1969-2022x) complex for 600 people |
|---|---|---|
|  detached tower => new urban gate solid volume and sober surrounding void |  detached symbol => entrance, surreal realm solid volume and sober surrounding void |  cross symbol => surreal realm, define the yard solid volume and sober surrounding void |
|  juxtaposition of volumes, space, function, material new experience of space transition and use |  juxtaposition of volumes, space, function, material new experience of space transition and use |  juxtaposition of volumes, space, function, material new experience of space transition and use |
|  playing of symmetry, flexibility of space and solid developing of textured technical envelope |  playing of symmetry, flexibility of space and solid developing of textured technical envelope |  playing of symmetry, flexibility of space and solid developing of textured technical envelope |
|  redesign of the Liturgical centre & congregation |  redesign of the Liturgical centre & congregation |  redesign of the Liturgical centre & congregation |

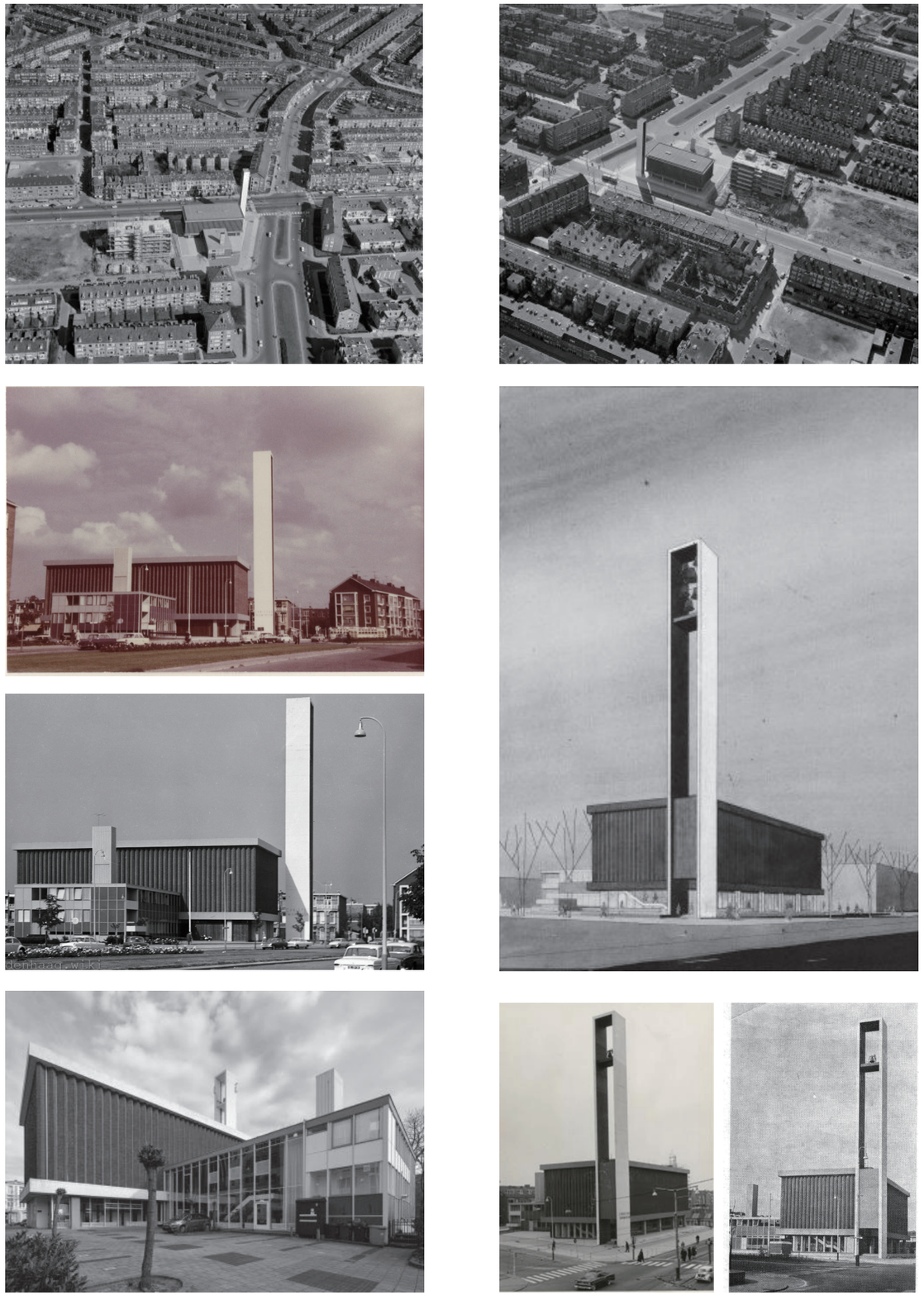
**Timeline of churches design & characteristics**

## 2.1 SITE & BLOCK

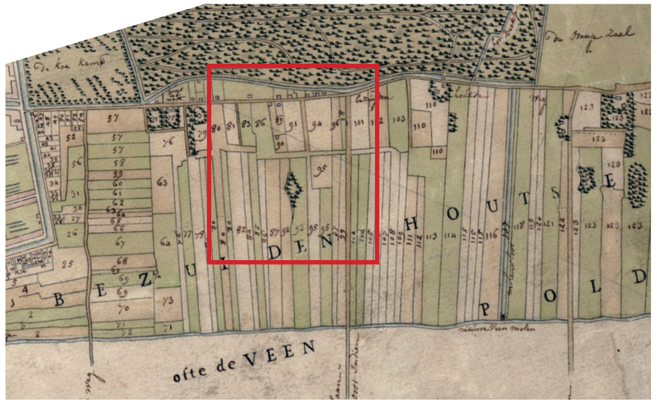
The church was designed to substitute three damaged Protestant churches in Bezuidenhout after the war. A competition was held and a committee to judge was selected by the Parishes to answer their expectations of the new design. Thus with the church members donating to build the church, they had more influence towards the decisions of the requirements and the architect. Geert Drexhage and his team were finally chosen for the competition.

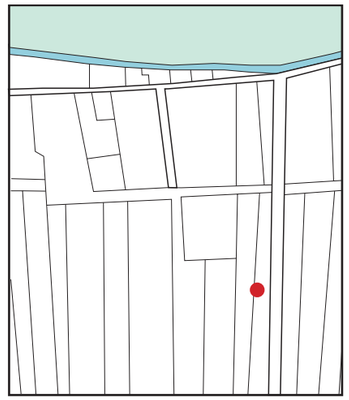
As the architect explained in his own words, he followed and interpreted the guidelines given by the church members, and he exerted to 'make the church open to the world and the future generations.

The church was built on a redevelopment corner of the block. Two mingled volumes, one floating and one tucked into the ground, with two urban objects- chimney and belltower, together create different spaces around from a monumental scale to a more community scale to form the church for answering the multiple expectations.

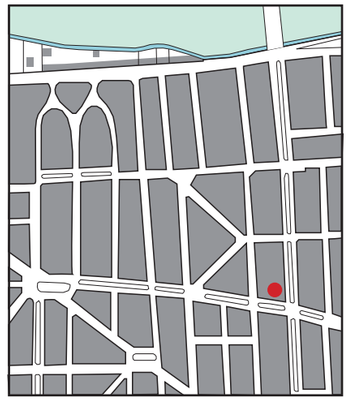


**2.1.1 Configurations- community center (right)/ monumental church**

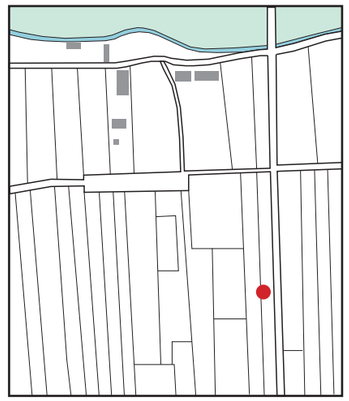


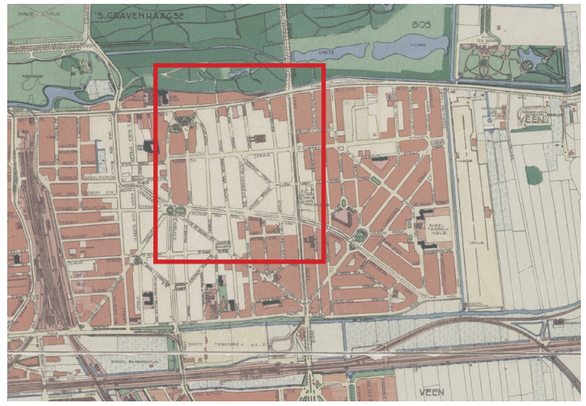
1734_Map of Haag Ambacht :
The area located in the south of the Bos of the count. The polders were surrounded by main roads and canals.

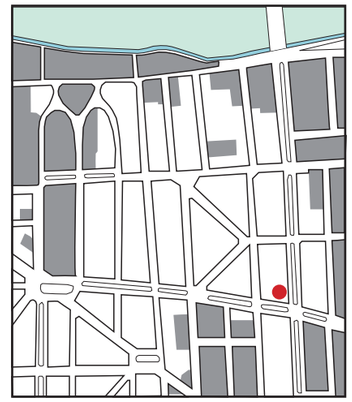



1923_Kaart van s'Gravenhage Uitsnede :
The area was developed with double-lanes boulevards planted with trees and diagonal intersections.

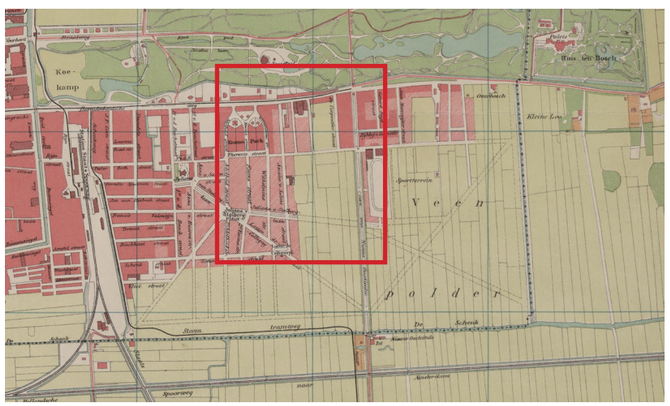


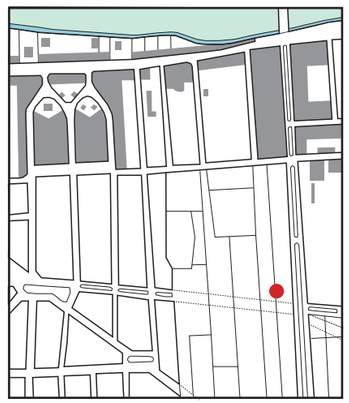
1870_Kaart van s'Gravenhage Uitsnede :
The railway systems were built and enclosed the south of the Bos area. The polders were divided into smaller patches.



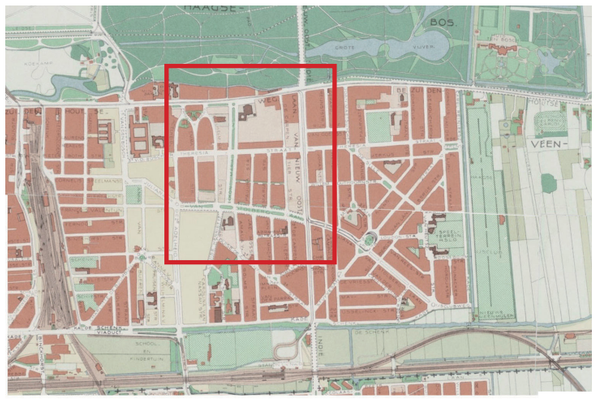



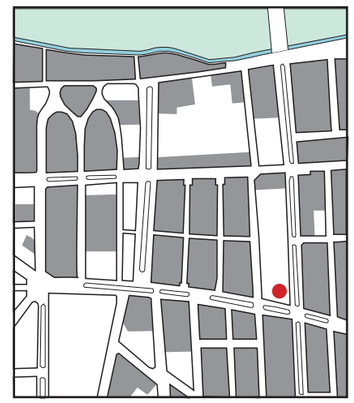
1948_Kaart van Gemeente s'Gravenhage Uitsnede:
The 1945 Bombards in WWII destroyed half of the streets developed in 19th century.



1899_ s'Gravenhage Vervaardiger Smulders :
The new developmet plans were executed along with the polders and also with on-axis streets.

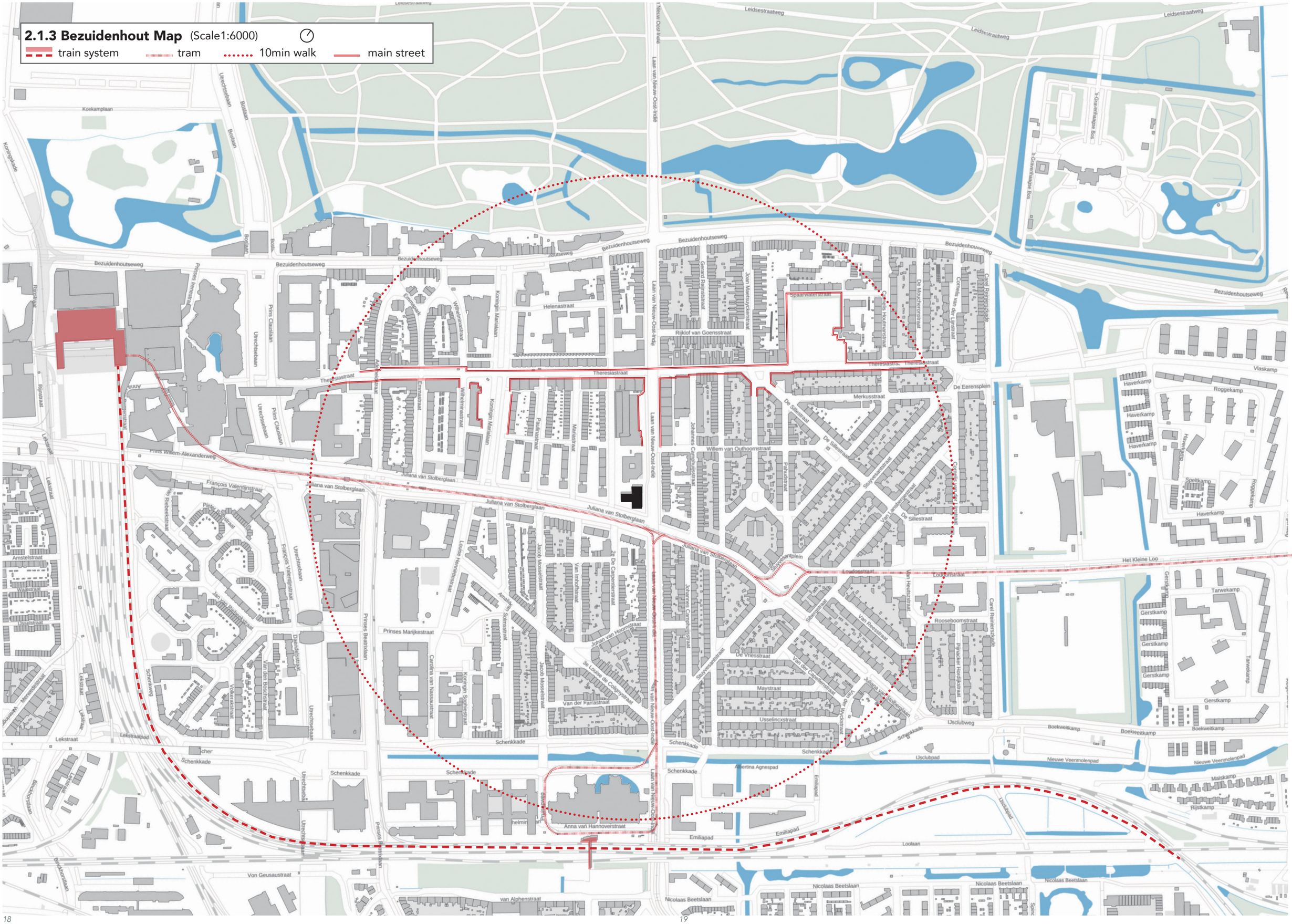


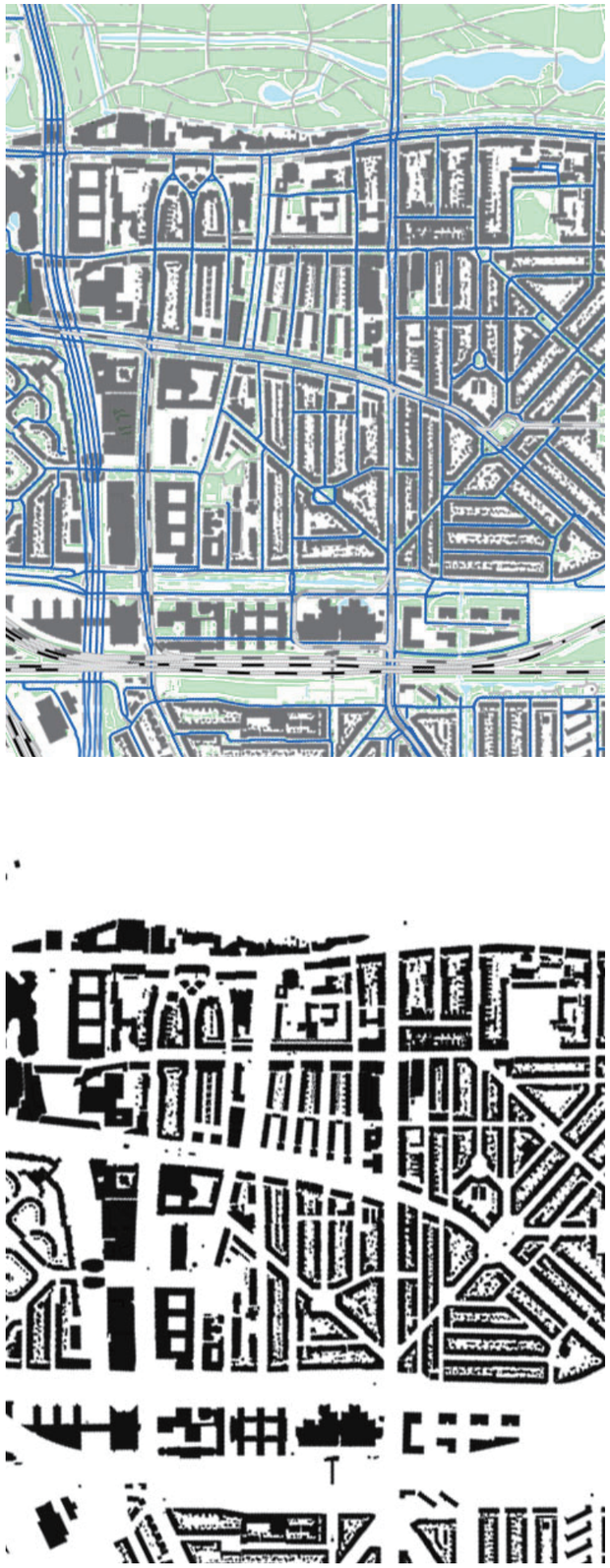



1957_Kaart van Gemeente s'Gravenhage Uitsnede:
The rebuild plan fixed several paths from the past, and resulted in the urban tissue we see now.

## 2.1.3 Bezuidenhout Map (Scale1:6000)

train system — tram — 10min walk — main street



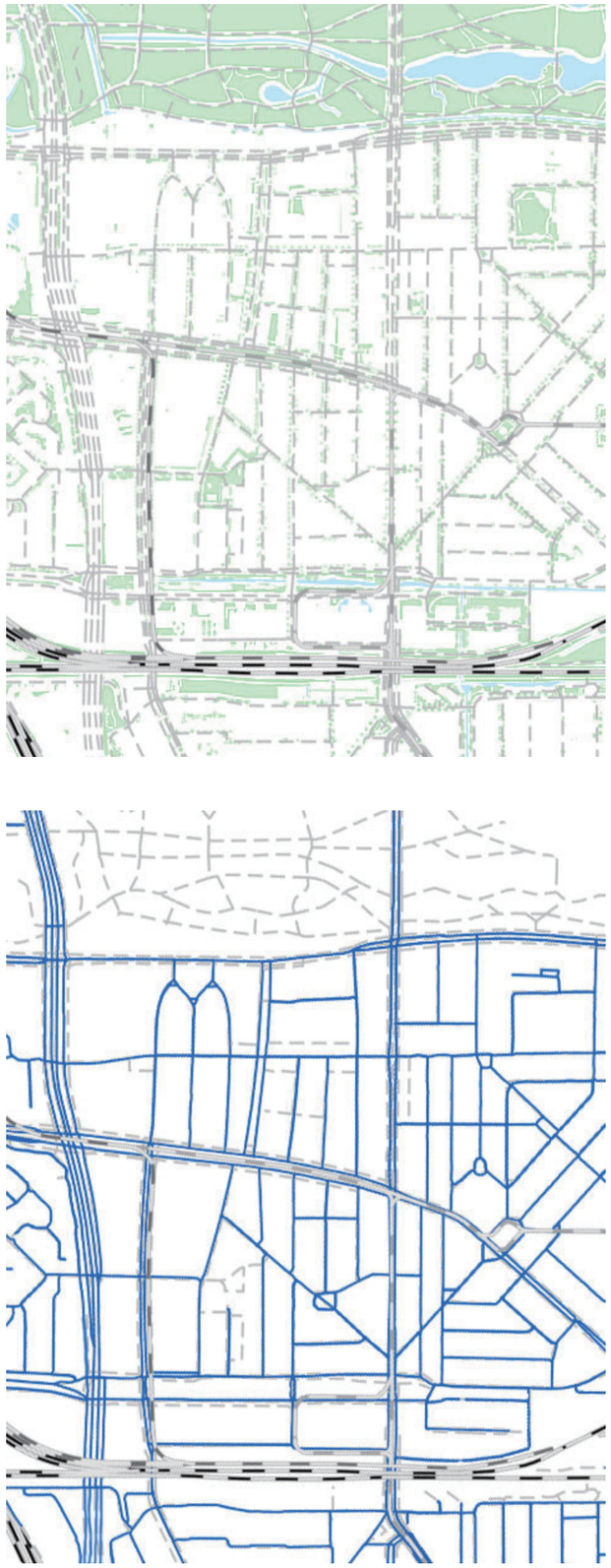




### 2.1.4 Figures & ground

Extracting the nowadays site into figures, we can see the more common morphology of the residential neighborhoods, and also the blocks with bigger building elements that developed under the post-war urban law. Some of them tried to form the street and courtyards and some not.







### 2.1.5 Path system

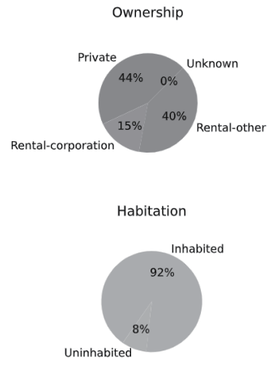
From the path system, we see a high ratio of green in building blocks and also the park in the north. Paths linked them together. And as a mixed-use area, convenient transportation systems link the area to the center in its west. The railway and tram systems also run through the blocks.

## 2.1.6 Mixed-use urban form

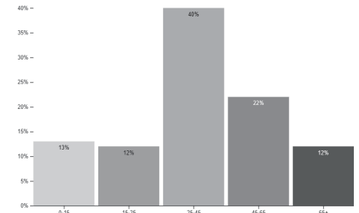
Two characters of morphologies are combined in these urban blocks. The bigger parcels of post-war figures are mixed-use three dimensional buildings that substitute the traditional buildings that focus mainly on forming streets.



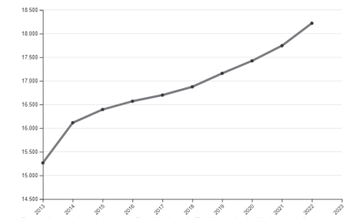
The centre area surrounded by three train stations




Building status




Population and age

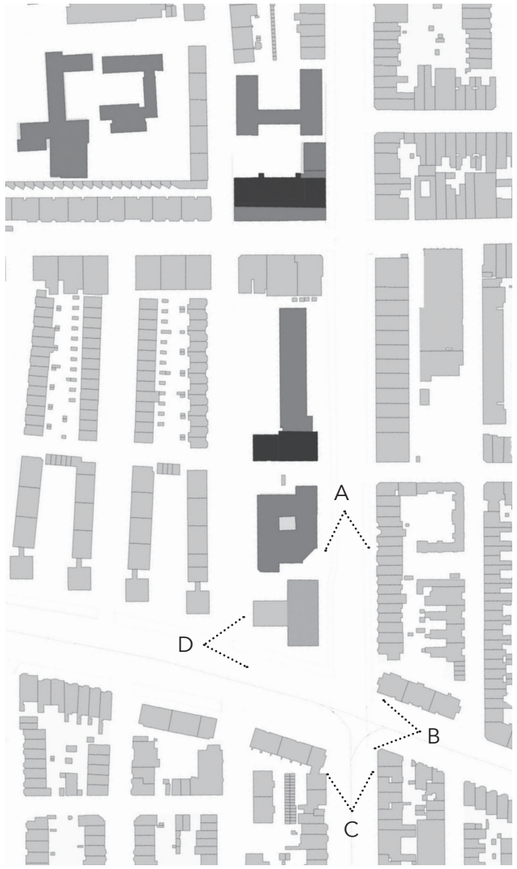



Growth of population

## 2.1.7 Future of the area

The area is under consistent population growth in the residential area. And with the convenience of a mixed-use urban environment and high quality of infrastructure and facilities, it is habited mainly by age between 25-45 workers and young families.

The area is expected to keep growing under the direction of the new urban design plan that focuses on the circle of three railway stations. The goal is to develop a high-quality cultural, business, political, and residential capital area of the city.


## 2.1.8 Urban function & building height

Zoom in to the block where the church stands, the block is opened with different characters of spaces around. Cars dominate the main two streets to form the corner and a quiet one-way street form another side of the block. The block can be read as figures in the ground but the buildings somehow still form the front street.

Multiple functions start to come into the residential area from the mixed-use street in the north.

## 2.1.9 Block

(Scale1:2000)
public/ private
accessibility
transportation
parking

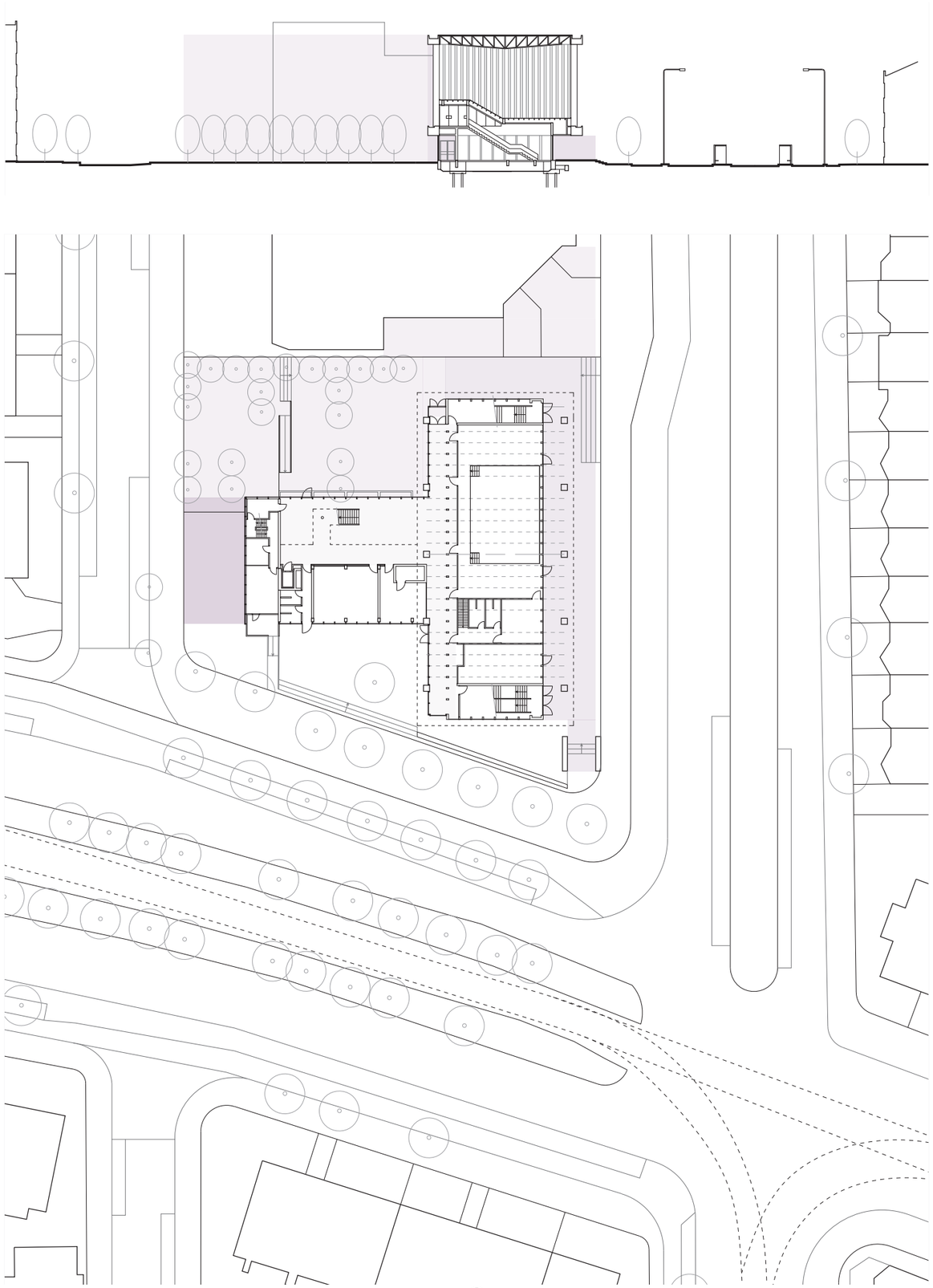
A
View from the north of the street, the building is few meters higher than the houses across the street.

B
View from the east, the bell tower is prominant among the trees.

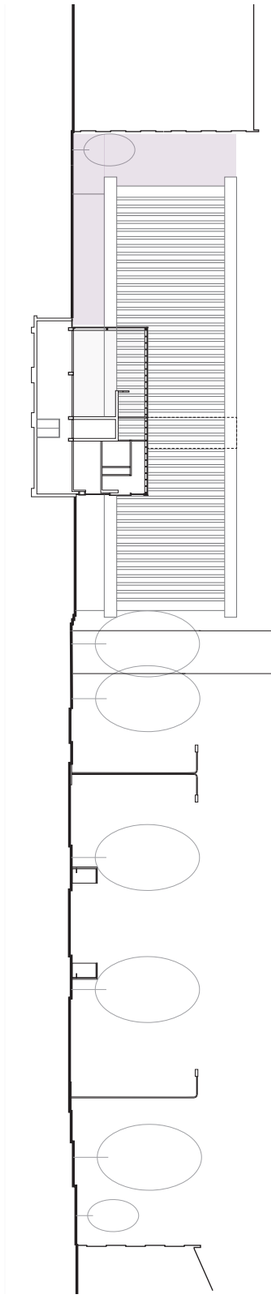
C
The church building is set back. The straight main road and the clear-cut tower.

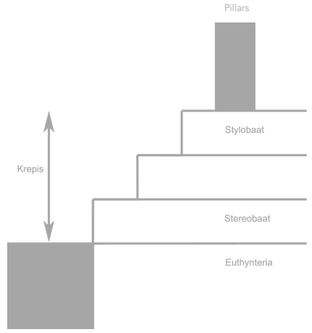
D
Approaching from the street block, the building is covered with ascending layers: bushes and garden, service volume, and the church volume.



**BLOCK PLAN & SECTION** (Scale1:1000)





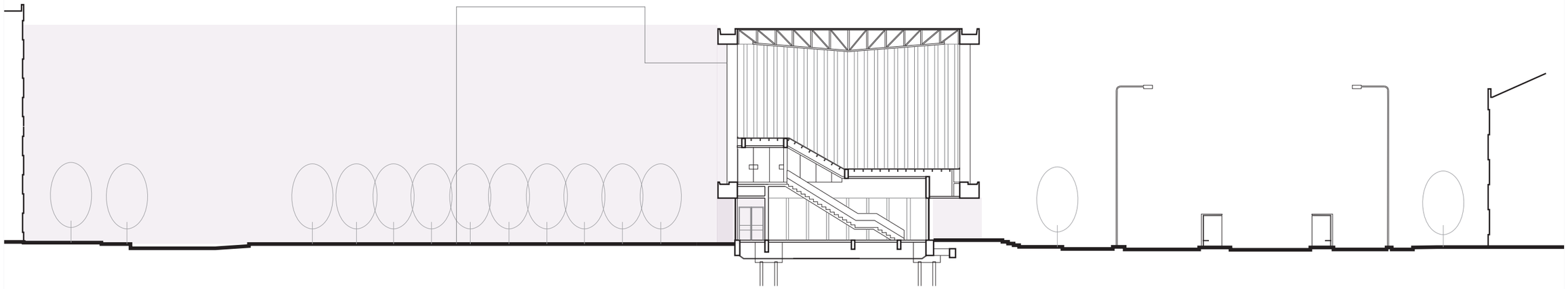

A typical foundation layers of a Greek temple.

### 2.1.10 Site - space and boundaries

The floating volume and the tower, raised on a platform (stylobate) of the church, defined the street and its backspace. And the floating volume and the platform hint the space beneath can be flexibly used by the community.

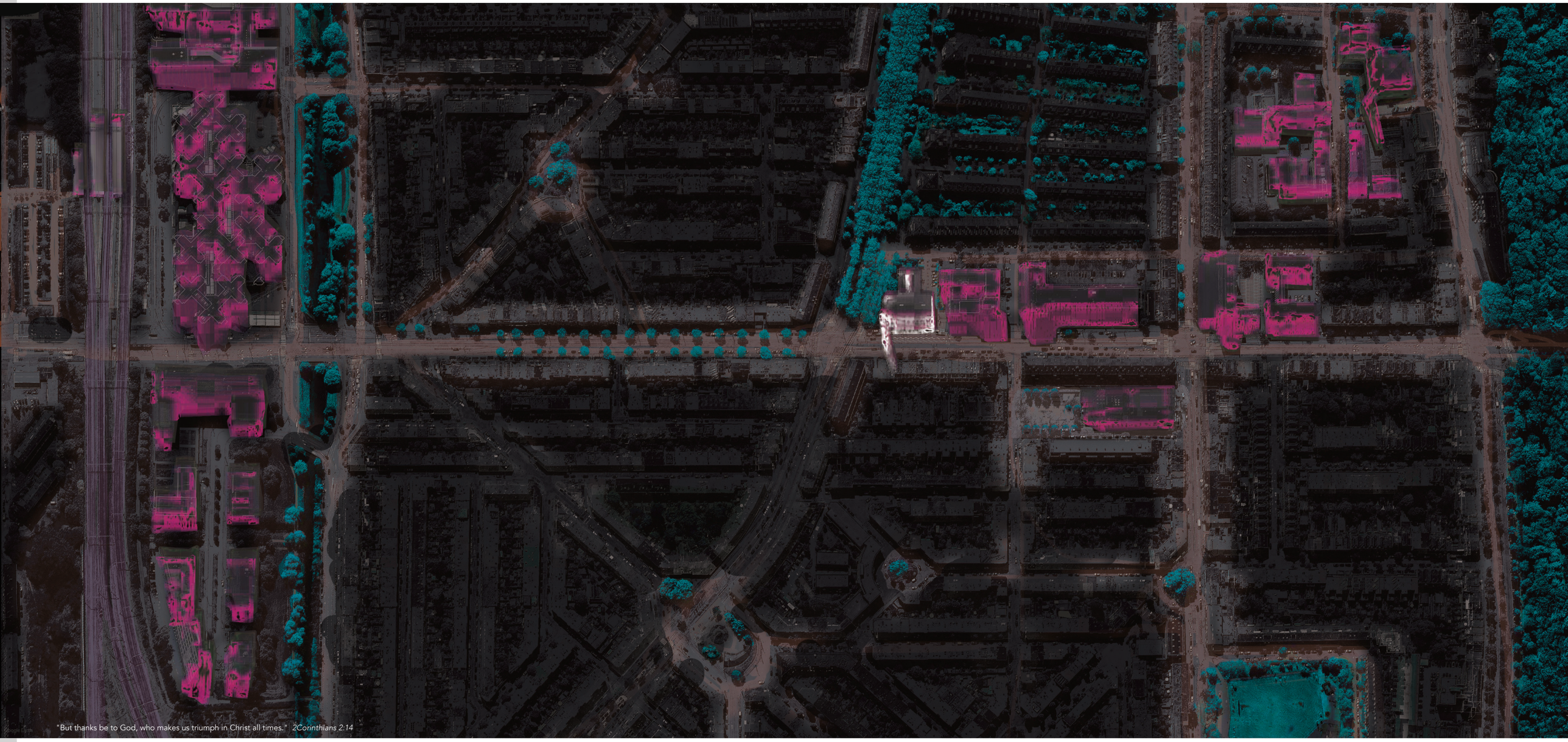
The floating volume brings the visitor to the space back which is the main courtyard, defined together with the surrounding buildings, is the main entrance of the complex.

The scale is transited from the monumental scale to a community scale. After approaching and entering the big tower, its impression is dissolved by the interaction of body movements of the entering. The 'stylobate' (originally named by the architect from a greek word) with the columns on it brings movements to the yard behind. In this yard everything is in a smaller scale.



**BLOCK SECTION** (Scale1:500)

**BLOCK SECTION** (Scale1:500)



"But thanks be to God, who makes us triumph in Christ all times." *2Corinthians 2:14*



## 2.1.11 Story

The Protestant church was rebuilt in the postwar site together with other mixed-use new buildings. They give new life to the blocks. "The church opens to the community and marks an 'apostolate' corner that accumulated voices of the world".

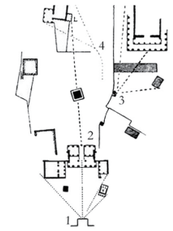
# 2.2 SPACE

To reflect on the Modernism developed before and after WWII, architects and scholars in the1950s started to look into aspects of the film, the development of the concept of urban, languages, and cultural and social origins. Christus Triumphatorkerk was designed at the same time as all these theories were evolving with the changing society.  And also, the complex project was directed with guidelines from the church comittee and its congregation. Different opinions are integrated into the requirements through processes of communication and negotiation in the Protestant community. They expected an ideal outcome that represents the democratic process and their faith.

The space of the church enentually were joined into the new evolving urban with ambiguous and new characters of open space; clusters of defined or undefined rooms were organized to a certain degree of part-to-whole flexibility and independency; and sophisticated juxtapositions of materials showed inner hierarchy in structure, envelope, and space divisions which also defined the expected changeable to unchangeable layers, spiritual to non-spiritual transitions, and textures and lights.



1938 Montage and Architecture, Eisenstein
Description on Athen Acropolis




1939 WWII

1945

Development of Modern Movement architecture
Le Corbusier, Louis Kahn, Functionalism, Brutalism...

1953 Gathering of Team X members
Structuralism

1956 First Urban Design Conference, Harvard, the USA

1958 Sky House, Kiyonori Kikutake

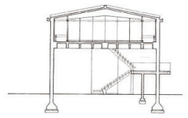
1959 **Designing of Christus Triumphator Church**

The last CIAM meeting, Otterlo, the Netherlands.
Starting of The Metabolists; presenting of the Tower-shaped City, and Sky House.

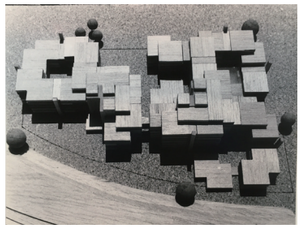
1960 Team X first formal meeting:
'cluster', 'mobility', 'growth' and 'change', 'habitat'

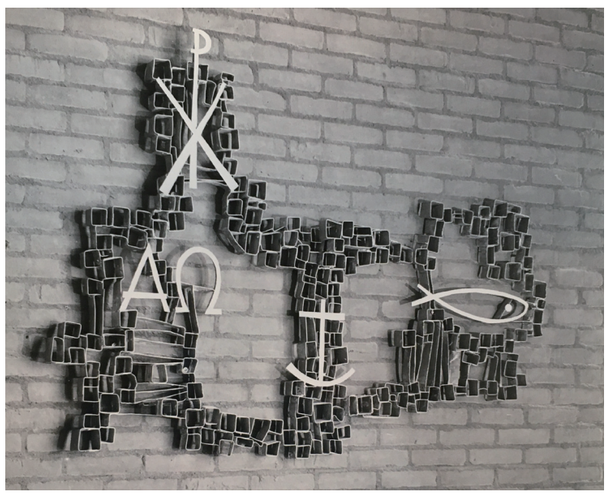
The Metabolism manifesto:
'Ocean City', 'Space City', 'Material and Man', 'Towards the Group Form'

Orphanage Home, Aldo van Eyck



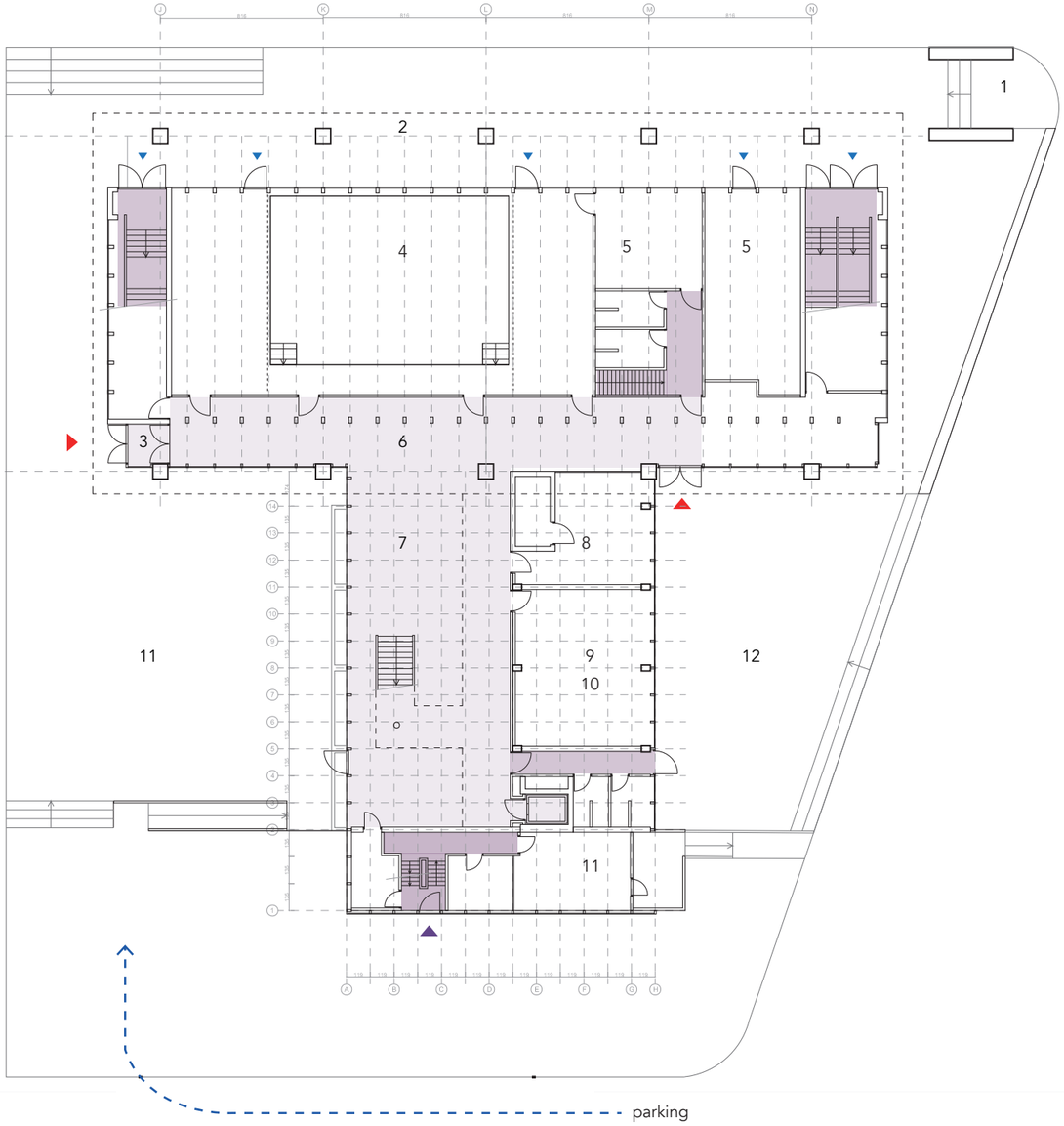
1962 **Christus Triumphator Church built**

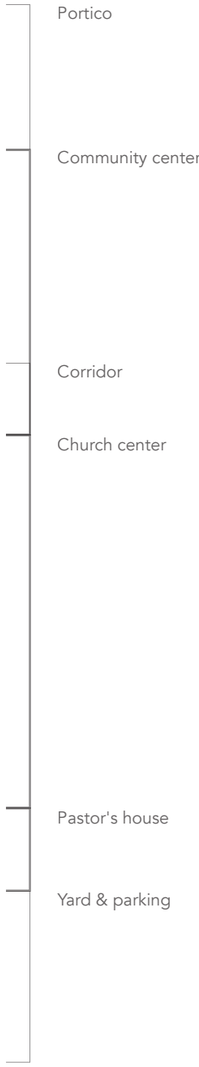




## 2.2.1 Design background

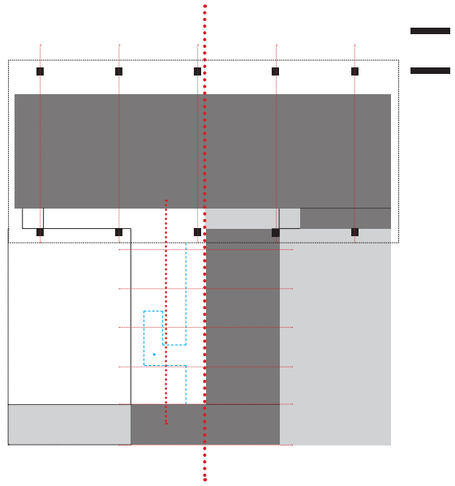
In Drexhage's modeling, furniture, and art piece design for his churches we can see the overlapping cells like patterns that form space and attached meanings. It's very different from the earlier modern art and space compositions in which the solid part and the space are clearly defined.




GROUND FLOOR PLAN
S:1/300

1 TOWER GATE
2 STYLOBATE
3 MAIN ENTRANCE
4 ACTIVITY HALL
5 CLASSROOM
6 CORRIDOR
7 SOCIAL HALL
8 OFFICE
9 CATECHISM
10 KITCHEN(NOW)
11 INNER YARD
12 OUTER YARD
13 SAXTON HOUSE

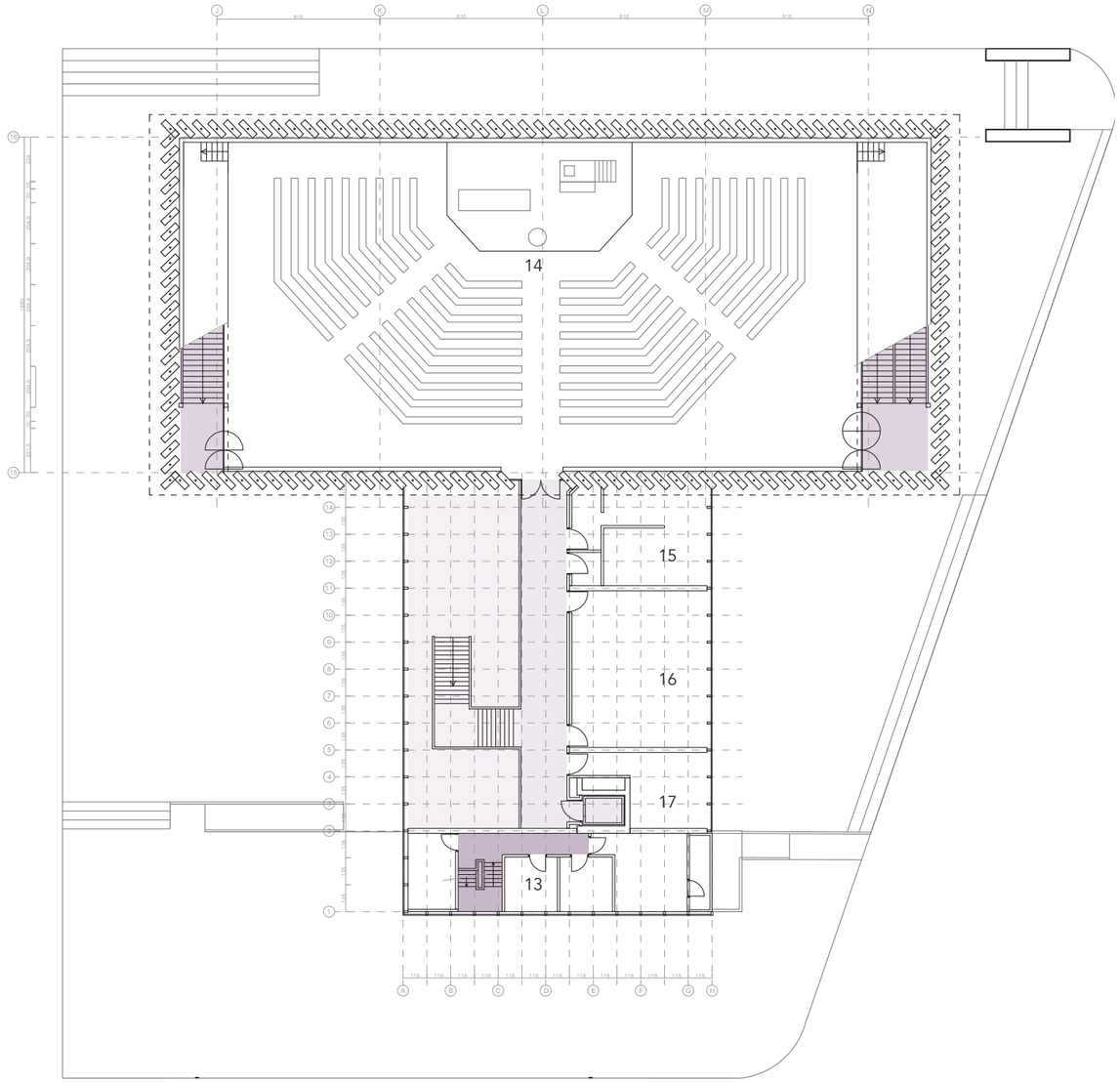


## 2.2.2 Accessibility & circulation

We can read the plan as an extended inner street and courtyard of the urban that is surrounded by three clusters of functions: the community hall which faces the main street, the church office which faces the secondary street, and the pastor's house face the alley behind.

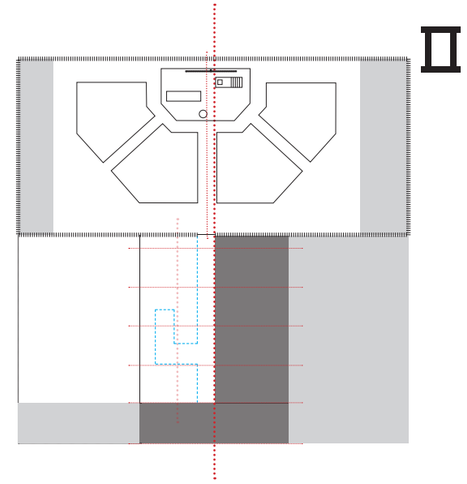
The main entrances are not directly linked towards the main streets, it takes transitions from the elevated platforms and turning of directions.

Multiple doors open to the front facade which is only opened inside of the plan and can be flexibly used to organize the activities in the community center and the chapel on the staircase.




FIRST FLOOR PLAN
S:1/300

13 PASTOR'S HOUSE
14 CHAPEL
15 VENTILATION ROOM
16 COUNCIL ROOM
17 PASTOR ROOM

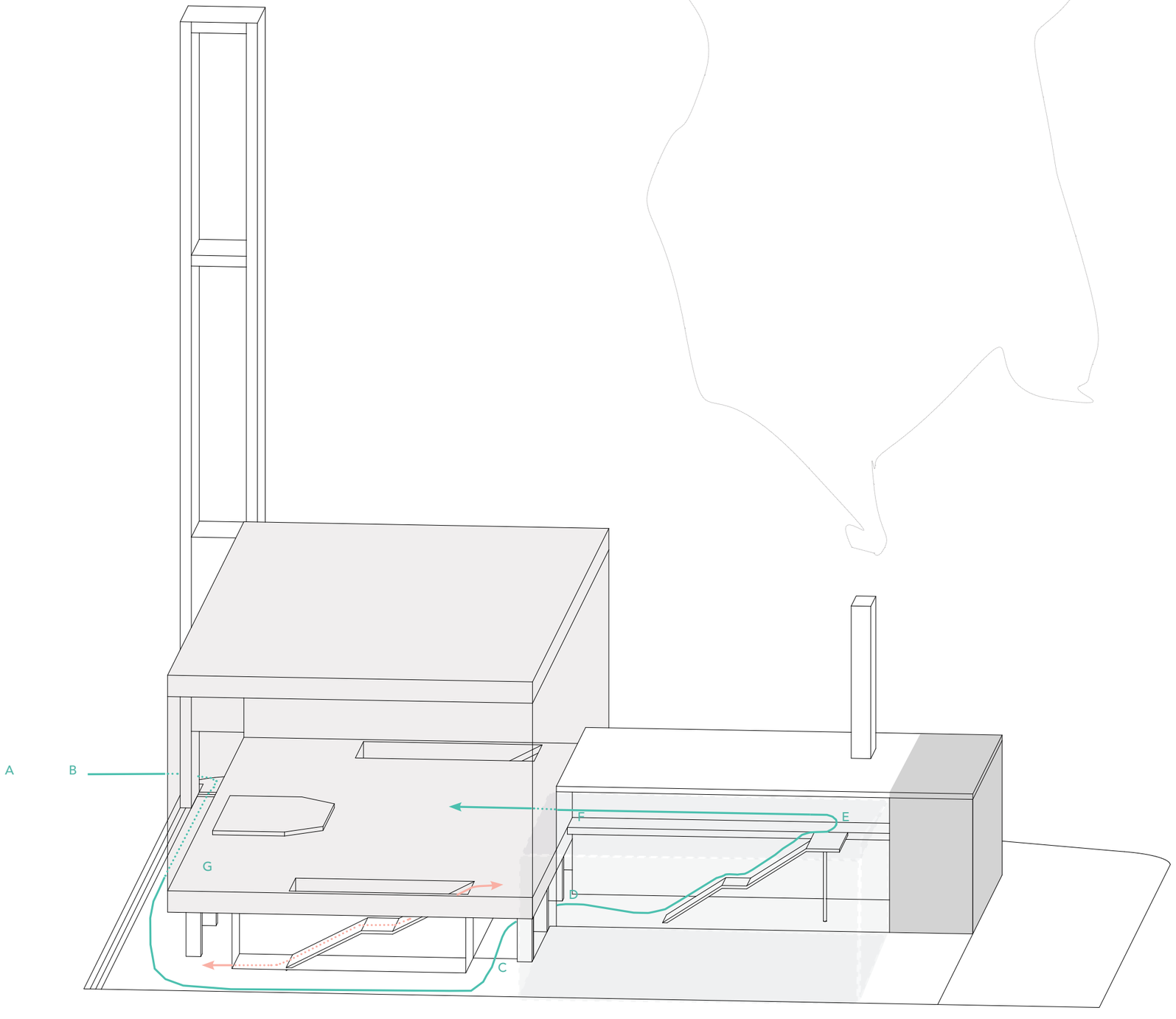


## 2.2.3 Chapel

It takes transitions to enter the chapel upstairs. And on the route, classrooms and other facilities are arranged and all open to the main social atrium.

The symmetry of the space shift from the social hall to the chapel. Before entering the chapel, the visitors experience constant movements of walking, and sights changing in height. The entrance of the chapel focuses attention on the liturgical center.

The seats in the chapel are arranged to surround the center. And on the center, a sacrament table, preaching stands, a baptismal fountain, and a steel cross are managed.





A


B


C


D

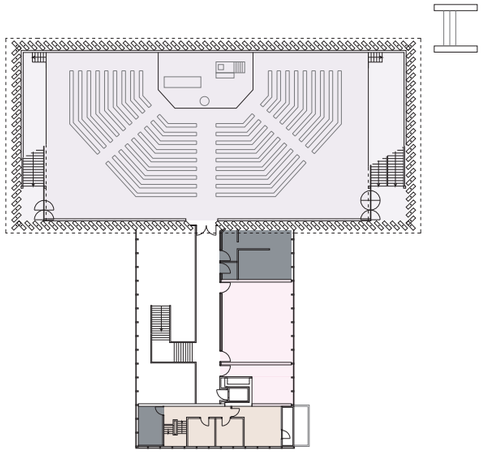

G


F


E

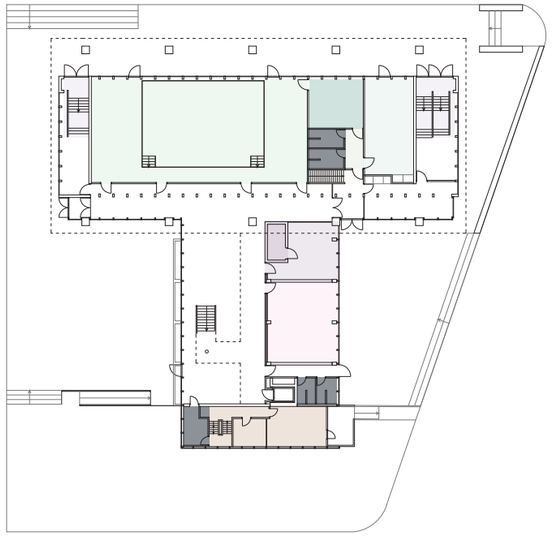
## 2.2.4 Space & sequence

The sequence is meant to help people transit from the bustle and experience the time and space while moving. The two mingled volumes and the ambiguous space in between are contrasted with the end of the scenes- the light-filled pure chapel.



CHURCH

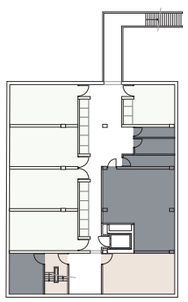
RESIDENTIAL



COMMUNITY CENTER

CHURCH

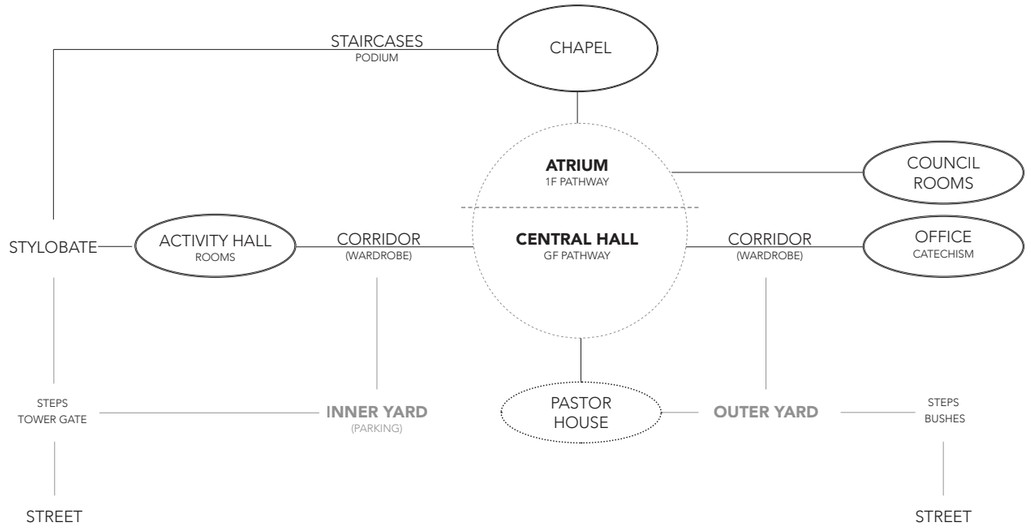
RESIDENTIAL

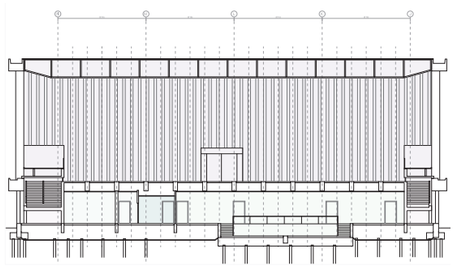


CHURCH / COMMUNITY

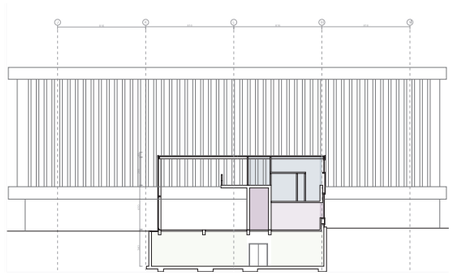
RESIDENTIAL





Chapel volume and the community center beneath



Service volume and the classrooms beneath

## 2.2.5 Function Clusters

The function clusters were arranged in a way that they all can work individually but still have internal relationships to form the bigger complex. The result of these clusters is that different groups of people can use the space separately but still have the common area of intermidiate space like the courtyard or the atrium. The complex becomes a small inner city like a village.

If we draw the relationship into the diagram, the heart of the complex is the inner courtyard or the social hall, and every cluster has links to it. And remarkably, this indoor courtyard has no direct connection to the outer bustle of the street. Also, we can see the parts are independently connected to the whole.

In the section, we see the mega structures- the envelope or volumes that enclose the little world.

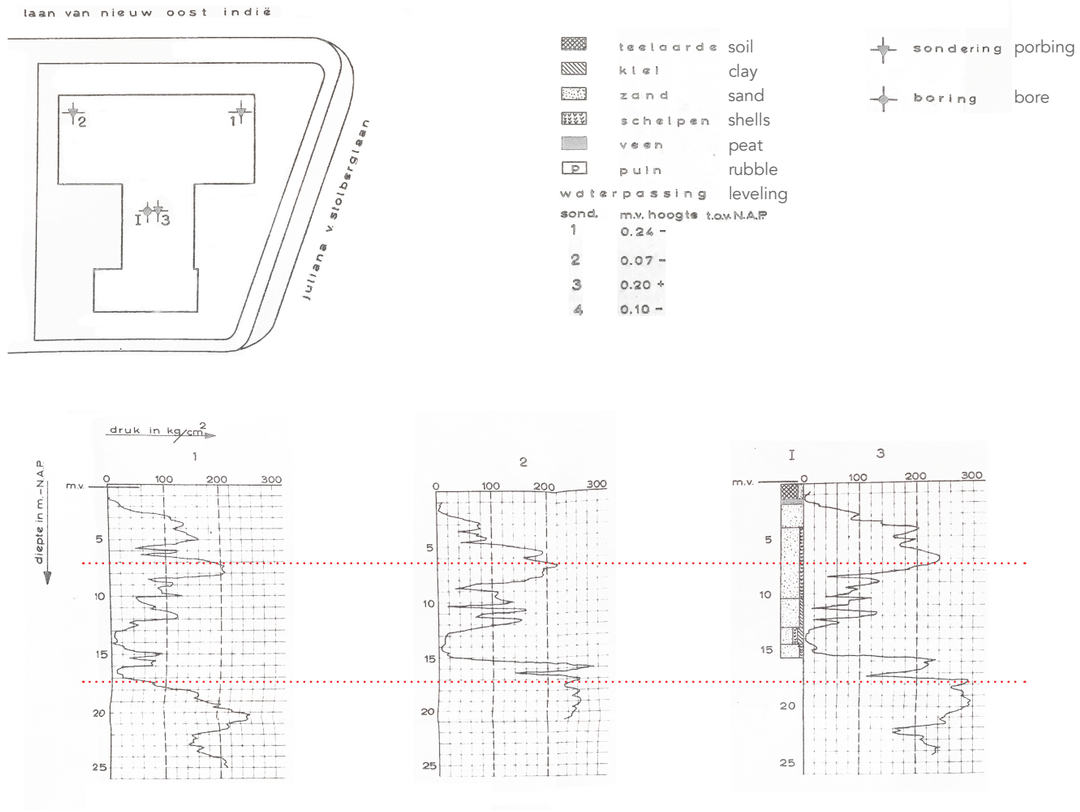
# 2.3 STRUCTURE

The structure of Christus Triumphatorkerk was implemented according to different characters of the building volumes. And the materials of the structure were selected according to their properties to function in the parts.

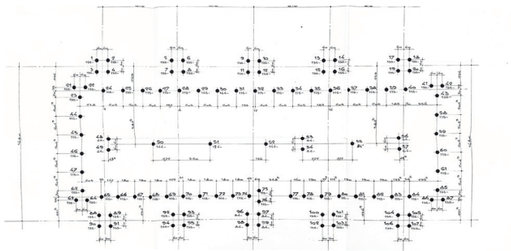
The structure of the building defines space as parts in the space that the architect predicted to be unchanged in the future. For example, the chapel and the main outer shell of the service building and its divisions were set for longer use. And the other parts with more freedom of change, for example, the community center and the pastor's house.

The building materials in the structure show the inner order according to loads of weight and the significance of the space. The chapel volume consists of larger elements for defining larger space and activities, and in the service building, there are smaller elements for more diverse use.

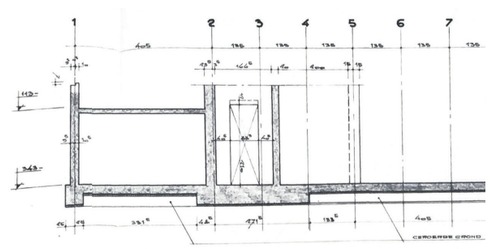
In the section, the elements are located according to their weight from the bottom for the heavier ones to the higher for the lighter ones.




The condition of the site ground



The plan of the deep concrete base (chapel)



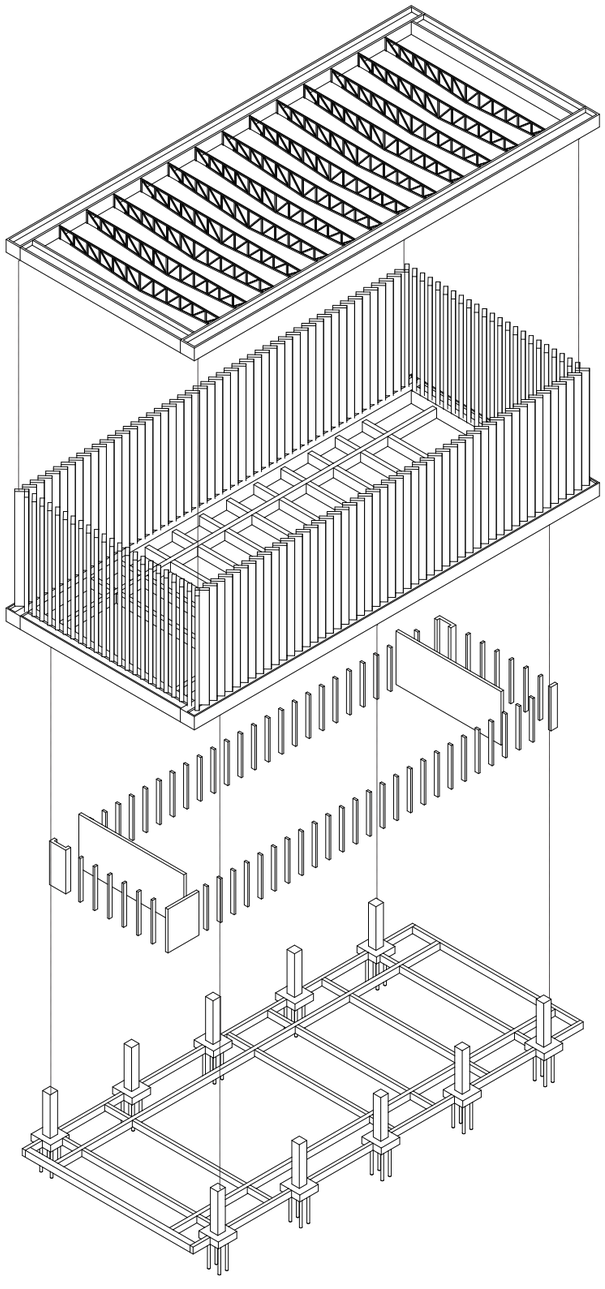
The section of the shallow concrete base (service building)

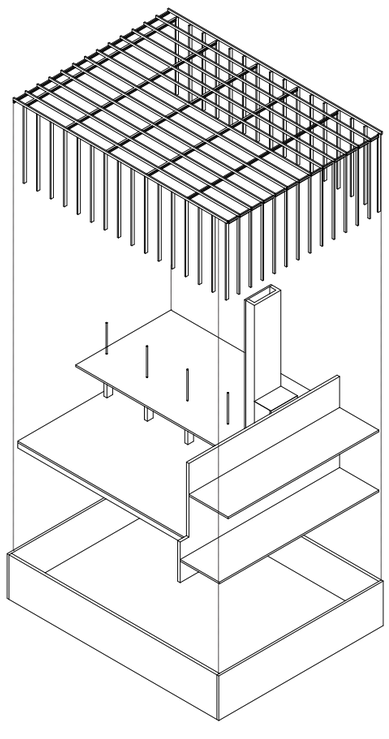
## 2.3.1 Soil & Foundation

The ground as it is shown in the table is mostly consisted of layers of sand. And by probing, the highest pressure and density of it appeared at a depth of around 7.5 meters and the depth of 17.5 meters.

To build foundations on the sand there were two ways formulated in the site, one is by deep and dense columns as deep foundations that hold the upper structure together, and another is by forming a light and shallow box foundation that floats close to the surface of the ground.

Both two strategies were used. The deeper foundation was built to the denser layer of the sand to hold the heavier main chapel. And the shallow base was built for holding the lighter service building and its basement.





**CHAPEL ROOF STRUCTURE:**

-IN-SITU R.C. GABLE BEAMS
-PREFABRICATED STEEL TRUSSES

**CHAPEL STRUCTURE:**

-POST TENTIONED MASONARY PILLERS
-IN-SITU R.C. GABLE BEAMS

**ACTIVITY CENTER STRUCTURE:**

-REINFORCED CONCRETE COLUMNS
-REINFORCED CONCRETE WALLS

**FOUNDATION:**

-REINFORCED CONCRETE COLUMNS/BEAMS
-REINFORCED CONCRETE DEEP BASE

**SERVICE BUILDING ENVELOPE:**

-STANDARDIZED STEEL COLUMNS
-STANDARDIZED STEEL BEAMS

**SERVICE BUILDING STRUCTURE:**

-REINFORCED CONCRETE COLUMNS/BEAMS
-REINFORCED CONCRETE PLATES
-STEEL SUBSTRUCTURE
-BRICK DIVISION WALL (LOAD BEARING)

**BASEMENT FOUNDATION:**

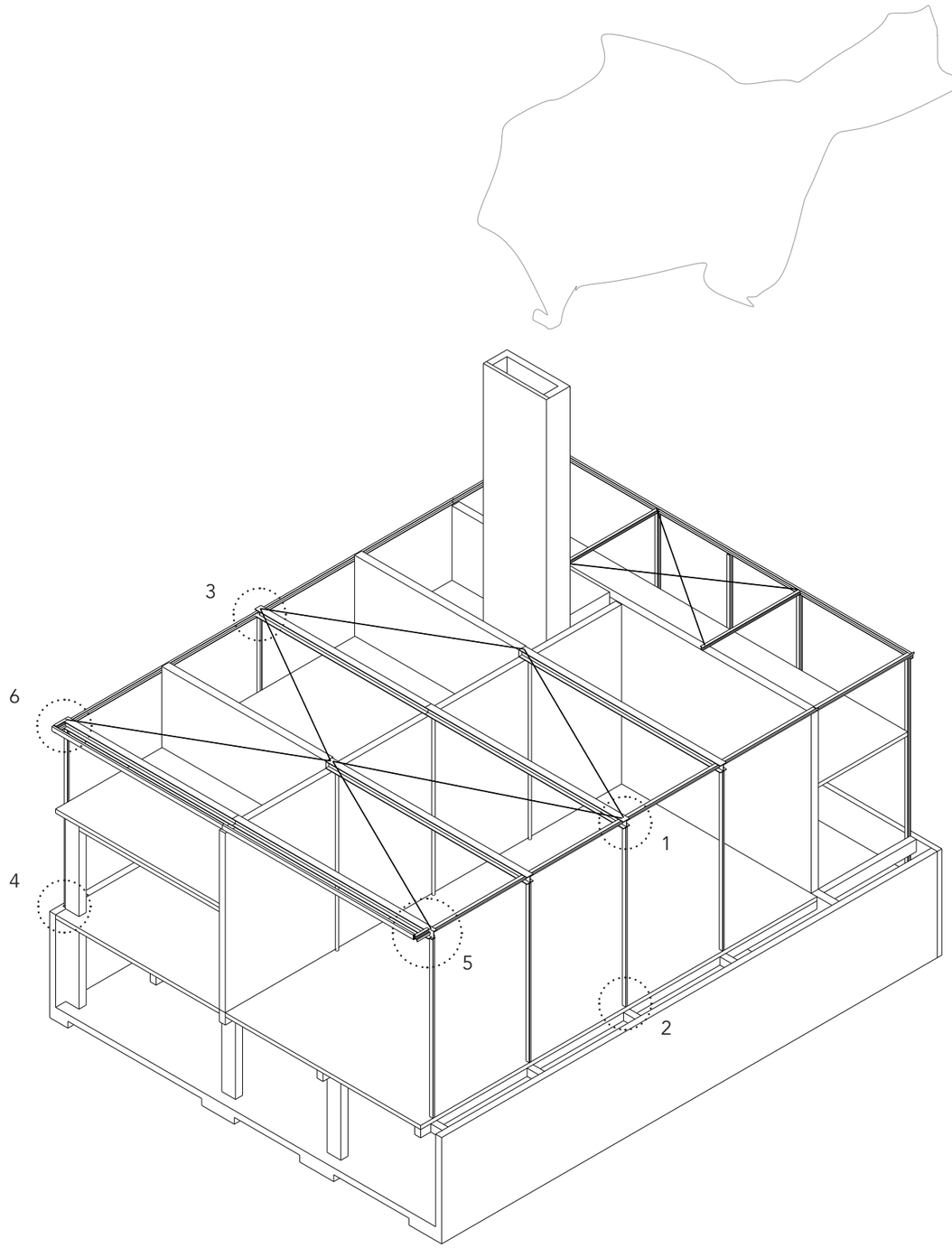
-REINFORCED CONCRETE COLUMNS/BEAMS
-REINFORCED CONCRETE SHALLOW BASE

## 2.3.2 Structural Systems

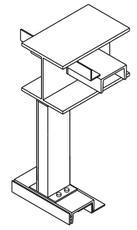
The two volumes were designed with different structural systems from the foundation to their envelopes. The design principle might be following the different characteristics of their use, significance, and needs.

The chapel and the community center below it were structured by heavy materials of reinforced concrete deep base and brickworks pillars as the facade, and light trusses at the top. The volume itself is designed in a definite way with a free plan under it for the community center.

The service building in contrast was structured with a shallow concrete box as foundation and classroom space, and some columns were integrated with it to form the flooring for the ground floor and first floor. Brick division walls were also used for supporting the floors and the roof. And the roof consists of steel profiles that are held by the steel posts for hanging the facade.

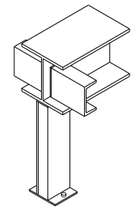



detail 01:
D IE 26
L 55
C NP16
C NP14 with plate



detail 02:
C NP14
strip 8*60
thermal strip

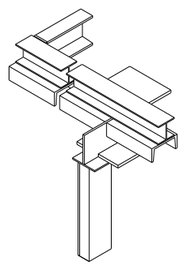
detail 03:
D IE 26
C NP16
C NP14 with plate



detail 04:
C NP14 with plate
plate with screw anchors

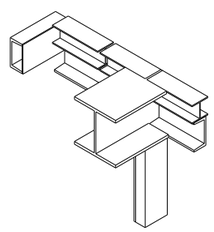
detail 05:
D IE 26
C NP16
C NP14 with plate

D IE 10
C NP16



detail 06:
D IE 26
C NP16
C NP14 with plate

D IE 10
C NP16 with plate







### 2.3.3 Service Building Structure

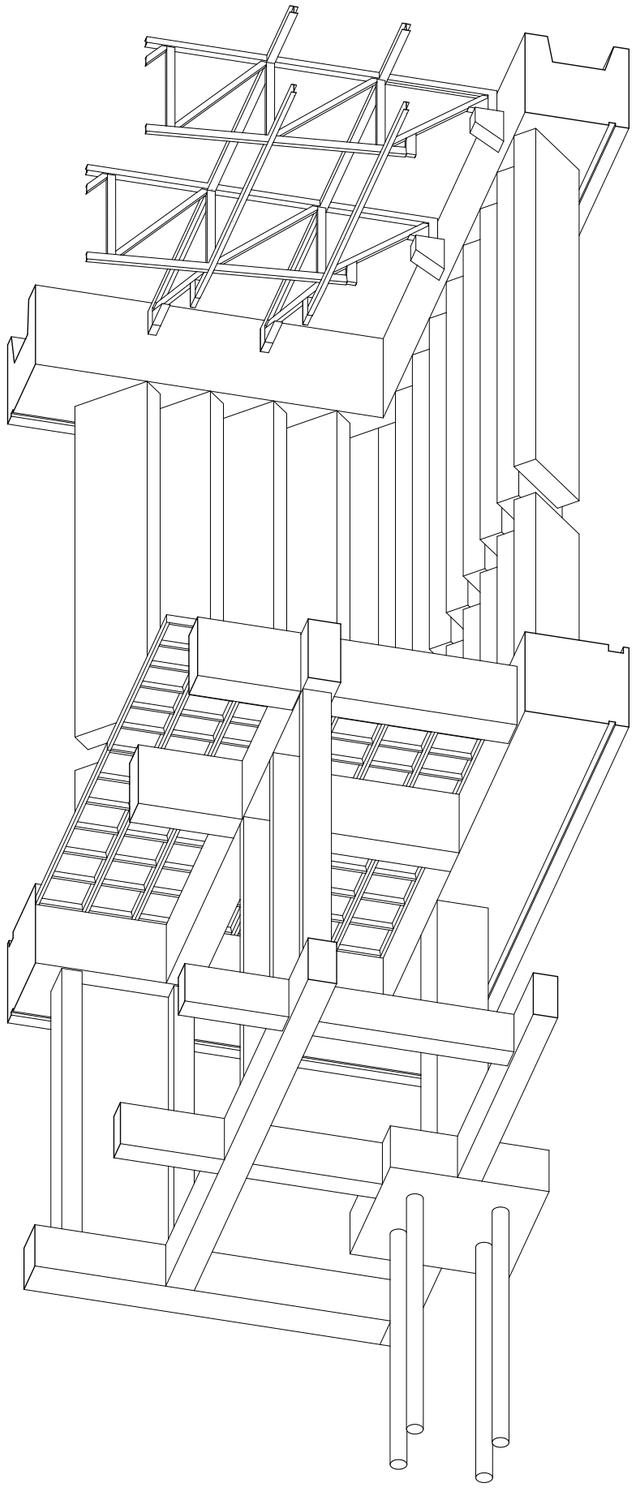
The structure system of the service building was done with multiple materials including concrete, brickworks, steel columns, and steel beams. The reason for a mixed material structure might be because of the limit of the budgets, and to efficiently place different materials where it functions utmost according to their properties.

The base was formed with concrete in situ as a shallow base in the soil. The R.C. beams and columns hold the concrete plates for floors and on these form a ground for lighter structural material of masonry walls and steel columns.

There are several types of bricks used in the building for their different texture, weight, and ability of sound and thermal insulation. Also, brick was the most common product at the time and very feasible for use. The main brick walls in the service building separate space according to functions. Some of them hold the beams directly with anchors. And roof structures also were laid on them.

The use of a standardized steel profile in the service building is prominent. It created a light feeling of the space in contrast with the masonry structure, and it freed the facade and envelope elements to enable sufficient and controlled light in each space. There were just a few different profiles of steel applied in the design, however, by variations, the structural system was clearly articulated.

The result of the pursuit of a modular system turn out into a highly modulated grid system on which the envelope of the building could be further attached unto.



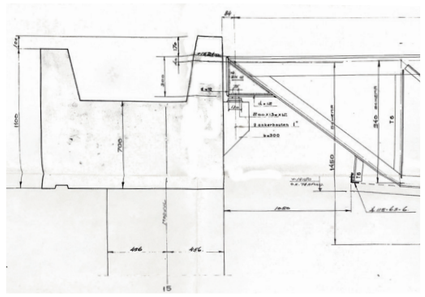
roof structure:
gable beam
trusses structure

masonry pillers
-with r.c. inside

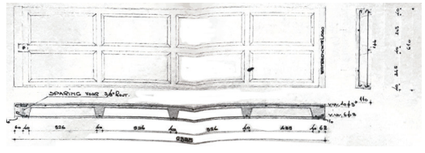
lower gable beams

concrete base
-concrete columns & beams
-prefabricated concrete slabs

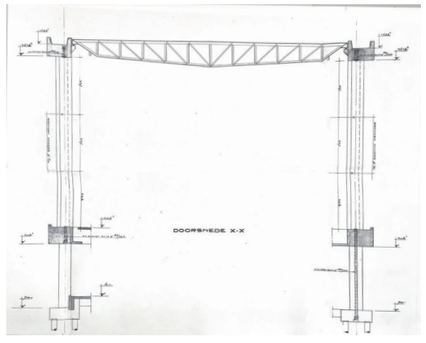
deep foundation to -15m



The steel trusses are put on the concrete gable beams with designed joints.



The chapel floors are prefabricated hollow core slabs with designed modules.




The force of the chapel structure is directed from roof to the gable beam to the post-stressed pillars than to the concrete structures and the fundation.

### 2.3.4 Chapel Structure

To achieve the span and height of the floating chapel and its textured brick pillar facade, a reinforced concrete net was designed to distribute the loads. The result was large concrete columns and beams throughout the structure and a deeper foundation to stabilize its weight of it.

Although there is a look of the pillars brickworks of the floating chapel, the inside of them is filled with tensioned steel and concrete to make sure all the pillars together with the huge gable beams become solid frames to form the four sides of the chapel box. And with the beams in the lower surface of the box for stabilizing, the roof could be opened with a light steel truss system with a large span and carry the least weight and moments.

The trusses are put on the gable beams with a specially designed neck joint for them. These necks were cast together with the gable beams with reinforced steel inside them.

The flooring of the chapel was made with 60cm * 240cm prefabricated concrete slabs. They were attached to the concrete beams after the structure of the chapel was done.

## 2.4 SKIN

The envelope of the volumes form a valuable part of the church complex as one of the main tryings of the architect was to define a new relationship between the church and its surrounding. The result was profound with a semi-opened brick chapel and almost all opened service buildings.

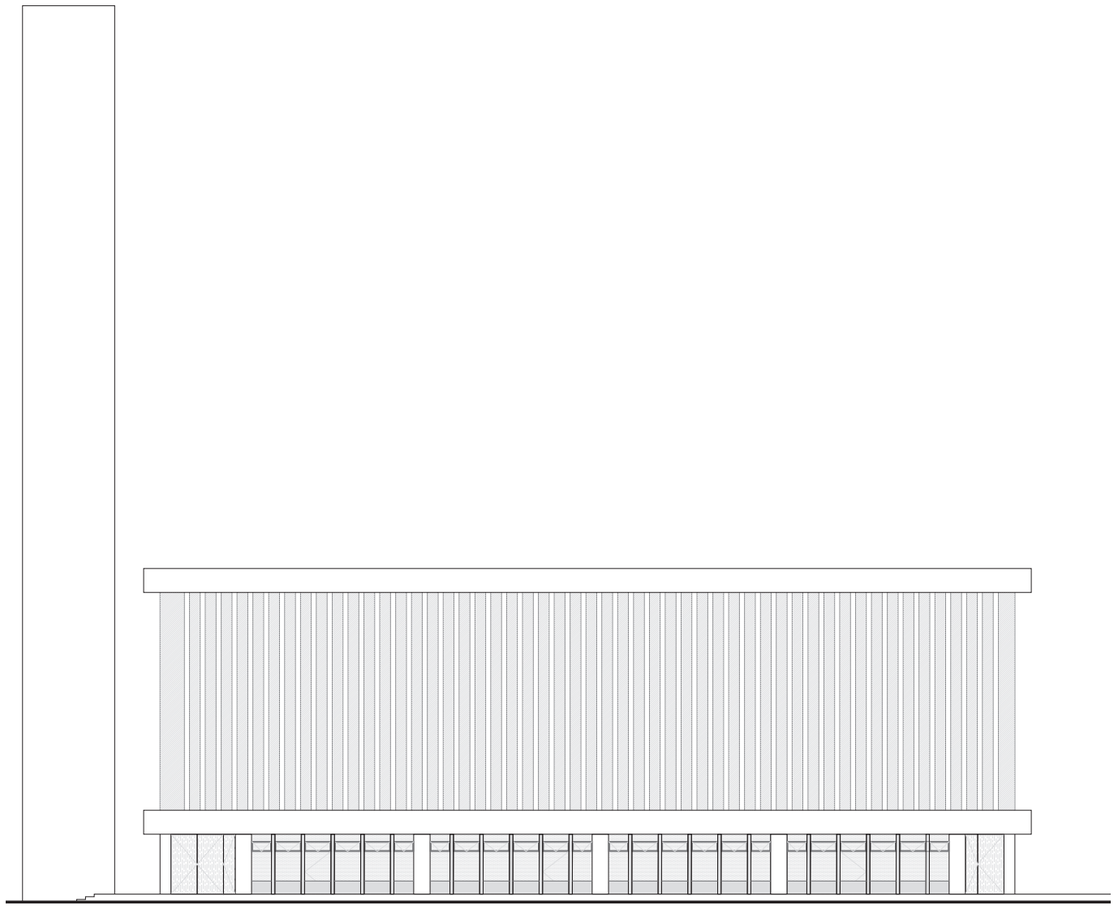
Another try of the architect was to test the light and space effects with different materiality and systems. Thus in this building, the two main volumes are covered with a glass facade with the integration of different materials and structures. The structure and the envelope together form the inner and outer space and define the texture and atmosphere at the same time.

The front facade of the street was clear of the movements of the street. The tilted pillars give an impression of changing and moving while passing through at different speeds. The openings of the community center beneath also become a dynamic interaction to the urban activities. And the effects of the facade stimulate creative exhibitions and gatherings in them.

**Elevation street - speed & mobility**

**Elevations street - dynamic boundary**

**Facade and inner activities**



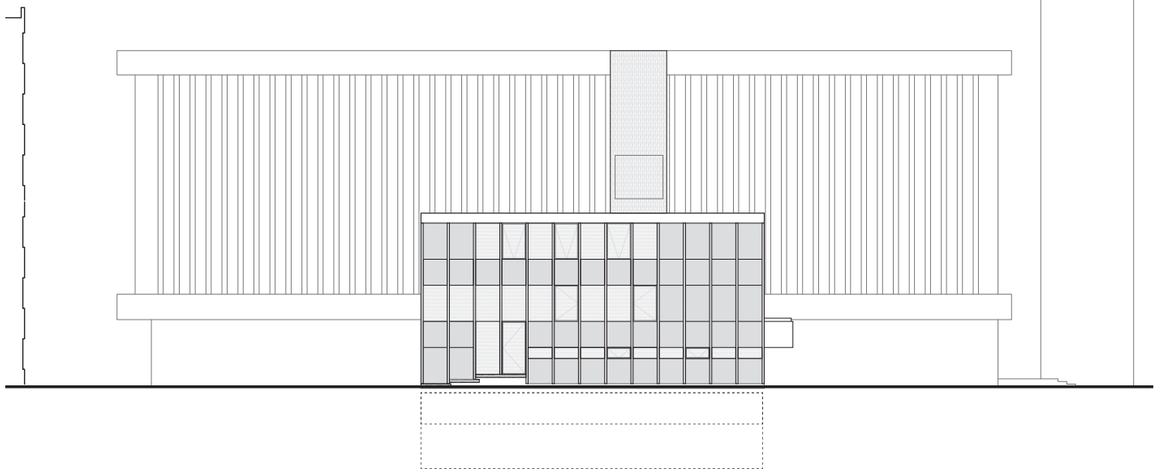


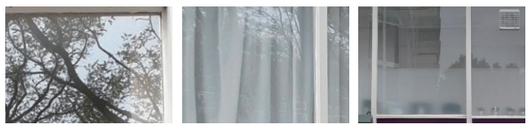


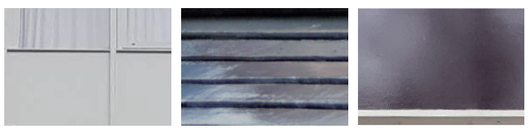
## 2.4.1 Front elevation- material

The materials used in the floating chapel volumes are mostly plain materials of concrete with white paint, brickwork, wood for doors, and glass for windows.There are no ornaments in this Protestant church. The simple material reflects the surroundings with shadows and reflections. And the simplicity directs the experience to the materiality itself and the space around it.



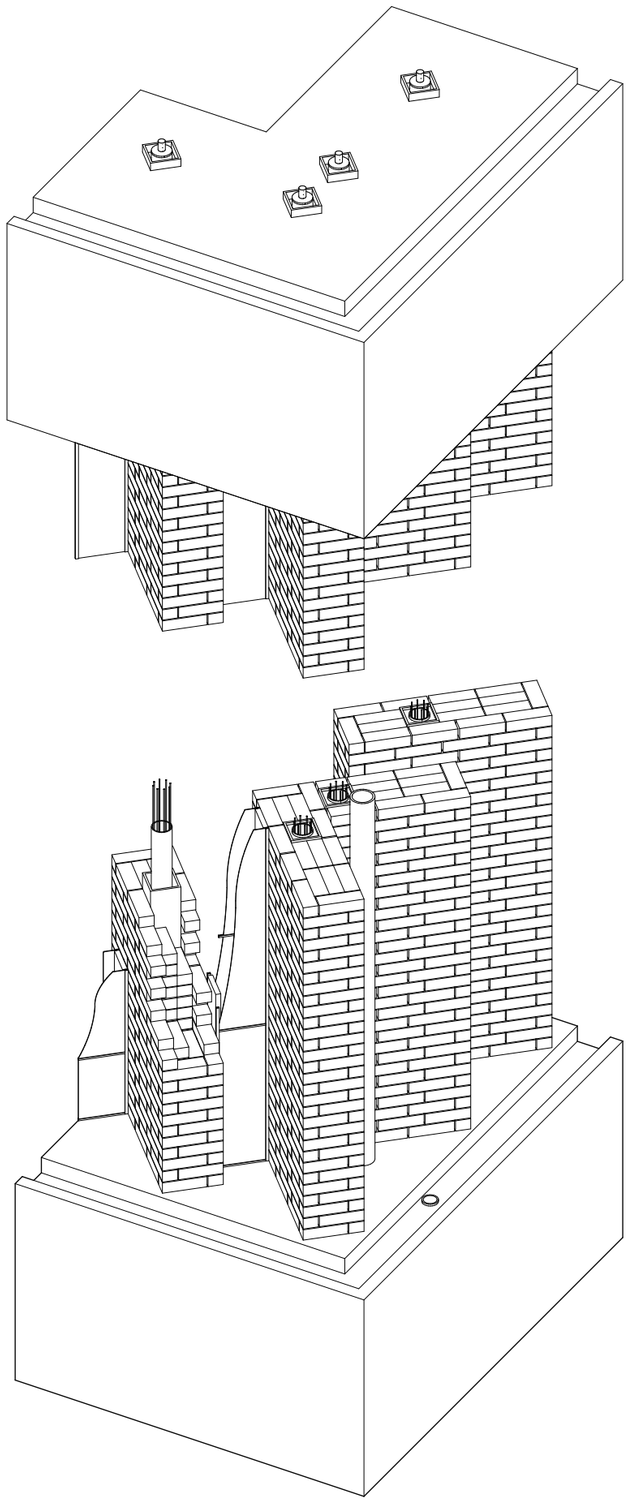






## 2.4.2 Back elevations- material

The material used for the service building is simply modular of painted transoms and glasses in the steel framework. The module of the frame is in a smaller dimension of 135cm to form a friendly scale. The glass facade is with different transparency according to the inner use and reflect the surrounding.



post-tensioning screw rods

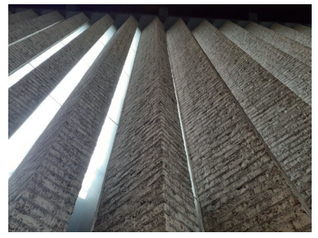
upper gable beam
-in-situ concrete
-gutter

glass profile
-double single profile glass
-steel frame with sealant
-wood attachments (in between)

masonry pillers
-brick work in-situ
-pvc tube (later filled with motar)
-round steel profile column
-steel rods *8

lower gable beam
-in-situ concrete
-gutter
-water pipes

post-tensioning process



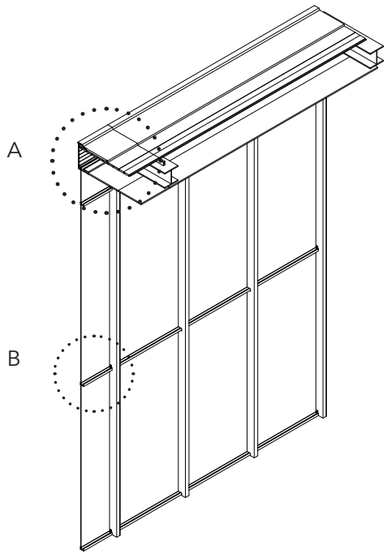
light of the facade

double glass of the facade

## 2.4.3 Chapel Envelope

Gables beams
The upper edge beam was cast on the above-mentioned columns, it also serves as a gutter for the flat roof of the church hall. The skeleton of the outbuilding is partly made of steel and reinforced concrete. Vertical Oregonpine uprights are attached to the steel construction of the facades, incorporating the window frames and glass sandwich panels. The concrete tower is cast in a traditional framework with continuous cable glands. Adjusting nuts have been fitted on the inside of the cable glands so that the formwork could be easily adjusted to the correct width. posed. Always two sets of complete framework were used. This made it possible to achieve that during the hardening of one part, the other could already be set and made ready for pouring.

Post-tensioned masonry
Post-tensioned masonry in the heavy gable beams of the church hall, steel fire tubes have been poured in above and below, fitted with welded plates with the necessary holes for the post-tension wires. The columns that form the facades of the church hall are directly placed on the lower gable beam. During the bricklaying, a p.v.c. tube raised., whereby a continuous opening was created in the core of the columns that connect to the above-mentioned fire tubes. After the top gable beam had been poured and had been sufficiently hardened, the steel wires were installed and tensioned with a jack. 8 wires are included per column. After all, the wires had been tensioned, and the vertical round openings in the columns were filled with a mortar of cement trass and water. This was done layer by layer from above to prevent too much tension in the columns, whereby the soft filling would press through the masonry. The masonry column was re-tensioned to give the whole great rigidity and to prevent the masonry columns from shrinking loose from the edge beams. This post-tensioning of the wires has resulted in a compressive stress per column of approximately 18,000 kg. The post-tensioning was done vertically here for the first time in the Netherlands.




1

Glass wall of the service building:

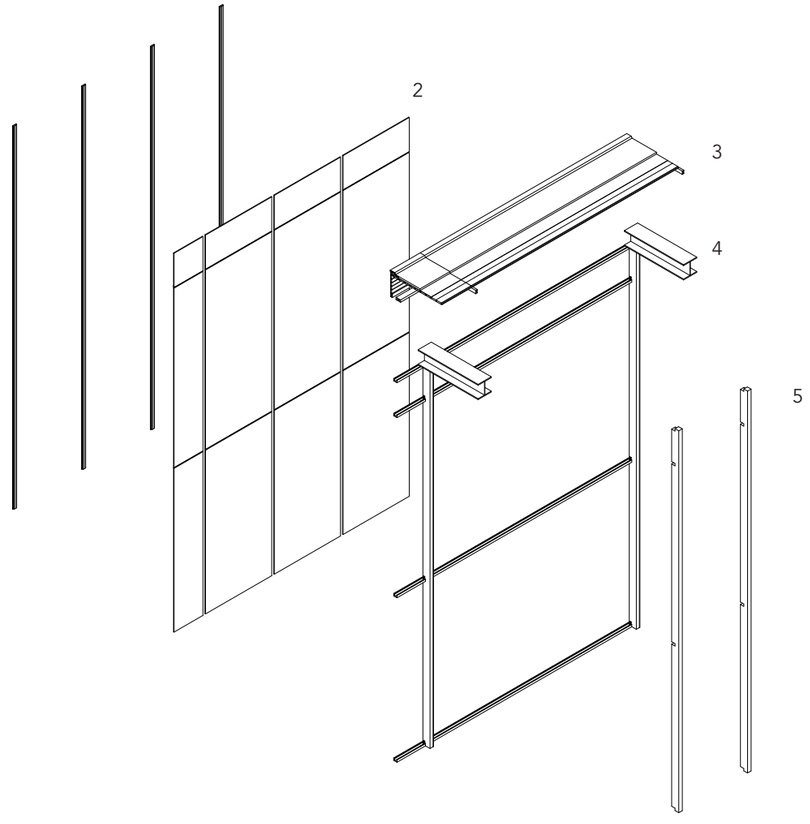
1 timber posts
- fixed in from outside for holding glass

2 single glaze glass profile
6mm* 135cm* 240cm

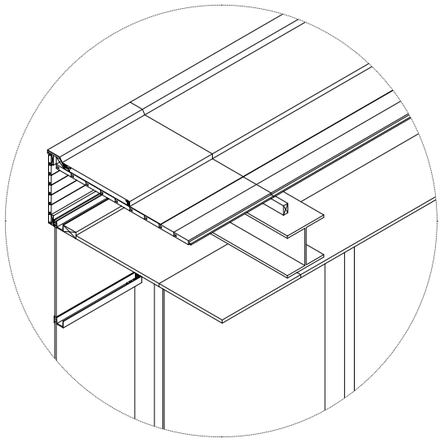
3 timber post & beam roof
- with 20mm rubbles
- waterproof foil

4 main facade structure
- fastened on steel columns
- attached with a galvalnized steel element to hold the glass.

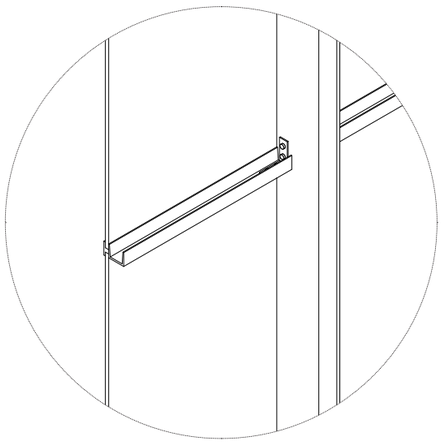
5 sub frame for attaching glass





A detail of the roof



B detail of the glass connector and sealant

## 2.4.4 Service building glass wall envelope

The composition of the glass wall of the service building which connects the social hall to the courtyard is comparingly simple to the one of the chapel.

The module is 135cm repeating. There is a special steel element that holds the glass to the main structure, and a timber post seals the frame from the outside. The design causes a cold bridge through the structure although sub-elements are covering the main frame.

The roof is designed without mentioning the insulation inside. However, there are layers of waterproof foils and rubbles on the top of the roof.

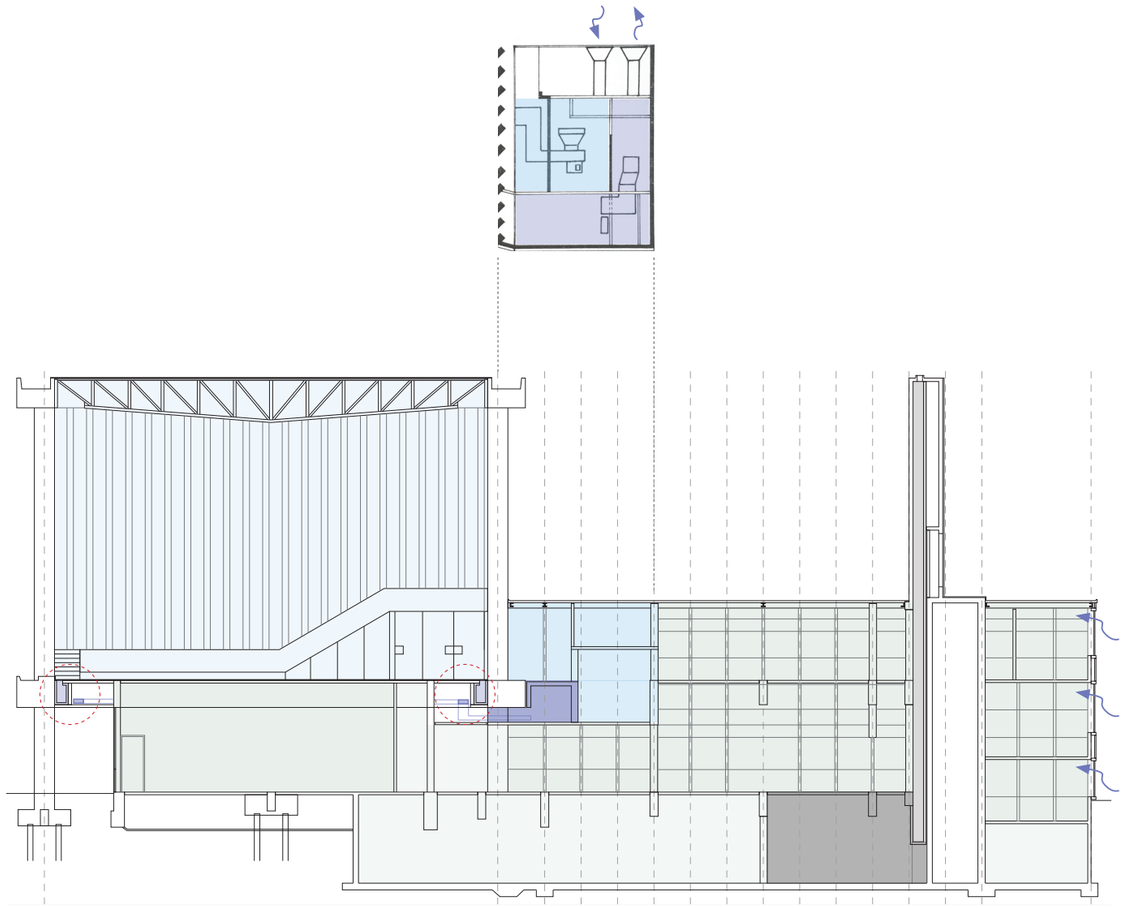
# 2.5 SERVICE SYSTEM

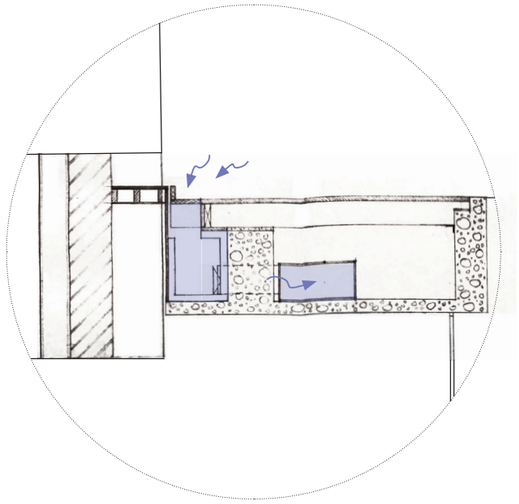
All three of Drexhage's churches were equipped with top service systems of the time. They all had individual electricity power rooms and centralized ventilation and heating systems. However, it also became the main reason for the demolition of two of them as lots of budgets that could be used in other places were distributed to the service systems. And the shrunk church communities no longer could afford the costs.

In Christus Triumphatorkerk, the centralized heating and ventilation system was reduced to be only used in the chapel to lower the running duration of the service rooms and the energy cost of the building. However, as the energy crisis in recent years has risen, the energy cost is expected to be over again with the funds. In the winter of 2022, they will only have the number of funds to heat the church half as before. This means the staff and church members will have to participate in the activities in half-heated rooms.

The church is considering collecting more funds from the members, and also they tried to manage more income through activities and renting rooms.







central ventilation system - air outlet

central ventilation system - clean air

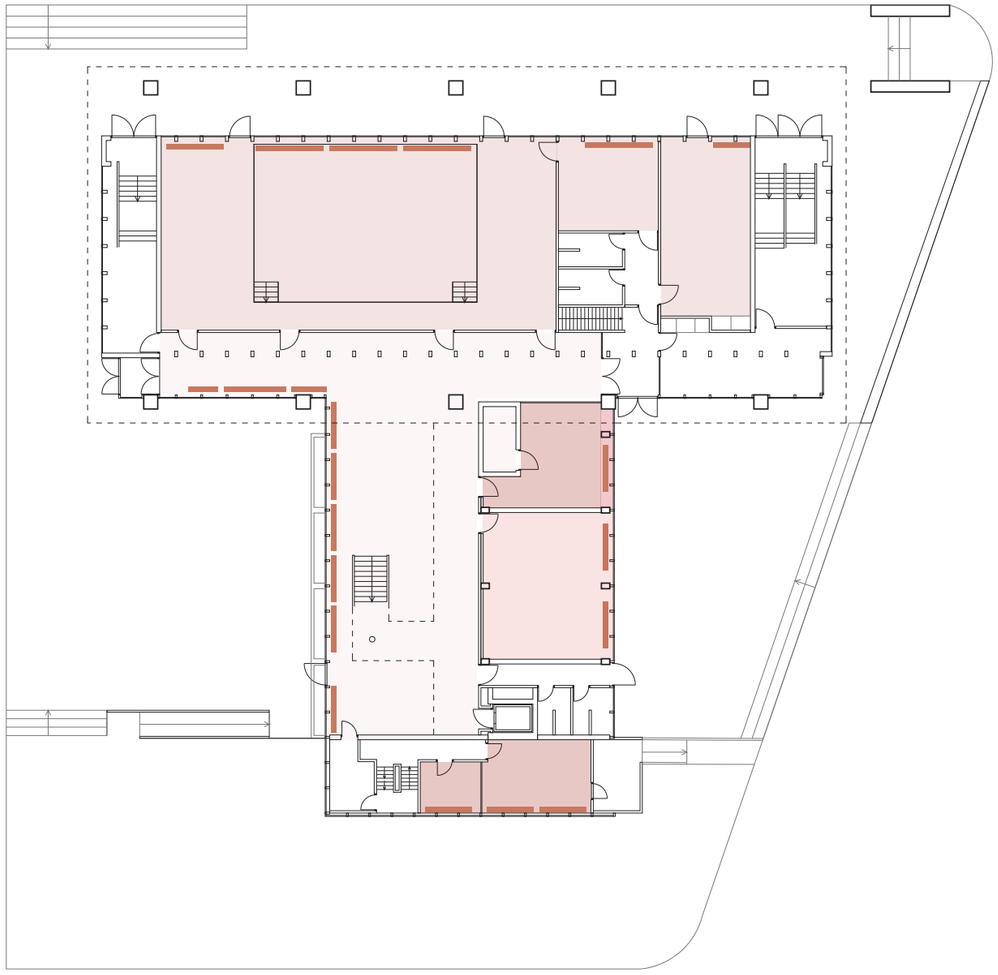
natural ventilation

eletricity power room

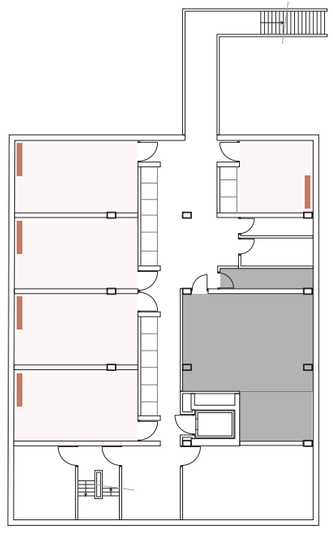
## 2.5.1 Ventilation System

The fan room of the chapel ventilation system is located on the first floor next to the chapel with louvers in between the indoors and the outdoors. The location is at the central spot that connects with different rooms to ensure it can work for most of the rooms. The lifted ventilation room also benefits the ground floor surroundings to be accessible.

The air inlet was combined with the benches, however, later they were not in use and substituted by direct louvers between the fan room. Air ducts of the chapel were specially designed right below the cold facade so that the cold air would go down and out to the fan room. The separate fan room also keeps the chapel quiet.







air warmed area

air ventilation machinical room

boiler warmers

boiler warmers area

eletricity boiler room

## 2.5.2 Heating System

The church's heating is mainly done by separate room boilers and a set of heating systems combined with the chapel's ventilation system.

The benefit of using boilers is that the temperature and the use can be controlled according to needs. The benefit of using an air heating system in the chapel is that the room can be warmed faster by having warm air directed into the room, however, it also costs more energy and budget. Due to the materialization of the chapel, the heat-lost during winter is high.

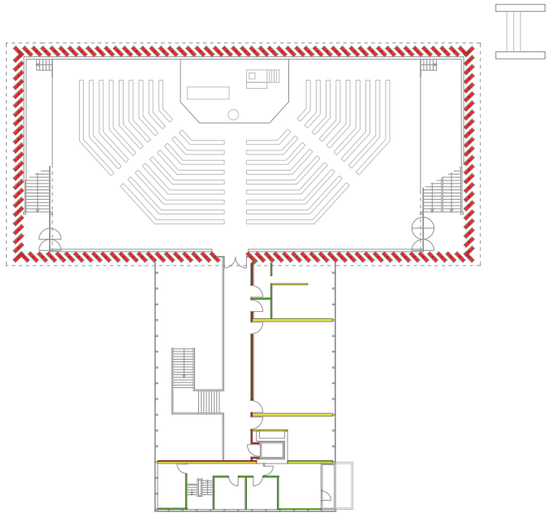
# 2.6 MATERIAL&TEXTURE

The architect mentioned in the commissioning ceremony of the church that 'bare walls have something to say' . The new church is a combination of glass walls, semi-opened brick walls to total brick walls. Using of bricks in the building has a symbolic meaning in the Protestant tradition.

The guideline for this Protestant church design was to make a place of modesty and refrain from decorations. Thus the inner walls of the church were mostly following the traditional texture with brick walls and white paint. Same in the main chapel, the paint was slightly bent so that the original texture of the brick could still be seen.

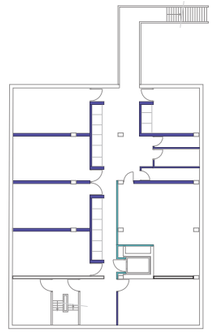
Multiple kinds of brickwork were used in the building for structural supports and inner division. They were placed according to their properties. The heaviest and strongest bricks were placed closer to the foundation, the brickworks with better surfaces were placed around the public area, and the lighter and refractory bricks were used in the service areas.

Few walls have real structural functions for supporting the roof: the divisions of the council room and the long wall next to the elevator.



refactory brick (vuurvaste steen)
porisostone (porisosteen)
facingstone brick (gevelsteen)
concrete

porisostone (porisosteen)
dark grey brick (boerengrauw)
facingstone brick (gevelsteen)
concrete



dark grey brick (boerengrauw)
grey hard brick (miskleurig hardgrauw schoon)
concrete

## 2.7 CONCLUSION

The tangible form and materialization of the church posts features for future redevelopments of design guidelines. A strong abstraction and interpretations of space and light were pursued in this post-war Modern church by the architect through means of modularity, industrialized components, and compositions of glass opening systems.

Through the preliminary analysis of Christus Triumphator Church, it is clear that the designer designed the complex with intangible degrees of importance and hierarchy from materiality, space, to urban plan for the changes in the expected future. Would there be a code there designed but disguised under labels of ‘functions’ and ‘requirements’ of the past church community? How to reduce the redundant and manifest these possible codes of orders? New boundaries are needed in the emerging activities and groups to the building. How to relate these orders in the designed material, space, and urban form into sustainable new forms for the nowadays church complex? And where are critical changes in the materialization that could enhance the overall life-span of the material and the church complex for the future?