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The Church of Saint James in Leuven
From 55 years of Closure to Reuse

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PREFACE

Working on the church of Saint James was a very interesting journey. This topic was something that caught my eye in my first year in studying in Leuven. Wondering why this church has been closed for so long, I hoped to contribute to its reuse.

First of all, I would like to thank my promoters and assessors. To professor Thomas Coomans for guiding the thesis in all its aspects. To professor Barbara Van der Wee for aiding in the research by design. To professor Els Verstrynge for guiding the structural aspects.
Furthermore, I would like to thank Studio Roma for allowing me to do an internship in which I worked amongst others on repurposing of churches. In addition, to provide me with the needed documents of the current project and access to the church. Besides that, I would like to thank Joke Buijs and Lien Neys (city of Leuven), Petra Griefing (Stad&Architectuur) and Els Mercelis (parish of Saint James) for their time.

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ABSTRACT

This thesis research deals with an exceptional case of repurposing of churches: the church of Saint James in Leuven. What is usually the cause of non-use of a church is a decreasing number of parishioners, however for the church of Saint James it is because of structural instability. Its location at a former swamp area and a foundation system on which loads where added over time for which the system was not designed, contributed to this instability. This ultimately led to the church's closure in 1963 and a rather heavy intervention in 1971 adding the current shoring structures.

The closure led to the church's non-use. From there until now, several studies and some interventions have been done related to the structure of the church. A project is recently initiated for stabilizing the church and remove the shoring after which the church can be reused again. However, no new use has been decided upon yet. The thesis research contributes to this, investigating the possibilities for reuse.

This research will be done in two main parts: a part assessing the church and its context and a part making a design. The first part is researched by literature study, archival research and site visits. What are the heritage values of the church? Why did the closure take already 55 years? What relevance did the several studies have for the ongoing project?
The second part is done by research by design. What function can this church have, without diminishing the values of the building?

Finally, this research can contribute to the debate on its future function. In addition, it provides a starting point for further research towards the church building history.

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1 INTRODUCTION

Fig. 1.



INTRODUCTION

This thesis research is linked to the issue of reusing churches. However, the Saint James's church's non-use is not caused by the decreasing number of members of a religious community as is usually the case, but by stability problems of the building which led to its closure and neglection.

The church of Saint James is located in the north-western part of the city centre of Leuven, next to a square carrying the same name. Furthermore, it is enclosed by the main street, the Brusselsestraat the Pelgrimstraat and the Kruisstraat. Regarding its legal status, it is protected as a monument, and the nearby square with its facades is protected as townscape.

The church is an east-west-oriented cross church with a west tower, a three-aisled basilic nave, a wide transept and a one-aisled choir. In the past it used to be a stop on the pilgrim route to Compostela. The church is a palimpsest of which the earliest mentioning dates from 1187. However, the oldest part of the current church, the bell tower, is from the 13th century. The other parts, the nave and the transept, were realized in several construction stages of the 13th until the 16th century. The latest part is the classicistic choir which dates from 1785. It is hypothesized that because of the several added parts to the church, stability problems occurred. Besides that, the church is situated in the valley of the river Voer, which results in a bad underground for foundations. This resulted ultimately in the church's closure in 1963 because it was esteemed too dangerous to hold masses. The desecration of the church was a fact in 2002.

The topic of repurposing of churches is currently much-discussed in Flanders. The region of Flanders is (among others) spatially determined by Christianity, many village centres are built around a church. As such, it often has a high urban and landscape value, besides its architectural and historic value. Deeply rooted in society, a church has high cultural and symbolic values as well. As the current trend of desecularisation progresses, the historically grown amount of churches is decreasing in (religious) use. In some cases a church is only opened during the very few worship services it still gives and besides that closed. In other cases, the church is not used anymore, possibly leading to dilapidation. Demolition of a church is to be avoided as this is an irreversible loss of heritage, and a

Fig. 1. View on the church of Saint James from the adjacent square [https://www.vrt.be/vrtnws/nl/2018/04/06/markante-plekken--de-sint-jacobskerk-in-leuven/]

loss of identity for society.
On the other hand, there is a general need of additional space for multiple social functions, such as for instance youth movements. This fuels the debate whether or not these less used churches might be important spaces to house other functions than their originally intended religious ones. These socio-cultural functions which need space are well suited for churches because of their public character as the original function of the church had a public role as well being in the centre of society.
A case study concerning this topic is done on the church of Saint James in Leuven. As stated before, this is a rather exceptional case, as its non-use is a result of instability problems. Usually it is because of a financial problem with maintenance or a decrease in parishioners. Hence, this case is in contrast with the usual cases of repurposing churches. Due to its closure, it has (partly) lost its place in society and the urban fabric as an identity bearer and its exceptional value has disappeared from the collective memory. The repurposing of this church introduces as such other additional challenges.



Fig. 2.

Fig. 2. Areal view on the church [https://www.google.be/maps/]
Fig. 3. City of Leuven with the indication of the church of Saint James [Pieter Vermeir]



Fig. 3.

1. Focus and Aim of the Thesis

The aim of the thesis is to propose a repurposing project for the church of Saint James in Leuven. To well argument this proposal, a thorough understanding of the church's history and structural problems is needed:

- What is the church's historical context?
- The main issue of the church of Saint James is its structural instability which led to its closure. What caused this instability?
- After years of studies done on the church, which relevance did this research have in light of the recently started project to solve the instability?
- What caused the solution for the instability to take 55 years?
- Which impact had the closure of the church on its parish?

Regarding the repurposing project, the following questions are asked:

- What are the heritage values of the church?
- How can a church which is already closed for 55 years be brought back to the collective memory of which it has partially disappeared?
- What function or which multitude of functions can be proposed for the reuse of the church?
- How can a new use take place without diminishing the heritage values of the church?
- What will be the role of the parish in the reuse of the church? Should a religious function still take place in the church?

In studying the topic, the main aim is the project. However, the understanding of the church past and present state will be discussed as well.

2. Methodology

The first part, stating the past and present state of the church and the parish, is done by means of a literature study. The literature study is used to compile the church's building history, structural studies and interventions done in the past. This is further backed up by archival research and on-site investigations. Much of the historical information is derived from R.M. Lemaire, R.A. Lemaire, Halflants and De Kempeneer, who on their turn bases their research on the studies by Van Even.
The archive of prof. Raymond M. Lemaire proved insightful for building history and the intervention done in 1971, resulting in the present shoring structure. Besides that, the archive of the church wardens of the parish of Saint James, the city archives of Leuven and the archives of the heritage agency of Flanders helped to get an insight in the impact of the closure and the difficult process of solving the instability. Furthermore, information on the debate linked to the issue of stabilizing and the needed subsidies was found here as well.
Making an inventory or roombook of this church was not possible. Either there was too much scrap to have a clear picture, or either the construction site hindered getting a full picture.
As a conclusion to this first part, the church's heritage values are determined.

In the second part, the church's urban context is analysed in the past and the present. It is not the aim to make a full analysis of the neighbourhood but rather to provide a first start for later research by design. To get the needed data, on-site investigations were done.

The third part, a repurposing project, is done by research by design. Before proposing a project, the architectural qualities of the church are analysed to assess the feasibility. To acquire the needed plans, the laser scan of the Geomatics Research Group of the KU Leuven is used, with additional information gathered from older (manual) surveys and pictures of the church.

Fig. 4.

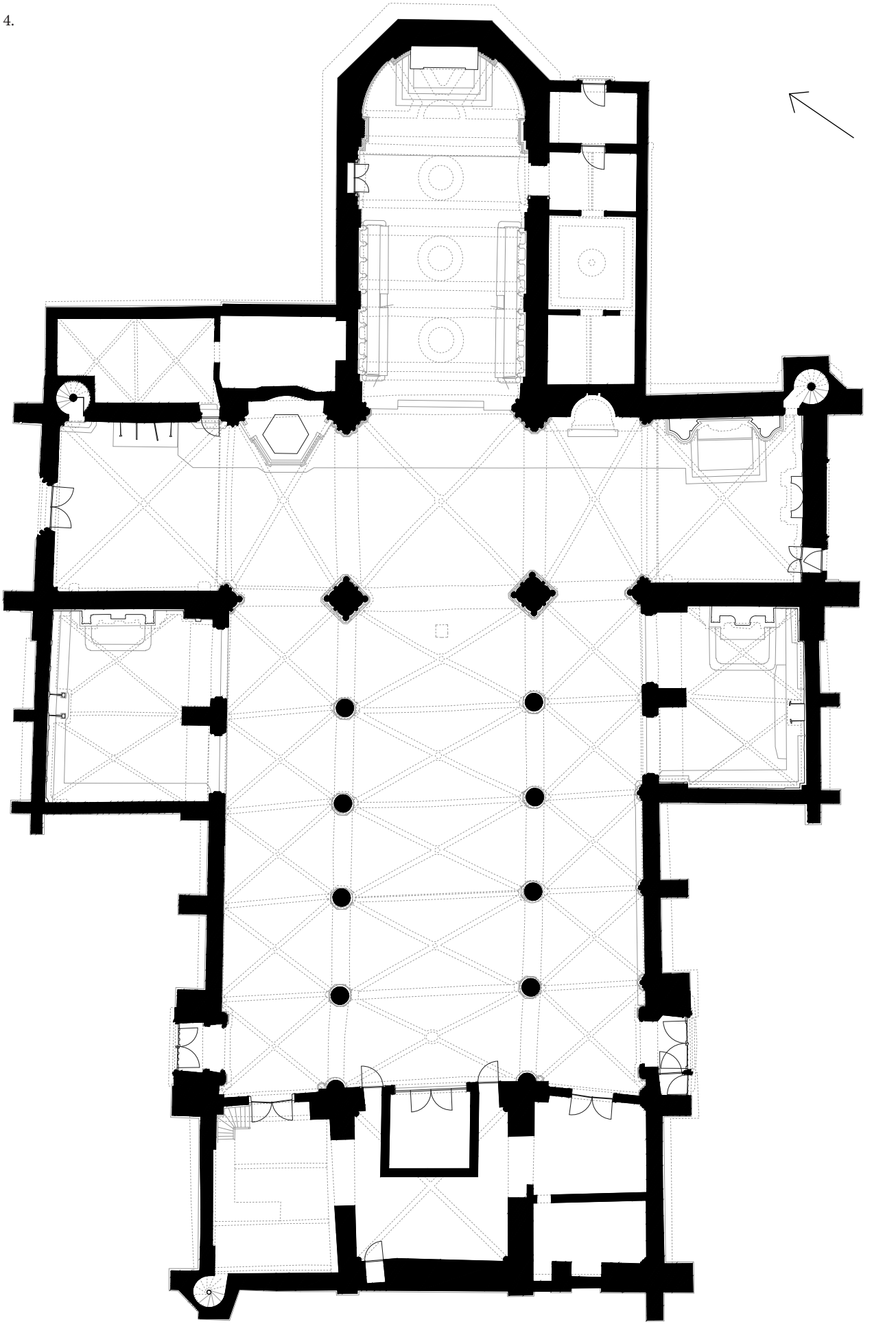


Fig. 4. General plan of the church of Saint James (scale 1/250) [Pieter Vermeir]



SAINT JAMES'S CHURCH

Fig. 5.



SAINT JAMES'S CHURCH

In order to present a study on the repurposing of the church of Saint James in Leuven, its current and past state must be understood well. Firstly, the church's history is summarized. In the second part, the structural behaviour is covered in the past, the present and the near future. The third part handles on the 55-years period of closure and the debate on the church's future use. Lastly, the heritage values will be defined.

Fig. 5. View on the main nave [Halflants and De Kempeneer, 1963, p. 155]

1. History

In order to provide a good understanding of the current status of the church of Saint James, a summary of its history is made. It consists of three parts: a general building history, the link with its patron saint's pilgrimage and the rather exceptional sacrament house residing in the church.

1. 1. Building History

1. 1. 1. General History

The history of the church of Saint James in Leuven starts probably at the end of the 12th century, the exact date remains unsure. In the township "ter Biest", which was located just outside the first city wall of Leuven, a chapel was constructed right next to the main route to Brussels. Whether this was a chapel or a church is not entirely sure, as in the 12th century the church of Saint Peter was the main church of several 'ecclesiae'. When the church was mentioned for the first time by name however, it was referred to as a 'cappellae'. The parish at this time was served by chaplains of the parish of Saint Peter. Chaplains could only minister some sacraments (confession, eucharist, anointment), other sacraments could only be ministered in the main church. The founding of the parish of Saint James occurred at the same time as those of other parishes situated outside the first city wall (Saint Quinten, Saint Michael and Saint Gertrudis).[1]
Later, in 1252, the parish of Saint James (as well as Saint Quinten, Saint Michael and Saint Gertrudis) became an independent parish, caused by the growing population of Leuven. The priests were however still being appointed by the collegiate church of Saint Peter, but being an independent

1. Edward VAN EVEN, *Louvain monumental, ou Description historique et artistique de tous les édifices civils et religieux de la dite ville*, Louvain: Fonteyn, 1860, p. 216.; Jacques HALFLANTS and J. DE KEMPENEER, "Un édifice monumental en péril: la collégiale Saint-Jacques à Louvain", *Bulletin de la Société et d'Archéologie de Louvain et environs*, 1963, 3/2, p. 130.; Koenraad VAN BALEN, Kristiaan NUYTS, Pierre SMARS and Dirk VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren gebruik makend van informatie uit vervormingsmetingen en scheuranalyse*, Leuven: Raymond Lemaire Centre for Conseration (KU Leuven), 1995, p. 2.; Hendrik CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven (1273-1803) met inbegrip van het archief van de rentmeester van het Sint-Pieterskappitel te Leuven (1552-1797)*, Brussel: Algemeen rijksarchief, 2005, p. 15.; Dieter NUYTTEN, "Naar Santiago De Compostella en terug: bouwgeschiedenis en stabiliteitsproblematiek van de Sint-Jacobskerk in Leuven", *Monumenten, landschappen en archeologie*, November/December 2008, 27/6, p. 35.

parish, the priests could minister all sacraments unlike the former chaplains. Besides that, contributions had to be payed to the collegiate of Saint Peter by the parish of Saint James. In 1454 the church of Saint James became a collegiate church as the collegiate of Incourt was impoverished and moved to Leuven. Most of the canons at the collegiate church of Saint James were professors at the university of Leuven as well and the collegiate would also hold the privileges of the university. The collegiate church was abolished in 1797, due to the republican decree posing the suppression of all secular collegiate churches.[2]

> *"A collegiate church is a church in which the worship is maintained by a college of canons."* [3]

Although the parish was the main parish of the city of Leuven besides the parish of Saint Peter in 1558, it still had a period of decay starting in the second half of the 16th century, probably because of the pestilence outbreak in 1578. It was only in the 18th century the parish started to flourish again. During the French occupation the church was closed from 1797 until 1802.[4]



Fig. 6.

Fig. 6. The limits of the parish of Saint James in 1600
[Callewier, 2005, Bijlage 1]

2. VAN EVEN, *Louvain monumental*, 1860, p. 221.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 130-131.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 2.; CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven*, 2005, p. 16.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 35.

3. https://vowb-vandale-nl.kuleuven.ezproxy.kuleuven.be/zoeken/zoeken.do (last accessed on 14/10/2018) (translated from dutch by Pieter Vermeir).

4. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 2.; CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven*, 2005, p. 17-18.

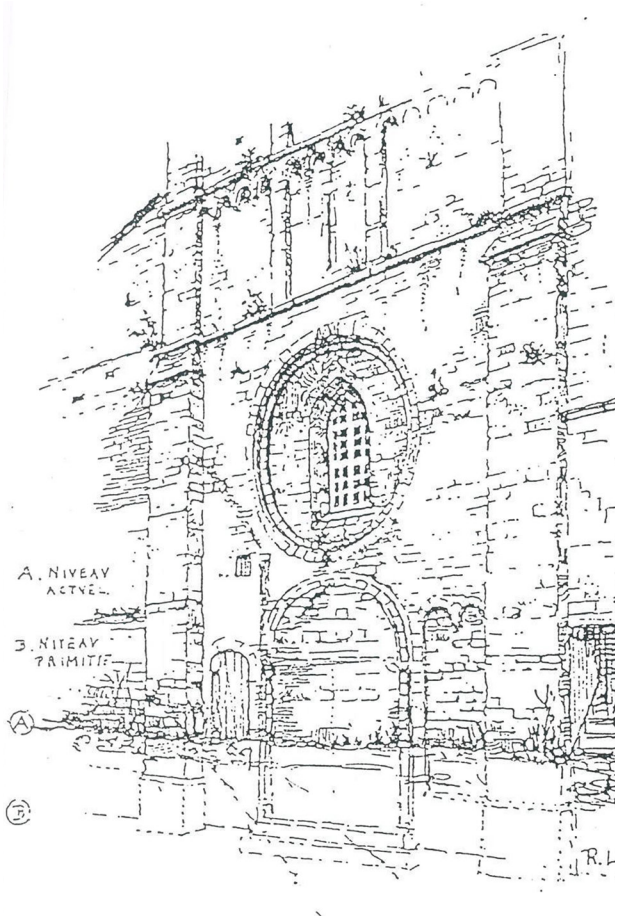


Fig. 7.

Fig. 7. Hypotised view on the past level of the Romanesque tower
[Van Balen, Nuyts, Smars and Van De Vijver, 1995, deel 2, p. 9]
Fig. 8. The plague in the parish of Saint James, unknown painter, 1587
[Leuven, Museum M]

Fig. 8.



1. 1. 2. Building History

- **Romanesque Phase (between 1220-1222 and 1230-1235)**

Of the Romanesque building phase, only the tower with its closed up rose window and portal remain. In 1943, canon Lemaire did archaeological research on this period of construction. Parts of the foundations remain: traces of the side nave walls and a staircase tower at the southwest corner of the tower. The floor level of this construction period is located at 1,2 metres below the current surface. Besides that, research was done on the Romanesque entrance portal and rose window. Based on more detailed traces in the tower (e.g. traces of the roof slope, former doors, corbels), a reconstruction of the former Romanesque church was made by canon Lemaire.[5] More in detail, the reconstruction of the rose window and the entrance portal was done by canon Lemaire as well (see Fig. 9-11). The first is based on pieces of stone found during excavation works, the latter after uncovering parts behind the existing masonry.[6]

The dating (between 1220-1222 and 1230-1235) of this building phase was done by stylistic comparison with other buildings in the city of Leuven. For the terminus post quem the similarities on both the general layout as well as the details between the portal of the church and the portal of the former Saint Elisabeth's guest house (1220-1222) are used as an argument (see Fig. 13). The framework of the portal of Saint James is slightly more refined, giving proof for dating of a later period. For the terminus ante quem, the tower of the Saint Michael church is used as argument. This tower was built between 1230 and 1235, after the former tower had collapsed in 1225. There are similarities between the tower of Saint James and (a representation of) the Romanesque tower of Saint Michael's (see Fig. 12 and 14), but the latter is much more elaborated concerning the buttresses. This indicates that it is probably of a later date and used the church of Saint James as an example.[7]

- **First Gothic Phase (1290-1300)**

During the first Gothic building phase, the arcade of the main

5. Raymond M. LEMAIRE, *La formation du style gothique brabançon: tome premier: les églises de l'ancien quartier de Louvain*, Antwerpen: Nederlandsche boekhandel, 1949, p. 22-25.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 4-5.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36.; University Archive, Lemaire Collection, n.836

6. LEMAIRE, *La formation du style gothique brabançon*, 1949, p. 22-25.

7. LEMAIRE, *La formation du style gothique brabançon*, 1949, p. 22-25.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 133-136.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 5-6.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36.

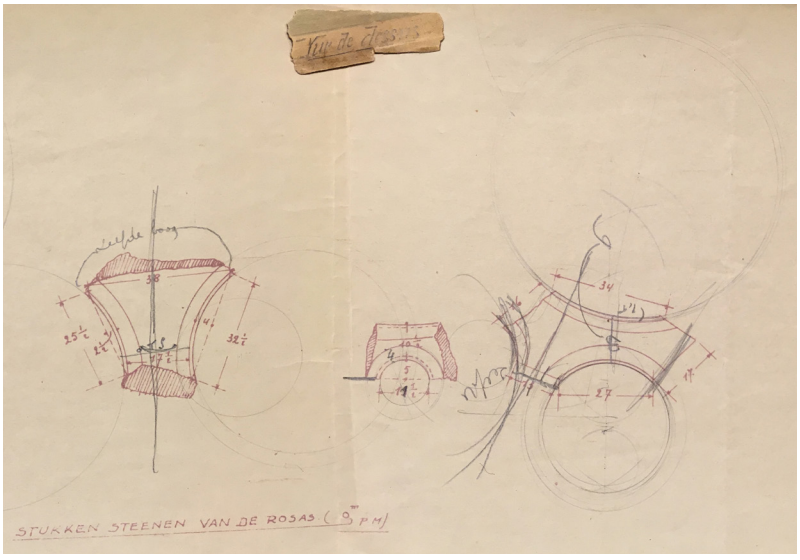


Fig. 9.

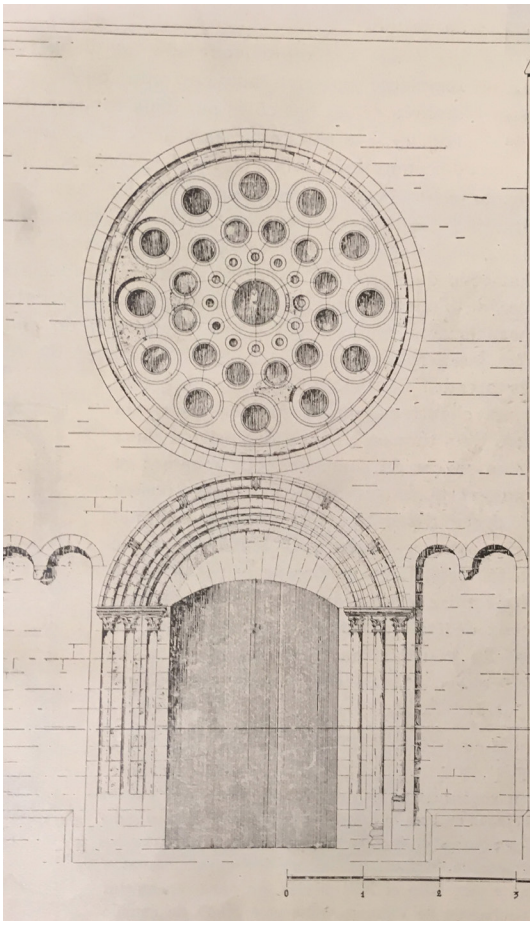


Fig. 10.

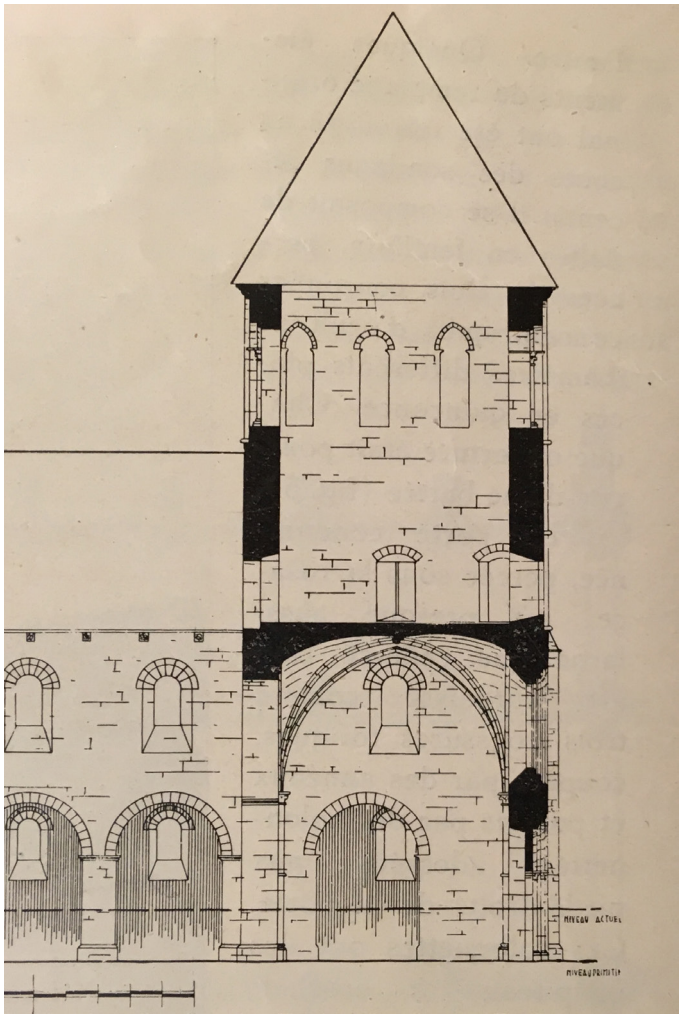


Fig. 11.

Fig. 9. Pieces of stone of the rose window [Leuven, University Archive, collection Lemaire, n.836]
Fig. 10. Reconstruction of the Romanesque church [Leuven, University Archive, collection Lemaire, n.836]
Fig. 11. Reconstruction of the rose window [Leuven, University Archive, collection Lemaire, n.836]



Fig. 12.

Fig. 13.





Fig. 14.

Fig. 12. Representation of the Saint Michael's church
[Van Even, 1860, p. 305]
Fig. 13. Portal of the Saint Elisabeth's hospital
[https://inventaris.onroerenderfgoed.be/erfgoedobjecten/42152]
Fig. 14. View on the front facade of the tower of the Saint James's church
[Studio Roma, 9/11/2010]

nave was built. However, it is hypothesized that these columns were originally not designed for carrying the later added vaults. This can be seen in the added corbels to carry the vaults, as these were not originally there, instead the vaults would have ended directly on the capstones of the capitals. The anchor beams of a wooden vault could have been carried by capstones of the capitals however. It is therefore assumed that the church had a flat wooden ceiling or a wooden vault ceiling, similar to the church of Saint Gertrudis (see Figure 16) and the church of the Great Beguinage in Leuven. Furthermore, the hypothesis of Lemaire states that the side naves were not intended to have a masonry vault either. This can be seen in the difference between the northern and southern side naves: the latter has engaged columns in the outer walls to carry a vault, the former has engaged columns built on corbels. Probably a part of the northern side nave wall was already constructed in this phase. This is considered as prove for a change in the original design.[8] The absence of a chain wall on the level of the foundation (no chain wall was found in the research by Smeets in

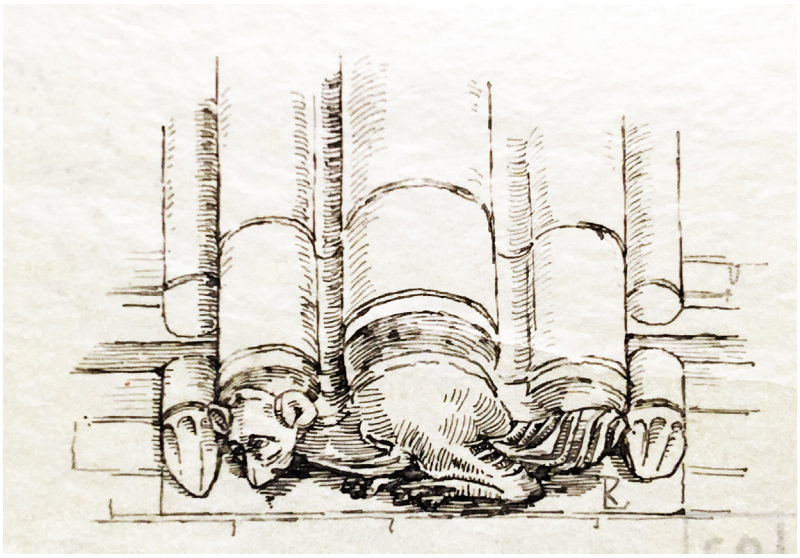


Fig. 15.



Fig. 16.

Fig. 15. Sketch of one of the corbels in the northern side nave [Leuven, University Archive, collection Lemaire, n.836]
Fig. 16. Interior of the Saint Gertrudis church in Leuven [https://hiveminer.com/Tags/interieur%2Cleuven]
Fig. 17. View on the northern side nave with half columns [Lemaire, 1949, p. 28]

8. LEMAIRE, *La formation du style gothique brabançon*, 1949, p. 25-31.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 7-8.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36.



2011), further backs up the theory that vaults were not intended.

The former Romanesque nave was probably dismantled during this building phase. However, the dating remains unsure. The hypothesis is that the arcades were constructed outside the main nave of the Romanesque church but inside the side nave. By doing this, a more continuous worship could be ensured.[9] This hypothesis is rather strange as the middle axis of the arcade is almost at the same line as the middle axis of the tower's walls (see p. 30).

• Second Gothic Phase (1305-1317)

This building phase is situated in a period of prosperity for the city of Leuven. In the second Gothic building phase, the side naves were constructed, and the rib vaults of the side naves were probably constructed as well. As stated before, the columns were not designed for this and thus corbels were added.[10]

Concerning the dating of this building phase, again this is based on stylistic comparison with other buildings in Leuven. As terminus post quem, the start of the construction of the church of the Great Beguinage in Leuven is proposed (1305). Numerous similar details of the church of Saint James can be found in this church. The corbels ornamented with animals are quite identical, for which a same creator can be suspected, as posed by Lemaire. As terminus ante quem, the start of the construction of the cloth hall in Leuven (1317) is proposed, as the details and profiling of this building are not recognisable in the Saint James's church.[11]

• Third Gothic Phase (1465-1535)

The third Gothic building phase was probably initiated because of the change to a collegiate church. The wooden barrel vault ceiling of the main nave was constructed in 1465, which is considered as the start of this construction period. The adding of a masonry rib vault in the main nave is considered to be the end of this building period. However, it is hypothesized that initially the masonry vaults were not intended. The buttresses are not necessarily an indication or proof for the intention of adding a masonry vault, as it is common in

9. LEMAIRE, *La formation du style gothique brabançon*, 1949, p. 30-31.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 7.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36.

10. LEMAIRE, *La formation du style gothique brabançon,* 1949, p. 25-28, p. 30-31.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 7-8.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36-37.

11. LEMAIRE, *La formation du style gothique brabançon*, 1949, p. 31-34.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 136-137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 8.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36-37.

the region to construct buttresses without vaults (church of Saint Gertrudis, church of the Great Beguinage). Works are done in the main and side naves, the transept and the choir.[12]

Between 1467 and 1488 the transept was probably constructed by Matheus de Layens, as hypothesized by Lemaire. As the pillars of the crossing have foundations which start less deep than the pillars of the main nave, it is assumed that these are definitely constructed after the first Gothic building phase.[13] Two building phases can be assumed in the construction of the transept as the profiles of the pillars in the northern transept arm are different than those of the southern transept arm.

In 1467, a choir was constructed by Matheus de Layens as well to replace the choir of that time which was situated in the crossing. To this end, Van Even refers to the archive of the parish, but this document got lost. This choir was a rather modest one built in brick (see Figure 19). However, the pointed arch (see Figure 17) near the current choir in the transept suspects an unrealized project. Probably this modest brickwork choir was intended as a temporary one, around which this unrealized choir would be constructed.[14]

From 1484 until 1485, a tower was built at the crossing of the main nave and transept (see Figure 20). The masonry works were conducted by Jan de Mesmaker (who succeeded Matheus de Layens as maître ouvrier of the city of Leuven), the wooden joinery by Laureyse Sprancx. Because of its bad condition, this tower was dismantled in 1735.[15]

Following the design of Jan de Mesmaker, the chapel of the Holy

12. HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 8.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 36-37.

13. HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 9.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 37.

14. VAN EVEN, *Louvain monumental*, 1860, p. 217.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 8.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 37.

15. VAN EVEN, *Louvain monumental*, 1860, p. 217.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 9.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 38.

16. VAN EVEN, *Louvain monumental*, 1860, p. 218.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 10.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 38.

Cross was constructed in 1488. The construction works were completed in 1490 by Henri Van Everghem who executed the works after the death of Jan de Mesmaker (probably by the pestilence outbreak at that time). The window mullions were designed by him.[16]
Lastly, in 1535 the rib vault of the main nave was constructed. Besides that, the walls of the main nave are heightened to add the clerestory. The flying buttresses are built in this period as well.[17]
The dating above for the third Gothic phase is also supported by the distinction made between the different phases based on studying the stone cutting of the masonry.[18]
The construction phases are shown in Figure 18, linked with the previously mentioned dating .



Fig. 18. *I: first and second Gothic phase*
II: third Gothic phase
- a: 1467-1488
- b: 1488-1535

- **16th Century Phase**

The Saint Hubertus's chapel was constructed in the 16th century. However, the worship of Saint Hubertus in the church of Saint James is older. The works were funded by the brotherhood of Saint Hubertus of the parish.[19]
The old sacristy was constructed in 1562, against the eastern wall of the northern part of the transept.[20]

17. VAN EVEN, *Louvain monumental*, 1860, p. 217.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137-138.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 9.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 38-40.
18. Frans DOPERÉ, "Les techniques de taille sur le grès calcareux: une nouvelle méthode pour déterminer la chronologie et étudier l'évolution des chantiers dans l'Est du Brabant pendant la première moitié du XVe siècle", *Acta Archaeologica Lovaniensa*, 1995, 8, p. 429-434, p. 437.
19. HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 137.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 10.
20. "Parochiekerk Sint-Jacob", in: Inventaris Onroerend Erfgoed, ID 42129: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/42129 (last accessed on 01/08/2018).

Fig. 18. Building phases based on stone cutting
[Doperé, 1995, p. 433]

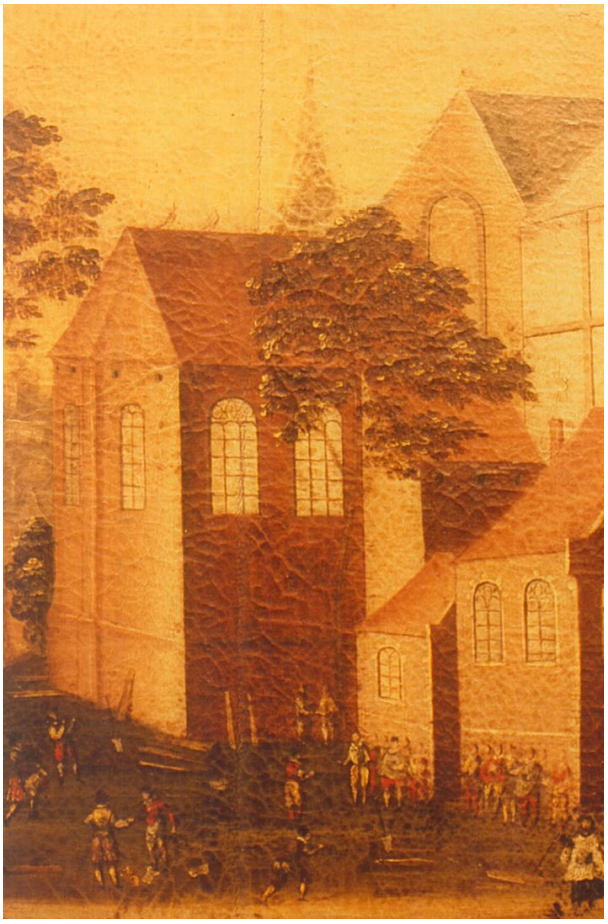


Fig. 19.

Fig. 20.

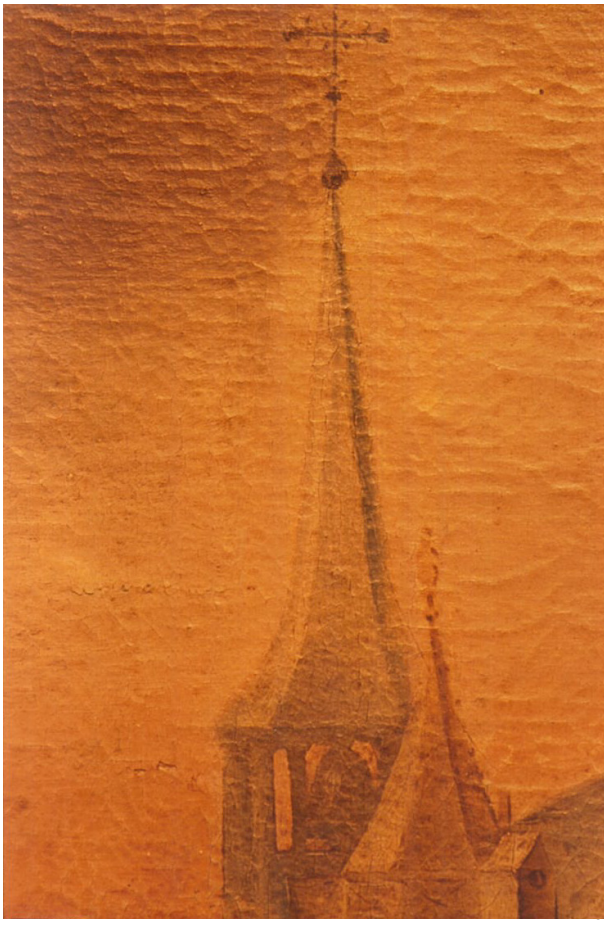


Fig. 19. Detail of the choir constructed in the third gothic phase, excerpt of the painting which depicts the plague [Van Balen, Nuyts, Smars and Van De Vijver, 1995, deel 2, p. 1]
Fig. 20. Detail of the tower at the crossing, excerpt of the painting which depicts the plague [Van Balen, Nuyts, Smars and Van De Vijver, 1995, deel 2, p. 1]

- **Neoclassical Phase (1785)**

In 1784, the modest choir was dismantled to construct a neoclassical choir in 1785. During this building phase, the entrance portals of the first bay were built as well. The choir stalls are dating from 1824.[21]
The new sacristy is probably constructed at the period of construction of the choir or later, the exact construction date is not known. The door in the eastern wall is built in the classicistic style.

After this building phase, no new structures are added, except from the ones caused by interventions or reparation and maintenance works.



Fig. 21.

1. 1. 3. Further Research

Still several questions related to the church's building history remain unanswered. It is not the aim of this thesis research to answer these questions, though some remarks regarding further research are made.

- **Archaeological Research**

A major gap in historical research is the lack of any archaeological research except the limited research done in 1943. The preliminary research in 2011 by Smeets (see p. 80) aimed to find the old levels in light of the stabilization project and is therefore very limited as well. Further in-depth archaeological research is needed to investigate the different building phases and possible changes in the design of

Romanesque axis

Romanesque axis, hypothesised

Gothic axis

Fig. 21. View on the choir [Studio Roma, 29/10/2010]
Fig. 22. Hypothetical reconstruction of the Romanesque church based on the axes [Pieter Vermeir]

21. HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 138.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 12.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 40-41.

Fig. 22.

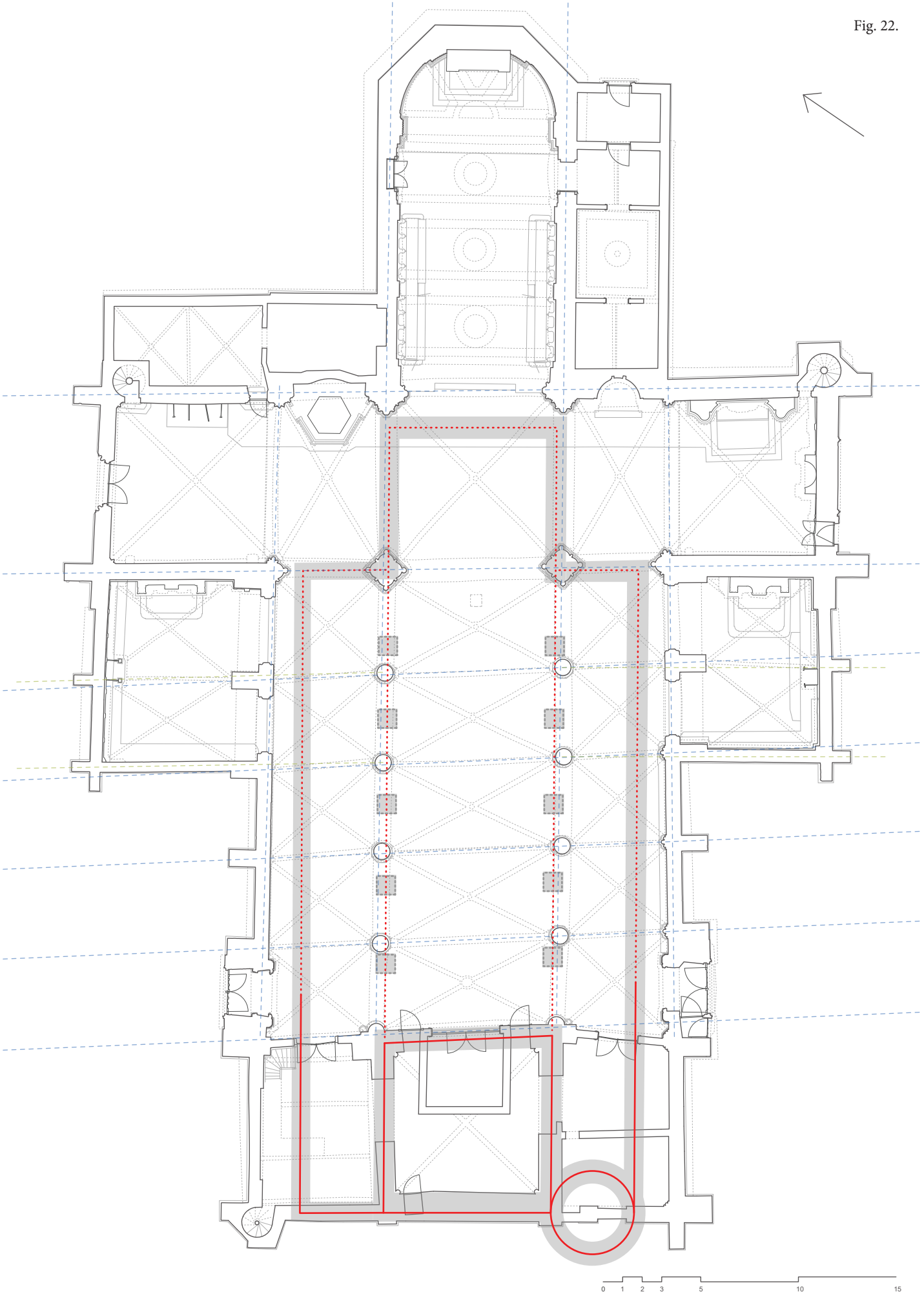
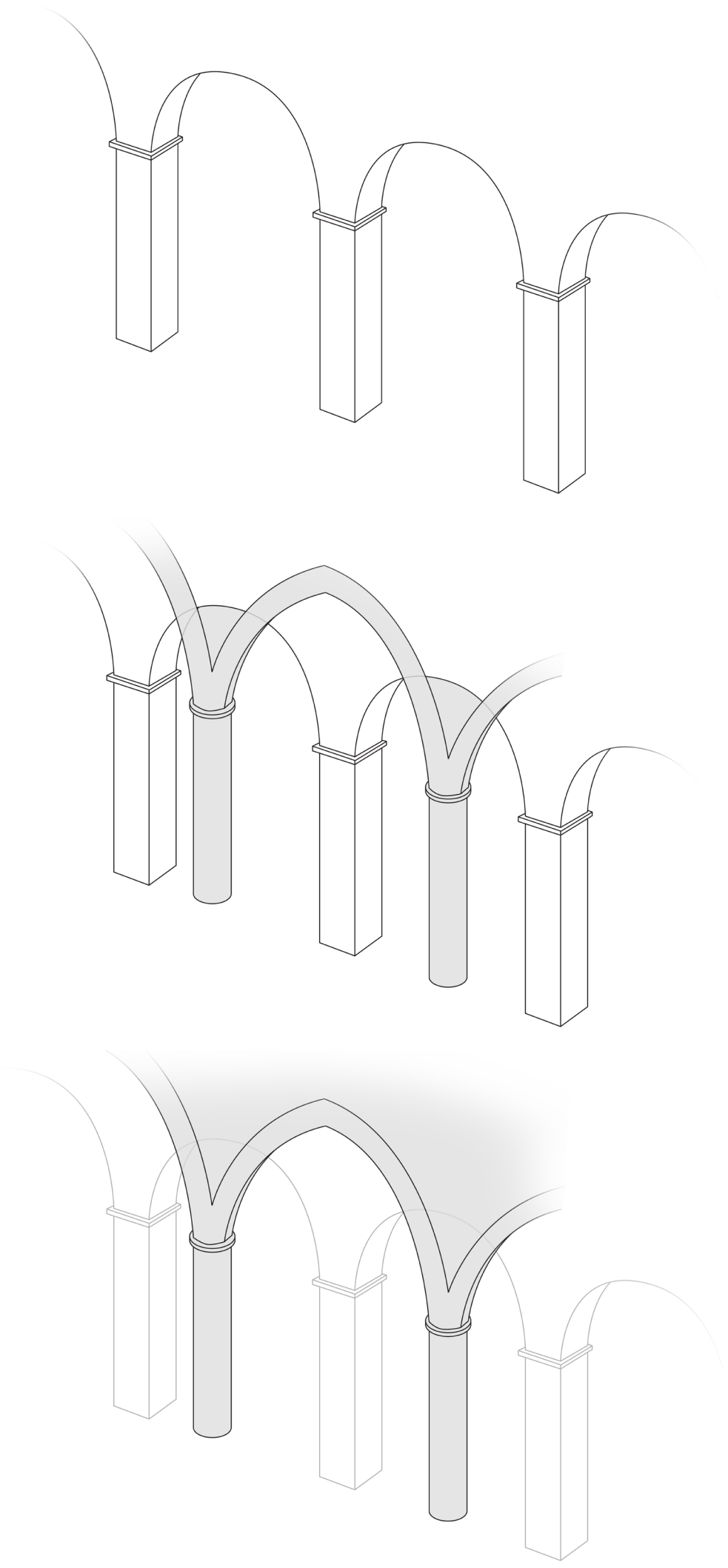


Fig. 23.



the church over time.

Firstly, archaeological research will provide answers regarding the Romanesque phase and how this was related to the current building. The excavations done in 1943 by canon Lemaire uncovered foundations of a round staircase tower and the foundations of the side nave's walls. If it is assumed that the middle axis of the main nave's walls is on the same line as the walls of the tower, there is an overlap between the Gothic axis and the Romanesque (see Figure 22). Either the assumption is wrong, and the Gothic arcade was constructed outside of the Romanesque arcade as is hypothesized by Lemaire, or either this hypothesis is wrong. An overlap would indicate that the Gothic arcade was constructed under the Romanesque one and the arches would be constructed part by part inside the existing wall. Once the Gothic structure was finished, the Romanesque pillars and masonry left under the Gothic structure would be dismantled. This might explain why the bases of the pillars are not on the same axis. In the end this indicates the importance of archaeological research, as this is another possible hypothesis which can be answered by executing archaeological investigations on the foundation systems of the different phases.
Figure 22 shows a hypothesis for a Romanesque choir as well. As stated before, the transept was constructed by Mattheus de Layens between 1467 and 1488. In order to do this an existing choir was located on the crossing and a modest brickwork choir was constructed instead 'buyten het cruyswerc' (outside the crossing). It is hypothesized that this existing choir was the Romanesque choir. Again, archaeological research will determine if this hypothesis is correct or not.

Secondly, archaeological research will answer some questions related to the changes in the design of the Gothic church. If the vaults were originally not intended (as hypothised by Lemaire), chain walls in the foundations will probably not be present. The change which left out the project for a Gothic choir might as well be discovered by excavations, as well as the former modest brickwork choir.

- **Building archaeology**

Several indications of changes in design, previous phases, etc. still remain unanswered in why they are present as such and what used to be their function. Firstly, when looking at the plan there is a slant in all arches. As shown in Figure 26, the axes are probably taken parallel to the tower, resulting in the slanted deviation from 'ideal'

Fig. 23. Process of constructing the Gothic arcade under the existing Romanesque arcade
[Pieter Vermeir]

axes. The transept's axes deviate from this as do the axes of the side chapels. The axes of the side chapels however are following an 'ideal' axis, which is perpendicular on the clerestory wall.

Secondly, on the transept north-eastern wall, there are indications for flying buttresses (see Figure 24), the same goes for a part of the main nave. This raises the question whether or not they once existed or if there was a change in the design. In addition to that, several parts in the transept walls are filled in with brickwork and there are traces of windows which might have been intended originally. Further research is needed here.

Thirdly, the pointed arch in the northern transept at the location of the sacraments house (see Figure 29) is a rather strange case. At the inside, the wall placed behind the arch is constructed using brick (see Figure 25), whereas the transept is constructed using stone. This might indicate that the wall was added later when the project for a Gothic choir was cancelled. If this arch would be ornamental, one would expect the wall to be in stone as well. At the outside, another possible indication for this is visible (see Figure 24). There is a part filled in with brickwork as well in such a way that it might suggest a slant of a roof. Further research might prove this hypothesis.

Fourthly, in the roof structure of



Fig. 24.



Fig. 25.

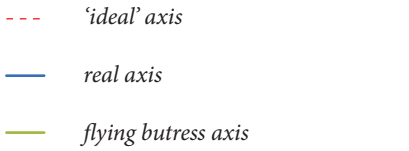


Fig. 24. View on the outside of the north-eastern transept wall
[Thomas Coomans, 7/12/2018]
Fig. 25. Brick wall behind the sacrament house
[Studio Roma, 12/10/2010]
Fig. 26. Real axes of the church compared to an ideal grid
[Pieter Vermeir]

Fig. 26.

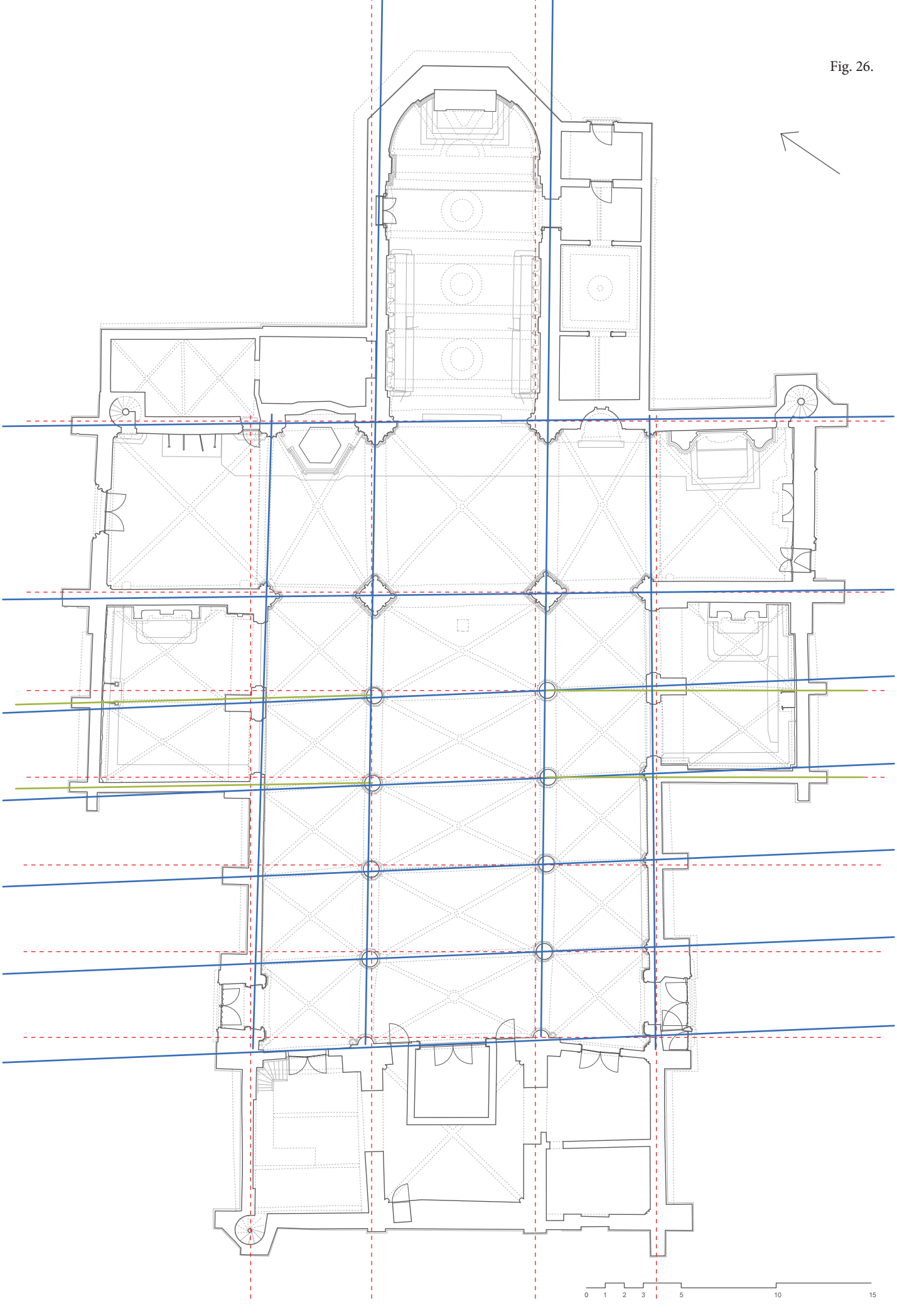




Fig. 27.



Fig. 28.

Fig. 29.



Fig. 27. Clay covering at the roof structure of the spire
[Thomas Coomans, 7/12/2018]
Fig. 28. Cut beam at the southern transept's roof structure
[Thomas Coomans, 7/12/2018]
Fig. 29. Sacrament house placed in front of the pointed arch
[© KIK-IRPA, Brussels (Belgium), cliché A125992]

the side naves, there is a clear difference between the northern and southern one. Furthermore, the width of the two side naves is different as well (approximately 30cm).

A fifth question is raised regarding the tower's roof structure. On the intersection of the spire's structure and the roof of the main nave, a wooden boarding with clay on top is present. Its function remains unknown. In addition to that, this further proofs the statement that the main nave was constructed in several phases. The fact that the roof structure of the tower is still present as it would have been with a lower main nave (before adding the clerestory) proves this.

Lastly, in the southern transept's roof structure, one beam is cut in the middle and supported by fixing it on the tie beam above (see Figure 28). This might again be an indication for a change in the design, as this beam is located at the square rib vault, which is higher than the rectangular rib vault next to it. Probably the roof structure was designed for a transept with only rectangular rib vaults. As roof structures were constructed before the vaults in order to work in dry conditions, the change in design happened after constructing the roof. However, the northern transept does not have such a beam, which might suggest that it was constructed later. This is supported when looking at the profiles of the columns which are different as well.

- **Dendrochronological Analysis**

No dendrochronological analysis has been done on the roof structure. Carpenter's marks are found in the study of 1996 which surveyed the roof structure but didn't investigate the results of the survey. These are shown in Figures 30, 31 and 32. Here it can be seen that there is a change in numbering in the middle of the roof of the main nave, which until today remains unexplained. Dendrochronological analysis might bring some answers which could imply two phases in the roof structure.

- **Archival Research**

As stated before, much of the historical information is based on the research by Van Even. However, most of the important documents to which Van Even refers, are not found. According

to Callewier, the last person who saw these important documents, among which the church accounts of the 15th century, was Joseph Wils. Between 1905 and 1970 these documents must have gone lost. A possible explanation for this, is that the documents were kept at the university archive after Wils had borrowed them from the parish's archive, and they were destroyed in the two fires of the university library during the two World Wars. In addition to that, the archive of the parish suffered a lot of damage in the 90s. The archive was temporarily stored in a side building because of renovation works. Afterwards a lot of the material was destroyed by fungus and animals. What was left, was transferred to the state archives.[22] As such, further archival research is very limited, much of the statement by Van Even will have to be backed up by building archaeology.

22. CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven*, 2005, p. 47-48.

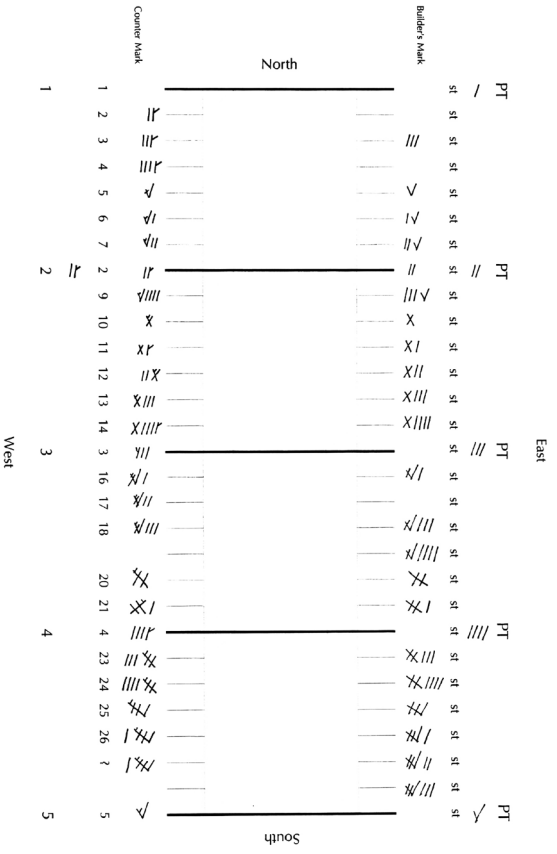


Fig. 30.

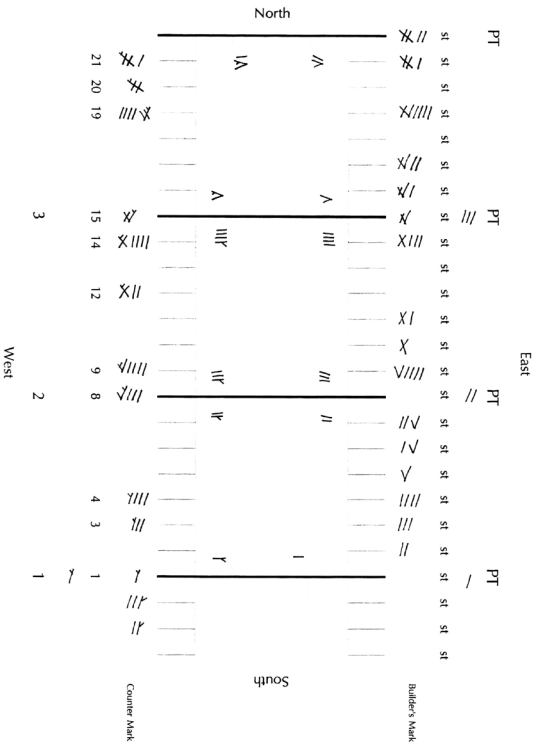


Fig. 31.

Fig. 32.

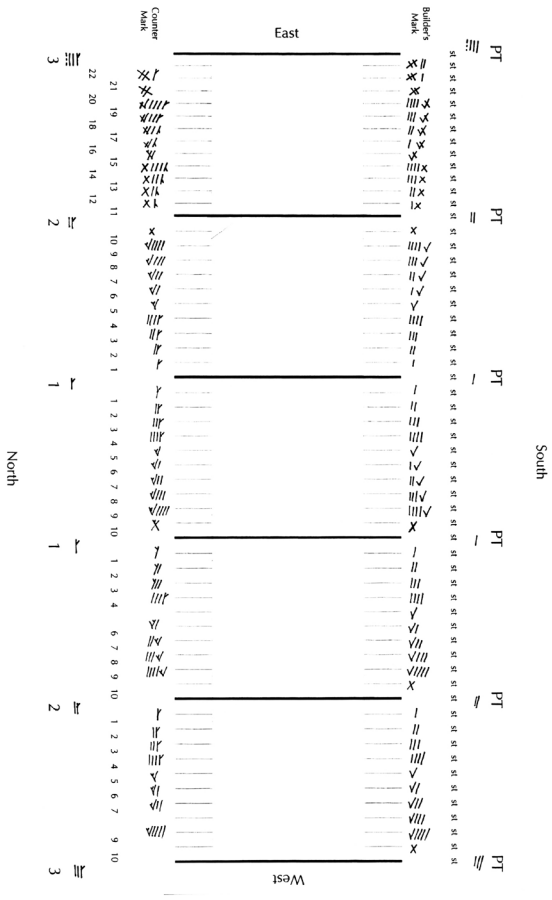


Fig. 30. Carpentry marks in the northern transept's roof structure [Cabido, Olensky and Vander Laenen, 1996, B3]
Fig. 31. Carpentry marks in the southern transept's roof structure [Cabido, Olensky and Vander Laenen, 1996, B4]
Fig. 32. Carpentry marks in the main nave's roof structure [Cabido, Olensky and Vander Laenen, 1996, B2]

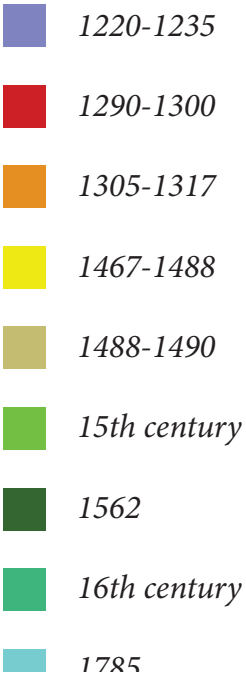
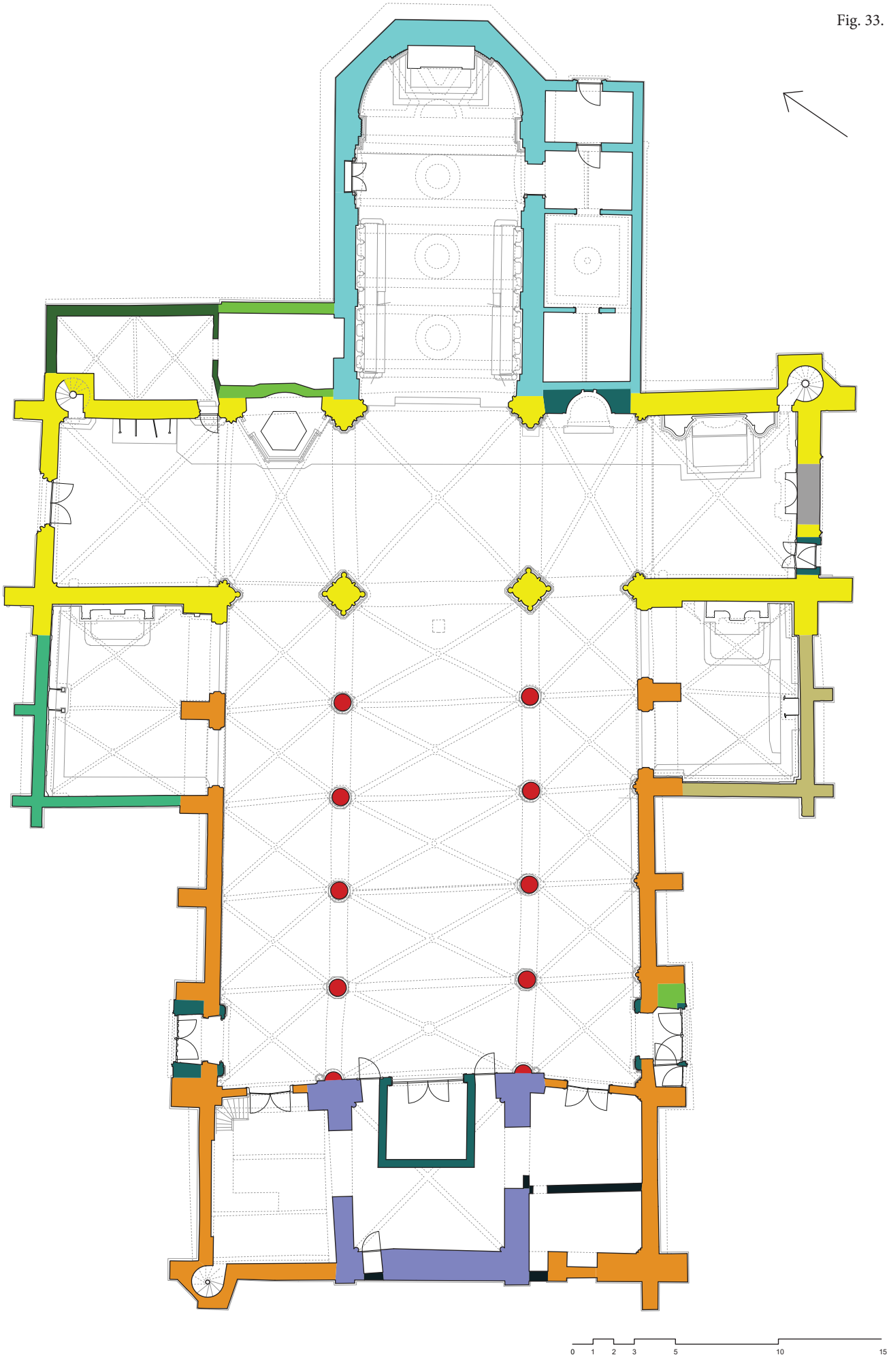


Fig. 33. Building phases [Pieter Vermeir]

Fig. 33.



1. 2. Pilgrim Route to Compostella

The church of Saint James is situated at an important (medieval) pilgrim route to Santiago de Compostella. The route started in Cologne and passed through Aachen, Maastricht and Leuven to end at another main route going from Utrecht to Paris. To get from Maastricht to Leuven, two routes are possible: either passing Diest and Hasselt or either passing Sint-Truiden and Tienen[23], see Figure 34 in (route depicted in light blue). Currently the route going through Leuven doesn't exist anymore. [24]

To provide shelter during the night, three hospitals existed in Leuven: the Saint Laurentius (1290) (also called Saint James due to its proximity to the church), Saint Nicolas (1333) and Saint Geneviève hospital (1356). The hospitals would provide shelter to poor travellers and give alms for travelling the day after as well. However, none of these buildings exist nowadays. Besides that, the brotherhood of Saint James was founded in 1481 by the parish of Saint James.[25]

23. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 2.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 35.; "Routes in Frankrijk", in: Vlaams Compostellagenootschap: https://www.compostellagenootschap. be/article.aspx?id=513 (last accessed on 15/10/2018)

24. "Routes in Frankrijk", in: Vlaams Compostellagenootschap

25. VAN EVEN, *Louvain monumental*, 1860, p. 280-281. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 2.;

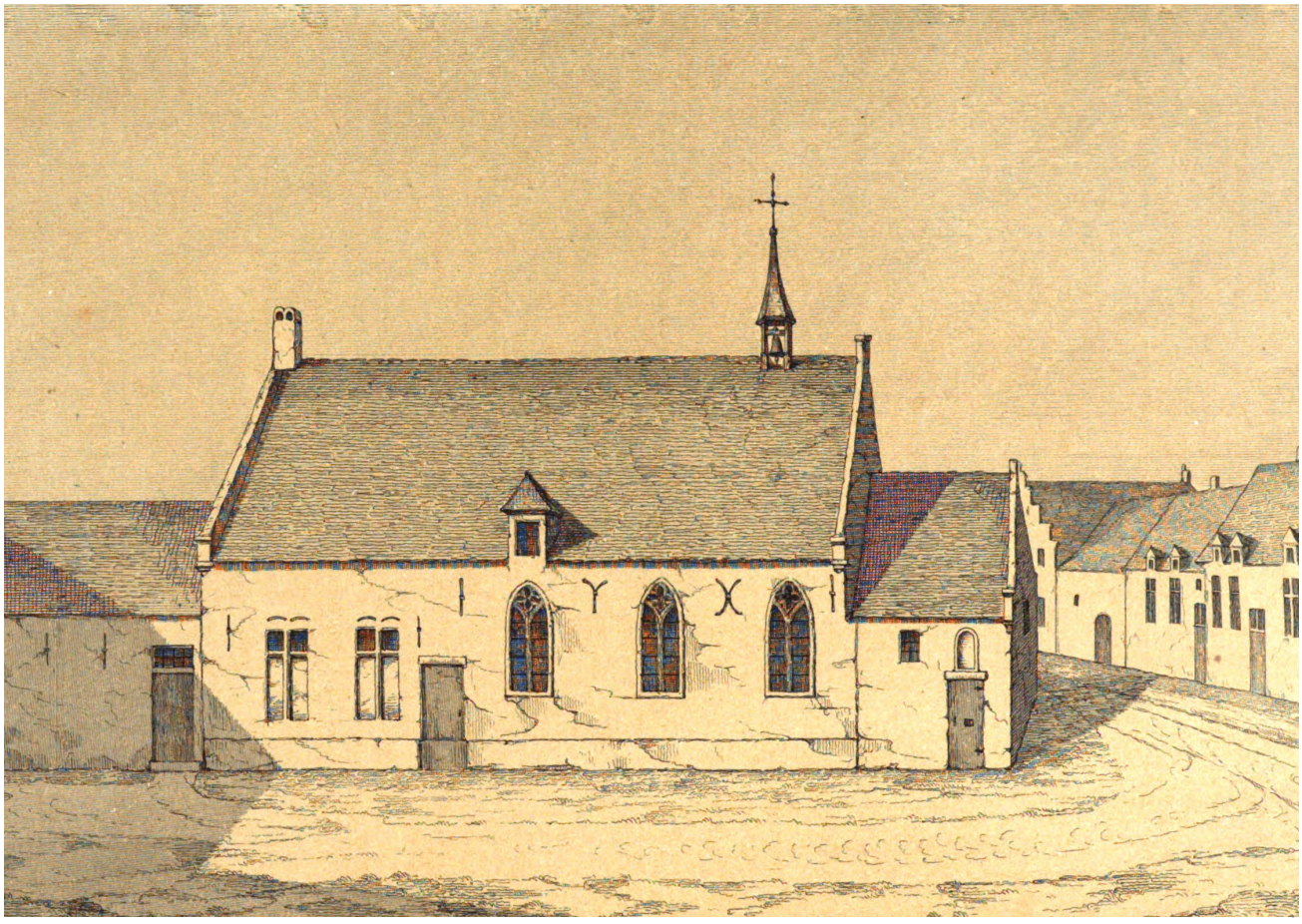
Fig. 34. Medieval pilgrim routes through Flanders and France [https://www.compostellagenootschap.be/article.aspx?id=513 (last accessed on 15/10/2018)]

Fig. 35. Saint Laurentius hospital in the 15th century [Van Even, 1860, p. 280]


Nieuwpoort
Brugge
Breda
Gent
Antwerpen
Boulogne
Mechelen
Diest
Rijsel
Brussels
Doornik
Tienen
Tongeren
Luik
Namen
Cambrai
Amiens
Givet
St Quentin
Compiègne
Senlis
Luxemburg
Reims
Parijs
Chalons-sur-Marne
Verdun
Orleans
Le Mans
Le Havre
Rouen
Caen
Troye
Nancy
Metz

Fig. 34.

Fig. 35.



1. 3. Holy Sacrament of the Miracle

The Holy Sacrament of the Miracle placed in a sacrament house in the Saint James's church was only transferred in 1803 to the parish of Saint James. Its history and legend however dates back to 1374, in Middelburg, Zeelande. It was in this year that a certain Jan of Cologne took the eucharist without doing a confession beforehand. Promptly, the sacramental bread transformed into a piece of meat in his mouth. When trying to swallow it to hide his crime, blood droplets spilled on the communion garb, uncovering the crime of the man to the priest. The incarnated sacramental bread and the garb were transferred to the Augustinian monastery of Cologne by order of the archbishop of Cologne. However, when the prior of the monastery – Jan Van der Gheest – was appointed to abbot of the Augustinian monastery of Leuven in 1380, he took half of the sacramental bread and a piece of the cloth with him. It would have miraculously split into two parts before.[26]

Afterwards, a worship of the relic started in Leuven. In 1426, the brotherhood of Holy Sacrament was founded and in 1435 permission was granted by the bishop of Liege to hold processions to honour the sacrament. Some miraculous events in the 16th century until the 19th century contributed to its success.[27] At the end of the 18th century, the relic was hidden due to the French occupation. But eventually it was moved back again to the Augustinian monastery of Cologne in 1793. After a stay with the Augustinian community of Erfurt until 1802. In 1803 it was moved back again to Leuven. Because there was no place for the relic in the Augustinian community anymore due to the abolishment of the monastery in 1796 and demolishment in 1801, it was placed in the parish of Saint James.[28] The choice for placing it in the parish of Saint James was not an easy one. Because the Augustinian community couldn't agree on this, it was put to a vote. Choices were between handing it over to the church of Saint Peter, Saint Gertrudis, Saint James or the hospital. It was an ex aequo between Saint James and the hospital. However, the cardinal

26. VAN EVEN, *Louvain monumental*, 1860, p. 221.; Joseph WILS, *Le Sacrement du Miracle de Louvain*, Leuven: Wils, 1905, p. 7-11.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 131-132.; CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven*, 2005, p. 38.

27. VAN EVEN, *Louvain monumental*, 1860, p. 221.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 132.; Pieter-Jan LAHAYE, *Alles gaat voorbij … Maar de Kerk blijft staan*, Leuven: Thomas c.v.b.a, 2002, p. 227-230; CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven*, 2005, p. 38.

28. VAN EVEN, *Louvain monumental*, 1860, p. 221, p. 251.; Jos. WILS, *Le Sacrement du Miracle de Louvain*, 1905, p. 30-37.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 132.; CALLEWIER, *Inventaris van het oud archief van de Sint-Jacobskerk te Leuven*, 2005, p. 38-39.

archbishop of Mechelen decided to place it in the church of Saint James. This was due to the fact that the church of the hospital had a more private character in its worship in comparison to the parish church of Saint James. Furthermore, the parish of Saint James was financially in a poor condition, which the worship of the Holy Sacrament could improve.[29] For its 450th anniversary in 1824, four paintings were commissioned depicting the miracle[30]: currently kept in Museum M.

Currently, the relic is placed in a high tabernacle. This sacrament house was commissioned to Gabriël van den Bruynen in 1537. The tower is constructed in Avesne stone.[31] It is a highly remarkable piece of architecture, in the late gothic style, of which not much examples remain today. Only five sacrament houses remain in Brabant. Furthermore, this sacrament house and the one of the Saint Peter's church are the only gothic examples in Brabant which survived the Great Iconoclasm.[32]
The use of sacrament houses was mainly a practical one: to store the sacramental bread or store other liturgical items such as chalices, monstrances. Any church of some esteem would have one. Johannes Eck stated in 1538 that a church without a sacrament house is no church at all. [33]
Before reaching a peak in the ornamentation of church furniture in the 15th century, the sacramental bread would be stored in a wall cabinet or a cabinet at the altar. However, later it became more usual to place the sacramental bread in a three-dimensional piece of furniture positioned in space. It became an object to accentuate a church's esteem and splendor.[34]
As stated before, the sacrament house is made by Gabriël van de Bruynen in 1537. It was made after the example of Saint Peter's (which was requested by the commissioner), however much more richly decorated. Timmermann states this to be 'conservative innovatism'.[35]
Lastly, another remarkable feature is the fencing around the sacrament house. It was not built at the same time as the tower itself.

29. Jos. WILS, *Le Sacrement du Miracle de Louvain*, 1905, p. 38-39.
30. VAN EVEN, *Louvain monumental*, 1860, p. 221.
31. VAN EVEN, *Louvain monumental*, 1860, p. 219.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 139-140.; Staf VAN GELDER, "Sacramentstorens in Brabant", *De Brabantse Folklore*, 1972, p. 171.; Anne-Laure VAN BRUAENE, "Embodied Piety – Sacrament Houses and Iconoclasm in the Sixteenth-Century Low Countries", *Low Countries Historical Review*, 2016, p. 47.
32. VAN GELDER, "Sacramentstorens in Brabant", 1972, p. 83, p. 91.; Achim TIMMERMANN, *Real Presence: Sacrament Houses and the Body of Christ, c. 1270-1600*, Turnhout: Brepols, 2009, p. 92-95.
33. VAN GELDER, "Sacramentstorens in Brabant", 1972, p. 89.; TIMMERMANN, *Real Presence*, 2009, p. 1-10, p. 324-329.
34. VAN GELDER, "Sacramentstorens in Brabant", 1972, p. 90.
35. VAN GELDER, "Sacramentstorens in Brabant", 1972, p. 176-177.; LAHAYE, *Alles gaat voorbij … Maar de Kerk blijft staan*, 2002, p. 155-156.; TIMMERMANN, *Real Presence*, 2009, p. 325-326.; VAN BRUAENE, "Embodied Piety", 2016, p. 47-48.

Therefore, it has some influences of the renaissance style. Using brass as material, it was made by Jan II Veldener. This makes the sacrament house of Saint James a piece of art at the transitioning of two style periods.[36]

Recently, a model of the sacrament house was rediscovered: it was fallen into oblivion but still kept in the presbytery of the parish of Saint James. Some elements in the model do not match with the current sacrament house. It is assumed this model is probably dating from the 19th century, which might have been used as a restauration model.[37]

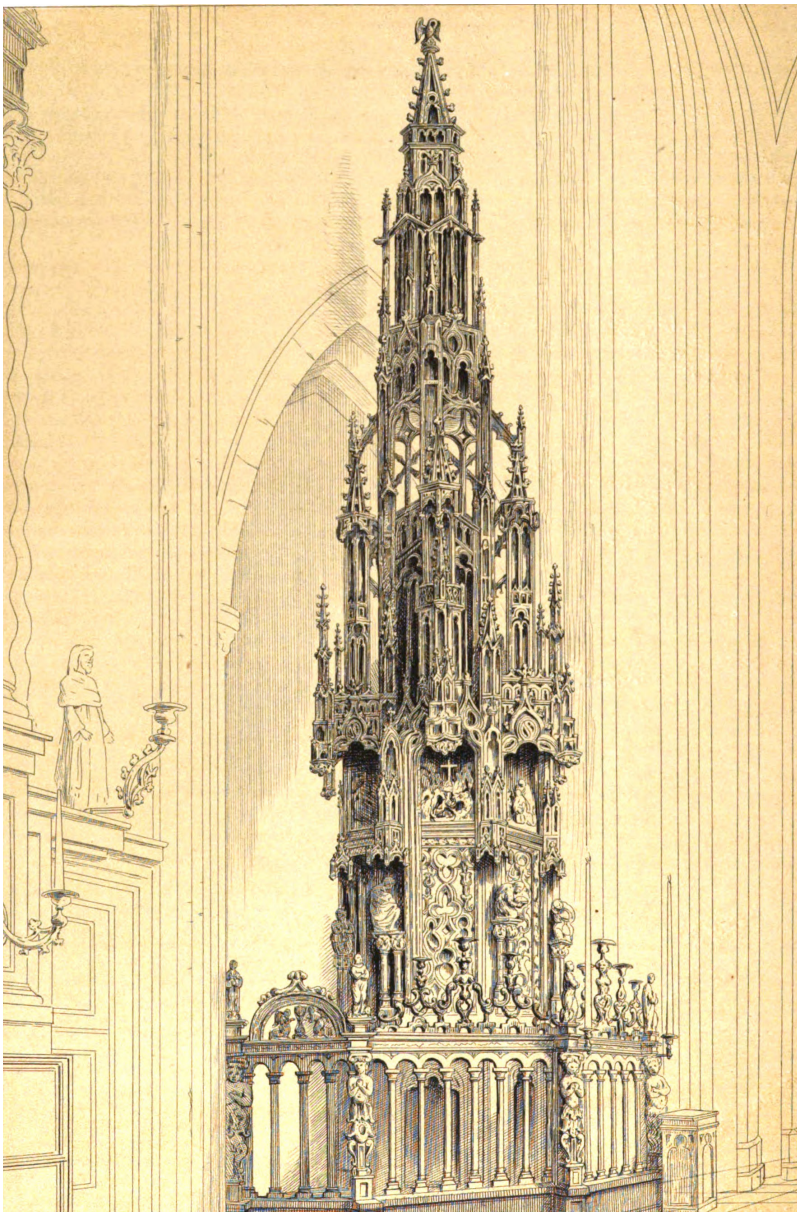


Fig. 36.

36. VAN GELDER, "Sacramentstorens in Brabant", 1972, p. 179-180.; LAHAYE, *Alles gaat voorbij … Maar de Kerk blijft staan*, 2002, p. 155-156.

37. Ramon KENIS, "Sint-Jacobskerk – Kunst in de steigers", *Nieuwsbrief Leuvens Historisch Genootschap*, 2010, 7/27, p. 7.; Marie-Hélène BLYAU, *De sacramentstoren uit de Sint-Jacobskerk van Leuven – 1538 – en zijn maquette*, Leuven: KU Leuven, 2016, p. 44-47.

Fig. 36. Representation of the sacrament house
[Van Even, 1860, p. 218]



Fig. 37.

Fig. 38.





Fig. 39.

Fig. 37. Detail of the wooden fencing with brass pinnacles
[Blyau, 2016, p. 72]
Fig. 38. The sacrament house in its present state
[Studio Roma, 21/06/2011]
Fig. 39. The model of the sacrament house
[Leuven, Museum M, n.663]

1. 4. Conclusion

The church of Saint James in Leuven has a rich past. It contains one of the few examples of Romanesque architecture in Leuven. Besides that, it is a relic depicting the transition of Romanesque style to the Gothic style. Furthermore, containing elements as well in the late gothic, renaissance, baroque and neoclassical style, it is a palimpsest of multiple periods in time. However not much linked to this history today, it was situated on a medieval route to Compostella. Lastly, the church contains a great example of late Gothic church interior architecture: the sacrament house.

Still some questions related to the building history of the church remain unanswered. Further research is needed for this. The most evident field in which research is lacking, is building archaeology. There is no clear evidence on how the Romanesque church was positioned, which can be archaeological researched. Secondly, there is a general idea of what was constructed in the different building phases. However, the boundaries of these phases are not that obvious and not researched. For instance, parts might already have been existing from another building phase but were modified in the building phase following after. The same applies for changes in the design during the construction.
This lack of in-depth research on the building history is illustrated in the previous chapter. There are a lot of theories, which are only scratching the surface of a profound theory. The aim of the thesis however was not to fill in these gaps, but rather point out the gaps and give starting points for further research.

Fig. 40. Current state of the church [https://www.vrt.be/vrtnws/nl/2018/04/06/markante-plekken--de-sint-jacobskerk-in-leuven/]



Fig. 41

2. Structural Problems, Studies and Interventions

To well understand a building's structural behaviour, understanding its past is needed, as it might affect the structure. This will be dealt with in four parts, of which the decision of closure is considered the turning point in the church's structural history as the instability suddenly worsened in a rapid pace.
In the first part, the events occurring before the closure which are considered to have an impact on the structure are summarized, as well as interventions. Secondly, the decision of closure and the issues that led to this decision are given. After this, many studies and interventions were carried out on the church, which will be described in the third part. Lastly, the recently initiated project is summarized and placed in relation to the past studies.

2. 1. Before Closure

During its history, the church of Saint James had several renovation campaigns before its closure. All these works are related to the instability which the church is still facing today.

- **Second Half of the 15th Century**

In the second half of the 15th century, the church was in need of a complete restoration. The masonry vaults of both the side naves were reconstructed because they were suspected to collapse. In 1485, the vaults of the northern side nave were reconstructed. The reconstruction works on the southern side nave were started afterwards but finished in 1487 due to wars at that time.[38] It is strange however, that stability problems were known of, but still it was decided later to replace the wooden barrel vault by a masonry vault, thus increasing the loads.[39]

- **End of 18th and Beginning of 19th Century**

As stated before, the tower on

38. VAN EVEN, *Louvain monumental*, 1860, p. 217.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 9.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 41.
39. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 13.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 41.

the crossing, finished in 1485, was dismantled due to its severe condition in 1735.[40]

In August 1802, Gens 'geomètre arpenteur' and Harmois 'captain du Génie' were appointed to research the instability problems of the church. The research focussed mainly on the vaults of both the side naves and the main nave. The two experts concluded that the church should not be allowed to stay open unless some measures would be taken. However, mayor de Beriot requested architects François de Rare, Ange de Bruyn and Jacques Verheyden to investigate the church as well. They had a different opinion: only the most urgent measures proposed by Gens and Harmois were needed. The execution of these needed works was approved by the church wardens.[41]

Later, on the 14th of May 1805, a team of three experts researched the church again. The team consisted of engineer-architect Claude Fisco, architect François de Rare and 'maître maçon' Arnould Bosmans. The works were executed in 1806. However, it is unsure what exactly was done as an estimation or bills of the works are missing. It is assumed that the pillars of the main nave were strengthened with blue stone and metal rings.[42](see Figure 67).

This is a rather strange intervention. Considering that the metal hoops are providing confinement, this indicates that the theory of this interventions was that the load bearing capacity of columns was not sufficient. However, in another column blue stones are added for which stones of the columns had to be taken out. The taking out of the stones would have had a great risk of collapse if the theory of insufficient load bearing capacity was right as it (temporarily) reduces the section of the columns and thus the load bearing capacity as well.

- **The Royal Commission for Monuments**

After its founding in 1835, the Royal Commission of Monuments took up the case of the church of Saint James. Several works were done under their supervision. Works were related to maintenance and non-structural interventions such as for example the adding of new profiles on top of the octagonal pedestal of all columns in 1884.

40. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 9.
41. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 13-14.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 42.
42. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 14.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 42-43.

Maintenance works were done in 1913, the windows of the transept were restored.[43] Furthermore, in 1920, the roof and gutters were repaired by architect Theo Van Dormael. Interestingly, the Royal Commission also pointed out already the severe condition of the flying buttresses in 1936 but no works were executed. Lastly, the Royal Commission urged on works in 1949 to repair the war damage. Works were executed in 1953 on the roofs and windows. Besides that, the severe condition regarding the stability was also noted.[44]

- **Research by Canon Lemaire**

As stated before, of this research in 1943 no report can be found, only some photo's and the reconstruction drawings remain. However, what is known, is that it mainly focused on the Romanesque period.[45] Furthermore, a research to the building's history is cited in the previous chapter.

In the same year as this study, a delegation of the Royal Commission for Monuments and Landscapes visited the church. They noted that the past floor level of the tower was presumably 1,75m



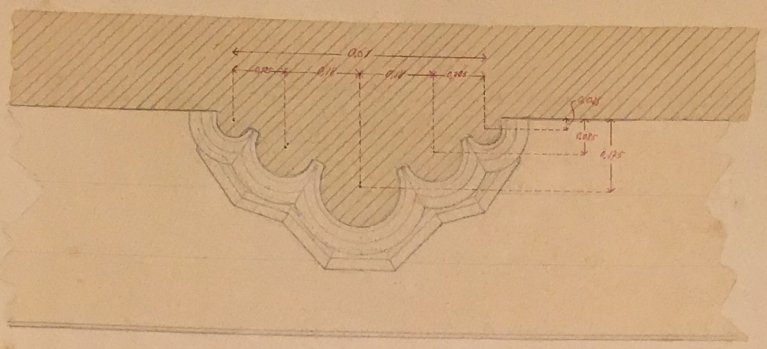
Fig. 41.

43. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 14-15.; Archief Kerkfabriek, Restauratie Dakwerken (II); University Archive, collection Lemaire n.836
44. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 14-15.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 43.; Stadsarchief Leuven 5564 (KF St Jacob onroerende goederen)
45. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 16.

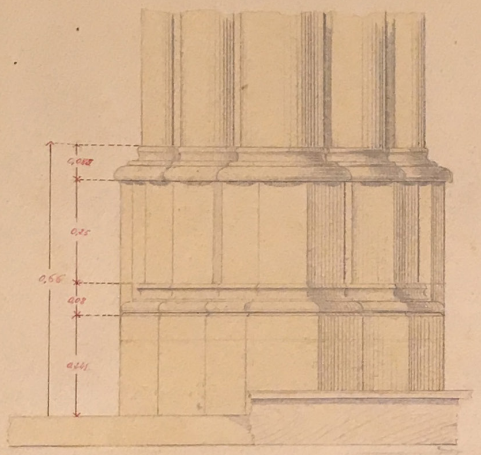
Fig. 41. Foundations of the Romanesque staircase tower uncovered by canon Lemaire
[© KIK-IRPA, Brussels (Belgium), cliché A037726]
Fig. 42. Plans of the added column bases intervention
[University Archive, collection Lemaire, n.836]

Fig. 42.

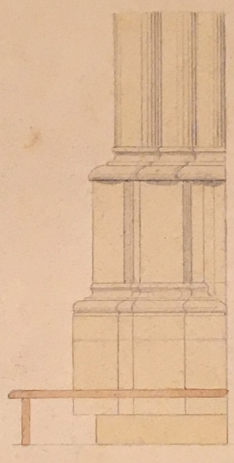
Eglise de St Jacques à Louvain. Bases des colonnettes de la petite nef à droite. Echelle 0,10 p. % 13-11-84



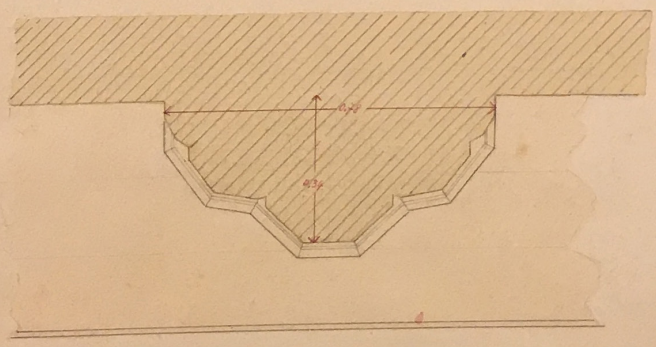
Coupe horizontale suivant la ligne A-B.



Elévation



Vue de côté.



Coupe horizontale suivant la ligne C-D



Profils en grandeur d'exécution

coll. R.L.
n° 1875/17/39

under the current floor level. The cause of this was according to them the settling of the church and the heightening of the surrounding soil. Furthermore, they noted that no bases of the columns were still visible, which also indicated a settling. This settling was uneven and caused the cracks in the walls, and the detachment and deformations of the arches and ribs.[46]

46. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 16.

2. 2. Decision of Closure

In 1956, a settlement of 30 cm was observed in the main nave and the two side naves. Two years later, this settling increased with another 10 cm. Because this sudden increase in settlements was alarming, the provincial architect Martiny ordered the closure of that part of the church (main nave and side naves), in effect on the 2nd of Februari 1959.[47] To allow the continuing of the masses, a wooden separating wall was constructed. To make this possible, permission was granted to reopen old entrances in the transept on the 18th of May 1960.[48] Professor Raymond Lemaire and engineer Vanderhaeghen were charged with the research on the instability of the church from 1959. In this year they designed the wooden separation wall (see Figure 43) and the temporary shoring structure of the main nave (see later).[49] On the 28th of March the cost estimation is handed over to the minister of Public Works (Openbare Werken), waiting for subsidies. Passelecq had an advisory role. [50]

Later, in 1963, Halflants and de Kempeneer noticed a continuing

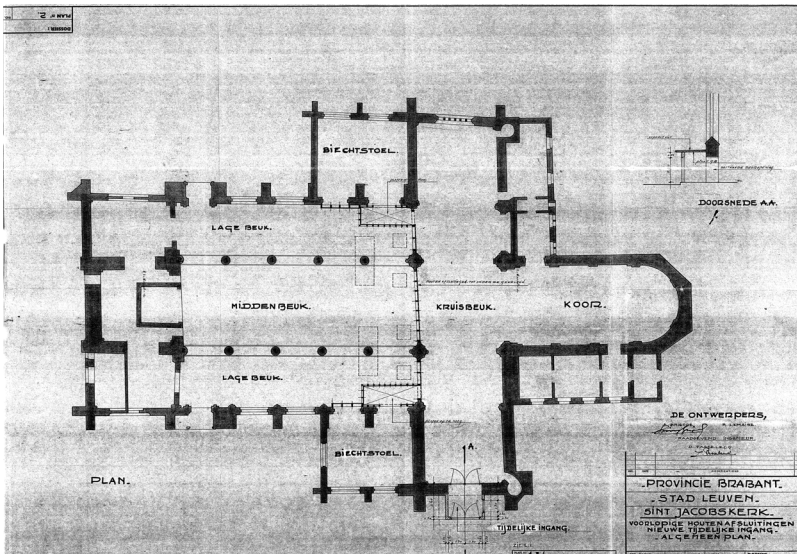


Fig. 43.

Fig. 43. Plan of the wooden seperation wall
[Archief Kerkfabriek, houten afsluiting 1959]

47. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 17.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 43-44.; Stadsarchief Leuven 5538 (KF St-Jacob)
48. Archief Kerkfabriek, houten aflsuiting 1959; Archief Onroerend Erfgoed 36/361/4245 (Sint-Jacobskerk I)
49. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 43-44.; Archief Kerkfabriek, houten aflsuiting 1959; Archief Onroerend Erfgoed 36/361/4245 (Sint-Jacobskerk I)
50. Archief Kerkfabriek, houten aflsuiting 1959

degradation of the church. Because fear of immanent collapse (posed by Martiny), the church was closed of to the public completely on the 11th of April 1963.[51]

On the 11th of February 1964, the public tender is approved for the firm 'Gebr. Vandekerkhove'. After that, an administrative hassle started before the actual execution of the works in 1971[52] (more on this later, see p. 105 and further).

51. HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 129.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 17.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 43-44.; Stadsarchief Leuven 5538 (KF St-Jacob)

52. Archief Kerkfabriek, houten aflsuiting 1959; Stadsarchief Leuven 5538 (KF St-Jacob)

2. 3. After Closure

After the closure of the Saint James's church for services in 1963 because of structural problems, several studies and interventions were done. The main aim was to assess the cause of instability and solve it. Most of the research was done by or in collaboration with the KU Leuven. The following studies were done (chronologically):

1. Van Balen et al., 1995 – *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren gebruik makend van informatie uit vervormingsmetingen en scheuranalyse*

The aim of this study is dual: to develop a methodology for the improvement of the assessment of gothic structures, and to get a better understanding of the stability problems in the church. This includes a study on the building history as well.

2. Schueremans et al., 2006 – *Hydrostatic levelling systems, monitoring of historical structures*

The Saint James's church's settlements are monitored by three techniques: hydrostatic levelling system for short term measurements, geodetic survey for long term measurements and vertical profiles to measure the slant of major structural components.

3. Smars et al., 2006 – *Monitoring the dismantlement of four flying buttresses*

Due to their structural instability, the flying buttresses of the Saint James's church were decided to be dismantled. Forces during and after work were monitored.

4. Schueremans et al., 2006 – *Church of Saint-James at Leuven (B) – structural assessment and consolidation measures*

In order to propose interventions for the strengthening and consolidation of the Saint James's church, the building history and structure is analysed.

5. Schueremans et al., 2007 - *Church of Saint-James in Leuven (B) – structural assessment and consolidation measures (Saint-James – assessment and consolidation)*

In order to propose interventions for the strengthening and consolidation of the Saint James's church, the building history and structure is analysed. (more elaborate paper of the same study, nr. 4)

6. Schueremans et al., 2007 – *The use of 3D-laser scanning in assessing the safety of masonry vaults – A case study on the church of Saint-Jacobs*

By using high precision laser scanning, a geometrical model of one of the vaults of the church could be made to use in analyzing its structural behavior.

7. Schueremans et al., 2007 – *Sint-Jacobskerk te Leuven, eindrapport*

Ordered by the city of Leuven, this study by TRIconsult and Labo Reyntjens (KU Leuven) makes a full structural assessment and proposes a diagnosis and therapy for the church.

8. Beita et al., 2009 – *On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium*

The stresses on the columns of the Saint-James's church are determined numerically as well as experimentally by a minor destructive hole drilling technique.

9. Beita et al., 2009 – *The hole drilling technique for on site deduction of the stresses states in stone masonry by using eight strain gages*

This paper discusses the derivation of the stresses in historical structures by means of the strains given by eight strain gauges by applying a hole drilling technique.

10. Smeets, 2011 - *Het archeologisch vooronderzoek in de Sint-Jacobskerk te Leuven*

This archaeological study aims to determine the original floor level of the church on one hand. On the other hand, it aims to estimate which recommendations for future research and preservation is needed. This is done by studying a test pit.

11. Smeets, 2011 - *Archeorapport 73, het archeologische vooronderzoek in de Sint-Jacobskerk te Leuven*

This is a report on the same archaeological research as above.

12. Verstrynge et al., 2012 - *Controlled Intervention: Monitoring the Dismantlement and Reconstruction of the Flying Buttresses of two Gothic Churches*

This study focusses on the importance of monitoring during structural interventions. Two case studies are discussed, of which the Saint James's church in Leuven.

13. Szekér, 2018 - *2D Macro-modelling of the structural behaviour of the Saint Jacob's Church*

This (unpublished) thesis research focussed on the northern main nave wall of the church, more

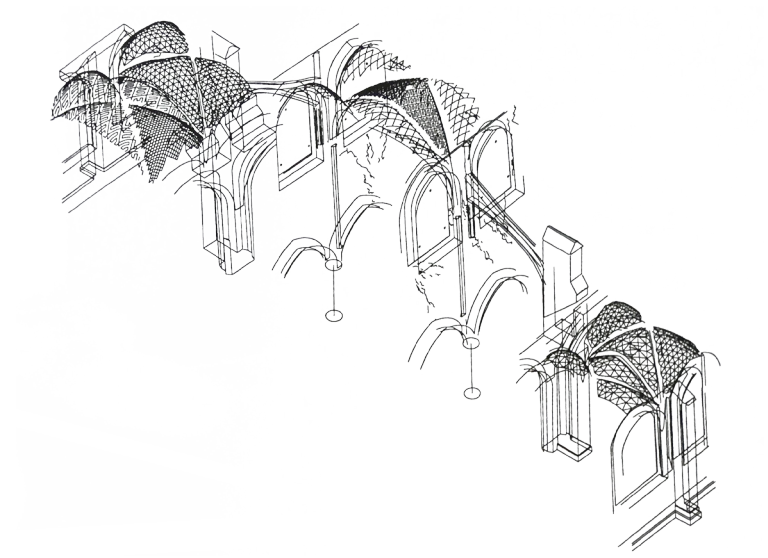


Fig. 44.

particular the structural behaviour and stability. This is done by implementing a two-dimensional numerical macromodel (finite element) in the DIANA FEA software.

14. Bejarano-Urrego et al., 2018 – *Numerical analysis of settlement-induced damage to a masonry church nave wall*

The aim of this study is to implement a practical modelling approach to predict damage on nave walls which experience differential settlements. It uses a finite element model of the church to model the settlements and cracks.

The topics handled in these studies can be categorized in the following items: surveying of the church, monitoring of the church, interventions on the church and structural assessment of the church. These categories will be discussed in the following parts.
The information in the studies is supported by other sources found in archives and journals.

2. 3. 1. Surveying

Several methods of surveying have been executed on the church. However, for most applied techniques the survey was not intended for documenting the church itself. Instead, the survey served for another study (e.g. analysing the stability of the vaults). As such, no good plans exist of the church apart from the one made by Lemaire, which is considered not that accurate and dated.

Fig. 44. Section 5 (going through the main nave and the side chapels) in Phidias [Van Balen, Nuyts, Smars and Van De Vijver, 1995, deel 2, p. 76]

Furthermore, the surveys that were intended for documenting the church did not use the modern techniques as was the case in surveys used for a technical study (e.g. scan of the vault).
The following techniques of surveying have been applied: photogrammetry, 3D laser scanning and manual surveying.

- **Photogrammetry**

Better understanding of the geometry of a building improves the structural notion. In the study done by the Raymond Lemaire Centre for the Conservation of Historic Towns and Buildings in 1995 (currently RLICC), photogrammetry is used to document the whole church. Firstly, several photographs were taken, and reference points measured with a total station. Secondly, the program Phidias was used to extract the geometrical 3D model out of the pictures. At last, at parts for which the photos were obstructed or not clear, manual surveying was used.[53]

- **3D laser scanning**

As the safety of a structure is related to its geometry, detailed surveying was needed to analyse the structural



Fig. 45.

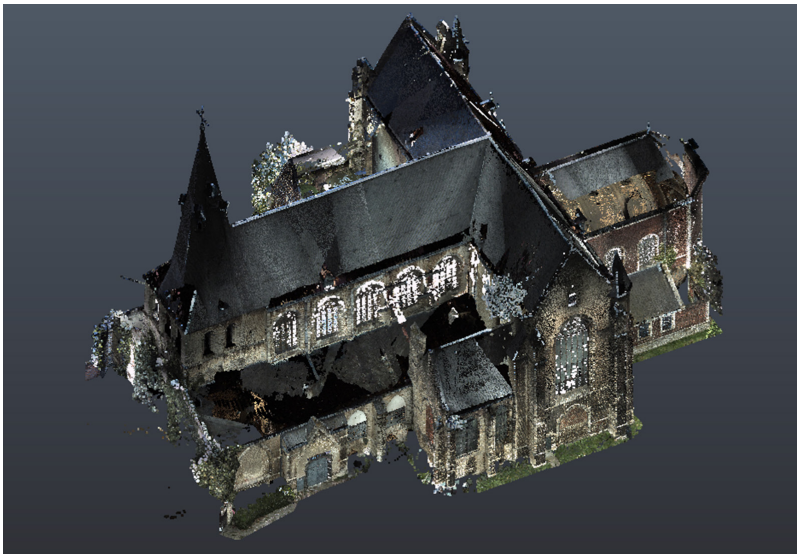


Fig. 46.

Fig. 45. 3D laserscan of the vaults [Schueremans and Van Gemert, 2007, Bijlage 11, p. 1]
Fig. 46. Laserscan of the church by Geomatics Research Group

53. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 32-33.

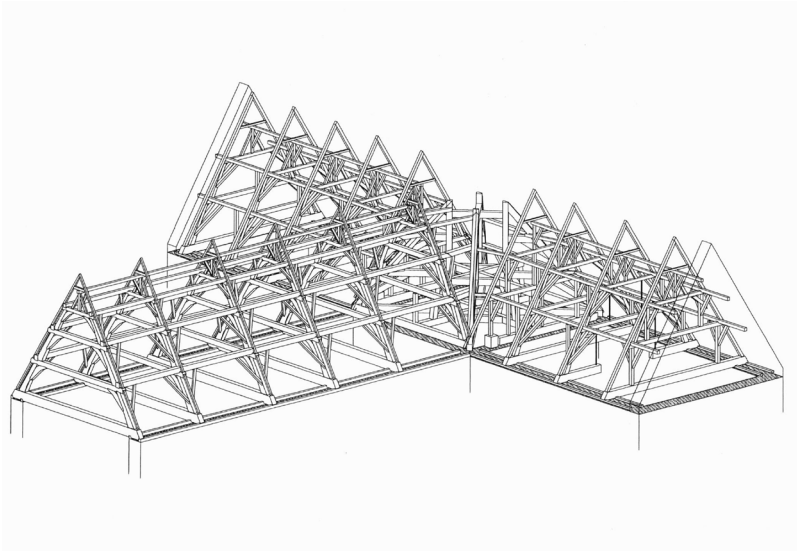


Fig. 47.

behaviour of the vaults. This was done using 3D laser scanning. The data allowed to analyse the safety and derive the forces in the vaults (see below).[54]

A full laser scan was made in 2018 by the Geomatics Research Group of the KU Leuven in light of a thesis research and was later used to extract a geometrical model to model the settlements of the northern wall of the main nave by using macro modelling. This is the most exact and complete (except from the spaces in the ground floor of the tower) survey done on the church.

- **Survey Roof Structure**

In 1996 a study was done by students of the Raymond Lemaire Centre on the roof structure of the church. The aim was to better understand the structure and functioning by surveying the structure by hand. [55]

2. 3. 2. Monitoring

To understand a building's structural behaviour, it is key to monitor it over a longer period of time. It provides essential information needed for further actions in the correct diagnosis and restoration of built heritage.[56] Monitoring of the church was

Fig. 47. Primary roof structure [Cabido, Olensky and Vander Laenen, 1996, V4]

54. Luc SCHUEREMANS and Bjorn VAN GENECHTEN, "The use of 3D-laser scanning in assessing the safety of masonry vaults — A case study on the church of Saint-Jacobs", *Optics and Lasers in Engineering*, 2009, 47, p. 329-330.

55. Ana CABIDO, John OLENSKY and Frédéric VANDER LAENEN, *Sint Jacobs Kerk Study and Analysis – Report*, Leuven: KU Leuven, 1996, p. 5-9.

56. ICOMOS charter Principles for the analysis, conservation and Structural Restoration of Architectural Heritage", in: ICOMOS, Documentation Centre; Recommendations for The Analysis, Conservation and Structural Restoration of Architectural Heritage", in: ISCARSAH Documents

done for two reasons on different occasions. To understand the movements of the church, the settlements were monitored. Secondly, to understand the structural behaviour during and after the interventions, and if needed to adjust the intervention.

- **Settlements**

In context of the study done by the Lemaire Centre finished in 1995, the Saint James's church was monitored using a hydrostatic levelling system. This system is highly accurate and is used to monitor differential vertical settlements. The system is composed of communicating vessels partly filled with a liquid (water). The link between the vessels uses a double circuit: one link for the measuring liquid and one for the air to assure equal pressure in the vessels. To actually measure the settlements, the distance between a sensor and the water level is captured. Should the vessel move lower in relation to a reference vessel, the water level in this moved vessel rises. The difference in the water levels provides the magnitude of settlement.[57]
The monitoring period was a five-month period (08/07/1994-13/11/1994), using a measurement frequency of 1/15 min. Over the same period of time and frequency the temperature was measured as well to consider the effects of temperature on the settlements.[58]

Besides the system described above, a geodetic survey was carried out using 63 marks on each column and structural node. Points were placed on the shoring of 1971 as well. The paths measured provided additional information on monitoring the structural behaviour of the church.[59]
This system was used to measure over a longer period (18/04/1994-27/09/2005), with a frequency of 7 moments of time (5 times in 1994-1995, one in 2000 and one in 2005).[60]

Lastly, at the end of the measurement period, 27 vertical

57. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 69-70.; Luc SCHUEREMANS, Koenraad VAN BALEN, Pierre SMARS, Vincent PEETERS and Dionys VAN GEMERT, "Hydrostatic Levelling System – monitoring of historical structures", *Structural Analysis of Historical Constructions*, New Delhi, 2006, p. 1-2.
58. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 70.; SCHUEREMANS, VAN BALEN, SMARS, PEETERS and VAN GEMERT, "Hydrostatic Levelling System", 2006, p. 5-6.
59. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 69.; SCHUEREMANS, VAN BALEN, SMARS, PEETERS and VAN GEMERT, "Hydrostatic Levelling System", 2006, p. 5-6.
60. SCHUEREMANS, VAN BALEN, SMARS, PEETERS and VAN GEMERT, "Hydrostatic Levelling System", 2006, p. 5-6.
61. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 69.; SCHUEREMANS, VAN BALEN, SMARS, PEETERS and VAN GEMERT, "Hydrostatic Levelling System", 2006, p. 5-6.

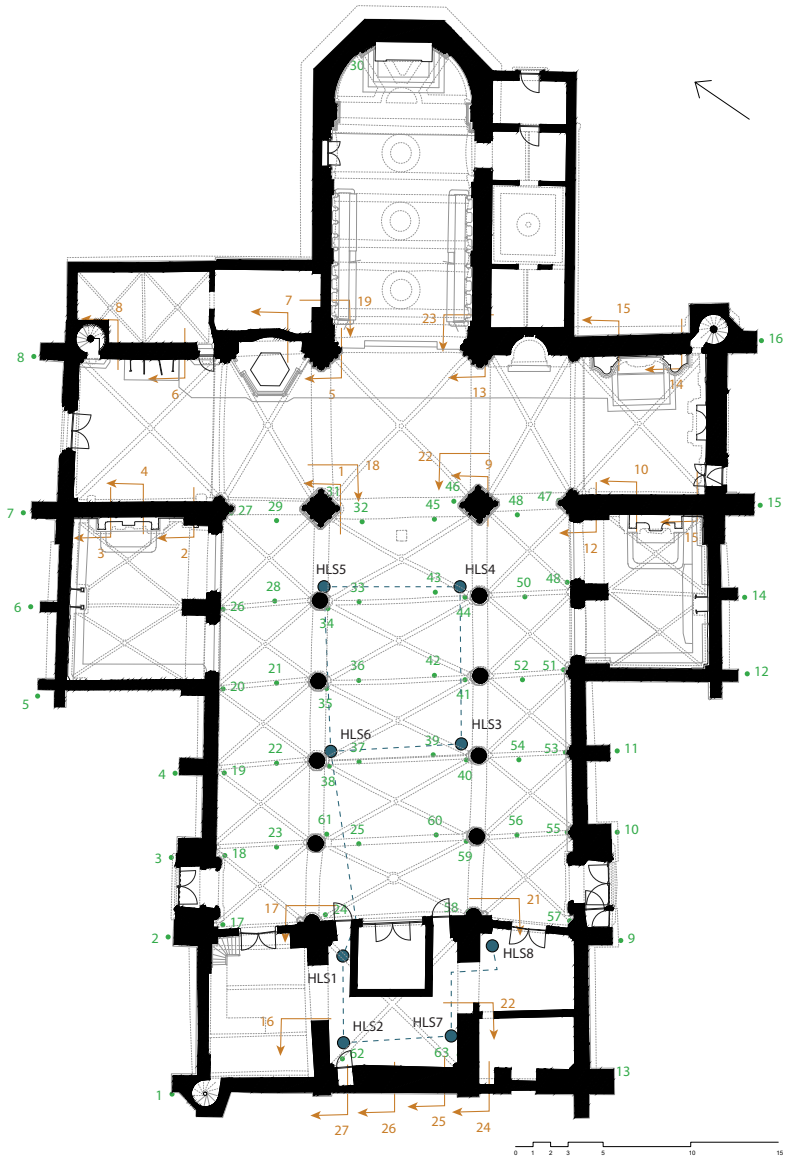


Fig. 48.

- *HLS*
- *geodetic points*
- *profiles*

Fig. 48. The positions of the different systems monitoring the settlements [Pieter Vermeir]

profiles were used to indicate the slant of the structural components.[61] These measurements indicated an outwards movement of the springers of the vaults. This movement is also visible in the roof structure: the common rafters are detaching from the wooden trusses.[62]

Using these sources of information, this monitoring study could retrace the slant of the tower and its evolution. It concluded that the leaning is continuing despite the present shoring. However, the speed of the settlement is lower than the average of the its lifespan. This is due to the fact that the subsoil has consolidated over time.[63] Furthermore, from the data of the geodetic levelling points, it can be concluded that the northern nave has experienced the largest settlements, at least in the last decade.[64] Lastly, an extrapolation of the settlements in the future can be made, based on which the expected settlements in ten years are four millimetres.[65]

- **Movements of the Vaults**

To monitor the movements of the masonry vaults of the main

62. Luc SCHUEREMANS and Dionys VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, TRIconsult and KU Leuven, 2007, p. 16.
63. SCHUEREMANS, VAN BALEN, SMARS, PEETERS and VAN GEMERT, "Hydrostatic Levelling System", 2006, p. 7.
64. Luc SCHUEREMANS and Dionys VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, TRIconsult and KU Leuven, 2007, p. 16.; Pepijn SZEKÉR, *2D Macro-modelling of the structural behaviour of the Saint Jacob's Church*, Leuven: KU Leuven, 2018, p. 47.
65. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 74.

nave, Distinvar wire measurement devices were used in the study of 1995. These were placed at the starting springers of the vaults, using three wires per vault. One was placed in the diagonal direction, one in transversal direction and one in longitudinal direction. The frequency of measuring was every three months five times in 1995.[66] The results showed no variation larger than 1mm, the biggest being 0,42mm, the smallest 0,2mm. Furthermore, a difference between the eastern and western sections can be noted. This is probably due to the difference in structure: the western section has tie rods instead of flying buttresses in the two eastern sections.[67]

In the context of the study done by TRIconsult and Labo Reyntjens, the movements of the springers of the vaults were also measured using the Distinvar measurement tool. The forces were measured as well. The frequency of measuring was every two months for a period of two years (29/08/2005-06/09/2007). Most movements were related to changes in temperature.[68]

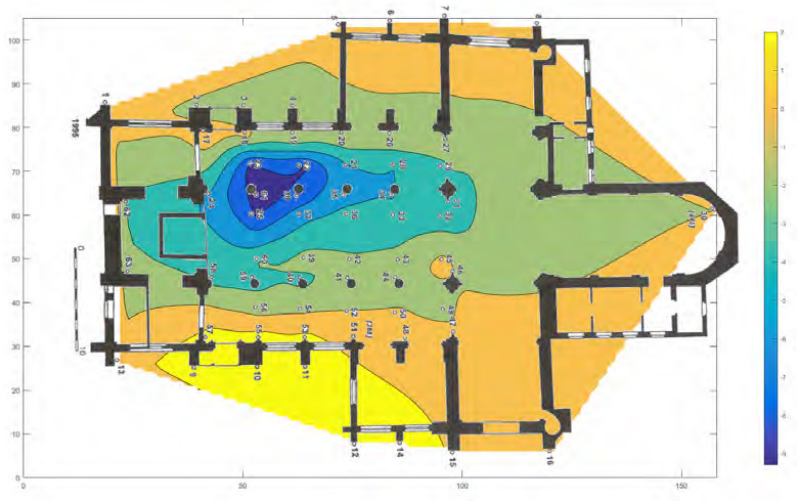


Fig. 49.



Fig. 50.

66. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 76-77.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 8*, 2007, p. 1.
67. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 78-79.
68. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 8*, 2007, p. 3-4.

Fig. 49. Contour plot of the differential settlements between 1994 and 2005, measured by the geodetic levelling points [Szekér, 2018, p. 49]
Fig. 50. Distinvar measurements in light of the TRIconsult study [Studio Roma, 8/12/2005]

- **Controlled Intervention**

During the intervention to dismantle the four flying buttresses of the church and adding tie rods (see p. 67), the distance between the nave walls was monitored. Besides that, a load cell was used for monitoring the forces. The relative displacements between the walls were monitored by invar-wire measurements.[69]

This was a good case executed following the methodology of controlled intervention: when needed during dismantlement, the forces in the tie rods could be increased when needed to counter possible deformations.[70] The monitoring was executed over a period of 56 days, with a measurement frequency of 2 measurements every 4 minutes.[71] The monitoring of the forces and the displacements made the controlled intervention possible with the goal to limit the disturbances to the structure.[72]

Although not directly linked to monitoring the church structural behaviour but rather the intervention's effects, it still provides interesting results. The temperature had an influence on the forces in the tie rods. Works on one section had an important influence on other sections.[73] Furthermore, when considering the data provided by the long-term monitoring campaign of 1994-2005, the rate of the settlements increased. Probably because the removal of the buttresses resulted in a redistribution of the stresses and thus the settlement speed.[74] Although this monitoring campaign was not intended to analyse the intervention, it still provided an idea of the effects of this intervention on long term.

2. 3. 3. Interventions

After the church's closure, several interventions were executed which were needed because of the structural instability. The

69. Pierre SMARS, Luc SCHUEREMANS and Koenraad VAN BALEN, "Monitoring the dismantlement of four flying buttresses", *Structural Analysis of Historical Constructions*, New Delhi, 2006, p. 2-3.

70. Els VERSTRYNGE, Luc SCHUEREMANS and Pierre SMARS, "Controlled Intervention: Monitoring the Dismantlement and Reconstruction of the Flying Buttresses of Two Gothic Churches", *International Journal of Architectural Heritage*, 2012, 6/6, p. 690, p. 693.

71. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 4.

72. VERSTRYNGE, SCHUEREMANS and SMARS, "Controlled Intervention", 2012, p. 693, p. 707.

73. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 4-5.; VERSTRYNGE, SCHUEREMANS and SMARS, "Controlled Intervention", 2012, p. 693.

74. SZEKÉR, *2D Macro-modelling of the structural behaviour of the Saint Jacob's Church*, 2018, p. 48.

intervention of 1971 was meant to solve the instability. Although not fully executed, it scarred the church immensely. On the other hand, the dismantlement of the flying buttresses and some maintenance works intended to not further damage the church.



Fig. 51.

- **Shoring Works 1971**

Plans of the first intervention after the closure to stabilize the church were initiated in 1961. The works were executed, led by prof. Brigode and prof. R.M. Lemaire. However, after an extensive administrative hassle, the works started on the 15th of November 1970 and finished on the 23rd of October the year after.[75] In 1965, the vaults of the side nave were dismantled. The plans were drawn up because the collapse of the church was feared.[76] The theory as to the cause of the instability was as follows.

During the construction of the main nave walls against the tower, these structural elements are connected, and are working together. This resulted however in an increase of loads at the eastern side of the tower, by which the tower started to lean in this direction. The leaning results in pushing against the main nave walls, which has limited stiffness because of its arcades and windows. Secondly, the

75. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 17.; Archief Onroerend Erfgoed 36/361/4244 (Sint-Jacobskerk II)

76. Luc SCHUEREMANS, Koenraad VAN BALEN, Kris BROSENS, Dionys VAN GEMERT and Pierre SMARS, "Church of Saint-James at Leuven (B) – structural assessment and consolidation measures", *Structural Analysis of Historical Constructions*, New Delhi, 2006, p. 3.

77. University Archive, Collection Lemaire, n.836; STAD LEUVEN, *Restauratiewerken der Sint-Jacobskerk - Openbare aanbesteding*, Provincie Vlaams Brabant, Stad Leuven, 1961, p. 12-13.; HALFLANTS and DE KEMPENEER, "Un édifice monumental en péril", 1963, p. 170-172.; VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 17.; Luc SCHUEREMANS, Koenraad VAN BALEN, Kris BROSENS, Dionys VAN GEMERT and Pierre SMARS, "Church of Saint-James in Leuven (B) – structural assessment and consolidation measures", *International Journal of Architectural Heritage*, March 2007, 1/1, p. 3.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 8.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 3*, 2007, p. 1-2.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 45-46.; Santiago S. BEITA, Luc SCHUEREMANS and Koen VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", International Journal of Architectural Heritage, 2009, 3/2, p. 115.

Fig. 51. Sketch on the church wall depicting the theory of the 1971 intervention
[Sketch by Raymond M. Lemaire]
Fig. 52. General plan of the 1971 intervention's shoring works
[Stadsarchief Leuven, 5538 (KF Sint-Jacob)]
Fig. 53. Cracks and estimated movements in plan
[University Archive, Collection Lemaire, n.836]

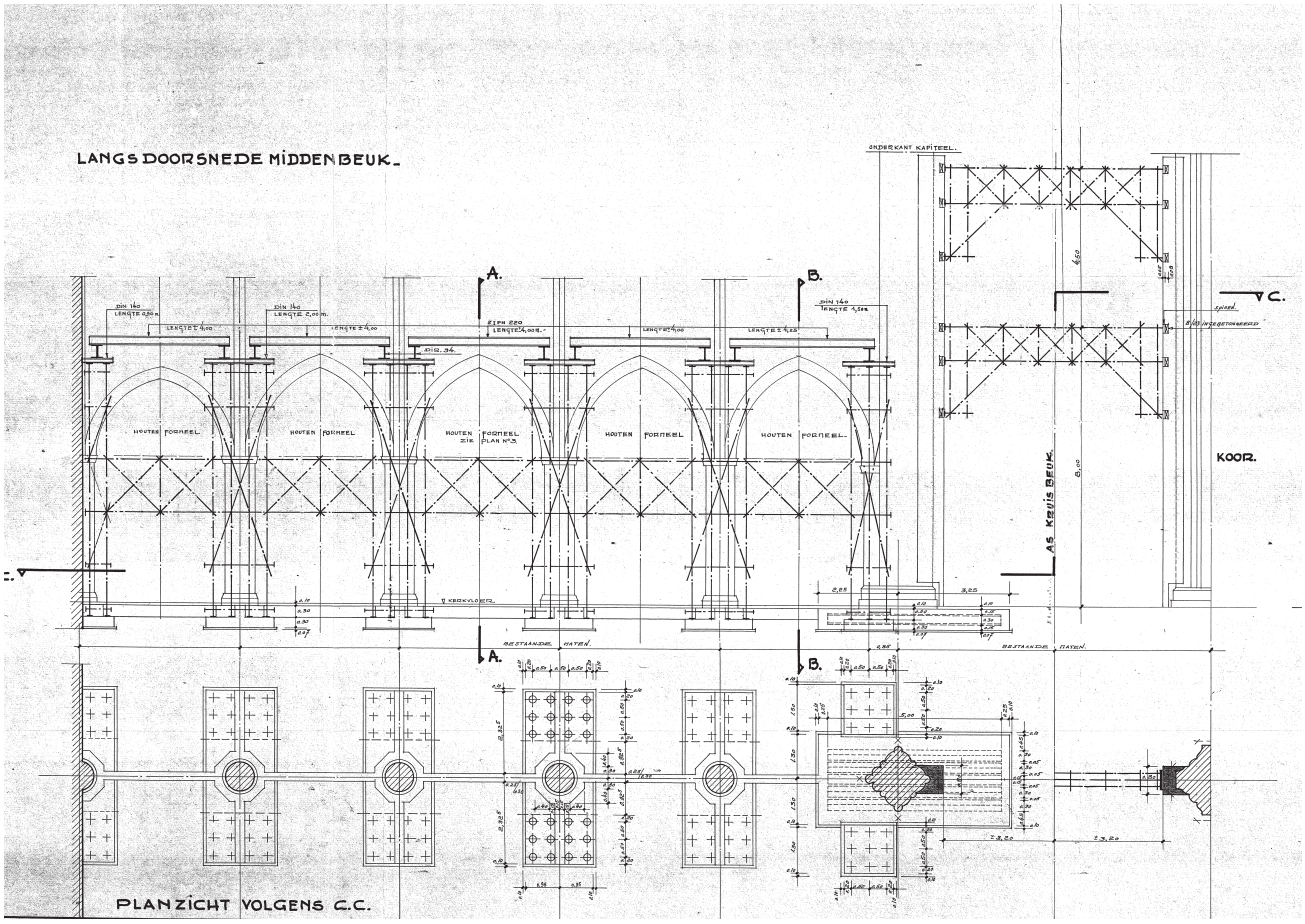
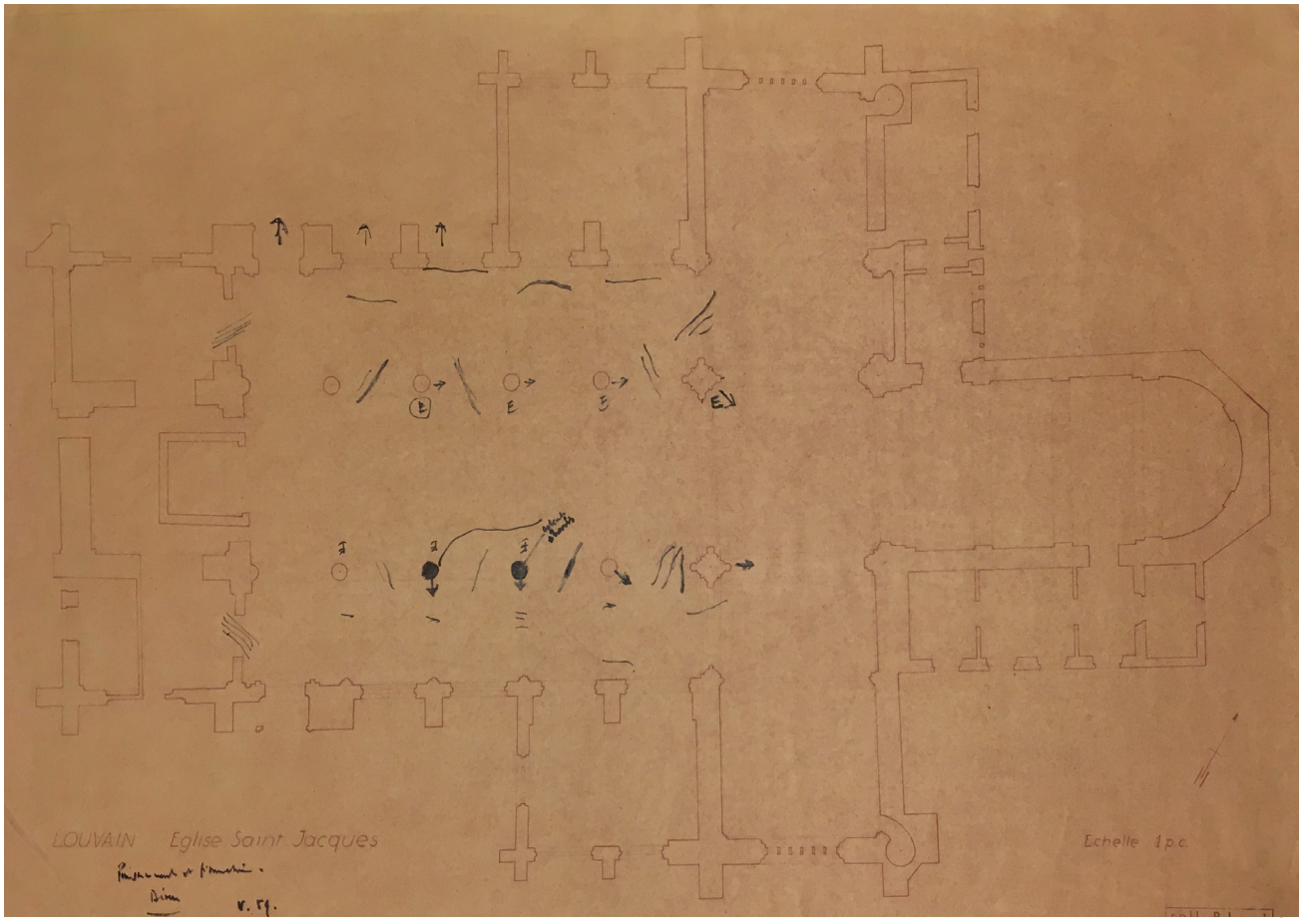

LANGS DOORSNEDE MIDDENBEUK.
A.
B.
C.
HOUTEN FORMEEL
HOUTEN FORMEEL
HOUTEN FORMEEL
HOUTEN FORMEEL
HOUTEN FORMEEL
KOOR.
PLANZICHT VOLGENS C.C.

Fig. 52.

Fig. 53.


LOUVAIN Eglise Saint Jacques
Echelle 1 p.c.

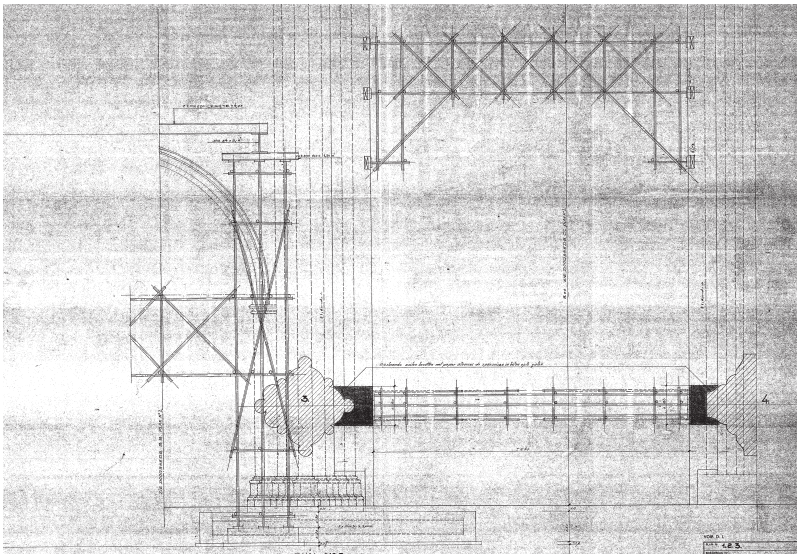
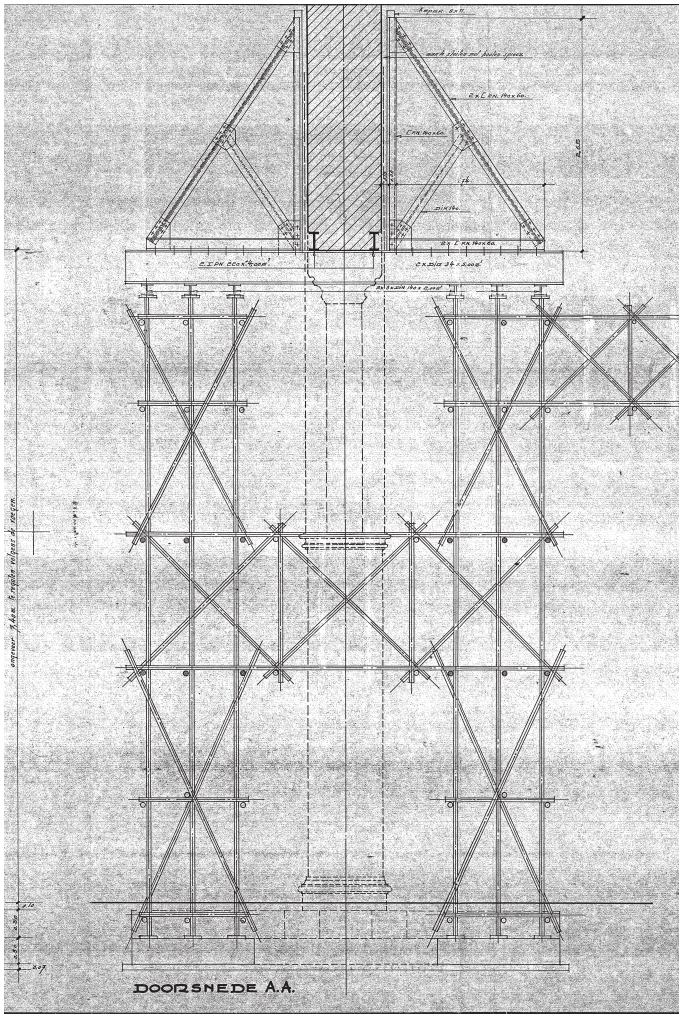


Fig. 54.

Fig. 55.



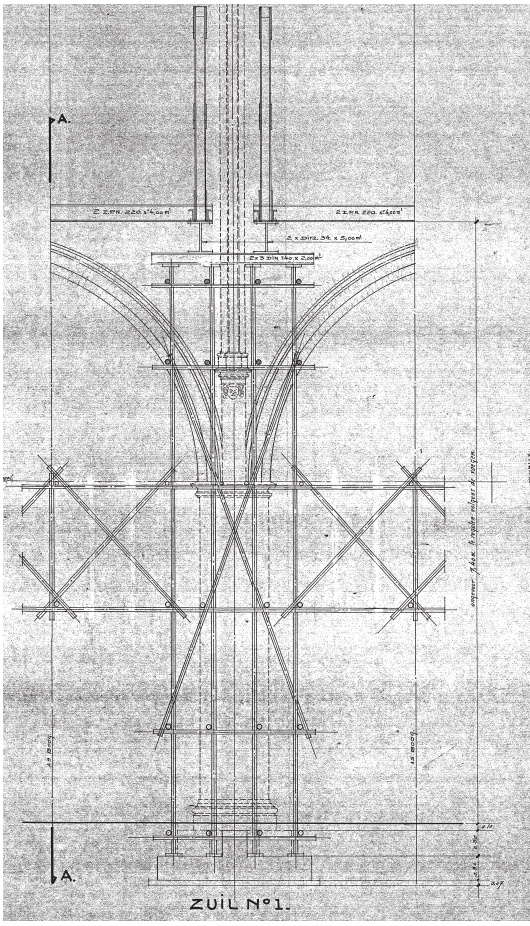


Fig. 56.

Fig. 54. Plan of the 1971 intervention's shoring works at the crossing pilar [Stadsarchief Leuven, 5538 (KF Sint-Jacob)]
Fig. 55. Front view of the 1971 intervention's shoring works at the main nave pillars [Stadsarchief Leuven, 5538 (KF Sint-Jacob)]
Fig. 56. Side view of the 1971 intervention's shoring works at the main nave pillars [Stadsarchief Leuven, 5538 (KF Sint-Jacob)]

main nave ends in slender pillars at the crossing. The vaults of the main nave are built too high to counter the leaning of the tower. Thirdly, the cross section of the pillars of the main nave would have enough load bearing capacity if the original design was kept. The building phase added loads on the pillars for which they were not designed. In addition to that, the middle of the cross section is filled with masonry rubble, giving it an inferior quality. The inferior quality of the subsoil was also suspected an additional cause as settlements occurred.[77]

To solve the issues of the hypothesis, three phases were planned. Firstly, the columns at the crossing had to be supported to counter the lateral loading of the tower. Doing this, concrete columns were added against the crossing pillars with two steel tube structures in between them (see Figure 52).[78]
Secondly, the aim of phase two was to replace the assumed masonry rubble core of the pillars with reinforced concrete columns, hidden behind a parament of natural stone. Besides that, the foundation surface had to be increased to limit soil stresses. To make this phase possible, a temporarily shoring of the main nave was needed. The vaults of the side nave were dismantled because of their bad state.[79]
Lastly, the aim of the third phase was to solve the assumed cause of the settlements, the leaning of the tower. This would be done by detaching the tower from the central nave.[80]

Only phase one and a part of phase two (only the temporarily shoring)

78. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 2.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 3.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 3*, 2007, p. 2.; STAD LEUVEN, *Restauratiewerken der Sint-Jacobskerk*, 1961, p. 13-15.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 46-48.;

79. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 3.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 3.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 3*, 2007, p. 2.; STAD LEUVEN, *Restauratiewerken der Sint-Jacobskerk*, 1961, p. 13-15.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 46-48.

80. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 3.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 3.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 3*, 2007, p. 2-3.; STAD LEUVEN, *Restauratiewerken der Sint-Jacobskerk*, 1961, p. 13-15.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 46-48.

81. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 3.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 3.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 3*, 2007, p. 3.

were executed, see Figures 52, 54, 55 and 56. Besides that, concrete frames were added as well.[81] As to why the works were only executed partially, financial problems of the parish of Saint James might have played a major role, more on this later. Furthermore, the theory was proven to be (partly) wrong later.

This proposed intervention was very radical and destructive. One could say that in the end it was a good thing that this intervention was never fully completed. In addition to that, the research done was not at all sufficient to propose such an intervention. Far more technical and historical analysis was needed at that time.



Fig. 57.

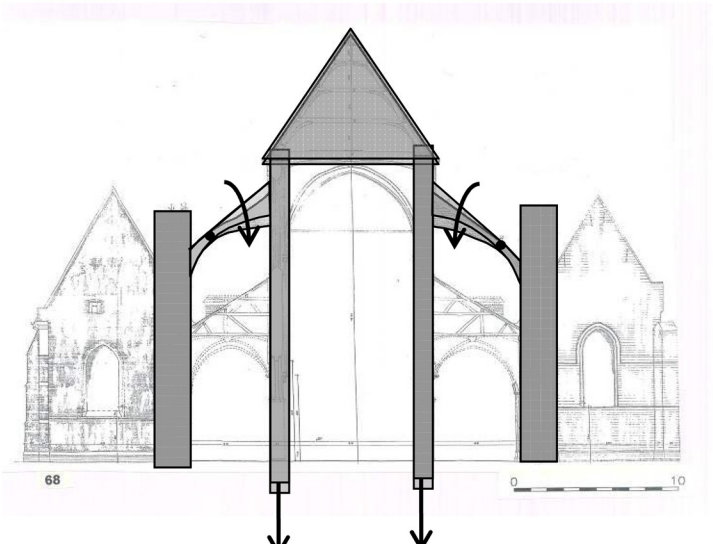


Fig. 58.

- **Dismantlement of the Flying Buttresses**

The ever-changing plans during the construction of the church is visible in the countermeasures taken for the horizontal thrust in the vault of the nave. The western part of the nave uses tie-rods to resist the thrust, the eastern part uses flying buttresses. However, there was an intention to build flying buttresses for the whole nave as the traces in the façade indicate (section 2 and 3 on Figure 57).[82]

Fig. 57. Different sections of the Saint James church
[Smars, Schueremans and Van Balen, 2006, p. 2]
Fig. 58. Movements of the flying butresses due to the differential settlements
[Schueremans, Van Balen, Brosens, Van Gemert and Smars, 2007, p. 18]

82. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 1.

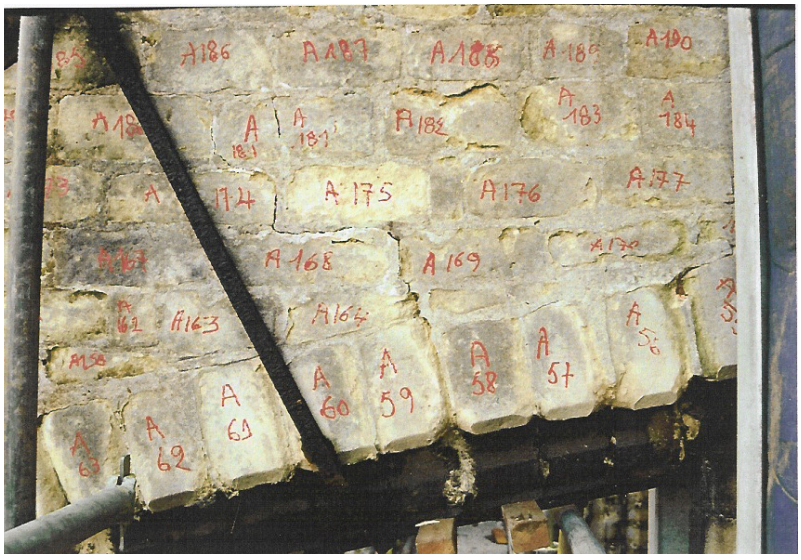


Fig. 59.

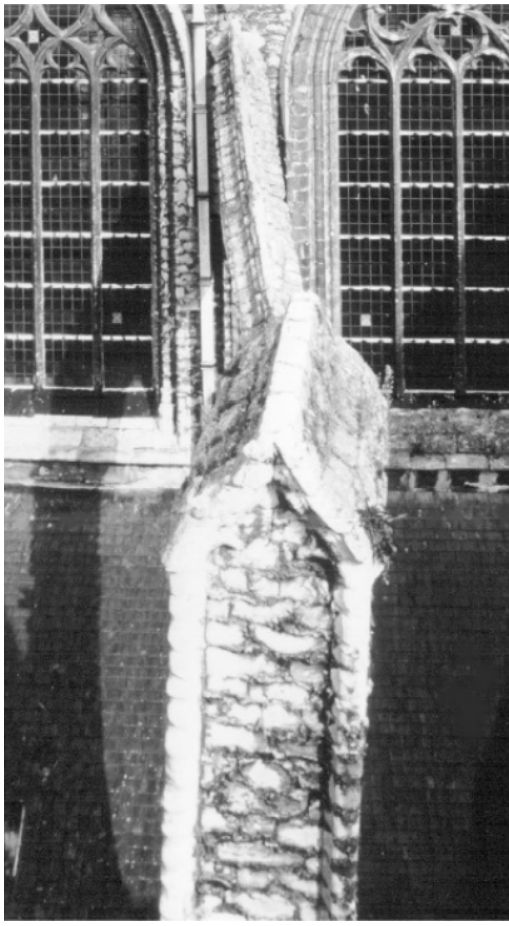


Fig. 61.

Fig. 60.

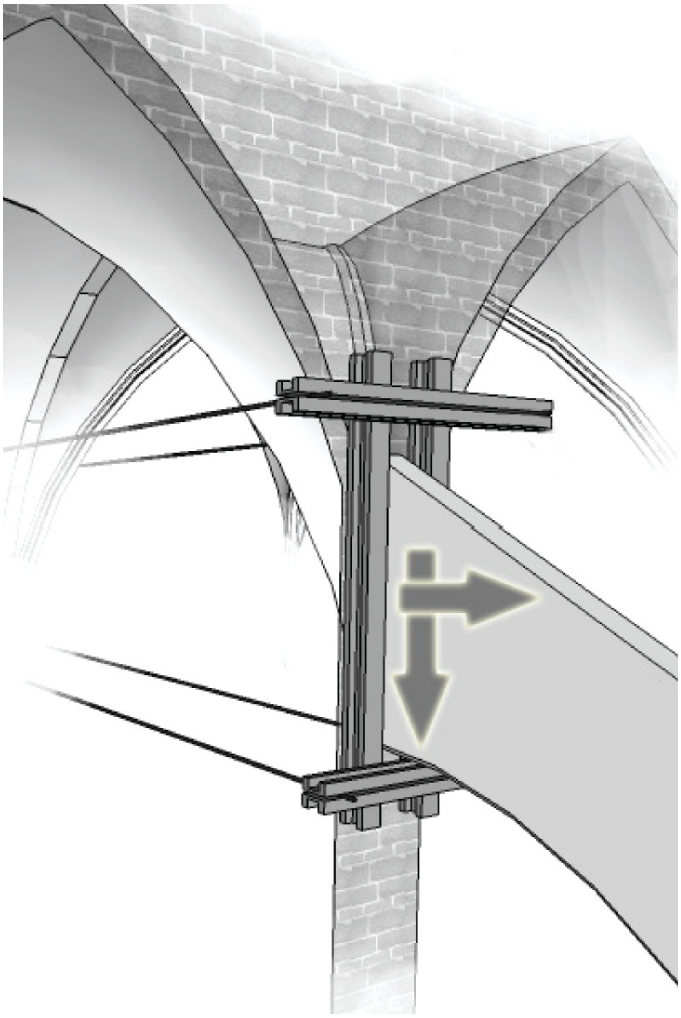


Fig. 59. Photograph of the numbered stones, allowing reconstruction [Schueremans and Van Gemert, 2007, Bijlage 20, p. 3/9]
Fig. 60. Basic layout of the support system [Verstrynge, Schueremans and Smars, 2012, p. 691]
Fig. 61. Buckled out arch of the flying butresss [Smars, Schueremans and Van Balen, 2006, p. 3]

The study by the Lemaire Centre in 1995 pointed out the severe condition of the flying buttresses.[83] It was decided to remove all flying buttresses and replace them by tie-rods because of their extremely deformed shape. The buttresses buckled out in both the horizontal and vertical plane.[84] As settlements occurred in the nave walls, the piers of the flying buttresses did have a smaller magnitude of settlements. This resulted in important tensions in the flying buttresses which, in order to match the movements, had to break.[85]

One of the buttresses, in section 4 of the south façade (see Figure 57), was in a bad condition. Firstly, since the movements caused the structure to crack, it was considered as being an isostatic structure, which has no resistance to tension. As such the structure was considered to have no resistance to tension. Secondly, as the structure does not have any resistance to tension, it is essential that the pressure line is located within the geometry of the structure. Although the arch was not perpendicular to the nave wall, the pressure line still fitted inside its deformed geometry. However, the stability of the flying buttress was considered to be critical. Besides that, the dismantlement of the vaults of the side naves in the 1970s resulted in a removal of a counterforce to the horizontal thrust in the main nave walls, leading to eccentricities. Given the above arguments, it was decided to dismantle all flying buttresses.[86]

Before starting the actual dismantlement, four tie-rods were installed for each section, of which the tension could be adjusted to counter movements of the nave walls during the intervention. The configuration of the system is shown in Figure 60. This system is lightweight and can be assembled on site, which allows to have a minimum of additional damage to the structure.[87] To this system, metal props were added as well on the place of the buttresses.[88]

The dismantlement was done in such a way that if in the future these buttresses would be reconstructed, it is still possible. The stones were numbered and photographs were taken.[89]

83. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 81.
84. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 8.
85. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 2-3.; VERSTRYNGE, SCHUEREMANS and SMARS, "Controlled Intervention", 2012, p. 693, p. 692.
86. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 2-3.
87. VERSTRYNGE, SCHUEREMANS and SMARS, "Controlled Intervention", 2012, p. 693, p. 690.
88. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 3.
89. SMARS, SCHUEREMANS and VAN BALEN, "Monitoring the dismantlement of four flying buttresses", 2006, p. 4.

- **Urgent Maintenance Works**

In 2005, various works were executed to prevent further deterioration of the building. Works included waterproofing the roof, other joinery works, sewage works and taking away loose stone parts.[90]

2. 3. 4. Structural Assessment

The extensive study of 1995 done by the Raymond Lemaire Centre for the Conservation of Historic Towns and Buildings gives a good inventory of the geometry and material properties of all the structural elements and subsoil. Besides that, an inventory of all the cracks and deformation measurements in monitoring campaigns (see p. 58) was made. Finally, the loads in the two types of cross sections (with flying buttresses and with tie rods) were calculated. As these data are needed to assess the structural behaviour of the church, they are used much in later studies on the church. Not all data needed for some studies were collected in the study of 1995, but they still provided a good basis for further research.

The study by TRIconsult and Labo Reyntjens was commissioned by the city of Leuven and does a full structural assessment of the church. Some papers are dealing with research done in the light of this larger study of TRIconsult and Labo Reyntjens.

- **Load Bearing Capacity of the Subsoil and the Foundations**

The leaning of the tower and the crack patterns in the walls of the main nave are indicators of differential settlements. Because of these occurring settlements, the assessment of the load bearing capacity of the foundations and the subsoil is needed.[91]

In the context of the study of 1995, four cone penetration tests (200kN) were executed to assess the load bearing capacity of the subsoil. The four tests had similar results, indicating a homogenous subsoil.[92]

The following layers can be distinguished based on the cone penetration tests:[93]

- 0.00m-2.00m: Alluvium, sandy

90. David MELLAERTS, "Herwaardering Sint-Jacobskerk", *Nieuwsbrief Leuvens Historisch Genootschap*, 2005, 2/3, p. 7-8.; Archief Onroerend Erfgoed 36/361/4245 (Sint-Jacobskerk I)

91. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 37.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 6.

92. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 38.

93. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 38.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 5.

clay, possibly disturbed

- 2.20m-4.00m: alluvium, highly compressible peat containing clay
- 4.20m-6.60m: alluvium, sandy clay
- 6.80m-12.00m: quaternary clay-containing sand
- 12.00m-…: tertiary highly consolidated, or moderately consolidated clay-containing sand

Furthermore, in site vane shear tests were executed in light of the study by TRIconsult and Labo Reyntjens. As the church is located on clay containing subsoil, this test is used to determine the cohesion of the soil as this contributes much to the load bearing capacity of clay containing soils.[94]
The study of 1995 pointed out that the subsoil had a major role in the instability of the church and urged to inspect the foundation system.[95]
To assess the foundation system, investigation pits were set out at a pillar of the main nave, a pillar of the crossing and a pillar of the side nave (Figure 63). By doing this, the geometry of the foundations could be determined. Besides that, core drilling was executed through the foundation masonry to assess its

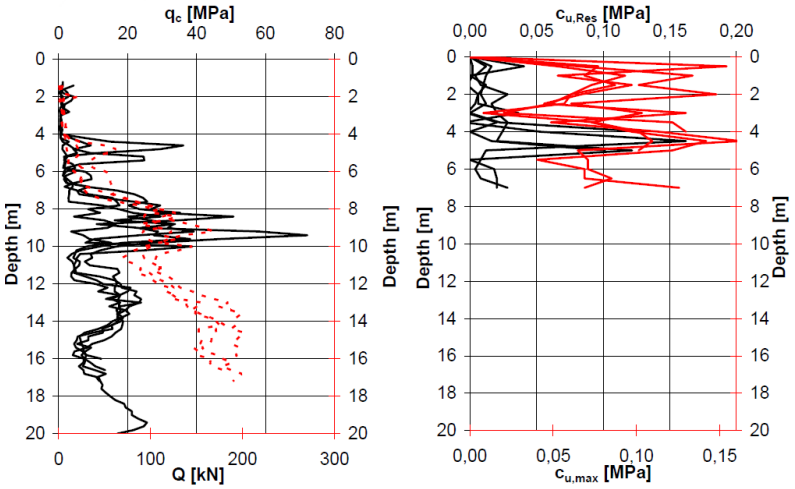


Fig. 62.

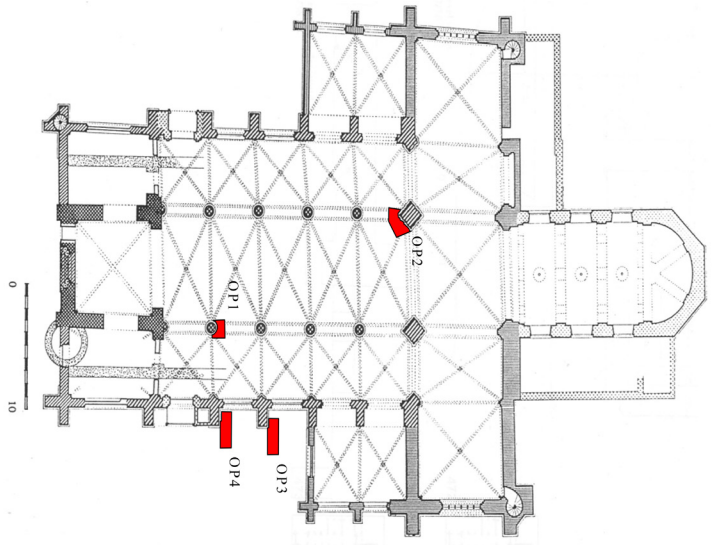


Fig. 63.

94. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 4.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 5.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 9.
95. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 85.

Fig. 62. Results of the cone penetration test (left) and vane shear test (left) [Brosens, Van Gemert and Smars, 2007, p. 17]
Fig. 63. Indication of the investigation pits [Schueremans and Van Gemert, 2007, Bijlage 5, p. 1]

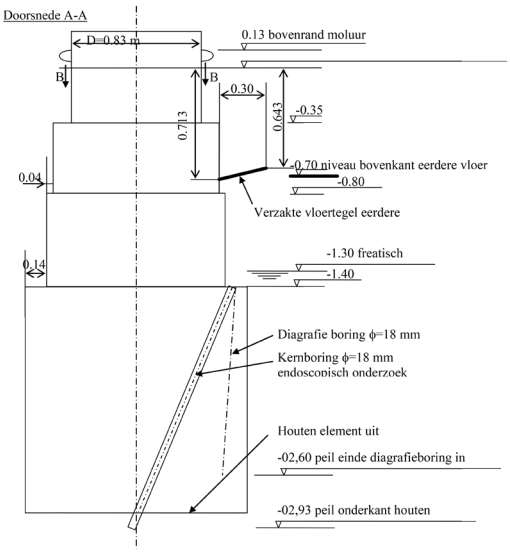


Fig. 64.

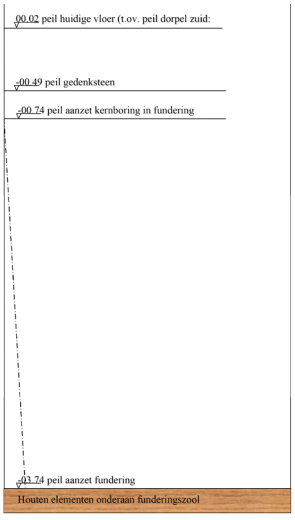


Fig. 65.

quality. The masonry was in excellent condition, but wooden elements without a clear indication as to their functioning (either a wooden beam grid on which the foundation is set or pile foundation) were found rotten at the bottom of the masonry of the pillars of the main nave. This is rather strange as the elements are below the phreatic surface. The quality of the wood at the foundations of the pillars of the side nave is good. To investigate the investigation hole more, an endoscope was used. The foundations differ in layout.[96] The layout of the foundations and the investigation holes are shown in Figures 64 and 65. A possible explanation for these rotten elements despite being below the phreatic surface is that sewage works in the past temporarily lowered the phreatic surfaces allowing for the wood to rot.

In analysing the stresses at the foundations, the water level, the geometry of the foundations and the loads are taken into account. Based on the soil properties found by the on-site tests, the design strengths were calculated. The results of this analysis are summarized in Table 1. In this, the main issue as to the instability of

Fig. 64. Foundation layout of the main nave pillar
[Schueremans and Van Gemert, 2007, Bijlage 5, p. 3]
Fig. 65. Foundation layout of the crossing pillar
[Schueremans and Van Gemert, 2007, Bijlage 5, p. 12]

96. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 4.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 5.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 10.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 5*, 2007, p. 2.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 56-57.

the church is clear. The stresses at the foundations for all structural components except for the side nave pillars are higher than the strength of the subsoil.[97]

- **Load Bearing Capacity of the Structural Components**

The actual load bearing capacity of the masonry was analysed in a least destructive way: samples of natural stones and bricks were taken on site as well as samples of mortar at ten different locations. Based on these samples of masonry and mortar joints, an estimation of the

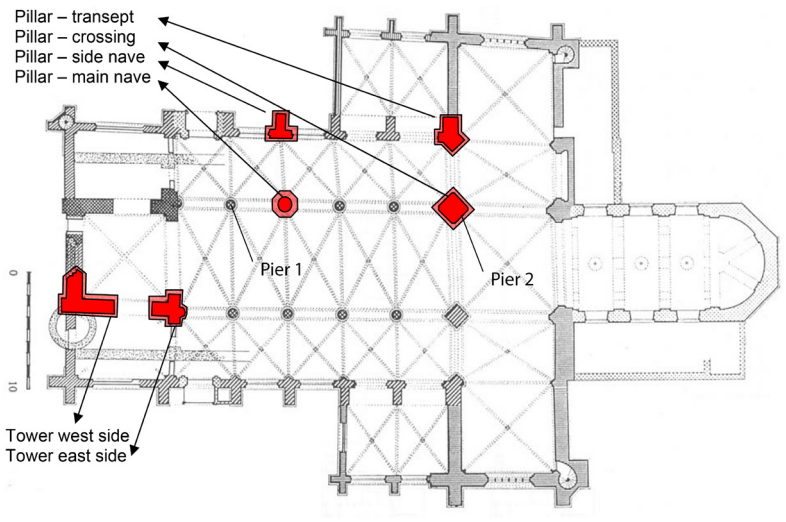


Fig. 66.

Structural component	Design stresses at foundation $\sigma_{g,d}$ [MPa]	Design strength subsoil $f_{g,d}$ [MPa]	Check (safety margin)
Tower – west side	0.43	0.24	not ok; (0.56)
Tower – east side	0.76	0.24	not ok; (0.32)
Pillar – main nave	1.01	0.28	not ok; (0.28)
Pillar – crossing	0.89	0.40	not ok; (0.45)
Pillar – side nave	0.22	0.26	ok; (1.18)
Pillar - transept	0.45	0.26	not ok; (0.58)

Table 1.

Structural component	Design stresses in masonry $\sigma_{m,d}$ [MPa]	Design masonry strength $f_{m,d}$ [MPa]	Check (safety margin)	Failure probability p_f	Reliability index β
Tower – west side	0.64	1.81	ok; (1.6)	$5.8\ 10^{-14}$	7.4
Tower – east side	1.33	1.81	ok; (1.36)	$2.8\ 10^{-9}$	5.8
Pillar – main nave	3.14	2.21	not ok; (0.70)	$2.2\ 10^{-5}$	4.09
Pillar – crossing	1.28	2.21	ok; (1.72)	$6.0\ 10^{-11}$	6.44
Pillar – side nave	0.45	2.21	ok; (4.91)	$< 10^{-16}$	>8
Pillar - transept	0.66	2.21	ok; (3.35)	$< 10^{-16}$	>8

Table 2.

Fig. 66. Indication of the analysed structural components [Schueremans, Brosens, Van Gemert and Smars, 2007, p. 17]
Table 1. Load bearing capacity of the subsoil at the foundations [Schueremans, Brosens, Van Gemert and Smars, 2006, p. 6]
Table 2. Load bearing capacity of the masonry structural components [Schueremans, Brosens, Van Gemert and Smars, 2006, p. 5]

97. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 6.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 8.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 12-13.

compressive strength is made. Finally, to get to the strength of the composite masonry, it is derived using a numerical relationship described in Eurocode 6.[98] Besides that, an endoscopic research was done on all important structural components to analyse the internal structure of the masonry.[99]
The analysed structural components are shown in Figure 66.

Based on the geometry and the load distribution, the load bearing capacity of the masonry of all important structural components could be derived. This is shown in Table 2. All components except for the main nave pillars have a load bearing capacity which is sufficient. Additionally, the safety check has the same results. However, when considering the failure probability, the safety is still acceptable.[100]

- **Case: Load Bearing Capacity of the Pillars**

In contradiction to what was assumed in the past, the pillars of the church are made out of solid stone blocks and not out of a natural stone outer shell and a core filled with masonry rubble. The theory was that the load bearing capacity of the pillars was not sufficient enough. Former strengthening (hoop reinforcements and vertical stone replacements) indicate that this theory was wrongly assumed in the past as well.[101] However, because of this theory, the current steel tube shoring was added in 1971 to relief the columns of their loads (intervention described above). Besides that, as the subsoil and the current foundation layout were proven not to be sufficient (see p. 70), strengthening of the foundations of the columns was advised. Considering this strengthening, the actual stresses are important to assess. As such, it was decided to assess the load bearing capacity of the columns.[102]
To derive the actual stresses in the columns, two methods are used: it can be done experimentally using a hole-drilling technique on two piers (see Figure 66), and

98. EN1996, *Design of masonry structures – General rules for buildings: Rules for reinforced and unreinforced masonry*, European Standard: Eurocode 6, 2002.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 5.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 4.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 11.
99. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 6*, 2007, p. 22.
100. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 5.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 6-7.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 12.
101. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 4-5.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 4.
102. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 113.

numerically.[103]

Briefly explained, this hole-drilling technique works as follows. Eight strain gauges are used to derive the stresses in the stone, three would be sufficient as well (in theory: three independent directions are required) but eight are better to avoid experimental errors.[104] These strain gauges are glued to the stone in a circle and within its centre, a hole is drilled after the strains are stabilised. Before the drilling, the strains are already being recorded for at least 60 minutes. After the drilling, the strains are recorded each 5 minutes for 120 minutes.[105]
The layout of the geometry of this technique is shown in Figure 68. Only three strains are needed, as such, combinations must be made (for instance C0, C2 and C5, see Figure 68). The drilled hole causes a change in strains as a part is missing which relate to the stresses in the structure. With the gathered data on these strains, the stresses can be derived using the Poisson coefficient and the Young's modulus.[106]
The results of the stresses in the piers are summarized in Figure 69. Some strains differ in the same orientations (for instance C1 and C5 for pier 1) and are left out in the deduction of the stresses. The stresses are mainly vertical originating from the self-weight of the structure.[107]

Based on the geometry and material density, the vertical stresses at a height of 1,5 metre were calculated.

Quantity	Symbol	Unit	Pier 1	Pier 2
Vertical force	F_V	kN	1160	1945
Cross-section	A	m^2	0.541	1.69
Average value of vertical stress	$\sigma_{V,num}$	[N/mm^2]	2.14	1.15
Stress gradient	$\Delta\sigma_{V,num}$	[N/mm^2]	0	0.22
Stress level at measuring point	$\sigma_{Vtot,num}$	[N/mm^2]	2.14	1.37
Experimental value (hole-drilling technique)	$\sigma_{V,exp}$	[N/mm^2]	2.24 (Combination [Comb] 3) 2.40 (Comb 4)	1.50 (Comb 1) 1.90 (Comb 5)

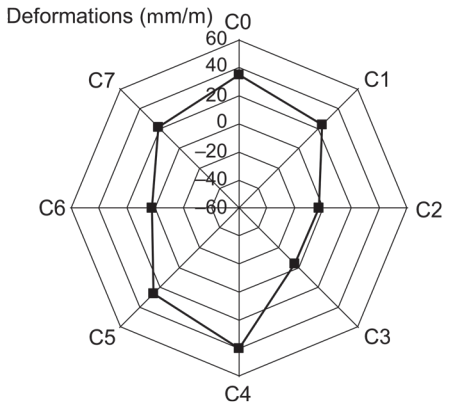
Table 3.

Table 3. Comparison between the stress levels obtained with the experimental and numerical method
[Beita and Schueremans, 2009, p. 123]

103. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 113.
104. Santiago S. BEITA and Luc SCHUEREMANS, "The hole drilling technique for on site deduction of the stresses states in stone masonry by using eight strain gages", *Construction and Building Materials*, 2009, 23, p. 2041-2042.
105. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 116.
106. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 116-118.; BEITA and SCHUEREMANS, "The hole drilling technique for on site deduction of the stresses states in stone masonry", 2009, p. 2044.
107. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 118-121.; BEITA and SCHUEREMANS, "The hole drilling technique for on site deduction of the stresses states in stone masonry", 2009, p. 2044.



Fig. 67.



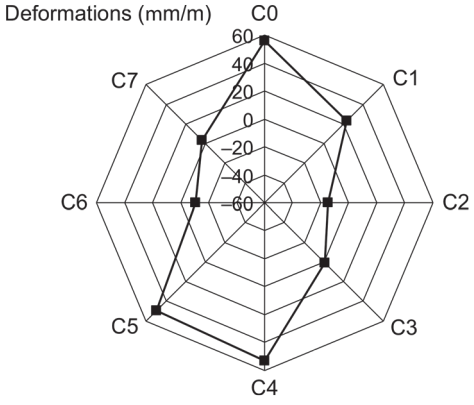
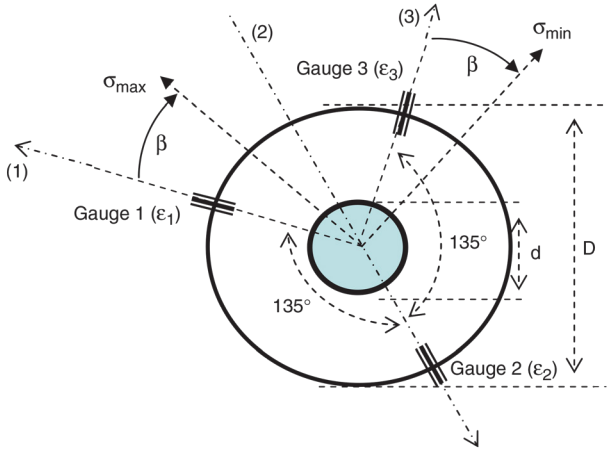


Fig. 69.

Fig. 68.



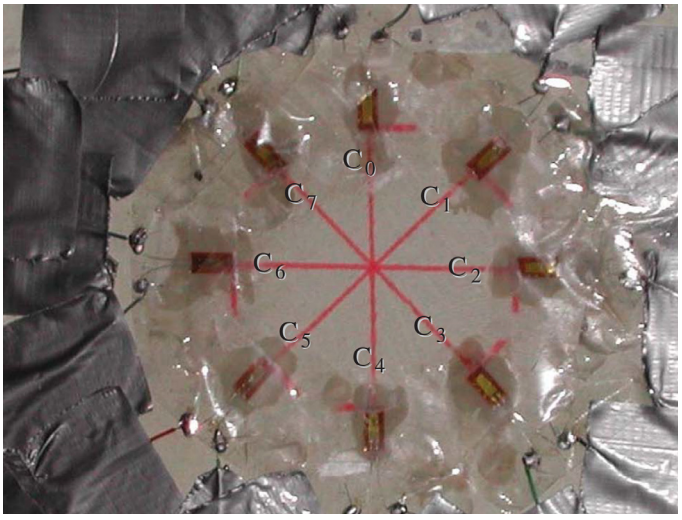


Fig. 67. Metal hoops and stone reinforcements on some pillars of the main nave
[Schueremans, Brosens, Van Gemert and Smars, 2007, p. 13]
Fig. 68. Layout of the geometry for the hole-drilling technique (top), the strain gauges on pier 1 (bottom)
[Beita and Schueremans, 2009, p. 117, 118]
Fig. 69. Radial representation of the final strains for all strain gauges in Pier 1 (bottom) and Pier 2 (top)
[Beita and Schueremans, 2009, p. 119]

	Horizontale resultante op trekkers - $H_{tot,x}$	
Belasting geval	Op basis van minimale druklijn H_{min} [kN]	op basis van maximale druklijn H_{max} [kN]
Diagonaal AB		
1	1.79x28.9=51.7	1.79x32.9=58.9
2	1.79x28.6=51.2	1.79x32.4=58.0
Diagonaal CD		
1	1.79x26.9=48.2	1.79x29.3=57.8
2	1.79x26.6=47.6	1.79x28.9=51.7

Table 4.

datum	2000	2005				2006						2007	
	04/04	1/6	29/8	7/9	8/12	8/2	5/4	7/6	9/8	4/10	6/12	1/3	1/6
travée 3	123	177	182	169	224	229	217	195	174	192	202	214	178
travée 4	64	82	81	72	106	110	101	90	79	86	91	99	84
T [°C]				23.2	6.6	5	6	14	23	17	14.8	6	16

Table 5.

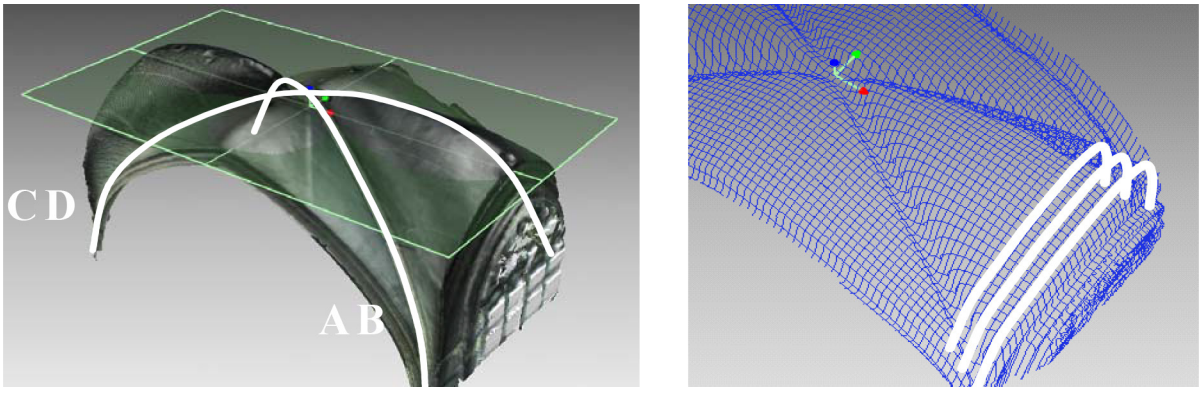


Fig. 70.

Table 4. Horizontal forces in the vault's arches
[Schueremans and Van Gemert, 2007, Bijlage 11, p. 11]
Table 5. Measured forces during monitoring campaigns
[Schueremans and Van Gemert, 2007, Bijlage 11, p. 11]
Fig. 70. Primary and secondary (conceptual) arches in the vault
[Schueremans and Van Gemert, 2007, Bijlage 11, p. 9]

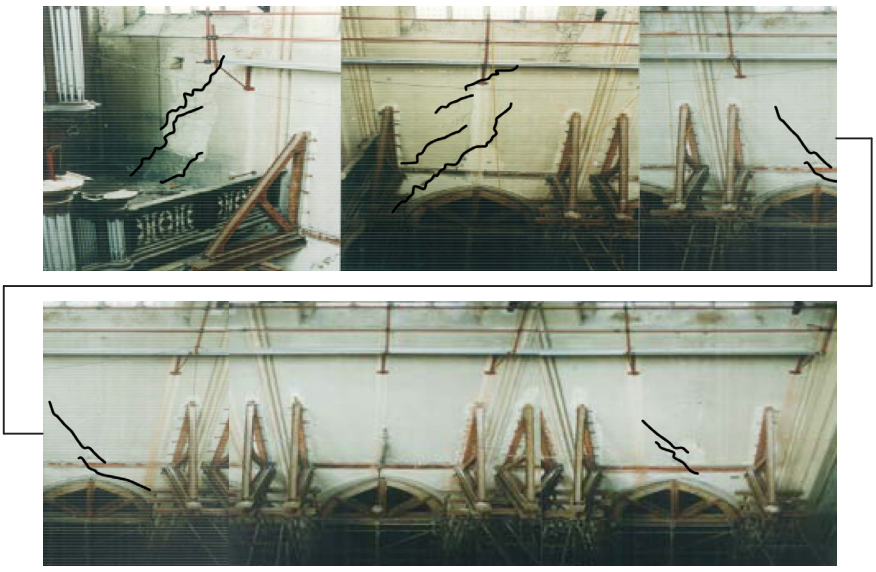


Fig. 71.

Fig. 71. Crack patterns in the northern side nave wall
[Schueremans, Brosens, Van Gemert and Smars, 2007, p. 20]

Due to its place at the corner of the main nave and transept, pier 2 has additional horizontal forces originating from the arches. This results in an additional stress due to the bending moment. The results from the numerical assessment are shown in Table 3.[108]

Comparing the stresses found by the experimental method with those found with the numerical method, an acceptable match is found. The differences might be because of the fact that the numerical calculation was a rough estimate. Besides that, the experimental values are depending on the Young's modulus, which on itself is an estimate that varies with the natural variability of the stones (20%).[109]

- **Case: Cracks in the Nave Walls**

The walls of the main nave have severe cracks. This pattern is comparable with shear cracking in a concrete beam of which the supports would be the tower wall and the pillars at the crossing. This is another indicator that the vertical displacements of the pillars of the main nave are larger than those of the tower and the pillar at the crossing. In fact, this crack pattern gives evidence for the theory that the pillars are punching through the subsoil.[110] Furthermore, there are no crack patterns which indicate the wrongly assumed pushing of the tower against the vaults.[111] Lastly, there are large open cracks where the nave and the transept meet, making this theory of a pushing force by the tower highly unlikely as well.[112]

- **Case: Measuring the Vaults**

Based on the measurements done

108. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 122-125.; BEITA and SCHUEREMANS, "The hole drilling technique for on site deduction of the stresses states in stone masonry", 2009, p. 2045.
109. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 124-125.
110. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 8-9.;
111. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 79.
112. VAN BALEN, NUYTS, SMARS and VAN DE VIJVER, *Optimalisatie van standzekerheidsmodellen van gewelfde gotische structuren*, 1995, p. 83.

by the Lemaire Centre in 1995 using Phidias and the measurements using 3D laser scanning, three sections were drawn up to analyse the vaults. The following could be concluded. Firstly, the vaults have a regular shape. Secondly, the analysis of the pressure lines show that the geometric safety is guaranteed. Lastly, the temporary tie rods can be replaced by a permanent tie rod on the same place as in the other vaults. Furthermore, the permanent tie rod in the other vaults can be kept.[113]

Based on the measured geometry, the forces in the vaults were calculated in the program Calipous. The ribs are considered as primary structures whereupon the vault's shells are carrying the loads. These shells can be subdivided in different small arches, see Figure 70. The vaults are considered to be structurally safe.[114] The total horizontal forces (two vaults next to each other) are shown in Table 4. When comparing this with the forces measured during the monitoring campaigns (see Table 5), one can see that the measured forces exceed the calculated forces. This is probably because of:[115]

- Deviations on the load cells (in use since 2000)
- Additional forces due to wind (considered to be small)
- Horizontal forces imposed by the roof structure (considered to be small)
- Slanting of the walls (considered to be small)
- Cyclic deformations of arches might cause irreversibility of these deformations, hence enlarging the forces

- **Settlements**

To gather data on the settlements, three different techniques were used: geodetic levelling points, hydrostatic levelling system and a

	Total settlements [m]			Peat layer settlements [m]			Peat/Total [%]		
	tower	pillar	cross column	tower	pillar	cross column	tower	pillar	cross column
Immediate	0.240	0.203	0.092	0.225	0.196	0.081	93.9	96.7	88.7
Primary	1.107	0.733	0.415	0.719	0.576	0.202	64.9	78.6	48.6
Secondary	0.207	0.100	0.061	0.178	0.094	0.047	86.0	94.6	77.2
Sum	1.554	1.036	0.568	1.122	0.867	0.330	72.2	83.7	58.1

Table 6.

113. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 17.

114. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 11*, 2007, p. 7-9.

115. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 11*, 2007, p. 10-12.; SCHUEREMANS and VAN GENECHTEN, "The use of 3D-laser scanning in assessing the safety of masonry vaults", 2009, p. 331-333.

116. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 4.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 4.

Table 6. Total (calculated) settlements with the contribution of the peat layer [Szekér, 2018, p. 43]

topographic survey (see p. 58).[116] Combined with the studies on the load bearing capacity of the subsoil and the dimensions of the foundations, it was possible to model and estimate the time dependant vertical settlements of the major structural elements. This included the different building phases and their effects on the settlements as well.[117]
The time dependent settlements for the east and west side of the tower, and the pillars of the main nave are shown in Figure 72. Here, the theory of the intervention of 1971 is proven wrong. In fact, the east side of the tower was experiencing larger settlements, causing it to lean to the east side. However, the settlements of the pillars of the main nave are significantly larger than those of the tower, by which the tower is actually not pushing against the main nave.[118]

As stated before, the subsoil of the church is insufficient to take up the stresses at the level of the foundation. The weakest layer of the subsoil is the layer with highly compressible peat containing clay. The contribution of this particular layer is analysed, which was in fact rather high. Table 6 shows the calculated settlements in total, in the peat layer and the contribution of the peat layer to the total settlements. The pillars of the main nave are influenced most, the cross-column least. This is explained by the depth of their foundations: the depth of the cross-column's foundation is located almost at the bottom of the compressible peat layer, that of the pillar in the middle. This causes the peat layer to have a larger influence on settlements for the main nave pillars. The foundation of the tower however starts at 0,4m above the peat layer, making the clay layer above the peat layer having the largest contribution to settlements. But given its large foundation surface, the influence is reaching deeper, hence the peat layer still has a significant influence on the settlements of the tower.[119]

- **Wooden Roof Structure**

To assess the strength of the wooden structure, a resistograph was used. This instrument pushes a needle in a wooden element and measures the resistance. Wooden elements in bad condition can be noted due to their small resistance.[120]
Generally, the wooden structures

117. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 111.
118. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James at Leuven", 2006, p. 6-7.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 14-15.
119. SZEKÉR, *2D Macro-modelling of the structural behaviour of the Saint Jacob's Church*, 2018, p. 42-43.
120. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 12b*, 2007, p. 5.

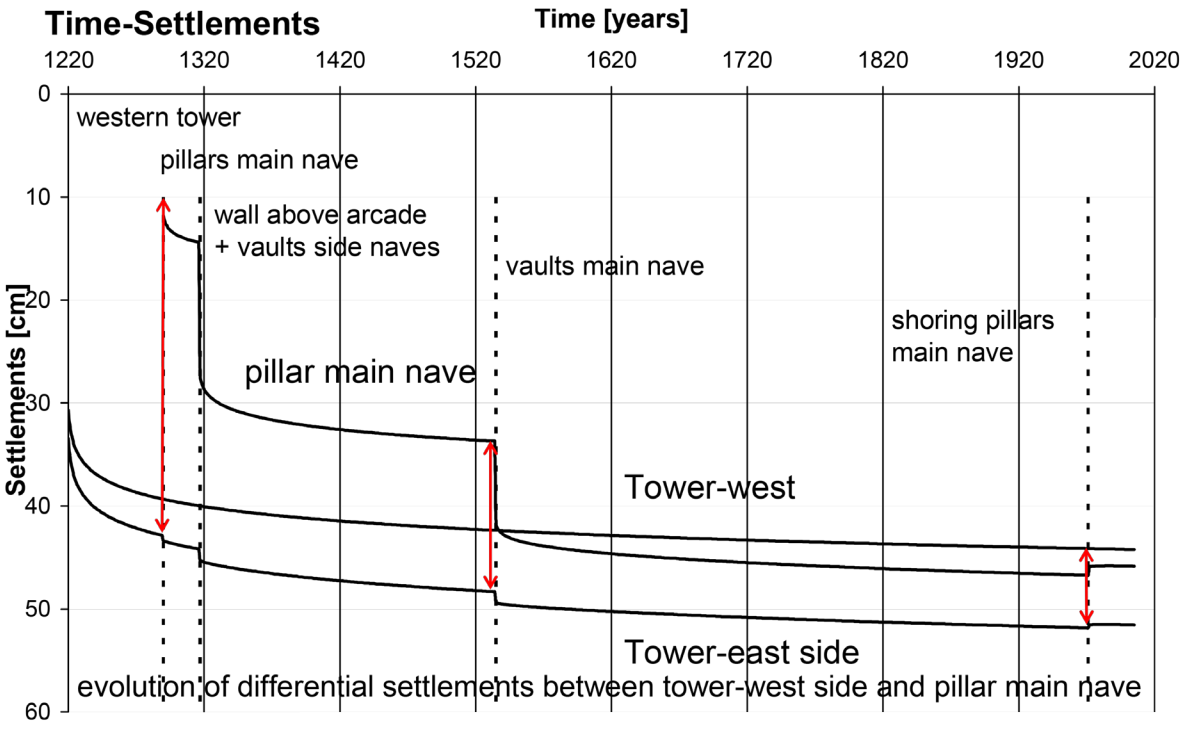
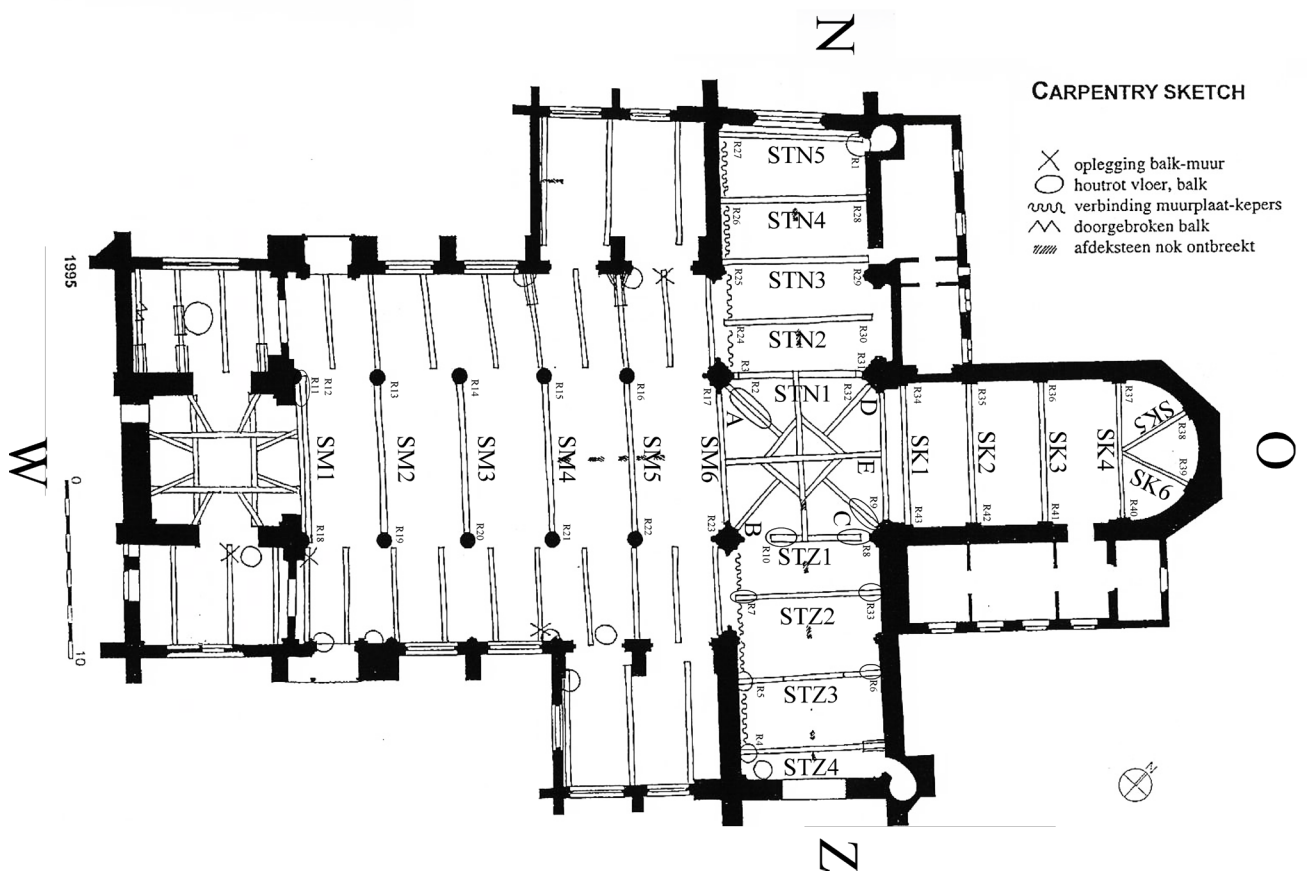

Time-Settlements
Time [years]
1220
1320
1420
1520
1620
1720
1820
1920
2020
0
10
20
30
40
50
60
Settlements [cm]
western tower
pillars main nave
wall above arcade
+ vaults side naves
vaults main nave
shoring pillars
main nave
pillar main nave
Tower-west
Tower-east side
evolution of differential settlements between tower-west side and pillar main nave

Fig. 72.

Fig. 73.


N
CARPENTRY SKETCH
oplegging balk-muur
houtrot vloer, balk
verbinding muurplaat-kepers
doorgebroken balk
afdeksteen nok ontbreekt
STN5
STN4
STN3
STN2
STN1
STZ1
STZ2
STZ3
STZ4
SM1
SM2
SM3
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SK1
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are in a good condition. However, there is some damage above the whole transept caused by the following. Firstly, the wall plates at the western side are deteriorated, causing a vertical settlement of the supports. Secondly, the horizontal trusses of the vaults have caused the masonry walls to move outwards, causing the supports to move and the common rafters to detach from the wooden trusses. Thirdly, the wooden tie beams are resting on the vaults because of the above-mentioned vertical displacements. Besides that, some supports at the crossing are rotting.[121] These rotten elements are enhancing the outwards movements of the walls of the transept as the horizontal thrust of the vaults can only limitedly be taken on by the wooden tie beams. Some repairs have been done in the past, but their effectiveness is in doubt. Lastly, some joints are loose.[122]

The tie beam in the middle truss of the southern nave (STZ3, see Figure 73) is partly cut out because they were hindering the vaults. This is causing a decreased effectiveness in its functioning.[123]

- **Reflection on the 1971 Intervention**

As stated before, the crack patterns do not support the theory stating that the tower is pushing against the main nave's walls. The analysis of the settlements proves the theory wrong, as the settlements of the main nave are happening at a faster pace as those of the tower (see p. 59). Besides that, limited research on the pillar's composition added to the wrong theory which stated that these pillars were made out of a rubble core with natural stone parament. In fact, they are made out of stone blocks. Furthermore, the foundation system was not inspected before doing the intervention, which would have resulted in better understanding the cause of the instability. The settlements were considered an issue, but the actual cause of the settlements was not well understood.

Besides that, the propping of the walls, vaults and arches were proven to have a relatively limited effect by the assessment of the stresses in the piers of the main nave. If this intervention of 1971 would be effective, one would expect the stress levels in the piers to be significantly smaller than those calculated numerically, which they are not. Therefore, the steel tube

Fig. 72. Time dependent settlements [Schueremans, Brosens, Van Gemert and Smars, 2006, p. 6]

Fig. 73. Damages in the roof structure [Van Balen, Nuyts, Smars and Van De Vijver, 1995, deel 2, p. 107]

121. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 17-18.

122. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 28.

123. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 12a*, 2007, p. 14-15.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 26.

shoring is only taking up a small part of the loads it was designed to take up. [124] Besides that, the monitoring campaign of 1994-2005 placed geodetic measuring points on the foundations of the shoring structure as well as the pillars. These points were experiencing settlements at a similar pace as the adjacent columns. As such, this confirms the limited effect of the shoring.[125]

2. 3. 5. Proposed Diagnosis and Therapy

The study done by TRIconsult and Labo Reyntjens in 2007 (and other papers related to this study) proposed a diagnosis and therapy for stabilizing the church of Saint James and removing the present shoring to use the church again. In the following chapter a comparison will be made between the intervention proposed in 2007 and the intervention which is currently being executed.

The main cause for the structural instability of the church is an insufficient load bearing capacity of the subsoil at the foundation level. In addition to that, the different building phases added weight for which the foundations were originally not designed. Furthermore, the rotting of the wooden elements facilitates the punching of the pillars through the subsoil, increasing the differential settlements. All these factors caused settlements which eventually resulted in cracks and immanent failure of some elements (side nave vaults and flying buttresses).[126]

The pillars of the main nave are heavily loaded; however, their design strength is judged to be sufficient to bear the loads.[127]

The tower is leaning to the east, because larger loads are concentrated there, in combination with a smaller cross-section. Besides that, the tower is leaning to the north. This is due to the fact that it is constructed on remains of an old Romanesque church (located mainly on the south side), giving the tower an asymmetrical foundation system.[128]

As to proposing a therapy, a key issue to solve is the lacking load bearing capacity. The proposed technique is micro-piling (type Titan 40/16) with a sufficient depth to reach a sufficiently load bearing layer of soil (12-13 metres), which

124. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 124.

125. BEITA, SCHUEREMANS and VAN BALEN, "On-Site Stress Measurement on the Piers of the Saint Jacobs Church in Leuven, Belgium", 2009, p. 124.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 5.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 16.

126. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2006, p. 7.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 19.

127. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2006, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 11-12.

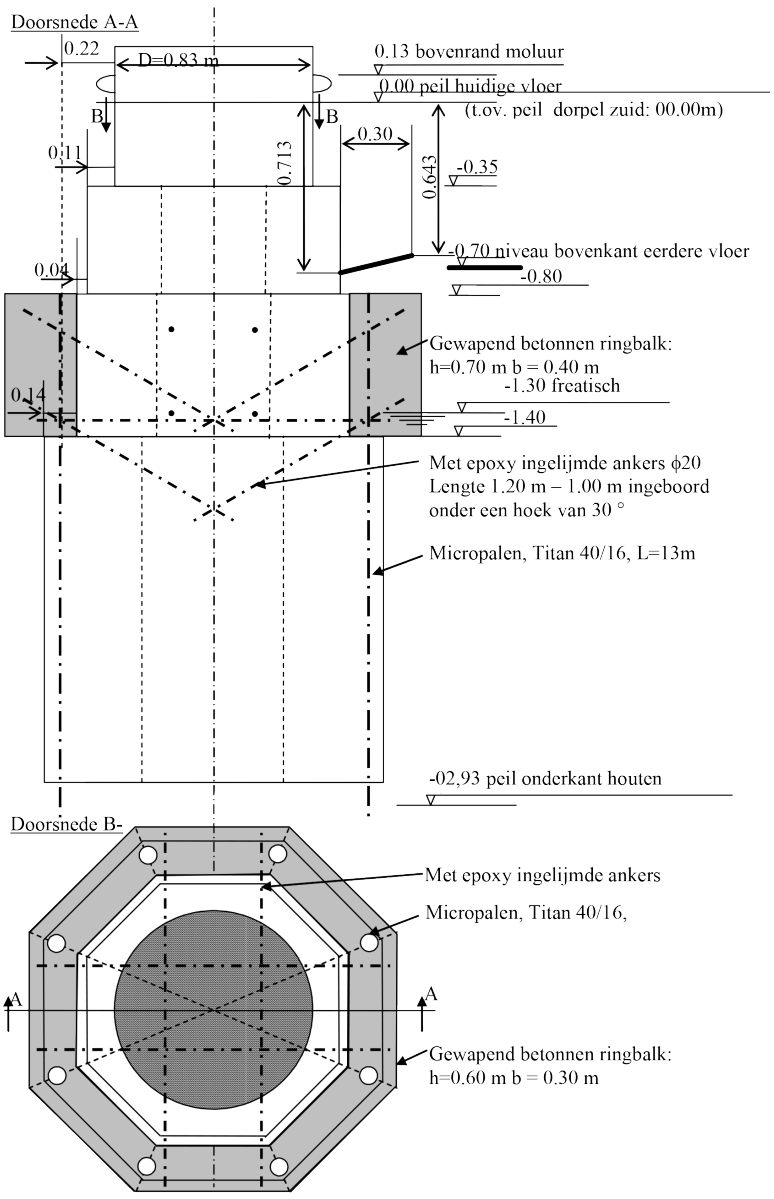


Fig. 74.

Fig. 74. Conceptual solution for strengthening the main nave pillars' foundations
[Schueremans and Van Gemert, 2007, p. 2]

provides enough point resistance. Figures 74 and 76 show the proposed intervention: the micro piles of the main nave's pillars are to be drilled partly through the existing foundation. This is not necessary for the crossing pillars. For the pillars of the main nave, eight micro piles will be used, for the crossing pillars twelve. These piles will be fixed to the pillars by using a reinforced concrete ring beam which is fixed in the cross section of the pillars by glued in anchors.[129]

The technique of micro piling was thought of as well in 1961, but at that time it was not feasible. Nowadays, different techniques have been developed and proven efficient in practise.[130]

However, by executing this intervention, a new risk for actual leaning of the tower against the nave is created, since both parts of the church are on different foundation systems. Three options to solve this problem are proposed. The first is to add micro piles to the foundation of the tower as well, stabilizing its settlements. The second is to monitor the slant of the tower based on which the necessity for interventions are judged. The third is similar to the

128. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2006, p. 7.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 21.

129. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2006, p. 7.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 9.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 19-21.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 1-4.

130. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 9.

intervention proposed in 1961: detaching the tower from the main nave. In addition to that the tower would be monitored before, during and after the intervention as well.[131]
Of the above-mentioned solutions for the tower, the study of TRIconsult and Labo Reyntjens proposes the same system of micro piling (type Titan 40/16). To realise the micro piles, the later added chapel in the tower needs to be dismantled to provide access to the machinery. No concrete ring beam will be used to attach the piles to the masonry foundations as the piles would be drilled through the existing foundation at an angle of 25 degrees. Additionally, to consolidate the masonry, grout would be injected in the foundation's masonry.[132]
After this proposed strengthening of the foundations, the concrete columns cast against the pillars of the crossing can be replaced by horizontal anchors in both longitudinal and transversal direction covering two bays each by which the pillars will have enough lateral support.[133]

Additionally, other consolidation measures are proposed. Concerning the past reinforcement

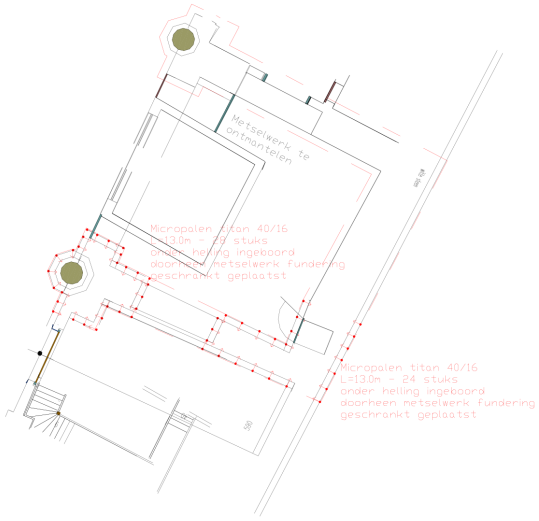


Fig. 75.

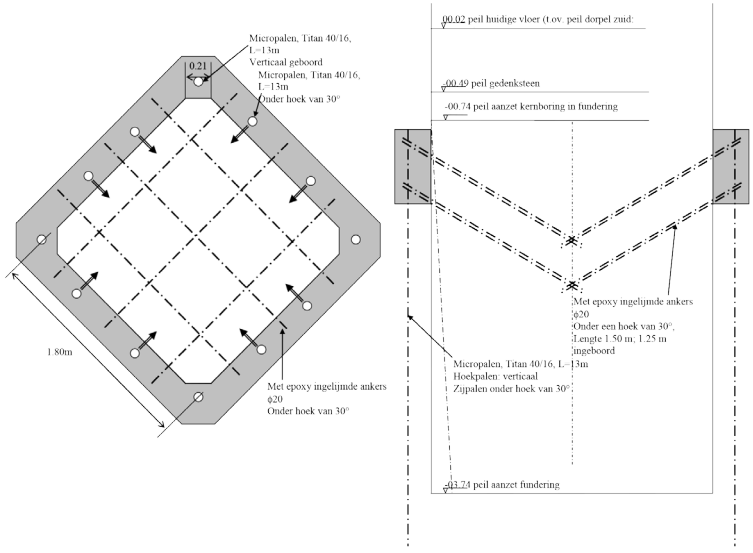


Fig. 76.

131. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2006, p. 7.; SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 9-10.
132. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 21-22.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 4-6.
133. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2006, p. 7-8.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 22-23.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 6-9.

Fig. 75. Conceptual solution for strengthening the crossing pillars' foundations [Schueremans and Van Gemert, 2007, p. 4]
Fig. 76. Conceptual solution for strengthening the tower's foundations [Schueremans and Van Gemert, 2007, p. 5]

measures taken for the pillars of the main nave, the steel rings and the replacements with Doornikse lime-sandstone, it is proposed to remove these elements. The Doornikse lime-sandstone is to be replaced by the original type of stone, or similar and the steel rings are to be removed. To provide enough compressive strength for the pillars, anchors will be glued in to provide confinement. If the monitoring would show the need for additional local reinforcement of the pillars, this can be done with the injection of epoxy resins to enhance the splitting strength.[134]

The cracks would be repaired by metal staples. Per metre of cracks, three staples are proposed to add. The total running metres of cracks is 450 metres (rough estimation). After the placement of the staples, the cracks would be injected with grout.[135]

The vaults of the side naves can be reconstructed. However, this would increase the vertical loading on the pillars of the main nave. In addition to that, horizontal forces will be induced by the thrust of the vaults, increasing stresses in the foundations. This would be countered by tie rods at the height of the roof trusses fixed with anchor plates at both ends in the wall. One end has a tensioning system to adjust the tension in the rod by means of an adjustable nut. Furthermore, some bricks are missing which rises the question on how to fill the missing parts.[136]

The flying buttresses can be reconstructed as well. Another option is to place permanent tie rods, but this implicates that wind stability must be improved in the level of the attic. [assessment 2007, p10] The reconstruction of the flying buttresses is proposed without giving these structures back their function by replacing the temporary tie rods with permanent ones. The tie rods would be fixed with anchor plates in the wall at which one has a tensioning system. However, the shape in which they would be reconstructed has to be investigated as the settlements caused them to buckle, causing instability. The only known shape was this deformed shape as this was documented at their dismantlement.[137]

Finally, regarding the wooden roof structure, some consolidation measures are proposed. Generally, the structure and it joints will be

134. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 10.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 23-24.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 9-11.

135. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 25.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 13.

136. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 10.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 25.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 13-14.

137. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 26.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 14-15.

repaired locally where needed, some parts would have to be replaced. Furthermore, two tie rods will be placed in the southern and the northern transept each, the wall plate would be again fixed in the wall with glued in anchors, and the partly cut out tie beam will be fixed with tensioning rods.[138]

After the proposed strengthening and consolidation measures, the present steel tube shoring and concrete columns of 1971 can be removed. The concrete columns at the crossing pillars will be removed in smaller pieces, the adherence to the crossing pillar is expected to be minimal as the concrete is cast against a foil of plastic.[139] The concrete shoring structures in the southern side nave can be removed as well. No plans of these structures are found, nor were they mentioned in the specifications of the intervention of 1971. However, they are measured in the context of the study of TRIconsult and Labo Reyntjens.[140]

Lastly, the proposed intervention is meant to be monitored following the principles of controlled intervention. A system for monitoring is proposed, shown in



Fig. 77.

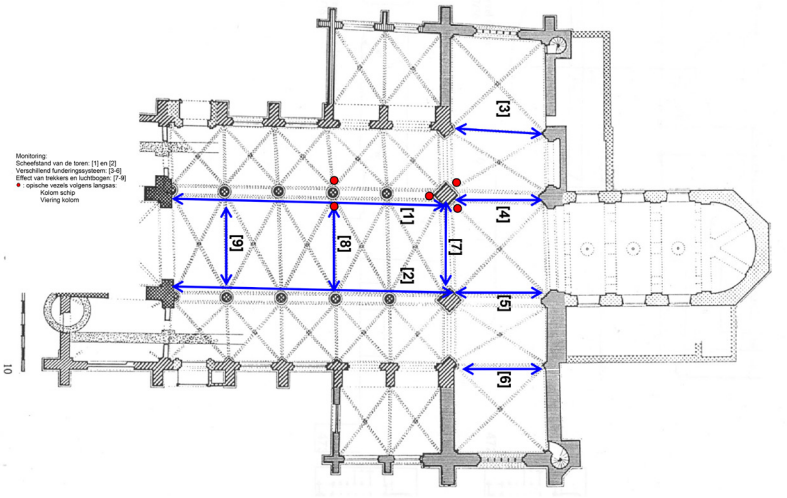


Fig. 78.

138. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 29-31.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 25-30.
139. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 24-25.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 11-12.
140. SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 24.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 12-13.

Fig. 77. Horizontal anchors in the transept and main nave for lateral support [Schueremans and Van Gemert, 2007, p. 7]
Fig. 78. Scheme of the proposed monitoring system [Schueremans and Van Gemert, 2007, p. 24]

Figure 78. This system uses optical fibre technology, which allows measuring large distances at high accuracy. The intended monitoring period should be in place one year before, during and at least 5 years after the intervention. Preferably the term of monitoring should be longer for some points to assess the long-term intervention. By doing this, the impact and process of the intervention can be judged correctly. Furthermore, strain gauges should be placed on the steel tube shoring before and after the intervention to assess the loads they were taking up. [141]

2. 3. 6. Archaeology

The aim of the archaeological study on the church was to determine the old floor levels. This was necessary in light of the proposed therapy, which uses micro piling, to keep all options for future reuse open (e.g. getting back to the original floor level). By means of one excavation pit, the study targeted to identify the past floor levels, and make recommendations for possible future research.[142]
The excavation pit was located at the crossing pillar at the northern side of the nave, see Figure 79.

During the archaeological research, the following layers were identified. The top layer is the present flooring which is laid on a thin sand bedding. Underneath that are some layers which are placed to heighten the floor level. The first archaeological surface is found under these layers (at 50-60cm depth) containing many wooden grave coffins. A first indication as to past floor levels is found here: a grave stone. However, there were traces of lime mortar which indicates that this grave stone was (re)used as foundations for an altar, for which it is not certain this indicates a floor level. Because of the limits of the research, this issue was not further researched.[143]
From the first archaeological surface, it was decided to leave everything untouched except for a smaller pit at the column. This is because the main aim was to indicate the floor levels for which the highest change of finding traces is at the columns. In this pit, the original floor level of the gothic church could be determined

141. SCHUEREMANS, VAN BALEN, BROSENS, VAN GEMERT and SMARS, "Church of Saint-James in Leuven", 2007, p. 10.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – eindrapport*, 2007, p. 27.; SCHUEREMANS and VAN GEMERT, *Sint-Jacobskerk te Leuven – bijlage 13*, 2007, p. 23-24.
142. Maarten SMEETS, "Het archeologisch vooronderzoek in de Sint-Jacobskerk te Leuven", in: Hadewijch DEGRYSE (ed.), *Archeologie 2011. Recent archeologisch onderzoek in Vlaams-Brabant*, Leuven, 2011, p. 20.
143. SMEETS, "Het archeologisch vooronderzoek in de Sint-Jacobskerk te Leuven", 2011, p. 21-22.; Maarten SMEETS, *Archeo rapport 73 – het archeologische vooronderzoek in de Sint-Jacobskerk te Leuven*, Studiebureau Archeologie, 2011, p. 6-9.

with certainty at a depth of approximately 1,10 metres, indicated by the transition from the foundation to the wall.[144]

Lastly, the study made the following recommendations. The onset of the micro piling should be at 1,25 metres under the present floor level to keep all options open for reuse. Secondly, considering the works for micro piling are only locally affecting the soil, an archaeological follow up of these works is considered not or barely not needed. Thirdly, as long as future works are not affecting the soil deeper than 40 cm, an archaeological follow up is limited as well. Lastly, whenever works need digging works deeper than 40 cm, a full archaeological research is needed. This research is advised to be in collaboration with the field of anthropology for the skeletons of the graves. This will require a quite significant budget.[145]

144. SMEETS, "Het archeologisch vooronderzoek in de Sint-Jacobskerk te Leuven", 2011, p. 22.; SMEETS, *Archeo rapport 73*, 2011, p. 11.
145. SMEETS, *Archeo rapport 73*, 2011, p. 12.

Fig. 79. Location of the test pit for archaeological research
[Pieter Vermeir]
Fig. 80. View on the first archaeological surface
[Smeets, 2011, p. 6]

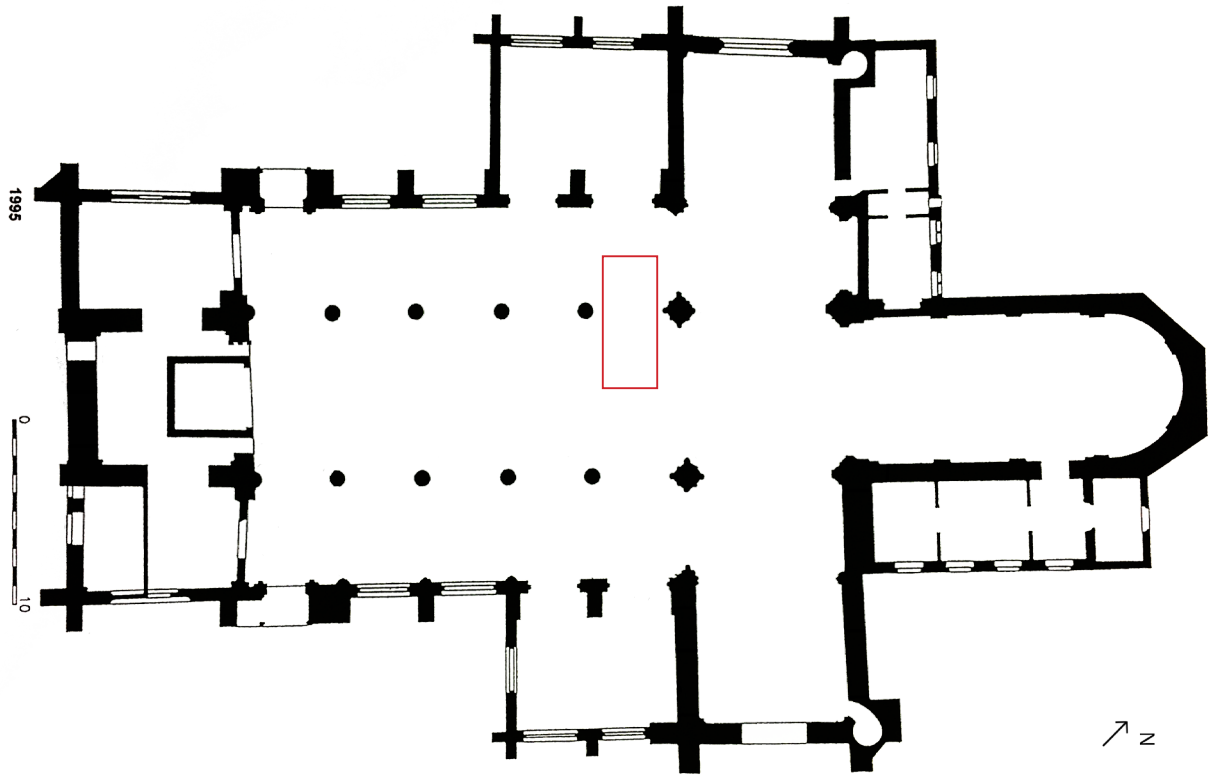

1995
0
10
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Fig. 79.

Fig. 80.


LEUVEN SINT-JACOB
SBA 2011/
WERKPUT: 01 VLAK 01
SPOOR
PROFIEL
14/06/2011


LEUVEN SINT-JACOB
SBA 2011/
WERKPUT 01 VLAK 01
SPOOR
PROFIEL
14/06/2011

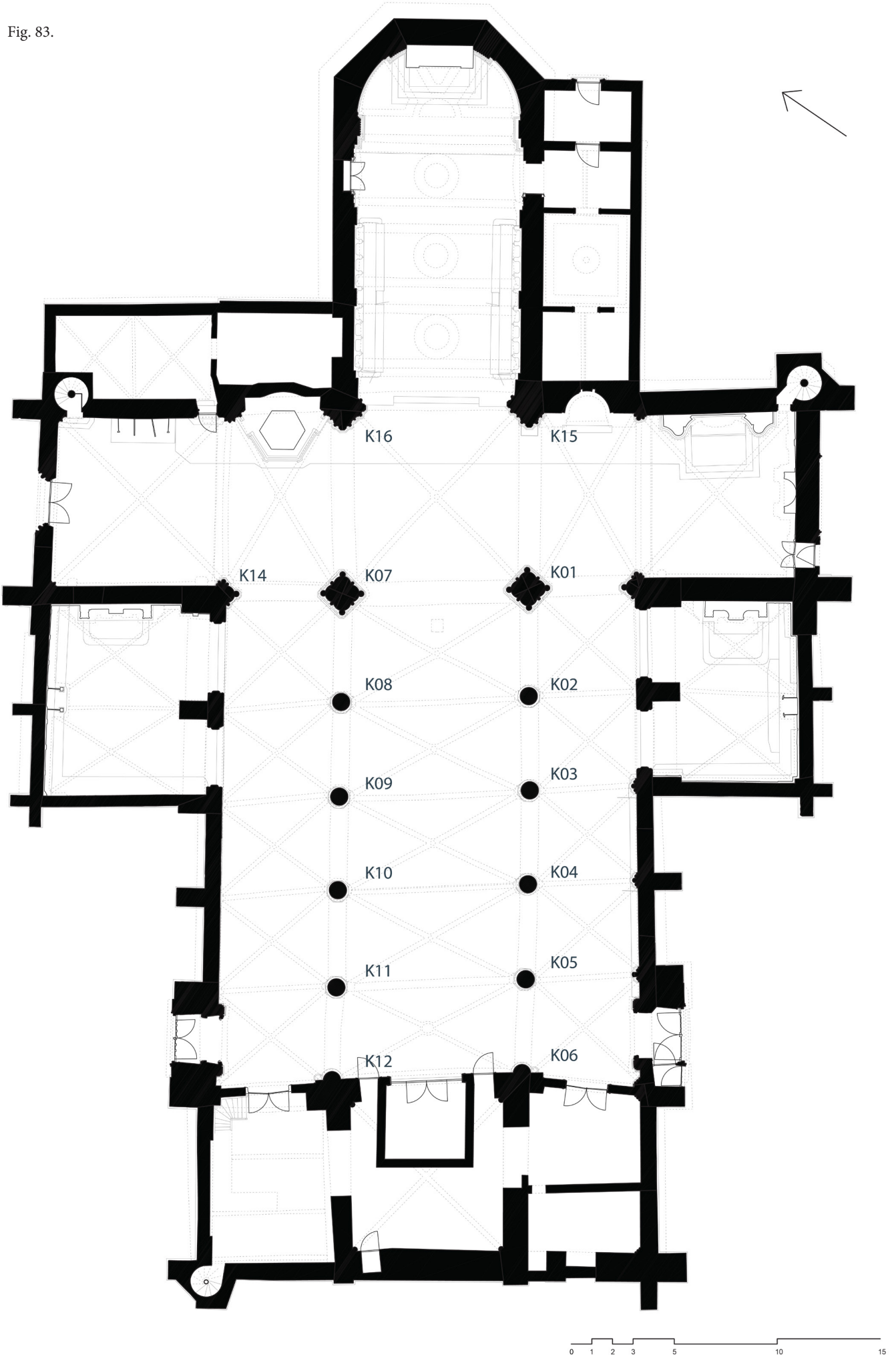
Fig. 81.

Fig. 82.


LEUVEN SINT-JACOB
SBA 2011/ 199
WERKPUT 01 VLAK 01
SPOOR 26
PROFIEL
14/06/2011

Fig. 81. View on the construction (grave stone?)
[Smeets, 2011, p. 10]
Fig. 82. View on the transition between the foundation and the wall (red arrow)
[Smeets, 2011, p. 11]

Fig. 83.


K16
K15
K14
K07
K01
K08
K02
K09
K03
K10
K04
K11
K05
K12
K06
0 1 2 3 5 10 15

2. 4. Relevance Today

After a long history of stability problems leading to 55 years of closure, several interventions and studies, works are now being executed to stabilize the Saint James's church. The city ordered these works in light of future reuse on the 10th of August 2010, as the church is given in loan lease to the city of Leuven. The works are drawn up by the engineering office TRIconsult and the architecture office Studio Roma. Furthermore, the heritage agency of Flanders and the province of Flemish Brabant are financially supporting the works. The cost of this project is estimated on 2.349.009,85 euro.

The planned works are largely based on the last extensive study of 2007 by TRIconsult and Labo Reyntjens. However, some adjustments as to its specific execution and additions are made.

- **Protecting Interior Elements**

The following elements cannot be removed from the church to prevent damage during the works: the choir stalls, the confessionals and the sacrament house. For protection, a wooden protective casing will be constructed around the objects. In addition to that, the chapels and choir will be closed off for works as well with a wooden wall.[146]

- **Archaeological Points of Interest**

The archaeological research done in 2011 (see p. 88) led to some points of interest concerning the possible archaeological remains when executing the stabilisation works, more specifically works on the foundations. These works will be executed in the following order:[147]

1. Removal of the floor tiles of the main nave and placing an equalization surface
2. Drilling the micro piles
3. Digging works until approximately 1,9 metres below the current floor surface
4. Construction of the concrete ring beam around the columns and fixing it in the existing foundation
5. Removal of the concrete pedestals of the tube shoring

Fig. 83. General plan with the column numbers
[Pieter Vermeir]

146. TRICONSULT and STUDIO ROMA, *Bestek voor de overheidsopdracht voor werken met als voorwerp "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, TRIconsult and Studio Roma, 2017, p. 27-32.

147. TRICONSULT and STUDIO ROMA, *Bestek"Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 41-43.

During these works, the first archaeological surface (at 50cm below current floor level) should be touched minimally. The digging works will be archaeologically thoroughly documented. The zones are estimated to be 450m² but this will probably differ during the execution, see Figure 73. As stated before, the expected focus of the archaeological works will be analysing human remains and documenting building phases. Even when works are executed in the soil above the first archaeological surface, an archaeological supervision will be done.[148] Figures 84 and 85 show the archaeological works being executed at the tower.

- **Foundations**

After having removed the floor tiles, the foundations of the pillars of the main nave, the crossing and the tower will be strengthened by means of micro piling (type Ischebeck Titan 40/16 or similar).[149] In addition to that, the foundation masonry of pillars K15 and K16 at the crossing (see Figure 72) and the tower will be injected with grout if the masonry would not be coherent enough for placing the micro piles.[150]



Fig. 84.



Fig. 85.

148. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 43-55.
149. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 65.
150. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 61.

Fig. 84. Preperatory works for the removal of the tiles [Thomas Coomans, 7/12/2018]
Fig. 85. Archaeological works in progress [Thomas Coomans, 7/12/2018]



Fig. 86.

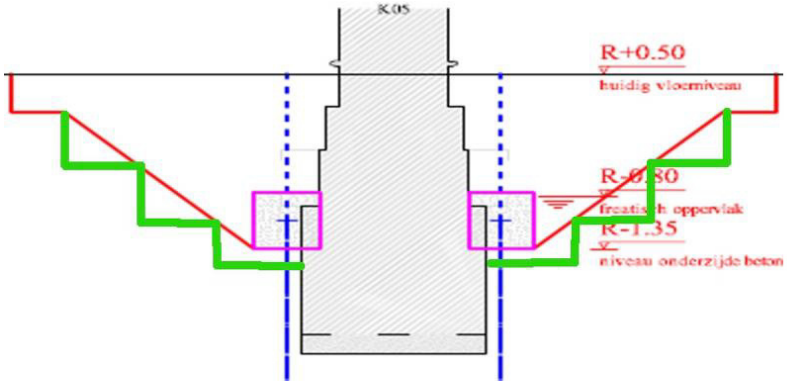


Fig. 87.

The works on the pillars of the crossing will be executed in two phases. Firstly, a part of the micro piles of pillar K01 and K07 will be drilled from the current floor level, the other part is hindered by the shoring structure. Secondly, the micro piles of pillars K15 and K16 will be drilled partly. Lastly, when the shoring structure is removed, the other parts of the micro piles will be drilled. Each pillar will have twelve micro piles, drilled vertically. The micro piles will be fixed to the existing foundation with a concrete ring beam.[151]

The micro piles will be drilled vertically at every pillar of the main nave, 8 micro piles each, except for the halve pillars at the tower. These piles will be fixed on a concrete ring beam, fixed into the existing foundation masonry.[152]

The connection between the new and existing foundation system will be executed as follows. After the drilling of the micro piles and the excavation works, holes will be drilled in the existing foundation masonry. Afterwards anchors are placed in and fixed using epoxy resin glue. A reinforced concrete ring beam will be constructed, incorporating the ends of the anchors and micro piles, ensuring

Fig. 86. Depiction of the zones involving archaeological works to a depth of 1,95m (orange) or 1,6m (green) [TRIconsult and Studio Roma, 2017, p. 44]
Fig. 87. Concept of executing the archaeological works [TRIconsult and Studio Roma, 2017, p. 44]

151. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 66.
152. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 66.

a good connection.[153]

At the foundations of the tower the micro piles will be drilled at an angle of 25 degrees. The part going through the existing masonry will be pre-drilled.[154]
These works are largely the same as conceptually proposed by the study of TRIconsult in 2007.

- **Main Nave**

The pillars of the main nave will be strengthened using anchors, placed according to the system shown in Figure 74. Holes will be drilled in which the anchors are placed. Afterwards, grout will be injected in each hole. To stabilize the pillar during injection, a temporary constriction will be placed using straps and wooden lattice work.[155]
To stabilize the crossing pillars horizontally, holes will be drilled in which stocking anchors will be placed (see Figure 75). After the placement of the anchor and its placeholders, the hole will be injected using hydraulic grout. Lastly, anchor plates will be fixed at the end of the anchors in the crossing columns, either hidden in the masonry or outside if needed.[156]
On the sections with the flying buttresses in the main nave,

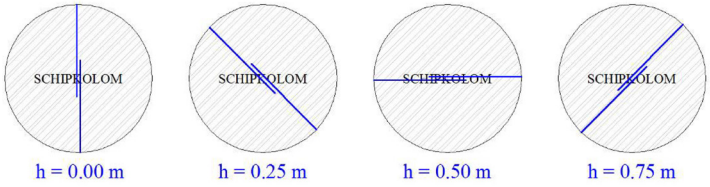


Fig. 88.

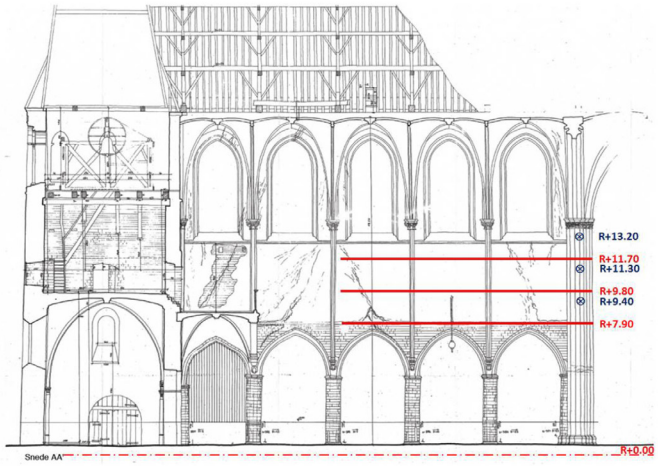


Fig. 89.

153. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 68-75.
154. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 67.
155. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 87-90.
156. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 82-87.

Fig. 88. Concept of positioning the anchors in the pillars [TRIconsult and Studio Roma, 2017, p. 89]
Fig. 89. Schematic plan of the drilled in anchors to stabilise the crossing pilars [TRIconsult and Studio Roma, 2017, p. 83]

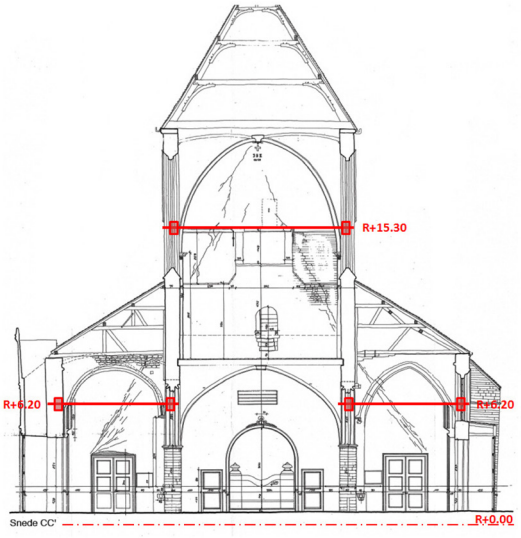


Fig. 90.

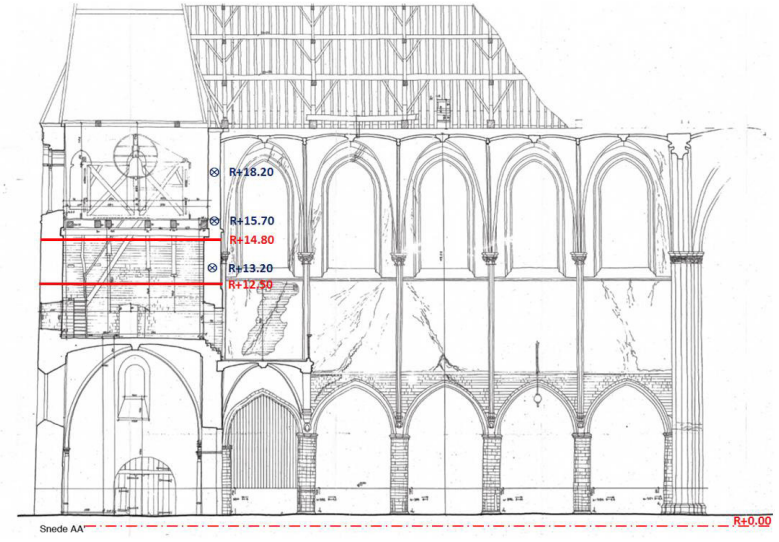


Fig. 91.

new tie rods will be placed as a replacement for the temporary ones placed after dismantling the flying buttresses. The existing tie rods in the other sections will be checked thoroughly. The new tie rods will be fixed in the walls with a concrete block in which anchor plates are fixed. To place these concrete blocks, the masonry will have to be locally dismantled and reconstructed. Lastly, the tie rods will have a passive and an active side, the latter containing a tensioning system.[157]

The reconstruction of the flying buttresses will be done with as much recuperation of the old stones as possible. These stones, which are now stored in the church, will be transferred to a workshop. Here, they will be cleaned and 3D scanned with high accuracy. With these scans and the plans with the numbered stones made during the dismantlement, the reconstruction drawings will be made. So it is known which stones are missing and need to be replaced. The flying buttresses will be constructed on wooden forms.[158]

- **Side Nave**

At the springers of the vaults of the side naves, tie rods will be placed as

Fig. 90. Schematic plan of the location of the new tie rods [TRIconsult and Studio Roma, 2017, p. 78]
Fig. 91. Schematic plan of the location of the drilled in anchors to stabilise the tower [TRIconsult and Studio Roma, 2017, p. 102]

157. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 76-80.
158. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 80-81.; Startvergadering 20/08/2018
159. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 92-94.

well (see Figure 76). The system is the same as the new tie rods in the main nave (see above).[159]
To reconstruct the vaults of the side naves, the same preparatory works as described for reconstructing the flying buttresses will be executed. First, the ribs will be constructed on wooden forms. When finished, the forms can be removed and the vaults will be constructed.[160]

- **Transept**

The existing tie rods will be checked thoroughly. Furthermore, the wall plates in the roof structure will be fixed again in the masonry with drilled in anchors.[161]

- **Tower**

To stabilize the tower, anchors will be paced (see Figure 77). The system of placing will be the same as the anchors placed to stabilize the crossing pillars horizontally. At the ends of the anchors a distribution plate will be fixed hidden in the wall.[162]

- **Dismantlement Shoring Structure**

The concrete columns giving horizontal support to the crossing pillars will be dismantled either simultaneously with placing the horizontal anchors by dismantling a part and putting the anchor before continuing the dismantlement or after placing the anchors. This is to ensure the horizontal support at the crossing pillars at all times.[163]
The concrete frameworks in the southern side nave will be dismantled, as well as the steel tube shoring. Damages due to the metal profiles fixed in the wall will be repaired, using as much as possible of the old stones stored in the church.[164]

- **Masonry**

To repair cracks, steel staples are used. These will be fixed under a downwards angle of 15 degrees in the parament and masonry using epoxy resin (see Figure 79). If needed, anchors can be used as well to repair cracks, fixed with epoxy resin. The same system can be used to fix the parament in the masonry behind, if needed. Lastly, to prevent additional cracks, small horizontal reinforcement bars will be placed hidden in the joints.[165]
Other measures to stabilize or strengthen the masonry are the following. The vaults can be strengthened pouring a grout on

160. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 94-97.
161. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 98-100.
162. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 101-105.
163. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 106-107.
164. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 107-110.
165. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 114-118.
166. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 118-125.

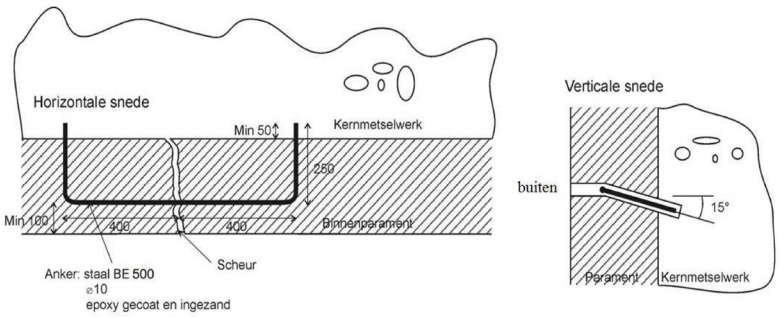


Fig. 92.

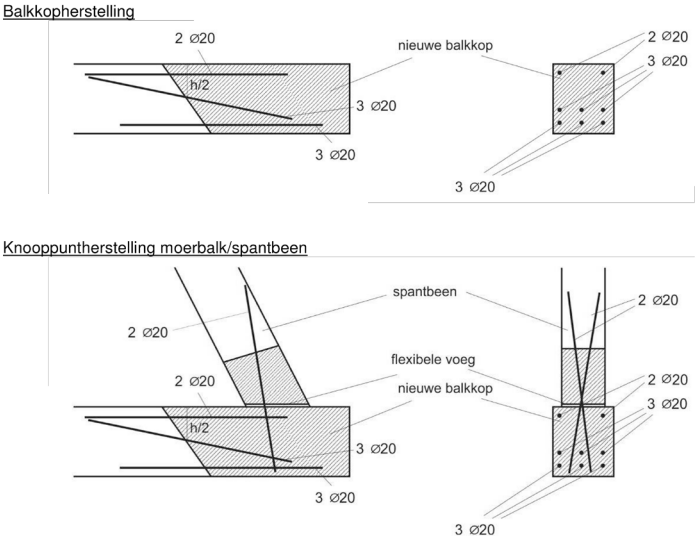


Fig. 93.

top. Furthermore, if needed, some masonry can be dismantled and reconstructed.[166]

- **Roof Structure**

To better asses the strength of the roof structure, additional resistograph measurements and inspections will be executed. If needed, beam ends in need of repair or replacement will be repaired using polymer or wood replacements. The same applies to the joints. The connections between old and new parts will be ensured with reinforcement bars fixed with epoxy resin. The principle of repairing is shown in Figure 80.[167]

Furthermore, some preventive measures are applied to the roof structure: protecting agent against biological contamination (fungi, insects, etc.) and fire-inhibiting agent.[168]

- **Monitoring**

To monitor the evolution of the relative movements between the structural elements, a total station is used. Measuring points (reflectors) will be placed on the structural components, measured according to a local coordinate system. A reference point will be

Fig. 92. Scheme for placing the staples in the masonry
[TRIconsult and Studio Roma, 2017, p. 115]
Fig. 93. Scheme for repairing the joints and beam ends in the roof
[TRIconsult and Studio Roma, 2017, p. 145]

167. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 135-148.
168. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 149-152.

taken in the choir and (preferably) one or two outside of the church. Based on the coordinates of one take, and the coordinates of another reference take, the movements will be determined.[169] As stated before, the study of 2007 proposed the use of glass fibres as measurement tools to monitor the behaviour of the church during the intervention. Because of accessibility, a total station is used instead at regular intervals of time.
To monitor the stresses in the tie rods during the construction works, two strain gauges will be placed: one on top of the rods, one below. Furthermore, the effectiveness of the steel tube shoring structure will be tested using strain gauges as well.[170]

The measurement frequency will be monthly and additionally one take after each work involving stability. After the provisional acceptance of the works, the church will be monitored over a period of two years.[171]

- **Order of Execution**[172]

The first phase will be stabilizing the tower. Anchors will be placed first, afterwards the foundation works will be executed, taking into account the drying time of the other measures.
In a second phase, the main nave and transept of the church are dealt with. First, the anchors in the main nave and transept, and those in the columns are placed. After that, works on the micro piles commence. This will be done in phases: starting with the two pillars at the side of the tower (K06 and K12) and moving section per section towards the crossing pillars (K15 and K16).
In the third and last phase, the side naves are stabilized. This will involve the reconstruction of the flying buttresses and vaults with new tie rods.

- **Conclusion**

These works are more elaborated in their details of execution than proposed in the study of TRIconsult, being more conceptual. This is only logical as this is an execution dossier.
Some adjustments are made. For instance, the tie rods in the main nave were proposed to be added at the height of the tie beams in the roof. However, the execution dossier will place these at the height of the springers of the vaults. Secondly, the monitoring

169. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 160-161.; Startvergadering 20/08/2018
170. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 159.; Startvergadering 20/08/2018
171. TRICONSULT and STUDIO ROMA, *Bestek "Globale stabiliteitswerken Sint-Jacobskerk te Leuven"*, 2017, p. 161-162.
172. Startvergadering 20/08/2018

of the works only starts just before the beginning of the construction works. TRIconsult proposed a monitoring one year in advance of the works.
Some adjustments are due to the availability of new techniques. In the study of TRIconsult, the vaults of the side nave would be reconstructed by means of old photos and plans, the stones of the buttresses having the advantage of being numbered. This would be an intensive work. However, the execution dossier proposes (in addition) a detailed 3D scanning of each stone separately and based on that, making a reconstruction plan. This improves the accuracy and the time needed for the works and allows to correctly state which stones are missing and in which shape these have to be remade.

All in all, the study of TRIconsult in 2007 gave a very good basis for solving the ages of stability problems of the Saint James's church. After the recently initiated works, a full restoration can be started, and a possible new use can be discussed upon.

Regarding the effects of the cause of the instability and the structural intervention solving this on the a future reuse, the following can be concluded.
Firstly, the new function should not be one which adds a lot of additional weight. Adding floors is not advisable as such.
Secondly, several measures taken (e.g. placing anchors and tie beams) are limiting the possibility of adding additional floors. But as pointed out before, additional weights should be avoided.
Lastly, the interventions scarred the church much. Since the current project is only covering the stability and not the restauration, wether this scar is solvable in the repurposing project should be discussed (see p. 233).

2. 5. Conclusion

Given all the studies done on the church, both on the church's past as well as its present state, the cause of the instability of the church was found. The first main cause lies in the fact that the church was built in different building phases, each adjusting and adding to the original design. The added height of the main vault and the replacement of the wooden barrel vault with a masonry vault caused an increase in dead weight for which the pillars and their foundations were not designed.
Secondly, the church is located in a former swamp area, next to the river Voer. This makes the subsoil have a limited load bearing capacity. Besides that, it was found that the wooden elements at the onset of the foundations are rotting. The settlements at the main nave are the most critical.
These two main causes combined make that the pillars are in fact punching through the subsoil. This punching through results in settlements. If the settlements of the church would be the same for the whole structure, there would not have been a problem. However, differential settlements are occurring, causing the structure to fail. To solve this problem, the foundations need strengthening so that the settlements are halted. For this, a project has recently started after which the church can once again have a use after 55 years of closure.

Secondly, some interventions were deemed necessary at their time but were proven not to have any effect or were even based on wrong theories. A common factor in these interventions is the lack of thorough historical and technical research.

Lastly, compiling all studies shows the necessity of historical research in proposing an intervention on heritage buildings. After all, events in the past can influence a buildings structural behaviour in the present. However, as stated before, some questions still remain unanswered. The research done on the church was mainly of a technical or structural character, even for the current project. Interdisciplinary research did not happen enough. Answering questions such as the exact size of the Romanesque church and the remains of that church's foundations might have had an impact on the settlements. Perhaps some questions might be answered during the construction works of the stabilisation project and the needed archaeological surveillance during the works.

Fig. 94. Interior of the Saint-James church (Maswiens Joseph, 1828 - 1880) [© KIK-IRPA, Brussels (Belgium), cliché B150086]



Fig. 94.

3. Debate on the Church's Future

For years the debate concerning the restoration and/or reuse of the church of Saint James was been dominated by the question whether or not this would be technically feasible. Besides that, if the resturation was still worth the cost was questioned as well. After 55 years it got out of this seemingly endless debate, this will be covered in the first part. Secondly, the effects on the parish and its current state will be discussed. In the third part the working group which tried to bring back the church to the collective memory is covered. Lastly, the effects of the recently drawn up 'kerkenbeleidsplan' (church management plan) which states on the future of the churches in Leuven is covered.

3. 1. Controversy and 55 Years of Closure

As stated before, only the preparatory works of the second phase were executed: the temporary shoring works (still present today). After the installation of the shoring structure, finished on the 23rd of October 1971, the works were meant to be stopped for a year in order to assess the load bearing capacity of the shoring. However, after a year works were never initiated again.[173] What did cause these works to be stopped, leaving the church in its closed state for 55 years?

- **Intervention of 1971**

Following the advice of Martiny, Brigode was charged by the church wardens to draw up the specification of the stabilisation project on the 29th of January, with R. M. Lemaire as an advisor. The designed intervention (see Figures 52, 54, 55 and 56) was proposed by Lemaire and Brigode on the 8th of September 1959. On the 18th of October 1959, the transept and choir were opened again for holding masses with access through the side naves, but the access was still via the side nave as opening

173. David MELLAERTS, "De lijdensweg van Sint-Jacob van Compostella: bedenkingen omtrent het verval van de Leuvense Sint-Jacobskerk", *Arca Lovaniensis*, 18, p. 126.; Archief Onroerend Erfgoed 36/361/4244 (Sint-Jacobskerk II)

up the old entrance at the transept was awaiting approval by the Royal Commision (given on the 18th of May 1960). Further works on the stabilization dossier were delaying, despite being urged by the church wardens.[174]

More than two years after the appointment of Brigode, on the 2nd of August 1961, the full dossier was handed in to the church wardens for approval, after they had put Brigode to an ultimatum. On the 28th of March 1962 the dossier was handed over to the minister of Public Works (Openbare Werken) by the church wardens after being sent to the city, waiting for subsidies covering the full costs.[175]

The dossier was approved for subsidies covered for 60% by the Belgian state, 20% by the Province and 20% by the city of Leuven. However, the latter was in financial troubles and pleaded for a higher coverage by the Belgian state. This caused the dossier to linger. Note, this dossier was only for the shoring works, not the actual stabilization project.[176]

After the full closure of the church in 1963, the dossier was sent back on the 5th of October with the urge to first make the public tender and some parts need to be revised. The parish decided to start up plans for a 'emergency' church, a temporary church until the old church is accessible again.[177]

On the 3rd of March 1964, the tender was given to the firm Gebr. Vandekerkhove for 3.833.020 BEF. A promise for a first subsidy of 2.434.900 BEF was given by the state for the shoring works on 12 January 1965, but the tender needs to be approved first. Later, on the 29th of March, the church wardens wrote the construction firm to commence the works. However, on the 4 July, the firm stated that due to shifting prices in the market, it cannot keep its price. The new sum they required was 20% more than what was first agreed.[178]

On 4 July 1968 an agreement was achieved regarding the increased cost: an increase of 10% and the insurance provided by an external firm was scrapped. The adjustments are sent to the ministry of Public Works. In the meantime, no answer was recieved for the approval for the project. However, on 16 November 1969, the firm Vandekerkhove noticed the church wardens that they will not work anymore on the project, on which they will come back to on

174. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 167.; Archief Kerkfabriek, restauratie oude kerk; Archief Kerkfabriek, houten afsluiting 1959; Archief Onroerend Erfgoed 36/361/4245 (Sint-Jacobskerk I); Stadsarchief Leuven 5538 (KF St-Jacob)

175. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 167-168.; Archief Kerkfabriek, restauratie oude kerk; Archief Kerkfabriek, houten afsluiting 1959

176. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 168.; Archief Kerkfabriek, restauratie oude kerk; Stadsarchief Leuven 5538 (KF St-Jacob)

177. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 168.; Archief Kerkfabriek, restauratie oude kerk; Stadsarchief Leuven 5538 (KF St-Jacob)

178. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 168-169.; Archief Kerkfabriek, restauratie oude kerk III; Archief Onroerend Erfgoed 36/361/4245 (Sint-Jacobskerk I); Stadsarchief Leuven 5538 (KF St-Jacob)

5 April 1970.[179]

Finally, on the 4th of October 1970, the ministry of Public Works approved the works, which were completed the year after. Works never progressed further than the temporary shoring works due to the delay in payments of the subsidies. The parish could not bear the costs and got in debt to the contractor Vandekerkhove. Due to interests on late payments, the debt amounts to 613.000 BEF in 1974. In several meetings of the church wardens, it was considered to let the church be expropriated by the state or the city of Leuven. At last, on 6 July 1975, the remaining sum of the works and the interest (1.862.130 BEF) was payed to the contractor after the ministry of Public Works had given their remaining part of 1.237.410 BEF.[180] After this, no money was available to execute the remaining works for the stabilization of the church. The church wardens limited their expenses to the utmost needed works in maintenance. From here on, the church enters a state of being neglected and discussed on ideologically.

- **An Ideological Debate**

At the heritage agency the debate on the church of Saint James had an ideological side to it at that time, after the closure. Three main opinions could be distinguished.[181] The first one is concerning the issue of finding the necessary funds for the needed restauration. This trend had the opinion that, given the fact of a high need for funds needed, the church would be better off if it would be consolidated as a ruin. In this way, the church still can be cherished in some extent as a relic of the past. However, its function would be lost.[182]

Secondly, there was the tendency which voted for the complete consolidation and restoration of the church in its current state. As argument, the church's high historical value, being a palimpsest of several styles and its importance as a pilgrimage church, is posed. The funds needed for this were estimated to be 10 to 25 million Euros at that time.[183]

The last opinion sought the middle way between the two above mentioned opinions. It had the theory that some parts are causing the problems. These parts can be demolished, and other parts would be restored completely. Many

179. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 169.; Archief Kerkfabriek, restauratie oude kerk III; Stadsarchief Leuven 5538 (KF St-Jacob)

180. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 169-170.; Archief Kerkfabriek, restauratie dakwerken; Archief Kerkfabriek, restauratie oude kerk III; Stadsarchief Leuven 5538 (KF St-Jacob)

181. MELLAERTS, "De lijdensweg van Sint-Jacob van Compostella", p. 127.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 48.; Archief Onroerend Erfgoed 36/361/4239 (Sint-Jacobskerk VII)

182. MELLAERTS, "De lijdensweg van Sint-Jacob van Compostella", p. 127.; NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 48.; Archief Onroerend Erfgoed 36/361/4239 (Sint-Jacobskerk VII)

183. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 48.; Archief Onroerend Erfgoed 36/361/4239 (Sint-Jacobskerk VII)

voted for the demolishment of the nave and the conservation of other parts. Of course this creates another problem: what to do with the interior elements and furniture? For instance, the Van Peteghem organ (now removed) and the sacraments tower (still present in the church) are highly valuable.[184] Furthermore, the technical feasibility is still a problem, as it is unknown how the kept parts of the church would react on the demolishment of others.[185]

Some opinions (not of the Royal Commission) pleaded for a complete demolishment of this - in their opinion - lost case. The free up plot would gain another function.[186]

- **55 Years of Closure to a Stabilisation Project**

After the incomplete intervention, the church got stuck in a never-ending controversy and a general neglecting in its maintenance and management. Several times, the church is mentioned in the press with proposals of demolishment, only fuelling the controversy. Several voices cry out about whether or not it is justifiable to put more money in the stabilisation of the church, of which many consider the church to be a lost case. Some opinions are a little bit more nuanced, proposing the Romanesque tower to be kept. The neglecting is denounced as well. Besides that, in light of the unification of Europe and the church location at an old pilgrim route throughout Europe, money is searched for at the European Parliament without effect in 1980. Neither the church wardens, neither the city has the money to realize a full restoration, as the latter was restoring a lot of buildings in the late 80s and the church wardens simply did not have the necessary capital. Lastly, the Royal Commission for Monuments and Landscapes continuously advocates the restoration at the minister, as well as to the church wardens, the city of Leuven and the diocese.[187] On the 7th of April 1988, the following is said on this matter by the Royal Commission:

> *"Confronted with the poignant status in which almost the complete heritage of Saint James is faring, proposes the Royal Commission to strive for reinstating the complete*

184. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 48-49.; Archief Onroerend Erfgoed 36/361/4239 (Sint-Jacobskerk VII)
185. MELLAERTS, "De lijdensweg van Sint-Jacob van Compostella", p. 127.
186. MELLAERTS, "De lijdensweg van Sint-Jacob van Compostella", p. 127.
187. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 49-51.; Archief Onroerend Erfgoed 36/361/4239 (Sint-Jacobskerk VII)

heritage (tangible and intangible) of the church of Saint James to a state which is specific to a monument of exceptional historic, architectural, religious, folkloric and art historic significance which is reaching far beyond or own national borders."[188]

The whole debate was stuck because of two issues: a financial problem and an ideological issue.

During all these years of neglecting and debate, there never was a study done to research the feasibility of the stabilization and its actual costs.[189]
However, in 1994, a study was commissioned by the Flemish Government to the Lemaire Centre. The main focus was on the vaults, but several general monitoring campaigns are executed as well as research to the church's building history. Furthermore, the properties of the subsoil were researched. This puts the emphasis on pile foundations as future stability intervention. In addition to that, this study broke the impression of the insolvability of this case, however, more research is needed.[190]

A second step forward to understanding the church structural behaviour is initiated by the loan lease contract of the church to the city of Leuven in 2003. Debate on this started already in 1991 with the church wardens. They pleaded however against irreversible interventions and wanted to have a new function in religious atmosphere.[191] This gives the city, instead of the church wardens, the responsibility of the works on the church. For this, the city of Leuven commissioned in 2003 a further study with the aim of a full structural assessment of the church to TRIconsult and Labo Reyntjens.[192]

Finally, with the study finished in 2007, the city initiated a procedure to tender the works for drawing up the execution dossier for the stabilisation project.[193] This project is recently initiated in August 2018, stabilizing the church and removing the shoring works of the 1971 intervention.

188. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 53. (translated from dutch by Pieter Vermeir)
189. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 53.
190. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 53-56.
191. Archief Onroerend Erfgoed 36/361/4238 (Sint-Jacobskerk VIII)
192. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 56.
193. NUYTTEN, "Naar Santiago De Compostella en terug", 2008, p. 57.

3. 2. The Parish of Saint James

The closure of the church of Saint James affected its parish much. Not only did they have to move from one temporary place for worshipping to the another before settling in a new temporary church of their own, they also saw their church to get lost in an administrative, financial and ideological hassle. Besides that, today it is facing a decrease in members as many parishes in Flanders are.

3. 2. 1. Impact of the Closure on the Parish

- **Movements**

After the closure of the church's main nave in 1959, the parish was in need of a place to hold the masses as the church was not accessible in another way than through the main nave. The plan for opening up an old entrance in the transept was awaiting approval.
In 1959, the parishioners would hold the Sunday mass in a banquet hall located at the adjacent square. Weddings and burials would be held at the chapel of the Latin-American College in the Tervuursestraat. As stated before, the choir is used again for masses from 18 October 1959.[194]
When the church was completely closed, the parishioners moved once again. This time to the school of the Sisters of Charity at the Kapucijnenvoer in the recreation hall of the student nurses. However, it was assumed the works would take some time and without wanting to claim this room for too long, it was decided to look into other solutions.[195]

- **An 'Emergency' Church**

As the discussions were mainly focussed on phase 1 and 2 of the stabilisation project and finishing the full project was considered to be far away, the parish decided to initiate a project in 1963 for an 'emergency' church, which would be used until the old church was stabilised.

At first, the parish wanted to construct this temporary church in the garden of the nearby presbytery in 1965. Pastor De Roeck advised against this decision as this garden

194. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 167.
195. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 168.; Archief Kerkfabriek, houten afsluiting 1959; Stadsarchief Leuven 5538 (KF St-Jacob)

was used by the youth movement Scouts, and because something of a temporary kind would be a waste of money as it is difficult to give another function to it later. He therefore pleaded for constructing a hall in the Goudbloemstraat which had nearby parcels still in property of the parish. This hall could be used as a parish centre later on. For acquiring the needed budget, other properties owned by the parish in the region would have to be sold.[196]

On the 2nd of January 1966, the bishop approved the selling of the properties in Erps-Kwerps, Tildonk and Wilsele for the amount of 3.391.350 BEF and the construction of a parish centre, with a hall temporary serving as an 'emergency' church. A first design is proposed for 3.900.000 BEF situated on the parcels of the Goudbloemstraat. In the beginning of 1970 this centre was finished, and masses were held in the hall.[197]

- **Temporary Becomes Permanent**

After the construction of a temporary 'emergency' church, the (practical) urge for the stabilisation of the old church became less prominent as the need for space was solved. In addition, the lack of funds and the ideological debate was contributing to the neglection of the church. Finally, in 1976[198], a modern church was constructed next to the parish centre, which still is the used church of Saint James today for worshipping. Furthermore, in 2002, the old church of Saint James was desacralized. As such, the idea of a temporary church became permanent.

The whole concours regarding the emercency church is rather strange. The amount of money needed to build this new church was enough to cover the stabilisation project at that time.

3. 2. 2. The Parish in Present

To assess the current state of the parishes in Leuven and be able to state some visions on shared use or repurposing of the churches, a study was ordered by the Centraal Kerkbestuur van Leuven (CKB), done in 2013. Although the parish is not using the old church currently, it is still useful to take into account some parameters (e.g. number of

196. Archief Kerkfabriek, houten afsluiting 1959

197. LAHAYE, *Alles gaat voorbij … Maar de kerk blijft staan*, 2002, p. 168-169.; Archief Kerkfabriek, houten afsluiting 1959; Stadsarchief Leuven 5539 (KF St-Jacob - verwerving vervreemding)

198. STAD LEUVEN, Kerkenbeleidsplan, Stad Leuven, 2016., p. 35.

attendees, visions on the future, etc.) as they affect the debate on the future function of the church. The data of this study is from five years ago but helps understanding the parish. Furthermore, it is interesting to compare this data to the data obtained by Leuven for the 'kerkenbeleidsplan' (church management plan) in 2016.

- **In Numbers**

The following data was provided by the audit on the parishes of Leuven done by the KU Leuven. The parish of Saint James has a medium average number of attendees per weekend (138) compared to the other parishes of Leuven. However, when only looking at the churches located in the city centre, it has the third-most number of attendees. Saint Peter has a very high score, but has one additional ceremony in the weekend, resulting in more attendees.[199] Regarding the age of the attendees, the parish of Saint James has a relatively young populace, 23% is aged under 35 years.[200] Besides that, the parish of Saint James has the second highest number of students (17%) as attendees, after the parish of Saint Michael (32%).[201] However, of the attendees, only 46% is visiting the church every week, making the parish of Saint James be the only parish in Leuven of which this is below 50%.[202]

The average amount of marriages in the (new) church of Saint James per year is very low, even none in the period of 2010-2012.[203] Probably this is linked to the atmosphere and aesthetic of the church, as this explains the high number in the church of Vlierbeek. Secondly, in number of baptisms, the parish of Saint James has a rather low score and a decrease is notable as well.[204] Lastly, in the number of burials, the parish has a medium number and a decrease is notable as well.[205]

When comparing these data of 2013 to those of 2016, one can observe a diminishing (almost a halving) in the number of attendees in the masses, 138 in 2013 and 70 in 2016. In addition to that, the number of ceremonies for burials, marriages and baptisms decreased from 23 per year to 10. By these data, the parish of Saint James is the parish

Fig. 95. Number of attendees for the parishes in Leuven [Vanneste, Beringhs and Steenberghen, 2013, p. 33]
Fig. 96. Age of the attendees [Vanneste, Beringhs and Steenberghen, 2013, p. 69]
Fig. 97. Background of the attendees [Vanneste, Beringhs and Steenberghen, 2013, p. 78]
Fig. 98. Frequency of church visits [Vanneste, Beringhs and Steenberghen, 2013, p. 84]

199. Dominique VANNESTE, Katia BERINGHS, Therese STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies – Onderzoek in opdracht van het Leuvense Centraal Kerkbestuur*, Leuven: ASTOR (KU Leuven), 2013, p. 32-33.
200. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 68-69.
201. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 77.
202. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 83.
203. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 34.
204. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 35.
205. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 36.
206. STAD LEUVEN, *Kerkenbeleidsplan*, 2016., p. 130-131.

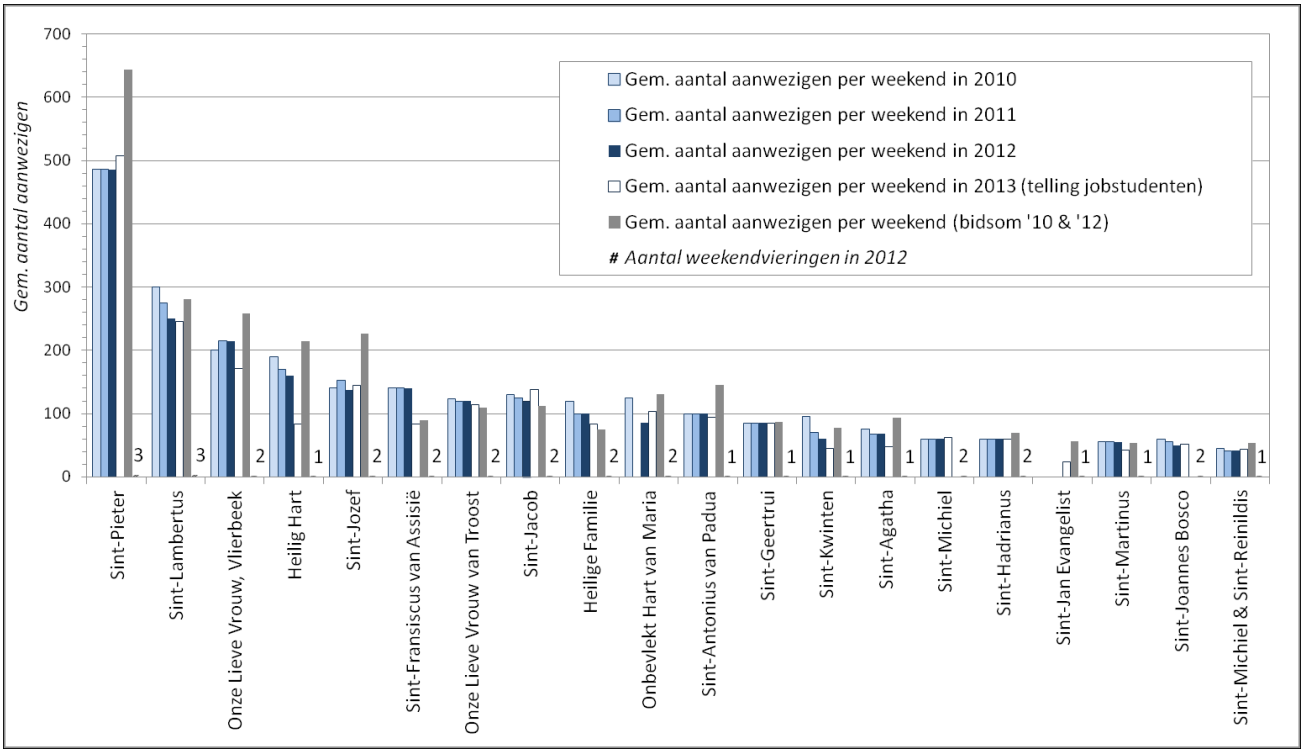
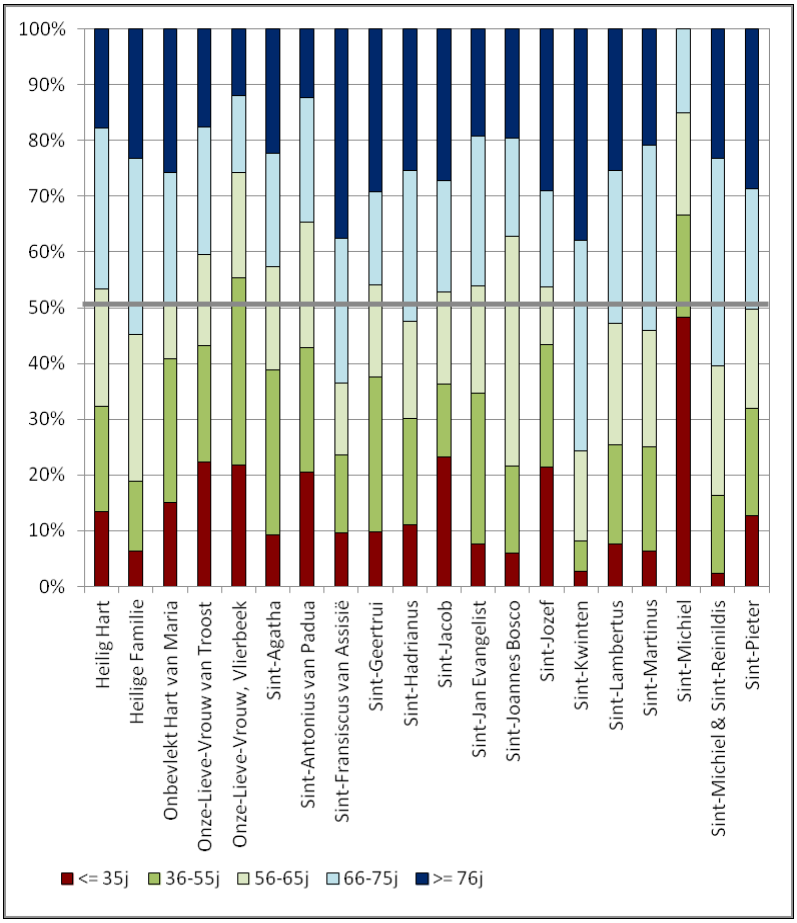

Gem. aantal aanwezigen
700
600
500
400
300
200
100
0
Gem. aantal aanwezigen per weekend in 2010
Gem. aantal aanwezigen per weekend in 2011
Gem. aantal aanwezigen per weekend in 2012
Gem. aantal aanwezigen per weekend in 2013 (telling jobstudenten)
Gem. aantal aanwezigen per weekend (bidsom '10 & '12)
Aantal weekendvieringen in 2012
Sint-Pieter 3
Sint-Lambertus 3
Onze Lieve Vrouw, Vlierbeek 2
Heilig Hart 1
Sint-Jozef 2
Sint-Fransiscus van Assisië 2
Onze Lieve Vrouw van Troost 2
Sint-Jacob 2
Heilige Familie 2
Onbevlekt Hart van Maria 2
Sint-Antonius van Padua 1
Sint-Geertrui 1
Sint-Kwinten 1
Sint-Agatha 1
Sint-Michiel 2
Sint-Hadrianus 2
Sint-Jan Evangelist 1
Sint-Martinus 1
Sint-Joannes Bosco 2
Sint-Michiel & Sint-Reinildis 1

Fig. 95.

Fig. 96.


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Heilig Hart
Heilige Familie
Onbevlekt Hart van Maria
Onze-Lieve-Vrouw van Troost
Onze-Lieve-Vrouw, Vlierbeek
Sint-Agatha
Sint-Antonius van Padua
Sint-Fransiscus van Assisië
Sint-Geertrui
Sint-Hadrianus
Sint-Jacob
Sint-Jan Evangelist
Sint-Joannes Bosco
Sint-Jozef
Sint-Kwinten
Sint-Lambertus
Sint-Martinus
Sint-Michiel
Sint-Michiel & Sint-Reinildis
Sint-Pieter
<= 35j
36-55j
56-65j
66-75j
>= 76j

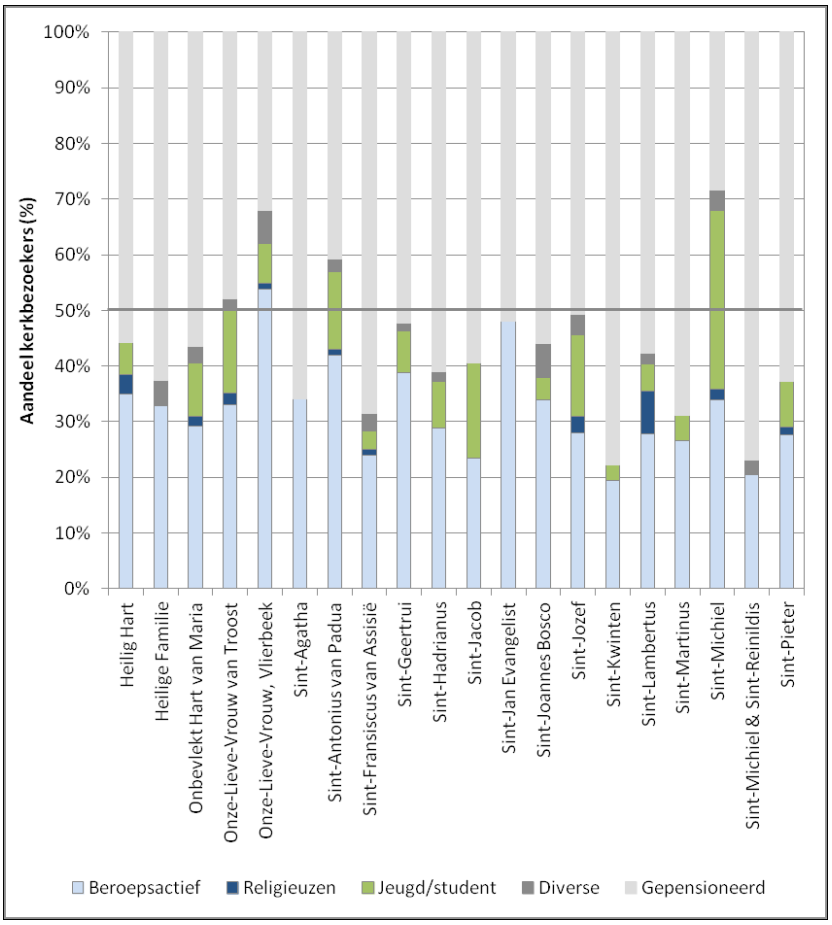
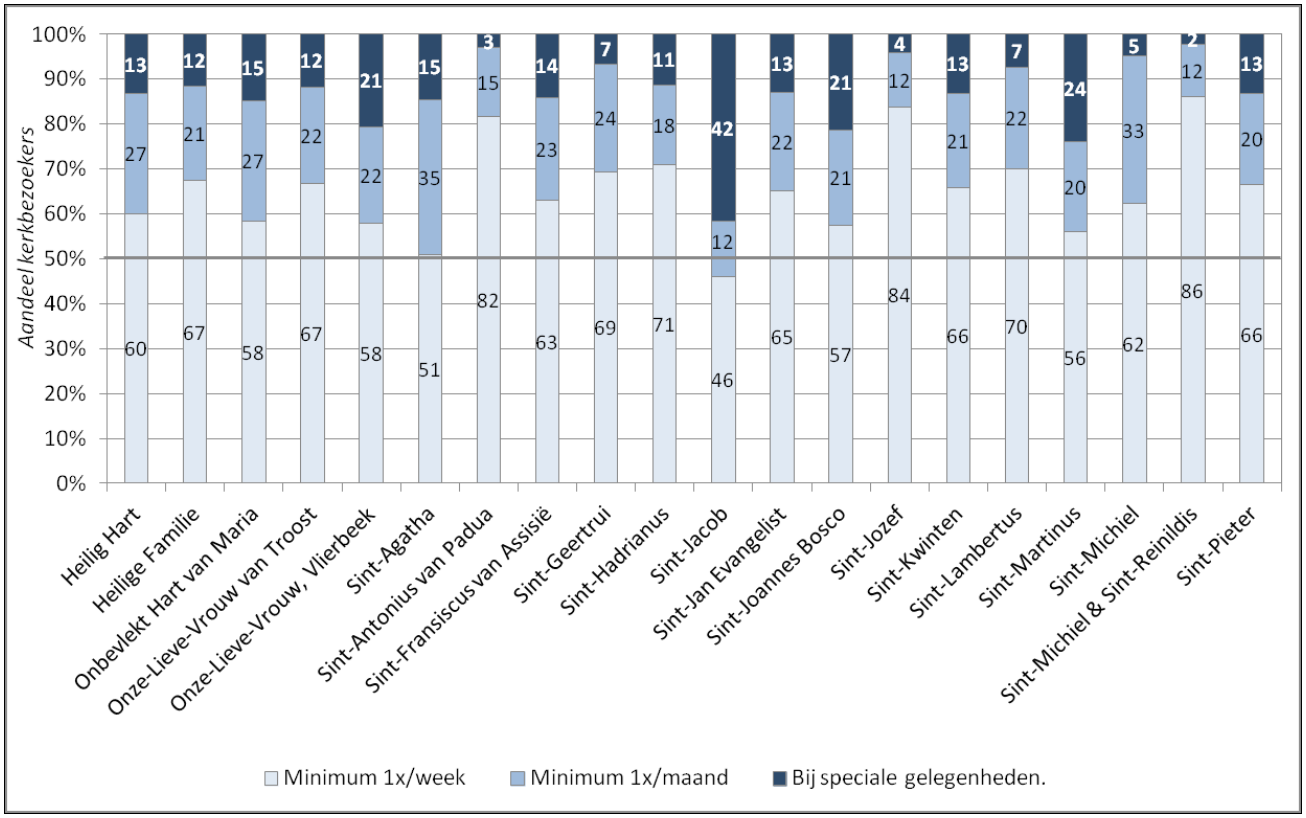

Aandeel kerkbezoekers (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Heilig Hart
Heilige Familie
Onbevlekt Hart van Maria
Onze-Lieve-Vrouw van Troost
Onze-Lieve-Vrouw, Vlierbeek
Sint-Agatha
Sint-Antonius van Padua
Sint-Fransiscus van Assisië
Sint-Geertrui
Sint-Hadrianus
Sint-Jacob
Sint-Jan Evangelist
Sint-Joannes Bosco
Sint-Jozef
Sint-Kwinten
Sint-Lambertus
Sint-Martinus
Sint-Michiel
Sint-Michiel & Sint-Reinildis
Sint-Pieter
Beroepsactief
Religieuzen
Jeugd/student
Diverse
Gepensioneerd

Fig. 97.

Fig. 98.


Aandeel kerkbezoekers
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
13 27 60
12 21 67
15 27 58
12 22 67
21 22 58
15 35 51
3 15 82
14 23 63
7 24 69
11 18 71
42 12 46
13 22 65
21 21 57
4 12 84
13 21 66
7 22 70
24 20 56
5 33 62
2 12 86
13 20 66
Heilig Hart
Heilige Familie
Onbevlekt Hart van Maria
Onze-Lieve-Vrouw van Troost
Onze-Lieve-Vrouw, Vlierbeek
Sint-Agatha
Sint-Antonius van Padua
Sint-Fransiscus van Assisië
Sint-Geertrui
Sint-Hadrianus
Sint-Jacob
Sint-Jan Evangelist
Sint-Joannes Bosco
Sint-Jozef
Sint-Kwinten
Sint-Lambertus
Sint-Martinus
Sint-Michiel
Sint-Michiel & Sint-Reinildis
Sint-Pieter
Minimum 1x/week
Minimum 1x/maand
Bij speciale gelegenheden.

with the least number of attendees in the centre of Leuven.[206]

- **Visions on the Future**

In response to the concept note of Geert Bourgeois (see p. 124), the Flemish bishops published several guidelines concerning the issue of reuse in churches. Three types of (re)use are distinguished: joint use, secondary use and repurposing.

> *"Joint use is to be able to have the church at disposal for religious activities of other catholic or Christian religious communities."*
>
> *"When a church is still being used for religious activities, but is too big for the local religious community, a secondary use can be considered. One makes a distinction between multifunctional use and shared use.*
>
> *Multifunctional use is a secondary use in time. This means that a church can occasionally, outside the hours of the religious activities, be used for other purposes or by other associations.*
>
> *Shared use is a secondary use in space. This means that the church is refitted architecturally in such a way that a new and smaller liturgical space is created, with besides that a space for one or more rooms that can be given another purpose permanently. Shared use thus assume that the liturgical space and the other spaces are architecturally completely separated from each other, allowing for shared use, without the separate activities hindering or crossing each other."*
>
> *"When a church is not qualified for anymore for religious activities, it can definitively be withdrawn from worship and be given a new function. For this, a procedure following church law has to be followed. Only the bishop can decide to withdraw a church definitively from worship. "*[207]

Concerning general visions of all parishes in Leuven, there are two groups distinguishable: one group has the opinion that the community of the parish is more important than the church,

207. "Richtlijnen van de Vlaamse bisschoppen voor het gebruik van de parochiekerken", in: https://www.kerknet.be/sites/default/files/2013%201A%20Richtlijnen%20gebruik%20van%20parochiekerken.pdf (last accessed on 24/10/2018) (translated from dutch by Pieter Vermeir)

208. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 53.

209. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 54.

210. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 60.

Fig. 99. Should the parish be kept? [Vanneste, Beringhs and Steenberghen, 2013, p. 94]

Fig. 100. Should the church be kept? [Vanneste, Beringhs and Steenberghen, 2013, p. 95]

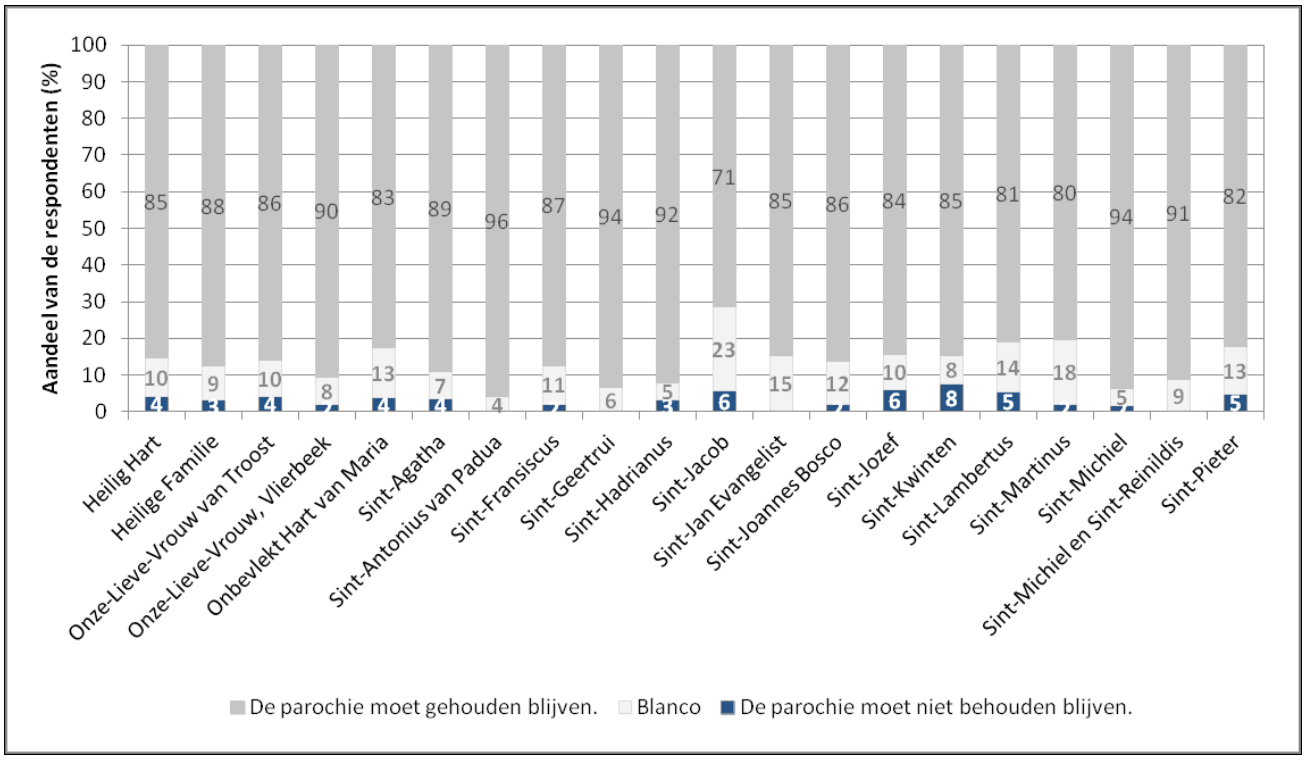


Fig. 99.

Fig. 100.

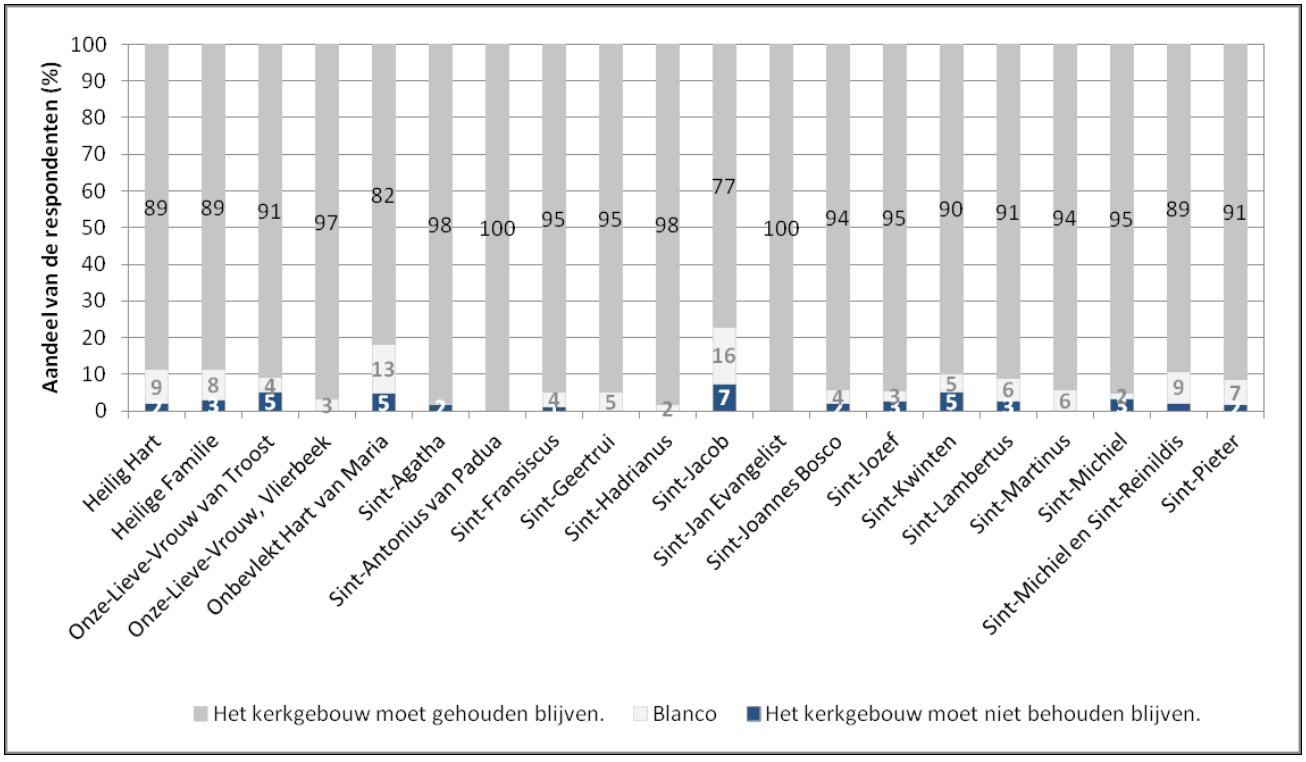
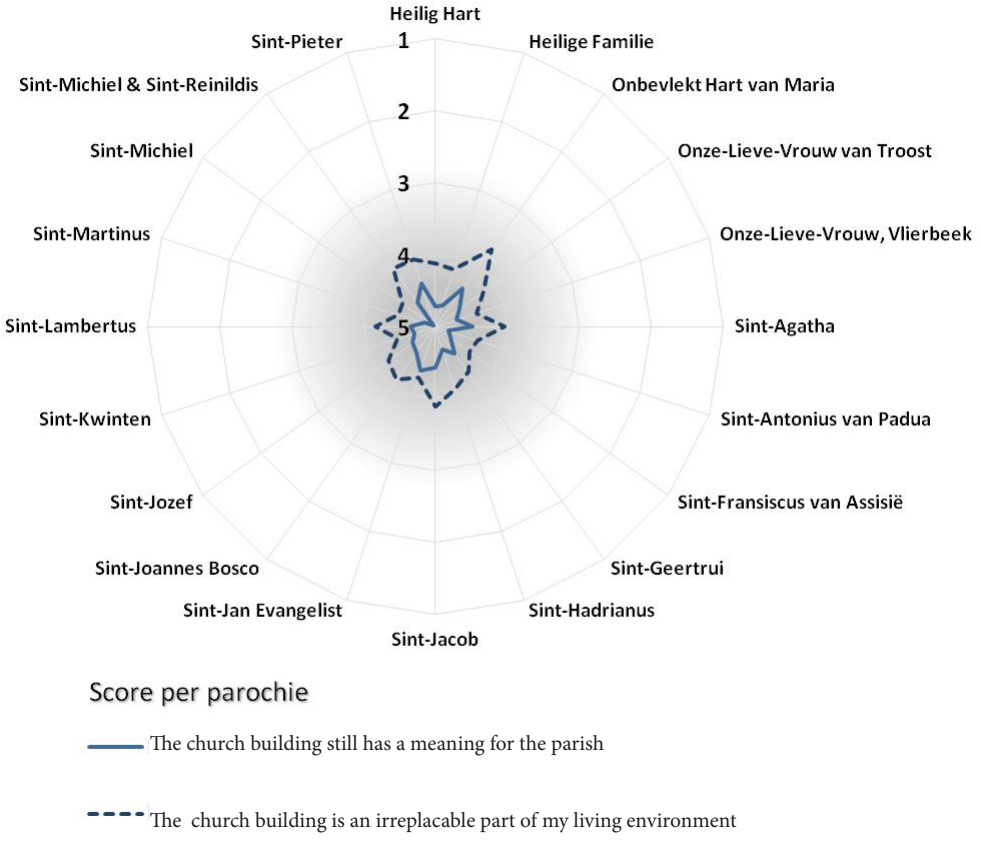




Fig. 101.

Fig. 102.



and another group thinks the infrastructure is more important.[208] Besides that, the associations connected to the parish (e.g. choir, youth movements) are expected to diminish their link with the parish in the future but hope to keep using the church's infrastructure in the future.[209] The parishes are open to the idea of sharing their spaces more to these associations and the community in general.[210] Lastly, generally speaking, all parishes are open to the reuse of their churches but do not search actively for it. Furthermore, the type of ownership (e.g. public, private) has a major influence on this debate as well as neighbouring facilities.[211]

Regarding whether or not the parish and the church should be kept, the attendees of the parish of Saint James had a relatively large number of people stating these shouldn't be kept or left the answer open compared to other parishes in Leuven.[212]
Linked to this, whether or not the attendees would mind going to another church, three statements were posed to investigate if one would agree or not. Firstly, if one would mind changing of church for the weekly mass. Secondly, if one would change of church for their marriage, baptism or burial. Thirdly, if one would go to the church where the masses are the most interesting. The parish of Saint James agreed more to these statements (see Fig. 101 and 102) than other parishes in Leuven.[213] However, when asked if one would mind if the church would be desacralized, one didn't agree much with this statement.[214] Which is understandable as the church has an emotional value because it is an identity bearer and former of the community. The same goes for the statement if the church is an irreplaceable part of ones living environment. Most people agree with this statement, however again the parish of Saint James has a slightly larger amount of people not agreeing compared to other parishes in Leuven.[215]

The study makes the following strengths and weaknesses for the parish of Saint James.[216]

Masses:

+ The number of attendees per weekends is larger than the average in Leuven, and the masses during the week are also relatively well visited

Fig. 101. Score for statements related to the ceremony (the higher the score, the more agreed with the statement) [Vanneste, Beringhs and Steenberghen, 2013, p. 102 (translated from dutch by Pieter Vermeir)]
Fig. 102. Score for statements related to the church (the higher the score, the more agreed with the statement) [Vanneste, Beringhs and Steenberghen, 2013, p. 106 (translated from dutch by Pieter Vermeir)]

211. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 56.
212. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 93-94.
213. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 102.
214. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 104.
215. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 106.
216. VANNESTE, BERINGHS and STEENBERGHEN, *Sociaal-geografisch onderzoek van de Leuvense parochies*, 2013, p. 44.

- No high number of marriages, baptisms and burials

Church Visitors:

+ The number of attendees younger than 56 year (36%) is higher than the average in Leuven (35%)

+ The number of students in the attendees is higher than the average in Leuven

- The number of attendees of the age of 76 year (27%) is higher than the average in Leuven (23%)

- The amount of weekly visitors (46%) is lower than the average in Leuven (66%)

Spatial:

+ Sufficient parking spaces (Sint-Jacobsplein)

+ Relatively central location

- Churches in the city centre are located close to each other

Other:

+ Choir: Saint James choir (men and women)

3. 3. Working Group: Sint-Jacobskerk

After the agreement on the loan lease of the church of Saint James to the city of Leuven, the debate was once again fuelled on the church's future. Not only regarding the structural issues (see above), but also regarding its future functioning and how it can be brought back to the collective memory.

In 2003, the organization Stad & Architectuur organized a debate on this topic. At this debate, it was decided to found a working group which would elaborate on this issue of repurposing. Members of this group were architects, urban planners, structural engineers, but also people from the neighbourhood, of the city's board, city guides and other interested people. Active from September 2004, the main goal of this working group is to create a broad public support for the conservation, restauration and the repurposing of the church of Saint James.[217]

In 2005, the working group started with organising debates on a theme for the following three years. Every six months, these themes were communicated through six panels present today at a wall at the Sint-Jacobsplein. The aim is to inform the public on the issues the church is facing and its history. Besides that, events such as guided tours and lectures are organised as well. By doing this, the debate can be opened up to the broader public.[218]

The group stopped in 2007, due to a switch in personnel. However, with the initiative to start up the study to assess the structure of the church and search for a solution, the group started again in 2008.[219] In 2009, there was a change in their structure, as it worked more closely with the city of Leuven. With the start of drawing up the execution dossier in 2009 for the stabilisation of the church, this close collaboration contributed much to the debate on the future use.[220]

All actions of the group proved that a broad support for the church by the public could be generated by means of a long process of sensibilisation and inclusiveness.

217. STAD EN ARCHITECTUUR, *Jaarverslag 2006*, Stad en Architectuur, 2006, p. 5.; STAD EN ARCHITECTUUR, *Jaarverslag 2008*, Stad en Architectuur, 2008, p. 5.
218. STAD EN ARCHITECTUUR, *Jaarverslag 2006*, 2006, p. 5-6.
219. STAD EN ARCHITECTUUR, *Jaarverslag 2008*, 2008, p. 5
220. STAD EN ARCHITECTUUR, *Jaarverslag 2009*, Stad en Architectuur, 2009, p. 5.

- **Deur op een kier**

In 2005, the event 'deur op een kier' was organised. This event allowed people to take a look at the church after the many years of closure. Only a small part was accessible, but still, this event being a first encounter for the people with this church, it contributed to the people's connection with this church.[221]

- **Babbelbox**

Babbelbox was an initiative organised in 2005 which allowed people to speak their mind on the use of this church or any other stories related to this church.[222]

- **Kunst in de Steigers**

The most prominent event organised by the working group, was 'kunst in de steigers' (art in between the scaffolding). For one weekend, the church was opened to the public as an exhibition space for several forms of art and performances. It was initiated in collaboration with 'De Hulster en Walden vzw', an organisation for assisted living for psychologically vulnerable people. Several other socio-cultural organisations from the neighbourhood of the church participated in this event. In



Fig. 103.



Fig. 104.

Fig. 103. Event 'Deur op een kier' [Petra Griefing, Stad & Architectuur, 05/09/2009]
Fig. 104. Babbelbox [Petra Griefing, Stad & Architectuur, 05/09/2009]

221. Meeting Petra Griefing, Stad & Architectuur
222. Meeting Petra Griefing, Stad & Architectuur



Fig. 105.



Fig. 106.

addition, a lot of people outside the neighbourhood were reached by this initiative, enlarging the public support. Besides that, it was shown that with a minimum on means a lot of things are possible using the space of the church. This event was organized one weekend every year over the period 2006-2014, having much public interest.[223]

- **In Search for Intangible Heritage**

Another initiative this group took, was the search for intangible heritage linked to the church. The aim was to conserve and bring back the collective memory. For this, a call was made for collecting photos related to related to the church and neighbourhood of Saint James, and the life in the parish. Stories accompanying these photos were collected as well.[224]

- **Inventorying the Moveables**

In 2010, the working group initiated the inventory of the church's moveables. This was because the church's bad state of conservation and its effect on the interior elements such as the sacrament tower, the pulpit. Besides that, it was feared that

Fig. 105. Cie Tartaren during 'Kunst in de steigers'
[Petra Griefing, Stad & Architectuur, 9/10/2009]
Fig. 106. Exposition of the proposed new functions by students of Sint-Pieterscollege
[Petra Griefing, Stad & Architectuur, 30/03/2014]

223. STAD EN ARCHITECTUUR, *Jaarverslag 2006*, 2006, p. 7.; STAD EN ARCHITECTUUR, *Jaarverslag 2009*, Stad en Architectuur, 2009, p. 5-6.; STAD EN ARCHITECTUUR, *Jaarverslag 2010*, Stad en Architectuur, 2010, p. 6-7.; STAD EN ARCHITECTUUR, *Jaarverslag 2011*, Stad en Architectuur, 2011, p. 4.

224. STAD EN ARCHITECTUUR, *Jaarverslag 2009*, 2009, p. 6.; STAD EN ARCHITECTUUR, *Jaarverslag 2010*, 2010, p. 4.; STAD EN ARCHITECTUUR, *Jaarverslag 2011*, 2011, p. 5.

some parts might have been stolen without somebody knowing, as the inventory at that time was old. [225]

- **Sint-Pieterscollege Repurposes the Church**

In light of a religious course, the last year students of the high school Sint-Pieterscollege made designs for the repurposing of the church in 2012. Some projects were selected by the working group and showed in an exhibition in the church. This idea contributed to involving a younger generation with the church's future.[226]

- **Study meeting 'Projectontwikkeling en beheer van herbestemd religieus erfgoed'**

The aim of this study meeting on the project development and management of repurposed religious heritage was to provide insight in this matter by means of studying best practices. It was organized in 2013.[227] The following themes were discussed in this meeting by analysing good examples:[228]

- The church as a motor of economic development
- Temporary forms of repurposing
- The church as carrier of the society

One concluded that all pillars of sustainable development should be included in a repurposing project, with a good balance between these and the heritage values. This balance is a challenge for the designers. Furthermore, the church should not be seen as a building on itself. Lastly, due to the recent history of a long-time closure of the church, poses the question whether or not it is agreeable to give this church back its original religious function. The church of Saint James poses a challenge for the designer, but it should stay in public use.[229]

225. STAD EN ARCHITECTUUR, *Jaarverslag 2010*, 2010, p. 5.
226. STAD EN ARCHITECTUUR, *Jaarverslag 2012*, Stad en Architectuur, 2012, p. 5.
227. STAD EN ARCHITECTUUR, *Jaarverslag 2013*, Stad en Architectuur, 2013, p. 7.
228. STAD EN ARCHITECTUUR, *Projectontwikkeling en beheer van herbestemd religieus erfgoed – verslag studiedag 16 oktober 2013*, Stad en Architectuur, 2013, p. 9-27.
229. STAD EN ARCHITECTUUR, *Projectontwikkeling en beheer van herbestemd religieus erfgoed*, 2013, p. 28-29.

3. 4. Kerkenbeleidsplan Leuven

A 'kerkenbeleidsplan' (church management plan) has its origin in the concept note of the Minister of tangible heritage in Flanders, Geert Bourgeois (24 June 2011).[230] In this note it is declared to provide subsidies for maintenance and restoration for protected and non-protected churches provided that extra requirements are met.[231] These requirements are stated in the tangible heritage decree of 12 July 2013: subsidies of 80% for the management of, or for activities, or services to or in protected monuments intended for a recognized worship service are approved provided that the municipality or region has an existing 'kerkenbeleidsplan'. This applies to all parish churches in the municipality regardless of the protection status.[232]

There is however a difference depending on whether the municipality has protected churches or not. If the municipality has at least one protected church, the document contains a long-term vision of the representative institute of the worship services approved by the municipality or province. The long-term vision should contain at least the following for all buildings intended for use in worship services:[233]

1. A description of the buildings, including the cultural and historical value, the architectural possibilities, and the state of conservation.
2. The situating of the buildings in its special context.
3. A description of the current use and function of the buildings
4. A substantiated vision on the future use of the buildings, including a plan on how this future function will be researched in means of side use or repurposing.

Secondly, if the municipality has no protected churches, the minimal requirement is a long-term vision with the following items:[234]

1. A description of the buildings, including the cultural and historical value, the architectural possibilities, the state of

230. STAD LEUVEN, *Kerkenbeleidsplan*, 2016., p. 7.
231. Geert BOURGEOIS, *Conceptnota: Een toekomst voor de Vlaamse parochiekerk*, Vlaamse Overheid, 2011, p. 11.
232. "Kerkenbeleidsplan", in: Centrum voor Religieuze Kunst en Cultuur vzw: https://www.crkc.be/kerkenbeleidsplan (last accessed on 05/08/2018)
233. "Kerkenbeleidsplan", in: https://www.crkc.be/kerkenbeleidsplan
234. "Kerkenbeleidsplan", in: https://www.crkc.be/kerkenbeleidsplan

conservation, possibilities of compartmenting the building, ...
2. The church in its spatial context.
3. The current use and function of the building.
4. Possible interests of other actors in the building.

In making up the document, the Centre for Religious Art and Culture (Centrum voor Religieuse Kunst en Cultuur, CRKC) provides guidance.

Primarily, a 'kerkenbeleidsplan' is needed to gain subsidies. Besides that, the document aims to promote an unanimity on this rather delicate issue by creating a platform for communicating with all actors. Lastly, it provides an objective source for further use in other future city planning issues.

- **Saint James's church in 'kerkenbeleidsplan' Leuven**

The 'kerkenbeleidsplan' Leuven was made up by the collaboration of two actors: the Central Church Board Leuven (Centraal Kerkbestuur Leuven, CKBL) and the city of Leuven. Phase 1 in making up the plan was to gain the necessary background information. In the second phase, based on the information gained in the previous phase, an advisory note was made containing a long-term view on the use of the churches in Leuven. Approved by the earlier mentioned actors in 2013, the third phase was initiated. In 2015, the two actors actualized this note and made the first general version of a 'kerkenbeleidsplan'. In the fourth phase (2016), three pastoral zones were decided on, each containing several parishes. Feedback on the first version by these zones was considered when making op the final version of the plan in the fifth phase in 2017.[235]

Each church has a fiche, in which the points summed up above as minimum requirements are mentioned and elaborated on.

However, the historical church of Saint James does not have such a fiche, because of its current non-use. As mentioned above, a 'kerkenbeleidsplan' should only contain the buildings used for worship services. The current Saint James church, built after the closure of its historical namesake,

235. STAD LEUVEN, *Kerkenbeleidsplan*, 2016., p. 8-9.

has a fiche instead. This church is currently used much (daily mass except on Sundays) and is located right next to the parish centre, in which several associations related to the surrounding community are housed.

As for future use, the urban tissue in which the current church building of Saint James is situated next to, is planned to be redeveloped. The same goes for the parish centre. As these buildings do not have any heritage value according to the plan, it is advised that the church would move. In this way, the whole tissue can be redeveloped which improves the architectural and urban unity. The parishioners of Saint James would have to move to other parishes nearby and the buildings would be sold and demolished. This is planned to happen on mid-term (5-10 years).[236]

The historic church of Saint James however is planned to be structurally restored after the subsidy for this was granted in March 2017. The church is in leasehold of the city of Leuven since 2003. On long-term (10-20 years) a repurposing of this church will be sought.[237]

236. STAD LEUVEN, *Kerkenbeleidsplan*, 2016., p. 35-38.
237. STAD LEUVEN, *Kerkenbeleidsplan*, 2016., p. 140.

3. 5. Conclusion

After 55 years of closure the church of Saint James is finally undergoing an intervention which will stabilize the church for the future. It was due to the studies done on the church (from 1995-2007), it got out of a downwards spiral of neglecting and endless debating on the future as the structural problem was proven solvable. Secondly, it was due to the transfer of the responsibility of the church to the city because of the loan lease contract, that these studies could contribute to a solution. Recently, there has been a shift from a debate being stuck to a debate on the future use.

Several key decisions and events led to the prolonging of the closure for 55 years. First, there was the financial issue, the church wardens could not support the project for which they had to wait for subsidies. Secondly, these subsidies were not freed up quickly causing the negative effects of the financial issues to enlarge. Thirdly, the decision to build an 'emergency' church removed the urgency from the equation, as the project was not that 'needed' anymore in terms of the practical need for space. This is linked to the financial aspect as well; the construction of the 'emergency' church rerouted a budget which could have been spent to the project. Lastly, the debt of the parish to the contractor worsened, having the situation spiralling downwards even more.
In any case, one could argue that these issues also had a positive effect: the thorough intervention of Lemaire and Brigode which was based on partly wrong assumptions was never executed.

The impact on the parish of Saint James was immense, financially as well as emotionally. They had to search for another place to hold their masses, having lost their church. The closure of 55 years led to the disappearance of the church out of the collective memory.
In addition to that, the parish is nowadays faced with the issue of a decreasing number of attendees. Besides that, in the enquiry it was shown that the number of parishioners that wouldn't mind their parish and church to disappear was higher than other parishes in Leuven. Of course this is linked to the modern church and not to the old church, but still questions whether or not the future use of the old church should be a religious one.

As the closure led to the disappearance out of the collective memory, the working group of

Saint James aimed to restore this collective memory. As such, the church is not only facing a structural problem, but also a social one. The group succeeded in bringing back again the church to the public and fuelled the debate positively.

Regarding the 'kerkenbeleidsplan' of Leuven, the parish is foreseen to disappear, with three parishes remaining in the city centre. Putting a religious function as a future use for the church out of the equation.

Despite the fact that the future of the church was much discussed, there is currently no project for a new use. This is rather strange as the stabilization project is being executed. One would expect that the use would have been decided on the same time of the stabilization (which started in 2010).

Fig. 107. State of the church in 1979 [Archief Onroerend Erfgoed, 36/361/4239 (Sint-Jacobskerk VII)*]*



Fig. 107.

4. Heritage Values

To be able to propose a good project for future use, the heritage values must be assessed. This is vital in decision making regarding what can be kept when doing an intervention, or what should be enhanced. A basis for the assessment is the previous research and research done in the thesis.
Firstly, the heritage values are highly depending on the authenticity of the building. A tool for analysing this is the Nara grid. Secondly, the values are represented graphically.

4. 1. Nara Grid

The Nara document on authenticity states:

> *"Authenticity, considered in this way and affirmed in the Charter of Venice, appears as the essential qualifying factor concerning values. The understanding of authenticity plays a fundamental role in all scientific studies of the cultural heritage, in conservation and restoration planning, as well as within the inscription procedures used for the World Heritage Convention and other cultural heritage inventories."* [238]

For understanding the authenticity, the Nara grid tool is used. This is based on aspects of the sources of information for authenticity, and the dimensions of the cultural heritage. The dimensions are artistic, historic, social and scientific. The aspects are linked to form and design, materials and substance, use and function, tradition, techniques and workmanship, location and setting, and spirit and feeling. Representing this in a grid allows for a good representation of combinations.[239]

238. Art. 10 in: "Nara Document on Authenticity (1994)", in: ICOMOS: https://www.icomos.org/en/179-articles-en-francais/ressources/charters-and-standards/386-the-nara-document-on-authenticity-1994 (last accessed on 26/10/2018)

239. "Nara Document on Authenticity (1994)", in: https://www.icomos.org/en/179-articles-en-francais/ressources/charters-and-standards/386-the-nara-document-on-authenticity-1994; Koenraad VAN BALEN, "The Nara Grid: An Evaluation Scheme Based on the Nara Document on Authenticity", *The Journal of Preservation Technology*, 2008, 2/3, p. 39-46.

Table 7. The Nara grid applied on the church of Saint James [Pieter Vermeir]

	Dimensions				
Aspects		Artistic	Historic	Social	Scientific
	Form and design	The building is a palimpsest of multiple styles; the tower is a relic of the transition from Gothic to Romanesque style; the sacrament tower is one of the few remaining in Flanders	The building is a palimpsest of multiple styles; the tower is a relic of the transition from Gothic to Romanesque style; some parts of the church are amongst the oldest in Leuven; the sacrament tower is one of the few remaining in Flanders	The different styles represent the changes in preferences of that time	The building is a palimpsest of multiple styles and the tower is a relic of the transition from Gothic to Romanesque style, archaeological remains of the former Romanesque church can be researched
	Materials and substance	Detailed ornaments in stone carving in forms of animals and human heads	Each style has its own preferences in materials	/	Stone carvings are indicative for the different building phases, typical use of materials for each style
	Use and function	/	One of the five medieval churches in Leuven	Repurposing of the church will have an impact on the neighbourhood	/
	Tradition, techniques, and workmanship	Traditional carving techniques in the natural stones	Each style of the palimpsest has its own techniques	/	The techniques can be studied for each style
	Location and setting	Although somewhat forgotten, its location at the square gives it a certain staging	Located since medieval times at an important route into the city	Located at a medieval route to Compostella	/
	Spirit and feeling	Feeling of past grandeur	Impression of a palimpsest	If brought back to the collective memory, it can once again be a space for the neighbourhood	Interventions for solving the instability leave an apocalyptic image

Table 7.

4. 2. Synthesis

The values of the Nara Grid are put to the scale of the building elements, but still considered as a whole building. Four classes of value are defined:

- *High heritage value*
  These elements have a high value and are much contributing to the qualities of the building. They should be kept and restored if needed. Only when absolutely necessary, these can be removed.
- *Average heritage value*
  These elements are of medium value and contribute to the qualities of the building. Their lower value makes more intervention possible, but the overall value of the building should be guaranteed.
- *No heritage value*
  These elements have no or almost no value and are not contributing to the qualities of the building. If needed, they can be removed.
- *Disturbing*
  These elements are disturbing to the values and qualities of the building. If possible, they should be removed.

Generally, the church has a high heritage value with exception of the shoring elements added in 1971. Although several parts are from different periods, they are given the same high value. It contributes to the feeling of the palimpsest, which is considered a value for the building as well.

The tower is dating from the Romanesque period. Being a relic of this period in the past of Leuven, it is considered to have a high value. The chapel constructed inside the ground floor is considered as having a medium value. It has a historic value, but due to its rather obstructing positioning in the original concept of the tower, it is given a lower value. Lastly, the closing of the Romanesque portal is given a medium value because it disturbs the original concept of the tower as well.

Regarding the nave, it has a high value. Furthermore, the chapels are considered to be of high value. Lastly, the windows that are filled in the southern side nave are considered to have disturbing effect to the value of the church. The same applies to the separating wall in the western part of both side naves.

The transept and choir are considered to be of high value. Only the later additions are of lower value.

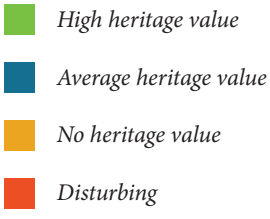
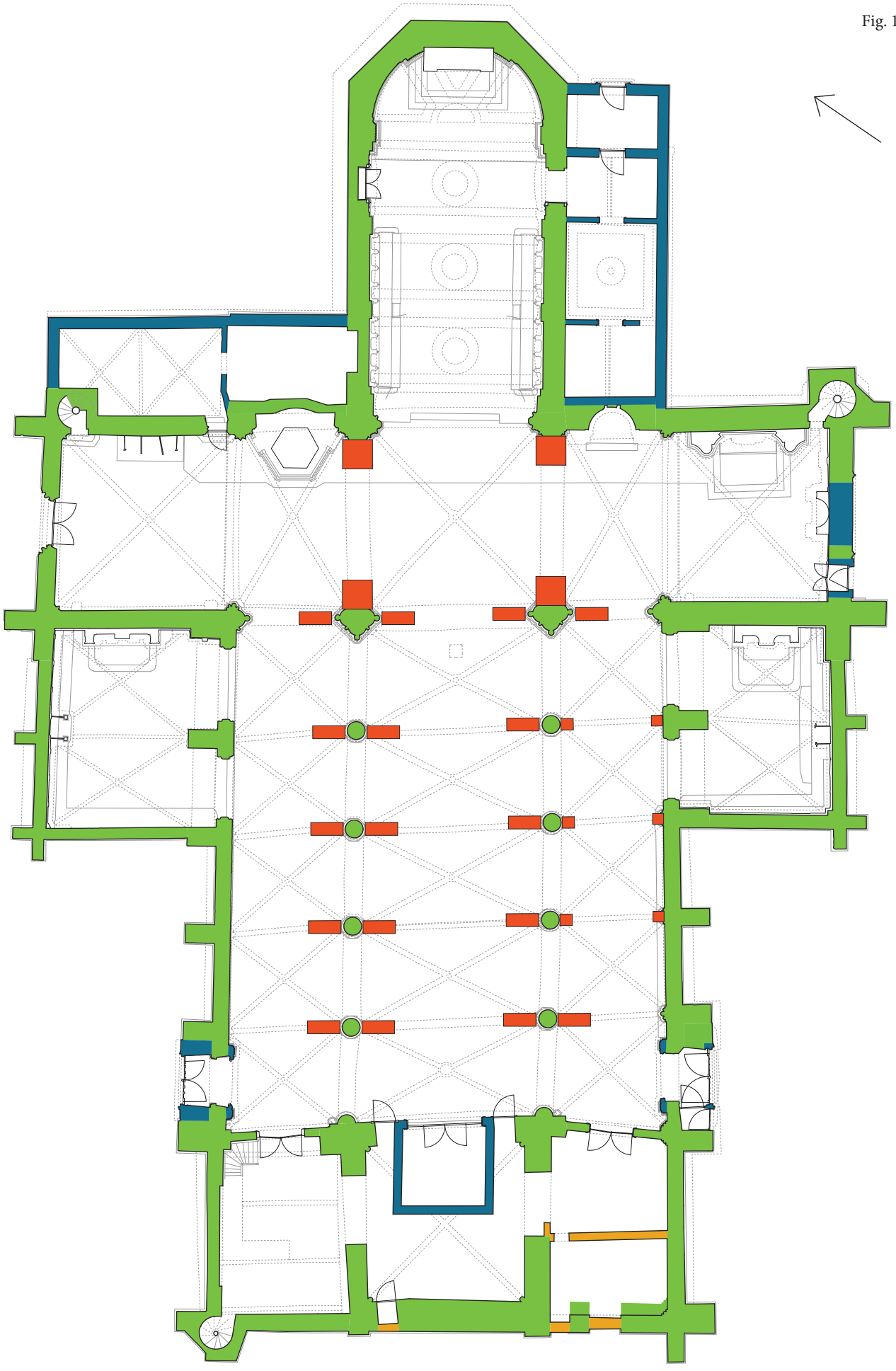


Fig. 108. Heritage values in plan [Pieter Vermeir]

Fig. 108.



0 1 2 3 5 10 15

5. Conclusion

The church of Saint James has a rich history, tangible and intangible. Being one of the oldest churches in Leuven, it represents various styles, making it a palimpsest. The church's link with Compostella is not much present today and its sacraments tower is, although being a remarkable piece of architecture, rather unknown of.
Still, on the aspect of building history, several questions remain for which further research is needed.

Structural problems ultimately led to the closure of the church in 1963. These problems are originating from a lack in load bearing capacity of the subsoil due to additions to the structure over time for which the foundations were not designed originally. From the decision of closure onwards, the church got stuck in a seemingly endless, financial and ideological debate to which an administrative hassle only contributed to its further delay. Because of the study done in 1995, the church got out of the downwards spiral. Further research contributed to a better understanding of the church's history and structural aspects. This research was culminated in the full assessment done by TRIconsult and Labo Reyntjens which was put to a new stabilisation project in 2010. The church of Saint James is currently undergoing this project and will be fully stabilised. After stabilization, all shoring elements can be removed.

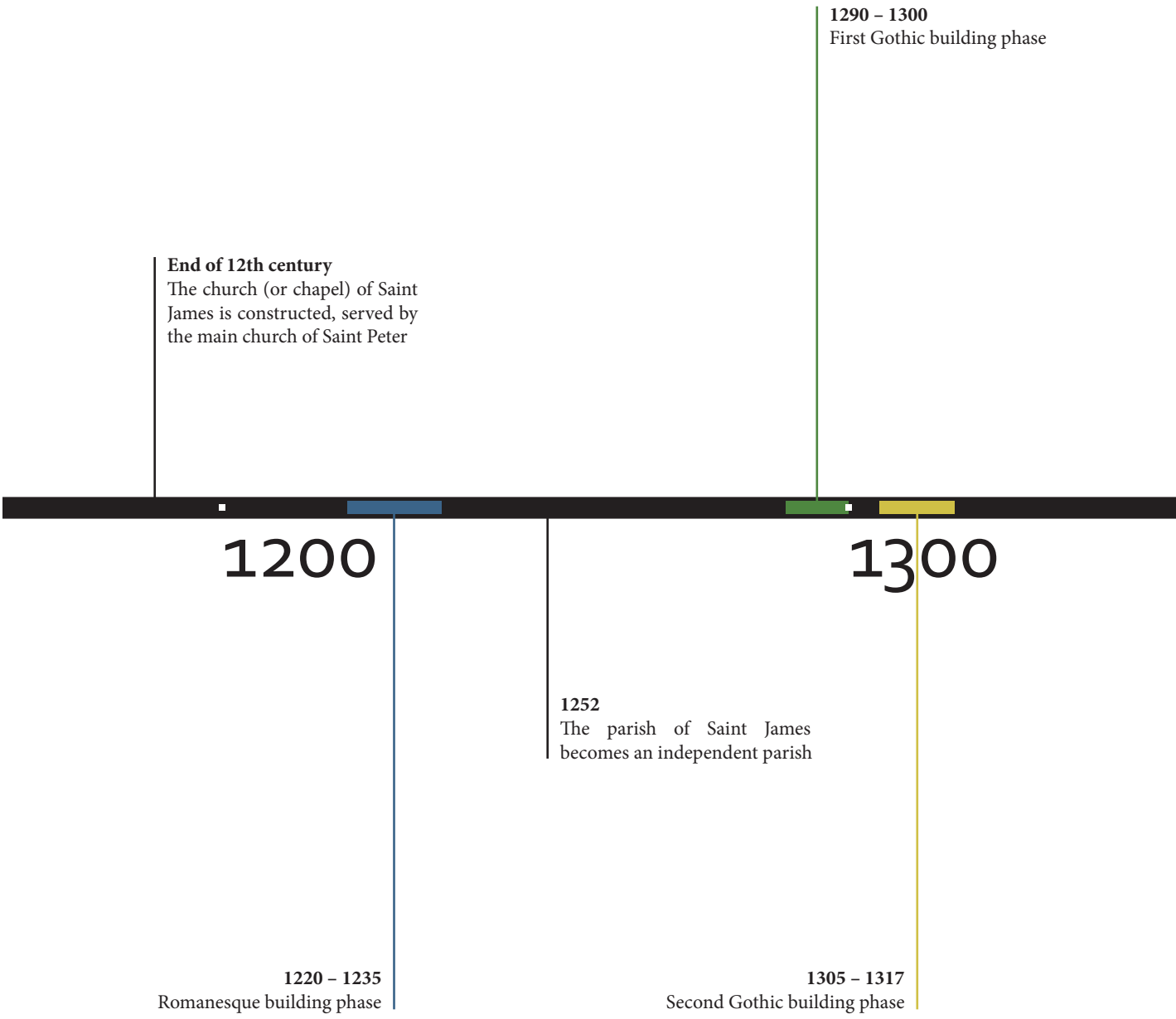
The closure of the church was meant to be temporary until the structural problems would have been solved. However, this took already 55 years. Furthermore, in this timespan the church was neglected. The second reason the church got out of this situation (besides the research) was the initiation of the loan lease contract. The intervention of 1971 never was completed because of a lack in budget. In addition to that, the building of an emergency church removed the urge for stabilising the church. The impact was very large, before building the temporary emergency church, the parish had to move a couple of times and further neglection led to the disappearance of the church out of the collective memory. This was aimed to be brought back by the working group. They organising several events by which they succeeded in this. Lastly, in the kerkenbeleidsplan of Leuven, the parish is aimed to disappear in the future to join the three main parishes in the city centre because

of a low number of attendees.
The heritage values are very high, with exception of the shoring structure added in the 70s. The perception of the palimpsest is an added value to the church.

As the church has undergone numerous of interventions and events over its course of time, a summarizing timeline is made.

Fig. 109. Summarizing timeline (next pages)
[PieterVermeir]

Fig. 109.


1290 – 1300
First Gothic building phase
End of 12th century
The church (or chapel) of Saint James is constructed, served by the main church of Saint Peter
1200
1300
1252
The parish of Saint James becomes an independent parish
1220 – 1235
Romanesque building phase
1305 – 1317
Second Gothic building phase

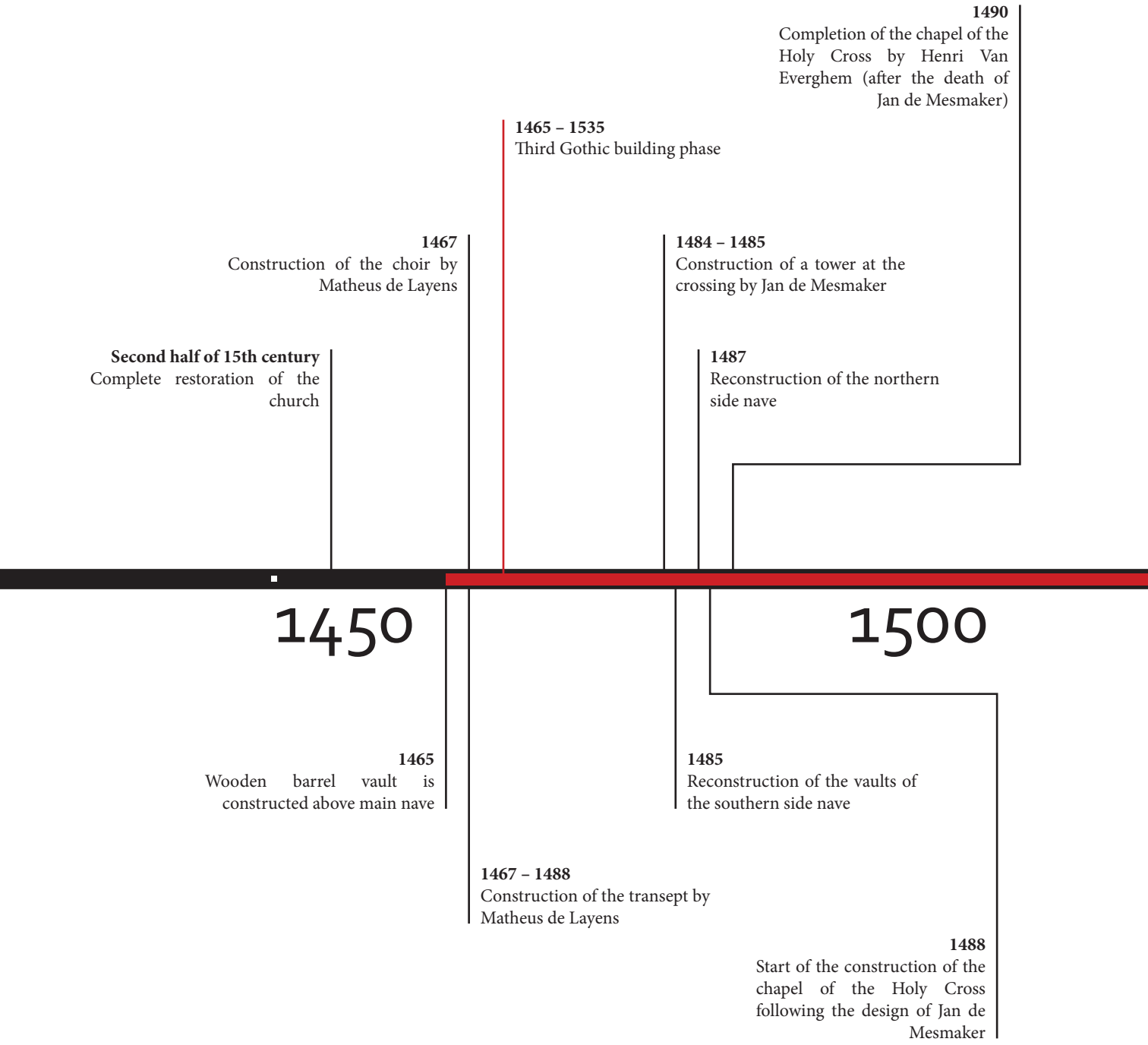
1380
Jan Van der Gheest is appointed as abbot of the Augustinian monastery of Leuven and took a part of the relics of the miracle with him

1454
The church of Saint James becomes a collegiate church

1400

1450

1374
Jan of Cologne took the eucharist without confessing first, upon which it transformed into a piece of meat


1490
Completion of the chapel of the Holy Cross by Henri Van Everghem (after the death of Jan de Mesmaker)
1465 – 1535
Third Gothic building phase
1467
Construction of the choir by Matheus de Layens
1484 – 1485
Construction of a tower at the crossing by Jan de Mesmaker
Second half of 15th century
Complete restoration of the church
1487
Reconstruction of the northern side nave
1450
1500
1465
Wooden barrel vault is constructed above main nave
1485
Reconstruction of the vaults of the southern side nave
1467 – 1488
Construction of the transept by Matheus de Layens
1488
Start of the construction of the chapel of the Holy Cross following the design of Jan de Mesmaker

16th century
Construction of the chapel of Saint Hubertus

1535
Construction of the rib vaults, and the clerestory and flying buttresses

1578
Pestilence outbreak

1550

1600

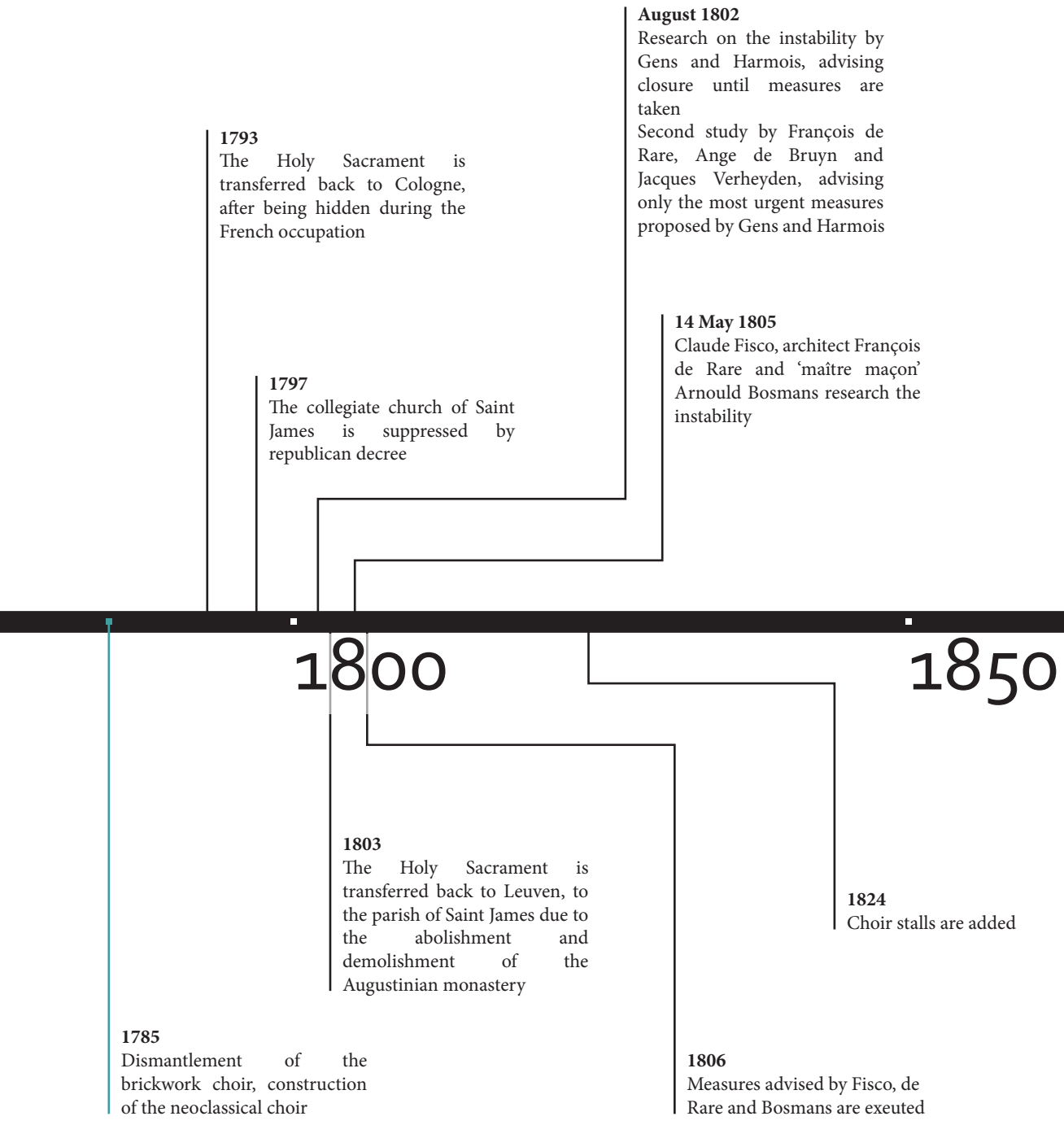
1537
The sacrament house is made by Gabriel van den Bruynen

1562
The sacristy is built against the northern transept's east facade

1735
Dismantlement of the crossing tower

1700

1750


1793
The Holy Sacrament is transferred back to Cologne, after being hidden during the French occupation
1797
The collegiate church of Saint James is suppressed by republican decree
August 1802
Research on the instability by Gens and Harmois, advising closure until measures are taken
Second study by François de Rare, Ange de Bruyn and Jacques Verheyden, advising only the most urgent measures proposed by Gens and Harmois
14 May 1805
Claude Fisco, architect François de Rare and 'maître maçon' Arnould Bosmans research the instability
1800
1850
1803
The Holy Sacrament is transferred back to Leuven, to the parish of Saint James due to the abolishment and demolishment of the Augustinian monastery
1824
Choir stalls are added
1785
Dismantlement of the brickwork choir, construction of the neoclassical choir
1806
Measures advised by Fisco, de Rare and Bosmans are exeuted

1884
New pedestals of the columns are added

1913
Restoration of the windows of the transept

1920
Restoration works on the roofs and gutters

25 March 1938
The church (with exception of the neoclassical choir) is protected as monument

1940-1945
The church suffers war damage, the bells are taken by the German occupator

1943
Research by canon Lemaire

1953
The war damage is repaired

1900

1950

8 September 1959
First draft of the dossier of the shoring structure is proposed

29 January 1959
Following the advice of Martiny, the church wardens decide to close the church at Candlemas
Simon Brigode is charged with the restauration dossier, advised by R. M. Lemaire

18 May 1960
Permission granted to open the old entrance in the transept for allowing masses to be held in the choir and transept

1960

1961

2 February 1959
Closure of the nave of the church by provincial architect Martiny
Sunday masses are from that moment on held in the banquet hall nearby, weddings and burials in the Latin-American College

1956
Sudden increase of settlements of 30cm is observed

18 October 1959
Transept and choir are opened again for holding masses with access through the side naves

28 March 1962
The dossier is handed over to the minister of Public Works, awaiting subsidies

1962

2 August 1961
Full dossier is handed in to the church wardens for approval

1963

11 April 1963
Closure of the complete church by Martiny, after Halflants and de Kempeneer noticed a continuing degradation
The masses are held in the school of the Sisters of Charity in the recreation hall

5 October 1963
The dossier is sent back to the church wardens to be revised, but the public tender can be made

12 January 1965
The promise for a first subsidy of 2.434.900 BEF is given by the state

3 March 1964
The tender is given to the firm Gebr. Vandekerkhove for 3.833.020 BEF

1964

1965

22 October 1963
The decision is made to build an emergency church

4 July 1965
Gebr. Vandekerkhove ask 20% more due to shifting prices in the market

2 January 1966
The bishop approves the selling of some properties of the parish to acquire money for the emergency church

1966

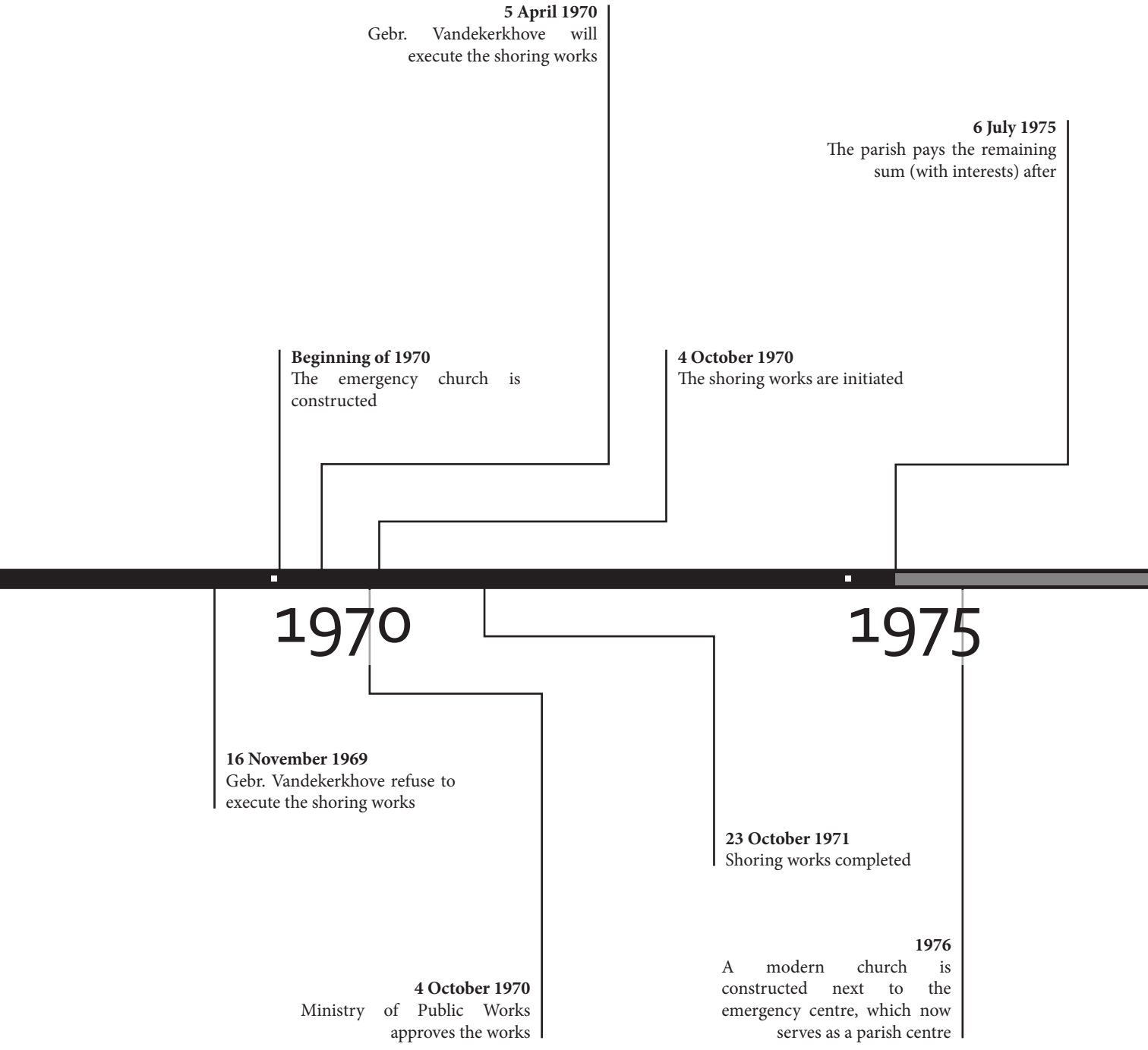
1967

26 November 1965
The parish is considering to build a temporary church in the garden of the presbytery, pastor De Roeck advised against this and envisions a church built in such a way it can be reused later as parish centre

4 July 1968
Agreement on the new price for the shoring works, the dossier is sent to the ministry of Public Works

1968

1969


5 April 1970
Gebr. Vandekerkhove will execute the shoring works
6 July 1975
The parish pays the remaining sum (with interests) after
Beginning of 1970
The emergency church is constructed
4 October 1970
The shoring works are initiated
1970
1975
16 November 1969
Gebr. Vandekerkhove refuse to execute the shoring works
23 October 1971
Shoring works completed
4 October 1970
Ministry of Public Works approves the works
1976
A modern church is constructed next to the emergency centre, which now serves as a parish centre

1995
Study by the RLICC on the church's structural problems and building history

12 January 1987
The choir is protected as monument, the church's environment as town or village scape

1980

1990

1994
The Flemish Government commissions a study on solving the stability of the church

1975 – 1994
Period of neglecting

2003
The church is given in loan lease to the city of Leuven

2000
The dismantlement of the flying buttresses

2005
Urgent consolidation measures are executed

2000

2005

2002
The church is desacralised

2006
First edition of the annual event 'Kunst in de steigers'

1996
A survey of the roof structure by students of the RLICC

2004-2007
Working group Sint-Jacobskerk Leuven

2007
Study by TRIconsult assessing the full structure of the church with a proposal for interventions

10 August 2010
A stability project is ordered by the city of Leuven

2011
A preliminary archaeological research is carried out

24 June 2011
The concept note of Geert Bourgeois on the future of parish churches

2014
The last edition of the annual event 'Kunst in de steigers'

2017
Kerkenbeleidsplan Leuven

2010

2015

14 September 2009
The church is protected as architectural heritage

2009-2013
Working group Sint-Jacobskerk Leuven

2013
Study meeting organised by the working group on:
'Projectontwikkeling en beheer van herbestemd religieus erfgoed'

12 July 2013
The tangible heritage decree obliging a kerkenbeleidsplan for subsidies

20 August 2018
Works on stabilising the church are initiated

Fig. 110. View on the crossing
[© KIK-IRPA, Brussels (Belgium), cliché B157400]



III URBAN CONTEXT



Fig. 110.

URBAN CONTEXT

The church of Saint James is located in the western part of the city centre of Leuven. This former marshy area is currently urbanised. Its characteristics of a river valley are not much notable anymore.
To have a background for the repurposing project, an inquiry the urban context is made. This will be done in four parts. The first part analyses the historical context of the city and the direct neighbourhood of the site. Secondly, the urban spaces and functions are analysed to see which role the new use of the church can play in this urban fabric. Thirdly, as the new use might be of public character, the connections of the site to other areas of the city are briefly analysed. In the last part, the legal status of the church and its surroundings are discussed.

Fig. 111. Areal view of the western part of Leuven with indication of the church of Saint James
[Pieter Vermeir]

1. Historical Context

1. 1. Leuven

Leuven started as a small settlement at a crossing of the river Dijle. This crossing was a side road to the Roman route Tienen-Elewijt. Of this Roman period no traces are left however. Furthermore, the first mentioning of the city was in 884 in a document in which Leuven was named Luanium. Other sources of the 9th century mention Loven, 'lo' meaning forest and 'ven' indicating a marsh. [240]

In the 11th and 12th century, Leuven exists of two cores. One was located around the Saint Peter's church, another at the 'Oude Borgh', at the location of the current Great Beguinage. The city was flourishing which led to several constructions. The alderman house was completed in 1140. A major construction of this time was the first city wall, constructed in 1165. Furthermore, in this period, several public buildings were constructed as well, of which the cloth hall in 1193.[241]

Due to further growth in population and economy, the city expanded. A second city wall was constructed in 1356. This wall has approximately the shape of the current peripheric road of Leuven. The economic growth was due to the favourable location of the city at the trade route Cologne-Bruges and its location at the river Dijle, as well as the city being the centre of the duchy of Brabant. After a small recession due to war in the 14th century, Leuven regained its importance in the 15th century. This resulted again in public works: the church of Saint Peter was rebuilt in Gothic style, and the construction of the city hall. Furthermore, the university was founded in 1425.[242]

In the second half of the 16th century, Leuven lost importance. This was until the Austrian reign by which the city gained more economic activity in the neighbourhood of the Vaart, the north-eastern part of Leuven. At around 1750, storehouses were built around the canal in this area

240. Edward VAN EVEN, *Louvain dans le passé et dans le présent: formation de la ville, événements mémorables, territoire, topographie, institutions, monuments, oeuvres d'art*, Louvain: Fonteyn, 1895, p. 4.; "Historische stadskern van Leuven" in: Inventaris Onroerend Erfgoed, in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/140040 (last accessed on 23/12/2018)

241. "Historische stadskern van Leuven" in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/140040

242. "Historische stadskern van Leuven" in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/140040

Fig. 112. Leuven, 12th century [Cuvelier, 1935]
Fig. 113. Leuven, 1583 [https://uurl.kbr.be/1035795]

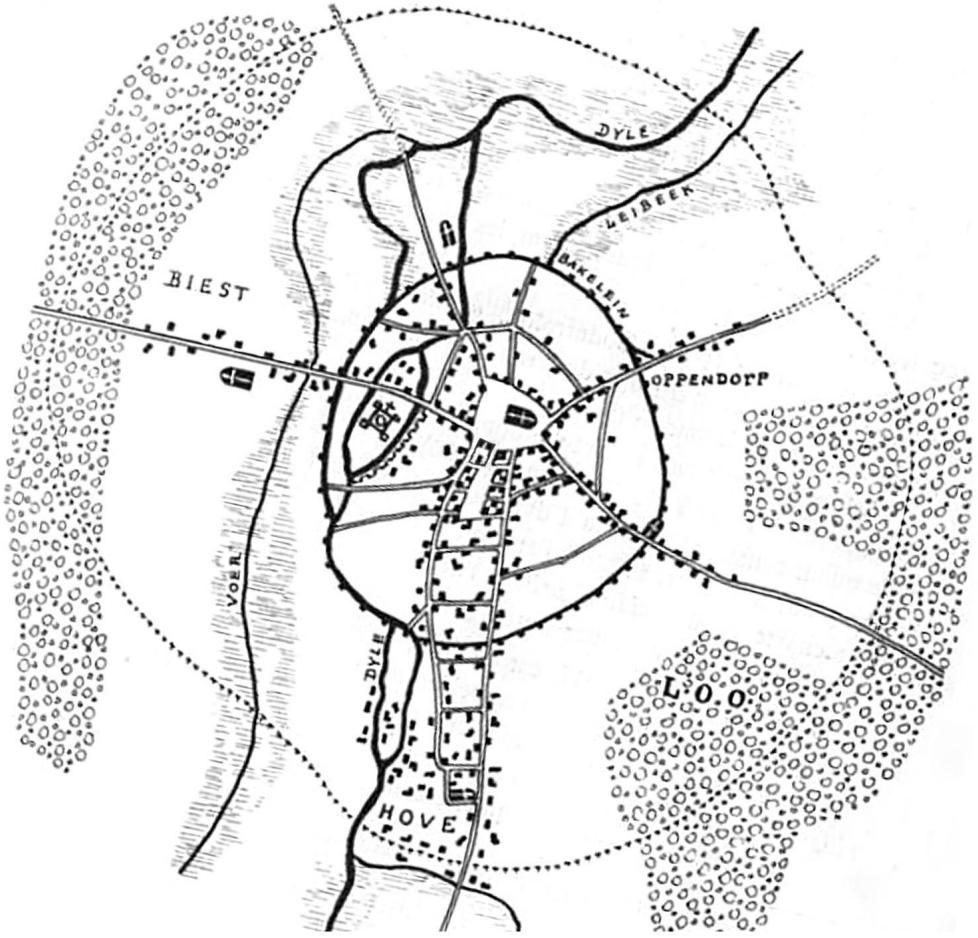


Fig. 111.

Fig. 112.



and several industries settled here, of which the brewer's industries are most known today. Other infrastructure works were the 'steenwegen' or 'chaussees', straight paved highways connecting the greater cities of Flanders. For connecting these roads with good access to the city, several city gates and parts of the city walls were demolished. [243]

In the 19th century, the city walls and gates were further demolished in light of urban renewal, making room for new squares and roads. With further industrialisation, a railway passing Leuven was constructed in 1837. This led to the further growth of the industrial zone at the Vaart. Parts of Leuven which were formerly rural areas gain straight roads, posing a contrast with the organically grown parts of the city. In addition to that, the railway station was connected with the city centre by a straight axis, the Bondgenotenlaan. Furthermore, parts of the two rivers passing through Leuven, the Voer and the Dijle, were vaulted in light of sanitation works.[244]

In the 20th century, Leuven was set ablaze by the German occupier, destroying numerous of houses and several public buildings, including the university library. In the reconstruction of the city, several streets were slightly altered.[245]

243. "Historische stadskern van Leuven" in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/140040

244. "Historische stadskern van Leuven" in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/140040

245. "Historische stadskern van Leuven" in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/140040

Fig. 114. Leuven, 1777 [Geopunt]
Fig. 115. Leuven, 1825 [https://uurl.kbr.be/1592945]



Fig. 113.

Fig. 114.





Fig. 115.

Fig. 116.



1. 2. Evolution of the Neighbourhood

As can be seen in the different phases of urban development in Leuven, the city has a dense core with radial streets extending outwards. This core expanded gradually over time as well as the buildings around the radial streets.

The same is noted in the development of the neighbourhood of the church of Saint James. Being a small core on itself around the church in the 12th century, Biest was located at the road connecting Brussels and Leuven. This marshy area in the Voer valley was gradually absorbed by buildings constructed at the radiant Brusselsestraat. However, it kept its less urban characteristic until the end of the 19th century approximately. By then the river Voer was vaulted and the square was constructed, encouraging for building at the edges of the square and further urbanization.

The decision to build a square at the church dates from 1793, with the intention to have a market for cattle and horses there. The works started in 1824 by Ferdinandus Duchesne and finished in 1827. The fencing with posts in blue stone is dating from 1842. Originally, the square had chestnut trees instead of plane trees. The adjacent buildings had to be approved before being constructed.[246] As can be seen in the primitive cadastre plan, the lines of the plots were perfectly aligned and square, resulting in the current outlook of the square. However, some houses have been demolished and replaced over time, diminishing this outlook. Besides that, the strict rules were confined to the square only, resulting in a notable change in the access streets.

Nowadays, the neighbourhood is completely absorbed by the urban sprawl and with that, the once prestigious square is claimed by cars, as parking space.

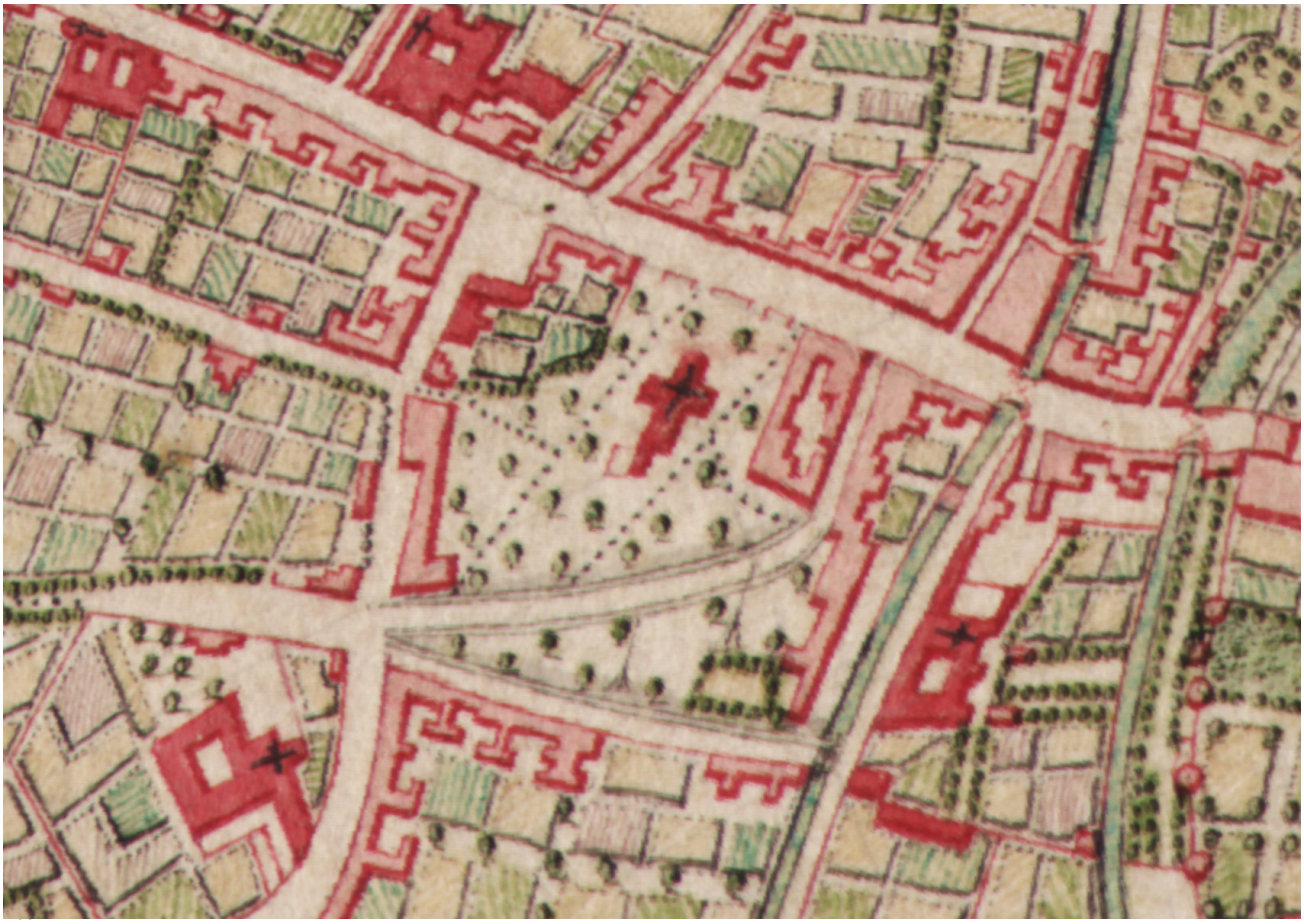
Fig. 116. Leuven, 1971
[Geopunt]
Fig. 117. Leuven, 2015
[Agiv]
Fig. 118. Neighbourhood of the church, 1583
[https://uurl.kbr.be/1035795]
Fig. 119. Neighbourhood of the church, 1777
[Geopunt]
Fig. 120. Neighbourhood of the church, 1825
[https://uurl.kbr.be/1592945]
Fig. 121. Neighbourhood of the church, 1911
[https://uurl.kbr.be/1046911]

246. "Sint-Jacobsplein met aanpalende straten", in: Inventaris Onroerend Erfgoed, in: https://inventaris.onroerenderfgoed.be/erfgoedobjecten/302519 (last accessed on 23/12/2018)



Fig. 117.

Fig. 118.



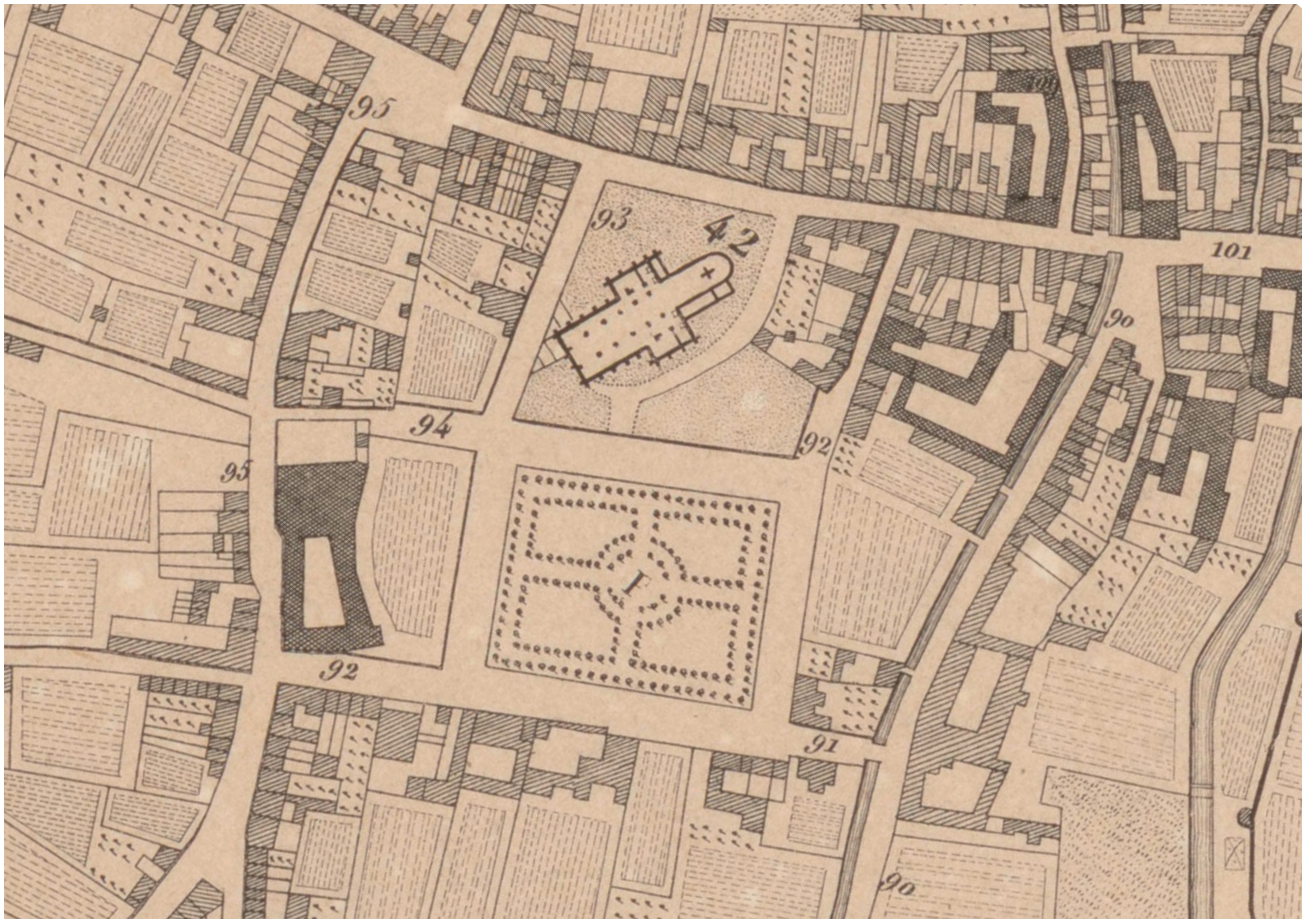


Fig. 119.

Fig. 120.

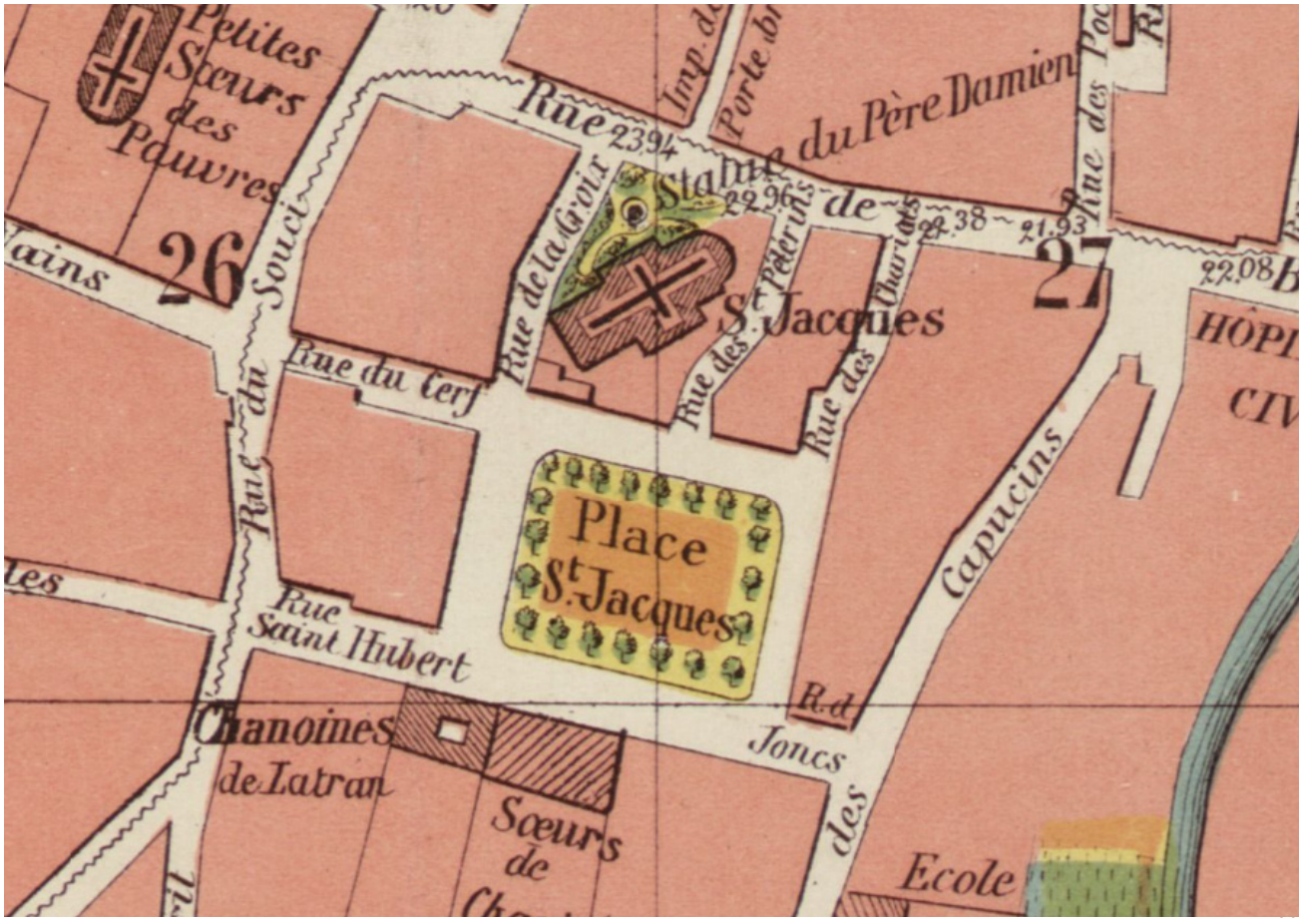




Fig. 121.

Fig. 122.



Fig. 122. Neighbourhood of the church, 1971
[Geopunt]
Fig. 123. Neighbourhood of the church, 2015
[Agiv]

2. Spaces and Services

In order to asses the qualities of the urban fabric surrounding the church, three aspects of the urban context are analysed: urban figures, functions and public spaces. Lastly, the direct neighbourhoods functioning is situated more in depth.

2. 1. Urban Figures

As discussed before, the city of Leuven has a very rich past. Due to its growth which occurred organically over time, several figures are still present as relics from this past. A first figure that is notable, is the radial streets connecting the city of Leuven with other cities in Belgium. Alongside these access routes, churches were constructed. More particular the church of Saint James at the Brusselsestraat, the church of Saint Gertrudis at the Mechelsestraat and the church of Saint Michael at the Naamsestraat.
A second figure is that of the two city walls. The second city wall is well recognisable despite it being dismantled with exception of some parts. The first city wall is less recognisable apart from the parts in which much of the actual wall is still present. In contrary to the second city wall, the street pattern is revealing less.
A last and less evident figure is the valley of the river Dijle. The river Voer is running parallel to the river Dijle before joining in the northern part of the city centre. However, this latter mentioned river is covered up on most of its trajectory but is still recognisable in the street pattern.

2. 2. Functions

From analysing the functions, it is clear that the neighbourhood has a more residential character. The Brusselsestraat houses some commercial functions being an offset of the commercial eastern part of the city. Besides that, there are some educational institutions present. Despite the fact that Leuven has much university

Fig. 124. Urban figures [Pieter Vermeir]

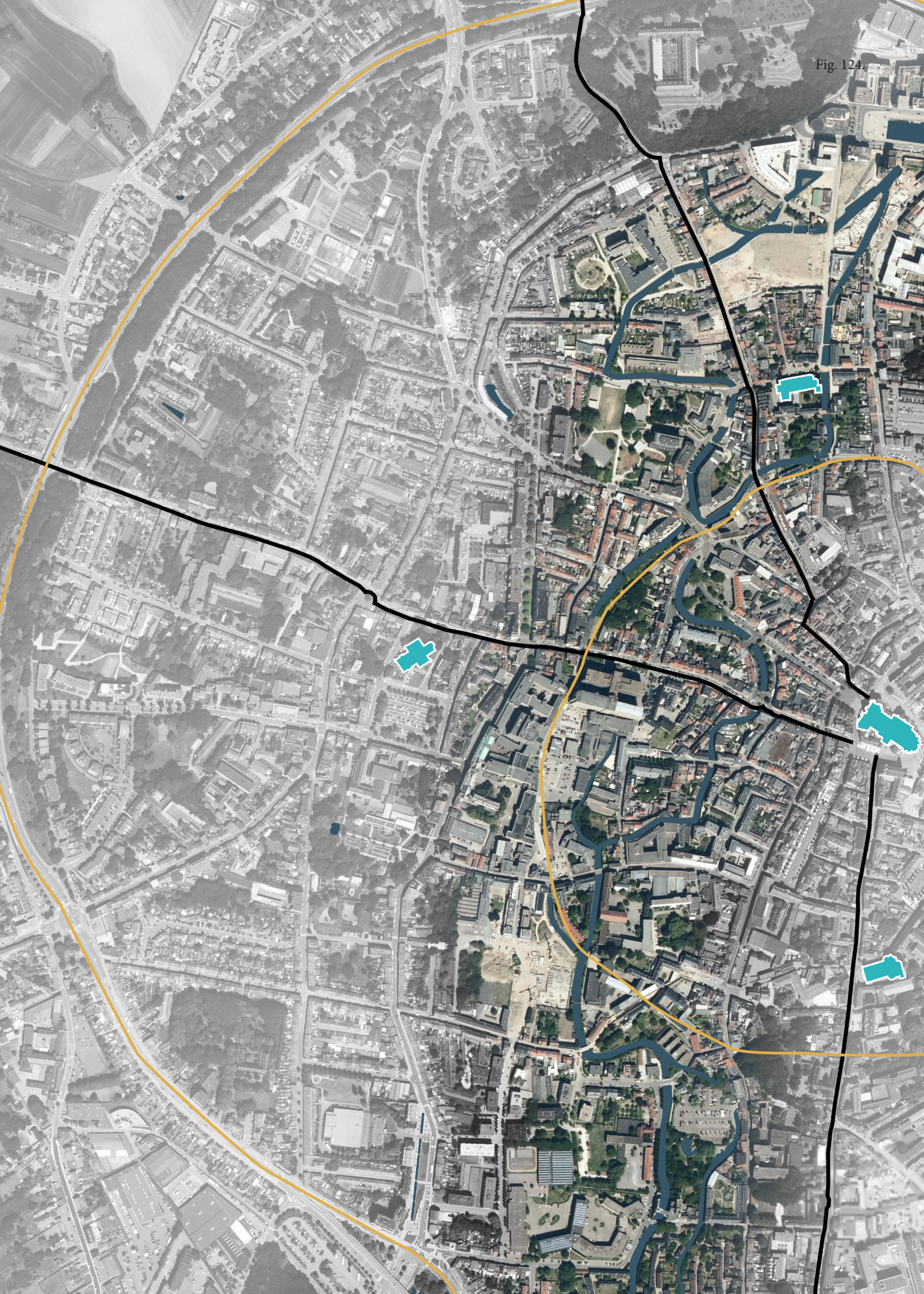


Fig. 124.

buildings, these educational institutions in the neighbourhood of the church are not. They are primary and secondary schools, supporting the more residential character of this neighbourhood. The Hertogensite nearby which now serves as a hospital site, will be redeveloped to housing and a cultural centre.
According to the 'Ruimtelijk Structuurplan Leuven' and visible in the functions scheme as well, there is a deficiency in day-care.[247] In addition to that, the populace of Leuven is expected to grow which leads to a general shortage in other services as well.[248]

2. 3. Public Spaces

The church of Saint James is situated at one of the larger squares of Leuven. However, this square is used as a parking space. With small interventions, such as shared use, this square could function as a meeting space.

Regarding greenery, the Kruidentuin and Bruulpark are nearby. Besides that, the redevelopment of the Hertogensite will include a green space. As such, the area will have greenery within reach.

2. 4. The Direct Neighbourhood of the Church

The neighbourhood surrounding the church is a rather lively area. The school 'Sancta Maria Leuven' is the only public building located at the square, besides some houses with a commercial ground floor (such as 'Demo-Spel', a game shop). Three main entities are recognisable: the square, the green space serving the youth movement Scouts and the building block of the church and the verger's house. These will be discussed later on to possibly include them in the design.



Fig. 125. Functions
[Pieter Vermeir]
Fig. 126. Public Spaces
[Pieter Vermeir]
Fig. 127. Direct neighbourhood of the church
[Pieter Vermeir]

247. STAD LEUVEN, *Ruimtelijk Structuurplan Leuven*, Stad Leuven, 2017, deel 3, hoofdstuk 4, p. 21.
248. STAD LEUVEN, *Ruimtelijk Structuurplan Leuven*, 2017, deel 3, hoofdstuk 4, p. 14.



Fig. 124.

Fig. 125.


Hostel St. Jacob
Presbytery house
Scouts
KBC Bank
Bank BNP Paribas Fortis
Verger's house
Saint James Square
Memento
Notary
Demo-Spel
Brasserie Sint-Jacob
Sancta Maria Leuven



Fig. 126

3. Connections

The means of connecting the church to its urban context is analysed on three aspects: the public transport, the soft connections and car-based transport.

3. 1. Public Transport

The church is very accessible by means of public transport. Within walking distance, several bus stops are reachable. In fact, the bus stop at the square is the one that is second most used in Leuven.[249] Besides that, the main bus route going through Leuven passes the square. Furthermore, the time to reach the train station of Leuven is 10 minutes by bus (one bus every four minutes), 7 minutes by bike and 23 minutes by foot. Lastly, the church is within walking distance of the main city core of Leuven as well.

3. 2. Soft Connections & Car-based Transport

Figure 128 shows the main routes for soft transport as envisioned in Ruimtelijk Structuurplan Leuven. Considering those, the church of Saint James is located well.
Most of the car-based transport is concentrated on main routes giving access to the city. On these routes, main parking spaces are located, one for each part of the city. The square of Saint James is serving one city part which gives it a difficult challenge to use the square for other purposes as its parking function is needed. On the other hand, the parking space on the square makes the church very well accessible by car.

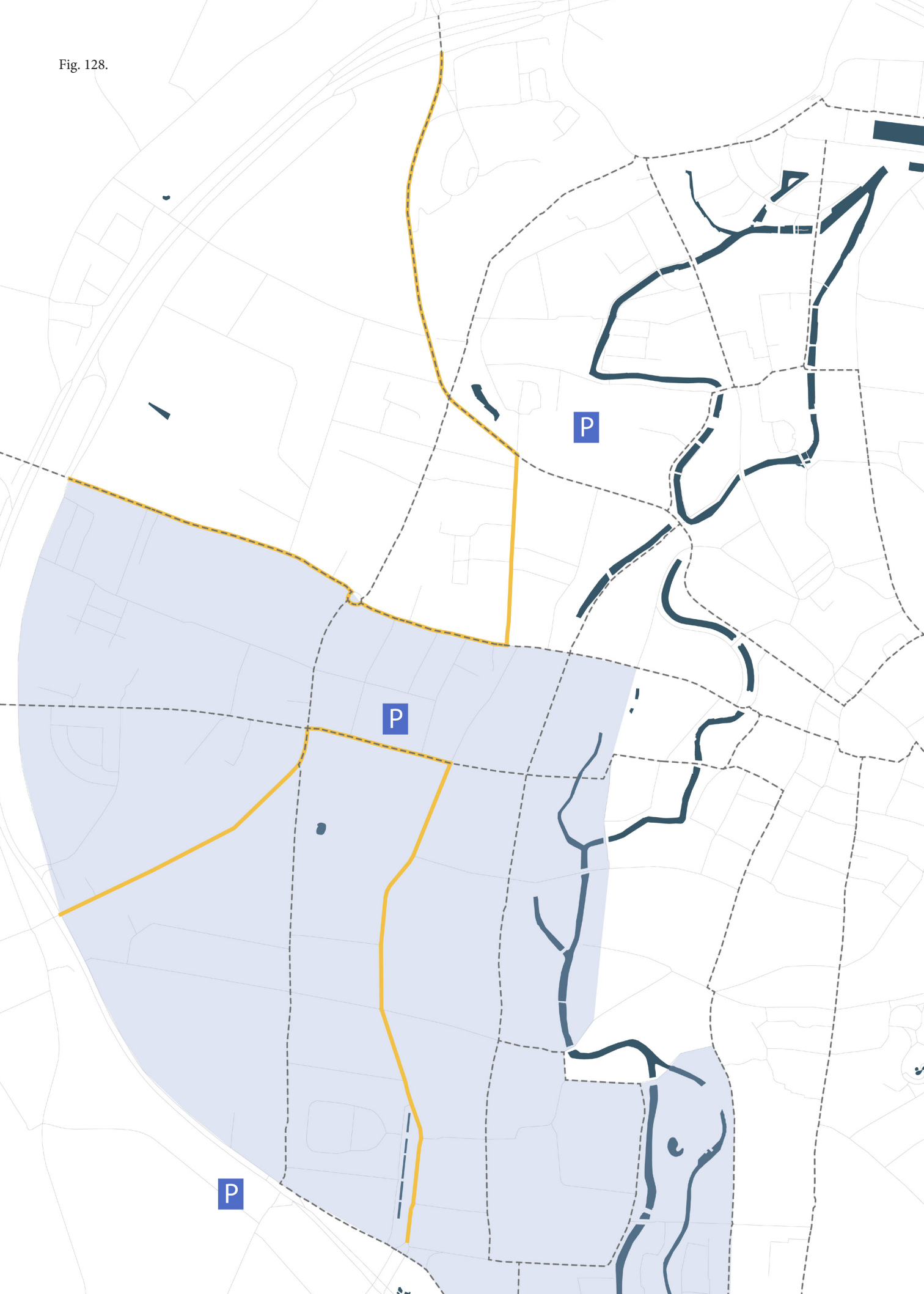
249. STAD LEUVEN, *Ruimtelijk Structuurplan Leuven*, Stad Leuven, 2017, deel 4, hoofdstuk 1, p. 19.

Fig. 128. Public transport & walking distances
[Pieter Vermeir]

Fig. 127.



Fig. 128.



Main access route for cars

Routes for soft transport

Fig. 129. Car-based transport & soft transport
[Pieter Vermeir]

4. Legal Context

4. 1. Heritage

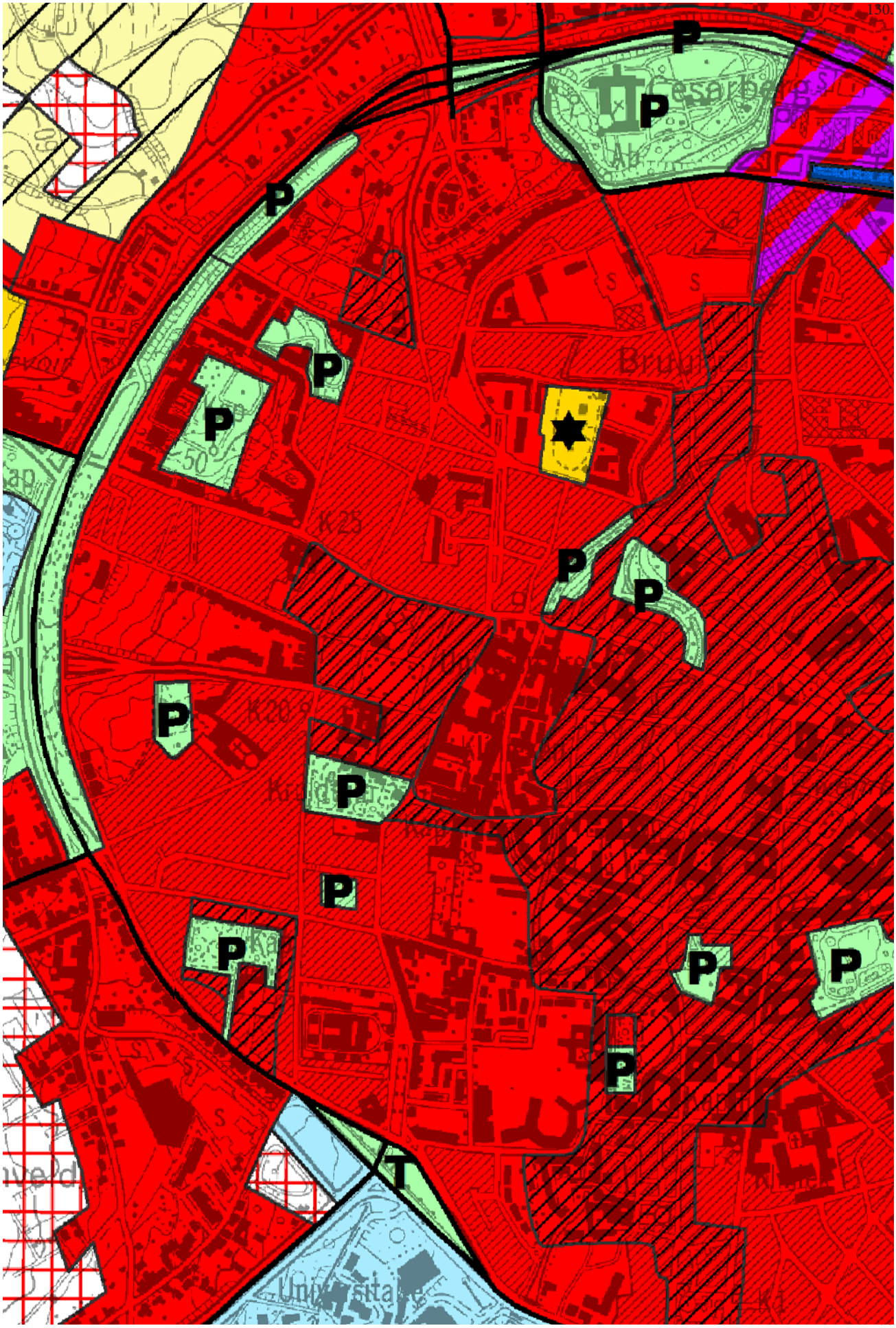
Being located in a historic city, the direct neighbourhood has a lot of heritage nearby, enriching the urban setting of the church. The church and the square are both protected as monuments, other buildings as well (see Figure 130). Besides that, the building block of the church is protected as townscape, the same goes for the square with its adjacent houses. Lastly, several buildings (including the church and the square) are classified as architectural heritage.

4. 2. Spatial Planning

The regional plan of this part of Leuven is depicted in Figure 129. In this plan, the neighbourhood of the church is determined as a residential area with cultural, historic and/or aesthetic value.
In the BPA (zoning plan) of the neighbourhood, one can see more in detail which type of buildings are present. It is rather strange that the parking area is categorized as open space with underground parking space. This will probably not happen given the bad properties of the subsoil in this region.



Fig. 130. Regional plan [Geopunt]


P
P
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P
P
P
P
P
K25
K28
50
Brau
Universitäre

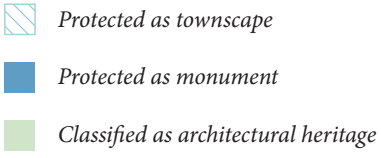


Fig. 131. Heritage in the vicinity of the church
[Pieter Vermeir]



Fig. 130.

5. Conclusion

The church of Saint James is located in a rich historic environment. During time, the historic growth left its marks on the area which has a more residential character. The square might have been once a centre for this neighbourhood but had to make room for parking space. However, several other public spaces are located nearby. Whether or not this parking space could be moved somewhere else, the church is very accessible by any means of transport.
Given the brief analysis of the urban context, the repurposing project provides an opportunity to invest in this more residential character and give the church back to this neighbourhood.

Other links on a local level can be made. These links were not discussed as such in this chapter but can be further researched. For instance, the figure with the radial streets and concentric city walls, provide an opportunity to lay out a cultural route connecting several churches and thus improving tourism. To this, the seven miracles of Leuven can be linked. Only three of the ones that Van Even mentions remain today, of which one is present in the church, 'the bell hanging outside the tower'. Other sources mention the sacrament houses as another miracle: 'towers inside the church'.
Lastly, the church can also be linked on supra local level. At the river Voer, several Romanesque churches or churches with Romanesque remains are situated. The church of Saint James can be seen as a starting point for a bicycle route connecting these churches.

Fig. 132. View from the square on the church of Saint James [Delcampe]



Fig. 131.

VI DESIGN

Fig. 132.



DESIGN

After the assessment of the church's context in the previous chapters, the issue of repurposing will be tackled. The previously analysed topics and gained knowledge influence the proposal of a new use through a feasability study. As such, possibilities may arise in analysing the use in its current state, without thinking on a particular future function. Finally, a project for a new use is proposed.

Firstly, the survey drawings of the church are presented. These are not of its present state (with the shoring structures). The drawings are presenting the church in its state after the completion of the project that is currently being executed, stabilizing the church. For this some assumptions are made (e.g. side nave vaults), based on older plans.
Secondly, a new context for the church is proposed after the evaluation of the building's properties and possibilities in functionality.
Thirdly, based on the feasibility study done in the second part, some scenarios for a project are presented.
Lastly, a project is proposed for a scenario which was presented in the previous chapter. Here, the scenario is worked out in detail.

Fig. 133. New context of the church [Pieter Vermeir]

1. Survey

To create the survey drawings of the church, a laser scan is used. As mentioned before, this scan was made in 2018 by the Geomatics Research Group of the KU Leuven, campus Ghent.[250] A Leica P30 scan-station was used, the point cloud which resulted from this scan was quite large, approximately 1,5 billion points.

Although being very complete, detailed and accurate, some issues had to be solved to make the drawings. Firstly, as expected, the size of the point cloud gave some issues in handling the file. However, this was solved by cropping the point cloud in Autodesk Recap. Because scans were made of the outside of the church, rather unnecessary points of other buildings outside were unintendedly added. However, these deleted points were used for drawing the site plan.
Secondly, all shoring works are present on the scan, which hampered the readability on some places. In addition to that, al kinds of debris, scrap and art installations were still present on the scan as well.
Lastly, one part of the church was not scanned completely. This part was mainly the ground floor of the tower and the adjacent spaces in the side naves. To draw these missing parts plans of previous surveys were used (city of Leuven, 2003 and Lemaire centre, 1983-84). These were used as an underlay for the drawing. Some points of the scan went through partly opened doors of these missing spaces, which improved the accuracy for positioning the underlay.

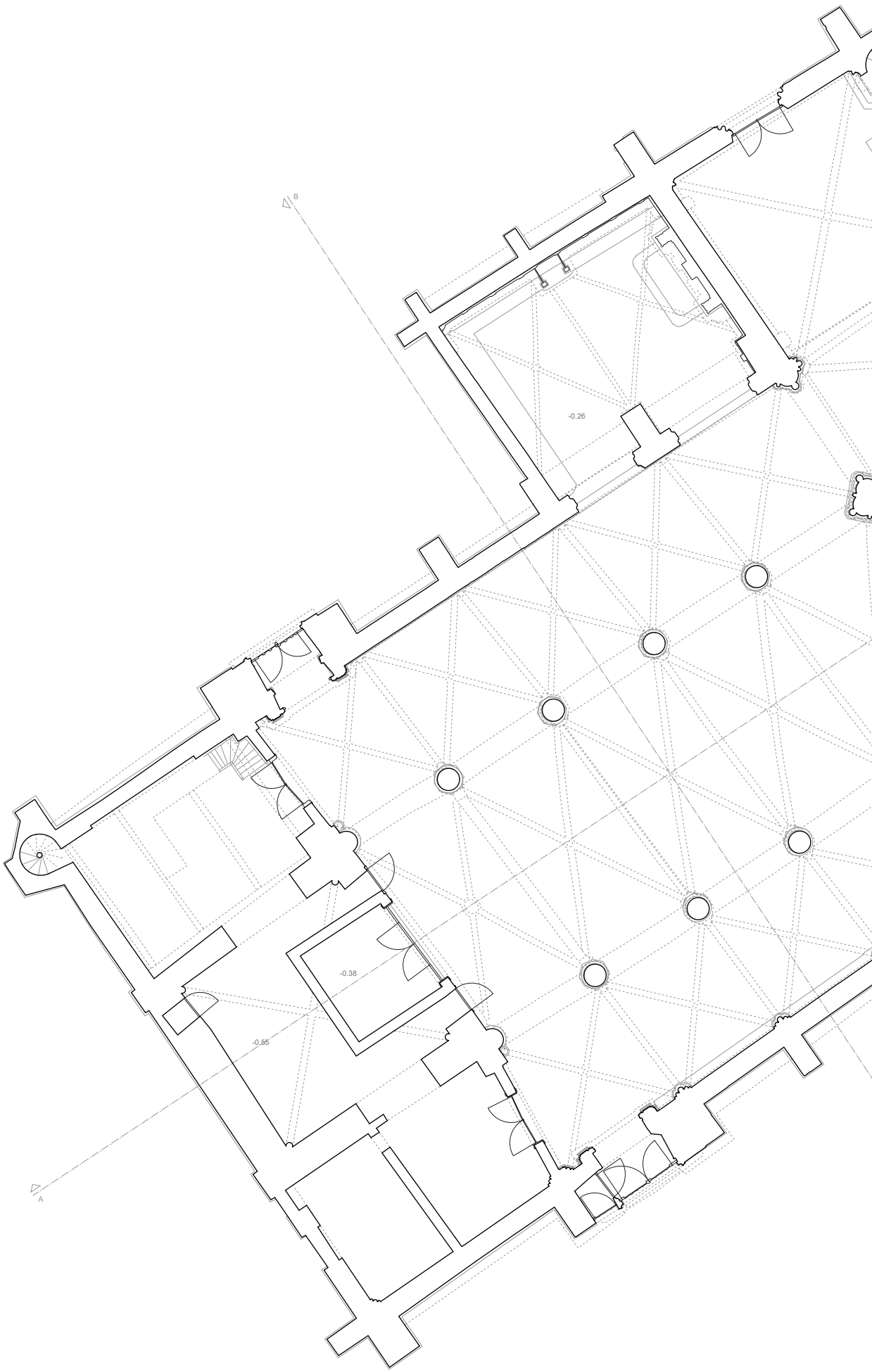
As reference for the levels in the plans, the tip of the highest stair in the choir was taken. The results are shown in the following pages. All drawings are presented on larger scale as an addition to this book.

250. Maarten BASSIER, Gilles HARDY, Leidy BEJARANO-URREGO, Anastasios DROUGKAS, Els VERSTRYNGE, Koen VAN BALEN and Maarten VERGAUWEN, "Semi-automated creation of accurate FEM meshes of heritage masonry walls from point cloud data", Structural Analysis of Historical Constructions: An Interdisciplinary Approach, 2018, 18/18, p. 305-314.; Gilles HARDY, Modelleren van de Sint-Jacobskerk in Leuven, Leuven: KU Leuven, 2018 (unpublished thesis research).

Fig. 134. Site plan, scale 1/500 [Pieter Vermeir]



Fig. 133.


B
-0.26
-0.38
-0.55
A

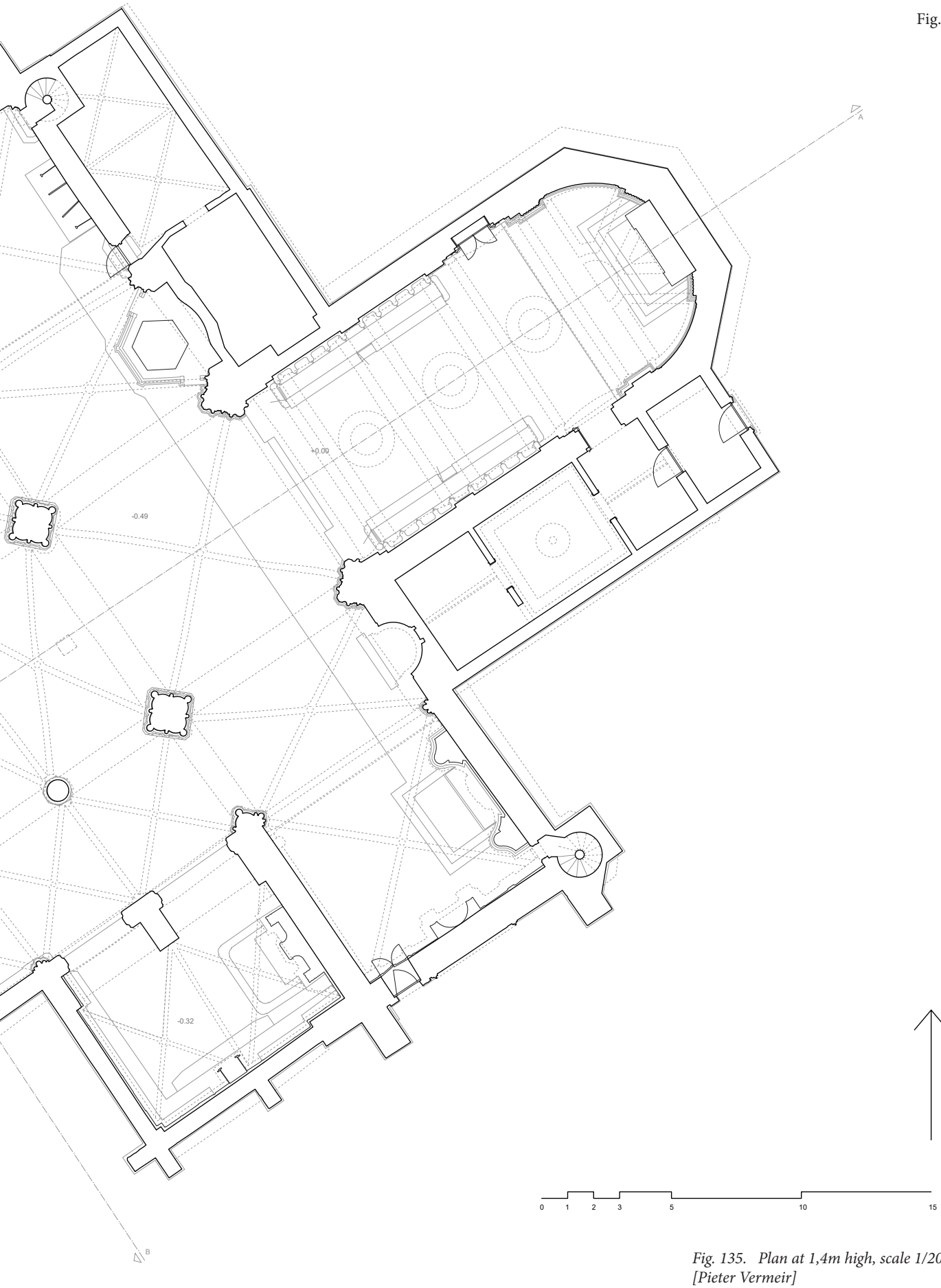
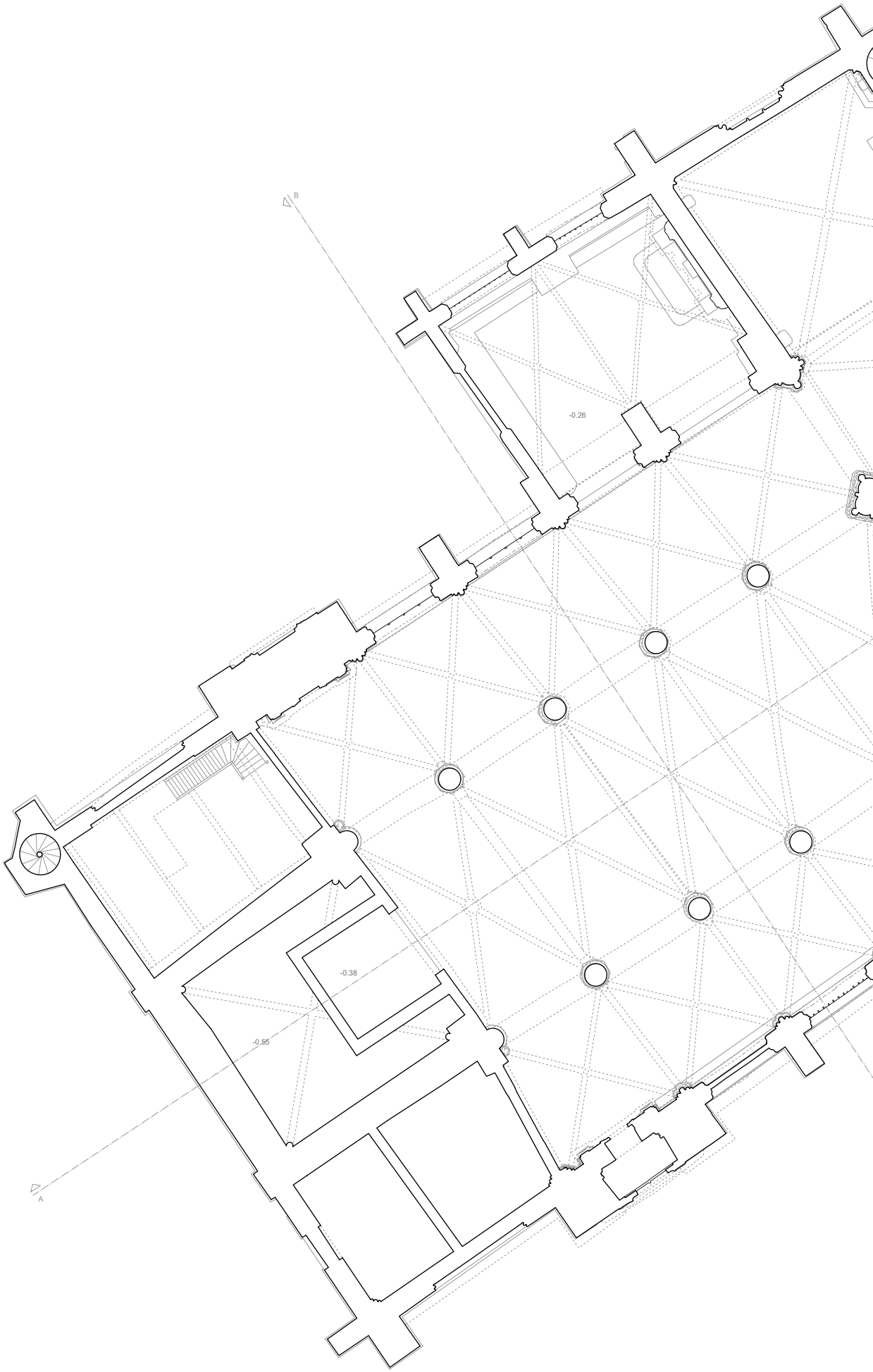


Fig. 135. Plan at 1,4m high, scale 1/200 [Pieter Vermeir]


B
-0.26
-0.38
-0.55
A

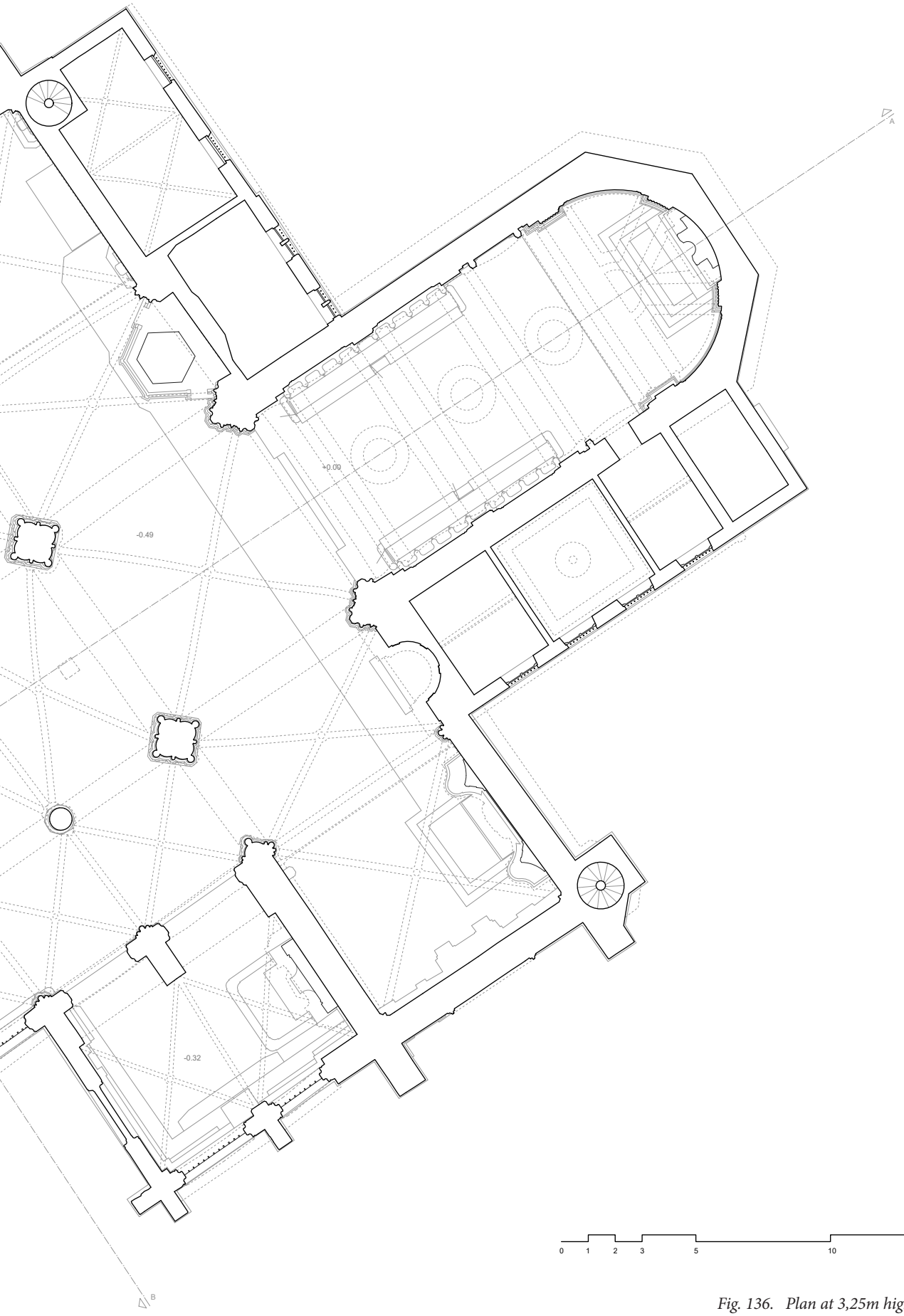
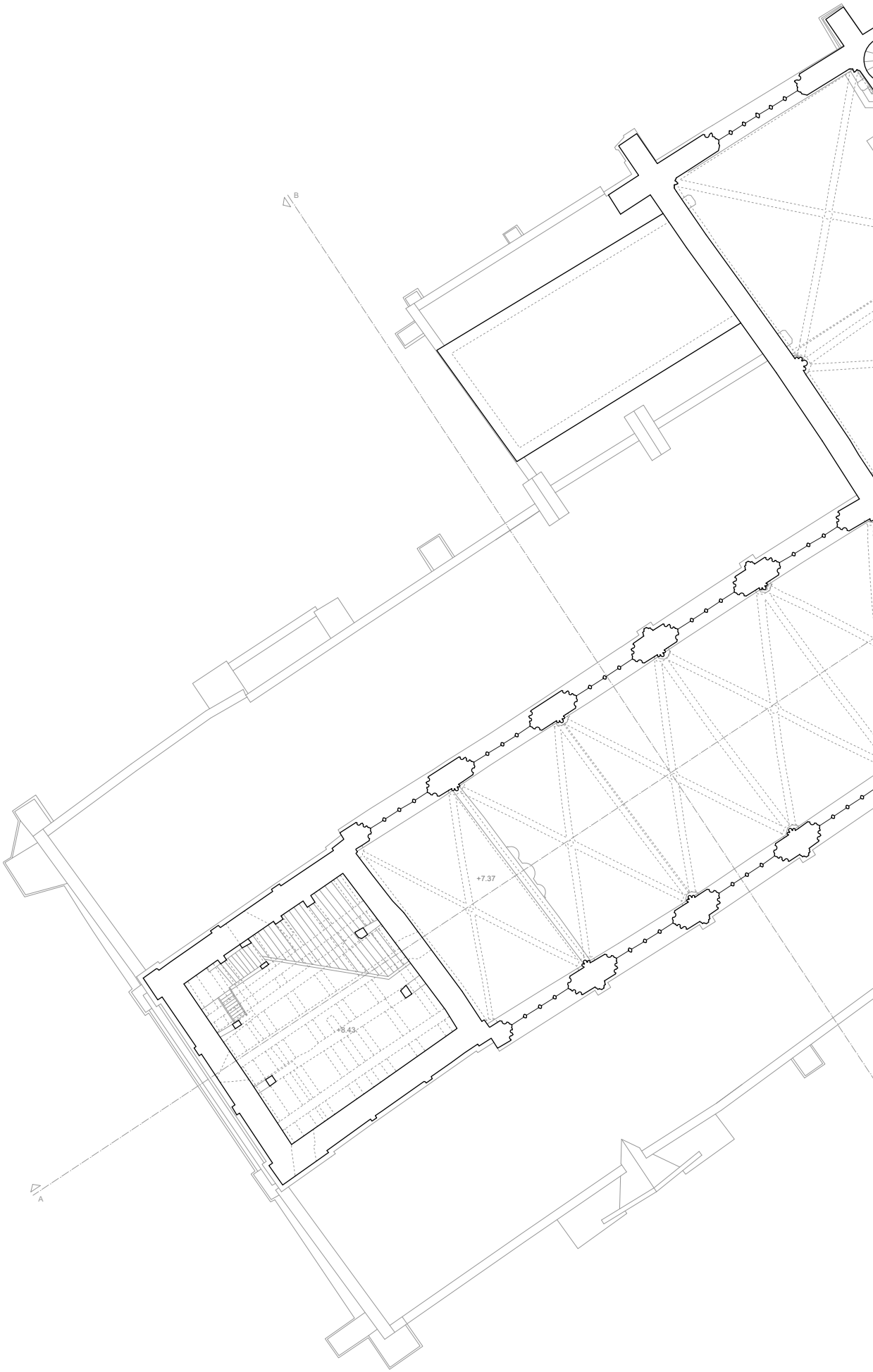


Fig. 136. Plan at 3,25m high, scale 1/200 [Pieter Vermeir]


B
A
+7.37
+8.43

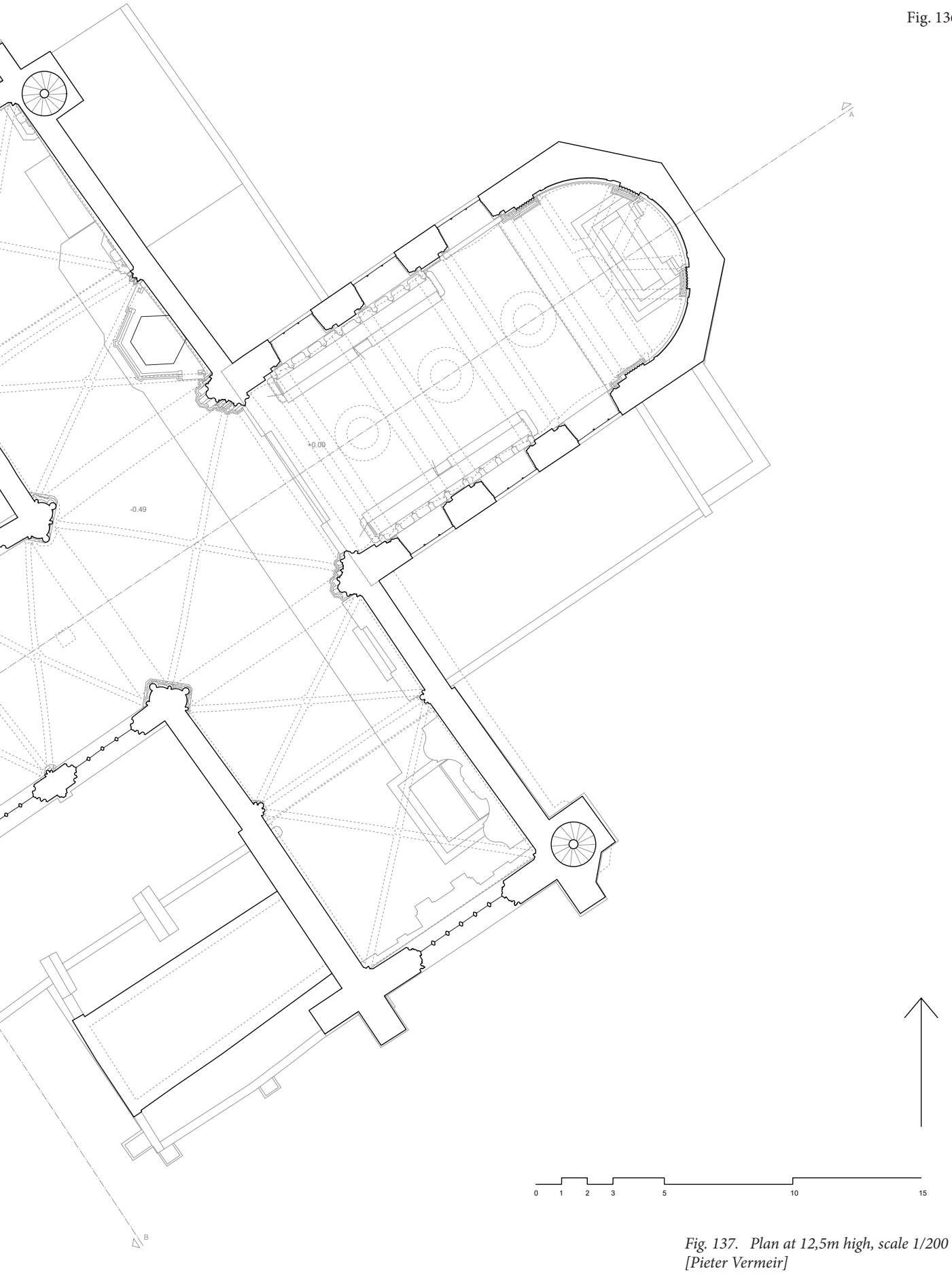


Fig. 137. Plan at 12,5m high, scale 1/200 [Pieter Vermeir]

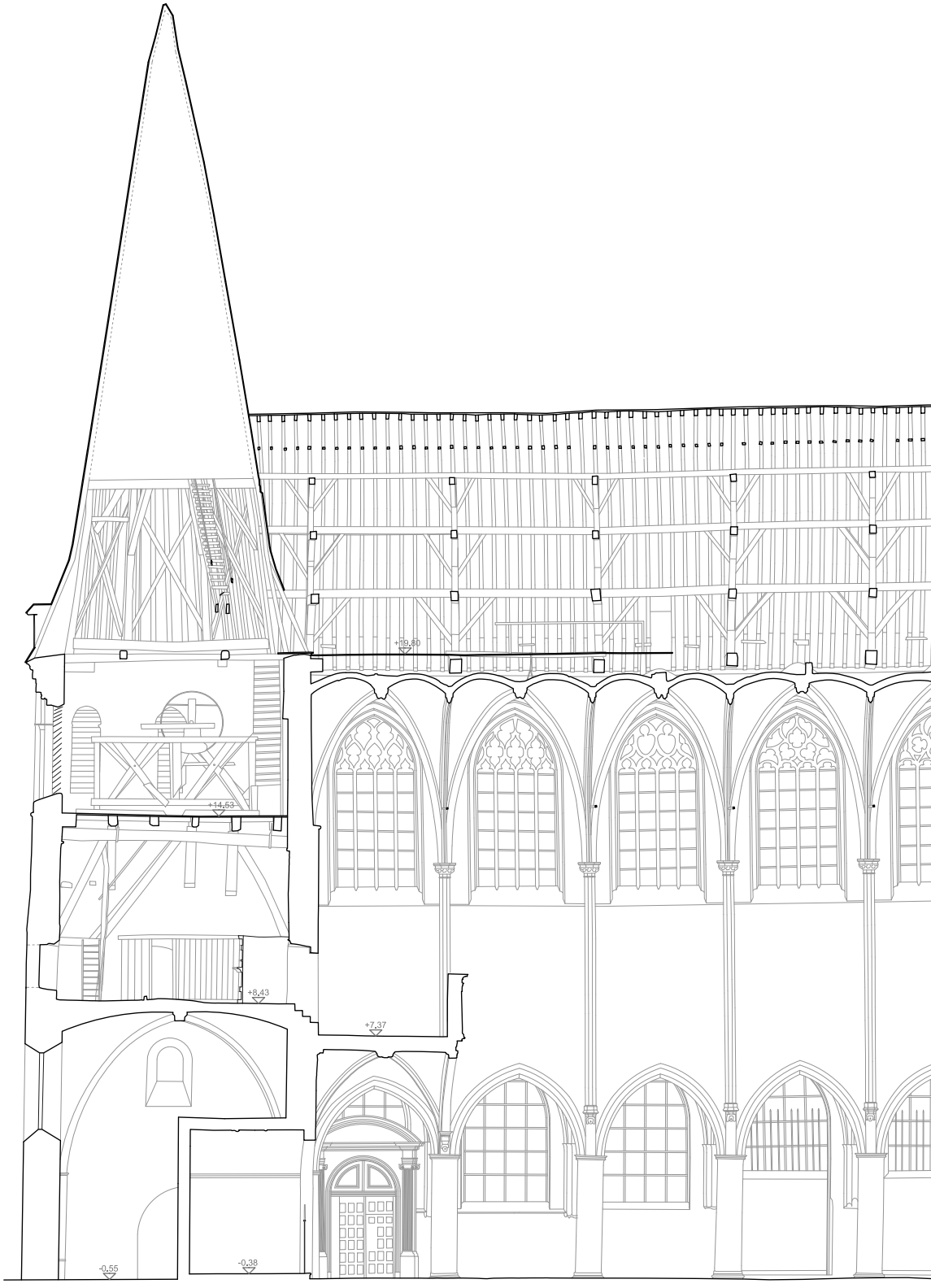
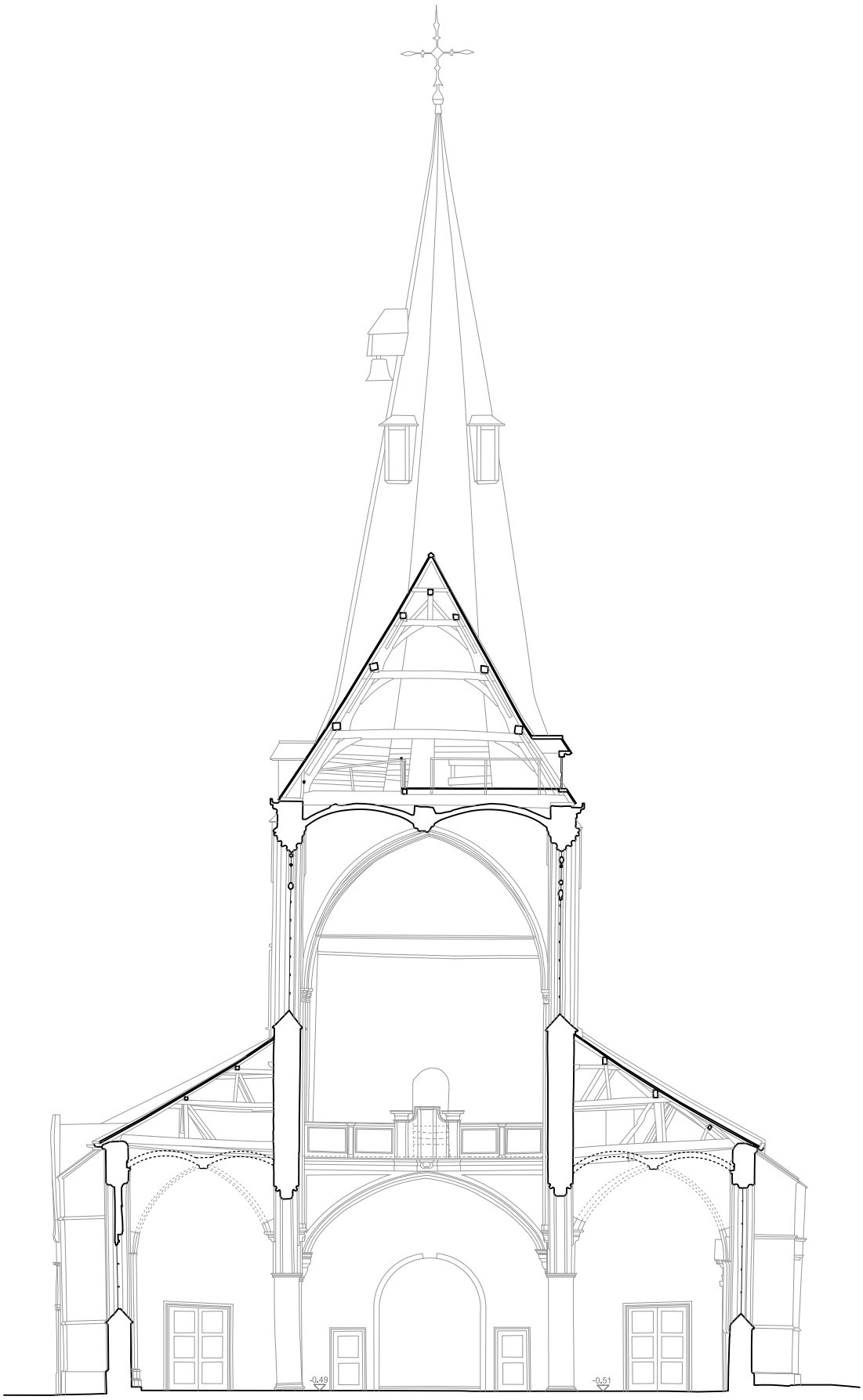

+19,80
+14,53
+8,43
+7,37
-0,55
-0,38



Fig. 138. Section A, scale 1/200
[Pieter Vermeir]


-0,49
-0,51

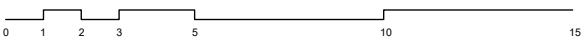


Fig. 139. Section B, scale 1/200
[Pieter Vermeir]

2. A New Context

Before getting to the design of a new use, a feasibility study is done. Firstly, the strengths, weaknesses, opportunities and threats are presented briefly. Secondly, the capacity of the building in terms of square metres and other characteristics are analysed. In the third part, possible functions for the church are discussed. Lastly, a general vision for a future use is proposed as a conclusion on the feasibility study done in this chapter.

2. 1. SWOT Analysis

The SWOT analysis offers a represntation of the church in its current state (Table 8). Both strengths and weaknesses are currently present, in which most weaknesses have arisen because of the church's neglection in the past. A large threat is its disappearance out of the collective memory. However, the church has the opportunity (when given a new use) to strenghten the local community.

STRENGTH	WEAKNESS
- The church is protected as monument - Neighbourhood is a lively housing area of Leuven - Good accessibilty - Many entrances	- The church has been closed for 55 years - The nearby square has lost its functioning as public space - No infrastructures - Aesthetically scarred
OPPORTUNITY	THREAT
- Bringing the church back as public space can enhance of the neighbourhood - Neighbourhood does not have a public space of this size	- Dissappeared out of the collective memory

Table 8.

Table 8. SWOT analysis
[Pieter Vermeir]
Fig. 140. Side naves at the tower
[Pieter Vermeir]
Fig. 141. Tower
[Pieter Vermeir]
Fig. 142. Side naves
[Pieter Vermeir]
Fig. 143. Main nave
[Pieter Vermeir]
Fig. 144. Side chapels
[Pieter Vermeir]

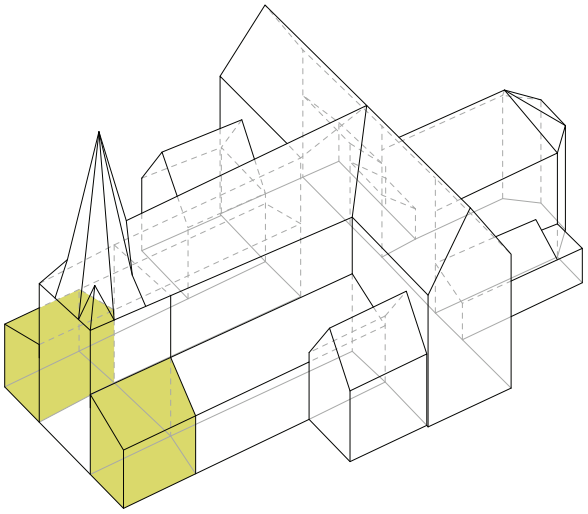


Fig. 139.

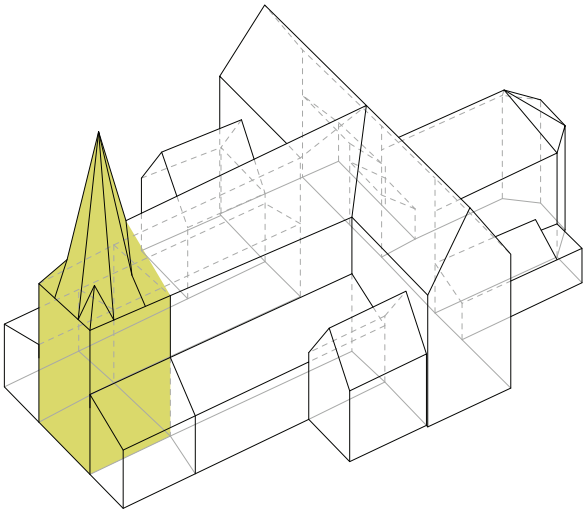


Fig. 140.

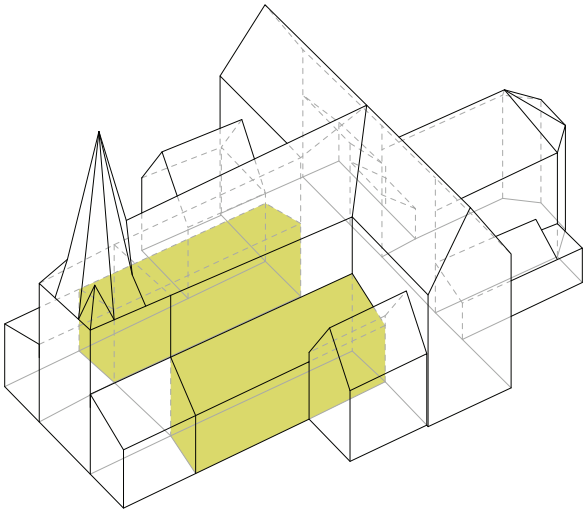


Fig. 141.

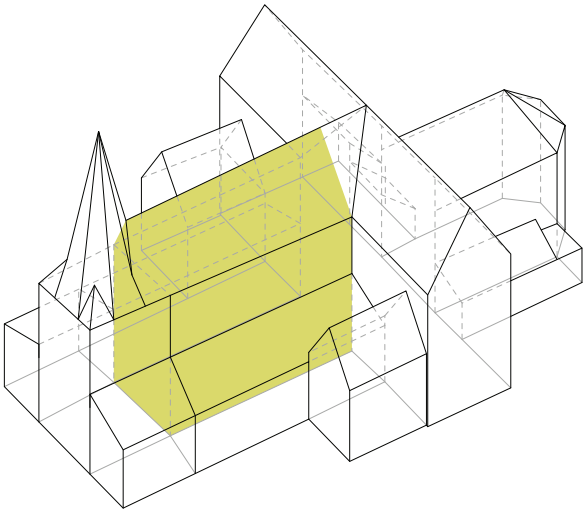
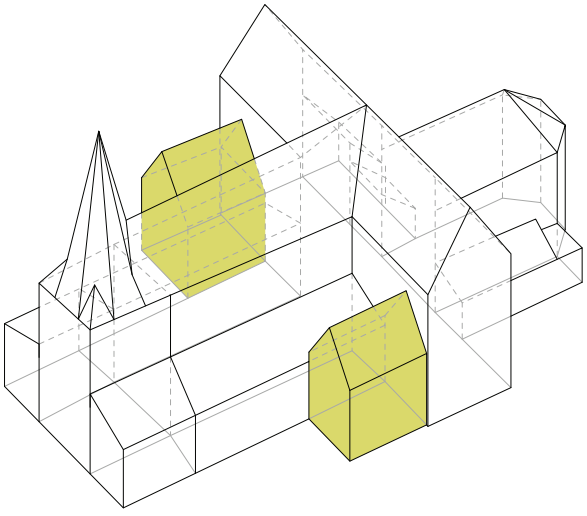


Fig. 142.

Fig. 143.



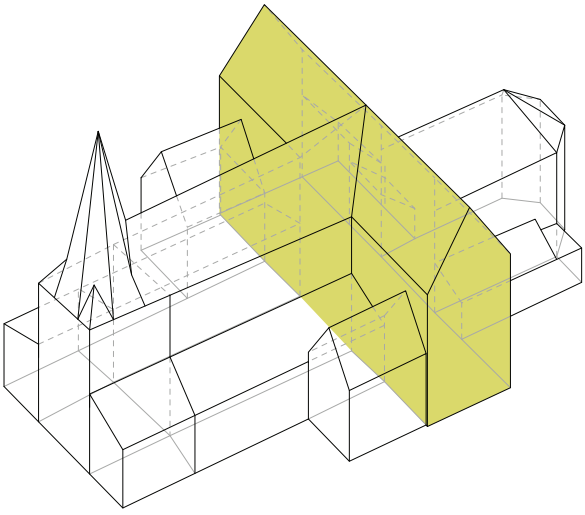


Fig. 144.

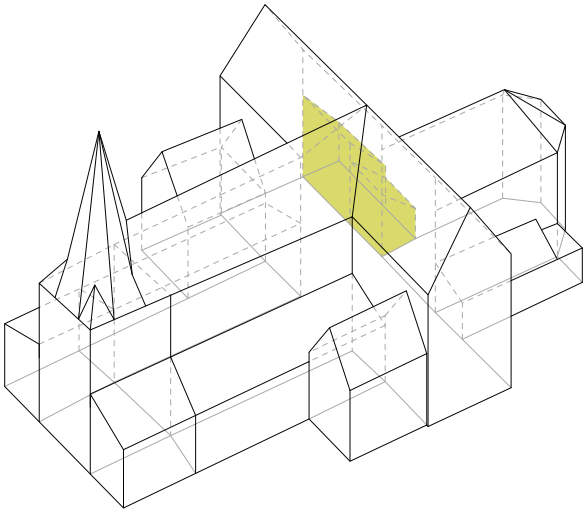


Fig. 145.

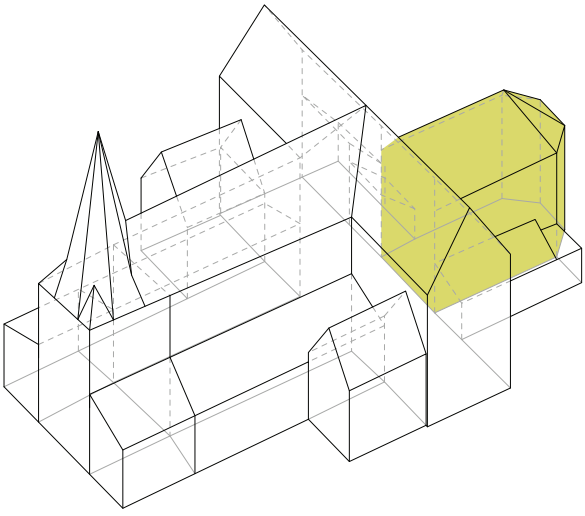


Fig. 146.

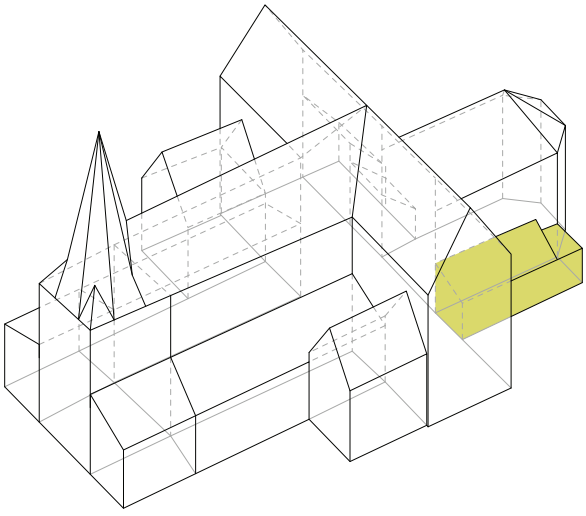


Fig. 147.

2. 2. Capacity of the Building

To propose a new function, the possibilities which the building offers in terms of accessibility, square metres and other characteristics need to be analysed. By doing this, the design can profit from these certain intrinsic qualities the building possesses and enhance them.
The following aspects are discussed to analyse the capacity of the building: spatial divisions, circulation, capacity, and light intrusion.

2. 2. 1. Spatial Divisions

Although the church's main space is currently a large and open space, a new use which proposes a division of this space is possible. Therefore, the options for divisions are analysed. While analysing, four archetypes for dividing the space could be derived. Firstly, a division according to the architectural entities. Figures 139-147 depicts the different arhitectural entities of the church.
Secondly and thirdly, the church can be partitioned according to its two main axes: longitudinal and transversal.
Lastly, the building phases can be a guideline for making divisions in space.

All others can be considered as a combination or a derivative of these archetypes. For the four archetypes, see Figure 148, 149, 150 and 151.

Fig. 145. Transept
[Pieter Vermeir]
Fig. 146. Old sacristy
[Pieter Vermeir]
Fig. 147. Choir
[Pieter Vermeir]
Fig. 148. Sacristy
[Pieter Vermeir]

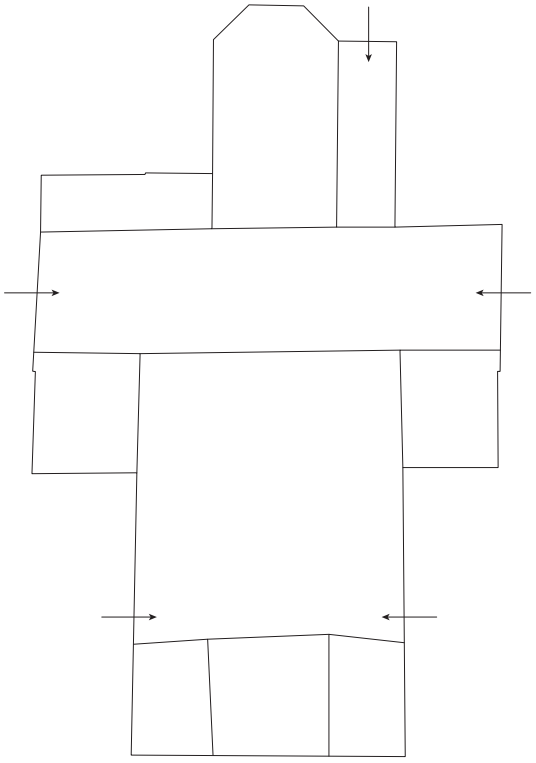


Fig. 148.

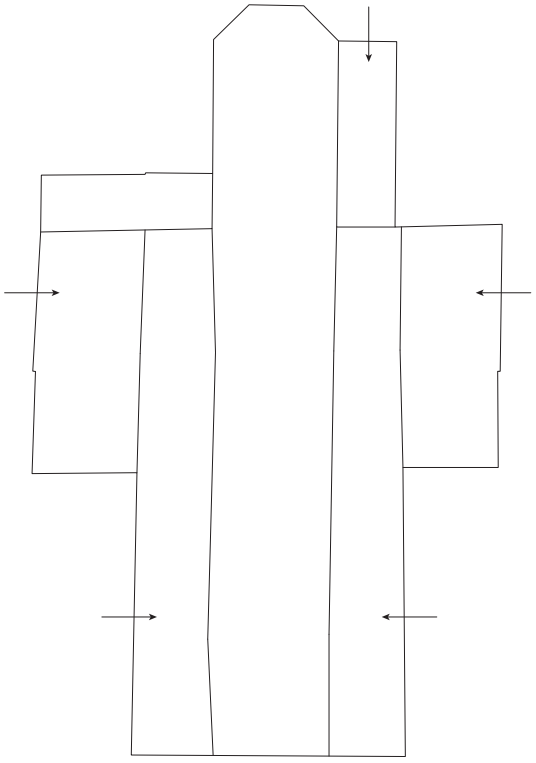


Fig. 149.

Fig. 150.

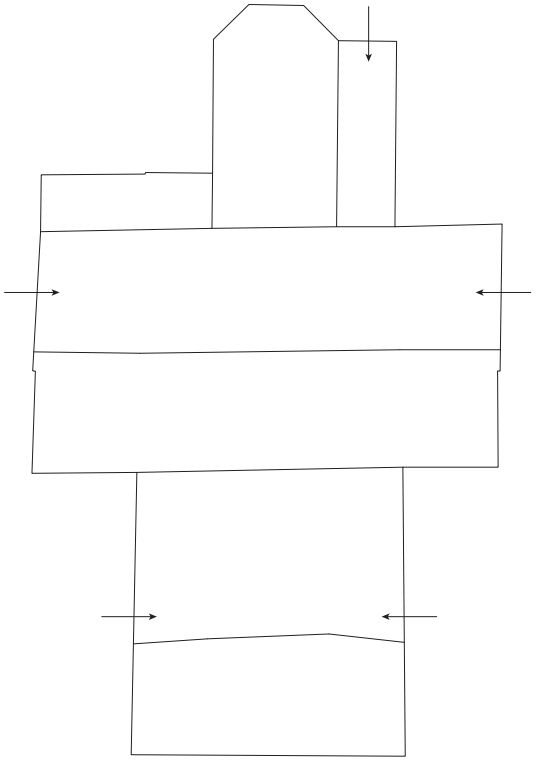
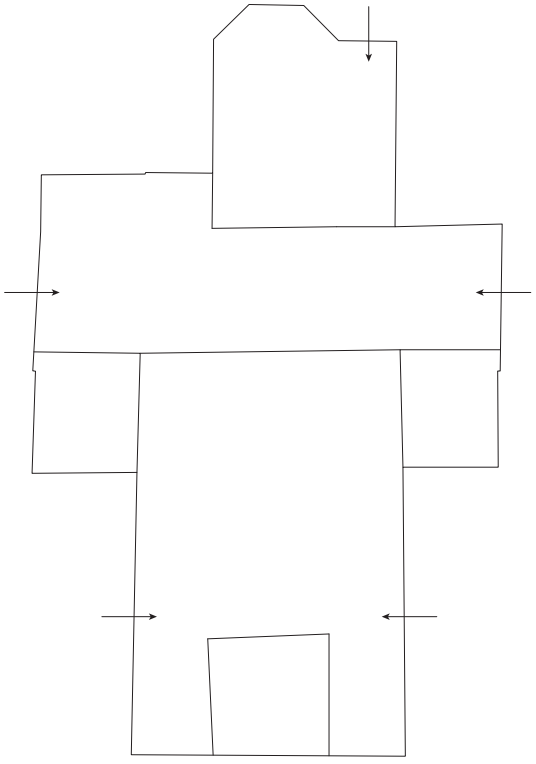


Fig. 151.

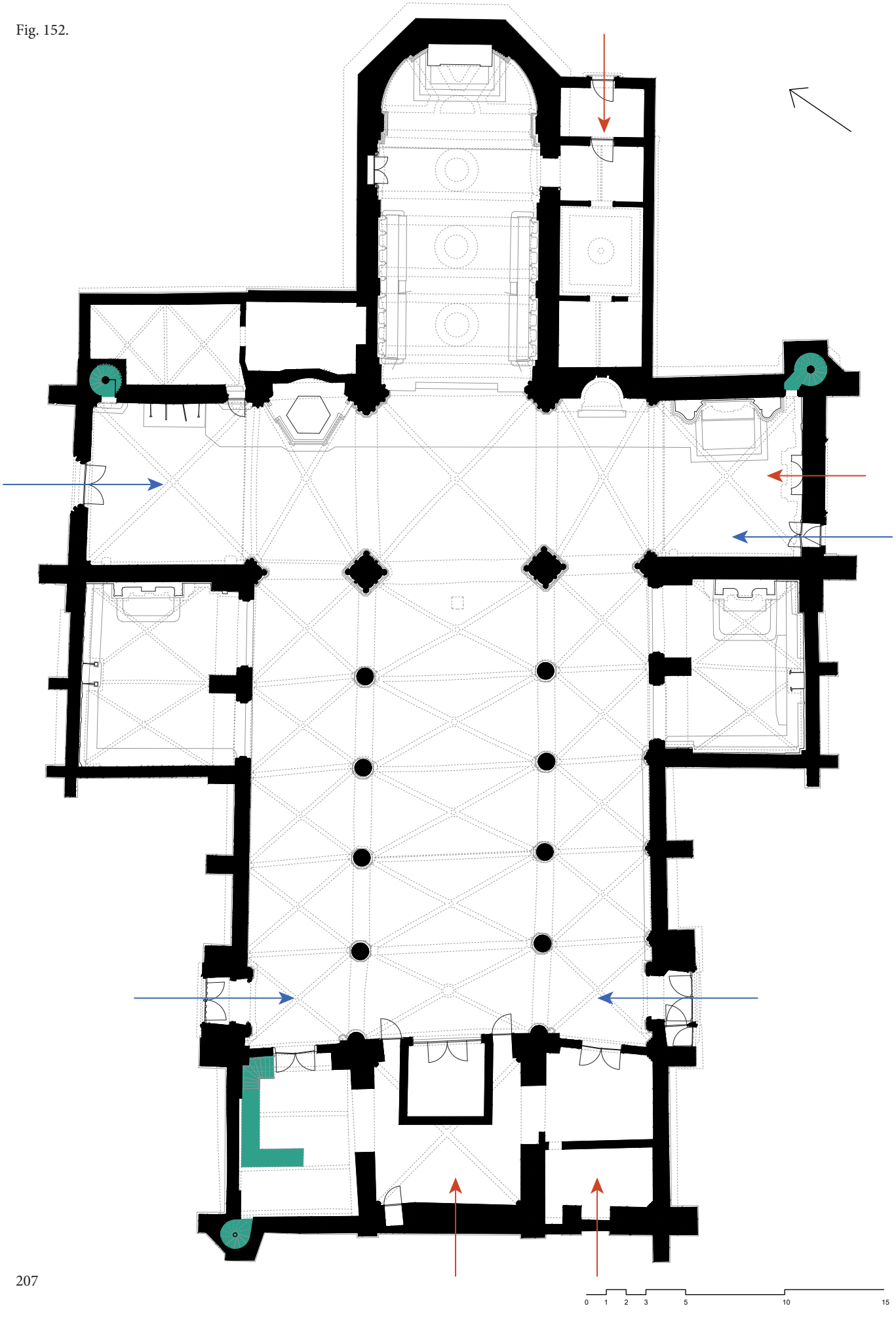


2. 2. 2. Circulation

The church has the advantage of possessing four access routes. In addition to that, other accesses can be made, see Figure 152. For using these, an intervention has to be done, such as dismantling a wall for reopening the Romanesque portal or the southern access to the transept. This gives however a certain versatility in functioning for the later design. Furthermore, each of these accesses has a kind of main orientation to the two adjacent urban figures: the Brusselsestraat and square. These two are connecting the church to other parts of the city. Lastly, not all accesses are that evident in the church's current state, such as the single door to the transept.
Currently, the vertical circulation in the church is concentrated in the northern side nave at the tower and in the transept's southern and northern arm.

Fig. 149. Division according to the architectural entities
[Pieter Vermeir]
Fig. 150. Division according to the longitudinal axis
[Pieter Vermeir]
Fig. 151. Division according to the transversal axis
[Pieter Vermeir]
Fig. 152. Division according to the building phases
[Pieter Vermeir]

Fig. 152.



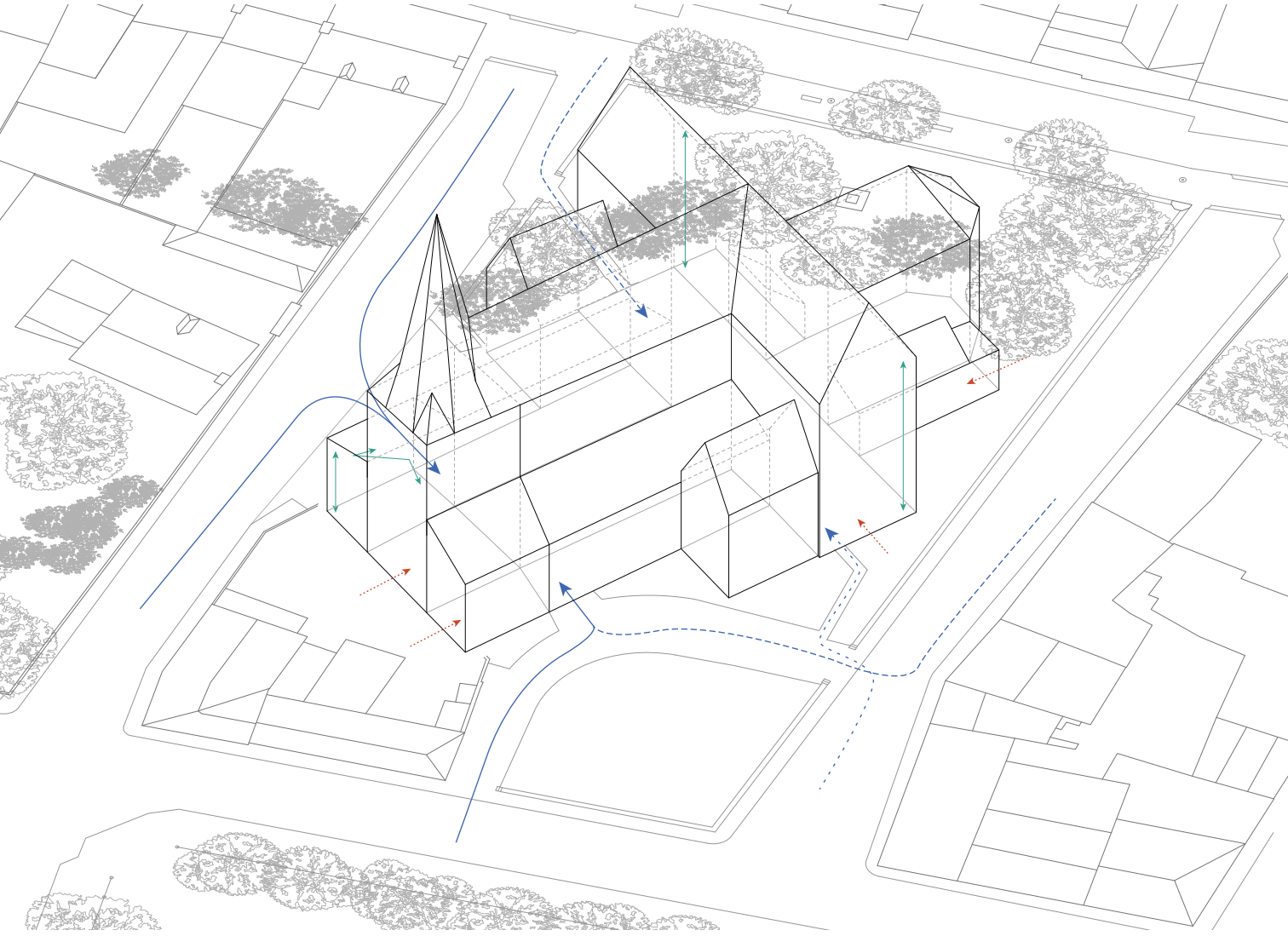


Fig. 153.

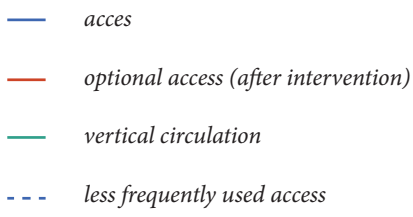


Fig. 153. Current circulation in the church [Pieter Vermeir]
Fig. 154. Accesses from the neighbourhood [Pieter Vermeir]

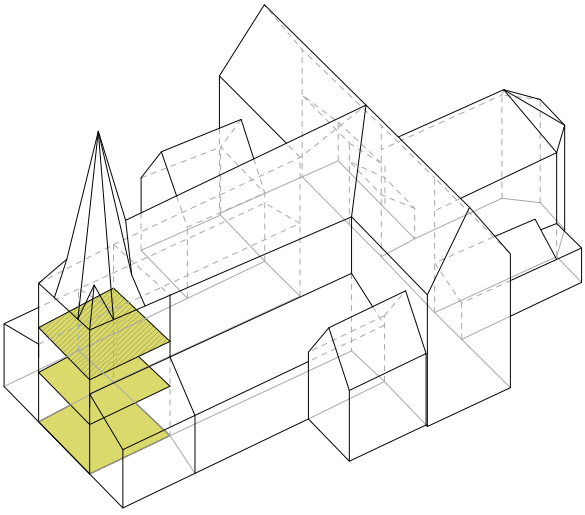


Fig. 154.

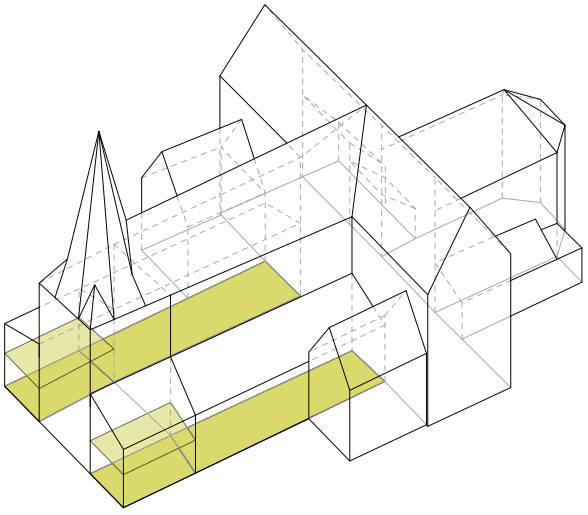


Fig. 155.

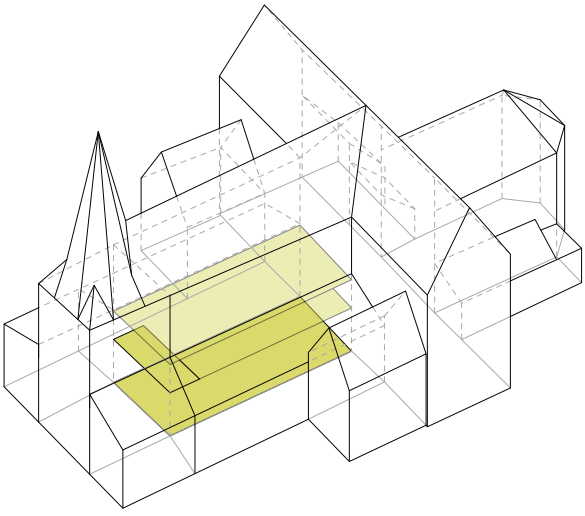


Fig. 156.

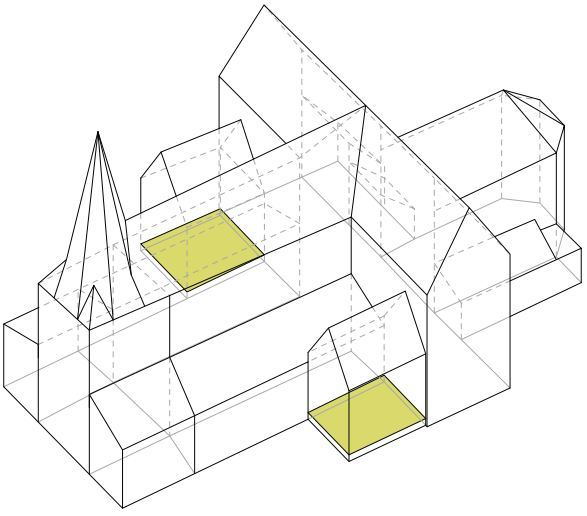


Fig. 157.

2. 2. 3. Capacity

To assess the maximum capacity which the church can offer, the current square meters of functional space are analysed. In addition to that, the possibility of adding floors is considered for each architectural entity mentioned before. Some added floors imply a change in light intrusion and might not be possible. However, in this aspect, light intrusion is not taken into consideration as this is also depending on the function. The aim is to assess the maximum capacity of the church. The attic is considered unusable space.

- **Tower**

The tower has three levels, of which only the two lower ones are usable spaces. The top floor contains the bells, making it unusable.

Base = 54m²
Additional = 54m²
Total = 108m²

- **Side Naves**

The side naves, a northern and a southern side nave, are quite a part of the main nave's space, but in light of possible partitions, they are considered separately. The same applies to a part of the side naves next to the tower. In these parts, an additional floor can be added. Because of the tie rods which will be added in the ongoing project, adding a floor in the side naves next to the main nave is considered not to be possible. Their position limits the adding of another floor. In addition to that, as mentioned before, in these parts the adding floors is not advised for structural reasons: adding additional loads.

Base =
- 41m² (southern side nave tower)
- 127m² (southern side nave)
- 45m² (northern side nave tower)
- 135m² (northern side nave)
Total = 348m²

Additional =
- 41m² (southern side nave tower)
- 45m² (northern side nave tower)

Total = 434m²

- **Main Nave**

The main nave is one of the larger and higher spaces of the church. As such, additional floors can be added. However, this is not advised for structural reasons. In the section next to the tower, an extra level is added in the past on which the organ was placed.

Fig. 155. Capacity of the tower [Pieter Vermeir]
Fig. 156. Capacity of the side naves [Pieter Vermeir]
Fig. 157. Capacity of the main nave [Pieter Vermeir]
Fig. 158. Capacity of the side chapels [Pieter Vermeir]

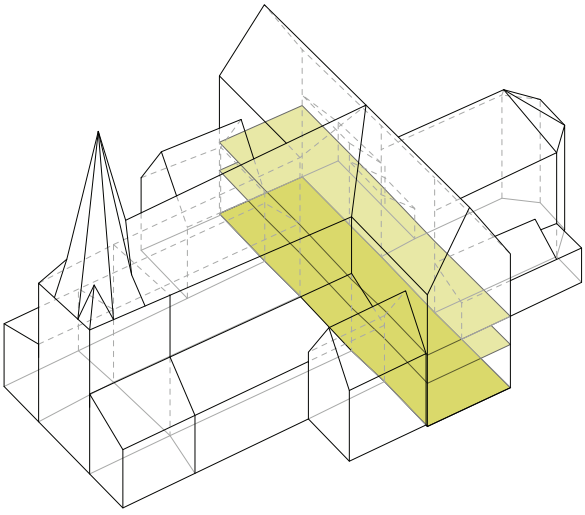


Fig. 158.

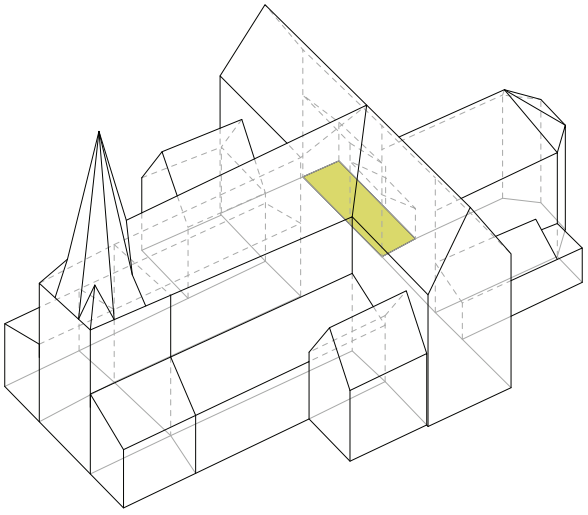


Fig. 159.

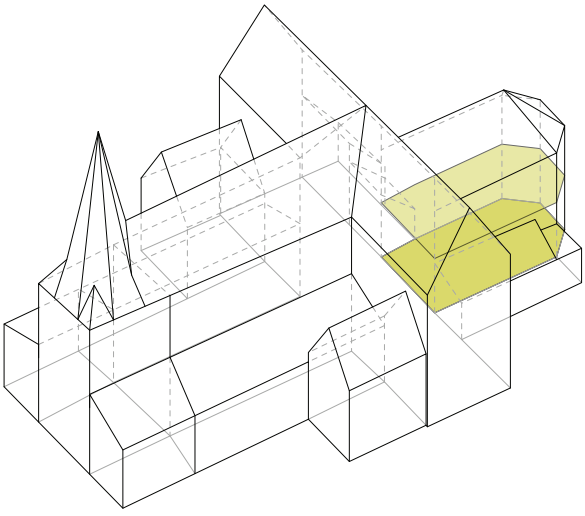


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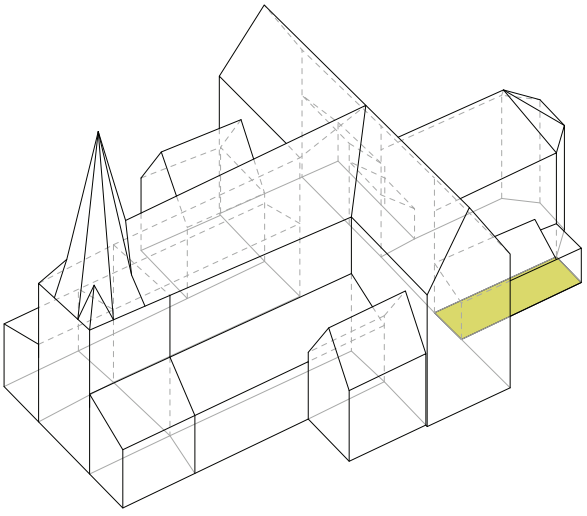


Fig. 161.

Base = *- 216 m²*
- 38m²
Total = 254m²
Additional = - 178 m²
- 216 m²

Total = 648m²

- **Side Chapels**

The side chapels are quite connected to the main nave, but their level is a few steps elevated to the main nave. No additional floors can be added here because of the limited height.

Base =
- 61m² (southern side chapel)
- 71m² (northern side chapel)

- **Transept**

The transept is another quite large and high space completely connected to the main nave. Again, additional floors can be added but is not advisable for structural reasons.

Base = *- 302m²*

Additional = - 302 m²
- 302 m²

Total = 906m²

- **Old Sacristy**

The old sacristy is a quite modest space added to the transept, consisting of two rooms.

Base =
- 288m² (vaulted room)
- 201m²

Total = 489m²

- **Choir**

The rather high ceiling of the choir allows for adding an additional floor. However, as stated before, the light intrusion could obstruct this.

Base = 133m²
Additional = 133m²
Total = 266m²

- **Sacristy**

The sacristy has four room, summed up below from west to east.

Base = *- 14m²*
- 19m²
- 12m²
- 11m²

Fig. 159. Capacity of the transept [Pieter Vermeir]
Fig. 160. Capacity of the old sacristy [Pieter Vermeir]
Fig. 161. Capacity of the choir [Pieter Vermeir]
Fig. 162. Capacity of the sacristy [Pieter Vermeir]

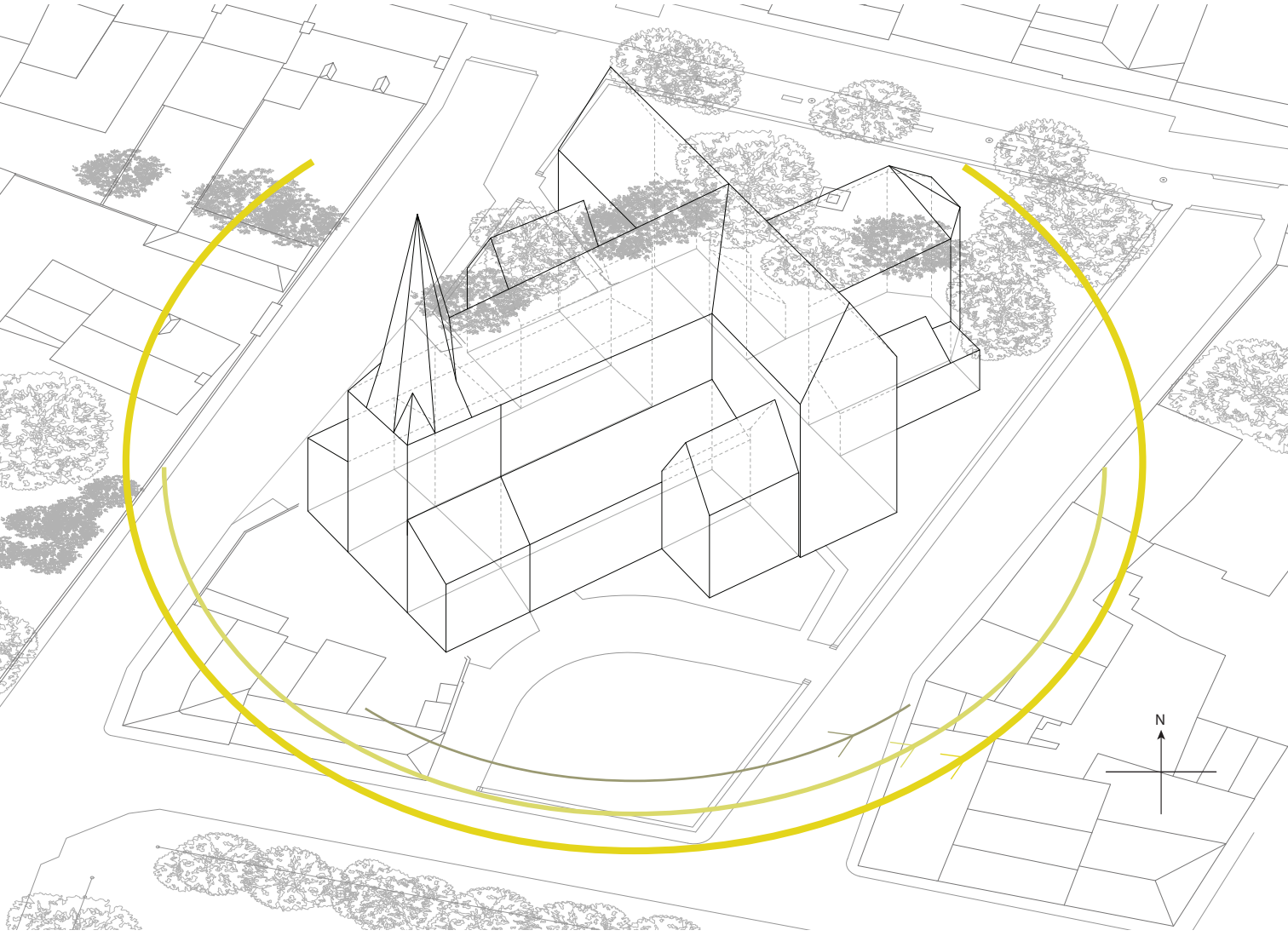


Fig. 162.

2. 2. 4. Light Intrusion

Regarding light intrusion, the church is orientated well. It benefits from the fact that its building block is almost not filled with surrounding buildings, with exception of the verger's house. As such, the south façade of the church is generously exposed to sunlight, providing a good intrusion of light. Figure 162 shows the path of the sun for the months March, June and December. Even the church's west façade has quite a good exposure, as well as the adjacent garden of the verger's house. The northern edge of the building block is not well exposed, with exception of the north-eastern corner. When thinking on additional buildings, this has to be taken into consideration. In order to fully exploit the intruding light, some closed up windows can be proposed to be opened again.

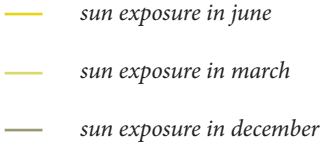


Fig. 163. Orientation towards the sun [Pieter Vermeir]

2. 3. Possible Functions

Several functions can be proposed for the church in search for a future use. In this part, these functions will be discussed with their benefits and drawbacks, and additional requirements needed for them to work properly.

- **Café**

Pro:
- more continuous function
- can benefit from the southern side of the church
- interaction with the nearby square is possible
- allows combination with other functions

Con:
- needed infrastructures

Extra:
- thermal comfort
- spaces: kitchen, storage, café space, toilets

- **Coworking Space**

Pro:
- Leuven is in need of working space for creative/innovative start-ups and offices (see urban analysis)
- a creative hub allows for cross
- Con:
- adding of additional floors might be needed

Extra:
- thermal comfort
- spaces: meeting rooms, small workspaces, landscape workspaces, copy space, toilets, small kitchen and dining room

- **Day-care**

Pro:
- Leuven is in need of this function, especially this neighbourhood (see urban analysis)
- the location is quite ideal: rather centrally, next to a parking space and an access route to Leuven

Con:
- needed infrastructures

Extra:
- thermal comfort
- spaces: small storage, washing space, sleeping space, living space, small kitchen (and small office)

- **Multifunctional Space for the Neighbourhood**

Pro:
- several uses possible
- links with the neighbourhood: school, youth movement, communal centre
- enhancing social interaction

and integration in this neighbourhood
- disappearance of the nearby parish centre in the near future, creates a demand for this function
- allows combination with other functions

Con:
- quite unspecified function

Extra:
- managing structure needed
- thermal comfort needed?
- spaces: polyvalent space, storage, toilets, delivery zone

• **Exposition/museum Space**

Pro:
- creating awareness of the heritage of the church
- allows combination with other functions

Con:
- not in need of much space (if used for church's history and such)
- needed infrastructures

Extra:
- thermal comfort
- spaces: exposition space, small storage, toilets

• **Pop-up Space**

Pro:
- continuation of activities organized in the past (e.g. Kunst in de steigers)
- allows combination with other functions

Con:
- is there a demand for this function?

Extra:
- thermal comfort
- spaces: pop-up space, storage, toilets, delivery zone

• **Culture/Event Space**

Pro:
- interaction with the nearby square is possible
- can enhance the area

Con:
- nearby project in the future will provide a cultural centre (Hertogensite)
- needed infrastructures
- similar use in a church nearby (Predikherenkerk) which is not much used

Extra:
- thermal comfort
- spaces: event space, storage, toilets, delivery zone

• **Housing**

Pro:
- growing population of Leuven creates demand

Con:
- needed divisions of space and additional floors will hamper the church's qualities
- needed infrastructures, acoustic and thermal comfort
- loss of a public function

Extra:
- spaces: depending on each housing unit

• **Agora for Students**

Pro:
- high demand for study space for students

Con:
- additional floors
- almost no connection with the neighbourhood

Extra:
- thermal comfort
- spaces: study space, silent study space, copy space, rooms for group meetings, toilets, lockers

2. 4. The Church as Centre of the Neighbourhood

Despite its current neglected state and its disappearance from the collective memory, the church of Saint James provides an opportunity to strengthen the surrounding neighbourhood. As it once played a major role in the (religious) society of this part of Leuven, its new function will take back up this role. For doing this, the church is seen as an enhancer on local and socio-communal level. In this way, the genius loci of the church is respected.

To partake in the idea as an enhancer for the community, the following concept of functioning is proposed. Firstly, the main body of the church is regarded as a sheltered public space with a multifunctional character. In this space several activities can take place. The focus for users in these activities should be mainly on the community and the city. Furthermore, these activities can be linked with other actors in the area such as for example the school 'Sancta Maria' or the youth movement scouts. However, given its good location and connection, activities on supralocal level are not excluded. For example, the church can provide support for the annual event Beestenmarkt. As such the link with the square should not be relinquished because of its functioning as parking space. Shared use of the square is advised. In addition, the mutifunctional space allows for several activities to take place, and not solely one. Besides addressing the needs of the community, the church can host events on a larger level, but without fixating it on one theme of use. For instance, the redevelopment of the Hertogensite with its planned cultural centre provides cultural spaces. This decreases the demand for cultural spaces in the church of Saint James and ruling out a fixation on a cultural use. As such, a multifunctional space befits this issue.

Secondly, other spaces of the church, such as for example the tower or the sacristy should provide support for the functioning of the main multifunctional space: the nave and transept. If additional infrastructures should have to be added, the best place for this is the northern part of the building block. This corner of the church has the least heritage and architectural values. In this way, preservation of the values of the church is achieved the most.

Lastly, given the fact that this church is desacralized, and the parish of Saint James is projected to be abolished in the near future

due to a decreasing number of attendees (see p. 124), the religious aspect will rather be put to the background in the church's functioning. However, this should not rule out the happening of religious activities completely.

More in detail, the following functions are proposed. Firstly, the main space of the church is regarded as a multifunctional space. Secondly, complimentary functions are provided to improve the functioning of the main space: a café, museum and infrastructures such as toilets. These functions can work separately or partake in the use of the multifunctional space. Thirdly, certain infrastructures are needed, toilets and storage.
In addition to the main functions of the church, an additional function is proposed: day-care. This is to strengthen the church's social role for the area. Besides that, the function of the verger's house (sheltered housing) is advised to be connected to the church.

This concept of functioning will be further elaborated on the next parts. It is advised to follow the trajectory of participative design with the community of the neighbourhood. However, this is not done for the coming parts, as this would extend beyond the limits of a thesis research. Though the most prominent actors, the city of Leuven and the parish, are met to take into account for the design.

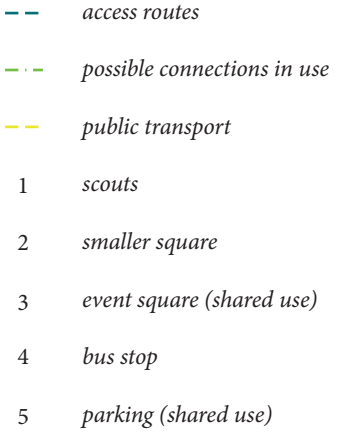
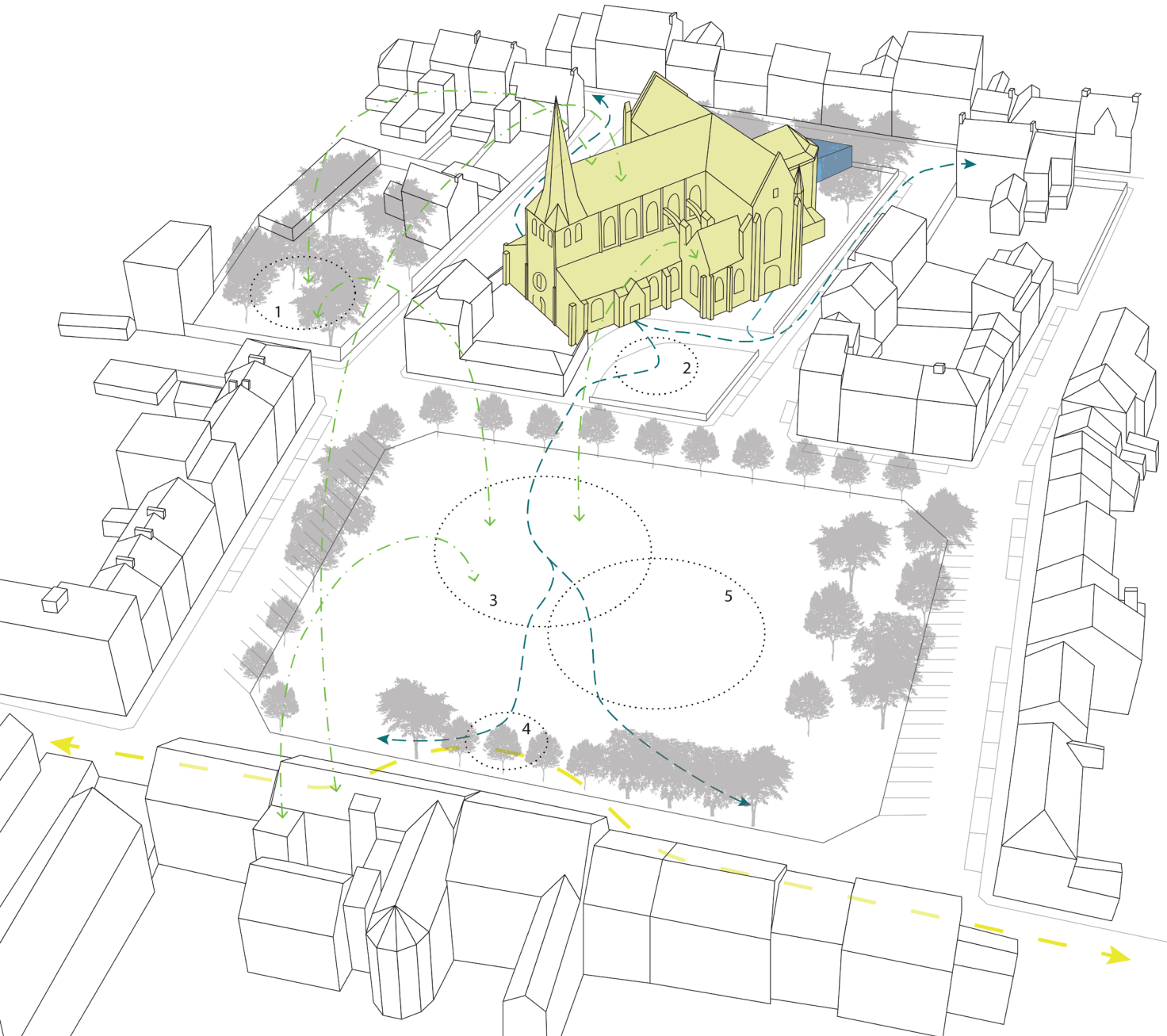


Fig. 164. The church as centre of the neighbourhood
[Pieter Vermeir]

Fig. 163.



3. Scenarios

The functions mentioned before give a starting point for the design. How these are implemented will be schematically presented in this chapter. Each of the scenarios will be discussed briefly to conclude with a choice for a scenario which will be worked out in the next chapter.

3. 1. Scenario A

The multifunctional space is divided in two parts (the choir and the main nave combined with the transept) which can work separately, as a larger and smaller one, but together as one space as well. Their separation is following the stylistic edge. Each of these two spaces has their own serving spaces, which contain storage and other infrastructures such as a small kitchen for the space serving the choir as well. The side chapels are projected to be smaller rooms, of which one serves as a (temporal/storable) museum. In addition to that, the base of the tower can also be used as a smaller room. At the northern part of the transept, an additional structure is added. This contains the café and toilets with circulation space as a kind of foyer in between them. The main access to the church is through this space.

Disadvantages of this layout is the orientation of the café. This northern side is a good place to add a new structure, but rather not for a function such as the café.

3. 2. Scenario B

This scenario is following the same principle as scenario A regarding the multifunctional spaces. Again, the side chapels are projected to be smaller rooms, with one of them housing a (temporal/storable) museum function. The café function is placed in the verger's house. The aim is that this café will be operated by the residents of the sheltered living, as a social café. Connecting the café will be done through the southern side nave. Furthermore, the garden of



Fig. 165. Scenario A [Pieter Vermeir]

Fig. 164.

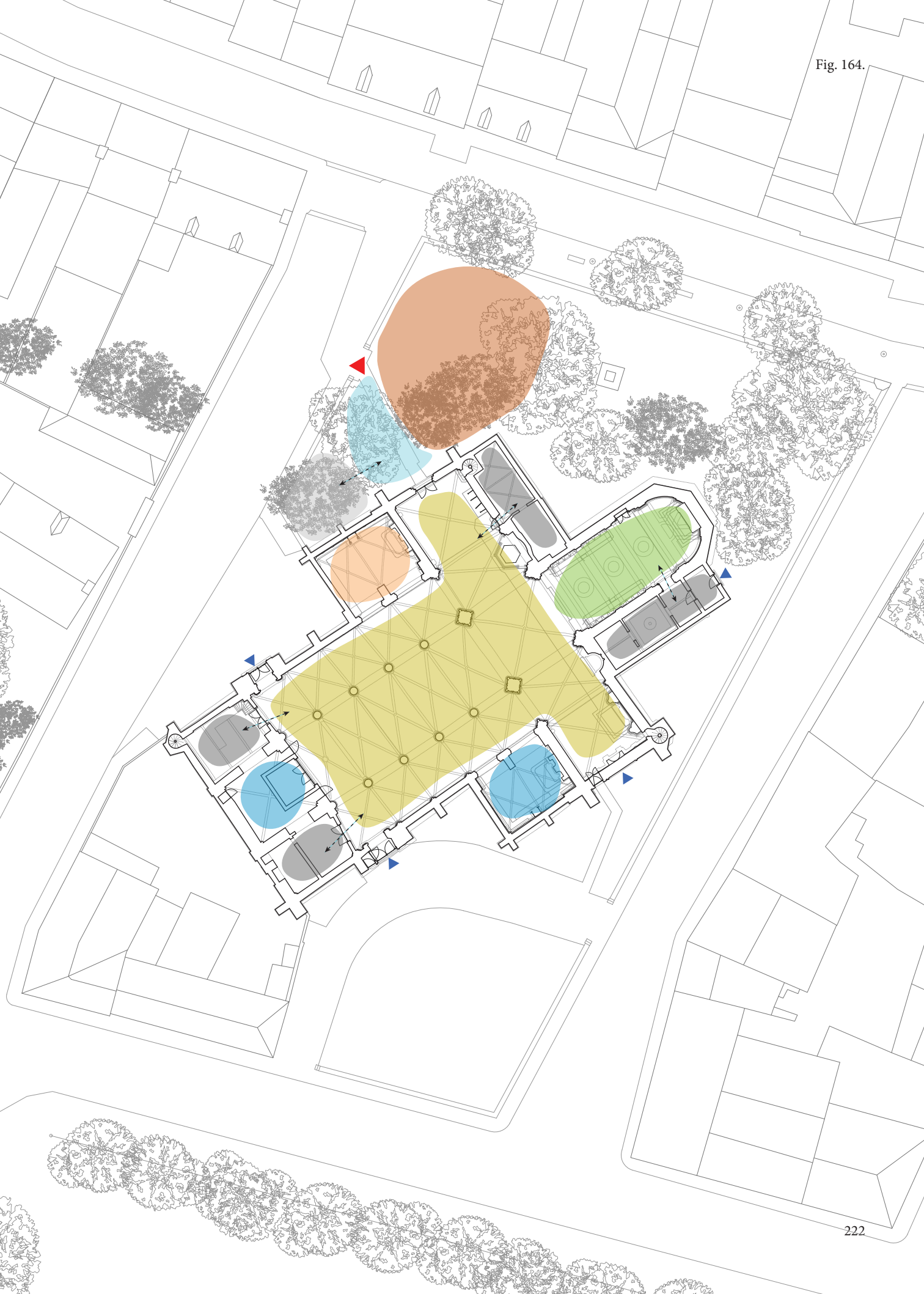


Fig. 165.



the verger's house can be used as outside space for the café. Lastly, as an addition to the northern part of the church, a day-care is added.

This layout has the disadvantage of having quite limited light intrusion for the day care. Furthermore, the association 'De Hulster vzw', which is responsible for the sheltered housing, has to be open for collaboration.

3. 3. Scenario C

For the multifunctional spaces, the layout is the same as described above. The same applies to the side chapels. However, in the southern transept arm, a café function is added with a new structure next to the sacristy. The main access route would be at this side of the transept.

The café profits from the orientation, but good accessible outside space which is well orientated is very limited.

3. 4. Scenario D

This scenario follows once again the same principles regarding the layout for the multifunctional space. The café is placed at the base of the tower. Linked to the café, the museum is placed on the second floor of the tower. As in a previous scenario, the garden of the verger's house would be used as an outside space for the café. Collaboration with the residents of the sheltered housing is aimed for, as a social café. Furthermore, the side chapels will be used as separate rooms, of which on used for storage. Lastly, on the northern side of the church, a day care and toilets are added with circulation space in between them.

Once again, a disadvantage for the day-care is the light intrusion. Besides that, the residents of the sheltered housing have to be open for collaboration.

Fig. 166. Scenario B [Pieter Vermeir]
Fig. 167. Scenario C [Pieter Vermeir]
Fig. 168. Scenario D [Pieter Vermeir]

Fig. 166.



Fig. 167.



Fig. 168.



3. 5. Scenario E

The starting point for scenario E was to add the day-care inside the church: in the side chapel and southern side nave. The layout for the multifunctional space is once again mostly the same. However, in the southern part of the transept, a café function is added in same way as discussed in scenario C. Lastly, the northern side chapel contains a (temporal/storable) museum function.
A disadvantage for this scenario is to needed interventions for making the spaces of the day-care comfortable enough for such a function. Furthermore, as stated before, the café does not have much good outside space nearby.

3. 6. Scenario F

In this scenario, the multifunctional space is functioning the same as discussed in the above scenarios. The side chapels are designed as smaller rooms. Furthermore, the café is functioning in the same way as described in scenario D, with the same museum space on the second floor of the tower. Again, the garden of the verger's house can be used as outside space for the social café, operated by the residents of the sheltered housing. In the northern corner of the church, the needed infrastructures are added (storage and toilets). By doing this, the other functions which require the most sun light are placed optimally, and those which don't need it are placed where there is almost no sunlight. As an addition to the added structure, the day-care is added. Due to its position, it still can profit from some sunlight. However, the statue situated on the same place needs to be moved to the west.

As stated before, the residents of the sheltered housing have to be open for this proposed collaboration.

Fig. 169. Scenario E
[Pieter Vermeir]

Fig. 169.



3. 7. Selected scenario

For the design, scenario F is further elaborated upon. This scenario allows for the most spaces of the church to be used frequently and with respect to their value. For instance, in some scenarios, the tower was used as storage space, which does not fit its high value well. In addition to that, the second floor of the tower, which doesn't have any windows except of a small aperture, is used as a museum space, which doesn't need that much light. By doing this, the available spaces are used the most optimal way. Secondly, by placing the day-care outside of the church in a new structure, the best comfort is achieved for the function needing it the most. In addition to that, functions needing the most interventions regarding vents and piping (e.g. toilets) are added in a new structure, allowing for easier execution. Lastly, the storage is concentrated in one larger space.

Fig. 170. Scenario E
[Pieter Vermeir]

4. Project

Explaining the project will be done in two parts. First, the concept of the design is presented. Afterwards, the design is shown in plans and images.

4. 1. Concept

The design is first explained by proposing some general concepts. After that, for each function a more elaborated concept is proposed per architectural entity.

4. 1. 1. Context

As concept for the direct urban context of the church, the following is proposed. The aim for the context is to strengthen the characteristics which are (rather unintendedly) present in the current situation, for example the unused green space at the backside.

Firstly, at the southern side, a small square is added with a rather petrified character. This will be the main outside space for the church, located at the main entrance. This smaller public space is linked with the square of Saint James, which can be used as well for certain occasions, instead of being a parking space.
Secondly, the Kruisstraat (at the western side of the church), is designed as an additional elongated public square, allowing for a better connection of the church with the scouts and the presbytery house.
Thirdly, the presbytery is advised to have a social function: either as additional space for the scouts or as social housing. This design is not included in the thesis however.
Fourthly, the garden of the verger's house is used as outside space for the café. This space has a more covered characteristic and is accessible through an opening in both walls, connecting it to the southern square and the western square. By making this garden semi public in use, the west façade with a high value is accessible for the public.
Fifthly, the main space of the church, the nave and the transept, is considered as an extension of the outside public space but covered.
Sixthly, the space at the north-

1 *church square*
2 *elongated square*
3 *presbytery as social addition*
4 *verger's house garden*
5 *sheltered public space*
6 *outside space for day-care*
7 *public green space*

Fig. 171. Concept for the context of the church
[Pieter Vermeir]

Fig. 170.



eastern corner will be designed as outside space for the day-care.
Lastly, the north western corner at the backside of the chruch, will be designed as public green space. The statue will be moved to this area.

4. 1. 2. Circulation and Spatial Divisions

Several entities are designed around the main space. These can function separately or can function together with the main space to give support to the activities happening there.
The entity of the tower with the adjacent side naves works as a café and a museum space. A connection through the tower is made, which is of such a kind that it can be opened completely to allow working together with the main multifunctional space. Furthermore, the opening to the garden of the verger's house can be opened through the Romanesque portal.
Secondly, the choir and the sacristy work as another entity. This entity is designed as a smaller multifunctional space but can work together with the larger multifunctional space by placing a division that can be opened.
Lastly, the side chapels have a more rigid division. The same applies to the entity housing the day-care.



Fig. 172. Spatial divisions and circulation [Pieter Vermeir]

4. 1. 3. Materiality

The church of Saint James is very much scarred due to its neglection and interventions in the past. Besides that, the project currently being executed only covers the structural issues. As such, the question on how to restore the church remains and whether its scars can be healed. Considering the funds needed to restore the church completely to its heyday, it is proposed to only consolidate the church in its current state. By doing this, only the necessary works are executed, and the focus will be on the reuse. Besides that, the layer of neglection and interventions, which can be called the layer of therapeutic relentlessness, is kept.
Regarding the furniture in the church, these are kept and restored. Special care needs to be given to the sacraments house.

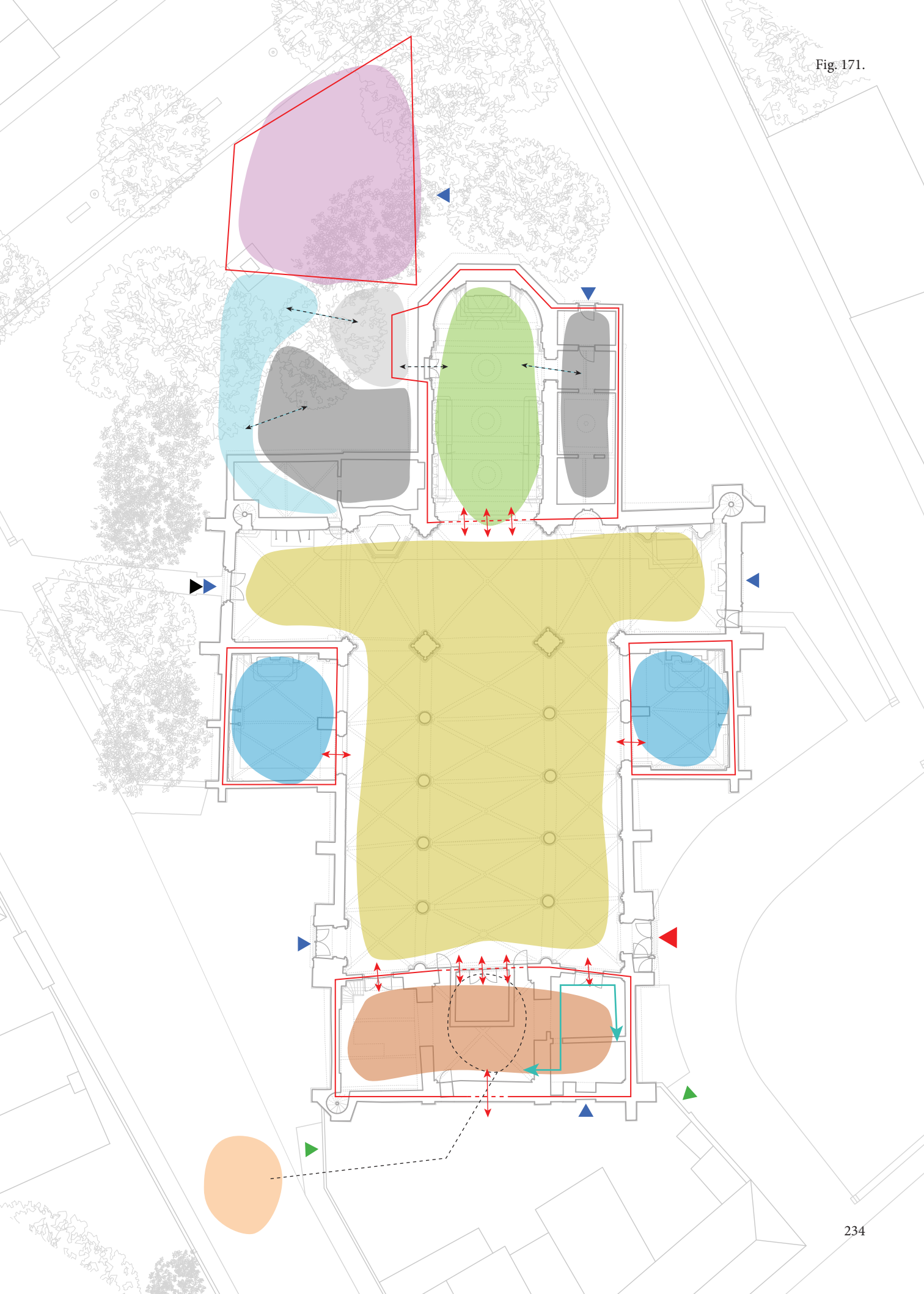


Fig. 171.

4. 1. 4. Building Energy

The concept for building energy follows the entities described above. Each of these entities is heated by a central heating system and insulated. The attic (of the tower, transept and nave) and main multifunctional space remain uninsulated. However, if there is an activity requiring a higher thermal comfort in the main multifunctional space, it can be heated as well. For example, the sheltered space can be used in winter to host a concert.
The proposed system uses floor convectors to heat the spaces. The works required to install this system need to be done with care for any archaeological remains.

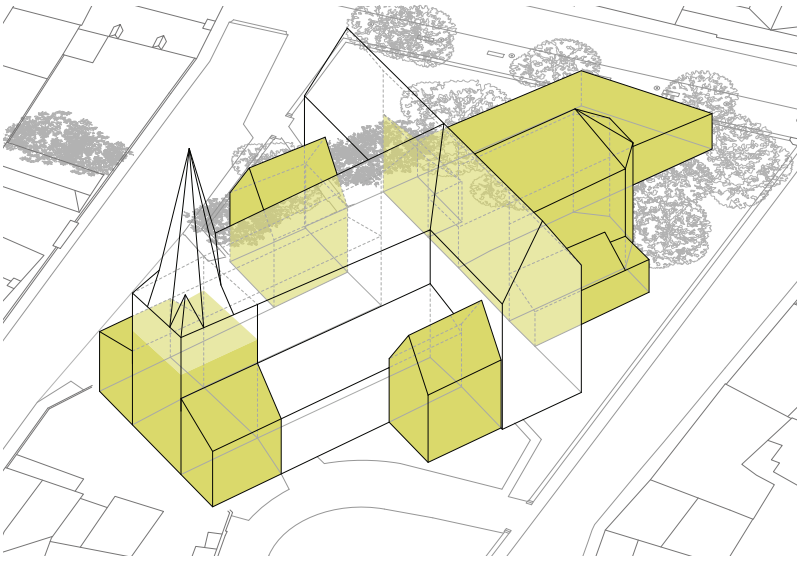


Fig. 172.



Fig. 173. Insulated spaces [Pieter Vermeir]
Fig. 174. Heating scheme [Pieter Vermeir]

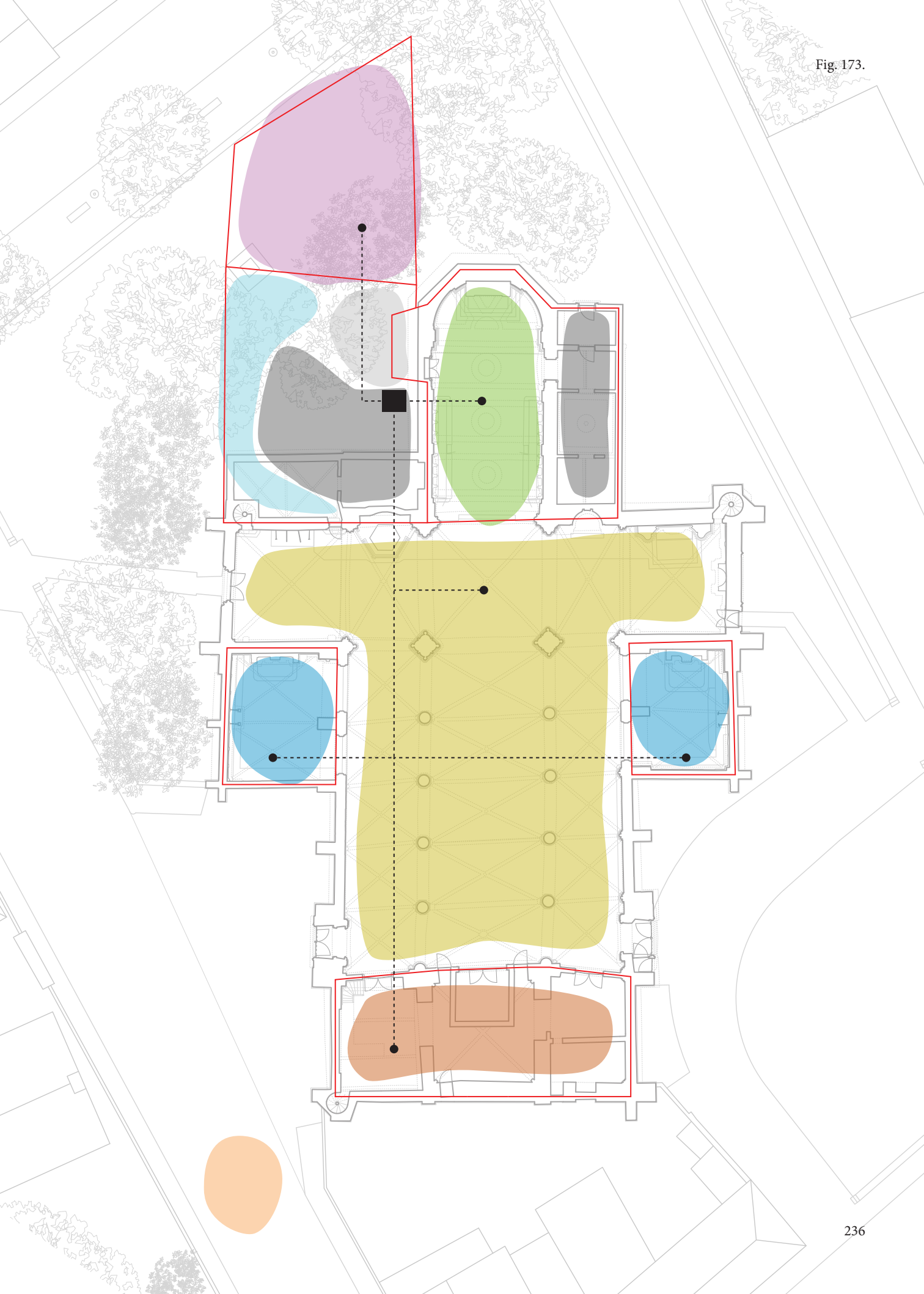
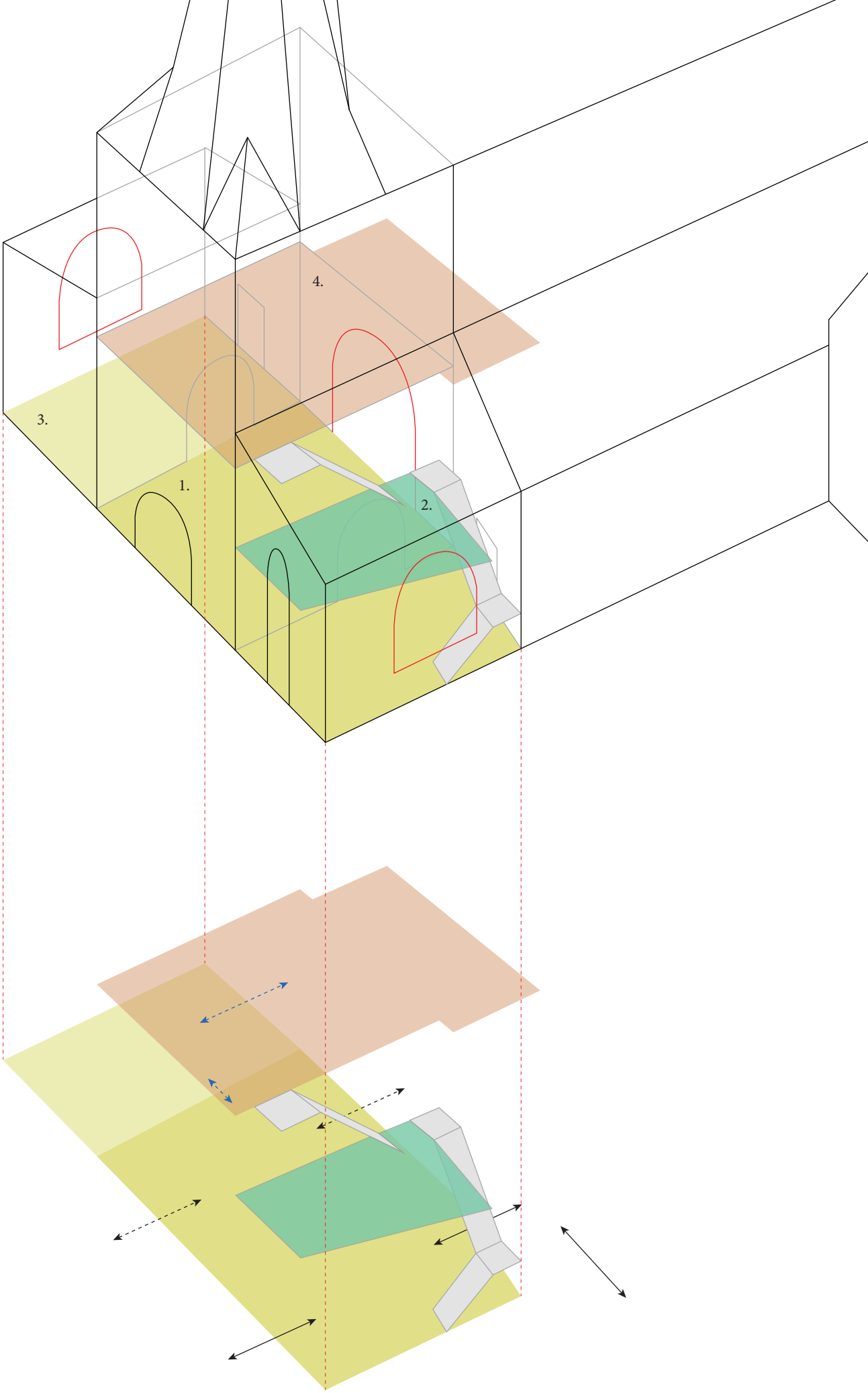


Fig. 173.

Fig. 174.



4. 1. 5. Café and Museum

The café functions as follows. The base of the tower and the adjacent southern side nave will function as the main café space, the northern side nave will function as the kitchen and storage space as this space enjoys the least of sunlight. Deliveries are done through connection of this room with the main multifunctional space. An additional floor is added to the southern side nave to create additional space for the café and make a connection to the museum. Lastly, the closed windows will be reopened.
The museum is situated on the first floor of the tower and on the floor added for the organ. Information would be given on the church's history, the structural problems and debate on the future. In addition to that, information on the sacraments house would be provided as well.

Regarding accesses, the café is accessible through the door at the southern side nave from the inside. The baptism chapel will be removed to make room and a fluent connection to the multifunctional space. Furthermore, the garden is accessible through the opening in the west façade. Additionally, the Romanesque portal can be opened.

1 *main café space*

2 *additional floor for the café*

3 *kitchen and storage*

4 *museum space*

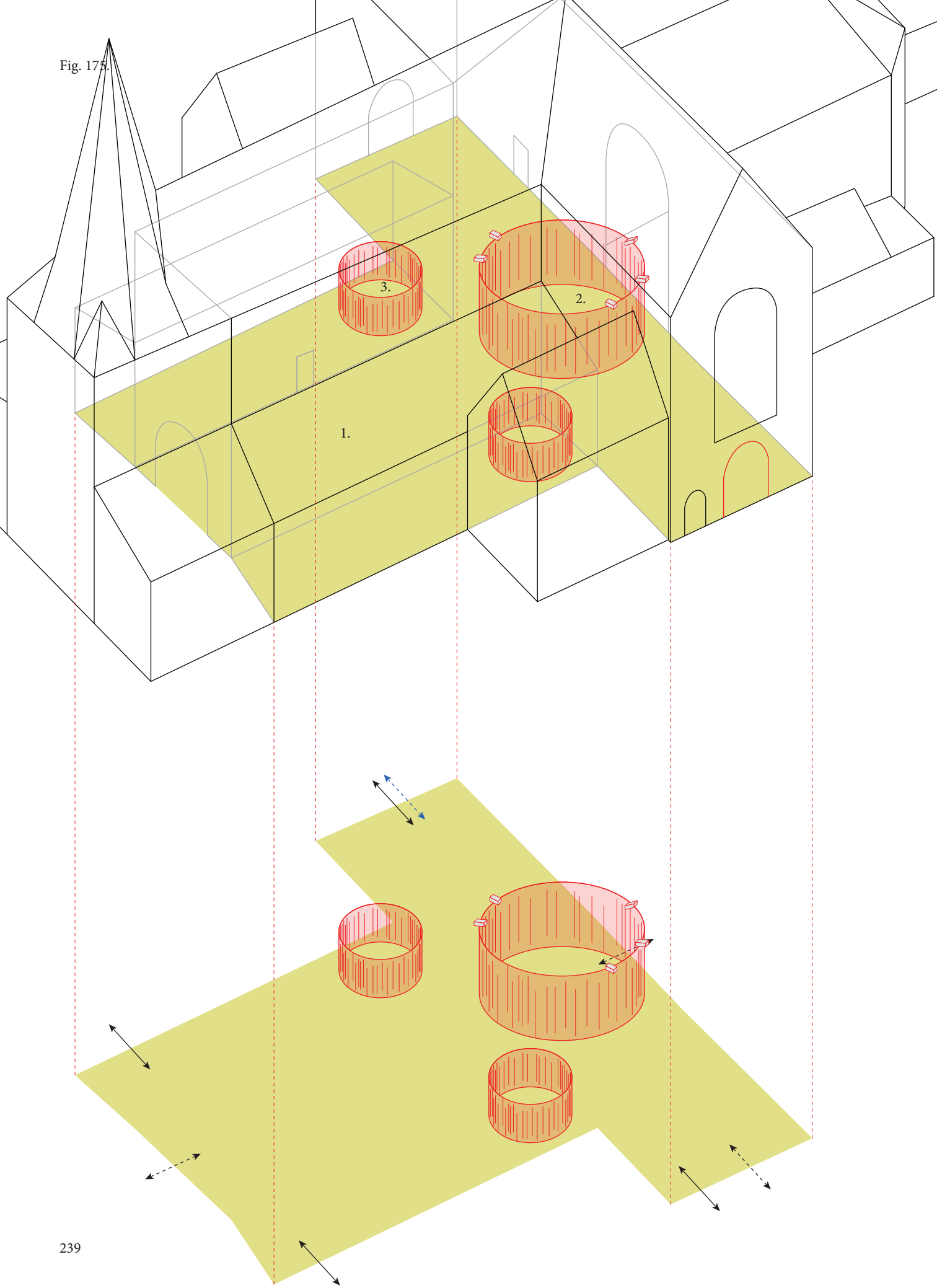
primary connection

optional connection

secondary connection

Fig. 175. Café and museum [Pieter Vermeir]

Fig. 175.



4. 1. 6. Main Multifunctional Space

The main functional space is considered as a sheltered public space where activities can take place. The focus of these activities is on the community (e.g. rehearsal/ concert of the parish' choir, food market, dinner event of the Scouts, etc.). As stated before, this space has an option to be linked to other side functions such as the café with its kitchen infrastructure. As such, the infrastructures of the side functions can provide support for the activity taking place in the multifunctional space.
Additionally, two curtain elements are placed to allow further (soft) subdivision of this space. If needed these elements can create spaces that are usable individually and subdivide the transept and crossing. Furthermore, the transparent division between the choir and nave/transept can be made partially closed to provide a visual division as well. In addition to that, the fixtures of the curtain element in the crossing can be used as rails to fix additional lightning armatures if an activity would need this.

The floor of the nave was much damaged during the intervention of 1971. The few remaining tiles are removed and stored. However, in light of the function of this space, a new floor is added. A concrete floor finishing allows for several functions to take place. Furthermore, to enhance the idea of a sheltered public space, the floor is continued outside. Caution needs to be taken in light of reversibility for this intervention.
In addition to that, as was stated before, the concept on materiality is to consolidate the church, not to aesthetically restore.

Access to this space is provided through four entrances. The one on the northern transept is considered as the entrance for deliveries. Furthermore, the closed-up portal in the southern transept will be reopened to provide an option to fully open this side of the transept to the outside, instead of only using the smaller door next to it.

1 *main multifunctional space*

2 *spatial division at crossing*

3 *spatial division at side nave*

primary connection

optional connection

secondary connection

Fig. 176. Main multifunctional space [Pieter Vermeir]



Fig. 176.

Fig. 177. Reference sheltered public space, Stadshal Ghent, Robbrecht en Daem [https://www.vai.be/nl/project/stadshal-gent]
Fig. 178. Reference circular curtains, DVA furniture gallery, CHYBIK+KRISTOF [https://chybik-kristof.com/portfolio-item/my-dva-showroom/]
Fig. 179. Reference materiality, Les Brigittines in Brussels, Andrea Bruno and SumProject/SumResearch [https://www.cos.be/telescoop_tribune_cultuur.php?lang=NL]

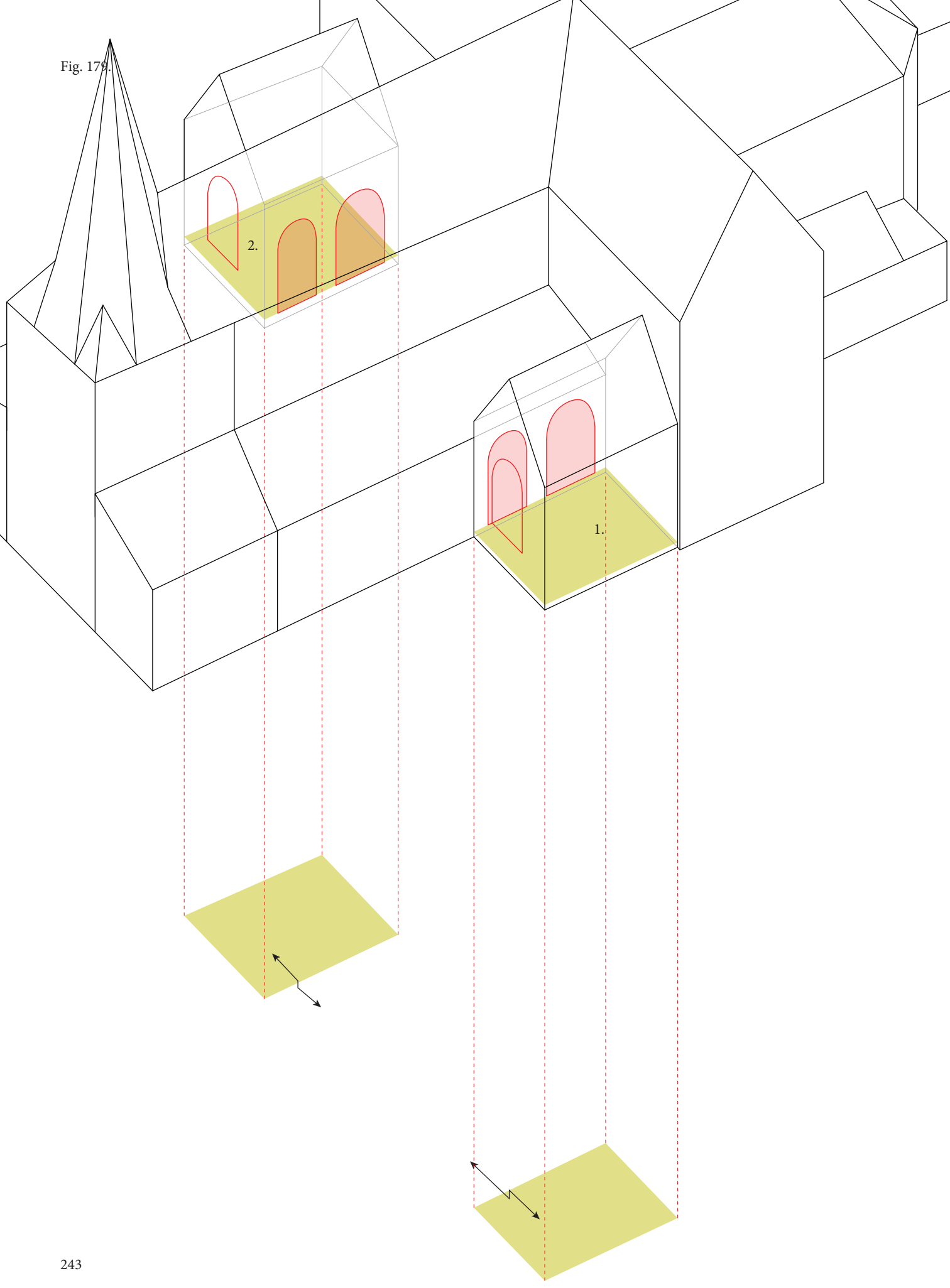


Fig. 177.

Fig. 178.



Fig. 179.



4. 1. 7. Side Chapels

The side chapels function as separate rooms. The pointed arch openings leading to the side naves, are closed off by windows following the architecture of the space but being an abstract interpretation of it. By doing this, the aim is to respect the Gothic forms and figures but allowing for a clear distinction. Lastly, the closed-up windows in both side chapels are reopened again.

1 *northern side chapel*

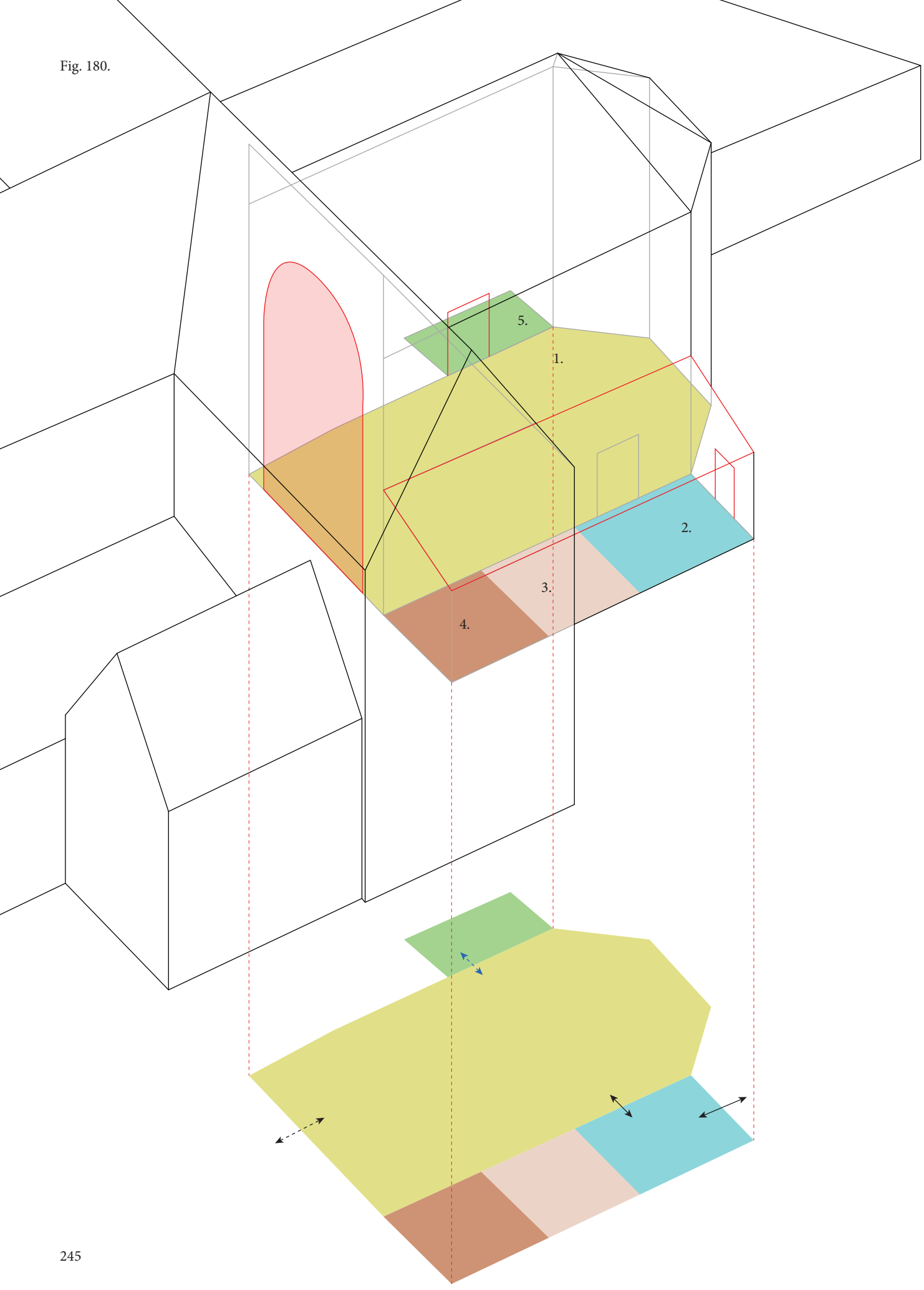
2 *southern side chapel*

spatial division

connection

Fig. 180. Side chapels
[Pieter Vermeir]

Fig. 180.



4. 1. 8. Choir and Sacristy

The part can function on its own as well. The choir is considered as a multifunctional space with the serving spaces placed in the sacristy. The sacristy contains a small kitchen with a dining room and a storage space.
To make the division between the transept and the choir, the same principle is followed as described for the divisions of the side chapels.

The entrance is through the sacristy. But as stated before, the choir is accessible through the transept as well and can be fully opened.

1 *multifunctional space choir*

2 *entrance and storage*

3 *dining room*

4 *kitchen*

5 *toilets*

spatial division

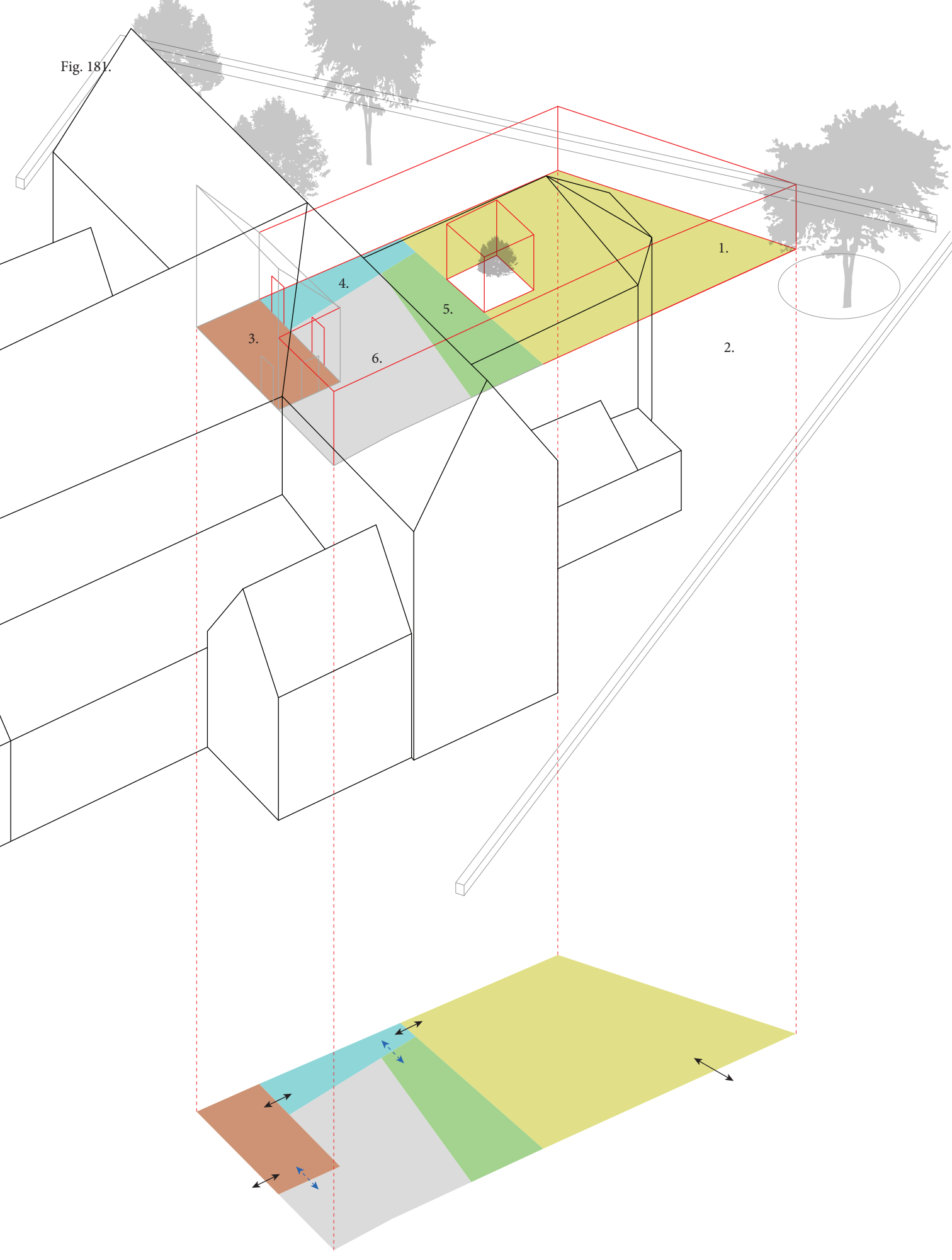
primary connection

optional connection

secondary connection

Fig. 181. Choir and sacristy
[Pieter Vermeir]

Fig. 181.



4. 1. 9. Old Sacristy and New Addition

The old sacristy with its new extension functions as a serving space for the church. The old sacristy contains lockers for users of the church's spaces. Furthermore, the new extension contains the storage and the toilets. At the backside, the day-care is added. The provide additional light in the day-care, an extrusion in the space is added. Lastly, the outside of the day-care is placed at its eastern side.

Through the door next to the sacraments house, the old sacristy is accessible, providing access to the functions added in this corner of the church. Lastly, the day care is accessible via the outside as well.

Regarding the materiality of the new addition, its character needs to be complimentary to the existing materials. A modern reinterpretation is rather difficult as it is positioned at an intersection of two styles. As such, the aim for this structure is to be rather modest. Wood is chosen as finishing for the façade, to be complementary with the adjacent green space and to provide a warmer character for the day-care.

1 *day care*

2 *outside playground*

3 *lockers*

4 *circulation space*

5 *toilets*

6 *storage*

⟷ *primary connection*

⟷ *secondary connection*

Fig. 182. Old sacristy and new addition [Pieter Vermeir]



Fig. 182.

Fig. 183. Reference spatial division choir, church of Saint Martinus in Baak [https://commons.wikimedia.org/wiki/File:Interieur,_overzicht_naar_het_oosten_met_glazen_scheidingswand_-_Baak_-_20533497_-_RCE.jpg]
Fig. 184. Reference spatial division side chapel, church of Saint Bernardus in Oberhausen, Zwoplus Architekten [http://www.zwoplus-architekten.de/projekte/st-bernarduskirche/]
Fig. 185. Reference new addition, church of Saint Peter in Wenzenbach, Brückner & Brückner Architecten [https://www.subtilitas.site/post/92489513144/brückner-brückner-addition-to-st-peters]



Fig. 183.

Fig. 184.



4. 1. 10. Phases of reuse

As stated before, the church has disappeared from the collective memory. Some activities in the past helped the church to regain notion amongst the residents of the city. However, after the completion of the currently being executed project, several phases in reuse can be taken to ease the process of awareness and to get a continuous path to its reuse.

- **Phase 1: Open Church**

After the completion of the current stabilisation project, the church should be opened again. Without infrastructures, activities and events can happen (e.g. Kunst in de Steigers).

- **Phase 2: Repurposing Project**

After the temporal use as open church, the repurposing project should be initiated. To allow a continuous use of the church, this can be done in phases. Preferably, the ones that generate money after completion and the needed infrastructures should be executed first.

A. New addition (with day-care)
B. Café and museum
C. Choir
D. Side chapels
E. Nave and transept

- **Phase 3: Redevelopment of the Square**

Additionally, as last phase, the redevelopment of the square can be considered as an alternative for the shared use proposed for the project.

Fig. 186. Third phase of reuse: redevelopment of the square [Pieter Vermeir]

Fig. 185.



4. 2. Design

The plans and sections of the design are shown on the following pages. First, the general plans and sections of the church are shown. Afterwards some possible activities the church can host are shown in plan. Lastly, some images of the design are shown.

4. 2. 1. Design Drawings

The drawings for the design show the church in the state in which only the permanent items are present. The possible infills of the spaces are shown later.

Fig. 187. Site plan, scale 1/500
[Pieter Vermeir]



Fig. 186.

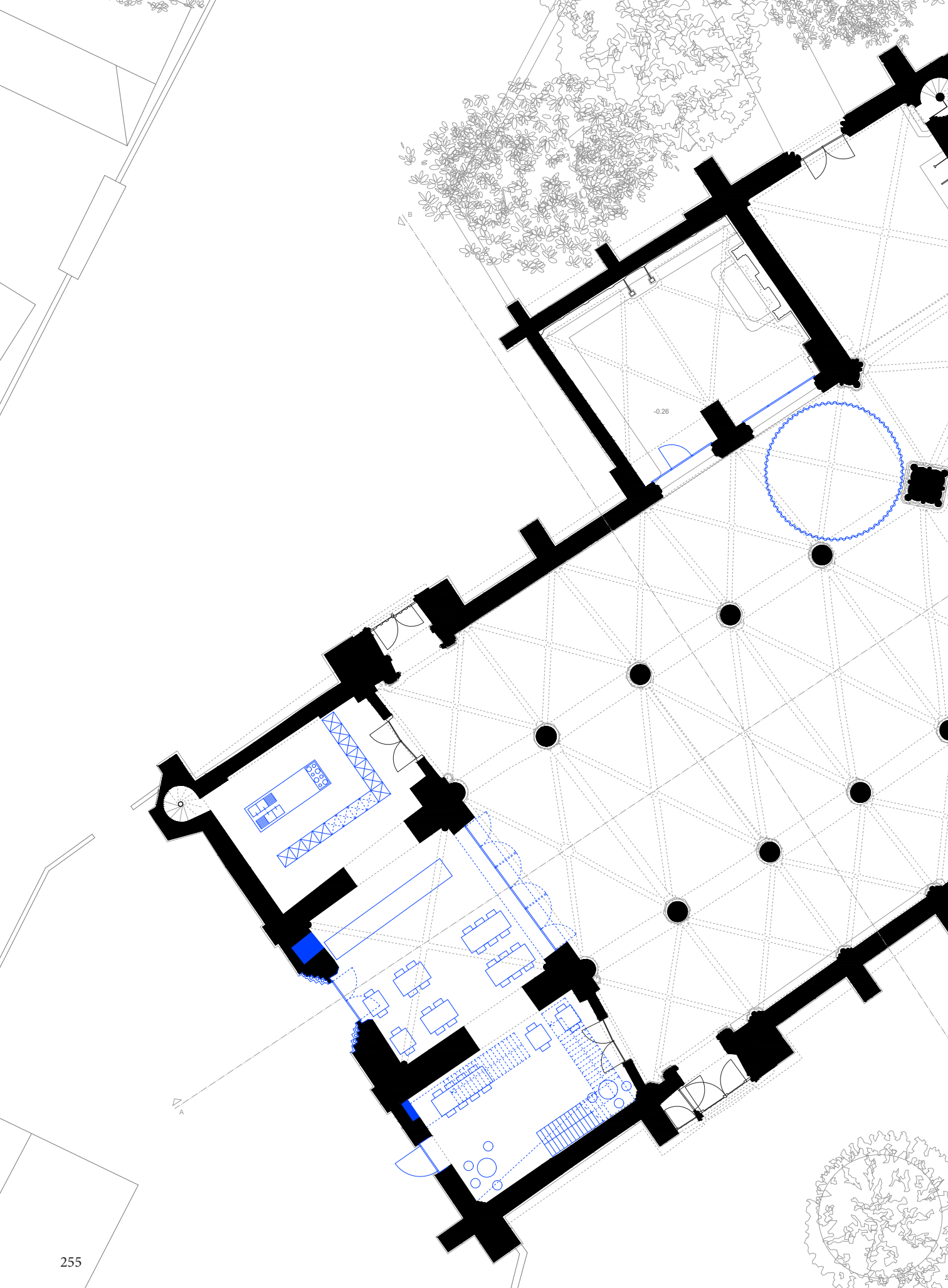

B
-0.26
A

Fig. 187.

Fig. 188. Plan at 1,4m high, scale 1/200 [Pieter Vermeir]

Fig. 188.

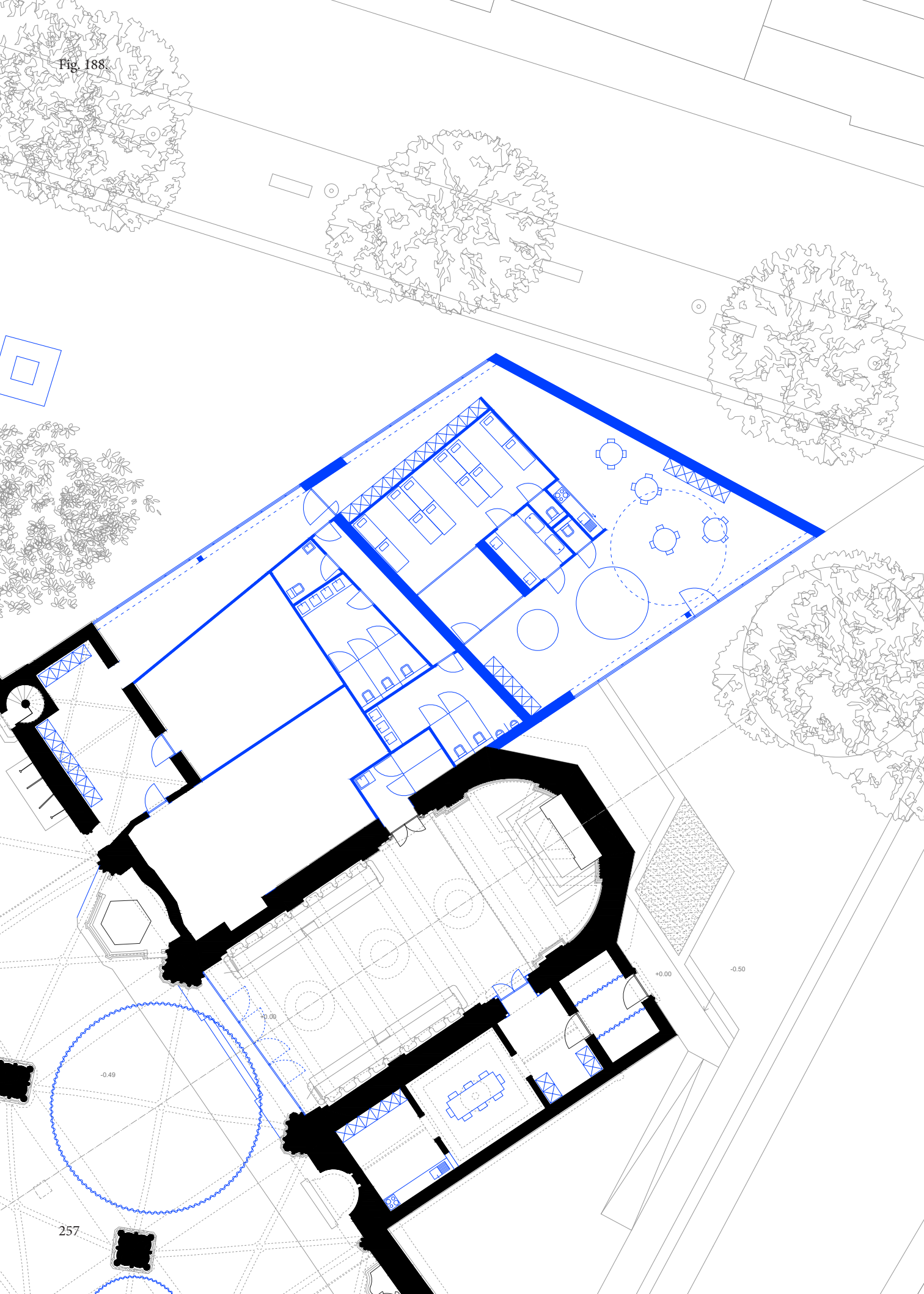
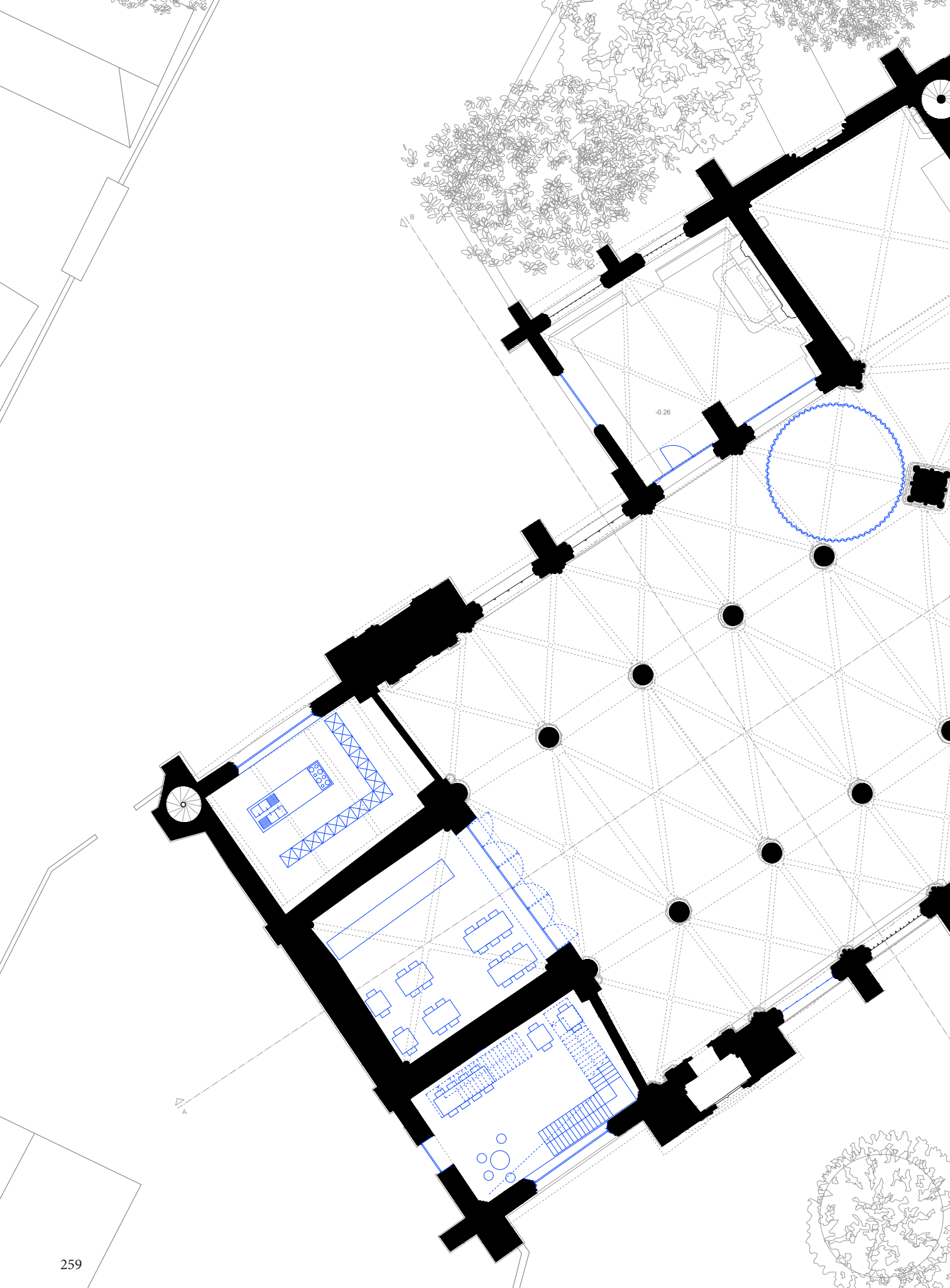


Fig. 189. Plan of the new addition at 1,4m high, scale 1/200
[Pieter Vermeir]


B
-0.26
A

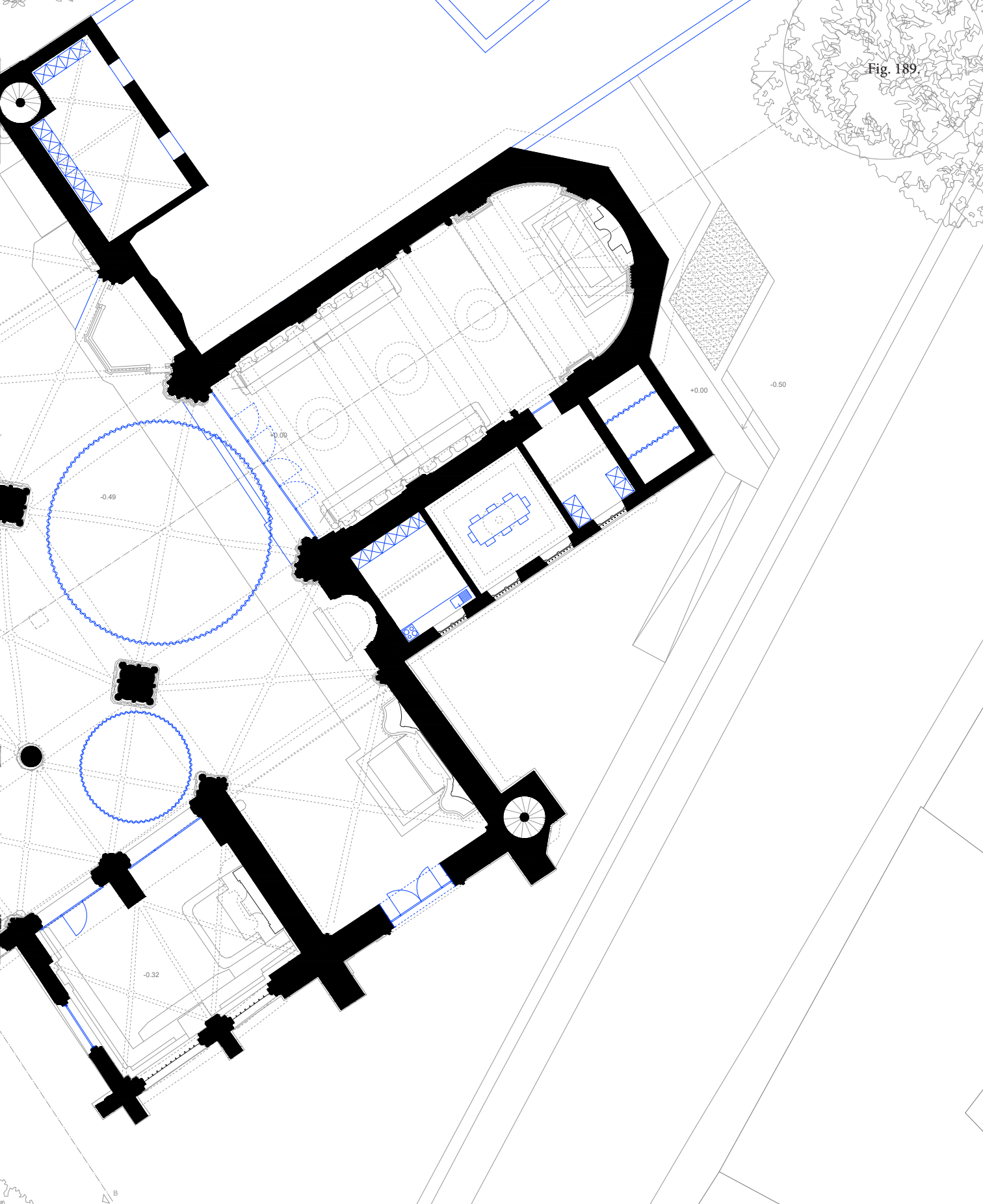
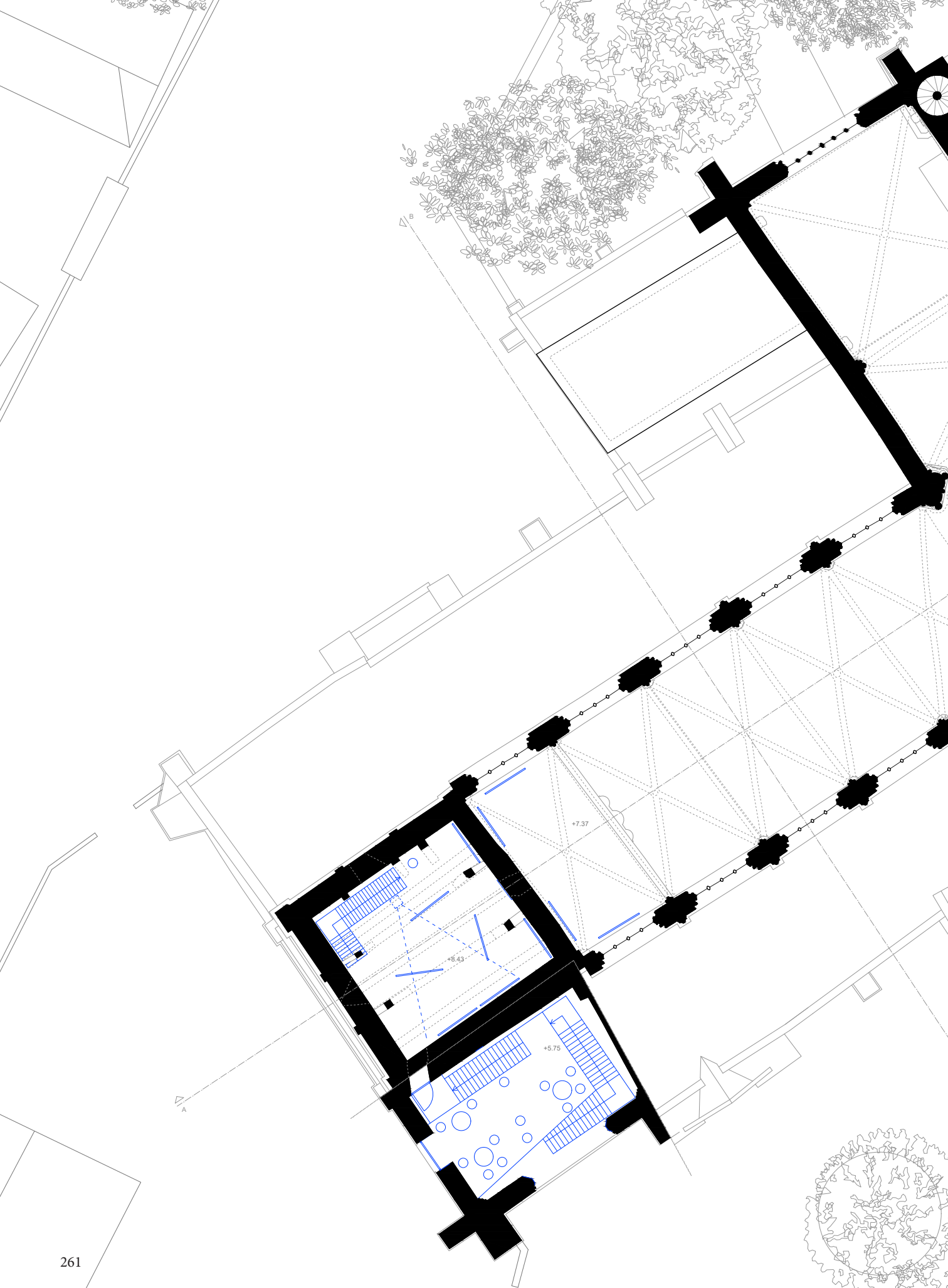


Fig. 189.

Fig. 190. Plan at 3,25m high, scale 1/200 [Pieter Vermeir]


B
A
+7.37
+8.43
+5.75

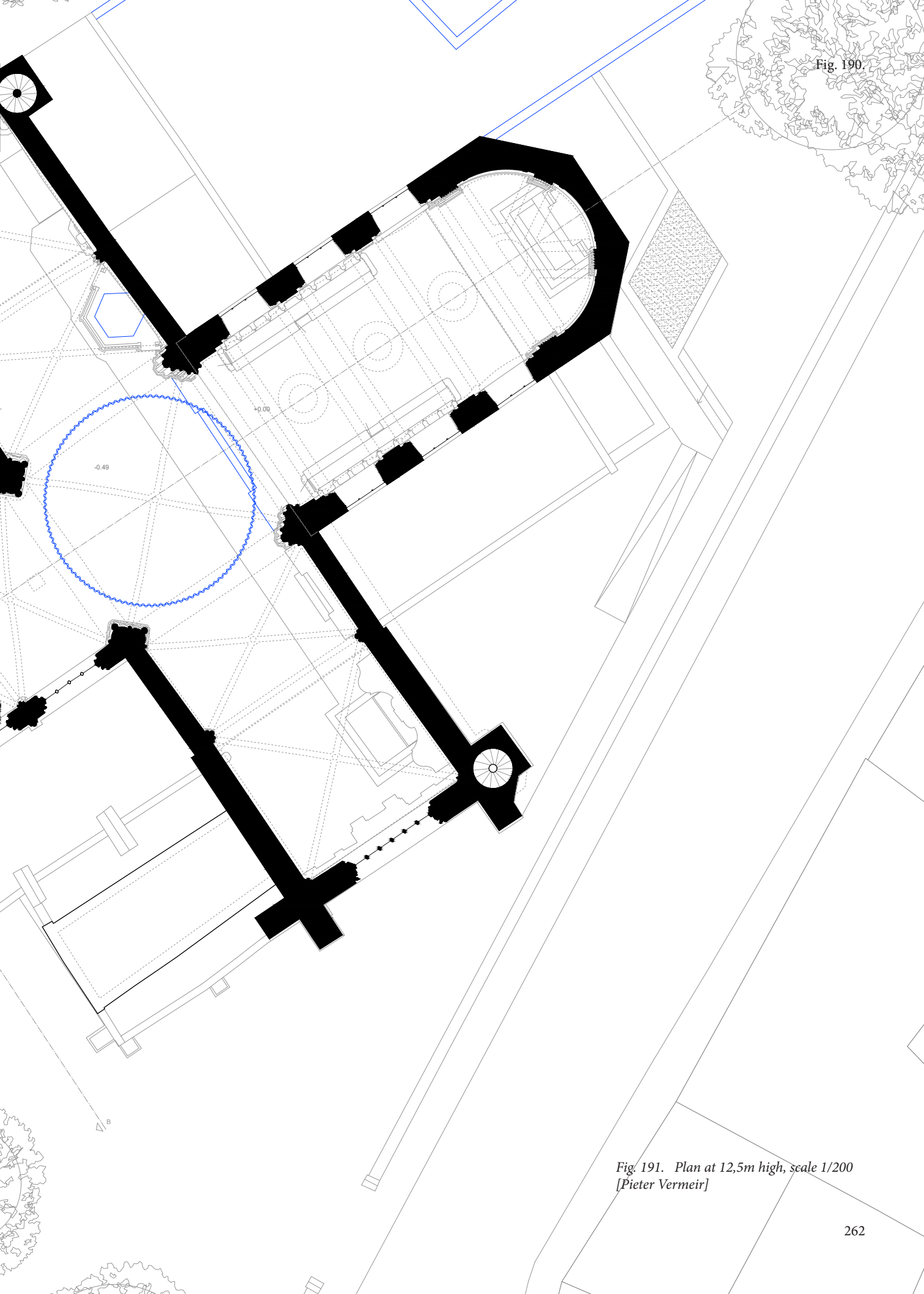
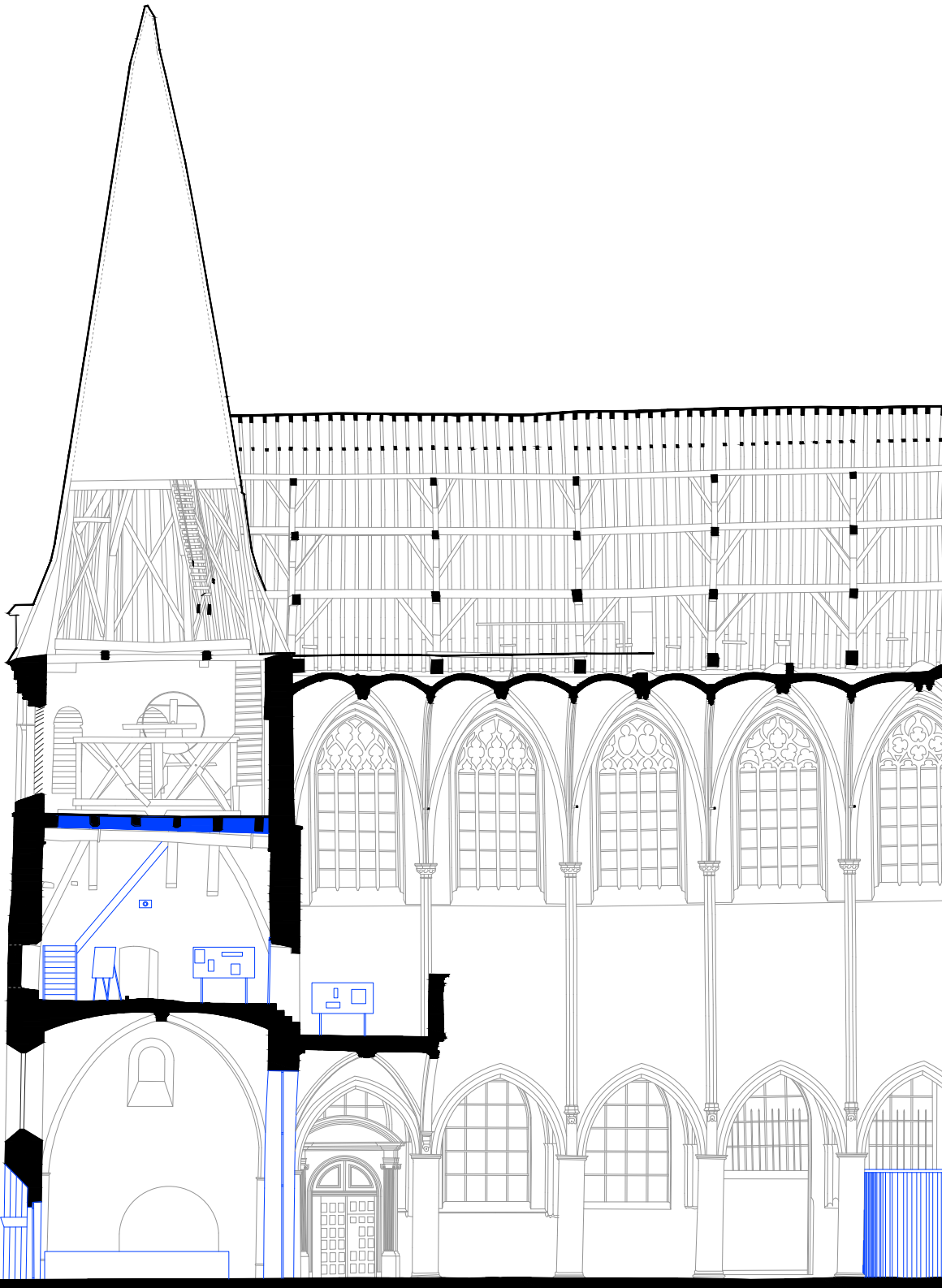


Fig. 191. Plan at 12,5m high, scale 1/200 [Pieter Vermeir]



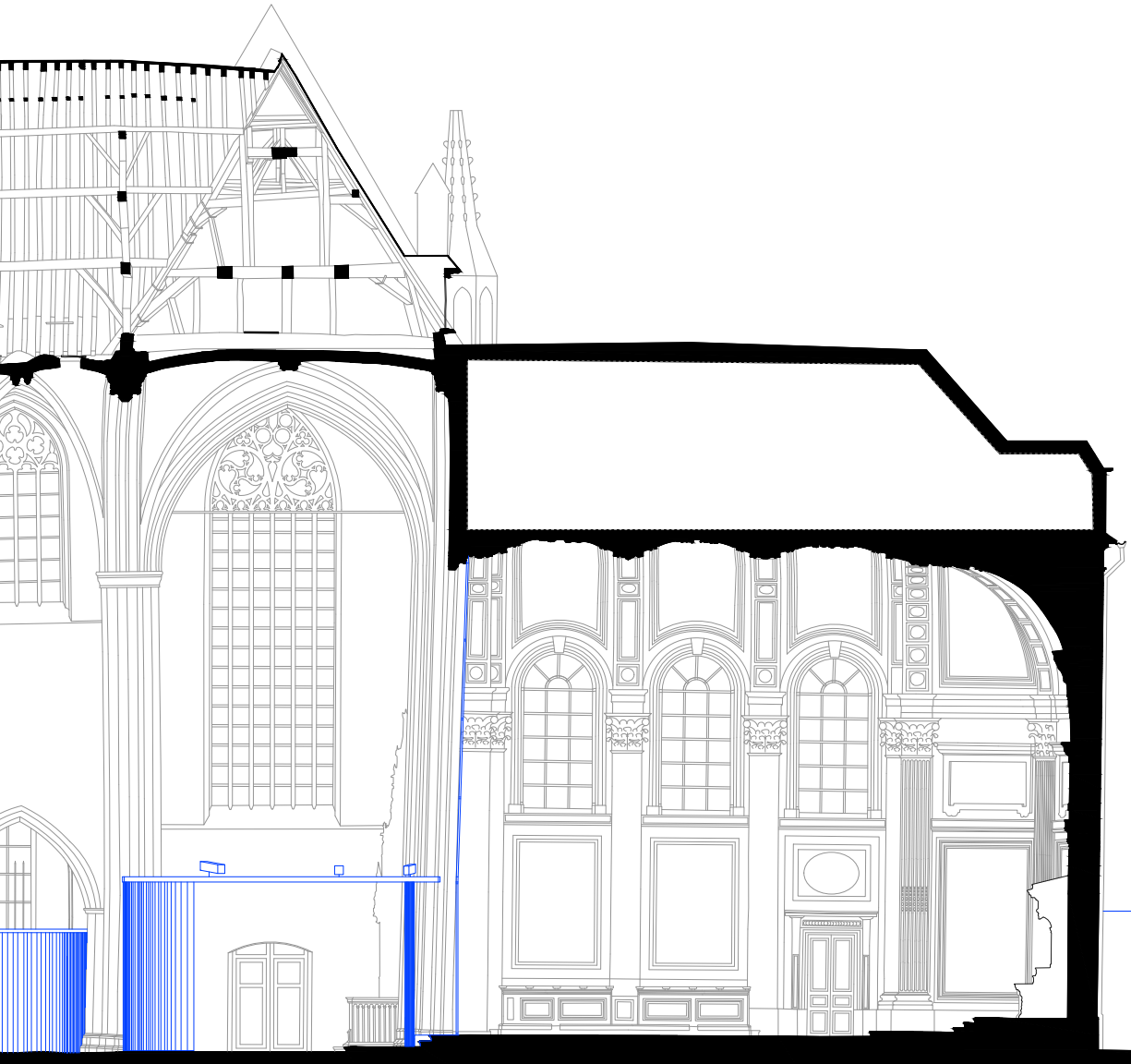


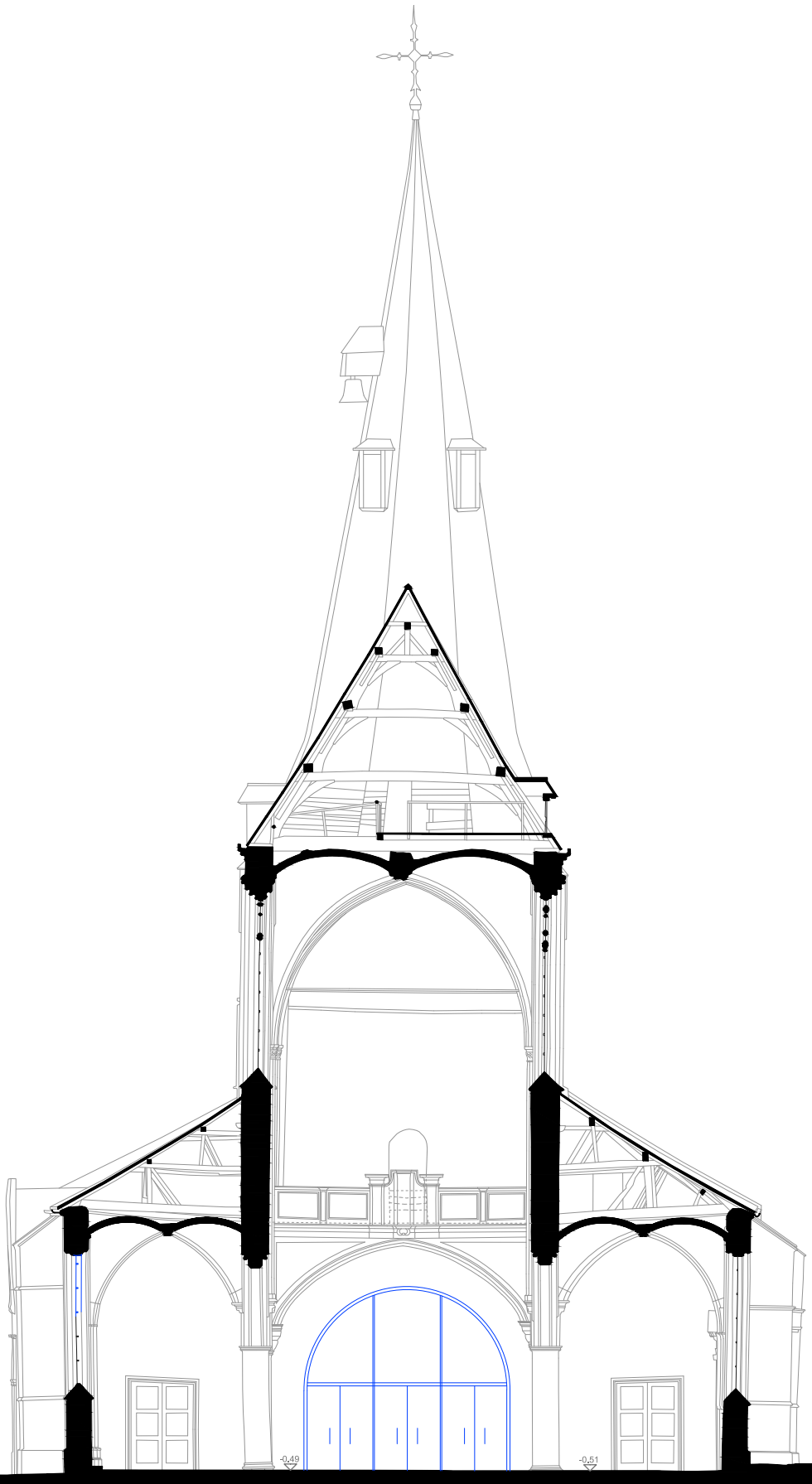


Fig. 192. Section A, scale 1/200
[Pieter Vermeir]

Fig. 192.



Fig. 193. Section A, scale 1/200
[Pieter Vermeir]


-0,49
-0,51

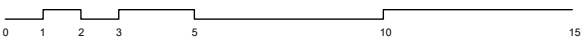
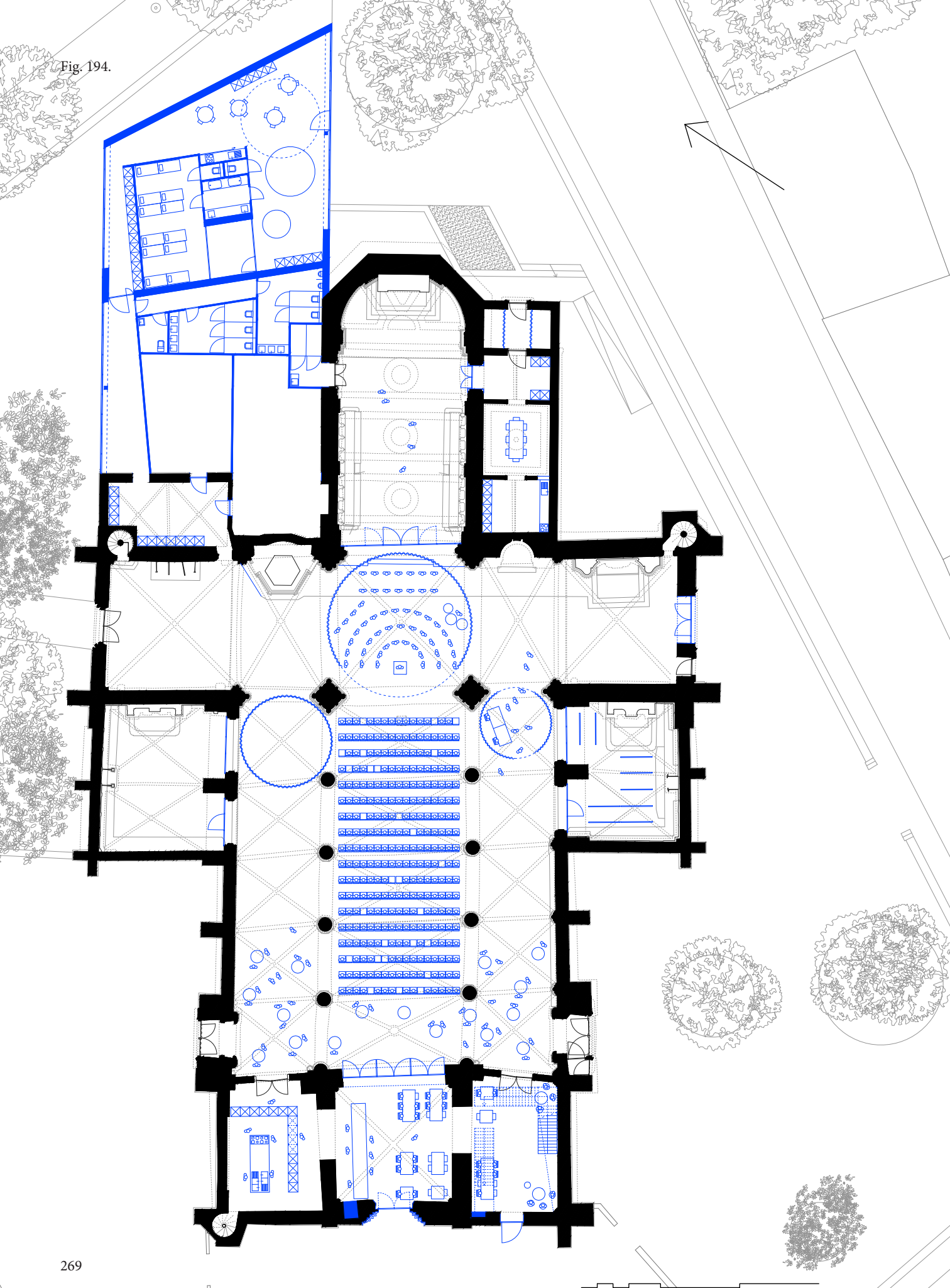


Fig. 194. Section B, scale 1/200
[Pieter Vermeir]

Fig. 194.



4. 2. 2. Possible activities

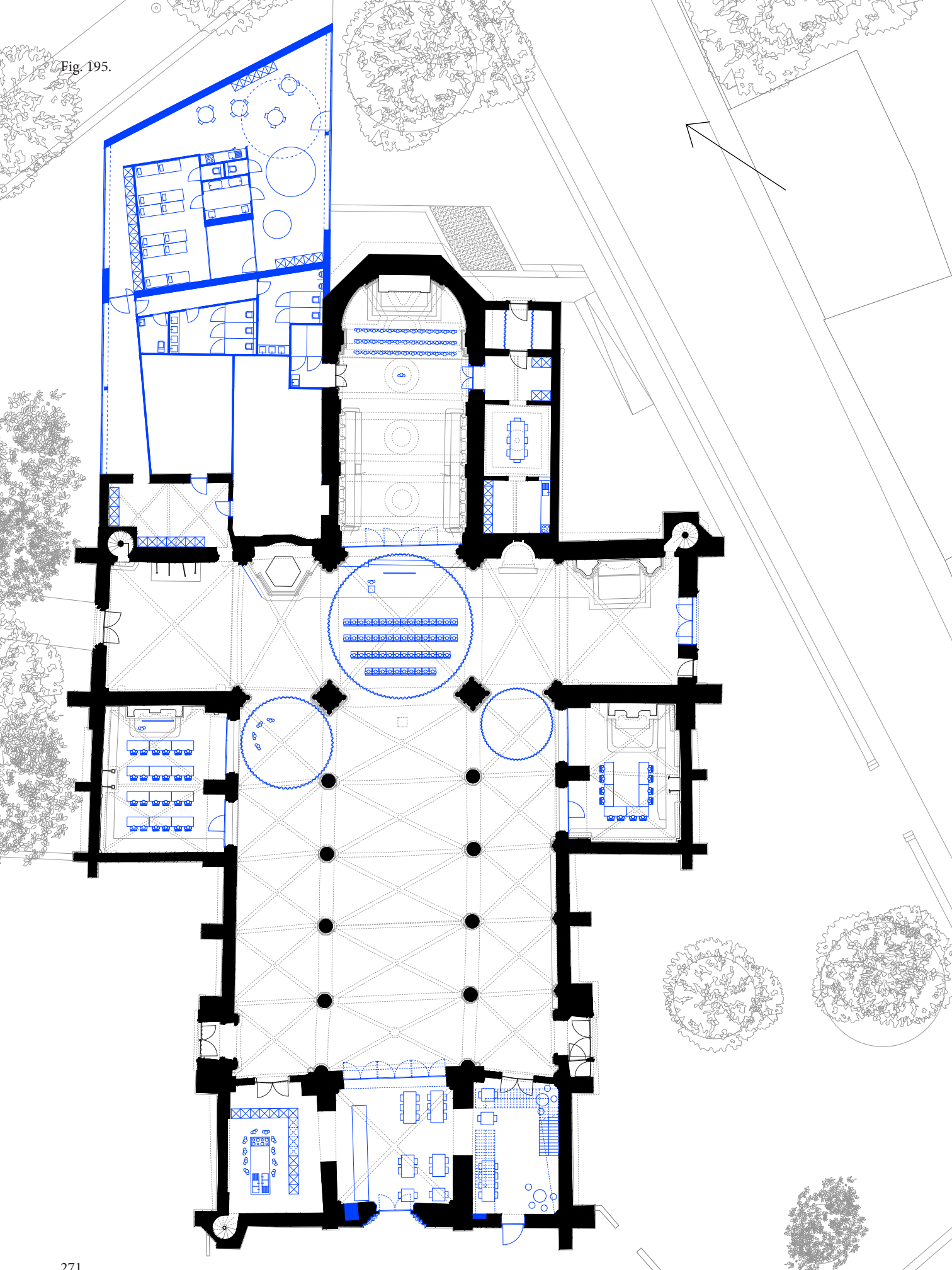
The folowing pages show some possible uses of the design: the multifunctional space and the permanent functions supporting it, such as the café. The activities are described as certain main uses, but a combination of these proposed uses is possible as well.

- **Concert Space**

For this activity the main entrance is the southern transept and the southern transpet arm is used as foyer. Entering the concert is done through one of the circular curtain, now used as a ticket desk. The adjacent side chapel is used as a cloakroom. The same system of entering and cloakroom can be applied on the northern transept and side chapel. Furthermore, the crossing is used as a podium. Linked to that is the choir which serves as backstage for the artists. The techincal support for the concert (lighting and sound is done from the balcony of the former organ. Lastly, at the tower of the church a reception can be held afterwards, using the infrastructures of the café.

Fig. 195. Use of the church as a concert space
[Pieter Vermeir]

Fig. 195.

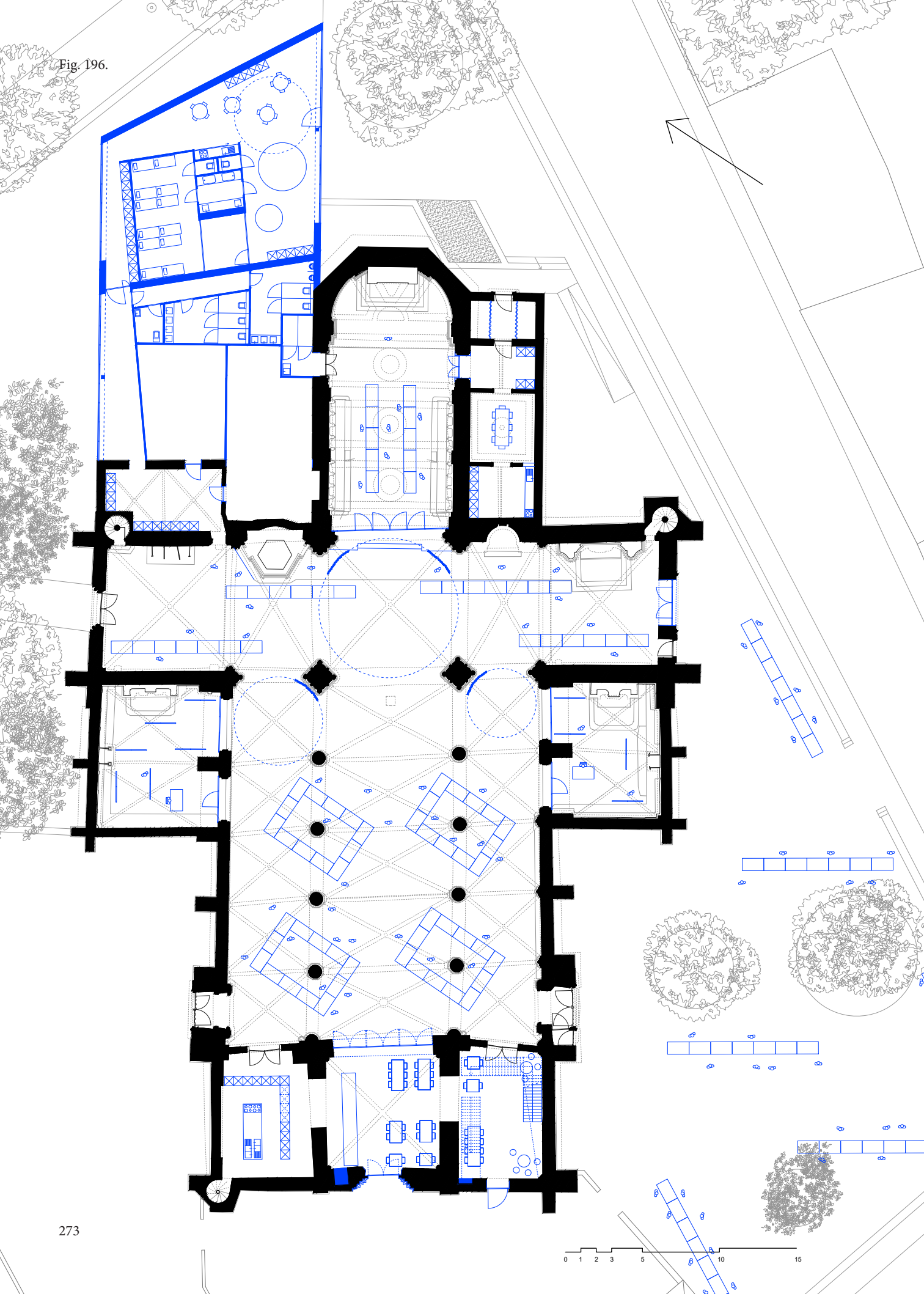


- **Community Centre**

This possible activity uses the church as a community centre. In the choir of the church, a rehearsal is held by the local choir. This space can also be used by the local theatre group. Furthermore, a lecture can be held in one of the circular curtain elements. In addition, the side chapels are hosting courses, such as for example a language course. Even the nearby game shop can host a game night in one of the side chapels.

Fig. 196. Use of the church as community centre
[Pieter Vermeir]

Fig. 196.

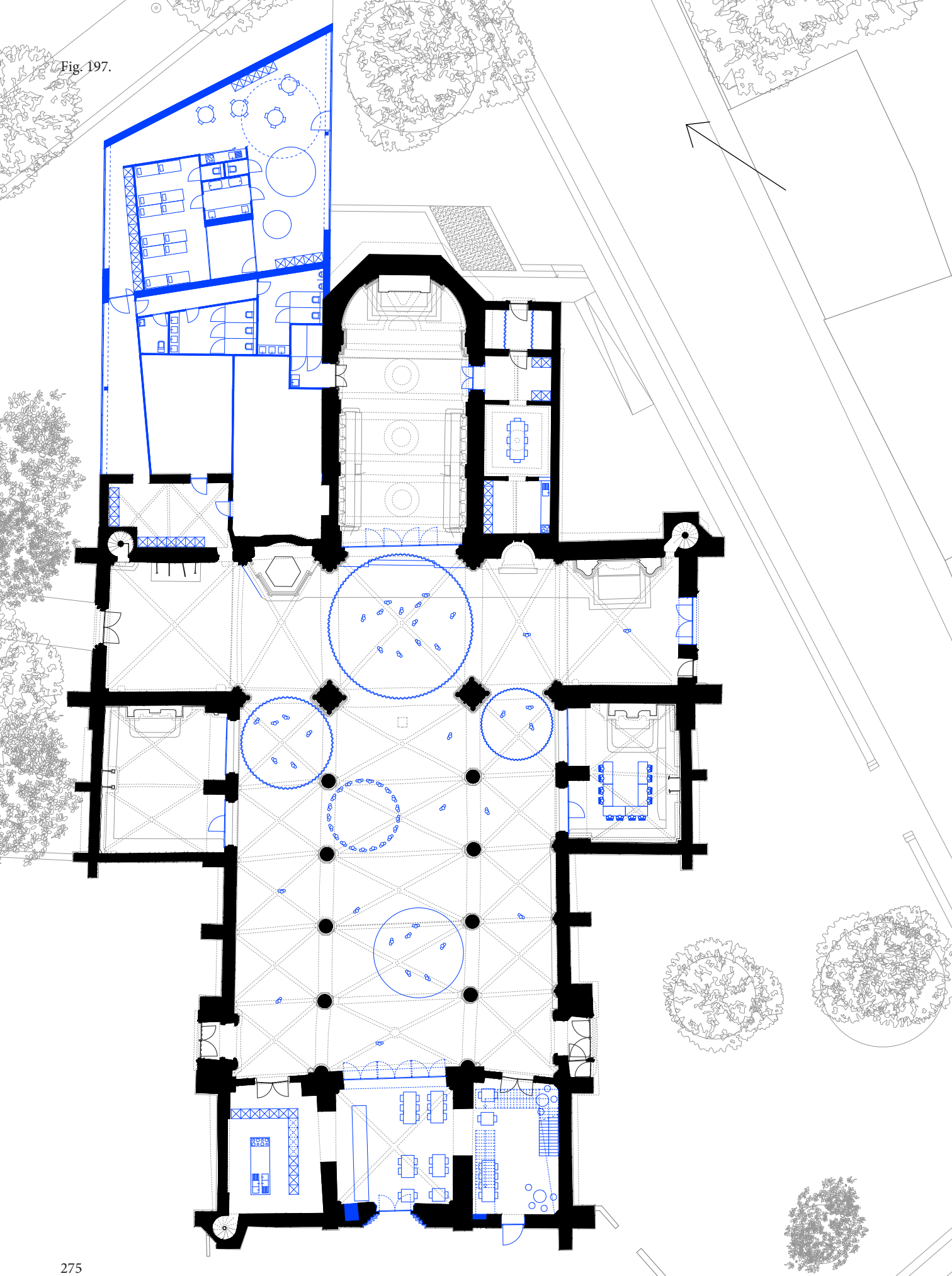


- **Pop-up/Local Market**

Another use the design allows is a pop-up market or a market with local products. This can be held both inside the shelterd public space of the nave and transept, or outside on the smaller square in front of the church. Furthermore, the side chapels an choir are proposed to function as individual stores, allowing for a larger space to sell products.

Fig. 197. Use of the church for a pop-up/ local market
[Pieter Vermeir]

Fig. 197.

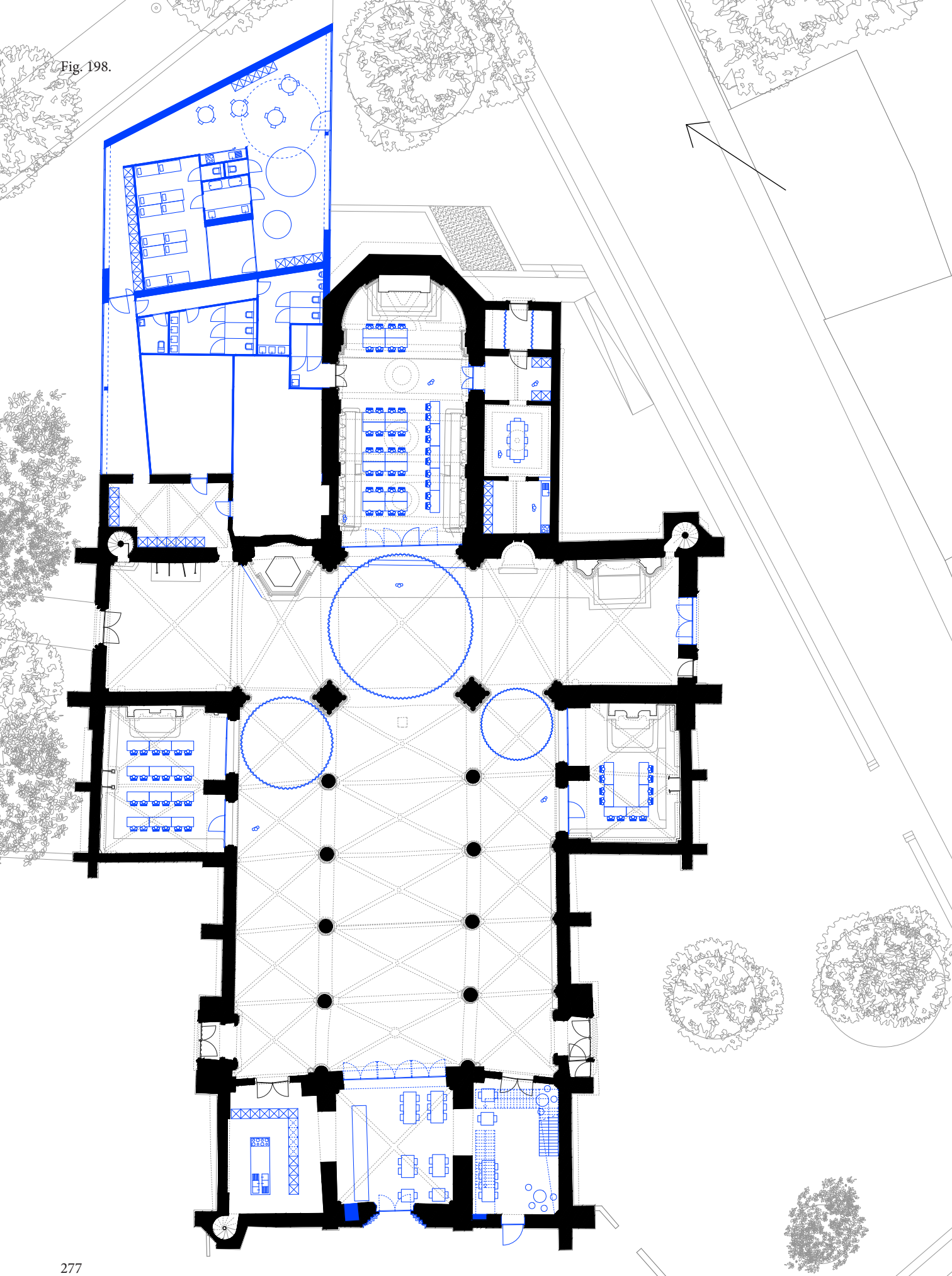


- **Youth Movement**

The neary youth movement, Scouts, can use the church on their Sunday afternoon activities as sheltered playground. Furthermore, a combination of the church with nearby facilities which are for rent to host camps in the holidays, allow for an additional use.

Fig. 198. Use of the church for the Scouts youth movement
[Pieter Vermeir]

Fig. 198.

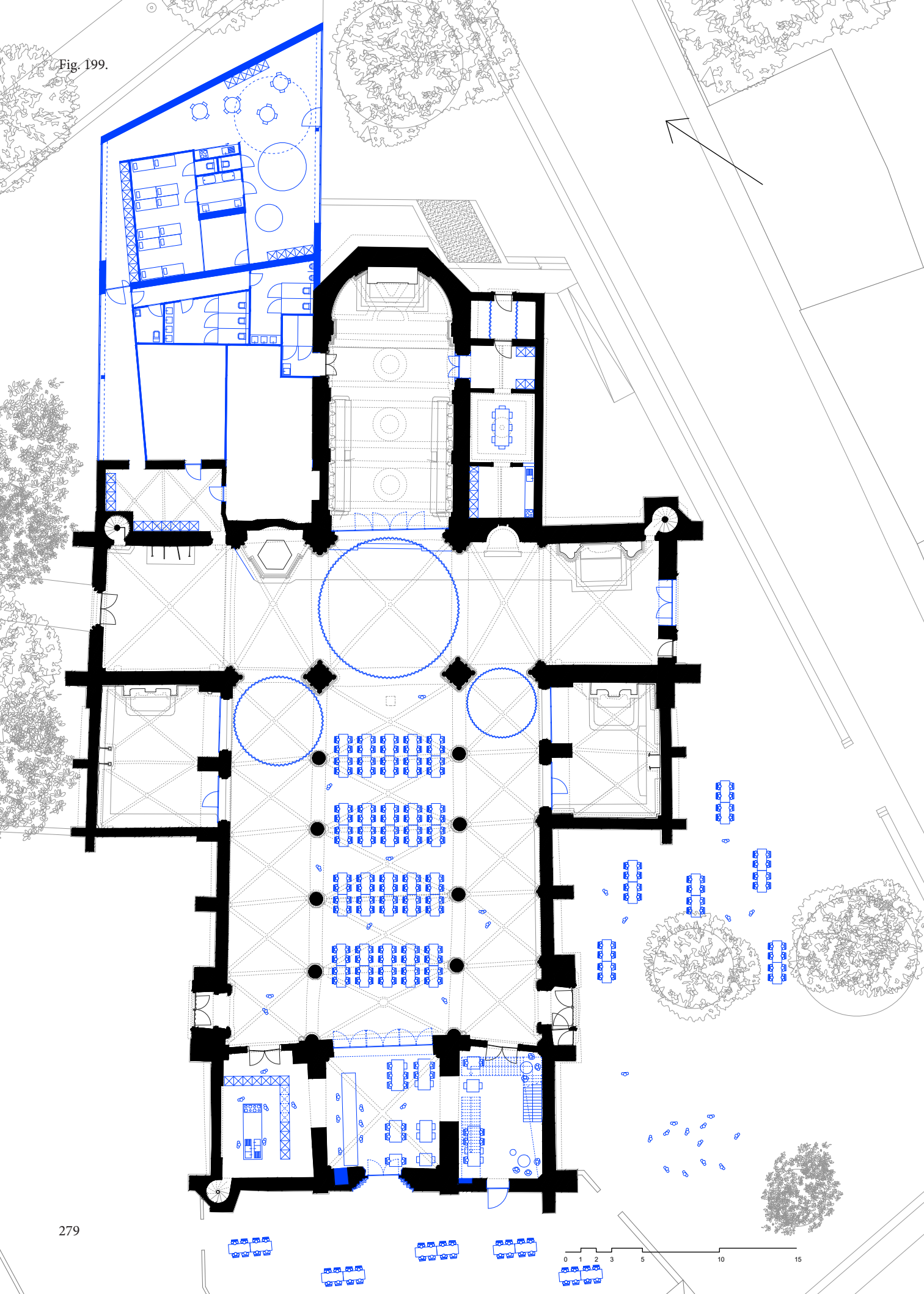


- **Agora**

During the exam period for university student, the church spaces can be freed up as agora space. As study spaces are a much requested item in this period, the church's functioning can partake in this. If needed, the use of space can be enlarged to use the nave and transept as well.

Fig. 199. Use of the church as an agora for students
[Pieter Vermeir]

Fig. 199.

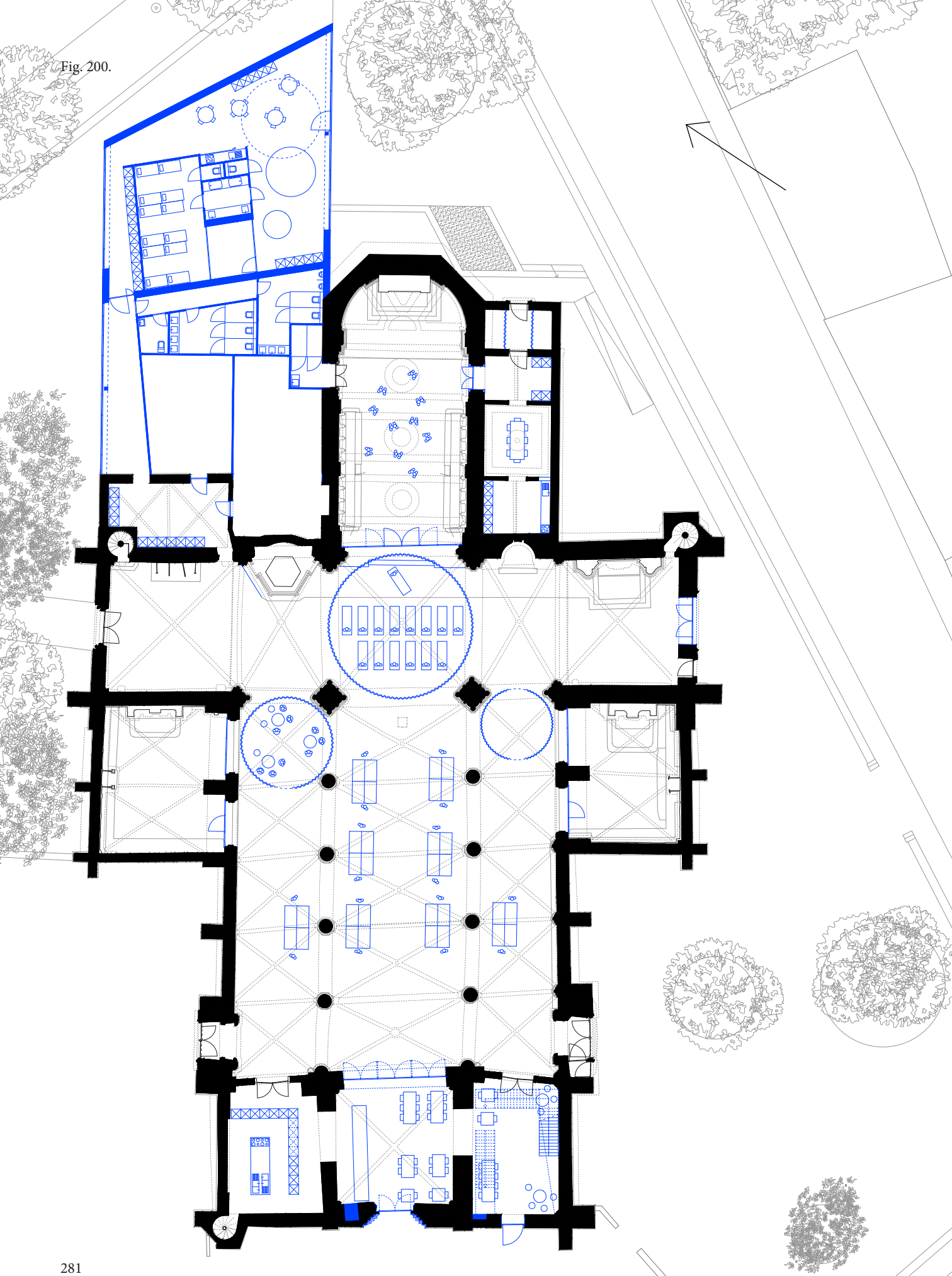


- **Neighbourhood Gathering**

The design for the church allows for a neighbourhod gathering to be hosted here. The main space is used as dining area and additionally the outside spaces of the verger's house garden and the smaller square ass well. The infrastructures of the café support this activity.

Fig. 200. Use of the church as space for a neighbourhood gathering
[Pieter Vermeir]

Fig. 200.

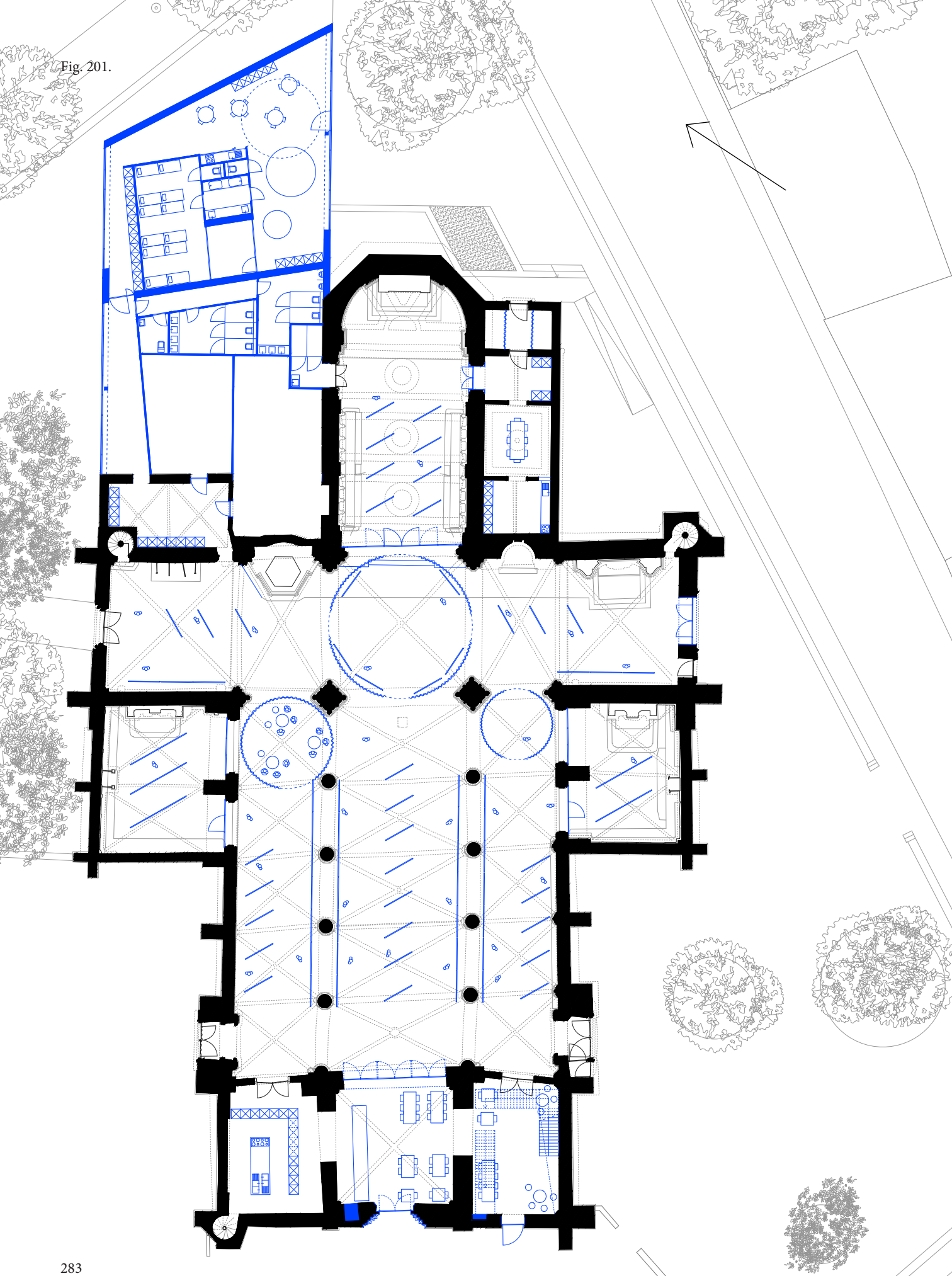


- **Sports**

A sports day can be organized in the church multifunctional spaces. Activities such as a dancing class in the choir, a yoga session at the crossing and a table tennis club can be organized here.

Fig. 201. Use of the church for sports
[Pieter Vermeir]

Fig. 201.

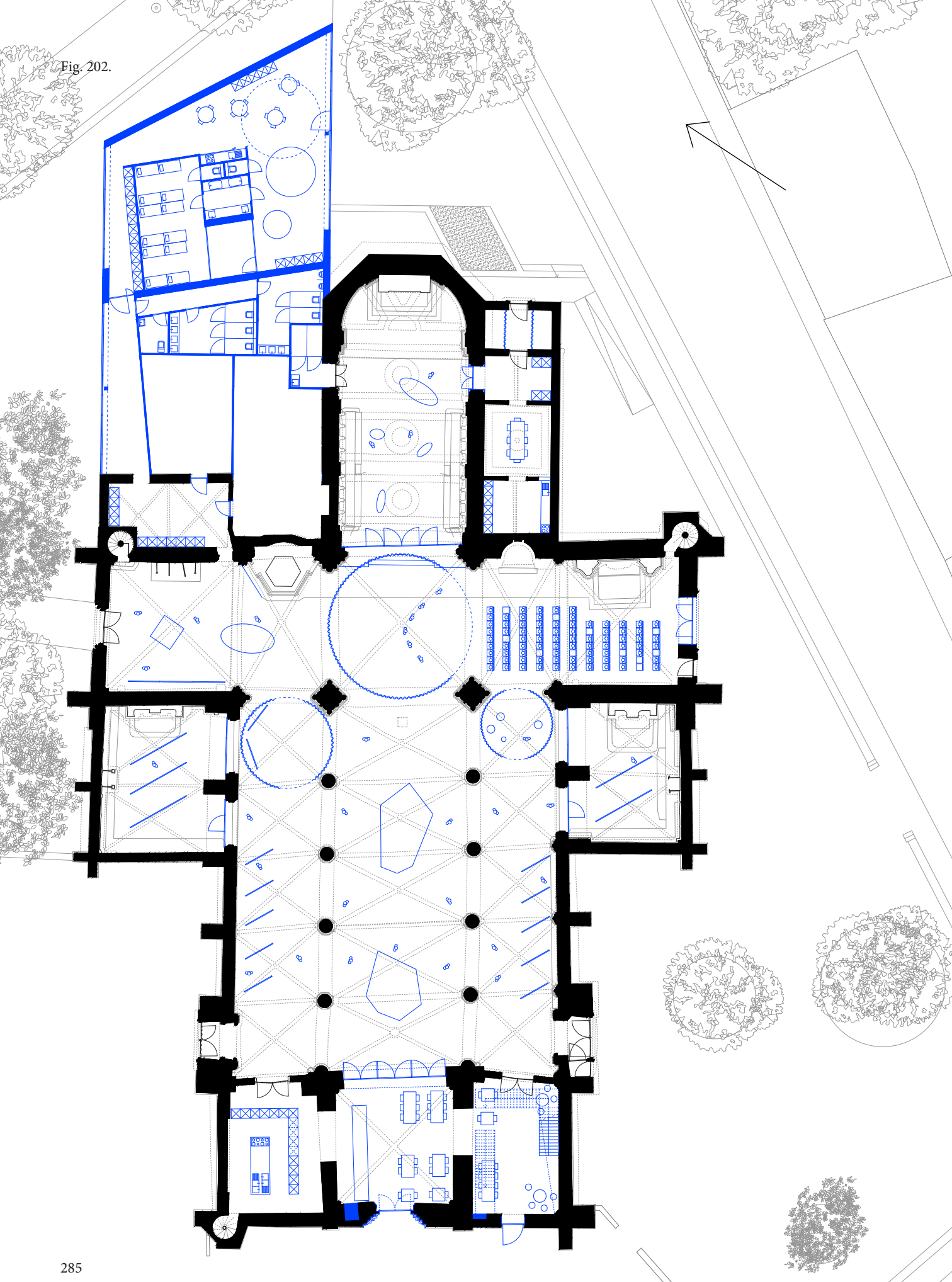


- **Exposition Space**

In collaboration with the nearby school (Sancta Maria) and the arts school (SLAC), the church is used as a exposition space for the student's work.

Fig. 202. Use of the church as an exposition space
[Pieter Vermeir]

Fig. 202.



- **Kunst in de Steigers**

The annual event 'Kunst in de Steigers' can be organized again in the church, this time withouth the shoring structures however.

Fig. 203. Use of the church for the event 'Kunst in de Steigers' [Pieter Vermeir]

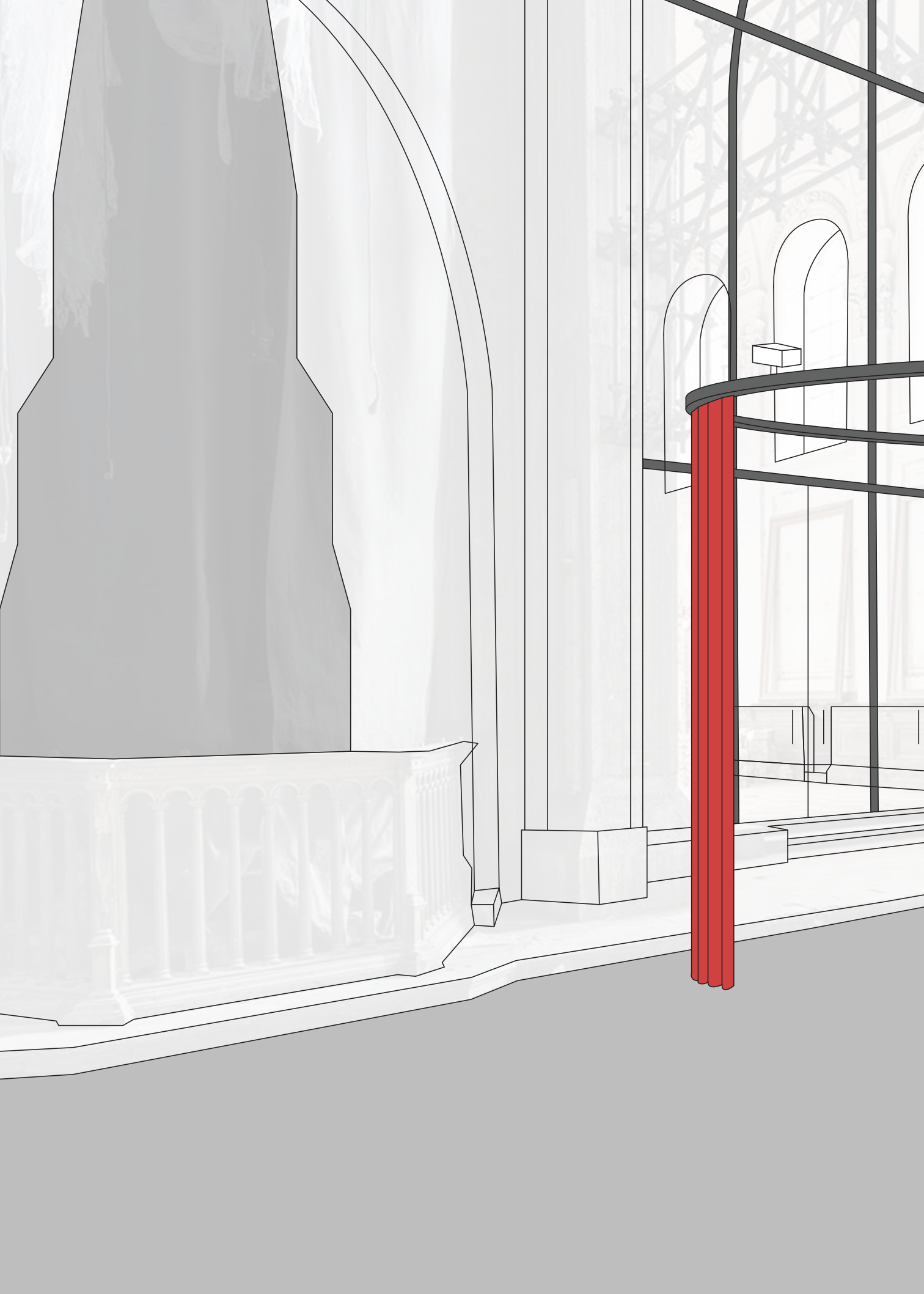


Fig. 203.

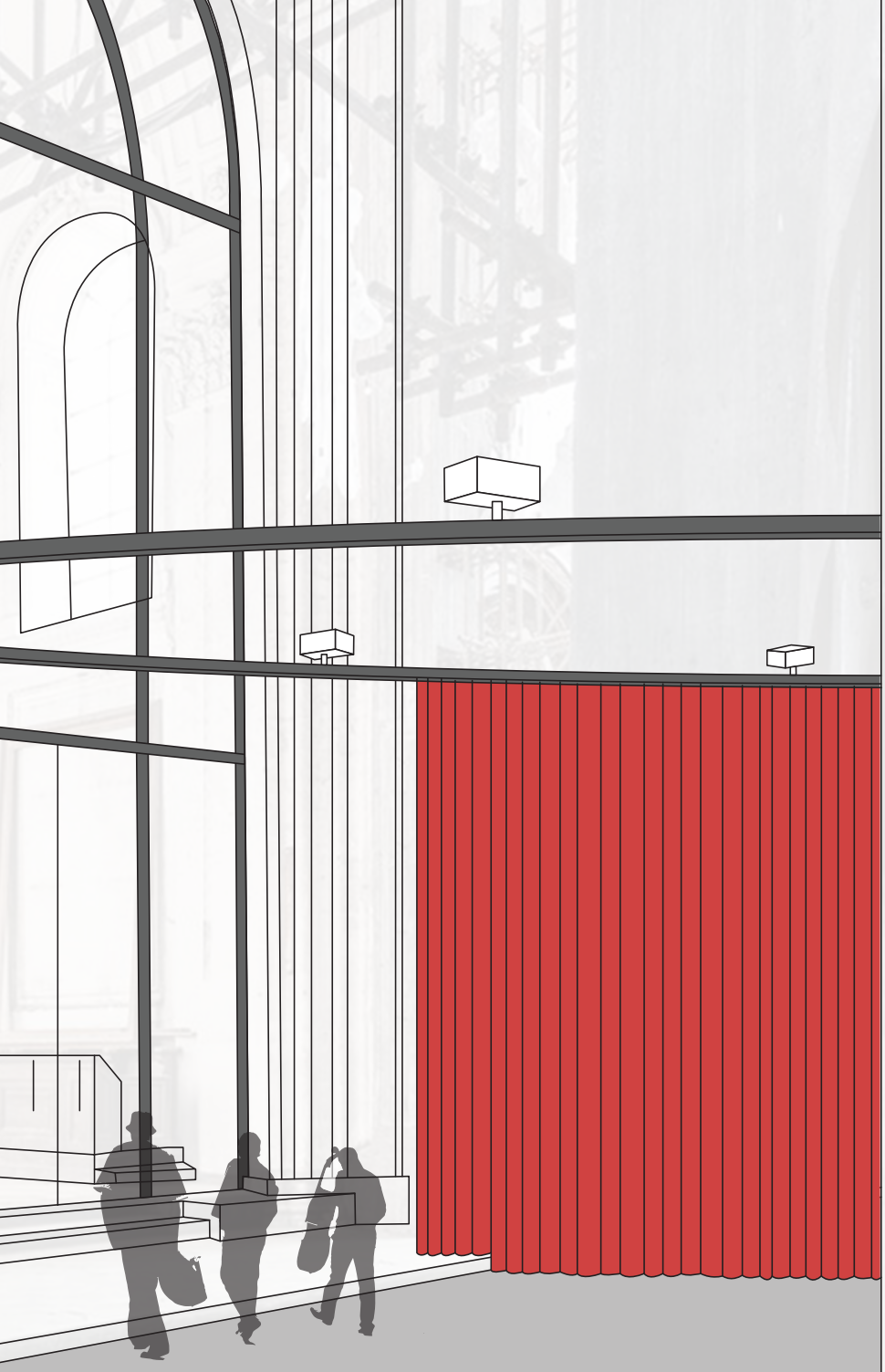


Fig. 204. View on the crossing [Pieter Vermeir]



Fig. 204.



Fig. 205. View on the northern side chapel used as classroom [Pieter Vermeir]





Fig. 205.

Fig. 206. View on the small square at the southern side of the church [Pieter Vermeir]

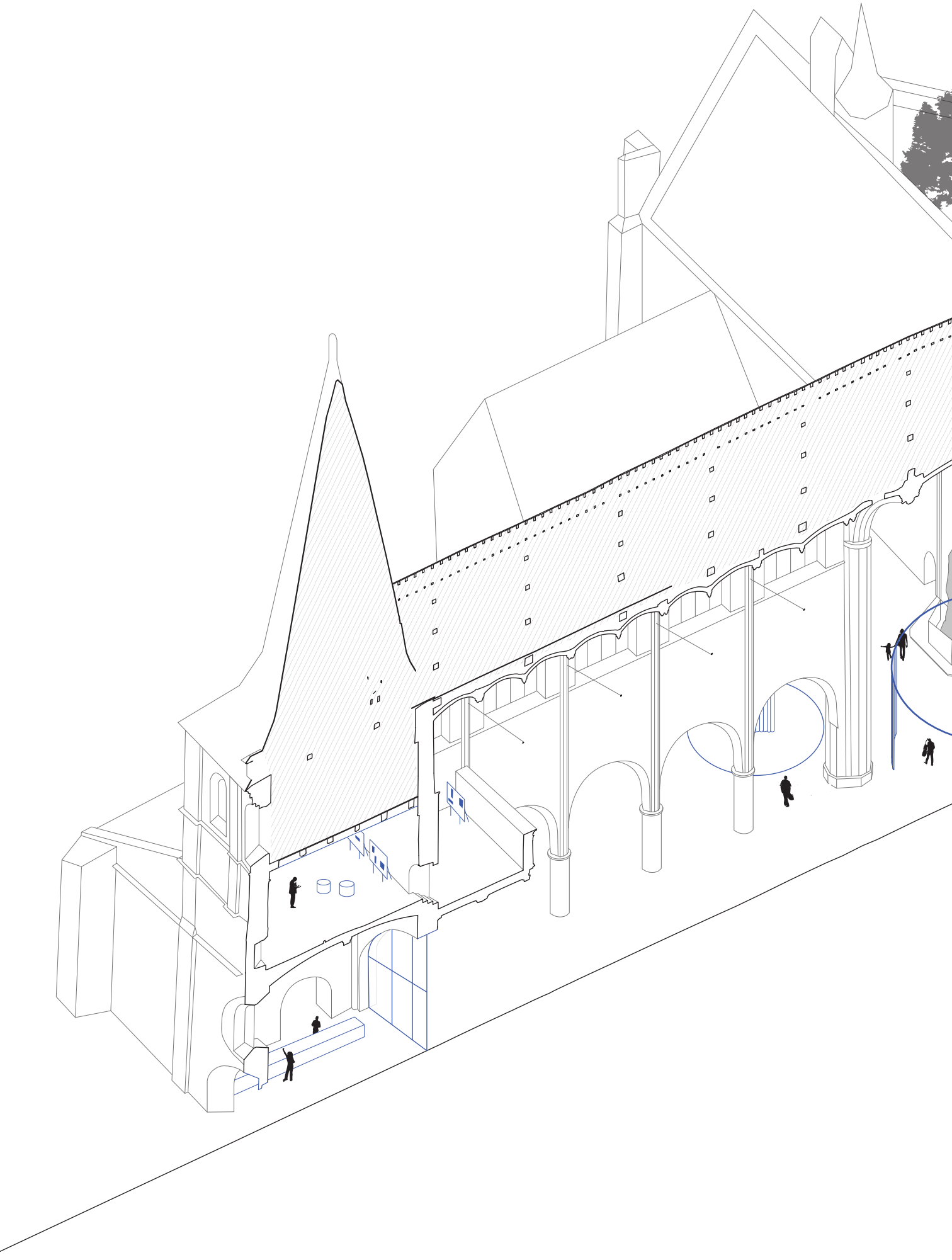


Fig. 206.

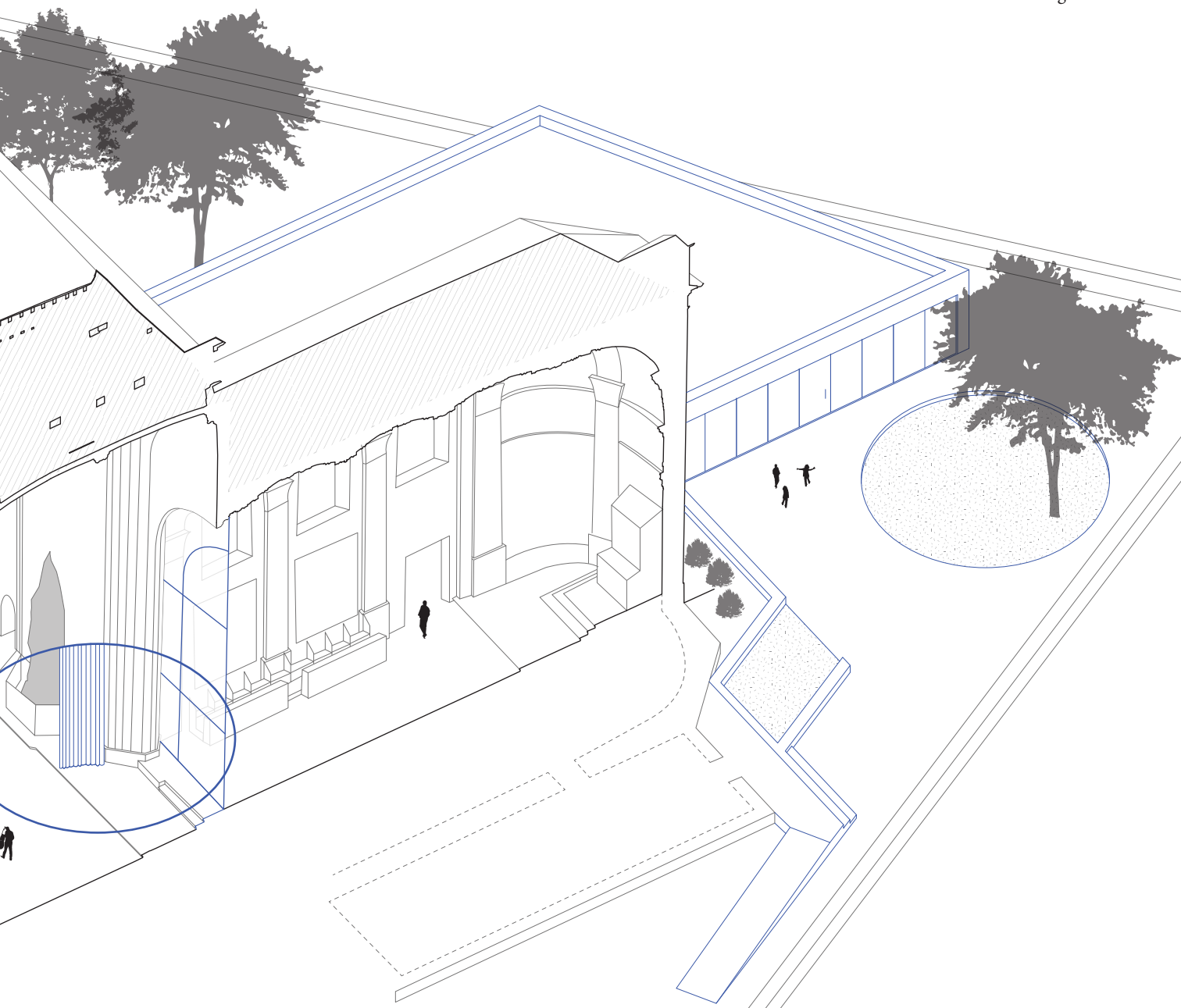


Fig. 207. Section A with axionometric view
[Pieter Vermeir]

V CONCLUSION

CONCLUSION

The first main part of this thesis (second chapter) was elaborating on the historical and structural aspects of the church of Saint James. Furthermore, the long period of closure, the debate after the intervention of 1971 and the parish were discussed.
The historical research done allowed for a statement on the heritage values the church possesses. In addition, the need for historical research is considered very important for understanding the structural issues as the past effects the church's structural behaviour in the present and the future. However, this was not sufficiently done for the current project, several questions remain unanswered. This is in link with the therapeutic relentlessness the church faced: the structural issues seemed to have been prioritised instead of an interdisciplinary research. Lastly, the administrative hassle caused by the unfinished intervention of 1971 and the limited financial support for the church led to a closure of 55 years. Until now, a project for stabilizing the church is initiated.

In the third chapter, the urban context of the church was briefly analysed to gain insights for the later design. For this, understanding the context is quite important and can not be ignored. Still some links of this church with other items on larger scale need to be researched. In the end, the parish is envisioned to disappear, along with it the parish centre and modern church. As such, the historic church of Saint James can retake its former place as centre of the society, but without the religious aspect.

Starting from the knowledge gained the previous chapter, a design for the reuse of the church of Saint James is proposed. The aim is to revitalize the neighbourhood and have the church play a major role in this enhancing of the local community. Not only a heyday of the past is considered, but a new heyday of the church is aimed for in the future with this design for reuse.
A multifunctional use is proposed,

backed up by permanent uses (café, museum, day-care) and needed infrastructures. The transept and nave are regarded as a sheltered public space with the possibility to host several activities linked to the neighbourhood.
The proposed design is a preliminary one, further research is needed. More works on technical aspects such as connections between old and new building parts.
With this design the church is aimed to be brought back to the collective memory of the community. This is advisably done by means of participative design.

Fig. 208. Clockwork of the bell tower [https://www.vrt.be/vrtnws/nl/2018/04/06/markante-plekken--de-sint-jacobskerk-in-leuven/]



Fig. 207.

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B176349	A37726	B157847	B157411
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B157850	B157390	B157399	
B157396	B157389	B163360	

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Collectie Lemaire/n.836

- **Archief Onroerend Erfgoed**

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36/361/4243 (Sint-Jacobskerk III)
36/361/4242 (Sint-Jacobskerk IV)
36/360/4241 (Sint-Jacobskerk V)
36/360/4240 (Sint-Jacobskerk VI)
36/360/4239 (Sint-Jacobskerk VII)
36/360/4238 (Sint-Jacobskerk VIII)

- **Stadsarchief Leuven**

5536 (KF St Jacob onroerende goederen)
5538 (KF St Jacob)
5539 (KF St Jacob verwerving vervreemding)
5564 (KF St Jacob patrimonium)

Interviews

Startvergadering (Studio Roma, TRIconsult) 20/08/2018
Meeting Petra Griefing (Stad en Architectuur) 25/10/2018
Meeting Joke Buijs and Lien Neyns (Stad Leuven) 03/12/2018

Works

Maarten BASSIER, Gilles HARDY, Leidy BEJARANO-URREGO, Anastasios DROUGKAS, Els VERSTRYNGE, Koen VAN BALEN and Maarten VERGAUWEN, "Semi-automated creation of accurate FEM meshes of heritage masonry walls from point cloud data", *Structural Analysis of Historical Constructions: An Interdisciplinary Approach*, 2018, 18/18, p. 305-314.;

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