

# **CASE STUDY RESEARCH**

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## INTRODUCTION

### Relation to design

This research is directly related to the design assignment of the Vacant Heritage graduation studio, which consists of the redesign of a police owned building. The building will potentially lose its current function, and the redesign will explore the possibilities for future use. The case study that has been chosen for redesign is the Koudenhorn police building in Haarlem. The construction of the building was concluded in 1771. The building consists of four wings enclosing a central courtyard. In the early 1970's an extension was added to the building.

The research has been conducted in order to create a better understanding of the courtyard building typology. The conclusions drawn from this research will be used to inform the redesign proposal of the Koudenhorn police station in Haarlem. The findings will be starting the points for the spatial organization of the redesign proposal.

### Research question

How can the courtyard typology be characterized and what redesign opportunities does it provide for the redesign of the Koudenhorn police station in Haarlem?

### Methods REFLECT ON 6x CASE STUDIES

The research consists of case study analysis. Through analytical drawings, six buildings have been analyzed on five aspects;

#### - Central space

What is the central space of the building?

#### - Spatial organization

What is the spatial organization of the building in relation to the central space?

The focus of the spatial organization analysis is on the relation of the central space to the adjacent spaces. The analytical drawings show the spaces that are accessible from the central space through one passage (door, wall opening, etc.) called the 'primary' spaces, and the spaces that are accessible from the primary spaces, called the 'secondary spaces.

#### - Entrances

Where are the main and secondary entrances of the building located?

#### - Routing

What are the main routes through the building?

#### - Daylight

How does daylight enter the building through the central space?

The case studies have been selected based on the following criteria;

- The building has a central space. The central space is significant in size in relation to the overall building and spans multiple floors.

The definition of a courtyard as given in the Cambridge dictionary is 'an area of flat ground outside that is partly or completely surrounded by the walls of a building'. Instead of focusing solely on courtyard buildings, the scope of the research is widened to include buildings with large central spaces, because they share many characteristics with courtyards. This includes into the research buildings with courtyards that were transformed into atria, but also buildings that were built with an atrium space originally. Although these buildings may not have a courtyard, the expectation is that similar spatial principles apply, and that the conclusions drawn from analyzing these buildings will be relevant to creating a better understanding of the courtyard typology.

- The building is a public building, preferably a library.

It is expected that the central space of a public building is used more intensively than that of a building with a private use. Therefore it is also expected that the central space of a public building has a stronger connection to the building itself. Analyzing a public building would thus yield more useful results. The intended (partial) new programme for the Koudenhorn building is a library. It would therefore be beneficial if the programme of a case study is also a library, so the findings of the analysis are more closely related to the design.

- The building is located in an urban context

The Koudenhorn building is located in an urban context. Its orientation and the location of its entrances are directly related to the context. In order to extract conclusions that are useful for the design, the case study buildings will also be located in an urban context.

# PREDIKHEREN CITY LIBRARY, MECHELEN

## GENERAL

Location: Mechelen, Belgium  
Programme: Library  
Area: 5840 m<sup>2</sup>  
Year: 2019  
Architect: Korteknie Stuhlmacher Architecten

The Predikherenklooster is a baroque monastery that was built starting in 1650. In the 18th century it was deconsecrated and during the 19th and 20th century it was mainly used for military purposes, until it was abandoned in 1975.

Programming, spatial design, restoration concept, design of technical installations and structural interventions were intended to preserve and reinforce the characteristics of the existing edifice. The building's structure consist of an outer ring of broad multifunctional rooms, an inner ring around the courtyard, the courtyard, the attic and the church. The structure has been preserved over the years and can be experienced anywhere in the building.

The leading principle for the programmatic setup was the architectural structure and character of the existing spaces. The buildings' imperfections resulting from various modifications made through the centuries and from recent neglect were regarded as its great strenght. The restoration has striven to preserve the traces of the buildings' long and tumultuous history.

Regardless of the changing role of printed media, books and other sources of information, the architects believe that libraries can continue to play a vital role in the public life of our cities as public living rooms and collective working environments.



Figure 1: Courtyard of the Predikheren library (ArchDaily, n.d.)

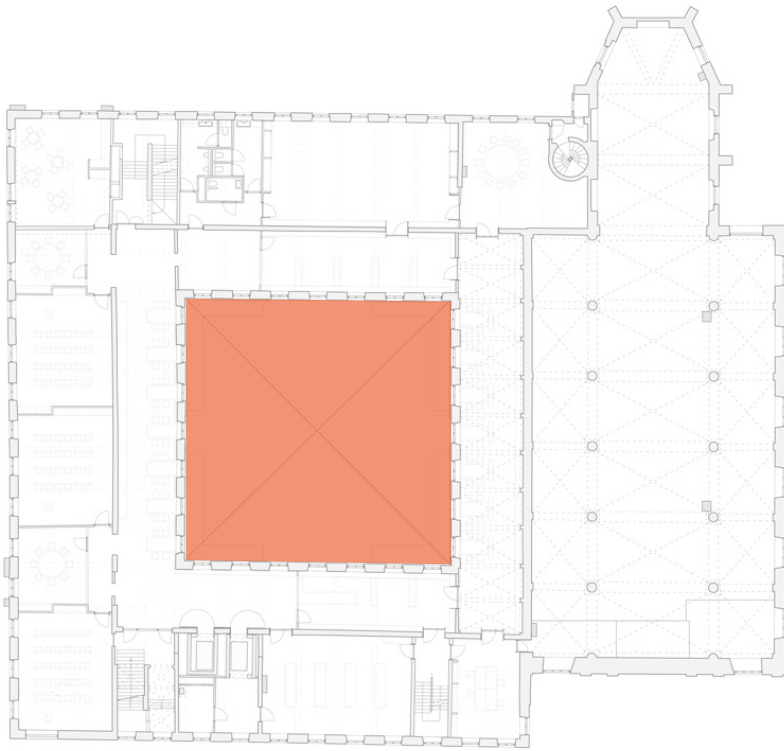


Figure 2: Cloister of the Predikheren library (ArchDaily, n.d.)

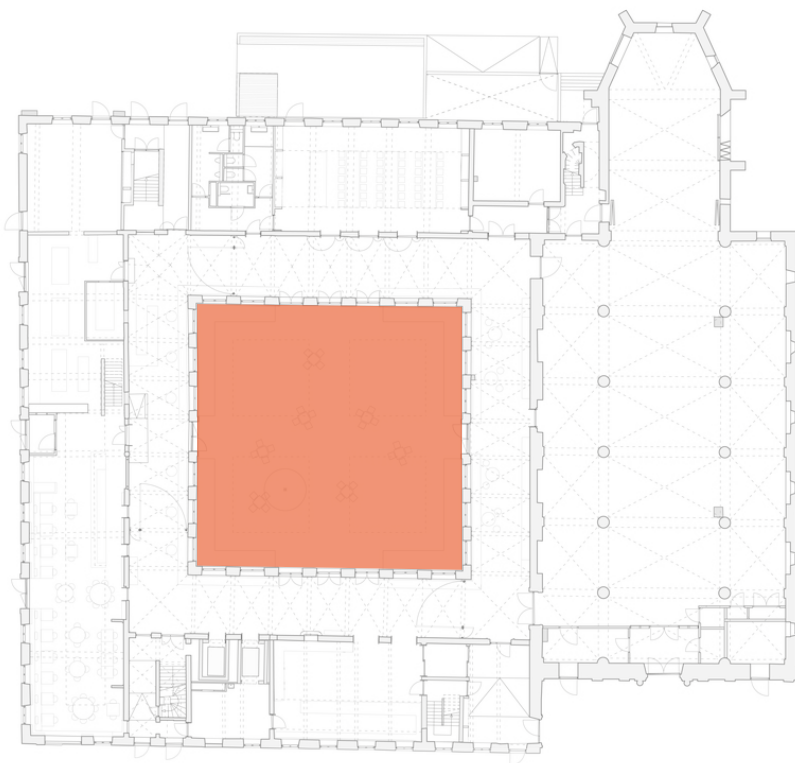
# CENTRAL SPACE

## Legend

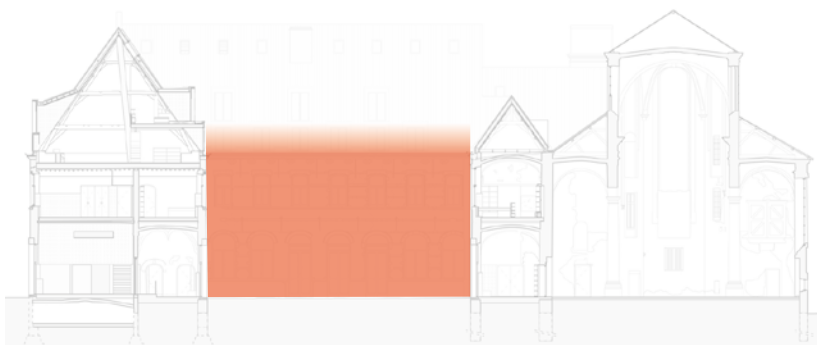
 Central space



First Floor



Ground Floor



Section

The central space of the Predikheren monastery is the open courtyard. It serves as a terrace and multipurpose 'outdoor room'. The courtyard is open to the sky, as it was originally.

 0 10m

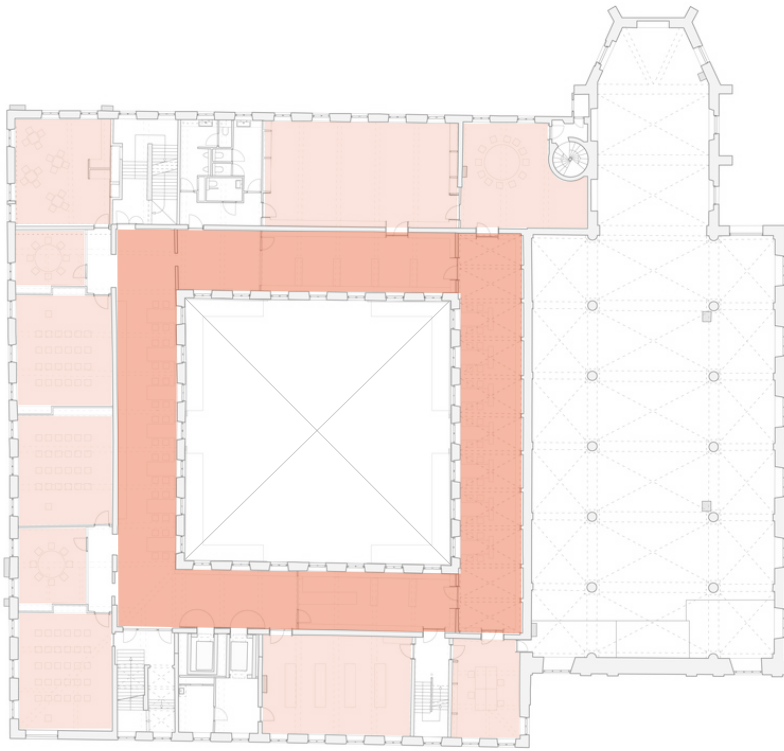
Figure 3.1: Predikheren analysis - central space



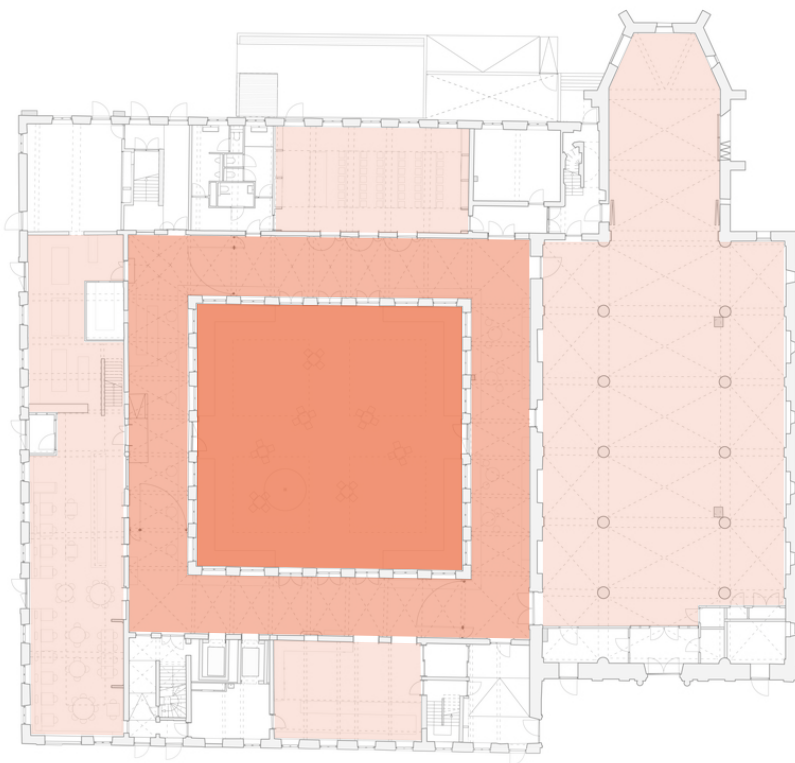
# SPATIAL ORGANIZATION

## Legend

- Central space
- Primary
- Secondary



First Floor



Ground Floor



Section

The courtyard is entirely enclosed by the cloister on both the ground and second floor. Adjacent to and accessible from the cloister are the main spaces in the outer ring of the building. On the ground floor these are the entry hall, refectory (dining hall), cafe and the church. On the first floor the staff office and library spaces are directly accessible from the cloister. The meeting rooms in the west wing of the building are accessible through a small intermediate entry space.

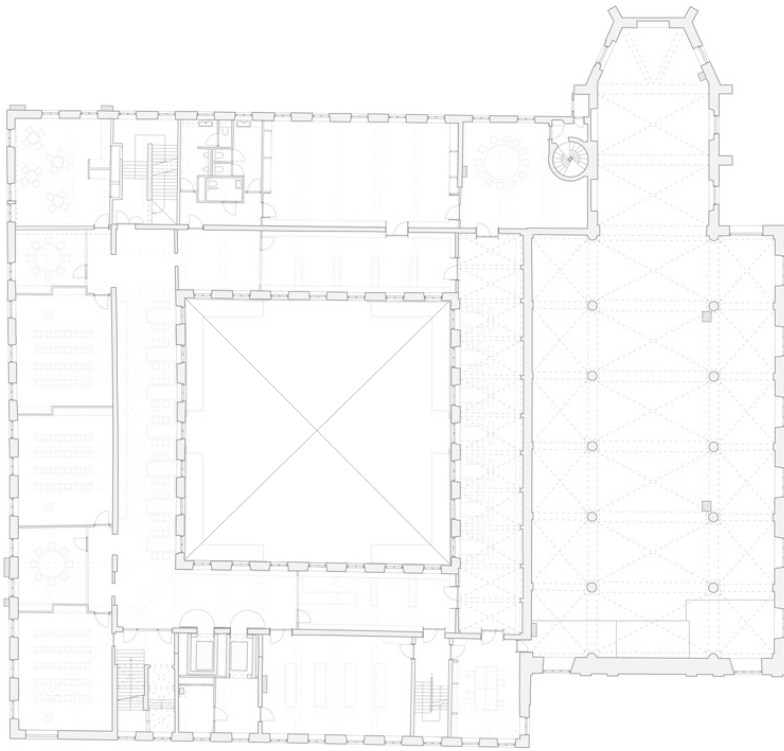


Figure 3.2: Predikheren analysis - spatial organization

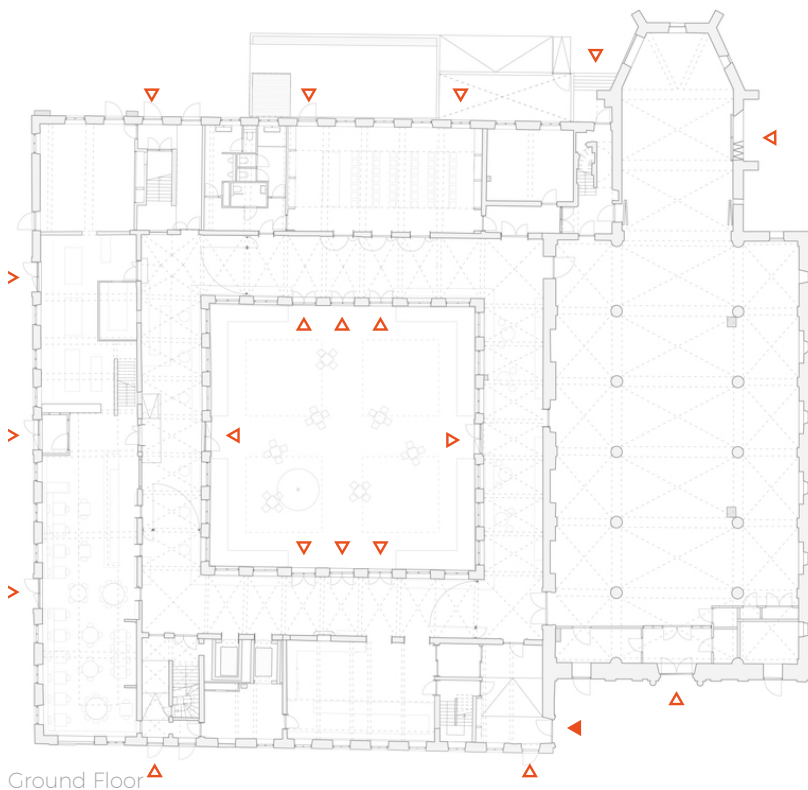
# ENTRANCES

## Legend

- ▶ Main entrance
- ▷ Entrance



First Floor



Ground Floor



Section

The building has multiple entrances on all sides, adding to the accessibility and public character of the programme. The courtyard is accessible from all sides. The north and south entrances to the courtyard consist of a series of three double doors, emphasizing the connection between the courtyard and the cloister.

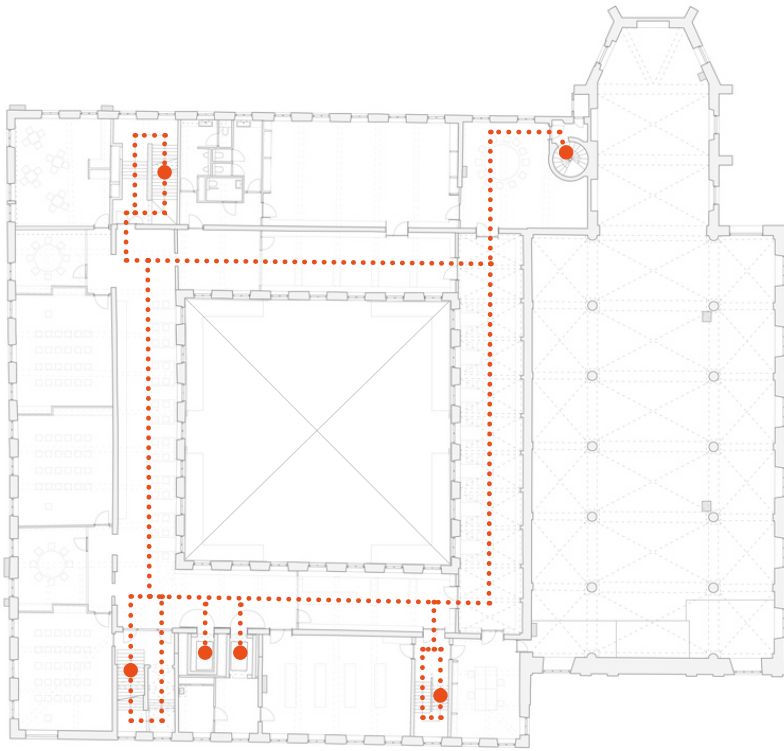


Figure 3.3: Predikheren analysis - entrances

# ROUTING

## Legend

- ..... Main routes
- Vertical access



First Floor



Ground Floor



Section

The cloister is the main organizational principle of the building. Most entrances and stairwells are located on the continuation of the axis of the cloister. From there, almost all other spaces can be accessed. In some instances, the spaces in the outer ring of the building are interconnected, creating secondary routes.

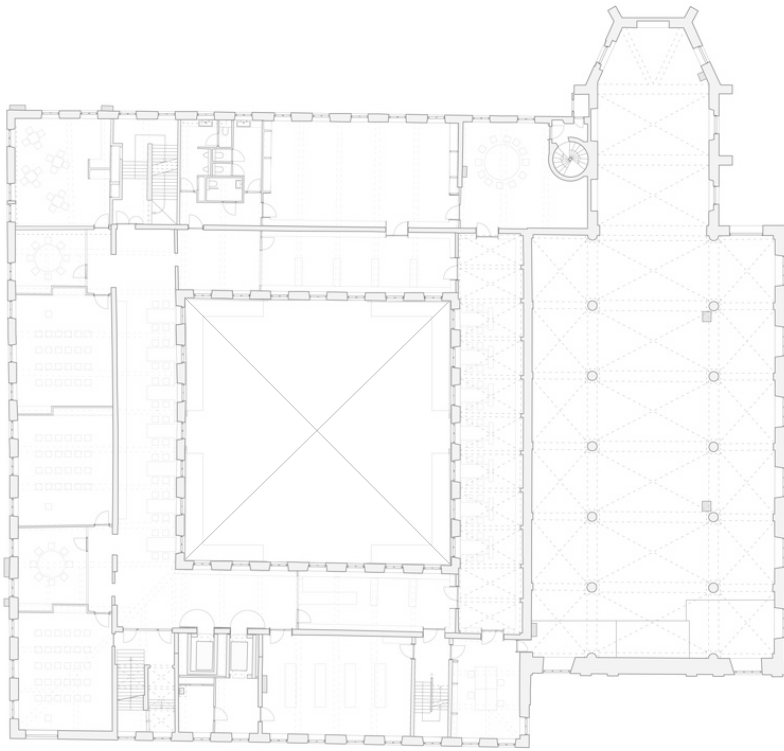


Figure 3.4: Predikheren analysis - routing

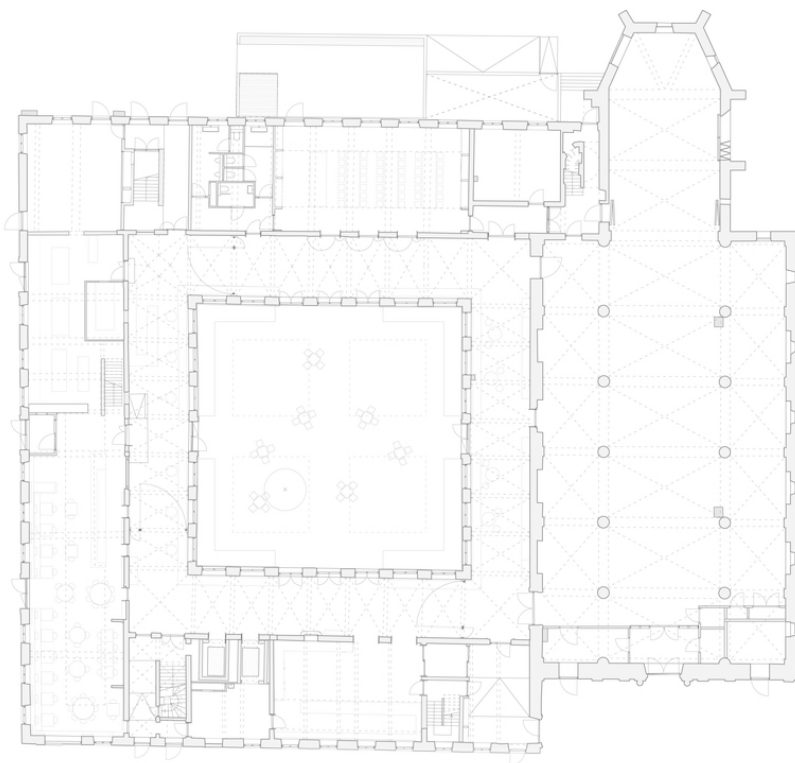
# DAYLIGHT

## Legend

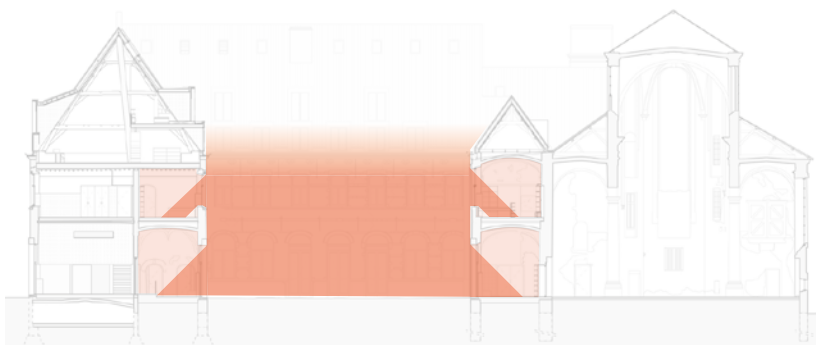
- Direct daylight
- Indirect daylight



First Floor



Ground Floor



Section

The window openings towards the courtyard allow for daylight to enter the building on the ground and first floor of the cloister. The high windows on the ground floor allow more light to enter the building, emphasizing the connection with the courtyard and the importance of the ground floor cloister.



Figure 3.5: Predikheren analysis - daylight

## SOURCES

Korteknie Stuhlmacher Architecten. (n.d.). *Library within baroque walls - Public library in the Predikherenklooster in Mechelen*. Retrieved from <https://www.ksa.nl/en/projects/public-library-mechelen>

Pintos, P. (2020). *City Library Het Predikheren / Korteknie Stuhlmacher Architecten + Callebaut Architecten + Bureau Bouwtechniek*. ArchDaily. Retrieved from <https://www.archdaily.com/944248/city-library-het-predikheren-korteknie-stuhlmacher-architecten-plus-callebaut-architecten-plus-bureau-bouwtechniek>

# PESTHUIS, LEIDEN

## GENERAL

Location: Leiden, the Netherlands  
Programme: Mixed use  
Area: 2049 m<sup>2</sup>  
Year: To be transformed  
Architect: Van Manen

Completed in 1662 to house plague victims, the Pesthuis ('Plague house') in Leiden is a square shaped building consisting of four wings around a courtyard. The building is, for obvious reasons, located just outside the historic city centre and is surrounded by a small moat.

The building was used as the entry to the Naturalis national history museum, allowing entry to the main museum building through a bridge. It was also used as exposition space. After the entry to the museum was relocated the building was used by pop-up hotspot 'de Buurt', a mixed programme of catering, culture and entertainment.

Recently, plans have been approved for transformation into a mixed use programme with a foodhall, co-working spaces, hostel, shortstay, dwelling, catering, art and culture.

The architect aims to use the principle of form follows function, and states that the buildings' potential can be utilized through relatively small interventions. The existing spatial qualities offer the possibility to fill the gaps in the programme of the city.



Figure 4: Courtyard of the Pesthuis as seen from the first floor. (own image)

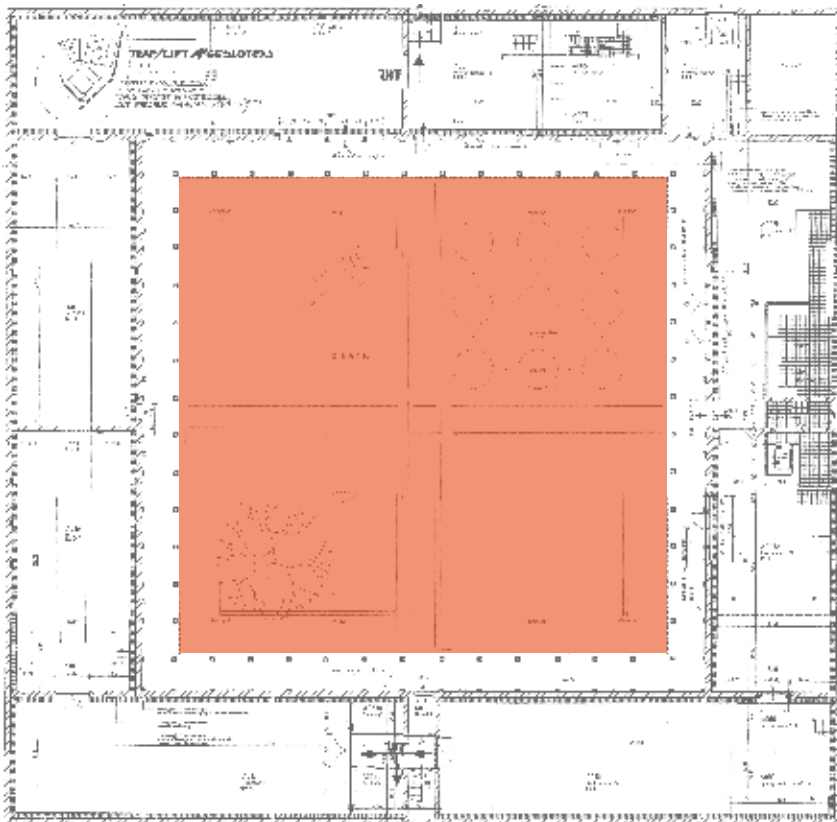


Figure 5: Courtyard of the Pesthuis as seen from the first floor. (own image)

# CENTRAL SPACE

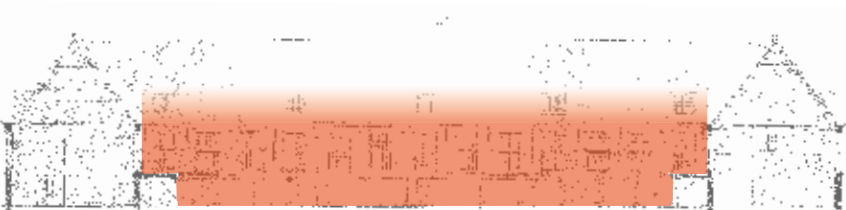
## Legend

 Central space



Ground Floor

The central space of the Pesthuis is the open courtyard. It is surrounded by an arcade, offering shelter from weather conditions. During use by de Buurt, the courtyard and arcade were filled with tables, seating areas and a small podium.



Section

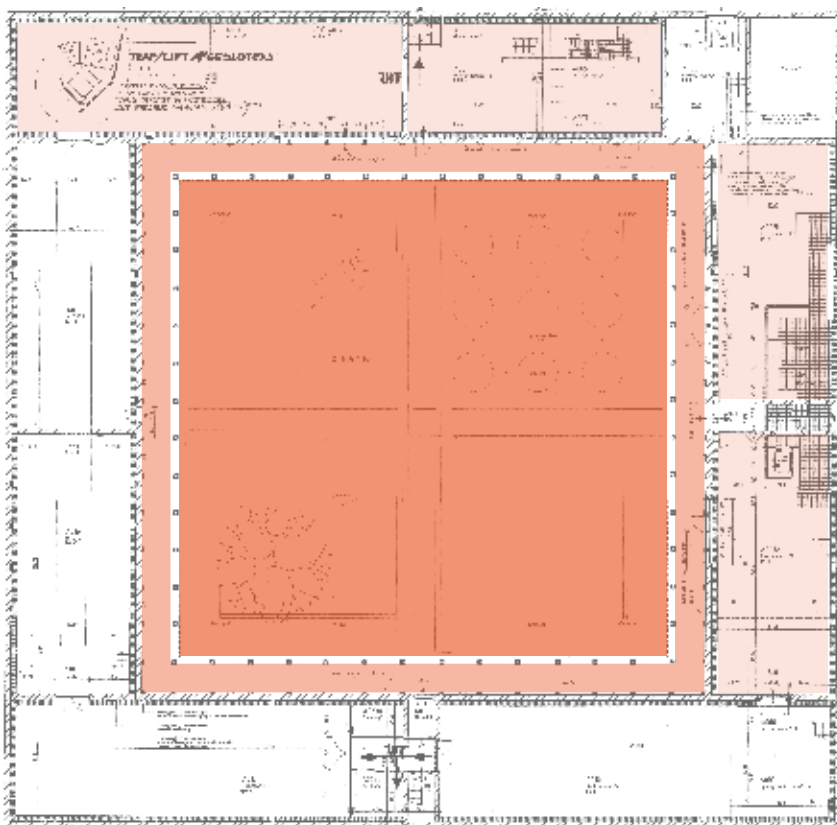
 0 10m



# SPATIAL ORGANIZATION

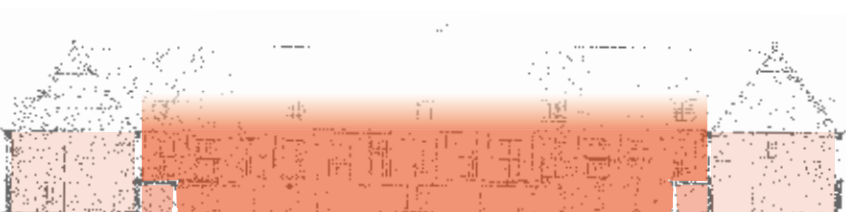
## Legend

- Central space
- Primary
- Secondary



Ground Floor

The four wings of the building enclose a central courtyard. An arcade runs along the edges of the courtyard. From the arcade, only four of the eight main spaces on the ground floor of the building can be reached. The other spaces can be reached through the interior of the building. The spaces on the ground floor are exceptionally high and have large windows due to the belief that ventilation would benefit the treatment of the plague victims.



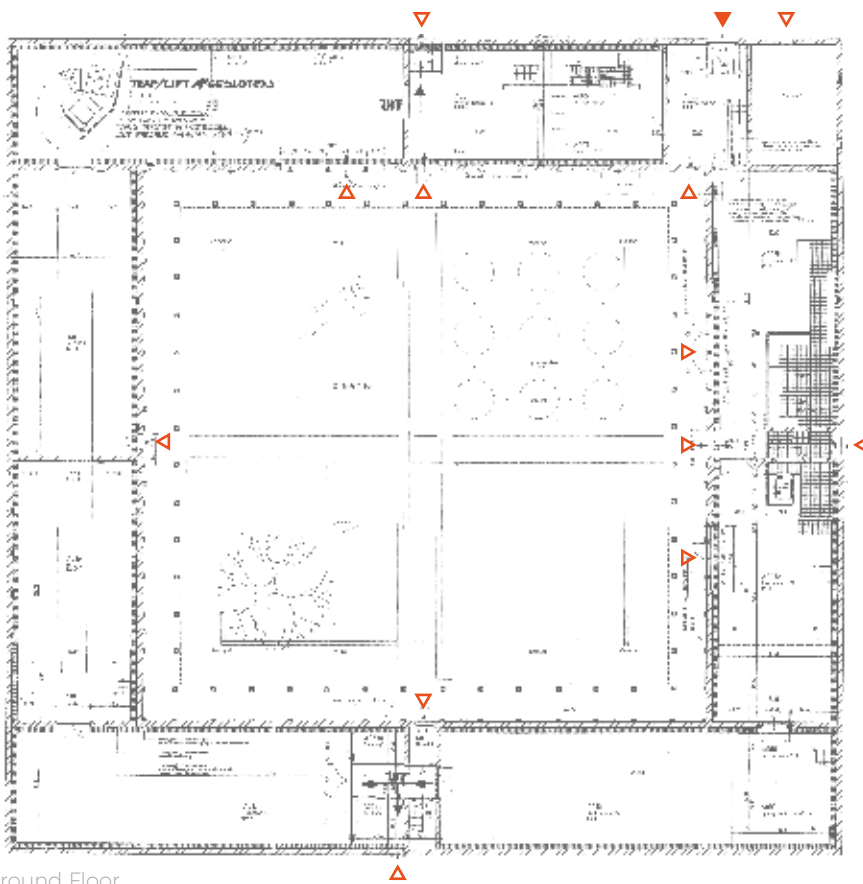
Section

0 10m

# ENTRANCES

## Legend

- ▶ Main entrance
- ▷ Entrance



Ground Floor

The main entrance is located at the only bridge over the moat that runs around the entire building. The other entrance on the outside of the building, some of which were added recently, are for logistical purposes. There are five original entrances to the courtyard; one in the middle of every wing and one in the corner at the entrance hall. Additional wider entrances to the courtyard have been added during the most recent transformation.



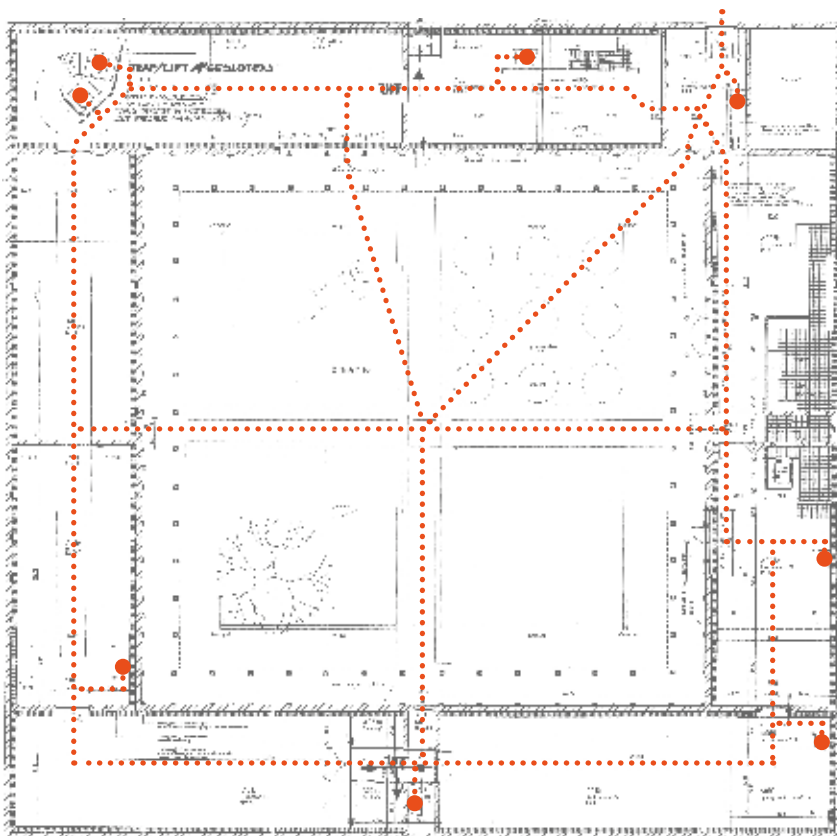
Section



# ROUTING

## Legend

- ..... Main routes
- Vertical access



Ground Floor

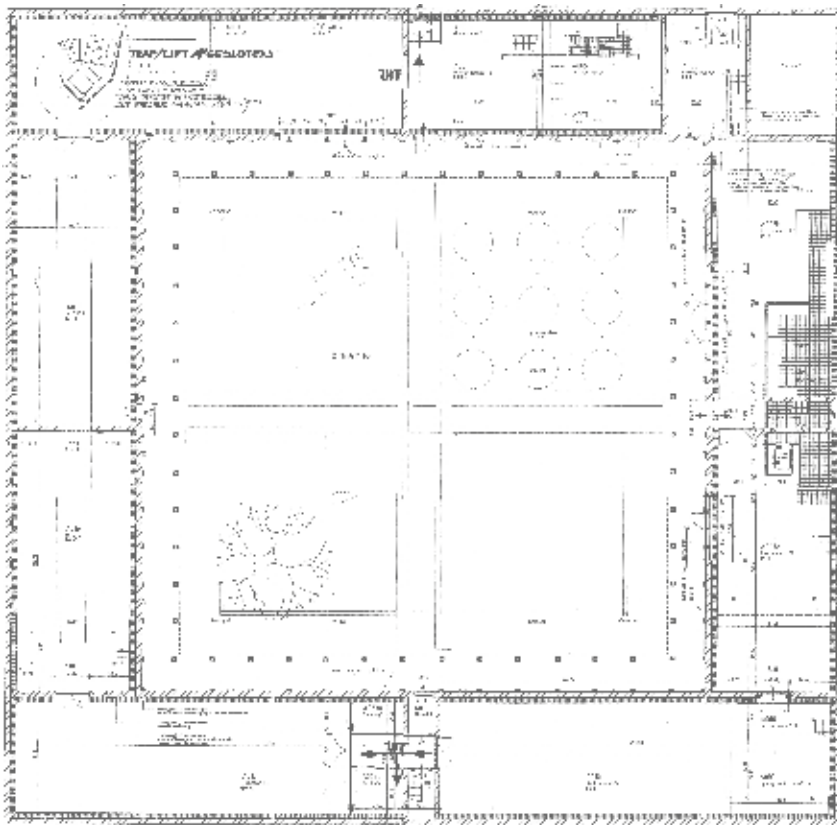
The wings of the building are all internally connected, and the main route runs through them. The arcade cannot be traversed continually, because several seating areas and tables have been placed in it. Therefore it is currently not part of the main route. Instead of the arcade, the courtyard itself is part of the main circulation through the building.



Section

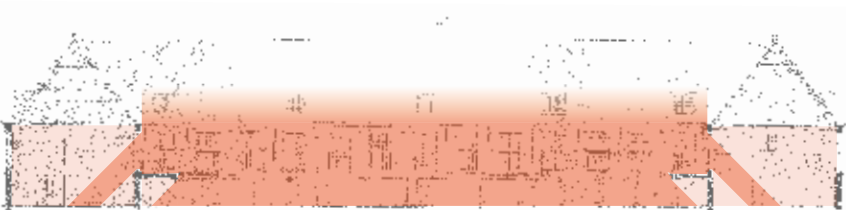


# DAYLIGHT



Ground Floor

The high ground floor spaces and high windows were constructed in such a way due to the belief that proper ventilation would help battle the plague. The high windows allow for a lot of daylight into the ground floor spaces.



Section

0 10m

## SOURCES

Rijksvastgoedbedrijf (n.d.) *Pesthuiscomplex Pesthuislaan 1-7 te Leiden*. Biedboek. Retrieved from <https://www.biedboek.nl/nl/realstate/view/428/pesthuislaan-1-7-te-leiden>

Van Manen. (2016). *Wijzigen noord- en zuidgevel + aanbrengen nooddeuren*. Technical drawings Pesthuis-complex Leiden.

Van Manen (2019). *De nieuwe toekomst voor het Pesthuiscomplex!* Retrieved from <https://www.van-manen.com/actueel/details/de-nieuwe-toekomst-voor-het-pesthuiscomplex>

# POST CENTRAL LIBRARY, UTRECHT

## GENERAL

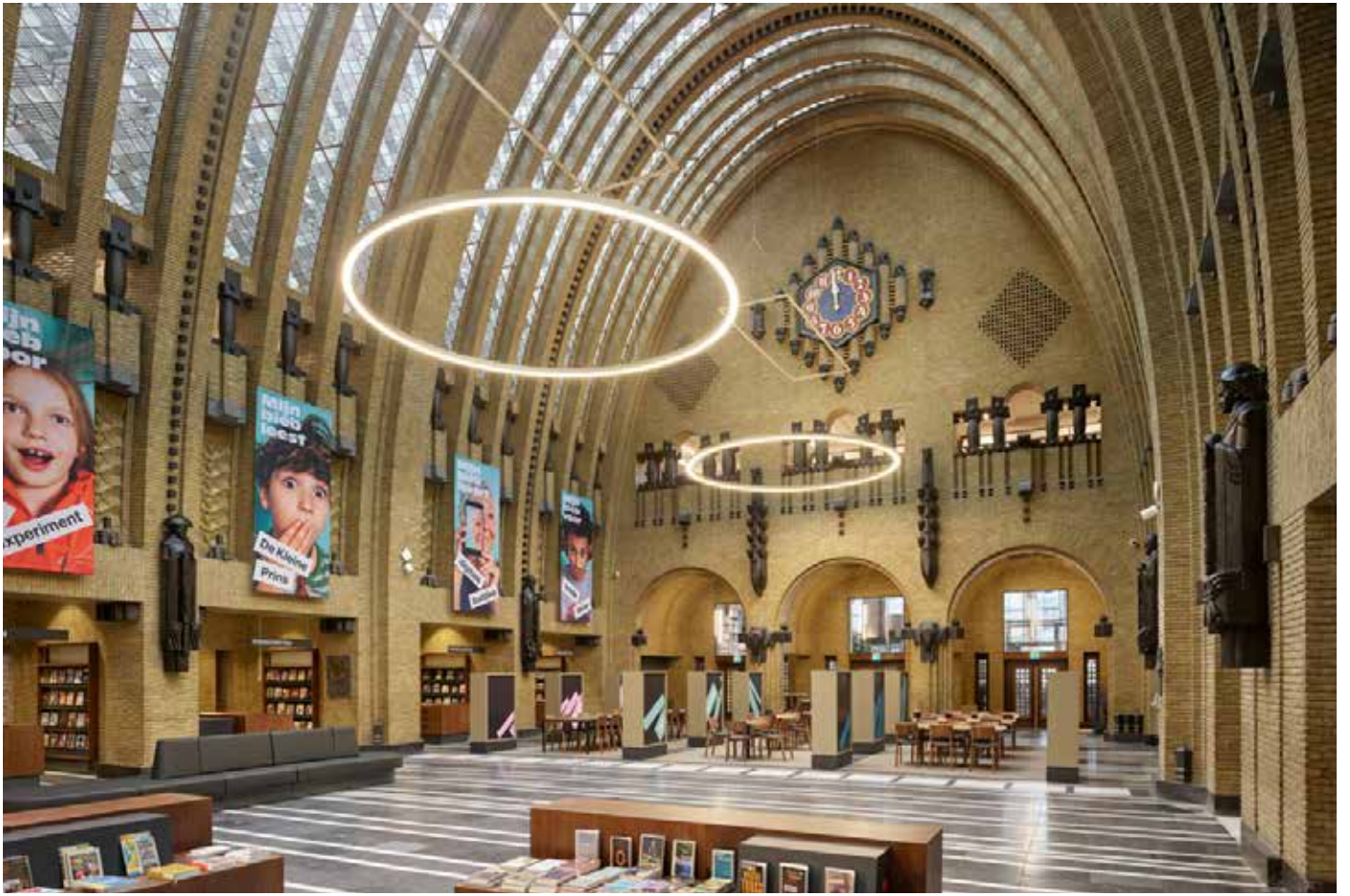
Location: Utrecht, the Netherlands  
Programme: Library, Retail, Cafe  
Area: 9000 m<sup>2</sup>  
Year: 2020  
Architect: Rijnboutt, Zecc Architecten

In 2011 the last central post office in the Netherlands closed its doors. The national monument is best known for the reception hall with its parabolic ceiling, glazed yellow stones and robust ornaments. Originally, this was the only entrance that was publicly accessible, but around it was another 8000 m<sup>2</sup> of business space.

The 1918 design had a public entrance and logistics court, marking a clear front and backside of the building. While this was a practical situation back then, it is not suitable for today as the Oude Gracht on the backside of the building is a main commercial street. During the redevelopment an extension and new front side to the building has been realised in the logistics court, with a new facade and entrances for shops, a cafe and an auditorium. The original front side entry and public hall for the library remains the most prominent public entrance. The redevelopment has aimed to create a library as a meeting place for the modern city dweller, a 'living room' for the city.

In the monumental hall, the challenge was to practice restraint in the design in order to let the already present quality speak for itself. To create a starting point for exploring the library. An inviting living room for encounter between people.

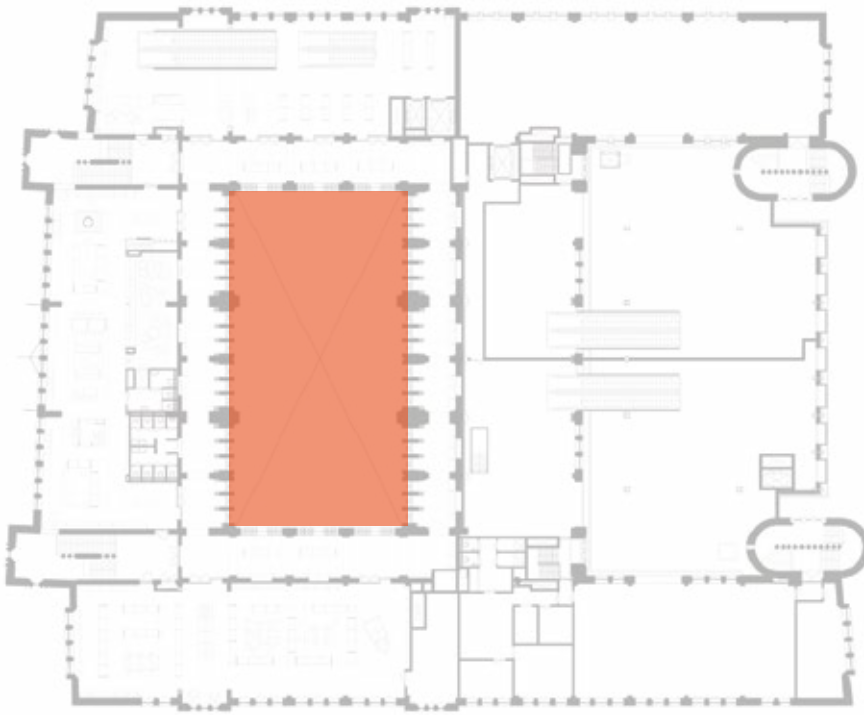
This analysis focusses on the part of the building around the central space, which is the library. The other part of the building consists of commercial spaces.



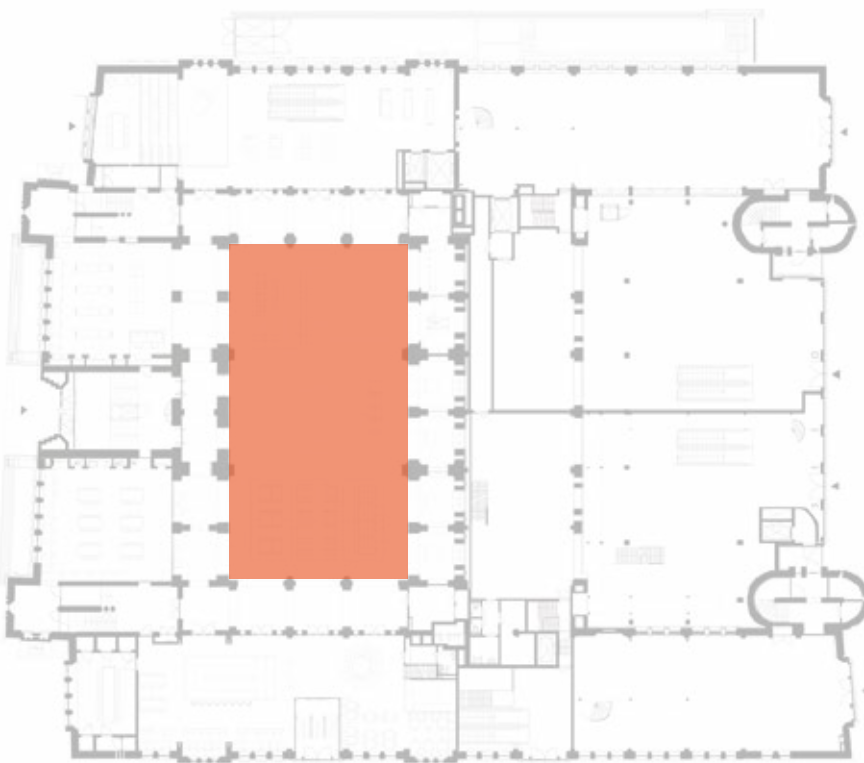
# CENTRAL SPACE

## Legend

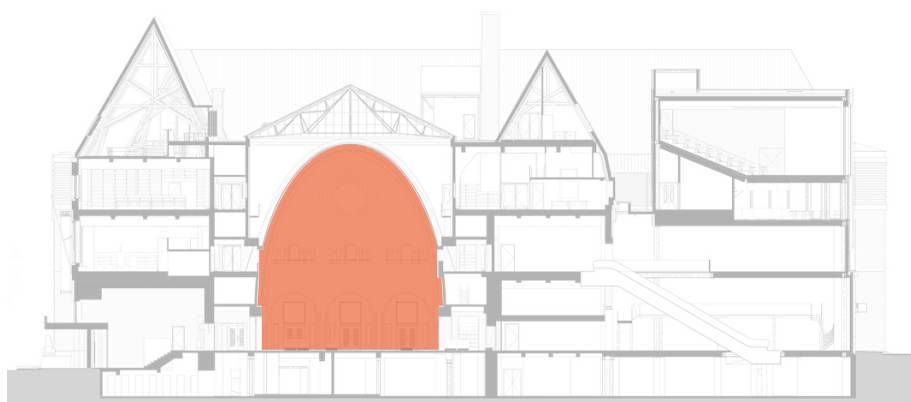
 Central space



First Floor



Ground Floor



Section

The central space of the Post is the monumental entrance hall with its characteristic parabolic ceiling. It serves as a starting point for exploring the library, and as a place for encounter; a living room for the city.

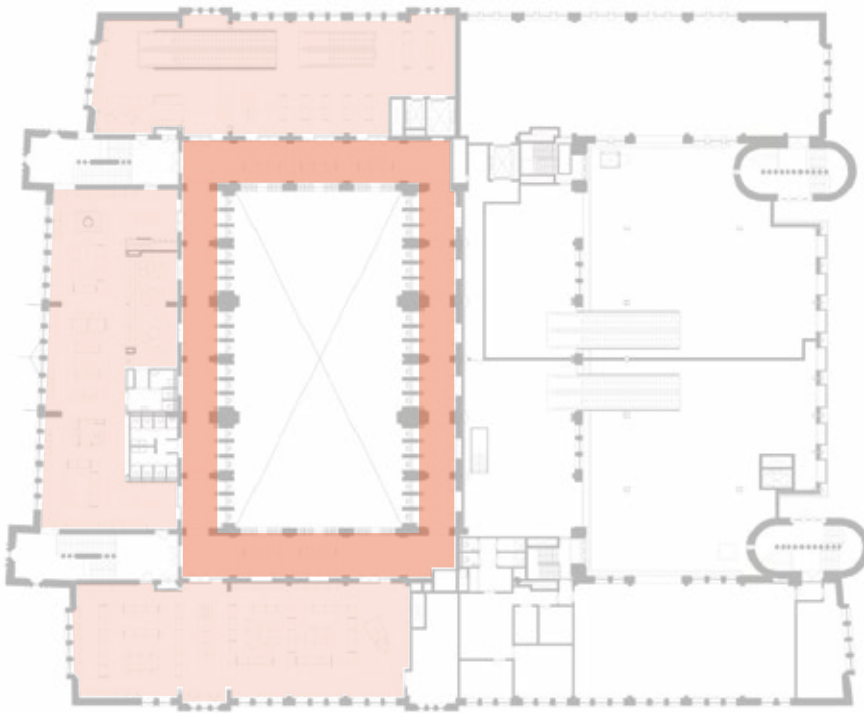
 0 10m



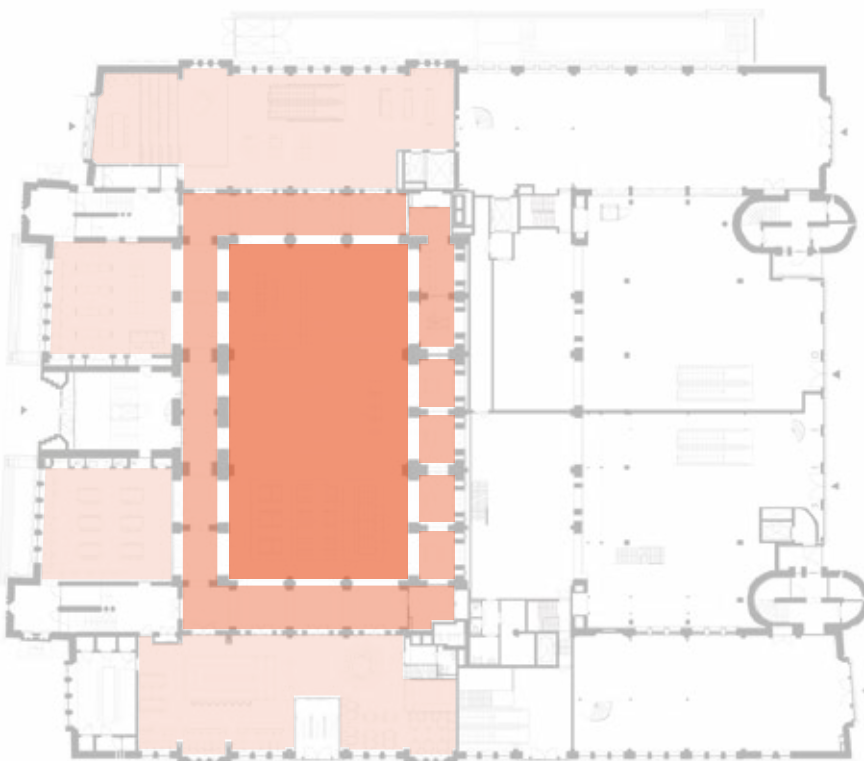
# SPATIAL ORGANIZATION

## Legend

- Central space
- Primary
- Secondary

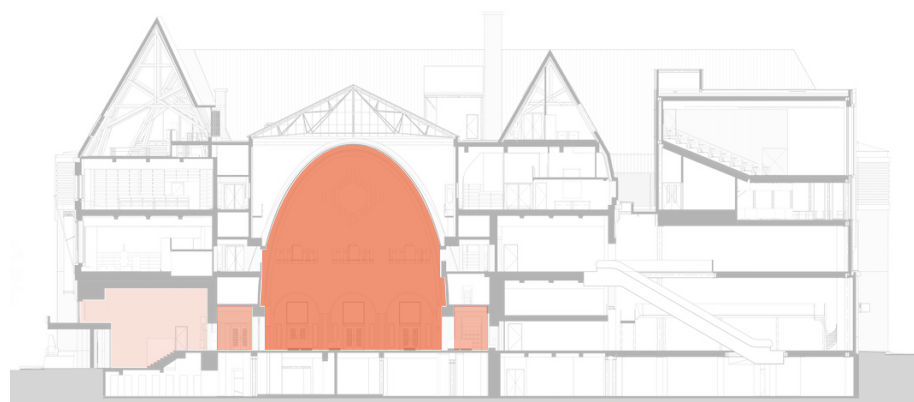


First Floor



Ground Floor

On the ground floor the reception hall is surrounded by an arcade. The front entrance hall connects directly and only to the arcade. From the arcade the main spaces on the ground floor can be accessed, among them the city cafe. On the first floor, directly above the arcade, there is a walkway with smaller openings to the central hall. Around it the main spaces of the first floor are organized, including the childrens section of the library and the reading room. All main spaces are directly accessible from the arcade and walkway.



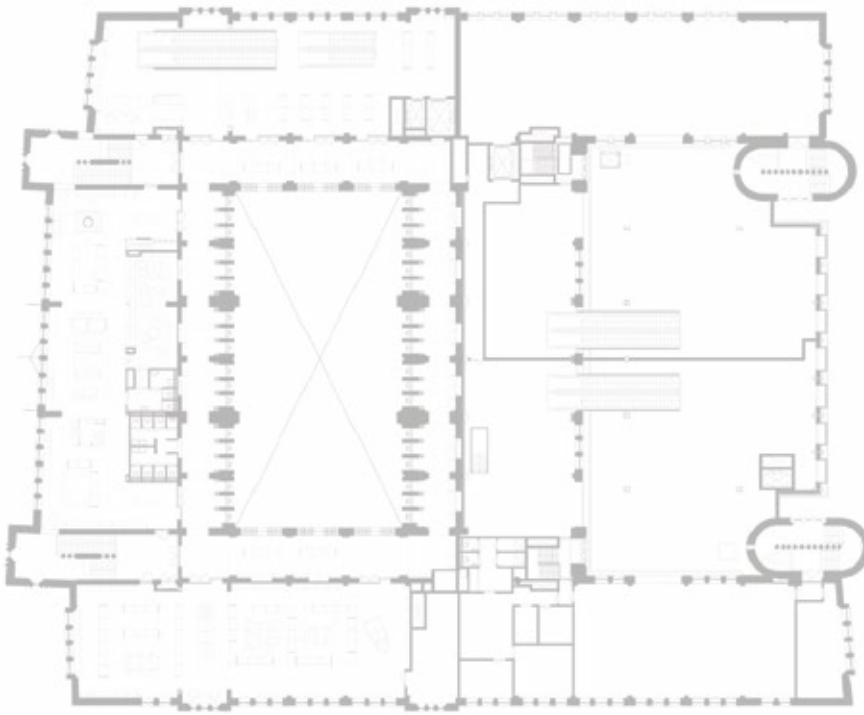
Section



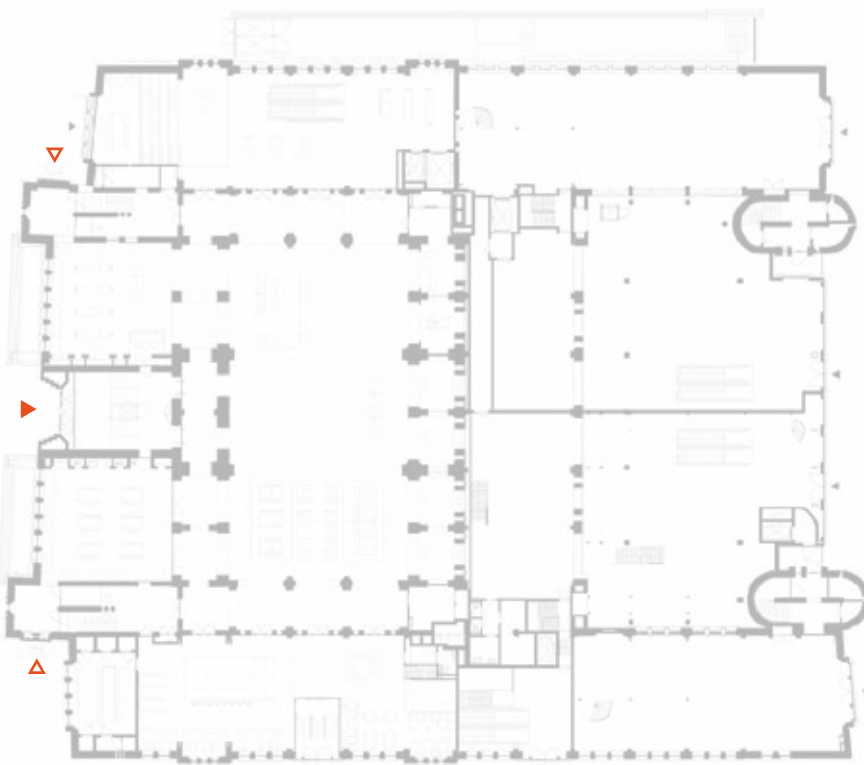
# ENTRANCES

## Legend

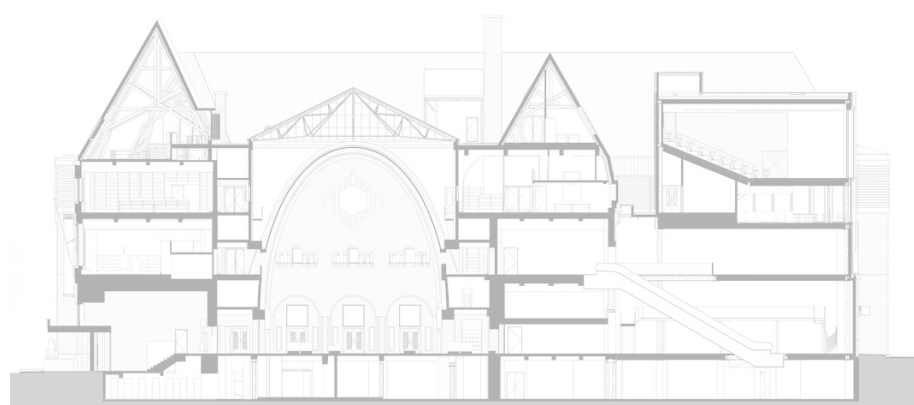
- ▶ Main entrance
- ▷ Entrance



First Floor



Ground Floor



Section

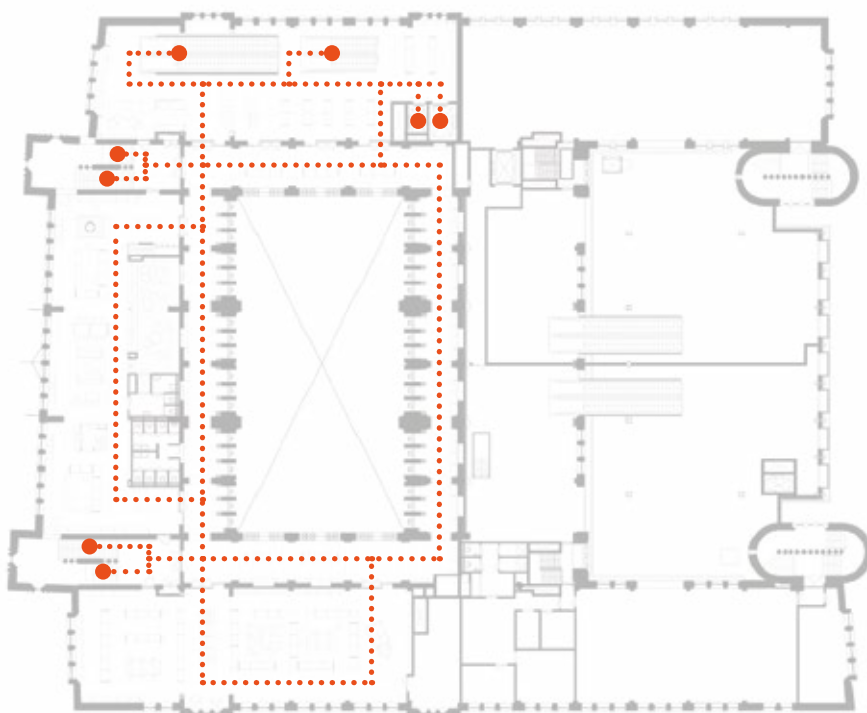
The library part of the building has two main entrances. One is the original front entrance of the building, which leads visitors up to the level of the reception hall through a smaller entrance hall. This entrance is located on the original front side of the building at Neude square. The other main entrance is the one on the north side, which allows entry to the city cafe.



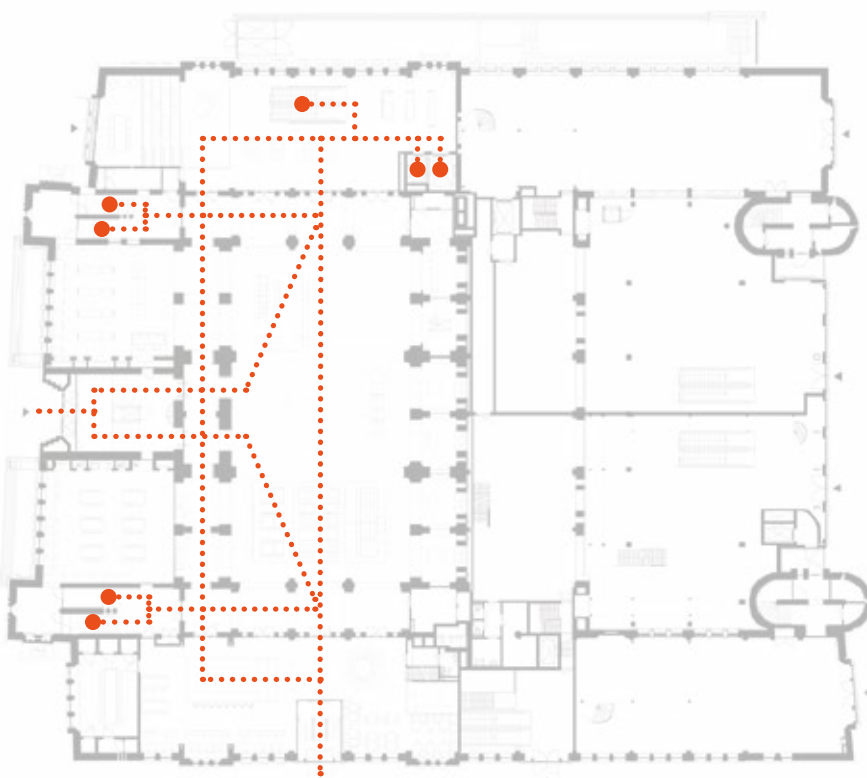
# ROUTING

## Legend

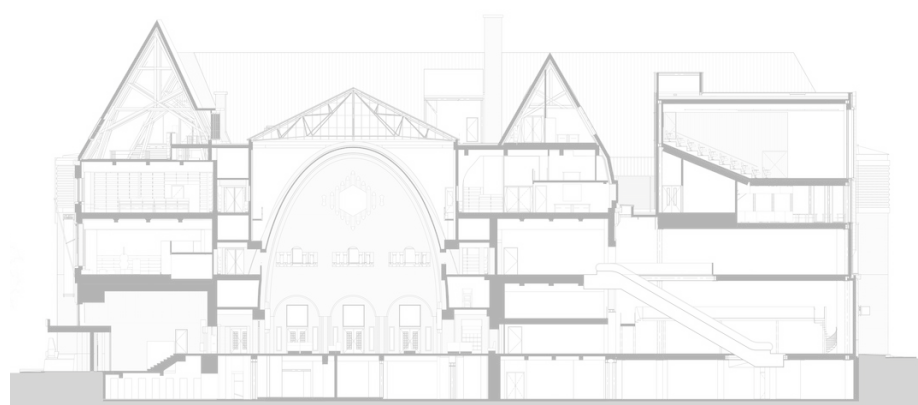
- ..... Main routes
- Vertical access



First Floor



Ground Floor



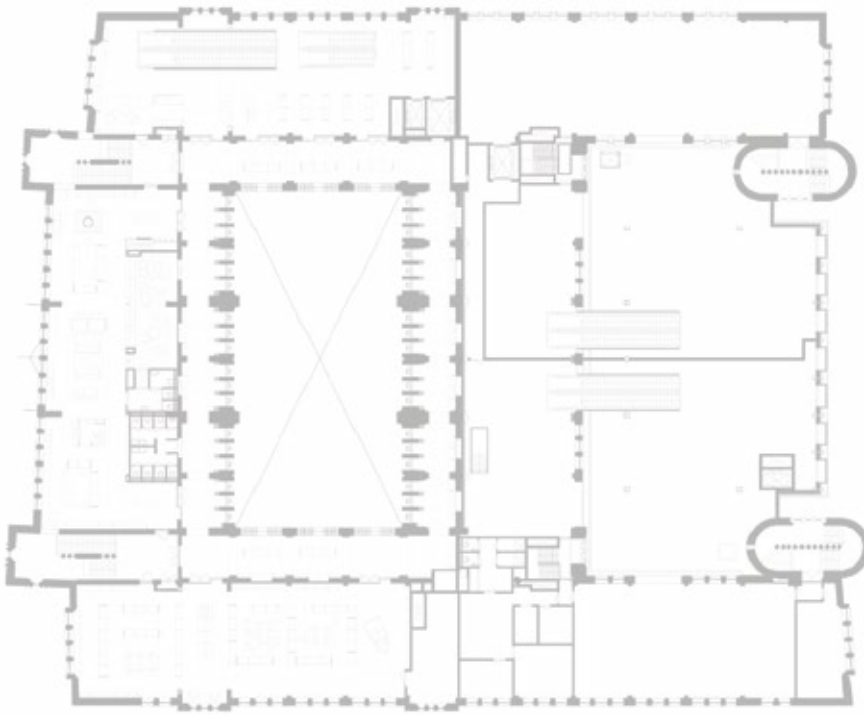
Section

From the two main entrances, the main routes through the building lead to the reception hall. This main central space has an open plan and can be traversed freely. The arcade around the reception hall is part of the main routing since it allows access all the functional spaces around it, in one of which the elevators and escalators are located. From the arcade the two stairwells can be accessed as well. The arcade is separated into smaller compartments on the western side and can therefore not be traversed completely.

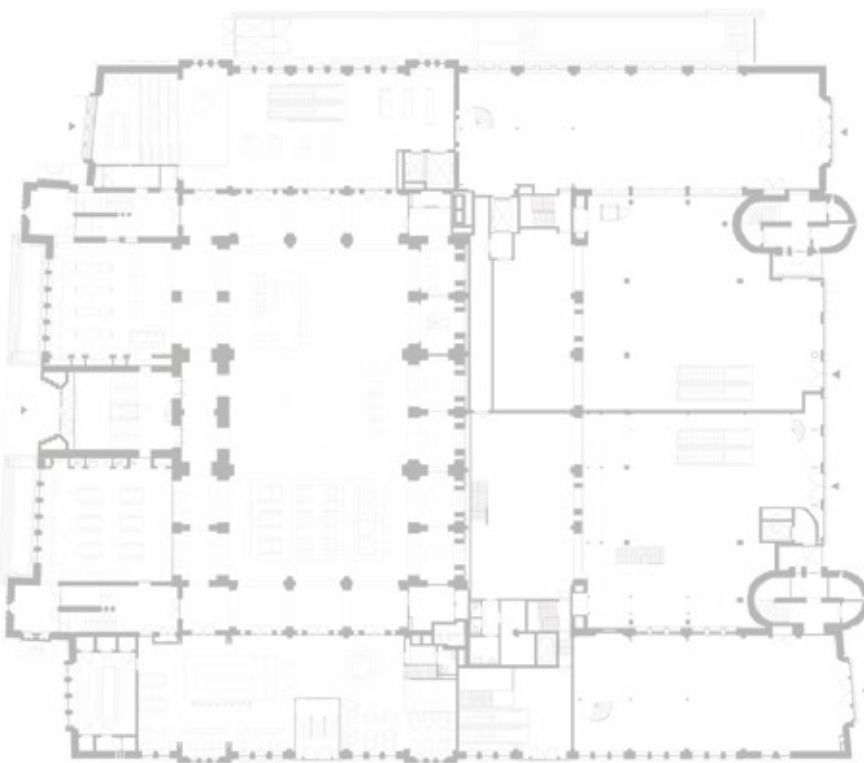
# DAYLIGHT

## Legend

- Direct daylight
- Indirect daylight

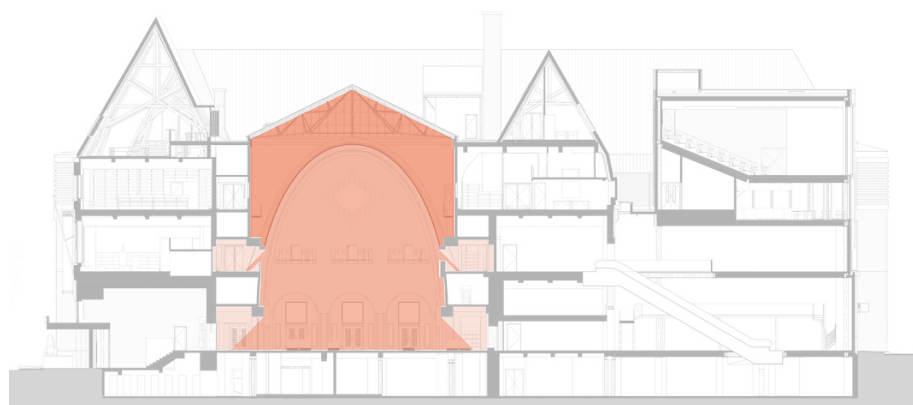


First Floor



Ground Floor

The parabolic ceiling of the reception hall consist of brick arches alternating with stained glass skylights that span the entire space. Above this ceiling is another transparent roof for weather protection. Through these two layers, daylight reaches the central hall and into the arcade. On the first floor some light is allowed into the walkway adjacent to the reception hall through openings in the walls.



Section

0 10m

## SOURCES

Pintos, P. (2020). *Utrecht Central Library & Post Office / Zecc Architecten + Rijnboutt*. ArchDaily. Retrieved from <https://www.archdaily.com/943774/utrecht-central-library-and-post-office-zecc-architecten-plus-rijnboutt>

Zecc. (n.d.). *Interieur Bibliotheek Neude - Cathedral of knowledge and interaction*. Retrieved from <https://www.zecc.nl/nl/project/2009/Interieur-Bibliotheek-Neude>

Rijnboutt. (n.d.). *Post Utrecht*. Retrieved from <https://rijnboutt.nl/portfolio/post-utrecht/>

# ETH FACULTY OF LAW, ZÜRICH

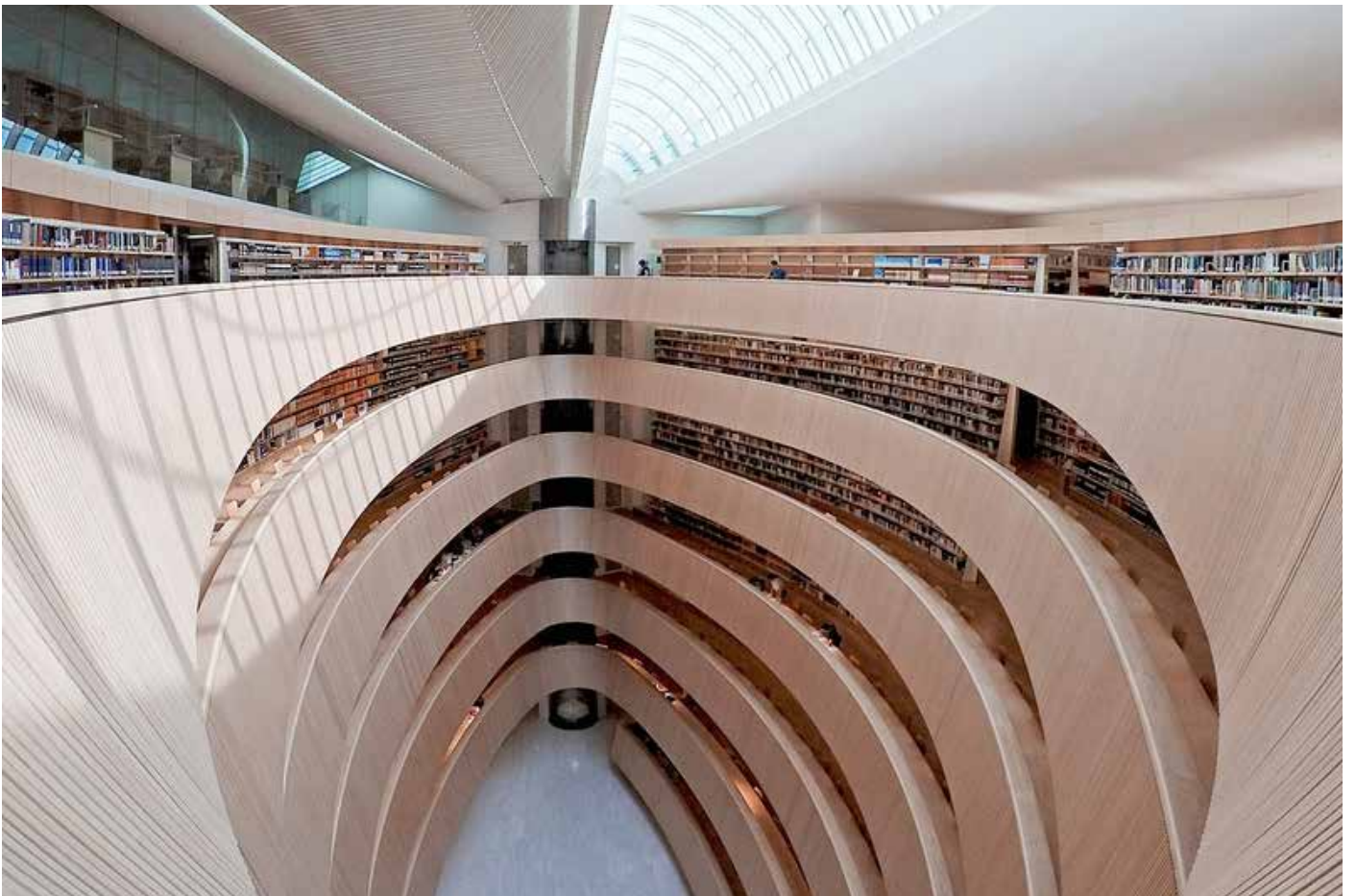
## GENERAL

Location: Zürich, Switzerland  
Programme: Faculty of Law, Library  
Area: 4800 m<sup>2</sup> (library)  
Year: 2004  
Architect: Santiago Calatrava

In 1930 two wings were added to the original L-shaped building structure from 1908, creating a central courtyard. The additional wings were lower than the original ones.

In order to centralize the facilities of the University of Zürich's Law School, the architect was asked to make a study for the addition of two storeys to house administration offices and classrooms. The scope of the proposal was expanded to provide a new facility for the law school's library and book collection.

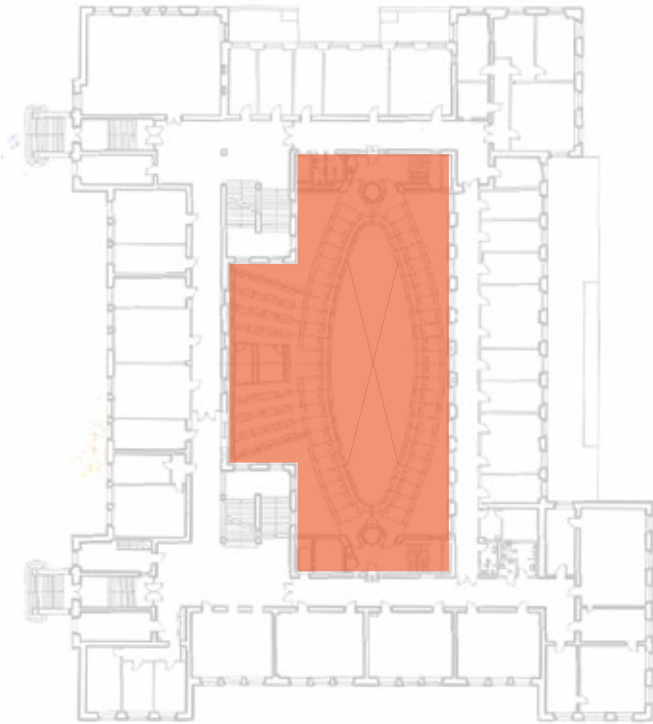
A glazed skylight was built over the courtyard, redefining it as an atrium. Underneath, the library is conceived as a stack of six oval rings, hung as an independent structure within the courtyard. A two-story lightweight structure of steel beams and columns supports the rest of the floors. The cascade of galleries is only supported by the courtyard walls at four points, leaving them mainly untouched. The bookshelves are placed against the walls of the structure. The oval rings are lined with reading rooms with individual workspaces.



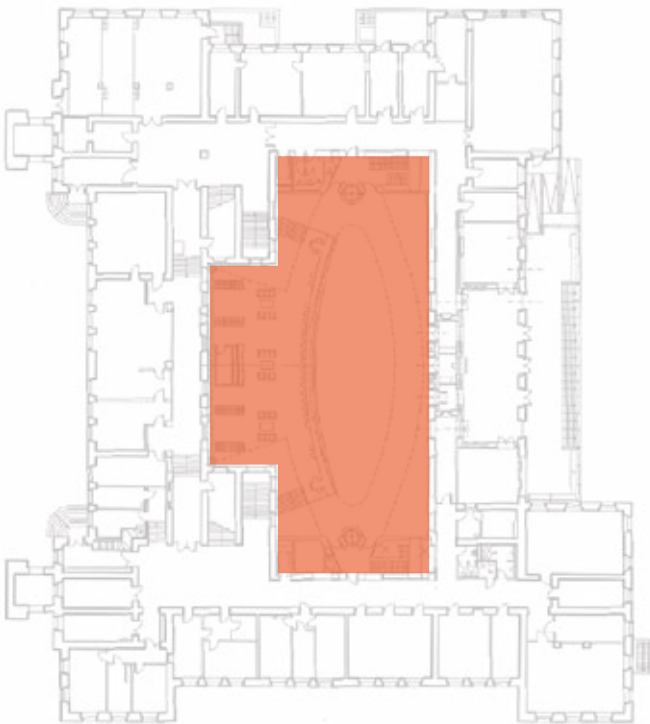
# CENTRAL SPACE

## Legend

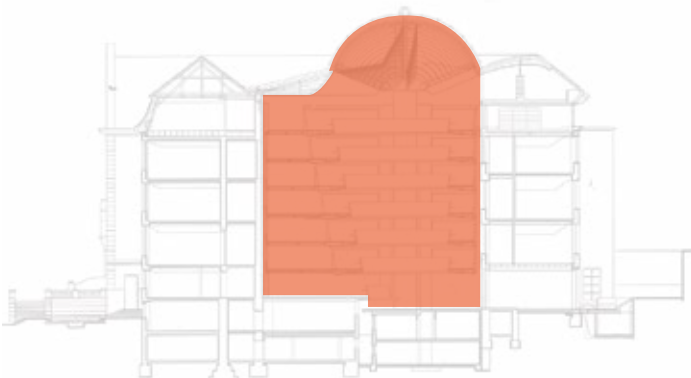
 Central space



First Floor



Ground Floor



Section

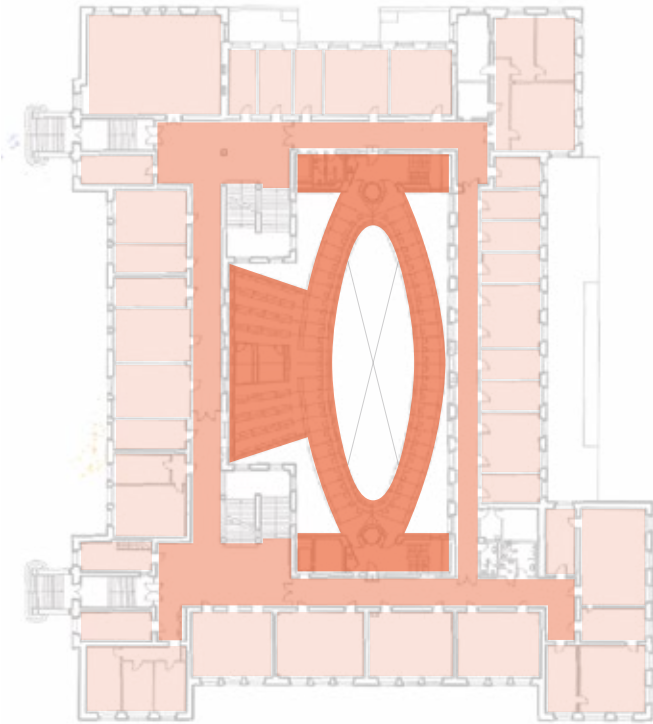
The former courtyard turned into an atrium is the central space of the building. Because the volume of the library floats in the atrium, the entire space is experienced as central space, instead of just the central diverging oval space within the library floors.



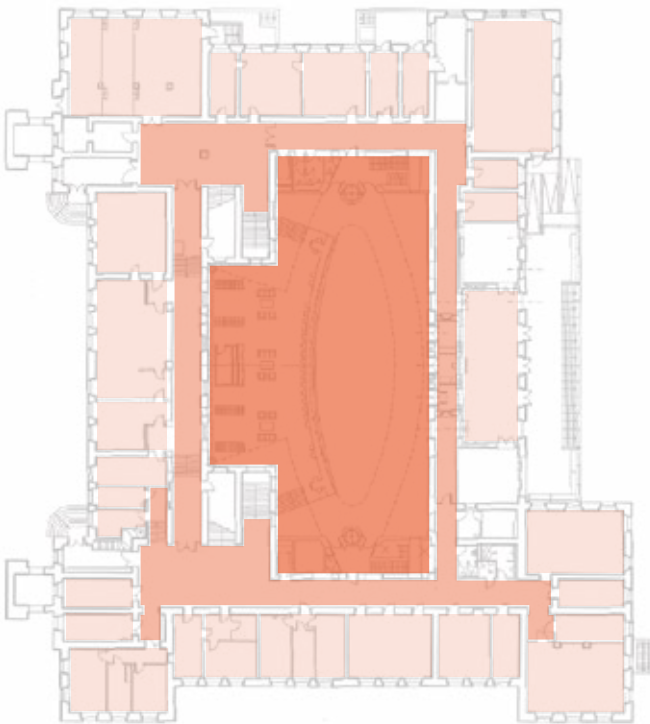
# SPATIAL ORGANIZATION

## Legend

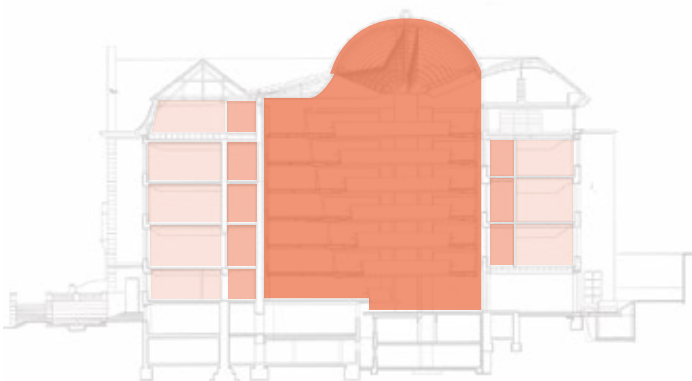
- Central space
- Primary
- Secondary



First Floor



Ground Floor



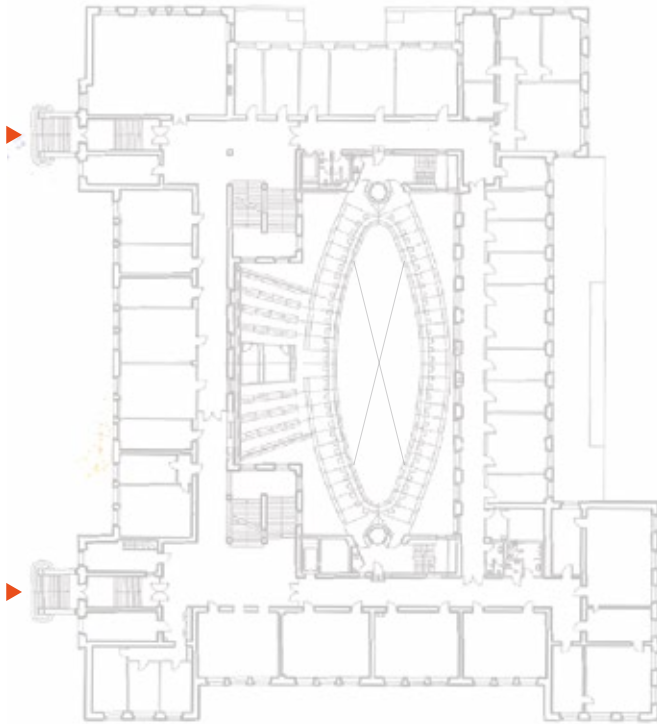
Section

Before the addition of the library, the spatial organization was that of a corridor adjacent to the courtyard wall, with classrooms, offices and other function spaces between the corridor and the exterior wall. With the addition of the library, the former courtyard has become the main space in the building. The library and the other functional spaces are accessible through the corridor, which remains the leading principle in the spatial organization of the building.

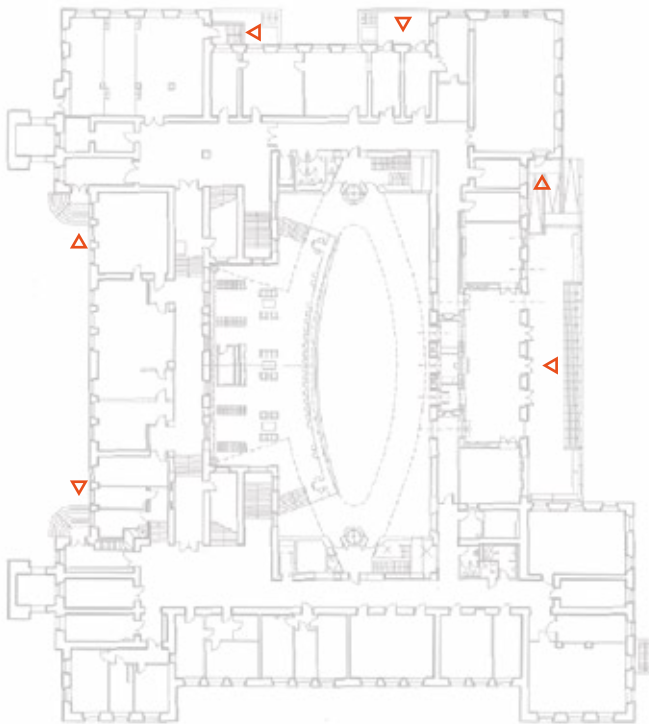
# ENTRANCES

## Legend

- ▶ Main entrance
- ▷ Entrance



First Floor



Ground Floor



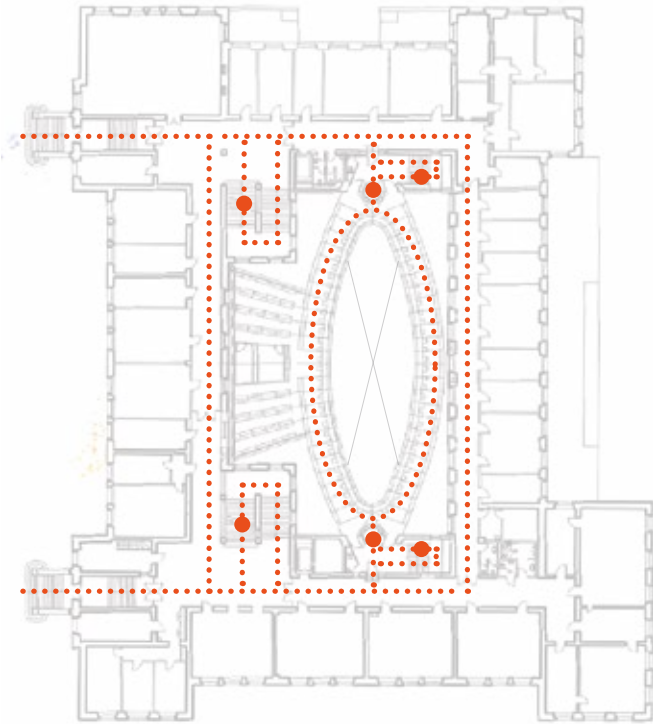
Section

The main entrances at the front of the building lead directly to the corridor on the first floor. On the ground floor, several secondary entrances are located.

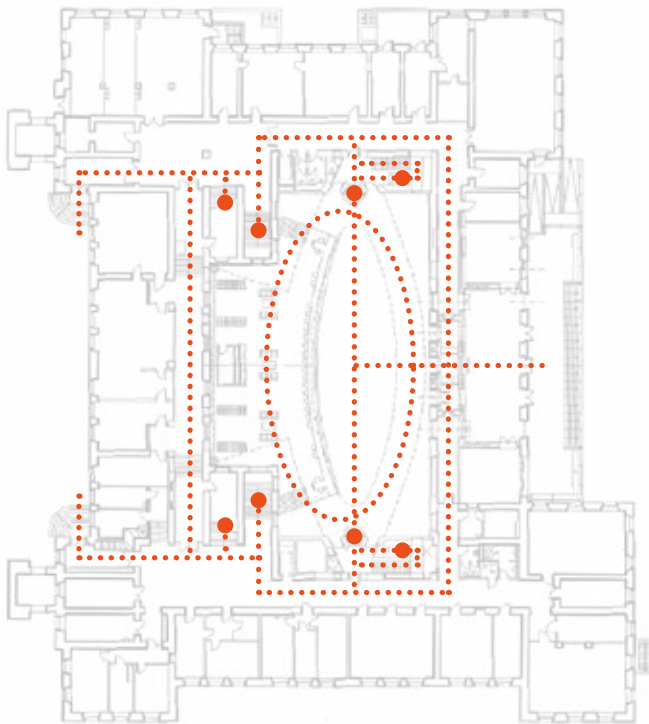
# ROUTING

## Legend

- ..... Main routes
- Vertical access



First Floor



Ground Floor



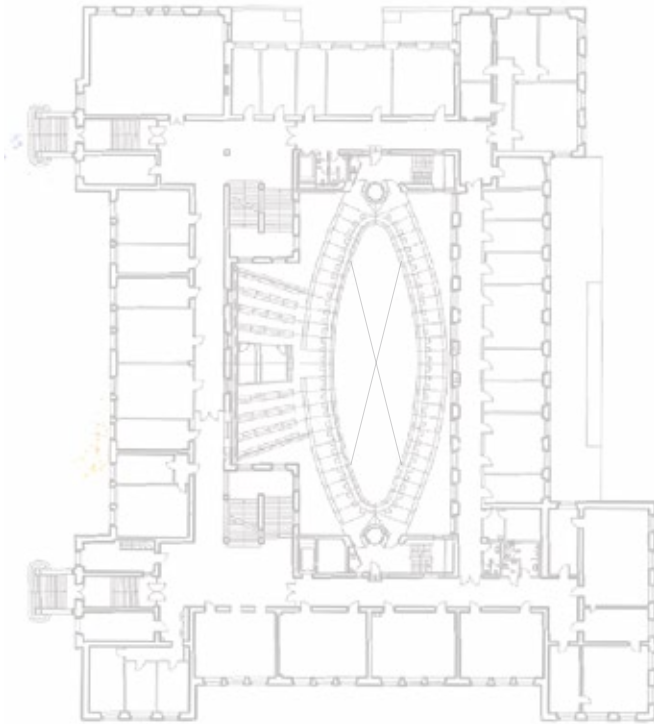
Section

The ground floor of the atrium now plays a major role in the circulation through the building, as two elevators and staircases are located in the atrium. The corridor remains the main means of circulation on the floors. From there, the classrooms, offices, other function spaces and stairwells of the original building can be accessed.

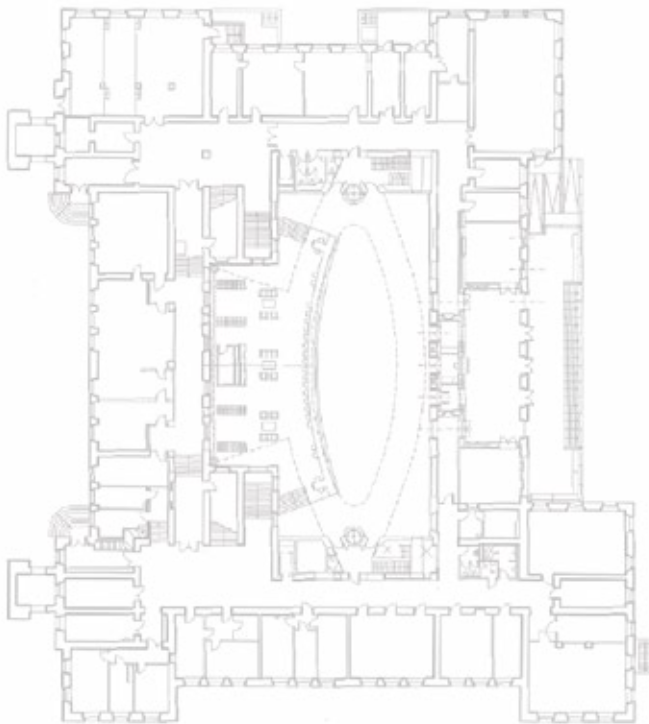
# DAYLIGHT

## Legend

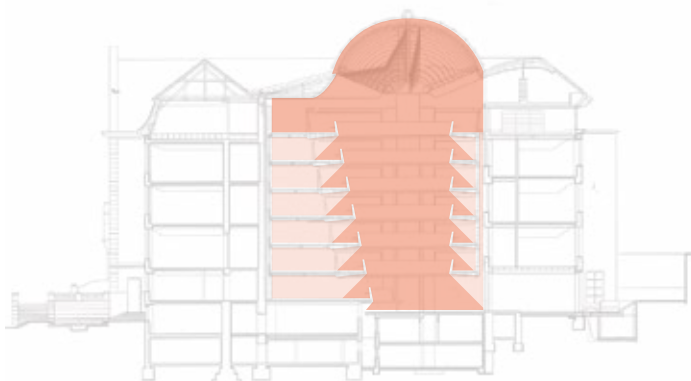
- Direct daylight
- Indirect daylight



First Floor



Ground Floor



Section

Through the glazed skylight daylight enters the atrium. The cascading floors allow the daylight to reach every floor in the library. A hydraulically movable pleated curtain of collapsible blades allows for control of the daylight entry. The floating volume of the library allows daylight to filter into the corners of the atrium.

## SOURCES

Santiago Calatrava (n.d.). *University of Zurich Law Faculty*. Calatrava. Retrieved from <https://calatrava.com/projects/university-of-zurich-law-faculty-zuerich.html>

Strehler, R. & Niederer, U. (2006). *The New Law Library of the University of Zurich*. *Liber Quarterly*. ISSN 1435-5205

# MUNICIPAL ART MUSEUM, THE HAGUE

## GENERAL

Location: The Hague, Netherlands  
Programme: Museum  
Area: 700 m<sup>2</sup> (courtyard)  
Year: 2014  
Architect: Braaksma & Roos (transformation)

In 2014, the courtyard of the Art Museum The Hague was transformed into an atrium. The design question was to create a multifunctional indoor garden for visitors to have a drink and to host varying events such as receptions, dinners, congresses, lectures and concerts. The design was created with concept of the original outdoor space, its experience and orientation in mind.

The courtyard has always been a vital part of the experience of the museum, and was an important logistical node with no less than nine entrance doors. In order to maintain a suitable indoor climate in the museum, accessibility to the courtyard was limited and visitors quickly became disoriented in the many wings around the courtyard. The design aims to reinforce the central position of the courtyard in the museum.

The glass roof seems only to be carried by the columns and floats above the building. The design looks simplistic, but it hides a complex and advanced system of technical installations. Proper acoustics have been achieved through the cladding of the columns together with the velum under the glass roof. The Ba-Opt climate system maintains a constant temperature in the entire space, leading to both a comfortable indoor climate and energy savings.

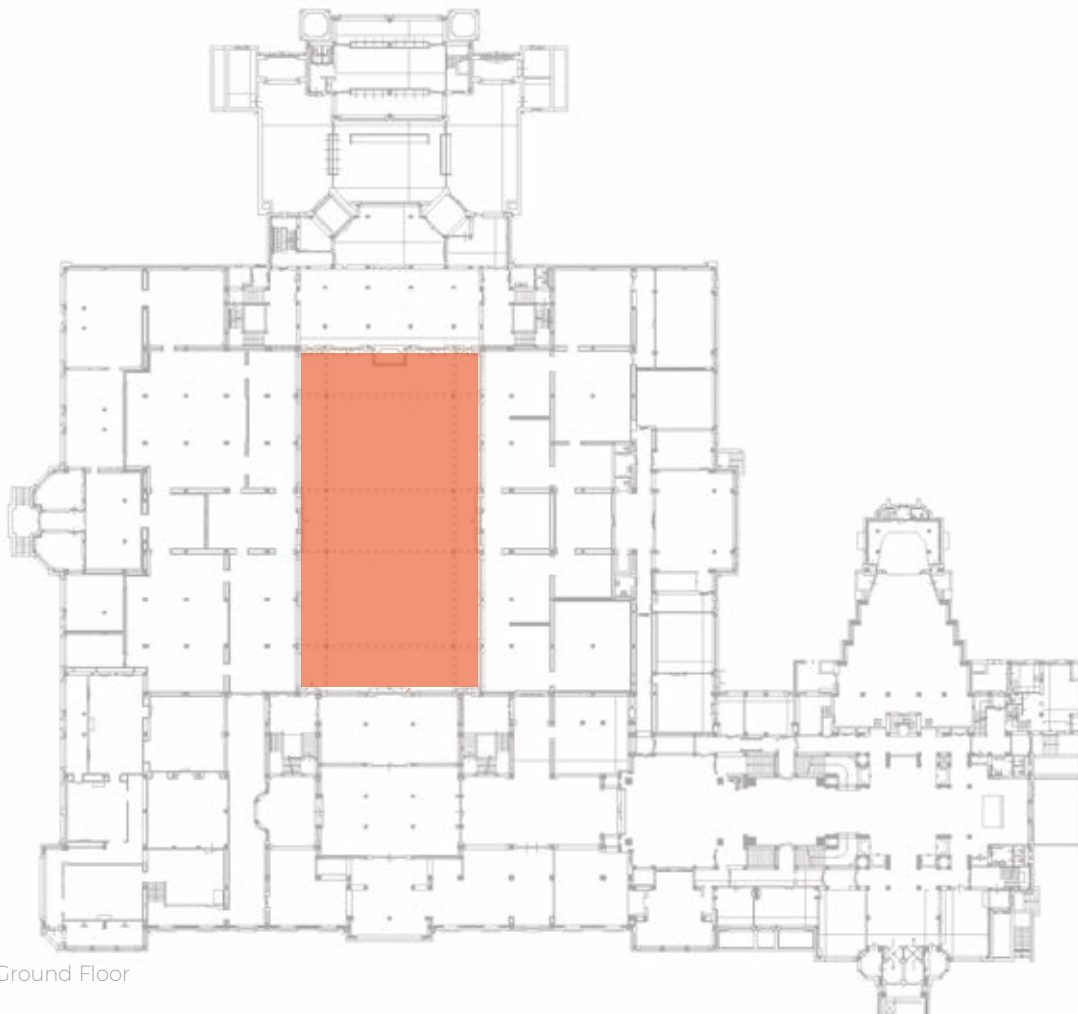


# CENTRAL SPACE

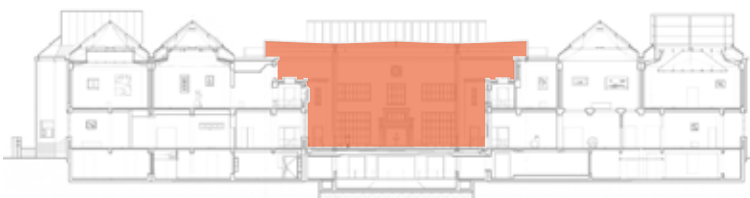
## Legend

 Central space

The courtyard has always been the central space of the museum. It used to be an important logistical node, but in order to maintain a suitable indoor climate access to the courtyard was limited. With the transformation of the courtyard into an atrium, the importance of the central position has been restored and the orientation through the building has become more clear.



Ground Floor





Section

 0 10m

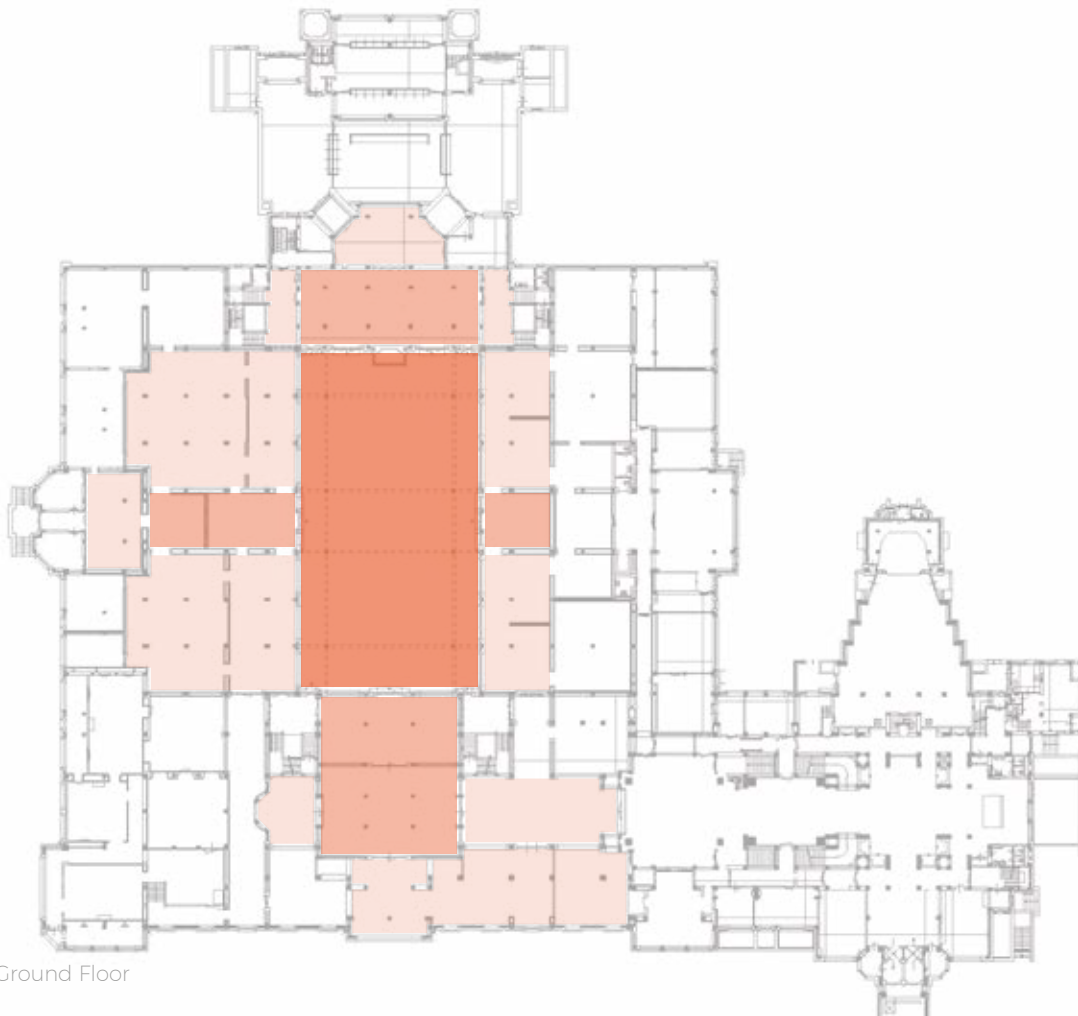


# SPATIAL ORGANIZATION

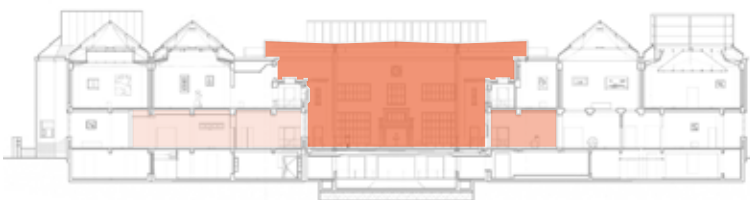
## Legend

-  Central space
-  Primary
-  Secondary

While there are some small corridors, the spaces in the museum are mostly directly connected, creating an enfilade of spaces. Several dividing walls have been added to the original design. From the central space there are four functional spaces that can be directly accessed. From there the adjacent functional spaces can be accessed.



Ground Floor



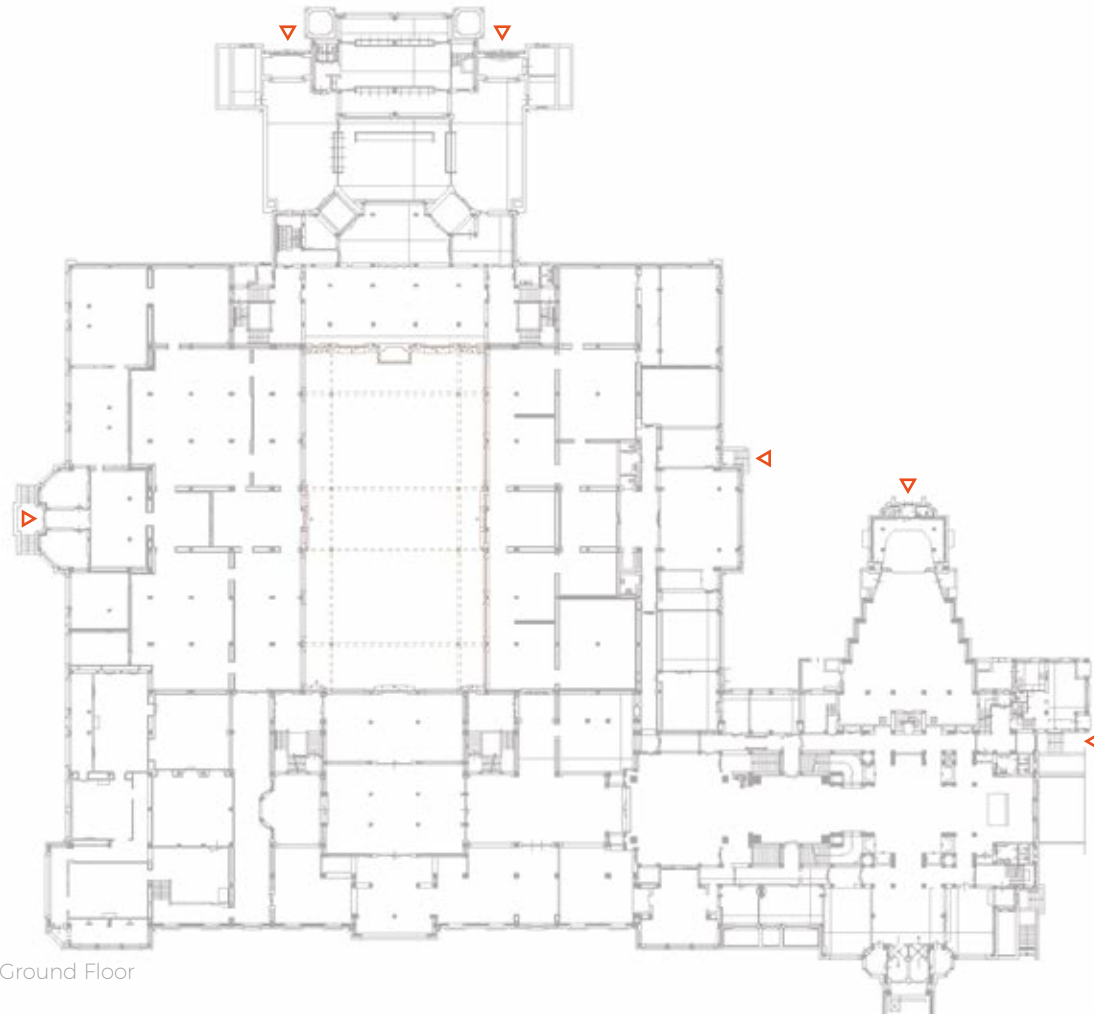
Section

# ENTRANCES

## Legend

- ▶ Main entrance
- ▷ Entrance

The main entrance to the museum is located at the street at the end of a corridor, even though the museum itself is set back roughly 40 meters from the street. Opposite the main entrance is the entrance to the sculpture garden. Several other entrances are located around the building for logistical purposes.



Ground Floor



Section

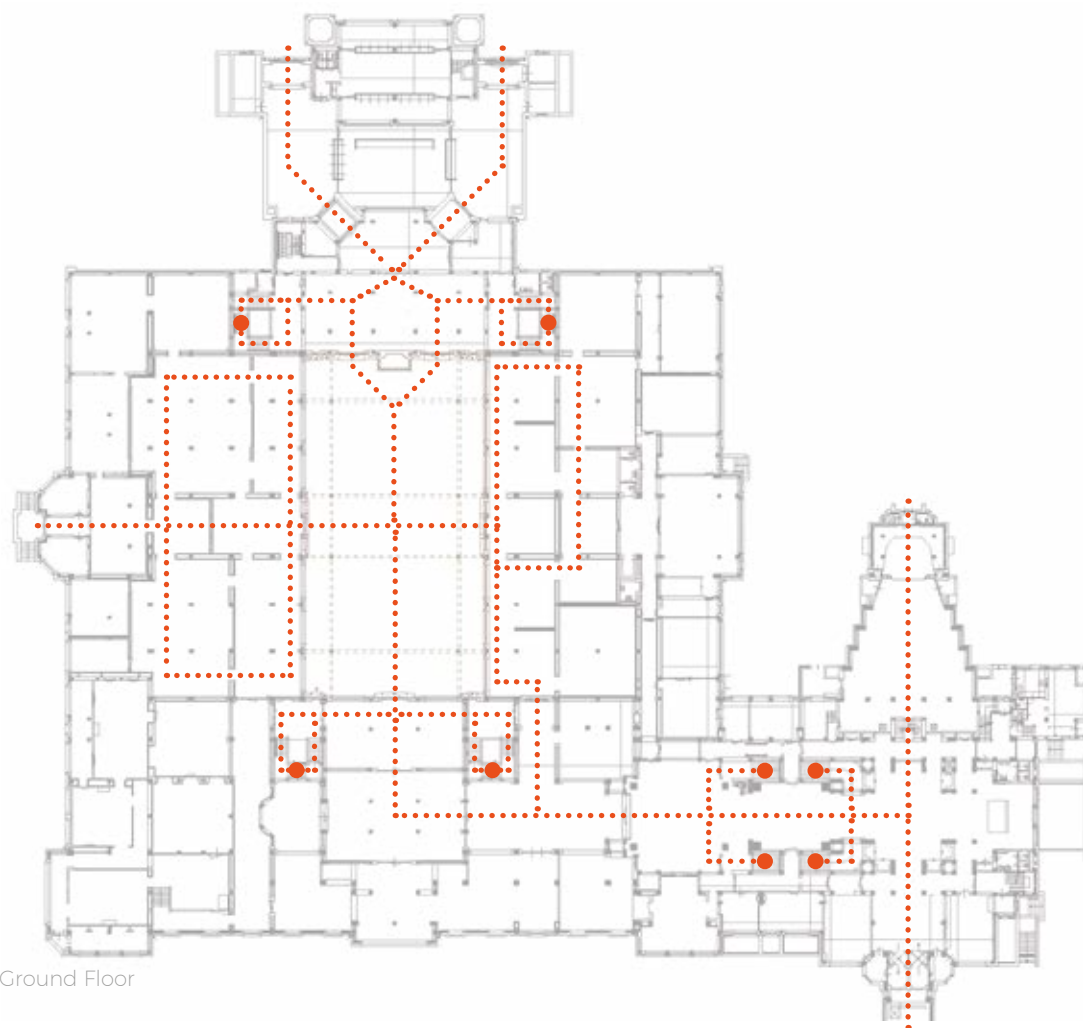
⊖ 0 10m

# ROUTING

## Legend

- ..... Main routes
- Vertical access

The main entrance to the museum leads through an entrance corridor that runs inbetween two ponds from the street to the entry hall. From the entry hall, the enfilades of exhibition spaces in the wings of the museum are accessible. Since the transformation, the atrium is an important node in the circulation through the museum.




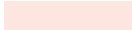
Ground Floor



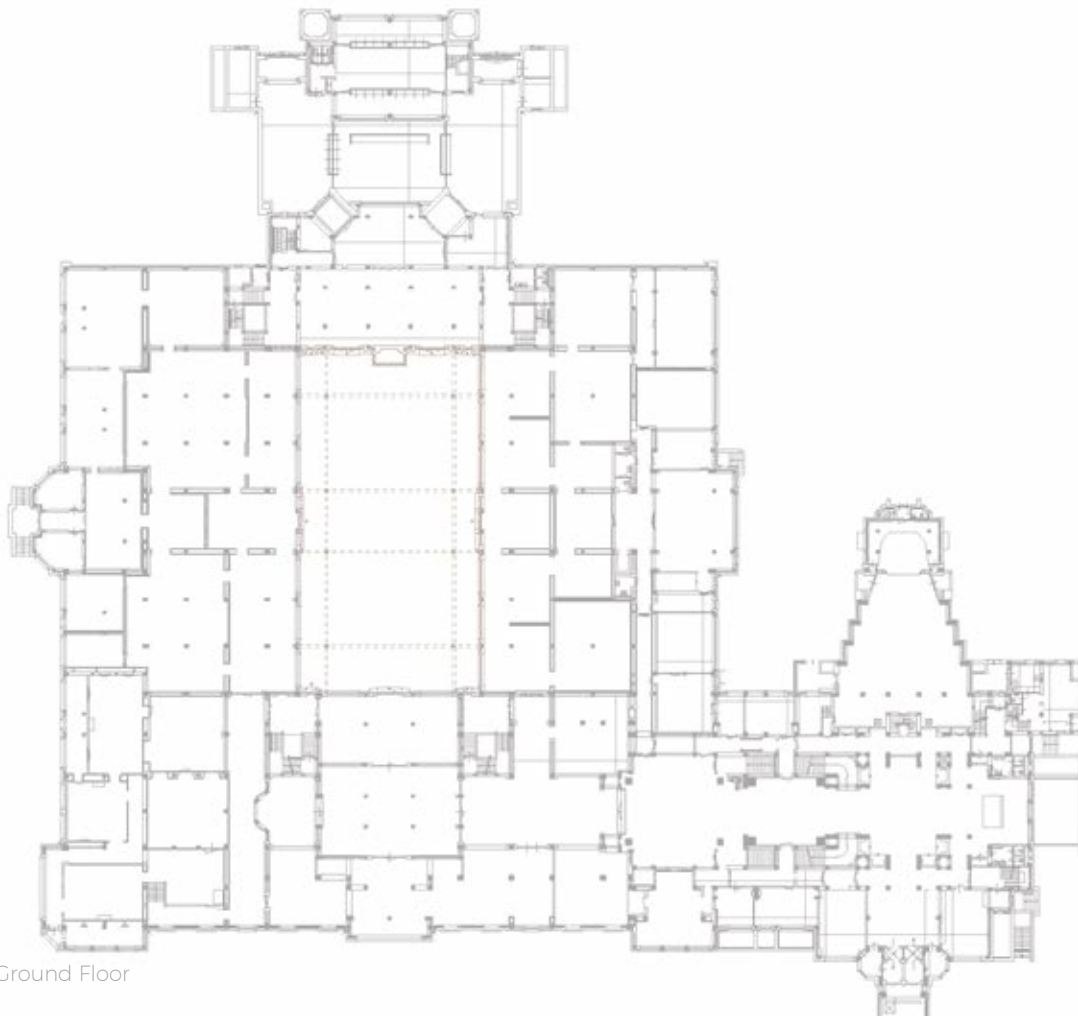
Section

# DAYLIGHT

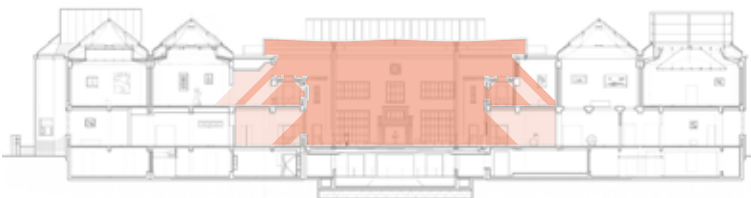
## Legend

-  Direct daylight
-  Indirect daylight

The courtyard allows for daylight to enter the wings of the museum. The roof of the atrium is completely transparent, which means there is no change to how the daylight can enter the building.



Ground Floor



Section

 0 10m

## SOURCES

Braaksma & Roos. (n.d.). *Kunstmuseum, Den Haag - Van binnentuin naar binnenzaal*. Retrieved from <https://www.braaksma-roos.nl/project/tuinzaal-haags-gemeentemuseum/>

# THE FORUM, NORWICH

## GENERAL

Location: Norwich, United Kingdom  
Programme: Library, Retail, Public Services  
Restaurants  
Area: 20.000 m<sup>2</sup>  
Year: 2001  
Architect: Hopkins Architects

Built in 2001 in the centre of Norwich, the Forum replaced the Central Public Library that was destroyed by fire in 1994. The library was reinvented as part of a larger institution, a 'cultural and recreational building for the whole community and a dynamic centre for information, learning and entertainment'. Besides the library the building houses the Norfolk Heritage Centre, the regional BBC studios, a tourist information centre, learning shops and various cafés, restaurants and bars.

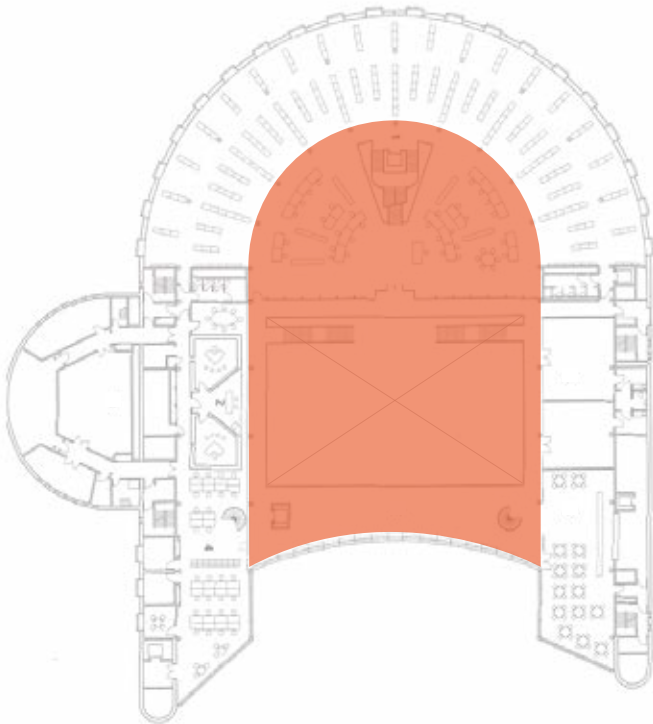
The building consists of a three-story horseshoe-shaped volume that accommodates the various activities on a series of balconies, enclosing a central courtyard space. The facade at the opening of the U-shape is fully glazed and provides visibility of the atrium. The roof of the atrium is supported by bow-string steel trusses forming leaf-shaped panels, infilled with acoustically absorbent materials. The spaces between the 'leaves' are filled in with glazing, allowing daylight to enter the heart of the building.



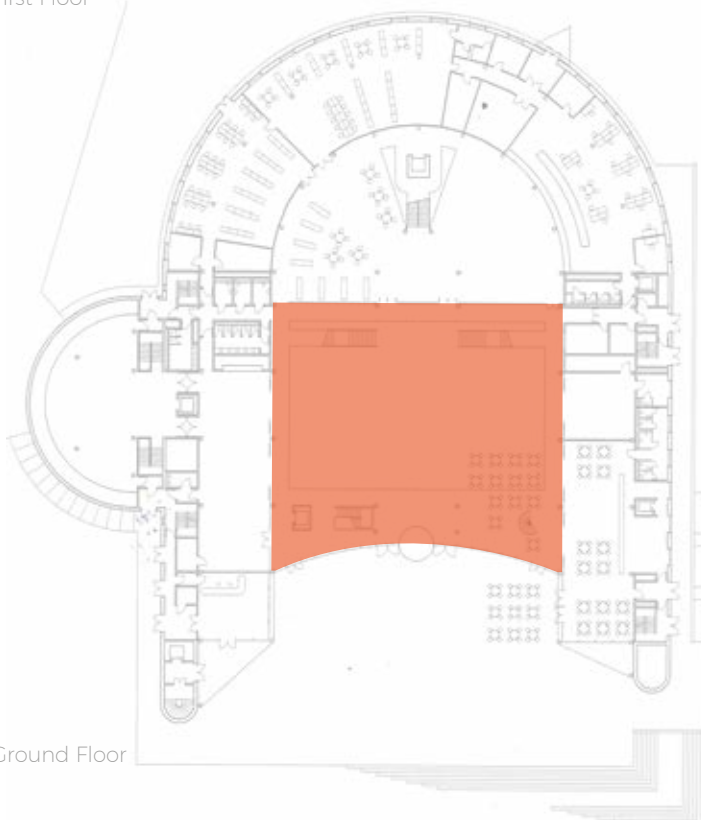
# CENTRAL SPACE

## Legend

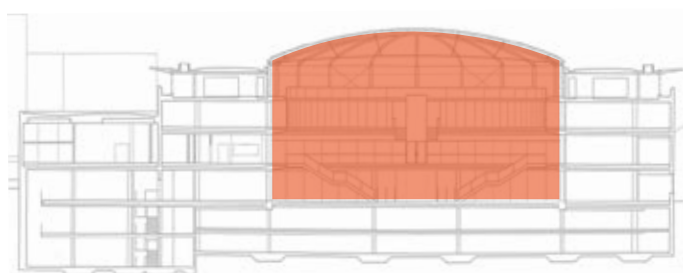
 Central space



First Floor



Ground Floor



Section

The central space in the Forum is the atrium enclosed by the U-shaped building volume. The central space has a wider footprint higher up as it vertically wraps around the first floor in the atrium which contains a part of the library.

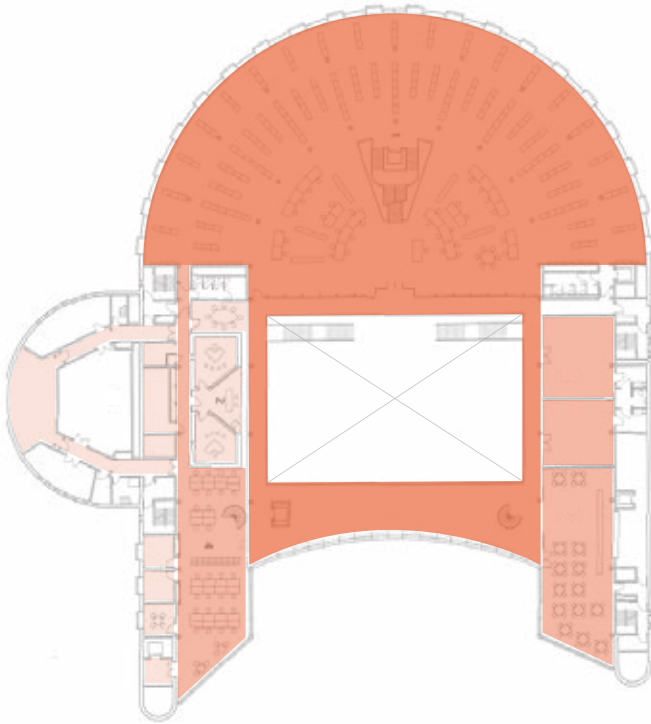
 0 10m



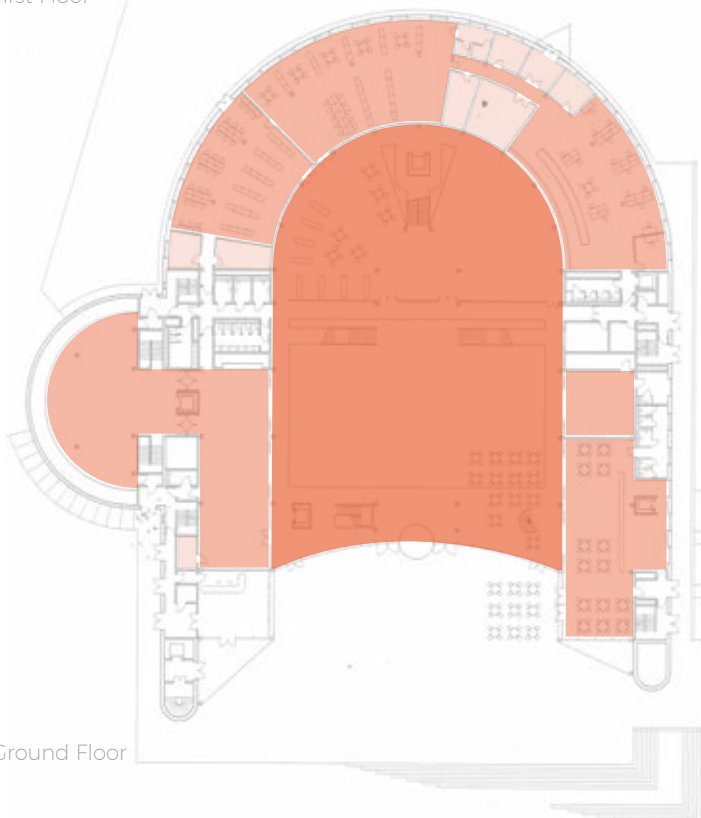
# SPATIAL ORGANIZATION

## Legend

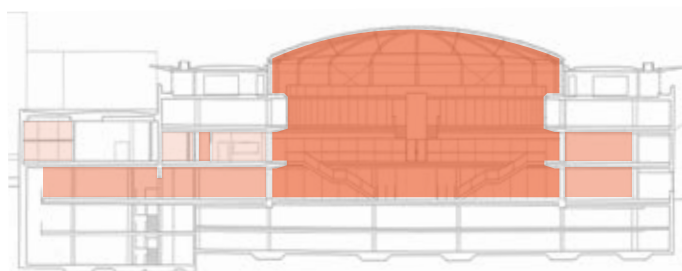
- Central space
- Primary
- Secondary



First Floor



Ground Floor



Section

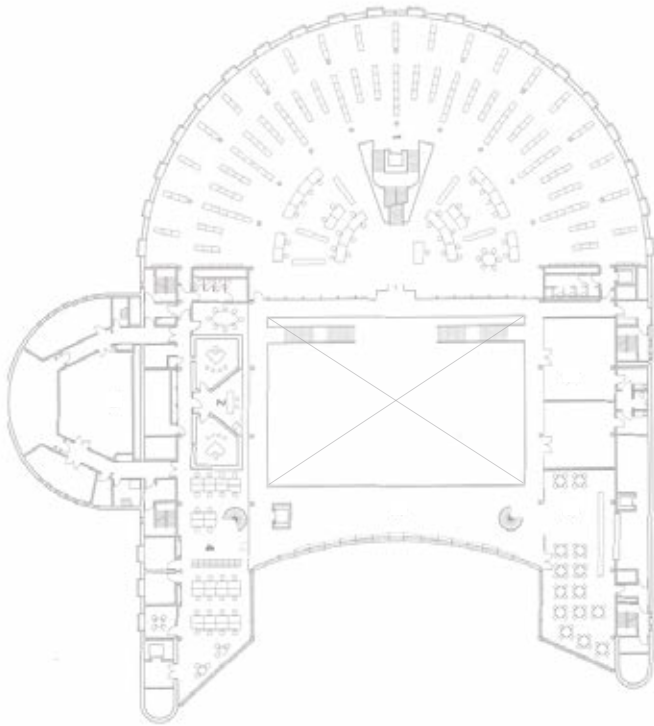
Most of the functional spaces of the building are organized around and can be directly accessed from the atrium.

[...]

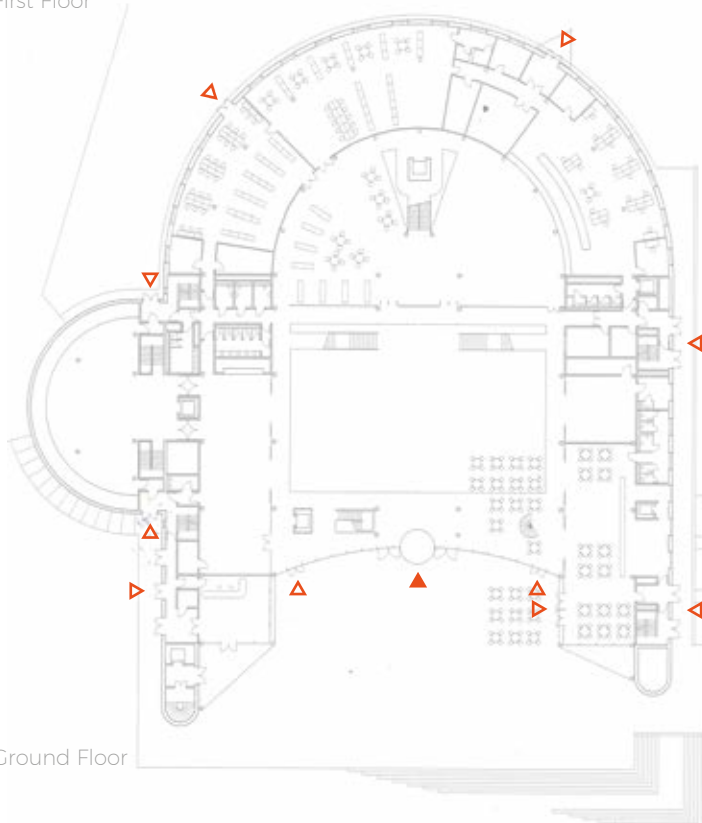
# ENTRANCES

## Legend

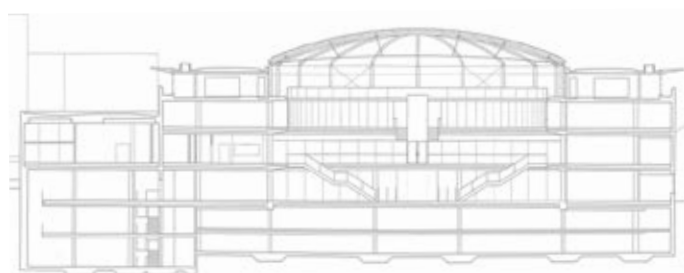
- ▶ Main entrance
- ▷ Entrance



First Floor



Ground Floor



Section

The main entrances are located at the front of the building, where the building opens up to the Millennium Plain square. Secondary entrances for staff and logistics are located around the building.

⊖ 0 10m

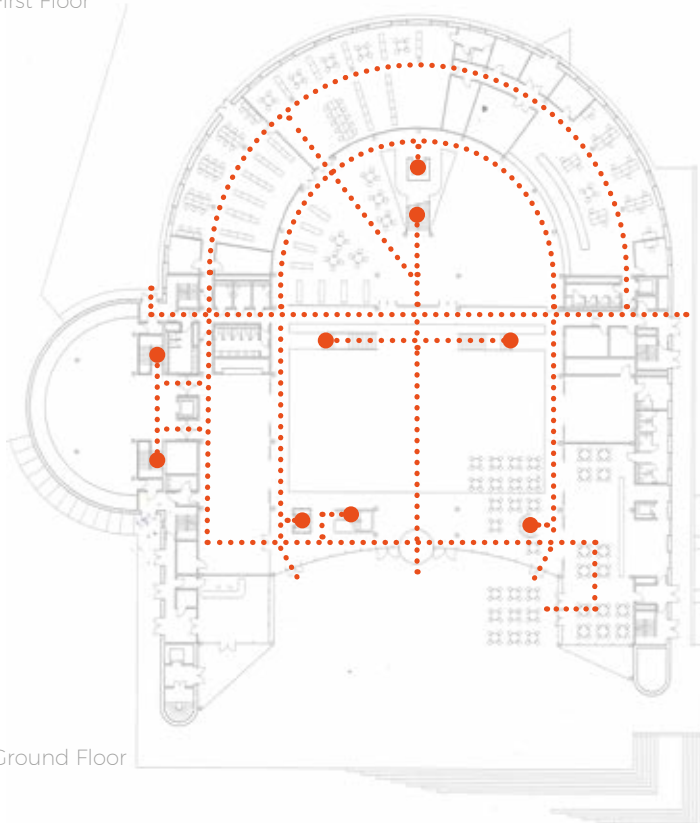
# ROUTING

## Legend

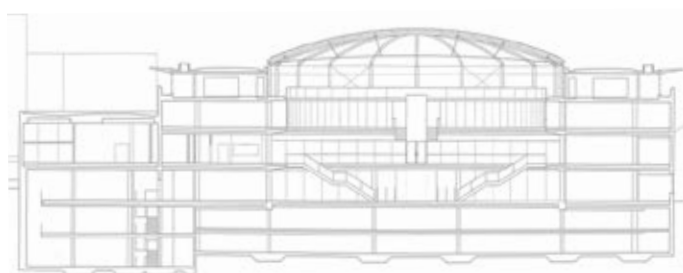
- ..... Main routes
- Vertical access



First Floor



Ground Floor


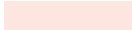


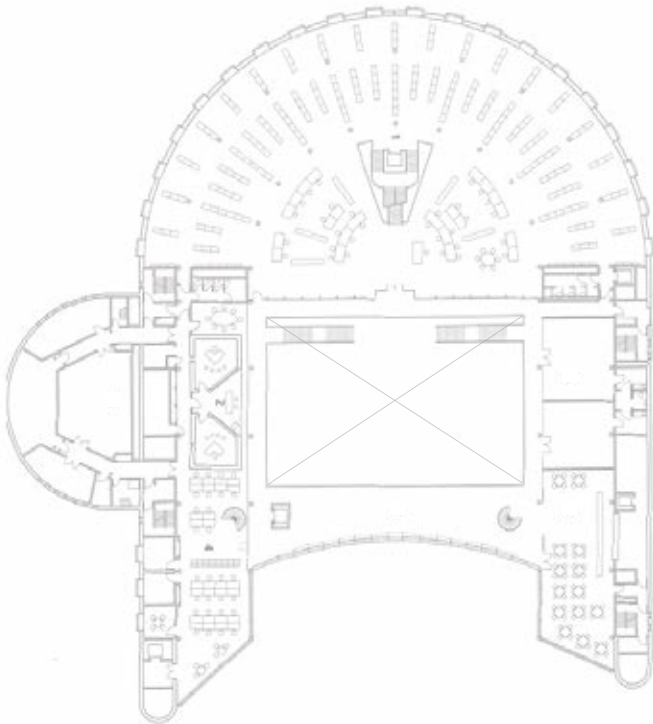
Section

From the main entrances the visitors enter the atrium. On the ground floor, the atrium can be freely traversed. From here the first floor balconies can be reached by elevator or stairs. Throughout the building there are two main routes; one through the U-shaped building volume, and one along the edges of the atrium.

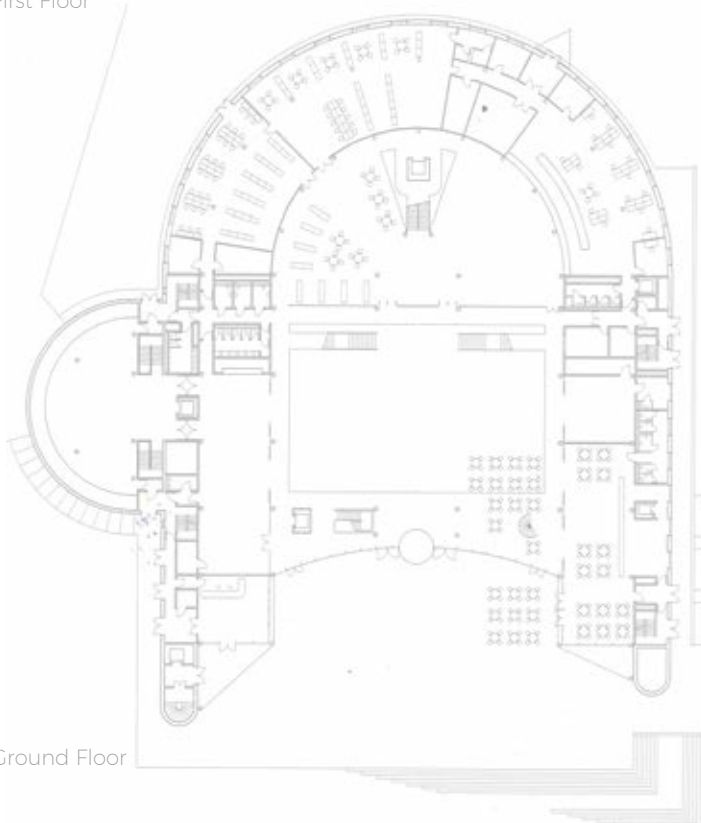
# DAYLIGHT

## Legend

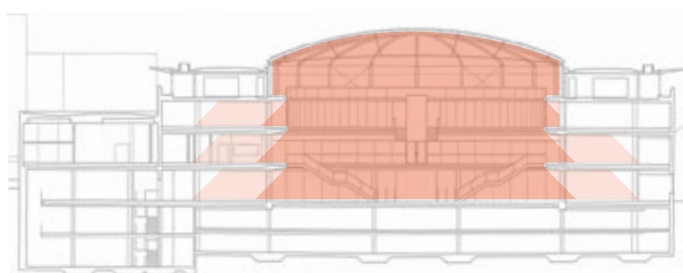
-  Direct daylight
-  Indirect daylight



First Floor



Ground Floor



Section

Through the glazed parts of the roof, daylight is allowed into the atrium. From there the light also reaches into the spaces adjacent to the atrium.

 0 10m

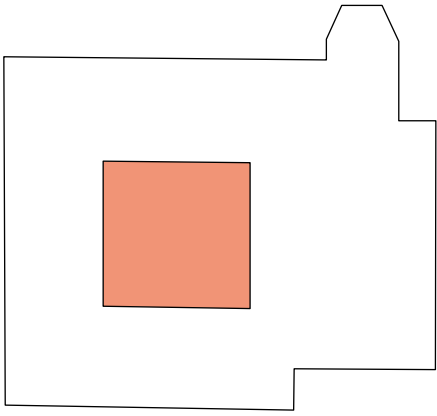
## **SOURCES**

Hopkins Architects. (n.d.) *The Forum*. Retrieved from <https://www.hopkins.co.uk/projects/1/78/>

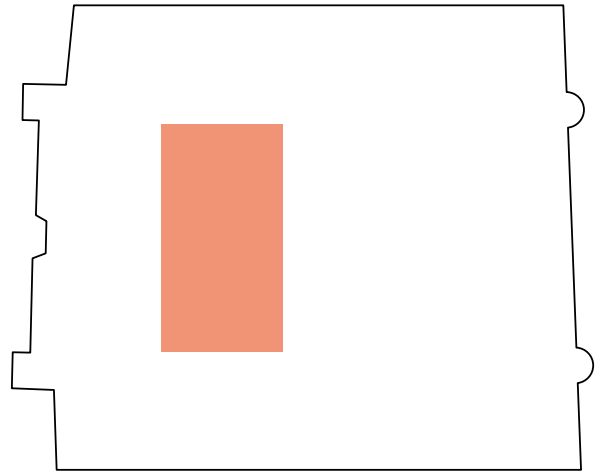


## ASPECT COMPARISON

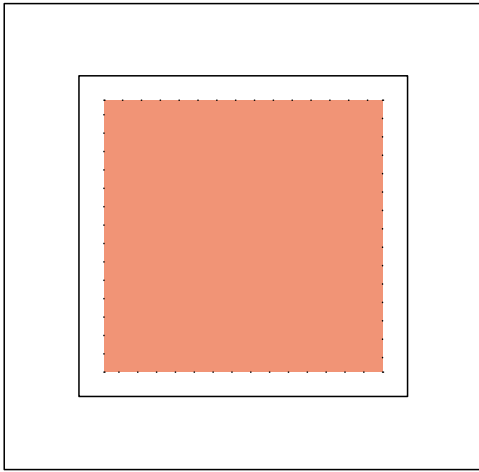
# CENTRAL SPACE



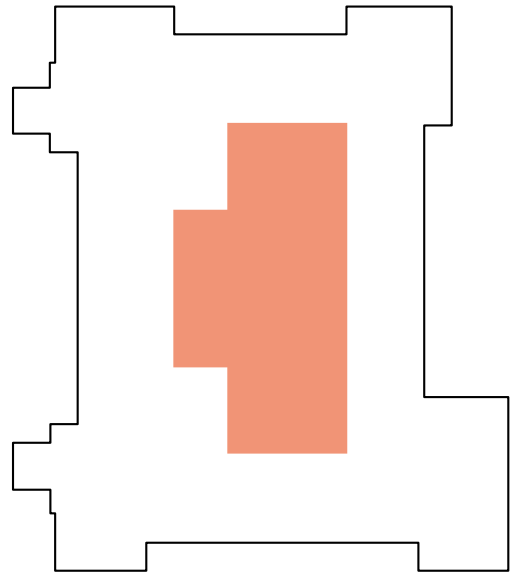
Predikheren



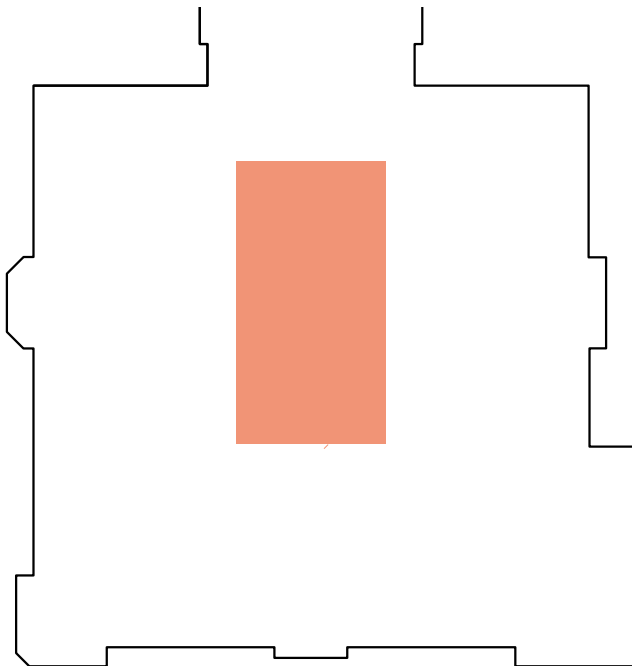
Post



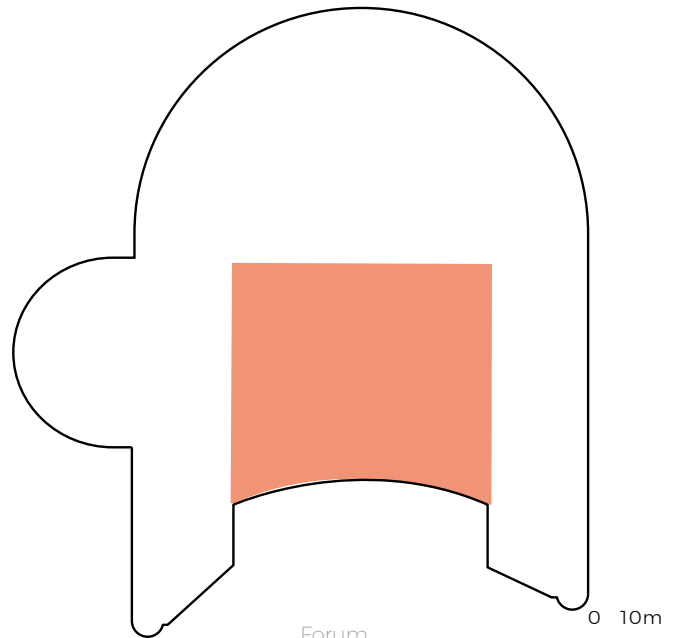
Pesthuis



Faculty of Law



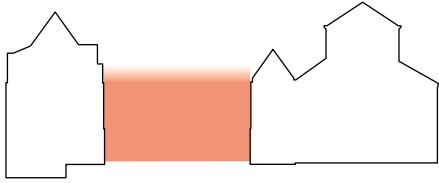
Art museum



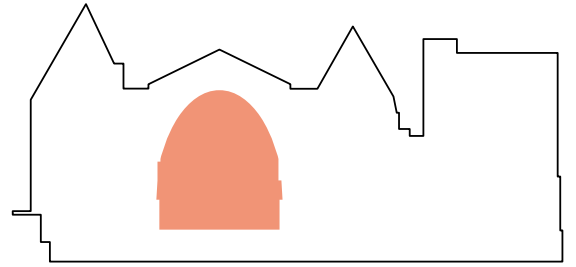
Forum

0 10m

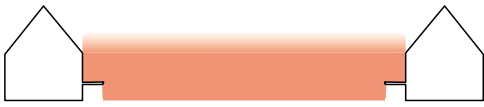




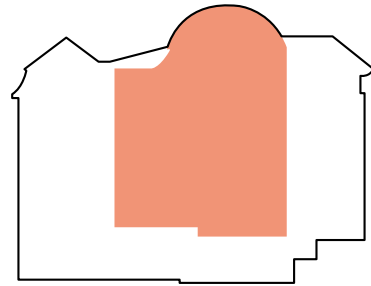
Predikheren



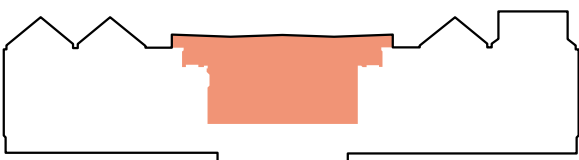
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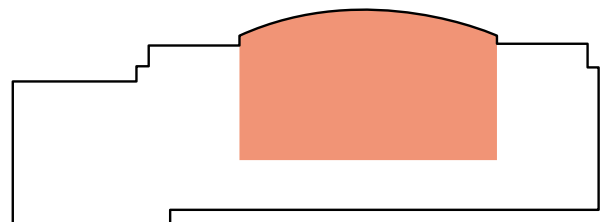
Pesthuis



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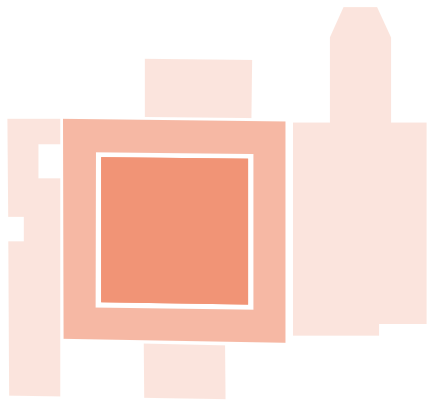
Art museum



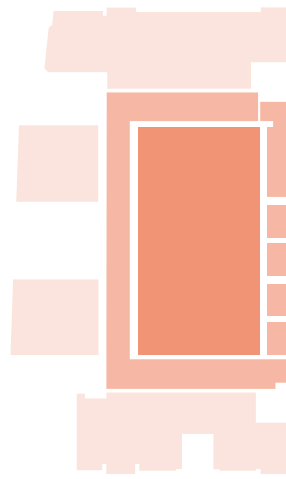
Forum

0 10m

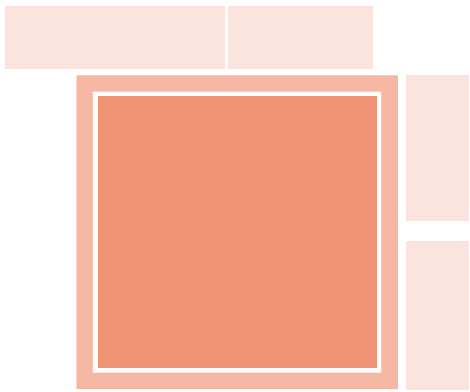
# SPATIAL ORGANIZATION



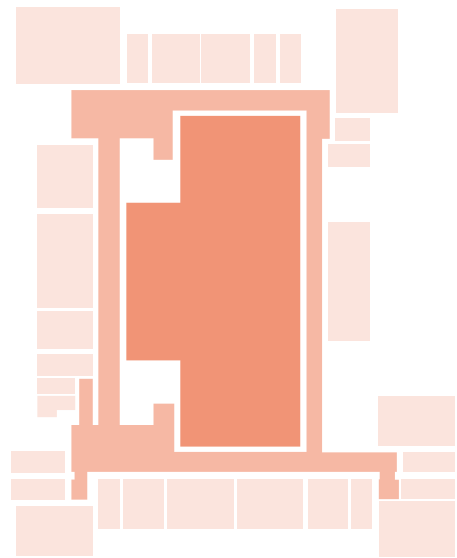
Predikheren



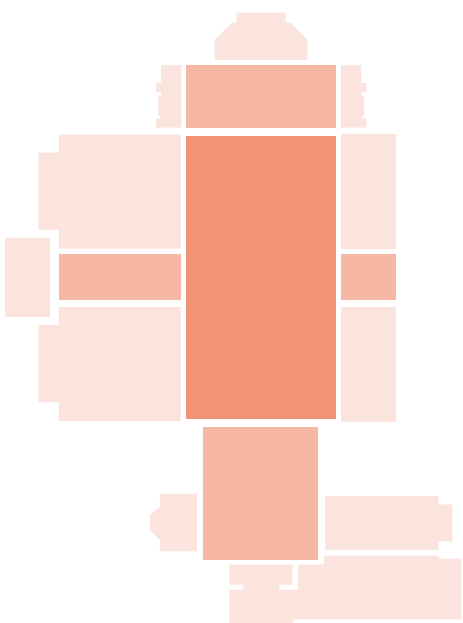
Post



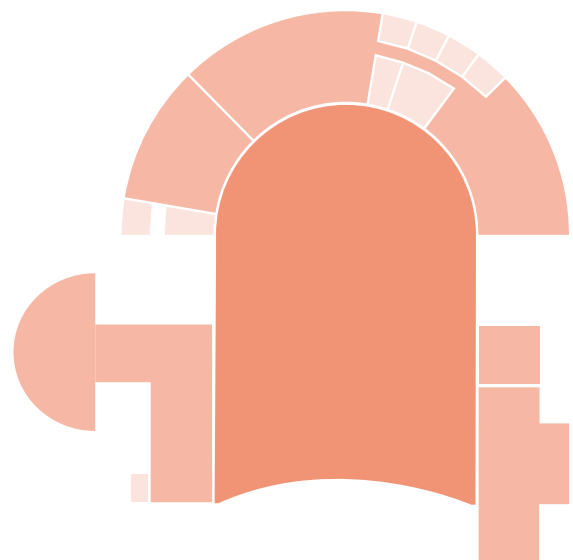
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Art museum



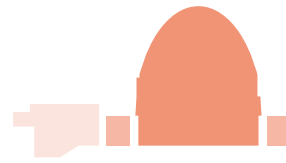
Forum

0 10m

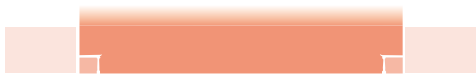
# SPATIAL ORGANIZATION



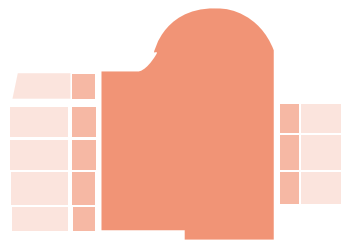
Predikheren



Post



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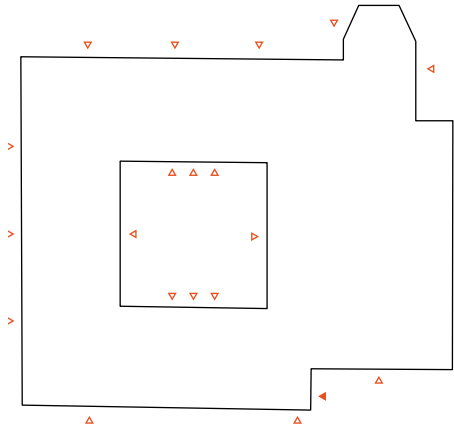


Art museum

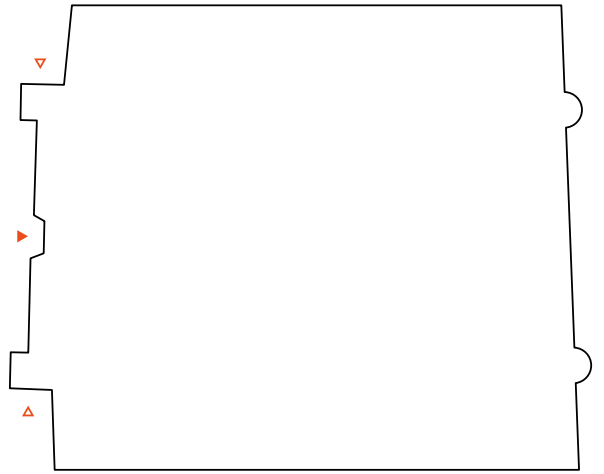


Forum

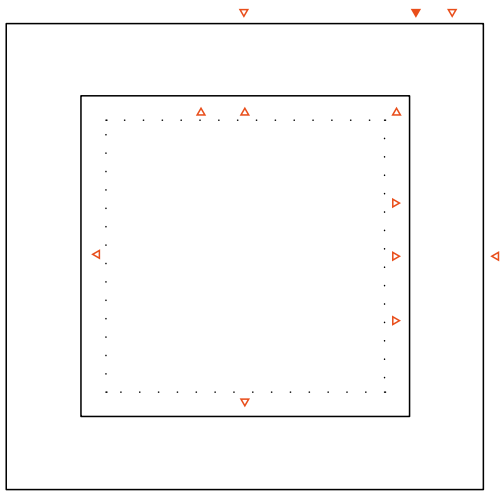
# ENTRANCES



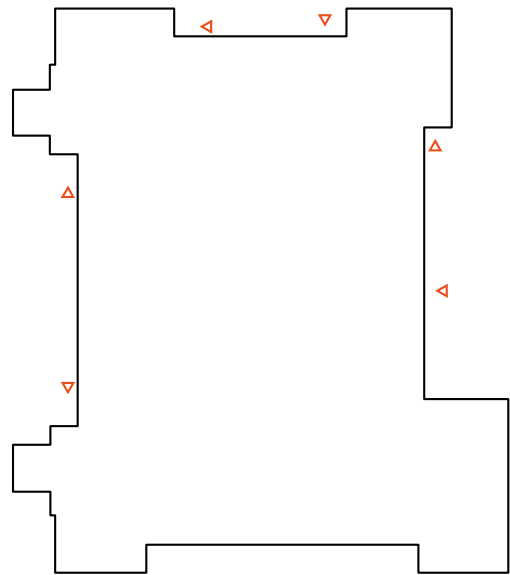
Predikheren



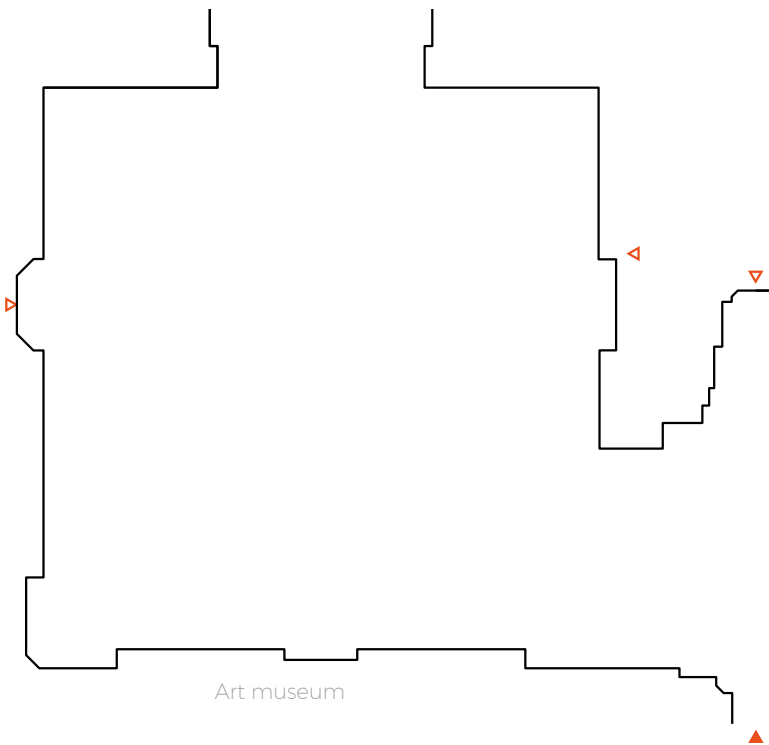
Post



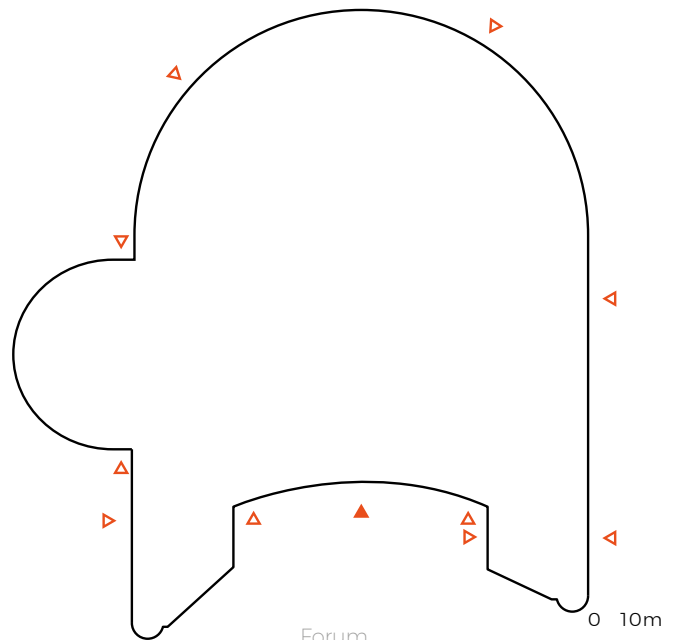
Pesthuis



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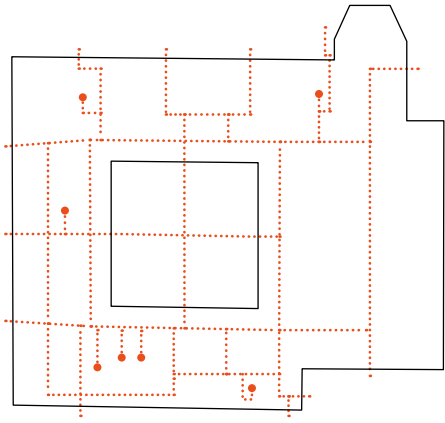


Art museum

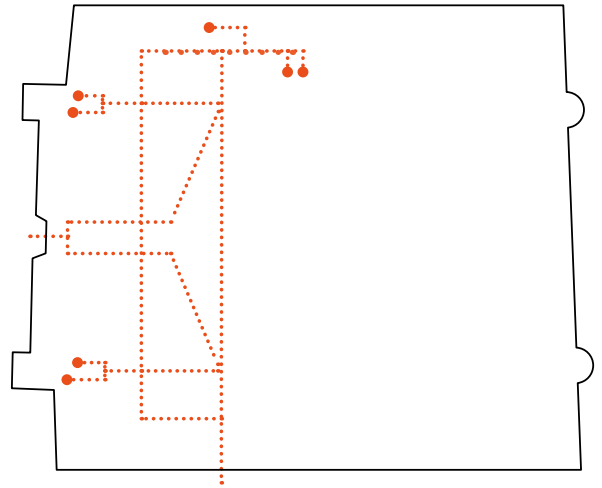


Forum

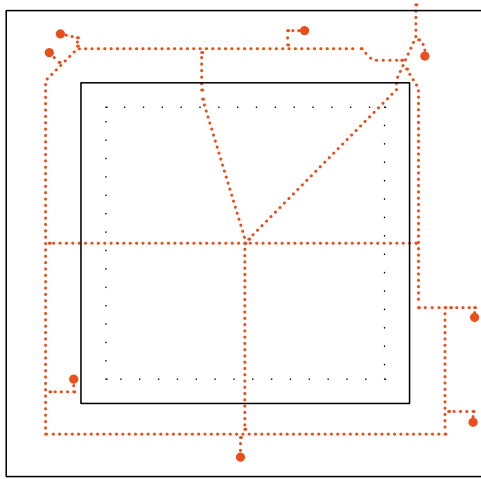
# ROUTING



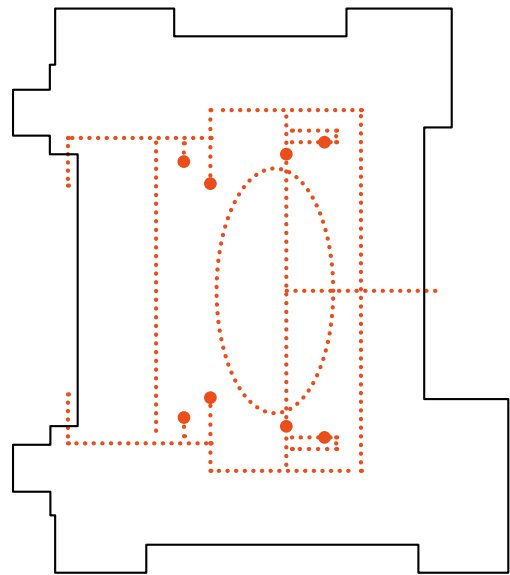
Predikheren



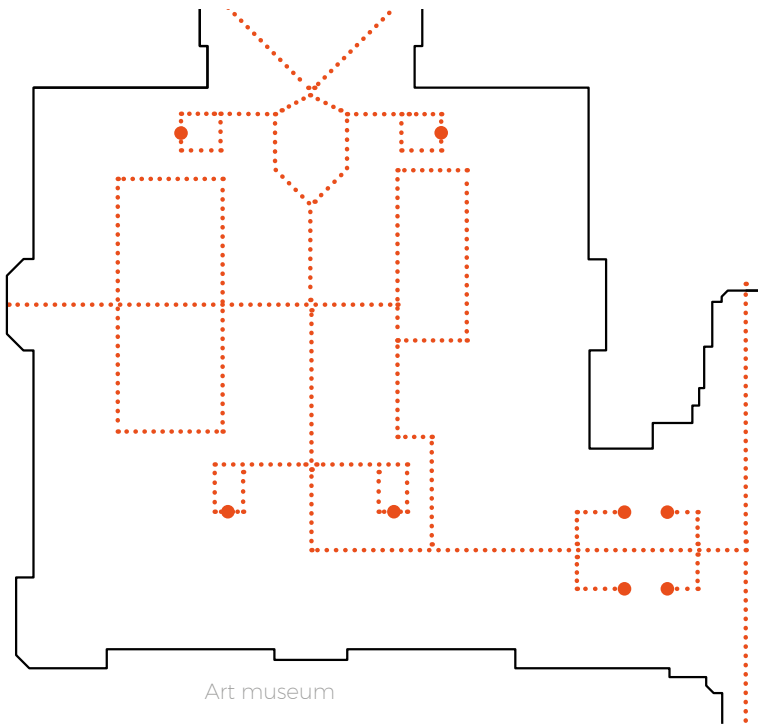
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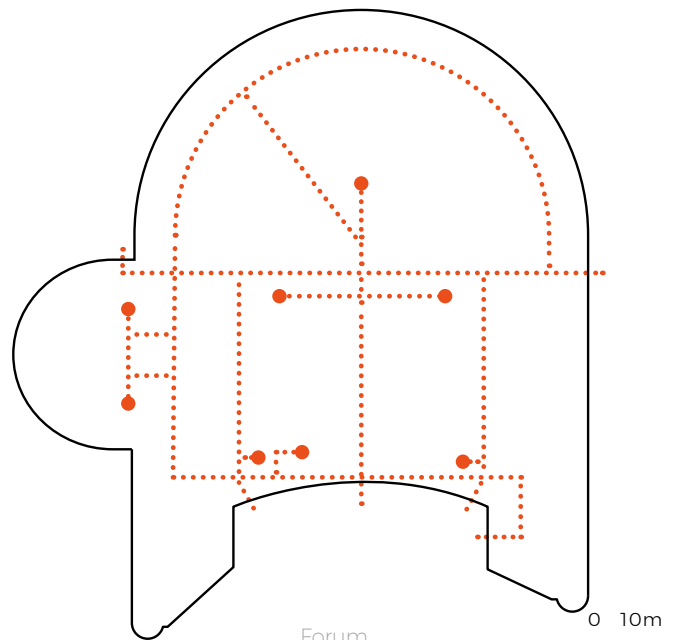
Pesthuis



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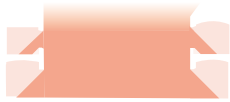
Art museum



Forum

0 10m

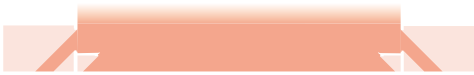
# DAYLIGHT



Predikheren



Post



Pesthuis



Faculty of Law

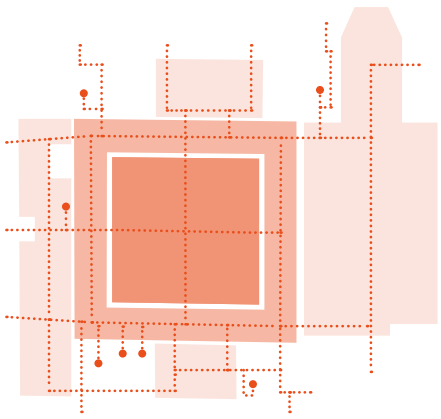


Art museum

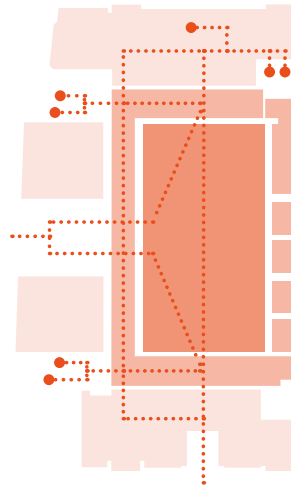


Forum

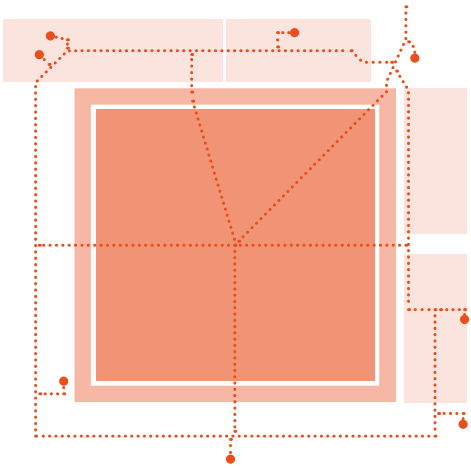
# SPATIAL ORGANIZATION & ROUTING



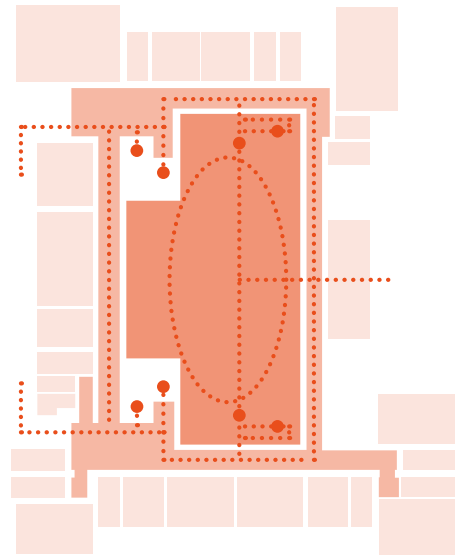
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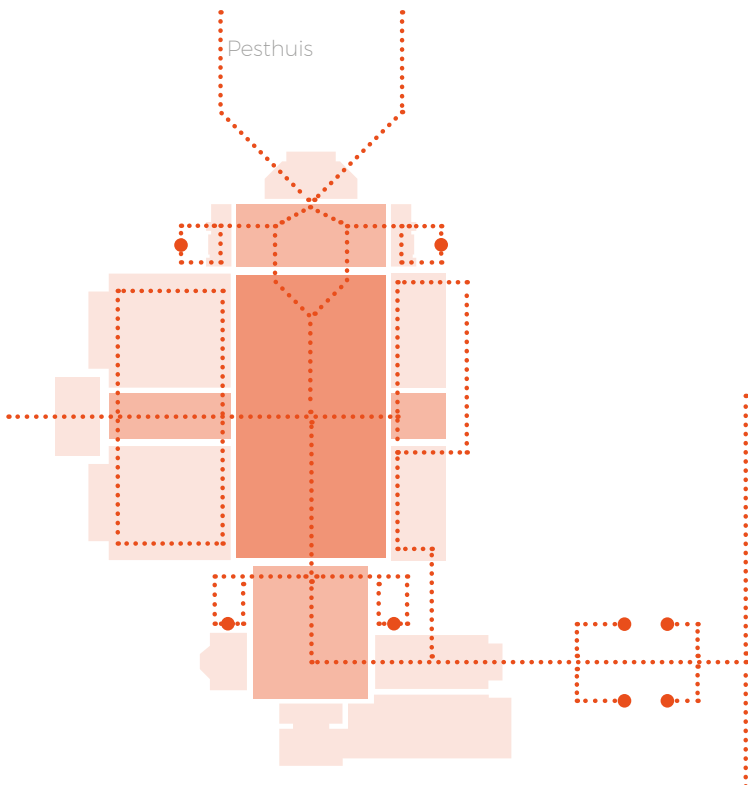
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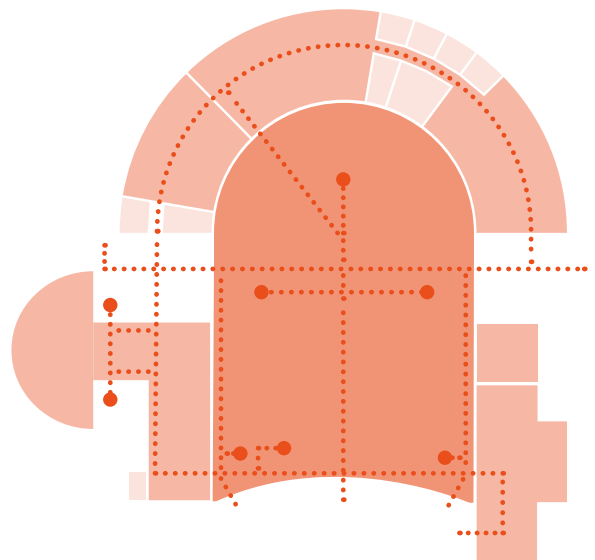
Pesthuis



Faculty of Law



Art museum



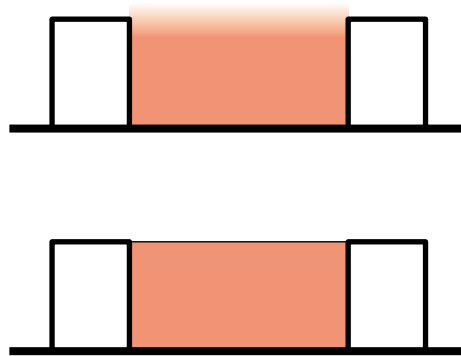
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## **CONCLUSIONS**

## CENTRAL SPACE



### CENTRAL SPACE

Based on the types of central spaces, the case study buildings can be divided into two typologies;

#### 1. Open central space

These buildings were originally constructed with a central space open to the sky. These central spaces fit the definition of a courtyard. They are used as a terrace and multifunctional space. Their use is dependent on weather conditions.

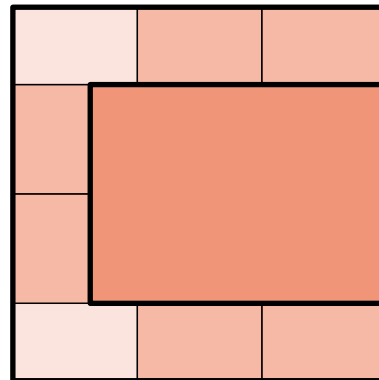
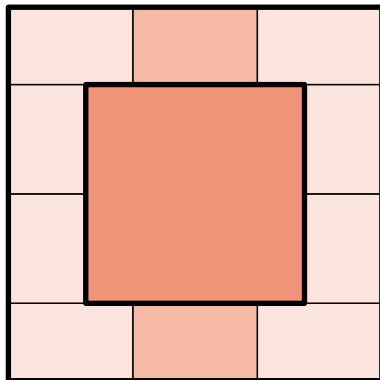
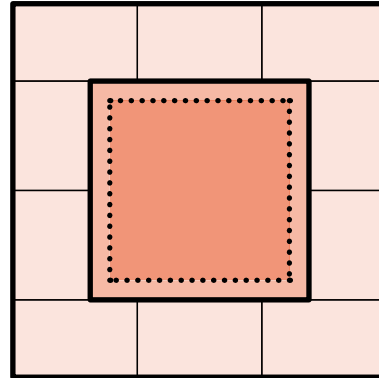
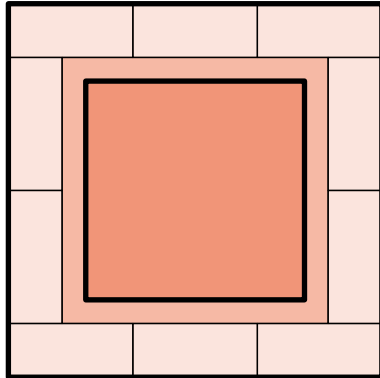
#### 2. Covered central space

Within the typology of the covered central space there are two sub-categories; buildings that were originally built with an open central space that was covered and buildings that were originally built with a covered central space. These central spaces, generally called atria, share the same spatial

characteristics and are therefore defined with a single typology.

The covered central space allows for use year-round. This leads to more permanent layouts and use of the central space.

# SPATIAL ORGANIZATION



## SPATIAL ORGANIZATION

Four typologies of spatial organization have been defined;

### 1. Cloister

An interior traffic zone is located around the central space. From there, the central space and the programmatic spaces can be accessed.

The traffic zone effectively functions as a barrier between the programme of the central space and the programmatic spaces.

### 2. Arcade

A traffic zone is located around the central space. From there, the central space and the programmatic spaces can be accessed. The traffic zone is an arcade. Therefore there is a more direct

connection to the central space, as it can be accessed from everywhere in the traffic zone without the need for doors.

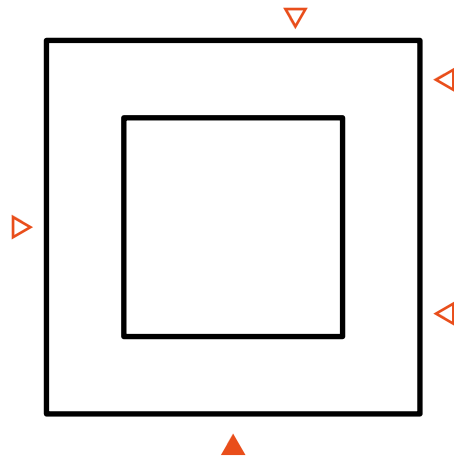
### 3. Hall

The central space is directly accessible from (some of the) adjacent programmatic spaces. The flow of traffic happens through the programmatic spaces and the central space. The relation between the programmatic spaces and the central space is reinforced through proximity and the possibility of the programme to bleed into the central space.

### 4. Semi-open Hall

A variation on the Hall typology where the central space is not completely enclosed by the building, but is directly connected to the exterior of the building on one side.

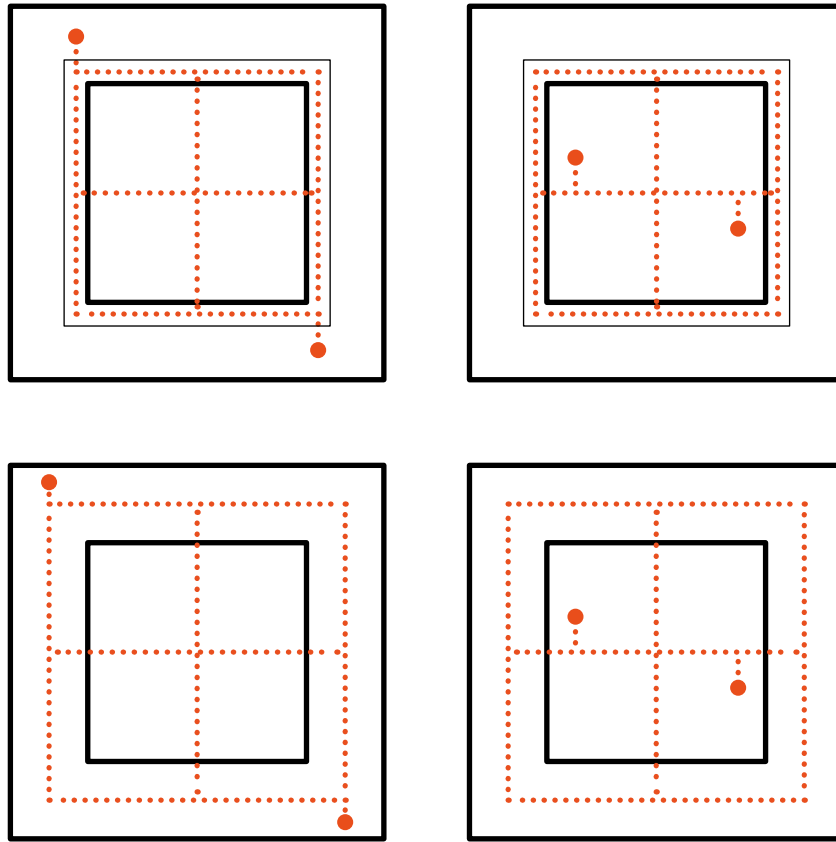
## ENTRANCES



## ENTRANCES

For the entrances, no distinct typologies can be derived from the case studies. The buildings largely follow the same principles. The location of the one or two main entrances have a direct and important relation to the surroundings. They are usually an important element in the appearance of the building. Multiple secondary entrances are located around the building for logistical purposes. These entrances have no distinct appearance and have no relation to the context besides allowing for access to the building from outside.

## ROUTING



## ROUTING

Four typologies of routing have been defined;

1. A traffic zone is located around the central space. The vertical access points are located in the building.
2. A traffic zone is located around the central space. The vertical access points are located in the central space.
3. Traffic in the building happens through the programmatic spaces. The vertical access points are located in the building.
4. Traffic in the building happens through the programmatic spaces. The vertical access points are located in the central space.

Placement of the vertical access points in the central space lead to an increased use.

This is exhibited in the Faculty of Law, where a permanent library function has been placed in the central space. The primary reason for the increase of use of the central space is the new programme.

## CONCLUSIONS

This research has been conducted in order to create a better understanding of the courtyard building typology. The conclusions drawn from this research will be used to inform the redesign proposal of the Koudenhorn police building in Haarlem. The construction of the building was concluded in 1771. The building consists of four wings enclosing a central courtyard. In the early 1970's an extension was added to the building. The building will potentially lose its current function, and the redesign will explore the possibilities for future use.

### Methods

Through analytical drawings in plan and section, six case study buildings have been analysed on five aspects: central space, spatial organization, entrances, routing and daylight. The analysis of these aspects is related to the central space rather than the complete building. Per aspect different typologies have been defined. These typologies will be the starting points for the spatial organization of the redesign proposal. In order to extract conclusions that are relevant and implementable to the design assignment the case studies have been selected based on the following criteria: The building has a central space, is a public building and is located in an urban context.

### Aspect typologies

#### Central space

1. Open central space: These buildings were originally constructed with a central space open to the sky. Their use is dependent on weather conditions.
2. Covered central space: The covered central space allows for use year-round. This leads to more permanent layouts and use of the central space.

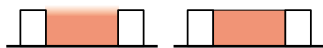


Figure 1 - Central space typologies (left to right: 1, 2)

#### Spatial organization

1. Cloister: An interior traffic zone is located around the central space. From there, the central space and the programmatic spaces can be accessed. The traffic zone effectively functions as a barrier between the programme of the central space and the programmatic spaces.
2. Arcade: A traffic zone is located around the central space. From there, the central space and the programmatic spaces can be accessed. The traffic zone is an arcade. Therefore there is a more direct connection to the central

space, as it can be accessed from everywhere in the traffic zone without the need for doors.

3. Hall: The central space is directly accessible from (some of the) adjacent programmatic spaces. The flow of traffic happens through the programmatic spaces and the central space. The relation between the programmatic spaces and the central space is reinforced through proximity and the possibility of the programme to bleed into the central space.
4. Semi-open Hall: A variation on the Hall typology where the central space is not completely enclosed by the building, but is directly connected to the exterior of the building on one side.

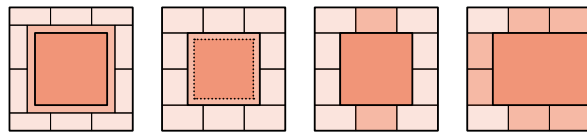


Figure 2 - Spatial organization typologies (left to right: 1, 2, 3, 4)

#### Entrances

Concerning the entrances, no distinct typologies can be derived from the case studies. The buildings largely follow the same principles. The location of the one or two main entrances have a direct and important relation to the surroundings. Multiple secondary entrances are located around the building for logistical purposes.

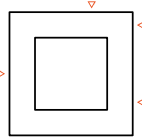


Figure 3 - Entrances typology

#### Routing

1. A traffic zone is located around the central space. The vertical access points are located in the building.
2. A traffic zone is located around the central space. The vertical access points are located in the central space.
3. Traffic in the building happens through the programmatic spaces. The vertical access points are located in the building.
4. Traffic in the building happens through the programmatic spaces. The vertical access points are located in the central space.

Placement of the vertical access points in the central space leads to an increased use of the central space.

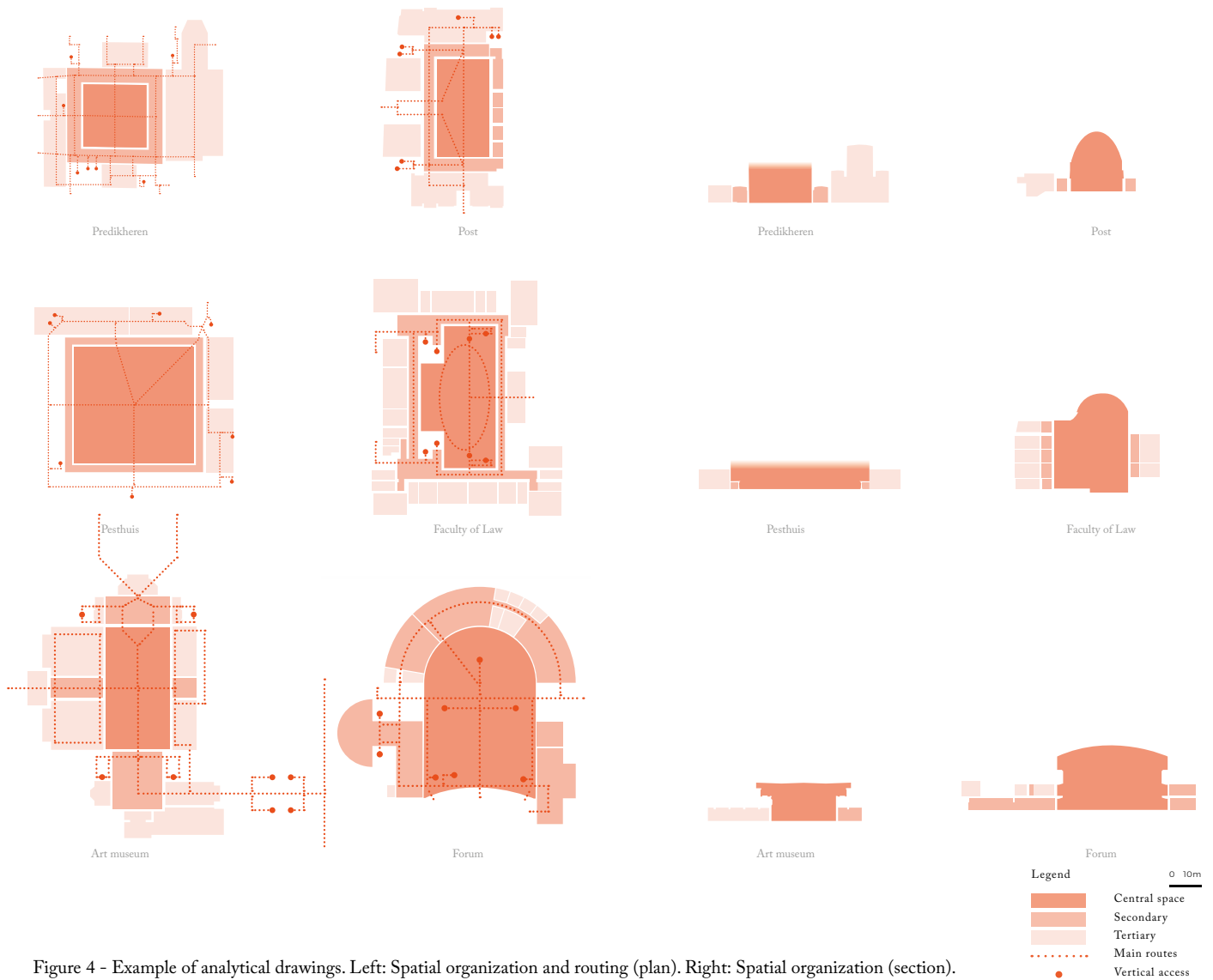


Figure 4 - Example of analytical drawings. Left: Spatial organization and routing (plan). Right: Spatial organization (section).

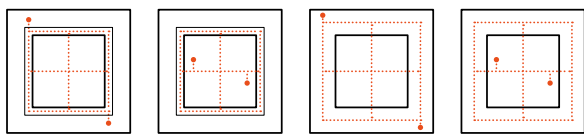


Figure 5 - Routing typologies (left to right: 1, 2, 3, 4)

*Daylight*

1. A traffic zone is located around the central space. Direct daylight enters the traffic zone. Indirect and insufficient daylight reaches the programmatic spaces through the traffic zone.
2. The programmatic spaces are located directly adjacent to the central space. Direct daylight enters the programmatic spaces through the central space.



Figure 6 - daylight typologies (left to right: 1, 2)

**Conclusions**

The case study research has led to the definition of distinct typologies for the five analysed aspects. There are three typologies which are expected to have the most significant impact on the use of central spaces: The covered central space (2) due to the possibility for year-round use, spatial organization with programmatic spaces adjacent to the central space (3,4) due to functions spilling into the central space and routing with vertical access points located in the central space (3,4) due to the flow of traffic through the central space. The actual impact of the typologies defined in this research will be tested through their implementation into the design process. The typologies will be used as optional scenarios during the development of the design proposal. When the final design is completed, reflection on the impact of the typologies will be conducted and final conclusions will be drawn.