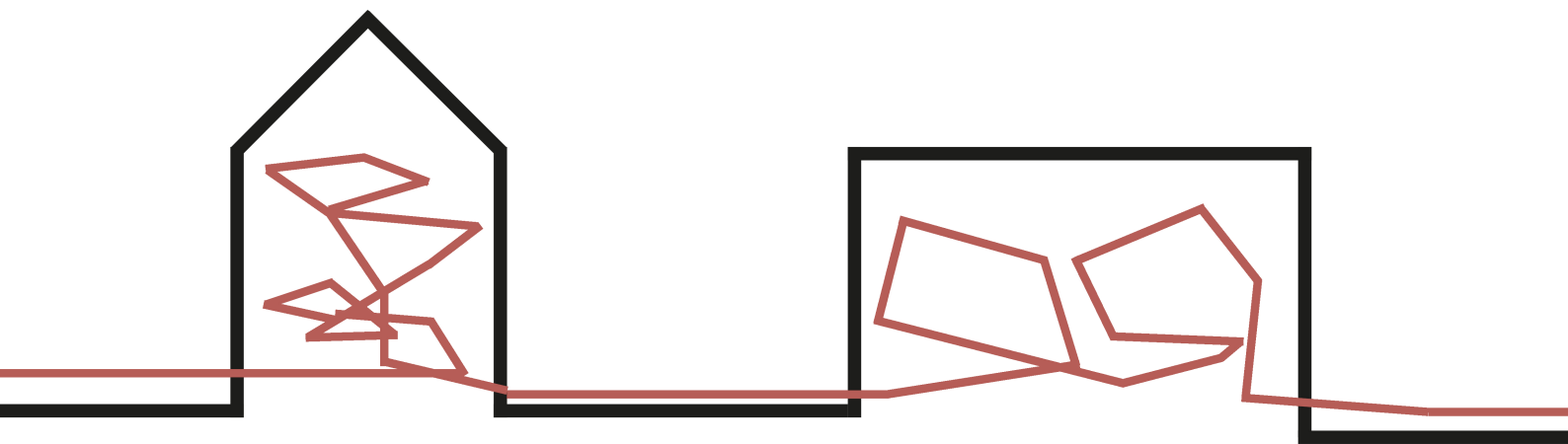


The throughline

A research to investigate the link between the circulation route
and the narrative of a museum exhibition



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Abstract

The central topic of this research paper is interior circulation design, particularly within the museum building typology. Investigated is how the interior circulation influences the narrative of the exhibition. The main question is 'How can interior circulation design support the story of a museum?' To answer this question a literature study is conducted. Various types of museum layout organization and arrangement of exhibition spaces are illustrated as well as potentials to facilitate storytelling through circulation design. The aim is to present a framework of circulation types and their characteristics, which can be applied on case studies. The paper includes one specific case study analysis of the dredging museum in Sliedrecht.

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1.1 Introduction

The order in which people visit particular segments in a museum can be described as one of the most important architectural and operational characteristics of this type of cultural building areas (Elettol & Badauddin, 2011). The main function of the pathway is to link the exhibition halls and assist the visitor to move through it. According to Cohen and McMurtry (Cohen, McMurtry, 1985, p. 30) the exhibition routes have greater potential than just guiding the flow of museum visitors. The accessible route determines the sequence of information, activities and objects, it can also tell a certain story. The museum has an overall narrative, main theme or even message. Then there is a way to express this through their exhibition and the experience of the visitors when visiting the museum. This all is connected with the circulation route, guiding visitors through the building. This research links the internal circulation routes and its influence on the story in a museum exhibition, highlighting its role in guiding the narrative flow, creating enhancement, encouraging exploration and facilitating accessibility. 'The throughline' is a route which leads visitors through the building, but is also the storyline of an exhibition. 'an exhibition is a narrative that unfolds in space and time' (Kossmann et al., 2017)

Keywords

Routing, museum (experience), interior circulation design, exhibition narrative, case studies

1.2 Theoretical framework

The frame of reference is a framework of organizational and circulation principles and their characteristics. The framework of circulation types is based on Ching (2014) organization of configuration of paths (figure 1), and secondly the classification of Naredi-Rainer and Schnell (figure 2) which are six types of spatial layout and routing in museums. This categorization mainly applies to layout shaping methods and is reflected in museum floorplans. While Ching (2014) seems to categorize paths and organization of buildings in general, Naredi focuses on the sequence of exhibition rooms. Combining these 2 schemes offers an analysis with a scope broad enough to fit each building and exhibition.

Few researchers only defined the **interior circulation**.

Circulation within interiors refers to the way in which people move through and around a building throughout time. (Noah 2020)

Black (2005) in his study defines interior circulation in the buildings as: " They are all walking areas on all floors of a building required for physical access to some subdivision buildings to the extent of the roof drop line " (Black 2005)

Hsu (2004) also highlights and defines the interior circulation design in the building as how we experience the three dimensionality of a building through the movement of our bodies with full consideration of time, sequence and space (Hsu 2004).

Finally Stephen (2009) defines clearly the interior circulation in the buildings as: wander more or less aimlessly?"

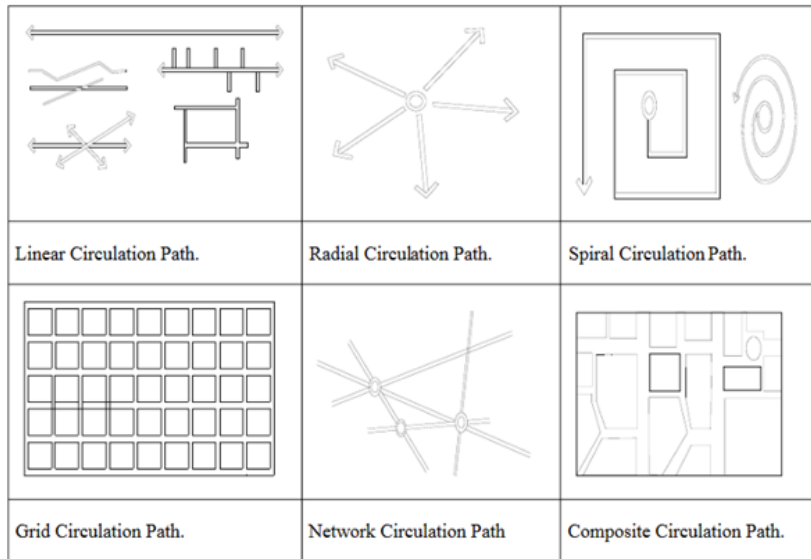


Fig. 1. Types of circulation paths within buildings (ching 2014)

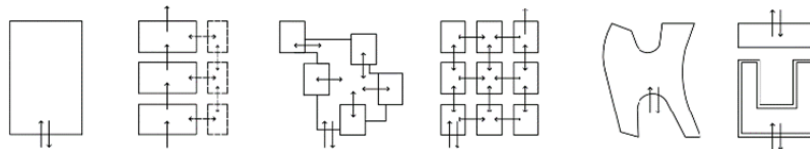


Fig. 2. Scheme of six basic types of exhibition space Layout according to Naredi-Rainer and Schnell (Naredi-Rainer, Schnell, p. 66)

1.3 Problem statement

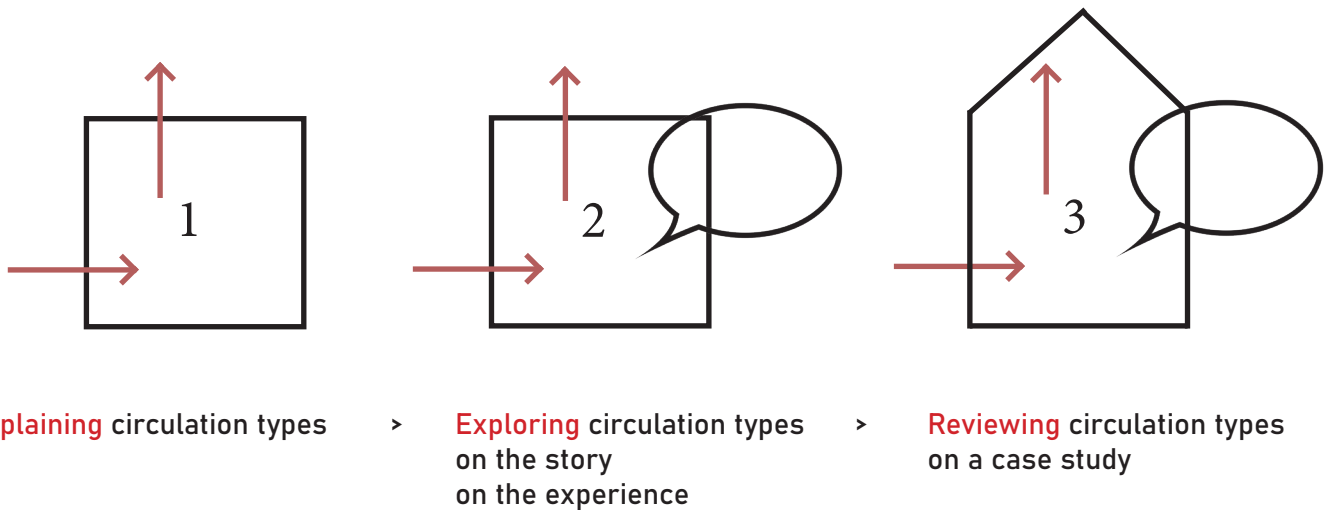
Sliedrecht is the 'Dredging village' where the origin of dredging can be found. A small city, with one of the biggest export products of the Netherlands in history. One of the most important families responsible for this is the Volkers family. Since 1958, the former directors dwelling and terrain has housed a museum about the history of the dredging industry. The floorplan with hallways, attick and small rooms is suitable for the former function, but makes less sense for the function of a museum. The building is in good condition and has a rich interior including a directors office, en-suite living room and added conservatory. The museum story is unique, it distinguishes itself from other maritime museums by its specific collection of mainly shipmodels, telling the story of dredging. Both the building as well as the museum narrative are highly valued, however in the current set up they don't reach their potentials. The topic is broad, more broad than the current collection and more broad than what fits inside the current building. It is therefore the museums wish to expand and attract more visitors. In the renewed museum, different stories of dredging can be told through the exhibitions. To achieve this, solid research is necessary to understand the principles of interior circulation design and how to implement them on the location of the dredging museum.

The main question is 'How can interior circulation design support the story of the museum?'
To answer this question, subquestions have been formulated:

- What interior circulation routes exist?
- What is the influence of circulation design on the narrative of the exhibition?
- How does the interior circulation design apply on the Dredging museum?

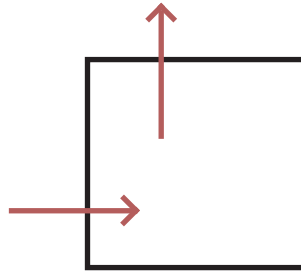
1.4 Methodology

Existing research has offered valuable insights in the topic of museum architecture. This present study focuses on the proximity of literature of circulation and spatial design and their influences on the exhibition. The information is derived from general design principles in exhibition design, architectural theory and user experience design. Information is gained through both literature study and case studies. Different circulation types in museums are explained, explored and compared to the floorplans of the dredging museum (subquestion 3) and case studies (attached in the appendix). This makes it possible to reflect obtained knowledge directly to a practical example. The goal of the research is to understand different layouts of circulation types in museums and their influence on the exhibition. The outcomes are summarized in a framework which can be applied on case study analysis, including the dredging museum.



- | | |
|----------|---|
| Step 1 | Explaining the circulation types |
| Method: | theoretical research on interior circulation design |
| Goal: | framework of circulation types |
| Step 2 | Exploring the circulation types |
| Method: | theoretical research on circulation design, museum experience and exhibition story |
| Goal: | framework of circulation types and their characteristics, pros, cons and influence |
| Step 3 | Reviewing the circulation types |
| Methods: | case study analysis |
| Goal: | Assessment of circulation and the influence on the story and experience on Baggermuseum |

Fig. 3. Research diagram



2.1 Explaining circulation types

This chapter will dive into the definition of interior circulation design. It describes what aspects are part of the interior circulation in terms of spatial organization, spatial circulation and exhibition layouts.

Spatial organisation

A building is normally composed of a number of spaces which interact in a spatial organization. How these spaces are organized can clarify their significance and their functional and symbolic roles within the structure of a building. Such differences define a hierarchy, and its function determines any space within the structure (Brebba & Hernández, 2015). A classification for organization types of architectural buildings was illustrated by Ching (2014) as; Centralized Organisation, Linear Organisation, Radial Organisation, Clustered Organisation, and Organization of Grids.

Spatial circulation

Spatial circulation is the architects predefined way or direction to establish a hierarchical connection for all the spaces in the organization of the building. The relationships among these components directly influence circulation routes, shaping the movement pattern within the museums internal space. (Saleh, 2020) The nature of the configuration of a path may either strengthen the organization of spaces by paralleling its pattern, or contrast with the form and serve as a visual counterpoint to it. Ching (2007) describes the circulation as 'perceptual thread' that binds all building spaces, or any set of indoor or outdoor spaces together. The aspects that have a direct effect of the users perception of the space and structure are categorized from distant to closeby phases within the sequence of spatial circulation.

Approach - the distant view

It is the first phase of the circulation system: preparing visitors to see, experience and use the spaces within a building. The approach to the building may vary in duration and form.

Entrance - from outside to inside

Entering a building, a room within a building, or a defined field of exterior space, involves the act of penetrating a vertical plane that distinguishes one space from another and separates "here" from "there." The act of entering can be signified in various ways. This could be a literal opening in a plane wall or an implied plane. The entrance could be flushed in the whole or an added element, centered or off-center.

Configuration of the path - sequence of spaces (figure 1)

The nature of the configuration of the path is linear in nature and has a starting point, from which people are guided through a sequence of spaces to a destination. A straight path, however, can be transformed in various ways to a path with intersections, branches or curves. A plural of paths can form a network or grid.

Path-space relationships- edges, nodes, and terminations of the path

As mentioned before, paths are the connection between spaces in a building.

They may pass by spaces, pass through spaces or terminate in a space.

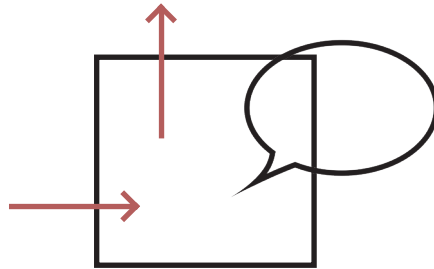
Form of the circulation space - corridors, halls, galleries, stairways, and rooms

Spaces for movement form an integral part of any organization of the building and occupy a significant amount of the volume of the building. The form and circulation space varies depending on the type of movement, the spaces it links and the requirements.

exhibition space layout

Bitgood (1988) stresses the importance of designing pathways in museums. He notes that the interior design of the museums and the layout of the buildings exhibits, which limit the movement of visitors, can decide how visitors communicate with display items. The way the route is designed is therefore the main issue of the interior design of a museum. Naredi-Rainer and Schnell (figure 2) describe the pathway in museum design within the organization of the exhibition halls as: open space, linear chaining, round-loop, spatial interpenetration & spatial isolation, labyrinth, free form spaces, conversions of architectural monuments and complex layouts.

Open space layouts provide a large, unobstructed area where visitors can move freely among exhibits. In contrast, linear chaining presents a sequential organization of exhibits, guiding visitors along a pre-determined path. The roundloop configuration, is much like its linear counterpart but returns visitors to their starting point. Diverging from these orderly arrangements, spatial interpenetration allows areas to overlap or intersect. Conversely, spatial isolation focuses attention by separating themes or exhibits into distinct areas or rooms. A labyrinth layout offers a complex, maze-like pathway through the exhibition. Free form spaces are characterized by non-traditional, often organic shapes and configurations that defy conventional rectilinear layouts, while conversion of a monument involves adapting exhibitions spaces to an existing historic significant building. Lastly, complex layouts use multiple of the design strategies above for one layout.



2.2 Exploring circulation types

This chapter investigates how the layout of the interior circulation design influences the narrative of the exhibition.

According to Ching (2005) the order in which we experience the spaces influences what we experience in the next. So you can imagine that choosing a different route in a museum gives a person a different experience of the museum. Also because every visitor brings his own foreknowledge and interests, the outcome of an exhibition is different for everyone. (Hartstra, z.d.) Interior circulation design can significantly influence the experience of the exhibition in various ways. The effectiveness of the circulation design means for the visitor: experience, engagement, wayfinding and potentially also telling stories. (Filvova, 2022) Unlike storytelling in literature, constrained by linear text on a page, or a cinema, limited to the visual image on a screen, and even in traditional theatre, where the audience has a fixed perspective, the museum offers potency to a multi-dimensional narrative. (Maclead et al, 2012)

An integrated journey within museum exhibition halls becomes feasible when visitors comprehend the full message of the exhibits. This comprehension is not solely reliant on visual perception but also hinges on the spatial organization of the building (Saleh, 2020) The arrangement of spaces and paths within an exhibition guides visitors through a curated journey, influencing the sequence in which artworks or exhibits are encountered. This sequential encounter can be designed to tell a **narrative**, emphasize a thematic progression, or build upon concepts, gradually enhancing understanding and engagement with the subject matter. Flexible circulation design can as well have multiple pathways through an exhibition, providing visitors with choices in routing. This approach encourages visitors to **explore** different narratives or themes and navigate based on their interest. Distinctions arise between museums that offer route choices where control of the layout and movement is minimal, and those with predetermined gallery sequences which imposes control over the movement and thus the story: exemplified by example the grid and single sequence as two extremes in museum building design. (Tzortzi, 2007)

Alternatively, the creation of distinct zones or focal points within the exhibition space could also be an option to facilitate storylines or emphasis exhibits. Different themes or exhibit items can be assigned to specific areas. By carefully placing exhibits along the circulation path, designers can optimize the **engagement** of the visitor. Key exhibits or focal points can be strategically positioned to capture attention and stimulate immersive experiences. Bitgood (1990) theorizes that the role of immersion in exhibition is significant because this may lead to a greater potential for pleasure and learning about the theme. Filová (2022) describes how circulation routes can also be designed to promote interactivity, encouraging visitors to participate and engage actively with the content. Interactive or hands-on museums provide an opportunity for extracurricular education in a playful way.

Lastly, **wayfinding** plays a critical role in making the museum's narrative accessible and inclusive. By accommodating diverse visitor needs, wayfinding systems and communication ensure broader audience can engage with the museum's narrative. Visibility and overview helps orient visitors within the space to understand where they are in relation to the overall layout, enhancing their understanding of the story being told. (Elottol & Bahauddin, 2011)

2.3 Framework of interior circulation

The following pages contain the framework of interior circulation types, with characteristics and eventual potentials and risks.

Configuration of paths

	Narrative	Engagement with exhibits
Linear	Singular narrative or perspective, leading visitors through the exhibition in a specific sequence.	The curated sequence ensures that key concepts or pieces are encountered at the optimal moment in the visitor's journey, maximizing their impact and educational value.
Spiral	The spiral configuration lends itself to a gradual unfolding of the narrative, mirroring the spirals physical progression.	Spiral paths can be an efficient use of space, allowing for a large number of exhibits to be displayed within a relatively compact area without feeling cramped
Radial	The radial layout naturally supports thematic organizations, with each radiating path potentially dedicated to different facets of the exhibitions narrative.	The central point in a radial configuration can serve as a powerful narrative and visual anchor, setting the tone for the exhibition and providing a key thematic or literal centerpiece.
Grid	The grid layout supports a multiplicity of narratives, enabling visitors to navigate through the exhibition in various sequences.	In a grid configuration, there's an opportunity to place equal emphasis on all exhibits, as no single path dictates the visitors journey.
Network	Network configurations allow for a wide range of narratives and non-linear narratives, where the story does not follow a strict chronological or thematic sequence.	Allows for a more flexible presentation of content, accommodating diverse historical periods, artistic movements, or scientific concepts within the same exhibition.
Composite	A composite layout enables a more layered and complex narrative experience. Visitors can encounter different storytelling methods within the same space.	Opens up creative possibilities for curators and designers to craft unique spatial experiences that defy conventional exhibition layouts.

[^] Framework of configuration of path characteristics (Black 2005), (Falk 2016), (Ching 2014), (Hughes, 2015), (Ambrose & Paine, 2018), (Tzortzoglou, 2018)

Exploration

Linear configurations can limit opportunities for exploration and personalization. Visitors follow the same path, which may lead to monotony.

The physical act of following a spiral path can also have a psychological impact, creating a sense of journeying towards (or away from) a central goal or conclusion.

Visitors may be encouraged to make repeat visits to explore different paths they did not initially take. It can also potentially overwhelm visitors with choices.

The inherent structure of a grid configuration encourages non-linear exploration, visitors can choose their path, piecing together their narrative based on their interests.

Each intersection offers multiple choices, placing agency in the hands of visitors to explore and experience the exhibition. This may also pose visitor overwhelm.

Composite configurations can strike a balance between straightforward navigation and the joy of discovery. The variety of paths and experiences could potentially fragment the narrative.

Wayfinding

Easy navigation

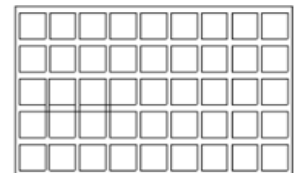
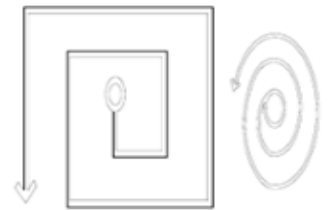
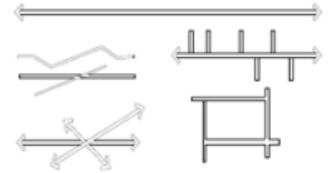
Visitors may find it difficult to exit the exhibition before completing the entire path.

The central hub of a radial layout aids in orientation, providing a clear point of reference for visitors as they navigate the exhibition.

The uniformity and predictability of a grid layout simplify navigation.

The abundance of choices and potential for fragmented experiences can make it difficult for some visitors to grasp the exhibition's overall narrative and navigation.

Easy navigation as well as more complex layouts, together may lead to challenges in spatial cohesion.



Exhibition space layout

Open space	An open space layout encourages the development of multi-dimensional narratives. Exhibits can be arranged to offer multiple perspectives on a theme, inviting visitors to draw connections between different pieces or ideas.	The openness of this layout becomes a canvas for interaction with the exhibits. Without narrow corridors or defined routes, visitors may find more ease to enhance engagement.
Linear chaining	Linear chaining ensures a directed narrative progression, guiding visitors through a curated story or chronological sequence.	The predetermined path minimizes distractions. Each exhibit or section builds upon the last, reinforcing key themes and concepts.
Round loop	The round loop layout presents a cohesive narrative. Introducing concepts and themes that develop and interwine as visitor progresses, leading to a comprehensive understanding by the time they return to the starting point.	Since the layout naturally leads visitors back to the start, it encourages a complete engagement with the exhibition. The loop guides through all the intended content, making it less likely to miss exhibits.
Spatial interpenetration & Spatial isolation	Spatial interpenetration allows for the creation of complex narrative layers within the exhibition. While spatial isolation creates distinct spaces for parts of the narrative.	Interpenetration facilitates a seamless integration of themes, where exhibits can flow into one another.
Labyrinth	Labyrinth layouts facilitate non-linear narratives.	The labyrinth layout allows for the segmentation of themes within different sections of the maze, this segmentation can highlight the diversity of the exhibition's content. This might also reduce effectiveness of certain displays.
Free form space	Free-form layouts naturally support non-linear narratives, the narrative can unfold in multiple directions.	The free-form introduces a sense of dynamism and interaction within the exhibition space. Creation of clusters or vignettes within the broader space can serve as focal points for specific stories, themes or exhibits. Without clear guidance, visitors may miss important exhibits.

Non-linear exploration. allowing visitors to choose their own paths through the exhibition, making the narrative more about individual discovery and exploration.

Linear chaining allows curators to control the pace at which information is presented and discovered. It provides less freedom for personal exploration, side routes can stimulate discovery.

The predetermined path means all visitors experience the narrative in the same sequence, which can restrict opportunities for personalized exploration based on individual interests.

The merging of spaces creates a dynamic and immersive experience Isolation allows for a focused exploration of individual themes or exhibits, minimizing distractions from other parts of the exhibition.

The labyrinth layout naturally encourages exploration and discovery, inviting visitors to navigate through its pathways in search of exhibits and narratives. This can create a sense of adventure and curiosity.

high degree of agency in the hands of visitors, empowering them to navigate and explore the exhibition space as they see fit leading to a personal experience.

Fewer physical barriers, which can increase visual accesibility and can aid in orientation.

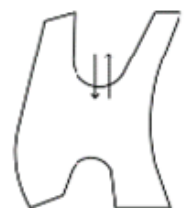
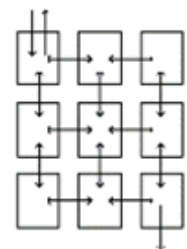
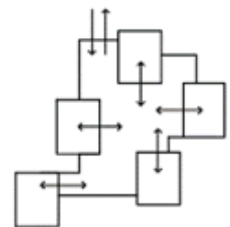
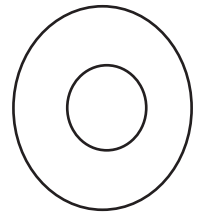
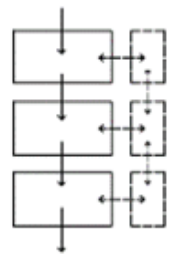
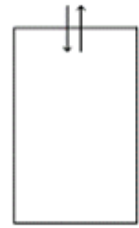
Linear chaining simplifies wayfinding, making the exhibition more accessible.

Round loop layouts can facilitate easy navigation and smooth visitor flow, making it easier for visitors to move at their own pace without disrupting the flow of others.

less predefined layout may lead to overwhelm and lack of orientation. Effective balance of isolation and interpenetration and clear communication improves.

The complex pathways can be confusing and disorienting. The potential obstacles may limit visibility.

Free-form layouts often mimic organic shapes, creating a natural flow and movement. Navigating can be challenging due to the absence of clear pathways and may lead to overwhelm.



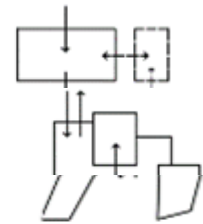
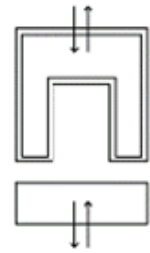
Conversions & extensions of architectural monuments	Conversions and extensions creates a dialogue of the narratives between the old and the new or the building and the exhibition.	The use of architectural monuments as exhibition spaces enhances the narrative with the historical context. The building itself becomes an exhibit. Visitors engage with the collection as well as with the spaces.
Complex	A complex layout creates an environment where multiple narrative pathways coexist, allowing visitors to experience the exhibition from different perspectives.	The unpredictability of a complex layout can create moments of surprise and wonder, as visitors encounter unexpected exhibits or thematic areas.

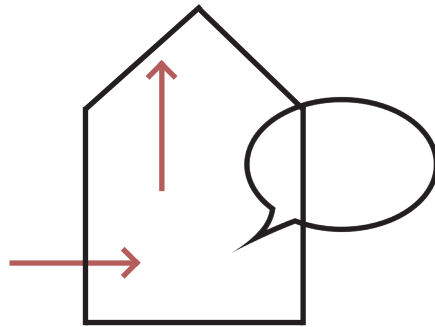
The existing architecture can provide a unique atmosphere as well as in combination with the exhibition. It can attract visitors not only interested in the exhibition but also in the buildings architectural and historical significance.

Encourages exploration and active engagement. Visitors are prompted to make choices about which paths to follow, which areas to explore in depth, and how to navigate the space.

Issues of accessibility and modernization need to be carefully addressed. The existing building can have structural and space limitations on restrictions.

Challenges in ensuring easy navigation. The risk of visitors becoming disoriented increases with the complexity of the layout. Effective wayfinding aids and thoughtful design are essential to help visitors.





2.4 **Reviewing** the circulation types

The configuration of paths and the exhibition space layout types are now reflected on the dredging museum as a case study analysis on both the terrain as a whole and the floorplans of the museum.

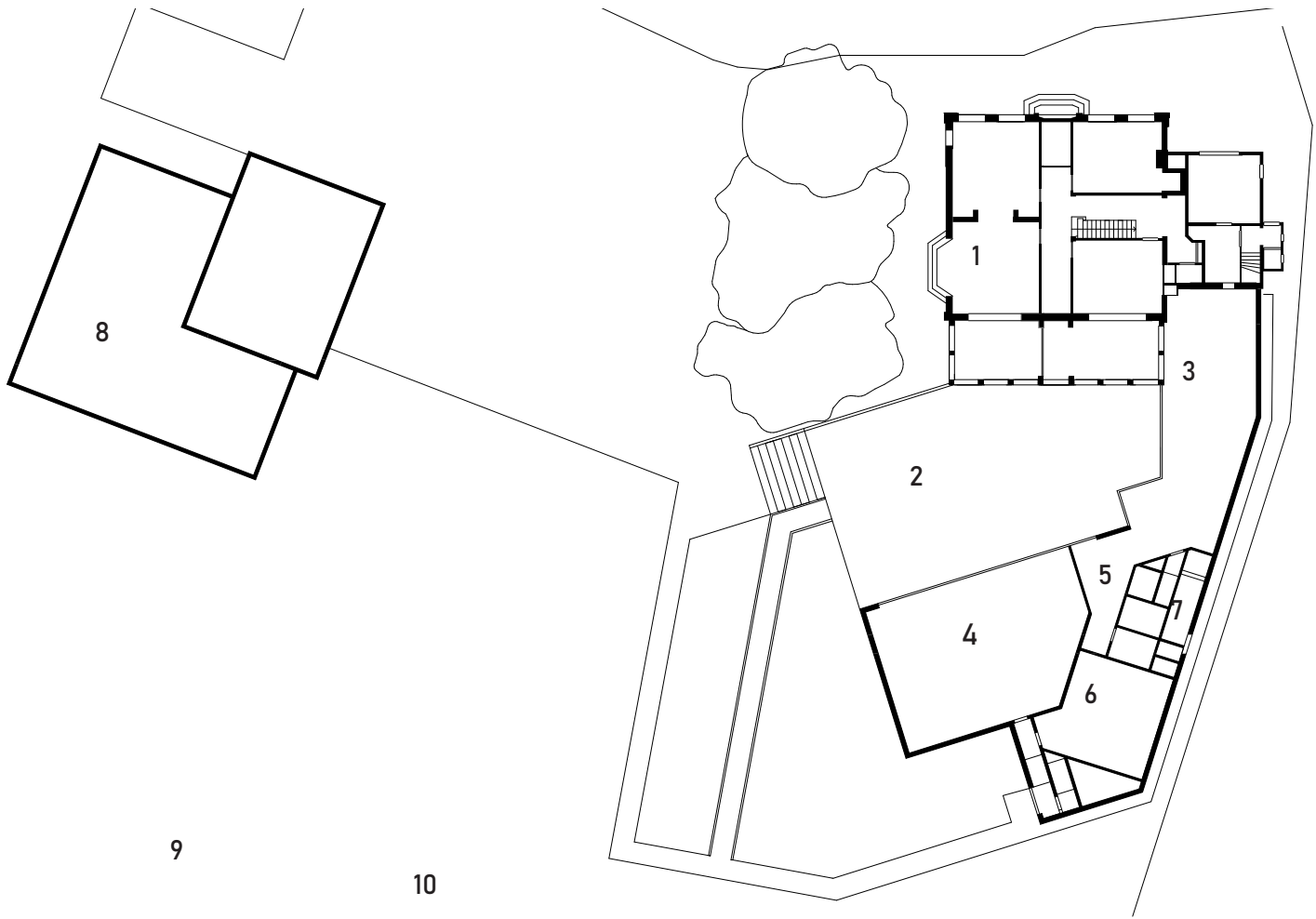


Fig. 4. Floorplan terrain

- 1 museum
- 2 terrace
- 3 kantine
- 4 multifunctional space
- 5 toilets
- 6 movieroom
- 7 basement - depot
- 8 practical garden
- 9 ship components
- 10 dredging ship

2.4.1 The terrain

The current museum is housed in the monument of the Volkers dwelling, the extension, the carriage house, a garden and even a dredging ship at the riverside.

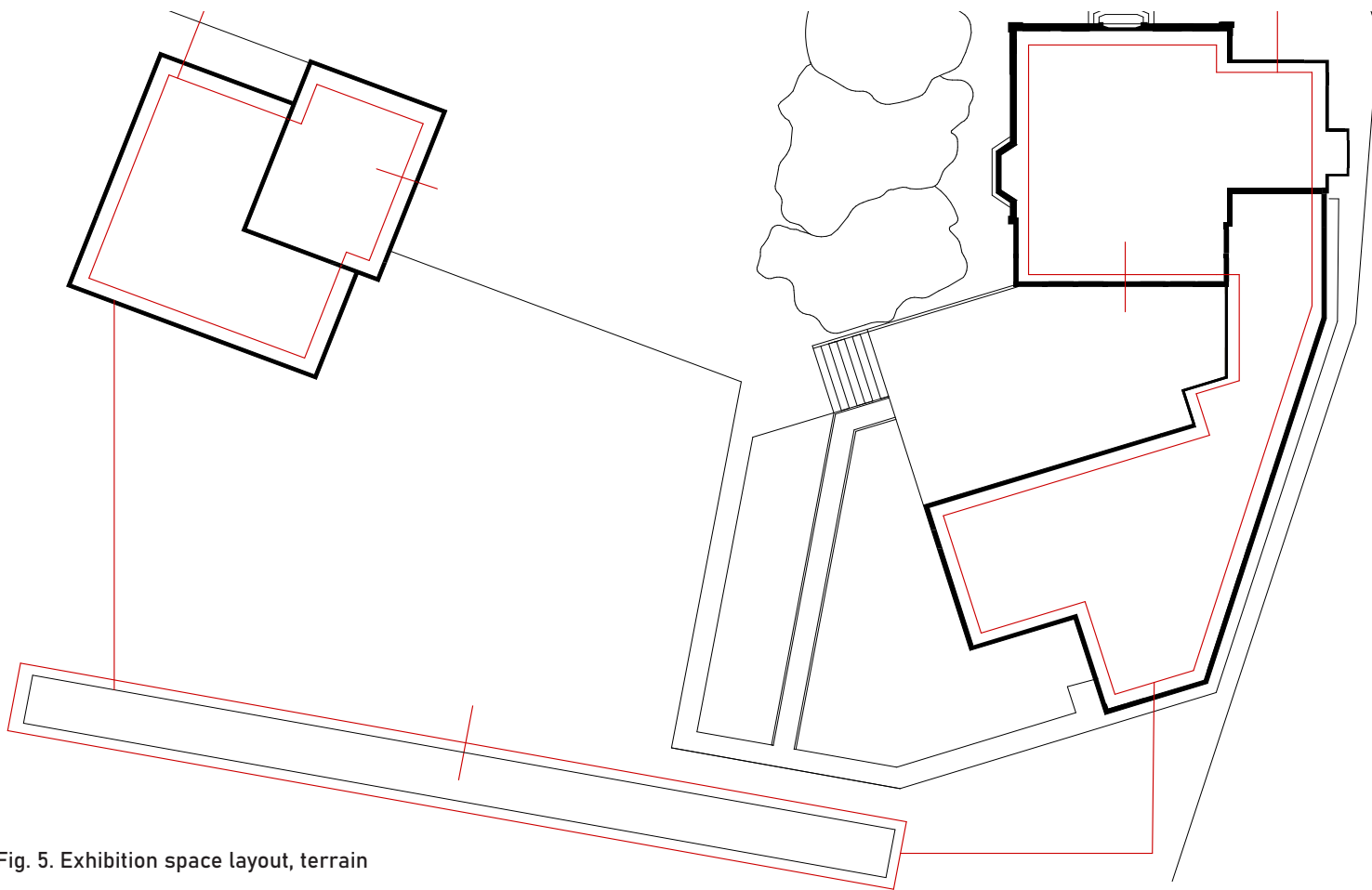


Fig. 5. Exhibition space layout, terrain

Exhibition space layout - Spatial interpenetration & spatial isolation

The space layout of the terrain could be seen as a kind of 'base' with exhibition rooms, alternatively pavilions, accessible from the scattered space.

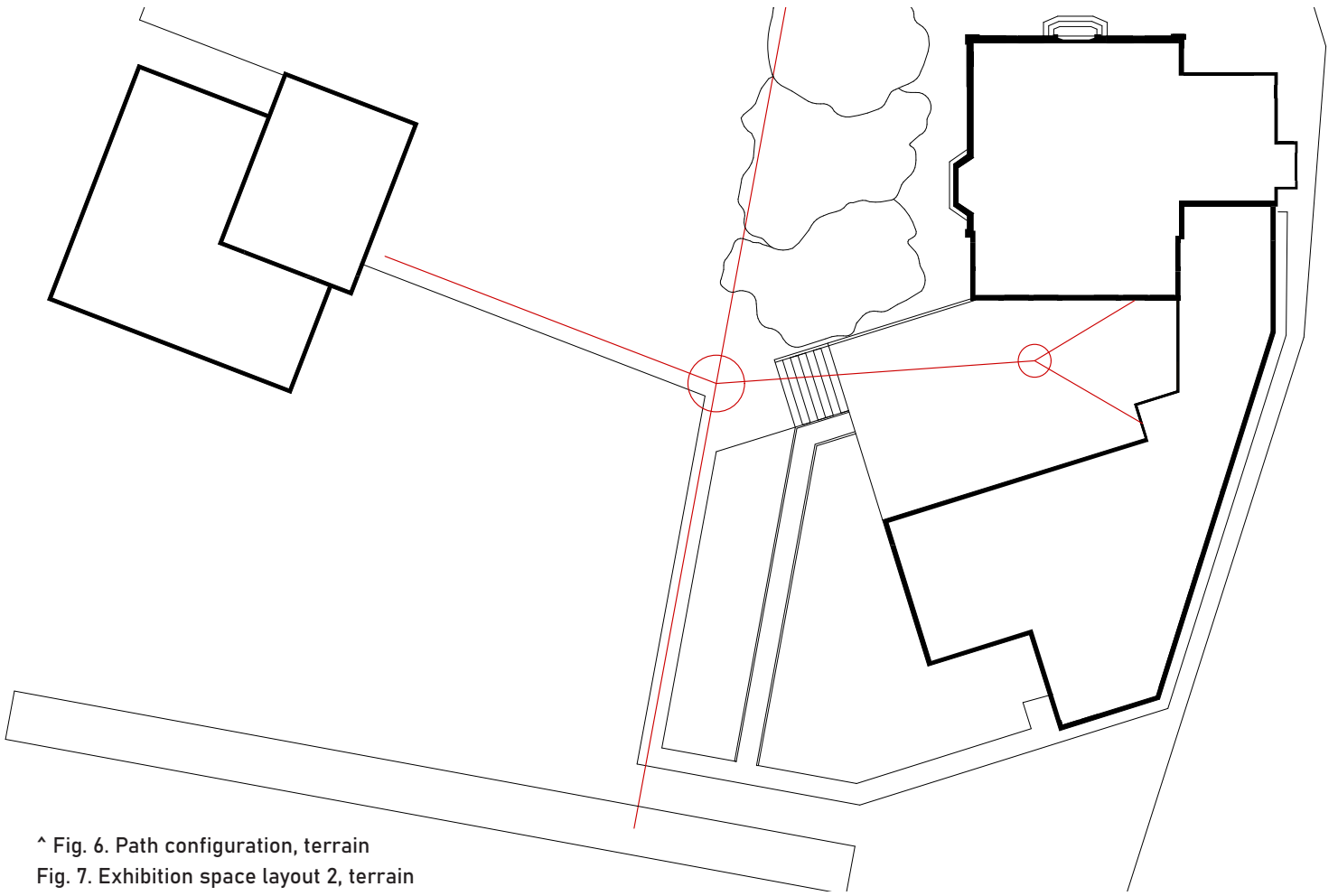
Configuration of paths - Radial & Network

There seems to be recognizable a network configuration of paths with 2 nodes.

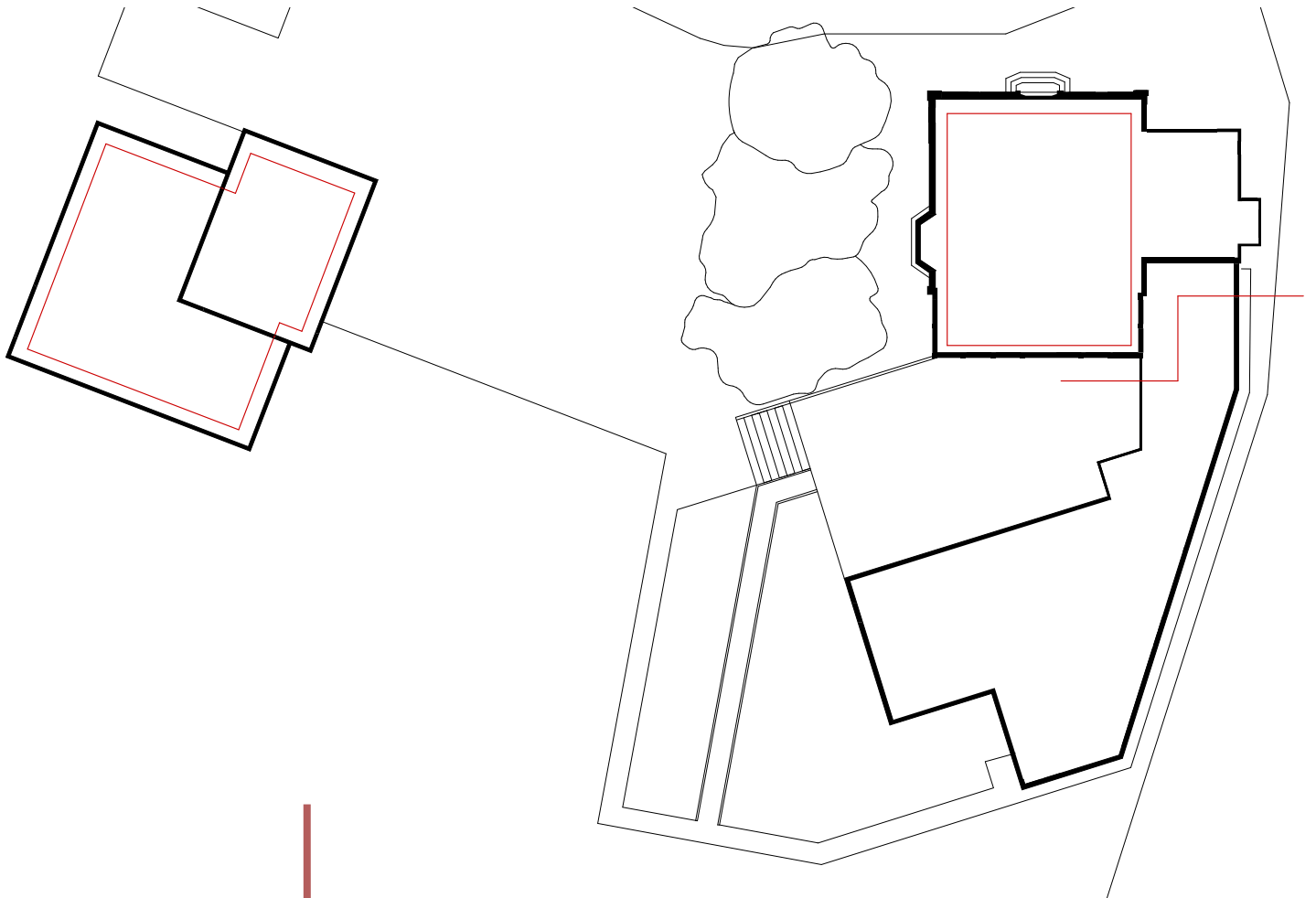
Linear paths extend radial from the first node to the entrance of the terrain, the carriage house, the terrace and the exposition of ship components. The second node is located on the terrace and has radial paths to the entrance of both the monument and the extension.

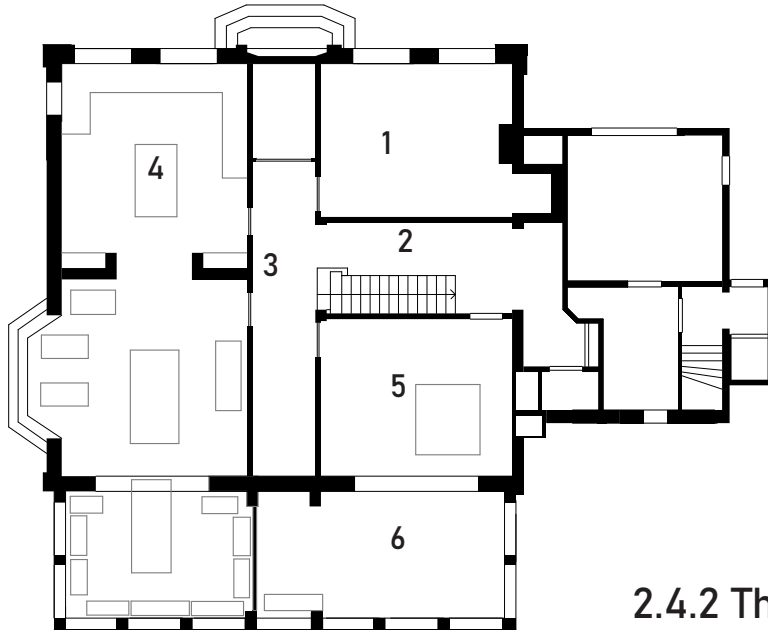
Exhibition space layout - conversions and extensions of architectural monuments

Both of the monuments, the dwelling and the carriage house, are converted to be part of the museum and exhibitions. An extension is added to the original building to increase the function of the museum.



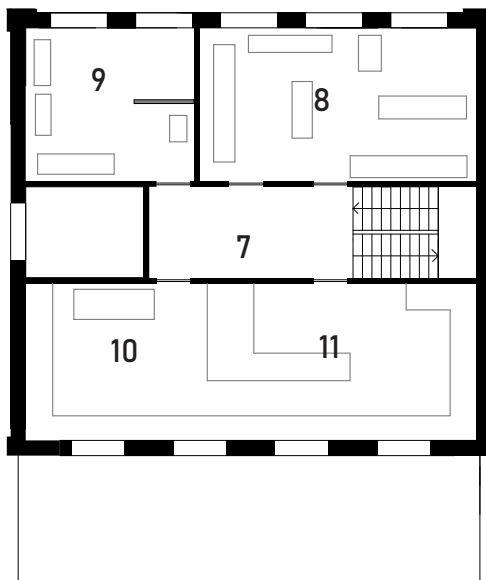
^ Fig. 6. Path configuration, terrain
Fig. 7. Exhibition space layout 2, terrain





2.4.2 The museum

The overall story of the museum is a historical journey which explains the development of dredging on the basis of shipmodels. The exhibition is as follows:



1 The original office of Volker

2 Making new land

3 How dredging used to go +outfit

4 Development of dredging, manpower up to steam engine

5 Counter and shop

6 Entrance and wardrobe

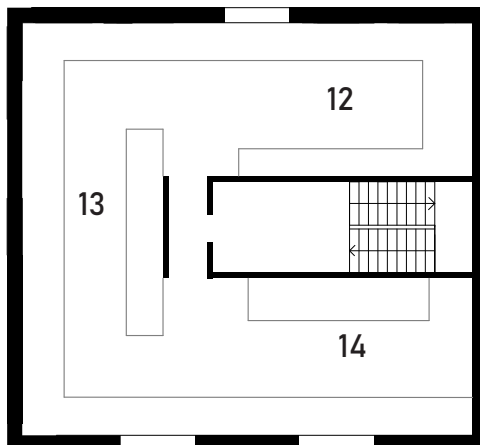
7 Sand types

8 Mechanical dredging

9 Small scale dredging, as a ditch

10 trailing hoppers

11 cutter suction dredgers



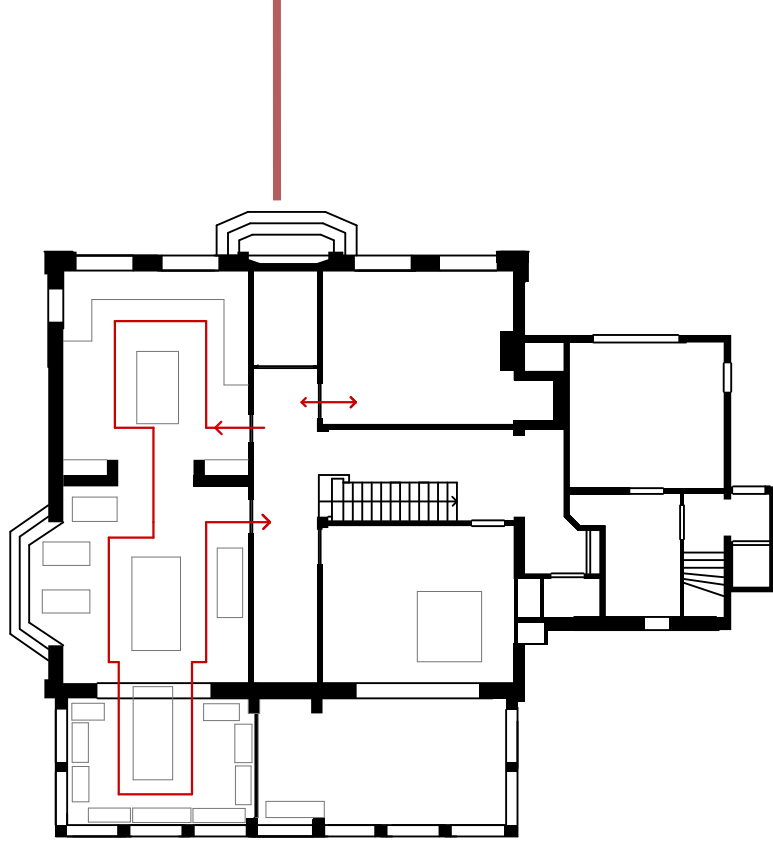
Attic: hydraulic engineering

12 history Biesbosch & production reed mats

13 dyke construction, then and now

14 models of waterworks

Fig. 8. Floorplan, building



The circulation route with a guided tour is a linear route through all the exhibition spaces.

Visiting the museum independently, however, several alternative routes through all the exhibition spaces are conceivable.

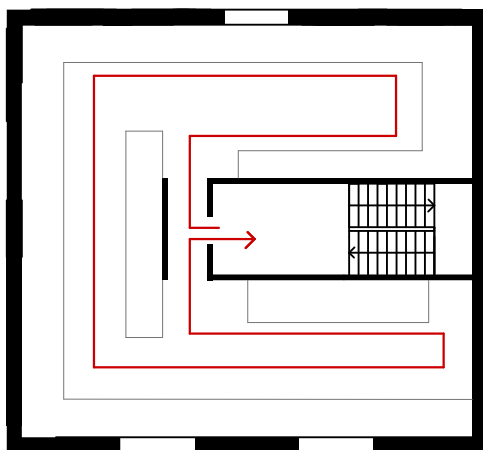
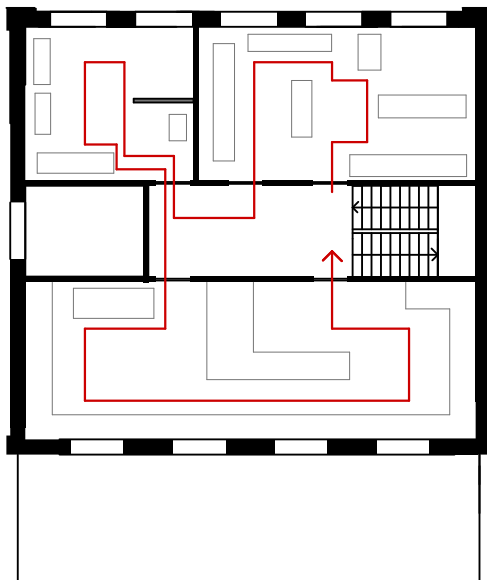
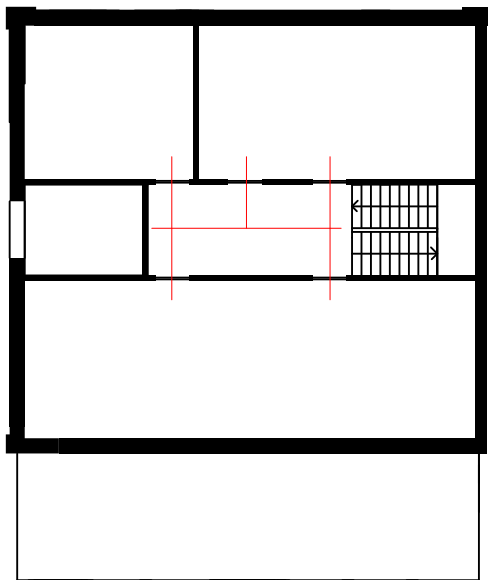
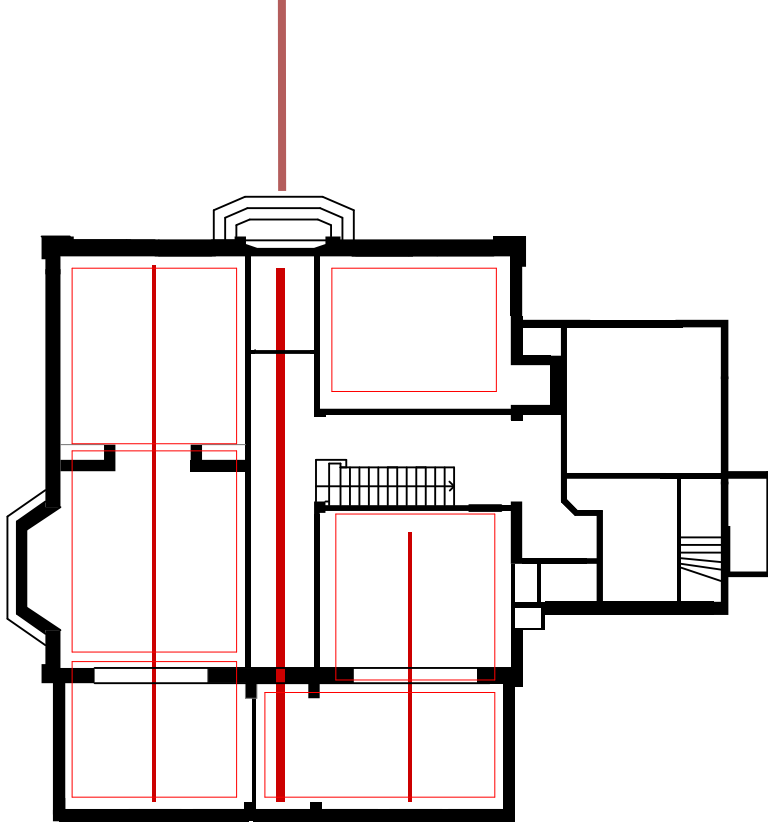
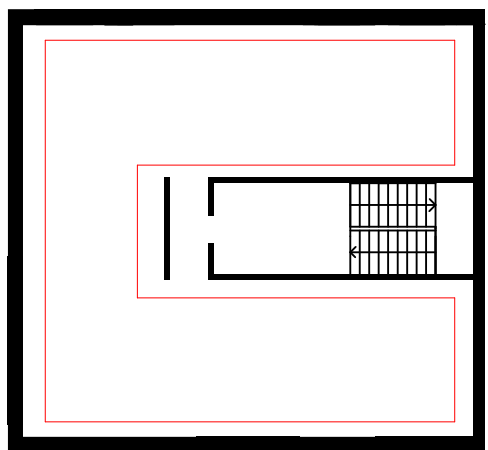


Fig. 9. Exhibition route



< linear chaining

The spatial layout most similar to the floorplan of the Dredgingmuseum is linear chaining. The hallway serves as the primary organizing element for a series of rooms. The groundfloor has also side routes in the form of en-suite rooms. However, the sequence of rooms can be visited in multiple orders, and therefore it deviates from the format of linear chaining.



< Open space

The exhibition spaces of the dredging museum refer mostly to the open space layout.

Fig. 10. Exhibition space layout and path configuration, building

2.4.3 Conclusions of the casestudy

While redesigning a historical building for its new function, the problem is that the building already has a spatial organization. Due to the buildings status as monument adjustments of the floorplan are not allowed, meaning you have to deal with structural and space limitations. This is challenging to arrange the exposition in the desired way to create a narrative. On the other hand, conversion and extension of an architectural monument also has a potential to create an unique atmosphere with a dialogue of the narratives between the building and the exhibition. The Volkers monument fits perfectly in the narrative of dredging in Sliedrecht.

The overall story of the exhibition is a chronologically order of shipmodels about the development of dredging. On the basis of the framework of circulationtypes, a predertermined sequence of spaces results in a linear narrative which fits well. As analyzed before, the sequence of rooms in the museum is mostly related to linear chaining. But, the sequence of rooms can be visited in multiple orders, leaving visitors with options to navigate their own narrative. One can understand the narrative with a guided tour through the building, but mostly you wander around in own visit. This means that the exhibition may not be visited in the way it was intended to fully understand the exhibition. The exhibition rooms are mostly arranged in an open space layout, the spaces are quite full which may lead to overwhelm as well as less engagement with certain displayed items.

In addition to the exhibits in the Volkers monument, the terrain has more to offer; an extension for multi-functional purposes, a carriage house with practical garden for dredging experiments, a garden with exhibited dredger components and a dredging ship. The division of the museumfunction over several spaces is most similar to a spatial interpenetration & spatial isolation exhibition layout. According to the framework, each 'isolation' could have its own exploration on the theme, strenghtening the immersive experience. In this case however, the less defined layout leads to less overview. The configuration of the paths stands out more effectively. The radial arms, extending from 2 nodes, to the entrances of the buildings and garden make it easy to navigate.

Conclusion

Each building consists of a spatial organization of spaces and configuration paths that link them together. Ching (2014) categorizes architectural organization into centralized, linear, radial, clustered, and grid types. And the architectural configuration into linear, spiral, radial, grid, network and composite types. Specifically for the museum layout Naredi-Rainer and Schnell classified the types as open space, linear chaining, roundloop, spatial interpenetration & spatial isolation, labyrinth, free form spaces, conversions of architectural monuments and complex layouts. Each type has distinct characteristics and considerations for the exhibition.

Interior circulation design can significantly influence the narrative of an exhibition in various ways. Layouts with a singular path lends itself well to a structured narrative. Every visitor experiences the same journey in the predetermined sequence. A multi-directional path layout can facilitate a non-linear narrative with different aspects, allowing visitors to explore and create their own journey based on their personal interest. The more people are engaged with the exhibits the more they learn. Components can be placed in specific locations to be emphasized within the whole. Ultimately, easy navigation ensures that the narrative is conveyed as intended. In singular layouts, this is more straightforward than in a multi-directional layout where clear signage is needed.

Case study analysis of the dredging museum concludes that lack of a coherent interior circulation design, due to the original function, results in lack of a coherent narrative.

Reflection

This research approach works very well for the theme of the dredging museum but could be implemented in other museums as well. The framework of circulation types is a useful tool to assess existing museum floorplans on their interaction with the narrative. Eventual reorganization can be substantiated with the theory. The framework suits also well for new museums. Circulation design applies to every building, there is no way to design without taking the circulation routes into account. Most importantly, however, this research will be of profound relevance for the Baggermuseum and the design assignment attached to this case study. Knowledge obtained from the research is implemented directly in the design process. Exploring the types in the Baggermuseum is the start for design decisions.

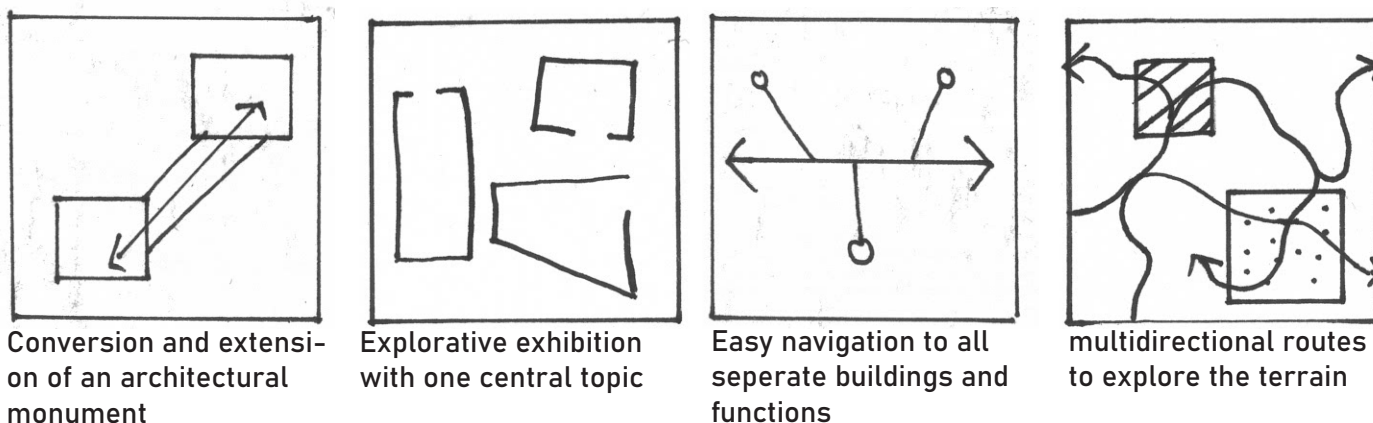
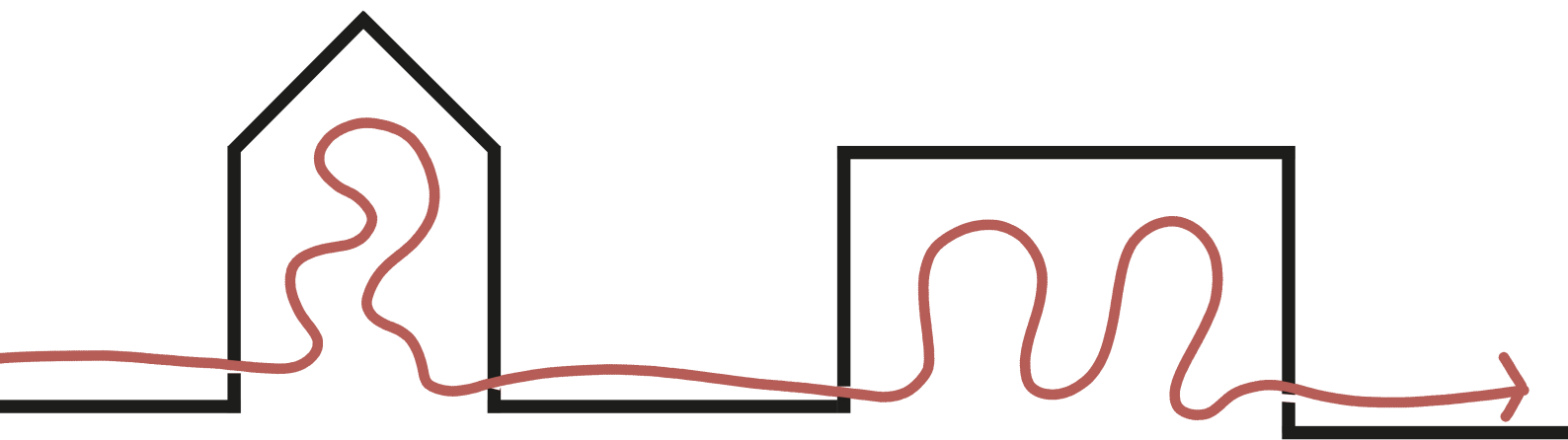


Fig. 11. Implemented design decisions



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figures

Fig. 1. Types of circulation paths within buildings, Ching

Fig. 2. Scheme of six basic types of exhibition space Layout, Naredi-Rainer and Schnell

Fig. 3. Research diagram, Frederica Bouwstra

Fig. 4. Floorplan terrain, Frederica Bouwstra

Fig. 5. Exhibition space layout of the terrain, Frederica Bouwstra

Fig. 6. Path configuration of the terrain, Frederica Bouwstra

Fig. 7. Exhibition space layout of the terrain 2, Frederica Bouwstra

Fig 8. Floorplan museum, Frederica Bouwstra

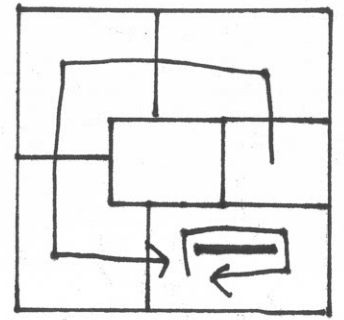
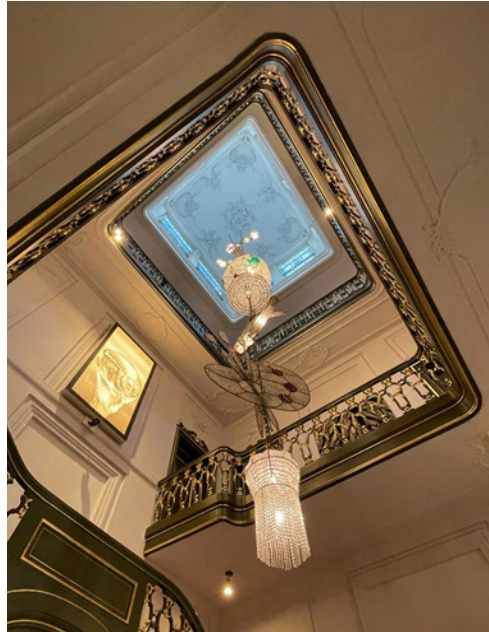
Fig 9. Exhibition route of the museum, Frederica Bouwstra

Fig. 10. Exhibition space layout of path configuration of the museum, Frederica Bouwstra

Fig 11. Implemented design decisions, Frederica Bouwstra

Appendix

Casestudies



Escher museum Den Haag

Circulationtype

Linear chaining / Round loop around stairwell
Conversion of architectural monument, Het Paleis

Exhibition
Story

Biography of Escher's art from early to most recent
Biography of Escher's art from early to most recent
Thematically: landscapes, illusions, metamorphose..
upper floor dedicated to interactive experiments based on Escher's work

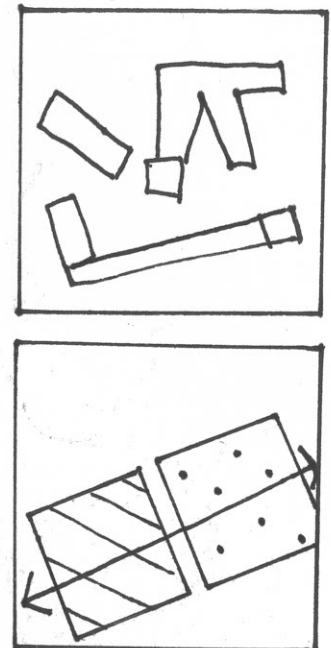
objects:

Art works and interactive experiments

Findings:

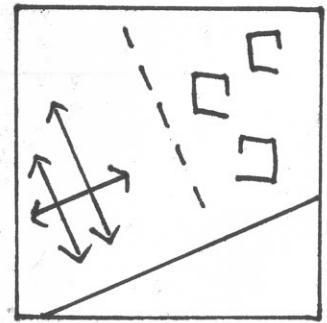
The linear ensemble of rooms is in line with structure of the exhibition story.
Navigation is a structured one route, which makes navigation easy
The monument is in good state and is part of the exposition. The history of the for-
building and rooms is added.

mar



Centraal museum Utrecht

Circulationtype	<p>Composite</p> <p>Conversion of architectural monument, the museum is housed in a complex of different building parts. A former medieval monastery, a chapel, a cavalry stable, a children's home and a museum. But they also differ in style and period of construction, from 1420 to 1998</p>
Exhibitions Findings	<p>A combination of temporary and permanent exhibitions</p> <p>difficult navigation in parts of the building</p>
Exhibition 1 story	<p>'Stoel neemt stelling' temporary exhibition</p> <p>The chair as central topic, with approaches varying from experiment to story teller and art piece.</p>
objects	<p>more than a 100 chairs with description and eventual a making of movie</p>
circulation type	<p>Open space + linear chaining</p>
findings	<p>Each room has its own character and theme</p>
rent	<p>disturbing factor: flow of visitors</p> <p>The linear organisation isn't used for a coherent story but a concatenation of different 'chair' expositions which works well in this case.</p>
Exhibition 2	<p>AI collection</p> <p>The space is filled with digital models which can all interact with each other through artificial intelligence</p>
circulation type	<p>Open space + labyrinth exposition</p>
Exhibition 3	<p>Dick bruna atelier</p> <p>looks like the original atelier of Dick bruna</p>
Circulation type	<p>open space</p>



Maritime museum Rotterdam

Circulationtype

Open space with expositions of 'decks'

**Exhibition 1
story**

Offshore experience
An exhibition on board of a platform on sea and 3 kilometers under sea level.
A challenging quest in search of energy.

**objects
circulationtype
findings**

Interactive games & informative videos
grid
Although the focus group is a younger audience, the information is interesting Wfor a large group

**exhibition 2
story**

Bestemming havenstad
'subway' through Rotterdam from the Rotte to Maasvlakte
from history to future plans, the expansion to world port

**objects
circulation type
findings**

Objects, media, ..
radial, each path representing a subway line to a different location/ time

**exhibition 3
circulation type**

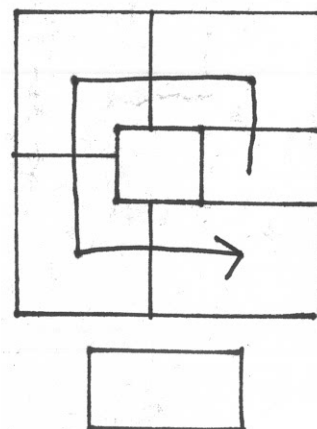
Ship models
open space + grid exposition

**exhibition 4
story
objects
circulation type**

Verankerd
10 stories about migration over sea
differ from video to objects
Spatial interpenetration & spatial isolation

Exhibition 5

museum harbour
Historical ships



Mauritshuis Den haag

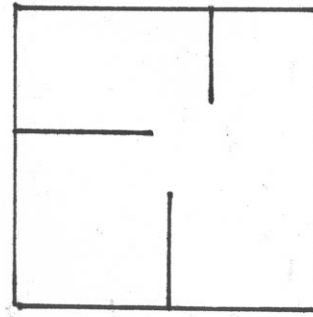
Circulationtype

Linear chaining / Round loop around a core of the stairwell
 Conversion of architectural monument, the home of Count Johan Maurits van Nassau-Siegen from 164 and the gallery of prince Willem V
 Building for exhibition + addition mainly underground for entrance and shop

Exhibition

Mauritshuis
 permanent collection
 artworks of wellknown painters Johannes Vermeer, Rembrandt van Rijn, Leyster, Jan Steen, Peter Paul Rubens, and many others
 Art, paintings

story
 Judith
 objects



Stedelijk museum Vianen

Circulationtype	Open space with partitions
Exhibition	Conversion of architectural monument, former secret church a combination of a permanent and temporary exhibition space
Exhibition 1	Berlijns dagboek temporary small scale exhibitions
Story	current: charcoal landscapes of deserted landscapes of Palestina. The lands-
cape	of her native country where her grandparents have been expelled when the state of Israel was founded
Objects	10 charcoal drawings.
Circulationtype	open space with partitions
Findings:	The small scale of the space fits very well with the small scaled exhibitions.
Exhibition 2	history of Vianen
Story	background stories of vianen as a city of refuge
Objects	portraits of the Brederode family, coin treasure and archeological finds.
Circulationtype	Open space
Exhibition 3	Garden
	Temporary exhibitions
	sculptures