

# THE RESTORATION WORK IN NAARDEN

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## Abstract

The important fortifications of Naarden in the Netherlands were transferred in 2016 from State ownership to a not-for-profit organisation. After a brief history of the fortifications, this article examines the decision-making that led to that transfer and at schemes for maintenance and restoration work that were drawn up by that organisation, starting with an area where no work had been carried out since the 1950s. The article also examines investigations into the processes of decay and damage and possible approaches to repair and the use of materials. Restoration and maintenance are accompanied by historical research which has revealed earlier building and repair procedures, even to details such as nineteenth

century colour schemes.

Keywords: Naarden, New Dutch Waterline, seventeenth century fortifications, heritage management, restoration.

## Introduction

Naarden is a small town in the Netherlands, located about 25 kilometres east of Amsterdam. It is one of the best-preserved fortified towns in Europe and currently nominated to become UNESCO World Heritage as part of the New Dutch Waterline. In 2016 the ownership of the fortifications of Naarden was transferred from the Dutch State to a private, non-profit organization: the Monuments Foundation. This article deals with the thoughts behind this decision, the practical consequences and the actual

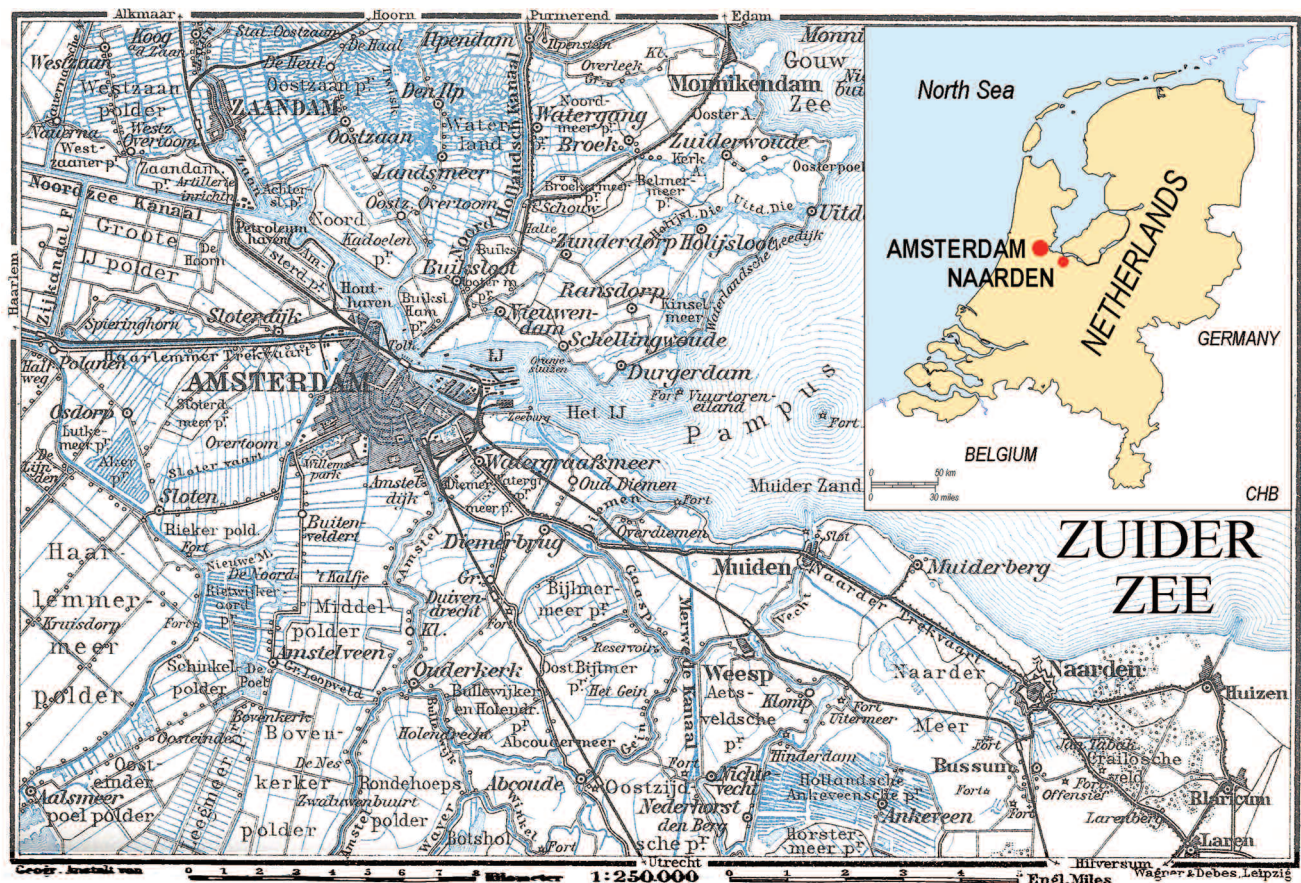


Figure 2 Map of the area between Amsterdam and Naarden around 1900 (Wikimedia Commons)



restoration work the foundation undertook between 2017 and 2019. This is preceded by a short outline of the history of the town's fortifications.

### **The history of the fortifications**

The city of Naarden was founded in 1350 by the Duke of

Holland. The area around the town was marshy and large parts of the lands to the north of it were regularly flooded by the sea. The only stretch of solid ground crossing these wetlands was controlled by this new city. It gave Naarden an important strategic position in the protection of the duchy of Holland against invasions from the east. In later



*Figure 1 Aerial view of Naarden around 1925 (image bank NIMH 2011-0363)*



centuries this strategic significance would be focussed more specifically on Amsterdam.

Soon after the city was founded it was surrounded by a stone wall with towers and six city gates. It replaced the original earth walls and palisades. Naarden flourished and became the economic centre of the region.

In 1572, during the Eighty Years War, Naarden was attacked by Spanish troops. They plundered and destroyed the town, slaughtered its population and razed the medieval fortifications. During the years that followed, the town was rebuilt and given modern bastioned

fortifications in the old Dutch manner. They were designed by Adriaan Anthonisz.

By the time the French invaded the Dutch Republic during the Dutch War, in 1672, these fortifications were outdated and in a bad condition. Naarden surrendered without a fight. After the French had retreated from Dutch soil in 1674 the decision was made to update the defence system of the Republic by creating the first Dutch Waterline. Naarden became an important part of this complex and was given completely new, modern fortifications. They were built in the period between 1675



*Figure 4 The obelisk in Rijswijk, commemorating the Peace of Rijswijk (image bank RCE 538304)*





*Figure 3 Aerial view of present day Naarden (image bank RCE 521734)*

and 1685 and resulted in the bastioned trace, with a double ditch and covered way, that can still be seen today. It is not entirely clear who designed these fortifications, but it is certain that the Dutch architect Adriaan Dortsman and the French engineer Paul Storff de Belville were involved in the building process.

These fortifications remained unchanged until the war between France and Prussia, 1870-1871, showed the

power of the modern rifled guns and mass mobilisations. Although the Netherlands remained neutral during the conflict it became clear that the defence of the country needed to be updated. It resulted in a large building activity in all of the Dutch Waterline, including Naarden.

During the period 1875-1880 a whole new fortified complex was built within the seventeenth century perimeter. It consisted of about twenty-five bombproof





*Figure 5 The ruins of Teylingen (image bank RCE 310067)*

buildings, scattered over the ravelins and bastions of the town. Varying from small powder houses, shelters and a richly decorated city gate to large barracks for hundreds of soldiers. Furthermore, the defence was strengthened by a detached fort to the north of the town on the border of the sea. It was called Fort Ronduit.

By the time it was finished this new complex had already become obsolete due to the introduction of high explosive shells. The strategic function of the fortress Naarden was rethought and turned into a base for short

distance combat. As a result, the focus of the defence was moved to the covered way. Between 1890 and 1910 several concrete shelters were built there. After the First World War, Naarden lost its defensive role completely. In the years that followed, the fortress was abandoned piece by piece by the military and the job of maintaining the buildings and walls was transferred from the department of defence to the general department of buildings. The fact that the fortifications remained state-owned proved vital for their preservation in the first years after they lost their



military purpose. Only two buildings were demolished during those years, although the municipality had the ambition to demolish more of it in order to expand the town. In later years the focus of the municipality shifted towards the protection of the fortifications as well. From about 1965 onwards the Dutch government undertook several large restoration campaigns. They came to an end around 2011, when the transfer of the fortifications to a private organisation became more and more a reality. This left one bastion, called Oud Molen, and a connecting stretch of curtainwall unrestored. This is where the Monuments Foundation undertook its first restoration works in 2018.

### **The thoughts behind the transfer of the fortifications to the Monuments Foundation**

In 2011 a debate started within the Dutch government, whether the Dutch State should be owner of real estate which wasn't used for state purposes. In other words, the State owns buildings that are rented out to third parties. It is not really the job of a State to do so. Why not sell these buildings and let the real estate market take care of them? A legitimate question and a good solution for many of the buildings involved. But more difficult to apply to a small part of them: monumental buildings and memorials. No commercial party will be interested in becoming the owner of the obelisk commemorating the end of the Nine Year's War in Rijswijk. What business case will make the Ruins of Teylingen worth buying for a real estate developer? What will be the consequences for the monumental values of these objects once they are sold to such a commercial party? Is it morally acceptable that the Dutch State sells some of its most important cultural heritage to commercial parties and giving away control over their protection? Especially if you take into consideration that most of them were bought in the past to protect them from this commercial market in the first place. These questions applied to twenty-nine of the buildings and memorials nominated to be sold by the Dutch government. These objects are hard to maintain, even harder to make profitable and of very high historical and cultural value at the same time. After several years of discussion and calculation it was decided to form an independent, non-profit organisation responsible for the maintenance of these twenty-nine valuable monuments. The organisation would become the owner of the monuments indefinitely and should not be allowed to sell

any of them. Thus, the Monuments Foundation was born.

On 15 January 2016 the twenty-nine monuments were transferred from the Dutch State to the foundation for the symbolic sum of €1. The fortifications of Naarden were part of this transfer.

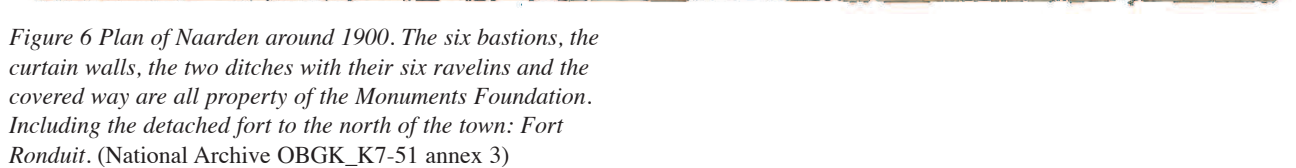
Because the costs of maintaining the monuments will always be higher than the revenues brought in by rent or subsidies, the foundation will have a negative income without any other form of revenue. In order to rule this out a fund was installed by the Dutch government at the moment of the transfer. The revenues of this fund will provide the additional income needed. Next to the Monuments Foundation, stands the National Monuments Organisation. This is an association that unites various large-scale heritage organisations from the Netherlands. The association supervises the fund and can function as a knowledge bank for the foundation if needed. Every year the Monuments Foundation has to report to the Dutch government on their activities.

With the transfer the responsibility for the restoration and maintenance of the monuments was shifted from the public to the private domain. This brings several advantages. As a private organisation the Monuments Foundation is not bound by the strict rules of contracting out work as public organisations are. It gives the foundation the possibility to look for the most effective cooperation with contractors. Private organisations have more possibilities to apply for subsidies. Finances can be spread out over several years and used at the locations where they are most needed, at the best possible time. There are less deadlines in spending certain budgets as is the case with many governmental or municipal budgets. Changes in local or national politics won't have any influence on the planning and organisation of the restoration and maintenance works. For each individual monument the foundation looks for the best method of maintenance. Both technical and financial. The next paragraph describes how all of this applies to the fortifications of Naarden.

### **The case of Naarden**

The Monuments Foundation is the owner of all of the fortifications of Naarden: the city wall with its six bastions, the two wet ditches with the six ravelins, the covered way and all military buildings located on these premises. They vary from small concrete shelters on the covered way to seventeenth century casemates and large









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foundation has established long-term contracts with larger, steady, partners. This is about specialized work, with great continuity, on the most essential parts of the fortifications. The work will basically never stop. Here a strong bond with the foundation is important to create a larger sense of responsibility for the work that is being done. There will be more focus on quality and knowledge than on time and money.

Establishing a contract for the landscaping was urgent in 2016. All former contracts were ended, and the trees, bushes and grass grew steadily. Based upon the existing work description, landscape plans and visions, made by the previous owner, three companies were invited to present a price and a vision for the described work. They all got the chance to present and explain their offer personally. Based upon these presentations a small-scale company, specialised in the maintenance of green heritage was selected. To make sure they were able to carry out all the needed work they invested in new personnel and equipment. This was part of their presentation and offer. One of their investments was buying a mowing machine specially designed for mowing steep slopes.

There are always at least two gardeners at work in Naarden. Depending on the season they mow the grass, cut the trees, mow the reed along the ditches or restore parts of the earth walls of the fortifications. Besides that, the gardeners help out with various day to day jobs and are an important point of contact for the inhabitants. This cooperation has continued now for four years to full satisfaction.

As described above, the landscaping contract is based upon existing documents, in that sense it's a continuation of an existing policy. This is not the case with the masonry work. Here the Monuments Foundation has chosen a different approach. Instead of contracting-out large restoration projects with intervals of several years, as was the policy up till 2016, the foundation plans on carrying out smaller portions of work on a yearly basis with the same contractor each year. Thus, establishing a similar long-term working relationship as has been done with the gardening. It is the start of a continuous cycle of masonry maintenance, where at first overdue work will be caught up with. After that, slowly the walls will reach a good, basic condition that will be maintained. By doing small portions of work each year it will be easier to manage the work and to control the budget. Unforeseen work will have less impact because less pressing work can be

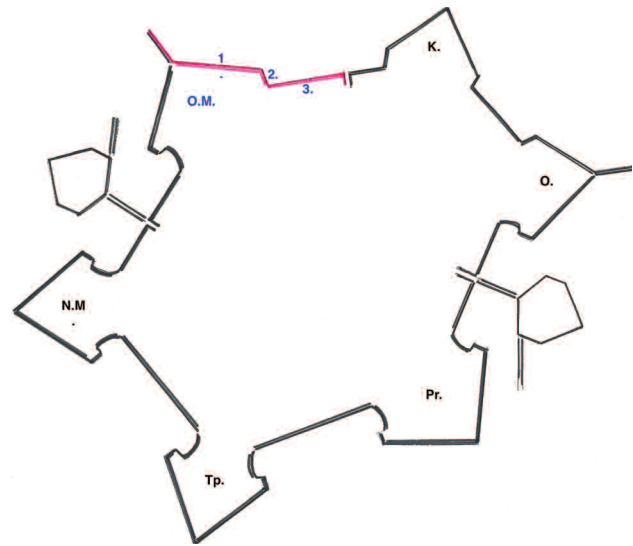


Figure 8 Schematic map of the fortifications showing the area (in pink) where the work of 2018-2019 took place: Bastion Oud Molen (marked with O.M. in blue) and the adjacent curtain wall. The numbers 1, 2 and 3 mark the three representative locations where the work was started. After this was finished another 120m<sup>2</sup> of wall was restored around position 1. The other bastions of the town are: K: Katten, O: Oranje, Pr: Promers, Tp: Turfpoort, N.M: Nieuw Molen.

postponed. It will simply be moved to a following year. By working in a steady partnership, contractor and client will learn from each other. The work that has been done can be monitored together over a longer period of time. Because small portions are being done and all aspects of the work can be discussed, it is easier to change policy. So, the best possible way of working can be found for each case.

### The aesthetics of the walls

The bricks in the walls of Naarden show a wide differentiation in size and colour. From orange, to red, purple and brown with a yellow accent here and there. Together they form a lively, harmonious whole. At the bottom enclosed by the water of the ditch, at the top by the trees, grass and bushes on the earthworks. The walls show a certain natural weathering. Slightly crumbling bricks, efflorescence of salt and lime, lichen and small plants add to the liveliness of the walls and are an important factor in the way the walls are experienced by visitors today. Restoration and maintenance work can disrupt this harmony. Newly added fields of brickwork stand out from the old parts. They are clean and miss the liveliness because of the use of bricks that all have the same colour and size. In some cases, this was a conscious choice, based on a restoration vision, in other cases this simply was the



result because no one thought about the aesthetic effects of the technical choices made. The Monuments Foundation wants to preserve this harmonious, lively character of the walls. This is an aesthetic choice but also, in a way, the consequence of the chosen work method. By doing small portions of work each year it is better to do it in the least notable way, to rule out a patchwork-effect.

During the execution of the work, material taken out has to be stored, cleaned and reused as much as possible. Cleaning of the walls should be done carefully to preserve lichen and algae. For the new brickwork a mix of different sizes and colours has to be put together. If necessary, bricks have to be manufactured specially for this work.

This has to be determined for every part of the walls individually. The joints between the bricks have to be approached in a similar way. Judging samples of stones and joints needs to be done regularly and forms an essential part of the preparation of the work.

### **Finding a contractor**

In 2017 a vision and description were made of the restoration work for the upcoming five years. In these documents the aesthetic side of the work, as described above was included, together with technical specifications. They were sent to four well known restoration contractors with the request to write a reaction



*Figure 9 View of bastion Oud Molen when entering the city. (All uncredited images by the author)*





*Figure 10 The vegetation on Bastion Katten during the summer. It doesn't take much imagination to see the amount of work this brings about.*

to the vision and submit a work plan, time schedule and description of the logistical approach to the work. Because a lot of the work has to be done from the water, logistics will have a large impact. It was important to pay extra attention to that aspect. Apart from that, an estimate was asked for a prescribed amount of work, differing in position, technique and materials needed. All of the contractors got the chance to visit the fortifications, inspect them and ask questions. Out of the inscriptions two contractors were selected for a test day and an interview. During the test they got the chance to show their skills and explain the used working methods. During the interview their submitted documents were discussed. In October 2017 a contractor was selected.

### **The restoration works of the walls during 2018 and 2019**

The restoration work started in May 2018 with a part of the fortifications where no restoration work had taken place since the 1950s: bastion Oud Molen. The first step was to determine the exact condition of this part of the walls and amount of work needed. An overall inventory of it had already been made in order to make the work description but this inspection would be much more detailed. The walls were inspected up-close. All types of damages on the surface were categorized (e.g. loose bricks, missing joints, broken bricks etc.) and the type and quantity of work



*Figure 11 The mowing machine designed for mowing steep slopes in action*

needed to repair them determined. Besides that, the whole surface of the wall was hammered to determine whether parts of the wall were loose on the inside, in other words to determine if they showed lateral cracks.

If all inventoried damages were to be repaired in one campaign, the work would exceed the available budget for this part of the walls by far. Besides that, the work still raised a lot of questions. What will come up once the loose and broken bricks have been taken out? How (un)stable will some parts of the walls really be? Most of the work looks urgent, but how bad is it once the work actually starts?

To get more of a grip on the situation it was decided to start working at three different, representative, locations. Each with a surface of about 50 square metres. This would give a better idea of the real situation at hand. The locations are shown on the schematic map (Figure 8).

After a few weeks of work the conclusion was drawn that although a lot of work was needed in this area of the fortifications, it would be no problem to spread it over several years. The walls are stable, the process of decay is slow and there are no risk-areas.

After finishing the three test locations another portion of 120 square metres was done and some other parts were consolidated. After that, the available budget was finished. In upcoming years, other parts of the fortifications will be done. In the meantime, this area will be monitored and if necessary, repairs will be done.

The following processes of decay and damage were noted during the work and the following work was done to resolve them. They are explained further in the added photos and drawings (Figures 12-17):





*Figures 12, 13, 14, 15 Four pictures of the walls of bastion Oud Molen just before the work started. There is a lot of visual damage: missing joints, broken bricks, loose bricks and much vegetation growing in and on the walls.*





Figure 16 The cavity found in the bastion front. It is about 6 to 8 centimetres wide 3 metres high and over 10 metres long.

1. Water enters the top of the wall through cracks in the top covering. This causes damage further down, when water seeks its way out and freezes. Bricks will break, joints will be pushed out and the wall will crack on the inside and the outside.

This problem is increased in places where the wrong materials have been used during restorations in the past: e.g. cement-based joints or relatively hard, dense bricks.

The water infiltration causes the upper 1 – 1.5 metre of the brickwork of the walls to lose its joints and its overall coherence over a depth of 1.5 stone.

This is the most urgent problem to be solved. For this, the upper part of the wall and the top covering need to be repaired. After that, the top covering will be smeared with a centimetre-thick layer of dense mortar to make it more waterproof over a breath of 60 centimetres. It will prevent new water infiltration in the future.

The new mortar for the joints will consist mostly of lime or trass/pozzolana with only a small addition of cement (1:25) This will make the new work more compatible with the existing work and will prevent damage in the future.

2. Large portions of the wall showed lateral cracks, causing big slabs of masonry to come loose. This is caused by the process of water infiltration and freezing described above when combined with cement joints. When this



Figure 17 The same goes for this cavity (located in the flank of the bastion) but this one is about 30 to 40 centimetres wide.

process continues long enough the lateral cracks become wider and let in earth and plants, causing them to widen further and eventually cause large parts of masonry to break out of the wall.

Where slabs of brickwork come loose or have lost their coherence with the surrounding masonry, they will be taken out and replaced by new masonry. Stable parts will be preserved. When they are surrounded by solid, well maintained masonry they won't deteriorate any further and can last for years to come.

3. The walls showed large cavities, caused by repairs from the past: damaged parts of the wall were taken out and replaced, without giving the new masonry any connection to the existing brickwork (Figure 18a). They were just filled in. Cavities were left behind them or came to be after a process of erosion. These repairs date from the nineteenth century.

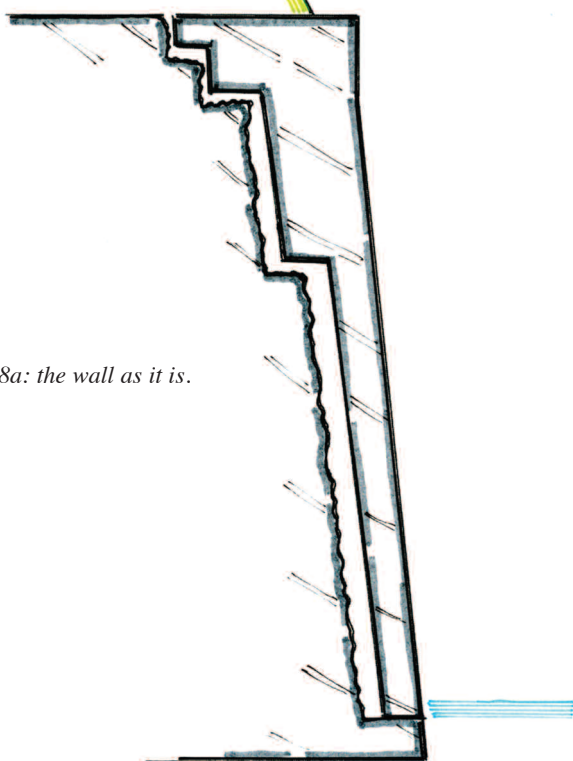
Some of the cavities in these parts of the wall were up to 40cm wide, over 10 metres in length and about 3 metres in height. This raised the question whether it was preferable to connect the two parts of the wall or to leave them unconnected, as they were.

One of the choices for connecting the two parts was to totally replace the outer layer for a new one connected to the old core of the wall. This would result in a new stable, monolithic and strong wall. Apart from the fact that this

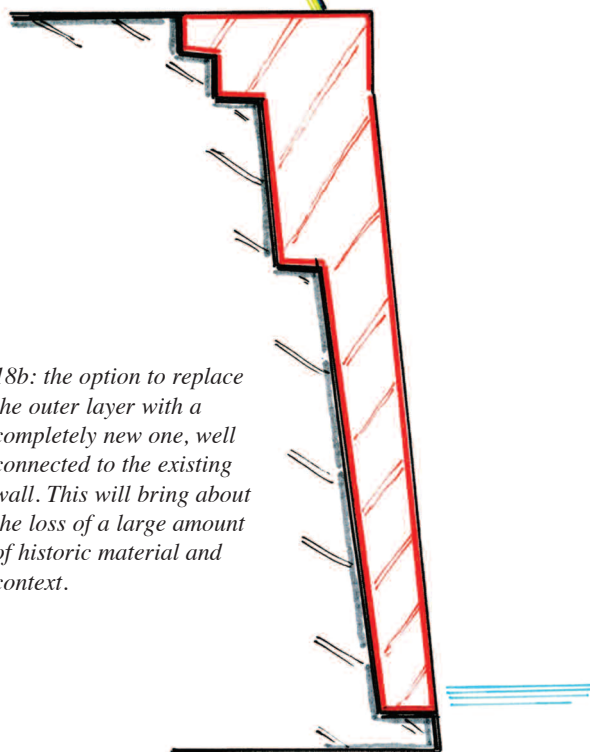


Figure 18 schematic drawings of the various options discussed for connecting the two parts of the wall.

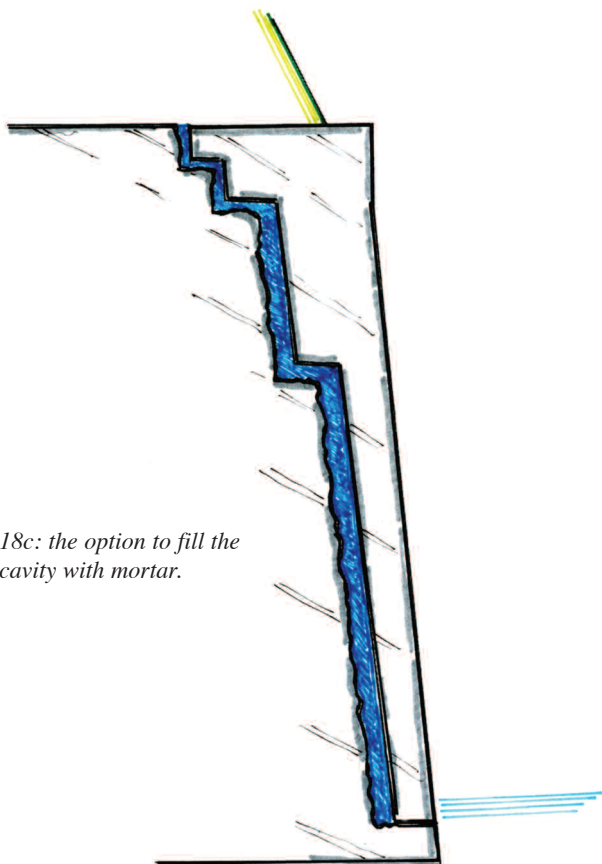
18a: the wall as it is.



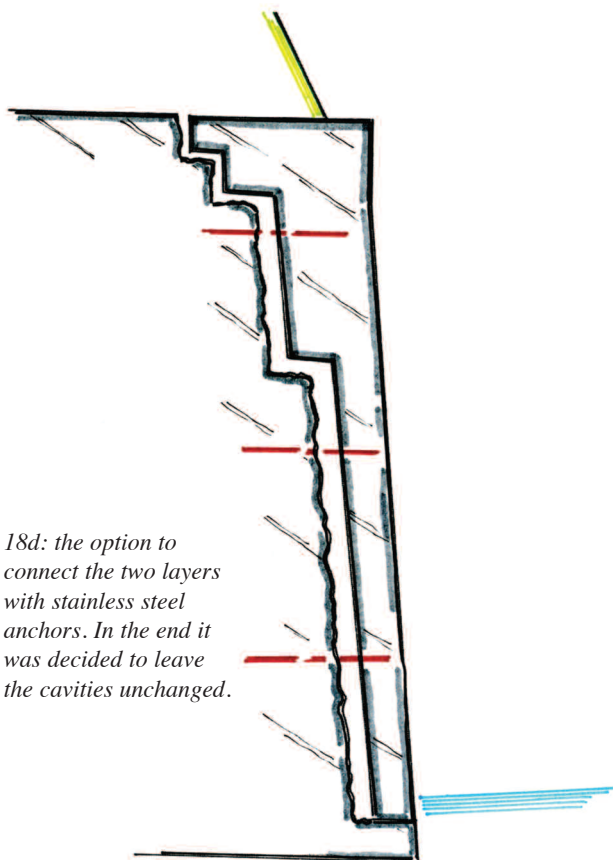
18b: the option to replace the outer layer with a completely new one, well connected to the existing wall. This will bring about the loss of a large amount of historic material and context.



18c: the option to fill the cavity with mortar.



18d: the option to connect the two layers with stainless steel anchors. In the end it was decided to leave the cavities unchanged.







*Figure 19 A slab of bricks broken loose from the masonry behind it, caused by the use of cement-based mortar and dense bricks.*

would be much too expensive it would also mean the destruction of a historical layer of the fortification walls. An unthinkable solution from a historic point of view. Other solutions were the use of stainless-steel anchors to connect the two layers, or to fill the cavities with a mortar, poured in from above (Figures 18b-d).

These last two solutions would result in a construction with unpredictable behaviour: Connected, the two layers lose their ability to move independently. This might lead to tension in the masonry, causing new and unpredictable damage in the future.

The existing construction on the other hand is stable and causes no further damage. By preserving it the construction will behave in a more predictable way and will be much easier to monitor. It will create the least amount of risk in the future. So, after a careful inspection on location it was decided to leave these cavities as they were.

4. The lower parts of the walls mainly show superficial damage, caused by lack of maintenance. Most damage



*Figure 20 The top covering of the wall is cracked. Cracks up to 2 centimetres wide will be repaired with mortar. Wider cracks will be filled out with new bricks. After that it will be smeared with a layer of dense mortar, replacing the existing, eroded one.*

goes no deeper than a half stone. Loose and broken bricks will be replaced, and missing joints repaired.

No work has been done on the waterline of the walls. This was a conscious choice. Although a lot of damage can be seen on the waterline, it is superficial. Bricks are loose, and joints are missing but the walls are still stable and infiltration of water in these areas doesn't cause extra damage. The water infiltration from the top, as described above, causes much more damage and is therefore an urgent problem to solve. Besides that, work on the waterline is expensive and specialised work. Although the selected contractor has much experience in this area and special equipment to do this type of work, it makes more sense to do a lot of it at once instead of small portions each year. So, part of the work in the future will be a restoration campaign focussed solely on a long stretch of the waterline.

During the restoration work another interesting phenomenon was noted. After the first work had been done, a thin white efflorescence was visible around some





*Figure 21 Another slab broken loose. Over time the cavity behind it was filled with earth and vegetation, causing it to break out further*

of the new joints: residues of lime. There turned out to be an almost constant transmission of water through the masonry. This is logical given the fact that the walls are covered in a huge mass of earth, but it was more than expected. The consequence is that the inside of the wall is almost permanently wet, even during a dry summer. The way the water moves through the brickwork is unpredictable, it will find its way through small cavities in the masonry and through the pores of the bricks and joints. It causes small streams of water to come out at one spot and leaving other parts of the surface completely dry. Because of the humidity of the brickwork the lime in the new mortar doesn't get the opportunity to react properly with oxygen, causing it to dissolve in the transmitted water and being brought to the surface of the wall, where it will cause the white efflorescence after the evaporation of the water. So, it was important to find a mortar with less lime, better suitable for a wet environment. Several alternatives were possible:

1. A mortar with more cement, but still with a very large



*Figure 22 Before the work starts the masonry will be cleaned carefully. The black pollution disappears but the lichen is kept intact, saving much of the appearance of the wall.*

component of lime in it. Given the hardness of the bricks this can be a good solution.

2. A mortar with a large component of trass/pozzolana added to it instead of cement. This volcanic material functions as a natural cement and is very well compatible with historic brickwork. It has been used since Roman times for under-water and water-resistant masonry.

3. A premixed mortar with trass/pozzolana added to it. The downside of a premixed mortar is that the manufacturer won't reveal the composition of it, so it is never really clear what is being used. On the other hand, it is a much-used product with proven merit.

A part of the wall has been restored with each of these alternatives. Over the next two years these parts can be monitored to see which mortar gives the best results. In the meantime, the planned restoration work of 2020 and 2021 will focus on the facades of the nineteenth century military buildings. They don't have the problem of water transmission and efflorescence as the walls do. Here a straightforward lime-based mortar will do.





Figure 23 A lateral crack. Over time this part of the masonry can break out further, if maintenance is neglected. This part of the wall can be preserved if the surrounding masonry is kept in a good condition through regular maintenance.

### Building history and research

Each restoration the foundation undertakes is accompanied by historical research. When a part of the brickwork of the walls has been removed, it will be studied and documented on site to get an idea of the work that has been done in the past. Although it is clear that the curtain walls, bastions and ravelins were built in one stage (1675-1685) studying the masonry will give information on how they were built and maintained. This on-site research is accompanied by the study of old documents and drawings in various archives. The combination of the two shows that from the nineteenth century onwards there have been several periods of large restoration works. Between those periods there was regular maintenance on a smaller scale. This makes it hard to determine exactly which parts date from which period, especially because similar bricks were used during the various phases of the work. All in all, there are five phases that can be distinguished in the masonry:

The seventeenth century, the building of the walls: soft

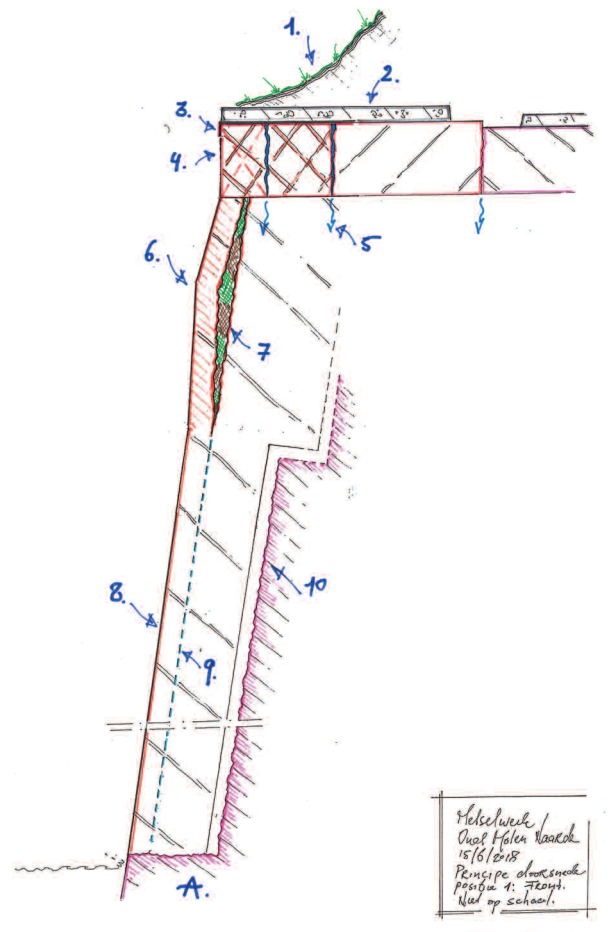


Figure 24 schematic cross-section of the wall, showing the various types of damage, noted during the detailed inspections.

- 1: Eroded earth work
- 2: Existing concrete slabs, placed in the past to improve the water resistance of the top of the wall. They are cracked and large parts have disappeared.
- 3: The top covering used to be smeared with cement. This layer is eroded, cracked and large parts have disappeared.
- 4: The outer edge of the top covering breaks loose
- 5: Cracks in the top covering cause the infiltration of water
- 6: Lateral cracks cause masonry to break out
- 7: Over time cavities fill up with earth and vegetation worsening the problem
- 8: Large quantities of joints are missing
- 9: Lateral cracks run over almost the entire height of the wall at some places
- 10: A cavity deeper inside the wall, caused by repairs in the past

orange bricks formed the core of the walls. They were covered with harder, denser, dark red bricks on the outside to make them more resistant to weather and water.

Due to lack of maintenance during the eighteenth century, this part of the walls, exposed to the sea was

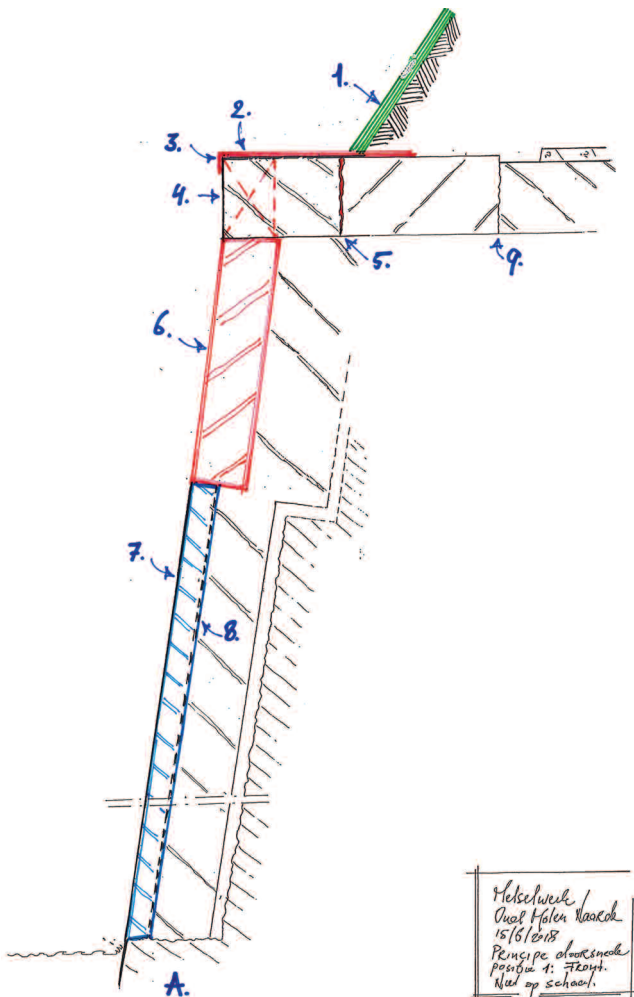




Figure 25 The wall during the restoration work



Figure 27 The wall after the restoration work



severely damaged. It was repaired during the second half of the nineteenth century by replacing the outer layer of the walls with a new wall of hard, purple bricks. This new wall was placed against the existing wall without any connection. This construction resulted in the cavities mentioned above.

These new walls were restored over time. Parts were replaced and in order to connect the new and the old, apertures were cut in the existing work.

The outer edge of the wallcovering was completely replaced. Judging from the type of bricks used there, this was done in the early twentieth century.

Figure 26 Schematic cross-section after the work has been done:

- 1: The earthwork restored
- 2: The concrete slabs have been removed
- 3: The top covering of the wall has been smeared with a new layer of dense mortar
- 4: The outer edge of the top covering is restored. Some parts have been replaced
- 5: The cracks have been repaired. Small ones poured-in with mortar, wide cracks filled out with new masonry
- 6: The top 1-1.5 metre of the wall has been replaced over the depth of 1-1.5 stone. As many existing bricks as possible have been reused (about 40% average)
- 7: The joints of the masonry in the lower part of the wall have been replaced (varying from 50 to 90% depending on the condition of the existing work)
- 8: Lateral cracks still exist but are consolidated in healthy restored masonry

As described above: no work has been done on the cavities.





Figure 28 White efflorescence on the bricks. This caused a revaluation of the mortars used.

Missing parts of the walls were filled-in with new masonry. Here dense bricks and hard cement-based joints were used. Parts of these reparations break out of the walls today, because they are not compatible with the existing work. Judging from the materials used, this was done in the 1950's.

The research in the archives resulted in some other interesting conclusions concerning the maintenance of the fortification walls.

Work descriptions from the past show that during the nineteenth century each year a portion of maintenance work on the fortress walls was scheduled. Every year a quantity of bricks or square metres of masonry would be prescribed. During the work, on location, it would be decided what those quantities should be used for. It shows that in the past a similar work method to that of the Monuments Foundation was applied. Back then constant maintenance was the best way to assure the defensible quality of the fortifications. Today, in the eyes of the Monuments Foundation, it is the best way to assure the protection of cultural values.

In other cases, when larger amounts of work had to be



Figure 29 Example of water transport in other parts of the wall. There is continuous water transport in the masonry. It is unpredictable where the water will come out. Causing a small stream of water in one place and leaving other parts of the wall completely dry.

done, a more detailed description was made. One of those descriptions, dating from 1876, specifically dealt with the part of the fortifications at hand in 2018. It described the replacement of the outer layer of masonry (phase 2 mentioned above). Notes in the margin of the document showed a discussion on whether the existing and new masonry should be connected, and if so, how: By using iron anchors or by intertwining the old with the new masonry. In the end the decision was made to do nothing at all and leave the two unconnected. It is interesting to see that the engineers in the past came across similar problems as we do now. After all this discussion has a lot of similarities with the one held in 2018 about the cavity problem described in the restoration paragraph above.

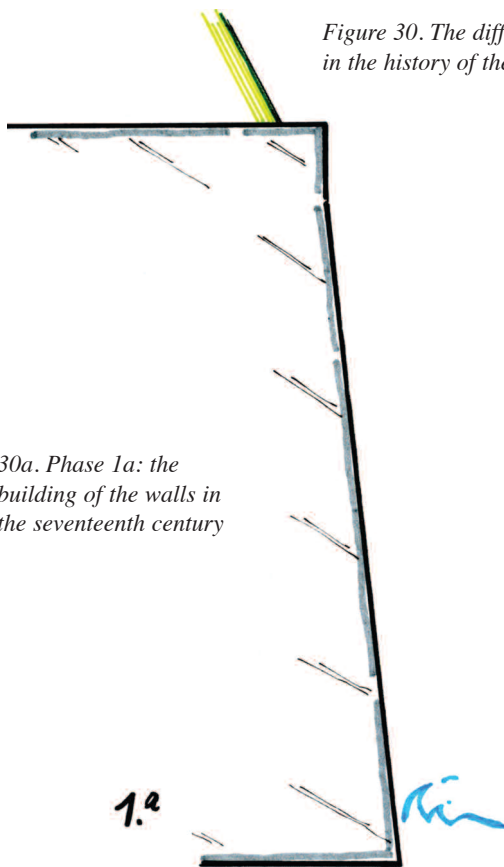
### Restoration of the Cantina

Besides the maintenance work on the city walls and bastions, the Monuments Foundation tries to stimulate the use of the military buildings, by renovating them and

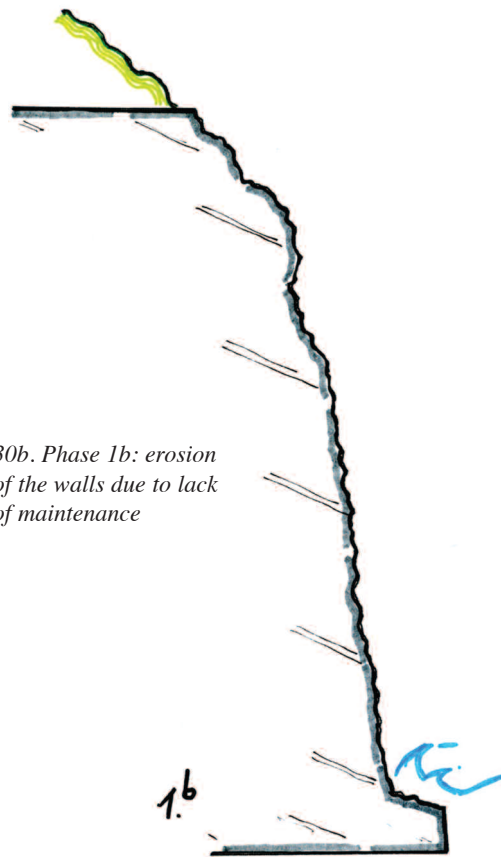


Figure 30. The different phases in the history of the walls.

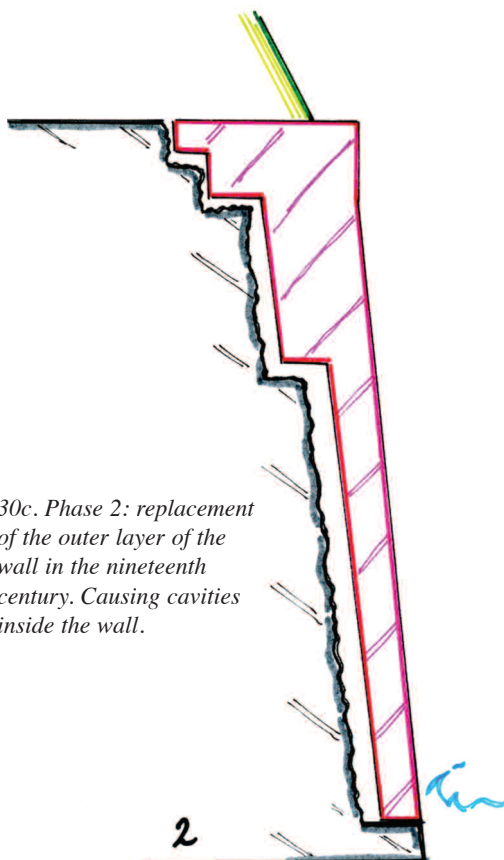
30a. Phase 1a: the building of the walls in the seventeenth century



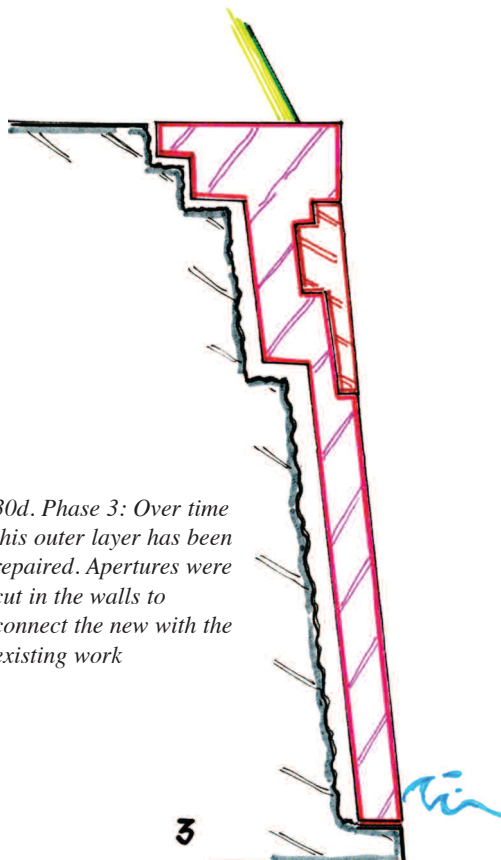
30b. Phase 1b: erosion of the walls due to lack of maintenance



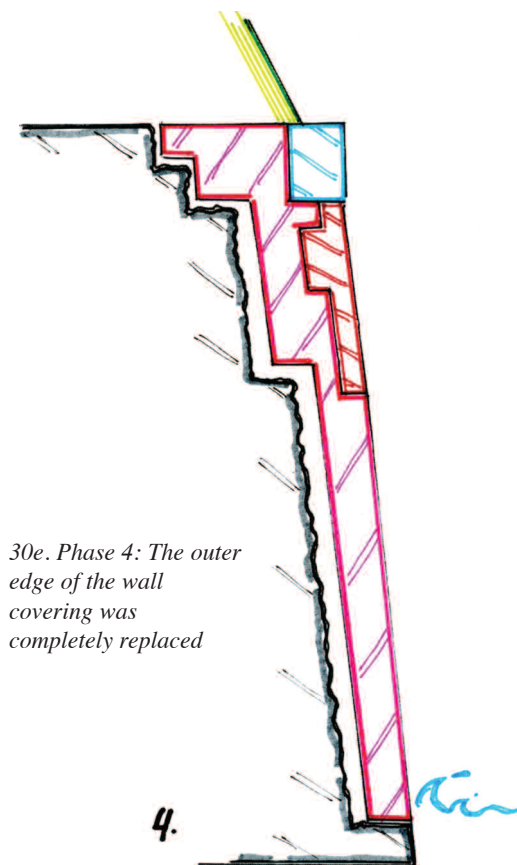
30c. Phase 2: replacement of the outer layer of the wall in the nineteenth century. Causing cavities inside the wall.



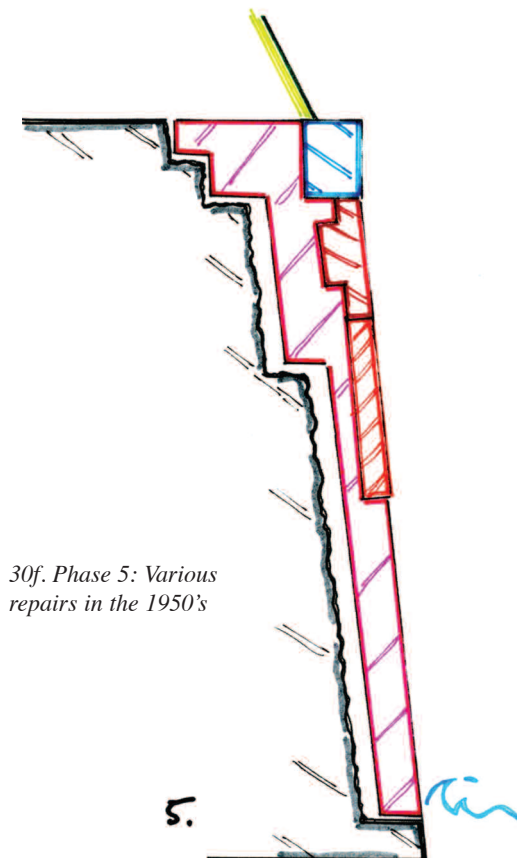
30d. Phase 3: Over time this outer layer has been repaired. Apertures were cut in the walls to connect the new with the existing work







30e. Phase 4: The outer edge of the wall covering was completely replaced



30f. Phase 5: Various repairs in the 1950's

finding tenants. It is healthier for a building to be used. It makes the building come alive, warm up and breathe again. Humidity and vermin will disappear. It is the best possible guarantee for long-term conservation. Because the Monuments Foundation is a non-profit organisation all revenues of exploitation flow back into the maintenance work of the fortifications. So, renting-out spaces is not just good for the buildings themselves but also for the maintenance of the fortifications as a whole.

Part of the rent-policy is to invest in public interest and make buildings accessible to a larger audience. That is one of the reasons why the first renovation project in Naarden was the establishment of a small theatre in the former garrison's cantina. The realization of such a theatre was a long time wish of several inhabitants. They submitted their plan in early 2016. Besides the fact that it was a very good idea it was also a nice way for the foundation to invest in the relationship with the local community. Plans were made in the summer of 2016. The building permit was



Figure 31 Here the outer layer of the wall is visible. It was placed in front of the existing wall in the nineteenth century. Behind this new layer there is a cavity. The seventeenth century brick work can be recognized by its clear orange colour. The new brick work has a purple colour.





Figure 32 Part of the wall during the restoration. The phases 2 through 5 are all visible here. Number three points out one of the three apertures visible on this picture.

given in early 2017 and work started shortly after that. It is important to notice that in renovation projects, such as this, the preservation of historic and monumental values come first. They are a deciding factor in the design and planning of a renovation. So, an important component of the project was research into the history and structure of the building.

The cantina was built in 1880 and housed several functions. First of all, the canteen for the regular soldiers. It was the largest room of the building. Second was the canteen for the non-commissioned officers. The kitchen was located between those two rooms. Behind the kitchen lay the billiard room for the non-commissioned officers. In later years it was used as such by the officers. The function of the last room of the building changed several times over the years. First it was a guard room, and, in the end, it became part of the canteen for the non-commissioned officers. The lay-out of the building, in 2018, was pretty much the same as it was in 1880. Only some minor modifications had taken place in the 1950's: The kitchen was reduced in size to make room for two

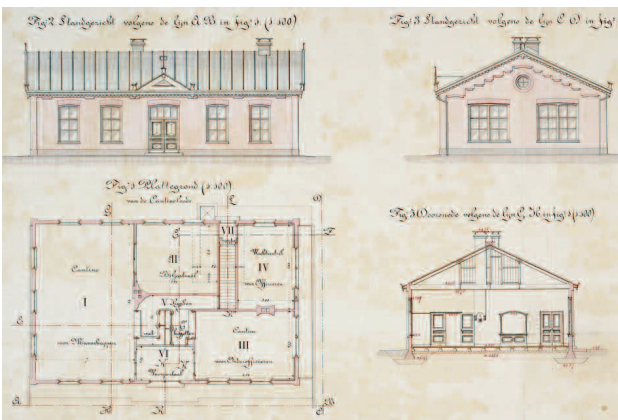


Figure 33 Drawing of the Cantina from 1880. The current lay-out of the building is almost exactly the same as it was back then. Only room V has been changed: This used to be the kitchen but now holds two toilets and a cloakroom.





*Figure 34 The cantina after restoration. The facades were painted white in the 1980's. It was impossible to remove the paint, so the façade was left painted.*

toilets. The existing lay-out of the building was preserved, except for the lay-out of the kitchen and the adjacent toilets. This part was turned into a cloakroom with two modernized and better accessible toilets.

Before the actual renovation work started the building was carefully stripped to see if any original wall finishes and ceilings were present. Several interesting things were found. It turned out that the rooms for the officers and non-commissioned officers had a more luxurious wall finishing, decorated ceilings, better heating and cavity walls. Some of the discovered decorations were restored and kept visible. The others were documented and preserved behind new, false walls.

The shell of the building and the loadbearing structure were restored by the Monuments Foundation. The rest of the work was done by the tenants and a large group of volunteers, under supervision of the foundation. The whole project was finished in September 2017, when the theatre opened its doors for the first time. The theatre turns out to be a great success and can count on an ever-growing group of volunteers for its operation.

### Use of colour

White is a very dominant colour in modern architecture. Throughout the years this love for the use of white has penetrated the restoration world as well. As a result, white dominates the colour palette of many a restoration, often together with a standard dark green. In most cases these colours were never part of the original design. Research shows that in the past a much more colourful palette was used, especially in the nineteenth century. Various shades of yellow, bright green, red, blue and grey were preferred over white and dark green. These colours make the facades of buildings come alive, they communicate with the brickwork and make details and decorations stand out. The last few years have shown a greater sensitivity towards this role of colour. As a result, colour-research has become a standard part of most restoration projects.

An example of this in Naarden is the restoration of the bridge keeper's house. This house, built in 1898, was one of the town's military buildings and was therefore part of the transfer to the Monuments Foundation. The house was





*Figure 35 The bridge-keeper's house before the restoration. The white roof frame separates the roof and the façade into two different entities.*

restored in 2017, shortly after the renovation of the garrison's cantina. On location research was done to find the original colours of the woodwork. For this, the existing paint, on doors, windows, roof frames etc., was scratched away layer by layer until the original colour was exposed. In the case of this building it turned out to be green for the windows and an ochre yellow for the rest of the woodwork. During the restoration this colour replaced all the white from the past. As a result, the dark red and yellow details of the masonry stand out more and the building becomes more of a coherent whole. It is much more present in its environment.

Similar research has been done on some of the military barracks, with a surprising result. Archives show that the use of colour on military buildings was prescribed meticulously in standard work descriptions from 1872 onwards. Every wooden or iron component had a certain prescribed colour. For example, in 1879: doors were supposed to be bright green, their hinges black and their frame a light yellow. Windows were painted white. If a door opened to the outside both inside and outside would have the same green colour. If the door opened to the inside it would be green on the outside and grey on the inside. These regulations show a conscious choice of colour and a sensitivity towards their role within the

architecture. Especially if you bear in mind that the prescribed colours changed over the years. In this process, Naarden seems to have had an exceptional position. In 1872, grey was prescribed as the colour for doors and shutters. This was only changed into bright green in 1879, according to the standard description. But a bright blueish green colour was found on doors in Naarden dating from 1876 and was prescribed in work descriptions for the modernisation of the fortifications in 1877 as well. So, during the modernisation of the fortifications, the choice was made to use a blueish bright green on doors and shutters instead of the standard prescribed grey. Looking at the architecture and building history of the barracks in Naarden this seems logical. Originally, in 1875, the barracks were designed with standard, sober facades, befitting the colour grey. While building them, the local chief engineers and architects decided to give the barracks more decoration and relief. Layers of yellow bricks, sculptured limestone, accents of dark red brickwork, deepened fields of masonry etc. found their way into the architecture. Doors and shutters in a lively blueish green will add to this rich architecture, more than grey will ever do. Grey will probably even diminish and flatten it. So, it might be possible that the experience in Naarden, contributed to the change of the colour standard in 1879.





*Figure 36 The house after restoration. By using the original ochre colour roof frame and façade form a harmonious whole. The building looks more logical.*

This is of course speculation, but the discovered use of colour, combined with the standard regulations show that in military architecture colour played a more important role as one might think. It goes without saying that this discovered blueish green will become the new colour on all doors and shutters of the military buildings in Naarden in the near future.

### **Plans for the future**

The Monuments Organisation will continue this line of work. Over the coming years the maintenance of the masonry will become as much a natural part of the work in Naarden as is the landscaping.

Besides that, two large renovations are planned for the upcoming years. The first one will be the transformation of a nineteenth century barrack complex into office spaces and workshops. The revenues that come out of this

development will be used to realize a tourist-office and information centre on fortified heritage in a wooden warehouse. It will become part of the Fortress Museum that is located in one of the city's bastions. It will fulfil a role in the preservation and spreading of knowledge on fortified heritage in general and that of Naarden in particular. In the meantime, research on the history of the fortifications will continue.

### **Biographical note**

Jeroen van der Werf (b. 1973) is an engineer and building historian. He works for the Monuments Foundation and is responsible for the maintenance and restoration works in Naarden. Besides that, he conducts historic research on fortifications in general and those of Naarden in particular. He is a board member of Stichting Menno van Coehoorn and the International Fortress Council.





*Figure 37 Aerial view of the walls. The yellow wooden building on the left is the wooden warehouse where the tourist office and information centre will be housed.*



