The Lower German Limes in the Netherlands

Scientific assessment of the site selection for the ‘Frontiers of the Roman Empire’ World Heritage Site

M. Polak & J. de Bruin
THE LOWER GERMAN LIMES IN THE NETHERLANDS
SCIENTIFIC ASSESSMENT OF THE SITE SELECTION FOR
THE ‘FRONTIERS OF THE ROMAN EMPIRE’ WORLD HERITAGE SITE

M. Polak & J. de Bruin

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Authors: M. Polak and J. de Bruin

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Frontispiece: Excavation of timber revetments along the Roman Rhine at Bunnik-Vechten in 1893 (courtesy mun. Utrecht).

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Auxilia, archeologisch projectbureau van de Radboud Universiteit Nijmegen
Heyendaalseweg 121
6525 AJ Nijmegen
Preface

Assessing the contribution of Dutch sites to the Outstanding Universal Value of the Roman frontier in the former province of Lower Germany demands insight into the accumulated efforts of former and present fellow archaeologists. Much of the results of their work is available in written publications or in digital datasets archived in the e-depot Dutch Archaeology (EDNA) accommodated in the DANS-EASY environment. Regrettably, many excavations carried out prior to the anchoring of the 1992 Malta convention in national legislation have not been analysed and published, but often bits and pieces of the information collected at that time are available in the heads of colleagues. The results of very recent excavations have not been disclosed either, as their analysis is still in progress, but various fellow archaeologists have very willingly replied to our questions.

Altogether, we are standing on the shoulders of many, and we are much obliged to all those who provided us with information, publications, maps, datasets and other services. Our thanks go to Peter van den Broeke (mun. Nijmegen), Bart Broex (RCE), Julia Chorus (Chorus Archeologie), Ton Derks (VU), Marieke van Dinter (ADC Archeoprojecten/UC), Lourens van der Feijst (ADC Archeoprojecten), Jean-François Gentenaar (mun. Nijmegen), Han Geurts (mun. Neder-Betuwe), Adam Haarhuis (RAAP), Femke Hoogenboom (ODR), Bram Jansen (RAAP), Kirsten van der Kant-van Dijk (Buro De Brug), Laura Kooistra (Biax Consult), Menne Kosian (RCE), Huib-Jan van Oort (ODR), Benno Ridderhof (MBB), Peter Schut (Regio FoodValley), Peter Seinen (Mergor in Mosam), Luit van der Tuuk (Museum Dorestad), Philip Verhagen (VU), Jan Verhagen (VU), Wouter Vos (VosArcheo) and Herre Wynia (mun. Utrecht).

Several regional and municipal archaeologists have readily shared their expert knowledge of their working area with us, and for this we are grateful to Harry van Enckevort and Paul Franzen (gemeente Nijmegen), Erik Graafstal (mun. Utrecht), Joris Habraken (mun. Arnhem, Duiven, Lingewaard, Overbetuwe, Rijnwaarden), Frits Kleinhuys (prov. Zuid-Holland) and Sigrid van Roode (mun. Berg en Dal). A special word of thanks goes to Kim Cohen (UU) for sharing his expertise in the paleogeography of the Rhine delta.

At various occasions we have been able to discuss our preliminary ideas with those involved in the preparation of the nomination, both at a national and at an international level. They also provided us with the necessary background information on the history and the broader setting of the nomination. For this we are much obliged to Steve Bödecker (LVR), Astrid Gerrits (prov. Zuid-Holland), Tessa de Groot (RCE), Jürgen Kunow (LVR), Tamar Leene (Nederlandse Limes Samenwerking), Thomas Otten (LVR), Bianca Roelink (prov. Gelderland), Cees van Rooijen (RCE) and Lisa Wouters (prov. Utrecht). David Breeze (Frontiers of the Roman Empire World Heritage Site) kindly shared his view on the essence of the Dutch frontier section with us. Finally, we gratefully recall the contribution of Carol Westrik (Westrik Consultancy), whose expert knowledge of the visions and procedures of ICOMOS and UNESCO has been very helpful.
In the end, all the views expressed in this report are ours, and inevitably they are not faultless, and susceptible to discussion. Archaeological data are almost by definition incomplete, and usually there are various ways to fill the gaps. Even when all the evidence points in the same direction, a new excavation may put everything in a new perspective. *Sic nisi aliter...*

Rien Polak & Jasper de Bruin, April 2016

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**About the authors**

Dr Marinus (Rien) Polak studied Roman Archaeology at Leiden University and is Assistant Professor in Roman Archaeology and director of *Auxilia archeologisch projectbureau* (archaeology services) at Radboud University Nijmegen. His PhD thesis (*cum laude*) on Roman pottery from the military settlement at Vechten was awarded the *W.A. van Es prijs voor de Nederlandse Archeologie*. In 1997-2000 he was responsible for the Roman period at the Cultural Heritage Agency of the Netherlands. He has been working on the Roman frontier for over thirty years and has published on several military sites and their material culture, including Nijmegen-Hunerberg (2011, 2014), Vechten (1997, 2007, 2011, 2012, 2014), De Meern (1999), Alphen aan den Rijn (2004, 2006), Leiden-Roomburg (2004, 2009) and Valkenburg (2007, 2009), and on the Roman frontier in the Rhineland in general (2009, 2012, 2015).

Jasper de Bruin M.A. studied Roman Archaeology at the University of Amsterdam and is Lecturer in Archaeological Practices and Roman Archaeology at Leiden University. For his PhD thesis, which he has recently handed in, he made an exhaustive study of the interaction between military, urban and rural communities in the *civitas Cananefatium*, the coastal area between Rhine and Meuse, including the military sites on the Rhine and along the North Sea coast. He has published studies on the Roman harbour of Goedereede-Oude Oostdijk (2012) and on the defences of the military fort at Leiden-Roomburg (2016).
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Summary

This report is the result of a project aimed at a scientific assessment of the preliminary selection of sites for the nomination of the Lower German Limes as part of the UNESCO World Heritage Site ‘Frontiers of the Roman Empire’. The evaluation was to be based on the archaeological content of the sites. Boundaries of the proposed sites were to be clearly defined. Further, the impact of degradation by overbuilding, river erosion and excavation on the integrity of the sites was to be assessed.

The evaluation of the sites was based on the draft Statement of Outstanding Universal Value of the Lower German Limes (Willems/Graafstal/Van Driel-Murray 2014), from which three key values were derived for the frontier section as a whole:

1. it was never a closed line, but a network of purpose-built military installations;
2. it formed part of the frontier throughout the entire existence of the Roman Empire;
3. it includes installations representing all successive phases of Roman military strategy.

The location of the Dutch frontier section in the dynamic delta of the river Rhine entails two additional special values:

4. the meandering and bifurcating river channels in the delta demanded tailor-made solutions for strategic and constructive challenges;
5. the high water table in the delta ensured the excellent preservation of organic remains and metal objects on many sites.

Building on these values the preliminary selection of sites has been narrowed down to 23 (clustered) sites:

<table>
<thead>
<tr>
<th>province</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gelderland</td>
<td>9</td>
</tr>
<tr>
<td>Utrecht</td>
<td>7</td>
</tr>
<tr>
<td>Zuid-Holland</td>
<td>7</td>
</tr>
<tr>
<td><strong>total</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>

The recommended sites have been arranged in four regional and thematic groups translating the five key values mentioned above:

(A) Adaptation to the delta landscape: the military installations on the Rhine;
(B) Military connectivity in the delta: canals, ships and the Limes road;
(C) Chronological and typological diversity: the Nijmegen area;
(D) Military and civil interaction: civil towns in the frontier zone.

River erosion was found to be no issue for sites in the provinces of Utrecht and Zuid-Holland, but in Gelderland all forts appear to have been considerably damaged. Nevertheless, three of these sites are recommended for nomination, on account of their contribution to the values of the frontier section.

In the six modern towns occurring in the site selection – Nijmegen, Utrecht, Woerden, Bodegraven, Voorburg and Valkenburg – overbuilding is less threatening than the overall picture of the relevant maps in Appendix 1 may suggest. Only at Nijmegen the Roman levels have been seriously affected in some areas,
mainly below building blocks. Where building densities are low, the effects will be restricted, however.

At Nijmegen (Hunerberg, Kops Plateau, Valkhof area), Voorburg and Valkenburg (Centrum) substantial areas have been excavated. In many areas all remains will be lost, but experience has taught that before World War II and occasionally in the 1950s and 1960s the deepest features were at least partly left intact.

Although they are in a sense cases of overbuilding as well, the impact of the building of modern military forts and a late medieval monastery at Nijmegen-Hunerberg, Vechten and Roomburg has been arranged under the heading of other factors of physical disturbance. In the former two cases the damage is far more limited than the surface of the forts may suggest, in the latter case we have no information about the effects on the Roman settlement. Clay extraction is an obvious eroding factor, and it applies especially to the Limes road between Utrecht and Leiden. Its impact must be clarified by additional research. Less predictable is the damage caused to the Nijmegen cemeteries by finds collection for antiquarian purposes. In the case of Nijmegen-West the survival of intact burial assemblage has been repeatedly demonstrated, however.

For ten sites or site clusters additional research is recommended. In most cases it is aimed at establishing the extension of settlements or at confirming the presence of (certain) features. Generally non-destructive methods are suggested, but supplementary digging of trenches may be advised to confirm the identity, age or preservation of attested features. The recommendation for site-specific research is preceded by a plea in favour of the development of a research agenda for the Dutch part of the Limes.

**Guide to the reader**

In Chapter 1 the background of the report is sketched. Chapter 2 is entirely dedicated to the recommended selection of sites, providing a simple site list (par. 2.3), the basis for the assessment and its practical application (par. 2.1-2.2) and a comparison of the sites (par. 2.4). In Chapter 3 the impact of erosive factors is discussed. Chapter 4 provides background information on the recommended boundaries of the sites. In chapter 5 an overview of recommended field work is presented.

Detail information on the recommended sites may be found in Appendix 1, while Appendix 2 provides a concise overview of the correspondence between sites and characteristics of the Outstanding Universal Value of the Lower German frontier section. Appendix 3 contains two lists of sites included in previous selections whose selection is no longer recommended.

The reader who is interested in the main lines of the recommended selection should start with the list in paragraph 2.3. The underlying argumentation starts with paragraph 2.1 and is further detailed in paragraph 2.2. Appendix 2 offers a quick overview of the main contributions of the various sites. Maps of every individual sites can be found in Appendix 1, with additional information.

Throughout the report the sites are discussed and presented in geographical order, from south/east to north/west, that is roughly downstream along the Rhine.
Introduction

This report is the outcome of a project which may be considered as a third phase in the process of selecting sites for the nomination of the Lower German Limes as part of the UNESCO World Heritage Site ‘Frontiers of the Roman Empire (FRE). The first two phases were carried out in 2012 by Vestigia and in 2014 by Buro De Brug. The selection history is briefly summarised here.

1.1 The UNESCO World Heritage Site ‘Frontiers of the Roman Empire’

When Hadrian’s Wall was inscribed on the World Heritage List of UNESCO in 1987 it was not yet envisaged to create a trans-national monument consisting of larger parts of the frontiers of the Roman Empire. It was only after the nomination of the Upper German-Raetian Limes as a World Heritage Site (WHS) in 1996 that the idea of a serial nomination of the whole of the Roman frontier gradually emerged. In 2005 the ‘Frontiers of the Roman Empire’ World Heritage Site was effectively created, with Hadrian’s Wall and the Upper German-Raetian Limes as its first constituent parts. In 2008 the Antonine Wall was inscribed as a further extension.

Today, the nomination of several other parts of the Roman frontier is being prepared, and the Lower German Limes (LGL) is one of them. The nomination concerns the frontier of the Roman province of Germania Inferior, which was located on the left bank of the river Rhine, extending from Remagen, south of Bonn, to the North Sea coast. The LGL is therefore a river frontier, as opposed to the sections inscribed so far, which consist of continuous artificial barriers in the shape of a stone wall or a turf rampart. The absence of a consolidated linear structure poses new challenges to the nomination of a river frontier. At the same time it clearly supplements the already listed sections of Frontiers of the Roman Empire.

1.2 Selection of Dutch sites: a brief history

The starting point for the selection process was an area defined by the Cultural Heritage Agency of the Netherlands (Rijksdienst voor Cultureel Erfgoed, RCE) for the protection of the Limes in a national decree on spatial planning. An evaluation of all protected sites from the Roman period in this area resulted in a preliminary selection of 119 sites presented in 2012. In the report the ad-hoc character of this selection was underlined. According to the authors the presence or absence of Limes elements on the list of scheduled monuments was not the outcome of a deliberate Limes protection policy, but of less conscious processes and assessments.

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2 Cf. Breeze & Young 2008 for its main characteristics.
4 Besluit algemene regels ruimtelijk ordening (Barro).
5 Hessing et al. 2012, 33, table 2, and appendix 3. The evaluated sites included both scheduled monuments (NL: archeologisch rijksmonument) and sites where other protective measures apply.
In 2014 a draft version of the Statement of Outstanding Universal Value (souv) and Comparative Analysis for the LGI became available. This document offers the framework which is required for the assessment of the provisional selection, not just of the Dutch sites, but for the entire Lower German section of the Limes.

The souv was used to add further details for the sites included in the preliminary selection, resulting in a site catalogue presented in 2014. In this catalogue the sites were arranged in 42 clusters. Each entry consists of three elements: 1) basic information in a standardised format; 2) a map showing the boundaries of the site(s) on a topographical layer; 3) a detailed explanation including the character of the site, the remaining structures and points of special interest. Although this second phase of the selection process did not involve a critical evaluation of the preliminary selection the list was considerably reduced, from 119 to 72 sites. Some sites were consciously removed, because of political considerations, but not a few others were dropped unknowingly, as a result of unrecognised technical issues.

In 2015 the state of affairs considering the nomination of the Dutch part of the LGI was evaluated, first during a Dutch-German expert meeting and later by an international committee appointed by the Ministry of Education, Culture and Science. Both groups concluded that the selection of sites and the definition of their boundaries were at times debatable. On account of several instances of degradation by overbuilding, river erosion and excavation it was deemed advisable to assess the impact of these factors on the integrity of the sites.

1.3 Assignment

In June 2015 the Nederlandse Limes Samenwerking invited Radboud University and Leiden University, represented by the authors of this report, to define an approach for a project with three main aims:

1. evaluate the preliminary selection of Dutch sites, starting from the list drawn up by Vestigia in 2012, building on the archaeological content of the sites and without considering aspects of spatial planning and policy. The selection should be clearly rooted in the souv;
2. define clear boundaries for each proposed site, based on a mapping of the entire archaeological assemblage;
3. assess the impact of degradation by overbuilding, river erosion and excavation on the integrity of the sites.

The Lower German Limes extends over parts of the German Bundesländer Rheinland-Pfalz and Nordrhein-Westfalen and of the Dutch provinces Gelderland, Utrecht and Zuid-Holland, and the nomination of this frontier section is a joint Dutch-German initiative. Therefore, the evaluation of the Dutch sites should be carried out in harmony with the German partners in the nomination.

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6 Willems, Graafstal & Van Driel-Murray 2014.
7 Van Dijk 2014.
8 One extra site was added in this phase, resulting in 73 sites.
9 It was assumed that the digital maps produced by Vestigia contained the entire provisional selection of sites. However, this selection included some 30 items which had no boundaries in the national monument database. These were not included in the GIS files and consequently overseen when these files were taken as a starting point by Buro De Brug.
10 For the result of the latter compare the report Bitter en Zoet 2015.
1.4 Method of working

The main characteristics of the LGL as defined in the SOUV have been translated into a matrix (cf. Appendix 2). For each site listed by Vestigia in 2012, the appropriateness of these characteristics has been assessed by reviewing documentation and publications. This provided a solid basis for the evaluation of the degree in which each site contributes to the SOUV.

None of the sites which had previously been rejected by Vestigia passed the test of this evaluation. Some of the sites which Vestigia proposed for selection failed to pass as well, generally because their presumed character could not be satisfactorily established or their integrity was severely compromised. For the same reasons some of the (clustered) sites included in the 2014 site catalogue were dismissed.

Eventually, the evaluation resulted in a list of some thirty (clustered) sites which were selected for further analysis. Most of these were discussed with colleagues with a special local or regional expertise. The supposed eroded forts in Gelderland were discussed with an expert in the morphodynamics of the Rhine-Meuse delta.

For each of the remaining sites a generalised map was made of the archaeological assemblage, as a basis for the definition of the advisable protective boundary. Occasionally, it turned out that there was insufficient evidence for a proper demarcation; in those cases a recommendation for additional field work was drawn up. In order to evaluate the integrity of the sites, the excavated areas were mapped, and for those sites in built-up areas an assessment was made of the impact of overbuilding.

The aggregated information was used to compare the contribution of the individual (clusters of) sites to the SOUV. The essence of that fundamental document was summarised in five key aspects, which served as a basis for a classification of the sites in four thematic and regional groups. As a result of the comparative analysis, the selection was narrowed down to 23 (clustered) sites (fig. 1).

For each proposed site the relevant information has been summarised; a map has been added with its proposed boundary or boundaries. Where applicable, a distinction has been made between highly recommended areas representing the key values of a site and areas whose protection is additionally recommended; generally, areas of the latter kind are less well demarcated.

1.5 Scope of this report

This report is not an in-depth study of the Dutch part of the LGL. It contains an evaluation of known sites and existing information, focused on archaeological contents and demarcation. The observation made by Vestigia in 2012 is therefore still valid: the selection is not based on a well-considered long-term strategy for the protection of the Limes in the Netherlands.

A hoard of valuable information recorded during excavations preceding the anchoring of the Malta convention in national legislation has not been disclosed.

11 Cf. Appendix 3, A3.2. Sites whose character is too uncertain include sections of the presumed Limes road in Gelderland. Examples of sites with a compromised integrity are the excavated ship De Meern 1 (169) and the nearly completely excavated settlement of Katwijk-Zanderij Westerbaan (200).
12 Cf. Appendix 3, A3.1. Sites of too uncertain character include the harbour at Nijmegen (4.3.14) and the road between Nijmegen and Elst (4.3.9 and 4.3.7). The nearly completely excavated temple of Elst-Westeraam (part of 4.3.5) is a clear example of a compromised site.
More recent excavations have usually been published, but their results have seldom been translated into additional protection or adaptation of existing protected areas. An analysis of the frontier area using historical maps, digital elevation models and aerial photography still stands out, and targeted surveys driven by research questions and hypotheses have rarely been carried out so far.

It should be clear that the site selection proposed in this report is the product of a conscientious evaluation of the present state of research, but this state leaves much to be desired.
Sites recommended for nomination

2.1 Assessment framework

The framework for the evaluation of the selection of Dutch sites for the nomination essentially consists of two documents: the so-called Koblenz Declaration defining the spatial and chronological extent of the FR WHS as a whole, and the (draft) Statement of Outstanding Universal Value (SOUV) for the LGL defining the specific assets of this section.

Koblenz Declaration (Bratislava Group meeting 23.6.2004)

“The Frontiers of the Roman Empire World Heritage Site (FR WHS) should consist of the line(s) of the frontier at the height of the empire from Trajan to Septimius Severus (about 100 to 200 AD), and military installations of different periods which are on that line. The installations include fortresses, forts, towers, the Limes road, artificial barriers and immediately associated civil structures. It is accepted that Roman frontiers are more complex, and that this might be recognized in a later amendment to the above definition, but this definition is recommended as the first step in the creation of this multi-national World Heritage Site.”

Outstanding Universal Value of the Lower German Limes

The draft SOUV of the LGL became available in July 2014. The document applies to the LGL as a whole, but there will be a special focus on the Dutch part in this document.

The LGL differs from most if not all other sections of the Roman frontier in three important aspects:

1. it was never a closed line, but a network of purpose-built military installations connected by the river Rhine, and at some stage by a land road as well;
2. it formed part of the frontier throughout the entire existence of the Roman Empire, from its earliest beginnings in the last decades BC until the breakdown of the Western Empire in the mid-5th century;
3. it includes installations representing all successive phases of Roman military strategy – conquest, forward defence and defence-in-depth – and all types of fortifications and garrisons.

The Dutch section contributes to all of these key aspects. On top of that, it has a unique aspect to offer: its situation in a river delta. This special landscape setting translates into two special values:

4. the meandering and bifurcating river channels in the delta demanded tailor-made solutions for strategic and constructive challenges;
5. the high water table in the delta ensured the excellent preservation of organic remains and metal objects on many sites.

The draft SOUV includes a list of 23 types of sites occurring in the Lower German frontier zone throughout its existence. All of these site types should be represented in the nomination by at least one example. In a slightly adapted format, this list has been transformed into variables of a matrix (Appendix 2)
which has been used both to estimate the contribution to the souv of individual (clustered) sites and to ascertain whether all key values are represented.

2.2 Application to the site selection

The selection of sites proposed below (par. 2.3) builds on the abovementioned essential values of the LGL as a whole and of the Dutch section in particular. The recommended sites have been clustered in four coherent groups (labelled A-D), whose main characteristics are summarised here.

(A) Adaptation to the delta landscape: the military installations on the Rhine

The bifurcating character of the Rhine provided several northerly accesses into Germanic territory. The strategic advantages of these connections were recognised at an early stage, as witnessed by the construction of a groyne (NL: krib, stroomdam; D: Buhne) at the bifurcation of Rhine and Waal as early as 12-9 BC, serving to divert more water into the northerly Rhine branches. At this location and at further bifurcations near Arnhem and Utrecht military installations were built as logistical nodes around the beginning of the Common Era. The eroded fort of Rijnwaarden-Bijlandse Waard and the military bases at Arnhem-Meinerswijk and Bunnik-Vechten are representatives of this category of sites with a special strategic character related to the delta landscape. Buren-Maurik/Eiland van Maurik may be a further example, depending on the interpretation of its geological setting.13

In the 40s of the 1st century AD the annexation of Britain turned the Rhine into a logistical axis for the supply of the British occupation army. The northerly branches and tributaries of the Rhine exposed this vital logistical axis to the dangers of Germanic raiding. Surveillance of the river was complicated by its winding course. In order to secure the military transports a series of small forts was built on the left bank of the Rhine downstream from Vechten, with watchtowers filling the gaps at vulnerable winding stretches.

The purpose of the fort series led to an atypical location and design. The forts were built immediately alongside the river channel, prone to flooding, even when more elevated terrains were available at short distance. All known forts display a peculiar design, which will be addressed here as ‘delta type’. As a rule, Roman forts consist of three built-up zones, with the headquarters centrally in the middle zone (fig. 2, latera praetorii). In the ‘delta type’ forts the rear zone (retentura) is missing. Consequently, the forts are facing the river with the long side. All known forts between Vechten and the North Sea display this peculiar design and in principal any of them may represent this unique ‘delta type’ of installation. The stone fort at Meinerswijk was of the same type as well, which may be taken as an indication that it was also situated immediately on the Rhine channel.

As the delta forts were built on the edge of the river it was very convenient to use the river bed as a rubbish dump. In cases where the river migrated away from the fort or was cut off by a new channel, considerable parts of these deposits have been preserved. Due to the high water table in the former river beds the preservation conditions are generally Excellent. River fronts of military settlements may therefore be veritable treasure-chests, especially for ecological finds and metal objects. Sites with well-preserved rubbish dumps include amongst others Utrecht-Hoge Woerd, Vechten and Woerden.

13 Compare the discussion of Maurik in Appendix 1.
Watchtowers have been unequivocally attested mainly around the fort of Utrecht-Hoge Woerd so far, but others have or may have existed further upstream (Bunnik) and downstream (Alphen aan den Rijn, Katwijk-Valkenburg). The excavated examples near Utrecht-Hoge Woerd were located at the southern outer bends of a strongly winding section of the Rhine, at spots where the Limes road passed at a later stage. Early building dates connect the Utrecht towers with the construction of the first ‘delta type’ forts, and it is likely that they constituted a common surveillance network. As such the watchtowers are a special asset of the military infrastructure of the delta.

The archaeological remains of timber watchtowers consist of little more than a single ditch surrounding four heavy uprights, occasionally supplemented with a shallow ditch of the wattle-and-daub walls of the tower body. The associated finds assemblages are small and a-specific. Consequently, watchtowers are extremely difficult to attest by other methods than excavation, which usually destroys all or most of their remains. On account of their relationship with river bends and the course of the Limes road, the presence of still undetected watchtowers may be assumed in some road contexts along the Rhine.

(B) Military connectivity in the delta: canals, ships and the Limes road

The groyne constructed c. 12-9 BC by the army commander Drusus is one of two engineering works connected with his name, the other being one or more dug canals (fossa Drusiana, single, or fossae Drusianae, plural, depending on the historical source) providing access from the Rhine to the peat lakes preceding the present IJsselmeer. So far, the precise location of the canal(s) is uncertain, with the middle course of the Gelderse IJssel as the best candidate. Shortly before the middle of the 1st century AD a second canal was dug, named fossa Corbulonis or Corbulo canal after the army commander who ordered or completed its construction. This canal was dug to create an inland short cut between the estuaries of Rhine and Waal/Meuse. Stretches of this canal have been archaeologically attested, and its date is confirmed by the analysis of the tree rings of timber posts used for revetments. The Corbulo canal is a unique example of a man-made adaptation of a river delta, with an excellent preservation of timber elements due to the prevailing wetland conditions.
The military installations on the Roman frontier were normally connected by a land road. Upstream from Xanten the construction of this so-called Limes road goes back to the early 1st century AD, perhaps in or soon after AD 16. In the Netherlands the Limes road is only known from Utrecht to the coast, with the exception of a small section recently excavated near Vechten. In Gelderland we are at a loss about its precise course.

The road section from Utrecht to the coast does not appear to have been constructed before the 80s of the 1st century. Seemingly, the forts were only connected by the Rhine up to that date. The late construction of a road may be explained by the challenges posed by the delta landscape, requiring timber reinforcements and engineering works as bridges on many spots. On the other hand, laborious tasks have never discouraged army commanders, as witnessed by the mentioned works of Drusus and Corbulo.

Yet, the tailoring of the Limes road to the delta landscape is a special asset of the western part of the LGL, and can be traced in all its details thanks to the excellent preservation of the timber elements. Large-scale repairs were carried out c. AD 99/100 and 124/125. It is difficult to escape the conclusion that these repairs were ordered by the emperors Trajan and Hadrian when they were present in Lower Germany shortly before. If imperial presence accounts for repair phases, the first construction of the road may be an imperial initiative as well, linked to the establishment of the province of Lower Germany by Domitian c. AD 85. The assumed imperial connections of construction phases of the western Limes road lends further lustre to an already outstanding element of the LGL.

Shipping was vital to the military grip on the delta, and the favourable preservation conditions have provided us with considerable numbers of vessels. Most of them were clearly transport ships, but the river front at Vechten has produced a rare example of a troopship of Mediterranean construction type. The cases of Utrecht-Hoge Woerd, Vechten, Woerden and Zwanmerdam clearly demonstrate that ships may be expected anywhere near forts, and the Leidsche Rijn area west of Utrecht-Hoge Woerd has taught us that they occur elsewhere just as well.

Most ships known so far have been entirely excavated or otherwise destroyed, with the exception of parts of two ships, at Utrecht-De Balije and Vechten. Ships are extremely difficult to detect by non-destructive survey methods, but one vessel may have been detected by ground penetrating radar at Utrecht-Zandweg. Well-preserved ships certainly rank among the major assets of the LGL, and the appropriate way to include them in the nomination seems to be to incorporate sections of river channels near forts or stretches of the Limes road.

(C) Chronological and typological diversity: the Nijmegen area

The Nijmegen area stands out by its chronological and typological variegation. The vast operational base on the Hunerberg is the earliest military installation on the north-western frontier and may be considered as the cradle of the LGL, while the Late Roman fort in the Valkhof area is likely to have constituted the nucleus of the Carolingian palace. The chronological and typological range is supplemented by the remains of an irregularly shaped fort on the Kops Plateau and a more or less standard legionary fortress on the Hunerberg. The evacuation of the former and the building of the latter were induced by the Batavian revolt of AD 69/70.

Although similar types of military installations occur elsewhere on the LGL frontier, the Nijmegen assemblage is unique as such. It is further extended by supporting facilities of the Flavian-Trajanic legionary fortress, consisting of an extensive extra-mural settlement, a military production unit for ceramic building materials and pottery at Berg en Dal-De Holdeurn, and an aqueduct.
(D) Military and civil interaction: civil towns in the frontier zone

The Koblenz declaration extends the definition of the frontier to the civil structures immediately associated with the military installations (cf. par. 2.1), without further elucidation. In the draft SOUV of the LGI it is stressed that the urban communities are characteristic elements of the frontier landscape.

The integration of the Rhineland into the Roman Empire was hindered by the absence of an urban tradition, necessitating the creation ex nihilo of the urban centres serving as the building blocks of the provincial administrative system. The successive civil agglomerations at Nijmegen known as Oppidum Batavorum (Valkhof area) and Ulpia Noviomagus (Nijmegen-West) illustrate the laborious process, with their initial ribbon-like development and the need of military and imperial involvement. Colonia Ulpia Traiana at Xanten and Forum Hadriani at Voorburg show a similar development, with a modest and difficult start followed by a sudden kick-off after imperial intervention. In all cases the imperial promotion of the towns went hand-in-hand with military assistance in the supply of building materials, possibly indicative of further-reaching military support.

The civil town of Ulpia Noviomagus is part of a triad consisting of castra-canabae-civil town which is characteristic of frontier zones. There are several instances where a civil town grew up at only a few kilometres from a legionary fortress (castra) and its extra-mural settlement (canabae legionis). Although the mechanism is not properly understood, the occurrence of this triad adds to the conviction expressed in the draft SOUV that “the towns of the Lower German frontier districts were very much part of the same military cordon on the left bank”.

2.3 List of recommended sites

This paragraph merely lists the recommended sites, arranged in the four regional and thematic groups defined in the previous paragraph. Within these groups the sites have been listed in geographical order, downstream along the Rhine, as throughout this report. Table 1 has been added for administrative convenience. The underlying assessment is elucidated in paragraph 2.4. The basic information of the sites is presented in Appendix 1.

It is common practice to use castellum (plural: castella) for a fort smaller than a legionary fortress, vicus or military vicus for the civil settlement outside such forts and canabae legionis for its counterpart outside a legionary fortress. In this report the more neutral terms of ‘fort’ and ‘extra-mural settlement’ have generally been preferred. The term castellum is generally identified with ‘auxiliary fort’, a more or less standardised fort garrisoned by an auxiliary unit of the Roman army; in most cases, however, the Dutch forts do not conform to that template, and in some cases their size is simply unknown. A similar objection applies to the use of the term military vicus, which is normally taken for a settlement housing non-combatants; in several cases, however, buildings outside fort defences have an unmistakeable military character and function. Despite these fundamental objections, castellum and military vicus are occasionally used in this report, when the character is clear, or for the sake of brevity or variety.
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(A) Adaptation to the delta landscape: the military installations on the Rhine
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- Arnhem-Meinerswijk: fort, extra-mural settlement?
- Buren-Maurik/Eiland van Maurik: re-deposited remains of an eroded fort
- Bunnik-Vechten: large fort, extra-mural settlement, cemetery, harbour installations, riverside deposits, remains of a ship
- Utrecht-Domplein area: fort, extra-mural settlement
- Utrecht-Groot Zandveld: watchtower
- Utrecht-Hoge Woerd: fort, extra-mural settlement, bath-house, cemetery, riverside deposits
- Woerden-Centrum: fort, extra-mural settlement, riverside deposits, Limes road
- Bodegraven-Oud Bodegraafseweg/Willemstraat: fort
- Leiden-Roomburg: fort, extra-mural settlement, harbour installations, riverside deposits
- Valkenburg-Centrum: fort, extra-mural settlement, bath-house, cemetery, Limes road
- Valkenburg-De Woerd: extra-mural settlement

(B) Military connectivity in the delta: canals, ships and Limes road
- Utrecht-De Balije/Veldhuizen/Zandweg: Limes road and associated structures, remains of a ship
- Woerden-Harmelen/Zoeterwoude-Rijndijk: Limes road and associated structures (four separate sections)
- Corbulo canal

(C) Chronological and typological diversity: the Nijmegen area
- Berg en Dal-De Holdeurn: military tile works and pottery
- Berg en Dal/Nijmegen: aqueduct
- Nijmegen-Kops Plateau: fort, extra-mural settlement, cemetery, rubbish deposits
- Nijmegen-Hunerberg: operational base, legionary fortress, extra-mural settlement, cemetery
- Nijmegen-Valkhof area: Late Roman fort

(D) Military and civil interaction: civil towns in the frontier zone
- Nijmegen-West: civil town Ulpia Noviomagus, cemetery
- Nijmegen-Valkhof area: civil settlement Oppidum Batavorum
- Voorburg-Arentsburg: civil town Forum Hadriani, harbour
2.4 Comparative analysis

The draft SOUV contains a comparative analysis for the LGL as a whole, as required by UNESCO. This paragraph is not a comment on that analysis, but a comparison between similar sites within the Lower German frontier zone, to clarify the importance of the recommended sites. The representation on these sites of characteristics listed in the SOUV is summarised in a table in Appendix 2, which may be used as a reference.

(A) Adaptation to the delta landscape: the military installations on the Rhine

In the most liberal view there may have been as much as nineteen forts on the left bank of the Rhine in the Netherlands (fig. 3). Ten of these have been firmly attested by excavation: Meinerswijk, Vechten, Utrecht-Domplein, Utrecht-Hoge Woerd, Woerden, Bodegraven (which we consider as a ‘delta type’ fort, cf. Appendix 1), Zwammerdam, Alphen aan den Rijn, Roomorn and Valkenburg. For a further five sites the former existence of a fort is plausible: Bijlandse waard, Lingewaard-Duiven/Loowaard, Neder-Betuwe/Kesteren, Maurik and Katwijk-Brittenburg. The four remaining sites are questionable or uncertain: Overbetuwe-Driel/Baarskamp, Overbetuwe-Randwijk, Utrechtse Heuvelrug-Amerongen/’t Spijk and Buren-Rijswijk; these will not be discussed here.

Vechten and Utrecht-Hoge Woerd include remains of all components of a military settlement: a succession of timber and stone forts, a civil settlement and the associated cemeteries. On top of that both have well-preserved riverside deposits with rich organic remains; earlier finds of ships indicate that more vessels may be hidden in the fossilised channels in front of the forts. Both sites have some other extras to offer. Vechten is one of the early logistical nodes located at access points into Germanic territory. It is the earliest under-legionary size fort downstream from Xanten and, after Moers-Asberg, the second of the LGL. Its stone building phase is the largest auxiliary fort in the Netherlands, and the only specimen with a retentura. The Hoge Woerd fort has one of the few known bath buildings just outside the north gate, with its wall foundations still standing. The interior of the fort is for the most part untouched by excavation. Its association with a range of early watchtowers both up- and downstream is a further added value.

Utrecht-Domplein is a fine demonstration of how the Roman frontier influenced the shaping of the Merovingian and Carolingian centres of power. Here, a series of delta type forts is overbuilt by an ecclesiastic complex. The medieval town which developed here seals the Roman settlement, which has led to an above-average preservation of its latest building phases. This probably applies both to the fort and the adjacent extra-mural settlements, of which little is known since they have hardly been exposed to excavation.

Woerden combines several aspects of the previous sites. It consists of a well-preserved series of timber forts, succeeded by a stone fort with some lower parts of its walls still standing. The fort area is surrounded by a civil settlement whose extent is not very clear. Much of the river front is still present, since the river has migrated away from the settlement. One or more ships may be hidden in the fossilised channel, which has already relinquished several cargo vessels.

The character of the military installation at Bodegraven is not beyond dispute, but we think there is a strong case for a ‘delta type’ fort here (cf. Appendix 1).

14 For Katwijk-Brittenburg cf. Annex 3, A3.2, site 209. For the other four cf. par. 3.1.
15 For Driel-Baarskamp cf. Annex 3, A3.1, site 4.3.4. For the other three cf. par. 3.1.
Excavation has been very limited, but it has demonstrated an excellent preservation of timber construction elements. Remains of similar quality have only been attested at Alphen aan den Rijn and Valkenburg, which have been excavated to a much larger scale. Valkenburg is internationally renowned for its timber constructions, and Bodegraven has the potential to come up to its level.

These five sites express core aspects of the delta part of the LGL. Five more attested and presumed forts are additionally recommended for nomination, because they extend or supplement core values. These include a partly eroded fort and two presumably completely eroded ones: Meinerswijk, Bijlandse waard and Maurik.

For Bijlandse waard and Meinerswijk it is primarily their historical value which justifies nomination. They resemble Vechten as far as their early foundation and location near riverine accesses into Germanic territories are concerned. The fort which may safely be presumed near Bijlandse waard was undoubtedly built in connection to the groyne which Drusus had built c. 12-9 BC to divert more water into the Rhine. The building of the fort at Meinerswijk is probably connected to the operations of Germanicus across the Rhine c. AD 14-16, judging by the few early finds known so far. Its location must be related to the use of brook systems preceding the Gelderse IJssel as a route to the Germanic coastal area, presumably canalised by Drusus. Both the groyne and the canal(s) are early and rare examples of the adaptation of the landscape to the needs of the Roman army.

The fort near Maurik may have been located close to the bifurcation of Rhine and Lek, but as this was no access into enemy territory the strategic situation differs from that at Meinerswijk and Vechten. The finds assemblage indicates that it was not of the same ‘generation’ as the forts west of Vechten. Further, it includes a larger component from the 4th century. Finally, it is one of the few forts known to have housed a mixed garrison of infantry and cavalry, a cohors equitata.

Roomburg and Valkenburg-Centrum have much in common with Utrecht-Hoge Woerd and Woerden. For Roomburg its association with the Corbulo canal is a special asset, and for Valkenburg its attested Late Roman structures. However, at Roomburg the building of a monastery on top of the fort may have damaged its internal buildings, and at Valkenburg large parts of the fort have been excavated. Nomination is nevertheless recommended on account of their special values.

The remaining five attested and presumed forts have not been recommended. The available information on the dredge finds from Loowaard has little or nothing to offer which is not represented by Bijlandse waard and Maurik. The same accounts for the fort that is assumed at Kesteren on account of the military character of the Prinsenhoef cemetery. The sites of Alphen aan den Rijn-Zwammerdam and Alphen aan den Rijn-Centrum have been largely excavated and the remaining parts have no unique characteristics which justify their inclusion. Finally, the Britenburg may be considered as lost to the sea, after many vain attempts to reveal its location.

Besides the previously discussed military forts, group A comprises an archaeologically attested example of a timber watchtower, at Utrecht-Groot Zandveld. Other known watchtowers have been excavated, but further examples may be hidden along the Limes road (cf. group B). Groot Zandveld is therefore without competition.

The military vicus at Valkenburg-De Woerd completes group A. Every fort is likely to have had an extra-mural settlement, although probably not from
the very beginning. On nearly all the fort sites from Vechten to the coast excavations have been carried out outside the fort defences, but the results are very patchy. Valkenburg-De Woerd is the only site where a coherent section of a civil settlement in a military setting has been uncovered.

A comparison with the German part of the LGL has no influence on the assessment of the Dutch sites of this group. Although Bonn, Moers-Asberg and Xanten were located opposite tributaries of the Rhine, of which the Lippe certainly was used as an access into Germanic territory, Bonn and Xanten were legionary bases and as such of a different category than Bijlandse waard, Meinerswijk and Vechten. Moers-Asberg compares with the early phases at Vechten, but it was already evacuated in the late 1st century.

The forts between Vechten and the coast have no parallels in Germany. They were built in a short time span for a particular purpose. The attested forts in Germany were built either earlier or later, and none of them has the ‘delta type’ lay-out without retentura.

The German nomination includes a watchtower at Neuss-Reckberg, with stone foundations, but that has a later building date than the timber watchtowers in the Netherlands. At Moers-Asberg a small but characteristic section of a military vicus with strip houses has been excavated. This is probably the best example of an extra-mural settlement outside an under-legionary sized fort along the LGL. It is not included in the German nomination, however, because it is damaged by overbuilding and sand quarrying.

(B) Military connectivity in the delta: canals, ships and Limes road

A unique feature of the Dutch Rhine delta is the occurrence of dug canals. The location of the earliest example, named after the emperor Augustus’s stepson Drusus, is not yet known. The second canal, named after the army commander Corbulo, has been archaeologically attested at several locations. It is not impossible that a third canal existed south of Utrecht-Hoge Woerd, connecting the Heldam channel of the Rhine to the Hollandse IJssel. As it is uncertain whether it was a natural connection or partly man-made, the nomination of this supposed Meerndijk canal is not recommended. The Corbulo canal is so far a unique structure, and an excellent representative of the adaptation of the military infrastructure to the delta landscape. The distribution of ships over the Lower German Rhine is very uneven. The German section has only produced three ships near Xanten and two at Köln, whereas well over twenty vessels are known from the Dutch section. With the exception of a troopship at Vechten all are river cargo ships, most of them known from Utrecht-Hoge Woerd, Woerden and Zwammerdam. Nearly all ships have been entirely excavated, but at Utrecht-De Balije and Vechten two ships still remain in situ, at Vechten only a small part is likely to be intact.

Experience has taught that ships can be expected anywhere in the Roman Rhine channels. Most vessels have been found in the proximity of forts, but that image is distorted by the circumstance that excavations in Rhine channels at greater distances of military installations are much rarer. The discovery of the first ship along the Heldam channel downstream from Utrecht-Hoge Woerd was only

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16 It appears that these civil settlements did not occur before the Claudian period.
17 At Wesel-Büderich, close to the mouth of the Lippe, a fort is presumed on account of surface finds. This site is not included in the German nomination, because it has not been properly located and identified as a military settlement.
18 Cf. Appendix 3, A3.2, site 168.
incidental, due to the digging of a pond. Later, a second ship was found nearby, and a third ship appears be hidden 2.5 km downstream.

Altogether, it may be evident that ships may be included in the nomination by protecting sections of the Rhine where it borders Roman infrastructure, be it military installations or the Limes road. This lends further weight to the recommendation of Vechten, Utrecht-Hoge Woerd, Woerden and perhaps Roomburg (previous section) and to the sections of the Limes road discussed hereafter.

In the 2nd century the military installations of the LGL were all connected by road. Upstream from Xanten road construction started early in the 1st century, but between Vechten and the coast no paved road seems to have existed before the 80s; about the age of the intermediate road section we know less to nothing. For a frontier section without a linear barrier, the road connecting the military installations may be considered as an alternative linking element, but since every frontier section has its military roads this is not a distinctive asset. Yet, the road between Vechten and the coast certainly deserves nomination, for its particular adaptation to the unique delta landscape. It is characterised by the occurrence of timber constructions including bank supports, revetments, quays, culverts and bridges, and as such it is a unique phenomenon.

The Limes road has been traced and researched at many locations in the municipality of Utrecht, but the section of De Balije/Veldhuizen/Zandweg has been proved to display all mentioned characteristics. On top of that it has produced several ships – one of which is still in situ – and watchtowers, and there is every reason to suppose that there are more. The archaeological quality of the section is well attested.

The continuation of the Limes road to the coast has been attested at many locations between Woerden-Harmelen and Zoeterwoude-Rijndijk. Many observations were made decades ago in ploughed fields. There is no doubt that the road was damaged in many places by clay extraction and overbuilding, but other sections may be relatively well preserved. As the landscape displays various similarities with that of the Heldam stream ridge near Utrecht there is good reason to expect a comparable diversity of construction here, with occasional quays, revetments, bridges, ships and watchtowers wherever it approaches the Rhine channel. The four proposed sections between Woerden-Harmelen and Zoeterwoude-Rijndijk have not been ranked on the same level as the Utrecht section with its well-attested excellent preservation, but their nomination is nevertheless recommended, because they increase the chance that representative values of the LGL are included.

(C) Chronological and typological diversity: the Nijmegen area

The sites listed under this heading actually constitute a single military assemblage with a nearly continuous occupation throughout the history of the LGL. Two associated civil elements are discussed under the next heading.

The core constituent of the assemblage is the Hunerberg, with its succession of the earliest military base in the Rhineland and a standard legionary fortress of the late 1st and 2nd centuries. Together with Neuss and perhaps Moers-Asberg the early Hunerberg base is the only military installation preceding the campaigns of Drusus in 12-9 BC. Large parts of the camp remain unexcavated.

The later legionary fortress was part of a group of four, with Bonn, Neuss and Xanten-Vetera II. The latter has been eroded by the Rhine, but Bonn and Neuss are part of the German nomination, though without their extra-mural settlements and cemeteries. At Nijmegen parts of the canabae legionis and the cemeteries of
the fortress and the civil settlement are included in the recommended protected areas. Although a considerable part of the later legionary fortress and extra-mural settlement has been excavated the assemblage certainly adds value to the nomination of the fortresses of Bonn and Neuss, which does not include the canabae. Altogether, the Hunerberg is considered as a major constituent of the LGL.

The value as an assemblage is further enhanced by the industrial site at De Holdeurn. Military tileries and potteries are known elsewhere, at Bonn, Köln-Feldkassel, Dormagen, Sinzig and Xanten, but none of these are listed as they are extensively excavated or poorly preserved. Together with the lime-kilns at Iversheim and the quarries of the Drachenfels De Holdeurn represents vital constructional facilities of the Lower German army.

The aqueduct of Berg en Dal/Nijmegen is a further asset of the assemblage, assuming that the interpretation of the earthworks is correct. On the one hand, it is odd that other aqueducts known in the Rhineland, serving the provincial capital at Köln and the colonia and legionary fortress Vetera II at Xanten, were constructed in brick and natural stone. With the military brickyard of De Holdeurn at a distance of only a kilometre it is difficult to comprehend why no brick was used for a military aqueduct at Nijmegen. On the other hand, there is no plausible alternative explanation for the earthworks, which are clearly visible on a digital elevation model (fig. 4), and display many other characteristics favouring the interpretation as an aqueduct.

The fort on the Kops Plateau is another site which is recommended, because of the peculiar character of the installation: an irregular shape, oversized residential building (excavated), extra-mural activity zones and a remarkably luxurious finds assemblage. For these aspects the site is without parallel. A thick layer of refuse on the northern slope of the plateau is an extra asset, constituting a dry counterpart of the riverside deposits of the Rhine forts, so far only paralleled by a no longer preserved deposit near the legionary fortress at Bonn. However, the circumstance that three quarters of the fort have been excavated detracts from its integrity.

A final asset of the Nijmegen military assemblage is the Late Roman fort in the Valkhof area. Next to Valkenburg with its Late Roman buildings it is the only site where military activity is attested by features, and not merely indicated by stray finds. A peculiarity of the Nijmegen fort is the presence of two lines of defensive ditches. A characteristic shared with Utrecht-Domplein is that the
Roman installations surely influenced the location of the Early Medieval power centre, in this case a Carolingian palace and its predecessors. All in all, the site is one-of-a-kind. The German nomination includes the Late Roman fortifications of Monheim-Haus Bürgel and Köln-Deutz, both very different from the Valkhof fort. Haus Bürgel is much smaller and Köln-Deutz, though of similar size, served as a bridgehead on the right bank of the Rhine.

(D) Military and civil interaction: civil towns in the frontier zone

In paragraph 2.2 it has been argued that the civil towns of the Lower German frontier zone should be part of the nomination. In the Rhineland four towns are known to have had a legal status: *colonia Claudia Ara Agrippinensium* at Köln, *colonia Ulpia Traiana* at Xanten, *municipium Batavorum* at Nijmegen and *municipium Aelium Cananefatium* at Voorburg. The latter two are also known as *Ulpia Noviomagus* and *Forum Hadriani*, either at an earlier stage or as an alternative name.

Köln was the provincial capital and is not further discussed. The towns of Xanten and Nijmegen are located in the immediate vicinity of legionary fortresses. The Nijmegen fortress was surrounded by an extensive civil settlement; for Xanten this cannot be attested, as Vetera II has been washed out by the Rhine, but there is no reason to doubt it. The *colonia* at Xanten is twice as large as the area of the walled town at *Nijmegen-West* and better preserved as it has hardly been overbuilt. However, only at Nijmegen remains of the two contemporary civil agglomerations have survived, which adds to its value.

Both at Xanten and at Nijmegen the civil towns with legal status have more modest predecessors, with a ribbon-like development. In the case of Nijmegen there was a shift of location after the Batavian revolt of AD 69/70. Prior to that event a civil agglomeration existed in the *Valkhof area*, which is generally identified as *Oppidum Batavorum*, mentioned by the historian Tacitus. It has been argued that at least part of the settlement was built for army veterans, who must have originated from the peculiar fort on the Kops Plateau. In this period the Batavian countryside shows few traces of integration into Roman provincial life, and it is hard to imagine that the regional population was attracted to urban life. From this point of view it is conceivable that the army was at least as important for the viability of the Valkhof settlement as it was for the later settlement at Nijmegen-West. The same may have applied to the predecessor of the *colonia* at Xanten, but because of its overbuilding that is even more difficult to grasp than for the Valkhof settlement.

The Roman town at *Voorburg-Arentsburg* is the latest urban creation in the province. Its foundation is dated in the 120s AD and may be connected to the emperor Hadrian’s visit of AD 121/122. As a creation *ex nihilo* in a region without an urban tradition a strong military involvement in the construction of the town may be expected, but so far the finds do not corroborate this idea. On the other hand it has been argued that the material culture has a clear military bias and that the town probably played a role in the provisioning of the military infrastructure of the region. Considering that at that time the nearest legionary fortress with a full garrison was Xanten – at a distance of 150 km as the crow flies – this is not implausible. Tile stamps indicate that military involvement was larger at a later stage than initially. This might be connected with the building of a town wall, but it may just as well be taken as support for the hypothesis that *Forum Hadriani* was a distribution point for the provisioning of the coastal defence which developed from the middle of the 2nd century onwards. Its harbour along the Corbulo canal must have been crucial in that respect.
Site types not represented in the Dutch site list

Of the 23 site types listed in the draft SOUV (cf. Appendix 2) five are not represented in the selection recommended for the Dutch section.

**Fortlets** are military installations which are smaller than the ‘delta type’ forts but larger than watchtowers. This type does not occur in the Netherlands so far, but it represented by the Neuss-Reckberg and Duisburg-Werthausen in the German section.

With the exception of the so-called marching camp at Ermelo **practice camps** have so far not been attested in the Netherlands. Ermelo is not included in the selection, because it is not on the line of the 2nd-century frontier. The type is well represented in the German section.

The fort of Deutz-**Divitia** on the right bank of the Rhine across Köln is the only known example of a **bridgehead** on the Lower German frontier.

Obviously, the provincial capital of Köln-**Colonia Claudia Ara Agrippinensium** – the seat of the governor of the province of Lower Germany – is the only site where a representative of the type **governor’s palace** occurs.

Finally, the temple of Vagdavercustis on the Kalkarberg near the fort of Kalkar-**Burginatium** is the only site which qualifies for a **military sanctuary**. Nearly all the attested dedications to this goddess were made by soldiers.

Altogether, the site types not occurring in the Dutch list are adequately represented in the German selection, and thus in the nomination for the LGL as a whole.
Impact of factors of physical disturbance

3.1 River erosion

As stated in paragraph 2.1 the delta setting of the Dutch part of the Lgl is a crucial element of the Outstanding Universal Value of this frontier section. In this delta, the Rhine and its branches and tributaries have continuously changed their courses. Inevitably, this has caused damage to some military installations and associated structures, both in and after the Roman period. However, there are also cases where flooding and river migration have led to an extraordinary preservation of frontier assemblages.

Utrecht and Zuid-Holland

A positive effect of river migration can be seen at sites as Bunnik-Vechten, Utrecht-Hoge Woerd and Woerden. Here, the Rhine has retreated from the forts and their extra-mural settlements, preserving the rubbish layers which resulted from the dumping of waste from the river bank, and necessitating the construction of piers and quays to maintain access to the migrating river channel. At all mentioned sites, sunken ships have been unearthed in the silted-up river beds. The high ground water table of the delta has led to a remarkable preservation of wood and other organic remains, and also of metal objects.

Negative effects vary in scale. At Vechten and Alphen aan den Rijn (not recommended) flooding has caused some damage to the first building phases. This was countered by an artificial raising of the fort areas before rebuilding. The sites demonstrate that river erosion was already occurring in the Roman period, and that the construction of the forts on the edge of the river was a conscious decision inspired by strategic considerations. Occasionally, rebuilt forts reveal a shift of location or change of orientation, as at Vechten and Woerden. Radical displacement of forts has not been attested, not even when less vulnerable locations were available at some distance of the river bank.

At Katwijk-Valkenburg erosion occurred both during and after the Roman period. The first two building phases are separated by sediment deposited during flooding. More severe damage was done some time after the Roman occupation, when about half of the left front area (praetentura) was washed out. The eroded area is estimated at 12% of the surface of the fort.

Gelderland

In Gelderland the Rhine has had a bigger impact on the frontier installations. Arnhem-Meinerswijk is the only fort along the Rhine in Gelderland which is known to have escaped erosion, that is to say partly. Other fortifications are supposed to have been washed out entirely, with their remains re-deposited at great depth in the river channel. So far, dredge finds at five locations have been considered as indications for eroded military installations: Bijlandse waard, Loowardaard (not recommended), Utrechtse Heuvelrug-Amerongen/’t Spijk (not further included in this report), Maurik and Buren-Rijswijk (not recommended).

19 A further location may be Buren-Ingen/Geldersweerd, at less than a kilometre from Amerongen-’t Spijk (the latter is located in the province of Utrecht). Today the sites are separated by the Rhine, but there is reason to assume that they were both situated on the left bank in the Roman period, and
At Kesteren an eroded fortification is assumed on account of the presence of a military cemetery (not recommended).

At Bijlandse waard, Loowaard and Maurik there is evidence of substantial remains of stone walls at great depth. Added to the richness and military character of the overall finds assemblages their interpretation as the remains of military installations is justified. Rijswijk is a less convincing case, with no firm record of building materials and a pottery assemblage with a conspicuous rural element.

that the finds at both sites have a common origin. The sites are not further included in this report as they were not listed by Vestigia in 2012 and – more importantly – have no added value compared to the other sites. Helmet fragments at Amerongen-'t Spijk and its supposed position on the right bank of the Rhine have given rise to the idea that it was the site of a watchtower or other small installation. Ingen-Geldersweerd has never been considered as a possible military site, but the finds assemblage resembles that of the remaining locations. Finds records for Amerongen include some debris and a military tile stamp, and also a stretch measuring c. 30 x 8 m of timber uprights, found c. 6 m below the surface. The assemblage has a broad date range, from the Iron Age to the Middle Ages, with a few earlier objects. On present evidence it cannot be included in the nomination.

Fig. 5 Supposed location of the “Auxiliarkastell” at Maurik as indicated in the 1974 Limesführer. The hatched area is the find spot of most of the dredge finds.
In all four cases the occurrence of the finds in coarse sandy deposits several meters below the surface indicates that they were no longer in their original settlement context. Occasionally, there is explicit mention of fragments of pottery and tiles being rounded off, a typical effect of waterborne transport over some distance. All in all, it may well be that the find spots of the dredge finds are not the locations of the presumed forts. Yet, they have always been considered as such, as the maps of Bijlandse waard and Maurik in the 1974 ‘Limesführer’ clearly demonstrate (fig. 5). 20 Added to the present location of the find spots in dredge pools this supposition has led to the general belief that there are no intact remains left.

The case of Kesteren may be taken as an encouragement to take a less pessimistic view. Here, a cemetery has been excavated in 1974, immediately south of

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20 Rijswijk is not included in the Limesführer, because the dredge finds were only made after its publication.
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The Rijnbandijk (fig. 6). This dike is the southern boundary of a channel belt of the Rhine which was active during the Roman period. The so-called Prinsenhof cemetery has produced well over 100 cremation graves. As far as the cremation remains have been analysed, most turned out to belong to male adults. The grave assemblages are of a military character, as indicated by the occurrence of graffiti (owner’s marks typical of a military setting) and the absence of handmade pottery (typical of rural settlements). Before the area was used for human burials it served to dispose of over 25 horses, of large sizes characteristic for military contexts. Altogether it is very likely that the cemetery area is part of a military settlement, with a fort located to the north of the Rijnbandijk, probably eroded by migrating Rhine channels.

The Kesteren fort may have been located in an area surrounded by the Adriaan van Ostadestraat, Jan Tooropstraat and Meindert Hobbemastraat, or somewhat further to the northwest. It cannot be ruled out that some Roman features still occur immediately north of the Rijnbandijk. If a fort located in this area has been

Fig. 7 River activity near Bijlandse waard, with an indication of the find spot of the Roman remains (red) and the area where intact or eroded remains may occur (green).
The Lower German Limes in the Netherlands

washed out by the Rhine its remains are likely to have been re-deposited somewhere to the west or northwest, at depths not touched by agricultural activities.

Assuming that the Kesteren fort has been entirely eroded, the present location of its remnants is likely to resemble those disturbed by the dredge works elsewhere. The very relevant point for this discussion is that until 1974 a part of the larger settlement assemblage was still preserved intact – the Prinsenhof cemetery. This allows us first of all to make a reasonably precise estimate of the original position of the associated military installation. Secondly, it provides us with valuable information on the history of the site, including aspects as chronology and garrison.\textsuperscript{21} The cemetery thus serves as a proxy for the military settlement as a whole.

For the remaining sites it is therefore very important to acquire insight into the behaviour of the Rhine after the Roman period. This may provide us with some clues as to where remains of the military settlements (in a broader sense) may still be hidden.

The area around Bijlandse waard has a very complicated genesis, as it combines a shifting bifurcation (of Rhine and Waal) with large meanders (fig. 7). The area of the present dredge pool has been entirely reworked by channels migrating westward. The Roman wall remains and other finds may originate from an area further to the east or southeast. If anything is left of the (larger) military settlement it is to be sought on the right bank of the medieval river channel situated there. In case all has been washed out, there may be further Roman material in the preserved section of this channel.

Meinerswijk may be a further reason for some optimism concerning the fates of the forts of Bijlandse waard and Maurik. Although both the western and the eastern parts of the stone fort have been eroded by successive channels of the Rhine, about one third of the fort site is still intact. The discovery of the fort was only due to the inspection of molehills during a targeted field survey in the late 1970s of settlement soils charted as an accidental by-product of large-scale regional soil surveys in the 1940s and 1950s. Without these systematic efforts the Meinerswijk fort may still have been unknown.

\textsuperscript{21} In the case of Kesteren we only know some headlines, as the cemetery has not yet been properly published.
The channel which eroded the eastern part of the fort may already have existed during the Middle Roman Period and have caused some flooding at that time (fig. 8). Severe erosion only occurred between the 3rd and 6th to 7th centuries. The channel which washed out the western part of the site only developed in the Late Middle Ages. If the eroded parts were re-deposited immediately downstream of the fort the boundary of the scheduled monument may include them, but it seems more likely that they were transported further to the south and west.\(^\text{22}\)

The depth at which the dredge finds from Maurik were made indicates that their origin is to be sought somewhat upstream. It is not impossible that there are still intact remains of the (larger) military settlement in the area northeast of the location of the finds, the Mauriksche en Ecksche Waarden. The river channels are not very securely dated here. However, the area may have suffered too much from clay extraction to be very optimistic. On the other hand, the remnants of the fort at Meinerswijk did survive the exploitation of an adjacent brickyard.

**Conclusions**

In the provinces of Utrecht and Zuid-Holland river erosion is no major issue. River migration has caused some damage to the fort at Valkenburg, and to a lesser degree at Vechten. At most sites, the effect of the mobility of the Rhine was markedly positive, as it generated veritable treasure-chests of organic remains, including quays, revetments, ships, a hoard of perishable artefacts, and seeds, pollen and animal bone.

In Gelderland all forts appear to have considerably suffered from erosion. Part of this may already have occurred during the Roman period, but most damage has been done only later. On closer consideration a distinction can be made between sites with attested intact remains of a military settlement – Meinerswijk and probably Kesteren – and presumed military sites which are only known from dredge finds – Bijlandse waard, Loowaard, Maurik and Rijswijk. For the former category it is not unlikely that eroded parts are still buried in fossil channels downstream. For the latter category there is reason to believe that non-eroded parts may still be present somewhere upstream.

In view of their added value to the nomination of the LGL Bijlandse waard and Maurik deserve closer inspection, consisting of a thorough analysis of available data and – depending on the outcome of that analysis – targeted field work. Loowaard, Ingen-Geldersweerd/Amerongen-’t Spijk and Rijswijk qualify for the same approach, but their nomination is not recommended. So far unmentioned is the case of Overbetuwe-Randwijk, where a fort has been suggested on account of spatial considerations, without any archaeological evidence. A proper study of this presumed site might finally allow to confirm or reject this hypothesis.

In the draft SOUV the nomination of washed out sites is brought up as a point of debate under the heading of integrity, with Bijlandse waard as an example. Before entering this discussion, it must be noted that UNESCO’s requirements of authenticity and integrity concern the nominated property as a whole – in our case the whole of the Lower German frontier. Yet, the contribution of each element of the nomination should be arguable.

The discussion concerning washed out sites revolves around the dredge finds, as a re-deposited representation of the original fort. At both the recommended sites of Bijlandse waard and Maurik parts of these re-deposited remains are

\(^{22}\) Cf. Hulst 2000-2001, 429: “The many deep borings in the channel fill [of the eastern channel, MP] uncovered no rubble remains, not even at the base.”
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likely to be still present. In the case of Bijlandse waard the location of the stone mass hindering the dredge works may recently have been confirmed by sonar scanning. At Maurik the major find spot of the dredge finds is located on the edge of the dredge pool, and further objects may be present on its bank, at several meters below the surface. The authenticity of the buried remains at Bijlandse waard and Maurik is not a matter of discussion – the archive of the history of the associated military installations that they constitute is entirely credible and truthful in the sense of UNESCO’s guidelines.\textsuperscript{23} In our view, a strong case can be made for the integrity of these remains as well – assuming that there are some left. Integrity is primarily about the wholeness and intactness of the elements conveying the value of the elements representing the property.\textsuperscript{24} The re-deposited remains at Bijlandse waard and Maurik are not whole and intact representations of the forts from which they originate, but neither is any other individual element of the FRE WHS. The important thing is that the finds assemblages as they are still have the potential of conveying the complete history of the original forts, as much as the remains of any other site included in the nomination. Their secondary context is a vivid illustration of the risks to which a frontier in a river delta are exposed.

3.2 Overbuilding

The list of recommended sites contains six modern towns: Nijmegen, Utrecht, Woerden, Bodegraven, Voorburg and Valkenburg. The overall picture of the relevant maps in Appendix 1 may appear alarming, suggesting high building densities. However, on closer consideration, appearances are deceptive in many cases.

For Nijmegen-Hunerberg and Nijmegen-Kops Plateau the effects of overbuilding are difficult to assess. The large scale excavations in the 1950s to 1990s north of the Berg en Dalseweg were confined to open sites, which had been used for agriculture or as playing fields for adjacent schools. South of this road research was restricted to the streets, in the context of the replacement of the sewer system. The only large-scale excavations in a built-up area – the renovation of a working-class district east of the legionary fortress around 2000 – has not been published, but extensive damage has been reported. The results of smaller excavations in built-up areas vary. In some cases the Roman features were considerably affected, in others they were still present underneath houses. On the whole building densities are not very high, but most houses have storage cellars.

For Nijmegen-Valkhof area the conditions vary. Since the Valkhof hill itself and the Hunerpark southeast of it are largely unexcavated we are hardly informed about the integrity of the Roman remains in these areas. The buildings of the Medieval palaces on the Valkhof did not cover the entire hill, so it may be expected that at least some features of Oppidum Batavorum and the Late Roman fort are still in situ. The Kelfkensbos scheduled monument may not be in a very good condition. The southwest quarter has been excavated in the 1990s and the eastern half is situated in an area occupied by the defensive works surrounding the inner city until they were demolished around 1880. Furthermore, there are several records of digging in the Hunerpark in the 1920s and 1930s.

The inner city was built over in the Middle Ages and large parts were destroyed by bombing in World War II. Nevertheless, unpublished excavations during the

\textsuperscript{23} Operational guidelines (2015), par. 79-86.
\textsuperscript{24} Cf. Operational guidelines (2015), par. 88-89.
1980s in the northwest sector of the area recommended for protection revealed that the Medieval overbuilding was not very dense in some areas. Especially here Roman features may be expected, but their extent and quality is unclear.

In the southwest sector recent excavations have demonstrated that the Roman levels reach as deep as 2 m below the present surface. But since most of the surrounding buildings have cellars only wells, latrines and (Roman) cellars may have survived underneath. South of the Burchstraat and Kelfkensbos building densities are high, and a comparison of depths of cellars and foundations with expected Roman levels is recommended before the area is included in the nomination.

For the Roman town of Nijmegen-West the only accessible information is provided by a recent excavation in the southwest corner, necessitated by the renovation of a working-class district. The demolished houses were provided with cellars, damaging the Roman levels which reach to only 0.6 m below the surface today. South of the Weurtseweg the areas occupied by building blocks may be similarly affected. North of the this road the Roman surface was situated 2.5 m deeper, caused by the formation of the river terraces of Rhine and Meuse. After World War II this area was raised with debris from the bombing of the town centre, preserving the Roman levels from later industrial activity along the river Waal.

One of the many sections from Van Giffen’s excavations in the Utrecht-Domplein area suffices to demonstrate how well the Roman levels are generally preserved here (fig. 9). In the left part the foundation of the southern defensive wall of the stone fort can be seen, based on wooden piles (fig. 9, left of m). To the right (i.e. north) of this a nearly 1 m thick layer of Roman date is still present, covered by at least 1.5 m of Roman debris and later levels. Although many buildings are provided with cellars these will usually not reach deep into the Roman layers. Even the foundations of churches, have caused only limited damaged, as demonstrated by excavations on the Domplein, where even post-Roman levels were well preserved between the pillar foundations of the cathedral.

For Woerden an analysis has been made of the preservation of the Roman levels. The actual buildings rarely reach deeper than 0.5-1.0 m beneath the surface, which varies from 2.5 m +NAP (sea level) close to the centre of the Roman fort to 1.2 m +NAP at the eastern boundary of the area recommended for nomination. The top of the Roman level varies between 0.6-0.8 m +NAP. Obviously, many Roman features will have been preserved, which is confirmed by past excavations, which have revealed amongst others the lower part of a stone wall, presumably part of the headquarters building.

There have been few excavations at Bodegraven-Centrum which provide insight into the correspondence of the Roman levels to the modern buildings. The timber remains west of the Oud-Bodegraafseweg have been found close to the surface, at a depth of only 0.8 m. However, on account of the high ground water table – demonstrated by the presence of well-preserved timber – the houses have no cellars, so as a general rule the effect of overbuilding is likely to be limited.

On the site of the Roman town of Voorburg-Arentsburg overbuilding is limited to the northwest sector. The building density is not very high, so even when the houses have cellars these will have caused little damage. Recent excavations have produced a plethora of Roman features beneath former buildings of the Effatha institute in the south. It is unlikely that the situation will be different in the northwest.

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For Valkenburg-Centrum at least some damage to the later Roman levels must be reckoned in. In 1962 a part of the excavated area was found to be disturbed by the cellar of a demolished house and by several wells from the Early Medieval and later periods. The top soil was a mixture of Roman and Medieval debris, reaching 1.2-1.6 m deep. Yet, nearly 2 m of Roman layers remained, and the deeper levels produced many remnants of the interior of the timber forts, including wattle-and-daub walls standing to a height of nearly 70 cm, with an excellent preservation of construction details. Sections and dispersed comments confirm that similar conditions have been observed in the 1940s and 1950s and in 1980. Altogether, the effects of overbuilding are probably very limited.

Conclusion
On the whole, the impact of overbuilding is likely to be limited. Only at Nijmegen the Roman levels have been seriously affected in some areas, mainly below building blocks. Where building densities are low, the effects will be restricted. The southern part of the Valkhof area requires an additional analysis to establish the impact.

3.3 Excavation

There are five site clusters where excavations exceed 10% of the areas involved: Nijmegen-Kops Plateau, Nijmegen-Hunerberg, Nijmegen-Valkhof area, Voorburg-Arentsburg and Valkenburg-Centrum.

With approximately 65% of its surface excavated, the integrity of the peculiar fort of Nijmegen-Kops Plateau is definitely compromised. However, the site derives its value from the overall assemblage, which includes extra-mural military structures, cemeteries and a rubbish deposit. Substantial parts of these elements still remain intact.

The site of Nijmegen-Hunerberg contains both the 42 ha large early military base and the 17 ha large standard legionary fortress of later date. Of the early base c. 24% has been excavated, of the later fortress c. 35%. Recent research has shown that at least some features from the lower levels of the excavations carried out in the 1950s and 1960s have remained intact. This relates to three quarters of the excavated area inside the later fortress. For the large early base the degree of excavation is acceptable, and its nomination would automatically imply protection of the later legionary fortress, which is entirely situated within the early base.

The Nijmegen-Valkhof area contains features from two distinct archaeological assemblages: the early civil settlement Oppidum Batavorum and the Late Roman fort. Of the area of the civil settlement indicated on the site map approximately 20% has been excavated. For the Late Roman fort the excavated area varies between 15% and 19%, for the areas inside the inner and outer set of defensive...
ditches. All in all, the scale of excavation does not present itself as a serious obstacle.

At Voorburg-Arentsburg c. 37% of the area inside the town wall as indicated in the site map has been excavated. Roughly 60% of this was carried out by Reuvens in 1827-1834 and 40% by Holwerda in 1908-1915. Re-excavation of a small area previously searched by Reuvens has proved that parts of stone walls and timber wells were still present; several timber elements were still preserved below the groundwater table, and their condition even permitted a dendrochronological date. Holwerda is known for leaving many features intact at the deepest levels of his excavations, amongst others at Nijmegen and Vechten. There is no reason to think that he applied a different practice at Voorburg. Altogether, many intact remains may still be present in the excavated areas.

At Valkenburg-Centrum approximately 60% of the interior of the fort has been excavated, mainly by Van Giffen in the 1940s. For contemporary excavations by Van Giffen at Vechten and Utrecht it has been demonstrated that at least part of the features from the lowest level were still intact, so the same may well be true for Valkenburg. Excavations and observations at undisturbed locations inside the Valkenburg fort in 1980 and later years have shown that timber remains from the earlier building phases were still in good condition. It may therefore be expected that the remaining 40% of the fort interior is still in the condition which has earned Valkenburg its international reputation. Furthermore, the fort is part of a much larger assemblage, with many intact remains.

Conclusions

There are five clusters of sites where at least 10% of the areas of major elements have been excavated. The forts of Nijmegen-Kops Plateau and Valkenburg-Centrum have the highest percentages, estimated at 65% and 60%. In both cases, however, the forts are part of larger assemblages with additional assets, and for these larger areas the scale of excavation is limited. The Roman town at Voorburg-Arentsburg follows with c. 37% of its walled area excavated, but it has been demonstrated that some remains have been left intact, and that these may be of great value for the understanding of the history and lay-out of the site. For the early large base and the later legionary fortress of Nijmegen-Hunerberg the scale of excavation has been estimated at 26% and 39% respectively. The early base is unique for the Lower German frontier and the fact that three quarters are still unexcavated fully justify its nomination. Since the later fortress is situated within the early base protecting the latter will automatically involve that of the former. For the Nijmegen-Valkhof area the scale of excavation is estimated at 15-20% – depending on the archaeological assemblage considered – and is not likely to pose much of a problem.

3.4 Other factors

The cemetery of the Roman town in Nijmegen-West and to a lesser degree the burial areas surrounding the castra and canabae of Nijmegen-Hunerberg have been seriously damaged in the early 20th century, when they were systematically robbed to supplement the collection of the retired industrialist Kam. For the former cemetery excavations carried out since the 1980s have revealed that many grave assemblages have survived intact, on the Hunerberg cemeteries we are hardly informed by a lack of recent research.

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26 That is: of the part of the fort interior which has not been eroded by the Rhine (estimated at 12%).
The 18th-century Sterreschans fort has an additional impact on the assemblage of Nijmegen-Hunerberg. The area of the fort can be estimated at 7% of the early base and 15% of the later legionary fortress. However, excavations have demonstrated that many features of both Roman military installations are preserved in the interior of the Sterreschans. If the actual damage by the Sterreschans is estimated at a quarter of its surface, the overall degradation of the early base and legionary fortress would increase to approximately 26% and 39%, respectively, which does not affect the assessment expressed in paragraph 3.3.

In the 1860s a fort was built in the middle of the Roman settlement at Vechten. The innumerable finds included many complete pottery vessels indicating considerable damage to a burial area. It is not unlikely that parts of early military installations and of the associated extra-mural settlement were affected as well. The modern Fort Vechten occupies c. 20% of the estimated surface of the Roman settlement, but recent excavations inside the complex have demonstrated that many remains have been preserved between and underneath the buildings and ramparts.

In paragraph 2.4 mention has been made of the overbuilding of part of the fort at Roomburg by a monastery. The former location of the monastery, which was founded in 1464 and pulled down in 1573, cannot be determined with great precision, but it is clear that the main buildings somehow interfered with the Roman fort and with the extra-mural area to its south (fig. 10). Since they were not touched by excavation the damaged caused to the Roman remains cannot be estimated.27

27 A sewer trench which was dug E-W through the fort and monastery was not deep enough to produce useful information.
The left bank of the Rhine between Utrecht and Leiden is in many places affected by clay extraction. The national digital elevation model AHN (Actueel Hoogtebestand Nederland) provides insight into its effects (fig. 11). A supplementary comparison of AHN data with the presumed course of the Limes road may assist in refining the selection of road segments west of Utrecht which qualify for nomination.

Fig. 11 Projection of the presumed courses of the Roman Rhine (blue line) and the Limes road (brown line) on the digital elevation model AHN2, east of Bodegraven. Clearly levelled parcels are indicated with arrows.
Boundaries

4.1 UNESCO on boundaries

Before discussing the boundaries delineated in the maps in this report it may be instructive to summarise the views and guidelines of UNESCO on this subject. The main directive is that boundaries should incorporate all the attributes that convey the Outstanding Universal Value and ensure the integrity and/or authenticity of a property. It is explicitly added that boundaries should include those areas which offer potential to contribute to and enhance understanding of the property's value in the future.

In addition, the delineation of buffer zones is demanded wherever necessary to provide additional protection of the nominated property. Buffer zones are intended to include the immediate setting of a property, important views and other areas or attributes that support the property and its protection. Their application is not well-defined, therefore.

4.2 Boundaries in this report

The site maps in this report have been generated using ArcMap 10 software. The Topografische Basiskaart was used as a base layer. The maps generally contain four types of boundaries.

The boundaries of excavated areas have been derived from various sources. Where available, digital datasets were used. For Nijmegen, Vechten, Woerden, Roomburg, Voorburg and Valkenburg these included not only recent excavations, but also (most of) the 'pre-Malta' ones, for Utrecht the latter were not available. When no digital data were at hand, excavated areas were copied from published maps; obviously, the precision of the vectorised boundaries varies with the quality of the available maps. Excavations from the last decade have not always been included, because the data are usually split up over many reports and datasets; exceptions were made particularly when large areas were concerned.

As a rule, the boundaries of the archaeological assemblages have been copied or adapted from published maps. Once more, the accuracy of the boundaries depends on the quality of the maps used, and on the reliability of the underlying evidence. For the section from Vechten to the coast the maps of Van Dinter and Luksen-IJtsma deserve special mention. The former has reconstructed the Roman landscape of the frontier zone, from which the course of the Roman Rhine has been copied. The latter has made an exhaustive inventory of observations of the Limes road in order to reconstruct its line.

The boundaries of the currently protected areas have been copied from a digital dataset (referred to as AMK) provided by the RCE. In the underlying data three types of protected areas have been distinguished besides scheduled

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28 Compare for further details Operational guidelines (2015), par. 99-102 (Boundaries for effective protection) and 103-107 (Buffer zones).
29 Esri Nederland & Community Maps Contributors.
30 Van Dinter 2013.
31 Luksen-IJtsma 2010a.
monuments. In our maps two of these categories have been merged, while the third has been omitted.32

Boundaries of areas recommended for protection occur when the currently protected areas have been considered as inadequate. We have distinguished three types of areas: highly recommended areas, recommended areas and search areas. Highly recommended areas include features which are required to express the value of a site – equivalent to its contribution to the SOUV of the LGL. Recommended areas include either extensions of features already covered by highly recommended areas or areas where the character, quality or extension of the archaeological features is less certain. Search areas are areas where relevant features may be expected, but have not been attested; for these areas additional field work is recommended. The accuracy of the boundaries of the areas recommended for protection vary along the accuracy of the underlying evidence. In all cases their precise courses have to be established in consultation with the responsible authorities.

The distinction between ‘highly recommended’ and ‘recommended’ areas should not be confused with that between ‘property’ and ‘buffer zone’ employed in UNESCO guidelines (cf. par. 4.1). Areas which have been qualified as ‘recommended’ in this report will be core areas rather than buffer zones in most cases. Definition and demarcation of buffer zones requires additional discussion and decision. If recommended areas are incorporated in ‘properties’ or core areas there will be little need for horizontal buffer zones; the preservation of organic remains may however require the definition of vertical buffer zones.

32 The merged categories are “terreinen van zeer hoge archeologische waarde” and “terreinen van hoge archeologische waarde” (areas of very high/high archaeological value). Areas qualified as “terreinen van archeologische waarde” (areas of archaeological value) have been disregarded; not rarely, these relate to vast areas.
Recommended additional research

5.1 General considerations

In paragraph 1.5 it has been underlined that the selection of sites for the Dutch part of the LGL nomination is not the product of a long-term and well-considered strategy. To a large degree it reflects an early ‘wave’ of scheduled monuments following the passage of the first Monumentenwet (Monuments Act) in 1961 and the state of knowledge of the 1970s. This is not to say that little or nothing has been added since, but the curve has definitely levelled off.

The subjection of archaeological field work to the market mechanism in the late 1990s has led to a severe scattering of archaeological information and hampered the generation of new archaeological knowledge. The creation of the scientific research programme Oogst van Malta (Malta Harvest) by the Ministry of Education, Culture and Science has been a welcome effort to counter the latter effect, but obviously the former effect has not been undone. The newly created e-depot Dutch Archaeology (EDNA) for the – legally enforced – storage of excavation data and reports is another useful initiative, but the access to the available information leaves room for improvement.

At the same time the primary tasks and responsibilities concerning archaeology have been handed down by the national government to the municipal authorities, and some to the provincial ones. Without contesting the positive aspects of this shift we observe that it poses new challenges to the protection and study of archaeological assemblages which transcend municipal and provincial boundaries. The creation of the Nederlandse Limes Samenwerking by the Cultural Heritage Agency of the Netherlands and the provinces of Gelderland, Utrecht and Zuid-Holland is a reflection of that situation and an administrative solution to join forces.

The selection of sites for the nomination of the LGL is a matter of some urgency and requires a practical approach of the abovementioned conditions. Therefore, we have formulated a number of recommendations for additional research which we think necessary to meet UNESCO’s requirements (par. 5.2). However, there is additional need of a concerted research agenda which aims at a better knowledge of the Roman frontier in the Netherlands. The recently presented Nationale Onderzoeksagenda 2.0 is primarily a framework for field work on individual sites, and is – however useful – not the research agenda which we envisage here. The knowledge gaps and other shortcomings signalled in this report may serve as a starting point for outlining what needs to be done. The wetland setting of the Dutch frontier section requires a tight cooperation with specialists in the palaeogeography and ecology of the delta.

A well-considered strategy for the Dutch frontier may well be long-term – to resume the start of this paragraph. Essentially, such a strategy should be two-pronged. The first strategic route deals with known locations and concerns the proper disclosure of evidence collected in the past. Another scientific research programma, Odyssee, has generated a large amount of invaluable information on individual sites, but much is still not accessed, since most excavations carried out prior to the 1990s have not been published. The near complete lack of insight into the finds from presumed military sites along the Rhine in Gelderland may serve as an example of the effects of the knowledge gap accumulated in the 20th
The Lower German Limes in the Netherlands

The second strategic route deals with yet unknown locations and entails a thorough analysis of sources including historical maps, digital elevation models and aerial photographs. It is hard to conceive that there should have been only one temporary camp in the Netherlands, at Ermelo, to mention only a single example for this aspect as well.

Developing such a strategy and a research agenda built on it should be a joint operation of the national, provincial and municipal authorities involved in the protection of the frontier and of the universities studying this military phenomenon. The UNESCO nomination provides both an encouragement and an excellent context to put this idea into action. The joint Dutch-German nomination of the Lower German frontier is an expression of the awareness that this frontier section does not stop at the modern border. From this point of view it is obvious that there is much to be gained from the development of a common Dutch-German research agenda.

5.2 Additional research required for the nomination

In the gazetteer of recommended sites provided by Appendix 1 the comments on each site has an entry ‘recommended field work’. For ten sites and site clusters field work has actually been advised.

Nomination is about protection, and integrity of the protected remains is an important criterion. From this point of view it is evident that additional research must be non-destructive where possible, and limited where invasive methods are required. The obvious non-destructive methods are coring and geophysical surveys (fig. 12). These may reveal the presence, extension and lay-out of archaeological remains. Neither method can establish the age or preservation quality of the attested features, however. Furthermore, the success of geophysical survey depends on local conditions, including soil composition, ground water table and sources of interference such as electric cables. There may be various reasons, therefore, why non-destructive methods may not be able to answer all the relevant questions. In such cases trenches should be dug, as limited as needed to provide the required information. Trenching may also be necessary to confirm the character of charted features, or to establish their date or preservation quality.

In the case of the Berg en Dal/Nijmegen aqueduct field measurements are required to allow a proper delineation of the as yet largely unprotected course of the water channel along the slope of the ice-pushed ridge. Once this trajectory has been defined its artificial character should be established in trial trenches, which will hopefully provide the tangible water channel which would definitely confirm its interpretation.

For Nijmegen-Kops Plateau a coring survey is recommended to establish the extension of the rubbish deposit on the northern slope of the plateau, which is an important distinguishing feature of the site.

In the case of the eroded forts of Bijlandse waard and Maurik additional research is advised to ascertain whether there remain any intact elements of the military settlements upstream from the location of the dredge finds. First of all the available archaeological and geological data should be analysed, in order to constrain the search area. If this analysis confirms the potential a coring survey should be carried out, eventually supplemented by geophysical survey. Limited trenching may be needed to establish the date and character of any detected features.

At Vechten a coring survey is likely to establish whether the military settlement extends to the north of the actually protected areas. In case of a positive result...
geophysical research may provide insight into the character of the buried features.

The current recommendation concerning the **Limes road between Harmelen and Zoeterwoude** is not firmly based. A study of digital elevation data will provide a better view of areas where an over-average preservation may be expected. For these areas a coring survey is advised, supplemented with geophysical survey if limited tests indicate positive results. In the end limited trial trenching may be required to confirm the interpretation of the non-destructive methods.

At **Roomburg** the disturbance of the fort interior by medieval buildings and the further preservation conditions require additional research. A geophysical survey is expected to give an idea of the extension of the medieval remains and of the presence of (primarily stone) inner buildings of the Roman fort. Testing the outcomes with limited trenching is strongly recommended on account of the complex situation. This will also provide information on the preservation conditions.

Additionally, the area (part of Meerburg-Rivierenwijk) to the north of the fort, across the Corbulo canal, should be surveyed, in order to gain insight into the character and dimensions of that part of the assemblage. Coring is the obvious primary instrument, supplemented with geophysical survey if it is deemed sensible on account of the coring results and the local conditions.

The **Corbulo canal** itself also needs additional work. Some coring surveys may be needed to specify the course of the canal within the proposed boundary, in order to reduce the width of the protected zone. Further it is advised to perform a coring survey between Voorschoten and the Roomburg fort, to establish the continuation of the canal and its transition in a natural (crevasse) river channel. Trenching may be required to distinguish between natural and artificial water courses.

At **Voorburg-Arentsburg** there appear to be opportunities for geophysical survey in the park area and on some lawns in the northeast. This may reveal both attested and presumed structures: on the one hand the presence of stone buildings previously excavated in the early 19th century, and on the other hand the northern and eastern courses of the town wall and ditch, with possible adjacent features.

For **Valkenburg-De Woerd** a limited coring survey is advised to locate the southern boundary of the settlement, possibly supplemented by trial trenching to attest the preservation conditions. On the former airfield northwest of the site a V-shaped ditch and timber structure probably indicate a military installation. A geophysical survey may provide insight into its lay-out. If unsuccessful it may be considered following the course of the ditch with a mini-digger.
List of figures

2 Left: after Johnson 1987, 46, fig. 29. Right: Glasbergen 1972, 135, fig. 46.
3 Map basis adapted from Bazelmans, Weerts & Van der Meulen 2011 (AD 100).
5 Bogaers & Rüger 1974, 69, fig. 19.
6 Boundary of cemetery taken from map ROB archive 1990-09357 (Gelders Archeologisch Centrum).
7 Adapted from Buesink et al. 2011, 39, fig. 3.5.
8 Adapted from Hulst 2001-2002, 428, fig. 33.
9 Ozinga et al. 1989, fig. 28.
10 Map by Coenraadts: Gemeentearchief Leiden PV 1541.2.
11 Roman Rhine after Van Dinter 2013; Limes road after Luksen 2010a.

Illustrations not listed above have been made by the authors.
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Appendix 1 Gazetteer of recommended sites

In this appendix the recommended sites are listed from east/south to west/north, roughly following the direction of the river Rhine, and independent from the regional and thematic grouping used elsewhere in this report.

For each site at least one map has been added, providing – where applicable – the extent of the archaeological assemblage, the boundaries of the present protection and the recommended boundaries. For some sites the situation is so complicated that the information has been divided over two maps.

Each map is accompanied by a summary of the relevant information in a standardised format: a short characterisation of the site, its major assets viewed from the souv, a comments on boundaries (of the archaeological assemblage, the existing protection, and/or the recommended protection) and recommended field work. Finally, the source(s) used to configure the maps are recorded.
# The Lower German Limes in the Netherlands

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<th>Kilns</th>
<th>Large Building</th>
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![Map of the Lower German Limes in the Netherlands](image)
Berg en Dal-De Holdeurn: military tile works and pottery

Cf. 2014 site catalogue: 4.3.16

Short characterisation The site covers the remains of kilns for the production of bricks, tiles and pottery, with associated structures. The industrial complex was probably founded to produce building material and pottery for the Tenth Legion in the legionary fortress at Nijmegen (c. AD 80-105), and subsequently for smaller detachments garrisoned at Nijmegen. In the 2nd and early 3rd centuries the Lower German army in general was provided with bricks and tiles.

Major assets Although production of building material and pottery in a military context has been attested elsewhere along the LGL, the assemblage of De Holdeurn is exceptional in its completeness. The presence of kilns, associated buildings and working areas, clay extraction pits and production debris has been proved by excavations.

Most of the uncovered kilns have been dismantled during the 1938-1942 excavations, but parts of two large kilns and buildings were left intact; the presence of further kilns and buildings is more than likely on account of geophysical research and common sense.\(^\text{33}\) The industrial site of De Holdeurn is an excellent representative of a rare but crucial element in the military infrastructure: the logistical backbone.

Boundaries Observations made during the supervision of building activities indicate that the archaeological assemblage may extend beyond the northwestern boundary of the scheduled monument, to Villa Dalhof, although it cannot be excluded that only superficial deposits of bricks and tiles are concerned.\(^\text{34}\) There are various discrepancies in the boundaries of AMK 788 between RCE and Vestigia data, which require clarification. Here, the RCE boundaries have been used.

Recommended field work Although the site may extend beyond the northwestern boundary of the scheduled monument no additional field work is recommended. It will be very difficult if not impossible to acquire the necessary degree of certainty. Coring is hindered by the occurrence of massive deposits of bricks and tiles in the topsoil, and the presence of such deposits is not necessarily indicative of the presence of relevant (other) archaeological remains underneath. The usefulness of geophysics is limited, because of the composition of the subsoil, of the presence of brick deposits and of the uncommon character of the industrial structures, which has a negative effect on the interpretation of anomalies.

Map basis Van Diepen & Polak 2009, maps 1-5.

\(^{33}\) At least when the Nijmegen legionary fortress was given up after the middle of the 2nd century the personnel of the tile works must have been housed at De Holdeurn.

\(^{34}\) Weiß-König 2008.
Berg en Dal/Nijmegen: aqueduct

Cf. 2014 site catalogue: 4.3.15

Short characterisation Between the tile works at Berg en Dal-De Holdeurn and the Flavian-Trajanic legionary fortress at Nijmegen-Hunerberg the remains occur of an infrastructural element so far unique for the LGL. The structure consists of partly artificial water reservoirs and earthworks. In absence of secure dating evidence it is assumed that its history was linked with that of the legionary fortress of the late 1st and 2nd centuries.

Major assets So far the Berg en Dal/Nijmegen assemblage is the only example of a military aqueduct on the LGL. It is a perfect illustration of the adaptation of infrastructural blueprints to local conditions, and in a more general way of the efforts made to maintain the frontier.

Although there is no incontestable evidence for the identification as an aqueduct – a water channel executed in lead, timber, concrete, brick or natural stone has not been attested – there is no satisfactory alternative explanation for the earthworks (cf. fig. 4). It remains puzzling that it was not built in solid brick, like the more or less contemporaneous aqueduct supplying Köln, while brickworks were at the ready on the Holdeurn and the fortress was provided with a stone sewer in or shortly after AD 89.

Boundaries The protection of the monument is not likely to meet UNESCO requirements. Over 2.5 km of the stretch between the Watermeerwijk and Swartendijk sections is hardly protected, and the 1 km long Broerdijk/Broerweg section is not protected at all.

Apart from that, there are various discrepancies in the boundaries of the individual parts of this monument between RCE and Vestigia, which require clarification. Here, the RCE boundaries have been used.

Recommended field work The additional areas mapped here as deserving protection were merely based on a published map.35 In advance of actual protection proper field measurements are recommended, in which the supposed course of the aqueduct is set out on account of the expected fall. It is recommended to supplement this with trial trenches in order to establish the assumed presence of an artificial element, ideally a tangible water channel.

Map basis Schut 2005, fig. 3.

35 Schut 2005, fig. 3.
Kops Plateau and Hunerberg: overview of the archaeological assemblages.
For the present and recommended protection cf. map on p. 60.
Nijmegen-Kops Plateau: fort, extra-mural settlement, cemetery, rubbish deposits

Cf. 2014 site catalogue: 4.3.13

This site may be merged with Nijmegen-Hunerberg (cf. next item) into a common property.

**Short characterisation** On a small elevated plateau along the edge of the ice-pushed ridge of Nijmegen-Kleve the remains occur of an irregularly shaped Early Roman fortification with several extra-mural activity zones considered as annexes, and with associated burial zones. An oversized residential building reveals that the fortification had an atypical character. The fort was occupied c. 12 BC-AD 70. In the Flavian and later periods the plateau was still used, as indicated by burials and a road.

**Major assets** Although three-quarters of the fortification has been excavated the remaining parts of the assemblage deserve nomination. It is characterised as an unparalleled complex by aspects including its irregular shape, oversized residential building (*praetorium*), extra-mural military structures and a noticeably luxurious finds assemblage. Excavations have revealed that at least part of the slope of the ice-pushed ridge was used as a rubbish deposit, where the exceptional material culture is preserved as a layered history book. In an excavated section several burnt layers occurred, which may contain carbonised organic material, but on the whole preservation conditions for ecological remains are not favourable here.

**Boundaries** The relationship between the AMK boundaries and the mapped excavations deserves attention, since there appear to be (minor) overlaps and gaps.

Excavations have confirmed that the burial areas associated with the Kops Plateau fort and the Hunerberg legionary fortress extend at least 300 m to the east of AMK 956, to the Hengstberg/St. Maartenskliniek. Since the area in question is not well delineated and has been considerably damaged since the late 18th century nomination of this eastward continuation of the cemeteries is not recommended.

On the other hand, the areas north, west and south of AMK 956 contain remains of the Kops Plateau assemblage and the cemetery of the Hunerberg legionary fortress as well. The attested rubbish deposit on the north slope may well be part of a much larger dumping area. A protected zone covering this area may be combined with a zone including parts of the eastern extra-mural settlement of the legionary fortress.

**Recommended field work** It is virtually impossible to attest burials by non-destructive methods, and for that aspect field work is not recommended. A coring survey on the northern slope of the plateau may well enhance insight into the extension of the dumping area.

**Map basis** Van Enckevort 2012, 132, fig. 56; 270, fig. 131; digital dataset mun. Nijmegen.

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Kops Plateau and Hunerberg: overview of the present and recommended protection.

For the archaeological assemblages cf. map on p. 58.
Nijmegen-Hunerberg: operational base, legionary fortress, extra-mural settlement, cemetery

Cf. 2014 site catalogue: 4.3.12 and 4.3.14

This site may be merged with Nijmegen-Kops Plateau (cf. previous item) into a common property.

Short characterisation The Hunerberg covers the remains of a large Augustan military base, a Flavian-Trajanic legionary fortress with its extra-mural settlement and the cemeteries associated with the latter. The military use of the Hunerberg started c. 19 BC and extended well into the 2nd century AD.

Major assets The over 40 ha large fortification serving as an operational base c. 19-16/12 BC may be viewed as the cradle of the legion (Lgl). It is the earliest military installation that has left firm archaeological traces, and represents a pivot-point between a strategy based on a re-active striking force operating from the interior of Gaul and a preclusive approach involving the deployment of a massive permanent garrison along its perimeter. Considerable parts of the early base remain unexcavated and therefore unknown, but they surely hide the remnants of large storage facilities essential to the survival of a forward base.

After the suppression of the Batavian revolt in AD 70 the area of the Augustan operational base was overbuilt by a regular legionary fortress (castra) and its extra-mural settlement (canabae legionis); the latter extended eastwards as far as the by then evacuated fort on the Kops Plateau. Together with the nearby civil town of Ulpia Noviomagus (cf. below) the legionary fortress and its civil settlement constitute the triad castra-canabae-civil town which is a characteristic element of the frontier zone. In Nijmegen the assemblage as a whole is fairly well preserved, although we are not well informed about the burial zones belonging to castra and canabae. An added value for the legionary fortress is its association with the aqueduct and the industrial site of De Holdeurn.

Boundaries The area covered by the early operational base is highly recommended. This area also includes the later legionary fortress and large parts of its extra-mural settlement. About two-thirds of the area is unexcavated and some of the earlier excavations (preceding 1970) were not entirely destructive (cf. par. 3.3). It is recommended to add a further protected area including unexcavated parts of the eastern extra-mural settlement; this may be combined with a protected zone including remains of the rubbish deposits on the slope of the Kops Plateau.

Recommended field work No field work is recommended.

Map basis Van Enckevort 2012, 132, fig. 56; 270, fig. 13; digital dataset mun. Nijmegen; digital dataset Radboud University.
Late Roman fort and Oppidum Batavorum: overview of the archaeological assemblages.
For the present and recommended protection cf. map on p. 64.
Nijmegen-Valkhof area: Late Roman fort

Cf. 2014 site catalogue: 4.3.11 (part of)

Short characterisation Remains of a fortification surrounded by a stone wall – possibly succeeding an earlier earth-and-timber wall – and a double ditch system. The establishment of the fort has been dated to the late 3rd century AD. The occupation seems to have continued at least into the 5th century, when the Roman garrison may have been replaced by Frankish soldiers.

Major assets The Valkhof area is the only site in the Dutch frontier zone with incontestable physical remains of a Late Roman military occupation, besides the fort at Valkenburg. The features consist of two pairs of defensive ditches and a stone wall which may have succeeded an earth-and-timber predecessor. A considerable part of the fort was later overbuilt by a Carolingian palace, which is likely to have had an Early Medieval predecessor. Although a continuous occupation from the Late Roman period into the Carolingian period is not certain, it is beyond dispute that the presence of the remains of a Roman fort has contributed to the choice of the Valkhof for the construction of the medieval palace.

A large part of the defensive system is unexcavated; it is likely that stretches of the ditches and of the robber trenches of the stone wall are still present. Parts of the northern stone wall may have been included in later, still existing walls. The remains of the inner area of the fort are hidden under those of the palace; a nearly complete lack of excavation explains why we have no information on the state of preservation of the fort’s interior.

Boundaries As the location of the excavation trenches indicate, the eastern demarcation of the fort is unclear. The proposed boundary covers most of the expected remains of both the Late Roman fort and the civil settlement Oppidum Batavorum (cf. below). The best preserved parts are already scheduled monuments (the boundary of 958 needs correction on account of excavations in the 1990s).

Recommended field work No field work is recommended.

Map basis Van Enckevort 2012, 132, fig. 56; Van Enckevort & Heirbaut 2010, 253, fig. 161; digital dataset mun. Nijmegen.
Late Roman fort and Oppidum Batavorum: overview of the present and recommended protection.
For the archaeological assemblages cf. map on p. 62.
Nijmegen-Valkhof area: civil settlement Oppidum Batavorum

Cf. 2014 site catalogue: 4.3.11 (part of)

Short characterisation Remains of a civilian agglomeration with a ribbon-like layout. It may have been founded as early as 10 BC and was destroyed during the Batavian revolt of AD 69/70. The settlement is identified with Oppidum Batavorum as mentioned by the historian Tacitus.

Major assets The finds assemblage indicates that the first inhabitants may have been or may have included army veterans. Wall paintings and stone foundations and cellars reveal an increasing prosperity in the course of the 1st century AD. These characteristics have contributed to the assumption that the settlement served as the urban administrative centre of the civitas Batavorum, the Roman equivalent of the tribal area of the Batavians.

As opposed to the more elevated parts of Celtic Europe the peoples of the Low Countries and the North German Plain had no urban tradition. In the Roman Empire, however, urban centres were the key elements of the administrative system. The integration of the North in the Roman Empire therefore required the development of an urban infrastructure. The military start-up and gradual urban development of the settlement in the Valkhof area, if correctly interpreted, may be a model for the military zone on the left bank of the Rhine.

Yet, the military association of the settlement is less evident than in the case of Nijmegen-West, and it has been excavated at a larger scale. For these reasons it has not been qualified as highly recommended.

Boundaries Cf. Late Roman fort (above). The extent of the civil settlement is not well-defined. It is likely to have been larger to the east, where its remains are difficult to identify as a consequence of overbuilding by the small Roman fort of Nijmegen-Trajanusplein (not further discussed in this report), the western periphery of the canabae legionis and a Late Roman cemetery. The proposed boundary probably includes a substantial and representative part of the settlement.

Recommended field work No field work is recommended.

Map basis Van Enckevort 2012, 132, fig. 56; Van Enckevort & Heirbaut 2010, 253, fig. 161; digital dataset mun. Nijmegen.
Nijmegen-West: civil town Ulpia Noviomagus, cemetery

Cf. 2014 site catalogue: 4.3.10

Short characterisation Remains of a civil settlement which eventually received the name of Ulpia Noviomagus, the legal status of municipium and a stone wall. The associated cemetery appears to have been limited to the areas south and east of the town walls. Habitation of the settlement certainly extends from c. AD 70-270, but there are indications for some earlier and later activity.

Major assets Ulpia Noviomagus and the nearby legionary fortress and its extra-mural settlement on the Hunerberg (cf. above) constituted the triad of castra-canabae-civil town which is a typical phenomenon of the frontier zone. The name element of Ulpia implies the bestowal of privileges by the emperor M. Ulpius Traianus (98-117), but it is certain that the town has earlier roots, possibly starting off as a roadside settlement with a ribbon-like development.
The interference of Trajan concurs with clear indications of military involvement in the erection of public buildings, which is also attested for the colonia at Xanten and the municipium at Voorburg. This imperially inspired interweaving of the military and the civilian spheres is a special characteristic of the LGL. Nijmegen is the representative par excellence of this phenomenon, with its military and civil components well in place.

**Boundaries** The proposed boundary roughly corresponds with that of AMK 3960 and 967, with some extensions to the west. These account for recent views that the town was larger on the west side and that settlement traces occur outside the town wall to the south.

**Recommended field work** No field work is recommended.

**Map basis** Van Enckevort 2012, 270, fig. 131; digital dataset mun. Nijmegen.
Rijnwaarden-Bijlandse Waard: re-deposited remains of an eroded fort

Cf. 2014 site catalogue: 4.3.18

**Short characterisation** Remains of a fortification which has been eroded by the river Rhine (cf. fig. 7). Substantial remnants of stone walls are located at great depth in a dredge pool – allegedly a bank of c. 200 x 70 m. Most of the dredged-up finds are dated c. AD 70-260, but there is an earlier inscription.

**Major assets** There is every reason to believe that the dredge finds at Bijlandse Waard represent the remains of a military installation. Originally, this must have been located near the bifurcation of Rhine and Waal, on the left bank of the former and the right bank of the latter river channel. This bifurcation was the site of one of the most famous examples of Roman water management, a groyne (NL: *krib* of *stroomband*, D: *Buhne*) built during the German campaigns of Augustus’ stepson Drusus in 12-9 BC. The groyne is mentioned by the historian Tacitus, but it also occurs in an inscription dredged up from the Bijlandse Waard. The groyne was intended to increase the water volume of the Rhine channel, at the expense of the Waal. It is beyond doubt that such a vital regulating element of the water infrastructure was guarded by a fort.

Therefore, the eroded and re-deposited remains of the fort express a distinguishing feature of the LGL, even though they have lost their original structural connection.

**Boundaries** It is difficult to conceive an adequate protection, since the attested remains are located at great depth in a dredge pool. It is uncertain whether any intact remains may be present upstream from the find spot of the dredge finds. The area immediately to the east of the dredge pool, between Lobith and Herwen, is the best candidate.

**Recommended field work** Field work – primarily coring – may shed light on the occurrence of intact remains of a Roman settlement to the east of the find spot. In advance of such field work a study should be made of all existing data (both geological and archaeological) of the area, in order to restrict the search area. The coring survey may be supplemented by geophysical survey and limited trenching to establish the date and character of any detected features.

**Map basis** Unpublished map Bogaers archive RU (folder 340); sonar image in unpublished report J. Verhagen (2015); digital dataset accompanying Cohen et al. 2014.
Arnhem-Meinerswijk: fort, extra-mural settlement?
Cf. 2014 site catalogue: 4.3.6

Short characterisation Remains of a succession of forts, and possibly of the associated extra-mural settlement. The finds assemblage points to activity c. AD 10/20-250, and to some Late Roman activity as well. A considerable part of the settlement has been eroded by the Rhine (cf. fig. 8).

Major assets The Meinerswijk fort is located just downstream of the bifurcation of the Rhine and the Gelderse IJssel. The latter is the best candidate for the location of the fossa(e) Drusiana(e), the canal(s) which Drusus had constructed in 12 BC to reach the river Ems via the Flevo lakes, and which was re-used by his son Germanicus in AD 15. The earliest finds so far unearthed at Meinerswijk have been dated c. AD 10-20, justifying its association with these key historical events. Structural remains from that period have not yet been attested.

The best known remains are those of the headquarters and defences at the rear of the fort, from the stone building phase. They demonstrate that Meinerswijk was of the same ‘delta type’ as the forts between Vechten and the coast. In the eastern part of the river area it is the only representative of this type, and the only one so far with surviving structural remains.

Boundaries The present scheduled monument is a more or less adequate representation of the expected extension of the Roman remains, based on excavations, corings and geophysical survey. Whether or not deliberately, it covers parts of the channels which have eroded both sides of the forts. It is not impossible that these contain Roman remains at great depth.37 However, the boundaries of the northern part of the monument should be carefully checked against the published maps, as their appears to be some discrepancy. The proposed boundaries are a more precise indication of the zone with attested remains and of sections of the river channels downstream from the stone fort.

Recommended field work No field work is recommended.

Map basis Hulst 2000-2001, figs 3 and 33.

37 But cf. Hulst 2000-2001, 429: “The many deep borings in the channel fill [of the eastern channel, MP] uncovered no rubble remains, not even at the base.”
The Lower German Limes in the Netherlands

channel active 1950 BP / ± 0 AD

channel active 1500 BP / ± 450 AD

dredge finds

157,000
158,000
159,000

442,000
443,000
444,000

Maurik
The Lower German Limes in the Netherlands

Buren-Maurik/Eiland van Maurik: re-deposited remains of an eroded fort

Cf. 2014 site catalogue: 4.3.2

Short characterisation Remains of a fortification which has been eroded by the river Rhine. Dredging activities in the early 1970s were hindered by the presence of massive stone concentrations. Most of the dredged-up finds are dated to c. AD 70-275, but they also include an assemblage from the 4th century.

Major assets The finds originate from two locations c. 300 m apart, indicating that at least part of them were transported over some distance. The finds assemblage, including over 130 tiles stamped by military units, leaves no doubt that it relates to an eroded fort. The original location is to be sought to the northeast of the easterly find spot.

Maurik differs from most other military sites in the delta in two aspects. First, it is one of the few forts to have housed a mixed garrison of infantry and cavalry. Second and more important, the 4th-century component in the finds assemblage is larger than elsewhere. This may be due to a special role of the site in this period, or to a better preservation of the Late Roman phase of the fort’s history. Contradictorily, the erosion of the fort may have secured the later occupation levels from medieval and later degradation, while re-depositing them in the Rhine channel.

Although the findspot is now some 4-5 km upstream from the bifurcation of Kromme Rijn and Lek, it may have been much nearer to the splitting point in the 1st century AD.38 If it was, the fort may have had the strategic ratio generally ascribed to the Rijswijk site.

Boundaries It is difficult to conceive an adequate protection, since the finds were made during dredging works. It is uncertain whether any intact remains may be present upstream from the find spots.

Recommended field work Field work – primarily coring – may shed light on the occurrence of intact remains of a Roman settlement to the northeast of the find spot. In advance of such field work a study should be made of all existing data (both geological and archaeological) of the area, in order to restrict the search area. The coring survey may be supplemented by geophysical survey and limited trenching to establish the date and character of any detected features.

Map basis Bogaers & Rüger 1974, 69, fig. 19; unpublished map (location of findspots by Ms Delfin) in Bogaers archive, Radboud University; digital dataset accompanying Cohen et al. 2014.

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38 The development of the Lek as a Rhine channel was preceded by a phase of crevasse formation in what appears to have been an unstable outer bend of the Rhine (pers.comm. Kim Cohen). The first crevasse splays occur near the Maurik dredge pools, suggesting that the fort may have been located much closer to the bifurcation than today.
Vechten: overview of the archaeological assemblage.

For the present and recommended protection cf. map on p. 76.
Bunnik-Vechten: large fort, extra-mural settlement, cemetery, harbour installations, riverside deposits, remains of a ship

Cf. 2014 site catalogue: 4.2.8

**Short characterisation** Vechten is the earliest and largest military site in the western Netherlands. It harbours the remains of a series of forts of various sizes, associated extra-mural settlements and parts of a cemetery. The property further covers most of a nearly 1 km long stretch of the Roman Rhine channel in front of the settlement. The occupation of the forts is dated in the period c. 5 BC-AD 275. Finds from the 4th century reveal some later activity.

**Major assets** The property is a fairly complete representation of the whole of a military agglomeration, including its rubbish deposits in the river channel. Excavations at various locations have demonstrated that the preservation conditions for organic remains in and along the silted-up Rhine channel are excellent. The channel still includes part of a rare type of troop transport vessel built in a Mediterranean tradition, and it is plausible that other ships are still in situ.

The stone building phase of the fort has a layout which is unique for the area inasmuch as it combines the unorthodox orientation of the small forts in the lower delta with a proper retentura (cf. fig. 2).\(^{39}\) It is the only fort on the Dutch part of the LGL with a cavalry unit (ala) as a garrison.

The earliest military installation must have been linked with the use of the river Vecht as an access to Germanic territory in the age of expansion and is likely to be a large and irregularly shaped supply base. All in all Vechten is of an unparalleled character throughout its existence.

**Boundaries** The scheduled monument and AMK 2231 (east) and 5635 (north) cover most of the archaeological assemblage. However, surface finds indicate that the settlement may have extended further to the north, on both sides of modern Vechten. The scheduled monument may extend too far to the south.

**Recommended field work** Corings will probably reveal whether the settlement extends to the north of AMK 5635. If so, geophysical research may provide insight into the character of the buried features.

**Map basis** Remouchamps 1928, pl. II; Hessing et al. 1997, fig. 10; digital dataset Radboud University.

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\(^{39}\) The *retentura* is the rear part of a fort, at the back of the headquarters.
Fort Vechten (built 1860s)

Currently protected, but no attested remains?

Vechten: overview of the present and recommended protection.

For the archaeological assemblage cf. map on p. 74.
The Lower German Limes in the Netherlands

protected area
(scheduled monument)

protected area
(otherwise)

area highly recommended
for nomination

area recommended
for nomination

search area

excavated area

military installation
(fort, watchtower)

civil settlement
(town, vicus)

cemetery

Roman Rhine

Limes road

colours may vary in
case of overlapping
Utrecht-Domplein area: fort, extra-mural settlement

Cf. 2014 site catalogue: 4.2.7

Short characterisation The Domplein and its surroundings cover the remains of a sequence of small forts and the associated military vicus. It is assumed that the forts were occupied during the period c. AD 40-275, with successive timber and stone building phases. Finds indicate that the fort area was used for some time during the Late Roman period, but so far there is no certain structural evidence. The extent and history of the military vicus are not very well known.

Major assets The Domplein area is one of the very few instances where a Roman military settlement became the nucleus of a thriving medieval centre of power. Although the stone fort was exploited as a quarry for several early medieval churches, a few stretches of its defensive wall have survived, and excavations have demonstrated that the levels from the Middle Roman period are relatively well preserved – better than at many other sites. Timber remains from the 1st-century forts indicate that the preservation conditions for organic matter are to all probability favourable. There is every reason to suppose that the remains of the military vicus are equally well-preserved. With the exception of several churches the buildings on top of the Roman settlement are unlikely to have caused severe damage to its remnants; rather than that the later buildings have protected the Roman levels from erosion by agriculture or clay extraction.

Boundaries The scheduled monument covers the remains of the forts, but only narrow adjacent strips of the western and eastern extra-mural settlement. The extension of both parts of the extra-mural settlement is not precisely attested. Extension of the protection to both parts of the vicus is strongly recommended.

Recommended field work No field work is recommended.

Map basis Kloosterman 2010, 10, fig. 1.6; Luksen-IJtsma 2010b, 12, fig. 2.2; digital dataset mun. Utrecht.
Utrecht-Groot Zandveld: watchtower

Cf. 2014 site catalogue: 4.2.6

Short characterisation  It is certain that a small military installation is present at this site. To all probability it is a watchtower built in the pre-Flavian period. Finds from the area indicate a continuation of military use into the 3rd century.

Major assets  Timber watchtowers are notoriously difficult to detect. They are usually only discovered during an excavation, with destructive effects for all or most of their remains. This site is a unique instance where the presence of a timber watchtower is as good as certain, while its remnants are still largely preserved. Small installations from the Early Roman period are one of the special features of the lgl nomination. A small and very conservative test excavation aimed at the identification of the character of the site has produced a timber post suitable for dendrochronological analysis, indicating that the preservation conditions for organic remains are favourable.

Boundaries  The scheduled monument covers the remains of the watchtower.

Note: There is a ‘chip’ out of the northern boundary of the monument, which must be intended to exclude an appartment building; however, a shift of 15-20 m appears to have occurred here.

Recommended field work  No field work is recommended.

Map basis  Gazenbeek & Polak 2002, fig. 3; digital dataset mun. Utrecht.
Hoge Woerd: overview of the archaeological assemblage.
For the present and recommended protection cf. map on p. 84.
Utrecht-Hoge Woerd: fort, extra-mural settlement, bath-house, cemetery, riverside deposits

Cf. 2014 site catalogue: 4.2.5

Short characterisation The Hoge Woerd area covers a succession of small forts, most of the military vicus and part of the cemetery. The property further includes a 400 m long stretch of the Roman Rhine channel in front of the forts, and roads departing in three directions. The occupation of the forts is dated in the period c. AD 40-275. Coins from the 4th century reveal some later activity.

Major assets First of all, the property is one of very few rather complete representations of the whole of a military settlement, including its riverside rubbish deposits. The area of the forts is relatively untouched by overbuilding and excavation. The levels of the 1st-century timber building phases are well preserved; of the later levels, including the stone building phase, only the deeper reaching features have survived. In the vicus the occupation levels from the 2nd and 3rd centuries are better preserved. These include the lower walls of a stone bath-house.

Excavations in the periphery of the settlement indicate that the preservation conditions for organic remains are favourable. This is especially the case in the river channel in front of the forts. The channel has migrated away from the settlement, leaving rich and layered deposits of settlement waste. The recovery of re-deposited planks of two Roman ships indicates that the river channel is likely to hide one or more ships, which constitute a distinguishing asset of the LGL nomination.

Boundaries The scheduled monument covers most of the assemblage, with the exception of a burial area in the northeast and part of the extra-mural settlement with its river front in the southwest. Extension of the protection with these areas is advisable.

Recommended field work No field work is recommended.

Map basis Langeveld, Luksen-IJtsma & Weterings 2010, 15, fig. 1.3; Aarts 2012, 13, fig. 1.1; digital dataset mun. Utrecht.40

40 Only excavations inside or near the recommended boundaries have been added.
Hoge Woerd: overview of the present and recommended protection.
For the archaeological assemblage cf. map on p. 82.
The Lower German Limes in the Netherlands

- protected area (scheduled monument)
- protected area (otherwise)
- area highly recommended for nomination
- area recommended for nomination
- search area
- excavated area
- military installation (fort, watchtower)
- civil settlement (town, vicus)
- cemetery
- Roman Rhine
- Limes road

*colours may vary in case of overlapping*
Utrecht-De Balije/Veldhuizen/Zandweg: Limes road and associated structures, remains of a ship

Cf. 2014 site catalogue: 4.2.4 (De Balije), 4.2.3 (Veldhuizen) and 4.2.2 (Zandweg)

Short characterisation This site covers an approximately 2.5 km long stretch of the Limes road, with various associated structures. The latter include revetments of a gradually migrating meandering Rhine channel (Heldam), the partly un-excavated remains of a ship and possibly a still untouched second ship.

Major assets The site includes a long stretch of the Limes road which is not only the best researched section in the Netherlands, but possibly the most varied one as well. The road passes through a very dynamic landscape where a Rhine branch developed several large meanders. The road brushes the southern outward bends of the river, mainly following the natural levees, but occasionally crossing the flood basin. Both the terrain conditions and the migrating river necessitated reinforcements with natural stone, timber constructions and occasional retracing. At some point even a ship was sunk down to counter further erosion of the road – most of this ship still remains in situ; a second ship may be present near the Zandweg site. At least two major building phases have been attested for the road, c. AD 100 and 124. At De Balije a crevasse splay has been located at a right angle to the main channel and the road, which must have required some sort of bridge construction. Three watchtowers have been uncovered along this road section, and although these no longer exist the presence of another watchtower between the Balije and Veldhuizen sites is not unlikely. A plethora of datable timbers has proved that the conditions for preservation of organic remains are favourable. All in all the site is a unique and multifaceted expression of the key aspects of road infrastructure and water management.

Boundaries Presently, two stretches of the Limes road and associated structures are protected: De Balije (scheduled monument) and Veldhuizen. The unicity of the assemblage of the Limes road along the Heldam channel belt justifies a much larger protected area: a stretch of 2.5 km connecting De Balije, Veldhuizen and Zandweg. In view of the location of the known watchtowers and ships in relation to the road an area of roughly 100 m wide, centred on the road axis, appears desirable.

Recommended field work No field work is recommended.

Map basis Luksen-IJtsma 2010a; Langeveld, Luksen-IJtsma & Graafstal 2010, 14, fig. 1.2; 18, fig. 1.4; 104, fig. 8.1 (Balije); Vos & Blom 2003, 14, fig. 2 (Balije); Van der Kamp 2007, 177, fig. 8.1; Van der Kamp 2009, 20, fig. 3.1 (Zandweg); digital dataset mun. Utrecht.
Woerden: overview of the archaeological assemblage.
For the present and recommended protection cf. map on p. 90.
Woerden-Centrum: fort, extra-mural settlement, riverside deposits, Limes road

Cf. 2014 site catalogue: 4.2.1

**Short characterisation** The town centre of Woerden is built on top of a succession of small forts and the surrounding extra-mural settlement. The military settlement is located on the edge of the Roman Rhine channel, bordered by quays and revetments. In the southern part of the settlement the Limes road has been attested. The forts appear to have been in use c. AD 45-275. With the exception of a handful of coins there is no evidence for Late Roman activity.

**Major assets** There is much that we do not know about the series of small forts at Woerden, the main reason being that they have hardly been touched by excavations. The best preserved remains appear to be those from the second and third timber building phases, dated c. AD 47-175; of the fourth, stone building phase a small section of a tuff wall has been found, presumably belonging to the headquarters building. Organic matter including datable timber has been attested at various locations, indicating that the conditions for preservation are favourable. This is underlined by the remains of no less than seven ships, with more vessels probably still in situ.

Traces of an extra-mural settlement have been found to the west and south of the forts; there is no positive evidence for an eastward extension beyond the Rijnstraat, but the landscape would certainly permit it. Cemeteries have not yet been identified. They will have been situated along a road, perhaps the Limes road, which seems to have passed through the southern part of the settlement. This road has been attested on two spots, with timber elements dated c. AD 124.

The forts were situated in an inner bend of the Roman Rhine. The channel gradually migrated away from the settlement, which explains the quays and revetments recorded here. There is every reason to assume that they extended over a considerable distance and that large parts of these constructions and the associated rubbish deposits have survived in an excellent condition.

**Boundaries** The scheduled monument covers the forts of periods 2-4, but not all of the remains of the fort of period 1, which has a different orientation and extends to the southwest of the area of the later forts. The forts were surrounded by an extra-mural settlement, the full extension of which is not known. On the west and north sides the Roman Rhine constituted the boundary of the settlement. Southward Roman remains extended at least as far as the Wilhelminaweg. On the east side the Rijnstraat is an obvious border for a protected area; until 1961 the Rhine was situated here. The presumed extension of the eastern vicus as far as the Achterstraat is merely based on the elevation of this part of the town. There is no record of Roman finds east from the Rijnstraat.

**Recommended field work** No field work is recommended.

**Map basis** Blom & Vos 2008, 15, fig. 1.3; 31, fig. 3.1; Alkemade et al. 2010, map 10 (adapted); Actueel Hoogtebestand Nederland; digital dataset Radboud University.
Woerden: overview of the present and recommended protection.
For the archaeological assemblage cf. map on p. 88.
The Lower German Limes in the Netherlands

- **protected area** (scheduled monument)
- **protected area** (otherwise)
- **area highly recommended for nomination**
- **area recommended for nomination**
- **search area**
- **excavated area**
- **military installation** (fort, watchtower)
- **civil settlement** (town, vicus)
- **cemetery**
- **Roman Rhine**
- **Limes road**

*colours may vary in case of overlapping*
Limes road Woerden-Harmelen/Zoeterwoude-Rijndijk.
Section 1: Harmelen (east) to Woerden (west).
Woerden-Harmelen/Zoeterwoude-Rijndijk: Limes road and associated structures

Considerable extension of 4.1.5 in the 2014 site catalogue

**Short characterisation** Between Woerden and Zoeterwoude-Rijndijk many find spots mark the course of the Limes road. Past research has demonstrated that this section was just as diverse as the preceding section (Utrecht). Along the road, several other infrastructural elements are likely to occur, such as river crossings, quays, revetments and small military installations.

**Major assets** The preservation of organic materials in most areas in the Western Netherlands is guaranteed. These materials proved to be of great importance for the understanding of the dating (and evolution) of the Limes road and the adaptation of Roman military engineering to the dynamic natural environment. By including the road and its direct environment in the nomination, the associated infrastructural elements are protected as well, preserving small but essential elements of the Limes.

**Boundaries** At present, no stretches of the Limes road are protected in the Western Netherlands (as scheduled monuments). Most parts of the trajectory are running through urbanised areas, where the remains of the road have been subject to various disturbances. However, four rural areas, situated between villages along the Rhine, are likely to have offered good preservation circumstances for the Limes road. In these areas the phenomenon of ‘afvletting’ or ‘afkleiing’ (the extraction of clay for the former brickworks in the area) may have caused disturbances. There is a striking correspondence between the parcels that were levelled because of this clay extraction and the find spots of the Limes road, which might indicate that the road was indeed disturbed on these locations. The recommended areas have suffered less from clay extraction. The inventory of Luksen-Utsma (2010a) allows only a broad demarcation of the relevant zone. A better definition requires a thorough analysis of sources including the digital elevation model aHN, field and coring surveys, and of the detailed geological map made by Van Dinter (2013). Such an analysis will permit the mapping of other relevant aspects as well, such as bends in the Roman Rhine (preferred locations for watch towers and revetments for the protection of the Limes road), small tributaries of the Rhine that had to be crossed by the road (locations for bridges and ‘sealed’ archaeological contexts below the groundwater table) and more elevated areas (locations for other military installations).

**Recommended field work** A study of digital elevation data will provide a better view of areas where an over-average preservation may be expected. For these areas a coring survey is advised, supplemented with geophysical survey if limited tests indicate positive results. In the end limited trial trenching may be required to confirm the interpretation of the non-destructive methods.

**Map basis** Luksen-Utsma 2010a; Van Dinter 2013.
The Lower German Limes in the Netherlands

Limes road Woerden-Harmelen/Zoeterwoude-Rijndijk.
Section 2: Woerden (east) to Bodegraven (west).

protected area (scheduled monument)
protected area (otherwise)
area highly recommended for nomination
area recommended for nomination
search area
excavated area
Limes road Woerden-Harmelen/Zoeterwoude-Rijndijk.
Section 3: Alphen aan den Rijn (east) to Hazerswoude-Rijndijk (west).

- military installation (fort, watchtower)
- civil settlement (town, vicus)
- cemetery
- Roman Rhine
- Limes road

Colours may vary in case of overlapping.
Limes road Woerden-Harmelen/Zoeterwoude-Rijndijk.
Section 4: Hazerswoude-Rijndijk (east) to Zoeterwoude-Rijndijk (west).
Bodegraven-Oud Bodegraafseweg/ Willemstraat: fort

Cf. 2014 site catalogue: 4.1.9

Short characterisation In the town centre of Bodegraven the remains of a small timber military installation have been attested, built in the pre-Flavian period. Size and shape of the fort are subject to discussion, but we consider it as a fort of the ‘delta type’. On two spots well-preserved timber has been attested. The finds assemblage indicates military activity starting around the middle of the 1st century AD and probably extending into the 2nd or 3rd century.

Major assets It is evident that the area covers well-preserved remains of a timber military installation. Especially for inner buildings this is rare. The quality of the excavated timber allowed successful dendrochronological analysis. The preservation conditions for organic remains appear to be favourable in general. Consequently, the Bodegraven fortification certainly qualifies for nomination.

Boundaries There is an ongoing discussion on the character of the military site – a small fort of the ‘delta type’ or a smaller installation of a so far unparalleled shape. The debate hinges on the activity of a small channel which is situated at a right angle to the Roman Rhine, below the Oud-Bodegraafseweg. If that channel was active around the middle of the 1st century, the installation cannot have been a fort of ‘delta’ size. However, a smaller installation with a large gate near one of its corner would be very odd.

If the identification as a ‘delta type’ fort is accepted, its size may vary from c. 110 x 70 m to c. 140 x 110 m.41 In both cases the SW corner of the installation would extend beyond AMK 9376, so a correction there is required. The fortification is likely to have had an extra-mural settlement, but the extent of that element cannot be estimated.

Recommended field work In the built environment of the town centre it will be difficult if not impossible to assess the size of the fortification. Coring will give a general idea of the extension of human activity, but will not reveal its character – inside or outside a fortification. Geophysical research is hindered by pavement and the small size of available plots.

There appear to be three locations where the questions regarding the character and size of the installation may be answered: the Nassaustraat (N-S), the Mauritsstraat (E-W) and the cemetery east of the Oud-Bodegraafseweg.

Map basis Vos, Lanzing & Siemons 2016, figs 2.7 and 7.5.

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41 The projection of the small rectangle on the topography is based on Vos, Lanzing & Siemons 2016, fig. 7.5. The large rectangle is based on the period 1 fort at Valkenburg, with the main gate (porta praetorian) projected on the excavated gate of the Bodegraven fortification.
Roomburg: overview of the archaeological assemblage.
For the present and recommended protection cf. map on p. 102.
Leiden-Roomburg: fort, extra-mural settlement, harbour installations, riverside deposits

Cf. 2014 site catalogue: 4.1.3

Short characterisation  Leiden-Roomburg was the site of a small Roman fort, situated at the conjunction of the river Rhine and the mouth of a natural gully. This natural gully connected to the Corbulo canal and the harbour of *Forum Hadriani*. The site itself comprises the remains of the fort itself, its surrounding extra-mural settlement and revetments and quays along the natural gully. These structures were used from AD 40/50 until the 4th century.

Major assets  Roomburg is a relative complete military assemblage, including a small fort and its extra-mural settlement, with extremely well preserved timber revetments and organic remains in the adjacent natural gully. Furthermore, Roomburg is one of the few sites that was excavated only to a very limited extent. Consequently, nothing is known about the internal buildings of the fort. Its dimensions, however, characterise it as a fort of the ‘delta type’.

The preservation quality of the internal buildings is unknown. It may have been compromised by the remnants of a medieval monastery on the same site (fig. 10). The extra-mural settlement and the integrity of its remains are not very well known either, because excavations only uncovered its periphery.

Boundaries  Most boundaries of the site were attested during archaeological research, and they appear to be included in the scheduled monument. However, part of the extra-mural settlement may be located north of the Corbulo canal, outside the monument. The further dimensions of this site are unknown. For this reason it cannot be included in the nomination.

Recommended field work  The extent of the medieval building activities on the site of the fort should be clarified, as well as the general preservation conditions, to be able to assess the quality of the archaeological remains. Also, the area to the north of the Corbulo canal should be surveyed, in order to gain insight into the character and dimensions of the site. Coring is the obvious primary instrument, supplemented with geophysical survey if it is deemed sensible on account of the results and the local conditions.

Map basis  Brandenburgh & De Bruin 2016, 13, figs 2.5 and 2.7; digital dataset Radboud University.
Roomburg: overview of the present and recommended protection.
For the archaeological assemblage cf. map on p. 100.
Corbulo canal

Not included in the 2014 site catalogue

**Short characterisation** The Roman army commander Corbulo is credited by the historian Tacitus with the construction in AD 47 of a canal connecting the Rhine to the Meuse. The reported length of the canal is 23 miles (34 km), which agrees astonishingly well with the present distance between the Oude Rijn near Roomburg and the Nieuwe Waterweg southwest of Naaldwijk, as the crow flies.

In 1989 the existence of a dug canal on this line has been attested.

At several locations the sides of the canal were reinforced with rows of posts, of oak in some cases, of softwood in others. Somewhat surprisingly, dendrochronology has provided consistently felling dates of spring AD 50. Even more unexpectedly, this timbered canal postdates a canal phase without timber facing, which must have been used several years. This first canal may have been dug when the first forts were built along the Oude Rijn, in AD 40.

**Major assets** Dug canals are extremely rare in the record of the Roman Empire, and an example with attestable, datable remains is one-of-a-kind and highly recommended for the nomination of a frontier section along a river in a delta setting.

**Boundaries** Nomination is highly recommended for a nearly 4 km long section which is mainly situated in a rural area. The boundary indicated in the map is 50–100 m wide and needs further reduction, based on attested locations and additional surveying where there is insufficient evidence.

**Recommended field work** Additional coring surveys are recommended when there is insufficient evidence to restrict the width of the protected zone. Occasional test trenches may be needed to confirm the survey results; occasionally it may be suffice to inspect the sides of ditches in the rural areas.

For the area northwest of the presently known section, between Voorschoten and Roomburg, a coring survey is strongly recommended. In this area, the dug canal is expected to end in a crevasse channel, parts of which may have been lined with posts, as in front of the Roomburg fort.

**Map basis** Map provided by Bram Jansen.
Voorburg-Arentsburg: overview of the archaeological assemblage.
For the present and recommended protection cf. map on p. 108.
Voorburg-Arentsburg: civil town *Forum Hadriani*, harbour

Cf. 2014 site catalogue: 4.1.4

**Short characterisation** The civil town of *Forum Hadriani*, also known as *Municipium Aelium Cananefatium*, was probably founded somewhere in the 120s AD as a central place by the Roman state. The city centre comprised stone buildings, including a bath-house, and was at some stage surrounded by a stone wall. Outside the walled city centre, a natural gully was in 160 AD transformed into a harbour, with elaborate wooden quays. The harbour connected to the Corbulo canal, which provided the city with good waterways to the Rhine frontier (to the north) and the mouth of the rivers Meuse and Waal (to the south). Next to the harbour, but also to the east side of the walled town, new quarters of the city developed over time. In the early 3rd century, the quays of the harbour were repaired. Habitation ended in the early 4th century.

**Major assets** *Forum Hadriani* is a very late creation in the frontier zone. The overall finds assemblage of the town displays some definite military characteristics. These may be taken as an indication that it played a part in the supply of the regional military infrastructure, perhaps especially of the installations along the North Sea coast.

The site is relatively well preserved. The excavations of the early 19th and 20th century were not entirely destructive, and the area outside the walled town centre has only been excavated to a limited extent. Timber constructions and other organic remains are still in good condition, as demonstrated by the quays of the town harbour and many wells lined with wooden barrels and framings.

**Boundaries** The boundaries of the site were nowhere securely determined. Since the areas excavated by Reuvens and Holwerda are still of considerable archaeological value (cf. par. 3.3) extension of the protection to the north and west is strongly recommended.

**Recommended field work** Geophysical research in the park areas, in the allotments in the eastern part of the town, and on the lawn behind Wijkcentrum Agora and Hospice Het Vliethuys may well shed more light on the course of the town wall and ditch and on the presence of remains of stone buildings, both inside and outside the areas excavated by Reuvens in 1827-1834.

**Map basis** Bink, Franzen et al. 2009, figs 2.8 and 12.5; Driessen & Besselsen 2014, figs 1.2 and 6.1; digital dataset Benno Ridderhof.\(^2\)

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\(^2\) In this dataset the excavated areas are shifted c. 5 m to the south compared with the plan in De Jonge, Bazelmans & De Jager 2006, 248. It is unclear which situation is correct. Cf. De Jager 2001. 14 for similar observations.
Voorburg-Arentsburg: overview of the present and recommended protection.
For the archaeological assemblage cf. map on p. 106.
The Lower German Limes in the Netherlands

- protected area (scheduled monument)
- protected area (otherwise)
- area highly recommended for nomination
- area recommended for nomination
- search area
- excavated area
- military installation (fort, watchtower)
- civil settlement (town, vicus)
- cemetery
- Roman Rhine
- Limes road

*colours may vary in case of overlapping*
Valkenburg-De Woerd and Valkenburg-Centrum: overview of the archaeological assemblages. For the present and recommended protection cf. map on p. 112.
Valkenburg-De Woerd: extra-mural settlement

Cf. 2014 site catalogue: 4.1.2

*Short characterisation* Civil settlement c. 1 km south of the fort in Valkenburg-Centrum. The settlement was situated on an artificially raised platform and consisted of strip houses, that were closely positioned next to each other. The houses were oriented on the Limes road. Lay-out and finds assemblage justify the interpretation of the site as a military *vicus*, but it is too far from the fort of Valkenburg-Centrum to be regarded as the extra-mural settlement of that fortification. A possible fort on the former airfield, less than 500 m to the northwest, is a better candidate. Habitation can be dated from 50 AD until the middle of the 3rd century.

*Major assets* De Woerd is the best known example of a military *vicus* in the Netherlands, be it so far without an attested association with a military installation. Paradoxically, excavations immediately outside other forts have so far failed to produce comprehensible lay-outs of extra-mural settlements. A confirmation of the military character of the features on the former airfield would further enhance the value of the site, if it were added.

Although some 2 ha of the site have been excavated in the 1970s and 1980s, the major part of the settlement remains undisturbed. The settlement has developed along the Limes road, stretches of which must still be present. Judging by the numbers of wood samples from the 1985-1988 excavations, the preservation conditions for organic remains are favourable.

*Boundaries* The site is already almost completely covered by the actual boundaries of the monument. However, the southern extension was never archaeologically attested.

On the former airfield west of De Woerd, a V-shaped ditch and heavy timbers have been found at a distance of less than 500 m from the *vicus*. A heavy upright founded on a plank reminds strongly of the construction of gates and towers at Alphen aan den Rijn. The distances of c. 3.5 m between two or perhaps three posts agree very well, too, as does the felling date of AD 39 ± 6 established for one of the timbers. So far the importance of the finds appears to have been underestimated. The ditch and timber construction may very well represent the western defences of fort or smaller military installation. Slightly over 200 m to the east a further V-shaped ditch occurs. On account of these possible military features he area east of these remains has been defined as a search area.

*Recommended field work* The southern boundary of the *vicus* may be located by a coring survey, potentially supplemented by trial trenches. A geophysical survey may provide insight into the character and delineation of the presumed military features on the former airfield. If the method fails, it should be considered following the line of the ditch with a mini-digger.

*Map basis* Digital dataset RCE (*vicus*); Tol & Jansen 2012, fig. 7.69 (airfield).
Valkenburg-De Woerd and Valkenburg-Centrum: overview of the present and recommended protection. For the archaeological assemblages cf. map on p. 110.
Valkenburg-Centrum: fort, extra-mural settlement, bath-house, cemetery, Limes road

Cf. 2014 site catalogue: 4.1.1

*Short characterisation* The successive forts of Valkenburg-Centrum are the best known examples of the ‘delta type’ characterised by the absence of a built-up zone at the rear of the headquarters building. It is assumed that six successive timber and stone forts were occupied during the period c. AD 40-275, with successive timber and stone building phases. Besides Nijmegen-Valkhof it is the only military installation in the Netherlands with structural remains from the Late Roman period, including warehouses (*horrea*) and headquarters. The site further includes most of the extra-mural settlement and cemeteries and is bisected by the Limes road.

*Major assets* The forts of Valkenburg-Centrum have an international reputation which is mainly due to the excellent preservation of the timber remains of the earlier building phases. Despite large-scale excavations parts of the fort remain in the ground, and the preservation of organic material is still excellent. The fort is surrounded by an extra-mural settlement and cemeteries. In the 1990s, not only well preserved wooden structures were observed, but also parts of a bath-house outside the fort. Its stone walls were found to be standing to a height of 50 cm, which is quite rare for stone buildings in the Netherlands.

*Boundaries* Most boundaries of the site were attested during renovation of the sewer system in the 1990s. Other observations indicate that the site must be somewhat larger to the west than previously assumed, but the extent of the archaeological remains in that direction is unknown. However, with minor adjustments, the most important features are included in the actual protected zone; the southern boundary should be extended.

*Recommended field work* No field work is recommended.

*Map basis* Van Giffen 1948-1953, pl. 1.
Appendix 2 Matching of recommended sites and souv criteria

The correspondence between recommended sites and detailed characteristics of the Outstanding Universal Value of the Lower German Limes has been visualised in a table. The souv criteria have been arranged in three groups:

Chronology
One of the key values is the representation of the entire existence of the Roman Empire, from its beginnings in the last decades BC until the mid-5th century AD. A further value is the degree in which it contributed in shaping the Medieval infrastructure of the region. The core period of the Frontiers of the Roman Empire is the 2nd century AD. Therefore, four periods have been distinguished under this heading.

Element
Another key value is the representation of all elements that the military occupation of the frontier zone could encompass. The draft souv contains a list of distinguished elements, which has been copied under this heading.

Special remains
This section is about preserved remains. The preservation of timber and other organic remains is a key value. The presence of stone building remains is relevant from the point of view that this is characteristic for the core period of Frontiers of the Roman Empire. Timber remains from this period have rarely been preserved.

Besides these groups there is a separate heading to indicate the applicability of degradation by overbuilding, river erosion, excavation and other factors.

Finally, our assessment of the site is indicated.

Explication of symbols used
++ convincingly attested by excavation  (++) no longer present
+ not convincingly attested by excavation, but either possible or plausible
? uncertain
x applies

The sites have been arranged in the four categories (labelled A-D) distinguished in paragraph 2.2.
### (A) ADAPTATION TO THE DELTA LANDSCAPE: THE MILITARY INSTALLATIONS ON THE RHINE

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Site</th>
<th>Object</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rijnwaarden</td>
<td>Bijlandse Waard</td>
<td>re-deposited remains of an eroded fort</td>
<td>+</td>
</tr>
<tr>
<td>Arnhem</td>
<td>Arnhem-Meinerswijk</td>
<td>fort, military vicus?</td>
<td>++ ++ +</td>
</tr>
<tr>
<td>Buren</td>
<td>Maurik-Eiland van Maurik</td>
<td>fort?</td>
<td>+</td>
</tr>
<tr>
<td>Bunnik</td>
<td>Vechten</td>
<td>fort, extra-mural settlement, cemetery, harbour, riverside deposits, ship</td>
<td>++ ++ +</td>
</tr>
<tr>
<td>Utrecht</td>
<td>Domplein area</td>
<td>fort, extra-mural settlement</td>
<td>++ + ++</td>
</tr>
<tr>
<td>Utrecht</td>
<td>Groot Zandveld</td>
<td>watchtower</td>
<td>+</td>
</tr>
<tr>
<td>Utrecht</td>
<td>Hoge Woerd</td>
<td>fort, extra-mural settlement, bath-house, cemetery, riverside deposits</td>
<td>++ +</td>
</tr>
<tr>
<td>Woerden</td>
<td>Centrum</td>
<td>fort, extra-mural settlement, riverside deposits, Limes road</td>
<td>++ ?</td>
</tr>
<tr>
<td>Bodegraven-Reeuwijk</td>
<td>Bodegraven-Oud-Bodegraafseweg/Willemstraat</td>
<td>fort</td>
<td>+</td>
</tr>
<tr>
<td>Leiden</td>
<td>Roomburg</td>
<td>fort, extra-mural settlement, harbour installations, riverside deposits</td>
<td>++</td>
</tr>
<tr>
<td>Katwijk</td>
<td>Valkenburg-De Woerd</td>
<td>extra-mural settlement</td>
<td>++</td>
</tr>
<tr>
<td>Katwijk</td>
<td>Valkenburg-Centrum</td>
<td>fort, extra-mural settlement, bath-house, cemetery, Limes road</td>
<td>++ ++</td>
</tr>
</tbody>
</table>

### (B) MILITARY CONNECTIVITY IN THE DELTA: CANALS, SHIPS AND LIMES ROAD

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Site</th>
<th>Object</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utrecht</td>
<td>De Balije/Veldhuizen/Zandweg</td>
<td>Limes road and associated structures, ship</td>
<td>++</td>
</tr>
<tr>
<td>Leidschendam-Voorburg/Voorschoten</td>
<td></td>
<td>Corbulo canal</td>
<td>+</td>
</tr>
<tr>
<td>Woerden-Harmelen/Zoeterwoude-Rijndijk</td>
<td></td>
<td>Limes road and associated structures</td>
<td>+</td>
</tr>
</tbody>
</table>

### (C) CHRONOLOGICAL AND TYPOLOGICAL DIVERSITY: THE NIJMEGEN AREA

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Site</th>
<th>Object</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berg en Dal</td>
<td>De Holdeurn</td>
<td>military tile works and pottery</td>
<td>++</td>
</tr>
<tr>
<td>Berg en Dal/Nijmegen</td>
<td></td>
<td>aqueduct</td>
<td>+</td>
</tr>
<tr>
<td>Nijmegen</td>
<td>Kops Plateau</td>
<td>fort, extra-mural settlement, cemetery, rubbish deposits</td>
<td>++</td>
</tr>
<tr>
<td>Nijmegen</td>
<td>Hunerberg</td>
<td>operational base, legionary fortress, extra-mural settlement, cemetery</td>
<td>++ ++</td>
</tr>
<tr>
<td>Nijmegen</td>
<td>Valkhof area</td>
<td>Late Roman fort</td>
<td>++ +</td>
</tr>
</tbody>
</table>

### (D) MILITARY AND CIVIL INTERACTION: CIVIL TOWNS IN THE FRONTIER ZONE

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Site</th>
<th>Object</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nijmegen</td>
<td>Valkhof area</td>
<td>civil settlement Oppidum Batavorum</td>
<td>++</td>
</tr>
<tr>
<td>Nijmegen</td>
<td>Nijmegen-West</td>
<td>civil town Ulpia Noviomagus and cemetery</td>
<td>++</td>
</tr>
<tr>
<td>Leidschendam-Voorburg</td>
<td>Arentsburg</td>
<td>civil town Forum Hadriani, harbour</td>
<td>++</td>
</tr>
<tr>
<td>Element</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Legionary fortress</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Auxiliary fort</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Extra-mural civil settlement</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fortlet</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Watchtower</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Practice camp</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Bridgehead</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cemetery</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Governor’s palace</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Military town</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Military sanctuary</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fleet base/harbour/quay</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Riverside deposits</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ship(s)</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Water management</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Road, road infrastructure</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Other infrastructure</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Military industry</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Special remains</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Timber building remains</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stone building remains</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Rich organic remains</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Special issues</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Overbuilding</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>River erosion</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Excavation &gt; 10%</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Other erosion</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
Appendix 3  Sites no longer recommended

A3.1 Sites included in the 2014 site catalogue

4.3.14 Nijmegen-Rijksstraatweg: harbour
The inclusion of the canabae legionis under this heading was probably a misunderstanding, caused by the statement that the presumed harbour was part of the canabae. Although the presence of harbour facilities in this area is not implausible, a recent trial trench (2015) has not confirmed the hypothesis.

4.3.9 Nijmegen-Lent/Centrum: road, vicus
The assumption that a road connecting Nijmegen and Elst passed Lent and Ressen was mainly inspired by the presence of these settlements, and by the interpretation of an excavated building at Lent as a possible storage building associated with the military at Nijmegen. However, the building may be understood in a villa context as well, and a case can be made for a more westerly course of a road.

4.3.7 Nijmegen/Lingewaard-Ressen: road, settlement

4.3.5 Overbetuwe-Elst/Grote Kerk and Westeraam: sanctuaries
The Westeraam sanctuary has been (nearly) completely excavated.
Although the army may have played a role in the provision of building materials for the second stone building phase of the Grote Kerk temple, its nomination is not recommended. There is no indication of a “specific military following”, which is defined as a distinguishing characteristic of military sanctuaries in the SOUV.

4.3.17 Lingewaard-Duiven/Loowaard: eroded fort
The presumed fort at Loowaard is based on dredge finds. Although a record of remains of stone walls at great depth supports the hypothesis of an eroded fort, the site offers no characteristics which are not already represented by similar sites with added values (Bijlandse Waard, Maurik).

4.3.8 Lingewaard-Huissen/Loostraat: Limes road, settlement
Recent large-scale excavations have seriously compromised the potential value of this series of settlements and a cemetery. The topography has added to the belief that they may have been situated on the Limes road, but this has not yet been confirmed. The finds assemblage, with metal finds of a military character and a coin assemblage with some aspects deviating from the rural pattern, has given rise to the hypothesis of a military presence at some stage, possibly connected with a concentration of ditches, some of which were V-shaped. All in all the evidence does not justify nomination.
4.3.4 Overbetuwe-Driel/Baarskamp: military settlement

The hypothesis of an early military installation at Driel-Baarskamp is based on its location at the presumed junction of the road Elst-Driel with the Limes road – the former has been attested, the latter not yet – and on a dozen of Early Roman finds. Relatively recent targeted and non-destructive research has not produced further positive evidence. Geophysical research may provide further insight, although success is not guaranteed, since possible remains of an early military installation will be hidden below later Roman features. If geophysics fails, only invasive methods (trial trenches) remain.

4.3.3 Neder-Betuwe-Kesteren/Prinsenhof/Nedereindsestraat: fort, cemetery, settlement

This is a slightly confused entry in the 2014 catalogue. The area includes the remains of two agglomerations. Along the Nedereindsestraat the remains of an extensive rural settlement and its cemetery have been excavated. As many other rural sites near the frontier line in the river area it has produced some Roman imports and militaria, but there is no reason to consider it as a military vicus, with perhaps the periphery of the presumed fort.

The Prinsenhof area covers the remains of a separate cemetery, with several horse burials preceding human cremation burials. There are several indications that this cemetery belongs to a (mainly or entirely) eroded fort which was located to the north of northwest of it. It is not impossible that some remains of it are left below or immediately north of the present Rijnbandijk, but to establish that additional field work is required. Horse burials in the context of a human cemetery have so far only been attested at Valkenburg-Marktveld, and as such the Prinsenhof site has a possible added value, but it is doubtful whether anything is left of it.

4.3.1 Buren-Rijswijk/Roodvoet: re-deposited remains of an eroded fort

The finds from the dredge pools near the Roodvoet brick works at Rijswijk are supposed to represent the remains of an eroded fort. The discovery of (fragments of) three helmets has certainly contributed to this assumption. However, the entire assemblage of the finds collected by the ROB during the dredging works is not conclusive. The finds include some 2350 fragments of Roman pottery and over 1100 fragments of medieval and later date. The numbers of post-Roman finds clearly indicate that the dredge finds are not even remotely a homogeneous assemblage.

The fact that 33% of the Roman pottery fragments are handmade casts severe doubt on the military character of the settlement from which they originate. Roman tiles (all fragments are indicated as ‘dakpan’, which may or may not mean that brick fragments were absent) were not rare, with some 2700 fragments, but only 336 were characterised as ‘fragmenten’, against some 2400 ‘brokjes’. Only a single tile stamp has been recorded – definitely not in the league of Maurik, which has produced over 130 stamps. There is no record of large fragments of tiles or natural stone, with the exception of two halves of mill stones.

Although a location near the bifurcation of Lek and (Kromme) Rijn would make perfect sense for a fort, the finds assemblage cannot be safely interpreted as the eroded remains of a nearby Roman military fortification. As a matter of fact, it is not certain that the bifurcation was located downstream from this site. In the 1st

---

century AD this area was an unstable outer bend of the Rhine, where crevasse formation occurred before the Lek channel of the Rhine developed. The Rijswijk area may not have been suitable for the construction of a fort at that time.\textsuperscript{44}

\textbf{4.2.15 Wijk bij Duurstede-Cothen/Trechtweg: Limes road}

This is one of a series of large settlement sites between Rijswijk and Vechten. It has been assumed that all or most of them are located on SE-NW roads, one of them possibly the Limes road connecting the forts at Rijswijk and Vechten. Recent evidence of a road lined by timber post dated c. 124 indicates that the Limes road may have followed the Achterdijk and its southward continuation for much of its course, passing several of these large settlements. The precise line of this road remains unknown, however, and experience has taught that it is extremely difficult to detect it with non-destructive methods.

Although most of the sites have produced some early imported pottery and metal finds of a military character their finds assemblage is nevertheless fundamentally rural. Their size may reflect a relative wealth originating from contacts with the military nearby, and they may have played some role in the provisioning of the military settlements. Yet this is not sufficient justification for inclusion in the nomination.

\textbf{4.2.14 Wijk bij Duurstede-Cothen/De Dom: Limes road, settlement}

\textit{Cf. 4.2.15 above.}

\textbf{4.2.13 Wijk bij Duurstede-Cothen/Smidsdijk: Limes road, settlement}

\textit{Cf. 4.2.15 above.}

\textbf{4.2.12 Wijk bij Duurstede-Oude Leemkolk: ship}

Remains of a ship have been found here in 1972, and nearby sherds dating to the 9th and 12th centuries, but the geological context was thought to point at an earlier date for the ship. A C14 sample was taken, but there is no record of its analysis. Later surface finds indicate a medieval date as well.

\textbf{4.2.11 Wijk bij Duurstede-Dwarsdijk: Limes road, settlement}

\textit{Cf. 4.2.15 above.}

\textbf{4.2.10 Bunnik-Werkhoven/Tuurdeijk: Limes road, settlement}

\textit{Cf. 4.2.15 above.}

\textbf{4.2.9 Bunnik-Werkhoven/Achterdijk: Limes road, settlement}

\textit{Cf. 4.2.15 above.}

\textbf{4.1.8 Alphen aan den Rijn-Zwammerdam: fort, extra-mural settlement, riverside deposits}

At Zwammerdam, a fort of the ‘delta type’ has been completely excavated, including a large part of the riverside rubbish dump, together with the remains of six ships from the Roman period. Parts of the extra-mural settlement are still preserved, despite the construction of an institution for the disabled on

\textsuperscript{44} Pers. comm. Kim Cohen.
this location. Because of the near complete destruction of the fort and the fragmentary character of the remaining elements of the settlement nomination of Zwammerdam is not recommended. All aspects of the site are better represented elsewhere.

4.1.7  Alphen aan den Rijn-Polder Steekt: Limes road
This is a small part of the road section between the forts of Zwammerdam (above) and Alphen aan den Rijn-Centrum (below), which is heavily affected by clay extraction. For that reason nomination is not recommended.

4.1.6  Alphen aan den Rijn-Centrum: fort, extra-mural settlement, riverside deposits
Cf. 4.1.8. The fort of Alphen aan den Rijn was nearly completely excavated, including large parts of the extra-mural settlement. Most of the riverside rubbish dump was destroyed during recent construction works.

A3.2  Sites recommended in 2012, but not included in the 2014 site catalogue

51  Berg en Dal-Millingen: Limes road
Although it is not unlikely that there was a road running SW-NE through this area it has not been attested. Its course cannot be predicted with enough precision to expect a survey to be successful. Besides, there are alternatives for a road connecting Nijmegen with Xanten.

101  Berg en Dal-Ubbergen: road Nijmegen-Xanten
Cf. 51.

86  Overbetuwe-Elst/Driel: road
Traces of a road connecting Elst and Driel have been attested at two locations. Since Driel and the temples and Elst are not recommended for nomination there is no reason to select this road section either.

89  Rijnwaarden: Limes road
This road has not been attested in Gelderland, and there is not enough evidence to predict its course with tolerable precision.

30  Lingewaard-Duiven: Limes road
Cf. 89.

44  Lingewaard: Limes road
Cf. 89.

6  Arnhem-Schuytgraaf/Elden: Limes road
Cf. 89.
87 Overbetuwe: Limes road  
Cf. 89.

61 Neder-Betuwe: Limes road  
Cf. 89.

12 Buren: Limes road  
Cf. 89.

183 Wijk bij Duurstede: Limes road  
The Trekweg immediately north of Wijk bij Duurstede (opposite the De Geer site) is the only location in the Kromme Rijn Area where a targeted survey has produced some evidence for the possible presence of a road, consisting of a scatter of gravel in corings. Yet it is not very convincing, and further tests between this location and the excavated road section near the Achterdijk at Bunnik have produced negative results. Furthermore, it is not certain that the road connecting these two points is the Limes road. To all probability there were several more or less parallel roads in this area.

107 Bunnik-Schoudermantel: watchtower  
Allegedly the presence of a watchtower has been attested here during construction works on the A12 motorway. Regardless whether the interpretation is correct – there is no proper documentation – there are no remains left. (Note: the location of cat. no 107 was probably confused with a different site with the same toponym, for which there is no indication of the possible presence of a watchtower).

131 Houten-Marsdijk: Limes road  
A section of a road paved with gravel was considered as part of the Limes road, as it was located more or less in a direct westward line from the western gate of the stone fort at Vechten. However, OSL samples from below the pavement turned out to be of early-medieval date. Although it may be a successor of a Roman road there is no justification for its inclusion in the nomination.

164 Utrecht-Duitse Huis: cemetery  
In 2007 eight burials were excavated here, nearly 400 m SW of the centre of the Domplein fort area. Three of the graves can be dated to the pre-Flavian period. A grave dated c. AD 180-275 contained the inhumated remains of a child. Although pre-Flavian pottery is likely to be associated to the military, it is less than certain that the cemetery belongs to the military settlement. The extent and boundaries of the cemetery are unknown, and are notoriously difficult to assess by non-destructive methods, especially in a built environment. All in all there are too many uncertainties to recommend nomination.

168 Utrecht-Meerndijk: dug canal  
Below the Meerndijk a crevasse splay has been attested. It is assumed that it provided a connection between the Heldam Rhine channel and the Hollandse IJssel (Meijerberg channel). This supposition receives some support from the recorded presence of a sherd of Roman handmade pottery in the crevasse channel. It is a matter of discussion whether it was a natural connection or partly
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artificial. Since most of the water course is situated below a dike, field work to attest its character is not actually possible. In absence of conclusive evidence nomination is not possible. The Corbulo canal is a better representative of a dug canal.

167 Utrecht-Touwslagerslaan: watchtower
In the past a watchtower has been supposed here on account of finds of pottery (including sigillata) and a sling shot in soil extracted for the creation of a pond. It is now no longer considered as a candidate for a watchtower.

169 Utrecht-De Balie: ship De Meern 1
This ship was excavated in 2003. (N.B. The coordinates of this find in Archis are incorrect).

163 Utrecht-Limes road (general)
The list of recommended sites includes a large section of the Limes road (Balie/Vleuterweide/Zandweg) which appears the most multi-faceted one in this area.

215 Leiden-Roomburg: southern periphery of extra-mural settlement
Besides some features belonging to the periphery of the extra-mural settlement of the Roomburg fort, this broad zone was completely disturbed by recent construction works for the A4 motorway. Only few Roman remains were found on that occasion.

219 Leiden: Limes road
In Leiden, no features of the limes road have been located yet.

200 Katwijk-Zanderij Westerbaan
This rural site was almost completely excavated. The remaining area was overbuilt by a new housing development, essentially destroying the last intact archaeological features, that were located just below the surface.

211 Katwijk-Valkenburg/Katwijk: Limes road
This site encompasses five different observations of the Limes road. Four locations in Valkenburg are completely excavated and therefore have not been preserved. The fifth location is a possible part of the Limes road in Katwijk. Its interpretation, however, is not only doubtful, but the area is also completely overbuilt and disturbed.

210 Katwijk-Uitwateringssluis
During the construction of a new lock of the river Rhine, a settlement was excavated which was considered as a possible military vicus associated with the Brittenburg. However, it remains unclear if the site was indeed an extra-mural settlement. Also the dimension of the site is unknown, due to the character of the excavation, which was a rescue operation. In absence of this specific information, nothing is known about remaining parts of the site in the area of the lock and therefore, the site is not included.
209 Katwijk-Brittenburg

The site was completely eroded by the sea, so no archaeological remains are preserved. Stray finds are also unknown, indicating that all remains were washed out.