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INHALT

THE ROMAN HARBOURS OF VELSEN AND VOORBURG-ARENTSBURG (NL)

Mark Driessen

Introduction

In the Roman period the Low Countries can be characterized predominantly as a swampy wetland area of little economic potential. This territory is not a colony rich in natural resources or with the prospect of large-scale agricultural surplus production, although it played a role in the recruitment of military manpower. The potential of the Low Countries for the Roman authorities lies in its geographical location as a coastal delta area where several important North-European waterways merged. Such waterways were essential for the logistics, infrastructure and security of the north-western part of the Roman Empire (Fig. 1, 4). The military presence, the establishment of the northern frontier line and the persistent efforts to maintain Roman authority in this area are connected to the strategic importance of the transit routes for the north-western section of the *Imperium Romanum*, and in particular towards *Britannia*.

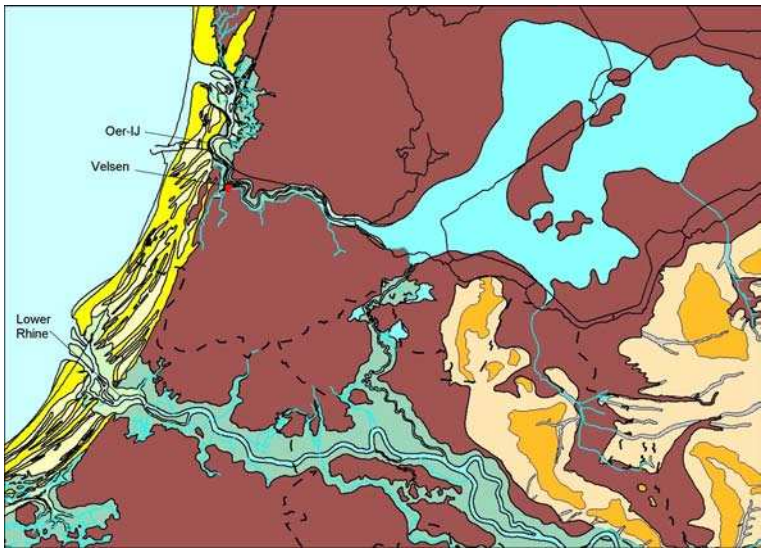

Fig. 1. Palaeogeographical map of the western part of The Netherlands, consisting the Lower Rhine Basin and the still open Oer-IJ estuary, around 500 BCE (after Vos/De Vries 2013).

Waterfront installations

The Rhine was the basis of the northern frontier and an important medium for the military and civilian distribution management, which can be demonstrated by the infrastructural adjustments to transport lines in

this area (see e.g. Graafstal 2002; van der Kamp 2009, 117 ff.). The Meuse formed a significant 'inland' transport route for our region and was connected to the Rhine via the Waal in our eastern river area. A variety of military and civilian settlement complexes at Roman Nijmegen play an important role as a hub for logistics and infrastructure by means of this connection (Driessen 2007, 39 f. 99 ff. 148 ff.). In the western river area of the Low Countries adjustments were made to connect both rivers by means of the Corbulo Canal *(fossa Corbulonis)*, which was constructed in the 40's of the first century (Jansma 1995, 129; de Kort 2009).

The hand of the central Roman authority is apparent throughout the Low Countries, from the maintenance of the frontier and the military facilities, the founding of new towns, the construction of waterfront installations and infrastructural adaptations. These adaptations and the transformations of the landscape involved are very diverse and reveal different scales of intervention. On the one hand we see simple landing and loading platforms along the Rhine used for the supply of small forts as have for instance been excavated at Zwammerdam, Alphen a/d Rijn and Woerden. Two settlements with extensive waterfront installations are on the other hand illustrative for supra-regional investments, and may be considered examples of the integration of the Lower Rhine area in the greater strategic framework of the Roman empire: Velsen and Voorburg-Arentsburg.

In order to describe and conceptualize the waterfront installations, it is important to note that there is an inter-changeability between the terminology of these installations in many languages, which have de-facto different meanings and functions[1]. There is a significant difference in purpose between landing places, hards, causeways, wharfs, embankments, jetties, piers, moles, loading platforms, ports and harbours, which we should take in consideration before we use these terms in relation to archaeologically retrieved structures (McGrail 1997, 49 ff.). Rogers (2013, 144) describes a harbour as an artificial – constructed with jetties, sea walls or breakwaters – or natural place where vessels can seek shelter or be stored. A port on the other hand can be described as an artificial waterfront construction – a settlement possessing a harbour – near a sea, lake or waterway shore where loading, transhipment and/or unloading of vessels takes place. Next to this difference in purposes we should consider the social impact these waterfront installations had on the involved waterscapes and people (Rogers 2013, 144 f.).

The Roman military bases and harbour of Velsen

A World War II German anti-tank trench brought the first artefacts from the Roman settlement of Velsen to light (Calkoen 1954). Excavations by the AWN-Velsen in the 50's and 60's, but especially the joint-venture AWN-IPP-research prior to the construction of the Wijkertunnel under the North Sea Canal, brought momentum to the archaeological interest for this site[2]. Around 1978 it became clear that Velsen was an early military base with associated waterfront installations. These would have ended up in oblivion without the persistence and expertise of especially Jaap Morel, the director of the excavations[3]. The excavations were carried out under exceptional circumstances, on a heavily abraded Roman subsoil where only very shallow features and ditto post remnants had survived later erosion, but ultimately it was possible to distinguish three phases of activity (see Fig. 2a–c; Morel 1988; Bosman 1997).

1 Cleere 1978, 36; McGrail 1997, 49 ff.; Jones 2009, 48; Rogers 2013, 143 ff.

2 AWN (Archaeological Workgroup Netherlands): a national partnership of local amateur archaeology groups; IPP is the former Institute of Pre- and Protohistory of University of Amsterdam, now Amsterdam Archaeological Centre of the University of Amsterdam.

3 Jaap Morel wrote an unpublished PhD-thesis – in Dutch and limited edition – on the features and structures of Roman Velsen in 1988. Also unpublished is the PhD-thesis of Arjan Bosman on the cultural find material of Velsen . In addition to these dissertations, many unpublished student theses and local papers were written on the site of Velsen in the 70's and 80's of the last century. Because only a few articles on Velsen reached the international archaeological community a grant from the Netherlands Organisation for Scientific Research (NWO) Odyssee programme was obtained with the aim of synthesising this and subsequent research. This work is still in progress, but for the features and structures the present paper rely heavily upon the analyses by Morel 1988 and Bosman 1997.

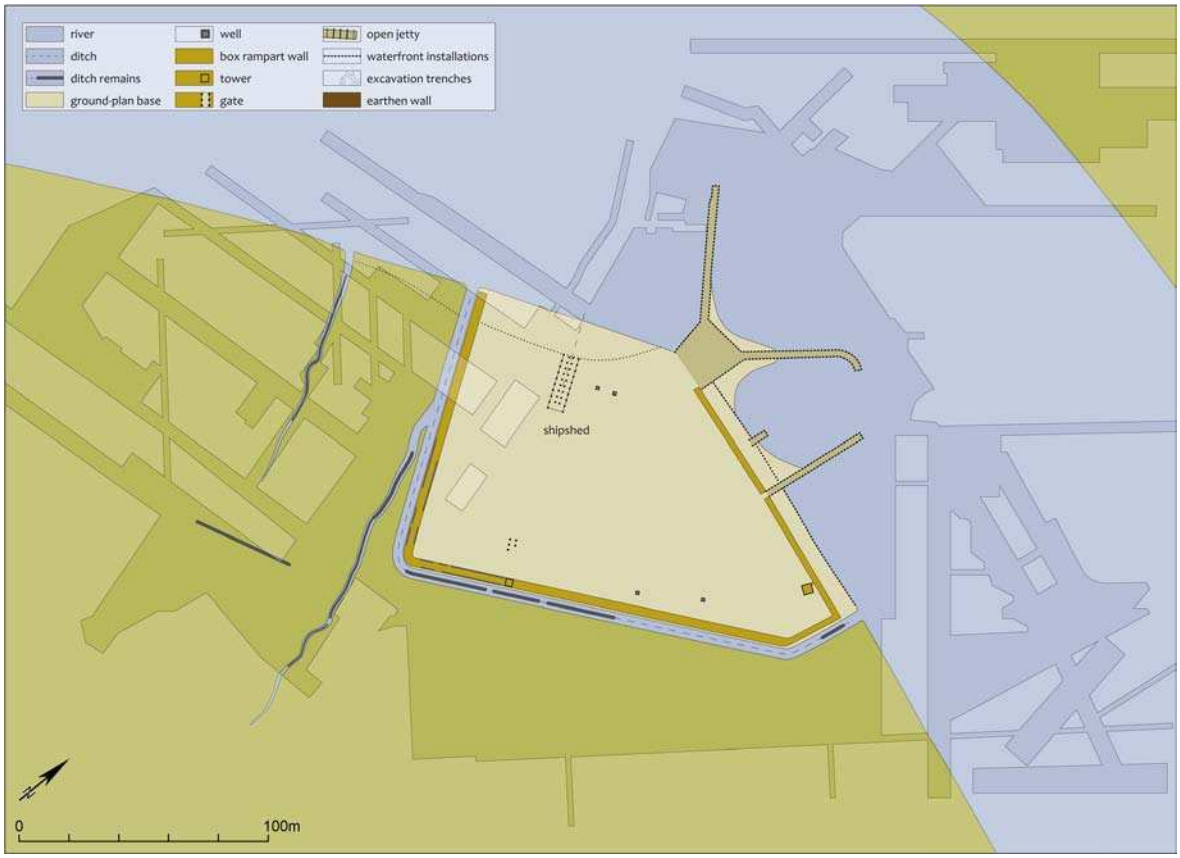

Fig. 2a. Velsen. Phase 1B of the military outpost and harbour (16–22 CE). – Drawing J. Kaarsemaker.

The phases of the military bases and waterfront installations at Velsen

The first phase of the base dates from 16 – 25 CE. A temporary building phase (1A) was replaced by a roughly trapezoid base of approximately. 1 ha (2.5 acres; see Fig. 2a). It consisted of a single ditch and a 3 m wide box rampart wall (Holz-Erde-Mauer). It is not clear whether the NW section of the rampart wall – next to the Oer-IJ River – was ever present or had been eroded away. The Oer-IJ River is an off-shoot of the Old Rhine and connected to the North Sea near present-day Castricum. By the time of Roman Velsen this North Sea connection was still (partially) open, but the continuous process of silting was irrevocable (Driessen/van Driel-Murray in prep.). Traces of a tower at the SE and a gate at the N section of the box rampart wall have been preserved. The gate gave direct access to the waterfront installations and was connected to one of the four pier-like structures: quay moles. The waterfront consisted on the NW side of a revetted trapezoid platform (approximately 24 × 24 m) to which two sheet-piled quay moles of 54 m (NW) and 45 m (NE) were connected. The reason they are called "quay moles" is twofold. They were most probably constructed to protect the artificial waterfront from the abrasive effects of the Oer-IJ River flow. In addition the numerous artefacts retrieved from the water around them may indicate that the quays were also used for docking ships in order to loading and transhipment. Although large amounts of artefacts have been retrieved, this can be but a fraction of the original quantities due to the intensive dredging that took place here in the Roman era. The term "mole" is used because of the massiveness of the structure which does not allow water to flow freely under it. To the east of the platform a revetted embankment wall was constructed with two other quay moles. The most eastern quay mole that connects with the gate of the box rampart wall is 41 m long, and the small quay mole of 5–6 m was already constructed in the initial phase 1A. Besides the remains of a few wells, the only two retrieved internal buildings of the base are the deeply cut features of two shipsheds (approximately 22 × 6 m and 20.5 × 6.5 m in size)[4]. The smaller SE shipshed most probably replaced the initial NW one (Fig. 2a) as a result of abrasion of the Oer-IJ River and

subsequent remodelling of the waterfront installations, which took place during the final years of this phase (1C: 22–25 CE). This second shipshed – approximately 35 m SE of the initial one – most probably remained in use during the later phases (see Fig. 2b–c). The dynamics of the Oer-IJ River resulted not only in protection against the water by constructing new embankments, but also in subsequent dredging operations to keep the river navigable. The northern part of the western ditch was widened, deepened and secured with revetted embankments, thus creating a basin approximately 40 m long connected to the Oer-IJ.

The second phase that dates from 25–28 CE can also be subdivided in an initial construction (phase 2A) and a definitive use (phase 2B). The new trapezoid camp has about the same in size as the initial one, but the lay-out is different (Fig. 2b). The box rampart wall is only erected on the landward side and no longer along the river. A double gate, probably with eight towers, was found at the SW-side of the wall[5]. The camp is surrounded by three parallel ditches that ended at the western side in the sheet-piled basin constructed during the last adaptations of phase 1 (22–25 CE), but remodelled for this period. Sheet piled embankments were also constructed at the western river shore and between the basin and the platform. The NW quay mole of the platform was extended with an open quay jetty and the NE one was completely transformed in an open quay jetty. The idea is that the quay moles of the earlier phase caused too much turbulence, erosion and deposition. The eastern quay mole of the second phase was partly replaced by an open version. At the eastern river shore the embankments were taken away and not replaced. A new open quay jetty of approximately 90 m length was constructed 40 m E of the eastern ditch of the camp. This would leave it unprotected, but a straight ditch was dug in EW direction approximately 75 m S of the base which enclosed this jetty. This new

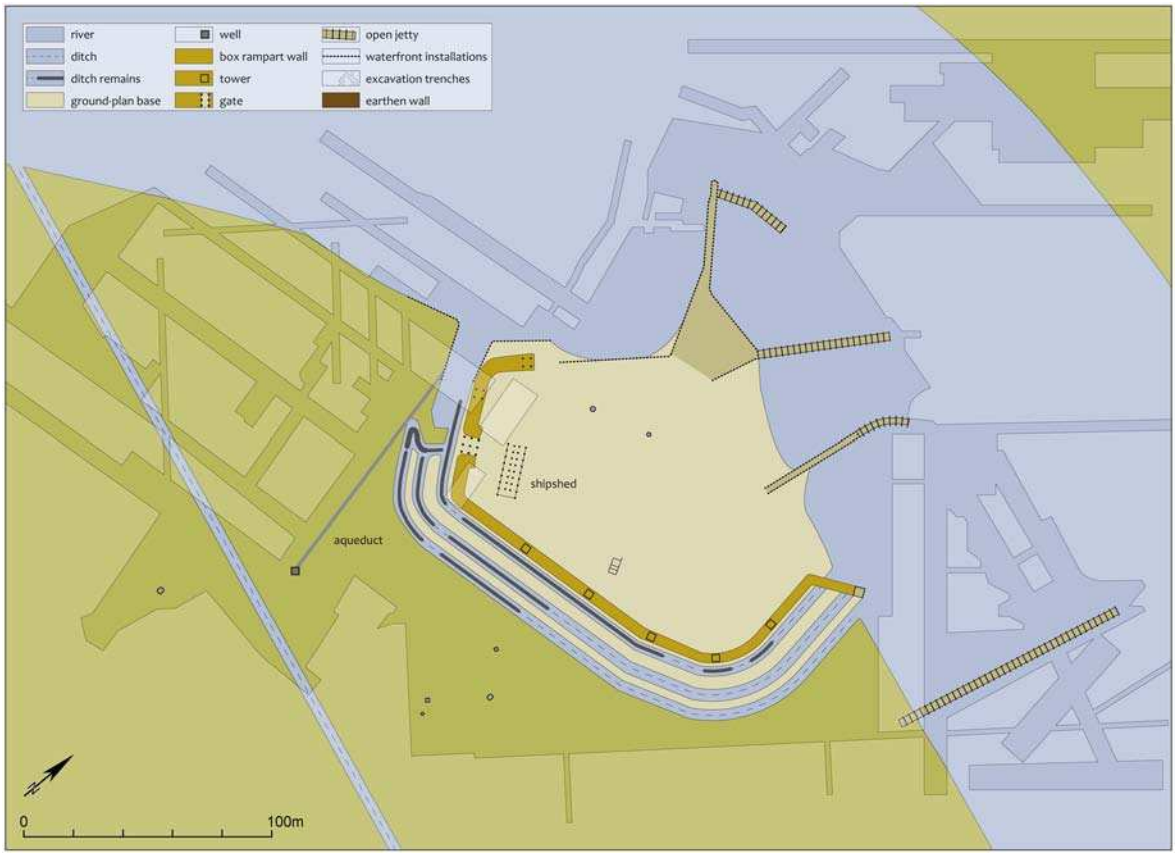

Fig. 2b. Velsen. Phase 2B of the military outpost and harbour (25–28 CE). – Drawing J. Kaarsemaker.

4 For the use and evidence of Roman shipsheds see Rankov 2013.

5 That no gate and no more towers were found at the box rampart wall of earlier phases can be due to levelling activities for later constructions or the earlier mentioned intensive erosion that took place here in later periods.

jetty was also overlooked by a newly constructed tower with platform at the eastern part of the box rampart wall. Another reason why this extra ditch was dug, probably related to the security of a new source of drinkable ground water. A new well of 3 × 3 m was constructed outside the perimeters of the camp and connected by means of an aqueduct to the harbour. It is assumed that this water source and distribution system was created to supply ships with drinking water, as no branch was found leading into the fort.

For phase 3 (28–45/47 CE) the camp was enlarged with a western annex, as a result of which the base comprised an area of about 2.5 ha (6.0 acres). This annex included the above mentioned well and aqueduct and was fortified by a double ditch and a box rampart wall, with most probably two new single gates and four towers (Fig. 2c). Within the perimeters of this annex a structure interpreted as a granary, together with an extra shipshed were constructed. This double shipshed was larger than the initial ones (approximately 30 × 12 m) and could probably house two small galleys. As far as we know no alterations were made to the harbour during this phase.

For all three phases other internal buildings of the camp as barracks are absent, the features of these were either eroded in later times, or the troops were housed in tents.

The active occupation and usage of the Roman camp and harbour of Velsen covers only a few decades and ends in the second half of the 40's, which is most probably due to the silting up of the Oer-IJ estuary and the establishment of the *limes* frontier along the Lower Rhine.

Velsen harbour finds and interpretations

One of the most intriguing – but also complicating – aspects of archaeological research in Holocene wetland contexts concerns the excellent conservation of organic remains. Velsen can be considered as one of the

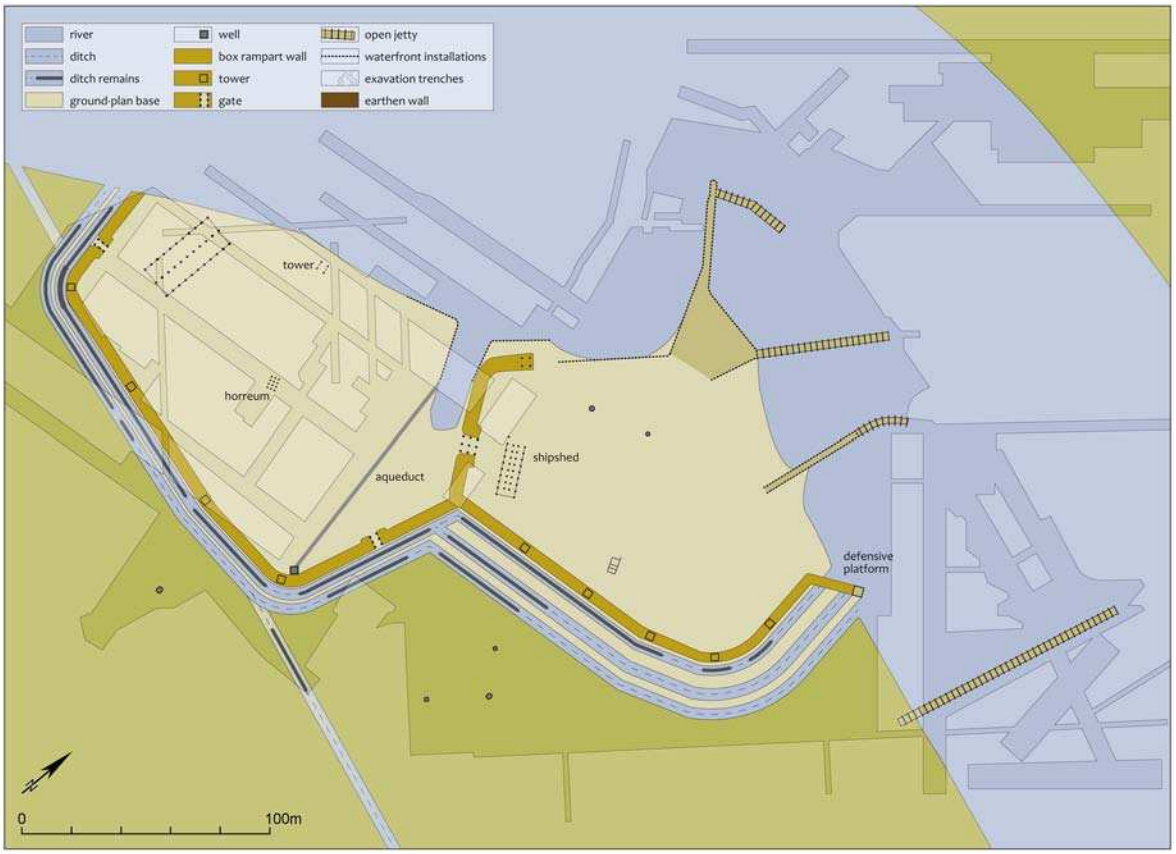

Fig. 2c. Velsen. Phase 3 of the military outpost and harbour (28–45/47 CE). – Drawing J. Kaarsemaker.

fine examples of this. The macrobotanical and palynological evidence gives us clues about the environment and point to diversity in habitats present in the vicinity of the site. One should think of a coastal dune area covered by semi-open forest vegetation. The immediate surroundings are characterized by a mosaic of more open vegetation types, consisting mainly of gradually merging grass and reed beds that were under the influence of both fresh and brackish water (Pals in prep.). The ichthyo-archaeological remains indicate that although the Oer-IJ estuary was silting up, it most probably still had an open sea access during the Roman phases of Velsen (Beerenhout in prep.).
Moreover, the organic remains also provide insights on food stuffs, as well as the logistics of supply. The economic plants indicate that (exotic) food crops were imported in substantial quantities. In addition to cereals (mainly bread wheat [*Triticum aestivum* L.] and spelt wheat [*Triticum spelta* L.] these predominantly concern Mediterranean fruit and nut species. Pignolia nuts form the Italian stone pine (*Pinus pinea* L.), gourd seeds (*Lagenaria* spp.), and peach pits (*Prunus persica* [L.] *Batsch.*) are well represented. Remarkable is the watermelon (*Citrullus lanatus*) that can be called unique in our region for this period. The presence of botanical remains from local wild plants as sloe (*Prunus spinosa* L.), common sea-buckthorn (*Hippophaë rhamnoídes* L.), elder (*Sambucus nigra* L.), and samphire (*Salicornia* spp.) might indicate that the food repertoire was also supplemented by locally gathered produce (Pals in prep.).

The diversity of wooden and organic objects found in Velsen gives a differentiated insight in the everyday activities which took place in and around this settlement, and are also indicative of the exploitation of local resources by the people living at Roman Velsen. This is illustrated by the coiled basket beehive made from grass stems (*Poa* spp.) and split twigs of bramble (*Rubus* L.), four fish traps made of willow strands and stakes (*Salix* spp.), and two wooden net floaters of alder (*Alnus glutinósa* L.) and beech (*Fagus sylvatica* L.) wood, which were all retrieved in the harbour basin. The harbour and shipsheds emphasise the marine role of the military outpost at Velsen. This can be underlined by the presence of different nautical implements such as wooden pulleys, cleats, blocks, and paddles. Lead strips with nail holes can point to the maintenance of seafaring ships. The use of lead strips/plates on the ship's hull is regularly observed archaeologically in Roman shipwrecks in the Mediterranean region. This lead sheathing had a multiple use and was applied to improve water tightness, but also as a measure to prevent the hull from bio fouling. Such kind of lead strips on the outside of shipwrecks and near waterfront installations are known from approximately 50 Roman sites in the Mediterranean region (Fitzgerald 1995, 182 ff.). The lead strips from Velsen not only correspond to those from many Mediterranean waterfront sites and Voorburg-Arentsburg in thickness, but also in the size of the holes and the impressions of the nail heads[6]. Large quantities of natural stones retrieved in the harbour basin were not imported for building purposes, nor seemed to be suitable for other specific uses. Some were probably used for the consolidation of the quay works. An interesting hypothesis is that they were partly used as ballast for ships after unloading. The Middle Rhine provenances of these stones can be interesting in this light especially in terms of provisioning routes.

A corpus of approximately 1400 wooden tent pegs might be indicative for the absence of barracks and together with the retrieval of several leather tent parts strengthen the hypothesis of the bivouacking of soldiers in tented accommodation. That they were not lacking a degree of Roman comfort can be deduced from 35 well-preserved wooden furniture fragments which show similarities with those retrieved from Mediterranean contexts, a dozen wooden lock fragments and keys plus more than 30 wooden wax tablets (van Rijn/Doeve in prep.).

Roman wheel-thrown pottery was retrieved in huge amounts (approximately 138,000 fragments) and with diversity in usage and provenances. A portion shows limited fragmentation and ditto traces of wear and use. Some even still contained intact wooden stoppers (Fig. 3). This component is most probably the result of transport and transhipment rather than of functional use in the settlement (see also 216 ff.). The pottery is partly Mediterranean in origin, but most has been manufactured in the new production sites along the rivers Rhine and Meuse. This is also the case for the majority of the Roman wheel-thrown pottery that

6 See respectively Meffert 1989, 24 ff.; Fitzgerald 1995, 67 ff. 184 ff.; Stolk 2014, 692.

Fig. 3. Velsen. Smooth ware jugs with intact wooden stoppers. – Photo BIAX CONSULT.

was retrieved as considerably fragmented and worn sherds, sometimes bearing traces of soot. This component is interpreted as refuse from the settlement. The variety in ceramic ware makes clear that some kind of Roman lifestyle, with imported food, drink and serving conventions was being maintained (Cool 2006). A *titulus pictus* on the neck of a Camulodunum 184-amphora might indicate that is was (re-)packaged with fava bean meal *(lomentum)*. The pottery gives us more clues about this early Roman outpost. Inscriptions with names on equipment and ceramic table-ware point to the presence of soldiers with cognomen related as well to Mediterranean as Germanic and/or Gallic origins. Are these last – as for example a genitive of the cognomen *Batavus* on the base of a terra sigillata plate – indicative for auxiliary detachments at this site? A large corpus of handmade pottery with different provenances, local as well as from the Dutch eastern river area, might be related to the presence of these auxiliaries and/or other forms of contacts with, for instance, local communities (Diederiks 2013). Remarkable in this light is the absence of Roman wheel-thrown pottery from the active period of Velsen in the surrounding native settlements (Morel 1987, 174; Therkorn et al. 2009, 156 ff.). An Elb-Germanic hairpin and handmade pottery of Chaucian traditions might indicate on contacts with groups from the northern regions, or relate to interaction with the military campaigns in the north (see for these e.g. Erdrich 2001, 115 ff.). Women and children – on the other hand – seemed to be present as well in this militarised settlement as can be deduced from the occurrence of their shoes at this site (van Driel-Murray in prep.), and the presence of brooches which are associated with female dress.

The Roman outpost and unique waterfront installations of Velsen were established in 16 CE as part of the Roman (military) reorientation following the Varus disaster. The waterfront installations at Velsen are best described as a harbour complex. The site was most likely essential in the set-up of a new logistical and security system for the region in this era. The settlement and harbour also played a role in the transhipment of maritime to river transport and vice versa, most probably in order to supply military campaigns in the north, and can thus also been seen as a military port.

The Roman harbour settlement of Voorburg-Arentsburg

The first systematic excavations in Voorburg-Arentsburg – situated along the Corbulo Canal between the rivers Rhine and Meuse (Fig. 4) – were begun by C. J. C. Reuvens in the 19th century. These and J. H. Holwerda's excavations in the early 20th century, uncovered structures of a Roman planned settlement with a surrounding wall plus ditches, a rectangular street grid and lay-out, and large Roman public baths (Buijtendorp 2010). This site was initially interpreted as a fleet station of the *classis Germanica* (Holwerda 1923), and later on reinterpreted as the Roman town *Forum Hadriani* (Bogaers 1972, 318 ff.). The estimated size of this small Roman town – which served as the capital for the *civitas* of the Cananefatians – was first put at twelve hectares (Buijtendorp 2006, 96 f.), but recent excavations suggest a more modest size of around five hectares (Driessen 2014, 222 f.; Bink/Franzen 2009, 437 ff.). The small Roman town at Voorburg-Arentsburg became in the 2nd century the stimulus for the circulation of money in the Cananefatian *civitas,* as a result of which the settlement increasingly acquired the function of a central place (Kemmers 2014, 610). Fragments of more than life-size imperial bronze statues may indicate that this settlement had also some kind of representative function. In 2007/2008 excavations were carried out in three large trenches by the University of Amsterdam in the expectation of examining two – possibly three – *insulae* of this Roman town.

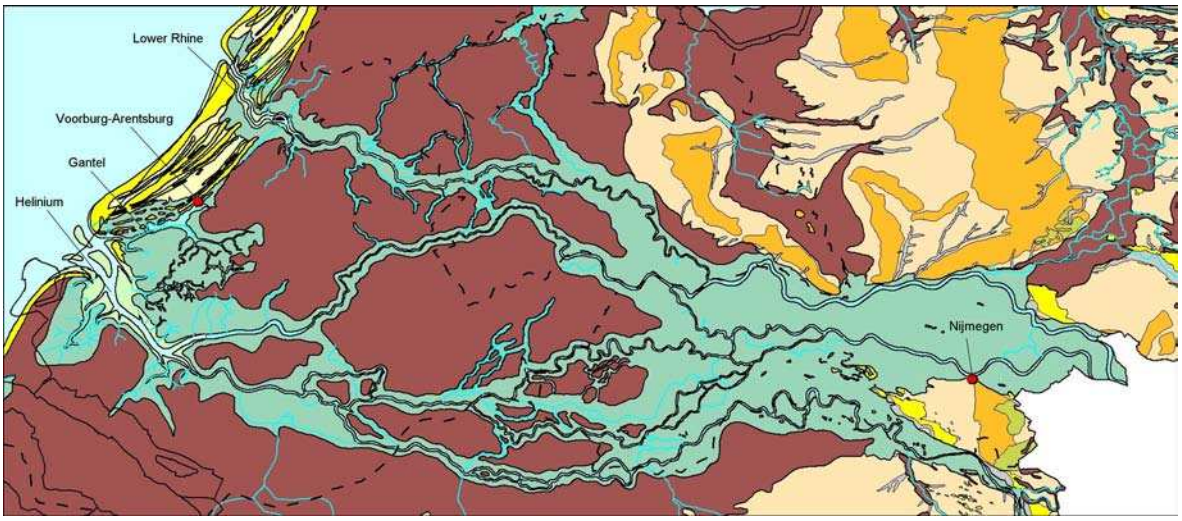

Fig. 4. Palaeogeographical map of the coastal river delta in The Netherlands (around 100 CE) (after Vos/De Vries 2013).

Waterfront installations at the harbour of Voorburg-Arentsburg

It surprised us when the excavations in two trenches uncovered a river channel 110 metres in length with a tapering from at least 41 metres in the south and 28 metres in the north (Fig. 5). The genesis of the river channel is probably connected with increasing marine influence in the Middle Iron Age. Water entered the land behind the dunes from the Helinium – the Meuse estuary – and the Gantel. The many stream channels of the Gantel system had an erosive effect on the peat area (Vos et al. 2007). The Voorburg river channel, a possible branch of the Gantel system, was most probably created by a spring tide. Micromorphological research, in combination with observed concentrations of rounded pebbles in the undisturbed – not dredged – contact zones between the bottom of the channel and the underlying beach barrier would

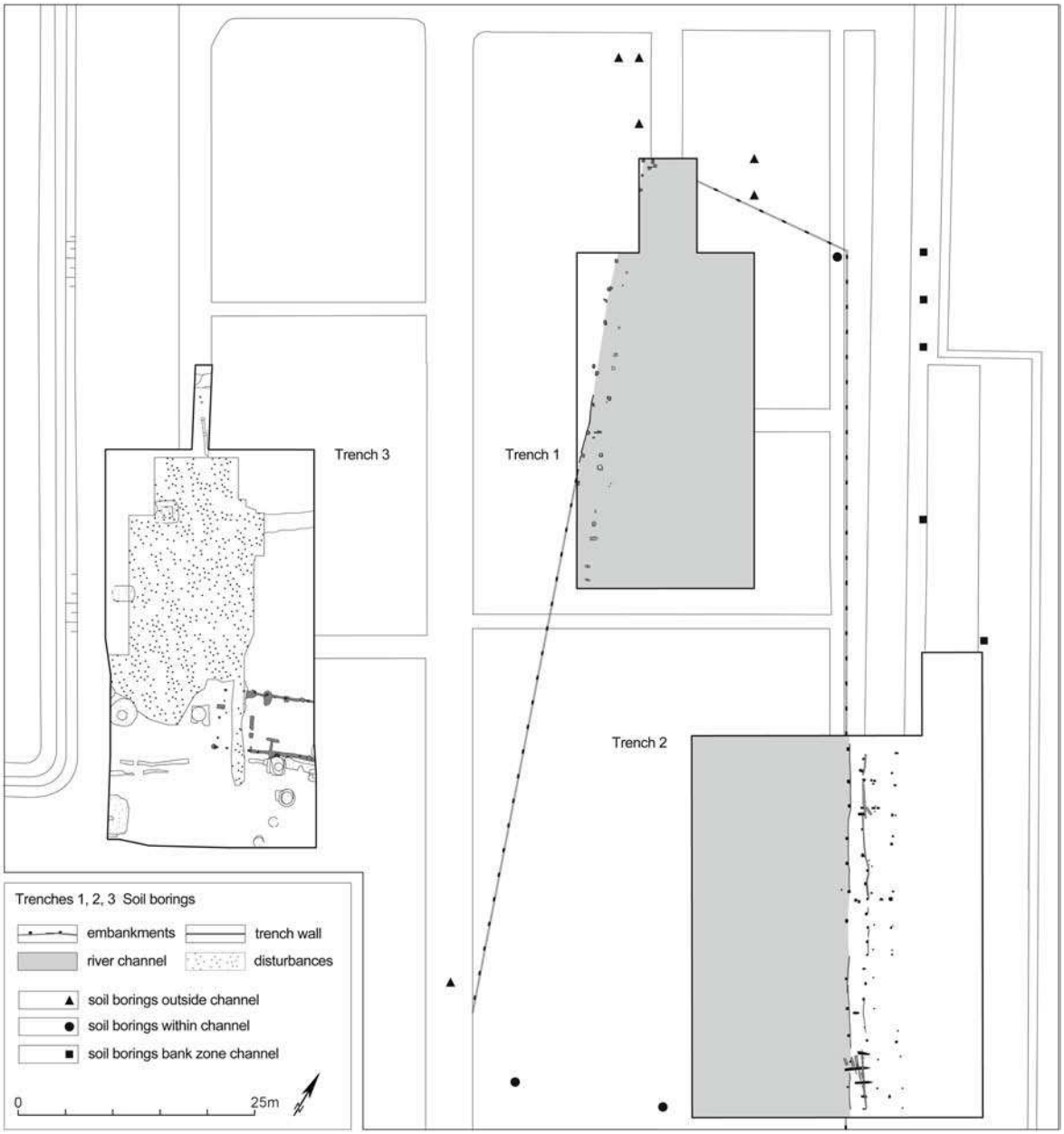

Fig. 5. Voorburg-Arentsburg. Plan of the excavations of the University of Amsterdam, with soil drillings to locate dimensions of harbour basin. – Drawing J. Kaarsemaker.

support this assumption. The river channel was dredged at least three times in the Roman era, which was most probably carried out by an experienced team as the deviation in dredging depth is at most 20 cm over an area of hundreds of square metres (Driessen 2014, 201). The micromorphological analysis shows that the dredging was done by hand and prior to this the channel was largely laid dry. Dredging is executed when navigability becomes an issue as for instance a result of relative changes in the water level or sedimentation, or to transform a natural body of water into a harbour basin of the desired proportions. The last seems to be the case as the channel is lined on three sides by quay installations. The base of these quay works consisted in pointed straightened oak posts – with a width of 0.3 × 0.3 m and a preserved length of 2.5 m – which were driven in the ground. To construct these quays, the oak posts, originally approximately four meters long, were probably hoisted up with a crane and driven in with a pile driver – a so-called *fistuca.* Dendrochronological analysis reveal that the oldest quays were constructed around 160 CE and their posts have a broad provenance from the Netherlands, Central and South Germany (Domínguez-Delmas et al. 2014). The ear-

liest dredging also took place around 160 CE, as is evident from the relationship between the dendro-dated posts and the dating of the cultural finds in the fill layer deposited after the first dredging operation. This operation deepened the channel over its entire width and almost its whole length to a level of around minus 1.9–2.0 m NAP (Normal Amsterdam Water Level). The quay works at the eastern side of the channel – consisting of a double row of driven-in posts – collapsed at the beginning of the 3rd century. This collapse was due to a sudden lateral pull probably caused by moored ships, which pulled the posts out of their piling holes (Fig. 6), followed by a gradual process during which the posts were keeled over gradually or slumped in the direction of the dredged basin (Fig. 7). The stratigraphy suggests that the gradual collapse of the posts was most probably caused by a too rigorous second dredging operation that took place at the end of the 2nd or beginning of the 3rd century. Gradual depositions of clay in the channel fills and around the posts make it unlikely that the collapse was caused by tidal activity (Driessen 2014, 202–203).

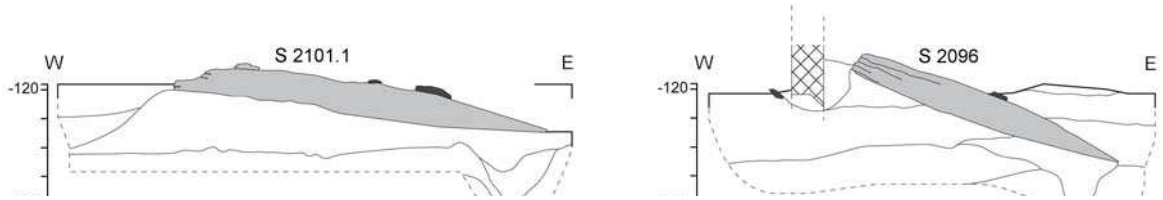

Fig. 6. Voorburg-Arentsburg. Two collapsed posts of the 160–210 CE quay works of the harbour. The posts had been pulled out of their piling holes, after which they subsided. – Drawing J. Kaarsemaker.

Fig. 7. Voorburg-Arentsburg. Collapsed post of the 160–210 CE quay works of the harbour. Photo Amsterdam Archaeological Centre.

At the end of the first decade of the 3rd century, the basin of the channel was thoroughly dredged for the third time. The waterfront installations were at the same time equipped with new or partially new quays. The quays on the north and west sides of the channel were provided with new posts to replace poor or weaker specimens of the oldest phase. The quays at the eastern side – where a row of thirteen posts was excavated (Figs. 8; 9) – were completely replaced after the collapse of the oldest structures. The subsidence of the initial posts probably gave rise to new ideas for the construction of these new quay works. Not only were these extended further into the harbour, namely over two meters more to the west than in the oldest phase, but the posts of the new quays had much longer points and were also driven in considerably deeper (on average to -3.27 m NAP vs. -2.45 m NAP for the previous phase), possibly to prevent future subsidence. For the early third century construction we also noticed that two extra rows of 'supporting posts' were driven in along the bank side, and thus creating open quays. Dendrochronologial research showed that the oak posts of these new quay works date around 210 CE and all have a South German provenance.

In total 90 quay posts were excavated along the banks of the Voorburg harbour basin. It was observed that the wood of the posts has few drying cracks, and remains of wood processing activities were retrieved from the channel basin. Dry oakwood is very difficult to work and as a result it can be assumed that the oak posts were transported shortly after felling, which would have had consequences for its transport. Freshly cut oak cannot be raft-floated because it remains unstable in the water, so it is thought that the posts were transported to Voorburg-Arentsburg either on board ships or on rafts of some other 'lighter' wood.

The southern part of the harbour was closer to the inflowing waterway(s) and there was probably more harbour activity here than in the northern part that also shows more evidence of gradually silting up. This is not only the result of a stronger current in the southern part of the harbour basin, but a micromorphologically observed stirring or mixing that took place here is probably the result of shipping activities (Kooistra 2014b, 28). In addition the differences in quantity and dating of the retrieved material culture between the otherwise similar layers of the northern and southern part of the harbour may be interpreted as better discipline in keeping the latter part clean.

Standing parts of the quay installations such as landing stages, platforms, or foot planks have – except for a few cross-beams and long staging planks – not survived. These were probably all above the Roman and post-Roman water levels and have decayed, as have the upper parts of the driven posts. Above the (post-) Roman water level post shadows of decayed posts were observed (down to -0.46 m NAP), above which they were disturbed by later activities. No Roman building traces or features were discovered east of the embankment in the south-eastern part of the harbour, and the north-western embankment was only partly excavated as the sheet piling of the northern trench cut right through it. We don't know how the harbour connects with the adjacent settlement, because no land-based waterfront structures such as warehouses have survived in the severely disturbed western trench.

The latest dredging took place around 210 CE, after which the harbour bed silted up further. The active usage of the harbour of Voorburg-Arentsburg covers only a few decades (160–230 CE), while the last Roman sedimentary layer in the channel can be dated to the third quarter of the 3rd century.

A backfilled harbour basin and its interpretations

Organic remains were also well preserved in the filling layers of the Voorburg harbour basin, especially when they were retrieved below post-Roman water levels. These remains reveal information about the environment of the Voorburg river channel, and point to a freshwater tidal area adjacent to the more brackish environment of estuaries, and an open sea-connection of the channel (Kooistra 2014a, 46; Beerenhout 2014, 817 ff.). The macrobotanical and palynological research indicates a landscape around the harbour with influences from brackish and fresh water. Few trees grew on the fossil beach near the harbour basin and the main vegetation near the harbour consisted of grasses, plus all kinds of tread-resisting plants, ruderals, and plants of disturbed habitats (Kooistra 2014a, 46; Fischer/Kooistra 2014, 874 f.).

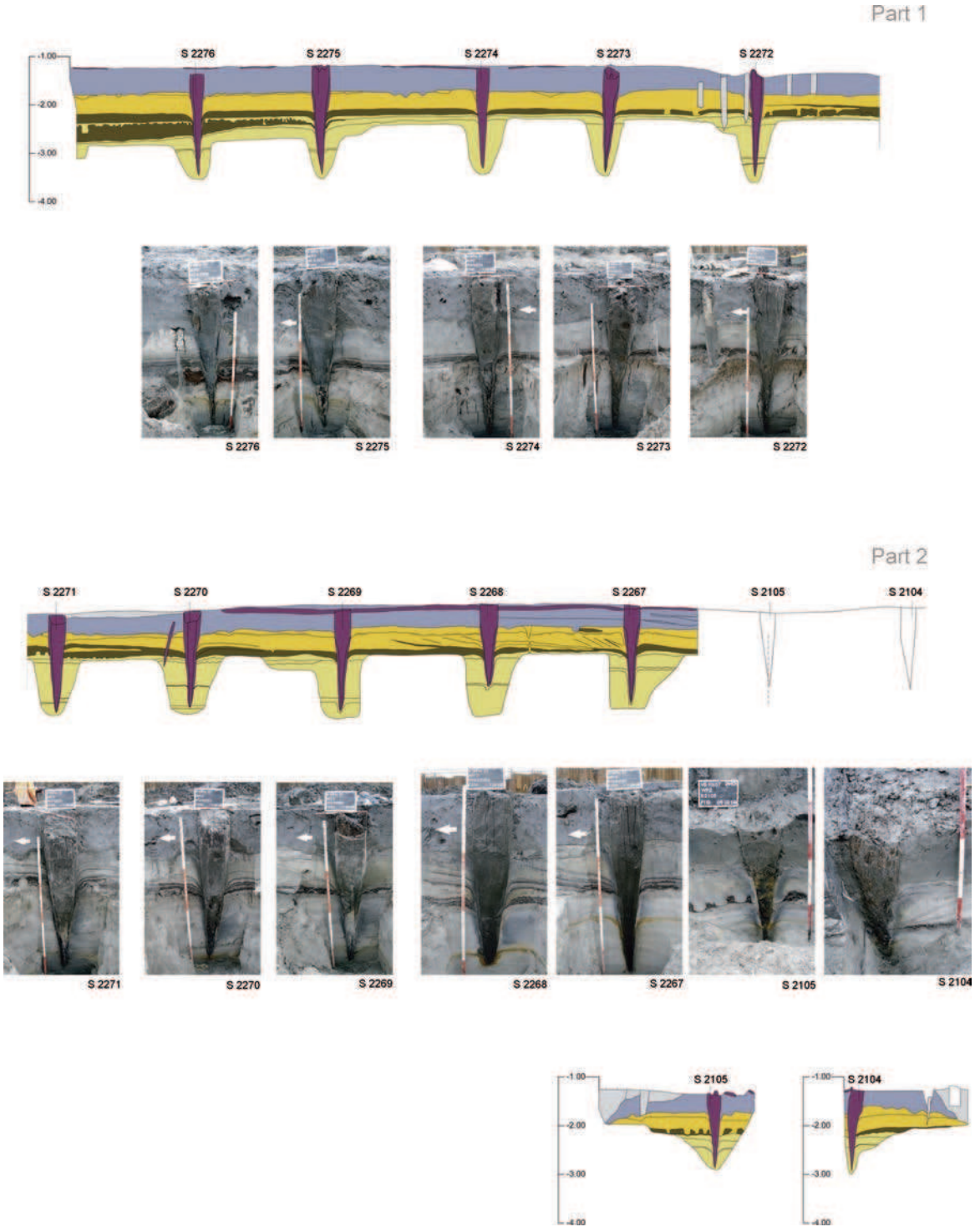

Fig. 8a. Voorburg-Arentsburg, section A. Frontal view of the replaced quay works at the eastern side of the harbour (210–230 CE) as retrieved in trench 2. – Drawing J. Kaarsemaker, Photos Amsterdam Archaeological Centre.

In and around a harbour we would expect to find evidence for trade activities. These became evident not only from the material culture (see below), but also from the organical material. Figs (*Ficus carica* L.) and raisins (*Vitis vinifera* L.) are typical import products from the Mediterranean, while wild parsnip (*Pastinaca sativa* L.), coriander (*Coriandrum sativum* L.), and dill (*Anethum graveolens* L.) although of Mediterranean

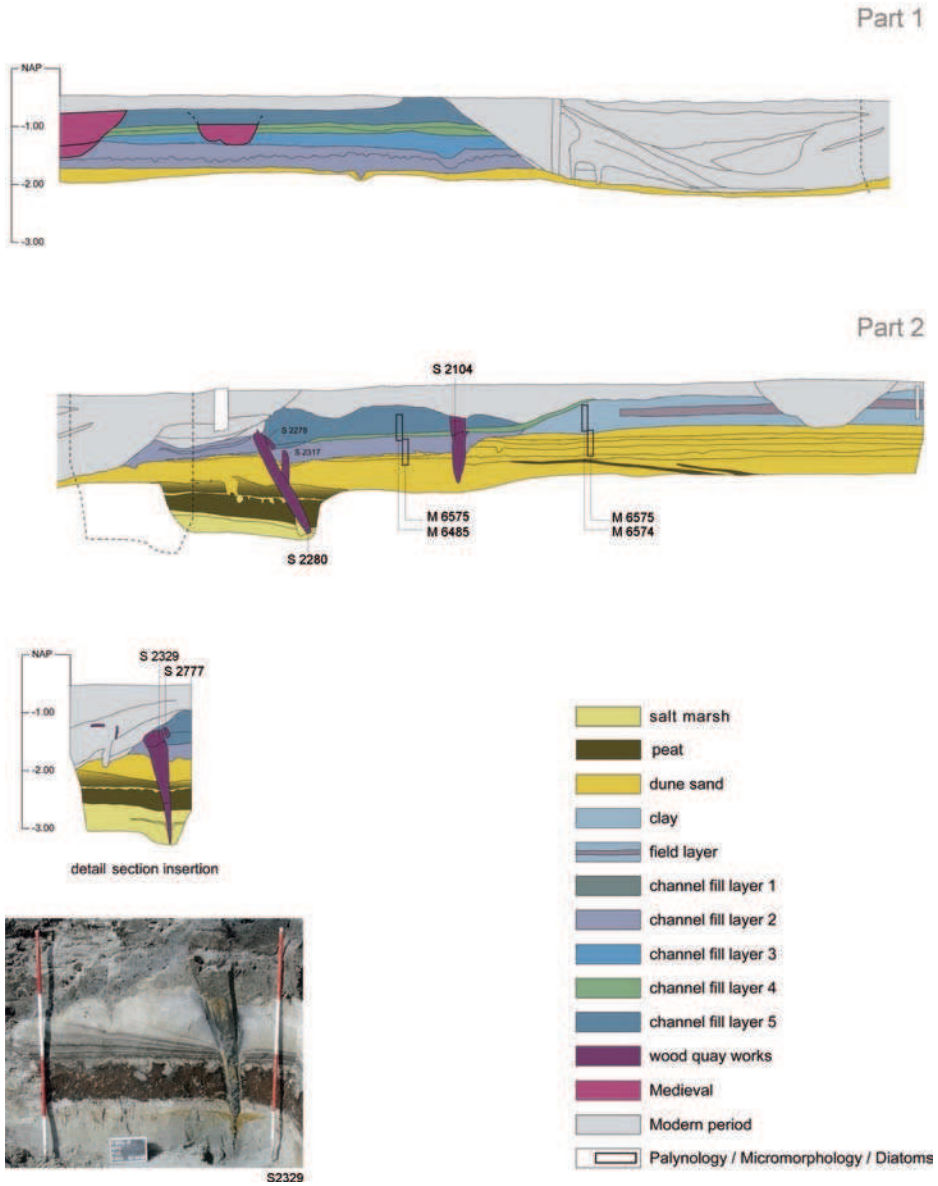

Fig. 8b. Voorburg-Arentsburg, section B. Frontal view of the replaced quay works at the eastern side of the harbour (210–230 CE) as retrieved in trench 2. The most northern post (S 2329) was found in the northern section of trench 2. Drawing J. Kaarsemaker, Photo Amsterdam Archaeological Centre.

origin could be cultivated locally. Supra-regional trade with the more southern regions of *Germania Inferior* and *Gallia Belgica* can be derived from the presence of spelt (*Triticum spelta* L.) and bread wheat (*Triticum aestivum* L.), in combination with arable weeds which are characteristic for winter fields: white lace flower (*Orlaya grandiflora* [L.] *Hoffm.*) and corn cockle (*Agrostemma githago* L.). These weeds are typical for loess and sandy clay soils, and are absent from threshing material in agricultural settlements north of the southern loess area. Walnuts (*Juglans regia* L.), peaches (*Prunus persica* [L.] *Batsch.*), and sour cherries (*Prunus cerasus* L.) were imported from these regions as well, or from other provinces of the Roman Empire. Hazelnuts (*Corylus avellana* L.), sloes (*Prunus spinosa* L.) and apples (*Malus sylvestris* [L.] *Mill.*) reached the harbour most probably via local or regional trade, as there is no archaeological evidence that such local nuts and fruit were cultivated in the Voorburg-Arentsburg area (Fischer/Kooistra 2014, 873 f.). Several specimens of adult sea fish reached Voorburg-Arensburg most probably via local trade with traders/inhabitants of the coastal region (Beerenhout 2014, 819–820).

Fig. 9. Voorburg-Arentsburg. View of the replaced quay works at the eastern side of the harbour (210–230 CE). Photo Amsterdam Archaeological Centre.

The vast majority of Roman material culture retrieved from the channel is composed of 'settlement refuse' dumped in the harbour. This consists in many categories, as for example tons of building ceramics and ditto stone material, delicate bronze furniture fittings, beautiful leather shoes and sandals, as well as huge quantities of Roman wheel-thrown pottery with a wide variety of usages and provenances (approximately 41,000 fragments). The last category can be divided in two distinctive components. The first one is characterized by worn and severely fragmented sherds, which often bear traces of burning and/or soot. This normal 'settlement refuse' pottery can be distinguished from a second substantial component: pottery that is largely complete, had not been exposed to fire or soot and where the limited traces of wear are the result of production and transport rather than of functional use (van Kerckhove 2014, 466 f.). Several tops and necks of smooth ware jugs and jug amphoras with the original stopper still in place also belong to this component (Fig. 10a–b). Because of the condition of the pottery and the presence of jugs with intact stoppers, it is assumed – as was the case with this component in Velsen – that in part this component had been damaged during transport and was dumped here in the harbour during unloading or transhipment. Another part of this relatively complete and unused ware which is interpreted as harbour-related find material, may have accidentally fallen into the water during transhipment.

The harbour of the newly founded centre of the Cananefatian *civitas* between the estuaries of two important Northwest-European transport arteries – the rivers Rhine and the Meuse – not only appears to have been a harbour for the import of goods for domestic use of this settlement. The pottery complex from the 160–230 CE harbour fillings has a remarkably military character. This is apparent from five characteristics, of which the main is its great similarity to that of regional military sites and its marked contrast to the pottery spectra from local and regional rural settlements (van Kerckhove 2014, 467 ff.). The limited number of *militaria* found during the excavation are almost all from these channel layers. In addition, ten spherical balls of tuff and coarse ceramic were discovered which may be associated with the *classis Germanica*[7]. Given

7 For the association with the *classis Germanica* see Fischer 2005, 689.

Fig. 10. Voorburg-Arentsburg. a Smooth ware jug with intact bitumen stopper; b Neck fragment of a Cretan amphora (Dressel 43/Crétoise 4) with intact wooden stopper. – Photos A. Dekker.

the noticeably military character of the pottery and the relative scarcity of *militaria* in Voorburg-Arentsburg, it is assumed that the harbour – which fits into the organization and later revitalization of a regional infrastructural programme (Driessen 2014, 154 f.) – played an important role in the trade directed and controlled by the military for the provisioning of the military in the coastal zone of the West Netherlands[8].

8 For these see Waasdorp 1999; 2012.

Larger waterfront installations, harbours, and ports in a maritime-coastal landscape serve not only logistical and transportation purposes, but can also be seen as marks of power and control in the landscape (Westerdahl 2006; 2011). The key positions in the regional infrastructure created by the central Roman authority in our coastal delta area around 160 CE, are not only monumentalized by the construction of waterfront installations, but also by the placement of more than life-size (imperial) statues (Driessen 2014, 207).

One would expect the construction of an inland maritime harbour in the coastal delta area of the Low Countries with its two important European transport arteries, in addition to the that our North Sea coast – characterized by a continental shelf under tidal influence – has no possibilities for a natural sea harbour. Is it possible that the harbour of Voorburg-Arentsburg also served as a maritime port? Such a maritime exchange probably took place via one or more transhipment port(s) in the Lower German coastal delta, as can be judged from finds produced in the Rhine, Moselle and Meuse basins. These were not only ready-made products such as Soller mortaria and tephrite quernstones from the Eifel, foodstuffs and drink packed in pottery containers, but also consisted in semi-finished products and/or raw materials such as stone, as can be shown by petrological analyses of Romano-British monuments[9]. Five of the eleven inscriptions that refer directly to the North Sea trade between Britain and the Continent are from the coastal region of the Low Countries (Morris 2010, 59 Tab. 4.3). Trade that took place via commercial *negotiatores*, while military provisioning was (largely) in the hands of the Germanic and British military fleets. Military fleets that were most probably connected, as can be derived from a Severian inscription mentioning a commander of the *classis Britannica* who also was in charge of the Rhine and Danube fleets (Birley 1988, 175; CIL VI, 1643). The same kind of pottery imports as were found in the harbour of Voorburg-Arentsburg reached the port of London's St. Magnus House. There are more remarkable similarities in pottery observed between the harbours of London and Voorburg-Arentsburg, like specific deposition patterns in the harbour basin (van Kerckhove 2014, 467, 471 f.). The presence of Romano-British ware in the harbour of Voorburg-Arentsburg (Black Burnished Ware I, Nene Valley painted ware, rough-textured pottery with possibly Southern Romano-British decoration patterns, and Romano-British handformed pottery) – also support a link with *Britannia*. Two Romano-British *fibulae* – one Romano-British trumpet head brooch which is associated with female dress (Hattat 1987, cat. no. 947–948) and a Romano-British knee brooch (Bayley/Butcher 2004, cat. no. 173A), both rare on the Continent – might also suggest a connection to *Britannia*. It is remarkable that these Romano-British brooches were both discovered in the fillings of the harbour basin with a complete and closed pin. This might indicate that we are not dealing with broken and discarded brooches or specimens that had sprung open and were lost. The harbour of Roman London had the same depth as the one of Voorburg-Arentsburg and it was here that the coaster Blackfriar I was found (Marsden 1994, 90). For this reason it may be assumed that similar coasters were also able to manoeuvre in the harbour of Voorburg. As has been mentioned previously similar lead strips with equivalent dimensions were retrieved from the harbour basin of Voorburg-Arentsburg as from the harbour of Velsen, and harbours and shipwrecks in the Mediterranean (Stolk 2014, 692). Such lead strips have not been observed in the caulking of the hulls of Roman river cargo ships like the Zwammerdam type. Our natural coastal delta with favourable off-shore winds and currents will have stimulated not only the Roman coastal trade, but most probably also that to and from Southern and Northern Britain. The combination of the observations and arguments listed above makes a reasonable case for the harbour of Voorburg-Arentsburg also having had a marine function and a connection with *Britannia*, and can thus be seen as having functioned as a port.

9 For references see Driessen 2014, 208 fn. 72.

Conclusion

The hand of the central Roman authorities can be felt all around the coastal delta area of the Low Countries. This varies from infrastructural adjustments, the construction and maintenance of the frontier line, to the construction of new planned towns. Two fine examples of larger infrastructural complexes constructed for supra-regional aims are the harbours of Velsen and Voorburg-Arentsburg. Both were in active use for only a few decades, which provides archaeologists with so-called type-site conditions.

The early 1st century military outpost and harbour complex of Velsen played a role in the (military) reorientation after the Varus disaster, and the set-up of a new logistical organisation for the coastal delta in the Tiberian-Claudian period. It most probably functioned as a supply centre for the military campaigns in the north.

The location of the harbour of Voorburg-Arentsburg – near the North Sea coast which lacked natural harbours – and the provenances of the finds fuel the idea that this harbour was not only laid out to supply this central place of the *civitas cananefatium*. The harbour was also pivotal in the provisioning of the military in the coastal zone of the West Netherlands, and there are enough arguments to suggest it played a role in the transit routes towards *Britannia*.

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