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Photograph of the cleaned bank of the freshly dug ditch north of Wartena (the province of Friesland, the Netherlands). Photo T.W. Varwijk (RUG/GIA).

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Peat reclamations of the Pre-Roman Iron Age and Roman Iron Age: Drainage ditch systems and settlement patterns in the province of Friesland, the Netherlands

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***Abstract**: In the northern Netherlands, the fringes of the peat area adjacent to the salt marshes, with their well-known terp settlements, have been reclaimed and settled since the middle of the Pre-Roman Iron Age. Over time, settlement gradually expanded deeper into the peat area, until the reclaimed peat lands, like most of the salt marshes, were abandoned over the course of the Late Roman Iron Age. In the province of Friesland, two large areas with traces of these early peat reclamations have recently been researched using a combination of modern digital elevation maps and old aerial photographs dating back to the 1940s and 1950s. It proved possible to map 1100 km of former ditches and 508 possible archaeological sites, of which 453 locations had not previously been known. Further research could confirm that 135 of the 508 possible sites are sites of former settlements, of which 65 definitely back to the Pre-Roman Iron Age or the Roman Iron Age and 59 most likely or possibly date back to these periods. The remaining 354 locations still need to be researched, but based on various archaeological indicators, 176 of these could very well be sites dating back to the Pre-Roman Iron Age or Roman Iron Age. Of the mapped former ditches, 413.1 km proved to have been part of artificial drainage systems dating back to the Pre-Roman Iron Age or Roman Iron Age, and a large landscape feature could be identified as a former artificial embankment dating back to the same time period. Although much research is still needed, based on the current dataset it can be concluded that the early peat reclamations were intensively drained, densely settled and well organized. It seems very unlikely that these reclamations were only seasonally occupied, in contrast to what has been claimed by other researchers. Instead, it is much more likely the primary motive behind the early peat reclamations was the creation of an agricultural landscape that was suitable for mixed farming and inhabited year-round.*

***Keywords**: archaeology, terps, aerial photography, excavations, coring.*

1. Introduction

The earliest known habitation of the salt marshes in the northern Netherlands dates to the Early Iron Age, around 650 BC (Taayke 1996: V: 169-70). Thanks to the construction of artificial dwelling mounds, known as terps, the salt marsh settlers were able to live in a landscape that was prone to flooding by the sea. Over the course of the Pre-Roman Iron Age and Roman Iron Age, the population increased and expanded across the salt marshes (Taayke 1996: I, III, IV; Nieuwhof *et al.* 2019: 82-3). What is less known is that the fringes of the adjacent peat area also became occupied during this period, even though an increasing number of sites relating to this occupation were discovered there during the 20th century (Van Giffen 1931: 18; Halbertsma 1955, 1963; Cnossen 1958, 1971; Elzinga 1962; De Cock 1965; Bruinsma 1968; Janssen 1989; Taayke 1996: IV: 132-40; Waldus 2000; De Langen 2000, 2007, 2011; Gerrets 2010). That phenomenon has only recently become the topic of broader research (Gerrets 2010; De Langen 2011; Bakker 2013, 2018, 2022a). Over the course of the early part of the Late Roman Iron Age (250–350 AD; Table 1) the reclaimed peat lands were abandoned (De Langen

Table 1. Archaeological time periods used in this paper.

Period	Date*	
Pre-Roman Iron Age	Early:	800-500 BC
	Middle:	500-200 BC
	Late:	250-0 BC
Roman Iron Age	Early:	12 BC-100 AD
	Middle:	70-250 AD
	Late:	250-476 AD
Migration Period		350-550 AD

* The overlaps in dates between periods reflect the margin of error of the ceramic seriation and the carbon dates, as well as differences in the definitions used by various (sub)disciplines.

2011: 79-80; Bakker 2013, 2019), like most of the salt marshes of the northern Netherlands (Bazelmans 2000; Nieuwhof 2016).

Since they show no continuity with the medieval peat reclamations, the reclamations of the Pre-Roman Iron Age and Roman Iron Age are well demarcated chronologically.[1] However, they are not well demarcated geographically. This is because, after being abandoned as an area of settlement, the landscape of the former reclamations changed dramatically. Some areas were flooded and covered with marine clay deposits, turning them into proper salt marshes, while others, less affected by the sea, once more became swamps, where, despite occasional flooding, renewed peat formation occurred (Vos 2001; De Langen 2011: 80-1; Bakker 2013; Aalbersberg 2018; Bakker & De Langen 2018a; Bakker & Vos 2018; Bakker 2019; Vos & De Vries 2019). Given that this flooding and its effects were followed, in the medieval and later periods, by human disturbance – such as the digging of ditches and canals, peat extraction and agricultural activities – it is difficult to determine the maximum extent of the early reclamations and to find the associated settlements. To locate these sites, a variety of prospecting techniques have been used over the past century, ranging from field observations and coring surveys to the study of aerial photographs and, more recently, LiDAR-derived digital elevation maps (Bakker & De Langen 2018b). Interestingly, these prospecting techniques have also resulted in the documentation of other features on occasion, such as the remnants of former ditches that formed part of past land allotment systems that, like the located sites, can be associated with the early peat reclamations.

The aim of this paper is to present an overview of the work carried out so far in the province of Friesland on locating and studying these early reclamation sites and their associated features, including our own recent work. As a result of fieldwork aimed at researching and dating the sites, we were able to discern and map many more of the former ditches associated with these sites, thereby enabling an analysis of the land allotment systems that were in use during these early peat reclamations (see Appendices A and B). Based on this analysis, we will show that the settlers of the peat lands had a much higher level of organisation and adaptability to changing circumstances and self-sustainability than previously thought, for instance by Gerrets (2010: 102-4, 203), who stated that the fringes of the peat were exploited only on a seasonal basis by the terp dwellers of the salt marsh area.

Peat reclamations during the Pre-Roman Iron Age and Roman Iron Age were not restricted to the province of Friesland. Such early peat reclamations are also known not only from the neighbouring province of Groningen (Cock 1967, 2007; De Roever *et al.* 1996) and adjacent north-western Germany (Van Giffen 1931: 39-43; Zylman 1933: 115-17), but also from the western Netherlands, where quite a number of sites have been researched, for instance in the regions Assendelver Polders (province of Noord-Holland) and Midden-Delfland and Voorne-Putten (both province of Zuid-Holland), sometimes including parts of the sites and their surroundings, during which researchers encountered such features as former ditch systems (Brandt & Van Gijn 1986; Trierum *et al.* 1988; Trierum 1992; Meffert 1998; Therkorn 2004, 2005, 2006; Van Londen 2001, 2006). Although this paper is focussed on the early reclamations in the northern Netherlands, at the end it will also briefly discuss how the methods used in this study can contribute to research on the reclamation history outside of the province of Friesland.

The study is of academic importance for two reasons. The first is that, until now, off-site structures, such as archaeological land allotment systems, have barely been investigated in the northern Netherlands, despite the fact that such research provides valuable insights into the origin and characteristics of the past cultural landscape (Bazelmans *et al.* 2009: 79-84). The second is that the sites and other features of the early peat reclamations are under threat of project development, agriculture and the artificial lowering of the ground water table. A low water table increases peat oxidation, thereby eventually leaving archaeological remains at the surface, unprotected and deprived from their context. It is therefore of great importance to map

1 During the Middle Ages, over a period of just a few centuries, large parts of the Dutch peatlands were transformed by reclamation from an inhospitable wilderness into an agricultural landscape (Borger 1975, 1992; De Langen 1992; Ettema 2005; De Bont 2008; Zomer 2018; Nicolay 2018). The results of the employed reclamation strategies are still visible on topographical maps of the Netherlands, in the form of the parcel allotment on the (former) peat soils.

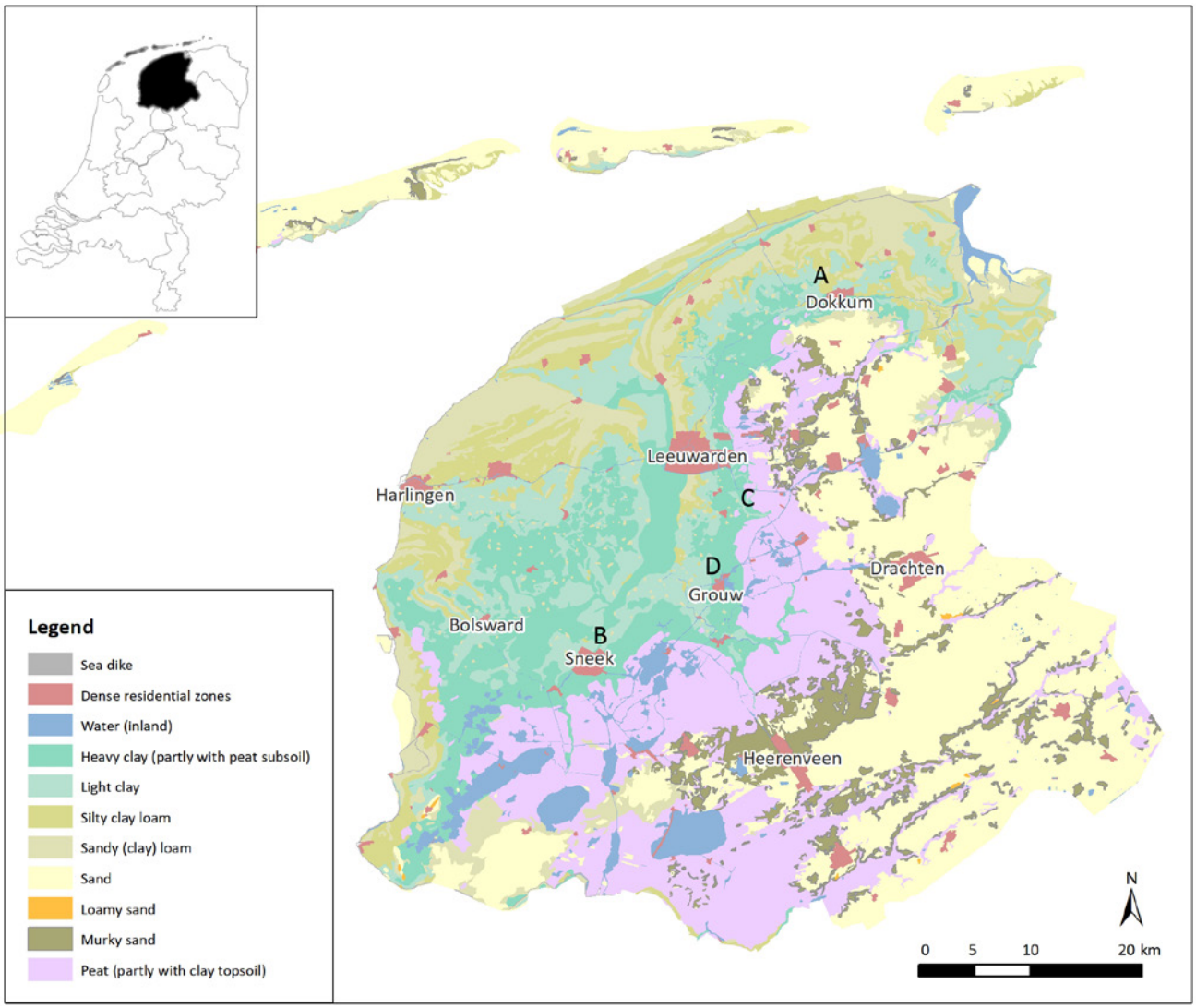


Fig. 1. Map showing the dominant soil types in the province of Friesland (source Provincie Fryslân), labelled with the research regions discussed in the text. Region A was researched by Van Giffen, who also discovered a terp with a subsoil of peat in Goutum (directly south of Leeuwarden) and one southwest of Dokkum. Region B (north and west of Sneek) was researched by Halbertsma. Region C (between Wartena and Warstiens) was researched by Santema. Region D (around Flansum, west of Grouw) was researched by Cnossen.

as many sites as possible within this dynamic (former) peat landscape (Bakker 2018), and the present study proved particularly fruitful for mapping sites relative accurately. Once located, these sites can be inspected to determine their current state of preservation, making it possible to determine what should be done to achieve better protection (Bakker & De Langen 2018b).

2. Early research

Already in the beginning of the 20th century, Van Giffen, the founder of the Biologisch-Archaeologisch Instituut (Biological Archaeological Institute) at Rijksuniversiteit Groningen, which would later become the Groningen Institute of Archaeology (GIA), discovered that not all terps in the northern Netherlands were originally raised on the salt marsh, because some of them had a subsoil of peat (Fig. 1; Van Giffen 1916: 188, 1926: 11-12, 1931: 18).[2] That this kind of terp settlement on peat is not restricted to the northern Netherlands became apparent in 1929 when Van Giffen carried out research on two small, silted-over terps near the city of

2 This concerns the terps of Dokkum - Drie Terpen and Goutum. Because Van Giffen was unfamiliar with the extent of this phenomenon, he initially thought that settlements raised directly on peat or on peat covered by a thin layer of clay, were typical for parts of the northeast of the province of Friesland only (Van Giffen 1926, 11-12). Van Giffen also mentions Jislum and Lichtaard but they seem to be raised on a clay soil.

Fig. 2. Aerial photograph of the region between the villages of Warstiens, located on the lower left, and Warten (region C in Figure 1), showing the remains of a former ditch system (thin black lines). Small, silted-over terps are distinguishable by their light colour and round shape, especially in the wetter and lower-lying (i.e. darker) parcels. The terp excavated by Elzinga in 1965 is marked with a red arrow (modified after Cnossen 1971, Fig. 27; original source KLM Aerocarto, archive topographical service no. 401-H-II-1).

Emden, in Germany. He observed that the terps, which he named Emden I and Emden II, were separated from the underlying peat layers by only a thin layer of clay (Van Giffen 1931: 40).[3] Van Giffen explained the difference in ground level with the relatively nearby settlement of Bentumersiel, which is located on clay soil, as being the result of a considerable subsidence of the peat (Van Giffen 1931: 39-43).

Research into terps on peat resumed halfway the 20th century, when Halbertsma discovered traces of former settlements around the town of Sneek (province of Friesland). They turned out to be small terps that had become silted over and then sealed off by thick deposits of marine clay, but which were originally raised on top of the peat (Fig. 1; Halbertsma 1955: 97-9). Around the same time, silted-over terps, with a subsoil of peat instead of clay, were also discovered by Santema around the village of Wartena, southeast of the town of Leeuwarden (province of Friesland) (Santema 1955). Based on finds of local handmade pottery termed terp pottery, the sites described by Van Giffen, Halbertsma and Santema can all be dated to the same timeframe, that is the Pre-Roman Iron Age and Roman Iron Age (Halbertsma 1955; Santema 1955; Bruinsma 1968; Boschker *geschriften;* Taayke 1996: IV: 132-40).[4]

During the time when Halbertsma and Santema made their discoveries, there was a strong increase in both project development and agricultural land improvement in the Netherlands. These developments often involved large tracts of land to be restructured and re-allotted, a process that damaged archaeological sites when new ditches were dug, or even caused their complete destruction when new industrial and residential areas were laid out. Halbertsma was able to make his observations thanks to the ditches that had recently been cut through previously invisible or barely visible remains of low terps lying beneath the surface. The immediate vicinity of these archaeological sites was disturbed too. It is therefore no coincidence that the earliest publications about remains of land allotment systems possibly associated with the early peat reclamations date from this period.

In 1958, Cnossen published an article about the origin of the Middelzee, a former sea inlet in the middle of the province of Friesland. He mentions observations

3 Emden I was also built of peat sods, in addition to layers of dung, and in some places even seemed to be situated directly on the peat (Van Giffen 1931, Fig. 37). Emden II, in contrast, consisted of sods of clay and peat. The pottery remains collected from both sites (Zylman 1933, 115-17; Van Giffen 1931, Fig. 37) seem to be of types common locally from the 1st century BC to 3rd centuries AD.

4 The *geschriften* (writings) of Boschker are a collection of (handwritten) notes by Boscker with observations from the 1960s that were never officially published.

Fig. 3. Left: Map showing silted-over terps and identified silted-up-ditches (based on Janssen 1989, Fig. 3). Right: Detail corresponding to the area shown in Figure 2.

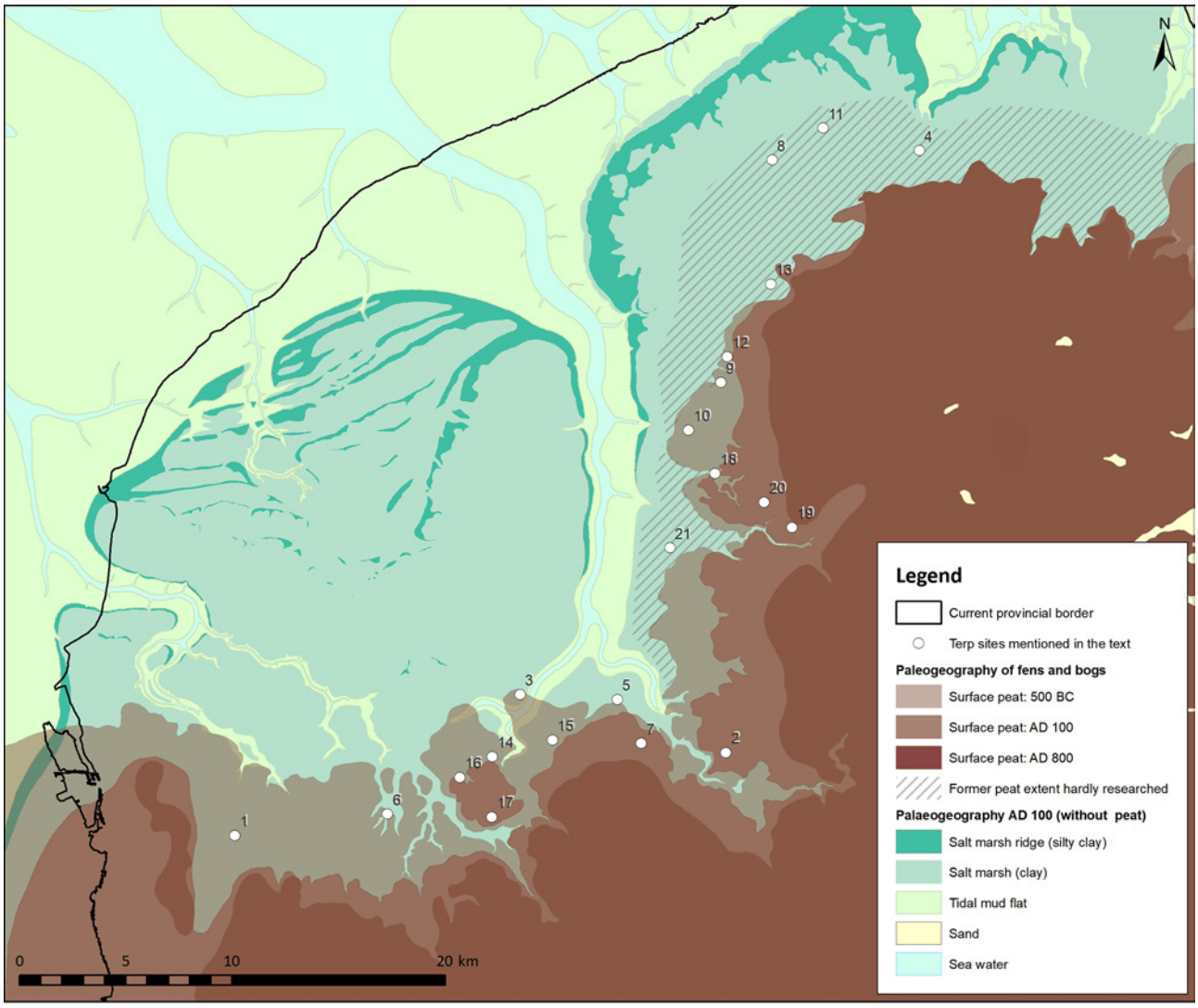
he made west of the hamlet of Flansum (Fig. 1; Cnossen 1958, 35). In this area, in which marine clay deposits lay on top of peat, several archaeological features became visible when new drainage ditches were dug. Clearly visible in the freshly dug ditches were sections of former, narrow ditches located at 12 m intervals. They had been dug through the peat and had become filled with (and covered by) clay deposits (Cnossen 1958, Fig. 14). Nearby, also the sections of much broader trenches filled with clay were laid bare, separated from each other by narrow peat ridges with a thickness of about 60 cm (Cnossen 1958, Fig. 15). Cnossen interpreted the ditches as part of a land division system and considered the larger trenches to be traces of peat extraction for fuel (Cnossen 1958: 35).

Although the uniform distance between the narrow ditches and the similarities in the fill of the narrow ditches and trenches pointed at contemporary activities, it remained unknown when the ditches and trenches had been in use. They did not seem to be related to the current ditches in the area. Cnossen assumed it most likely that the encountered former ditches dated from the Roman Iron Age. He based this assumption on the presence of terp pottery and the absence of medieval pottery (Cnossen 1958: 35). Because he was familiar with the discoveries of Halbertsma and Santema, Cnossen was not surprised to find evidence of land division and peat extraction from this early period (Cnossen 1958: 35-6). Later, Halbertsma mentioned that silted-up ditches or trenches similar to those spotted by Cnossen had also been observed near disturbed silted-over terps in the vicinity of Sneek (Halbertsma 1961).

2.1 First use of aerial photography

In the Netherlands, Von Frijtag Drabbe, head of the Topografische Dienst (Dutch Topographic Service) during the years 1934-1940 and 1945-1954, was the first to promote the use of aerial photographs for archaeological research, such as the mapping of Celtic field systems (Van Giffen 1939; Von Frijtag Drabbe 1972; Brongers 1976) or small terps (Santema 1955).[5] Cnossen would be the first to show that aerial photographs can also be successfully used to discern features of land allotment systems related to the early reclamation activities in the (former) peat zone (Cnossen 1971). The photograph he published was taken between the villages of Wartena and Warstiens (Cnossen 1971: 44-5; Fig. 2). It displays not only the ditches of the current land allotment system, which date back to the Middle Ages and more recent times, but also features of former ditches belonging to an older land allotment system that was first mentioned in a report on plans for agricultural land improvement in the area (Van der Schans & Vleeshouwer 1957). This system consisted of silted-up ditches that, due to the weight of their fill, had sunk slightly into the peat subsoil and seemed to correlate with a row of small, abandoned terps also visible on the photograph. Cnossen dated the ditch pattern to the beginning of the Common Era (Cnossen 1971: 43), referring not only to Santema,

5 Santema mentions using an aerial photograph that, together with some advice, was provided to him by Von Frijtag Drabbe while Santema was searching in the fields for abandoned reclamation sites (Santema 1955, 55-56).



1	*Arkum*	8	*Jislum*	15	*Sijbrandaburen*
2	*Bokkum*	9	*Leeuwarden-Bullepolder*	16	*Sneek-Harinxmaland*
3	*Bozum*	10	*Leeuwarden-CCF*	17	*Sneek-Jachthaven*
4	*Dokkum-De Drie Terpen*	11	*Lichtaard*	18	*Hempens-Teerns*
5	*Flansum*	12	*Miedum*	19	*Wartena-Noord*
6	*Folsgare*	13	*Oudkerksterpolder*	20	*Wartena-Warstiens*
7	*Jirnsum*	14	*Scharnegoutum*	21	*Wirdum*

Fig. 4. Portion of the palaeogeographical map of Friesland (based on Vos 2013) that coincides with the area defined as an area of interest in 2013. The peat zone that became covered by layers of clay between 500 BC and 800 AD is indicated in shades of brown. Because some archaeological information indicates that the Iron Age peat area extended farther to the north, our study area is larger than can be deduced from modern palaeogeographical maps.

but also to Elzinga, who had excavated one of the terps in this region in 1965 (Fig. 2).

Both Halbertsma and Cnossen mention the features of exposed land allotment systems with curiosity, but they do not address the significance of these systems for research into past land use; their interest lay more in research themes, such as the periodic succession of sea-water level rising and lowering, also known as the transgression and regression phases, and the formation of the Middelzee and other tidal inlets.[6] Neither researcher conceived of the possibility of a connection between

6 Archaeological research plays an important role in dating geological events that occurred during the Holocene. By dating cultural layers located between natural layers, archaeology provides a *terminus ante quem* and *terminus post quem* for these natural layers. Geological research, in turn, is important to wetland archaeology because it helps to understand environmental conditions before, during and after human activities.

peat reclamation and the fact that these reclamations were found covered by layers of clay. Although one might think that the period 1950-1980 was too early for such an idea to develop, as Edelman had only just published about the phenomenon of peat oxidation as an important cause for land subsidence in reclaimed peat land (Edelman 1958), there were some researchers who were already making this connection. One of them was De Cock, who published about the central parts of the province of Groningen. According to him, local human drainage activities in the Roman Iron Age had caused oxidation of reclaimed peat land and its subsequent subsidence, which in turn had made it increasingly vulnerable to flooding, eventually enabling the sea to deposit clay sediments on top of the peat (De Cock 1965).

Of the early researchers who made use of aerial photographs, the last to be mentioned here is Janssen (1989). Janssen continued on the work of Cnossen and also incorporated the results of surveys and field observations, focusing on the previously mentioned region of Wartena and Warstiens (Janssen 1989: 191-3). His aim was to create an overview of the early ditch pattern and former settlements in the region. According to him, 25 (newly found) sites could be dated to the Roman Iron Age, which brought the total number of sites in this region dating to that period to 36 (Fig. 3). Like Cnossen, Janssen claimed that the silted-up ditches of the old ditch pattern date back to the same period (Janssen 1989: 199-200). He based this assumption on the similarities between the location of the former settlements and the orientation of the silted-up ditches, as well as on the finds of terp pottery in the fill of some of the ditches.

Janssen was not familiar with finds from the Early Middle Ages in this region, and he therefore discarded the possibility of an early medieval date (Janssen 1989: 199-200). However, because there have been some early medieval finds in the region, including isolated finds from the Carolingian period (De Langen 1992: 190), the date of the old ditch pattern remained uncertain. According to De Langen (1992: 143-5), an early medieval date was possible or even likely once it became clear that the first historical mention of the current village of Wartena dates back to that period (see also Gildemacher 2007). The exact date of the old ditch pattern could only be researched recently, when one of the silted-over terps in the area was excavated. This effectively became the starting point of the current research, as will be elaborated on in the next section.

3. Recent research

Based on the early research, it was plausible to assume that the outer fringes of the peat area in the northern Netherlands stretched farther seawards during the Pre-Roman Iron Age and Roman Iron Age than they do nowadays. Recent observations, coring surveys and archaeological excavations executed in the later part of the 20th century and the first decade of the 21st century have further verified that this was indeed the case (Jager 1988, 1989; Waldus 2000, 2005; Vos 2001; Koopstra 2002; Aalbersberg 2006, 2007; Tuinstra 2007). The results of this fieldwork, combined with LiDAR-derived digital elevation maps (DEM), enabled the creation of paleo-geographical maps reconstructing the landscape situation during successive periods (Vos 2006; Vos & De Vries 2013). Although the reconstruction of these former landscapes remains a work in progress, the present paleo-geographical maps are quite useful to discern which parts of the peat area were silted over with marine clay during or soon after the Pre-Roman Iron Age and Roman Iron Age and thus which parts may have archaeological sites associated with the early peat reclamations (Fig. 4).[7] In the case of Friesland, this seems to provide us with a 4 to 8 km wide research area located in the current transition zone of (heavy) clay-to-peat soil (Fig. 1 and 4).

However, in their present state, the paleo-geographical maps are not a reliable guide for every part of the research area, because of three biases.

The first bias is the intensity of research. Not every part of Friesland has been sufficiently well researched archaeologically and geologically. For instance, based upon the discovery of peat lying directly beneath a couple of terps in the north of the province, the research area of the study on early peat reclamations should be extended farther to the north than the maximum extent of surface peat around 500 BC as estimated by Vos and De Vries (2013).

The second bias is differential preservation, caused by the disappearance of traces of early and later peat reclamations in some parts of the province. For example, in the same northern part of the province, oxidation, stirred by medieval and modern land use, has caused the complete disappearance of peat in large areas and the resurfacing of the Pleistocene sandy subsoil (murky sand and sand soil in Fig. 1), making it almost impossible to investigate local peat reclamation activities.

The third bias is the already mentioned destruction of sites and other archaeological by various kinds of modern project development (residential, industrial and infra-structural) and agricultural land improvement activities. Before the late 1980s, there was barely any interest in the documentation of archaeological finds during land development. As a result, in some parts of the transitional area, much of the archaeology has been disturbed or even completely dug away (see also Jager 1988, 1989; De Langen 2012: 10-12), without sufficient archaeological fieldwork having been executed. For that reason, the current distribution maps can (and,

7 New fieldwork in the future will undoubtedly result in adjustments to and refinements of the present maps.

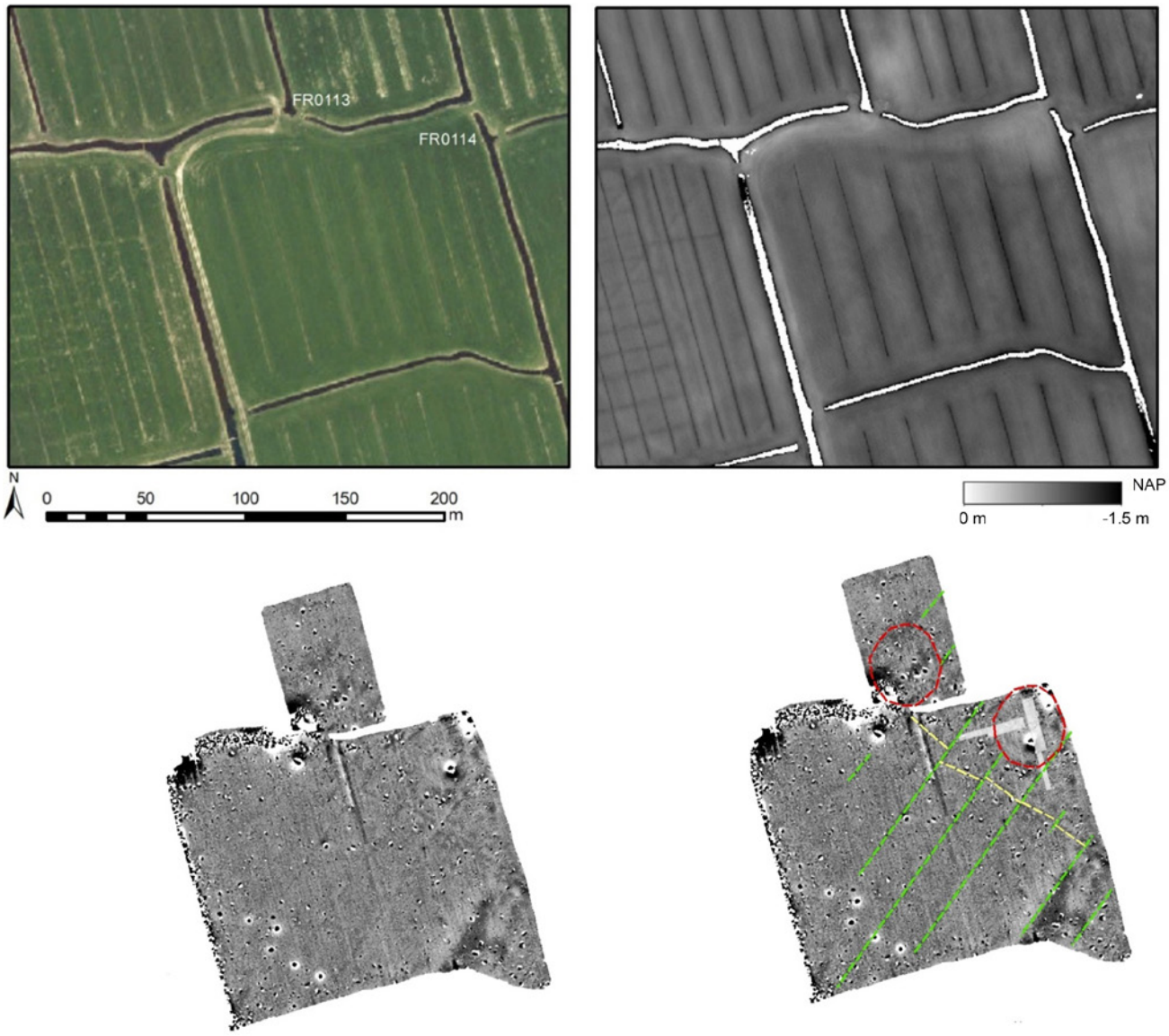


Fig. 5. Four plan views of the parcel containing the site of Wartena-Noord and its surroundings. Top left: A recent aerial photograph with the research location (114) and the adjacent terp location (113) pinned on it. Top right: A digital elevation map of the same area, on which the terps and some of the former ditches are visible. Bottom left: An image of the geomagnetic readings. Bottom right: The same image interpreted. Green and yellow: the visible parts of the former, now silted-up ditches red: the two terp sites; white: the excavation trenches.

in fact, do) give a distorted picture of the original situation in the early peat reclamation areas. From the 1990s onwards, the recording of archaeological finds has improved significantly, in turn leading to a related bias: the reason we know of more sites in certain sub-areas have is because these subregions have been more closely examined.[8]

3.1 *Fieldwork and mapping of features north of Wartena*

In the summer of 2013, the site of Wartena-Noord, a silted-over terp north of Wartena, was excavated by the GIA (Bakker 2014, 2017, in prep. a). The excavation offered the opportunity to study not only the terp itself but also the possible relationship between the terp and the mentioned silted-up ditches. Shortly before the excavation started, and with the help of the *Niedersächsisches Institut für historische Küstenforschung* (Wilhelmshaven, Germany), the parcel with the terp (Fig. 5: FR0114), as well as part of the adjacent parcel to the north with a similar terp (Fig. 5: FR0113), were examined by means of

8 To compare: in the province of Groningen, currently only a small area can be associated with early peat reclamations. It can be assumed, however, that the maximum extent of these early reclamations in the province of Groningen was much larger than this small area. Taking into account the current lack of research on early peat reclamations in that province, this paper will mostly focus on the province of Friesland.

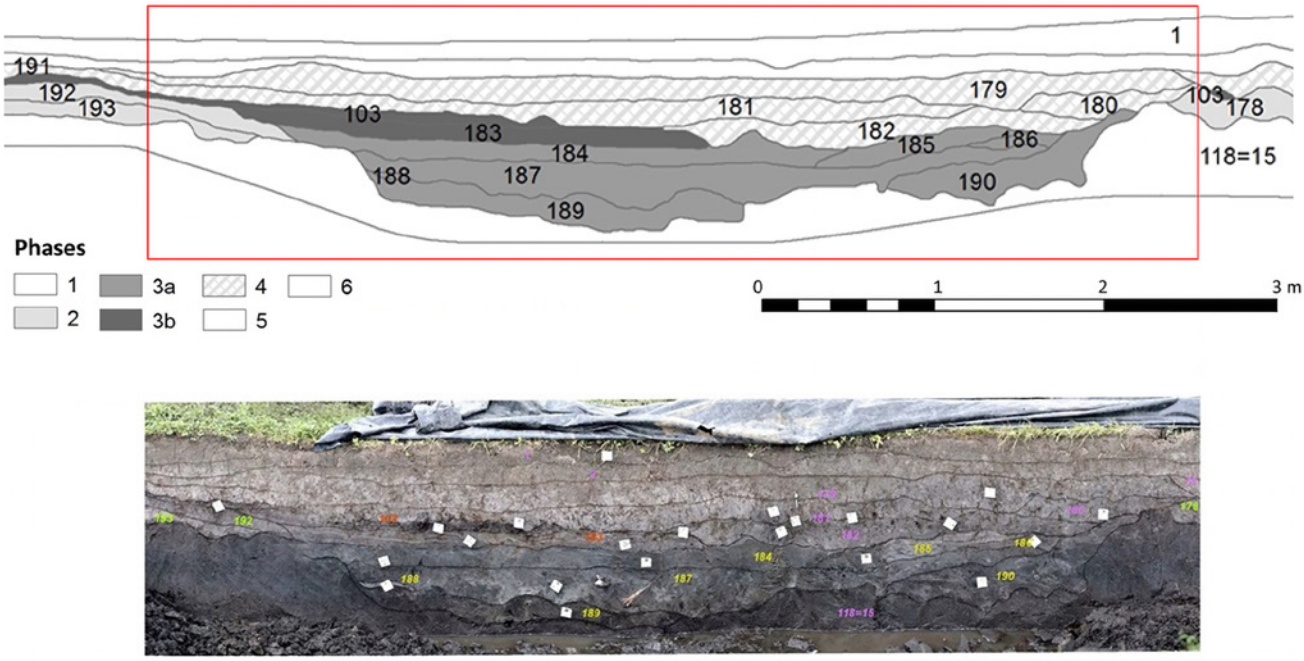


Fig. 6. Digital image (top) and photograph (bottom) of the section through the silted-up ditch (bottom), with the photographed area indicated with red border. Phases 3a and 3b relate to the filling of the ditch, with phase 3a representing natural clay deposits and phase 3b representing the thin peat layer. The photograph shows that this layer consisted of a combination of fine-layered clayey peat at the base and peat that was increasingly less clayey as it neared the top.

a geomagnetic measuring system.[9] The use of this device made the silted-up ditches even more visible than they were on the available elevation map and ensured that the excavation trenches could be positioned in such a way that also one of these ditches could be researched during the excavation (Fig. 5).

The excavation revealed two important facts about the relationship between the terp and the silted-up ditches. First, it could be proven that the studied ditch, which was part of the wider ditch system, as is visible on the elevation map, was in use during the first habitation phase of the terp, in the 1st and 2nd centuries AD (Bakker 2014, in prep. b).[10] In many parts of the excavation trenches, a thin peat layer could be documented, which separated the layers dating to the Roman Iron Age and those dating to the Middle Ages. This layer also covered the filled-in ditch (Fig. 6). A radiocarbon-date on the this thin peat layer proved it was most likely formed during the 3rd century CE.[11]

Second, it could be established that the ditches of this reclamation were already fully functioning before the terps were raised, instead of being dug during or following terp construction. Beneath the terp lay a ditch that had been a part of the mentioned artificial drainage system, and it was filled in at that spot when the terp was created, while a couple of perpendicular ditches were dug to reroute the water around the terp. Patches of grass located on top of the degraded peat soil beneath the terp provided further evidence of the existence of a large-scale ditch drainage system in this area before the terps were raised, because grass can only grow in abundance in peat lands when these are reclaimed and well drained. Re-examination of the old excavation data of the terp of Wartena-Warstiens, which had been excavated by Elzinga in 1965, provided further evidence that the ditches were in existence before the first terps were raised (Bakker in prep. c).

A couple of months after the excavation terp Wartena-Noord was completed, further evidence was obtained that many of the silted-up ditches belong to an artificial drainage system dating back to the Roman

9 We thank Prof. Dr. H. Joens of the *Niedersächsisches Institut für historische Küstenforschung* for the opportunity to make use of that institute's geomagnetic measuring system and Dr. K. Mückenberger of that same institution for operating the device (Trimble 5800) and for helping to analyze the results.

10 A second habitation phase of the terp started in the High Middle Ages and by then the old ditch system was no longer in use.

11 1770 ± 30 BP; calibrated results: 260 ± 50 AD (ca. 68%: CalPal 2007) or 137-345 AD (ca. 95%: OxCal 2010). Carbon-dating was carried out by the Poznań Radiocarbon Laboratory (sample: Wart 393-141).

Fig. 7. Photograph of the cleaned bank of the freshly dug ditch north of Wartena. The arrows indicate the position of two silted-up ditches covered by a thin layer of peat (comparable to phases 3a and 3b in Fig. 6), beneath a thicker layer of clay (comparable to phases 4 and 5 in Fig. 6) (photo T.W. Varwijk RUG/GIA).

Iron Age, when a large ditch was dug north of Wartena over a length of several kilometres. This ditch sectioned a great number of the silted-up ditches and an old silted-up gully and thereby offered an excellent opportunity to document more information on the old land allotment system. Every afternoon, the east side of the successive freshly dug parts of the new ditch were cleaned and photographed and GPS coordinates were taken when silted-up ditches were encountered. It was noted that the fill of many silted-up ditches was covered with the same thin peat layer as documented during the excavation (Fig. 7).

After the GPS coordinates were combined with the digital elevation map of the Actueel Hoogtebestand Nederland (AHN) 2.0 in a GIS, it became clear that all of the encountered silted-up ditches with a peat layer on top of them were part of the same ditch system (Fig. 8). With the use of the AHN elevation map, it was also possible to map many of the silted-up ditches, like Janssen (and Cnossen before him) had done with the help of aerial photographs (Fig. 2 and 3). Thanks to the elevation map, many of the areas on the map left blank by Janssen could be filled in and a few additional locations of possible silted-up terps could be traced. Most interesting, however, was that the result of the DEM analysis showed that the silted-up ditches were part of not one, but two neighbouring ditch systems or reclamation units (Dutch: *ontginningsblokken*; Fig. 8).

To summarize, the most important result of the research on the site of Wartena-Noord and its vicinity was proving that the early habitation of the peat lands in Friesland were accompanied or even preceded by large-scale artificial drainage activities. A practice often seen as typical for medieval peat reclamations could now also be associated with peat reclamations a thousand years older. At the same time, the proven existence of these ancient artificial drainage systems meant that further study into their scale and layout was justified.

3.2 *Fieldwork and mapping of features north of Leeuwarden*

During preparatory work for the GIA excavation of Leeuwarden-Bullepolder in 2015, when the few publicly available aerial photographs of the area made by the English Royal Air Force (RAF) in 1944 were inspected, an old silted-up gully with side branches was detected near this excavation site English (Bakker & Top 2015). It is of interest that later, some of the excavated ditches, of which the oldest date back to the Middle Pre-Roman Iron Age (4th century BC), could be lined up with (barely visible) lines on the RAF photographs (Bakker 2020: 80-3). This match not only enabled a first reconstruction of the local cultural landscape of the Pre-Roman Iron Age and Roman Iron Age, but also offered proof that a number of local and previously unknown, mapped terp sites also could be associated with this old ditch system (Fig. 9).

On the AHN elevation map, only small parts of the previously mentioned gully and silted-up ditches were visible. This was for a large part because, due to modern

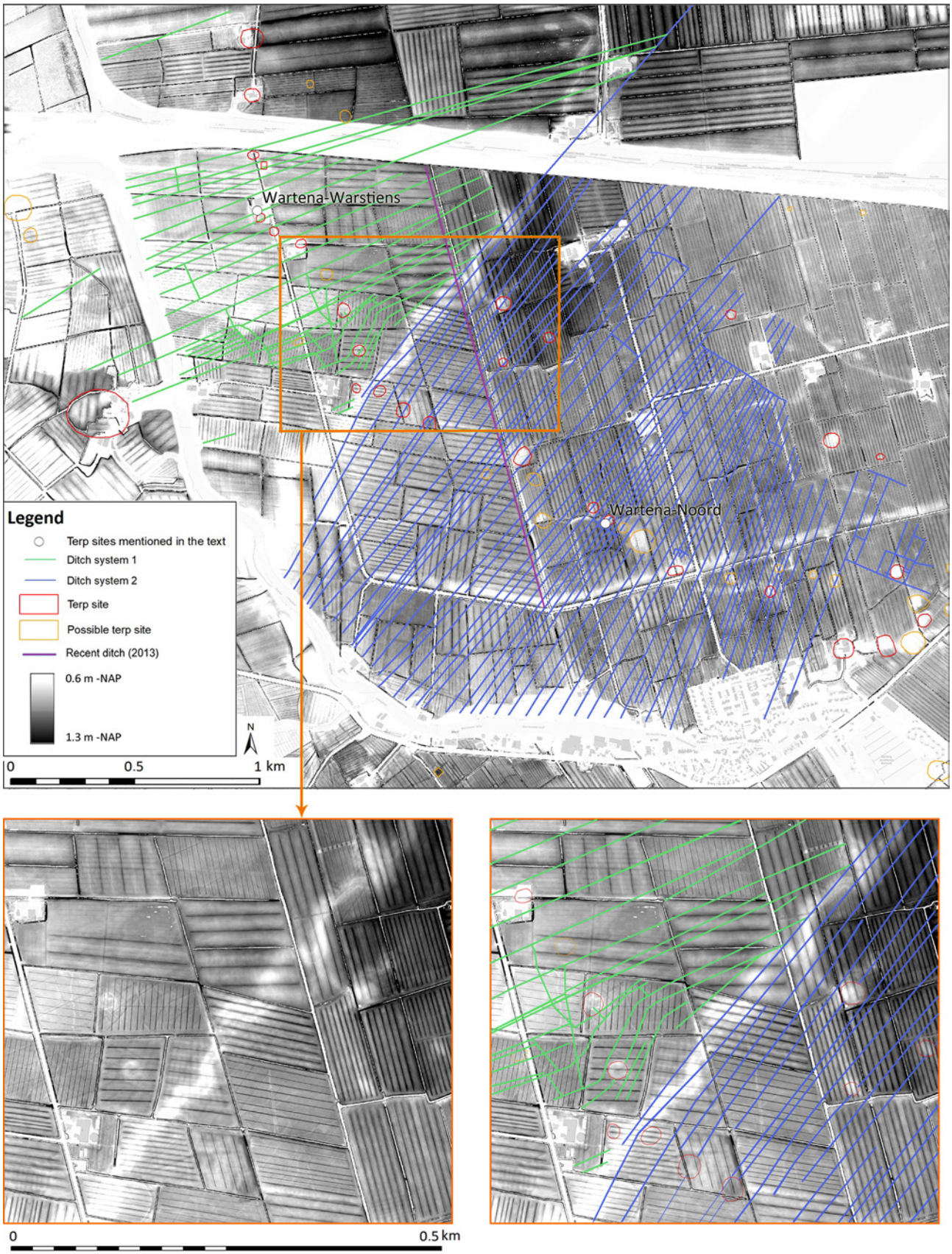


Fig. 8. Top: Elevation map AHN2, showing the region of Wartena and Warstiens superimposed with the results of the digital elevation map analysis of late 2013 (subsequently, based on aerial photographs, some ditches and sites were added and some were discarded). The ditches are marked in different colours to make clear that they are part of two different field systems or reclamation units. Bottom: A slightly magnified section of the map illustrating the visibility of the silted-up ditches, unaltered (left), and superimposed with the results of the digital elevation map analysis (right).

Fig. 9. Top: One of the available RAF photographs (source RAF106G-2766-3336), *annotated with the location of the site of Leeuwarden-Bullepolder (site 362-363). Bottom: A* recent topographic map *of the same area, superimposed with streams and ditches identified during the analysis of aerial photographs and digital elevation maps (for an explanation of the colours, see Fig. 20).*

urban expansion, most of the old features, including three terp sites, were no longer present, while features of former ditches situated in plots of land that were still in agricultural use were damaged by land levelling (Fig. 9). It was therefore clear that the aerial photographs of the RAF provided a valuable source for the study of old landscape features. Although these photographs are, on average, of lower visual quality than later aerial photographs and the current elevation maps, they predate the major land improvement and development activities that, as mentioned, violated the old rural landscape with its remnants of even older features.

3.3 *Projects for Provincie Fryslân: The Mapping of larger areas*

The results of the mapping analysis were shared and discussed with the people of the archaeological department of Provincie Fryslân on a regular basis. They were very interested in the newly discovered possible settlements, the associated remains of former ditch systems, and, also, testing the mapping method itself. It was agreed that, with financial help of Provincie Fryslân, the GIA would start a pilot project (Bakker 2018b; Scholte-Lubberink *et al.* 2016). The geographical scope of the research assignment was limited to a smaller part of the transitional zone of clay-to-peat soils of Oostergo (eastern part of Friesland; area 1 in Fig. 10).

The first goal was to map remains of possible archaeological settlements and former ditches that could not be associated with ditches visible on the earliest cadastral maps of the 19th century. The available source material consisted of the AHN 2.0 and 3.0 elevation maps of the area, a selection of aerial photographs from the RAF dating back to the Second World War, as well as aerial photographs covering the entire area made by the department Aerocarto of the Koninklijke Luchtvaart Maatschappij (KLM Royal Dutch Airlines) dating from 1956 and part of 1959.[12] Although it was known beforehand that on the whole the elevation maps would provide a sharper picture, the study of the aerial photographs was expected to be crucial because of the mentioned changes in the landscape since the 1950s.

The second goal was to test the usability of the different sources for detecting archaeological features in the various soil types within the research area. To this end, we did not make use of existing maps with known terp locations during the mapping process. This enabled us to compare the results of the mapping with the known data at a later stage. After the pilot project was successfully completed, in early 2016, it was decided to continue the research, starting with a mapping project focusing on the area around the towns of Sneek and IJlst (situated in Westergo; area 2 in Fig. 10). This project started in late 2016 and was completed in early 2017.[13] For the

12 These aerial photographs are not public domain. They have been purchased by Provincie Fryslân and could only be used temporarily. For this reason, example images can, unfortunately, not be shown.

13 Not only archaeological features that are certainly or possibly older than medieval developments, but also remains of possible medieval and younger features of filled-in ditches and abandoned settlement sites were charted during this project. Because documenting these younger features was not part of the assignment during the pilot, the pilot area was studied again during the 2016-2017 project to also chart these later features. The mapping of these medieval and younger features can aid possible future research into this matter. These features will not be addressed here.

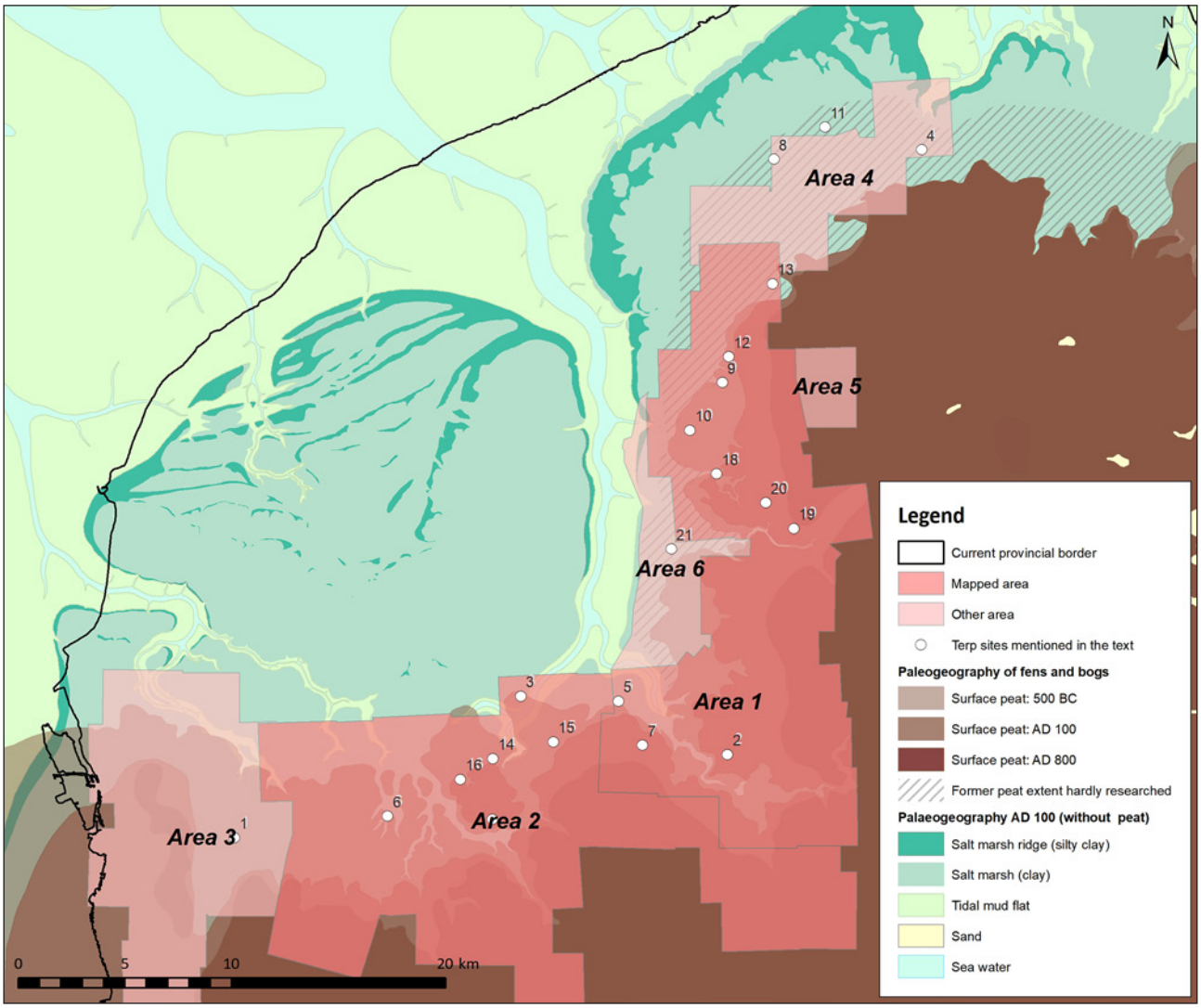


Fig. 10. Palaeogeographical map (modified after Vos 2013) marked with the research areas of the pilot project and the sequels, which were delineated based on the available older aerial photographs. Part of the assumed area of early peat reclamation directly southwest of Leeuwarden has not been directed to one of the mapping areas, due to the local presence of the silted-up sea arm of the Middelzee, which has either eroded traces of early peat reclamations or buried them beneath such thick clay deposits that they are not visible on the surface.

remaining parts of the transitional zone between clay soils and peat soils, aerial photographs predating the 1960s were acquired. These areas will be mapped for archaeological features in the near future, starting with areas 3 and 4 (Bakker 2018b).

3.4 *Primary analysis of the mapped features (see Appendix A and B)*

The first purpose of the primary analysis was to compare the mapped possible archaeological sites with the terps already known from the official records. These official records consisted of the terps known from the national soil data *(bodemkaart)* and the provincial records. Prior to the recent mapping projects, there were 226 terp sites known in the official records of area 1 and 2 (Table 2; see Appendix B for the entire list). On the whole, the mapping efforts of 2013-2017 resulted in 508 possible archaeological sites in these two areas, of which 454 were not previously known (Table 2). Interesting in this regard is that in area 1 only 48 of the 123 terps mentioned in various official records were among these 508 mapped sites, while in area 2 a mere 6 locations could be matched with the 120 already officially known terps. This means that in area 1, as many as 75 of the 123 officially known terps (60.1%) were not spotted during the mapping analysis and in area 2, no fewer than 114 of the 120 officially known terps (94.2%). For area 1 and in part for area 2, this mainly has to do with the fact that many of the officially known terps concern larger 'village terps' that lay 'hidden' beneath the larger residential zones of villages and towns. That especially in area 2 even more of the officially known terp sites were not spotted, has to do with the fact that in that area the clay deposits covering them are on average much thicker

Table 2. Terp sites found in official records versus mapped (possible) terp sites, by area.

Documentation source	Timeframe	Area 1		Area 2		Areas 3, 4 and 6
		Total	Mapped (2013-2017)	Total	Mapped (2013-2017)	Total
National soil data (terps)	until 1977	42	5	11	1	27
Provincial records (terps)	until 2013	77	26	77	4	96
Provincial records (noted as silted-over terps)	1988-2013	47	27	42	1	7
	Subtotal*	**123**	**48**	**120**	**6**	**103**
Previously unknown	2013-2017	-	291†	-	163	-
Total of mapped (possible) terp sites	2017	**n/a**	**339**	**n/a**	**169**	**n/a**

* Sites documented in more than source are counted as n = 1.

† This includes a very likely terp (site 364) that has been dug away and can no longer be researched.

Table 3. Number of terp sites from unofficial records compared with mapped sites and those found in official records.

Documentation source	Area 1	Area 2
Only known from 'official records' (see Table 2)	25	45
Only mapped (2013-2017)	14	2
Mapped and known from 'official records'	28	1
Neither mapped nor known from 'official records'	14	4
Total	**81**	**52**

Table 4. Results of recent coring surveys on mapped (possible) terp sites.

Coring survey (mapped sites)	Year	Area 1			Area 2		
		Settlement	Indet.	False	Settlement	Indet.	False
Oudkerk-Wyns-Leeuwarden (N=19)	2017	11	1	7	-	-	-
Wartena-Jirnsum-Oldeboorn (N=41)	2017	28	8*	5	-	-	-
Abbega (N=6)	2018	-	-	-	4†	2‡	-
Total		**39**	**9**	**12**	**4**	**2**	

* At five locations, no coring was performed because no permission was obtained from the landowner

† These four sites include two locations that most likely were part of the same settlement (site 923).

‡ Both locations have disappeared due to being disturbed recently. It is uncertain whether they were (terp) sites.

than in area 1. It is no coincidence that many of the officially known terp sites in area 2 were found either by accident during land development or by coring surveys prior to land development.

The second purpose of the primary analysis was to provide dates for the mapped features, if possible. Therefore the dates of known sites in the area were looked into first. Besides the official records, also other records were used to provide dates (Table 3). Important was the dissertation of Taayke (1996), mentioning pottery finds from terps that were quarried or otherwise dug away and therefore did not exist in the current official records. Of equal importance was the more recent work by Volkers, who, on behalf of Provincie Fryslân, catalogued the known archaeological finds made in a large part of the transitional clay–peat zone in Friesland. A third source were reports of coring surveys in locations which were assumed by Provincie Fryslân to be terp sites or raised sites of medieval farmsteads (the so called *provinciale verdiepingslagen*). For the locations of possible settlements from which no finds were known, it was checked if they might belong to a group of positively identified settlements of which some had already been dated. If this was the case, the former locations were assigned the same date as the latter, though with caution.

It proved impossible to date every (possible) site in this manner. In most cases, there was insufficient information to do so. Fieldwork would be needed to provide dates and also to confirm whether the mapped sites are really former settlements. Starting in 2017, the archaeological consulting firm RAAP conducted coring

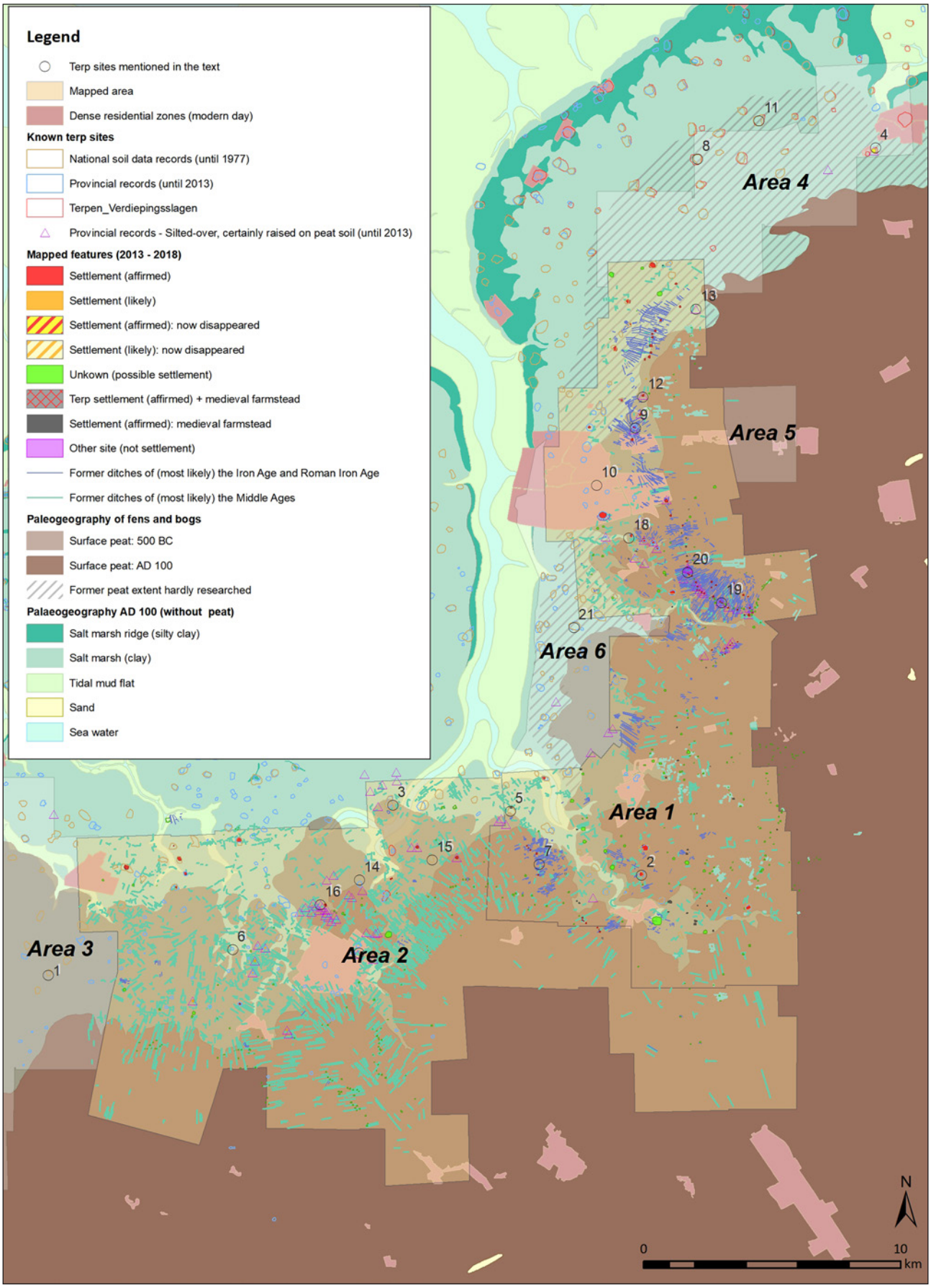


Fig. 11. Palaeogeographical map of the northern and central parts of Friesland (modified after Vos 2013) superimposed with an overview of the results of the mapping analysis in the research areas of the pilot and the sequels. For more detailed maps of the individual research areas, see Appendix B.

surveys on the (possible) sites between Oudkerk, Wyns and Leeuwarden (Veenstra 2017) and between Warten, Jirnsum and Oldeboorn (Veenstra 2018). These coring surveys were carried out as part of a larger project carried out by Provincie Fryslân to improve the existing provincial map of archaeological monuments. For that purpose, a coring survey was also conducted around Abbega (Aalbersberg 2019). Although that project concentrated mostly on the paleo-geographical development of that area, it also provided information about a couple of (possible) sites.

During the RAAP coring surveys, 66 mapped locations of possible sites were inspected, as well as 4 other sites.[14] No fewer than 43 (65%: Table 4) proved to be former settlements, and of these, 36 could be dated with confidence to the Pre-Roman Iron Age or the Roman Iron Age. Only 12 locations (20%) appeared not to be archaeological sites, leaving 11 locations indeterminable. Some of these were disturbed to such a degree that it was impossible to determine if they were archaeological sites. In other cases, no permission was granted by the landowner to conduct a coring survey at the location. Due to the success of the coring surveys (and the mapping), new field research into the recently mapped (possible) sites and other features will be fully incorporated in the province's research agenda for the coming years.

Based on all current available data (official records, data compiled by Taayke and by Volkers, and data from coring surveys), 135 of the 508 mapped locations in area 1 and 2 are confirmed archaeological settlements, of which 65 certainly date back to the Pre-Roman Iron Age or the Roman Iron Age and 59 most likely or possibly date back to those periods (see Appendix A). Of these 124 locations, 49 were also inhabited in the (late) Middle Ages. Of 10 locations, it is (very) unlikely that habitation started as early as the Late Pre-Roman Iron Age or Roman Iron Age, and for 1 location it is absolutely certain that habitation did not start until the late Middle Ages.

Of the remaining 373 locations in area 1 and 2, at least 3 have completely disappeared due to modern land improvement and project development and 15 can be disqualified because it is certain they are not archaeological sites but relatively modern structures or discolorations on aerial photographs. There is 1 additional location that appears to be a feature within a larger site dating back to the Pre-Roman Iron Age or Roman Iron Age.[15] This leaves 354 locations of which it is uncertain, for now, if they are archaeological sites or not. Based on their location and nearby finds of former ditches, pottery and other objects dating back to the Pre-Roman Iron Age or Roman Iron Age, 72 locations could be sites that very likely date back to those periods and 103 could be sites that possibly date to those periods, and 179 locations lay in areas in which finds dating to that period are unknown. If these latter 179 locations are indeed archaeological sites, they most likely are medieval in origin.

The third and final purpose of the primary analysis was to provide dates for the mapped remains of former ditches. Regarding these former ditches, mapped over a total length of more than 1100 km, it is important to realize that almost every single ditch seems to have been part of a group or system of ditches. During the excavations at Wartena-Noord and Leeuwarden-Bullepolder, one or more of these ditches could be dated, thereby providing a clear date for the other ditches of the same system. For the remaining ditch systems, the possible association with local settlements was studied. In cases where the traces of former ditches and settlements seem to clearly relate to each other, it is likely that they were in use simultaneously. The same goes for cases where a terp site overlies part of a former ditch and other ditches were dug to lead the water around the terp. Where it was not possible to study the relationship between ditches and settlements, the interaction with neighbouring ditch systems was studied. If ditches overlap, it is assumed that they are not related, whereas if they connect to each other or to neighbouring ditches without overlap, they are interpreted as likely to be contemporary.

In this way, a total of 413.1 km of silted-up or otherwise filled-in former ditches are registered as most likely dating to the Pre-Roman Iron Age or Roman Iron Age (Fig. 11; for detailed maps, see Appendix B) and the remaining 708.8 km are interpreted as most likely dating to the Middle Ages (Fig. 11). While the combined total length of more than 1100 km is already staggering, it must be kept in mind that this total excludes the many ditches that are still in use to this day. Many of the present-day ditches date from the Middle Ages, and parts of them may even date from the Pre-Roman Iron Age or Roman Iron Age. The features of medieval or younger origin will not be addressed further in this paper.

4. Discussion

The first results of the research into aerial photographs and elevation maps, combined with fieldwork to test whether these mapped remains were indeed sites and

14 Besides the 19 mapped locations between Oudkerk, Wyns and Leeuwarden, four otherwise suspicious locations were also inspected (locations A–D). Because these were not part of the mapping analysis, they have been left out in the text. For the record, we note that two of these were (former) terp settlements (site B and C) and the other two were not (Veenstra 2017).

15 Site 316 is a feature in the Pre-Roman Iron Age or Roman Iron Age site 66.

former ditches, provided the opportunity to study how the early peat reclamations were carried out. In the following, the results of the mapping efforts are further analysed in order to gain a better understanding of the early peat reclamations in Friesland, for example in terms of the approach followed, the extent of the reclamations and the primary motive of the reclaimers.

First, the basic structure of the reclamations will be further examined. The methods of reclamation and the elements of which a reclamation unit consists are discussed based upon the mapped features. This part of the discussion also provides a set of terms and definitions to be used in the rest of the paper. Second, the observed differences in layout among the reclamation units will be discussed, in order to gain insight into the strategies followed and the possible reasons behind any differences in strategy. Third, the extent of the peat reclamations will be discussed. It will be examined in which areas which kind of features could be mapped. It will also be argued that some of the areas where such traces were not spotted may still very well have been subject to early reclamation activities. Fourth, the expansion of the reclamations over time will be briefly looked at. Based upon pottery and radiocarbon dates, it will become clear that not all reclamations started at the same time and that there is a gradual expansion of the reclamations deeper inland.

It is thanks to the insights provided by these four steps that a number of more theoretical topics can be addressed. To start with, the level of organisation that must have been necessary to reclaim those large tracts of peat land and to deal with water management issues will be briefly discussed, followed by population density. Based upon the parts of the former reclamation area in which there is a relatively clear picture of the number of settlement sites per reclamation unit, it will be argued that in comparison with other soil types, the reclaimed peat lands were densely occupied and that it is quite possible that the land within each reclamation unit was generally divided equally among the respective settlements.

Finally, the primary motive behind the early peat reclamations is considered. According to earlier researchers, the reclaimed areas were only in use during the drier months of the year. Given the complexity, scale, extent and level of organisation of the reclamations, as well as the settlement density in the reclaimed areas and the ongoing intensive maintenance of the drainage system, this merely seasonal exploitation model seems highly unlikely. It is much more likely that the primary motive behind the reclamations was the creation of an agricultural landscape that was suitable for mixed farming and inhabited year-round.

4.1 The structure of a reclamation

The basic structure of an early peat reclamation consisted of a coherent system of straight ditches that divided a reclamation unit into parcels. These main ditches, or 'parcel ditches' (*perceelsloten*), were dug at right angles or at a slight angle to a natural stream or an artificial waterway like a (broad) ditch of another reclamation unit, and they could be very long, sometimes reaching a length of several km. Ditches were dug to drain the original peat land in order to make it accessible and usable for occupation. Afterwards, the ditches retained the task of draining excess water, thereby also acting as boundaries between the parcels stretching within the system. The shape of the parcels varied from tapered to rectangular; their maximum width was approximately 20 to 80 m. A width of 80 m may seem too wide, and it is noted that widths of 80 m were mostly encountered as the maximum width in parcels that were strongly tapered in shape.

Interestingly, in addition to the main ditches, which ran lengthways, there are ditches at a perpendicular angle to the main ditches. These transverse ditches could interconnect to each other, but the interconnected ditches rarely formed straight lines (Fig. 5). This indicates that these perpendicular ditches were dug later than the parcel ditches. For the digging of these perpendicular ditches, two reasons can be brought forward. First, the perpendicular ditches could have been dug to improve the drainage of the parcels as soon as the effects of land subsidence became critical. Second, and equally likely, they may have served to divide the long parcels into smaller plots that could be used separately for different purposes.

The parcel between two perpendicular ditches, or between a perpendicular ditch and the waterway that acted as an outlet, in some cases also contained the remains of small, shallow ditches that divided that parcel into smaller strips. These small ditches were most likely 'grips', which purely functioned as drainage.[16] They are too small to act as boundary or boundary marker and too numerous to be associated with a functional division. Because of their shallowness, they are rarely visible on elevation maps. During the excavation of Wartena-Noord, several grips were documented that could not be spotted on either the elevation map or the geomagnetic map. It was also established that not all grips were of the same age. Some of them must have been dug very early, because they went out of use and were filled up early during the habitation period, while others were clearly dug at a later stage, during the habitation period. Compared with that of the larger parcel ditches and perpendicular ditches, the use of grips was necessary for draining a parcel, but individually they were not necessarily a stable element and seem to have been replaced on multiple occasions.

16 Alternative spellings are grype and gripe (Smart 2011). The English terms are comparable with *greppel* in Dutch.

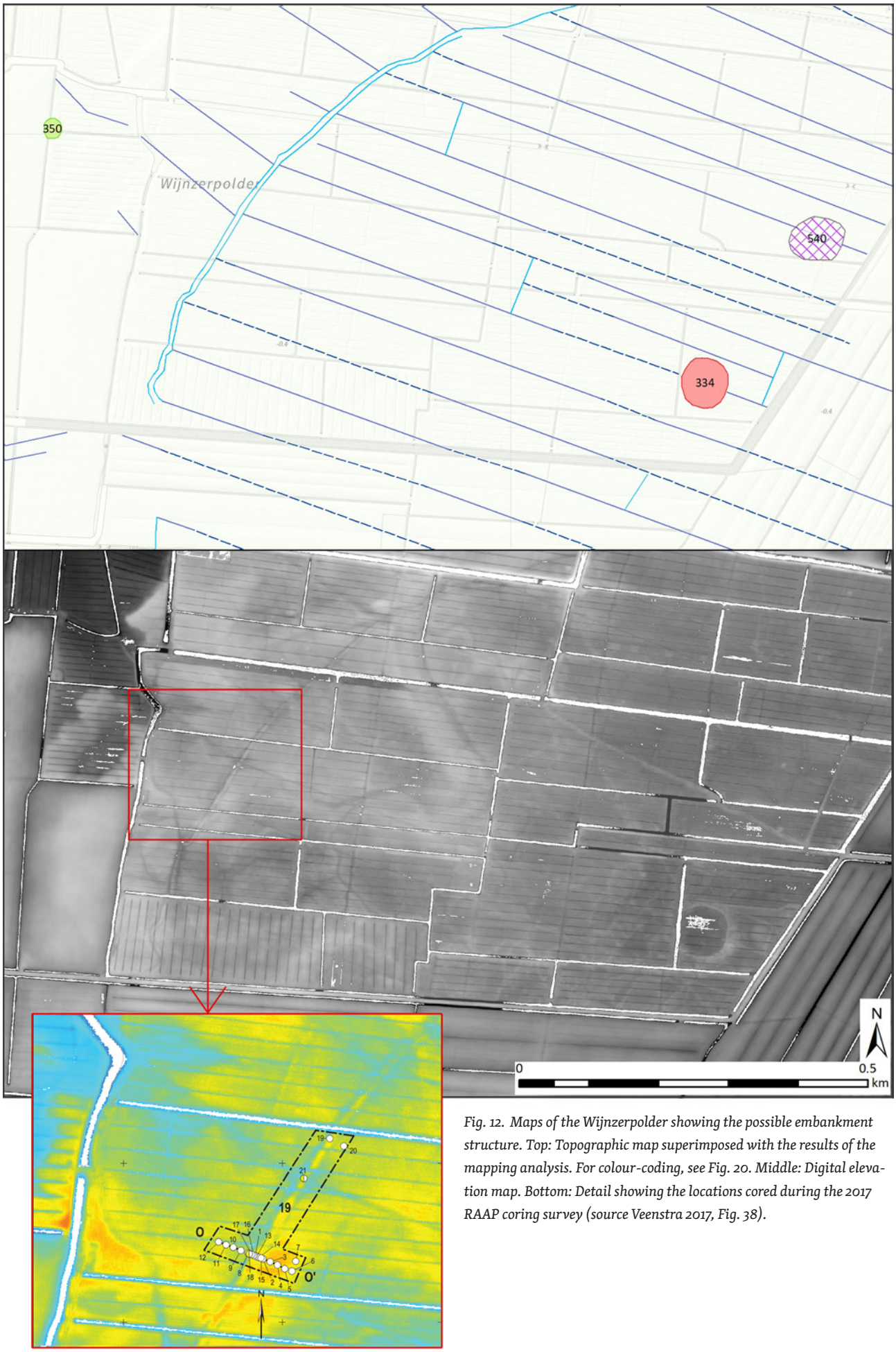


Fig. 12. Maps of the Wijnzerpolder showing the possible embankment structure. Top: Topographic map superimposed with the results of the mapping analysis. For colour-coding, see Fig. 20. Middle: Digital elevation map. Bottom: Detail showing the locations cored during the 2017 RAAP coring survey (source Veenstra 2017, Fig. 38).

It remains a guess how deep and broad the ditches and grips were originally. After ditches in peat land are dug and water is drained, the topsoil of the peat starts to shrink (*inklinken*). At the same time, the dried peat starts to oxidize. Both processes benefited the first settlers, because the shrinking process leads to a more compact and accessible topsoil, while oxidation decreases the carbon content of the peat soil, thereby starting peat mineralization and the release of nitrogen in the newly formed topsoil (Schothorst 1982: 149-50, 158-9; Borger 1996: 138; Ettema 2005: 245). However, both changes also imply land subsidence, which has as negative effect that the soil starts to become wetter again. To thwart this effect, the local water table needs to be brought to a lower level. Therefore ditches not only need to be well maintained, but also deepened repeatedly.[17] Under the given circumstances, it is almost impossible for a ditch, especially one dating from the start of the reclamation, to retain its original depth and width for a longer period of time. This means that it is impossible for us to determine the original dimensions of the first ditches by means of an excavation or, indeed, any method whatsoever.

That artificial drainageof a tract of peat land started earlier than its habitation, was not only established at Wartena-Noord and Wartena-Warstiens (Bakker 2014, in prep. a, b), but also at the excavated settlements near Arkum, Sneek and Leeuwarden (Bakker 2013; Bakker & De Langen 2018b; Bakker 2019, 2022a). This makes sense, because an active fen or raised bog would only become well accessible after draining. To indicate how accessible the drained peat could be, it is interesting to see that during the first habitation phase of Arkum (on top of drained fen peat), Sneek-Harinxmaland and Leeuwarden-Bullepolder (both on top of drained bog peat) the settlers did not build their house on a terp but on only a thin layer of clay or peat sods, which meant basically close to the surface (*Flachsiedlung*). Only at a later moment in time they raised a low terp of approximately 0.3 to 0.6 m high, when, as traces of thin marine clay deposits indicate, the reclaimed peat land had become vulnerable for floods due to land subsidence (Bakker 2022a).[18]

Evidence for the construction of artificial drainage systems and terps raises the question whether the settlers also made use of artificial embankments and levees to keep water out of their land.[19] Remains of such constructions dating from the Late Pre-Roman Iron Age and Roman Iron Age were found during excavations at Wijnaldum, Peins and Dongjum (Bazelmans *et al.* 1999), all at that time situated in the salt marsh area, and at Warga (Zandboer 2010), situated on the border of the salt marsh area and the peat area. These embankments were relatively low dikes built of clay sods.[20] Although their ability to protect against flooding appears to have been modest, they may have been used as summer dikes to prevent the highest tides – which are less dangerous in summer – from spoiling any crops grown in the fields. The low summer dikes may also have served to accelerate the silting up of the lands stretching directly behind them by breaking the power of the current during floods and slowing down the receding of the water afterwards. A combined function is also possible.

Until recently, similar structures could not be confirmed for the peat reclamation area, even though they were very likely in use there too. One possible candidate for such an artificial embankment is a landscape feature situated between the villages of Wyns and Oudkerk (Fig. 12). The structure, clearly visible on recent elevation maps, is at least 3 km long and may have stretched even farther north. Its shape can be best observed, in the Wijnzerpolder, because the fields in that area have hardly been subject to agricultural land improvement. On the AHN elevation map, the remains of the structure seem to consist of a 4 to 5 m wide ridge that reaches a height of approximately 0.02 to 0.1 m above mean sea level (Amsterdam Ordnance Datum, known by the acronym NAP). Running parallel to this low ridge on both sides are 2 to 3 m wide silted-up ditch-like structures, reaching a height of approximately 0.1 to 0.3 m below NAP, while the neighbouring fields reached a maximum height of about 0 m NAP. On both sides, former ditches dating back to the Pre-Roman Iron Age or Roman Iron Age connected to the ditch-like structures.

17 The process of subsidence is continuous and will, when excess water cannot (any longer) be extracted, inevitably lead to the conversion of usable lands into soggy 'bad lands' (*onlanden*).

18 In the case of the more recent terps of Wartena-Noord and Wartena-Warstiens, a dwelling mound was raised right at the start of the habitation. These terps were about 1 m high.

19 The English word dyke (or dike) is often used as direct translation of the Dutch word *dijk,* but the words are not equivalent. A *dijk* is an artificial embankment to prevent floods entering the lands behind it) and was originally a combination of a trench (canal or ditch) and an embankment. In English, in cases where the embankment is gone, the surviving trench is still called dike or dyke (for instance the Car Dyke in the Fenlands or the King's Dike in Cambridgeshire). In other parts of England, even a ditch is often called a dyke.

20 The two artificial embankments, found along the river Ouddiep next to the terp Groot-Palma (Wergea), were raised on top of each other. The first embankment was approximately 14 cm and the second approximately 28 cm high. Both date from the 1st century AD (Zandboer 2010, 40-41).

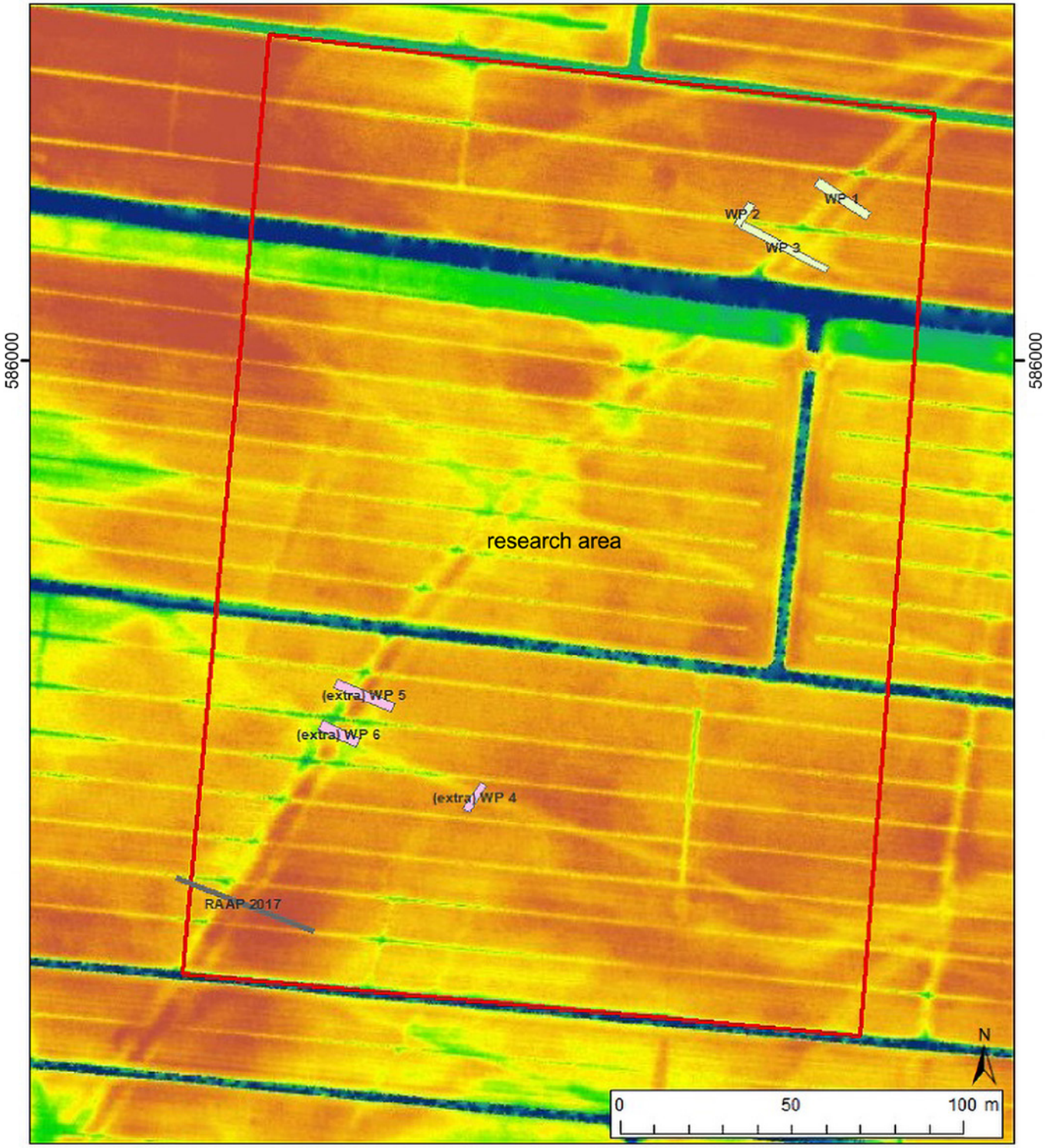


Fig. 13. Elevation map AHN-3 superimposed with the location of the excavation trenches (WP 1-3) and back-up trenches (WP 4-6) (mapped out in case the first three did not deliver any information) (source Bakker 2022b, Fig. 6). For reference, the location of the 2017 RAAP coring survey is also displayed. The research area is outlined in red.

In 2017, a coring survey carried out by RAAP revealed that the ridge consists of heavy clay with a subsoil of peat. The clay layer of the ridge is thicker than the clay layer that covers the surrounding peat (Veenstra 2017: 85-91). Sadly, the results from the coring survey could neither deny nor confirm that it was originally an embankment with ditches on both sides, though they were deemed to indicate that it is unlikely it was a silted-up gully suffering from tidal inversion (Veenstra 2017: 91). It seemed that only an excavation could provide more clarity on this issue.

In 2021, a small excavation was conducted on the structure by the GIA (Bakker 2022b; Fig. 13). It became clear that the structure indeed consisted of an artificially

Fig. 14. Photo of the section of the embankment structure in the first excavation trench (source Bakker 2022b, Fig. 9). The ranging rods (2 m) are positioned in the middle of the ditches on either side of the ridge. The clay-and-peaty fill of these ditches has partly sunken into the peat subsoil.

raised ridge, of about 4 m wide. The ditch-like structures flanking it were indeed found to be ditches, to which the ditches of the adjacent parcels were connected (Fig. 14). The structure was constructed in a clay-on-peat landscape, most likely in the Late Pre-Roman Iron Age (Bakker 2022b: 23-5). Although the top of the ridge lay higher than the surrounding parcels, it can only have had a modest, water-retaining function.[21] This assumption is based on both its relatively low height and the fact that during its existence sedimentation of marine clay continued in the surrounding area, not only in the ditches but also on the surrounding fields. Its water-retaining function must therefore have been comparable with that of the summer dikes that had been excavated earlier at Wijnaldum, Peins, Dongjum and Warga. Furthermore, the embankment would have been very useful to move cattle and carts across the fields, because in this way no ditches needed to be crossed.

Based on the fact that the former settlement sites east of the embankment seem to have a slightly younger origin than those west of it, and on the fact that the parcels east of the embankment are oriented on a slightly different angle from their western counterparts, it is very likely that the reclamation of the area was done in two phases (Bakker 2022b: 24-5). During the first phase (Fig. 15a), only the western part was drained. The soil that was dug from the ditch that enclosed the parcels was deposited directly behind the ditch, in order to form a small embankment. This construction prevented surface water from the area not yet reclaimed from flooding the new fields.[22] Only during the second phase, when the eastern part was reclaimed (Fig. 15b), was the ditch east of the embankment dug.

At the end of the 2nd or in the early 3rd century AD, the ditches of the old land allotment system fell out of use and silted up with clay. Eventually, starting in the 4th century, peat was formed in the former ditches (Bakker 2022b: 20-3). By then the structure had already ceased to function as an embankment or even as a road, because at an earlier moment in time, which could not be dated exactly, it had been dug through in order to create a direct connection between the two ditch systems on both sides of the structure. After the ditches silted up and were filled with peat, the formation of peat expanded to the rest of the area, turning it into a reed swamp. In the course of the Early Middle Ages the entire area once again became silted up with marine clay deposits. Later in the Middle Ages, the area was reclaimed once again when the land allotment system still in use today was established.

Considering that in the Iron Age embankments were raised in the salt marshes and reclaimed peat lands to prevent flooding of fields during the summer, there also must have been methods of releasing surplus water from the embanked areas. One of these methods was the application of culverts (*duikers*), which even today are still used in Dutch agricultural wetlands. Remains of culverts in the Netherlands dating back

21 The maximum height of the top of the ridge could not be determined, as it has been incorporated into the modern cultivation layer, but the part that was visible lay at least 30 cm higher than the original level of the surrounding fields.

22 In Dutch, such an embankment separating reclaimed land from the not reclaimed hinterland is called an *achterkade*.

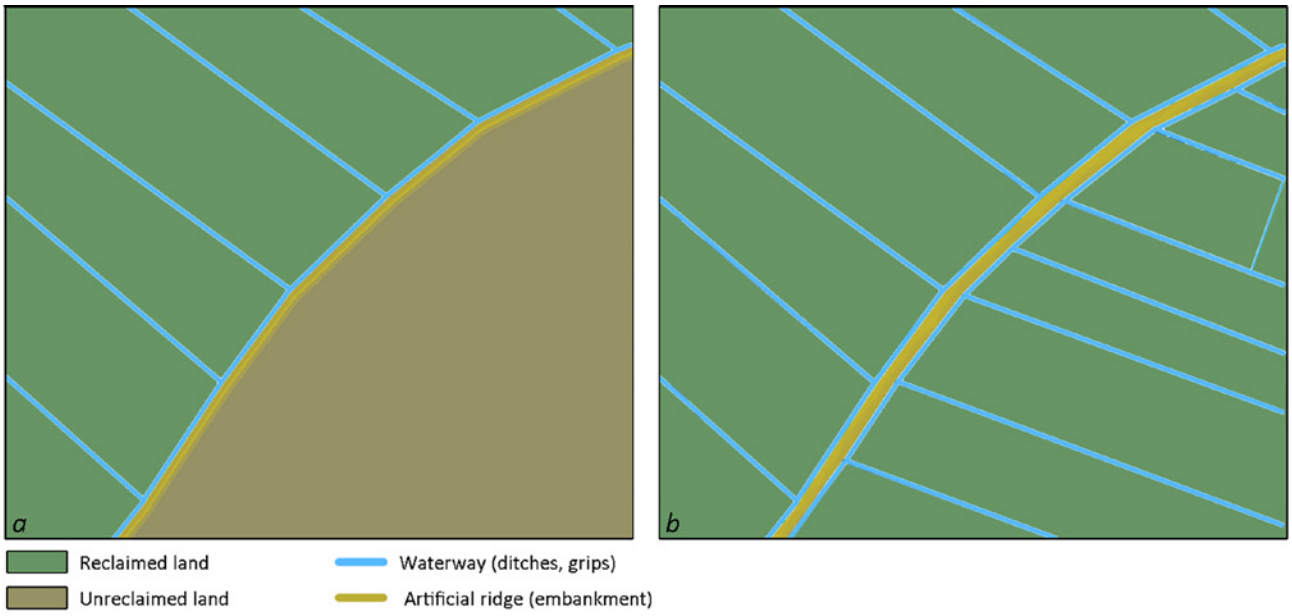


Fig. 15. Planview reconstruction of the most likely process of land reclamation during the Pre-Roman Iron Age (a) and Roman Iron Age (b) in the Wijnzerpolder.

to the Pre-Roman Iron Age and Roman Iron Age have been found in the Meuse estuary (Ter Brugge 2002) and near Jemgum, in Ost-Friesland, Germany (Prison 2009). These culverts were made of hollowed-out tree trunks and were positioned beneath a dam or placed in an embankment to enable the passage of water. The culverts found in the Meuse estuary are of two different functional types: the connecting culvert (*verbindingsduiker*) and the sluice culvert (*uitwateringsduiker*).[23]

Especially the introduction of the sluice culvert can be seen as an important innovation because it enhances water management. Secondly, it also delivers a mid-term solution for drainage problems that will occur in peat reclamations over time. At first clay-on-peat and peat areas can be drained by directly connecting the ditch system to a natural waterway. Over time, however, this drainage method becomes less efficient and, eventually, ineffectual. As explained earlier, the process of land subsidence in peat reclamations demands a periodic deepening of the ditches in order to keep the land drained. This method offers a respite until the level of the land in the reclaimed area nears the common water level of the outlet. From then on, the reclaimed lands are in constant danger of inundation due to rainfall or – as in the case of the early reclamations in the northern Netherlands – flooding by seawater. Reclaimed peatlands surrounded by embankments with sluice culverts are better protected from such situations. The use of sluice culverts therefore lengthens the life span of an artificially drained peat land within an embanked area – until, of course, the land levels drops to the lowest water level outside the embankment.

Remnants of culverts have not (yet) been found in Friesland or Groningen, but because they were in use in the wetlands of the neighbouring areas of the Meuse estuary and Ost-Friesland, it is reasonable to assume that they were also known in the northern Netherlands during the same timeframe and would have been used when circumstances required.

4.2 *Differences in reclamation strategy*

Within the research area, two different types of parcelling or land allotment systems can be discerned: on the one hand, that of strongly tapering parcels with a settlement situated in the centre, giving the impression of a radial allotment system, and, on the other hand, that of a parallel alignment of (slightly tapering) long strip parcels with small settlements, spread out like a string over the different parcels in such a way that they together form a linear settlement pattern. Examples of the radial system can be found around Leeuwarden, including at

23 The function of a connecting culvert is to connect two ditches when they are separated by a dam. Sluice culverts have a different function. They are positioned in a dam or embankment that separates the inland water (*binnenwater*: the surface water within the reclaimed area) from the water outside the embankment (*buitenwater*: outlet in the form of larger waterways, such as brooks, creeks, gullies and canals). The function of sluice culverts is to drain the surplus inland water while keeping out the outside water when it rises. To achieve this, a lid is attached to the end of the culvert facing out. When the outside water level is low, the lid opens and water within the embankment can flow out. When the water level outside the embankment rises, the lid closes due to the pressure of the water, thereby preventing the flooding of the embanked area. In addition to this kind of self-regulating sluice culvert (*klepduiker*), simpler versions, which had to be controlled manually, were discovered in the area of Vlaardingen (Ter Brugge 2002).

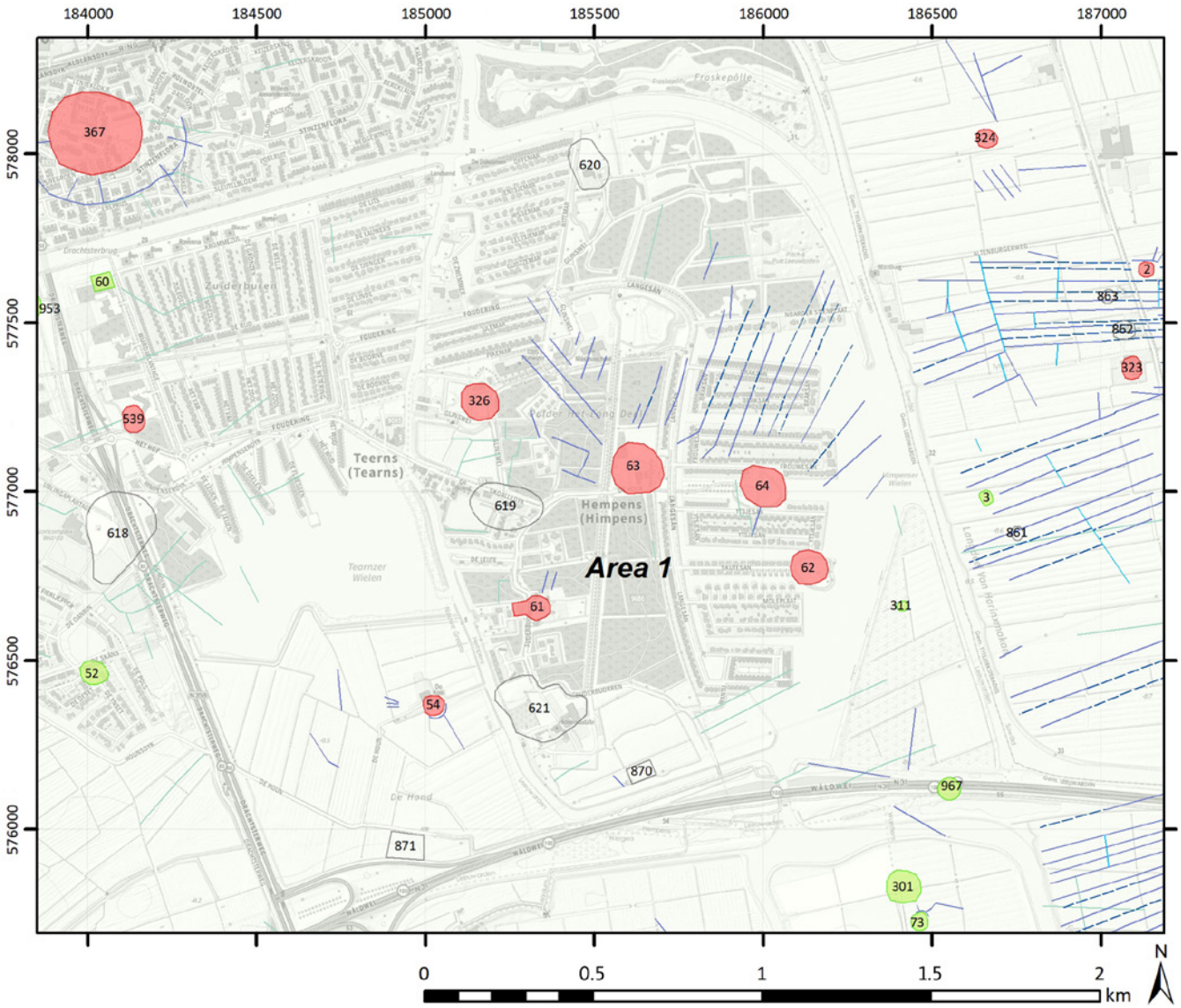


Fig. 16. Recent topographic map of the area around Hempens and Teerns, south of Leeuwarden, superimposed with (possible) settlements and former ditches identified during the analysis of aerial photographs and digital elevation maps (for an explanation of the colours, see Fig. 20).

Leeuwarden-Bullepolder (see Fig. 9), while examples of the linear system can be found around Wyns and around Warten, Irnsum and Grouw. Even though the settlements within the radial systems seem to be older in origin than those within linear systems (Bakker 2014, 2016, 2017, in prep. d), the differences between the two patterns do not appear to be related to a technological development over time, but rather to locally differing landscape conditions.[24]

The natural peat landscape of Leeuwarden consisted for a large part of fen peat, which is not surprising considering the eutrophic to mesotrophic circumstances in coastal peat areas adjacent to a tidal salt marsh. Nevertheless, here and there small cushions of oligotrophic bog peat had developed at quite an early stage (Bakker & Vos 2017; Bakker 2020). In 2001 and 2015, geological research carried out during the excavations of the Middle Pre-Roman Iron Age settlement at Leeuwarden-Bullepolder showed that, despite its proximity to the salt marsh, a small bog peat cushion had been able to evolve here since the Middle Bronze Age (Vos 2002; Bakker & Vos 2017). To the south of Leeuwarden, a similar discovery was made during the excavation of the site of Hempens-Teerns. Here a bog peat cushion had developed since the Late Bronze Age (Waldus 1999, 2000: 24). It is understandable that such cushions were more attractive to settlers than the adjacent, lower-lying fen peat. Cushions are

24 At Leeuwarden-Bullepolder, the earliest habitation dates from the 4th century BC (Bakker 2016, 2020), and at Wartena-Noord and Wartena-Warstiens, it dates from halfway the 1st century AD (Bakker 2014, 2017). Based on pottery finds, the earliest habitation of the peat reclamations around Irnsum and Grouw can for now only be roughly dated, between the 2nd century BC and the 1st century AD.

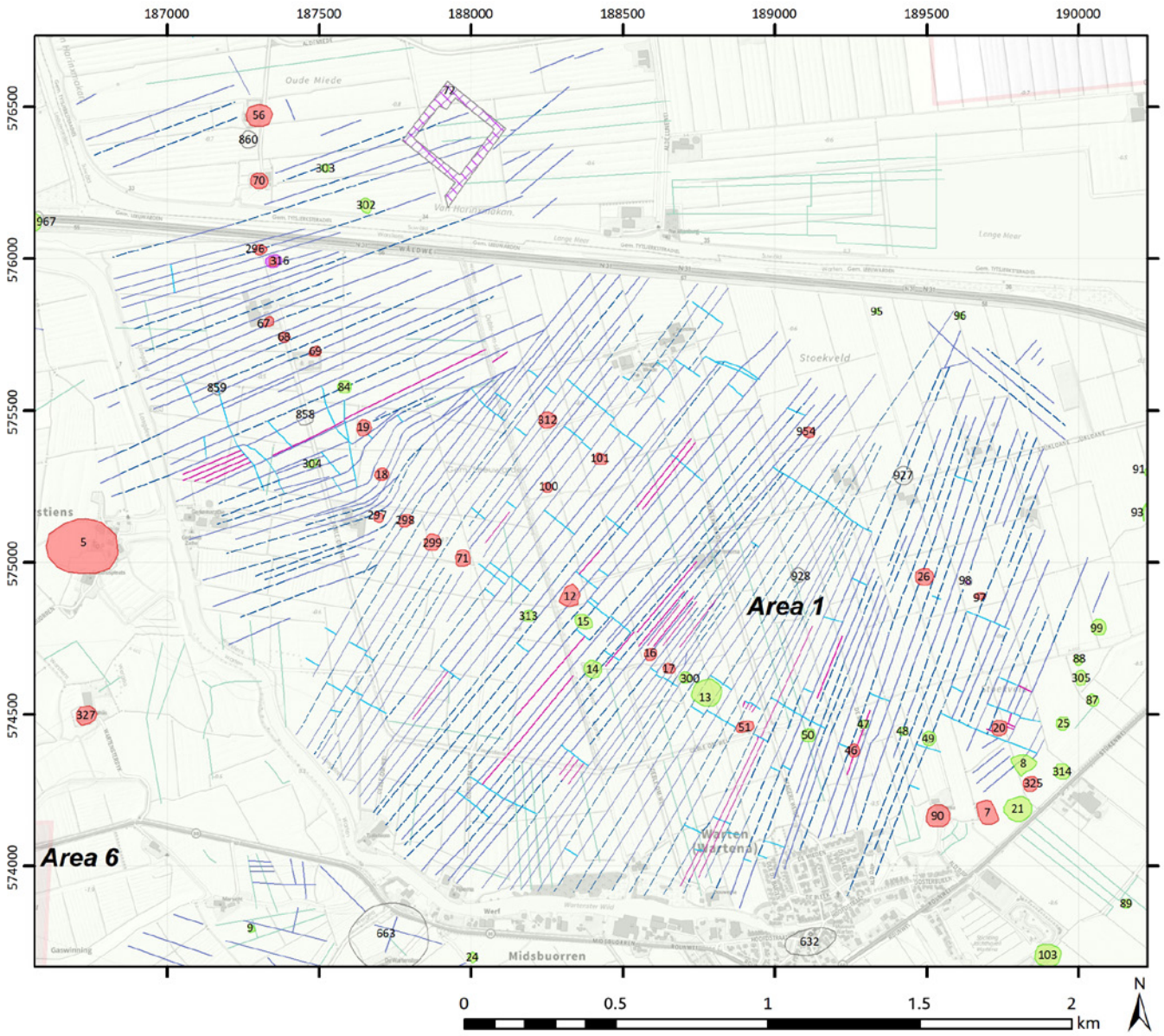


Fig. 17. Recent topographic map of the area between Warstiens and Wartena, superimposed with (possible) settlements and former ditches identified during the analysis of aerial photographs and digital elevation maps (for an explanation of the colours, see Fig. 20).

best drained by digging ditches that run from the top to the lower flanks. With smaller cushions, this principle leads to the emergence of tapering parcels within a radial system.

Deeper inland, the natural peat landscape was vast, with large raised bogs (*hoogveenkoepels*) that could be many kilometres in diameter. Only along streams and at the lower flanks of the raised bogs did eutrophic and mesotrophic fen peat remain. For reclamation purposes, drainage ditches were dug in these bogs, starting at the brooks and other waterways and crossing the low-lying fen peat in the direction of the dome of the raised bog. This resulted in long strip parcels. Because the domes lay at quite some distance from the edge of the parcels, it was easier to dwell in farmsteads dispersed over the parcels than to live concentrated on or near the far-away top of the dome. The ditches of the peat reclamations around Wartena even never reached the top of the dome (situated near the current village of Hurdegarijp), because there was already plenty of drained land available after the initial reclamation of the lower half of the southern and western slopes.

The distinction between radial and linear allotment systems is not clear-cut, because there were also ditch patterns with hybrid forms. When a bog peat cushion was larger than the small cushions just discussed, the land allotment system could still show radial characteristics, but the ditches could stretch farther (see Fig. 16, surrounding Hempens-Teerns). When the parcels became too wide, a perpendicular ditch was dug in

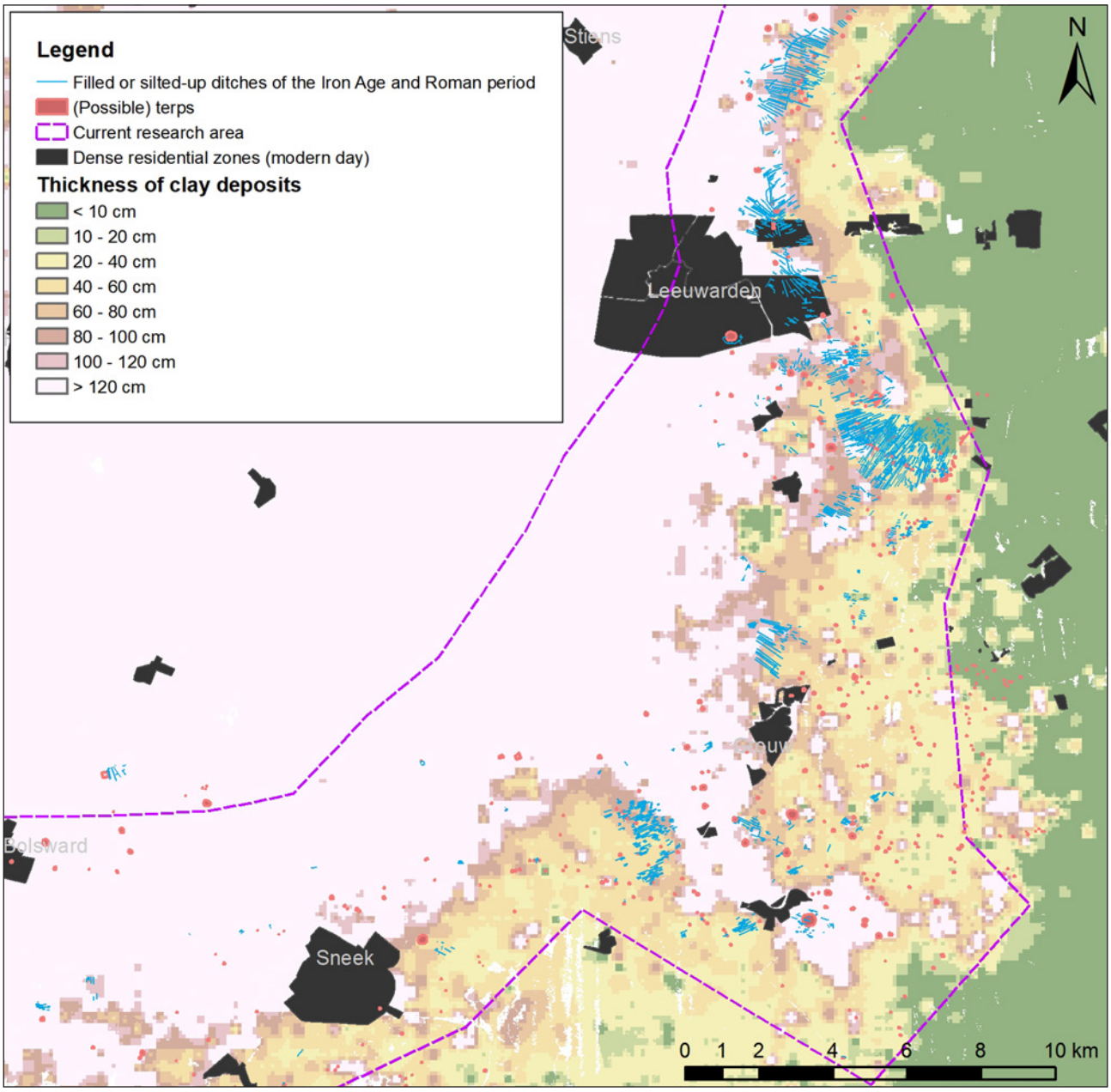


Fig. 18. Map of the northern and central parts of Friesland, showing the thickness of clay deposits (source Provincie Fryslân), superimposed with ditches of the Iron Age and Roman period identified during the analysis of aerial photographs and digital elevation maps.

order to divide the parcels.[25] Starting from there, new and additional ditches could be dug, not only to extend the existing ditches lengthways, but also to divide the new parcels into narrower ones. Basically the practice of prolonging ditches (and parcels) within a linear or hybrid system was continued until a natural watercourse or another reclamation unit was encountered.

It seems that the smaller peat bog cushions that lay close to the salt marsh were reclaimed first. Because of the smaller size and round shape of these cushions, the radial allotment system predominated in this first phase. On raised bogs, which were reclaimed at a following stage, ditches were dug parallel to each other over long distances. However, the hybrid forms show that local adaptations were necessary. In all cases, the ditches led

25 During reclamation of a raised bog, the reverse happened. Here the parcels became narrower because ditches were dug from the lower slopes in the direction of the top of the bog. In the case of the reclamation to the north of Wartena, perpendicular ditches were dug to close the narrowing parcels, and afterwards new ditches were dug continuing in the direction of the top of the dome, with more room between them, allowing once again for wider parcels.

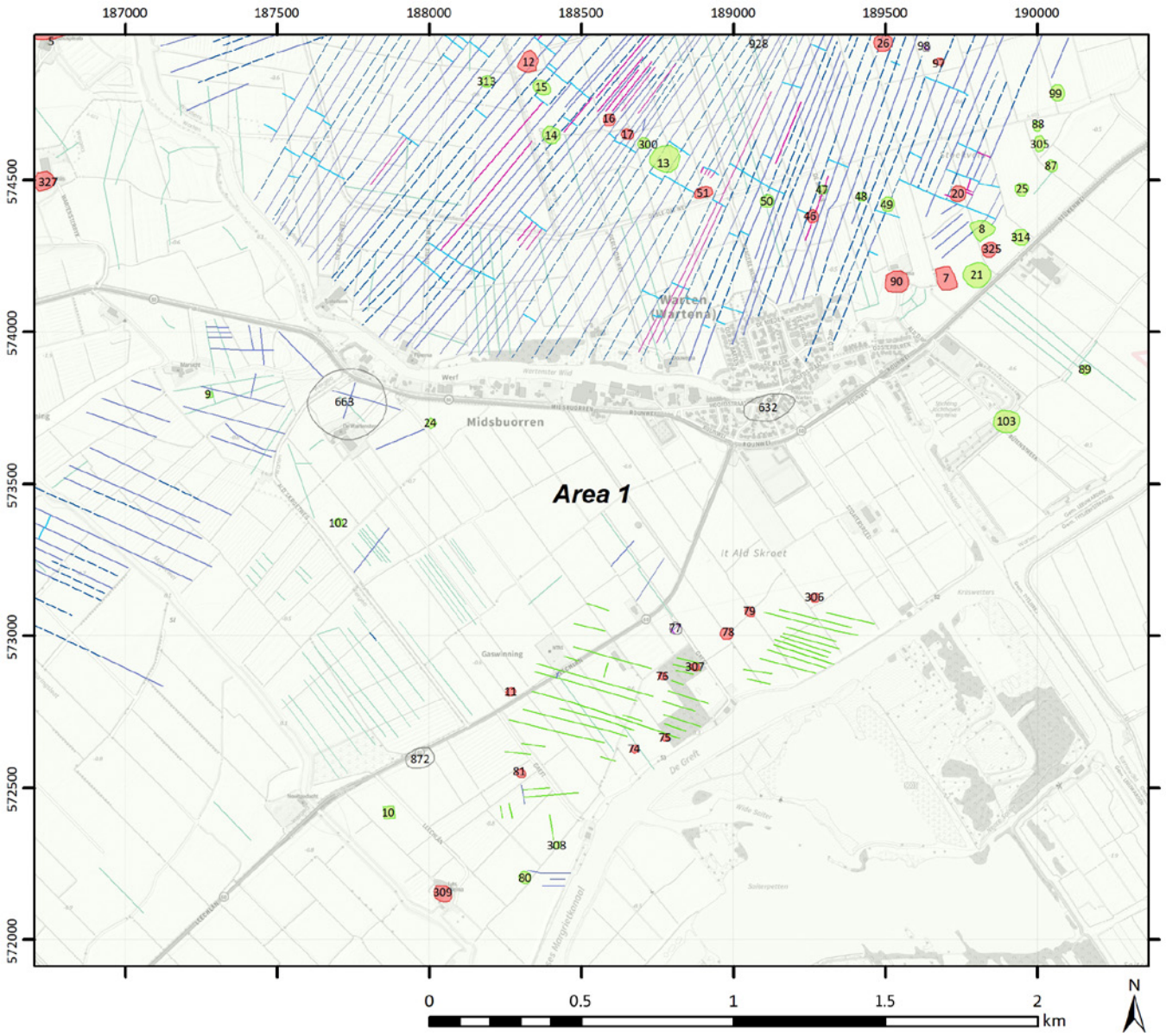


Fig. 19. Recent topographic map of the area south of Wartena, superimposed with (possible) settlements, former ditches and possible former ditches identified during the analysis of aerial photographs and digital elevation maps (for an explanation of the colours, see Fig. 20).

the water away from the top in the most efficient way, whether or not the top itself was directly drained.

This means that the peat reclamations from the Roman Iron Age did not differ in a technical sense from those of the Pre-Roman Iron Age. Only the scale changed over time, and with it the settlement pattern, because the peat lands that came under reclamation in the later phases were more vast and less diverse. It seems more useful to make a technical distinction between the reclamation of large units – with their own regularity – and the reclamation of the remaining peat that lay between these large units. In the case of such remnants, the gap between the larger units was filled by creating small and straight parcels of even width, but of different lengths (Fig. 17; see also Fig. 8, lower half).

4.3 *The extent of the reclamations*

Thanks to the mapping of the ditch systems and related settlements, more insight has been gained into the scale of the early peat reclamations. At the same time, it has become clear that we still do not know the former peat zone or reclamation zone well enough to specify the maximum extent of the reclamations. This is partly the result of many of the reclaimed areas having been transformed into clay-on-peat soils, in which, depending on the thickness of the clay deposits, features of the former reclamations are more difficult to spot nowadays. In some cases, areas eroded to such an extent by marine influences that they were completely transformed into (low-lying) salt marshes intersected by creeks and gullies, during which process the features of the early peat reclamations could become erased completely.

Interesting are the apparently empty spaces within the research area. Among them are areas with sites dating from the early reclamation period in which no traces of an accompanying drainage system have yet been found. In section 3, several processes were mentioned that may explain this absence, such as the oxidation and eroding of peat after the end of the early reclamations, medieval ploughing and the agricultural land improvement, and urban development after the Second World War – all of which hamper our ability to detect former ditch systems. Another cause for the invisibility of these ditches in areas where they can be expected is the thickness of the clay deposits covering the Pre-Roman Iron Age and Roman Iron Age land surface. In general, the remains of silted-up ditches appear to be best visible when the covering clay deposits are between about 30 cm and 60 cm thick (Fig. 18). The thicker the deposits, the smaller the chance that traces of silted-up ditches become visible as a result of partial subsidence of the soil. Clay deposits thinner than 30 cm seem to fail to protect the archaeological features well enough to prevent their disappearance due to medieval and later disturbance, such as ploughing.

Another possibility that should be taken into consideration when no reclamation ditch system is visible in a location where one would be expected to be visible is the re-use of the older ditch system by the medieval reclaimers. Such a re-use is only plausible in areas where the older ditches had maintained their visibility into medieval times in one way or another, i.e. in areas where new clay or new peat layers were thin. But even under those circumstances, re-use was not guaranteed. For example, in cases were the connecting natural drainage system had taken a new course or the overall relief of the peat had changed significantly, the medieval reclamation settlers may have preferred to dig new ditches, constructing a new system customized to the new situation. Only where old ditches remained visible and could once again fully fulfil their drainage function would re-use of the old drainage system have been an efficient option. Re-use can explain why in some areas a drainage system which was present in the Pre-Roman Iron Age and or Roman Iron Age is now undetectable: its traces were erased during the construction and maintenance of the medieval ditch system.

Such a case of re-use may have occurred south of Wartena (Fig. 19). Here older silted-up ditches have not been discovered yet, although in this area the cover of clay deposits is only between 30 and 60 cm thick and traces of several settlements dating back to the Roman Iron Age are known (Jager 1988; Veenstra 2018). On only one of the aerial photographs of the RAF do some vague lines possibly indicate the presence of former ditches, with a different orientation, at a short distance south of the settlement sites. However, these indications are not very reliable, and the lines may also be caused by scratches on that particular photograph. This may very well mean that the older reclamation ditches may have had the same orientation as the current ditch system. Interestingly, the present ditch system seems to mirror the clearly detectable silted-up ditch system north of the waterway and the current village perfectly. If there ever is a chance for fieldwork in the form of a small excavation of one of the Roman Iron Age settlement sites south of Wartena, the functioning and orientation of the associated ditches should also be researched.

4.4 The expansion of the reclamations over time

In discussions about the differences in reclamation strategies, it was pointed out that not all reclamations are of the same age (see section 4.2). This became apparent during the primary analysis of the mapped features. For instance, the start of the reclamations in and near Leeuwarden-Bullepolder (Bakker 2020) and Wirdum (Bakker in prep. d) could be dated in the Middle Pre-Roman Iron Age, those near Hempens-Teerns (Waldus 1999, 2000) to the Late Pre-Roman Iron Age, and those near Wartena to the end of the Early Roman Iron Age (Bakker 2017, in prep. a).

Although additional fieldwork is needed to more accurately date the individual reclamation units, it is already clear that the younger reclamations lie farther inland than the older ones. We are also already justified in assuming that with each new reclamation or expansion of an existing unit, increasingly larger tracts of peat land were reclaimed. This is in accordance with the population growth assumed for the entire northern Netherlands during this period (Taayke 1996: V; Nieuwhof *et al.* 2019: 82-3). On this point, however, as far as peat reclamations are concerned, a caveat must be made. In the case of the peat reclamations, population growth cannot have been derived directly from spatial expansion, as some of the inhabitants of the new units will have come from older (partially) abandoned ones (Bakker 2022a). More details will be provided in the final topic of the discussion, about the primary motive behind the reclamations.

4.5 Organization and population density

At this stage of the research, it is not possible to make any firm statements about how these early reclamations were organized. Too few excavations have been done, too many gaps still exist in our maps of the ditch systems, and too many localized (potential) sites lack information on the exact date and nature. Moreover, historical written sources are lacking. However, given that the systematic draining of a tract of peat land and the following distribution of reclaimed land among the settlers were complex tasks, and given that water management required constant attention and investment

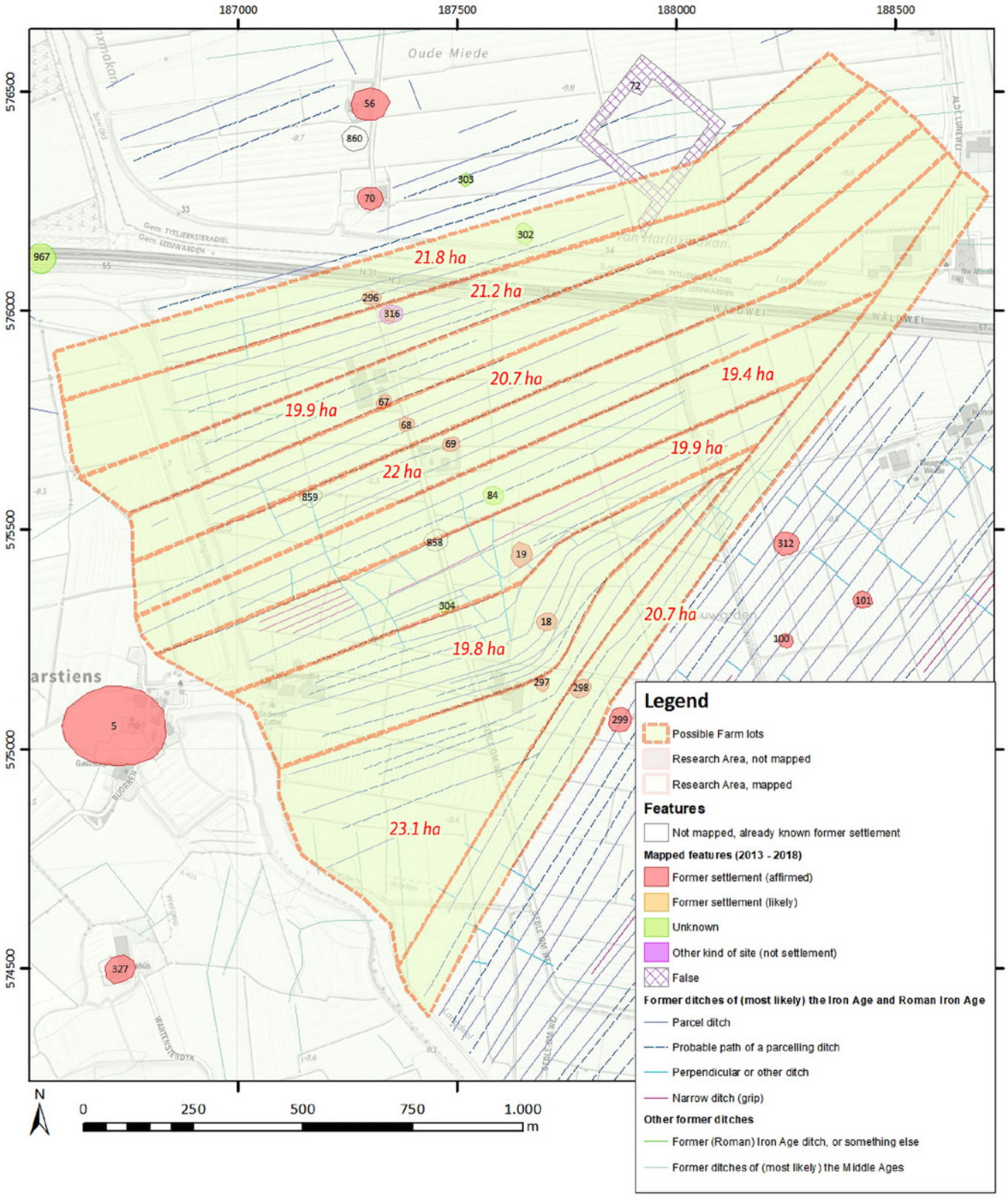


Fig. 20. Recent topographic map of the southern part of the western unit of the reclamations between Wartena and Warstiens, superimposed with boundaries of possible farm lots based on the path of former ditches and the premise of a single settlement per lot. The size in ha refers to the size of the individual farm lot. To enable it to function as a boundary, the western-most settlement of the eastern unit has also been provided with its (possible) farm lot. The former path of a river is used as the south-western boundary. It can be assumed that the former ditches of the Roman Iron Age used this stream as their outlet (the current canal, called 'Langdeel', is of medieval origin). The north-eastern extent of the parcels is not certain; the border may have been farther to the north-east, but no traces of former ditches have been recorded there. Based on the bend (marked with a black dashed line), it cannot be excluded that the parcels were originally a bit shorter and were extended in north-easterly direction at a later stage, perhaps when the land nearer to the stream became too wet for agriculture because of land subsidence. The bend in the parcel ditches would have been created to prevent the parcels becoming too narrow.

in order to keep the reclaimed lands habitable, there is no doubt that the reclamations were well organized.

A good impression of the complexities that were faced can be gained when looking at the techniques of the larger inland peat reclamations, in this case those between Wartena and Warstiens, where two excavations have been conducted.[26] This reclamation, consisting of two large reclamation units, can only have been achieved by group effort, given the amount of planning and labour required to lay out and dig the ditches needed to drain such large pieces of peat land and produce more or less equal sized parcels. The existence of two reclamation units bordering each other is an important indication that planning and organisation exceeded the local level.

The approximate size of both reclamation units can be estimated when looking at the visible remains of both ditch systems. The western unit measured at least 2.3 square km (230 ha), but possibly stretched farther to the north, while the eastern one measured about 4.4 square km (440 ha). Within the western unit, at least 9 settlement sites date back to the 1st century AD and 4 uninspected sites almost certainly date from this period as well. The eastern unit counts 15 settlement sites that certainly date back to the 1st century AD and 9 uninspected settlements of which this is very likely. Assumed that the yet uninspected locations are indeed settlements, there would have been roughly 5 to 6 settlement sites per square km.[27] Because it is safe to assume for both units that every settlement site accommodated a household (Bakker 2022a), the number of households was also 5 to 6 per square km.[28]

It is not certain how many members an average household would have numbered in the peat area. An average of 5 to 8 persons seems acceptable based upon research into the size of late prehistoric households in neighbouring regions (Van den Broeke 1993; Brinkkemper 1993; Gerrets 2010).[29] In the case of the two reclamation units around Wartena and Warstiens, this would mean a density of, on average, 25 to 48 persons per square km. Although this number also includes non-adult household members, it seems very high in comparison with the population density of the sandy soils in the Netherlands at this time, which is estimated at 1.5 to 5 persons per square km (Waterbolk 1959: 32-3; Harsema 1980: 18, 32), or that of the salt marsh area, which is estimated at 3 to 9 persons per square km (Miedema 1983: 345-54; Taayke 1996: V: 184).[30]

Based upon the number of sites, Van den Broeke also provides a high population density for Iron Age peat reclamation in the current province of Zuid-Holland. According to his calculations, between 23 and 77 persons lived per square km, although he mentions that 77 people would most likely be too many considering the economic carrying capacity of the area (Van den Broeke 1993: 74-6). Nevertheless, for the medieval *cope* reclamations of the Holland-Utrecht peat area, quite high population density numbers can also be calculated. Here the distribution of reclaimed peat land resulted in farms of approximately 14 ha in size (seven households per square km), each providing enough sustenance for a household after paying the tithe (Van der Linden 1956, 1982; De Bont 2008: 157, 234).

The calculation of population density also raises the question of how evenly the land was distributed among the households. In the case of the reclamations between Wartena and Warstiens, an even distribution seems likely considering the regular distribution of the settlement sites. By way of experiment, we distributed the land in the southern part of the western unit in such a way that a separate lot was assigned to each single settlement (Fig. 20; to enable it to function as a boundary, the western-most settlement of the adjacent eastern unit

26 Wartena-Warstiens in 1965 (Bruinsma 1968; Bakker in prep. c) and Wartena-Noord (Bakker 2014, 2017, in prep. a)

27 The western block would have had, on average, at least 5.6 settlements per square km (17.7 ha per site) and the eastern block at least 5.5 settlements per square km (18.3 ha per site).

28 Based on the amount of pottery and the house plans of successive single farmsteads found on the two excavated settlement sites, Warstiens and Wartena-Noord (Bruinsma 1968; Bakker 2017, 2022a, in prep. b, c), it is absolutely certain that they were used simultaneously by individual households for a couple of generations. It can be assumed that this was also the case for the other sites within the same artificial drainage system, because they consisted of terps similar in size to the excavated ones and because the dwellers must have cooperated in digging and maintaining the many ditches of the drainage system. Ditches need (semi)-annual maintenance, like dredging, to prevent a reclaimed area from turning back into swamp again. This demanded the input of many hours of labour.

29 This includes possible children. Van den Broeke mentions 6-8 persons (1993, 74) and Brinkkemper mentions 4-6 persons (1993; 146) on average per household for the western Netherlands, whereas Gerrets (2010, 73) mentions 5-8 persons for Westergo in the Pre-Roman Iron Age and Roman Iron Age.

30 Miedema provides the figure of 0.7 to 1.2 households per square km (Miedema 1983, 345-354). However, it should be noted that she calculated the household density on the basis of the assumed economic carrying capacity of the salt marsh, instead of the number of contemporary households per settlement.

has also been provided with its own lot).[31] As it turns out, most settlements were surrounded by four parcels of land, providing each of them with approximately 20 ha of drained land. Only in the southern-most part of the unit is the situation different. Because this part of the unit is cut off by the eastern reclamation unit, the parcels here are of a different shape and size. However, also here the average household would have had about 20 ha of drained land available.[32]

Without more detailed data on the situation in the rest of the peat reclamations, organisation on a higher social level than that of an individual reclamation unit cannot be effectively researched. Concerning the two reclamation units between Wartena and Warstiens, it is clear that claims on land were mutually respected: the settlers of the western unit adjusted their parcelling, as they did not expand their parcels across the border of the neighbouring reclamation unit. How these claims were legitimized and enforced remains unknown. But it is obvious that there must have been a generally accepted set of rules; otherwise the peat reclamations, with their complex situations concerning the layout and maintenance of the drainage system, could not have been occupied for long and probably, given the organisation needed during their initial phase, could not even have been begun.

4.6 The primary motive behind the reclamations

The new insights concerning the land allotment systems and their associated sites are of importance not only for research into the strategy, extent and organisation of the reclamations, but also for the way we think about the motive behind the early peat reclamations. The adaptability of the settlers, together with the organisational complexity of their reclamation works – which enabled them to densely settle reclaimed peat land in the first place – and the amount of labour needed subsequently for the maintenance of their drainage system and habitation do not seem to fit with an exploitation on a merely seasonal basis by terp dwellers of the salt marsh whose primary motive was (only) the extraction of peat for fuel, as stated by Gerrets (2010: 102-4, 203).

It is beyond the scope of this paper to present the results of the current research into the level of self-sustainability of the reclamation settlers.[33] Nevertheless, based on the mapped area, some remarks on this issue can be made here. First, it is clear that the scale of the reclamations and the labour involved are difficult to reconcile with any kind of pure seasonal exploitation. The settlers were not simply exploiting the peat area, but instead transformed it into a landscape that was probably as suitable for farming as the later medieval reclaimed peat areas were. For the latter, which had a very similar layout and appearance, year-round habitation is generally accepted and not questioned (Borger 1996; Ettema 2005; De Bont 2008: 150-3). That the area would have been too wet from the start to make it possible for settlers to make it through the winter is also unlikely: the presence of (small) terps shows that settlers did not hesitate to invest the time and labour needed to raise dwelling mounds when circumstances, such as the (occasional) flooding of the land during winter, demanded it, and that they implemented the techniques used on the salt marshes.

There is also another indication that the primary motive behind the peat reclamations of the Pre-Roman Iron Age and Roman Iron Age was agricultural. Earlier, De Langen presented the idea that agrarian settlements in the reclaimed peat area moved when circumstances demanded it, but he could not prove it because of scarcity of evidence (2011: 76-7). Based on the recent excavations and the present dates for part of the settlements in the reclaimed peat area, it has become clear not only that the youngest settlements are situated the farthest inland, but also, in general, the primary habitation of the settlements lasted only three to four generations on average (Bakker 2017, 2019, 2020, 2022a, in prep. a, b; Bakker & De Langen 2018a).[34]

That settlements were abandoned and farms relocated has to do with the process of land subsidence mentioned earlier. At some time, after years of adjustments, such as the further deepening of ditches, the digging of more grips and, possibly, the transformation of a number of grips into ditches, the settlers were confronted with the fact that the water level could no longer be maintained at an acceptable level. Even the creation of embankments, with or without the use of such innovations as sluice culverts, could prolong the agricultural usability of reclaimed peat land for only a limited time. However, the land could still be used for grazing cattle in the summer or for peat extraction. Leaving their homesteads, therefore, would make no sense if peat extraction in the summer was the settlers' main motive, because plenty of easily accessible peat was still available in the abandoned reclamations for

31 Two sites (858 and 859) in the provincial records do not fit within the distribution of settlements. All that is known of both sites, is that they were mapped by Boschker (*geschriften*). It is possible that the coordinates were recorded incorrectly or that both sites date from the Middle Ages.

32 The southern-most settlement may even have had 23 ha available.

33 For a multi-disciplinary approach to this discussion, see Bakker and Schepers (in prep.).

34 Settlement sites could be inhabited for a second time when local conditions had improved sufficiently, for example as a result of clay deposition by the sea or, more rarely, renewed peat formation (Bakker 2022a).

many generations.[35] However, farming and especially the cultivation of cereals and other crops require land that is not subject to inundation during the growing season. Therefore, to retain a more or less self-sufficient household, the settlers would either have had to leave the area completely or relocate to higher peat land deeper inland that was not yet reclaimed by others.

5. Future research

Although several conclusions could be drawn from the current dataset, this study also shows that much research remains to be done, not only into the peat reclamations of the Pre-Roman Iron Age and Roman Iron Age, but also into those of (early) Middle Ages, which have been less addressed in this paper. This further research would not only be interesting from an academic point of view, but also necessary for the future protection of the archaeological sites in the (former) peat area.

A first task would lie in the examination of the yet unmapped (former) peat areas in Friesland. The aerial photographs have already been acquired by the province and can hopefully be analysed in the near future, preferably together with modern DEM. A second task lies in determining if the already-mapped locations in the examined research areas are indeed former settlements. As mentioned, there are still 356 locations of which it is undetermined whether they are sites of former settlements or something else. The study of currently unmapped research areas will very likely deliver an additional number of possible locations of former settlements. To determine the nature of the location and its current state, not only a visual inspection combined with coring, but also enquiring into the knowledge of local landowners and amateur archaeologists could prove very useful.[36] Their information might also lead to the mapping of sites that are invisible on the aerial photographs and DEM. Perhaps this enquiry could, furthermore, provide information on the 'empty' map areas within the research areas where sites of former settlements are still unknown but can be expected.

Following up on the coring research, small excavations in the form of small test pits or excavation trenches on a selection of sites could help to gain a better understanding of the form of the earliest habitation, its date and the current state of its remains. As the GIA excavations at Arkum, Wartena-Noord, Sneek-Harinxmaland and Leeuwarden-Bullepolder have shown (Bakker 2022a), an excavation trench can provide a lot of information about these topics and also about the relationship between the habitation and the field system and about the interaction between human activities and natural processes over time. Excavations may prove necessary in cases where sites are so threatened that protection of the remains in situ is impossible.

As mentioned in the introduction, early peat reclamations are not restricted to Friesland. The research conducted here could therefore also be expanded beyond this province, to areas where former reclamation settlements have been found or can be expected. In the case of the Asendelver polder (province of Noord-Holland), prospecting with the help of aerial photography played an important role in earlier research. Stakenborg, while interpreting aerial photographs of the RAF and KLM, discovered not only sites, but also traces of ancient creeks and gullies and of former ditches of which parts could be dated to the Pre-Roman Iron Age and Roman Iron Age (Van der Leeuw 1987: 11, Fig. 1.6; contribution by Stakenborg in the same article: 19). It is of interest that by using elevation maps of the area, the ditch pattern Stakenborg discovered could be expanded a bit more (Appendix A: Fig. A8).

It would also be interesting to investigate aerial photographs of other parts of the western Netherlands were reclamation settlements dating back to the same period have been excavated, such as the area around the municipalities of Schagen (province of Noord-Holland; Therkorn 1988, 2004) and Midden-Delfland and Voorne-Putten (both province of Zuid-Holland). Excavations in Midden-Delfland have uncovered ditches and other kinds of features associated with early peat reclamations (Van Londen 2001, 2006) and the same goes for Voorne-Putten (Van Trierum *et al.* 1988; Van Trierum 1992), but by using aerial photographs it might be possible to map more of these features. Because these areas are now for a large part covered by residential and industrial areas, the recent AHN elevation maps are not going to be suitable, but aerial photographs predating the development of housing and industry might deliver additional information about the early peat reclamations in this area. The same goes for parts of the Dutch provinces of Zeeland (Vos & Van Heeringen 1997; Sier *et al.* 2001; Dijkstra 2011) and Groningen (De Cock 1965), as well as parts of adjacent north-western Germany (Van

35 After habitation had ceased at Sneek-Harinxmaland, halfway the 1st century CE, the site was used for activities that left behind ash layers up to 1 m deep that contained huge amounts of burned pottery sherds (Bakker & De Langen 2018a). It is most likely that after abandonment the location was used to bake pottery and perhaps to engage in other activities for which heat was required. The abandoned location would have been ideal because the surrounding peat land could be used for peat extraction for fuel without the risk of houses burning down. In the case of Leeuwarden-Bullepolder, traces of peat extraction were encountered south of the settlement (Koopstra 2002). Interestingly, during the 2015 excavation, no traces of peat extraction were encountered north of the settlement, even though there were peat layers here that would have been easy to extract (Bakker 2020, 59-86).

36 Farmers, for instance, sometimes encounter features of former settlements, such as old water wells, when cattle or machinery become stuck in one.

Giffen 1931; Zylman 1933: 115-17), were early peat reclamation settlements have been encountered in the past.

6. Conclusions

In this paper, an overview has been given of recent research into artificial drainage systems and settlements in a large part of the Dutch province of Friesland that can be associated with peat reclamations during the Pre-Roman Iron Age and Roman Iron Age.

By combining modern DEM and old aerial photographs dating back to the 1940s and 1950s, it was possible to map 1100 km of former ditches and 508 locations of possible archaeological sites, of which 453 were not previously known. Further research into the 508 locations, including new fieldwork in the form of coring surveys on 66 of them, could confirm that 135 of these locations are indeed archaeological sites, of which 65 for certain date back to the Pre-Roman Iron Age or the Roman Iron Age and 59 most likely or possible date to those periods. A further 15 locations are not archaeological sites, 3 could not be researched as they have disappeared due to land and project development, and 1 appears to be a feature inside a larger site dating back to the Pre-Roman Iron Age or Roman Iron Age. The remaining 354 locations still need to be researched to determine their nature. Based on various archaeological indicators, 175 locations could very well be sites dating back to the Pre-Roman Iron Age or Roman Iron Age, and the other 179 locations are most likely sites dating to a later period. Of the mapped features of former ditches, a total of 413.1 km could be associated with archaeological sites dating to the Pre-Roman Iron Age or Roman Iron Age. The remaining mapped features of former ditches most likely date from later periods.

Even though not all mapped sites have yet been investigated and it is likely that many sites and traces of the associated drainage system are still hidden in the soil, the new data offers an important contribution to the research into the early peat reclamations of the Pre-Roman Iron Age and Roman Iron Age. Analysis of the current dataset has shown that all these reclamations were of similar structure in the sense that at the start of each reclamation a tract of peat land was drained by the digging of long and straight ditches that connected to a water stream and divided the land into narrow parcels. Very long or highly tapered parcels were divided by digging perpendicular ditches. Smaller and shallower ditches (grips) were intended to further enhance drainage. The main layout of the individual reclamation unit was radial or linear, depending on the existing landscape conditions in each subarea. If the natural peat landscape within a reclamation unit showed significant differences, a main layout with a hybrid form was chosen. In general, within radial allotment systems, the settlements were often clustered in the centre. In the linear allotment system, the settlements were distributed over the different parcels in such a way that they formed a linear settlement pattern. From the Middle Pre-Roman Iron Age until the Middle Roman Iron Age, the area under reclamation appears to have expanded gradually, with the youngest reclamation located farthest inland.

At present all data point to the early peat reclamations having been a well-organized undertaking. It is improbable that these reclamations were undertaken to allow no more than seasonal exploitation by terp dwellers from the salt marsh, as had been previously suggested by some researchers. Given the complexity, scale, extent and organisational level of the reclamations, as well as the settlement density in the reclaimed areas, need for agreements between neighbouring communities regarding water management and ongoing intensive maintenance of the drainage system, it is much more likely that the primary motive behind the early peat reclamations was the creation of an agricultural landscape that was suitable for mixed farming and habited year-round.

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APPENDIX A

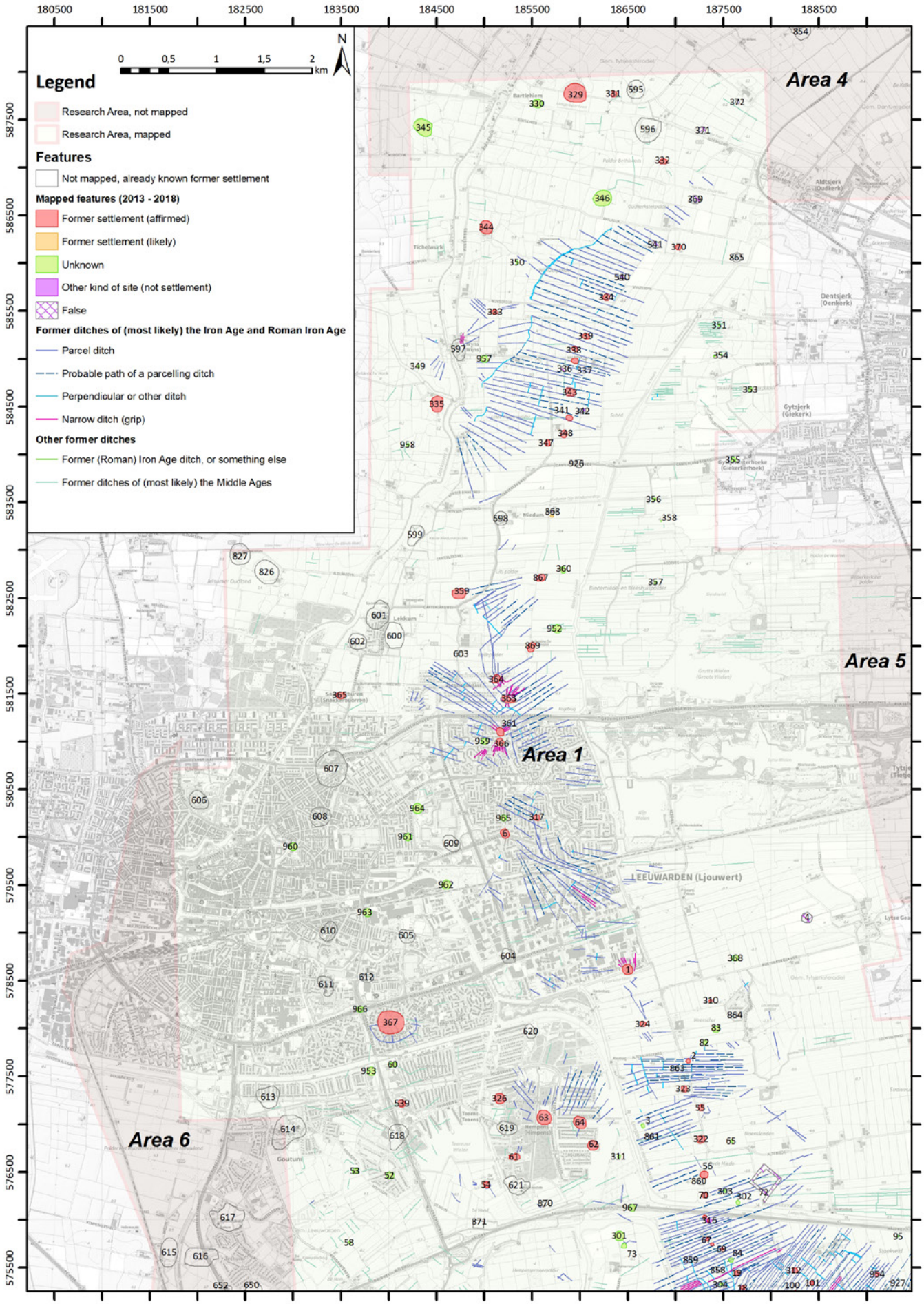

Fig. A1. The northern part of research area 1 (see Figs. 10 and 11). For a description of each site, see Appendix B (graphic M. Bakker/GIA).

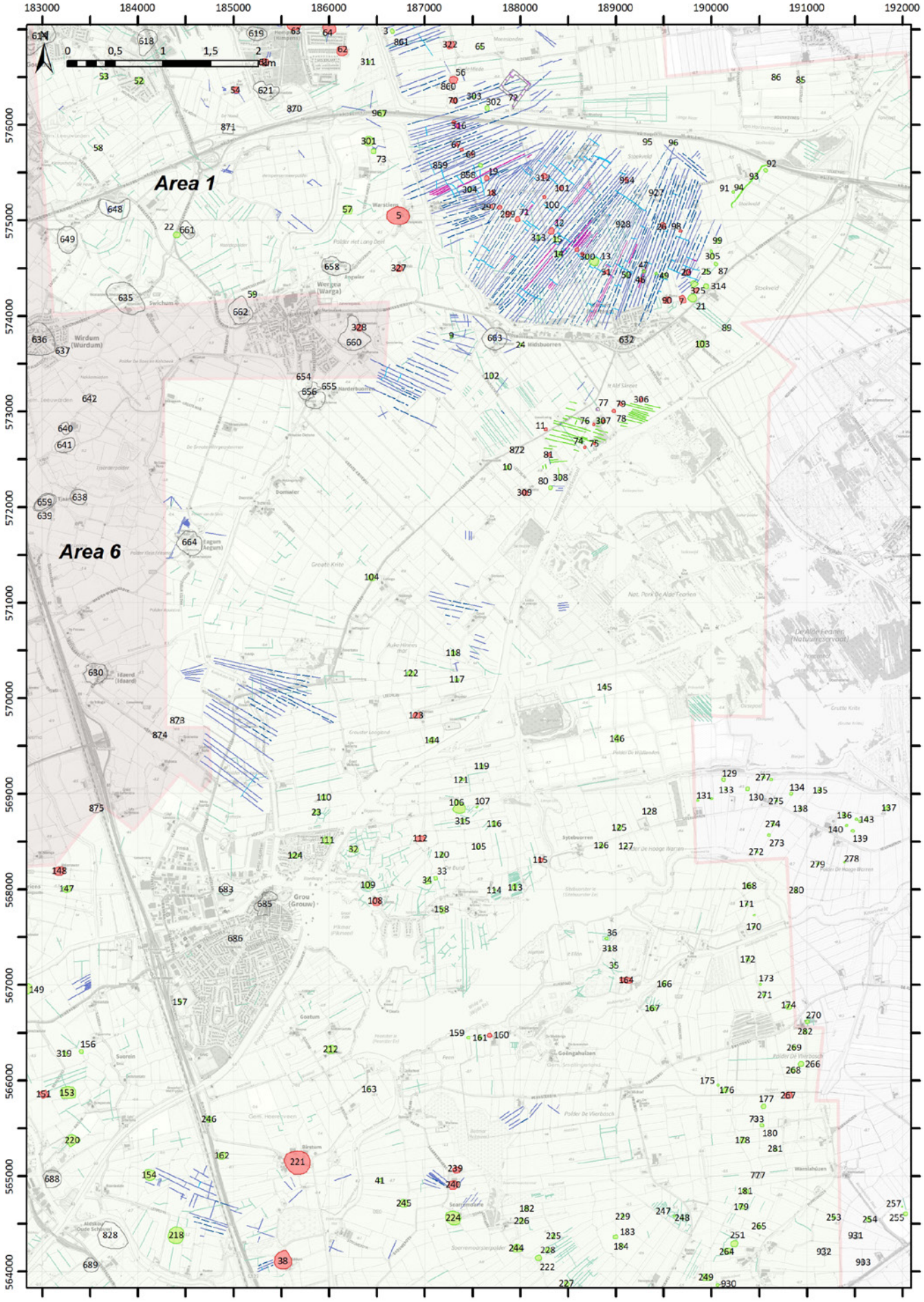

Fig. A2. The middle part of research area 1 (see Figs. 10 and 11). For the legend, see Fig. A1. For a description of each site, see Appendix B (graphic M. Bakker/GIA).

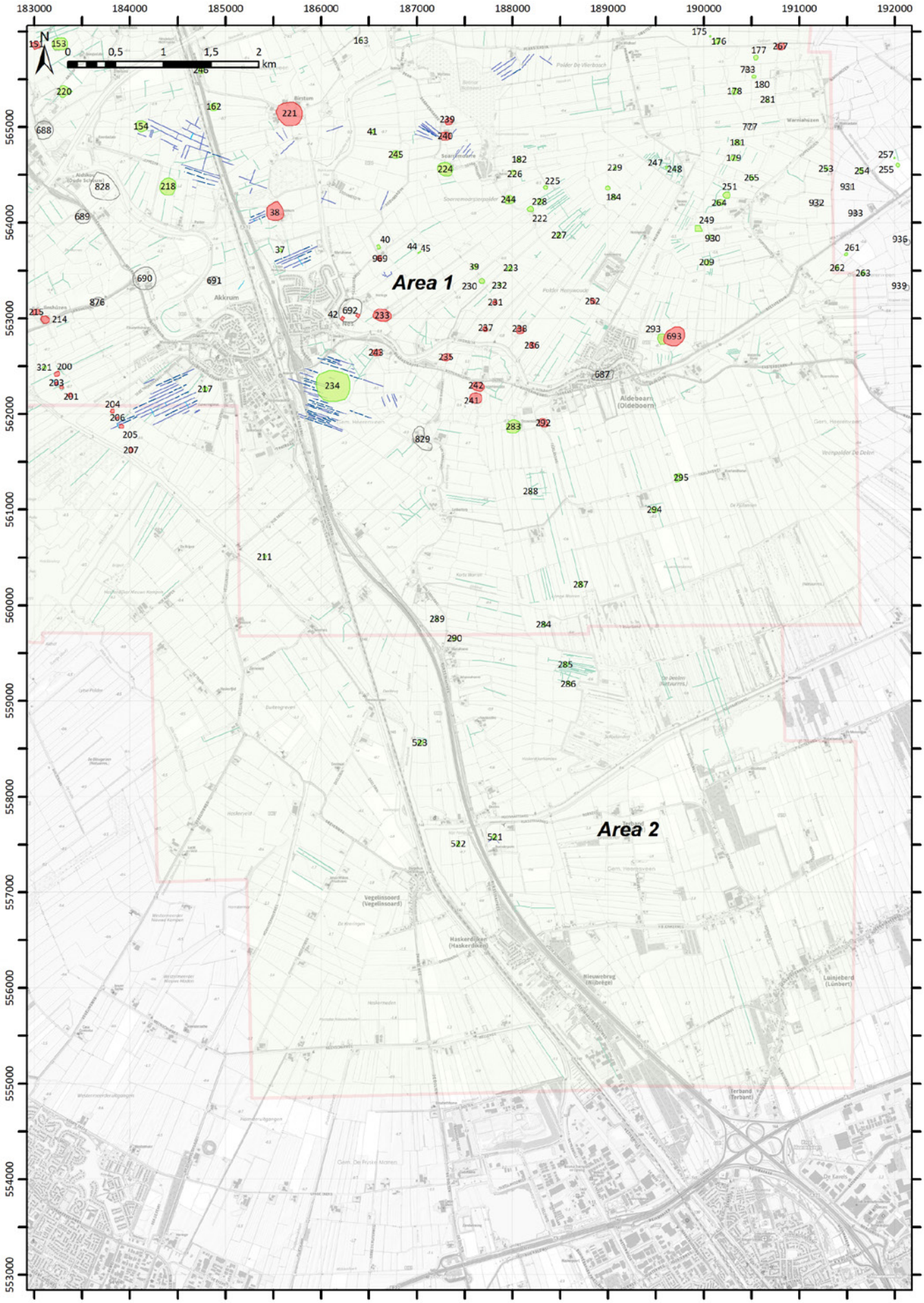

Fig. A3. The southern part of research area 1 (see Figs. 10 and 11). For the legend, see Fig. A1. For a description of each site, see Appendix B (graphic M. Bakker/GIA).

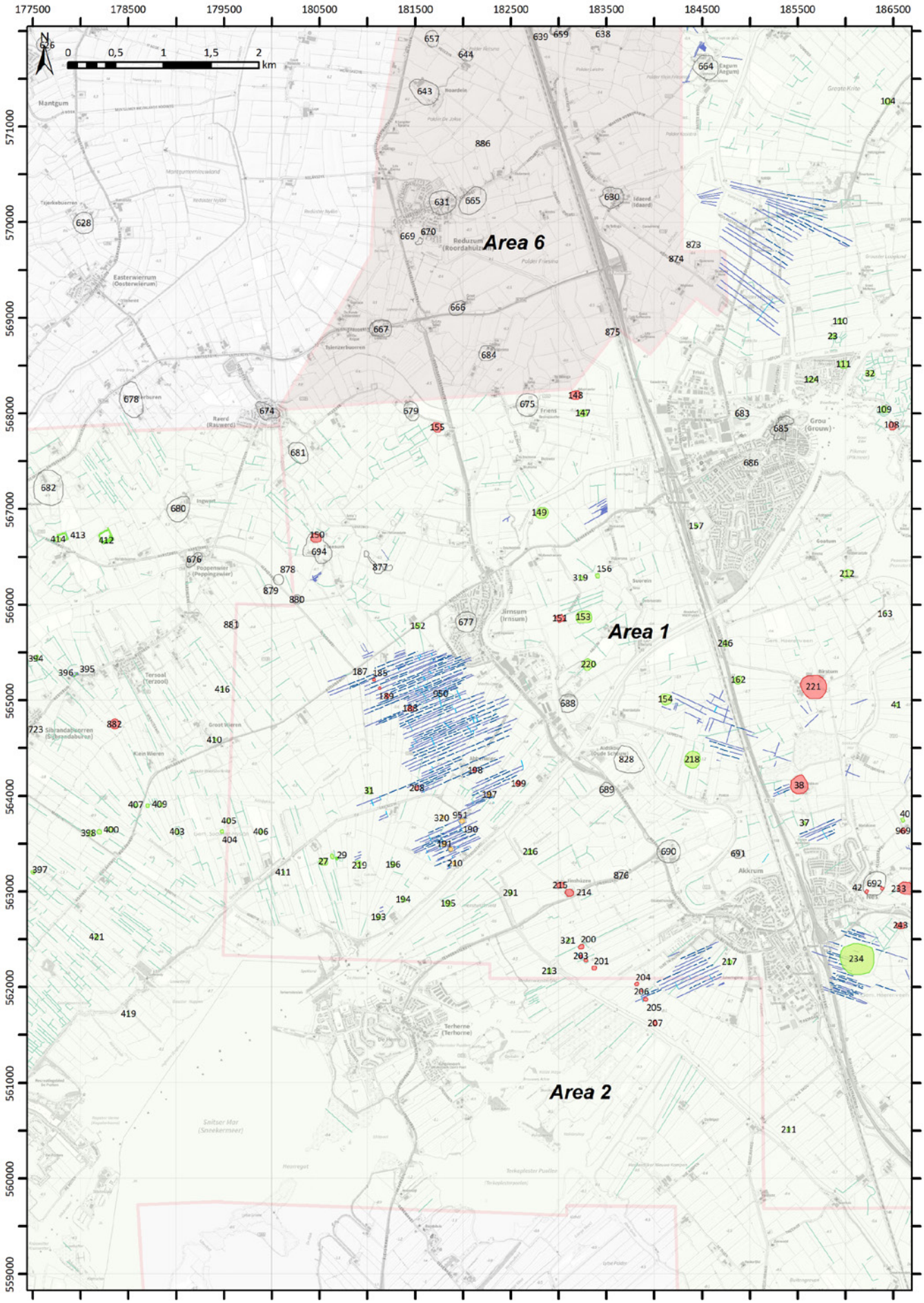

Fig. A4. The part between research area 1 and 2 (see Figs. 10 and 11). For the legend, see Fig. A1. For a description of each site, see Appendix B (graphic M. Bakker/GIA).

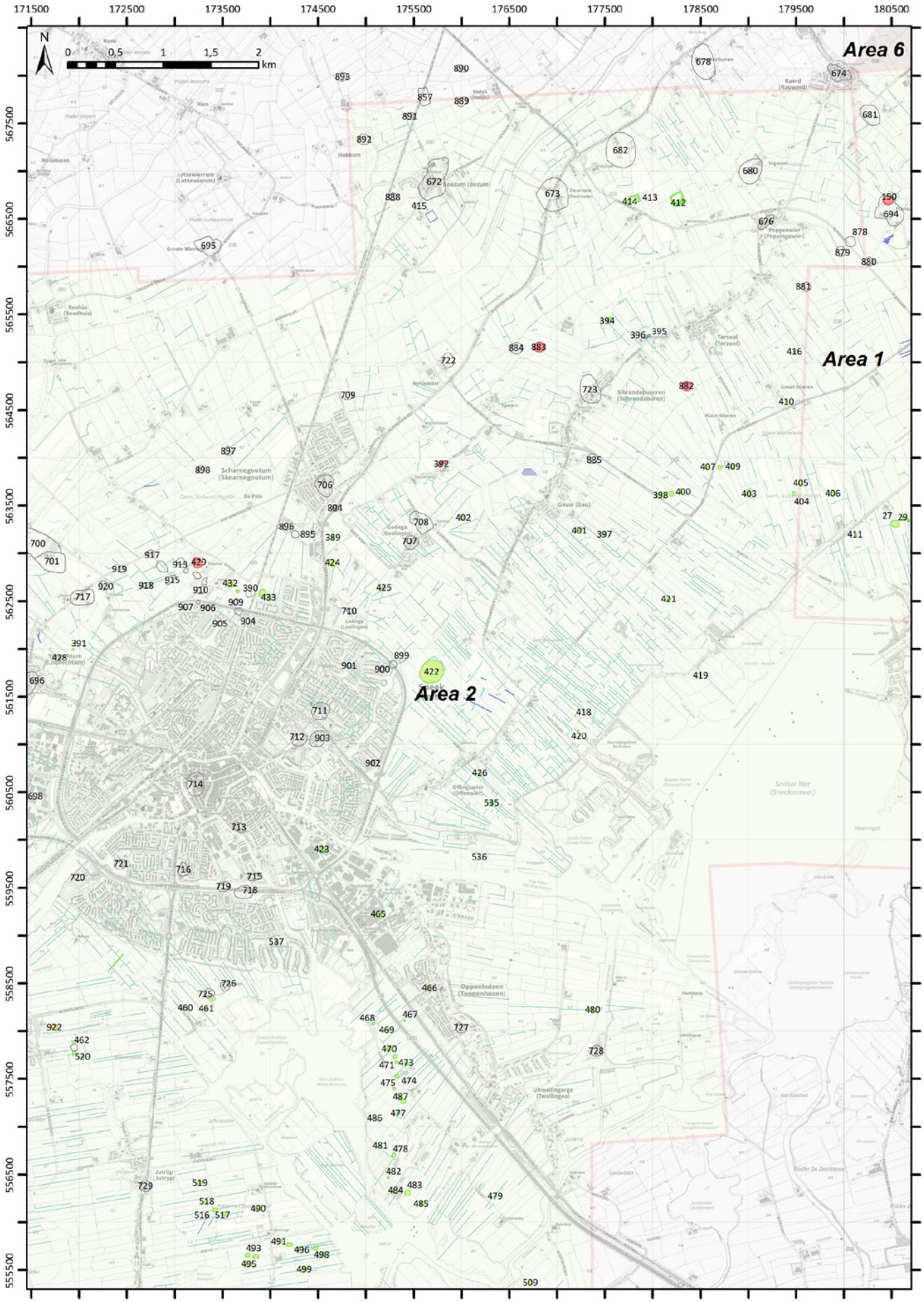

Fig. A5. The middle part of research area 2 (see Figs. 10 and 11). For the legend, see Fig. A1. For a description of each site, see Appendix B (graphic M. Bakker/GIA).

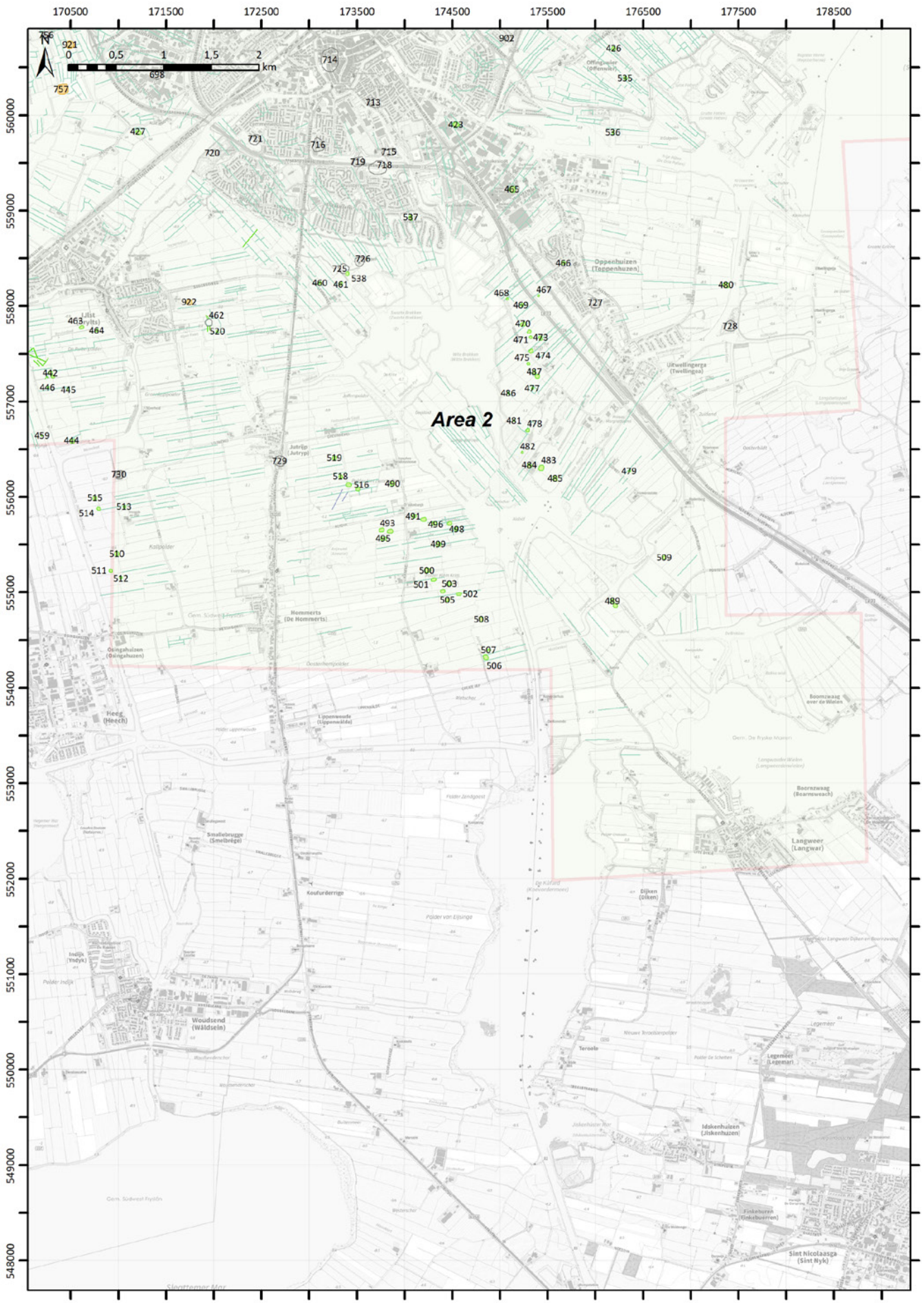

Fig. A6. The southern part of research area 2 (see Figs. 10 and 11). For the legend, see Fig. A1. For a description of each site, see Appendix B (graphic M. Bakker/GIA).

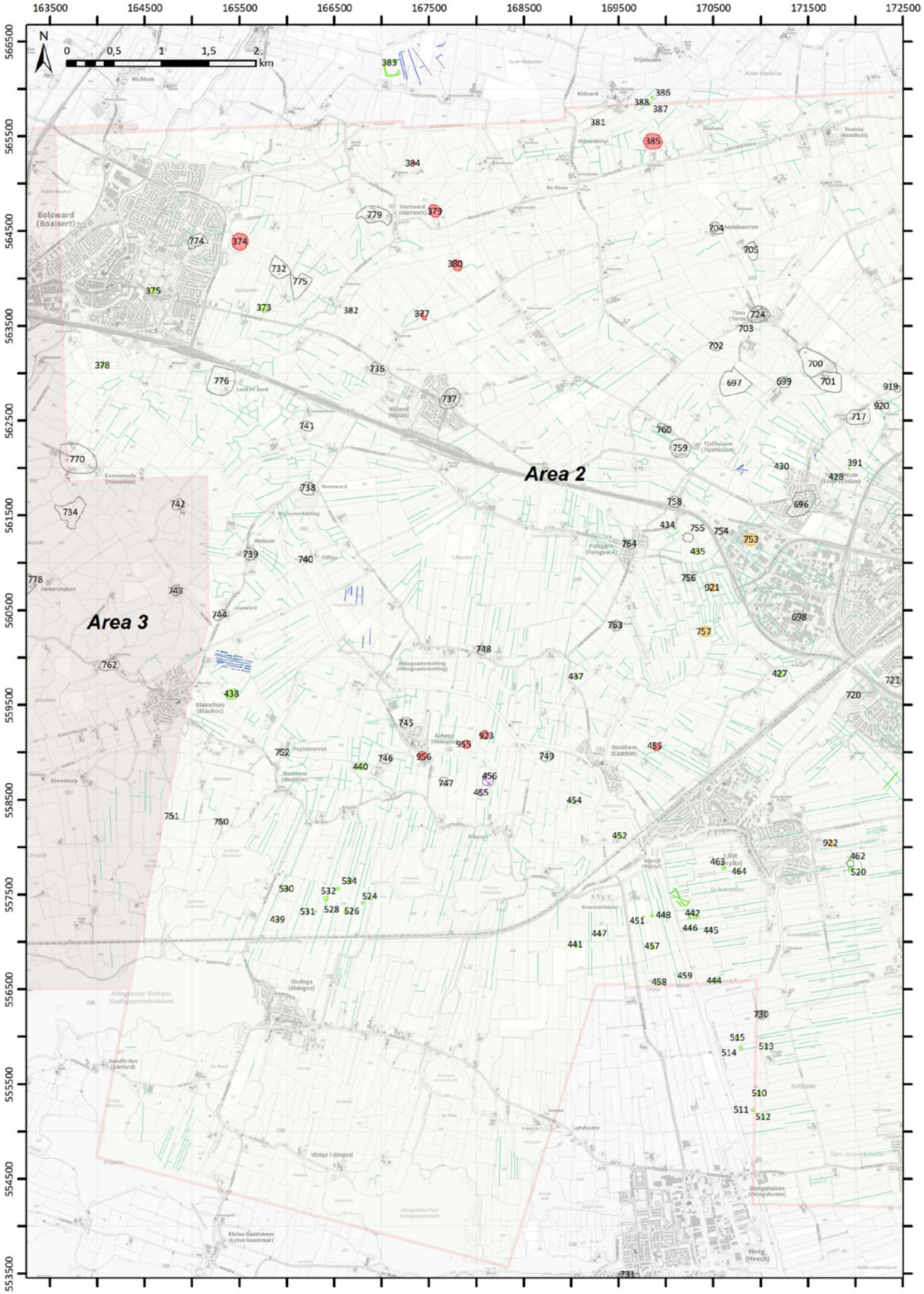

Fig. A7. The western part of research area 2 (see Figs. 10 and 11). For the legend, see Fig. A1. For a description of each site, see Appendix B (graphic M. Bakker/GIA).

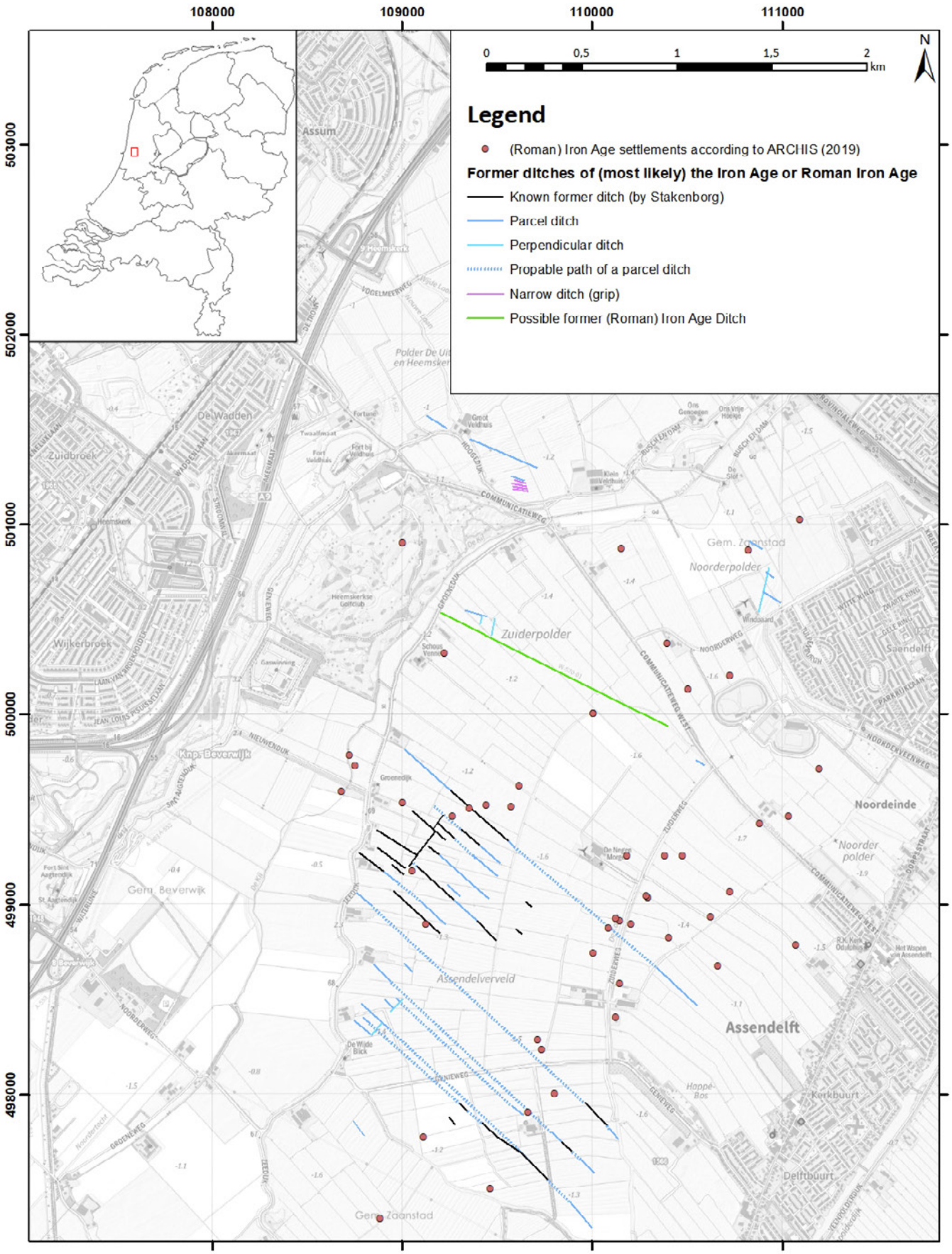

Fig. A8. Map of the Assendelver Polders (province of Noord-Holland), showing traces of features dating back to the pre-Roman Iron Age and the Roman Iron Age in the national ARCHIS-database. The traces of former ditches found by Stakenborg (Van der Leeuw 1987, Fig. 1.6) are shown as black lines. The other traces of former ditches, recently mapped using the AHN elevation map, are shown in bright blue (graphic M. Bakker/GIA).

APPENDIX B

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
1	1	++	+-	in old ditch system; Taayke 1996 IV	TO-091		TO-091	
2	1	+	+-	In PRIA-RIA ditch system				
3	1	+	+-	In PRIA-RIA ditch system				
4	1	false	false					
5	1	+-	++	Village terp Warstiens				
6	1	+	+-	In PRIA-RIA ditch system				
7	1	+-	+	Jager				
8	1	+-	+	Terp half in old ditch system; Could contain PRIA-RIA				
9	1	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
10	1	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
11	1	++	++	Veenstra 2018				
12	1	+	+-	AHN (clear terp) + in old ditch system				
13	1	++		Volkers: 300 and or 13 belong to Vol_571, 574, 587, 589, 592				
14	1	+	+-	In PRIA-RIA ditch system				
15	1	+	+-	In PRIA-RIA ditch system				
16	1	++		Jager				
17	1	++		Jager				
18	1	++		Jager				
19	1	++		Jager; Taayke 1996 IV	19, 84 or 858: one of these is TO-067		? TO-067	
20	1	++		Jager				
21	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
22	1	+	+-	In region with PRIA-RIA dated sites and finds				
23	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
24	1	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
25	1	+-	+-	PRIA/RIA or MA?				
26	1	-	++	Veenstra 2018				
27	1	+-	+	More likely MA than PRIA/RIA				
28	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
29	1	-	++	Seems the front house (approx. 9 x 10 m) of a head-neck-trunk farmstead with barn directly east of terp or, tower house mound with courtyard of farmstead bordering next to it				
30	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
31	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
32	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
33	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
34	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
35	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
36	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
37	1	+		Volkerts	Nearby Vol_427 en 412			
38	1	+		Volkerts	Nearby Vol_427 en 412			

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
					80	y	1	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	False: not a site
		191				y	1	Terp/reclamation (terp) site
		248				y	1	Terp/reclamation (terp) site
				11A-36	66	y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
	Vol_571, 574, 587, 589, 592					y	other	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
				11A-31	61	y	1	Terp/reclamation (terp) site
				11A-32	62	y	1	Terp/reclamation (terp) site
				6C-47	38	y	1	Terp/reclamation (terp) site
				6C-45	37	y	1	Terp/reclamation (terp) site
				11A-35	65	y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
		1263				y	1	Terp/reclamation (terp) site

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
39	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
40	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
41	1	+	+-	In PRIA-RIA ditch system				
42	1	+-	++	Angular shape of MA-farmstead? Within PRIA-RIA area				
43	1	+-	++	Angular shape of MA-farmstead? Within PRIA-RIA area				
44	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
45	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
46	1	++		Jager				
47	1	+	+-	In PRIA-RIA ditch system				
48	1	+	+-	In PRIA-RIA ditch system				
49	1	+	+-	In PRIA-RIA ditch system				
50	1	+	+-	In PRIA-RIA ditch system				
51	1	++		Jager; Volkers				
52	1	+	+	PRIA-RIA area				
53	1	+	+	PRIA-RIA area				
54	1	+	++	In PRIA-RIA ditch system; but farstead is named 'De Kooi', in origin also old duck decoy site?				
55	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
56	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
57	1	+	+-	In PRIA-RIA ditch system				
58	1	+	+-	PRIA-RIA area				
59	1	+	+-	PRIA-RIA area				
60	1	+	+	PRIA-RIA area				
61	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
62	1	++		RAAP 610; Taayke 1996 IV?	62 or 64: one of these is TO-103		? TO-103	
63	1	++		RAAP 610				
64	1	++	++	RAAP 610; Taayke 1996 IV?	62 or 64: one of these is TO-103		? TO-103	
65	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
66	1	++		Jager; Volkers				
67	1	++		Taayke 1996 IV; Volkers	TO-107		TO-107	
68	1	++		Jager; Taayke 1996 IV	68, 69 or 859: one of these is TO-108		? TO-108	
69	1	+		Taayke 1996 IV	68, 69 or 859: one of these is TO-108		? TO-108	
70	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
71	1	++		Jager; Volkers				
72	1	false	false		Weird shadow on one of the aerial photos of this part (looks like a Roman Castrum)			
73	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
74	1	++	++	Veenstra 2018				
75	1	++	++	Veenstra 2018				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
				11A-34	64	y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
	Vol_568, 573, 586, 588, 591			11A-33	63	y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
		297		Cat. nr. 8	106	y	2	Terp/reclamation (terp) site
		299		cat. nr. 6	86	y	2	Terp/reclamation (terp) site
		298		Cat. nr. 7	105	y	2	Terp/reclamation (terp) site
						y	0	Unknown
	Vol_556			6C-44-2	34	y	1	Terp/reclamation (terp) site
	Vol_550, 557, 558					y	other	Terp/reclamation (terp) site
				6C-B	43	y	1	Terp/reclamation (terp) site
						y	other	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
	Vol_594-596			6C-48-3	41	y	1	Terp/reclamation (terp) site
						y	0	False: not a site
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
76	1	++	++	Veenstra 2018				
77	1	false	false	Veenstra 2018				
78	1	++	++	Veenstra 2018				
79	1	++	++	Veenstra 2018				
80	1	+	+-	In PRIA-RIA ditch system				
81	1	--	++	Veenstra 2018				
82	1	++		Taayke 1996 IV	82 or 83: one of these is small terp of Elzinga (Tiet-jerk-Meenschar TO-096)		? TO-096	
83	1	++		Taayke 1996 IV	82 or 83: one of these is small terp of Elzinga (Tiet-jerk-Meenschar TO-096)		? TO-096	
84	1	+		Taayke 1996 IV	19, 84 or 858: one of these is TO-067		? TO-067	
85	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
86	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
87	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
88	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
89	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
90	1	+-	++	Halfway in old ditch system; MA-farm-stead with PRIA-RIA beneath?				
91	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
92	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
93	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
94	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
95	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
96	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
97	1	-	++	Veenstra 2018				
98	1	false	false	Veenstra 2018				
99	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
100	1	+-	++	Veenstra 2018	Terp with MA-pot-tery; no PRIA/RIA pottery found or seen			
101	1	+-	++	Veenstra 2018	Terp with MA-pot-tery; no PRIA/RIA pottery found or seen			
102	1	+	+-	In PRIA-RIA ditch system				
103	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
104	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
105	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
106	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
107	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial ver-diepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
					69	y	1	Terp/reclamation (terp) site
						y	0	False: not a site
					68	y	1	Terp/reclamation (terp) site
					67	y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	other	Terp/reclamation (terp) site
						y	other	Terp/reclamation (terp) site
						y	other	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	False: not a site
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
108	1	-	++	MA-farmstead; seems outside PRIA-RIA area and in a likely MA-ditch system				
109	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
110	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
111	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
112	1	-	++	MA-farmstead; seems outside PRIA-RIA area and in a likely MA-ditch system				
113	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
114	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
115	1	-	++	MA-farmstead; seems outside PRIA-RIA area and in a likely MA-ditch system				
116	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
117	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
118	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
119	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
120	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
121	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
122	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
123	1	+-	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
124	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
125	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
126	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
127	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
128	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
129	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
130	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
131	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
132	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
133	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
134	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
135	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
136	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
137	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
138	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
139	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
140	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
141	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
142	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
143	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
144	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
145	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
146	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
147	1	+	+	PRIA-RIA area				
148	1	+	++	PRIA-RIA area; MA-farmstead with PRIA/RIA beneath?				
149	1	+	+-	In PRIA-RIA ditch system				
150	1	+	++	PRIA-RIA area; MA-farmstead with PRIA/RIA beneath?				
151	1	+-	++	Angular shape of MA-farmstead? Within PRIA-RIA area				
152	1	+	+-	In PRIA-RIA ditch system				
153	1	+	+-	In PRIA-RIA ditch system				
154	1	+	+-	In PRIA-RIA ditch system				
155	1	+	+	PRIA-RIA area				
156	1	+	+-	In PRIA-RIA ditch system				
157	1	+	+	PRIA-RIA area				
158	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
159	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
160	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
161	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
162	1	+	+-	In PRIA-RIA ditch system				
163	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
164	1	-	++	MA-farmstead; seems outside PRIA-RIA area and in a likely MA-ditch system				
165	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
166	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
167	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
168	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
169	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
170	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
171	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
172	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
173	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
174	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
175	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
176	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial ver-diepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
		1188				y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
177	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
178	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
179	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
180	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
181	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
182	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
183	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
184	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
185	1	++	-	Veenstra 2018				
186	1	++	-	Veenstra 2018				
187	1	false	false	Veenstra 2018				
188	1	+	-	Veenstra 2018				
189	1	++	-	Veenstra 2018				
190	1	+	+-	Veenstra 2018; Volkers				
191	1	+-	+-	Veenstra 2018				
192	1	+-	+-	Veenstra 2018				
193	1	+	+-	In PRIA-RIA ditch system				
194	1	+	+-	In PRIA-RIA ditch system				
195	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
196	1	+	+-	In PRIA-RIA ditch system				
197	1	++	-	Veenstra 2018				
198	1	+-	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
199	1	+-	+-	Veenstra 2018				
200	1	++		Veenstra 2018				
201	1	++		Veenstra 2018				
202	1	++		Veenstra 2018				
203	1	++		Veenstra 2018				
204	2	++		Veenstra 2018				
205	2	++		Veenstra 2018				
206	2	++		Veenstra 2018				
207	2	++		Veenstra 2018				
208	1	++		Veenstra 2018				
209	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
210	1	+	+-	In PRIA-RIA ditch system				
211	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
212	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
213	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
214	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
215	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
216	1	+	+-	In PRIA-RIA ditch system				
217	1	+	+-	In PRIA-RIA ditch system				
218	1	+	+-	In PRIA-RIA ditch system				
219	1	+	+-	In PRIA-RIA ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial ver-diepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	False: not a site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
	Vol_538, 332, 104					y	other	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Old farmstead
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
220	1	+	+-	In PRIA-RIA ditch system				
221	1	+	+-	In PRIA-RIA ditch system				
222	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
223	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
224	1	+	+-	Ditch system; mentioned in RAAP-rapport 181 about RIA near Nes (pp. 9, 26)				
225	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
226	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
227	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
228	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
229	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
230	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
231	1	-	++	MA-farmstead; seems outside PRIA-RIA area and in a likely MA-ditch system				
232	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
233	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
234	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
235	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
236	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
237	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
238	1	+-	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
239	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
240	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
241	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
242	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
243	1	+-	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
244	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
245	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
246	1	+	+-	In PRIA-RIA ditch system				
247	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
248	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
249	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
250	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
251	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial ver-diepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
		1262				y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
252	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
253	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
254	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
255	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
256	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
257	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
258	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
259	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
260	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
261	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
262	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
263	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
264	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
265	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
266	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
267	1	-	++	MA-farmstead; seems outside PRIA-RIA area and in a likely MA-ditch system				
268	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
269	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
270	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
271	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
272	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
273	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
274	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
275	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
276	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
277	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
278	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
279	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
280	1_extra	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
281	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
282	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
283	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
284	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial ver-diepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
285	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
286	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
287	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
288	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
289	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
290	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
291	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
292	1	+-	++	Outer edge of a PRIA-RIA ditch system? ; MA-farmstead with PRIA-RIA beneath?				
293	1	+	+	Next to 693 (RIA near Oldeboorn - see Veenstra)				
294	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
295	1	-	+-	Angular shape of MA-farmstead? Seems outside PRIA-RIA area				
296	1	++		Jager				
297	1	+		Volkers? DB_id 297 or 298 is T395, 570, 598				
298	1	++		Jager; Taayke 1996 IV; Volkers? DB_id 297 or 298 is T395, 570, 598	TO-112		TO-112	
299	1	++		Jager; Taayke 1996 IV	TO-111		TO-111	
300	1	++		Volkers: 300 and or 13 belong to Vol_571, 574, 587, 589, 592				
301	1	+	+-	In PRIA-RIA ditch system				
302	1	+	+-	In PRIA-RIA ditch system				
303	1	+	+-	In PRIA-RIA ditch system				
304	1	+	+-	In PRIA-RIA ditch system				
305	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
306	1	++	++	Veenstra 2018				
307	1	++	++	Veenstra 2018				
308	1	+	+-	In PRIA-RIA ditch system				
309	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
310	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead with PRIA/RIA beneath?				
311	1	+	+-	In PRIA-RIA ditch system				
312	1	-	++	Veenstra 2018				
313	1	+	+-	In PRIA-RIA ditch system				
314	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
315	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
316	1	(++)		Jager	Seems a dug in feature in site_66			
317	1	+	+-	In PRIA-RIA ditch system				
318	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
319	1	-	+-	Angular shape of MA-farmstead? Seems outside PRIA-RIA area				
320	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
321	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Old farmstead
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
				6C-44-1	33	y	1	Terp/reclamation (terp) site
	Vol_395, 570, 598					y	other	Terp/reclamation (terp) site
	Vol_593; Vol_395, 570, 598	1268		6C-48-1	39	y	2	Terp/reclamation (terp) site
				6C-48-2	40	y	1	Terp/reclamation (terp) site
	Vol_571, 574, 587, 589, 592					y	other	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Old farmstead
						y	0	Combination terp+farmstead
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
				6C-44-3	35	y	1	False: see remark
		249				y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
322	1	+-	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
323	1	++	++	Taayke 1996 IV; is also MA-farmstead	323 or 862: one of these is TO-098		? TO-098	
324	1	+	+-	In PRIA-RIA ditch system				
325	1	+-	+-	? (Archisnummer 10242 not right)				
326	1	++		Taayke 1996 IV	TO-100		TO-100	
327	1	+	++	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
328	1	++	++	? (Archisnummer 10226 not right); MA-farmstead on PRIA/RIA terp				
329	1	++		Taayke 1996 IV	TO-048	400	TO-048	
330	1	+	+	PRIA-RIA area				
331	1	-	++	Veenstra 2017				
332	1	++	++	Veenstra 2017; De Wit et al. 2018				
333	1	+	+-	In PRIA-RIA ditch system		302		
334	1	++	++	Veenstra 2017				
335	1	++		Taayke 1996 IV	TO-065	78	TO-065	
336	1	false	false	Veenstra 2017				
337	1	++	-	Veenstra 2017				
338	1	++	-	Veenstra 2017; Taayke 1996 IV	TO-063a		TO-063a	
339	1	++	-	Veenstra 2017; Taayke 1996 IV	TO-061a		TO-061a	
340	1	+-	+-	Veenstra 2017				
341	1	++	-	Veenstra 2017				
342	1	false	false	Veenstra 2017				
343	1	++	-	Veenstra 2017; Taayke 1996 IV	TO-064a		TO-064a	
344	1	++		Taayke 1996 IV	TO-059	301	TO-059	
345	1	++		Taayke 1996 IV	TO-052		TO-052	
346	1	+-	+	On the edge of a ditch system PRIA/RIA area? ; MA-farmstead withPRIA/RIA beneath?				
347	1	++	-	Veenstra 2017				
348	1	++	-	Veenstra 2017				
349	1	+	+-	In PRIA-RIA ditch system				
350	1	+	+-	In PRIA-RIA ditch system				
351	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
352	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
353	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
354	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
355	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
356	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
357	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
358	1	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
359	1	+	+-	In PRIA-RIA ditch system		355		
360	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
361	1	++		Taayke 1996 IV	TO-078		TO-078	
362	1	++		Taayke 1996 V; Koopstra 2002; Bakker in prep.	Same as site_363; TO-075		TO-075	
363	1	false	false		Same as site_362: this one therefore made false			
364	1	+	+-	In PRIA-RIA ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Old farmstead
						y	other	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
				10A-132	87	y	1	Terp/reclamation (terp) site
		302				y	1	Terp/reclamation (terp) site
						y	0	Old farmstead
				11A-116	88	y	1	Combination terp+farmstead
		1158				y	2	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Old farmstead
						y	0	Terp/reclamation (terp) site
		1060				y	2	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
		836				y	2	Terp/reclamation (terp) site
						y	0	False: not a site
						y	0	Terp/reclamation (terp) site
						y	other	Terp/reclamation (terp) site
						y	other	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	False: not a site
						y	other	Terp/reclamation (terp) site
		1059				y	2	Terp/reclamation (terp) site
						y	other	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	1	Terp/reclamation (terp) site
						y	0	Unknown
		247				y	1	Terp/reclamation (terp) site
					108	y	1	Terp/reclamation (terp) site
		304			108	y	2	False: not a site
						y	0	Gone probable terp site

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
365	1	+	+-	In region with PRIA-RIA dated sites and finds				
366	1	+	+-	In PRIA-RIA ditch system				
367	1	++		Taayke 1996 IV	TO-094		TO-094	
368	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
369	1	false	false	Veenstra 2017				
370	1	++	++	Veenstra 2017				
371	1	false	false	Veenstra 2017				
372	1	false	false	Veenstra 2017				
373	2	+	+-	PRIA-RIA area				
374	2	+	+-	In region with PRIA-RIA dated sites and finds				
375	2	+	+	PRIA-RIA area; In Bolsward				
376	2	+	+-	PRIA-RIA area				
377	2	+		Volkers				
378	2	+	+-	PRIA-RIA area				
379	2	+	+-	PRIA-RIA area				
380	2	+	+-	PRIA-RIA area				
381	2	+	+-	In region with PRIA-RIA dated sites and finds				
382	2	+	+-	PRIA-RIA area				
383	2_extra	+	+-	In PRIA-RIA ditch system				
384	2	+	+-	PRIA-RIA area				
385	2	+	+-	PRIA-RIA area				
386	2	+	+-	In region with PRIA-RIA dated sites and finds				
387	2	+	+-	In region with PRIA-RIA dated sites and finds				
388	2	+	+-	PRIA-RIA area				
389	2	+	+-	In region with PRIA-RIA dated sites and finds				
390	2	+	+-	In region with PRIA-RIA dated sites and finds				
391	2	+	+-	In region with PRIA-RIA dated sites and finds				
392	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely		400		
393	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
394	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
395	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
396	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
397	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
398	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
399	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
400	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
401	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
402	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
403	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
404	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
		258				y	1	Terp/reclamation (terp) site
		267				y	1	Terp/reclamation (terp) site
		871				y	1	Terp/reclamation (terp) site
		412				y	1	Unknown
		412				y	1	False: not a site
		1193				y	1	Terp/reclamation (terp) site
		411				y	1	False: not a site
		984				y	1	False: not a site
		95				y	1	Unknown
		1158				y	1	Terp/reclamation (terp) site
		1037				y	1	Unknown
		426	136			y	1	Unknown
	Vol_179, 377		136			y	other	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	1	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
405	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely	Lies on the border between Area 1 and 2: largest part in Area 1 therefore assigned to that area			
406	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
407	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
408	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
409	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
410	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
411	1	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
412	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
413	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
414	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
415	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
416	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
417	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
418	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
419	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
420	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
421	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
422	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
423	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
424	2	+	+-	In region with PRIA-RIA dated sites and finds				
425	2	+	+-	In region with PRIA-RIA dated sites and finds				
426	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
427	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
428	2	+	+-	In region with PRIA-RIA dated sites and finds				
429	2	+	+-	In region with PRIA-RIA dated sites and finds				
430	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
431	2	+	+-	In region with PRIA-RIA dated sites and finds				
432	2	+	+-	In region with PRIA-RIA dated sites and finds				
433	2	+	+-	In region with PRIA-RIA dated sites and finds				
434	2	+	+-	In region with PRIA-RIA dated sites and finds				
435	2	+	+-	In region with PRIA-RIA dated sites and finds				

Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Terp/reclamation (terp) site
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
436	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
437	2	+-	+-	Angular shape of MA-farmstead? Within PRIA-RIA area				
438	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
439	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
440	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
441	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
442	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
443	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
444	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
445	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
446	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
447	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
448	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
449	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
450	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
451	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
452	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
453	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
454	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
455	2	unver-ifiable	unver-ifiable	Aalbersberg 2019				
456	2	unver-ifiable	unver-ifiable	Aalbersberg 2019				
457	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
458	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
459	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
460	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
461	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
462	2	++		steekproef				
463	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
464	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
465	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
466	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
467	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
468	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Gone probable terp site
						y	0	Gone probable terp site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
					91	y	1	Terp/reclamation (terp) site
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
469	2	+-		Volkers: Can be dropped here with quarried terp soil				
470	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
471	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
472	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
473	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
474	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
475	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
476	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
477	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
478	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
479	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
480	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
481	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
482	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
483	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
484	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
485	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
486	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
487	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
488	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
489	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
490	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
491	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
492	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
493	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
494	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
495	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
496	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
497	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
498	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
499	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
500	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
501	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
Vol_253					y	other	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown
					y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
502	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
503	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
504	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
505	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
506	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
507	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
508	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
509	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
510	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
511	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
512	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
513	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
514	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
515	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
516	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
517	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
518	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
519	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
520	2	+	+-	In PRIA-RIA ditch system				
521	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
522	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
523	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
524	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
525	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
526	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
527	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
528	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
529	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
530	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
531	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
532	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
533	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				
534	2	-	+	Seems outside PRIA-RIA area and in a probable MA-ditch system				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
535	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
536	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
537	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
538	2	+-	+	Outer edge of ditch system in PRIA/RIA area? MA likely				
539	1	++	-	ARC 30				
540	1	false	false	Veenstra 2017				
541	1	false	false	Veenstra 2017				
542	4_extra			RAAP-rapport 659		235		
543	4_extra			RAAP-rapport 659		389		
544	4_extra					65		
545	4_extra					65		
546	4_extra					68		
547	4_extra			RAAP-rapport 659		131		
548	4_extra					478		
549	4_extra					6		
550	4_extra					7		
551	4_extra					9		
552	4_extra					10		
553	4_extra					11		
554	4_extra					15		
555	4_extra					70		
556	4_extra					72		
557	4_extra			RAAP-rapport 659		130		
558	4_extra			RAAP-rapport 659		133		
559	4_extra					137		
560	4_extra					138		
561	4_extra					185		
562	4_extra							
563	4_extra			RAAP-rapport 659		239		
564	4_extra					242		
565	4_extra					248		
566	4_extra					290		
567	4_extra					292		
568	4_extra			RAAP-rapport 659		347		
569	4_extra					348		
570	4_extra					393		
571	4_extra							
572	4_extra					404		
573	4							
574	4_extra							
575	4_extra					291		
576	4_extra			RAAP-rapport 659		5		
577	4_extra			RAAP-rapport 712		66		
578	4_extra			RAAP-rapport 712		67		
579	4_extra			RAAP-rapport 712		134		
580	4			RAAP-rapport 712		181		
581	4			RAAP-rapport 712		182		
582	4			RAAP-rapport 712		183		
583	4_extra			RAAP-rapport 712		184		
584	4			RAAP-rapport 712		285		
585	4_extra			RAAP-rapport 712		286		
586	4_extra			RAAP-rapport 712		287		
587	4			RAAP-rapport 712		289		
588	4			ARC-publicaties 146		293		
589	4					294		
590	4			RAAP-rapport 712		295		
591	4			RAAP-rapport 712		297		

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
						y	0	Unknown
		296			8	y	2	Terp/reclamation (terp) site
						y	0	False: not a site
						y	0	False: not a site
		993	73				2	
		1147	72				2	
		169	77				2	
		170	77				2	
		171	79				2	
		178	78				2	
		182	51				2	
		764					2	
		765					2	
		767					2	
		768					2	
		769					2	
		773					2	
		828					2	
		830					2	
		888	75				2	
		891	52				2	
		895					2	
		896					2	
		943					2	
		947					1	
		997	76				2	
		1000					2	
		1006					2	
		1048					2	
		1050					2	
		1105	16				2	
		1106					2	
		1107					2	
		1151					1	
		1162					2	
		157					1	
		243					1	
		557	109				2	
		763	50				2	
		824	124				2	
		825	39				2	
		892	133				2	
		939	132				2	
		940	92				2	
		941	128				2	
		942	122				2	
		1043	40				2	
		1044	38				2	
		1045	129				2	
		1047	130				2	
		1051	46	6B-35	83		3	
		1052					2	
		1053	125				2	
		1055	126				2	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
592	4			RAAP-rapport 712		391		
593	4			RAAP-rapport 712		392		
594	4			RAAP-rapport 712		394		
595	1	++		Taayke 1996 IV	TO-049	187	TO-049	
596	1					244		
597	1	+	+	Large terp in PRIA/RIA/MA area		350		
598	1	+	+	Large terp in PRIA/RIA/MA area				
599	1	+	+	Large terp in PRIA/RIA/MA area		353		
600	1					356		
601	1	++		Taayke 1996 IV	TO-072	81	TO-072	
602	1							
603	1	false	false	Veenstra 2017				
604	1							
605	1							
606	1							
607	1	++		Taayke 1996 IV	TO-080		TO-080	
608	1							
609	1	++		Taayke 1996 IV		20	? TO-084	
610	1							
611	1							
612	1							
613	1	++		Taayke 1996 IV	TO-099	260	TO-099	
614	1	++		Taayke 1996 IV	TO-102	29	TO-102	
615	6					450		
616	6					316		
617	6					31		
618	1	++		Taayke 1996 IV	TO-101	262	TO-101	
619	1					462		
620	1	++		Taayke 1996 IV	TO-095	203	TO-095	
621	6_extra					95		
622	6_extra							
623	6_extra							
624	6_extra					160		
625	6_extra							
626	6_extra							
627	6_extra					105		
628	6_extra					44		
629	6_extra					424		
630	6_extra	++		Volkers		218		
631	6	++		Volkers; finds belong to village terp?		108		
632	1							
633	6							
634	6							
635	1							
636	6							
637	6							
638	6							
639	6							
640	6							
641	6	++		Volkers				
642	6							
643	6							
644	6							
645	6	++		Volkers				
646	6							
647	6							
648	1					445		
649	1					470		
650	6	++		Volkers		319		
651	6	+		Volkers? Can also be 653				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
		1149	131				2	
		1150	127				2	
		1152	123				2	
		749				n	2	
		1002				n	2	
		1108				n	2	
		252				n	1	
		253				n	2	
		255				n	2	
		256				n	2	
		257				n	1	
		1261				n	1	False: not a site
		250				n	1	
		251				n	1	
		263				n	1	
		264				n	1	
		265				n	1	
		266				n	2	
		276				n	1	
		268				n	1	
		269				n	1	
		270				n	2	
		271				n	2	
		292					2	
		293					2	
		294					2	
		295				n	2	
		300				n	2	
		301				n	2	
		303					2	
		58					1	
		59					1	
		60					2	
		137					1	
		138					1	
		140					2	
		150					2	
		151					2	
	Vol_439, 442; 446	192					2	
	Vol_669, 670	193					2	
		196				n	1	
		211					1	
		235					1	
		272				n	1	
		273					1	
		274					1	
		275					1	
		277					1	
		278					1	
	Vol_456	279					1	
		280					1	
		281					1	
		282					1	
	Vol_469	283					1	
		284					1	
		285					1	
		286				n	2	
		287				n	2	
	Vol_459	288					2	
	Vol_468?	289					1	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
652	6							
653	6	++		Volkers; Vol_468 can also be 651		446		
654	1					212		
655	1					212		
656	1					212		
657	6					39		
658	1					321		
659	6	++		Volkers		373		
660	6					101		
661	1					369		
662	6					421		
663	1					211		
664	1					375		
665	6					269		
666	6					429		
667	6					333		
668	6					408		
669	6							
670	6							
671	6_extra							
672	2					170		
673	2	+		Volkers		380		
674	6_extra					49		
675	1					271		
676	2					475		
677	1					383		
678	6_extra					168		
679	1					169		
680	2					274		
681	1					337		
682	2	+		Volkers		338		
683	6_extra							
684	1					378		
685	1							
686	1	++		Volkers				
687	1							
688	1	++		Volkers		54		
689	1					229		
690	1					174		
691	1					231		
692	1					439		
693	1	++	++	Veenstra 2018		440		
694	1	++		Volkers		275		
695	2_extra							
696	2					57		
697	2	+		Volkers		343		
698	2							
699	2							
700	2					483		
701	2					483		
702	2							
703	2					342		
704	2							
705	2							
706	2							
707	2							
708	2							
709	2							
710	2							

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
		290					1	
	Vol_463; Vol_468	291					2	
		404				n	2	
		757				n	2	
		758				n	2	
		797					2	
		1079				n	2	
	Vol_467	1131					2	
		1247					1	
		1248				n	2	
		1249					1	
		1250				n	2	
		1251				n	2	
		1252					1	
		1253					2	
		1254					2	
		1256					2	
		1258					1	
		1259					1	
		147					1	
		148				n	2	
	Vol_565	189				n	2	
		190					2	
		194				n	2	
		195				n	2	
		410				n	2	
		926					2	
		927				n	2	
		1032				n	2	
		1095				n	2	
	Vol_423, 455, 601	1096				n	2	
		1246					1	
		1255				n	2	
		1257				n	1	
	Vol_525	1260				n	1	
		752				n	1	
	Vol_381	812				n	2	
		1264				n	2	
		1265				n	2	
		1266				n	2	
		1267				n	2	
		1268				n	2	Terp/reclamation (terp) site
	Vol_577	1033				n	2	
		110					1	
		402				n	2	
	177	409	138			n	2	
		431				n	1	
		440				n	1	
		442				n	2	
		443				n	2	
		445				n	1	
		446				n	2	
		448				n	1	
		449				n	1	
		452				n	1	
		454	137			n	1	
		455	137			n	1	
		456				n	1	
		459				n	1	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
711	2	+		Volkers				
712	2							
713	2							
714	2	++		Volkers				
715	2	+		Volkers				
716	2							
717	2							
718	2							
719	2	+		Volkers				
720	2							
721	2							
722	2							
723	2	++		Volkers				
724	2							
725	2							
726	2							
727	2							
728	2							
729	2							
730	2							
731	2_extra							
732	2							
733	1	++		RAAP-rapport 2945				
734	3							
735	3							
736	2	++		Volkers				
737	2							
738	2							
739	2							
740	2							
741	2							
742	3							
743	3							
744	2							
745	2							
746	2							
747	2							
748	2							
749	2							
750	2							
751	2							
752	2	++		Volkers				
753	2	++		Grontmij 237				
754	2	++		Grontmij				
755	2							
756	2							
757	2	++		Grontmij 237; Volkers				
758	2							
759	2	++		Volkers				
760	2							
761	3							
762	3							
763	2							
764	2							
765	3							
766	3							
767	2							
768	2							
769	3	+	+	Large terp in PRIA/RIA/MA area				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
	Vol_711	460				n	1	
		461				n	1	
		462				n	1	
	Vol_191, 245, 246, 263	463				n	1	
	Vol_207, 212	464				n	1	
		465				n	1	Terp/reclamation (terp) site
		470				n	1	
		471				n	1	
	Vol_200, 202, 213, 215	472				n	1	
		473				n	1	
		474				n	1	
		524	135			n	1	
	Vol_335, 336	931				n	1	
		1100				n	1	
		475				n	1	
		476				n	1	
		477				n	1	
		478				n	1	
		479				n	1	
		480				n	1	
		753					1	
		392				n	1	
						n	0	
		395					1	
		397					1	
	Vol_181	413				n	1	
		414				n	1	
		415				n	1	
		416				n	1	
		417				n	1	
		418				n	1	
		419					1	
		420					1	
		421				n	1	
		422				n	1	
		423				n	1	
		424				n	1	
		425				n	1	
		427				n	1	
		428				n	1	
		429				n	1	
	Vol_96	430				n	1	
		432			111	n	2	Terp/reclamation (terp) site
		433			110	n	2	Terp/reclamation (terp) site
		434				n	1	
		435				n	1	
	Vol_134	436			113	n	2	
		437				n	1	
	Vol_174-176	439				n	1	
		444				n	1	
		450					1	
		451					1	
		466				n	1	
		467				n	1	
		484					1	
		485					1	
		486				n	1	
		487				n	1	
		872					1	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
770	1							
771	2							
772	1							
773	3							
774	2							
775	2							
776	2							
777	2							
778	3							
779	2							
780	3							
781	3							
782	3							
783	3							
784	3							
785	3							
786	3							
787	3							
788	3							
789	3							
790	3							
791	3							
792	3							
793	3							
794	3							
795	3							
796	3							
797	3							
798	3							
799	3							
800	3							
801	3							
802	3_extra							
803	3_extra							
804	3							
805	3							
806	3							
807	3_extra							
808	3							
809	3							
810	3							
811	3							
812	3							
813	3_extra							
814	3							
815	3_extra							
816	3							
817	3							
818	3							
819	3							
820	3							
821	3							
822	3							
823	3							
824	3							
825	3					73		
826	1	++		Taayke 1996 IV	TO-070	144	TO-070	
827	1					250		
828	1					112		
829	1					116		
830	4_extra							

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
		873				n	1	
		875				n	1	
		876				n	1	
		985					1	
		986				n	1	
		988				n	1	
		990				n	1	
						n	0	
		991					1	
		1035				n	1	
		1142					1	
		1194					1	
		348					1	
		349					1	
		350					1	
		351					1	
		398					1	
		496					1	
		497					1	
		498					1	
		501					1	
		503					1	
		504					1	
		505					1	
		506					1	
		507					1	
		508					1	
		509					1	
		511					1	
		512					1	
		513					1	
		514					1	
		515					1	
		517					1	
		519					1	
		522					1	
		523					1	
		352					1	
		499					1	
		500					1	
		362					1	
		367					1	
		869					1	
		516					1	
		518					1	
		342					1	
		488					1	
		489					1	
		490					1	
		491					1	
		492					1	
		493					1	
		494					1	
		520					1	
		521					1	
							1	
						n	1	
						n	1	
						n	1	
						n	1	
			140				other	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
831	4_extra							
832	4_extra							
833	4_extra							
834	4_extra							
835	4_extra							
836	4_extra							
837	4_extra							
838	4_extra							
839	4_extra							
840	4_extra							
841	4_extra							
842	4_extra							
843	4_extra							
844	4_extra			? (archis nr.15195 not right)				
845	4_extra							
846	4_extra							
847	4_extra							
848	4_extra							
849	4_extra							
850	4_extra							
851	4							
852	2							
853	2							
854	4	+-	+-	Outside PRIA-RIA area?				
855	4	++		Jager				
857	2_extra	++		Taayke 1996 IV	TO-071		TO-071	
858	2	++		Taayke 1996 IV	19, 84 or 858: one of these is TO-067		? TO-067	
859	1	++		Taayke 1996 IV	68, 69 or 859: one of these is TO-108		? TO-108	
860	1	++		Jager; Taayke 1996 IV	TO-104		TO-104	
861	1							
862	1	++		Taayke IV 1996	323 or 862: one of these is TO-098		? TO-098	
863	1							
864	1							
865	1	++		Jager				
866	4	?	?	? (archis nr. 7564 not right)				
867	1	++	++	Veenstra 2017				
868	1	false	false	Veenstra 2017				
868	2	false	false	Veenstra 2017				
869	2	++	-	Veenstra 2017				
870	2	++	++	Jager				
871	1	++		Jager				
872	2	++		Jager				
873	1	++		Jager				
874	6	++		Jager; Volkers				
875	1	++		Jager				
876	1	++		Jager; Volkers				
877	1	++		Jager; Volkers				
878	1	+		Jager; Volkers				
879	1	+		Jager; Volkers				
880	1	++		Jager; Volkers				
881	2	+-		? (archis nr.7794 not right)				
882	2	++		RAAP-rapport 1241				
883	2	++		RAAP-rapport 1241; Volkers				
884	2	++	++	Jager; RAAP-rapport 1241; Volkers				
885	2	++		Jager; Volkers				
886	6	++		Jager				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
			141				other	
			142				other	
			143				other	
			144				other	
			145				other	
			146				other	
			147				other	
			148				other	
			149				other	
			150				other	
			151				other	
			152				other	
			153				other	
			154		90		1	
			24				other	
			25				other	
			6				other	
			26				other	
			29				other	
			80				other	
			9				other	
			2			n	1	
			32			n	1	
			91				other	
			90	6A-69	27		1	
							other	
					44	n	1	
					36	n	1	
				6C-38	77	n	1	
						n	other	
						n	other	
						n	other	
						n	other	
				6C-34	32	n	1	
				6B-32	84		1	
					31	n	1	Terp/reclamation (terp) site
					30	n	1	False: not a site
						n	0	False: not a site
						n	other	Terp/reclamation (terp) site
				6C-37	78	n	1	
				6C-89	42	n	1	
				11A-42	71	n	1	
				11A-43	72	n	1	
	Vol_449			11A-41	70		1	
				11A-44	73	n	1	
	Vol_541			11A-46	75	n	1	
	Vol_421, 540, 534, 392, 578			11A-45	74	n	1	
	Vol_390, 382			11A-29	59	n	1	
	Vol_390, 383			10F-52	53	n	1	
	Vol_406. 411			11A-28	58	n	1	
				10F-30	89	n	1	
				Cat. nr. 44?	104	n	1	
	Vol_331			?	21	n	1	
	Col_329			10F-51	20	n	1	
	Vol_330, 353, 355, 356, 359, 365			10F-53	54	n	1	
				11A-30	60		1	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
887	6_extra							
888	2							
889	2	++		Jager; RAAP-rapport 1680				
890	2_extra	++		Jager; RAAP-rapport 1680				
891	2	++		RAAP-rapport 1680				
892	2	++		RAAP-rapport 1680; ADC-rapport 324				
893	2_extra	++		RAAP-rapport 1680				
894	2	++		ADC-rapport 324				
895	2							
896	2							
897	2	++		Jager; Volkers				
898	2	+		Volkers				
899	2	+		Volkers				
900	2	+		Volkers				
901	2	++		Hofstra; Volkers				
902	2	+	?	Volkers				
903	2	++						
904	2	++		Niekus; Jager; Volkers	Sneek-Stads-rondweg			
905	2	++		Hofstra; Volkers				
906	2							
907	2	++		Taayke brief; Jager				
908	2	++		Volkers				
909	2	++		Aalbersberg; Volkers				
910	2			Aalbersberg				
911	2	++		Aalbersberg; Volkers				
912	2	++		Aalbersberg; Volkers				
913	2	++		Aalbersberg; Volkers				
914	2	++		Bakker et al. 2018; Aalbersberg; Volkers				
915	2	++		Aalbersberg; Volkers				
916	2	++		Aalbersberg; Volkers				
917	2	++		Aalbersberg; Volkers				
918	2	++		Aalbersberg; Volkers				
919	2	++		Aalbersberg; Volkers				
920	2			Aalbersberg				
921	1			Grontmij				
922	1	++		steekproef				
923	1	++		Jager; Aalbersberg 2019; Volkers				
924	1							
925	3							
926	1	++	++	RAAP-rapport 21				
927	1							
928	1							
929	3	++	++	Jager; RAAP-rapport 21				
930	1_extra			RAAP-rapport 2945				
931	1_extra			RAAP-rapport 2945				
932	1_extra			RAAP-rapport 2945				
933	1_extra			RAAP-rapport 2945				
934	1_extra			RAAP-rapport 2945				
935	1_extra			RAAP-rapport 2945				
936	1_extra			RAAP-rapport 2945				
937	1_extra			RAAP-rapport 2945				
938	1_extra			RAAP-rapport 2945				
939	1_extra			RAAP-rapport 2945				
940	1_extra			RAAP-rapport 2945				
941	1_extra			RAAP-rapport 2945				
942	1_extra			RAAP-rapport 2945				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
					7		1	
					2	n	1	
				10F-50 (dub-bel)	5	n	1	
				10F-50 (dub-bel)	6		1	
					4	n	1	
					1	n	1	
					3		1	
					109	n	1	
					24	n	1	
					23	n	1	
	Vol_265, 276			10F-49	52	n	1	
	Vol_898				102	n	1	
	Vol_235/231				22	n	1	
	Vol_195/231				99	n	1	
	Vol_214, 234				97	n	1	
	Vol_241, 242, 340				114	n	1	
					96	n	1	
	Vol_224, 226			10H-10	56	n	1	
	Vol_229				100	n	1	
					101	n	1	
				10H-A	57	n	1	
	Vol_225					n	other	
	Vol_2326				19	n	1	
					18	n	1	
	Vol_325				17	n	1	
	Vol_293, 317				16	n	1	
	Vol_290, 295, 320, 305				103	n	1	
	Vol_278, 301				15	n	1	
	Vol_238				14	n	1	
	Vol_288, 313				13	n	1	
	Vol_279, 308, 266?				12	n	1	
	Vol_310, 285				11	n	1	
	Vol_284, 309				10	n	1	
					9	n	1	
					112	n	1	Terp/reclamation (terp) site
					92	n	1	terp?
	Vol_138			10G-18	55	n	1	Terp/reclamation (terp) site
					82	n	1	terp?
					115		1	
				?	95	n	1	
					76	n	1	
					47	n	1	
				10B-53	48		1	
				cat. 12			other	
				cat. 16			other	
				cat. 17			other	
				cat. 18			other	
				cat. 22			other	
				cat. 23			other	
				cat. 24			other	
				cat. 25			other	
				cat. 26			other	
				cat. 27			other	
				cat. 28			other	
				cat. 29			other	
				cat. 30			other	

DB_ID	Area	PRIA-RIA	MA	Remarks on date	Other remarks	National Soil data (bodem-kaart - 1977)	Other records (Taayke 1996 I & II)	
943	1_extra			RAAP-rapport 2945				
944	1_extra			RAAP-rapport 2945				
945	1_extra			RAAP-rapport 2945				
946	1_extra			RAAP-rapport 2945				
947	1_extra			RAAP-rapport 2945				
948	1_extra			RAAP-rapport 2945				
949	1_extra			RAAP-rapport 2945				
950	1	false	false	Veenstra 2018				
951	1	false	false	Veenstra 2018				
952	1	++		Volkers				
953	1	++		Volkers				
954	1	+-	++	Veenstra 2018				
955	2	++	--	Aalbersberg 2019; Volkers				
956	2	++		Aalbersberg 2019				
957	1	++		Taayke 1996 IV	TO-063b		TO-063b	
958	1	++		Taayke 1996 IV	TO-068		TO-068	
959	1	++		Taayke 1996 IV	TO-079		TO-079	
960	1	++		Taayke 1996 IV	TO-086		TO-086	
961	1	++		Taayke 1996 IV	TO-085		TO-085	
962	1	++		Taayke 1996 IV	TO-088		TO-088	
963	1	++		Taayke 1996 IV	TO-089		TO-089	
964	1	++		Taayke 1996 IV	TO-082		TO-082	
965	1	++		Taayke 1996 IV	TO-083		TO-083	
966	1	++		Taayke 1996 IV	TO-093		TO-093	
967	1	++		Taayke 1996 IV; Volkers	TO-105		TO-105	
968	6	++		Bakker in prep.; Volkers	Wirdum-Bredyk			
969	1	++		Archis II: 49437				

	Other records (Volkers)	Provincial records (terps)	Other records: provincial verdiepingsslag	Other records: RAAP Cat_nr	Provincial records ('silted-over terps')	Mapped (y/n)	Known in offical records	Site_type
				cat. 31			other	
				cat. 32			other	
				cat. 33			other	
				cat. 34			other	
				cat. 35			other	
				cat. 36			other	
				cat. 37			other	
						y	0	False: not a site
						y	0	False: not a site
	Vol_599					n	other	Terp/reclamation (terp) site
	Vol_554					n	other	Terp/reclamation (terp) site
						y	0	Terp/reclamation (terp) site
	Vol_110					n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
						n	other	Terp/reclamation (terp) site
	Vol_551, 552, 553, 602					n	other	Terp/reclamation (terp) site
	Vol_461						other	Terp/reclamation (terp) site
						n	0	Terp/reclamation (terp) site