An Archaeology of the Battle of Arnhem September 1944: The potential of an interdisciplinary approach of consulting the World War 2 soil archive

Reinders, Martijn

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M. Reinders

Figure on cover: Two Airborne soldiers of The Parachute Regiment pick up their own archaeology right after the liberation in 1945: a Lee-Enfield rifle and magazine between the debris of the battlefield of the Oosterbeek Perimeter (Benedendorpsweg) (source: Gelders Archief, 1560 – 4439).

Universiteit Leiden

An archaeology of the Battle of Arnhem September 1944

The potential of an interdisciplinary approach of consulting the World War 2 soil archive

Master Thesis Archaeology

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Version date:	12-6-2023 (final version)
University:	Leiden, Faculty of Archaeology
Word count:	27,176

Figure: British ammunition and equipment (Lee-Enfield clips, a Bren-gun magazine, mess tins) belonging to prisoners of war from the Airborne Division scattered between debris of civilian homes at Velperplein in Arnhem (picture: W. Zilver Rupe; source: *Gelders Archief*, 1560 – 2398, CC-BY-4.0).

"*The wind plays with the open doors, some blown up Empfänger ER 1 lie in a pit next to a pair of disabled telex machines. The furniture of the house is – who knows in what kind of a whim – partially smashed. It is remarkable how much one experiences the destructive nature of the war at the sight of trifles; a broken window pane in a well-kept house or the pulled out interior of a chair in a tastefully decorated room disturb more than if everything had been completely destroyed by a bomb, for example.*"

- Wolfgang Fricke, *Flieger-Hauptingenieur* (engineer) who visited the hastily abandoned headquarters of *Luftnachrichten-Regiment 201* in Villa Raaphorst (Velperweg 69) in Arnhem on 18 September 1944[1]

[1] Tiemens, 1984, p. 110. Translated by Tiemens from the original (German) in Dutch, and translated by the author from Dutch to English.

Acknowledgements

Dear reader,

I am honoured to present my master thesis on the archaeology of the Battle of Arnhem (September 1944), a crucial moment in World War 2 (WW2) that has had lasting effects on the region and its people. In this thesis, I focus on material remains to explore the archaeology of the battle and its aftermath. Through my research, I seek to answer the question: what can be the significance of conflict archaeology? One that expects a full overview of ground dug items or found features in and around Arnhem, will be disappointed. In my thesis, I hope to provide insight in the potential of an interdisciplinary approach of consulting the soil archive for all people that feel involved in the common heritage that archaeology from WW2 is, be it “professionals” or “amateurs” (a term deliberately avoided, apart from quotes), coming from commercial parties, authorities (municipalities, the province, or on a national level), metal detectorists (individual or united), private initiatives resulting in foundations (e.g., museums), or the Ministry of Defence.

Given the fact I graduated for my bachelor’s degree in 2013 (already on a WW2 subject) and worked in the archaeological field in the meantime, the step to the halls of academia was not an impulse. I am grateful to my supervisors, Richard Jansen (Universiteit Leiden), Martijn Defilet (gemeente Arnhem), and Marlous van Domburg (gemeente Ede), for their guidance and support throughout my studies. I would also like to thank my employer and colleagues at DAGnl and Greenhouse Advies, for giving me all liberty, support and the opportunities to reach this goal during my daytime job. The same goes for my family, Maraly and Bente, who had to share me with this occupation during late nights and weekends the last year and a half, and Maraly specifically for reading my manuscript and improving it linguistically. My parents should also not be forgotten in this list, for their unconditional support that I always have received. Also, a word of appreciation goes out to the sounding board of my ‘conflict-colleagues’: Ruurd Kok (Leiden), Jobbe Wijnen (Wageningen) and especially Ivar Schute (Leiden), who kept on nagging I really had to get my master degree, and Dwayne Beckers (Roermond) and Nick Warmerdam (Utrecht) for reviewing my manuscript and sharpen it on key points. For providing information and documentation the following people are thanked: Leo van Midden (National Amateur Archaeological Society (AWN) and Association of Friends of the Airborne Museum (VVAM)), Leo Smole (gemeente Arnhem), David van Buggenum (*Zoekgroep*) and Jos van der Weerden (BAAC bv). Lastly, these acknowledgements would never be complete without naming Hans Timmerman (*Erfgoedcentrum Arnhem*, former member of the *Zoekgroep*) without whom I would never have been so deeply involved in researching WW2 and conflict archaeology as I am today.

Arnhem, 3 June 2023.

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1 Introduction

1.1 An archaeology of the Battle of Arnhem

In September 1944 one of the major Allied operations in the Second World War (WW2) in Europe was performed: operation Market Garden. One of the key locations during this event, which is generally called the Battle of Arnhem, was the Arnhem-Oosterbeek-Ede (southern Veluwezoom) region (Figure 1.1). The operations in Noord-Brabant and Limburg resulted in territorial gain by the Allies, although the outcome wasn't exactly according to plan with Arnhem even being claimed the "the last German victory". These stories have been the domain of (military) historians for long and, as a result, many bookcases have been filled on this subject from this view.

Besides the shaping of a narrative as told by historians, archaeologists and others have increasingly consulted the soil archive of this battle and WW2 in general, from loose finds, metal detecting but also full excavations. An overview of these archaeological results, however, has not been presented to date. This thesis elaborates on the potential of this soil archive for WW2 heritage by studying the archaeology of the Battle of Arnhem. The research area is demarcated by the present municipalities of Arnhem, Renkum and Ede and by events happening between 17 and 25 September 1944 (Figure 1.2).

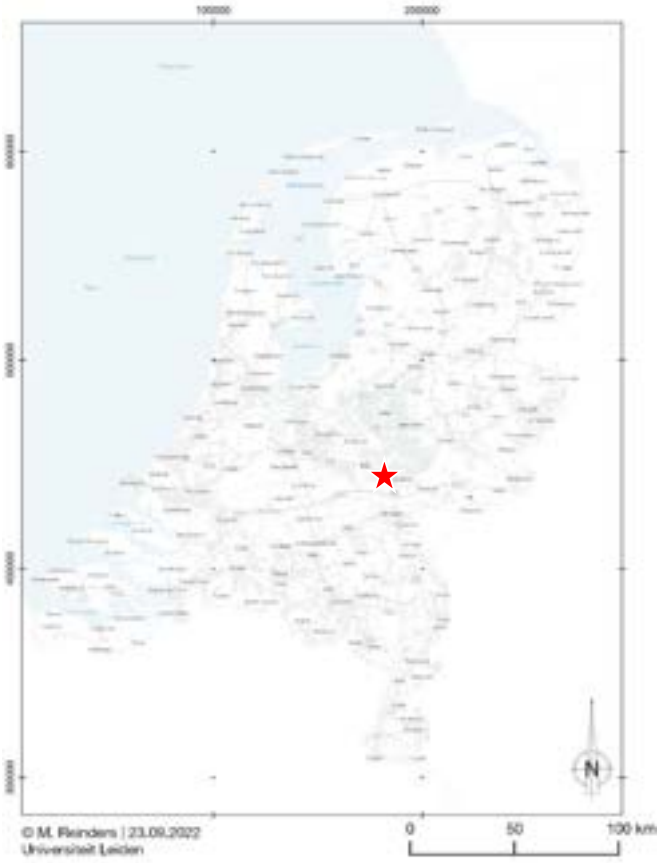


Figure 1.1. The research area (map by Author).

1.2 Relevance

WW2 irrefutably was a major event in Dutch history that appeals and continues to appeal to the imagination of current and future generations. It has been widely accepted that the freedom in which we live (in the Netherlands) since the end of WW2 must be cherished and commemorated in order to prevent new conflicts from happening. From 1945 onwards, the remembrance of WW2 and the Battle of Arnhem specifically has been honored through a wide variety of initiators and actors, varying from independent foundations, municipalities and other political organs, museums and private individuals..

Metal detectorists, several branches of the Ministry of Defence (Netherlands Armed Forces) and commercial parties like unexploded ordnance (UXO-)clearance firms have been digging up myriad relics throughout the decades. Contrary to other European countries, professional (conflict) archaeologists in the Netherlands have not been very well represented to date in this realm. Dutch conflict or WW2 archaeology has been called being in its infancy for the last couple of years (Kok *et al*., 2013, p. 2; van der Heul, 2017, p. 48; *Rijksdienst voor het Cultureel Erfgoed*, 2019, p. 15) and it is lacking a national research agenda, which could stimulate directed research on WW2 sites. Yet, archaeological research into WW2 for remembrance is increasingly considered important like in Dutch national politics. In a *Kamerbrief* (Letter to Parliament; van Engelshoven, 2019) “making stories tangible” is mentioned among the surplus values of WW2 archaeology (p. 8). However, the overarching value of the many different archaeological results remains impeccable.

With all this in mind, it seems relevant to record a *status quaestionis* ("where are we now?") of WW2 archaeology. As this has been conducted recently for the whole Netherlands in the form of a dissertation (van der Schriek, 2020), for this master thesis the Battle of Arnhem (September 1944) is chosen as a case study. Precisely because so much is and presumably will be said about this particular battle and the fact that commemorations of these events are still increasing, this case lends itself perfectly to learn lessons from. This thesis can also ensure that other researchers (like historians and teachers) and the interested public become more familiar with the methodology, the results and the significance of an archaeological approach of the Battle of Arnhem, or WW 2 in general.

1.3 Research aims and questions

As mentioned above, this thesis is demarcated by the present municipalities of Arnhem, Renkum and Ede and by the archaeology of events happening between 17 and 25 September 1944. The main objective of this thesis is to investigate the meaning and relevance of WW2 or conflict archaeology on the basis of the Battle of Arnhem. This significance is measured both in scientific research (knowledge-gain) as in a broader perspective, like the meaning it can have for communities and in remembrance.

To achieve this objective, the following research questions are compiled:

Main research question:

What can be told archaeologically about the Battle of Arnhem, which otherwise would have been untold or underexposed? What is the significance of WW2 archaeology?

Sub-questions:

1. *Which invasive researches have been carried out within contract and academic archaeology? What were the results?*
2. *What kind of other (non-archaeological) stakeholders are searching for and excavating WW2 heritage? What were the results and methods? What were the motivations and goals?*
3. *When comparing professional archaeology with initiatives from other results: how do these relate to each other, when comparing methods and results?*
4. *To what extent do the archaeological values differ from what is known from other (e.g., historical) sources?*
5. *To what extent can forthcoming results of non-professional archaeological research and other stakeholders be considered heritage?*
6. *To what extent can archaeology contribute to remembrance of and education on the Battle of Arnhem, compared to the existing initiatives?*

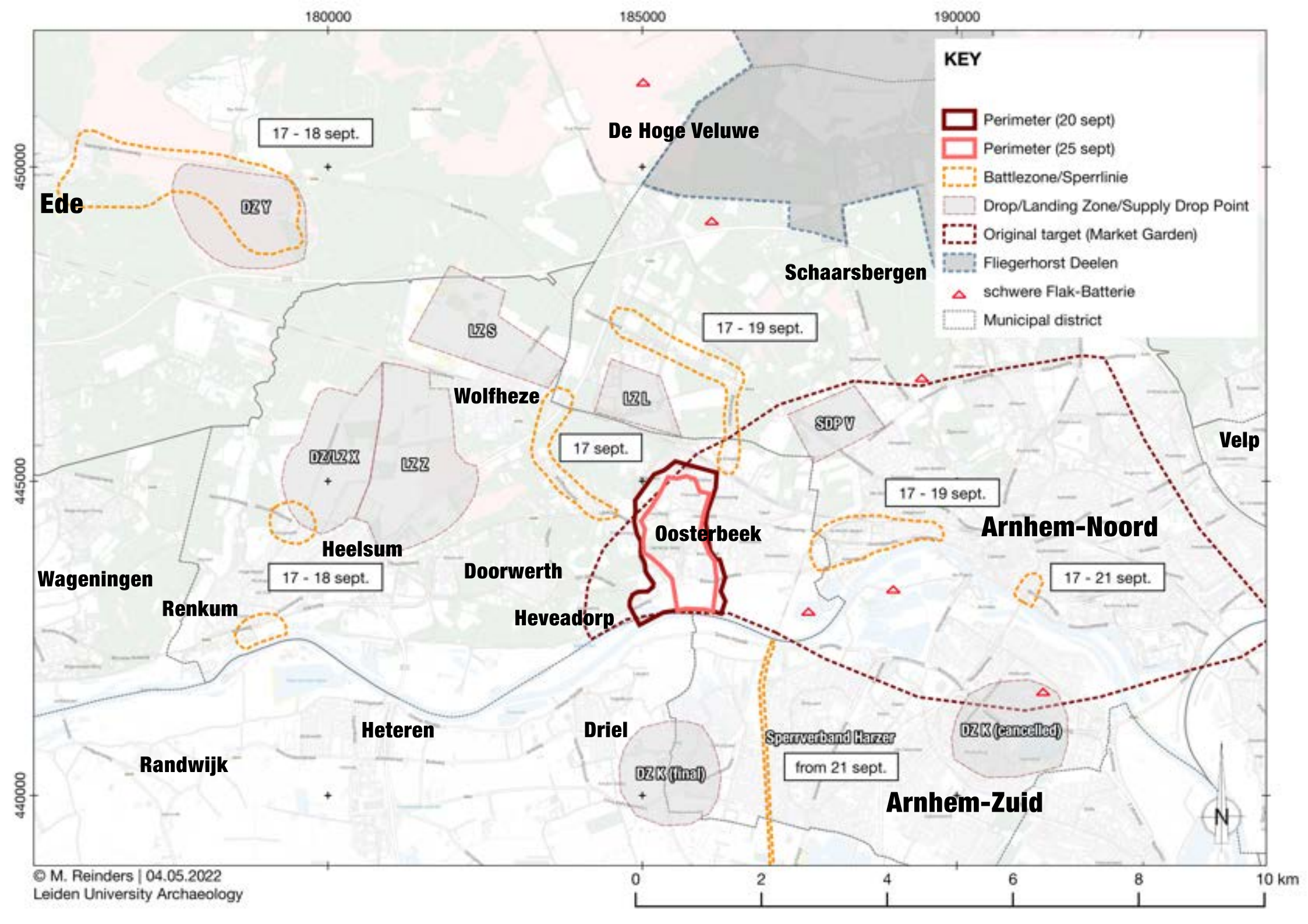
1.4 Research design and methodology

The research project was started with a study of reports, articles and other literature in which archaeological results, finds from metal detecting or other, comparable discoveries have been published. Collecting this data has been done firstly by consulting the Dutch national archaeological database (Archis) for all professional archaeology. Also, contact with the municipal archaeological services, the *Onderzoeksgroep Historisch Terreinonderzoek Wereldoorlog II* (*Zoekgroep*), the WW2 Working Group of the National Amateur Archaeological Society (AWN) and the Association of Friends of the Airborne Museum (VVAM) and several individuals provided information. Whenever possible, this data was put in a GIS-database. For all non-professional archaeology, like metal detectorists, the treated results merely are a selection. For this group the requirement applies that results must have been documented in some way, are verifiable and were accessible during the writing of this present thesis. Reports from other stakeholders like the Armed Forces, specifically the *Bergings- en Identificatiedienst* (BIDKL), and UXO-clearance companies are no part of this thesis, because this would involve an approach too large for a master thesis.

1.5 Reading guide

First of all, chapter 2 will provide an elaboration and chronology on the historical events and remembrance of the Battle of Arnhem (September 1944), dealing with the tangible remains and the evolution of and place of WW2 archaeology in the Netherlands, both in science and in a broader context. Subsequently, in chapter 3, the results of all invasive initiatives within the scope of the Battle of Arnhem from professional archaeology will be presented (sub question 1). Chapter 4 gives an overview of other stakeholders; their results and motivations (sub questions 2 and 3). In the following chapter (5), the research questions 4, 5 and 6 will be analysed. In chapter 6 conclusions will be presented and aforementioned research questions will be discussed reaching out for the main question and goal of this thesis.

Figure 1.2 (next page). Map of the research area (Author).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Perimeter (25 sept)
Battlezone/Sperrlinie
Drop/Landing Zone/Supply Drop Point
Original target (Market Garden)
Fliegerhorst Deelen
schwere Flak-Batterie
Municipal district
17 - 18 sept.
Ede
DZ Y
De Hoge Veluwe
Schaarsbergen
LZ S
17 - 19 sept.
Wolfheze
LZ L
SDP V
17 sept.
DZ/LZ X
LZ Z
Velp
17 - 19 sept.
Oosterbeek
Arnhem-Noord
Heelsum
Wageningen
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Doorwerth
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2 The Battle of Arnhem: its history, remembrance and archaeological heritage

2.1 Introduction

This chapter presents a background on how the Battle of Arnhem (September 1944) has been commemorated and how material heritage (both objects and landscape) has been approached throughout the last 78 years (from 1944 – 2022), by which stakeholders (e.g., museums, metal detectorists) and what their approaches are. Also, the place of the landscape and material heritage and, superfluously, conflict archaeology and tension fields between these actors will be discussed.

2.2 Synopsis of a battle

Firstly, a short overview of the planning and outcome of the Battle of Arnhem as based on historical sources will be given. The fighting at the southern Veluwezoom region in September 1944 was a direct consequence of the Allied invasion (6 June 1944) and subsequent battles in Northern France and the German withdrawal. This happened at the end of August towards the Netherlands, which from the German point of view could be seen as a location where the *Wehrmacht* was to be reorganized. Arnhem city, and specifically the Veluwezoom and Achterhoek regions were appointed as assembly points for two battered SS armoured divisions (Tieke, 1975, pp. 301-302).

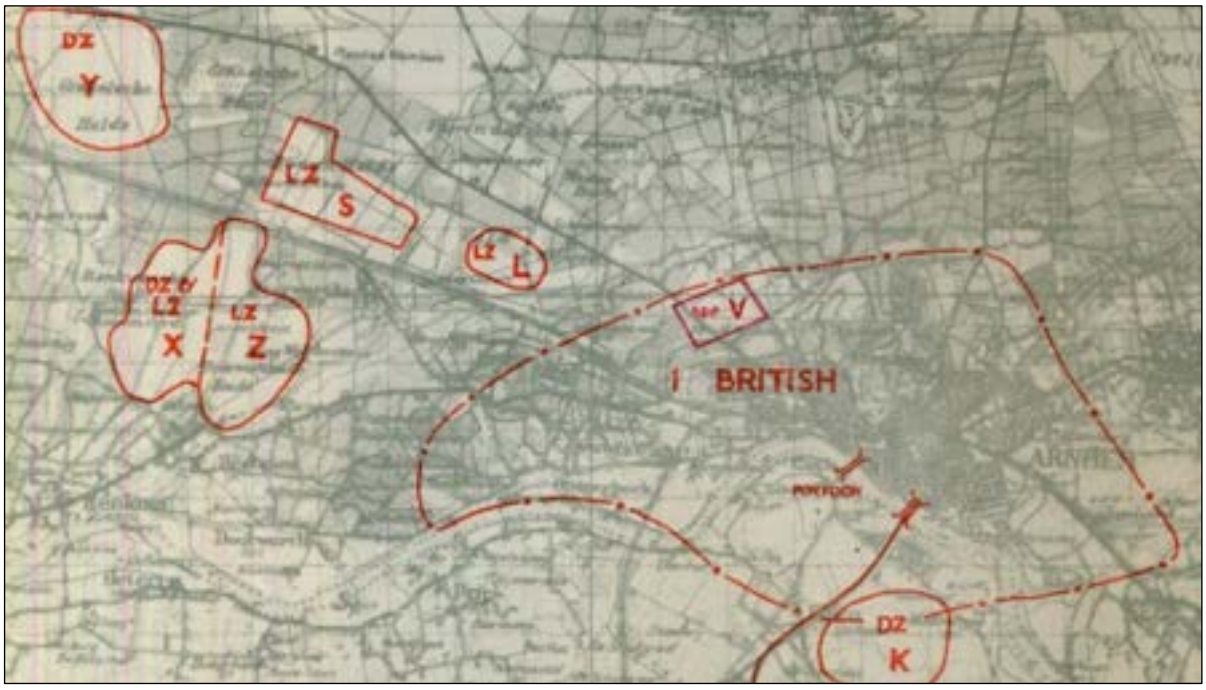

Figure 2.1: Plan of operation Market north of the Lower Rhine with Drop and Landing Zones (DZ, LZ) and one Supply Drop Point (SDP) in the research area. The large area around Arnhem was the initial goal of the 1st British Airborne Division (source: unknown, via Association of Friends of the Airborne Museum).

After being able to push through near the Dutch-Belgian border, a new Allied offensive was planned. This operation was divided in two parts (Market and Garden). Plan Market was a large-scale airborne operation in which American, British and Polish forces would land at several locations behind enemy lines: near Eindhoven, Nijmegen, and Arnhem. These had to create bridgeheads, among which bridges across several canals and rivers like Maas, Waal and Rhine. The airborne forces would be relieved by ground troops advancing from the Valkenswaard area to the north, which was Plan Garden. The new plan was to be executed from 17 September onwards (Middlebrook, 1994, p. 16).

In the Arnhem region, the subject of this thesis, the 1st British Airborne Division commanded by Urquhart would land. It was their objective to form a bridgehead around Arnhem, including a number of crossings over the Lower Rhine (Figure 2.1). The ground forces were planned to connect with the British division at Arnhem in three or even less days (*Ibidem*, p. 20). The landings were spread over several days. In the early afternoon of 17 September the first airborne troops landed: parachutists and gliders with infantry and (light) equipment, such as jeeps, half-track vehicles and guns (artillery and antitank). This was done on pre-selected Drop and Landing Zones (abbreviated DZ, LZ) on heathlands and agricultural areas (meadow and fields) in the outskirts of the southern Veluwezoom.

All different units had their own assignments in the broader plan Market. North of the Rhine, none of these were achieved. Only a relatively small group reached the northern part of Arnhem road bridge, while others were held up. Commander Frost at the bridge entrenched himself with about 740 man in a handful of buildings (Gerritsen & Revell, 2010, pp. 46-47). They suffered greatly and only held out until the morning of the 21st. The German army, on their turn, had reacted fast after the initial surprise landings. In two days all three British advance routes leading towards Arnhem were sealed off by blocking forces (Kershaw, 2008, p. 210). Moreover, German troops were pushing both from east and west and partly from the north. During the first three days, heavy fighting occurred especially in the western suburbs of Arnhem, within the city centre and at the northern end of the bridge and near the Landing and Drop Zones (e.g., Ginkelse Heide).

Figure 2.2. The U-shaped Perimeter in the western part of the village of Oosterbeek, Veluwezoom region, the attacking German forces and the Polish Drop Zone south of the Rhine and the eventual withdrawal of the British (map by L. Kaulartz, *Nederlands Instituut voor Militaire Historie*, Den Haag).

Meanwhile, at other locations of operation Market Garden south of Arnhem, vital goals were not achieved or later than planned, partly due to coordinated German blocking forces and counterattacks. This caused crucial delays (*Ibidem*, pp. 382-383).

The goal of reaching Arnhem had been abandoned and the British division was badly hit. Urquhart therefore decided to merge his remaining forces and shorten the lines in order to be less vulnerable. A horseshoe-shaped so-called Perimeter was formed right through the western half of the village of Oosterbeek (Figure 2.2). In addition, all other positions were abandoned (Urquhart, 1958, p. 144; Ryan, 1974, pp. 395-396). With this decision, a new phase in the fighting north of the Lower Rhine began. The Perimeter's defence at that point is estimated at around 3,600 men (Middlebrook, 1994, pp. 333-334).

The British became entrapped in Oosterbeek with German forces all around their positions and the Lower Rhine river as a natural border in the south. Due to the constant pressure during this siege, ground was slowly gained on the Allied airborne troops. On 21 September a Polish brigade (as part of the British Airborne Division) landed at Driel, on the other side of the river where the Perimeter had formed. As a reaction, a new German blocking force was arranged along the high railway embankment between Elden and Driel. Part of the Poles crossed the Rhine to fight in Oosterbeek. In the night to 26 September, most of the remainder of the Airborne Division retreated over the Lower Rhine. This ended the Allied presence north of the Rhine in 1944 and also demarcates the historical framework within this research.

2.3 A brief history of remembering "Arnhem"

The Battle of Arnhem has been etched in the collective memory since the fall of 1944 and the amount of monuments and commemorations has only grown in the course of the last decades. Since the liberation in 1945, the battle is commemorated annually during the September month. With the increase of remembering the events of September 1944, the landscape also gradually received its place in this process of emotions. For example, from 1947 onwards the Airborne March takes its attendants past locations that played a role during the fighting. From 1960 onwards annual parachute droppings are conducted at Ginkelse Heide (a former Drop Zone) near Ede. The 75th anniversary in 2019[2] was attended by no less than 100,000 visitors.

The absolute pinnacle of Arnhem and especially the road bridge as a symbol is the Hollywood film adaption "A Bridge Too Far" (1977, after historian C. Ryan's book from 1974), making the operation world famous. The movie motivated the municipality to baptize Arnhem bridge as John Frost bridge (after the British commander that defended the northern ramp for three and a half days) only a year after the release of the movie (Figure 2.3). The Airborne Museum in Oosterbeek should also not be missed, established in 1949 in Doorwerth castle and since 1978 located in the former Airborne headquarters in Hotel Hartenstein, so also at a key location. The museum welcomed more than 150,000 visitors in 2019.

[2] Because of the COVID-19 pandemic and its measures like limitations for public events and museums between 2020 and 2022, data from 2019 is used.

Figure 2.3. Airborne commander John Frost at Airborneplein in Arnhem during the September memorial in 1978. That year the post-war road bridge was baptized as John Frost bridge. The nearby traffic circle is adorned with a battle-damaged column of the former courthouse: an eyewitness of the conflict turned into a monument (picture: *Gemeentearchief Arnhem*; source: *Gelders Archief*, 1524 – 6588).

The unbridled proliferation with numerous small and large memorials and different events culminated in Arnhem region becoming a *lieu de mémoire* (memory space) already by the 1990s (Kolen & van Krieken, 2010, p. 90). Kolen and van Krieken conclude that Arnhem takes an important place in remembering WW2 in the Netherlands (2010, p. 86). The city and its surrounding villages but mainly Arnhem bridge have become the ultimate symbols for a national trauma: it was the last Allied defeat with major consequences for the Dutch people in the Arnhem region and the still occupied parts of the country (*Ibidem*, p. 88).

Battlefield Tours visiting locations in the field, organized tours on foot, by bike, car or even coach, are held multiple times a year. In fact these originate from right after the war, when veterans could still visit the uncleared battlefields. These initiatives, attracting both military interested and others, fall midway between education and entertainment, and seem popular. Guided tours in Oosterbeek focussing on ground-dug items also generated a lot of interest in the past (Anonymous, 2013).

In the last decade, the collection of events has been broadened with the “Bridge To Liberation” annual live concerts (2014 to present). This musical experience is located at Arnhem road bridge, which serves only for a limited amount of public. Nonetheless it was attended by almost 20,000 visitors in 2019. In 2018, four municipalities (Arnhem, Ede, Overbetuwe and Renkum)[3] joined hands to "make the story of the Battle of Arnhem known at home and abroad". To achieve this, they have set up the Airborne Region foundation (Airborne Region, n.d.).

[3] Since the Battle of Arnhem during operation Market Garden was only fought on very limited grounds of the present-day municipality of Overbetuwe, this municipality is no part of this thesis. Only after its initial failure, the area between Rhine and Waal rivers became increasingly involved in military ground actions.

Figure 2.4. Mass commemoration with live pop artists in 2018, located at the battlefield of John Frost: the northern ramp of the Arnhem "bridge too far" (picture and copyright: R. Hensel; source: Berends, 2018).

Simultaneously, or as a result of these public events, commercialism comes into play increasingly, with, for example, beer and sweets bearing the Airborne "brand" and all kinds of military paraphernalia being sold during the mass events and commemorations (Kok, 2021, pp. 75-76). Also, a more recent increase of "experiences" and "adventures" for the public can be mentioned, like the audio-visual and interactive Airborne Experience in the Airborne Museum, in which people can walk through history in "realistic reconstructions" (Airborne Museum, n.d.). The annual concert at the bridge is described as a "spectacular experience" performed with light shows, fireworks, "(war)sound effects", dance groups, Dutch pop artists and a full orchestra (Bridge To Liberation, n.d.) (Figure 2.4). Through remembrance (in its widest form), present and future generations are also educated, as "September 1944" is present in educational material for elementary and secondary schools in the Airborne Region.

Lastly, commemorating WW2 and the Battle of Arnhem has contained a military aspect to date. For example, the Ginkelse Heide commemorations are combined with a large military exercise (Falcon Leap). Moreover, members of the Dutch Ministry of Defence recently connected memorizing WW2 with the present and future state of the world.[4] Also, the Dutch 11th Airmobile Brigade have a tradition consisting of a ceremony at the Oosterbeek Airborne Cemetery. The fallen soldiers of September 1944 (like themselves wearing the red beret) are seen as their direct predecessors (Anonymous, 2018).

In conclusion, it can be safely declared that while the commemorations on 4 and 5 May (remembrance day and liberation day, respectively) are important Dutch national events, the September month is of uttermost importance for the Arnhem region. In most cases, the memory spaces themselves like former Landing Zones,

[4] Dutch former Minister Bijleveld emphasized during her speech in 2019 on Ginkelse Heide that "we, the Allies, together protect what we think is important: our safety and our freedom" which is a "powerful tradition" in the present. NOS Nieuws, 2019.

surviving buildings and the bridge are serving as symbols where the commemorations or guided tours are taking place.

2.4 The interest in material heritage

Apart from spaces, also objects have been playing a role in memorizing war times. Collecting physical objects like souvenirs seems a normal course of business (Figure 2.5). Motivations were, for example, to collect trivial objects as a token which, because of the traumatic event, turned into something special for the person owning it (Saunders, 2007, pp. 33-35), or as “proof that a man had seen active combat” (Bourke, 1999, p. 39). These material remains have a direct connection to “what happened”. This is why it should be no surprise that tangible remains of WW2 were already in demand during the war, among the people that experienced it themselves. As a 15-year-old, Bob Castendijk experienced the fighting in Oosterbeek up close and kept a detailed diary about it. He owned a large collection of equipment and other military objects and handed them out to his new British friends: "The English staff sergeants all want souvenirs. Well, they can get it: SS and *Luftwaffe* eagles, epaulettes, patches, hats." (Castendijk, 2011, p. 47. Translated from Dutch by the author.). It seems evident that only above-ground remains of the Battle of Arnhem were collected in the first post-war years. After the return of civilians, leftover items were discarded or stored.

Figure 2.5. Evacuated men of The Parachute Regiment after the fighting in Oosterbeek. The soldier standing in the middle wears a German belt with the “Gott mit uns” inscription, swastika and eagle buckle, probably as a souvenir from his experiences during Market Garden (source: The Pegasus Archive, n.d.).

Figure 2.6. Two children playing with a British antitank cannon and equipment, as abandoned by British Airbornes in the western suburbs of Arnhem (Utrechtseweg 177), summer of 1945 (source: *Gelders Archief*, 1560 – 4404).

Also known are the stories of children playing with weapons and equipment left behind on the battlefields (Figure 2.6) (e.g., Versluijs, 1996, p. 3). Regardless of personal danger, weapons and (live) ammunition of all kinds were collected. In nearby Elst and Huissen a massive load of thousands of dangerous objects was confiscated by the police in the fall of 1948. Among this haul were even a cannon and an amphibious tank (Reinders, 2020, pp. 132-134). The examples of the former battlefield being a playground, claiming deaths and wounding people severely after the war, are innumerable.

2.5 The advent of metal detectorists and other, private initiatives

Although chance finds (usually ammunition) occurred from 1945 onwards, the popularity of the metal detector provided a great impulse in the active search for hidden, buried remains, as far as we now can reconstruct. This device was already in use during and right after WW2 by the military to locate mines. No exact history (in the Netherlands or the Arnhem region) on this subject is known, but a brief analysis on the online newspaper databank Delpher provided some information.

During the 1960s and 1970s both the practical use (like finding unexploded ordnance and also cables) but also archaeological benefits were spoken of. From the 1970s onwards, a proliferation is noticeable in the use of the metal detector by (non-professional) individuals, in order to actively search for antiquities (Figure 2.7). The finding of a “treasure” in a garden in Arnhem made the news in 1975. With the help of a metal detector, more than 2,000 silver coins were found. Presumably, these were buried in 1943, in order to hide them from the German occupiers (Het Vrije Volk, 1975), making this the first Arnhem WW2 archaeological find known.

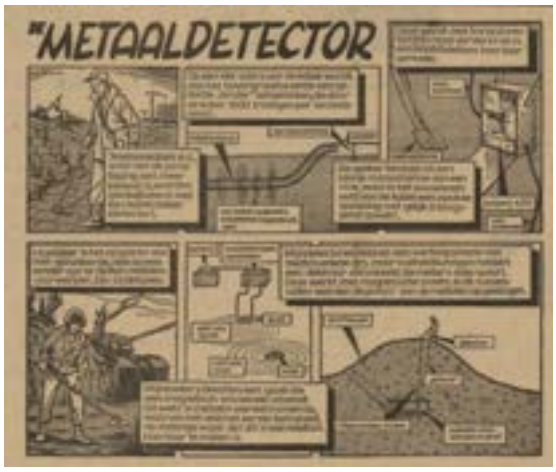

Figure 2.7. Infographic about the application of the metal detector, among others to find artefacts in burial mounds (bottom right) (source: *Nederlands Dagblad*, 1970).

One newspaper published the article "*Schatgraven, dé hobby voor 1976*" (Treasure hunting, the ultimate hobby for 1976). As a result, the editors of archaeological periodical *Westerheem* came up with the call: "Do not hunt for treasure with a metal detector". The AWN (National Amateur Archaeological Society) already pointed to the "tearing out of their original context" of archaeological values, meaning 'old' (like prehistoric) archaeology exclusively (Leeuwarder Courant, 1978). Amateur archaeologist Ruud Borman was asked for his opinion on the rise of the metal detector. He did not see the added value: "A real amateur archaeologist does not just want to find some coins or something, but he will always want to know the whole context", as stated in 1979 (Algemeen Dagblad, 1979).

Although it is not exactly documented, focussed digging for WW2 remains seems to have arisen simultaneously (e.g., Figure 2.8).[5] However, no real (published) documentation of these finds is known to exist or is at least easily accessible. A notable exception is the *Onderzoeksgroep Historisch Terreinonderzoek Wereldoorlog II* (Research Group Historical Field Research WW2) or *Zoekgroep* (Search Group) in short (Figure 2.9, 2.10). This group of united detectorists documented their findings relatively detailed and shared their results in reports from 1994 onwards. Partly as an initiative of the Renkum municipality (Geert Maassen), their main goal is to find MIA's (soldiers Missing In Action), in some cases even searching on behalf of the Netherlands Army.[6] Contrary to their congeners, de *Zoekgroep* have documented part of their finds in reports, complete with spatial layout maps and interpretation of their finds in a historical context (Kok, 2006, p. 3).

[5] For example, one WW2 detector enthusiast claims he began searching around 1971, another around 1974, and a third and fourth in 1981. All were active in the Arnhem-Oosterbeek region (e.g., Schoordijk, 1986; van der Velden, 2008, p. 1). The *Explosieven Opruimingsdienst* of the Royal Army (EOD, Explosive Disposal Unit) claimed already in 1979 they were present in Arnhem and Renkum weekly to collect UXO found by detectorists (*Algemeen Dagblad*, 1979). Another example: national newspaper NRC investigated that by 1985 20,000 Dutch people had purchased a detector with the goal to "treasure hunt" (Knip, 1985).

[6] After the recovery of an unknown British soldier near Westerbouwing by the BIDKL (Royal Army) in 1995, a metal detector survey was conducted at the request of the BIDKL by the *Zoekgroep*, in search for smaller items which could have been missed but could help the identification process (report 30, 1998).

'Oorlogsgekken' op zoek naar bommen

Korpschef Renkumse politie wil verbod op metaal-detector

Tussen 1 januari en 13 augustus van dit jaar zijn in Renkum gevonden: 24 mortiergranaten, 23 handgranaten, 2 ontstekingen van granaten, 22 brisantgranaten, 5 losgranaten, 1 houder met patronen, 2 Duitse pantservuisten, 1 landmijn, 1200 patronen, 2 vliegtuiggranaten en 1 vliegtuigbom.

MUSEUM

Figure 2.8. "'War Nuts' in search for bombs" about ammunition found by metal detectorists in the municipality of Renkum and the appeal for a prohibition by the local police chief. Already in the 1970s, a vivid community of private individuals searching for WW2 artefacts was present (source: *Algemeen Dagblad*, 1979).

Figure 2.9. The *Zoekgroep* systematically searching a garden with metal detectors at Hoofdlaan 3, Oosterbeek (British field hospital) in 1994. All the findings were later appointed on a map (picture and courtesy: *Zoekgroep*).

Figure 2.10. A former German field grave at Dreijenseweg as found by the *Zoekgroep* in 1996, which according to historical sources already was recovered after the war. Besides the equipment a few remains were found (picture and courtesy: *Zoekgroep*).

The Zuid-Veluwe and Oost-Gelderland department of the AWN established a WW2 Working Group in 2015. In consultation with the competent authorities (mostly Arnhem and Renkum) this group conducts mostly non-invasive field work and are advocating for preservation of threatened remains, being one of the pioneers for the Arnhem situation (e.g., van Midden & Nijsse, 2021).

Sharing results (objects) and their contexts with the public on a larger, organized scale has started already in the 1980s (e.g. Schoordijk, 1986) with the private initiatives of the *Arnhems Oorlogsmuseum* (Schaarsbergen) and *Museum Vliegbasis Deelen*. Both have built a large collection consisting of artefacts from the ground, including from the Battle of Arnhem. The *Platform Militaire Historie Ede* also exhibits archaeological and other ground-dug items, besides organising battlefield tours and guiding local schools.

A special mention in the light of Market Garden deserves the *Glidermuseum* (Wolfheze), a private collection specialized in parts of gliders of which most parts are found in the vicinity of Wolfheze and Renkum. The *Airborne Museum* in Oosterbeek also owns several objects that were both found by non-professionals (metal detectorists) but also from archaeological research. The actions by private individuals, with objects from “where it all happened” ending up partly in museums for the public to visit, can be seen as the first initiatives to save and even cherish physical, ground-dug items from WW2.

2.6 Conflict archaeology and WW2 research

From the beginning of the archaeological discipline in the 19th century, research focussed on burials and settlements among other topics is conducted. In more recent times, professional archaeologists began to

explore the realm of conflict, in all its different forms. Studying the human consequences of wars in the 19th and 20th century by an archaeological approach goes back to the mid-1980s (Little Bighorn, US) (Brouwers, 2012, pp. 15-16; Wijnen *et al*., 2016, pp. 23-24). In practice, most of the Dutch research is focused on WW2, but (international) studies to, for example, prehistoric and Roman conflicts and the 16th – 17th century Dutch Revolt also occur (e.g., Scott & McFeaters, 2010, p. 4; Kok *et al*., 2013; Fontijn, 2016), while even the most recent eras have gradually become topic of research too, like the Cold War (e.g., Hanson, 2016).

At this point it should be made clear how conflict archaeology also partly has its roots in the movement of contemporary archaeology, in which not (merely) the scientific values are central, but the broader sense of heritage in which past is connected with the present and even the future particularly is a cornerstone (e.g., Harrison & Schofield, 2010, p. 8). In this sense, maybe not all WW2 or 'military' archaeology can be seen as pure conflict archaeology (e.g., Wijnen, 2015).

To give a summary of the last decades, archaeological finds and features of conflict and warfare have the potential to serve as a supplement to other sources and, by extension, offer us a deviant, personal or even more complete dimension of an event, differing from the "official" accounts or even to romanticized stereotypes and myths (e.g., Sutherland & Holst, 2005, pp. 3-4; Saunders, 2007, pp. 104; 126, 136-137; Wijnen, 2015, p. 7; Stichelbaut *et al*., 2018; p. 18, Theune, 2018, pp. 27-28). These results can not only yield particular knowledge-gain, but in some cases archaeology even is the only or one of very few sources. This is the case with, for instance, oppressed or marginalized people (e.g., Theune, 2018, for archaeology of German concentration camps throughout Europe in the 1930s and 1940s) and with (consciously) forgotten events, which can affect politics in the present (e.g., González-Ruibal, 2017, for archaeology of the Spanish Civil War, 1936 – 1939).

In France, WW1 archaeology has been a matter of course from the start because of the nation's common feeling of and responsibility towards its shared past (Saunders, 2007, pp. 98-99). In other countries, like Flanders (Belgium), conflict archaeology has also developed towards an integral part of commemoration and heritage (*Ibidem*, p. 149). In the field of community archaeology and public participation, studying the physical remains of war can help present-day war veterans which suffer from Post-Traumatic Stress Disorder (PTSD) (e.g., Waterloo Uncovered, n.d., for archaeology of the Battle of Waterloo in Belgium, 1815 or Operation Nightingale, n.d., for not specific period-focused research on the Salisbury Plain in England). Finally, the discipline can have its contribution to "memory and commemoration, public participation and education", and even tourism (Saunders, 2007, pp. 125; 149).

2.7 WW2 archaeology in the Netherlands and Arnhem region

All this is contrary to the Dutch situation, where archaeological research can be seriously restrained by legislation, or even prohibited (e.g., van der Schriek, 2020, p. 125), which can maybe be mentioned as cause as to why the discipline developed later in the Netherlands than in other countries. It can be roughly assumed that the first sporadic registrations of WW2 finds date from the (late) 1990s but were considered as bycatch (*Ibidem*, pp. 99-106) (Figure 2.11).

The first systematic archaeological documentation of WW2 features (a German anti-aircraft battery) was conducted in Deventer in 2002, but a tipping point nationwide was known only around 2010 (Wijnen *et al*., 2016, pp. 24-26). Already in 2006 a modest *status quaestionis* on the archaeology of the Battle of Arnhem has been written, in which Kok concluded: "as carefully as we handle objects, photos, official documents and

personal testimonies of the Battle of Arnhem, that's how carefully we should be dealing with the finds and traces which were preserved underground." (Kok, 2006, p. 7. Translated by the author).

For the Arnhem region, several archaeological researches can be named. The first two being the field inspection on a German anti-aircraft site and the watching brief of unexploded ordnance (UXO) clearance in brooks in and around the Oosterbeek Perimeter (both conducted in 2011-2012) (Kok & Vos (eds.), 2013; van der Weerden & Verspay, 2014). The former research was commissioned by the Dutch national Cultural Heritage Agency (*Rijksdienst voor Cultureel Erfgoed*). Thirdly, in 2013 an excavation at the Old Church of Oosterbeek yielded finds of WW2 which were included in the report (Pronk, 2015). The fourth of early focused excavations was the archaeological campaign around the south banks of the river Rhine near Arnhem bridge (conducted 2013 – 2014), bearing the telling title "A bridge too far researched" (*Een brug te ver onderzocht*, Bosman *et al*. (eds.), 2017) (Figure 2.12).

Figure 2.11. 1999: WW2 remains from the battlefield at former hamlet De Laar (now Schuytgraaf) are valued as "curiosities", and not documented within the scope of the research (source: Defilet *et al*., 2019).

Figure 2.12. 2014: early focused archaeological research. Pictured are two archaeologists investigating a German gun position at Arnhem bridge (picture: ADC ArcheoProjecten; source: De Erfgoedstem, 2017).

Also increasing are the number of contract archaeologists and companies that specialize in researching modern conflict. The archaeological services of some municipalities also already have taken responsibilities by changing archaeological policies towards WW2 heritage (like expectation maps on WW2 archaeology or conflict in general). On the academic side, publications on a Dutch WW2 subject are increasing, judging by the number of Ba and MA theses and one Phd. Van der Heul (2017) paid some attention to remains of the "Battle of Oosterbeek" (pp. 40-44). Notwithstanding all initiatives and advocates, an overview and synthesizing research for the Dutch case is still absent. Only few and fragmented focussed researches have been conducted to date (van der Schriek, 2020, p. 114).

2.8 Other players and thresholds in WW2 archaeology

All aforementioned situations have resulted in thresholds and tension fields between professional archaeology and other parties that cannot go undiscussed for understanding the work field in the present-day Netherlands. One of the most spoken of subjects in this are metal detectorists. Many former battlefield and other sites from WW2 (over the world) have been searched and plundered throughout the decades, as already mentioned, with objects even being traded (Figure 2.13). The obvious problem of looting WW2 sites has been addressed in the past (e.g., Kok, 2006; van der Schriek & van der Schriek, 2014; Reinders, 2019).

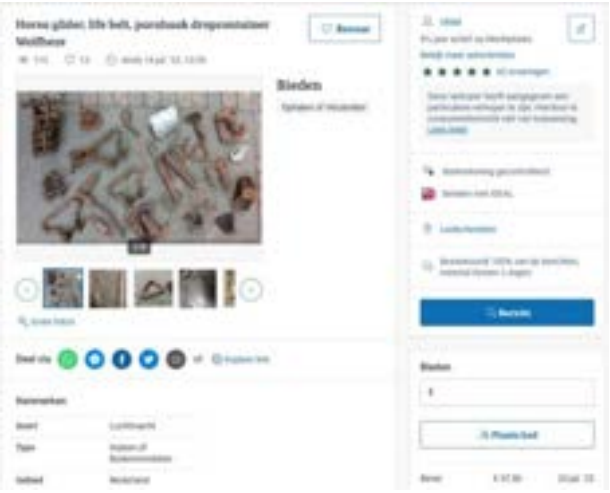

Figure 2.13. Ground dug items of a Horsa glider and a drop container: Market Garden relics found in the Wolfheze vicinity, as offered openly for sale online in July 2022 (source: Marktplaats, 2022).

Apart from private enthusiasts, archaeologists are also fishing in the same pond of other players in the professional and commercial world. In the Netherlands, contrary to other countries (e.g., Belgium, France, the United Kingdom, Germany and Poland)[7], recovering aircraft wrecks and missing persons (including identification) are mandated by the Armed Forces as part of the Ministry of Defence. In fact, in Flanders, war victims from WW1 are explicitly seen as archaeology (Verdegem *et al*., 2018, pp. 83), while Moshenska (2013) argues that "to recover a body, (…) and to return it to the family is one of the most important functions of Second World War archaeology" (p. 137).

The destruction of UXO is, like in other countries, also reserved for the Army (EOD), while searching for UXO is commercialised and certificated firms are allowed to conduct surveys. In all these cases archaeological heritage can be disturbed too. Science (archaeology), public participation and operations of the Armed Forces in the Netherlands are thus separated.

While wanting to document the heritage value of aircraft wrecks, all "bycatch" during UXO-clearances or to record the context of a found missing person, Dutch archaeologists are strictly bound to regulations and in some cases still lose out in this field of contradictory legislation, while smooth cooperation is possible more often than not nowadays (Kok, 2009, pp. 20-21; Schute, 2016, p. 264; van der Schriek, 2020, p. 114).[8]

In conclusion, the realm in which Dutch archaeologists studying WW2 are engaged can be summed up as follows. The multiple parties involved literally dig into heritage, where the motivation for at least the private enthusiasts with a metal detector partly is the direct, physical connection with a historical event. This same

[7] For a summary, see van der Schriek, 2020, pp. 67-114. For an example of the recovery and identification of an officer from New Zealand from WW1 by archaeologists in Belgium, see Verdegem *et al*., 2018. For several examples of archaeologists recovering and identifying WW1 victims in France, see Saunders, 2007, pp. 101-104. For an example of a systematic metal detection survey on the crash site of a British WW2 bomber by archaeologists in Germany (with Dutch students), see Marter *et al*., 2018.

[8] For a guide on the combination of UXO-clearance and archaeology in the Netherlands, see *Stichting Infrastructuur Kwaliteitsborging Bodembeheer*, 2014. For an example in practice of working with the Netherlands Air Force during an WW2 aircraft recovery, see Reinders, 2021, pp. 23-25.

archaeological heritage value is still not yet fully guaranteed elsewhere. On the other side, commemoration of the Battle of Arnhem is considered relevant by governments and independent foundations, is therefore still increasing and becomes more and more a “spectacular” public event, and in some cases are the domain of the Ministry of Defence. How and why archaeologists can contribute to this, is a clear starting point for the study of the relevance of archaeology of the Battle of Arnhem.

3 Results from professional archaeological research to the Battle of Arnhem

3.1 Introduction

In the following two chapters, the excavated remains of the Battle of Arnhem will be discussed. The results from professional archaeology will be presented first by their location, introduced by a historical summary. These invasive researches consisted of test trenches, excavations and watching briefs of unexploded ordnance (UXO) clearance and one observation, conducted by the archaeological service of the Arnhem municipality and several commercial companies.

Almost all researches were development-led (within regular cultural heritage management or CRM), except for a pilot-study, commissioned by the Dutch National Heritage Agency, driven by scientific objectives, and an example of 'emergency research' conducted by professional archaeologists, both conducted outside of CRM. Within the scope of the Battle of Arnhem academic research is still entirely absent.[9]

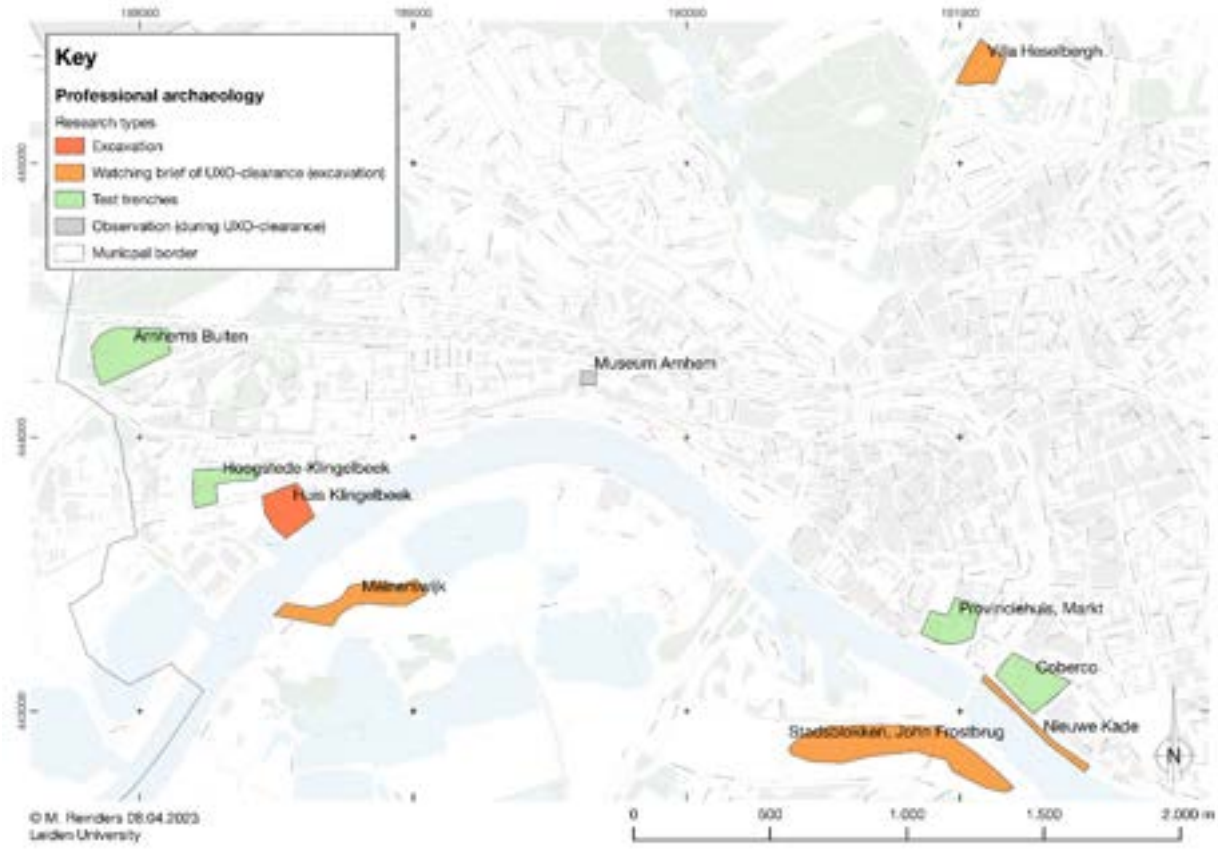

Figure 3.1. The sites discussed in Arnhem city (map by Author).

[9] The *Universiteit van Amsterdam* excavated several locations at Landing Zone Z (Wolfheze) in 2005 and 2007, but focussed on the late medieval period.

3.2 Arnhem bridge

3.2.1 Background

Arnhem bridge is world famous. The book “A bridge too far”, the movie adaption and the subsequent baptize of the crossing as John Frost bridge in the 1970s all resulted in a historical ‘hero-narrative’, as discussed in chapter 2.

The hastily built post-war “*wederopbouw*” buildings are redeveloped in the last decennium, meaning this is highly development-led archaeology. This built-up area around the northern ramp of the bridge has been investigated relatively extensively (Figure 3.3), although the results suffered from already demolished and newly built areas as a result of the intense bombing (Figure 3.2). Four major construction projects can be named in this light: the renewal of the river embankment (*Nieuwe Kade*), the altering of the river Rhine in the floodplains directly south of the bridge, the new construction of the Provincial House and market square and the redevelopment of the Coberco terrain.

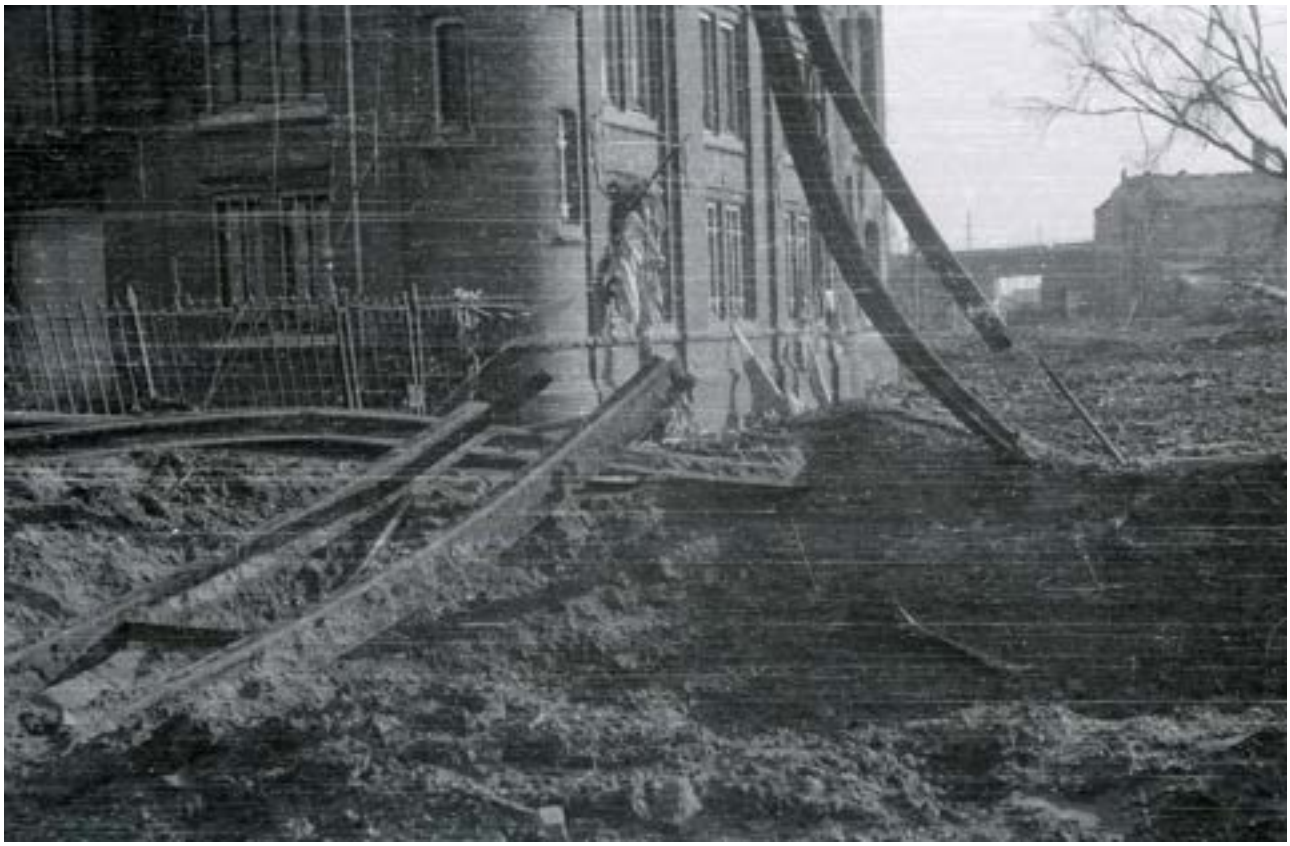

Figure 3.2. The former archives building (today part of Provincial House) with the northern ramp of the bridge in the back, photographed shortly after the October 1944 bombing (picture: P.J. de Booys; source: *Gelders Archief*, 1533-434, CC BY-4.0 license).

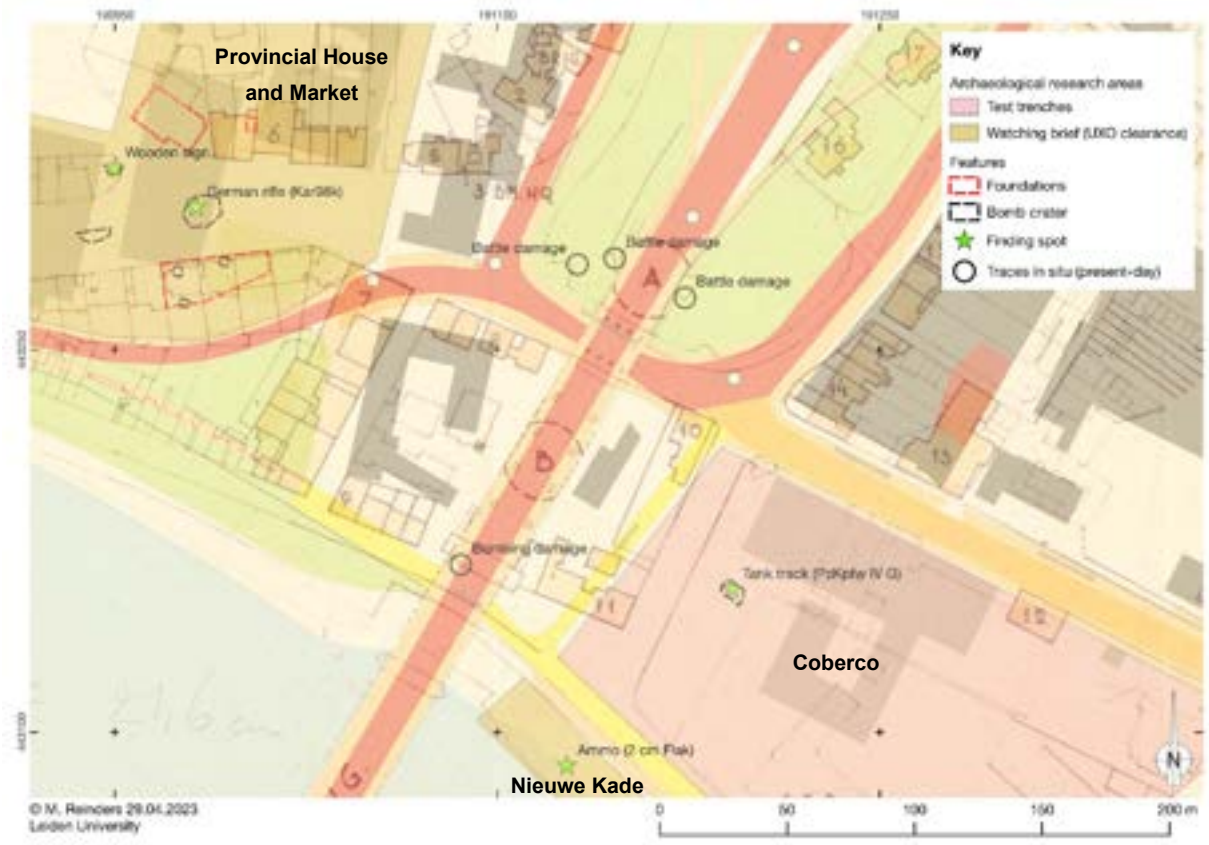

Figure 3.3. The sites examined around the northern ramp of the bridge with features and finds, and both present-day and 1944 buildings plotted (data: Archis, BAAC bv, Arnhem municipality; historical underlay by Boeree (*Gelders Archief*, 2173-53-0015); map by Author).

3.2.2 Nieuwe Kade

In 2012 a watching brief of UXO-clearance was carried out in order to relocate the northern quay of the Rhine near the bridge 10 metres to the north. Prior to the archaeological work, an UXO-firm had cleared the area, which yielded shells from German 2 cm anti-aircraft guns (Smole, 2017, p. 35) which are known to have been present as defence of the bridge prior to Market Garden.

3.2.3 South of the river Rhine

In 2013 and 2014 an extensive archaeological watching brief (excavation) of UXO-clearance was conducted at several locations in the floodplains south of the Rhine (Bosman *et al*. (eds.), 2017). Two of them will be discussed here: Stadsblokken (at the John Frost bridge) and Meinerswijk (Figure 3.1). In the preliminary desk study already the expectation of WW2 remains was valued high (Zielman, 2011, pp. 21-24). Subsequently, the archaeological research here was focussed partly on WW2.

At the southern end of the bridge itself a German light anti-aircraft position (*leichte Flak*) was excavated. Situated at the southern bank of the river, the site must be built earliest in the afternoon of 21 September, directly after Frost's surrender. An aerial picture taken the following day already shows the site. Based on this, it can be concluded this light calibre Flak had to protect German troops crossing Arnhem bridge from Allied fighter planes, emphasizing the importance of this vital bridge over the Lower Rhine to the Betuwe, where the main fighting occurred from 21 September onwards. After the American bombing on 7 October, heavily damaging the bridge, it was of no relevance anymore.

Figure 3.4. World War 1 helmet (M16) from a cluster with *Waffen-SS* helmets in a bomb crater next to the John Frost bridge (picture and courtesy: ADC bv, Amersfoort).

Figure 3.5. One of the Flak-positions with the foundation of concrete tiles and a wooden lid as seen from above (picture and courtesy: Jasja Vliegt; source: Bosman *et al*. (eds.), 2017).

The Flak-site consisted of three circular positions (diameter 3,5 metres) placed in a triangle about 35 metres apart. Finds identified the guns as 2 cm Flak (30/38). For stability during firing, at least one of the guns was founded on a rise of three half wine barrels made of oak wood, filled with tar with a rectangular concrete tile on top. Another was at least founded on piled up tiles and a wooden lid (Figure 3.5) (Geerts, 2017, pp. 67-75). The documentation of the site gives insight in the ingenuity of German Flak-personnel, given the fact these positions had to be built quickly.

Among the finds in situ were standard military equipment and civilian utensils, a golden ring, many Dutch, one Belgian and one French coin. The gun crew had standard German (Kar98k) but presumably also Dutch Mannlicher M95 rifles at their disposal. Not many objects were left behind when abandoning the site, which could demonstrate this site was left in an organized matter.

In surrounding shell holes of the aforementioned bombing some finds were done that can be related to Market Garden. Firstly, numerous helmets were found. An older type of German helmet (*Stahlhelm M16*), introduced during WW1, contains remnants of yellow-green camouflage paint (Figure 3.4). This may indicate that the (outdated) helmet was (re)used later in the war. A second helmet (M40) also contains such coarse paint residues in the colours yellow, green and brown but also decals indicating it was used by the *Waffen-SS*. A third helmet contains remnants of yellow-brown camouflage paint. The similarities in the (hand-applied) colour patterns seem, according to the researchers, to point in the direction of an ensemble. And since one of the three can certainly be counted among the *Waffen-SS*, all three helmets may have belonged to soldiers who fought the road bridge between 17 and 21 September 1944; and thus to the direct opposers of Frost's men (Bosman, 2017b, pp. 149-151).

All kinds of objects were found in the craters, the most intriguing being a British fuel can from a Market Garden drop container, parts of a Soviet gasmask (type BS-T5) and large parts which presumably are from a non-identified British Halifax bomber (*Ibidem*, pp. 160, 164-165). These finds illustrate the moving of objects over larger distances, or other post-depositional processes. Shrapnel of 75 mm artillery shells were documented too all around the southern end of the bridge, which can in all probability be linked to the light artillery of the

Airborne Division, positioned at Oosterbeek (Bosman, 2017a, p. 109; Sam, 2017a, pp. 206-207, see also § 3.4.3 and 4.2.6).

Moreover, the periphery of a German heavy Flak-battery (*schwere Flak-Batterie*) in Meinerswijk (see also § 3.3.3 and 4.4.2) was investigated, situated on the southern bank opposite the western residential area of Arnhem. It yielded some standard German equipment, among them a *Stahlhelm M42* with two bullet holes (Bosman & Sam, 2017, pp. 266-269; Bosman, 2017c, p. 278). The finds of part of a 2 cm Flak gun (base plate) and spent cases of the same calibre contributed to the defence of the site (Sam, 2017b, pp. 275-276). Moreover, evidence of the air attacks on the morning prior to the first landings on 17 September was found: four unexploded American 260 lbs bombs (duds) and part of an exploded RP-3 rocket. Finds reveal that the site was also shelled by artillery on a later moment (*Ibidem*, p. 274; Bosman, 2017c, 278).

3.2.4 Provincial House and market square

At the western outskirts of where Frost's troops and attacking Germans (former Eusebiusplein) saw combat, several test trenches and archaeological watching briefs were conducted. The 2014-2015 research around the renewal of the Provincial House yielded some WW2 features that partly can be attributed to September 1944. Nine (part of) craters from the 7 October bombing were documented. The measures of the craters varied between 2 and 4 metres wide and 2,5 – 3,0 metres below the surface. The filling of these features consisted mostly of debris and household goods, parts of the tram tracks. Only some shrapnel, a Kar98k rifle and one *Eierhandgranate* were found. Of some civil pottery the glaze had melted (van der Mark, 2016, pp. 51, 59-61) (Figure 3.6).

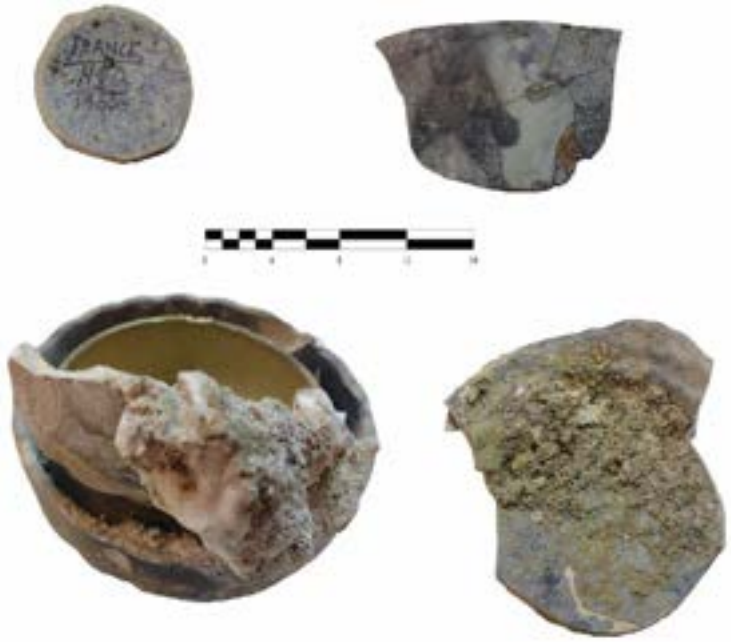

Figure 3.6. Burned and melted pottery from one of the craters of the US bombing, west of the northern bridge ramp (picture and courtesy: BAAC bv, 's-Hertogenbosch).

3.2.5 Coberco

This large area was located directly east of Frost's troops, so in the front zone of the attacking German infantry and tanks. In 2018 test trenches were dug, yielding some spectacular finds. A literally big find was about 12 meters of steel tank tracks, found in a bomb crater east of the northern ramp of the bridge during archaeological test trenches (Figure 3.8). The tracks could be identified as belonging to a German *Panzerkampfwagen*

(PzKpf) IV, subtype G, quite possibly assigned to *SS-Panzer-Regiment 10*, part of the 'Frundsberg' division.[10] A German helmet (*Stahlhelm M40*) with residues of green paint came from the same crater (Smole, 2019, pp. 60-63).

The remnants of the German tank have been placed in a detailed historical context by the Association of Friends of the Airborne Museum (VVAM). Based on written sources and (aerial) photos, it is their theory the tank must have been put out of action between 18 and 20 September (Figure 3.7). They also state that it is very likely that the tank was knocked out by Robson, gunner of one of the British 6-pounder anti-tank guns that had joined John Frost's troops (van Midden, 2018). Both the helmet and the tracks can be seen as tangible remains of the eliminated Germans in this part of the battlefield, despite the fact that the British were eventually defeated.

In another bomb crater, a large steel part of the Arnhem road bridge, damaged and twisted, was found. As mentioned earlier, the bridge was heavily damaged by the American Air Force and was eventually completely destroyed by the Germans in February 1945. The found fragment can therefore be placed in one of these moments. The bridge section that “experienced the September struggle” has been made a stand-alone monument south of the bridge in 2019 (Smole, 2019, pp. 57-60).

Figure 3.7. Knocked out PzKpf IV (G), shortly after the fighting around Arnhem bridge. Most probably the find can be linked to this specific tank (source: *Nederlands Instituut voor Militaire Historie*, 2155_000540).

Figure 3.8. Tank track of a PzKpf IV (G) as found in an archaeological test trench, with present-day Arnhem bridge ramp in the background (picture and courtesy: Arnhem Municipality).

[10] In the archaeological report (Smole, 2019) *Panzer-Kompanie* Mielke is mentioned. However, it is now believed this newer G-type could not have been part of a training unit at that moment, but the SS-regiment did have them at their disposal (L. van Midden, personal communication, April 1 2022).

3.3 Arnhem West

3.3.1 Background

The western suburbs of Arnhem along the Utrechtseweg between the railway and the river saw intense fighting from 17 until 19 September. In these residential areas two British advance routes from the landing zones towards the bridge met, which were blocked by a German *Sperrlinie*. The final and successful attack of the Germans westwards with infantry and self-propelled guns at the former Municipal Museum (now Museum Arnhem) was documented extensively through a series of photographs (e.g., Waalkens & van Iddekinge, 1999).

3.3.2 Museum Arnhem

With the renovation of the Museum UXO-clearance was conducted in 2020. This company contacted the municipal archaeologists after finding several WW2 objects. These have been documented and partly collected by the municipal archaeologists (Smole, 2020b). Although these positions were first occupied by German SS-infantry (*Kampfgruppe* Möller) and later captured by part of the 2nd South Staffordshire Regiment (Berends, 2002, pp. 82-83; 157), the found objects were predominantly of British origin: ammunition and equipment like several gasmasks, a backpiece of a badly damaged body armour, .303 rifle cartridges and packaging of mortar grenades (2 inch). As with the tank tracks at the bridge, the finds were described and published by the VVAM (van Midden, 2021). Although no context has been documented, these objects most probably have a direct link with the desperate fighting of 18 and 19 September.

3.3.3 Hoogstede and Klingelbeek

In this area only little archaeological research has been conducted with results in the WW2 period. In 2011 test trenches were dug at Hoogstede (van den Berghe & Smole, 2014). Prior to this archaeological research, an UXO-company had made sure no dangerous material was present, which maybe explains why no WW2 features were done. The list of found explosives was included as an attachment to the report. This list reveals the presence of mostly British, few German, American and even French ammunition (*Ibidem*, p. 60). This French 7.5 cm high-explosive grenade may have been a remnant of the shooting by a German heavy anti-aircraft battery in Meinerswijk about 900 metres away on the other side of the river (see also § 3.2.3 and 4.4.2), which was reaping havoc among the advancing British in these suburbs (Berends, 2002, p. 141). Furthermore, circa 750 pieces of small arms ammunition (for infantry rifles) were found while no details about calibre or nationality was noted (van den Berghe & Smole, 2014, p. 60). Since no context has been applied to these finds, these kind of lists are regrettably of little use. Interesting is the fact that during the post-excavation analysis, all 25 other metal WW2 objects were still sorted by material, while finds within a contemporary context are customary classified by context and function (Theune, 2010, pp. 7-8; Kok & Vos (eds.), 2013, pp. 79-80).
At Huis Klingelbeek, an 18th century mansion situated along the southern route, test trenches were conducted, followed by an excavation (Smole, 2020a; 2021). Some British material maybe can be seen as evidence for presence of Airborne soldiers, which were on their way to the east: a para helmet, crushed and badly preserved, cylinder packages for 3 inch mortar grenades and a brass buckle for the sling of a Lee-Enfield rifle (Smole, 2020a, pp. 62-63).

3.4 Perimeter Oosterbeek

3.4.1 Oorspongbeek, Gielenbeek, Zuiderbeek

In the area between Oosterbeek and Doorwerth near the river Rhine several brooks are present. Historically, these are located within the southwestern part of the Perimeter all the way through the German positions and the *Hinterland*. Moreover, these brooks could have been filled up during the frontline period until April 1945 or even during the post-war clean-up.

In 2011 it was decided four brooks were to be dredged by an UXO-clearance company. To document these finds, archaeologists were also present. For this thesis, only the finds from the Perimeter are discussed. These are: Oorsprongbeek (Perimeter west), Gielenbeek (center) and Zuiderbeek (east), which also include twenty ponds (van der Weerden & Verspay, 2014, p. 5). It must be noted that spatial layout of the finds is only relative, since most of the finds were dumped in the water and so post-depositional processes are evident.

Most of the WW2 objects date from September 1944 and all of them are of German or British/Polish origin (*Ibidem*, p. 52). The majority of the finds consists of standard military equipment (para helmet, bayonet, gasmask cannister, et cetera) (Figure 3.10) and parts of weapons (Bren and Sten-gun, Kar98k, MG-34 and -42). The ratio between German and British finds is equal, and most are from Oorsprongbeek and Zuiderbeek (*Ibidem*, pp. 27-28). Again, most of the small arms ammunition was not documented in detail. Moreover, all other ammunition was only collected in bulk (*Ibidem*, p. 32).

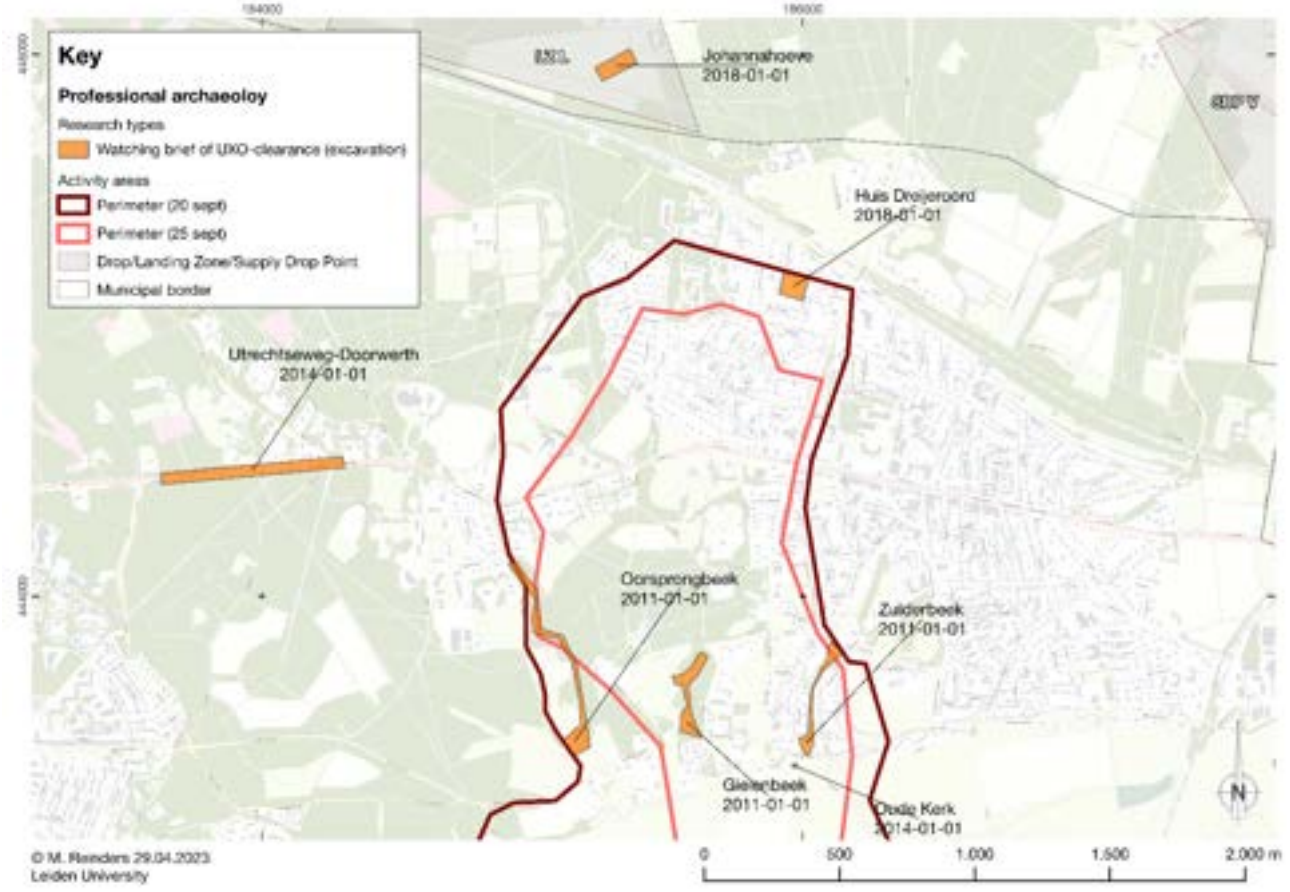

Figure 3.9. The sites discussed in and around the Oosterbeek Perimeter (map by Author).

Figure 3.10. British para-helmet found in Oorsprongbeek (picture and courtesy: Diachron UvA bv, Amsterdam).

In the west (Oorsprongbeek), in one of two ponds near the crossing with Benedendorpsweg, a large amount of .303 tracer bullets looks to have been intentionally dumped. The researchers suspect the use of this kind of illuminating ammunition could have alerted the attacking Germans on the British positions so these were discarded (*Ibidem*, p. 33).

From the centre of the Perimeter (Gielenbeek) all finds discussed here are from the ponds in Hemelse Berg park along Hoofdlaan. In the north, a deviant part of weaponry was found: an asset of a British hand-held anti-tank weapon PIAT which was used for training purposes exclusively. It seems that this weapon was delivered in a complete set and useless items were thrown away (*Ibidem*, p. 29).

The following finds were done in three ponds near the Hoofdlaan-Kneppelhoutweg junction. These are the empty package for a scope of the Lee-Enfield rifle used by a British sniper, and a spare barrel of a Bren-gun which was chrome-plated, indicating a younger version (*Ibidem*, p. 45). Parts of swimming belts, as used by the Airborne troops, which quite possibly belonged to one of the approximately 150 Polish soldiers that crossed the Rhine from Driel to this part of the Perimeter (*Ibidem*). Lastly, a remarkable large dump of a several hundred brass cartridges (calibre 7.92x57 for the German standard rifle) all made in 1932 were found (*Ibidem*, p. 38).

3.4.2 Huis Dreijeroord

At the most north-eastern corner of the Perimeter the large hotel Huis Dreijeroord served as the home of B and D Company of the 7th (Galloway) Battalion The King's Own Scottish Borderers (in short: 7KOSB) and other units, which baptized it 'the White House' (Figure 3.11). The hotel, a symbol for veterans, was sold in 2016 and shortly after planned to be demolished, while some watched with disgust (Omroep Gld, 2017).

Through the archaeological watching briefs of UXO-clearance at the site several details and tangible remains on the fierce defence could be documented before it was eventually destroyed during the last days of 2017. Important to note is that the UXO-clearance was guiding, since only those parts that were appointed by the UXO-firm were excavated (van Willigen & van der Weerden, 2019, p. 13). In other words, no real focussed archaeological research could be conducted.

The archaeological research yielded the following results. In general, two observations were done. First of all, very few German finds were done, most were British. This can be explained because the battle was won by the Germans, so afterwards useable equipment of their own would be collected for re-use. Secondly, few features were found in front of the hotel, but all concentrations were situated behind the building. This can be explained by the fact that the German attacks came from the north, so south of (behind) Dreijeroord was a more sheltered place for the British. However, the researchers also remind the fact that these grounds have

been looted by metal detectorists for decennia already, which makes it unclear whether the archaeological documented distribution is representative. Because of this, the results must also be only a fraction of the original remains (Warmerdam, 2020a, p. 68).

Spatial layout of the defence of the hotel was documented too. Two positions of Vickers machineguns were recognized by the large number of .303 shells with bottom stamp "VIIIz" (Figure 3.12). In written sources, the decisive role of this type of machinegun is emphasized several times (van Willigen & van der Weerden, 2019, pp. 79-80). Also, a still working and costly bronze clinometer was found; part of the basic equipment of a mortar group. These kind of weapons supported the defenders and gave attackers a hard time. The remains of both 2 and 3 inch mortar ammunition were found on the site (*Ibidem*, pp. 71-72). An anti-tank mine (type Hawkins) was found near the driveway, which was planted to prevent German vehicles to come close. Part of a booby trap (type Switch No. 3, early pattern) was found behind the hotel (*Ibidem*, pp. 76-77).

Figure 3.11. The aftermath at Huis Dreijeroord: a fallen British soldier in the yard west of the hotel (source: *Bundesarchiv*, 495-3450A-10).

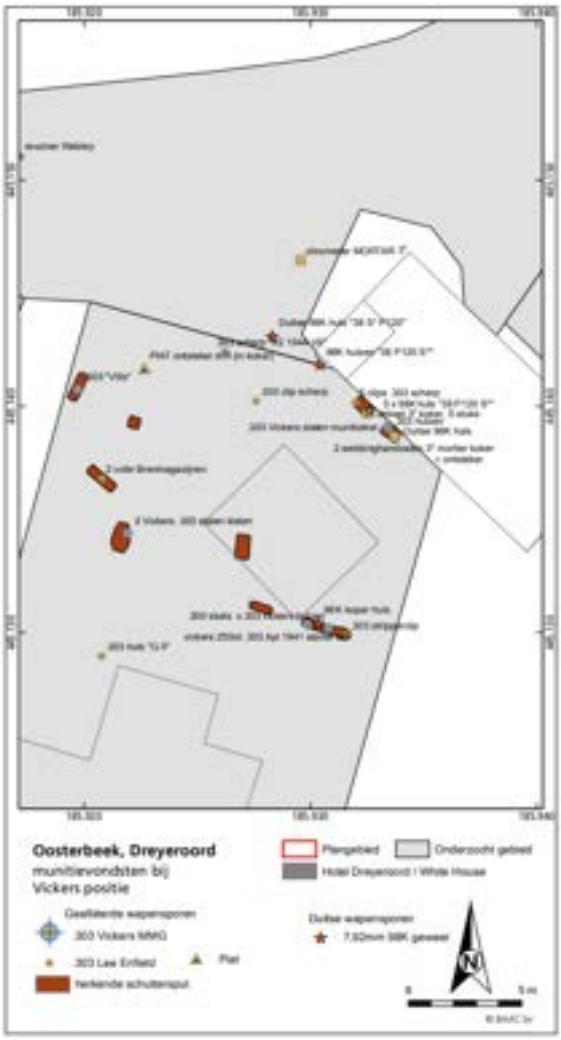

Figure 3.12. Spatial layout of UXO finds near a position for a Vickers medium machinegun, in the garden behind Dreijeroord (map and courtesy: BAAC bv, ‘s-Hertogenbosch).

Among the weapons found were parts of a Lee-Enfield standard rifle, and also Bren and Vickers machineguns (*Ibidem*, pp. 59-60). Somewhat curious is the Webley revolver found under a bush, which could have belonged to an officer or for example to a machinegun crew (*Ibidem*, p. 57). Also remarkable is the magazine of a Thompson machine-pistol, which was not standard equipment of the Airborne Division. This weapon could have had a special former owner, among them Dutch commandos (*Ibidem*, pp. 62-63).
Other finds include a British megaphone (from the cellar), a protractor and a non-military, but British meter "The Stewart Standard Grouping Gauge" (*Ibidem*, pp. 94-96). Interesting is a part of a guy rope from a glider, which must have been taken from a Landing Zone for re-use purposes (*Ibidem*, pp. 97-99).
Among the standard personal items was a dinner knife with an engraved Royal Air Force number (927558), which during the post-excavation analysis could not be appointed to a person. However, the Air Ministry stamp points towards cutlery from the Air Force while the number refers to a person from the Royal Artillery (*Ibidem*, pp. 89-90).
Intriguing were the discovery of several former British field graves. At one location, 1.2 meters below the surface, a piece of white parachute silk together with remains were found. Because of legislation, the research was temporarily stopped in order to let the Graves Registration and Identification Unit (BIDKL) of the Army further recover the remains. It appeared to be the incomplete right forearms of at least two persons. In the direct vicinity three British para helmets were found too, but without clues for identification (*Ibidem*, pp. 55-56; 88).

3.4.3 Oude Kerk

At the southwestern edge of the Perimeter the *Oude Kerk* (Old Church) is situated. This Romanesque church, with its early medieval origin and a tuff base, was heavily damaged during and radically modified after the war. Among other things, the roof of the nave has been lowered and two aisles have been demolished and is never rebuilt. Immediately south and southeast of the church, three guns and its Command Post from F Troop, 3 Battery (belonging to the 1st Airlanding Light Regiment) were dug in. This third battery featured three 75mm Pack Howitzer M1 guns of American production; artillery guns for long-range firing (maximum range 8.4 km). This unit (including F Troop) provided fire support to the British, as did those on the north side of the Arnhem road bridge (approximately 5 km as the crow flies) (Truesdale *et al*., 2015, pp. 86-87).
In 2013 an archaeological excavation was conducted at the south-eastern edge of the present-day church (Pronk, 2015). The archaeological research documented, among medieval graves and other features, a German communication trench dating from the *Panther-Stellung* period after Market Garden which was filled up with debris (*Ibidem*, pp. 31-32). For the Battle of Arnhem, only finds and no features were done. Most of the objects dating from September 1944 were found in the top-soil, and only partly in the filling of the trench (*Ibidem*, p. 35). The majority of the finds was British, for instance 75mm ammunition and accompanying packaging. Interestingly, all racks were found being wrapped in barbed wire, indicating these were re-used as barriers, presumably in the new (post-September) German front line. Among the found ammunition, excavated by an UXO-clearance company so not directly archaeologically documented, are six tails of 8.1 cm *Wurfgranate* (mortar grenades) and 75 mm ammunition (from the British artillery positions). Unfortunately, details of the 120 pieces of small arms ammunition were not documented (*Ibidem*, p. 71). A sole German find was a *Stahlhelm* type M42, which was broken in two pieces, indicating a direct hit by an explosion (*Ibidem*, p. 36).

3.5 Landing Zones

3.5.1 Johannahoeve (Landing Zone L)

Directly north of Oosterbeek (municipality of Arnhem) an open terrain known as Johannahoeve was used as Landing Zone (LZ) L for Polish parts of the Airborne Division (Figure 3.13). Heavy fighting occurred north and east of the LZ, near Leeren Doedel[11] at the Amsterdamseweg and all along the Dreijenseweg, where British attacks and German counterattacks clashed. The LZ was abandoned at 19 September.

In 2018 a watching brief of UXO-clearance took place prior to the construction of a natural cemetery at the south-western part of the LZ (ten Broeke & Louwe, 2019). The desk study (not archaeological, but for UXO) determined that two small German Flak-sites with accompanying communication trenches and a cluster of foxholes were present. Two of them were excavated but contained no materials (Figure 3.14). The foxholes probably were dug by the defenders of the LZ (7KOSB).

Only the spots that according to ferro-detection contained metal objects were to be excavated, comparable to the method used at Dreijeroord. Moreover, only parts of the UXO-clearance were archaeology documented. Several equipment of Airborne soldiers was found (*Ibidem*, p. 18). The trenches, which are post-September 1944 (*Panther-Stellung*) revealed a small part of a glider (*Ibidem*, p. 16).

Figure 3.13. Scattered material and a glider (note the Polish eagle at the jeep remnants at the right) at LZ L near Johannahoeve, after the battle (source: *Gelders Archief*, 1560-5609).

[11] Now: Roadhouse, Amsterdamseweg 467, Arnhem.

Figure 3.14. Aerial picture showing the foxholes dug by 7KOSB near Johannahoeve, and the cross-section of the left foxhole (picture and courtesy: Econsultancy bv, Doetinchem; edited by Author).

3.6 Schuytgraaf (Drop Zone K)

3.6.1 Background

The area south east of the small village of Driel (municipality of Overbetuwe), in the lower landscape opposite of the Oosterbeek Perimeter south of the Lower Rhine, became part of the conflict landscape in the course of 21 September 1944. The main events contributing to this were the landings of the 1st (Polish) Independent Parachute Brigade (*1 Samodzielna Brygada Spadochronowa*) and their occupation of Driel and the German reaction to this (setting up a blocking force along the high railway dike, *Sperrverband* Harzer). The Drop Zone itself and a large part of the forthcoming fighting are situated in the present municipality of Arnhem. With the consolidation of the front near the Rhine, this area was in the front zone until April 1945. This palimpsest can make dating WW2 archaeology very hard.

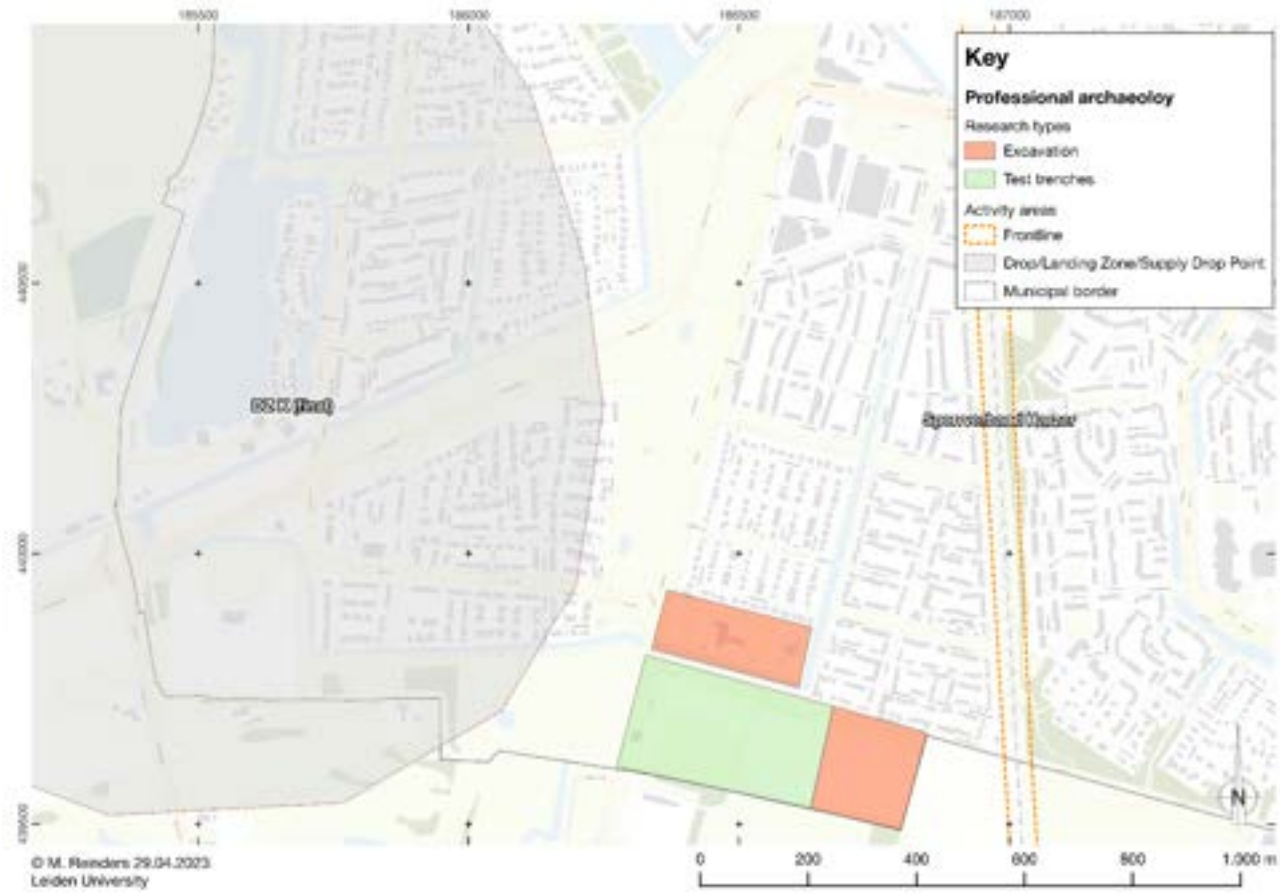

Figure 3.15. The sites examined in Schuytgraaf, Arnhem (map by Author).

3.6.2 Results

Several large excavations were conducted throughout the years, in which no WW2 was taken into consideration. However, non-archaeologist enthusiasts around that time did collect and store several items. The fact that one WW2 battlefield consolidated with an older site (e.g., Roman Period), allowed some of the WW2 features and finds to be researched after all. The particular site, former hamlet De Laar, was excavated between 1998 and 2001 and is published in a monograph (Defilet *et al*. (eds.), 2018), in which WW2 results are discussed separately (van Willigen, 2018).

The excavation was preceded by an extensive UXO-clearance and the work of the BIDKL, resulting in WW2 archaeology being only the discussion of a few find clusters and some loose objects. These results yielded the following data. Twelve field graves of former missing soldiers were found, with a nucleus of seven individuals at De Laar itself. In addition, eleven German military identity discs (*Erkennungsmarke*) were found without the presence of remains (*Ibidem*, pp. 634-636). In a later book, the cases of the BIDKL were further explored and published. This revealed that all individuals died during the bitter fighting between 1 – 4 October, resulting from (so after) Market Garden (Reinders, 2020, pp. 46-60). This suggests the archaeological remains will date from that period too, so these are not further elaborated upon.

Figure 3.16. Both found metal emblems belonging to one beret, most probably lost by a Polish officer, found in the southern part of Schuytgraaf (picture and courtesy: Arnhem Municipality).

Unfortunately, the lists maintained by the UXO-company proved to be insufficient for reconstructing the archaeological story (van Willigen, 2018, p. 636). A member of the UXO-team remembered that also parts of the nearby exploded freight train were found; these were blown away about 750 metres. Moreover, instead of only finding shards of aircraft bombs, which the train was said to transport, also other types and calibres of ammunition were found (*Ibidem*).

More recently, an excavation at an expansion of Schuytgraaf directly south of De Laar (Smole, 2021b) was preceded by UXO-clearance, meaning all artefacts found during this phase were not archaeology documented. Besides the usual shrapnel (e.g., 8.1 cm German mortar grenade), in the recent top-soil a special find was done: two metal emblems with parts of the beret still attached (Figure 3.16), belonging to a member of the Polish Parachute Brigade. The two or maybe even three stars seem to indicate the rank of the owner was a First Lieutenant (*Porucznik*) or Captain (*Kapitan*), meaning there cannot be that many candidates *(Ibidem*, pp. 87-88). Directly west to this site, test trenches were dug in 2021 (Smole, 2023), again preceded by UXO-clearance. Remaining features from WW2 (mostly craters and some loose finds of small arms ammunition) were concentrated in the northern part of the area, near the former hamlet. This research still has to be elaborated on during the writing of this thesis.

3.7 Ginkelse Heide (Drop Zone Y), De Sysselt and Ede barracks

3.7.1 Background

De Ginkelse Heide is perhaps the most famous of all Drop Zones. This scope has been shaped because since 1960 the annual commemoration with parachute landings, until recently even with WW2 veterans, is being performed. On the edge of the built-up area of Ede, in pre-war barracks and the forest area De Sysselt, German soldiers were dug in. They were positioned there during day 1 of the operation, when British airborne soldiers of the aforementioned 7KOSB took the open heath field in the east (Ginkelse Heide), where the following day parachute landings were planned (DZ Y). The fighting on 18 September, before, during and after the landing of the 4th Parachute Brigade, can be described as chaotic. Moreover, the heath field and surrounding forests contain a palimpsest, since the heath was a military training field long before and during WW2 and formally still is in use by the Dutch Army.

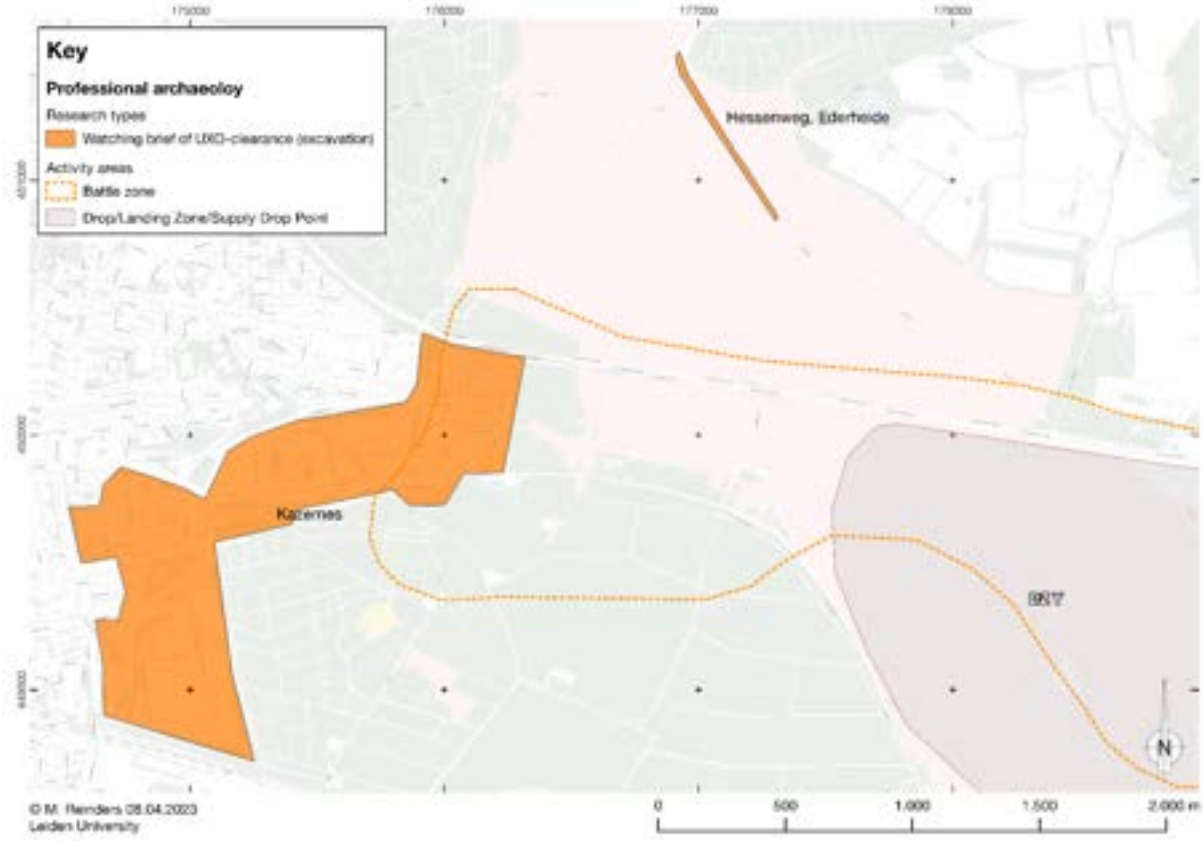

Figure 3.17. The sites examined in Ede (map by Author).

3.7.2 Results

No professional archaeological research on Ginkelse Heide itself or in De Sysselt forest focused on WW2 has been conducted to date. During a watching brief of UXO-clearance at nearby Ederheide only one fragment of a German mortar grenade was found, which could have been fired during the fighting at the Drop Zone, but also during trainings (Warmerdam, 2020b).

The barracks, which were in use by German troops during Market Garden, have been redeveloped during which several invasive archaeological research was conducted. During the test trench phase, no WW2 values were discovered (Hesseling, 2018). The watching brief of UXO-clearance only resulted in a few possible remnants of the German defence being found. It concerns four “banana-shaped” foxholes, aimed at the

southwest (towards De Sysselt and Ginkelse Heide) and thus at the British. Unfortunately, no finds were done in or around the features that could prove this (Schute & Wijnen, 2018, pp. 41-42).
During the same research a Russian Maxim machinegun (type PM M1910) was found. In the summer of 1944, the Wehrmacht had more than 4,600 weapons of this type, of which a large part (38.5%) also had been transformed to be able to shoot German ammunition. Written sources indicate that most of the weaponry captured from the Soviet army was handed over to troops in eastern Europe (de Vries, 2017, pp. 112-114). Maybe, because of this, the Russian machinegun from Ede can be seen in a relatively rare light. The location at the Elias Beeckman barracks can point to German training troops during 1940 to 1944 but also defenders during Market Garden or in the battles of April 1945. After all, the Germans present on 17 and 18 September were not first-class (and would therefore in theory could have been issued these *Beutewaffen*), but that also applies to the training units that occupied the barracks in the four previous years. Even post-deposition has been suspected by the researchers. Unfortunately, there is no certainty about the context of this deviant weapon (Schute & Wijnen, 2018, pp. 48-49).

3.8 The Hinterland

3.8.1 Utrechtseweg (west), Oosterbeek/Doorwerth

About 600 metres west of the Oosterbeek Perimeter a research was conducted in 2014 along a small route for the construction of a new bicycle road south of and parallel to Utrechtseweg (van Mousch, 2015). This corresponds with one of the British advance routes, although most parts were in the rear of the German positions in the west. Moreover, the far eastern part of the route (junction with Wolfhezerweg) is the exact location where German commander Kussin and his crew (see also next paragraph) accidently were shot up by advancing British Airbornes and died. The research consisted of a watching brief of UXO-clearance.
In general most found objects were Allied and fewer were German (*Ibidem*, pp. 24). Loose finds were done but also two nuclei were documented, being a dump pit (near Utrechtseweg 362) and a dump zone (near Wolfhezerweg junction). The first is interpreted as from April 1945 or later so it will not be discussed here.
Evidence of the western defence of the Perimeter, at the junction with Wolfhezerweg, include so-called ‘spiders’ belonging to British anti-tank mines, and the pressure plate of another type of anti-tank mine (type Hawkins) about 250 metres to the west (*Ibidem*, pp. 25-26). German finds include a helmet type M42 showing the impact of an explosion, near the junction with Kerklaan near Doorwerth (*Ibidem*, p. 42). The iron lid of packaging for ammunition of the 7.5 cm *Panzerabwehrkanone* (PAK, anti-tank cannon) was found about halfway through the route (*Ibidem*, pp. 40-41).
The eastern part of the route (near the Wolfhezerweg junction) is the closest to the Perimeter, about 600 – 800 metres west of the nearest British positions at Koude Herberg and Van Lennepweg. Here, more German ammunition was present compared to the western part of the route (*Ibidem*, p. 38). For example, two intact 8.1 cm *Wurfgranate* (mortars) were found, in addition to a French DF 37 hand grenade (*Ibidem*), which was probably used by the German forces. At the same location a cluster of packaging of British 2 inch mortar grenades was found (*Ibidem*, p. 28). Also, a British drop container and a part of another one were found there. An accessory (so-called cradle) was found further west (*Ibidem*, pp. 27-28). These were thrown out of airplanes during the whole campaign to supply the Airbornes, and can be found almost everywhere. Surprisingly, there was almost a complete lack of ammunition (like spent cases of small arms) at the junction where Kussin was

killed, which according to the researcher maybe can be explained by looting through metal detectorists (*Ibidem*, p. 45).

3.8.2 Villa Heselbergh, Arnhem

At the former Villa Heselbergh (built in 1912) north of the city centre, an archaeological watching brief of UXO-clearance was conducted in 2018 (Reinders & Bex, 2021). Although not situated at the front, the location is historically relevant for several reasons. From August 1943, the large house (Figure 3.18) was confiscated for an administrative unit (*Feldkommandantur 642 Arnheim*). Its commander was Kussin, whose fate already has been described in the previous paragraph. Around the same moment, Villa Heselbergh became the staff office of the *9. SS-Panzerdivision 'Hohenstaufen'* too, in which important decisions would be made for the course of the battle at the bridge and in Oosterbeek. It is therefore not surprising that photographs exist from meetings at Heselbergh between the highest German commanders in the region at the moment (e.g., Model, Harmel, Student, Bittrich, Harzer). Lastly, British prisoners of war were assembled and interrogated in the villa and nearby school, and Dutch citizens were shot here.

Figure 3.18. Pre-war picture of Villa Heselbergh, during the Battle of Arnhem headquarters of both the staff of '*Hohenstaufen*' SS-division and the *Feldkommandantur 642*. The shelter was dug in in the yard in front of the side-entrance at the loggia (1), the skull-ring was found in the topsoil of the slope at the left (2) (source: *Gelders Archief*, 1501-04-1240).

Figure 3.19. Finds from Villa Heselbergh: the aluminium skull-ring, the plastic Mickey Mouse and the glass bottle for Tonophosphan (pictures and courtesy: Restaura, Heerlen (left); Greenhouse Advies bv, Huissen).

Due of the demolishing of the original house after WW2, as well as the demolishing of a new house (built in 1957, demolished in 2018), only few features of the original constructions were found. Some loose finds but also some features in situ were done only in the periphery of the research area, at the borders near the surrounding roads. Among them are a the remains of a shatterproof ground dug parking space (*Splitterbox*), opposite the former house of Kussin himself. Also, the concrete bomb shelter of the personnel was found, north of the former villa, near a side-entrance. In the filling a back-plate of a British (bullet-proof) body armour was found. Introduced only in 1944, this piece of equipment never has been in use in large numbers. All kinds of British and Polish Airborne troops but also some of the British and Canadian infantry later in the war wore this armour. However, the fact that Allied material was almost completely absent in the research area, points in the direction of the body armour being a piece looted in September 1944.

Feldkommandantur 642 consisted partly of female staff (*Stabshelferinnen*), such as typists. It is known that, after the staff of the '*Hohenstaufen*' division moved in, these females also remained at their post. They received an award for their performances during the Battle of Arnhem (Revell, 2015, p. 21). In that light, some of the finds from a waste pit, located just northwest of the former entrance, will be discussed. The material from this feature was largely civilian and only partly military, but it only concerns objects that can be dated to 1945 at latest (e.g., all found coins are from WW2, one from the 1920s). Between the tableware and glassware a French gasmask (type ANP T-31), a plastic brooch of a dog and a bracelet with imitation diamonds were present. The gasmask is pre-war captured material that was reused by the Germans and was usually handed over to second-class personnel (such as an administrative unit). The plastic jewellery can almost certainly be attributed to women, and given the finding spot, most likely the aforementioned *Helferinnen*. A small (circa 2 cm) plastic Mickey Mouse of a 1930s-type is among the rarities (Figure 3.19). Despite the (enemy) origin of Walter Disney, Mickey Mouse was a mascot for some Germans and was, apparently, also in use at this headquarters. Another curiosity is a small glass bottle for Tonophosphan (Figure 3.19), a medicine that stimulates metabolism and was in use as a drug in the Third Reich (and was even used by Hitler himself) to improve physical performance. Drugs are known to have been in use widely by all sides during WW2, like the British at the bridge in the shape of Benzedrine (speed) (Brentjens, 2021), however, it is no topic that is widely debated.

In the top-soil of the lower part of the terraced garden, east of the former villa, a flattened, aluminium finger ring (approximately 35 x 17 mm) was found (Figure 3.19). The ring contains the image of a skull, a symbol widely used by German forces, especially *Waffen-SS* and tank units. The object is not a standard emblem or distinction with a factory code and is clearly not mass produced. It therefore rather must be seen as trench art. Given the location, it seems likely that the ring belonged to a staff member of the '*Hohenstaufen*' SS-division.

3.8.3 Kamp Koningsweg Noord, Arnhem

Fliegerhorst Deelen, the major German airfield north of Arnhem, played a role during Market Garden. Although being largely destroyed by largescale bombing in the two months before the operation, it was incorporated in the primary plan, one of many goals that were never reached. Secondly for the Germans, as the southern edge was used as an assembly point during the battle (Berends, 2002, p. 95), and from 21 September onwards a unit specially trained for street-fighting was flown in (Kershaw, 2008, p. 280). Lastly, the giant command-bunker Diogenes II played a significant role in communications during the first hours of Market Garden, albeit it already was largely abandoned and dismantled (Tiemens, 1984, pp. 102-103).

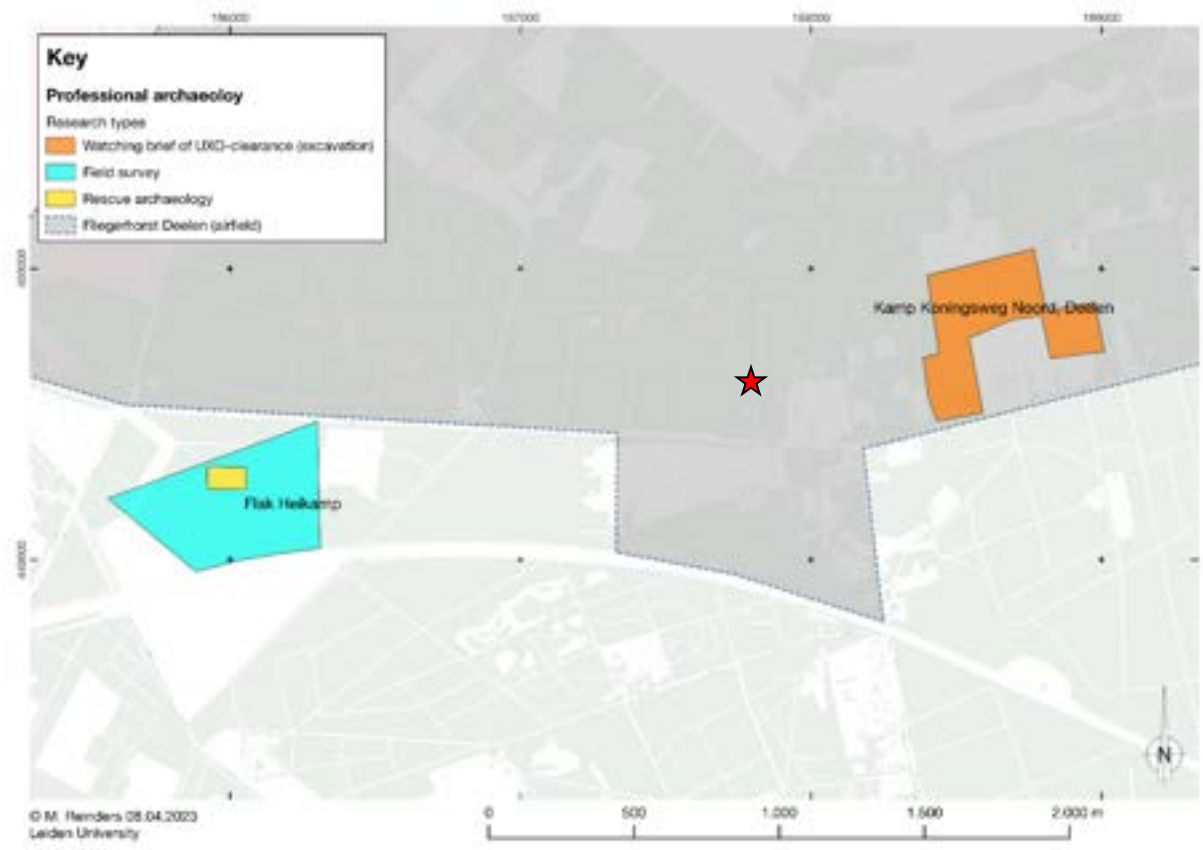

Figure 3.20. The sites examined at and near *Fliegerhorst* Deelen (Arnhem municipality). The command bunker Diogenes is situated at the red star (map by Author).

One of these southern barrack areas (initially *Luftnachrichtenlager*, during the Cold War *Kamp Koningsweg Noord* and now *Buitenplaats Koningsweg*) was redeveloped in the recent past for housing, in which framework an archaeological watching brief of UXO-clearance was conducted in 2021-2022 (Beckers, 2022). Some features and finds were difficult to attribute to a specific context, given the fact the site was occupied over years by different users (German airfield, *Hinterland*, liberation, post-war Canadian and Dutch military presence).

Several objects could be linked to Market Garden, all of them found in German foxholes that were dug around the barracks. Among these was part of a Sten-gun, which subtype Mk V was predominantly used by Airborne troops (*Ibidem*, p. 65). Also, camouflaged parachute silk and parts of a parachute harness (Figure 3.21) were found. These last two could also come from one of the crashed airplanes nearby, given the fact some airplane parts were found too (*Ibidem*, pp. 56; 82; 97). Also, British and American products like toothpaste and part of a radio or tool were found (*Ibidem*, p. 82). All these objects could be taken from the battlefield or robbed from prisoners of war in Oosterbeek or Arnhem and taken back behind the front lines, before being discarded there.

Special mention should be made of objects that could have been looted from civilians in Arnhem, which started right after the fighting in the city. Among these, large amounts of civil utensils (both regular and costly antique porcelain), care products and valuables like 216 coins (Dutch, all from 1941-1943) and a vault were discarded in German foxholes (*Ibidem*, pp. 77-78).

3.8.4 Heikamp, Arnhem

In the woods north of Arnhem, a short distance of the aforementioned Diogenes bunker, one of many heavy anti-aircraft batteries (*schwere Flak-Batterie*) was present. In 2011– 2013 a systematic metal detection was conducted there (Kok & Vos (eds.), 2013). This was partly a follow-up of the documentation of tangible traces on the grounds of *Geldersch Landschap & Kasteelen* (see also § 4.3.2 and 4.5).

Given the importance on a broader perspective of this research during the time, it seems evident this research is discussed too, moreover since evidence exists for the site, like Deelen, being an assembly point of German troops attacking the Landing Zone L and Dreijenseweg (Reinders, 2019, p. 7). This investigation was a pilot-study, commissioned by the Dutch National Heritage Agency (RCE), with the goal to investigate to what extent archaeology can contribute to site management, research and presentation of the WW2 soil archive (Kok & Vos (eds.), 2013, p. 13). The scientific results primarily dealt with the site being in use as a Flak battery and causal relationships with the Battle of Arnhem were close to zero.

In 2019, as an answer to unsupervised looting, some professional archaeologists and volunteers joined forces to document finds that were left behind and features that were made visible at this site (Reinders, 2019). This so-called ‘rescue excavation’ was done in consultation with the municipality and landowner. Interestingly, besides information on the German settlement, the remains of British parachutes and contents of drop containers were found (Figure 3.22), indicating that these were either dropped in the near vicinity or that British supplies were brought there later on, for the Germans to use (Figure 3.23). Again, possible traces of looting were found in non-military objects (e.g., luxury objects, parts of furniture).

Figure 3.21. Part of a British parachute harness as found in a German foxhole at Deelen (picture and courtesy: BAAC bv, ‘s-Hertogenbosch).

Figure 3.22. Fuel container from a British drop container as found and left by a metal detectorist at the Flak-site (picture: Author).

Figure 3.23. German soldiers in Oosterbeek looking grateful with their British supplies (source and courtesy: B. Gerritsen, Duiven).

3.9 Conclusion

At this point it is clear how and from what moment on professional archaeology in the Netherlands has been involved in WW2 archaeology in general and focussed on the Battle of Arnhem. All of these researches are conducted by commercial parties and the municipality of Arnhem, while focussed (academic) research has been absent. These excavations are in most cases development-led (commercial), focussed on the scientific value, and have been conducted on the former battlefields and the Hinterland, although also large areas (e.g., Schuytgraaf) have been largely exempted from WW2 archaeology.

4 The realm of non-professional archaeology of the Battle of Arnhem

4.1 Introduction

In this chapter, non-professional archaeology in its widest form (like metal detectorists) and other stakeholders will be discussed, including results but also motivations and goals of its executors. To have been part of this thesis, the requirement applies that results have been documented in some way and were accessible and verifiable during the writing of this present thesis. For obvious reasons not every single ground dug item can be treated and thus the discussed results in this chapter are merely a (brief) selection. Stakeholders which have been selected in order to answer the research questions are the *Zoekgroep*, the Working Group of the National Amateur Archaeological Society (AWN), a brief selection of individual metal detectorists and initiatives from a nature organisation. Also, data from field graves will be discussed in this chapter.

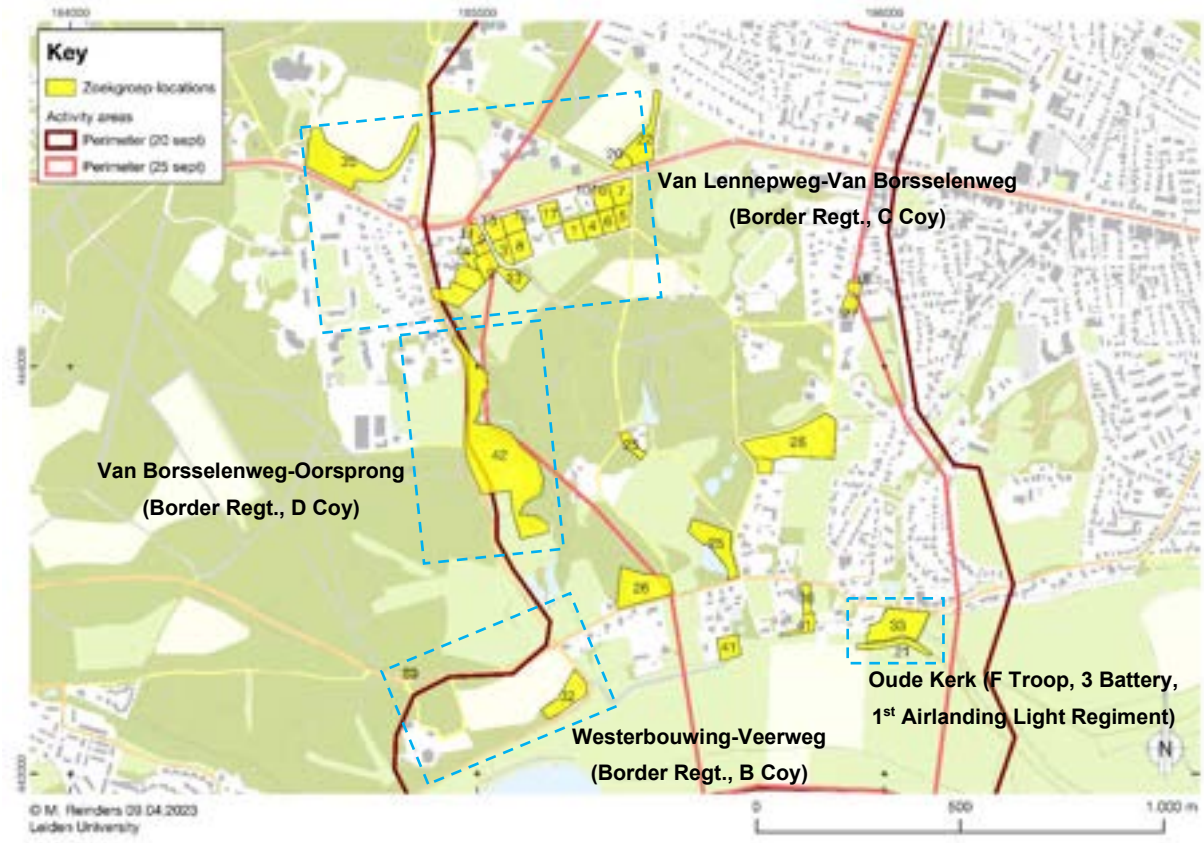

Figure 4.1. The research areas (with report-numbers) of the *Zoekgroep* in the Oosterbeek Perimeter. The marked areas are discussed in this thesis (map by Author).

4.2 Zoekgroep

4.2.1 Introduction

Not all actions of the private metal detector specialists of the *Zoekgroep*, introduced in § 2.5, have been fully published yet, mainly due to lack of time (D. van Buggenum, personal communication, February 26 2023). For this thesis, four areas have been appointed which will be discussed further: three along the western Perimeter and one at *Oude Kerk* (Figure 4.1). It is emphasized this is only a small part of all actions and reports of the *Zoekgroep*. For convenience, the reports of the *Zoekgroep* are cited according to their number, which corresponds with the list and map in Appendices 1 and 2.

4.2.2 Perimeter West (North)

Background

With the forming of the Perimeter after 19 September, the C Company of the Border Regiment took positions near Koude Herberg restaurant[12] and crossroads (now a roundabout), which in the following days were well fought over. This is residential area (mostly detached houses with large gardens and parks) adjacent to forest with some open fields. The company headquarters of William “Jock” Neill was situated a few hundred meters to the east, at Van Lennepweg 13. From their positions, the Company could overlook the open area alongside Utrechtseweg and towards Valkenburglaan to the (north) west (Boersma *et al*., 2009, pp. 17-19). On the German side (sector *Kampfgruppe* Von Tettau) companies of the *SS-Unterführerschule Arnheim* (training unit) under Michael Lippert, subdivided into the *Bataillons* Eberwein (north) and Schulz (south) were deployed. This infantry was supported by captured French Renault tanks (*Panzer-Kompanie C (ND) 224*, or Pz-Kp 224 in short) (Gerritsen, 2018, pp. 134-136).

British positions

These locations have been relatively extensively and systematically researched, one plot at the time. At C Company’s positions the headquarters, several foxholes including field graves, weapon positions and an aid post were researched. All data from the reports of the *Zoekgroep* on (concentrations of) finds and field graves in this area, as well as some information available through other (historical) sources, has been assembled and analysed for this thesis in a GIS-application, and through this it provides a detailed picture of the spatial layout of the site (Figure 4.2).

[12] Now: De Oude Herbergh, Utrechtseweg 245, Oosterbeek.

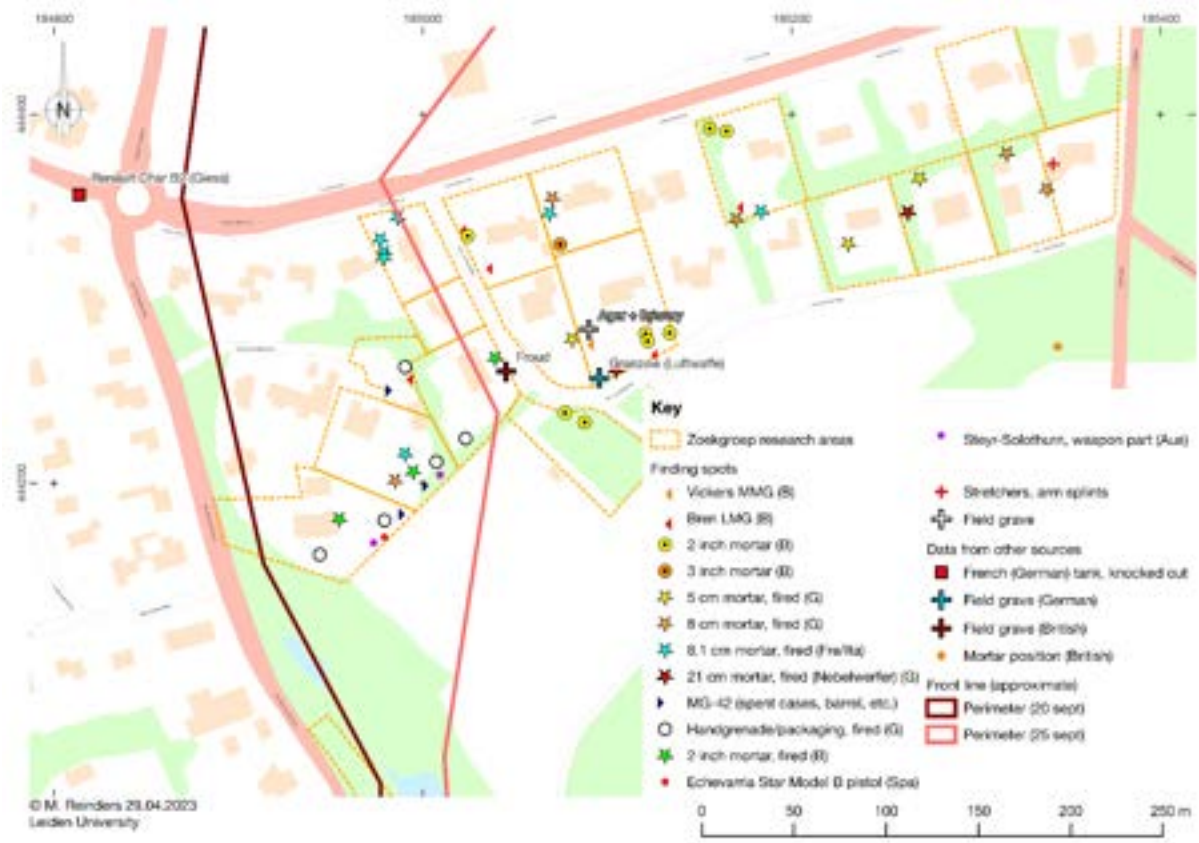

Figure 4.2. Spatial layout finds done by the *Zoekgroep*, combined with locations from other sources, at Van Lennepweg in the Oosterbeek Perimeter (data: *Zoekgroep*; map by Author).

Figure 4.3. Aerial picture (15-03-1945) plotted on present-day topography with appointed interpretations (data: *Zoekgroep*; photo: Wageningen University & Research; map by Author).

The field graves of two British soldiers in the garden of Van Lennepweg 13 were found early 1993, which initiated further focussed research by the *Zoekgroep* in this area (report 8, 1994). At first only one para helmet was found with the skull still inside after which the action was halted and, in accordance with legislation, the Graves Registration and Identification Unit (BIDKL) of the Army[13] was contacted. In total the remains of two individuals with their equipment were found. These have been identified as 33-year old Ernest Ager from 16 Platoon and 21-year old Douglas Lowery from 17 Platoon (Figure 4.5), who had been missing until that moment. Ager died on 22 September, Lowery two days later. Items from their graves consisted of a ring with initials, a wallet, a cigarette case, Lee-Enfield ammunition and three Border Regiment beret emblems. Interestingly, two of the emblems were attached to each other, so the one on the front stood out more. Moreover, the third sole copy was attached to an early form of plastic (Figure 4.4) probably for the same purpose; signs of vanity or pride? Ager and Lowery were buried with military honour in October 1993.

In and around the same area, similar to the archaeological research on the Dreijeroord grounds (see § 3.4.2), specific weapon positions could be pointed out for the Vickers medium and Bren light machineguns and for a light mortar group (Figure 4.3) . Near the Bren-gun position, indications have been found for a 2 inch mortar. The distance to the front zone (in a straight line) is about 200 meters and approximately 400 - 600 meters to the probable German positions. It should be noted that the effective range of this weapon was only about 450 meters, so it may be concluded this mortar only came in action when Germans were actually attacking. Noteworthy is the fact that a specific foxhole was found by using photographs taken during the battle (Figures 4.7, 4.8) (report 15, 1995).

About 350 metres from the front line, a Regimental Aid Post was established (Hoofdlaan 3, west of the house). There, all kinds of medical material were found: three British foldable stretchers along with some small bones and arm splints about 30 cm beneath the surface and two para helmets of which one was just 20 cm beneath the surface. It was interpreted in the field as if the fallen soldiers were temporarily buried while lying on their stretchers, and after the war only their remains were exhumed (report 5, 1994).

Veteran James Swan, who fought at the Van Lennepweg site and recorded his memoires somewhere around 1990, stated that captured German rifles were handed out as backup (Swan, 1994). The absence of spent German cases within the British positions may point out that these weapons were only used sporadically or not at all. The only exception are cases (amount not documented) for a German MG-42, recovered from Van Lennepweg 3, in the rear of Border Regiment's positions (report 6, 1994).

[13] At the time the BIDKL was known as *Gravendienst* (Grave Service), but for legibility in the text the modern-day abbreviation will be used.

Figure 4.4. Beret-emblem on a piece of plastic, right after the recovery from the double grave of Ager and Lowery (C Company, The Border Regiment) in 1993 (picture and courtesy: B. de Reus).

Figure 4.5. Portrait of Douglas Lowery (1923 – 1944), who died on 24 September in the garden of Van Lennepweg 13 (source: Operation Market Garden: The Digital Monument, n.d.).

Figure 4.6. German soldiers who fell during their attack at The Border Regiment positions, just south of Van Lennepweg 14. Picture taken on 20 September 1944 (source: Imperial War Museum, BU1104).

Figure 4.7. Foxhole of Jury and Malcolm at their Bren-machinegun in the front-yard of Van Lennepweg 17. Their gun is facing southwards (source: Imperial War Museum, BU1108).

Figure 4.8. The *Zoekgroep* traced the exact location of this position. Note the curved Bren-gun magazine and the rhododendron shrub, both also visible in the 1944 picture (picture and courtesy: *Zoekgroep*).

German positions

The Germans also covered the Koude Herberg crossing with cannons, as evidenced by the finds of several fired steel shells for an anti-tank gun (*Panzerabwehrkanone* or PAK 38, calibre 5 cm) about 300 meters west. Also, packaging for additional powder charges and an ammunition box of regular German mortars (*8 cm Granatwerfer 34*) as well as belts for a machinegun (type MG-34 or –42) were found (report 35, 1999), indicating this position could be defended on both long and short range and against both infantry and armour. Several examples of the ammunition used by the attacking Germans were found within the British positions. In the middle of and near the British positions at Van Lennepweg, fragments of French and/or Italian mortar grenades were found.[14] One example is stamped with "Paris", so at least part of it was of French production (Figure 4.9). At the Van Lennepweg sites the calibres 5, 8.1 and 21 cm *Wurfgranate* (mortar grenades, the latter from the infamous *Nebelwerfer*) were found.

In the gardens and parks between Van Borsselenweg and Van Lennepweg (Figure 4.6) a mixture of used ammunition and lost equipment from both sides were found (e.g., unnumbered report, 2001), indicating a transition zone between attackers and defenders. At a location which was interpreted as a German machinegun position (two backup barrels for the German MG-42 and spent cases which were fired from this weapon), two deviant types of armament were found too. A Spanish pistol (*Star Bonifacio Echeverria, Model B*) (Figure 4.10) and a magazine and buttstock from an Austrian machine-pistol (*Steyr-Solothurn*, or MP-34) were found (*Ibidem*). Both are known to exist in *Wehrmacht* use; the Spanish factory Star sold an amount of this type to the Wehrmacht during WW2 (Two Old Dogs, 2015), the Austrian MP-34 (ö) was predominantly distributed to *Luftwaffe* and *Polizei*-forces (de Vries, 2017, p. 32), which could point towards Air Force training personnel or guards or the *SS-Unterführerschule*.

Further away from the front line (about 1.8 km from the Van Lennepweg positions) a German weapon position for infantry support (mortar and light artillery) was discovered (report 38, 2000). Besides ammunition and accessories for the aforementioned 8.1 cm mortar, also evidence for the 7.5 cm *leichtes Infanteriegeschütz* and 10.5 cm *leichte Feldhaubitze* were found. The maximum ranges of all three of these weapons are well within the distance towards the British positions.

[14] It seemed impossible to determine the remains of these grenades in more detail since the 8.1 cm Italian ammunition was a copy of the French 8.14 cm grenades and almost looks the same. These were used on a large scale by the *Wehrmacht* throughout WW2 (Gander & Chamberlain, 2008, pp. 307-308).

Figure 4.9. Base stamp of French mortar grenade stamped with “Paris” from the Van Lennepweg positions (picture: Author).

Figure 4.10. Spanish *Star Bonifacio Echeverria, Model B* pistol, as found at a German machinegun position near C Company’s positions (picture and courtesy: *Zoekgroep*).

4.2.3 Perimeter West (Middle)

Background

One of the most extensive searches and documentation (Figure 4.11) was conducted around the positions of Border Regiment’s D Company, around the farm of Van Borsselenweg 32-34 and 36 (report 42, 2007). Along with the SS-units of Schulz in *Kampfgruppe* Von Tettau, at least one French Renault-tank was deployed and disabled here. The *Zoekgroep* conducted their research in the years 2004-2006.

British positions

Presumably two weapon positions for both 2 and 3 inch mortars could be identified but, remarkably enough, no locations explicitly for close range defence like with machineguns were found. At least two nuclei for military communications were recovered by dumped material like headphones, microphones, remote controls and batteries, presumably all together in foxholes or other pits.

These objects have been identified as being part of radio sets used for the communication between companies, but also especially for so-called Forward Observation Units. This last position most probably was in contact with the Allied artillery operation from the Nijmegen region, who gave fire support in the Perimeter from 21 September onwards. This theory is supported by the find of a brass Arc Bearing No. 2 Mk1 tool for artillery calculations.

A (broken) silver signet ring was found in the top-soil. It is engraved with “Tunis 1943” and a roughly carved palm tree with a building (Figure 4.12). This has been interpreted, especially through the mentioned year, as a British trench art souvenir from North Africa. The Border Regiment was present there from April 1943, before taking part in the invasion of Sicily later that year. The owner of this ring must have been a veteran, experiencing all campaigns from Africa, Sicily, Normandy to Market Garden, before losing it in Oosterbeek; symbolizing the lost battle.

Another personal item is a broken silver chain with the engraving of “G.R.E. ALLEN. 2579984” (Figure 4.13), found about 1 meter below the surface, probably in a foxhole or trench. After further investigation, Allen proved to be a co-pilot of a Hamilcar glider. Contact with relatives was established after the find, but Allen himself was already deceased. Lastly, a snap lock of a glider was found, proving re-use of this kind of material.

German attacks

Like other locations, the first indications for German attacks are shrapnel. In this case, several fired mortar grenades (calibre 8.1 cm of German production) for infantry support were found. Presence of German units within the British positions was discovered too, like loose finds of German equipment and ammunition. Screwcaps of hand grenades (removed before the moment of throwing them) indicate close-range battle, while a set of leather boots (one with a cut of shrapnel) and a single *Kriegsmarine* uniform button shows the presence of German troops deep within the British positions. Supporting the theory of a (temporary) capture of predominantly the gardens west of the buildings are several British mortars fired on the German intruders.

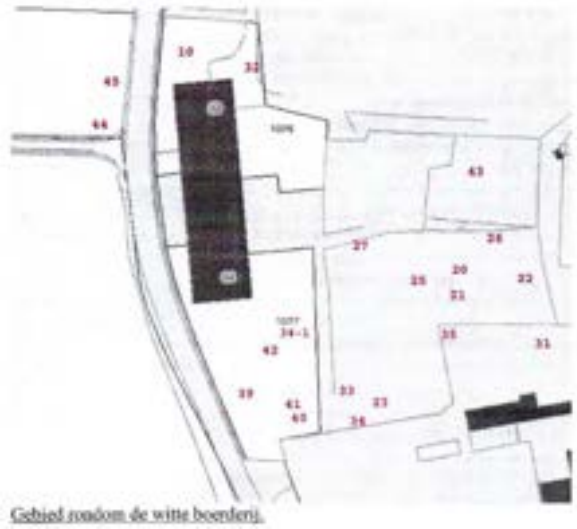

Figure 4.11. Example of a map made by the *Zoekgroep* of the farm which was the headquarters of Border Regiment’s D Company (map and courtesy: D. van Buggenum, *Zoekgroep* (see report 42, 2007)).

Figure 4.12. Silver ring with “Tunis 1943” inscription.

Figure 4.13. Silver chain with name (both pictures and courtesy: D. van Buggenum).

Also in the forest opposite these positions (Oorsprong) some finds were done by members of the *Zoekgroep*. Unfortunately, most of this data has not been published (yet). For example, some small finds from German Navy uniforms were retrieved, like aluminium buttons and an anchor from a shoulder board (Figure 4.14). Also, an anchor carved in a tree is still present today, which (admittedly, with some imagination) is being interpreted as a German Navy symbol (Figure 4.15), given the specific details (arm with flukes, the ring on top and even the rope) and the location, while taking into account the slow distortion through time. This feature is one of the foremost examples of how nature, like trees, can be “the last witnesses of the intertwining of landscape and battle” (Reinders, 2022, p. 11).

However not found by the *Zoekgroep*, a ghastly discovery done very close to the same location should be mentioned. A human skull in a steel helmet was found which apparently could still be identified as belonging to 18-year old Franz Moser (of 10. SStA) who, oddly enough, already had a grave (H. Timmerman, personal communication, 22 April 2022). These kind of finds are a strong reminder of the truth of war.

Figure 4.14. Small aluminium *Kriegsmarine* anchor found in D Company’s The Border Regiment positions (picture: Author).

Figure 4.15. *Kriegsmarine* anchor as carved in a beech tree at the same location, near former German Navy graves, as discovered during research of the *Zoekgroep* in the early 00s. For comparison a *Kriegsmarine* button is attached (pictures and editing: Author).

4.2.4 Perimeter West (South)

Background

In the uttermost southwest corner of the Perimeter the Westerbouwing high grounds are present. On the German (Von Tettau) side, specifically in the forest between Heveadorp and Westerbouwing, Navy soldiers from a training unit (*10. Schiffsstammabteilung*, or 10. SStA) were deployed. On 21 September they received reinforcements from the *3./Fallschirm Ersatz-und-Ausbildungs-Regiment 'Hermann Göring'*, a training company of the Air Force from Katwijk sometimes referred to as *Wossowski-Bataillon*.[15] They had very few or even no experience at all. With heavy casualties, this group captured the important Westerbouwing and later the lower crossroads at Veerweg too (Figure 4.16). During this advance three of four aforementioned French Renault tanks were knocked out. Later, the 10. SStA Navy troops and *Luftwaffe* personnel (guards) were deployed there too, making this sector a mixture of all sorts of (unexperienced) soldiers (Boersma *et al*. 2009, pp. 22-25; Brouwer, 2012, pp. 109; 118; 148; Gerritsen, 2018, pp. 134-136). After the British withdrawal (B Company, The Border Regiment) further east (around Dennenoord), remnants were merged in the so-called Breeseforce from 21 September onwards.

British positions

In 2003-2004 a field which was in use by Breeseforce was investigated (report 41, 2005). There, at least one foxhole used as a mortar position (2 inch) and one for a Vickers machinegun were discovered. Interesting are the finds that probably indicate re-use or looting of civilian objects like glass storage jars ('Weckpot'), a wooden crate with text "Huissen Holland", a letter opener and luxury tableware. The absence of German objects makes it highly implausible the positions were re-used after the September-days.

Figure 4.16. View from the present-day Westerbouwing parking area towards the east: on this field the German attacks with captured French tanks were performed. In the background the Eusebius church tower of Arnhem can be seen (picture: Author).

[15] And mislabelled "Worrowski", e.g., in the Airborne Museum. See also Timmerman, 2004.

German positions

In 2008, in search for a still missing British soldier, a part of a human skull of what later turned out to be a German was found at the steep slope near the stairs towards Westerbouwing by the *Zoekgroep*, which excavation naturally was taken over by the BIDKL. In this field grave, in addition to more remains, uniform buttons of the *Kriegsmarine*, a military identity disc, a wristwatch, remains of a wallet and a gold wedding ring with inscription were found. It turned out to be the grave of 31-year old Johann Grabowski. He was assigned to the 3rd company of 10. SStA (Navy recruits) and was killed on 25 September (Maassen, 2011, pp. 3-4). Possibly this was during the fierce fighting that day around the ferry of Heveadorp.

German attacks

Again, a spatial layout and part of the development of the battle could be distilled from the registration of finds (report 42, 1999). Along the steep slope north of Veerweg several finds were done. At different locations between 80 and 30 metres distance from the British positions both British and German ammunition were mixed together. This suggests the (not simultaneous) presence of both sides; indicating the (counter)attacks on 21 September. Parts of a thrown German hand grenade at short distance of the British positions are evidence of close combat.

Another interesting addition are cartridges and spent cases, found along the Veerweg slope halfway between Westerbouwing and the British HQ, of calibre 8x50R Lebel of French production (Figure 4.17). These are at least partially stamped with the logo of *Société Française de Munitions* (Paris), without a date. This may give an insight into (part of) the armament of the *Luftwaffe* or *Kriegsmarine* men. Not further discussed in this thesis is a location north of the Perimeter, where the remains of an outdated model French rifle and parts of a second one were found (*Fusil d'Infanterie modèle 1916*) (report 34, 1999). Also of French production are fired mortar grenades within B Company's positions. The aforementioned positions of Breeseforce near Dennenoord were being fired upon by German 8.1 and 21 cm *Wurfgranate*, the last known as *Nebelwerfer* (report 41, 2005).

Figure 4.17. Headstamp of one of many found French 8x50R Lebel cases from the steep slope between Westerbouwing and Veerweg (picture and editing: Author).

4.2.5 Perimeter West (*Panzer-Kompanie 224*)

Background

Among the most intriguing and well documented captured arms used by the German during the Battle of Arnhem are the French tanks of *Panzer-Kompanie 224*. Additional information on these tanks could be provided from objects found at the location where the tanks were disabled during and dismantled after the war. These pre-war tanks (type *Char B2*) were partly adapted. In these subtypes the primary 7.5 cm cannon was replaced by a flamethrower (type *Flammpanzer B2* (f)). The exact division between regular B2's and *Flammpanzers* is not mentioned in written sources (Zwarts, 2001, p. 65; Reinders, 2010, pp. 3-4). As a result, in much of the literature and on information panels in the Airborne Museum these Renault-tanks in general are called "flame-throwing tanks" (e.g., Eastwood *et al*., 1994, p. 135; Brouwer, 2012, p. 82; Gerritsen, 2018, p. 135).

Figure 4.18. Char B2 *Flammpanzer*, destroyed in the positions of D Company, The Border Regiment at Van Borsselenweg (picture: Rutkowski; source: Bundesarchiv, J27-896).

Figure 4.19. Small brass sign in French indicating spare parts of the 4.7 cm gun from the Char B2 tank that was destroyed on the field between Westerbouwing and Veerweg (picture: Author).

Figure 4.20. Exploded 7.5 cm shells from the same tank, proving this was no *Flammpanzer* (picture: Author).

Results

A discovery on the field east of Westerbouwing gave a definite answer about at least that particular tank (Reinders, 2018). Wreck parts of the tank were found, along with exploded shells of the 7.5 cm gun (Figure 4.20), proving that this tank was a regular *Char B2* – although it has been named a *Flammpanzer* in literature. In contrast, halfway Van Borsselenweg, where another Char B2 was destroyed (Figure 4.18), an abundance of exploded 4.7 cm shells was found (from the secondary gun), but the site lacks any finds of 7.5 cm ammunition, despite an exhaustive search.[16] This makes it highly plausible this certainly was a *Flammpanzer*. A fire extinguisher from France from one tank, and a sign for spare parts in French ("*Affut a re… pour C.T. de 47 Mle … Accessoires & Rechanges*") (Figure 4.19) from another tank give some insight in the re-use of practical objects (original, with French text). In comparison, a German made bakelite plug (with a so-called *Material und Prüfung* stamp), may indicate the replacement of or addition with technical equipment like radios for *Wehrmacht* copies (additional, with German codes).

Location	Commander[17]	Put out of action	Flamethrower
Van Borsselenweg (32-34)	W. Kunze	21-9-1944	Yes
Field between Westerbouwing-Veerweg	H. Höser	21-9-1944	No

Tabel 4.1. Subdivision of regular Char B2 and converted tanks with a flamethrower, according to archaeological data (data: *Zoekgroep*).

[16] The *Zoekgroep* only partly published these results. See report 42, 2007.

[17] According to Timmerman, 2008.

4.2.6 Oude Kerk

Background

Prior to the archaeological excavation in 2013 (see § 3.4.3) the *Zoekgroep* systematically has searched the fields south and east of the Old Church of Oosterbeek in 1996, 1997 (Figure 4.21) and 1998 (report 21, 1996; report 33, 1999). Although already in the early 1990s another metal detectorist has searched this area, the new search yielded many artefacts. South of the church a British artillery position was dug in (F Troop, 3 Battery of the 1st Airlanding Light Regiment), equipped with three American 75mm Pack Howitzer M1 guns. Because of the open terrain, the positions of the guns and other positions can easily be reconstructed on the basis of historical aerial photographs (Truesdale *et al*., 2015, p. 128 and appendices).

British positions

Again, the registration of finds provides a spatial layout of this site. Some conclusions can be drawn from this data. Personal items ended up in the gun pits, which maybe illustrates how these positions were permanently 'inhabited' by the crew of the guns. Objects to make fire to cook, to eat and drink, but also hygiene objects (toothpaste from British brand Colgate) were represented.

For short range defence of the position the artillerymen were equipped with Vickers and Bren machineguns and 2 inch mortars. This is based on finds mainly in and around the Command Post. This may seem surprising, since these defensive posts are suspected in the periphery of the site. Maybe this is due to post-depositional processes, like post-war dump or the re-use of British weapons by Germans, right after the British surrender (Krafft, 1944, pp. 38-39).

Locations of E Troop (about 150 meters west of the church) along Kerkpad were investigated in 2003 and 2004 (report 41, 2005). This yielded comparable results, like 'habitation' of the site (oil lamp, tooth brush) but also re-used material from gliders and at least one foxhole with the remnants of a Vickers machinegun position. A handle of one of the 75mm guns was found too, maybe a remnant of disabling the cannon before the withdrawal.

Figure 4.21. The finds of the *Zoekgroep* at the *Oude Kerk* positions in 1997 made the news (picture and courtesy: M. Vellinga, *De Gelderlander*).

4.3 AWN

4.3.1 Museum Arnhem

One of the pioneer and long-term projects of this group is the documentation and (partial) excavation of two German bunkers (type *Kochbunker*) and corresponding features like trenches. The primary goal of these different researches will be excluded, since it concerns the post-September period. The location of the bunkers, in the present-day sculpture park of Museum Arnhem on Utrechtseweg, corresponds with the location of the failed British push-through towards the city centre and Arnhem bridge.

Firstly, a Sten-gun was found at the bottom of the eastern bunker, near the entrance (Figure 4.22). Post-depositional processes are evident; war material being scattered around the museum after the liberation is being confirmed by an eye-witness (Reinders, 2016, pp. 44; 48). A third example is a single spent brass case of a 2 cm German anti-aircraft gun, which can maybe me attributed to the Flak 38 gun which was known to have been deployed there (van Midden & Nijsse, 2021).

4.3.2 Oorsprong forest

As part of a large-scale inventory by landowner *Geldersch Landschap and Kasteelen* (see also § 3.4.8 and 4.5) the AWN was asked to document features in the Oorspong and Zilverberg woods on both sides of Van Borsselenweg. Along the Oorsprongbeek (brook) the remnants of at least sixteen foxholes are still visible (Figure 4.23), which were documented in 2017 (Reinders, 2018). Being in the collective memory of the generation right after the war up until the present, it hasn't been clear to date who dug and used them. According to written sources, like war diaries and (post-war) witness accounts, it is known where the various platoons and heavy weapons were located but, in contrast, this location isn't mentioned anywhere (e.g., Jellema, 2018, p. 19; Cornelissen, 2021, p. 34). As a result of prevailing chaos on the battlefield, it may well be memories faded or were (partly) distorted. So, the actual location of traces and lines (micro level) and how these are left behind in the landscape may differ from memories of veterans or even from contemporary written sources (Reinders, 2018, pp. 38-39).

Figure 4.22. The working group of AWN17 with the found Sten-gun at a *Kochbunker* (picture and courtesy: M. Popova, De Gelderlander).

Figure 4.23. One of the foxholes along Oorsprongbeek, recognizable as shallow pits filled with leaves (picture: Author).

4.4 Other metal detectorists

4.4.1 Introduction

As mentioned in § 4.1, for this thesis the requirement was envisaged that at least some basic documentation on found items was applied and was accessible. Evidently, in this paragraph no full overview of all found ground dug items can be provided. For this paragraph mostly articles of the Association of Friends of the Airborne Museum (VVAM), like the Mini-Stories and Airborne Magazine, were used. One metal detectorist published his memoires on "searching the former battlefields for 35 years" in 2008 (van der Velden, 2008). Despite it being no real documentation in context-details, his story on found items is impressive and is therefore used in this thesis. All results (mostly objects) that have been published about are summarized in Appendices 3, 4 and 5.

4.4.2 Results

In 1981 and 1982 van der Velden found four soldiers at Ginkelse Heide (Drop Zone Y), which saw heavy fighting on 18 September 1944, when German and Dutch soldiers of *SS-Wachbataillon 3 'Nordwest'* almost captured the heath field but in their turn were run over when the 4th Parachute Brigade landed. The field graves reflect these chaotic events for the double grave found at the camping site next to restaurant Zuid Ginkel[18] (the headquarters of the SS-battalion) was of Dutch volunteers. The BIDKL identified them as 19-year old Paulus Bollen from Noordwolde and 36-year old Theodorus Gebbinck from Groenlo. In addition, presumably in a foxhole next to the graves, a *Stahlhelm* M40 containing yellow and brown camouflage (Figure 4.24) was found, with inside the name of Willem van Ginkel (a peculiar coincidence). This 27-year old construction worker from Amsterdam (Figure 4.25) already had a grave, so maybe his helmet was left at his first field grave. 20-year old Waldemar Renz was found near the former labour camp Het Wijde Veld. The fourth, found "on the heath", remains unknown (*Ibidem*; H. Timmerman, personal communication, September 29, 2022). In September 1985, near the same location (the forest directly west of the aforementioned restaurant), the remains of 19-year old William John Allen of 10th Battalion, The Parachute Regiment, were found by another detectorist (Maassen, 2011). Allen had carved his name in his leather belt (Heusschen, 2022).

At Sonnenberglaan, together with tracks from the Renault tank which was disabled there, the remains of a soldier of the Royal Engineers were found. Unfortunately, he was not identified. Nearby, at the retirement home De Sonnenberg, the remains of D. Thompson and L.H. Howes of the Glider Pilot Regiment were found, in a foxhole under a drop container (Figure 4.26).

Also, former field graves were found. Along Van Tienhovenlaan, behind the Bilderberg Hotel, a former mass grave in which presumably nine British soldiers were buried was discovered. In this mass grave, all kinds of personal objects were found. They belonged to the commander of 156th Parachute Battalion Des Voeux, who died on 20 September. Also, a pistol bag and improvised arm sling made from parachute silk belonging to Dawson (Figure 4.27), and a piece of a gasmask bag with the text "Watkins HQ" were still present.

[18] Now: Juffrouw Tok, Verlengde Arnhemseweg 101, Ede.

Figure 4.24. *Stahlhelm* of Dutch SS-volunteer van Ginkel who died during the fighting of 18 September 1944 against the British. His helmet was found in 1981 at the camping site Zuid Ginkel (picture and collection: T. Kuijpers, edited by Author).

Figure 4.25. Portrait of van Ginkel (1917 – 1944) (source: Fred, 2012).

Figure 4.26. Photo in a Dutch newspaper showing the recovery of Thompson and Howes by the Dutch Army (*Gravendienst*), as found by a metal detectorist at Sonnenberglaan in Oosterbeek (picture: J. Stappenbeld; source: *De Telegraaf*, 1994).

Figure 4.27. Items from the field grave of Bruce Dawson as found by a metal detectorist, on display at the Airborne Museum (picture: Author).

Figure 4.28. Large iron carriage of a 6-pounder antitank cannon, as found in 2004 along Benedendorpsweg (picture and courtesy: H. van der Velden).

Another former field grave was found near the tennis court behind Hartenstein in 1993. A para helmet with a painted emblem of The Oxfordshire and Buckinghamshire Light Infantry was present, which turned out to have been worn by L.J. Barton who died 24 September. Also in this context a gift-box from 1914 (originally meant as a present for WW1 soldiers) was found which was probably reused by Barton for other purposes, as the box in his grave contained the remains of a letter (Gerritsen, 2021).

Opposite Utrechtseweg, the 1st Airborne Reconnaissance Squadron were dug in in a forest edge at Oranjeweg. Their former foxholes were discovered in 1987, which still were stacked with all kinds of material, among them a red beret in which part of a paper list was folded. It was only until 1996 the second half was found by the *Zoekgroep* (report 22, 1996). The former owner appeared to be F.W. Ladds, who himself was tracked down and met van der Velden to share his story.

In the Hemelse Berg forest (centre of the Perimeter) a radio position of the headquarters of the Royal Artillery was discovered in 1988, with all kinds of communication equipment like headphones, microphones and filled-in paper message forms. A comparable find was described in a Newsletter of the VVAM, in which the human aspect of these notes were emphasized, like how the different posts attempted to stay in contact with each other and, despite the poor connections, to repeatedly send messages (Boersma, 1992.). Interestingly, after several inquiries during the writing of the thesis, no clear answers came whether these were the same finds; stressing the importance of documentation.

In 2004, van der Velden found brass cases and even part of an anti-tank cannon (Figure 4.28) which, because of the location, could be attributed to a specific weapon, crew and a “heroic battle” on 20 September (van Midden, 2020).

Besides the aforementioned examples few metal detectorists have published their finds. Two will be named here. In 1996 a complete 7.5 cm French canon from a German anti-aircraft battery was dug up by members of *Museum Vliegbasis Deelen* in the Meinerswijk floodplains south of the Lower Rhine (Arnhem). This unit played a role during the British push through towards the bridge. The barrel was blown up, probably because of a hastily abandoning of the site. It still contained some original camouflage-paint and hand-painted rings indicating how many Allied planes were shot down (Anonymous, 1996). Most intriguing is the fact that the Museum tracked down still living members of the battery, who visited Emil after the find (Figure 4.29) (Mijn Gelderland, n.d.). Part of the same site was investigated by archaeologists in 2013-2014 (see § 3.2.3).

Lastly, in 2012 a detectorist found human remains about 500 metres from the sheepfold on Ginkelse Heide (north-eastern part of the field). The BIDKL eventually identified 19-year old John Kennell, who most probably was killed during or shortly after his jump. Interestingly, because of “the importance of the find” the detectorist wasn’t prosecuted (Anonymous, 2012).

Figure 4.29. The former Flak crew visits the gun in 1996. The shown paint is not original (source: *Archief Museum Vliegbasis Deelen*, BF4504_0005).

4.5 Nature organizations

In 2008 *Geldersch Landschap & Kasteelen* (a nature organization which possesses large parts of the former battlefields) started a pilot study to inventory physical traces in their areas. The first “scars in the landscape” were documented by two students in the Mariëndaal forest, north of Oosterbeek (Branderhorst, 2009). A year later, traces in De Sysselt forest near Ede were documented (Wijnen, 2010). In this series of documenting tangible traces also the already discussed systematic metal detection at Heikamp (§ 3.8.4) and in Oorsprong forest (§ 4.3.2) should be mentioned.

Figure 4.30. Van der Velde and Rugers during their 2009 inventory (picture: B. de Gouw).

4.6 Field graves

Right after the war, in and around the Oosterbeek Perimeter numerous field graves were present (Figure 4.31). Back then, these locations were inventoried, along with information like name, unit or other details if this could still be retrieved. This data is available (Hey, n.d.) and is put in a GIS-database for this thesis. However, it has to be emphasized that in some cases only global locations like toponyms are mentioned in this source, meaning the accuracy of some of the graves may be several hundred meters. Nevertheless, it provides a significant source for reconstructing specific parts of the battle, which is not available from other sources. It is emphasized that this dataset is deviant from the work of the BIDKL.

Figure 4.31. Field graves in the garden of Karel van Gelderlaan 2, northern part of the Oosterbeek Perimeter, two weeks after the battle (picture and courtesy: B. Castendijk).

First of all, a few *Kriegsmarine* (Navy) and *Luftwaffe* (Air Force) nuclei can be identified (Figures 4.32 and 4.33). *Kriegsmarine* graves (64) are represented almost exclusively at this western part of the Perimeter, from north to south (so in the complete area of *SS-Unterführerschule Arnheim*). Two clusters in the east and one in the west are at former aid posts (the hotels Tafelberg, Schoonoord and Wolfheze) so these have no relation to the deployment of the units but rather where they were transported to when wounded, and eventually died. The two Navy graves at Hoofdlaan, behind the British positions, can maybe be explained by a successful penetration. Both are dated 21 September. *Luftwaffe* graves (29) give the same image (keeping into account the hospitals), although the majority seems to be clustered south of Utrechtseweg, so the south western part of the Perimeter (*Bataillon* Schulz).

At Van Lennepweg (Border Regiment's C Company positions), another five Navy soldiers (all from *10. Schiffsstammabteilung*) were buried (H. Timmerman, personal communication, 22 April 2022). In addition to this, a handful of *Luftwaffe* soldiers fell there. Interestingly enough, three of these soldiers were from the *Hermann Goering* training unit, which according to written sources was located at Westerbouwing, about 1 km to the south. In the garden of Van Lennepweg 13 (headquarters of C Company, 1 Border) 44-year old Paul Granzow was buried. He was part of *Fliegerhorst-Bataillon I, Luftwaffe-Landeszug 35/XI*. This unit consisted of airfield security guards and was put under command of *SS-Unterführerschule Arnheim*, but according to written sources only saw action clearing the Landing Zones and was even nonactive from 20 September onwards (Berends, 2002, pp. 127, 238; Gerritsen, 2018, pp. 107-108, 161).

Halfway Van Borsselenweg (opposite Border Regiment's D Company positions at house numbers 32-36), a large cluster of *Kriegsmarine* activity can be identified. At least eight members of the *Kriegsmarine* found their end at Oorsprong forest, west of and within the British positions. Another one was found at "Hooge Oorsprong", which is presumably located a bit further north. If the dates on the graves are correct, they were deployed (and fell) there on 20, 23, 24 and 25 September; so almost during the whole Perimeter battle. *Luftwaffe*, *Heer* and *Waffen-SS* graves are absent at this location. However, this could possibly be misleading, given the fact that some dead were already moved elsewhere instead of buried on the spot.

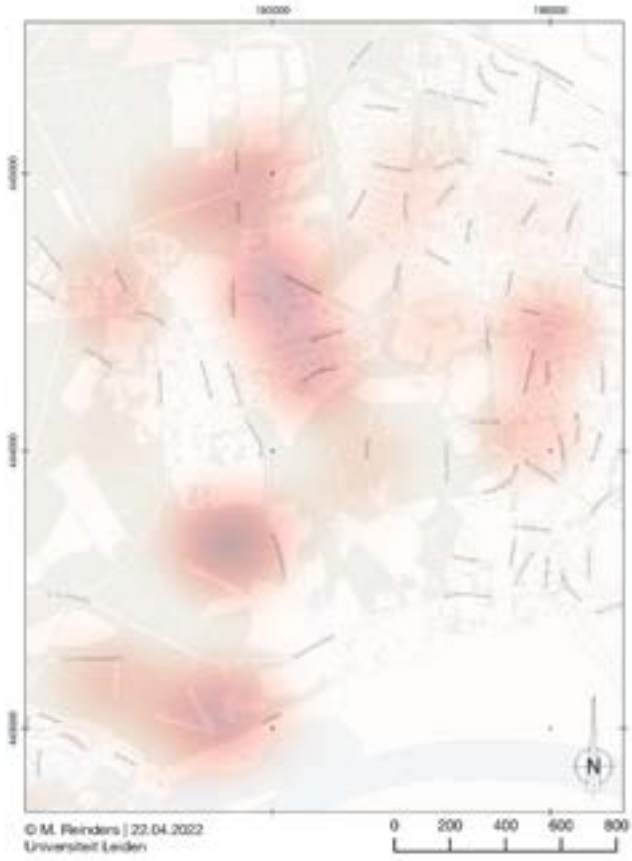

Figure 4.32. Heat-map on *Kriegsmarine*-graves in the Perimeter.

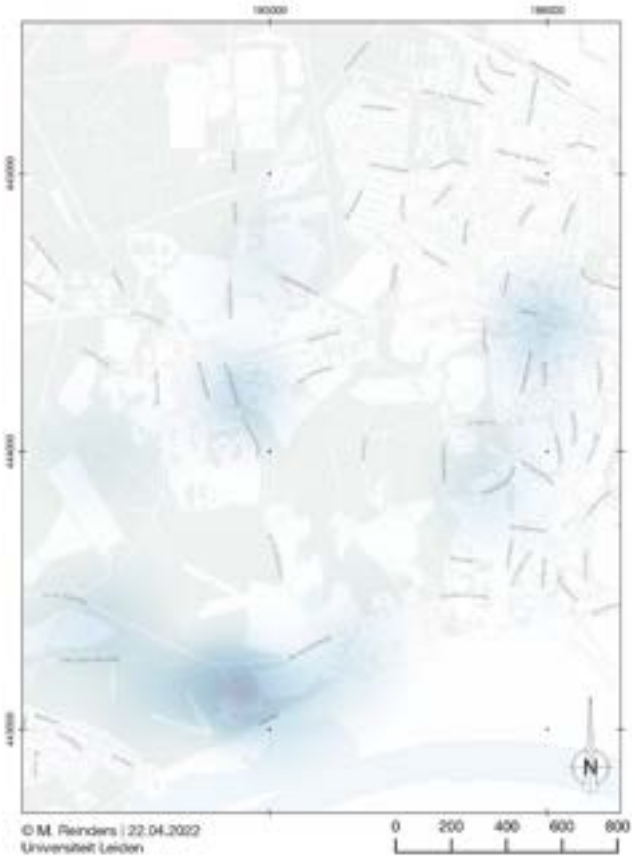

Figure 4.33. Heat-map on *Luftwaffe*-graves (data both maps: Hey, n.d.; maps by Author).

4.7 Conclusion

In this chapter, we have seen how scattered the physical remains from non-archaeologists (e.g., metal detectorists) are. Also, just part of these have been documented or published about, making its role for archaeology and the public difficult. As a result, a full overview of every single object or feature proved to be too ambitious. What became clear too, is how most of these individuals and groups have an intrinsic motivation to dig up war relics, which was developed separately and decades before professional archaeologists were present. Their data proved to be very worthy, especially on a synthesizing level.

5 Discussion

5.1 Introduction

In this chapter the presented results will be analysed. Within this discussion, the scientific archaeological values and, moreover, the broader aspect like engagement and participation of the different stakeholders are treated. Most and foremost, I discuss the relevance of conflict archaeology in general and for the Battle of Arnhem case in particular.

5.2 Comparing professionals and others in archaeological heritage

As already introduced in chapter 2, professional archaeology and other stakeholders (for this case specifically metal detectorists) have developed separately, coming from different angles and backgrounds. Discussing the yield of methods and results of both realms are interwoven, as will be shown next.

Archaeological WW2 research is limited by imposed methods. To date, some archaeologists only document the specific locations of unexploded ordnance (UXO)-clearance or even start their invasive research *after* all UXO (and other metal finds) have been removed from the site. Obviously, obtaining a list of found explosives for archaeological interpretation is futile, while a smooth cooperation between UXO-clearance and archaeologists is possible for a long time already (Figure 5.1), however, it is also no matter of course yet. In the same line, spatial planning (project developers) and other (commercial) goals determine the area and, indirectly, the period and theme that will be researched by archaeologists (Schute, 2016, p. 266).

In contrast, in many non-professional cases a metal detecting survey is based on other sources of a known site, so in fact focussed research. However, they are driven and limited by external factors too, for example, when a desired area is inaccessible, or specifically focussing on a unit or object of personal interest. In several cases a form of a desk based study is conducted, like studying an aerial picture in search for military positions. Of course, to some extent, this is done by professional companies too, but only when an area already is appointed. In many cases however, only the desk study of the UXO-clearance company is used, while this does not necessarily serve the goals of an archaeological research. For instance, “high risk of UXO” does not equal a high expectation on conflict archaeology, or vice versa.

Ironically, the documentation of spatial layout of both large objects and small finds like rifle cartridges or uniform buttons found in the top-soil seems to have been done exclusively by non-professionals (*Zoekgroep*). Again, in professional archaeology (e.g., the Dreijeroord case), this was only limited to locations appointed for UXO-clearance. Dutch archaeologists focussing on conflict have been arguing that the top-soil is the depositary for these relatively recent events, which, for example, can result in following the course of a battle (Wijnen, 2013). Also, classifying finds by context and function rather than material (which for contemporary archaeology better match the research questions) is not being applied consistently in professional archaeology (e.g., § 3.3.3), while metal detectorists are almost exclusively focussed on the use of an object.

Figure 5.1. Cooperation between UXO-clearance and archaeologists at Huis Dreijeroord, 2016 (picture and courtesy: BAAC bv, 's-Hertogenbosch).

Through the focus on specific locations, it was possible in many cases to establish a direct link with units or even persons, in some cases resulting in tracing back the person or their heirs back – thus linking past with present. Not in the least, although recovery and identification of MIA's is reserved for the Netherlands Armed Forces (BIDKL), the majority of them was found back in the first place by detectorists: British and German, but also Dutch volunteers of the *Waffen-SS*.

Metal detecting in a non-professional context, obviously, also has some significant limitations. This is a larger problem which is not confined to the Arnhem region or the Netherlands or to WW2 as a period only, as already introduced in chapter 2 and discussed in the past thoroughly (e.g., van der Schriek & van der Schriek, 2014; Herva *et al*., 2016). Metal detecting is primarily a hobby without obligation to document, report or share results. If documentation is applied, this is only a (very welcome) extension. This means potentially crucial information can be missed during the actions.

The documentation by the *Zoekgroep*, for example, only applies to the horizontal spread, not (systematically) through stratigraphy or features. Maps with spatial lay out are made and finds are being interpreted and put in a larger, historical context. However, the finding spots in fact are roughly drawn on a map. GPS was not in use back then, but also no measurement system was set up. In general, searching with a metal detector is find- and not context-based. Also, the soil level is not reduced in even spits nor is in situ documentation applied. This leaves room for improvement, and maybe professionals could reach out in equipment and teaching on methods.

Generally speaking, illicit and uncontrolled digging not only can undermine efforts to protect cultural heritage but, more importantly, it robs the public of the opportunity to learn from and appreciate these artifacts. Selection in the field (e.g., taking helmets but leaving civil ceramics or toothbrushes), lack of an overview and (proper) documentation can result in a one-sided story and subsequently meaning (ironically) at least part of the metal detector community doesn't serve or engage with the public at all. Furthermore, more than once detectorists

have been financed by their finds. In this light it is worth repeating that illegally ground-dug items have been purchased by one museum in the past (Anonymous, 2001) and that another museum even sold found items as souvenirs in their shop.

Mainly because of the aspect of danger from UXO it is forbidden to search with a metal detector as recorded in a byelaw (APV) in large parts of the research area. As agreed with the municipality of Renkum, the *Zoekgroep* have an exemption. For all others however, law enforcement is inconsistent when a detectorist is caught, as evidenced by the case in 2012 at Ginkelse Heide (§ 4.4.2). In the same year an episode of the BBC-series “Dig WW2” was broadcasted in which a military historian was searching the terrain of Dreijeroord with a metal detector, which yielded some finds and apparently could be conducted and broadcasted without any legal objections (van Willigen & van der Weerden, 2019, pp. 105-106). However, some larger illicit excavations nation-wide, for example the recovery of the dumped wreckage of a German Me 262 jet aircraft in Arnhem (2014) or recently (2022) a British Spitfire in Meerlo (Limburg province), are no longer conducted with impunity.

5.3 Archaeological material versus other sources

The western world looks at our contemporary past from a historic starting point (e.g., Henson, 2017, p. 52), using written documents (war diaries, maps), photographs, movies, or memories. The narratives of WW2 in the Netherlands and the Battle of Arnhem are no exception. An abundance of literature about a specific person, unit, airplane or other military point of view exists. The long tradition of a specifically military historical approach has shaped our communal view of how the contemporary past should be researched (Saunders, 2007, pp. 31-32). Finds from the Arnhem region are occasionally discussed in articles like in Airborne Magazine but have not yet reached the public or researchers as a matter of course.

In this thesis, many examples have been presented, both from contract archaeological excavations and actions of other stakeholders, in which other sources are challenged, seen from another angle or complemented. This can give us new information or complement what was not known before from other sources.

Firstly, some examples on detail information will be given. On the battlefield, the distribution of types and calibres of German artillery and mortars fired upon the British as well as discovered locations of those guns and mortars around the Perimeter themselves, give an exclusive insight in the course of the battle. This also applies for the distribution of *Beutemunition*, used by attacking Germans. Also, where in literature and in the Airborne Museum all German-used French Renault-tanks are called flamethrowing tanks, archaeology suggests a more nuanced view. Loose finds like the plastic Mickey Mouse and drugs from a German headquarters deviate from the general narratives too.

Secondly, through synthesizing decades of results it should also become possible to project the distribution of several types of finds on a larger scale. Parts of glider planes taken from the landing zones to the Perimeter give insight in recycling by Airborne soldiers. Swimming belts that ended up far from the Rhine may indicate positions of Poles that crossed the river from Driel to Oosterbeek. The spatial lay-out of British (and American) military and civilian materiel found outside of the battle-zones may give us insight in the spread of temporary POW camps or rendezvous points or, depending on the context, looted stuff by German soldiers. These are just some of the possibilities, which within the limitations of this thesis could not all be discussed but only coined, emphasizing the potential of conflict archaeology.

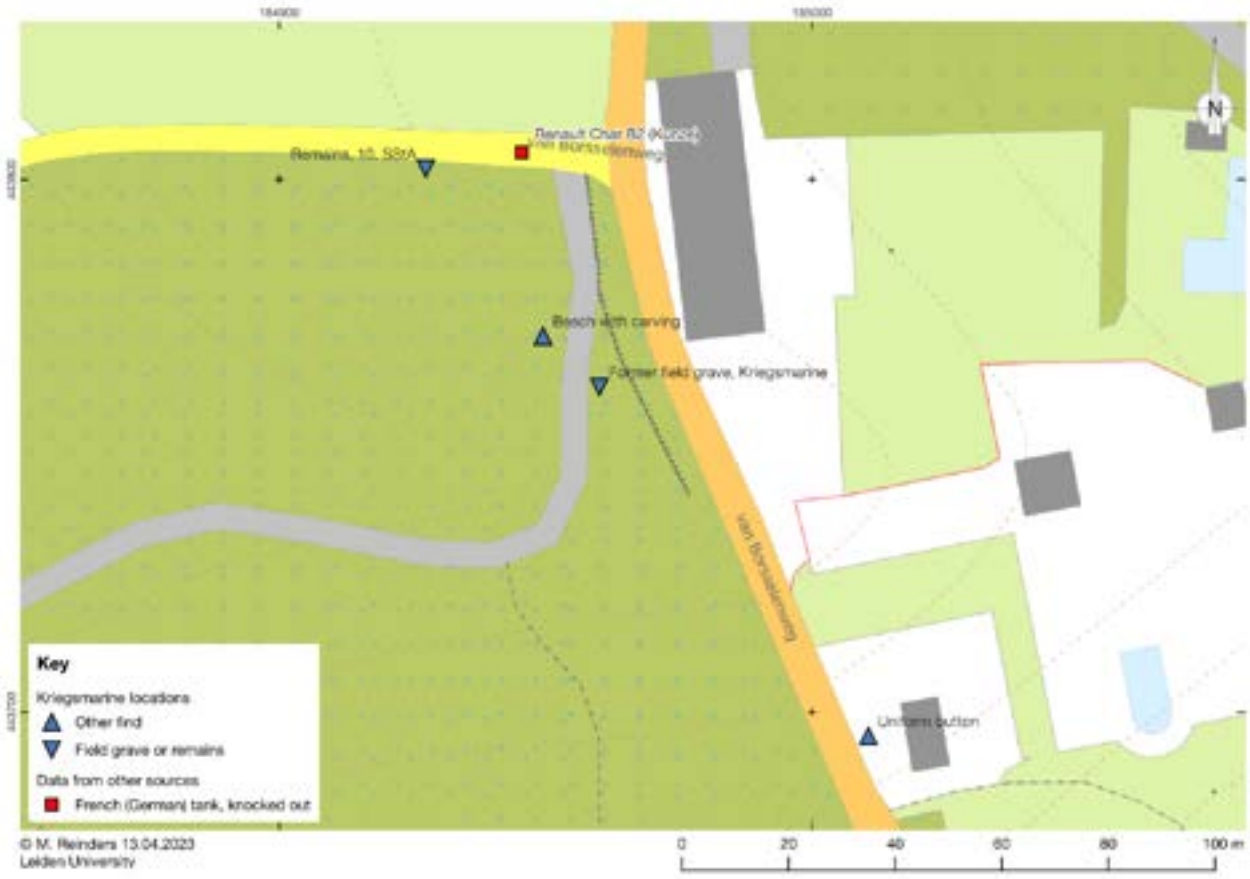

Figure 5.2. Known *Kriegsmarine* features at Van Borsselenweg 32-36 site, western Perimeter. In this area at least another eight *Kriegsmarine* graves were present in 1945 (data: *Zoekgroep*; Hey, n.d.; map by Author).

Thirdly, while most of the published literature on the Battle is written on the basis of written reports, statements and memories, this output can be compared to archaeological data. For example, it is striking how the positions of German units in the western Perimeter differ from each other in literature (compare Kershaw, 2008, who doesn't give details on German Navy units in the western Perimeter at all; Berends, 2002, p. 196; Brouwer, 2012, p. 107; 130; 148; Gerritsen, 2018, p. 141). Apparently, the written sources are not unambiguous about this and/or are strongly subject to interpretation. Moreover, theory and practice will have caused deviations (the "fog of war[19]"), which maybe is overlooked when solely written sources and historical maps are consulted. When chaos reigns, a military order may not have been (completely) obeyed, or (unexperienced) troops could get caught up in action elsewhere then where they should have been present, as stated by an SS-soldier in the western Perimeter: "during the final attacks on the pocket, the Navy unit on our right flank simply got lost on the way" (Kershaw, 2008, p. 368). Furthermore, in German *Kampfgruppen* it was no exception that these were composed of all sorts of soldiers, while bearing a name as if being a solid whole. As for the Von Tettau casus, all the units that have been discussed were designated to the aforementioned *SS-Bataillons* on paper, which seemed not representative of reality. The field graves, but also loose finds like buttons, present a deviant narrative of the events in this area (Figure 5.2). One could argue that the Navy units in this particular area have been forgotten, but only come back to life when being confronted with their materials remains.

[19] Uncertainty in reality during battles. First (indirectly) introduced by von Clausewitz (1832) and literally used for the first time by Hale (1896).

The same applies to the still existing foxholes along Oorsprongbeek. The closest unit may be platoons of D Company, The Border Regiment, however in none of the sketches, memories and subsequently in historical reconstructions these positions are mentioned. With this example, documenting what is still visible today shows how the landscape can have its own memory which helps us to reconstruct past events.

The abovementioned is comparable with memories (autobiographies or interviews with veterans or citizens). For example, the circa 45-year old impressions and drawn maps of James Swan (The Border Regiment) of the Van Lennepweg positions were corrected by the recovery and identification of Ager and Lowery (Swan appointed Egan and Ager on his map) in 1993. Besides, his story was also complemented as handed out German rifles for back-up were probably never used, as within their positions only British spent cases were found. As much as one would love to use interviews and memories, the testing of these kind of sources (e.g., using archaeology) makes one question to what extent these are reliable (e.g., Theune, 2010, p. 3); these “cartographic reflections” were, after all, created “under extreme stress” (Schute, 2016, p. 267), but are used as ‘truth’ or at least a starting point in many cases.

However, as it is not beneficial to view history and archaeology as competing specialities (Sturdy-Colls, 2012, pp. 96-97), instead of comparing sources one should look at the opportunities of an interdisciplinary approach. This has already been named the “inclusiveness of all (available) sources”, all having pros and cons and none of them being absolutely objective (Theune, 2018, pp. 26-27). Naturally, material remains (archaeology) also have its limitations and bias.

History is and shall never be "complete", and there will never be "one single definitive history" (Moshenska, 2013, p. 1), including of Battle of Arnhem. Moreover, archaeology is not merely a discipline in isolation, but should be part of the larger domain of WW2 heritage, including features in the landscape, underground remains and existing ruins and buildings. Not surprisingly, archaeology can be fully embedded in “memory and commemoration, public participation and education” (Saunders, 2007, p. 125) and is seen as an integral part of the war history of, for example, Flanders and France (*Ibidem*, p. 149).

5.4 Should non-professional initiatives be considered heritage?

According to the Heritage Law (*Erfgoedwet*) in the Netherlands only certified companies and some municipalities and universities may conduct (invasive) archaeological research, comparable with other countries. But how do all other acts where WW2 heritage is being found fit this image?

Important in this discussion is the interface with the Faro Treaty (2005), designed for the promotion of (public) participation in cultural heritage, which the Netherlands so far have not ratified yet. However, recently (December 2022), several heritage stakeholders in the Netherlands have signed a statement of intent. In this, the “involvement of the whole society” is being emphasized through not only informing on, but certainly empowering the public in what is considered their heritage (*Rijksdienst voor het Cultureel Erfgoed*, 2022, p. 39). This can certainly apply for WW2 too (e.g., Moshenska, 2013, p. 10), since this period irrefutably is part of our shared heritage and remembrance. The recent court ruling on the illegal salvage of an airplane wreckage also speaks volumes in this context. The court explicitly declared that this WW2 wreckage is in fact cultural heritage, which is in line with the “broad sense of heritage” which, as they state, is being determined by the significance assigned to it by society (*Rechtbank Limburg*, 2022), or, in other words: the public largely decides what heritage is meaningful to them.

Despite all mentioned obvious limitations and critiques, part of the (non-professional) initiators on the heritage of the Battle of Arnhem or WW2 in general in the Netherlands, which exceed the demarcations of this thesis, already fall within this framework. Physical remains, features and buildings can have a specific and very important meaning for communities, enabling them to being engaged on a “more intimate, sensuous and direct” manner with their own past (González-Ruibal, 2018, pp. 9-10). The Working Group of the AWN is a clear example, but in a way also people that have been using their metal detectors from the 1970s, and the proliferation of local museums showing ground-dug objects to the public from the 1990s onwards. They have been determining their own research areas and themes and conducting researches for decades while, simultaneously, professional archaeology was completely absent. A striking example is the fact that the Van Borsselenweg battlefield, treated extensively in this thesis, was documented and reported between 2004 and 2006 by the *Zoekgroep*, while six years later professional archaeologists only conducted prospective corings at a large area and, finding no indicators for (older) archaeology, cleared the way for a large development without attention for WW2 heritage. These non-professional initiatives share the fact that people are intrinsically and personally motivated to keep the past alive: it is their own heritage. In a way, this can also be seen as a successful start of engagement in conflict archaeology (Wijnen *et al*., 2016, pp. 33-35).

Figure 5.3: Close cooperation between volunteers and professional archaeologists with the same goal: documenting looted material at a WW2 site in Arnhem, 2019 (picture and courtesy: Author).

In this light one can ask: are archaeological (scientific) methods required when objects already get a platform for the public (e.g., ground dug items exhibited in a museum or discussed in a magazine)? For tourism or commercialism, it seems, a scientific narrative is unnecessary (Herrara, 2015, as cited in González-Ruibal, 2018, p. 10). However, only unbridled enthusiasm in the past will not be sufficient, as is shown in various examples already (e.g., § 5.2). Certainly not every single detectorist can be appointed an advocate of serving the public, but the same applies for professional archaeologists.

As a result, more close cooperation between professionals, volunteers and archaeologists and other stakeholders should be promoted (which is, as mentioned, one of the goals of the AWN already). In that context, the danger of encountering UXO should be named, which obviously could exist on a WW2 site. As in professional archaeology, this could act as a serious barrier for participation projects. Although confluence certainly is possible in professional archaeology in the Netherlands (e.g., *Stichting Infrastructuur Kwaliteitsborging Bodembeheer*, 2014) and during participation projects abroad (e.g., Operation Nightingale, n.d.), a concrete answer to this possible threshold is no part of this thesis.

Apart from this, cooperation between volunteers and professionals, in accordance with legal authorities and subsequently transparent and out in the open, in the Netherlands has very few examples to date in a WW2 context.[20] In 2011, the successful Westerbork Archaeological Research Project took place (Schute, 2013), which proved such a program is possible even within a very sensitive context (transit camp for Jews and other "unwanted" minorities). In 2017, a test trench dug at concentration camp Vught could be visited by the public, while archaeologists shared their finds and accompanying stories. In Arnhem region the rescue archaeology at a Flak site is a small but notable case (Reinders, 2019), because a varied group of volunteers from different backgrounds were gathered to document and save tangible remains (Figure 5.3).

5.5 Remembrance and education

Remembrance and education are closely linked. Through the wide variety of commemorations that exists nowadays, present and future generations can be educated on, for example, life during war and oppression, and subsequently (in)tolerance, discrimination, inclusiveness and racism.

In this context, it should be repeated that a large part and the best promoted commemorations in the Airborne Region have contained a military aspect to date. For instance, the annual parachute droppings at Ginkelse Heide are combined with a large military exercise (Bouman, 2021) and military display in general. Soldiers from the armed forces all over the world are present "commemorating the brave warriors who fought for our freedom" (*Defensie*, 2022). This rhetoric on "heroes" and "warriors" is seen in many examples of remembrance, which resounds in education and events for children. For example, in Ede a course for the ages 8 to 12 on WW2 is about "military heritage", which theme is explicitly different from "archaeological finds" (*CultuurPunt Ede*, 2016), not only as a period but also in topic. Moreover, the *Nationaal Militair Museum* is interwoven with the Armed Forces as "war (is) being inextricably linked with our contemporary world and so with us" (*Stichting Koninklijke Defensiemusea*, n.d.). Subsequently, they organise "Summer offensives" during school holidays

[20] In the context of (non-WW2) contemporary archaeology the Wyldemerck archaeological project is noteworthy (*Moluks Erfgoed*, n.d.).

and events where children are being encouraged to discover if “you have it in you to become a fighter pilot” (*Nationaal Militair Museum*, 2022).

Kok (2021) notices that the presence of the military can become problematic when commemorations are used in support of or even to justify military actions in the present (pp. 168-170). The aforementioned examples do not breathe a “conscious memory” of the terrible things that happened and are happening (what war in general means), in order to do everything what it takes to prevent new conflicts (e.g., Wijnen, 2015).

Another argument for this is how a dominant historical (heroic) view can usurp remembrance, education and tourism in a landscape which in fact is multi-layered (Schute, 2016, pp. 267-277). In the Oosterbeek Perimeter this is the case with the events of the *Panther-Stellung* and its remains, but also confiscated buildings from the preceding years during the occupation. Eventually, such focus can lead to one-sided and even false versions of the past (Seitsonen & Herva, 2017, p. 182).

Sutherland & Holst (2005) have emphasized that archaeology can offer a more realistic view instead an “over-glorification of the narrative” (pp. 3-4), or, in their words: “reading about a 'glorious' battle in a history book is one thing; seeing the evidence of the same battle on the skeletal material in a mass war grave is something quite different” (*Ibidem*, p. 4). Archaeology also does not present the ‘truth’. Despite reading about and researching war extensively, seeing movies, playing “realistic” games and watching the news or even studying material remains one should “grow increasingly convinced that [we] have very little idea of what a battle can be like”, as famous military historian Keegan starts one of his major works (1976, p. 1). Conflict, suffering and long-term consequences (to this very day) of wars being unrealistically portrayed or at least being underestimated, while shifting towards stereotypes of romanticism and heroism (Wijnen, 2015, p. 7) obviously is unwanted. González-Ruibal (2017) goes even further, stressing the importance of sharing results, making it public and even to foster dialogue (p. 298) in order to show another angle.

Moshenska (2013) names WW2 archaeology an important tool for education to understand the present, and a manner of commemoration (pp. 136-137). Archaeology, as a bridge between past and present, can even result in more empathy (Henson, 2017, pp. 44-45) like with people in comparable situations in the present as studied by materials from WW2. “Places of terror”, like concentration camps, can be locations of remembrance and above all a warning for the future. From the 1990s onwards archaeology has been used abroad for education purposes in these contexts (Theune, 2010, pp. 3-4).

Subsequently, the intermediary role an archaeologist can have between the public, veterans or groups with other (social) backgrounds, young and old, can be discussed. In this light, the case of the demolishing of Huis Dreijeroord, a symbol and *lieu de mémoire* for both veterans, their heirs and local residents, should be emphasized. This decision was painful and was met with protest and citizens’ initiatives, supported by (then still living) veterans themselves (Figure 5.4). The British ambassador in the Netherlands called it a “tragedy” (*De Gelderlander*, 2016). Despite all emotions and actions, the project developer demolished one of these strong and living symbols. This decision is one that maybe would not have been imposed abroad. In Flanders, for example, the design of a motorway was altered because of the presence of archaeological heritage from WW1 and its attached importance (Saunders, 2007, p. 161).

In practice, however, excavation remains the only option in many cases. But even (or especially?) then, archaeology can be of significance, for instance with a participation project. The Ministry of Defence of the United Kingdom has initiated, for example, the Operation Nightingale project in which through archaeology military personnel and veterans (e.g., with PTSD) can experience processing or even closure (Ministry of

Defence, 2020). Of course certain projects could also be conducted with other citizens and with other goals. It may seem far-fetched for archaeologists working in the Dutch field, but they too can assume an intermediary role and thus contribute to remembrance and education. At Huis Dreijeroord it would have been possible to bring together all involved people, maybe even including veterans, their heirs and local residents, to explore the "material narrative of the conflict" (González-Ruibal, 2017, p. 281), which in their own perspective all is part of both their personal and shared heritage.

Figure 5.4. British veterans returned to their old battlegrounds in September 2016 in support of the protest against the demolishing of Dreijeroord (picture and courtesy: NRC Handelsblad).

5.6 An archaeology of the Battle of Arnhem?

At the end of this chapter, it seems logical to analyse and summarize all discussed topics before reaching a final conclusion. The nucleus may be illustrated through the following dichotomy. Conflict archaeology can have a specific scientific value. Not only does it provide detailed information on known or unknown events. Derived from this data, deviant views or focus on a deeper level can arise. Also, the effect of or importance for certain communities (e.g., Wijnen *et al*., 2016, pp. 31; 35) in the present and future should be emphasized.
Firstly, several examples have been presented on new details or other knowledge-gain. Moreover, these objects themselves play a key role as they literally "have been there": they provide a window through time, offering people in the present the opportunity to touch their past. It gives a personal insight in the suffering and other emotions or customs of people who in many cases have not left us any other memories. Typologies of (general) beret emblems used by Airborne soldiers is something different than the specific copies of Ager and Lowery, which exemplify something characteristic, like vanity. The same goes for the trench art-rings like the copy with the "Tunis 1943" engraving or the skull, or any other hand-made or -adapted object Saunders (2007)

has named “a trace of humanity” (p. 41); an emotional action caught in time. This is reflected in signs of pride, assuming the skull-ring indeed was worn by an SS-soldier, or a hopeful reminder of an earlier victory in North-Africa for future thoughts. Obviously, it has to be emphasized these interpretations never are purely objective. Transcending this through all these finds and features, archaeology can offer an aberrant view on past events, or how we see or deal with conflict in general. Such deviations of the generally accepted, however, may not always be welcomed with open arms “when scientific conclusions do not meet social expectations” (Zalenska *et al*., 2017, p. 17; also González-Ruibal, 2018, p. 7).

For the Arnhem region, some examples can be named. For instance, the emotional impact of a field grave can be unquestionably large. Showing remains or objects from a grave have the power to confront us with the realities of war or even disrupting a “dominant narrative” (González-Ruibal, 2017, p. 297); whether it is a ‘clean’ grave with the remains in their original anatomical composition or the gruesome find of a skull with helmet belonging to an 18-year old German boy found in Oorsprong forest.

Some found objects from British positions may indicate looting of civilian possessions. Even though it has been described that Allies also plundered Dutch civilian homes extensively (Klinkenberg *et al*., 2020), in the ‘hero narrative’ of the British Airbornes this could be an unwelcome discovery; a reality which in archaeology cannot be covered up.

The remarkable contrast in the deployment of Dutch SS-volunteers against the British liberators of the Airborne Division is also no secret (Maan, 2019), however, also no main topic. Showing photographs of them or, obviously, their objects we can find and touch, confronts us with this dark side of what is also part of Dutch history: that of conscious choices of over 20,000 individuals (van Roekel, 2011, p. 9) like Bollen, Gebbinck and van Ginkel, fallen while fighting Allied soldiers at Ginkelse Heide. Needless to say, these events have no place in the annual commemorations at this location, and as a consequence may well be become underexposed.

A last example, on an international level, is the Spanish pistol found in German context. This weapon not only sheds a light on German scarcity, but also illustrates the formal neutrality, but cooperation in practice, of Spain under dictator Franco towards Nazi Germany. Spain’s friendly attitude consisted among other things of arms deliveries, of which a tangible example ended up in an Oosterbeek garden.

Furthermore, in this chapter the ‘hero narrative’ that dominates most (military) commemorations is mentioned. Questioning this of course does not equal downplaying the value of defeating Nazi Germany, but simultaneously solely repeating that rhetoric can at least create a one-sided story, in which no critical commentary (González-Ruibal, 2017, p. 296) is possible, specifically when connecting remembrance with the present and future state of the world (see § 2.3; also Kok, 2021, p. 168-170).

Moreover, what is the definition of a “warrior” or “hero” has been a debate which has not resulted in consensus (in armies or societies) throughout the previous and present centuries and therefore the definition has changed tremendously (Bourke, 1999, p. 107). The same goes for how soldiers have felt pride, shame or another emotion for their acts. For example, according to a survey held in 1949 with WW2 veterans, the majority felt completely indifferent towards their medals (as some of the veterans recognized in them a glorification of killing), while those that did claim those awards mostly did not see actual action at the front (*Ibidem*, pp. 132-133; also: note 122, p. 423). It has been said: instead of “over-glorification of the narrative” (Sutherland & Holst, 2005, pp. 3-4), archaeologists can have their (modest) share in challenging “prevalent public opinions” (Wijnen, 2015, p. 5). The accompanying “commercialization” of remembrance, and it becoming a “leisure activity” or

“experience” (Figure 5.5), should also be viewed in this light (Kolen & van Krieken, 2010, p. 94; Kok, 2021, pp. 75-76).

Lastly, public participation maybe is best described by Harrison & Schofield (2010), in which they see contemporary archaeology (e.g., WW2) not as a study focussed on a specific period, but as a “critical engagement” in which the past plays a significant role in the present (p. 8). Since most of us have a personal (e.g., family) link with WW2, and the fact that these global events shaped our modern world towards where we are now, it seems logical that a research agenda on topics that are relevant in the present and future should be designed in accordance with different stakeholders, in which the people appoint their own heritage. This thought, sometimes referred to as “democratising of social heritage values” (e.g., Pastor Pérez *et al*., 2021), is being promoted by the Faro Treaty, as already discussed.

An example has been already named with the Huis Dreijeroord case, and can also be appointed in the following. In the last few decades, Polish people have increasingly become part of Dutch society with just under half a million people, mostly working as migrant workers (*Algemene Bond Uitzendondernemingen*, 2021). Also, the Polish contribution to the Battle of Arnhem and the liberation of the Netherlands in general, has been neglected and downplayed for long. Archaeologists, for whom it is not uncommon to find the physical evidence of their presence in a WW2 context, could contribute to engagement between the different cultures, bringing them together by letting people explore the impact of their (partially unfamiliar) shared history. This could, for instance, very well be combined with the goal of the initiators of the website *Polen in Beeld*, which is to “contribute to the public debate on and image of” Polish people and their culture, also by teaching on Operation Market Garden (*Polen in Beeld*, n.d.).

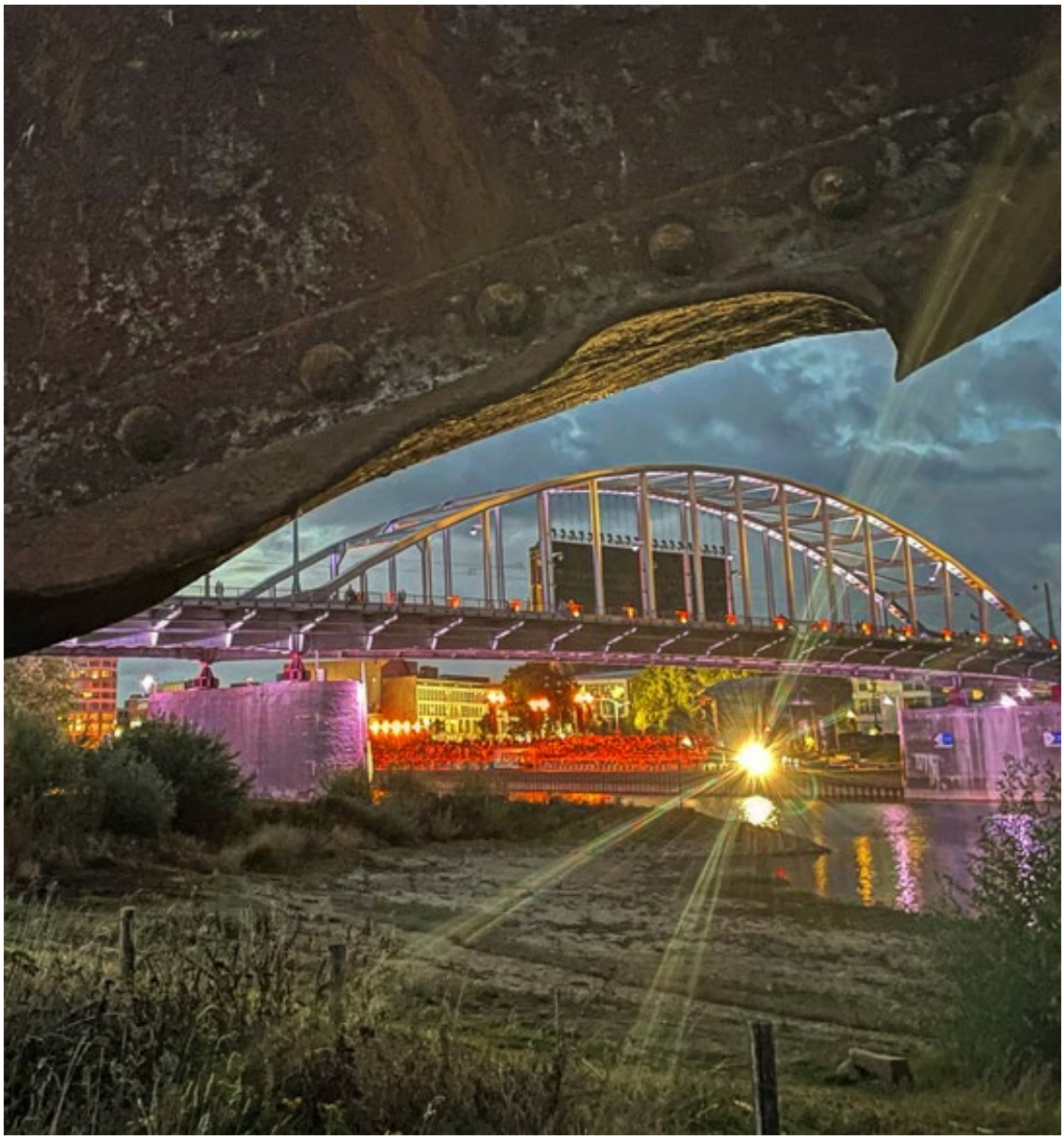

Figure 5.5: Archaeology (part of the 1943-built bridge as memorial) in the shadow of “Bridge To Liberation” experience, September 2022 (picture: Author).

6 Conclusion

6.1 Introduction

The September month still plays an important role in remembering the 1944 events in the Arnhem region. It has become clear that a wide variety of stakeholders are part of these commemorations, all in their own right, and that this tradition is still developing. This thesis examined what is the position of archaeologists and their narratives in this realm.

6.2 The domain of professional archaeology and non-archaeologists compared

In the Arnhem region, since circa 2010 professional archaeology has been increasingly involved at WW2 sites, the majority consisting of contract archaeology and within regular cultural heritage management (CRM). Academia have been absent in the research area. Through consulting the national information system (Archis) a full overview seemed possible, which is presented in this thesis. Most of the invasive researches were through watching briefs of unexploded ordnance (UXO-)clearance, partly bound by legislation resulting in the (deeper) heritage value not always being situated on the foreground.

Archaeological heritage of by non-archaeologists (not equal to 'non-professional') is shaped as a very extensive range of stakeholders, including individual as well as united metal detectorists, but also commercial UXO-clearance companies and branches of the Ministry of Defence (Netherlands Armed Forces). A full overview proved to be too ambitious. As a result, this thesis provides merely a brief overview in which was chosen to discuss case studies of the *Zoekgroep* (1993 – present), AWN working group (2015 - present) and only briefly mentioning some other, individual actions, all of them metal detectorists. Moreover, motivations and goals of all these different people have also been researched to a lesser degree. In general, as stated in several articles, the motivation can be to trace back persons Missing in Action (MIA), but also "direct contact" with events from the dark past, and "promoting the preservation of threatened remains".

The emphasis in professional archaeology (so far) is specifically within the scientific value while it seems devoid of a "critical engagement" (a common aspect of contemporary archaeology). This seems to result in it (in the Arnhem region, and maybe even in the Netherlands in general) being no part of the wider concept of WW2 heritage, the public, its remembrance, education et cetera, subject to certain exemptions. It also means that most research can be labelled military or battlefield archaeology; conflict archaeology being arisen from the broader sense of heritage in which the past, the present and future are connected and, for instance, the impact on societies like our own is being discussed.

Since commercial archaeologists have to work with restrictions, while some non-professionals (e.g., metal detectorists) conduct focussed research and are active for at least three decades prior to professional archaeologists entering the WW2 room, most detailed data, spatial layouts and subsequently also synthesizing research is available from non-archaeologists. This engagement also arose naturally and independently.

However, non-professional archaeology obviously has some significant limitations. Most of the research is find- and not context-based and most importantly, metal detecting is a hobby which lacks any obligation to

document and share results. In addition, hardly any law enforcement exists, resulting in condoning illicit digging and even trading in objects (on an unknown scale) by individuals but also museums. For archaeological research this all means no full overview of found artefacts is possible, of which this thesis in fact is proof, meaning also at least part of metal detectorists is not promoting transparency or public engagement, actually, quite the contrary. On the other hand, as professional archaeology is commercial as a result of the Valletta Treaty (1992), public outreach or engagement in a WW2 context has been conducted only on a very limited scale. A fruitful symbiosis has not been reached yet, but very well seems possible.

6.3 Archaeology as a source

The soil archive has presented details with which accounts on events can be broadened (e.g., the deployment of German Navy units in the Perimeter). Also, acts that deliberately could have been withheld might come to light (e.g., the use of drugs). Furthermore, these features can give overshadowed events or persons their face or voice back in the wider narrative. Even when the last user is not identified (e.g., the skull-ring), such an object presents a reflection of an emotion, or of customs, which offers people in the present and future a way to deeply connect with the past, taking into account a degree of subjectivity. It can also shock people, especially when human remains and accompanying personal objects come to light.

Moreover, the combination of all available sources (an interdisciplinary approach) has shown how archaeology indeed has become available and can no longer be ignored, in order to create a wide net of different narratives, of which none is purely objective or "complete", but rather complementing, all angles contributing in their own way. However, physical remains still do not seem to have reached others than the archaeologists themselves routinely (think of the "flamethrowing tanks" or aforementioned Navy units). In this thesis, it is said, no full overview but rather the potential of these insights are presented. In this sense, archaeology is part of the broader realm of WW2 heritage in which still-existing buildings, but also carvings in trees, damage from shrapnel in concrete or loose archaeological or metal detecting finds together create one dynamic *lieu de mémoire*.

6.4 Heritage value of non-archaeologists

In accordance with the Faro Treaty (2005) people should have a (stronger) voice in determining what is their own heritage. Archaeology in fact can be applied as a very useful tool or method in letting people engage in that. In a way, the decade-long tradition of non-archaeologists being involved in WW2 heritage already provides herein; from individual detectorists to local museums. This sprawl, however, is at the cutting edge of truly motivated persons and groups and (partly unintentionally) disturbance of WW2 heritage, claiming it and removing its context (e.g., through personal, non-transparent collections and trading) while in fact it belongs to the public, not to individuals usurping it. This also resulted in the fact that only the work of selected groups and individuals could be used for the archaeological framework in this thesis.

The negative sides of metal detectorists are unbridled actions by anyone without any obligation to document and share results, yet claiming objects. It also is not known what is the division between detectorists that do document (e.g., the *Zoekgroep*) and those that don't. However, it can be beneficial to invest in bringing all worlds closer, in order to learn from each other in techniques, experience but also by differing motivations and (social) backgrounds (e.g., veterans, heirs and local residents of Huis Dreijeroord or present-day Poles in the

Netherlands). It has to be concluded that a large part of all other, non-archaeological stakeholders already was an inseparable part of WW2 heritage and its remembrance, long before professional archaeologists started researching WW2 (in the Arnhem region or in the Netherlands). This cannot be denied nor ignored when speaking of heritage value.

6.5 The significance of archaeology for remembrance and education

Conflict archaeology in the close-linked remembrance and education is illustrated in two forms. Firstly, this is through the aforementioned deviant *perspectives* of a dominant narrative ("showing another side"), which does not equal giving new *facts* in a historian's point of view. No source can provide a 'complete' overview; they all show their own angle. For archaeology, this may be translated through education programs for primary and secondary schools where WW2 or war and conflict in general may be told through the eyes of an archaeologist, using tangibility, the landscape, and context. For teenagers and adults tours may be conducted (which already has been done in the recent past). For educational purposes, this seems especially relevant while linking the previous World War with the current world conflicts in the background, but emphasizing on suffering rather than glorification of "heroes" or even "warriors". Secondly, archaeologists can play an intermediary role between people with different backgrounds (professional or personal), and conducting archaeology can even contribute to closure and processing. In this light, the Battle of Arnhem (being claimed one of the last major enemy (German) victories of WW2) seems a prime case.

6.6 Reflections and future visions

Although this thesis lifted the veil of "the fog of war" a bit, it was no complete overview of the soil archive of the Battle of Arnhem. However, it does show the potential of an interdisciplinary approach, and for engagement and public participation. Promoting and facilitating closer cooperation (and coordination) between all stakeholders, respecting their motivations (to the extent of tangible heritage responsibly being documented) should be implemented by the responsible authorities (municipalities, the province) and through focussed research led by universities.

It must be emphasized too that this case study only investigated a famous, but small part (both geographical and in time) of WW2 archaeology, while leaving other sites and themes in the Arnhem region (e.g., airfield Deelen, *Panther-Stellung*, et cetera) or in the Netherlands out of consideration. At this moment, roughly 15 years after the first (systematic) archaeological research on this period in the Netherlands, the lack of synthesizing research in this discipline should certainly be compensated.

As has been said already by many writers before me, we are at a tipping point in time where the speaking witnesses almost completely have disappeared. As I write this, still living 16 year-olds in 1944, have almost reached the age of 100. Surviving material remains and the landscape will become increasingly important being the sole surviving witnesses of this last major conflict western Europe was directly involved in. Without the proper view of heritage value from above (e.g. by legal authorities), archaeologists (possessing the techniques) and non-archaeologists (being intrinsically motivated), being at crossed purposes, landscapes of conflict will continue to be erased systematically by project developers and looted by uncontrolled acts of some of the metal detectorists. We can safely declare that striving towards an interdisciplinary way of research, determined with the input of all stakeholders, is our responsibility towards both past and future generations.

6.7 The significance of WW2 archaeology

Having reached the final conclusion: *what is the significance of WW2 archaeology*, as discussed through the Battle of Arnhem? In the wide realm of archaeology and in a larger perspective the full landscape of buildings, nature and mobilia, many individuals and groups are involved with different backgrounds and professions, of which some already on their own for many decades. This means the physical traces of the Battle of Arnhem have had significance to people already for long, and that value is determined by individuals or communities themselves.

In this thesis, it also became clear to what extent archaeological research can have potential both as a source in knowledge-gain, and on a deeper level in confronting us with past events. By this, archaeology can offer us deviant angles of the general, prevalent or even one-sided narratives that exist, and by this influence current and future generations. This of course is not limited to the research area or WW2 alone, but can be seen as part of the movement of contemporary archaeology. This can be achieved when archaeology is not predominantly development-led (commercial), but rather becomes an integral part of commemoration and education, for example through public participation projects or at least involving all people by which they can engage in their individual and shared heritage.

Abstract

In this master thesis, finding the significance(s) of conflict archaeology is key, with the Battle of Arnhem (September 1944) as a case study. This event, like (all) other battles and narratives of WW2, or even of our contemporary past as a whole, has been researched by historical, rather than archaeological sources and views. Using the data of excavations from professional archaeology, but also the results, methods and motives from non-archaeological initiatives, be it local museums or individual or united metal detectorists, an overview of the widespread of several different stakeholders that are being involved in the remembrance of the Battle of Arnhem is given. Also involved in heritage are the Ministry of Defence (Netherlands Armed Forces) and commercial unexploded ordnance (UXO-)companies, both literally coming into contact with ground dug items, but these were no part of this thesis, as giving a full, complete overview of *all heritage* from the soil archive seemed too ambitious. Through several case studies and some examples from all available non-archaeological data, a selection of non-professional archaeological finds from the Battle of Arnhem was presented for the first time. Furthermore, by consulting all data from professional archaeology and combining the results and methods with the motivations and initiatives from other discussed, aforementioned, stakeholders, an attempt at a synthesizing level is made. Using this, different views on, for example, remembrance and education, are presented. Especially the role archaeology can play in the “broader meaning” and “democratising” of heritage, and the role it may have for all involved specific communities, is being discussed. Through this, “prevalent opinions” may be challenged and deviant narratives may arise, and the potential of an interdisciplinary approach becomes clear: challenging dominant narratives, providing a more complete and nuanced picture of the past, and promoting a more inclusive and diverse understanding of history by cooperation, and by consulting and respecting all involved stakeholders, which is in line with the Faro Treaty.

Samenvatting

Het duiden van de betekenis(sen) van conflictarcheologie staat in deze masterscriptie centraal, met de Slag om Arnhem (september 1944) als casestudy. Deze gebeurtenis is, net als (alle) andere veldslagen en verhalen van de Tweede Wereldoorlog, of zelfs van ons recente verleden als geheel, onderzocht aan de hand van historische, in plaats van archeologische bronnen en opvattingen. Met behulp van de resultaten van zowel opgravingen uit de professionele archeologie als acties van niet-archeologische initiatieven, of het nu gaat om lokale musea of individuele of verenigde metaaldetectorzoekers, is een overzicht van de verschillende belanghebbenden die betrokken zijn bij de herdenking van de Slag om Arnhem gegeven. Ook betrokken bij erfgoed zijn het Ministerie van Defensie (Nederlandse Krijgsmacht) en commerciële OOO-bedrijven (Opsporing Ontplofbare Oorlogsresten), die beide letterlijk in contact komen met het begraven verleden. Deze partijen maakten echter geen deel uit van deze scriptie omdat het geven van een volledig overzicht van *al het erfgoed* uit het bodemarchief te ambitieus bleek. Voor het eerst is een selectie van niet-professionele archeologische vondsten (zoals van detectorzoekers) van de Slag om Arnhem gepresenteerd aan de hand van enkele casestudy's en andere voorbeelden, mits de gegevens beschikbaar (gepubliceerd of anderzijds gedeeld) waren. Door alle gegevens uit de professionele archeologie en van de andere bovengenoemde belanghebbenden te raadplegen en te vergelijken, is bovendien een poging gedaan tot onderzoek op een synthetiserend niveau. Aan de hand hiervan worden verschillende visies op bijvoorbeeld herdenken en educatie gepresenteerd. Vooral de rol die archeologie kan spelen in de "bredere betekenis" en "democratisering" van erfgoed, en de rol die het kan hebben voor betrokken gemeenschappen, zijn belangrijke onderdelen binnen dit onderzoek. Door archeologie kunnen "heersende meningen" worden uitgedaagd (dialogen gevormd) en kunnen alternatieve verhalen ontstaan. Daardoor wordt het potentieel van een interdisciplinaire aanpak duidelijk: het uitdagen van dominante verhalen, het bieden van een completer en genuanceerder beeld van het verleden, en het bevorderen van een meer inclusief en divers begrip van de geschiedenis door samenwerking en het raadplegen en respecteren van alle betrokken belanghebbenden, wat in lijn ligt met het Verdrag van Faro.

Bibliography

Airborne Museum (n.d.). *Airborne Experience. Beleef het zelf*. www.airbornemuseum.nl/tentoonstellingen/airborne-experience

Airborne Region (n.d.). *Airborne Region – Samen stilstaan*. http://airborne-region.nl/

Algemeen Dagblad (1979, August 18). 'Oorlogsgekken' op zoek naar bommen. Korpschef Renkumse politie wil verbod op metaaldetector. *Algemeen Dagblad*, 31. www.delpher.nl

Algemene Bond Uitzendondernemingen, 2021. *Factsheet arbeidsmigranten in Nederland: de cijfers*. ABU. www.abu.nl/app/uploads/2021/06/HR_ABU_NBBU_Factsheet_Arbeidsmigranten_A3_juni-2021_DEF.pdf

Anonymous (1996). Duits luchtafweerkanon opgegraven. *VVAM Nieuwsbrief 64. November 1996*.

Anonymous (2001). Bodemvondsten. *VVAM Nieuwsbrief 82. Mei 2001*.

Anonymous (2005). Zeldzame Stengun bajonet opgegraven. *VVAM Nieuwsbrief 97. Februari 2005*.

Anonymous (2012). Stoffelijk overschot van militair gevonden op de Ginkelse Heide. *VVAM Nieuwsbrief 128. December 2012.*

Anonymous (2013). Veel belangstelling voor de excursies met als thema 'Bodemvondsten'. *VVAM Nieuwsbrief 132. December 2013.*

Anonymous (2018). Luchtmobiel op de Airborne begraafplaats. *Airborne Magazine Nr. 12*, 32-34.

Beckers, D.E.P.C.M. (2022). *Een stip op de kaart: over Blitzmädel, plunderingen en afval. Opgraving (archeologische begeleiding). Buitengebied Koningsweg Noord*. BAAC-rapport A-20.0203.

Berends, P. (2002). *Een andere kijk op de slag om Arnhem. De snelle Duitse reactie*. Uitgeverij Aspekt.

Berends, R. (2018, September 29). PVV haalt uit naar Bridge To Liberation Experience in Arnhem. *De Gelderlander.* www.gelderlander.nl/arnhem/pvv-haalt-uit-naar-bridge-to-liberation-experience-in-arnhem~ab47dd4f/

Boersma, W. (1992). Een opmerkelijke vondst. Ministory XXXIII. *VVAM Nieuwsbrief 45. 1992.*

Boersma, W., Korsloot, J. & Rinkema, J.G. (2009). *De verdediging van de westzijde van de Perimeter in Oosterbeek. Battlefield Tour West Perimeter*. Vereniging Vrienden van Airbornemuseum.

Boersma, W. (2019). De Royal Enfield 125 van het Airborne Museum. Bits and pieces gekooide vlo. *Airborne Magazine Nr. 16.*

Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.) (2017). *Een brug te ver onderzocht. Archeologisch onderzoek in Stadsblokken-Meinerswijk, Arnhem.* ADC monografie 22. ADC ArcheoProjecten.

Bosman, A.V.A.J. (2017a). Onderzoek naar granaatscherven. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht. Archeologisch onderzoek in Stadsblokken-Meinerswijk, Arnhem.* ADC monografie 22 (pp. 106-117). ADC ArcheoProjecten.

Bosman, A.V.A.J. (2017b). Metaal en leer. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht. Archeologisch onderzoek in Stadsblokken-Meinerswijk, Arnhem.* ADC monografie 22 (pp. 136-166). ADC ArcheoProjecten.

Bosman, A.V.A.J. (2017c). Overige metaalvondsten. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht. Archeologisch onderzoek in Stadsblokken-Meinerswijk, Arnhem.* ADC monografie 22 (pp. 278-281). ADC ArcheoProjecten.

Bosman, A.V.A.J. & Sam, D. (2017). Vondsten. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht* (pp. 266-269). ADC ArcheoProjecten.

Bosman, A.V.A.J. (2021). Modern metaal. In Smole, *Arnhem Schuitgraaf Veld 24. AR18.19. Sloot noch grippe (greppel) ontzien. De rand van een Romeinse nederzettingsterrein alsnog opgegraven*. Archeologisch Rapport Arnhem 111 (pp. 79-88), gemeente Arnhem.

Bouman, M. (2021, September 1). Paralandingen en vrachtdroppings: Defensie oefent in regio Arnhem en de Betuwe. *De Gelderlander.* www.gelderlander.nl/arnhem/paralandingen-en-vrachtdroppings-defensie-oefent-in-regio-arnhem-en-de-betuwe~af07ef9f/

Bourke, J. (1999). *An intimate history of killing: face-to-face killing in twentieth-century warfare*. Granta Books.

Branderhorst, A. (2009, April 2). Wandelen tussen sporen van oorlog. *Resource #23* (3), 10-11.

Brentjens, J. (2021). Museumcollectie – Amfetaminen. *Airborne Magazine Nr. 21*, 22-23.

Bridge To Liberation (n.d.). *Informatie en veelgestelde vragen*. Bridge To Liberation. https://bridgetoliberation.nl/bezoekersinformatie/

Brouwer, J. (2012). *Van Market Garden tot bevrijding en het belang van het Over-Betuwse bruggenhoofd (Het Eiland)*. Historische Vereniging Marithaime.

Brouwers, K. (2012). *Fields of Glory or Fields of Gory? The emergence of conflict archaeology as an academic discipline and its influence on current archaeological research*. Master thesis. Universiteit Leiden. https://hdl.handle.net/1887/18436

Castendijk, B. (2011). *De zeer schoone uuren. Oosterbeek 1944. Dagboek van Bob Castendijk, 1 september – 6 november*. Uitgeverij Kontrast.

Cornelissen, M. (2021). Een onuitwisbare indruk. Ministory 139. *Airborne Magazine Nr. 22*, 28-34.

CultuurPunt Ede (2016). *Ede vroeger en nu. Erfgoedleerlijn Ede. Militair erfgoed in Ede*. www.edetoenennu.nl/downloads

De Erfgoedstem (2017, September 23). *Archeologisch onderzoek brengt sporen Slag om Arnhem naar boven*. De Erfgoedstem. https://erfgoedstem.nl/archeologisch-onderzoek-brengt-sporen-slag-om-arnhem-naar/

Defensie (2022, September 17). Herdenking Market Garden. *Ministerie van Defensie.* www.defensie.nl/actueel/activiteiten/2022/09/17/herdenking-market-garden

Defilet, M., Smit, M., Bosman, A.V.A.J., Wieringa, E.N., van Roode, S.M., de Jong, J. & Bos, J.E.M.F. (eds.) (2018). *Van Woerd tot Wereldoorlog. Het archeologisch onderzoek in Arnhem Schuytgraaf. Archeologisch Rapport Arnhem 10.* Gemeente Arnhem.

de Gelderlander (2016, August 10). Britse ambassadeur vindt dreigende sloop Dreijeroord 'tragedie'. *De Gelderlander.* www.gelderlander.nl/default/britse-ambassadeur-vindt-dreigende-sloop-dreijeroord-tragedie~a2678673/

de Telegraaf (1994, January 25). Stoffelijke resten uit Slag bij Arnhem gevonden. *De Telegraaf*, 9. www.delpher.nl

de Vries, G. (2017). *Captured arms (Beutewaffen)*. Propaganda photo series Vol. IX. SI Publicaties bv.

Fleischer, W. (1996). *Beutewaffen und -gerät der deutschen Wehrmacht 1938-1945*. Waffen-Arsenal Band 158. Waffen und Fahrzeuge der Heere und Luftstreitkräfte, Podzun-Pallas-Verlag.

Fontijn, D. (2016). *(Un)familiar and (un)comfortable - the deep history of Europe*. www.academia.edu/23600583/_Un_familiar_and_un_comfortable_-_the_deep_history_of_Europe

Fred (2012, January 12). Willem van Ginkel. *Findagrave.* https://nl.findagrave.com/memorial/83371277/willem-van_ginkel

Gander, T. & Chamberlain, P. (2008). *Enzkyklopädie deutscher Waffen 1939-1945. Handwaffen, Artillerie, Beutewaffen, Sonderwaffen*. Motorbuch Verlag.

Geerts, R.C.A. (2017). Vindplaats 1: Flak-stelling. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht* (pp. 66-68). ADC ArcheoProjecten.

Gelre Nieuws (2021, October 24). Unieke vondst in het bos bij Heveadorp. *Gelre Nieuws*. www.gelrenieuws.nl/2021/10/unieke-vondst-in-het-bos-bij-heveadorp.html

Gerritsen, B. (2018). *Fighting the British at Arnhem. The SS-Unterführerschule Arnheim. Its origins and operations against the 1st British Airborne Division September 1944*. R.N. Sigmond Publishing.

Gerritsen, B. (2021). Gewoon een oud doosje. Een Princess Mary Gift Fund 1914 Box in een schuttersput. *Airborne Magazine Nr. 22*, 26-27.

Gerritsen, B. & Revell, S. (2010). *Retake Arnhem bridge. An illustrated history of Kampfgruppe Knaust September-October 1944*. R.N. Sigmond Publishing.

González-Ruibal, A. (2017). *Excavating Memory, Burying History. Lessons from the Spanish Civil War*. https://doi.org/10.17169/refubium-146

González-Ruibal, A. (2018). Ethics of Archaeology. *Annual Review of Anthropology, 47(1)*, 345–360. https://doi.org/10.1146/annurev-anthro-102317-045825

Hale, L. (1896). *The fog of war*. Edward Stanford.

Hanson, T.D. (2016). *The archaeology of the Cold War*. The American Experience in Archaeological Perspective. University Press of Florida.

Harrison, R., & Schofield, A.J. (2020). *After modernity: archaeological approaches to the contemporary past*. Oxford University Press.

Henson, D. (2017). Archaeology and education. In *Key Concepts in Public Archaeology*. UCL Press.

Herva, V.P., Koskinen-Koivisto, E., Seitsonen, O & Thomas, S. (2016). 'I have better stuff at home': treasure gunting and private collecting of World War II artefacts in Finnish Lapland. *World Archaeology, 2016*. http://dx.doi.org/10.1080/00438243.2016.1184586

Hesseling, H.J. (2018). *Kazerneterrein Ede, gemeente Ede, archeologisch vooronderzoek: proefsleuvenonderzoek – variant archeologische begeleiding*. RAAP-rapport 3424. RAAP bv.

Het Vrije Volk (1975, May 5). Schat in tuin. *Het Vrije Volk*, 3. www.delpher.nl

Heusschen, A. (2022). Interview. "Wij zijn geen re-enactmentkamp. Een spijkerbroek is prima, legergroen ook". Dick Timmerman, voorzitter Stichting Aiborne Battle Wheels Oosterbeek (ABWO). *Airborne Magazine Nr. 24*, 6-9.

Hey, J.A. (n.d.). *Provincie Gelderland* [Unpublished work. Data on fallen German soldiers in the Netherlands, compiled from several sources by J.A. Hey, copy provided to author by H. Timmerman (Arnhem)].

Jellema, E. (2018). 1st Battalion The Border Regiment tijdens de Slag om Arnhem. *Airborne Magazine Nr. 12*, 12-23.

Keegan, J. (2001). *The face of battle. A study of Agincourt, Waterloo and the Somme*. Pimlico. (Original work published 1976)

Kershaw, R. (2008). *It never snows in September. The German view of MARKET-GARDEN and the Battle of Arnhem, September 1944*. Ian Allan Publishing Ltd. (Original work published 1990)

Klinkenberg, P., Thissen, P. & van der Heijden, P. (2022). *Bezet, bevrijd & geplunderd. Geallieerde plunderingen in de regio Nijmegen, 1944-1945*, Vantilt.

Knip, K. (1985, September 7). Schatzoeken en het partizanengereedschap voor WO III. *NRC Handelsblad*, 15. www.delpher.nl

Kolen, J. & van Krieken, R. (2010). Arnhem. In de Keizer, M. & Plomp, M. (eds.), *Een open zenuw. Hoe wij ons de Tweede Wereldoorlog herinneren*, pp. 85-94. Uitgeverij Bert Bakker.

Kok, R.S. (2006). Archaeology of the Battle of Arnhem: the significance of excavated finds as historical source. Ministory 89. *VVAM Nieuwsbrief 102. 2006.*

Kok., R. (2021). *Denken over herdenken. Oorlogsmonumenten in Nederland*. Uitgeverij Verloren.

Kok, R.S., Beckers, D.E.P.C.M., van Doesburg, J., Parlevliet, M., Reinders, M., Visser V. & Vos, W.K. (2013). Conflictarcheologie in Nederland. De potentie van een thematische, diachrone benadering van sporen van oorlog en geweld. *ArcheoBrief 2013-2*, 2-8.

Kok, R.S. & Vos, W.K. (eds.) (2013). *Archeologie van de Tweede Wereldoorlog*. Rapportage Archeologische Monumentenzorg 211. Rijksdienst voor het Cultureel Erfgoed.

Krafft, S. (1944). [Combat report on the period of 19 September - 7 October 1944 of the SS-Panzer Grenadier Ausbildungs und Ersatz Bataillon 16 against the 1st British Airborne Division during the Battle of Arnhem]. Collectie L.P.J. Vroemen (2867, D26-10). Gelders Archief, Arnhem.

Leeuwarder Courant, (1978, March 13). Archeologenblad waarschuwt: Niet schatgraven met een metaaldetector. *Leeuwarder Courant*, 14. www.delpher.nl

Maan, A. (2019). “Wat we hier mede gemaakt hebben, kan ik jullie niet beschrijven”. De Landstorm Nederland in de Slag om Arnhem. Ministory 131. *Airborne Magazine Nr. 15*, 22-26.

Maassen, G., (2011). Thirty years searching: Investigation into missing and unknown soldiers in the Arnhem area. Ministory 110. *VVAM Nieuwsbrief 124. 2011.*

Marktplaats. (2022, July 24). Horsa glider, life belt, parahaak dropcontainer Wolfheze [Advertisement]. *Marktplaats*. www.marktplaats.nl [deleted advertisement]

Marter, P., Visser, R., Alders, P., Röder, C., Gottwald, M., Mank, M., Hubbard, S. & Recker, U. (2017). The excavation of WWII RAF bomber, Halifax LV881-ZA-V. *Journal of Conflict Archaeology*, 12(1), 29–45. https://doi.org/10.1080/15740773.2017.1414423

Middlebrook, M. (1994). *Arnhem. Ooggetuigenverslagen van de Slag om Arnhem*. Uitgeverij Bosch & Keuning.

Mijn Gelderland (n.d.). *Duits kanon in Arnhemse bodem. Museum Vliegbasis Deelen*. Mijn Gelderland. https://mijngelderland.nl/inhoud/verhalen/duits-kanon-in-arnhemse-bodem

Ministry of Defence (2020, August 7). *Operation Nightingale*. GOV.UK. www.gov.uk/guidance/operation-nightingale

Moluks Erfgoed (n.d.). *Moluks Erfgoed. Archeologische sporen van Molukkers in Nederland*. http://molukserfgoed.com

Moshenska, G. (2013). *The archaeology of the Second World War. Uncovering Britain’s wartime heritage*. Pen & Sword Archaeology.

Nationaal Militair Museum (2022). *Behaal je wings tijdens de zomervakantie*. Nationaal Militair Museum Nieuwsbrief, 26-07-2022. https://mailchi.mp/nmm.nl/cleared-for-take-off-f16-936081?e=2e7496e941

Nederlands Dagblad, (1970, August 17). De metaaldetector. *Nederlands Dagblad*, 4. www.delpher.nl

NOS Nieuws (2019, September 21). 'Met herdenking op Ginkelse Heide houden we een krachtige traditie in stand'. *NOS Nieuws.* http://nos.nl/artikel/2302687-met-herdenking-op-ginkelse-heide-houden-we-een-krachtige-traditie-in-stand

Omroep Gld (2017, December 11). ‘Sloop Hotel Dreyeroord pijnlijn voor oorlogsveteranen’. *Omroep Gld*. www.gld.nl/nieuws/2151667/sloop-hotel-dreyeroord-pijnlijk-voor-oorlogsveteranen

Operation Market Garden: The Digital Monument (n.d.). Douglas Lowery, Pte. *The Digital Monument*. https://monument.marketgarden.com/person/982/douglas-lowery

Operation Nightingale (n.d.). Operation Nightingale. *Wessex Archaeology*. www.wessexarch.co.uk/our-work/operation-nightingale

Pastor Pérez, A., Barreiro Martínez, D., Parga-Dans, E., & Alonso González, P. (2021). Democratising Heritage Values: A Methodological Review. *Sustainability*, *13*(22), 12492. MDPI AG. http://dx.doi.org/10.3390/su132212492

Polen in Beeld (n.d.). *Over Polen in Beeld. Waarom, hoe en wat?* Polen in Beeld. Cultuur & Maatschappij. www.poleninbeeld.nl/over-polen-in-beeld/

Pronk, E.C. (2015). *Naast de Oude Kerk te Oosterbeek. Gemeente Renkum. Archeologisch onderzoek: een opgraving.* RAAP-rapport 2886. RAAP bv.

Rechtbank Limburg (2022, November 29). *Illegale opgraving en diefstal van resten of delen van een neergestort Engels militair vliegtuig, van het merk Supermarine Spitfire Mark XI. Zaaknummer 03.233706.21*. Rechtspraak. http://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBLIM:2022:9447

Reinders, M. (2016). *Kochbunkers in de tuin van Museum Arnhem. Een historisch onderzoek naar en archeologische waarneming van resten uit de laatste fase van de tweede wereldoorlog*. Rapport nr. 32 van de Archeologische Werkgemeenschap Nederland, afdeling Zuid-Veluwe en Oost-Gelderland. AWN.

Reinders, M. (2018a). *Project Landgoed Oorsprong. Historie en archeologie van schuttersputten langs de Oorsprongbeek te Oosterbeek*. Archeologische Werkgemeenschap Nederland, afdeling Zuid-Veluwe en Oost-Gelderland. AWN.

Reinders, M. (2018b). Sporen en vondsten van de gevechten rond de Westerbouwing. *Airborne Magazine Nr. 13*, 12-15.

Reinders, M. (2019). *Archeologisch noodonderzoek in een Flak-stelling bij Arnhem*. Reinders Erfgoed.

Reinders, M. (2020). *Oorlog in Lingezegen. Sporen uit de bodem van het front tussen Arnhem en Nijmegen*. Greenhouse Advies bv.

Reinders, M. (2021). *Archeologisch onderzoek bij de berging van een Messerschmitt aan de Oude Vechtsteeg te Dalfsen. Opgraving - variant Archeologische Begeleiding*. GRA-rapport 2020.26. Greenhouse Advies bv.

Reinders, M. & Bex, J. (2021). *Archeologisch onderzoek Silhouet (Villa Heselbergh) te Arnhem. Opgraving - variant Archeologische Begeleiding*. GRA-rapport 2018.15 Greenhouse Advies bv.

Reinders, M. (2022). Stormschade op de 'Wossowski-akker'. *Airborne Magazine Nr 24*, *10-11.*

Reinders, P. (2010). *Panzer Kompanie.C (ND) 224 in the Netherlands 1943-1945*.

Revell, S. (2015). *A piece of coloured ribbon. An insight into German award winners at the Battle of Arnhem*. Historia House.

Rijksdienst voor het Cultureel Erfgoed (2019). *Op Verkenning 2.0. Twee eeuwen militair erfgoed in het vizier. Rapportage Verkenning Militair Erfgoed*. www.cultureelerfgoed.nl/publicaties/publicaties/2019/01/01/op-verkenning-2.0

Rijksdienst voor het Cultureel Erfgoed (2022). *Onderweg naar Faro. De betekenis van het Verdrag van Faro voor het Nederlandse erfgoedveld en een vertaling in ambities. Uitvoeringsagenda Faro – Deel I*. www.cultureelerfgoed.nl/onderwerpen/erfgoedparticipatie-faro/documenten/publicaties/2022/01/01/uitvoeringsagenda-onderweg-naar-faro

Ryan, C. (1974). *Een brug te ver*. Van Holkema & Warendorf.

Sam, D. (2017a). Munitie en restanten van munitie. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht. Archeologisch onderzoek in Stadsblokken-Meinerswijk, Arnhem.* ADC monografie 22 (pp. 206-207). ADC ArcheoProjecten.

Sam, D. (2017b). Munitie en restanten van munitie. In Bosman, A.V.A.J., Geerts, R.C.A. & Sam, D. (eds.), *Een brug te ver onderzocht. Archeologisch onderzoek in Stadsblokken-Meinerswijk, Arnhem.* ADC monografie 22 (pp. 274-277). ADC ArcheoProjecten.

Saunders, N.J (2007). *Killing time. Archaeology and the First World War*. The History Press.

Seitsonen, O. & Herva, V.P. (2017). "War Junk" and cultural heritage: Viewpoints on World War II German material culture in the Finnish Lapland. In *Proceedings of the 45th Annual Chacmool Conference: War and Peace – Conflict and Resolution in Archaeology.* Chacmool Archaeology Association: Alberta.

Schoordijk, T. (1986, September 17). Museum gewijd aan operatie Market Garden. *Algemeen Dagblad*, 5. www.delpher.nl

Schute, I. (2016). De wetenschappelijke betekenis van archeologisch onderzoek naar de Tweede Wereldoorlog. *Tijdschrift Voor Geschiedenis, 129(2)*, 263–278. https://doi.org/10.5117/TVGESCH2016.2.SCHU

Schute, I.A. & Wijnen, J.A.T. (2018). *Archeologische begeleiding van munitiesanering Kazerneterreinen in Ede.* RAAP-Rapport 3318. RAAP bv.

Scott, D.D. & McFeaters, A.P. (2010). The Archaeology of Historic Battlefields: A History and Theoretical Development in Conflict Archaeology. *Journal of Archaeological Research, March 2011*, 103-132. DOI: 10.1007/s10814-010-9044-8

Stichting Infrastructuur Kwaliteitsborging Bodembeheer (2014). *Handreiking Samenloop archeologie en explosieven-opsporing*. www.sikb.nl/archeologie/opgraven-en-explosieven

Smole, L. (2017). *Nieuwe Kade. Een Archeologische Begeleiding van de Opsporing van Conventionele Explosieven*. Briefrapport. Archeologisch Rapport Arnhem 84. Gemeente Arnhem.

Smole, L. (2019). *Cobercoterrein. Graven onder de rook van de Arnhemse binnenstad. Inventariserend veldonderzoek door middel van proefsleuven*. Archeologisch Rapport Arnhem 107. Gemeente Arnhem.

Smole, L. (2020a). *Huis Klingelbeek AR18.15. Van vuurstenen kling tot granaatscherf. Een inventariserend veldonderzoek door middel van proefsleuven bij Huis Klingelbeek*. Archeologisch Rapport Arnhem 108. Gemeente Arnhem.

Smole, L. (2020b). *Dagrapport Projectcode: AR20.17* [Unpublished internal report, copy provided to author by municipal archaeological service]. Gemeente Arnhem.

Smole, L. (2021a). *Huis Klingelbeek II. Millennia in trek als woonlocatie. Een definitieve opgraving te Arnhem op de grens van stuwwal en Nederrijn*. Archeologisch Rapport Arnhem 109. Gemeente Arnhem.

Smole, L. (2021b). *Arnhem Schuitgraaf Veld 24. AR18.19. Sloot noch grippe (greppel) ontzien. De rand van een Romeinse nederzettingsterrein alsnog opgegraven*. Archeologisch Rapport Arnhem 111. Gemeente Arnhem.

Smole, L. (2023). *Evaluatierapport Schuytgraaf Veld 26-27, AR20.46. Proefsleuven (landbodems)* [Unpublished internal report, copy provided to author by municipal archaeological service]. Gemeente Arnhem.

Stichelbaut, B. (ed.) (2018). *Sporen van oorlog. Archeologie van de Eerste Wereldoorlog.* Hannibal.

Stichting Koninklijke Defensiemusea (n.d.). *Wat we doen. Gezamenlijke missie en visie*. Defensiemusea. www.defensiemusea.nl/organisatie/wat-we-doen/

Sturdy Colls, C. (2012). *Holocaust archaeology: archaeological approaches to landscapes of nazi genocide and persecution*. ProQuest Dissertations Publishing.

Sutherland, T.L. & Holst, M.R. (2005). *Battlefield Archaeology - The Archaeology of Ancient and Historical Conflict, Guidelines for the British Archaeological Job Resource (BAJR)*.

Swan, J. (1994, February). [17 Platoon 'C' Company, 1st Border battalion (Airborne), transcription of recordings on tape]. Stichting Beheer Collectie Airborne Museum (1604, 6717). Gelders Archief, Arnhem.

ten Broeke, E.M. & Louwe, E. (2019). *Rapportage opgraving (deels variant archeologische begeleiding) Johannahoeveweg 79 te Arnhem in de gemeente Arnhem*. Rapport 1912.007. Econsultancy bv.

Theune, C. (2010). Historical archaeology in national socialist concentration camps in Central Europe. *Historische Archäologie 2.2010*, 1-14. www.histarch.org

Theune, C. (2018*). A Shadow of War. Archaeological Approaches to Uncovering the Darker Sides of Conflict from the 20th Century*. Sidestone Press.

The Pegasus Archive (n.d.). www.pegasusarchive.org/arnhem/Photos3/Pic_Evacuated.htm

Tieke, W. (1975). *Im Feuersturm letzter Kriegsjahre. II. SS-Panzerkorps mit 9. und 10. SS-Division "Hohenstaufen" und "Frundsberg"*. Munin Verlag GmbH.

Tiemens, W.H. (1984). *Facetten van de Slag om Arnhem*. De Gooijse Uitgeverij.

Timmerman, H. (2004). Duitse veldgraven in Oosterbeek. Ministory 84. *VVAM Nieuwsbrief No. 96. December, 2004.*

Timmerman, H. (2008). *Panzer Kompanie 224: gesneuvelden* [Unpublished manuscript, copy provided to author by H. Timmerman (Arnhem)].

Truesdale, D., Cornelissen, M. & Gerritsen, B. (2015). *Arnhem Bridge Target MIKE ONE. An illustrated history of the 1st Airlanding Light Regiment RA 1942-1945. North Africa – Italy – Arnhem – Norway*. R.N. Sigmond Publishing.

Two Old Dogs (2015). Star Model B. *Gun Values Board.* www.gunvaluesboard.com/star-model-b-2205.html

Urquhart, R.E. (1958). *De Slag om Arnhem*. A.W. Sijthoff.

van den Berghe, K.J. & Smole, L. (2014). *Archeologisch onderzoek Hoogstede – Klingelbeek. Inventariserend veldonderzoek door middel van proefsleuven*. Archeologisch Rapport Arnhem 51. Gemeente Arnhem.

van der Heul, H. (2017). *The Potential for Second World War Archaeology in the Netherlands. A Discussion Document*. Dissertation, MA in Archaeology. UCL Institute of Archaeology.

van der Mark, R. (2016). *Weerbare stad. Arnhem, Markt Prinsenhof. Proefsleuvenonderzoek met doorstart naar opgraving en begeleiding*. BAAC-rapport A-14.0151. BAAC bv.

van der Schriek, J. & van der Schriek, M. (2014). Metal Detecting: Friend or Foe of Conflict Archaeology? Investigation, Preservation and Destruction on WWII sites in the Netherlands. *Journal of Community Archaeology & Heritage, 1(3)*, pp. 228–244. https://doi.org/10.1179/2051819614Z.00000000020

van der Schriek, M. (2020). *Beyond the Battlefields: Archaeological approaches to and heritage perspectives on modern conflict*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam]. https://research.vu.nl/en/publications/beyond-the-battlefields-archaeological-approaches-to-and-heritage

van der Velden, H. (2008). 35 jaar zoeken op de voormalige slagvelden bij Arnhem. Ministory No. 98. *VVAM Nieuwsbrief No. 111. Augustus, 2008.*

van der Weerden, J.F. & Verspay, J.P.W. (2014). *Archeologisch onderzoek in der Perimeter te Oosterbeek, gemeente Renkum. Explosief Erfgoed.* Rapport 56. Diachron bv.

van Engelshoven, I. (2019). *Kamerbrief Visie erfgoed uit de Tweede Wereldoorlog*. www.cultureelerfgoed.nl/publicaties/publicaties/2019/01/01/kamerbrief-visie-erfgoed-uit-de-tweede-wereldoorlog

van Midden, L. (2018). Bijzondere vondst bij Arnhemse brug. *Airborne Magazine Nr. 12*, 28-31.

van Midden, L. (2020). Hulzen in een moestuin. *Airborne Magazine Nr. 17*, 16-25.

van Midden, L. (2021). Conflictarcheologie – Vondsten bij Museum Arnhem. *Airborne Magazine Nr. 21*, 24-27.

van Midden, L. & Nijsse R. (2021). Twee bunkertjes uit de Tweede Wereldoorlog bij Museum Arnhem. *Archeologie in Nederland, Jaargang 5, Nr, 2*, 44-48.

van Mousch, R.G. (2015). *Doorwerth, Utrechtseweg. Archeologische Begeleiding van explosievenonderzoek*. BAAC-rapport A-14.0081. BAAC bv.

van Roekel, E. (2019). *Jongens van Nederland : Nederlandse vrijwilligers in de Waffen-SS*. Spectrum.

van Willigen, M. (2018). Tweede Wereldoorlog in Defilet *et al*., *Van Woerd tot Wereldoorlog. Het archeologisch onderzoek in Arnhem Schuytgraaf. Archeologisch Rapport Arnhem 10.* Gemeente Arnhem.

van Willigen, M. & van der Weerden, J.F. (2019). *Dreyeroord. Een hotel in de vuurlinie. Archeologische begeleiding van de OCE werkzaamheden.* BAAC-rapport A16.0240. BAAC bv.

Verdegem, S., Dewilde, M., Bracke, M., Wyffels, F., Decorte, J. & Stichelbaut, B. (2018). Vermist aan het front in Stichelbaut, B. (ed.). *Sporen van oorlog. Archeologie van de Eerste Wereldoorlog*. Hannibal.

Versluijs, A.J. (1996). De Excelsior Welbike 98 cc. Ministory 50. *VVAM Nieuwsbrief 62. Juni, 1996*.

Versluijs, A.J. (2005). Een dropkooi uit de Drielse klei. Ministory 85. *VVAM Nieuwsbrief 97. Februari, 2005*.

von Clausewitz, C. (1832). *Vom Kriege*. Dümmler.

Waalkens, B. & van Iddekinge, P.R.A. (1999). "PK-Berichter im Raum Arnheim". Duitse oorlogsfotografen in september 1944. *Ministory nr. 63. VVAM Nieuwsbrief 75. 1999.*

Warmerdam, N.W.T. (2020a). *'Gefechtsstand Osterbeek'. Archeologische begeleiding van OCE-werkzaamheden op het terrein van Hotel Dreyeroord*. BAAC-rapport A-18.0229. BAAC bv.

Warmerdam, N.W.T. (2020b). *Begeleiding OCE-onderzoek Hessenweg, Ederheide. Archeologisch opgraving, variant archeologische begeleiding*. BAAC-rapport A-20.0183. BAAC bv.

Waterloo Uncovered (n.d.). *Waterloo Uncovered. Explore our impact.* http://waterlooncovered.com/

Wijnen, J.A.T. (2010). *Oorlog in de Sysselt. Een onderzoek naar fysieke sporen van de Tweede Wereldoorlog in de Sysselt bij Ede en Aanbevelingen voor het Cultuurhistorisch Beheer van Oorlogserfgoed*. De Lawick Pers.

Wijnen, J. (2013). *The Battlefield of Devils Mount (Grebbeberg 1940)*. https://www.academia.edu/14024240/The_Battlefield_of_Devils_Mount_Grebbeberg_1940_

Wijnen, J. (2015, July 21). *Conflict Archaeology versus Battlefield Archaeology in the Netherlands. "For this is not a place of comfort".* www.academia.edu/23604378/Conflict_Archaeology_vs_Battlefield_Archaeology [English translation of a Dutch paper, original Journal reference: Wijnen, J.A.T. (2015). Conflictarcheologie versus Slagveldarcheologie. *Archeobrief 19, 2*. 2-6. Matrijs].

Wijnen, J. A. T., Schute, I. A., & Kok, R.S. (2016). Conflict Archaeology in the Netherlands: The Role of Communities in an Emerging Archaeological Discipline. *Journal of Community Archaeology & Heritage*, *3(1)*, 22–39. https://doi.org/10.1080/20518196.2015.1123889

Zielman, G. (2011). *Uiterwaardvergravingen in Meinerswijk-Stadsblokken. Twee plangebieden in de gemeente Arnhem. Archeologisch vooronderzoek: aanvullend bureauonderzoek en verkennend booronderzoek*. RAAP-Rapport 2295. RAAP bv.

Zwarts, M. (2001). *German armored units at Arnhem. September 1944*. Armor at war series 7039. Concord Publications Company.

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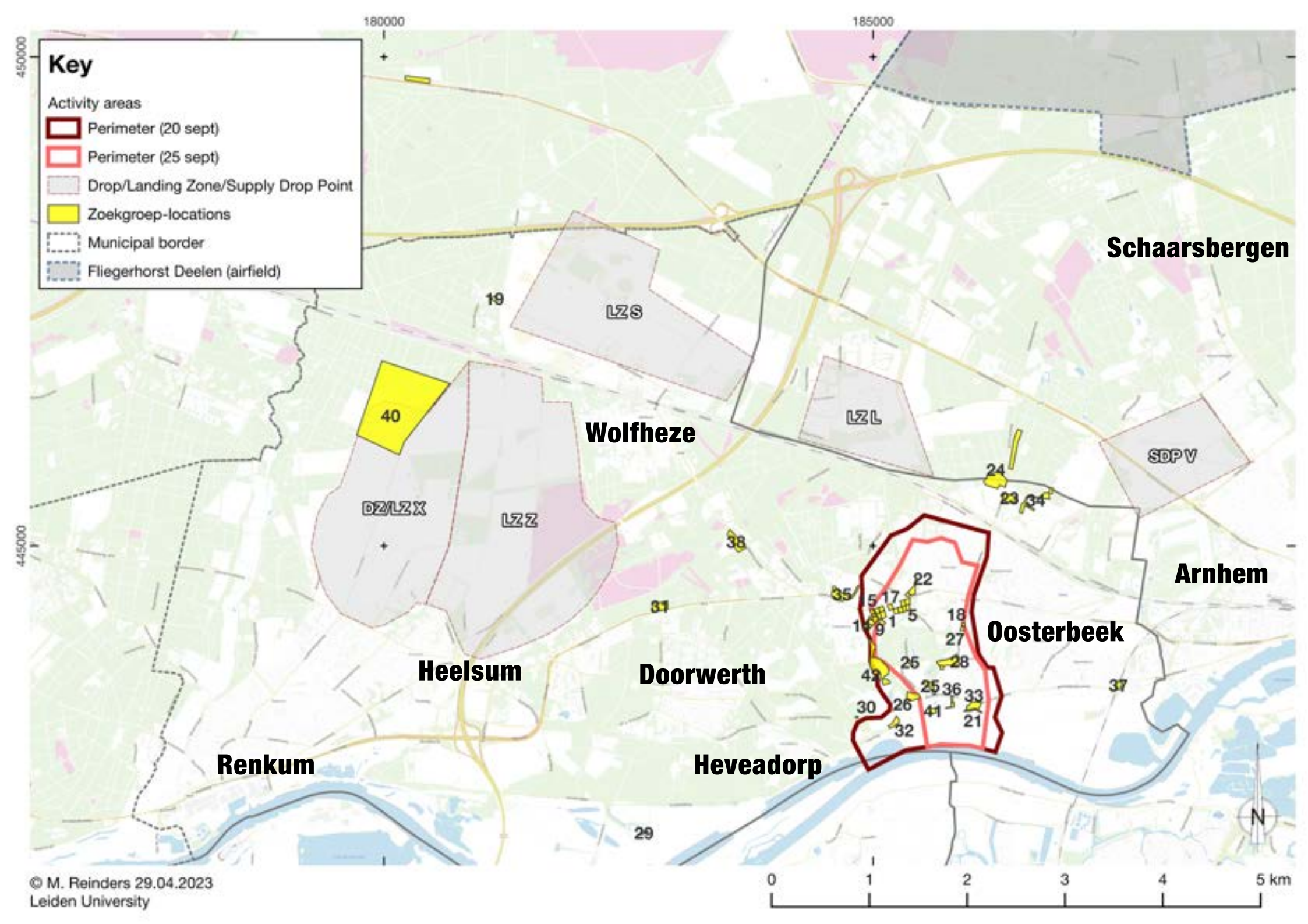
Appendix 1. Maps of research areas of the *Zoekgroep*


Key
Activity areas
Perimeter (20 sept)
Perimeter (25 sept)
Drop/Landing Zone/Supply Drop Point
Zoekgroep-locations
Municipal border
Fliegerhorst Deelen (airfield)
180000
185000
450000
445000
LZ S
LZ L
SDP V
DZ/LZ X
LZ Z
Schaarsbergen
Wolfheze
Arnhem
Oosterbeek
Heelsum
Doorwerth
Renkum
Heveadorp
N
0
1
2
3
4
5 km
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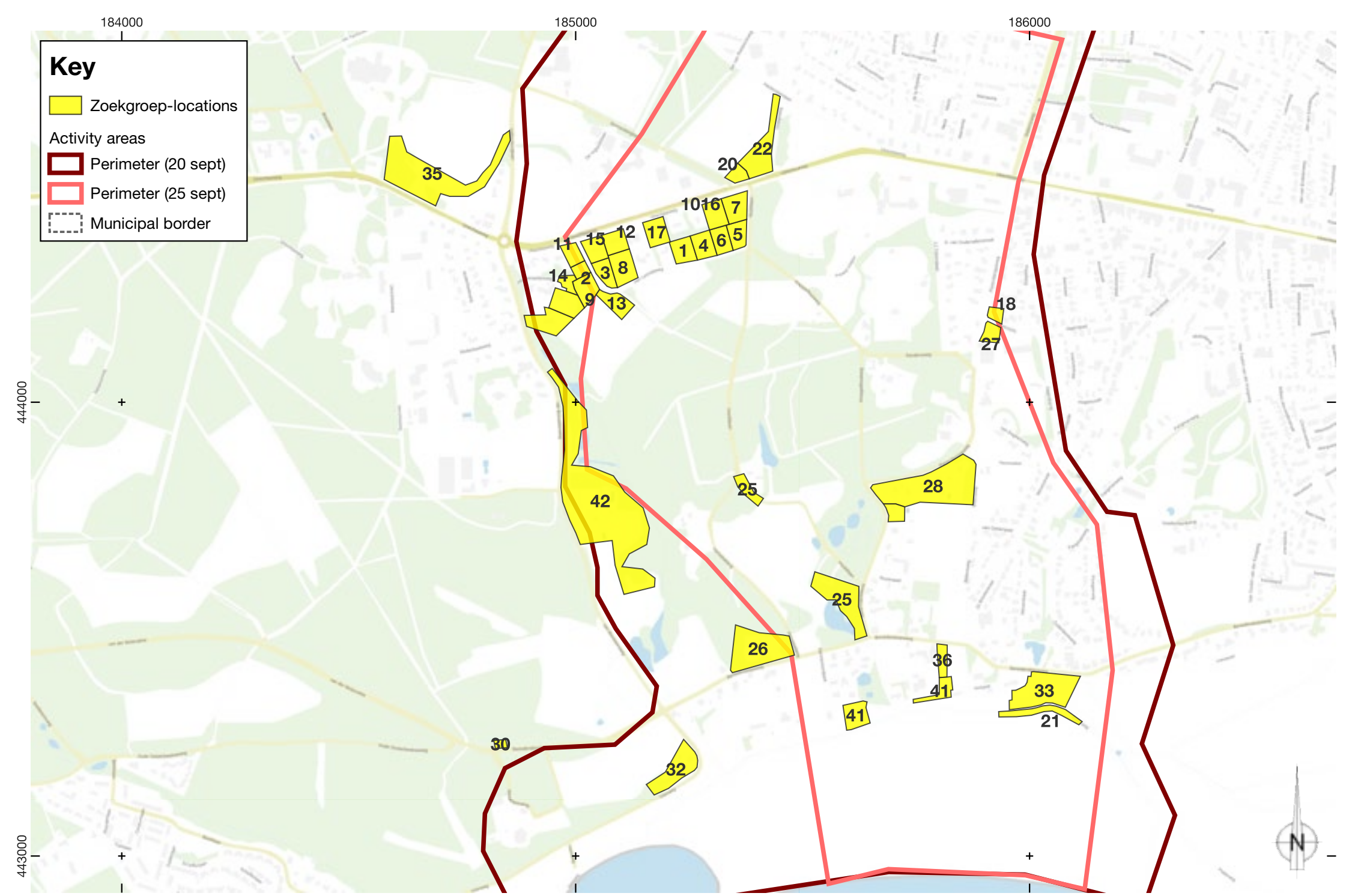


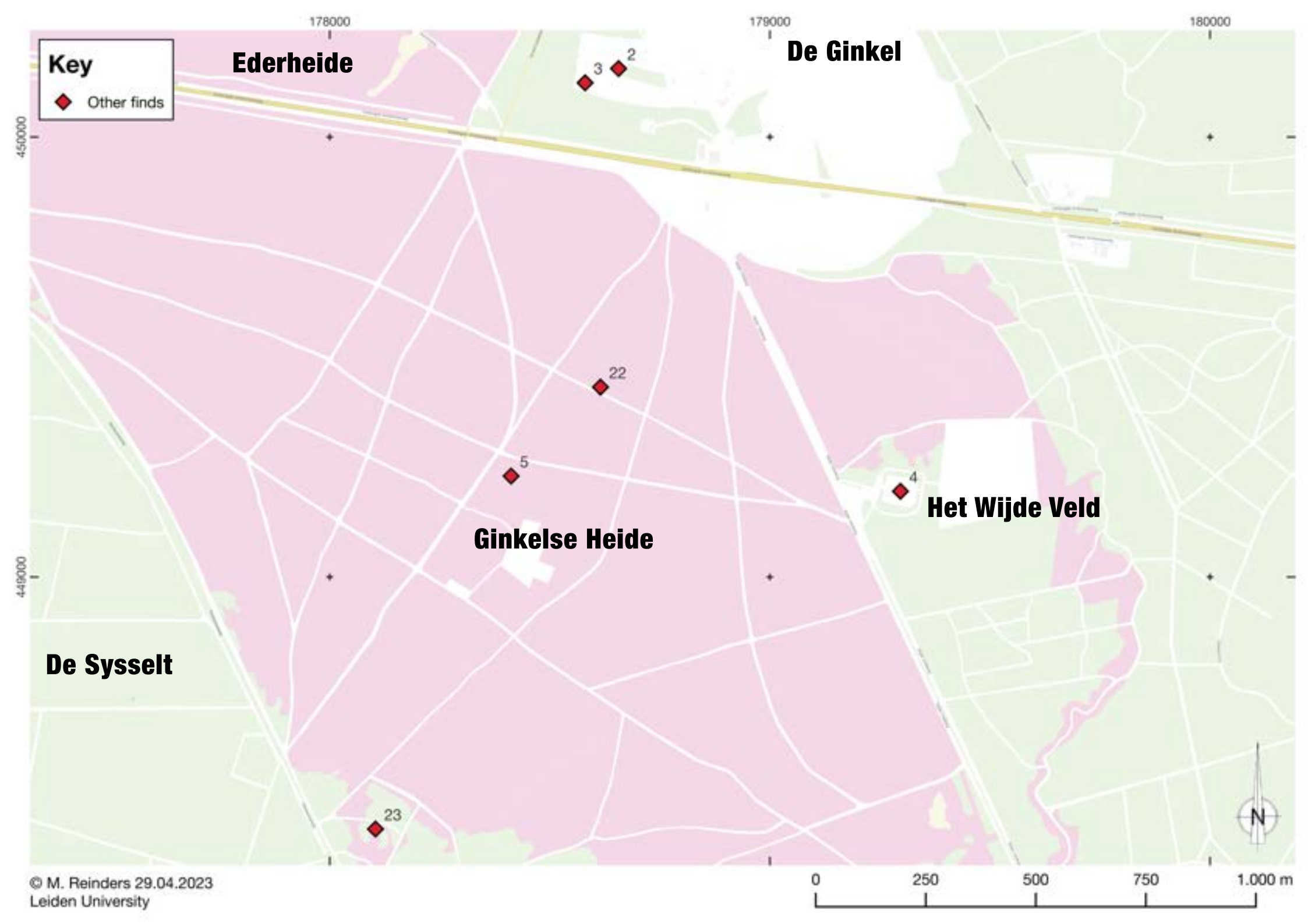
Appendix 2. List of research areas and reports of the *Zoekgroep*

Report nr.	Year	Title/location	Comment
1	1994	V Lennepweg 7	
2	1994	V Lennepweg 16	
3	1994	V Lennepweg 15	
4	1994	V Lennepweg 5	
5	1994	Hoofdlaan 3	
6	1994	V Lennepweg 3	
7	1994	Hoofdlaan 1	
8	1994	V Lennepweg 13	
9	1995	V Lennepweg 14	
10	1995	Utrechtseweg 238	
11	1995	V Lennepweg 18	
12	1995	Utrechtseweg 250	
13	1995	V Lennepweg, groenstrook, ter hoogte van de Gemeentekwekerij	
14	1996	Braakliggend terrein tussen v Borselenweg en v Lennepweg	
15	1995	V Lennepweg 17	
16	1996	Utrechtseweg 240	
17	1997	Utrechtseweg 246	
18	1995	Pieterberseweg 40	
19	1995	Buunderkampweg 10 (Buunderkamppad)	
20	1995	Sonneberglaan 1	
21	1996	Oude kerk Oosterbeek-Laag, ten zuiden van beek de Leigraaf	
22	1996	Bosperceel ten westen van de Oranjeweg grenzend aan de Utrechtseweg	
23	1996	Bouwterrein langs de Dreijenseweg + deel van tuin van nr. 19.	
24	1996	Weiland ten westen van Dreijenseweg	
25	1998	Zuidelijk deel van de Hemelsche Berg	
26	1998	Benedendorpsweg 191	
27	1997	Huize de Tafelberg	
28	1997	Pieterbergseweg 52, 54, 58, 60, 62	
29	1998	Bosperceel bij Kasteel Doorwerth	
30	1998	Benedendorpsweg, tegenover ingang De Westerbouwing	
31	1998	Bosperceel gelegen aan de Utrechtseweg, tegenover de Kasteelweg	
32	1999	Veerweg 5	
33	1999	Weiland Nederlands hervormde kerk Oosterbeek	
34	1999	De Lichtenbeek	
35	1999	De Bilderberg (+ toevoeging: Valkenburglaan 4)	
36	1998	Benedendorpsweg 150	
37	2000	Station Oosterbeek-Laag	
38	2000	Bosperceel Wolfherzerweg	
39		*Bosperceel ten noorden van Klein Zwitserland (RV 2nd Battalion)*	*no report yet*
40	2004	Telefoonweg	
41	2005	Kerkpad	
42	2007	Van Borsselenweg	
43		*DZ 'X'en LZ 'Z'*	*no report yet*
44	*2008*	*Westerbouwing*	*no report yet*
45		*Hoog Oorsprong*	*no report yet*
46		*V Borsselenweg 14 – aangekochte tuin*	*no report yet*
47	*2013*	*'The man from Ginkel Heath' – Ginkelse Heide*	*no report yet*
48	*2013*	*Bosperceel Ginkelse Heide*	*no report yet*
49	*2014*	*Sonnenberg Bossen*	*no report yet*

50	*2014*	*Bilderberglaan*	*no report yet*
51	*2014*	*Heveadorp*	*no report yet*
52		*Valkeniersbossen – rondom de Westerbouwing*	*no report yet*
53	2015	Hoog Oorsprong	*no report yet*
54		*Hemelsche Berg*	*no report yet*
55		*Dreijeroord*	*no report yet*
56		*LZ-Z Winkworth – LZ-X en LZ-S*	*no report yet*
57		*Weverstraat*	*no report yet*
58		*Papendal*	*no report yet*
59		*Ommershof*	*no report yet*
60		*Ter Horst*	*no report yet*
61		*De Hemelsche Berg – Fidler*	*no report yet*
62		*Ohlen & Kerkje*	*no report yet*
63		*Pietersberg*	*no report yet*
64		*Benedendorpsweg 163*	*no report yet*
65		*Acacialaan*	*no report yet*
-	2000	Perceel Kneppelhoutweg 8, Oosterbeek	
-	2000	Bosgebied Dreijenseweg, oost	
-	2001	Noodbegraafplaats Ede	
-	2001	v. Borsselenweg 14	
-	2001	v. Borsselenweg 4	

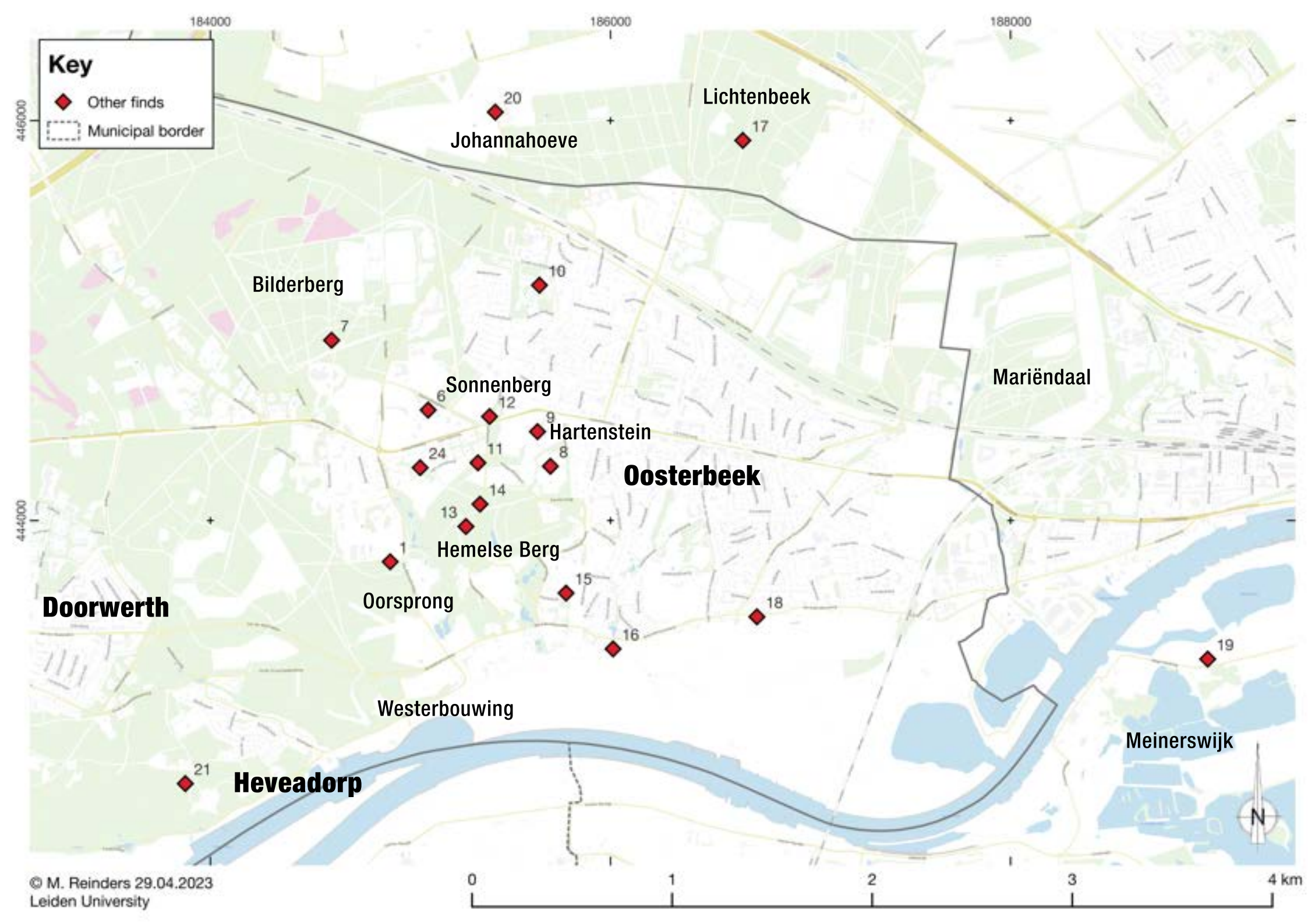
Appendix 3. Map of finds from metal detectorists and others at Ginkelse Heide (Ede municipality)

NB. The appointed locations on both maps are not accurate. For this thesis, solely the (available) publications on these finds were used. Exact locations have not been verified.



Appendix 4. Map of finds from metal detectorists and others in and around the Oosterbeek Perimeter and Meinerswijk (Arnhem)

NB. The appointed locations on both maps are not accurate. For this thesis, solely the (available) publications on these finds were used. Exact locations have not been verified.


Key
Other finds
Municipal border
184000
186000
188000
446000
444000
20
Johannahoeve
Lichtenbeek
17
Bilderberg
10
7
Sonnenberg
6
12
9
Hartenstein
24
11
8
Oosterbeek
14
13
Hemelse Berg
1
Mariëndaal
15
Oorsprong
Doorwerth
18
16
19
Westerbouwing
Meinerswijk
21
Heveadorp
N
© M. Reinders 29.04.2023
Leiden University
0
1
2
3
4 km

Appendix 5. List of known finds from metal detectorists and others

NB. As described, solely the (available) publications on these finds were used. Exact locations have not been verified.

id	Finder	Location	Date	Object	Source
1	Unknown	Oorsprong/Van Borsselenweg		Human skull and helmet (Moser, 10. SStA)	Pers. communication H. Timmerman (22-04-2022)
2	H. van der Velden	Camping Zuid-Ginkel	2-1-1981	Double grave Dutch SS 'Nordwest' (Bollen and Gebbinck)	van der Velden, 2008; pers. communication H. Timmerman, (29-09-2022)
3	H. van der Velden	Camping Zuid-Ginkel	1-1-1981	Helmet with name "van Ginkel" (Dutch SS 'Nordwest')	van der Velden, 2008; pers. communication H. Timmerman, (29-09-2022)
4	H. van der Velden	Werkkamp (labour camp) Wijde Veld, Ginkelse Heide	1-1-1982	Grave German SS 'Nordwest' (Renz)	van der Velden, 2008; pers. communication H. Timmerman, (29-09-2022)
5	H. van der Velden	Ginkelse Heide	1-1-1982	Grave unknown German	van der Velden, 2008; pers. communication H. Timmerman, (29-09-2022)
6	H. van der Velden	De Sonnenberg	1-1-1994	Double grave the Glider Pilot Regiment (Thompson en Howes)	van der Velden, 2008
7	H. van der Velden	Tienhovenlaan, behind Bilderberghotel		Former mass grave (ao Des Voeux, Dawson, Watkins)	van der Velden, 2008
8	H. van der Velden	Tennis court, behind Hartenstein Hotel	1-1-1993	Former field grave (Barton)	van der Velden, 2008; Gerritsen, 2021
9	H. van der Velden	East of Hartenstein Hotel		Former field grave (British, unknown), large dump pits	van der Velden, 2008
10	H. van der Velden	Ommershof	1-1-1985	Many finds, "hundred foxholes"	van der Velden, 2008
11	H. van der Velden	Hoofdlaan-Van Lennepweg		British mortar positions (known from moving images)	van der Velden, 2008
12	H. van der Velden	Utrechtseweg-Oranjeweg (bos)	1-1-1987	Many finds, including paper documents in beret (Ladds), veteran traced	van der Velden, 2008
13	H. van der Velden	Hemelse Berg, near pergola	1-1-1988	Many finds, belonging to HQ communication Royal Artillery	van der Velden, 2008
14	H. van der Velden	Hemelse Berg, along Hoofdlaan	1-1-1988	Para helmets (1x name "Green")	van der Velden, 2008
15	H. van der Velden	Rozenpad		Artillery position 1st Airlanding Light Regiment	van der Velden, 2008
16	H. van der Velden	Meadow Oude Kerk	1-1-1990	Artillery position 1st Airlanding Light Regiment	van der Velden, 2008
17	H. van der Velden	Lichtenbeek		"many drop containers"	van der Velden, 2008
18	H. van der Velden	Benedendorpsweg	1-1-2004	Part of 6-pounder (anti-tank) canon	van Midden, 2020
19	Museum Vliegbasis Deelen	Meinerswijk, Arnhem	1-1-1996	7,5 cm Frans Flak (anti-aircraft) canon	Anonymous, 1996
20	Unknown	Johannahoeve, Landing Zone L	1-1-2007	Royal Enfield 125cc LWT 'Flying Flea' motor cycle	Boersma, 2019

21	Unknown	Duno, Heveadorp	1-1-2021	Five drop containers (type CLE), empty	Gelre Nieuws, 2021
22	Unknown	Ginkelse Heide	1-1-2012	Field grave (Kennell), exact location not disclosed	Anonymous, 2012; gemeente Ede
23	P. Reinders	Ginkelse Heide/De Sysselt zuid	1-1-2005	Sten-gun Mk II bayonet (positions C Coy, 7KOSB)	Anonymous, 2005
24	NUON (utility company)	Van Lennepweg	8-7-1997	Field grave (Froud)	Pers. communication H. Timmerman; D. van Buggenum (22-04-2023)
25	Unknown	Former Drop Zone 'K' (Schuytgraaf) vicinity (not appointed on map)	1-1-2003 (~)	Drop cage for 'Flyin Flea' motor cycle (in collection Airborne Museum)	Versluijs, 2005