Geophysical Survey Report

Geophysical Survey at the Second World War Prison Camp at Falstad, Ekne in Levanger Municipality, Norway.

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and Archaeology
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Seksjon for arkeologi og kulturhistorie

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Geophysical Survey at the Second World War Prison Camp at Falstad, Ekne in Levanger Municipality

J.NR.	
SAKSTITTEL	Geofysiske undersøkelser ved Falstadsenteret
PROSJEKTLEDER	Marek Jasinski – NTNU
FYLKE	Nord-Trøndelag
FYLKESNR.	17
KOMMUNE	Levanger
KOMMUNENR.	19
GÅRDSNAVN	Falstad Nedre
BRUKSNAVN	Falstadsenteret
GNR. BNR.	157/94
LOKALITET	Falstadsenteret
UTM 32	600945 Eastern, 7064240 Northern
ID-NR. ASKELADDEN	
KULTURMINNETYPE	Fangeleir fra andre verdenskrig.
DATERING	1941-1949

REPORT BY

Arne Anderson Stamnes

DATE

Signature

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Illustrations

Summary

A fluxgate gradiometer and earth resistance survey was carried out at the Falstad Prison Camp complex in 2008 and 2009. The data showed that the area has been quite disturbed, and some parts have been landscaped. Some anomalies could be related to former buildings at the camp, and the georeferencing of historical maps makes it possible to stake out their position with high accuracy.

Introduction

Background

The painful heritage project is a research collaboration between the NTNU Museum of Natural History and Archaeology and The Falstad Centre, concerning the collective memory of the Second World War. The project seek to invigorate the cultural landscape of the Second World War as a field of research and strengthen the attention on heritage management, documentation and preservation. As part of investigating ways of managing these cultural resources, a project involving geophysical assessment of a prison camp was undertaken. Earthsound Associates with Kevin Barton (Landscape and Geophysical Services), James Bonsall and Heather Gimson (Earthsound Archaeological Geophysics) was contacted, and they performed a survey with help from the NTNU Museum of Natural History and Archaeology and the Falstad Centre. The data for this report was provided by James Bonsall and prepared and presented by Arne Anderson Stamnes.

Survey Objectives

A geophysical investigation was initiated with the following objectives:

- Indicate the state of preservation of former buildings and constructions related to the Falstad complex
- Accurately map geophysical anomalies

Georeferenced historical maps are also to be used in this work.

The knowledge derived from these investigations can be used to assess the level of preservation, as well as help both target any future excavations and easily perform a GPS stakeout to indicate the location of past buildings and constructions on the current ground surface for dissemination purposes.

Location and geology

The Falstad Area is located approximately 43 kilometers northeast of Trondheim, or about 13-14 kilometers west of Levanger. It is within the municipality of Levanger, in the parish of Ekne. The immediate surroundings are dominated by farmland and forests, with some more moist boggy areas

towards south. The subsoil is dominated by marine deposits, and is most probably dominated by a relatively thick cover of silt or clay.

Archaeological and historical background

The Falstad complex was built as a reformative boarding school for children that either were seen as having behavioral troubles, criminal tendencies or a lack of attention in their original homes. The main building at Falstad acted more as a juvenile prison before the Nazi occupation. It was finished in 1921 (Sand 1988).

During the Second World War the Nazi occupation forces used the complex as a prisoner of war camp. The Nazi forces seized the school for their own use during the autumn of 1941, after first searching for a suitable location for a hospital for women and finding the main building at Falstad more suitable as a concentration camp. The first war prisoners arrived at Falstad in November 1941, and were put to erect posts for double barbed wire fences, guard towers and other constructions. This was the only prisoner of war camp under direct command from the SS ("Schutz-Staffel"). The camp interred around 200 prisoners the first winter and spring, and the number of prisoners increased to around 259 and 500 during 1942. Additional Prisoners barracks were built in 1943. A barn containing stables, garage and a pigsty, the Sawmill and the Pottery was most probably also built during 1943, along with a building housing sanitary facilities and the commander's residence (eee figure 10 and 11). At some point a greenhouse was constructed (Sand 1988, The Falstad Centre 2011).

The camp was reused as a prison for war criminals from the liberation in 1945 until 1949. During these years another Guards barrack was constructed, along with a smithy and a garage (see figure 12). The prisoners continued to work with roadwork, in the workshops, at farms or lumbering wood. All barracks, the greenhouse, smithy, guard towers, fences and the sanitary building was dismantled and torn down in 1949. The pottery was reused as a kindergarten.

After 1949 Falstad was home for a school for "physically or mentally retarded" children. The building was used as a school until 1992. Today the Falstad Centre houses the Norwegian Memorial and Human Rights Centre, that is in charge of the national documentation and education concerning the history of imprisonment during the Second World War and human rights.

Photos of buildings at the Falstad Prisoner of War Camp – visible features and constructions

Figure 1: Picture probably taken in 1945 of the eastern Prisoners barrack and main building. Photographer: Erling Nordholmen. From the archives of the Falstad Centre. Archive number 0800311.

On figure one it is clear that there still was an open space covered with gravel between the eastern prisoner barracks and the main building. The fence seems to be built by relatively small wooden posts with a barbed wire. The barracks were wooden buildings, and at the lower parts of the wall horizontal wooden planks can be seen. They seem to cover up the actual base foundation of the buildings. These foundations could therefore easily be from relatively perishable materials, such as roof bearing timber logs. The foundation could also be of stone- or concrete. A drawing made in 1943 might indicate that the barracks rested wooden posts (figure two), but this is still considered uncertain. The walls were of prefabricated cardboard and wooden slabs (Arne Langås, pers. com.), and were constructed as a socalled “lembrakke”, which were a typical building type used by the occupational forces. The roof is extended out slightly from the wall to the north and probably also on the south side of the building. On figure three a pathway be seen between the western prisoner barrack (prisoner barrack 1) and the building housing sanitary facilities, and the picture confirms the presence of staircases on the middle of the long side of the buildings. The walls were of layered planks and cardboard, and must have been a relatively light construction. A registry of buildings dated to February 1948 mention that these barracks were 34x14m, which is quite similar to measurements made from the georeferenced maps.

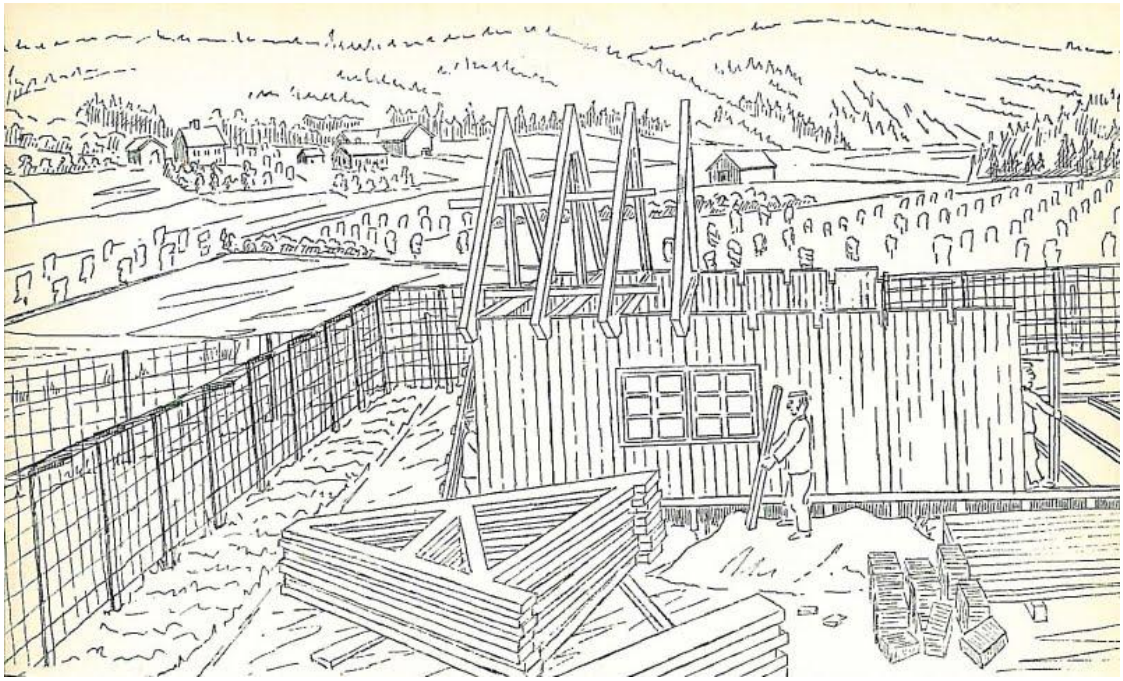

Figure 2: A drawing made by Leif Hallesby in 1943. Source: The Falstad Centre 2010.

Figure three also shows activity on the east side of the road with ditches, a railway leading up to a quarry, fences and several other buildings (from right to left): Barracks, sanitary building, the sawmill, the pottery and the guards barracks. The western prisoners barrack was placed on a slightly higher setting in the terrain compared to the eastern one.

Figure 3: Picture taken on the 12th of May 1945. Photo. Oskar A.Johansen, From the Falstad Centre archives. Archive number 0800517.

Figure 4: Overview of the camp taken during the winter of 1944. Photographer unknown. From the Falstad Centre archives. Archive number 0800617.

Figure four shows a lot of the same buildings, but with some additional details. The sanitary building is under construction on this picture, as well as a small building can be seen between the Guards barracks and the pottery. This building is not to be seen on any of the maps of the camp, and could very well be the former guard shelter before the camp was expanded in 1943. The barracks were torn down in 1949, but an imprint of these could still be seen on an aerial photo from 1953 (Figure 5). On this oblique air photo the layout of the barracks can be seen quite clear as rectangular disturbances. The sanitary building has also been torn down, and what is a concrete foundation can be noticed. Another basement foundation, belonging to the northern part of the Guards barracks, can be seen. Rectangular foundations for the former greenhouse are also visible.

Figure 5: Aerial photo taken of Falstad in 1953 by Widerøe Flyveselskap AS. Photographer: Wilhelm Skappel. From The Falstad Centre archives. Archive number 0800152.

The pottery:

The pottery was probably erected north of the camps main building in the latter part of the war, and can be seen as a rectangular building on figure four taken in 1944. On figure three taken in 1945 it is clear that this building has been extended with another section, making the building more "L"-shaped. This extension happened during the winter of 1945. This building was still standing in 1953 (figure five). It is said that they found larger amounts of ceramics when this building was torn down in the 1980s, which might indicate that the ground was disturbed or levelled when this happened (Arne Langås, pers.com). The picture indicates a wooden building with a large brick chimney.

The Sawmill:

The Sawmill was built between 1941 and 1944.. It is very clear on a picture from 1944, and could be seen on a map of the camp from the 1944 and the post-war prisoner camp from 1945-1949, and must have been torn down before 1953. Since other camp buildings were torn down in 1949, it is likely that it was the same for the sawmill. The photographic evidence indicate that this was a simpler construction than the barracks, pottery or sanitary building. Any detail on wall foundations or additional information is hard to make out from the pictures.

Figure 6: The pottery. Picture taken in 1944. Photographer unknown. From the archives of the Falstad Centre. Archive number 0800653

Figure 7: The sawmill. Picture taken in 1944. Photographer unknown. From the archives of the Falstad Centre. Archive number 0800652.

The Guards barracks:

This building can be seen on several pictures taken from the camp (figure 3 and 4) as a larger wooden building. The aerial photo from 1953 indicates that the northern part of the building had some form of basement or more solid foundation that had not been totally removed.

Figure 8: The guards barracks by the main entrance. Picture taken in 1944. From the archives of the Falstad Centre. Archive number 0800615

A map from the camp indicated that a second barracks was erected between 1945 and 1949 north of this one. A georeferenced map from 1944 indicate a size of approximately 35x14,5 meters, which is the same as the prisoners barracks. Sand (1988) notes that these barracks were constructed in much the same way as the Prisoners barracks, but were a lot better equipped – with their own sanitary facilities. They were also divided into several smaller rooms compared with the Prisoners barracks. While the Prisoners barracks according to a registry from 1948 had nine ovens and three chimneys, the Guards barracks had 13 ovens and a wooden stove, as well as 7 chimneys. The windows also seem to be more equally spaced, and the Guards barracks also had windows on the short end of the building- at least towards the entrance of the camp on the south side of the building.

Georeferenced historical maps

Four historical maps were georeferenced: a map over a planned garden from 1925, a map in German from 1944 over the prisoner of war camp, a sketch made by one of the inmates after war and a map from the years 1945-1949 when the camp was used as a prison for Norwegian Nazi war collaborators.

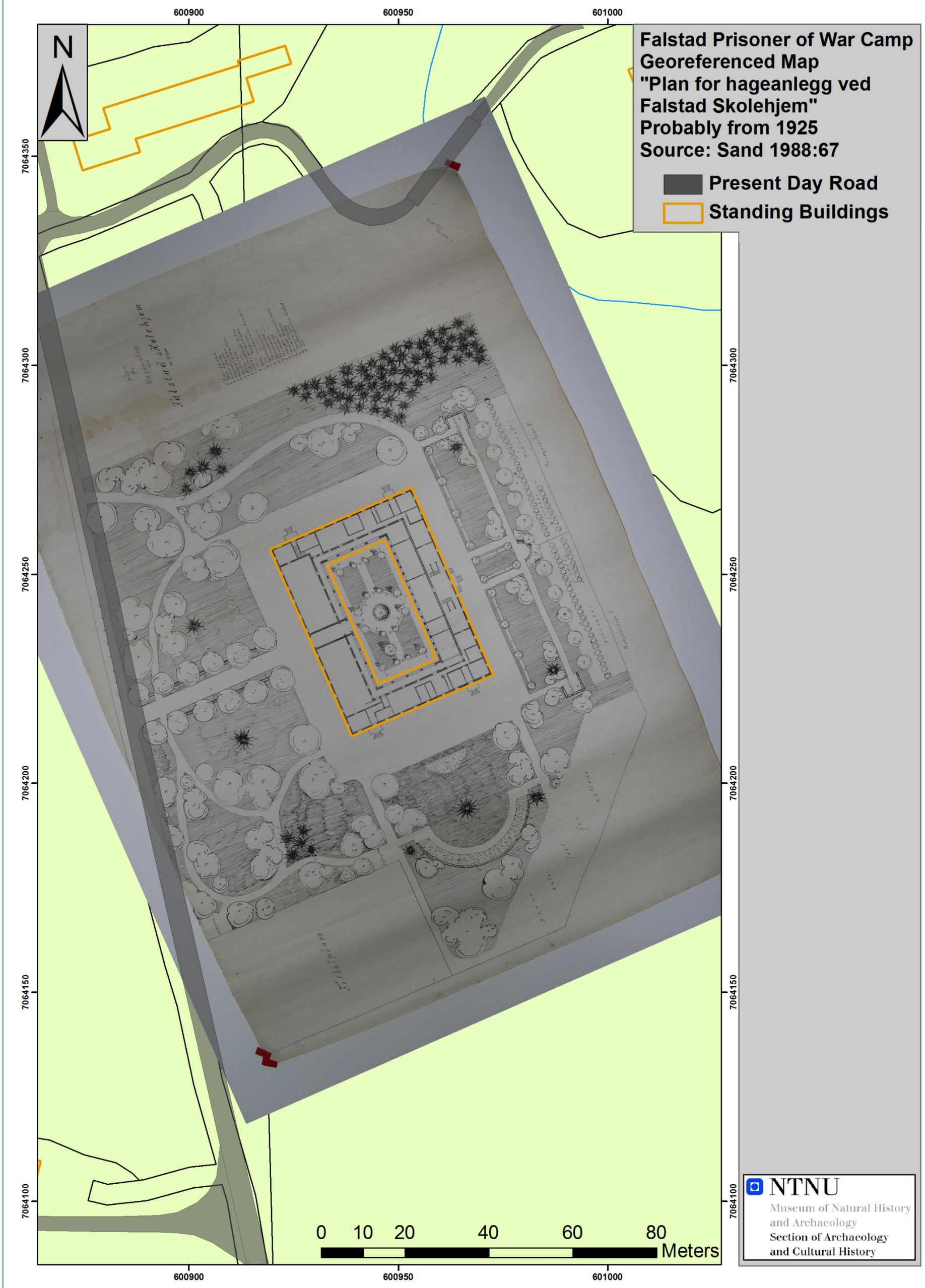

Figure 9: A map over the garden at the reformative school as they originally planned it.

The first map is over the planned layout of the reformative school from around 1925. A lot of the paths and garden ornaments were probably not built, judging from other pictures of the complex from that time. The football pitch in southwest and vegetable patches to the east were probably there.

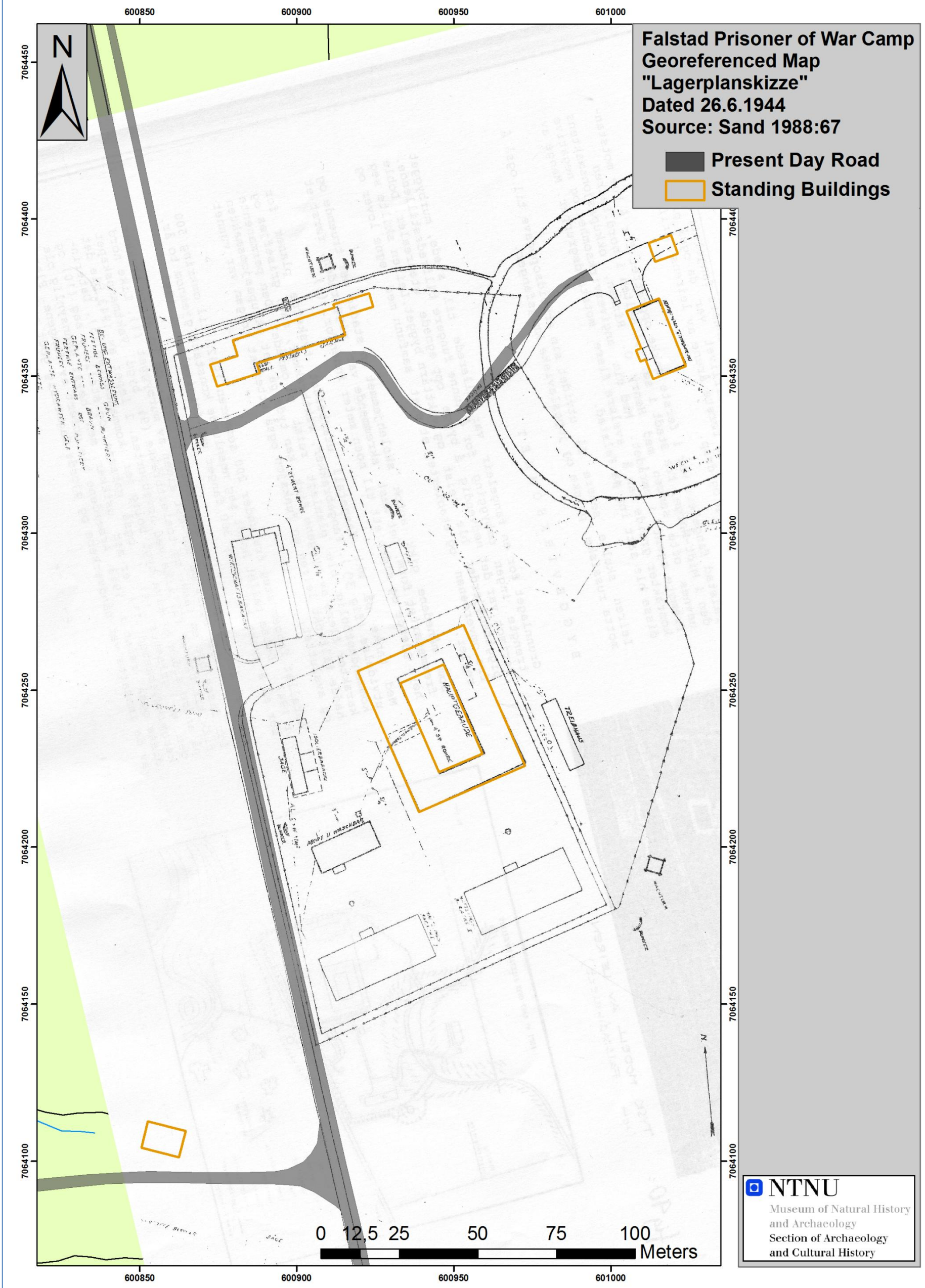

Figure 10: A map made by the Nazi occupation forces over the camp.

This map shows the placement of the camp buildings such as the Prisoners and Guards Barracks, Pottery, Sawmill, Sanitary building and the Green House. It also shows the double barbed wire fences, guard towers and bunkers. It is unsure whether or not these bunkers were built.

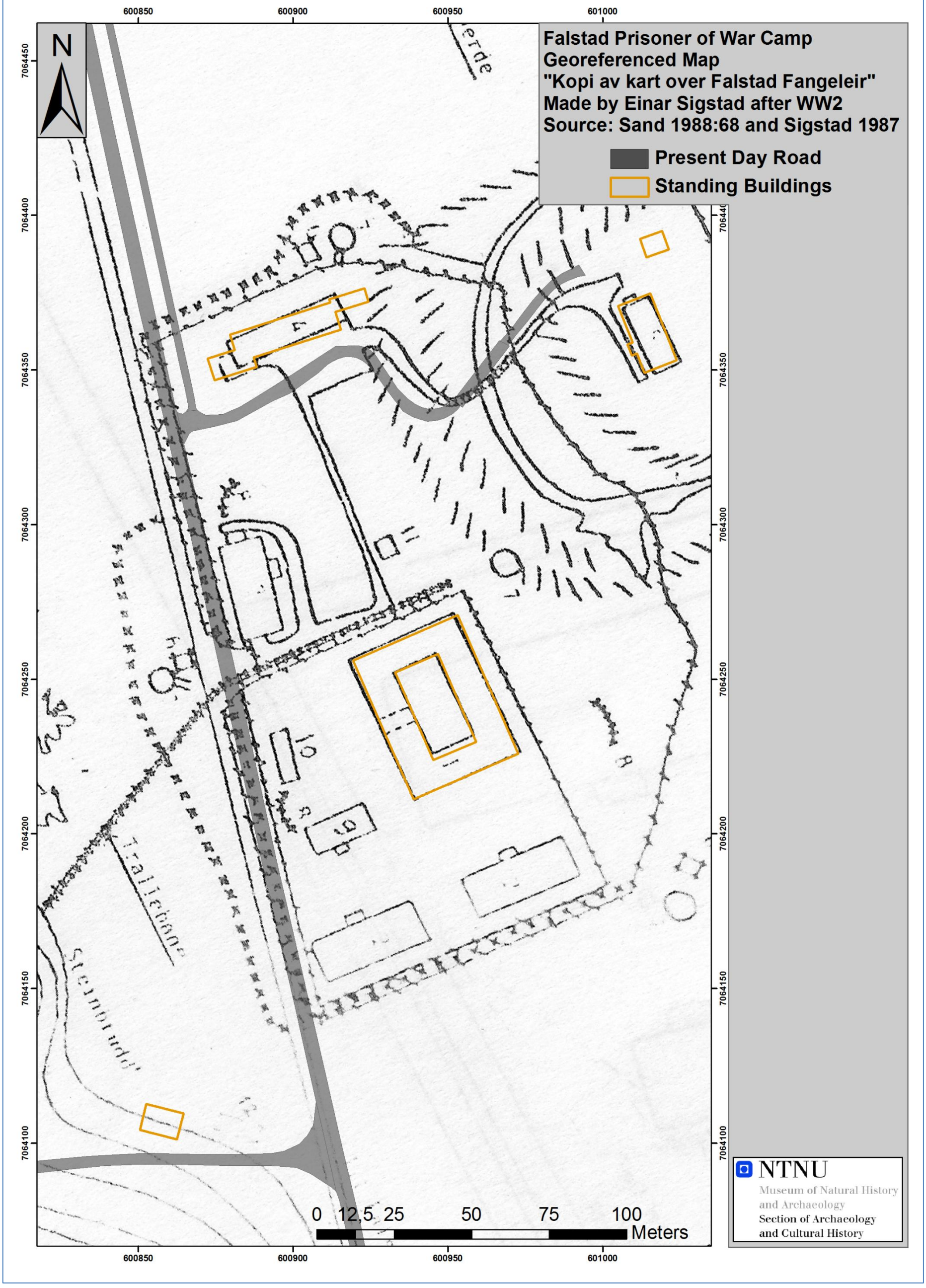

Figure 11: Sketch over the camp made by Einar Sigstad after WW2.

This map is probably less spatially accurate than the "Lagerplanskizze" from 1944 (figure 10), but has some additional details. It shows the placement of the so called “fotangler”, or foot traps, as well as the trolley track leading southwest from the camp to the stone quarry.

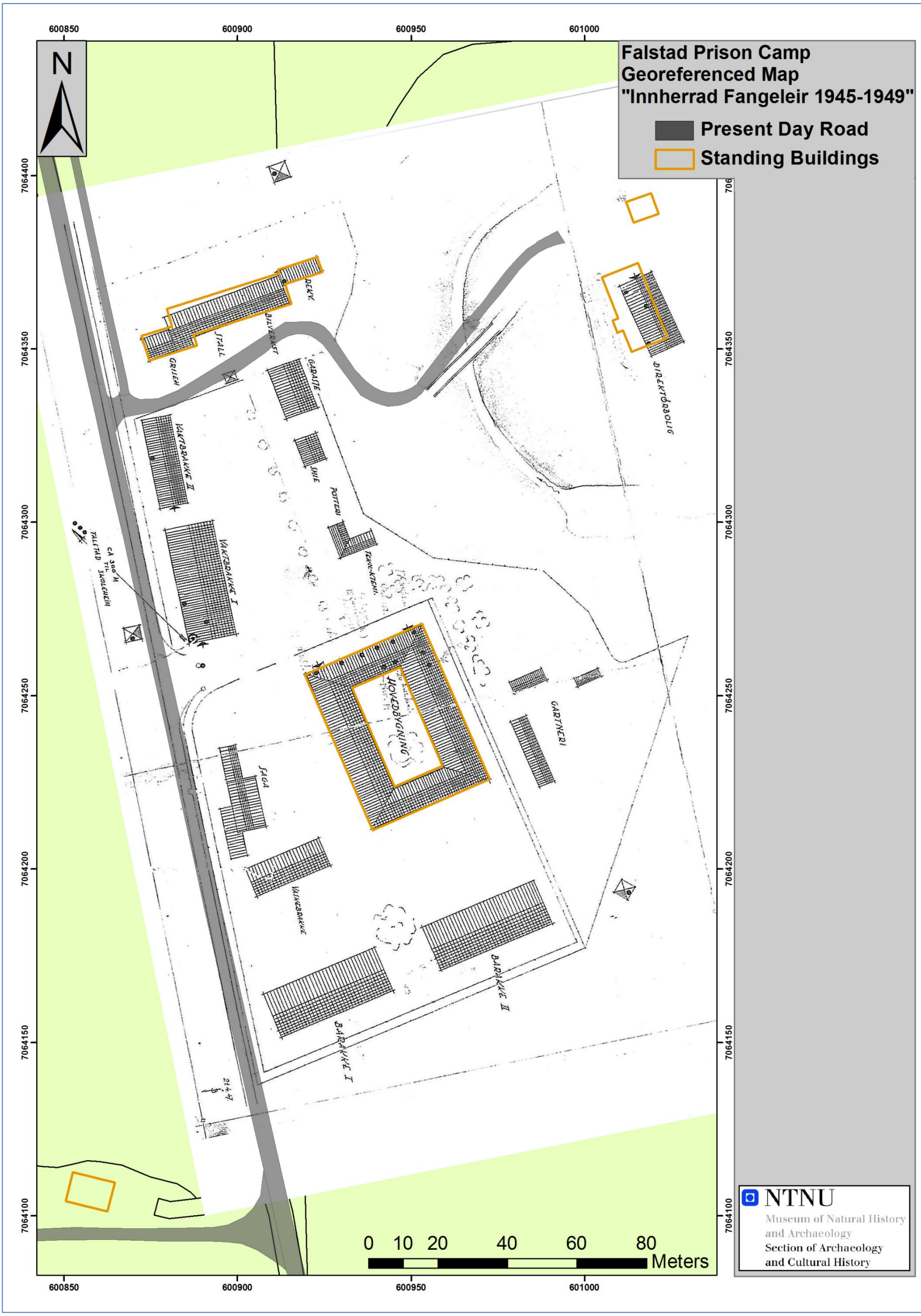

Figure 12: Map over the prison for Nazi collaborators for the years 1945-1949.

This map shows additional buildings that were built after the war, including a smithy, a garage, another Guards barracks, as well as an extension of the pottery and the farm building situated north of the main camp area. There are also two more buildings near the green house east of the main building.

Methods

Grid layout and survey techniques

All grid-corners were measured in using a Sokkia Total Station and related to the WGS 84/UTM32N grid system. It is uncertain whether or not the grid corners were staked out using this total station or set out using tapes and the Phytagoras theorem, but 20x20m grids placed parallel to the main building at the camp were used – roughly orienting them NW-SE with traverses running from WSW-ENE. The three fluxgate gradiometer areas surveyed north of the main building as well as the grid east of the barn are all based on separate grid systems laid. This report contains data presentation and interpretation of fluxgate gradiometer and earth resistance data. Additional data was collected with a Ground Penetrating Radar, but this data was not available for data processing at the time this report was prepared.

Fluxgate Gradiometer

If a feature has a differing magnetic property than its immediate surroundings, it might be detectable with a magnetometer. A magnetometer measures variations in the Earth's magnetic field, where features in the subsoil can act as small magnets that creates a local magnetic field that differ from the background set by the Earth's Magnetic field. By having two magnetometers mounted vertically, it is possible to remove the effect of the Earth's magnetic field, and only map the effects caused by anomalies in the subsoil. This type of arrangement is caused a gradiometer. Archaeological features that might be located with this method are ditches, pits, stone constructions, metal objects or industrial remains. Past activity involving burning, industrial activity, or re-deposition of archaeological material might increase the chance for positive identification, and the method is considered to have a relatively high resolution – being able to detect anomalies down to a size of 0.5m in diameter depending on survey resolution. (Aspinall *et al* 2009, Gaffney & Gater 2003-36-42). The survey was conducted with a Geoscan Research FM256 fluxgate gradiometer with a resolution of 0.5m along the traverses and a sampling interval of 0.125m along the traverses. 1.01 ha was surveyed in total.

Earth resistance

This method is an electric method. By passing a current through a soil, it is possible to measure the electrical resistance systematically over a piece of ground, and plot the spatial variation of this parameter on a map. This property is closely related to the water content in the soil, where water helps to dissolve negatively charged ions in the subsoil. Archaeological features such as ditches, pits

walls, stone constructions d ground might be found in this way. A ditch, pit or areas of loosely packed soil would usually contain more water than its surroundings, and therefore have a lower resistivity than its surroundings due to higher water content. In the same way areas of compacted ground, stone walls or similar will contain less water, and therefore have a higher resistivity. The archaeological contrast is to a higher degree climate dependent, where waterlogged sites or well drained sites might yield no earth resistance contrast. Similarly can a ditch in a waterlogged area drain more easily than its surroundings, and in some cases yield a high resistance contrast instead of its normal low earth resistance contrast. Knowledge of soil types and recent weather conditions are therefore interesting documentation when dealing with Earth Resistance data (Clark 1996, Gaffney & Gater 2003, Schmidt 2009). 0.22 ha was surveyed in total with this method.

Resolution

The following parameters were used during this survey:

Fluxgate Gradiometer	Geoscan Rm256	Earth Resistance	Geoscan MSP 40/RM15 (Piggary)
Grid size	20 x 20 m	**Grid Size**	20 x 20 m
Number of grids/area	49/1.01 ha	**Number of grids/area**	0.22 ha
Direction of first traverse	E (Piggary: N)	**Direction of first traverse**	N (Barracks: W)
Data Collection	Zig-zag	**Data Collection**	Probably parallell
Traverse interval	0.5 (Piggary: 1.0m)	**Traverse interval**	0.5
Measurements along the traverse	0.125	**Measurements along the traverse**	0.25 (Piggary 0.5m)
Sensitivity	0. 1 nT	**Sensitivity**	?

Additional Information

The fieldwork was led by Kevin Barton from Landscape and Geophysical Services, with help from James Bonsall and Heather Gimson from Earthsound Archaeological Geophyscs. Kristin Foosnæs and Arne Anderson Stamnes from the Museum of Natural History and Archaeology helped with the data collection, as well as Arne Langås from the Falstad Centre. The report, including data preparation and presentation, was prepared by Arne Anderson Stamnes.

Results

Survey location and outline

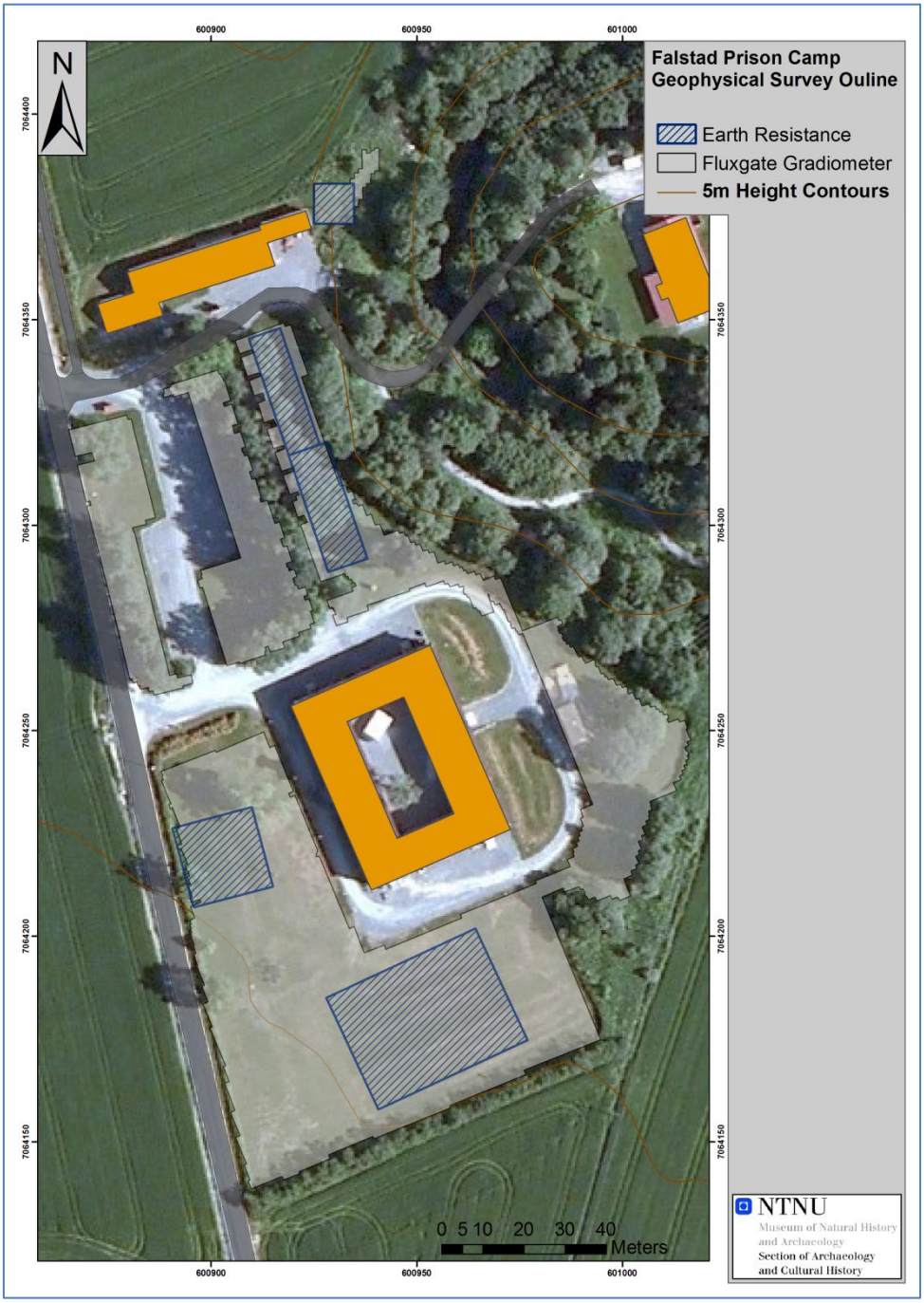

Figure 13: The figure shows the areas surveyed with an earth resistance meter and by fluxgate gradiometer.

Fluxgate Gradiometer – Results

On the following pages a series of figures will present the results from the fluxgate gradiometer survey. These will later be discussed in the "Fluxgate Gradiometer Survey Results – Summary" section.

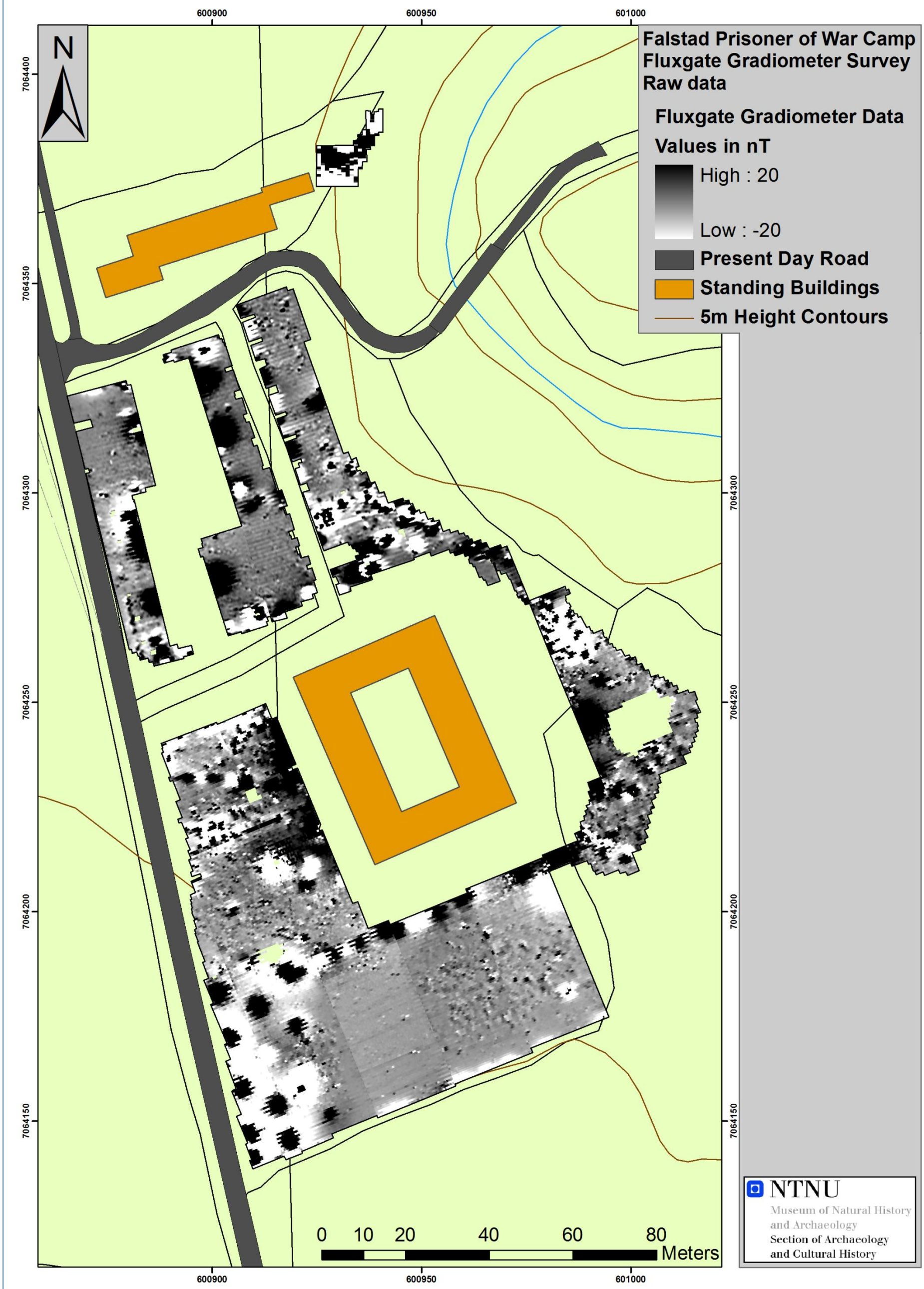

Figure 14: Fluxgate gradiometer results. Raw data. ± 20 nT

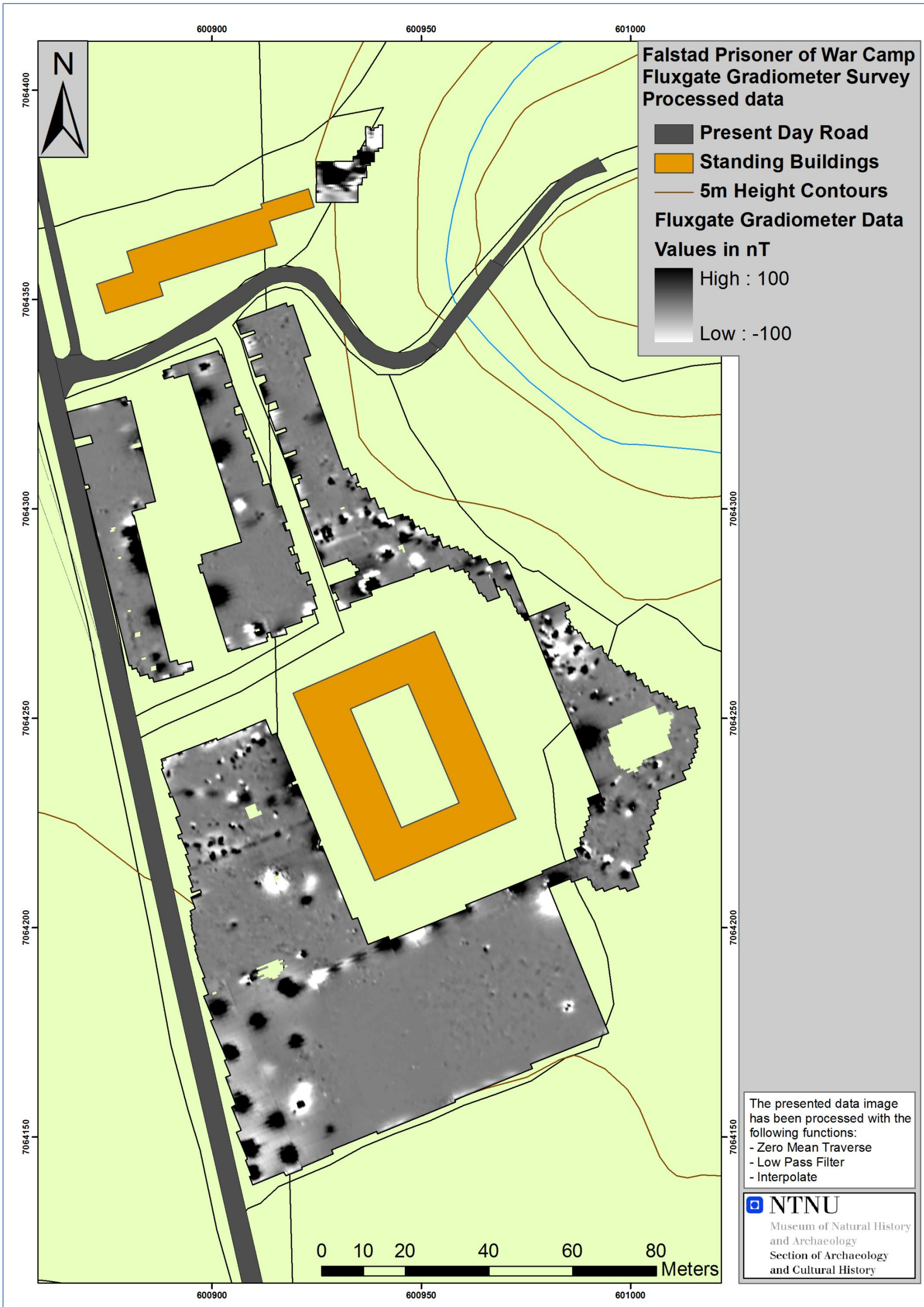

Figure 15: Fluxgate Gradiometer Results. Processed data. ± 100 nT.

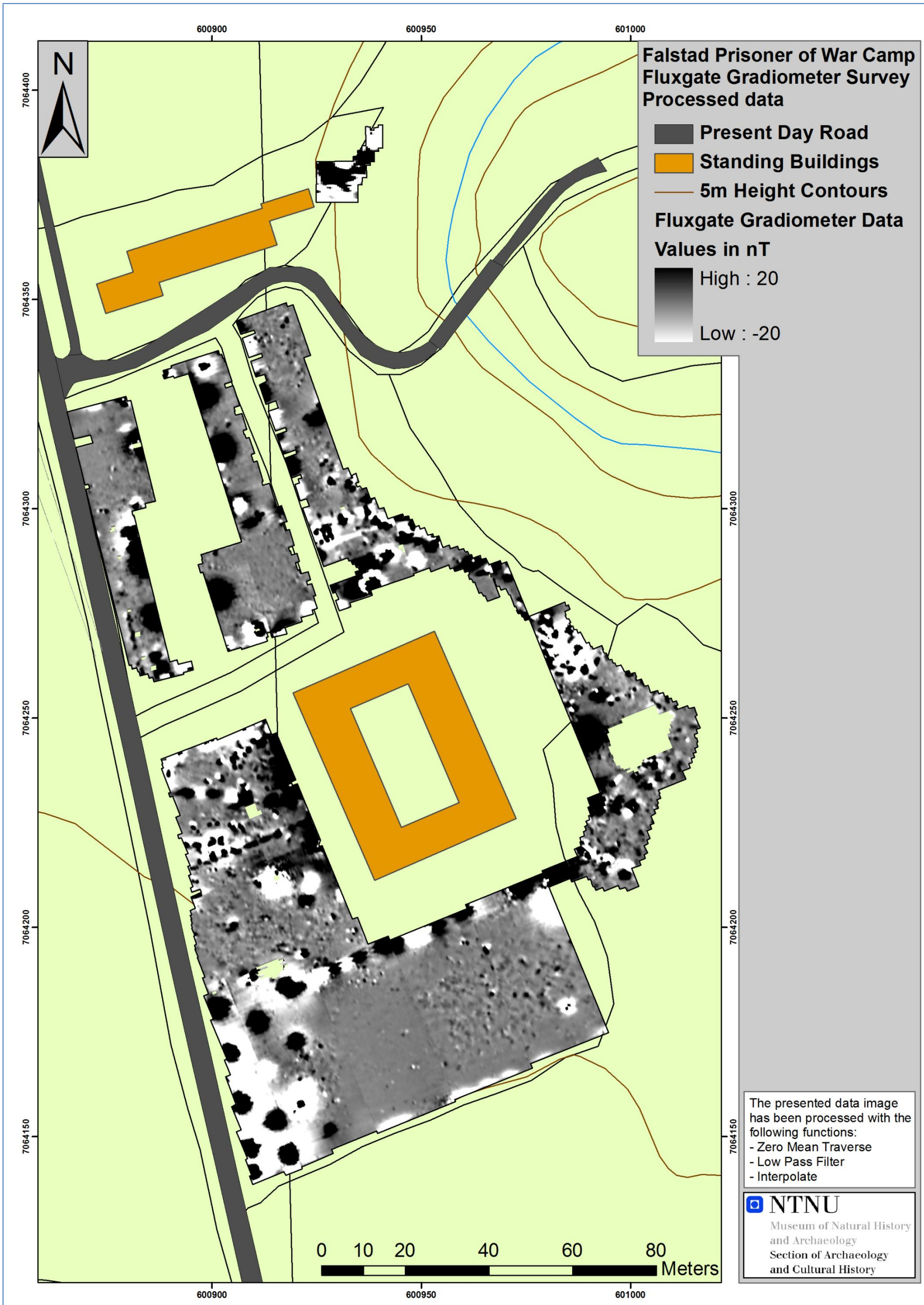

Figure 16: Fluxgate Gradiometer Results. Processed data. ± 20 nT.

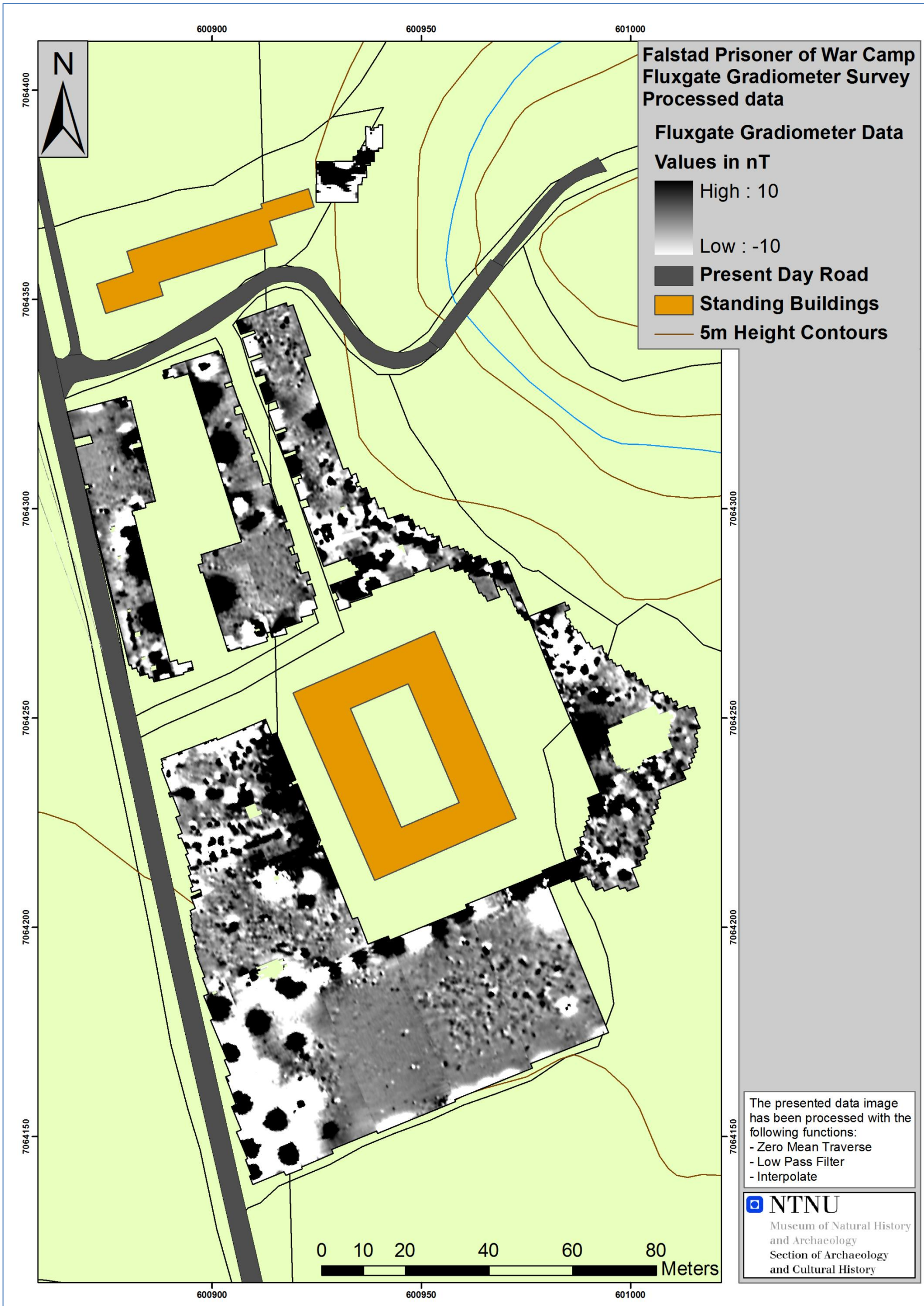

Figure 17: Fluxgate Gradiometer Results. Processed data. ± 10 nT

Figure 18: Fluxgate Gradiometer Results. Processed data. ± 5 nT.

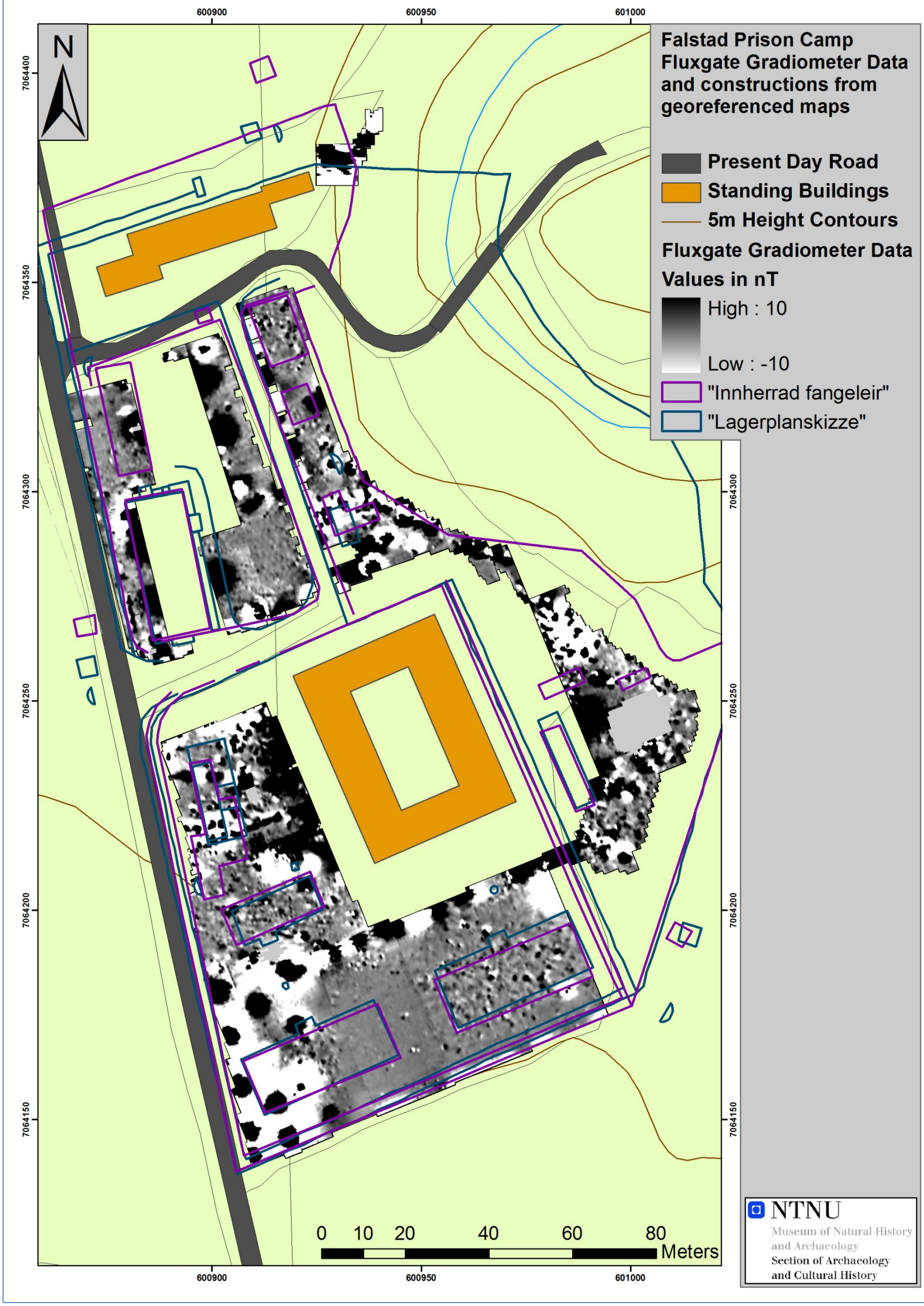

Figure 19: The outline of known buildings identified from georeferenced maps compared with the fluxgate gradiometer survey results.

Fluxgate Gradiometer – Interpretation

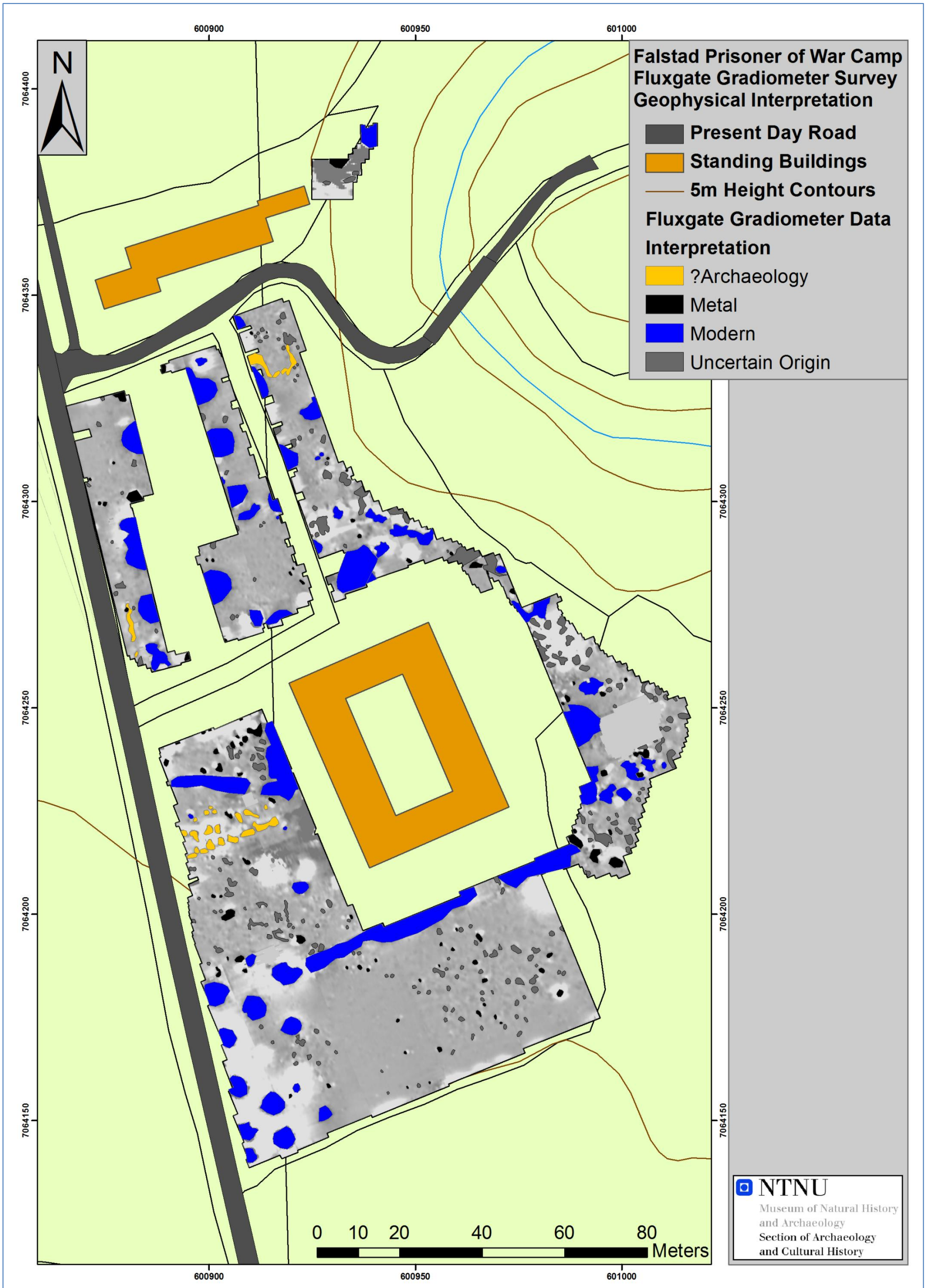

Figure 20: Geophysical Interpretation of the Fluxgate Gradiometer Data.

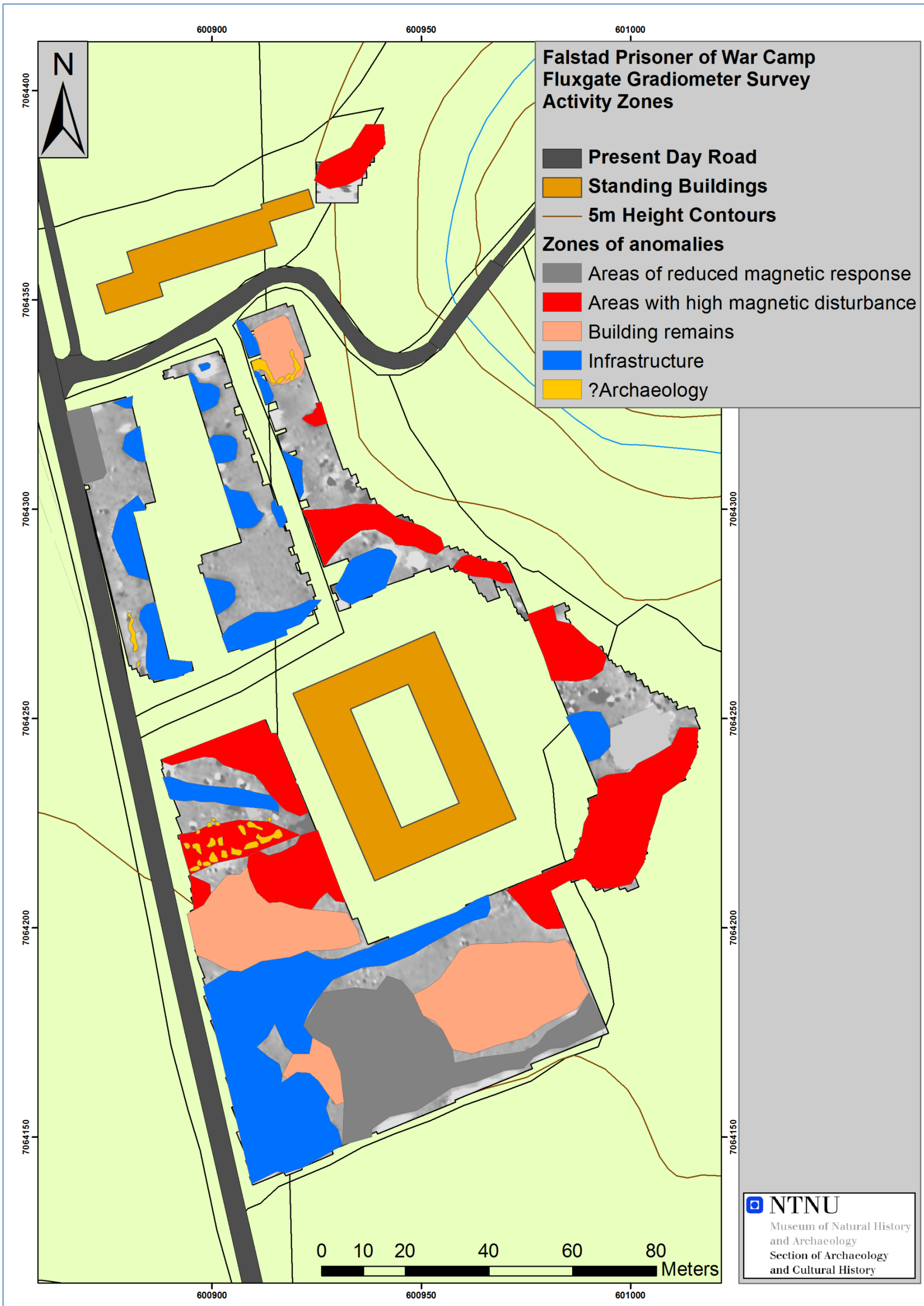

Figure 21: Interpretation of activity zones based on the Fluxgate Gradiometer Data.

Fluxgate Gradiometer Survey Results – Summary

The Fluxgate Gradiometer data shows quite a lot of modern disturbance, with areas of both reduced and increased magnetic disturbance. Modern installations such as lamp posts, heating systems, pipes etc. all increase the impression of modern "clutter", hindering a decent identification of buildings and activity from the prison period at Falstad. When that is said, it might be that modern activity such as identified metal objects might have a distribution that might reflect the usage of the different areas of the camp during the period when the area was used as a prison.

The areas of reduced magnetic response are likely to be caused by modern landscaping. Especially for the area to the south a clear break can be seen in the present day surface.

Most of the areas interpreted as "Infrastructure" can be related to present or known installations.

The areas of high magnetic disturbance can relate to camp activities, but the clutter from high remanent magnetic material mask the immediate surroundings, rendering positive identification of possible building remains and activity. Activities such as smithing or pottery production might be lead to similar response. While this might explain the response at the known pottery, the site for the smithy from 1945-1949 does not contain such a response. This is strange, but can be explained by either by the smithy not being in much use, or that they were very good at cleaning up any refuse from the smithy when either using it, or after the building went out of use and was torn down.

The interpretation of areas categorized as "building remains" are based on an assumption that some clutter and random anomalies might cluster together, but not necessarily be as strong as to be categorized as areas of high magnetic disturbance. A certain containment or relation to known buildings, such as the area of relatively confined magnetic disturbance where prisoner barracks 2 has been, increase the confidence in this interpretation.

The anomalies categorized as "? Archaeology" are few. The northernmost, horseshoe shapes anomaly coincide well with the known location of the garage from 1945-1949. The relatively parallel, dotted pattern west of the main building might coincide with a former pathway leading up to the main entrance of the building. These have the signature of features made of remanent magnetic material, most probably metal. These anomalies also have a similar alignment as the sawmill, and could be related to this building as well.

Earth Resistance – Results

The Earth Resistance survey results will be presented with a series of figures, and the results and interpretations presented in the "Earth Resistance Survey – Summary" section following the data presentation.

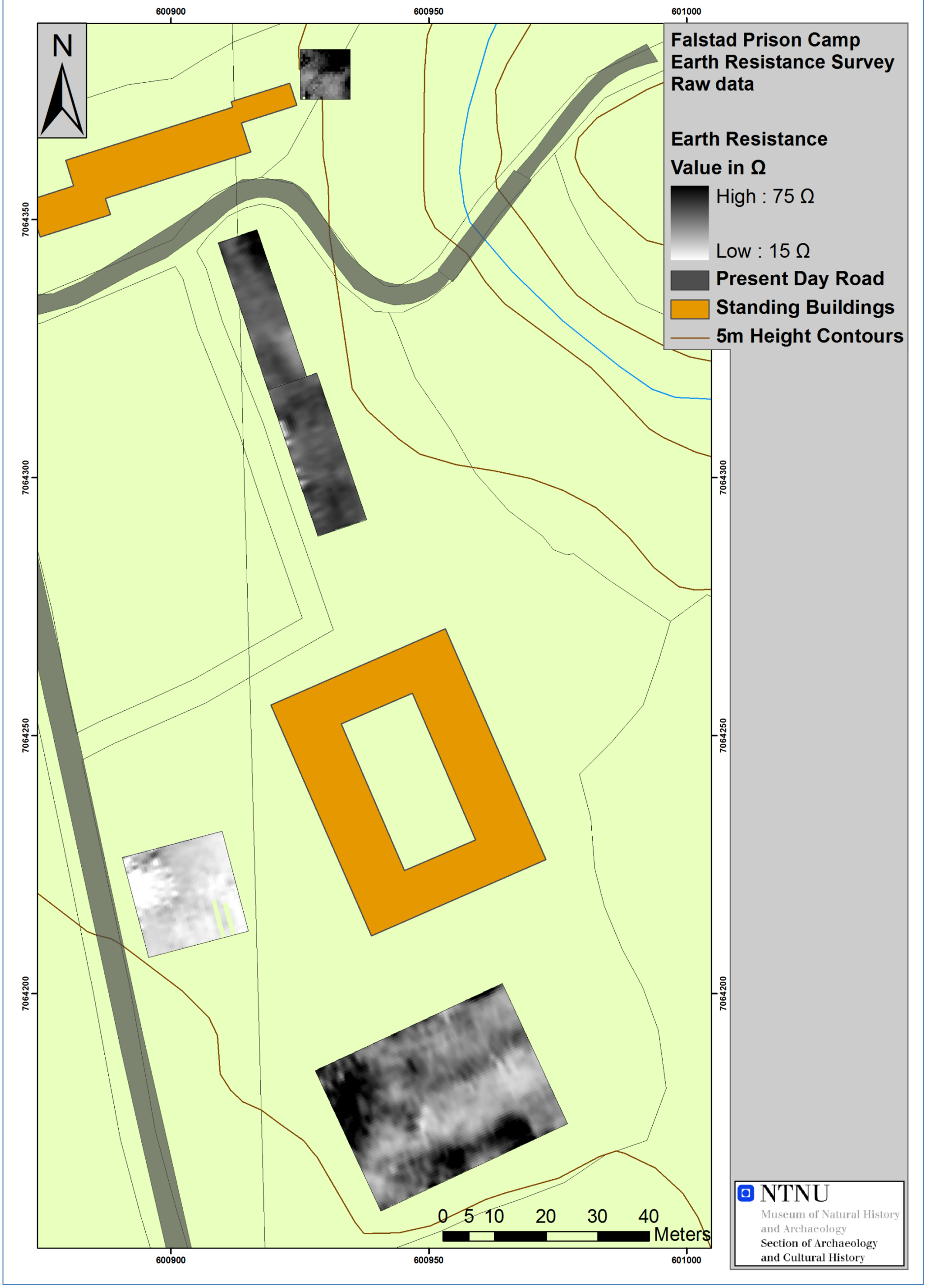

Figure 22: The raw data from the Earth Resistance Survey. Differing soil conditions and survey conditions might explain the differing data ranges in the areas surveyed.

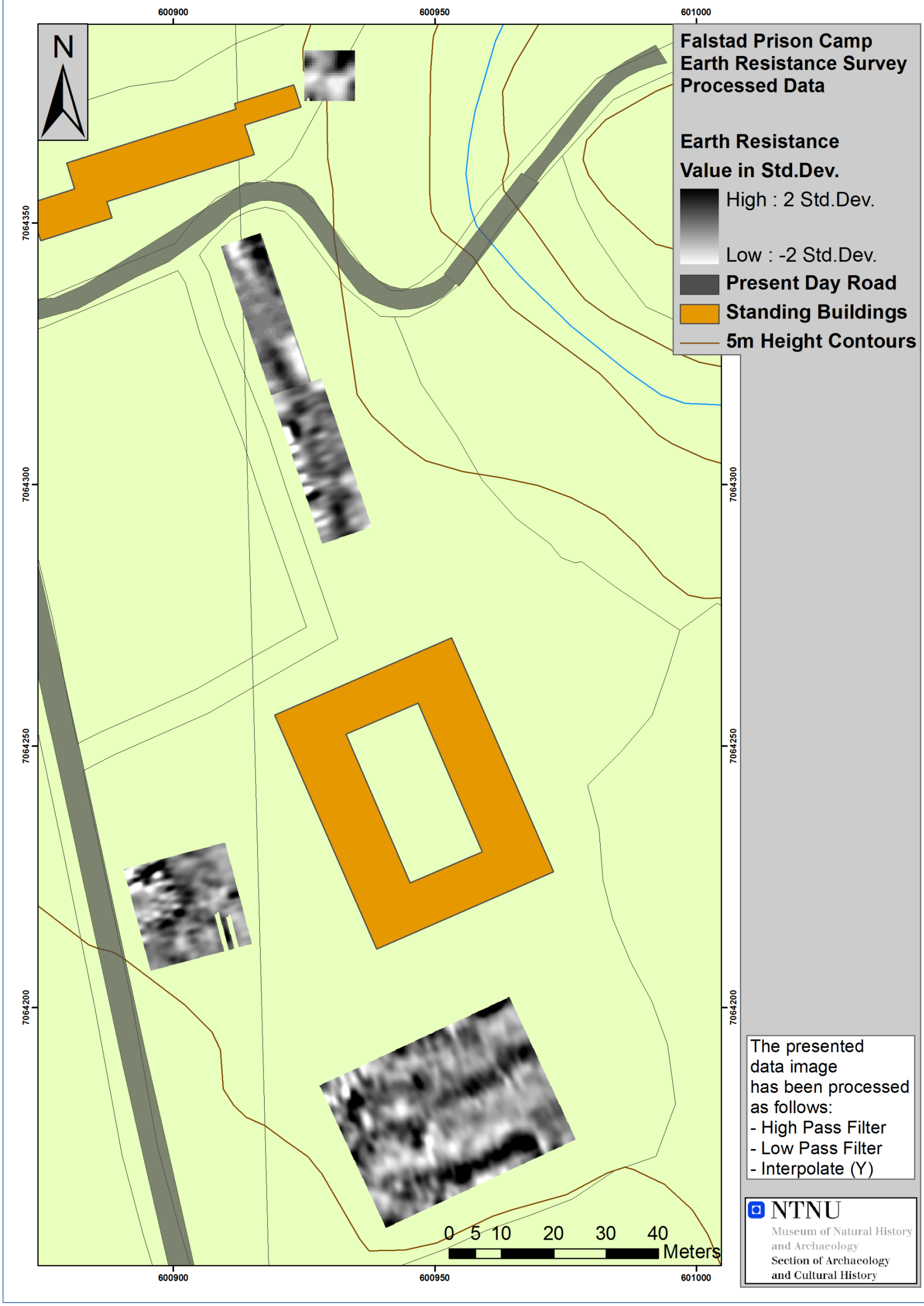

Figure 23: Processed Earth Resistance Data.

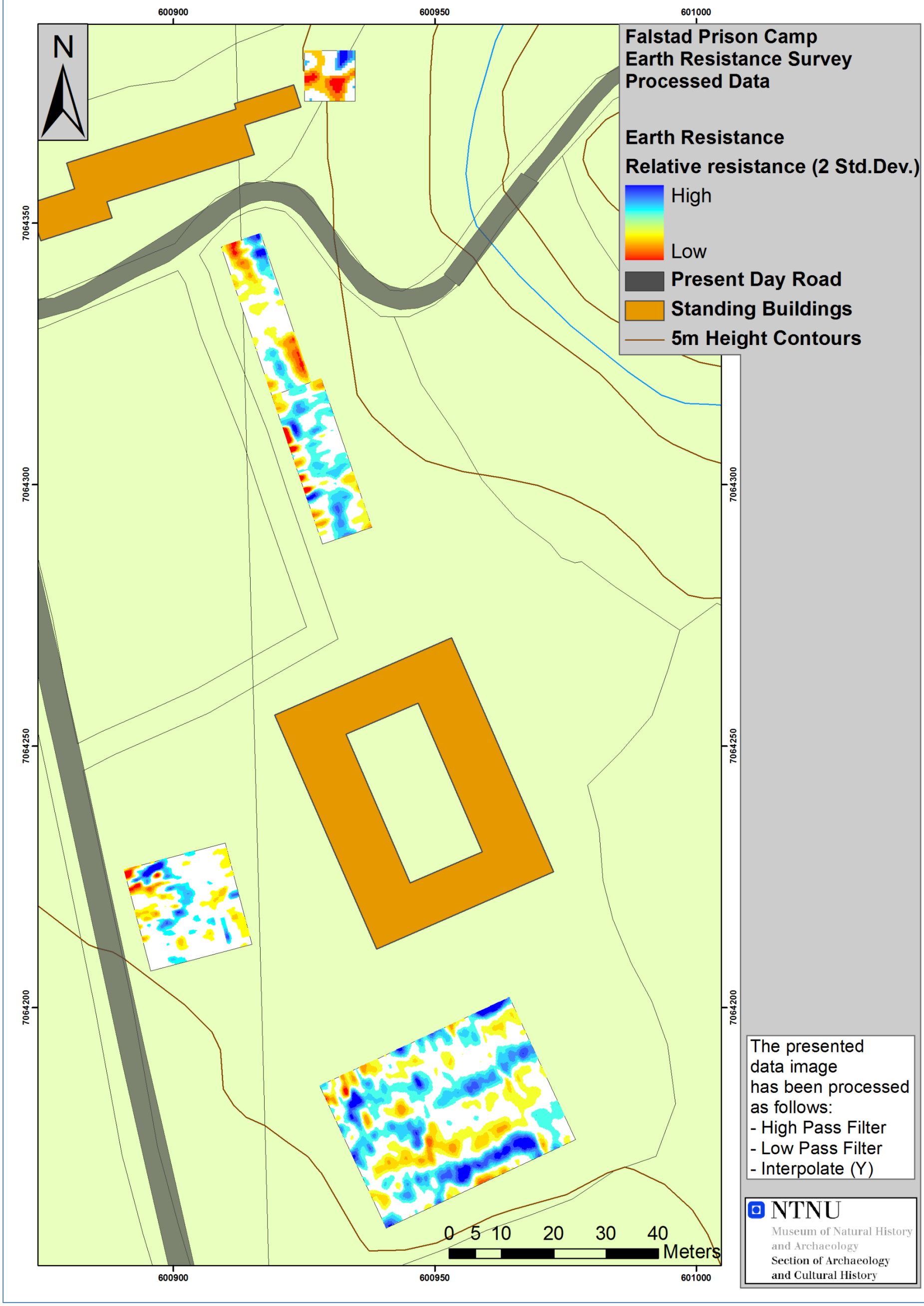

Figure 24: Areas of high or low electrical resistance visualised with colours. Mid-values have been made invisible to help categorise the anomalies.

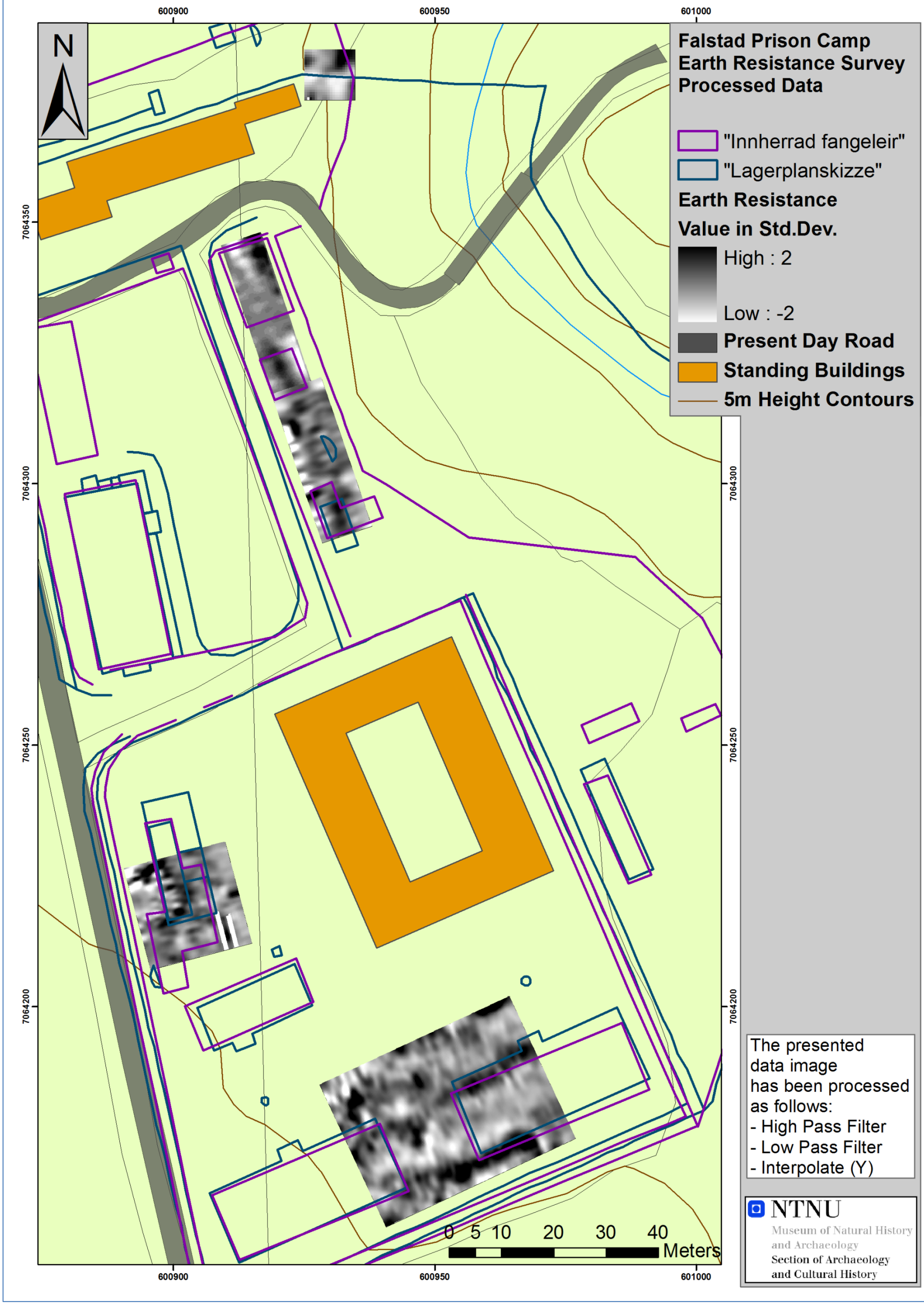

Figure 25: The processed earth resistance data with buildings identified on the georeferenced historical maps overlaid.

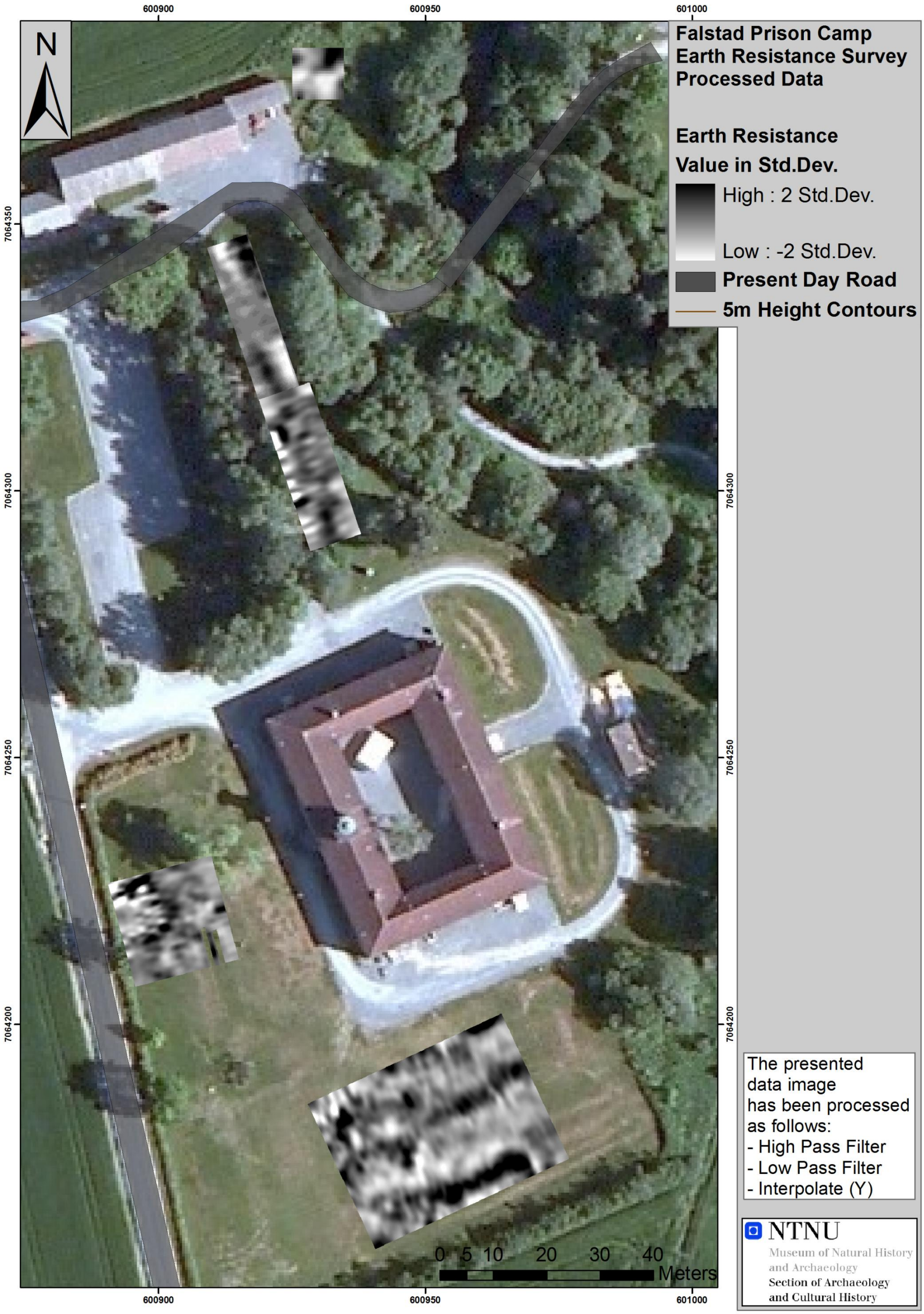

Figure 26: The processed Earth Resistance data overlaid over an aerial photo of the camp area.

Earth Resistance – Interpretation

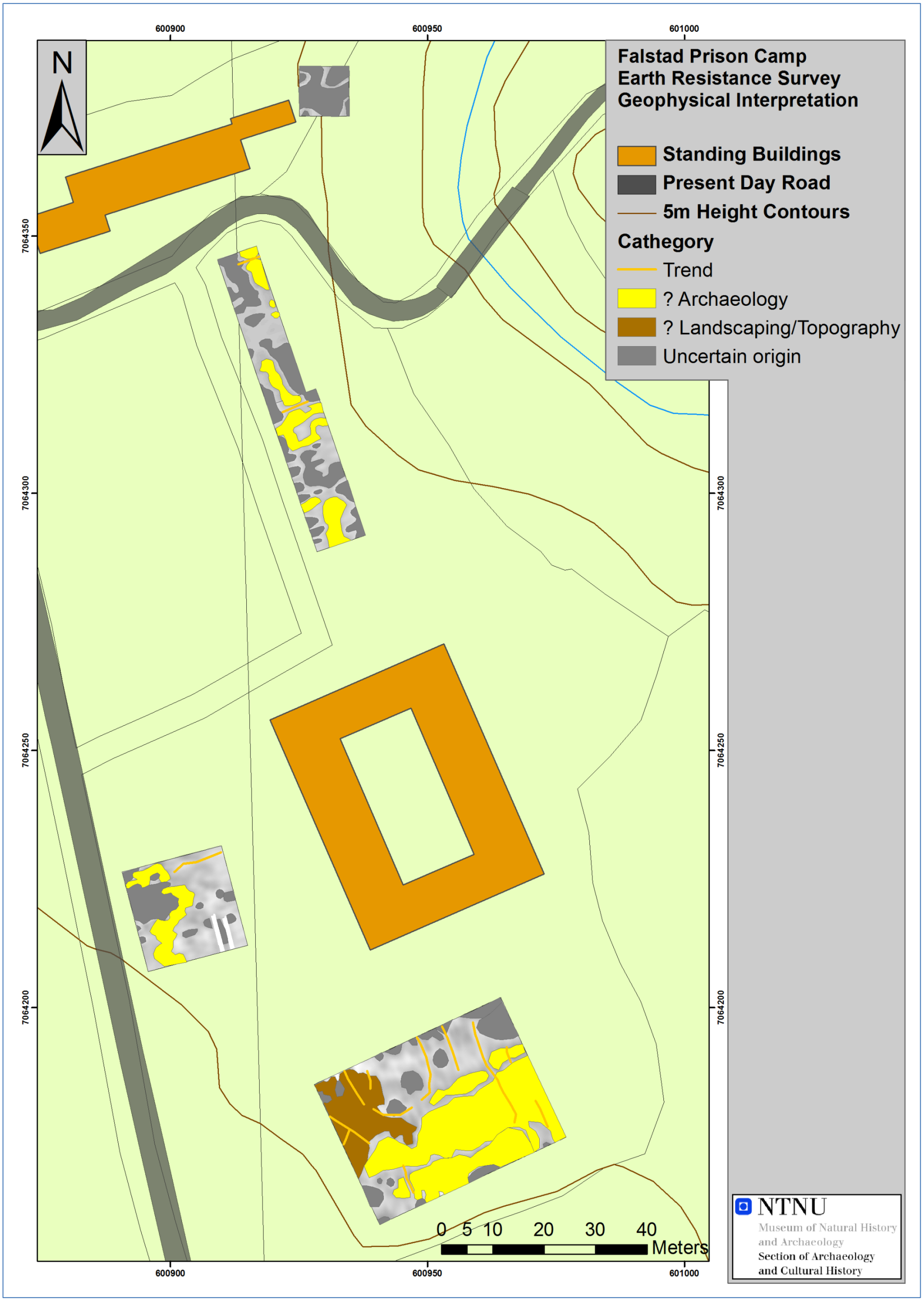

Figure 27: Geophysical interpretation of the Earth Resistance Data. Some of the interpretations are supported by the known location of former buildings.

Earth Resistance Survey Results – Summary

Few anomalies in the earth resistance data can be clearly identified as archaeological judged by their shape or form. On the other hand, it is important to bear in mind that high resistance areas might indicate stone, rubble or compacted ground while low resistance areas shown in grey/black can be related to deeper soils, ditches, and/or areas with clay. Areas of either high or low resistance could therefore partly represent some form of former activity, such as building footprints, disturbed soils etc. This will be discussed for each known former building separately in the section below.

Combined Results and Interpretations

In this section each building and the geophysical response found at these spots will be discussed. This might indicate whether or not any remains of these buildings might still be found.

The Pigsty: Some areas of low earth resistance might indicate deeper soils. Confusing and disturbed magnetic response.

The Garage: Central part high resistance, north-eastern corner low resistance. Not conclusive earth resistance results. Magnetic data shows a horseshoe-shaped anomaly that very well could be the southern edge of this building.

The Smithy: Central area has low resistance, while edges coincide slightly with high resistance. No clear pattern. Disturbed magnetic signal to the east, probably due to some form of modern infrastructure, but apart from that this area shows no magnetic signal typically related to a smithy.

The Pottery: Both areas of high and low resistance. Confusing and strong magnetic disturbance that might from activity related to the pottery, but might also be modern.

The Guards Barracks: The northernmost of these are situated within an area dominated by a disturbed magnetic response, probably due to infrastructure. No clear signs of any anomalies that can be related to this building. The same can be said about the southern of those two. The site of the southernmost barracks has also been landscaped and turned into a parking lot.

The Sawmill: A modern metal pipe or cable runs through the northern part of this area. Resistance show both areas of high- and low resistance, but the shape of a high resistance anomaly might follow the shape of the Sawmill as seen on the map from 1945-1949 (figure 12). A dotted collection of

relatively parallel magnetic anomalies might relate either to the Sawmill or a former gateway towards the main entrance of the main building.

The Sanitary building: This area is less disturbed by strong magnetic signals, but still has quite a few anomalies within the area. This kind of signal can often be related to building remains. Knowing that this building had a concrete floor, it is quite probable that some of these isolated anomalies might be concrete rubble. The concrete floor is partly or completely removed.

The Prisoners Barracks: Barrack 1 to the west is greatly disturbed by magnetic anomalies relating to the heating system. Part of this area also seems to be leveled and landscaped. Some building rubble might remain in what has been the central part of the building. The area where barrack 2 has been, coincide well with a delimited area of magnetic activity which has the same overall shape and distribution as the former barrack. Higher resistance anomalies along the northern and southern long end of this building indicate some compacted ground along where the fundaments of this building must have been. Some linear trends might indicate minor ditches or similar crossing through.

The Greenhouse: This area seems to be highly magnetically disturbed, and no clear indications related to these buildings can be identified.

Conclusion

A fluxgate magnetometer and earth resistance survey was conducted over the campsite of Falstad. The georeferencing of historic maps makes it possible to relatively accurately position any former buildings in the landscape, and if any of the geophysical signals gathered from these sites could indicate the state of preservation. Generally, it can be said that the area must have been highly disturbed, but some building remains might still be partly preserved. This relates especially to prisoner barracks 2, the garage and maybe the pottery. The rest of the known buildings are more uncertain, but parts of some of these must have been removed due to landscaping. High magnetic disturbance scattered around the area indicate either modern activity or scattered metal objects, refuse or infrastructure.

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Appendix

Categories used for data interpretation

Magnetometer	
Archaeology	Anomaly with a shape or occurring in a pattern which indicates an archaeological origin. This could be supported by their spatial context and information from other sources. This could be both negative and positive anomalies, depending on the magnetic contrast to the surrounding material.
? Archaeology	Anomalies where the strength or shape might be interpreted as archaeological, but incompleteness or some other form for uncertainty makes it difficult to positively to classify them as clearly archaeological.
Industrial	Strong magnetic signal where the context indicates an the source of being industrial activity. This could be ovens, smithies, iron production sites or similar. Shapes and properties of the anomalies might indicate a modern origin.
Metal	Metal objects with a high iron content will give a strong, dipolar signal. The negative part of the response deviate from the typical north-south response often seen by induced magnetism. Metal anomalies could be caused by small metal objects, or larger objects surrounded by distinct negative readings. Linear, "beaded" dipolar responses are typically caused by iron pipes or cables.
Ploughing	Linear anomalies that could be related to agricultural activities. Often parallel stripes, relatively well defines. Could both modern or prehistoric.
Non-archaeological linear trend.	Linear responese that could be caused by agricultural practices, tire ruts, or wires and pipes. The interpretation could be supported by observations in the field, the presence of manholes and known infrastructure.
Trend	Linear trend of unknown origin. Could be weak, indistinct, or spatially isolated.
Natural	Magnetic anomaly that have a shape or pattern that could be associated with geological or natural processes. Thes e could be paleochanels, areas with more magnetic soils or gravel deposits. Sometimes these can be seen as "soft" anomalies with a blurred edges but might still have a distinct response.
? Natural	Anomalies that probably can be explained by natural origins, but associated with some uncertainty.
Area with increased magnetic response	Areas with increased magnetic response where there are no visible or obvious features that might cause such a signal. The context might indicate archaeological significance.
Areas with high magnetic disturbance	Area with increased magnetic activity. Often noisy signal where it is difficult to identify individual anomalies. Could be caused by modern rubble, refuse, bricks, concrete, or some other material.
Areas of reduced magnetic response	Areas of reduced magnetic response, with clearly lower readings than the areas surroundings. Could be caused by geology, landscaping or land use.
Uncertain	Anoamaly with a positive or negative contrast with its surroundings, but no identifiable shape or context to explain its origin.
Infrastructure	Anomalies that has a shape or form that can be associated with known infrastructure, pipes, cables, lamp posts, heating facilities, manholes or similar.

***Resistance* –** can be of either *high* or *low* resistance	*High resistance* anomalies are for example hard surfaces, walls, compact ground, or well drained ditches due to their lack of ability to retain moisture than the surrounding soil. *Low resistance* anomalies have often an increased ability to retain more moisture than the surrounding soil. This can be for example ditches, pits, drains, gullies or graves.
Archaeology	Anomalies that are probably archaeological due to their nature and context. Can be of any age.
? Archaeology	The strength or shape of anomaly might indicate anthropogenic origin, but might be incomplete or have some inherent uncertainty about them.
Natural	Patterns of resistance anomalies from geological or natural processes. These could be paleochannels, rock outcrops etc.
? Natural	Anomalies most likely to be of natural origin, but associated with some uncertainty.
? Landscaping/Topography	These are responses which can be due to landscape alterations or topographical effects that can be identified. This can also be more modern paths or alterations.
Vegetation	Isolated or grouped narrow linear responses that can be associated with visible or known vegetation. This could also be patches of less or more drained areas, due to the evapotranspiration of plants or trees.
Trend	Linear trend of unknown origin. Might be weak, isolated or obscured.
Uncertain Origin	Anomalies that stand out from the background either as negative or positive anomalies, but with no shape or context easily associated with any other category.