3D SURVEY AND MATERIAL CHARACTERIZATION OF THE ARCHAEOLOGICAL COMPLEX OF THE STADIUM OF ANTONINO PIO IN POZZUOLI

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ABSTRACT:

The presented work is an expansion of practice exercise carried out for a diploma thesis of the School of Specialization of Architectural Heritage and Landscape of the University of Naples Federico II, in agreement with the Archaeological Park of Phlegraean Fields, and illustrates the results of the 3D survey and material characterization campaign of the archaeological complex of the stadium of Antonino Pio in Pozzuoli. It is located on the western border of the Roman city of *Puteoli* and was built by Emperor Antonino Pio to host *Eusebia*, the quinquennial *ludi* instituted in Hadrian's memory. After the 6th century, the area was gradually abandoned until it was buried by volcanic ash in 1538. Since the start of the 21st century, archaeological excavations were performed, together with the first series of safety works on the structures and excavation fronts.
This research work fits in the phase of analysis and material characterization, which is preliminary to the elaboration of a restoration project. It consisted of the 3D survey of the structure with laser scanning and photo modeling techniques through aerial drone shots and was aimed at the individuation of the construction typologies and ongoing decay phenomena.
The continuous reference between the results of the survey and those from the comparative analysis of historical and archival documentation has allowed the reconstruction of its architectural history and the sequence of its recent restorations, hence defining an integrated and implementable picture, which is necessary for the realization of suitable strategies of conservation and fruition.

1. INTRODUCTION

The presented work is an expansion of practice exercise carried out for a diploma thesis of the School of Specialization of Architectural Heritage and Landscape of the University of Naples Federico II, in agreement with the Archaeological Park of Phlegraean Fields, and illustrates the results of the 3D survey and material characterization campaign of the archaeological complex of the stadium of Antonino Pio in Pozzuoli.
The Stadium of Antonino Pio is part of the Archaeological Park of Phlegraean Fields, which preserves and manages the main archaeological sites and monuments of the Phlegraean territory. It is located on the western border of the Roman city of Puteoli, just South of the ancient Domitian road, and was built by Emperor Antonino Pio to host Eusebia, the quinquennial ludi instituted in Hadrian's memory.
Our work, following the essential historical, archival, documental, and iconographical investigations, focused on the survey of the artifact and its constructional interpretation, which is preliminary to the elaboration of a restoration project. It consisted of the 3D survey of the structure with laser scanning and photo modeling techniques through aerial drone shots and was aimed at the individuation of the construction typologies and ongoing decay phenomena, with special care for the identification of the ancient parts of the stadium, those related to its transformation into a farm, and finally, those subjected to restoration interventions between 2008 and 2010.
The continuous reference between the results of the performed 3D survey and those from the comparative analysis of historical and archival documentation has allowed the reconstruction of its architectural history and the sequence of its recent restorations, hence defining an integrated and implementable picture, which is necessary for the realization of suitable strategies of

2. THE STADIUM OF ANTONINO PIO

2.1 *Dicearchia*, *Puteoli*, Pozzuoli

The present city of Pozzuoli, located in the centre of the magnificent roadstead between the Pausilypon promontory and Cape Miseno in the heart of the Phlegrean region, originally had a mercantile function. The first settlement identifiable according to sources as Dicearchia was founded around 528 B.C. by a group of Sami exiles and, as is known, occupied the promontory corresponding to today's Rione Terra (Amalfitano et al., 1990).
Roman Puteoli developed, however, up to the Flavian age at the foot of the 'ciglione', with the construction of the Emporium Maximum. Only later were the new port areas and those of the first settlement interconnected.
Meanwhile, the city had become Rome's seaport (Castagnoli, 1977) and, therefore, the main port in the southern Tyrrhenian Sea. Many wealthy Roman citizens built their leisure villas along the coast between Pozzuoli, Baia and Miseno, a widespread rural urbanisation arose along the communication routes between Rome, *Puteoli* and *Neapolis*, such as the *Consularis Puteolim Capuam and the Puteolis Neapolim per colles*. The decision of Claudius, and later, Trajan, to set up a new port at the mouth of the Tevere caused the rapid economic decline of *Puteoli* as early as the Hadrianic period: the entire Phlegraean coastline became mainly a place of *otium*; important bath complexes such as that of Baia were built, and sumptuous villas were built for the Roman aristocracy, who stayed there for many months of the year enjoying the enchanting beauty of the area, celebrated by the greatest poets of antiquity.
Unfortunately, in late antiquity and the early Middle Ages, the fall of Rome with the resulting economic and social crisis, and the geological and volcanological phenomena that affected the area,

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caused the contraction of the settlement at the top of the ancient acropolis and a progressive depopulation of the entire Phlegraean region.
The Roman *villae rusticae* became the hubs of a new territorial organisation (Sereni, 1961): in the Middle Ages, rural dwellings grew up on the Roman ruins, while much of the agricultural land was acquired by the powerful Neapolitan monasteries of Santa Chiara and San Martino, and only a small part was divided between citizens, public property and large baronial estates. Beginning in the early 18th century, with the suppression of many religious orders, the dismemberment of the great religious heritage began; in the following decades, industrial complexes were established, whose often devastating effects on the territory cannot be examined here.

2.2 The *Eusebeia* established by Antonino Pio

The stadium of Antonino Pio at Pozzuoli represents a case of exceptional archaeological interest that has been little studied so far. The stadium typology is widespread in Greece and Asia Minor, little in the Italic peninsula; the only exceptions known so far are the stadium at *Neapolis* (Capasso, 1978; Gabrici, 1914; Gabrici, 1951; Napoli, 1959; Naples 1967) - although no remains have been found - that of *Cumae*, the ruins of which were brought to light in excavation campaigns carried out between 2004-2006 (Giglio, 2015), and, finally, the Roman stadium commissioned by the emperor Domitian in Campo Marzio to host the *agon Capitolinus*, established in 86 AD. C. (Colini, 1998; Caruso and Pergola, 2014; Ciancio Rossetto, 2015). Like all similar constructions, Antonino stadium had a planimetric shape consisting of a long rectangle with the short west-facing side curved (*sphendone*), while the east side consisted of stone arches marking the monumental entrance to the athletes runway. Figure 1. A second access, intended for spectators, took place on the northern front, structured in several avant-corps, interspersed with green spaces; these were followed by an ambulatory with a *cocciopesto* floor and a composite vaulted roof, from which one could access the different sectors of the terraces (cavea) through different openings (*vomitoria*).
Dramatic and spectacular events - gladiatorial games, *veniationes*, athletic displays, pantomime shows, cytarody - were a strong feature of the life and culture of ancient Puteoli, as handed down to us by literary evidence and data from epigraphy and archaeology (Cannavale, 2018).
The tradition of the *munera anfiteatrali* was rooted in Pozzuoli at least since the late Republican age, a period around which the imposing, still visible remains of an older amphitheatre are dated, which in the second half of the 1st century A.D. was replaced by the better known Flavian amphitheatre (Johannowsky, 1993).

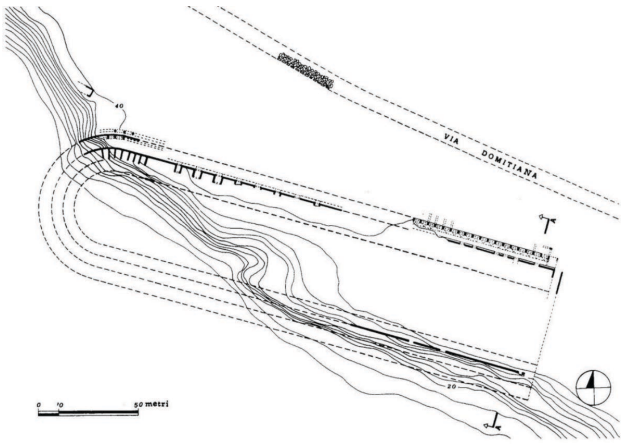

Figure 1. Stadium Plan (Camodeca, 2018, 239).

It was, therefore, in line with a well-established vocation of the city that Antonino Pio decided to build - in memory of Hadrian, who died in nearby Baia in 138 A.D. and was temporarily buried *'in villa ciceroniana Puteolis'* - a Greek-style lithic stadium and to establish a Greek-style agon, the *Eusebeia*, to be held every five years with artistic, musical and athletic events.
After decades of activity and the fall of Rome, between the 4th and 5th centuries A.D. the Stadium gradually lost its original function; the north-eastern area, buried by a powerful flood, was occupied by a series of rooms referable to a late antique complex; part of the ancient structures were partially modified according to rustic/production needs. The area of the northern portico was used for processing and extinguishing lime, part of the cavea for the production of oil and wine (Gialanella and Romano, 2022).
After the 6th century, the area was gradually abandoned until it was buried in 1538 by the eruption that gave rise to the nearby Monte Nuovo. From then on, the outcropping stadium remains were the subject of misinterpretations by scholars of the time.
Throughout the 16th and 17th centuries, in the important studies of Loffredo (Loffredo, 1570) and Mazzella (Mazzella, 1591), the thesis that the ruins of the building were those of Cicero's Lucrinian villa, the *Academia*, is upheld. Of the same opinion was the erudite antiquarian P. A. Paoli (Paoli, 1768), in his famous *Antichità di Pozzuoli* in 1768.
It was Andrea de Jorio in the early 19th century who first claimed that the architectural remains then visible belonged to the ancient stadium. Figure 2.

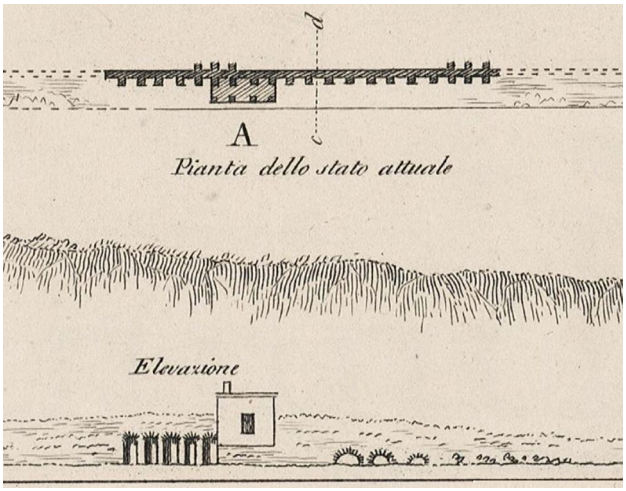

Figure 2. Caristie, *Stadium of Pozzuoli* (de Jorio, 1830 Tav. 4).

The drawings by the architect Caristie that illustrate de Iorio's text (de Jorio, 1817) show that the remains of the stadium had been incorporated into a new colonial complex, while the outer spaces had been used for the cultivation of citrus fruits and vines; part of the ambulatory had been transformed into a cellar for storing wine and to house a small bakery oven. Figure 3.

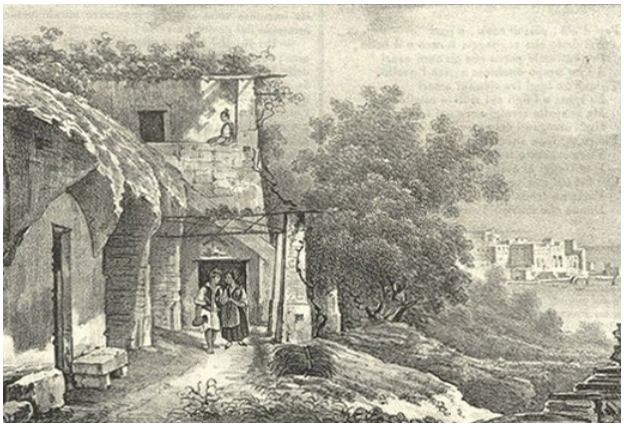

Figure 3. Cuciniello and Bianchi, Ruins of the Villa of Cicero in Pozzuoli, (Liberatore, 1832).

Although de Jorio's publication is well known, the stadium was still considered a circus for a long time even by important authors such as Beloch (Beloch, 1890) and Dubois (Dubois, 1907), as well as in Maiuri's classic guide to the Campi Flegrei (Maiuri, 1963) and in Laterza's archaeological guide from the early 1980s (De Caro and Greco, 1981). It was only in 1977 that Castagnoli (Castagnoli, 1977), taking up de Jorio's old hypothesis, proposed that the Puteolian monument should be identified as a stadium and not a circus, given the lack of a central division in the arena, necessary for chariot races (Johannowsky, 1993). It will be necessary to wait for the results of the excavation operations conducted by the Superintendency for the Archaeological Heritage Sites of Naples the early 2000s for the definitive association of the archaeological remains found with the Stadium of Antonino Pio (Camodeca, 2018).

2.3 The recent archaeological excavation

Excavations carried out in the early 2000s, followed by limited restoration work, brought to light part of the ambulatory and the northern façade, as well as a section of the *cavea.* Figure 4. Unfortunately, almost nothing remains of the curved side and the entire southern half, which collapsed with the subsidence of the natural terrace, on whose edge the stadium had been scenographically constructed (Nava, 2007).

Figure 4. View of the cavea during the excavations, 2006 (Archive of the Archaeological Superintendency of Naples)

On the extrados of the *ima cavea,* three vats were brought to light, possibly wine vats, made from spoliation materials excavated from the stadium and buried by the primary eruptive deposits of Monte Nuovo, which help to confirm that the *cavea* had already assumed a rural use in late or post-antiquity (Nava, 2008). The monumental double-curtain entrance of the athletes to the runway, consisting of arches supported by quadrangular trachyte pillars covered in light-coloured plaster, was excavated and recomposed by anastylosis. Figure 5.

The ashlars of the front face of the easternmost arch had collapsed towards the interior of the cavea and were obliterated by the eruptive deposits of Monte Nuovo; those relating to the outer face, on the other hand, were almost all found in their original location, or in the immediate vicinity. In the space between the two sides of the monumental opening, a number of vault collapses were also found, suggesting an original covering of the passage between the outer and inner arches. In order to carry out the anastylosis of the ashlars pertaining to the front face of the first archway, the trachyte piers, founded on a *coementicium* slab, were completely exposed; to the west and parallel to these, two trachyte blocks with a central recess, probably related to the departure system, were housed at a height above the level of the runway (Nava, 2008).

Figure 5. View of the reconstruction by anastylosis of one of the triumphal arches, 2007 (Archive of the Archaeological Superintendency of Naples)

The farm building was partially consolidated and the roofing slab was exchanged. During the excavation, the remains of a Late Antique building also emerged: at the beginning of the 4th century A.D., on a section of the perimeter wall to the north-east of the stadium, an architectural complex was built, characterised by two different rooms in opus vittatum mixtum, possibly a portico, consisting of a group of four composite pillars aligned along the east/west axis and a second one with a north/south orientation, characterised by a poly-absidate plan (Nava, 2009). Figure 6.

Figure 6. View of the remains of the late ancient architectural complex, 2007 (Archive of the Archaeological Superintendency of Naples).

The archaeological structures brought to light at the Stadium and the late antique villa constitute a valuable testimony to the city of Puteoli. The Stadium constitutes a particularly interesting example of an architectural palimpsest and an irreproducible repertoire of building traditions, materials and techniques of undeniable interest. Unfortunately, to date it is not usable: the expropriation of the farmhouse and the excavation of the ancient structures have not been followed by a necessary programme of knowledge, restoration and use.

The experimentation conducted aims precisely at providing elements of knowledge of a geometric and constructive nature that it is hoped will be useful for a correct and conscious project of restoration and use.

3. RESULTS OF THE EXPERIMENTATION

3.1 Data survey and segmentation

Given the particular orographic conditions, the three-dimensional survey of the archaeological site required the use of two distinct survey methodologies.
The main objective of the survey campaign was to construct a model through which to explore the morphology and the relationship between the parts, and to draw up and elaborate representations that would enrich the available technical and scientific documentation. Surveys of structures that did not guarantee safe operation were excluded from the acquisition work. The survey operations were carried out in two phases, the first in October 2021 with the survey of the entire area using the RPAS (Remotely Pilot Aircraft System) photogrammetric survey; the second in February 2022 with the integrated survey using photogrammetric modelling and 3D laser scanning technology, covering the entire stadium complex. Figure 7.
The survey was carried out from a topographical grid of the area and was linked to monographic points within the area. The closed polygonal constructed allowed for the connection of the photogrammetric survey and the georeferencing of the survey with TLS laser instrumentation. In the first survey campaign, photogrammetric acquisition was carried out using *RPAS* (Remotely Piloted Aircraft System). Five flights were carried out, of which two orthogonal nadiral and three inclined camera flights with 70% overlap between the shots (overlap and sidelap). Four GCP (ground control points) were distributed within the area, appropriately beaten with a total station.

Figure 7. Perspective view of the dense point cloud from the RPAS (Remotely Pilot Aircraft System) of the Stadium of Antonino Pio.

Figure 8. Survey area of the Stadium of Antonino Pio.

The flight height was 40 m, and the acquisition returned an average GSD (ground sample distance) of 1.22 cm pixels. The dataset obtained was 354 frames taken by the drone, a DJI Phantom 4, and processed with the *Agisoft Metashape* photogrammetric modelling software. The work carried out allowed for the reconstruction of the current consistency of the archaeological complex and the subsequent elaboration of a three-dimensional model, which was used as a survey tool

for the creation of orthophoto plans, sections and DEM (Digital Elevation Model) of the site. Figure 8- 9-11-12-13-14-15-16-17.
The photographic acquisition with a UAV (Unmanned Aerial Vehicle) required a preliminary shooting project, based on a mapping of the area of interest with Mission Planner, a open source software that allows the creation of flight plans through the calculation of *waypoints*, which define the route, the number of shots, and the value of the *ground resolution as a function of the height of the drone and the sensor mounted on board the camera*. Operational and environmental factors that could affect restitution were taken into account in order to ensure maximum coverage of the area to be surveyed.

Figure 9. Nadiral orthoprojection from dense point cloud from RPAS of Stadium of Antonino Pio. GSD 1.22cm/px.

During the second survey campaign, point clouds were acquired with laser scanners. A TLS (Terrestrial Laser Scanner) with phase shift from CAM2/Faro, model Focus3D X330, was used to survey the site with laser instrumentation and to acquire the morphometric characteristics of the archaeological complex. The scans were recorded and processed using checkerboard targets and spheres using ICP and cloud-to-cloud algorithms; TLS and UAV cloud matching was performed in CloudCompare.
The instrumentation used enabled the acquisition of useful information to define the topology of parts of the complex that could not be reached with other surveying equipment or techniques.
Artificial targets and calibrated spheres were used to ensure the correct connection between the different scans. Particular attention was paid to their positioning. They were placed according to a chessboard pattern, and it was constantly checked that the same trio of targets was always visible on consecutive pairs of scans.
In particular, 90 scans were carried out, choosing appropriate station points with as few occlusions as possible. The resolution set was 6.136 millimeters measured in a plane 10 meters from the emitter, with 3X quality, each scan lasting 7 minutes. The acquired clouds were recorded by collimating the artificial targets and calibrated spheres. After pre-processing, we proceeded with the registration phase of the individual scans by establishing the starting scan, barycentric with respect to the site, and aligning all the others to it, applying the roto-translation matrices between the different internal local systems in order to frame them in a global reference. Figure 10.

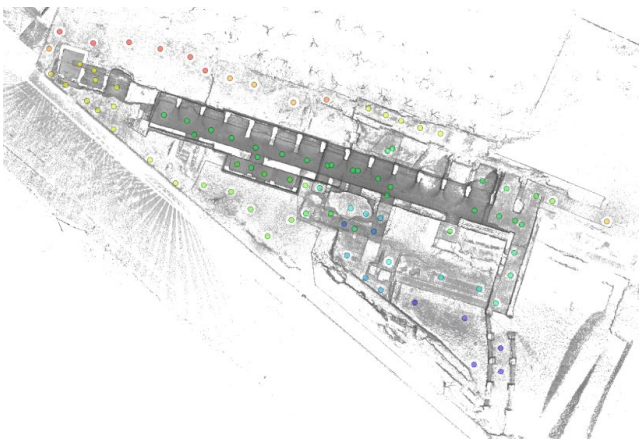

Figure 10. Orthoprojection from TLS cloud with position of laser scanner station points.

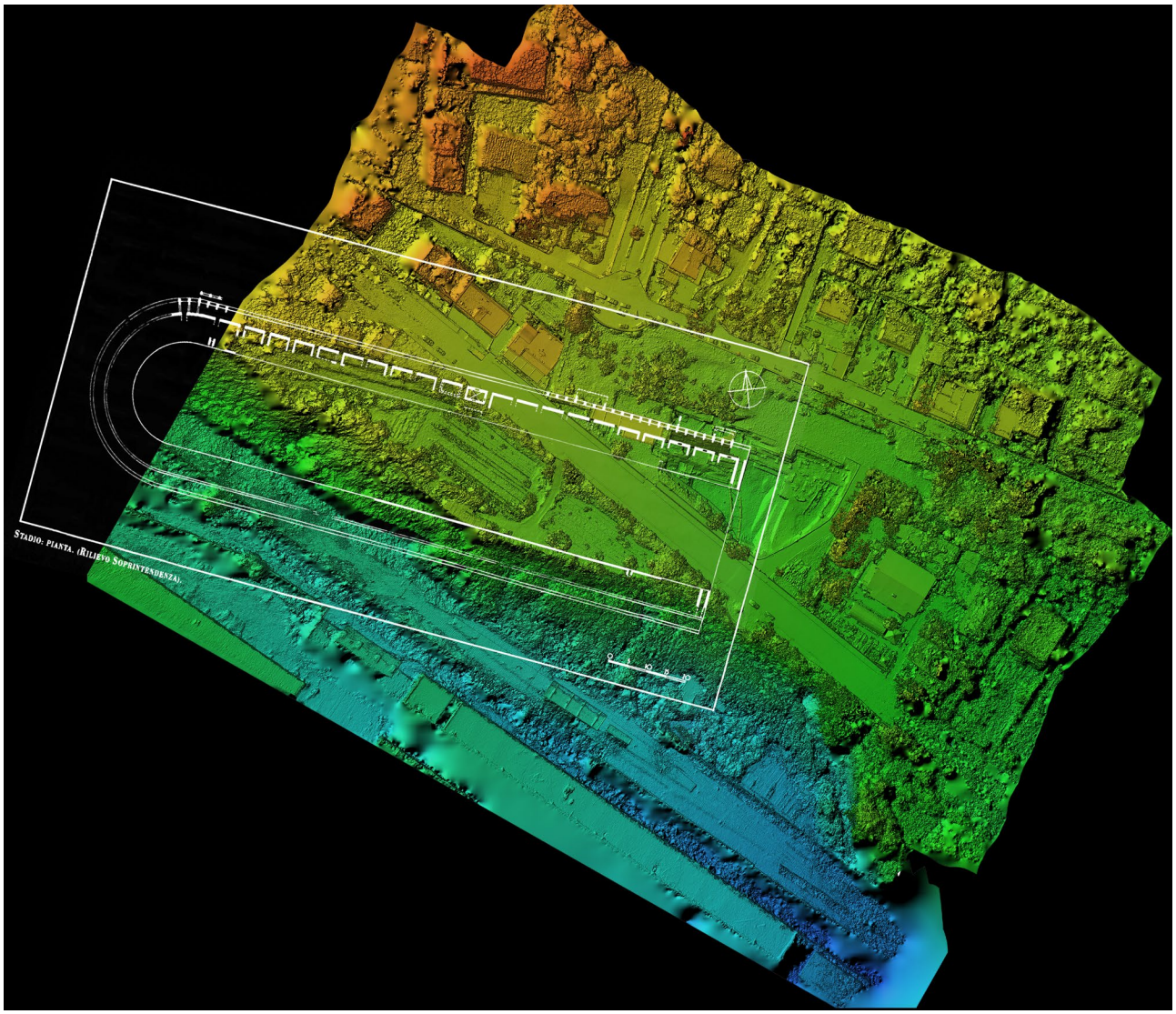

Figure 11. DEM (Digital Elevation Model) of Stadium of Antonius Pius. GSD 1,22 cm/px

This allowed them to be georeferenced to the reference system through the common coordinates of the targets, and the subsequent merging of the individual point clouds into a single three-dimensional model.
The data obtained by laser scanning made it possible to return dimensional values, generate orthophotos, process three-dimensional models, extract textures and produce spherical photos. The choice of an active-sensor technology such as laser scanning made it possible to operate even in low-light environments such as some parts of the underground complex, acquiring their reflectance values**.**

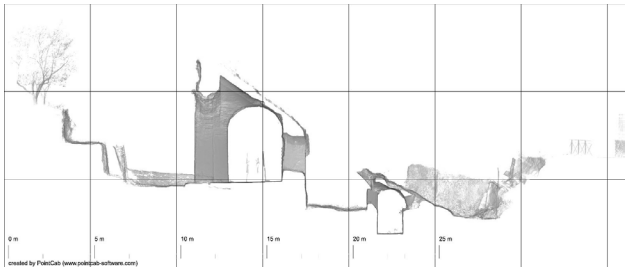

Figure 12. Orthoprojection of section from TLS point cloud of Stadium of Antonino Pio.

In order to obtain a single model from the two point clouds, GCPs (Ground Control Points) were positioned in both the first and second survey campaigns, materialised by means of checkerboard targets and RAD (Ringed Automally Detected) targets, visible from the aircraft and identifiable in the point cloud obtained with the laser scanner.
The network of control points ensured topographic support to georeferenced the two models (photogrammetric and laser) so that the gaps in both clouds could be compensated for.
The high quality of the data made it possible to identify construction peculiarities that allowed various analyses of the existing building.
Subsequently it was possible to recreate a three-dimensional model, which can be interrogated and navigated, of the entire complex, a tool that represents a further means of dissemination and fruition. In fact, the site, which cannot be visited physically, can, through a virtual tour, be measured, analysed and shared remotely.
The survey campaign thus constituted an interesting integration of different technologies, the outcome of which, at this early stage of the research, can be considered largely successful.

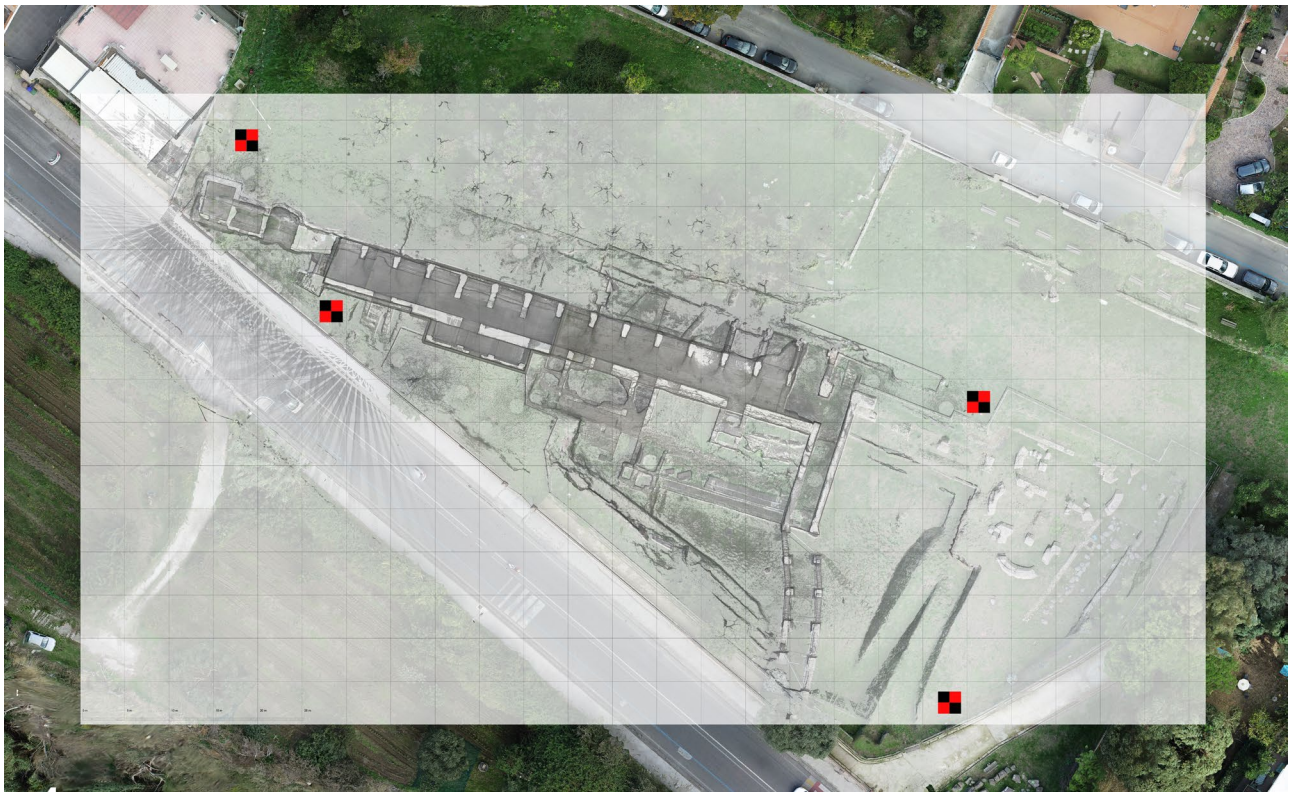

Figure 13. Overlay TLS – RPAS survey of Stadium of Antonino Pio. GCP location.

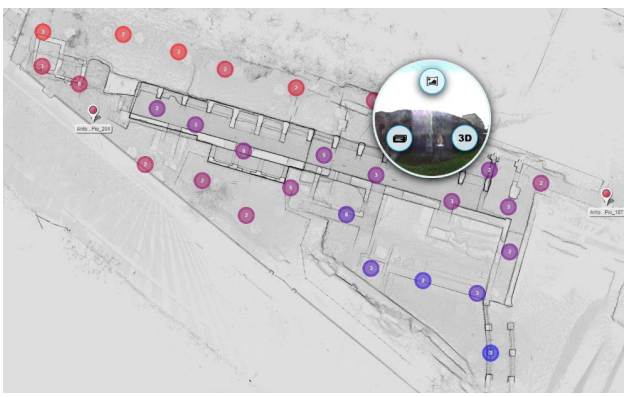

Figure 14-15. Virtual tour of the spatial model obtained from point clouds

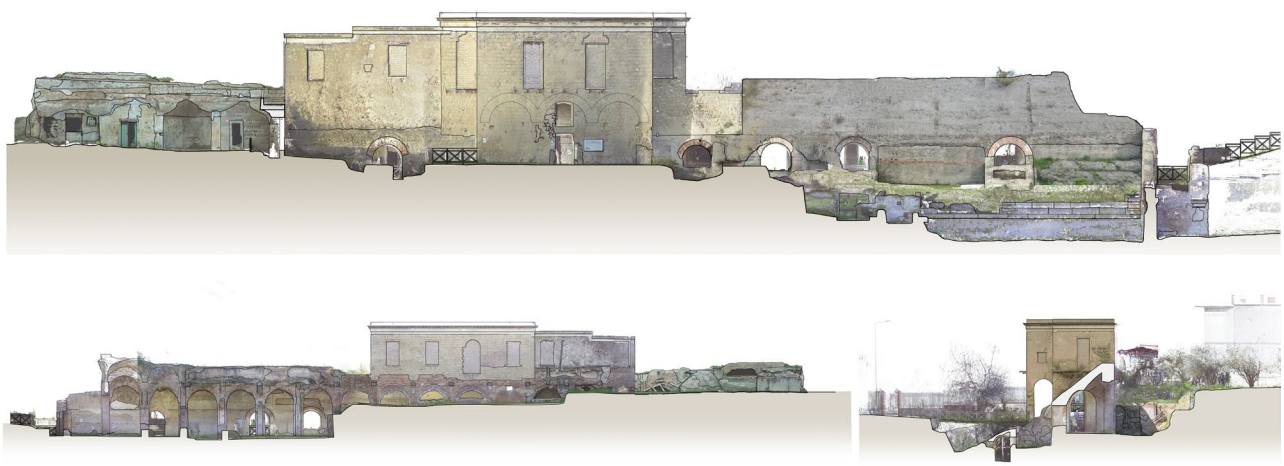

Figure 16-17. Ortoprojectionobtained from the three-dimensional model

3.2 Considerations about construction typologies

Compared to other archaeological monuments in the Phlegraean area, most of which have been excavated since the 1930s and have undergone various consolidation works in recent decades, the Stadium of Antonino Pio has only recently been excavated and has not been subjected to any particular restoration work. In this sense, it represents a unique testimony of its type, as it makes it possible to analyse the ancient material of the monument still in its original consistency and form. Unfortunately, much of the cladding has been lost and it is not possible to reconstruct the exterior appearance, except by resorting to conjecture. On the other hand, important evidence remains of the vaulted structures, arches and walls with which the *cavea* and ambulatory were built.

The materials are the classic ones of Roman architecture in the Phlegraean area: trachyte, tufa, bricks and pozzolanic mortar; the methods of execution, on the other hand, have various specificities specified below.

Having acquired the three-dimensional reliefs of the structure, we then moved on to the direct survey and drawing of some details of the individual elements of the structure, which, presenting their constructive 'anatomy' on sight because they were in a rudimentary state, allowed us to carry out some reflections on their material-constructive consistency.

Among the elements examined, the arches that define the façade of the ambulatory proved to be very interesting; they present a very particular construction method.

These arches - which have a total thickness of 1.45 m - are made up of two simply juxtaposed arches, an internal one, which is 0.42 cm thick, and an external one, which is approximately one metre thick. The external one, in particular, is characterised by two outer walls of a width of 0.25 cm made of 3.5 cm thick bricks with 1.5 cm thick mortar courses, and a central core consisting of masonry made of tuff flakes and bricks of approximately 0.53 cm thick. Approximately every six/seven bricks, a larger brick was inserted that spanned the entire thickness of the arch, a sort of transversal diatonic connecting the two faces. This was a very particular construction expedient that speeded up the construction of the arch while guaranteeing its adequate strength. Figure 18.

Figure 18. View of arches of the façade of the ambulacrum

Direct examination of the building revealed a further construction specificity. In some points of the structure, in fact, there are real continuity solutions between the masonry, cracks a few centimeters thick, what today we would call structural joints. In particular, such solutions of continuity are found between the structure of the aforementioned and the arches behind them on which the vaults of the roof of the ambulacrum discharge and, again, between the lower part of the structures of the cavea. Figure 19-20.

This is a construction expedient that is not easy to interpret. The masonry in question is for at least part of its height simply juxtaposed to one another.

This could be explained simply by imagining that the execution of the different parts was entrusted to different teams of workers who worked separately: in that case, it remains to be explained why simple joints were not made between the different parts. Is this an error or a precise construction choice? What does the lack of clamping between the parts

mean from a mechanical point of view in the event of non-gravitational stresses? Is it a point of criticality or strength of the original structure? These are questions that need to be answered through further and specific investigations, which are indispensable in order to define any congruent consolidation interventions.

If, for the structures of the cavea and ambulatory, the use of sack masonry and techniques with brick facing or *opus reticulatum* is pre-eminent, for the construction of the structure of the arches leading to the runway, the technique of masonry with shaped blocks of trachytic lava without the use of mortar was used, which denotes a certain versatility of the builders of the time, capable of realising both jet techniques, in which the role of mortar is predominant, and stereometric techniques, for which the good execution of the work is entrusted to the modelling of the individual stone ashlars.

Figure 19. View of the inner side of the brickwork pier of the ambulatory arch. Note that the two masonries are not joined

Figure 20. View of the outer wall of the ambulacro. Note that the two masonries are not joined

4. CONCLUSION

4.1 Possible suitable strategies of conservation and fruition

The stadium of Antonino Pio has at least two features that make it unique, even within the extraordinary context of the architecture of the Archeological Park of Phlegrean.
It is one of the few still-visible testimonies to an architectural typology that is not particularly widespread in Italy, that of the stadium, and to date has not undergone any particular restoration work, as it has only recently been excavated.
Unfortunately, the construction of Via Campi Flegrei, which has cut the complex in two, and the landslide event that caused the collapse of the ridge on which the southern structures of the complex stood, make it impossible to 'enlarge' the current stadium area to include the entire site, although additional plots of land downstream of the aforementioned roads have been acquired by the State. For this reason, the remains that can be visited today present themselves as an 'urban fragment' that is not easy to interpret. The lack of visual landmarks is not conducive to understanding the extent and form of the original complex.
Regarding specifically architectural restoration issues, the richness and uniqueness of the building palimpsest that emerged from the excavation must be preserved in its current consistency. It will be necessary, therefore, to calibrate minimal intervention strategies that - in full respect of the ancient material - will allow the asset to be secured, without too many additions.
While we hope that exploratory tests will soon be carried out to ascertain the quality and quantity of further surviving structures in the funds downstream from Via Campi Flegrei, it is clear that a desirable inclusion of the stadium in the Phlegraean archaeological heritage tour circuit should also aim to provide the site with a communication and explanatory apparatus capable of helping us understand both the spatiality and construction characteristics of what remains, and the monumentality and extension of the site in its original consistency.
In this sense, the disciplines of drawing can be a useful aid to reconfigure by means of representations, physical or virtual models, the spatial articulation of the complex and accompany possible visitors in understanding what is still present in its ancient and authentic consistency, showing them what it must have been, in a continuous cross-reference between direct observation and imagination. In this sense, the three-dimensional survey work that has been carried out represents a first step towards possible further research that - through the collaboration between architects and archaeologists - will make it possible to define the original planvolumetric aspect of the stadium and elaborate the corresponding three-dimensional computer models.
All in all, the conservation conditions of the complex are fair: the most relevant problems are related to the presence of weeds and the disposal of rainwater. Without prejudice, therefore, to possible additions to meet static requirements and the desirable, yet complex, recomposition of the arches of the monumental access to the slope, it is hoped that work will soon be carried out to safeguard the wall crests, consolidate the excavation faces, and regiment rainwater as best as possible through active and passive rainwater drainage systems.

Finally, as far as fruition is concerned, the studies conducted thus far lead us to believe that it is almost impossible to refunctionalise the volume of the farmhouse because the implementation of the necessary facilities would significantly damage the preservation of the stadium structures and that, therefore, the farmhouse should also be preserved as a ruin, bearing witness to the phenomena of re-appropriation of the vestiges of ancient monuments from the medieval period onwards. And, furthermore, that just as the Archeological Park of Phlegrean Fields has already done for other assets it manages, such as the case of the Macellum - Temple of Serapis, starting from 2020 the first public-private partnership in Italy, pursuant to the provisions of art. 151, c.3 of Legislative Decree n. 50/2016, it is necessary to define fruition policies that involve not only municipal institutions, but also citizens' associations operating in the area for common actions that start from the bottom, as called for by the Faro Convention.

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