Archivo Español de Arqueología 98
Enero-Diciembre 2025, 750
ISSN-L: 0066-6742 | eISSN: 1988-3110
https://doi.org/10.3989/aespa.098.025.750

The urban transformations of the 3rd and 4th centuries in *Mirobriga* (Santiago do Cacém, Portugal): an in-depth analysis

Las transformaciones urbanas de los siglos III y IV en Mirobriga *(Santiago do Cacém, Portugal): un análisis en profundidad*

Filipe Sousa
Pre-doctoral Research Fellow, CHAM, Centro de Humanidades – FCSH,
Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa, Portugal
filipesousa@fcsh.unl.pt
ORCID iD: https://orcid.org/0000-0002-6883-7945

Catarina Felício
Pre-doctoral Research Fellow, CHAM, Centro de Humanidades – FCSH,
Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa, Portugal
cfelicio@fcsh.unl.pt
ORCID iD: https://orcid.org/0000-0002-7274-600X

Submitted: 19-11-2024. Accepted: 30-10-2025. Published online: 07-04-2026.

Citation / Cómo citar este artículo: Sousa, F. y Felício, C. (2025). "The urban transformations of the 3rd and 4th centuries in Mirobriga (Santiago do Cacém, Portugal): an in-depth analysis." *Archivo Español de Arqueología*, 98, 750. DOI: https://doi.org/10.3989/aespa.098.025.750.

ABSTRACT: The 3rd century is a pivotal era that led to profound transformations in the social and political environment of the Roman Empire. These changes, which severely affected the westernmost areas of the empire, are reflected mostly in a phenomenon of degradation of urban life and infrastructure that begins in the late 2nd century AD onwards. In Hispania several studies conducted over the years have presented a scenario of urban decay and loss of status of several towns, showing a somewhat widespread phenomenon, albeit not manifesting itself in the same degree on every settlement. In this paper, we present a case study of a Roman provincial small town from the perspective of the urban dynamics, epigraphic habit and the imports of fine wares and foodstuffs through a comparative analysis. The results show a scenario of two periods of abandonment from the mid-3rd century onwards, interspersed with reoccupations of some of the previously abandoned buildings.

Keywords: urban crisis; Late Roman; Lusitania; Roman urbanism; evergetism.

RESUMEN: El siglo III es una época crucial que condujo a profundas transformaciones en el entorno social y político del Imperio romano. Estos cambios, que afectaron gravemente a las zonas más occidentales del imperio, se reflejan principalmente en un fenómeno de degradación de la vida urbana y sus infraestructuras que se desarrolla a partir de finales del siglo II d. C. En Hispania, diversos estudios realizados a lo largo de los

años han presentado un escenario de decadencia urbana y pérdida de estatus de varias ciudades, mostrando un fenómeno bastante generalizado, si bien no se manifiesta con la misma intensidad en todos los asentamientos. En este artículo presentamos el estudio de caso de una pequeña ciudad provincial romana desde la perspectiva de la dinámica urbana, el hábito epigráfico y la importación de cerámicas finas y alimentos en un análisis comparativo. Los resultados muestran un escenario de dos períodos de abandono desde mediados del siglo III en adelante, intercalados con reocupaciones de algunos de los edificios previamente abandonados.

Palabras clave: crisis urbana; periodo tardorromano; Lusitania; urbanismo romano; evergetismo.

1. INTRODUCTION

The 3rd century is a period marked by several political, economic and military convulsions. Albeit frequently studied from a historical point of view, the archaeological evidence has demonstrated that this period presents a turning point in the urban evolution of the cities of the western empire.

In *Hispania* scenarios of urban degradation have been archaeologically documented since the late 2nd century CE (Andreu Pintado, 2017a; Andreu Pintado and Blanco-Pérez, 2019; Brassous and Quevedo, 2015; Cepas Palanca, 1997; Romero Vera, 2022).

Throughout the history of research into this issue, several causes have been proposed as responsible for the urban decline of cities. Of these, the occurrence of a "crisis" in acts of munificence has been highlighted, caused by the growing lack of interest among local elites in sustaining the maintenance of the urban infrastructure (Arce Martinez, 2015, p. 312; Purcell, 2019, p. 24).

This idea has been defended also under the premise of an ideological change in the cities' elites that would have as one of the consequences the lack of interest in acts of munificence. D. Espinosa has highlighted six symptoms as indicators for detecting this ideological change and proposed some of the possible causes (see Espinosa Espinosa, 2019, p. 74-79).

Furthermore, the idea that the territorial organisation system of *civitates* was already fragile from the outset has also emerged (Martín-Bueno, 1999, pp. 117-121; Mata Soler, 2014, pp. 224, 219-251; Blanco-Pérez, 2019; Espinosa Espinosa, 2019, p. 72), aggravated by the pursuit for a *dignitas urbs* and an *aemulatio* of Rome (Witschel, 2009, p. 494; Andreu Pintado, 2019, p. 33), which resulted in the construction of large complexes and public buildings that were, in some cases, overdimensioned and became too costly to maintain, initially for the smaller municipalities and, later, extending to the vast majority due to the economically troubled situation (Romero Vera, 2021a, pp. 61-63; 2021b, pp. 260-261). This fragility had already led to the indebtedness of some cities in the second half of the 1st century CE (Blanco-Pérez, 2019),[1] and would again manifest itself from the end of the 2nd century and throughout the 3rd century, in an aggravated form, turning many of the cities of *Hispania* in *oppida labentia* (Andreu Pintado, 2017b) or *civitates intermortuas* (Arce Martinez, 2015, p. 311).

This situation led to the progressive abandonment and depopulation of the urban centres (Romero Vera, 2021c, p. 48) and, according to some views, is reflected in the population growth verified in the rural settlements as well as an enrichment in the *villae* of this period. This hypothesis, however, is not consensual, being dismissed by many authors, which underline a more complex reality for the development of the rural areas in the late Roman period (Chavarría-Arnau, 2006, p. 24; Kullikowski, 2010, p. 130; Arce, 2015, p. 322).

Regarding *Lusitania*, there is almost a void of published contexts and discussion on the matter, with the exception of *Augusta Emerita*, namely the abandonment of part of the public sanitation system in the 3rd century (Romaní Sala and Acero Pérez, 2014) and its urban evolution in the Late Antique period (Osland, 2011); and Olisipo (Silva, 2011, p. 205, 2012, p. 399; Vieira, 2011, pp. 110-111; Sousa and Felício, 2025).

On the other hand, *Mirobriga* presents a considerable amount of unexplored data regarding this period, some of which has been previously mentioned in previous occasions (Slane, 1988; Quaresma, 2012; Teichner, 2018d; Felício, 2019; Sousa, 2019; Sousa and Felício, 2020; Teichner, 2021) but only briefly discussed, and not always thoroughly framed in the problematics mentioned above.

1 The author cautions to some exaggeration in the presentation of problems by embassies to the emperor in order to provoke greater awareness, a situation that would be common and traditional in this type of diplomatic procedures (Blanco-Pérez, 2019, p. 43).

These data attest to a period of abandonment of some sectors of the city, which can be dated back to the mid-3rd century, or perhaps a little earlier, followed by a period of transformations. These are denounced by the evidence of ruin of several buildings from this time onwards, ubiquitous in most of the investigated sectors, and the construction of new structures inside some of the partly ruined buildings (Biers and Biers, 1988b; Felício, 2019, pp. 40-49; Felício and Sousa, 2019; Sousa, 2019; Sousa and Felício, 2020; Oberhofer, 2018a, 2018c). Some of these contexts have already been addressed, having been associated with a possible sudden catastrophic event, such as an earthquake, from which the city would not have recovered (Teichner, 2018c, pp. 246-247; 2021, pp. 77-79), and it has been previously proposed that climate change may have motivated the transformation of some buildings, eventually leading to a cultural change during the 3rd/4th centuries (Quaresma, 2004, p. 47; 2012, pp. 56-57 and 304-305; 2014, p. 114-115). However, the complexity of the picture that emerges deserves a dedicated analysis.

To better understand this phenomenon and its possible underlying causes, we've analysed the urban dynamics, comprising data from the building, rebuilding and abandonment contexts, starting from the second half of 2nd century which is the diagnosed starting point of the problem in other settlements.[2] We've also considered the available information on the territory, and the perceived economical relevance of import wares and foodstuffs to test the possibility of a relationship between these quantitative data and the qualitative stratigraphic data of the urban tissue.

2. DEMOGRAPHY AND ECONOMIC RESOURCES

The Roman-era city largely overlaps an Iron Age settlement.[3] Despite the scarcity of studies on this period at the site, the antiquity of material finds from early Roman occupation, 2nd century BCE, suggests that the site may have had some importance during this period (Fabião, 1999, pp. 245, 247-248).[4]

As a result of the Augustan administrative reforms, a *civitas* was created, which, taking the toponymic association as proven, began as an *opiddum stipendiarium*, being elevated to *municipium* possibly in the Flavian period (Encarnação, 1996). It is estimated that its territory encompassed approximately what today corresponds to the Municipalities of Santiago do Cacém and Sines, thus including a port hub in the latter location, approximately 17 km from *Mirobriga*.

Much of the territory would have a strong agricultural tendency, with several known *villae* (Quaresma and Silva, 2021, pp. 97-99), but still scarcely investigated, along with mining possibilities of silver, copper and gold to the northwest and iron to the east. Reflections on the geostrategy for the placement of this city highlight its relative proximity to the coast but also the fact that it is located on a hill facing inland, giving the city means of controlling or supervising the circulation of these resources, which in turn suggests a greater importance to this mining aspect of the territory (Barata, 1997, p. 39; Fabião, 1999, p. 245).

2 See Romero Vera, 2022.

3 C. Fabião classifies it as type IV (spur) by L. Berrocal-Rangel, reinterpreting the original classification proposed by the same author (Fabião, 1999, p. 233).

4 The author suggests that, if further investigations reveal that these finds correspond to an effective Italic presence, and not just a commercial contact, such an early chronology suggests a military nature (Fabião, 1999, p. 247).

Figure 1. Location of *Mirobriga* in the province of *Lusitania* (adapted from Ancient World Mapping Center – Map.3.4).

However, this potential richness does not appear to have been reflected in the architectural monumentality of the city itself, whether at a public or private level. To date, no *pomerium* wall has been identified. The existence of a *circus* appears, in a way, to contrast with the scale of the city itself, but it is also important to point out that only the *carceres* and the *spina* present some monumentality. The remaining known structures consist of a simple delimitation of the perimeter of the arena by a masonry wall, without a *cavea*, which was possibly a wooden structure (Almeida, 1964, p. 73) or non-existent (Leonard and Slane, 1988, p. 44). Moreover, there are no mosaic pavements known in the city. An absence which stands out, in contrast to what is known in the territory. Overall, *Mirobriga* presents itself as a "small town" with modest resources, at least at the construction level.

The majority of the buildings date to the second half of the 1st century CE and the beginning of the 2nd century (Biers and Biers, 1988, pp. 110-111; Quaresma, 2012; Kopf, 2018a, 2018b; Oberhofer, 2018a, 2018b; Sousa, 2019; Teichner, 2018a, 2018b), corresponding to the period of the greatest construction in the city.

Several estimates have sought to determine its population, the most recent being between 1500-2000 people (Teichner, 2021, p. 73), a number that we consider excessive. In fact, geophysical survey campaigns have demonstrated a sparse urban pattern, composed of different nuclei of buildings arranged on the hills or in the valleys, meaning that the urbanised perimeter would not be completely built (Teichner and Hermann, 2022, pp. 170-171).

Currently, nine undoubtedly residential buildings are known in the site, to which eight of uncertain function can be added, which could correspond to housing of lower social classes, making a total of seventeen buildings. To these we could add, from an optimistic perspective, a margin of ten buildings, to account for those that potentially remain to be discovered. Considering an estimate of ten inhabitants per building, which seems excessive in some cases, we would obtain a population that would not reach three hundred even considering that the commercial/workshop spaces could also be inhabited by those who carried out their activities there.

3. THE 2ND CENTURY

In most cities of *Hispania*, during the 2nd century building activities seem to have been mainly focused on maintenance and the improvement of existing facilities, and not so much in building anew (Romero Vera, 2022, pp. 173-174). In effect, by the late 2nd century some cities show signs of urban, economic and political stagnation that were traditionally associated with the 3rd century, pointing to a premature disruption of the High Imperial urbanism (Romero Vera, 2022, pp. 167-168).

Mirobriga doesn't seem to fit this profile, as it shows signs of considerable construction investment in both public and private buildings, especially from the mid-2nd century onwards. Public investment in this period includes the construction of the West Baths (Biers and Biers, 1988b, pp. 110-111), and the construction of a new *apodyterium* (Room 12) and of Room 8 in the East Baths (Biers and Biers, 1988a, p. 183; Felício, 2019, p. 72).

In domestic buildings, new workshops or *tabernae* were created, such as the cases of the expansion of a *taberna* in *Casa da Calçada* / House 3, possibly in the second half of the 2nd century (Sousa and Felício, 2020, p. 1375); and of House of the Frescos, where a new, separate, workshop space was also created in this period (Sousa and Felício, 2023, p. 11).

The major rebuild of House 8 stands out as the largest known private reform in this period, as it required the near demolition of the existing building, giving place to a more complex house with two peristyles (Oberhofer, 2018a, p. 128, fig. 145).

4. THE EARLY 3RD CENTURY

The first decades don't show any particular signs of disruption in the urban landscape. Effectively, the large reconfiguration of the *tepidarium* and *caldarium* of the East Baths (Phase 3), although lacking direct dating, is stratigraphically later than Phase 2, as it abuts against the walls of the *apodyterium* (Room 12) (Biers and Biers, 1988b, p. 105, fig. 77). As such, its chronology can range from the late 2nd to the early 3rd centuries.

The *circus* poses some critical questions regarding this period. The preliminary analysis by the Missouri team led to the identification of wall sections built with different construction techniques and thicknesses, corresponding to several wall restorations. One of these consisted of a rebuild of a large section of the western boundary wall that had presumably collapsed due to damage caused by water run-off from the hill to the west (Leonard and Slane, 1988, pp. 31-32).

The majority of the soundings did not provide chronological data for the construction of the *circus* nor these restorations. The only exception was Area 3, dug below the foundation level of the restoration to the northeast boundary wall [301]. The area had previously been excavated by F. Almeida or others. Locus [304] produced a coin of Alexander Severus, dated to 235 CE. This SU was cut by locus [306], whose interpretation is not safe, as the authors weren't able to determine if it was a foundation trench for building wall [301], which could date the restoration; or part of the sounding trench made by previous excavations (Leonard and Slane, 1988, p. 36).

The construction of this section of wall [301], and underlying restorations to the *circus* in a *post quem* of 235 CE, could be framed in the same context as the works of Phase 3 at the East Baths, possibly extending this period of stability and some investment to the second quarter of the 3rd century. In any case, it is worth stressing that the construction works identified during the Missouri campaigns amount to relatively modest and limited interventions, consistent with localised repairs to damaged structures, as proposed by A. Leonard and K. Slane; and not with a large reconstruction of the complex, as has sometimes been proposed (Alarcão, 2008, p. 106; Quaresma, 2012, p. 58).

Finally, it is worth mentioning that the scarce number of materials collected in these interventions, including surface materials, doesn't go beyond the 3rd century (Leonard and Slane, 1988, pp. 36 and 43), and it is unclear whether the *circus* was in use after that period.

5. MID-3RD CENTURY: THE FIRST PHASE OF ABANDONMENT

The second half of the 3rd century, on the other hand, is a turning point in the city's urbanism, as the different interventions over the years revealed. However, our knowledge of the evolution of each area is very different, due to the methods used by different project directors for the excavation and recording of finds (Fig. 2).

5.1. Public spaces

Both the *forum* and the bath buildings were extensively excavated between the late 1930s and the 1960s without record. The test pits carried out in the *forum* during the Marburg campaigns of 2005-2010, only provided contexts predating its construction (Teichner, 2018a). In the East Baths, later excavations have produced relevant contextual and chronological data, whereas the evolution of West Baths remains elusive and will be discussed in chapter 9.

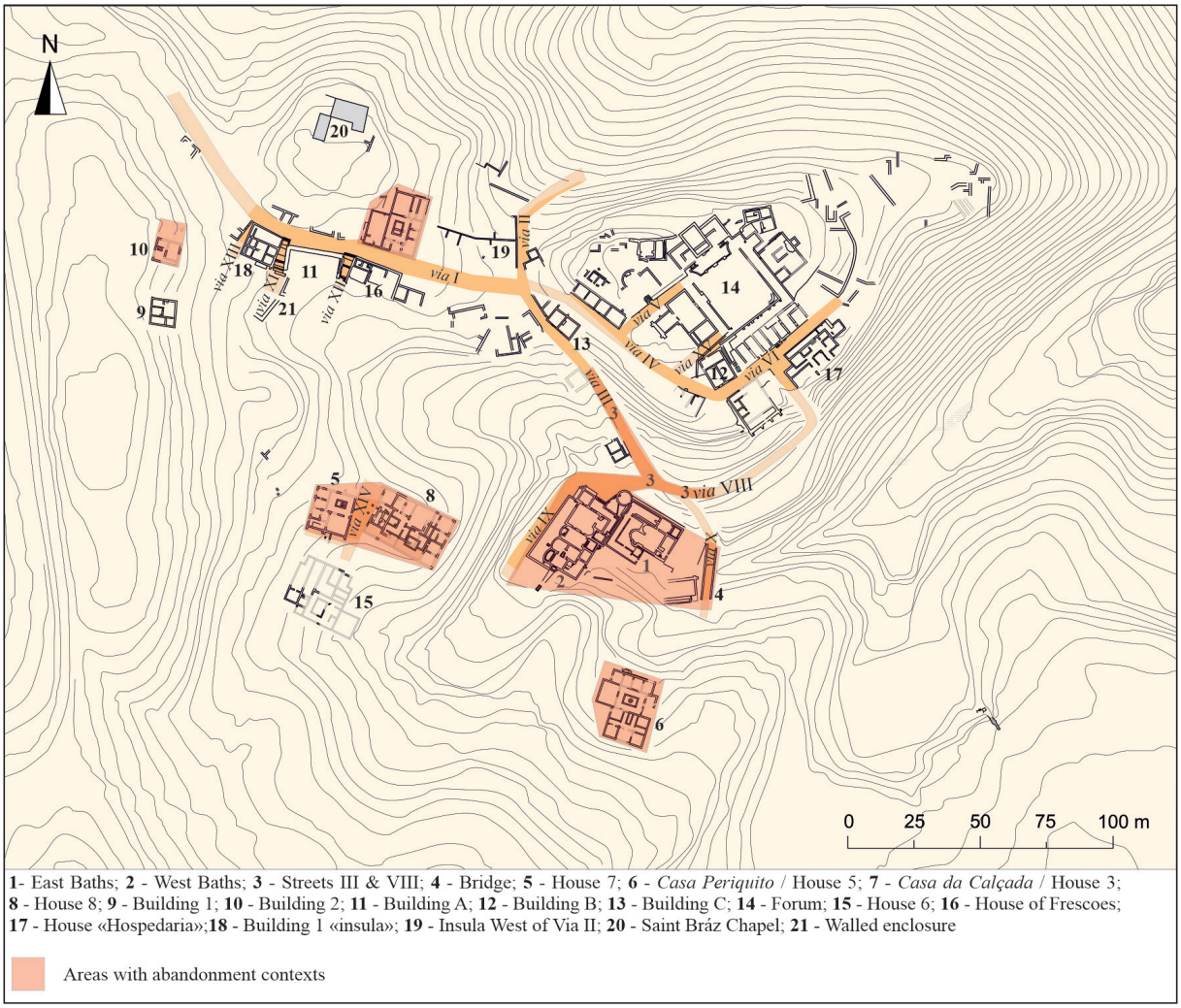


Figure 2. Areas and buildings that show signs of abandonment and neglect from the mid-3rd century onwards (adapted from Felício, 2019, fig. 2).

5.1.1. East Baths

The 1981-1986 Missouri campaigns targeted areas that hadn't been previously excavated (Biers and Biers, 1988b, pp. 79-117).

The pool in the *frigidarium* (Room 14) still preserved the collapse of the vaulted ceiling, [locus 008]. In this SU, and in the SU below [locus 009], laid a context of waste containing ceramic fragments and faunal remains, as well as fragments of the frescoes that had fallen from the wall. Two fragments of African *terra sigillata* C fabric were found within these two deposits, providing a *post quem* in the mid-3rd century. The strata which overlaid the vault's collapse was also consistent with this chronology (Biers and Biers, 1988a, pp. 191-193).

The excavation of the main channel of the baths' latrine (Room 10) revealed some personal objects, such as hairpins, a ring, a pendant, ceramic finds such as fragmented amphorae, one lamp, kitchenware and African *terra sigillata*. The most recent finds were dated from the mid to late 3rd century (Biers and Biers, 1988a, pp. 180-182).

Also, the test pit carried out in the west corner of the portico revealed an abandonment deposit which had accumulated over the pavement and masonry bench. Ceramic finds, albeit scarce, can be dated between the second half of the 3rd and the beginning of the 4th century (Biers and Biers, 1988a, pp. 174-175).

Finally, in the 2004-2005 intervention by J. C. Quaresma, a sounding in the area to the south of the bridge, the space between the bridge and the baths' supply reservoir, revealed two units of accumulation of waste and construction debris, SUs [703] and [720]. These included stone rubble, ceramic building material, faunal remains and a fragment of column, with ceramic finds dating to the 3rd century (Quaresma, 2005, p. 15; 2012, p. 337). The large quantity of stone rubble could eventually correspond to the partial ruin of the bridge's side rail and of the reservoir's east wall, suggesting a state of disrepair of these structures in the 3rd century.

5.1.2. Streets and open areas

One of the most significant sets of data comes from street XIV. There, [Fundensemble T], found lying over the pavement and sealed under the collapse of the perch of House 8, attested that that street had started to accumulate sediment in a *post quem* of 230/240 CE (Oberhofer, 2018a, pp. 128 and 145; Peña Cervantes *et al*., 2018, pp. 208-209).

A test pit carried out by the Missouri team, in the southeast limit of the East Baths (Test Pit I in Biers 1988, p. 291 fig. 79), revealed that sedimentation against the building's wall, SW Courtyard *Loci* [003] and [004], started sometime in the second half of the 3rd century (Biers and Biers, 1988a, p. 176-178).

The 2004-2005 intervention on street X, which includes the bridge, provided more data for this area. The bridge itself had been excavated by F. Almeida (1964, p. 38), having exposed the pavement and covered it again, the pavement would be later re-exposed and restored in 1998.

Of the preserved levels that covered the pavement to the north of the bridge, two SUs are of particular interest: [681b] and [687]. The first was a level of greyish-brown clay soil that contained charcoal and produced finds ranging from the 1st to 3rd centuries (Quaresma, 2014, p. 132). The author interpreted it as a natural sedimentation phenomenon and compared the overall aspect of this sediment to the description of [*Estrato* III][5] that had been found over the pavements of the nearby streets in a previous excavation by M. L. C Arthur (Quaresma, 2004, p. 12).

As for SU [687], it was a light-brown compact unit with shale fragments. Finds, albeit not numerous, included faunal remains, a fragment of iron slag, and glass and ceramic finds dating from mid to late 3rd century (Quaresma, 2004, p. 7; 2012, p. 336). The author expressed some doubts regarding the interpretation of this specific unit, stating that he had initially considered it an abandonment deposit, only to settle on its interpretation as a constructive feature, possibly a rebuild of the bridge,[6] entirely due to the chronology of the finds. The report provides conflicting information regarding this SU, referring it covered the destruction interface of the bridge's west side rail, whilst sustaining that it went under the pavement of the bridge (Quaresma, 2004; 2014, p. 134).

Upon analysing the photographic records, we are not able to give much weight to the interpretation that [687] goes under the pavement of the bridge, whose slabs were not removed to confirm this hypothesis.[7] Instead, the published graphic records (Quaresma, 2009, Anexo 7; 2012, p. 59; 2014, p. 129) clearly show that this SU is not limited to the area presumably occupied by the road/bridge and, instead, extends to the West, covering the destruction interface of wall [755], part of a yet unexcavated building/structure located between the bridge and the East Baths (Fig. 3). This gives strength to the author's original interpretation for this unit, as an abandonment layer, that would have formed in this area from the mid-3rd century onwards. Following this line of thought, the fact that not all pavement slabs were preserved and that this deposit fills the space previously occupied by the pavement also suggests some damage or spoliation had already occurred and had not been repaired.

The 1954-1955 intervention by M. L. C. Arthur had also provided data on some of the streets. Given the antiquity of the intervention, the author's methodology is understandably incipient, and the records too vague for modern standards.

5 A sediment with a large quantity of charcoal, faunal remains and ceramic (Arthur, 1983, p. 52).

6 The author doesn't specify whether it was a rebuild of the bridge's structure or a repaving.

7 The published section has a dashed line that indicates that the relation of SU [687] to pavement [756] is hypothetical (Quaresma, 2014, p. 135, fig. 11).

However, a review of the published descriptions of stratigraphic data and materials, revealed explicit mention of contexts/finds that lied directly over the pavements of streets III and VIII,[8] designated as [*Estrato* III] (Arthur, 1983, pp. 52 and 61-83), which had not been analysed in depth in the original publication.

These were found in the so-called "trench of Antonio", which comprised the intersection of streets III and VIII, immediately north of the baths, and continued uphill to the East, following the preserved pavement of street III in its entire extension.

Overall, the excavation of these streets produced no finds later than the end of the 3rd/early 4th century (Arthur, 1983, pp. 61-67; Felício, 2019, pp. 26-27), and the overlapped data from all the interventions in the area allow us to safely pinpoint the cease of maintenance and a start in the sedimentation of streets III, VIII and X (bridge area), as well as against the south walls of the East Baths' complex.

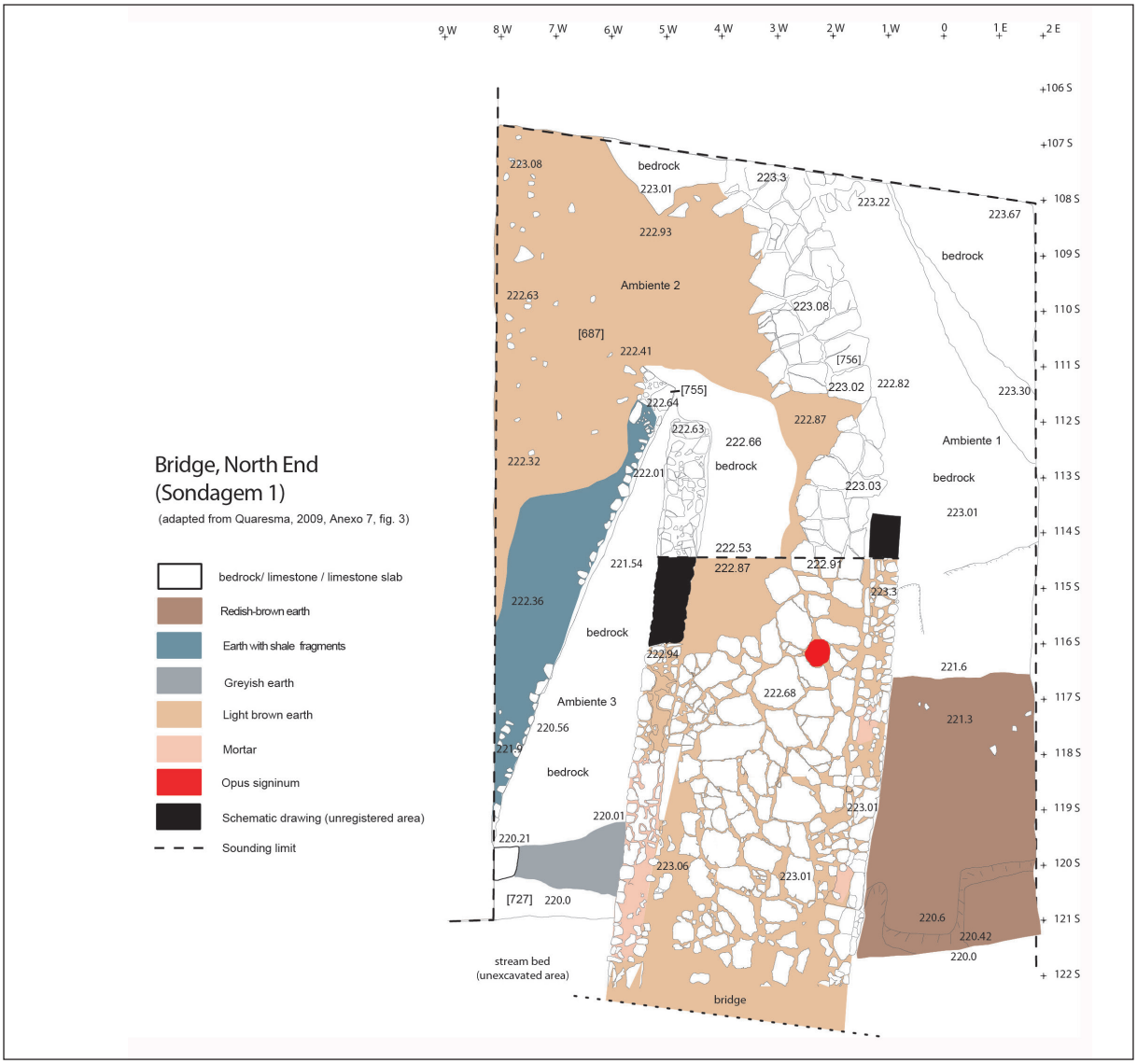


Figure 3. Plan of Sounding 1 in the area north of the bridge, where SU [687] can be seen extending to the West and covering the destruction interface of wall [755] (adapted from Quaresma, 2009, Anexo 7, fig. 3).

8 Originally designated as Street A and Street B by M. L. C. Arthur (1983, pp. 61-64).

5.2. Private spaces

A relevant number of private buildings, both houses and workshops, have been excavated in more recent years, also providing direct evidence for abandonment from the mid-3rd century onwards.

5.2.1. House 7

This house was identified and partly excavated during the U. of Marburg interventions of 2005-2010. The excavation of the well in the peristyle of House 7, provided the most interesting set of data. The lowest level found, [Fundensemble I], contained various vessels related to the retrieving of water from the well (ceramic, bronze, and possibly leather), as well as fragments of a wooden pulley (Oberhofer, 2018c, pp. 213-214; Peña Cervantes *et al*., 2018, p. 205; Teichner, 2018b). These finds relate to the well's operation (Oberhofer, 2018c, p. 121) and ranged from the second half of 2nd to the early 3rd centuries (complete list in Peña Cervantes *et al.*, 2018, p. 205).

[Fundensemble J] produced various ceramic finds, faunal remains and a very complete skeleton of an adult dog (Prust, 2018, pp. 234-235). It also contained *imbrices* and *tegulae* in almost vertical position, an indicator that the roof's structure was caving in this period (Oberhofer, 2018b, p. 123). This unit marks the start of waste dumping in the well, thought to have taken place before the mid-3rd century (Peña Cervantes *et al.*, 2018, p. 206).

[Fundensemble K] produced yet more ceramic and was interpreted as a level of waste deposition. This context included a significant amount of roof tiles and stones, as well as bones showing burning marks, and has a terminus *post quem* in the mid-3rd century marking a sequence of waste deposits that filled about half the height of well.

[Fundensemble L] was a silty layer suggesting a natural accumulation of fine sediment. The scarce finds included two fragments of Alm. 51C (Peña Cervantes *et al.*, 2018, p. 207). This unit marked the cease of waste dumping in the well in this period. Waste deposits in upper units, [Fundensemble M], have a *post quem* of 250 CE (Peña Cervantes *et al.*, 2018, p. 207).

Overall, the data suggests that before the mid-3rd century the roof of the peristyle was falling, meaning that the house could be vacant or, at least, was not being maintained. The stratigraphical sequence that followed, also from this period, establishes that the fall of part of the roof was not coincidental, and that the building was probably abandoned or largely degraded, and the well started to be used as a rubbish pit. Around this time, a dog falls (or is thrown) into the well and the action of dumping waste would continue, and intensify, throughout the remainder of the 3rd century. It is unknown if the people dumping the waste were living in this house.

More recently, it has been noted that the continued presence of rather complete flagons, not only in [Fundensemble I], but also in [J] and [K] (Peña Cervantes *et al*., 2018, pp. 205-206), could suggest that people were still retrieving water from the well throughout this period. This coexistence would surely have had implications on the quality of the water and the living conditions of those retrieving it (Felício, 2025, p. 24).

[Fundensemble L] marks the end of these actions and is dated by two Alm. 51C amphorae (Peña Cervantes *et al.*, 2018, p. 207).

5.2.2. Casa Periquito / House 5

This house was initially found and excavated by F. Almeida (1964, p. 40), but the structures were covered after the intervention. Although this has disturbed some of the stratigraphy, the 2005-2010 excavations by the U. of Marburg have been able to identify some preserved contexts.

In the open area of the main peristyle (Room 5.1.1.), the upper interface of SU [1007b], a deposit of humic soil, produced a large quantity of coins (Kopf, 2018a, p. 66). A total of 19, dating from the 2nd and 3rd centuries, with the most recent being a bronze coin of Aurelian, providing a *terminus post quem* of 270 CE. Above this unit lay SU [1006], a collapse of a roof, containing *imbrex* and *tegulae* and iron nails, associated with the wooden beams. The author also describes that pieces of charcoal were found adhering to some of the tiles and suggests these could be traces of damage by fire (Kopf, 2018a, p. 83), albeit not specifying if it could be a fire that destroyed the building or traces of bonfires.

J. Kopf interpreted this context, [Fundensemble C] as an indication that the house was abandoned around this time (2018a, p. 83), although the author didn't address the subject of how so many coins have ended in a soil layer on the peristyle.

Beyond the meaning of this possible monetary deposit, its context of deposition provides a *post quem* chronology for the collapse of the peristyle's roof, strongly suggesting that the house was abandoned in the late 3rd century.

5.2.3. House 8

This house was also identified and partly excavated during the 2005-2010 excavations. It lies very shallow beneath modern ground level and agricultural activity has severely damaged the stratigraphic contexts related to later phases in most parts of the house.

However, the preserved evidence suggests a state of neglect of the area in front of the house's entrance. As mentioned before, SU [103]/[Fundensemble T], indicates that this space, part of street XIV, started to accumulate sediment in a *post quem* of 230/240 CE (Oberhofer, 2018a, pp. 128 and 145; Peña Cervantes *et al*., 2018, pp. 208-209) and stopped being cleaned at this time, as can be deduced from the absence of sedimentation in previous periods. This unit was sealed by the collapse of the frontdoor's perch around the same period.

The building also underwent a major transformation somewhere in the 3rd century, Phase 4 in (Oberhofer, 2018a, p. 141). The interface over which the new structures were built attest that the building was already largely ruined, strongly suggesting that it was abandoned prior to these reforms.

5.2.4. Building 2[9]

The building was fully excavated in 1998-1999 during the intervention that preceded the construction of the Interpretation Centre (Barata, 1999). It was deeply affected by contemporary agricultural works, and some walls are only traceable through foundation cuts in the bedrock. Its most striking feature is the extensive complex set of drainage structures identified (Quaresma, 2012, pp. 36-37), probable evidence for a workshop, whose precise function and phasing are still unclear (Felício, 2019, p. 34; Felício and Sousa, 2023, pp. 273-274). Despite the building's poor state of preservation, it was possible to identify levels of sedimentation consistent with the abandonment or neglect of some areas.

The building had a waterproofing ditch in its western side, designed to protect it from rainwater infiltration (Felício, 2019, p. 115; Acero and Felício, 2021, pp. 149-150). Its excavation revealed an accumulation of dirt and broken objects, starting in the turn of the 2nd to 3rd centuries, SU [418=435]. The overlying SU [395], consisted of waste deposits containing various ceramic finds, dating to the mid-3rd century (Quaresma, 2012, pp. 38 and 42).

The areas corresponding to *Ambientes* A, B and H also revealed contexts of abandonment dating from this period, and were associated with the same formation process found in the waterproofing ditch, since one of them, SU [399] covered the walls forming *Ambiente* H, adjacent to the waterproofing ditch, and those of *Ambientes* A and B (Quaresma, 2012, p. 38, fig. 11). Parts of the building may have remained in use, and the chronology for the building's complete ruin is suggested by some sherds of african *terra sigillata* from the first half of the 5th century that were mixed in the collapse of the roof of *Ambiente* D (Quaresma, 2012, p. 40).

6. LATE 3RD AND EARLY 4TH CENTURY: REOCCUPATION PHASE AND URBAN TRANSFORMATIONS

Towards the end of the 3rd century there seems to be a revitalization of the city, as some of the buildings were re-occupied and transformed (Fig. 4).

All the documented transformations produced a change in the internal organization, mostly made out by crudely constructed walls that sometimes used the pre-existing building to support themselves and, in most cases, changed the buildings' original purpose.

9 *Construção* 2 in Quaresma, 2012.

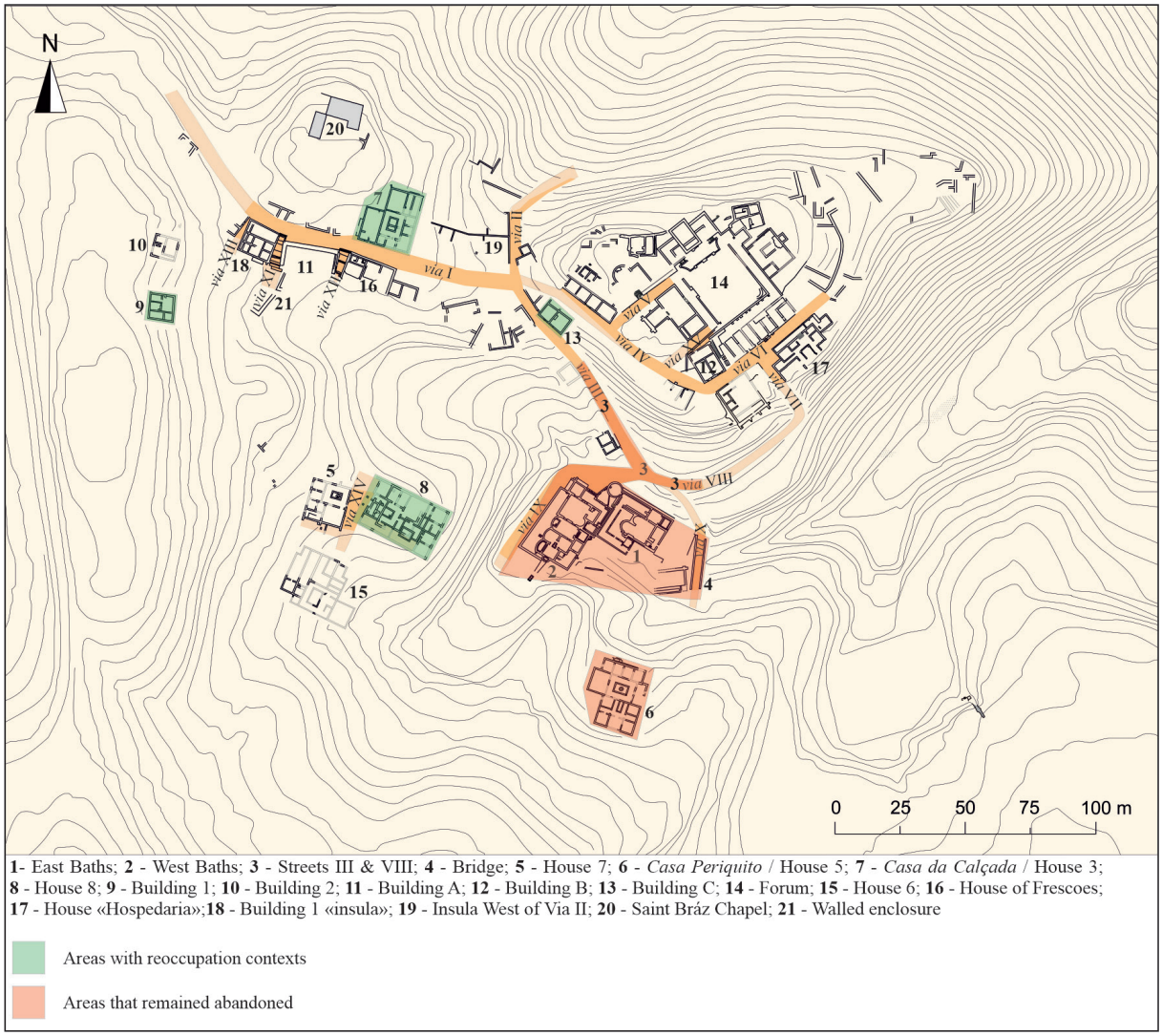


Figure 4. Buildings that show signs of reoccupation and/or transformation in the second half of 3rd to early 4th century 0 (adapted from Felício, 2019, fig. 2).

6.1. Building 1[10]

Identified during the 1995-1998 excavations for the Interpretation Centre, the building was originally interpreted as a house (Barata, 1999; Quaresma, 2003, 2012). It has since been reinterpreted as a workshop due to the complex network of hydraulic channels and interconnected round vats, excavated in the bedrock (Felício, 2019; Quaresma *et al*., 2020), presenting, at least, two phases of functioning (Felício and Sousa, 2023, p. 272).

Sometime in the late 3rd to early 4th centuries, these hydraulic structures and negative features were filled with earth, SUs [517=484=483=521=520=510=528], [355=456=473], [471=486=487=522] and [481], and fragmented stone slabs were placed on top of the channels, effectively deactivating them (Quaresma, 2012, pp. 55-56). It is possible that these slabs were the fragments of the cover of the channels, reused to level the ground.

10 *Construção* 1 in Quaresma, 2012.

Over these fills, a new masonry structure was built on the southeast corner of *Ambiente* 4 (Quaresma, 2012, p. 55), whose function is unknown,[11] along with a wall between *Ambientes* 6 and 7 (Quaresma, 2012, p. 55). These transformations are consistent with the adaptation of the building for a new use, eventually a dwelling (Quaresma *et al*., 2020, pp. 201-203; Felício and Sousa, 2023, pp. 271-274). In this specific case, there is no evidence that the building was abandoned prior to these transformations.

6.2. *Casa da Calçada*[12]/ House 3

Part of this peristyle house was visible prior to the 1995-1996 excavation. Stratigraphy was shallow and some contexts were disturbed by contemporary activities (Barata, 1996). Preserved contexts were mainly found in the west side of the building and in the *impluvium*. Room 7, the *triclinium*, was not fully excavated and was left at a level of roof collapse, [CPX135].

The house suffered a major reform, Phase 4 in (Sousa, 2019, pp. 60-62; Sousa and Felício, 2020, pp. 1375-1377), which included the demolition of some walls and the construction of new, rougher built, ones. These transformations also included the removal of the *opus signinum* pavements, whose fragments were reused in the construction of some of the new walls.

The extent of these transformations suggests that the building may have been previously abandoned and that these are the result of its reoccupation. (Sousa and Felício, 2020, p. 1375). The area of the *triclinium* may have been cut off. Since its doorway to the peristyle was closed by UEM [28], and there is no evidence of the opening of a new access, it has been suggested that this part of the house may have remained abandoned, eventually, due to the collapse of the roof (Sousa and Felício, 2020, p. 1376). As this room wasn't fully excavated, the available evidence relates only to the unit above its roof collapse, [CPX98], which included building debris and fragments of *opus signinum* as well as slag. The single dating find was a green glass bowl, dated from the second quarter of 4th to the early 5th centuries (Sousa, 2019, p. 27).

In the part of the house that was, undoubtedly, still in use, the *opus signinum* floors seem to have been replaced by rammed earth (Sousa, 2019, pp. 39-40). A set of post holes, SUs [-80 to -84], identified in the south and west corridor of the peristyle, may be related to the structural reinforcement of the roof beams that could be collapsing. They also appear to be related to wall [31=32], which divided the peristyle, overlaying the stylobate wall (Sousa, 2019, pp. 61-62; Sousa and Felício, 2020, pp. 1375-1377).

In the *taberna* (Room 1), the space was rearranged by UEMs [28] and [30], and the access door to the street was narrowed by a crude wall made of rubble and reused building ceramic. The set of hydraulic structures, two vats and respective drainage, built in the late 2nd century, were demolished and the floor was levelled with soil brought in from the vicinity (Sousa, 2019, pp. 34-35).

Dating evidence for these activities was provided by [CPX103+178], a level of rammed-earth from this phase in Room A1.5, which produced a fragment of form Hayes 52B, whilst the collapse of the building itself, [CPX93+141], which lay above that layer, produced a fragment of Hayes 50 A/B and a shard of a glass plate broadly datable between the 4th to early 5th century, providing an *ante quem* (Sousa, 2019, pp. 18-19).

Both contexts loosely date the transformations between the last quarter of the 3rd century and the early 4th.

6.3. House 8

As in the previous case, the transformations documented in this phase included the removal of the *opus signinum* floor, its replacement by rammed earth, and the demolition of some walls along with the reuse of the floor fragments in newly built walls (Oberhofer, 2018a, pp. 144-145). Part of the building was cut off through wall [27], dividing one of the peristyles, R.8.3.1., and, from then on, presumably unused (Oberhofer, 2018a, p. 138-141)

This wall was built over the destruction interface of the peristyle's south wall, [26], showing that that side of the building had collapsed or been demolished (Fig. 5).

11 The author's proposal of a *lararium* is not verifiable.

12 Designation in the excavation reports (Barata, 1996). Also named House 3 in Quaresma, 2012.

A B

Figure 5. A: subdivision of the peristyle in *Casa da Calçada* / House 3 (photo by F. Sousa); B: subdivision of the peristyle of House 8 in a similar way and showing the stratigraphical relation between the 3rd century wall [27] and the south wall of the peristyle [26], indicating the state of dismantlement of House 8 (adapted from Oberhofer, 2018a, p. 133, fig. 150).

Dating evidence for these transformations, [Fundensemble S], is very scarce and is suggested by a single amphora fragment of Almagro 50/51, which places them from the 3rd century onwards (Peña Cervantes *et al*., 2018, p. 208).

As mentioned before, the collapse of the roof of a small perch by the entrance is dated by the sedimentation of street XIV in 230/240 CE (Oberhofer, 2018a, pp. 128 and 145; Peña Cervantes *et al*., 2018, pp. 208-209). If we assume that the perch had already fallen by the time the building was transformed, as the nature of the reforms suggest that the building was in partial ruin, then these data may reinforce the chronological evidence for this phase.

6.4. Building C

This building was found in 1955 in M. L. C. Arthur's intervention, which identified two of its rooms. It was later further excavated, likely by F. Almeida, although not completely.[13] Currently, it appears as a row of four rooms with independent accesses. The doorways of two of the rooms —1 and 2— suggest they were intended as commercial spaces, since they feature the typical shutter doors. The features still preserved in Room 1 suggest it was likely a workshop.

M. L. C. Arthur describes that Room 2 was divided into two compartments, and that a floor hearth was identified in the innermost room (Arthur, 1983, pp. 89 and 96). As the room was originally intended as a commercial space, the narrowing of the entrance door, the construction of a floor hearth and its use as a dwelling were likely a later transformation to the space (Felício and Sousa, 2019, pp. 137-139), suggesting the space was somewhat abandoned in a previous period giving freedom for it to be occupied and transformed, possibly in late 3rd to early 4th centuries. The construction of these structures is dated in *ante quem* by its final abandonment (see Chapter 4).

In Room 1, sometime before its abandonment in the mid-4th century, the room had several stone plinths distributed somewhat randomly, whose function hasn't been identified. A group of imbrex tiles was also found purposely stacked against the northwest wall, near the doorway[14] (Arthur, 1983, pp. 83 and 90, figs. 3-5). This latter finding is interesting as it denotes an on-going action/intention pertaining to the building's last moments. However, the precise action is not discernible since the tiles could have been placed there for storage; positioned there as part of an ongoing reparation of the building's roof; or even being the result of a spoliation of the roof and placed there awaiting to be transported elsewhere (Fig. 6).

13 At the time of this publication, this building is under excavation, coordinated by J. C. Quaresma. Data from the remaining rooms, only partially excavated by previous scholars, may provide further evidence regarding this subject.

14 The tiles were placed behind the part of the doorway that had shutters, still allowing access through the hinged part of the door.

Figure 6. Roof tiles found stacked in room 1 of Building C (PCIP/SIPA Archive Foto.00501021, unknown author, 1955).

7. THE 4TH CENTURY

Excluding its first decades, the 4th century is somewhat unknown in terms of contexts of urban transformation, which may be an indicator of a slow abandonment that seems to take place from its first decades onwards (Fig. 7).

This can be diagnosed in *Casa da Calçada* around the first decades of the 4th century, in Building C in mid-4th century, and in Building 1 in the late 4th century (Fig. 6). In the first, the stratigraphic units corresponding to the collapse of the south and west facades, [CPX93+141], are interspersed with depositions of materials dating from the first half of the 4th century (Sousa, 2019, p. 18), indicating that the major ruin of the building occurred over this period, a period that marks the end of the previous occupation[15] (Sousa, 2019, pp. 33-34). As the building collapsed the area seems to have been occupied by some kind of metallurgical workshop, as is suggested by the presence of bronze droplets and a small weight in lead, along with some slag fragments recovered in the vicinity (Sousa, 2019, pp. 41-42).

15 The reoccupation phase.

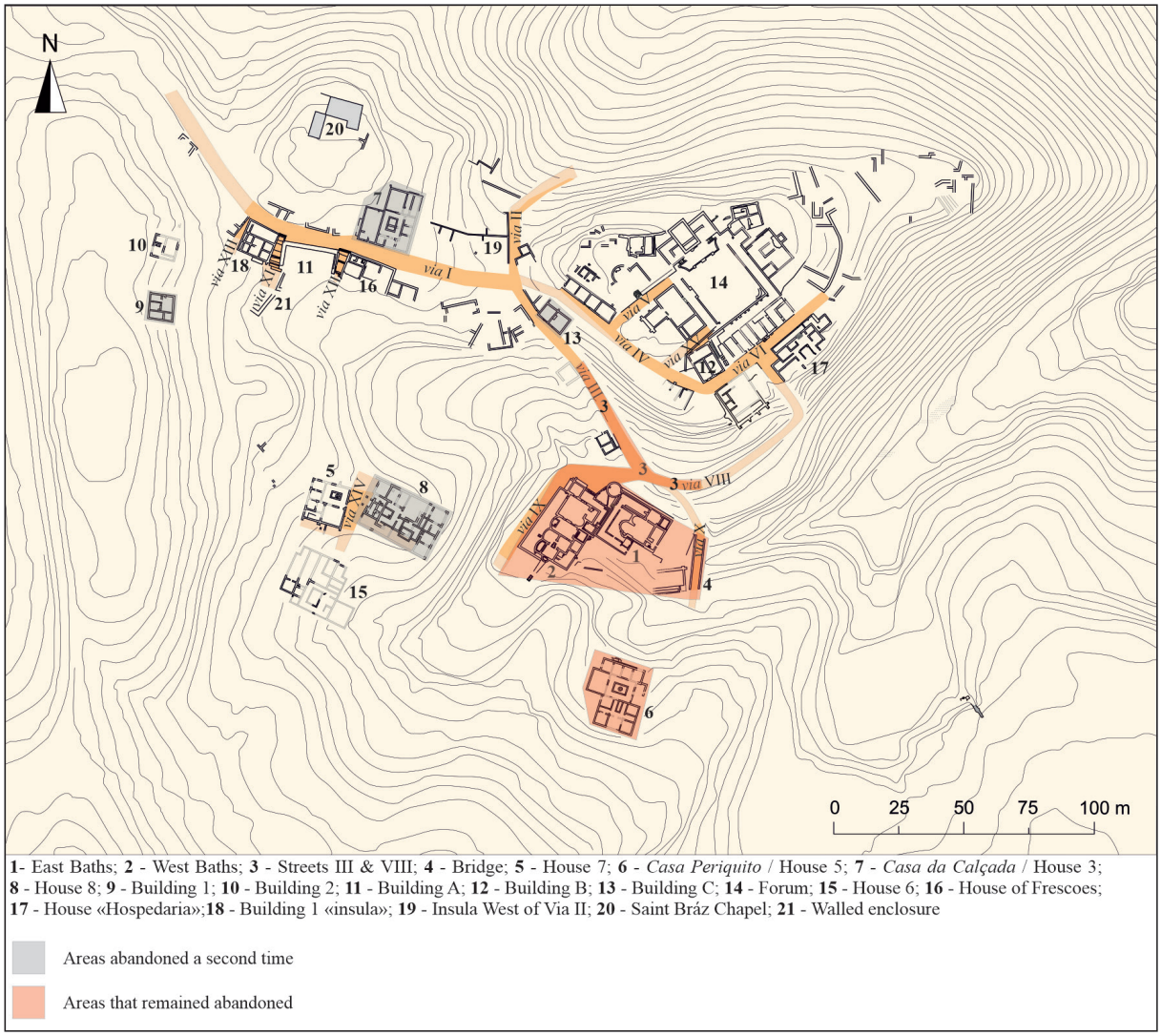


Figure 7. Buildings abandoned a second time in the first half of the 4th century (adapted from Felício, 2019, fig. 2).

Building C was abandoned again around the mid-4th century as is suggested by datable finds recovered from beneath the collapse of the roof in both of the identified rooms (Arthur, 1983, pp. 83 and 94; Felício and Sousa, 2019, pp. 137-139), and damaged by a fire, as suggested traces of fire in both rooms that were also present in the datable finds: the ceramics were burnt, and the coins had charcoal attached (Arthur, 1983, pp. 88 and 96).

The abandonment level of Room 1 produced one bronze coin of Maximinian and 1 bronze coin of Galerius (Arthur, 1983, p. 91), whereas in Room 2, a context of deposition of domestic waste with two other coins, one bronze of Licinianus and a silver coin of Constantine (Arthur, 1983, pp. 88 and 96), stratigraphically located above the fireplace and below the collapsed roof (Arthur, 1983, pp. 97-99) gives a *terminus post quem* to its ruin, sometime in the first half of the 4th century (Felício and Sousa, 2019, pp. 137-139).

Building 1 was also abandoned by the late 4th to early 5th centuries as is suggested by the ceramic finds of upper SUs, [331=400=392=413=343] (Quaresma, 2012, p. 55).

It should be stressed, however, that the occupation of other areas of the town continued at least until the 6th century, as indicated by the presence of Phocaean *terra sigillata* form Hayes 3H (Quaresma, 2012, pp. 212-213), form Hayes 87B from North Africa (Biers and Biers, 1988a, pp. 171-172) and a amphora Keay 62 (Quaresma, 2012, p. 306) and it is worth asking what type of housing existed, and/or remained, at this time, as there are still little data to clarify these questions.

8. DECONTEXTUALIZED FINDS AND CONTEXTS WITH UNCERTAIN CHRONOLOGY

Adding to the contexts analysed in previous chapters, there is other data which may be related with these urban transformations, although with less certainty.

These relate to contexts where dating finds were absent or are insufficient; as well as areas uncovered during early excavations at the site, which lack the necessary stratigraphical data to understand the contextual meaning of the finds (Fig. 8). Although some may well relate to later periods, as the area of the city was inhabited until, at least, the 6th century (Biers and Biers, 1988b, p. 75; 1988a, p. 171; Quaresma, 2012, p. 34; 2022), given the overall scenario, we cannot rule out that some may have taken place from the late 3rd to 4th centuries onwards.

8.1. The *forum*

The complex was extensively excavated during the 1960s, with no known stratigraphic records, rendering uncertain its evolution in this period.

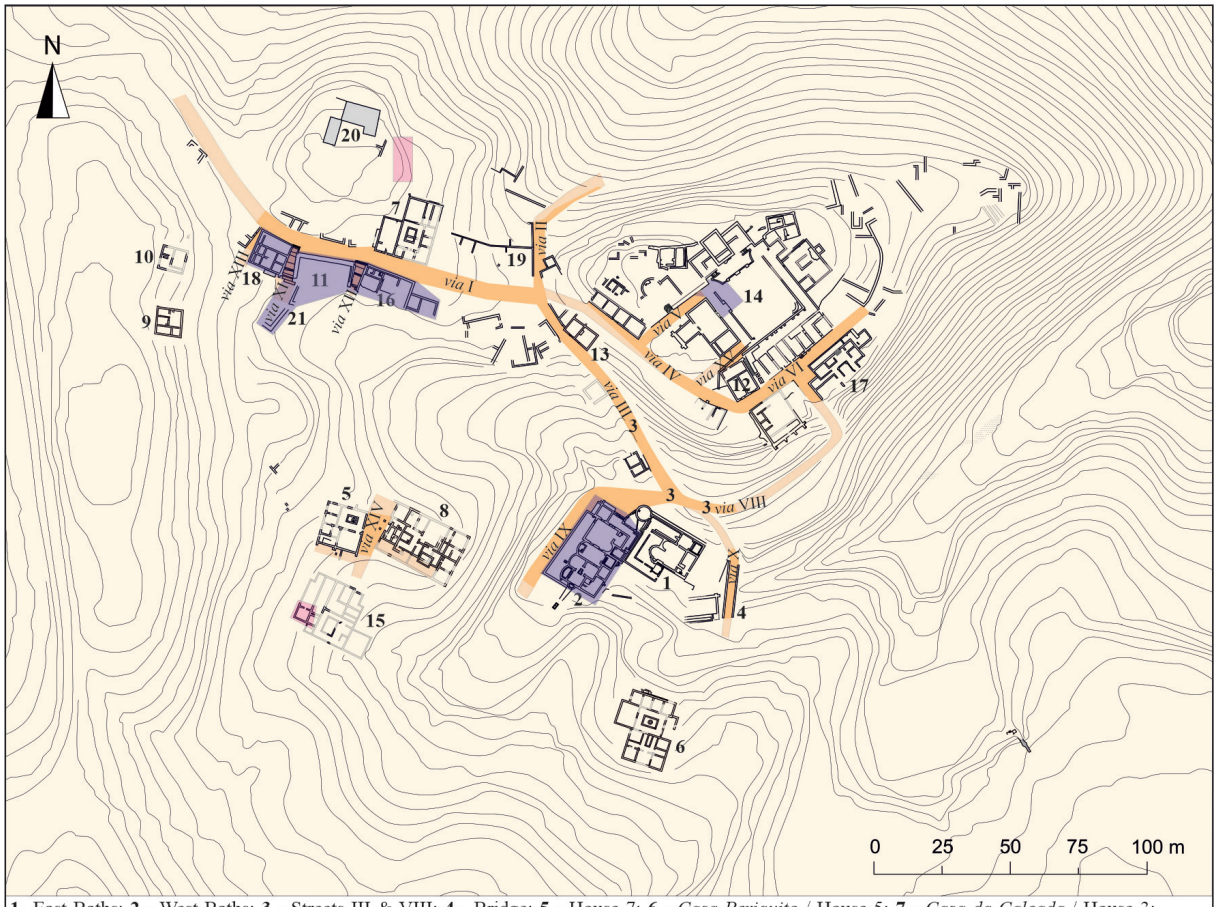


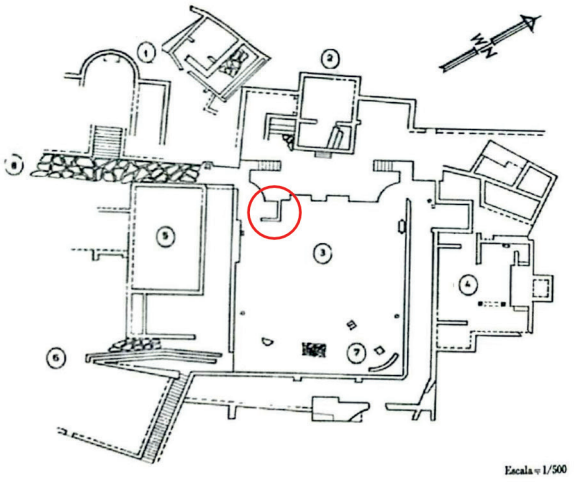
Figure 8. Urban transformation contexts without known chronology (authors' elaboration on basemap from Felício, 2019, fig. 2).

Photographs from the 1960s, taken during the excavation works, show an "L" shaped structure abutted to the central temple's *rostrum*. Its walls were visibly made of reused building elements and lay over an earthen deposit

(Fig. 8). The structure was represented in the plan of the *forum* published by F. Almeida (1964, fig. 9) but not addressed in the text. It has, unfortunately, been removed, as was customary for later structures, and its construction period cannot be ascertained.

A

B



C

Figure 9. Possible late Roman "L" shaped structure identified in the *forum* in the 1960s. A: seen from south (PCIP/SIPA Archive Foto.00501529, unknown author, 1962); B: seen from southeast (PCIP/SIPA Archive Foto.00501523, unknown author, 1962); C: "L" shaped structure represented by Almeida in the *forum* plan (Almeida, 1964, fig. 8).

The pavement slabs of the *forum* are very poorly preserved, and mainly traceable through negatives in mortar (Barata, 1997, p. 90), strongly suggesting its spoliation, in an undetermined period. As the pavement slabs are also not preserved in the area where the "L" shaped structure stood, it is plausible that they had already been spoliated when it was built.

J. C. Quaresma highlighted the chronological homogeneity of the fine wares found during Almeida's campaign in the *forum*. The overall assemblage, includes specimens of African *terra sigillata* of forms H14B, H44, H50A, as well as an unidentifiable fragment of African *terra sigillata* type C/E. The author refers that these may be seen as indication for a transformation in the *forum*, which would have created an abandonment or circulation (*sic*) level, sometime during the 3rd to early 4th centuries (Quaresma, 2012, pp. 33-34). Despite being deprived of context, it is suggestive to establish a contextual relation between these finds, the earthen level that can be seen below and the "L" shaped structure.

F. Almeida also refers to fragments of several epigraphic monuments found in the area of the *forum* during his and J. G. Cruz e Silva's interventions.[16] Among these, are three funerary inscriptions (Almeida, 1964, pp. 53-56, ins. 14, 26 and 27).[17] The most recent inscription (*IRCP*, 159) was dated by J. Encarnação (1984, pp. 240-241) to the 3rd century, providing a *terminus post quem* for the dismantlement of these monuments, originally from a nearby necropolis, and their transport the *forum* area.[18]

The absence of more recent finds in the *forum*, such as African *terra sigillata* type D, makes it unclear if the area was occupied in the following decades.

8.2. The "walled enclosure" in the west area

During the excavations that accompanied the construction of the Interpretation Centre (1998-1999), a part of a large structure was found. It superimposes what would presumably be the continuation of street XI, and abuts to Building A. Despite being poorly preserved, it can be observed that the exposed part consists of two walls, about 160 cm thick.[19] The longest wall has *c*. 25 meters, and runs roughly northeast-southwest, curving to west, where it continues under the walkway and embankment in front of the Interpretation Centre. The structure is built with stone elements bound by clayish earth, containing a large quantity of reused ceramic building material, and is similar to the construction technique found in the transformations of the late 3rd century. These characteristics suggest that these structures may be some kind of strong enclosure, although its specific function is not discernible considering it was only partly excavated. The structure's implantation, in the middle of the urban fabric, as well as its dimensions and covering an apparently extensive area, suggest a certain disruption of the city's landscape.[20]

8.3. Burials inside the *pomerium*

In 1996, three graves were excavated near *Casa da Calçada*. The burials didn't have associated finds which could determine their chronology but based on their construction technique and the fact that the buried individuals had their head facing west, F. Barata suggested they could be late-Roman or early Medieval. All were cists excavated in the slate bedrock, one of them re-using Roman *tegulae* (Barata, 1996, pp. 28-30; 1997, pp. 19-20).

In 2009, the U. of Marburg team also identified an inhumation grave of a non-adult individual inside House 6. Unfortunately, this inhumation also didn't have associated finds and as the excavation did not continue to the levels below it was not possible to determine its chronology. J. Kopf (2018b, p. 92) has suggested that it was unlikely to be earlier than the end of the 3rd century.

16 The locations are referred to as "2º *e 3º planos do Monte do Castelo Velho*."

17 These correspond to *Inscrições Romanas do Conventus Pacensis* (*IRCP)* 155, 159 and 160 in (Encarnação, 1984)

18 A similar phenomenon of dismantlement is attested at the northwest necropolis of *Olisipo* (Lisbon) in the late 3rd/early 4th century (Silva, 2012, p. 399).

19 The description is based on our observations. We have no knowledge of a report or publication about the excavation of this area.

20 The location of the structure at the foot of the western hill does not favour its interpretation as a defensive structure; perhaps it could have been built to store livestock at a time when the city would have acquired a very rural aspect, eventually in the 4th to 6th centuries.

8.4. The spoliation of the West Baths

Unlike the East Baths, this building was almost completely excavated between 1938 and the 1940s, and there is no chronological evidence for its cease of function and abandonment.

The University of Missouri's excavations in the Northwest Courtyard revealed the collapse of the northwest façade of the building, locus [002]. The only datable find within this SU was a rim of form Hayes 87B, retrieved in the sounding near the doorway connecting to Room 1 (Biers, 1988, fig. 79-E), marking a *terminus post quem* for the collapse of that wall in the beginning of the 6th century. The SU that lay beneath this collapse, locus [003], was composed of a fine silt sediment, which provided no finds (Biers and Biers, 1988a, pp. 171-172).

The building shows evident signs of spoliation. Photographs taken during the excavation of the West Baths in the 1940s show that parts of the limestone pavement were missing in Rooms 1 and 4 (Fig. 10). As mentioned, there is no sound chronological evidence for these actions. However, the recovery of construction material is likely to have occurred prior to the complete fall of the roof's structure, as it would otherwise require excavations and the clearing of debris, with no guarantee that the elements intended to be reused wouldn't be damaged. Although scarce, evidence from locus [002] provides evidence for when Room 1 collapsed, setting a plausible limit for the spoliation actions sometime the early 6th century.

Currently, the only, indirect (and fragile), chronological indication may be the marble fragment of a fluted pilaster potentially from the West Baths found by M. L. C. Arthur in Building C.[21] It was found in [*Estrato* III], an abandonment context in Room 2, with a *post quem* dating in the first half of the 4th century (Felício and Sousa, 2019, p. 139). If this fragment is confirmed to come from the West Baths, it suggests that at least part of the building was being spoliated in that period.

The pattern designed by the spoliation of the pavements shows three distinct areas of removal: two in Room 1 and another in Room 4, suggesting two different teams at work. The choice of taking the pavement from the apse in Room 1 is interesting, as it would be difficult to adapt the removed elements to a space with a different configuration. As such, this choice seems deliberate and suggests an intention to reuse it in another apse.

In this case, as only part of the pavement was taken,[22] we could speculate that the team was specifically looking to source slabs for paving an apsidal building, perhaps a small paleo-Christian Basilica that was being built nearby.

It is relatively common to identify contexts of reuse of bath buildings for religious worship (Fuentes Dominguez, 2000, pp. 142-143). One of the reasons for this adaptation is related to the planimetry of the baths which, due to the presence of apses and water supply systems, made these buildings ideal for conversion into churches and baptisteries (Page, 2020, p. 252). Although in this case, the evidence suggests that the baths were only used to source material.

The existence of the Chapel of S. Braz (St. Blaise) has been attested since the 16th century.[23] The current building stands over Roman structures (Barata, 1997, p. 65), but the area and the building itself have yet to be studied. The existence of an earlier religious building is not impossible and could justify the presence of the three cist graves, mentioned above, found in the vicinity.

21 The author described them as identical to those found in the West Baths: "1 fragmento de mármore com lavor em estrias idêntico ao do revestimento das pilastras do balneário" (Arthur, 1983, p. 97). At the time of Arthur's intervention (1954-1955) only the West Baths had been identified, so "balneário" refers to this particular building.

22 Apart from some lead pipes removed from the walls, some columns and capitals and specific areas of limestone pavement, all the other pavements were preserved, including the pools implying that a selective spoliation took place and not a systematic one.

23 It is mentioned by A. Resende (1593).

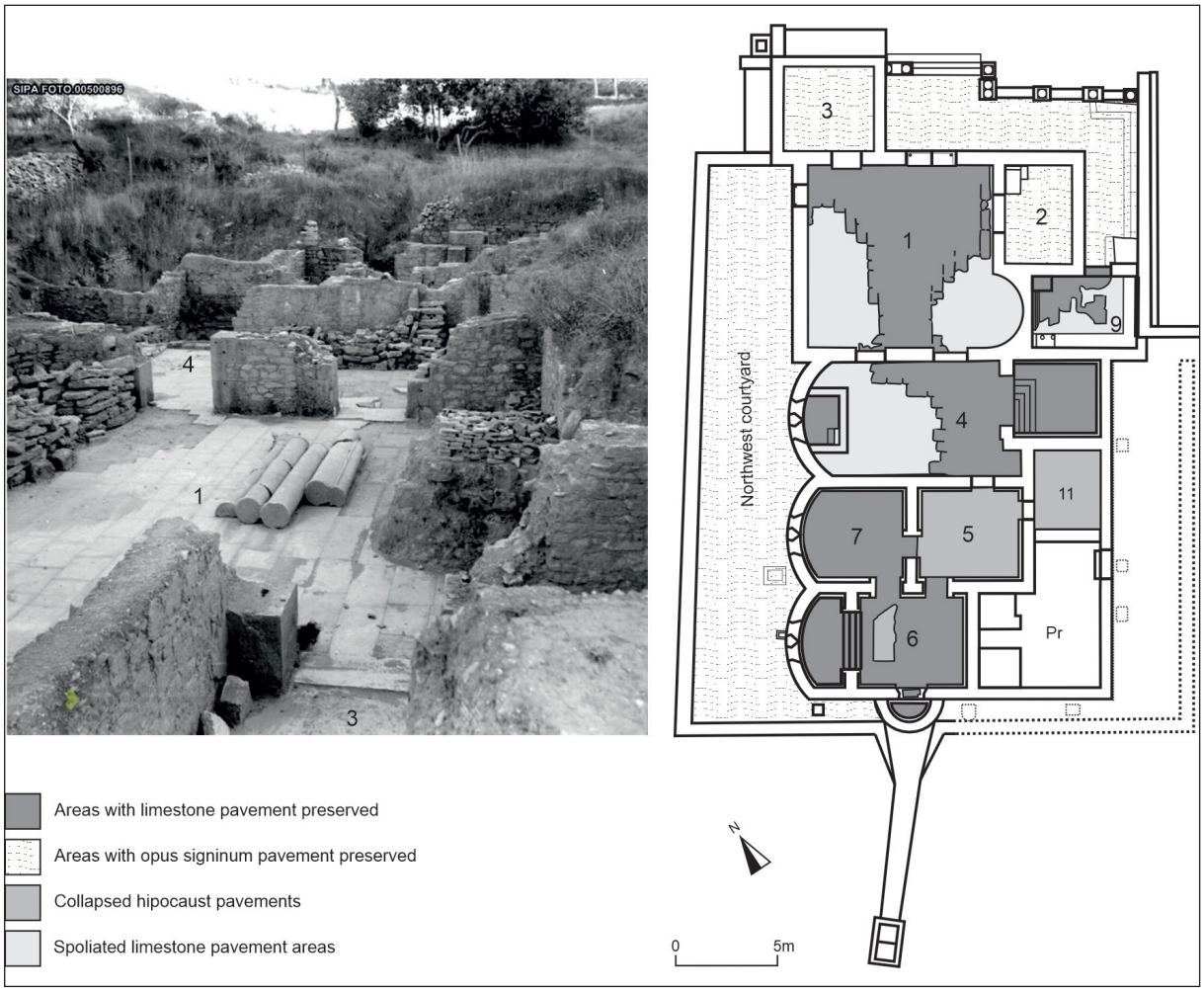


Figure 10. A: Spoliation of the West-Baths pavement as was found during the 1940s excavation by J. G. Cruz e Silva (PCIP/SIPA Archive Foto.00500896, unknown author, 1942), seen from northwest; B: West Baths floor plan with indication of missing floor areas (floor plan adapted from Felício, 2019, fig. 17), with superimposed archaeological drawing of missing floor areas (Centro Interpretativo de Mirobriga archive: documentation of "Mirobriga Project" 1981-1985).

9. DISCUSSION

9.1. The urban landscape of *Mirobriga* in the 3rd and 4th centuries

The stratigraphical data creates a vivid, albeit fragmented, report on the second half of the 3rd century. Evidence for decaying and ruined buildings, both public and private, suggest, first and foremost a decrease in the city's demography, as also noted by F. Teichner (2018c, pp. 246-247; 2021, pp. 77-79) and a retraction of the inhabited areas.[24] This situation cannot be overemphasised as the building's ruinous state, and later collapse, clearly indicates they were unoccupied.

The observed contexts were found throughout the excavated areas, indicating that buildings were vacated equally throughout the urban centre and that there were no preferential, or strategic, areas of occupation/abandon-

24 J. C. Quaresma (2012, p. 35, fig. 9-G) proposed a graphical representation of a retraction phenomenon in the 4th century. The proposal was based on the chronology of the fine wares whose finding location was known, but the meaning of this retraction was not elaborated further. This representation is outdated since further data was published from 2018 onward.

ment. Moreover, this retraction was not accompanied by any fortification of the remaining inhabited areas, as there is no evidence for a city wall, either from the Imperial or the late Roman period.[25]

The precise moment of each building's abandonment and demise is also unknown. The dating evidence for the abandonments comes mostly from the waste that was deposited after providing a *terminus ante quem* for the vacancy of the buildings. It is probable that the waste deposits found in abandoned areas go together with the documented reoccupations, as they are the strong candidates for having produced the waste contexts found in the vacant buildings.

However, the dating finds can only provide a broad time interval of about 50 years, making it difficult to determine how suddenly or slowly this phenomenon took place. As such, we must ask for how long these buildings had been abandoned before people started to dump their waste inside, spoliate, or reoccupy them. The ruinous state and partial collapse of the reoccupied buildings suggest they were vacant for a considerable time.[26]

The documented reoccupations suggest a recovery in the settlement's population during the late 3rd to early 4th centuries. The reasons for this increase in population and the very origin or social economic background of the "new" people are unclear.[27]

The people that inhabited the city in this period would live mostly in partly ruined houses, adapting the still standing walls of previous buildings, rearranging them with the scarce means at their disposal: new walls were built with reused materials and bound with earth, at times using spoliated *opus signinum* blocks as building elements; timber posts seem to have been placed inside some buildings as a way to support the caving roofs. Spaces that were beyond repair seem to have been cut off. In most cases, there are no remaining elements that can allude to the new functionalities of the spaces as these reconfigurations completely break with the previous structure and don't present a recognizable planimetric organisation.

9.2. Previous proposals for the urban crisis of *Mirobriga*

Over the years, almost all the interventions that were stratigraphically documented have detected a disruptive phenomenon from the mid-3rd century onwards, and the various studies have proposed different interpretations on its meaning.

In 1983, M. L. C. Arthur interpreted the contexts found in the streets and Building C as the urban decline of *Mirobriga*, associating them with the general "crisis of the 3rd century" (Arthur, 1983, pp. 108-109).

K. Slane mentions, in the conclusions of the Missouri project's monograph, that some parts of the settlement may have been abandoned around the mid-3rd century, corresponding to what we've designated as the 1st phase of abandonments, probably due to an economic crisis, eventually derived from "barbarian invasions" in other parts of the Iberian Peninsula. Sustaining that the site would remain inhabited in the 4th century, albeit substantially reduced (Slane, 1988, pp. 140-141).

J. C. Quaresma proposed that the transformations to some buildings it the 3rd/4th century,[28] corresponding to what we've designated as the reoccupation phase, could be related to climate change (Quaresma 2003, p. 47; 2010, pp, 354-355; 2012, pp. 304-305; 2014, pp. 114-115).

The hypothesis is based on the transformations identified in Building 1, namely in room "Ambiente 4", where a vast network of drainage channels was identified. The author interpreted the channels as rainwater drainage and, consequently, the room as a courtyard.

The decommission of the channels in the 3rd/4th century was interpreted as a sign that the courtyard had been covered and rendered an indoor space. Citing paleoclimatic studies, the author proposed that these transformations were the result of a "cultural change driven by an environmental stimulus" (Quaresma, 2012, pp. 56-57; 2014, p. 115).

---

25 The only structure that recalls a fortification is the thick walled "enclosure" in the western side of the site, whose function and chronology are not known.

26 Also, given that some of the ceramic forms have a long duration in time, the waste contexts could date from the later part of the 3rd century. This hypothesis also has an impact in the understanding of ceramic quantifications (see Chapter 9.5).

27 We are of the opinion that these reoccupations would be carried out by people who were not the original owners of the buildings. Would they possibly come from other cities or rural areas? In any case, the number of reoccupied buildings suggests that a considerable number of people will have established in the city.

28 At the time only Buildings 1 and 2 had been analysed, and data pertaining to transformations in the other buildings wasn't available.

However, in a study on the construction phases of the channels it has been proposed that the drains were related to a workshop (Felício and Sousa, 2023, pp. 271-273). As such, if the possible connection of the drains with rainwater is to be excluded, there is no other indication that the room "Ambiente 4" was open aired in the first place.

Proxy data on climate, has, indeed, revealed a shift between about 150 and 200 CE, from a stable warm and wet climate, which steadily yielded favourable crops and where climate changes were not enough to cause strain; toward a broadly cooling, drier climate with rapid short-term changes with potential for less good crops and the capacity to disrupt food production (McCormick *et al*., 2012).

These effects, however, would have played out at a macro level. In McCormick *et al*.'s own wording, it would have acted as a "background factor in the northwestern provinces' turbulent third century" (pp. 185-186 and 203). Overall, there are no references that these rapid short-term changes were drastic enough to justify an adaptation of existing buildings to harsher weather.

Finally, the base argument that the transformations in *Mirobriga* were climate/weather driven, is based in a single building. Considering that these changes would also have been detected in other places, which doesn't seem to be the case, as domestic buildings featuring peristyles continued being the norm in *Hispania* during the 3rd and 4th centuries, both in urban and rural contexts (Beltrán, 2003, pp. 52-53), the author's proposal seems very unlikely.

More recently, F. Teichner referred to this period, Phase IV in (Teichner, 2018c; 2021), as "the stagnation of the 3rd century." The author argues that some buildings came to a sudden end in the 3rd century, referring to the roof collapses of *Casa Periquito* (House 5) and House 8 (Teichner, 2021, p. 77), possibly due to an earthquake (Teichner, 2018c, pp. 246-247; 2021, pp. 77-79).

However, during the present analysis we've found no clear evidence of a destructive earthquake. The best preserved buildings, such as the baths, show no cracks or other signs that can be indisputably attributed to seismic damage.[29]

Furthermore, as mentioned in the previous section, the dating finds have a wide chronological interval, making it impossible to determine whether the abandonments occurred simultaneously or gradually over a period of time.

The hypothesis that the transformations identified in *Mirobriga*, could be related to a broad scenario of urban transformations in the 3rd and 4th centuries was first proposed in (Sousa, 2019, pp. 101-107), although at the time, given the scope of that work, the subject wasn't investigated in depth. The changes detected in street maintenance have later prompted the suggestion that by the mid-3rd century public institutions may have not been working properly (Felício, 2019, pp. 142-147).

9.3. Data on the health of municipal administration

As mentioned in Chapter 1, the urban crisis has been linked to a change in mentality of the local elites that stopped financing public buildings and their maintenance. Also, some hypotheses sustain that public construction programs may have been oversized, in respect to the actual economic possibilities and population of the settlements which, in a period of economic instability, may have become unsustainable, resulting in the abandonment or repurposing of these buildings

In *Mirobriga*, at a first glance, the size of the *forum* complex and, mainly, the existence of two bath buildings and a *circus*, may seem somewhat disproportionate when compared to the size of the urban settlement.

However, the construction of these complexes was intended to serve the entire population of the city's territory and not just those who lived in the urban centre and its environs, and their size could be justified by seasonal periods of greater influx of people into the city, like religious festivals, fairs and political gatherings.

This idea is especially pertinent when we consider the presence of a *circus*, which would only be justified when intended for a considerable number of spectators[30] and two bath buildings, one of them showing upgrade reforms

29 There is a portion of a window jamb fallen in an unexcavated layer of debris in the northwest courtyard of the West Baths, but a collapse of the wall in an advanced state of ruin could also create a similar fragment.

30 In this case, the epigraphic inscription celebrating the *Quinquatria* games held in the *circus* of *Mirobriga*, sponsored by a *medicus* from *Pax Iulia* (Encarnação, 1984, pp. 218-219), seems to attest a considerable territorial reach for this building, with public coming from other *civitates*.

possibly until the early 3rd century, indicating its relevance and the interest and means for its maintenance until this period.[31]

However, from the mid-3rd century onwards, the abandonment of the East Baths abandonment, the accumulation of sediment on all streets with stratigraphic information, as well as the deposition of debris in and around the public baths, and on the stream bank beside the bridge, all suggest that the local administration was weakened.

In some cities, the finding of layers of earth covering the original stone pavements has been interpreted as possible repairs (Romero Vera, 2020, p. 28). However, in *Mirobriga* this doesn't seem to be the case. The research on the city's sewage and rainwater management has revealed that streets played an added role in *Mirobriga* as part of a surface drainage system (Felício, 2019, pp. 21-27; Acero and Felício, 2021, pp. 148-149), making the sedimentation of the streets a large problem to this system as the water flowing through the sediment in the streets would create numerous holes and trenches.

Surviving Roman legal texts attest that local authorities were responsible for the construction and maintenance of streets (and bridges) and had specific responsibilities regarding the clearing of drainage structures and watercourses for flood prevention. Private owners of the plots adjoining those structures were also obliged to keep them clean and unobstructed, and sanctions were applied to those who damaged or built structures over the streets (Saliou, 2003, p. 39; Acero Pérez, 2018, p. 79; *Dig*. 43:10 and 43:11).

Based on these documented regulations, it has been proposed that given the importance of the stream for the city's drainage system, since it had been partly transformed and made to run through the bath buildings, as part of their sewage system (Felício, 2019, pp. 68-91; Felício and Sousa, 2020), it was likely that its maintenance was also a public matter regulated by municipal law (Felício, 2019, pp. 127 and 129). As such, the accumulation of sediment and debris both on the streets and on the stream bank, beside the bridge, could be an indication that, by the late 3rd century, the municipal authorities had become unable to enforce these regulations (Felício, 2019, p. 143).

Moreover, the ceramic findings from the *forum*, albeit decontextualised, show a chronological cohesion that cannot be ignored (Quaresma, 2012, pp. 33-34) and, along with the "L" shaped subdivision walls, may attest to a state of disrepair and repurpose of this public area sometime during the 3rd to early 4th centuries. In this regard, the inscription mentioning Emperor Aurelian (*IRCP*, 149) dated to 275 CE is, apparently, contradictory evidence, since it attests to some form of administration that was still active in the *forum*.

However, the same occurred in the *forums* of *Lucentum*, *Emporiae* and *Carthago Nova*,[32] which saw the placement of epigraphic monuments while being in a ruinous state (Romero Vera, 2021, p. 48) so, a similar situation may have happened in *Mirobriga*, being the last known symptom of municipal life.

9.4. The epigraphic data

The inscriptions recovered both at the site of *Mirobriga* and immediate surroundings provide some interesting, although incomplete, data about the city's "epigraphic habit." Of the thirty-eight known inscriptions (Encarnação, 1984, pp. 217-250),[33] six are religious (*IRCP*, 144, 145, 146, 147 and 148) one including an honorific dedication to a citizen and two possible imperial dedications (Table 1), dating from the 1st to early 3rd centuries; a possible proclamation by Emperor Aurelian (*IRCP*, 149), with a proposed date of 275 CE; sixteen funerary (*IRCP*, 150; *IRCP*, 152 to 161; *IRCP*, 169; *IRCP*, 172, 173, 176; 180 and 181), of which only one dates to the 3rd century (*IRCP*, 159); and sixteen of undetermined content and chronology.

31 No works of public nature are documented after the beginning of the 3rd century, if we accept that the last construction phase of East Baths could date from this time.

32 In *Carthago Nova*, a dedication to Iulia Mamaea was placed at a time when some of its buildings were already dismantled (Quevedo Sanchez, 2019, p. 113).

33 No new inscriptions have been published since. Later works (Encarnação, 1988, 1996, 2008; Alarcão, 2008) are updates and studies of already known inscriptions.

Inscription	Chronology	References	Type of Inscription
Monument to Venus	Early 1st c.CE	IRCP 146	Religious
Monument to Iulio Marcello, edile, Duunvir	1st c. CE	IRCP 150	Honorific
Monument to an emperor (?)	1st c. to 2nd half of 2nd c. CE	IRCP 175	Religious (?)
Monument to emperor Trajan (?)	Early 2nd c. CE (?)	IRCP 148	Religious (?)
Monument to Asclepius	2nd c. CE	IRCP 144	Religious
Monument to Mars	2nd half of 2nd c. CE	IRCP 145	Religious
Monument to Venus and Lucilia Lepidina	2nd half of 2nd c. to early 3rd c. CE	IRCP 147	Religious and Honorific
Monument to G. Agrius Rufus, adlecto Italicense	2nd half of 2nd c. to early 3rd c CE	IRCP 151	Honorific
Monument by emperor Aurelian	275 CE	IRCP149	Imperial Decree (?)

Table 1. Religious and honorific inscriptions known in *Mirobriga* (elaborated by the authors).

The most recent epigraphic monument is the one mentioning the Emperor Aurelian in his third Consulate, that is, in the year 275 CE[34] (*IRCP*, 149) which J. Encarnação attributed to the activity of members of an elite, possibly of the *curia*. The inscription is very fragmented and neither the entire text nor its content are known, and the restitution of some parts of the text is still questionable (Encarnação, 1984, pp. 225-229).[35] However, the name of the emperor appears in nominative (Encarnação, 1988, p. 103) making it not a dedication, but a text in which the emperor is presented as an agent[36] (Alarcão, 2008, p. 105; Encarnação, 2008, p. 220).

The date of this inscription coincides with the period of urban transformations we've been addressing. It is possible that the demographic retraction documented in this period may relate to an eventual political and economic unattractiveness of the *civitas*, which ultimately could have given rise to a lack of interest or incapacity on the part of the members of the *ordo* to financially support the municipal administration, a situation that could have led to a request for help, as seen elsewhere in the Empire.[37] In this case, could the inscription be a transcription of a response from the emperor to an appealing embassy from the city for him to take an interest and intervene in its urban recovery?

Whatever the reasons that led to the production of this epigraphic monument, its presence in *Mirobriga* in the last quarter of the 3rd century highlights the persistence of a latent municipal identity, albeit in an urban environment that was already quite degraded.

Indeed, in this period, and during the reoccupation attested decades after, the urban scenario lacked the expected conditions where the traditional urban elites would live and, if these were still in charge, they were likely living in the surrounding countryside. On the other hand, it also wouldn't be implausible that, by this time, the people in

34 J. Alarcão (2008, p. 105) proposed another interpretation for the inscription atributing it to the first consulate of Aurelian, dating the inscription in the year 271 CE.

35 J. Encarnação (1984, p. 229) suggests that the dedication had been drawn up by the provincial *flamine* based on the reading of "PROV…." The majority of imperial dedications from the 2nd to 4th centuries is erected in the name of the city by decree *concilium* or *decurionum*, which in these cases makes it possible to attest to the continuity of the *ordo decurionum* (Witschel, 2009, p. 489).

36 There is another epigraphic monument, from *Lucentum*, in which the names of emperors Marcus Aurelius and Commodus appear in the nominative and mentions the *municipium* of *Lucentum* (CIL II 5958) in the years 177-180 CE (Olcina Doménech, Guilabert Mas and Tendero Porras, 2022, p. 122).
As in our case, the monument is fragmentary and the whole text is unknown. A possible patronage of the emperors to the city has been proposed along with another that suggests that the city underwent a major restoration, financed by the emperors, after an attack from the *mauri* (Abad Casal, 1984, pp. 120-124). A few years after the production of this monument, in the late 2nd to early 3rd centuries, the public buildings of *Lucentum* started to be dismantled due to possibly having lost its municipal status (Olcina Doménech, Guilabert Mas and Tendero Porras, 2022, p. 122).

37 See in detail Arce Martinez, 2015; Blanco-Pérez, 2019.

charge, who commissioned the Aurelian inscription, were from humbler *strata* of the resident population, namely *alieni*.[38]

9.5. The data from fine wares and amphorae

A comparison between the urban development and the imports of ceramic wares, amphorae and coin finds was first presented by F. Teichner (Teichner, 2018c, fig. 254), but without further discussing it.

A similar comparison has been made by P. Calaveiras regarding the amphorae and other imported ceramics. The author tried to establish a relation between these imports and the urban evolution of the early imperial period, when the increase in imports seems to match the Roman urban development (Calaveiras, 2023, pp. 90-100).

In fact, this period is marked by the construction of a first *forum* in the first half of the 1st century CE, and increase in imports are, in theory, the result of a large amount of people coming to the site to participate in the construction supply chain for the urban conversion of the settlement (Fig. 11).

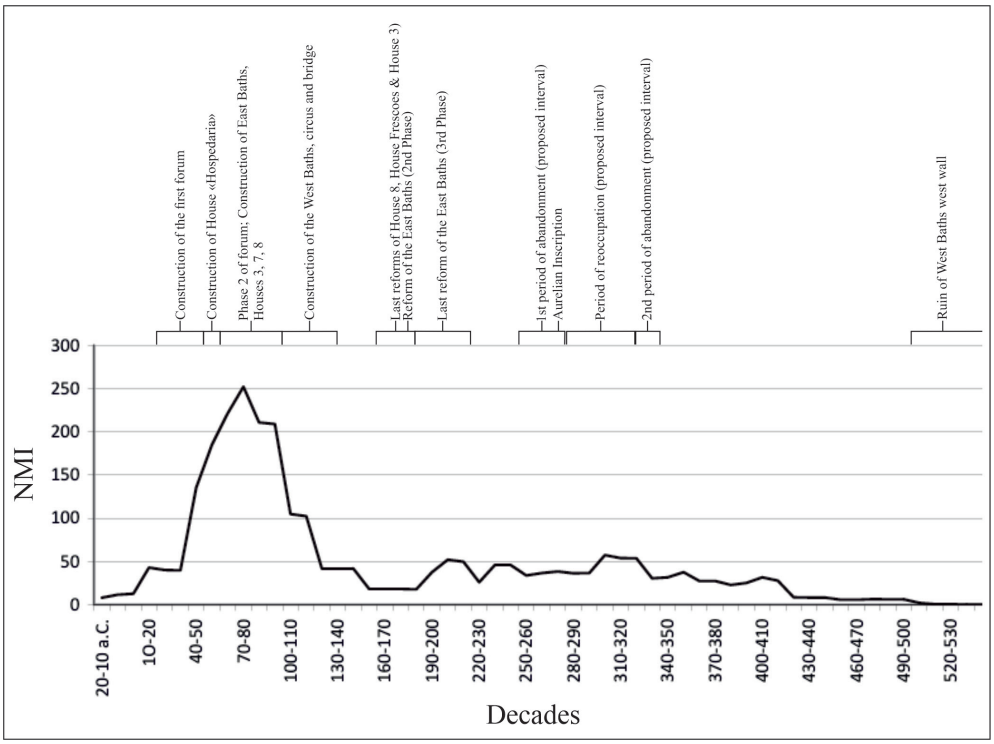


Figure 11. Comparison of the available urban data discussed in this paper with the evolution of imports of *terra sigillata* vessels (adapted from Quaresma, 2012, p. 247, fig. 104).

However, in the following decades, when major construction activities are recorded, like the construction of the Phase 2 of the *forum*, the East Baths, and most of the houses, the *terra sigillata* curve does not reflect this reality.

The amphorae curve seems to match more closely with the urban evolution (Fig. 12). However, it also shows some stagnation in the second half of the 1st century, rising again at the beginning of the 2nd century, when urbanism was practically consolidated. Also, the highest peak occurs in the first half of the 3rd century, in a period when the urban data only seem to attest to small renovations of previous existing buildings, making very unclear the meanings brought by these comparisons.

38 About this subject see (Espinosa Espinosa, 2019, p. 75).

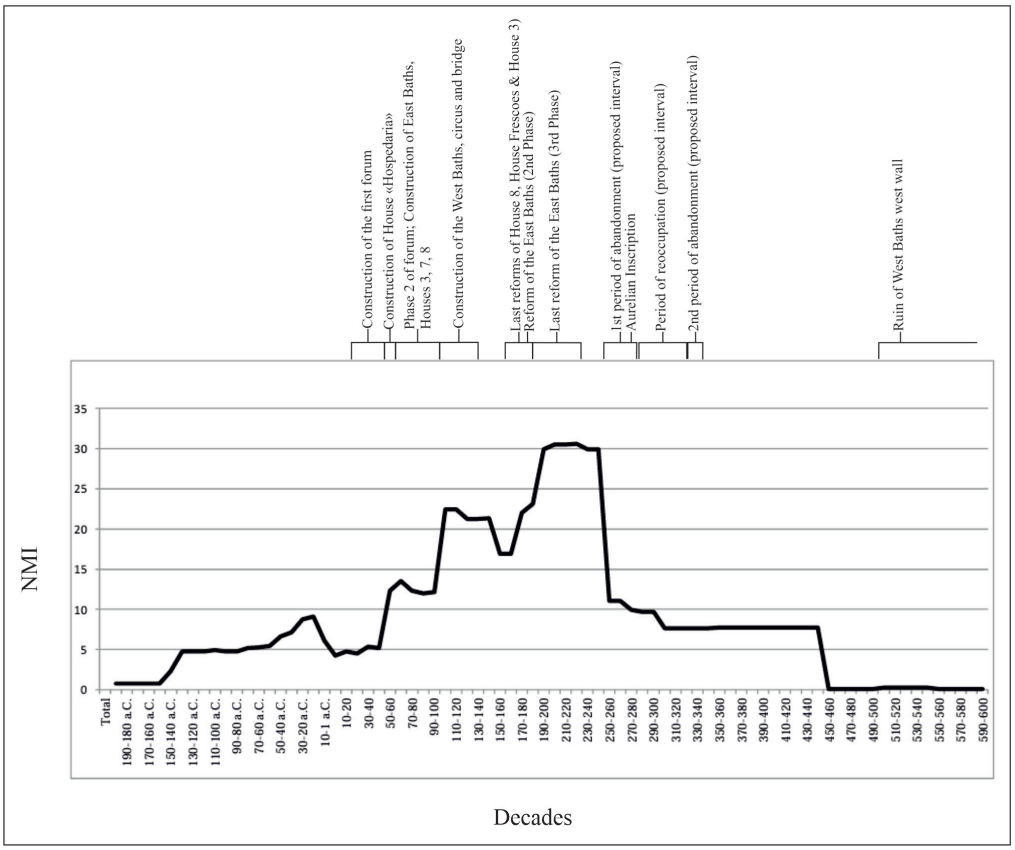


Figure 12. Comparison of the available urban data discussed in this paper with the evolution of amphorae imports (adapted from Calaveiras, 2023, p. 162, graph. 1).

In fact, in the study carried out to several sites from North-Africa and Sicily (Fentress *et al.*, 2004), the african *terra sigillata* curves showed the appearance of artifacts that arise from the precise dating intervals used, where the sudden increases and drops in the curve most probably reflect the appearance and disappearance of forms, and not any specific local event (Fentress *et al*., 2004, pp. 148-150). As such, in the curve for *Mirobriga* (Fig. 10), the sudden rise around 200 CE can be linked to the introduction of form Hayes 14A in considerable numbers, and the sudden drop before the mid-3rd century is probably caused by the also impactful disappearance of forms Hayes 14A, 14B and 9B (Fig. 10) (see Quaresma, 2012, tab. 20).

Furthermore, in Fentress *et al.*'s study, the curve of African *terra sigillata* fragments for each site does not find a corresponding evolution in the occupation of the sites. In fact, the opposite occurs: a continuous drop in imports along the decades goes along with an increase in the number of sites (Fentress *et al.*, 2004, pp. 150-155). The authors propose that this profile of imports could, instead, reflect "a combination of the curves for the larger African Red Slip Ware A and D productions which form the peaks to either side of the lesser C production." (Fentress and Perkins, 1988, p. 208; Fentress *et al.*, 2004, p. 150).

Overall, this study suggests that a connection between urban development and ceramic imports is not that simple, and further comparison studies are needed to better understand the possible connection between urban transformations and imports of ceramic and foodstuffs.

9.6. Data on the territory

One of the most significant sets of data regarding the territory of *Mirobriga* comes from the port settlement known today as Sines. This settlement has for long been considered to be *Mirobriga*'s port connection, namely for its proximity (Encarnação, 2009, p. 41; Barata, 1997, p. 40) and for an epigraphic monument found in *Mirobriga*'s

surroundings mentioning an *aedile* that was also a possible *caudicarius* (*IRCP*, 150; *CIL II*, 25) whose activity would have been carried in the port town of Sines (Encarnação, 1984, p. 230; Mantas, 2017, p. 186).

Based on another epigraphic monument found in 1983, the base of a statue, one meter tall, bearing a dedication to *Mars Augustus*, made by an *augustalis* in the second half of the 2nd century AD (Encarnação, 2009, p. 40), J. Encarnação proposed the existence of a public square, or port *forum* where the statue would be placed, questioning the administrative status of the settlement and its degree of dependence from *Mirobriga*, which could be less than previously thought (Encarnação, 1993, p. 317).

The Roman urbanism of Sines is badly known. Only six salted fish production *officinae* are known (Silva and Coelho-Soares, 2006, p. 120) along with a possible dwelling (Pereira, 2021, p. 24).

The excavation of two of the *officinae* (*officina* A and *officina* B) showed a phase of abandonment in the late 2nd to early 3rd centuries, followed by their reoccupation in the 3rd century, but only partially. The courtyard of *officina* A was then occupied by a possible small dwelling. The final abandonment dates to the 4th and 5th centuries (Coelho-Soares and Silva, 2004, p. 113, fig. 15; Silva and Coelho-Soares, 2006, pp. 108-110).

Compared to *Mirobriga*, the first abandonment of these *officinae* seems to have happened considerably earlier, but the reoccupation phase seems to take place around the same time and with a similar vernacular approach, suggesting a similar changing environment in both settlements.

For the inland territory, the information currently available is very scarce, and no conclusions can be drawn. There are seven known *villae* in the outskirts of Alvalade do Sado, all of them badly known (Feio, 2009, pp. 47-71). All, except one, show an occupation period that goes beyond the 3rd century (Feio, 2009, p. 66). The most striking is, perhaps, the Roman *villa* of Monte do Roxo, where a Christian *basilica* was identified. The author suggests that its construction could go back to the 4th or 5th centuries, making it one of the oldest. The basilica was remodelled in the 7th century and occupation continued until the Islamic period suggesting the importance of the settlement (Feio, 2009, pp. 52-54).

10. FINAL THOUGHTS

The beginning of the urban crisis of *Mirobriga* can be placed around the middle of the 3rd century. From this period onwards almost all of the known buildings, public and private, suffer a slow process of abandonment, reoccupation and final abandonment in the first half of the 4th century, a process which takes place along the course of roughly one hundred years.

The reasons for this urban crisis, as with other cities, cannot be pinpointed by the archaeological evidence, but the general course of urban dilapidation and epigraphic silence from the late 3rd century onwards, agrees with what has been documented in other cities of *Hispania*. Likewise, similar causes could be proposed, like the ideological shift in the municipal elites that led to disinvestment in the urban maintenance along with intrinsic and/or conjunctural economical stress.

The available data on the city's territory isn't enough to understand what was happening during this period. The economic resources of *Mirobriga*, which remain largely unknown, may have dwindled and played a crucial part in the city's demise. To this regard, the evidence from the salted fish *officinae* in Sines is not conclusive and, if the connection to mining activities is confirmed, a possible decline in this sector could have had an influence on the outcome, much like what probably happened in *Carthago Nova.*[39]

If the first phase of abandonment can be framed in the context of urban transformations that occurred in *Hispania* in the late 2nd century and throughout the 3rd century, the reoccupation of ruined buildings in the later part of that century poses interesting questions regarding the population dynamics of this period, suggesting a demographic movement of people leaving and coming to the city. In fact, one might question whether the people inhabiting the repurposed ruins of the houses and other buildings were already inhabitants of the city or its countryside or came from elsewhere.

It can be said that the living conditions differed greatly from those experienced just a few decades earlier, as the people that inhabited the town and its buildings during the reoccupation phase seem to have some cultural detachment from the previous centuries and didn't seem to bother with the urban conditions and buildings' *status*

39 Domergue, 1966, pp. 41-72; 1990, p. 247; Bellón, 2009, *apud* Mata Soler, 2014, p. 233.

quo, as can be concluded by the sedimentation of streets and the substitution of *signinum* pavements to rammed earth, i.e. This is also highlighted by an apparent break from the earlier construction supply chain, since there is no lime mortar construction documented in this period, and the elements are reused from other buildings.[40] This form of occupation, progressively less urban, may have continued perhaps until the definitive abandonment of the settlement sometime after the 6th century.

ACKNOWLEDGMENTS

F. S. would like to thank José Carlos Quaresma and Rodrigo Banha da Silva, who supervised the early stages of this research during the Master's degree (2017-2018). The authors thank Manuela de Deus, *DRCAlentejo* coordinator for *Mirobriga* at the time of our investigation, and to the team of the Mirobriga Interpretation Centre, all the support provided to our research; as well as Fernanda do Vale, coordinator of the Municipal Museum of Santiago do Cacém, for the support and information on finds of the 1954-1955 excavations. We also thank the comments and suggestions made to our manuscript by the reviewers.

During this research the authors were financed by national funds through the *Fundação para a Ciência e Tecnologia* (PhD Scholarships UI/BD/151244/2021 and 2020.06757.BD, held respectively).

DECLARATION OF COMPETING INTEREST

The authors of this article declare that they have no financial, professional or personal conflicts of interest that could have inappropriately influenced this work.

AUTHORSHIP CONTRIBUTION STATEMENT

Filipe Sousa: conceptualization, investigation, writing – original draft, writing – review & editing.
Catarina Felício: investigation, writing – original draft, writing – review & editing.

BIBLIOGRAPHY

Abad Casal, L. (1984). *Los orígenes de la ciudad de Alicante*. Alicante: Instituto Juan Gil-Albert/Diputación Provincial de Alicante.

Acero Pérez, J. (2018). *La gestión de los residuos en Augusta Emerita. Siglos I a.C.-VII d.C.* Anejos del Archivo Español de Arqueología, LXXXII. Madrid: CSIC

Acero Pérez, J., and Felício, C. (2021). "*Aquae pluviae et caducae*. Sistemas de drenaje y impermeabilización frente a la escorrentía superficial en *Augusta Emerita* (Mérida, España) y *Mirobriga* (Santiago do Cacém, Portugal)." *Zephyrus*, 88, pp. 135-161. DOI: https://doi.org/10.14201/zephyrus202188135162.

Alarcão, J. (2008). "Notas de arqueologia, epigrafia e toponímia – V." *Revista Portuguesa de Arqueologia*, 11 (1), pp. 103-121.

Almeida, F. (1964). *Ruínas de Miróbriga dos Célticos (Santiago do Cacém)*. Setúbal: Edição da Junta Distrital de Setúbal.

Andreu Pintado, J. (Ed.) (2017a). *Oppida Labentia. Transformaciones, cambios y alteración en las ciudades hispanas entre el siglo II y la Tardoantigüedad*. Serie Monografias Los Bañales, 2. Uncastillo: Fundación Uncastillo / UNED de Tudela.

Andreu Pintado, J. (2017b). "Presentación." In: Andreu Pintado, J. (Ed.). *Oppida Labentia. Transformaciones, cambios, y alteración en las cuidades hispanas entre el siglo II y la tardoantigüedad*. Serie Monografias Los Bañales, 2. Uncastillo: Fundación Uncastillo / UNED de Tudela.

Andreu Pintado, J. (2019). "Challenges and threats faced by municipal administration in the Roman West during the High Empire: The Hispanic case." In: Andreu Pintado, J., and Blanco-Pérez, A. (Eds.). *Signs of weakness and crisis in the Western cities of the Roman Empire (c. II-III AD)*. Potsdamer Altertumswissenschaftliche Beiträge, 68. Stuttgart: Franz Steiner Verlag, pp. 25-35.

40 Sousa, 2019, p. 107

Andreu Pintado, J., and Blanco-Pérez, A. (Eds.). (2019). *Signs of weakness and crisis in the Western cities of the Roman Empire (c. II-III AD)*. Potsdamer Altertumswissenschaftliche Beiträge, 68. Stuttgart: Franz Steiner Verlag.

Arce Martinez, J. (2015). "La inscripción de Orcistus y las preocupaciones del emperador." In: Brassous, L., and Quevedo, A. (Eds.). *Urbanisme Civique en temps de crise. Les espaces publics d'Hispanie et de l'Occident romain entre le IIe et le IVe siècle*. Collection de la Casa de Velázquez, 149. Madrid: Casa de Velázquez, pp. 311-323.

Arthur, M. L. C. (1983). "Merobriga. Santiago do Cacém (Portugal)." *Caesaraugusta*, 57 (8), pp. 51-109.

Barata, M. F. (1996). *Escavações 1995/1996. Continuação dos trabalhos preliminares entregues ao IPPAR em Março de 1996* (Informação n.º 240/DA/96) *e em Outubro de 1996* (Informação n.º 20/FB/96). Parte de Processo S - 0004. Arquivo da Arqueologia Portuguesa. Palácio Nacional da Ajuda.

Barata, M. F. (1997). *Miróbriga - Urbanismo e Arquitectura*. Dissertação de Mestrado em Arqueologia. Faculdade de Letras da Universidade do Porto.

Barata, M. F. (1999). "As habitações de Miróbriga e os ritos domésticos." *Revista Portuguesa de Arqueologia*, Série 2 (2), pp. 51-68.

Bellón, J. (2009). "Minería y metalurgia en el área de Carthago Nova: modelos de ocupación del territorio desde la República hasta el Principado de Augusto en Finca Petén (Mazarrón, Murcia)." *Arqueología y Territorio*, 6, pp. 165-177.

Beltrán, M. (2003). "La casa hispanorromana. Modelos." *Bolskan*, 20, pp. 13-63.

Biers, W. R. (Ed.) (1988). *Mirobriga. investigations at an Iron Age and Roman Site in Southern Portugal by the University of Missouri-Columbia 1981-1986*. BAR International Series, 451. Oxford: BAR.

Biers, W. R., and Biers, J. C. (1988a). "Appendix C - The baths, Locus Summaries and catalogue of finds, Catalogue of Architectural Blocks." In: Biers, W. R. (Ed.). *Mirobriga. investigations at an Iron Age and Roman Site in Southern Portugal by the University of Missouri-Columbia 1981-1986*. BAR International Series, 451. Oxford: BAR, pp. 164-205.

Biers, W. R., and Biers, J. C. (1988b). "The Baths." In: Biers, W. R. (Ed.). *Mirobriga. Investigations at an Iron Age and Roman Site in Southern Portugal by the University of Missouri-Columbia 1981-1986*. BAR International Series, 451. Oxford: BAR, pp. 48-125.

Blanco-Pérez, A. (2019). Imperial responses to urban crisis in the Roman Empire: A conceptual approach." In: Andreu Pintado, J., and Blanco-Pérez, A. (Eds.). *Signs of weakness and crisis in the Western cities of the Roman Empire (c. II-III AD)*. Potsdamer Altertumswissenschaftliche Beiträge, 68. Stuttgart: Franz Steiner Verlag, pp. 37-45.

Brassous, L., and Quevedo, A. (Eds.) (2015). *Urbanisme civique en temps de crise. Les espaces publics d'Hispanie et de l'Occident romain entre le IIe et le IVe siècle*. Collection de la Casa de Velázquez, 149. Madrid: Casa de Velázquez.

Calaveiras, P. (2023). *As ânforas de Miróbriga? (Chãos Salgados – Santiago do Cacém) – Análise tipológica e comercial (Séc. II a.C. a Séc. VI d.C.)*. Dissertação de Mestrado em Arqueologia. Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Available at: http://hdl.handle.net/10362/167970 [accessed 21-09-2025].

Cepas Palanca, A. (1997). *Crisis y continuidad en la Hispania del siglo III*. Anejos de Archivo Español de Arqueología, XVII. Madrid: CSIC.

Chavarría-Arnau, A. (2006). "Villas en Hispania durante la Antigüedad tardía." In: Chavarria, A., Arce, J., and Brogiolo, G. P. (Eds.). *Villas tardoantiguas en el Mediterráneo occidental*. Anejos de Archivo Español de Arqueología, XXXIX. Madrid: CSIC, pp. 17-35.

Coelho-Soares, A., and Silva, C. T. (2004). "Novas oficinas de produção de preparados piscícolas na área urbana de Sines. Intervenção arqueológica na Rua Ramos Costa." *Musa*, 1, pp. 111-122.

Domergue, C. (1966). "Les lingots de plomb romains du Musée archéologique de Carthagène et du Musée Naval de Madrid." *Archivo Español de Arqueología*, 39, pp. 41-72.

Domergue, C. (1990). *Les mines de la péninsule ibérique dans l'Antiquité romaine.* Collection de l'École Française de Rome, 127. Rome: École Française de Rome.

Encarnação, J. D' (1984). *Inscrições romanas do Conventus Pacensis.* Coimbra: Faculdade de Letras de Coimbra - Instituto de Arqueologia.

Encarnação, J. D' (1988). "Aureliano homenageado em Miróbriga." *Arqueologia e História*, sér. X, vol. I-II (1), pp. 105-108.

Encarnação, J. D' (1993). "Arqueologia e Epigrafia – uma complementaridade a potenciar." In: Jorge, V. O. (Coord.) Número temático: Actas do 1º Congresso de Arqueologia Peninsular (Porto, 12-18 de Outubro de 1993). *Trabalhos de Antropologia e Etnografia*, 33 (1-2), pp. 313-325.

Encarnação, J. D' (1996). "Problemas em aberto na epigrafia mirobriguense." *Conimbriga*, 35, pp. 129-146.

Encarnação, J. D' (2008). "*IRCP*, 25 anos depois." *Revista Portuguesa de Arqueologia*, 11 (2), pp. 215-230.

Encarnação, J. D' (2009). "Em torno da inscrição a Marte, em Sines." In I. Silva, J. Madeira and S. Ferreira (Coords.). *Actas do 1.º Encontro de História do Alentejo Litoral*. Sines: Centro Cultural Emmerico Nunes, pp. 40-42.

Espinosa Espinosa, D. (2019). "From *municipia Latina* to *oppida labentia*." In: Andreu Pintado, J., and Blanco-Pérez, A. (Eds.). *Signs of weakness and crisis in the Western cities of the Roman Empire (c. II-III AD)*. Potsdamer Altertumswissenschaftliche Beiträge, 68. Stuttgart: Franz Steiner Verlag, pp. 71-82.

Fabião, C. (1999). *O Mundo Indígena e sua Romanização na área céltica do território hoje português*. Dissertação de Doutoramento em Arqueologia. Faculdade de Letras da Universidade de Lisboa. Available at: http://hdl.handle.net/10451/44209 [accessed 21-09-2025].

Feio, J. (2009) "A ocupação romana em torno de Alvalade: novos dados." *Atas do 1.º Encontro de História do Alentejo Litoral*. Sines: Centro Cultural Emmerico Nunes, pp. 47-71.

Felício, C. (2019). *Gestão de resíduos em Mirobriga. O Sistema de Saneamento (Séc. I-IV d.C.)*. Dissertação de Mestrado em Arqueologia. Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Available at: http://hdl.handle.net/10362/80651 [accessed 21-09-2025].

Felício, C. (2025). "Water Usage in Mirobriga (Castelo Velho de Santiago do Cacém, Portugal). An Overview of the Structures of Water Supply and Distribution." In: Castro García, M. M., Acero Pérez, J., Gangale Risoleo, D., and Felício, C. (Eds.). *Ancient Water Supply and Management Systems in the Western Mediterranean - Construction and Operation*. Archaeopress Roman Archaeology, 131. Bicester: Archaeopress Publishing, pp. 7-28.

Felício, C., and Sousa, F. (2019). "Dois amuletos em osso Mirobriga - Evidências do culto de Magna Mater?" *Ophiussa*, 3, pp. 133-143.

Felício, C., and Sousa, F. (2023). "Drainage, sanitation and wastewater management in the Roman town of Mirobriga (Santiago do Cacém, Portugal)." In : Lebret, J.-B., and Agusta-Boularot, S. (Eds.). *Actes du Colloque « Eaux sales, eaux troubles, eaux de ruissellement. La gestion des eaux indésirables dans le monde romain ». Montpellier, 15-16 octobre 2020*. RAN - Revue Archéologique de Nabonnaise, 54-55. Montpellier: PULM - Presses Universitaires de la Mediterranée, Université Paul Valery, pp. 263-283.

Fentress, E., Fontana, S., Hitchner, R. B., and Perkins, P. (2004). "Accounting for ARS: fineware and sites in Sicily and Africa." In: Alcock, S. E., and Cherry, J. F. (Eds.). *Side-by-side survey: comparative regional studies in the Mediterranean world*. Oxford: Oxbow Books, pp. 147-162.

Fentress, E., and Perkins, P. (1988). "Counting African red slip ware." *L'Africa Romana*, 5. pp. 205-214.

Fuentes Domínguez, A. (2000). "Las termas en la antigüedad tardía: reconversión, amortización, desaparición. El caso hispano." In: Fernández Ochoa, C., and García Entero, V. (Eds.). *Termas romanas en el occidente del imperio*. *II Coloquio Internacional de Arqueología en Gijón*. Serie Patrimonio, 5. Gijón: Vtp Editorial, pp. 135-145.

Kopf, J. (2018a). "Archäologische und stratigraphische Untersuchungen zu Haus 5." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipps-Universität Marburg, pp. 58-91.

Kopf, J. (2018b). "Archäologische und stratigraphische Untersuchungen zu Haus 6." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipps-Universität Marburg, pp. 92-108.

Kullikowsky, M. (2010). *Late Roman Spain and Its Cities*. Baltimore: The Johns Hopkins University Press.

Leonard Jr., A., and Slane, K. W. (1988). "The Excavations in the *Circus*." In: Biers, W. R. (Ed.). *Mirobriga. Investigations at an Iron Age and Roman Site in Southern Portugal by the University of Missouri-Columbia 1981-1986*. BAR International Series, 451. Oxford: BAR, pp. 31-47.

Mantas, V. G. (2017). "Navegação, centros urbanos e espaços portuários na Lusitania." In: *IX Mesa Redonda Internacional de Lusitania. Lusitania romana: del pasado al presente de la investigación*. Mérida: Museo Nacional de Arte Romano, pp. 179-207.

Martín-Bueno, M. A. (1999). "La ciudad julio-claudia ¿una estrella fugaz?" In: Bueno Ramírez, P., and Balbín Berhmann, R. de (Coords.). *II Congreso Internacional Arqueología Peninsular, Zamora 24-27 septiembre 1996*. Zamora: Fundación Rei Afonso Henriques, vol. 4, pp. 117-121.

Mata Soler, J. (2014). "Crisis ciudadana a partir del siglo II en Hispania: un modelo teórico de causas y dinámicas aplicado al Conventus Carthaginensis." *Cuadernos de Arqueología Universidad de Navarra*, 22, pp. 219-251.

McCormick, M., Büntgen, U., Cane M. A., Cook, E. R., Harper, K., Huybers, P., Litt, T., Manning, S. W., Mayewski, P. A., More, A. F. M., Nicolussi, K., and Tegel, W. (2012). "Climate Change during and after the Roman Empire: Reconstructing the Past from Scientific and Historical Evidence." *Journal of Interdisciplinary History*, 43 (2), pp. 169-220

Oberhofer, K. (2018a). "Archäologische und stratigraphische Untersuchungen zu Haus 8." In: Theichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipp-Univesität Marburg, pp. 128-147.

Oberhofer, K. (2018b). "Archäologische und stratigraphische Untersuchungen zu Hauz 7." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipps-Universität Marburg, pp. 109-127.

Oberhofer, K. (2018c). "Die Holzfunde aus dem Brunnen (UE 221) in Haus 7." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Phillips-Universität Marburg, pp. 211-214.

Olcina Doménech, M., Guilabert Mas, A., and Tendero Porras, E. (2022). "*Lucentum*: la extinción de la ciudad e sus implicaciones jurídicas e territoriales." In: Mateos, P., Olcina, M., Pizzo, A., and Schattner, T. (Eds.). *Small Towns*, *una realidad urbana en la Hispania romana*. Mytra – monografías e trabajos de arqueología. Mérida: Instituto de Arqueología de Mérida, vol. I, pp. 117-127.

Osland, D. (2011). *Urban change in Late Antique Hispania: The case of Augusta Emerita.* PhD Dissertation in Classics. College of Arts and Sciences. University of Cincinnati.

Page, M. P. (2020). "El final de las termas públicas en Hispania: las provincias Carthaginiensis, Tarraconensis y Gallaecia." In: Noguera Celdrán, J. M., García Entero, V., and Page, M. P. (Coords.). *Termas públicas de Hispania*. Colección Spal Monografías de Arqueología, 33. Murcia / Sevilla: Ediciones de la Universidad de Murcia / Editorial Universidad de Sevilla, pp. 251-264.

Peña Cervantes, Y., Jankoviak, A., and Teichner, F. (2018). "Keramisches Fundmaterial aus Mirobriga." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipps-Universität Marburg, pp. 199-210.

Pereira, P. (2021). *Sines em época romana: Uma conciliação de produções*. Dissertação de Mestrado em Arqueologia. Faculdade de Letras da Universidade de Lisboa.

Prust, A. (2018). "Animal exploitation in Roman Mirobriga." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipps-Universität Marburg, pp. 228-237.

Purcell, N. (2019). "Unstable cities: some questions about Roman urbanism." In: Andreu Pintado, J., and Blanco-Pérez, A. (Eds.). *Signs of weakness and crisis in the Western cities of the Roman Empire (c. II-III AD)*. Potsdamer Altertumswissenschaftliche Beiträge, 68. Stuttgart: Franz Steiner Verlag, pp. 13-24.

Quaresma, J. C. (2003). *Terra sigillata sudgálica num centro de consumo: Chãos Salgados, Santiago do Cacém (Mirobriga?)*. Trabalhos de Arqueologia 30. Lisboa: Instituto Português de Arqueologia.

Quaresma, J. C. (2004). *Relatório da escavação da área denominada "Ponte-Norte", nas ruínas romanas de Mirobriga*. Parte de Processo S - 0004. Arquivo da Arqueologia Portuguesa. Palácio Nacional da Ajuda.

Quaresma, J. C. (2005). *Relatório da campanha de escavação das áreas "extremidade sul da ponte (Ponte-S)", "Ambiente 3 da extremidade norte da ponte (Ponte-N)" e "natatio", nas ruínas romanas de Mirobriga*. Parte de Processo S - 0004. Arquivo da Arqueologia Portuguesa. Palácio Nacional da Ajuda.

Quaresma, J. C. (2009*). Economia antiga a partir de um centro de consumo lusitano. Terra sigillata e cerâmica africana de cozinha em Chãos Salgados (Mirobriga?).* Dissertação de Doutoramento em História, Especialidade em Arqueologia. Faculdade de Letras da Universidade de Lisboa.

Quaresma, J. C. (2010). "Changement et continuité : la romanisation à Chãos Salgados, Santiago do Cacém - Mirobriga? - (Portugal)." In: Corsi, C., and Vermeulen, F. (Eds.). *Changing Landscapes. The impact of Roman towns in the Western Mediterranean*. *Proceedings of the international colloquium, Castelo de Vide-Marvão. 15th-17th May 2008*. Ricerche - Series Maior, 1. Évora: Universidade de Évora / Ante Quem, pp. 347-356.

Quaresma, J. C. (2012). *Economia Antiga a partir de um centro de consumo lusitano - Terra Sigillata e cerâmica africana de cozinha em Chão Salgados (Mirobriga?)*. Estudos e Memórias, 4. Lisboa: UNIARQ - Centro de Arqueologia da Universidade de Lisboa.

Quaresma, J. C. (2014). "Escavações de 2004 e 2005 na área da ponte de Chãos Salgados (Mirobriga?): Estratigrafia, arquitectura e materiais de um sector público da cidade romana." *Musa - Museus, Arqueologia e Outros Patrimónios*, 4, pp. 125-156.

Quaresma, J. C. (2022). "Taberna 2 de Mirobriga (Santiago do Cacém, Portugal): adaptações artesanais e domésticas e evolução ceramológica, nos séculos V e VI d.C." *Archivo Español de Arqueología*, 95, e16. DOI: https://doi.org/10.3989/aespa.095.022.16.

Quaresma, J. C., Felício, C., Sousa, F., Gadanho, A., Guimarães, R., and Silva, R. B. (2020). "Mirobriga (Santiago do Cacém): novos desenvolvimentos científicos, entre análises e novas escavações." *Revista Portuguesa de Arqueologia*, 23, pp. 121-130.

Quaresma, J. C., and Silva, R. B. (2021). "A região de Alvalade do Sado: Entre o Sul da Lusitania e o Mediterraneo Romano." In: Deus, M., Vale, F., and Matias, J. (Coords.). *Memórias da Terra, das Águas e dos Povos. Catálogo da Exposição do Museu de Arqueologia de Alvalade.* Santiago do Cacém: Câmara Municipal de Santiago do Cacém, pp. 91-112.

Quevedo Sanchez, A. (2019). "Carthago Nova between the 2nd and 3rd centuries AD: the decline and urban crisis of a Roman city in South-Eastern Hispania." In: Andreu Pintado, J., and Blanco-Pérez, A. (Eds.). *Signs of weakness and crisis in the Western cities of the Roman Empire (c. II-III AD)*. Potsdamer Altertumswissenschaftliche Beiträge, 68. Stuttgart: Franz Steiner Verlag, pp. 101-116.

Resende, A. (1593). *Libri quatuor de antiqvitatibvs Lvsitaniae*. Évora: Excudebat Martinus Burgensis academia typographus.

Romaní Sala, N., and Acero Pérez, J. (2014). "La red de saneamiento de las ciudades hispanorromanas en época bajoimperial y tardoantigua: transformación y abandono / Urban sewerage networks in Roman and Late antique Hispania: transformation and disuse." In: Álvarez, J. M., Nogales, T., and Rodà, I. (Eds.). *Actas XVIII Congreso Internacional de Arqueología Clásica. Centro y periferia en el mundo clásico*. Mérida: Museo Nacional de Arte Romano, vol. II, pp. 1801-1805.

Romero Vera, D. (2020). "Walls, streets and sewers: Signs of the Urban Vigour in the Hispano-Roman Cities during the 2nd century AD." In: Andreu Pintado, J. (Ed.). *From "splendidissima ciuitas" to "oppidum labens": Financial problems and material ruin in Roman provincial cities at the End of the High-Empire. The Hispanic provinces*. *Proceedings of the 19th Internacional Congress of Classical Archaeology. Cologne/Bonne, 22-26 May 2018 - Archaeology and Economy in the Ancient World. Panel 8.7*. Heidelberg: Propylaeum/Heidelberg University Library, pp. 27-36

Romero Vera, D. (2021a). "*Ab aetate aurea ad aetatem ferream*. Causes and interpretations on the beginning of the urban crisis in Hispania during the Late Antonine age." In: Pérez González, J., and Bermúdez Lorenzo, J. M. (Eds.). *The Romans before adversity – forms of reaction and strategies to manage change*. Quaderni di Aiônos, 5. Roma: Aracne, pp. 43-70.

Romero Vera, D. (2021b). "Vitalidad y transformación urbana en el siglo II d.C.: Los espacios monumentales de las capitales provinciales de Hispania." *SPAL – Revista de Prehistoria y Arqueología*, 30.2, pp. 245-268

Romero Vera, D. (2021c). "Conjeturas en torno a la ruptura del modelo urbanístico altoimperial en Hispania: La fase tardoantonina y primoseveriana (138-211 d.C.)." *Arqueología Iberoamericana*, 47, pp. 41-52.

Romero Vera, D. (2022). "Entre la plenitud y la decadencia. Un balance historiográfico sobre la vitalidad y el desaroll urbano de las ciudades hispanorromanas durante el siglo II. d.C." *Revista de Historiografía*, 37, pp. 155-175.

Saliou, C. (2003). "Le nettoyage des rues dans l'Antiquité : fragments de discours normatifs." In: Ballet, P., Cordier, P., and Dieudonné-Glad, N. (Dirs.). *La ville et ses déchets dans le monde romain. Rebuts et recyclages, Actes du colloque de Poitiers, 19-21 septembre 2002*. Montagnac: M. Mergoil, pp. 37-49.

Silva, C. T., and Coelho-Soares, A. (2006). "Preparação de preparados piscícolas na Sines romana." *Setúbal Arqueológica*, 13, pp. 101-122.

Silva, R. B. (2011). "Olisipo." In: Remollà Valverdú, J. A., and Acero Pérez, J. (Eds.). *La gestión de los residuos urbanos en Hispania*. *Xavier Dupré Raventós (1956-2006)*. Anejos del Archivo Español de Arqueología, LX. Madrid: Instituto de Arqueología de Mérida - CSIC, pp. 203-212.

Silva, R. B. (2012). *As «marcas de oleiro» na terra sigillata e a circulação dos vasos na Península de Lisboa*. Dissertação de Doutoramento em História, Especialidade em Arqueologia. Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Available at: http://hdl.handle.net/10362/9472 [accessed 21-09-2025].

Slane, K. W. (1988). "Mirobriga and Its History." In: Biers, W. R. (Ed.). *Mirobriga. Investigations at an Iron Age and Roman Site in Southern Portugal by the University of Missouri-Columbia 1981-1986*. BAR International Series, 451. Oxford: BAR, pp. 139-142.

Sousa, F. (2019). *A Casa da Calçada (Mirobriga). Diacronia de um edifício habitacional de época romana (séculos I a IV d.C.)*. Dissertação de Mestrado em Arqueologia. Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Available at: http://hdl.handle.net/10362/65644 [accessed 21-09-2025].

Sousa, F., and Felício, C. (2020). "A Arquitectura Residencial em Mirobriga (Santiago do Cacém): contributo a partir de um estudo de caso." In: Arnaud, J. M., Neves, C., and Martins, A. (Eds.). *Arqueologia em Portugal 2020 - Estado da Questão. Actas do III Congresso da Associação dos Arqueólogos Portugueses (Porto, 18-21 de Novembro de 2020)*. Lisboa: Associação dos Arqueólogos Portuguese / CITCEM, pp. 1371-1383.

Sousa, F., and Felício, C. (2023). "Urban dining rooms in Lusitania: a metrological and morphological approach." *Arqueología de la Arquitectura*, 20, e136. DOI: https://doi.org/10.3989/arq.arqt.2023.003.

Sousa, F., and Felício, C. (2025). "The urban transformations of the 3rd and 4th centuries in *Olisipo* (Lisbon, Portugal): an overview". In: *International Congress Olisipo entre Mares / Olisipo between Seas. 23 to 25 November 2023.* Lisboa: Câmara Municipal de Lisboa / Direcção Municipal de Cultura / Departamento de Património Cultural, pp. 419-441.

Teichner, F. (2018a). "Baugeschichtliche uns stratigraphische Untersuchungen im Bereich des Forums." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Klein Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipp-Universität Marburg, pp. 156-182.

Teichner, F. (2018b). "Funstücke aus Metali, Bein, Glas, Leder und Stein sowie Baukeramik." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schiften asu dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipps-Universität Marburg, pp. 193-198.

Teichner, F. (2018c). "Mirobriga - Eine Römische Stadt im fernen Westen (Zusammenfassung)." In: Teichner, F. (Ed.). *Mirobriga. Eine Stadt im fernen Westen de Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, 62. Marburg: Philipp-Universität Marburg, pp. 238-249.

Teichner, F. (Ed.) (2018d). *Mirobriga, Eine Stadt im fernen Westen des Imperium Romanum*. Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg, Heft 62. Marburg: Philipps - Universitat Marburg.

Teichner, F. (2021). "Mirobriga (Santiago do Cacém, Portugal) como caso paradigmático das «pequenas cidades» da Hispania romana: algumas reflexões." *Anas*, 34, pp. 55-85.

Teichner, F., and Hermann, F. (2022). "Cuidado con los huecos – reflexiones sobre la representatividad de los datos arqueológicos y las pequeñas ciudades de Mirobriga y Regina." In: Mateos, P., Olcina, M., Pizzo, A., and Schattner, T. (Eds.). *Small Towns*, *una realidad urbana en la Hispania romana.* Mytra – monografías y trabajos de arqueología. Mérida: Instituto de Arqueología de Mérida, vol. I, pp. 163-176.

Vieira, V. (2011). *As lucernas romanas da Praça da Figueira (Lisboa): Contributo para o conhecimento de Olisipo.* Dissertação de Mestrado em Arqueologia. Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Available at: http://hdl.handle.net/10362/6957 [accessed 21-09-2025].

Witschel, C. (2009). "La crisis del siglo III en Hispania: algunas reflexiones." In: Andreu Pintado, F., Cabrero Piquero, J., and Rodà de Llanza, I. (Eds.). *Hispaniae. Las provincias hispanas en el mundo romano*. Serie Documenta, 11. Tarragona: Institut Català d'Arqueologia Clàssica, pp. 473-503.