

REPORT ON THE H̄UMAYMA EXCAVATION PROJECT'S 2010 AND 2012 FIELD SEASONS

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Introduction

H̄umayma, ancient H̄awara, is the largest Nabataean and Roman period site in the H̄isma desert of southern Jordan. The Nabataeans, in the first century BC, had founded a town with an impressive water-supply system here on a pre-existing caravan route. Just over a century later, following the creation of *Provincia Arabia*, the Romans chose to build a fort for 500 soldiers at this strategic location. The residents of H̄umayma's fort and town coexisted for the next three centuries, during which time socio-political conditions in the Roman and Byzantine Near East underwent many changes.

In 2008 a new cycle of excavations was begun at H̄umayma with the goals of investigating the character and extent of H̄umayma's Nabataean and Roman period civilian communities and of exploring the nature of the interactions between the site's civilian and military populations. The spatial focus for excavations in the civilian community is immediately south and west of the Roman fort, an area which past research

had shown was heavily impacted by the nearby garrison (**Fig.1**; Oleson *et al.* 2008; Reeves 2009; Reeves *et al.* 2009). This area had once formed part of the Nabataean town, but it was damaged and then rebuilt in conjunction with the construction of the Roman fort. Based on Roman parallels, this Roman period civilian community is referred to as the *vicus*. Even though the inhabitants of the *vicus* would have been civilians, its spaces catered to the needs of the soldiers, as shown by both the community shrine (in E125) and the garrison's bathhouse (in E077).

A major goal of the H̄umayma Excavation Project in 2010 and 2012 was to learn more about the Nabataean to Roman transition at H̄umayma and about the subsequent phasing of the *vicus* by continuing excavations in two previously opened multi-phase fields (E077 and E128). Another goal was to catalogue all of the ceramic building material found in association with the Roman and Byzantine phases of the garrison's bathhouse (Field E077) and with

1. The 2010 and 2012 seasons of the Humayma Excavation Project took place from 15 May to 24 June 2010 and 19 May to 2 July 2012. Project funding was provided by the Social Sciences and Humanities Research Council of Canada and the Senate Advisory Research Committee of Queen's University. The project director was Dr. M. Barbara Reeves of Queen's University, Kingston, Ontario, Canada. Craig A. Harvey was Assistant Director in 2012. Area supervisors were Kristine Chua, Barbara Fisher, Craig A. Harvey, Marla MacKinnon, M. Barbara Reeves, Samantha Rice, Brian Seymour and Victoria Wijnbergen. Michael Fergusson and Marla MacKinnon conducted the RTI and Photogrammetry survey. The ceramicists were Andi Shelton in 2010, and Sherry Hardin and Lindsay Holman in 2012. M. Barbara Reeves and Craig A. Harvey processed the ceramic building materials. Brian Seymour supervised the architectural drawings in the field and Devon

Skinner (2010) and Chris Mundigler (2012) digitized the plans in Canada. Lisa Bengston was field conservator in 2012. Staff from the ACOR Conservation Cooperative cleaned our coins in 2010 and 2012 and looked for pottery joins in 2010. Jessie George, Craig A. Harvey, Marla MacKinnon and M. Barbara Reeves photographed the finds. Amer Bdour (2010) and Mohammed Donabiat (2012) served as representatives of the Department of Antiquities. The Humayma Excavation Project is accredited by the Archaeological Standards Committee of the American Schools of Oriental Research and licensed by the Department of Antiquities of the Hashemite Kingdom of Jordan. The Project Director is very grateful to Dr Ziad al-Saad, former Director-General, Mr Fares al-Hmoud, former Acting Director-General, and to everyone at the Department of Antiquities, as well as to Drs Barbara Porter and Chris Tuttle, and all the staff at ACOR, for their assistance with the project.

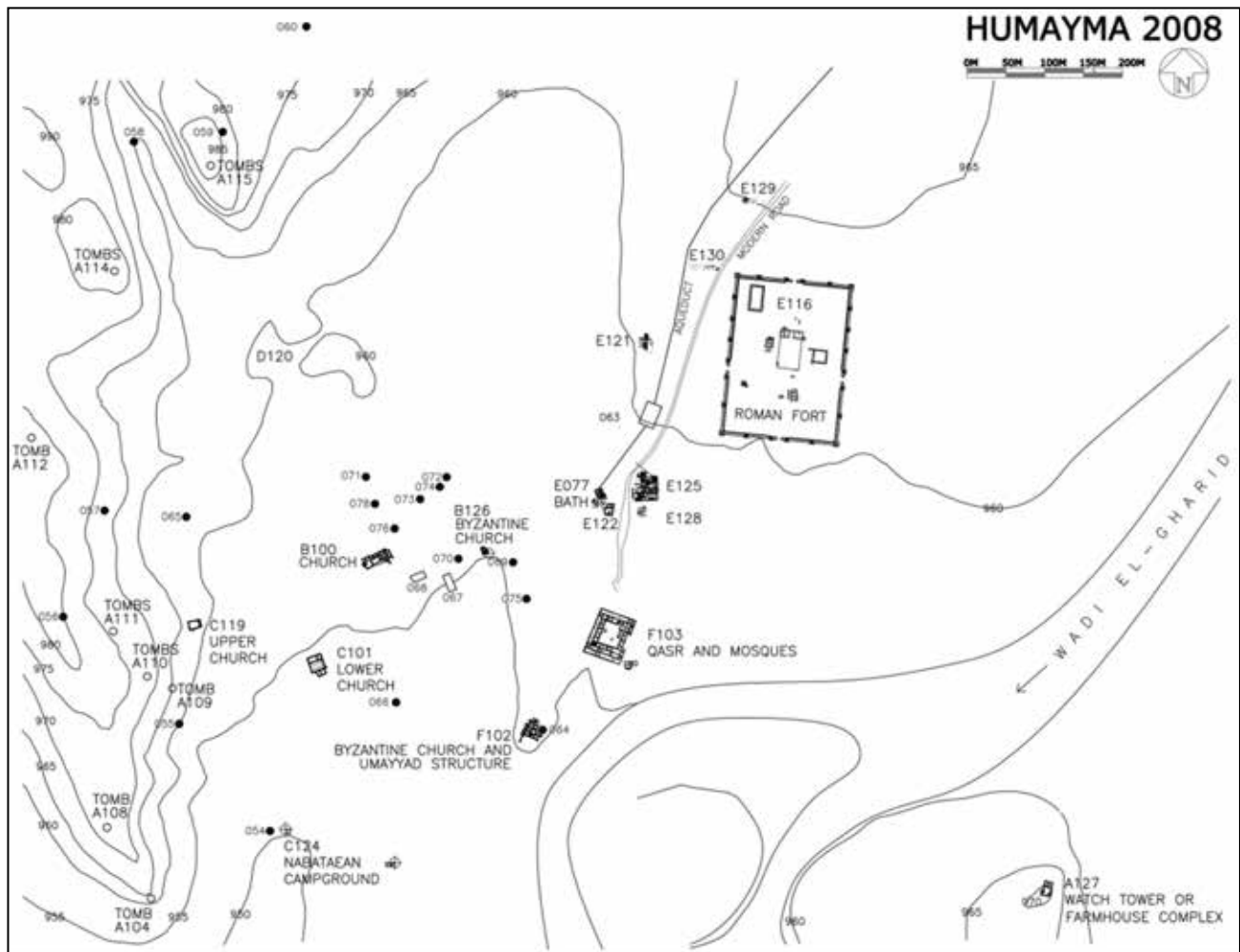
the heated room in the Roman fort (Field E116 Area I Room J), in order to create diagnostic typologies for each class of building material. A final goal of the 2012 field season was to test the use of close-range photographic techniques to document excavated artifacts in the lab. These techniques were also used on *in situ* inscriptions and graffiti found in excavation areas and in the hills to the south-west of the ancient town-site¹.

Field E077: Nabataean Structures and Bathhouse (M. B. Reeves)

Field E077 is located approximately halfway between the center of the Nabataean town and the Roman fort (Fig. 1). Its elevation on a slight rise above the floodplain and rain-fed cisterns to its west, but below the civic distribution point of the gravity-fed aqueduct, meant it was probably

always dependent on the aqueduct for its water supply (cf. Oleson 2010: 223). Past explorations by the Humayma Excavation Project (Oleson 1990; Reeves *et al.* 2009) had indicated that this field was occupied by a succession of buildings spanning the Nabataean to late Byzantine or early Islamic periods. E077 is thus one of most important areas at Humayma for understanding the Nabataean to Roman transition and the subsequent phasing and character of the civic community (*vicus*) that developed next to the Roman fort.

Excavation in this field dates back to 1989 when J. P. Oleson examined seven freestanding rooms (Fig.2: A-G) associated with an ancient bathhouse (Oleson 1990). Oleson’s probes within and against the outside walls of this structure suggested that a small Roman



1. Plan of Humayma with ancient structures marked.

bathroom had been built in the second century AD on top of a Nabataean stone structure, and that the bathroom had grown in size by means of a renovation in the Byzantine period (Oleson 1990: 298). Although these data formed the basis for subsequent analyses of the site's history (e.g. Reeves 1996), new excavations carried out in 2008 revealed that the phasing of the architecture in this field was much more complicated than originally suspected (Reeves et al. 2009). In particular, the 2008 excavations showed that there were more ruins associated with the bathroom than previously suspected and that the bathroom had actually decreased in

size between the Roman and Byzantine period.

The goals for the 2010 and 2012 excavations in this field were to reveal the maximum extent of the bathroom and to assess the character and construction of E077's remains in each phase. This investigation included the Nabataean structures that preceded the bathroom's construction, the dump piles and other activity areas associated with the bathroom's operations and renovations, and subsequent occupational areas postdating the building's abandonment as a bathroom. The investigation also sought to ascertain how the bathroom fitted into the plan of the *vicus* by exploring its water supply,



2. Plan of E077 after 2012 excavations.

drainage system and any associated roads.

A total of 24 cardinally oriented 6 m x 6 m squares were laid out around all four sides of the freestanding remains excavated in 1989 (**Fig. 2**). As the bathhouse and preceding Nabataean structures are oriented 20 degrees west of north, some squares were slightly extended in order to abut the walls mapped in 1989. In addition, new probes for dating purposes were excavated in Rooms A, D, E and F, and *in situ* ceramic building materials were collected from Rooms A, D and E. Five of the six squares excavated in 2008 also underwent further excavation in 2010 or 2012.

These 2010 and 2012 excavation seasons have produced a great deal of information about Field E077 which is being analyzed in association with the data from the 1989 excavations, as well as from small probes done in 1996 and 2000. Owing to space restraints, this report will only provide an overview of the current theorizing regarding E077's phasing and discuss some of the more significant discoveries (**Table 1**).

Pre-Bathhouse Phases

The five pre-bathhouse phases correspond to three construction and two destruction phases, all of which pre-dated the second century AD construction of the bathhouse. (**Fig. 3**) shows the identifiable walls associated with the three construction phases. Only traces of these walls survive today as a result of subsequent activity.

The earliest traces of human activity in E077 date to the first century AD when at least two finely constructed ashlar structures were built at the south end of the field (Pre-Bathhouse Phase 1). Although these structures have been heavily robbed out, traces of them have been found both reused as foundations beneath the southern half of the Roman bathhouse and in abandoned areas around the bathhouse's southern perimeter. The traces that remain reveal carefully constructed sandstone walls, flagstone floors and arched ceilings (**Fig. 4**). The walls and the cobblestone foundation courses of floors were set in dark

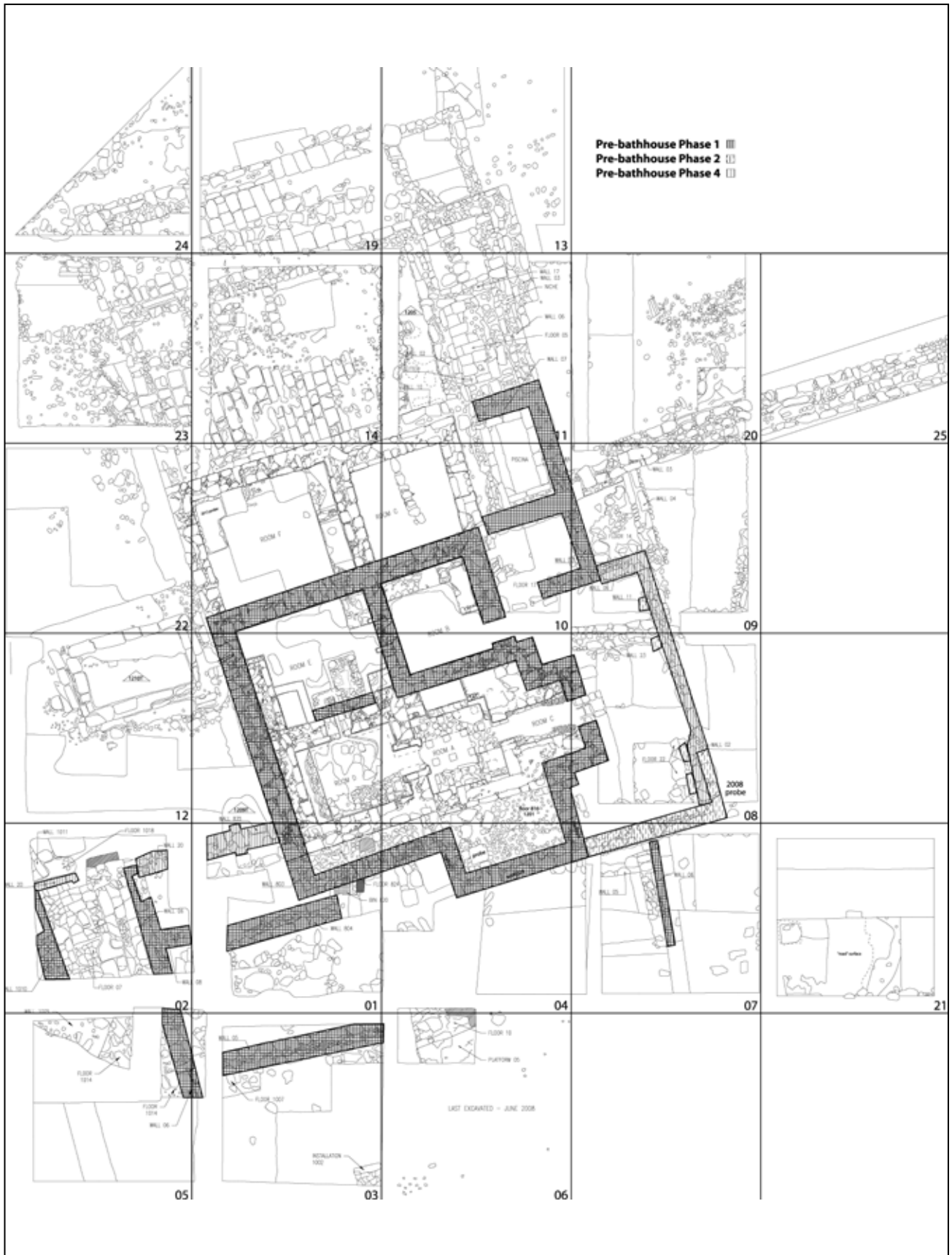
grey mortar. The walls had mortared rubble cores and were faced with Nabataean dressed blocks. Interestingly, the exterior faces of walls (with tightly fitting blocks) seem to have been more carefully constructed than the interior faces (where chinking stones were used between blocks) (**Fig. 5**).

There is not enough left of these structures to determine their original function. Previous suggestions that E077 might have contained a Nabataean bathhouse (Oleson 1990: 296, 2010: 223) are probably not true as no Nabataean phase basins or sandstone *pilae* like those used in the Nabataean bath at Wadi Ramm (Dudley and Reeves 1997) or hypocaust bricks matching those used in the Nabataean bath at Wadi Musa have been found (Reeves and Harvey 2013). The quality and complexity of the construction, as exemplified by a surviving corridor with doorways opening to the east and west (**Fig. 4**) suggests elite structures. It is likely that the construction of these stone structures represents the expansion of the Nabataean town in the first century AD into a previously unoccupied area. This area was above the run-off zone to the west that fed the cisterns associated with the town's earliest occupation. The structures in E077 were likely built following the construction of the Nabataean aqueduct whose water was distributed to the town from a point just north-east of E077. Although no Nabataean period pipeline to E077 has been identified, it is likely that the buildings here received water from ceramic pipelines, as was the case in nearby Field E125 (Oleson *et al.* 2008: 317).

Following the initial construction of buildings, the eastern structure seems to have expanded eastwards as evidenced by an abutting wall in the south-east which bonded with a new northward running wall which had a series of arch springers on its western face (Pre-Bathhouse Phase 2). The prosperity evidenced by both the original construction and this expansion, however, seems to have been cut short by a calamity that damaged the building towards the end of the first century (Pre-Bathhouse Phase 3). Architectural evidence

Table 1: Overview of E077 Phasing.

Phase	Culture; Proposed Date (CE)	Result and Description
Pre-Bathhouse phase 1	Nabataean; 1 st century	Construction: The earliest structures in E077 consist of at least two finely constructed stone structures built in the southern half of the field.
Pre-Bathhouse phase 2	Nabataean; 1 st century	Renovation: The eastern structure expands to the east.
Pre-Bathhouse phase 3	Nabataean; end of 1 st or early 2 nd century	Destruction: The Nabataean structures and their contents are damaged.
Pre-Bathhouse phase 4	Nabataean or Roman; early 2 nd century	Crude construction: Southeastern walls are crudely repaired. A new western wall runs over and through previous Nabataean walls and floors.
Pre-Bathhouse phase 5	Roman; 2 nd century	Destruction: Nabataean walls from previous phases are robbed out. The displaced stones are probably reused in the Roman fort or bathhouse.
Bathhouse phase 1	Roman; 2 nd century	Construction: A Roman bathhouse is constructed, probably contemporaneously with the fort. The southern rooms incorporate the foundations of Nabataean walls and floors. The northern rooms are built on virgin soil.
Bathhouse phase 2	Roman; 2 nd or 3 rd century	Minor renovation: Thin walls are built to the north of the latrine in the northeast corner of bathhouse.
Bathhouse phase 3	Roman; 2 nd or 3 rd century	Major renovation: The Roman bathhouse undergoes elaborate expansion with the addition of the grand entranceway and entrance corridor on the north. The plunge pool on the west, cistern on the east, and the expansion of the fresh water conduit likely also date to this phase.
Bathhouse phase 4	Roman - Byzantine; late 3 rd (and possibly early 4 th) century	Abandonment: The bathhouse, along with the fort and adjacent <i>vicus</i> structures (e.g. E125, E122) were probably abandoned when the Roman garrison withdrew from Humayma in the late 3 rd century.
Bathhouse phase 5	Byzantine; early 4 th century	Major renovation: A much smaller bathhouse is created by abandoning all rooms except A-E. This renovation is probably related to the reoccupation of the fort by a smaller garrison.
Bathhouse phase 6	Byzantine expansion, 5 th century or later	Renovation: The <i>klinai</i> in Room F (and probably the room itself) were added.
Bathhouse phase 7	Late Byzantine or Umayyad; 6 th century or later	Renovation: The latest datable artifacts associated with renovations to the bathhouse's furnace and wall heating date to the Late Byzantine or possibly Umayyad period.
Bathhouse phase 8	Umayyad?	Abandonment: Although there is no clear evidence for when the bathhouse or the aqueduct that supplied it went out of use, both were likely used into the Umayyad period.
Post-Bathhouse	mid-20 th century	Construction: Between 1948 and the mid-1960s the ruins in E077 are reused and recycled for a domestic structure.



3. E077: Pre-bathroom phases.



4. E077: Corridor from a robbed out Nabataean structure in Square 02. The corner of a later structure extends from the north-west corner.



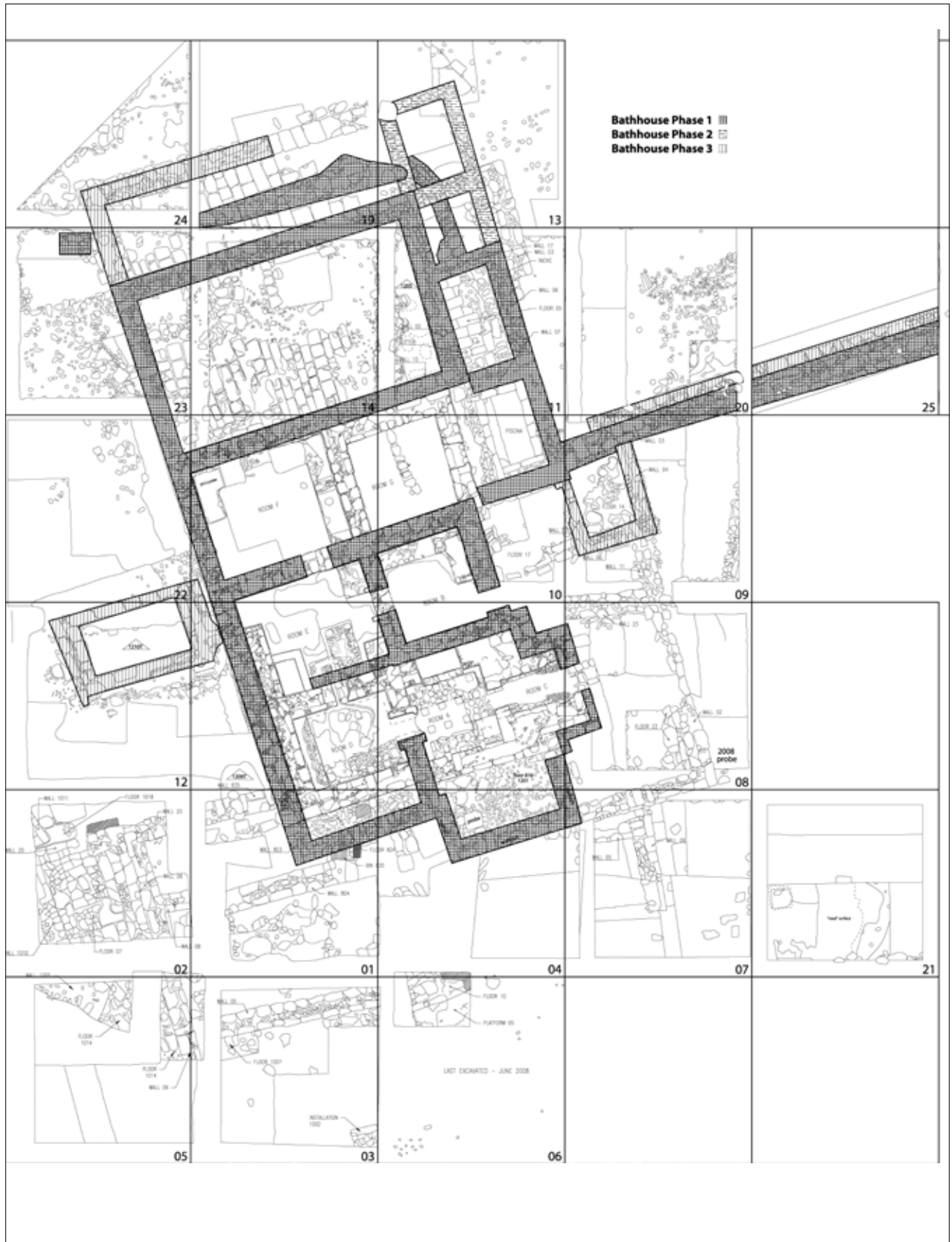
5. E077: Finely constructed external face of two Nabataean walls in Square 04. The more crudely faced walls behind correspond to a Nabataean internal face (right) and two Byzantine walls (center and left).

post-dating this calamity (Pre-Bathhouse Phase 4) includes a crude wall built in Squares 01 and 02 with disregard for the previous doors, walls and floors, a crude wall inserted behind the surviving arch springers on the eastern side of the E077, and the construction of the abutting wall in Square 09 which overlays wall collapse. A thick concentration of broken pottery against the external face of the expansion-era wall in Square 08 is hypothesized to constitute the material discarded from the building following the Pre-Bathhouse Phase 3 calamity. As discussed more fully in the ceramicists' report below, the pottery from this dump suggests that it was discarded in the late first or early second century AD. The architectural evidence suggests that the damage to the Nabataean structures at this time was substantial, perhaps resulting from an earthquake. Later still, the original phases of occupation in E077 were brought to an end when all of the preceding architecture was robbed out, often to floor or foundation levels (Pre-Bathhouse Phase 5; **Fig. 4**). Pottery sherds found in the corridor in Square 02 suggest this robbing occurred in the second century. Since the Roman fort built in the early second century incorporated large numbers of recycled Nabataean blocks, the E077 stones likely ended up there, or in the Roman bathhouse.

The Large Roman Bathhouse

After the Nabataean structures in E077 had been robbed out, a large bathhouse was built incorporating the lower courses of surviving Nabataean walls and subfloors as foundations (Bathhouse Phase 1; **Fig. 6**). As a result, the bathhouse is oriented 20 degree west of north, rather than following the cardinal orientation employed in the construction of the Roman fort. Based on its second century construction date, its location near to but outside the main gates of the Roman fort and the large quantities of water and fuel required to operate it, this bathhouse was most likely built for the use of the Roman garrison (cf. Reeves 1996). The date of the bathhouse's construction is not precisely known, but based on parallels to external bathhouses built outside auxiliary forts in the western half of the Roman Empire its first incarnation was probably built contemporarily with the fort. It then expanded during two renovations dating to the second and third centuries before probably being abandoned, along with adjacent structures in E122 and E125, when the garrison withdrew from the fort in the second half of the third century (Oleson *et al.* 1999: 427; Oleson *et al.* 2008: 313).

Although the bathhouse's orientation was determined by the recycled Nabataean foundations, the



6. E077: Roman bathhouse phases.

placement of the rooms conformed to Roman guidelines with the heated bathing rooms on the south and west sides of the building and the unheated rooms to the north (Vitruvius X.1). Another important organizational design feature for this bathhouse was the location of the conduit that conveyed fresh water from the town's aqueduct. The conduit's support wall entered the bathhouse in the center of the east side and provided a central axis for the building with unheated rooms located to its north and heated rooms to its south.

Owing to the Byzantine period downsizing of the bathhouse, which resulted in the abandonment of most of the northern rooms, the Roman period organization and features of these northern rooms are relatively well preserved. Notable among the unheated rooms from the first phase of the bathhouse are the *piscina* and *frigidarium*, the latrine, the drainage channel taking dirty water away, and a large entrance hall / *apodyterium*. The *piscina* (**Fig. 7**) was a small pool with an internal bench on which bathers sat while having cold water poured over them (Nielsen 1990: 154). It was located in the center of the eastern side of the building, right next to the *terminus* of the stone conduit wall conveying the fresh water (**Fig. 8**). Parallels suggest that the *piscina* would have been located at the eastern end of a *frigidarium*, which may have extended all the way to the western edge of the bathhouse. Subsequent renovations have obliterated the internal features of the *frigidarium*, except for part of its cobblestone subfloor and a drainage channel right next to the *piscina* which carried dirty water from the *frigidarium*'s floor through its northern wall to the latrine (**Fig. 7**). This dirty water entered the latrine's underfloor channel in its south-west corner and flushed the latrine while being carried downhill to an exit in its north-west corner. Seats (no longer extant) would have been placed over the channel and a clean water trough, on the flagstone floor just in front of the seats, would have provided water for washing. After leaving the latrine, the dirty water was conducted through a covered stone channel



7. E077: Latrine (front) and piscina (back).

running across the north of the bathhouse and beyond its western edge (**Fig. 9**). The flagstone floor above this channel probably also dates to the bathhouse's original phase, although in that phase it would have been located outside the building. This external flagstone floor must have provided entrance to the north-west corner of the large unroofed hall that probably served as an *apodyterium* (changing room). Although this hall has been heavily disturbed it seems to have been unroofed with a flagstone floor and mortared rubble benches, which are still extant against the west and south walls in its south-west corner (**Fig. 9**). The entrance to the rest of the phase 1 bathhouse would have been through this room. There was likely a separate external entrance into the latrine from the north.

In contrast to the northern rooms, the arrangement of the southern rooms is much less clear at this time, owing to later renovations.

Traces of phase 1 hypocausts have been found beneath Room E and the later cut-off sections to the south of Rooms D and A. The furnace would have been located in the south-east corner of the building (Room C). A probe beneath the plaster floor of Room F indicates that its extant floor was a Byzantine addition (see below), but provided no evidence of Room F's Roman function. Likewise owing to later disturbance, it is not possible to determine how far east the southern portion of the bathhouse extended in its original phase.

After its original construction, the bathhouse was renovated twice more during the second and third centuries. The first renovations were minor (Bathhouse Phase 2). They involved the construction of the thin walls in the north-east corner of the building. This expansion presumably had something to do with regulating access to the latrine. The other renovation phase (Bathhouse Phase 3) was major and would have had a great impact not only on the functionality of the structure, but its prestige. During this phase the building underwent elaborate expansion with the addition of the wide entranceway in the center of the northern side leading to a walled entrance corridor (**Fig. 9**). By turning right, entrants could access the bathhouse; by turning left, they could access the latrine. Other renovations from this period seem to have pulled more water from the town's aqueduct. The northern extension to the stone conduit wall (**Fig. 8**) was likely built at this time to increase the water supply to the bathhouse and the rectangular cistern in Square 09 was used to store extra water (**Fig. 8**). Finally, on the west side of the building, a plunge pool (**Fig. 10**) was added to enhance the bathing experience by allowing bathers to fully immerse themselves while viewing the towering vista of Jabal Qalkha to the west.

At its greatest extent, the plan of Ḥumayma's bathhouse bears some striking similarities to the plan of the bathhouse next to the Great Temple in Petra (Joukowsky 2007: 200-10), albeit on less grandiose scale. Both have an entrance corridor

leading either to a latrine via an anteroom or to the bathhouse proper via an *apodyterium*. Next, both have a bank of unheated rooms with a large pool on the west and a small immersion pool with internal bench on the east. Beyond the unheated rooms, at the opposite side of the building from the entrance corridor, is a bank of rooms heated by hypocausts. The basic similarities in the plans of Ḥumayma's and Petra's contemporaneous bathhouses make it likely that either the same designer was involved in their construction or that one building was inspired by the other. Indeed, given these similarities, it can now be posited that there might be a buried *palaestra* around Ḥumayma's plunge pool, just like at Petra. However, in spite of these similarities, there are also major differences in the size and luxuriousness of these two buildings. Ḥumayma's bathhouse is approximately half the size (ca 450 m²) of Petra's bathhouse, and lacks the marble surfaces and non-rectangular design embellishments of that structure. These differences probably reflect the different clientele intended for an auxiliary fort's bathhouse versus a civic bathhouse in the center of a major urban center.

The Small Byzantine (and Possibly Umayyad) Bathhouse

In the early Byzantine period, probably early in the fourth century, the bathhouse in E077 underwent a major renovation (Bathhouse Phase 5; **Fig. 11**). The result of this renovation was to create a much smaller bathhouse by abandoning most of the Roman period structure. Undisturbed strata in the abandoned pools and rooms contained ceramics dating up to the third or perhaps fourth century. A probe through the new plaster floor in Room B produced pottery extending possibly to the fourth century, a foundation probe in Room A produced an early Byzantine pottery sherd associated with the renovated hypocaust, and the fill around the abandoned hypocaust in Room E contained ceramics dating from the first to third century. All of this evidence is consistent with a military



8. E077: Two-phase stone water conduit entering bathhouse with piscina at bottom left and cistern on right.



9. E077: Northern rooms of Roman bathhouse from north-east corner.

bathhouse being abandoned following the departure of Ḥumayma's garrison in the late third century (Bathhouse Phase 4) and then downsized following the arrival of a much smaller garrison in the early fourth century.

The fourth century bathhouse was smaller and required less water and fuel. It consisted of a furnace (Room C), two heated rooms (A and D) and two unheated rooms (B and E). Given the bathhouse's location, it would still have been dependent on piped water from the aqueduct. The northern extension to the water conduit wall (**Fig. 8**) may date to this renovation, instead of an earlier time, if some damage had occurred to the Roman period conduit. The amount of water piped into the building was probably considerably less at this time as the immersion pools had been abandoned and likely replaced by splash pools in Rooms E and A.

There is evidence for (at least) two subsequent renovations to this bathhouse. The first renovation (Bathhouse Phase 6) resulted in the addition of an *apodyterium* (Room F) and a new entrance to the bathhouse on the north. This *apodyterium* contained plastered *klinai* (benches) around its sides constructed of bricks, stones and mortar. Although all but two *klinai* were subsequently robbed out, their former position is still marked by floor plaster. A probe excavated in the north-west corner of the room beneath the location of the robbed out *klinai* produced a Byzantine corpus of finds including

an early fifth century coin of Theodosius II (408 - 423), dating the *klinai*'s installation to the fifth century or later. As this renovation likely post-dates the occupation of the fort (Oleson 2010: 59), the bathhouse's clientele following this renovation is not clear.

There is also evidence for at least one other renovation of the bathhouse in or after the late Byzantine period (Bathhouse Phase 7). A 1989 probe in Room C's latest floor packing produced late Byzantine ceramics (550 - 640) indicating that the furnace was rebuilt in or after that time (Oleson 1990: 305). This major remodeling of the furnace may relate to a problem in distributing heat throughout the building, evidenced also by a large hole punched into the hypocaust through the southern wall of Room D and then subsequently filled in (**Fig.12**). The *in situ tubuli* lining the south wall of Room A (i.e. from the last phase of the functioning bathhouse) may also date to this renovation of the heating system (**Fig.13**). As the best published parallels for these 'Wheel-made Square-vent' *tubuli* come from the Umayyad period bathhouse at *Qasr al-Hayr East* in Syria (Harvey 2013: 81-4), this last renovation may have occurred in the Umayyad period. In support of the theory that Ḥumayma's bathhouse may have been operational into the Umayyad period, it should be noted that the adjacent ruins in Field E122 were converted into an Umayyad house (Oleson *et al.* 1999: 426-27), suggesting that this area of the site still received



10. E077: Plunge pool on west side of bathhouse.

water from the aqueduct. The Abbasid family was also resident at Ḥumayma at that time in the *qasr* they built south of the bathhouse. Given that the *qasr* contains no bathhouse and that such facilities are standard in similar Umayyad period elite residences (Reeves 1996), it is likely that the *qasr* residents would have reused the E077 bathhouse. Unfortunately, the ceramic evidence is inconclusive: Umayyad period sherds have been found in E077's highest soil strata and in the disturbed fill from rooms reused in the mid-twentieth century (see below), but not in sealed contexts.

There is no evidence as yet for when the bathhouse went out of use. Theoretically, the bathhouse in E077 could have remained in operation for as long as it had a water supply and, given its location, its only feasible source was piped aqueduct water. It is unfortunate, therefore, that it is not known when Ḥumayma's aqueduct ceased to operate.

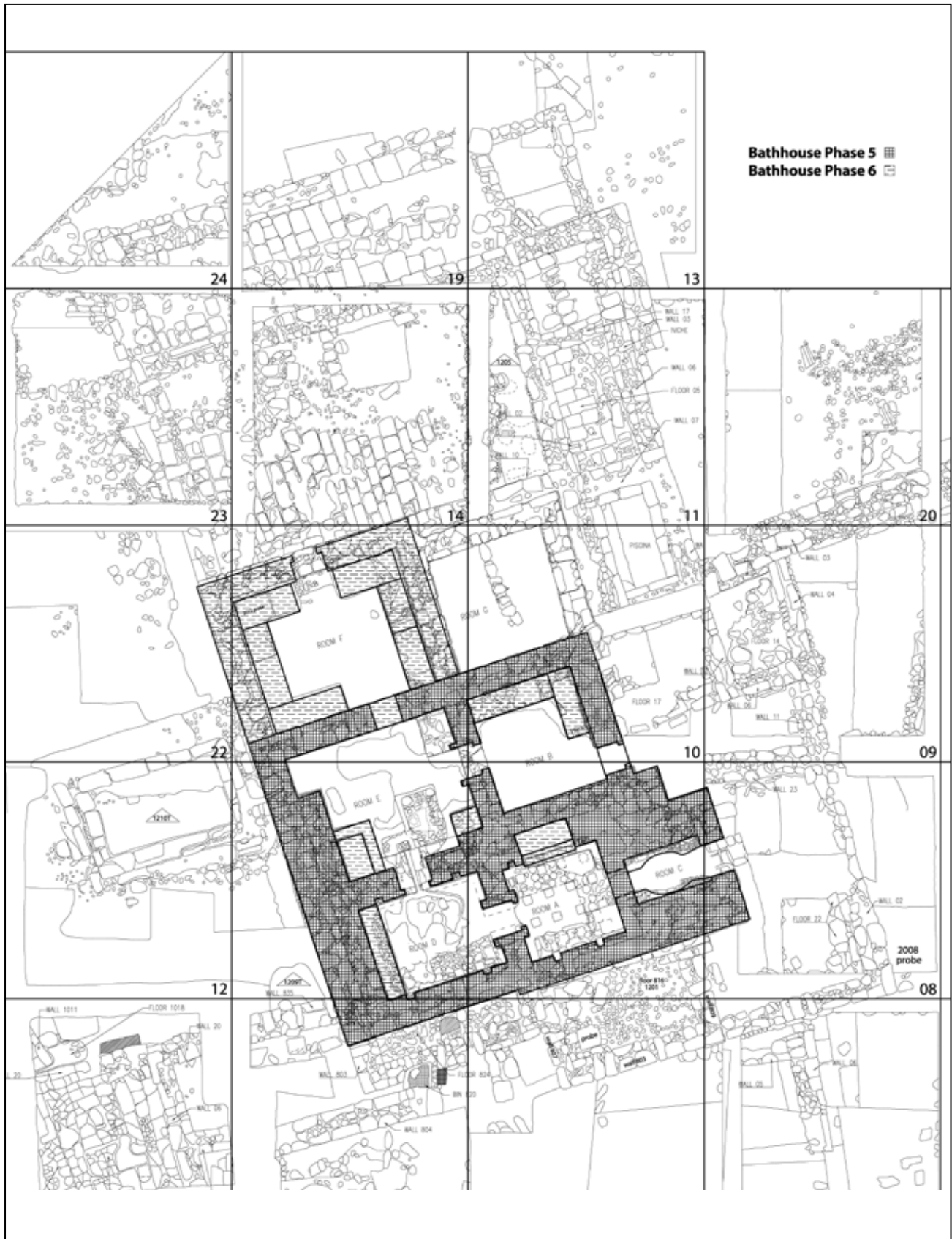
The Mid-Twentieth Century Domestic Structure

After the abandonment of the bathhouse, the ruins seem to have been left alone until the mid-twentieth century when E077 was reoccupied (**Fig. 14**). According to the locals, a Moroccan named Abdul Aziz al-ʿArabi lived in the ruins of the bathhouse between 1948 and the mid-1960s (Oleson 1990: 294). A 1992 aerial photo taken after Oleson's excavations (Oleson 2010: fig. 4.50) shows that al-ʿArabi recycled both

wall stones and extant walls to create a circular room on the eastern side of the Byzantine period structure. A 1953 aerial photo, taken during al-ʿArabi's occupation, suggests that his structure also incorporated Room B and that he built circular features, perhaps animal pens, over Rooms F and E (Hunrin Aerial Survey, Aerial Photographic Archive for Archaeology in the Middle East, APA 1953/HAS 26.002).

Al-ʿArabi was also probably responsible for the construction of Room G. As Oleson (1990: 298) noted in 1989, Room G is a late addition to the structure. Its north and east walls "are less well built than those elsewhere in the Bath, they do not bond with them, and the only door opens outside the building." When excavated, Room G contained a thin central partition wall (shown in the top plan) and a hearth (mentioned in the field notes), but no ancient features as the interior "had been cleared out to the foundation level sometime in the post-classical period" (Oleson 1990: 298). Oleson noted that this room was a late addition, dating either to the last phase of the bathhouse (Oleson 1990: 297-8) or to modern times (Oleson 2010: 225). Given that the north and east walls do not appear in the 1953 aerial photo and that they are located without regard to the bathhouse's wall lines, it seems most likely that this room was built after 1953 as an addition to al-ʿArabi's domestic complex.

Additional evidence of al-ʿArabi's residence turned up during the 2010 excavation of Squares 09 and 10, where the circular room of his house had been located. Although the curved walls had been removed during the 1995 consolidation of the bathhouse, and although that removal and two subsequent consolidations had greatly impacted this area, excavators were still able to find a floor level and objects dating to the mid-twentieth century. Of particular note is the only modern coin found: a 1949 50 fils coin issued by the Hashemite Kingdom of the Jordan. As 1949 was the first year that Jordan issued its own coinage, this particular coin likely had sentimental value for an immigrant who had settled in Ḥumayma the previous year.



11. E077: Byzantine (and Umayyad?) bathhouse phases.



12. E077: Ancient cleaning or inspection hole punched into Room D hypocaust through Byzantine-phase south wall.



13. 'Wheel-made Square-vent' tubulus from south wall of E077 Room A.

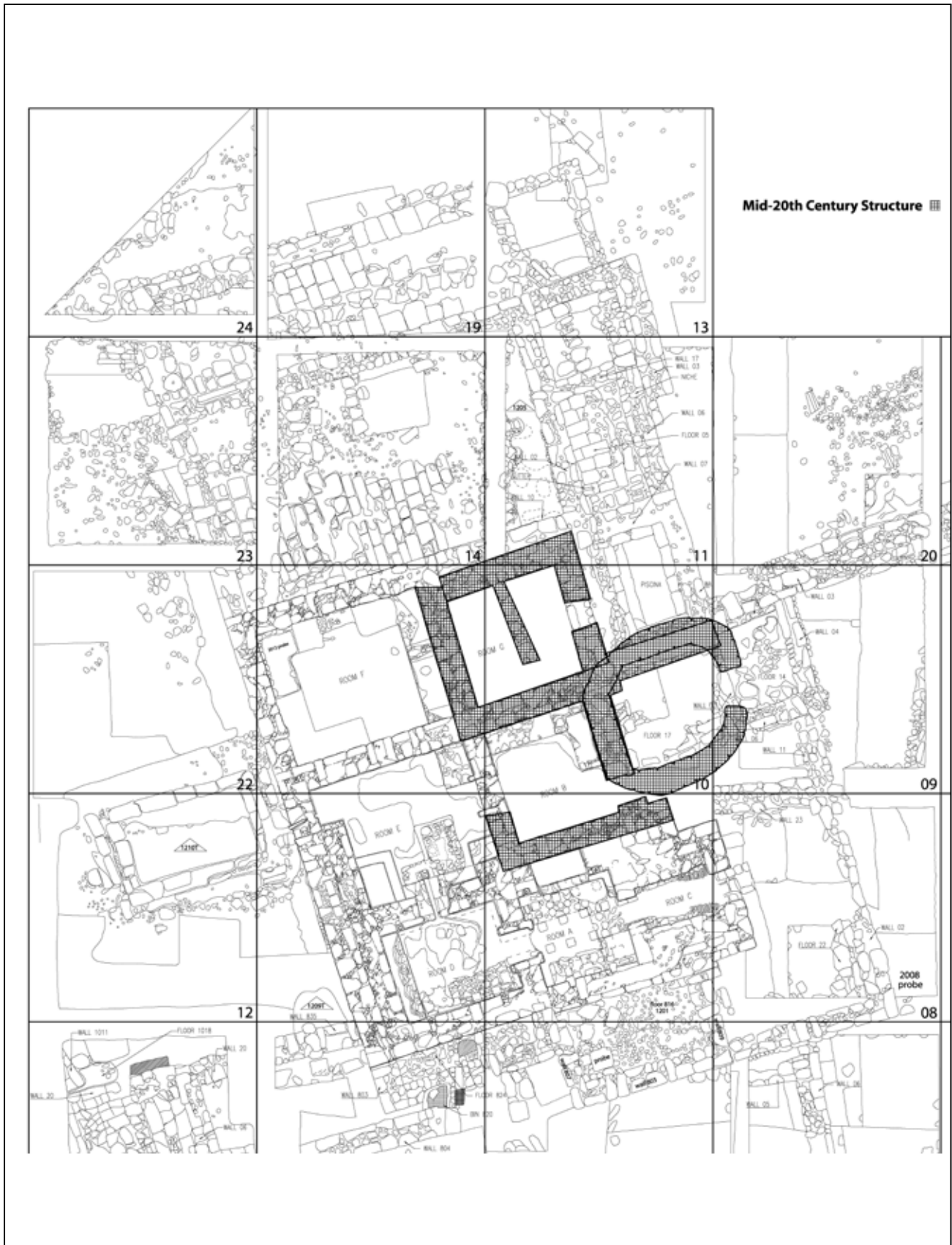
Water Supply, Drainage and Roads

In addition to providing information about E077's various phases, the 2010 and 2012 excavations also provided valuable information about the local infrastructure associated with the functioning bathhouse. Most importantly, the excavations confirmed the theory that the bathhouse was supplied by the town's aqueduct. As can be seen in the area to the east of the bathhouse on the plan (**Fig. 2**), fresh water was piped down from the vicinity of the aqueduct-fed pool (no. 063) via a stone conduit. In Squares 15 and 16 this conduit split, with some water being piped directly into the unheated areas of the bathhouse, and another section continuing to the south-west. It is unknown whether this latter

conduit continued past the bathhouse into the town (cf. Oleson 2010: 218-19) or whether all or part of it diverted again in order to go directly to the bathhouse's heated rooms. Alterations were later made to the conduit entering the bathhouse's cold rooms, with the northern side having much shallower foundations and probably a later date. The northern alterations may have increased the water supply into the bathhouse as they seem to go with the square cistern at the end of the conduit and with the addition of a plunge pool on the west side of the structure. No internal pipelines survive to show exactly how the clean water moved around the building; however, the location of the Roman period piscina, immersion pool and latrine sponge channel, as well as the Byzantine period splash basins, make it clear where the clean water ended up in the various building phases.

As mentioned above, dirty water displaced from the Roman period piscina fell on the floor of the *frigidarium* and then drained through a small square hole in the wall between the *frigidarium* and the latrine trench. The dirty water then flowed via gravity through the latrine trench, thus cleaning it, and into a covered sewer that ran beneath the floors of adjacent areas. The sewer exited the building to its north-west and was last observed in Square 23. Dirty water from the plunge pool seems to have exited through a pipe in its south-west corner that led through the wall at floor level. The endpoint of this pipe has not been traced. As already documented by Oleson (1990), dirty water from the Byzantine period splash basins ran across floors and through channels under the doorways until it exited the building in the north-west corner of Room E. Given the presence of the former plunge pool at the apparent end of the gravity flow, it is possible that dirty water was then collected in the pool for agricultural or industrial uses.

Two roads through the site have now also been identified at the edges of E077. No physical remains have been found of the first road, but a road - or at least a path - must have led patrons



14. E077: Mid-twentieth century domestic occupation.

to the wide entranceway in the center of the north side of the Roman bathhouse. Traces of another road were found in Square 21 outside the south-east extent of E077's building remains. The discovered section of this hard packed soil surface was at least 3.4 m wide, with a ditch up to 0.8 m wide on its east side. The road and ditch ran between the Roman bathhouse and the Roman house in Field E122 on a bearing of 24 degrees east of north. Cultural remains found on the surface of the road, which included a sandstone tessera coated in mortar that looks identical to the tesserae displaced from the damaged mosaic floors in the commander's residence of the Roman fort (see E116 *Praetorium* Room J below), are consistent with the road being used to at least the third century. A probe through the road revealed an underlying hard natural layer with calcium carbonate concretions that could have served as an earlier surface (cf. Reeves *et al.* 2009: 250).

Other Structures and Activity Areas

In addition to the major structures described above, there is evidence of other human activity in E077 dating to various time periods. In the north-west corner of Square 02 the external corner of another stone building was discovered (**Fig.4**). The corner is constructed of three courses of reused ashlar blocks and chinking stones. As this seemingly well-built structure is on a different orientation (45 degrees west of north) to the Nabataean buildings in E077, is placed in disregard to the Nabataean structures and reuses Nabataean ashlar, it probably dates to the Roman or Byzantine periods, although more excavation is needed to confirm this.

Other Roman or Byzantine walls and activity areas that are difficult to date precisely are located in the northern half of E077 on top of architecture dating to the Roman phases of the bathhouse. For example, near the north-east limit of the building (in Squares 11 and 13) crudely constructed walls were built against the eastern wall and overtop the bottommost courses of the northern wall of the latrine's anteroom. The new

eastern wall is on top of a thick concentration of displaced wall plaster fragments (**Fig.9**). Other evidence of destruction preceding or associated with the crude reworking of the northern rooms of the bathhouse comes from the large unroofed *apodyterium* (Room K) and entrance corridor where the flagstone floors were partially robbed out, including over the sewer (**Fig.9**). In the north-west corner of the building, a wide wall containing column drums (recycled from an unknown location) was built over the original Roman wall. A lead crucifix was associated this wall (**Fig.15**). The crude reworking of these possibly damaged northern rooms suggests that they were reused by squatters after they no longer formed part of the bathhouse. This phase may date to the period following the withdrawal of the Roman garrison from Humayma in the late third century when the fort and other parts of the *vicus* (e.g. E125; E122) were abandoned, or it may follow the Byzantine downsizing of the bathhouse.

Other walls and activity areas around the south and south-east perimeter of E077 are also indicative of the field's history but unfortunately are often difficult to date precisely because of subsequent activity in these areas. One particularly interesting category of activity area is that associated with the construction or renovation of the bathhouse. This includes areas where torn out ceramic building materials have been stacked for possible reuse (e.g. in the piscina) or discarded. This category also includes the thick layer of hard sandy white mortar with carbon and lime inclusions that seems to have spilled on the ground outside the south-west corner of the bathhouse during a renovation. Another interesting category of activity area consists of the ash dumps associated with the frequent cleaning out of the bathhouse's hypocausts. Although these dumps contain few artifacts, their stratigraphic placement in the site and the types and condition of ceramic building materials they contain is helping to phase them.



15. Lead crucifix associated with column drums in post-bathhouse wall, E077 Square 23.

E077's Ceramic Building Materials (M. B. Reeves and C. A. Harvey)

During all excavation seasons at Humayma, samples of ceramic building materials (CBM), including bricks, *tubuli* (flue pipes), water pipes and roof-tiles, were collected. In 2011, M. B. Reeves and C. A. Harvey began the careful analysis of these samples with the goal of creating typologies for each CBM category and using those typologies as dating tools (Reeves and Harvey 2013). In order to further refine this typology, all of the CBM encountered in soil strata during the 2012 excavation was collected.

Before processing, all CBM was carefully dry brushed in order to remove dirt while leaving in place mortar, plaster and soot. The dimensions, weights, fabric details, surface details and archaeological context of each sample were then recorded. This analysis has resulted in the identification in E077 of four major assemblages of bricks and five major assemblages of heating pipes (including both rectangular *tubuli* and cylindrical flue pipes). The archaeological

contexts in which these assemblages have been found (especially original versus recycled versus discard contexts) have helped to clarify the very complicated phasing of E077. Particularly informative are the *in situ* bricks from the heated rooms of the bathhouse.

In Room E, *in situ* bricks were collected from both Oleson's 1989 south-eastern probe and from a small western extension to this probe excavated in 2012. The *in situ* bricks observed and sampled from the hypocaust included pedales, square *bessales*, circular *bessales* and small rectangular bricks (Oleson 1990: fig. 1). All were produced in a common type of fabric featuring straw inclusions, leading to the label 'Straw Tempered Fabric Type' (Fig. 16). The hypocaust in Room E was abandoned and sealed in the Byzantine downsizing of the bathhouse. Bricks of this same type have been found *in situ* in other areas of the bathhouse abandoned at same time, i.e. in the south-west corner of Room D-South and under the partition wall between Rooms A and A-South. These straw tempered bricks were clearly used throughout the heated rooms of the Roman bathhouse. No *tubuli* remain *in situ* from the Roman period; however, rectangular slab-made straw tempered *tubuli* recovered from dump contexts are probably contemporary with the straw tempered bricks.

Room A was already heavily disturbed prior to its 1989 excavation owing to both the mid-twentieth century occupation and the destruction of the previously intact hanging floor in 1986 (Oleson 2010: 223). Moreover, since 1989 it had been further disturbed by clandestine digging and the 1995 consolidation of the bathhouse (Oleson *et al.* 1999: 446-7). As a result of these disturbances, it was only possible to collect *in situ* samples of the small rectangular bricks lining the walls, the square *bessales* in the *pilae* and the circular *bessales* lining the subfloor (Oleson 1990: Fig. 2). Samples of the *in situ tubuli* from the south wall and from the *pilae*-covering bricks had been collected in 1989 and were also available for study. The small rectangular bricks, square *bessales* and *pilae*-



16. Circular *bessalis* of 'Straw Tempered Fabric Type'.



17. E077 Room D: *in situ* CBM along south wall.

covering bricks are all of the same type (dubbed the 'Smoothed Top / Ovoid Bottom Type') and appear to be in their original use context. In contrast, the circular *bessales* in the subfloor correspond to two different assemblages (the 'Straw Tempered Fabric Type' and the 'Room A Subfloor Type') and bear clear signs of having been recycled from previous hypocausts. Finally, the wheel-made square-vent rectangular *tubuli in situ* in the walls (Fig. 13) are not distinctive in terms of fabric; however their form (which is unlike most of the rectangular *tubuli* found at Ḥumayma) resembles published *tubuli* from an Umayyad bathhouse (Harvey 2013: 81-4).

The final room sampled for *in situ* bricks, Room D, had not previously been excavated below the level of its suspended plaster floor. The 2012 probe along the south wall of this room provided the most complete CBM assemblage from any heated room in E077 (Fig. 17). This assemblage, corresponding to a renovation of the room dating to the fourth century or later, was extremely heterogeneous. Moreover, residual traces of mortar and soot on some bricks of all types and sizes show that much or all of the CBM used in this room had been recycled from earlier phases of the bathhouse. The most common bricks recovered from this probe were of the 'Smoothed Top / Ovoid Bottom Type' and included square *bessales* (lining the walls), small rectangular bricks (lining the walls and in the *pilae*), *pilae*-covering bricks and fragments

of various sizes used as packing for the hanging floor. 'Room A Subfloor Type' circular *bessales* were also found in the packing for the hanging floor. Finally, square *bessales* of a new type, dubbed the 'Thin Non Straw Tempered Fabric Type', were used to cap the *pilae*. No rectangular *tubuli* were used in this room but fragments of cylindrical flue pipes (still undergoing analysis) were found beneath the wall grooves that had once held them.

In addition to the CBM found *in situ*, a vast amount of CBM was found in dump contexts. Particularly noteworthy among the dumped material is the most prevalent type of rectangular *tubuli* from E077, dubbed the 'Wheel-made Wide-depth' type (Harvey 2013: 61-72). These *tubuli* with oval, pointed-oval or tear-shaped vents are similar to those from many other second to fourth century bathhouses in the region (Harvey 2013: 118-19). Their study, and that of Ḥumayma's other CBM, is still ongoing (cf. Reeves and Harvey 2013).

Field E128: Nabataean and Roman Mudbrick Structure (C. A. Harvey & M. B. Reeves)

Field E128 is a small mound containing a decayed structure situated in the Nabataean and Roman neighborhood to the south-west of the Roman fort (Figs. 1 and 18). Excavations in 2005 (Oleson *et al.* 2008: 317-18) and 2008 (Reeves *et al.* 2009: 235-41) suggested that the

original walls of the building were constructed from a mixture of materials including Nabataean cut blocks and mudbricks with at least three different fabrics. This eclectic construction suggested that the structure was built using debris recycled from various previously damaged buildings. Based on ceramics, the structure in E128 is hypothesized to have been initially constructed sometime between the third quarter of the first century AD and the middle of the second century AD. At some point in the structure's occupation, an earthquake caused extensive damage and shifted several walls westward. Some time after the early third century the building was abandoned and repeatedly used as a dumpsite up until the sixth century.

In 2012 it was decided to reopen E128 in order to address some questions raised by the previous excavations. In particular, we wished to refine the building's phasing in order to determine whether its construction pre-dated or post-dated the arrival of the Roman garrison in the early second century and what the structure's subsequent phases of occupation were, including when its earthquake damage occurred. We also wished to determine the original function of the building. In this regard, the exposure of a portion of a small room with a wide masonry bench in the central portion of Square 14 in 2008 was intriguing, as this architectural arrangement might be indicative of a structure related to the Roman garrison, such as a Roman brothel (cf. Wallace-Hadrill 1995; McGinn 2004) or temporary quarters for Roman soldiers (cf. Magness 2009: 75). Finally, by renewing excavations in Field E128, we sought to determine more in general about the size and the layout of the buried structure.

In order to address these issues, we began the 2012 season by reopening three squares (Squares 09, 14 and 15) that had been partially excavated in previous seasons, as well as opening new squares immediately to the east (Square 10) and south (Square 21) of the previously excavated area. Unfortunately, however, the goals intended for these squares could not be achieved in 2012 as

it became necessary to close down this field after only two weeks and transfer the personnel over to Field E077 in order to complete the excavation of the Roman bathhouse. The premature end to the intended excavations meant that there was not time to determine anything significant from the excavations in Squares 10 and 15; however, important information was gained from the excavations in Squares 09, 14 and 21.

The focus of the 2012 excavations in Square 09 was the removal of three thin mid-square baulks left over from the 2008 excavations (Reeves *et al.* 2009: **Fig. 8**). Although these baulks had contributed important stratigraphic data, it was felt that they were obscuring information about the architecture's phasing. With the removal of these baulks, several hitherto unknown features of the architecture were revealed (**Fig. 19**). One result was the full exposure of the threshold of Doorway 41. This threshold, made of several cut sandstones, was situated at the northernmost extent of Wall 11 before it turns east and becomes Wall 1201. The door itself would have been about 1 m wide and, judging from the position of the 3 cm high doorjamb and the pivot hole, which measured 7 cm in diameter, the door opened to the east. Further south along Wall 11, the removal of the southernmost mid-square baulk revealed a sharp drop in the extant wall's height. Although earlier excavation had shown that the wall was not preserved to a uniform elevation, the location of the internal baulk had concealed the nature of this change in height. Excavation this season has shown that the southern section of Wall 11, which has a top elevation of 957.75 m comes to a sudden vertical drop in height to a top elevation of 957.30 m that is maintained along its north extent. This 45 cm drop was further defined by several stones that sat on top of the lower section of the wall and leaned against the higher section. These leaning stones suggest that the wall was altered in antiquity, possibly as a result of earthquake or human actions. As a result of these alterations, the northern section of Wall 11 had been dismantled to its foundation level, whereas the southern sections were left

at a higher level. An interesting find from the collapsed baulks in this square was a copper alloy coin issued at Rabbathmoba in 210 / 211 AD (**Fig. 20**; Spijkerman 1978: 272-3 no. 31 pl. 61). Unfortunately, this coin came from a fill layer, and thus was not able to help refine the dating of the structure.

Some of the most interesting discoveries regarding the building's phasing and character came from the north-west corner of Square 14 where an arch springer (Arch Springer 1207), a door jamb (Door Jamb 1208) and a later mudbrick wall (Wall 1203) were all found *in situ* (**Fig. 21**). Voussoirs that had fallen from an arch that once extended to the west were also found to the north-west of the springer in a position that would have blocked the door associated with the doorjamb. Based on the exposed architecture, we hypothesize that there was originally an arched room in the western portion of Field E128 that could be entered from an external area or courtyard via an inwardly opening door. Later the arch collapsed blocking the interior and the doorway. Later still a northward extending mudbrick wall was built which butted up against the ruins. As the 2012 excavation did not extend below the fallen voussoirs, it is not known when the arch collapsed. It could be related to the major damage that occurred to buildings in Fields E077 and E125 in the first, second or third centuries AD (Oleson *et al.* 2008: 313; Reeves *et al.* 2009: 261).

The existence of the westward and northward extending arched room and a possible new external doorway suggests that the structure in E128 was once much more grandly built and important than previously thought. These discoveries may necessitate new theories on the building's purpose and function, and more excavation will be needed before it is possible to fully understand the architecture and phasing of this ruin. The later mudbrick wall (possibly reflecting squatter occupation) further demonstrates the complicated phasing of the site.

Excavation in the southernmost square (Square 21) confirmed that the structure continued at least 5 m south of the previously excavated area. Moreover, the excavation revealed more evidence of an earthquake that caused considerable damage to the building. As was the case in Square 15, this earthquake seems to have shifted the southern end of the north-south mudbrick wall in Square 21 west of its original cardinal orientation. It is possible that this earthquake is the same one that caused the destruction of the arch in the north-west corner of Square 14. Concerning the date of this earthquake, the 2008 excavations found that artifacts uncovered in association with a tabun and bin postdating the displacement of the wall in Square 15 date to the late second and third century (Reeves *et al.* 2009: 238). These later phase features are possibly contemporary



19. E128 Square 09 Wall 11.



20. Coin from Rabbathmoba found in E128. Obv: Bust of Caracalla with laurel wreath; inscription illegible. Rev: Poseidon standing to left with one foot on prow; dolphin in left hand; shaft [of trident] in right; inscription PABA[---].



21. E128 Square 14: arch springer, door jamb, fallen voussoirs and later mudbrick wall.

with the squatter wall (1203) in Square 14, and with the squatter occupation that followed the destruction of arches and walls in adjacent Field E125 (Oleson *et al.* 2008: 310-14). There is as yet, however, no firm evidence from within Field E128 to date the earthquake which ended the primary occupation of the building in this field.

After the abandonment of the structure, the area was used as an ancient dump until the sixth century AD. Excavation in 2008 uncovered numerous artifacts from this dump (Reeves *et al.* 2009: 238-41), which had been sealed by collapsing mudbrick from the surrounding walls. Although excavation was limited in 2012, several more interesting artifacts from this dump were uncovered, including an illegible copper-alloy coin, a bone pin, two sea urchin spines and a great deal of glass, bones and ceramic material. Of particular note is an Eastern Sigillata A (ESA) bowl rim (Hayes form 56), which dates to the second half of the second century AD. Although from a dump context, this sherd is an excellent example of the imported fine ware that was brought to the site.

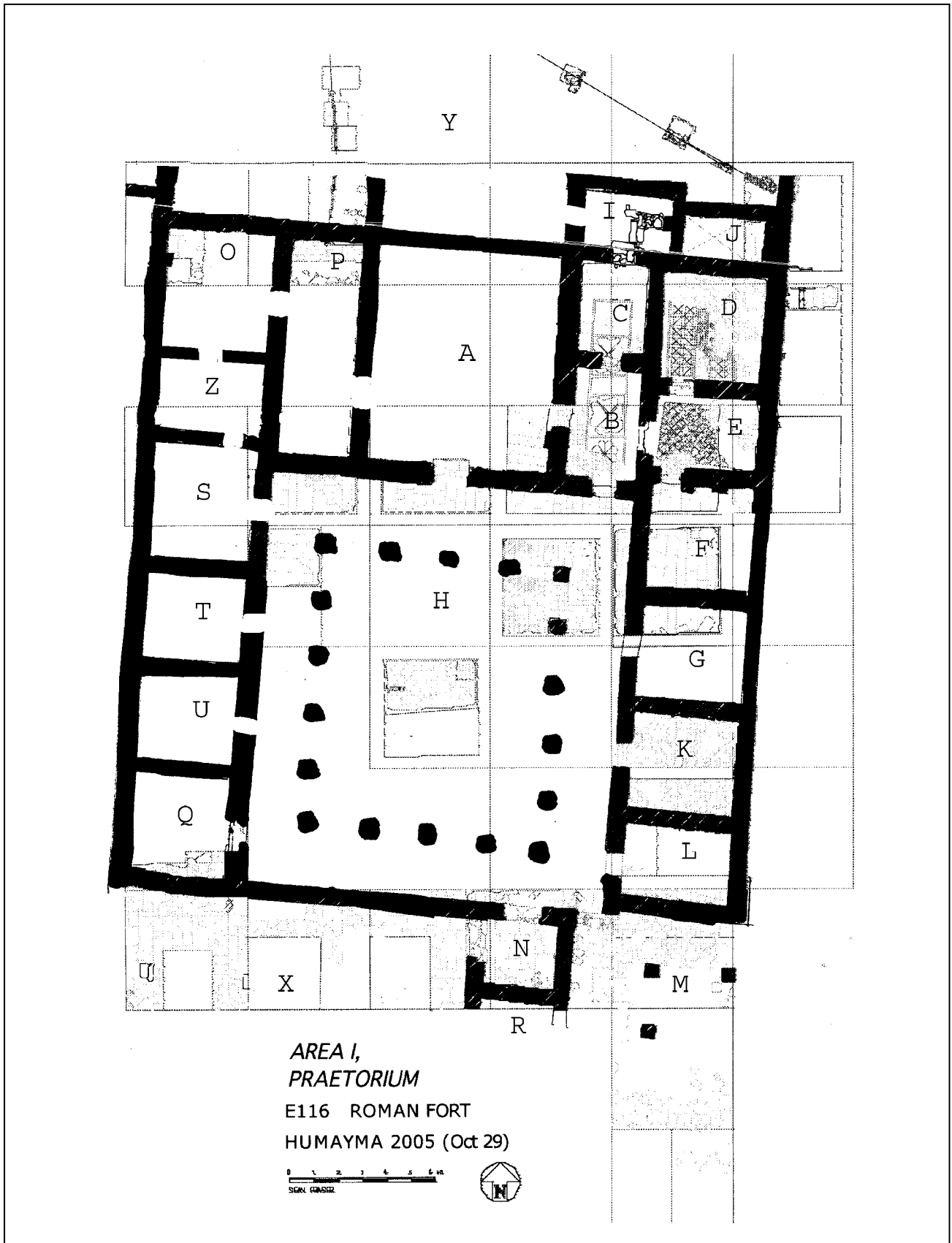
Although several interesting new discoveries were made in E128 this season, there was not time to achieve the overall goals of the renewed excavations. Further excavation is necessary before this interesting area of the site can finally be understood. Although there are multiple features within E128 that would benefit from

further excavation, one of the more interesting ones is the collapsed arch in the north-west corner of Square 14. Renewed excavation around the arch and beneath the voussoirs would help to date both the arch's destruction and the end of a major phase in E128's occupation.

Field E116 Area I Room J: Heated Room in Fort's Praetorium (M. B. Reeves)

Humayma's Roman fort was excavated by John P. Oleson between 1993 and 2005 (Oleson 2009; Oleson *et al.* 1995, 1999, 2003, 2008). During the 2004 season, excavations in the extreme north-east corner of Area I (the *praetorium* / commanding officer's house) revealed the presence of a small room, Room J, which had once been heated by a hypocaust (**Fig. 22**). The access to this room was via Room D, a large room decorated with polychrome mosaic floors and wall frescoes, interpreted as the Roman commander's dining room (Oleson *et al.* 2008: 322). Although only a small probe was excavated within Room J in 2004, enough of the plan and phasing of the room was recovered to hypothesize that the heated room and its stokehole from Room I were part of a northern extension to the *praetorium* (Phase 1b), which postdated the *praetorium*'s early second century construction (Phase 1a), but preceded the partial destruction of the building in the second half of the third century (Phase 2). This destruction was followed by a period of abandonment lasting until early in the reign of Constantine when a smaller garrison reoccupied parts of Humayma's fort (Phase 3). The excavators suggested that Room J was used as a dump after its suspended floor had been dismantled and its door from Room D blocked at the beginning of Phase 3 (Oleson *et al.* 2008: 318-24).

The probe excavated in 2004 had revealed important details about Room J's hypocaust, including the presence of some bricks still *in situ* in the *pilae*, larger brick fragments and ceramic pipe fragments in the room's fill, and recesses in the walls that had once held chimney pipes (Oleson *et al.* 2008: 323-24). The 2004



22. Plan of E116 Area I (praetorium) at the end of excavations in 2005.

excavators had also described the ceramic building materials from the probe; however, when comparative study of the site's ceramic building materials began in 2011, it became clear that the descriptions of Room J's materials were not precise enough in regards to form and fabric to allow meaningful comparisons with the materials from the E077 bathhouse. It was, therefore, decided to re-open Room J in order to catalogue all of the ceramic building materials found *in situ* and in the unexcavated fill. Another motivation to reopen this room was to determine its original function. Following the 2004 excavation, the excavators suggested it might have functioned as either a bath or a heated dining room. As the bath interpretation was largely dependent on the presence of waterpipe fragments in the fill, we wished to determine if flue pipe fragments could have been misidentified as waterpipe fragments and to look for any other evidence in support of a bath interpretation. The final motivation to reopen Room J was to see if the materials dumped in this elite structure could provide additional information about conditions during the fort's various phases.

(**Fig.23**) shows Room J following the excavation of the western three-quarters of the room and the removal of the 2004 backfill from the eastern quarter. At subfloor level, the interior dimensions of the room are 3.4 m x 1.7 m. The west, north and east walls were constructed contemporaneously as a bounded unit that abutted the pre-existing south wall. The new room's intended function as a heated room is clearly shown by the brick-arched stokehole through the west wall and the recesses (ca 13 x 8 cm) to hold cylindrical heating pipes in the room's four corners. In contrast to the walls in the E077 bathhouse, the walls of this heated room were much more crudely constructed with rough courses of cobbles, boulders and semi-hewn sandstone blocks set in mud packing. The east and west walls, at 40 cm and 47 cm thick, are also thinner than average walls in either the E077 bathhouse or elsewhere in the *praetorium*. One very

strange design feature is the absence of stone courses for the bottom 77 cm of the eastern wall where firm soil (possibly *pisé*) was used instead (**Fig.24**). Perhaps the builders did not think that a completely stone built wall was necessary here because Room J's eastern wall ran along the inside of the *praetorium*'s eastern perimeter wall for its full length (**Fig.22**). Another curious feature of the room is the subfloor composed of tightly fitting sandstone slabs. Such a floor is not as heat resistant as a brick floor and would have been unnecessarily expensive. The date of the floor could not be determined from a foundation probe. It is possible that this floor predates the heated room as the flagstones continued directly under the brick stokehole; the flagstone floor was also considerably lower than the lowest course of stones in the east and south walls (**Figs.24 and 25**). As regards phasing, it is also important to note that Room J's eastern and northern walls were set just within the borders of the Phase 1b northern extension of the *praetorium*. This suggests that Room J belongs to an even later renovation phase of the *praetorium* (Phase 1c?).

Room J's suspended floor was supported by ten *pilae* of circular *bessales* (d = 19.3 - 19.8 cm; th = 5.8 - 6.7 cm) in the center of the room and five *pilae* of small rectangular bricks (23 - 24.5 cm x 11 - 12.5 cm; th = 2.3 - 3.5 cm) along the north wall (**Figs.23 and 26**). The stacked bricks in these *pilae* were attached together and to the subfloor by a lime-based mortar (in contrast to the mud mortar used in E077's *pilae*). The suspended floor was presumably also supported on the south, but all evidence of how is now lost. Broken square bricks 4.7 - 5.2 cm thick with uncharred central areas preserving the shape of circular *bessales* are probably pedales that topped the circular *pilae* (**Fig.26.3**). Some of the other large square or rectangular brick fragments (up to 6 cm thick) in the fill probably come from bricks that spanned the space between the individual *pilae*. Numerous large fragments from the room's fill of light grey mortar with embedded bricks and cobbles presumably represents the suspended



23. Praetorium Room J at the end of the 2012 excavations.

floor's packing, whereas the many fragments of reddish-yellow plaster with crushed pottery inclusions and a smoothed upper face probably represents the suspended floor's upper surface. Although many stone tesserae were found in the room's fill (**Fig.27**), there are no tesserae imprints in the room's mortar, suggesting that Room J did not have a mosaic floor; instead these tesserae were probably dumped here when the mosaics in adjacent rooms were crudely repaired in Phase 3. Narrow ledges to support the *tubuli* (with some bricks embedded in mortar still attached) were present on the north and west walls 57 - 65 cm above the subfloor (**Fig. 23**). No *tubuli* were found *in situ* but the material from the fill shows that they were attached to the walls with a light grey mortar and then covered with white wall plaster that also formed the finished wall surface. Many fragments of ceiling



24. Praetorium Room J's east wall.

plaster bearing reed imprints suggest this small room had a flat roof (and that the occasional fragments of roof tiles in the fill were dumped from elsewhere).

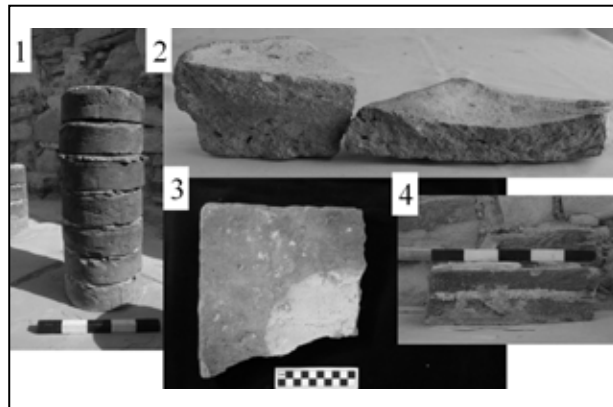
When excavated, the room contained 1.75 m of fill that was full of artifacts and ecofacts originating both from the destruction of this room and from the room's subsequent use as a dump. After the hypocaust was no longer in use, any *in situ* remains of the suspended floor must have been removed and any easily accessible bricks must have been taken away for other building projects (e.g. blocking the door to Room D (**Fig. 25**)). The recycling of these bricks explains why no intact bricks were found loose in the room's fill and only the lowermost bricks in the *pilae* were left in place. The recycling effort also explains why the room's fill below the removed suspended floor was so churned up that fragments of ceiling plaster were found within 10 cm of the hypocaust's subfloor. In spite of the churned up nature of the room's fill, three main concentrations of artifacts and ecofacts were identifiable. The first layer (Loci 1208 - 1210), extending from the top of hypocaust's subfloor to 1.21 m above it, contained over a thousand fragments of flue pipes and more than 300 fragments of broken bricks, in addition to a great deal of mortar and plaster, representing most of what was left after the hypocaust was destroyed and robbed out. The second layer (Loci 1203 - 1208) overlaps the first but extends



25. Praetorium Room J's south wall. Note the 19 cm thick layer of compacted sand located between the lowest course of wall stones and the top of the flagstone subfloor.

above it. This layer, which begins 51 cm over the subfloor and extends up for 80 cm, is notable for its high concentration of finds, many of which were unusual objects more in keeping with the elite inhabitants of the *praetorium* than with Roman soldiers in general (Figs. 27, 28 and 35). Of particular interest are 4,539 *ceramic vessel* sherds reflecting both regional and long distance trade (see below), high quality glass vessel sherds, a Latin graffito scratched into wall plaster, some copper alloy cosmetic items, a high concentration of mammal, fish and bird bones, some rare seashells (that seem to have been used for adornment) and many worked bone artifacts. Finally, the highest layer (Loci 1201 - 1202), beginning 1.38 m above the subfloor and extending 47 cm to the surface contained almost no material from the hypocaust, produced no registered artifacts, and contained considerably less pottery and glass sherds, bone fragments and artifacts of any type than the second layer. It is hypothesized that this layer formed after the major dumping from the *praetorium* had been completed.

During excavation, all fragments of bricks and *tubuli* recovered from the fill were studied, along with samples of the *in situ* bricks. Significantly,

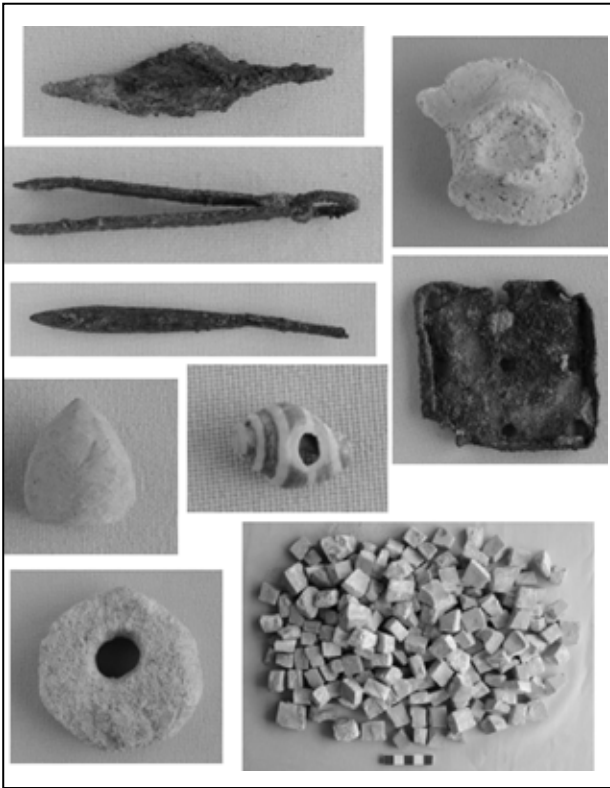


26. Brick assemblage from praetorium Room J: (1) pila of circular bessales; (2) fabric and surface parallels between circular bessalis and small rectangular brick; (3) pedalis pila cap retaining uncharred shape of circular bessalis; (4) pila of small rectangular bricks.

the small rectangular bricks, circular *bessales*, pedales and larger bricks shared the same fabric, surface treatment and a white build-up on their surfaces that is mostly likely efflorescence (Fig. 26; Table 2)². This uniformity suggests that all of the bricks used to construct this hypocaust were made at the same production facility. Moreover the patterns of soot and mortar on the bricks suggest they were used for the first (and only) time in this hypocaust. The heating pipes (both rectangular *tubuli* and cylindrical flue pipes (Fig. 29) also constitute homogenous corpuses in original use. This CBM assemblage (dubbed the 'Praetorium Room J Type') also differs from those found in the E077 bathhouse. In terms of phasing, the bricks and heating pipes from this room are therefore very important because they constitute an assemblage of ceramic building materials imported to Humayma's garrison during a renovation to the fort. Also informative was what was missing from the ceramic building material in the room's fill. The absence of any complete bricks in the fill suggests that, as was common practice, intact bricks had been recycled for new building projects. (It is not clear why some *pilae* bricks were left but perhaps they were not easily accessible.) Also

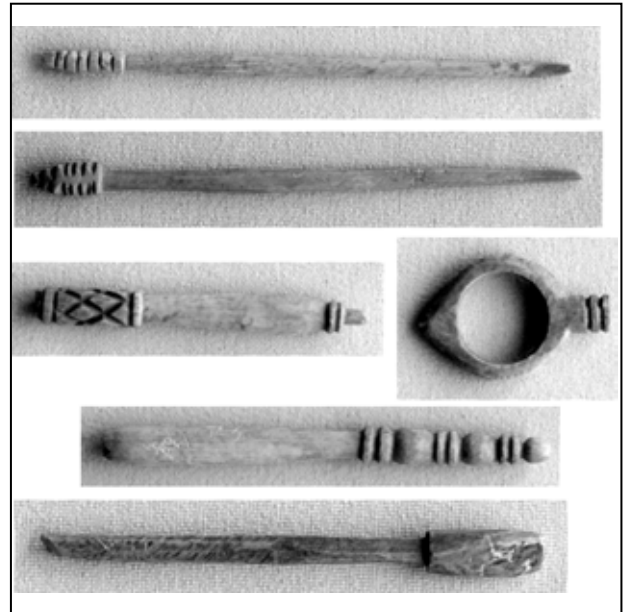
2. The white surface of the bricks has not yet been tested, but x-ray diffraction on the core of one brick revealed Albite (NaAlSi₃O₈), a sodium end member which is consistent

with the efflorescence theory (Dominique Dupuis, personal communication, 2014).



27. Artifacts from praetorium Room J (clockwise from upper left): H12.0314.02: three-bladed iron arrowhead, 4.5cm long. H12.0314.03: vessel stopper molded from chalky off-white plaster; max. th = 2.35cm; outside d = 4.9cm, plug d = 2.6cm. H12.0315.09: square artifact (4.5cm x 4.4cm) with a raised lip and three rows of three evenly spaced holes (d = 0.25cm) made from a sheet of copper alloy (th = 0.1cm). H12.0328.01: 206 variously coloured sandstone mosaic tesserae fragments with white mortar adhering to all sides except the upper surface. H12.0315.06: six-sided flat disk with central hole created from a wall plaster fragment, 4.0-4.2cm wide; h = 1.2-1.3cm; hole d = 1.0-1.2cm. H12.0319.03: conical sandstone game piece or miniature betyl, 1.9cm high; 0.1-1.7cm wide; ovoid base is 1.3cm long x 1.1cm wide. H12.0314.05: complete *Engina mendicaria* shell with a hole for suspension drilled through the external surface after it had been filed down, 1.1cm long; 0.7cm wide. H12.0314.06: copper alloy tool (6.9cm long) with a shallow lanceolate scoop head (4.7cm long x 0.5cm wide) and a circular (broken) shaft (d = 0.2cm). H12.0314.01: copper alloy tweezers, 4.7cm long; 0.6cm wide.

extremely rare in the fill were cylindrical pipe fragments that were free of heat damage. As cylindrical flue and waterpipes often share the same form (Harvey 2013: 19), it seems likely that the 'waterpipe' fragments identified by the 2004 excavators were actually fragments of the cylindrical flue pipes that once ran up the recesses in the room's corners.



28. Bone artifacts from praetorium Room J (top to bottom): H12.0315.01: 9.4cm long; shaft th = 0.2-0.3cm. H12.0315.02, 9.1cm long; max. shaft d = 0.3cm. H12.0315.07: 6.0cm long; shaft d = 0.5-0.65cm. H12.0315.04: 3.7cm long; shaft th = 0.65cm. H12.0315.03: 8.1cm long; shaft th = 0.45-0.7cm. H12.0310.01: 6.9cm long; shaft th = 3.0cm.

The paucity of waterpipe fragments, in conjunction with the lack of any basins or similar features in Room J make it likely that this room, next to a *triclinium*, was a heated dining room rather than a bathing room. As outlined by the Roman architect Vitruvius, a Roman house should have specific triclinia for the spring, summer, autumn and winter seasons (De Arch. VI.4). The original *triclinium* in Ḥumayma's *praetorium*, in the north-east corner of the building (Room D), presumably had windows to the north and east that made it appropriate for spring, summer and autumn dining. However, the building originally lacked a winter dining room, which according to Vitruvius should have windows to the west so as to be lit and heated by the afternoon sun. For the architects at Ḥumayma, a difficulty in building a sufficiently heated winter *triclinium* would have been the hills immediately west of the site which block the afternoon sun. It is therefore likely that Room J, with its hypocaust, was added next to the original *triclinium* in

order to serve as a heated winter dining room that was not completely dependent on the sun's rays. As this was an addition, rather than part of the original design, it is likely that the inspiration came from heated triclinia in other *praetoria* (e.g. South Shields [Hodgson 1993: 133]) or possibly from heated dining and reception rooms in other elite houses (e.g. Dharīh [al-Muheisen & Piraud-Fournet 2013: 841-42]; Bignor [Rudling 1997: 16]).

Finally, it must be noted that the finds from the layers of dump excavated from within this room in 2012 are necessitating a rethinking of the room's phasing. All three layers from the 2012 dump contained pottery forms that extend into the fourth century (see *Ceramic vessel overview below*). This makes it possible that the room was damaged and its hypocaust dismantled in the mid fourth century (possibly after the 363 earthquake), rather than in the early fourth century (Phase 3) as previously hypothesized. It is hoped that the phasing will become clearer once all of the analyses of the finds from this room have been completed. The dating of the hypocaust's dismantlement would also be clarified if the charred bricks removed from this room could be located in a recycled context.

RTI and Photogrammetry (M. Fergusson, M. MacKinnon and M. B. Reeves)

Two types of close-range photographic techniques were used during the 2012 excavation season to improve the reading, analysis and interpretation of inscriptions, petroglyphs and artifacts in and around the site of Ḥumayma. The photographic techniques used were Reflectance Transformation Imaging (RTI) and photogrammetry.

The RTI image capture process creates a 2D digital image with imbedded 3D data. This capture process requires a relatively inexpensive kit that includes a DSLR camera, tripod, a powerful strobe and the placement of two black spheres in the frame of the image to model the light location in 3D space (**Fig. 30**). Between sixty and eighty photographs are captured of a subject, each lit from a different angle in a



29. Reconstructed rectangular tubuli and cylindrical flue pipes from praetorium Room J.

hemisphere surrounding the object and each from the same distance. While this process is simple in a studio setting, its use in the field is sometimes hindered by logistical problems such as inaccessibility. The type of 3D data created by an RTI is surface normal information. Surface normal data is used to map the 3D surface of the subject and allows for dynamic re-lighting in an RTI viewer. This gives one the ability to quickly capture images in the field and to manipulate the RTI data later, allowing a viewer to discern shallow relief with raking light from 360 degrees.

The photogrammetry technique for close-range imaging is a form of stereo photogrammetric imaging that can either use multiple strips of overlapping photos or two or more convergent images to create dense 3D models. These kinds of projects are ideal for imaging small-scale inscriptions and petroglyphs on relatively flat surfaces, such as those found in and around Ḥumayma. They are especially useful for imaging subjects that are inaccessible for RTI. Convergent pair photogrammetry is useful for inscriptions that are inaccessible for close-range strip photogrammetry projects. A number of different lenses are used to capture these images, including wide angle lenses for large subjects, telephoto lenses for distant subjects and macro lenses to capture a high level of detail. The ADAMTech Mine Mapping Suite,

Table 2: Characteristics of 'Praetorium Room J Bricks and Flue Pipes' (M. B. Reeves and C.A. Harvey).

Type	Dimensions and weight	Feel, color and grain	Fabric inclusions and voids	Surfaces	Other notable features
Small rectangular bricks (Fig. 26.4)	<u>Length:</u> 23.3-24.5cm <u>Width:</u> 11.0-12.5cm <u>Thickness:</u> 2.3-3.5cm <u>Weight:</u> 1255-1285g	<u>Feel:</u> hard sandy <u>Colors:</u> light red (10YR 6/6; 10R 6/6; 2.5YR 6/8); red (2.5YR 5/6; 10.5 YR 4/6; 10R 4/6; 10R 5/6; 10R 5/8) or weak red (7.5R 5/4) fabric; some have dark surface (bluish grey: 6/2; 2.5Y Pb; greenish grey (6/2 6/1) <u>Grain:</u> brick's grain parallel to faces and sometimes goes up at sides	Well sorted or poorly sorted fine to very coarse sub-rounded and sub-angular clear and multi-colored quartz sand; some very small to small white flecks; some very small pebbles; some very small to medium voids	<u>Top face:</u> concave or flat with an even surface that is smooth to the touch; smoothed lengthwise (or in one case widthwise) by tool or fingers; finished by smoothing along one short side <u>Bottom face:</u> flat, slightly concave or convex with an even surface that is rough to the touch; some ovoid voids <u>Sides:</u> flat with an even surface that is smooth to the touch	* Thin white build-up on most faces and sides (including over dark surfaces), but not on breaks * Likely form-made given flat, even and smooth sides and thin outwardly raised edge along bottom of some bricks which possibly resulted from clay squishing out of the form
Circular <i>bessates</i> (Fig. 26.1)	<u>Diameter:</u> 19.3-19.8cm <u>Thickness:</u> 5.8-6.7cm <u>Weight:</u> 3140-3315g	<u>Feel:</u> hard sandy <u>Colors:</u> red (7.5R 5/6; 10R 5/6; 10YR 5/8) <u>Grain:</u> brick's grain parallel to faces	Poorly, moderately or well sorted fine to coarse sub-rounded clear quartz sand with some small white inclusions; very many small to medium voids	<u>Top face:</u> slightly concave or flat with an even or uneven surface that is smooth to the touch; evidence of smoothing by hand or tool. <u>Bottom face:</u> slightly concave or flat with an even or uneven surface that is rough to the touch; evidence of smoothing by hand or tool. <u>Sides:</u> convex with an even surface that is smooth to the touch; top and / or bottom edge trimmed with knife on an angle.	* White build-up on surfaces * Likely form-made; vertical and encircling imprints on brick's side possibly from mold or production process
<i>Pedales</i> (Fig. 26.3) Caveat: all samples were fragments so some bricks larger than <i>pedales</i> may have been mistaken for <i>pedales</i>	<u>Theoretical length / width:</u> ca 29.6cm (1 Roman foot) <u>Maximum preserved length / width:</u> 25.0cm <u>Thickness:</u> 4.4-6.2cm at edge; 3.3-4.1cm near center <u>Weight:</u> unknown (none complete)	<u>Feel:</u> hard sandy <u>Colors:</u> pinkish grey (7.5YR 7/2), red (10R 5/8) or yellow (10YR 7/6) fabric; one has brown (10YR 5.3) surface <u>Grain:</u> brick's grain parallel to faces and goes up at sides	Poorly sorted or well sorted medium to very coarse sub-rounded and sub-angular clear and multi-colored quartz sand; some small white pebbles; occasional black flecks; some very small pebbles; some very coarse angular sand; some to many very small to medium voids; a few large voids	<u>Top face:</u> concave or slightly concave with an even or uneven surface that is smooth to the touch; smoothed in one lengthwise direction by tool leaving fine linear marks or fingers; smoothed last along one edge <u>Bottom face:</u> flat with an even surface that is rough to the touch; occasional to many straw imprints; some small ovoid voids <u>Sides:</u> flat with an even surface that is smooth to the touch	* Thin white build-up on faces and sides * Likely form-made given flat, even and smooth sides * Some fragments with a charred face have an uncharred central area preserving part of the shape of a circular <i>bessatis</i>
Rectangular <i>tubuli</i> (Fig. 29.1)	<u>Length:</u> 17.4-18.3cm <u>Width:</u> 15.5-16.5cm <u>Depth:</u> 8.0-10.0cm <u>Wall Thickness:</u> 0.4-0.8cm	<u>Feel:</u> Coarse, sandy <u>Colors:</u> Reddish yellow (5YR 6/6), red (2.5YR 5/8) or reddish brown (2.5YR 4/3) fabric; most have light brownish grey (10YR 6/2) or dark grey (5YR 4/1) surface; some have a dark grey (5YR 4/1) core	Well sorted medium sub-rounded clear quartz sand, with some coarse to very coarse sand and some small white flecks; some small voids	<u>Inside surface:</u> all examples have wheel marks, suggesting they were wheel-made; heavy soot-staining and soot build-up <u>Outside surface:</u> some examples have faint wheel marks; some surfaces have soot-staining; many examples have mortar adhering	* Thin white build-up on most surfaces * One end is oval, while other is rectangular in shape * Oval, pointed-oval, and tear-shaped vents were cut into both short sides
Cylindrical flue pipes (Fig. 29.2)	<u>Length:</u> 26.8cm <u>Diameter of Middle:</u> 9.3cm <u>Diameter of male end:</u> 6.0cm <u>Diameter of female end:</u> 8.4-9.4cm	<u>Feel:</u> Coarse, sandy <u>Colors:</u> Reddish brown (5YR 5/4) and red (2.5 YR 5/6) fabric; dark grey (5YR 4/1) surface	Well sorted, medium, sub-rounded, clear quartz sand; some coarse sand; some white flecks; occasional very small voids	<u>Inside surface:</u> wheel marks; heavy soot-staining and soot build-up <u>Outside surface:</u> faint wheel marks; some surfaces have soot-staining; other surfaces have mortar adhering	* Thin white build-up on some exteriors * All have a wide groove followed by a thick ledge on the interior of the female end just inside the rim, which was likely designed to grip the mortar that sealed the joint between two adjoining pipes * Exact parallels of this form were used as water pipes

a photogrammetry software package originally designed for the mining industry in Perth, Australia, was then used to construct the models. These models are accurate to within 1/10 of a pixel which, when using a macro lens, can be accurate to the level of microns.

All of these techniques were employed over the course of the 2012 excavation season on ten previously noted inscriptions and graffiti in and around the site of Ḥumayma and on seven artifacts excavated this season. Of particular interest were the results obtained for the heavily eroded inscription on a statue base excavated in the principia of the Roman fort in 1996 (Oleson *et al.* 1999: 417; Oleson *et al.* 2002: 110-12). When publishing the inscription, Oleson, Reeves and Fisher (2002: 111) noted that “very little is certain about the text of the inscription, despite autopsy during a variety of lighting conditions, and manipulation of digital images.” The lack of success of traditional methods suggested this statue base would ideally be a good test case for RTI in the field. In reality, however, the fact that the inscription had remained *in situ* and exposed to the elements for 16 years cast doubt on whether the RTI technique would reveal any details that were not discernable to the original interpreters.

Previous Reading

Oleson *et al.* (2002:111) interpreted the inscription as follows.

The inscription originally consisted of two lines of tall (H ca. 0.05 m), narrow letters, occupying approximately the central 0.45 m of the longer (south) side of the block. Traces of letters, and possibly of a recessed cutting to allow correction or damnatio memoriae can be traced over 0.34 m of the first line, but nothing is legible. Traces of letters can be seen over 0.43 m of the second line, but only 0.28 m of the middle portion could be deciphered with even partial confidence, yielding approximately 13 letters. The proportions and spacing of the lettering resemble those of the Greek alphabet used on a dedicatory inscription to Trajan at Petra dating to 114, and the Latin alphabet of the nearby, contemporary inscription of C. Claudius Severus. The NT of line 2 appear to be ligatured.

1. (illegible)
2. PRAESENTEMLEGAṬ (end?) or
PRAESENTEMERAT (end?)

New Reading

To create a RTI model of this inscription, 62 high resolution digital images, taken under a variety of lighting conditions (e.g. **Figs. 31 and**



30. Capturing Reflectance Transformation Imaging data on an inscription carved near Ḥumayma's dam.



31. Two of 62 images of the principia statue base's inscription taken for Reflectance Transformation Imaging.

32), were merged and examined on the computer (e.g. **Fig. 33**). This model revealed several new significant details and clarified the uncertain letters from the original reading allowing us to propose a new reading for this inscription.

1.]VḂ[---]CḲḪ[---]ROṢ (end?)
2.]R ṼI PRAESENTMPRAT (end?)
3.]R[

The first significant finding was that the inscription seems to consist of three lines, instead of the two originally proposed. Although most of the third line has eroded away, an “R” is clearly visible at the end of the first quarter of this line (**Figs. 31 and 32**). Just before the “R” there seems to be a letter with vertical line, possibly an “I”.

Another significant discovery is that the end of the second line reads neither “PRAESENTMLEGAT” nor “PRAESENTMERAT” as proposed previously, but probably “PRAESENTMPRAT” (**Figs. 31, 32 and 33**). (Although the “T” at the end could alternatively be a taller vertical line, possibly with a diagonal bar at the top rising to the right.) In addition, some of the letters earlier in the line can now be read. Immediately before “PRAESENTM” are two letters followed by a central dot indicating a word division (**Figs. 31 and 32**). The first of these letters is possibly a “V”, although the reading is uncertain as the letter has been damaged at the top by a square-

sided punch. (The sides of the punch mark are eroded in the 2012 photos but clear in Oleson *et al.* 2002: tafel IV no. 3.) The second letter seems to be an “I”. Before these two letters is a word ending in an “R” (or possibly an “X”), followed by another central dot.

In the first line, which was illegible previously, several letters are now visible enough to allow interpretations. There seems to be a “V” followed by a “B” (or short “O”) at the end of the first quarter of the line (Figs. 31.1, 31.2 and 32.1), and possibly a “CX” followed by an “H” (or “M”) just after the crack (Figs. 32.1 and 32.2). Most importantly, the line seems to end with “ROṢ” (or possibly “ROX”) (**Fig. 33**).

One of the reasons that it is difficult to read some of the surviving letters is that the face of the statue base containing the inscription is covered with pockmarks, some of which are directly over letters (see Figs. 31.2 and 32.2 [and Oleson *et al.* 2002: tafel IV no. 3]). The pockmarks were probably deliberately punched into the sandstone to key the plaster of a later (non-extant) painted inscription. Similar punch marks were found between layers of wall plaster in Ḥumayma’s fort (**Fig. 34**) and the altar from Ḥumayma’s shrine had both pockmarks and traces of a thick layer of whitewash on its carved surface (Oleson *et al.* 2002: 113). Moreover, other statue bases from Ḥumayma’s principia, which lack carved inscriptions, are thought to



32. Two more images of the principia statue base’s inscription taken for Reflectance Transformation Imaging.



33. Computer composite screenshot detailing the end of Lines 1 and 2 in the principia statue base’s inscription.

have had painted inscriptions (Oleson *et al.* 2003: 41). In the case of this statue base, which occupied a prime position in the principia courtyard, a new inscription would mean that its honorand was changed during the course of the fort's occupation. Finally, as regards damage to the inscription, it is possible that horizontal erasure in the first line just before the ROS might be deliberate scratching; however, as the grain of the stone goes in the same direction, this might alternatively simply be natural erosion (**Fig. 31.1**).

Although large parts of the inscription still remain illegible, the new reading will make it easier for scholars to comment on the inscription's overall message. Moreover by revealing new letters and contextual details (such as the punch marks) and clarifying some previously misread letters, the RTI technique has demonstrated its usefulness even on an extremely weathered sandstone inscription.

Ceramic Vessel Overview from the 2010 and 2012 Seasons (Holman, L.M. Hardin, S. and Shelton, A.)

General Observations

Approximately 54,000 sherds were recovered during the 2010 and 2012 excavation seasons. These ceramics represent types produced between the first century BC and the early ninth century AD. The earliest and latest dated sherds represent a small percentage of the corpus. Thus, the majority of the ceramics date from the first to fifth centuries AD. Owing to the site's long history, most contexts excavated are mixed. One notable exception is the Square 08 pottery dump from Field E077, which contained primarily Nabataean pottery of the first centuries BC and AD. To date, no evidence of local ceramic production has been found (Oleson *et al.* 2008: 337). The major suppliers of ceramic materials for Ḥumayma are Petra and Ayla (modern 'Aqaba); however during the Late Roman period (106 - 324 AD), imported amphorae also reached the site in significant quantities (see below).

Coarse Wares

Coarse ware pottery represents the largest portion of the ceramics recovered from both seasons. The majority of coarse ware pottery was imported from Petra and Ayla, with Petra being the predominant supplier. Only a handful of sherds have been identified as imported from regions other than Petra and Ayla. Five fragments recovered during the 2010 season appear to have been imported from the Karak plateau. Also, a few sherds (still undergoing analysis) were possibly manufactured in the Negev. A single sherd of Pompeian Red Ware, produced during the first century AD, was also identified among the 2010 material. A wide variety of coarse ware forms reached the site. The most common forms are open bowls, jugs, jars, closed cups and cooking vessels. In general, only sherds of vessels were recovered, although a complete cooking pot (**Fig.35.1**) and a nearly complete hemispherical bowl with holes purposefully punched out for straining (**Fig. 35.2**) were recovered from a dump in the *praetorium* of the Roman fort (Field E116 Area I Room J).

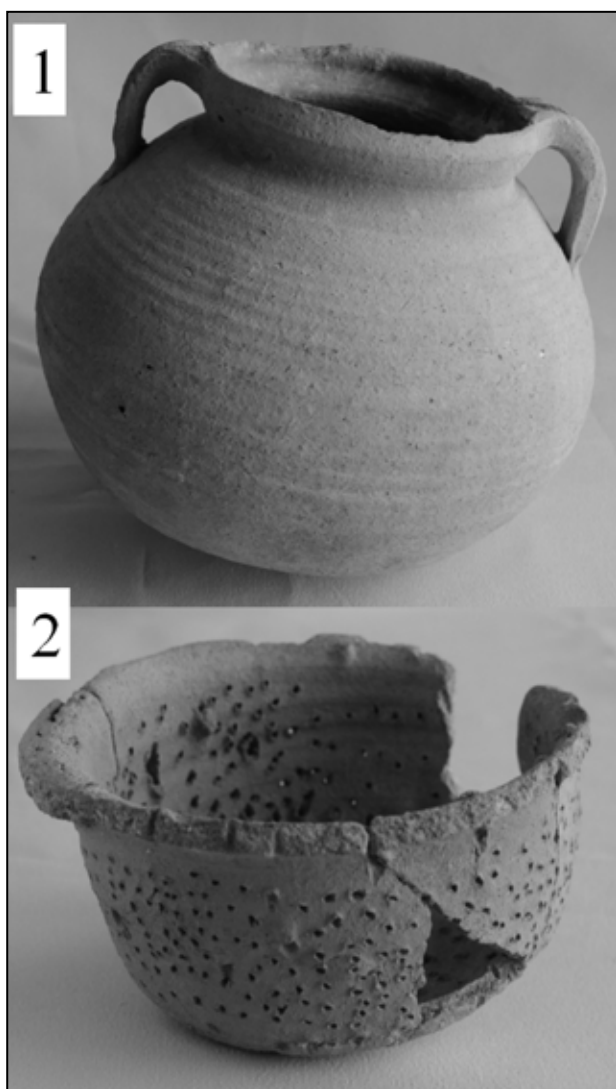
Fine Wares

The majority of fine wares recovered are Nabataean painted and unpainted fine wares produced at Petra. The painted fine wares date from the late first century BC to the third century AD. Schmid's Dekorphase 3 (early first to early second centuries AD) dominates the assemblage. Carinated bowls represent the most common unpainted Nabataean fine ware form. Hemispherical bowls and beaded rim cups represent other common Nabataean fine ware forms recovered.

Small quantities of fine wares produced outside Arabia reached the site, most of which were too fragmentary to classify as a specific type. The most common Early Roman imported fine ware recovered during the 2010 and 2012 seasons was Eastern Sigillata A (ESA). There were two classifiable sherds: one base of Hayes Form 28 (E128), manufactured from the last quarter of



34. Top of an old layer of wall plaster punched (left) to key the underside of a new layer (right).



35. Ceramic vessels from dump in E116 Area I Room J: (1) Cooking pot (H12.0322.01); red fabric (10 R 5/18); exterior buff slip (10 YR 7/3); h = 13.0cm; (2) Strainer (H12.0314.04); light red fabric (2.5 YR 6/6); height = 6.1cm.

the first century BC to the first quarter of the first century AD (Hayes 1985: 27), and one rim of Hayes Form 56 (E128), produced during the early second century AD (Hayes 1985: 39). All ten of the ESA sherds recovered during the 2012 season were from the *vicus* (E077 and E128). Of the Late Roman and Early Byzantine period sherds recovered, a small quantity of Red Slip ware sherds were identified, including 11 fragments of African Red Slip (ARS). Three ARS sherds were recovered from the Roman fort (E116); the remaining sherds were found in E077.

Amphorae

The majority of imported amphorae identified date from the second to fourth centuries AD. Class 47 is the most frequently identified imported amphora from both seasons, based on the quantity of sherds (219). This vessel is thought to be a wine amphora produced in the Aegean during the late second to fourth centuries AD (Peacock and Williams 1986: 193-95). Class 47 amphorae were recovered from E128 and E116, but most sherds were found in E077. Class 45, found in E116 (19 sherds) and E077 (two sherds), was the second most commonly identified imported amphorae. The form appears in the late first century AD and was produced until the late sixth century AD (Peacock and Williams 1986: 188-90). Several fragments of amphorae produced in Egypt (Class 52) and Gaza (Class 48) were identified (Peacock and Williams 1986: 196-97, 204-5). These Class 48 and 52 amphorae were probably used to ship wine.

Lamps

Few identifiable lamps were recovered during the 2010 and 2012 seasons. Those lamps which could be classified date from the first to fourth centuries AD. Several Nabataean Rosette Lamps (Negev type 1a) of the first century AD were recovered, including one complete lamp and one fragment from E077's Square 08 pottery dump (Negev 1986: 134; **Fig. 36.1**). A complete Late

Roman ovoid lamp, manufactured between 280 and 320 AD, with volute decoration between the spout and the fill hole, and groupings of rosettes around the fill hole was recovered from the fill beneath the plaster *klinai* in Room F of the E077 bathhouse (Grawehr 2006: typentafel 2: fig. K.3; **Fig.36.2**). Several Late Roman lamps were recovered from E116 Area I Room J. From the middle layer of the dump in Room J, a spout fragment and a disk fragment have been identified as Grawehr's type J.2 round lamp dated to 180 / 210 - 260 (2006: typentafel 2). A semi-complete lamp disk, also from this layer, was identified as Grawehr's type J.2. Finally, the latest dated lamp from the 2010 and 2012 seasons was a very charred complete lamp top,

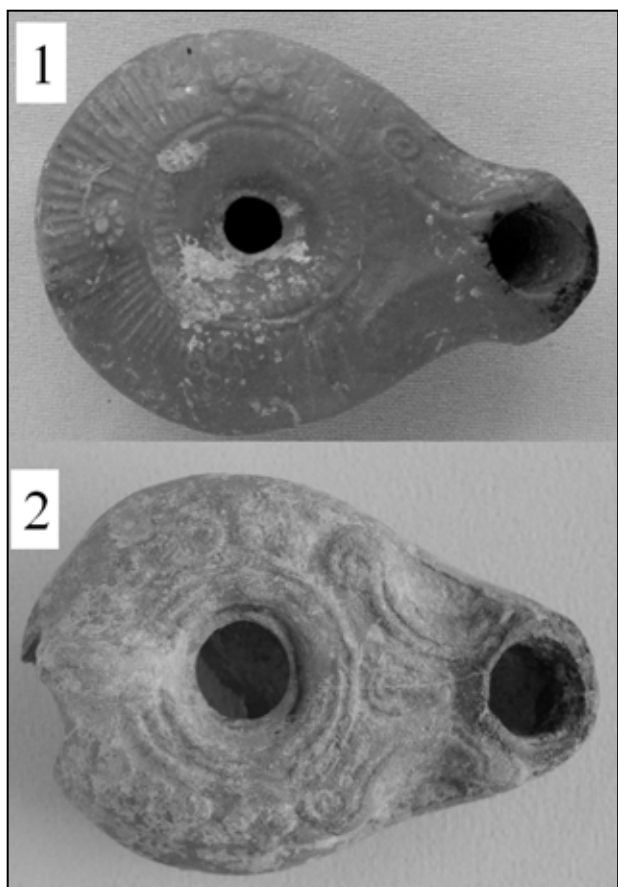
again from the middle layer of the dump of E116 Area I Room J. It most closely resembled Grawehr's type J.3 variation b dating from 225 - 300 (2006: typentafel 2).

E077 Square 08 Dump and E116 Praetorium Room J Dumps

During the 2013 study season, the diagnostic sherds from two pottery dumps, one in E077 Square 08 and the other from E116 Room J in the *praetorium*, were analyzed. The dump from Square 08 is a unique assemblage from Ḥumayma. It is a homogenous corpus of Nabataean wares from Petra and Aila that is thought to have a closing date of the late first or early second century AD. On the other hand, the dump excavated from Room J in the *praetorium* shows the breadth of wares and vessels that reached the site during the second to fourth centuries AD. Specifically, the dump in E116 Room J illustrates the manufacturing centers that supplied the army and commander stationed at Ḥumayma.

E077 Square 08 Dump

The dense concentration of ceramics designated as the E077 Square 08 Dump was found during the excavation of a foundation probe against the outside face of the E077's eastern perimeter wall (**Fig. 2**). Given the many phases of occupation in E077, it was especially remarkable that the pottery dumped here seems to represent a homogeneous Nabataean assemblage containing material dated from the late first century BC to the late first century or early second century AD. The corpus is comprised of Nabataean coarse and fine wares from Petra and Aqaba. 3,864 sherds were retained from the portion of the pottery dump within the 2010 probe; unexcavated portions of the dump were also observed to extend to the north, east and south of the probe's location. In 2011, Na'if Zaban of the ACOR conservation cooperative sorted the retained sherds into vessel types and looked for joins. During the 2013 study season, a database was created to document the different



36. (1) Nabataean Rosette Lamp (H10.0245.01) from the E077 Square 08 dump; fabric is light red (10 R 6/6) to very pale brown (10 YR 8/3); red slip (2.5 YR 5/8) covering the top; h = 2.8cm; (2) Ceramic ovoid lamp with charring around the nozzle (H12.0065.01) in fill beneath kline in E077 Room F; red fabric (10 R 5/8); h = 2.1cm.

types of vessel amongst the assemblage. The fragments that were joined were counted as a single sherd. Thus, the total sherds recorded in the database equaled 3,545. The percentages provided for the wares are based on the initial reading of the 3,864 sherds in 2010. Percentages of the vessel forms discussed in the report will be based on the 3,545 sherds recorded during the 2013 study season.

Over 99 percent of the recovered corpus is Petra coarse and fine wares. No fine wares or amphorae produced outside of the Kingdom of Nabataea were identified. The only other regional ceramics recovered were Aila coarse and fine wares, which represent less than one percent of the corpus. The majority of the corpus is Petra fine table-wares (32.8 percent) and Petra coarse cooking wares (39.2 percent). Coarse serving and storage vessels also comprised a significant portion of the corpus (20.9 percent). Open bowls represented nearly 25 percent of the corpus, with Nabataean Painted Fine Ware representing slightly over four percent and Petra fine ware carinated bowls comprising 12.4 percent. Diagnostic sherds of jug, juglet and jar forms, which were most likely utilized for serving and storing food stuffs, represent approximately six percent of the corpus. Petra fine and coarse ware cups compose one percent of the ceramics recovered. Petra ware cooking pots (7.9 percent) and cooking bowls (0.8 percent) also represent a significant portion of diagnostic sherds. This suggests that the contents of the dump were from a domestic context, presumably a kitchen or storeroom.

The earliest dated ceramics from the corpus are Petra coarse ware cooking pots of the first century BC (nine sherds or 0.26 percent) with rims that are flanged and flattened (Gerber 2001a: 360, fig. 1.11). However, the remaining fine and coarse ware pottery recovered, such as carinated bowls, are forms common during the first century AD. All of the Nabataean Painted Fine Ware identified were Schmid's Dekorphase 3b manufactured from 70 / 80 - 100 AD (Schmid 1996: 207, abb. 701). The exclusivity of

Dekorphase 3b, as well as the presence of second century AD Petra coarse ware cooking bowls (Gerber 2001a: 360 fig. 1.23) and Petra cooking pots with grooved rims that form a protrusion (Gerber 2001a: 360 fig. 1.20-21) suggest that the *terminus post quem* for the deposition of the pottery was the late first or early second century AD. However, the small quantities of these later cooking vessel types (0.54 percent of the corpus) could suggest that the material was dumped prior to or around the time of Trajan's annexation of Arabia in 106 AD. The absence of pottery produced outside the borders of the Nabataean Kingdom may also indicate that this homogeneous corpus represents pre-annexation material. Limited quantities of early imported fine wares, such as ESA, do reach the site, yet none were found in the E077 Square 08 assemblage. The importation of amphorae to the site does not begin in significant quantity until after the fort was established in the early second century AD. The rarity of an abrupt *terminus* for ceramics at Ḥumayma may suggest that a catastrophic destruction, possibly an earthquake, caused the vessels to be broken and subsequently discarded in the late first and early second century AD (cf. Stucky *et al.* 1995: 303; Kolb and Stucky 1993: 417).

Praetorium Room J Dump

The corpus from Room J of the *praetorium* (Area I) in Field E116, which was excavated during the 2012 season, is comprised of ceramic material dating from the first to fourth centuries AD. 4,859 sherds were recovered. As noted by the excavators above, once the hypocaust in *praetorium* Room J was dismantled, the interior of the room appears to have been used as a dump. The three soil layers previously noted by the excavators contained three distinct assemblages of ceramics. All three layers contained material produced from the first to fourth centuries AD.

The lowest (non overlapping) layer of the dump (Loci 1209 - 1210) yielded the smallest quantity of sherds. As noted by the excavators, this layer was formed when the hypocaust bricks

were robbed out for reuse in other buildings at the site. The ceramics date primarily to the first to third centuries AD; however, some vessels have production periods that extend into the mid-fourth century AD. Of the 135 sherds collected, only four were manufactured outside of the Province of Arabia. One sherd was identified as a Class 47 amphora; the three other amphora sherds have not yet been identified. The Nabataean Fine Wares included the most commonly identified forms at Ḥumayma. There were three carinated bowls, two hemispherical bowls and one notched rim bowl (Schmid 1996: 189 abb. 663-667). Only one Nabataean Painted Fine Ware sherd was collected. This was identified as Schmid's Dekorphase 3c, manufactured during from the early to mid second century AD (Schmid 1996: 209 abb. 702-704). The cooking wares revealed the widest variety of forms. Two cooking pots manufactured from the late first to third centuries AD with rims that are squared and overhang the exterior were recovered (Gerber 2001a: 360 fig. 1.18; Lindner *et al.* 2007: 246 fig. 10). Two triangular rim cooking pots were also identified (Gerber 2001b: 11 fig. 2.A-G). A Late Roman casserole form that was in use from the second century into the mid-fourth century AD at Petra was also recovered from Locus 1210 (Gerber and Fellmann Brogli 1995: 652 fig. 5.10). A cooking lid that typically accompanies this casserole form was found in Locus 1209 (Gerber and Fellmann Brogli 1995: 652 fig. 5.7-8). The three remaining diagnostic cooking sherds were of a cooking pot form with a rounded rim and offset neck dated to the second and third centuries AD (Gerber 2001b: 11 fig. 2.E).

As noted by the excavators, the middle layer (Loci 1203 - 1208) had a much higher concentration of sherds than the layers above or below it. This assemblage is the largest in terms of total sherds recovered (4,539 sherds) and yielded the widest variety of imported and locally manufactured vessel forms. It is also a thoroughly mixed layer, including ceramics commonly manufactured from the first to mid-

fourth centuries AD.

Among the amphorae sherds recovered, Class 45 (nine sherds) and Class 47 (eight sherds) were identified. There were also 39 sherds identified as Gaza ware jars or amphorae, 36 fragments of which were from the same locus and are likely to be from the same vessel.

As regards fine wares, the only fragments (three sherds) of ARS ware recovered from *praetorium* Room J were found in this deposit, including one rim sherd of Hayes' Form 50A, produced from 230 / 240 to 325 AD (Hayes 1972: 62-73). All of Schmid's Dekorphases from 2c to 4, which were manufactured from the beginning of the first to the beginning of the fourth centuries AD, were identified (Schmid 1996: 205, 207, 209 abb. 698-706). The only two unguentaria sherds from Room J were recovered from this layer. The common bowl forms, carinated (seven sherds) and hemispherical (three sherds), were represented in this assemblage. Nabataean Fine Ware cups with beaded rims and globular bodies (40 rim sherds) were recovered (Erickson-Gini 2010: 119-25). Eleven fragments of a cup type with a globular body, an offset neck and a bevelled rim were identified (Schmid 2000: abb. 263, 301-302). The middle layer also yielded several ovoid lamps (discussed above) dating from the late second to early fourth centuries AD.

As was the case for fine wares, the middle layer also yielded a variety of cooking vessel forms. One complete cooking pot with a short neck and simple rounded rim is comparable to the cooking pot from az-Zanṭūr that was found in the destruction layer from the earthquake of 363 AD (Gerber and Fellmann Brogli 1995: 655 fig. 10; Fig. 35.1). Casseroles (27 sherds) with vertical sidewalls and two horizontal loop handles produced from the second to fourth centuries were recovered (Fellmann Brogli 1996: 257 abb. 773-774). Examples of cooking lids (seven sherds) were also recovered. The cooking pots manufactured in the second and third centuries, which were also found in the lowest layer, were the most common cooking pots found in the middle layer, with 24 sherds of

the form with a squared, overhanging rim and 31 sherds of the vessel with a rounded rim and offset neck identified. The remaining cooking vessels were of common types, including triangular rim cooking pots (three sherds) and the cooking pot form with a slight groove on the rim (11 sherds), a form that was manufactured from the late first to fourth centuries AD (Fellmann Brogli 1996: 244 abb. 734-735).

The coarse wares found in the middle layer were unique to this room. Several fragments of a hemispherical bowl with holes punched out, presumably for straining, were recovered (**Fig. 35.2**). Late Roman jar and jug forms found at az-Zanṭūr well into the fourth century AD were identified, including two sherds of a globular jar with a groove under a folded rim (Fellmann Brogli 1996: 251-251 abb. 760-761) and one example of a cylindrical jug with a grooved neck (Fellmann Brogli 1996: 266 824-825). Finally, a coarse ware version (11 sherds) of the Nabataean Fine Ware cup with a bevelled rim and offset neck was found, sometimes with traces of charring on the outside, suggesting that it may have been used for cooking.

In the uppermost layer of the dump (Loci 1201 - 1202), 185 sherds were processed. Only 12 of the 185 sherds were imported from outside the Province of Arabia. As in the middle layer, Class 45 (ten sherds) and Class 47 (one sherd) amphorae were identified. Of the diagnostic Nabataean fine and coarse ware sherds processed, several common forms were identified, including two sherds of Nabataean Fine Ware carinated bowls. No Nabataean Painted Fine Ware sherds were recovered from this layer. Among the cooking vessel forms identified there were two triangular rim cooking pots, one grooved rim cooking pot (Gerber 2001a: 360 fig. 1:20-21; Fellman Brogli 1996: 242 abb.730) and one cooking pot with a slight groove on the rim, similar to the form from the middle layer. Whereas the amphorae and the cooking pots have production periods that extend to the mid-fourth century AD, the fine wares are residual sherds of the first century AD.

Conclusions and Future Plans (Reeves, M. B.)

The 2010 and 2012 excavations have contributed a great deal of data about the Nabataean, Roman and Byzantine period structures that existed in the vicinity of the Roman and Byzantine fort. Most importantly, Field E077, which contains several phases of Nabataean structures, a Roman, Byzantine and perhaps Umayyad bathhouse, and a mid-twentieth century domestic structure has now been fully excavated and its finds are undergoing analysis. In addition to the analysis of traditional finds, the Ḥumayma Excavation Project has been conducting an analysis of the ceramic building materials from this field and other areas at Ḥumayma since 2011. The resulting typologies are clarifying the phasing of Ḥumayma's structures. The ceramic building material assemblage from the heated room in the *praetorium* of the Roman fort is particularly interesting as it is distinct from the assemblages in the bathhouse and indicates a different phase in the importation of these artifacts to Ḥumayma. In addition, the excavation of the only heated room in the Roman commander's house, which was undertaken primarily to retrieve ceramic building materials, has contributed new information relating to the function and phasing of this special room in an elite Roman domestic structure. Finally, although the buried mudbrick structure in Field E128 has only been partially excavated, these limited excavations have contributed new information about the design of this mudbrick structure and the extent of the Roman civilian community (*vicus*).

After several years of excavation in the *vicus* adjacent to the Roman fort, there is now enough data to begin the final analysis of this area. Our plan is to spend the next few years focusing on the final analyses of the architecture, finds and stratigraphy from the previously excavated fields in order to prepare a volume on the Nabataean town and Roman *vicus* to be published in Ḥumayma Final Report series. In the meantime, limited fieldwork will likely be undertaken to answer questions generated during the final report preparation.

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