IMTO – Italian Mission to Oman

University of Pisa

SUMHURAM

Preliminary Report

October – November 2012 (SUM12C)

PRELIMINARY REPORT (SUM12C)

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The third IMTO's campaign of 2012 (SUM12C), under the direction of prof. A. Avanzini, started on 8th October and finished on 29th November 2012.

The main goals of the excavations have been focused in area A –easternmost part - (room A188 and adjacent area), in area A -central part- (building BA12, partly excavated by AFSM, and building BA13), in area F – eastern part- square A20.

The restoration activities have been carried on at the main entry of the city (rebuilding and rising up of the wall M5, rebuilding of the wall M4 and reopening of the postern gate located between the walls M4 and M14), and along the western side of the city wall (rebuilding and rising up of the wall M460). Beside these works, the restoration of the inner corner of the wall M4 (where is located one of the inscription of the city) has been stabilized by the insertion of two different level of stones.
The restoration of the wall M460 can be considered a huge intervention that involved the dismantling, the reconstruction and the rising up of the wall in order to reach the level of the internal face of the wall itself and the restoration of the walls of the existing rooms (A172 and A173) on top as well as the restoration of the internal face of the walls M118 and M117.
The consolidation and restoration of ancient masonry structures has been done by arch. Andrea Filatondi and arch. Valter Filatondi who participated to the previous campaigns SUM12A and SUM12B during the reconstruction of the southern side of the city wall and to the demolition of the modern staircase located between southern and western sides of the city wall.

The excavations were conducted on the field by dr. Vittoria Buffa, Carlotta Rizzo, Giulia Buono, and arch. Enrica Saglia.

The consolidation and restoration of ancient masonry structures has been done by arch. Valter Filatondi and arch. Andrea Filatondi.

The work of IMTO has been possible thanks to the collaboration of the Office of the Adviser of His Majesty the Sultan for Cultural Affairs in Muscat and in Salalah, in particular Doctor Said Al Salmi, Hassan Al Jabri, Ghanem Al Shanfari, Said Al Mashani, Ali Al Kathiri.

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Archaeological Report

Excavation in area A: rooms A188 and A194 and connection with entrance of building BB2 (trench supervisor: Vittoria Buffa)

During the SUM11C campaign the area East of wall M486 was shortly cleared. During the SUM12C campaign the area of excavation was extended to the East for roughly 11m x 5m and excavation was completed down to the level of US516floor left *in situ* in street A113.

Fig. 1. Area before excavation

Fig. 2. Rooms A188 and new room A194 after excavation

Room A188

The removal of the superficial deposit US458 was completed. In this area the surface of US458 was sloping down from East to West from 31.25 m to 30.77 m. US458 consisted of reddish brown loam, incorporating animal bones, some shells, some fish vertebrae and some pottery (some glazed fragments). Some very large amorphous limestone blocks were found in the eastern part of the trench; they were also emerging from the deposit underneath. Near M362 some plaster fragments with some geometric motifs were collected (D30). No floor was detected, but the average elevation of the base of US458 was 30.50 m.

The deposit under US458 has been denoted as US534. US534 consisted of grayish loam, rather crumbled. In it many animal bones, few shells, some pottery (one glazed bowl), some stone tools: a polisher (S1865), a mortar (S!867), a softstone vessel (S1861) a handstone (S1866), a bead made from a fragment of glazed vessel (C139), an incense burner (S1876), a fragment of an alabaster vessel (S1904), some fragments of softstone vessels, and some iron slags.

US534 incorporated still some of the very large amorphous limestone blocks mentioned above and some roughly dressed limestone blocks fallen from the surrounding walls. The removal of a small portion of US534 uncovered the continuation of wall M534 to the East. The NW-SE wall M534, about 9.30 m long and 0.60 m wide, has an opening to the South, 1.50 m wide; the sides of the opening were made of well dressed limestone and sandstone blocks. Another wall (M552) was uncovered; it had a N-S direction, and was leaning on wall M360 of building BA9, room A136. Wall M552 was 2.60 m long and 0.50 m wide. The newly discovered walls defined the room A188 with external walls: M486 to the W, M534 to the South , M552 to the E, and M362 of building BA9, room A136, and M538 (already uncovered in previous campaigns). Wall M552 had a door connecting room A188 with an adjoining room A194 (see below).

US534floor was reached at the average elevation of 30.00 m. The door, 0.30 m wide, connecting the two rooms had a threshold made of a well smoothed limestone slab and a limestone block at the

elevation of 30.06 m. US534floor had been disturbed by the falling of the very large blocks. Where preserved, the floor was well trumped with medium size pebbles and topped with limestone slabs. In some area of A188 unstructured fireplaces , marked by ashes and burned pebbles, were present. We can conclude that during the accumulation of US534 the room has been abandoned as a structure, but still frequented as attested by the fires and the few finds. The reason of the presence of the very large unworked limestone blocks inside the area remains unclear. Similar blocks were uncovered excavating the junction between streets A45 and A113, more or less at the same levels and also in other areas of the city. Very heavy to transport, they could have been transported there to be later dressed for masonry work. The largest block still in situ in the room presents in its upper surface a series of smooth, shallow cavities.

Fig. 3. Large limestone block in room A188

These appear natural, as observed on the bedrock around the site and on a block of similar size on the shore at bay at Khor Rori. Similar blocks with shallow cavities , but roughly shaped, constitute the benches lying along M11 in area A2 of the Gate Complex.

On floor US534 a rectangular structure (M557) was built against wall M362. Made of one single row of limestone blocks , it was 2.00 m long and 0.80 m wide, raising from the floor for a height of about 0.50 m. Four *chlamys townsendi* shells (Sh433), commonly used in Sumhuram as oil lamps, and two *strombus* shells (Sh434) stood on its surface. A similar structure has been found in building BA4, room A32. There a storage pedestal bowl was lying on the surface. M557 has been removed after documentation.

Slightly raised from US534floor a curved solid structure (M487) had been built in the corner between M486 and the southern wall of room A112. It was made of rows of roughly dressed limestone blocks filled with lime chips. Like similar structures in the city, it was built to sustain wall 263 in danger of collapse. M487 was removed after documentation to clarify the relation between M486 and M559.

US547 was excavated under US534floor. The deposit US547 consisted of reddish brown crumbled loam with areas of fire , ashes and burned pebbles. It incorporated animal bones, few fish vertebrae and iron slags. Fragments of pottery vessels included glazed shards and some amphorae. Among the small finds a pendent (B81), a loom-weight (S1870), a fragment of a glass vessel

(G171), a fragment of a softstone vessel (A1877) and a crucible (G173) and some fragments of softstone vessels. US547floor was reached at the elevation of 29.57 in the middle of A188. It was made of hard packed grayish loam incorporating white specks; in some areas it was trumped with small stones. On the floor lines of well dressed limestone blocks protruding from the base of walls M534 and M486 were visible.

The meaning of the row of blocks protruding from walls M486 and M534 became clear removing US547floor. In the opening in wall M534, under US547floor, a massive wall (0.95 m wide) was uncovered (M563). A second massive wall (M559) was uncovered next to wall M486.

US548 was excavated under US547floor. It consisted of reddish brown loam, rather fine. In US548 several pottery fragments, some animal bones and fish vertebrae. Among the small finds: a crucible (G172) a bead (Sh436). US548floor was reached at the average elevation of 29.35 m. The floor was made of very hard packed grayish to reddish loam mixed with tiny white lime specks. The impression was that of plaster. On the floor two fragments of Dressel 2-4 amphorae and two rims of "Indian" cooking pots were found. On the floor a platform (M564) 1.30x0.85 m 0.52 m, raised from the floor for 0.52 m, was made of sandstone oblong blocks. It was connected to wall M538 by two rows of sandstone blocks. Along M538 another row of blocks was followed to the end of the wall and turned North, making an angle to meet a threshold made with a large, well smoothed block. The threshold was set at the elevation of 29.58 m. In front of wall M362 a large block, 0.73x030m, (a threshold?) had two holes on one side and another larger one on the other side; it was slightly higher than the US548floor. In the corner of walls M362 and M552 a large fireplace (M565) was made of two rows of sandstone blocks; it was 2.50x1.20 m. Inside the fireplace grayish brown loam , charcoal, limestone chips, few animal bones. The fireplace was set directly on US548floor.

US548floor was left *in situ* at the end of the SUM12C campaign.

Fig. 4. Room A 188, Fireplace M565

Room A194

In room A194 the deposit US543 was excavated under US458. It corresponds to US534 in room A188. It consisted of fine, compact dark brown loam. Like in room A188, some very large unworked limestone blocks were present in the deposit. US543 was marked by areas of fire with very loose dark brown loam with ashes. Some pottery shards, some bones, a polisher (S1853), two loom weights (S1882, S1883), a fragment of a stone vessel (S1884) and some iron slags were found in the deposit. US543floor was badly preserved; it was reached at the elevation of 29.93 in the middle of the room.

Underneath US543floor, the deposit US549 was excavated. It consisted in loose, reddish brown loam incorporating some medium size stones, ashes, burnt pebbles. Also in this area the deposit was badly disturbed by the presence of very large limestone blocks. In US549 many animal bones and pottery shards, including amphorae fragments and several glazed shards; a polisher (S1885) was also found. Covered by US549 was a NW-SE wall (M560) dividing the room in two parts. M560 had a base of limestone blocks and a upper part made of mud bricks. The door between the two rooms was at the eastern end of the wall and was marked by a sandstone slab, well smoothed. The southern part of room A194 was designated room A194a, the northern part room A194b.

Room 194a

In room A194a US551 was excavated under US549. It consisted of rather fine reddish loam, compact with areas of ashes and burnt pebbles. Removing some 20 cm of layer, a row of blocks protruding from wall M534, like in room A188, was uncovered. US551floor was reached at the elevation of 29.65 m. It corresponds to US547floor in room A188. It was made of packed reddish soil. Several pottery shards were recovered , among them some glazed fragments; animal bones were also found. In US551 many stone tools were recovered: a grinding stone (S1891), four handstones (S1889, S1892, S1894, S1895), two whetstones (S1890, S1897), a mortar (S1896), a bronze pin (MB695).

Removing US551floor a row of stone blocks was uncovered under M534 and under M553. They are the continuation of wall M563 in room A188. Under US551floor, the deposit US554 was excavated. US554 consisted in crumbled reddish brown loam. Pottery shards, iron slags, animal bones were recovered. Some stone tools were found (S1907, S1910, S1911) and a mortar (S1912). US554floor was reached at the elevation of 29.32 m. It corresponds to US548floor in room A188. The floor was grayish hard packed loam with some small over fired lamps of clay underneath. A platform (M566) stood on the floor; it was made of sandstone blocks, 1.10 m long and 0.50 m wide, similar to the one discovered in room A188 (M564), on the corresponding floor US548.

US554floor was left *in situ* at the end of the SUM12C campaign.

Room A194b

In the northern room, US552 was excavated under US549. It corresponds to US551 in room A194a. It consisted of crumbled reddish brown loam. Several small finds were recovered: one oil lamp (Sh438), two handstones (S1886, S1888), a fragment of a softstone vessel (S1887), a netsinker (S1906), a pendent (Sh442) and a bead (Sh443) and few pottery fragments and some iron slags. US552floor was reached at the elevation of 29.56 m. It was lined with mudbricks. Because of the presence of many fires in the room the mudbricks were burnt to a red color.

The layer US553 was excavated under US552floor. It consisted of crumbled, reddish brown loam. A *strombus* shell (Sh439), three oil lamps (Sh441, Sh445, Sh446)), a bronze ring (MB699), a fragment of glass vessel (G176), a clay stopper topped by plaster (Cl141), probably for an amphora, and some stone tools: a polisher (S1913), a handstone (S1916), two whetstones (S1917, S1918) were found. Some pottery shards were also recovered. US553floor was reached at the elevation of 29.24. It corresponds to US554floor in room A194a and to US548floor in room A188. Like US548floor in room A188, it was made of a thick hard layer of clay/mud mixed with tiny angular fragments of limestone. The appearance is that of light grey hard packed surface, but where

broken it reveals a reddish kind of mortar underneath (intentionally exposed to heat of fire??). US553floor was left *in situ* at the end of the campaign.

Fig. 5. Rooms A194a and A194 b

Trench to connect room A188 to the entrance of building BB2

A trench, 1.50 m wide, has been dug in the deposits outside room A188 to reach the entrance of building BB2, excavated during the previous campaigns. The trench started from the opening in wall M534 at the level of M563 and was stopped before reaching the threshold marking the entrance to building BB2, leaving a bulk 0.80 m wide. The excavation reached the elevation of 29.37 m. No structures were found in the trench and very few findings were recovered (few bones and very few pottery shards). The excavation proves that the street A113, at the level of US516floor (=US22floor), turns SE after the corner between M559 and M563 of room A188 and continues in a SE direction at least passed building BB2.

Preliminary observations

Lowest level reached so far in rooms A188 and A194.

The massive walls M559 (0.93 m wide), M563 (0.95 m wide) , the wall under M553, walls M358 (0.93 m wide), M360 (0.70 m wide) and M362 (0.90 m wide) -all plastered- are probably originally the walls of a single room. Walls M538 in the northern part of room A188, narrow wall M552 dividing the area in two rooms (A188 and A194) and narrow wall M560 dividing again A194 in rooms A194a and A194b are probably additions made not long time afterwards. Wall M538 closing the room to the North appears also to have been built sometime afterwards. The entrance to the hypothetical large single room was originally from the North, from room A147, where a threshold, 1.66 m x 1.10 m, height 0.35 m is visible under unexcavated room A147.

The lowest floors excavated so far in the rooms in question (US548floor in A188, US554floor in A194a, US553floor in A194b) can be stratigraphicaly related to the floor US516 in street A113.

US516floor equals US22floor in streets A45 and A75; it marks the renovation of the city in the second phase of the life of Sumhuram.

The next constructional phase in the investigated area is marked by the construction of new narrower walls on top of the massive ones (walls M486, M534, M553). Also the entrance to room A188 is changed with the opening to the South on wall M534. On street A113 it corresponds to US508floor. This floor has been put in relation with US29floor in streets A45 and A75.
Short afterwards the abandonment at least partial of the area began, as can be proven by the presence in the deposits of the very large limestone blocks and of blocks fallen from the surrounding walls. Nevertheless the two rooms remained at least partially in use as proven by US534floor (room A188) and US543floor (room A194). The nature and function of the two rooms needs further investigation in the surrounding area, since for their characteristics they cannot be assimilated to the rooms of the residential buildings, known so far in Khor Rori.

Excavation in area A/B: BB2, removal of the N-S trench in square A184 (Trench supervisor: Giulia Buono, Carlotta Rizzo).

During the excavation in area A we decided to connect the rooms A188 and A194 with the entrance to building BB2 in square A184. Therefore to make visible the buildings for the tourists, it was necessary to remove the superficial layer in square A184 between M522 and M516 in order to change the position of the path.

During the excavation of US530 we observed the presence of substantial traces of burnt and stones of medium and small sizes, collapsed maybe from the walls. In US530 we found some stone tools, a bronze plaquette (MB720), a bronze nail (MB721), a bronze needle (MB722) and a spindle-whorl (Sh458).

At the end of the work the area has been cleaned and the path bordered with stones.

Fig. 6. Trench before excavation from the West

Fig. 7. Square A184 after excavation with the path from West

Excavation in Area A: building BA12, rooms A192, A195, A198, A199 (trench supervisors: Giulia Buono and Carlotta Rizzo)

Building BA12 has been in part investigated during the campaign SUM 11C. The purpose of this campaign in this area was to complete the work in the eastern part of the building. Previously the area of the building had been the object of excavation by the AFSM. The report of AFSM's excavation relates that rooms A198 and A199 had been excavated as a single room, and room A195 had not been excavated (V K24 in Albright 1982, p.35).

Fig. 8. BA 12 before excavation.

Room A195

The superficial layer that covered the all area was previously identified as US507. The upper elevation of this layer before the SUM12C campaign in the area of room A195 was 30,42 m. US507 consisted in brownish gray, medium compact loam, incorporating some limestone blocks (about 0.65x0.20x0.15 m), fallen from the surrounding walls. In US507 some findings were recovered: bones and shells, some fragments of pottery, some iron slags, a coin (Co745), an earring (MB687), a whetstone (S1855), a spindle-whorl (S1856), a mortar (S1868) and a grinding slab (S1869). After the removal of US507 the room A195 was identified. Room A195 cover a surface of about 3,8 square meters and it is delimited by walls M550 (l. 10,10), M554 (l. 2,65), M555 (l.8,55), M556 (l.1,85).

Room A195

The room was defined by walls M555 to the East, M556 to the North, M550 to the West and M554 to the South.

Under the superficial deposit US507, US546 has been excavated. Its upper surface was set at the elevation of 29.96 m. US546 was composed of a reddish brown, medium compact loam. Some pottery fragments, some animal bones, few shells, some iron slags were found. Among the small finds: a bead (Cl140), a fragment of a mirror (MB690), two handstones (S1871, S1875), a loom-weight (S1872), a polisher (S1874) and two coins (Co749, Co751). US546floor was reached at the elevation of 29,72 m. US546floor was made of whitish gray and very compact loam.

The southern part of room A195 was filled up with large limestone blocks. The same situation had been observed in the SUM11C campaign in room A192. After the removal of US507 in the southern area to A195 a layer made of a quantity of limestone blocks fallen from walls has been brought to light and it seems the same situation of collapse like in the southern area of A192. The presence of the quantity of blocks prevented the clearing of the area South of wall M554 where possibly another room (elevation 29.70m) is present with a probable door from room A192.

Fig. 9. Room A 195 from South

Room A192

The southern part of the room was cleaned in order to identify the southern wall closing the room. Under US507 US542 was removed. It consisted mainly of the collapse of limestone blocks mixed with some reddish loam. US542floor was identified at the elevation of 29,31m. The floor has not be preserved in all the room. It is compact grey in color. It seems that there was a door connecting room A192 with an eastern room. Here the collapse of blocks made impossible to carry further the excavation during this campaign.

Room A198 and room A199

As mentioned above, the space occupied by the two rooms had been tested by the AFSM. Afterwards debris of different nature had filled up the space. The area, during the SUM12C

campaign, was cleaned. This operation allowed the identification of a wall (M558) dividing the space in two rooms: the northern room A199 and the southern room A198.

Fig. 10. Building BA12 after excavation

Excavations in area A/F: new building B13, rooms A 166, A 196, A 197, A 200, A 201. (Trench supervisor: Vittoria Buffa, Carlotta Rizzo with Giulia Buono)

During the SUM12C campaign the area South of rooms A 166 and A 170 was excavated . Room A170 had completely excavated during the SUM11A campaign; room A 166 only partially during the same campaign. This year the operations started with the removal of US 480, a layer made of collapse of well-dressed stones, of medium and big sizes, and some sandstones. After the removal of this collapse, it became clear that rooms A166 and A170 belong to a large building, now designated as BA13. Four new rooms has been discovered: rooms A 196, A 197, A 200, A 201.

Fig. 11. BA 13 before excavation

US 480, l 8-9

US480 was the deposit that covered all the investigated area. The superior elevation was 30.70 m. It was made of brownish loam and a lot of well-dressed stones, of medium and big sizes, and some sandstones. Pottery, some animal bones, some shells, and many iron slags were recovered. Also some nice small finds like two beads (Sh 444, S 1899) and several coins (Co 746, Co 747, Co 755, Co 757, Co 758, Co 759, Co 760, Co 761) were found, along with stone tools and an iron nail. Outside building BA13 we also found some fragments of pottery, a polisher (Cl 142), a small lid (S 1953) and a spindle whorl (S1954). During the cleaning of the southern section a new wall was discovered. The last days were dedicated to the cleaning of the southern part outside BA 13. Here we removed some superficially stones and we found a big mortar, left in situ (fig.13)

Room A166

The excavation of the room already partially investigated during the SUM11A campaign, was completed. The room is delimitated eastward by wall M 490, westward by M 492, northward by M

485 and southward by M 569. A threshold made of mudbricks was marking the entrance from room A166 to room A196. It was set at an elevation of 29.71 m; no floor was detected at this height in the room. Mudbricks were present at the elevation of 29.26 m; the presence of US483floor was confirmed at the elevation of 29.05 m. The room it's divided by a small wall made of mud- bricks. We found some pottery, some iron slags, some bones and shells. A nice fragment of glass (G 175) a small bronze needle (MB 698), a stone tool (S 1921), a coin (CO 763) one bronze plaque (MB 704), a clamp (MI 197).

Room A196

Room A196 is the room South of A 170. Below the collapse US 480, here 30- 40 cm thick, the deposit US 544 was excavated**.** It was made by reddish brown and soft earth. US544floor was set at the elevation of 29.86 m. The floor was compact, grey in colour, with some crumbled mud-bricks. It was badly preserved, just in some parts of the room. No small finds, but some bones and shells and few fragments of pottery. The mudbrick threshold connecting room A166 and A201 must have been related to this floor that was not present in A166.

The room was divided from room A201 by a limestone threshold and some mudbricks that suggested a kind of light wall in the same position as wall M568 dividing room A197 from room A200. The room had an access from outside from the west with a door marked by a threshold (55x20 cm at an elevation of 30.00 m) in wall M494.

Below US 544 floor, the deposit US 558 was excavated. It was made by compact e dark brownish loam with some mud bricks.

Room A197

Room A197 is South of room A196. It was delimitated northward by M 567, eastward by M 568, southward by M 561, westward by M 494. A door in M 568, 0.84 m wide, connects the room with the eastern room A200. After the removal of US 480 and of all the limestone blocks and small sandstones, the deposit US 545 was excavated. It was reddish brown in colour and quite soft. US545floor was reached at the elevation of 29.96 m. It was very compact and grey in colour, like US 544 floor. We found few fragments of pottery, and one coin (Co 752). Under US 545 floor the deposit US560 was excavated. US560 consisted of reddish brown, very soft loam, with charcoals. Few fragments of pottery and several animals bones were recovered. Among the finds: stone tools (S1914, S1974), two bronze object (MB 715, MB 717), an oil lamp (Sh452), a coin (Co772). US560floor was reached at the elevation 28.92 m. The floor is very compact, reddish grey in colour with several white inclusions and some charcoals.

Room A 200

Room A200 is the south-eastern room of the building. It is delimitated northward by M 562, eastward by M 490, southward by è 561**,** westward by M 568. In M 562 a door, 0.80 m wide connects the room with room A201. Under the superficial layer US480, the deposit US 555 has been excavated. It was made by reddish brown earth with few limestone many medium and small blocks of sandstone, some of which dressed. No pottery was found, but one coin (Co 753) , two small sandstone pillars (S 1932, S1933), one needle (MB 702), and one hand stone (S 1915) were recovered.

US555floor has been set at the elevation of 29.86 m. The floor consisted in very compact, grey loam, very similar to US 544 floor. In some parts the floor was badly disturbed by the presence of many sandstone blocks, which were probably likely the result of a collapse from surrounding walls. In the western part of the room there was a series of small sandstone slabs fitted upright in the hard packed floor.

US559 was excavated under US555. It was made by brownish soft loam. Few fragments of pottery were recovered. Under M 562 there was several charcoals and some burned bones. US559floor,

very badly preserved, has been identified at an elevation of 28.77. It is light grey in colour with some charcoals.

Room A 201

The room is the central room of the building. It is delimitated northward by M 569, southward by M 490 and westward by M 562. After the removal of the collapse of US 480, the deposit US 556 was excavated. It consisted of dark brownish earth incorporating many well-dressed stones, of large and medium sizes. At an elevation of 29.75 we found some crumbled mud bricks. Some pottery fragments and few objects have been discovered: one coin (Co 766), a fragment of soft stone vessel (S1929) and an eye- stele (S 1931). US556floor has been reached at an elevation of 29.57. It was badly preserved and there was a limestone threshold in front of M 562**.** An access from outside was marked by a sandstone block (78x35 cm) at an elevation of 30.57. It constituted probably a step to reach the room through M490.

Room A 196 a

Removing US544floor in room A196 and US556floor in room A201 it became clear that in the earlier phase the area was occupied by a single room, denoted as room A196a (fig.8). The faint wall that was dividing A196 from A201 did not reach down in the deposit below; that is it was built at the same time as the floors US544 and US556. RoomA196a was in this phase delimitated to the West by M 494, to the North by M 495 and M 569, to the East by M 490, to the South by M 562. In M 495 there is a door (w. 75 cm) which connects A 196 a to A 170 and another door there is in M 569, which connects A 196 a to A 166. In this phase wall M494 closes the building from the West and the only access in the room/corridor A196a is from the East in wall M490.

Under the two floors the deposit US558 was excavated. US558 was reddish brown earth, more compact that US556; it incorporated some limestones and sandstones. Some bones and fragments of pottery, two coins (Co 762, Co 767), a stopper (S 1923), two mortar (S 1924, 1925) and a fragment of stone basin (S 1930) were found. At an elevation of 29. 34 we found a fireside (0.40 m x0.53 m) under M 567. Some charcoals and burned bones were present in the rest of the room. US558floor has been reached at an elevation of 29.06 m. The floor is compact, light brown in colour with some white inclusions. In the eastern part of the room a small block (base for a pillar?) stands at an elevation of 29.22. During the cleaning of the floor we found a seal pendant in soft stone (S 1933), with four incised letters.. Under M 567 a kind of wall made of hard packed loam and undressed limestone blocks (fig. 12). In the western part of the room, in the corner between M 494 and M 567 there is a big fireplace with a large threshold (80x 24 cm).

Fig. 12 A 196 a from West

Fig. 13 Mortar found in surface (1-8)

Preliminary observations

The latest occupation of the building was detected by some traces of floors, not preserved in all rooms, and some thresholds. These layers were very disturbed by the presence of blocks collapsed from all walls (US545floor, US555floor, US544floor, US556floor). Only in room A197 the upper floor (US545) was clearly visible. This late scanty occupation seems to have taken place after a period of abandonment of the building. In the top layer in room A200 (US 555) two sandstone pillars (beatyls?) have been found (S1932, S1933). In the top layer in room A 201 (US 556) a "eye stele" have been found (S 1931).

Underneath, in the late well attested phase, the building consisted in six rooms. The western access to the building was in room A196 with a door in wall M494; the eastern access was in room A201 with a door in wall M490. In the western part, room A196 gave access to room A170 and room A201. In the eastern part, room A201 gave access to rooms A166, A200. The access to room A197 was only from room A200 with the door in wall M562.

In the earlier phase attested so far in the excavation, a single room, a long hall (A196a) (under A196 and A201) had an opening to the outside only with a door in wall M490. From the hall A196a all the rooms of the building were accessible, except room A197 that was reachable only from room A200.

Fig. 14. BA 13 after excavation

Excavation in area F, square A20 (trench supervisors: Giulia Buono with Carlotta Rizzo)

The large square A20 in front of the *intra muros* temple has been excavated in different campaigns. According to the stratigraphy already unearthed, during the SUM12C the remaining part of the deposit still in place, was removed. The deposits US71, US56 and US54 were excavated. Pottery shards, animal bones and fish vertebrae were found. A ring base of storage jar (US56, 49) with a south Arabian letters incised before firing , pale yellow in colour and of medium compact paste has been brought to light in US56, while in US54 a conical seal-pendent with two holes and an inscription incised on the base (S1950), a coin (Co771) and a bronze plaquette (MB713) have been discovered. Wall M343 of rooms A132 and A132a of building BF7 was set higher than US54floor. Underneath and slightly covered by the wall M343 a complete mortar was discovered. It is 0.55 m high with a diameter of 0.32 m; its bottom was worn out by use. It was lying on a squared limestone basin and it was protected by one slab on one side and by a small wall of three rows. The mortar leans on a layer that is an elevation of 27.09 (in Report 2 the elevation of US54floor was 26.45-26.92) Excavation stopped at the level of US54floor.
In the southern part of the deposit, during the removal of US54, at the elevation of 27.55 we noted the presence of a layer composed by reddish brown loam with substantial traces of burnt. The layers have not been numerically differentiated. After the removal of US54, in proximity to the wall M340, at elevation 27.32 m, a badly preserved floor made by packed earth with a preparation of rubble and loam has been identified. In the interface between US54 and the previously mentioned floor we found the incense-burner S1980. After cleaning, we brought to light a small N-S wall made by two rows of stone that might continue under the section of M340 and a sandstone squared block of 60x30 cm and two stones of small sizes leaning on it (base?) (fig.17).

Fig.15. Square after excavation from West

Fig.16. Mortar in the wall M343

Fig.17. Sandstone block from the North.

Examples of findings: pottery and objects

Pottery

During the IMTO SUM12C campaign the excavations of different areas, have allowed to us to bring to light different type of objects and of pottery types.

The study of the pottery focused on the so-called diagnostic pieces as the rim, the base, the handle and the decorated walls. For each piece of pottery we compile a "pottery Index Card" where we describe the characteristics of paste, the color and the treatment of the surface. It is usual to divide the pottery into three different categories. According to their function we have: storage vessel, table vessel, kitchen vessel.

The storage vessels have thick walls, and they were used as a kind of container for transportation or for storing different kind of products. Sometimes, to make the vessel waterproof, the internal surface is coated with bitumen. The main shapes are amphorae and various types of jars and bowls. A typical storage jar found in Sumhuram is well attested in Hadramawt. The shape is oval with a ring base. The color of the paste is either pale yellow or light red, medium compact-porous with straw temper inclusions. This year we found a ring base belonging to this type of jar in area F . It has the letters *dr*ʾ stamped on the external surface of the base. We can hypothesize that it is a name that refers to the Kingdom of Qataban and it is possible that this pottery came in particular from the capital Timna. In excavation in Timna, in one storage room in the TT1, three jars bear the same seal impression on the ring base. In the TT1 two jars show the same Qatabanian proper name, the giver or the receiver of the content of the jars.

Another kind of containers for storage are the *amphorae* used for the transportation of wine from Italy and the Aegean islands, like the Dressel 2/4. During the excavation of square A 20 in Area F, we found a fragment of a Dressel 2/4, a handle with the Greek letter, *lambda*, painted on the shoulder. This is a *titulo picto* very well drawn that could indicate the capacity of the container, the price of the product or the indication of the counting of the amphora. Usually the *lambda* letter was accented to indicate the numeral 30; in effect this kind of amphora contains about 25 liters. The fabric is light red and very compact with several tiny black and white mineral inclusions; this kind of characteristics suggests an italic production, precisely from Campania.

The table vessels have a fine fabric and usually they are well fired thin-walled vessels. They may have a different surface treatment like a slip, a burnishing or a polishing. There are different kind of shapes of table vessels, like bowl, jar, jug or plate. A large amount of glazed pottery was discovered in the site. Glazed wares represent an important share of the table pottery. It has compact paste with the external surface glazed and often the internal too. The glazed surface can be greenish gold, or whitish or goldish in color. The difference of tone give us a chronological indication. The glazed pottery greenish in colour is later (2^{nd}-3^{rd} centuries AD) than the goldish one (last centuries BC)

The kitchen pottery is easy to recognize by traces of burnt on the exterior. In Sumhuram a class of cooking vessel has been recognized as being of Indian origin. These vessels are present especially in the early phases of Sumhuram. Since during the SUM12C campaign excavation has interested mainly the late phases very few examples of Indian cooking vessels have been found.

Pottery Cards

Index Nr. SUM12C US56, 49			
Provenance Area F SquareA20			
Photo			
Drawing code Nr. By S. Martelli			
Category Storage			
Shape Closed	**Type** Jar	**Preserved part** Base	**State of preservation**
Measures. Cm Diam. Base 14 Th. Base 2.3	**Color inter. Surface** Light red 2.5YR 7/6	**Color ext. Surface** Pale yellow 2.5Y 8/3	**Color section** Light red
Characteristic of paste Medium compact-porous	**Inclusions** Straw temper. Some tiny black mineral inclusions		**Method manufacture** Hand made
Surface treatment (ext.) Wet smoothing	**Surface type (ext.)** Plain		**Decoration (ext.)**
Surface treatment (int.) Smoothing	**Surface type (int.)** Plain		**Decoration (int.)**
Description/observations Three southarabian letters dr˒ are printed on the external surface of the ring base and bordered by a rectangle.			
Date 24-11-12	**Responsible** G. Buono		

Index Nr. SUM12C US56, 80	
Provenance F Square A20	
Photo	
Drawing code Nr.	
Category Storage	

Shape	**Type**	**Preserved part**	**State of preservation**
Closed	Amphora	Handle and wall	

Measures. Cm	**Color inter. Surface**	**Color ext. Surface**	**Color section**
l. 18 th. Handle 2.4 th. Wall 0.7	Light red 2.5YR 7/8	Pink 7.5YR 8/4	Light red

Characteristic of paste	**Inclusions**	**Method manufacture**
Very compact	Some tiny black and white mineral inclusions.	Wheel made

Surface treatment (ext.)	**Surface type (ext.)**	**Decoration (ext.)**
Wet smoothing	Plain	

Surface treatment (int.)	**Surface type (int.)**	**Decoration (int.)**
Smoothing	Plain	

Description/observations

The Greek letter *lambda* in painted on the external surface of the wall in the proximity of the handle.

Date	**Responsible**
24-11-12	G. Buono

Objects

As in all the excavation campaigns in Khor Rori, also during the SUM12C season many objects have been recovered. The objects are divided first for the material use in their manufacture (stone, bronze, iron, glass, shell, bone. For each material there is a different inventory. Coins have a separate inventory. Each object is assigned an inventory number; the object card is then filled with the provenience, description of the object, typology, material, shape, measures and possibly the interpretation of the function of the object. For instance in the case of stone tools, if we observe the traces of use on the surface of the tool we can classify the object according its function. So we may have rubbing stones, whetstones, hammer stones, pestle, mortar, net sinker etc. Each of these tools present different traces of use. According to their function the objects from excavation in Khor Rori so far can be classified as follows: tools, stone vessels, ornaments, weapons, objects related to cult.

During the SUM12C campaign excavation focused on two buildings (BA12 and BA13), in a space divided in two rooms, possibly with a public function (A188 and A194a and b), and on the square in front of the temple (A20). As could be expected, we found several types of stone tools (for grinding cereals, polishing surfaces, for spinning etc.) and stone vessels (for cooking) of daily use in a house , several ornaments (earrings, bracelet, pendants, beads, mirror etc). Some tools in metal were also found (knife, needle, pin, awl etc.).

Three objects can be considered the most interesting find of this campaign.

Two seal pendants made in soft-stone were found. The first one in Building BA13, room A196. It is troncopyramidal in shape with an hole in the upper part. On the bottom there are four letters from above anticlockwise, *ʾḏ sʾ ʾ*. Usually on the seals were incised monograms or names of a functionary or person, in this case it would be only four abbreviations. The second one was found in Area F, Square A20 and it is cylindrical in shape with two holes in the upper part. On the flat surface, circular in section, there is just one letter, *m*.

Another important finding is the stele discovered during the SUM12C campaign in building BA13, room A201. It is an unique piece in Sumhuram and indeed in Hadramawt. No such stelae, *eye stelae* or stelae with incised face elements, have ever been found in South Arabia outside the Minaean and Qatabanian territories. Another peculiarity of this discovery is the urban context in which the stele has been found. Considered funerary monuments, this kind of stelae are known from cemeteries, in particular from Hayd bin Aqil, the cemetery of Timna, capital of Qataban. Several *eye stelae* are also known from al-Jawf in Minaean territory (unknown proviniences).

Although not a proper *eye stele*, we have to mention one distant parallel in Sumhuram: a roughly dressed sandstone slab, 26 cm high and 20 cm wide with two incised lines representing the eyes and one vertical line representing the nose. It was found during the SUM08B campaign in US275 (S1192).

House BA13 is a large residence that was abandoned rather early. After abandonment the house, already mainly in ruins, has been occupied again. In this upper most layer other peculiar discoveries have been made: two sandstone pillars, 20 cm high, and a series of small sandstone slabs fitted upright in the hard packed floor of room A200.

Object Index Card

<table>
<tr><td>Registration Nr.

SUM 12C; US 553, 5; Cl 141</td><td colspan="3" rowspan="3">   </td></tr>
<tr><td>Provenance
Area A; A 194 b</td></tr>
<tr><td>Drawing code Nr.

X done by S. Martelli</td></tr>
<tr><td>Definition
Stopper</td><td>State of preservation
Good</td><td rowspan="2">Measures
l.
w.
h.
th. 4 cm
diam. stopper 12.2 cm</td><td>Shape
Circular</td></tr>
<tr><td>Material</td><td>Preserved part
Complete</td><td>Section</td></tr>
<tr><td colspan="4">Description

SUM 12C; US 553, 5; Cl 141. Stopper in pottery with a slip on the visible surface. It presents some tiny black mineral inclusions and some small white ones. Colour, reddish brown (5 YR 5/4). It is covered by a thick plaster.
Diam. stopper: 8.3 cm
Diam. Plaster : 12.2 cm</td></tr>
<tr><td colspan="2">Responsible
V. Buffa</td><td colspan="2">Date
07/11/2012</td></tr>
</table>

Registration Nr. SUM12C, US546,8 MB690			
Provenance Area A, BA12, A195 US546			
Drawing code Nr.			
Definition Mirror	**State of preservation** Corroded	**Measures** l. w. h. th disc 0,4; edge 0,5 diam.10	**Shape** Circular
Material Bronze	**Preserved part** Half complete		**Section**
Description Fragment of mirror with flat surface and thickened and elevated edge.			
Responsible V.Buffa		**Date** 25-10-12	

Registration Nr. SUM12C, US556,4 S1931			
Provenance Area A, BA13, A201			
Drawing code Nr.			
Definition Eye stele	**State of preservation** Fair	**Measures** l. w.20 h. 15 th.4,6 diam.	**Shape** Rectangular
Material Sandstone	**Preserved part** Half complete		**Section** Subrectangular

Description

The stele has a rectangular shape. The bottom is missing. The top and the sides are roughly smoothed. The back is rough and shows pointed chisel marks. A fragment of the base , not matching, could be identified in a sandstone block, found in the same deposit, with a recess that could be the place to place the stele.
The eyes, 4 cm wide, are rendered with incisions 0.3 cm wide. The nose is rendered with two vertical, pointed incised lines. The mouth is marked with one incised line0.7 cm long.
The so called *eye stelae* are well known funerary stelae in South Arabia. They were unknown until now in Sumhuram and Hadramawt. Only one parallel in Sumhuram can be quoted: a roughly dressed sandstone slab, 26 cm high and 20 cm wide with two incised lines representing the eyes and one vertical line representing the nose. It was found: SUM08B, US275,16, S1192.

Responsible V. Buffa	**Date** 13-11-12

Registration Nr. SUM12C, US558,10, S1933			
Provenance Area A, BA13, A196a			
Drawing code Nr.			
Definition Seal pendant	**State of preservation** Good	**Measures** l. w.1.6 h. 1.9 th.1.4 diam.	**Shape** Troncopyramidal
Material Softstone	**Preserved part** Complete		**Section** Rectangular

Description

Seal pendant of tronco-pyramidal shape with rectangular section. A hole is present in the upper part. On the bottom (ᵓd̲ s³ ᵓ)

Responsible V. Buffa	**Date** 13-11-12

Registration Nr. SUM12C, US552,7, S1906			
Provenance Area A, room A194b,			
Drawing code Nr.			
Definition Net-sinker	**State of preservation** Good	**Measures** l. 5.7 w.3.5 h. th.2.1 diam.	**Shape** Oblong
Material Stone	**Preserved part** Complete		**Section** Oval

Description

Net-sinker with oblong shape and oval cross-section. Two long notches are precisely incised on the two ends. The surface is well smoothed.

Responsible V. Buffa	**Date** 13-11-12

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

a b c d e f g h i l m n o p q

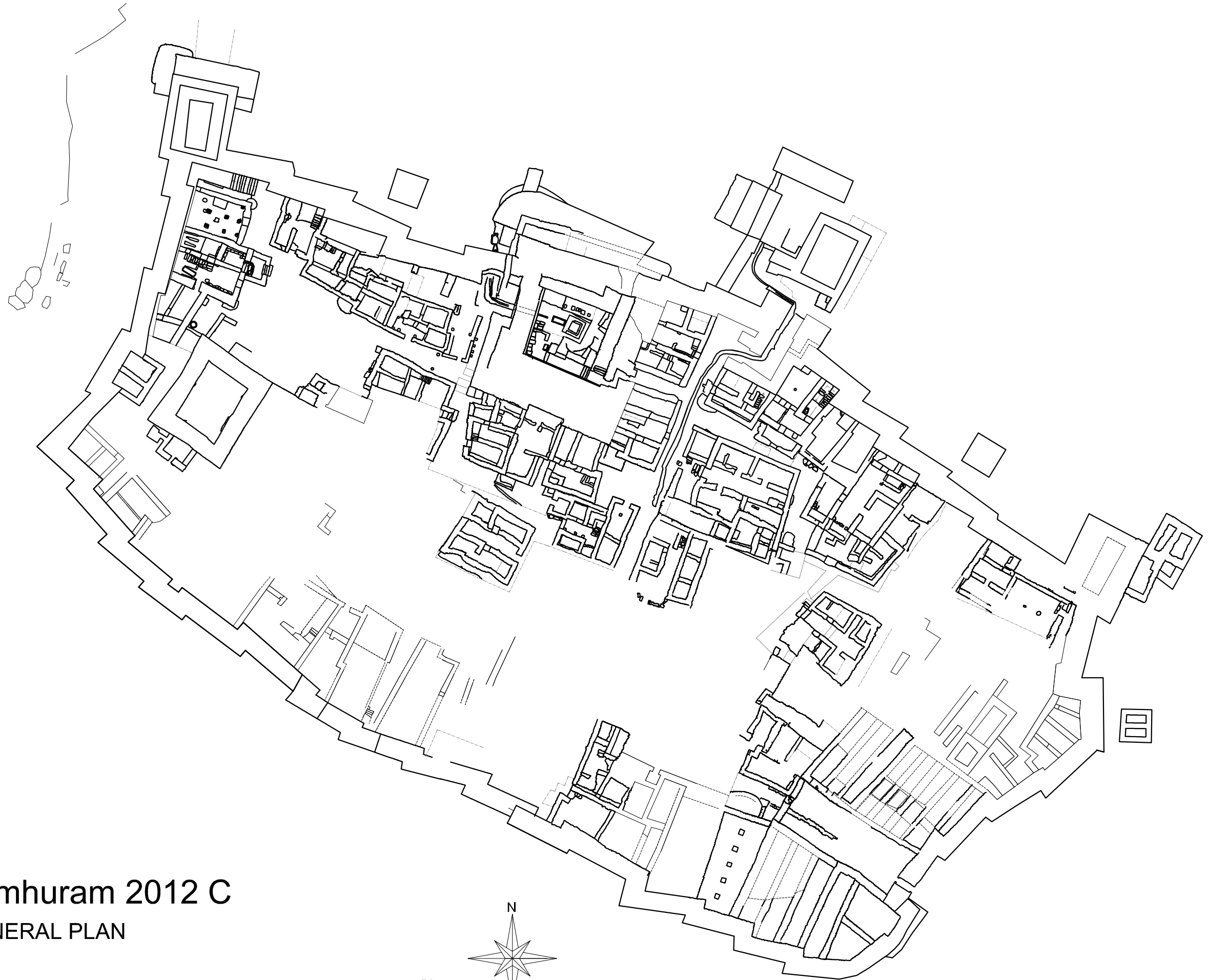
A

Sumhuram 2012 C

GENERAL PLAN

N

5 0 50m



Sumhuram 2012 C

GENERAL PLAN

M2 X = 63.3220 Y = 124.1880 Z = 29.2150
M3 X = 68.1340 Y = 180.6630 Z = 29.3470
M4 X = 108.0700 Y = 150.4640 Z = 32.5230
M5 X = 154.8560 Y = 142.7840 Z = 31.5440

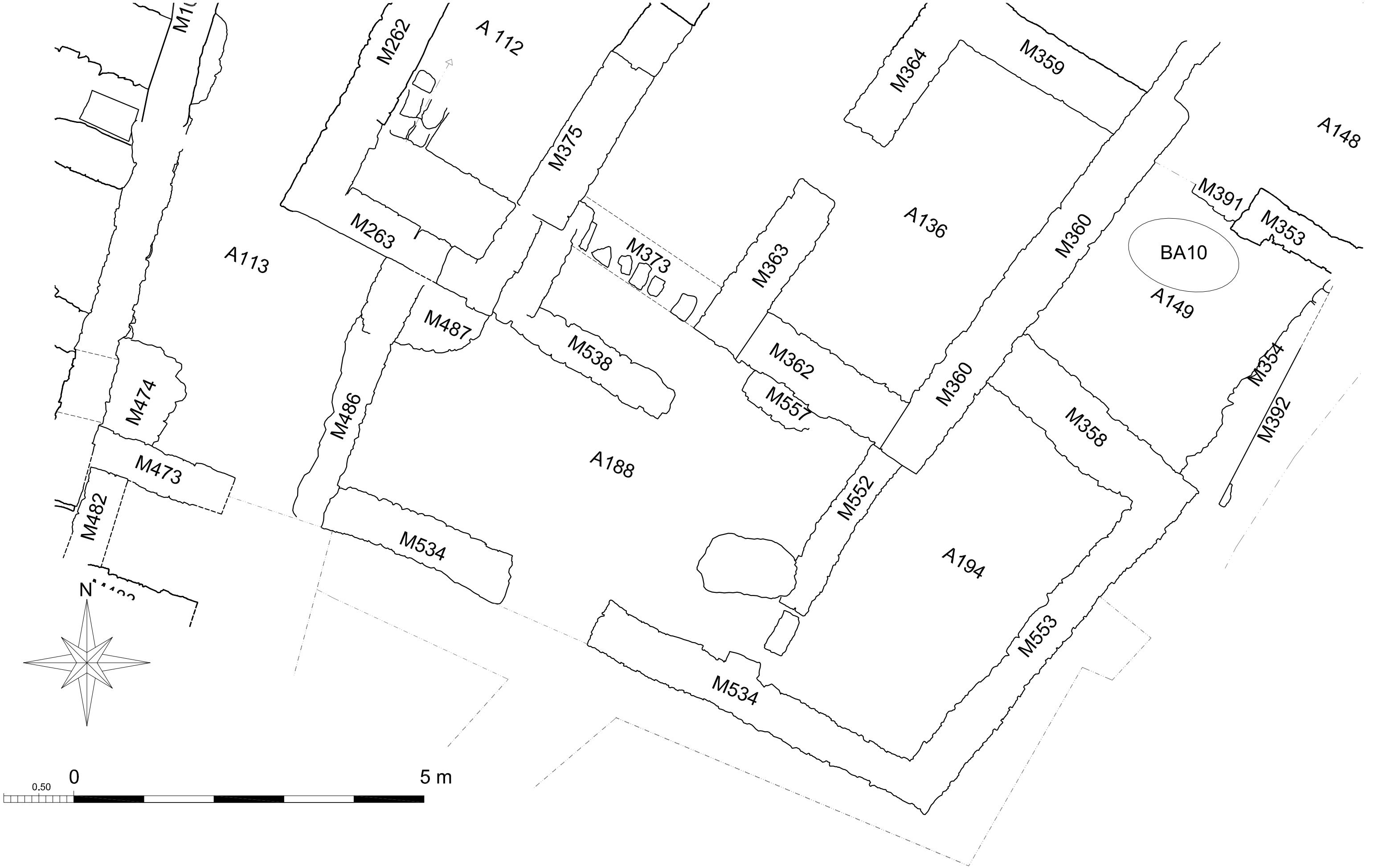
Sv1 X = 135.6390 Y = 126.4780 Z = 31.6110
Sv2 X = 120.6000 Y = 100.6670 Z = 31.4750
Sv3 X = 108.9170 Y = 130.8760 Z = 30.0460

E1 X = 85.5530 Y = 222.3211 Z = 21.8310
E2 X = 148.3190 Y = 207.6640 Z = 24.3680
E3 X = 201.7270 Y = 162.7970 Z = 22.7730
E4 X = 189.9160 Y = 108.0670 Z = 26.3480
E10 X = 17.7330 Y = 184.0410 Z = 22.3880

PUNTI FISSI

Sumhuram 2012 C

GENERAL PLAN



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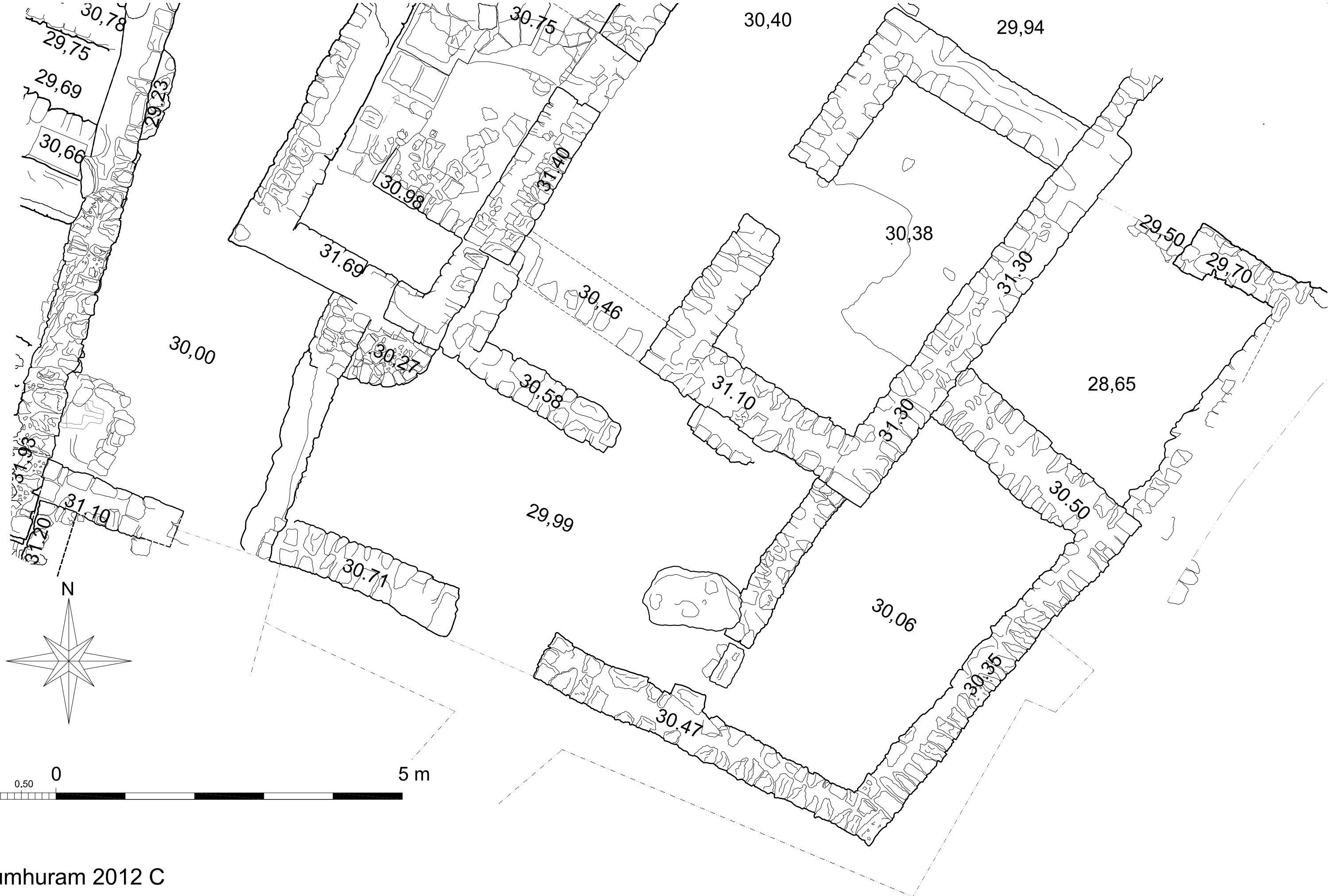

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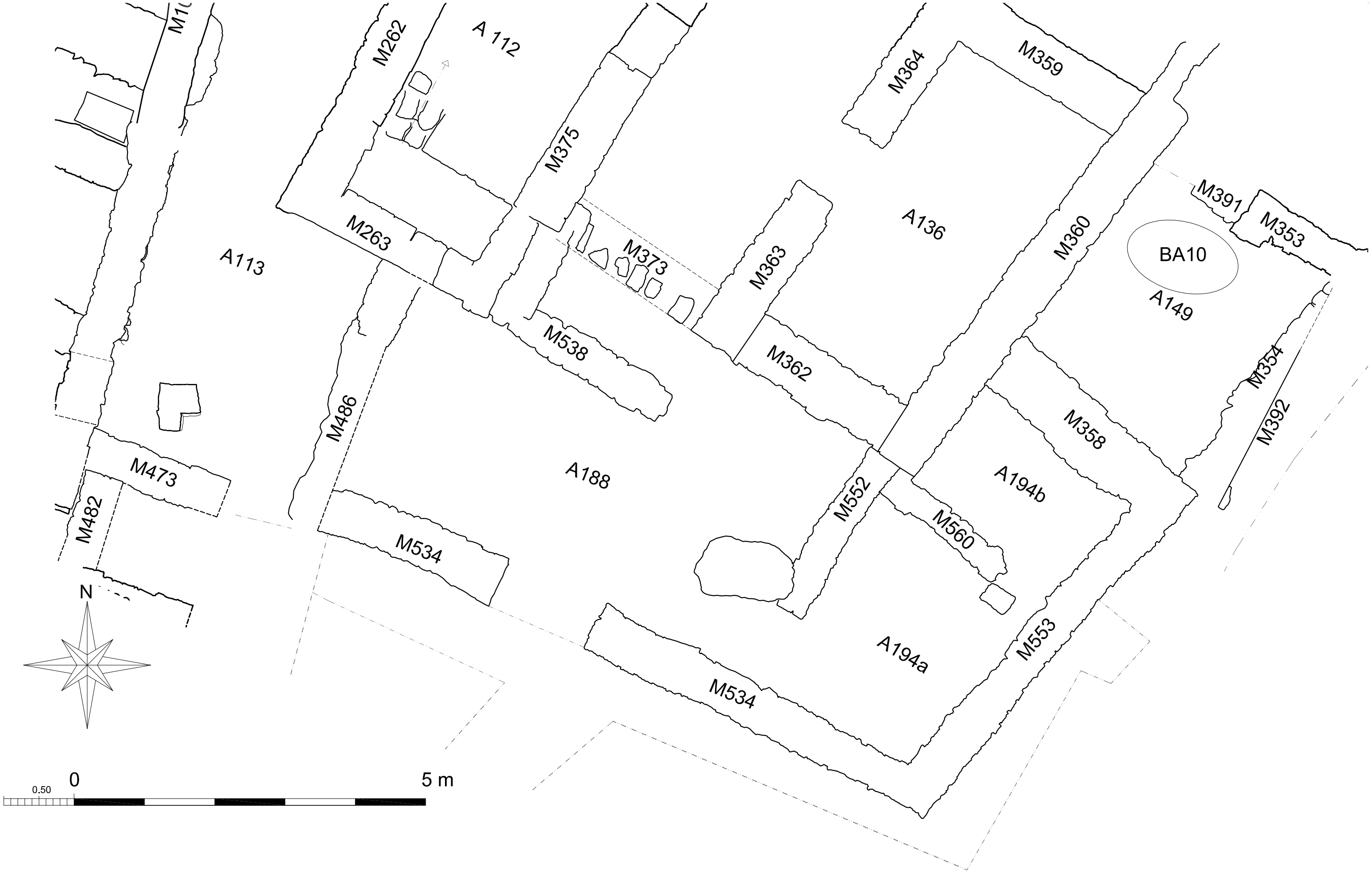
Area A phase 1



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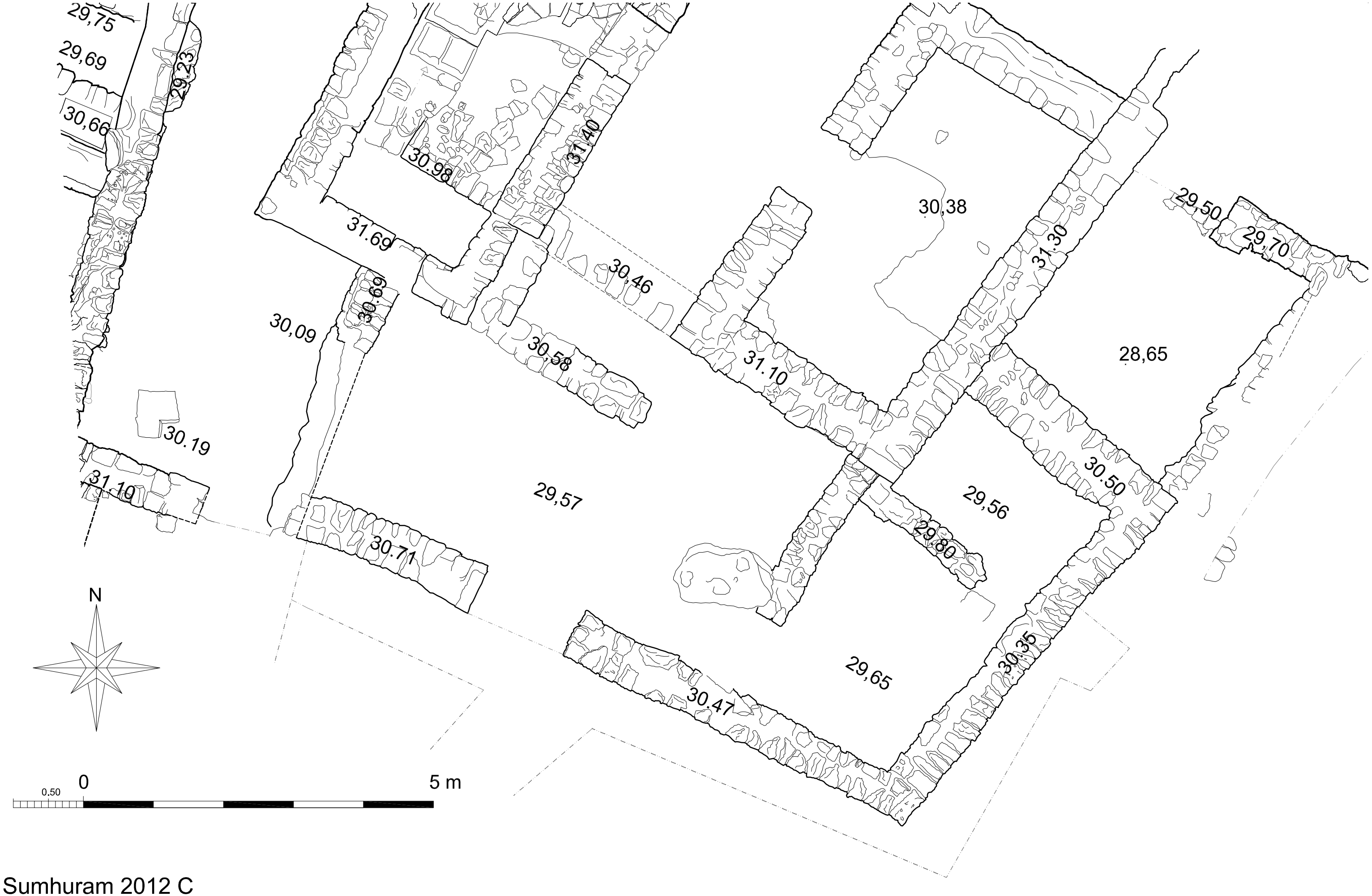

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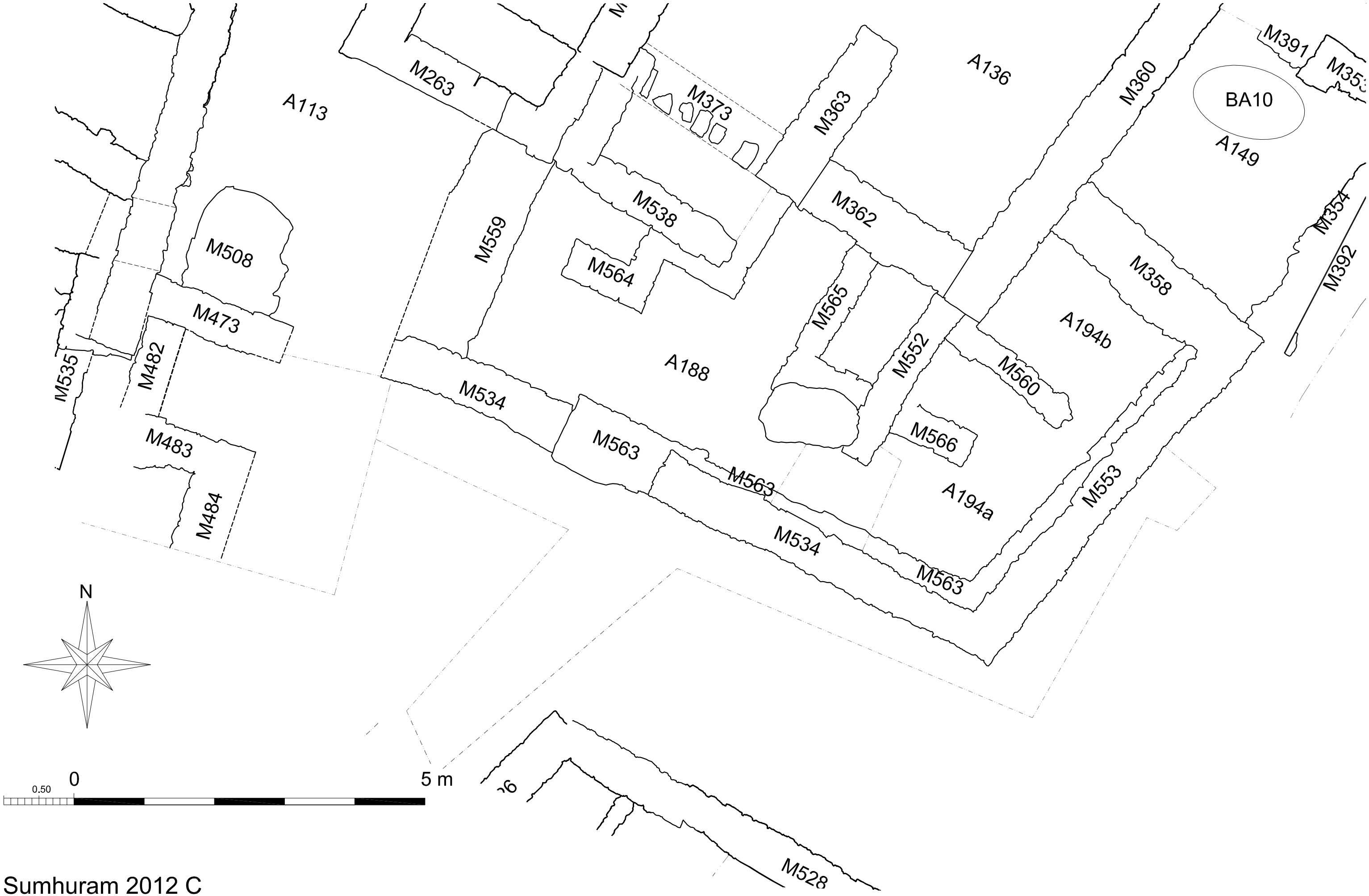

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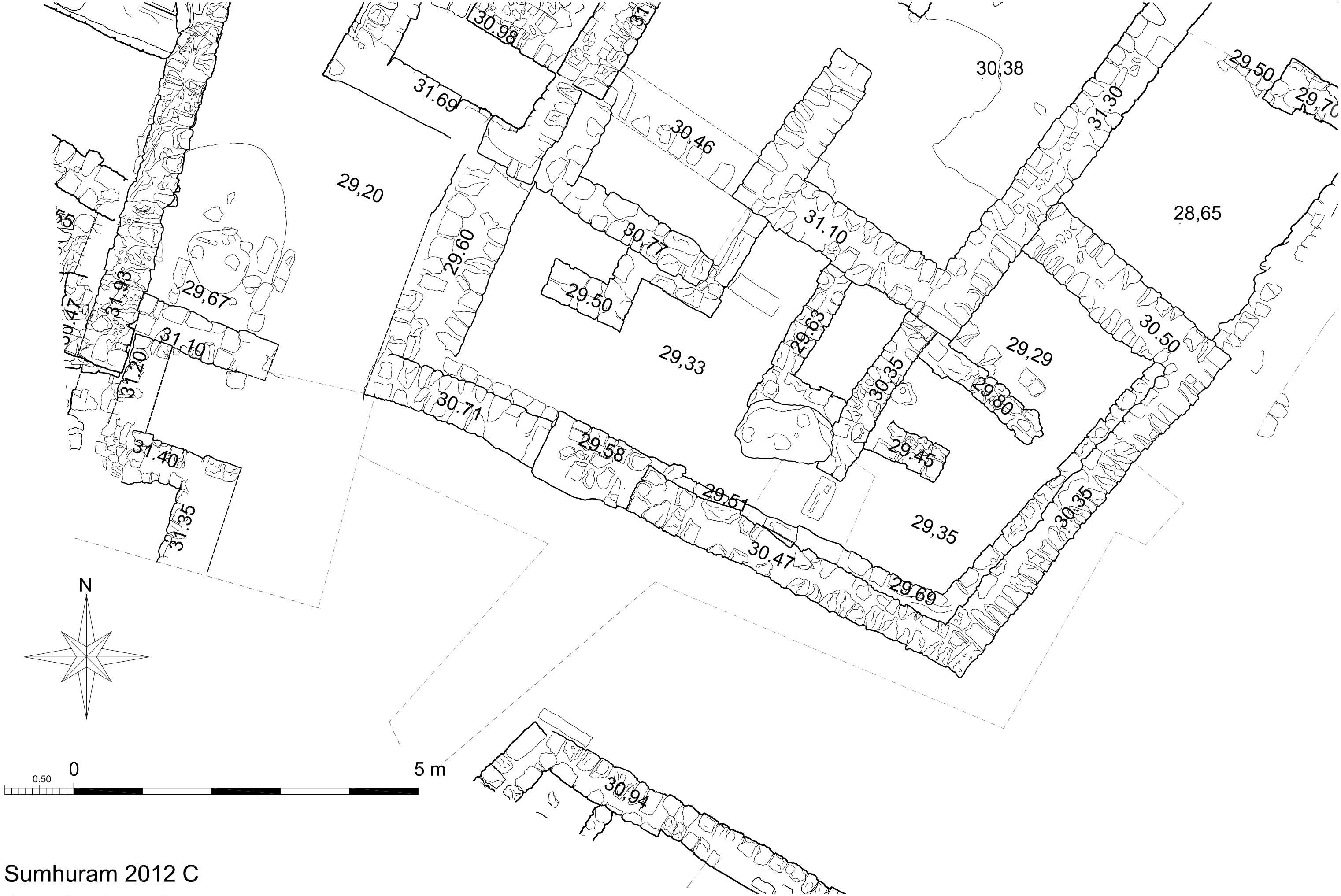

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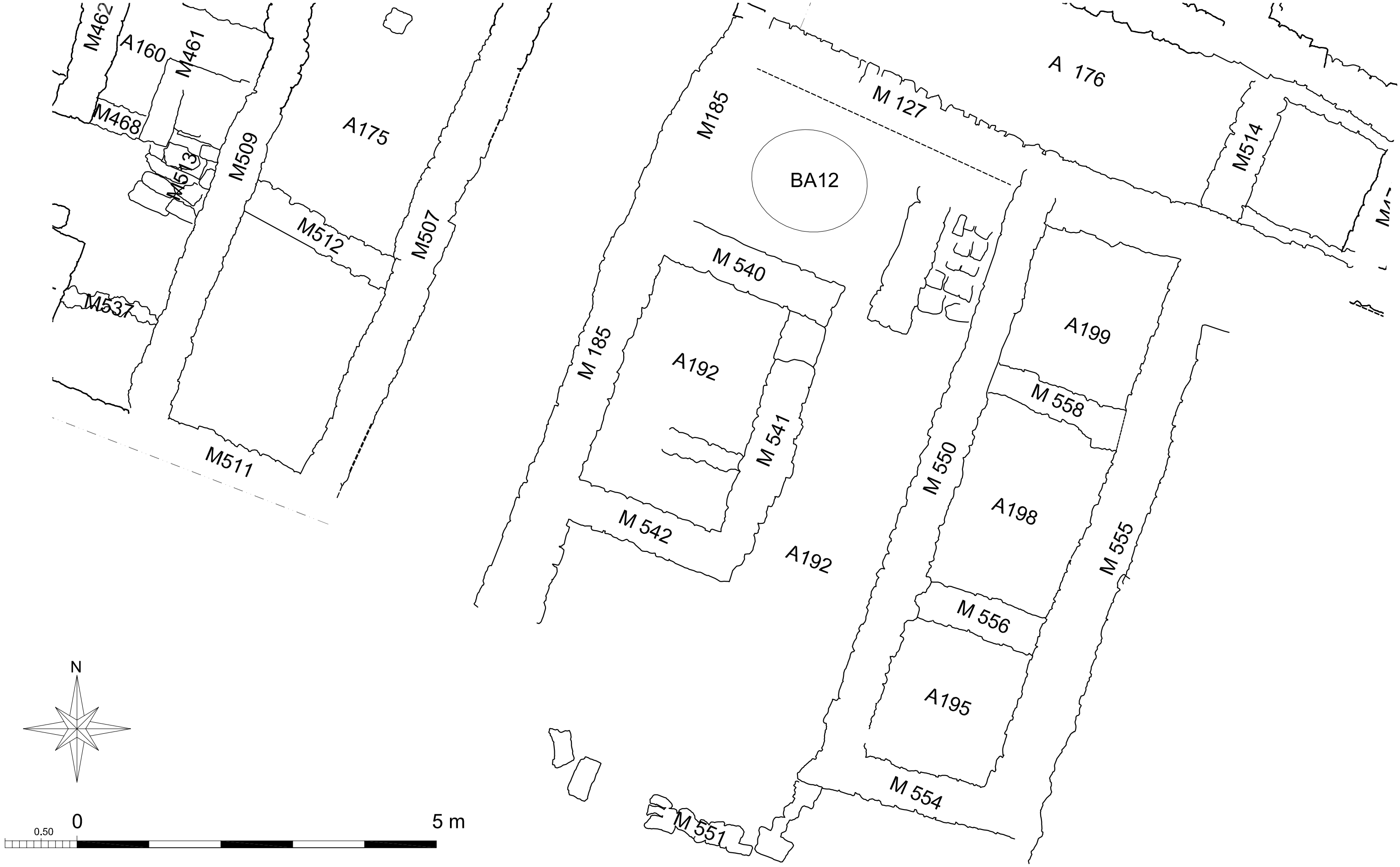
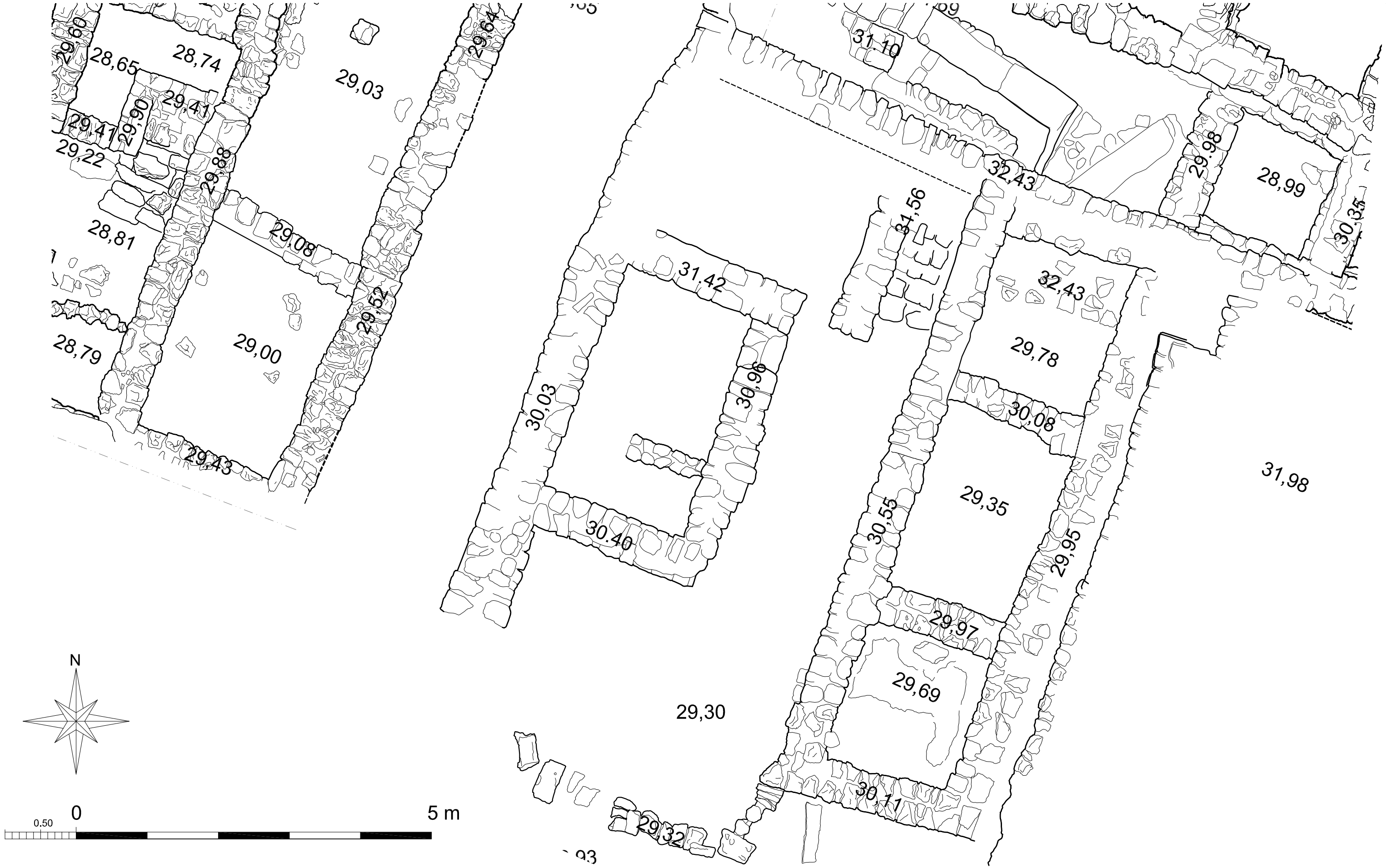


Sumhuram 2012 C
Area A, building BA12



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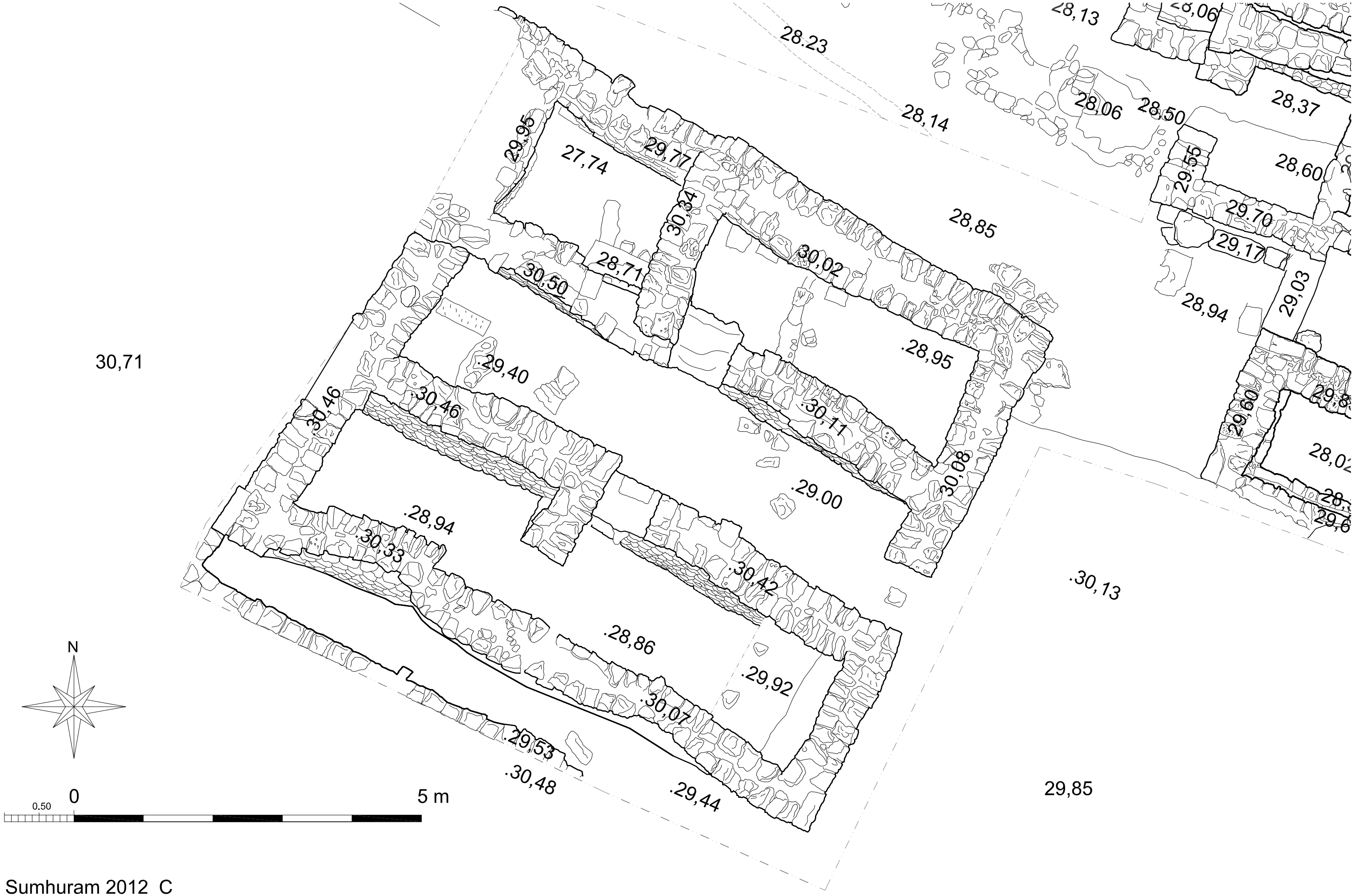

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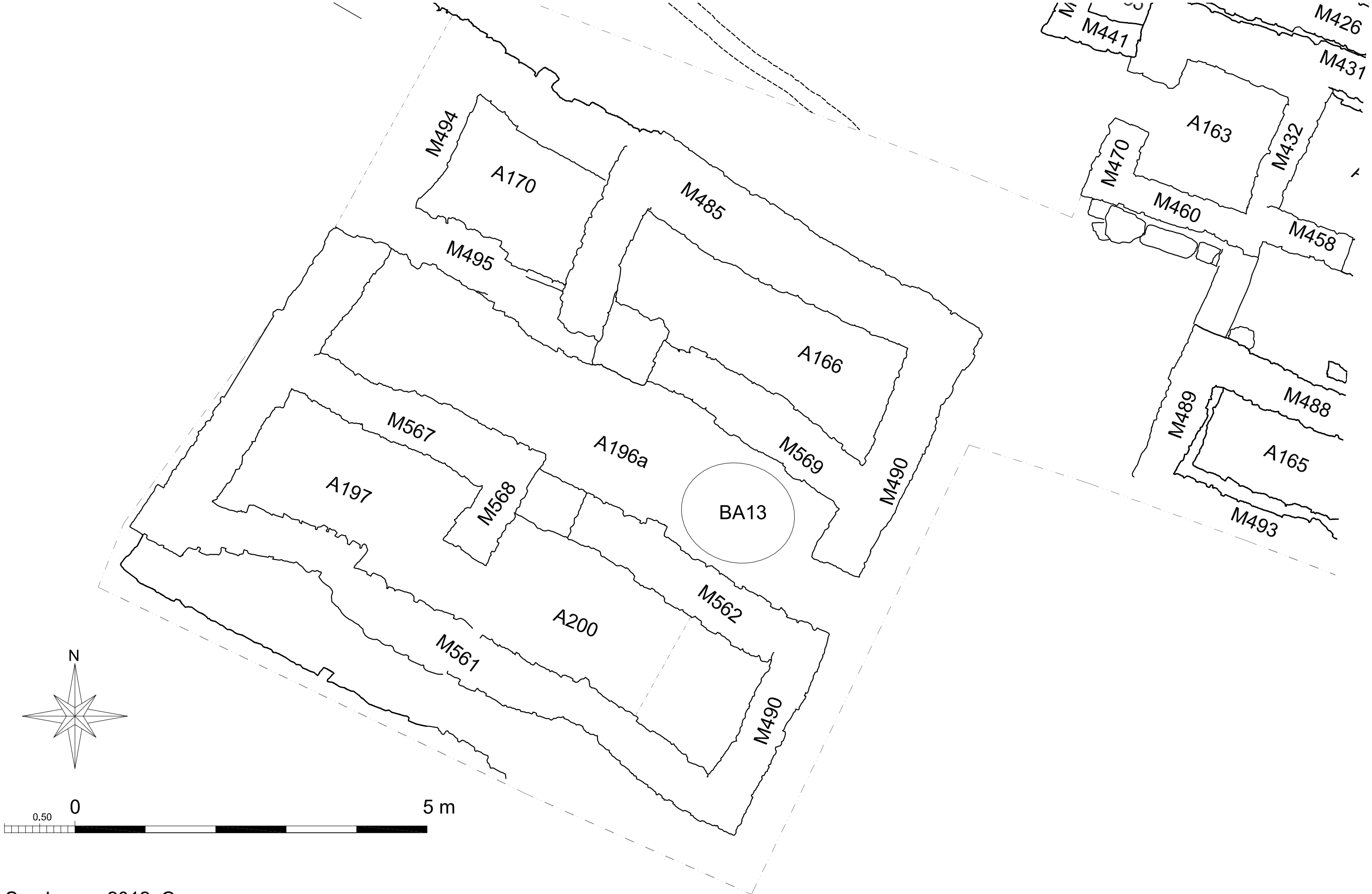
Area A/F - building BA13



Sumhuram 2012 C
Area A/F - building BA13

27.87

27,

28,36

28,50

28,26

28,09

27.31

28,46

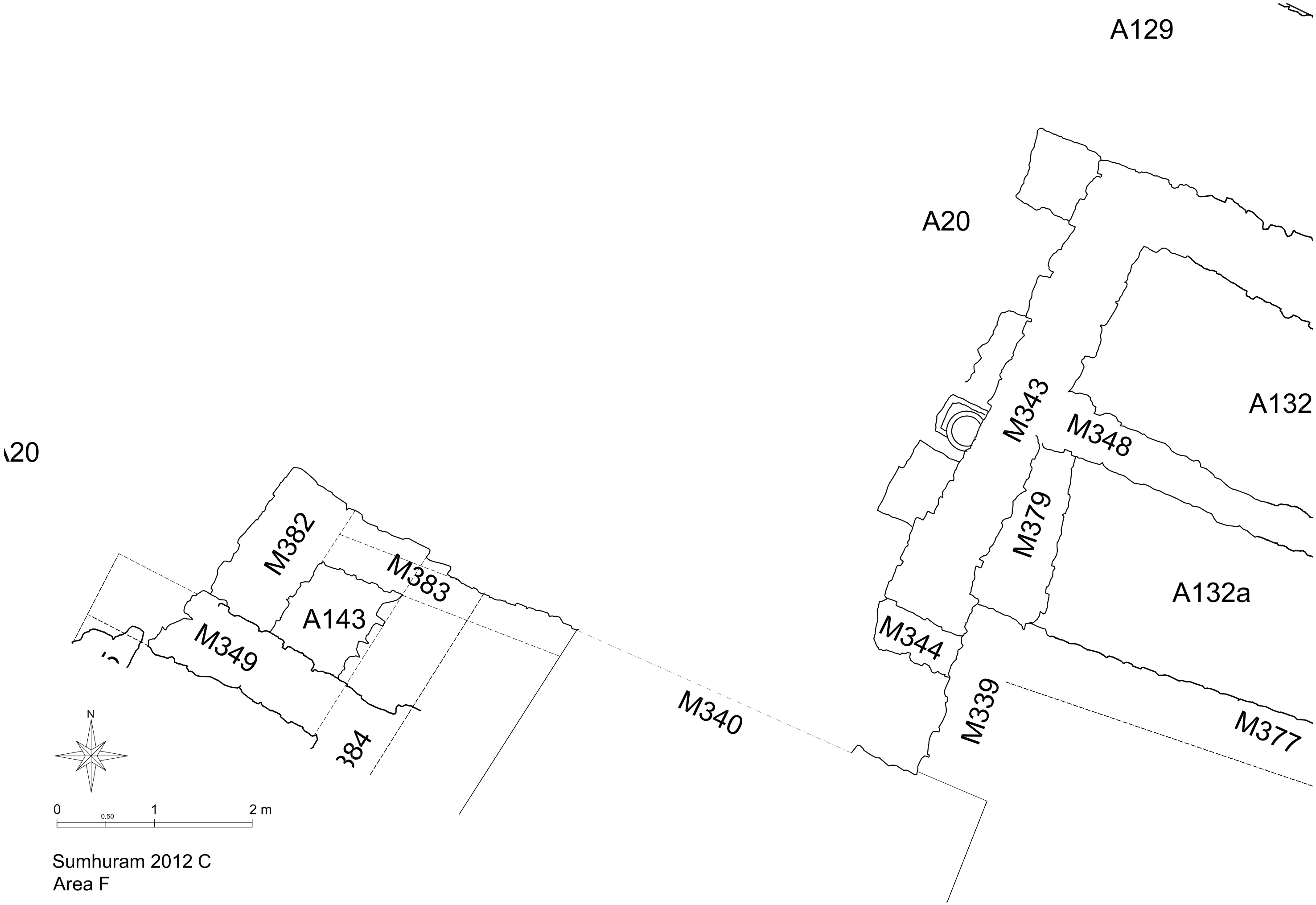
27.50

30,34

N

0 0.50 1 2 m

Sumhuram 2012 C
Area F



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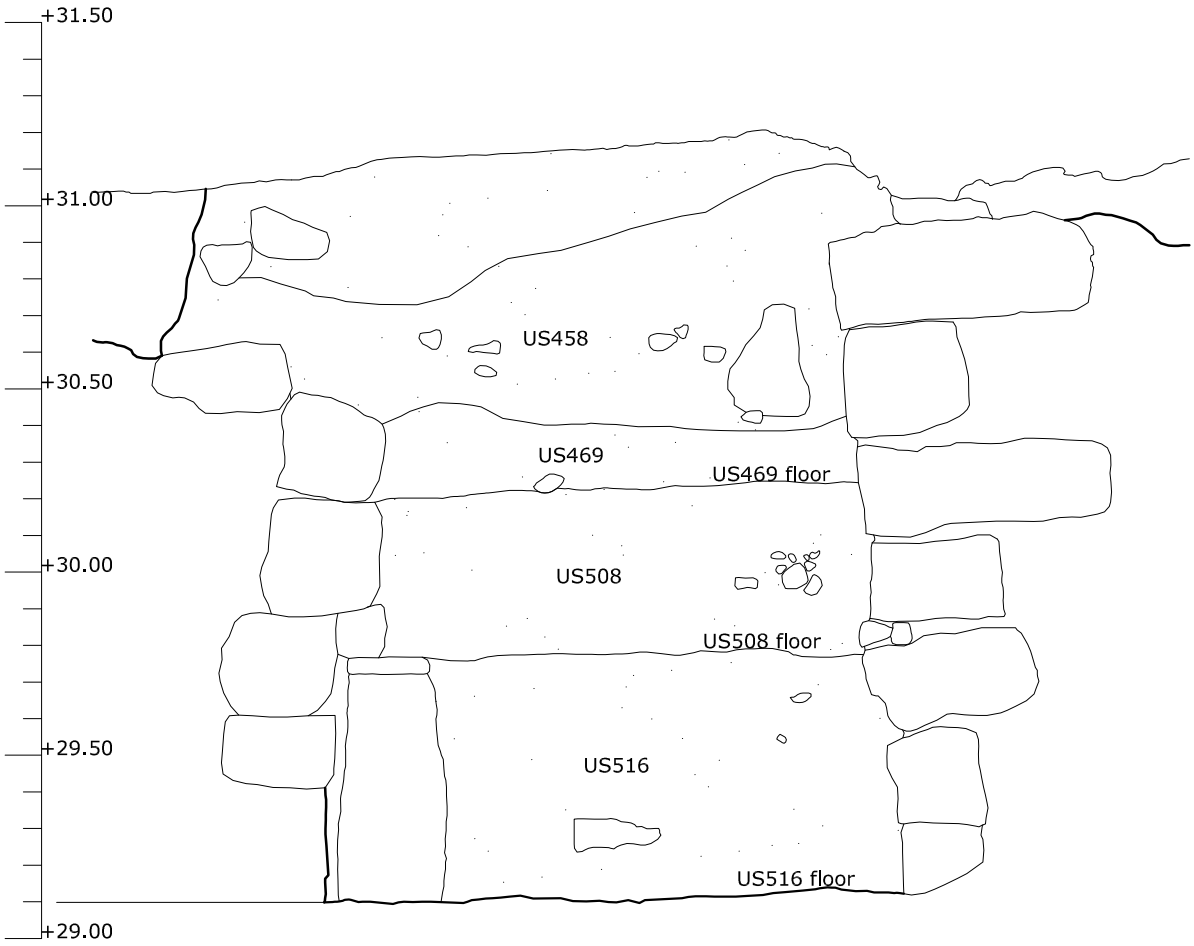
Area F



Sumhuram 2012 C

Area A section street A113

ARCHAEOZOOLOGICAL ANALYSIS
(SUM12C; A188 US548, A194b US553, A194a US554)

Dr. Laura Strolin
Oct-Nov 2012

The osteological evidence here taken into account pertains to some selected stratigraphic units (US548, US553 and US554) of area A of Sumhuram, and has been collected during the third campaign of 2012. According to the preliminary observations, these layers, located in three contiguous rooms (A188, A194a and A194b) are chronologically contemporary. They indeed correspond one another for elevation, material evidence and physical characteristics and have been therefore attributed by the excavator to the same phase of the site, the second one. Moreover, considering their features, these layers do not seem to pertain to a building with residential functions. The lack of similarities with other certainly residential areas in the site makes futher investigations necessary.

Methodoligical premises

This preliminary analysis is not insered in any systematic archaeozoological study of the materials recovered during the excavations. It is instead a single study, concentrated on a selection of layers from one campaign. These conditions make comparisons and articulation of the analysis limited. For the site of Sumhuram we refer to the previous archaeozoological studies, namely WILKENS 2002 and CARENTI/WILKENS 2008.
The material has been hand-collected on sight, without any sieving or floating procedure. The efficiency of recovery may have biased species diversity through affecting the recovering of bones of small dimentions. It must be considered not only fragmented ones, but also bones belonging to small species may have been missed during the fieldwork. The material has then entirely been studied *in situ* during the campaign, this preliminary report is therefore a first approach to the evidence.
The immediate result of the work of classification is a database (Appendix) which is supported by this short text expliciting some first hand preliminary observations. The database of the faunal remains includes the identification of the anatomical parts and the determination of the *taxa*, for which we could not refer to a comparison collection but only to the previous studies on the site (WILKENS 2002, CARENTI/WILKENS 2008) and to archaeozoological osteological *atlantes* and publications (SCHMID 1972, HILLSON 2005). We also compared the material with evidence collected in other areas being explored during the campaign, for having a sort of local comparative set. When the distinction between *capra* and *ovis* was attempted we referred to BOESSNECK 1969, HALSTEAD/COLLINS/ISAAKIDOU 2002, KRATOCHVIL 1969, PAYNE 1985, PRUMMEL/FRISCH 1986, ZEDER/LAPHAM 2010 and ZEDER/PILAAR 2010. When the recovered parts were not diagnostic for sorting the species, the expression *ovis vel capra* was adopted as in the previous studies on Sumhuram, also because it is closer to a realistic definition of the fauna. The database also incudes information about age at death, for which calculations was executed following DENIZ/PAYNE 1982, GRANT 1982, PAYNE 1973 for dental eruption and occlusal surface wear; NODDLE 1974, SCHMID 1972 and WILSON 1978 for the epiphyseal fusion degree (when fusion stage is not mentioned in the observations, it means that the epiphysis was completely fused, with the fusion line totally closed and obscured). Measurements have been taken according to VON DEN DRIESCH 1976 standards as adopted in previous studies of the site. In case of the few burnt fragments, we must take into account a possible shrinkage of the bone. Unfortunately the fragmentation of specimens made this source of information less incisive, and in combination with the lack of comparative elements, has

consequences on all what may be inferred by dimensional data (sexing, domestication issues, climate, diet…). We have then included eventual observations such as presence of gnawing, butchering or burning marks, nevertheless the taphonomic analysis is limited to a fieldwork observation and has not been carried out with specific optical instruments. Taphonomic observations refer to LYMANN 1994 and REITZ/WING 2008. Broadly, the database is organized per US and per *taxa*. Regarding the quantifying methods, the species proportions have been estimated following the NISP abundance measuring system and then with the MNI one, calculated following BÖKÖNYI 1970 and CHAPLIN 1971 recommentations. Not only the anatomical frequency of each element but also of size, symmetry, age and preserved portion have been considered, with eventual matches.

Preservation of the assemblage

The analysed material was not in optimal state of preservation, mostly because of its high state of fragmentation, but also because of the nature of the soil and especially the climatic conditions of the Dhofar region, which strongly affected the resistence of bone and increased post-depositional fragmentation. The composition of the soil has brought along time the bones to a high degree of fragility, which increased their post depositional fragmentation. In particular, several bone fragments from US553 (A194b) were completely covered with white crystal encrustations (silicon?). This fragility is particularly evident in the more porous parts of the bone, in particular thin bones consisting of trabecular structure such as flat ones. Cubic bones of large species are represented in volume but their surface is damaged, flaky and scraped off.
The majority of the material is preserved much under 40% of its entire size. The proportion between the relative dimensions of fragments is explicited in Table 1.

Preservation of fr	Preserved ≥ 40%	Preserved < 40%
	15.6%	84.4%

Table 1. Preservation of specimens.

The surface of the bones fits in a picture of medium taphonomic impact. Weathering traces such as root etching are present, the surface is opaque and coarse, having lost all its original gloss, damaged by abrasion. Trampling too may have damaged the sample. Some fragments show signs of exfoliation and cracks, for instance in some epiphyseal fragments the cancellous structure is visible for the partial lack of the external cortical layer. Overall weathering can be defined as stages from 2-3 of BEHRENSMEYER 1978. Some traces of burning have been noticed, that may be linked to fireplaces found in the layers (room A188). Altogether the fragments seem to indicate a heavy mechanical and chemical post-depositional disturbance. A certain amount of pre-depositional fragmentation is ikely to have happened too, in relation to food distribution and consumption.
Such a picture of post-depositional degradation is consistent with a situation of slow obliteration of the evidence.
The high degree of fragmentation and by consequence the small dimensions of the recovered fragments hampered the determination of the species. As can be read in Table 2, the percentage of complete elements was very low (less than 7% in the three asseblages), and very low was also the percentage of bones preserved for more than 40% of their entire size (less than 10% in all the US observed). Concerning the undetermined fragments, when determination of species was not possible, we followed the same method as in CARENTI/WILKENS 2008. We therefore divided the

record depending on their dimensional proportions in large, medium and small. A comparison with the archaeozoological fauna of the site makes the correspondence between big bones and bovines, medium bones and sheep/goat a realistic approximation.

US	Total n. fr.	Complete	Preserved ≥ 40%	Determined	Und	Malacofauna
US554	87	2	7	23	53	9
		2.3 %	8%	26.4 %	60.9 %	10.3%
US553	103	7	10	30	51	11
		6.8 %	9.7 %	29.1 %	49.5 %	10.7 %
US548	152	9	14	55	83	9
		5.9 %	9.2 %	36.2 %	54.6 %	5.9 %

Table 2. Percentages of preservation and determinability of sample.

Quantitative analyses

The quantitative analysis of the specimen is presented in Tables 3-5. The calculation of MNI and NISP have both been presented per single US, NISP in particular, especially to make future studies and widening of investigations possible. In this way, in case the three considered layers will be confirmed as contemporary it will be possible to unify the quantification data.
NISP and MNI give an overview on the living population of each specie. NISP is an addition per specie, with the problem that structurally more fragile bones will provoke an over-estimation of the specie they belong to, which is evident for the fragments of undetermined bones recovered in great quantity. MNI takes into account the recurrence of each element in animal anantomy and therefore tries to give a solution to the problem of recounting and over-representing body parts that may belong to the same individual. It is scientifically appreciable because it gives a sure theoretical minimum of individuals. Nevertheless it generates disproportions since it over-represents species scarcely present in the sample, which can be seen in the case of the malacofauna or avifauna.
Due to high fragmentation of the assemblage, we decided not to adopt minimalist recording methods implying selection criteria on th evidence such as DAVIS 1992. We recorded all fragments instead (e.g. CHAPLIN 1971), also in prevision of further analyses on the assemblage and on the possibility of widening to archaeozoological approach to other layers of the area or to other areas. The same considerations that led us also to use two quantification systems for counting bones.
With this premises, we can obtain an approximate estimation of relative proportions of species. Tables 3-5 offer the possibility of discerning between the determined fragments and the undetermined ones. If we count *ovis vel capra* data together with undetermined medium ones, and bovines together with undetermined large animal bones, we obtain a picture of more or less equal predominance of these *taxa* in comparison to other ones in all the asseblage, with a slightly heavier presence in US548, likely due to the different proportional importance of malacofauna. Nevertheless, US548 presents a pattern of higher determinability of fragments in comparison with

US554 and US553. In particular, a better preservation of diagnostic large animal bones can be observed.
This study concentrates on terrestrial fauna and does not take in specific account the determination of malacofauna and fish. The evidence observed presented a percentage of malacofauna around 9% of the total (Tables 3-5) and a percentage of fish around 4% of the total (Tables 3-5). Shell presence is attested in variable percentage in Sumhuram depending on the chronological phases of the site[1]. Which compared to the previous contexts analysed in Sumhuram is a very lower percentage. The different pattern here recorded in comparison with other areas of the site[2], even though corresponding to the same chronological phase, has to be considered. Since the diet emerging from other evidence was strongly comprehensive of fish, in particular even fish of big dimensions, for the supply and distribution of which an articulated and skilled organisation was required, this discrepancy must be underlined. This observation may help the interpretation of the function of the rooms from which the assemblage comes. Doubts have already arosen on this issue during the excavation[3]. The archaeozoological remains here analysed indeed do not fully correspond to household refuse in comparison with other Sumhuram areas.

US554 Species representation	Species	Relative proportion of species, percantage (NISP; MNI)	NISP	MNI
	ovis vel capra	9.3 % ; 17.4 %	8	4
	ovis aries	2.3 % ; 8.7 %	2	2
	capra hircus	4.6 % ; 17.4 %	4	4
	bos taurus	10.3 % ; 4.3%	9	1
	und large	28.8 % ; .	25	1 (0)
	und medium	6.9 % ; .	6	1 (0)
	und small	4.6 % ; .	4	1 (0)
	und	19.5 % ; .	17	1 (0)
	bird	1.1 % ; 4.3 %	1	1
	fish	2.3 % ; 8.7 %	2	2
	shell	10.3 % ; 39.1 %	9	9
	Tot.		87	27 (23)

Table 3. Quantitative species representation US554

[1] See CARENTI/WILKENS 2008.
[2] See for instance CARENTI/WILKENS 2008 (figg. 1-2, tables 10-13).
[3] See Preliminary Report of SUM12C campaign.

US553 Species representation	Species	Relative proportion of species (NISP; MNI)	NISP	MNI
	ovis vel capra	14.5 % ; 17.8 %	15	5
	ovis aries	0.9 % ; 3.6 %	1	1
	capra hircus	4.9 % ; 10.7 %	5	3 (4)
	bos taurus	8.7 % ; 7.1 %	9	2
	und large	31.1 % ; .	32	1 (0)
	und medium	15.5 % ; .	16	1 (0)
	und small	3.9 % ; 3.6 %	4	1
	bird	0.9 % ; 3.6 %	1	1
	fish	8.7 % ; 14.3 %	9	4
	shell	10.7 % ; 39.3 %	11	11
	Tot.		103	31 (28)

Table 4. Quantitative species representation US553

US548 Species representation	Species	Relative proportion of species (NISP; MNI)	NISP	MNI
	ovis vel capra	19.1 % ; 23.3 %	29	7
	ovis aries	2% ; 3.3 %	3	1
	capra hircus	2% ; 10 %	3	3
	bos taurus	13.8 %; 6.6 %	21	2
	camelus	1.3% ; 3.3 %	2	1
	und large	31.6 % ; .	48	1 (0)
	und medium	19.t %; .	30	2 (0)
	und small	2 % ; 10 %	3	3
	und very small	0.7 % ; 3.3 %	1	1
	und	0.7 % ; 3.3 %	1	1
	bird	0%	0	0
	fish	1.3 % ; 6.6 %	2	2
	shell	6 % ; 30 %	9	9
	Tot.		152	33 (30)

Table 5. Quantitative species representation US548

Species representation

The evident pattern is that farmyard mammals are predominant, but the record includes also local fauna. In particular *camelidae* are represented in at least one, maybe two specimen in US548. Thei are consistent with the nowadays as well as with the ancient fauna (camel specimen have been recovered in previous campaingns, but also in SUM2012C campaign in other sectors of the site). Its main function has to be linked to carrying and other working tasks. It has already been observed by CARENTI/WILKENS 2008 that the quantitative paucity of records is not compatible with a regular dietary consumption. The predominance of farmyard species indicates that hunting was not the main activity linked to food consumption. The absence of *sus scrofa* remains are consistent with climatic, environmental and religious factors, and with previous archaeozoological results in Sumhuram. The presence of rodents was also indirectly deduced in reason of the presence of multiple teeth marks on a good number of specimens. Maybe other scavengers were present on the site too, for tooth marks and some small undetermined bones. The presence of scavengers had already been observed in the site of Sumhuram, for which the habit of food dumping after consumption had been assumed by scholars[4].

	ovis vel capra	bos taurus
US554		
determined	14 (16%)	9 (10.3%)
det+und	14+6 (23%)	9+25 (39%)
US553		
determined	21 (20.3%)	9 (8.7%)
det+und	21+16 (35.9%)	9+32 (40%)
US548		
determined	35 (23%)	20 (13.1%)
det+und	35+30 (42,7%)	20+48 (44.7%)

Table 6. Species proportions (%)

Ovis vel capra together with *bovidae* are the most abundant *taxa* (see Table 6). *Ovis vel capra* had a large diffusion on the site and in particular, when diagnostic parts were preserved, we noticed a slightly stronger presence of certainly assessed goats. This pattern seems to correspond to the local habitat. Goats can skillfully climb for grazing on shrubs and bush, they are browsers, can also behave as scavengers, they are more stenotopic and altogether their dietary requirements are more consistent with Sumhuram environment and geomorphology. Their presence can also be linked to

[4] See CARENTI/WILKENS 2008.

secondary exploitation of their abundant milk produce. Sheep, also represented in the assemblage by some certain specimens, have less differenciated food preferences and their feeding is more complicated in dry seasons. These considerations let us suppose that among the non discriminable specimens there might be a majority of *capra* bones, corresponding to a living population that would better fit in the environment conditions. The nowadays strong presence of goats in the surroundings of the site and in the region may be a clue too.

Anatomical part representation

The following tables and histograms (Tables 7-14) show the abundance of species and of body elements derived from a total recording of findings. We decided to report the number of fragments instead of the percentage because the high number of total fragments, comprehensive of the undetermined ones, would have minimized the proportions.
Considering these particular assemblages, we can assume that fragile bones, for their structure, for their dimensions, for the species to whom they belong, will scarcely be represented. Cubic bones are still found because of their dense structure and material resistance, nevertheless the dimensional factor may have biased the retrieval (indeed cubic bones are preserved only from large species). This pattern is also compatible with scavengers' dismembring activities. Vertebrae and ribs are well represented in reason of their high anatomical frequence per individual. Their presence indicates that the animals were not dismembered in small joint for consumption, but that they were entirely present. Metapodia are strongly represented especially in their proximal portion since it is the most robust one (it is also one of the recurrent body parts that are left by carnivore gnawing, that concentrate on other portions). Metapodia are a skinny anatomical part, not a meaty one, so it can happen that they are disjointed from the body and found in high number altogether. In this case, the presence of axial anatomical elements (especially cranial ones) indicates the presence of the whole animals in Sumhuram and therefore we may think of an on-site butchery habit, of a local supply system together with a a local consumption, and maybe associated to local herding. The relative proportions of ribs and vertebrae compared to abundant metapodials may suggest a function of the room non exactly fitting with the household parameters, but the state of the assemblage and the phase of the research do not allow so precise assumptions yet. The presence of cranial and axial elements is recorded not only for sheep and goat but also for cattle. Distal tibia tend to survive more than proximal one for its strong nature. On the contrary distal femur is less dense and so susceptible to damage. Phalanges all belong to large species and to the same US. This can be related to various factors: the dimensions of the bone impact their visibility during the recovery and their resistance to post-depositional degradation; the presence of scavengers that may have disarticulated and transported the small phalanges elsewhere; maybe a difference between the contexts, A188 in comparison with the other two rooms. It may be interesting to see if A188 has any points of distinction in comparison with A194a and b. A188 contains a fireplace (M565)[5]. The issue remains hypothetical for the moment, and it is impossible to asses if the rooms were associated to any specific function. Another observation is that almost all the bones with cut marks analysed in this work come from US548 (8 over 10).
Of course the lack of *intra situ* comparisons leave many suggestions unanswered.

[5] See Preliminary Report of the SUM2012C campaign.

US554		
	Element	Number
	teeth	10
	mandible	4
	cranium	0
	atlas	0
	axis	0
	vertebrae	9
	scapula	1
	humerus	1
	radius	3
	ulna	1
	carpal	0
	metacarpus	0
	pelvis	3
	femur	3
	tibia	1
	astragalus	0
	calcaneus	0
	metatarsus	3
	phalanges	0

Table 7. Element representation US554.

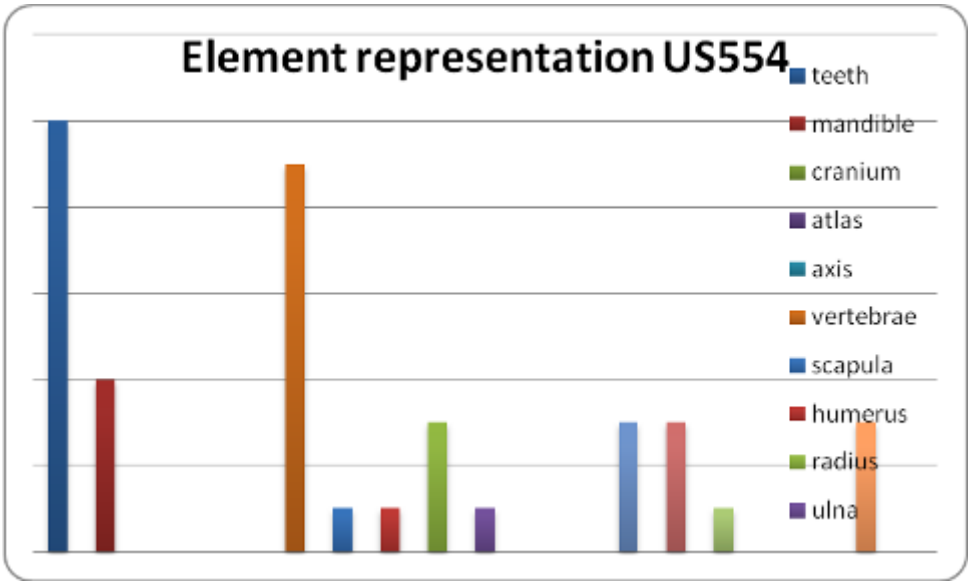


Table 8 Element representation histogram US554.

US553		
	Element	Number
	teeth	3
	mandible	5
	cranium	7
	atlas	1
	axis	0
	vertebrae	10
	scapula	2
	humerus	3
	radius	2
	ulna	1
	carpal	2
	metacarpus	0
	pelvis	5
	femur	2
	tibia	4
	astragalus	1
	calcaneus	1
	metatarsus	1
	phalanges	0

Table 9. Element representation US553.

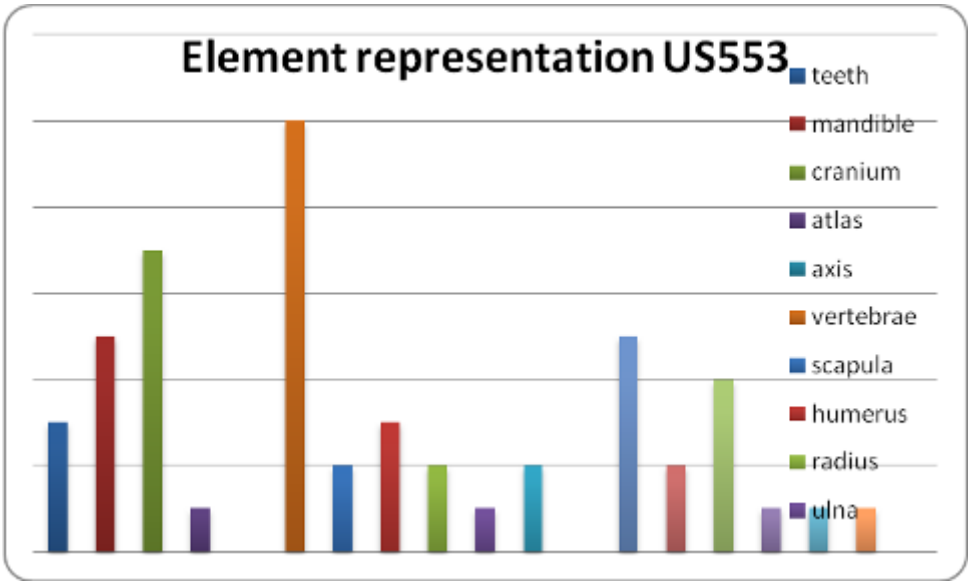


Table 10. Element representation histogram US554.

US548		
	Element	Number
	teeth	12
	mandible	10
	cranium	8
	atlas	0
	axis	0
	vertebrae	5
	scapula	6
	humerus	2
	radius	4
	ulna	2
	carpal	3
	metacarpus	8
	pelvis	8
	femur	5
	tibia	3
	astragalus	1
	calcaneus	1
	metatarsus	7
	phalanges	5

Table 11. Element representation US548

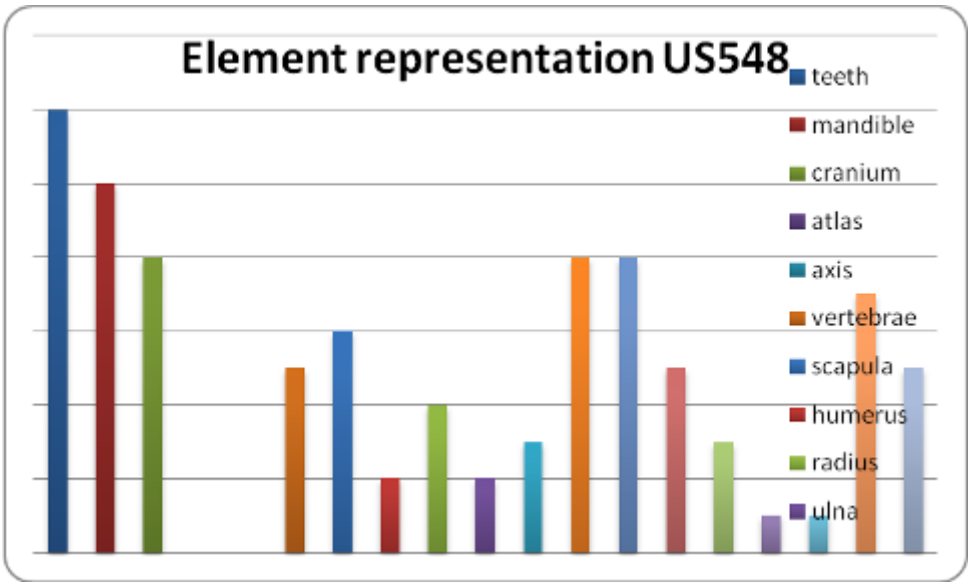


Table12. Element representation histogram US548.

Element representation (tot)	Element	Number
	teeth	25
	mandible	19
	cranium	15
	atlas	1
	axis	0
	vertebrae	24
	scapula	9
	humerus	6
	radius	9
	ulna	4
	carpal	5
	metacarpus	8
	pelvis	16
	femur	10
	tibia	8
	astragalus	2
	calcaneus	2
	metatarsus	11
	phalanges	5

Table 13. Complexive element representation (tot.)

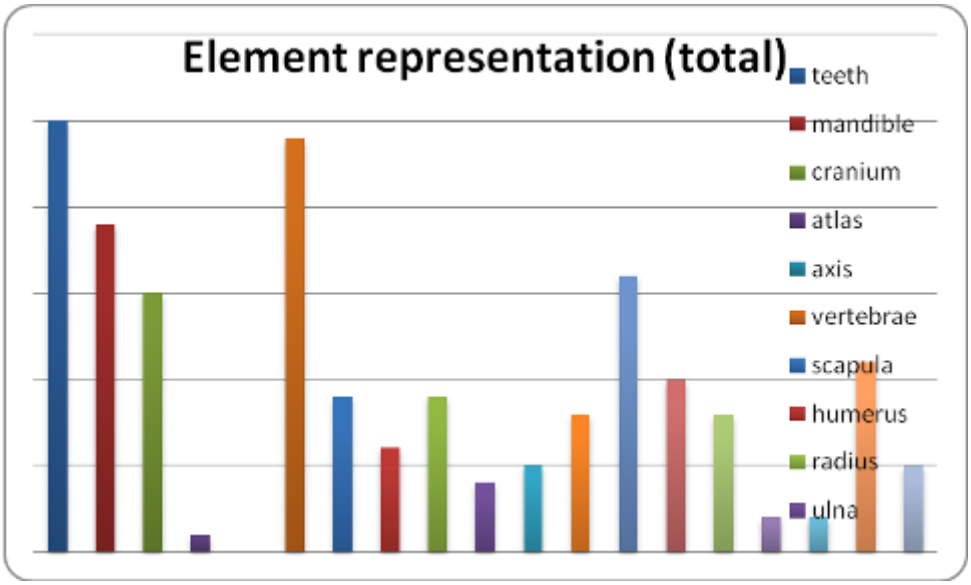


Table 14. Complexive element representation histogram (tot.)

Mortality pattern

The mortality profiles of the sample show a pattern of relatively young living population, which usually reflects a meat-based management of animals with sufficient stock for reproduction. Age at death estimations for all determined species record the presence of several young individuals and an indicative strong rareness of senile ones. Consisting with this profile is the assumption that cattle was mainly used for meat consumption, while adult individuals were used for transport or other duties (it may not be indicative considering the state of preservation of the sample, but no anatomical modifications due to effort or particular working tasks were recorded). Among *ovis et capra* in particular, considering epiphyseal fusion, tooth eruption and wear, we recorded 11 certainly juvenile individuals (≤ 2 years) and 7 sub-adults (2-3 years). In percentage on the total of determined ovicaprid specimen these data correspond to 16,2% of young individuals and 10,3% of young adults at death. Such a mortality pattern indicates that ovicaprid were heavily slaughtered for consumption, since in general individuals killed young are mostly meat providers, therefore for a primary exploitation. Moreover, sheep and goats have scarce utility for work, heavy tasks and carriage of goods in camparison with other *taxa*. But they could be easily held in the proximity of the city, due to their spatial characteristics and requirements. These considerations and the collected data draw a picture of primary exploitation of these species, likely combined with milk (especially goats) and wool production. These observations seem to confirm the conclusions drawn in the previous studies.

Other taphonomic observations

Regarding the consumption of animal meat, data emerging about slaughtering must be taken into account (Table 15). Cut marks visible at sight have been recorded on 10 specimens, 8 of which found in US548, and one in each of the other stratigraphic units The position of the cut marks indicates fleshing but also disarticulation of the limbs. The marks on axial parts of skeleton indicate extraction of meat from the parts of the carcass reach in edible parts, both on cattle and ovicaprids. The same observation can be made on the cuts observed on meaty bones such as tibia and femur. The cut mark on the mandibula is too consistent with an *in loco* butchering habit or with skinning activity. The lack of observation of cut marks on metapodia surprises, but it may be due to instrumental reasons or to preservation factors (distal metapodia which usually present skinning marks are less represented because of their physical structure that makes them more sensible and also more attrative for scavengers). It may also be linked to other factors as some skinning procedures that may leave metapodia and phalanges with the skin. Skinning activity has previously been widely observed at Sumhuram on farmyard species[6]. The fragmentation state of the specimens heavily hampered the individuation of long bone breaking for marrow extraction, a highly likely activity.

[6] See WILKENS 2002.

Cut marks			
US554	ovis vel capra	femur distal epiph (condyles)	
US553	ovis vel capra	femur diaph	
US548	ovis vel capra	tibia distal unfused metaph	gnawing
	ovis aries	radius prox metaph	gnawing
	und medium	rib	
	und medium	long bone diaph	
	bos taurus	phalanx III lateral + ventral	
	bos taurus	mandibula	
	bos taurus	vertebra	
	und large	tibia prox metaph (over and under foramen)	

Table 15. Slaughtering marks

Gnawing marks were observed without instrumental support and are listed in Table 16. Therefore it has not been possible to verify small traces of teeth, of margin chewing… Their presence indicates accessibility to waste for rodents and scavengers, with consequent possibility of displacement of parts. This fact informs us about the disposal strategies at the site, for faunal remains were not in pits or other concentrations, but were found in the layer. It also points to a specific treatment of animal remains, which were not immediately removed. Gnawing marks were mostly made by rodents, maybe some carnivores (possible teeth punctures and scoring) and are recorded in all the layers studied. The marks are diffused especially on the cancellous parts of bones, but also on some shafts. They present the typical aspect of parallel series of furrows and grooves. The presence of rats had already been indirectly recorded through gnawing marks in Sumhuram[7].

[7] See CARENTI/WILKENS 2008.

Gnawing marks			
US554	ovis vel capra	ulna prox epiph	
	ovis vel capra	radius diaph	
	ovis vel capra	pelvis	
	bos taurus	pelvis	
	und large	vertebra thor	
	und large	cancellous bone fr	
	und large	cancellous bone fr	
	und large	long bone diaph	
	und	9 und fr	
US553	capra hircus	tibia distal epiph	
US548	ovis vel capra	metatrsus prox epiph	
	ovis vel capra	metatrsus prox epiph	
	ovis vel capra	metacarpus prox epiph	
	ovis vel capra	tibia unfused dist metaph	cut
	ovis vel capra	metatrsus prx epiph + diaph	
	ovis aries	radius prox metaph	cut

Table 16. Gnawing traces.

Measurements

Dimensional data emerging from the assemblage show a local fauna of slightly smaller dimensions in comparison with other geographic contexts. For the elements on which a standard measurement was viable, one can notice in a good part of the sample a discrepancy between the mean size of local cattle (diffusely smaller) and ovicaprids (good part of he sample presented small dimensional features, another portion seems more similar to other contexts' dimensional data). This discrepancy goes in a range of 1-2 mm, but is recurrent in almost all the anatomical elements (or parts of them, resulting in different overall proportions of the element), in undoubtly adult individuals and in all the species for which measurements were executed.

This preliminary study of course needs widening of research to other sectors of the site, in order to have comparative elements a draw a broader and more certain picture of archaeozoology at Sumhuram. The study should be deepened too, by means of specific approaches and instruments, for a global reassessment of the first hand observations. Shells and fish need to be analyzed with more attention too. It may also be useful to create or recover and enlarge a local faunistical collection for closer comparisons.

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US	SPECIES	ANATOMICAL PART	OBSERVATIONS	MEASUREMENTS (cm)
US554				
	ovis vel capra	femur R fr, dist epiph	unfused; <36-42 months; some cut marks on both condyles and metaph	Bd 3.5
	ovis vel capra ?	tibia L, dist diaph fr	unfused; <18-24 months	.
	ovis vel capra	ulna R, prox epiph fr	few small crystal white encrustations; >30 months; gnawing marks	.
	ovis vel capra	mandibula R fr, hinge fr	.	.
	ovis vel capra	radius L fr, diaph fr	ovis? (same bone as radius L, prox epiph ?); gnawing marks on all sides (frontal, caudal, prox, dist)	.
	ovis vel capra	metatarsus L fr, prox epiph + diaph	almost complete; >28 months	Bp 1.9; SD 1.1
	ovis vel capra	metatarsus L fr, prox epiph + diaph	>28 months; gnawing marks	Bp 1.8; SD 1.1
	ovis vel capra	pelvis L fr, ilium fr	.	.
	ovis aries	radius L fr, prox epiph	>10 months	Bp 2.7; BFp 2.5
	ovis aries	radius R fr, prox epiph + diaph	almost complete; few tiny white encrustations; >10 months	Bp 2.45; BFp 2.3; SD 1.4
	capra hircus	mandibula L fr + Pd4, M1, M2 + P4	P4 formed not yet erupted; 1.5-2 years	Pd4: L 1.3, B 0.5; M1: L 1.2, B 0.6; M2 1.5, B 0.65
	capra hircus	mandibula L fr + Pd3, Pd4, M1	1-1.5 years	M1 L 1.3, B 0.7
	capra hircus	Pd4 mand. L	6-12 months	L 1.8; B 0.6
	capra hircus	M1/M2/M3 fr, buccal + tiny occl fr	tiny occlusive portion; >6-12 months	.
	bos taurus	humerus L fr, dist diaph fr, radial fossa	epiph missing	.
	bos taurus	femur ? prox epiph fr, metaph fr, head ?	humerus?	.
	bos taurus	femur diaph fr	nutrient foramen	.
	bos taurus?	scapula fr, spine ?	.	.
	bos taurus?	metatarsus L fr, prox epiph fr	foramen	.
	bos taurus?	sacrum fr	foramina	.
	bos taurus	P3/P4 maxill. R	40-50 months	.
	bos taurus ?	maxilla R, fr	.	.
	bos taurus?	pelvis L, ilium fr	gnawing marks	.
	und large	thor vertebra fr	spinous process fr; tooth marks	.
	und large	thor vertebra fr	transverse process +spinous pr fr	
	und large	3 cancellous bone fr	2 with gnawing marks	.
	und large	10 flat bone fr.	.	.
	und large	mandibula fr ?	.	.
	und large	6 long bone diaph fr	1 diaph with many gnawing marks	.
	und large	pelvis fr		.
	und large	flat bone fr	.	.
	und large	vertebra fr	.	.
	und medium	thor vertebra fr	almost complete	.
	und medium	lumb vertebra fr	almost complete	.

	und medium	vertebra fr	.	.
	und medium	pelvis L, ilium fr	.	.
	und medium	2 rib fr	.	.
	und small	lumb vertebra dorsal fr	transverse process + spinous pr fr	.
	und small	3 und fr	.	.
	undetermined	mandibula/maxilla? fr + tooth root	.	.
	undetermined	5 flat bone fr	.	.
	undetermined	11 fr	9 with gnawing marks	.
	bird	und fr	.	.
	fish	2 vertebra fr	.	.
	shell	3 complete; 6 fr	1 cypraea; 1 strombus ? pierced fr; 1 almost complete	.
US553				
	ovis vel capra	pelvis R fr, acetabulum	.	.
	ovis vel capra	femur L fr, dist epiph	unfused; <36-42 months	Bd 2.9
	ovis vel capra	pelvis L fr, acetabulum caud fr + ischium fr	.	.
	ovis vel capra	mandibula R fr, condylar process + coronoid pr fr	.	.
	ovis vel capra	humerus R fr, dist diaph	.	SD 1.2 (?)
	ovis vel capra	mandibula R fr, condyle	1 of 3 fr from the same broken mandibula	.
	ovis vel capra	mandibula R, coronoid pr fr	1 of 3 fr from the same broken mandibula	.
	ovis vel capra	tibia L, dist diaph fr + epiph fr	unfused; <18-24 months	.
	ovis vel capra	metatarsus dist fr, epiph fr + diaph fr	.	.
	ovis vel capra	femur ?, diaph fr	2 cut marks ?	.
	ovis vel capra	radius L, diaph fr	.	.
	ovis vel capra	humerus diaph fr	.	.
	ovis vel capra ?	pelvis L fr, acetabulum fr + ischium fr	small	.
	ovis vel capra	mandibula R fr	1 of 3 fr from the same broken mandibula	.
	ovis vel capra ?	atlas	.	GL 4.8; GB 5.4
	ovis aries	horn core fr	.	.
	capra hircus ?	tibia L fr, distal epiph + diaph	gnawing mark on caudal side of epiph (diam 0.6 cm)	Bd 2.3; Dd 1.3
	capra hircus	P4 mand R, fr	2-4 years	.
	capra hircus	M1/M2 mand R, fr	M1: 1-3 years; M2: 2-6 years.	L 1.1; B 0.6
	capra hircus	horn core L , fr	.	.
	capra hircus	astragalus R	.	Bd 1.6; Gl 2.6; Dl 1.4
	bos taurus	I phalanx	white crystal encrustations	GL 5.4; Bp 2.4; Bd 2.4; SD 2.6
	bos taurus	humerus R fr, dist epiph fr	.	Bd 6.2
	bos taurus	calcaneum L fr	facies articularis talaris; traces of burning	Bs 3.1 (?)
	bos taurus	tibia L, dist epiph fr	unfused; malleolus medialis; <24-30 months	Dd 3.5
	bos taurus	ulna L, prox fr	incisura semilunaris	DPA 4; SDO 2.3
	bos taurus	tibia, prox diaph fr	.	.
	bos taurus	M1/M2 max R, fr	3-6 years	B 1.1 (?)

	bos taurus ?	pelvis, ischium fr	.	.
	bos taurus	carpal bone fr ?	.	.
	und large	scapula fr, spine ?	.	.
	und large	pelvis fr	.	.
	und large	5 long bone fr	some with many crystal encrustation	.
	und large	1 rib fr	.	.
	und large	16 flat bone fr	.	.
	und large	4 cranium fr	.	.
	und large	carpal uncinate R fr	.	.
	und large	3 und fr, cancellous bone	.	.
	und medium	lumb vertebra	.	.
	und medium	mandibula L, condyle fr	.	.
	und medium	radius fr ?	.	.
	und medium	3 rib fr	.	.
	und medium	8 long bone fr	.	.
	und medium	flat bone fr	.	.
	und medium	cranium fr, brain cavity ventral internal fr	missing ventral surface + auditory meatus fr (?)	B cavity 4.7
	und small	cranium, cranial cavity ventral fr	.	Bmax 4.5
	und small	3 rib fr	.	.
	bird	cranium, cranial cavity fr	.	.
	fish	9 vertebrae	.	.
	shell	5 complete	1 cypraea	.
	shell	6 fr		
US548				
	ovis vel capra	pelvis L fr, acetabulum + ischium fr + ilium fr	white encrustations	LAR 2.5
	ovis vel capra	pelvis L fr, acetabulum fr + ilium fr	.	.
	ovis vel capra	pelvis L fr, acetabulum fr +ilium fr	.	.
	ovis vel capra	scapula R fr, dist epiph	fossa articularis + proc cor + spina fr	SLC 1.2; GLP 2.8; LG 1.8; BG 1.7
	ovis vel capra	scapula L fr, dist epiph	fossa art + proc cor + acromion + spina	SLC 1.2; GLP 2.8; LG 2.1; BG 1.9
	ovis vel capra	scapula L fr, dist epiph	fossa art + proc cor fr	SLC 1.6; LG 2.4?; BG 1.6
	ovis vel capra	tibia L fr, diaph	white encrustations	.
	ovis vel capra	metapodia fr, lateral condyle	diagnostic elements for species distinction non visible, ovis ?	.
	ovis vel capra	metatarsus R fr, prox epiph fr + diaph	gnawing marks on epiph	Bp 2; Dp 1.5; SD 1.1
	ovis vel capra	metetarsus R fr, prox epiph fr + diaph	intercondyle present	SD 1.1
	ovis vel capra	metatarsus diaph, fr	.	SD 1.2
	ovis vel capra	metatarsus L fr, prox epiph + diaph	gnawing marks on epiph	Bp 1.9; Dp 1.75; SD 1.2
	ovis vel capra	metacarpus, diaph fr	.	SD 1.1
	ovis vel capra	metacarpus L fr, prox epiph + diaph	gnawing marks on epiph	SD 1.5
	ovis vel capra	metacarpus diaph fr	.	.
	ovis vel capra	metatarsus diaph fr + epiph fr	.	.

	ovis vel capra	radius diaph fr	.	SD 1.5
	ovis vel capra	tibia L, dist ep + diaph fr	gnawing mark on epiph + cut marks; unfused; <18-24 months	Bd 2.1; Dd 1.5
	ovis vel capra	metacarpus dist diaph fr	.	SD 1.2
	ovis vel capra	metacarpus, prox fr, diaph	.	SD 1.2
	ovis vel capra	femur L, prox fr, epiph fr + diaph fr	head fr + trochanter minor + trochantic fossa	.
	ovis vel capra	2 mandibula fr	.	.
	ovis vel capra ?	metetarsus prox fr, epiph fr + diaph fr	gnawing marks on diaph and epiph	.
	ovis vel capra	radius R, dist epiph + diaph fr	unfused; <36 months	Bd 2.5
	ovis vel capra ?	mandibula fr ?	.	.
	ovis vel capra	P4 max. L	advanced stage of wear	L 0.6; B 0.7
	ovis vel capra	maxilla L fr + P2 + P3	advanced stage of wear (P2 all dentine)	P2 L 0.6, B 0.4; P3 L 0.7, B 0.6
	ovis vel capra	horn fr	.	.
	ovis aries	metatarsus L, dist ep + diaph fr	encrustations	DD 0.8; Bd 2; SD 1
	ovis aries ?	humerus L, distal epiph fr	diagnostic element for distinguishing sheep and goat damaged	Bd 3; BT 2.9 (?)
	ovis aries ?	radius L, prox epiph fr	diagnostic element for distinguishing sheep and goat damaged; cut marks on metaph +tooth marks	Bp 2.8
	capra hircus	P3 mand. L	20-30 months	L 0.7; B 0.5
	capra hircus ?	Pd4 mand. L fr	0-6 months	B 0.5
	capra hircus ?	M1/M2 mand. L	M1: 2-3 years / M2: 3-6 years	L 1.2; B 0.9
	bos taurus	tarsal scapho-cuboid R	complete	B 4.9
	bos taurus	radial carpal R semilunar	complete	.
	bos taurus	calcaneus R	complete	GL 11.2; BS 2.9; C 2.3
	bos taurus	mandibula L, fr, proc art hinge	.	B 3.6
	bos taurus	phalanx I distal fr	.	BSD 2.1; d 2.3
	bos taurus	phalanx III	2 cut marks on lateral side, corresponding to 2 cut marks on ventral side	Ls 5
	bos taurus	phalanx III fr	.	Ld 5.7
	bos taurus	phalanx II fr	distal part partially missing	GL 3.6?; Bp 2.7; SD 2.1
	bos taurus	femur L, prox epiph fr	head + neck	.
	bos taurus	femur L, prox epiph fr, head	unfused; <42 months	.
	bos taurus	astragalus L, fr	small	GLl 5.3;Dl 2.7
	bos taurus	M3 (?) max. R	3-4 years	B 1.6; L 2.5
	bos taurus	M1/M2 max. R fr	6-8 years	B 1.6
	bos taurus	M3 mand. L fr	3-5-years	B 1.2
	bos taurus	ulna L, prox fr	processus olecrani + incisura semilunaris fr	LO 5.5; SDO 5.4; DPA 56.4
	bos taurus	3 und teeth fr	.	.
	bos taurus ?	mandibula fr	processus coronoideus; cut marks	.
	bos taurus ?	phalanx III fr	.	.
	bos taurus ?	metapodia fr, condyle fr	.	B 1.5; W 2 (?)
	und large	tibia prox fr	foramen; cut marks on diaph some above and 1 under the foramen	.

TC

	und large	6 rib fr	.	.
	und large	4 pelvis fr	.	.
	und large	11 long bone fr	.	.
	und large	11 flat bone fr	.	.
	und large	scapula, collum fr	.	.
	und large	radius diaph fr ?	.	.
	und large	3 cranium fr	1 orbit fr? zygomaticus?	.
	und large	vertebra fr	proc transv fr + centrum fr	.
	und large	vertebra fr	proc transv fr + centrum fr	.
	und large	intermediate carpal L fr (CPI)	some white crystal incrustations	.
	und large	carpal uncinate L	.	GL 5.2, GB 3.5
	und large	vertebra fr	proc transv fr + spinous proc dorsal fr; cut mark	.
	und large	5 und cancellous bone fr	1 traces of burning	.
	und large	canium fr	.	.
	und medium	femur, prox fr ?	.	.
	und medium	3 rib fr	1 with cut marks	.
	und medium	humerus R fr, diaph	.	SD 1.3
	und medium	radius diaph fr + ulna dist fr ?	.	.
	und medium	vertebra fr, cervical	centrum + foramen transv + proc transv	.
	und medium	tibia prox diaph fr	.	.
	und medium	radius diaph fr	.	.
	und medium	metacarpus diaph fr	.	.
	und medium	4 cranium fr	occipital condyle fr or auricolar meatus fr ?	.
	und medium	2 long bone fr	1 with cut marks on diaph	.
	und medium	4 mandibula fr?	.	.
	und medium	scapula fr ?	.	.
	und medium	5 flat bone fr	.	.
	und medium	3 long bone fr	.	.
	und medium	pelvis fr?, ilium fr ?	.	.
	und small	flat bone fr	.	.
	und small	3 rib fr	.	.
	camelus	scapula R, dist fr	fossa art fr + spina fr + tuber scapulae fr	GLP 10; SLC 6
	und large (camelus?)	femur L, prox fr	head fr + neck fr + troch fossa fr	.
	fish	mandibula/maxilla fr	.	.
	fish	vertebra fr	.	.
	shell	5 fr	1 big cypraea	.
	shell	4 complete	3 oliva	.

Restoration Report

RESTORATION WORKS AT SUMHURAM

(ARCHAEOLOGICAL PARK OF KHOR RORI)

(Sultanate of Oman)

CAMPAIGN OCTOBER-NOVEMBER 2012

IMTO

Diary of activities

04th October - 29th November

(Andrea Filatondi, Valter Filatondi)

Introduction

This campaign started on Thursday 04th October 2012 and will finish on Thursday 29th November 2012. At the beginning we received all the needed information regarding the locations we had to restore in Khor Rori. The locations are as follows:

1. M5 city wall – demolition of the existing collapsed wall and its reconstruction increasing the high in order to reach the level of about 4 meters;
2. M4 city wall – demolition of the existing wall at the right side of the postern gate, opening of the path on both sides, internal and external, of the postern gate and its reconstruction following the same way of the original one discovered during the demolition;
3. M4 tower – restoration of the lower part of the corner installing new stones where they were missing.

Later on, during the campaign, we have been required to add other works as follows:

- M460 city wall - demolition, restoration and rising up of the city wall;
- A171 - rising up of the city tower;
- Platform - reduction of the existing platform by removing the gravel and demolishing of its structure basement along wall M340;
- Tourist path - partial relocation of the path across the area B BB2 N-S trench square 184;
- Stairs - restoration of two stairs at the rooms A11 and A33
- Panels - design, assembly and construction of the new explanatory panels.

Working teams

Two teams of workers, each of about twelve members, have been engaged for all the needed operations to complete the restoration of the above mentioned walls and areas. One more team of six people was engaged to prepare the sieved sand and the mortar used by the other teams.

Working progress status

In order to check the advancement of the works, we daily took a significant number of pictures of all the areas in which we had to make the restoration.

The number of the pictures and the position from which they are taken from, are hereby reported in order to have a weekly update about the working progress status. From every reference point, two or more pictures have been taken, depending on the significance of the point of view.

The procedure of preparing the mortar for reconstruction

For the mortar we follow the same criteria used during the previous campaigns.

Sand and lime were always four buckets of sand mixed with eight scoops (600grams/each) of lime.

Therefore the final composition for 10 kg. of mortar was the following:

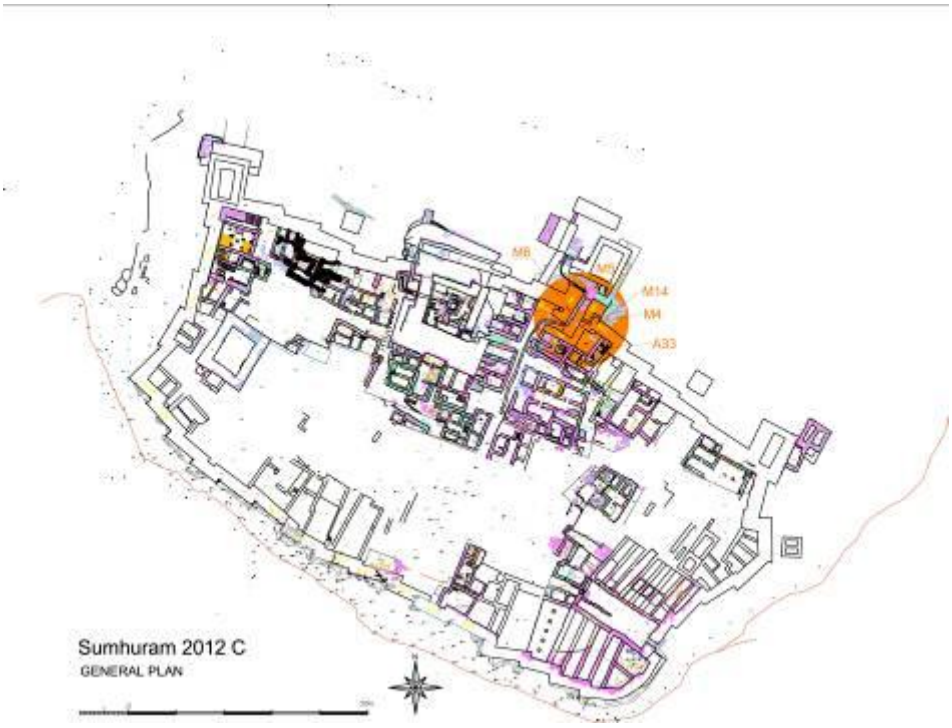
- Sand 9182 grams
- Lime 765 grams
- Yellow colour 40 grams
- Brown colour 13 grams

To fix the stones each other, we used two different kinds of mortar as it has been done before:

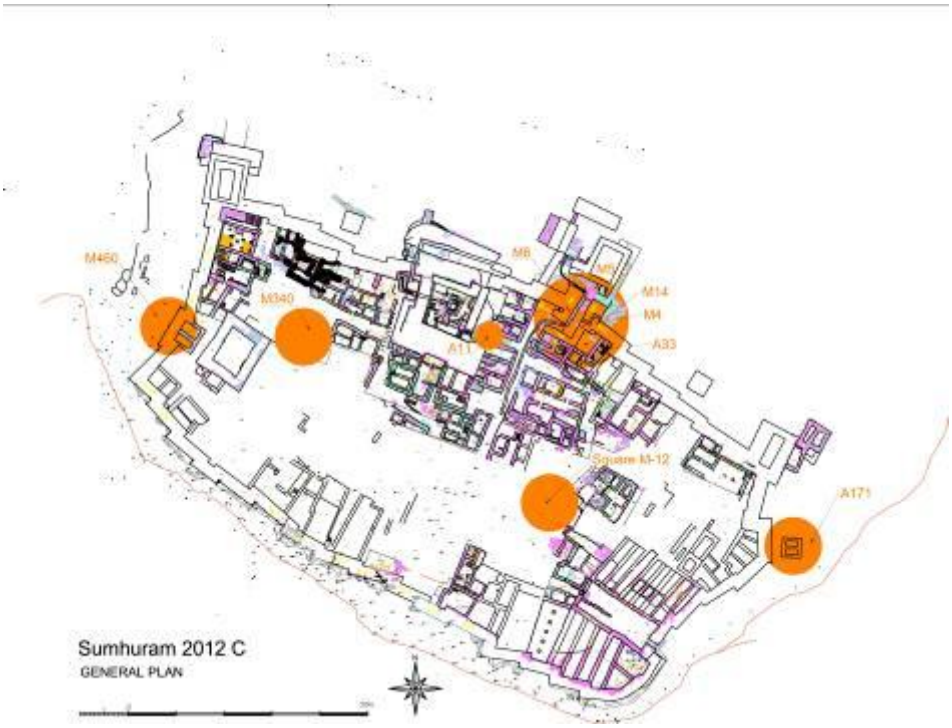
- **stone mortar**, for the external stones, obtained by the mix of sieved sand, hydrated lime, brown and yellow oxides for the chromatic tone.
- **filling mortar**, used for the back filling of the structure, made with the same components, except the use of raw sand instead of sieved sand.

The different locations are as follows

Location of required works:



Location of all the works carried out:



Restoration of the wall corner M4

The situation of the existing corner and its restoration is as you can see on the pictures below, took on 06th October 2012.

Restoration of the walls M5

The situation of the existing walls M5 was as you can see on the pictures below, took on 04th October 2012.

Front view from main entry

Front view from inside

Lateral views of existing wall

Picture 1 (from main entry)

Picture 2 (from inside)

The picture 1 shows the profile of the wall viewed from the side. As you can see the shape of the wall is not vertically straight on both sides as shown on the picture 2. The procedure of restoration consists of the demolition of the existing wall up to the first row of the stones from the ground.

As required we will increase the high of the wall in order to reach 4 meters in high.

In order to simplify the comprehension of the listed pictures, we show them on an optical cones map as follows:

Optical cones on M5

Sequence of photos on the wall M5 up to 06th October 2012

Picture 1 Picture 2

Sequence of photos on the wall M5 up to 07th October 2012

Picture 1 Picture 2

Sequence of photos on the wall M5 up to 08th October 2012

Picture 1 Picture 2

Sequence of photos on the wall M5 up to 09th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 10th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 11th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 13th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 14th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 15th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 16th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 17th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 18th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 28th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 29th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 30th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 31th October 2012

Picture 1

Picture 2

Sequence of photos on the wall M5 up to 01th November 2012

Picture 1

Picture 2

This wall has been finished on 01st November 2012.

Restoration of the Postern Gate - walls M4 – M14

The situation of the existing postern gate is as you can see on the pictures below, took on 04th October 2012.

Picture 1 from M14

Picture 2 from Main Entry

Picture 4 from top

Picture 3 from top

On both pictures is shown the existing situation of the poster gate viewed from top where (Picture 3) you can see the collapsed roof of the gate and, on Picture 4, the feeling of the whole path due to the collapse of the structure.

The way of restoration we followed is as described:

- demolition of the covering of the poster gate actually collapsed
- verification of which kind of structure were provided originally for the soffit (arc or flat)
- reconstruction of the entire path following the indication collected during its demolition
- covering the top of the postern gate and rebuild the previous status of the wall

Optical cones on walls M4 – M14 and Postern Gate

After the starting of the demolition we discovered that the walls of both sides of the Postern Gate were in good status as shown on the pictures below.

Sequence of photos on walls M4 – M14 and Postern Gate up to 07th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 08th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 09th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 10th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 11th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 18th October 2012

Picture 1

Picture 2

Sequence of photos on walls M4 – M14 and Postern Gate up to 20th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 21th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 22th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 25th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 29th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 30th October 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 06th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 07th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 08th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 10th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 11th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 12th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

Sequence of photos on walls M4 – M14 and Postern Gate up to 18th November 2012

Picture 1

Picture 2

Picture 3

Picture 4

The Postern Gate restoration has been finished on 18th November 2012.

Restoration of the wall M460

The situation of the existing wall was as you can see on the pictures below, took on 18th October 2012.

The situation of the wall is bending outside from the third row starting from the ground. Therefore we had to demolish all the above part of the wall and reconstructing increasing of two rows to contain the upper beautification. As you can see on the picture, and on the map below at the top of the wall M460 there are two rooms to be reconstructed partially.

Optical cones on the wall M460

photo on the wall M460 on 20th October 2012

Picture 1

photo on the wall M460 21th October 2012

Picture 1

photo on the wall M460 22th October 2012

Picture 1

photo on the wall M460 on 25th October 2012

Picture 1

photo on the wall M460 on 28th October 2012

Picture 1

photo on the wall M460 on 29th October 2012

Picture 1

photo on the wall M460 on 30th October 2012

Picture 1

photo on the wall M460 on 31th October 2012

Picture 1

photo on the wall M460 on 04th November 2012

Picture 1

photo on the wall M460 on 05th November 2012

Picture 1

photo on the wall M460 on 06th November 2012

Picture 1

photo on the wall M460 on 07th November 2012

Picture 1

photo on the wall M460 on 08th November 2012

Picture 1

photo on the wall M460 on 10th November 2012

Picture 1

photo on the wall M460 on 11th November 2012

Picture 1

photo on the wall M460 on 18th November 2012

Picture 1

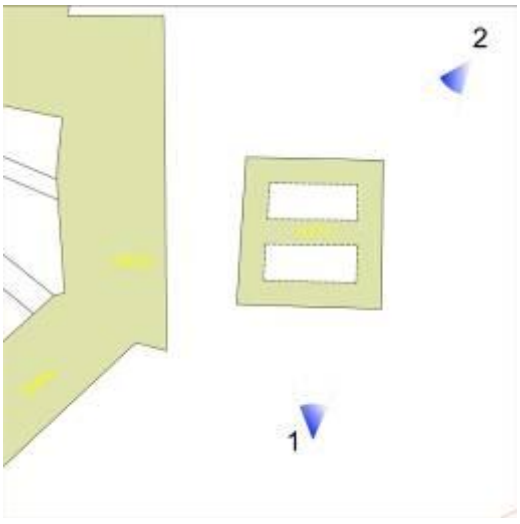
This wall has been finished on 18th November 2012.

Rising up of the tower A171

The situation of the existing tower A171 was as you can see on the pictures below, took on 19th November 2012.

In order to simplify the comprehension of the listed pictures, we show their points of view on an optical cones map as follows:

Optical cones on A171



Sequence of photos on tower A171 on 19th November 2012

Picture 1

Picture 2

Sequence of photos on tower A171 on 22th November 2012

Picture 1

Picture 2

This wall has been finished on 22th November 2012.

Restoration of the stair A11

The situation of the existing stair is shown on the picture below. The starting steps were disconnected from their proper position therefore we decided to remove them recreating the original situation.

Stair before restoration

Stair after restoration

Restoration of the stair A33

The situation of the existing stair is shown on the picture below. The starting steps were disconnected from their proper position therefore we decided to remove them recreating the original situation.

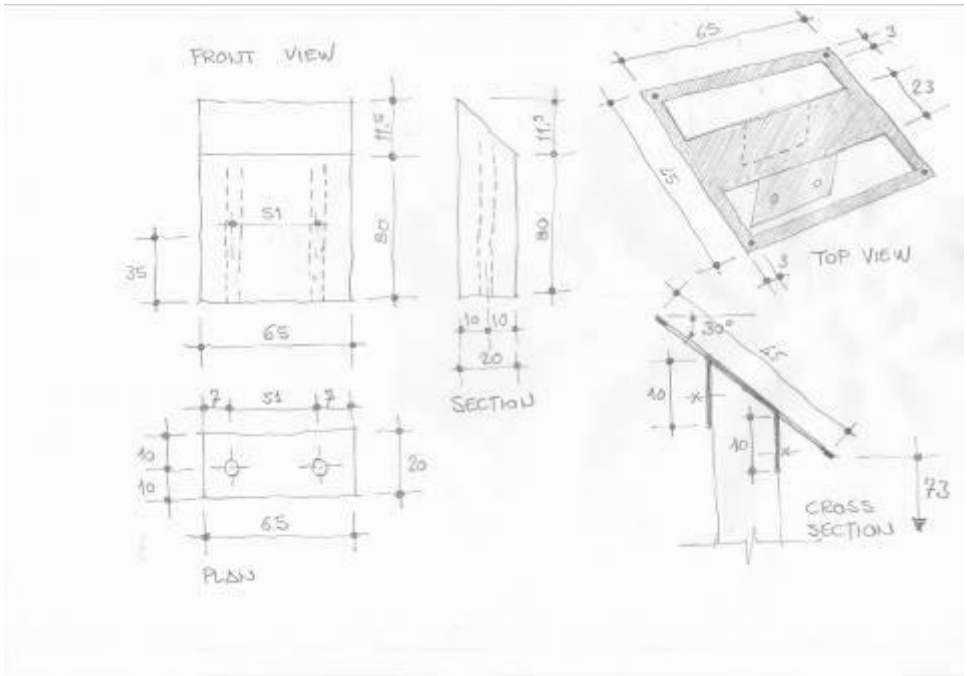
Partial dismantling of the tourist platform along the wall M340

This platform is located at the end of the tourist pedestrian path looking to the temple. The platform partially coincides with an excavation area beside the wall M340 and it is too large for its scope. The new arrangement is as shown on the picture below.

Design of new explanatory panels

It has been decided to change all the panels and their supports. They told us to provide a new support lower than the existing one. Below we show the existing panels and the design that has been approved by the Advisor.

Existing panel



Design

The support is composed as follws:

- A base (monolite) made by concrete;
- A steel frame three millimetre in thk;
- A aluminium plate on which is attached the explanatory detail.

In the beginning we try to find a company able to provide a marble monolite, but it was impossible and therefore we decided to make it by the means of white concrete adding yellow and brown oxide colours in order to get the sand colour. To make the monolite stronger we use the existing pipes support cutting them 65 cm from the ground.

Here in after you can see the phases sequences of the installation.

Existing structure

Formwork

Monolite made by coloured concrete

Steel frame of the panel

Panel complete with aluminium plate

The installation of the panels will be possible after a period of 28 days to allow the concrete becomes dry. The pouring of the concrete has been done on 22th November 2012.