

**IMTO – Italian Mission to Oman**

**University of Pisa**

**SUMHURAM**

**Preliminary Report**

**October – December 2011 (SUM11C)**



## **PRELIMINARY REPORT (SUM11C)**

### **October – December 2011**

The third IMTO's campaign of 2011 (SUM11C), under the direction of prof. A. Avanzini, started on 8<sup>th</sup> October and finished on 1<sup>st</sup> December 2011.

The campaign had a continuation of one month (till the 29<sup>th</sup> of December) under the supervision of Said al Mashani.

The main goals of the excavations have been focused in area A –easternmost part - (BA6, room A188, street A133 and rooms A57, A176 and A177), in area A – central part - (new rooms A175 and A193, extension towards south of street A75, cleaning of the building excavated by the Americans) and in area B (squares A180 and A184, building BB2 with rooms A181, A182, A183, A185, A186, A187 and the storage room A93).

The restorations activities have been carried on along the southern side of the city wall (completion of wall M498, rebuilding of M497, stabilisation and rebuilding of M503, cleaning of M499 which brought to the discovery of the small buttress M517) and in the south-eastern corner of the city wall where walls M199, M200 and M140 have been raised up with the aim of monumentalizing the corner of the city wall.

A huge intervention has been carried on in the area of the Monumental Building and involved the dismantling and the reconstruction of walls M18, M276, M269 and M268.

The heavy rains of the beginning of November stopped the activities for three days and obliged to spend some working days after to clean the damages and to consolidate the area near the tourist path in area B.

Some operations for a better enhancement of the site have been performed in the south-western corner of the city. Moreover the external side of the walled-up postern gate has been plastered with a mud mortar. The interior of the Monumental has been re-filled after the heavy rains of November which compromised the stability of the structure.

The eastern side of the city wall has been cleaned from the dumps: wall M460 is now completely visible as well as the corner of M118.

The excavations were conducted on the field by dr. Vittoria Buffa, dr. Alexia Pavan, prof. Alexander Sedov with the collaboration of Giulia Russo, Carlotta Rizzo and Tommaso Moggio.

The consolidation and restoration of ancient masonry structures has been done by arch. Sergio Martelli, arch. Alessandro Massa, eng. Marco Previti under the supervision of eng. Giuseppe Cecinato.

Arch. Alessandro with his team made a proposal for a general intervention to be performed in all the city wall with the aim of raise up some crucial parts, to complete the reconstruction of the southern side and to remove the modern staircase placed in the south-western corner.

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 Salalah and in Muscat, in particular Ghanem al Shanfari, Said al Mashani, Ali al Kathiri, Said al Salmi, Hassan al Jabri and all the Museum's team for their kind helpfulness.

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# Archaeological Report

## **Excavations in area A: area of building BA6, street A113 and area A188 (trench supervisor: Vittoria Buffa)**

### **Area occupied by building BA6**

The area occupied by building BA6 has seen, during the life of Sumhuram, several construction changes that will be illustrated below.

Furthermore a part of the area has been excavated by AFSM, but no documentation is available. The last fact made the understanding of the stratigraphy of the area quite difficult.

### **BA6 proper**

The most prominent building of Area A has been excavated during several campaigns. It consists of the central corridor A60, two rooms to the NE (A59 and A63) and two rooms to the SW (A56 and A65a). To the sides of the imposing entrance, one elevated porch (A51) and one open hall (A58). While the deposits accumulated on the floors of rooms A56, A59, A60, A63, had been partially excavated and refilled by AFSM, the south-eastern corner of the building underwent more intensive excavations by the same team.

The completion of excavation during this campaign allows the reconstruction of the different phases of occupation of the area.

It must be stressed again that the reconstruction is only hypothetical due to the undocumented work by AFSM in this area.

### **Phase 1**

Only a single room, room A64a, can be ascribed to a first building of which we do not know the complete plan. The room has the dimension of 2.50 x 3.50 m. It is defined by walls M476, M147, M230 and M172. The floor US470 was reached at the elevation of 29.04 m. A preparation was made to level the bedrock in order to build the floor.

The bedrock, probably very uneven, was uncovered only in the western part of the room at the elevation of 28.61 m. The preparation included a kind of wall (M510) leaning on wall M476, and a filling of loam (US510) and lime chips. M510 was 2.00 x 0.67 for a height of 0.25 m. US510 consisted of reddish brown loam, rather loose, incorporating few pottery fragments, some bones and some charcoal specks.

Walls M230, M172, M147 and M476 and floor US470 were set on the preparation US510. US470 floor consisted of hard packed, fine, reddish brown loam. It was reached at the elevation of 29.04 m. It was marked in the NE corner of the room by a limestone slab. The top surface of wall M510 was visible on US470 floor. It is possible that, right at the beginning, the room A64a had been open to the NW with a passage to reach room A177. Here the floor has not been reached, but excavation stopped at the elevation of 28.99 m., only 5 cm lower than US470 floor. Wall M476 seems to be divided in two parts; the South part could be a filling of the opening, a short time after. The blocks of the South part of wall M476 are set only one line higher than the ones of the eastern part.

The space South-East of wall M172, between M172 and M101, is defined by the N-S walls M172 and M535, and the W-E walls M147, M518 and M535. Another wall (M183) divides the space in two parts, leaning on M172 and M535. The northern part, although not a room proper, was given the number A189, to make the description easier. It was connected with room A64a through a threshold (distinguished as M506) in wall M172 at the elevation of 29.60. In the narrow space A189 the filling US451 has been excavated to the bottom in the previous campaign. Floor US509 was unearthed during this campaign under US451. Its elevation was 29.60 m. The thin deposit above US509 floor consisted in reddish brown loam. No finds have been recovered. US509 floor had a foundation of limestone blocks and, above it, was hard packed grayish loam with white specks (lime). Parallel to the threshold M506, a similar one seems to be the continuation of M535

in A189. At the elevation of US509 floor room A189 is open toward street A113. In the street A113 a lime kiln (M508) is present at this time (see below). Deposit US451, with the very numerous lime globules, was the result of the cleaning of the kiln after each firing to produce lime. US451 was found not only in A189, but also in front of the threshold M506 above US470 floor. The same deposit was present in street A113 around the kiln (see below US516).

In the southern part a room, A79a, was excavated down to US453 floor during the SUM10C campaign. In the SUM11C season a second floor was unearthed under US453 floor: US519 floor. It was reached at the elevation of 29.53; it was marked by one flat stone. The room had a bench, made of two long limestone blocks, along M183. During the excavation it became clear that wall M515, that closed the room to the South, was set on US453 floor. M515 was removed. The deposit above the floor consisted in brownish loam, incorporating some shards and few animal bones. It is not clear for the moment which was the relation between room A64a and A79a at the time of US519 floor.

## **Phase 2**

Room A64a went out of use due to a series of walls collapses. Of this event or events are witness the quantity of limestone blocks fallen in US470, US455 and 459, filling up the room. Judging from the distribution of blocks, probably the most affected were M476 and M147.

This deposit related to the collapse, over 1 m thick, has been excavated according to the basic lithographical distinctions observed at the time of excavation. So numbers US470, US455, US459 were given. It became clear afterwards that room A64a had been excavated more extensively and deeply than previously supposed by AFSM. Therefore the stratigraphy was the result of this work and of the refilling of the room. The deposits that resulted at least partially *in situ* were US470, near the floor, and US451 (see below).

During this period of abandonment the kiln in street A113 was always in use and its debris continued to accumulate in space A189, which was not affected by collapses (US451).

During this time building BA6 proper was erected. No connection with room A64a was in place.

For building BA6 see above. A door in wall M144 was connecting the central corridor A60 with room A65a, that had the floor US186 at the elevation of 29.89 m. The door had two steps descending in room A65a.

## **Phase 3**

Room A64a underwent major changes. A floor was constructed over the ruins of the previous phase. Floor US454, in places tramped with stones, consisted of hard packed grey loam with lime mortar (see SUM10C Preliminary Report). In the middle of the room one large sandstone slab served as floor of the room. It was placed above the edge of wall M147 and M183, and rested on the blocks accumulated during the previous phase. Another, smaller, slab rested, South of the large one, on a wall (M472) constructed for this purpose and on the edge of wall M172. The floor had the elevation of 30.30 m.

During this phase room A64a was included in building BA6. The access to the room was through a door in wall M147. The threshold of the door was at the elevation of 30.33 m. The access to room A65a from the central corridor was still through the door in wall M144. Another door was connecting room A64a with street A57, where floor US512 was unearthed at the elevation of 30.20. The threshold of this door consisted of two flat limestone blocks. This last door was later blocked with wall M213.

During this phase the level in street A113 was raised up, and the connection with A189 did not exist anymore (see SUM10C).

## **Phase 4**

In the last phase of occupation, in the south-eastern corner of BA6, over rooms A64a, A189 and A79a, the so called "late complex" was constructed. It consisted in six small rooms. To give access

to the complex a staircase was erected in the central corridor A60 (see Preliminary Report SUM05B).

### **Street A113**

The area has been excavated during the SUM10C and SUM11A campaigns. The floor US469 had been reached at the elevation of 30.00 m. US469 floor corresponds to US21 floor in the stratigraphy of street A45, excavated by IMTO in previous years.

Street A113 had been object of undocumented excavations by AFSM. The limit of the excavated area was clearly visible on US469 floor during the SUM11A campaign. Therefore, during the present campaign it was decided to remove, at least its major accumulation, the refilling of the AFSM. The few finds recovered were labeled as US514. US514 included a quantity of stone blocks. In this part the removal (probably not complete) reached the elevation of US22 floor in street A45. At the far northern end of the street some very large limestone blocks (a kind of massive wall?) could be connected stratigraphically with floor US508 (see below).

Under floor US469 the deposit US508 has excavated. It consisted of crumbled grayish loam incorporating lime specks, shards reddened by fire, animal bones and stones whitened by fire in the corner formed by wall M473 and M101. In incorporated a iron slags, a faceted ball (S1739), a shell spindle whorl (Sh410), a oil lamp (Sh413), a fragment of soft stone vessel (S1763). The US508 floor was reached at the elevation of 29.60 m. On its surface the most superficial blocks of what seemed to be a fireplace appeared. A wall, M486, running in a NE-SW direction was leaning on wall M263 of room A112 and on wall M473 of room A179. It was set on US508 floor.

The deposit underneath US508 floor, US516, consisted of reddish brown loam along M486 and of grayish loam around the blocks of the fireplace. US516 floor was reached at the elevation of 29.10 m. What had appeared as a fireplace on the US508 floor was a lime kiln set on floor US516. The top of the blocks forming the kiln (M508) emerged on US508 floor. It was constructed with oblong sandstone and limestone blocks. It measured 0.77 m x 0.65 m for a height of 0.40 m. It is leaning on wall M473 of room A179. A “window” opens in wall M473 at the level of the upper blocks of the kiln. It is 0.46 m wide and 0.40 m high. M473 was set at least on US516 floor. Room A179 has not been excavated so far, so the meaning of the position and the nature of the opening remains unclear.

All around M508 an area of grayish loam mixed with lime specks (US516) can be interpreted as the remains of the cleaning of the kiln after each firing. US516 contained several fragments of burned mud bricks, pottery fragments burned to a “rusty” color, limestone stones whitened by fire, very few animal bones. US516 filled the opening in wall M101 and it can be considered equal to US451 in A189.

In the area inside the kiln proper (M508) a circle of compacted ashes marks the fire itself. The deposit inside the kiln (US525) consisted of loose, black loam incorporating a quantity of white lime globules, many shards, blackened or reddened by fire, some mud brick fragments hardened by fire, one fragment of pottery with one surface vitrified. One half of a incense burner (S1785) whitened by heat was found in US525. The bottom of the deposit inside the kiln consisted of black loam, white lime globules and some amorphous stones (also whitened by fire) forming the floor. The lime kiln is stratigraphically related with floor US22, that marks the renovation of the entire city. We can assume that it was used to provide lime for the numerous new building under construction.

On street A113 floor US516 and the kiln were left *in situ*. Street A113 and A45 are now connected at the level of US22 floor.

### **Room A188**

Excavation started in the area East of wall M486. The surface unearthed so far reaches to the East the modern path built for the passage of tourists. The superficial deposit US458 was removed. It

consisted of loose, fine, reddish brown loam incorporating very few shards and animal bones. It can be interpreted as the moment of abandonment of the area. Some small sandstones slabs were present on the surface. Under US458 a wall (M534) made a corner with wall M486 in an eastern direction. Another wall (M538) was aligned, but not connected, with wall M263 of room A112. The deposit inside the walls (US534) was excavated under US458. US534 was only partly removed. It consisted of reddish brown loam, rather loose, incorporating some pottery shards (some glazed) and some bones. Some very large limestone unworked stones are present in the eastern part of the trench.

## **Excavations in area A: rooms A57, A176, A177 (trench supervisor Giulia Russo)**

The archaeological works in A57 started on the 24<sup>th</sup> October and lasted till the 1<sup>st</sup> December. During the campaign the whole A57, partly excavated by Vittoria Buffa in SUM11A, was completely dug and two new rooms have been discovered (A176 and A177).

### **Room A57**

The removal of US482 and US485 (see SUM11A Preliminary report) in A57 revealed the wall M536, leaning on M126 to the north and laying on US485floor. The wall was made of medium-large limestone blocks quite irregularly laid in two rows. It was grossly filled with a loamy accumulation of earth, ashes and crumbled mud-bricks and its measures are: l. 2.41m, w. 0.50m, h. 0.87m. The wall has been documented and then removed.

US485 covered also the retaining wall of the staircase M538 (superior elevation 31.10 m, h. 1.38, w. 0.53, l. 1.00).

The staircase could be considered in relation with A57 when it was an unique ambient and it was covered by US485, US512, US513 and US517; it is set on US517floor.

M538 is made from five steps of limestone and sandstone blocks with some mud-bricks. Each step is about 94 cm wide.

The retaining wall is made of eight rows of sandstone and limestone blocks with earth and small stones as filling. Between M127 and M538 a very narrow passage was left and it has never been possible to pass through it).

M538 leans on M126 to the north.

Under US485, US512 was found. It was a loamy accumulation, greyish-brown in colour, with charcoals and ash lenses and regular surface, almost plain (elevations: 30.20 in NE/SE corners, 30.18 in NW/SW corners and 30.26 in the centre).

The limit with US485 above (elevation 30.66) was defined by the alignment of collapsed stones from M126, fallen on a fireplace. The limit with US513 below was defined in the eastern sector of A57 by a layer of ashes and fireplaces and in the western sector by a well defined floor (US512floor). Two worked stones with flat surface and rounded margins were found in the NE and SE corners near the entrance to the A64a. Their surfaces were respectively at 30.37 and 30.35 and could be considered in relation to the entrance to the A64a and its US454floor.

In the western part of A57, the accumulation US512 covered the third step of the staircase M538. The inferior limit of US512 is also marked by the plaster applied on M127, whose base is aligned with US512floor. Bone fragments (some with traces of burning) and pottery shards were found, along with many oil lamps made from *Chlamys townsendi* shell, stone vessel fragments, *Strombus* shells and iron slags.

US512 covered US513, a medium compact accumulation discovered in the whole A57, loamy, with regular surface. The limit with US512 above was well defined in the western part by an accumulation of crumbled mud-bricks.

The limit with the US517 and US520 below was defined by US513floor, quite a good floor with two worked stones similar to those in US512 near the entrance to A64a (flat surfaces and rounded margins). Their surfaces were respectively at 30.06 and 30.11. In the SE corner of the area under the rounded stone defining US512floor and the accumulation below US513, two limestone squared stones were placed, defining the limit US513floor. The inferior elevation of US513 was 30.05-30.04. The layer covered wall M514 which divides A57 in two rooms: A176 and A177.

US513 covered also the third step of the staircase M538 while the fourth step of the above mentioned staircase was set on US513floor.

US513 represents the older layer related to A57 as a unique ambient. When US513floor was set, the whole area was modified. A176 and A177 and M514 between them were no more in use, covered by a unique ambient (A57). The staircase M538, which lays on US517floor, was in use maybe to reach a second floor of the building. To the north, M126 was set on the accumulation defined by

US513 and the layers below in A176. The foundation of the wall was made of six very big stones, around 40 cm high, leaning on US513 floor and the wall M514. It was possible to reach the A64a to the east walking through the passage in M148 later blocked by wall M231.

### **Room A176**

US517, under US513, was a loamy accumulation in A176. The limit with US522 below was marked by a well-made floor visible in the whole area with two circular post-holes. The first of them was located in the eastern sector of A176; it was emptied and contained a lot of small charcoals recorded as sample. It was about 10 cm deep. The second hole was recorded as US535, which cut US517 floor and US522 below, and was about 22 cm deep. US517 covered the last step of the staircase M538, which lays on US517 floor (29.78m).

US522 below was a rather compact accumulation in the whole A176 area, loamy and grey-brown in colour. It covered US524, US526, US537 and the two mud-bricks walls M519 and M520 (US522 floor at an elevation of 29.23). Bones, shells and many pottery fragments have been found in the layer and also three coins (Co731, Co735, Co736), a fragmentary bronze plaque (MB679) and an iron slag.

After the removal of US522, US524 was excavated. It was an accumulation placed in the northern part of A176, between M519 and M520, loamy and loose in consistence. It leans on the two mud-brick walls M519 and M520 and covers also part of the foundation of these walls (stones of various size identifiable as the foundation and related filling). The layer contained crumbled mud-bricks, stones of various size, fragments of plaster and charcoals (both recorded as sample), bones, pottery and stone tools (S1805, S1814, S1815) together with three coins (Co739, Co740, Co741). US524 floor was reached at 28.72m.

Between M519 and M127, US526 was excavated. It was an accumulation in the southern part of A176, loamy and brown in colour, differing from US524 because of the absence of plaster fragments and stones. The northern limit with wall M519 was defined by the exterior covering of the wall, yellow in colour and quite clayey in consistence. US526 covered the foundation of wall M127 to the south. The inferior limit (US526 floor) is defined by a row of gray mud-bricks which links M127 and M519. Coins (Co742, Co743), pottery, a stone tool (S1799) and also some glass fragments (G168) with an iron object (MI187) have been found. US526 floor was reached at an elevation of 28.59.

In the south-eastern corner of A176, delimited by M520, M514 and M127, the accumulation US537 was excavated. The layer was brown in colour and loose in consistence, with some charcoals, bones a stone object (S1816) and few fragments of pottery.

The walls M519 and M520 are both mud-brick walls with an external clayey covering, yellowish in colour. M519 is well preserved only in the eastern part and it's linked to M127 to the south by a row of mud-bricks in US526 floor.

### **Room A177**

In room A177, under US513, the accumulation US520 was discovered. The layer, quite compact in consistence, was *circa* 1 m high with a superior elevation of 30.04 (US513 floor) and an inferior elevation of 28.99 (US520 floor). The change of consistence of the layer defined the new accumulation US538. To the east, US538 continues under M476 and so it was not possible to remove completely the layer. US538 floor was defined by a well-made floor, very compact in consistence and orange-reddish in colour, with some plaster fragments and small stones incorporated. It was preserved only to the north of A177. Along the SE margin (not the original limit of the layer) the beginning of a plaster floor/covering of a structure is visible; since it goes under M476, it was not possible to dig it up completely. The plaster above mentioned is well made and is enclosed by mud-bricks. Bones, shells and many fragments of pottery were found. Close to

the SE corner of A177, near M476, many fragments belonging to a storage vessel were unearthed (US538,1). US538 floor has been reached at an elevation of 28.67 m.

**Excavations in area A: new rooms A175 and A193, A160, A174, extension towards south of street A75, cleaning of the building excavated by the Americans (BA12) (Trench supervisor: Alexia Pavan with Carlotta Rizzo)**

Goal of the campaign performed in SUM11C was to clarify the arrangement of street A75 towards south in order to collect new data about the architectural lay-out of the city and the general arrangement of streets and squares in Sumhuram.

Street A75 has been already exposed, during the previous excavations, at the level of US22floor, reached at an elevation of 29,40-29,30 in all the area delimited by buildings BA6, BA5, BA11.

Works in area A started with the removal of US21 from square 110. As denoted in previous campaigns US21 is a massive heap, resulting from the landslide of the walls after the abandonment of the city, brown in colour and non homogeneous in consistence. It's made from a large amount of roughly dressed limestone blocks but with a consistent component of smaller and regular sandstone slabs, probably belonging to the upper parts of the walls (in the specific case of wall M185 partially excavated and placed in the plan from Albright).

At the bottom of US21 the previous excavations revealed the existence of US21floor, a thin hard packed layer, made up of greyish loam mixed with some medium and small size stones, above all sandstone, disposed in a chaotic way. The same situation has been discovered in the southern continuation of A75 also if it has not been possible to follow the floor extensively, but just to notice some "spots" where it was preserved.

Two coins (Co728, Co729), a complete bronze nail (MB677), a whetstone (S1735), a stone pendant (S1738) and a mortar (S1740) have been collected during the excavations.

Contemporary with the removal of US21, we proceeded also with the excavation of a new layer, US507, leaning against US21. US507 is a noticeable accumulation of dumps coming from the American excavations performed in the compound southern from BA6, named, in this campaign as BA12

It's made above all by earth with a very few amount of stones. Some small findings have been found in the dumps, ignored or discarded by the Americans: coin C0730, the sandstone container S1736, the stone pendant S1737, the sea-urchin pendant D27, the cippus/architectural element S1741, the loom weight S1783, the fragmentary plaque Sh415, the bead S1784, two bronze objects (MB681, MB682), a stone vessel handle with rim and part of wall (S1793) and a fragmentary incense burner (S1798). Few iron slag (sample n. 3), a sample of murex (?) –n.6- and some stone vessels samples (sample n. 10) have been found as well together with some pottery shards (above all straw-tempered) and some animal bones and sea-shells.

Below strata US 21 and US507 we found a different layer, with a softer consistence and grayish in colour for the presence of some ash-lenses. The most evident feature of this layer – US29- is the noticeable quantity of remains of sea-shells – mussels- spread in large amount in all the area. This feature, probably to be connected with natural events which caused a over-production of mussels, has been evidenced also during previous excavations (V. Buffa pers. com.).

A bone handle (B78), three whetstones (S1742, S1745, S1756), a stone stopper (S1743) and an hammerstone (S1744) have been discovered together with some pottery shards.

US29floor was tramped with small stones and sometimes with small sandstone slabs, above all scattered in not-coherent arrangement. The floor was not possible to follow in all the area. Its easternmost limit was M185, its westernmost fitted with the top of wall M507 (see below).

The average elevation was 29,50 circa (29,59 near the easternmost portion of M219), which fits with elevation of US29floor brought to light in SUM06B: 29,52 (see SUM06B Preliminary Report). The removal of US29floor and the related accumulation permitted the discovering of the accumulation US22 and, contemporary, shown the existence of a new room, A175.

### **Room A175**

Room A175 covers a surface of about 32 square meters and is delimited by walls M219 (l. 3,70), M507 (l. 8,70), M511 (l.) and M509 (l. 8,70). The top of M219 was already exposed during previous excavations and actually was covered by a thin loose deposit of aeolic material.

Inside room A175 the following stratigraphy has been exposed: US21 (blocks from the collapse of the perimeter walls M219, M507, M511, M509) but without its related floor, US29, with its typical abundant presence of mussels but without the related floor, and US511.

US511 is rather soft, brownish in colour with some stones of medium and small size. It's not very different from US29, covering it, but there is a more consistent quantity of animal bones, an almost complete lack of sea-shells and a bigger variety of pottery (above all storage jars, but not more just straw-tempered shards -see Black and gray types- and also glazed vessels).

A large quantity of stone tools have been recovered: most of them are whetstones (S1747, S1748, S1749, S1757, S1764, S1765, S1769) together with fragments of stone vessels (S1750, S1751, S1758, S1759), a mortar with inscription (S1746), fragments of different and broken tools grouped together with the name of S1768, an handstone (S1770) and an hammerstone (S1771).

Some iron slags (samples n. 8, 2) and a sample of flint (n. 7) have been discovered as well.

US511, reached at a level of 29,00 circa, was the last living floor of the room, to be placed in relation with US22 floor discovered in street A75. A threshold placed at the elevation of 29,38.

The cleaning of the lower part of US511 reveals the presence of different layers of floor, indicating a consistent series of repairing. The highest presence of floor has been registered at an elevation of 29.26 and it was visible near the threshold.

The highest levels of US511 floor covered the partition wall M512, exposed just for the top and made from sandstone slabs for the western half and from small limestone blocks for the eastern one.

### **Rooms A193 and A160/A174**

The excavations carried on during the campaign included also the enlargement of the excavated trench eastern from street A156.

The area originally delimited by walls M458 and M468 in the northern side, by wall M488 of A165 in the southern side, and by wall M489 and the threshold in the western side, has been enlarged eastward till wall M509. A new room closed by M458, M468, M509, M493, M491 and M488 has been named as A193.

The stratigraphic sequence brought to light was coherent with the one discovered in the previous campaign: some remains of US21 (masonry blocks), no attestation of US29, US442 with its related floor, US316 with its related floor and US489 with its related floor.

US442 is very compact, without small finds and with noticeable remains of smashed mud-bricks. The floor has been reached at an elevation of 29.47 (in SUM11A it was reached at 29.40).

No small finds have been discovered, in line with the results of the previous excavations. Near the corner between walls M488, M491 the floor was very damaged by a collapse, probably due to the landslide of the upper part of the above-mentioned walls together with M509. The collapse was made from few limestone blocks with a large amount of sandstone slabs and mud-bricks. It has been named as US515 and its' very similar to US480 and US481, discovered above US442 floor in A156 and to relate to walls M485 and M488-M489.

Also the layer covered by US442 floor was very compact in consistency: it's US316 with a related floor reached at level 29,07 (in SUM11A it was at 29.04), grayish in colour and with a noticeable quantity of smashed mud-bricks. It's very hard and almost completely sterile.

On the top of US316 the fragment of the upper part of rotary mill has been found and placed in the lapidarium.

The last layer discovered in A193 is, coherently with the sequence brought to light during previous excavations, US489 with its related floor reached at 28,81.

The following small finds have been discovered in the layer: the stone bead S1760 and the fragmentary hoe (?) MB678.

The removal of the deposit in A193 brought to light a new structure, namely staircase M513, leaning on wall M503 and on wall M544. The first excavated step of the staircase connected US489 floor with a second storey in room A160 (but some other steps could be still below the accumulation in A193). Staircase M513 is made by big sandstone slabs (average measures: 57x13x30) used as steps together with small blocks of limestone and sandstone. On the back (i.e. in the part facing towards M463) the staircase has a retaining wall made from good shaped and good worked sandstone blocks.

Room A160 was partially excavated in SUM11A. It was closed by walls M463 (north), M461 (east), M468 (south) and M462 (west); the following stratigraphy has been recovered: US22 and related floor (29.62); US432 and related floor (29.09); US457 and related floor (28.74) and US460 and related floor (28.10) where we decided to stop.

At the beginning we expected the same situation also in the new room A174 where the top of walls M461 (west), M463 (north) and M509 (east) seemed to determine a space “specular” to A160.

This was true but only in relation with the latest phase where we discovered traces of a floor at an elevation of 29.74. Considering its typical features it seems possible to determinate a correspondence with US22 floor in A160.

The excavation of the room let to clarify that wall M461 was a “late” compartment wall, made from 3 rows of sandstone blocks, standing on a more ancient wall (M544) which sustained the staircase when there was just one room, A160.

Below the floor we equalled to US22 floor, US518 has been individuated. The layer is characterized by the presence of a big quantity of whale bones, probably to be connected with the presence of the staircase M513. Numerous iron slags have been found, in correspondence with US518, in wall M509. No items have been recovered in the layer.

Below US518 the situation brought to light in A160 (US457 with its related – well plastered – floor) has been discovered. No items but a few quantity of bones have been discovered above the floor.

The choice of excavated areas of SUM11C let us to decide to start the cleaning of the building, previously excavated by AFSM, located southern from BA6 and eastern from street A75.

It has been named BA12. Six rooms are still visible but, till now, we cleaned and named only those place on the western side: A190, A191 and A192 (corresponding to L20 of the American excavations). Only room A190 has been partially excavated removing before the top layer US536 where a quantity of objects have been found: an arrowhead (MI186), a fragment of glass vessel (G169), three hand-stones (S1807, S1811, S1813), some whetstones (S1800, S1802, S1804, S1808, S1809, S1810), a stone loom weight (S1801) and a stone object with unclear function (S1812).

Below US536, US539 has been individuated. The following items have been discovered: the necklace D29, the oil lamp Sh417, the whetstone S1820 and the hand-stone S1821.

## **Excavations in area B: squares A180 and A184, building BB2 and the storage room A93 (trench supervisor A. Sedov)**

During the short stay at Sumhuram in the SUM11C season (30.10.2011 – 17.11.2011) excavation at the Area B has been conducted. Previously, excavations at the area took place in the season SUM07B, when the room A107 of the building BB1 and a sort of ‘corridor’ (A178), also belonging to the same building, were partially excavated. The ‘corridor’ (A178) is delimited by two long walls M239 (on the south) and M245 (on the north), and two short walls M215 (on the east) and M516 (on the west). It seems that the entrance to the ‘corridor’ (A178) was located in its SE corner. In the SUM07B season only top layer of the ‘corridor’ (A178) was cleared out. During the present campaign the excavations were concentrated to the north of the above-mentioned structure, the building BB1. It seems also that the room A106, delimited by the walls M234, M235 and M236 and occupied the NW corner of the building BB1, belongs to the “period of late occupation” of Sumhuram.

### **Square A180**

As we can judge, a wide square, circa 5.50x9.90 m in size, is located to the north of the ‘corridor’ (A180). On the south it was delimited by the very badly preserved wall M245, on the east – partially by the wall M215, and on the west – by extremely thick (2.70 m) wall M516. On the north the square A180 was bordered by the new discovered building BB2, by its external wall M529 and “late” additional wall M522. The so-called ‘passage’, 1.50 m wide, located in its NW corner, connected squares A180 and A184. On the east the square A180 was running in the north direction, along the eastern external wall M530 of the building BB2.

The top stratum US523 was cleared along the wall M516 and near the possible entrance only. It consisted of greyish rather compact loam mixed with lime- and sandstone blocks collapsed mostly from the wall M516. Certain amounts of pottery fragments, animal bones and marine shells were discovered in the stratum US523 as well as several stone tools, fragmented and intact, mostly concentrated against the NE corner of the wall M516. A whale vertebra was found in the ‘entrance’ in situ against the “late” additional wall M522.

### **Square A184**

An area in front of the entrance to the building BB2 from the west was denoted as square A184. The so-called ‘passage’, 1.50 m wide, located between the wall M516 and the southern external wall of the building BB2, connected the square A184 with the square A180. A small trench, circa 1.2-1.5 m wide, running in N-S direction, was only excavated on the square. Cultural deposits were denoted as US530 and consisted of greyish and dark brown compact loam mixed with lime- and sandstone blocks collapsed from the walls of the building BB2.

### **Building BB2**

The building BB2, 8.20x9.90 m in size, is oriented along E-W direction. Its plan is typical for ancient Hadrami dwellings: the central corridor with stairs to the top floor and adjacent rooms on both sides of the corridor. Its external and internal partition walls were 0.55-0.6 m wide and were made from two horizontal rows of limestone blocks. The entrance, circa 1.3 m wide, is located in the centre of the western side of the building.

### **Room A181 (central corridor)**

Rectangular oblong room, 1.8-2.0x8.0 m in size, occupies the central part of the building. It was excavated down to 40-50 cm from the present surface. The stratum, denoted as US527, consisted of greyish and dark brown compact loam mixed with big amount of lime- and sandstone blocks collapsed from surrounding walls, pottery fragments, marine shells and animal bones. Charcoal

flecks and ash lenses were recorded in the stratum indicating, probably, activity of “late” occupants of the ruins of the building. A bulk for section was left in the western part of the room, between walls M524 and M525.

### **Room A182**

The room, 2.6x5.6 m in size, occupies the SW corner of the building. It has rectangular plan and an entrance, 0.85 m wide, in the centre of its northern wall M524. It seems that the south wall of the room, the wall M522, is not the original wall of the building, but a sort of “late” addition, constructed already above the ruins of the building. It was irregularly built from large roughly dressed stones. The western part of the room remained unexcavated (for section). The cultural deposits, denoted as US528, consisted of limestone blocks mixed with loose dark brown loam, very little amount of pottery fragments, marine shells and animal bones.

### **Room A183**

The rectangular room, 1.85x4.20 m in size, occupies the NW corner of the building. The entrance to the room, 0.85 m wide, was located in the centre of the south wall M525, and connected A183 with the central corridor A181. Cultural deposits were denoted as US529 and consisted of greyish compact loess mixed with stones, little amount of pottery fragment, marine shells and animal bones. The eastern part of the room remained unexcavated (for section).

### **Room A185**

The rectangular room, 2.25x3.20 m in size, occupies the SE corner of the building. The entrance to the room, 0.9 m wide, was located in its NW corner, between walls M533 and M523, connecting the room and the central corridor A181. Cultural deposits were denoted as US531 and consisted of dark brown loam mixed with lime- and sandstone blocks from collapsed walls, little amount of pottery fragments, animal bones and marine shells, flecks of charcoal and ash lenses. An almost complete globular glass vessel was found in US531 in very top layer against the wall M533. It seems that the vessel could be dated close to the mediaeval period (Abbasid?) and represented the “late” occupation of the ruins of the building.

### **Room A186**

The rectangular room, 1.4x2.3 m in size, occupies the NE corner of the building. Probably, it represents the so-called staircase well, and that’s why there was no entrance to the room. Cultural deposits were denoted as US532 and consisted of dark brown to black loose loam mixed with stone blocks (collapsed walls), little amount of pottery fragments, marine shells, animal bones, flecks of charcoal and ash lenses.

### **Room A187**

Small rectangular room, 0.8x2.95 m in size, is located in the centre of the northern part of the building. It has a wide opening to the central corridor A181, and, most probably, represented a staircase (not yet found) leading to the upper floor of the building. Cultural deposits were denoted as US533 and consisted of dark brown to black loose loam mixed with stone blocks (collapsed walls), little amount of pottery fragments, marine shells, animal bones, flecks of charcoal and ash lenses. The lower part of large storage vessel on a ring base reused as a fire-place was found in the upper layer of US533, representing remains of “late” occupation of the ruins of the building.

In general we can conclude that the discovered building BB2 represents, according to its lay-out, the typical ancient Hadrami dwelling, known from the excavations in Shabwa, Raybun, Qani’ and Makaynun. It seems quite probable, that the ruins of the building were re-occupied in mediaeval times, when several small houses and shelters were built on the remains of the ancient town.

**Storage room A93**

A storage room A93, part of the storage complex in front of the “Small Gate” of Sumhuran, was cleared during the present campaign. It was partially excavated down to the bed-rock in 1996 by D. Morandi (the first IMTO sounding at Sumhuran). The room was delimited by two long walls M210 (from east) and M211 (from west). We were able to understand the junctions of these two walls and the wall M167, bordering the northern part of the storage complex from the square A77, and junctions with the wall M214, bordering the storage complex from the north. The width of the room A93 was 1.7-1.85 m, its length – 11.4 m.



Fig. 1 Area A, room A64a, before the excavations



Fig. 2 Area A, room A64a, after the excavations



Fig.3 a, b Area A, room A79a before and after the excavations

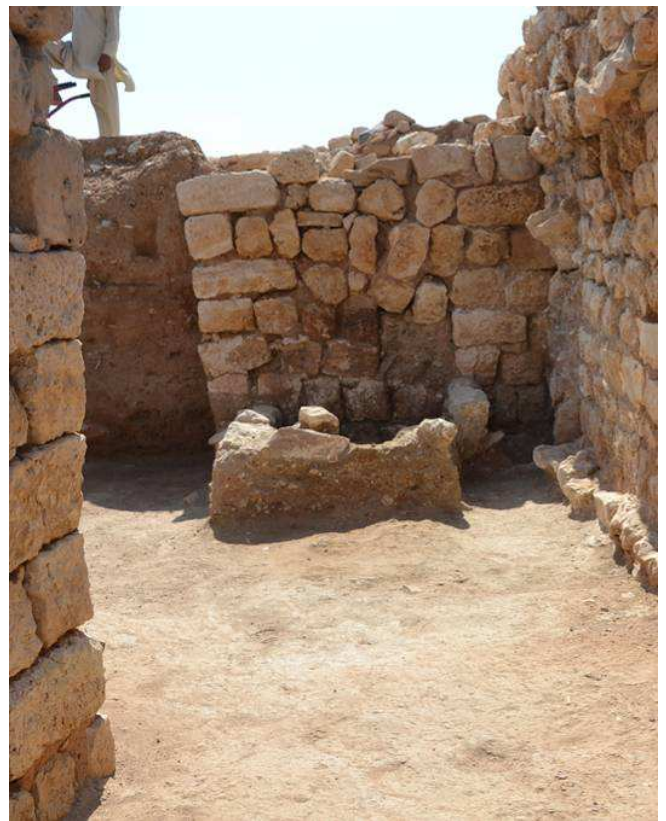


Fig. 4 a, b Area A, street A113 before and after excavations



Fig. 5 Area A, A188 before the excavations



Fig. 6 Area A, A188 after the excavations



Fig. 7, Area A, A57 before the excavations



Fig. 8, Area A, A176 after the excavations



Fig. 9, Area A, A177 after the excavations



Fig. 10, Area A (eastern from BA6) before the excavations



Fig. 11, Area A (eastern from BA6) after the excavations



Fig. 12 Area A, building BA12 before the excavations, completely covered by dumps



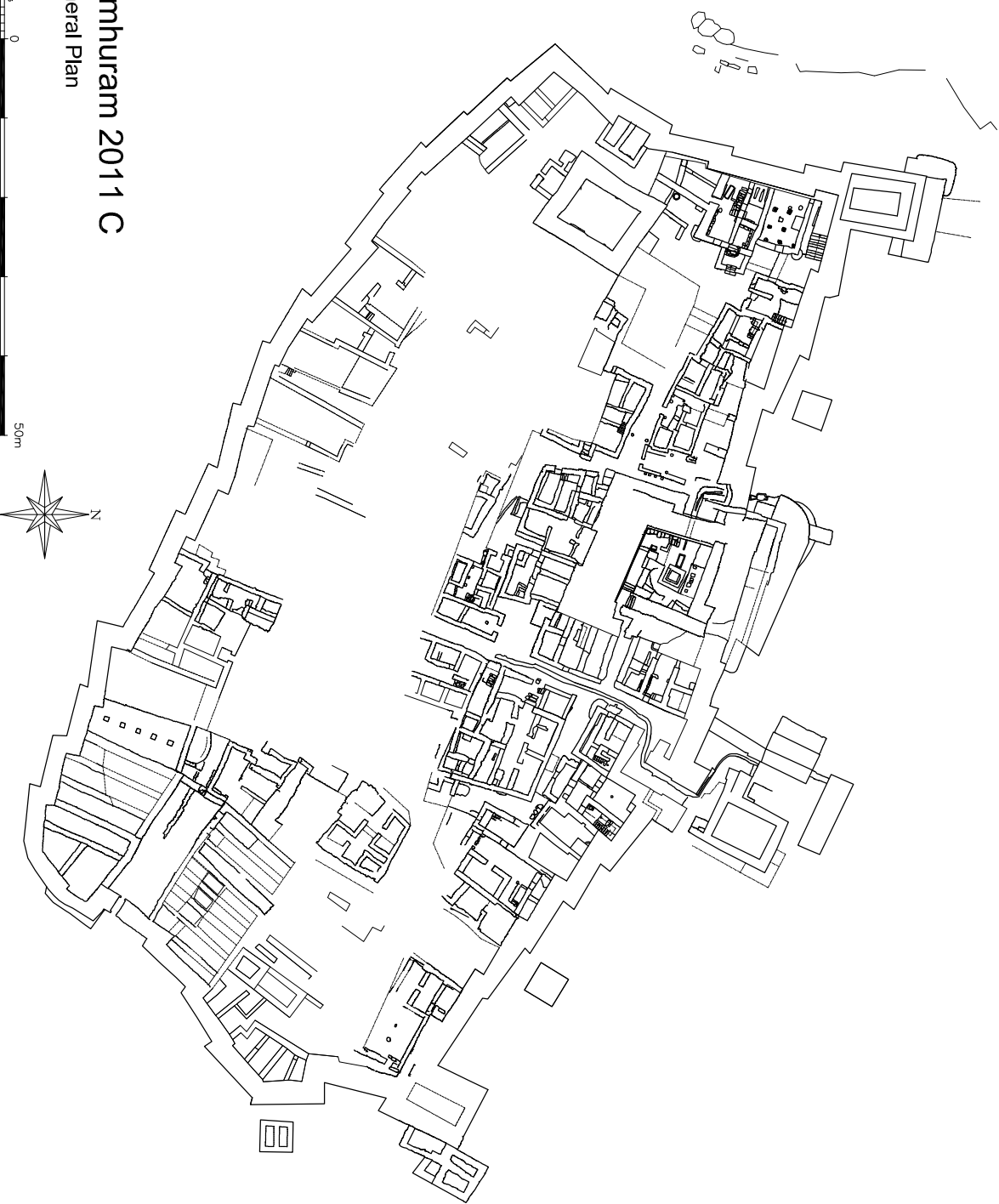
Fig. 13 Area A, building BA12 from south after excavations



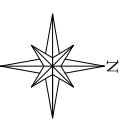
Fig. 14, Area B, general view of the area after excavations



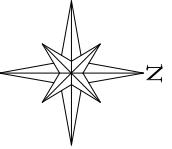
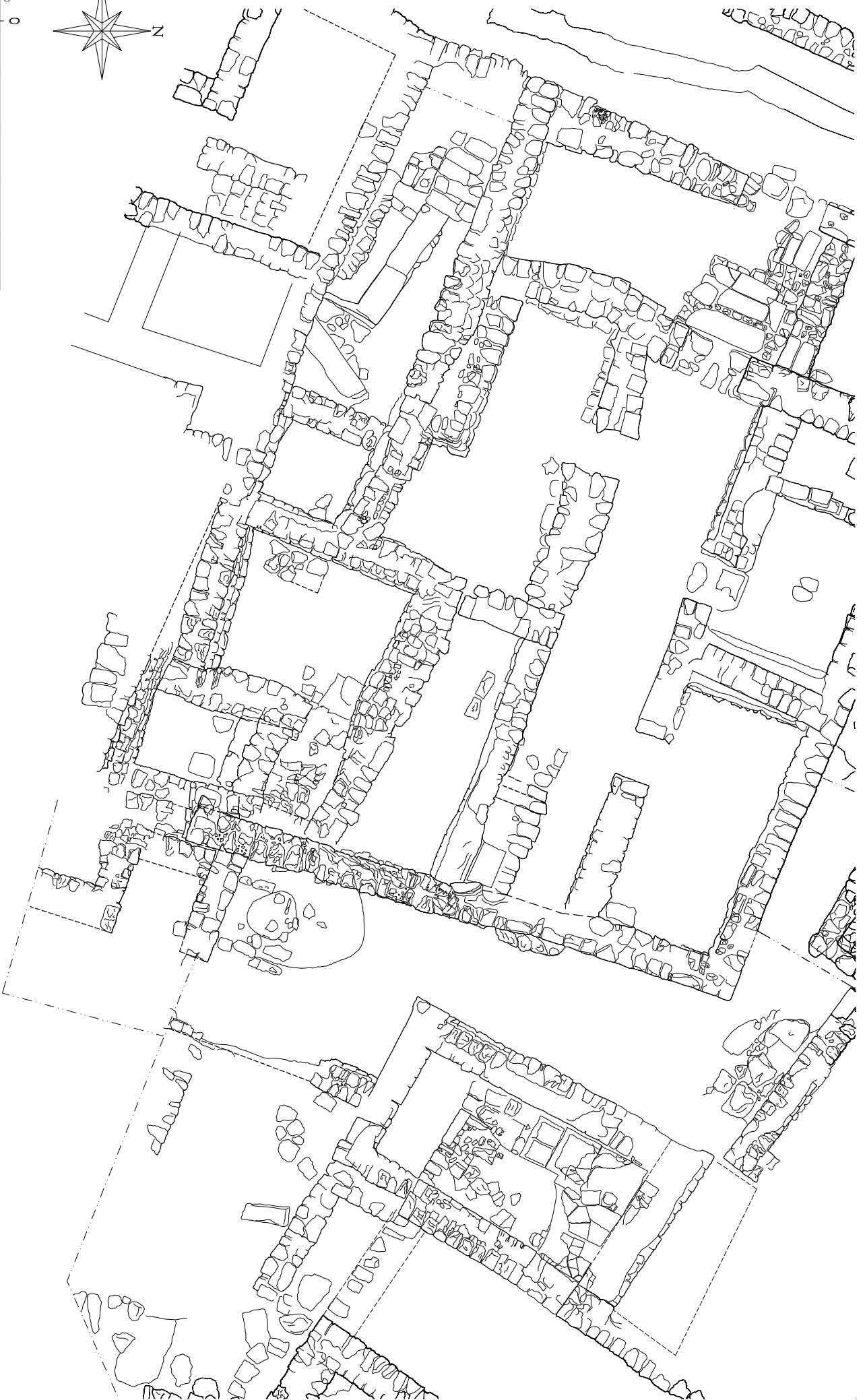
Fig. 15, Area B, detail of the building BB2



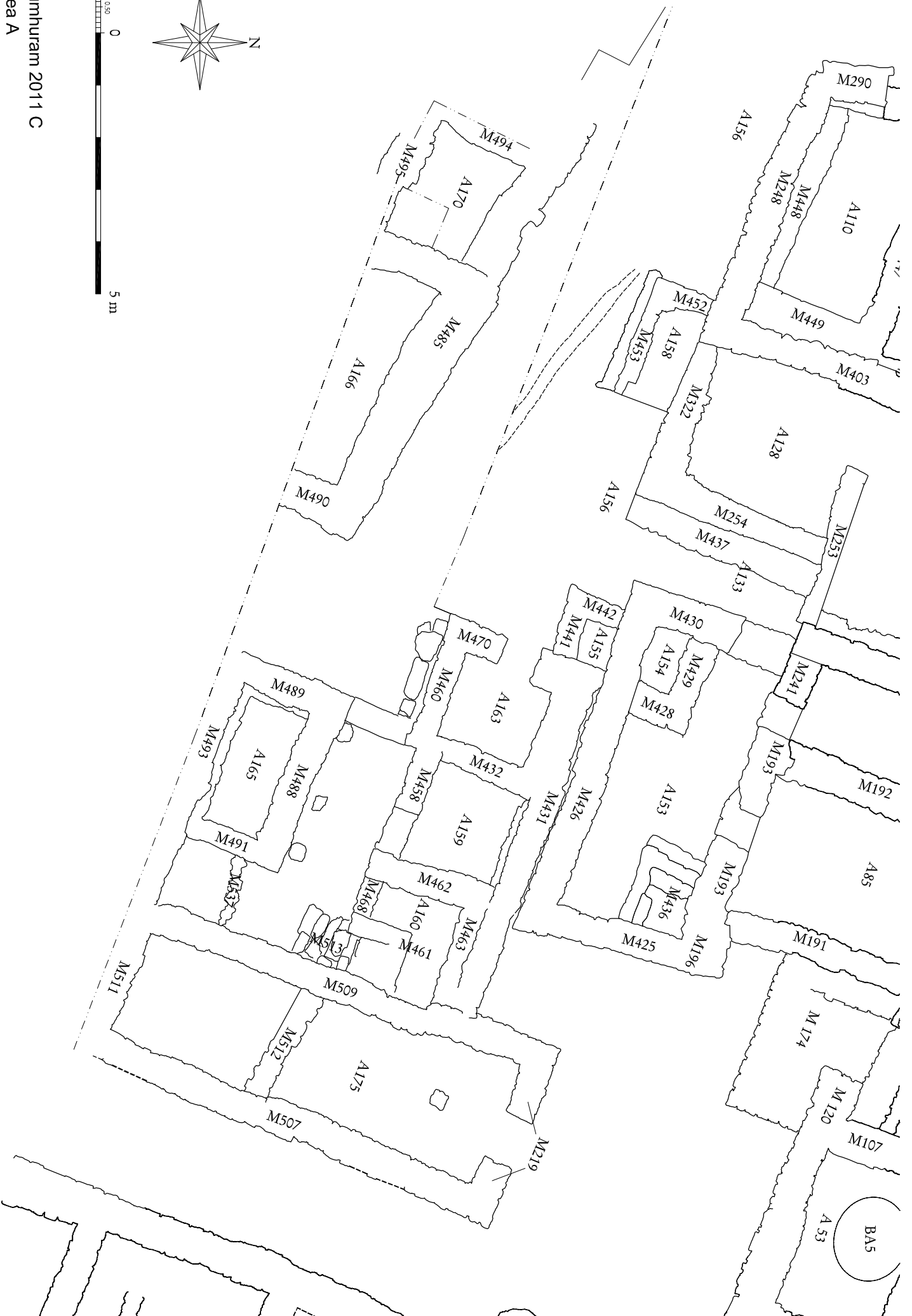
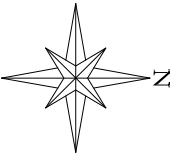
Sumhuram 2011 C  
General Plan

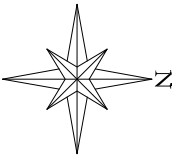
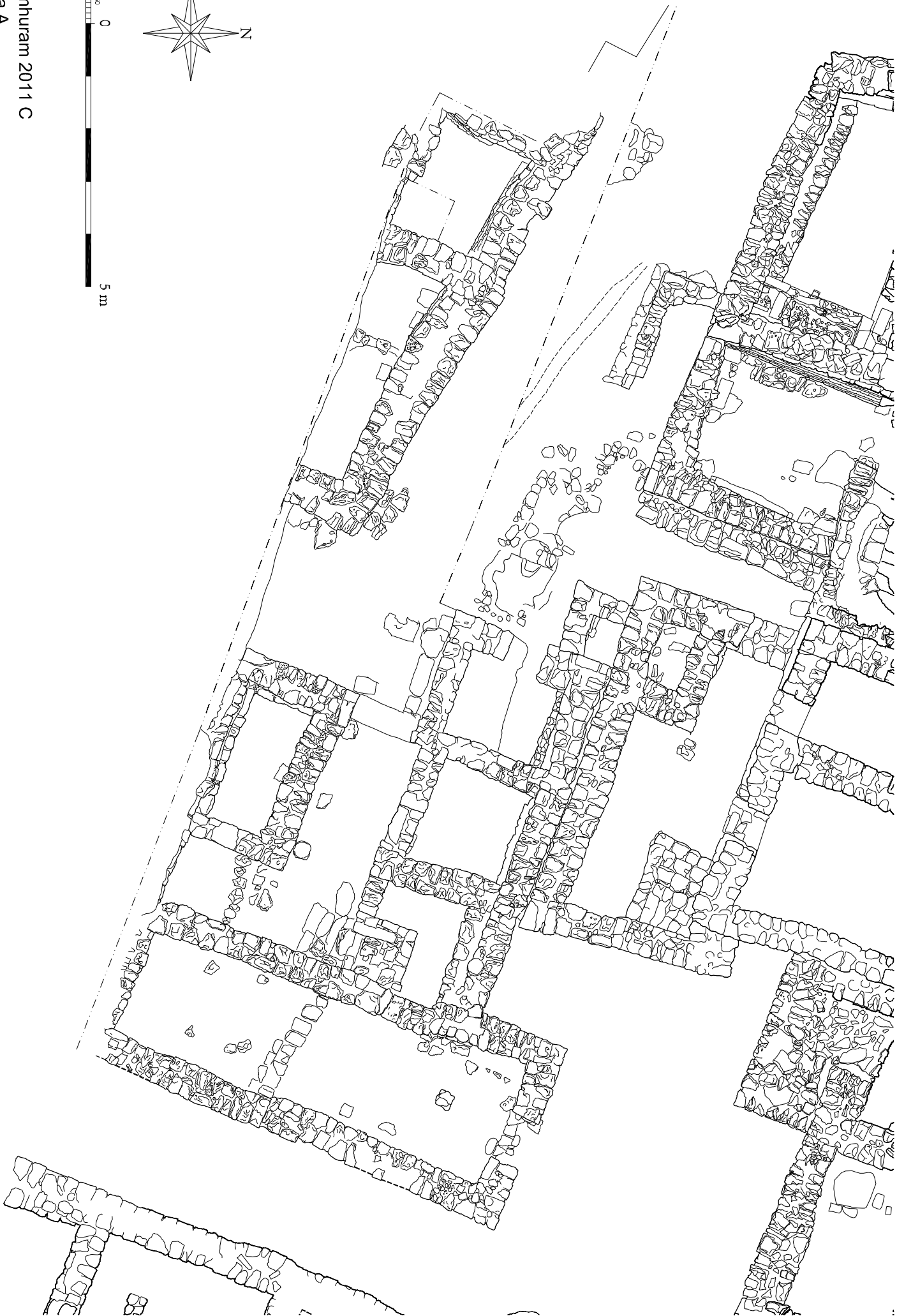




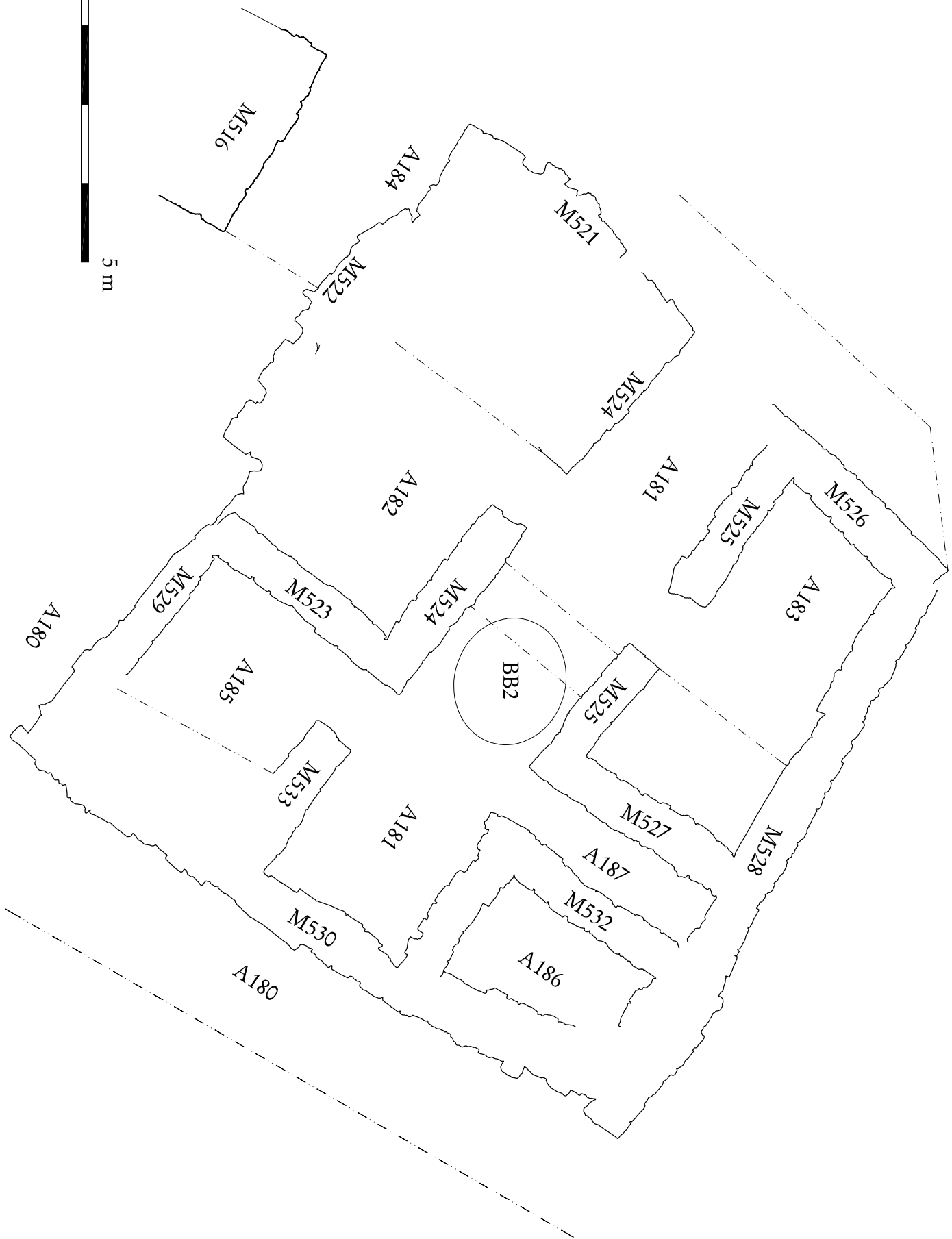


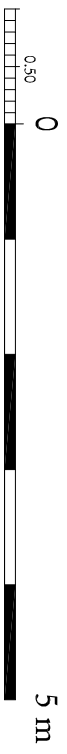
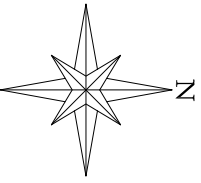
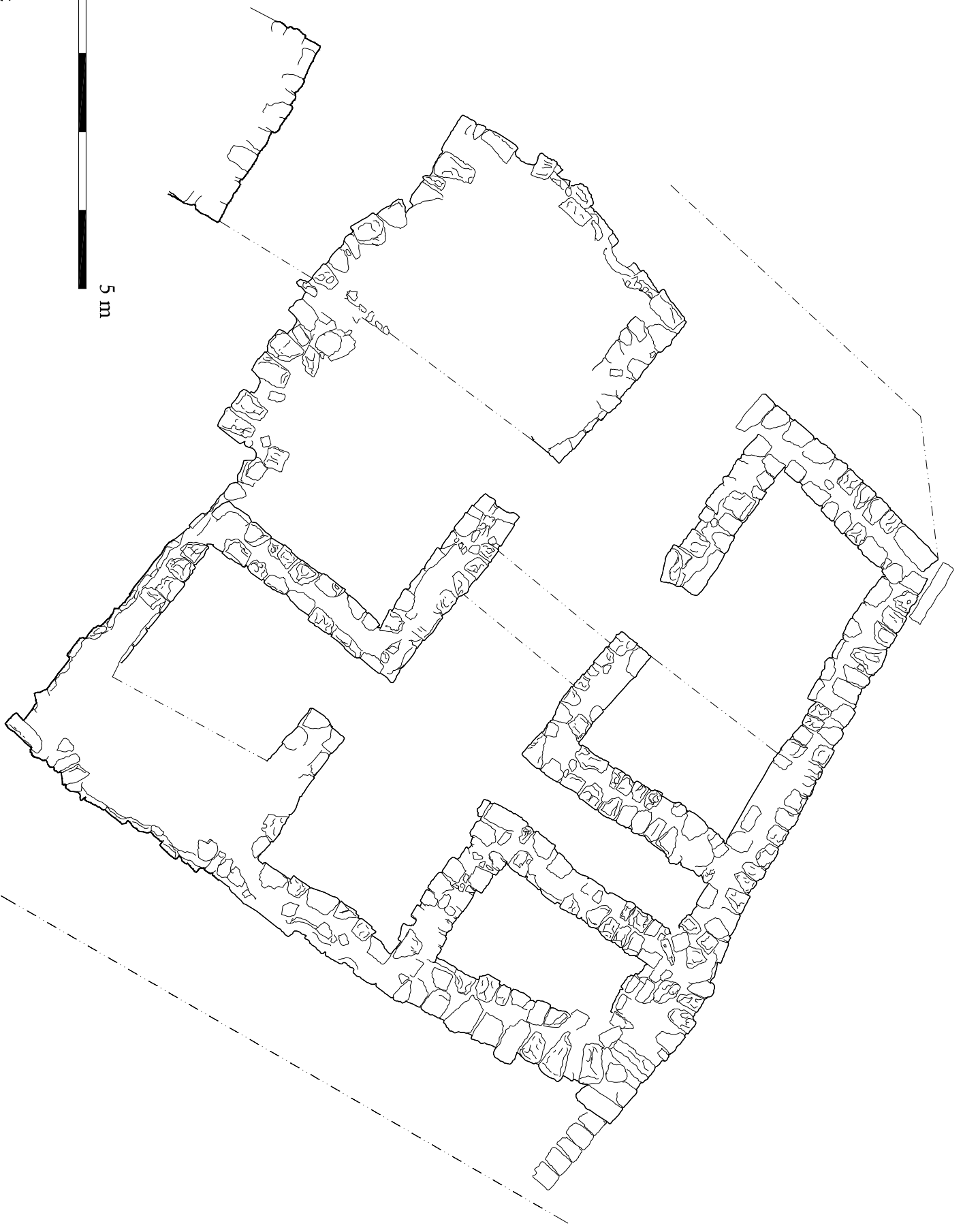
Sumhuram 2011 C  
Area A





Sunhuram 2011 C  
Area A





**Objects from SUM11C:**



SUM11C; US531,1; G167, glass vase



SUM11C; US525,2; S1785, incense burner



SUM11C; US539,1; D29, necklace

## Object Index Card

<b>Registration Nr.</b> SUM11C; US531,1; G167			
<b>Provenance</b> Area B, n12, BB2, A185, very top			
<b>Drawing code Nr.</b>			
<b>Definition</b> Vase	<b>State of preservation</b> Good	<b>Measures</b> l. w. h. 11 th. diam. max 10,5	<b>Shape</b>
<b>Material</b> Glass	<b>Preserved part</b> Archaeologically complete		<b>Section</b>
<b>Description</b>  Archaeologically complete vase, lacking of a small part of the rim. The vase has been found at the very top of US531. The surface appears decorated but it needs to be cleaned.			
<b>Responsible</b> A.P.		<b>Date</b> 31.10.11	

## Object Index Card

<b>Registration Nr.</b> SUM11C; US525,2; S1785				
<b>Provenance</b> Area A, A113				
<b>Drawing code Nr.</b>				
<b>Definition</b> Incense burner (type III)	<b>State of preservation</b> fair	<b>Measures</b> l. w. h.                      6,3 th. diam. base    13 diam. rim     15 dp.             1,8		<b>Shape</b> cylindrical
<b>Material</b> limestone	<b>Preserved part</b> fragmentary			<b>Section</b>
<b>Description</b>  Cylindrical-shaped incense burner, preserved for less than half. The base is flat and the lateral sides slightly flared towards the top. The rim is flat on top (diam 15) and rectangular in section. The walls of the object are carefully smoothed and decorated with incised lozenges.				
<b>Responsible</b> A.P.		<b>Date</b> 20.11.11		

## Object Index Card

<b>Registration Nr.</b> SUM11C; US539,1; D29			
<b>Provenance</b> Area A, 110, A190			
<b>Drawing code Nr.</b>			
<b>Definition</b> necklace	<b>State of preservation</b> fair	<b>Measures</b> l. w. h. th. diam.	<b>Shape</b>
<b>Material</b> Glass, shell, stone	<b>Preserved part</b>		<b>Section</b>
<b>Description</b>  Set of 17 beads in different materials, belonging to the same necklace (but the US is still to complete to dig).  1 biconical bead greenish yellow in glass-paste (diam. max. 1,1; h. 0,8); 1 cylindrical bead dark in colour in glass paste (diam. 1; h. 0,8); 1 barrel shape bead green in colour in glass paste (diam. max. 1; h. 1); 1 elongated bead triangular in section, in red stone (h. 1,2; l. 1; w. 0,8); 1 irregularly biconical bead in whitish glass paste (diam. max. 1; h. 1,2); 1 short cylindrical drawn bead with central hole in turquoise glass (diam. 0,4; h. 0,3) 1 irregularly biconical bead, flaked along the surface in glass paste (diam. max. 1,1; h. 0,9) 1 shell bead pierced near the apex (h. 1,6; w. 1) 1 irregularly biconical bead in whitish glass paste (diam. max. 1,2; h. 1) 1 irregularly spheroid bead in whitish glass paste (diam. 1; h. 1) 1 oblate short bead with large hole in green glass with whitish veins (diam. 0,6; h. 0,4) 1 irregularly cylindrical bead with irregular hole in whitish glass paste (diam. max. 1; h. 0,9) 1 irregularly biconical bead, flaked along the surface, in whitish glass paste (diam. max. 1,1; h. 1) 1 short cylindrical bead, slightly flaked along the surface -millefiori glass?- (diam. 1; h. 0,8) 1 irregularly biconical bead, greenish in colour (diam. max. 1; h. 1,2) 1 irregularly spheroid bead in dark colour glass paste (diam. 1,3; h. 1,2) 1 irregularly biconical bead in whitish glass paste (diam. 1; h. 0,8)			
<b>Responsible</b> A.P.		<b>Date</b> 20.11.11	

## 2. Technical Report

## **Restoration on the southern side of the city wall (arch. Sergio Martelli)**

### **Wall M497**

The restoration works focused on the southern side of the city wall started with wall M497 found in very poor conditions and already dismantled in the previous campaign, to be ready for the restoration works in SUM11C.

Only the first row, built on the bedrock, was preserved.



Fig. 1 Wall M497 before the restoration

The first operation consisted in the consolidation of the easternmost part of the wall. The bedrock has been levelled and chiselled to create a kind of “pit” to place the foundation blocks (figs. 2-3).



Fig. 2 Chiseling the bedrock for the placement of the foundation blocks.



Fig. 3 The placement of the masonry blocks

The wall has been reconstructed following the new procedure started to be used in 2011, placing all the stones to find the right balance of the blocks along the row and after setting the mortar. Once completed the row, the filling has been placed and covered with a different kind of mortar, more liquid to drain among the stones (fig. 4).



Fig. 4 Wall M497 during the works

Contemporary with the restoration of wall M497 also the top part of the wall M499 has been partially raised up



Fig. 5 Wall M497 and the raised up top of M498 at the end of the works



SULTANATE OF OMAN

Khor Rori

# Sumhuram



Autumn Campaign 2011 – Restorations Report

*Marco Previti*

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## FOREWORD

The city of Sumhuran is located in Khor Rori, 40km from Salalah, in the Dhofar region of the Sultanate of Oman, in the southeast part of the Arabian peninsula.

Object of excavations and research since the early 50's, from 1996 it has been cured from the IMTO (Italian Mission To Oman) under the direction of the Prof. A. Avanzini, from Pisa University.



O Sumhuran was a port city protected by a beautiful natural harbor, in the region famous for the precious frankincense production.

***In 2000 Sumhuran was enclosed in the Unesco's humanity patrimony sites.***

Throughout its history, this city was linked to the Mediterranean sea, northern Oman, Africa east coast, all the gulf area and India. This permitted during the ages the economic activities, supported by the finding of objects with different origins and usage.

Thank to 15 years of research excavations and restorations, Sumhuran could now entirely be visited. It is possible to understand the disposition of the spaces in the city, the life systems, works, culture and common areas inside the external fortification, for a complete comprehension of the human living at the time.

## THE COMPANIES:



Before Project S.r.l. is a company qualified to provide services for building constructions, from the conception to the final realization of the operas.

More than 30 years of experience in the Italian and international developments attest its qualifications on the execution of building operations with its technicians on site for the execution of the operas.



**ITALCOSTRUZIONI** S.r.l.

Italcostruzioni S.r.l. operates in the building field since 1995 and has consolidated its presence achieving specific experience in the public and private works.

Italcostruzioni is experienced in ménage and planning the carrying out of big building works, assuring the well-done execution and the full customer satisfaction.

Those companies cooperate with IMTO for this mission 2011 about the restoration of some critical structures in Sumhuram city.



GIUSEPPE CECINATO ENGINEERING

Engineer Giuseppe Cecinato, is collaborating and supervising the structural interventions through all Sumhuram city in Khor Rori, since 2011.

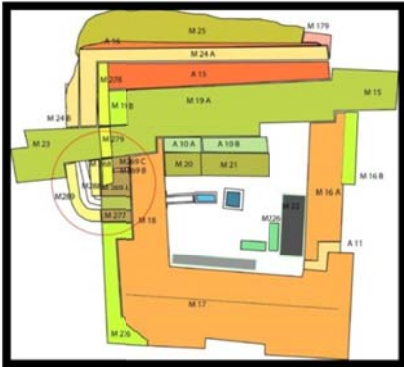
Thanks to his advising, some important and delicate restorations has been possible in the recent campaigns.

[www.beforeproject.it](http://www.beforeproject.it) – [www.italcostruzioni.it](http://www.italcostruzioni.it) - [www.gceng.it](http://www.gceng.it)

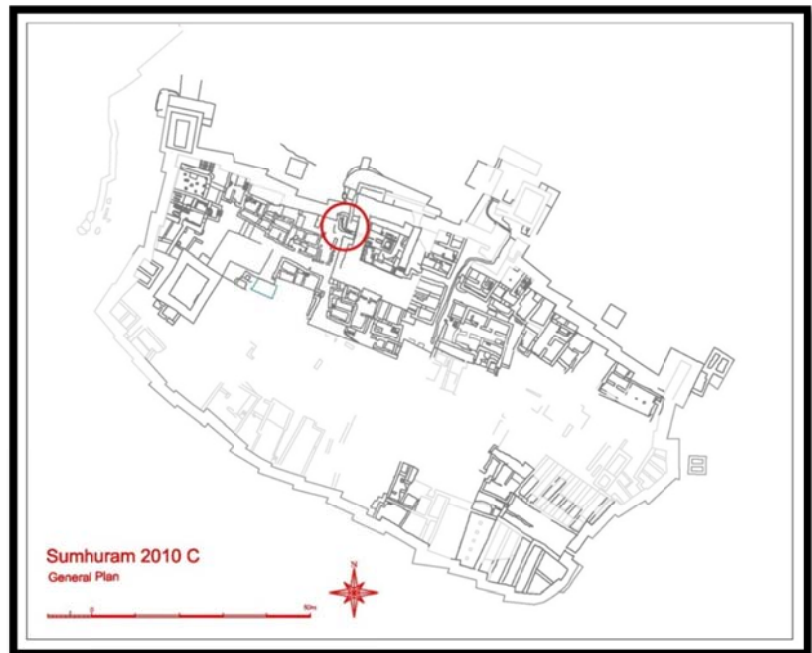
## THE RESTORATIONS:

### *Monumental building*

The main intervention cured by the technician in this campaign, regards the monumental building west part restoration.



*Particular map of the Monumental Building*

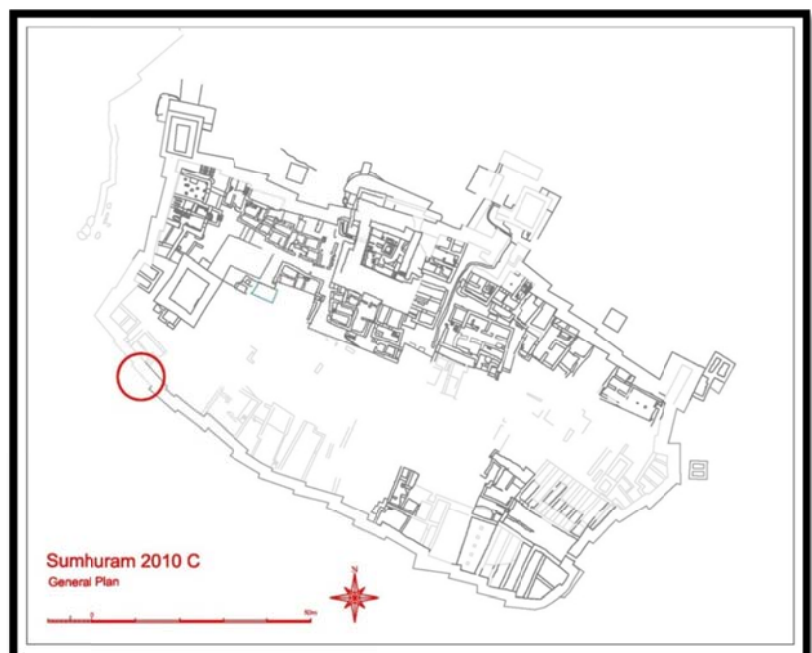


The monumental building, was the most important construction, hosting the water well that used to serve all the city. The external part of it was a water channel that let pass the rain waters and thank to a sluicagate system was able to manage the drain getting the best usage for the different needing.

### *South external wall*

The intervention on the south fortification, was realized to reconstruct one of the collapsed external part of it.

The intervention were taken difficulties caused for the small operative space and the high level of the damages at the wall foundation.



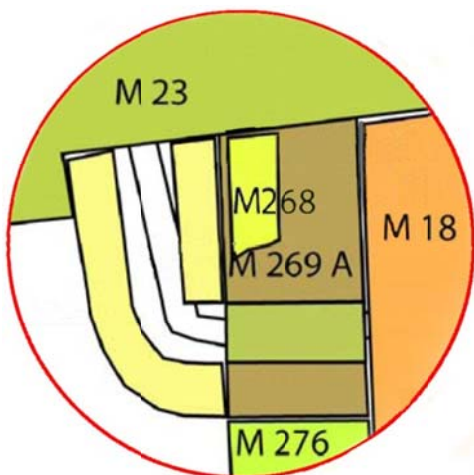
## The Monumental Building:



The last years of excavation in this areas, has included consistent investigation from the archeologist in this area of the city.

With a slow deterioration of the structures, became unavoidable a restoration.

The intervention on the monumental building according with the direction, was divided in three different phases.



The **FIRST** target was the corner of the M276, almost collapsed.

The **SECOND**, was the restoration of the portion of M18 wall plus the demolition of the M268, M269A, already crumbling, and the consequent reconstruction of them.

The **THIRD** intervention, involved the portion of M23 collapsed including the corner. This, was instead planned for 2012 campaign.

### *First intervention: demolition of the collapsed corner of the M276 wall*

The corner of the M276 was collapsing to the ground. The movement was caused by an inadequate stones course, not high and strong enough to guarantee the right balance of the structure.

The operation consisted in disassemble the numbered component of the wall and stock them well in the near areas for the sequent rebuild.



*Left side of the corner*



*Front side of the corner*



We started the disassembly of the M276, and we get down until the last stone compromised by the collapse.

From there we start to rebuild.

In every intervention we used two kind of mortar:

**The stone mortar**, for the external stones, obtained by the mix of sieved sand, hydrated lime, brown and yellow oxides for the chromatic tone. This is harder once dried, and has a finer surface.

**The filling mortar**, used for the back filling of the structures, made with the same components, except the use of raw sand, not sieved.

Furthermore at the contact point from the old and the new construction, we inserted 10cm of **geotextile**, half left out, to let easily see the begin of the restoration.

Fortunately, during the demolition phase, behind the M276 we discovered a perfect conserved part of the wall M18, the west side of the monumental building.

Considering this founding, according with the site direction, we rebuild leaving the last part of the corner free. It's now possible understand how was originally made the structure of the main walls that compose the monumental building, the most important construction of the city.



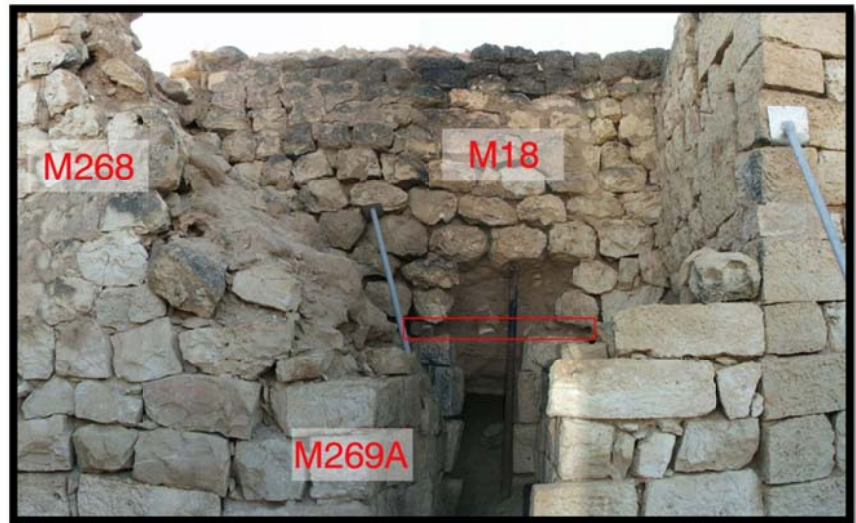
From the lowest stone refitted we rebuild up the corner, adjusting the stones with the right shape, getting up with the necessary care for the best definition, realizing a hard back filling with different size of unshaped rocks very closed each other, bind together from liquid filling mortar.

## Second intervention: demolition and reconstruction of the M18-M269A-M268 walls

The second part of the intervention, regarded the **M18**, **M268** and **M269A** walls.

The criticality was caused by the consume during the ages of the wood lintel that was sustaining this part of wall, working on two lateral jambs.

The load uniformly distributed, get twist the jambs, and generate the collapse.



The procedure and method, were the same of the previous:

- numbering of the stone;
- disassembly of the structure;
- rebuild faithfully, the most possible with originals stones.

We started the job on the wall M18 disassembly from the top of it.

Sequent, we remove the M268 and the M269A, with the internal site of the channel collapsed.

On the highest part of the wall, we founded a friable back filling, then we rendered with filling mortar



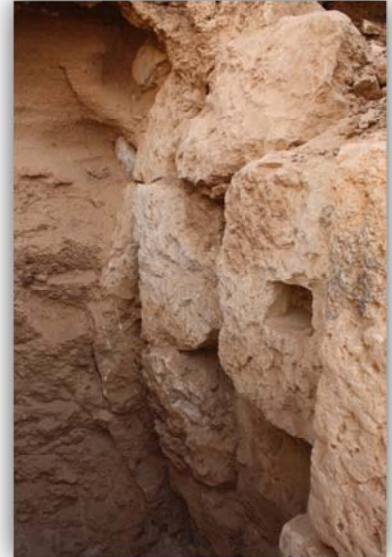
### Particular of the Watergate

A particular photo vision of the water gate cleaned at the moment of the discovery.



**Left** - *Back vision of the highest components of the left jamb;*

**Center** - *Frontal view of the gate.*



**Right-** *On the jamb element can be seen the holes for the sluice gates rods, used to manage the water flow.*

## Reconstruction:



This is the situation we obtained from the demolition and disassembly.

All the M18 part was taken down and remained only the lowest part in the ground. The ancient M23 came out perfectly conserved.

The containment walls of the M279A were taken off, to rebuild them faithfully.

In this moment of the campaign an extraordinary cyclone passed on Oman getting serious damages through all the site. This took problems to the monumental building also, that at the moment had all the back part of the wall completely exposed. Fortunately the damages were not too hard to fit and this didn't compromised the final result taking just few days of hard work.



On the lintel place, we used a huge finely squared stone high enough to permit all the load over.

The gate closure, is made behind the jambs position, to leave the possibility to see the holes shaped on the vertical elements.

The M268 is now ready to be rebuilt.

The monumental building at the end of the campaign

### South external wall:

The intervention on the south external wall, resulted more difficult than the expectations.

The following picture show the situation of the wall trait, before the restorations.

The external part of the foundation crumbled under the load of the wall, creating the collapsing.



We started cleaning around the wall section, until we exposed the foundation bedrock. We numbered all the stones for consequently disassembly and stock them.



Then we started disassembling the wall with the same method of the previous interventions.

Once disassembled, the foundations discovered was seriously compromise.  
The picture, captured the foundation cleaned from all the rock pieces after the disassembly of the wall.



View from the over walk passage

This discovery, obliged us to clear up the area removing the rock cusp. The solutions identified was to get full the empty spaces with big unshaped rocks, hammered between each other, get them blocked in their position don't leaving free spaces.



To compose the final foundation, we made a good mortar casting, maintaining the mixture very liquid to let it penetrate until the huge spaces created. This permit to obtain a flat surface, strong enough to support the weight of the wall.



Frontal vision of the wall

Once dried, we start the reconstruction. We realized a stone course at the foundation foot, to get sure that also the minimum movement of the compromised foundation would not be able to create brakes in the structure.





Once finished the elevation we covered the “engineering step”, using unshaped stones legacy together by a mixture of ground, mortar and lime.

This, with the monsoon season water, will permit to get the stone remain in the position, obtaining a romantic reconstitution of the original bedrock.

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SULTANATE OF OMAN



UNIVERSITÀ DI PISA



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The Technician

## **SUM11C – INTERVENTION ON THE CITY-WALLS SOUTH-EASTERN CORNER OF THE CITY (Arch. Alessandro Massa)**

Walls M140, M199 and M200, located in the south-eastern corner of the city, have been raised up by the addition of five rows of stone in the higher part.

Intervention were located over a 12 meters long wall.

Walls have been raised up at different heights, to give it more impressiveness and monumentality, and in the meantime more visibility from the lagoon and the surrounding areas.

Works have been made over already restored walls: levels of the top of the wall were included between 28,85 and 30,20 m over sea level; after the intervention the maximum level of the wall reached 30,50 m over sea level, modifying the shape of the wall. In the final situation the higher part is in the middle of the wall, sloping down to the corners.

Before the intervention the covering of the inner part of the wall has been partially removed, beneath the outer face of the wall. Only the outer face of the wall has been raised up; the inner face of the wall is still original, without restorations.



Wall M140 - before the intervention



Wall M140 - after the intervention



Wall M140, the top covering before the intervention



Wall M140, the top covering after the intervention



M140 – M199 – M200 - before the intervention, view from the lagoon



M140 – M199 – M200 – after the intervention, view from the lagoon

3. Report after the heavy rains of November, 1-3.

The heavy rains of the beginning of November stopped the field activities for the following working days: 1<sup>st</sup> November half day; 2<sup>nd</sup> and 3<sup>rd</sup> complete days.

The most important aspect to be underlined is that any of the restored structures suffered damages from the heavy rains, confirming the good results obtained during the interventions of consolidation.

The survey on the site, developed on the morning of Friday, 4, reports the following situation.

### City wall

The city rampart did not suffer any kind of structural problem, concerning both the restored partitions, and the new compartments brought to light during the present campaign in the western side of the city wall.

The masonry revealed a strong stability with very isolated and minor cases of collapse of incoherent materials from the top of the walls (fig. 1).



Fig. 1

### Area A

Collapses of masonry structures have been registered in area A (figs.2-3), together with the washing out of parts of trenches in A156 and A80 (figs. 4-5)



Fig. 2



Fig. 3



Fig. 4



Fig. 5

### Area B

The main damage noticed in the storage area has been detected in correspondence with the tourist path, near the information board (fig. 6)



Fig. 6

An emergency intervention to place in safety condition the area for the visitors should be done as soon as possible.

### Area F

In area F two main different parts have mainly been damaged: the “modern” platform (fig. 7) and the trench in building BF7 (fig. 8).



Fig. 7



Fig. 8

### Monumental Building

Inside the Monumental Building we registered the collapse of part of the trench in the northern side (fig. 9) and of part of a compartment wall in the southern side of the structure (fig. 10).



Fig. 9



Fig. 10

### The modern staircase

A small collapse of the soil supporting the staircase has been noticed in correspondence with the southernmost part of the path.

To guarantee the safety of the visitors, we advise to close the access to the staircase to the tourists till the an emergency intervention of reduction and modification of the path will be performed.



Fig. 11

No archaeological data have been lost since all the damaged structures have already been surveyed and documented.

## **Cleaning operations and emergency interventions after the damages**

In the days immediately after the heavy rains, when the soil started to be drier, all the collapses have been removed and all the pits created by the water on the field have been re-filled.

A structural intervention has been necessarily performed in area B (fig. 12), where some wooden beams have been fixed in order to avoid the collapse of the tourist path.



Fig. 12, Area B, the storage area, after the emergency intervention

## **4. Complementary works: enhancement of the site**

During the present campaign different kind of interventions have been carried on in order to improve the enhancement of the site.

An important work has been performed along the eastern side of the city wall. The accumulated dumps have been removed manually and by JCB.

The segment of the city wall named M460 (squares h-g/3, g4) has been completely brought to light, as well as the corner with M118, completely hidden by the massive accumulation.

In order to avoid further collapses the top unsafe parts have been dismantled.



Fig. 1 Walls M118 and M420 before the excavations



Fig. 2 Walls M118 and M420 after the excavations

Moreover the postern gate, walled up during some a previous campaign (SUM08B) has been covered by mortar, as well as the opening in the external part of Monumental Building.



Fig. 3, the postern gate after the placement of the mortar covering