

IMTO – Italian Mission to Oman

University of Pisa

SUMHURAM

Preliminary Report

January – March 2012



PRELIMINARY REPORT (SUM12A)

January – March 2012

The first IMTO's campaign of 2012 (SUM12A), under the direction of prof. A. Avanzini, started on 28th January and finished on 22nd March 2012.

The campaign had a continuation of one month (till the 12th of April) under the supervision of Said al Mashani.

The campaign has been mainly focused on restoration; however archaeological excavations have been performed by Alexander Sedov (2th February – 8th March).

The excavations were conducted on the field by Alexander Sedov.

The consolidation and restoration of ancient masonry structures has been done by arch. Valter Filatondi and eng. Marco Monti under the archaeological supervision of dr. Alexia Pavan.

Arch. Simona Rossi was responsible of the topographic survey and of the project of the external path.

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.

Sumhuraam Preliminary Report SUM12A
January – March 2012

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1. Technical Report

**RESTORATION WORKS AT SUMHURAM
(ARCHAEOLOGICAL PARK OF KHOR RORI)
(Sultanate of Oman)
CAMPAIGN JANUARY-MARCH 2012**

IMTO

Diary of activities

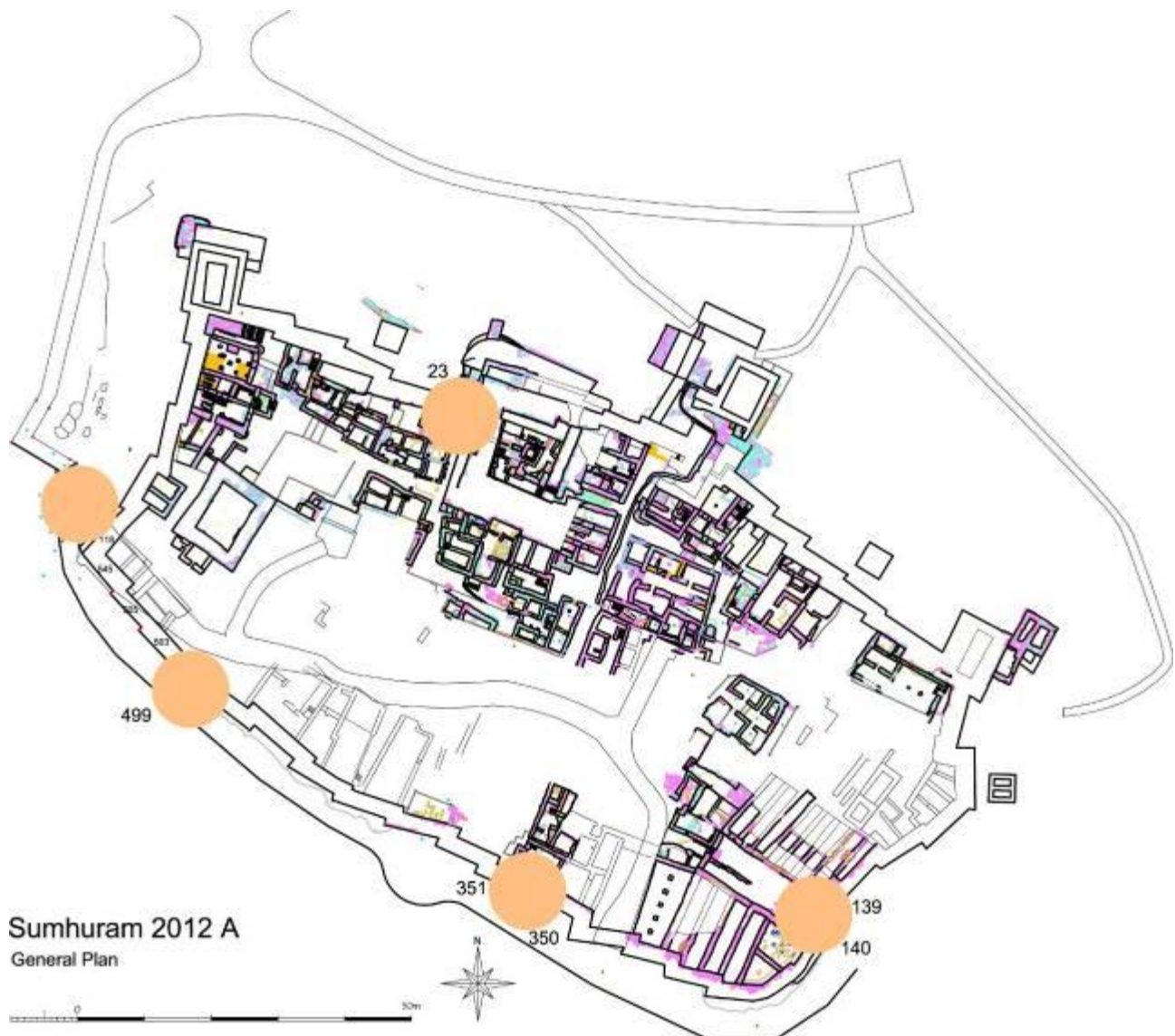
29th January - 22nd March

(Arch. Valter Filatondi, Surveyor Marco Monti)

Introduction

After our arrival at Salalah, on Sunday 29th January, we have taken delivery of all the locations in Khor Rori we had to restore during this campaign. In order to simplify the sequence of the operations and identify the position of the activities, every area of restoration has been named with an abbreviation (i.e. M23 means the wall number 23), as reported on the specific annex.

The different locations are as follows:

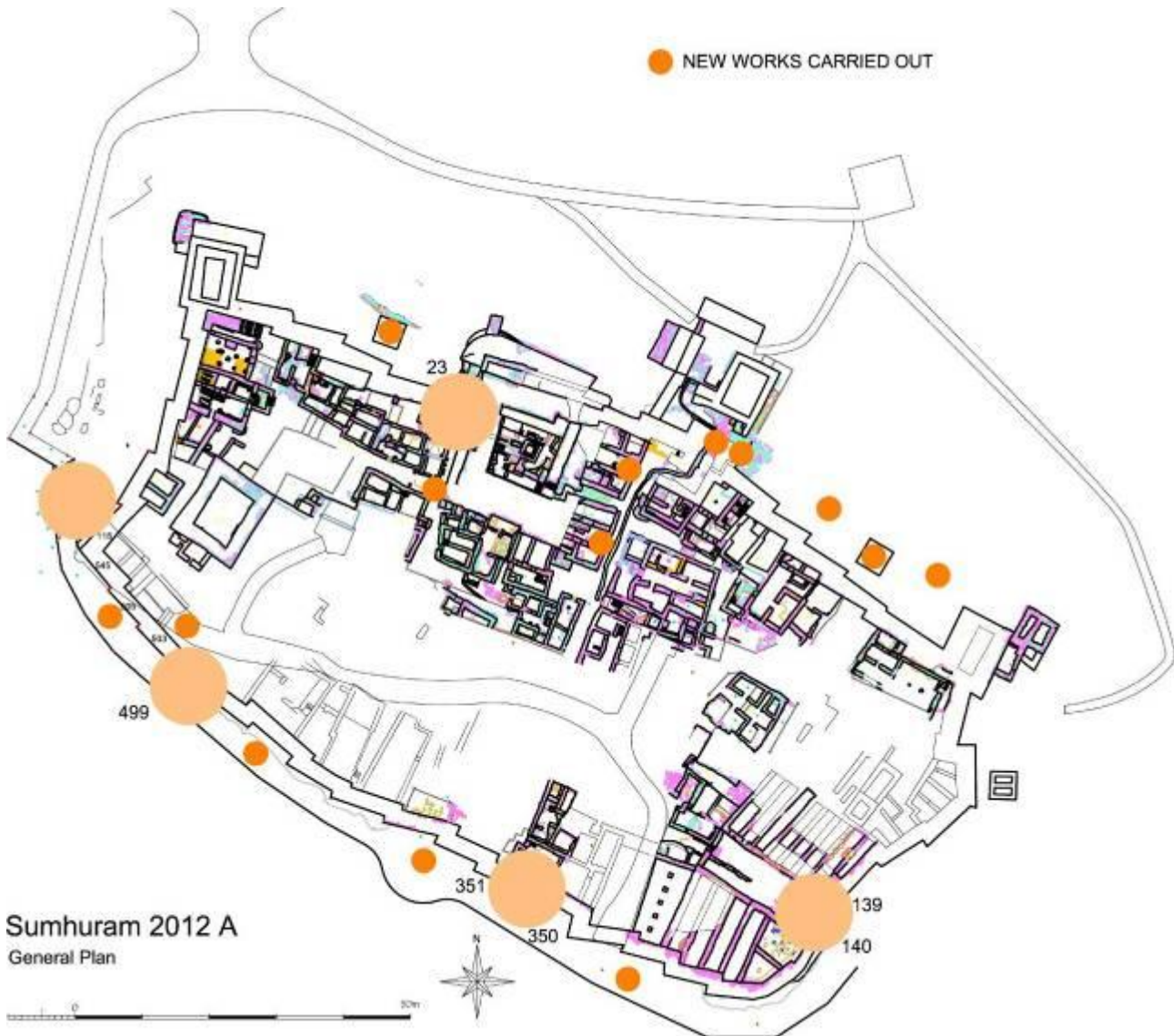


1. M23 city wall – north western side
2. M350 and M351 city wall – south eastern side
3. M499 city wall – south western side, beside the modern staircase
4. M139 and M140 city wall – east side where is located a little gate looking to the sea
5. Demolition of the modern staircase and uncovering the hidden walls underneath that south-west corner

During this campaign we have been asked to carry on also the following works:

6. M118 and M545 city walls – south western site, under the modern staircase
7. Minor works to be done during the campaign, just in case we will have enough time, such as:
 - cleaning of the black stones on the tower located on the left side of the main entrance to the city;
 - new solution for the support at the corner of the wall M221;
 - modification of the ground slope at the left side of the main entrance;
 - modification of the ground slope at the external path in front of the walls M350 and M351;
 - modification of the internal path beside the city wall M499;
 - rise of the two towers A61 – A97 beside the main entry of the city;
 - restoration of wall M26 and M66 at the inner main path to the city.
8. Feasibility study for a better use of the entry box to the archaeological park.

New works carried out during this campaign



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

During the first week, from Monday 30th January to 3rd February, we took care of the demolition and restoration of M23. We also started the restoration of M350 and M351, as well as the restoration of M499. In the meantime we started the demolition of the modern staircase by the means of a JCB.

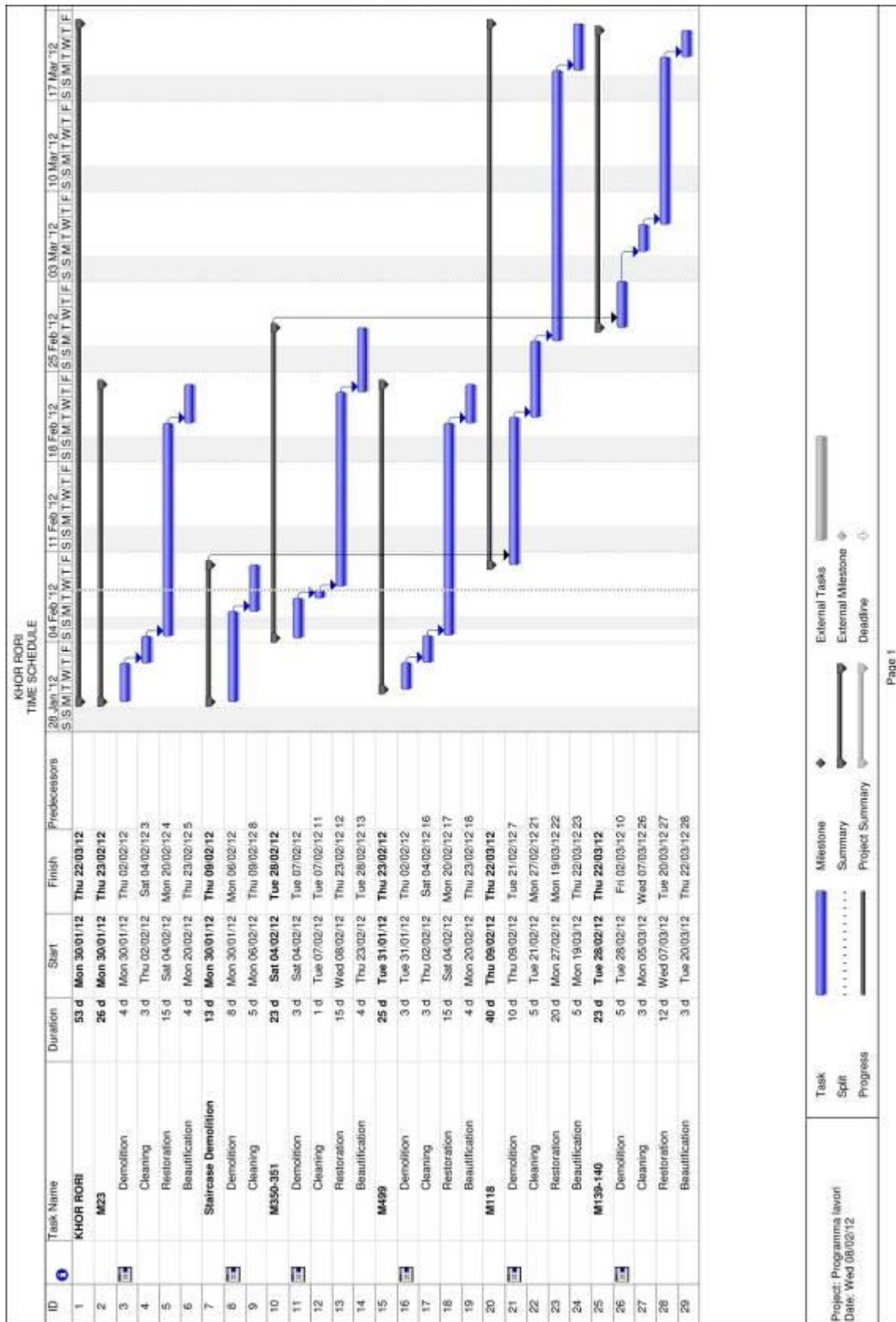
Unfortunately we had to stop the works for several days during this campaign due to the strong wind we had. It happened on:

- 5th February 2012
- 21st February 2012
- 22nd February 2012
- 4th March 2012
- 5th March 2012

To better control the advancing of the works and the use of the resources on site, a simple time schedule was prepared at the beginning of the campaign to help us in checking the timing during the sequences of the job.

Restoration works at the Archaeological Park of Khor Rori (Sultanate of Oman)
Campaign SUM12A - Diary of activities (29th January – 23rd March)

Time Schedule at the beginning



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 three pictures have been taken, depending on the significance of the point of view.

The procedure of the reconstruction of the walls

The reconstruction of the walls has been done as follows:

- a) in a first phase, the dismounting of the stones has been done by hands removing the inner filling by the means of pick and shovel. We kept all the marked stones in a protected area close to the job site for the following phase of the restoration.
- b) the second phase has been the reconstruction of the walls, row by row, replacing the marked stones at the external faces of the wall and providing the inner filling as soon as any row became finished. Of course before starting every new wall, a layer of geotextile was previously positioned keeping at least 10 centimetres outside of the wall face to easily recognise the beginning of the restoration.

Before starting the reconstruction of the walls, we provided several samples of composition for the mortar. We tried different percentages of brown and yellow colour in order to reach the same chromatic tone as the mortar previously used in the restoration. We prepared four different samples using the following mix:

1. **80** parts of brown colour with **200** parts of yellow colour
2. **80** parts of brown colour with **250** parts of yellow colour
3. **100** parts of brown colour with **300** parts of yellow colour
4. **200** parts of brown colour with **300** parts of yellow colour



Sand and lime were always:

- four buckets of sand with eight scoops (600grams/each) of lime.

As soon as the mortar dried, we chose the composition n. 2 that was the more similar to the previous used mortar.

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

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

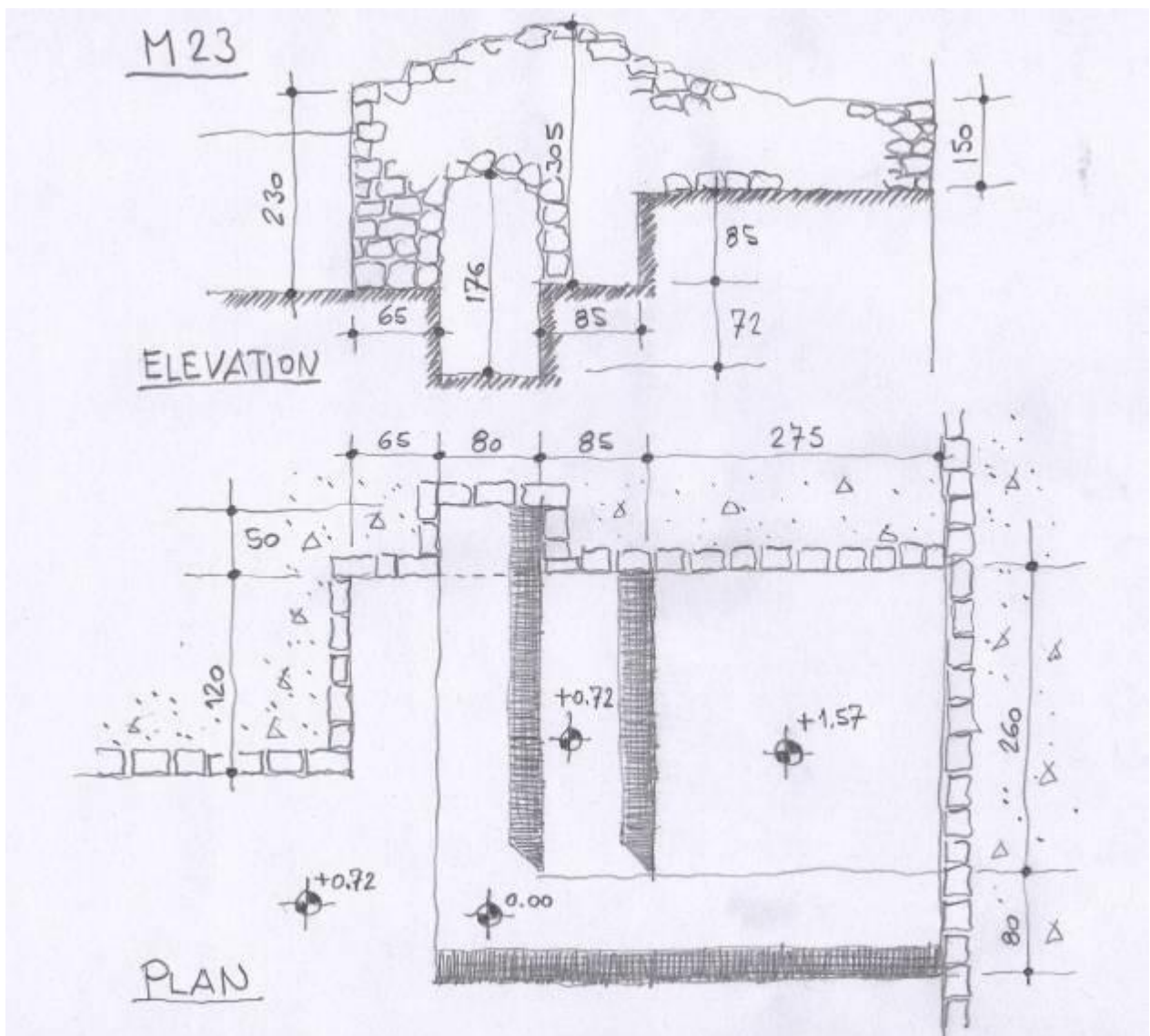
To fix the stones each other, we used two different kinds of mortar as it has been done during the last campaign:

- **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.

We have a different opinion about the use of stone mortar. We think that the use of raw sand to fix the stones each other is better as a binder for the presence of inert in the mix. However, we followed the received instructions.

Reconstruction of the wall M23

Before starting to remove the stones, each one of them has been marked for their position. This procedure gave us later the opportunity to make the restoration of the walls as they were originally. Also the measurements of the several walls position has been taken as follows:



Sequence of photos on the wall M23 – up to 2nd February 2012



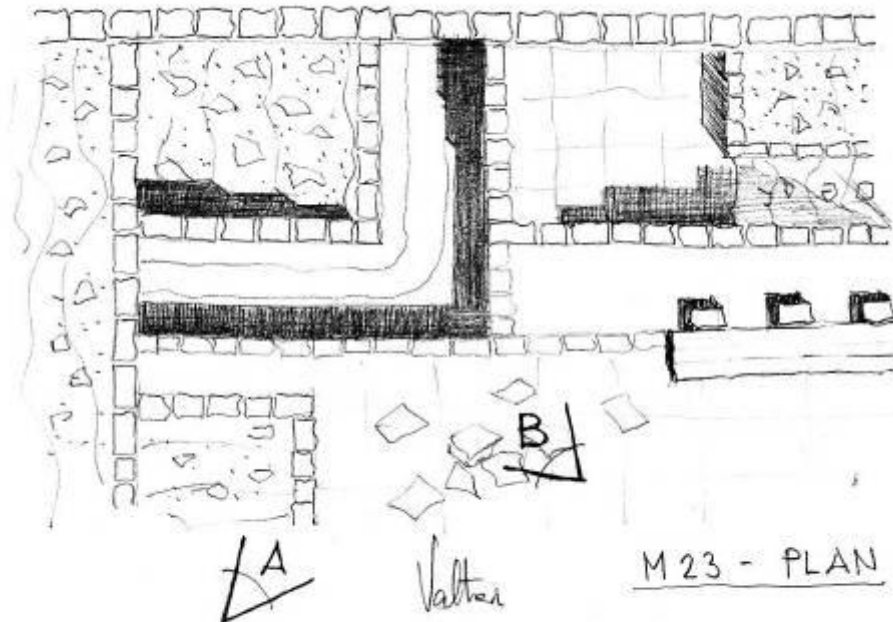
Sequence of photos on the wall M23 – up to 9th February 2012



Sequence of photos on the wall M23 – up to 16th February 2012



On 18th February 2012, we received confirmation to our suggestion to modify the shape of the walls beside M23 as follows:



VIEW A
--- PARTE AGGIUNTA



VIEW B
--- PARTE AGGIUNTA



Sequence of photos on the wall M23 – up to 23rd February 2012



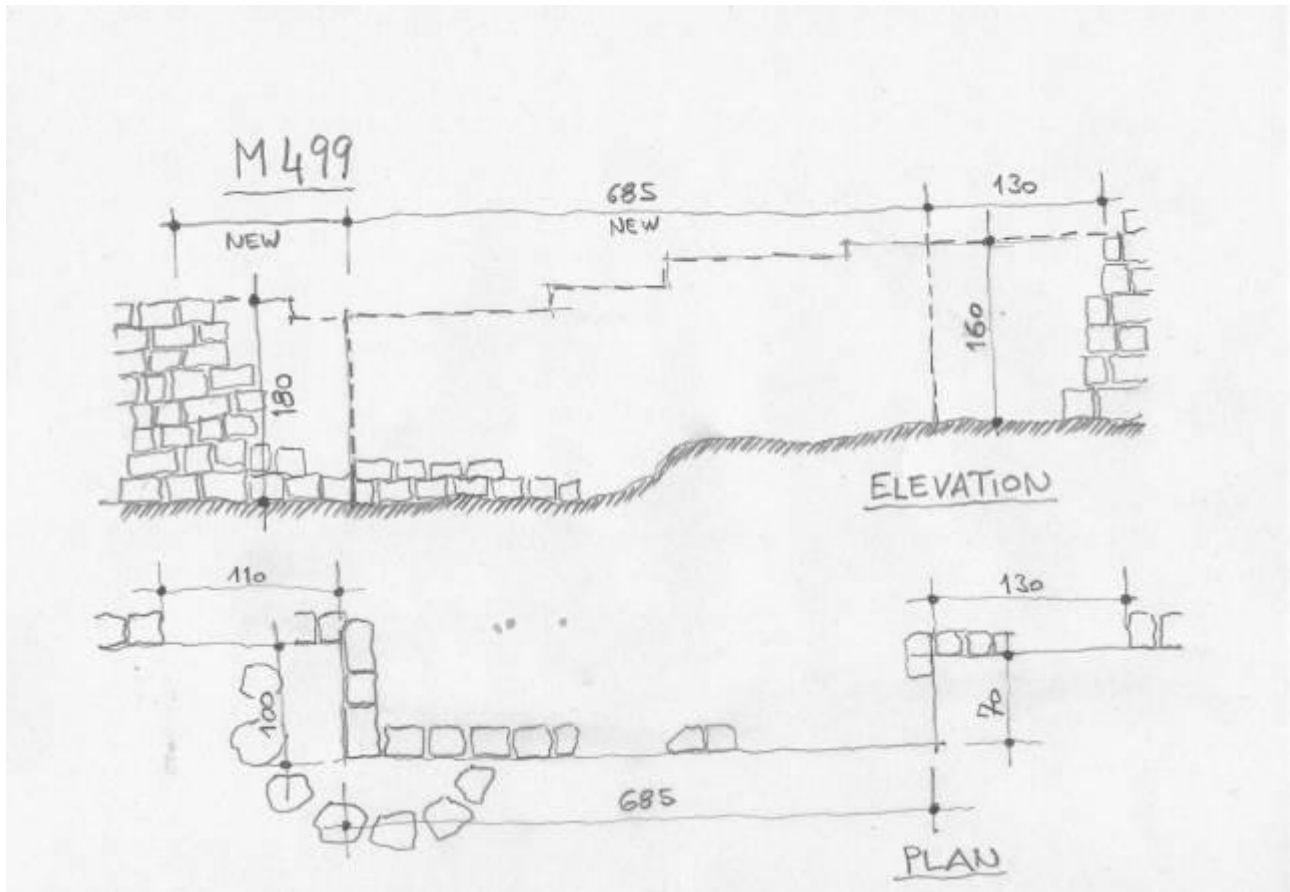
Sequence of photos on the wall M23 – up to 2nd March 2012



This work has been completed on Saturday, 3rd March 2012.

Reconstruction of the wall M499

Before starting the demolition and cleaning of the bedrock underneath the original wall, that was completely collapsed, we took all the measurements as follows:



Using the same procedure above described, we started the demolition and the reconstruction of the wall as described in the following picture.

Sequence of photos on the wall M499 – up to 2nd February 2012



Sequence of photos on the wall M499 – up to 9th February 2012



Sequence of photos on the wall M499 – up to 16th February 2012



Sequence of photos on the wall M499 – up to 23rd February 2012



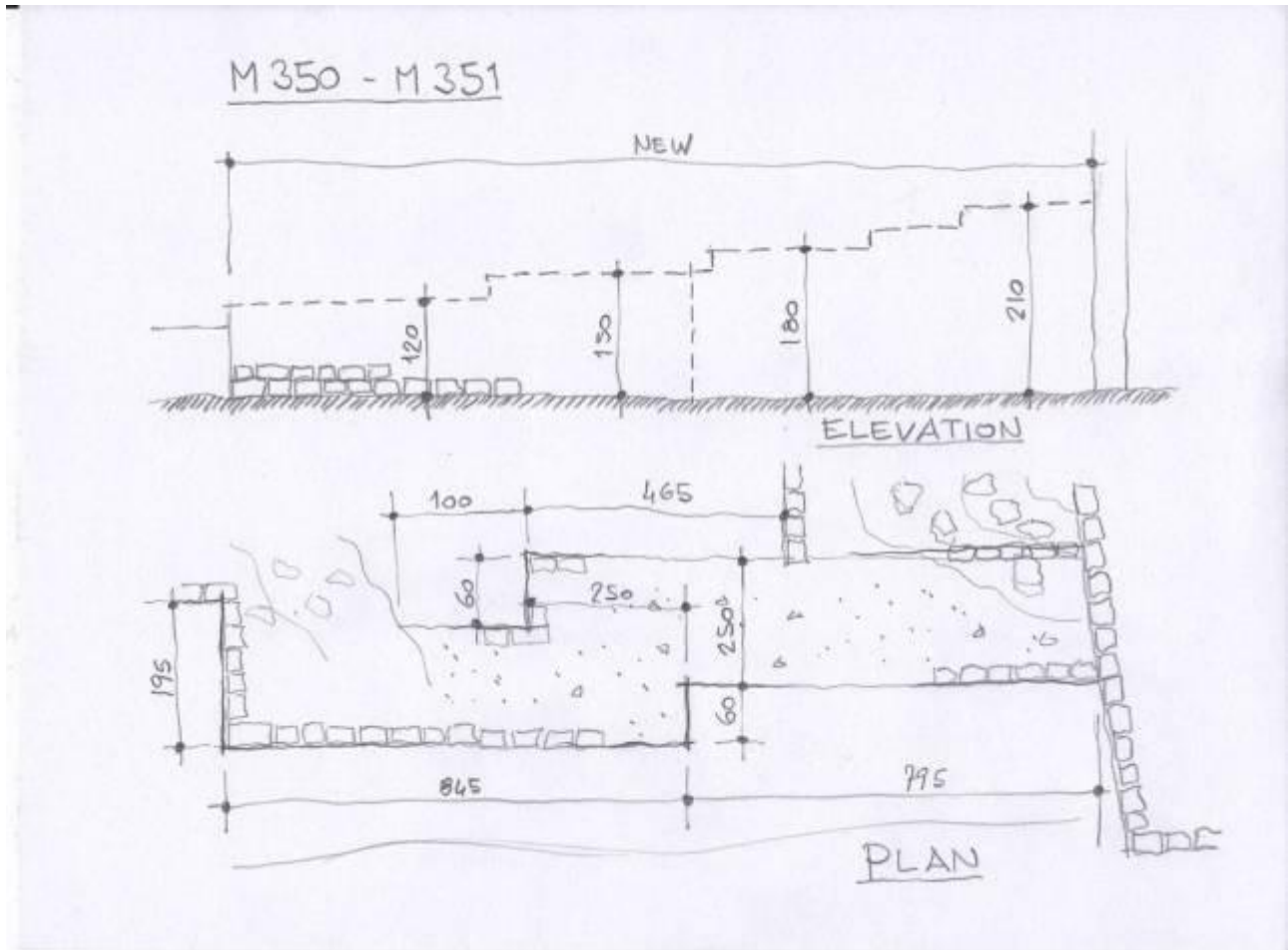
Sequence of photos on the wall M499 – up to 2nd March 2012



This work has been completed on Tuesday, 6th March 2012.

Reconstruction of the walls M350 – M351

Before starting the demolition and cleaning of the bedrock underneath the original walls, that were completely collapsed, we took all the measurements as follows:



Using the same procedure above described, we started the demolition and the reconstruction of the walls as described in the following picture.

Sequence of photos on the walls M350 and M351 – up to 2nd February 2012



Sequence of photos on the wall M350 and M351 – up to 9th February 2012



Sequence of photos on the wall M350 and M351 – up to 16th February 2012



Sequence of photos on the wall M350 and M351 – up to 23rd February 2012



Sequence of photos on the wall M350 and M351 – up to 2nd March 2012



On 3rd March 2012 we stopped the restoration due to the fact we had to make the excavation in front of both these walls for taking a final land survey of the path to be constructed as soon as possible. Therefore, during the excavation time, we had not any chance to reach the place with stones and mortar.

During a visit on site of the Prof. Mrs. Avanzini, it has been decided to rise the wall M350 increasing the number of the stone lines well enough to interrupt the horizontality of that part of the city walls. Therefore, we stop the works and the rise of these walls will be started again after the new proposal design for the landscape of the city walls, during a new campaign.

Demolition of the modern staircase

The demolition of the staircase was necessary to uncover the original walls and to modify the pedestrian path around the west and south walls of the city.

The situation on 29th January 2012 was the following:



Sequence of photos on the modern staircase – up to 2nd February 2012

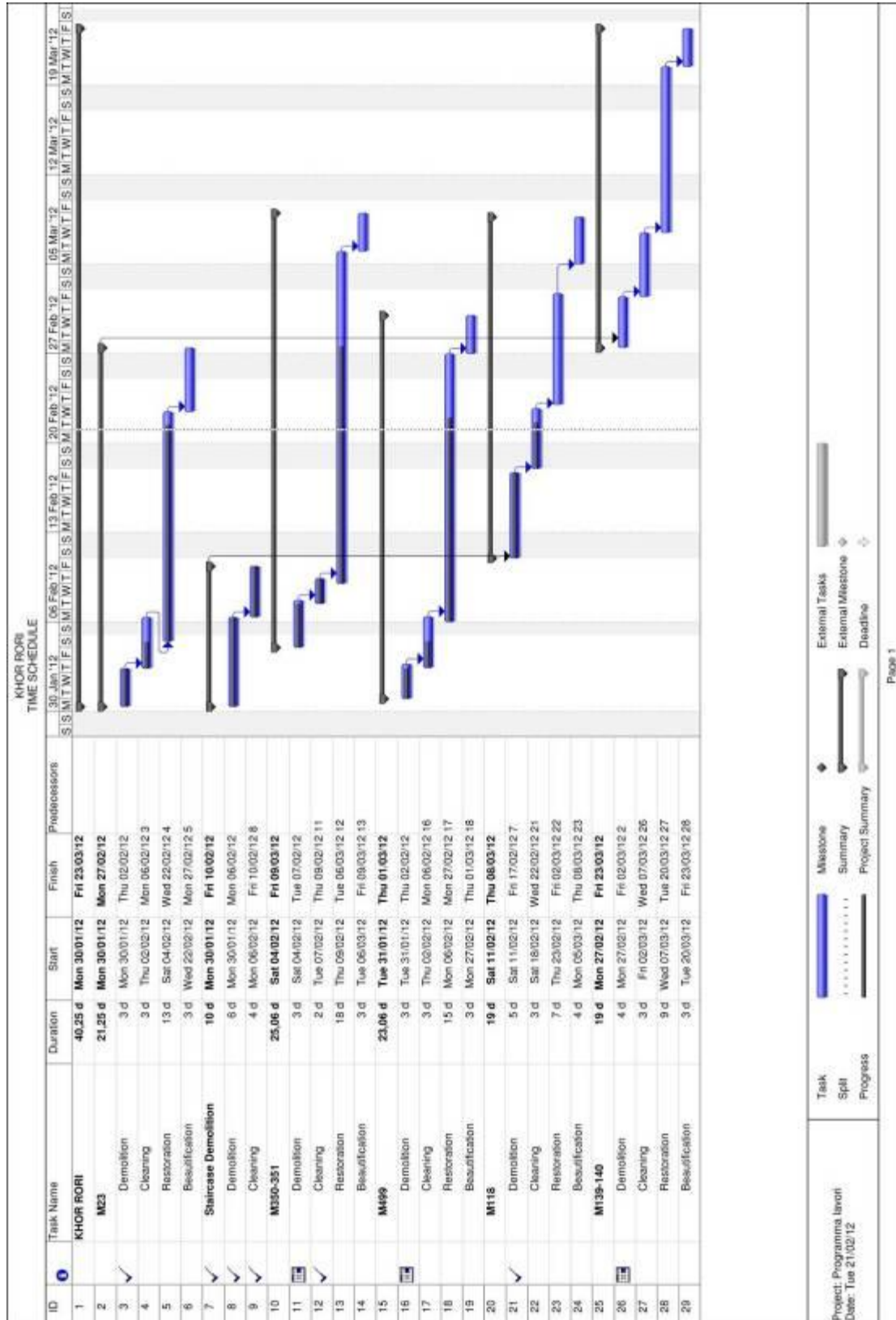


Sequence of photos on the modern staircase – up to 9th February 2012

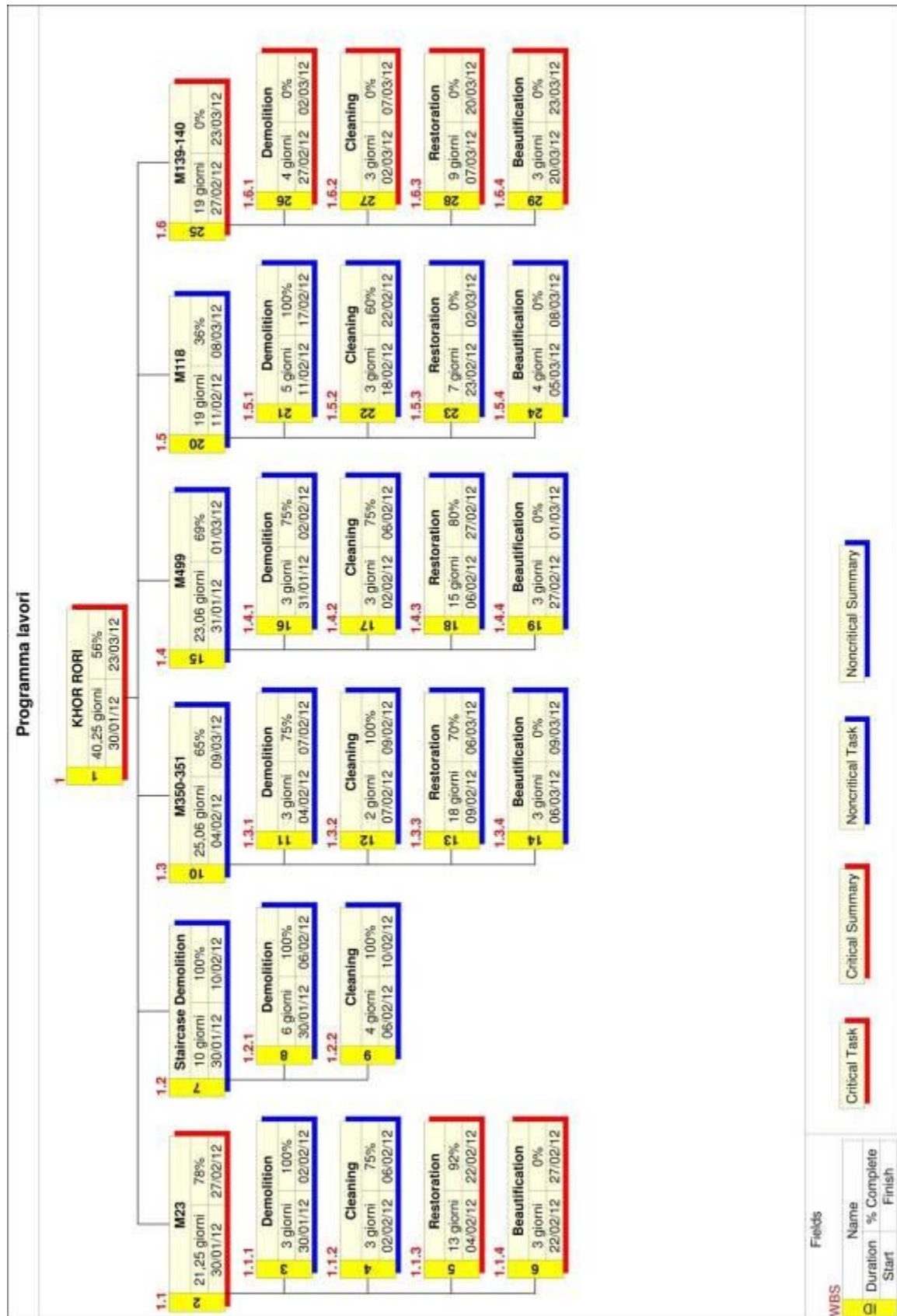


Time Schedule on 21st February 2012

As shown we are on time in every work and therefore we decided to start also some of the minor works as indicated above.



Works Breakdown Structure



Cleaning of stones of the upper part of the wall M14

On 18th February 2012, the black stones on the wall M14 have been dismantled for their cleaning and then mounted again at the same position. The beautification has been remade by the use of new small stones. In the meantime, the slope of the ground in front of the M14 has been reduced for a better view of the front elevation of the city.

Sequence of photos on the wall M14 – up to 23rd February 2012



Modification of the ground slope on the left side of the Main Entry

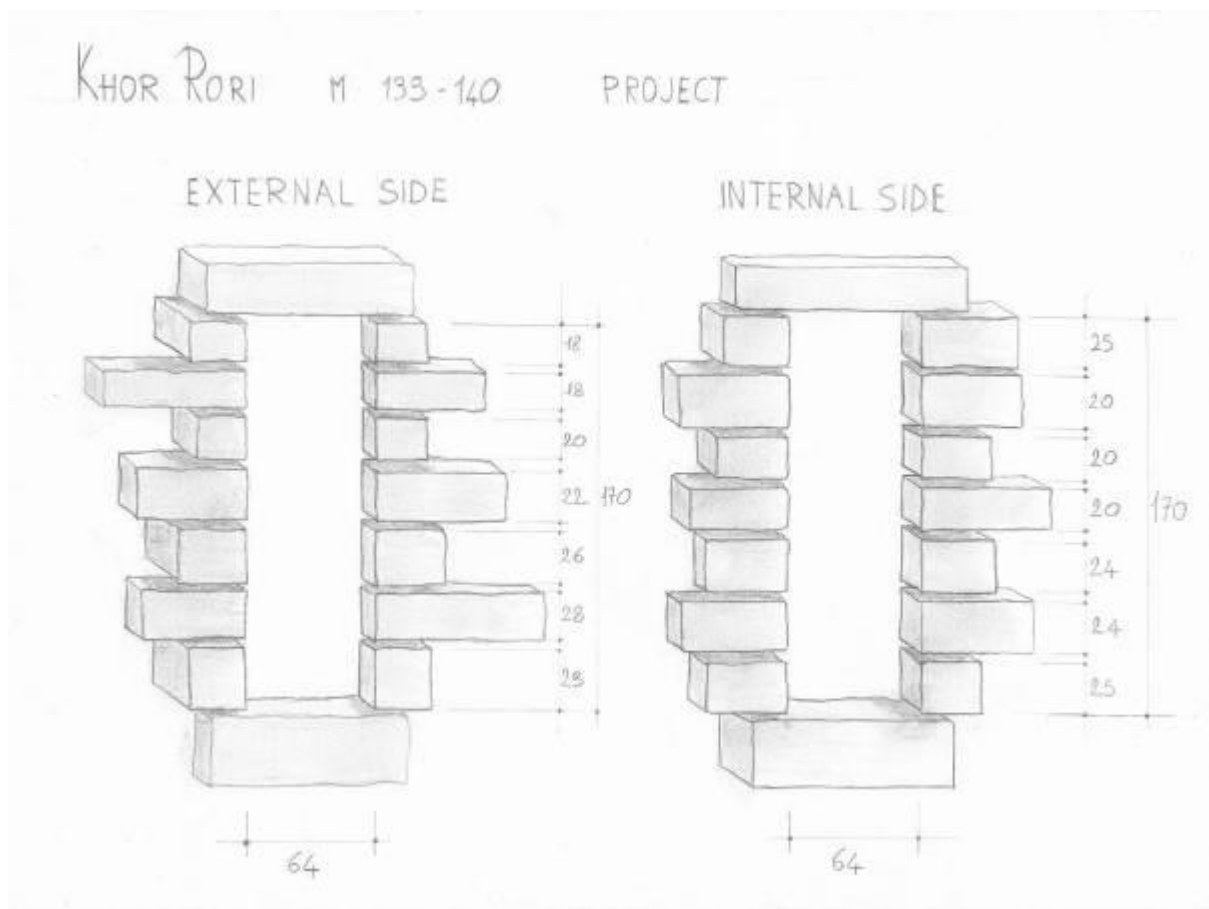
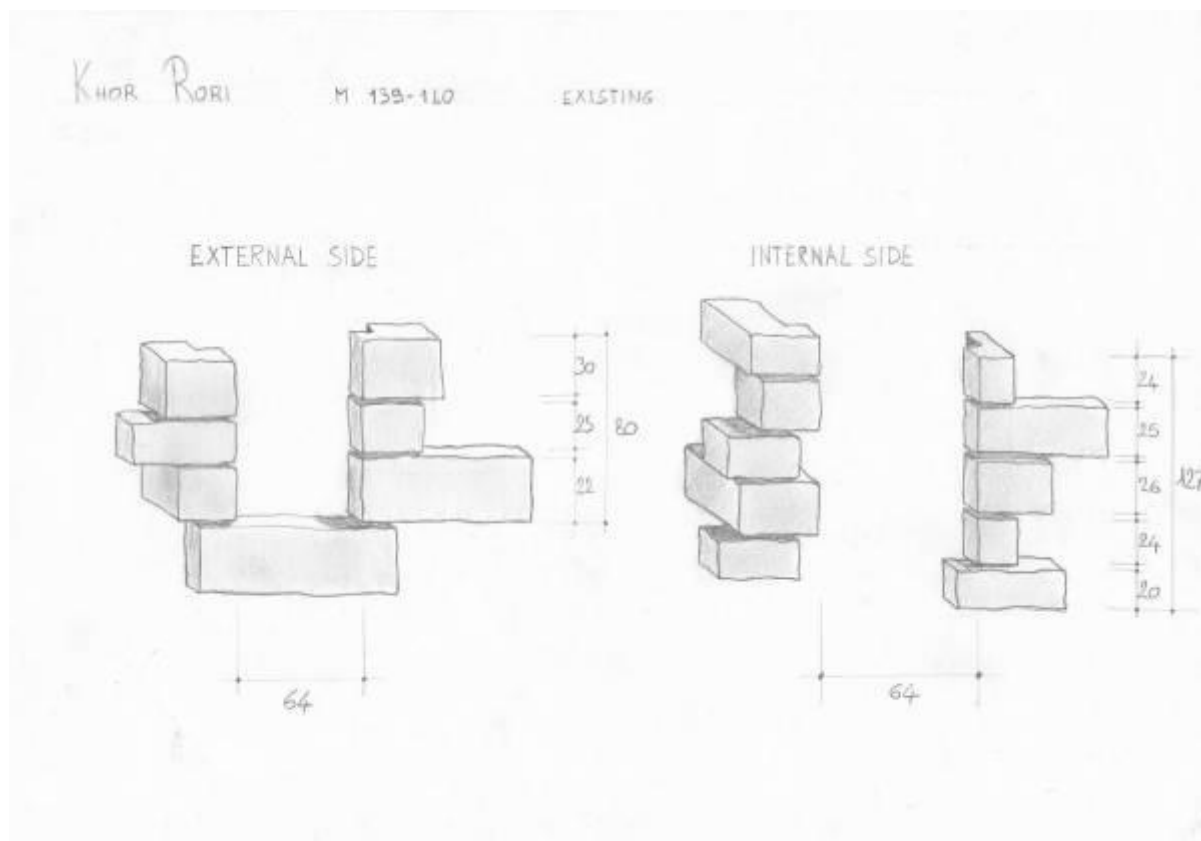
Sequence of photos at the ground slope in front of wall M14
up to 23rd February 2012



During and After the works



*Restoration works at the Archaeological Park of Khor Rori (Sultanate of Oman)
Campaign SUM12A - Diary of activities (29th January – 23rd March)*



Sequence of photos on the wall M139 and M140 – up to 25th February 2012



Sequence of photos on the wall M139 and M140 – up to 2nd March 2012



Sequence of photos on the wall M139 and M140 – up to 8th March 2012



Sequence of photos on the wall M139 and M140 – up to 15th March 2012



Sequence of photos on the wall M139 and M140 – up to 22nd March 2012



This work has been completed on Thursday, 22nd March 2012.

Restoration of the walls M118 and M545 corner

After the demolition of the staircase, we started the cleaning of the uncovered wall M118. We started to dismount the stones and to remove the inner filling. We discovered two different alignments of the external finishing. The first one supported on the bedrock and the second one inside the first one but not supported by the bedrock. Therefore we decided to keep the first alignment and kept the first run of stones supported on the bedrock.

Sequence of photos on the wall M118 and M545 – up to 23rd February 2012



Sequence of photos on the wall M118 and M545 – up to 2nd March 2012



Sequence of photos on the wall M118 and M545 – up to 8th March 2012



Sequence of photos on the wall M118 and M545 – up to 15th March 2012



Sequence of photos on the wall M118 and M545 – up to 22nd March 2012



This work has been completed on Thursday, 22nd March 2012.

Restoration of the walls M26 and M66 at the main entry

Sequence of photos on the wall M26 and M66 – up to 2nd March 2012



Sequence of photos on the wall M26 and M66 – up to 8th March 2012



Sequence of photos on the wall M26 and M66 – up to 15th March 2012



Sequence of photos on the wall M26 and M66 – up to 20th March 2012



Photo on the wall M26 and M66 – up to 22nd March 2012



This work has been completed on Thursday, 22nd March 2012.

Modification of the ground slope in front of M350-M351

Sequence of photos at the ground slope - up to 2nd March 2012



Sequence of photos at the ground slope - up to 8th March 2012



Restoration of the pavement at the main entry

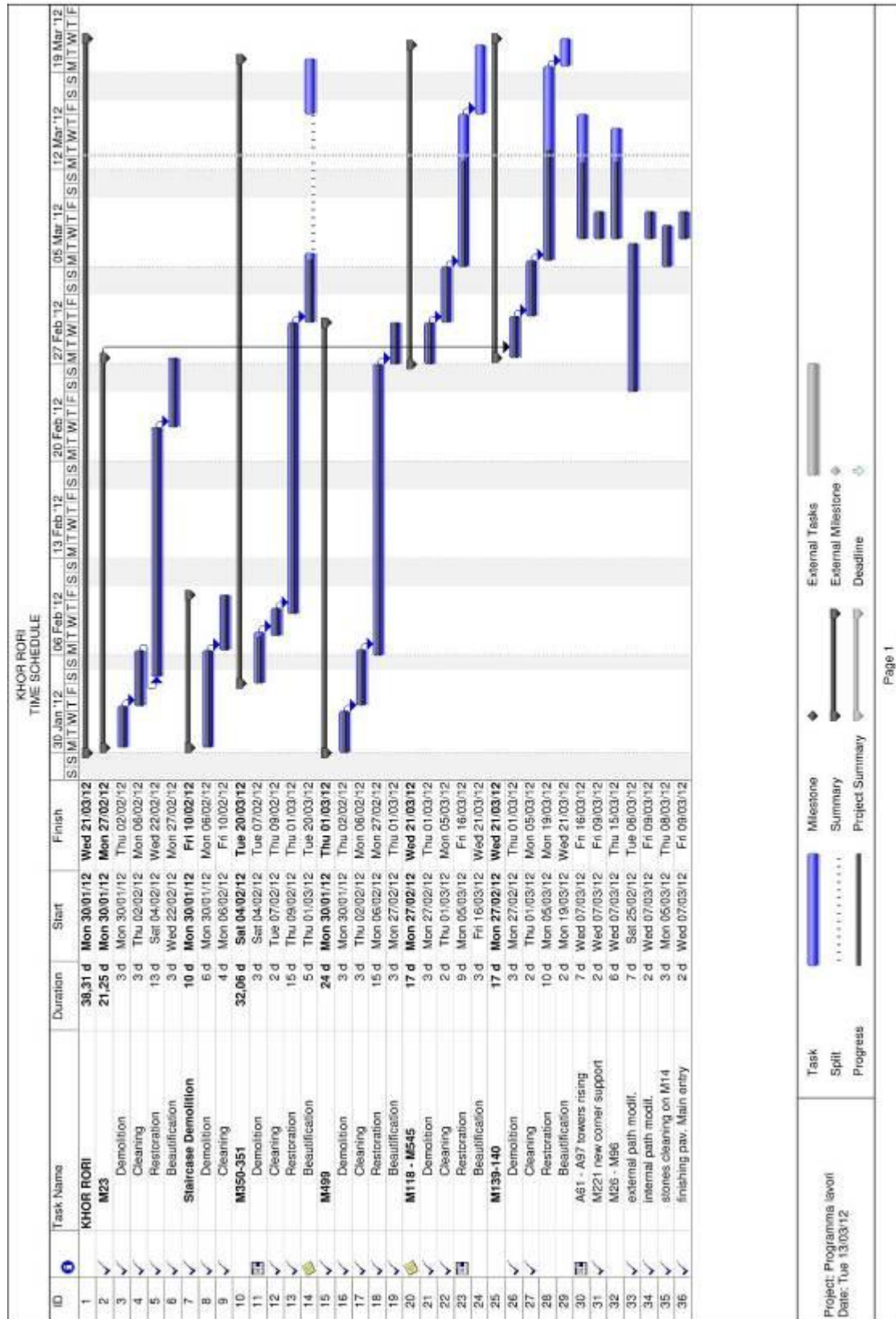


before and after restoration



Time Schedule on 13th March 2012

As shown we are still on time and we think to be able to complete all the works.





Modification of the internal path close to wall M499



during and after the works



Restoration of the two towers A61 and A97 beside the main entry

On 7th March 2012, the restoration of the two towers A61 and A97, the first on right side and the second on the left side of the main entry of the city, had taken in place. We started with the A61 tower but, due to the bad condition of the foot stones (the stones on the runs beneath 70cm. from the ground), we decided to rise the tower with two runs instead of four runs as we were asked.

We verified the stability using a safety factor not more than 6kg/sqcm as follows:

- a) actually the high of the tower is 2,7m. (2 meters over the bad stones). The load per square centimetre is 4,4kg/sqcm.
- b) we supposed to increase the high of the tower with 60 centimeters and therefore the load per square centimetre will be 5,72kg/sqcm.
- c) With four runs the final high of the tower will be 3,9m. (3,2 meters over the bad stones). In this case the load per square centimetre will be 7,04kg/sqcm.

photos at the tower A61 and A97 - up to 2nd March 2012



A61 tower



A97 tower

Sequence of photos at the tower A61 - up to 7th March 2012



Sequence of photos at the tower A61 - up to 15th March 2012



This work has been completed on Thursday, 20th March 2012.

Sequence of photos at the tower A97 - up to 20th March 2012



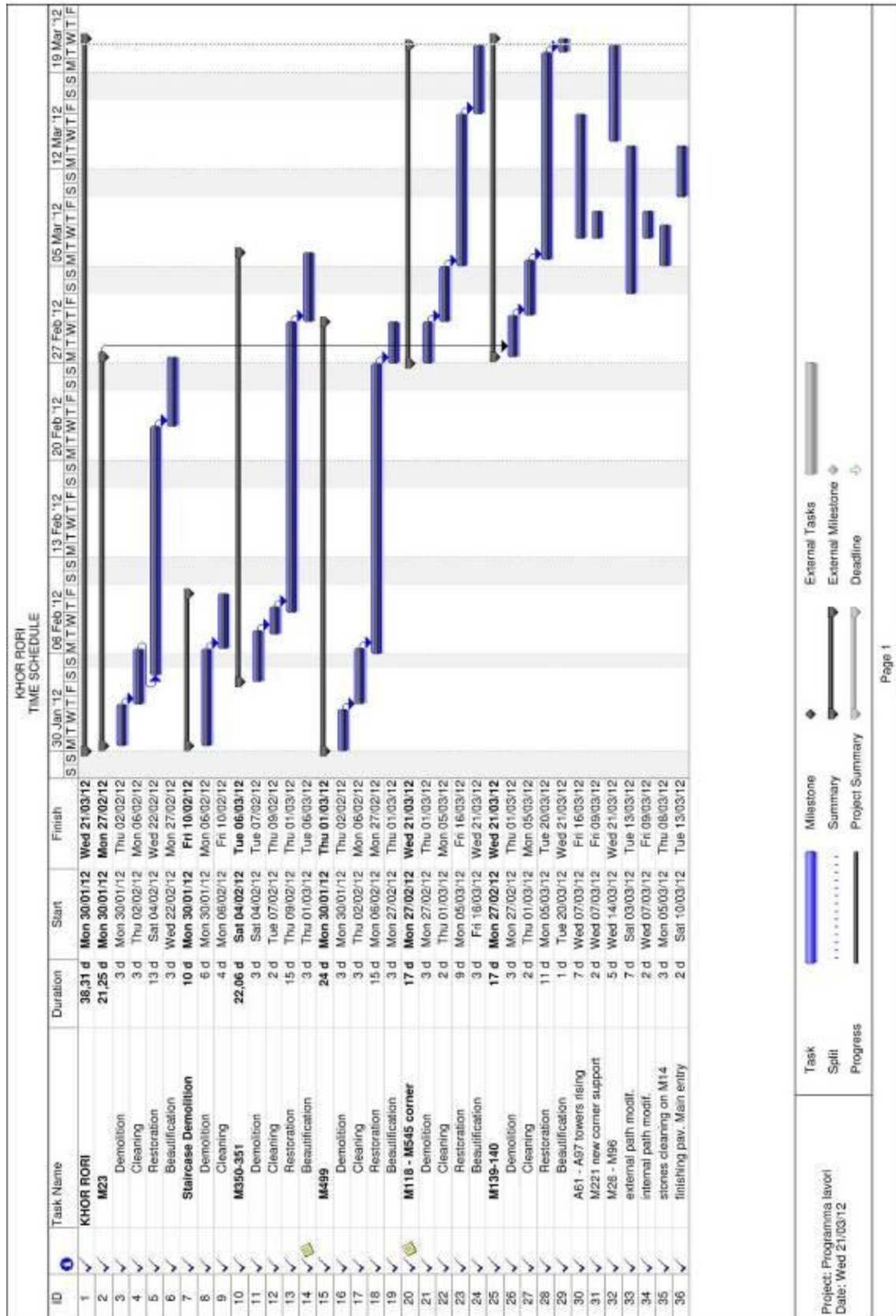
This work has been completed on Thursday, 22nd March 2012.

Modification of the path close to the Monumental Building



In spite of the strong wind that occurred during this campaign, as above indicated, and the sand storm occurred during the last three days, from 19th to 21st March 2012, we can say that we had the chance to finish every asked work as you can see on the pictures sequences of this final report and reading the following time schedule.

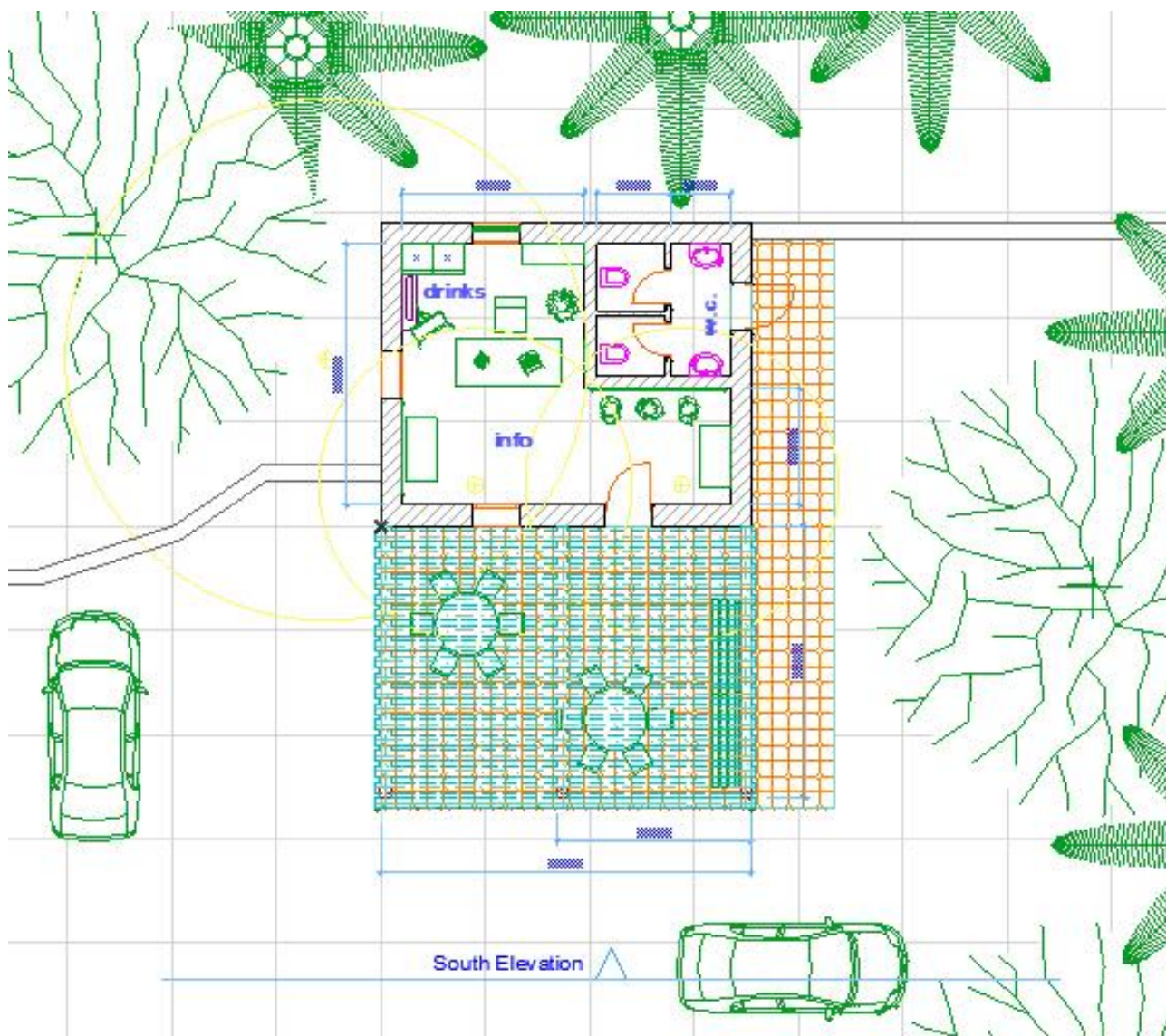
Time Schedule on 22nd March 2012 - complete





Feasibility Study for a new use of the entry box

Plan



Front View



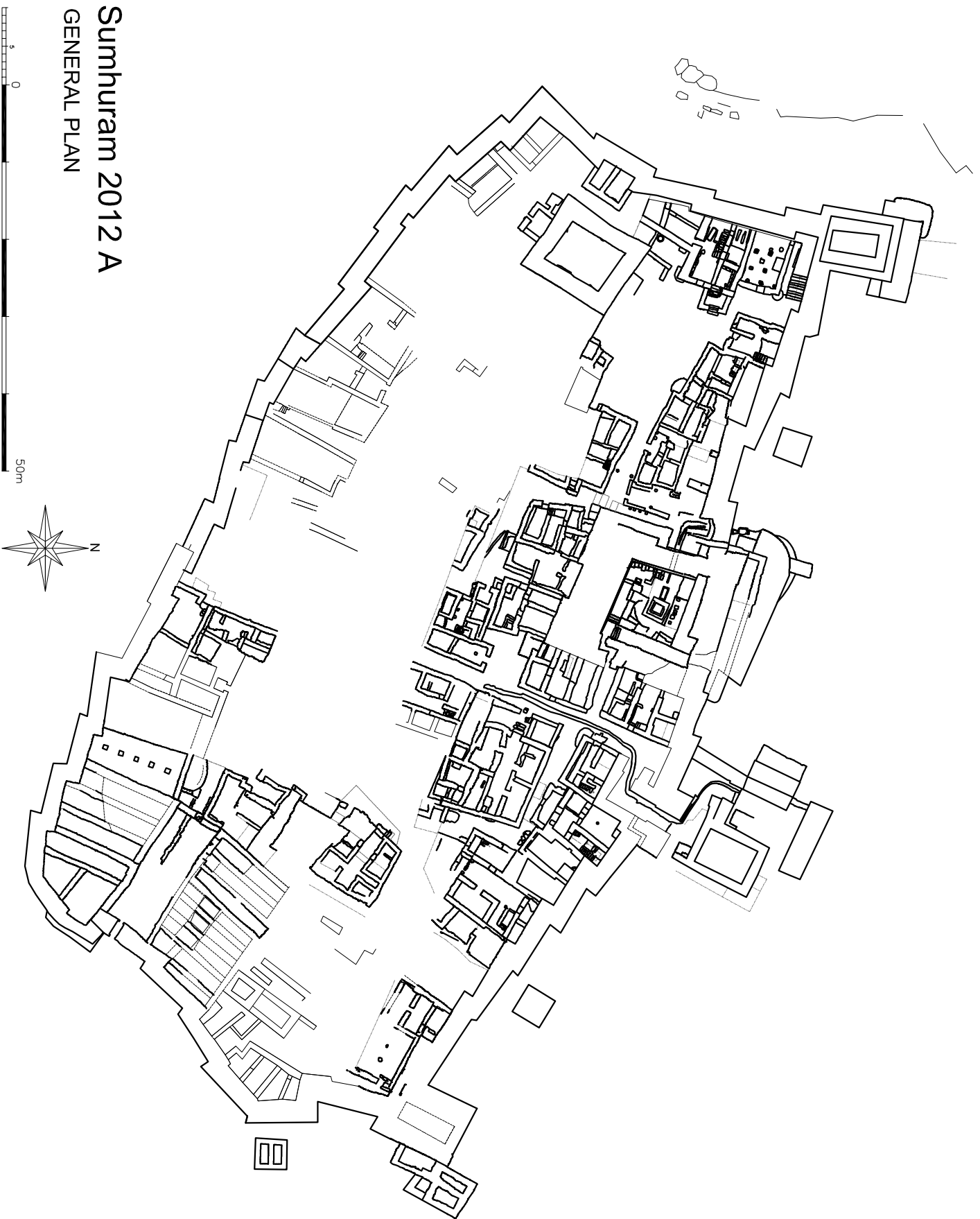
Internal View



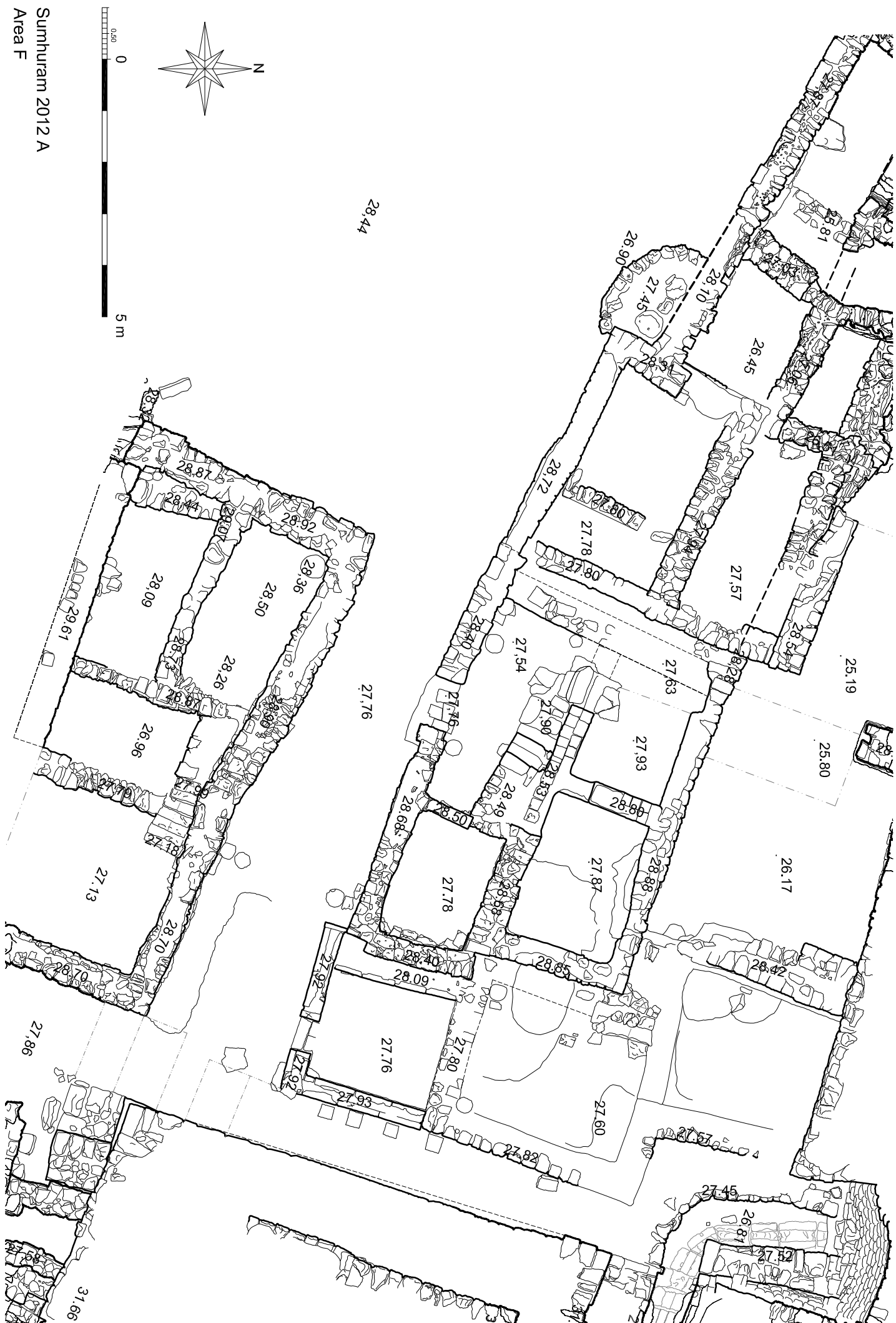
Proposal for the new path finishing at southern wall



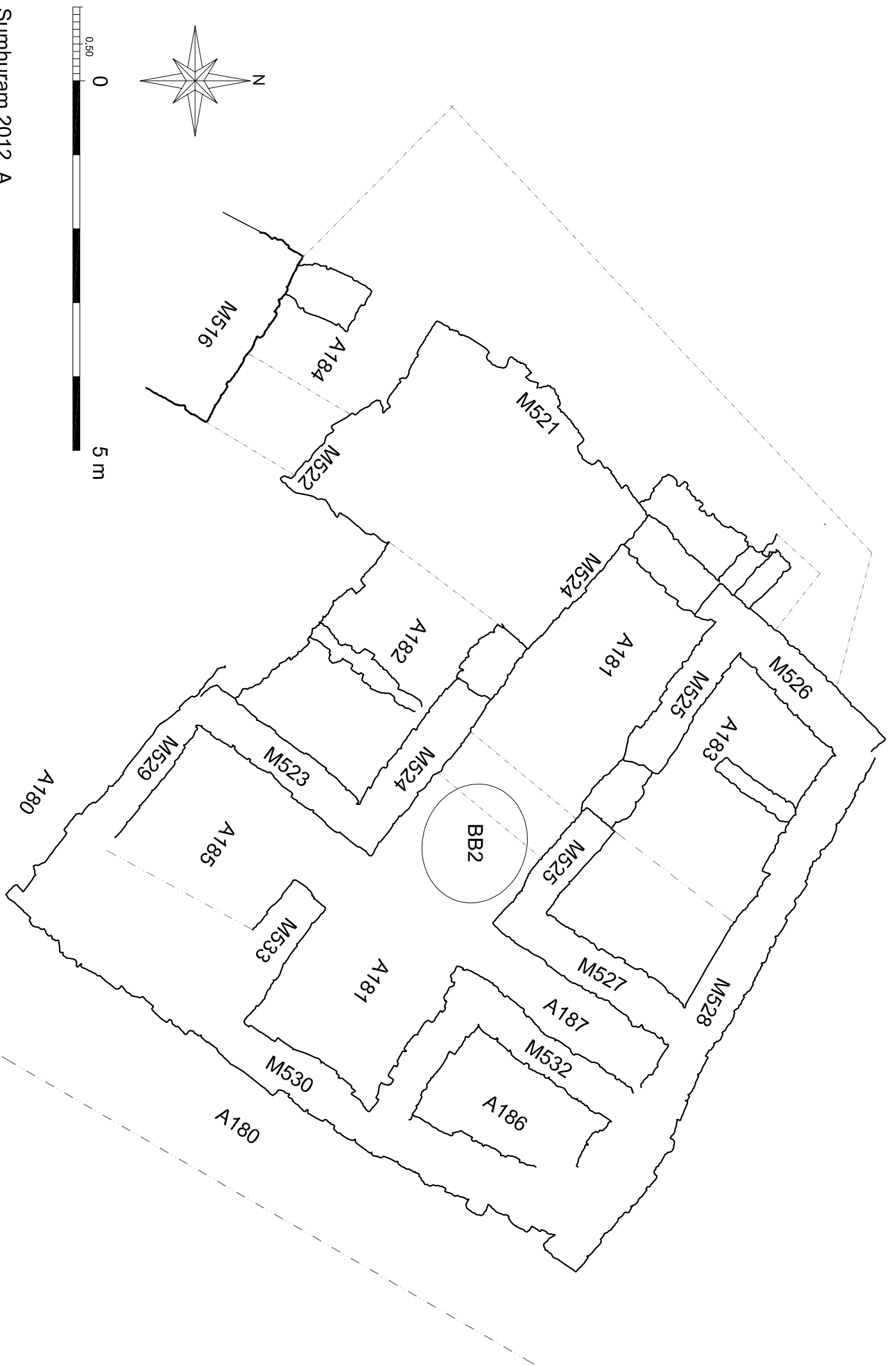
2. Topographic Survey



Sumhuram 2012 A
GENERAL PLAN



Sumthuram 2012 A
Area F



M521

M522

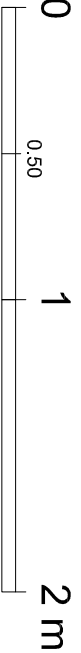
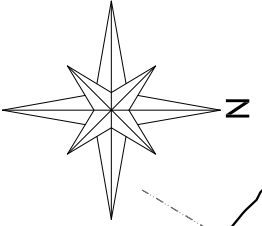
A182

M524

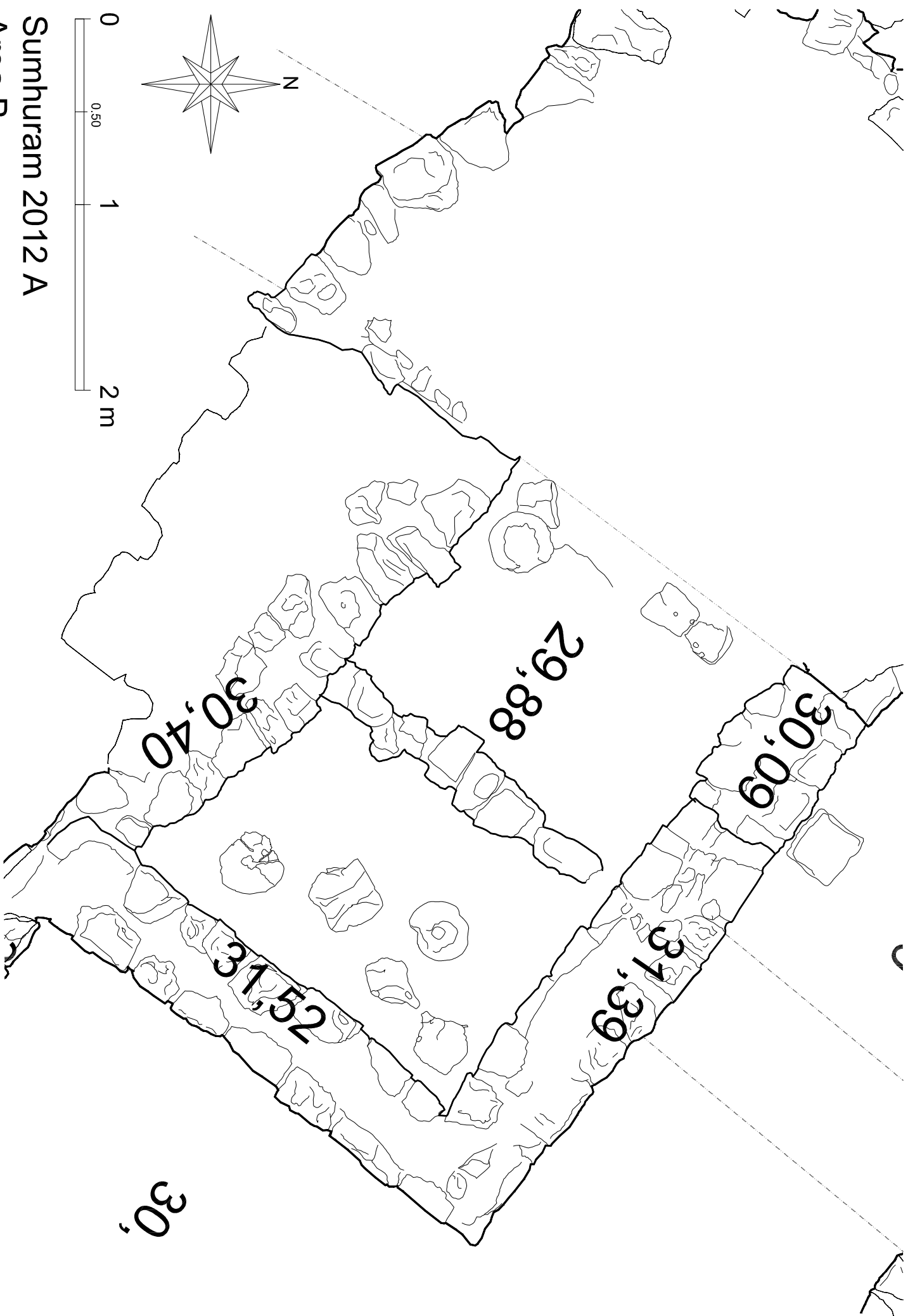
M523

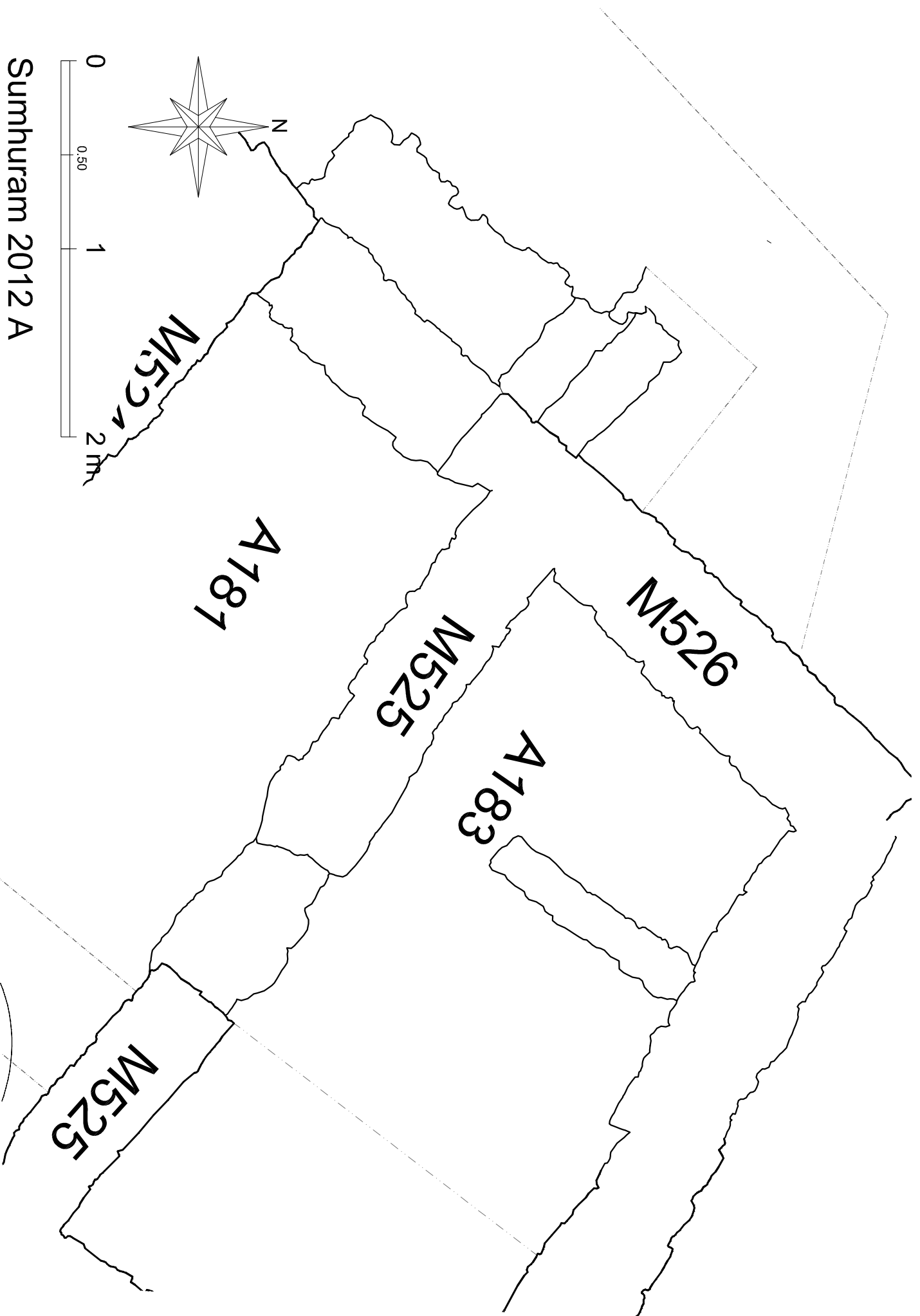
BB2

A185

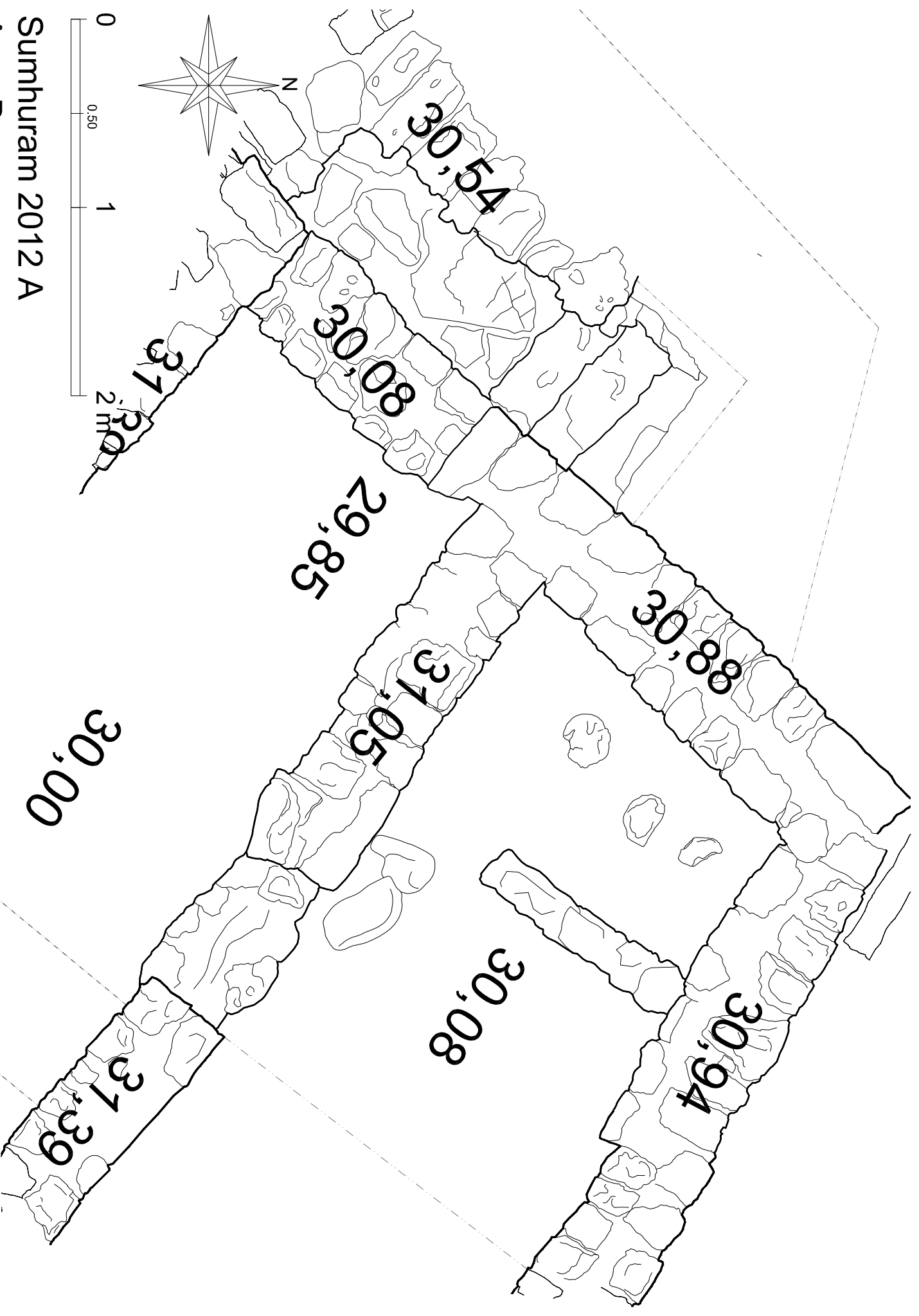


Sumhuram 2012 A
Area B

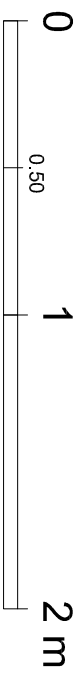
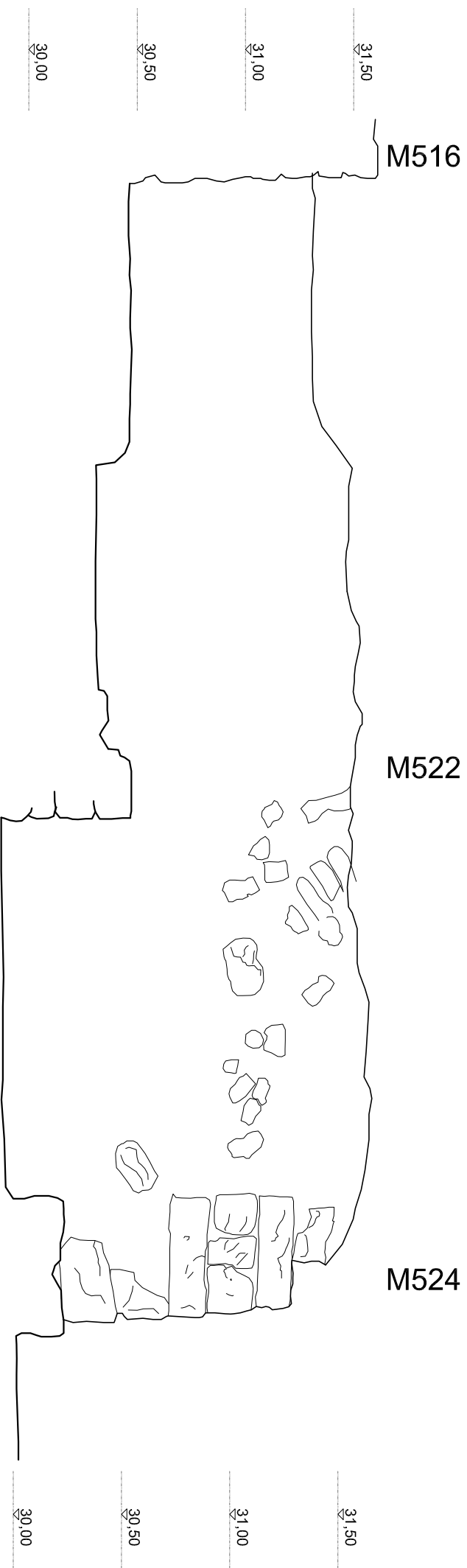




Sumhuram 2012 A
Area B



Sumhuram 2012 A
Area B



Sumhuram 2012 A
Area B
section in A182



Sumhuram 2012 A
Area B
section in A183, A181

3. Preliminary survey of the site of Khor Mughsail



IMTO, 1st March 2012

On 1st March 2012 a preliminary survey of Khor Mughsail has been done by IMTO.

The goal was to check the state of preservation of the ancient masonry structures already recorded by F.P. Albright in *The American Archaeological Expedition in Dhofar, Oman, 1952-1953*, Washington 1982 (fig. 1).

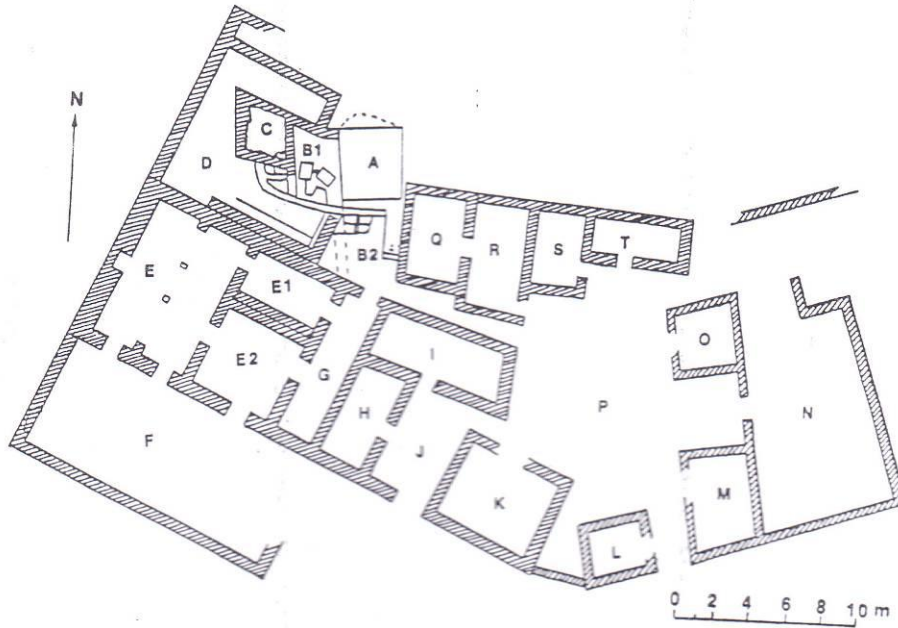


Fig. 1, Map of the settlement of Khor Mughsail (Albright 1982: 42)

Khor Mughsail is placed at the estuary of the wadi Farhit, about 50 km south-west from Salalah. The current geographical conformation suggests the existence of a previous ancient harbour, currently almost completely silted up.

The occupied site is placed 500 m westward from the khor, on the top of a rocky outcrop, slightly emerging from the surrounding soil (fig. 2).



Fig. 2, General view of the ruins

Remains of ancient buildings are visible for a length of about 50 meters but traces of occupation are visible also around the main settlement.

An imposing well (A in the map), a mosque (E), an area devoted to the ablutions (B1 and B2) and other buildings (G-O and Q-T) constructed around an open space (P) are still visible on the site.

Currently, the most interesting feature is the well (fig. 3), measuring 2x3 m. and cut into the bedrock, linked with an area devoted to the ablutions made from stone basins (general dimensions: 1x0,50) (fig. 4). The well, with its noticeable size, was supposed to provide water for all the inhabitants of the village.



Fig. 3, The well



Fig. 4, The stone basins used for ablutions

The tanks were connected with the mosque, placed in strict connection with the well. The three basins were linked and water passes from one to the others through a series of holes and drainage features. It could not be excluded (Albright 1982: 79) that the tanks belonged originally to an ablution area connected with a pre-Islamic structure, a kind of open-air templar area.

Structure C, with an original lozenge-shape, has been interpreted as a platform or a tower.

The mosque measures about 10x13 m and is made from three rooms. The *mihrab* is in the centre of the western wall and pillars are placed in the centre of the short walls.

Different buildings made from rooms of variable size (H-O) are clearly recognizable east from the mosque, also if their specific function could not be clarified.

Among them, some rooms of considerable dimensions to be interpreted as bins (fig. 5).



Fig. 5, Room interpreted as bin

The general lay-out of the ruins suggest the interpretation of the site as a village for fishermen. The dimensions of the Khor fit with an harbour for boats of medium-small size.

The masonry is made by sandstone blocks of regular size, and the floors are made from packed-earth. Traces of re-building operations are clearly recognizable in the masonry structures, suggesting the existence of different chronological phases.

The upper existing parts show a masonry made from rather longer and rectangular blocks, the lower, instead, a masonry made by almost squared blocks.

What could be seen today seems “late”, but, already according to Albright (1982: 77), “the earlier walls.. indicates *earlier and certainly pre-Islamic* buildings”.

The surrounding of the site reveal traces of occupation as well.

Some boat-shaped graves are visible eastern ward from the settlement (fig. 6).



Fig. 6, Boat-shaped grave on the east of the site.

Moreover at least two breakwaters (figs. 7,8) are visible northern from the main settlement, confirming the existence of agricultural practises in the area.



Figs. 7-8, Breakwaters north from the site.

No small finds have been individuated during the preliminary survey, except some flints and splinters of flints.

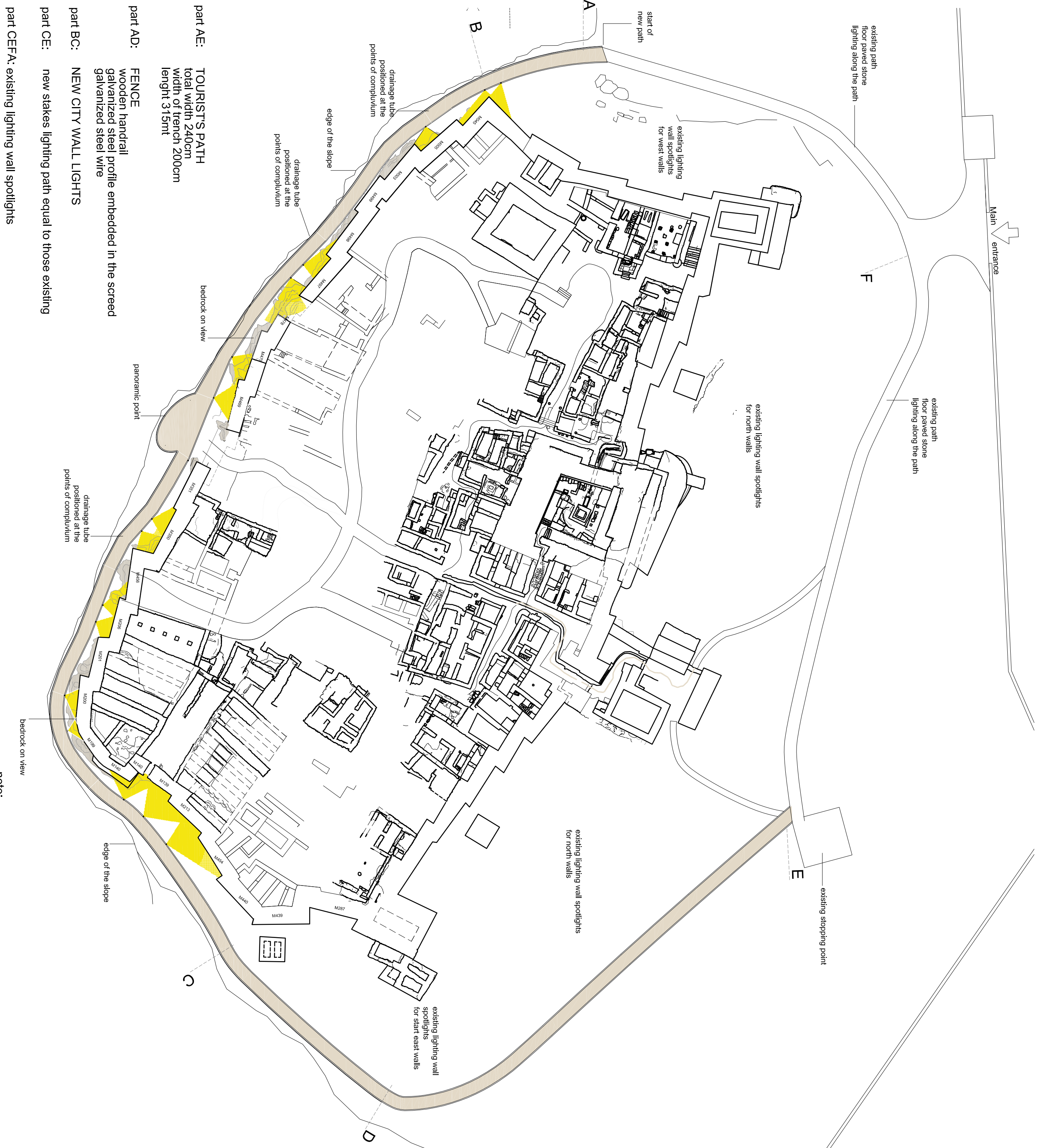
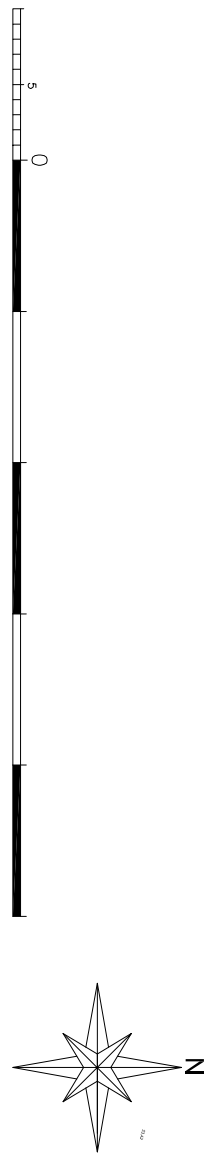
However, a quantity of pottery shards are visible, scattered along all the surface of the site. Most of the collected shards seem to be local (shelly-temper ware) and do not give indications about the dating and could be Islamic or pre-Islamic. Glazed pottery and possible “Bahla” ware are, instead, element confirming a later occupation of the site.

A pre-Islamic phase is to be considered and deeply investigated, as already pointed out by Albright and confirmed by the different and visible constructional phases.

Despite the interest of the ruins, the general state of the site appears rather spoiled, with garbage pits and numerous collapses.

To avoid further damages and for a better conservation of the ruins prior to eventual archaeological researches, a protection of the site, at least with a fence, is strongly suggested.

4. Project of the external path (southern side)



CITY WALL LIGHTS type BEGA 8702

Were chosen the lighting to be installed due to the conformation of the site.
On the south side the path is very close to the city wall stone, (no space between wall and embankment) This prevents to position of the lighting at a distance high as has been done on the other side of the town as it is more clear on drawing.
It was decided to locate the light in A position, between two stone, if we locate the lights on the other side of the path the shadow of the stakes will be on the wall.
In-ground floodlight with wide beam asymmetrical light distribution, particularly suitable for floodlighting the walls.
The color of the cover cast bronze is part of goods between the stones

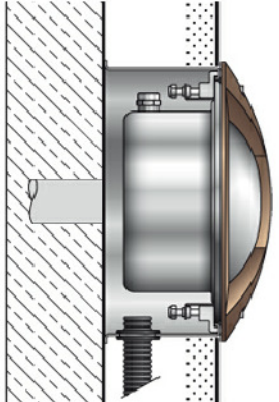
TECHNICAL DATA

Luminaires for illuminating vertical surfaces
Pressure load: 4000 kg
Material: Cast bronze steel
Installation housing: Stainless steel
Protection class: IP 67
Installation depth: 120 - 160 mm

average illuminance on facade 32LUX

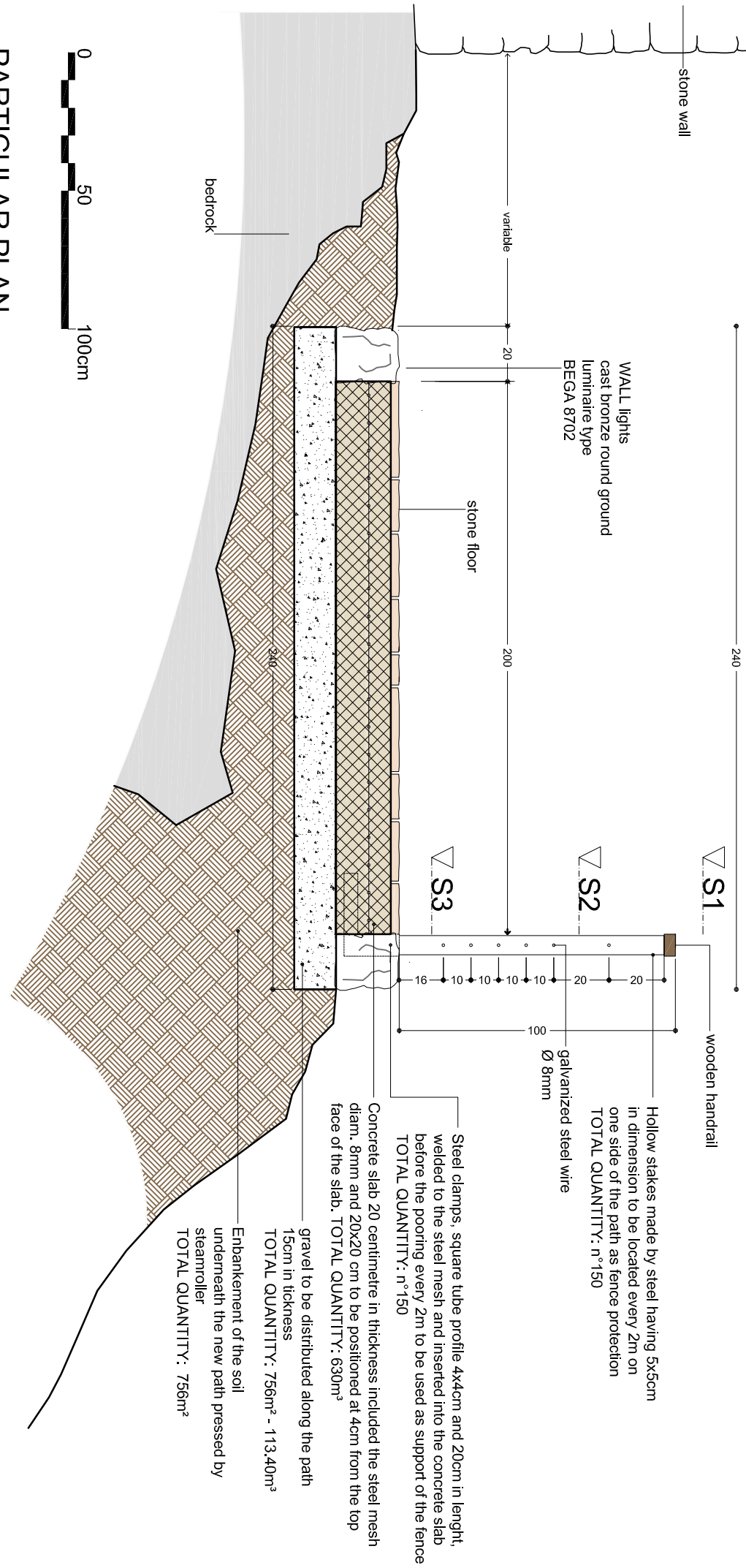
Low voltage tungsten halogen lamps, 600 lumen

IMAGE

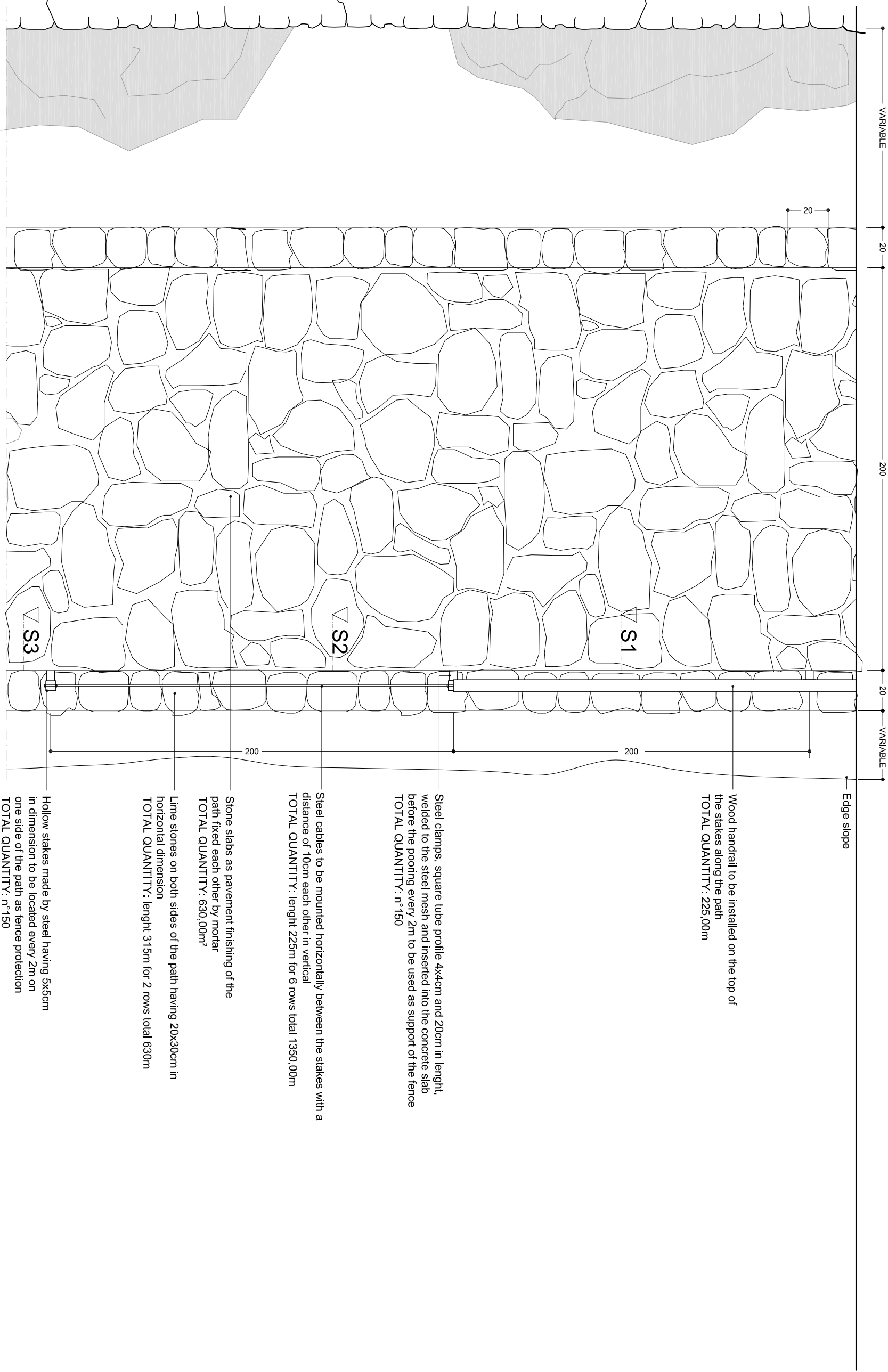


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SECTION TYPE



PARTICULAR PLAN



VIEW

